

6,500 WOODWORKING PROJECTS

Woodworking Shop Safety

10 Safety Tips to Post in Your Shop

- 1) **Think Before You Cut** – The most powerful tool in your shop is your brain, use it. Thinking your cuts and movements through before acting can help save both fingers and scrapwood.
- 2) **Keep a Clean Shop** – A cluttered shop is an accident waiting to happen. Keeping your shop clean will help protect you, and your tools, from tripping hazards.
- 3) **Avoid Distractions** – Pay attention to your actions. Looking up to watch the shop TV or visitor can result in your hand contacting the blade. Always wait until you have completed your cut before you take your eyes off the blade.
- 4) **Don't Rush** – Keep in mind that this is just a hobby and take a break when you feel rushed or frustrated with a project. Mistakes happen when we rush to complete a job.
- 5) **Don't Force It** – If your saw is resisting the cut, stop and see what's wrong. A misaligned rip fence or improperly seated throat plate can sometimes cause a board to get stuck in mid cut. Forcing the board in these situations may cause kickback or contact with the blade. Take a moment to evaluate the situation and determine the problem.
- 6) **Protect Yourself** – Wearing the proper shop protection is an important part of safe tool operation. Goggles, Ear Protection, and Lung Protection should be used when operating tools. Use push sticks when working close to the blade and make sure the tool's safety features are in place.
- 7) **Let the Tool Stop** – Giving the power tool time to wind down after a cut is an often-overlooked safety mistake. Even without power, the spinning blade can still do a lot of damage.
- 8) **Fumes and Dust** – Solvent fumes and airborne dust can present health and explosion hazards. Care should be taken to ensure a supply of fresh air and use only explosion proof vent fans.
- 9) **Wear Appropriate Clothing** – Loose clothing or hair can get caught in power tools and cause severe injury.
- 10) **No Alcohol** – Too many woodworkers have been injured because Alcohol clouded their judgment. Avoid their mistakes and wait until after you're done in the shop.

DISCLAIMER OF WARRANTY

THE MATERIALS CONTAINED ON THE CD ARE PROVIDED "AS IS" WITHOUT WARRANTIES OF ANY KIND EITHER EXPRESS OR IMPLIED. WE ASSUME NO LIABILITY OR RESPONSIBILITY FOR ANY ERRORS OR OMISSIONS IN THE CONTENT OF THE CD; ANY FAILURES, DELAYS, OR INTERRUPTIONS IN THE DELIVERY OF ANY CONTENT CONTAINED ON THE CD; ANY LOSSES OR DAMAGES ARISING FROM THE USE OF THE CONTENT PROVIDED ON THE CD; OR ANY CONDUCT BY USERS OF THE CD. TO THE FULLEST EXTENT POSSIBLE PURSUANT TO APPLICABLE LAW, ACTUSLINK DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OR OTHER VIOLATIONS OF RIGHTS.

LIMITATION OF LIABILITY

UNDER NO CIRCUMSTANCES, INCLUDING, BUT NOT LIMITED TO, NEGLIGENCE, SHALL ACTUSLINK, ITS OFFICERS, DIRECTORS, OR EMPLOYEES BE LIABLE (JOINTLY OR SEVERALLY) FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE, DATA, OR PROFIT, ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR THE INABILITY TO USE THE MATERIALS ON THE CD, EVEN IF ACTUSLINK OR A ACTUSLINK' REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. IF ANY APPLICABLE AUTHORITY HOLDS ANY PORTION OF THIS SECTION TO BE UNENFORCEABLE, THEN LIABILITY WILL BE LIMITED TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW.

1

CANDLEBOX



MAKING THE CANDLEBOX

This simple but attractive candlebox is distinguished by its sliding top. The lid has beveled edges tapering so they can slide in grooves cut into the inside faces of the box's sides and one end. A carved, inset pull adds a decorative touch as well as providing a means for easy sliding of the lid.

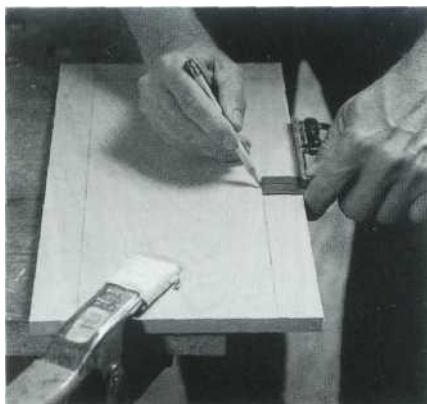
After the lumber is milled to the required thicknesses, widths and lengths, cut grooves to receive the top and bottom panels. Next, cut the through dovetails at each corner (this procedure is discussed in chapter twenty-five). Bevel the top and bottom panels and assemble the case around the bottom panel, which is left unglued so that it can expand and contract across its width in response to seasonal changes in humidity. Complete construction by fitting plugs into the openings left at each corner at the ends of the grooves.



The open top of the candlebox lid reveals the grooves the lid rides in.

HAND-PLANING THE BEVELS FOR THE CANDLEBOX LID

1 First, make layout lines to mark the limits of the bevel. Make one line around the edges of the lid $\frac{1}{2}$ " from the lid's bottom surface. Make a second line on the lid's top 1" from the outside edges. The bevel will connect these two lines.



2

Plane the bevel across the end grain first so that any tearout occurring at the end of the plane's stroke will be removed when the adjacent bevel is formed. Although a jack plane can be used to make this bevel, it may be necessary to finish with a block plane which, with its lower cutting angle, produces a cleaner surface across end grain.



SHAPING THE PULL



1

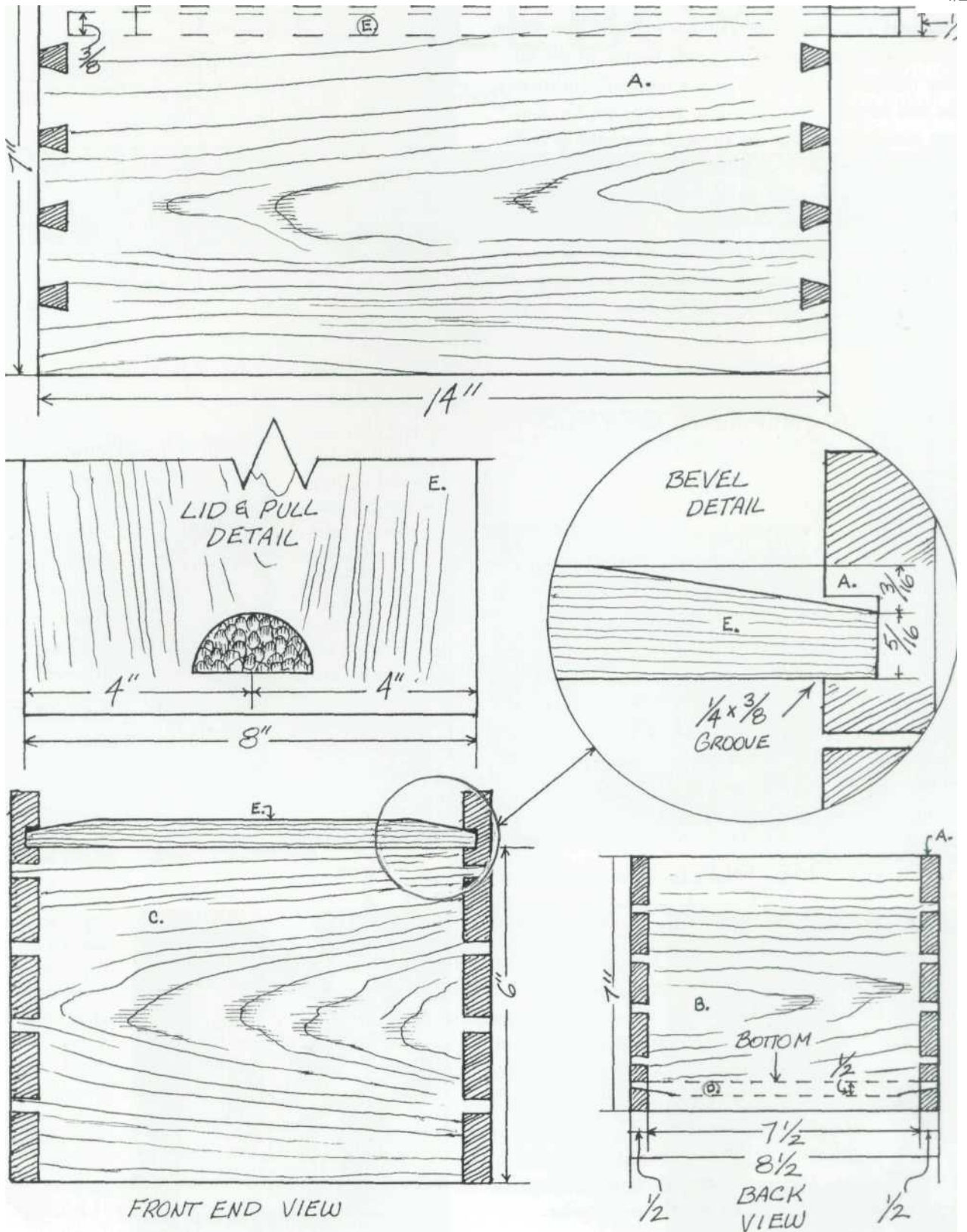
With a marking gauge or a sharp knife, make a line parallel to and 1" from the unbeveled end of the lid. Position the stationary leg of a compass on that line halfway across the width of the lid. Draw an arc with the compass's pencil point.



2 Placing the tip of a flat chisel in the scored line, cut along that line, angling toward the arc. Using a wide-sweep gouge, make cuts from the arc back toward the scored line. Carefully lever up chips.

SIDE VIEW

1/2



SHAPING THE PULL (CONTINUED)



3 Once the depression has been formed, you can give the pull a smooth surface, or, as I've done here, you can give it a bit of texture.

MATERIALS LIST

A	Side	2 pcs.	1/2X7X14
B	End	1pc.	1/2X7X8 1/2
C	End	1pc.	1/2X6X8 1/2
D	Bottom	1pc.	1/2X8X13 1/2
E	Top	1pc.	1/2X8X13 3/4
F	Plug	6 pcs.	1/4 X3/8 X1/4, shaved to fit

**These are net measurements, Surplus should be added to dove-tailed parts to allow them to be sanded flush.*

SAM MALOOF'S TWO-STAGE FINISH

Fifteen years ago, *Fine Woodworking* (issue no. 25) ran a profile of Sam Maloof, the California woodworker best known for his magnificent rocking chairs. Included in the article was a sidebar in which Maloof discussed several technical issues, closing with the recipe for his finishing mix.

My dad—who designed and built several of the pieces displayed in this book, including the crotch-grained chess table—began experimenting with Maloof's finish and found it wonderfully adapted to the small shop. After years of spraying lacquer, a toxic experience inevitably preceded by the emotionally toxic experience of attempting to vacuum every particle of dust from every shop surface, he found in Maloof's formula a finish that not only produced a very appealing surface but also, just as importantly, was impervious to dust contamination.

Preparation is no different for this finish than it would be for any other. Scrape the wood, then sand it with a variety of grits, finishing with a thorough sanding using paper no coarser than 220-grit. Then wipe the wood clean with a tack rag.

Maloof's recipe calls for equal parts mineral spirits, boiled linseed oil, and polyurethane varnish (an extra dollop of varnish seems to add body to the dried film).

Brush on this mixture liberally with only minimal concern for drips and runs—coverage is the focus at this stage. Allow the finish to set until it gets a bit tacky. Depending on temperature and relative humidity, this

could be anywhere from ten to sixty minutes.

Wipe the surface with clean rags to remove any excess that has failed to penetrate into the wood.

As the finish dries, it lifts wood fibers and hardens them producing a rough texture. (This first coat acts as a sanding sealer.) Again, depending on temperature and relative humidity, this could take anywhere from one to three days. In humid Ohio, I've found it best to wait three days before sanding that first coat. Otherwise, areas of raised, roughened grain may not make their appearance until after the last coat has dried.

I use 320-grit wet/dry paper soaked in mineral spirits to cut away the raised grain. The thinner clots the removed material into a slurry which may help to smooth the surface; however, my reason for dunking the paper in mineral spirits is to unload the grit in order to get more mileage out of each piece of sandpaper.

Once you have sanded and thoroughly cleaned the surface with a tack rag, apply a second coat of the three-part mixture. It is particularly important that this coat (and any subsequent coats) be wiped clean. Any residue remaining on the surface will dry there and leave a roughened area.

Sam Maloof tops this finish with a layer or two of boiled linseed oil into which he's mixed enough shaved beeswax to achieve the consistency of cream. He applies the wax, allows it to dry, then buffs it out. You can achieve similar effects with a number of commercially prepared waxes.

2

BENTWOOD BOXES WITH TURNED AND CARVED LIDS

Walnut, Curly Maple, Cherry



MAKING THE BENTWOOD BOXES

First, make a bending form for the main body of the box. This can be fabricated from any scrap that can be glued together to make up a sufficient thickness. This is then band sawn and sanded to the inside profile of the finished box. Undercut the face of the bending form at one point to allow for the thickness of the lapped material underneath the box's glue joint. Screw a thin strip of metal (I used a scrap of aluminum siding) to the form underneath which an end of the sidewall material should be inserted prior to being wrapped around the form.

At this time, saw a clamping caul (see photos, below) with a slightly greater radius than the bending form from scrap material. This caul will protect the sidewall material from the clamps.

The next consideration is the sidewall material itself. There are three possibilities. First, the stock can be resawn, planed and sanded to a thickness of 1/16". Second, Constant-e's Hardware sells 1/16" veneer in cherry, walnut and mahogany, even though those thicknesses aren't listed in their most recent catalogs. Third, the sidewall material can be glued-up from two thicknesses of 1/32" veneer, which is

widely available in a variety of species. I would recommend using one of the new waterproof glues between the laminations, although I have built boxes using regular aliphatic resin glue to bond the thicknesses of veneer.

Then, soak the sidewall stock in a tub of cool water for twenty-four hours; dunk it briefly in warm water and take it directly to the bending form. Tuck one end of this softened, plasticized material under the metal strip on the bending form. Wrap the remaining length around the form and secure in place with clamps and the caul.

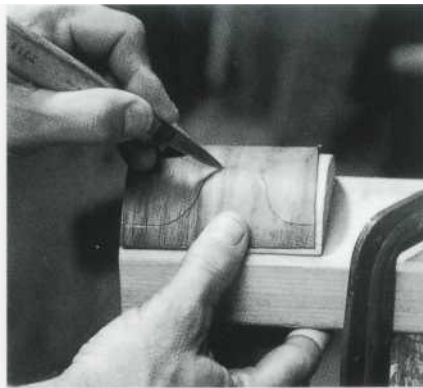
Four or five days later, remove the sidewall material from the form and cut the profile of the lap joint. A bench extension to which is nailed a piece of scrap sawn to the inside radius of the box simplifies the cutting of the joint.

Then, glue the lap, wrap the sidewall material around the form once again and clamp with the aid of the caul. This time, however, do not insert the end of the sidewall material under the form's metal strip. After being turned, attached the box's bottom to the sidewalls with four 1/8" wooden pegs driven into predrilled holes.

CUTTING THE LAP JOINTS

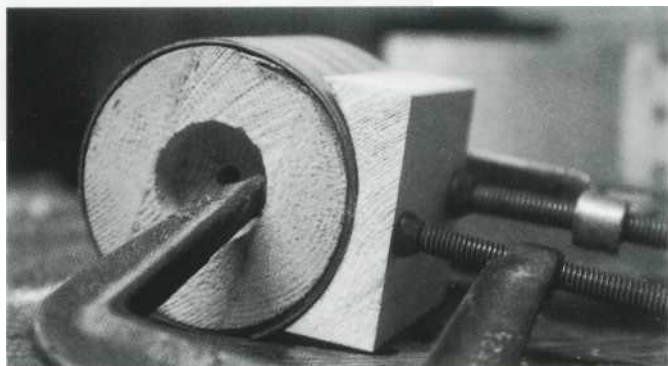


1 This is the bench extension used to maintain the curved form of the sidewall material during the cutting of the lap. The clamping caul is visible on the right.



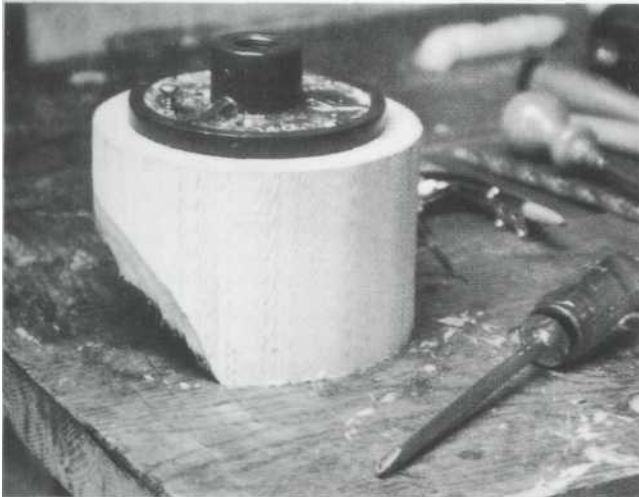
2

A lap joint is being cut on the bench extension.

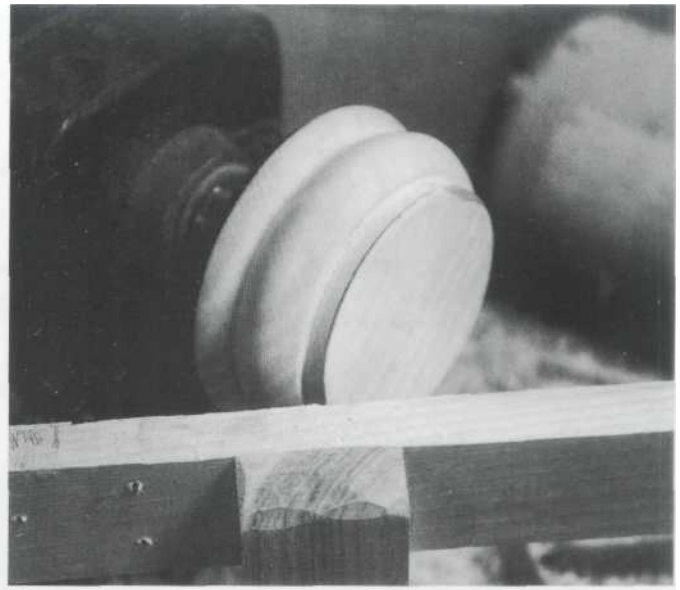


3 Here, the glued lap joint is being clamped with the aid of the caul. Notice that the end of the sidewall material is not positioned under the metal strip as it was during its initial clamping for shape.

TURNING THE LID AND THE BOTTOM

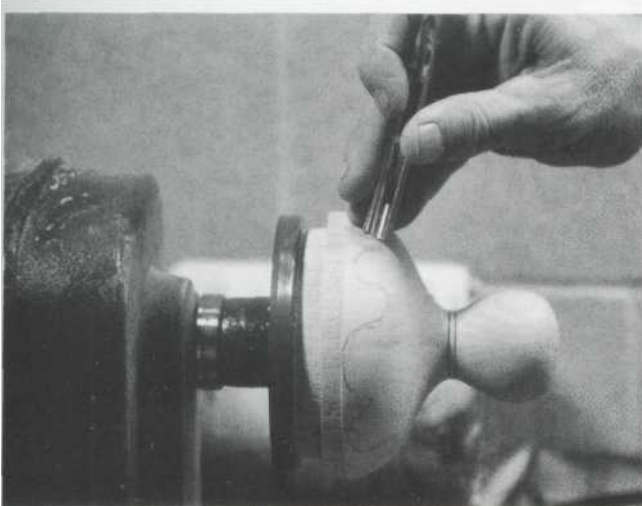


1 Screw a faceplate to a band-sawn turning blank with large sheet metal screws. Then, install it on the lathe.

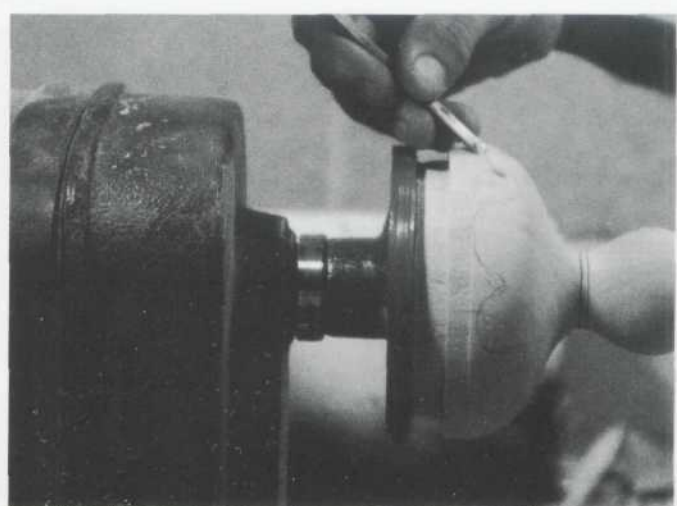


This is the same blank after being turned. Above the bead, notice the flange that will fit inside the box's sidewalls.

DECORATING THE SURFACES



1 Before removing the parts from the lathe, sketch pencil lines on the lid approximating the shapes to be created. Then with gouges of various sweeps, define those lines (shown above).



2 Remove material below the line (as shown above), and create the stippled texture by repeatedly tapping a nail set into the surface of the wood.

MATERIALS LIST

A	Form	1 pc.	3X3/2
B	Caul	1 pc.	1/2X3 1/2X3 1/2
C	Sidewall	1 pc.	1/16X3 1/2X15
D	Lid	1 pc.	variable
E	Bottom	1 pc.	variable
F	Pegs	4 pc.	1/8 X 1/8 X 1/2

3

CROTCH-GRAINED CHESS TABLE

Walnut, Poplar



MAKING THE CHESS TABLE

This piece is designed around a set of angles taken from the playing pieces, angles echoed in the fat dovetails holding the stretchers to the legs and to each other, in the big triangles cut from the apron parts, and in the compound angles used to bring the legs into the tabletop. The repetition of these angles—in addition to the consistent color of the walnut—unifies this piece.

Construction begins with the two sides (the faces of the table showing the wide sides of the legs). Fasten the apron parts to the legs with wide tenons glued only halfway across their widths in order to minimize the potential for cracking as these cross-grained constructions expand and contract in response to seasonal changes in humidity.

The creation of these joints is complicated by the compound angles at which the legs meet the tabletop. The tenon shoulders on the apron parts, for example, are cut at angles which are 83° from the top edges of these apron parts. The dovetailed ends of the stretcher are simpler to lay out, as these can be marked once the apron tenons have been dry-fit into their leg mortises.

Once dry-fit, glue and clamp these sub-assemblies—each of which consists of two legs, apron part, and stretcher.

On the table saw, give the center stretcher a dovetailed bottom that extends from end to end. Then fit this into dovetail mortises cut into the side stretchers. Surplus length is necessary on this stretcher so that the end grain can be pared back to the 83° angle at which the sides are canted. Then fasten the apron part opposite the drawer front to the legs on the back end of the table with a pair of 1/2"-long tenons. Again, in order to avoid cracking as a result of this cross-grained construction, glue the tenon only across half its width. Screw glue blocks into place behind this joint to reinforce these stubby tenons.

Resaw the drawer guide stock so that one face is canted at an 83° angle. Then, using a set of dado cutters on the table saw, plough a 1/2" X 5/8" groove down the center of the uncanted face of this stock. Cut the two drawer-guide pieces to length and install them on the inside faces of the apron sides.

The top is the next concern.

If woodworkers stay in the discipline long enough, they inevitably become wood collectors. My dad is no exception. Over the years he's put together a hoard of native hardwoods with an emphasis on black walnut, his personal favorite among American species. At the time this table was built, he had in his collection a number of short lengths of crotch-grained walnut he'd harvested several years before,

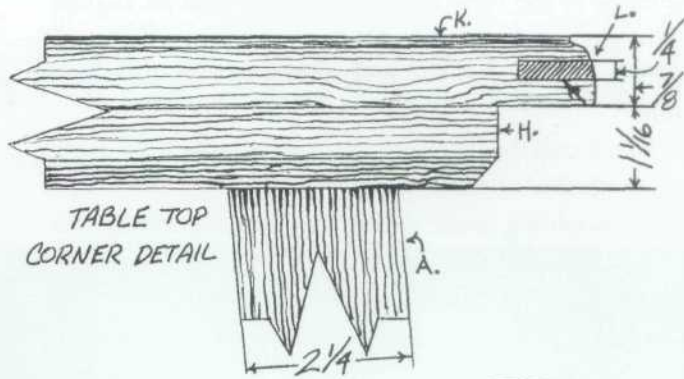
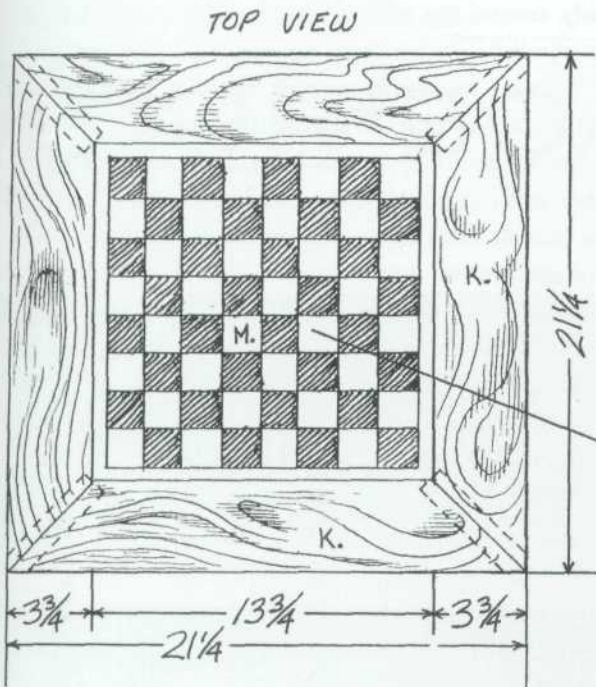
MATERIALS LIST

Table

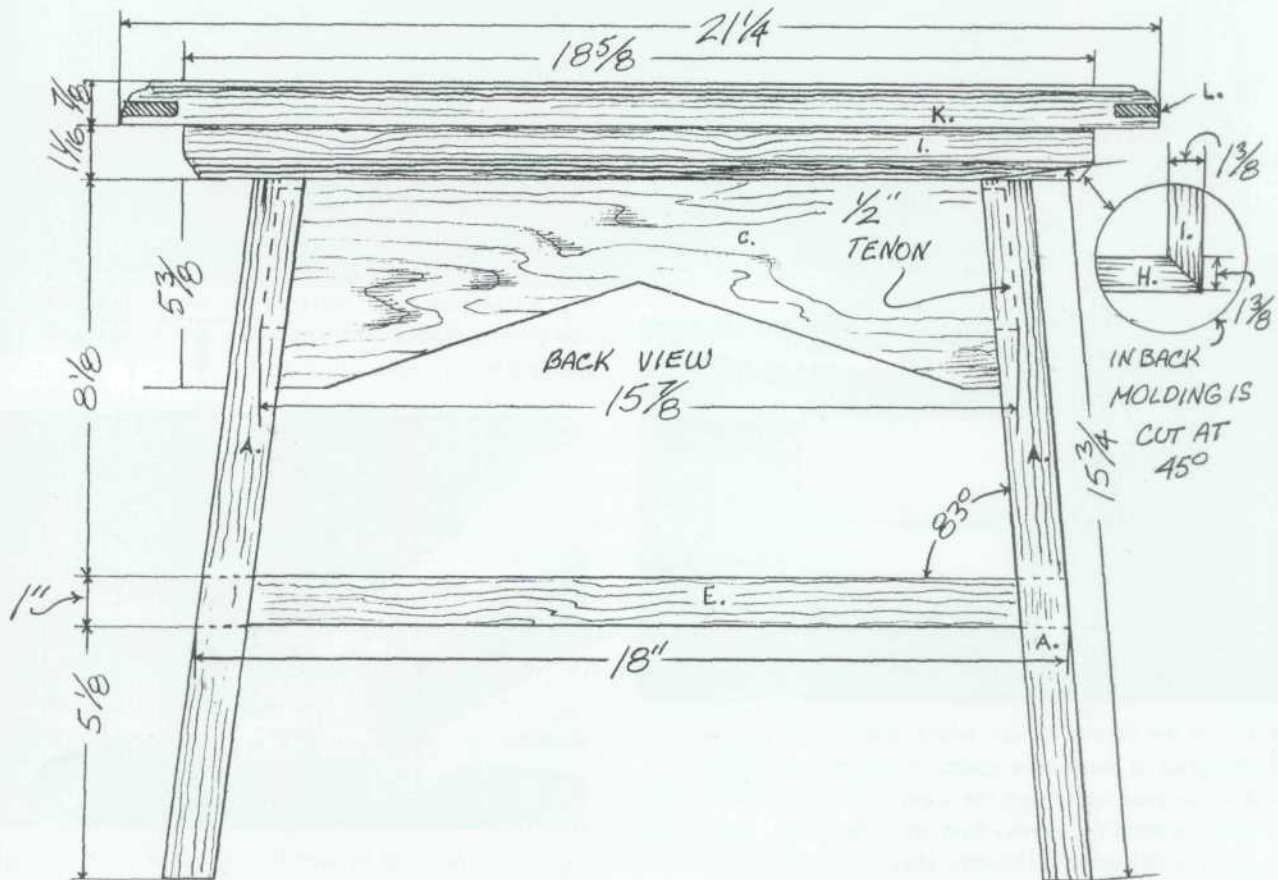
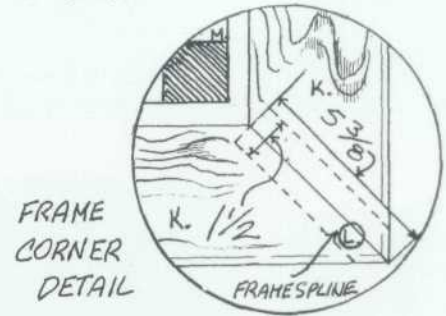
A	Leg	4 pcs.	1 × 2¼ × 15¾
B	Apron (sides)		1 × 5¾ × 14¼ (includes 1" tenons on each end)
C	Apron (end)	2 pcs.	1 × 5¾ × 15¾ (includes ½" tenons on each end)
D	Stretcher (sides)	1 pc.	1 × 1½ × 15 (includes dovetailed ends)
E	Stretcher (center)	2 pcs.	1 × 2¼ × 18 (includes surplus to be sanded flush)
F	Glue block	1 pc.	
G	Drawer guide	2 pcs.	7/8 × 7/8 × 5¼
H	Moulding (sides)	2 pcs.	7/8 × 3¼ × 13¾
I	Moulding (end)	2 pcs.	1½ × 1¾ × 17¼
J	Chessboard base	1 pc.	1½ × 1¾ × 18¾
K	Chessboard frame	1 pc.	¼ × 14¾ × 14¾
L	Frame spline	4 pcs.	7/8 × 3¼ × 21¼
M	Chessboard	4 pcs.	¼ × 1½ × 5¾
N	Drawer stop strip	1 pc.	½ × 13¾ × 13¾
O	Button	1 pc.	¾ × 1 × 14¾
P	Screws	4 pcs.	¼ × ¾
P	Screws	various	
Drawer			
Q	Front (apron)	1 pc.	1 × 5¾ × 14¼
R	Front spline	2 pcs.	¼ × ¾ × 5¾
S	Moulding	1 pc.	1½ × 1¾ × 18¾
T	Front shim	1 pc.	¾ × 3¾ × 12¾
U	Side	2 pcs.	¾ × 3¾ × 13¼
V	Back and front	2 pcs.	¾ × 3¾ × 11¾
W	Bottom	1 pc.	¼ × 12¼ × 12¼
X	Runner	2 pcs.	7/16 × 7/16 × 13¼
Y	Screws	various	

and he selected four of these for the top of this table because the swirling grain in the walnut echoed the swirling figure in the onyx frame of the chessboard.

Once you have chosen the stock for the chessboard frame, give it a shaped outside edge, and rabbet the bottom inside edge to receive the base on which the chessboard will set. Cut the slots for the splines. You can cut these by hand with a tenon saw, but I find it much easier to perform this operation on the table saw with a Universal Jig. (See



BOARD IS
13 1/16 SQUARE



chapter six for a photo of this jig in operation. Please note, however, that in order to cut the slots for the splines on the frame of the chess table, the work would be aligned so that the mitered end of the frame stock sets flat on the saw table). Thickness and cut splines, and assemble the frame.

Next, install the 1/4" chessboard base in its 1/4" X 1/2" rabbet with a number of small wood screws.

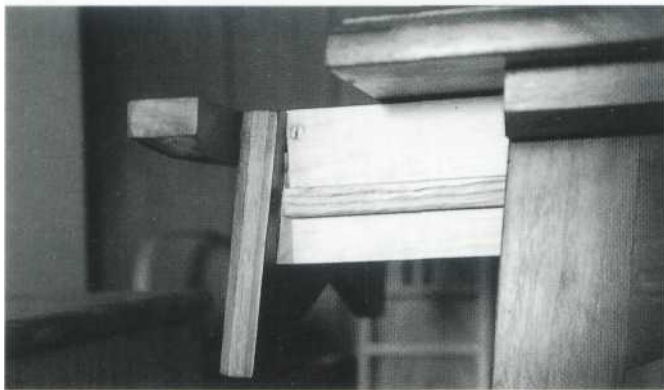
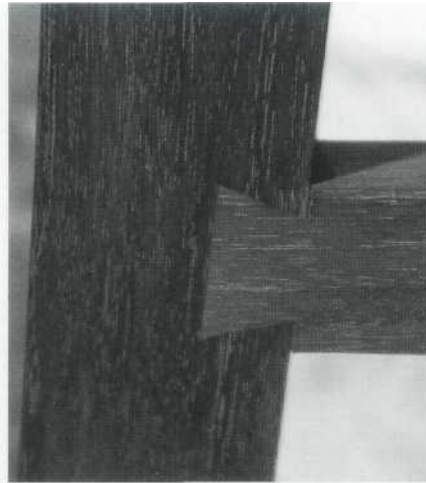
The moulding under the tabletop is not merely decorative—it's also functional, serving to fasten the top to the base via a number of wood screws passing up through the moulding into the top and passing through the apron into the moulding into the top and passing through the apron into the moulding.

The drawer is a simple open-topped, butt-jointed box, to the front end of which a section of the apron and the moulding are affixed so that when the drawer is closed,

both the apron and the moulding appear to run continuously around the table. Place a wedge of wood the full length of the drawer front, tapered from a bottom thickness of $\frac{5}{16}$ " to a top thickness of 0 between the drawer front and the apron that covers the drawer front. This shim causes the apron to be canted at the same 83° angle as the other sections of the apron. Slide the runners screwed to the outside faces of the drawer sides into the grooves ploughed in the drawer guides. Construct a drawer stop by screwing a strip of wood across the bottom of the drawer guides. When the drawer is opened to its greatest extension, a pair of screws turned slightly into the bottom edge of the drawer sides strike this strip, preventing the drawer from coming out too far and spilling its contents.

After finishing the table, set the chessboard into place on a felt pad.

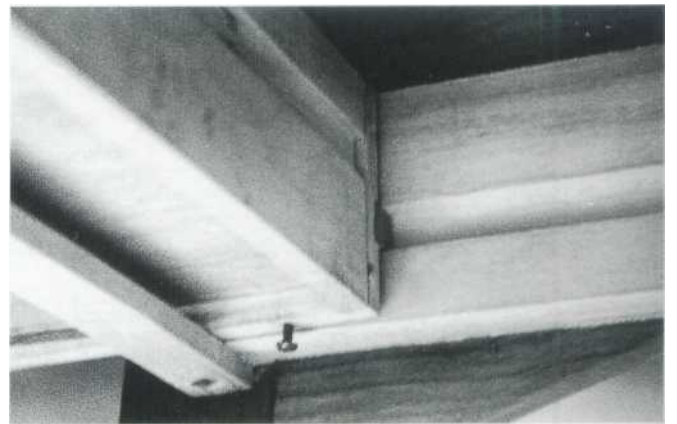
1 Fasten the stretcher to the leg with a hand-cut dovetail



3 Fasten the drawer runner, which slides in the groove ploughed in the drawer guides, to the drawer via several wood screws passing through the drawer side into the slide. Note the shim between the drawer front and the apron. This causes the apron to be canted at the same angle as the table's legs. Note also the spline set into the end grain of the apron. This prevents the corners of the apron from breaking off because of the grain runout on the apron's triangular tips.



2 Screws passing up through this moulding into the top and passing through the apron into the moulding hold the top to the base.



4 The drawer can be seen sliding in the groove ploughed in the drawer guide. When the screw turned into the bottom of the drawer side strikes the stop strip, the drawer is prevented from being pulled completely from the table.

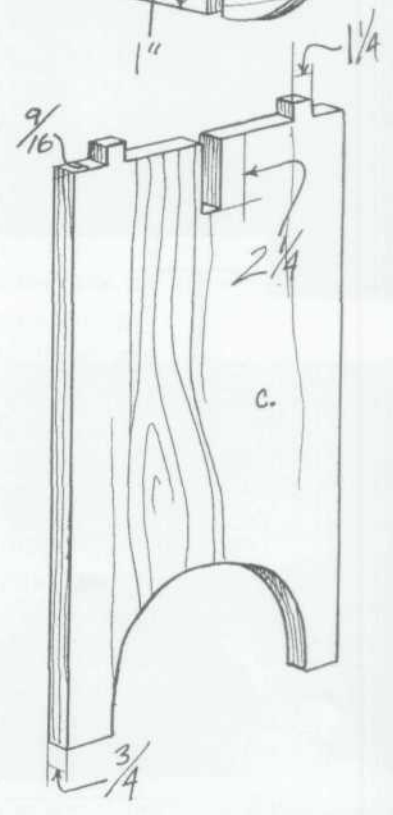
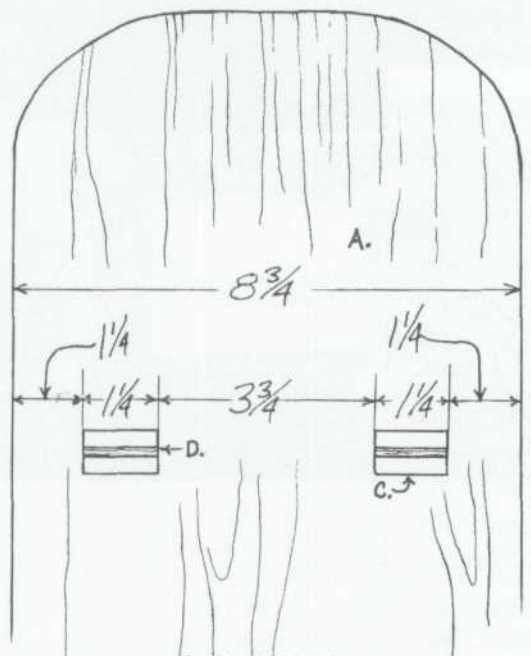
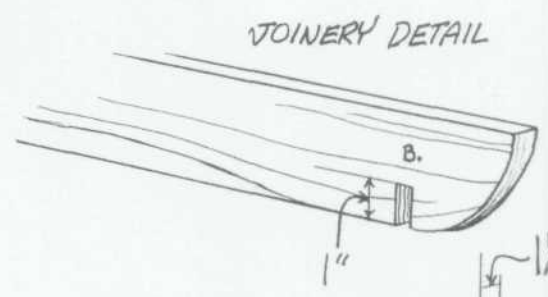
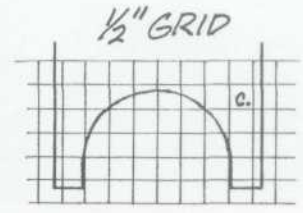
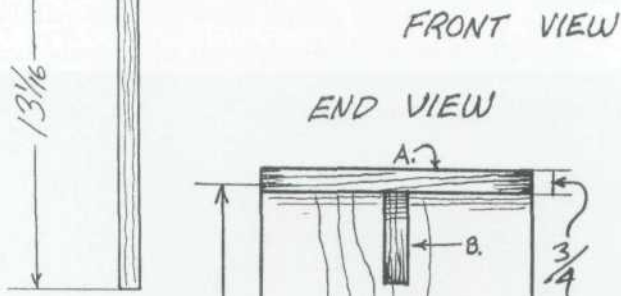
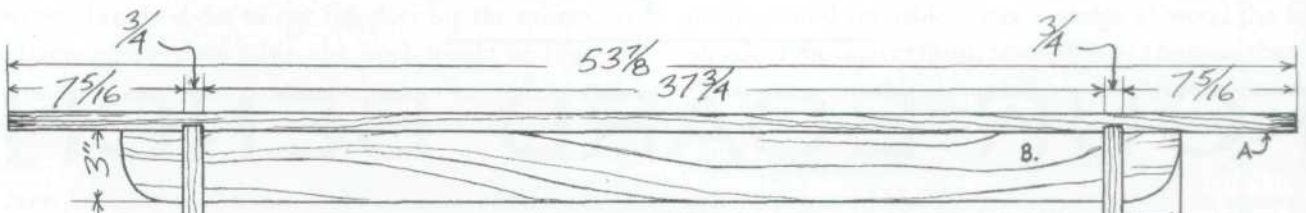
4

FOUR-BOARD BENCH

Hickory



The four-board bench, consisting of a top, two



MAKING THE FOUR-BOARD BENCH

After the material has been dimensioned, profile the rounded ends of the top, the half round ends on the stretcher, and the circle cutouts on the legs. This can be done on the band saw, but because of the length of the top, it is probably easier to cut this, at least, with a handheld jigsaw.

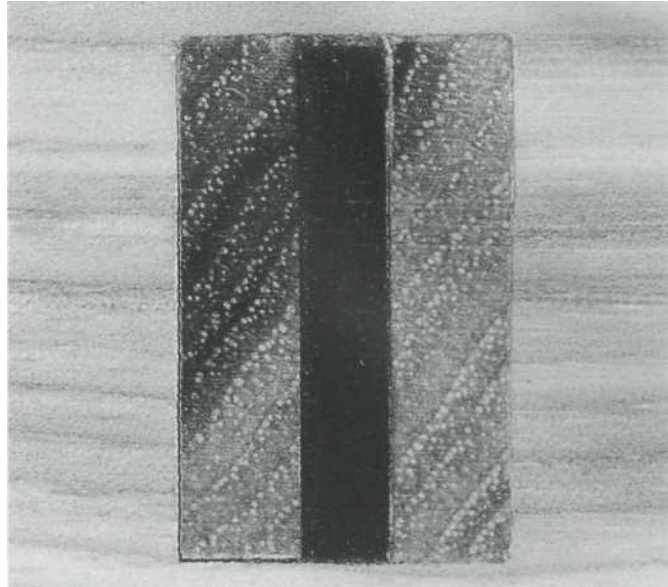
Next, using a cutoff box on the table saw (or crowded against the fence of the radial arm saw), form the dadoes on the underside of the top. Cut the through mortises cut using the method described in chapter twelve.

Then, on the band saw, cut the through tenons at the tops of the legs. Because of the 1/4"-deep dado, these need only be 9/16" long (1/2" for the tenon and 1/16" to be sanded flush). Then, fit them into their mortises.

Next, cut the edge cross lap joints that will fasten the stretcher to the legs. Two notches are required at each leg. Cut one, 2 1/4" deep, in the leg panel midway between the through tenons. Cut the other, 1" deep, into the bottom edge of the stretcher. The extra 1/4" in the total depth of the two notches is necessary because of the 1/4" dado on the underside of the bench top.

Then cut the notches in the ends of the through tenons using a fine-toothed backsaw. Drill a 1/8" hole from end to end at the base of each notch. This will prevent the tenon from splitting when the wedge is driven into the notch.

After the parts have been dry-fit, glue the joints and assemble the bench.



MATERIALS LIST

A	Top	1 pc.	$\frac{3}{4} \times 8\frac{3}{4} \times 53\frac{7}{8}$
B	Stretcher	1 pc.	$\frac{3}{4} \times 3 \times 44\frac{1}{4}$
C	Leg	2 pcs.	$\frac{3}{4} \times 8\frac{3}{4} \times 16\frac{5}{16}$
D	Wedge	4 pcs.	$\frac{3}{16} \times 1\frac{1}{8} \times \frac{3}{4}$

**These are net measurements. A surplus should be added to lengths of through tenons so that they can be sanded flush.*

5

TV RISER

Cherry



Friend asked me if I could make something that would

MAKING THE TV RISER

First, the material that will make up the riser is glued together.

Then, dress down the glued-up panel to a flat surface and a consistent thickness. In a shop with a big planer, this involves nothing more than feeding the stock into the machine; but in a small shop, like mine, this 15" panel must be flattened and smoothed with hand planes.

If the boards used to create the panel were all flat and all aligned correctly at glue-up, you may not need to do more than scrape away the glue squeeze-out and make a couple of token passes with a jack plane. However, boards are rarely flat, often undulating along their lengths like bacon. In such cases, more substantial plane work may be needed.

I begin by exchanging the regular iron in my jack plane for one that's been crowned across its width. This shape eliminates the sharp corners on either side of the iron's width, corners that can dig too deeply into the planed

surface when the craftsman is attempting to remove material quickly. With this crowned iron, it's relatively easy to remove significant amounts of thickness. It does, however, leave a rippled, rather than smooth, surface, so it must be followed by a plane fit with a conventional iron.

Next, cut the grooves into which the scrollwork will be inset. You can cut the groove across the bottom face of the top panel in one pass over a table saw fit with a $\frac{3}{8}$ " stack of dado cutters. But the grooves in the two end panels must be handled differently. Because the scrollwork is only two inches high, stopped grooves are necessary.

You can cut these freehand with a mallet and chisel or start them on the table saw and finish them by hand.

The scroll is then thickened, ripped to width, and profiled on the band saw.

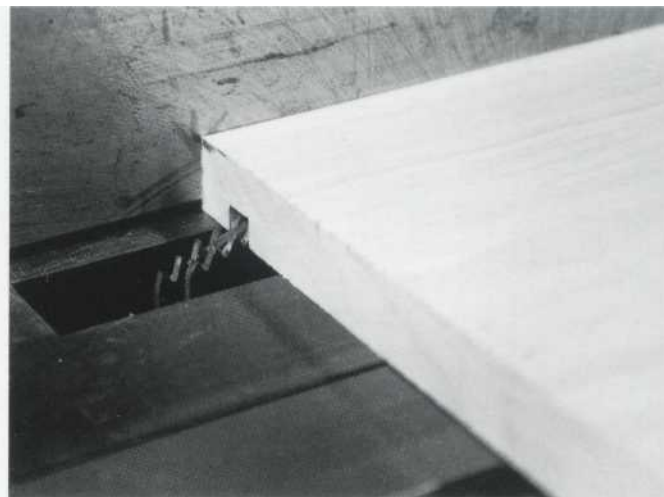
Following the procedure discussed in chapter twenty-five, cut the through dovetails joining the end and top panels. Then, glue-up the riser around the strip of scrollwork, and plug the holes in the ends of the grooves.

CUTTING A STOPPED GROOVE ON THE TABLE SAW

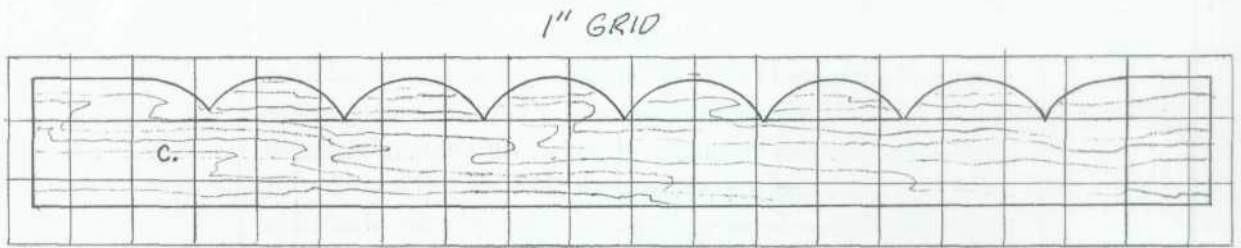
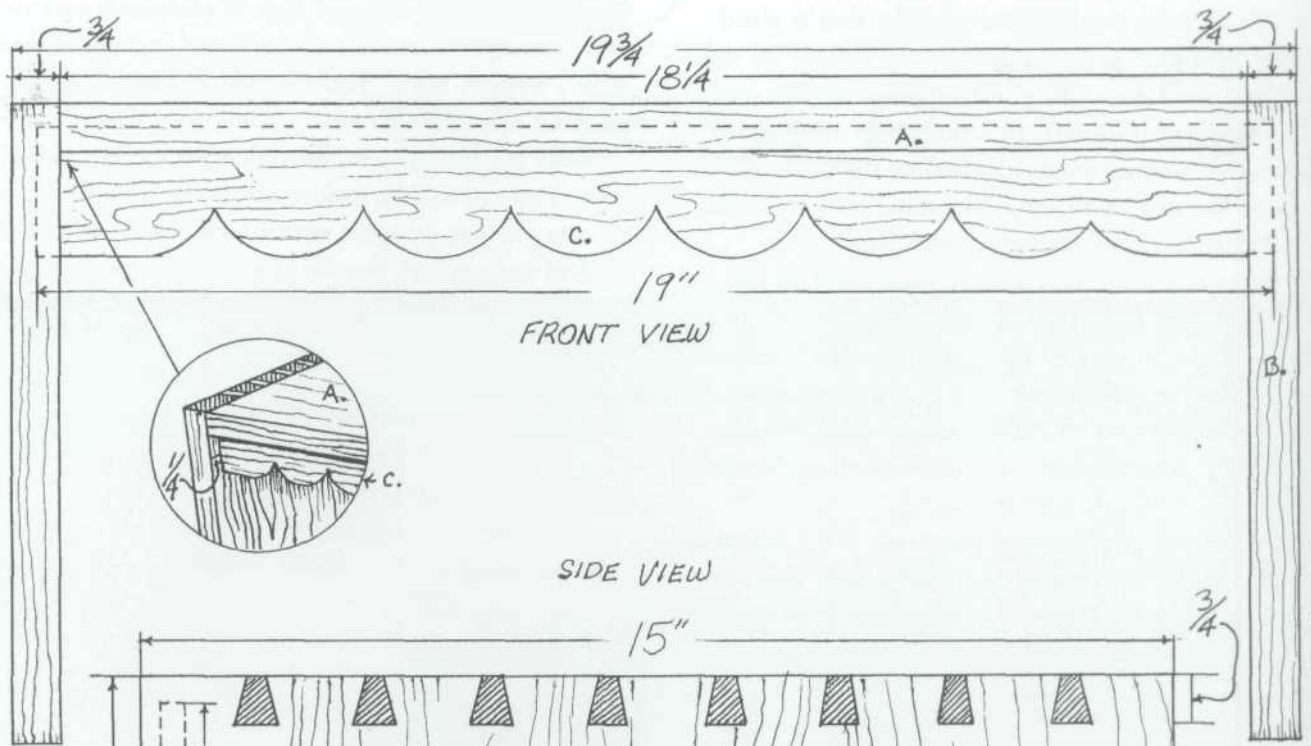


1 To match the 2" height of the scrollwork, the groove must stop $2\frac{3}{8}$ " from the top of the end panels. The extra $\frac{3}{8}$ " provides for the $\frac{3}{4}$ " top minus the $\frac{3}{8}$ " groove cut into that top.

The arrow penciled on the fence marks a point $2\frac{3}{8}$ " past the leading edge of the dado cutters.



2 When the end panel is fed into the cutters as far as the penciled arrow, the cutters have advanced the groove $2\frac{3}{8}$ ". (Due to the circular shape of the dado cutters, a bit of material will remain in the end of the groove. This is removed with a chisel.)

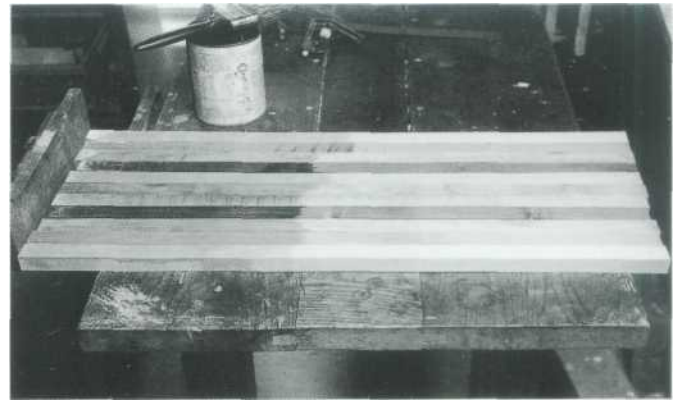


GLUING-UP PANELS

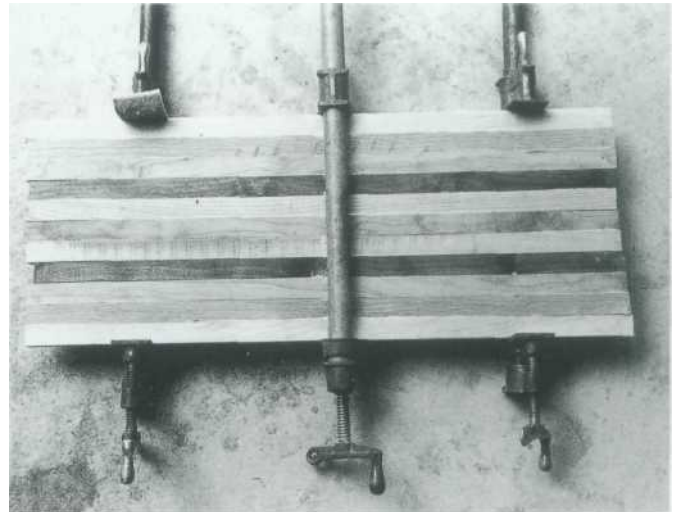


1 Matching figure and color is the first step. Here, two walnut boards with sapwood edges are being matched.

2 These two pieces of cherry were both cut from the same board, assuring a consistent color. Also, making the joint at the edges of the board where the lines of figure cluster close together helps to produce an invisible glue line.



3 A wash of mineral spirits reveals color, enabling you to achieve better matches.



4 Once you have matched (or, as in this case, contrasted) color and grain, form glue joints (the lowly butt joints) on the edges of each board. These joints consist of nothing more than flat, straight planes 90° from the board's adjacent surfaces.

You can create the joint by hand, using a jack or jointing plane. However, this is fussy work requiring experience and a steady hand. You can also create the joint on the jointer, a stationary power tool designed to perform this very task.

After cutting the joints, coat each edge with glue and align them in pipe or bar clamps. These are necessary in order to bring the joints tightly together.

Clamp arrangement should follow the pattern shown above. Position them no more than 12"-15" apart on alternate sides of the panel. After a couple of hours, you can remove them; within eight hours, you can work the panel.

MATERIALS LIST

A	Top	1 pc.	$\frac{3}{4} \times 15 \times 19\frac{3}{4}$
B	End	2 pcs.	$\frac{3}{4} \times 15 \times 9\frac{1}{8}$
C	Scroll	1 pc.	$\frac{3}{8} \times 2 \times 19$
D	Plug	2 pcs.	$\frac{3}{8} \times \frac{3}{8} \times \frac{3}{8}$, shaved to fit

**These are net measurements. Surplus length should be added to all dovetailed parts to allow them to be sanded flush.*

6

SHAKER-STYLE MIRROR

Walnut, Curly Maple



MAKING THE SHAKER-STYLE MIRROR

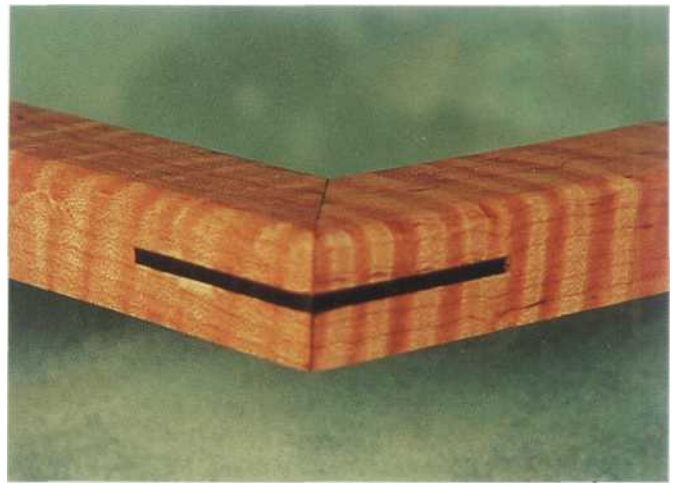
Begin construction with the mirror itself. After thickening the frame stock, cut the 1/2" X 3/8" rabbet on what will become the back, inside edge of the frame. (This rabbet will ultimately receive the glass and the glass backing.) Form a radius on the two front edges of the frame stock.

Then miter the frame parts. You can do this on a miter box or a table saw or radial arm saw using a very fine-toothed blade. At this point, cut the slots for the feathers that will later join the frame parts. You can cut these by hand with a tenon saw or on a table saw fit with a hollow-ground planer blade, using a Universal Jig to control the stock as it is passed over the blade. Precision is important in the cutting of both the miters and the feather slots as these joints comprise the entire inventory of joinery in the mirror frame. Any error in these processes is very difficult to hide.

The feather stock is then thickened and slid into the slots, marked, and cut. The frame is assembled with glue.

The hanger consists of only three parts: the blade, the shelf and the shelf front.

Fashion the blade first. After cutting its shape on the band saw, facet the top edges. Do this by hand, guided by a marking system similar to that used in the hand manufacture of the raised panel in chapter one. First, draw a line down the center of each edge to be faceted. Then draw lines on the front and back faces of the blade adjacent to these edges. These lines should be placed about 3/16" from the corners. Then, by using a wood file to create planes, join the lines down the center of the edges and the lines



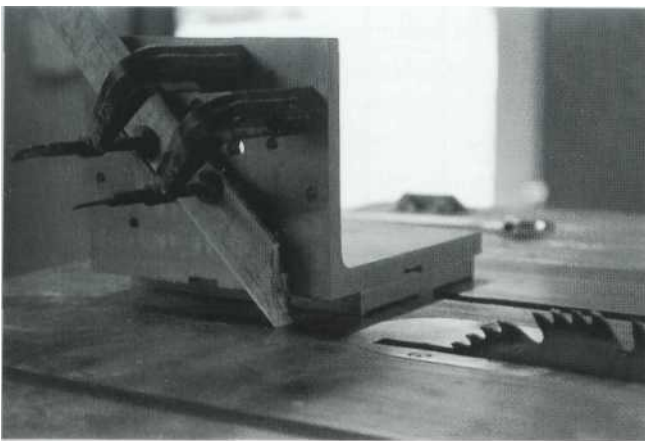
The walnut wedges in the mirror frame corners are not only beautiful, they also add structural support.

on the blade's faces. You could create these planes freehand, but the reference lines make it much easier to produce regular shapes.

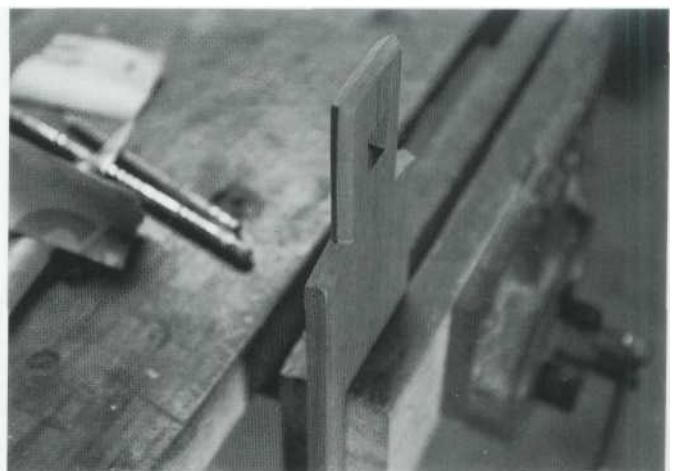
Cut a dado on the back edge of the shelf, and position the blade in that dado, holding it there with a bit of glue and two 1 1/2" no. 12 wood screws.

Then profile the shelf front on the band saw and facet all except the top edges in the same manner as that used for the top edges of the blade. Glue this to the front edge of the shelf.

After sanding and finishing the wood parts, place the mirror glass and a matt board backing inside the rabbet cut in the back side of the mirror frame. Hold both in place with the protruding heads of a half-dozen wood screws turned into the sides of the frame rabbet.



1 Clamp a piece of mitered frame stock in the Universal Jig prior to passing it over the hollow-ground planer blade. Notice that the frame stock rests on its mitered tip and is clamped in the jig at a 45° angle.



2 The faceting at the top of the blade can be seen in this shot. The same faceting is used on all but the top edges of the shelf front.

ADHESIVES

A recent *Woodworker's Supply* catalog lists eleven different types of adhesives. Several of those—for example, hot melt glues—are available in different formulas for different applications. These different formulas increase the actual number of choices to sixteen.

Sixteen kinds of glue?

Without devoting significant time to study and experimentation, no woodworker is likely to make the perfect adhesive choice for any particular application. And who wants to spend hours studying adhesives?

In my shop, except for specialized applications (for example bonding Formica-like products to wood), I've reduced the adhesive inventory to three choices: white glue (plain old Elmer's), yellow glue, and hide glue, all of which are more or less appropriate for any wood-to-wood joint.

Each of these three types forms a bond that is stronger than necessary for wood furniture. The primary differences are the amount of working time they allow, the ease with which joints they've bonded can be disassembled, and the convenience of their application.

Hide glue allows for relatively easy disassembly when making repairs and also offers the woodworker the longest working time. It's available in two forms, each of which, unfortunately, has its own set of drawbacks. Traditional hide glue, which comes in flakes or pearls, must be mixed with water and kept heated to a temperature of 140-150° F. Then, after a few days, it must be thrown out and a new batch mixed because, once mixed and heated, it quickly loses its strength. All of this is a significant inconvenience for the owner of a small shop.

The other form comes premixed in squeeze bottles just like white and yellow glues. Unfortunately, however, its shelf life is shorter than white or yellow glue and much shorter than the dry form of hide glue.

In terms of convenience, both white and yellow glue are clearly superior to hide glue. They come premixed in easy-to-use squeeze bottles. They have long shelf life if kept from freezing, and they form an all-but-unbreakable bond between two pieces of joined wood.

There are, however, drawbacks to their use. First, because the bond they form is all-but-unbreakable, a piece assembled with these glues is very difficult to repair. If a yellow- or white-glue-assembled chair comes into my shop needing a new rung, I have to explain to the customer that I can't predict the cost of the repair.

MATERIALS LIST

Mirror

A Sides	2 pcs.	$\frac{3}{4} \times 1\frac{1}{4} \times 19\frac{7}{8}$
B Top and bottom	2 pcs.	$\frac{3}{4} \times 1\frac{1}{4} \times 13\frac{5}{16}$
C Feather	4 pcs.	$\frac{3}{32} \times 1\frac{1}{8} \times 2\frac{1}{8}$
D Mirror glass	1 pc.	$\frac{1}{8} \times 11\frac{1}{16} \times 18\frac{1}{4}$
E Mirror backing	1 pc.	$\frac{1}{8} \times 11\frac{1}{16} \times 18\frac{1}{4}$

Rack

F Blade	1 pc.	$\frac{5}{16} \times 3 \times 24\frac{7}{16}$
G Shelf	1 pc.	$\frac{7}{8} \times 1\frac{3}{8} \times 13\frac{3}{4}$
H Front	1 pc.	$\frac{5}{16} \times 3\frac{3}{8} \times 14$

Hardware

I Brass eye hook	2 pcs.	$\frac{7}{8}$
J Brass chain		
K Screws	various	

Whereas a chair assembled with hide glue can be disassembled by applying warm water to a tight joint, thus allowing a fairly predictable repair time, the same chair assembled with white or yellow glue may resist my best efforts at disassembly. On more than one occasion, I've broken the slab seat on an old Windsor trying to break loose parts that have been joined with white or yellow glue.

The second problem associated with the use of white and yellow glues is short assembly time. When using these products, a woodworker may have only ten or fifteen minutes to get parts aligned and clamped before the glue grabs and adjustments become all but impossible to make. The time constraints applied to the assembly process by white and yellow glues add stress to an already stressful procedure.

In my shop, I follow these guidelines when choosing an adhesive:

1. For large, complex pieces with a high dollar value (pieces for which one could justify the cost of making repairs), I use hide glue.

2. For pieces requiring lengthy assembly time, I use hide glue.

3. For all other applications, I turn to the ease and convenience of white and yellow glues. For example, all the pieces in this book were assembled with one of those two varieties, the choice being determined by the proximity of the glue bottle to my hand when it was time to glue something up.

7

SIDE TABLE WITH CURLY MAPLE DRAWER

Cherry, Curly Maple

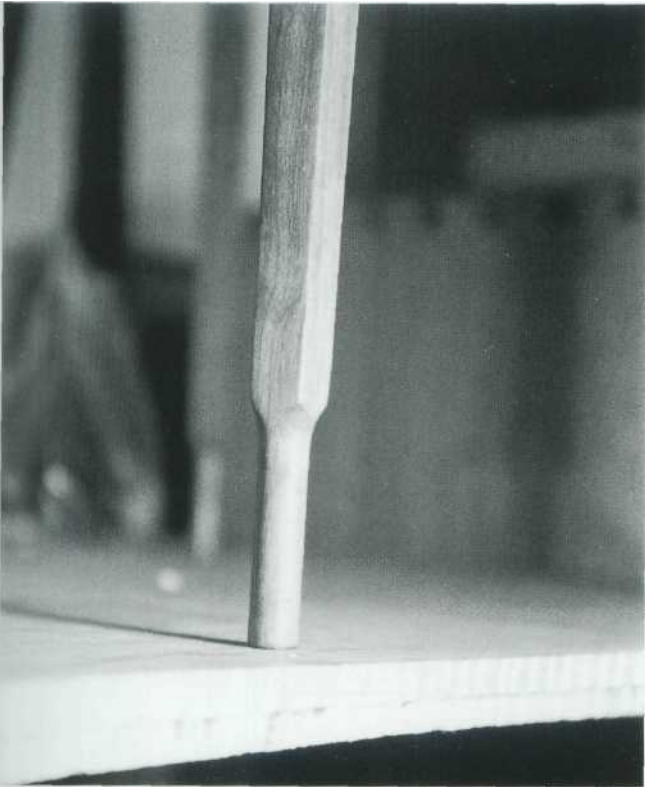


MAKING THE SIDE TABLE WITH CURLY MAPLE DRAWER

Joint, glue and clamp the boards selected for the top and set aside. Next, fashion the legs.

Rip and joint the leg stock to 1" X 1", and draw the tapers on the front and side of each leg. At the base of the apron, these two faces measure the full 1" X 1". At the floor, the legs measure 9/16" X 9/16". Then cut the tapers on the band saw, keeping the blade well to the waste sides of the taper lines. Finish the taper with a hand plane, while holding the stock in a vise.

Next, center the leg stock so that it can be loaded into the lathe prior to turning the feet. On the narrow end of each leg, this is simply a matter of drawing diagonals across the end grain. On the other end of the leg, however, finding the center is a bit more complicated because you don't want the actual center of the 1" X 1" end grain square. What you do want is the center of the 9/16" X 9/16" end grain square directly in line with the square on the opposite end of the leg. To find this, draw a square measuring 9/16" X 9/16" on the end grain with two sides of that square directly on top of what will become the outside edges of that leg. Draw diagonals on this square to find the center.



The table's dainty turned foot is blended into the flat, tapered sides.



The thin contrasting band inlay adds the perfect touch to this tabletop.

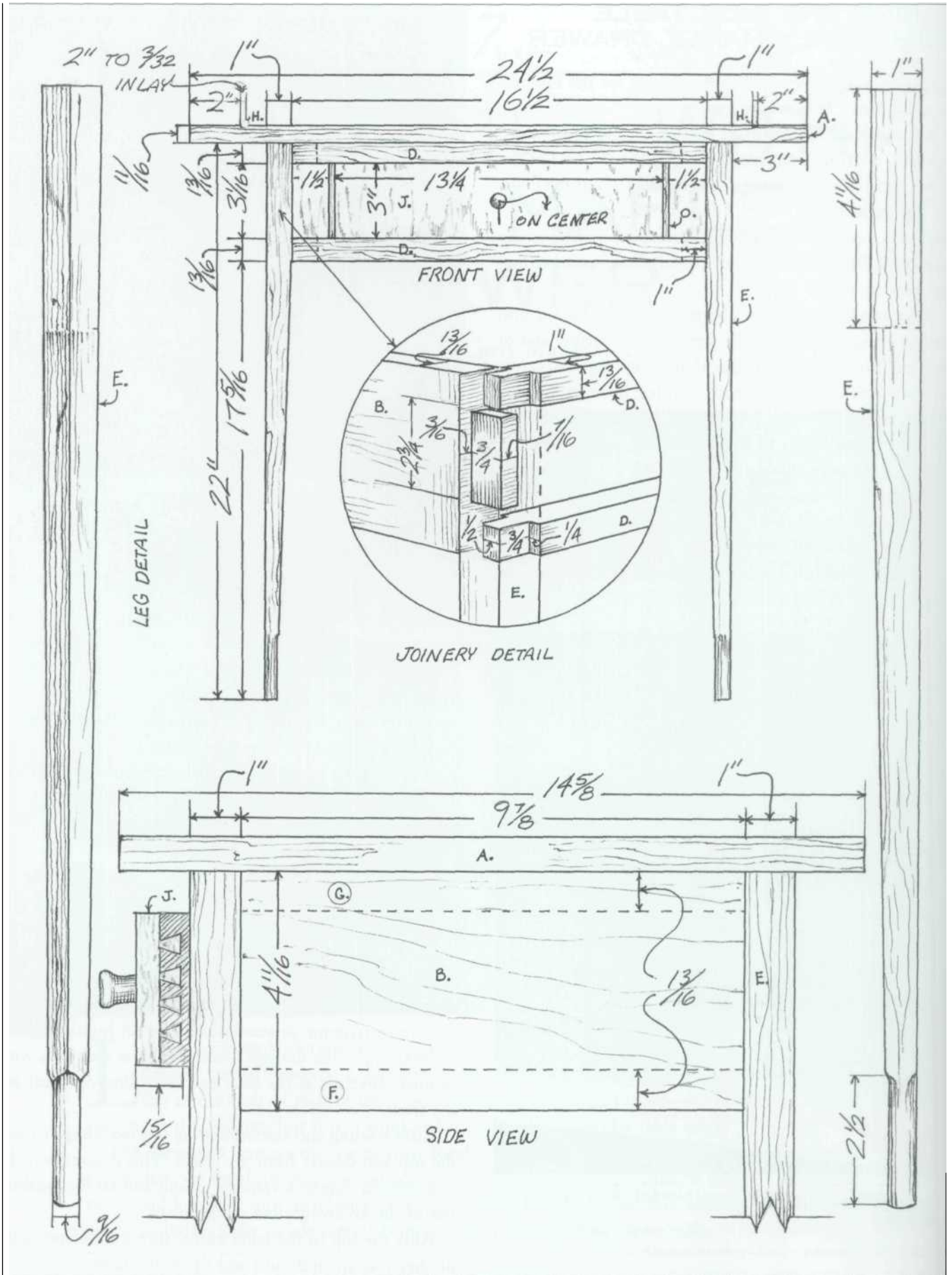
Then mount the leg in the lathe. In order to eliminate the fraying of corners that can occur when a round shape is turned immediately adjacent to a square shape along the length of a turned part, relieve the four corners of the leg with a knife just above the turned foot. Blend this cut into the round tip of the leg with a lathe tool. Finally, clean up with a chisel, knife and sandpaper.

Next, cut the mortises that will receive the tenons on the ends of the apron parts and drawer rails. Set these so that the outside faces of the apron parts are recessed 1/8" from the outside faces of the legs. Set the drawer rails, however, so that their outside faces are flush with the outside faces of the legs. When the mortises are fit, assemble the table frame. Next, install drawer runners and kicker strips. Fit the kicker strips with oversized holes, through which screws will pass into the top. The oversized holes allow for expansion and contraction across the width of the top in response to seasonal changes in humidity.

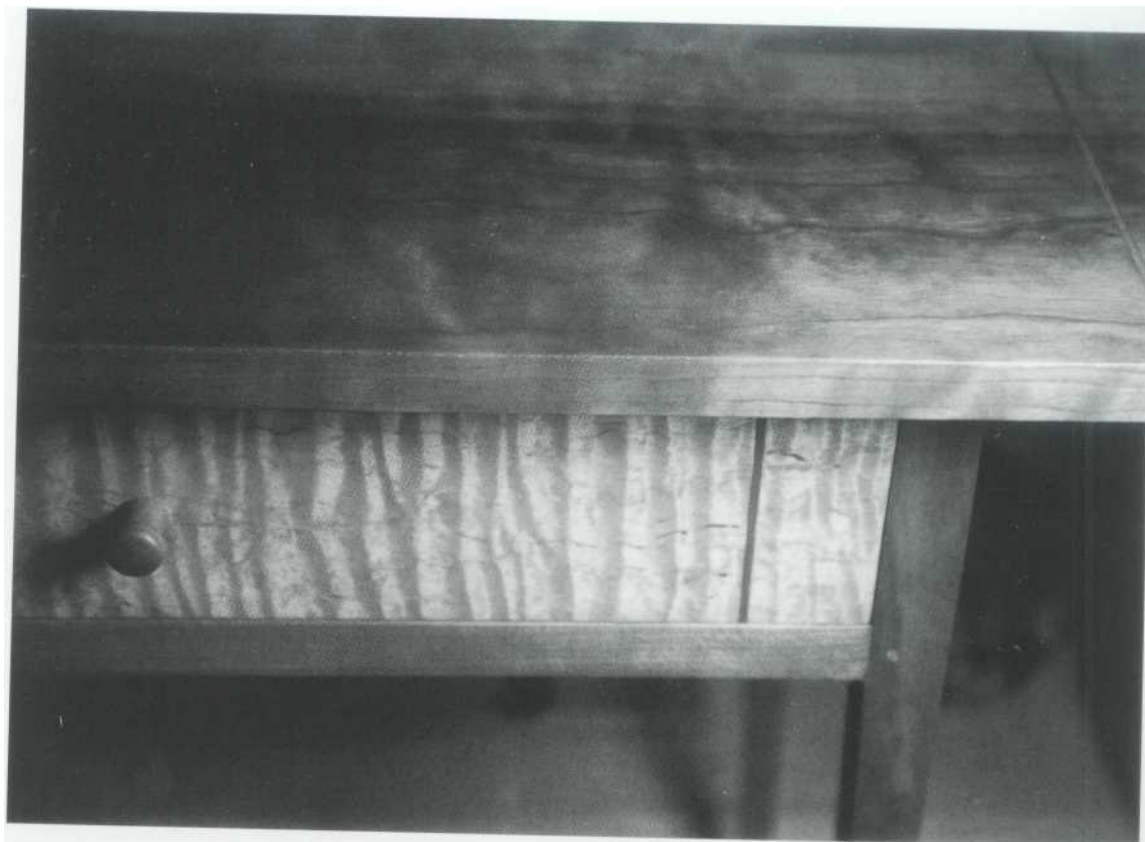
Next, make the drawer. Construction is standard, with through dovetails at the back and half-blind dovetails at the front.

After leveling and smoothing the top (see chapter five), the top and drawer front are inlaid. This process, which is covered in chapter seventeen, is built around the capabilities of the hollow-ground planer blade.

Affix the top to the table frame, turn a pull from a bit of cherry scrap, and sand and finish the table.



A strip of cherry is inlaid across the width of the drawer's curly maple front. Similarly, a strip of curly maple is inlaid across the width of the table's cherry top. Note the peg driven into the tenon of the drawer rail below the drawer front.



MATERIALS LIST

Table

A	Top	1 pc.	$1\frac{1}{16} \times 14\frac{3}{8} \times 24\frac{1}{2}$
B	Apron side	2 pcs.	$1\frac{3}{16} \times 4\frac{1}{16} \times 11\frac{3}{8}$
C	Apron back	1 pc.	$1\frac{3}{16} \times 4\frac{1}{16} \times 18$
D	Drawer rail	2 pcs.	$1\frac{3}{16} \times 1 \times 18^*$
E	Leg	4 pcs.	$1 \times 1 \times 22$
F	Drawer runner	2 pcs.	$1\frac{3}{16} \times 1 \times 9\frac{7}{8}$
G	Kicker strip	2 pcs.	$1\frac{3}{16} \times 1 \times 9\frac{7}{8}$
H	Inlay	2 pcs.	$\frac{3}{32} \times \frac{3}{32} \times 14\frac{3}{8}$
I	Screws	various	

Drawer

J	Front	1 pc.	$1\frac{5}{16} \times 3 \times 16\frac{7}{16}$
K	Side	2 pcs.	$\frac{1}{2} \times 3 \times 10$
L	Back	1 pc.	$\frac{1}{2} \times 2\frac{1}{2} \times 16\frac{7}{16}$
M	Bottom	1 pc.	$\frac{1}{2} \times 9\frac{3}{8} \times 15\frac{15}{16}$
N	Pull	1 pc.	$\frac{5}{8} \times 1\frac{1}{4}$
O	Inlay	2 pc.	$\frac{3}{32} \times \frac{3}{32} \times 3$

**Includes $\frac{3}{4}$ " tenons on either end.*

**These are net measurements. Surplus should be added to dove-tailed parts to allow them to be sanded flush.*

8

FOOTSTOOL

Cherry, Walnut, Oak



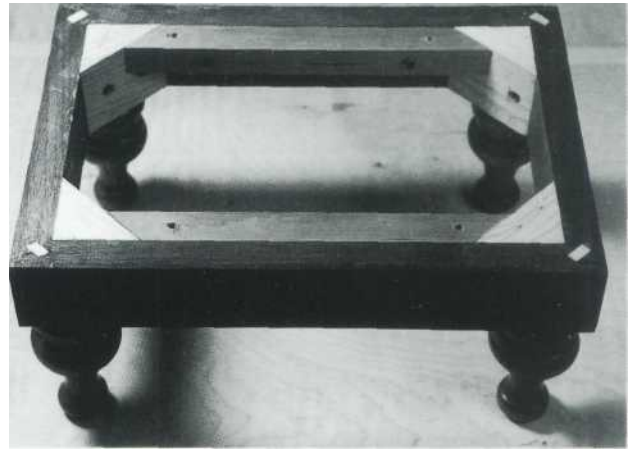
MAKING THE FOOTSTOOL

Construction begins with the legs since they are the most time-consuming components. Rip out 2X2 stock, cut to length, and center on the lathe. First, turn the 1/2 X 7/8" tenon on the top of the leg. Care must be taken in sizing the tenon so that a tight fit can be achieved. In my shop, I begin tenon sizing with a gouge, reducing the stock to 1/16" over its finished diameter. Then, with a flat (paring) chisel laid bevel side down on the tool rest, I bring the tenon to its final size, checking frequently with calipers. (Charles Harvey, a chairmaker in Berea, Kentucky, uses an open-end wrench to check tenon diameter.)

After sizing the tenon, give the leg its rough shape. Then form the coves and beads.

The frame is next. After dimensioning the stock, cut miters on each end of the frame components. Then, on a table saw fit with a stack of dado cutters tilted to a 45° angle, cut the dado for the spline on each end of every mitered piece.

Then rip out spline stock to a width of 2 1/16". Thickness to 1/4". When you have achieved a tight fit in the dadoes, crosscut the individual splines from the length of spline stock. Remember that the grain of the finished spline must run perpendicular to the mitered faces of the pieces being joined.



This photo shows the structural parts of the stool.

Assemble the splined and mitered frame. When the glue has dried, glue the triangular glue blocks in each corner and screw them into place. Take exact measurements for the screw strips and cut and install the strips.

The top of the footstool is a piece of 5/8" wood stock on which a piece of 1/2" foam padding has been placed. This is held in place by upholstery cloth wrapped around the top and stapled underneath.

Turn four screws up through the screw strips into the bottom side of the top to hold it in place.

AIR-DRYING LUMBER

Lumber is expensive.

Beautiful lumber is very expensive.

One way to avoid these high prices is to switch from the expensive kiln-dried lumber available at retail outlets to the much less expensive green lumber available at sawmills. Preparing green lumber for use does require labor and time, but the cash savings can be enormous.

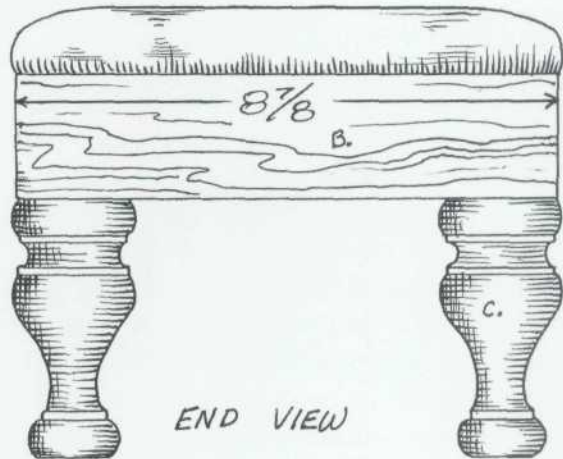
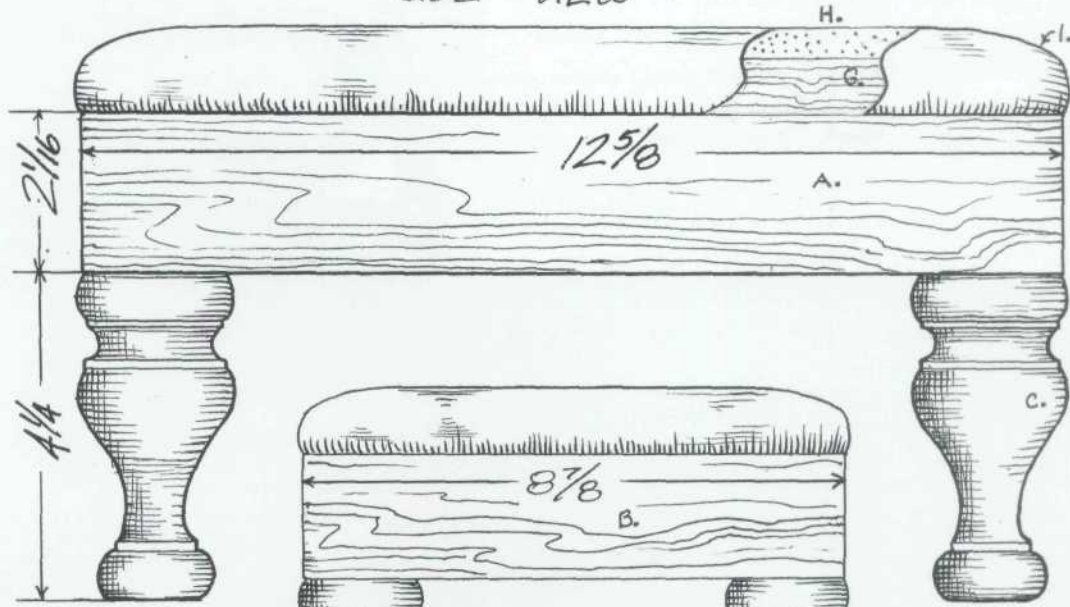
Before the green lumber can be air-dried, a solid foundation for the drying pile must be built.

First, you must choose an acceptable location. Drying piles are not beautiful things. For that reason a backyard

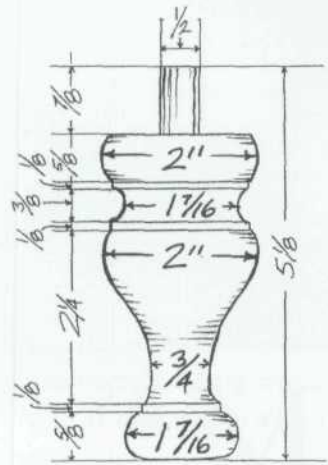
might be a better choice than a front yard. Air movement is also important. The site should also be open enough so that wind can blow through the pile to aid in reducing the moisture content. Finally, it should be situated on a slight grade so that water can run off whatever roofing material is placed atop the pile.

Begin the foundation with six concrete blocks set in two parallel rows of three. Set these so that the length of each row (measured from outside to outside of the end blocks) is about 8'. Again, measured from outside to outside, place the rows about 4' apart. Make some

SIDE VIEW

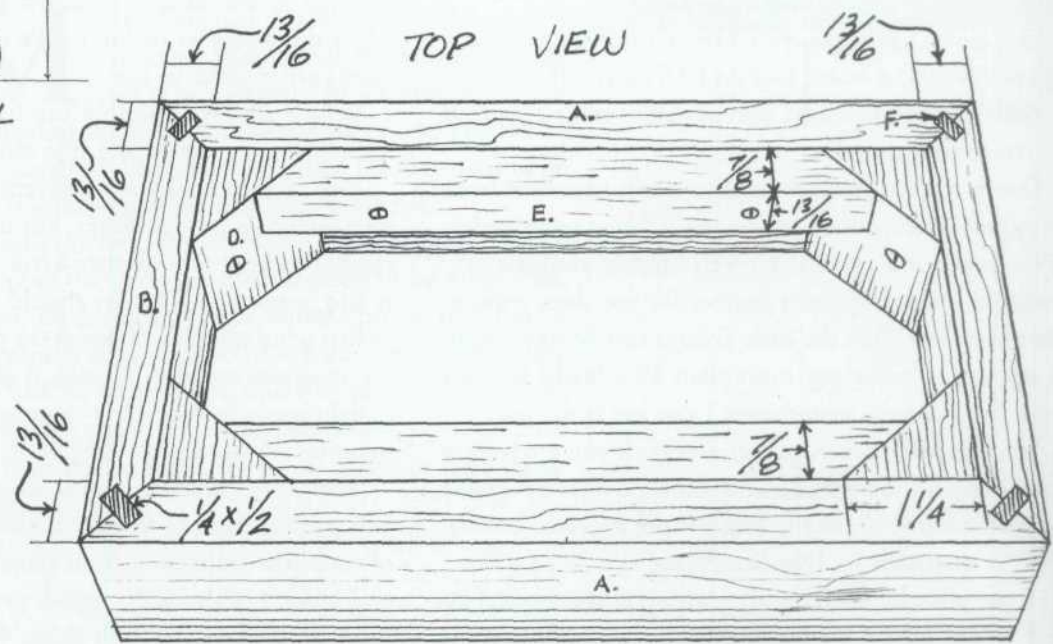


END VIEW



LEG DETAIL

TOP VIEW



effort to get the tops of these blocks into the same plane. Later, you can use shimming to correct minor inaccuracies.

Next, lay a row of railroad ties along each row of three blocks. Set these so that their top surfaces are in the same plane. You can check this by sighting across the ties from the side, shimming where necessary.

Then, set five 4' lengths of 4X4 across the ties at 20"-24" intervals. Again, these must be in the same plane because any twist in the foundation will be transferred to the drying lumber, in some cases making it unusable. Sight along the length of the pile from either end to reveal any twist in the alignment of the top surfaces of the 4 X 4s.

Air-drying lumber requires a large quantity of stickers, sometimes called sticks. These are nothing more than 1" X 1" X 48" dry hardwood ribs which separate the layers of drying lumber so that air can pass freely through the pile.

Once you have ripped out the stickers, the actual lumber pile can be constructed. First, place a single 1" X 1" X 48" sticker along the center line of each 4x4 support. Then, place a layer of green lumber perpendicular to and atop that first layer of stickers. As you are laying out these boards, take care so that an air space (approximately 1") is left between the edges of the boards.

MATERIALS LIST

A Side	2 pcs.	$1\frac{3}{16} \times 2\frac{1}{16} \times 12\frac{5}{8}$
B End	2 pcs.	$1\frac{3}{16} \times 2\frac{1}{16} \times 8\frac{7}{8}$
C Leg	4 pcs.	$2 \times 2 \times 5\frac{1}{8}$
D Glue block	4 pcs.	$1\frac{1}{4} \times 2\frac{1}{16} \times 2\frac{5}{8}$
E Screw strip	2 pcs.	$1\frac{3}{16} \times \frac{7}{8} \times 8\frac{7}{8}$, length to fit
F Spline	4 pcs.	$\frac{1}{4} \times 2\frac{1}{16} \times \frac{1}{2}$
G Top	1 pc.	$\frac{5}{8} \times 8\frac{7}{8} \times 12\frac{5}{8}$
H Foam	1 pc.	$\frac{1}{2} \times 8\frac{7}{8} \times 12\frac{5}{8}$
I Fabric	1 pc.	14 X 18
J Screws	various	

When that first layer of lumber has been positioned, place a second set of stickers across that layer directly above the first row of stickers. Then add a second layer of lumber, followed by another set of stickers and another layer of boards and so on until you have stickered all the green lumber.

Professional driers often build these piles to a height of 12'-14', but I find that if the top of the pile is more than five or six feet above the ground, it becomes too difficult to get the lumber up and down.

Complete the pile with a water-shedding top. It

doesn't need to be fancy. A couple of sheets of roofing metal will do, as will a tarp, or even a layer of knotted and checked lumber—anything that will keep water from percolating down through the pile.

Now, wait. The traditional rule-of-thumb states that material should air-dry outdoors one year for each inch of its thickness. I usually exceed that time allotment, although on a couple of occasions, in a pinch, I brought lumber inside after only six months. However, those six-months did include the prime drying seasons of summer and fall.

After air-drying outdoors, you can take the lumber to a commercial kiln for finish drying or bring it inside and sticker it again in a warm, dry room for a few additional months

It's then ready to use.

Much has been written about the importance of using

kiln-dried material, and retail outlets often brag about the fact that the moisture content of their stock has been reduced to 7 percent.

I think this is misleading. Yes, the lumber might have had a moisture content of 7 percent on the day it was taken from the kiln. But wood is not an inert medium. After leaving the kiln, its moisture content immediately begins the process of moving toward a point of equilibrium with the relative humidity of the surrounding air.

That means that if a craftsman took that 7 percent board to his shop in Death Valley, California, that 7 percent would soon become 4 percent or 3 percent. And if I took that same 7 percent board to my shop in central Ohio during the steamy month of July, that 7 percent moisture content would quickly become 11 percent or 12 percent, which is the same as the moisture content of the material I've prepared for use by air-drying.

The 1" X 1" stickers are arranged perpendicular to the layers of drying boards. These stickers provide a space through which air can move to hasten the drying process.



9

TRESTLE TABLE

Walnut



MAKING THE TRESTLE TABLE

After the material has been dimensioned, lay out, joint and glue the stock for the top. Construct the leg assemblies next.

After laying out the feet but before profiling them on the band saw, cut the 2"-deep mortises that will receive the leg tenons. This can be done on the drill press, clamping the work to a tall fence custom-made for this operation. You can also cut the mortises by hand, securing the work in a vise, then removing the bulk of the waste with a drill bit, and cleaning up the mortise walls with a chisel. Similarly, cut the through mortises in the two cross braces. Profile the feet and cross braces on the band saw.

Then, fashion the leg tenons. You can do this on a table saw fit with a stack of dado cutters or by hand using a tenon saw. After fitting the tenons into their mortises, glue-up the two leg assemblies.

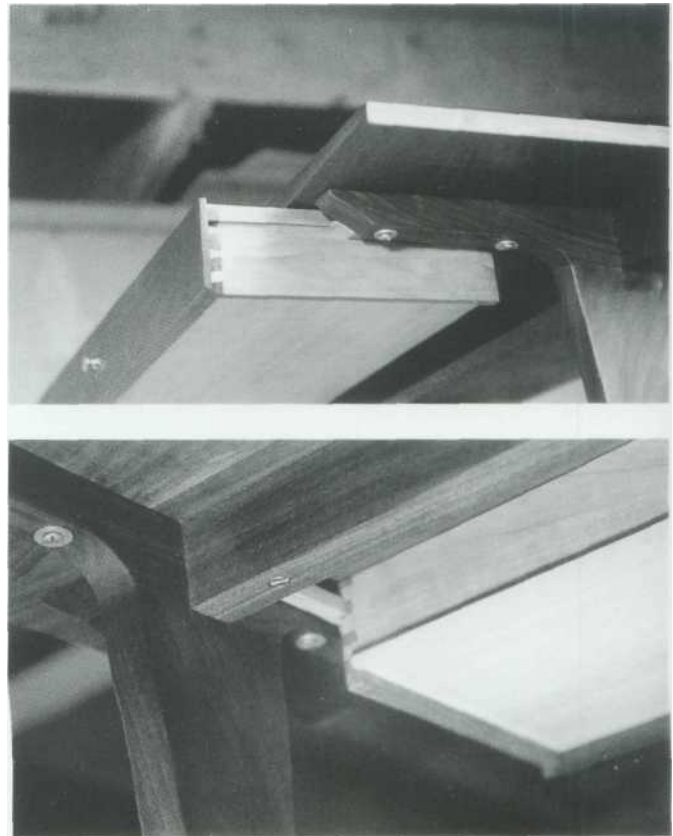
Shape the stretcher and fasten it to the top of the cross braces with half-notch joints. The top is held in place with wood screws passing through oversized holes in the braces. These oversized holes allow for expansion and contraction of the top in response to seasonal changes in humidity.

The original table was built of cherry with pine used for the drawer back, sides and bottom. The exception was the drawer front, which was made of maple. Because of this, Kassay suggests the possibility that the drawer might have been added at some time after the completion of the

original table, a notion further supported by the drawer's extremely (and impractically) short front-to-back depth, a feature that suggests that the drawer wasn't fully integrated into the table's design.

With the exception of the grooves that must be ploughed on the outside faces of the drawer sides, drawer construction is conventional, with through dovetails at the rear and half-blind dovetails at the front.

After fitting the drawer, sand and finish the table and drawer.



1 These photos show the underside of the table. Note the washers under the heads of the screws holding on the top. These are necessary because of the oversized holes drilled through the cross braces. Note also the drawer runner affixed to the inside face of the cross brace.

MATERIALS LIST

Table

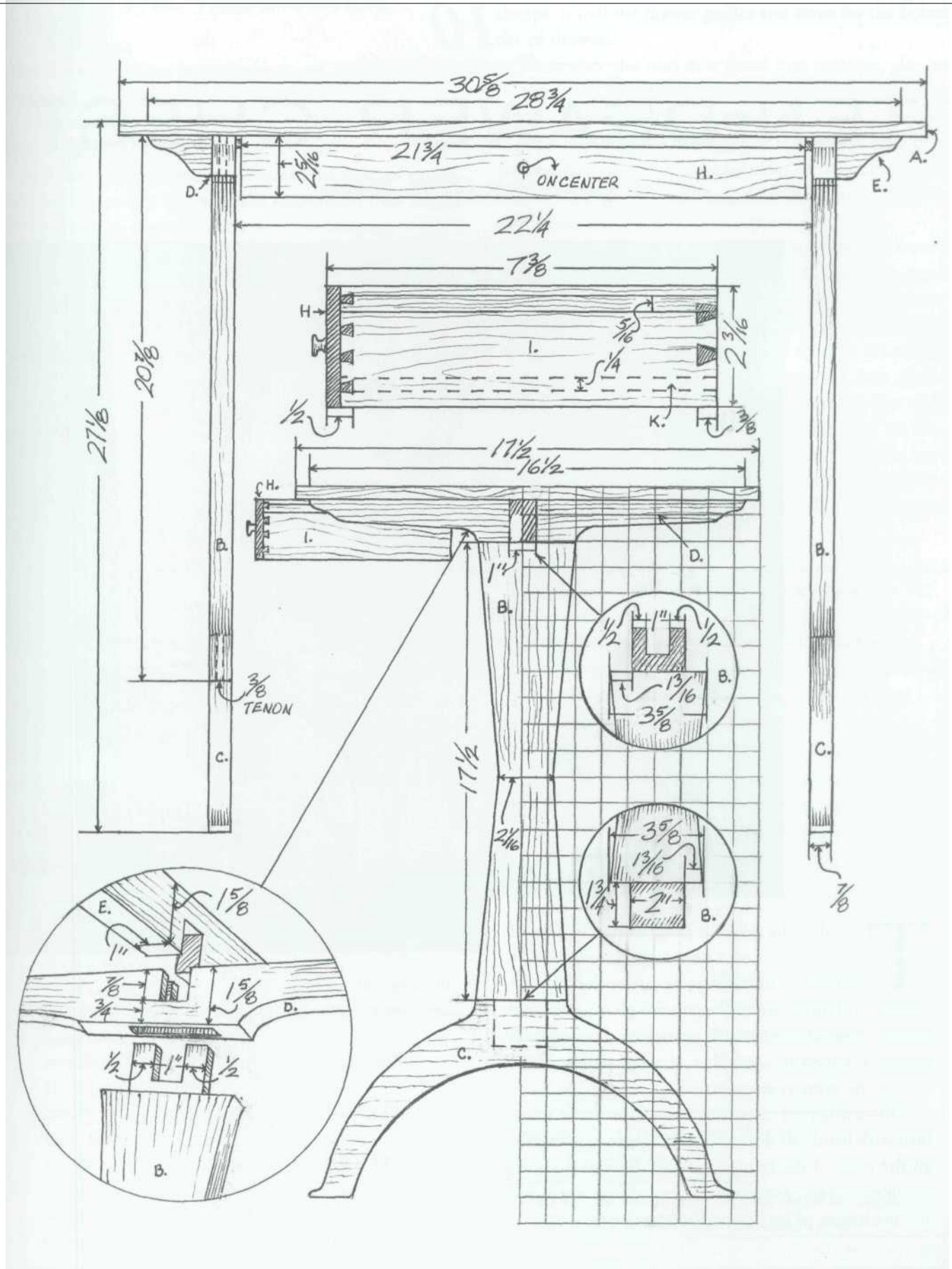
A	Top	1 pc.	$\frac{1}{2} \times 17\frac{1}{2} \times 30\frac{3}{8}$
B	Leg	2 pcs.	$\frac{7}{8} \times 3\frac{3}{8} \times 20\frac{7}{8}$
C	Foot	2 pcs.	$\frac{7}{8} \times 7\frac{1}{2} \times 16\frac{1}{2}$
D	Cross brace	2 pcs.	$\frac{7}{8} \times 1\frac{1}{8} \times 16\frac{1}{2}$
E	Stretcher	1 pc.	$1 \times 1\frac{1}{8} \times 28\frac{3}{4}$
F	Drawer runner	2 pcs.	$\frac{1}{4} \times \frac{3}{8} \times 7$
G	Screws	various	

Drawer

H	Front	1 pc.	$\frac{1}{2} \times 2\frac{5}{16} \times 21\frac{3}{4}$
I	Side	2 pcs.	$\frac{3}{8} \times 2\frac{3}{16} \times 7\frac{1}{8}$
J	Back	1 pc.	$\frac{3}{8} \times 1\frac{3}{4} \times 21\frac{3}{8}$
K	Bottom	1 pc.	$\frac{1}{4} \times 7 \times 21\frac{3}{8}$
L	Pull	1 pc.	$\frac{1}{2} \times \frac{1}{2}$

**These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.*

**Pull was ordered from Constantine's Hardware.*



10

TEN-DRAWER CHEST

Curly Maple, Cherry, Walnut



MAKING THE TEN-DRAWER CHEST

After the material has been dimensioned, glue-up the top panel and set it aside.

Then cut joints for the face frame. When these have been fit, glue the frame.

Build the end panels next. Because of the seasonal expansion and contraction that will take place across their width, they are built as framed panels with the tongues on the perimeter of the central panel floating in grooves cut into the inside edges of the frame components, which are held together with mortise-and-tenon joinery.

After the end panels have been glued-up, cut dados across their width for the tongues on the ends of the dust panels. Then, glue the front edges of the end panels to the back of the face frame.

Assemble the interior of the case in layers beginning at the bottom. First slide the tongues on the bottom dust panel into the dados cut on the inside faces of the end panels. Glue and clamp the front edge of the dust panel to the back side of the face frame. After removing the

clamps, install the drawer guides and stops for the bottom tier of drawers.

Then, slide the next dust panel into position, glue and clamp it, and install its drawer guides and stops. Continue up the chest until each layer of interior work is completed.

After installing the filler strip at the bottom back of the cabinet, fasten the four mitered sides of the bottom frame in place with screws passing up into the bottom of the end panels and face frame.

Assemble the top frame, with kicker strips, as a separate unit. Before installing it in the cabinet, fasten the top to the frame with screws passing up through slotted screw holes. These holes allow the top to expand and contract across its width in response to seasonal changes in humidity.

Set the top frame, with the top attached, into place. Hold it there with screws passing through the top of the face frame and the tops of the end panels. Nail on the upper moulding, concealing these screws. Nail the lower moulding into place. Drawer construction is straightforward, with through dovetails at the back of the drawers and half-blind dovetails at the front.

MATERIALS LIST

Case

A	Top	1 pc.	$1\frac{1}{16} \times 15\frac{3}{16} \times 21\frac{3}{8}$
B	Short bottom frame	2 pcs.	$1\frac{1}{16} \times 11\frac{1}{16} \times 15\frac{13}{16}$
C	Long bottom frame	2 pcs.	$1\frac{1}{16} \times 11\frac{1}{16} \times 21\frac{3}{8}$
D	Central end panel	2 pcs.	$\frac{3}{8} \times 10\frac{1}{8} \times 14\frac{7}{8}^1$
E	Top of end panel frame	2 pcs.	$\frac{7}{8} \times 3\frac{5}{8} \times 10\frac{5}{8}^2$
F	Bottom of end panel frame	2 pcs.	$\frac{7}{8} \times 5\frac{3}{16} \times 10\frac{5}{8}^2$
G	Back of end panel frame	2 pcs.	$\frac{7}{8} \times 21\frac{3}{16} \times 22\frac{11}{16}$
H	Front of end panel frame	2 pcs.	$\frac{7}{8} \times 2\frac{1}{8} \times 22\frac{11}{16}$
I	Back planking	various	$\frac{1}{2} \times \text{various} \times 22\frac{11}{16}$
J	Short upper moulding	2 pcs.	$\frac{5}{16} \times 1\frac{3}{16} \times 15\frac{7}{16}$
K	Long upper moulding	1 pc.	$\frac{5}{16} \times 1\frac{3}{16} \times 20\frac{3}{4}$
L	Short lower moulding	2 pcs.	$\frac{3}{8} \times 1\frac{1}{16} \times 15\frac{9}{16}$
M	Long lower moulding	1 pc.	$\frac{3}{8} \times 1\frac{1}{16} \times 20\frac{7}{8}$
N	Outside vertical facing	2 pcs.	$\frac{7}{8} \times 1\frac{1}{4} \times 22\frac{11}{16}$
O	Central vertical facing	1 pc.	$\frac{7}{8} \times 1\frac{1}{4} \times 20$

P	Top horizontal facing	1 pc.	$\frac{7}{8} \times 1\frac{3}{4} \times 18\frac{7}{8}$
Q	Bottom horizontal facing	1 pc.	$\frac{7}{8} \times 2\frac{3}{16} \times 18\frac{7}{8}$
R	Short facing	8 pcs.	$\frac{7}{8} \times 1\frac{5}{16} \times 9\frac{3}{16}$
S	Dust panel	5 pcs.	$\frac{3}{4} \times 13\frac{3}{4} \times 18\frac{3}{4}^3$
T	Drawer stop	10 pcs.	$\frac{3}{16} \times \frac{7}{8} \times 7$
U	Central drawer guide	5 pcs.	$\frac{3}{4} \times 1\frac{7}{16} \times 13\frac{3}{4}$
V	Outside drawer guide	10 pcs.	$\frac{7}{16} \times \frac{7}{8} \times 13\frac{3}{4}$
W	Kicker strip	2 pcs.	$1\frac{3}{16} \times 1\frac{1}{8} \times 12\frac{7}{8}$
X	Short top frame	3 pcs.	$1\frac{3}{16} \times 1\frac{1}{8} \times 11\frac{1}{4}$
Y	Long top frame	2 pcs.	$1\frac{3}{16} \times 1\frac{1}{8} \times 18\frac{3}{4}$
Z	Clear	1 pc.	$1\frac{3}{16} \times 1\frac{1}{8} \times 18\frac{3}{4}$
AA	Bottom filler strip	1 pc.	$\frac{3}{4} \times 1\frac{7}{16} \times 18\frac{3}{4}$

Drawers

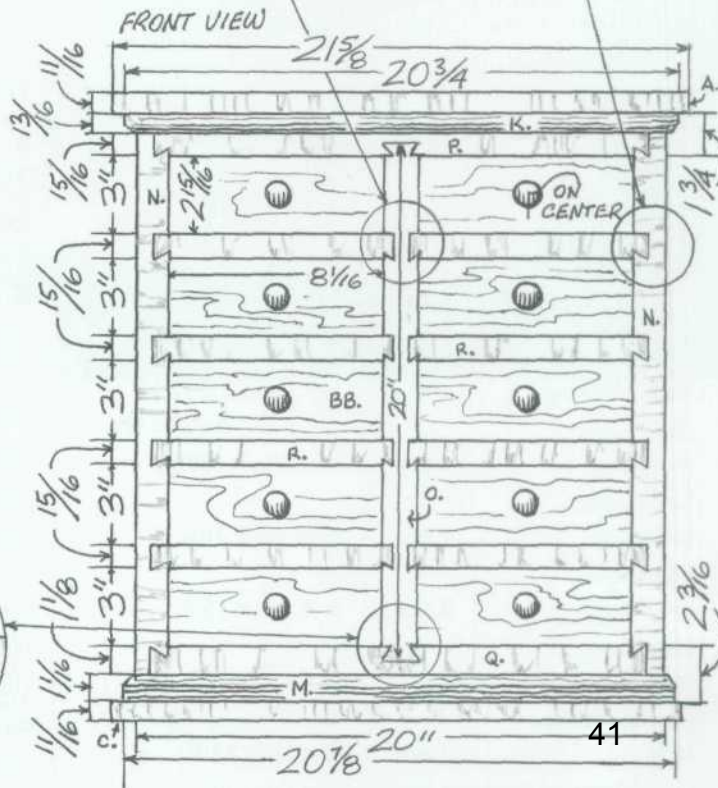
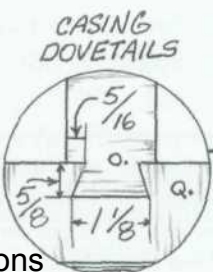
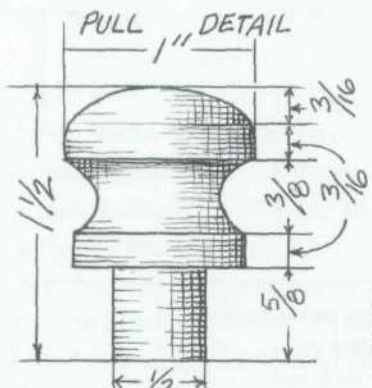
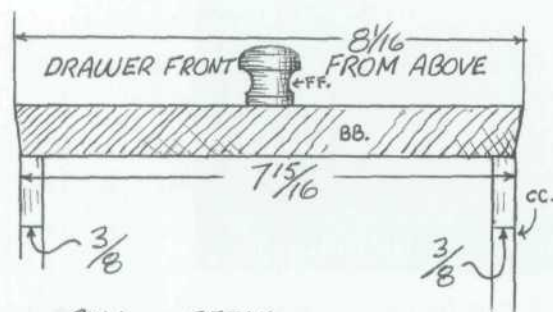
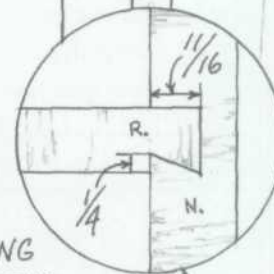
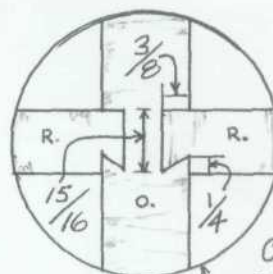
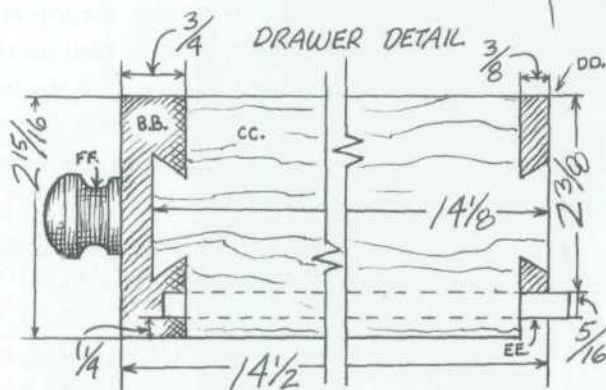
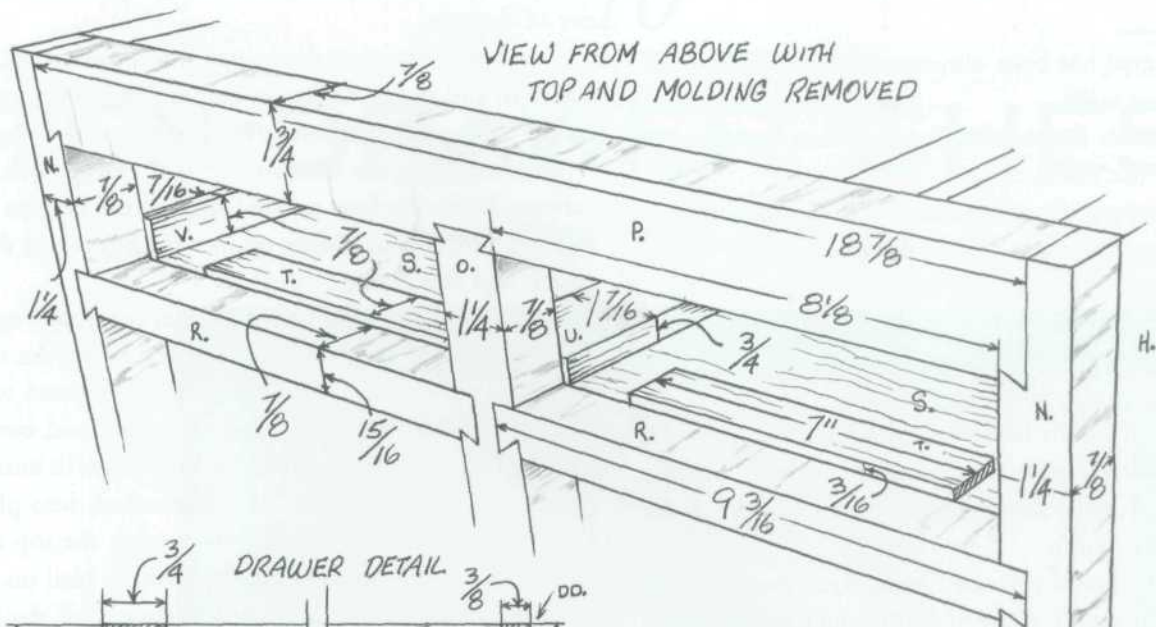
BB	Front	10 pcs.	$\frac{1}{4} \times 2\frac{1}{16} \times 8\frac{1}{16}$
CC	Sides	20 pcs.	$\frac{3}{8} \times 2\frac{1}{16} \times 14\frac{1}{8}$
DD	Back	10 pcs.	$\frac{3}{8} \times 2\frac{3}{8} \times 7\frac{1}{16}$
EE	Bottom	10 pcs.	$\frac{5}{16} \times 7\frac{1}{16} \times 14\frac{1}{8}$
FF	Pull	10 pcs.	$1 \times 1\frac{1}{2}$

¹Includes $\frac{1}{4}'' \times \frac{1}{2}''$ tongue on all four edges.

²Includes $\frac{3}{4}''$ tenon on each end.

³Includes $\frac{1}{4}''$ tongue on each end.

*These are net measurements. Surplus should be added to all dovetailed parts to allow them to be sanded flush.



11

KEY RACK

Cherry, Walnut



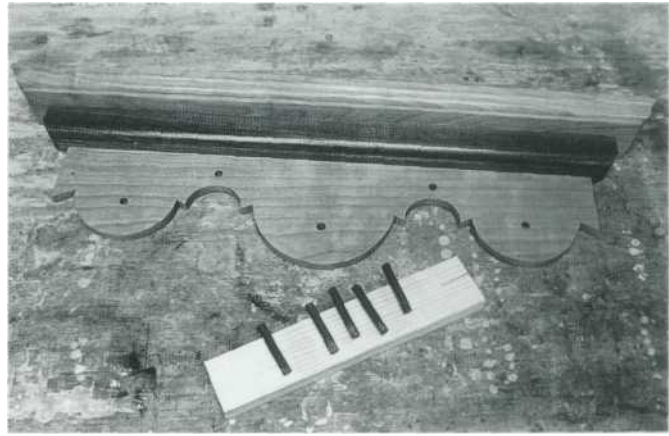
MAKING THE KEY RACK

After the stock has been dimensioned, lay out and cut the scrollwork with the band saw. Remove saw marks with a paring chisel, a wood file and some sandpaper. Care must be taken when cleaning up the scroll's sharp points since they can be easily broken off because of the grain runout on both sides of the points.

Next, form the moulded edges on the walnut mid-section with a shaper or a table-mounted router. Any of a number of different cutters would work nicely for this profile.

Cut a $\frac{7}{16}$ " X $\frac{5}{16}$ " stopped rabbet along the bottom of the walnut mid-section to house the top of the scrollwork. You can do this by hand with a mallet and chisels or on the table saw using the method for cutting the stopped groove discussed in chapter five. You could use a similar method to cut the stopped rabbet with a table-mounted router, although it would take several passes.

Join the shelf and the mid-section with glue and a simple butt joint, as the width of the areas being joined provides ample glue surface. Fasten the scrollwork into its rabbet



Because it would have been difficult to wipe excess finish from the scrolled back while working around the five pegs, they were removed during finishing, then glued into place.

with glue and several $\frac{3}{4}$ " no. 6 wood screws.

You can turn the pegs on a lathe or cut them from a length of $\frac{1}{4}$ " walnut dowel available from Constantine's. Glue these into the $\frac{1}{4}$ " mortises drilled in the scrollwork.

WOODWORKING MISTAKES

In the second issue of *Home Furniture* magazine, Alan Breed wrote an account of his experiences during the construction of a reproduction of one of the masterpieces of American cabinetmaking: a six-shell secretary built by John Goddard late in the eighteenth century. Before beginning any shop work, Breed took detailed measurements, rubbings and photos of the original, which awaited auction at Christie's in New York. (The original later sold for \$12.1 million.) Although he found the level of craftsmanship to be superb, he also found mistakes "like planing a little too deeply on the upper door stiles and exposing the mortises for the rail tenons."

For those of us whose skills fall a good bit short of John Goddard's, this is reassuring. Just as we sometimes struggle in the shop, so did he.

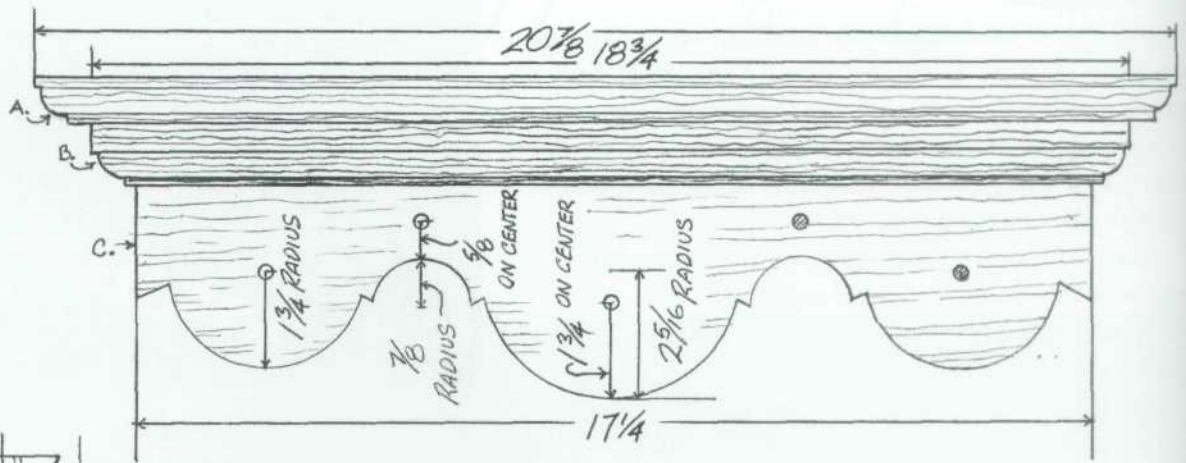
With each piece I built for this book, for example, there is at least one nagging detail I wish I'd managed a little better. It might be an area of roughened finish. (I could have wiped the piece more thoroughly.) It might be a gap showing beside a through tenon. (I could have taken more time paring the mortise.) It might be an imperfect color match on a glued-up panel. (I could have dressed more lumber prior to choosing the pieces

I would use.)

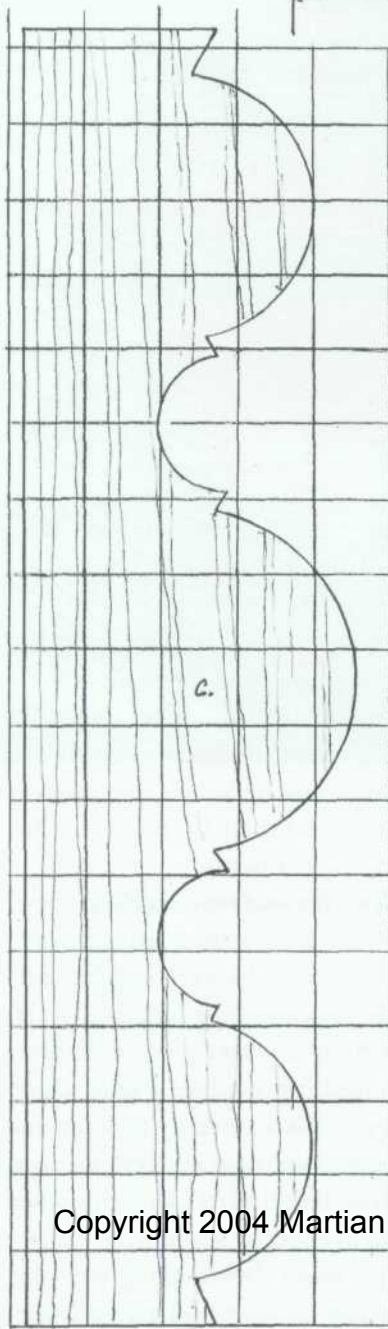
What follows are some of the more common fixes I use in my shop, each of which was employed at least once in the preparation of projects for this book:

1. Make a new part. Sometimes, after struggling for hours to make a piece come together, this most obvious solution can be emotionally difficult to face, but it is almost always the best solution. An hour spent cutting out a new end panel for a case on which the dovetails simply don't fit is better spent than an hour given to attempts at patching up such a joint.

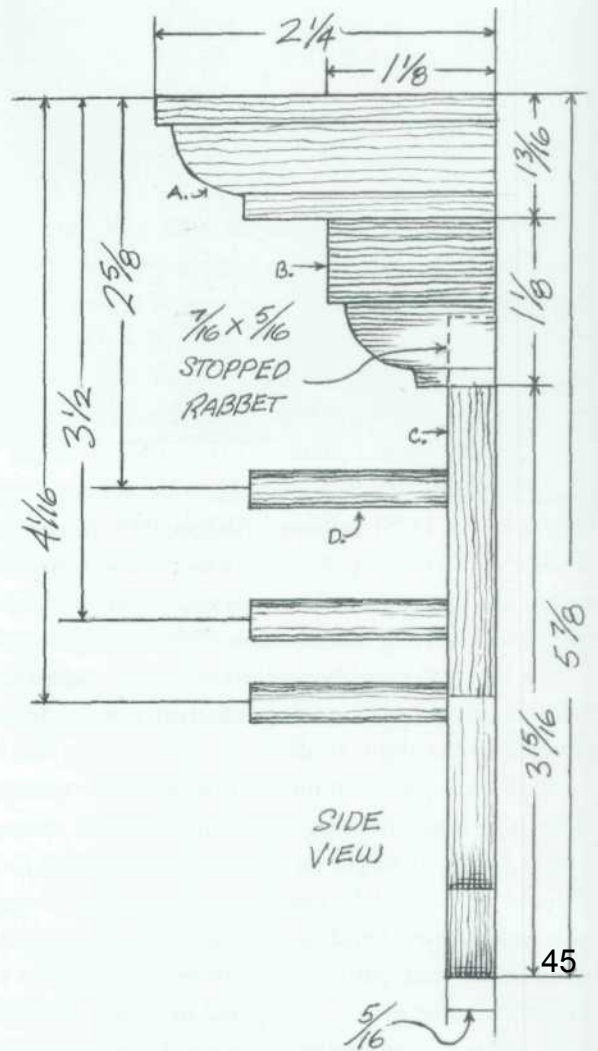
2. Mix up some yellow glue and sanding dust. Some times a set of dovetails will have a small gap or two beside a pin or tail. If the rest of the work is sufficiently well done, a filler made of yellow glue (aliphatic resin) and dust created by machine-sanding a piece of the same species as that being joined can produce a satisfactory appearance. It's not as good as a perfectly fit joint, but the results are much better than those achieved by using commercially made fillers. This is particularly true when working with photoreactive species like cherry. Commercially prepared fillers won't darken along with the surrounding wood whereas the dust and glue mixture



FRONT VIEW



SCROLL DETAIL 1" GRID



SIDE VIEW

will, having been created from the same photoreactive material.

3. **Trust the glue.** Sometimes, no matter how carefully we work, a part will split during a test assembly, but this is rarely the disaster it may at first appear to be.

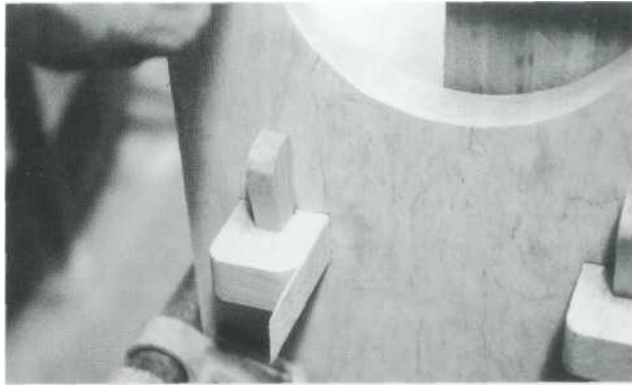
If the split runs the full length of the part and the two sides can be separated cleanly, a coat of glue on each fractured face and an hour in a set of clamps will restore the part to its original strength.

If the split only runs a couple of inches along the length of a longer piece, you can work glue into the split with a little patience. First, apply a generous layer of glue to the part, directly over the split. Then work the split open and closed a number of times, causing the glue to migrate down into the gap. When it appears that the glue has worked all the way through the split, wash the excess off of the surface, and clamp the part until the glue has cured.

4. **Modify the piece.** In places that can't be reached with shaving tools, I use a wood file to remove band saw marks from scrollwork. In cleaning up the scrollwork for the key rack at the beginning of this chapter, I got a little too aggressive with the file and flaked off some chips from one of the sharp points near the central arc. I worked that point down until I was beyond the torn-out grain, but when I stepped back from the part, I could see that that particular point was visibly different than the other three.

The solution? With a file, I carefully removed enough material from the other three points so that they matched the one on which I'd made my error.

5. **Graft in new material.** While building the figured oak magazine stand (chapter twelve), I got a poor fit on



A gap was visible on one side of the tusk tenon so a sliver has been grafted onto the tenon to fill it.

the mortise for one of the eight tusk tenons. The gap was fairly noticeable, and I would have liked to have made a new shelf, but I had no more oak with that particular wavy grain.

To hide the "Me" gap, I ripped a thin sliver from a piece of scrap having grain and color similar to the tusk tenon that fit through the bad mortise. Then, with a C-clamp and a couple of scrap pads, I glued the sliver to the side of the tusk tenon after sliding one end of the sliver into the 1/16" gap. When the glue had dried, I cut away the excess and blended the sliver into the curve at the end of the tusk tenon.

The gap hadn't made the joint structurally unsound, and the glued on sliver did conceal the gap, but this wasn't a perfect solution. When that particular tusk tenon is sighted from above, it's clear that there's a little more material on one side of the walnut wedge than there is on the other.

MATERIALS LIST			
A	Shelf	1 pc.	13/16 x 2 1/4 x 20 7/8
B	Mid-section	1 pc.	1 1/8 x 1 1/8 x 18 3/4
C	Scroll	1 pc.	5/16 x 4 3/8 x 17 1/4
D	Peg	5 pcs.	1/4 x 1 5/8
E	Screws		3/4" no. 6

12

FIGURED OAK MAGAZINE STAND

White Oak, Walnut



MAKING THE MAGAZINE STAND

Through tenons completely pierce and, in some cases, extend beyond the outside surface of the board through which they pass. One advantage of this joint over the shorter, more commonly used stopped tenon is increased glue surface.

The through tenon also offers some design opportunities not associated with the stopped tenon. A through tenon can be shaved flush and fit with wedges of contrasting wood, as was done with the through tenons on the ash drying rack pictured in this book (chapter nineteen). Or, as with this magazine stand, the tenons can extend well beyond the outside surface of the board through which they pass and can themselves be given through mortises into which wedges (keys) are driven. These wedges, characteristic of knockdown furniture, provide a mechanical lock for the sides of the case, in addition to adding an appealing visual detail.

After the stock has been thickened, ripped to width, and cut to length, lay out and saw the half-circle cutouts that separate the feet and those that form the handgrips with a handheld jigsaw.

Then, cut shelf dadoes. You can do this with a set of dado cutters on the radial arm saw or with a set of cutters on the table saw. At this time, cut the through mortises for the tusk tenons.

Careful marking is essential. First, using a try square, extend the upper and lower limits of the shelf dadoes around the edges and onto the opposite faces of the end panels. These lines mark the upper and lower limits of the through mortises. Then, mark the widths of these mortises and score their perimeters with a knife held against a straight-edge.

CUTTING THROUGH MORTISES

1 Careful layout is essential. After marking locations with a pencil, use a knife to score across the grain only on the perimeter of the mortises. This knife line will provide a reliable means for aligning the chisels with which the mortise will be given its final shape.

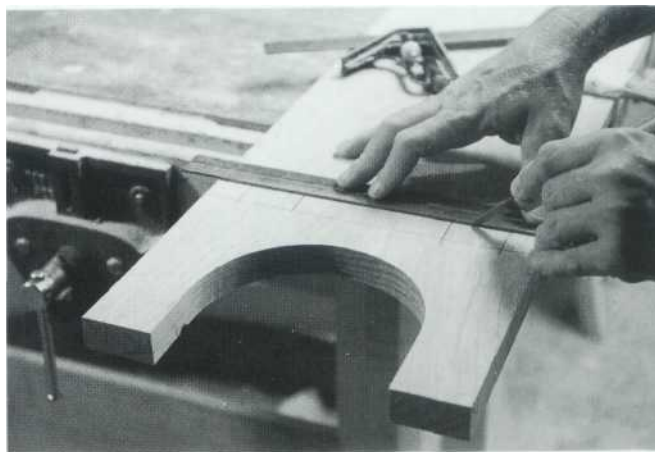


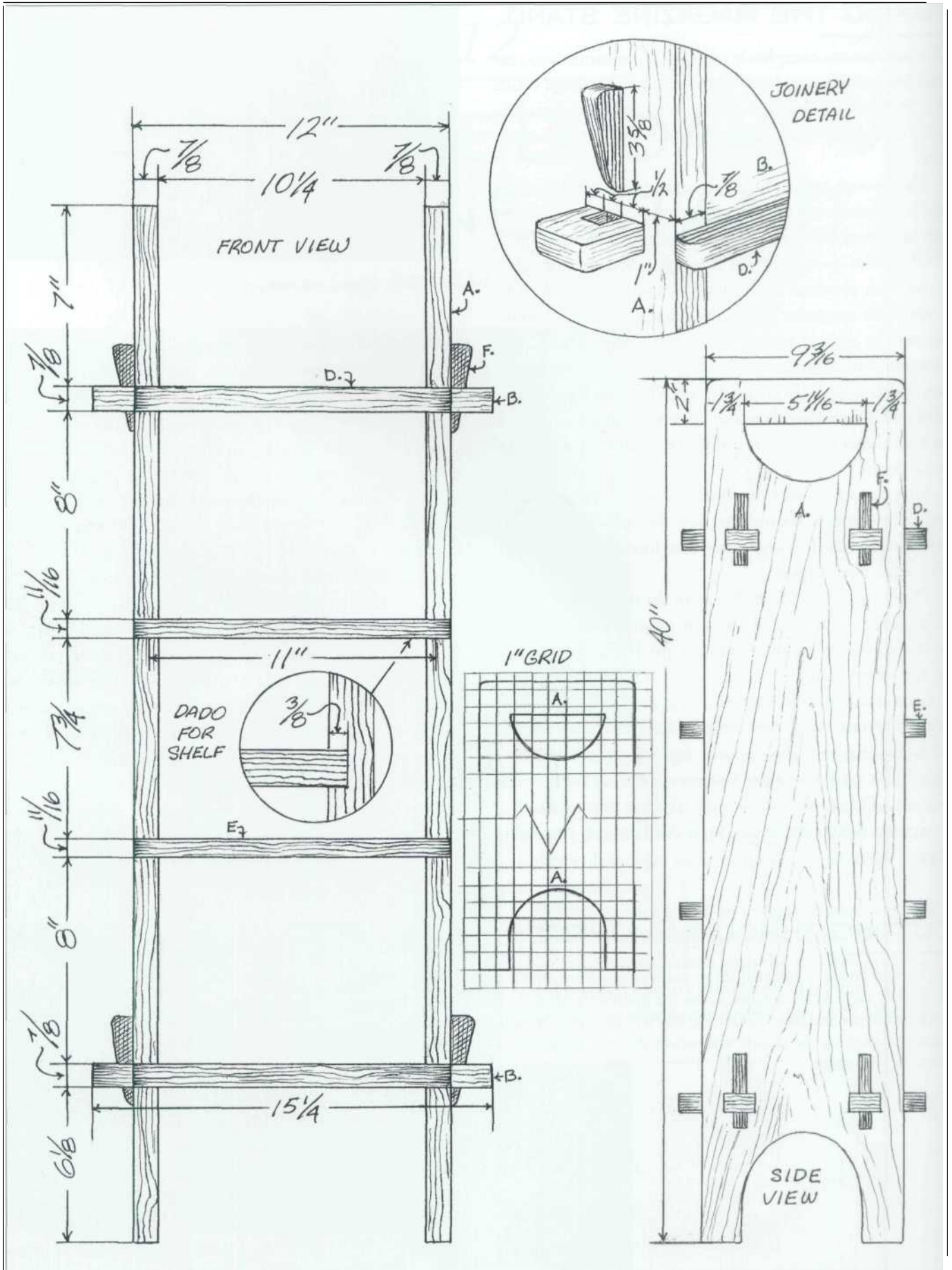
This wildly figured oak was perfect for this piece.

Remember: Aggressive drilling and chisel work can result in chips breaking out around the perimeter of the mortise on the back side of the board. For this reason, use a backup board during drilling, and lay out the mortise on both sides of the board so you can alternate chisel work from one side to the other, working toward the middle.

After cutting the mortises and fitting the tusk tenons through them, cut the mortises for the walnut wedges. It's important to dry-clamp the whole assembly tightly before marking these mortises so that they will be correctly located along the length of the tusk tenon. Their placement should cause the wedges to draw the case together as they are driven into their mortises. To achieve this, place the inside edge of the wedge mortise so that it will be approximately 1/8" inside the outside face of the end panel at assembly.

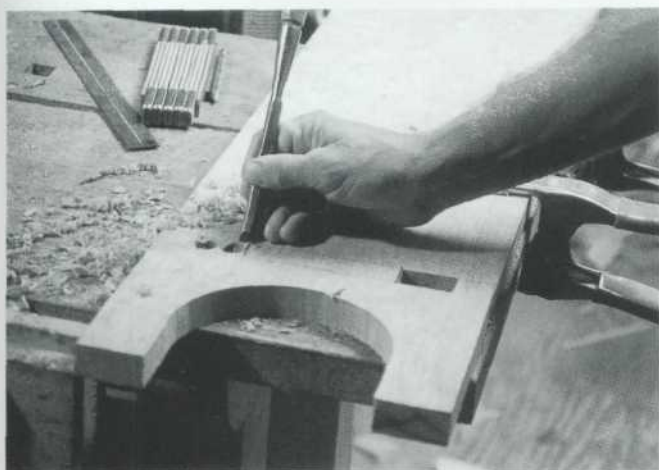
When the wedges have been fit, glue and assemble the case, clamping everything tightly together. After the glue has cured, remove the clamps and apply the walnut shelf-facings. Glue and nail these into place (my choice) or glue them and clamp until dry. The second method eliminates the need to fill nail holes, but it is a bit slower.





CUTTING THROUGH MORTISES (CONTINUED)

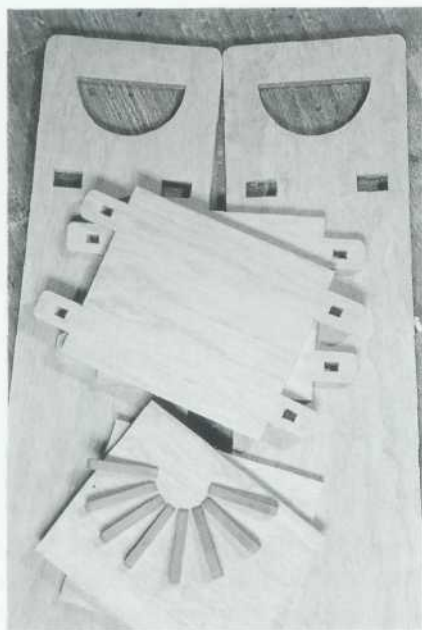
2 Then, remove waste with a handheld drill and a Forstner bit.



3 With a paring chisel and a wooden mallet, define the walls of the mortise.

GLUE-UP

1 Sand parts before assembly, even though additional sanding will be necessary later



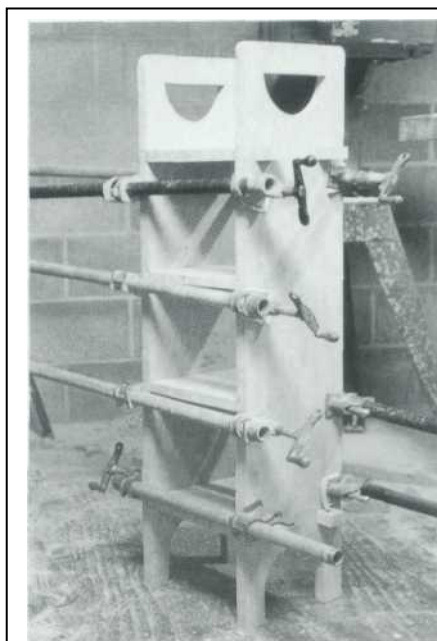
MATERIALS LIST

A	End	2 pcs.	$7/8 \times 9\frac{3}{16} \times 40$
B	Top and bottom shelf	2 pcs.	$7/8 \times 9\frac{3}{16} \times 15\frac{1}{4}$
C	Middle shelf	2 pcs.	$1\frac{1}{16} \times 9\frac{3}{16} \times 11$
D	Top and bottom shelf facing	4 pcs.	$7/8 \times 1 \times 12$
E	Middle shelf facing	4 pcs.	$1\frac{1}{16} \times 1 \times 12$
F	Wedge	8 pcs.	$1/2 \times 1\frac{3}{16} \times 3\frac{3}{8}$



4 Mark the tusk tenons on the upper and lower shelves using the mortises as guides. Then, cut tenons on the band saw.

2 A large number of clamps are required to bring the case together before you can drive the wedges into place through the tusk tenons.



13

BOX WITH RAISED PANELS



MAKING THE BOX WITH RAISED PANELS

After the material has been selected and dimensioned, plough grooves on the inside faces of the box's sides and ends to receive the tongues on the edges of the box's top and bottom. Cut dovetails at each of the box's four vertical corners,

Glue the dovetails and assemble the four walls of the box around the top and bottom. At first, this may seem strange because this makes the box a completely sealed enclosure, allowing no access to the space inside. This problem, however, will be solved very quickly.

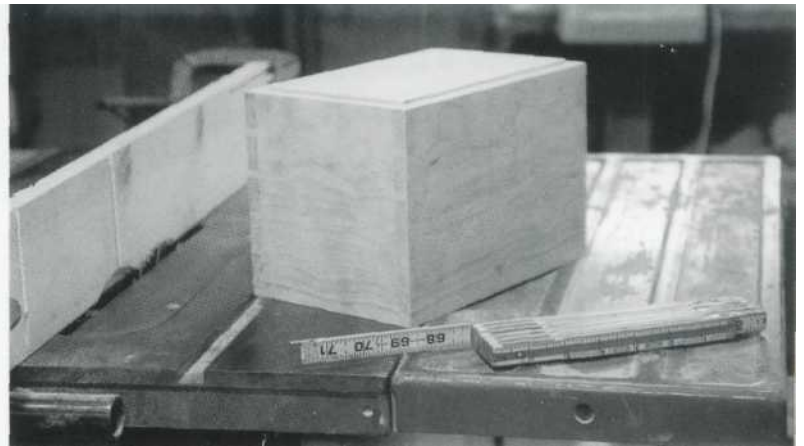
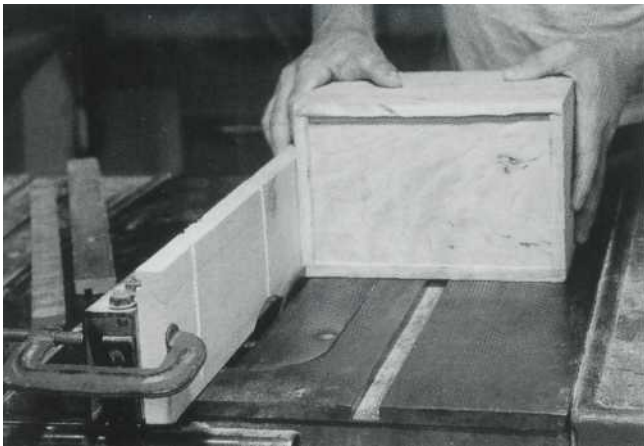
Because of the placement of the groove near the top of the inside faces of the front, back and ends, the top panel is already raised 1/8". After the pins and tails at each of the

box's vertical corners have been sanded flush, the four vertical panels are raised by cutting a 7/16" X 1/8" pass around all four sides.

You can do this on either the table saw or on a table-mounted router by removing enough material to give the effect of raising the central portion of each of the vertical panels.

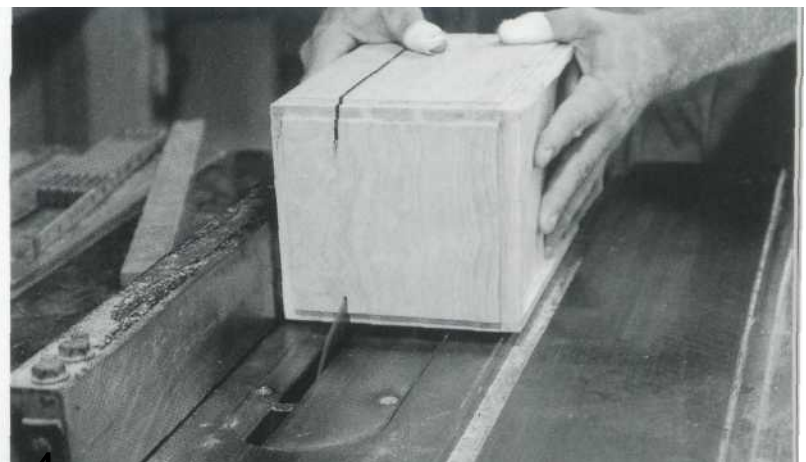
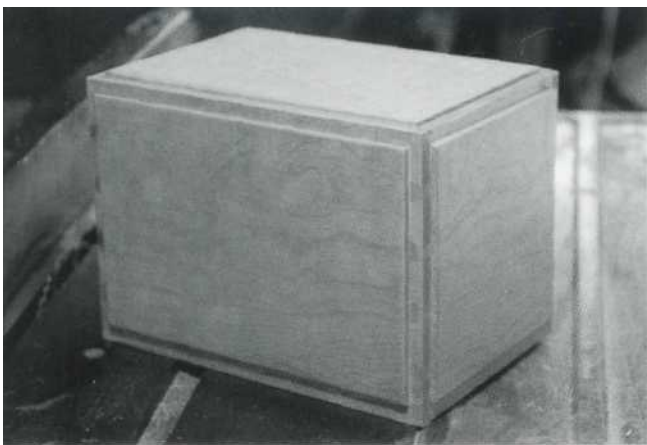
Create a lid by cutting a saw kerf through the four walls of the box 1 7/8" from the top.

After installing the hardware (see chapter twenty-seven), cut a shallow mortise around the strike plate, and fasten the 1/8" thick pull into place with glue and a few brads. The box is then ready for sanding and finishing.



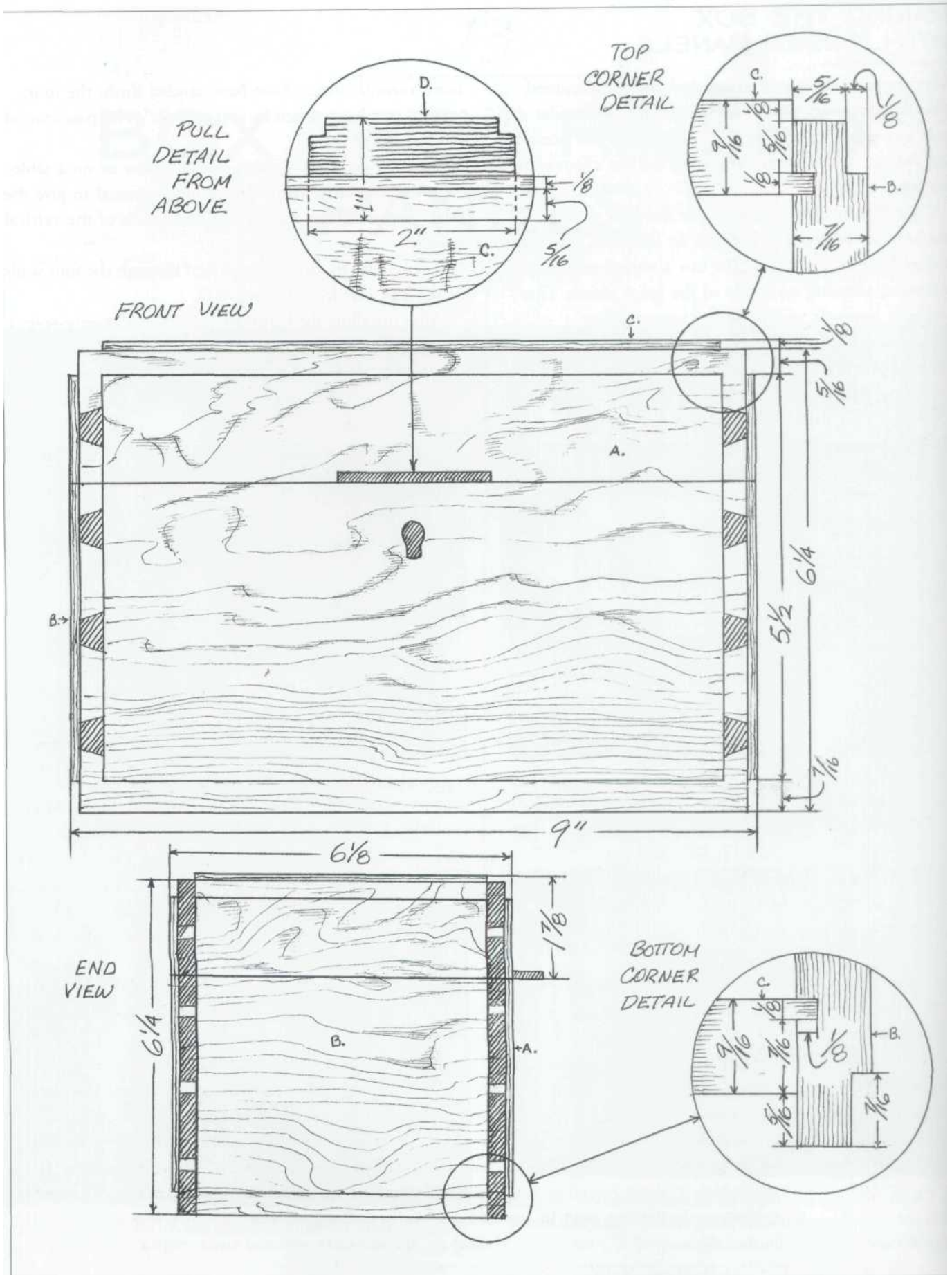
1 Clamp a strip of wood to the saw fence. This wood will protect the blade when the fence is crowded against it. Then, set the blade at a height of 7/16" above the saw table, and bring the fence up to it.

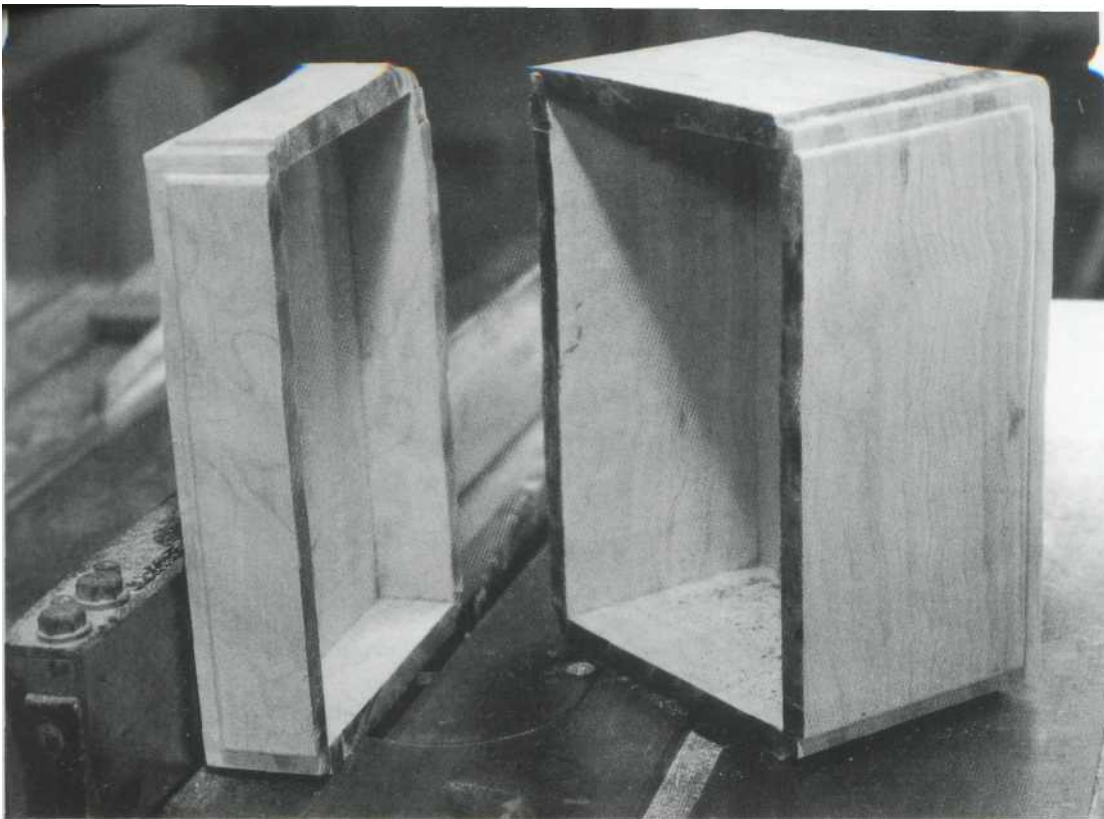
2 The box's four vertical faces are framed by the 7/16" X 3/32" saw kerf created when the perimeter of those faces is passed over the blade.



3 Chisels, files and sandpaper are necessary to remove the grain tear-out and burn marks left along the saw kerfs. (This should bring the saw kerf to its finished thickness of 1/8".)

4 Set the fence 1 7/8" from the blade, cut off the top, creating the lid.





5 Notice the burn marks left by the saw blade. A blade on which the teeth have set won't burn; however, the hollow-ground planer blade is made without set in order to produce a smoother cut and, as a result, often leaves a burned surface.

BURN REMOVAL

I have read that a hollow-ground planer blade can be persuaded to cut without leaving behind the unsightly, blackened surfaces visible in the above photo. I have read that if the blade is razor sharp, free of pitch, and set perfectly parallel to the rip fence, it is possible to cut without burning.

But I haven't been able to manage it.

I clean the blade frequently, and it is kept sharp, and of course I make an effort to properly set the rip fence, but I always end up with burned surfaces on one or both sides of the cut.

This could be a result of the fact that machine tool maintenance is not a priority in my shop. Although I have the standard array of power tools, I use them no more than necessary and never take pleasure in their operation. They produce too much noise and too much dirt, making the shop a thoroughly unpleasant place to be.

I have, instead, focused on methods for removing these bum makes from cut surfaces.

Those in the above photo are relatively easy to eliminate. Placing the tip of an extremely sharp 1" butt chisel across the thickness of the blackened wood, I drag the chisel backward (in the direction opposite the bevel) in a scraping motion. Two or three passes removes most of the scorching, in addition to leveling any irregularities left behind by the sawing process. A little work with sandpaper wrapped around a bit of flat scrap then completes the clean-up process.

The scorched areas resulting from the formation of the

MATERIALS LIST

A	Front and back	2 pcs.	$\frac{7}{16} \times 6\frac{1}{4} \times 9$
B	End	2 pcs.	$\frac{7}{16} \times 6\frac{1}{4} \times 6\frac{1}{8}$
C	Bottom and top	2 pcs.	$\frac{3}{16} \times 5\frac{1}{2} \times 8\frac{3}{8}$
D	Pull	1 pc.	$\frac{3}{8} \times 2 \times 1$
E	Hinges	2 pcs.	$1\frac{1}{2} \times \frac{7}{8}$
F	Box lock	1 pc.	$1\frac{1}{2} \times 1$

**These are net measurements. A surplus should be added to dovetailed parts to allow joints to be sanded flush.*

**Hinges and lock were ordered from Constantine's Hardware.*

raised panels on the four sides of this box are a little more difficult. Because the raised panel is immediately adjacent to these flats, they can't be straddled with a chisel. Making the process even more difficult is the fact that the vertical flats on each end of the raised panels run across the grain.

The solution? The only one I know requires patience and a lot of work with a fine-toothed wood file and sandpaper.

I suspect that it would take less time to tune my table saw so that a hollow-ground planer blade wouldn't burn cut surfaces than it does to remove the burn marks afterwards. I suspect that I'm not using my shop time as wisely as I might. But there is a trade-off here. To achieve the overall time savings, I would have resigned myself to several hours of frustrating, knuckle-busting power-tool maintenance, and the truth is that I would rather spend my time scraping and sanding.

16

CHIPPENDALE MIRROR

Cherry, Walnut



MAKING THE CHIPPENDALE MIRROR

Although not a reproduction of any specific eighteenth-century original, this mirror does evoke a number of Chippendale designs.

Begin construction with the scrollwork background. After the pieces have been band sawn and sanded, assemble them with butt joints and hold in place with a pair of cleats which are glued and screwed across the back of the scrollwork. At that time, take measurements for the large moulding which lifts and presents the glass.



This close-up shows how the scrollwork, tack strip and cleat are assembled.

CHIPPENDALE

What are the characteristics of Chippendale furniture?

In the strictest sense, the only furniture that can be identified as Chippendale is that to which Thomas Chippendale, the English carver and designer actually applied his tools. But there are few such pieces and many that are commonly (and usefully) referred to as Chippendale.

Another approach reserves the Chippendale name for those pieces that are exact representations of his published drawings. But this, too, is very limiting, particularly when discussing furniture made in North America. While there are a handful of American-made pieces which accurately represent specific Chippendale designs, the overwhelming majority of American-made Chippendale furniture does not—for some very good reasons.

Thomas Chippendale, George Hepplewhite and Thomas Sheraton—the English designers whose seminal books inspired much American period furniture—all designed for a different market than that served by most

Working with these measurements and the available shaper cutters and router bits, you can determine the moulding's profile. After the stock has been run, miter the four pieces of the moulded frame to length and screw into place. Complete finishing before installing the mirror to avoid sullyng its surface. Tack four wood strips to the back, inside face of the moulding, to hold it in place.

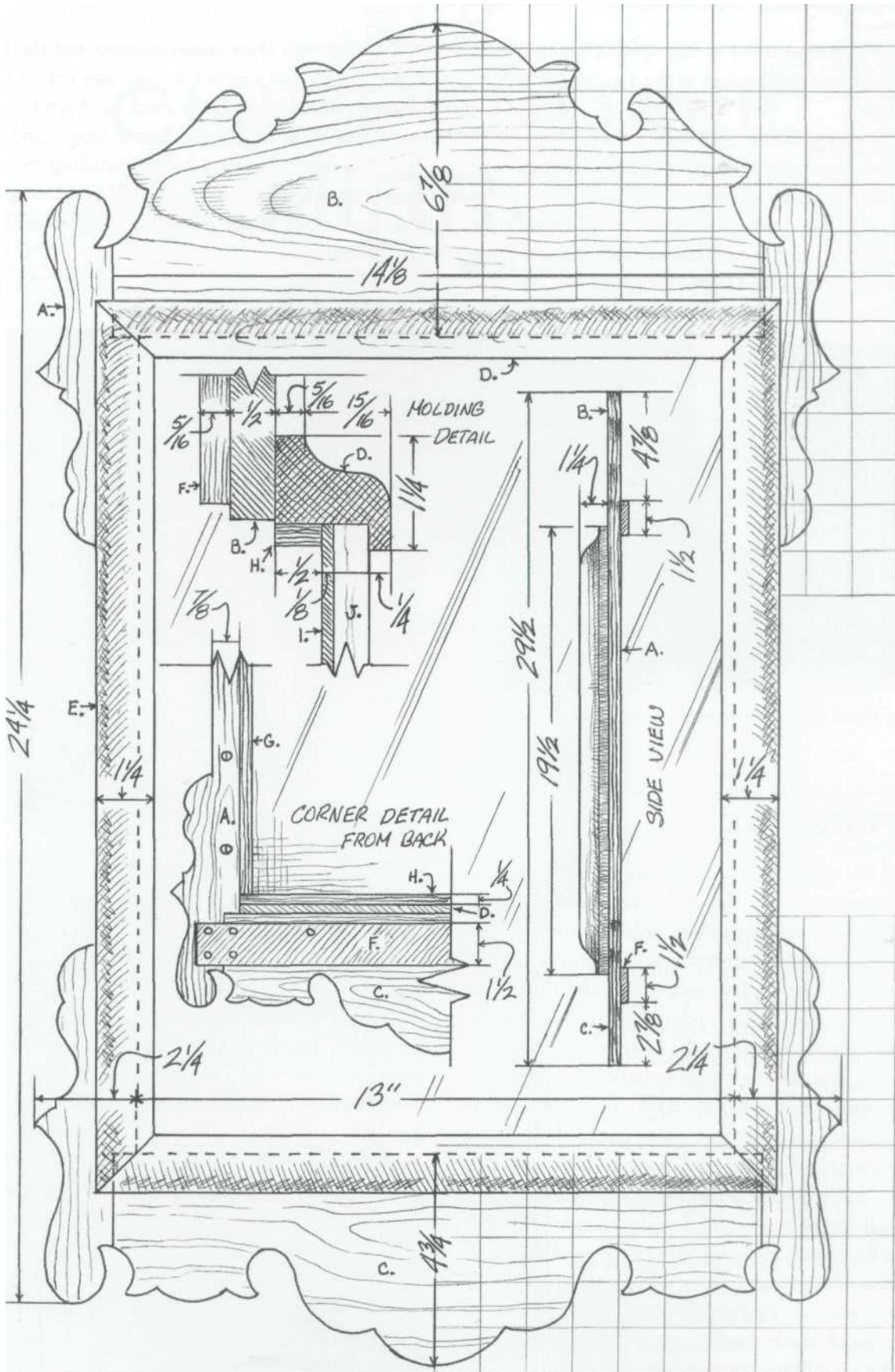
MATERIALS LIST

A	Vertical scrollwork	2 pcs.	$\frac{1}{2} \times 2\frac{1}{4} \times 24\frac{1}{4}$
B	Top scrollwork	1 pc.	$\frac{1}{2} \times 6\frac{7}{8} \times 14\frac{1}{8}$
C	Bottom scrollwork	1 pc.	$\frac{1}{2} \times 4\frac{3}{4} \times 14\frac{1}{8}$
D	Horizontal moulding	2 pcs.	$1\frac{1}{4} \times 1\frac{1}{4} \times 14\frac{7}{8}$
E	Vertical moulding	2 pcs.	$1\frac{1}{4} \times 1\frac{1}{4} \times 19\frac{1}{2}$
F	Cleat	2 pcs.	$\frac{5}{16} \times 1\frac{1}{2} \times 16\frac{1}{8}$
G	Vertical tack strip	2 pcs.	$\frac{1}{4} \times \frac{1}{2} \times 17\frac{1}{16}$
H	Horizontal tack strip	2 pcs.	$\frac{1}{4} \times \frac{1}{2} \times 12\frac{7}{8}$
I	Mirror back	1 pc.	$\frac{1}{8} \times 12\frac{7}{8} \times 17\frac{1}{16}$
J	Mirror	1 pc.	Exact measurements should be taken after the frame has been constructed.

American craftsmen of the day. Many of the English designs were intended for placement in grand English homes and included, therefore, elaborate ornamentation that was inappropriate for less palatial American settings (and perhaps for less effete American sensibilities).

This doesn't mean that discriminating American buyers weren't concerned about the appearance of their furniture. Clearly they were, but what those buyers wanted was furniture that not only looked good but was also, and most importantly, useful. They wanted storage, serving surfaces, beds. In short, they wanted furniture in which function and form were more fully integrated.

To address this desire on the part of their customers, American designers/craftsmen reinterpreted the forms presented in the books of the English designers, restraining the decorative excesses of the originals, focusing on the usefulness of their furniture in the homes of their customers.



This makes stylistic attribution a slippery business. Even though almost all high-style American furniture of the late eighteenth and early nineteenth centuries exhibits characteristics of Chippendale, Hepplewhite and Sheraton designs, very little actually represents any specific published drawings. Further complicating the business of stylistic attribution is the fact that many pieces exhibit characteristics of more than one style. A sideboard might have a spade foot (a Hepplewhite signature) and a gallery of turned spindles (associated with Sheraton's designs). A chair might have a balloon back

and solid splat (Queen Anne) and ball-and-claw feet (Chippendale).

In the hands of a skilled craftsman, such blending is unimportant. A well-designed chair is a well-designed chair whatever the origins of its iconography.

But for the student of furniture, it can be useful to look at this matter of stylistic attribution—not to fasten a particular label on a particular piece but in order to reflect on the American designer/craftsman's handling of the forms and motifs with which he worked.

With that in mind, I put together the following chart:

<u>STYLE CHARACTERISTICS</u>				
This chart is not intended to list all the elements of any of these styles. It is meant only to illustrate ways in which one style might be differentiated from another.				
	CHIPPENDALE	HEPPLEWHITE	SHERATON	EMPIRE
form	syma curve	geometrical curvilinear	geometrical rectilinear delicate	massive
ornament	carving scrollwork	stringing veneering inlay	turning bandings carving reeding	carving veneering ormolu
motif	cabriole leg ball-and-claw foot	spade foot tapered legs	turned and tapered legs	animal feet animal heads

14

SHAKER-STYLE PEDESTAL STAND

Cherry, Walnut, White Pine



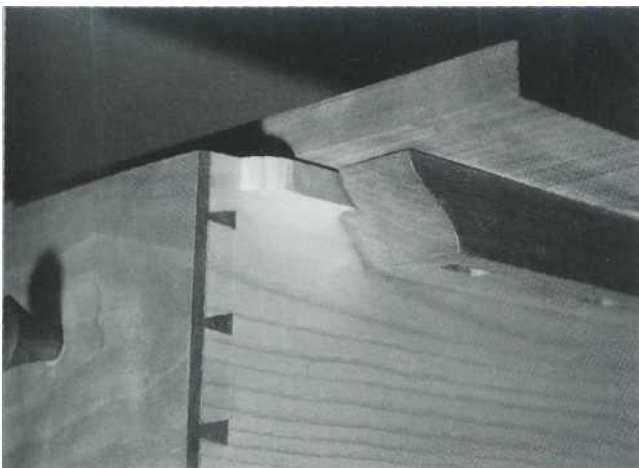
MAKING THE SHAKER STYLE TWO DRAWER PEDESTAL STAND

After the stock has been dimensioned, glue-up the top panel and set aside to cure. The pedestal is turned next.

Although the arrangement of coves, beads and vases will be determined by the craftsman's individual tastes, there are two areas along the length of the pedestal that must be shaped to meet the requirements of joinery.

The first of these is the very top section, the one that will eventually become the tenon fitting into a mortise cut into the center cleat. In order to create at this location a joint that would lock more positively than would a round tenon in a round mortise, I decided to cut that tenon into a 1" X 1" square. This meant that the diameter of that top section could be turned to no less than 1 7/16".

The second area requiring special attention is the base into which the tenons (or sliding dovetails) are fit. The exact diameter of this section is, of course, up to the discretion of the individual craftsman, but it is very important that a consistent diameter be maintained along the full 5 1/4"

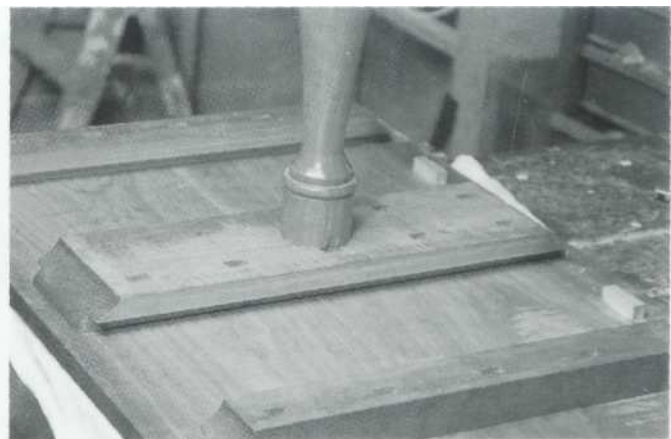


1 Here, a drawer runner can be seen sliding into its rabbet.

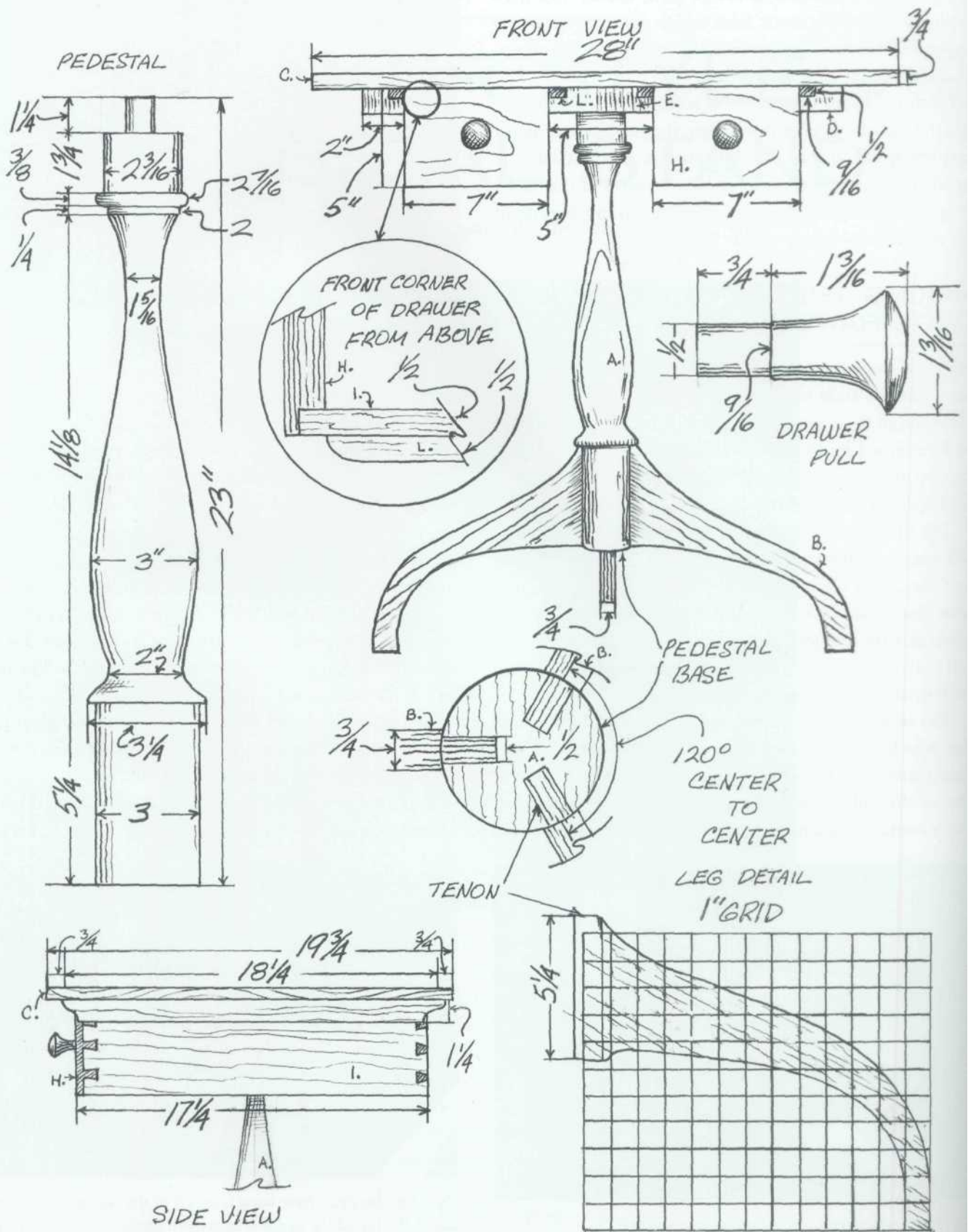


The walnut drawer pulls contrast nicely with the cherry drawer fronts.

length of this section because the shoulders of the three legs will be fit tightly against this turned face, and any variation in diameter will result in gaps at those shoulders. The next step, which is taken before the work is removed from the lathe, is marking leg locations on the base of the pedestal. This can be done by using the lathe's indexing head. Briefly, an indexing head is a disk centered on the lathe's axis that is divided into thirty-six sections, each representing 10° of the disk's circumference. On my lathe, there is a spring-loaded peg that can be set into any of thirty-six holes marking these divisions. To locate the centerline of the first leg, I release the peg into any of the holes, locking the work into that position. Then, with the tool rest snugged against the base of the pedestal, I draw a line along the 5 1/4" base. This line marks the centerline of the first leg. To find the second line, I remove the peg, rotate the work, allowing the peg to slide into the next



2 After the cleats have been fastened to the top, glue the tenon at the top of the pedestal into the mortise cut into the center of the middle cleat.



hole. This process is repeated until I have worked my way to the twelfth hole. Here, I draw another line along the tool rest, marking the centerline of the second leg. Then, counting out twelve more stops on the indexing head, I arrive at the centerline for the third leg.

Although the indexing head simplifies the process of dividing the circumference of the pedestal base into three equal sections, there is an alternative requiring only a compass, a pair of calipers and a rule. First, with the calipers and a rule, determine the diameter of the base. Then, multiply half of that diameter by 1.732. Separate the points of the compass by this distance, and position the stationary leg of the compass at any point on the cylinder's circumference. Make a line along the tool rest at that point. Then, make a second line at the point at which the opposite leg of the compass is farthest from the first line. Then advance the compass so that its stationary leg rests on this second line. Finally, draw a third line along the tool rest where the opposite leg of the compass is farthest from the second line, completing the process of dividing the circumference of this cylinder into three equal sections.

Fit the three legs of this stand into 5^{1/4}" long sliding dovetails cut into the base of this pedestal. To this point, I've cut the joints on every pedestal table I've made by hand, and it is inevitably a laborious process. To cut the dovetail mortise, I place the pedestal between 1"-thick blocks of Styrofoam held in place by a towel wrapped in tape, securing the entire, awkward assembly in my vise. This method works but it is slow and a bit clumsy.

The dovetail tenons are even more difficult to cut. I begin these by scoring lines which mark the shoulders on the faces of the 3/4"-thick legs. Then, crowding the teeth of a fine-toothed backsaw against the waste side of this line, I cut the shoulders. Complicating this process even further is the fact that the shoulders have to be undercut so that they form a sharp knife-like edge. This is necessary so the shoulders make tight contact with the round base. Maintaining an accurate alignment along the full 5 1/4" length of these shoulders is very tricky, but not as tricky as cutting the face of the dovetail. This cut begins on the end grain of the leg and, like the shoulder, was a full 5 1/4" long. The saw delights in wandering to one side.

After having made several of these stands with hand-cut sliding dovetails, I'm ready to suggest some alternatives. First, if I were to make another with the dovetail joints, I would take the time to build a fixture that would allow the dovetail mortises to be cut with a router while the pedestal is still mounted on the lathe. A reeding or fluting fixture would work nicely for this purpose. The tenons, of course, could be readily cut on a table-mounted router.

But I really believe that, if I were to make another of these stands, I would drop the dovetail joints and switch to mortise-and-tenon construction. Not only would this be much easier to cut, it would, I think, result in no loss of strength since it would provide an equal amount of glue surface and, at least in this particular application, there is little mechanical advantage to the dovetail joint

MATERIALS LIST

Table

A	Pedestal	1 pc.	3¼ × 23
B	Leg	4 pcs.	¾ × 5¼ × 18
C	Top	1 pc.	¾ × 19¾ × 28
D	Outside cleat	2 pcs.	1¼ × 2 × 18¼
E	Middle cleat	1 pc.	1¼ × 5 × 18¼
F	Drawer stop	2 pcs.	½ × ½ × ¾
G	Screws	various	

Drawers

H	Front	2 pcs.	¾ × 5 × 7
I	Side	4 pcs.	½ × 5 × 17¼
J	Back	2 pcs.	½ × 5 × 7
K	Bottom	2 pcs.	½ × 4½ × 17
L	Runner	4 pcs.	½ × ½ × 15¾
M	Pull	2 pcs.	1¾ × 1½
N	Screws	various	

**These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.*

After profiling the legs on the band saw and fitting their tenons into the mortises cut into the pedestal, flatten and smooth the tabletop (see chapter five) and cut to its final length and width. Then, profile the ends of the cleats on the band saw, and cut rabbets for the drawer runners.

Using a backsaw, cut the tenon at the top of the pedestal to its 1" X 1" final size. Cut a matching mortise into the center of the middle cleat. Dry-fit this to the tenon.

At this point, fasten cleats to the bottom of the tabletop using no. 12 wood screws passing through oversized holes (holes that will allow the top to expand and contract in response to seasonal changes in humidity) in the cleats.

Build the drawers with through dovetails at the back and half-blind dovetails at the front. Screw drawer runners to the tops of the drawer sides and fit them to the rabbets in which they will slide. Turn and install pulls. Fasten drawer stops (two blocks of wood screwed to the underside of the top) into place. The piece is ready to finish.

15

WALL BOX

Hard Maple



MAKING THE WALL BOX

After the material has been dimensioned, lay out the scrollwork on the back. Once the location of the top circle is established but before the scrollwork is cut out on the band saw, cut a dado across the grain on the back side of this circle. This dado should extend well below the narrow throat on which the top circle is resting. Fit a strip of vertically grained wood into that dado and fasten with 3/8" no. 4 wood screws. Then, cut out the scrollwork. After establishing the angle for the two sides, cut the top edge of the front to match. You can do this on the table saw by ripping the piece to width on a blade canted at the proper angle, but I find it quicker to create that angle with a few strokes of a hand plane. Use a bevel gauge to check progress during this operation.

Remember that the angle on the box's front piece is not cut to match the height of the sides at their front most point because the highest point of the angle on the front piece will join the sides 7/16" back from the frontmost point. The 7/16" measurement allows 3/8" for the thickness of the dovetail joint, plus a 1/16" surplus which will be sanded away to make the joint flush.

Cut the dovetails at each of the box's corners. After sanding these flush, give the bottom of the box and the

lid shaped edges on a shaper or a table-mounted router. Install the bottom with wood screws passing through oversized holes in the bottom. These holes are oversized to allow the part to expand and contract in response to seasonal changes in humidity.

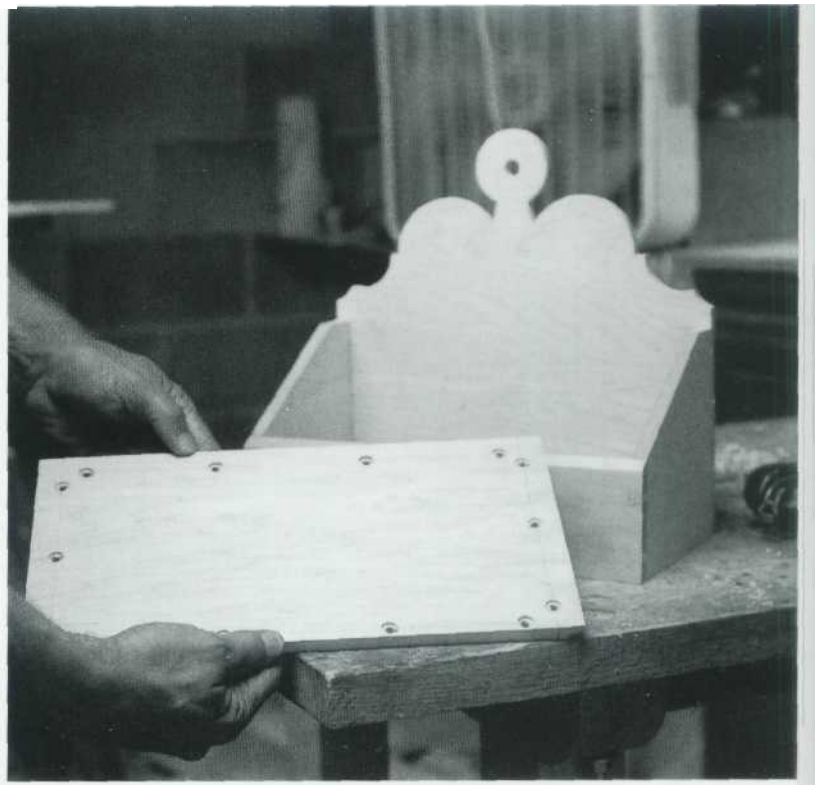
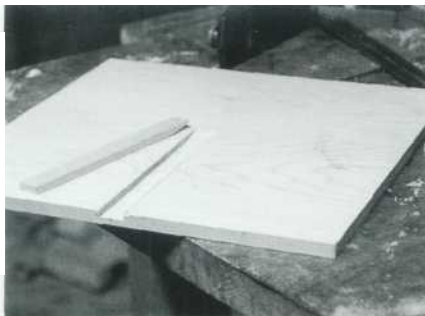
The narrow top, to which the lid will be hinged, is the next consideration. Form the angled front edge, which will abut the angled back edge of the lid, with a hand plane. Then fasten it to the case with several screws passing through the back of the box. Although I felt it unnecessary because of the top's narrow width, this part might be more securely fastened by installing some short glue blocks underneath the joint between the top and the sides of the case.

Using a hand plane, fit the back edge of the lid to the angle already established on the front edge of the box's top. Do this gradually so that it can be fit against the front edge of the top without gapping at the ends.

Next, install the hinges. The pair shown in the photo are Brainerd antique brass hinges from which the tails on the upper leaves have been cut to allow those upper leaves to fit on the narrow width of the top of the box.

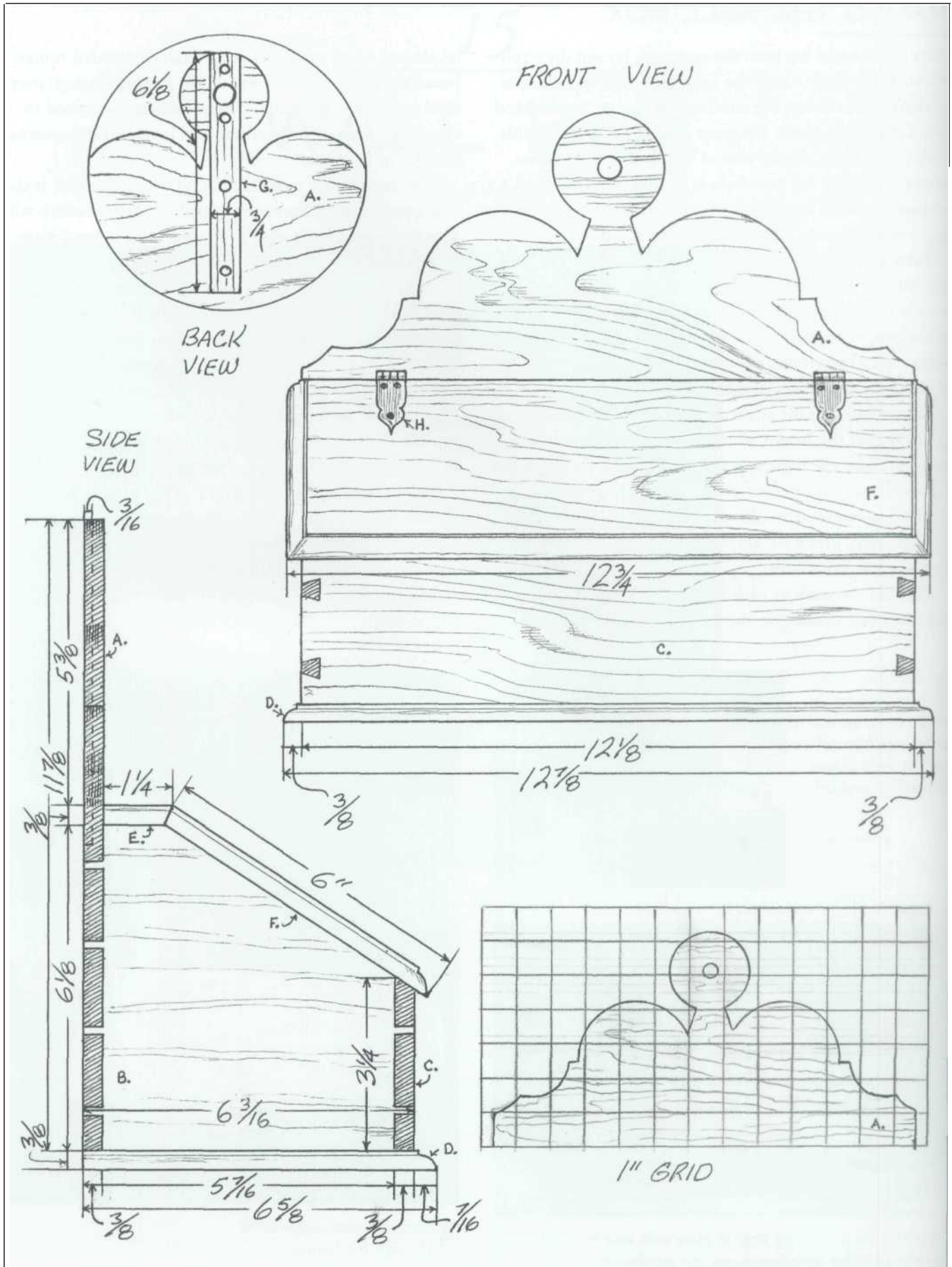
Remove the hinges and give the box a final sanding and several coats of finish.

1 Butt this wide, straight edge up to the fence on the radial arm saw and cut the dado before the back is profiled.

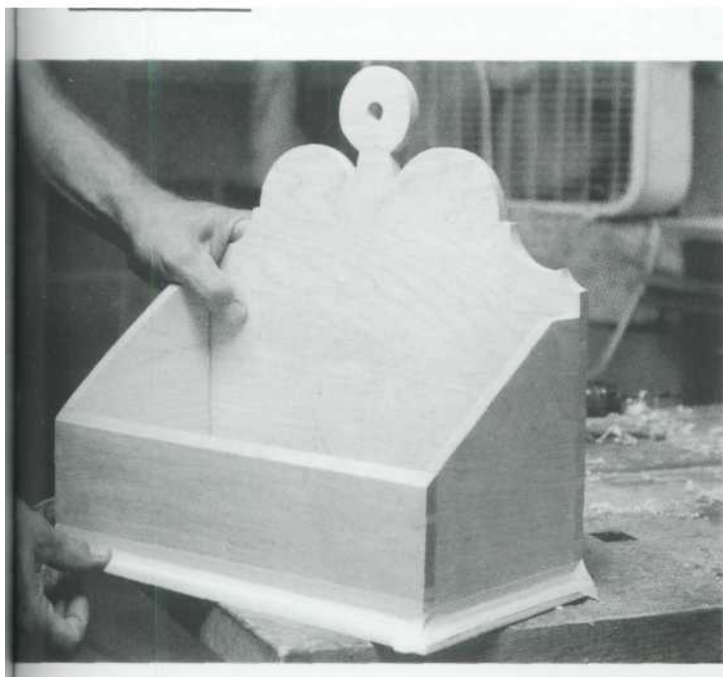


2 Hold the reinforcing strip in place with four 3/8" no. 4 wood screws. After installing it, cut the scrollwork.

3 Drill oversized screw holes through the bottom.



MAKING THE WALL BOX (CONTINUED)



4 Hold the bottom in place with masking tape while driving the screws up into the box's frame.



5 With the box held upside down in a vise, fasten the bottom.



6 Check frequently to ensure that the top and the lid will come together without gaps.

MATERIALS LIST

A	Back	1 pc.	$\frac{3}{8} \times 11\frac{7}{8} \times 12\frac{1}{8}$
B	Side	2 pcs.	$\frac{3}{8} \times 6\frac{1}{8} \times 6\frac{3}{16}$
C	Front	1 pc.	$\frac{3}{8} \times 3\frac{3}{4} \times 12\frac{1}{8}$
D	Bottom	1 pc.	$\frac{3}{8} \times 6\frac{7}{8} \times 12\frac{7}{8}$
E	Top	1 pc.	$\frac{3}{8} \times 1\frac{1}{4} \times 12\frac{3}{4}$
F	Lid	1 pc.	$\frac{3}{8} \times 6 \times 12\frac{3}{4}$
G	Reinforcing strip	1 pc.	$\frac{3}{16} \times \frac{3}{4} \times 6\frac{1}{8}$
H	Hinge	2 pc.	$3\frac{1}{4} \times \frac{1}{2}$
I	Screws	14 pcs.	$\frac{3}{4}$ " no. 6

**These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.*

17

HEPPLEWHITE-STYLE END TABLE

Cherry, Birch, White Pine



MAKING THE HEPPLEWHITE" STYLE END TABLE

Select plane, joint and edge-glue material for the top.

Set aside the top panel, and prepare the legs. First, dimension the leg stock to $15/16" \times 15/16"$. Then mark and cut the mortises for the apron parts and the drawer rails, and draw the taper on the leg stock with a pencil.

On the face of the leg that will be seen from the side of the table, the legs taper from $15/16"$ at the lower limit of the apron to $1/2"$ at the floor. On the face of the legs that will be seen from the ends of the table, the legs taper from $5/16"$ to $3/8"$

Cut the tapers on the band saw; clamp the leg in a vise so that saw marks can be removed with a hand plane.

Cut out and tenon apron parts and drawer rails. Fit these tenons into the leg mortises which are placed so that the outside faces of the apron parts are recessed $1/8"$ from the outside faces of the legs. Set the drawer rails, on the other hand, so that their outside faces are flush with the outside faces of the legs. Then, glue-up the frame—consisting of the apron parts, the drawer rails and the legs.

Remove the tabletop from the clamps, and surface it with hand planes and sandpaper, a process discussed in chapter five.

Next, cut the grooves for the inlay. You could make these with a router, but I cut the grooves on this top on a table saw fit with a hollow-ground planer blade. This blade is made without set and with a thin-ground rim. As a result, it leaves a $3/32"$ saw kerf with sharp, clean edges.

Rip out the birch inlay itself using the same planer blade passing through a combination wood fence and throat that is clamped to the saw's steel fence. Glue the inlay into its grooves; plane and sand flat.

Because the top will expand and contract across its width in response to seasonal changes in humidity, fasten it to



Shown here is the combination fence and throat I use for ripping inlay and cock bead.



This close-up of the drawer side shows the cock bead inlay around the drawer.

the table frame with wood screws passing through oversized holes in the kicker strips. (The kicker strips are the two cleats above the drawer sides that keep the front of the drawer from dropping as the drawer is opened.)

The over-sized holes in the kicker strips will allow wood movement without splitting the top.

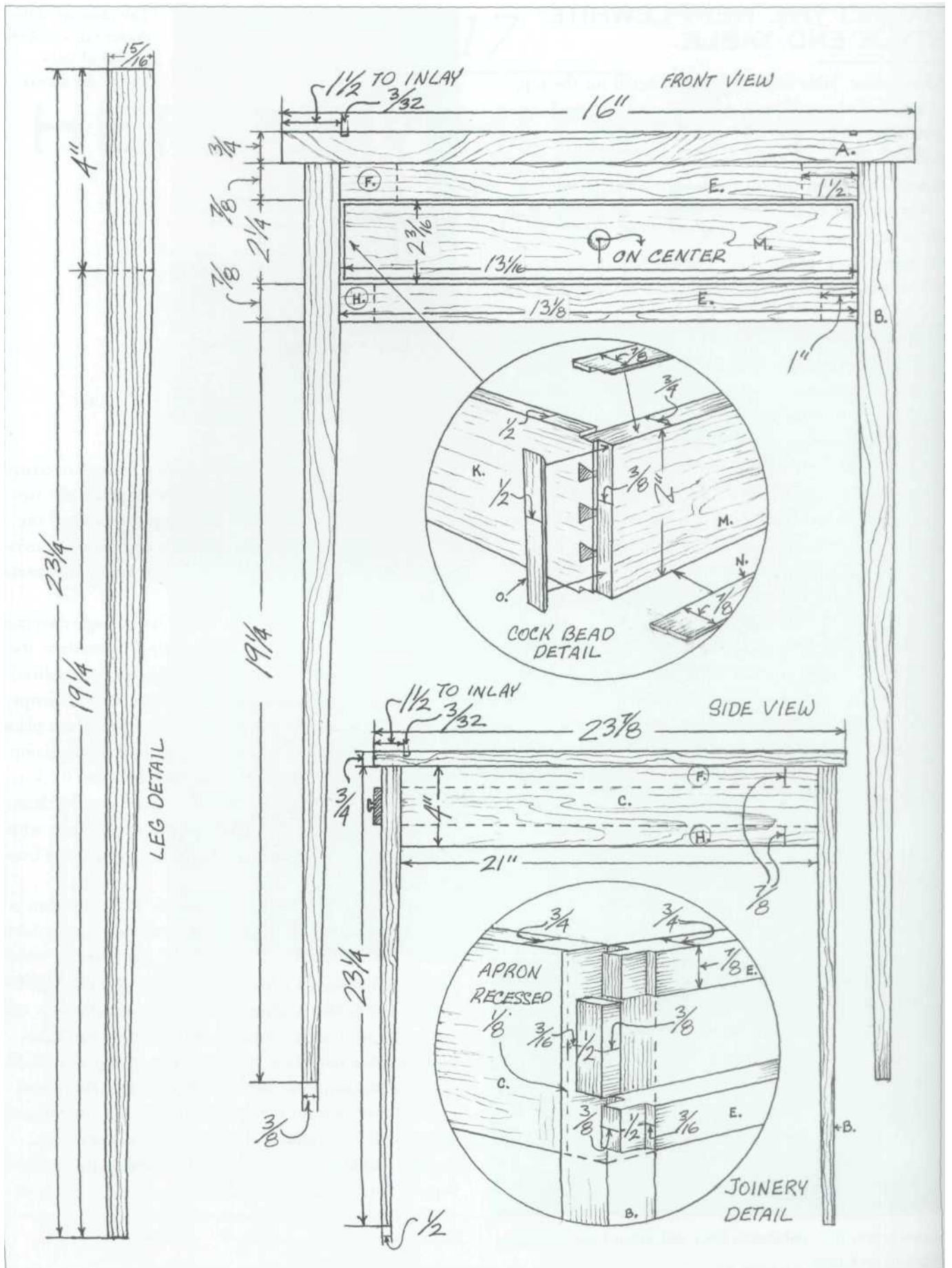
Drawer construction is standard. Use through dovetails at the back of the drawer and half-blind dovetails at the front. (Both joints are discussed in chapter twenty-five.)

Rip strips for the $3/32"$ cock bead (thin, mitered strips framing the drawer front) from $7/8"$ birch stock. Next, plane them. To round the front edge of the cock bead, clamp the strips of $3/32"$ planed stock in a vise between thicker, wider boards so that approximately $1/4"$ sits above the clamping boards along the full length of the strips. Then with a block plane, remove enough material to round the front edges of the strips.

Next cut rabbets for the cock bead. This operation is done on the table saw, again using a hollow-ground planer blade. The blade is set to a height $1/8"$ less than the width of the cock bead ($5/8"$). Then, with the blade crowded against a wood fence, take a single pass from the top, bottom and both ends of the drawer which stands on its front end.

This cuts a rabbet $3/32"$ wide which is equal to the thickness of the cock bead. With brads and glue, fasten the mitered cock bead to the drawer front so that its rounded edge stands $1/8"$ proud of the face of the drawer front.

After installing the drawer runners and stops, the table is ready for finishing and hardware.



FURNITURE DESIGN

Almost 150 pages of Thomas Sheraton's *The Cabinet-Maker and Upholsterer's Drawing Book*, a collection of some of the most influential furniture designs ever published, is focused on geometry, including almost thirty pages on the five classical orders of proportion taken from the five types of Roman columns: Tuscan, Doric, Ionic, Composite and Corinthian.

This lengthy exposition on the subjects of geometry and proportion highlights the importance of formal design education to the makers of period originals. This is an education that many modern designers/craftsmen lack. Some contemporary woodworkers, guided by enormous natural talent, seem unhindered by this absence. Others, however, lacking both the talent and the education, are creating furniture which, while well-crafted, is often clumsy in appearance.

Although not guided by either an enormous natural talent or by a classical design education, I've found that, in order to do business, it has been necessary for me to design work to suit my customer's needs. What follows is a list of commonsense principles I've found useful:

1. Steal from the past. Wood furniture has a history that stretches back at least five thousand years, and throughout that span designers and craftsmen have struggled with the same question confronting wood workers today: How can chairs, beds, tables and chests be designed so that they are both beautiful and useful?

Clearly, no single answer to this question is perfect. If it were, we would have only one style of bed, chair or table. But many of the hard-won solutions created by our predecessors are worthy of study and emulation.

2. Take chances. Particularly at the pencil and paper stage, the most bizarre ideas deserve consideration because, although they may never be translated whole into actual pieces of furniture, a careful examination may reveal things that can be incorporated into more traditional forms.

3. Consider aesthetics and joinery simultaneously. Often, designs that look spectacular on paper simply can't be created from wood, a natural material with a whole range of characteristics that must be considered each time one wood part is joined to another.

4. Develop graceful lines. When I designed the two-drawer sewing stand (after several Shaker originals), I worked to create a curve in the legs that would move smoothly into the curves of the pedestal. I hoped this

would lift the eye to the tabletop and drawers, as well as produce a line that was inherently satisfying to contemplate.

5. Repeat motifs. Repetition of a shape, pattern or color can give a piece both rhythm and unity. On the six-drawer chest, for example, the cone shape of the pulls is repeated six times across the front of the drawers, adding visual rhythm in much the same way that a repeated drumbeat can add auditory rhythm to a piece of music. Also, that tapered cone shape is repeated in the four legs that support the chest, assuring the viewer that all these parts belong to the same piece.

6. Incorporate exposed joinery. A set of dovetails marching across the corner of a piece not only adds rhythm (see photo on page 26), it also adds an appealing

MATERIALS LIST

Table

A Top	1 pc.	$\frac{3}{4} \times 16 \times 23\frac{7}{8}$
B Leg	4 pcs.	$1\frac{1}{6} \times 1\frac{1}{6} \times 23\frac{1}{4}$
C Apron side	2 pcs.	$\frac{3}{4} \times 4 \times 22^1$
D Apron end	1 pc.	$\frac{3}{4} \times 4 \times 14\frac{1}{8}^1$
E Drawer rail	2 pcs.	$\frac{7}{8} \times \frac{3}{4} \times 14\frac{1}{8}^1$
F Kicker strip	2 pcs.	$\frac{7}{8} \times 1\frac{1}{2} \times 21$
G Cleat	1 pc.	$\frac{7}{8} \times 1\frac{1}{2} \times 10$
H Drawer runner	2 pcs.	$\frac{7}{8} \times 1 \times 21$
I Inlay		$\frac{3}{32} \times \frac{3}{32} \times 7$ linear feet

Drawer

J Bottom	1 pc.	$\frac{1}{2} \times 12\frac{3}{8} \times 15\frac{3}{4}$
K Side	2 pcs.	$\frac{1}{2} \times 2\frac{3}{16} \times 16\frac{1}{8}$
L End	1 pc.	$\frac{1}{2} \times 1\frac{1}{8} \times 13\frac{1}{16}$
M Front	1 pc.	$\frac{3}{4} \times 2\frac{3}{16} \times 13\frac{1}{16}$
N Horizontal cock bead	2 pcs.	$\frac{3}{32} \times \frac{7}{8} \times 13\frac{1}{16}$
O Vertical cock bead	2 pcs.	$\frac{3}{32} \times \frac{1}{2} \times 2\frac{3}{16}$
P Pull	1 pc.	$\frac{1}{2} \times \frac{1}{2}$

¹Includes $\frac{1}{2}$ " tenon on each end.

*Net measurements are given. A surplus should be added to the lengths of dovetailed parts to allow them to be sanded flush.

*Drawer height and width are $\frac{1}{16}$ " less than the height and width of drawer opening. This allows $\frac{1}{32}$ " of clearance on all four sides.

*The pull was ordered from Constantine's Hardware.

visual detail, which arrests the eye, satisfying its hunger for interesting shapes and patterns.

7. Adapt stock thickness to the scale of the piece. Smaller, more delicate pieces require stock dimensioned to a greater thinness. A plate rack that is elegant when built from 3/8" material is brutish and clumsy when built from 7/8" stock.

8. Use beautiful materials. Yes, hardwood—particularly figured hardwood—is expensive, but the simplest pieces (the Shaker document chest, for example) are enormously appealing when built with beautiful material.

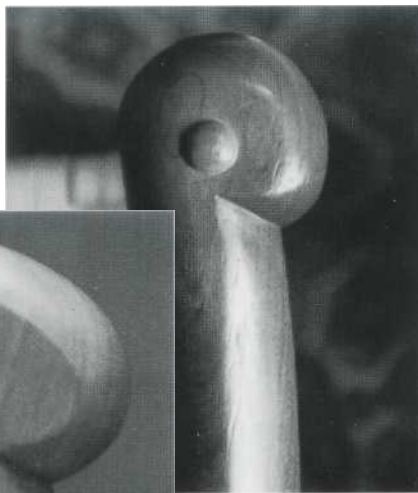
9. Use contrasting materials. A desk made entirely of walnut heartwood can be very attractive. But imagine that same desk with curly maple drawer fronts or with streaks of walnut sapwood showing like jagged lightning across the top.

10. Recognize that design is as much an evolutionary process as a revolutionary process. Rather than focusing on sweeping changes that might be made to the form of a chair, bed or chest, a designer might be better served by focusing on small, incremental changes which, over time, might add up to something significant.

DESIGN EVOLUTION

These photos illustrate the evolutionary development of an arm shape I've used on many Shaker-style chairs.

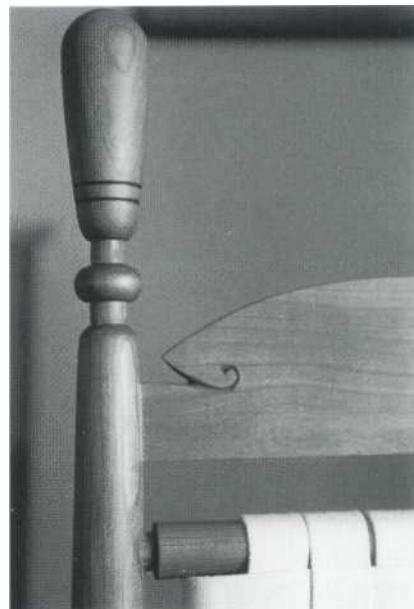
1 The first photo shows one of my earliest attempts to elaborate on the cookie-cutter shapes of the Shaker original.



3 The last two photos show details of a more recent chair.

2

The second shows an arm that's been widened and given a more distinct form.



4 The incised curve on the top of the arm now reaches to the wedged through tenon at the top of the chair's front post, a shape that recurs on the chair's slat.

18

TWO-DRAWER CHEST

Curly Maple, Cherry, Beech, Poplar

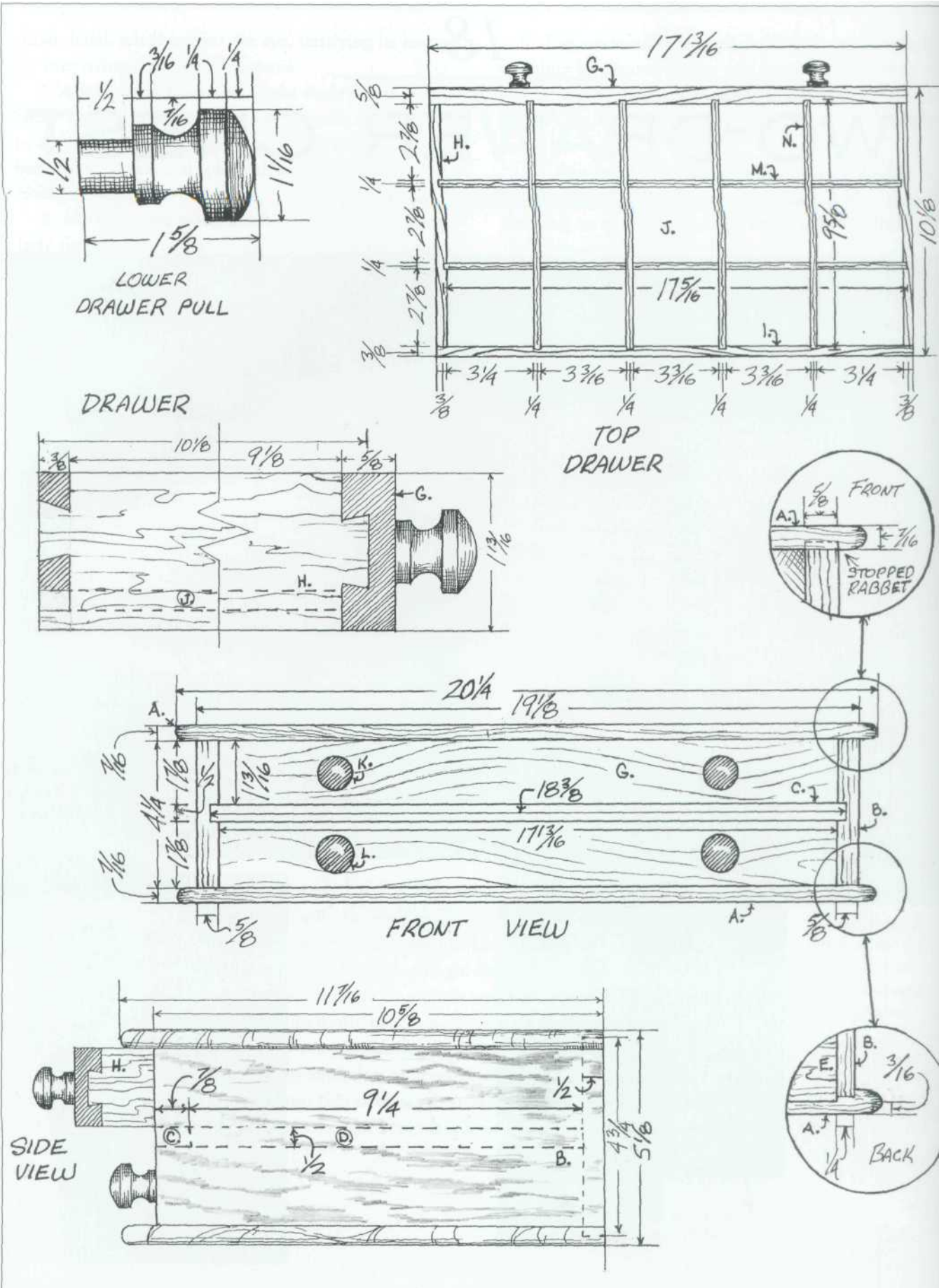


18

TWO-DRAWER CHEST

Curly Maple, Cherry, Beech, Poplar





MAKING THE TWO-DRAWER CHEST

After the material has been dimensioned, cut the joints for the case. First, cut the 1/8" X 5/8" stopped dadoes on the top and bottom that will receive the case sides. (See chapter five for information about cutting a stopped joint on the table saw.) Then cut the 5/16" X 1/2" rabbet along the back inside edges of the case sides and a 1/4" X 1/2" rabbet along the back inside edges of the top and bottom. Although the side rabbets run the length of the stock, the rabbets on the top and bottom are stopped on both ends. (Chapter five discusses a method for making stopped grooves and rabbets on the table saw.) Finally, cut the dadoes that will receive the dust panel and the drawer rail. Assemble the case with glue and screws. Fit plugs into the countersunk screw holes in the case's top.

Build the drawers next. The bottom drawer is a simple box, the parts of which are joined together with a single fat dovetail at each corner, through at the back, half-blind at the front (see chapter twenty-five). The upper drawer, compartmentalized by egg crating, is a little more complex.

After the egg crate stock has been dimensioned, dado the interior faces of the drawer sides, front and back to receive the ends of the crating material. Lay out and cut the half-slots that will join the pieces of the crating material. For this particular drawer, the slots were cut on the bottom half of the short lengths and the top half of the long lengths.

MATERIALS LIST

Case

A	Top and bottom	1 pc.	7/16 × 11 7/16 × 20 1/4
B	Side	2 pcs.	5/8 × 4 1/2 × 10 5/8
C	Drawer rail	1 pc.	1/2 × 7/8 × 18 3/8
D	Dust panel	1 pc.	1/2 × 9 3/4 × 18 3/8
E	Back	1 pc.	1/2 × 5 × 18 3/8
F	Plug	8 pcs.	5/8 × 1/4

Drawers

G	Front	2 pcs.	5/8 × 1 13/16 × 17 13/16
H	Side	4 pcs.	3/8 × 1 13/16 × 10 5/8
I	Back	2 pcs.	3/8 × 1 7/16 × 17 3/4
J	Bottom	2 pcs.	1/4 × 9 3/4 × 17 1/4
K	Upper pull	2 pcs.	1 × 1 1/2
L	Lower pull	2 pcs.	1 1/16 × 1 5/8

Egg crating

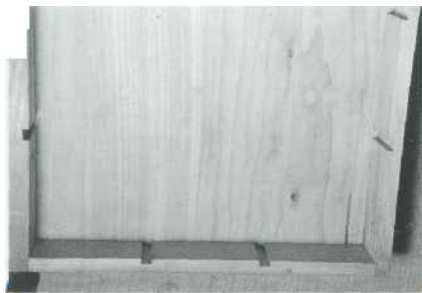
M	Long	2 pcs.	1/4 × 1 3/16 × 17 5/16
N	Short	4 pcs.	1/4 × 1 3/16 × 9 5/8

Hardware

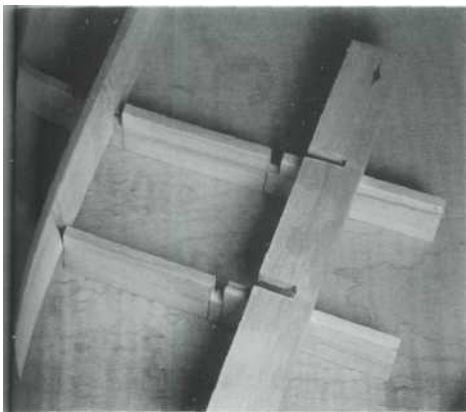
O	Screws	various	
---	--------	---------	--

**These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.*

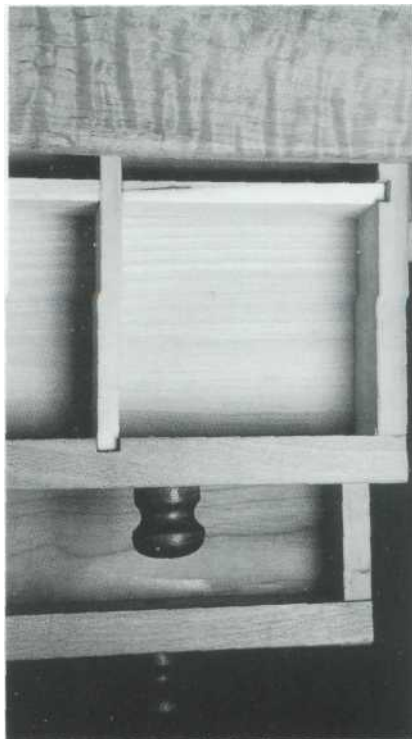
1 Prior to the drawer's assembly, cut dadoes on the inside faces of the drawer front, back and sides.



2 The egg crate components are held together with half-slots.



3 The chest's partially open drawers are shown here from above. Note the shape of the drawer pull.



19

DRYING RACK

White Ash, Walnut



MAKING THE DRYING RACK

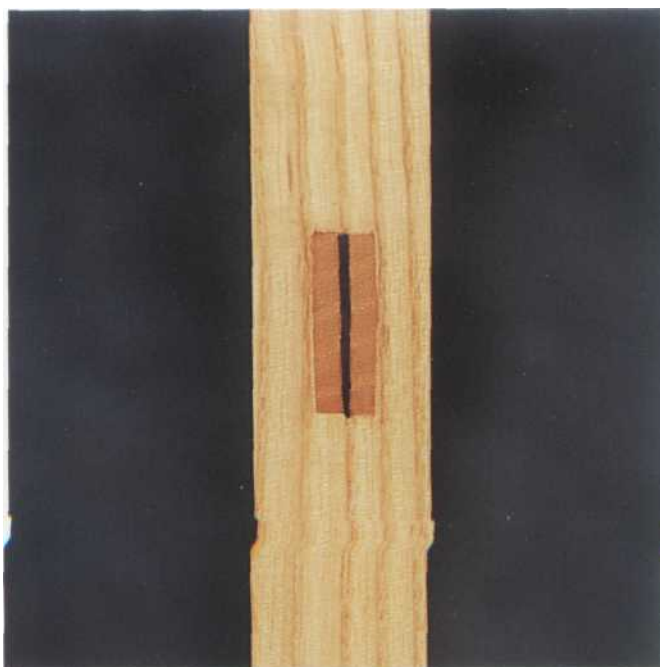
After milling the stock to the required thicknesses, widths and lengths, cut the feet with a band saw.

Form tenons on both ends of the posts and crossbars. This can be done by hand, using a tenon saw, or on a table saw fit with a stack of dado cutters.

Lay out and cut the twelve through mortises. Precision is essential with these tiny joints as the slightest error will multiply over the lengths of the posts, arms and crossbars. When test-fitting these tenons into their mortises, it's important to use a framing square (or other long-armed square) to make frequent checks of all right angles.

Notches for the walnut wedges should be no wider than *the kerf of a fine-toothed hacksaw*. After cutting these notches, dry-assemble the rack. Check angles and joints. Then, knock apart the rack, glue the joints, and drive the tiny walnut wedges into their notches.

After the glue has cured, saw off protruding wedges, pare tenons, and give the piece a final sanding.



Walnut wedges contrast with the ash through tenon and end grain.

FITTING MATERIAL TO TASK

All woods are not created equal. Among our American hardwoods, some—like cherry and walnut—display striking color. Others—such as oaks, ashes and hickories—have enormous resistance to breaking. Still others—like hard maple—can be turned or carved very finely without detail crumbling away as it might with a coarser wood.

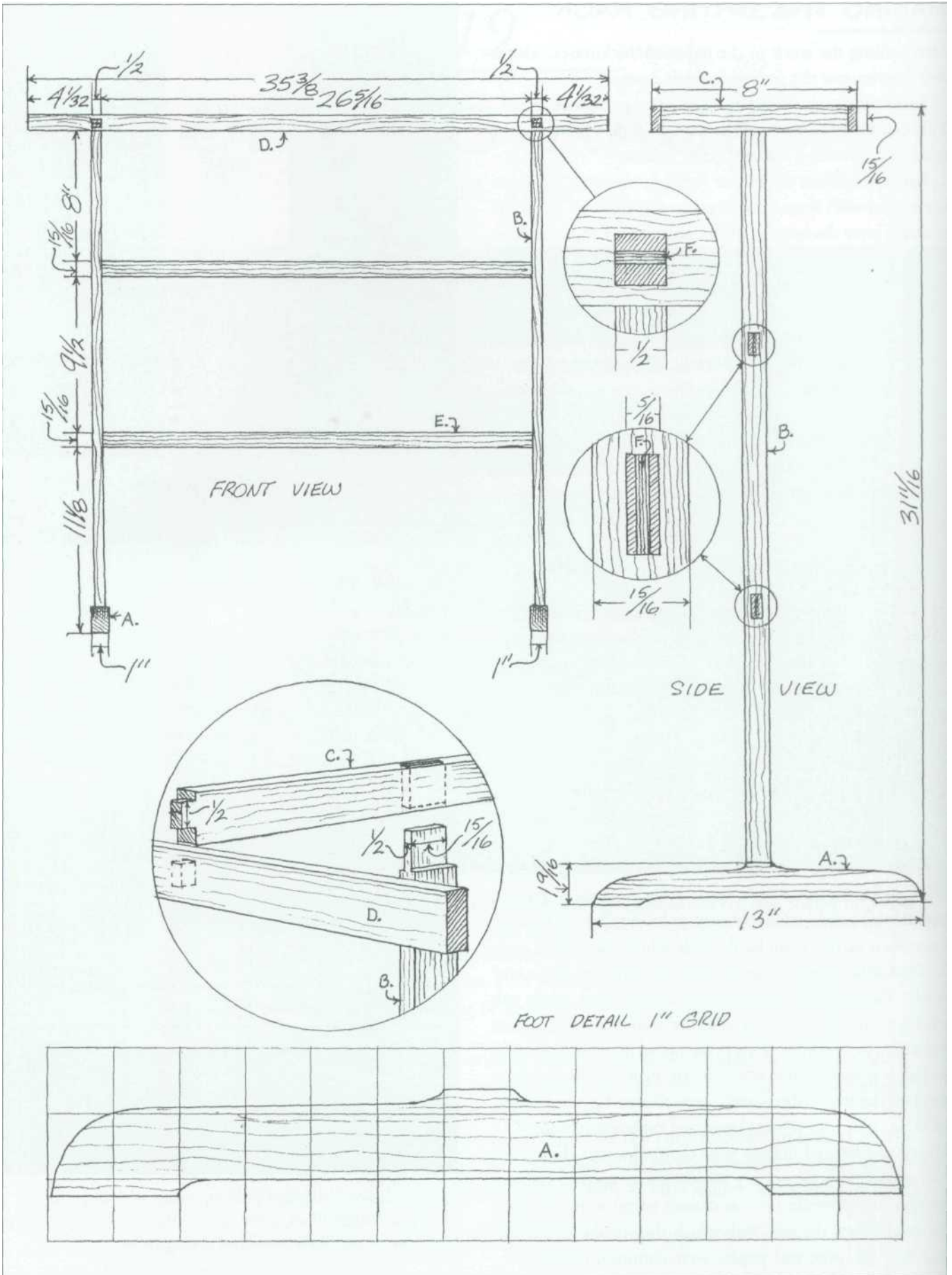
Traditionally, furniture was designed to take advantage of the different characteristics of the different species. The selection of species for the various parts of the Windsor chair illustrates this point. Windsor seats, which must be shaped to conform to the human bottom with hand tools—adzes, inshaves, travishers—were typically made of pine or poplar: softwoods relatively easy to manipulate. The legs were often turned from hard maple which, despite its nondescript color, possesses enormous strength and turns very nicely. Back spindles were usually shaved from white oak which, even when reduced to a tiny diameter, retains great resistance to breaking. This principle of matching material to task was also applied to casework. Primary woods (those used to fashion visible parts) were chosen for the beauty of their color and figure. Imported mahogany, walnut, cherry and figured maples were the traditional choices for this application. Secondary woods (those used to fashion interior components such as drawer parts) were selected for availability, the ease with which they could be worked. For this use, pine and poplar were common choices.

In general, eighteenth- and nineteenth-century woodwork reflected an intimate knowledge of the different qualities of different species of wood.

In an attempt to fit my material to my task, I chose ash for this drying rack because, of all the woods available in my shop, it offered the greatest strength when *planed so thinly*. This said, I should also point out that the original on which this rack is based was, inexplicably, built of pine.

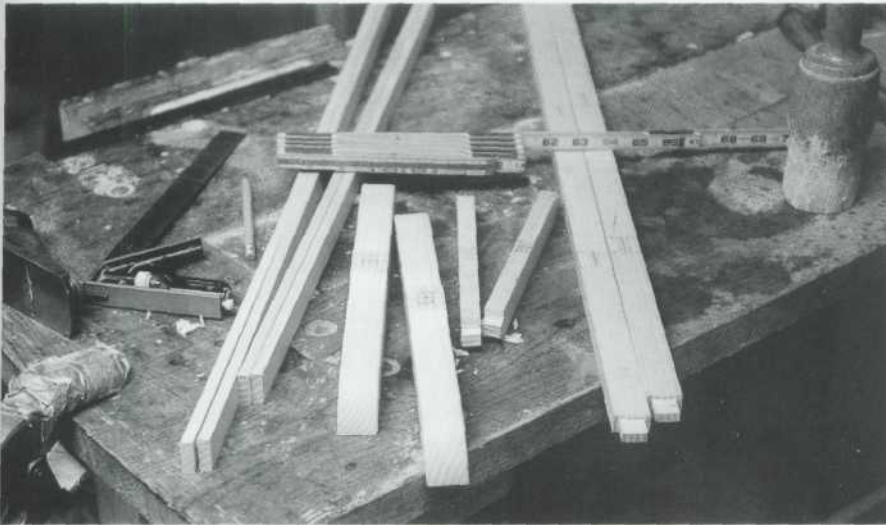


1 The Shakers delighted in doing much with little. In this single length of ash, there is more than enough material to build two of the Shaker-designed drying racks.



FITTING MATERIAL TO TASK (CONTINUED)

2 Tenons can be cut on the table saw with a stack of dado cutters.



3 After the parts have been dimensioned, shaped and tenoned, lay out and cut mortises.

MATERIALS LIST

A	Feet	2 pcs.	$1 \times 1\frac{1}{16} \times 13$
B	Post	2 pcs.	$\frac{1}{2} \times 1\frac{1}{16} \times 31\frac{7}{16}$
C	Crossbar	2 pcs.	$\frac{1}{2} \times 1\frac{1}{16} \times 8$
D	Arm	2 pcs.	$\frac{5}{16} \times 1\frac{1}{16} \times 35\frac{3}{8}$
E	Post brace	2 pcs.	$\frac{5}{16} \times 1\frac{1}{16} \times 27\frac{5}{16}$
F	Wedges	8 pcs.	$\frac{1}{8} \times$ various widths

**These are net measurements. Surplus should be added to the lengths to allow through tenons to be sanded flush.*

20

SIX-DRAWER CHEST

Curly Maple, Walnut



MAKING THE SIX-DRAWER CHEST

After the stock for the top, bottom and ends of the case has been thickened, ripped to width, and cut to length, each must be given a 1/4" X 5/16" rabbet that will later receive the back panel. At this time, cut the through dovetails at each corner. *The rabbet complicates this process, but there are a couple of easy choices you can make here: (1) miter the material that will house the rabbet, or (2) use a Jap joint in which the rabbets on the case's top and bottom simply lap the rabbets on the ends.*

After fitting the dovetails, lay out and cut the dadoes for the partitions between drawers. Then glue-up the case.

After the glue on the dovetails has cured, slide the partitions into place with a bit of glue spread in the dadoes. Drive brads through the top, sides and bottom of the case to help hold these partitions.

Fit the tenons at the top of each leg into mortises drilled into the bottom of the case, and affix the back panel in its rabbet using 1/2" no. 6 wood screws passing through oversized holes (to allow for wood movement as the panel expands and contracts in response to seasonal changes in humidity) in the panel.

Except for the big, fat dovetail at each corner, drawer construction is conventional. Plough a 1/4" X 1/4" groove on each drawer side and on the back of the front. These will receive the 1/4"-thick drawer bottom. The back of the drawer is not as high as the sides; it extends down only as far as



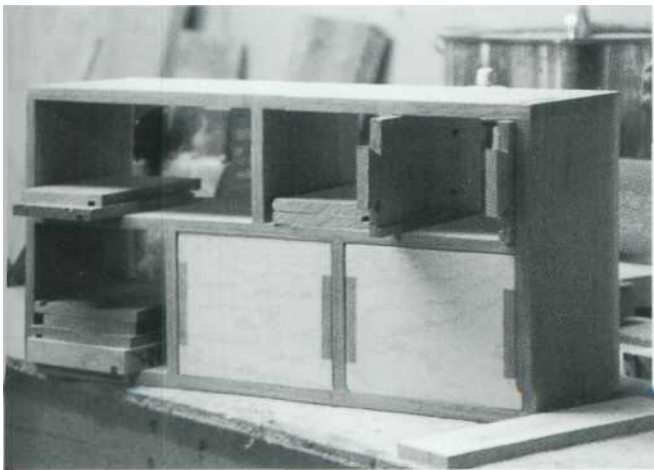
Partially open drawers reveal the fat dovetails.

the top of the drawer bottom. Nail through the drawer bottom, up into this drawer back.

For a larger, weight-carrying drawer, the single dovetail at each corner would be a poor choice, but for such a tiny drawer, one that will never carry more than a few ounces of load, the single dovetail provides a joint offering a fair amount of mechanical resistance to forward pull and a fair amount of glue surface.

Turn the drawer pulls from walnut and fasten them in place with a thin tenon fit into a mortise drilled into the drawer front.

BUILDING THE DRAWERS



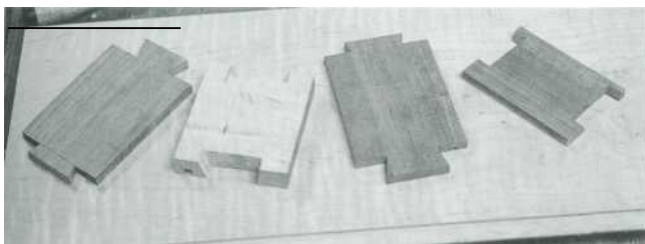
Each drawer is custom-fit into its opening. First, plane the sides to the right height—one that permits them to slide into their openings with the least amount of clearance.



2 Cut dovetails using a backsaw and a coping saw. Use a parting chisel to achieve final fit.

BUILDING THE DRAWERS

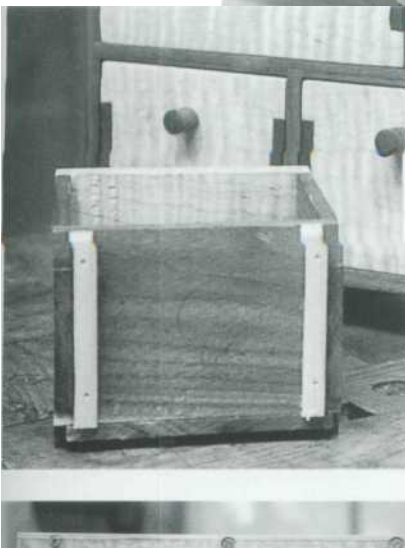
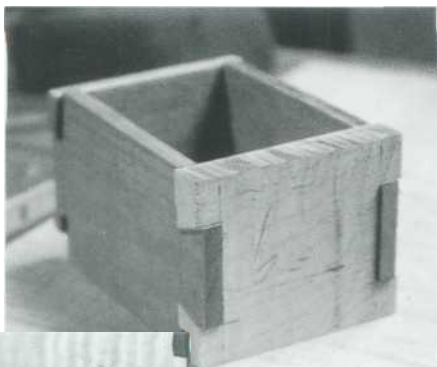
<CONTINUED>



3 After its parts have been cut and fit, the drawer is ready to assemble. Brads help the glue hold the drawer sides in place.

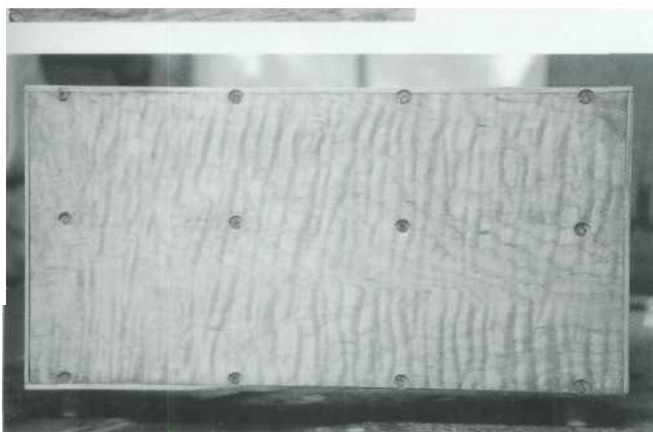
4 Note the surplus length at each corner.

This is ground off with a belt sander

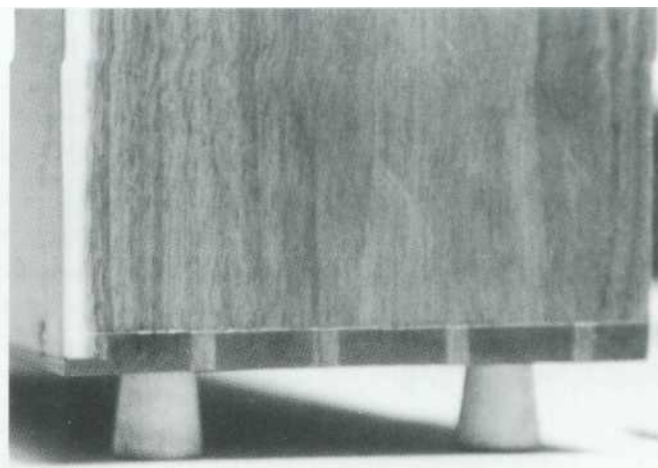


5 After sanding the sides and the front of the drawer, slide the bottom into place and fasten with brads. Plug the holes at the ends of the grooves on both sides of the drawer front. Plane thickness from the two strips of softwood tacked to the back of each drawer to achieve final fit.

CHEST BACK The back is unglued, fastened with screws to the case's top, bottom and central partitions.



BACK RABBET This photo shows the lapped rabbet corner at the back of the case



MATERIALS LIST

Case

A	Top and bottom	2 pcs.	$\frac{3}{8} \times 5\frac{5}{16} \times 15\frac{7}{16}$
B	End	2 pcs.	$\frac{3}{8} \times 5\frac{5}{16} \times 7\frac{3}{4}$
C	Central partition	1 pc.	$\frac{3}{16} \times 5\frac{1}{4} \times 14\frac{1}{16}$
D	Upper partition	2 pcs.	$\frac{3}{16} \times 5\frac{1}{4} \times 3\frac{3}{16}$
E	Lower partition	2 pcs.	$\frac{3}{16} \times 5\frac{1}{4} \times 4$
F	Back panel	1 pc.	$\frac{1}{4} \times 7\frac{1}{2} \times 15\frac{3}{16}$

Upper Drawers

G	Side	6 pcs.	$\frac{1}{4} \times 2\frac{7}{8} \times 5$
H	Short back	2 pcs.	$\frac{1}{4} \times 2\frac{3}{8} \times 3\frac{3}{16}$
I	Long back	1 pc.	$\frac{1}{4} \times 2\frac{7}{8} \times 7\frac{1}{4}$
J	Short front	2 pcs.	$\frac{3}{8} \times 2\frac{7}{8} \times 3\frac{3}{16}$
K	Long front	1 pc.	$\frac{3}{8} \times 2\frac{7}{8} \times 7\frac{1}{4}$

Lower Drawers

L	Side	6 pcs.	$\frac{1}{4} \times 3\frac{1}{16} \times 5$
M	Back	3 pcs.	$\frac{1}{4} \times 3\frac{3}{16} \times 4\frac{3}{8}$
N	Front	3 pcs.	$\frac{3}{8} \times 3\frac{1}{16} \times 4\frac{3}{8}$

Miscellaneous

Softwood fitting strip

O	Upper drawer	6 pcs.	$\frac{1}{4} \times \frac{3}{8} \times 2\frac{3}{8}$
P	Lower drawer	6 pcs.	$\frac{1}{4} \times \frac{3}{8} \times 3\frac{3}{16}$
Q	Pull	6 pcs.	$\frac{1}{2} \times 1$ (this includes tenon length)
R	Leg	4 pcs.	$\frac{7}{8} \times 1\frac{1}{4}$ (this includes tenon length)

*These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.

*Opening measurements are given for drawer width and height. I subtract $\frac{1}{16}$ from both dimensions. This gives me $\frac{1}{32}$ clearance on all four sides of drawers.

21

CHIP BOX

Walnut, White Oak



MAKING THE CHIP BOX

Walnut was used in the construction of *this box with care* taken to select pieces exhibiting contrasting streaks of white sapwood. The bail was shaped from white oak. While any of a number of woods would do nicely for the box, make the bail from a wood that is not only strong but also pliable enough to assume the U shape without breaking. Suitable woods include oaks, ashes and hickories.

Construction is very simple. After milling the stock to a thickness of 1/2", rip the sides, ends and bottom to width and cut to length. Then plough a 1/4" X 1/4" groove in the

sides and ends to receive the bottom. Then cut and pare dovetails to fit (see chapter twenty-five). With hand planes, bevel the edges of the bottom to allow them to slide in their grooves (see chapter one).

Then assemble the box and fit plugs into the ends of the grooves ploughed into the sides.

After removing the bail from its bending form, give its two paws their final shape using a paring chisel and a shop knife. Then fasten the bail to the box with four 1/8" X 1 1/4" brass machine screws and nuts.

SHAPING THE BAIL

1 The bail requires a 3/8"-thick length of continuous-grain bending stock. This means that, when viewed from the quarter-sawn side (the side with the narrow, parallel lines), the grain should run from end to end. Traditionally, this is achieved by splitting out the stock with the use of a froe and beetle. However, few contemporary woodworkers have these tools. You may, therefore, choose to use a length of sawn stock selected for straight grain.

Before bending, work the band-sawn strip with a drawknife and spokeshave to rough-in the desired shape. At this point, it isn't necessary to be fussy. The goal is simply to round the edges on the top side of the bail since this procedure can be carried out more comfortably now, when the stock is unbent, than later, when the bail has taken on its *U* shape.



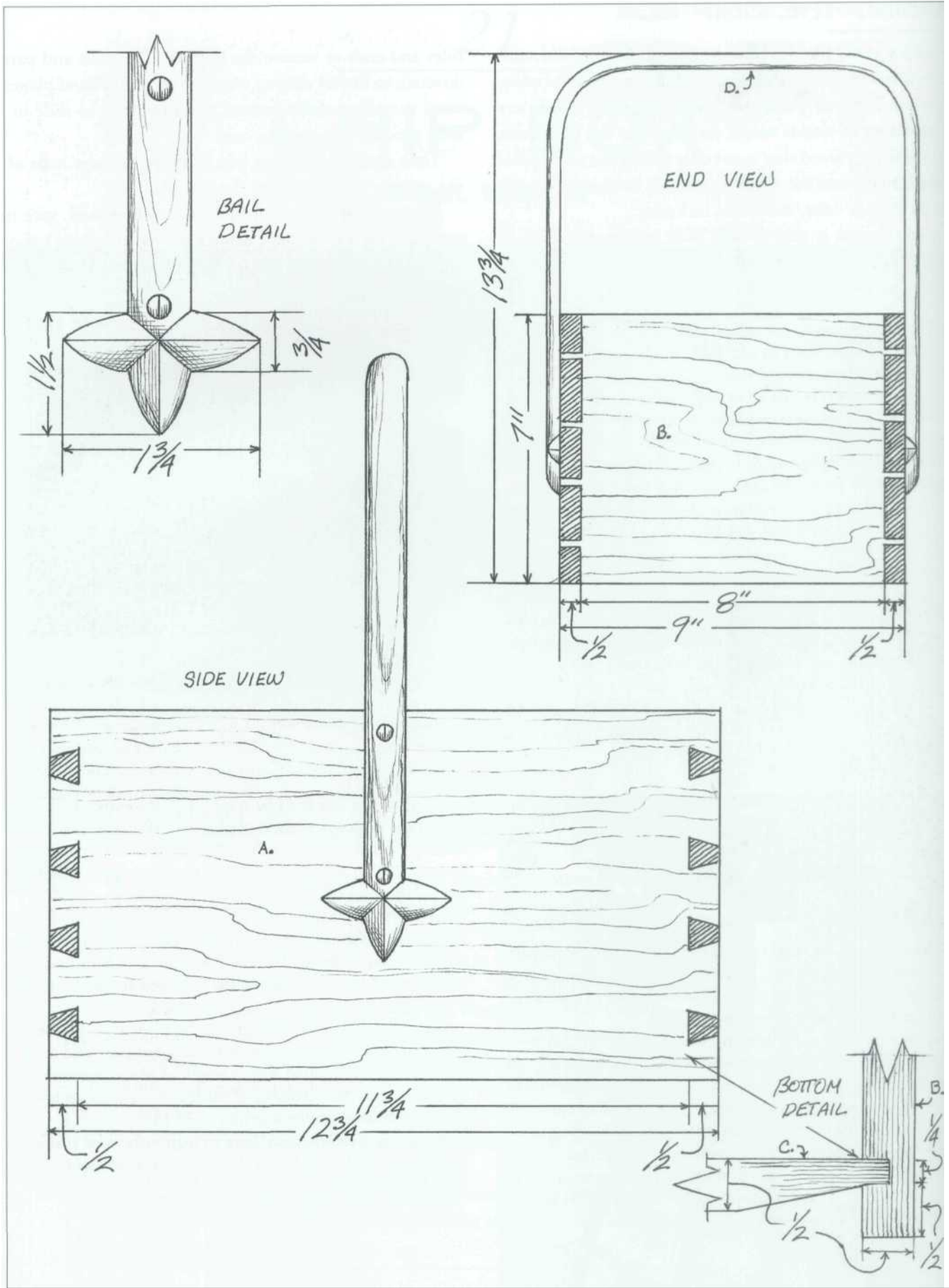
STEAM BENDING



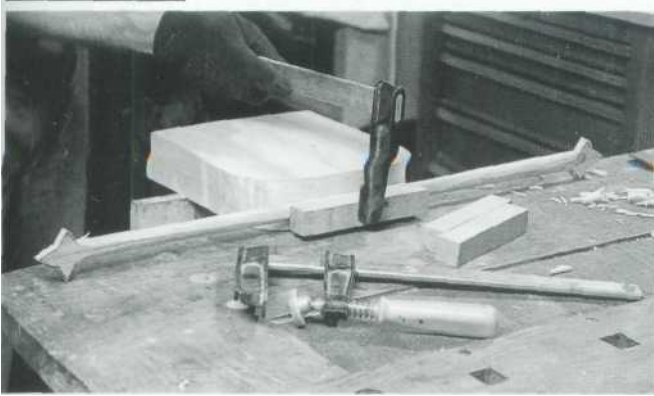
1 My steamer is a deep fat fryer. I've cut an opening in the lid the same size as the outside diameter of a length of PVC which I use as a steam chamber. Three sheet metal screws turned into the PVC just above its base are allowed to protrude. These rest on the fryer's lid holding the steam chamber above the water's surface. A square of hardware cloth that laps the bottom of the steam chamber and is screwed to the PVC supports the material being steamed. To hold the entire apparatus upright, a strip of wood lath is screwed to the PVC and spring-clamped to a stepladder.

Similarly, functional steamers can be made in a number of different ways. Many woodworkers use a hot plate and a tea kettle with a spout fitted with a length of plastic hose which conducts steam to a chamber of some sort—a wooden box, a length of downspout, or a section of PVC.

Steam the bending stock long enough to become plastic. In my steamer, with material of this thickness, that means about forty-five minutes.



STEAM BENDING (CONTINUED)



2 Prepare bending forms beforehand. This particular form, a 2"-thick block of poplar cut to the inside profile of the bail, is nailed to a block of wood held in a vise. Necessary clamps and clamping blocks are placed nearby. Gloves are needed because the steamed oak will be very hot when removed from the steam chamber.

Although you shouldn't rush, proceed quickly because the steamed wood will cool rapidly, becoming less pliable.

Place the midway point along the length of the oak strip at the halfway point across the width of the poplar form. Then clamp it, using a block of wood to protect the oak from clamp marks.

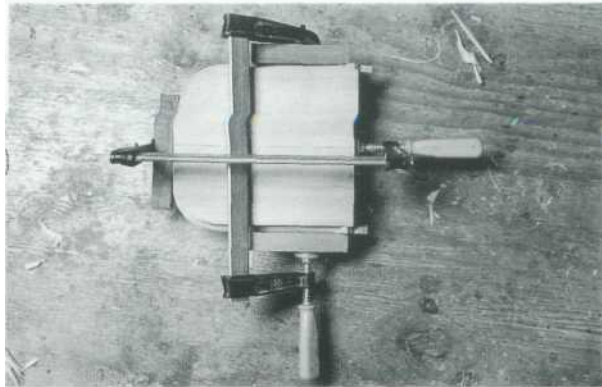


3 Bend the oak strip into its U shape, holding it in place with a second clamp set perpendicular to the first. Again, use blocks of scrap to protect the oak. From above, the strip can be seen to have assumed the shape of the bail.

Green wood is best for bending, but dry material can be coaxed into the required shapes with enough steam and enough patience.

Wood bending, particularly bending involving the sharp curves shown here, is a process rich with opportunities for failure. Sometimes, even after selecting continuous-grained material, even after steaming that material thoroughly, fracture can occur along the bends. When that happens, the only solution is to start the process all over again.

SHAVING TOOLS



Shown are the shaving tools I use in my shop. The two with turned wooden handles are drawknives. The knife at the top is a general-purpose tool, while the one at the bottom is a variety known as the "inshave" used by makers of Windsor chairs to hollow-out seats. The two middle tools are metal-bodied spokeshaves. The shave with the straight iron is used for general-purpose work, while the other, a hollow shave, can only be used for rounding spindles.

MATERIALS LIST

A	Side	2 pcs.	$\frac{1}{2} \times 7 \times 12\frac{3}{4}$
B	End	2 pcs.	$\frac{1}{2} \times 7 \times 9$
C	Bottom	1 pc.	$\frac{1}{2} \times 8\frac{1}{2} \times 12\frac{1}{4}$
D	Bail	1 pc.	$\frac{3}{8} \times 2\frac{1}{8} \times 29$
E	Plug	4 pcs.	$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4}$, shaved to fit
F	Machine screws & nuts	4 pcs.	$\frac{1}{8} \times 1\frac{1}{4}$

**These are net measurements. Surplus should be added to lengths of dovetailed sides and ends to allow joints to be sanded flush.*

22

PEGGED DISPLAY SHELF

Curly Maple, Walnut



MAKING THE PEGGED DISPLAY SHELF

After the material has been dimensioned, profile the end panels, the back panels, and the lower shelf on the band saw. Form the moulded edge on the top on a shaper or table-mounted router fit with appropriate cutters.

Next, cut joinery. You can cut the stopped rabbet that will house the ends of the back panel on the table saw (see chapter five), with a table-mounted router, or by hand, using chisels.

Cut the through mortises in the end panels (see chapter twelve). Then, with a backsaw or a stack of dado cutters

on the table saw, cut the tenons on the ends of the lower shelf and pare to fit these mortises.

On the lathe, turn the two Shaker-style pegs. Then, fit their tenons into mortises drilled into the shelf's back panel.

When all the parts have been dry-assembled and checked for fit, glue the frame and screw it together. Install the top, using four 1" no. 6 wood screws passing through the top into the end grain of the side panels. Glue four maple plugs and tap them into the countersunk screw holes.

FIGURED LANGUAGE

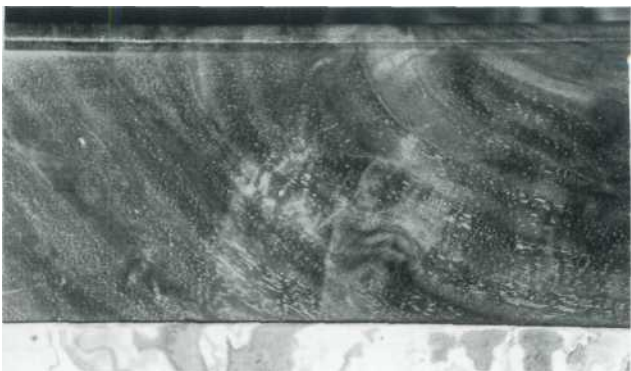
In *The Woodworker's Dictionary* by Englishman Vic Taylor, the word *curlis* defined this way: "Highly figured grain obtained by cutting through the junction of a tree or large limb. Used only in veneer form. Also known as crotch or feather."

If you ordered curly material from an American supplier of figured wood, you would not get the material described by Vic Taylor. You would, instead, get lumber marked by rippling bars of grain marching across the widths of the boards perpendicular to the grain direction. This inconsistency of language occurs not only among dealers working in different countries but also among dealers in the U.S.

One of the sawmill operators from whom I buy has his own system of figured wood classification: If it tears out in the planer, it's curly. Period. And he sells it that way. Because I've bought from him in the past and am aware of his system of classification, I carefully inspect

every curly board I buy from him, but a customer unfamiliar with his system might assume that whatever he purchased from this sawmill operator as curly would exhibit a figure that was consistent from board to board and consistent with the buyer's expectation of curly lumber.

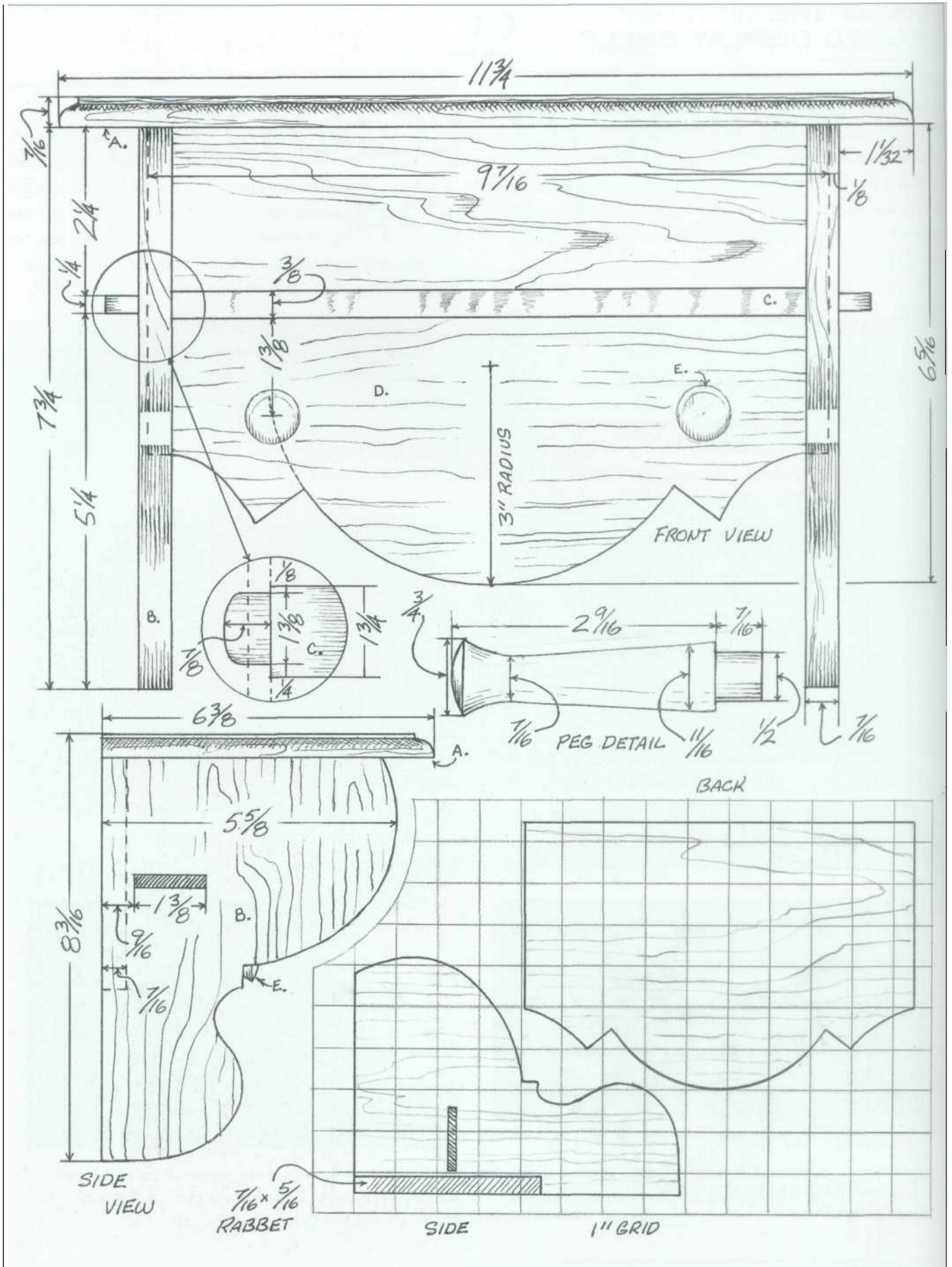
In general I've found that owner/operators of small sawmills aren't good sources of figured lumber. In part, this may be because they are sawyers, not woodworkers, and therefore look at lumber from a different perspective. But I also think that owner/operators of small sawmills don't have the experience with figured lumber to make considered judgments about its quality.



1 The border of the chess table (featured in chapter three) shows the kind of figuring common in crotch-grained lumber.



2 Tiny dots are scattered across the surface of this piece of bird's eye maple. (This grain is used on the top of the display shelf in this chapter.)



Tiger maple. Often referred to by the generic "curly," the wood identified by this term includes the soft (red and silver) curly maples.

Fiddleback maple. This material, characterized by a tighter, more compact curl than is evident in tiger maple, comes from hard maple and is widely used by violin makers for the backs of their instruments.

Blistered maple. This figure, which is also present in hard maple, has a surface on which there is the appearance of raised blisters or boils.

Quilted maple. A product of the western big-leaf maple, this material is marked by a regular pattern of what appear to be raised areas of varying shapes.

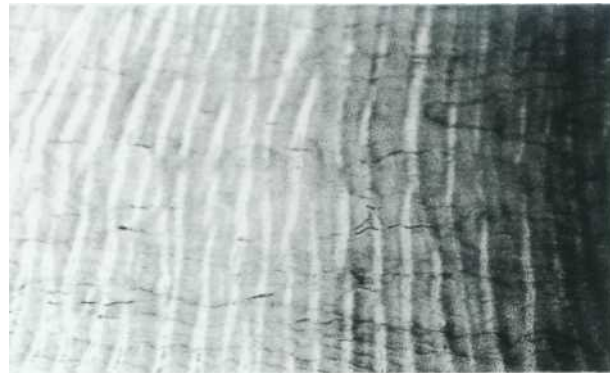
Bird's eye maple. This variety of hard maple exhibits swirling grain scattered with dots resembling bird's eyes.

Crotch-grained. For American woodworkers, this is the material about which Vic Taylor wrote in his definition of "curly." Sometimes known as "feathered," this is taken from the junction of a tree and a large limb.

Burl. Taken from growths that appear on the trunks of certain trees, this material is highly prized by makers of veneer and by turners for its wildly convoluted grain.

3

This panel of glued-up cherry exhibits a wavy figure not uncommon in cherry (see the side table in chapter seven for an excellent example).



4

This photo shows a length of heavily figured curly (tiger) maple (featured in the document chest in chapter twenty five).

SUSTAINABLE FORESTS

At some point, everyone who applies tools to wood considers the issue of forest maintenance. Although many experts believe that reserves of the commonly used American species are adequate to meet projected needs, there is an irrefutable

difference in the quality of available material. Although cherry, maple and oak are always on hand in any well-stocked lumberyard, the boards are not as wide and not as clear as they were even a single generation in the past. And the situation is even more critical for walnut, the king of American hardwoods. Walnut saw logs are increasingly rare, and when they can be found of any quality, they are inevitably snatched up by veneer mills.

MATERIALS LIST

A	Top	1 pc.	$\frac{7}{16} \times 6\frac{3}{8} \times 11\frac{3}{4}$
B	End	2 pcs.	$\frac{7}{16} \times 5\frac{5}{8} \times 7\frac{3}{4}$
C	Shelf	1 pc.	$\frac{3}{8} \times 1\frac{3}{4} \times 10\frac{1}{2}$
D	Back	1 pc.	$\frac{7}{16} \times 6\frac{7}{16} \times 9\frac{7}{16}$
E	Peg	2 pcs.	$\frac{3}{4} \times 3$
F	Plug	4 pcs.	$\frac{3}{8} \times \frac{1}{4}$
G	Screws	various	

23

TABLETOP DESK

Cherry, Poplar



MAKING THE TABLETOP DESK

After the material has been dimensioned, edge-joint and glue the boards that will make up the desk top.

Plough a 1/8" X 1/4" groove on the inside faces of the desk sides, front, and back. This groove will later receive the bottom of the materials compartment. Then, cut openings in the sides for the inkwell and stationery drawers.

Next, cut the angles on the desk sides on the band saw, after which the four sides of the case are dovetailed. The case is dry-assembled, and the bevels on the top edge of the front and back are marked from the angles on the sides. Form these bevels with a hand plane, and glue-up the four walls of the case around the bottom of the materials compartment.

Before installing the bottom, glue and brad into place the cock bead that frames the stationery drawer. Also at this time, glue the two fill strips that will guide the stationery drawer in position. Then, tack the bottom into place using small finishing nails. Nails are perhaps better than screws for this particular application because they are flexible enough to allow for seasonal expansion and contraction of the bottom across its width. Screws—unless they pass through oversized holes which would be very difficult to

achieve in such thin stock—could lock the material so that cracking would occur in connection with this expansion and contraction.

The inkwell drawer is next. The unusually shaped long drawer side does two things. First, it is a drawer guide, and second, it prevents the drawer (with its bottle of ink) from being completely withdrawn from the case, a circumstance that could easily have had messy results.

After forming the drawer parts, glue and tack them together. Then, fit the drawer to its opening and screw the wooden bracket that acts as its guide and keeper to the inside face of the desk back.

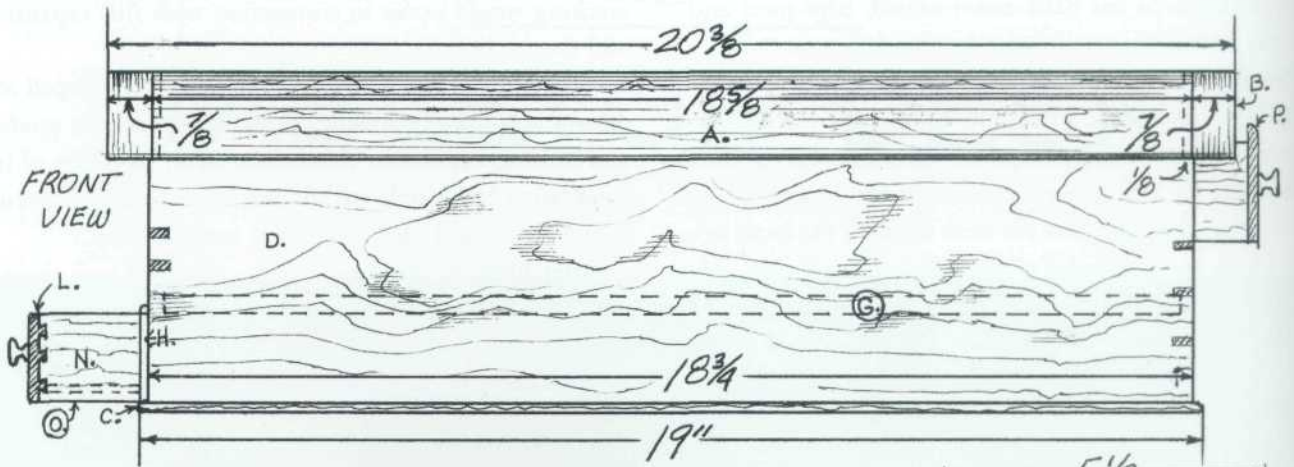
Assemble the stationery drawer with through dovetails at the front and half-blind dovetails at the back.

The till rests on a pair of 1/8"-thick supports which are glued to the inside faces of the desk front and back. After installing these supports, glue the till—with its side already glued to the bottom—into place atop the supports. Fasten it also to the desk side with a thin line of glue.

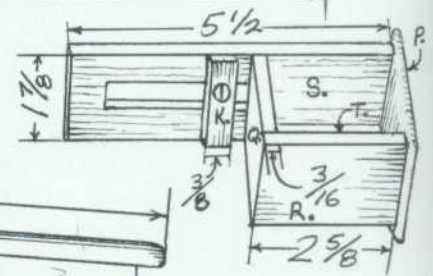
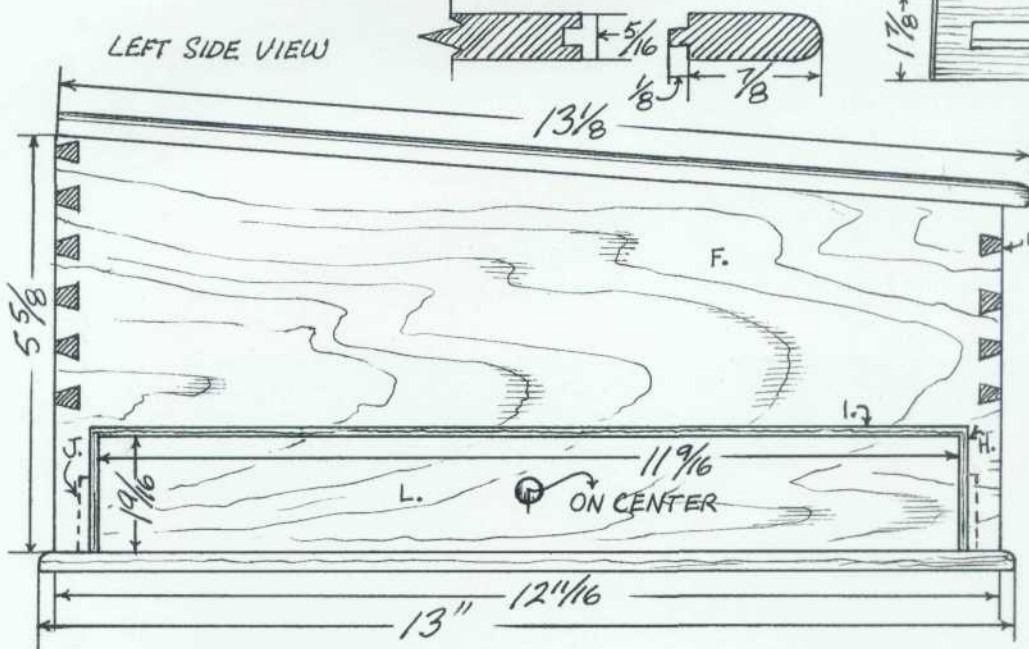
The top panel is removed from the clamps and planed to a thickness of 5/16". Then, cut 1/8" X 1/8" grooves in both ends of the top panel to receive the tongues on the bread-board ends. Form and fit the tongues to the grooves. Hold



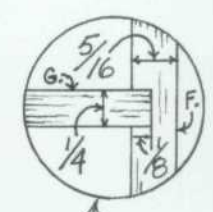
The opened tabletop desk reveals the ink well drawer and the paper drawer in the bottom.



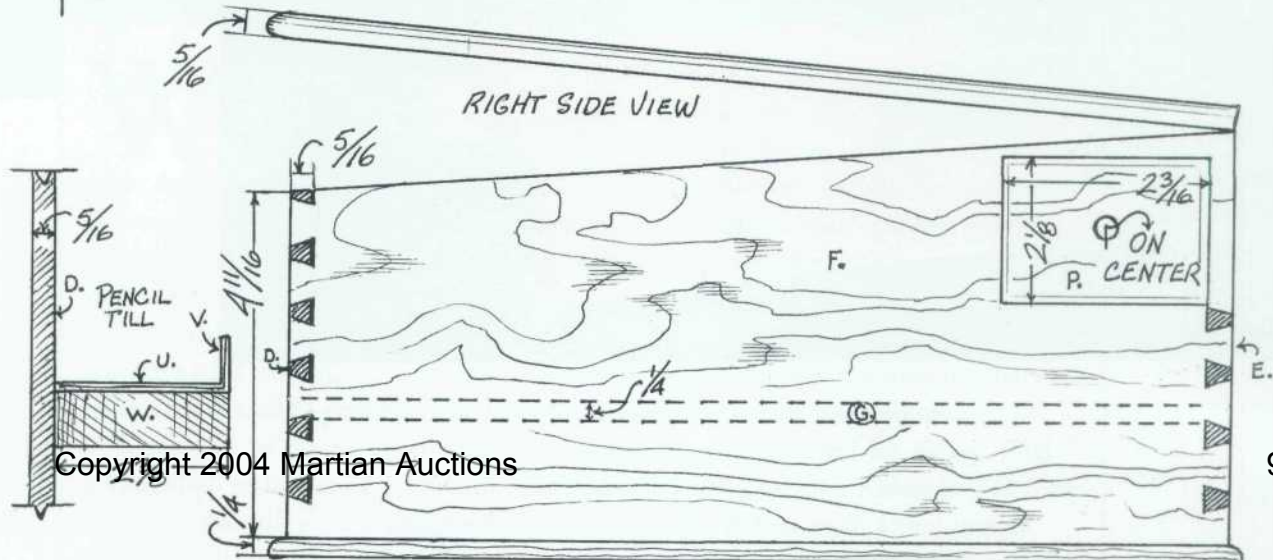
BREADBOARD DETAIL



INK DRAWER



DADO FOR COMPARTMENT BOTTOM



each breadboard end in place with a dab of glue on the tongue at the middle of the tongue's length. The remainder of the tongue floats on the groove, allowing for seasonal expansion and contraction of the top.

Hinges are problems because of the top's extreme thinness. My dad, who built this particular piece, struggled to find screws that could get a good enough bite in the top to hold it in place. After trying and discarding several brass screws, he settled on deep-threaded 3/8" no. 6 steel screws from which he'd ground away the tips so that they wouldn't penetrate the upper surface of the top.

After fitting the hinges, remove the hardware, and give the desk a final sanding.

KILN-DRIED OR AIR-DRIED

Reference books inevitably cite the necessity of using kiln-dried material for furniture construction. I think that's misleading.

Of the thousands of board feet of lumber I've turned into chairs and into casework, less than a quarter was kiln-dried. The remainder was air-dried outdoors and finish-dried in my shop. Nevertheless, I can remember only two occasions when pieces I built experienced wood failure.

Once, I built a Hepplewhite huntboard from air-dried cherry. The top (which didn't fail) was fastened to cleats fixed with slotted screw holes. But one of the end panels, which I had triple-tenoned into the posts, split after sitting in our living room through a couple of cold, dry Ohio winters. In looking back on the construction of the huntboard, I remember hurrying to finish it before Christmas since it was a present for my wife.

When I glued up the end panels, I remember noticing, as I slathered glue on the middle tenon, that I hadn't cut the top and bottom tenons back to allow the end panel to shrink. Each tenon completely filled its mortise. But the glue was already on the middle tenon and in its mortise. To cut the other tenons back, I would have to wash away the glue, find my paring chisel, pare the tenons, and reglue. Or risk having the aliphatic resin glue set before the joint was assembled. I remember thinking it wasn't worth the effort. I remember thinking I could get away with it. The end panel failed because I built it to fail. I think that if allowances are made during design for the inevitable movement of wood, carefully air-dried material is every bit as good as kiln-dried. In fact, I think that careful air-drying is preferable to the kind of rushed kiln-drying practiced by some commercial driers. At least in humid Ohio, air-drying is a gradual process during which

wood surrenders its moisture so slowly that surface checking is almost unheard of. And it's worth mentioning that, just like air-dried stock, kiln-dried stock, when exposed to humid, July conditions, quickly takes on enough moisture to reach 11, 12 or even 13 percent.

The answer to the problem of wood movement isn't laboring to make wood inert; it is, I think, to accept movement as an inevitable component of solid-wood construction and to design to accommodate that inevitability.

MATERIALS LIST

Desk

A	Top	1 pc.	$\frac{5}{16} \times 13\frac{1}{8} \times 18\frac{3}{8}$
B	Breadboard end	2 pcs.	$\frac{5}{16} \times 1 \times 13\frac{1}{8}$
C	Bottom	1 pc.	$\frac{1}{4} \times 13 \times 1$
D	Front	1 pc.	$\frac{5}{16} \times 4\frac{1}{16} \times 18\frac{3}{4}$
E	Back	1 pc.	$\frac{5}{16} \times 5\frac{1}{8} \times 18\frac{3}{4}$
F	Side	2 pcs.	$\frac{5}{16} \times 5\frac{1}{8} \times 12\frac{1}{16}$
G	Compartment bottom	1 pc.	$\frac{1}{4} \times 12\frac{5}{16} \times 18\frac{3}{8}$
H	Short cock bead	2 pcs.	$\frac{1}{8} \times \frac{1}{2} \times 1\frac{1}{8}$
I	Long cock bead	1 pc.	$\frac{1}{8} \times \frac{1}{2} \times 11\frac{1}{8}$
J	Drawer fill strip	2 pcs.	$\frac{1}{8} \times 1 \times 16\frac{1}{4}$
K	Ink-drawer stop	1 pc.	$\frac{3}{8} \times \frac{3}{8} \times 1\frac{1}{8}$

Stationery drawer

L	Front	1 pc.	$\frac{5}{16} \times 1\frac{1}{16} \times 11\frac{1}{16}$
M	Back	1 pc.	$\frac{1}{4} \times 1\frac{1}{16} \times 11\frac{1}{16}$
N	Side	2 pcs.	$\frac{1}{4} \times 1\frac{1}{16} \times 18$
O	Bottom	1 pc.	$\frac{1}{4} \times 11\frac{1}{16} \times 18\frac{1}{4}$

Ink drawer

P	Front	1 pc.	$\frac{5}{16} \times 2\frac{1}{8} \times 2\frac{13}{16}$
Q	Back	1 pc.	$\frac{3}{16} \times 1\frac{1}{8} \times 2\frac{3}{32}$
R	Short side	1 pc.	$\frac{3}{16} \times 1\frac{1}{8} \times 2\frac{3}{8}$
S	Long side	1 pc.	$\frac{3}{16} \times 1\frac{1}{8} \times 5\frac{1}{2}$
T	Bottom	1 pc.	$\frac{3}{16} \times 2\frac{1}{32} \times 2\frac{1}{2}$

Pencil till

U	Bottom	1 pc.	$\frac{1}{8} \times 2\frac{1}{4} \times 12\frac{1}{16}$
V	Side	1 pc.	$\frac{1}{8} \times \frac{3}{4} \times 12\frac{1}{16}$
W	Support	2 pcs.	$\frac{1}{8} \times \frac{3}{4} \times 2\frac{3}{8}$

Hardware

X	Hinge	2 pcs.	$1\frac{1}{2} \times \frac{7}{8}$
Y	Pull	2 pcs.	$\frac{1}{2} \times \frac{1}{2}$
Z	Screws and nails	various	

**These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.*

**Pulls were ordered from Constantine's Hardware.*

24

SHERATON-STYLE TABLE

Walnut, White Pine



MAKING THE SHERATON- STYLE TABLE

Begin construction with the legs. The exact shapes of their various *sections can* be determined by the individual woodworker; however, the section that will be joined to the apron, that section above the upper bead, must be carefully formed so that it maintains a consistent diameter from top to bottom as any variation in diameter will show itself here as a gap.

Once a leg has been formed but before it's taken from the lathe, mark the centerlines for the mortises that will receive the apron tenons. Do this using the lathe's indexing head.

The indexing head is a disk centered on the lathe's axis with holes drilled near its perimeter. Each of these holes marks 10° of the disk's 360° circumference and, by extension, 10° of the 360° circumference of any work centered on the lathe's axis. After selecting the faces of the leg that will be visible from the table's side and end, the tool rest is brought into contact with that section of the leg that will be joined to the apron. The indexing head is then locked at this position (on my lathe that's simply a matter of releasing a spring-loaded peg into one of the holes drilled near the head's circumference) and a line is drawn along the tool rest on the leg. Then, using the spring-loaded peg to count holes, the work is turned nine stops on the indexing head which is then locked at this point and a second line drawn. These lines are 90° apart and mark the centerlines of the mortises that will house the apron tenons.

After the apron parts and drawer rails have been dimensioned, cut their tenons. You can start this on the table saw, but it must be completed by hand or on the band saw as the shoulders of the apron parts must be undercut so that the shoulders come to a sharp point. This is necessary if the shoulders are to make tight contact with the round surface of the leg.

The table frame—consisting of the four legs, the three sections of the apron, and the two drawer rails—is then glued-up.

Next, install drawer runners and kicker strips. The kicker strips on this table serve two purposes. First, they keep the drawer properly aligned when it is partially open. Second, they act as cleats to affix the table's top to its base. In order

to accommodate the seasonal expansion and contraction of the top across its width, the screws that fasten the top to the base should pass through oversized holes in the kicker strips.

Drawer construction *is tricky* in one respect. *Like the* parts of the apron and the drawer rails, the drawer front must be shaped to allow it to be closed so that its surface is flush with the surface of the drawer rails without wide gaps at either side. Like the apron and drawer rail shoulders, the drawer front could be undercut, but I wanted a more graceful shape in this location because it is visible when the drawer is opened. I decided then to curve the back side of the drawer front, matching it to the curve on the legs. After fitting the drawer, sand and finish the table and drawer.

MATERIALS LIST

Table

A	Top	1 pc.	$\frac{3}{4} \times 17 \times 23\frac{1}{2}$
B	Leg	4 pcs.	$2\frac{7}{16} \times 2\frac{7}{16} \times 23$
C	Apron side	2 pcs.	$\frac{7}{8} \times 5\frac{1}{8} \times 18\frac{3}{4}$ (includes $\frac{7}{8}$ tenon on each end)
D	Apron end	1 pc.	$\frac{7}{8} \times 5\frac{1}{8} \times 12\frac{1}{4}$ (with tenons)
E	Top drawer rail	1 pc.	$\frac{7}{8} \times 1\frac{1}{4} \times 12\frac{1}{4}$ (with tenons)
F	Bottom drawer rail	1 pc.	$\frac{7}{8} \times \frac{7}{8} \times 12\frac{1}{4}$ (with tenons)
G	Kicker strip	2 pcs.	$1\frac{1}{4} \times 1\frac{1}{2} \times 17\frac{7}{8}$
H	Drawer runner	2 pcs.	$\frac{7}{8} \times \frac{7}{8} \times 17\frac{7}{8}$

Drawer

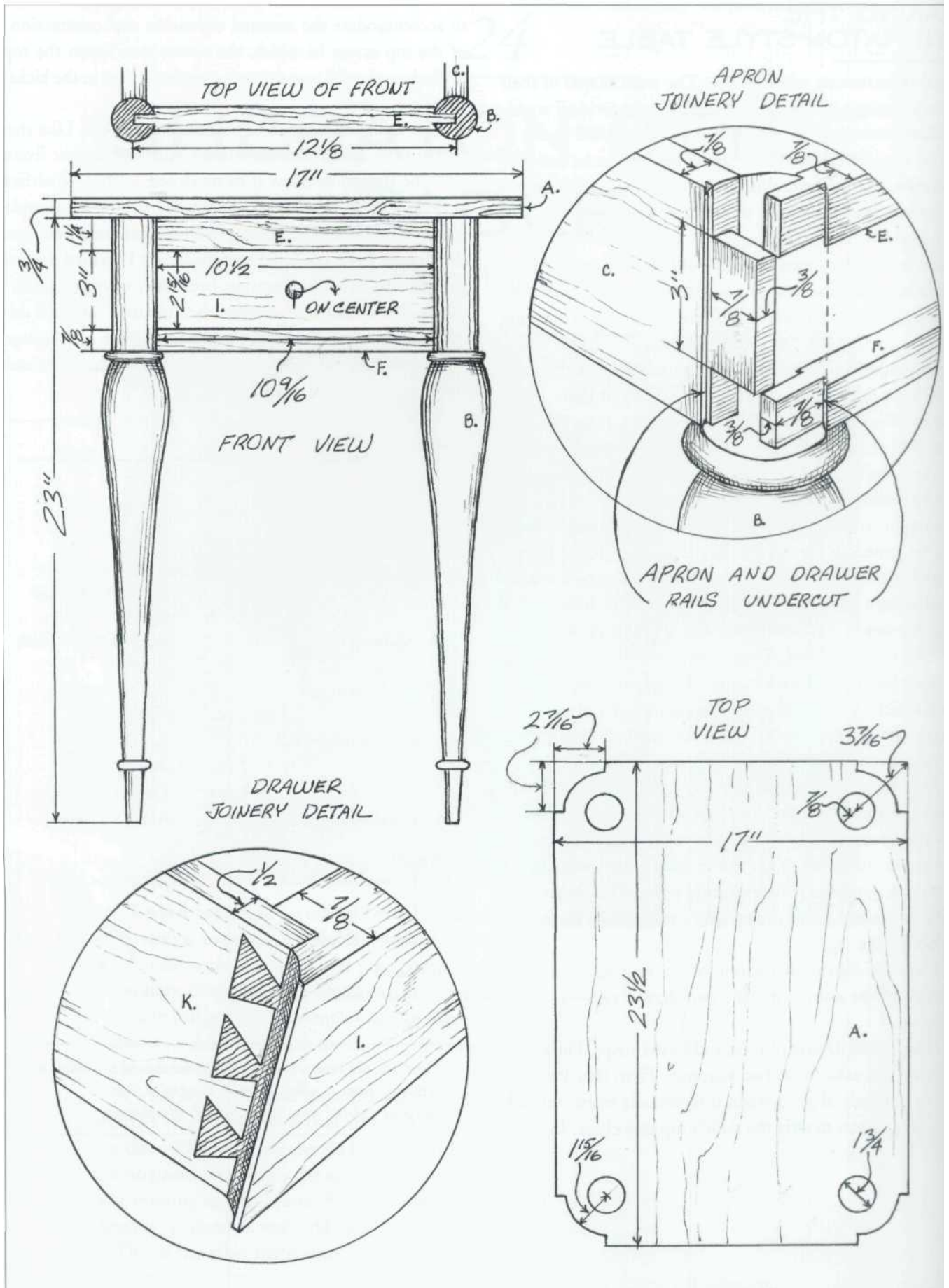
I	Drawer front	1 pc.	$\frac{7}{8} \times 2\frac{1}{16} \times 10\frac{1}{2}$
J	Drawer back	1 pc.	$\frac{1}{2} \times 2\frac{1}{16} \times 10$
K	Drawer side	2 pcs.	$\frac{1}{2} \times 2\frac{1}{16} \times 17$

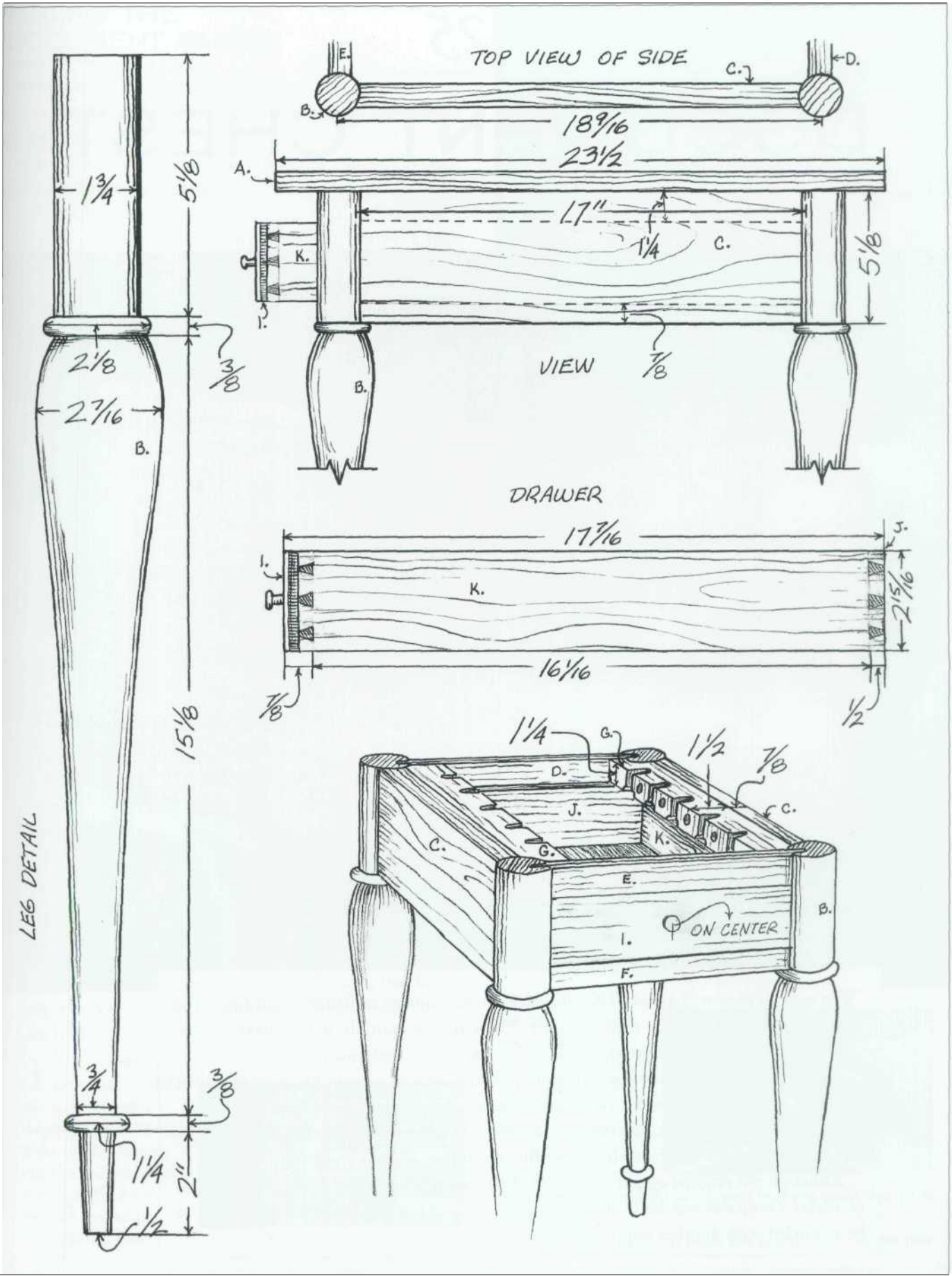
Hardware

L	Brass knob	1 pc.	$\frac{1}{2} \times \frac{1}{2}$
M	Screws	various	

**These are net measurements. A surplus should be added to dovetailed parts to allow them to be sanded flush.*

**Pull was ordered from Constantine's Hardware.*





25

DOCUMENT CHEST

Curly Maple, White Pine



MAKING THE DOCUMENT CHEST

After the stock has been thickened, ripped to width, and cut to length, plough a 1/4" X 3/8" groove on the inside faces of the front, back and two ends. This groove will receive the raised panel that will separate the upper storage chamber from the drawer compartment.

Then cut through dovetails for the four corners of the case (this process is detailed in the sidebar below). Glue the joints and assemble the case around the raised panel that separates its two sections.

Shape the moulded edge on the top and bottom of the lid and on the top side of the chest's bottom. Fasten the bottom to the case with ten 1 1/2" no. 10 wood screws. These pass through oversized holes drilled in the bottom to allow for seasonal expansion and contraction across its width.

Although the Shaker original didn't have them, I installed a pair of sturdy ash cleats on the underside of the lid to prevent it from cupping—a problem I encountered the first time I built one of these chests.

Build the drawer next (see the sidebar below) with through dovetails at the rear and half-blind dovetails at the



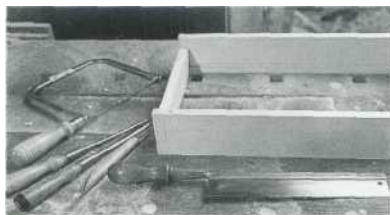
front. Slide the drawer bottom into its groove and tack it up into the drawer back. Then fit the length of the completed drawer by planing thickness from a pair of softwood strips tacked to the back side of the drawer.

Complete the chest by finishing the wood and installing the hardware.

CUTTING DOVETAILS BY HAND

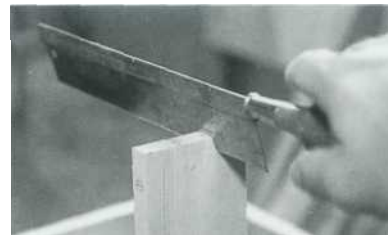
There's something soothing about the process of cutting dovetails by hand. The shop is quiet. The air is clean, carrying no load of machine-generated dust. There is the sense that this is what woodworking is supposed to be: calm, unhurried, not driven by the frantic scream and whine of power tools. This is woodworking stripped of the efficient unpleasantness of technology, reduced to the application of sharp tools to beautiful material. Even though the case must be made first, the following discussion of hand-cut dovetails will begin with drawer construction because, unlike the case, the drawer requires the creation of both through and half-blind dovetails.

1 The process begins with careful stock preparation. After the parts have been dimensioned, cut the grooves into which the drawer bottom will slide. Establish base-



lines for every pin and tail (the pins are those parts of the dovetail joint that fit between the tails). Score these lines across the grain with either a marking gauge or a sharp knife. In the case of the through dovetails (those on the back of the drawer), lines should be placed a distance from the end that is 1/16" more than the thickness of the stock to which the piece is being joined. Since, in this case, the drawer sides and back are 1/2" thick, the baselines will be set 9/16" from the ends of the drawer sides and back. Placement of the baselines on the front end of the drawer sides is handled a little differently because these joints will be half-blind dovetails. Because the drawer front is 11/16" thick, set the baselines on the front ends of the drawer sides 1/2" from the end. This leaves 3/16" of drawer-front material covering the ends of the dovetails on the front ends of the drawer sides.

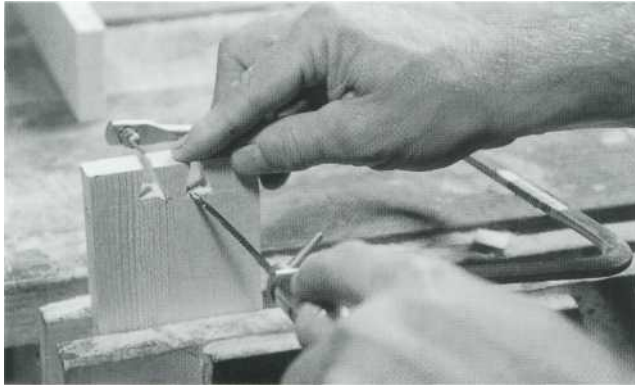
2 Cut the tails first. After deciding on their widths, use pencil lines (drawn with the aid of a try square) to mark the end grain of the drawer side. These lines indicate the widths of the gaps between the widest parts of the tails.



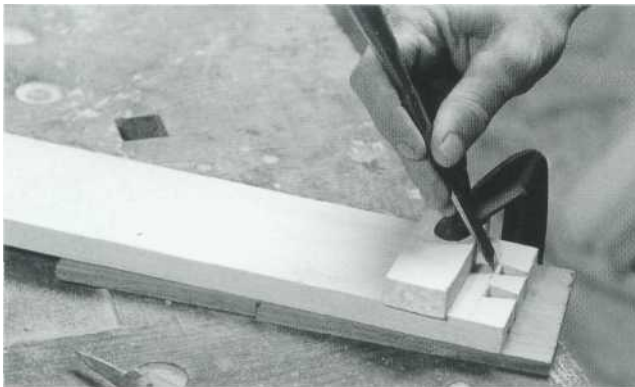
At this point, you can mark the actual angles of the tails

with the aid of a dovetail gauge. I chose to cut these freehand because the slight variances of angles and tail-widths provide incontrovertible proof of the piece's handmade origin.

With a fine-toothed backsaw, make cuts from the lines squared across the end grain down to the baseline established for the tails.

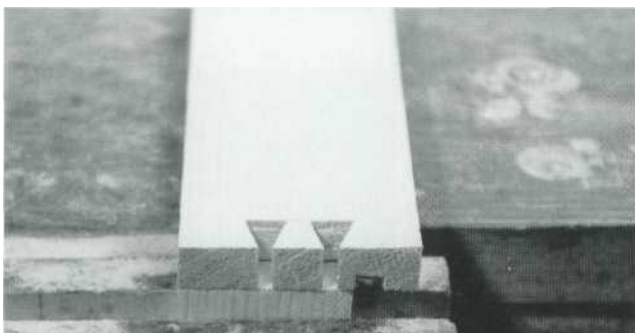


3 With a coping saw, remove the bulk of the waste. Don't approach the scored baseline too closely.



4 Then, use a paring chisel driven by a wooden mallet to cut away the remaining waste. The scored baseline serves to position the tip of the chisel.

In order to avoid breaking out chips on the back side of the piece, flip over the drawer side from time to time, working toward the middle from one side, then the other.



5 When the gaps between the tails have been cut and pared down to the baseline, mark the pins. Position the pin

MATERIALS LIST

Chest

A Side	2 pcs.	$1\frac{1}{16} \times 10\frac{1}{4} \times 18\frac{3}{8}$
B Full End	1 pc.	$1\frac{1}{16} \times 10\frac{1}{4} \times 10\frac{3}{8}$
C Partial End	1 pc.	$1\frac{1}{16} \times 7\frac{1}{8} \times 10\frac{3}{8}$
D Lid and bottom	2 pcs.	$1\frac{1}{16} \times 11\frac{3}{8} \times 18\frac{3}{8}$
E Bottom of storage chamber	1 pc.	$\frac{5}{8} \times 9\frac{7}{8} \times 17\frac{3}{8}$
F Cleats	2 pcs.	$1\frac{1}{8} \times 1\frac{7}{8} \times 8$
G Plug	4 pcs.	$\frac{1}{4} \times \frac{3}{8} \times \frac{1}{2}$

Drawer

H Front	1 pc.	$1\frac{1}{16} \times 3\frac{1}{16} \times 9\frac{3}{8}$
I Side	2 pcs.	$\frac{1}{2} \times 3\frac{1}{16} \times 17$
J Back	1 pc.	$\frac{1}{2} \times 2\frac{1}{8} \times 9\frac{7}{16}$
K Bottom	1 pc.	$\frac{5}{8} \times 8\frac{1}{2} \times 16\frac{3}{4}$
L Fitting strip	2 pcs.	$\frac{3}{8} \times \frac{5}{8} \times 2\frac{1}{8}$

Hardware

M Hinges	2 pcs.	$1\frac{1}{4} \times 2$
N Pull (brass)	1 pc.	$\frac{1}{2} \times \frac{1}{2}$
O Closer	1 pc.	
P Screws	10 pcs.	$1\frac{1}{2}$ " no. 10

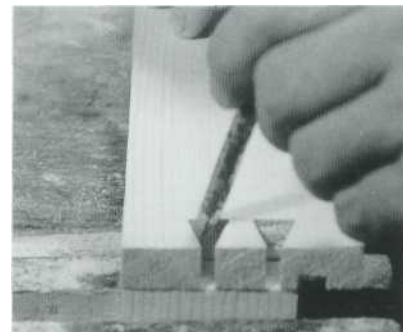
**These are net measurements. Surplus should be added to the length of dovetailed sides and ends to allow joints to be sanded flush.*

**Drawer height and width are $\frac{1}{16}$ " less than the opening size. This allows $\frac{1}{32}$ " clearance on all four sides.*

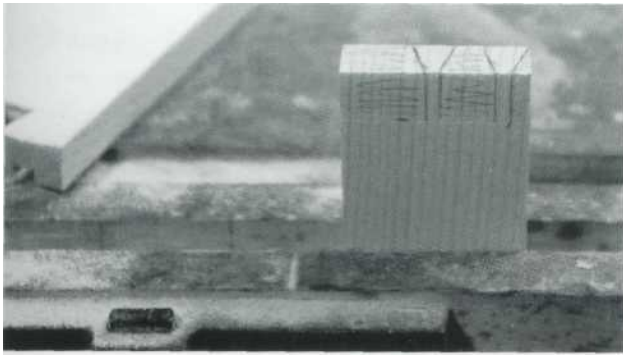
**Hardware was ordered from Constantine's Hardware.*

stock (in this case the back of the drawer) in a vise so that its end is just above the level of the bench top. Position the tails that were just cut above the end grain on the drawer back. Take care to align the baseline between the tails directly above the inside face of the drawer back.

(Because the drawer bottom must slide underneath the back of the drawer, the width of the back extends only from the top of the drawer side to the top of the groove.)

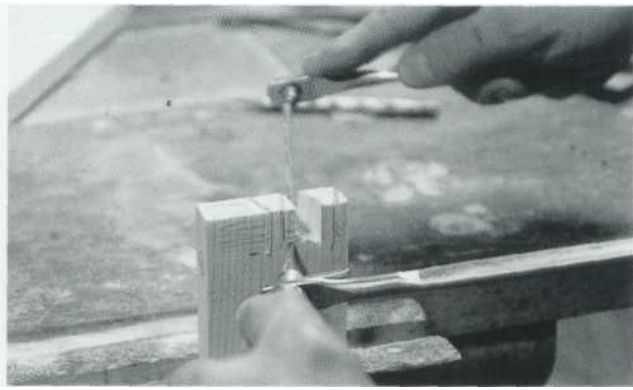


6 With a sharp pencil (you may need to whittle the tip of the pencil to a smaller diameter so that it can work its way into the gaps between tails), mark the limits of the pins on the end grain of the drawer back.

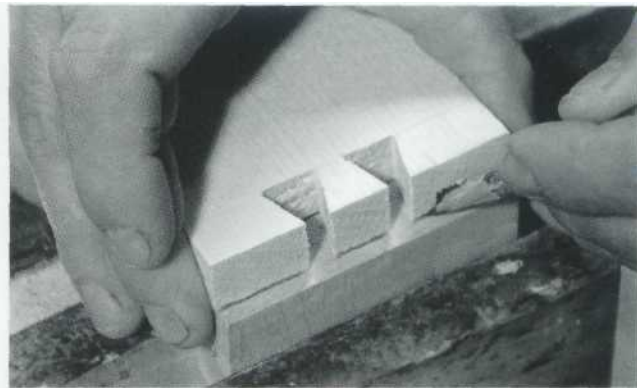


7 Using a try square, extend those lines from the end of the drawer back to the scored baseline for the pins. These lines identify the waste that is to be removed.

With a fine-toothed backsaw set just to the waste side of each line, cut the pin walls down as far as the baseline.



8 With a coping saw, remove the bulk of the waste between the pins. As with the gaps between the tails, cut away the remaining waste between the pins with a sharp chisel. Again, use the scored baseline to position the tip of the chisel.

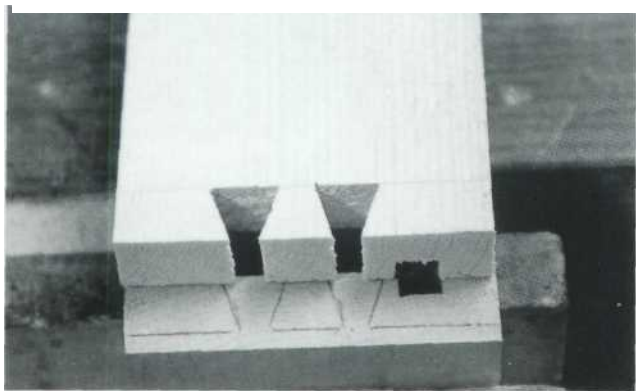


9 Shaving some of the pin walls may be necessary, but once fitting is accomplished, the joint can be dry-assembled (without glue).

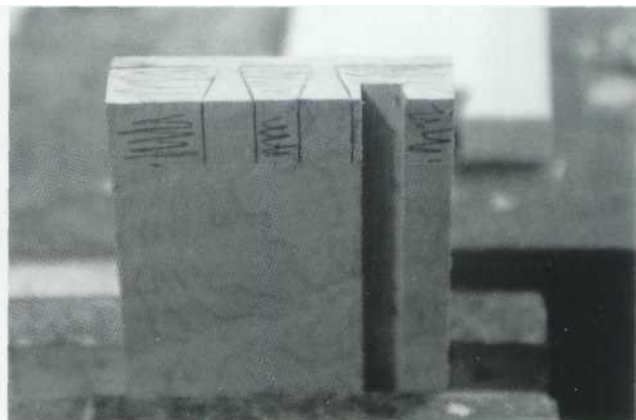
White pine is a very soft wood, so a joint that might not fit perfectly can still be brought together. Hardwood, however, requires more fine-tuning of the pins with a paring chisel. Too much force applied to the fitting of a dovetailed joint can result in a split drawer side.

10 The half-blind dovetails (so named because the joint doesn't show from the front) used at the front of the drawer are a bit more complicated to cut.

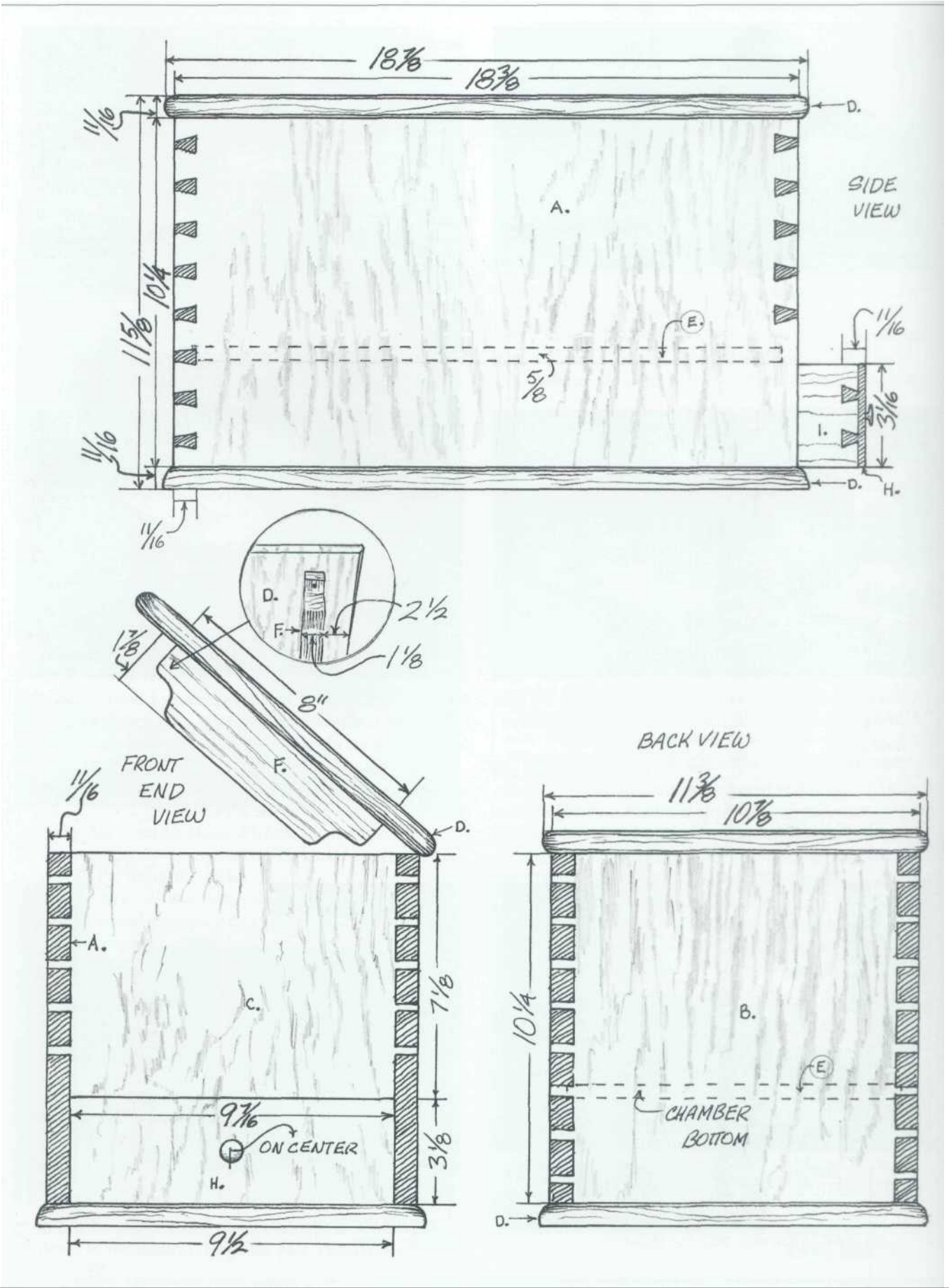
Again, the process begins by cutting the tails. Then lay these across the end grain of the drawer front, and mark the perimeter of each tail on the drawer front.



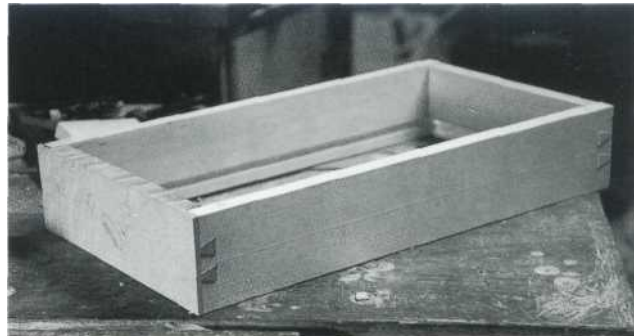
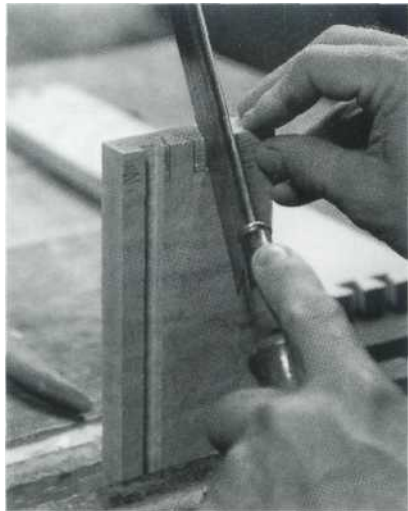
11 The marking can be seen more clearly here.



12 With a try square, extend the lines from the end of the drawer front to the scored baseline. Scribbling indicates waste.



13 With a backsaw positioned just to the waste side of each line and held at about a 45° angle, define the sides of each pin by a saw kerf that connects the baseline on the back of the drawer front with the line drawn on the end grain indicating the forward limit of the tails.



16

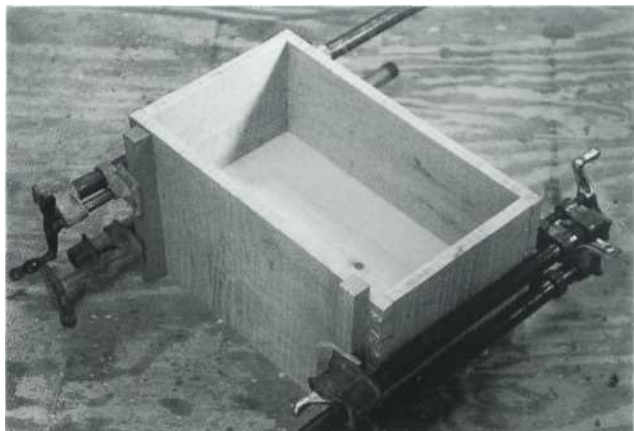
The dry-assembled drawer shows through dovetails at the back and half-blind dovetails at the front.



14 Then clamp the drawer front to the bench with its inside face up. Cut away the waste with a mallet and chisel.



17 The procedure for dovetailing the sides of the case is the same as that used for the back of the drawer with two important differences: First, because of the board widths, there will be many more pins and tails, making joint fitting more time-consuming. Second, because the joint components are hardwood, they must be fit more carefully. Forcing a hardwood joint nearly always results in split stock.



18 Assemble the case around the bottom of the storage chamber. The edges of this bottom are housed in the groove on the inside faces of the four sides of the chest.

Clamping blocks permit the pressure to be exerted behind the pins. This allows the pins to protrude 1/16". After the glue has cured and the clamps have been removed, sand this excess away, making the ends of the pins flush with the sides of the case.



15 Carefully (to avoid splitting the drawer front), shape the sides of the pins with the chisel.

26

SHADOW BOX

*White
Oak*



MAKING THE SHADOW BOX

First, cut a 1/2" X 3/8" rabbet on the back inside edges of the two sides, into which the piece's back will later be fit. Cut through dovetails at each corner (see chapter twenty-five). After dry-fitting but before gluing the dovetails, cut the dados that will house the ends of the shelves on the inside faces of the two sides. When the shelves have been fit into the dados, glue and assemble the four sides of the case.

While the glue in the dovetail joints is curing, cut the dados in the two upper partitions and fit the partitions into them. Then glue and slide the partitions into place.

Below the half-circle at the top of the back, relieve the sides of the back so that they will fit into the rabbet cut into the back inside edges of the sides. Fasten the back in

place with 3/4" no. 6 wood screws passing through the back, into the rabbet and into the back edges of the box's top and bottom. Then, sand and finish the shadow box.

MATERIALS LIST

A	Back	1 pc.	1/2 X 6 5/16 X 20 3/16
B	Side	2 pcs.	1/2 X 2 X 17 3/8
C	Top and bottom	2 pcs.	1/2 X 1 1/2 X 6 3/16
D	Shelf	3 pcs.	3/8 X 1 1/2 X 5 5/16
E	Partition	2 pcs.	1/4 X 1 1/2 X 2 1/8
F	Screws	10 pcs.	3/4" no. 6

**These are net measurements. Surplus should be added to dovetailed parts to allow them to be sanded flush.*

INTERPRETING HARDWOOD GRADES

The grading system used to indicate the quality of individual hardwood boards can be a little intimidating. In an effort to clarify that system, I spoke with the National Hardwood Lumber Association.

First, the system *is* complicated. The training course offered by the National Hardwood Lumber Association for people interested in a career in lumber grading consists of fourteen weeks of "intensive" training.

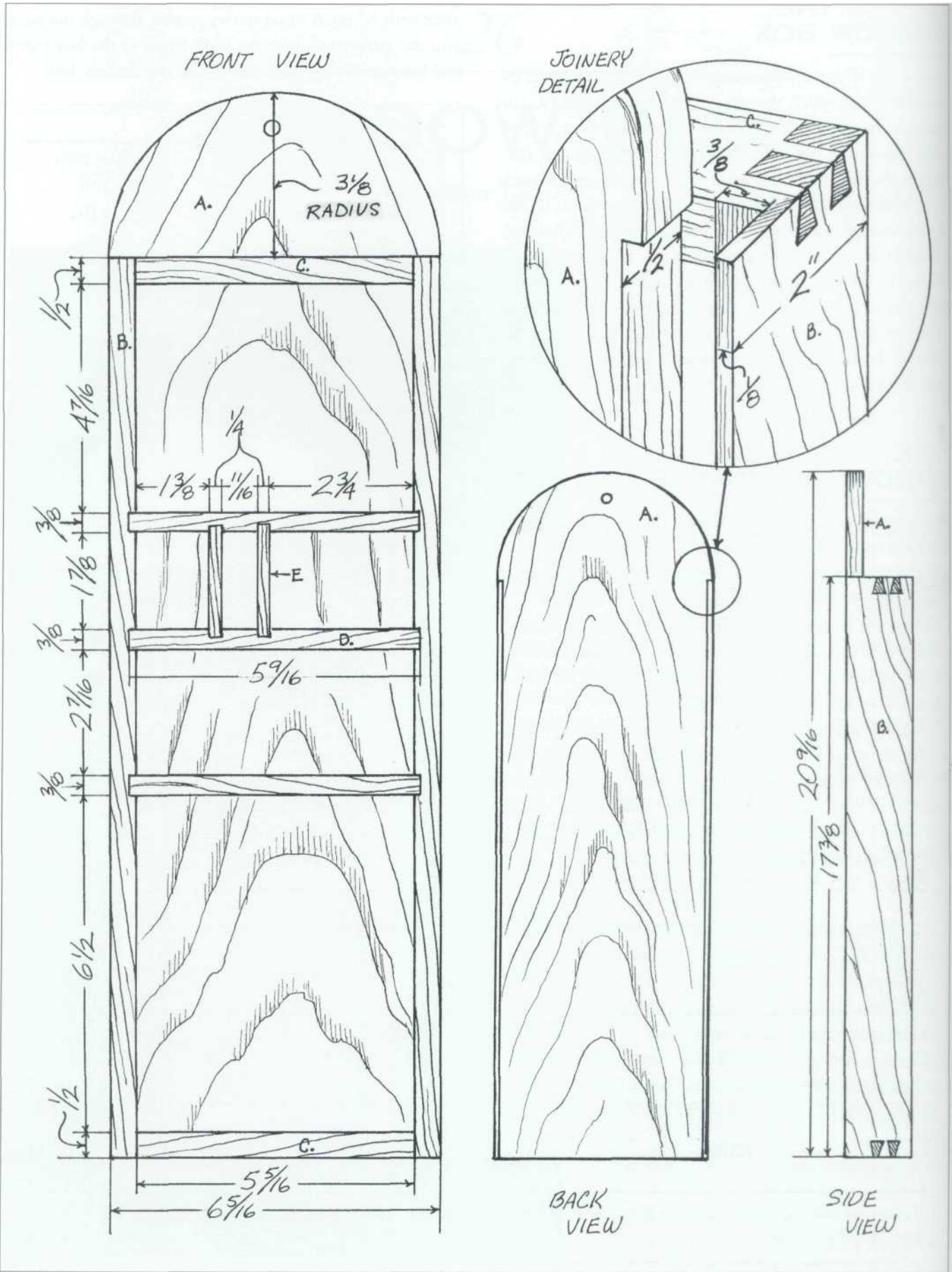
Second, although there are only nine commonly used grades, there are any number of specialized or combination grades used in the woodworking industry. However, the good news is that there are only four grades with which the average cabinetmaker need to be concerned. These are FAS, Selects, #1 Common, and #2A common.

Third, the grades are distinguished by the percentage of clear wood that could be taken from a board in cuttings not smaller than those specified on the chart below. For example, to be graded FAS, a board must be able to yield 83 1/3 percent of its surface as clear wood when taken in cuttings not smaller than 4" X 5' or 3" X 7'. (The odd percentages reflect the convention of measuring lumber in board feet, a unit consisting of the amount of material contained in a cutting 12" X 12" X 1'.)

Fourth, all grades, with the exception of Selects, are determined from the poor face of the board. This means that if a woodworker buys a board graded FAS, its good face is likely to offer a higher percentage of clear surface than is indicated on the chart.

	FAS	SELECT	#1 COM	#2A COM
Minimum Size Board	6" X 8'	4" X 6'	3" X 4'	3" X 4'
Minimum Size Cuttings	4" X 5' 3" X 7'	4" X 5' 3" X 7'	4" X 2' 3" X 3"	3" X 2'
Minimum Clear Yield	83 1/3%	83 1/3%	66 2/3%	50%

**Please note that this chart is not intended to be a complete representation of any of the grades shown. It's intended only to offer some general guidelines.*

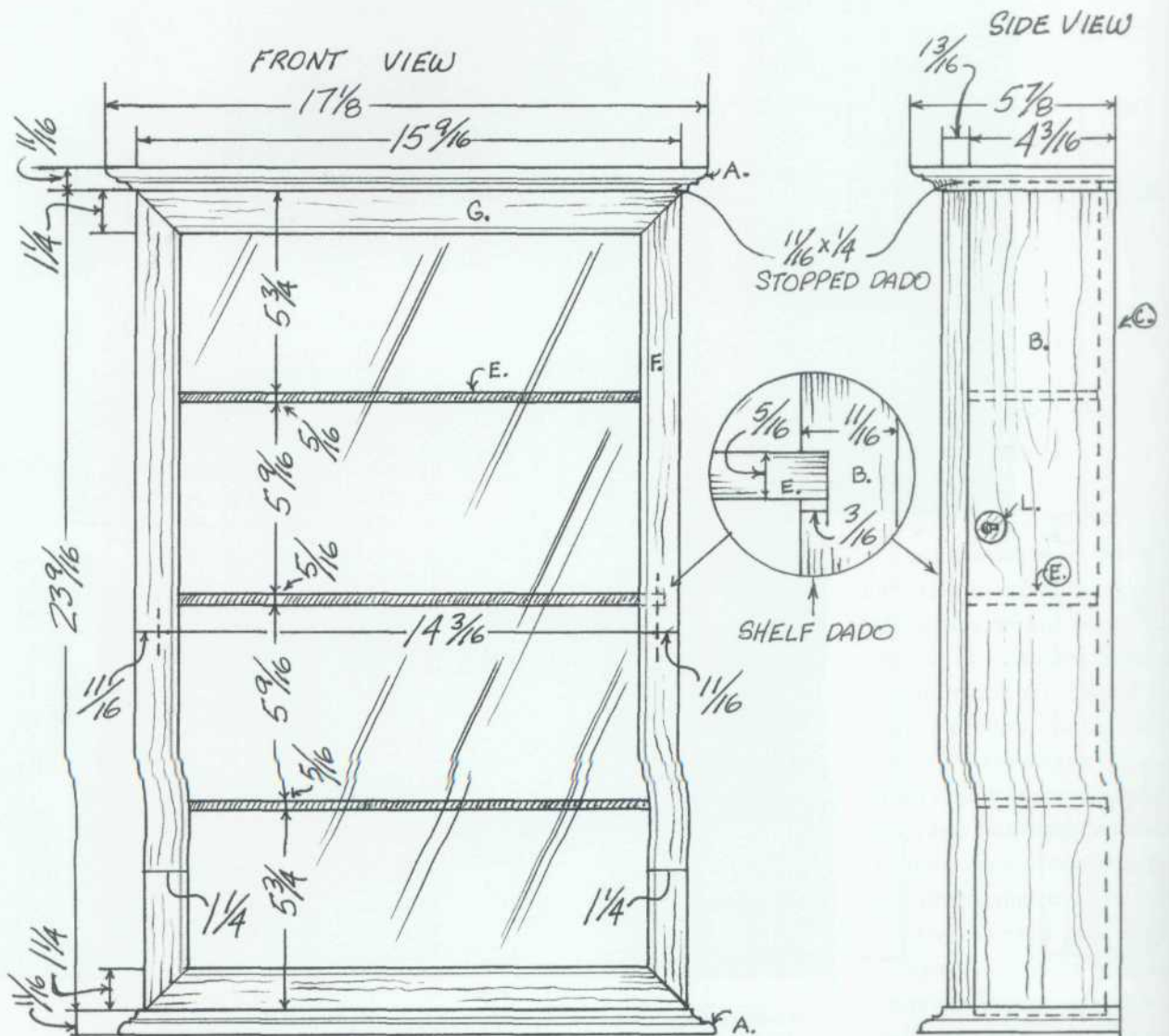
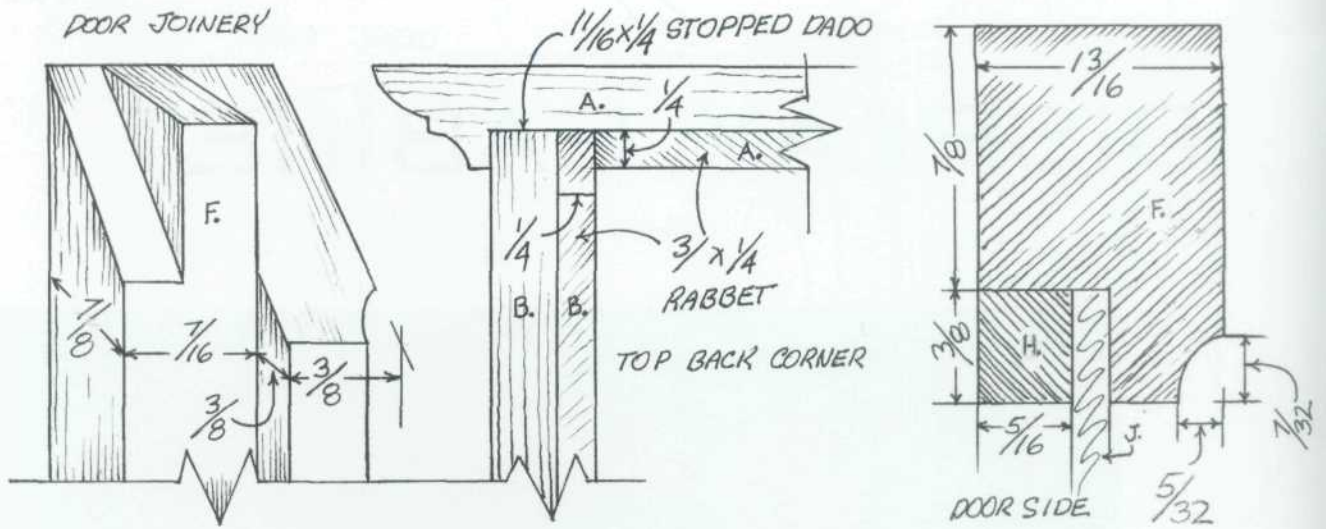


27

DISPLAY CABINET

Cherry





miter. This spline not only increases the glue surface; it also allows face grain to be glued to face grain. The feathered miter, used in the construction of the Shaker-style mirror, is another variation of the basic miter joint, one offering the same advantages as the splined miter. The mitered bridle joint used in the construction of the door on this cherry display cabinet is still another variation, one including tenons on the door's sides which fit into mortises cut into the miters on the door's top and bottom. This joint offers the strength of tenons which are an actual part of the door's sides. It does, however, provide less glue surface than either the splined or feathered miter joints.

MAKING THE DISPLAY CABINET

After milling the stock to the required thicknesses, lengths, and widths, form the moulded edge on the front and ends of the cabinet top and bottom. Then, cut 11/16" X 1/4" stopped dadoes on the top surface of the bottom and the bottom surface of the top (see chapter five). These dadoes will house the ends of the cabinet sides. Cut a 3/8" X 1/4" rabbet across the back of the cabinet top and bottom connecting the dadoes. Cut the same rabbet on the back, inside edges of the cabinet sides. These four rabbets will house the perimeter of the cabinet back. Finally, cut three 3/16" X 5/16" dadoes across the inside surface of the cabinet sides to house the ends of the shelves.

Then assemble the case with glue and screws passing down through the top into the sides, and up through the bottom into the sides. Screw the back to the cabinet sides, top, bottom and the backs of the shelves. These screws

pass through oversized holes to allow the back to expand and contract in response to seasonal changes in humidity.

Begin door construction by running the moulded edge on the front inside corner of the frame stock. Cut a 3/8" X 7/16" rabbet on the back inside edge. Then cut the mitered bridle joint. You can do this with a backsaw and a chisel or with a stack of dado cutters on the table saw, holding the work in a Universal Jig.

The glass is held in its rabbet with the four tack strips.

MATERIALS LIST

A	Top and bottom	2 pcs.	1 ¹ / ₁₆ × 5 ⁷ / ₈ × 17 ¹ / ₈
B	Side	2 pcs.	1 ¹ / ₁₆ × 4 ³ / ₁₆ × 24 ¹ / ₁₆
C	Back	1 pc.	3 ⁷ / ₈ × 14 ¹³ / ₁₆ × 24 ¹ / ₁₆
D	Cleat	1 pc.	1 ³ / ₁₆ × 1 ¹ / ₄ × 14 ³ / ₁₆
E	Shelf	3 pcs.	3 ⁷ / ₁₆ × 3 ³ / ₁₆ × 14 ³ / ₁₆

Door

F	Door side	2 pcs.	1 ³ / ₁₆ × 1 ¹ / ₄ × 23 ³ / ₁₆
G	Door top and bottom	2 pcs.	1 ³ / ₁₆ × 1 ¹ / ₄ × 15 ⁵ / ₁₆
H	Vertical tack strip	2 pcs.	1/4 × 3/8 × 21 ³ / ₄
I	Horizontal tack strip	2 pcs.	1/4 × 3/8 × 12 ¹⁵ / ₁₆
J	Glass	1 pc.	3/8 × 13 ³ / ₄ × 21 ³ / ₄

Hardware

K	Hinge	2 pcs.	1 × 1 ³ / ₄
L	Lock	1 pc.	1 ³ / ₈ × 1 ⁷ / ₈
M	Screws	various	

**These are net measurements. Surplus should be added to door sides to permit joints to be sanded flush.*

28

SIX-WOOD BOX

Mixed Woods



INSTALLING HARDWARE

Many years ago, I made a drop-leaf walnut wall desk with a number of variously sized pigeonholes. I remember the satisfaction I felt fitting each of the little dividers into its dadoes. I remember the pains I took to smooth the wood with a variety of sandpaper grits. I also remember visiting the hardware store in search of a lid support that would hold the drop leaf at the proper angle so that it could be used as a writing surface.

I found the brass support that I had envisioned for my desk and I took it home and tried to install it. I tried it one way and then another and another, each time making screw holes in my carefully sanded walnut, until I realized, with a growing sense of panic, that it simply wasn't going to work, that the arrangement of pigeonholes I'd designed left no room for the operation of this lid support.

I searched the mail order catalogs next (at that time, there weren't nearly as many to choose from). But nothing I found there looked any more likely to work in the tight confines of my desk than what I'd already tried.

Rule number one for makers of furniture and woodenware: *Buy the hardware first.* Buy it before construction starts, before a single stick of wood is cut, before even the finishing touches are put on the design. Buy the hardware first because what the project requires may not be available or, if available, may not work as envisioned.

What happened to the wall desk? I did finish it, and we did use it in our home for several years. We, then, later gave it to a friend. Although I haven't seen it for ten or eleven years and have attempted to blot its memory from my mind, I believe that my solution to the problem of the drop leaf support involved a length of noisy and inelegant brass chain.

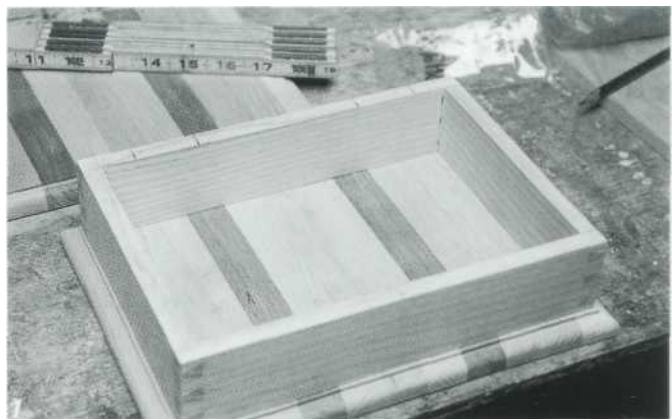


The opened six-wood box shows the lock installed in the front.

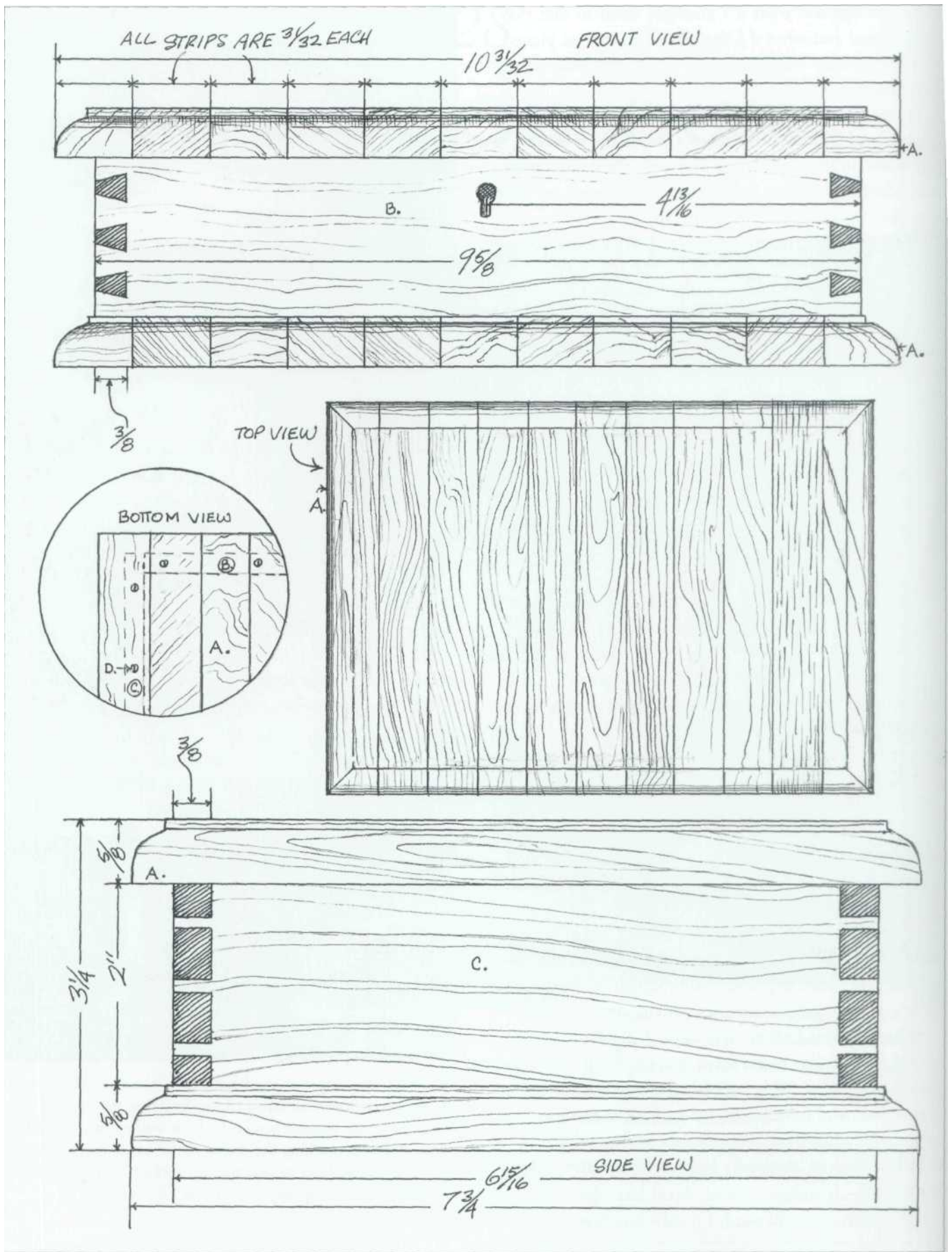
Before beginning work on this small box, I waited for my hardware to arrive.

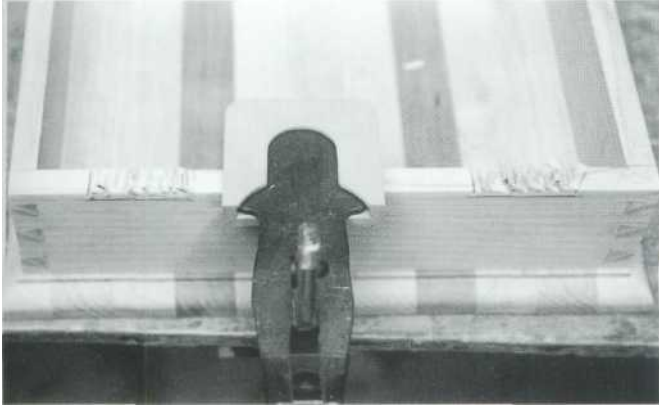
Begin construction with the glued-up panel from which the top and bottom are cut. Shuffle around a number of ribs approximately 1" wide until a pleasing arrangement is found. Then glue-up and clamp these ribs. After the glue is cured, you can plane the panel (see chapter five) cut out the box's top and bottom, and mould them on a shaper or a table-mounted router.

Dimension and dovetail sidewall material together (see chapter twenty-five). Fasten the bottom in place with a number of screws passing through oversized holes that allow expansion and contraction of the bottom in response to seasonal changes in humidity.

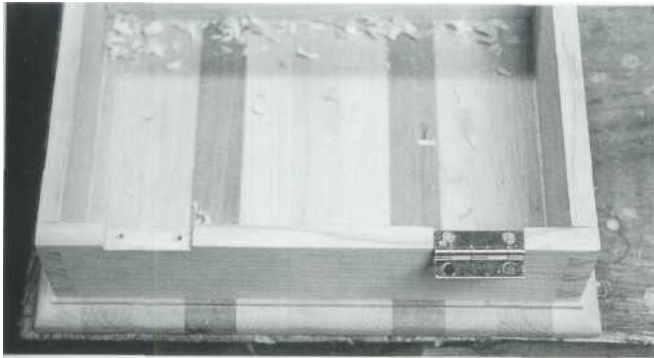


1 Install the hinges on the back wall of the box. This process begins with careful layout. Lines marking the ends of the hinge leaves are squared across the back wall of the box. Then, additional lines marking the depth of the hinge mortises are drawn. Set these lines so that the top surfaces of the top leaves are flush with the top edge of the box's back wall.

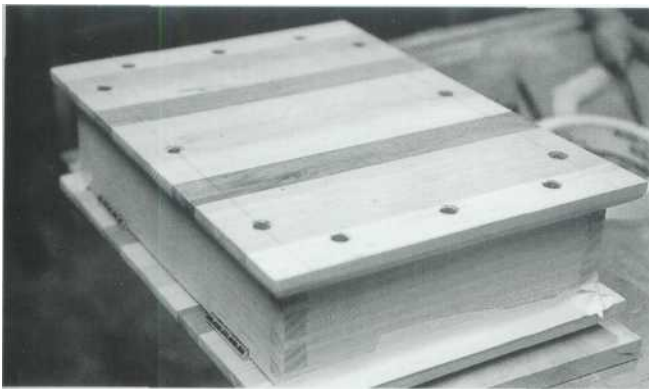




2 A series of *shallow* chisel cuts lifts wood from the mortises. This will be removed by working the chisel back, from the opposite direction.



3 After cutting the mortises, install the hinges. Take care to accurately align the hinges so that both hinge pins open on the same axis.



4 When the hinges have been fastened to the box's back wall, invert the box over the lid and tape in place. Then mark hinge locations very carefully.

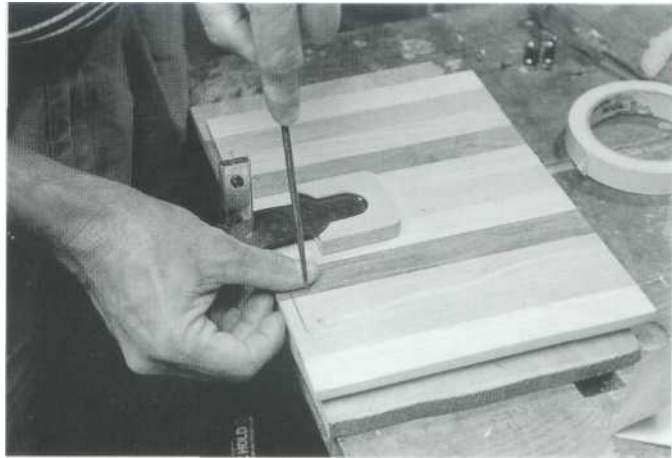
MATERIALS LIST

A	Top and bottom	2 pcs.	$\frac{3}{8} \times 7\frac{3}{4} \times 10\frac{3}{32}$
B	Front and back	2 pcs.	$\frac{3}{8} \times 2 \times 9\frac{3}{8}$
C	Side	2 pcs.	$\frac{3}{8} \times 2 \times 6\frac{1}{16}$
D	Screws	12 pcs.	1 $\frac{1}{4}$ no. 8
E	Hinge	2 pcs.	1 $\frac{1}{2} \times 7\frac{3}{8}$
F	Box lock	1 pc.	1 $\frac{1}{2} \times 1$

**Front, back and side length measurements are net. Surplus should be added so that dovetail can be sanded flush.*

**Hinges and lock were ordered from Constantine's Hardware.*

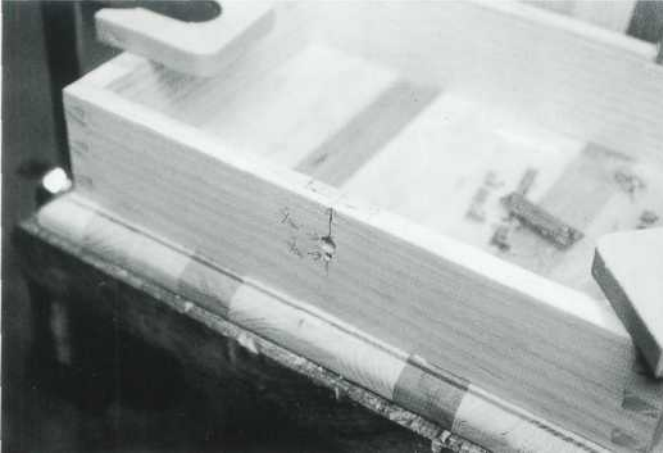
**Reading from left to right, the woods in the top are as follows: hard maple, white oak, cherry, walnut, sassafras, cherry, sassafras, walnut, cherry, white oak, hard maple. The box's walls are made of ash.*



5 Remove hinges from the back wall so they can be installed on the lid. Here, a scratch awl is being used to punch a starting hole for the drill bit in the center of the circle marking the screw holes in the hinges.

6 After installing the hinges on the lid, fasten the hinges' other leaves into the mortises previously cut into the box's back wall.

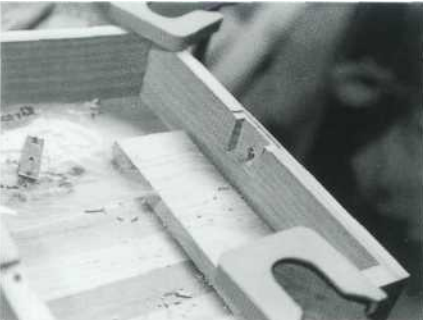




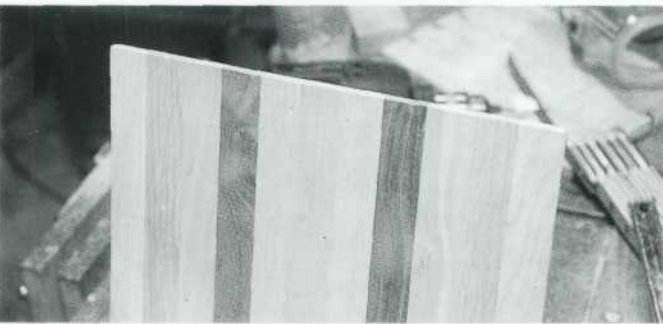
7 Next, install the brass box lock. Again, careful layout is essential. Square a centerline across the top edge of the box's front wall and draw the mortise for the lock on the top edge and inside face.

Then extend the centerline down the front face of the box's front wall, and lay out the keyhole along this line. Drill a 1/4" hole above a 1/8" hole to remove most of the waste necessary for the creation of the keyhole.

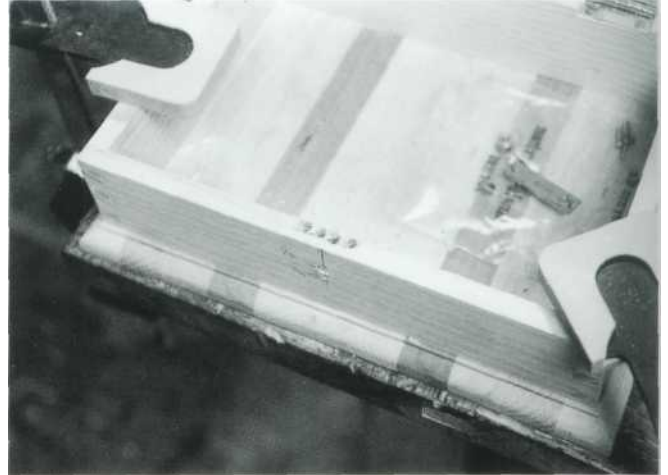
9 The completed mortise can be seen from the back



9 The completed mortise can be seen from the back



11 In this photo, the two depressions can be seen near the upper edge of the lid. After the lid has been clamped face-down on the benchtop, position the strike plate so that the two bumps on its upper side are located in these depressions. Then draw a line around the strike plate and the mortise cut.



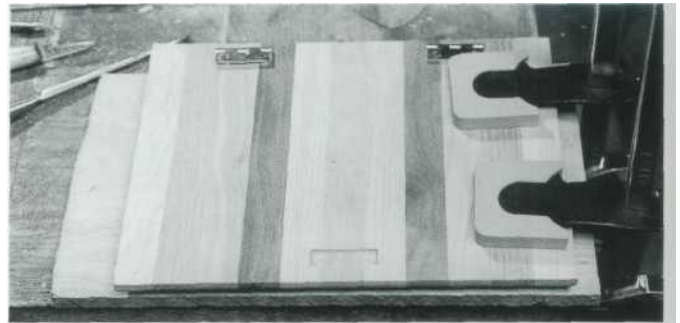
8 Four 3/16" holes remove much of the waste for the mortise that will house the main body of the lock.



10 After installing the lock in the box's front wall, locate the strike plate on the bottom side of the lid. The first step in that process is locking that strike plate in place with the key.

Here, the strike plate can be seen locked facedown. Notice the two bumps on the back side of the strike plate. When the lid is closed and tapped firmly, these two bumps leave depressions on the lid's bottom surface, locating the strike plate on the lid.

12 Cut the mortise in which the strike plate will sit. The lock is now fully functional.



29

BENTWOOD BOX WITH SNAP-FIT LID

Walnut, Hard Maple



MAKING THE BENTWOOD BOX

Work begins with the construction of a bending form for the main body of the box. Mine consists of a stack of spruce 2 X 4's laminated together and band-sawn and sanded to the box's inside profile. On the side of the form that will shape the front of the box, the face of the form is undercut for the lap of material beneath the box's glue joint. A thin strip of metal (in my case, aluminum siding) is screwed to the form creating an opening into which the end of the sidewall material can be slipped as that material is wrapped around the form.

The next step is acquiring material for the sidewalls of the box (see chapter two for a detailed discussion).

After the sidewall material has been soaked (for twenty-four hours in cool water, followed by ten minutes in warm water), wrapped around the form, and clamped in place, it should dry for four or five days. At that time, remove it from the form and cut the lap joint. For this particular example, I drilled three holes in the joint, sandwiching in three bits of peacock feather between the lapping laminations so that the feather was visible through the holes. The joint is then glued and clamped using the bending form and the caul both to protect the material from the clamps and to preserve the box's oval shape while the glue cures. (this process is described in some detail in chapter two).

Cut out the clasps and the handle next. Thicknesses can vary, but the thickness of the clasps must be accurately transferred to the stock that will later become the lid so that the walls of the notches fit snugly against the clasps.

When you have selected the lid material, place the box's bentwood sidewalls on that material and draw a line around its circumference. Next, establish a centerline running from one end of the box to the other. This centerline is necessary in order to lay out the notches that will house the clasps.

Next, sketch the outside profile of the lid. There is considerable freedom in establishing this profile since the notch placements are the only critical locations on the lid. Then cut the lid's outside profile on the band saw.

Once the lid has been shaped, the handle is affixed. I taped the handle in place, turned the lid over, and drove a couple of wood screws up through the lid and into the handle.

Make the bottom next. After thickening the stock to 7/16", place the box's bentwood sidewalls on the bottom

MATERIALS LIST

A	Top	1 pc.	1 × 7¼ × 15½
B	Sidewall	1 pc.	½ × 3½ × 30
C	Bottom	1 pc.	7/16 × 6¼ × 8½
D	Clasps	2 pcs.	½ × 1½ × 7¼
E	Handle	1 pc.	¾ × 1¾ × 6¾

**Measurements for lid, bottom and clasps must be taken from the dimensions of the sidewall, which are, in turn, determined by the size of the bending form.*

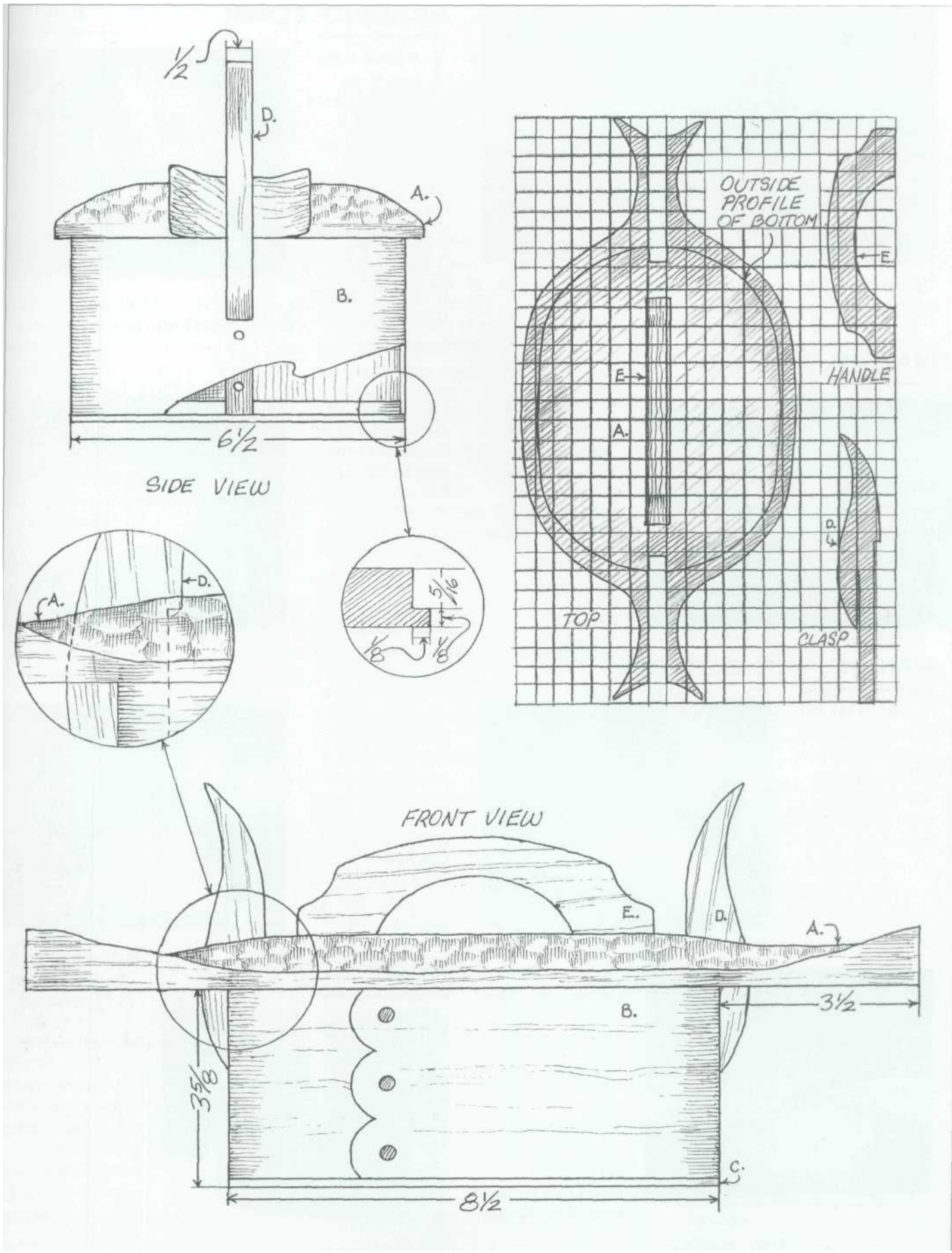
material. Profile the inside and outside of the sidewalls. On the band saw, cut the bottom profile, keeping the saw kerf approximately 1/16" outside the pencil line that marked the outside circumference of the sidewalls. Then, clamping the bottom in a vise, cut away the extra 1/16" of material with a block plane, to remove the saw marks.

Mark the rabbet around the bottom circumference with a line 5/16" from the top surface of the bottom. Next, with a dovetail saw, make a shallow cut along that line. This saw kerf represents the bottom of the rabbet. With a chisel, cut the rabbet to the depth marked by the line traced around the inside face of the sidewalls. Once the bottom has been fit, sand the parts and assemble the box using 1/8" wooden pegs to both fasten the walls to the bottom and the clasps to the walls.

OPENING THE BOX



1 Place your thumbs on the tops of the box's clasps while your fingers grasp the fishtail ends of the lid. Spread open the clasps and lift the lid. To close, press the lid down against the clasps until it snaps into place.

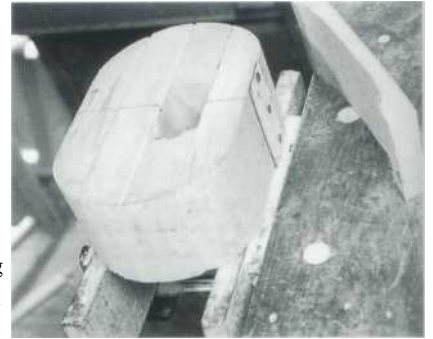




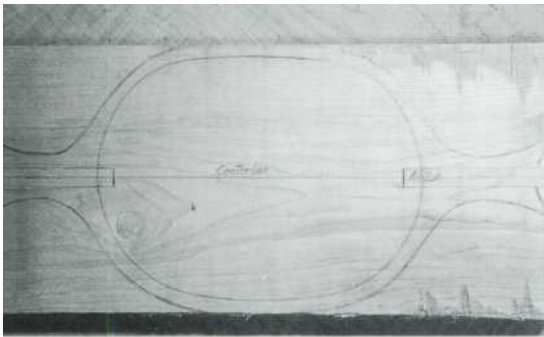
This close up of the box side reveals peacock feather inlay in the holes, a very unique design element.

BENDING FORM

1 A block at the base of the bending form allows a vise to hold it. After wrapping the soaked, resawn stock around the form, clamp the caul to the form to hold it in place. Cut an opening in the top of the form for the clamp head.

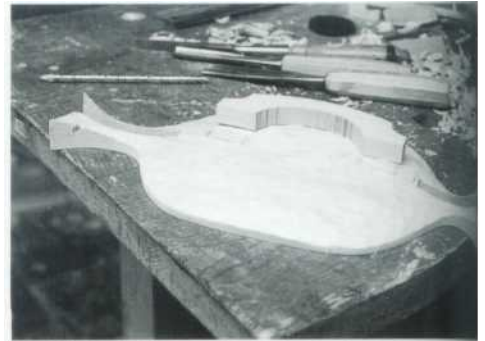


MAKING THE LID



1 The layout of the lid is shown. Careful planning at this stage will ensure a lid that snaps cleanly into place.

2 If the surface of the lid is to be shaped, flat surfaces must be left for the base of the handle.



MAKING THE BOTTOM

1 Define the bottom of the rabbet that will receive the sidewalls by a shallow saw cut made all around the bottom.

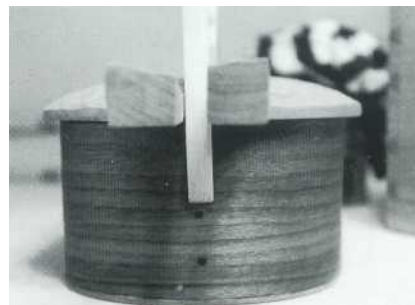


2 Cut the rabbet with a chisel. Here, the chisel is cutting across end grain. After cutting another $\frac{3}{4}$ " of the rabbet, reverse the bottom in the vise in order to cut back to that point from the other side.



3 The various parts have been cut and fit and are ready for assembly. Notice the widened section of the rabbet which will receive the lapped section of the sidewalls. Notice, too, the notches for the bottoms of the clasps.

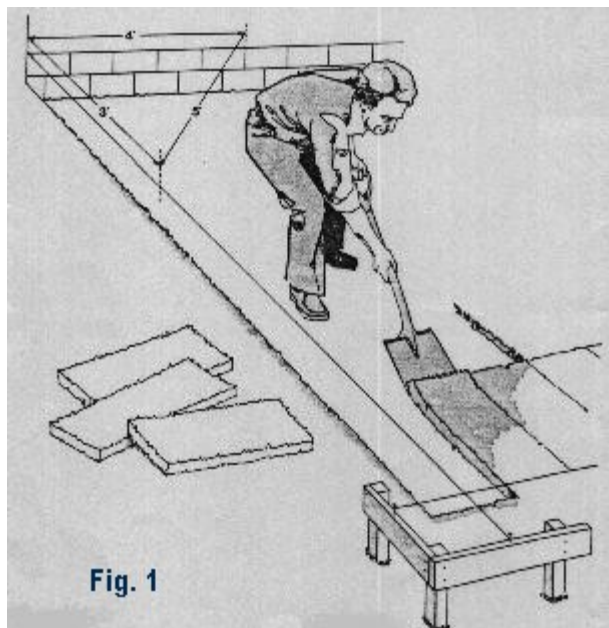
PEGS



1 This shows the ends of two pegs driven through the sidewall into the clasp. Below, to the left, is one of the pegs holding the bottom and sidewall together. Drill a hole before inserting these pegs.

30

DECK



Step 1

Mark off the deck area using string and "batterboards" making sure that it is square. Batterboards are boards hammered in to the ground just outside the corners of where the deck will be. See Fig 1. The string will help you visualize the size and appearance of the finished deck and will also serve as a guide for excavation and post placement. But trust me, it will always look smaller this way than when it is done.

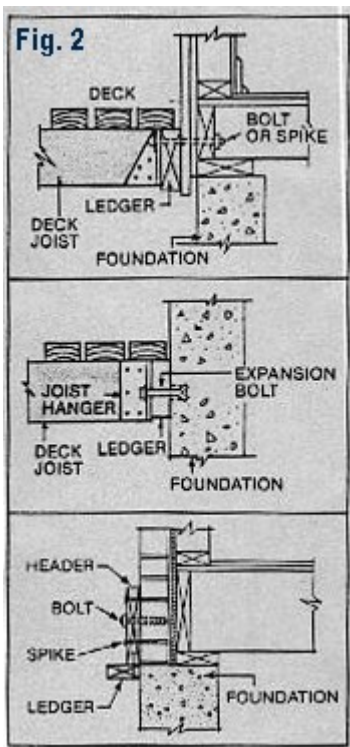
SQUARING WITH STRING

1. Attach string to house and/or batterboards to make sure its level.
2. Use a felt tip marker to mark the string 3' from the corner in one direction and 4' from the corner in

other direction.

3. When the diagonal connecting these 2 points is 5', you have a right triangle and the angle at the corner will be 90°.

Note: To obtain the 5' measurement, move the string attached to batter board to the left or right until correct.



Step 2

Prepare the site. With a spade or sod cutter, remove sod to a depth of 2 or 3 ". Uncover an area approximately 2 ft. larger than the planned deck. It's unlikely that grass would be able to grow in the shadow of your deck, so you might as well transfer the sod to a bare spot in your yard where it would be useful. To prevent weeds and unwanted vegetation from growing up through the deck, spread a sheet of polyethylene film over the area. You'll have to slit this to embed posts in the ground. After the posts have been installed, cover the sheet with gravel, pebbles or wood chips.

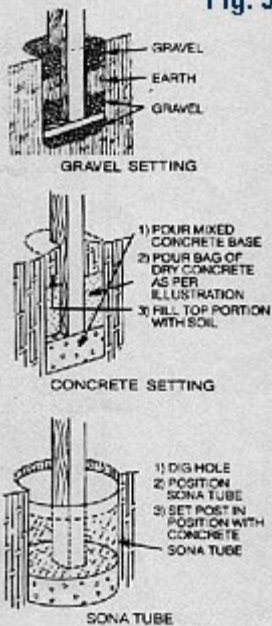
Step 3

A ledger/header board is the next step if you are attaching your deck to an existing structure.

The placement of the ledger/header determines the level of the deck floor, so be sure it is positioned at the correct height and is horizontal.

When fastening ledger/header boards to wood, the ledger should be held securely with bolts through the wall or lag screws. Use aluminum flashing to keep water from getting behind your ledger board.

Fig. 3



This should tuck up under your siding and bend down over the ledger, then down the face of the ledger board. Where aluminum or vinyl siding is in place, carefully cut siding away from house so that ledger/header board can be secured directly to the house. You may be able to use the bottom edge pieces of the siding above the deck to refinish the lower edge, so save these if possible. See figure 2. I will assume the joists are hung from the ledger and not resting on it, but be sure you account for the height of your deck boards when figuring the placement of the ledger. (Typically just 1 ½ inches down from the final height of the deck.)

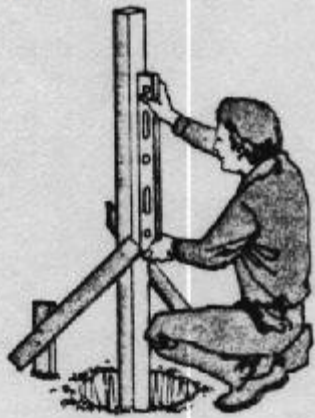
Step 4

Locate and dig holes for footings. In normal soil the holes should be a minimum of 24 to 36 inches deep, although the actual depth will depend on the height of the column and the depth of the frost line. Posts should go deeper than the frost line to avoid heaving during freeze and thaw cycles. Again, this is usually specified by code when the deck is attached to the house.

If you have many holes to dig and/or have difficult soil to dig in, you should rent a power posthole digger. These can be operated by one person, and certainly make the digging go MUCH faster.

You can use pressure treated wood in the ground for your footings as follows. Fill the bottom of the hole with 6 inches of gravel and place a wood footer plate (2" x 6", or 2" x 8" cut off) on top of the gravel. Upright posts can then be positioned on this base (Fig. 3). Fill the posthole with alternating layers of 4 to 5 inches of gravel and earth. Tamp each layer until the hole is filled and post is plumb and solid. If concrete collars are used, taper the tops downward and away from the post for drainage. Posts can also be set in concrete. Or my preferred method, uses a cement footing to just above the ground level. Fill the post hole completely with cement and use a section of "sona tube" (a heavy cardboard tube, 8 inches in diameter) to finish off the hole at ground level. Make sure you have already purchased the hardware to attach the posts to the cement so you can set the bolts in the cement while it is wet.

Fig. 4



When setting the posts directly in the holes, make sure they are plumb and in alignment with one another. Use a carpenter's level to check for vertical alignment (Fig. 4).

One advantage of using the cement footings and the wood attached to them above ground, is the leveling and exact location can be set later, when the beams are positioned. It allows for some adjusting later (a little, but that is all you are usually looking for.)

Step 5

Secure beams to posts. Using a string and level, find the desired deck floor height on the posts. Or extend a long straight 2 by 4 from the ledger board to the posts and placing a level on the board, determine the post height. By subtracting the thickness of the joist (use the actual dimension not the nominal one), you will have determined the correct height for securing the top of the beam to the post. Carefully mark all 4 sides of the posts. Beams can rest on top of the post, or be fastened to the side. You may cut all posts except those serving as railing supports at this time. Fasten the beam to the post, keeping post and beam flush. Or set the beam atop the post nailing it down to the post.

Step 6

Attach joists. Joists are attached to the house with joist hangers and/or supported by a ledger board. Joists are placed on 16" or 24" centers, and attached to the beams and ribbon joist. Joists can be attached to the beams using joist hangers, or rest on the beam. If the joists are to extend over a beam, do not extend them more than 1/3 of their length.

Step 7

Install deck boards using hot-dipped zinc-coated 16-penny nails.

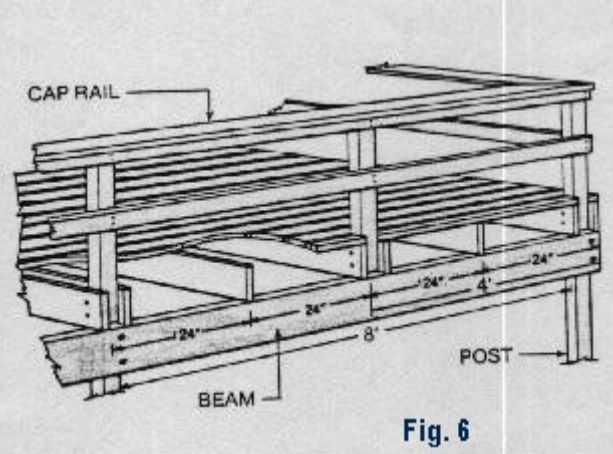
Separate boards using a small finishing nail as a spacer or set boards right up against each other. If pressure treated wood came dry, a space would be necessary for some expansion may take place when it gets wet. However, it typically is quite wet and will always shrink. I have found that when placed

tight against each other they will shrink leaving an adequate gap. If you leave to large a gap while they are still wet, the gap may get quite large .

Your deck surface is an important part of your project, and the most visible. Make it simple with the boards set to end on the joists. If you could not get decking long enough to span your deck, stagger the butt end joints so they do not all end along the same joist.

You can trim your deck after nailing to assure a straight line (see Fig. 5). Do not allow an overhang exceeding 1 1/2". For a more finished appearance, cut boards flush to the joist and add a fascia board.

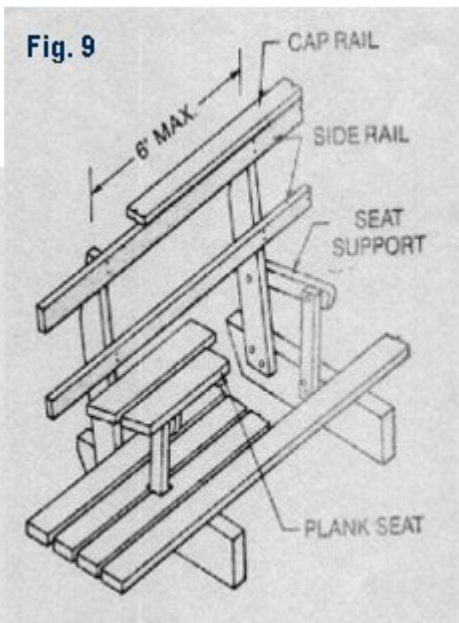
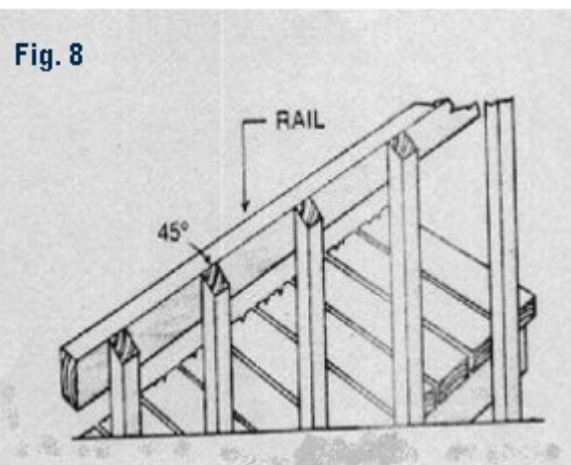
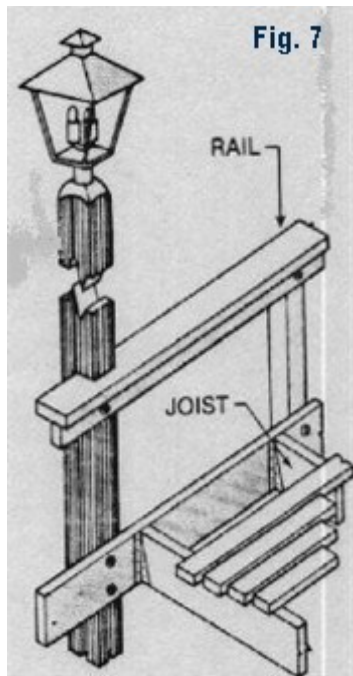
If a board is slightly humped, install it with the bark side up when possible to minimize cupping. The weight of people and objects on the deck, and of the board itself, will tend to flatten it. A curved board can also be used; use a board to pry it to the desired position and nail securely.



Step 8

Install posts for railing. These can be a continuation of the posts which support the deck, or railing posts may be bolted to the outside joist or joist extensions.

Notice in Fig. 6 how the main posts continue up from the actual deck floor level and by doing so provide a good sturdy post. Intermittent posts or spacer posts can be used between the main support posts. The top railing member can be easily nailed to the side of the main posts at desired height. Posts can then be cut off. Spacer post height can be determined and added for additional support and appearance. Railing cap of suitable size can now be added as well as additional rails. More railing ideas are illustrated below.

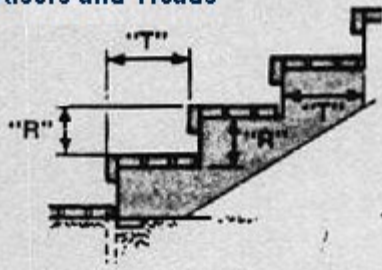


The safety and beauty of your deck are enhanced by its railings. They can be plain or very elaborate, offering as much opportunity for individual preference as a fence.

Benches can be integrated into the railing on one or all sides. Bench seats should be at least 15" wide and 15" to 18" above the deck floor.

Privacy screens can enhance the beauty of your deck, as well as offering you privacy. They can also be used effectively under an elevated deck to create a storage facility or hide an unsightly hillside.

Suggested Ratios for Risers and Treads



"R"	"T"
7"	11"
6"	15½"
5½"	16"
5"	17"
4½"	18½"
4"	19½"

Table A

Step 9

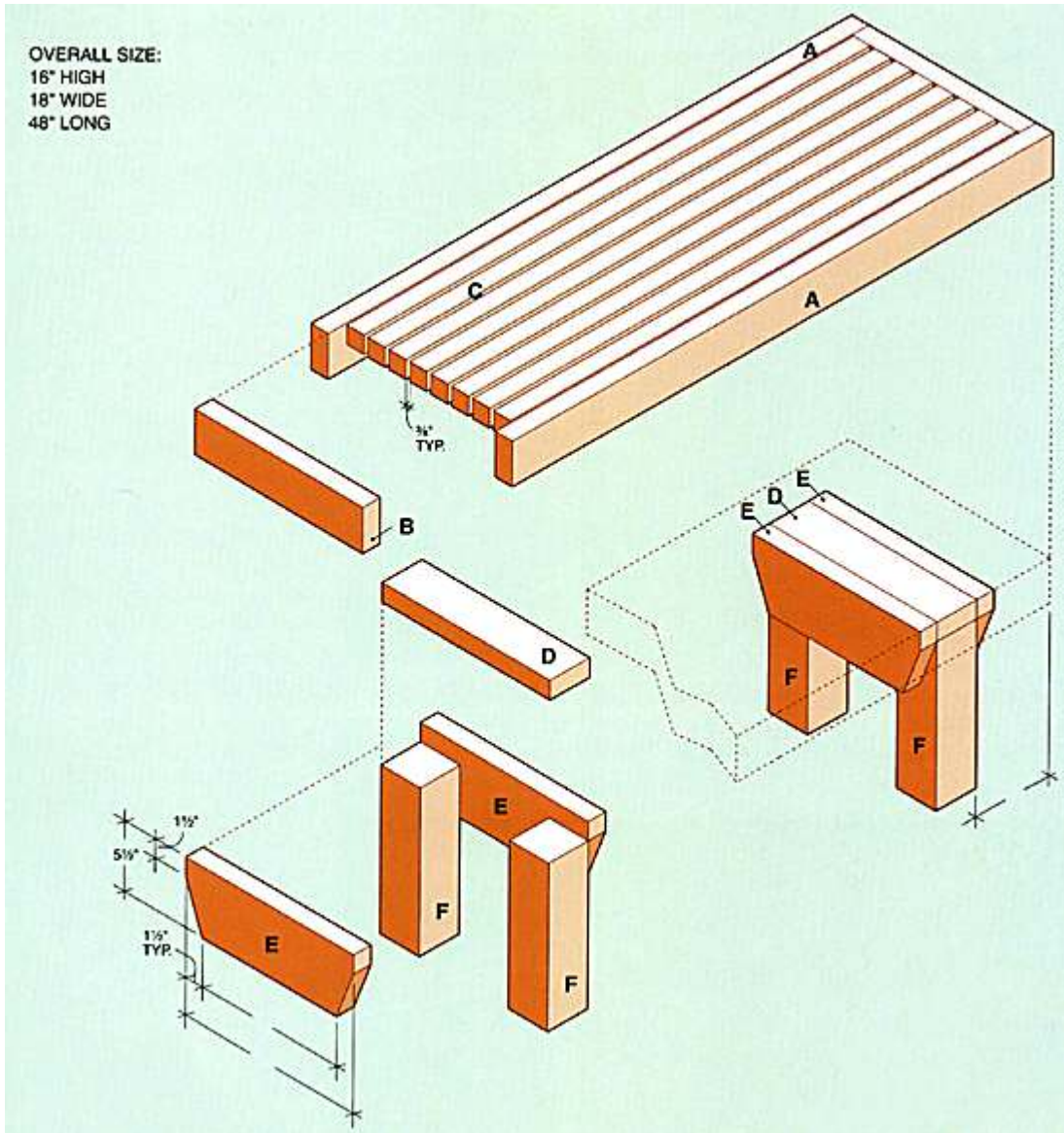
Construct steps. Measure the vertical rise and decide upon the best riser size for each step. This will determine the number of steps needed. The adjacent table shows some recommended ratios of tread length and riser height. Multiply the number of steps by the tread length to find the overall run of the stairs.

Using 2 x 4 or 2 x 6 boards for treads will reduce cupping problems common with wider boards.

It is also possible to purchase precut steps at certain lumberyards. A call ahead might eliminate some of the more difficult angle cutting you need to do.

31

DECK BENCH



Due to its modular design, this bench can be mixed or matched with planters or other benches. Cedar wood enables this bench to withstand sun, rain, and even snow. This bench will enhance your enjoyment of your deck and its beauty.

Everything You Need:
Materials:
3" gold-colored deck screws (60)
2 1/2" gold-colored deck screws (16)

Directions: Deck Bench

CONSTRUCTION MATERIALS	
Quantity	Lumber
1	2 x 4" x 8' cedar
1	2 x 4" x 6' cedar
4	2 x 2" x 8' cedar
1	2 x 6" x 6' cedar
1	4 x 4" x 6' cedar

Cutting List				
Key	Part	Dimensions	Pcs.	Material
A	Sides	1 1/2 x 3 1/2 x 48"	2	Cedar
B	Ends	1 1/2 x 3 1/2 x 15"	2	Cedar
C	Slats	1 1/2 x 1 1/2 x 45"	8	Cedar
D	Stretchers	1 1/2 x 3 1/2 x 15"	2	Cedar
E	Braces	1 1/2 x 5 1/2 x 15"	4	Cedar
F	Legs	3 1/2 x 3 1/2 x 13"	4	Cedar

Note: Measurements reflect the actual thickness of dimensional lumber.

MAKE THE FRAME.

The butt joints make this bench sturdy and easy to construct. For strength and good looks, we used gold-colored deck screws.

1. Measure, mark and cut the sides (A) and ends (B) to length, using a circular saw.
2. Position the ends between the sides so the edges are flush. Measure from corner to corner. When the diagonals are equal the frame is square.
3. Drill 1/8" pilot holes through the sides and into the ends. Fasten the sides to the ends by driving 3" gold-colored screws through the pilot holes.

BUILD THE SEAT.

The slats that make up the seat are spaced 3/8" apart to allow rain water to run off.

1. Cut the slats (C) to length using a circular saw.



2. Set the frame on a flat surface and place 3/8" spacers against one side. Place the first slat in the frame against the spacers. Drill 1/8" pilot holes through both ends into the slat. Secure the slat to the ends with 3" deck screws. Repeat this process of positioning and attaching slats until all the slats are in place **(photo A)**.

3. Measure, mark and cut the stretchers (D) to length.

4. To mark the stretcher outlines, measure in 5" and 3 1/2" from the inside of each end piece on the back of the slats and make a mark.



5. Position the stretchers between the marks. Drill 1/8" pilot holes through the stretchers into the slats. Attach the stretchers with 2 1/2" screws **(photo B)**.

ASSEMBLE THE BENCH.

The braces hold the legs in place against the stretchers.

1. Measure, mark and cut the braces (E) to length.



2. To shape the ends of each brace, mark the angle by measuring down 1 1/2" from the top edge and 1 1/2" along the bottom edge. Draw a line between the two end points and cut along that line (**photo C**). Repeat this step at the other end of the brace.

3. On each brace, measure down 3/4" from the top edge and draw a reference line across the stretcher for the screw positions. Drill 1/8" pilot holes along the reference line. Position a brace on each side of the stretchers and fasten it with 3" screws driven through the braces and into the stretchers.

4. Measure, mark and cut the legs (F) to length, using a circular saw. If needed, finish any cuts with a handsaw.



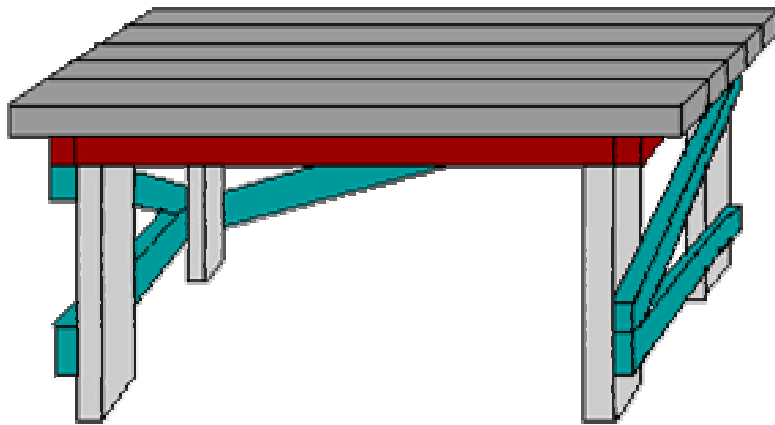
5. Position each leg between the braces and against the sides of the bench frame. Drill pilot holes through each brace and attach the leg to the braces by driving 3" screws through the braces and into the leg. Repeat the process for each leg until all legs are installed (**photo D**).

APPLY THE FINISHING TOUCHES.

1. Sand all surfaces with 150-grit sandpaper. Be sure to sand edges thoroughly so bare legs will not be scratched.

2. Because cedar is naturally resistant to decay, it will age to a natural gray. To preserve its reddish color, you can apply a clear sealer as we did. Cedar is also suitable for painting.

32 WORK BENCH

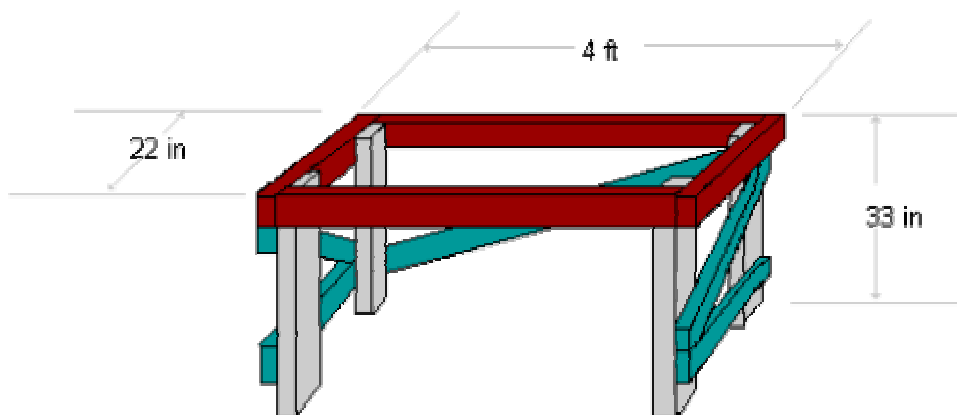


These plans are for a simple workbench you would build for your garage or along the wall in your shop. It is a sturdy bench, built simply, but to last as long as the structure you put it in.

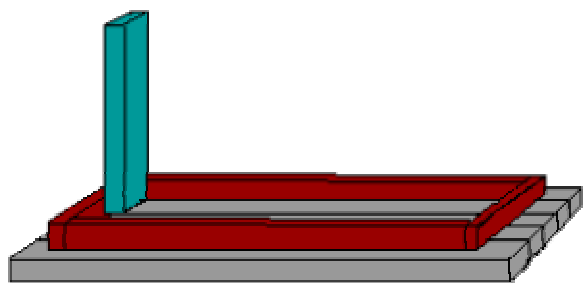
I used 2x6 boards for the top and the legs. The braces and frame can be 2x4's. You can also use 2x4's for the top.

The length should be dictated by your location. If the bench will be longer than 8 feet, you should build another set of legs under the center. The height should be about 34 inches high. But depending on your height you may want that higher or lower. A good rule of thumb is to stand with your arm straight down and your palm parallel to the floor. Measure the distance from the floor to your palm and build it that high. The width should be about 27-28 inches, which equates to 5 2/6's or 8 2x4's.

I have listed the dimensions and bill of materials for a bench 5 feet long, 27 1/2 wide and 34 1/2 high.



Start by nailing the bench's top boards to the two boards that run perpendicular underneath using 16d nails. The boards for our example size are five 2x6's 5 ft. long. Squeeze the top boards together as tight as you can, since little items will be finding their way through any cracks for years afterwards. The boards that will run underneath are 2x4's 22 in. long and should be set in from the edge 6". Flip the top over and nail the front and back frame boards to the end boards. These are 2x4's, 3' 9" long and go between the two nailed to the top.



Next nail the legs into the 4 corners of the frame under the bench. The legs are 2x6's cut 33 in. long. Nail the long 2x4 diagonal board that runs along the back of the bench to the two back legs. Turn the bench back right side up and nail in the stretchers that join the legs on both sides and the two diagonal boards on either side. These four boards are 2x4's.

You can make a shelf underneath by running boards from one side to the other supported by the stretchers between the legs. You may also wish to add a backsplash board to keep things from falls behind the bench. Nail a 2x4 to the top of the bench along the length of the back.

Bill of Materials:

3 (three) 10 foot 2x6 (cut two of them in half for the top and one in 3 pieces for 3 of the legs)

1 (one) 8 foot 2x6 (cut the remaining leg and remaining top board from this one)

3 (three) 8 foot 2x4

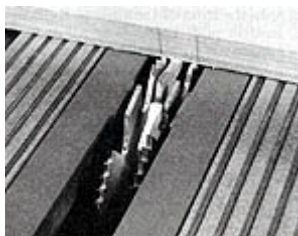
33 BOOKCASE



1. **Cut the plywood to size.** Begin by ripping the plywood lengthwise into strips 15 3/4" wide. The extension table on the Mark V helps support the heavy plywood for these long cuts, yet even with this support, you should enlist the assistance of a helper or use a roller stand and rear support table.

After ripping the plywood, crosscut it to length. Follow the cutting instructions in the list of materials.

2. **Cut the dados.** Mark the position of your dados on the sides (A, O). All of your dados will be 3/4" wide and one-half the thickness of the plywood, or 3/8" deep, with some exceptions on the top (B) and shelf divider (J).



Be sure the machine is unplugged for your set-up. Carefully line up the marks you made on the edge of the plywood with the Dado Blade. Then crosscut your dados with one edge flat against your miter gauge. This is a tricky procedure because furniture-grade oak plywood has a very thin veneer on the outside that is susceptible to splitting if it is not cut properly.

Set your speed dial to "R". Make a cut that is only as deep as the veneer thickness on the plywood. Then lower the table to final depth and make a second cut at the same place. The Stop Collars (from the lathe Tailstock) mounted on the table posts will set the final Dado depth of cut.

The large table system on the Mark V 510 allows you to crosscut or Dado wide pieces with ease. If you are working with the Mark V Model 500, use the Front Table Extension to help support wide pieces as you crosscut and Dado. The Rear Support Table, Roller Stands, a Miter Gauge Extension or a Cross-Cut Sliding table will also help provide additional stability.

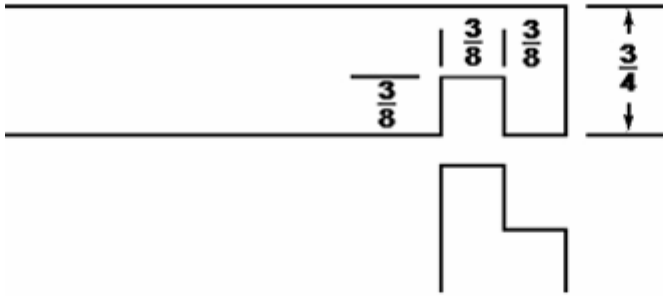
Now mark and cut the other dados on shelf divider (K), and fixed shelves (G, N).

Mark the dados on shelf divider (J). The dados on the button will be on both sides of the piece, so mark them just 1/4" deep.

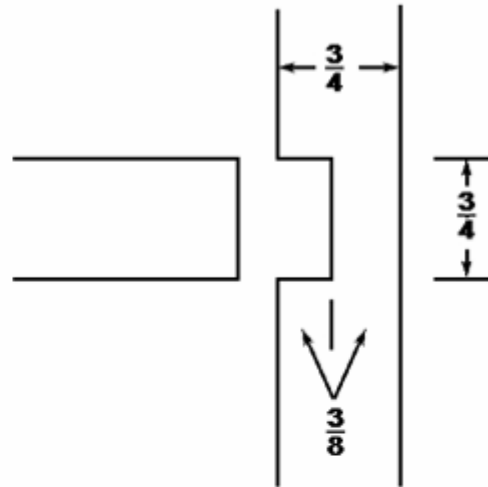
Mark the Dado in the center of the top (B), but not the ones on the ends. Cut these dados.

3. **Other dados and rabbets.** Now that you have completed all the 3/4" dados, change the width of your blade to 3/8". As you can see from the illustration of this Dado-Rabbet joint, the dados on the ends of the top (B) are 3/8" wide, 3/8" deep, and 3/8" from the end of the board. Mark and cut these dados.

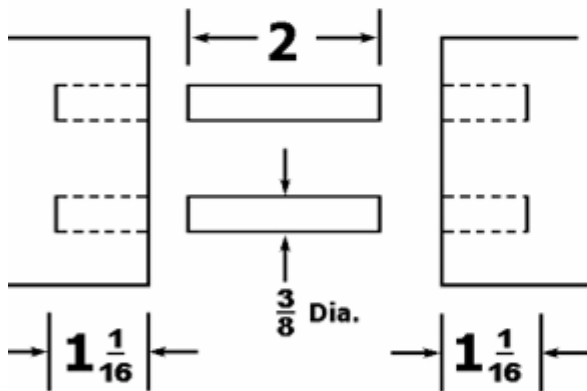
Top Corners: Dado-Rabbet Joint



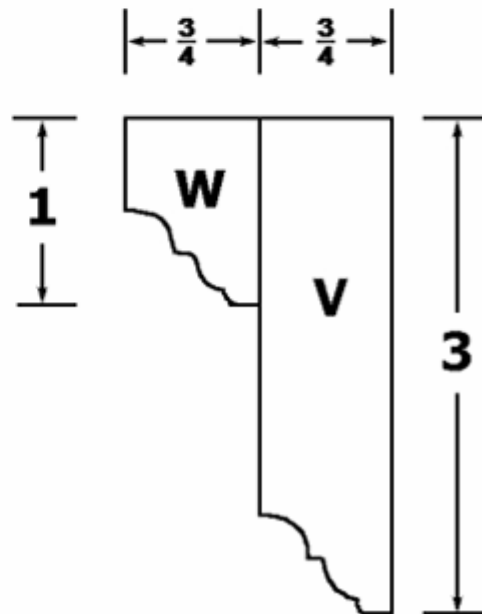
Fixed Shelves: Dado Joint



Face Frame: Dowels



Crown Molding



The L-shaped cuts on the top of sides (A, O) are rabbets. Use the same 3/8" adjustment on your Dado blade to cut them 3/8" deep right on the ends of the boards. Notice that these cuts are on the opposite side of the previously cut dados (A, O).

- Drillholes for brackets.** Brown plastic shelf brackets are used here for the adjustable shelves. They are available in hardware stores and fit in 1/4" holes. Mark and drill your holes in the right side (O), and shelf dividers (J, K). These holes are set in two inches from the front and back, at 2" intervals up and down.

- 5. Finishing.** At this stage, the finish is applied to the plywood. The reason for finishing the unassembled boards is so you can work on them while they lie flat and so the finish will not run.

Put masking tape on the ends of the boards that will be housed inside dados. The joints will glue together better on bare wood.

- 6. Glue up the carcass.** For this, you will definitely require the help of an assistant to provide extra hands while you assemble the awkward pieces. Yellow wood glue is used.



Assemble the bookcase dry first to be sure all the pieces fit. Set your clamps and check for square. Then re-assemble it with glue.

Leave out your adjustable shelves (F, H, M) and TV shelf (P) during the glue up.

- 7. Begin the face frame.** Cut the left side (Q); right side (R), top (S), and bottom (T). Do not cut the narrower, 3/4" molding strips at this time. As you rip the long 96" pieces, use a helper or roller stand to hold them level during the cuts.
- 8. Joint the edges.** Run the edges of your face frame pieces over the Jointer to square them up and smooth them out. This will give you a much smoother edge than you get from the table saw.
- 9. Drill dowel holes.** Set up your Mark V for the horizontal-boring mode. Drill 3/8" holes in the top and bottom edges of the long, 96" side pieces (Q, R). Each joint will have two dowels. Measure the spacing on them so they will fit into the ends of the 3" bottom piece (T) and the 4" top piece (S). Drill the holes as shown in illustration.



- 10. Match the dowel positions.** Place 2 3/8" dowel centers into the holes at the bottom edge of side piece (Q). With a try square or a combination square, line up the bottom piece (T). Push it against the dowel centers and tap it with a mallet to mark the exact centers of your dowel holes. Then cut corresponding dowel holes in the end of your bottom piece. Repeat this process for each end of your top (S) & bottom piece (T).

NOTE: If you prefer, biscuit joints the Biscuit Joiner Attachment could be substituted for the dowel joints suggested here.

- 11. Glue up the outer frame.** Glue the 3/8" dowels and edges of the outer frame pieces where they will join. Clamp them together and allow the glue to dry.
- 12. Finish the frame.** Follow the same procedures you followed earlier. Finish all additional pieces similarly just prior to assembling them.
- 13. Attach the face frame.** Use glue and small finishing nails (2" long) and attach the outer face frame to the carcass. Drill pilot holes into the frame so that the solid oak will not split.
- 14. Shape the molding.** Use the Shopsmith Shaper Package your Mark V with a 1/2" Bead & Quarter Round Cutter. Round the edge of a long piece of oak with the Quarter Round side of the cutter. Then turn the piece over and round the other corner of the same edge.

After you have completed shaping the edge, rip it on the table saw so that it is 3/4" wide. You now have half-round molding. Shape and cut enough molding strips to face all of your shelves and shelf dividers, and both the front and sides of the TV shelf (P).

The secret to shaping is to take shallow cuts, follow all the safety guidelines, and experiment with some scrap wood to test the results. Shaping is also much easier with the DC3300 Dust Collection System, which disposes of the chips just as they are being made.

15. **Size the molding.** Measure the shelf lengths after the outer frame is attached and cut your 3/4" molding strips to length.

Chamfer the ends of the molding. Set up your disc sander and tilt the table to 45°. Lay a molding strip upside down against your miter gauge and chamfer the end to add a little accent if you wish.

Since the TV shelf (P) will have molding on the sides as well as the front, the ends of the molding will have to be beveled at 45° to "frame" the shelf on the front corners. Do not chamfer the ends of the TV shelf molding.

16. **Attach the molding.** After applying the finish to the molding, nail the molding onto the front of the shelves. Remember to drill pilot holes. Inset all of your finishing nails with a punch. Then cover the holes with wood patch that is mixed with stain.
17. **TV shelf hardware.** A combination shelf slide and lazy-susan called a "TV Extension Slide" will hold your TV shelf (P), and eventually your TV set. Attach the slide to the TV shelf (P) and fixed shelf (N) with #8 3/4" screws.
18. **Crown Molding**

With your shaper, you can create a crown molding effect. This effect is achieved by shaping the edge of a wide piece of oak with the Cove & Bead Cutter.



Then flip the piece over and shape a corner on the opposite edge. After the piece is shaped, rip one side on your table saw 3" wide and the other side 1" wide. (The ripping is done after the shaping because shaping is safer with wide pieces.)

Repeat this process so that you will have two 3" wide and two 1" wide molding strips, each 48" long.

All of the molding pieces must be measured precisely and cut with 45° bevels on the front corners. To avoid mistakes, we suggest clamping each piece in place at the top of the bookcase and checking precisely where the bevel cuts should go. Glue up each 3" and 1" molding combination together. Line up the beveled edges, and then clamp them while the glue dries.

Clamp each 1" and 3" molding combination to the top of the bookcase. Line up the corners carefully. Then drill pilot holes from the inside of the bookcase and screw in #8 1 1/4" screws to secure the crown molding.

19. **Make the door.** This door is optional and hides the "record" shelves. The vertical stiles and horizontal rails are made on the shaper with the Complete Cabinet Set. The cutter is used in different combinations and positions on the insides of the rails and stiles, and on the ends of the rails. The Bead and Quarter Round Cutter is used on the outsides of the pieces to round the outer edges on the front only.

This cutter kit takes some practice to perfect, so plan to spend time experimenting on scrap wood before making the door. It is a challenge to work out, but the appearance of a nice looking, door makes it worth while.

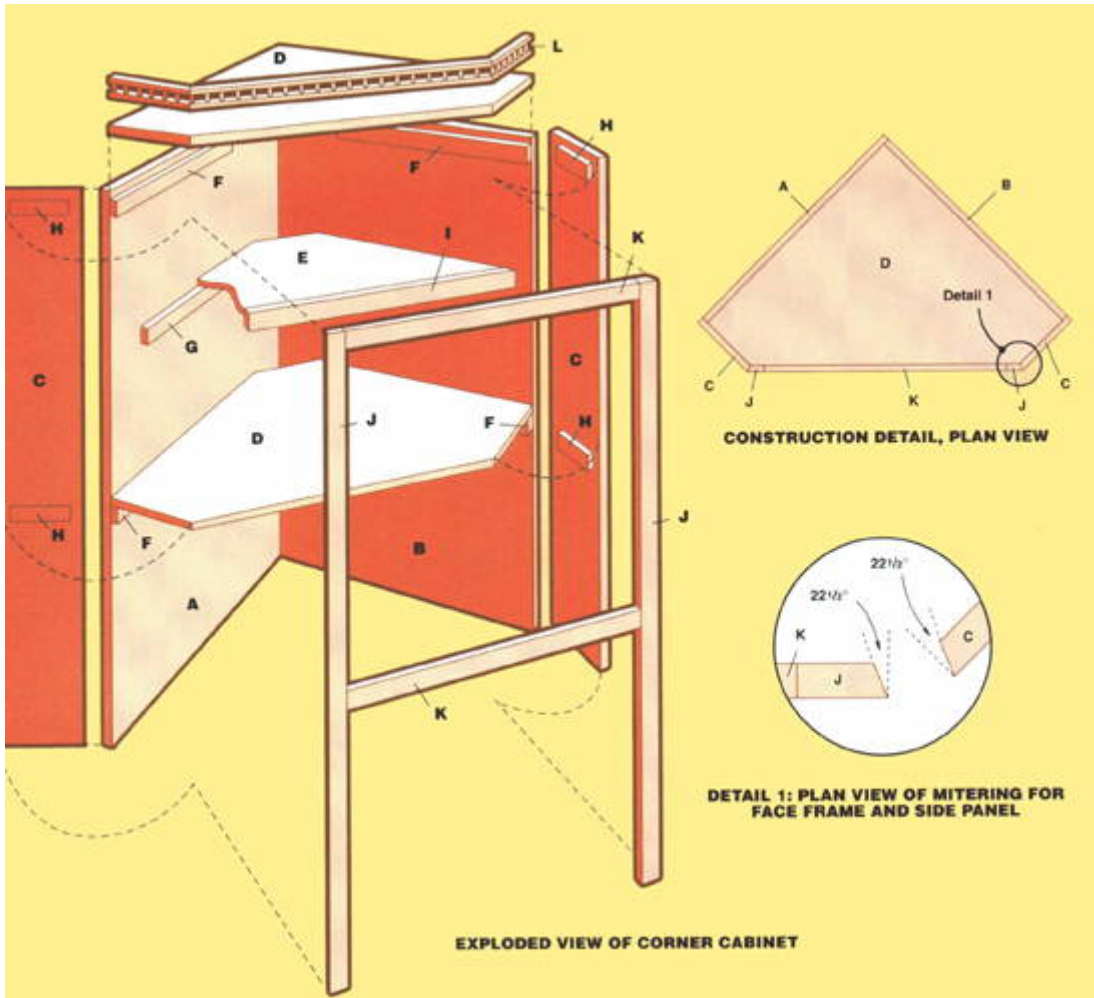
Slide a 1/4" oak plywood panel into the frame pieces. Glue and clamp the pieces together - no dowels are necessary because of the way the rails and stiles fit together.



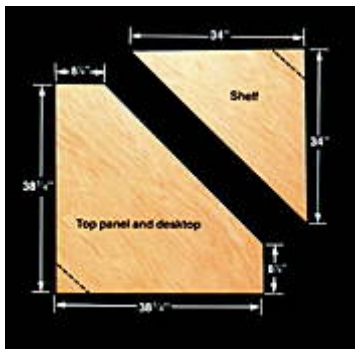
Apply your finish, add hinges, and attach the door to the bookcase.

34 CORNER CABINET

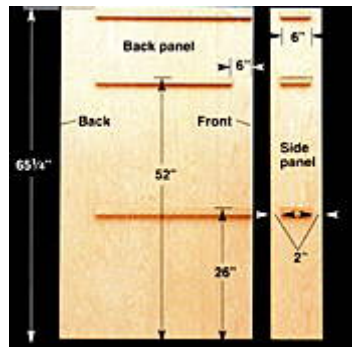




Key	Part	Material	Pieces	Size
A	Left back panel	3/4" oak plywood	1	39" \times 66"
B	Right back panel	3/4" oak plywood	1	38 1/4" \times 66"
C	Side panels	3/4" oak plywood	2	10" \times 66"
D	Desktop and top panel	3/4" oak plywood	2	38 1/4" \times 38 1/4"
E	Shelf	3/4" oak plywood	1	34" \times 34"
F	Cleats for desktop, top panel	1 \times 2	4	31"
G	Cleats for shelf	1 \times 2	2	27"
H	Cleats on side panels	1 \times 2	4	6"
I	Shelf edging	1 \times 2	1	51 1/2"
J	Face frame stiles	1 \times 2	2	66"
K	Face frame rails	1 \times 2	2	37 1/2"
L	Decorative top trim	spindle rail		5 linear ft.



Desktop, top panel, and shelf are made from 3/4" finish-grade plywood. Use a circular saw and a straightedge guide to cut the pieces to the dimensions shown. If you plan to use the cabinet as a computer work center or an entertainment center, cut off the back corners of the desktop and shelf (but not the top panel) to provide ventilation and space for routing electrical cords.



Back panel and side panels have 1 x 2 hardwood cleats to hold the desktop, shelf, and top panel. Attach them to the panels with glue and 1 1/2" screws driven into counterbored pilot holes. Position cleats according to dimensions shown. **NOTE:** If you wish to make the shelf the same size as the desktop, add shelf cleats to the side panels (dotted line).



1. Measure and cut back panels (left panel overlaps right panel, so it is 3/4" wider than right panel). Cut and attach 1 x 2 cleats. Drill counterbored pilot holes in cleats, then attach cleats with glue and 1 1/4" screws.



2. Clamp right back panel (38 1/4" wide) to your workbench, then apply glue to back edge. Butt left panel (39") against glued edge, and hold in place with clamps. Join back panels by drilling pilot holes and driving 2" screws through butt joint.



3. Attach a plastic wire organizer to one back panel edge, next to the corner joint, using 1" wire nails. (Skip



4. Measure and cut the desktop, then apply glue to the tops of the desktop cleats mounted on the back panels. Set the desktop on the cleats, then attach

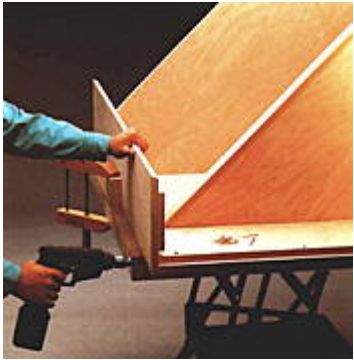
this step if you do not plan to store electronic equipment in the corner cabinet.)

drilling pilot holes and driving 1 1/4" finish nails every 8".



6. Set a table saw blade to 22 1/2° blade angle, then cut 10"-wide, 66"-long side panels, beveling the front edge of each panel.

5. Measure and cut shelf, then install on shelf cleats with glue and 1 1/4" finish nails. Measure and cut a 1 x 2 hardwood shelf edge with 45° mitered corners to fit flush with top of shelf. Attach with 2" finish nails driven through pilot holes.



7. Attach 6" cleats to side panels using glue and 1 1/4" finish nails, then attach side panels to back panels with glue and 1 1/2" screws driven into counterbored pilot holes. Cut top panel and attach to cleats with 1 1/4" finish nails.

8. With table saw blade set to 22 1/2°, cut 1 x 2 face frame stiles (as in step 6). Apply glue to the outside edge of each side panel, then attach stiles to side panels using 2" finish nails driven through pilot holes at 8" intervals.



9. Measure and cut 1 × 2 face frame rails. Attach them to edges of desktop and top panel, so upper edges of rails are flush with the surfaces of the shelf and top, using glue and 2" finish nails driven through pilot holes.



10. Measure and cut decorative trim to match the angle of the face frame stiles and side panels, then attach the trim to the outside edges at the top of the cabinet, using finish nails.



11. With a helper, move cabinet into corner, flush against the walls.



12. Shim below the side panels, if necessary, to bring the cabinet to level.



13. Drill pilot holes, then toenail the cabinet to the floor at shim locations, using 2" finish nails. Score the shims with a utility knife.



14. Attach the cabinet to the wall with 3" screws driven through the back panels and into wall studs. Drive screws just behind or below shelf cleats to keep them out of sight.

material.



15. Measure and cut base shoe molding to cover the gap between the cabinet and the walls and floor, using 1 1/2" finish nails. **TIP:** To protect wall from oil or paint, insert plastic between molding and wall as you attach the molding.



16. Sand and finish cabinet then remove plastic. If cabinet will contain electronic equipment, use a hole saw or forstner bit to cut a hole for an outlet strip cord in side panel, then feed cord through hole and install a grommet.

17. Install any other hardware and computer desk accessories, like a retractable keyboard slide, that you need to complete your project.

35 PLAY HOUSE





Materials List

Quantity	Item
11	2" x 6" x 8' lumber rated for outdoor use
1	10' x 10' sheet of 1 mil. plastic film
2	4' x 8' sheets of 3/4" CDX plywood
18	2" x 4" x 12' spruce
14	2" x 4" x 8' spruce
3	4" x 4" x 8' lumber rated for outdoor use
7	4' x 8' sheets of 5/8" T-111 sheathing
3	5/4" x 6" x 12' lumber rated for outdoor use
4	4' x 8' sheets of 1/2" sheathing
1	36"-long roll of 15-lb. roofing felt
3	bundles of roofing shingles
	small quantity of roofing cement
3	windows
3	tubes of caulking compound
5	1" x 4" x 8' Ponderosa Pine
1	1" x 4" x 6' Ponderosa Pine
2	1" x 3" x 12' Ponderosa Pine
1	1" x 6" x 8' Ponderosa Pine
3	1" x 2" x 12' Ponderosa Pine
2	gallons latex primer
1	gallon latex top coat paint
2	quarts of accent colors, depending on color scheme
2	8' pieces of drip edge
4	decorative fan brackets (optional)

Step 1: Site Preparation

Select a site that is fairly level and has good drainage. Using a tape measure and a framing square, measure an 8' x 8' square. Check that your site is perfectly square by measuring the diagonals. If they each measure 11' 6", your site is a perfect 8' square.

Step 2: Outer Frame

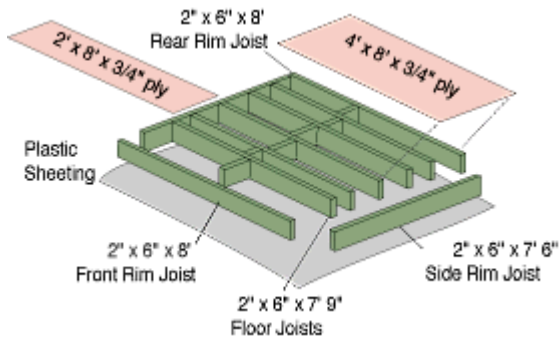
Use two 8' lengths of 2" x 6" lumber rated for outdoor use for the front and rear rim joists. From two more 8' lengths of 2" x 6" lumber rated for outdoor use, cut two pieces of 2" x 6" x 7' 6" for the side rim joists. Assemble the outer frame by nailing through the front and rear rim joists into the side rim joists, using two 12d 3 1/4" common nails for each corner. See Figure 1.

Step 3: Leveling the Site

Level the ground under your floor frame using a shovel and a rake. Check your level by placing a 4'-long carpenter's level on top of the rim joists (you may have to prop up a corner of the floor with a brick or a patio block). After the site is level, move the frame away and spread a sheet of polyethylene film over the site to prevent vegetation from growing. Move the frame back into place.

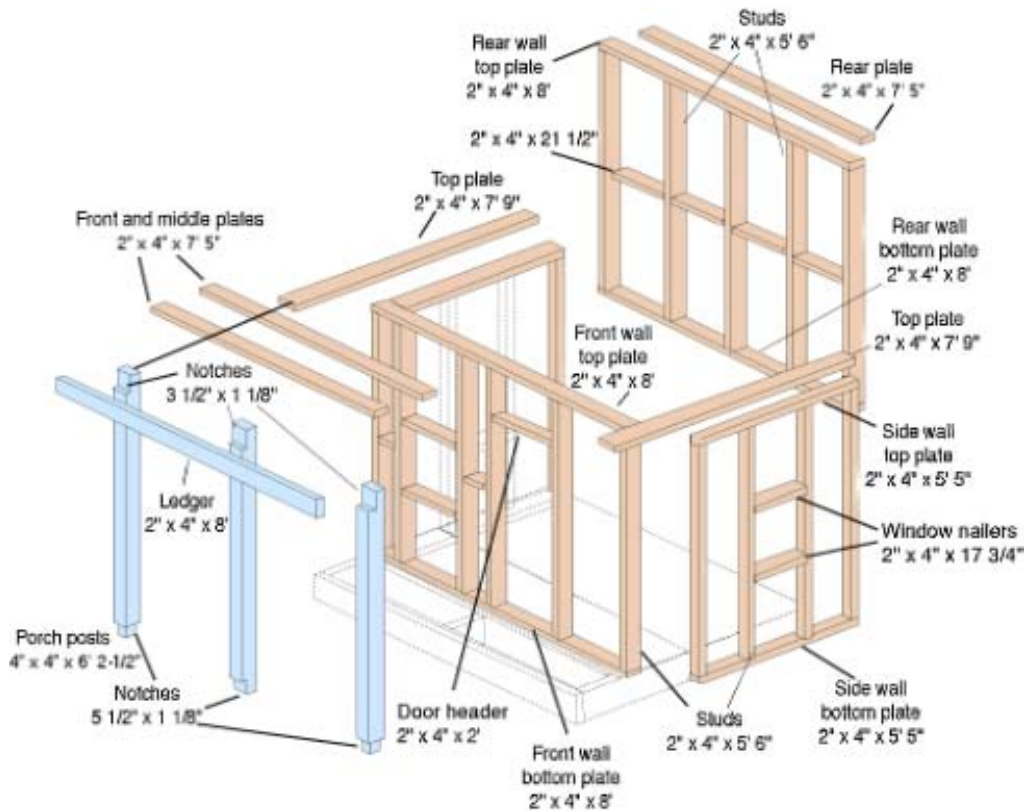
Step 4: Inner Frame Joists

From 8' lengths, cut five pieces of 2" x 6" x 7' 9" lumber rated for outdoor use for the floor joists. Measure from the outer rear corners of the frame, and locate the centers of the inner floor joists at 16", 32", 48", 64" and 72". Use two 12d 3 1/4" galvanized common nails to secure each end of the inner floor joists to the side rim joists. Measure the gaps between the inner floor joists and cut lengths of 2" x 6" lumber rated for outdoor use to fit between each pair of joists. Nail the blocks into place near the middle of the floor joists. Every second block should be offset slightly to facilitate nailing.



Step 5: Plywood Floor

Set one 4' x 8' sheet of 3/4" CDX plywood on the frame, with one edge of the sheet flush with the rear rim joist. Use the plywood as a guide to square up your frame. The front edge of the plywood sheet should fall exactly at the center of the floor joist that was secured at 48" on center. Fasten the plywood to the joists with 1 5/8" #6 coated deck screws at 8" intervals around the perimeter and at 12" intervals in the center of the plywood. Mark and cut the second sheet of 3/4" CDX plywood in half lengthwise. Put one half aside for later use as the door. Set the other half on the floor joists next to the full plywood sheet, leaving a 1/16" gap between the two sheets. Secure the half-sheet to the floor joists with 1 5/8" #6 coated deck screws.



Framing

Build the walls on the ground, stand them up and then nail them into place.

Step 1: Wall Studs

Cut nineteen 5' 6" lengths of 2" x 4" from 12' lengths for the wall studs.

Step 2: Rear Wall

Use two 8' lengths of 2" x 4" for the top and bottom plates. Space the studs 2' on center between the top and bottom plates and secure the studs by nailing through the plates with 8d 2 1/2" galvanized common nails. Cut four 2" x 4" x 21 1/2" pieces and nail them, horizontally, between the studs about halfway up the wall.

Set the rear wall in place directly over the rear rim joist and floor. Nail the rear wall into place with 16d 3 1/2" galvanized common nails, driven through the wall's bottom plate and the floor and into the rim joist. Temporarily prop up the rear wall with an 8'-long 2" x 4". Rest one end on the ground and nail the other at an angle into the right-side stud of the back wall, at a height of about 4'.



Step 3: Side Walls

The two side walls are identical. Our windows required a 17 3/4"-wide x 15 1/4"-high opening. If you use different windows, adjust the distance between the two center studs. In doing so, make sure you have a stud centered at 4' from the back of the playhouse to use as a nailer for the edges of the sheathing boards. Since the side walls will be mounted 3 1/2" from the back of the playhouse, the middle nailers should be centered at 44 1/2" from the back of the side walls.

Cut four 2" x 4" x 65" pieces from 12' lengths for the top and bottom plates. Nail the plates to the end studs with two 8d 2 1/2" common nails at each joint. Nail one stud on center at 44

1/2" from the back of each side wall. Nail another stud at the appropriate distance for the window framing.

Set one side wall in place, butted up against the end of the rear wall and flush with the edge of the side rim joist. Nail the wall into place with 16d 3 1/2" nails. Use a level to make sure that the wall is plumb and then secure it to the end of the back wall with 8d 2 1/2" common nails. Repeat for the other side wall.

Step 4: Front Wall

Use two 2" x 4" x 8' pieces for the top and bottom plates. Fasten a stud to each end of the top plate by nailing through the plate into the stud, using two 8d 2 1/2" common nails at each joint. Fasten the bottom plate to the two end studs with 8d 2 1/2" common nails. Fasten another stud 22" from the right end of the front wall for the edge of the doorway. Fasten a fourth stud so that it is centered 48" from each side of the wall. This will serve as the second stud for the doorway and as a nailer for the left front sheathing. The other two studs serve as framing for the front window. We spaced them 17 3/4" apart so that their centers were 61" and 79 1/4" from the right side of the wall (adjust for different window sizes).

Set the front wall in place, butted up against the side walls and flush with the edge of the plywood floor. Nail the front wall to the floor with 16d 3 1/2" common nails. Make sure the front and side walls are plumb and nail their end studs together with 8d 2 1/2" common nails.

Step 5: Porch Posts

Cut three 4" x 4" x 6' 2-1/2" pieces of lumber rated for outdoor use for porch posts. Cut a 3 1/2"-long by 1 1/8"-deep notch at the top of the front face of each post. The easiest way to do this is to make a series of 1 1/8"-deep cuts in the face about 1/2" apart, break out the cuts and clean out the excess wood with a 2"-wide, sharp chisel.

Cut 5 1/2"-long, 1 1/8"-deep notches on the bottom front faces of the posts, at the bottom left side of one post and at the bottom right side of another post.

Stand the left post inside the rim joists at the front left of the playhouse. The notches will allow the base of the post to be flush with the left and front rim joists. Have a helper hold the post plumb. Secure the post to the floor frame by nailing through the rim joists with four 12d 3 1/4" common nails. Repeat for right post.

Stand the center post inside the front rim joist with its center at 50" from the right side of the frame. The notch allows the base of the post to be flush with the front of the rim joist. Secure it to the rim joist with two 12d 3 1/4" common nails.

Step 6: Top Plates

Insert one 2" x 4" x 8' into the top notches of the front posts as a ledger board. Check that the posts are plumb and secure the ledger to each post with two 2 1/2" #7 deck screws.

Cut two 2" x 4" x 7' 9" pieces from 8' lengths for the lateral top plates. Set one on top of each side wall, overlapping the splice between the back and side walls and stretching to the front edge of the post. Using ten 12d 3 1/4" common nails, secure each side plate by nailing into the post, the back wall splice and the top of the side wall.

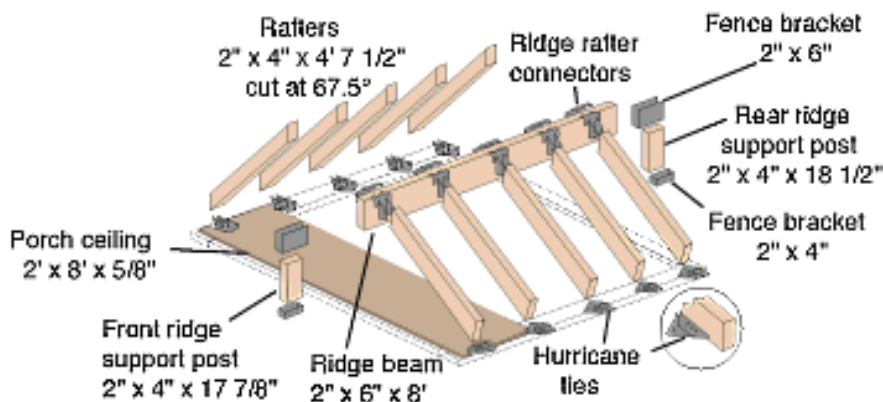
Cut three 2" x 4" x 7' 5" pieces from 8' lengths for the front, middle and rear plates. Set them in place between the side plates and over the front wall, the rear wall and the ledger. Using ten 12d 3 1/4" common nails, secure the plates.

Step 7: Window and Door Framing

Cut six lengths of 2" x 4" to serve as window nailers. Our nailers are 17 3/4" wide, to bridge the distance between the two studs that serve as side framing for the windows. Using two 8d 2 1/2" galvanized common nails at each joint, fasten the lower nailer between the two studs, 24" from the floor. Check that the nailer is level before securing it.

Fit a window into the opening, resting on the lower nailer. Set the top nailer in place over the window. Remove the window and fasten the top nailer with 8d 2 1/2" galvanized common nails, driven through the studs into the nailer. Repeat for the other two windows.

Cut one 2" x 4" x 2' for the header above the front door. Insert the header between the two front door studs at a height of 5' from the floor. Make sure that it is level and then fasten the header in place, with two 8d 2 1/2" galvanized common nails, driven through the studs into each end of the header.



Roof Framing

Step 1: The Ridge Beam

Use one 2" x 6" x 8' board for the roof ridge beam. Use 1 1/2" galvanized joist hanger nails to secure five ridge rafter connectors to each side of the ridge beam. Starting from the front end of the beam, locate the centers of the connectors at 2", 24", 48", 72" and 93".

Step 2: Hurricane Ties

To ensure that the rafters are secured to the proper locations on top of the two side walls, set the ridge beam on top of each side wall in succession, allowing the beam to overhang 1 1/2" in the front and 1 1/2" in the back. Mark the top of each side wall at the center of each ridge rafter connector. Secure hurricane ties to the top of each side wall at the ridge rafter marks, using 1 1/2" galvanized joist hanger nails. Make sure the prongs of the ties are facing outward and protrude over the edges of the plates.

Step 3: Porch Ceiling

Cut one 4' x 8' sheet of 5/8" T-111 tongue and groove sheathing in half, lengthwise, for the porch ceiling. Set half the sheet, groove-side down, over the front wall and flush with the front edge of the posts. Mark the location of the front hurricane ties on the sheathing and cut 1 3/4"-wide, 1 3/4"-deep notches in the sheathing at each hurricane tie location. Set the sheathing back in place and secure it to the wall plates with 1 5/8" #6 coated deck screws every 6" around the perimeter.

Step 4: Front Ridge Support Post

Cut one 2" x 4" x 17 7/8" piece for the front ridge support post. Using 1 1/2" joist hanger nails, secure one 2" x 6" fence bracket to the top edge of the ridge beam support post, flush with the front of the post, as shown in Figure 3. Secure the support post to the center of the porch ceiling, flush with the front edge, using a 2" x 4" fence bracket and 1 1/2" joist hanger nails.

Step 5: Rear Ridge Beam Support Post

Cut one 2" x 4" x 18 1/2" piece for the rear ridge beam support post. Prepare the top of the post as outlined in Step 4. Center a 2" x 4" fence bracket over the rear wall plate, flush with the rear edge of the plate. Secure the bracket and post as outlined in Step 4.

Step 6: Fastening the Ridge Beam

Set the ridge beam, rafter connector-side up, into the 2" x 6" fence brackets. The beam should overhang the posts by 2" in the front and 1" in the back. Using 1 1/4" #6 deck screws, secure the beam to the brackets.

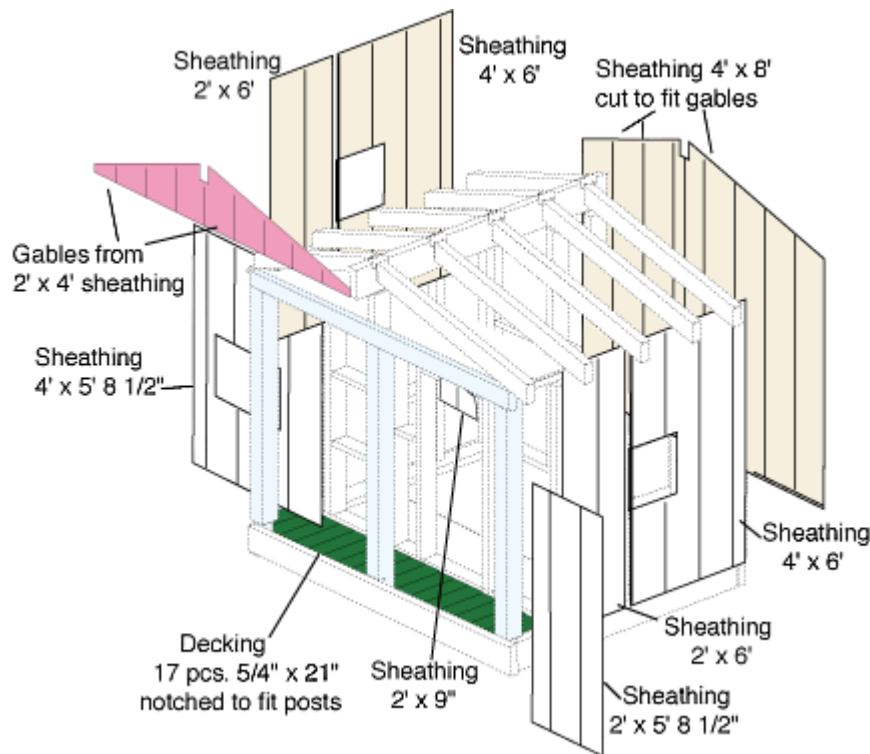
Step 7: The End Rafters

A miter saw is particularly useful for cutting the rafters. They are 55 1/2"-long parallelograms, cut from 2" x 4" lumber. Cut ten rafters at 67 1/2° angles, as shown in Figure 3. Using one 1 1/4" #6 deck screw, secure one rafter to each of the front ridge rafter connectors and set the other end of each rafter into the appropriate hurricane tie. Use a torpedo level to bring the front ridge beam support post to a plumb position. Secure each front rafter to its hurricane tie with one 1 1/4" #6 deck screw. Repeat for rear rafters.



Step 8: Securing the Rafters

Insert the remaining rafters into the ridge rafter connectors and hurricane ties. Using 1 1/2" galvanized joist hanger nails, fasten all rafters to the hurricane ties and rafter connectors. It is vital to use all of the fastening holes in the connectors, as this will increase the strength and snow-bearing capacity of the roof.



Decking & Sheathing

Step 1: Decking

Cut 17 pieces of 5/4" x 6" x 21" for the front deck boards. Notch one deck board to fit around the left post and secure it to the front and left rim joists and the floor joist with 2" #7 deck screws. Use two 16d 3 1/2" common nails as spacers between deck boards and secure all deck boards in place. You will need to notch two boards to fit around the center and right posts. You will also have to trim the right decking board to make it flush with the right rim joist.

Step 2: Rear Wall Sheathing

Position two 4' x 8' sheets of T-111 tongue-and-groove sheathing vertically, so that they fit together at the center stud of the rear wall and reach the top of the ridge. Using two 6d 2" finishing nails, hammered through the sheathing and about 1" into two studs, tack each rear sheathing board into position. The boards will be bent slightly at the top because the ridge beam hangs over the rafters. Mark each sheet of sheathing for the ridge beam notch. Remove the sheathing and cut the notches. Tack the sheathing back into place and mark the sheets for the gable cuts.

Cut the sheathing for the rear gable and use the two sheets as templates for marking the front gable angles on two other sheets of sheathing, making sure that the front gable sheathing boards meet with a tongue on one side and a groove on the other. Mark the sheathing for the location of wall studs and then secure the sheathing to the rear wall with 1 3/4" galvanized ring shank nails, spaced 6" apart around the perimeter and 12" apart on the rest of the board.

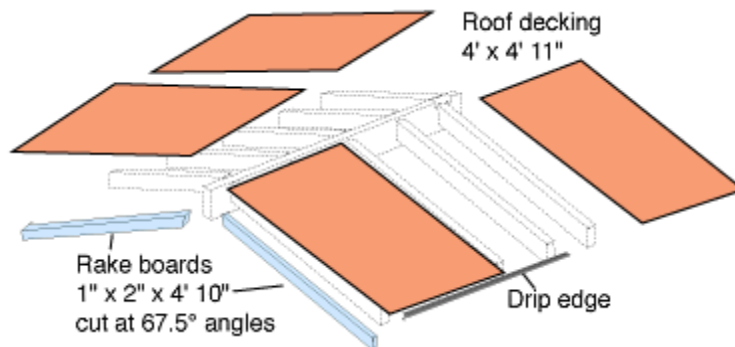
Step 3: Side Wall Sheathing

Cut two 2' x 6' pieces of T-111 sheathing from one 4' x 8' sheet. Butt the straight edge of one board against the front edge of the playhouse and push the sheathing up until it is 1/16" from the bottom of the rafters. Fasten it to the front wall stud and the top and bottom wall plates with 1 3/4" galvanized ring shank nails at 6" intervals. Do not secure the sheathing to the stud that is 48" from the rear wall at this point.

Cut the front gables from the tops of the two previously marked sheets of sheathing. You will have two 4' x 6' sheets left that should be used as the side wall sheathing. Attach, using 1 3/4" ring shank nails.

Step 4: Front Wall Sheathing

Fasten the two gable sheathing pieces to the front gables, using 1 3/4" ring shank nails. Cut one sheet of T-111 sheathing to a height of 68 1/2" and secure it to the left side of the front wall, using 1 3/4" ring shank nails. Cut a 68 1/2"-high piece of sheathing from the 2' x 8' piece that was left from the front shelf cut. Nail it to the left front side of the playhouse with 1 3/4" ring shank nails. Cut a 2' x 9" piece of sheathing and nail it to the door header, top plate and door studs with 1 3/4" ring shank nails.



Roof Deck

Step 1: Laying Out the Deck

Cut four 4' x 4' 11" pieces of 1/2" plywood sheathing from the four 4' x 8' sheets. Snap chalk lines down the centers of the middle rafters on each side of the roof. Those lines should be exactly 4' from each end of the ridge beam. Stand on the front shelf and carefully position the left front piece of sheathing so that one side meets the center of the left middle rafter. The top end of the sheet should be positioned directly over the center of the ridge board. Tack the sheet in place, using two 6d 2" finishing nails, driven to a depth of about 1" through the deck board and into the rafters.

Step 2: Fitting the Deck Sheets

Set the second deck sheet in place next to the first sheet, leaving a 1/16" gap between the two sheets. Tack the sheet in place with two 6d 2" finishing nails. Set the right rear roof deck sheet in place and make sure that the sheets meet at the ridge. If they do not, adjust the sheets until they do. Do not tack the right rear deck sheet at this time.

Step 3: Nailing the Roof Deck

Remove the right rear roof deck sheet. This will allow you to stand on a ladder inside the playhouse to secure the left deck boards. Snap chalk lines on the two left roof deck boards to mark the positions of the rafters. Using 6d 1 7/8" coated cooler nails, fasten the roof deck boards to the rafters. The nails should be positioned at 6" intervals around the perimeter and at 12" intervals in the centers of the sheets.

Secure the right roof decking boards in the same way. To secure the front right board, you will need to sit on the peak of the roof.

Step 4: Drip Edge

Cut two 8' 2" pieces of drip edge. Secure them to the left and right edges of the roof deck with 7/8" roofing nails.

Step 5: Rake Boards

Cut two pieces of 1" x 2" x 4' 10" boards at 67 1/2° angles from a 12' length for the rake boards. They are parallelograms that match the angles of the rafters. Using five 1 5/8" #6 deck screws, driven through the roofing deck, fasten the rake boards flush with the front edges of the roofing deck.



Roofing

Wear sneakers when roofing on a warm day. Since the materials are designed to bond together by melting slightly in warm weather, heavy, hard shoes can mar the shingles. Do as much work as you can from a ladder and then sit on the roof for the remainder of the work.

Step 1: Roofing Felt

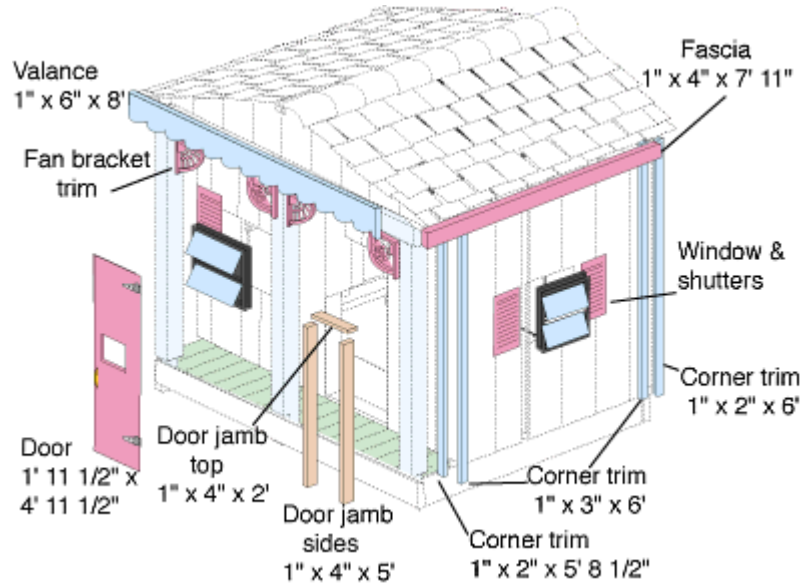
Snap chalk lines across each side of the roof deck, 34" and 50" up from the drip edges.

Place a 36'-long roll of roofing felt at one corner of the deck. Roll it out along the first chalk line, extending over the front and rear of the deck by 2". Cut the felt with a sharp utility knife. Staple the roofing felt down with 9/16" staples, spaced about 18" apart. Roll out and staple down the next course of felt, along the second chalk line, overlapping the first courses by about 8". Repeat for the other side of the roof. Roll out and staple down the ridge course, overlapping the second courses on both sides by about 10".

Step 2: Shingles

Since asphalt roof shingles vary from manufacturer to manufacturer, carefully read the instructions provided with your shingles. In general, three bundles of asphalt shingles is enough material to cover a 100-square-foot area, or slightly more than is needed to cover this playhouse roof.

To ensure that nails do not protrude into the playhouse, secure the shingles with 7/8"-long roofing nails. Cut shingles on the smooth side, using a sharp utility knife. If you follow the manufacturer's instructions carefully, you should have only two exposed roofing nails on the ridge. They must be covered with roofing cement.



Windows, Doors & Trim

Step 1: Window Openings

From inside the playhouse, drill 1/2" holes through the sheathing in the four corners of the rectangular window frames. Use a framing

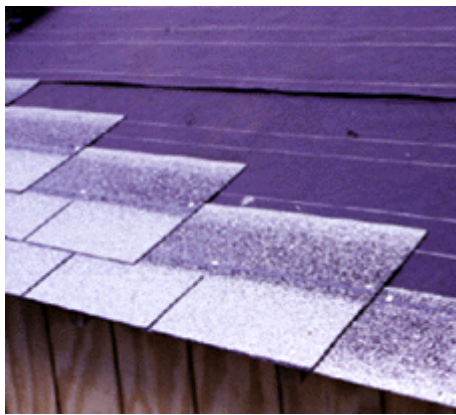
square to draw lines for each window on the outer sheathing, linking the four holes for each window. Cut out the window rectangles. We used a DeWalt cordless circular saw to make the cut. It can also be done with a saber saw.

Step 2: Inserting Windows

Caulk liberally along the inside flange of each window and then secure it in place according to the manufacturer's instructions.

Step 3: Door Opening

Using a handsaw, cut away the bottom plate of the doorway framing in the front wall. Cut one 2' piece and two 5' pieces of 1" x 4" Ponderosa Pine from a 12' length for the top and sides of the door jamb. Using 6d 2" finishing nails, join the top piece to each of the 5' jamb sides. Set the jamb in the door opening and nail it in place with 6d 2" finishing nails. Although it is preferable to make the door jamb level and plumb for the sake of appearance, it is not really necessary because the door will mount over the jamb, rather than inside it.



Step 4: Door

Cut a 1' 11 1/2" x 4' 11 1/2" door from the remaining half-sheet of 3/4" CDX plywood. Secure the door with 4" galvanized tee-hinges, mounted on the right side of the jamb on the outside of the playhouse. The hinges should be positioned 10" from the top and bottom of the door. When mounting the door, set it on a piece of scrap shingle to create a 1/8" clearance from the deck boards. If your playhouse is square, your door should fit inside the right and left pieces of T-111 sheathing.

Step 5: Fascia

Cut two 7' 11" pieces of 1" x 4" Ponderosa Pine for the fascia boards to cover the exposed edges of the rafters. Secure them to the rafters with 6d 2" finishing nails.

Step 6: Exterior Corner Trim

Cut four 6' pieces of 1" x 3" Ponderosa Pine and two 6' pieces of 1" x 2" Ponderosa Pine from 12' lengths. Caulk the back of a 1" x 2" piece and secure it lengthwise to the rear corner of the side wall, flush with the edge of the back wall and the bottom of the sheathing, using 6d 2" finishing nails. Caulk the back of a 1" x 3" and secure it to the corner of the back wall, flush with the outer edge of the 1" x 2" trim. Repeat for the other rear corner.

Cut two 5' 8 1/2" pieces of 1" x 2" Ponderosa Pine for the front wall corner trim. Caulk the back of a 1" x 2" and secure it lengthwise to the right corner of the front wall, flush with the edge of the side wall, using 6d 2" finishing nails. Caulk the back of a 1" x 3" and secure it to the corner of the front wall, flush with the outer edge of the 1" x 2" and the base of the sheathing. Repeat for the remaining corner.

Step 7: Paint the Playhouse

Use a top-quality outdoor latex primer and top coat. We chose Enterprise® Severe Weather because it has a warranty of 15 years. For a playhouse that blends with the exterior of your house, choose colors that are compatible with your home's color scheme. Or have fun and let your children select a color palette.

Step 8: Finishing Touches

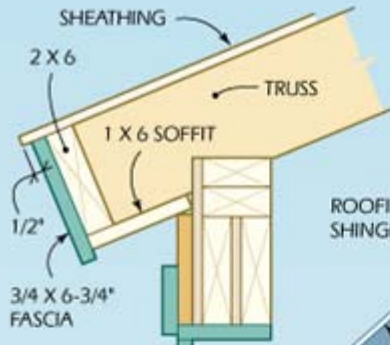
Since 18"-long shutters are difficult to find, we used shutters from two interior-wood shutter kits and secured them to the sheathing at the sides of the windows, with 1 1/4" #6 deck screws. We fastened decorative fan brackets at the front corners of the playhouse, using 6d 2" finishing nails. Using a saber saw, we made the scalloped valance from an 8' piece of 1" x 6" Ponderosa Pine, finished it off with a router and then nailed it in place with 6d 2" finishing nails. We also cut a hole in the door for a Plexiglas window and trimmed the rough opening with corner molding.

36 SHED

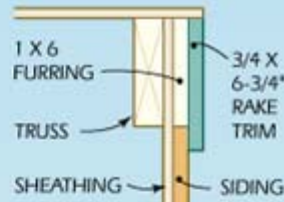


GARDEN SHED

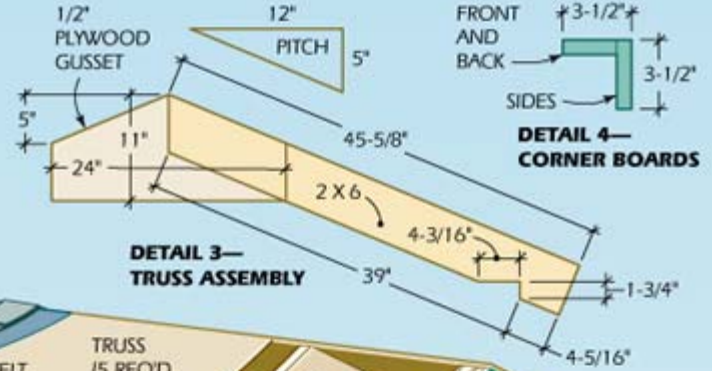
7'5" DEEP X 8'3" WIDE X 9'4" HIGH



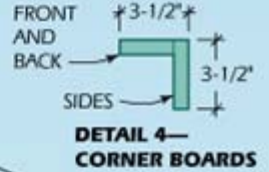
DETAIL 1—EAVE TRIM



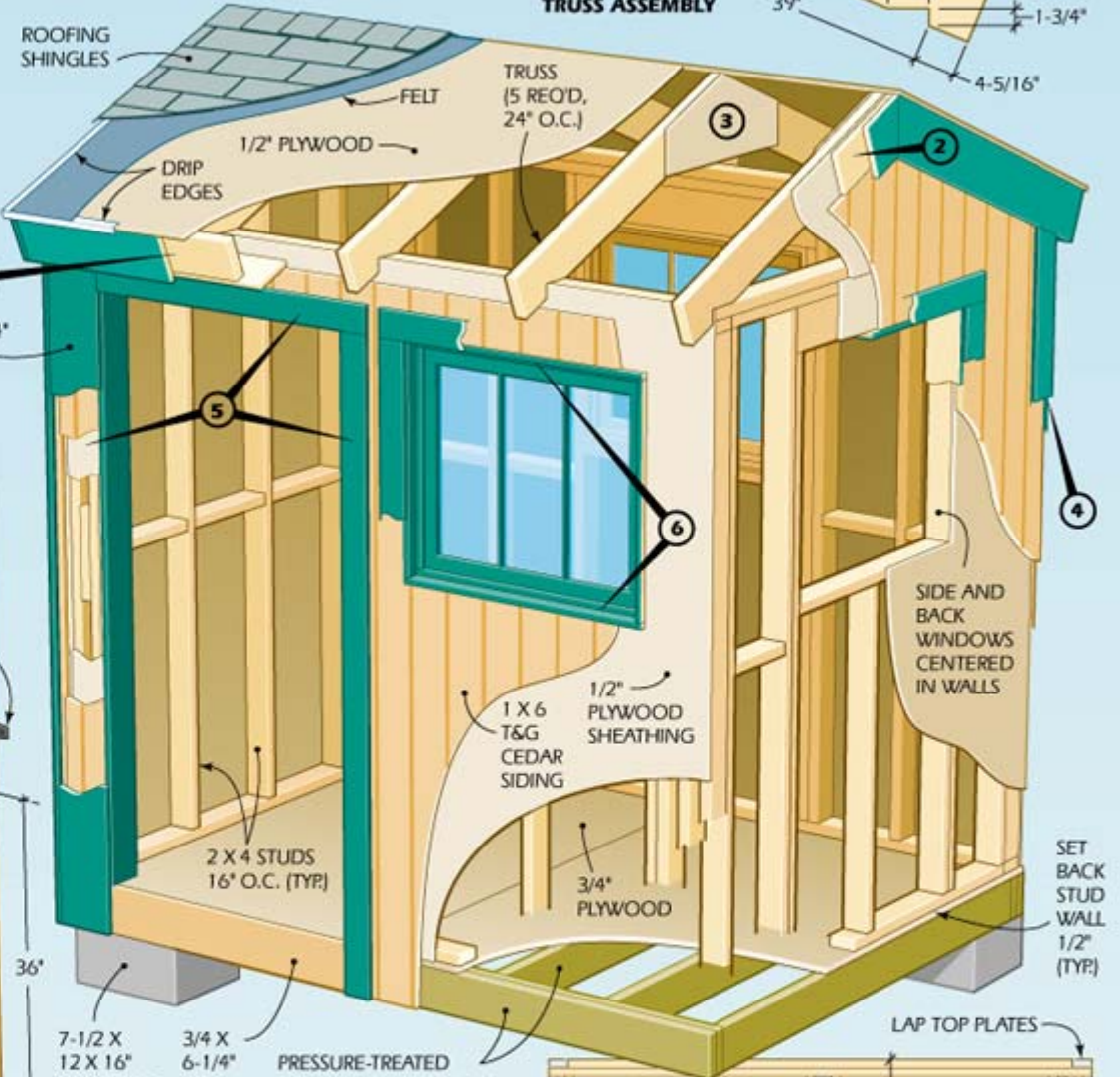
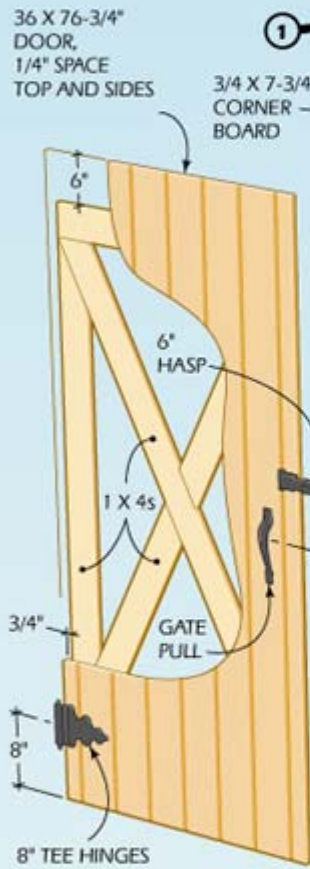
DETAIL 2—RAKE TRIM



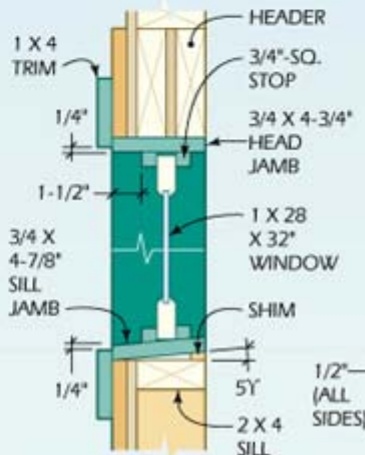
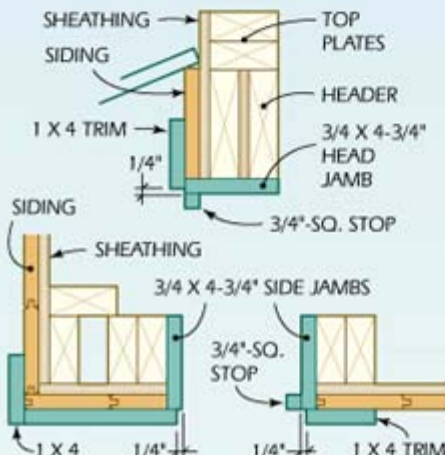
DETAIL 3—TRUSS ASSEMBLY



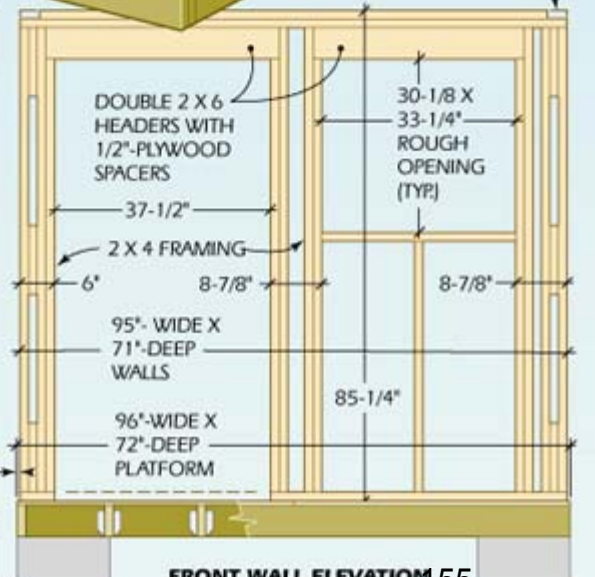
DETAIL 4—CORNER BOARDS



7-1/2 X 12 X 16" CONCRETE BLOCK, 3/4 X 6-1/4" KICK BOARD, PRESSURE-TREATED DOUBLE 2 X 6 RIM JOIST AND 2 X 6 JOISTS, 16" O.C.



DETAIL 6—WINDOW TRIM



FRONT WALL ELEVATION

Site Work

Begin by marking out the building's location in your yard. For a structure of this size, it's simplest to build a lightweight frame that's the exact size of the shed, then use the frame to mark the site.

Use 3/4-in.-thick pine to build your frame. Cut the sides to the exact dimensions of the floor, and use one screw in each corner to fasten the sides into a rectangle. Screw a diagonal brace between two sides of the frame to hold it square.

Clear the building site and level any obvious high spots. Place the frame in the site and adjust its position until you're happy with the location of the shed. Drive stakes into the ground to mark each corner, stretch string between them (Photo 1) and then remove the frame.

Find the highest corner of the site and excavate for the first foundation corner block. Plan on having 3 to 4 in. of block exposed above grade. Dig out an area several inches wider than the block. Spread 2 or 3 in. of crushed stone in the hole to form a stable base for the block.

Now you're ready to position the first block, aligning its edges with the layout string. Check that the block is level across its length and width (Photo 2), and adjust the crushed stone as required.

Use a long, straight 2 x 4 and level to check the relative height of the second corner, then excavate the site for the block. Check that the second block is level with the first (Photo 3), and add the remaining corner blocks in the same way.



Use a wooden frame to find the best spot for your shed. Drive a stake at each corner and use string to delineate the site.



Dig a hole for the first block at the highest point in the grade. Add gravel, install the block, align it with the string, and level it



Use a straight 2 x 4 and a 4-ft. level to check that the corner blocks are installed at the same height.



Building The Floor

It's a good idea to use pressure-treated lumber for the floor joists. Cut 2 x 6 stock to length for the front and back rim joists, and then lay out the locations of the floor joists on 16-in. centers. Nail joist hangers to the inside surface of each inner joist using 1-1/2-in. joist hanger nails (Photo 4). Next, place the inner front and back joists between the corner blocks, and then cut and position the floor joists (Photo 5). Nail the floor joists in place, then attach the outer rim joists to the front and back of the floor frame.

After marking joist locations on long front and rear rim joists, install metal hangers with 1-1/2-in. joist hanger nails.



Compare opposite diagonal measurements of the floor assembly to check that it's square. Nail 3/4-in.-thick plywood to the joists for the shed floor (Photo 6).

Lay the front and rear joists on the corner blocks. Then, cut the joists, position them in the joist hangers and secure with nails.



After doubling the front and rear joists, add the 3/4-in. plywood floor. Nail it in place with 8d nails spaced about 6 in. apart.

Wall Construction

Cut 2 x 6 stock to size for the door and window headers. Use pieces of 1/2-in. plywood as spacers between the 2 x 6s to bring the header assemblies to 3-1/2 in. thick. Nail together the header pieces with 16d common nails.

Cut 2 x 4 stock to length for the wall studs and window and door jack studs. Nail each jack stud to a wall stud with 8d common nails. Build the four corner posts by nailing three 2 x 4 spacers between two studs as shown on the diagram

Begin framing the back wall by laying out the stud locations on the top and bottom plates. Then, lay out the framing members on the deck (Photo 7). Nail through the top plate and into the wall members, then secure the bottom plate. Frame the window opening, and nail the second top plate to the wall, keeping its ends back 3-1/2 in. from each end of the wall.

Now compare the opposite diagonal measurements of the wall and adjust the assembly until it's square. Then, apply 1/2-in. plywood sheathing, using 6d common nails spaced about 6 in. apart.

Stand the rear wall, bracing it with 2 x 4s nailed between the wall and the outside floor joists (Photo 8). Nail the bottom plate to the deck so the plywood sheathing is flush with the edge of the deck.

Frame the front wall, but don't apply the sheathing yet. Instead, stand the framed wall and brace it. Position the wall 1/2 in. from the deck edges to allow for the thickness of the sheathing. Then frame the side walls, one at a time, and stand them. Leave the second top plate off the side walls until they are raised. Nail the walls together at the corners, and then cut and install the side wall top



With the back wall framing members cut to length and headers assembled, lay out the pieces on the shed floor and join with nails.



Install 1/2-in. plywood wall sheathing on the framed back wall. Then, raise the assembly and secure it with diagonal braces.



Frame and raise the remaining walls without sheathing. After nailing together the corner studs, add the top plates.

plates (Photo 9). Use a level to check that the corners of the building are plumb, and nail temporary diagonal braces to the inside surface of each wall.

Apply the remaining plywood sheathing (Photo 10). At the side walls, keep the plywood 1-1/2 in. down from the top to provide room to nail the gable-end sheathing.



When the framing is in place and the assembly is square and plumb, add the remaining plywood sheathing.



To find the rafter cutting angle, align the 5- and 12-in. marks on the framing square's legs with the edge of the rafter stock.

Framing The Roof

Use a framing square to lay out the 5-in. pitch on the first roof rafter (Photo 11). Cut out the rafter and use it as a pattern to make the second rafter. Test the first two for proper fit, then trace and cut the remaining rafters.

Cut a gusset for each truss from 1/2-in.-thick plywood as shown in the plans. Use a sheet of 3/4-in. plywood as an assembly table, and draw the outline of the roof truss directly on the plywood surface. Align two rafters over the pattern and nail the gusset to the rafters with 1-1/2-in. roofing nails (Photo 12).



Set up a worktable with the outline of the rafter assembly marked. Then, join each pair of rafters with a plywood gusset.

Toenail the trusses to the front and rear walls with 8d common nails (Photo 13). At the gable ends keep the gussets on the inside faces of the trusses.

Cut 2 x 6 stock to length for the subfascia, and nail the boards to the rafter ends with 16d common nails. Cut and install the gable-end sheathing, and then nail 1 x 6 pine furring over the gable rafters.

Rip cedar stock to width for the front and back soffits and cut it to length. Use 6d galvanized finishing nails to fasten the soffit boards to the rafters and subfascia. Then, install the cedar fascia and rake trim.

Install the plywood roof deck, allowing it to overhang the fascia by 1/2 in. along the eaves.



roofing felt. Then, install the drip edge along the rake edges.

With all the rafters assembled in pairs, position each pair on the wall top plates and secure by toenailing.

Roofing And Siding

Follow the manufacturer's directions for installing the roof shingles (Photo 14).

Since the tongue-and-groove siding is installed vertically, add 2 x 4 nailing blocks between the studs, about halfway up the wall. Cut and install these nailers by toenailing them between adjacent studs.

If you plan to stain or paint the trim a different color than the shed siding, it's a good idea to finish the roof trim before applying the siding. Cut siding boards to length and begin installing them at a corner of the building. Use galvanized finishing nails to fasten the boards—8d nails for fastening to the 2 x 4 framing and 6d nails for the plywood sheathing (Photo 15). Face nail the first board, but fasten succeeding boards with nails driven diagonally through the tongue so the heads will be hidden. Set the nailheads slightly below the wood surface.



Use 1/2-in. plywood for the roof deck and cover it with roofing felt. Install shingles following the manufacturer's instructions.



Nail 1 x 6 tongue-and-groove cedar siding in place. Use 8d nails over wall framing and 6d nails when nailing into plywood alone.



Windows And Doors

After staining or painting the siding, install the door and window jambs (Photo 16). Nail the jambs directly to the framing, with the outside edge of each jamb flush to the face of the siding. At the windows, slope the sill pieces about 5° toward the outside of the building, add the top jambs, and then cut the side jambs to fit.

Cut stops for the windows from 1 x cedar stock, and install the outer stops with 6d galvanized finishing nails. Then, place a window in each opening and add the inner stops.

Rip door and window trim and shed corner boards from rough-sawn cedar. Cut each piece to length and nail in place.

Cut siding boards to length for the shed door. Use clamps to pull the boards together, but don't use glue on the joints. Cut the battens for the door, and screw them to the inside surface of the boards.

Hold the door hinges in place and mark the mounting-hole locations. Bore pilot holes and fasten the hinges to the shed. Position the door with a 1/4-in. space on the sides and top, and mark the hinge holes. Bore pilot holes and mount the hinges (Photo 17). Install the door pull and hasp. Cut the doorstops and nail them in place on the top and open-side jamb. Then, stain or paint the windows, door and remaining

Cut stock for doorjambs and nail in place. At a window, install the angled sill piece first, then the top jamb, then side jambs.



Position the door in its opening with a 1/4-in. space at the top and sides. Bore pilot holes for the hinge screws and secure the hinges.

We built a ramp from pressure-treated stock to make it easier to wheel a mower or snowthrower into the shed. To build a ramp, use 2 x 6 material spaced about 1/2 in. apart for the ramp deck, and 2 x 4 stock for battens underneath.

37 CORNER CABINET



Skills needed include using a circular saw. Definitely not one for beginners! Remember to allow for the room's skirting board – the top section of the cabinet will be set further into the corner than the bottom. Our cutting diagram (Figure I) allows for this

THE BOTTOM CABINET

1. Mark out the plan or template as shown in Figure I (diagram 1). It's essential to be accurate with the complex angles that occur. As you proceed, check all the components against this plan. Glue and screw all the joints.
2. Screw the two backs together at the rear corner. Position the cabinet floor in place, 90mm up from the bottom, using its 90-degree corner to set the backs at the same angle relative to one another.
3. The top rail is made of three pieces screwed together to negotiate the front corners (see Figure I, diagram 1). Making this is the most complex section of the project. Notches are cut out of the front corners to accommodate the vertical hinging rails. The top rail is screwed into place, checking that the structure remains square. The second purpose of the top rail is to make the cabinet structurally sound, without its two side panels. This makes the installation procedure simpler and allows you to shape the side panels into the wall, allowing the cupboard to be a perfect fit regardless of irregularities in the wall surface.
4. Cut out the hinging rails, noting that they stop at the cupboard bottom. Use 42mm x 19mm radiata pine with a 67-degree chamfer, where they abut the sides. Check the top and bottom hinges; screw them in place. Add a 67-degree chamfer to the corner edge of the sides before screwing them in place temporarily.
5. Screw down through the floor into the bottom rail which is a single timber component mitred to the sidewall angle at each end.
6. Position the top using angle brackets, screwed in place from the inside and hinge the doors in place.

THE TOP SHELVES

7. Screw the two backs together and brace them against one another, using one of the triangular shelves as the top.
8. Include another fixed shelf halfway down the backs. These two will be sufficient bracing and all other shelves will be adjustable.
9. Screw the side fascias in place.

Materials for bottom cabinet:

Component	Material	Length/size
Back (1 of each size)	18mm thick MDF	882mm x 800mm 882mm x 782mm
Bottom: shelf (2) sides (2)	18mm thick MDF	960mm right-angle triangle 882mm x 200mm
Rails: top/bottom (2) side (2)	45 x 35mm pine	850mm 250mm

Hinging cleats (2)	42 x 19mm pine	754mm
Skirting: sides (2)	90 x 19mm pine	225mm
front (1)		850mm
Top (1)	18mm thick MDF	1060mm right-angle triangle
Doors (2)	9mm thick MDF 13mm thick lining boards	755mm x 390mm

Materials for top shelving

Component	Material	Length/size
Backs (1 of each size)	16mm thick MDF	1740mm x 665mm 1740mm x 649mm
Shelves/top (3)	18mm thick MDF	645mm right-angle triangle
Fascia (2)	18mm thick MDF	1740mm x 150mm
Cornice (1)	78mm pine cornice moulding	1100mm

Other materials: 50mm particle-board screws; wood glue; 35mm brass butt hinges (4); magnetic door catches (2); 19mm scotia for trimming.

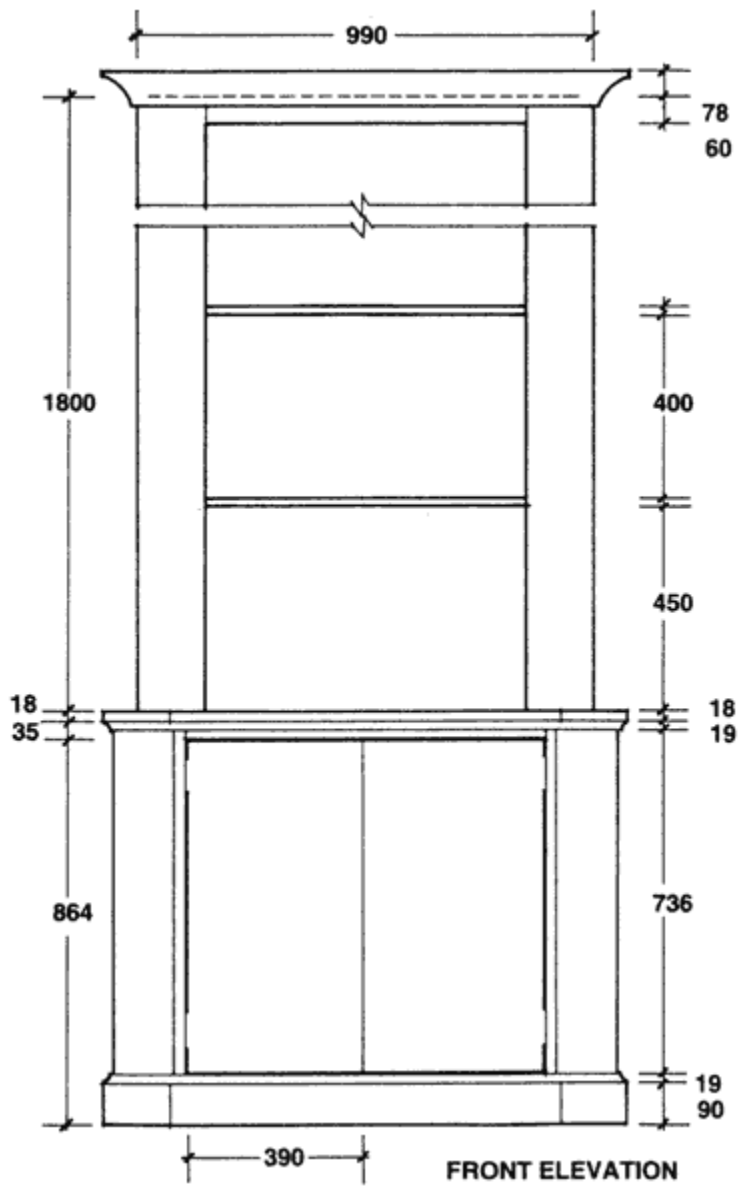


DIAGRAM 1 (cutting diagram)

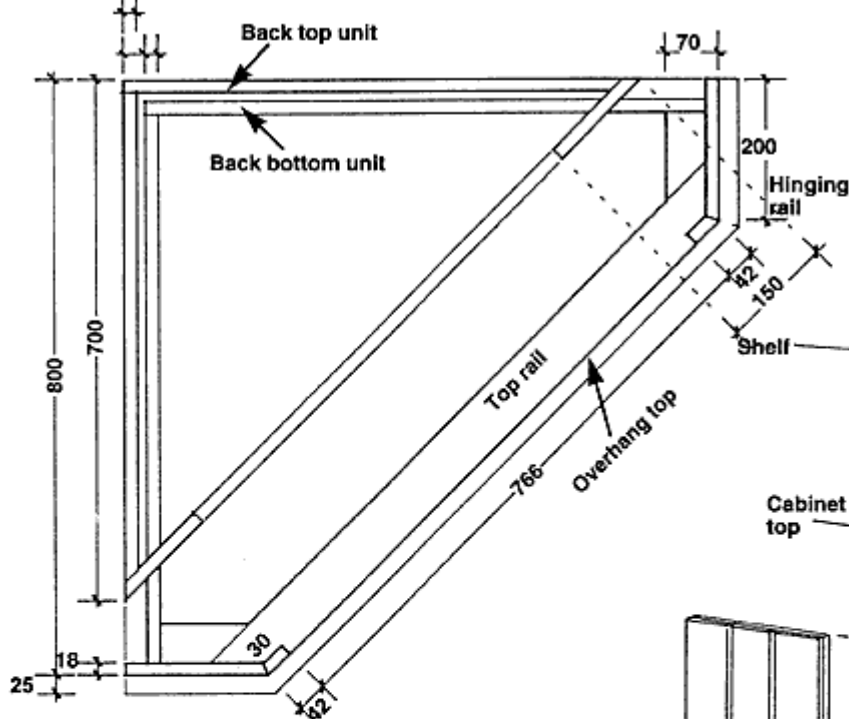
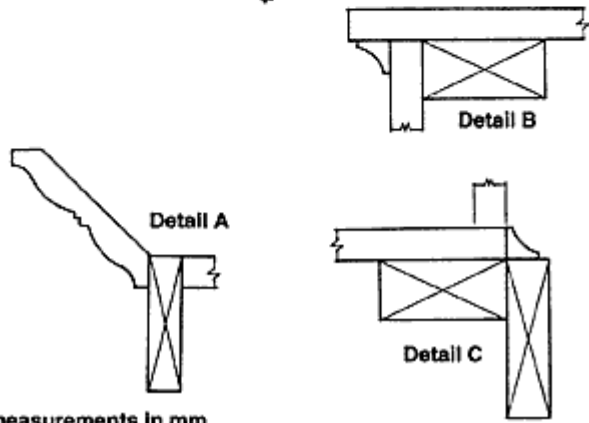
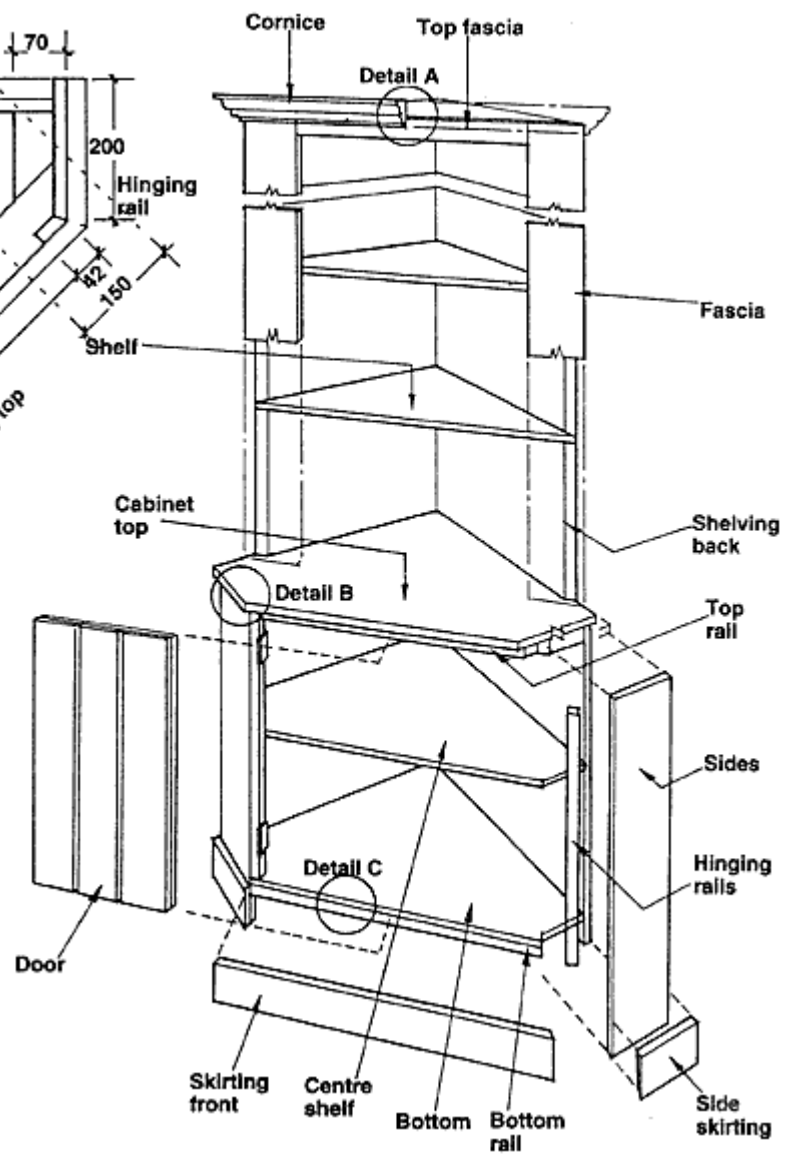


DIAGRAM 2



All measurements in mm

38
TABLE AND BENCH SET



We chose red cedar for this project. This wood resists rot and insect infestation and it's readily available at lumberyards and home centers. If you can't purchase kiln-dried cedar for your project, you should buy the material several weeks before starting and stack it someplace where it will have a chance to air dry. Place evenly spaced strips of wood between each layer of boards to allow air to flow through the stack of lumber. Other suitable wood species for this project are redwood, teak and cypress. These woods are more expensive than cedar, however, and you may have a hard time finding them at lumberyards and home centers.

We should mention that we used Titebond II wood glue to assemble the furniture joints. This single-part glue is waterproof for all but the most extreme situations, such as when joints are subject to continuous submersion in water. Unlike epoxy or resorcinol adhesives that are truly waterproof, this glue is easy to use and readily available.

Making The Parts

The table legs are cut from 4 x 4 stock (or they can be glued up from thinner material). When using 4 x 4 stock, cut each leg to rough length. Next, clamp a fence to the band saw table, and rip the blanks to a 2 3/4 x 2 3/4-in. square (**Photo 1**). Then clamp the leg to a workbench, and use a razor-sharp plane to remove the saw marks (**Photo 2**). Unless you are very experienced with a hand plane, check the workpiece frequently as you go. The edges of the leg must remain square to one another. Remember that you are only smoothing the surface, so do not remove too much material.



Rip the table leg stock out of a cedar 4 x 4. Clamp a temporary rip fence to the band saw table to do this.



Clamp a table leg to a benchtop and remove saw marks with a hand plane. To make a smooth cut, push the plane at an angle.

Use a miter gauge on the band saw to crosscut the leg blanks to finished dimension **(Photo 3)**.

Since the bench legs are smaller than the table legs, it is a better use of materials to glue them up from three pieces of 3/4-in.-thick stock. You can simplify the job if you plan to make the blanks large enough to cut four legs from each glued-up stack.



Crosscut the legs on the band saw. Here, a shopmade crosscutting table and a miter gauge are used to make the cut.

Rip and crosscut material for the leg blanks slightly oversize, then use a foam roller to spread glue on the mating surfaces of each piece. Assemble the pieces into a stack, and clamp the pieces together **(Photo 4)**. After about 20 minutes, scrape off the glue that has squeezed from the joints, then allow the glue to fully set.



For the bench legs, spread glue on 3/4-in.-thick stock. Lay disposable material under the pieces and clamp them together.

Now use the table saw to rip the blanks to 2 1/4 in. wide, and crosscut the bench legs to finished length.

Lay out the mortise locations in all the legs for the apron joints. You can speed the process by clamping four legs together with their ends perfectly aligned. Then, mark across the stack using a square **(Photo 5)**. Next, use the router and edge guide to cut the leg mortises **(Photo 6)**. It's best to use a spiral up-cutting bit in the router because that type of bit pulls the dust and chips out of the cut, and reduces the strain on the motor. This also keeps the bit's cutting edge cooler.



Rip and crosscut the individual bench legs to size, and then clamp them together. Mark out mortise locations on the legs.

Rip and crosscut 1-in.-thick stock for the table and bench aprons as well as for the top frames and slats. Install dado blades in the table saw, and then use the miter gauge to guide the workpiece over the saw blades when cutting tenons (**Photo 7**). Note that you can use the rip fence as a stop to gauge the tenon length. Since the tenons are 1 in. long, you need to make two passes to complete each cheek.



Using a spiral up-cutting bit in a plunge router, cut the table leg mortises. Two legs clamped together provide a stable base.



Use a dado blade setup in the table saw to cut the tenons on the apron pieces. Butt each apron to the fence, and make the cut.

Cut the tenons across the width of each workpiece, then adjust the blade height and move each workpiece over the blade on edge to cut the shoulder (**Photo 8**). Clamp each workpiece upright in a vise and gently round over the tenon's edges using a wood rasp (**Photo 9**).



To cut the shoulders on a tenon, stand the apron up, and hold it firmly to the miter gauge. Butt it to the fence and make the cut.



Round off a tenon with a rasp. The tenon's radius matches the radius left by the spiral up-cutting bit used to cut the mortise.

Lay out the mortise locations for the tabletop and benchtop joints. Use a router with an edge guide and a spiral up-cutting bit to cut the mortises **(Photo 10)**. It is best to clamp three workpieces of the same width together when routing to form a wide and stable base for the plunge router.

Mark the location of the umbrella posthole in the center rail of the tabletop, and then use a Forstner bit in the drill press to bore the hole.

After laying out the locations of the holes in the aprons for mounting the top, use a Forstner bit in the drill press to counterbore a recess for each screwhead. Next, use a 3/16-in.-dia. bit to drill the pilot holes for the screw shanks. Each of these holes is centered in a recess.

To complete the part-making process, install a chamfer bit in the router table, then use it to cut the 3/16-in.-deep chamfer on the table and bench legs, aprons and top parts as shown in the plans **(Photo 11)**. Note that not all edges are chamfered.



To cut the long row of mortises in each stile and rail, clamp three of the work-pieces together to support the router.



Use a chamfer bit in the router table to cut the chamfer on all four edges of the legs for the benches and table.

Assembly

Begin assembly with the benches, since they are smaller and are much easier to work with. After you refine your technique on them, you can assemble the table.

It's worth noting that all the parts for the table and benches should be dry assembled before glue is applied. With the assemblies joined in this manner, make reference marks and numbers on the backs of the parts or in some other discreet location. Before proceeding to gluing and clamping, gather the parts together in batches so they are not confused during the assembly process. In some cases, you'll want to make a second dry fit midway through the assembly process, such as when gluing and clamping a stile or rail to multiple slats that have been glued to a stile or rail on the opposite side. This is a necessary evil to ensure that the parts go together smoothly--the parts may have fit the first time you tried them but shifted slightly when they were glued up as a subassembly.

Apply glue to the mortises of two bench legs and on the tenons of one short apron. Use a small wood shim to spread glue on the mortise walls, and use a small brush to coat the tenons. Press together the apron and legs, and then clamp the subassembly to pull the joints tight (**Photo 12**).

When the glue is dry on these parts, glue and clamp the long bench aprons to the end subassemblies (**Photo 13**). It's best to do this on a flat work surface to ensure that the base assembly is not twisted.

Assemble the table base in the same manner as the bench bases. Make two subassemblies consisting of a pair of legs and one apron. When the glue has set on these, join the subassemblies spanned by a pair of aprons.



Glue and clamp together a pair of bench legs and one short apron. Make two of these subassemblies.



Join two leg-apron subassemblies spanned by a long pair of aprons. Glue and clamp this to complete a bench base.



The first stage in assembling a benchtop is to glue and clamp slats to one stile. Use one clamp in the center of each slat.

Now move on to assembling the benchtops. Since there are several slats in each top, assemble each top in stages. First, glue and clamp the slats to one long rail (**Photo 14**). After the glue sets on those joints, apply the opposite rail.



Multiple subassemblies are made in assembling the tabletop. First, slats are joined to the center rail.

Approach the tabletop assembly in the same manner. Begin by gluing and clamping a slat at each end of the center rail. Fill in between these two slats with more slats (**Photo 15**). When the glue is dry on this subassembly, glue and clamp slats to the opposite side (**Photo 16**). Next, glue and clamp the side rails to this subassembly (**Photo 17**). When the glue is set on that subassembly, position clamps across it and then glue and clamp one stile to it (**Photo 18**). Complete the top by gluing and clamping the second stile.



Using this technique, you will not have to worry about getting all the parts together before the glue begins to set. Your results will be better, and the stress of a frantic assembly is eliminated.

A second set of slats is glued and clamped to the center rail. Again, use one clamp in the center of each slat.



Glue and clamp a side rail to the center rail. One clamp, carefully centered, should provide enough force.

Mark the benchtops and tabletop for the 45 degree corner cuts, and make these cuts with a sabre saw. Sand the cut corners smooth, then use the chamfer bit in the router to shape the table edges and benchtops. Use the router and chamfer bit to shape the top edge of the umbrella hole as well.



Clamp one stile at each end of the top subassembly. Space clamps evenly and at the center of a tenon.

Rip, crosscut and miter the 1-in.-thick stock to make corner blocks. Bore and countersink pilot holes in each block, and then attach them with screws to the aprons for the table and benches (**Photo 19**).



A corner block is installed at each leg on the table and the benches. A pair of screws holds each block to the aprons.

Invert the tabletop on a padded surface, then place the base over it. Adjust the base so there is an even reveal on all sides of the top, and then attach the base to the top with screws (**Photo 20**). Assemble the benches in the same manner.



Attach the tabletop to the base with several screws. Drive each screw into its matching counterbored hole the apron.

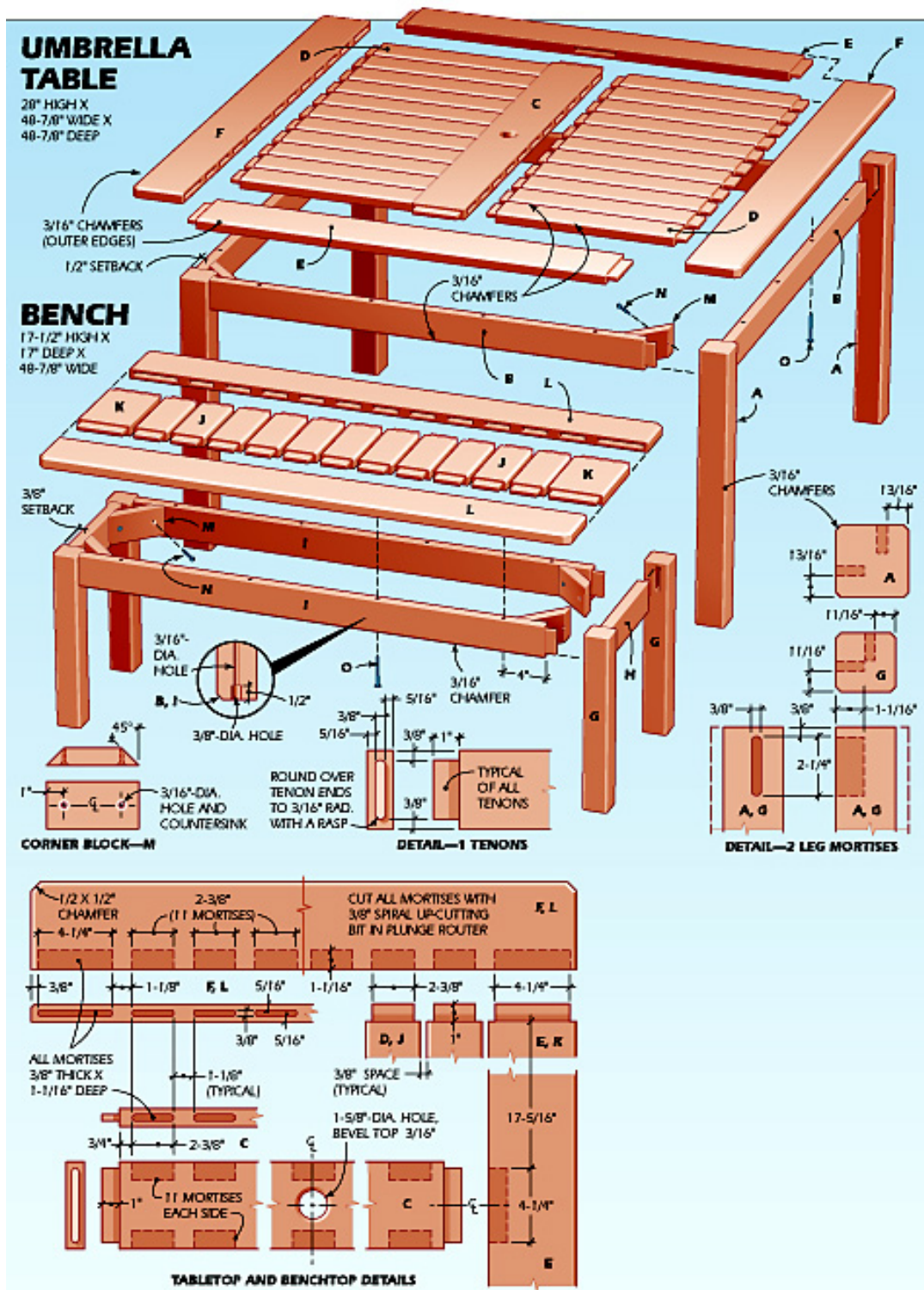
Sand all surfaces with 120-grit and 140-grit sandpaper, and remove all dust with a tack cloth. While cedar is resistant to rot and insect infestation, it will weather if left untreated. To preserve its natural color and protect it from the elements, apply a penetrating finish with a high-quality brush. We used clear (unpigmented) Cabot Decking Stain No. 1400.

A pigmented stain could easily be used on this project. In fact, pigmented finishes provide greater protection against weather damage--even if they do obscure the wood's grain. Although most people prefer white, green or redwood-colored finishes for outdoor wood furniture, there's nothing to prevent you from being a bit more creative. The finish could be color matched to other outdoor furnishings, or to the house itself.

For maximum protection against the elements, use a paintable water-repellent preservative, followed by a compatible primer and topcoat. Visit your paint store to buy these three products and check that they are fully compatible.

MATERIALS LIST--UMBRELLA TABLE AND BENCH		
Key	No.	Size & Description (use)
A	4	2 3/4 x 2 3/4 x 27" cedar (leg)
B	4	1 x 3 x 43 7/8" cedar (apron)
C	1	1 x 5 x 40 7/8" cedar (rail)
D	22	1 x 3 1/8 x 18 15/16" cedar (slats)
E	2	1 x 5 x 40 7/8" cedar (rail)
F	2	1 x 5 x 48 7/8" cedar (stile)
G	16	2 1/4 x 2 1/4 x 16 1/2" cedar (leg)
H	8	1 x 3 x 12" cedar (apron)
I	8	1 x 3 x 44 7/8" cedar (apron)

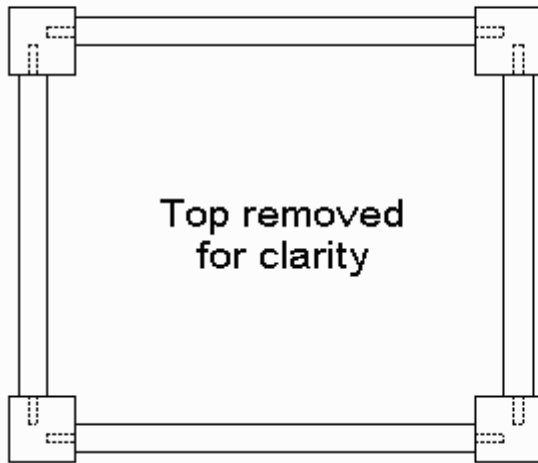
J	44	1 x 3 1/8 x 9" cedar (slats)
K	8	1 x 5 x 9" cedar (rail)
L	8	1 x 5 x 48 7/8" cedar (stile)
M	20	1 x 2 3/4 x 5 1/4" cedar (block)
N	40	2" No. 8 fh galvanized screw
O	48	3" No. 8 fh galvanized screw



39
BASIC TABLE

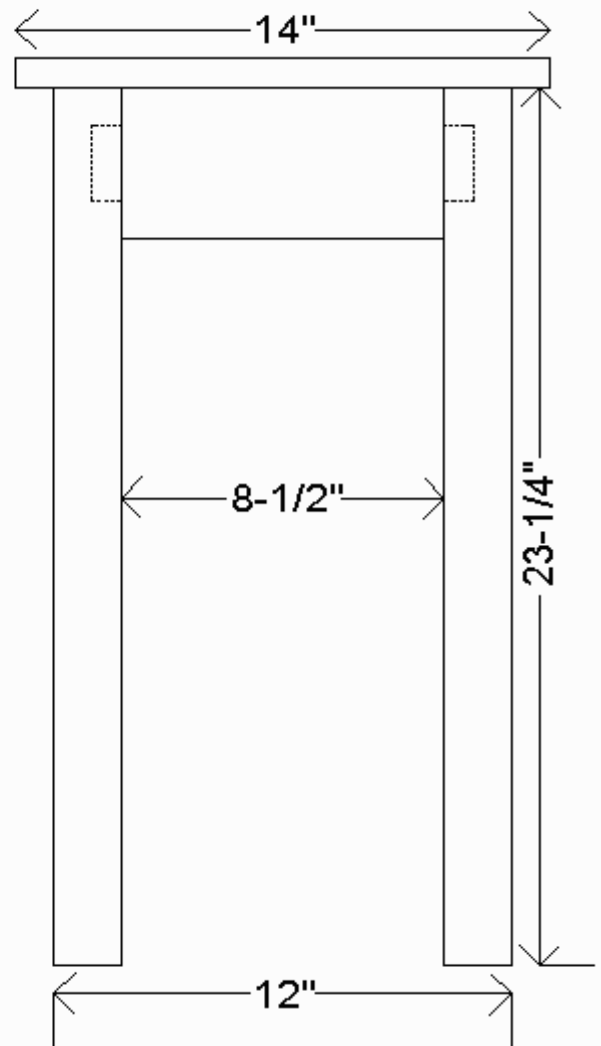
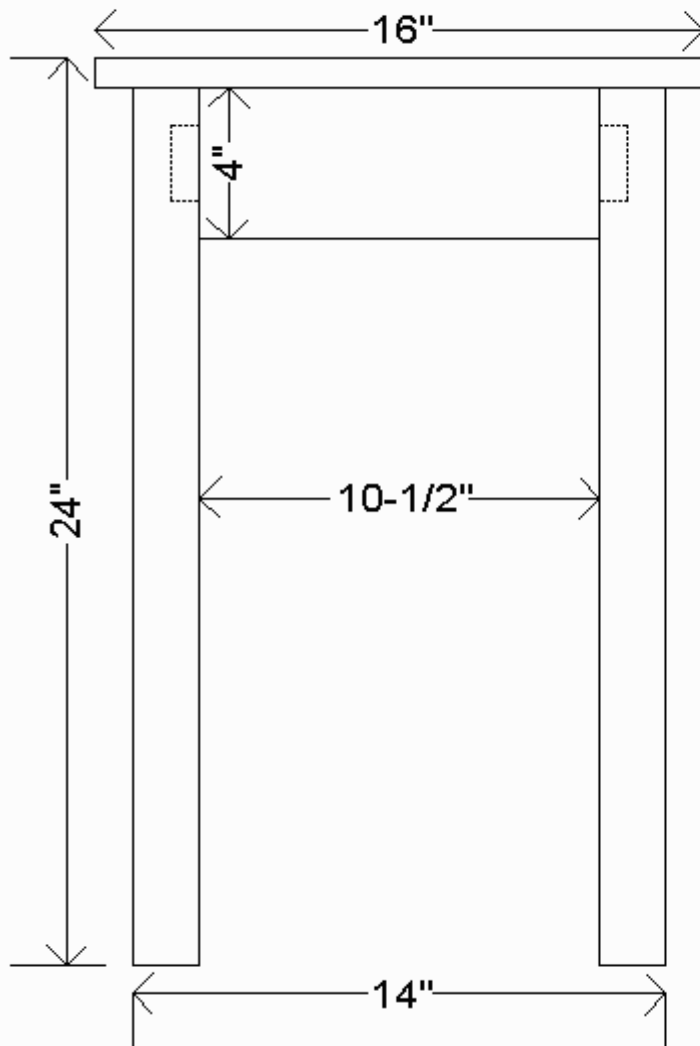
Basic Table

Top View



Top and apron are 4/4 stock
(3/4" nominal thickness)

Legs are 8/4 stock (1-3/4"
nominal thickness)



Front View

Side View

Stock Selection:

Try to get some North American Eastern White pine, probably available up there in Canada. In the states, Idaho pine is a good substitute, because of it's easier tooling and fewer and smaller knots. Home center Ponderosa pine from the North West has much large knots and doesn't hand tool as well.

Because the nominal thickness is standardized, your planing will be limited to mostly jointing & smoothing. Unless you add a drawer, (more good experience) then you'll want to thickness the stock down.

Tool Required:

The basic list of tools needed for this project is small. Some of the variants will require some other tools (see below).

- **Layout Tools**
A good ruler (tape measure will do) and a very important tool called a square. Get a marking gauge as well.
- **Saws**
26" Crosscut saw and a 10-14" backsaw.
- **Planes**
Eventually you'll need a scrub, jointer, and smooth plane too, but you can start by getting a common Stanley #5 jack plane and a fully-adjustable (mouth and blade) block like the Stanley #65 or #18.
- **Chisel**
Since we will be doing mortises in this project, a 1/4" mortise chisel will be needed. Alternately, a brace with a 1/4" bit and a paring chisel could be used.
- **Stones**
I won't start an argument over which are better, and yes you can use Silicon Carbide sandpaper to sharpen too. But I will say that without a doubt, Sharpening is the most important skill you must learn. Otherwise most of the above tools are useless, resulting in frustration.
- **Bench**
Hey, perhaps this should be your 1st project... Make sure you get a good quality and large faced woodworking style vise.

Optional Tools:

These are tools that either make the job easier, or are needed for some of the variants on the original design.

- **Smooth Plane**
A #3 or #4 is a very handy tool for final smoothing of the parts.
- **Mortise Gage**
Not strictly necessary, but makes laying out mortise and tenon joints much easier.

- **Rip Saw**
If you would like to use tapered legs, a 26" rip saw will make the job easier.
- **Drawknife**
Another good way to taper the legs is with a drawknife.
- **Spokeshave**
If you will be using curved aprons, a round-soled spokeshave will be needed to smooth the curves. Either metal or wooden will do.
- **Coping Saw or Turning Saw**
If you will be using curved aprons, you will need a saw capable of cutting the curves.

Making the Legs

Leg Variants

Standard



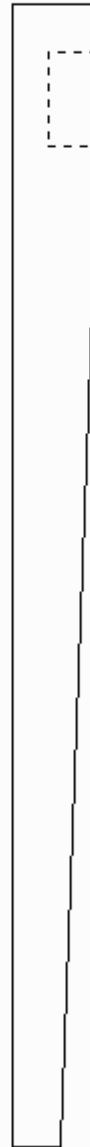
w/Shelf



Tapered
w/Shelf



Inside
Taper



Outside
Taper

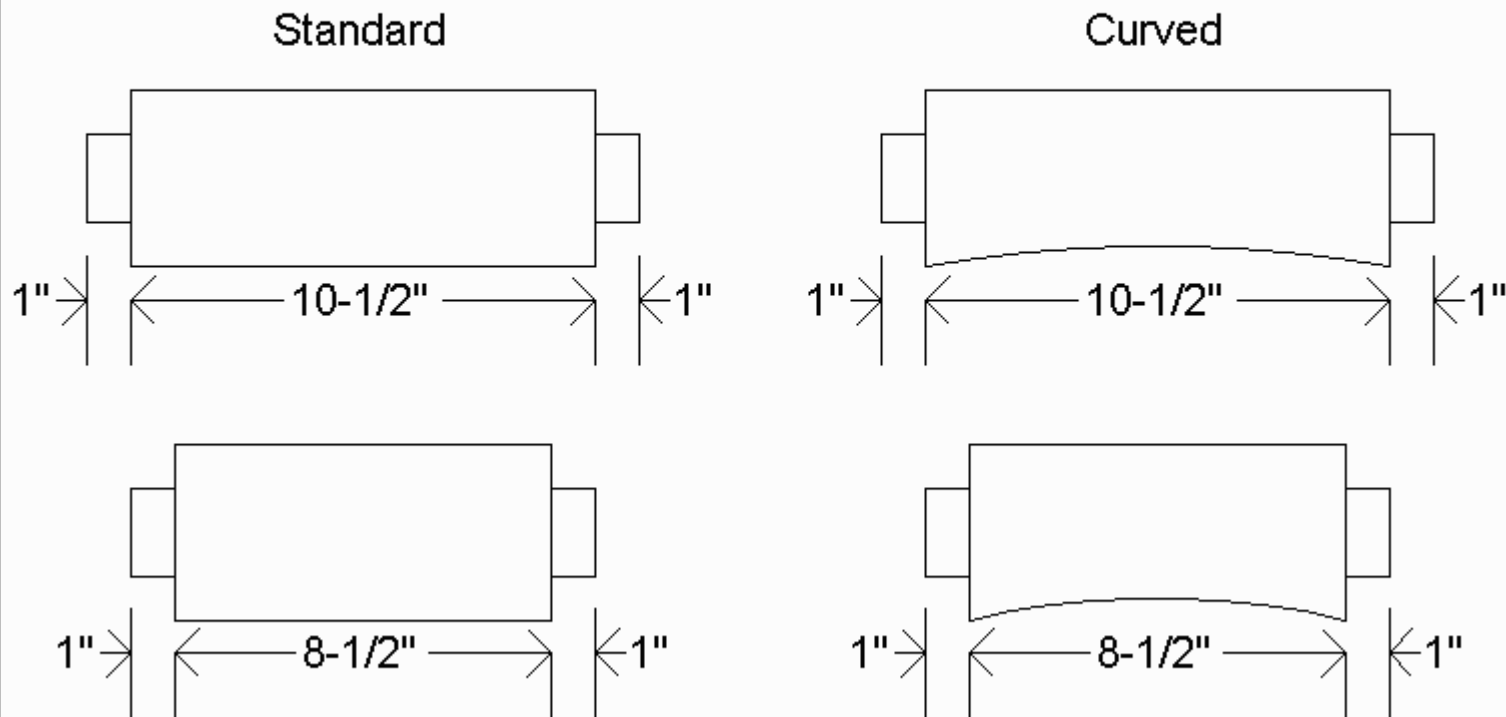


Start with the legs. Either get 8/4 (actual size 1-3/4") square stock, or joint and glue some up into four usable squares of the desired length. The jack plane should be fully capable of jointing a 24"-30" length. Glue & clamp overnight. Then remove & smooth all four sides.

Now cut the mortises for the rails to join into. Lay them out on those same two "inside" sides of each leg. Mortises should be 1/4" wide and 1" deep, set 1/2" back from the front face. Mortises can be either chopped with a mortise chisel, or bored with a brace and bit and cleaned up with a paring chisel. Either way is pretty simple.

Making the Aprons

Apron Variants



Cut your 4/4 (actual size 3/4") stock to *FULL* length and lay out the tenons. Score the tenon shoulders first with a knife or chisel edge. Use your backsaw to remove the cheeks & cleanup with a chisel. If you will be using the curved aprons, lay out and cut the 1/2" deep curve last, and clean up with a spokeshave.

Glue the tenons into their appropriate mortises & clamp the entire assembly together. Check the diagonals and ensure that the entire assembly is square and level (or even on the top).

Making the Top

Normally, the top is probably already glued up & ready to be mounted at this time. But assuming that you didn't multi-task, let's cover making one now.

Saw the boards to length, watching for stock that might twist or cup after glueup. Lay them out and mark the face around each joint for ensure the proper order for assembly. Since this is a basically small project the jack plane can be used as a jointer.

As a newbie, joint the edges two at a time, back to back. This way if you can't plane nice & square, the bevel on Each will offset the other, and your panel will be flat.

Learn during planing to press on the toe upon entry and the heel during exit. This helps avoid rounding down the ends of the board being planed. When you are getting complete shavings for the entire length of the stroke, and the boards join together without any light appearing through anywhere, move on to do the other side of board #2 with board #3.

Glue, clamp, set overnight. Remove, cut to size, clean up. Smooth the top with your jack plane very sharp & set very fine (if you have a smoother, use it instead). Plane the top as smooth as possible, and finish by knocking off the corners with your block plane.

Attaching the Top

When attaching the top, be sure to allow for seasonal movement of the wood!

The easiest method is to put corner blocks in the rails, and attach the top with a couple of small screws in from the bottom. Alternatively, you could use any of the commercial "button" attachments, or use L-shaped cleats which engage a groove in the apron. Any good woodworking book should show several options for this.

40

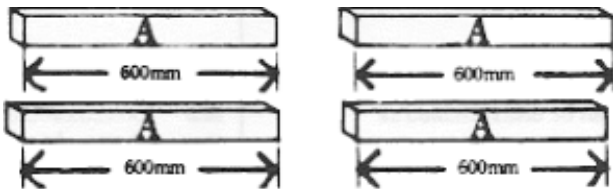
WINE RACK

Here is a rack for one dozen average size wine bottles. Longer or higher racks can be designed using spacing shown but some variation in timber thickness, width, etc., may be necessary.

TOOLS YOU WILL NEED	MATERIALS YOU WILL NEED	
<ul style="list-style-type: none"> • Hand saw • Hammer • Nail punch • Carpenter's square and pencil • Measuring tape or rule • Drill and bits 	<p>TIMBER</p> <p>Timber: Seasoned softwood DAR for decorative rack, otherwise sawn hardwood or softwood 1550x25mm, 1 piece 75x25mm, 1 piece 2.7m</p>	<p>HARDWARE</p> <ul style="list-style-type: none"> • Hardware • 50x2.9mm bullet head nails • Sandpaper or electric sander.

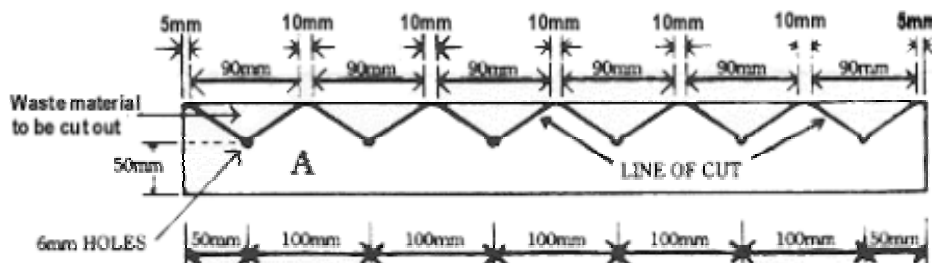
Cut these four rails

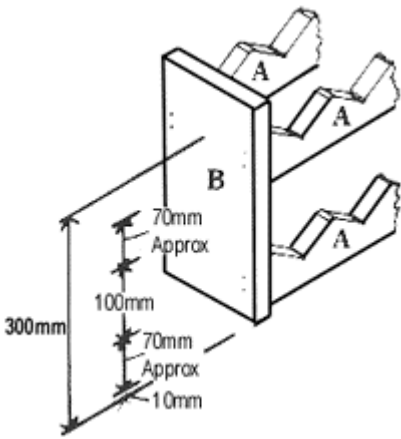
from the pieces 75x25mmx2.7m. Each rail to be exactly 600mm long



Mark out

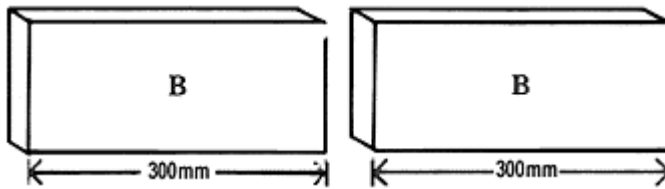
each of the four pieces 'A' as below. Drill **six** 6mm holes as shown in Step 2, then cut each triangular piece out using hand-saw or jig saw, cutting into the prepared 6mm holes. Smooth off each rail each of the four pieces 'A' with sand paper or sander.





Cut two end pieces

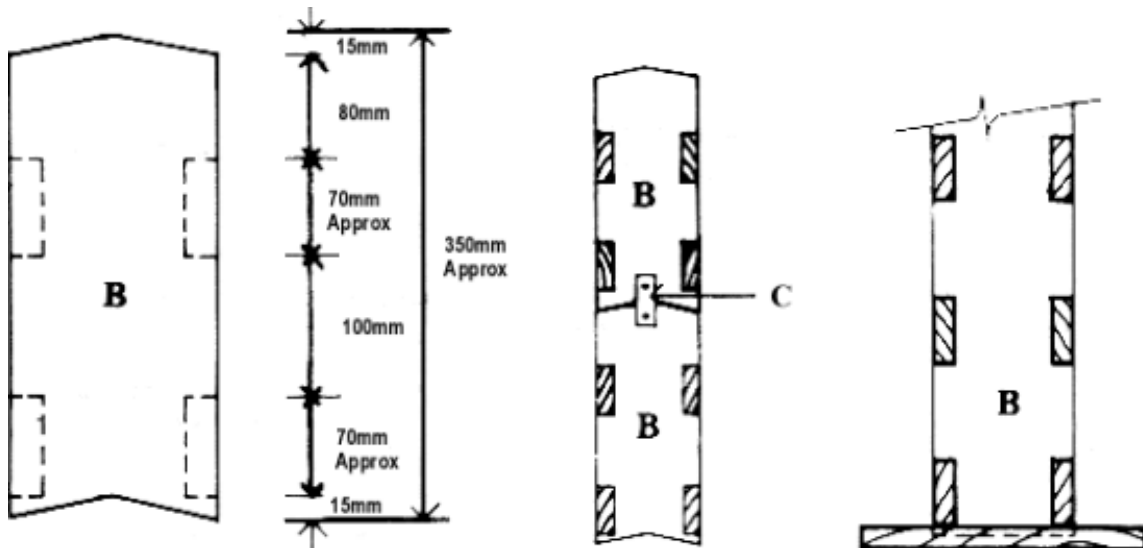
'B' from the piece 150x25x600mm. Each piece should be exactly 300mm long.



Attach rails

'A' to ends 'B' at spacing shown using two 50x2.8mm nails at each end. Punch nail heads. Not: Pre-drill nail holes but locate to avoid timber splitting and penetration into bottle retaining space. Smooth down, fill nail holes, etc., stain, clear finish, paint etc, as desired.

Design Variations



DEMOUNTABLE RACK

Use screw fastening instead of nailing so that rack can be disassembled as required.

STACKING RACKS

Cut two sides 'B' from a timber piece 150x25x900mm DAR and to shapes shown. Assemble as indicated using location clamp or clip.

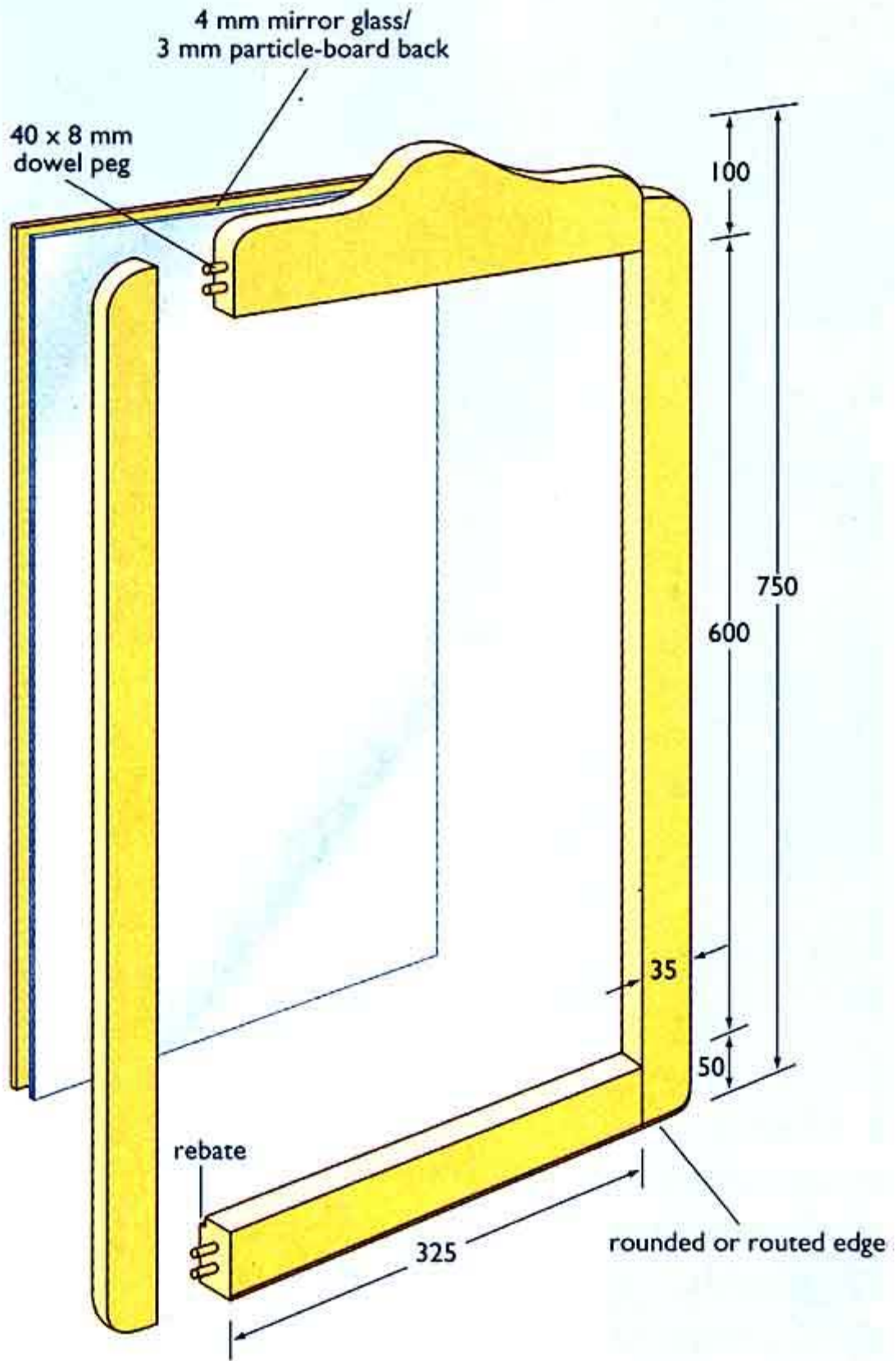
TALL RACKS

Very tall racks could be unstable because of height. Use standards or racking design but add a 'foot' to each side of the rack depending on space available. Use an added 'foot' to each side of the rack depending on space available. Use an added 'foot' equal to about normal bottle length. Use, for example, one 'foot' each end, cut to 75x50x300mm DAR.

41

BATHROOM MIRROR





You'll need:

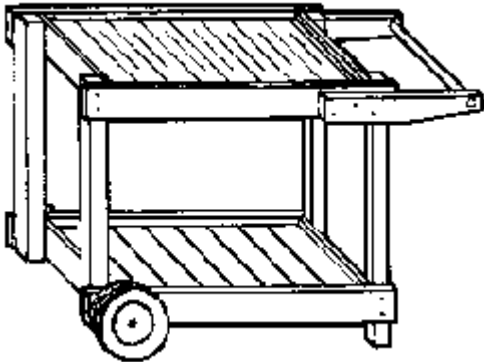
Item	Material
mirror frame sides (2)	40 x 19mm timber, cut and planed to 700 x 35mm
mirror frame top (1)	115 x 19mm timber, cut and planed to 325 x 100mm
mirror frame bottom (1)	65 x 19mm timber, cut and planed to 325 x 50mm

You'll also need: 8mm dowel cut into 8 x 40mm lengths; waterproof epoxy resin (if using in bathroom) or PVA glue; mirror glass measuring 342mm x 616mm; 3mm-thick plywood or MDF measuring 345mm x 620mm; 120 grit sandpaper; polyurethane gloss varnish; panel pins.

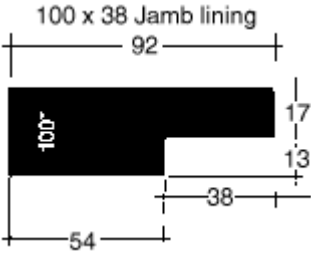
Here's how:

1. Cut and plane the timber to the correct measurements. Click on the illustration at the top of this story for a full-sized diagram.
2. With a jigsaw, shape the top piece, making it 50mm high at the ends and the full 100mm height at the centre. Similarly, round off all the corners.
3. Using a router with a straight bit, cut a 10mm square rebate into the rear inside edges of each of the four frame components to take the mirror glass and back. Make the corner joints by drilling holes for two dowel pegs into each one. A dowelling jig will ensure accuracy. Now glue and assemble the frame.
4. You can simply round the front edges of the frame with an electric sander, but for a better trim, rout the edges with a 12mm round-over bit. Sand and triple-varnish frame.
5. Have mirror glass cut to size and fit 3mm-thick plywood or MDF inside the back rebate. Use panel pins tapped into the inside edge of the frame to hold the back in place.

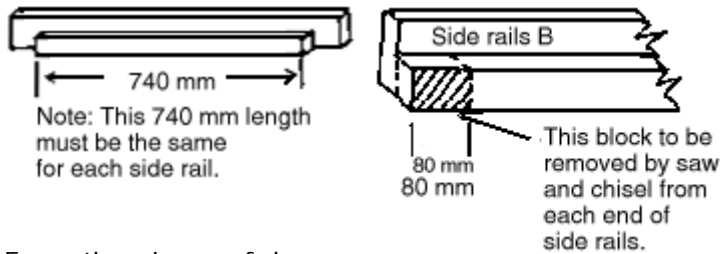
42
BARBECUE TROLLEY



Many of those odd bits and pieces required at the outdoor barbecue can be delivered conveniently on this barbecue (or indoor tea) trolley. Basic design consists of two equal sized flat trays supported on corner posts. However we strongly advise that you decide first on the sort of wheel/axle system since width of trays should be made to fit closely between the wheels. With some changes in details the width of this barbecue trolley can be adjusted to suit your purchased wheel, axle, bracket units. As an alternative you could use a system of bolts and lock nuts, etc to fasten wheels to base tray or corner post as shown later.

TOOLS YOU WILL NEED	MATERIALS YOU WILL NEED	
<ul style="list-style-type: none"> • Saws • Drill and bit, countersunk bit • Measuring tape/rule • Carpenter's square and pencil • Adjustable spanner • Wood chisel • Hammer • Screwdriver • Chisel 	<p>Timber</p> <p>Note that this trolley is designed on the assumption that it will be generally protected from exposure to rain and dew. If this limit on exposure is accepted then standard door jamb lining can be used (e.g. from Pacific Maple, meranti, oregon, radiata pine, Tasmanian oak, etc.) and standard or interior quality particle board or plywood would be acceptable for bottom of trays. Corner of posts could be timber selected for appearance rather than for performance under weather exposed conditions.</p>  <ul style="list-style-type: none"> • 50 mm x 50 mm DAR 4 pieces 750 mm * (4 posts) • 100 x 38 mm door jamb lining (see diagram) 4 pieces 900 mm * (side rails) 4 pieces 600 mm * (end rails) • 100 x 25 mm DAR softwood 16 pieces as bottom planks or use 19 mm particleboard or 12 mm plywood cut to fit frames. • 75 x 25 mm DAR softwood 1 piece 900 mm * (rail bracket) • 19 mm or 25 mm diameter dowel or 1 piece 700 mm for handle/rail <p>* Discuss these length requirements with your supplier, who will supply standard lengths of timber from which these pieces can be cut.</p>	<p>Hardware</p> <ul style="list-style-type: none"> • 8/50 x 6 mm diameter round head wood screws (end rail to post). • 40 mm x 6 mm diameter round head wood screws (side rail to post, handle) • 100/50 x 2.8 mm bullet head nails. (bottom planks) • PVA wood adhesive • 2/150 mm diameter wheels/axle s bracket units as available.

Step by Step

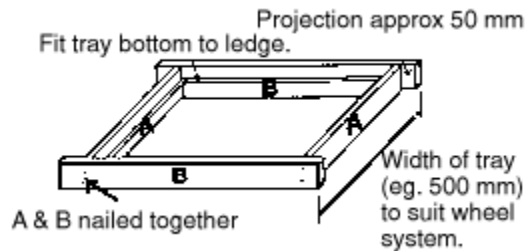


From the pieces of door exact length to suit the axle/wheel system.

Example: For an overall width of tray of 500 mm cut four end rails each 465 mm long

Mark out side rails

At each end of the four side rail pieces mark out as shown 80 mm from each end. Mark edges as guide for removal of excess material.



Saw and chisel out rail section

Saw and cut on marked line 80 mm from each end and chisel out excess materials to give four rails as indicated in diagram. Check the dimension shown as 740 mm in diagram. This measurement should be the same for each cut and trimmed rail.

Assemble tray frame

Fit tray rails together and fix in position using nails. Check squareness of trays and confirm that the two trays are the same size. Trim rails and adjust where necessary.

Cut bottom planks

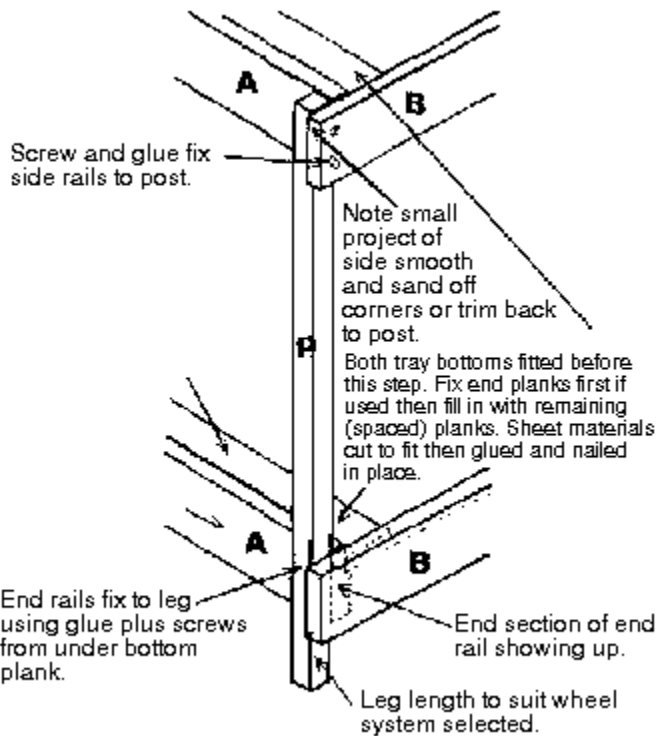
Measure internal width of tray as shown in previous diagram. Cut 16 bottom planks to this length or cut particleboard or plywood to fit in as tray bottom.

Cut corner posts

From the pieces of 50 x 50 mm DAR timber cut four posts (P) each 750 mm long.

Cut end rails

jamb cut four end rails (A) each of an



t remains at 750 mm. The distance between trays maybe varied depending on the wheel and axle system chosen.

Fix wheel system

Note: The assembly could stand on four legs until the wheels are attached to the front of the units, or the front 'legs' are removed first as appropriate for selected wheel assembly. Fit selected wheel/axle system. Cut off excess front legs as required.

Provide drainage holes

If sheet products (particleboard or plywood) are used in trays, provide drainage holes (9mm 3/8" diameter in each corner. Loose fitted plank bottom if used should give adequate drainage.

Smooth and rounding off

Using sanding disc, sander or hand sanding or planing, smooth and round off all accessible sharp corners and edges of the trays and posts. Punch all nails if desired and fill nail holes with putty/filler the same colour as timber.

Note: The trays could have side rails projecting 5-10 mm beyond posts. These projections should be rounded off thoroughly, or trimmed off.

Cut, trim and fix handle

< From the piece of 75 x 25 mm DAR x 900 mm cut two handles each 450 mm long. Trim or shape as in diagram, smooth all corners and edges, then screw - and glue-fix to rear end of upper tray as in diagram.

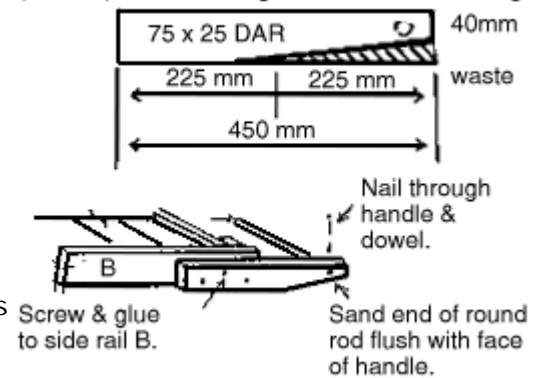
Square up trays

Fit a bottom into each tray and fix in place using glue and nails. Before final fixing square up tray and check that the two trays are of the same size.

Attach legs

Fix trays to the four legs as shown in diagram below using glue and screws. Note that the final length of each pair of legs will depend on wheel/axle bracket system used. However, in this initial assembly, the four

HANDLE PATTERN
(Make 2) Round off edges corners before fitting.



posts are of equal length h such that the overall height

Note: To make sure that handle fits flat to the rail you may need to chisel out small pieces of the handle where it comes into contact with the heads of screws into posts or use countersunk screws.

Cut to length and insert broom handle/dowel. Use glue in hole and drive in one 30 mm long nail through top edge of shaped timber piece into handle/dowel.

Apply finishes

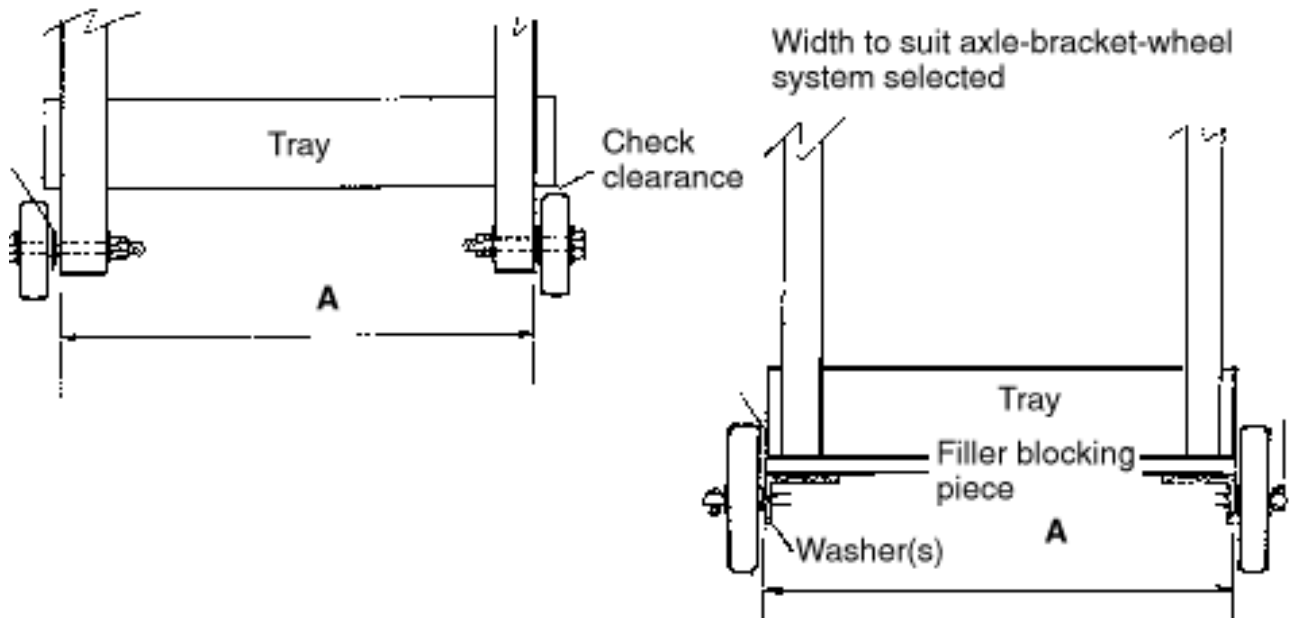
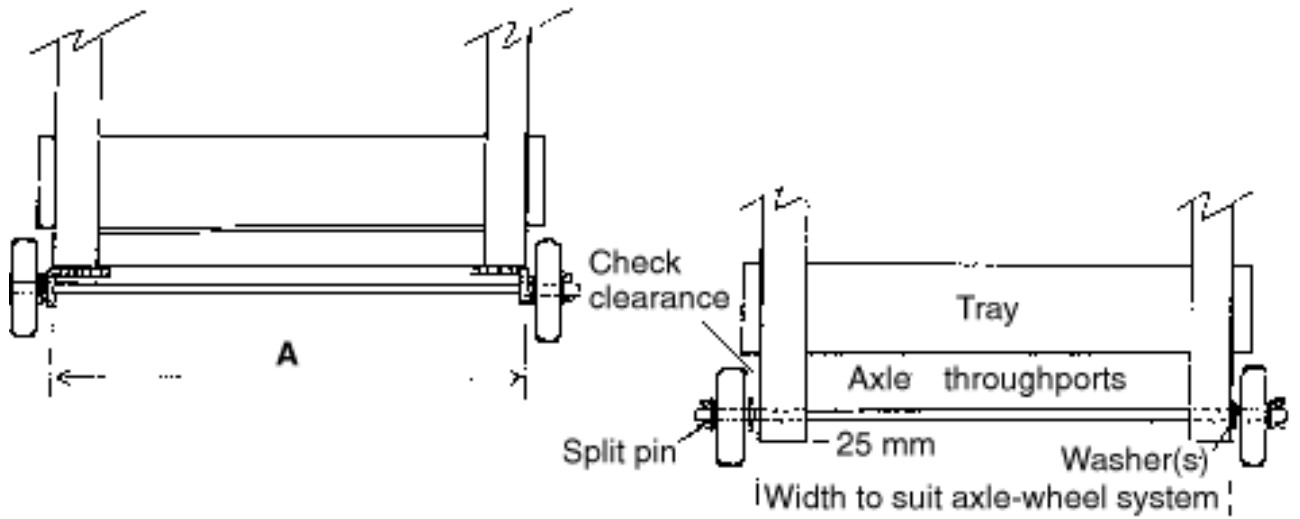
Clear finish with three coats of satin clear polyurethane finish, or selected stains, or garden furniture finish or conventional paint finish. It is strongly recommended that the trolley receive a thorough coating of one of these finishes and that this coating be maintained adequately.

For weather exposed trolleys

If the trolley is to be exposed to weather for long periods, then be selective about materials. For timber components for example select 'durable' or moderately durable timbers such as western red cedar, jarrah, black butt etc. or preservative treated timber, OR pay particular attention to applying exterior finishes (and then maintenance) to low durability timbers. Fastenings (nails, bolts, etc.) should be non-corroding such as hot dipped or electroplated galvanised coatings.

Alternative wheel/axle systems

Dimension 'A' adjusted to suit your system
Check wheel clearance from tray side



43 CABINET BATHROOM



Start At the Top

The first thing I needed was a moulded sink top. It measured 19" x 31" and was the starting point for the project.

My design includes what I call extended cabriole legs on the front, creating an elegant, old-fashioned look. I used sugar pine for these legs. It's a little harder than eastern white pine, but it's still easy to work with. The outline of the 1/4"-thick hardboard template I made for the leg profile is on this illustration.

Creating cabriole legs is within the reach of most woodworkers. The plans include step-by-step directions. The technique is quite straightforward but you'll need access to a bandsaw and the patience to sand the inside and outside curves that form each leg. This is where pine makes life easier than hardwood.

Once you've got two front legs and the straight back legs done, it's time to tackle the side panels. Although most bathroom cabinets are 32" tall, I went with 36". This is reflected in the materials list. To shorten this cabinet to a standard height, reduce the side stiles, door stiles and upper portion of the legs by 4".

The plans show the stiles and rails joined into a frame with #20 biscuits. The panels fit into the inside face of this frame, within 1/4"-wide x 3/8"-deep table-routed rabbets you make after the frames are dry and sanded flat.

The next step is to install the side panels, but two things must happen first. The edge of the panels needs to be routed to fit the 3/8" rabbet you routed in the frame. The four rounded corners of the frame rabbet must be squared with a sharp chisel. Secure the panel with 1/2" finishing nails or wood trim on the inside face of the side frame. This is the same design and construction process I used to build the face frame, door and drawer frames. Build these parts now. Sand them flat, then rout a round-over profile on the outer edges of the drawer face and doors.

Bring the Cabinet Together



Creative cabriole legs cut from a template refine the vanity's stance and give it a furniture-like appeal



Sillaot's trademark drawer slides function beautifully but require an eye for precise tolerances

With the side and face frames done, it's time to join them to the legs. I used screws driven into angled pocket holes. This is fast, easy and allows me to assemble the whole cabinet without waiting for glue to dry.

When the cabinet is assembled, including the two back support members, you can measure the opening for your drawer box. Mechanical slides like the kind I used require a specific drawer-to-cabinet clearance—usually 1/2" on each side. That's why you should measure your drawer opening and make changes to the drawer specs if needed. Construction variations can easily throw dimensions off 1/8"—more than

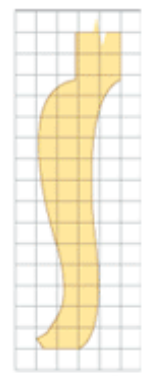
enough to make mechanical drawer slides perform poorly. The plans show how the drawer support rails provide a surface for the mechanical slides to fasten to.

I kept things simple with butt joints at all four drawer box corners. The drawer bottom fits into 1/4" x 1/4" dados in the sides, front and back. Install the drawer in its opening on the slides, then temporarily fasten the frame and panel drawer face to the drawer box with four screws driven from inside the box. Take the drawer face off for finishing.

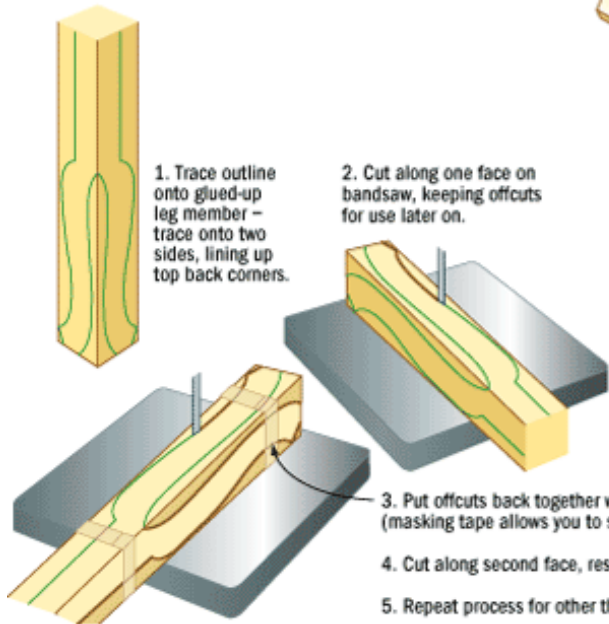
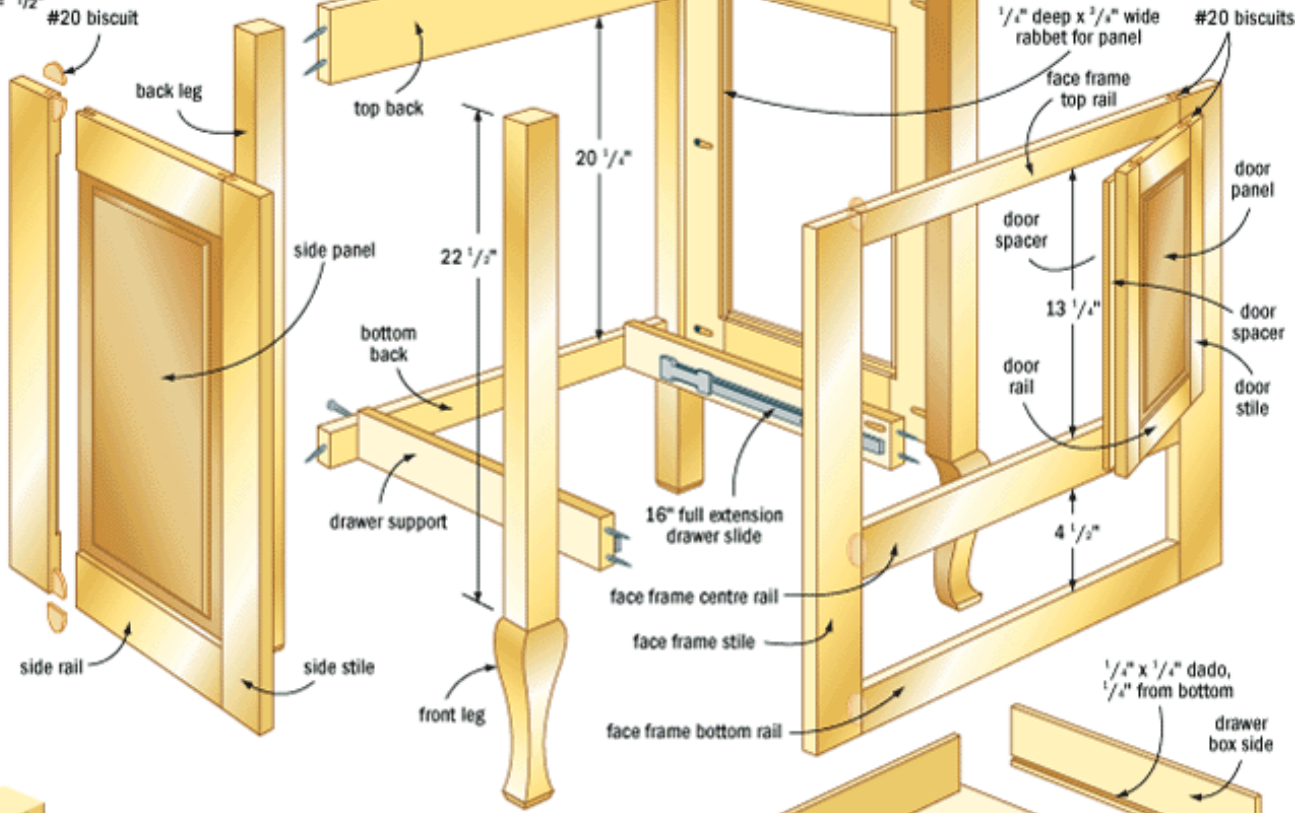
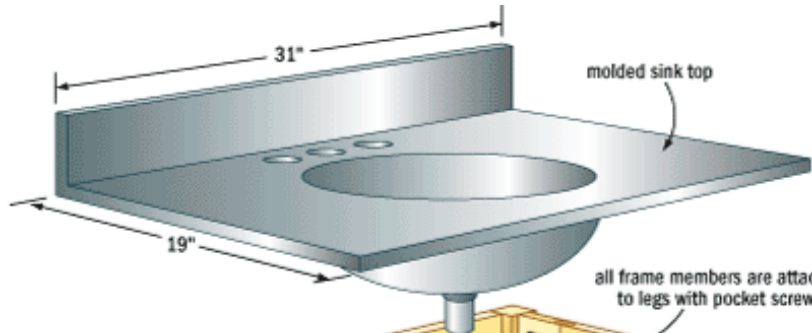
Final Steps

Minwax pre-stain wood conditioner was used to even out the absorption of the Ipswich Pine stain. The stain was sealed under three coats of oil-based urethane. Once the finish is complete, seat the sink top on a bead of silicone applied along the top edges of the cabinet. Screws driven through the top and bottom back members and into wall studs will secure it to the wall. Hook up the plumbing and you're ready to go.

<i>For the Cabinet</i>	<i>Material</i>	<i>Size</i>	<i>Qty.</i>
Front legs	sugar pine	4" x 4" x 36"	2
Back legs	sugar pine	2" x 2" x 36"	2
Side rails	pine	3/4" x 2 1/4" x 9 3/4"	4
Side stiles	pine	3/4" x 2 1/4" x 22 1/2"	4
Side panels	pine	3/4" x 10 7/8" x 18 3/4"	2
Face frame stiles	pine	3/4" x 2 1/4" x 22 1/2"	2
Face frame top rail	pine	3/4" x 1 1/4" x 20 5/8"	1
Face frame centre rail	pine	3/4" x 2" x 20 5/8"	1
Face frame bottom rail	pine	3/4" x 1 1/2" x 20 5/8"	1
Drawer supports	pine	3/4" x 2 3/4" x 16 1/8"	2
Top back cross member	pine	3/4" x 4 1/2" x 25 1/4"	
Bottom back cross member	pine	3/4" x 2" x 25 1/4"	1
Sink top	molded acrylic	19" x 31"	1
<i>For the Doors</i>			
Door rails	pine	3/4" x 1 3/4" x 7"	4
Door stiles	pine	3/4" x 1 3/4" x 14 1/2"	4
Door panels	redwood	3/4" x 7 5/8" x 11 5/8"	2
Door spacer	pine	1/4" x 2" x 13 3/8"	1
<i>For the Drawers</i>			
Drawer box fronts	birch-veneer ply	1/2" x 4" x 18 5/8"	2
Drawer box sides	birch-veneer ply	1/2" x 4" x 16"	2
Drawer bottoms	birch-veneer ply	1/4" x 15 1/2" x 19 1/4"	1
Drawer face rails	pine	3/4" x 1 3/4" x 18 1/4"	2
Drawer face stiles	pine	3/4" x 1 3/4" x 5 1/2"	1
Drawer face panel	redwood	3/4" x 2 5/8" x 19"	1
Drawer slides	full-extension	16"-long	2
Drawer/door knobs	white porcelain	1 1/8" dia.	4



1 square = 1/2"



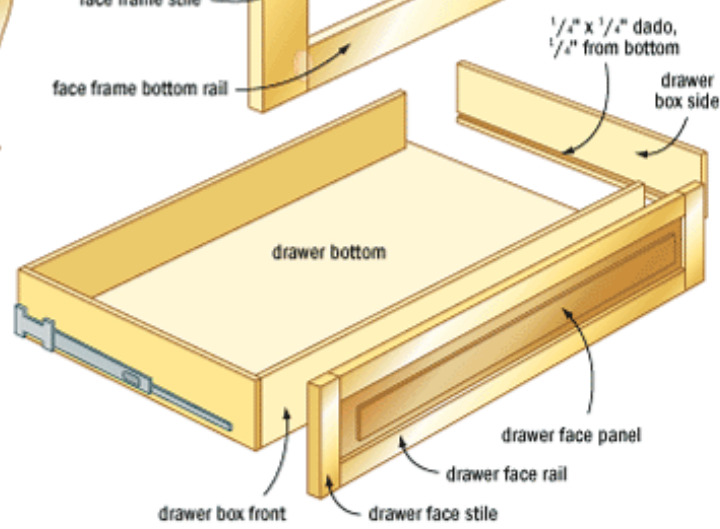
1. Trace outline onto glued-up leg member - trace onto two sides, lining up top back corners.

2. Cut along one face on bandsaw, keeping offcuts for use later on.

3. Put offcuts back together with masking tape to hold in place (masking tape allows you to see cutting lines).

4. Cut along second face, resulting in a cabriole leg.

5. Repeat process for other three legs, then sand to a smooth finish.



44

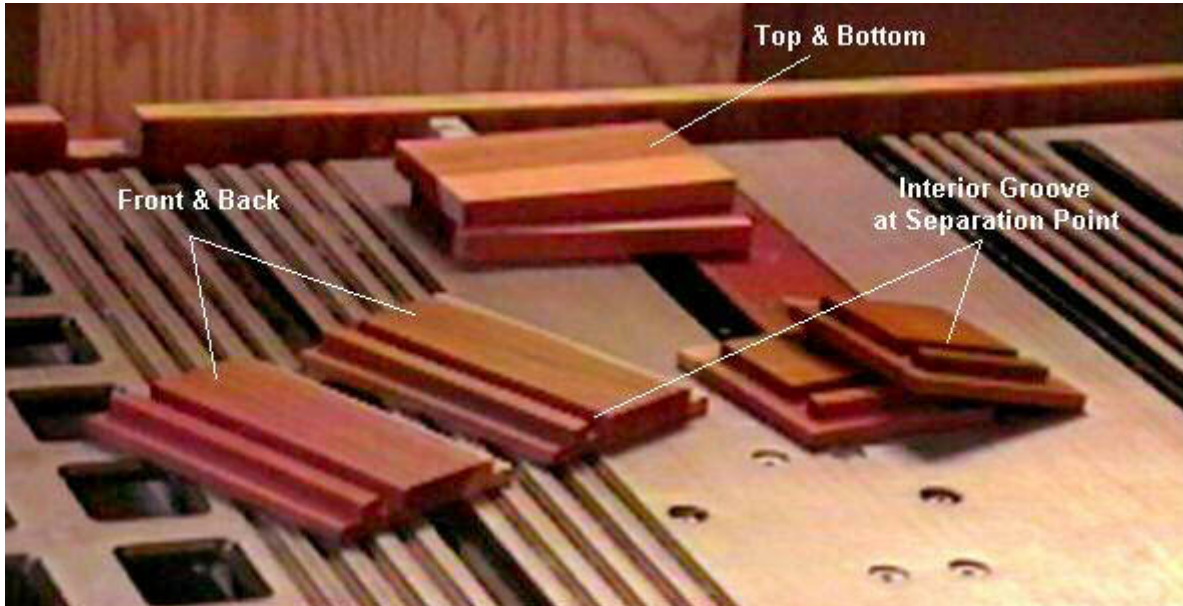
SMALL BOXES



The box can be made from any 3/8" wood.

Some exotic wood seems usually to come in 3" x 24" pieces so that kind of dictates the size of your small box. So I cut 4 pieces 4 1/8" long for the front, back, top & bottom, and 2 - 2 7/8" for the ends. I was left with a piece no more than 5/8" as scrap because of wastage due to the thickness of the saw cuts.

Set the pieces which will be your top and bottom aside till later.



ROUTING THE RABBETTS & GROOVE

On the front, back, and end pieces, cut 3/8" rabbetts, about half the thickness of the stock deep, (with a 3/8" straight bit) lengthwise **ONLY** along the inside of

the **TOP AND BOTTOM EDGES ONLY**. On your end pieces **ONLY**, cut 3/8" rabbetts across the inside of the other two edges.

Move your router's fence away from the bit about 1/4" and leaving your router's 3/8" straight bit at the same depth, rout a groove length wise on these 4 pieces. This groove will become a necessary element of the way the top fits on the finished box.

For more details, see drawing below.

IMPORTANT With a soft lead pencil, mark a line end to end, on the outside of these 4 pieces indicating where the bottom edge of your interior groove is - once your box is glued together you need to know where that bottom edge is.

Mark it end to end because you may be rounding over **ALL** edges and small markings may be cut off



Dry assemble your box and holding it together with some light clamp pressure, measure carefully for the width you need to cut your top and bottom. Oversize your top and bottom if you're unsure of

an exact fit. You can always take a tad more off but you can't put it back.

BE CAREFULL! THIS PIECE WILL BE CUT TO ONLY APPROXIMATELY 2 1/2" WIDE. KEEP YOUR FINGERS AWAY FROM THE BLADE AND USE A GOOD PUSH STICK AND FEATHERBOARD TO PROTECT YOUR HANDS! IF YOU DON'T FEEL COMFORTABLE

MAKING THIS CUT, GET SOME HELP FROM SOMEONE WHO IS!

Use LOTS of clamps and glue your box together. When dry, you will make another cut with your router but this time on the outside of the box and just a bit deeper than you previously were using. Position your box against the fence and line up your 3/8" straight bit so that it will make a cut just below the line which you marked on the outside of the box. Leave a small space between the line and the edge of your bit. This is all that will be holding your box together and you must be sure of the placement of this groove for safety reasons, so be sure to measure correctly!

PROFILING THE EDGES

Now we can do the profiles on the edges you choose using a 1/2" round over bit. I decided to do just the top front and top back, but different "looks" of boxes can be attained by selective choices of edges to be routed with the 1/2" roundover bit, for instance another attractive box has all edges rounded over. Another has just all four top edges rounded over.

LOCATION OF GROOVES

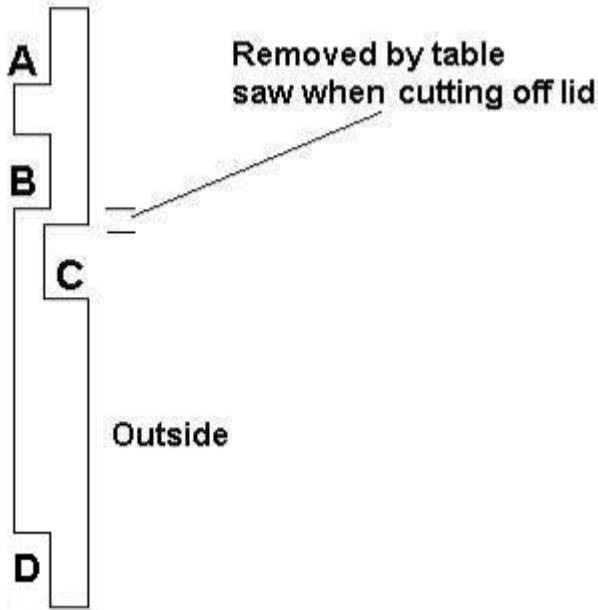
This profile shows the location of the grooves & rabbets. When you are sure you've got your bit positioned properly for this cut (C), extend your

bit just a bit and make your exterior groove. If you wish, you may want to make a couple of shallower passes to insure a clean cut.

For a nice fit of the lid to the bottom, just be sure you extend the bit just a very small amount, like 1/32". Extending it too much will make for a sloppy fit. Not enough may be too snug.

CROSS SECTION DRAWING EXPLANATION

- "A" is the top rabbett on the inside which accepts the top
- "B" is the interior groove which along with the exterior groove "C", forms the mating edges for the 2 sections (top & bottom) of this box



- Note the location of the saw kerf. When cutting off the top, most of the wood which was left between the inner and outer grooves, will be cut away as the lid is cut off. This edge will probably need a bit of cleaning up though for a proper fit before finishing.
- "D" is the bottom rabbett on the inside which accepts the bottom

CUTTING THE TOP OFF

Now it's time to cut off the top of your box. You could do this with a Japanese draw saw, on your table saw or with an Exatco blade. I think this task is best accomplished using your table saw,,, I find less clean up needs to be done afterward that way. No matter how you do this, you will have to clean up this area later with a sander or by hand sanding and/or an Exacto knife.

Here's how I do that job on a table saw. Start with the cuts to the ends of the box first. Turn your box on it's end and position your saw's fence so that the blade will make it's cut adjacent to the line you marked on the outside of the box. Set your blade height to just higher than the thickness of the wood and so that it just takes off the line, and make your cut on each end.

BE CAREFUL!!! THIS STEP MUST BE DONE PROPERLY TO AVOID INJURY BY KICKBACK AND/OR RUINING YOUR PROJECT! Insert a small piece (1" x 1") of 1/8" thick wood into each kerf or cut, and using masking tape, tape these pieces securely to the top and bottom to keep the kerfs open thereby avoiding any problems. You must be sure this arrangement is secure for safety's sake. It's worthwhile noting that your taping must be done so that when you make this next cut, you won't be cutting through your tape job.

Without changing the blade setup in any way, turn the box on it's side and make the length wise cut to the front and then to the back. When all cuts are completed, remove the tape and those small 1/8" thick spacers.

FINAL CLEANUP AND FINISHING

Using sand paper, carving knife, chisel or any other tool you prefer, clean up your project and fit the top to the bottom of the box. It should go on and off easily, but not sloppily! Sand the project with 80 - 120 grit sand paper and then 220 grit, and finish with a top coat of your choice. I used a clear satin finish spray lacquer.

45 BASIC BOARD FENCE



Instructions



Fig. 1

1) Prepare and Set the Posts

Coat the ends of each post with a waterproof deck sealer (Fig. 1).

Dig holes for and install the corner posts first, setting them below the frost line and on a 6-inch tamped bed of crushed rock or gravel so their end grain does not sit in water.

Next, stretch a taut mason's line between the corner posts to help locate the intermediate holes and posts; try to space them evenly about 6 feet apart.

Gradually backfill each hole with soil and tamp every four inches. Then fill the area around the posts with a well-tamped mix of earth and gravel or with concrete for extra strength at corners and gate openings. Check for plumb.



Fig. 2

2) Mark the Lower Fence Rail Position on the Posts

Establish a level for the lower rail at least a few inches above the ground and, on each post, mark placement for the top and bottom edges of the lower rail. (Fig. 2)



Fig. 3

3) Cut the Posts to Accept the Lower Rail

Between the marks, make several kerf cuts 1-1/2 inches deep with a circular saw. Chisel out each post to accept the rail. (Fig. 3)



Fig. 4

4) Join the Lower Rails at Corners

At the corners, inset intersecting rails and screw them in place (after predrilling to avoid splits) with galvanized deck screws. (Fig. 4)



Fig. 5

5) Affix an End Post to the House, If Necessary

If your fence will meet the house, fasten an end post to your home's siding. Make sure the post is plumb; you may need to insert spacers or shims if the siding is irregular or slanted. (Fig. 5)



6) Adjoin the Upper Rails

Center the joint between upper rails in the post notches, then predrill the rails before screwing them to the posts. (Fig. 6)

Fig. 6



7) Install the Pickets

Cut a 1/2-inch spacer to simplify installation of the pickets. Periodically check for plumb as you work along the rails. (Fig. 7)

Fig. 7



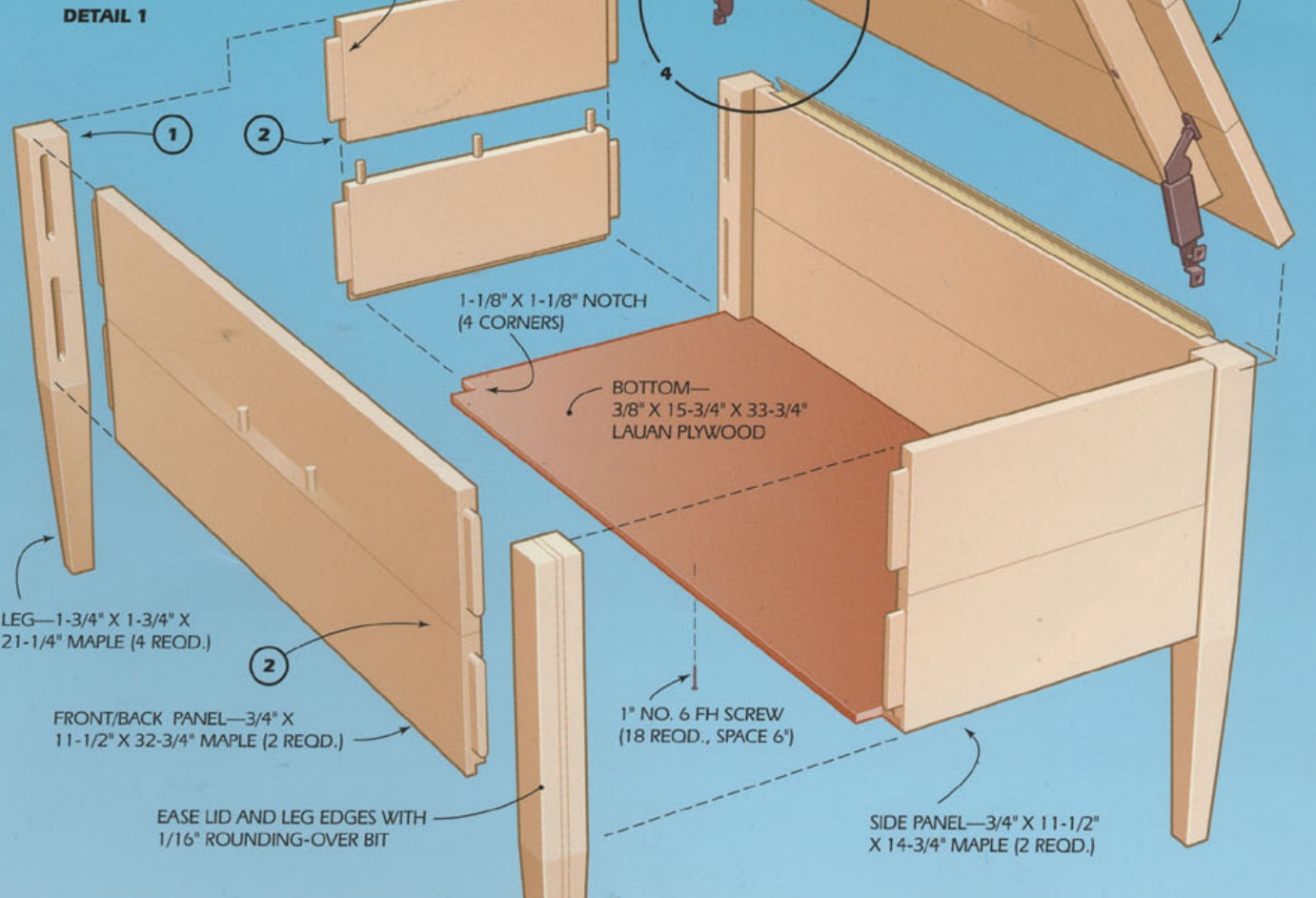
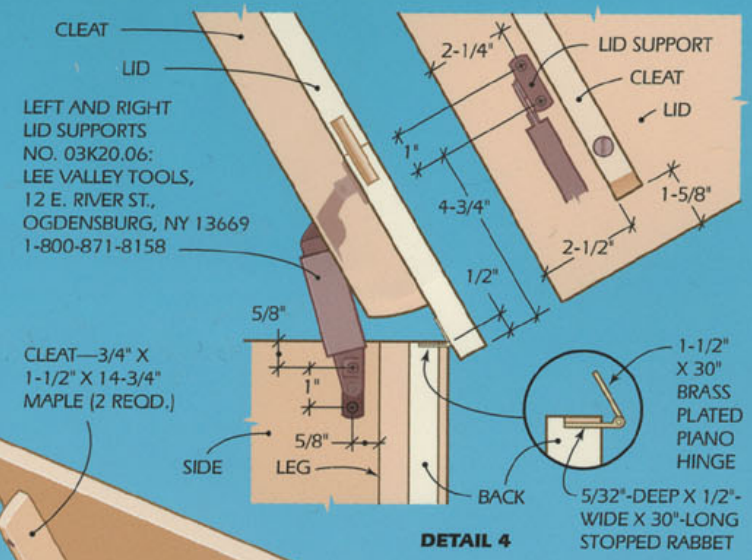
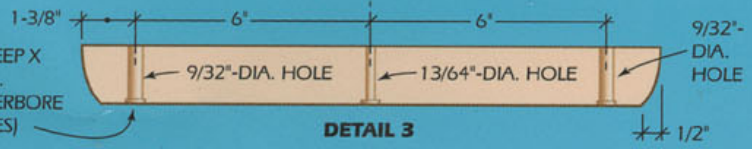
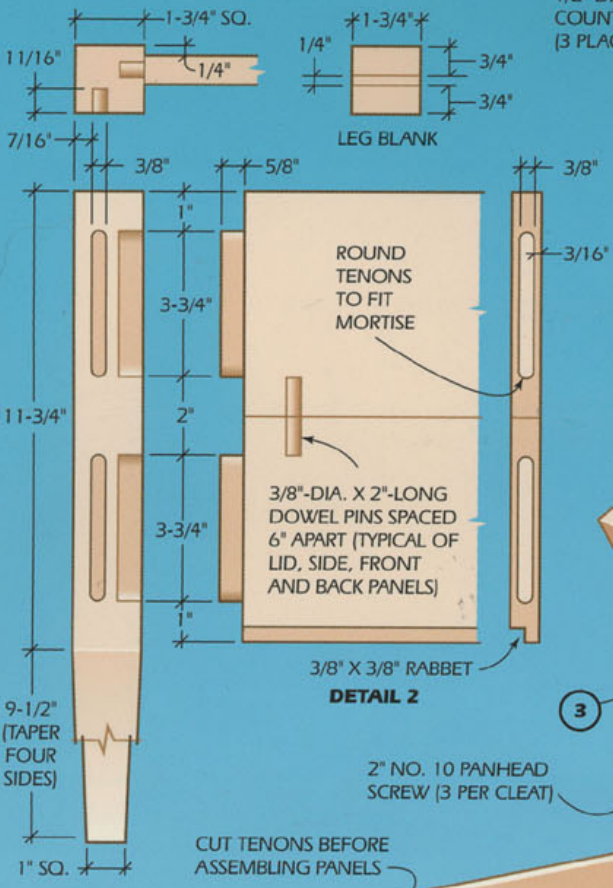
Fig. 8

46 FILE CHEST



FILE CHEST

18" DEEP X 22" HIGH X 36" LONG



Making Panels

To get started, rip and crosscut the stock for the front, back and side panels to the sizes indicated in the accompanying drawing. For the top, cut all three boards about 1 in. oversize in length. The two outside boards are cut about 1/2 in. oversize in width while the center board is cut to the 6-in. finished width. This allows for trimming the top to size.

Arrange the boards back to back in a vise and, using a square, mark the dowel centerlines across both edges. Then, always working the same side of a doweling jig to the face of the workpieces, bore the dowel holes.

The end tenons on the side panels must be cut before the paired boards are edge glued. For best results, add an auxiliary fence to the saw's miter gauge, and clamp a stop block to the fence to ensure that the rabbet cuts are of uniform size. Using a dado blade, make a cut on the face of the workpieces. Then raise the blade to project 1 in., and pass each board over the blade on edge to form the tenon.



Prepare for edge gluing by readying three bar or pipe clamps, four small clamps and four cauls. Apply paste wax to the cauls so they don't get glued to the panel. Tap the dowel pins into their holes and then apply glue to the panel edges (Photo 3).

Join the pieces. Then alternately apply pressure to the bar clamps and to the caul clamps to close the joint and to keep the panel from buckling.

Use a belt and finish sander to dress the panel faces. Then use a 4-in. hand file or a chisel to round the tenons.

To complete the panels, cut the rabbets for the bottom. Next, use a router with a straight bit to cut the hinge rabbet. Then switch to a 1/16-in. rounding-over bit to ease the panels' exposed edges.



Making The Legs

Make the legs from two 45-in.-long blanks, which you'll later cut into four finished

Mark each leg mortise with centerlines 3/8 in. apart, and then bore the mortise holes. Trim the mortise to finished dimension.

lengths. The legs require that three pieces of wood be glued together. The center piece is sawed from a thicker piece. Be sure to use a smooth cutting blade, the saw's antikickback splitter, a feather board and a pushstick for this operation.

Glue and clamp the leg pieces (Photo 8). To keep the pieces from sliding out of alignment during clamping, bore two 3/32-in. holes in the ends of the blanks, and use 2-in.-long finishing nails as alignment pins. The pins are inserted in an area to be cut off.

Mark the mortise locations on each leg, and be sure to arrange the legs so that the surfaces showing the glue joint face the chest's ends.

Assembly

Before gluing the parts together, make a dry assembly to prepare the necessary cauls. Check the clamp adjustments and the fit of parts.

Do the gluing in two stages. Apply glue only on the short end panels and legs. Then make a temporary complete assembly. When the glue has dried, remove the clamps. Then glue and clamp the long side panels to the preglued end subassemblies.

Cut the bottom panel to size and attach it with screws.

Use a jig to cut the leg tapers. Place the leg between the rear stop and the front notched block, and make two cuts. The notched block is tack nailed so it projects 1 in. from the guide board. Make a taper cut on two adjacent faces, and then reposition the block so the notch projects 1-3/8 in. Cut the remaining tapers.

Then use a router to ease their corners

Trim the top to size. Rip and crosscut its cleats, and bore the holes in them. The two outside holes are oversize to permit the lid to move with changing humidity.

Bore the pilot holes for the hinge, lid supports and cleats. First, install the hinge at the back, then lay the table on its back to join the second leaf of the hinge to the lid. Attach the lid support in the same manner (Photo 14). Attach the cleat with screws only, not glue.

After finish sanding, we applied three coats of clear satin polyurethane. The first coat was tinted with yellow ochre universal color, available at art supply stores.

47 FIRE PLACE MANTLE



1. Cut a 1x8 for the front plate to the length of the hearth opening. Cut a 1x6 piece one inch longer than the length of the 1x8. Use a router table and a chamfer bit to bevel a 1/4-inch detail along the edge and sides of each piece. Connect the two pieces at a ninety-degree angle with wood glue and finishing nails.

2. Cut and attach small triangle supports where the pieces meet, which add extra strength to the top and provide a place for a piece of crown molding to rest (**figure A**). Make the angled trim molding using the router table and chamfer bit by running each long edge over it. The trim will later be centered between decorative end brackets (**figure B**).

3. To make the decorative brackets for each end, first sketch the desired design on a piece of paper to use as a template. Put double-sided tape between the two pieces of lumber so they can be cut at the same time so they're identical. Trace the design onto the lumber and cut it out using a jigsaw with a scroll blade attached (cut as close as possible to the line). Sand the pieces smooth using the pencil lines as a guide and separate the boards.

4. To build up the top shelf, cut a 1x8 with a 1-1/2-inch reveal and make the same routed bevel on the edges. For more interest, add square drawer pulls along the front plate. Place the entire assembly against the wall; secure it using wall anchors and hide the screws with button caps.

5. Caulk around the edges; prime and paint the piece as desired.

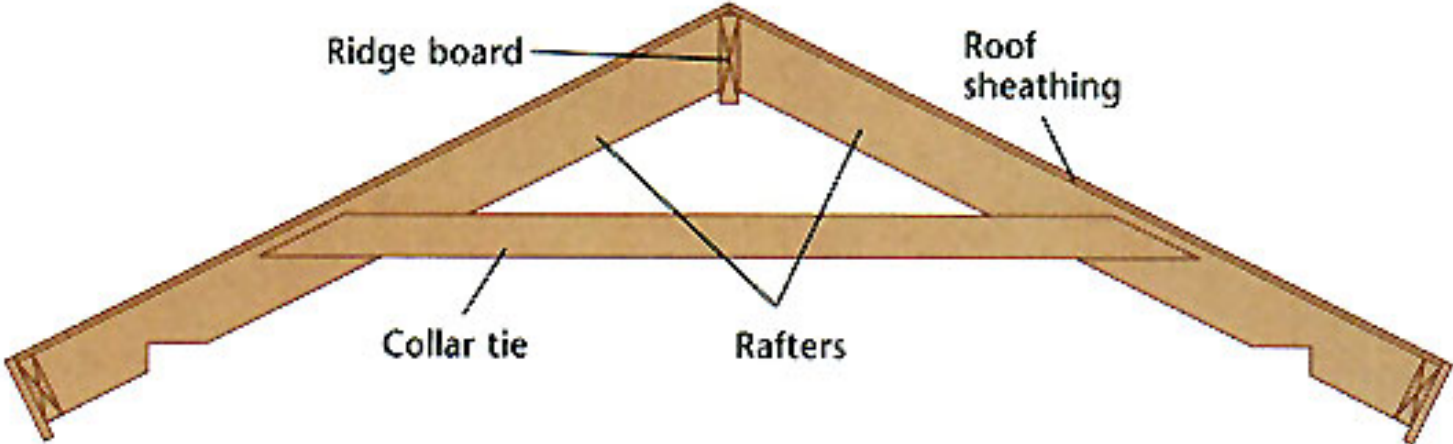


Figure A



Figure B

48 ROOF FRAMING



A roof frame is an important structure not only because it supports the roofing and helps keep the building dry, but because its style and shape have a great impact on the character of the building, the feel of the interior space, and the amount of storage space available.

There are four common roof types shown in this book. A *gable* roof is the classic, triangular design, with two sloped sides meeting at the peak, and flat ends (called *gable ends*). *Gambrel* roofs are like gable roofs with an extra joint on each side, resulting in two different slopes. A *hip* roof is structurally similar to a gable, but has no gable ends. *Shed* roofs are the simplest style, with only one sloped plane. They can be built with frames or, for small structures, a sheet of plywood.

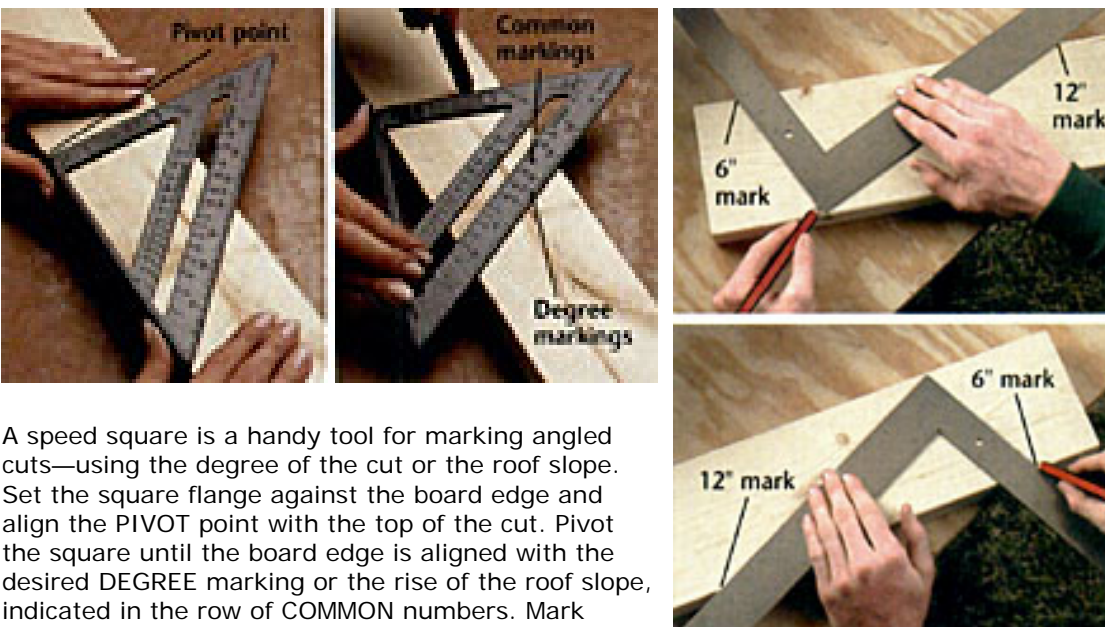
All of these roof styles have a designated slope, which is the degree of angle of each side. The slope is expressed in a ratio that states the number of inches of vertical rise per 12" of horizontal run. For example, a roof that rises 6" for every 12" of run is said to have a slope of 6-in-12. Roof slope is indicated in plan drawings by a triangular symbol known as the *roof-slope indicator*. You'll use the roof slope to lay out rafters and fascia.

In standard roof framing, rafters are the principal structural members, rising from the walls to the ridge board (or *hub*, in gazebos) at the peak of the roof. Rafters in outbuildings typically are made from 2 × 4s or 2 × 6s, are spaced 16" or 24" on center, and are installed perpendicular to the length of the building. To keep the roof planes from spreading apart, *rafter ties*, or *collar ties*, are nailed between opposing rafters to form a structural triangle. With shed-style roofs, the rafters span from wall-to-wall and no ridge board or ties are needed.

The key to successful roof sheathing framing is making accurate cuts on the rafters. Take your time to cut the first two rafters, making any necessary adjustments, then use one as a pattern for marking the rest. The following project shows you how to cut and install rafters in a gable roof frame, but the basic procedures are the same for gambrel and hip roofs.

As an alternative to rafter framing, you can take your plans to a truss manufacturer and have custom trusses built for your project. However, this will cost you more and probably will limit your storage space: the internal supports in truss frames leave little room for storage.

TOOLS & MATERIALS	
Circular saw	2 × lumber
framing square	8d, 10d, and 16d common nails
4-ft. level	

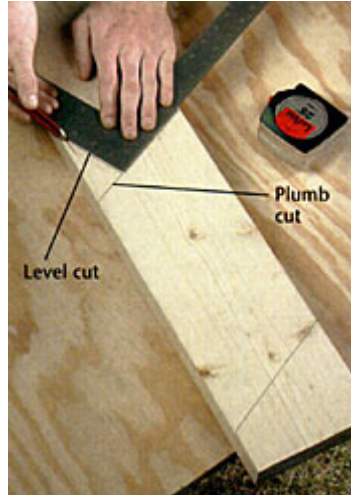


A speed square is a handy tool for marking angled cuts—using the degree of the cut or the roof slope. Set the square flange against the board edge and align the PIVOT point with the top of the cut. Pivot the square until the board edge is aligned with the desired DEGREE marking or the rise of the roof slope, indicated in the row of COMMON numbers. Mark along the right-angle edge of the square.

HOW TO BUILD A ROOF FRAME

Note: The following instructions are based on the sample rafter template shown here, which is designed for a 6-in-12 roof slope.

Step A: Mark the Plumb Cuts



1. Select a straight board to use for the pattern rafter. Mark the top plumb cut near one end of the board: Position a framing square with the 6" mark of the tongue (short part) and the 12" mark of the blade (wide part) on the top edge of the board. Draw a pencil line along the outside edge of the tongue.

2. Starting from the top of the plumb-cut mark, measure along the top edge of the board and mark the overall length of the rafter, then use the square to transfer this mark to the bottom edge of the board. Position the square so the tongue points down, and align the 6" mark of the tongue and the 12" mark of the blade with the bottom board edge, while aligning the tongue with the overall length mark. Draw a line along the tongue. If the bottom end cut of the rafter is square (perpendicular to the edges) rather than parallel to the top end, mark a square cut at the overall length mark.

Step B: Mark the Bird's Mouth Cuts

1. Measure from the bottom of the lower plumb cut and mark the plumb cut of the bird's mouth. Position the square as you did for the lower plumb cut and draw a line across the board face at the new mark.

2. Measure along the bird's mouth plumb cut and mark the bird's mouth level cut. Use the square to draw the level cut—it must be perpendicular to the bird's mouth plumb cut.

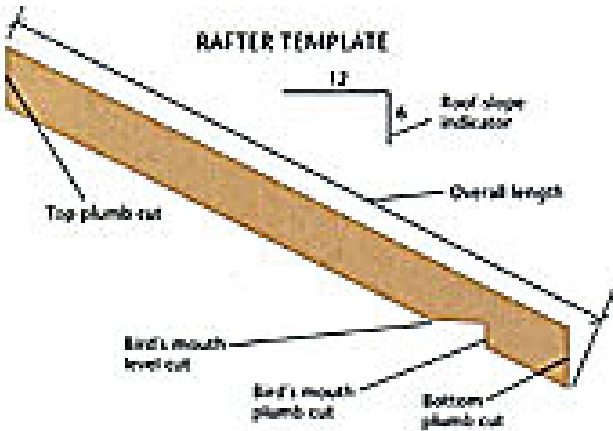


Step C: Make the Cuts

1. Cut the rafter ends at the plumb-cut lines, using a circular saw or power miter saw.

2. Set the base of a circular saw to cut at the maximum depth. Make the bird's mouth cuts, overcutting slightly to complete the cut through the thickness of the board. As an alternative to overcutting (for aesthetic reasons), you can stop the circular saw at the line intersections, then finish the cuts with a handsaw.

3. Select another straight board to use as a second pattern rafter. Use the original pattern rafter to trace the cutting lines onto the duplicate, then make the cuts.



Step D: Test-fit the Rafters

1. Cut a 12"-long spacer block from 2 × 6 or 2 × 8 material.

2. With a helper or two, set the two rafters in place on top of the walls, holding the spacer block between the top rafter ends. Make sure the rafters are in line with each other (perpendicular to the walls) and are plumb.

3. Check the cuts for fit: the top-end plumb cuts should meet flush with the spacer block, and the bird's mouths should sit flush against the wall plates. Make sure the top ends are at the same elevation. Recut any angles that don't fit and test-fit the rafters again.

4. Write "PAT" on the pattern rafter, then use it to trace the cutting lines onto the remaining rafters. Before marking, check each rafter for crowning and mark the crowned edge; always install the crowned edge up. If your building has overhangs at the gable ends, mark the end cuts for the overhang rafters but not the bird's mouth cuts-overhang rafters don't have them. Also, if you have the fascia material on-hand, use the pattern rafter to mark the angle for the top ends of the fascia boards.

5. Cut the remaining rafters.



Step E: Lay Out the Wall Plates & Ridge Board

Note: Start the rafter layouts from the ends of the walls where you started the wall stud layouts. This ensures the rafters will fall above the studs. Install rafters aligned with the end studs but not the extra corner studs.

1. Make a mark on the top wall plate 1 1/2" in from the end. Then, mark at 15 1/4" (for 16" on-center spacing) or 23 1/4" (for 24" on-center spacing)—measuring from this mark, make a mark every 16" (or 24") to the end of the wall. Make a mark 1 1/2" in from the remaining end. Following your plan, draw an

Step F: Install the Rafters

1. You'll need a couple of helpers and a long, straight 2 × 4 to get the rafters started. Lay the first two rafters on top of the wall, then nail the 2 × 4 to the far end of the ridge board to serve as a temporary support. Set up the rafters at the end of the walls and hold the free end of the ridge board in place between them. Have a helper tack the rafters to the wall plates. Hold a level on the ridge board and make sure it's level, then have a helper tack the support to the far wall to keep the ridge level.

2. Slide one rafter a few inches to the side and endnail the other rafter through the ridge board with three 16d common nails (use two nails for 2 × 4 rafters). Slide the other rafter

× next to each mark, designating to which side of the line the rafter goes.

2. Mark the wall on the other side of the building, starting from the same end.

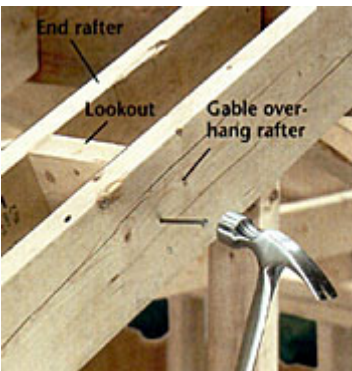
3. Cut the ridge board to length, using the plan dimensions. Check the board for crowning, then lay it on top of the walls next to one of the marked plates, making sure it overhangs the end walls equally at both ends. Use a square to transfer the rafter layout onto both faces of the ridge board.



Step G: Install the Collar Ties

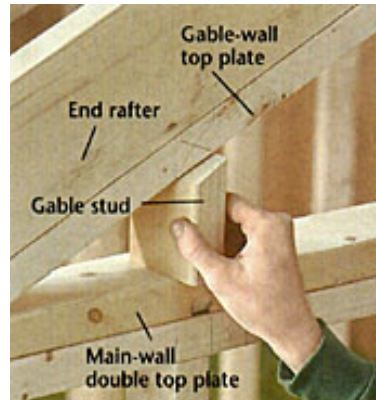
1. Cut the collar ties (or rafter ties) to span between opposing rafters at the prescribed elevation, angle-cutting the ends to match the roof slope.

2. Position the collar tie ends against the rafter faces so the ends are about 1/2" from the rafters edges. Make sure the ties are level, then facenail them to the rafters with three 10d common nails at each end.



onto its layout mark and toenail it to the ridge with four 16d nails (three for 2 × 4s). Toenail the lower end of each rafter to the wall plate with two 16d nails, then reinforce the joint with a metal anchor, using the nails specified by the manufacturer.

3. Make sure the rafters are plumb and the ridge is level. Install the remaining rafters, checking for plumb and level periodically as you work.



Step H: Frame the Gable Wall

Note: Gable walls consist of top plates that attach to the undersides of the end rafters, and short studs set on top of the wall plates. They appear only on gable and gambrel roofs.

1. Cut the top plates to extend from the side of the ridge board to the wall plates. Angle-cut the ends so they meet flush with the ridge and wall plate. The top-end angle matches the rafter plumb cut; the bottom angle matches the level cut of the bird's mouth.

2. Fasten the plates to the rafters so the front plate edges are flush with the outside faces of the rafters; use 16d nails.

3. Mark the gable stud layout onto the wall plate, then use a level to transfer the layout to the gable plates. Cut the gable studs to fit, angle-cutting the ends to match the roof slope. Install the gable studs with 8d toenails. Also install a square-cut stud directly under the ridge board.

Step I: Build the Gable Overhang (Gable Gambrel Roofs)

Note: Gable overhangs are built with additional rafters installed at the gable ends. They are supported by the ridge board and blocks called *lookouts*—attached to the end rafters.

1. Mark the layouts for the lookouts onto the end rafters, following the project plan. Cut the lookouts and toenail them to the rafters with 8d nails (or endnail them with 16d nails) so that the top edges of the blocks are flush with, and parallel to, the tops of the rafters.

2. Install the overhang rafters over the ends of the lookouts with 16d endnails.

49 GARAGE



1. Build the foundation and floor

1.1 Carefully mark the location of the garage on your lot. Hire a surveyor to precisely locate the site for the garage and define the excavation area.



1.2 Have a contractor excavate the designated site to the required depth. He will properly dispose of the dirt excavated.

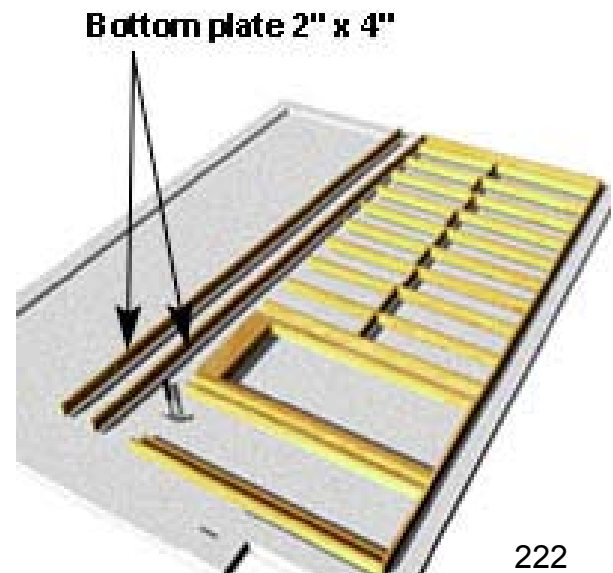
1.3 In order to build the foundation, we recommend you contract out this job. The foundation specialist will start with the footing, the concrete walls and backfilling before making the foundation slab. Make sure that anchor bolts are encased, centered every 4 feet (1.2 m).

2. Build the walls

2.1 Outside walls

Start the outside walls building them flat on the ground, using lumber with less than 19% moisture content. Wall studs should be centered every 16 in. (406 mm) and made of 2 x 4 in. (50 x 100 mm) timber. Strengthen the base of the walls with a 4 in. (100 mm) bottom plate in which you will drill holes every 4 ft. (1.2 m) for the anchor bolts.

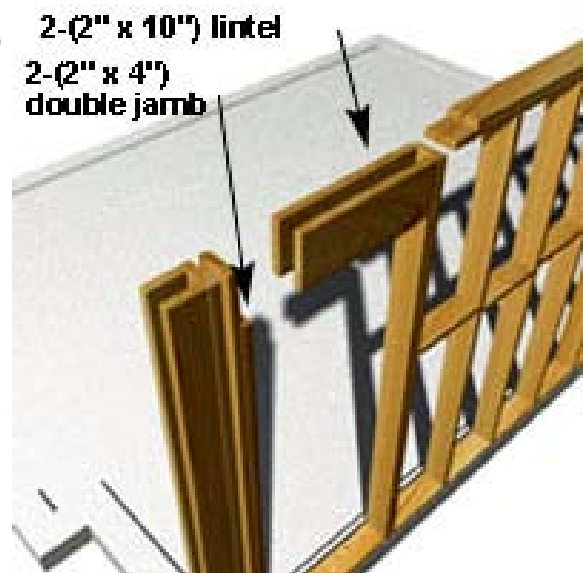
2.1.1



Separate the top and bottom plate slightly more than a stud's length apart with the bottom plate positioned nearest the wall's final location. Center the studs every 16 in. (406 mm). Attach pre-nailed double 2 x 4 in. (50 x 100 mm) top plates above the studs.

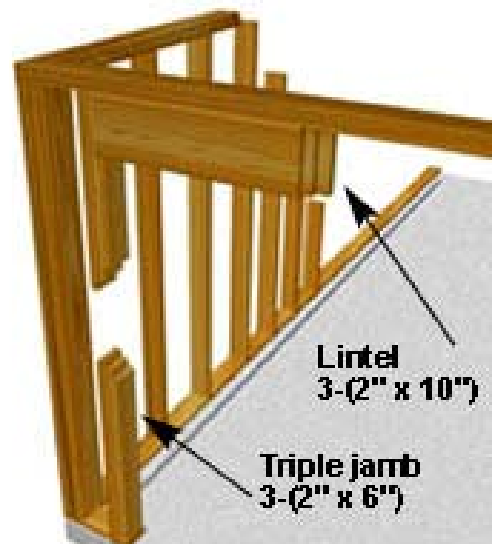
2.1.2 A secondary stud made of two planks solidly nailed together will delineate the sides of the door or window opening and support the coping.

2.1.3 The lintel (window contour) load will be transmitted to the twin studs on each side of the opening. To install a lintel, nail a 2 x 10 in. (50 x 254 mm) each wall face. Fill the empty space between them with insulation material.



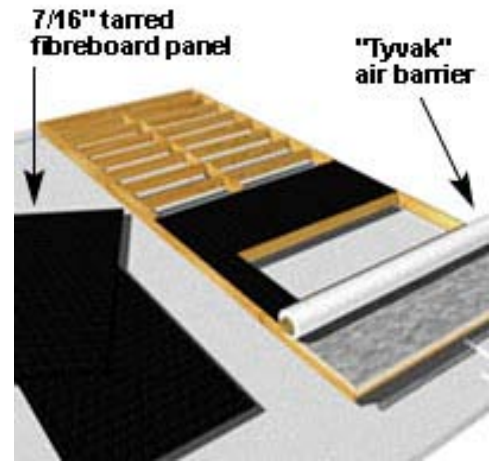
2.2 The garage door framing

Build the two short sections on either side of the large opening using three 2 x 6 in. (50 x 152 mm) studs nailed together. The top part of the frame (called lintel or header), is made up of three 2 x 10 in. (50 x 254 mm) nailed together then nailed to the trimmer studs of the two side sections.



2.3 Sheathing and air barrier

2.3.1 The suggested sheathing material is 4 x 8 ft (1.2 x 2.4 m) tarred fiberboard panels. Use a thin plastic air barrier.



2.3.2 First, apply the sheathing, positioning the panels on the wall (that is still flat on the ground) and nail to frame with dog nails. Apply the air barrier and nail or staple into place. Lastly, install fillers every 16 in. (406 mm).

2.4 Before lifting the wall into place, make sure the bottom plate is well positioned. At this stage, make sure you have enough people to lift and hold the wall in position while bracing. Nail braces from the top of the wall into stakes driven into the ground outside the wall and nail the wall upright to hold it temporarily.



3. Build the roof

3.1 With the walls up, you should close the roof as soon as possible to avoid rain or wind damage to the inside of your garage. Roof trusses are a pre-built series of structural members designed to carry the load of the roof to the outside walls. Trusses are built in special factories to the individual specifications for your garage plans.

3.2 Trusses are designed to resist loads only when they are in a vertical position. That is why they should not be lifted flat or laid over the top of the outside walls. Gently lift the trusses mechanically or with a rope and pulley.



3.3 Beginning at one end, measure and mark every 24 in. (610 mm) the location of the roof trusses on the top plate. Nail the trusses in place.

3.4 With the trusses installed, nail a temporary brace to each one. You can now start putting up the edge boards. Apply roof sheathing. Plywood or particleboard roof sheathing is most commonly used, being rigid, durable, non-slip and easy to apply.



3.5 Align panels perpendicular to the rafters and stagger the joints of each course. Panels should meet in the center of a truss or rafter. Leave a small gap between the panels for contraction of the material. According to the truss spacing, the horizontal edges of the panels should be attached every 24 in. (610 mm). To prevent sagging, use sheathing clips to attach the panels between the trusses.



4. Install doors and windows

Doors usually come with comprehensive installations, a pre-mung door is expensive and if not properly installed, will loose it,s energy efficiency and will not operate properly in the long run. It is recoomended to have your door indtalled by a professional. However, if you decide to do itself follow these instructions and get some help as they tend to be heavy.

5. Install the asphalt shingles

The next step is to install the asphalt shingles.

6. Install the outside siding

It is now the very last step, the one that has to do with the outside siding.

The construction of a garage is a huge project. Once it is completed you'll be proud of it. You will find it very useful and not only to put your car away in Winter.

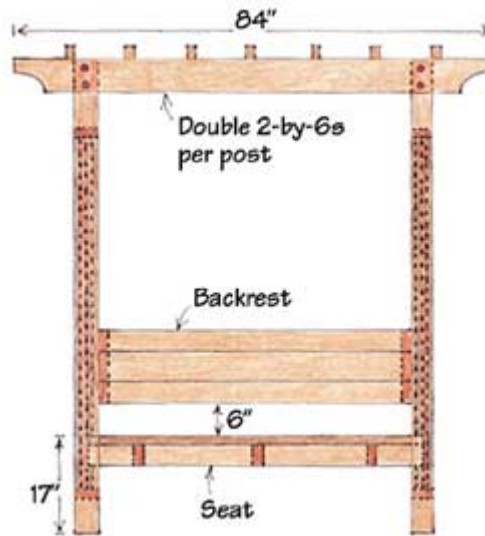
50

ARBOR BENCH



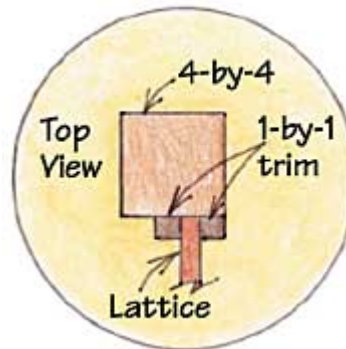
Materials

- Lumber
- 4-by-4s: four 8-foot lengths
- 2-by-4s: one 8-foot length, four 10-foot lengths
- 1-by-1s: eight 8-foot lengths (or rip down from two 8-foot lengths of 1-by-6)
- 2-by-6s: eight 8-foot lengths, two 10-foot lengths
- Two 2- by 8-foot redwood lattice panels
- 3 1/2-inch deck screws
- 2-inch galvanized finishing nails
- Six 2-by-4 joist hangers (with nails)
- 6 feet of undermount deck fastening brackets
- 30 1 1/4-inch deck screws (for seat)
- A dozen 2 1/2-inch screws
- Eight 5 1/2- by 3/8-inch carriage bolts
- Eight 3/8-inch washers
- 16 3/8-inch nuts
- Sandpaper
- Clear wood sealer
- Cotton rags
- 16 1-inch copper-pipe end caps

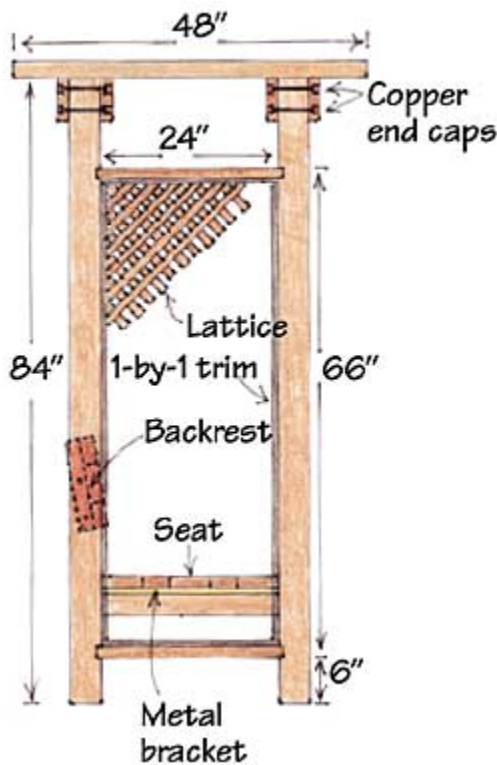


Tools

Most of the project requires basic woodworking tools--a circular saw, a saber saw, an electric drill, a hammer, and a nail set. You'll need to rip a few boards into smaller sizes; you can use a table saw or ask the lumberyard to do it. You'll also need:



- Tape measure
- Pencil
- Combination square
- Compass
- C-clamps or adjustable clamps
- Framing square
- 15/16-inch paddle bit
- Extra-long 1/2-inch drill bit
- Socket wrench set
- Ladder
- A small pump sprayer (about \$10) to apply wood sealer (optional)
- Pipe clamps



Directions

The arbor bench has four main sections: the two sides, the bench seat, and the backrest. Build it in the sequence that follows, allowing for the inevitable variation in the thickness of the lumber and lattice, which will affect widths and lengths. The trellis top, which consists of two pairs of horizontal 2-by-6s and seven 2-by-3 crosspieces, is added piece by piece. Before starting construction, rip four of the 8-foot 2-by-6s in half (to create 2-by-3s).

Assembling the side sections

1. Cut the 4-by-4s 84 inches long. To avoid splintering, bevel the bottom edges of each post.
2. Divide the posts into pairs and mark them (A and B, C and D). Lay each pair side by side on a flat work surface. Measuring from the bottom end, mark points at 6, 7 $\frac{1}{2}$, 70 $\frac{1}{2}$, and 72 inches. Using a pencil and combination square, draw lines at these points across the width of the posts. Set blade of circular saw to extend $\frac{1}{4}$ inch and make multiple passes to remove the wood between the pairs of lines, creating grooves.
3. Measure actual width of lattice panels, add $\frac{1}{2}$ inch to that dimension, then cut four 2-by-4 crosspieces to that size.
4. Turn pairs of posts so grooves face each other, place crosspieces in grooves, check squareness, and secure with two angled 3 $\frac{1}{2}$ -inch deck screws.
5. Cut both lattice panels to fit between crosspieces, approximately 63 inches long.
6. Each lattice panel will be sandwiched between 1-by-1s mounted to the posts and crosspieces. Create the outer layer by cutting 1-by-1s to fit between posts and nail them to crosspieces flush to their *outside* edges. Cut and nail 1-by-1s to fit vertically between crosspieces. Place outer side face down on work surface. Insert lattice panel, then hold in place with 1-by-1s at top and bottom.
7. To complete sandwich, mark a point 17 inches from the bottom of each post. Measure, cut, and nail lengths of 1-by-1 that extend from the top crosspiece down to this point on either side of the lattice. (After seat is in place, cut and nail 1-by-1 to fit between seat and bottom crosspiece.)

The bench seat

The seat pieces are attached to a 5-foot-long ladder-like frame, which is held in place by deck screws that run through the frame and into the four posts. To

make a snug fit, measure the distance between the posts and build the bench frame to that depth.

1. Equally space three 2-by-4 crosspieces between two 5-foot-long 2-by-4s and secure with joist hangers and nails.
2. Add undermount deck fastening brackets to top of each crosspiece.
3. Cut one 10-foot-long 2-by-4 and two 10-foot 2-by-6s into 5-foot lengths. Place on a work surface, alternating three 2-by-6s (save the fourth 2-by-6 for the back) with the two 2-by-4s. Position frame on top so the outer 2-by-6s are flush with the edge of the frame, equally space middle boards, and attach with 1¹/₄-inch deck screws.
4. Stand the side panels on their back edges and slip in the bench so its top butts against the 1-by-1s on the inside faces of the posts. Check for squareness and drive two 3¹/₂-inch deck screws through bench frame into each post.

The back

Slightly shorter than the bench, the back fits snugly between the two back posts. The actual size is determined after the bench seat is in place. The back is held together by screws running through a 12-inch 2-by-2 (ripped from a scrap of 2-by-4) at each end of its three boards.

1. After checking for squareness of the assembled sides and bench sections, measure the distance between the two rear posts. Cut two 2-by-4s and one 2-by-6 to this size.
2. Space the boards ¹/₈ inch apart, with ends flush. Overlay and attach the 2-by-2s, flush to the ends, with 2¹/₂-inch screws. (Predrilling holes will avoid splitting the wood.) Round outside corners.
3. Stand the bench upright and recheck for squareness. Slip the back in place so the bottom board is 6 inches above the seat and the 2-by-2 backer boards are centered on the posts. Tack loosely in place with one screw through each 2-by-2 backer. Angle the back so it feels comfortable to lean against, then add another screw through each side. Set the screws firmly.

Adding the trellis

The top of the bench has two pairs of 2-by-6 beams connecting the posts and attached with countersunk carriage bolts. Seven 2-by-3s are spaced across the top.

1. Cut four 7-foot-long 2-by-6s. Using the compass, draw identical curving cutouts at the ends of each beam. Make cutouts with saber saw.
2. Lay the arbor bench on its back. Clamp a pair of the beams to the front and back of the front posts so they're flush with the tops and extend equally on each side. Find center line of posts, transfer to top 2-by-6, and mark points 1 inch from top and bottom edges.

- 3.** Drilling the holes through the beams and posts is the trickiest part of the whole project. When doing this step, it's important to keep the drill perpendicular to the work surface. Use a square as a guide. Start drilling with the $\frac{15}{16}$ -inch paddle bit and make a $\frac{3}{4}$ -inch-deep hole at each of the four marked points. Switch to the long $\frac{1}{2}$ -inch bit and continue drilling through the top 2-by-6, the post, and almost through the bottom 2-by-6. Stop when bit begins to break through. Remove clamps and bottom 2-by-6. Switch back to a $\frac{15}{16}$ -inch bit and drill back into board (using break-through hole as a guide), making a $\frac{3}{4}$ -inch-deep hole.
- 4.** Reposition and clamp boards, aligning them over the holes. Slip the carriage bolts through all the boards, add washers and double nuts, then tighten firmly with socket wrench.
- 5.** Flip arbor bench on front face; repeat steps 2 through 4 for rear set of posts.
- 6.** Cut seven 48-inch-long 2-by-3s.
- 7.** While bench is still on its front, find center of beams and mark points, evenly spaced (approximately 9 inches apart), for the 2-by-3s.
- 8.** Stand arbor upright. Place 2-by-3s at points marked so they extend equally to front and back. Secure with $3\frac{1}{2}$ -inch deck screws.

Finishing touches

Sand all the wood surfaces except lattice. Transport structure to outside location (two strong people can do this, but three are better). Using a small pump sprayer--a life-saver with all that lattice--apply clear sealer to all surfaces. Wipe off excess sealer with cotton rags. When dry, apply second coat, following directions. The last step is to insert the copper-pipe end caps in the holes for the countersunk bolts. Depending on the fit, you may have to hammer or glue them in position.

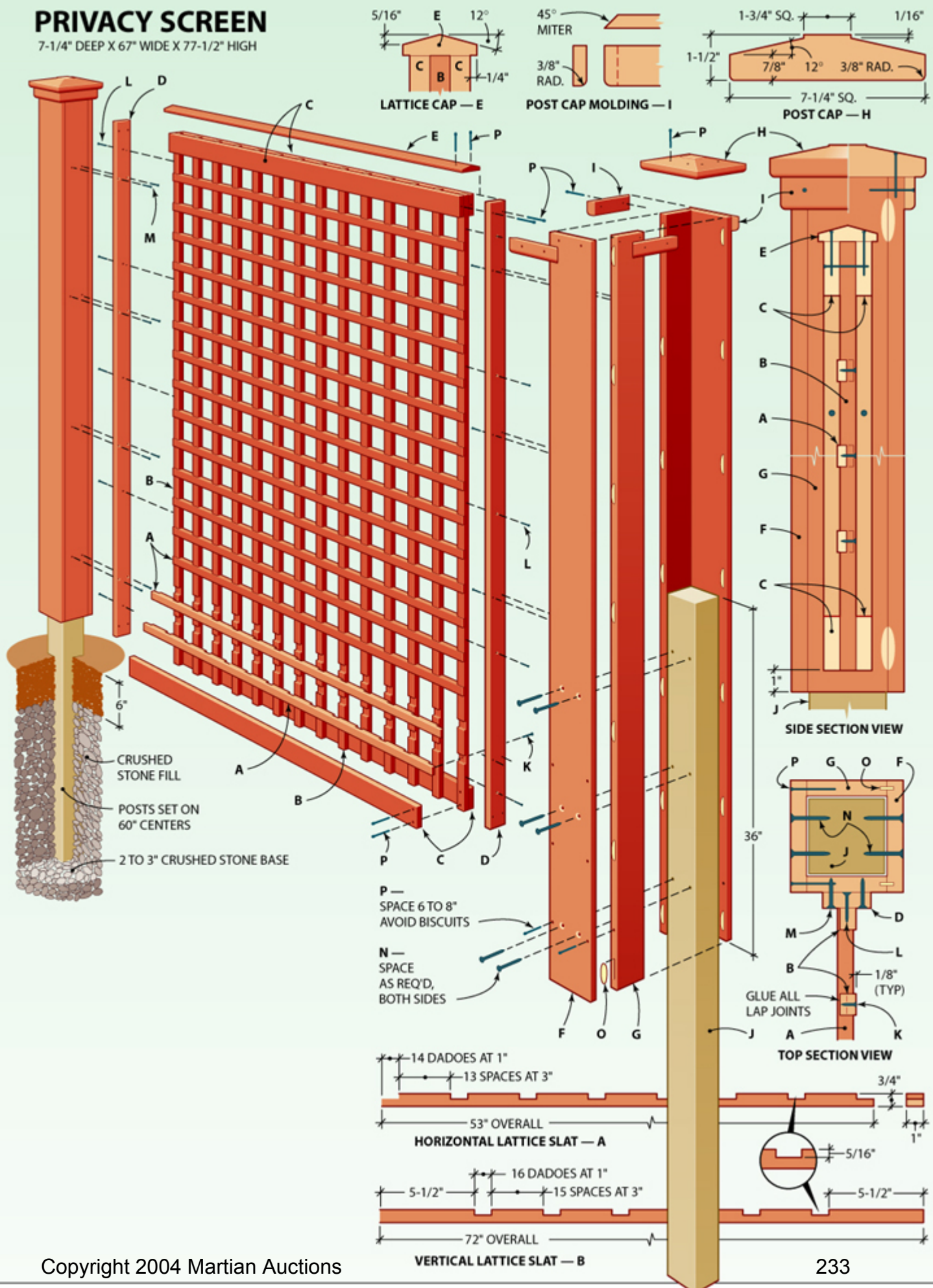
51

GARDEN SCREEN FENCE



PRIVACY SCREEN

7-1/4" DEEP X 67" WIDE X 77-1/2" HIGH



Materials List--Privacy Screen		
Key	No.	Size and description (use)
A	16	3/4 x 1 x 53" cedar (horizontal slat)
B	14	3/4 x 1 x 72" cedar (vertical slat)
C	4	3/4 x 2-1/2 x 53" cedar (rail)
D	2	3/4 x 2-1/4 x 72" cedar (lattice end)
E	1	3/4 x 2-3/4 x 54-1/2" cedar (top cap)
F	4	3/4 x 5-1/4 x 76" cedar (post face)
G	4	3/4 x 3-3/4 x 76" cedar (post side)
H	2	1-1/2 x 7-1/4 x 7-1/4" cedar (post cap)
I	8	1/2 x 1-1/2 x 6-1/4" cedar (molding)
J	2	6'-long 4 x 4 pressure-treated post
K	224	3/4" No. 4 fh brass woodscrew
L	10	1-1/2" No. 8 fh brass woodscrew
M	16	1-1/2" No. 10 fh brass woodscrew
N	24	2" No. 10 fh brass woodscrew
O	56	No. 0 plate
P	as reqd.	6d galvanized finishing nail
Note: Quantities based on one lattice and two posts.		
Misc.: 120-grit sandpaper; Benjamin Moore Moorwhite Penetrating Alkyd Primer 100 and MoorGlo 100% Acrylic House & Trim Paint 096,		

Making The Lattice

First, crosscut 1 x 8 stock to length for the vertical and horizontal lattice members. Clamp each set of blanks in a stack with the ends flush, and mark the locations of the half-lap joints on the stock edges.

Use a dado blade to cut 5/16-in.-deep notches at the half-lap joint marks (Photo 1). Make two passes to complete each notch. Then, rip the lattice slats from the wide stock (Photo 2).

To assemble a lattice panel, first lay out the horizontal slats with a 3-in. space between each. Spread glue in the notches of a vertical slat and in the mating notches on the horizontal slats. Firmly seat the joints, and drive a 3/4-in. No. 4 brass screw at each intersection (Photo 3). Install the remaining vertical slats in the same way.

Rip and crosscut the top and bottom rails to size, and fasten them to each side of the lattice with 6d galvanized finishing nails (Photo 4). Cut the vertical end strips to size, and nail them to the ends of the top and bottom rails. Attach the end strips to the end vertical lattice slats with screws placed in between the horizontal slats (Photo 5).

Rip and crosscut blanks for the lattice panel cap. Then, tilt your table saw blade to 12° and cut the top bevels. Smooth the cut surfaces with 120-grit sandpaper and use galvanized finishing nails to fasten the cap to the top rails and end strips (Photo 6).



After cutting the 1 x 8 lattice stock to length, lay out the half-lap joint notches and cut them with a dado blade.



When the notches are cut, rip the 1-in.-wide horizontal and vertical lattice strips from the 1 x 8 blanks.



Apply glue to the half-lap joints and press the lattice strips together. Reinforce each joint with a single screw.



Position the top and bottom rails along each side of the lattice panel, and secure them with galvanized finishing nails.



Nail the vertical end strips to the top and bottom rails, and add screws between the horizontal lattice members.



Copyright 2004 Martian Auctions After ripping the angles on the top of the lattice cap, fasten the cap to the rails and end strips with finishing nails.

The Posts

Rip and crosscut the post faces and sides to finished size. While it's not necessary to use fasteners other than nails, post assembly is easier if you use joining plates to help position the parts.

Clamp a fence to the worktable and cut plate-joint slots in the post faces (Photo 7). Then, cut the corresponding slots in the edges of the post sides. Install the joining plates in the faces. Since the plates are only positioning aids, it's not necessary to use glue. Position the side pieces over one face, add the opposite face and secure with 6d galvanized finishing nails. Take care not to nail through the joining plates (Photo 8).

Cut 2 x 8 stock into 7-1/4-in. squares for the post caps, and set up the table saw to make the angled cuts on the caps. Begin by clamping a tall guide to the table saw fence. Tilt the saw blade to 12° and raise it so the top of the blade is 2-3/4 in. above the table. Adjust the fence so it's 7/8 in. from the blade at the table. Clamp one edge of a cap block to a 2 x 6 x 12-in. backer board. Turn on the saw and cut one of the angled faces (Photo 9). When the blade enters the backer board, shut off the saw, wait till the blade stops and remove the assembly. Then make the remaining cuts in the same way. If using the raised fence, backer board and clamps seems too complicated, simply shape the cap bevels with a hand plane. This may take longer, but it's a more relaxed procedure.

Mount a 3/8-in.-radius, quarter-round bit in your router table and shape the bottom edges of the post caps. Sand the caps and nail them to the post tops (Photo 10). Then, use the same bit to round one edge of 1/2 x 1-1/2-in. stock for the cap molding. Cut the molding pieces to length with a miter saw, and nail the mitered pieces under the post caps (Photo 11).



Lay out plate joints in the post parts and cut the slots. The plates keep the pieces aligned during assembly.



Assemble the box posts with plates but no glue. Then, use galvanized finishing nails to fasten the pieces together.



Use a tall auxiliary fence when cutting the post cap angles. Clamp stock to a backer board to support the cut.



Position the cap so it overhangs the post uniformly. Then, fasten it to the top of the post with galvanized finish nails.



Miter the ends of the cap molding pieces. Fit each piece under a cap and secure with galvanized finishing nails.

Assembly And Finishing

Bore screwholes in the lattice panel side strips, position a panel on one of the posts and secure with screws (Photo 12). Repeat the procedure for each lattice/post joint. If you're constructing more than one screen section, disassemble the parts into separate lattice/post subassemblies so they're easier to carry.

Cut pressure-treated 4 x 4s to 6-ft. lengths. Slide one of these pieces into the bottom end of each post so that 30 to 36 in. protrudes. Notice that the post cavity is 1/4 in. wider than the 4 x 4 to make installation easier. Drive two screws through the post into the 4 x 4 to temporarily hold it in place. After you install the screen you can remove the screws to adjust the relative heights of the posts.

Set all nail holes, then prime the screen with a quality exterior-grade primer. We used Benjamin Moore Moorwhite Penetrating Alkyd Primer 100. Fill all nail holes with glazing compound or painter's putty, then apply a coat of a 100 percent acrylic topcoat, such as Benjamin Moore MoorGlo



Bore screwholes in the lattice side strips and position the lattice on a post. Attach with screws.

100% Acrylic House & Trim Paint 096.

To install the screen, mark the post centers on the ground, and use a posthole digger or shovel to dig holes at least 30 in. deep. Place a few inches of crushed stone in the bottom of each hole.

Bring the screen to the site and reassemble it. Tip the 4 x 4 post ends into the holes, and brace the screen so that the posts are plumb. Fill the holes with more crushed stone to within 6 in. of the surface, tamping it down to provide a solid base. Then top off the holes with topsoil. Check that the bottom rail of the screen is level. If necessary, remove the screws that hold the posts to the 4 x 4s and adjust the height of the screen as required. Install more screws to hold the posts to the 4 x 4s, then fill the holes over the screwheads and touch up the paint. This system will work for locations where the ground slopes no more than 2 in. from one end of the screen to the other. For dramatically sloped yards, you'll need to construct posts that accommodate the difference in grade.

52

CHILDREN'S BUNKHOUSE LOFT



Children's bedrooms are frequently the smallest rooms in the house. And, as the youngsters grow, their space seems to become smaller. One way to lessen this problem is to go vertical, as in building a loft.

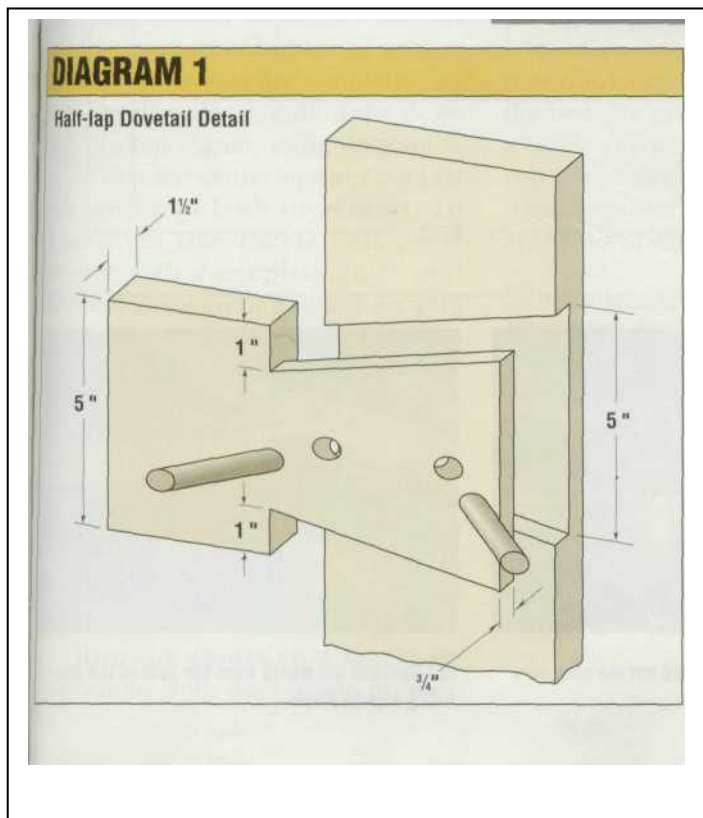
The loft we've constructed was made from 12 simple 2x6s in 8'

lengths. We used standard yellow pine, but did spend a few minutes at the lumberyard trying to pick out the best looking wood without large knots, twists or terribly mangled edges.

Even having been picky with our lumber, we still felt more comfortable ripping and planing the boards

to 1 1/2" x 5" to remove the factory edges and to make sure the material was uniform.

Once your boards are ready, pick the straightest ones and cut the five long rails to length. Work through the cutting list from longest to shortest, getting your shortest lengths from the worst lumber.

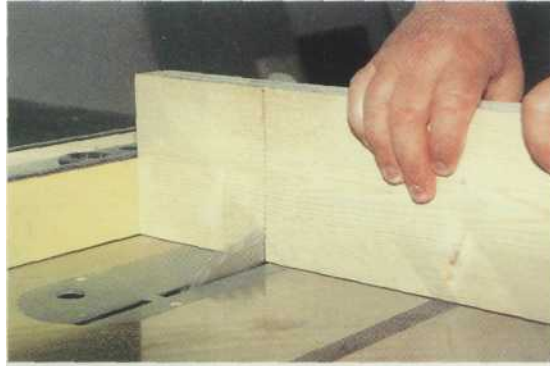


Loft Frame Cutting list

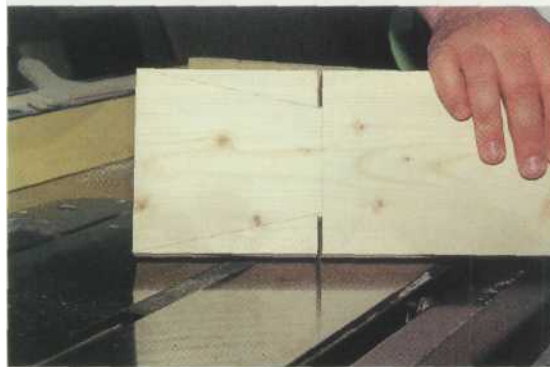
	No.	Size
Posts	5	1 1/2" x 5" x 60"
Face frame rails	4	1 1/2" x 5" x 82 1/4"
Face frame rail	1	1 1/2" x 5" x 61 1/2"
End rails	4	1 1/2" x 5" x 41"
Step rails	4	1 1/2" x 5" x 26"
Mattress support	1	3/4" x 40 3/4" x 75 1/4"

Bookcase Cutting list

	No.	Size
Shelves	6	3/4" x 8" x 39 1/2"
Ends	4	3/4" x 8" x 30"
Backs	4	3/4" x 6" x 39 1/2"
Shelf supports	12	3/4" x 1 1/2" x 39 1/2"
Cleats	12	3/4" x 1 1/2" x 4 1/2"



1 The shoulder of the pin is cut on the table saw, 5" in and 1"



2 Flip the board and make the same cut on the opposite side. Note the angle for the dovetail.



3 Lower the blade to 3/4" and run the backside of the pins to form the joint's cheek.

You're now ready to cut the half-lap dovetails which will provide aesthetics, as well as stability and strength, to the loft (diagram 1). Start by separating the lumber into vertical (posts) and horizontal (rails) piles. All of the horizontal pieces (the five longer rails and the steps) will receive the pins for the dovetails.

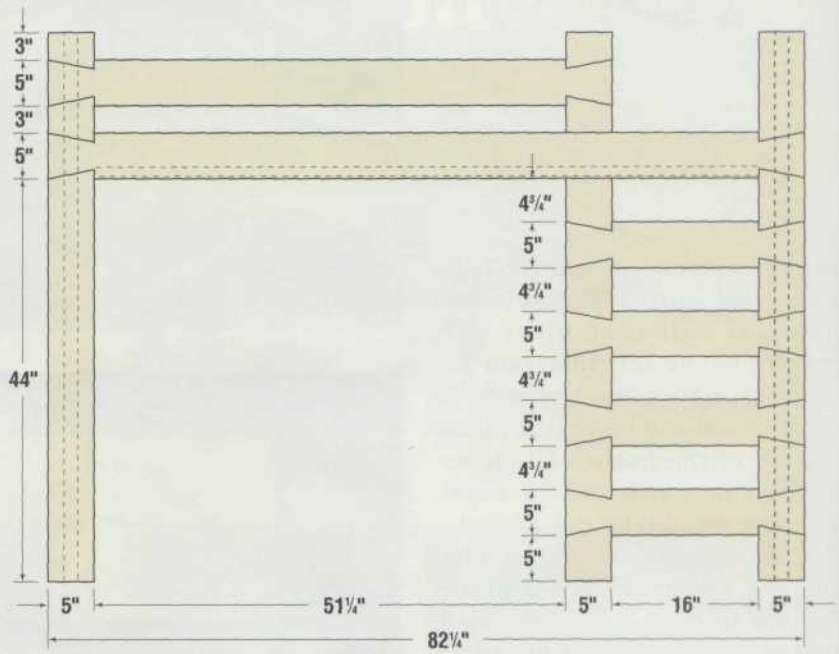
The first cut, to form the shoulder of the pin, was accomplished on the table saw using the rip fence as a guide set at 4 7/8" (5" with the kerf) (photo 1). We chose to work with a 12° angle for the dovetails, and marked the board to use the entire width. Photo 2 shows the defined shoulder and the pin as marked.

Without changing the rip fence setting, lower the blade height to 3/4", Then run the back side of each pin to form the cheek of the joint (photo 3). Take note, we had all the dovetails' joints visible to the front of the bed, including those on the rear frame.

To form the pin itself, move to the

DIAGRAMS 2 & 3

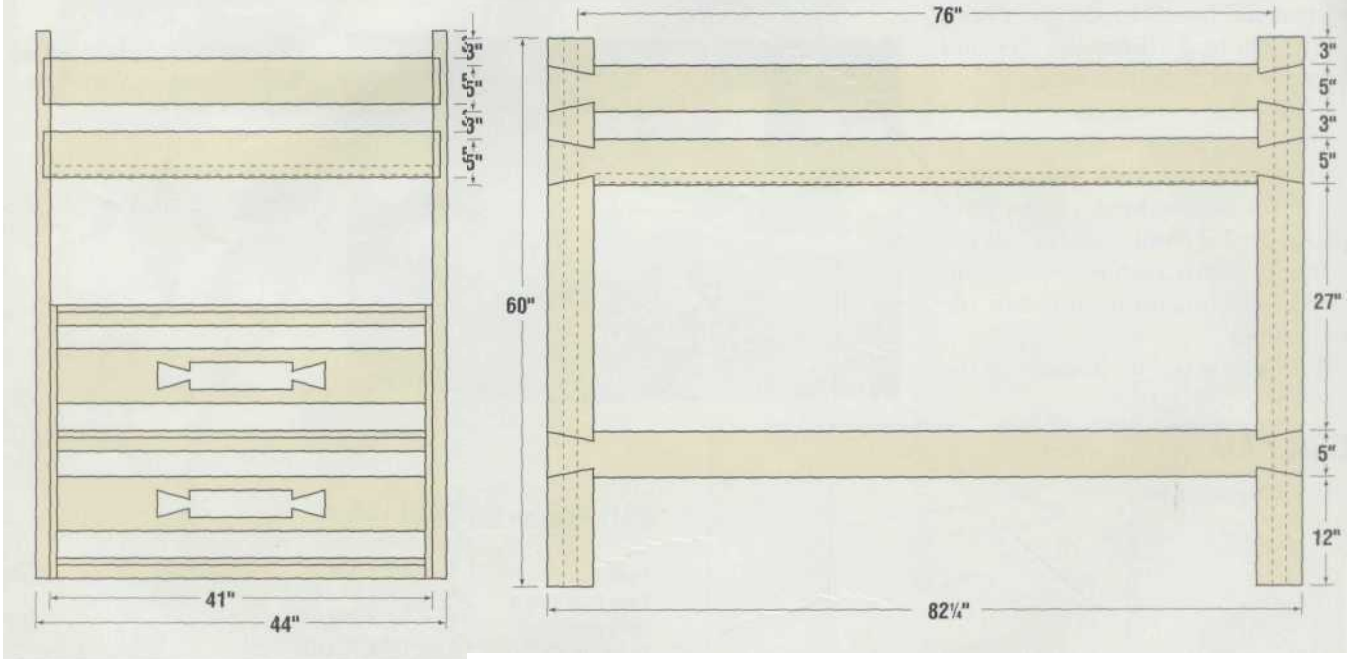
Diagram 2 Front Frame Layout



band saw and follow your 12° marks, cutting from the front side (photo 4). We freehanded the cuts since the overall finish of the piece is intended to be rustic. If you choose, a sled jig can be made to cut the tails in a more exact manner.

The final step in forming the pin is to remove the waste from the rear to form the half-lap. After considering a number of methods of per-

Diagram 3 End and Rear Frame Layout



forming this step (hand sawn, resawn on the band saw, using a router), we opted to use a dado stack on the table saw (photo 5). This method removed the waste quickly, and in a safe and uniform manner. If the dado stack isn't an option for you, the router may be your next best choice.

To form the dovetail pockets, we marked the location of all the pock-

4 Follow the 12° marks and cut the pins on a band saw.

5 Remove the waste from the rear of the pin using a dado stack.

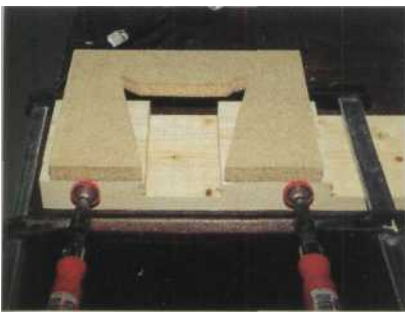




6 Remove the waste from the dovetail pockets using the dado set-up.



7 Detail showing dovetail pockets and the full 5" half-lap.



8 A template guide makes quick work of finishing the dovetail shape



9 1 1/2" dowels, cut on the band saw, help make the joint stronger.

To make the joint even stronger (and the whole piece more aesthetic), we used 1/2" dowels to pin the dovetail joints. Cut the dowels to uniform length (1 1/2") using the band saw. To make the cut safely we used a piece of tape to mark the length (photo 9). Don't work too fast and

ets (diagrams 2 & 3), left the dado stack in the saw and removed most of the material from the posts (photo 6).

As you're cutting the dadoes, note that the center post requires a full 5" half-lap joint (photo 7). The mate to this joint should be located and cut on the lower front horizontal rail.

After these cuts are complete, lay out the direction for all of the dovetail pockets. Again, using diagram 2, note that the center upright pockets are going in both directions. To complete the dovetail shape, a router with a template guide and upward spiral cutting router bit were used. The template can be made out of most any common scraps in your shop (photo 8).

Clamp the template firmly in place. If you're using a 1/2" shank bit, the router depth can be set to match the full dado depth and cut in one pass. If you're using a 1/4" shank, you'll want to use two depth passes to remove the waste material.

Run the router in a clockwise direction, from the outside in, start-

ing at the bottom left. Be careful not to run the router in the opposite direction, as it may cause kickback.

Once all the pockets are cut, check the fit at each joint. Chances are good some minor adjustments with a chisel will be required.

In gluing-up the front and back frames you may want to consider how transportable you want to make the bed. We glued each frame up as a single piece, but for convenience you may want to screw parts of the frame together to make it more of a knock-down design.

keep your fingers clear.

Start your glue-up with either the right or left end of the back frame. Use a flat work surface which you can clamp the glued components to. Cover all touching surfaces of the joint with glue and clamp the two pieces together.

Next mark a 1/2" drill bit at 1 1/4" with a piece of tape. Then, with the drill held at an approximate 45° angle, drill two holes through the dovetail joint, stopping at the tape (photo 10). The two holes should be drilled at opposing angles. The

10 Drill 1/2" holes at a 45°, 1 1/4" deep, to accept the dowels.



dowels



11 The dowels in place and the joint clamped.



12 After the glue has dried, cut the dowels with a hand saw.



13 The knock-down hardware installed.



14 The aluminum "L" track is mounted 1" up from the bottom edge of the rail

15 Veneer tape is simply ironed on to the visible edges of the MDF board.



should be glued and hammered into place (photo 11). We used a smaller dowel to spread the glue around the interior of each hole to get even coverage. Repeat this process for the other two joints on that end and let dry.

After the glue has set, repeat the process on the opposite end. Then move to the stair section, and finally the left end of the front frame.

After both frames have dried, any dowels extending beyond the frame

can be cut flush with a hand saw (photo 12).

Unless you've been extraordinarily precise or lucky, your joints will more than likely not fit flush in all places. If you try to sand or plane these joints flush, you'll end up doing more harm to the appearance than good. So, in keeping with the overall rustic look, we opted to leave any rough joints as they were.

To make the loft more "child friendly," we used a 1/4" roundover bit

in a router on all the edges of both frames and the long edges of the four end rails.

The next step is to install the knock-down hardware to assemble the bed. Many types of

knock-down hardware are on the market, so the type you choose may be quite different from ours. With our hardware it was necessary to rout pockets in both the face of the frames and ends of the cross pieces that mount the KD plates flush to the surface (photo 13).

Assemble the bed to check the fit of all pieces.

This also is a good opportunity to measure and attach support rails for the 3/4" plywood which will, in turn, support the mattress. For our loft we chose a 1/8" gauge aluminum "L" track drilled, countersunk and mounted 1" up from the bottom edge of the lower rail (photo 14).

This is not, however, the least expensive method to support the plywood and mattress. Other fine alternatives include 1" x 1" wood strips attached in the same location, or "L" brackets rather than "L" strips. Regardless of your choice of material, make sure it will support plenty of weight without allowing the plywood to slip out of place.

At this point the loft is essentially complete; but to provide toy and book storage and to strengthen the overall piece, we added a couple of simple bookcases (diagram 4).

The cases were made from 3/4" MDF (medium density fiberboard) material with a factory Birch veneer on both sides. To finish the look of the pieces we used Birch veneer tape on the visible MDF edges. The veneer tape is simply ironed on (photo 15),

16 Once the veneer has been attached, it can be trimmed using a block plane.

then trimmed to fit using a block plane (**photo 16**) and sanded flush.

Part of the Southwestern detail is achieved by using a jigsaw to cut out part of the backs (**diagram 4 & photo 17**).

The next step is to attach the pre-drilled shelf supports and cleats to each shelf's underside (**diagram 5**).

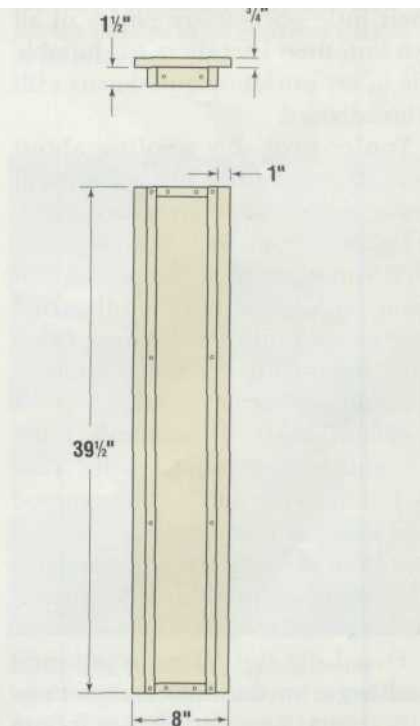
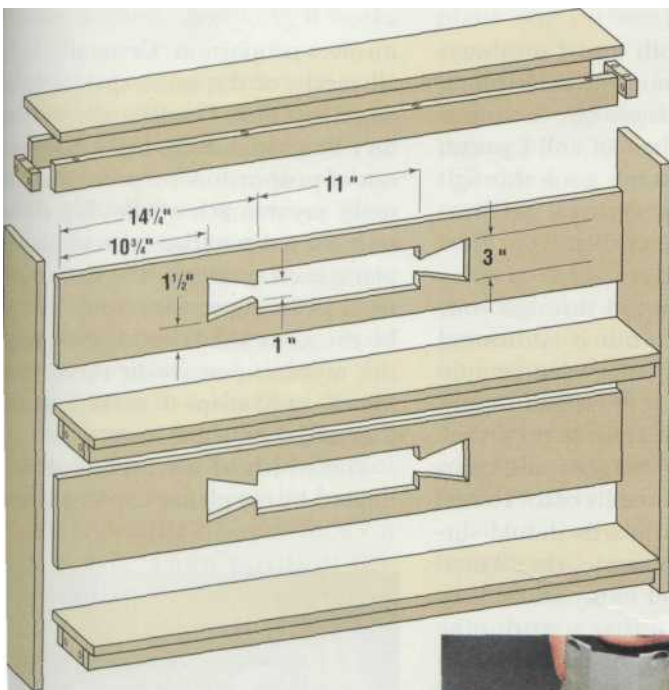
After that, it's a simple process of screwing the cases together. The backs were pilot drilled and screwed into place through the case ends. When in place between the posts of the bed, these screws won't be visible. The cases themselves are then screwed between the posts from the inside.

As shown in the opening photograph, we used an oil-based grey

wash stain which was a simple wipe-on, wipe-off process. This brought out more of the wood's character and gave the piece a more antiqued "barn board" look. We used multiple coats of lacquer with a dull finish to seal and protect.

You've no doubt by this time realized that these same plans can be rearranged to fit your particular space needs. In fact, you can even duplicate the frame's upper structure and make a traditional bunk bed. However you design it, we hope your special youngsters enjoy their time "aloft."

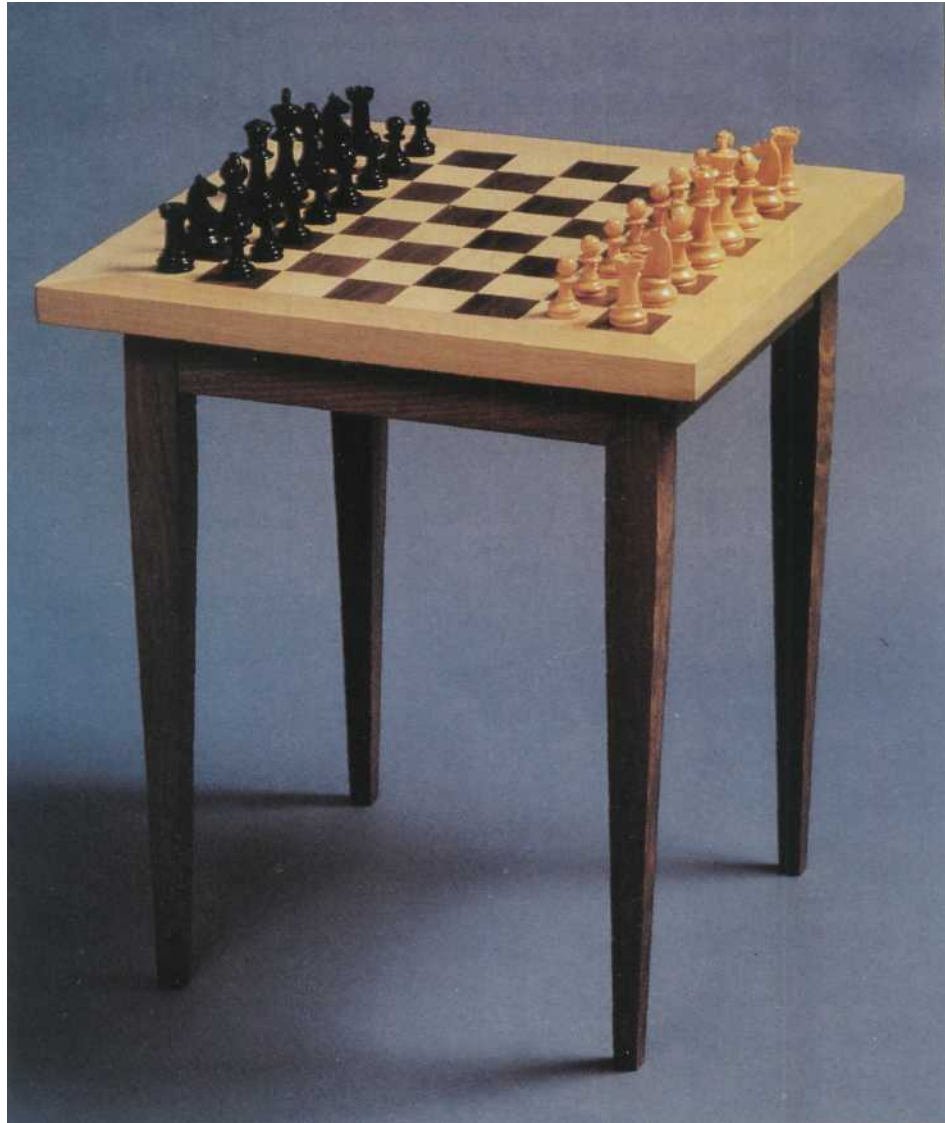
DIAGRAMS 4 & 5



17 The Southwestern detail is created with a jigsaw.

53

TRI-COLOR CHESS TABLE



Have you ever played a serious game of chess while crouching on the floor? You're likely to be racked by lower-back pain. And unless you're a chess fanatic, storing the board out on a surface can take up room needed for other purposes.

This chess table evolved to cure these problems and put the enjoyment back in the game. But even if you don't play, you'll have to admit the top's checked pattern and full four-quarter thickness is an eye-catcher.

This tri-color chess table gets its name from the black walnut, white oak, and blond, fine-textured hardwood, known as *ramin*, it's constructed from. But it doesn't really matter what you make it out of as long as one species color-contrasts from the other (for obvious reasons). Even using just one variety of a light colored, tight-grained softwood and staining the alternate strips of the board could save you the trouble of searching for a darker species. The legs and frame can be matched with the border.

There's no trick to setting up the board other than keeping your cuts square, your blade sharp, and your work on a flat surface. Alternate strips of dark and light wood are glued together, face side down directly on the pipe clamps. It's best to apply the glue sparingly and carefully, so no excess runs from the joints to spoil the final finish. You also should be aware that rust or oil on the clamps can put an indelible stain on the wood, so cover the pipes with kraft paper to prevent disappointment.

Once the parallel strips are cross-cut, they're shifted alter-

Dimensions



Materials List

1	1 × 6 × 5'	ramin
2	1 × 2 × 3'	walnut
1	1 × 3 × 4'	white oak
1	2 × 3 × 40"	white oak

(All measurements are in actual dimension)

Hardware and Materials

4 #6 × 1¾" cabinet screws
 Yellow carpenter's glue
 (aliphatic resin)

Tools

Table saw
 Radial arm saw (optional)
 Taper jig
 Combination square
 Framing square
 Measuring tape
 VSR drill (variable speed reversible)

Cut List

5	1 × 1¾ × 18	ramin strips
4	1 × 1¾ × 18	walnut strips
4	1 × 1¾ × 17½	ramin border
4	1 × 2 × 11½	white oak skirts
4	1½ × 1½ × 19	white oak legs
4	1 × 1¾ × 2½	ramin corner braces

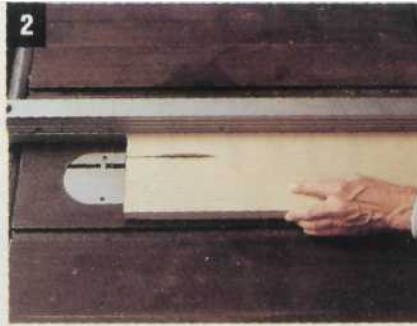
Cutting Assignments

1 × 6 × 5'	ramin strips border corner braces walnut strips
1 × 2 × 3'	skirts
1 × 3 × 4'	legs
2 × 3 × 40"	

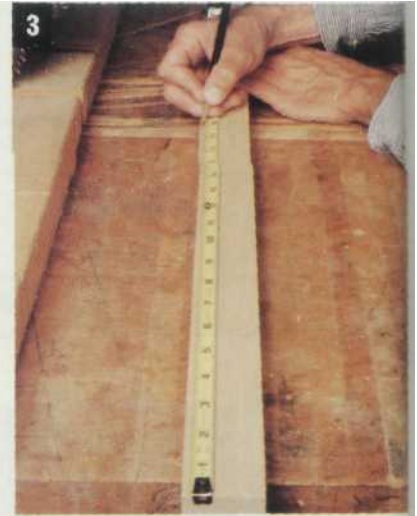
#6 screw bit
 #2 Phillips bit
 4 pipe clamps
 Bar clamp
 Band clamp
 Palm sander
 Belt sander (optional)



1 Set the table saw blade at a 90° angle and measure exactly 1¼" from the fence.



2 Rip the ramin into 1¼" strips.



3 Cut nine 18" lengths from the 1¼" ramin strips and select five.



5 Glue the strips together with an even bead, alternating the four dark and five light species to make a 15¾" width. Place the best face down toward the clamps.



6 Use the edge of a framing square to check the plane of this initial glue-up. Any inconsistencies should show on the exposed side, which will be the underside of the table surface. Square one edge as well before tightening the clamps.



7 After 24 hours, once the glue is dry, square up the board against the miter gauge and carefully trim the squared edge.



12 Mark the miter lines on one end of each of the four remaining 1" x 1¼" x 18" border strips.



13 Establish the exact length of the first piece against one edge of the board and mark the opposite miter. Set the miter gauge to a 45° angle, and cut the first border piece. Cut the marked ends of the other three pieces.



14 Determine the exact length of each remaining border by measuring against its respective edge before you mark it. The finished lengths should be very close to 17½".



4 Rip the walnut into 1 3/4" strips and cut them into four 18" lengths.

nately and reglued with the same care to create the checked pattern (step 9). Then the border pieces can be trimmed and fastened. Though you may prefer to rip down the 1 3/4" border to a less imposing 1" width, I left it full to provide for a place to line up chess pieces taken in play.

This project does not use metal fasteners, except for four screws that hold the corner braces to the legs. All the joints rely on an even application of glue and solid clamping. However, don't make the mistake of overtightening the

pipe clamps, which would force the glue out of the joints and weaken them.

You can finish the table with a brushed-on semi-gloss polyurethane for good abrasion and stain resistance. If durability isn't a major concern, try a wipe-on technique using water-based polyurethane for a thinner coat. Simply slosh the liquid over the surface and remove it immediately with a lint-free rag. It will get into the wood and still leave a somewhat protective film that looks surprisingly like a Danish oil finish.



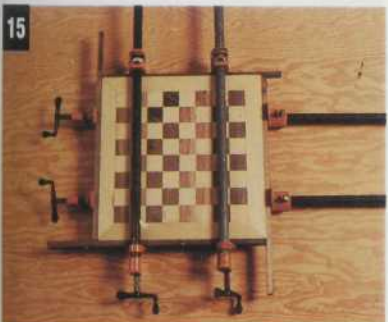
8 Reset the fence for a 1 3/4" cut and pass the board through the blade until you've got eight dark-and-light strips. Arrange them in the same order they've been cut.



9 Using the same procedure as before, glue the eight strips together, in order, best face down, but shift every other strip by one block width to create the checkered pattern. Line up the cured joints carefully, because you won't get a second chance!



10 Clamp the board and allow the glue joints to cure for another 24 hours. Note the protective stickers at the clamps' heads and tails.



15 Glue and clamp the finished border pieces to the board. The border and board should be on an even plane against the pipe clamps.



11 Use the saw's miter gauge to carefully trim the board to a 14" square.



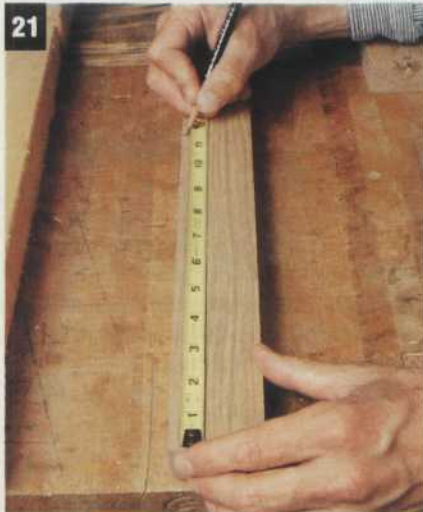
16 Rip the 2" x 3" x 40" leg billet in half to make two 1½" x 2" x 40" pieces.



17 Lay the pieces side by side, align the ends flush, and mark at 19".



18 Use a square to carry the mark to the adjacent piece, then cut both. Repeat the procedure on the remaining pieces to make four 19" leg blanks.

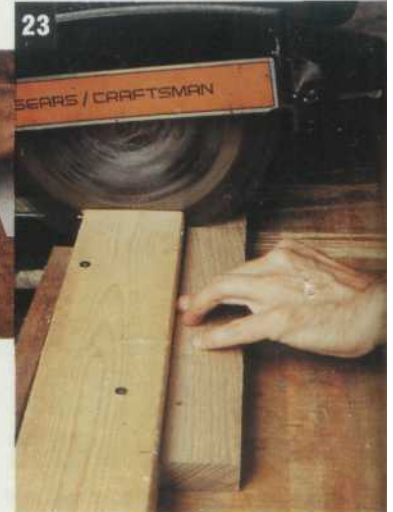


21



22

22 Measure an 11½" length on the 1" x 2" x 48" skirt piece. Square the mark and cut. Repeat for the remaining three skirt pieces. Now's the time to check the skirts and legs for blade burn, and sand the faces if needed.



23



24

24 Tilt the table saw blade to a 45° angle and cut the four 1" x 1¾" x 2½" corner braces. Because the work is so close to the blade, clamp each brace to a scrap of 1 x 2 and make the cuts that way. Be sure the clamp clears the blade before starting the saw.



25

25 Set up the table frame on a flat work surface with a band clamp placed snugly around the frame's circumference. Use a #6 screw bit with the stop collar set at 1¾" to pre-drill a hole through each brace and then into the leg behind it. Center the hole ¾" from the exposed edge, and set the braces flush against the work table.

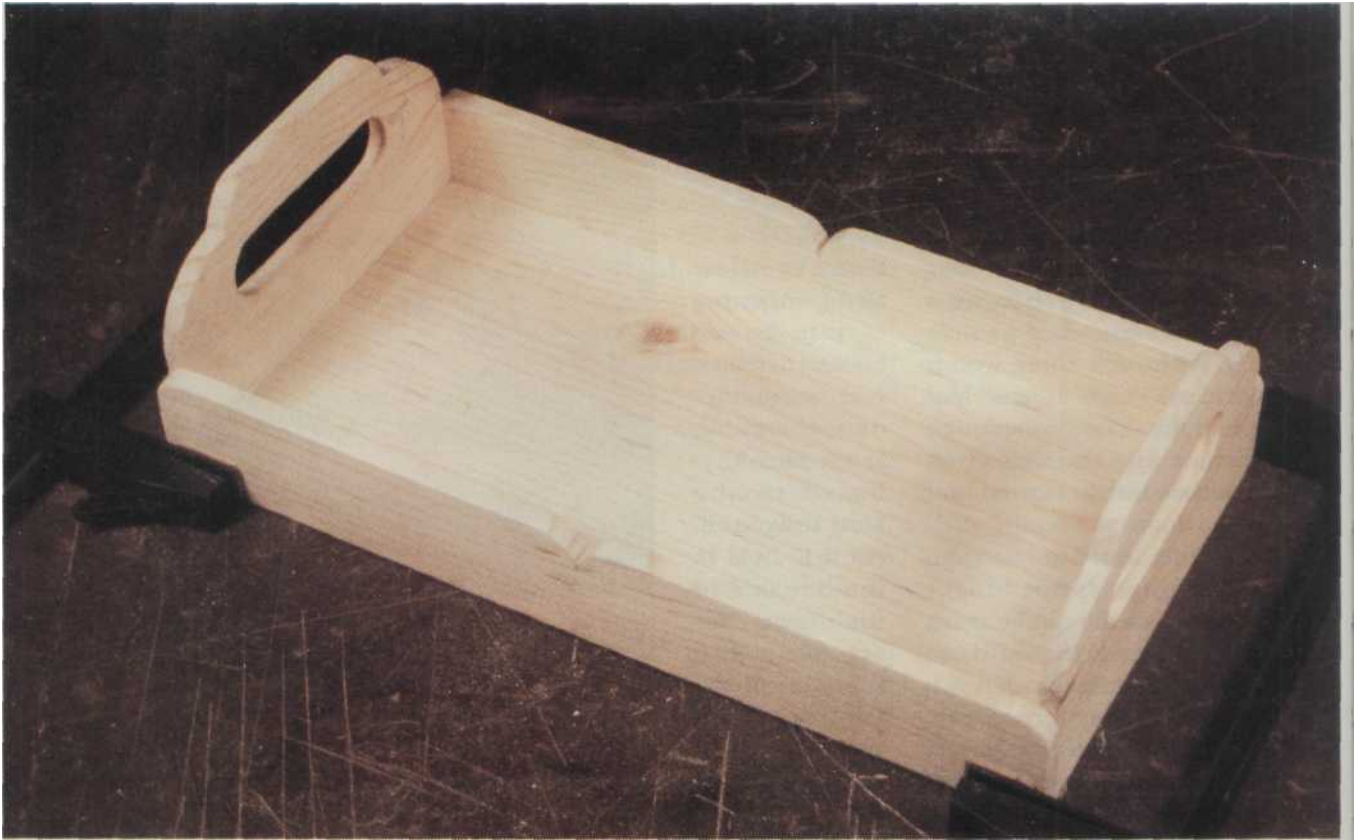


26

26 Glue the skirts to the legs, and the braces to the skirts. If the corner braces don't set squarely against the skirts, place and draw up the cable screws lightly to hold the braces in place. Tighten the band clamp.

54

SERVING TRAY



This is a great project for using up some of that leftover, common pine you've got lying around the shop. It won't take much material or time to build this tray once you get the stock to its proper thickness.

You also should enjoy both the easy construction methods and the results. Another interesting feature is the use of round pegs that give the piece an antique look. Once you see how it's done, you'll want to use this method on other projects to add both strength and beauty.

Start with 3/4"-thick common pine stock and resaw it so it can be finished to a 1/4" thickness.

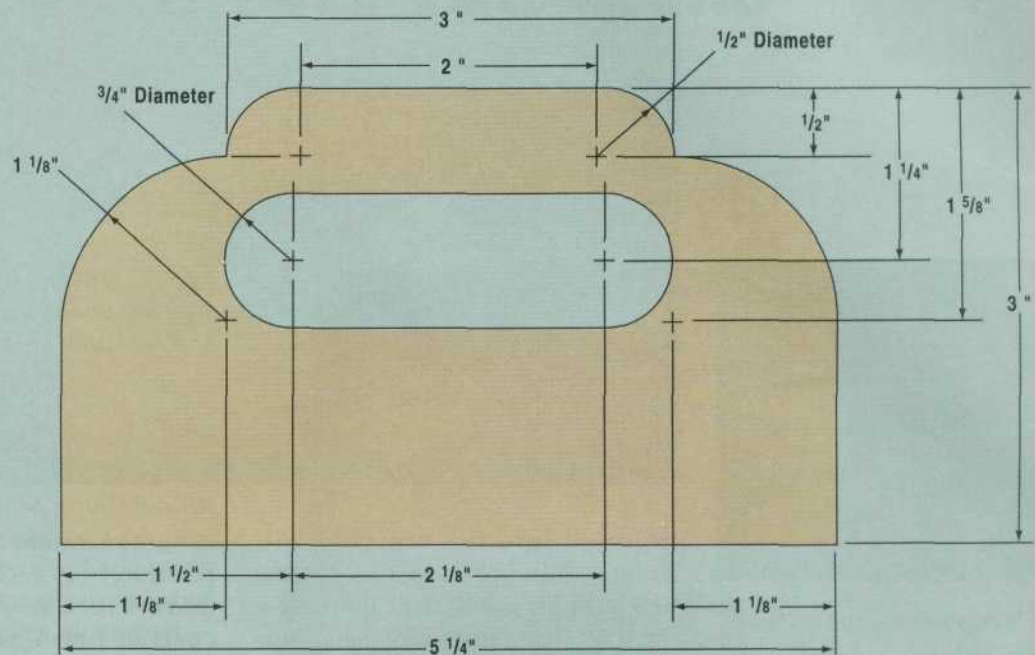
Resawing

the lumber is easily done on a band saw, but this material is so easy to work that you can probably hand plane it to thickness without too much trouble.

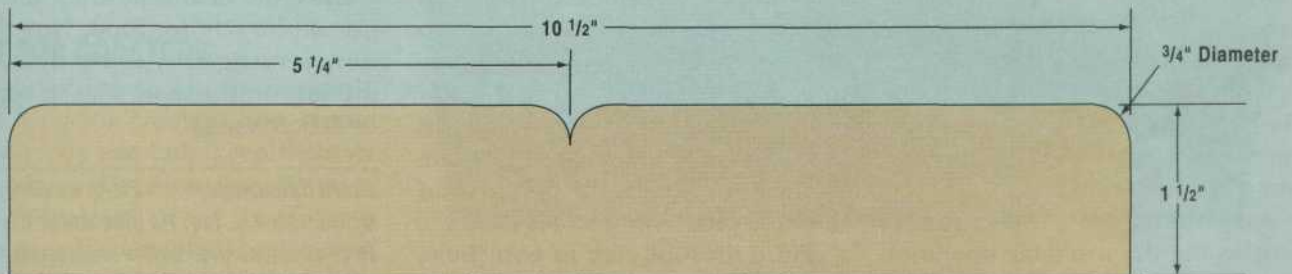
In either case, you should make sure all the cutting tools you're using are at their sharpest state because the fibers of softwoods, like pine, tend to compress rather than cut when worked with dull tools. This compression leads to crushed **edges** instead of the sharp edges that are formed when sharp tools are used.

If you elected to resaw the **boards**, you'll have to either finish plane or power sand the boards to

DIAGRAM 1



End piece with dimensions for handle cut outs.



Front and back pieces with dimensions for decorative saw work.

their final thickness. I used a belt sander for this operation. The job went so quickly that the boards were down to their finished size almost before I realized it.

Cut the base to its finished length of 10", then set the rip fence on your table saw for the 5 1/4" width. Without changing the saw setting, rip another piece at least 7" long to the same 5 1/4" dimension. Cut this board into two pieces, each measuring 3 1/2" long x 5 1/4" wide. These two pieces will be used as the tray's ends.

Rip a pair of boards measuring at least 11" long into 1/4" widths to become the sides of the tray. Don't

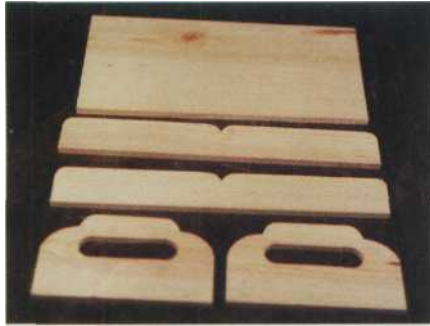
cut these sides to length at this time.

Before you go any further, you need to lightly touch up all the cut edges of the parts with some fine sandpaper. Be careful not to round any edges, just take off the fuzzies that formed when the cuts took place. Once this is done, your parts will be as clean as possible and ready for dry assembly.

Dry assembly is the act of putting the pieces together without any glue or fasteners to ensure everything is of the proper size. If you've never done this operation before, you should find this project to be a good opportunity to test it out.

Dry assemble the tray by butting one end panel against each end of the base board. Make sure the end panels are square to the base, and set a single side panel in position. Mark that panel for length, and cut both of the 1 1/2"-wide side panels to the same length. Touch up the cut edges with fine sandpaper, being careful not to round the edges.

Referring to the sketches, lay out the curved areas on the two end panels and two side panels. Instead of using a compass for the layout work, I found a drafting circle template works well and doesn't leave any holes from the compass pin. Cut the curves to shape, then drill a



The parts for the tray are completed and laid out prior to assembly.

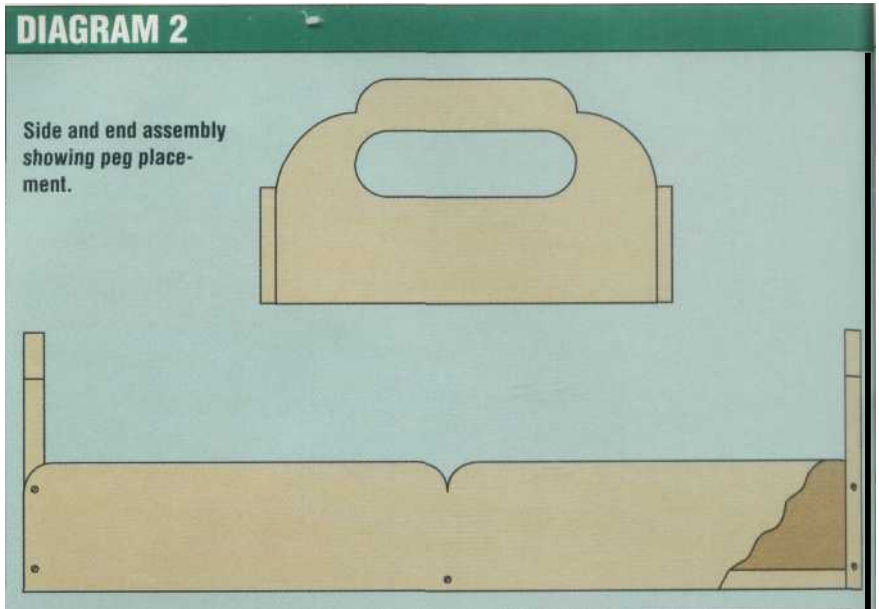
pair of 3/4"-diameter holes in each of the end panels for the finger cutouts. Use a coping saw, scroll saw, or jigsaw to cut out the finger openings in these two panels.

Lightly sand all pieces in preparation for final assembly, then dress up the cuts just made. Don't round any edges at this time.

Assembling the parts is just as easy as the dry assembly operation because you're doing the same steps, with the exception that this time you'll be using glue to hold the parts together. Set up for the assembly operation by getting your clamps set to the approximate openings and preparing your clamp blocks for use. Clear your work area, and have a container of water and a rag available for wiping up any excess glue.

Now you're ready to start. Apply some yellow woodworker's glue to the edges to be joined and butt all the parts together. A few light-duty clamps are all that are needed to hold the details in place.

Once the glue has completely dried, it's time to install the round pegs that help make this project unique. The pegs are nothing more than round wooden toothpicks that have had the tapered ends cut off;



then cut into two equal length pieces. The toothpicks I used needed only a #40 drill hole for a good fit, but you should check your toothpicks before drilling.

The holes should be drilled about 5/8" deep at the locations shown in the drawing. The pegs' exact locations aren't important. You also can create any pattern you choose to get the effect you want. I used only five pegs per side because the tray will be subjected to very light duty, but you could easily adjust the number to suit your own opinion on how the piece should look.

Put a drop of glue in each hole, then push the peg into place. Allow the glue to cure completely before trimming the pegs to length.

Trimming can be done with a sharp knife, a "setless" saw (like a backsaw), a chisel, or a belt sander. I chose a sharp chisel to get the pegs to the proper length, then touched up their ends with fine sandpaper.

At this time, you should dress up all the exposed edges on the assembly with sandpaper to remove the sharp areas. Pay particular attention to the end panels that will receive the most handling. It won't take too much effort to complete this step. Before you know it, you'll be ready to apply the finish.

I used a clear, water-soluble finish that's environmentally safe. Regardless of what you select for this job, you should follow the manufac-

turer's recommended application procedures to get the best results.

My directions called for three coats of finish with light sanding between coats. It definitely took more time for the coats to dry than it did to apply them, but the results were worth it.

Once the final coat dries, the finish will be safe for food. Now your new serving tray is ready to sit proudly on the table with its supply of delicacies.

55

CRAFTY COMPUTER DESK



For most computer owners, finding a desk with enough space for all the computer's components plus enough room to work is a challenge. While many models are on the market, most are made of pressed wood products lacking any redeeming aesthetic qualities.

This computer desk was carefully designed to satisfy the need for a functional work space and the desire for quality furniture.

A typical computer system has four basic pieces: a hard drive unit, monitor, keyboard and printer. These pieces must be hooked together with an array of plugs and cables. Through the pictures, drawings and text, you'll see how this center has been designed to accommodate these parts and hide unsightly cables.

The computer center consists of a desk and a hutch. Each is built as a separate unit, then assembled to complete the design. For both units, you will use 3/4" solid oak lumber, 3/4" MDF oak and 1/4" oak ply-wood. The solid oak is available in any length; the MDF and oak ply-wood come in 4' x 8' sheets.

A rule every experienced wood-worker lives by is "measure twice, cut once." Even though you're getting the most exact measurements possible, you should double check before cutting.

To begin, build the desk face frame from oak stiles and rails (**parts A-F**), using **diagram 1** and the **Materials List** as a guide. Special consideration should be given to the location of the shelf rails to accommodate your computer's

DIAGRAM 1

Materials List

Desk

Desk Face Frames (3/4" solid oak)

- A 2 ends 1 1/2" x 29 1/4"
- B 1 middle 1 3/4" x 27 3/4"
- C 1 top 1 3/4" x 53 3/4"
- D 1 divider 1" x 20"
- E 2 dividers 3/4" x 20"
- F 1 base 2 3/4" x 20"

Desk Bulkheads (3/4" MDF oak)

- G 2 outer 23 3/4" x 29 3/4"
- H 1 inner 23 3/4" x 29 3/4"
- I 1 back rail 2 1/2" x 33"

Desk Shelves (3/4" MDF oak)

- J 3 22 1/2" x 23 3/4"

Drawers - (Overall 19" x 22", allowing 1/2" each side for the drawer slides.)

Top Drawer (3/4" MDF oak)

- K 2 sides 2 3/4" x 22"
- L 2 ends 2 3/4" x 17 1/2"
- M 1 bottom 1/4" oak 18 1/4" x 21 1/4"

Printer Drawer (3/4" MDF oak)

- N 1 side 2" x 22"
- O 1 side 11" x 22"
- P 2 ends 11" x 17 1/2"
- Q 1 bottom 1/4" oak 18 1/4" x 22 1/4"

Drawer Fronts

- R 1 1 3/4" solid oak 3 3/4" x 20 1/2"
- S 1 1 3/4" solid oak 12 1/2" x 20 1/2"

Pull Out (3/4" MDF oak)

- T 1 19 1/8" x 20"
- U 1 3/4" x 3/4" x 20 1/2" solid oak

Guides (glue 2-3/4" pieces together)

- V 2 1 1/2" x 2" x 17"
(3/4" x 3/4" rabbet)

Stop Piece

- W 1 3/4" x 3/4" x 17"

Desk Top (3/4" solid oak)

- X 1 25 1/2" x 59"

Hutch

Face Frame (3/4" solid oak)

- AA 2 ends 1 1/2" x 37 1/4"
- BB 1 middle 1 1/2" x 22 3/4"
- CC 1 top 2 1/2" x 53 3/4"
- DD 1 left bott. 1 1/2" x 24 3/4"
- EE 1 right bott. 1 1/2" x 27 3/4"

Bulkheads (3/4" MDF oak)

- FF 2 outer 12 3/4" x 37 1/4"
- GG 1 inner 12 3/4" x 25 1/4"

Fixed Shelves (3/4" MDF oak)

- HH 1 shelf 12 3/4" x 26"
- II 1 shelf 12 3/4" x 30 3/4"

Adjustable Shelves

- JJ 1 12 3/4" x 25"
- KK 2 12 1/4" x 29 3/4"

Inner Rails (3/4" solid oak)

- LL 1 2 1/4" x 29 1/2"
- MM 1 2 1/4" x 25 1/4"

Base Molding (3/4" solid oak)

- NN 1 2" x 60"
- OO 1 2" x 30"

Hutch Crown Molding (3/4" solid oak)

- 1 3/4" x 62"
- 2 3/4" x 16"

Top (3/4" solid oak)

- PP 1 14 3/4" x 59"

Doors (3/4" solid oak)

Panels

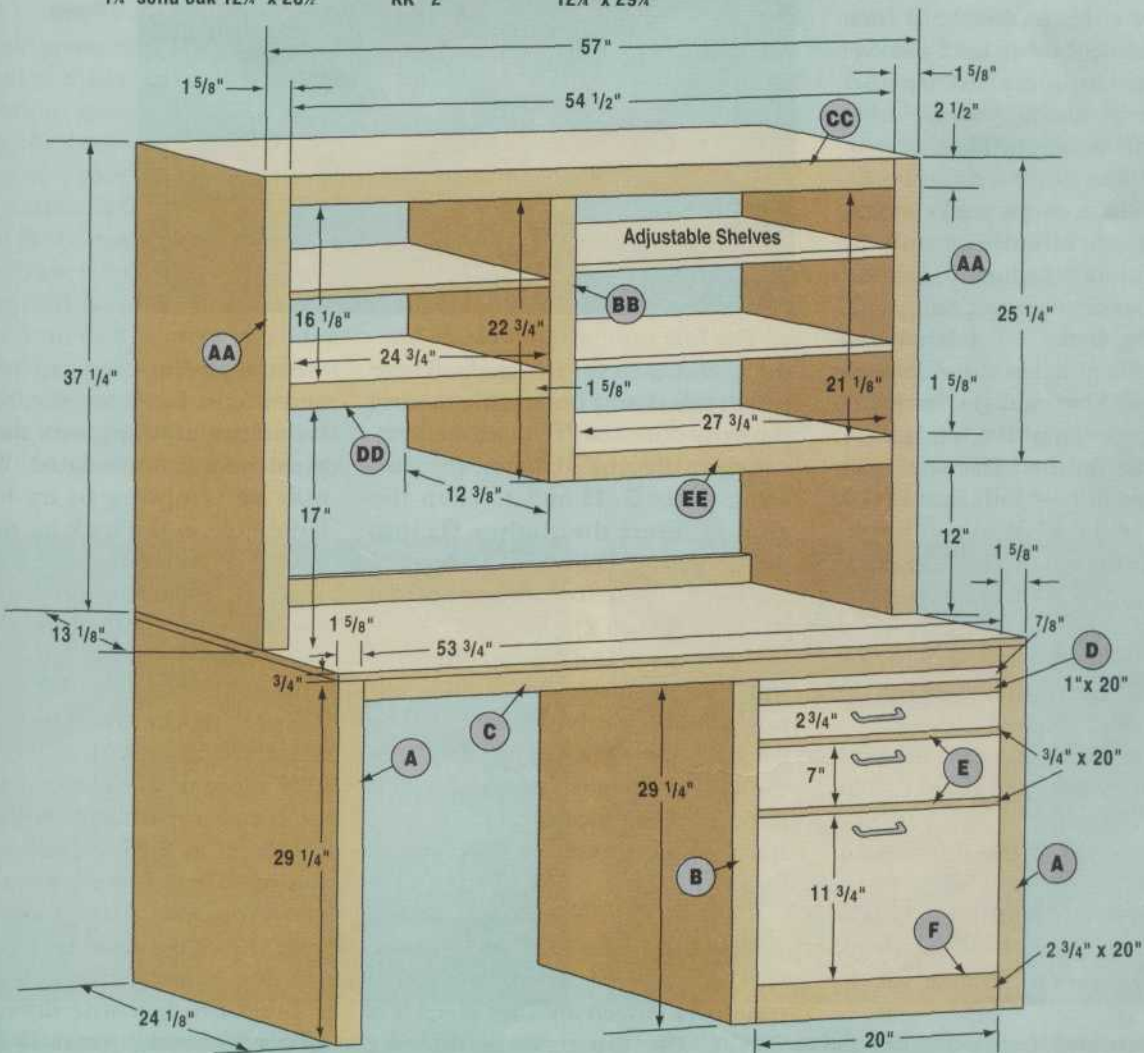
- 2 8 3/4" x 12 13/16"
- 2 10 3/4" x 17 3/4"

Frames

- 4 Rails 2 1/4" x 8 1/8"
- 4 Rails 2 1/4" x 10 1/8"
- 4 Stiles 2 1/4" x 21 3/4"
- 4 Stiles 2 1/4" x 16 3/4"

Drawer Hardware

- 1 Set 22" full extension
- 1 Set 22" heavy duty full extension





1 Mirrored dados in the drawer bulkheads are ready to receive the drawer shelves.



2 The assembled drawer section with shelves in place. The face frame has already been glued on.

hard drive unit and printer. If you find the spaces inappropriate for your system, adjust the spacing accordingly.

There are a number of ways to attach the stiles and rails to form the face frame, but we used a doweling jig as the simplest option. Remember to lay out your doweling lines exactly before drilling.

If you'd like to try a different fastening method, screw pockets using a Kreg jig works well not only for the face frame attachment, but also for the carcass construction.

Once the frame has been assembled and the glue has dried, remove the clamps. Flat sand the back side joints to get a flat gluing surface.

Using the finished face frame, lay out the two drawer bulkheads (G & H) to make the $3/8$ " dado cuts for the shelves (**photo 1**). The top dado holds the shelf to support the pull out board. The second dado is for the hard drive unit's shelf. The bottom dado houses the shelf for the bottom printer drawer.

Spacers will be needed on both bulkheads to allow the drawer slides to clear the face frame. You may need to custom fit the thickness of these pieces.

On the outside bulkheads (G), cut a $3/8$ " x $3/8$ " rabbet on the inside rear edge to accommodate for the $1/4$ " back.

Before assembling, pre-sand the visible sides of the bulkheads and



3 The three backs in the desk unit shown in place. Notice the wire chase hole for the printer drawer.

Since all the computer's components must hook together with the hard drive unit, space for the cables must be accommodated.

the $1/4$ " oak used for the backs. These pieces are almost impossible to sand properly once they're put together.

Assemble the drawer section using parts G, H and I. Then use glue to insert the shelves (J) into the dados in G and H. Clamp the assembly, check for squareness and let it dry (**photo 2**).

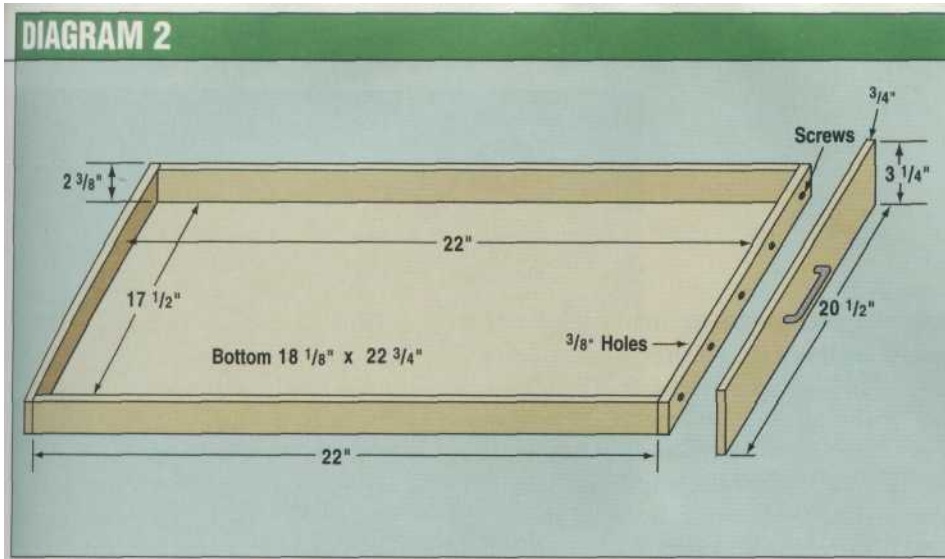
Next, glue and clamp the face frame to the assembled drawer section and the left bulkhead (G). Finish nail the back rail (I) between the two bulkheads. The back rail is important for supporting the knee space section and the $1/4$ " plywood back.

Using $1 1/4$ " finish nails, attach a $1/4$ " x $33 3/4$ " x $29 1/4$ " piece of oak plywood to the back of the knee space (**photo 3**). Attach another piece 5 " x $22 1/2$ " to the top right behind the pull out shelf and the top

While it may be tempting to try to cut a large hole in the back for this area, it's actually easier to leave the entire space between the top drawer and the second shelf open to allow access for hooking up the hard drive unit.

Enclose the area behind the printer drawer with a $1/4$ " x $15 1/4$ " x $22 1/2$ " piece of oak plywood. Cut a 3" hole in this piece to match the hole you'll cut in the back of the printer drawer. These holes are essential to allow for cable passage and to prevent the cables from tangling when the drawer is opened or closed.

Build two box style drawers (**diagram 2**) using parts K-Q. The upper drawer is standard, but the



and the desk top will be easier to finish unassembled, so don't glue the stop strip to the pull out.

The top of the desk (X) is fashioned from multiple oak boards. The lumber you have available will determine how many pieces will be necessary for its construction.

Joint the edges to be glued, then glue and clamp, making sure the top will dry on a flat. Again, pay attention to the growth rings while gluing.

Unless you're fortunate enough to have a multitude of double clamps, it's important that you alternate them about 8" apart (one on top, the next on the bottom, etc.) to keep the top flat (**photo 5**). When dry, the top is sanded with a random orbital sander and smoothed with a palm sander.

Next, attach the top. (Even if you finish the top unattached, you should attach it now to make final assembly easier.) To attach the top's back right-hand side, use a hole saw or expansion bit to create a 3" hole in the top shelf, then drill a 3/16" pilot hole in the right back corner brace. This gives you accessibility in fastening the desk top through the shelf to the corner brace.

On the right front side, drill a 1/2" hole about halfway through the top front rail. This pocket will give you

printer drawer has been designed to allow easier access to the printer and paper. Three sides of the drawer are 11" high, but the left-hand side is only 2".

When making the drawers, dado 1/4" x 3/8 deep, 1/4" up from the bottom of the sides and ends to allow for the 1/4" bottom. Use glue and nails or an air powered stapler to attach one end and two sides. Then slide the bottom into the groove and attach the last end. Square the drawer and turn the box upside down, running a heavy bead of glue around the bottom's inside.

The drawer fronts (R & S) are constructed from solid oak. The smaller front can be created from a single piece, but the bottom front will probably need to be glued-up. Alternate the growth ring pattern on the end grain of the boards to

prevent bowing. Pay attention to the grain pattern while you're arranging the drawer fronts.

Glue-up the pull out board made of MDF oak (T) with a 3/4" oak piece (U) glued on the front edge. Before you start gluing, cut a finger pull on the underside of **part T**, using either the table saw or a cove bit in a router.

Next, cut the rabbets in the pull out guide pieces (V). When in place, these will act as the top guide for the pull out. The top shelf will be the bottom guide and support, thereby creating a slot for the pull out to ride in (**photo 4**). Corner braces in three of the four corners add stability to the unit and will fasten the top.

Screw the stop piece (W) to the top of the pull out board at the desired length. The pull out board



4 The drawer assembly (R & S) being held in place with squeeze clamps.



5 Alternating clamps help keep the glued-up top level while drying.

room to maneuver your screwdriver or drill. Make a 3/16" pilot hole the remainder of the way for the screw. Attaching the left side is easier. Simply screw through the corner braces into the desk top.

An effort was made to maintain as much desk top working space as possible, so the keyboard was placed underneath it on a slide-out unit. There are a variety of options for the keyboard's hardware. The type shown (**photo 6**) is mounted on a board measuring 1 1/2" (or thicker) x 6" x 17", which in turn is mounted to the top's underside in the center.

The hutch's design gives special consideration to space utilization. Computer monitors, like hard drive

units, are being made bigger than in the past, so they require at least 17" in height. On this hutch, only the left side was made this height to provide maximum storage for office and computer supplies. You may prefer to make both of the shelf units equal in height.

The hutch's construction is similar to the desk's, with rails and stiles (**parts AA-EE**) fashioning the face frame. Using your face frame, mark the position for the 3/8" shelf dadoes on the bulkheads (FF & GG). Again cut a 3/8" x 3/8" rabbet on the rear inside edge of the outside bulkheads (FF) to accommodate the 1/4" back. The two back pieces (30 1/4" x 37 1/4", 26" x 37 1/4") will meet and overlap the inner bulkhead edge.

The hutch's bottom stationary shelves (HH & II) are flush with the top of the bottom face frame rails. Do not cut dadoes for the adjustable center shelves (JJ & KK).

Glue in the top rails (LL & MM) and the hutch base moldings (NN) to the inside of the back. Make sure the piece is flush with the inside of the back rabbets.

Next, cut out and glue-up the hutch top (OO). Again, remember to pay attention to the growth rings.

If you prefer not to use solid oak, make sure your crown molding covers the unfinished edges.

Next, glue the crown molding to the front and both sides. You can make your own crown molding if you have access to the proper equipment. If not, you can purchase preshaped crown molding from a local lumberyard.

Make sure your corner miters are tight before you start gluing. Attach the hutch top by gluing and clamping, or you can use some strategically placed screws through the front and back rails.

The doors depicted on this hutch are fashioned in the popular raised panel mode. In case of expansion, it may be beneficial for you to stain the interior of the panel prior to assembling rather than after, since the stain may not cover the unexposed areas.



6 The keyboard retracts under the top to allow for a cleaner desk top. Notice the cable running into the side of the drawer section.



7 The edge view of the door shows the through tenon and groove used to assemble the stiles and rails.



8 The back of the door shows the dados cut to receive the hinges.

The stiles and rails for the door are made on the shaper using a standard 1/4" tongue and groove (**photo 7**). Although some woodworkers find a 3/8" or 1/2" tongue and groove make the door stronger, the 1/4" is sufficient. Use the sizes given in the **Materials List** to cut out and assemble the doors.

To fasten the doors to the cabinet, a knife hinge (pivot hinge) gives a more finished look. To make the hinge grooves, use a 1/4" dado blade in your table saw raised 9/16". The groove is 1 3/4" long for the type of hinge shown (**photo 8**). Always check the manufacturer's instructions for specifications.

A 1/2" round over bit in a router was used to shape both the ends and fronts of the hutch and desk top. Shape all the edges of the doors and drawer fronts to your own style. Run a profile on the rest of the base material, then glue to the desk and hutch.

Attaching the hutch to the desk base is one of the easiest tasks. Simply drill pocket holes angled through the outside of the hutch back and screw in with face frame screws.

Now you're almost finished, with the exception of a couple modifica-



9 This detailed photo shows the hole cut in the drawer section's left bulkhead for the keyboard wire.

tions to allow the computer system to be hooked together.

To accommodate the cable from the keyboard to the hard drive unit, cut a 1" hole in the left side of the drawer section (**photo 9**) at the level of the hard drive unit shelf.

Next, cut a 2" hole in the back of the hutch to access the cable from the monitor to the system. The monitor will cover the hole nicely and isn't readily visible.

If you opt to cut the hole in the top of the desk, you will need to make the 1" hole in the drawer section larger (at least 2" to allow for the cable attachments).

Complete the entire piece using your favorite stain and preferred finish.

56

CAPPUCINO BAR



Materials:

white pine 2" x 6", 8 feet long
3/4" and 1/2" dowels, 3 feet each
circular saw
drill
3/4" and 1/2" drill bits
2 or 3 large C-clamps
hammer
2-1/2" drywall screws
heavy-duty picture frame hangers
paint
polyurethane stain
measuring tape
black paint
coarse, medium and fine sandpaper
small scrap block of wood
wood glue

Note: Before tackling this project, practice drilling on some scrap 2" x 6" wood pieces to see how straight you can make a hole. Always wear safety goggles when using the drill or saw.

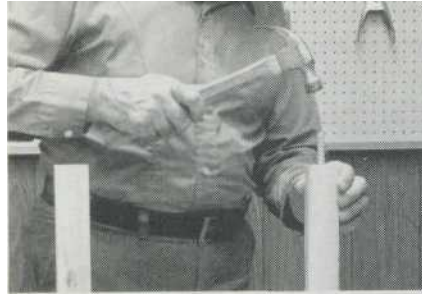
Steps:

1. Place the pine on the work table and measure 21 inches from the end that has the flattest cut. Put the straightedge on the board, diagonal from one corner to the other, and draw a cut line. Use the clamps to hold the wood down while cutting, and manipulate the wood in order to make a clean cut with the circular saw.
2. Put the cut piece on top of the other like a sandwich, so the widest end is now the top of the base for the shelf.
3. Make a pencil line along the sandwich edge to match the other.
4. Un-sandwich, re-clamp and cut along the line.
5. Cut the top, measure 29 inches from the edge and draw a cut line. Cut with circular saw.
6. Pick the side that will look the best for the front, and measure 2" from each end, measuring in towards the center. Mark. Draw a line from both of these to the back corners. Clamp and cut these two lines.
7. At the widest end (the top), find the center along the side where you are to insert the 3/4-inch dowel and mark. From this marked point, measure down the side 2-1/2 inches twice, then one inch back toward the uncut end, which is the back. These are the other two dowel marks. Clamp both pieces together like a sandwich.
8. Fit the drill with the 3/4-inch bit and with a steady hand, drill through both pieces as straight as possible.
9. Repeat for 1/2-inch dowels using the 1/2-inch drill bit.
10. Cut the 3/4-inch dowel to 20 inches and the two 1/2-inch dowels to 12 inches.
11. Sand all pieces with coarse, medium and fine sandpaper.
12. At the bottom of the base, if the edges are too sharp, wrap sandpaper around a block of wood and sand it flat.
13. Assemble the two sides of the base, with the top down, and set on the table. Feed the dowels through the holes and center each one. Use the scrap pine for the spacer in between the two sides. Mark each dowel and slide out to glue, then slide back to the marks and twist, spreading the glue. Allow to glue to dry for at least an hour.
14. Lay the newly glued base flat on its back with the spacer underneath, center the top next to the top base, and mark two pilot holes for each side, two inches apart. Mark and drill the four pilot holes, all the way through to the base.
15. Spread some glue on the tops of each base, reposition and screw together.

16. Turn over and find the center, mount the hangers 16 inches on center from the center mark on the back.
17. Finish by masking out the dowels on the base and painting the them with black paint. Apply a polyurethane stain and let dry overnight.

CHINA HUTCH





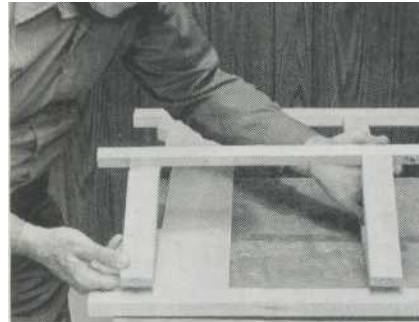
The frame sections of the china hutch are assembled with the aid of glue and spiral dowels. Dowel centers are recommended to ease matching of dowel holes.

ganic bakeware, antique vase, or collectibles? Here's the perfect cabinet for you, with lots of transparent glass to show off your treasures. It even has an elegantly wallpapered backing that can be changed at will. Select the decorative hardware to match the decor of your room—bright, brassy and modern or dark and intricate Mediterranean, or even sleek Oriental. You'll find a wide variety of handles and drawer pulls in all styles at any good hardware shop.

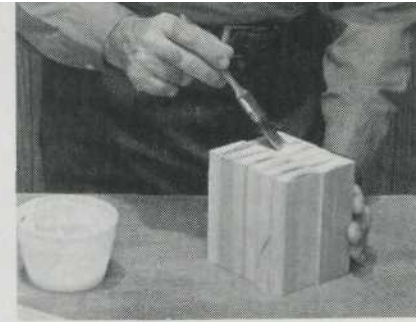
Choose flat defect-free boards in the wood of your choice for the frame. Rip them on the table saw into strips 1 3/4" wide. Remove all saw marks with a plane or jointer. Do not

you will need three strips cut to 28 1/2". These are for the crosspieces. You will also need one piece 5 3/4" x 28 1/2" to be used for the lower section.

Drill dowel holes as indicated; the use of a doweling jig and dowel centers is recommended. Mark off! the hole locations and drill into the ends of the crosspieces. Make the holes 3/8" in diameter and 1 1/16" deep. Because of the narrow width (1 3/4") use only one dowel per joint. The jig will automatically center the hole. After drilling the crosspieces, use dowel centers to transfer the hole locations to the uprights. Use two dowels for



This photo more clearly shows how locating pins are used to transfer the dowel holes from the edge to front of frame. Use bar clamps till glue dries.



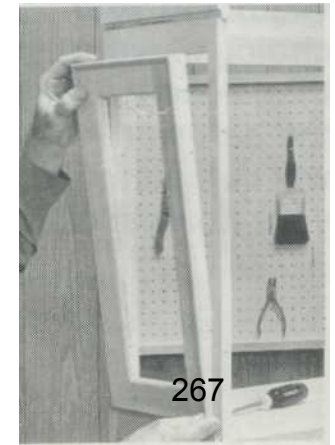
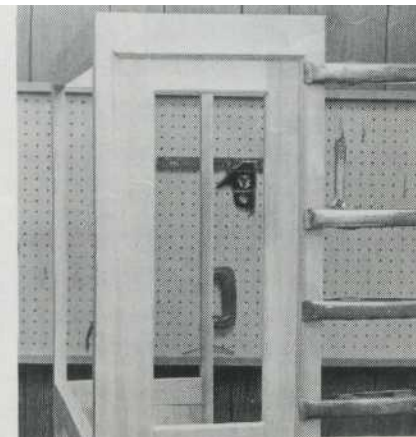
Shown here is how the end grain of the crosspieces are given a sizing coat of glue. Sized glue is made by mixing equal measurements of glue and water.



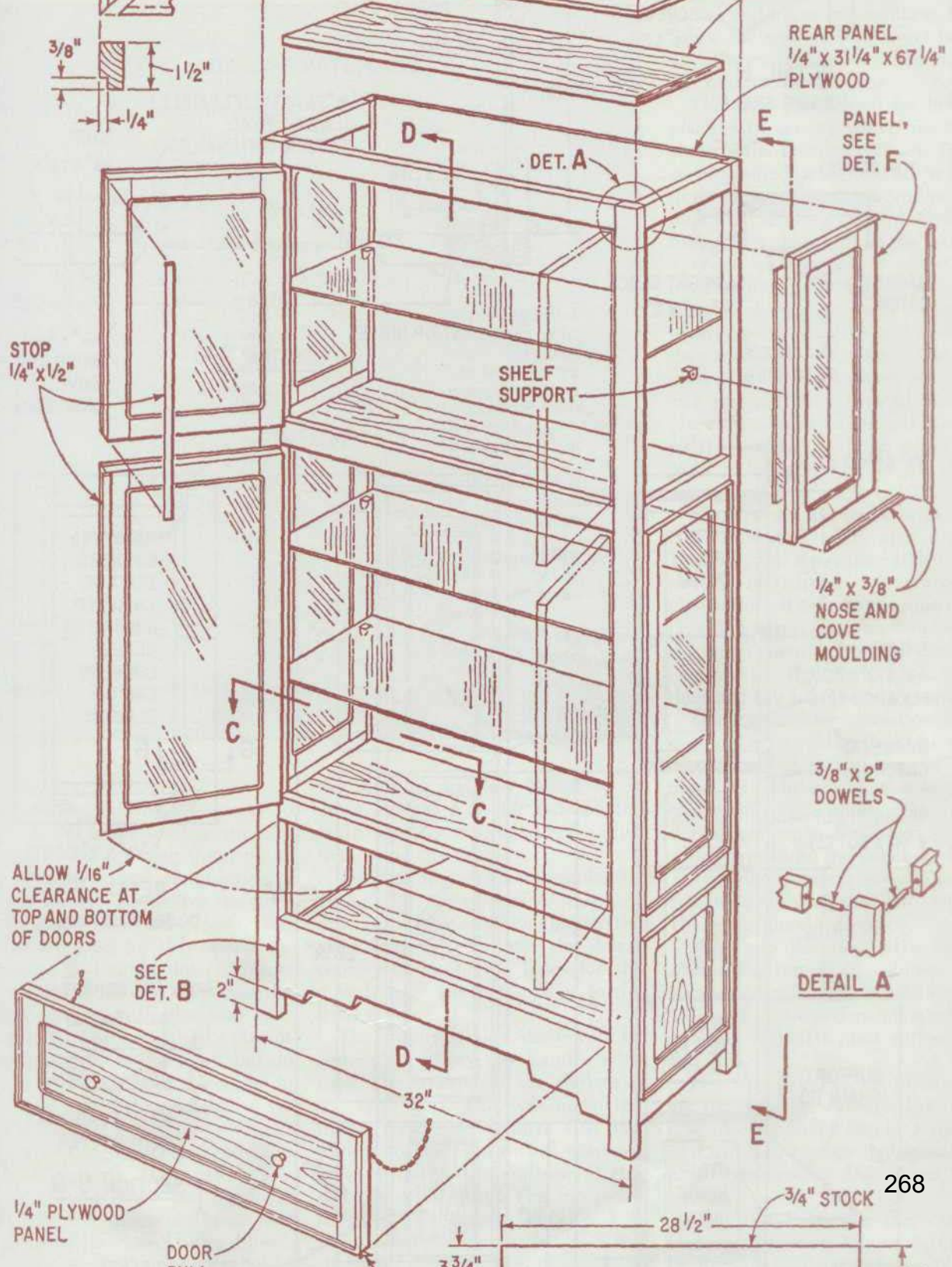
The upper, center, and lower panels are assembled with glue and nails. Pilot holes are drilled before nailing to prevent the thin wood from splitting.



The edges of the panels are dressed up

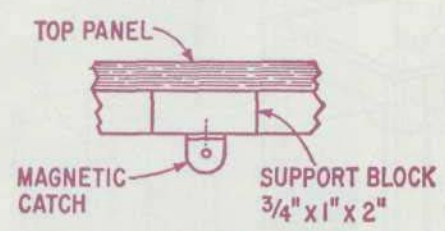


The inside edges of the panels must be rabbeted to accept the glass; they are

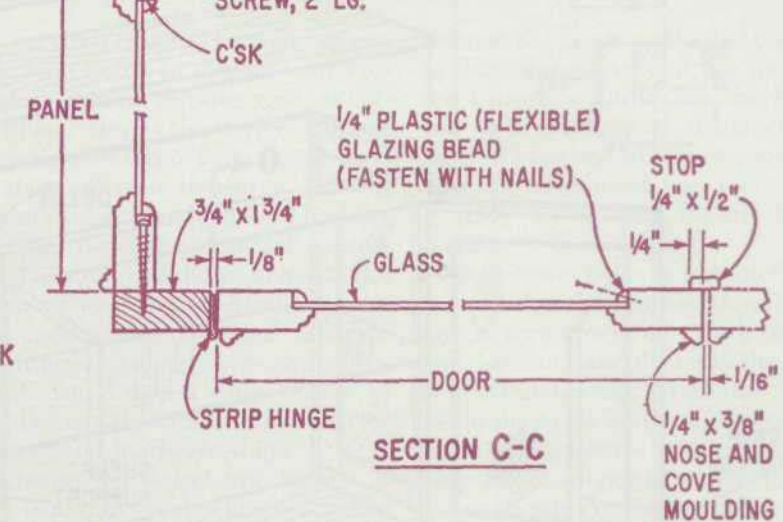


SCREW, 2 LG.
1/4" LG.

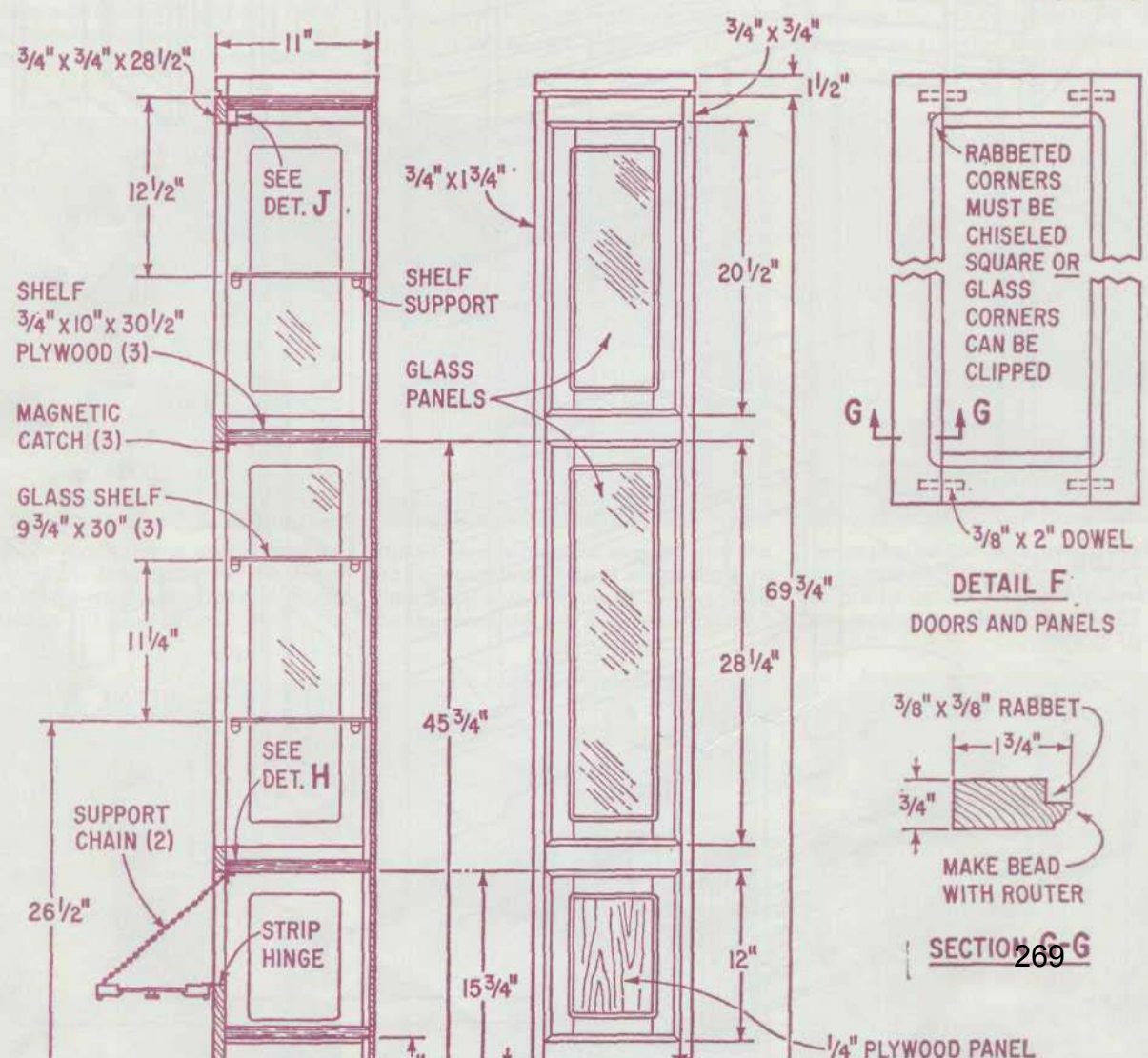
DETAIL H
JOINING SHELF



DETAIL J
REAR VIEW



SECTION C-C



BILL OF MATERIALS

QUANTITY	SIZE AND DESCRIPTION	PURPOSE
2	3/4" x 1 3/4" x 69 3/4"	Front stile
2	3/4" x 3/4" x 69 3/4"	Side stile
3	3/4" x 1 3/4" x 28 1/2"	Front rail
1	3/4" x 5 3/4" x 28 1/2"	Apron
8	3/4" x 1 3/4" x 9 1/2"	Side rail
2	3/4" x 1 1/2" x 11"	Side cap
1	3/4" x 1 1/2" x 32"	Front cap
1	1/4" plywood, 31 1/4" x 62 3/4"	Rear panel
4	3/4" x 10" x 30 1/2"	Shelves
4	3/4" x 2" x 20 1/4"	Upper side panel
4	3/4" x 2" x 28 3/8"	Center side panel
4	3/4" x 2" x 12 1/8"	Lower side panel
12	3/4" x 2" x 9 1/2"	Side crosspieces
4	3/4" x 2" x 20 1/8"	Upper door stiles
4	3/4" x 2" x 28 1/4"	Center door stiles
8	3/4" x 2" x 14 3/32"	Door rails
2	3/4" x 2" x 28 3/8"	Lower door stiles
2	3/4" x 2" x 7 7/8"	Lower door rails
1	1/4" x 4 3/4" x 24 1/4"	Lower door panel
2	1/4" x 3/8" x 60 ft.	Nose & cove molding
2	1/4" x 6 1/4" x 8 7/8"	Lower side panels
1	1/4" x 1/2" x 48"	Door stops
	8 ft.	Strip hinges
6		Pulls
3		Magnetic catches
	3/8" x 2"	Dowels
12	40 ft.	Glazing bead, plastic Shelf pegs

Also: have glass pieces cut to fit frames.

with the router later on when making the rabbets for the glass.

The side panels will be held in place with screws which must not show in the finished cabinet. This is accomplished by drilling screw holes in the rabbeted area where the glass molding will conceal them. Drill the holes before assembling the panels.

When all the panels are assembled, rabbet them for the glass and cut the decorative bead using the router. Sand all edges and surfaces, then install into the frame. The nose and cove molding is added using glue and spring clamps to hold them in place. Miter all corners and use care not to mar the molding surface. A piece of felt glued under the clamp jaws is recommended.

Door panels are made with sufficient allowance for the strip hinges. The left-hand doors have a door stop added. The right-hand doors are beveled at the left edge to clear the other door. When installing the strip hinges, use only the end holes until you have checked fit. If fit is okay, you can then add the balance of the screws.

The bottom door which opens horizontally is treated in the same manner. Instead of glass, it has a 1/4" back panel. In addition, it has an insert to improve its appearance. This insert is simply a piece of 3/8" solid lumber which drops into the panel opening.

Add the plywood inserts to the bottom panels of the side pieces. These are glued into place.

Next add the decorative strips around the top of the cabinet. This is made by rabbeting a long strip of 1 1/4" stock which is then cut apart and mitered. Hold it in place with screws and glue.

The rear panel of 1/4" plywood is not nailed to the cabinet. Instead it is screwed so that it can be removed as desired to change the decorative paper background. Use round head screws.

Drill the holes for the various pieces of hardware. Mount and check fit. Remove hardware ~~270~~ applying finish, then replace.

Finish the cabinet as desired. You can stain the wood and top with sev

the wide bottom piece.

Before assembling the parts to make up the frame section, prepare the clamps by opening them up to size; also have some scrap strips of wood at hand for protecting the work surface from the clamp jaws. Bar clamps are ideal for this operation. Dab some glue on the dowels, insert into the drilled holes, then coat the mating surfaces with glue and join. Use adequate pressure on the clamps to force glue from the joint, but do not overtighten. Check the frame to be certain that it is square, then set aside while the glue dries.

Prepare the side crosspieces and the rear uprights. These are drilled and assembled much like the front frame, the only difference being that the depth of the dowel holes differs. The holes are drilled 1 1/2" deep into the 9 1/4" crosspieces and 1/2" deep into the uprights.

After drilling the necessary holes

the uprights are only 3/4" X 3/4" in cross section, a double pass on the table saw is recommended rather than using the router.

The side frames are assembled by gluing the crosspieces to the rear uprights. These are then glued to the front frame. Again, use the dowel centers to locate the holes for the dowels from the crosspieces to the front frame.

The frame at this stage will be somewhat flimsy, so handle with care. The addition of the shelves is the next step. This will make the frame rigid and strong. Cut the frames to size, then drill diagonal holes through the bottom of the three lower shelves. The top piece is drilled from the top side. Use 1 1/2" round head (RH) screws to attach the shelves.

The frames for the doors and side panels are made next. Cut the necessary pieces and assemble them

58

CORNER DISPLAY CABINET



ALTHOUGH it looks complicated, there are short-cuts that take much of the hard work out of the project. First is use of readily available decorative molding strips; second is use of flexible wood tape to cover exposed plywood edges. The fancy scalloped curves on side pieces, fringe, and skirt can be cut with a power jig saw or saber saw, and if you clamp the two side pieces together you can use a wood rasp and sandpaper to get exactly-matching curves.

The entire cabinet is made of 1-inch thick veneered plywood, except for the door facings. These are 1/2-inch plywood. Use the veneer surface of your choice (birch, ash, mahogany, walnut, etc.) and buy wood tape to match.

Cut out the two back pieces. Note that one panel is 21 inches wide, the other is 20 3/4 inches. Rabbet the front and back edges of the narrower panel as shown in Detail A. Now cut out the bottom, top, intermediate top, and the shelves. Make up full-size patterns for the side piece scallops (or use those available as noted at the end of this article), trace them on the rectangular side pieces, and cut the wood to shape. Clamp the side pieces together as noted above, and trim to smooth, fair curves.

Make up the spine from 3/4-inch plywood (or hardwood), and bevel each side to a 45° angle. This gives added strength to the back joint.

Use glue on mating surfaces, and fasten the two back panels together with 1/4-inch #8 flat head wood screws. Be sure to drill pilot holes for all screws, and countersink for the heads. Next install the spine and the top panel with 1 1/4-inch #8 flat head wood screws, after coating the mating surfaces with glue.

Rabbet the rear edges of the two side pieces, and install them as shown in Detail A. Now you can install the bottom panel, the intermediate top, and the upper shelves. Cover the exposed edges of the shelves with wood tape before installation, and be sure that all these panels are square with the back

and side pieces. Again, use glue on mating surfaces, and fasten with 1 1/4-inch flat head wood screws.

Make up a cleat of 3/4 X 3/4-inch pine stock, as shown in the exploded perspective drawing. Install it underneath the intermediate top, and fasten the apron to it. The face of the apron should be flush with the edge of the intermediate top.

Cut out the two spacers from 7/8" X 7/8-inch pine or other hardwood stock, and bevel one side of each to a 45° angle as shown in Detail A. These spacers are installed along the front edge of each side piece, bottom and intermediate top panels.

Use full size patterns for the skirt and fringe pieces, cut the pieces out, sand the curves smooth, and install them. The fringe goes under the front edge of the top panel, and the skirt goes under the front edge of the bottom panel. Make cleats of 3/4 X 3/4-inch stock as shown in the exploded perspective view, and install them behind the fringe and skirt pieces. Cover the scalloped edges with flexible wood tape.

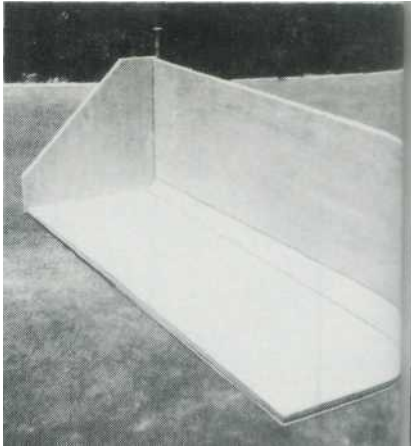
Now install the decorative molding at the top and intermediate top. Bevel the corners and use the same trim along the sides. Use glue and small brads to fasten the molding in place. Set the brad heads below the surface of the wood, and cover with matching wood filler. Cut out and install the cabinet shelf in the lower compartment after covering the front edge with wood tape.

Make up the two doors from 3/4-inch plywood, with 1/2-inch plywood facings and decorative molding around the edges as shown on the plans. Note that corners of facings and moldings must be mortised carefully for a snug fit. Round the edge of each door on the side opposite the hinges, and cover the exposed top and inner edges with wood tape

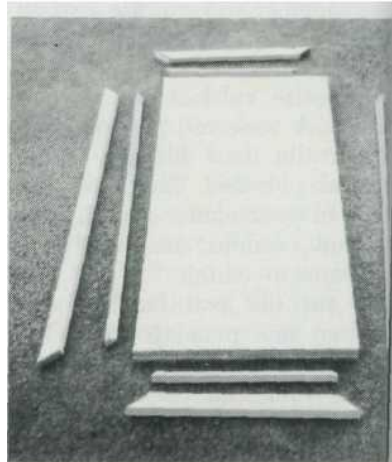
. For hinges, use the new knife type used by radio cabinet manufacturers. These come in left hand and right hand models, and they feature stops that prevent the doors from swinging all the way back. See Detail B for hinge and door relationship.

Finally, sand the cabinet lightly, and finish with two coats of varnish or other clear coating to bring out the natural beauty of the wood. Sand lightly between coats, and if additional coats are needed, sand before application. When the final coat is dry, install the doorknobs of your choice, and the project is done.

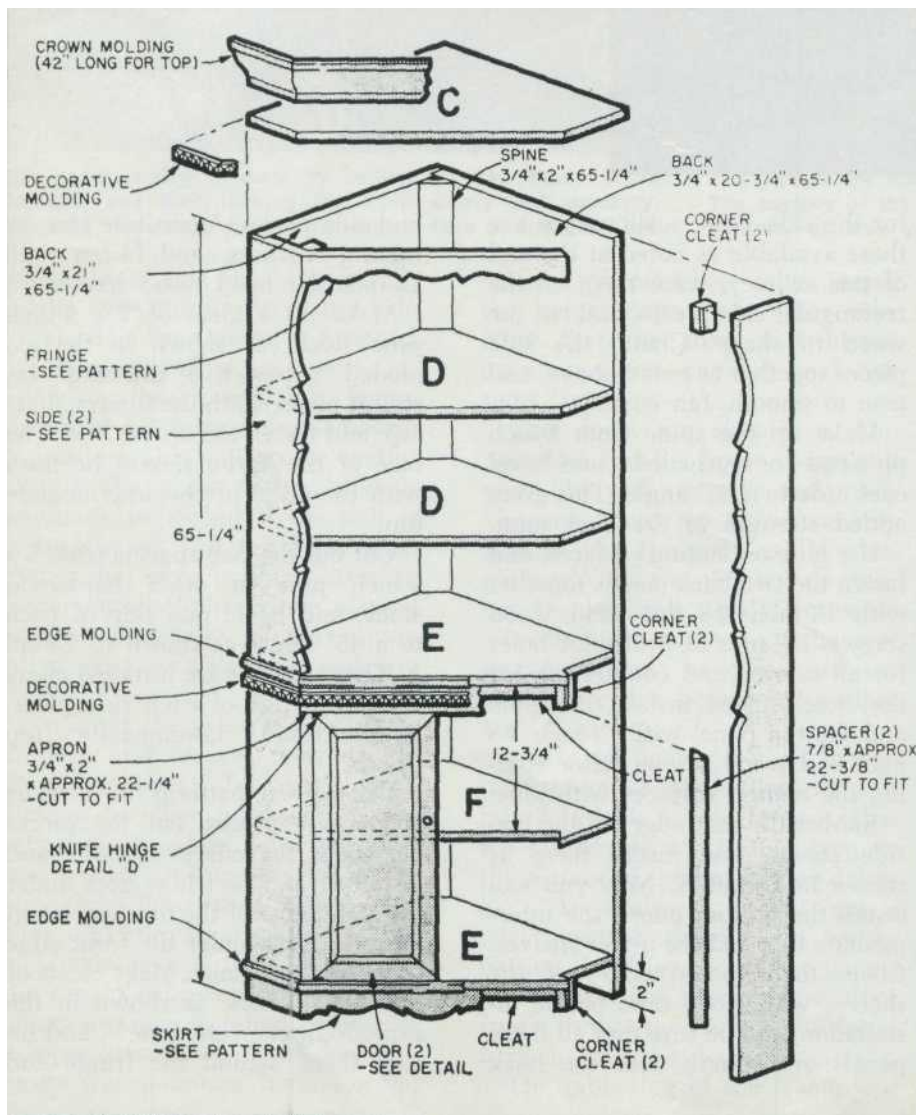
Shown here are the assembled back top and spine. The spine is beveled each side to a 45 degree angle, and gives strength to the back join



Put in the intermediate top, apron and shelves, covering shelf edges tape. Next is fringe and skirt, plus molding on top and intermediate top

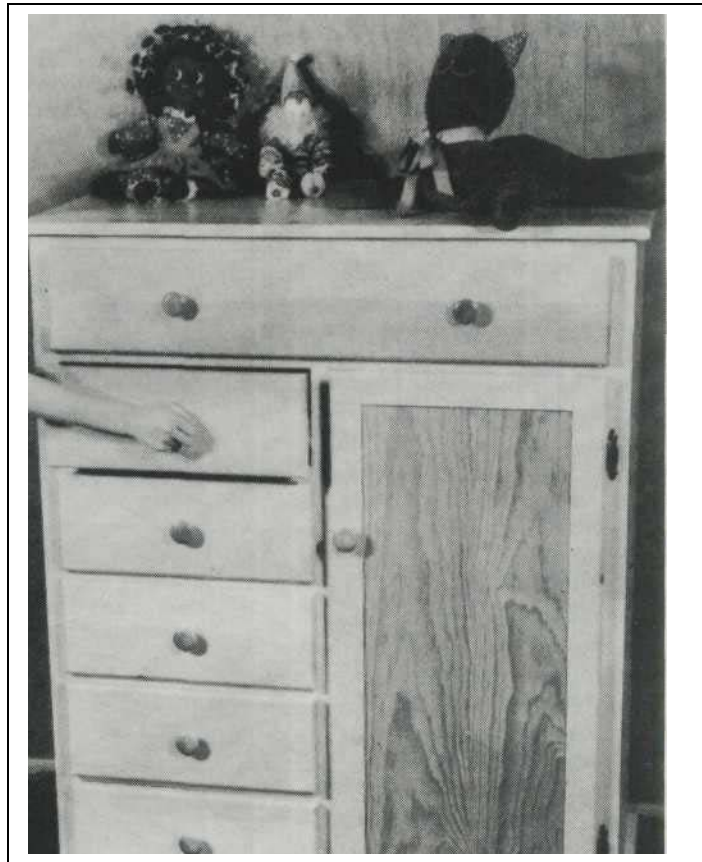


Attach door facings with glue, and wood screws. Work from backside door. The corners and facings must be mortised carefully for a snug fit



59

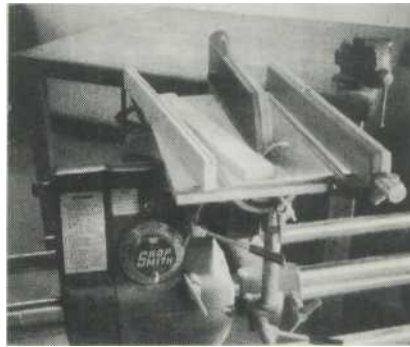
CHILD'S ARMOIRE



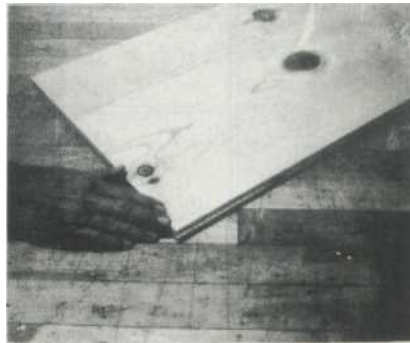
THIS CHILD'S ARMOIRE will make it easy for kids to keep their rooms neat and orderly. Its six drawers and two shelves provide enough storage space to house a substantial wardrobe. By following a simple modification to be described below, the shelf compartment can even be replaced with a small closet complete with clothes pole for hanging dresses, suits, or coats. Best of all, the ar-moire is designed especially with the pint-sized set in mind. No more standing on tippy toes just to reach a clean pair of socks!

Before starting on the project, carefully study all photos, diagrams, lists, and building instructions. One attractive feature worth noting at the outset is that no fancy joinery is required. With the exception of a few simple rabbets, nothing more complicated than butt joints is called for. On all of these joints, use 1 1/4" finish nails and glue unless otherwise specified. Another plus is that only the most basic of shop tools are needed, although a router is essential, and you'll probably also find a table saw to be helpful.

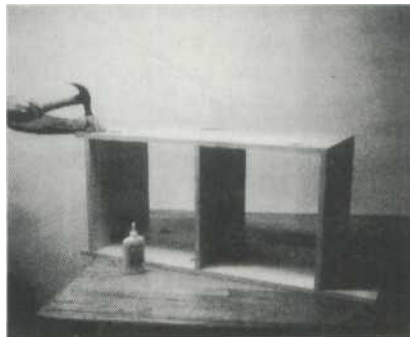
Because of the variety of dimensions encountered in the plan, we've simply indicated the total amount of 3/4" pine required, which is 47 board feet. This figure allows approximately 15% for scrap. When shopping at the lumberyard, bear in mind that the largest single width of pine called for in the plan is 6 3/8" (parts V and W). Procuring the hardware should not be much of a problem. If you do have difficulty, though, a complete



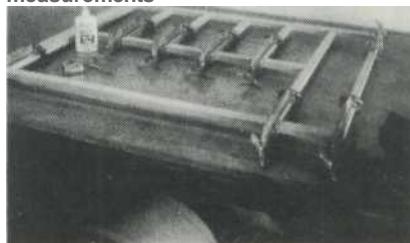
The first step is to cut all wood to proper size. Refer to the cutting schedule and Details 1 and 2 for further instructions.



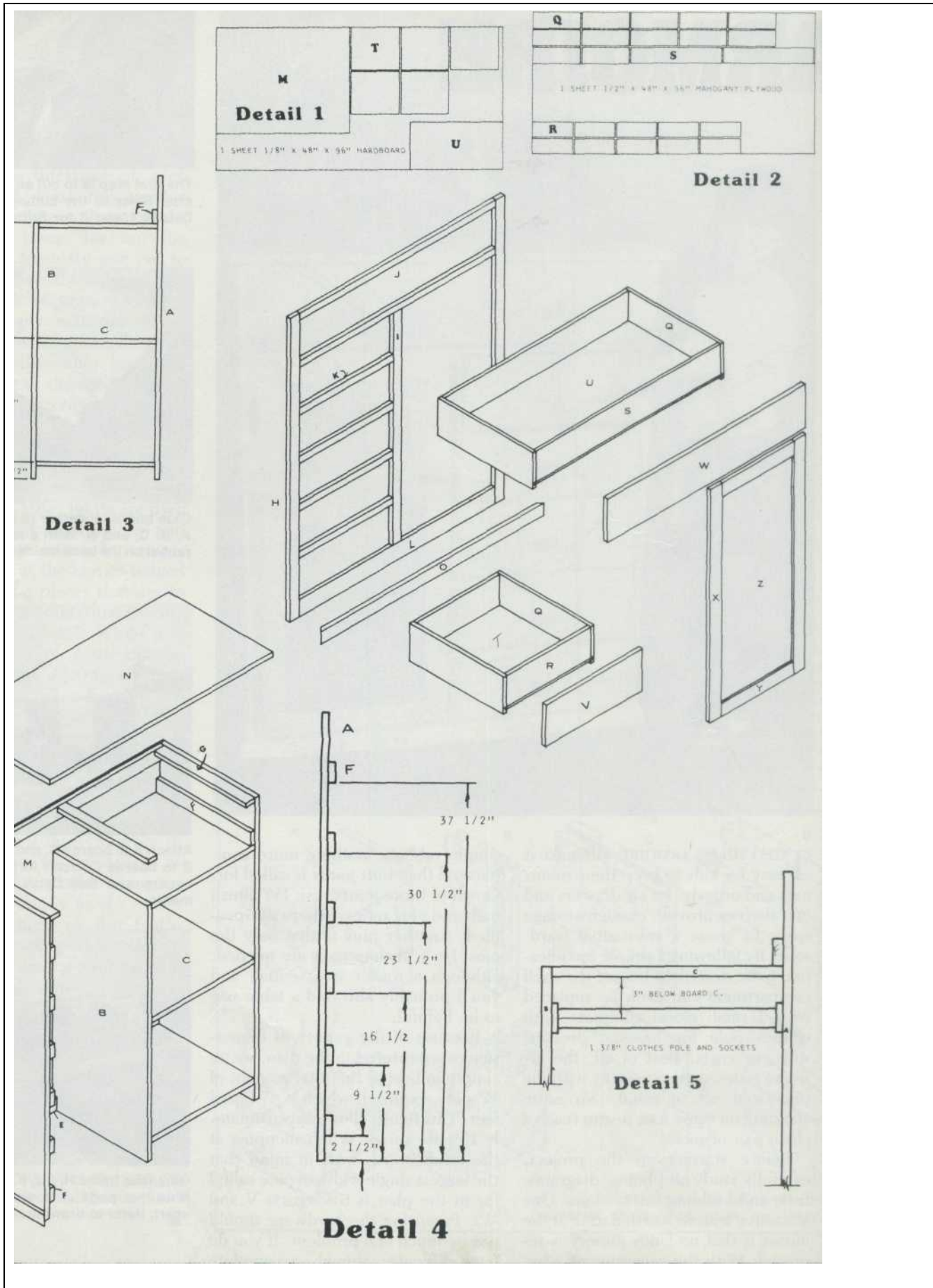
Glue boards together to make up boards A, B, C, and N. With a router, cut a thin rabbet on the back inside edge of board A.



Attach A to boards B, and C. Attach board B to boards C. Don't forget to check for squareness. See Detail 3 for measurements

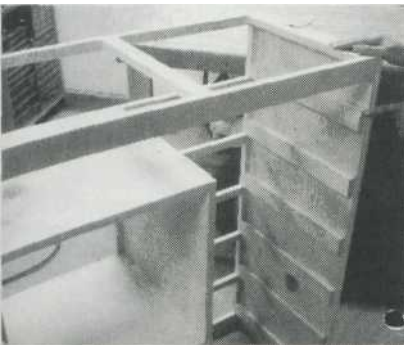


Glue face frame H, I, J, K, and L together. Note that parts J, K, and L are each 6" apart. Refer to drawing on the next page.

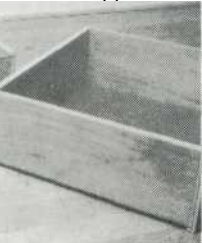




Attach face frame to A, B, and C. Attach upper back crosspiece D to boards A. Attach lower crosspiece E to A and B.



Attach two boards G to A, D, and J. Attach one board G to the center of D and J. Then attach drawer supports F to both boards A.



Nail Q to R using 1" brads. Slide hard-board T into groove in Q and nail. Follow the same procedure for the large drawer.



Attach drawer guides to boards Q and F. Nail the drawer fronts R and S to the drawer face panels using brads and glue.

set of hardware, replete with mounting instructions and all necessary screws, can be ordered through the mail. Write to the address found at the end of this article for more information.

Cutting the Parts. Begin by cutting all parts down to their proper sizes as indicated on the cutting schedule. Consult the panel layouts in Details 1 and 2 before cutting out parts M, Q, R, S, T, and U. Parts A, B, C, and N are formed by gluing smaller boards together. This not only saves you the trouble of hunting down unusually large widths of lumber, but is also an excellent strategy for avoiding possible warpage. Of course, whenever you build up large boards from smaller ones in this way, it's a good idea to use dowels for extra strength. When cutting out the parts, note that only two shelves (C) are needed if you intend to make the cabinet space into a closet.

With a router, cut a rabbet into the back inside edge of each part A side piece; this is to allow for the eventual placement of the rear hard-board panel (M). Similarly, cut grooves into the lower inside edge of each of the drawer sides (Q) to provide access for the hardboard drawer bottoms (T and U). In the interests of safety, you'll also want to round off all of the exposed edges of the piece with a router. The upper edges of the top piece (N), for example, should be rounded off to a 1/4" radius, as should the outside edges of the drawers (parts V and W) and cabinet door (parts X and Y).

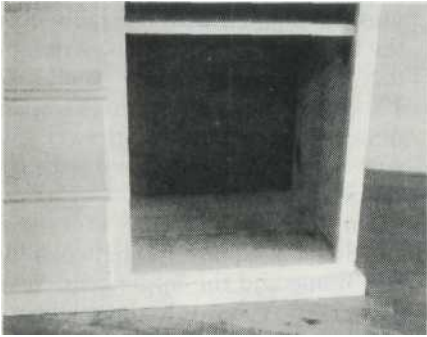
Construction. Start by building the cabinet compartment with parts B, C, and one part A. Refer to the accompanying photos and to Detail 3 for the proper placement of parts. If you intend to make a closet out of the shelf space, ignore the middle shelf board (C) shown in Detail 3. Check for squareness and accurate alignment of all parts. Next, assemble the face frame from parts II, I, J, K,

glue here, and drive the nails through part II (on the drawer side of the face frame) into the front edge of the side panel. To secure the construction, attach the upper back crosspiece (D) between the two parts A, following the placement indicated on the schematic. This crosspiece must be aligned with the rabbets on the two parts A in order to accommodate the rear hardboard panel (M). The lower back crosspiece (E), spanning from part B to the drawer-side part A, is similarly aligned with the rabbet on A.

On each side of the unit now, attach a top support (G) between the face frame and the upper rear cross-piece (D), as shown in the schematic and Detail 3. Then take the remaining part G top support and fasten it to parts D and J in the center of the unit. The drawer supports (F) are added next. Detail 3 shows how one part F is to be situated on the cabinet-side part A. The remaining six drawer supports are arranged on the drawer-side part A according to the measurements given on Detail 4. Once all the drawer supports are in place, carefully center the armoire top (N) and fasten it to parts D, G, and J. Set the unit aside now, and allow all glue to dry.

Drawers. Each of the five small drawers consists of two sides (Q), a front and back (both parts R), a hard-board bottom (T), and a face panel (V). Start by attaching the front and back to the sides with 1" brads and glue. As seen in the schematic, the tops of the two parts R are flush with the tops of the drawer sides. Next, slide the hardboard bottom (T) into the grooves of parts Q, and secure it with a nail or two. Repeat this procedure in assembling the large drawer from parts S, U, and the remaining parts Q.

Following the manufacturer's instructions, attach the 16" drawer guides now to the drawer supports (F) within the armoire unit and to the sides (Q) of each drawer. Assembly of the drawers is completed then with the addition of the face panels (parts V for the small drawers; W for the large drawer). Use glue here, and drive 1" brads through the drawer fronts (R or S) into the face panels. Again using 1" brads, fasten the hardboard rear panel (M) to the back of the armoire, driving the brads through M into parts A,



Use 1" brads to attach M to A, D, and E. Miter front ends of boards P and attach to A. Miter both ends of O and attach to L.

attached next. First, miter both ends of the front base piece (O) at a 45° angle, and miter the matching end of each of the two side base pieces (P). Parts P are then glued and nailed to parts A, while O is fastened to the face frame bottom (L).

Cabinet. The cabinet door comprises parts X, Y, and Z. Start by routing out a 1/8"-wide x 3/8"-deep channel centered along the inside edges of parts X and Y. The cabinet door panel (Z) is nestled within these channels and secured in place with glue. The excess channel space on both ends of each part X may be concealed with a wood filler. Otherwise, **cut** four 1/8" x 3/8" x 1 1/2" splines from scrap and glue into place. Hang the door with hinges mounted 4" in from each end. Attach wooden knobs to the drawers and cabinet door, sand the entire unit and finish as desired.

Assuming you've left out the middle shelf (C), it's an easy matter **to** make the cabinet compartment into a closet for hanging clothes. All that's needed is a pair of 1 3/8" diameter clothes pole sockets and a 17" length of 1 3/8" dowel. Just locate the sockets 3" below the cabinet ceiling (C), and centered on parts A and B. Detail 5 shows the arrangement found in the closet option.

and L, as shown in the schematic. The horizontal parts J, K, and L are spaced 6" apart in the frame to make room for the drawers. Clamp the completed face frame securely, and allow all glue to dry before continuing.

The face frame assembly is then carefully positioned on the cabinet compartment and fastened into place. Now attach the remaining side panel (A) to the construction. Use

B, D, and E. The front and side base pieces are

MATERIALS LIST

Qty.	Size	Material	Items
1	1/8" x 48" x 96"	Hardboard	M,T,U
1	1/2" x 48" x 96"	Mahogany plywood	Q,R,S
1	1/8" x 13" x 31"	Pine or birch plywood	Z
47	Board feet, 3/4"	Pine	A,B,C,D,E,F,G, H,I,J,K,L, ,N,O,P,V,W,X,Y

CUTTING SCHEDULE

All measurements are in inches. All material is pine unless otherwise indicated.

Item	Qty.	Size	Description
A	2	3/4 x 16 1/4 x 44 1/2	Sides
B	1	3/4 x 16 1/8 x 37 1/2	Vertical divider
C	3	3/4 x 16 1/8 x 17 1/4	Shelves
D	1	3/4 x 2 x 34 1/2	Upper back crosspiece
E	1	3/4 x 2 x 16 1/2	Lower back crosspiece
F	7	3/4 x 2 x 16 1/8	Drawer supports
G	3	3/4 x 1 1/2 x 15 3/8	Top supports
H	2	3/4 x 1 1/2 x 44 1/2	Face frame sides
I	1	3/4 x 1 1/2 x 34	Face frame vertical divider
J	2	3/4 x 1 x 33	Face frame top drawer guides
K	4	3/4 x 1 x 15 3/4	Face frame drawer guides
L	1	3/4 x 2 1/2 x 33	Face frame bottom
M	1	1/8 x 35 1/4 x 44 1/2 (hardboard)	Rear panel
N	1	3/4 x 17 3/4 x 37 1/2	Armoire top
O	1	3/4 x 1 5/8 x 37 1/2	Front base piece
P	2	3/4 x 1 5/8 x 17 3/4	Side base pieces
Q	12	1/2 x 5 5/8 x 16 (mahogany ply.)	Drawer sides
R	10	1/2 x 5 1/4 x 13 3/4 (mahogany ply.)	Small drawer fronts and backs
S	2	1/2 x 5 1/4 x 31 (mahogany ply.)	Top drawer front and back
T	5	1/8 x 14 1/4 x 16 (hardboard)	Small drawer bottoms
U	1	1/8 x 16 x 31 1/2 (hardboard)	Top drawer bottom
V	5	3/4 x 16 3/8 x 16 1/4	Small drawer face panels
W	1	3/4 x 6 3/8 x 33 1/2	Top drawer face panel
X	2	3/4 x 2 x 34 3/8	Cabinet door frame verticals
Y	2	3/4 x 2 x 12 1/4	Cabinet door frame horizontal
Z	1	1/8 x 12 3/4 x 30 7/8 (ply.)	Cabinet door panel

Hardware:

- 6 pair 16" drawer guides
- 8 1 1/2" diameter wooden knobs
- 1 pair door hinges
- 1 small box 1" brads
- 1 small box 1 1/4" finish nails
- 1 bottle yellow carpenter's glue
- 1 quart finish

60

CHINA HUNT



ARE YOU LOOKING for a showpiece china hutch to display your elegant chinaware, antique vase, or collectibles? Here's the perfect cabinet for you, with lots of transparent glass to show off your treasures. It even has an elegantly wallpapered hatching that can be changed at will. Select the decorative hardware to match the decor of your room—bright, brassy and modern or dark and intricate Mediterranean, or even sleek Oriental. You'll find a wide variety of handles and drawer pulls in all styles at any good hardware shop.

Choose flat defect-free boards in the wood of your choice for the frame. Rip them on the table saw into strips 13/4" wide. Remove all saw marks with a plane or jointer. Do not remove too much stock, just enough to clean the edges. Cut the strips to the various lengths. For the front, you will need three strips cut to 28 1/2". These are for the crosspieces. You will also need one piece 5 3/4" x 28 1/2" to be used for the lower section.

Drill dowel holes as indicated; the use of a doweling jig and dowel centers is recommended. Mark off the hole locations and drill into the ends of the crosspieces. Make the holes 3/8" in diameter and 1 1/16" deep. Because of the narrow width (1 3/4") use only one dowel per joint. The jig will automatically center the hole. After drilling the crosspieces, use dowel centers to transfer the hole locations to the uprights. Use two dowels for the wide bottom piece.

Before assembling the parts to make up the frame section, prepare the clamps by opening them up to size; also have some scrap strips of wood at hand for protecting the work surface from the clamp jaws. Bar clamps are ideal for this operation. Dab some glue on the dowels, insert into the drilled holes, then coat the mating surfaces with glue and join. Use adequate pressure on the clamps to force glue from the joint, but do not overtighten. Check the frame to be certain that it is square, then set aside while the glue dries.

Prepare the side crosspieces and the rear uprights. These are drilled and assembled much like the front frame, the only difference being that the depth of the dowel holes differs. The holes are drilled 1 1/2" deep into the 9 1/4" crosspieces and 1/2" deep into the uprights.

After drilling the necessary holes into the rear uprights, rabbet the edge to take the rear panel. Because the uprights are only 3/4" X 3/4" in cross section, a double pass on the table saw is recommended rather than using the router.

The side frames are assembled by gluing the crosspieces to the rear uprights. These are then glued to the front frame. Again, use the dowel centers to locate the holes for the dowels from the crosspieces to the front frame.

The frame at this stage will be somewhat flimsy, so handle with care. The addition of the shelves is the next step. This will make the frame rigid and strong. Cut the frames to size, then drill diagonal holes through the bottom of the three lower shelves. The top piece is drilled from the top side. Use 1 1/2" round head (RH) screws to attach the shelves.

The frames for the doors and side panels are made next. Cut the necessary pieces and assemble them with 3" finishing nails. Pilot holes for the nails must be drilled to simplify nailing and to prevent splitting. Note: Space the nails so they won't be cut with the router later on when making the rabbets for the glass.

The side panels will be held in place with screws which must not show in the finished cabinet. This is accomplished by drilling screw holes in the rabbeted area where the glass molding will conceal them. Drill the holes before assembling the panels.

When all the panels are assembled, rabbet them for the glass and cut the decorative bead using the router. Sand all edges and surfaces, then install into the frame. The nose and cove molding is added using glue and spring clamps to hold them in place. Miter all corners and use care not to mar the molding surface. A piece of felt glued under the clamp jaws is recommended.

Door panels are made with sufficient allowance for the strip hinges. The left-hand doors have a door stop added. The right-hand doors are beveled at the left edge to clear the other door. When installing the strip hinges, use only the end holes until you have checked fit. If fit is okay, you can then add the balance of the screws.

The bottom door which opens horizontally is treated in the same manner. Instead of glass, it has a 1/4" back panel. In addition, it has an insert to improve its appearance. This insert is simply a piece of 3/8" solid lumber which drops into the panel opening.

Add the plywood inserts to the bottom panels of the side pieces. These are glued into place.

Next add the decorative strips around the top of the cabinet. This is made by rabbeting a long strip of 1 1/4" stock which is then cut apart and mitered. Hold it in place with screws and glue.

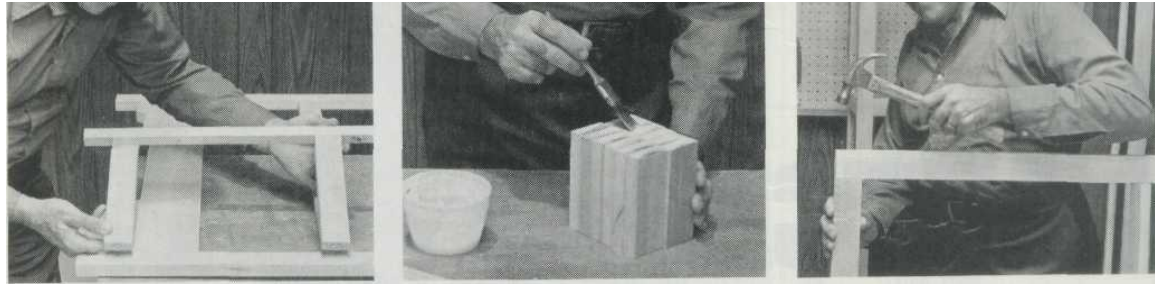
The rear panel of 1/4" plywood is *not* nailed to the cabinet. Instead it is screwed so that it can be removed as desired to change the decorative paper background. Use round head screws.

Drill the holes for the various pieces of hardware. Mount and check fit. Remove hardware when applying finish, then replace.

Finish the cabinet as desired. You can stain the wood and top with several coats of varnish for an antique look.



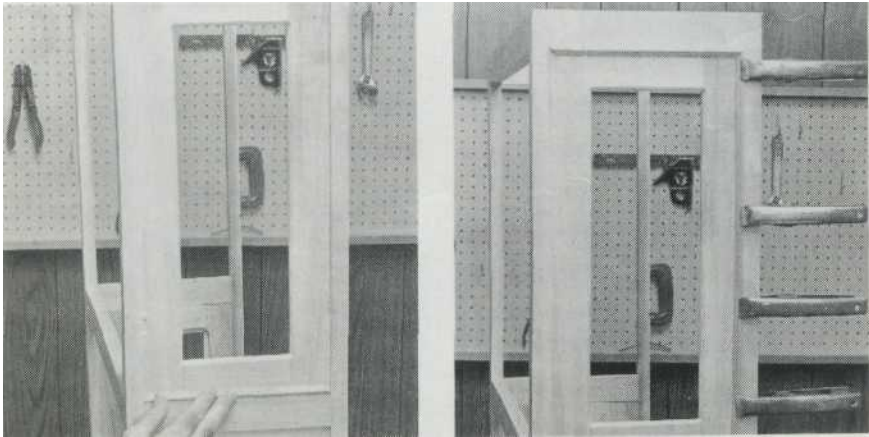
The frame sections of the china hutch are assembled with the aid of glue and spiral dowels. Dowel centers are recommended to



This photo more clearly shows how locating pins are used to transfer the dowel holes from the edge to front of frame. Use bar clamps till glue dries

Shown here is how the end grain of the crosspieces are given a sizing coat of glue. Sized glue is made by mixing equal measurements of

The upper, center, and lower panels are assembled with glue and nails. Pilot holes are drilled before nailing to prevent the thin wood from

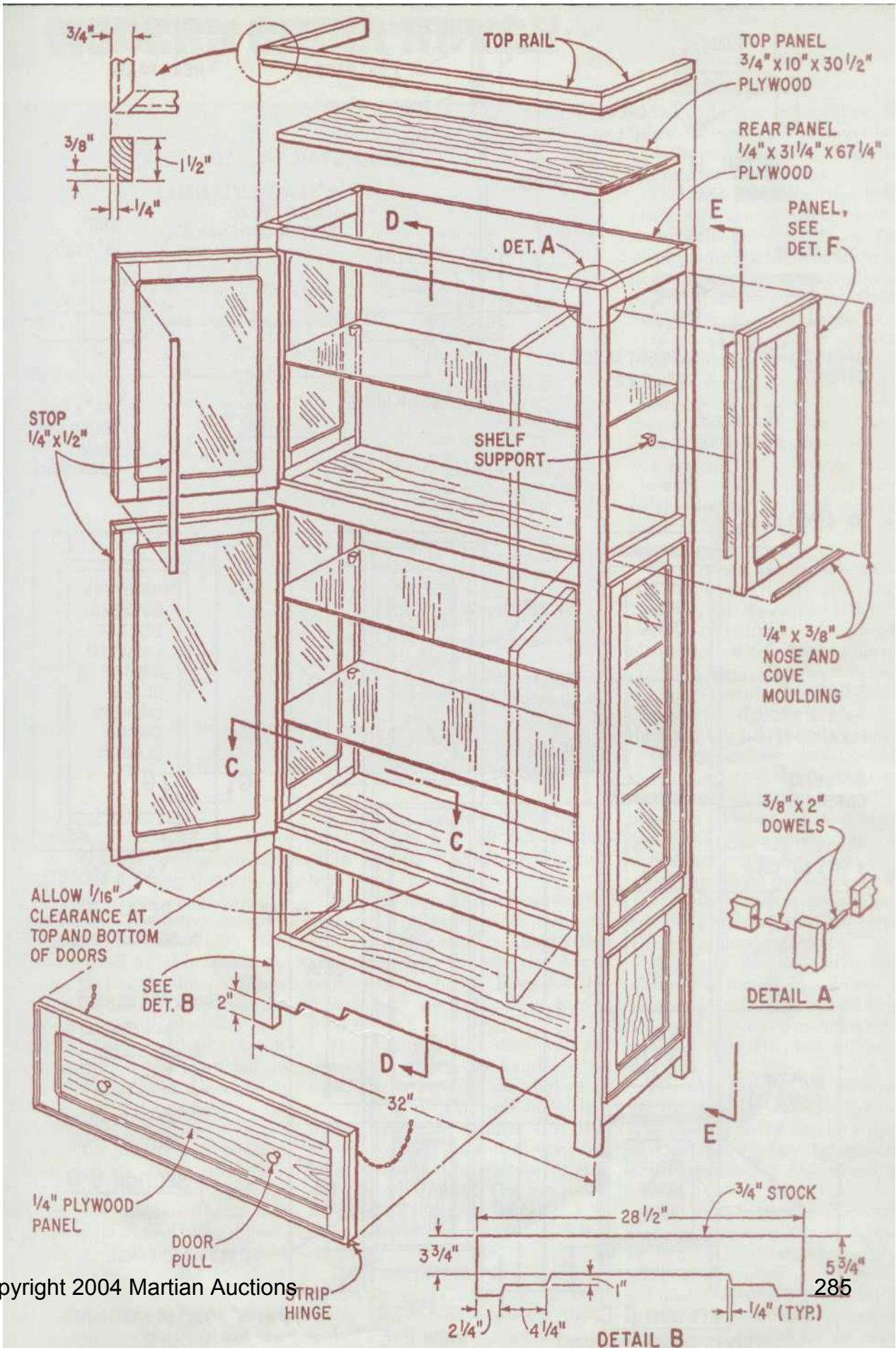


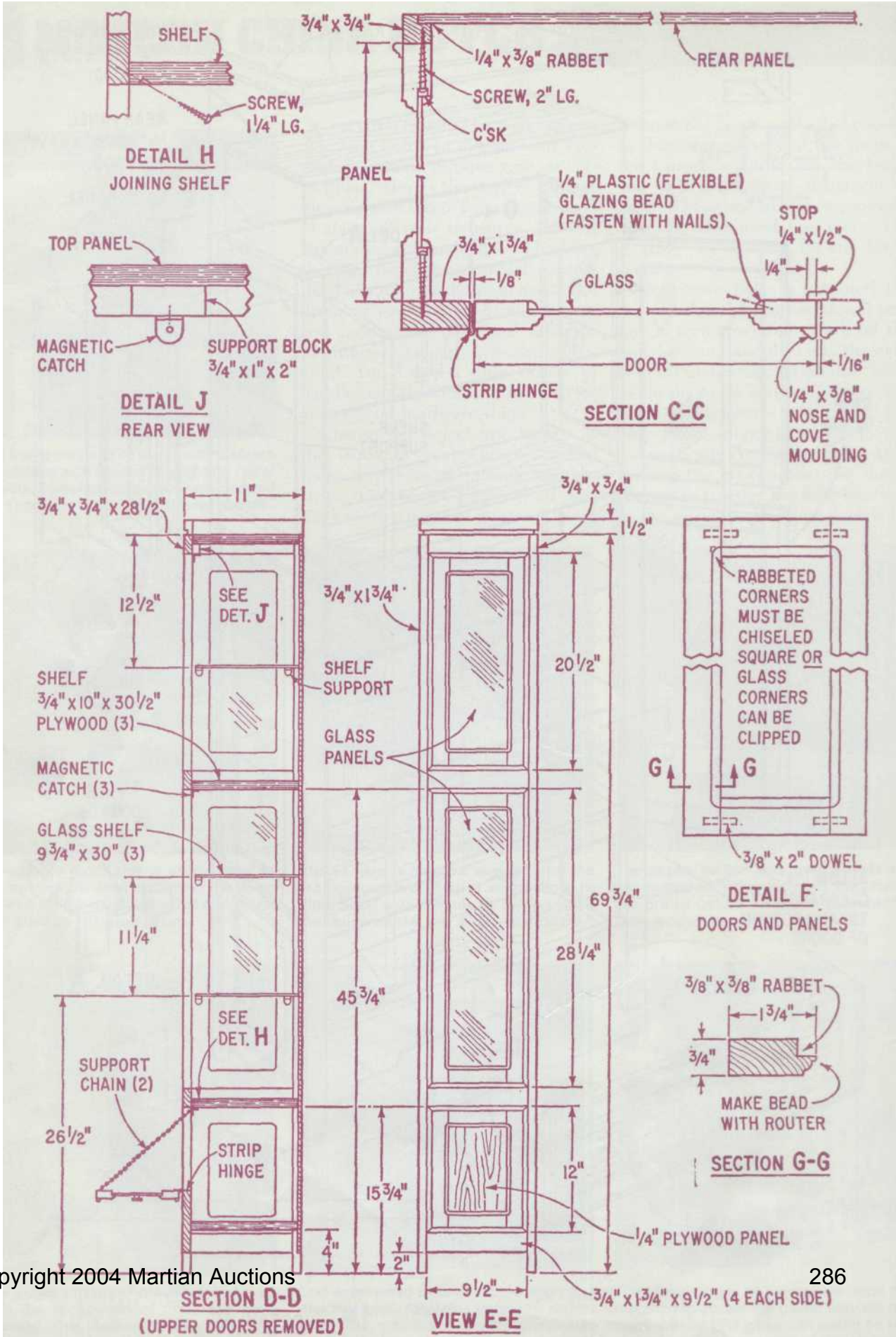
The edges of the panels are dressed up with the application of nose and cove molding. This molding can be bought at lumber yards, home decorating centers.

You won't need to use nails to apply the molding if you follow the technique shown here. The molding is simply glued into place, held by clamps until dry



The inside edges of the panels must be rabbeted to accept the glass; they are re-moveable so that glass can easily be replaced in the event they are broken.





61

Shaker-Style Woodbox



G

iven the resurgence of fireplaces and wood-burning stoves over the last couple of decades, needs for in-home firewood storage also have redeveloped. Unlike earlier times, when many households depended upon wood-fueled fires for all of their cooking and heating, storage requirements today are somewhat reduced. This became readily apparent as I looked through my library for design ideas to construct a woodbox. While the room's overall ambiance is southwestern, it also contains a few other early-American antique pieces. A durable, functional woodbox was needed that, rather than providing a focal point for the room's decor, would serve its purpose without detracting from the ambiance.

Because the box was to be painted, I built it of clear white pine. Also, since the box was to be simple but functional, the joinery was selected on the basis of durability and efficiency. This box is easy to make, but it is still high quality. To ensure that the box would hang together as chunks of firewood are thrown in, and as the wood shrinks and swells with the changing seasons, the joinery, the grain orientations and the seasonal movements of its components all had to be carefully considered. As indicated in the drawings, da-

does and rabbets were used to join this box, securing the joints with cut nails. Cut nails are my choice over wire nails because they have more holding power and are historically correct for this style of joinery. I oriented the grain so the ends and bottom expand and contract in unison; that is, the cross-grain dimension extends front to back in these components. Thus, the front and back panels are carried along as the end and bottom shrink and swell.

The cross-grain orientation in the front, back and partition is vertical so these three components move as a unit as well. However, the partition is not carried with the bottom; therefore, the partition is housed in dados at each end and its length is adjusted so the bottom (along with the front and back panels) will move independently throughout the year.

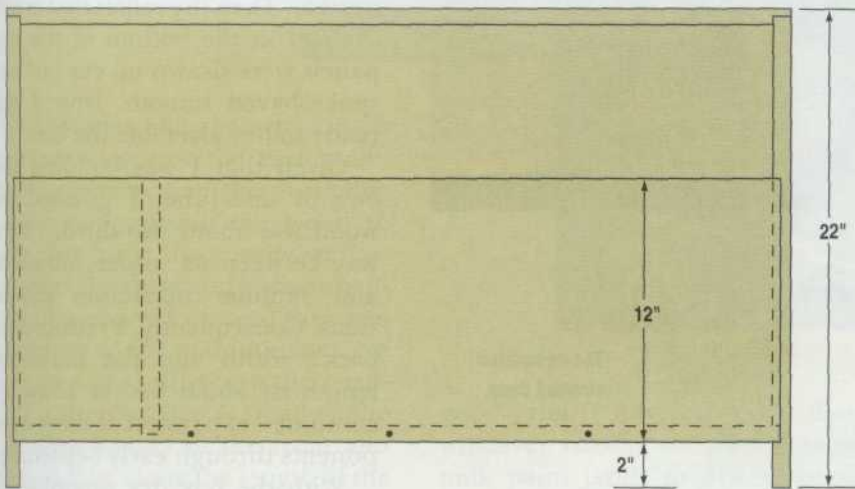
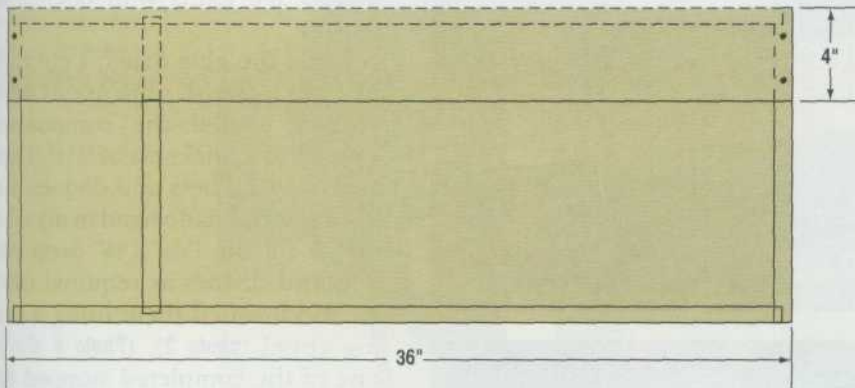
Finally, the rabbets in the end panels are stopped at the bottoms of the front and back panels. With the bottom housed in dados in the ends and in rabbets in the front and back, the bottoms of the front and back should be fixed, forcing expansion and contraction of these components to operate along their tops.

Since the back is housed in the top of the rabbet, the gap between the back and top from late-winter to mid-summer will be visible only from the back. However, the front will shrink to expose an 1/8" or so of the rabbets in each end, while in late summer the front's top edge will extend above the relief in the ends

If this is objectionable, one could use a housed rabbet and dado joint, stopping the dado below the relief. This is a more complicated joint, however, requiring a bit more time which translates, in the commercial world, to additional cost.

With these design and construction details thought through, I proceeded to select and square-up stock for this box, not overly concerning myself with grain and color matching since the box was going to be painted. I also did not discard stock because of blue stain as I glued-up stock to the panel dimensions given in the cutting list. To make the wider panels, I simply edge-joined the stock, liberally spreading yellow glue on the edges, and clamped the stock together. Since one of my most important goals is to build furniture that does not self-destruct a decade

Dimensions



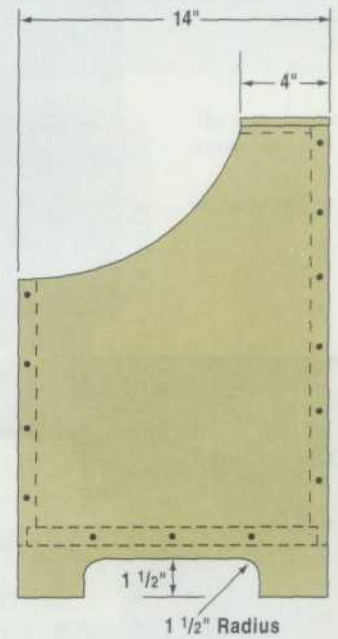
Materials List

White Pine:

2 ends	$1\frac{3}{16}" \times 14" \times 21\frac{9}{16}"$
1 front	$1\frac{3}{16}" \times 12" \times 35\frac{1}{8}"$
1 back	$1\frac{3}{16}" \times 19\frac{9}{16}" \times 35\frac{1}{8}"$
1 top	$1\frac{3}{16}" \times 4" \times 36"$
1 partition	$\frac{3}{4}" \times 11\frac{9}{16}" \times 13\frac{1}{8}"$
1 bottom	$1\frac{3}{16}" \times 13\frac{1}{8}" \times 35\frac{1}{8}"$

2d cut finish nails

1 pint milk paint

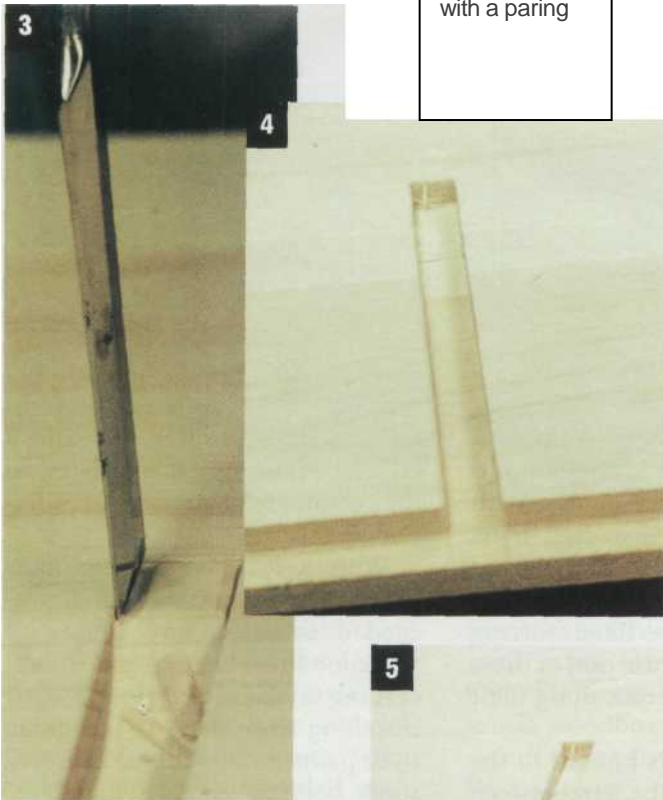




1
Cutting glued-up ends to finish dimensions



2
Cutting the rabbet in the bottom edge of the back panel



3
Completing a stopped dado with a paring

4
The complete stopped dado.

or two hence, I did not "reinforce" these edge joints with biscuits or dowels.

Once the glue dried, I cut each piece to its finish dimensions (photo 1) and planed the components smooth to a thickness of 13/16". Then I laid out rabbets and dados. Using a stacked dado head in my table saw, I cut the 13/16"X3/8" deep rabbets and dados as required (photo 2), and finished them using a paring chisel (photo 3). (Photo 4 shows one of the completed stopped dados.) I also cleaned up the rabbets with a shoulder plane so the assembled joints would be tight and crisp (photo 5). Then the reliefs that create the feet in the bottom of the end panels were drawn in, cut out and spokeshaved smooth. Now I was ready to dry assemble the box.

Given that I was building this box in mid-June, I guessed my wood was about two-thirds of the way between its winter minimum and summer maximum dimensions. Consequently, I reduced the back's width and the partition's length by about 3/32" to allow for continued expansion of these components through early September

With the box dry assembled, I laid out the curved relief in the top front of the end panels. By drawing the curves full-size on the ends, I could play with the shape until I found one that was pleasing to the eye. Disassembling the box, I cut the reliefs in each end, spokeshaved them smooth, and sanded the inside surfaces to 180 grit. The box was now ready for final assembly.

As before, I assembled the box dry and clamped it together securely. No glue was used in the box's assembly to ensure that slight differences in expansion would not cause the components to pull themselves apart. Using a 1/16" drill bit, I provided pilot holes for the nails and proceeded to nail through the ends into the front, back and bottom panels. In using cut nails, which have a



Cleaning up a rabbet joint with a shoulder plane



Driving a cut nail, showing the wide dimension of the nail, is oriented along the grain of the wood you're nailing through

The assembled and sanded woodbox.



rectangular cross-section shape, the wide dimension must be oriented along the grain (**photo 6**); thus the wedge effect of the wider than thick nails is exerted against the end grain, thereby eliminating the possibility of the nail causing the wood to split. Similarly, the bottom was secured to the front and back by nailing through the front and back into the edges of the bottom panel. No nails are used to secure the partition, since the idea is to allow the partition dadoes in the front and back to float along the length of the partition as the bottom/ends unit expands and contracts. Finally, I nailed the top to the ends, then countersunk all nail heads 1/16" to 1/8" below the surface. The cavities were filled, and after the filler cured, all exterior surfaces were sanded to 180 grit. (**Photo 7** shows the assembled box.) While 180 grit abrasives leave far too coarse a surface for my taste, this box was to be painted with tavern green milk paint. Since milk paint provides a textured mat surface, sanding beyond 180 grit would have been a wasted effort.

Following the manufacturer's directions, I mixed a pint of tavern green milk paint and coated the box inside and out. Now I have painted a fair number of Windsor chairs with milk paint since I began building chairs in 1984, but despite this decade of experience, my reaction as the first coat of milk paint dries is almost always the same — good grief, I have ruined it! For whatever reason, the first coat of milk paint tends to dry off-color and blotchy, in a word, awful! (**photo 8**) Anyhow, I persevered and burnished the dry painted surface with #2 steel wool. Then I applied the second coat and, voila, things were looking up. Once the paint was dry, I again burnished the surface, this time with #0000 steel wool. Now the box looked like something I could sign.

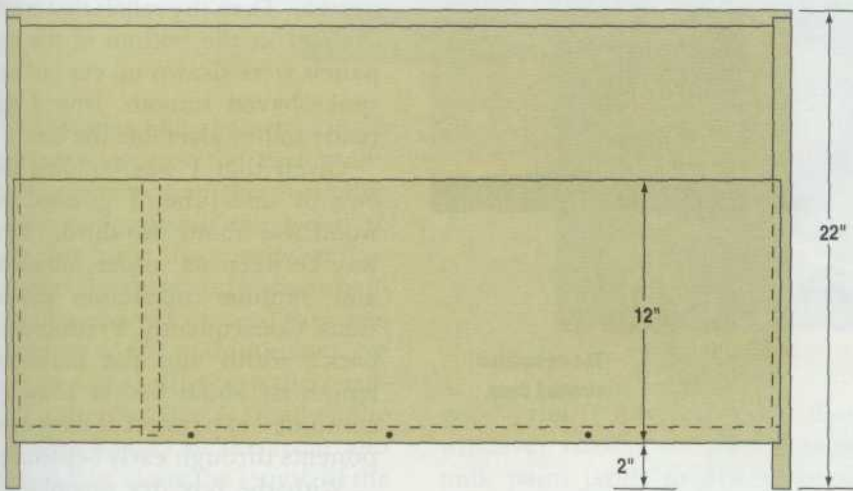
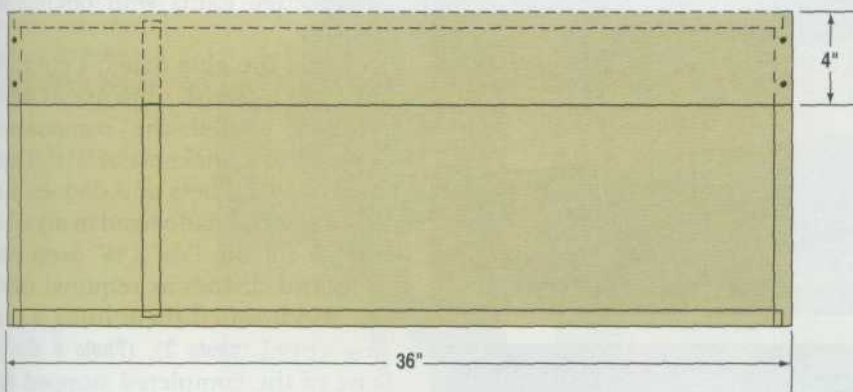
While the milk paint provides a



Applying milk
pain

very durable and quite refractory finish, it does water spot badly. To minimize this, I always seal milk painted surfaces with an oil finish of some sort —tung oil, Watco Danish oil or, for this piece, a mix of equal parts of boiled linseed oil, turpentine and satin polyurethane varnish. I coated the box with this mix, let it stand for 10 or 15 minutes, then wiped off the excess with paper towels, taking great care to collect all the oily paper afterward and destroy them in my wood-burning stove to avoid having them

Dimensions



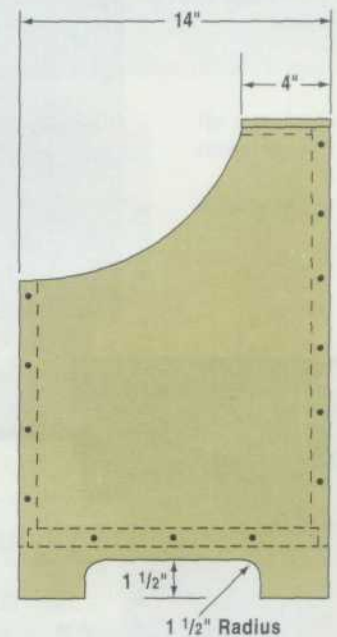
Materials List

White Pine:

2 ends	$1\frac{3}{16}" \times 14" \times 21\frac{9}{16}"$
1 front	$1\frac{3}{16}" \times 12" \times 35\frac{1}{8}"$
1 back	$1\frac{3}{16}" \times 19\frac{9}{16}" \times 35\frac{1}{8}"$
1 top	$1\frac{3}{16}" \times 4" \times 36"$
1 partition	$\frac{3}{4}" \times 11\frac{9}{16}" \times 13\frac{1}{8}"$
1 bottom	$1\frac{3}{16}" \times 13\frac{1}{8}" \times 35\frac{1}{8}"$

2d cut finish nails

1 pint milk paint



does and rabbets were used to join this box, securing the joints with cut nails. Cut nails are my choice over wire nails because they have more holding power and are historically correct for this style of joinery. I oriented the grain so the ends and bottom expand and contract in unison; that is, the cross-grain dimension extends front to back in these components. Thus, the front and back panels are carried along as the end and bottom shrink and swell.

The cross-grain orientation in the front, back and partition is vertical so these three components move as a unit as well. However, the partition is not carried with the bottom; therefore, the partition is housed in dadoes at

els) will move independently throughout the year.

Finally, the rabbets in the end panels are stopped at the bottoms of the front and back panels. With the bottom housed in dadoes in the ends and in rabbets in the front and back, the bottoms of the front and back should be fixed, forcing expansion and contraction of these components to operate along their tops.

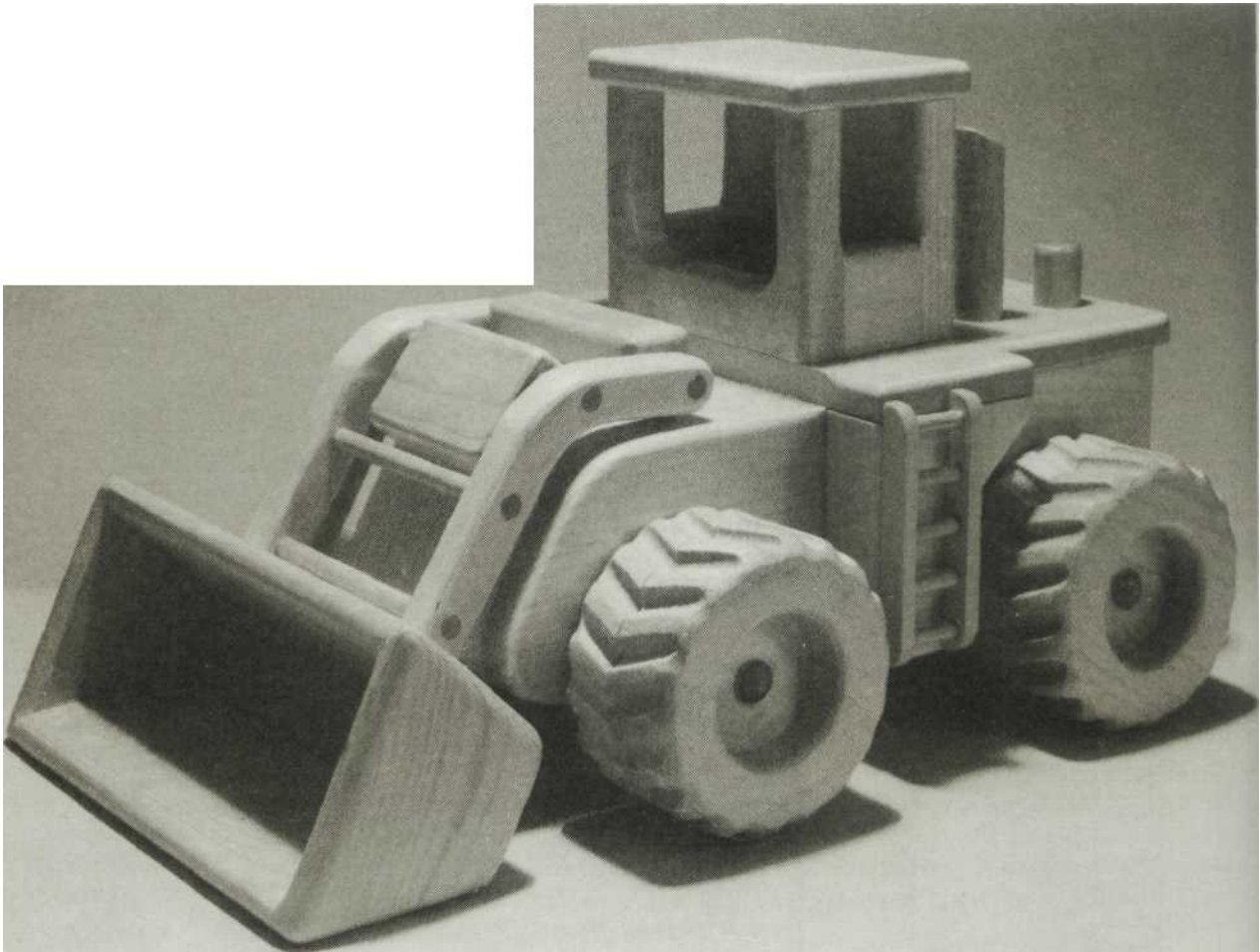
Since the back is housed in the top of the rabbet, the gap between the back and top from late-winter to mid-summer will be visible only from the back.

dado joint, stopping the dado below the relief. This is a more complicated joint, however, requiring a bit more time which translates, in the commercial world, to additional cost.

With these design and construction details thought through, I proceeded to select and square-up stock for this box, not overly concerning myself with grain and color matching since the box was going to be painted. I also did not discard stock because of blue stain as I glued-up stock to the panel dimensions given in the cutting list. To make the wider panels, I simply edge-joined the stock, liberally spreading yellow glue on the edges, and clamped the stock together. Since one of my most important

<p>each end and its length is adjusted so the bottom (along with the front and back pan-</p>	<p>However, the front will shrink to expose an 1/8" or so of the rabbets in each end, while in late summer the front's top edge will extend above the relief in the ends. If this is objectionable, one could use a housed rabbet and</p>	<p>goals is to build furniture that does not self-destruct a decade</p>
--	---	---

EARTH MOVER



This earth mover features a moveable shovel that stops in different positions. This project should successfully accommodate most of your child's heavy earth moving needs for quite sometime. It is pictured here built in clear pine but it can be built in a wide variety of woods. Soft maple would be an excellent alternate choice.

Begin construction with the body. Rip an 18" length of 3/4" stock 4-1/2" wide then set the saw for a 30 degree bevel. Make a crosscut to produce the mitered ends. Cut from the remainder then make a series of 1/8" deep kerf cuts spaced 1/8" apart to detail the radiator grille.

Cut the side pieces to size then bore the axle holes before assembly. Use a belt sander or hand plane (or both) to form the front end curves.

Cut the cab and remaining body parts to size then use the router with a 5/32" corner rounding bit to ease all sharp corners before completing the body assembly.

Construct the bucket and bucket arm assembly. Mark the location of the arm ends and use a chisel to cut the 1/4" deep mortises to receive them. If you have a brad point or Forstner bit that bores a flat bottomed hole, use it first then square the corners with the chisel. The bucket pivot is nailed and glued to the body after the entire bucket assembly has been completed.

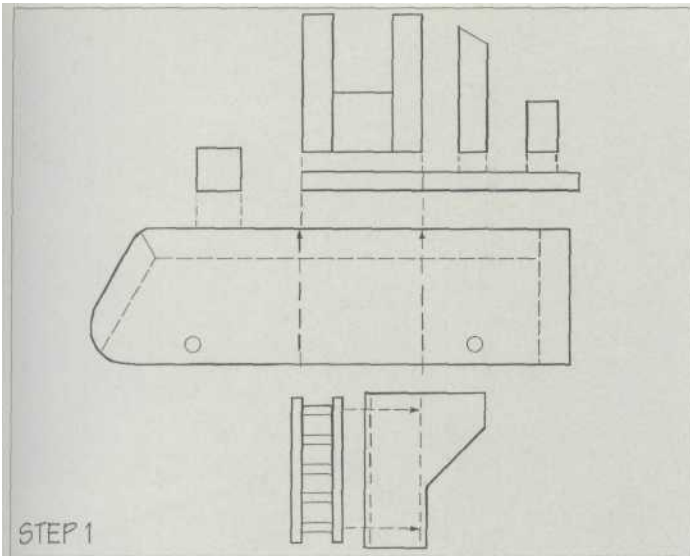
The fat wheels are made up by joining two discs of 1-1/8" stock after angled holes are bored to form the knobby treads. The simple jig used to

bore the holes features a hardwood guide block which has two holes drilled at 20 degree angles in **opposite** directions. Note that these holes must align with the pivot hole so they are bored from the bottom of the block before the jig is assembled.

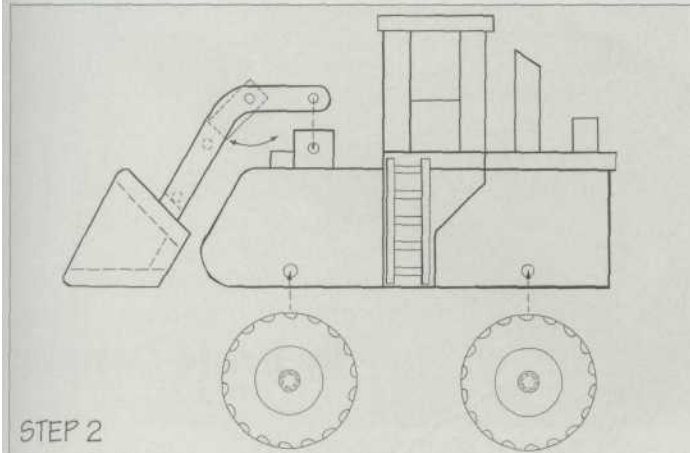
The jig may be used with a portable drill or on a drill press. If using a drill press tilt the table or prop the jig so the bit enters the angled guide holes squarely. Bore the holes in discs #1 & #2 as indicated. To save layout time make photocopies of the wheel diagram and attach to each disc with rubber cement.

Use a 2" dia. Forstner bit to bore the recess in the outer disc, Part 1, then Counterbore for the plug and axle. Saw the discs to final size after the angled holes are bored to reveal the treads. Use the router to round over the corners. Sand then glue the wheels to the axles in place on the body.

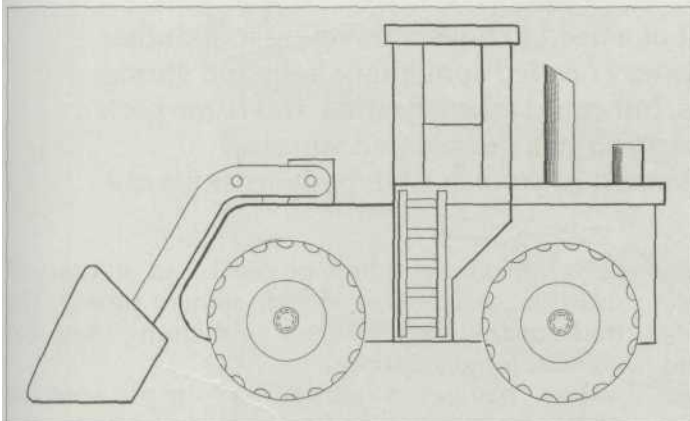
Finish with several thin coats of shellac or two coats of polyurethane finish.



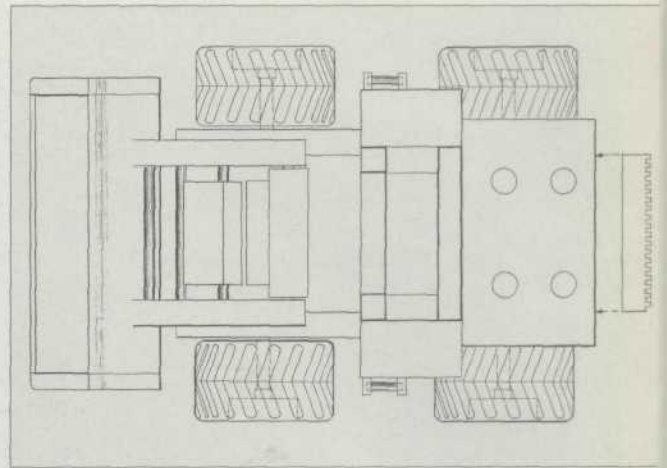
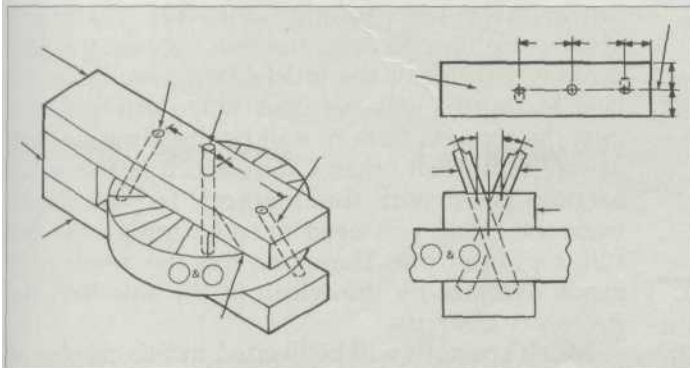
STEP 1



STEP 2



STEP 3 COMPLETED PIECE



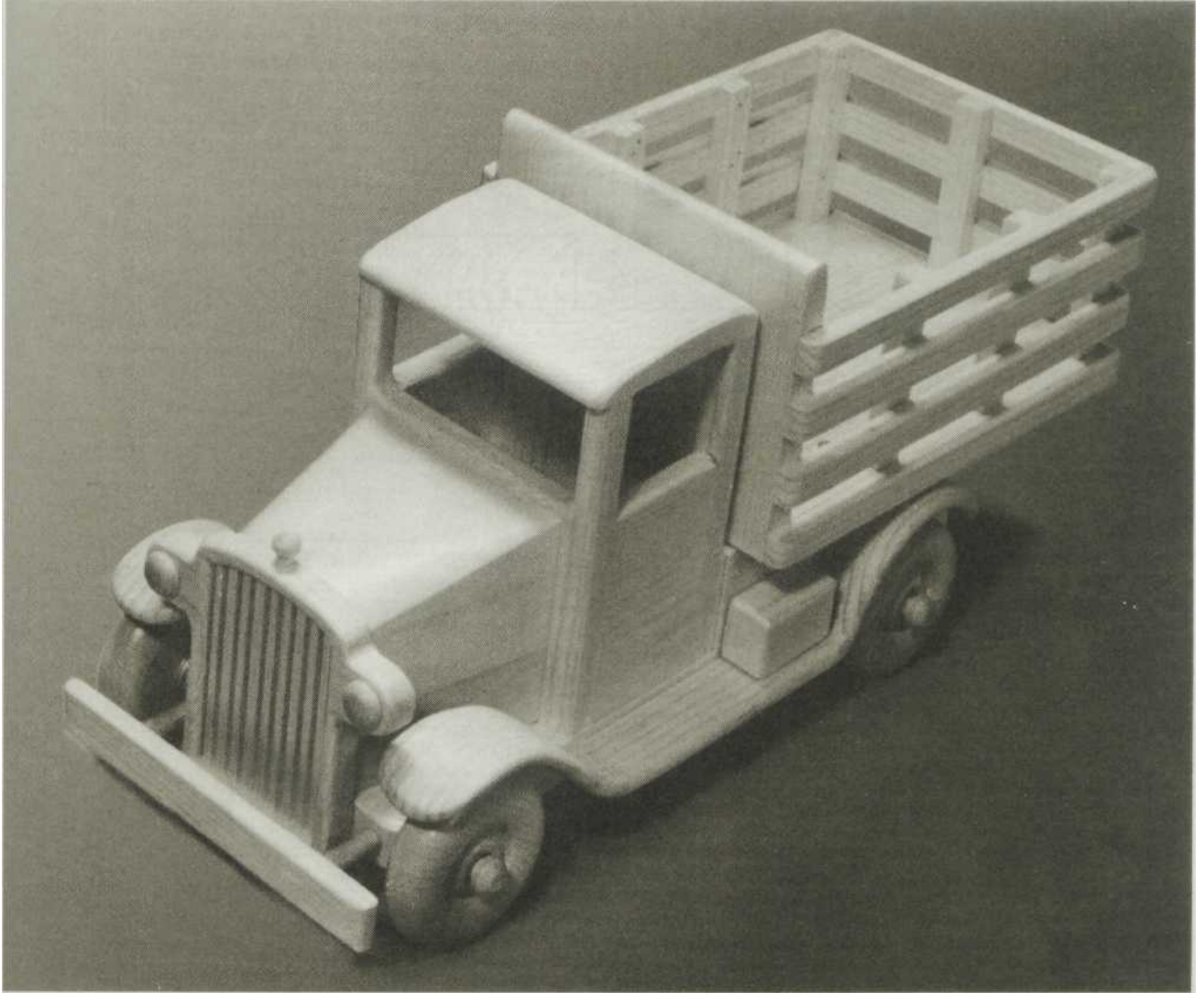
PLAN VIEW OF COMPLETED PIECE

BRUT EARTH MOVER MATERIAL LIST

QTY. DESCRIPTION

4	1-1/8" x 5" dia.	(outer wheel)
4	1-1/8" x 5" dia.	(inner wheel)
2	3/8" dia. x 8-1/2" dowel	(axle)
4	5/8" dia. wood buttons	(hub cap)
1	3/4" x 3-5/16" x 4-1/2"	(body front)
1	3/4" x 4-1/2" x 10"	(body top)
1	3/4" x 3-1/2" x 4-1/2"	(radiator)
2	3/4" x 3-1/2" x 12"	(body side)
2	1-1/8" x 3" x 3-1/2"	(body)
1	1/2" x 3" x 3-1/2"	(cab deck)
1	1/2" x 3-7/8" x 6-1/2"	(engine hood)
1	3/4" x 3-1/2" x 5"	(cab front)
1	3/4" x 3-1/2" x 5"	(cab rear)
2	3/4" x 1-1/2" x 1-1/2"	(cab side)
1	1/2" x 3-3/8" x 5-1/4"	(cab roof)
2	3/4" dia. x 3-1/2" dowel	(exhaust)
2	3/4" dia. x 1-1/2" dowel	(exhaust)
2	1/2" x 2-3/4" x 4"	(bucket end)
1	1/2" x 3" x 8"	(bucket rear)
1	1/2" x 1-1/4" x 8"	(bucket bottom)
1	1/2" x 3-1/2" x 8"	(bucket front)
2	3/4" x 2-1/4" x 6-1/4"	(bucket arm)
1	3/4" x 1-3/4" x 3"	(bucket lift)
1	1/2" x 5/8" x 3"	(bucket stop)
1	1-1/8" x 1-1/8" x 3-3/4"	(bucket pivot)
4	5/16" dia. x 5-3/8" dowel	(arm support)
4	1/4" x 1/2" x 3-3/4"	(ladder rail)
10	1/4" dia. x 1" dowel	(ladder rung)
4	7/16" I.D. x 1" O.D.	(flat washer)

STAKE TRUCK



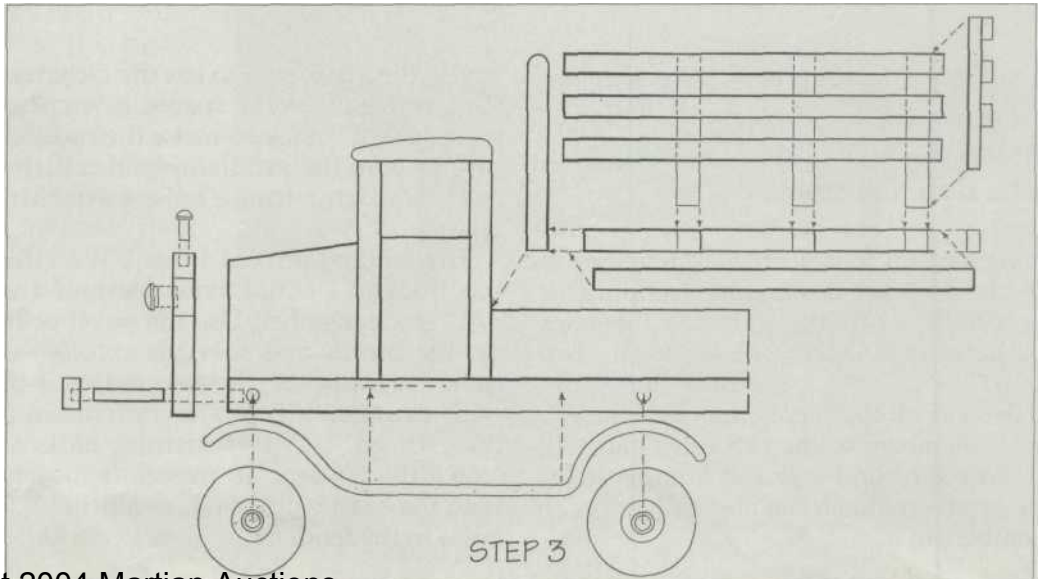
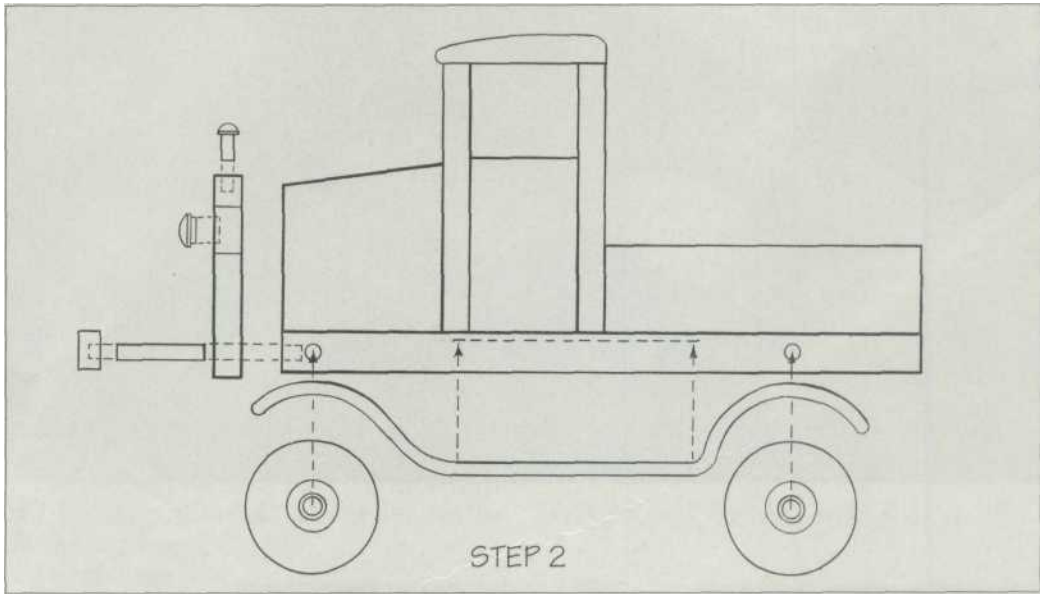
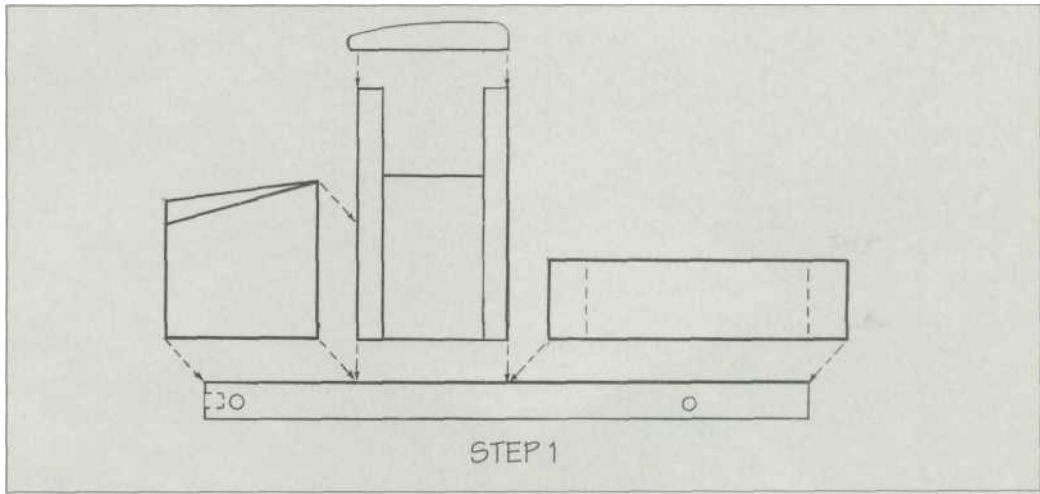
Here is a neat easy to build toy truck that your child will treasure. This truck is made of clear pine but you may opt for a different stock.

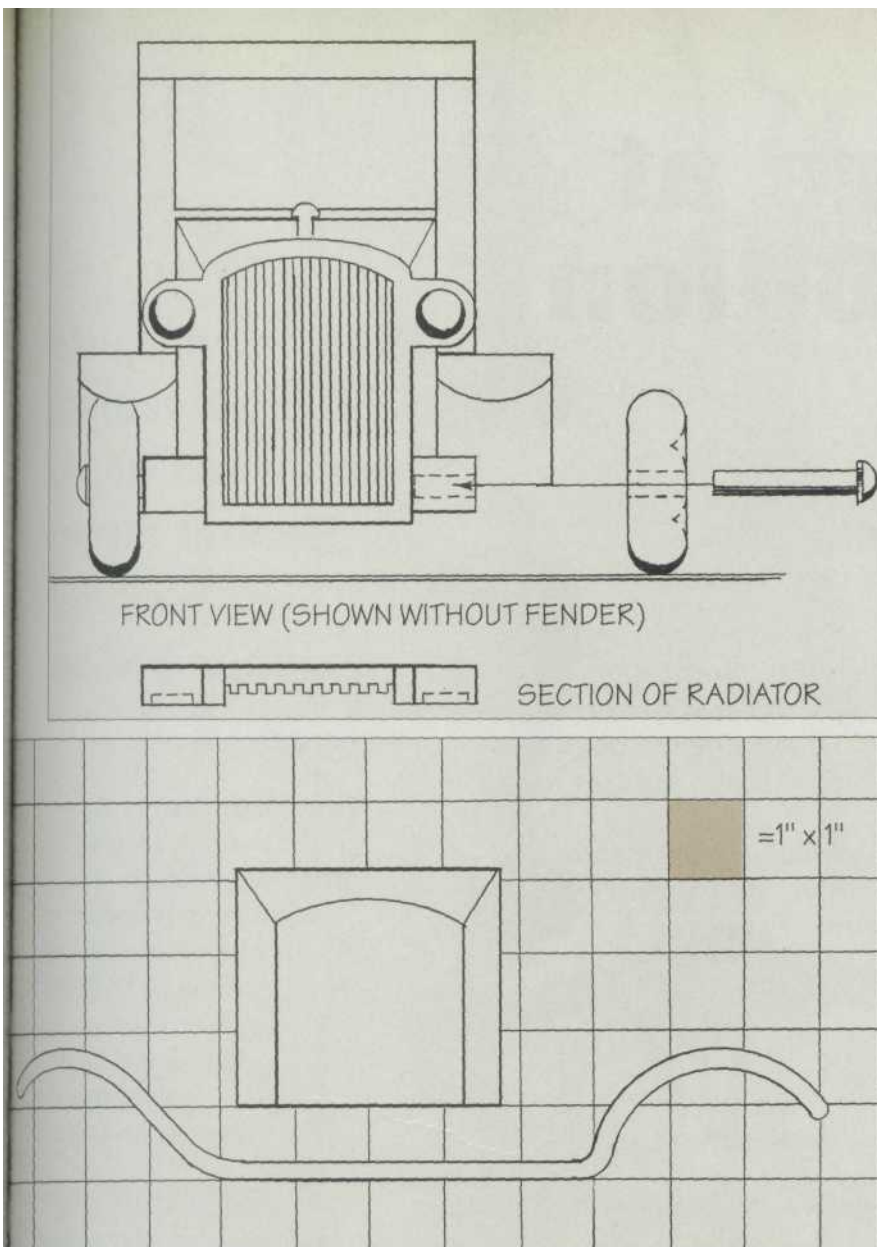
Begin gluing several pieces of stock together to make the thick block for the engine section. Cut this piece to size then saw the slants on the sides and use a plane and sander to form the top contour.

Next, finish sand all the pieces then join the cab front and back members to the cab sides and add the cab roof. Bore the blind axle and bumper holes in the base piece then attach the engine block, cab and back members to it.

Use the scroll saw to cut the radiator frame then cut a series of evenly spaced saw cut grooves in a piece of 3/8" stock to make the radiator frame. Be sure to bore the headlamp and radiator cap holes in the radiator frame before attaching it to the chassis.

The fenders are cut from 1 1/2" thick stock. If this thickness is not available glue two pieces of 3/4" stock together. Use the scroll or hand saw to cut the profile and save the cutoffs—use them as back-up supports during sanding which is done with drum sanding attachments in a drill. Use thin, 19 ga. 1-1/4" finishing nails and glue to attach the fenders. To prevent splitting use a nail, with the head clipped off, as a drill bit to bore pilot holes in the fenders.





The dump truck cargo container has two pivoting parts; the bin which tilts back on a pair of hinges, and the tailgate door which swings open when the bin is tilted up. Attach the hinges to the bin first then hold the bin in a fully raised vertical position so it butts against the rear of the body while marking the hinge screw holes.

To assemble the rails on the stake truck nail and glue the stakes into place in the bed notches then alternately lay the assembly on its sides and attach the rails in place with a dab of glue at each intersection.

The special parts including axle pegs, wood buttons and wheels are available from hobby and craft shops or through mail order woodworker's supply outlets.

The trucks may be clear finished with shellac or varnish or they may be painted with brightly colored non-toxic paints.

TOY STAKE TRUCK MATERIAL LIST

All dimensions are in inches.

Truck body quantity is listed for one truck

QTY.	DESCRIPTION	QTY.	DESCRIPTION
1	3/4 x 4-1/2 x 12 (truck base)	2	5/8 dia. wood button (headlight)
1	3 x 3-1/8 x 3-1/2 (engine)	2	5/16 dia. x 1-5/8 dowel (bumper supports)
1	1/2 x 4-1/2 x 5 (cab front)	1	3/8 x 3/4 x 5-3/4 (bumper)
1	1/2 x 4-1/2 x 5 (cab rear)	1	7/32 dia. x 9/16 (radiator cap)
2	1/2 x 2 x 3-1/4 (cab side)	<i>Additional parts for stake truck:</i>	
1	1/2 x 3-5/16 x 4-1/2 (cab roof)	1	1/2 x 5 1/2 x 8 (bed)
1	3/4 x 1-5/8 x 3 (truck front)	1	1/2 x 4-1/2 x 5-1/2 (front)
2	3/4 x 1-5/8 x 6 (truck side)	7	5/16 x 1/2 x 3-1/2 (stake)
1	3/4 x 1-5/8 x 3 (truck rear)	8	5/16 x 1/2 x 8*-13/16 (side rail)
1	1-1/2 x 1-3/4 x 11-5/8 (left fender)	4	5/16 x 1/2 x*-5-1/2 (rear rail)
1	1-1/2 x 1-3/4 x 11-5/8 (right fender)		
4	2-1/2 dia. x 3/4 (wheel)		
4	5/16 dia. x 1-7/8 (axle peg)		
2	3/4 x 1 x 1-5/8 (gas tank/tool box)		
1	1/2 x 3-3/4 x 4-1/2 (radiator)		
1	300/8 x 2-1/4 x 3-1/4 (radiator grille)		

64

TOY BOX



This little chest, which can hold a bunch of easily accessible toys, turns into a convenient bench when the top is closed. And the lid is controlled by a spring-tensioned support that prevents accidental slamming on little fingers.

Next, rip and crosscut maple edge banding and glue it to the panels (Photo 2). We used 3-way clamps, but you can try bar clamps or even masking tape. Note that the top edge bands of the end panels are slightly long, so they'll be sawn at an angle when the ends are cut to shape. Also, use three 19-gauge brads partially driven into each edge band to keep it from sliding. Band all the panels in this fashion -- except the lid, which gets its edge bands after the chest is assembled.

After the glue dries, scrape off glue beads and plane edge bands flush to the panel surfaces.

Next, set the table saw miter gauge to 35 degrees and make the angled cuts on the end panels (Photo 3). Glue and clamp the edge bands onto the sawn surface. We cut the panel dados and grooves with a router and a 1/2-in.-dia. straight bit. A rectangular frame is used to guide the router to make these cuts (Photo 4). Be sure that the side rails are parallel and are spaced to fit the diameter of your router base, plus the difference between the diameter of the router bit and the width of the required dado or groove. You must precisely measure the thickness of the plywood before setting the distance between the rails. (Hardwood plywood is always slightly thinner than its stated dimension.) Tack nail a movable stop across the rails to control the length of the cut, and cut each groove or dado in two passes. Then, using a chisel, cut the ends of the grooves square.

Making The Splat Rail And Assembly

Cut the splats to shape, then smooth their edges. The pieces will be too small to clamp to a bench. Instead, use a 1/16-in.-radius corner-rounding bit in the router table for the job (Photo 5).



1--Tack nail a strip to the back of each panel. The strip should ride in the miter gauge groove as the panel is being cut.



2--Glue and clamp each of the edge bands to the panels. Note that the top edge band of the end panel is just slightly long.



4--Cut grooves and dados in the end panels with a router. The block tack nail a

With the dado head in the table saw, cut the groove in the top rail and the edge band on the back panel. Then cut the filler blocks to length, leaving the four end blocks 1/2 in. longer than the others. Remember to round off the rail edges before assembling the workpieces.

When the back assembly is dry, complete the project in the following sequence: Insert the back panel into the groove (Photo 7). Join the bottom and front to this subassembly, then add the second end and lay the chest on its back. Next, glue and clamp the entire assembly together (Photo 8) and check it for square. Cut the lid panel to size, glue and clamp the side bands to it and then add the front and back bands. Install the hinge and lid support, attach the standoffs and relieve any sharp corners with fine sandpaper. Finally, apply several coats of polyurethane to finish off the project.



5--Since the splats are so small, it's best to round over their edges on a router table. A ball-bearing bit usually works best.



6--Insert the splats and spacer blocks in the top rail. After the glue has dried, repeat the procedure on the back panel.



7--Begin the assembly by inserting the back into an end panel. Next, add the bottom and front, then the other end.

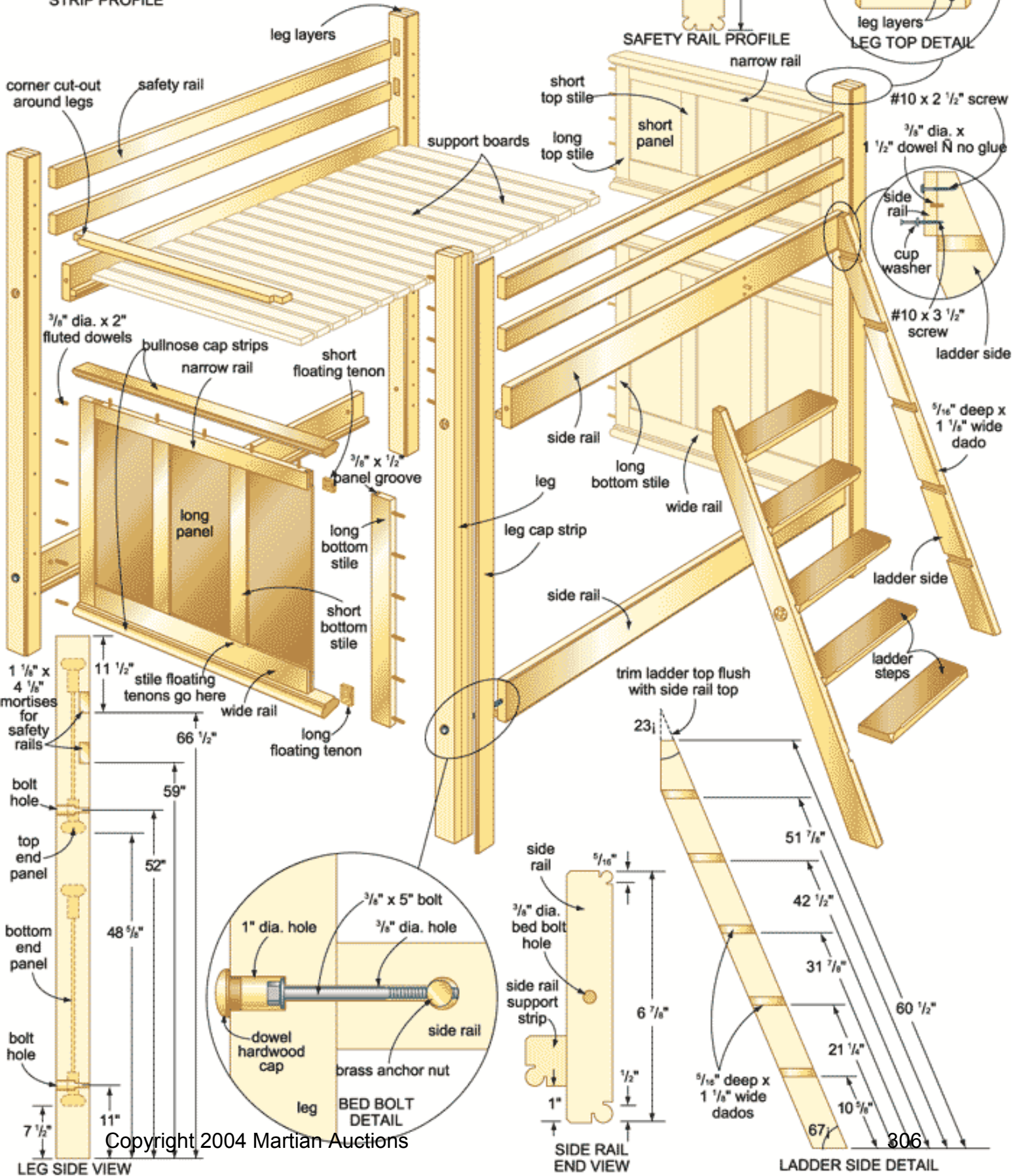
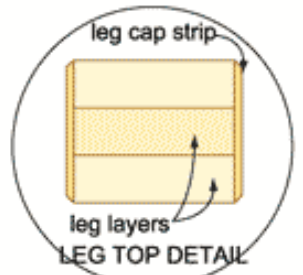
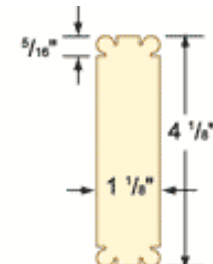
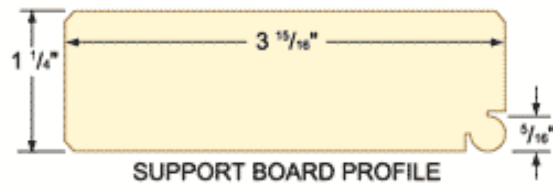
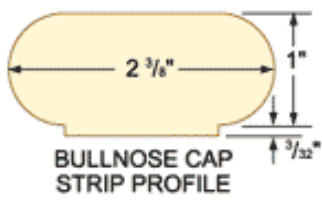


8--Clamp the chest using five bar or pipe clamps. Be sure to check the assembly for square before allowing the glue to set.

65

BUNK BEDS





<i>For the head and foot boards</i>	<i>Size</i>	<i>Qty.</i>
Legs	3 1/4" x 3 5/8" x 78"	1
Leg cap strips	3/16" x 3 1/4" x 78"	8
Long panels	3/8" x 9 7/8" x 24 1/2"	6
Short panels	3/8" x 9 7/8" x 17 5/8"	6
Long top stiles	1 1/8" x 2 3/4" x 24"	4
Long bottom stiles	1 1/8" x 2 3/4" x 30 3/4"	4
Short top stiles	1 1/8" x 2 3/4" x 17"	4
Short bottom stiles	1 1/8" x 2 3/4" x 23 3/4"	4
Narrow rails	1 1/8" x 2 3/4" x 33"	4
Wide rails	1 1/8" x 4 1/4" x 33"	4
Short floating tenons— <i>hardwood</i>	3/8" x 1" x 2 1/4"	16
Stile floating tenons— <i>hardwood</i>	3/8" x 1" x 1 3/4"	16
Long floating tenons— <i>hardwood</i>	3/8" x 1" x 3 3/4"	16
Bullnose cap strips	1 1/8" x 2 3/8" x 38 3/8"	8
Dowels	3/8" dia. x 1 1/2" fluted	40
<i>For the mattress support assembly</i>		
Side rails	1 5/16" x 6 7/8" x 76 3/4"	4
Side rail support strips	1 1/8" x 1 3/4" x 76 3/4"	4
Support rail screws	#14 x 2" round head, brass	24
Support boards	1 1/8" x 3 15/16" x 40 7/8"	40
Bed bolts	3/8" dia. x 5"*	8
Bed bolt caps	hardwood, 1" dia. domed caps	8
<i>For the ladder and safety rails</i>		
Ladder sides	1 1/4" x 4 3/8" x 61 1/2"	2
Main ladder steps	1 1/8" x 5 1/8" x 16 1/2"	5
Safety rails	1 1/8" x 4 1/8" x 78 3/4"	4
Long ladder screws and cup washers	#10 x 3 1/2"	2
Short ladder screws and cup washers	#10 x 2 1/4"	2
Dowels	3/8" dia. x 1 1/2" fluted	2

Start With The Panels



Variations of the tudor rose are all over my house. Although the spruce is strong, it proved difficult to slice cleanly. Consider white pine or basswood for carving

Since construction-grade wood needs time to dry while you're building, I'll lead you through the preparation of parts in stages. Moving from one group of parts to another as you work allows wood to cup and twist (as it inevitably will) while you still have the opportunity to do something about it.

The panels are a prominent part of the bed, so choose and combine grain patterns with care. This is where artistry comes in. Since the finished panels are about 3/8" thick, you can easily get two panel parts by splitting 1 1/2" lumber down the middle, on edge. This leaves lots of extra wood for jointing and planing operations. If you don't have a bandsaw, rip the panel parts no wider than 4", then slice them in half, on edge, in two passes across your tablesaw. Splitting thick stock like this naturally reveals striking book-matched grain patterns on matching parts. This is good stuff, so make the most of it.

Next, spend time at the workbench arranging panel parts so they look their best. Mark the location of neighbouring pieces, then set them aside to dry for at least three or four days before jointing and edge gluing. Thin, newly split pieces like these tend to cup as they dry, so you'll want to let that happen before jointing. I designed the completed panels to be less than 12" wide so they could be milled in any benchtop thickness planer after lamination. Set the panel parts aside for now.

Bags And Bags Of Shavings

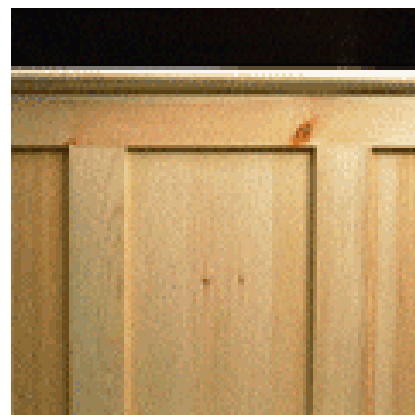
Most of the bunk bed parts are 1 1/8" thick, meaning you'll have to spend hours working with your planer to mill the 1 1/2"-thick boards down to size. You'll save time if you rough-cut all stiles, rails, bullnose cap strips, side rail support strips, support boards, safety rails and ladder parts to width first, instead of running uncut lumber through your planer, and then cutting these parts. Joint and plane components to 1/8" thicker than final size, then let them sit for a week with a fan blowing on the stickered pile before milling to final thickness. Keep the parts in separate groups so you can work on each kind in turn.

Laminate The Legs

The bunk bed legs are thick and long, making them the most troublesome part of the project. The plans show how each leg has five parts: three hefty internal layers, capped by two face strips that hide the lamination lines.

Divide the 12 leg layers you cut earlier into four groups: three pieces for each leg. The idea is to arrange the layers so the outer face of each leg looks best. Mark relative layer locations, then joint and plane leg layers to 1 1/4"-thick and glue them together. A few wooden hand screws tightened across the edges of the layers will do wonders to align the parts as the main clamps draw them together. This saves lots of jointing later.

While the leg layers are drying, cut the leg cap strips slightly wider than listed and plane to final 3/16" thickness. When the legs are ready to come out of the clamps, joint and plane them to final size. Glue the cap strips over the sides showing the lamination lines, using as many clamps as needed for gap-free joints. Plane the excess edging flush with the legs, sand and rout a chamfer along all edges. The plans show how the joint line between leg and leg cap disappears if you cut so its edge lands on the joint line.



Head and footboard panels are made of planks sawn in half on edge, so there's lots of bookmatched grain pattern. Use wood with growth rings perpendicular to the panel face

Back To The Panels

Joint one face of each panel member, then joint an edge, before ripping each piece to wider-than-final width and jointing this sawn edge. Keep all panel parts grouped, as you arranged them earlier for best appearance, while dry-fitting the panel parts. When everything looks good, edge-glue the panels, scraping off excess glue after a few hours when it's half-hard.

As the panels are drying, joint and plane the rails and stiles to final size, then trim to length. The plans show how the edges of these parts require grooves to house the panel edges. These grooves also admit floating hardwood tenons that join the panel frames. This is why the panel grooves extend around the ends of the rails. A wing-cutter router bit in a table-mounted router is the best tool for cutting these grooves. Take one pass from each side of the rail and stile parts so the grooves are centred. Aim for a 3/8"- to 7/16"-wide groove, then plane and trim your floating tenons for a snug fit.



The corner of the underside of the top bunk, showing mattress support boards, mattress support strip and the bottom of the headboard where it joins the leg

Dry-fit all stiles, rails and floating tenons under clamp pressure to check for tight joints, then measure the inside dimensions of the frame (to the bottom of the grooves) to determine the ideal panel size. Make the panels 1/16" smaller than these measurements and plane the panels to fit nicely within the grooves. Dry-fit the stiles, rails and panels, then assemble the frame permanently with glue. Give everything a day or two to dry, then joint the outside edges of the frame parts to level and square them.

Mill the bullnose cap strips on a table-mounted router, then fasten them to the top and bottom edges of the assembled panel frames using 3/8" fluted dowels. With all the parts of this project that needed dowelling, I invested in a self-centering drilling jig to help me bore accurate dowel holes in the panel edges and the ends of the side rails—all parts too large to be bored on my drill press. It worked wonderfully. When the cap strips are glued to the panel frames, run the edge of the assembly over the jointer again, taking a light cut to level the sides for a tight fit with the legs. Install 3/8"-fluted dowels across the leg-to-panel joints, dry-fit under clamping pressure, then join the legs and panel frames permanently. Cleaning glue squeeze-out from the corner where the legs meet the panel frames would be difficult without help. I used Waxilit, a glue resist that looks like skin cream. Smear some across the dry-fitted joints—when the joint is reassembled with glue the product prevents the squeeze-out from bonding to the surface wood. The hardened glue pops off with a chisel.

Refine The Legs And Safety Rails

The plans show how each leg needs counterbored holes for the bed bolts, and two mortises to house the safety rails for the top bunk. Drilling the holes is easy (just don't do it before you've read further), though the mortises demand explanation. I made mine using a router and flush-trimming bit, guided by the shop-made plywood jig. This creates four identical round-cornered mortises in the legs that need to be cut with this. Use these mortises as a guide to plane, rip and joint the safety rails you rough-cut earlier, so they fit into the mortises sweetly. Complete the rails by sanding, trimming to final length and routing quirk beads

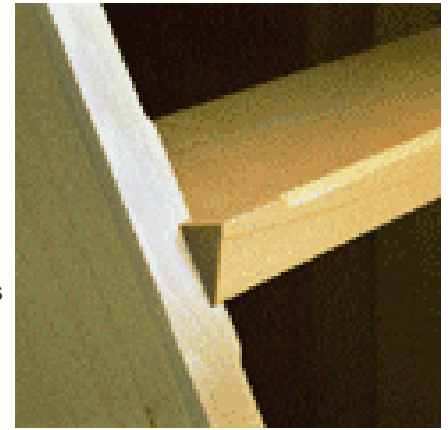
on all four edges. These extend to within 1 1/4" of the end of each safety rail.

Side Rails, Support Strips And Support Boards

These parts connect the head and foot boards, and support the two twin-size mattresses that the bed is made for. Mill and trim these parts to final size, then rout quirk beads on all four edges of the side rails, on one edge of the support strips, and along one edge of the support boards. The plans show the details, though you're free to use whatever profile you like.

Before you go further, think about mattress size. Although there are supposed to be standard sizes out there, the variation from brand to brand can be considerable. It's safest to have your mattresses on hand, then measure them and adjust side rail hole locations in the legs, and the side rail lengths, to suit. The dimensions and locations I used are for mattresses that are slightly larger than printed mattress specs.

Drill holes in the legs and side rails for the bed bolts now, then glue and screw the mattress support strips to the inside edge of the side rails. If I had to build my beds over, I'd raise the support strips 1" higher than where I put them. That's what's shown in the plans. Without an exceptionally thick mattress, the side rails press into your legs as you roll out of bed. Raising the mattresses with the higher support strip location solves the problem .



Chamfer the top front edge of the ladder steps for better resistance to wear. A sharp chisel makes quick work of angling the outer corners of each step

66

CHILD'S BED



Making the Headboard



The legs are first cut to length and then the mortises are cut into the four leg posts using a router fitted with a 16mm straight cutter, remembering to make handed pairs. It is important to ensure that each corresponding pair of mortises are cut at the same distance from the bottom of each leg so the rails, when fitted to the legs, will be square. The mortises can then be squared with a chisel or alternatively the tenons can be rounded to fit the holes. Rather than cut tenons individually on the end of each rail, cut a length of oak 950mm in length from each of the 200mm wide boards and clamp a straight edge guide in place. Use the router free hand against the guide to cut the rebates to form the tenons. Obviously care must be taken when setting the depth of cut as well as making sure that the straight edges are true on each side of the board. The boards can then be cut lengthways to form the rails and the ends notched by hand to fit the mortises.

A profile/scribe cutter set (Titman RPSS1) is used in the router table to form the profiles on the rail sides and the headboard, temporarily clamped together ensuring all is square. The length of the stiles can now be accurately measured and the appropriate length cut from the oak board. The ends of the boards can now be scribed on the router table without worrying about any breakout as the boards are a little overwidth anyway. After cutting the timber to width, the cutter can be reversed and the stiles profiled to match the rails. It will be noticed that one of the stiles is, in fact, a half width and this is to fit into a rebate cut into the leg to visually balance the panelled effect. Another dry assembly takes place spacing the stiles equally in place and the space for the panels accurately measured. All three panels should measure the same size. Each panel should be cut and planed so that it can fit neatly on top of the profiling with the headboard laid flat. I aim to cut the panel a whisper undersize to allow for any slight expansion in the timber as well as to ensure the assembly is straightforward without putting undue stress on the joints.

used to shape the edges of the panels. The depth of cut is set so the panel is a tight fit into the profiled stile with its edge just off the bottom of the groove. With this set up the bearing runs along the sides of the panels so it is important that the edges are straight as any defect here will show up on the finished panel as a kink in the fielding. The footboard is made in exactly the same way.

The Bed Rails

The long side rails are cut to length allowing an extra 60mm in the total length for the mortises and the tenons are formed using the router and a straight edge clamped in place as a guide. Care is taken to prevent the router rocking over the ends and thus removing too much timber. The ends are trimmed so the tenons are a tight fit into the mortises. All four edges are rounded over with a rounding over bit to remove sharp edges and as a decorative feature the top outside edge is moulded with a sunken bead cutter (Titman SBBC4) At this stage some 38 x 19mm softwood can be firmly screwed in place on the inside of each rail near the bottom edge. When the slats are screwed in place on this battening the mattress will sit between the rails rather than level with the top edge. This not only looks neater but it prevents the mattress from sliding around.

Finishing and Final Assembly



All the joints are held together with threaded rods and barrel nuts. This entails boring a hole about 20mm deep on the opposite side of each mortise in the middle of the leg. This should be wide enough to take the steel washer as well as the socket used to tighten the nut. A hole the diameter of the threaded rod is drilled through the leg and into the ends of the tenons to a depth of about 100mm into each rail. A further hole is drilled either in the back of the headboard or footboard or on the inside of the side rails into which is inserted the barrel nut. Great care should be taken to ensure that this hole does not break through the other side of the rails where it would be seen and ruin the effect of the bed.



side can be made to fit on top of the headboard and the footboard. This can have a shallow 20mm wide groove underneath so it fits neatly on top of the rails and can be held in place with a few spots of glue. Lengths of softwood, 75 x 25mm, are screwed in place with a 25mm gap between each to support the mattress.



Four acorns are turned on the lathe using the offcuts of timber from when the legs are cut to length. A spigot is left under the acorn and glued into a hole drilled on top of the legs.

The finish is a matter of personal preference but I covered all surfaces with a 50/50 mix of raw linseed oil and turpentine to bring out the grain and left this to dry thoroughly for a couple of days. Three coats of button polish are brushed on and allowed to dry. This is gently cut back with 0000 grade wire wool and wax and then buffed to a soft shine. As a finishing touch antique brass bed post covers were screwed in place to cover the nuts.

Cutting List

Item	Quantity	Dimensions (mm)
Legs	4	75 x 75 x 1200
Headboard Panels	1	280 x 20 x 2500
Headboard / Footboard Stiles and Rails	2	200 x 20 x 1500
Bed Side Rails	2	75 x 35 x 2000

67

BOOKCASE



Cutting the Parts

For precise crosscuts, first make a simple, self-aligning T-guide for your circular saw. Cut a piece of 1/2-in. plywood to 2 1/2 x 24 in. and glue and screw it to a roughly 12-in.-long piece of 1 x 4 pine that will serve as the crossbar of the T. Center the plywood strip along the 1 x 4 and make sure the pieces are perfectly square to each other.

Butt the crossbar of the T-guide against the edge of a piece of scrap lumber, tack the guide in place and make a cut through the 1 x 4 with your saw base guided by the plywood strip. Then, trim the 1 x 4 on the opposite side in the same way. Now, the ends of the 1 x 4 can be aligned with layout lines on the stock for precise cut positioning.

Begin construction by using a tape measure to mark the length of a side panel on 1 x 10 stock, and lay out the cut line with a square (**Fig. 1**). The side panels on our bookcase are 48 in. long.

Place the T-guide against the edge of the stock and align its trimmed end with the cut line. Tack the guide in place and use your circular saw to make the cut (**Fig. 2**).

To support your work during the cuts, use 2 x 4s spanning two saw-horses for a temporary bench and clamp your work in place. Set your circular saw cutting depth so the blade cuts about 1/8 in. into the 2 x 4s.

After both sides are cut to length, lay out and cut the five shelves to length to suit the width of your bookcase. Our shelf length is 31 in.

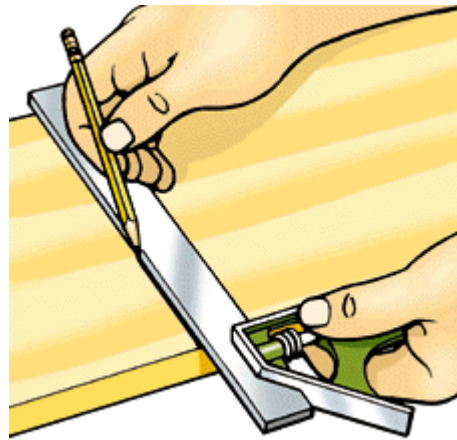


Fig. 1 Mark the lengths of the bookcase side panels on 1 x 10 lumber and use a square to lay out the crosscut lines.

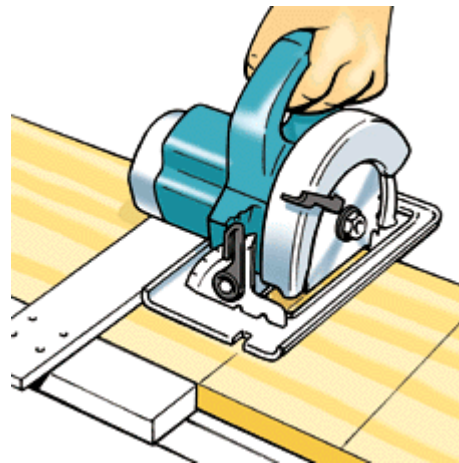


Fig. 2 With a T-guide cut to match your saw, align the end of guide with crosscut line. Tack guide to the work and then make the cut.

Rip the four lower shelves to 8 7/8 in. wide to allow for the thickness of the case back. Clamp each shelf to the sawhorses and tack a straight strip to the work to guide your circular saw (**Fig. 3**).

Next, cut the 10 shelf-support cleats from lengths of 1/2 x 3/4-in. parting strip. Use a handsaw to cut the pieces slightly oversize, then gang the pieces together with masking tape. Mark the cut lines and use your circular saw and T-guide to cut the cleats to 8 7/8 in. long (**Fig. 4**).

Because we varied the spaces between the shelves, the vertical back cleat lengths vary. Rough cut and mark the back cleats in pairs. From the top down, the lengths are 8, 9, 9 1/2 and 11 1/4 in. When cutting the back cleats with the T-guide, first gang them together so all the marks on one side align. After the cut, untape the cleats and reposition them so the marks on the opposite side are aligned for the next cut.

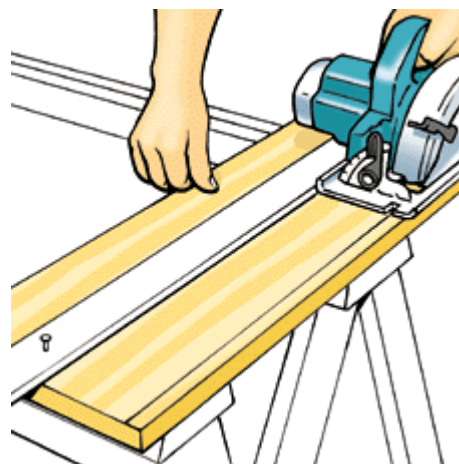


Fig. 3 Use a straight strip as a guide when ripping stock for the four lower shelves to 8 7/8 in. The top shelf remains a full 1 x 10.

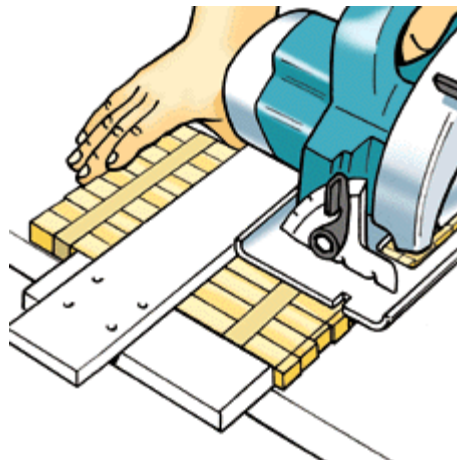


Fig. 4 After cutting shelf cleats oversize, gang them together with tape, mark the cut lines and trim with a T-guide and circular saw.

Assembly

First mark the shelf cleat locations. Hook your tape measure to the top edge of a side panel, extend the tape and place marks at the following dimensions: $\frac{3}{4}$, $10 \frac{1}{4}$, $20 \frac{3}{4}$, $31 \frac{3}{4}$ and $44 \frac{1}{2}$ in. These marks indicate the top edges of the shelf cleats. Transfer the marks to the other panel. Lay both side pieces edge to edge with the marks on the outer edges and use a rule or straightedge to extend the shelf locations across both panels at once (**Fig. 5**).

Use 2d nails and glue to attach the shelf cleats to the sides. Position the cleats so they're flush with the front edges of the sides. Then, attach the vertical back cleats, leaving a $\frac{3}{4}$ -in. gap at the bottom of each back cleat for a shelf (**Fig. 6**). The gaps will help to keep the shelves aligned during assembly. Align the back cleats with the back ends of the shelf cleats to provide the $\frac{3}{8}$ -in. recess for the back panel.

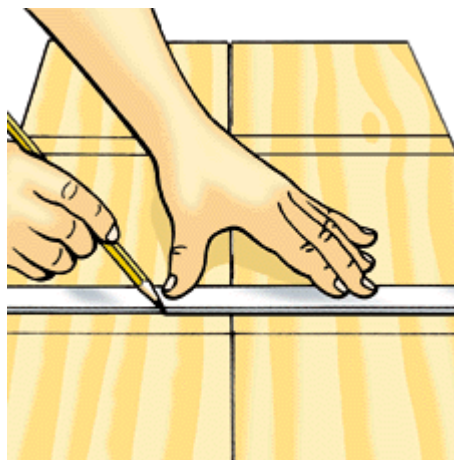


Fig. 5 Butt sides together with shelf-location marks on outer edges. Use a straightedge to extend the shelf marks across work.



Fig. 6 Nail and glue shelf cleats and back cleats to the side panels. Note that cleats are recessed $\frac{3}{8}$ in. from back edge of sides.

To join the sides and shelves, first lay a side panel on a few 2 x 4s placed on the floor. With a helper assisting, stand the shelves in position and lay the opposite side on the shelf ends. Start a pair of 6d finishing nails at each shelf location so the points just penetrate the shelves. Lift the side off and apply glue to the endgrain of the shelves. Let the glue soak in for a few minutes, then apply a second coat. Follow with a coat of glue on the sides and cleats. Replace the panel using the nail points to align the shelves. Then drive the nails (**Fig. 7**) and set them below the surface.

After the first side is attached, grasp the sides at one end while your helper grasps the opposite end and flip the assembly over. Secure the remaining side and check that the case is square. If necessary, tack a diagonal brace across the back to hold it while the glue sets. When the glue is dry cut a piece of parting strip to fit between the two top cleats and under the top shelf. This piece will be set 3/8 in. in front of the top shelf rear edge to provide room for the back panel. Glue and nail this long cleat to the shelf.

Adding the Fascia

To fit the 1 x 2 fascia over the case front edges, first mark the stock for crosscutting. Make the vertical pieces 48 in. long to match the sides and mark the horizontal members at 29 1/2 in. Rough cut the pieces to length and use the T-guide and circular saw to trim them squarely to exact size.

Apply glue to one of the vertical members and nail it to the case so its edge is flush with the side. Then, add each horizontal member with glue and nails, keeping the top edges flush with the shelf tops (**Fig. 8**). Finally, add the remaining vertical member with nails and glue.

Use 1 x 4 stock for the front and two side baseboard pieces. Cut the length of each side piece to 10 in. long and glue and nail the parts in place. Then, cut the front baseboard piece to 34 in. long and secure it so its ends are flush with the side pieces.

After the glue has dried, use a block plane to trim a chamfer around the top edge of the baseboard. Plane the side pieces first, working from front to back to avoid splitting the corners of the front piece. Then, plane the front piece to match. It helps to lean the plane against the case to maintain a uniform angle (**Fig. 9**).

The final component is the case back. Lay out the cut lines on 1/4-in.-thick lauan plywood. Tack a straight strip to the panel to serve as a guide for your circular saw and cut the stock to size (**Fig. 10**). Attach the back panels to the case with glue and 1-in. finishing nails.



Fig. 7 Secure one side to the shelves with glue and 6d finishing nails. Then flip the assembly over and attach the other side. Set all nails.

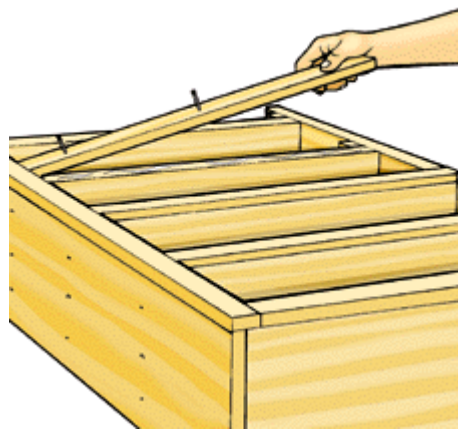


Fig. 8 Attach the 1 x 2 strips to the case starting with a vertical member. Then, add the horizontal pieces and the other vertical.

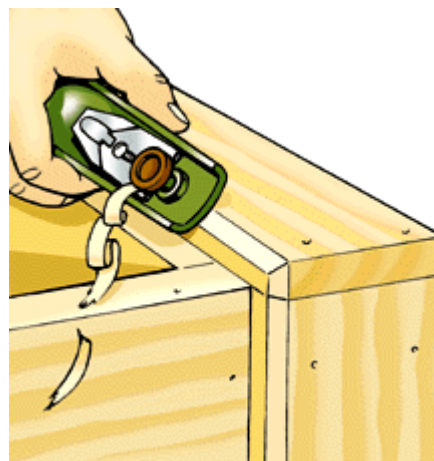


Fig. 9 Use a block plane to shape the chamfers on the baseboard. Rest the plane against the case to maintain a uniform angle.

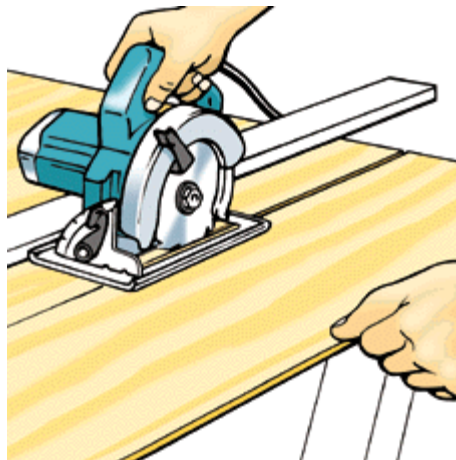


Fig. 10 Cut the 1/4-in.-thick back panel to size with a circular saw. Use a straight strip as a guide when making the cuts.

Finishing

First make sure all the nails are set below the surface. Use a putty knife to fill the nail holes with wood filler and let the compound dry (**Fig. 11**).

Sand the entire bookcase with 120- followed by 220-grit sandpaper. Then, use a sanding block and 220-grit paper to slightly ease all corners. Thoroughly dust off the case with a tack rag.

If you plan to paint your bookcase, first apply two coats of shellac over each knot to prevent the knots from bleeding through the final paint job (**Fig. 12**).

Then, prime and paint the bookcase according to the manufacturer's instructions.



Fig. 11 Use a nail set to drive all nails below the surface. Then apply wood filler over the nailheads with a putty knife.

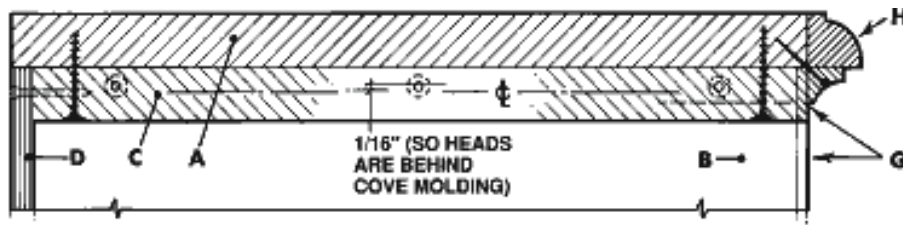


Fig. 12 Apply shellac to any knots before painting. This will seal the knots and prevent sap from bleeding through.

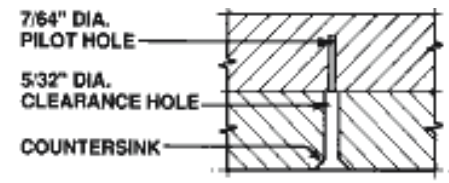
68

**TRADITIONAL
BOOKCASE**

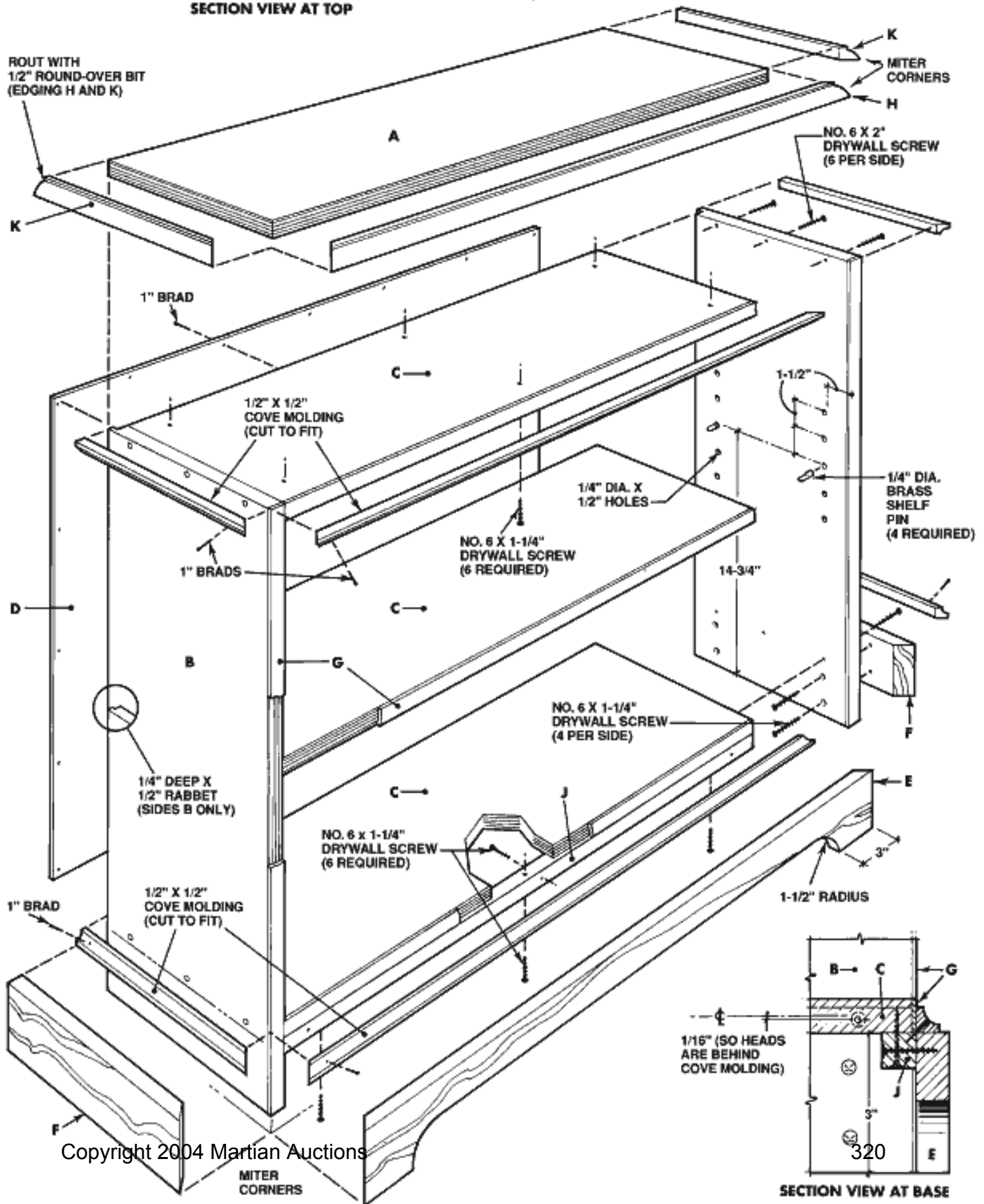




SECTION VIEW AT TOP



SCREW HOLE DETAIL



ROUT WITH
1/2" ROUND-OVER BIT
(EDGING H AND K)

NO. 6 X 2"
DRYWALL SCREW
(6 PER SIDE)

NO. 6 X 1-1/4"
DRYWALL SCREW
(6 REQUIRED)

NO. 6 X 1-1/4"
DRYWALL SCREW
(4 PER SIDE)

NO. 6 X 1-1/4"
DRYWALL SCREW
(6 REQUIRED)

1/16" (SO HEADS
ARE BEHIND
COVE MOLDING)

SECTION VIEW AT BASE

CUTTING AND ASSEMBLY PROCEDURE

Refer to the [Assembly Diagram](#).

1. Cut the 3/4" plywood pieces (A, B and C) to the sizes given in the Cutting List.

Woodworker's Tips: Many people have trouble cutting hardwood plywood cleanly, especially across the grain. For this bookcase, you'll have to master this skill, because some of the cuts will show on the finished piece. Here are a few tricks:

- Be aware of which side of your plywood is the good side, and keep it facing up while cutting on the table saw.
 - Adjust your saw so the fence is exactly parallel to the blade, and the miter gauge slots are exactly perpendicular to it. If not, the blade will tear up fibers where it touches the wood behind the cut.
 - For the smoothest cuts, use a 10" carbide-tipped saw blade with 60 to 100 teeth.
 - If you're still not getting clean cuts, score the cutting line deeply with a sharp utility knife before you saw.
2. Cut the solid wood pieces (E, F, G, H, and K) a couple of inches longer than the dimensions given, so they can be trimmed to exact size later. Part J can be cut to the specified size now.
 3. Rip part G into 1/8" strips for gluing to the front edge of pieces B and C. Your saw blade will be close to the fence, so use a push stick to guide the wood.
 4. Glue the strips (G) to the front edges of pieces B and C using yellow carpenter's glue. After the glue is dry, cut or sand the strips so they're flush with the plywood. You can do this with a block plane or belt sander. If you use a sander, be careful not to cut or sand through the thin veneer of the plywood. If you've never tried this operation before, you may want to experiment on some scrap plywood first. When the strips are flush with the veneer, trim the ends with a small handsaw.

Woodworker's Tip: Use strips of masking tape as clamps for the edge strips. Tape is strong enough for this job and less cumbersome than bar clamps. Apply a tape strip about every 3-4".

5. Cut mitered ends on the 3/4" edging (H, K) that is used for the top (A). Cut the front piece (H) first, so that the miters are exactly flush with the corners of the plywood, then cut the side pieces (K). Clamp them to be sure they fit, then glue. The sides can be long in back and trimmed after the glue is dry. When the glue has dried, sand the edging flush with the plywood.
6. Cut the profile on the edge of the top with a router, using a 1/2" round-over bit with a pilot bearing.
7. Mark where the screws will go into the sides of the case, the top and the cleats. Drill the countersinks, then the clearance holes for the screws. Note that these holes are slightly off-center (about 1/16"), so the cove molding you add later will completely cover them.

Woodworker's Tip: Drilling first and countersinking second can result in a rough, chatter-marked hole, especially on oak plywood, which tears easily. Drill the countersink first, or use a combination drill/countersink bit.

8. Carefully lay out and then drill the shelf pin holes into the inside face of the sides (B).

Woodworker's Tip: A common mistake is to drill the shelf-pin holes inaccurately, resulting in a shelf that wobbles because it's not sitting on all four corners. To avoid this, mark out the holes very carefully; use an awl to prick the surface where you want the drill bit to start; and use a brad-point drill bit, which won't easily wander off the mark.

9. Cut the rabbets on the back edges of the sides (B). The easiest way to do this is with your table or radial arm saw, making two cuts and adjusting the fence after the first cut. Or, install a dado blade and rip up the saw to make the rabbets in one pass.
10. Finish-sand all the pieces you've made so far. Start with 120-grit paper and finish with 220-grit.

Woodworker's Tip: It's a good idea to do as much of your sanding as you can before any pieces are assembled. That way, you eliminate having to sand inside corners. The same goes for finishing: If you can finish parts separately and then assemble them, do it. Remember, however, that glue won't stick to a finished surface, so don't put finish on the surfaces of glue joints.

11. Dry-clamp the pieces to be joined with screws and drill the pilot holes, using the countersunk clearance holes as your guide.
12. Screw the bookcase together. Start by screwing the top and bottom shelves (C) to the sides (B). Then screw the base cleat (J) to the bottom shelf (C). Next, screw the top (A) to the case.
13. Hold the base front piece (E) to the front of the bookcase and mark on its inside surface where the miters should be cut. Cut these miters, then cut the miters on the base sides (F).

Woodworker's Tip: Test your miter cuts on a couple of pieces of scrap (plywood works fine) before making the final cuts.

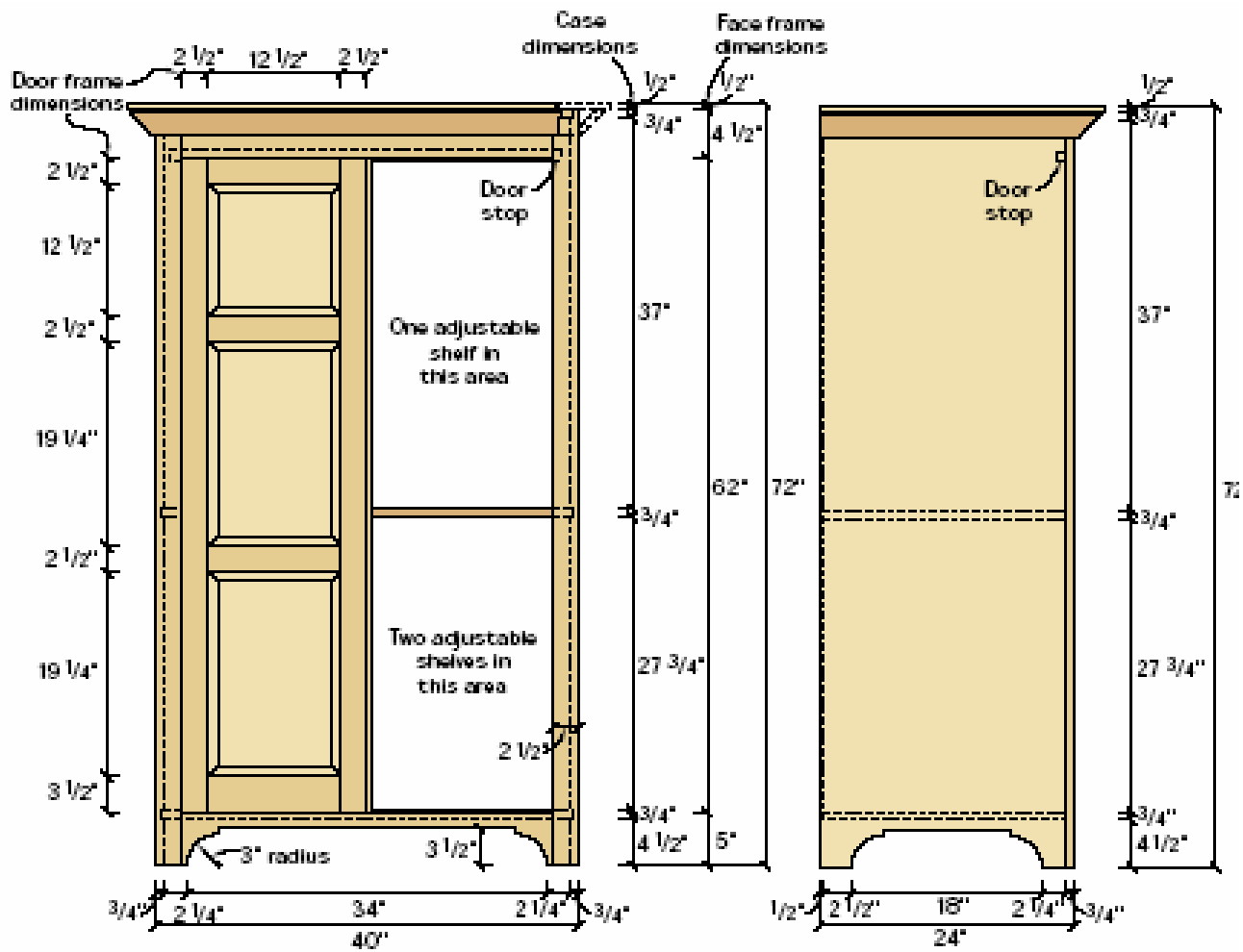
14. When the three base pieces (E and F) fit well, cut the curved opening at the bottom of the base front (E). Give all the base pieces a final sanding, then screw them onto the case. Use yellow carpenter's glue on the miter joints and other surfaces that meet. Trim the ends of the side pieces (F).
15. Mark the cove moldings for cutting the miter joints, and fit them on as you did with the edging and base piece—the front first and then the sides. Drill pilot holes for the brads, not just into the cove molding, but into the bookcase as well. Nail on the molding, sink the nailheads slightly with a nail set, push putty into the nail holes. When the glue is dry, trim the ends of the molding and sand them smooth.
16. Cut the back (D) to size and sand it, but don't nail it on until you've completed the finishing.

To prepare for finishing, slightly break all sharp edges on the bookcase with sandpaper.

69

**TRADITIONAL
ENTERTAINMENT
CENTER**





Shaker Entertainment Center

No.	Item	Dimensions T W L	Material
2	Face frame stiles	3/4" x 29 1/2" x 71 1/2"	Maple
1	Face frame top rail*	3/4" x 4 1/2" x 37"	Maple
1	Face frame bottom rail*	3/4" x 5" x 37"	Maple
3	Door stiles	3/4" x 2 1/2" x 62"	Maple
1	Door stile	3/4" x 3" x 62"	Maple
6	Door rails*	3/4" x 3 1/2" x 14 1/2"	Maple
2	Door bottom rails	3/4" x 3 1/2" x 14 1/2"	Maple
2	Door panels	5/8" x 13" x 13"	Maple
4	Door panels	5/8" x 13" x 19 3/4"	Maple
2	Cabinet sides	3/4" x 23 1/4" x 71 1/2"	Maple
3	Fixed shelves	3/4" x 22 1/4" x 39"	Maple
3	Adjustable shelves	3/4" x 22 1/4" x 38 1/4"	Maple
1	Back	1/2" x 39 1/2" x 71 1/2"	Maple
1	Door stop	3/4" x 3/8" x 37"	Maple
1	Crown moulding	3/4" x 3 3/4" x 96"	Maple
1	Crown cap	1/2" x 3 1/2" x 96"	Maple
6	Hinges, Lee Valley #00H52.03, \$2.30 each, 800-871-8158 or www.leevalley.com		

*Measurement includes 1"-long tenon on both ends

As cabinet construction goes, this is about as basic as it gets, and it still offers old-world joinery, styling and strength. The entire piece is solid lumber, using a face-frame front and a shiplapped back. The raised-panel
 Copyright 2004 Martian Auctions 324

doors are held together with mortise-and-tenon joinery, and the crown moulding is all simple cuts on the table saw and jointer.

I start construction on face-frame cabinets by making the face frame first. All the other pieces will be sized to fit the frame, so it just makes sense to begin there. Also, the width of the face frame's stiles are 1/16" wider than shown in the drawing. This will allow you to trim them flush to the case after assembly.

There are a number of ways to fasten a face frame together, but when I'm making a piece of furniture that has the potential to be moved every so often I prefer the strongest joint I can think of — mortise and tenon. That's because if it's moving it's racking. While a strong back will help keep the cabinet from racking, the face frame does most of the work. In addition, if the piece is a reproduction, like the one here, it's appropriate to use a mortise-and-tenon frame.

I prefer to cut the tenons on the ends of the rails first, then use the tenons to lay out the mortises on the stiles. Set up your table saw to cut the 3/8" x 1"-long tenons, centered on both ends of the top and bottom rails. Then set up your mortiser to cut the mating mortises, setting your depth to 11/16" to avoid having the tenon bottom out in the mortise.

Once the mortises and tenons are cut, assemble the frame by putting glue in the mortises. Don't overdo it; glue can keep the tenon from seating properly in the mortise. After the glue is dry, I pin the joints using 3/8"-square stock.

Three-Panel Doors

Since I'm already set up for making mortise-and-tenon joints, I go ahead and make the doors next. The doors are basic frame-and-panel construction using raised panels with an 8° bevel on the front face. Determine the size of the doors by making them exactly the size of the opening in the face frame. We'll trim them to fit later.

Before cutting the joints for the doors I make the groove in the rails and stiles for the raised panels. These grooves are 3/8" x 3/8" and are centered on the inside edge of each piece, with both edges of the center rails receiving a groove. After the grooves are run, start making the tenons on each end of the rails. Make the tenons and mortises the same size as you used for the face frame. Because the panel groove was run through the ends of each stile, the tenons on the top and bottom rails need to be haunched (the tenon shoulder is left wider to fill the notch left by the groove).

Next mark the locations for the mortises at the locations shown in the diagrams, and cut the mortises in the stiles.

The panels themselves are cut to size allowing 1/2" extra in both height and width to fit into the grooves in the door frame. With the panels sized, set your table saw blade to an 8° angle. Then set the rip fence to bevel the faces of the panels. The distance between the fence and blade should be set so that the bevel is about 3/8" thick, 1/4" in from each edge.

When the door pieces are ready, assemble the doors, again being careful not to use too much glue on the joints. Clamp up the doors and determine if the doors are square by measuring corner to corner. The distance should be the same in both directions. If not, adjust the door by tightening a clamp diagonally across the longer length. When everything is square, tighten the clamps and set the doors aside for the glue to cure.

When the doors are ready, take them to your saw and cut a 3/8" x 1/2" rabbet on the two interior edges to form a shiplap joint to keep the dust out. Then head to the jointer and trim them to size, allowing a 1/16" gap all the way around the doors. When fitting the doors, run the top and bottom of the doors over the jointer first, as the end grain on the ends of the stiles may tear out. By running the long grain edges last, you should be able to clean up any tear-out on the stiles.

With the doors fit, go ahead and mount the doors in the face frame. I used 2½" non-mortise butt hinges (see schedule). They look good, are easy to attach and are adjustable. When the doors are attached, take them off again to make it easier to glue up the cabinet.

Cabinet: Dadoes and Nails

You're now ready to make the cabinet itself. All the cabinet pieces are made of solid lumber on this piece to keep it reproduction quality. The center shelf, top and bottom are fit into ¼"-deep by ¾"-wide dadoes in the sides. Use the diagrams to locate the dadoes. The sides of the cabinet have 3/8" x 1/2" rabbets run on the inside edges for the back. Cut the dadoes, then glue and nail the top, bottom and center shelf between the sides.

After assembling the case, lay it on its back and glue and clamp the face frame to the cabinet. Check for square, and make sure the overhang on the sides is even. When the glue is dry, I simply remove the clamps and use a flush-cutting router bit to trim the face frame flush to the sides. I used a ½" hardwood beaded shiplap back for this piece. The number of back slats is up to you. They can be random widths, or they can all be the same. I cut a ¼" x ½" rabbet on the slat sides, then add a ¼" bead on one edge using a beading bit in my router table. Don't attach the back yet, as it'll only make finishing more difficult. Set the pieces aside for now.

Shaker furniture is known for its lack of ornamentation, but the Shakers still had a sense of style. Style for this cabinet requires a crown moulding. Cut the moulding pieces to the sizes given in the materials list. Set your table saw blade to a 45° angle and bevel one long edge of the moulding piece. Then move to your jointer, adjust the fence to 45° and run the sharp bevel edge of the moulding over the jointer to leave ¼" flat on the moulding's edge. Repeat the entire process on the opposite edge.

Fit and cut the crown pieces to length, then glue and nail them to the case. On the side pieces I only glue the first 8" of the moulding and attach the back end with a screw through a slotted hole in the case. This allows the sides of the case to move during humidity changes without tearing the crown moulding off. I use small triangular glue blocks behind the crown moulding to support the crown. Next cut the ½" cap pieces to length, mitering them to overhang the crown by ¼", then attach them to the case as well.

A Simple Base

You're almost done. To give the case a base (and to make it sit on an uneven floor without rocking) I used a jigsaw to cut out a pattern on the bottom of the face frame and the sides of the piece, essentially leaving legs. Drill the holes for the shelf pins. Then cut slots for ventilation in the back pieces, and holes through the shelves to pass wires.

The next to last step was finishing. I used a coat of dark oak stain over the entire piece and then applied three coats of semi-gloss spray lacquer.

All that's left is the hardware. You can use whatever you find attractive. I used a couple of turned pulls and added a stop rail behind the doors (at the top of the cabinet). A couple of bullet catches and I was ready to deliver it to the customer. Of course it'll take them another two days to get all the equipment hooked up and arranged the way they want it



When you trim the doors to size, make sure you support the door adequately and start with the top and bottom edges. That way any tear-out on the end grain will be removed when you run the long-grain edges over the jointer.



After the face frame is glued to the cabinet, it's a simple step to walk around the case with a flush-cutting bit in your router to trim the frame flush to the cabinet. A little sanding and you're ready to move on.



To bevel the crown pieces, first bevel cut one edge (shown) with the table saw blade set at 45°. Then move to your jointer (also set at 45°) and put a ¼" flat at a right angle to your first bevel.



Head back to the saw to cut the second bevel. As you'll see in the photo, by cutting the return bevel on the first edge you've provided a bearing surface for the rip fence, rather than let the bevel slip under the fence, messing up the cut.



With one last pass on the joiner you're ready to start hanging the crown.

To make sure the crown moulding is flush to the top of the cabinet, I temporarily screw two scrap strips to the top of the cabinet while I align the front piece. When the front piece is attached, it's fairly easy to carry the height orientation around to the sides. Then simply remove the strips.



The last step on the crown is to attach the cap to the crown and cabinet. Notice the glue blocks behind the crown moulding to support the crown and add stability.

70

PICTURE FRAMES



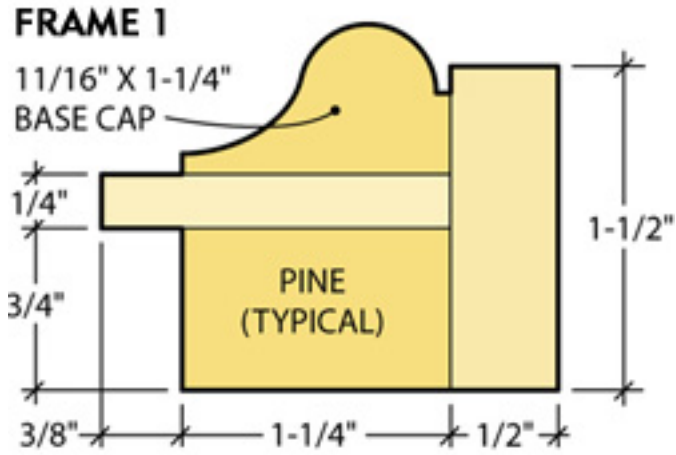
Painted Pine Frames

Our first two frames are made from pine and are great candidates for a paint finish. They feature standard moldings available at well-stocked home centers (below we give the molding's reference number in addition to its common name). For all the frames, it's best to cut the rough materials about 2 or 3 in. longer than necessary before ripping to width or machining.

Frame 1 uses base cap molding (No. WM 166) and flat pine stock. Rip four $3/4 \times 1-1/4$ -in. pine pieces and glue lengths of $1/4 \times 1-5/8$ -in. lath to each. Place them face to face with the edge of one piece flush with the adjoining piece. Use spring clamps to hold the assembly while the glue sets. Then, spread glue on the back of the molding and clamp it to the top of the lath (Photo 1). Make sure that the outer edge of the molding aligns with the flush edge of the flat-stock assembly.

Next, cut the four laminated frame members to size with a miter saw (Photo 2). Use a small brush to spread glue on the mitered ends and assemble the frame in a miter clamp (Photo 3). Check that all corner joints remain tight as you tighten the clamp. After the glue has cured, remove the frame from the clamp and drive small brads into the corners to reinforce the joints.

Next, rip pieces of 1×2 to $1/2$ in. thick and miter them to fit around the perimeter of the frame. Apply glue and clamp them to the frame with spring clamps (Photo 4).



After gluing a $1/4$ -in.-thick lath to a $3/4$ -in. backer, add the molding to the lath. Use spring clamps to apply pressure.



Use a miter saw to make the 45° cuts at both ends of each piece. Make sure opposite pieces are the same length.



Spread glue on the mating surfaces and assemble the sides in a frame clamp. Use brads to strengthen joints.



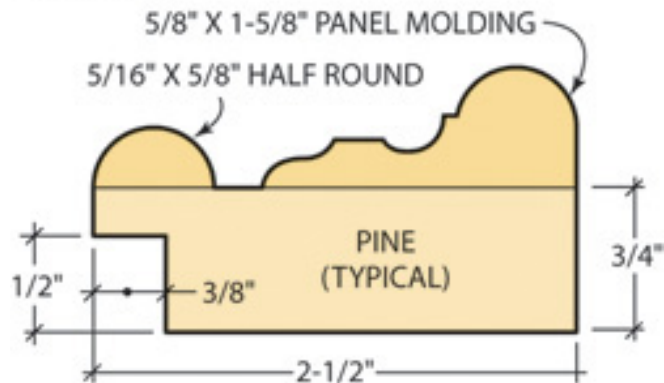
Cut banding strips of 1/2 x 1-1/2-in. pine to length with mitered ends. Glue these to the outside of the frame.

Frame 2 features a panel molding (No. WM 8174) and a 5/8-in. half round (No. WM 123), glued to 1 x 3 pine. After cutting the stock to rough length, spread glue on the back of the molding and use spring clamps to hold it to the 1 x 3 until the glue sets. Keep the panel molding flush to one edge and the half round flush to the opposite edge. When the glue is dry, use a dado blade in your table saw to cut the rabbet along the inner edge of the 1 x 3 (Photo 5). Then, miter the frame stock to exact length.

Since this frame is wider than the first, you can use No. 0 joining plates to reinforce the corners and eliminate the need for brads.

Mark centerlines for the plate slots in the mitered ends of the frame stock and cut the

FRAME 2



slots (Photo 6). Spread glue on the mitered faces, in the plate slots and on the plates, and assemble the pieces in the frame clamp to pull the corners tight. After about 20 minutes, use a small chisel or putty knife to remove any glue that has squeezed from the joints.

To finish these painted frames, first lightly sand with 150- and 220-grit sandpaper. Then apply an aerosol spray finish, following the manufacturer's instructions. We used Rust-Oleum Hammered Gold (No. 7210) and Hammered Silver (No. 7213) for our frames.



Frame 2 uses two moldings glued to 1 x 3 stock. Cut the frame rabbet with a dado blade and table saw.



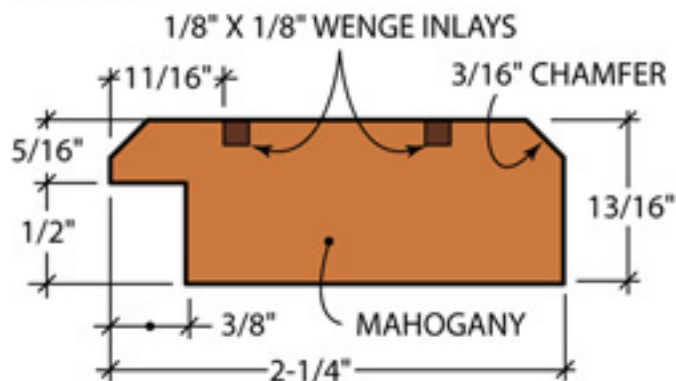
Reinforce the corners of wider frames with plate joints. Mark the centerlines and cut slots for No. 0 plates.

Hardwood Frames

Another approach to building frames is to use hardwood with either a clear or stained finish. In each of the following designs, we've combined different woods to create patterns of contrasting colors and textures. After building four oversize pieces of frame stock for each design, use a dado blade or router table to cut the 3/8-in.-wide frame rabbet on the inner edge of each piece. Then, use a miter saw to cut the pieces to precise length and join the corners with plate joints.

Frame 3 is constructed of mahogany with wenge inlay. Begin by ripping 13/16-in. mahogany to 2-1/4 in. wide. Crosscut the stock to rough length, then readjust the saw blade and cut two 1/8-in.-deep kerfs in the face of each piece. Use a band saw to rip 1/8 x 1/4-in. inlay strips of wenge. Run a bead of glue into each saw kerf and press the inlay

FRAME 3



strips into place. Use spring clamps to hold them while the glue cures (Photo 7). When the glue is dry, use a plane or sharp cabinet scraper to trim the wenge flush to the mahogany surface. Then, install a chamfer bit in your router table and bevel the two top edges of the frame stock.

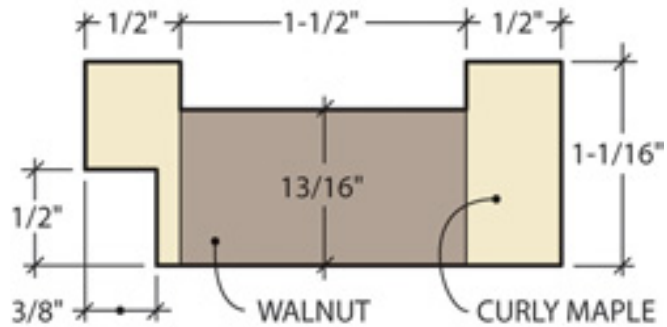


Frame 3 has two inlaid strips. Cut the slots on a table saw. Glue the strips in place and rout a chamfer on the edges.

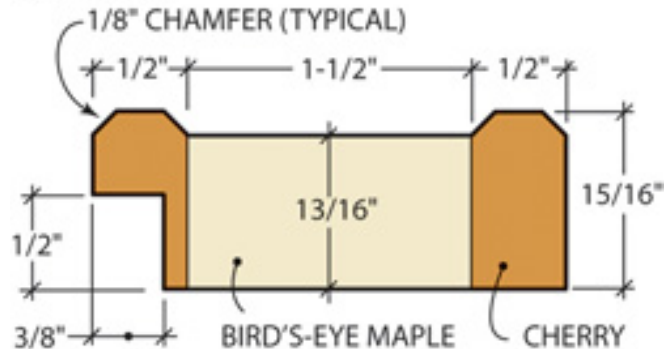
Frames 4 and 5 are variations on the same theme. For the first design, rip curly maple strips to $\frac{1}{2} \times 1\text{-}\frac{1}{16}$ in. and glue them to the edges of a $\frac{13}{16} \times 1\text{-}\frac{1}{2}$ -in. walnut field (Photo 8). Keep all pieces flush on the back side of the frame.

For the second variation, rip $\frac{1}{2}$ -in.-thick cherry stock to 2- $\frac{1}{2}$ in. wide. Use a router table with a chamfer bit to shape all four edges of the cherry, then rip the molded stock into $\frac{15}{16}$ -in. strips (Photo 9). Glue these strips to both edges of a bird's-eye maple field.

FRAME 4



FRAME 5





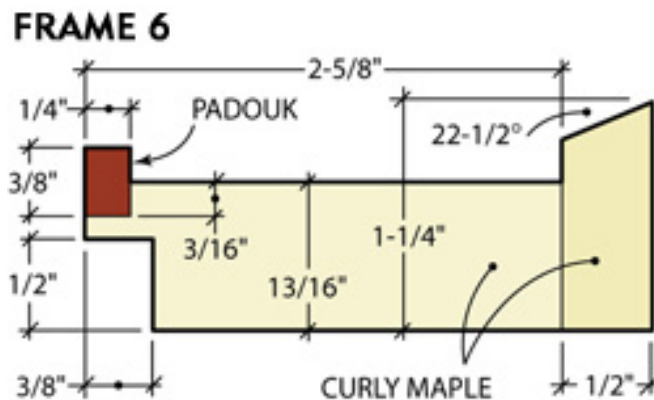
Clamp maple strips to both edges of a walnut field to form Frame 4. Make sure the pieces are flush on the back.



After routing chamfered edges on cherry stock, rip two strips. Glue them to the edges of a maple field for Frame 5.

For Frame 6, we've chosen curly maple for the field and raised outer band, with a padauk inlay that accents the inner edge. After ripping the maple stock to width, use a dado blade or router table to cut a 3/16-in.-deep x 1/4-in.-wide rabbet along one edge of each of the four frame pieces. Then, cut pieces of padauk to fit the rabbet in each piece. Glue the inlays in place, securing them with strips of masking tape until the glue sets (Photo 10).

To make the outer band, rip a 22-1/2° angle on the edge of a 1/2-in.-thick piece of maple. Re-adjust your saw to 90° and rip this beveled strip from the board. With four band strips made, glue each to the outer edge of the maple field pieces (Photo 11).



hardwood frames with clear shellac. This finish is easy to apply, it dries quickly, and it won't react with delicate artwork and mounting materials. Brush on a light coat with a good-quality bristle brush and let dry for at least 2 hours. Lightly sand with 320-grit paper to remove any roughness, and dust off. Apply one or two additional coats as needed. When the last coat is dry, rub it with 4/0 steel wool for a warm, satin gloss.



For Frame 6, glue padauk strips in a rabbet on the edge of a maple field. Use masking tape instead of clamps.



Glue the angled band strips to the outside of the maple frame pieces. Be sure that the strips are flush on the back.

Mounting Equipment

Now that you have your wooden frames ready, it's time to gather the materials for mounting. You can buy what you need at any well-stocked art supply store.

Photos and prints are typically mounted within a broad mat-board window that highlights the artwork. Mat board is available in a variety of colors and a few textures as well. Make sure to get acidfree, or archival, mat board to protect the artwork from deterioration. This same material can be used as the mounting board behind the artwork. You'll also need archival mounting tape. This tape is made of linen cloth and is activated by wetting its glued surface. Backing board, installed behind the mounting board to keep it flat, can be either stiff corrugated cardboard or foam core stock. After the backing board, you'll need kraft paper to act as a dust cover over the back of the frame--a glue stick is a convenient way to attach the paper to the frame.

Most artwork requires a pane of glass to protect it from dirt and changes in humidity. In most cases, normal window glass will work, although a special ultraviolet-protective glass is available to help prevent fading. Nonglare glass is also used for framing. However, this type has a slightly dull appearance. Acrylic sheet can be a practical alternative to glass--especially if weight is an issue. But acrylic scratches easily, attracts dust and doesn't have the same degree of transparency as glass.

As for special tools, you'll need a straightedge and a mat cutter. Mat cutters come in a variety of configurations, ranging from basic \$15 models to professional versions costing a few hundred dollars. We achieved good results with a medium-priced Logan Model 3000 Pro-Am mat cutter and Adapt-A-Rule straightedge and ruler.

Mounting The Artwork

Measure and mark the size of your mat and mounting boards. It's best to work from the back of the boards to prevent soiling the face. Place the boards on a piece of scrap cardboard and use a utility knife and straightedge to cut both pieces to size.

Position the artwork on the mounting board and mark the corners with light pencil marks. Rip two 1-1/2-in.-long pieces of linen mounting tape and moisten about 1/2-in. of each piece. Adhere the tape to the back side of the artwork, along the top edge so that about 1 in. extends beyond the top. When the glue dries, turn the piece face side up and position it on the mounting board. Rip two more strips of tape, each about 3 in. long, and moisten them. Apply them across the extending tape strips so the artwork is hinged to the mounting board (Photo 12). This system allows the print to expand and contract with changes in humidity, without wrinkling.

Mark the cutlines for the opening, or window, on the back side of the mat board. Typically, a mat extends over the image by no more than 1/4 in. on each edge. Use the straightedge and mat cutter to make the cuts (Photo 13). It's a good idea to practice on scrap board to learn how to start and stop the cuts exactly at the corners.

Place the cut mat over the mounted print (Photo 14). It's not necessary to attach the mat since the whole assembly will be sandwiched in the frame.



Use linen tape to attach photos and prints to the mounting board. Hinge the artwork at the top edge.



To cut the mat opening, mark cutlines on the back side of the mat board and use a mat cutter to make the cuts.



Place the mat over the print and mounting board. It's not necessary to fasten the two boards together.

Turn the frame upside down and install the glass. Then place the matted print into the frame (Photo 15). Cut the backing board to size and place it over the mounting board. Use framer's points to hold the back in place (Photo 16). You can use a special driving tool or a flat-blade screwdriver to install the points. On hardwood frames, the driving tool is worthwhile since the points are a bit harder to install.

Cut a piece of kraft paper slightly larger than the overall frame size. Rub a glue stick on the back side of the frame and apply the paper, letting it overhang on all edges. Press the paper to the frame to get a good bond and use a straightedge and utility knife to trim it 1/8 in. in from each edge. The simplest method of hanging a frame is to use a sawtooth-type hanger. Center the hanger on the back of the top rail of the frame and drive brads to hold it in place (Photo 17). On a hardwood frame, use an awl or bore small pilot holes for the brads.

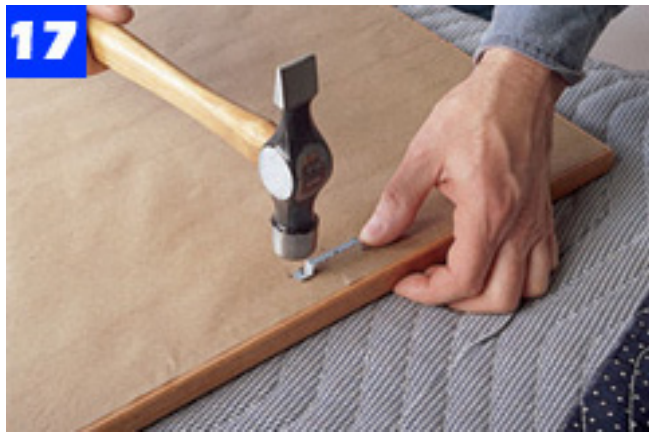
Large or heavy frames are best hung with picture wire. Bore pilot holes, and install screweyes or D-ring hangers in the side frame rails about 3 or 4 in. from the top edge of the frame. String a length of picture wire between the hangers, leaving about 1-1/2 in. of slack. Twist the wire together to lock it to the hangers (Photo 18).



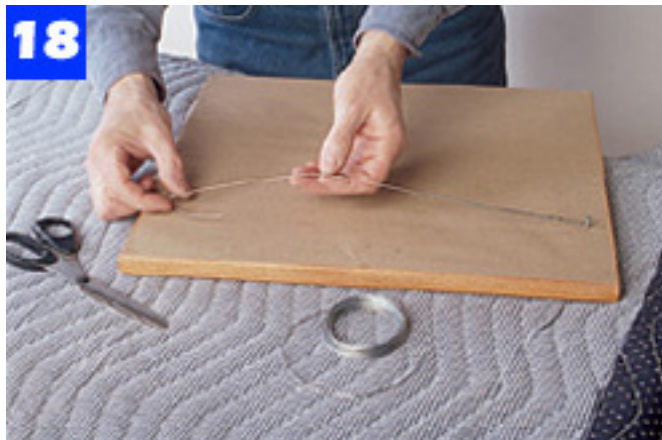
With the frame lying face side down, install the glass panel. Then, place the mounted artwork in the frame.



Place a corrugated or rigid foam backing board over the mounting board and hold it in place with framer's points.



A sawtooth hanger is fine for supporting light frames. Use brads to secure it to the center of the frame.



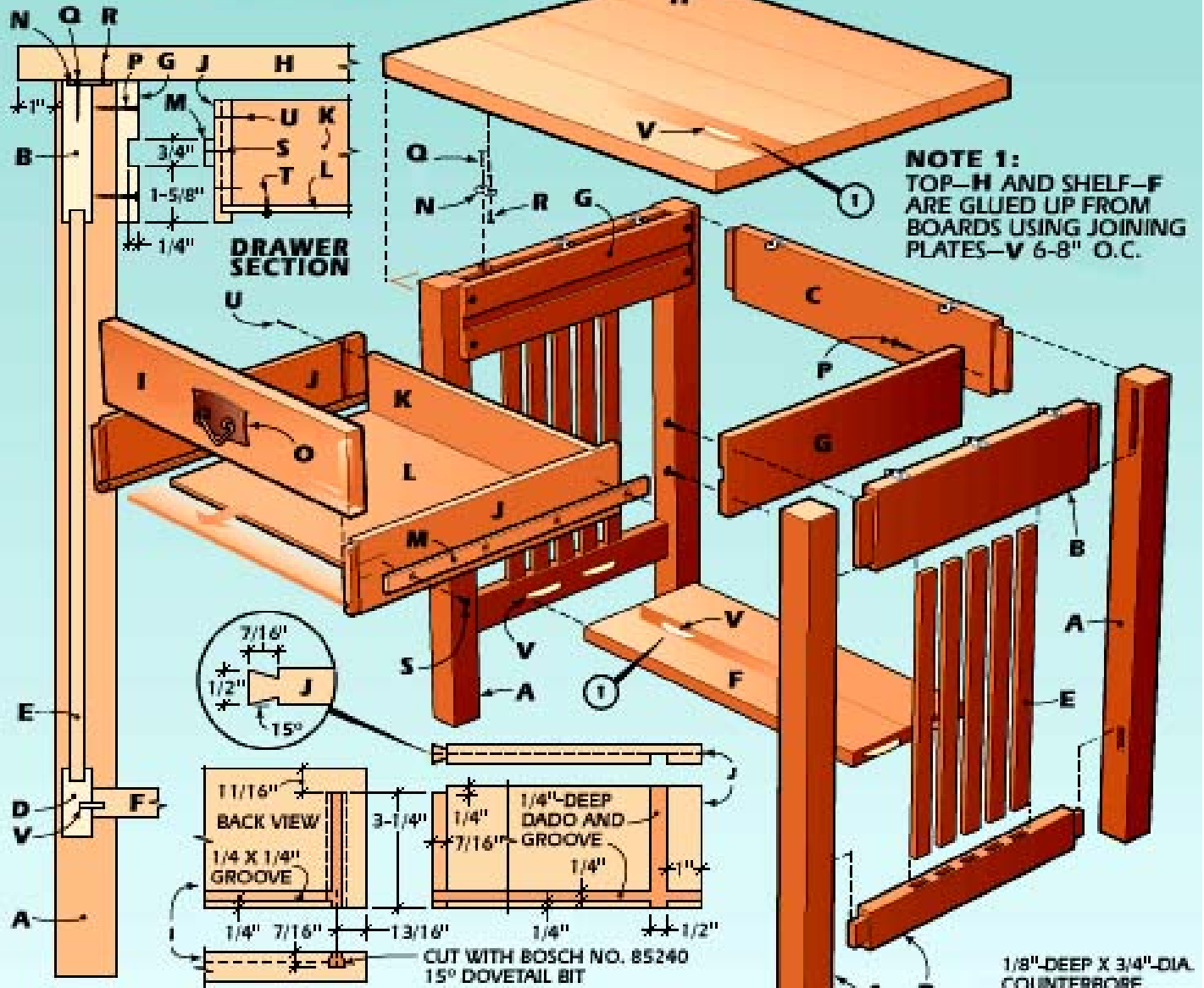
Hang heavy frames with picture wire. Install screweyes or D-ring hangers and string picture wire between them.

71

SIDE TABLE

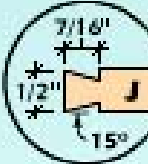


SIDE TABLE 20" DEEP X 24" WIDE X 26" HIGH



NOTE 1:
TOP-H AND SHELF-F
ARE GLUED UP FROM
BOARDS USING JOINING
PLATES-I 6-8" O.C.

DRAWER SECTION

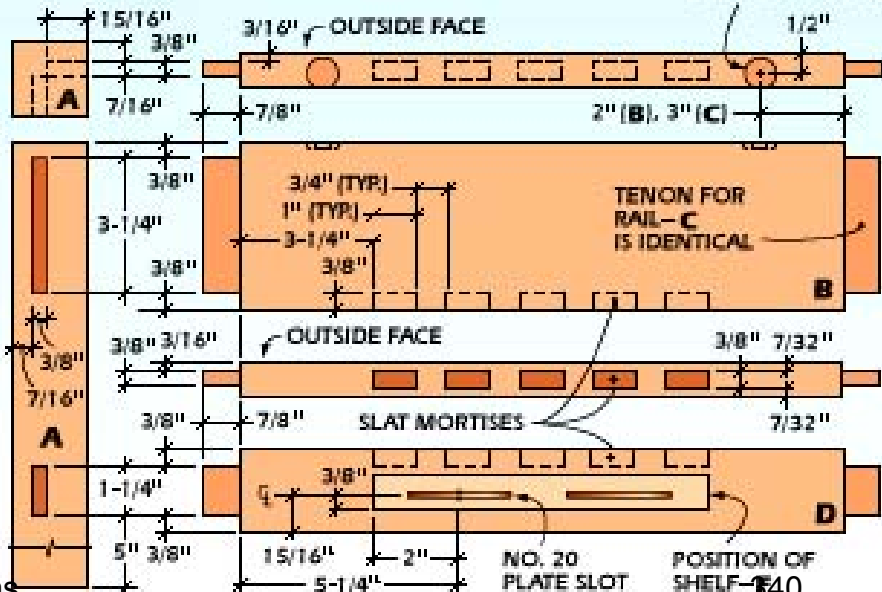


CUT WITH BOSCH NO. 85240
15° DOVETAIL BIT

SIDE SECTION VIEW

DRAWER DETAILS

1/8" DEEP X 3/4" DIA.
COUNTERBORE
(2 REOD., RAIL-C;
3 REOD., RAIL-B)



LEG DETAIL

RAIL DETAILS

MATERIALS LIST–SIDE TABLE		
Key	No.	Size and description (use)
A	4	1 3/4 x 1 3/4 x 25" oak (leg)
B	2	13/16 x 4 x 16 1/4" oak (rail)
C	1	13/16 x 4 x 20 1/4" oak (rail)
D	2	13/16 x 2 x 16 1/4" oak (rail)
E	10	3/8 x 1 x 15 1/8" oak (slat)
F	1	13/16 x 8 x 19 7/8" oak (shelf)
G	2	5/8 x 4 x 15 7/8" oak (drawer guide)
H	1	1 x 20 x 24" oak (top)
I	1	13/16 x 3 15/16 x 18 3/8" oak (drawer face)
J	2	1/2 x 3 1/2 x 16 1/4" oak (drawer side)
K	1	1/2 x 3 x 16 3/4" oak (drawer back)
L	1	1/4 x 15 1/16 x 16 3/4" oak plywood (drawer bottom)
M	2	1/4 x 3/4 x 15 13/16" oak (drawer guide strip)
N	8	Knape & Vogt No. 1547STL tabletop fastener
O	1	Whitechapel No. 106STH2 drawer pull
P	8	1 1/4" No. 8 fh screws
Q	8	1" No. 8 fh screws
R	8	5/8" No. 8 fh screws
S	8	1/2" No. 6 fh screws
T	3	5/8" No. 6 rh screws
U	8	3/4" x 16-ga. brads
V	16	No. 20 joining plates
Misc: Yellow glue, 120- and 220-grit sandpaper, 0000 steel wool, aniline stain, tung oil varnish, paste wax.		

Stock preparation

Like the rocker and bookcase, the material used in this table is quarter-sawn white oak. The legs are cut from 8/4 solid stock, the top from 5/4 material and the rest from 4/4 lumber. For the drawer sides, you will have to either plane 4/4 stock to 1/2-in. thickness or have your lumber dealer plane the lumber to the finished size. The same holds true for the drawer guides, which are 5/8 in. thick.

The panels for the bottom shelf and tabletop are glued up from narrow boards. Cut stock slightly longer and a bit wider than required to yield the finished panel. Edge-joint each piece, then lay out the locations of the No. 20 joining plate slots every 6 to 8 in. along the mating edges. Keep the end slots about 3 in. from the finished ends of the panels.

Use the plate joiner to cut the slots, registering the cuts against a flat work surface. Then apply glue to the slots, plates and edges and assemble the panels. Use clamps to pull the joints tight, then let the glue set for about 20 minutes. After the glue fully cures, rip and crosscut the panels to finished dimension.

Joinery

Rip and crosscut the remaining parts for the table base to finished dimension. Then, lay out the mortise in the table legs. Use a router with an edge guide and 1/2-in.-dia. up-cut spiral bit to make these cuts (Photo 1). Use a sharp chisel to square the ends of each mortise (Photo 2).

Use a dado blade in your table saw to cut the tenons on the side and back rails. Since the tenons are 7/8 in. long, you will have to make two passes for each tenon cheek. Readjust the blade height to cut the shoulders at the top and bottom edges of the tenons (Photo 3). Check the fit of each tenon in its matching mortise.

Mark the locations of the slat mortises in the side rails. Clamp a tall fence to the drill-press table to help locate the rails, then bore overlapping 3/8-in.-dia. holes to remove most of the waste (Photo 4). Complete the mortises by smoothing the walls and squaring the ends with a sharp chisel.



1--Use a router with an up-cut spiral bit and an edge guide to cut the rail mortises in the table legs. Make several passes.



2--When the routing is done, carefully square the ends and flatten the sides of each mortise with a sharp chisel.



3--Use a dado blade in a table saw to cut the rail tenons. First cut the cheeks, then readjust the saw to cut the shoulders.



4--Cut the slat mortises in the rails using a drill press to remove most of the waste and a sharp chisel to finish the cuts.

Lay out the joining plate slots on the bottom shelf and side rails. Use the plate joiner to cut the slots in the shelf ends, registering the cut on a flat workbench or on the top of your table saw (Photo 5). To cut the slots in the side rails, you must use a spacer block under the plate joiner to yield the proper slot position (Photo 6).

Before beginning to assemble the base, sand all the parts with 120- and 220-grit sandpaper, then dust off the pieces thoroughly. It is much easier to do a good job of sanding at this stage than it is once the base is together.

Base assembly

Position the side slats in their mortises in one bottom side rail (Photo 7). If the parts fit properly, you need not apply glue to these joints, since the slats will be held captive between the rails. Place the top side rail over the slat ends, then clamp the assembly temporarily to be sure that the slats



are completely seated in the mortises.

Apply glue to the rail tenons and leg mortises, then assemble the table side. Clamp the joints tight, then compare opposite diagonal measurements to be sure that the assembly is square (Photo 8). Follow the same procedure for the other side. Apply glue to the joining plate slots, mortises, tenons and plates for assembling the shelf and back rail to the sides. Join the rail and shelf to one side (Photo 9), then place the opposite side over the shelf and rail ends. Stand the base on a flat work surface and clamp the joints tight (Photo 10). Check for square.

Use a router with an edge guide to cut a 1/4-in.-deep x 3/4-in.-wide dado in each drawer guide (Photo 11). Bore and countersink pilot holes for mounting screws in the guides, then sand the guides with 220-grit sandpaper before fastening them to the table legs (Photo 12).

5--Clamp the bottom shelf securely to a workbench. Then use a plate joiner to cut joining slots in both ends of the shelf.



6--Clamp the bottom rails to your table saw fence. Then use a plate joiner to cut joining slots in one side of both rails.



7--Test fit the side slats in the rail mortises. Sand or trim the joints, if necessary, to achieve a tight fit for each slat.



8--Apply glue to the mortises and tenons, then clamp the parts. Check for square by comparing diagonal measurements.



9--To join the sides to the back rail and bottom shelf, apply glue to the slots and plates, and to the mortises and tenons.



10--Clamp the side assemblies to the back rail and shelf and check the parts for square. Readjust the clamps if necessary.

Mark the locations of the tabletop fasteners on the top edge of the side and back rails. Use a 3/4-in. Forstner or multispur bit to bore the 1/8-in.-deep recess for the fasteners. Bore a pilot hole for each, then attach the fasteners with 1-in.-long No. 8 fh screws.

Drawers

Cut stock to finished size for the drawer sides and back, and rip stock for the drawer face, but don't cut it to length yet. Instead, leave the drawer face blank about 12 in. long. The drawer sides are joined to the face with sliding dovetails. These joints are not difficult to cut, and they provide a nice compromise when you do not want to invest the time required for traditional dovetail corner joints. In order to cut these stopped dovetail slots, construct a U-shaped jig to guide the router. You can build this jig by screwing together three strips of scrap lumber or plywood. The dimensions of these pieces are not critical. But it is important that the three pieces are assembled square to each other.

Set the dovetail bit—we used a Bosch No. 85240—to cut 7/16 in. deep, then make an indexing cut into the fence of your jig to make locating your cut easy. Mark the position of the two slots—along with an end mark for each slot—on the inside surface of the drawer face, centered on the length of the face blank. Clamp the face to the routing jig with the indexing cut centered on one mark. Slide the router bit into the slot, turn on the motor and guide the tool along the jig to the end mark of the slot (Photo 13). Turn off the router and slide the bit back to the indexing cut to remove it. Repeat for the other slot. Cut the face to finished length.

Use the same dovetail bit in the router table to cut the dovetail shape on the ends of the drawer sides (Photo 14). For the joint with the drawer back, use a dado blade in the table saw to cut a simple dado. Then use a 1/4-in.-dia. straight bit in the router, and an edge guide, to cut the grooves for the drawer bottom in the face and drawer sides (Photo 15). Note that the groove in the face runs only between the dovetail slots.

Use a small backsaw to cut the shoulder at the top of the dovetail on each drawer side. Then dry assemble the drawer box to be sure that all joints fit properly. If all the joints are correct, sand all drawer parts, then apply glue and reassemble the drawer (Photo 16). Use brads to reinforce the glue joints between the back and drawer sides. Then clamp the drawer parts together. Check that the assembly is square.

Cut the drawer bottom from 1/4-in.-thick plywood, then slide it into place, and fasten it to the bottom edge of the drawer back with screws. You can remove the bottom later to make finishing the drawer easier.

Cut the drawer hanger strips to size, then bore and countersink pilot holes for attaching them to the drawer sides. Clamp the strips to the drawer sides, then fasten them with screws (Photo 17). Finish the drawer assembly by marking the locations of mounting screws for the drawer pull. Bore pilot holes and attach the pull.



13--Rout slots in the drawer face for the drawer sides with a dovetail bit. Use a square U-shaped jig to guide the router.



14--Use the same dovetail bit in a router table to cut both sides of the dovetails on the ends of each drawer side.



15--Cut a dado between the dovetail slots on the drawer face for the bottom panel. Cut matching dados in the drawer sides.



16--Apply glue to all the drawer joints, then clamp the box together. Reinforce the side-to-back joints with brads.



17--Slide the drawer bottom in place and attach it to the back with screws. Also, screw the guide strips to the sides.



18--Center the base over the top and mark the fastener holes. Then bore pilot holes in the top and attach the base.

Assembly

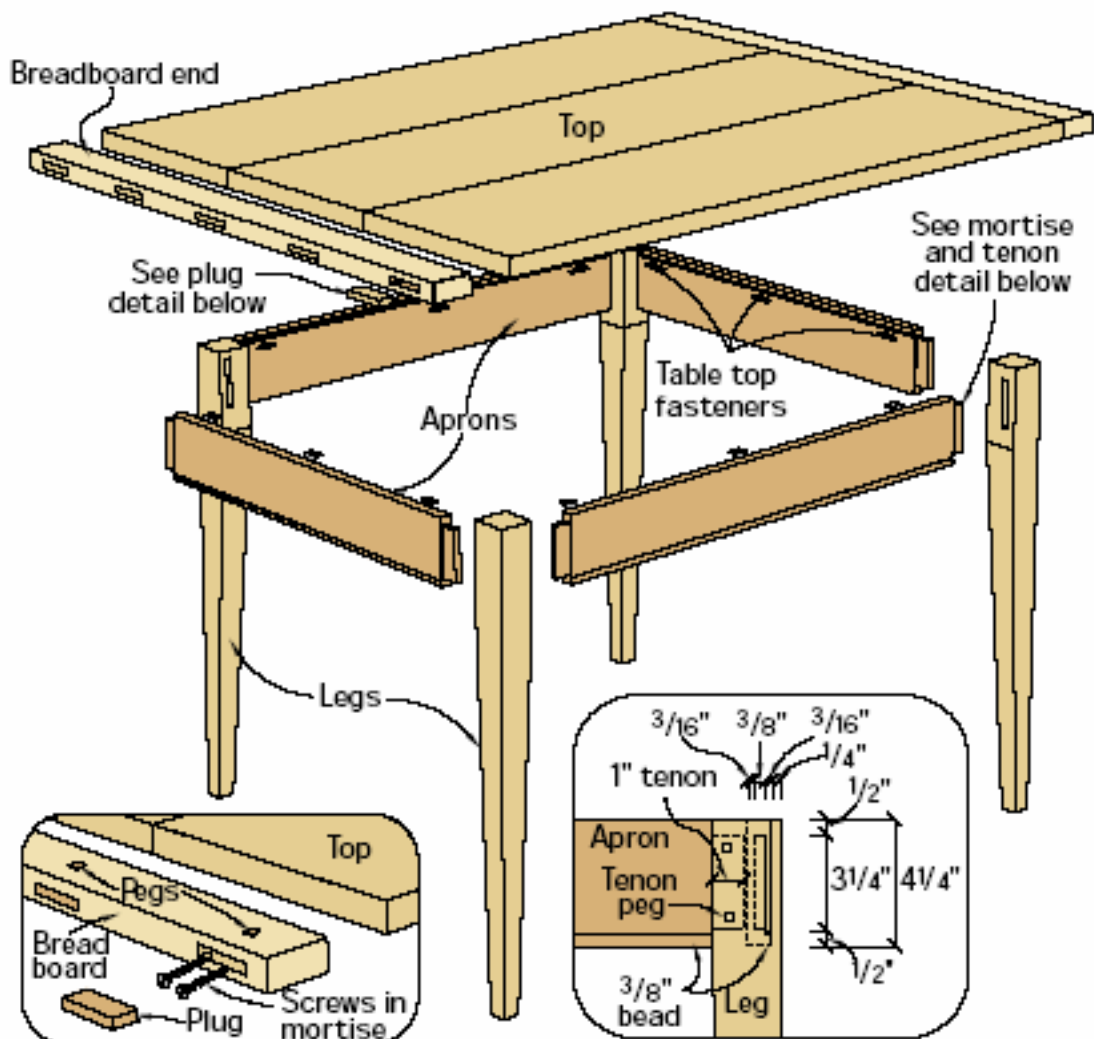
Sand the tabletop smooth with 220-grit sandpaper, then place it upside down on a padded surface. Invert the base on the top and adjust it for an even reveal on all sides. Next, mark the locations of the screwholes for the tabletop fasteners (Photo 18). Use a clamp to maintain the proper spacing between the front table legs.

Remove the base from the top and bore pilot holes for the tabletop fastener screws. Then, replace the base and install the screws. You'll need a screwdriver with a magnetic tip to start the screws between the drawer guides and side rails. Apply the same stain and finish that's described in "Rocking Chair."

72

TAVERN TABLE





Detail of breadboard ends

Detail of mortise and tenon

Schedule of Materials:Tavern Table				
No.	Item	Dimensions	T W L	Material
4	Legs	$2\frac{1}{8}'' \times 2\frac{1}{8}'' \times 28\frac{1}{4}''$		S
2	Aprons*	$\frac{3}{4}'' \times 4\frac{1}{4}'' \times 31\frac{3}{4}''$		S
2	Aprons*	$\frac{3}{4}'' \times 4\frac{1}{4}'' \times 25\frac{3}{4}''$		S
1	Top	$1\frac{1}{8}'' \times 36'' \times 43''$		P
2	Breadboards	$1\frac{1}{8}'' \times 2\frac{1}{2}'' \times 36''$		P

P - chestnut; S-poplar • * Including 1" tenon

Begin the project by milling the legs and cutting the taper. You can use a tapering jig for your table saw, but I don't recommend it. A few years ago I came up with a quick way to use a jointer to cut tapers faster and safer..

There are a lot of ways you can join the aprons to the legs, from totally traditional to quick-and-dirty. I prefer using a straight mortise-and-tenon joint, though if I were building a little side table or something else that wouldn't see daily abuse, the two less traditional methods I'm going to cover would work just fine. But before we talk about the bases, build the top.

Making the Top

After I pulled the right boards from my woodpile, I got them ready for glue-up. I wanted this top to look rustic, so I didn't plane the lumber. Instead, I jointed the edges of the planks and glued up the top. Then I rough sanded it with a belt sander to get it reasonably flat and to remove some of the milling marks. Then I cut the top to size and worked on the breadboard ends.

For a long time I used traditional through-mortises to attach breadboards to cover the end grain of my tabletops. Other people showed me how to do it with slotted screw holes. I was always against using that method until I actually tried it. Now it's the only way I'll attach breadboards. You actually get less up-and-down movement using screws, and the top stays flatter-looking for a longer time. Here's how I make my breadboard ends.

After cutting the breadboards to size, cut 3/8"-wide by 2-1/2"-long by 1-1/2"-deep mortises in the breadboards. I cut five of these for my 36"-wide top. However many you use, it's always good practice to use an odd number of mortises so it's easier to lay them out. I put the two outside mortises 1/2" in from the end of the breadboard.

Now cut two slots for two screws in each mortise. I make the slots about 3/8" long to give the top some real room to move if it has to. You can make a router jig to cut the slots, or you can use your drill press and work the bit back and forth. Clamp the breadboard to the table top and put two screws in each mortise. I put the screws at the sides of the mortise, not at the center. I do this because I peg the fake plug later in the process, and this keeps me from boring a hole into one of my screws accidentally. Don't drive the screws in too tightly because you want the table top to be able to move.

Now plug the mortises. I cut plugs to fit the opening and taper them a bit so they fit snugly when tapped in place. Glue the plugs in place, then peg the plugs through the top with 1/4" x 1/4" square pegs.

Now age the top. I strike the top with a key ring full of keys; I even write people's names in the top with a knife. It's pretty amusing to watch people as they see me do this. They freak out.

Stain the top with a golden oak color and then add a natural oil finish, such as Watco, which is an oil/varnish blend. You don't want the top to look too shiny.

Now plug the mortises. I cut plugs to fit the opening and taper them a bit so they fit snugly when tapped in place. Glue the plugs in place, then peg the plugs through the top with 1/4" x 1/4" square pegs.

Now turn your attention to the base.

Mortise and Tenon

Cut your aprons to size. Cut 1"-long tenons that are 3/8" thick. The apron lengths in the Schedule of Materials include the tenons. I cut my tenons first and use them to lay out my mortises, which results in less layout, in my opinion. These aprons are set back 1/4" from the front of the legs, this is called a "set back."

Now cut a bead on the bottom edge of the aprons using a beading bit in your router. Finally, cut a slot in the inside of the aprons for fastening the base to the top. I use metal



The plugs for the breadboard ends are made from the same material as the table top. Sand the plug to fit, put some glue on the sides and tap it in place.



I usually build my tables using straight mortise-and-tenon joinery. However, there are special cases when other methods are just as good or even better.



These table top fasteners are cheap (\$1.99 for a pack of eight) and sturdy. Simply place the clip end into the kerf in your apron and screw the other end to your table top.

tabletop fasteners from Rockler (see the supplies list at the end of the article). Rockler sells very sturdy ones, and I recommend them.

For these fasteners, the slot needs to be the width of your table saw's blade (between 1/8" or 1/16" wide) and 7/16" down from the top of the apron and 3/8" deep.

Glue up your base, peg the mortises through the legs and finish the base. I use square pegs in my legs. Drill a round hole through the leg and into the mortise. Then take a piece of square stock, whittle one end of it roundish, then pound it into the hole. It should convert your round hole into a square.

Mitered Mortise and Tenon

This method is similar to the straight mortise and tenon above, but you must miter the ends of the tenons because your mortises meet in the middle of the leg. Why would they meet? Well you might have a thinner leg, or your mortises might be back farther if you chose to use a larger set back.

When this is the case, I make a standard tenon and chop the end off at a 45-degree angle on my miter saw. You're not trying to match the two miters exactly (it will never show) so leave a little gap between the two tenons. If it's too tight, it could get you in trouble because the ends of the tenons will touch before the shoulders seat into the legs.

Pocket Screws

I wouldn't recommend this for a large table. If you're going to spend the money on the wood, you might as well do it right. But if you want to build a quick-and-dirty side table, this will work fine. Be sure to glue and screw this joint for added strength. It's important to keep the pieces tightly together as you screw the apron to the leg.

Corner Brackets

Corner brackets are a faster alternative to traditional joinery, but they aren't as sturdy. However, you can't beat them when you want to make a table that can be knocked down and stored away.

These measurements apply to the brackets from Rockler (see the supplies box at the end of the article). The first step to installing these brackets is to cut a bevel on the inside corner of the legs. This is where you'll later install the hanger bolts. The best way to cut the bevel is on your jointer. Set the machine's fence to a 45-degree angle and the depth of cut to 1/4". Cut 3-1/2" in on the top corner as shown in the photo.

Now install the hanger bolts, which are odd-looking fasteners that have wood screw threads on one end and machine screw threads on the other. The wood screw end goes into the leg, and the machine screw end is bolted to the corner bracket. To install the hanger bolts, first lay out and drill pilot holes on the leg. Then install the bolts using the method shown in the photo.

Now you need to cut a kerf in each apron for the bracket to grab. The kerf should be 1-3/4" in from the end and 3/8" deep for these brackets. Different brands can use different measurements.

Attaching the Top and Finishing

I attach the top with tabletop fasteners that I screw in place about every foot. On the long aprons, don't push the fasteners all the way into the kerf when screwing them down. This will give your top some room to move.

I finished the base with a couple coats of latex paint followed by a glazing stain. Finally, I added a couple coats of lacquer for protection.



When you have to use mitered mortise-and-tenon joinery, don't get too worked up about the fit of the miter. You don't want the miter too tight.



Mitered mortise-and-tenon joinery is common on tables with thin legs or when your set back is deeper than normal.



Be sure to glue the joint and hold the leg and apron together tightly while screwing it together.



Pocket screws aren't my first choice for building dining tables, but for a small occasional table, it'll work.



Use the bracket as a template for locating the holes for the corner bracket. Then use a drill press to make your pilot holes.

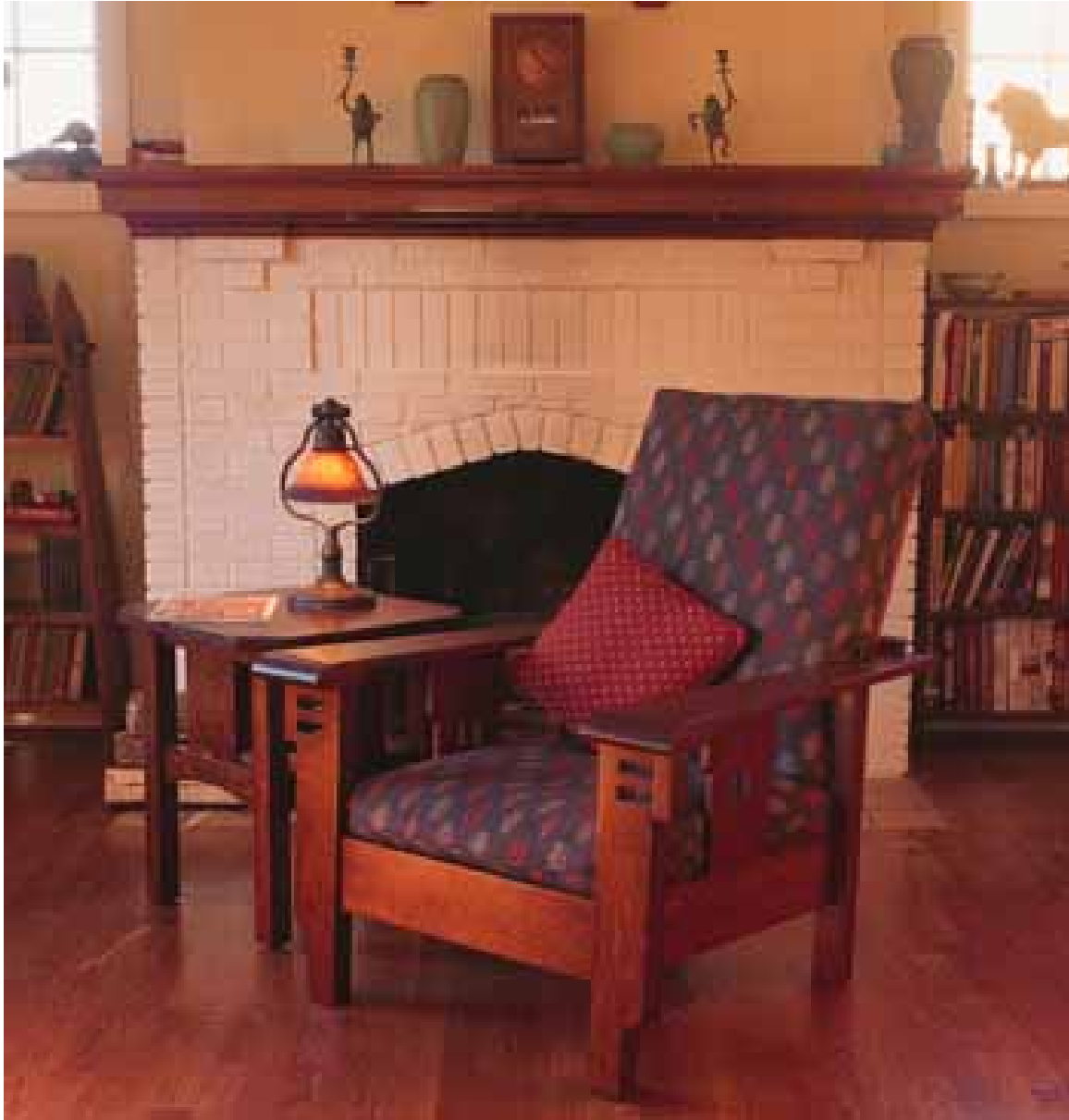


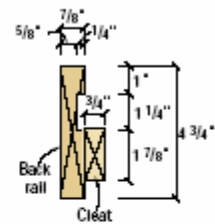
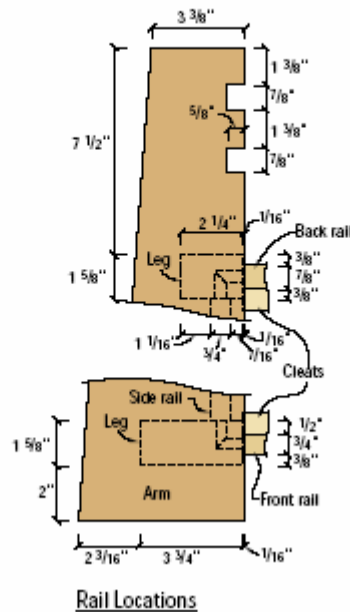
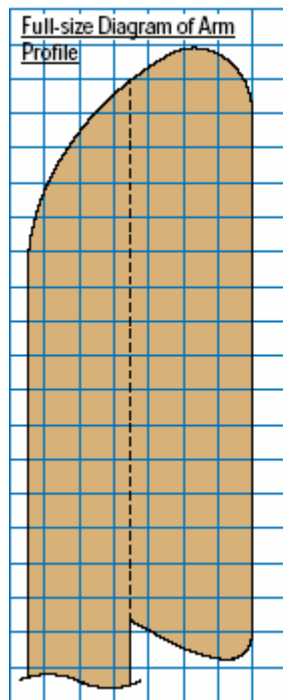
To install the hanger bolts, thread two machine nuts onto the end of the hanger bolt and tighten them against one another. Then grip the two nuts with a wrench and screw the hanger bolts into the leg.



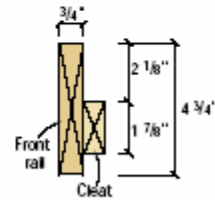
Corner brackets are great for building furniture that needs to be knocked down or moved frequently.

73 MORRIS CHAIR





Cleat Location, Back Rail



Cleat Location, Front Rail

The "X" on the rails and cleats denotes a cross section rather than an end view.

Mortises: Machine or No Machine?

First cut all your pieces to size according to the Schedule of Materials and begin laying out the locations of your mortises. The rule of thumb is that your mortises should be one half the thickness of your tenon's stock. When your stock is 3/4" thick, your mortises and tenons should be 3/8" thick. That means the tenons for the beefy back rail should be thicker (7/16") and those for the side slats should be thinner (1/4").

Also remember that except for the tenons on the legs and slats, all the tenons are 3/4" long. To ensure your tenons don't bottom out in your mortises, it's always a good idea to make your mortises about 1/16" deeper than your tenons are long.

After you mark the locations of all the mortises, it's time cut them. There are 38 mortises in this project. You'd be nuts to do these all by hand. Use this project as an excuse to purchase a hollow chisel mortising machine (about \$250) or a mortising attachment for your drill press (about \$70). If you can't swing the cash, I'd make plywood templates and cut the mortises with a router and a pattern bit. Making plywood templates is something covered later in the story.

One more thing: don't cut the mortises in the arms or the arm buildups until the chair frame is assembled. You'll cut these with a router and a pattern bit after the chair frame is assembled.

Tenons With a Dado Stack

Once you get your mortises cut, make tenons that fit snugly into the mortises. You can use a tenoning jig or the fence on your table saw, or you can use a router. I prefer to use a dado stack and my miter gauge.

While your dado stack is in your saw, cut the groove in the back piece that holds the seat frame. See the drawing for the location of this groove.



Make the mortises in the legs before you shape the curve near the bottom or make cutouts on the top.



When pattern-routing the curve on the legs, make sure you have the work firmly clamped in place. I have the pattern and leg wedged between two pieces of oak (the pattern is on the underside of the leg). Then the leg itself is clamped to the table. You also could perform this operation on a router table with a starting pin for pattern-routing.

Once you cut your tenons, prepare to assemble the drop-in seat and the adjustable back. To save yourself some grief, sand the edges of the rails that you won't be able to get to after the frames are assembled. Now put glue in all the mortises and clamp up the frames. Set them aside to dry.

Curves and Cutouts

What makes this Morris chair stand out are the curves and cutouts on the legs, arms and slats. Each curve and cutout needs a slightly different strategy.

The large curves on the legs and the small curves on the side slats were cut using a plywood template and a pattern-cutting bit in a router. I made the patterns from 1/2"-thick Baltic birch plywood. Use the drawings to make your own plywood template using a scroll saw, band saw or coping saw. Smooth all your cuts with sandpaper, then try shaping a couple scraps with your template to make sure your pattern produces the right shape. When satisfied, cut the curves to rough shape on your band saw (about 1/16" shy of your finished line) and clean up the cut with a router and pattern bit. Finish shaping the legs with a chisel.

To produce the large cutouts on the front legs, do what Oscar Onken did: cheat a bit. Make the "cutouts" using a dado stack on your table saw, with the legs on edge. Then glue the applied sides to the legs to cover the open end of the cuts. Instant cutout. While you're at it, cut out the notches on the arm pieces for the rod that adjusts the back.

To complete the legs, you need to cut the bottom of all four legs at a 2-degree angle so the chair sits flat on the floor. I recommend you make a full-sized mock up (see the photo above) so you can get the angle exactly right. Cut the angle on a chop saw.

Assembly

Now you're almost ready to assemble the chair frame. You'll need to first miter the tenons slightly where they meet to fit in the mortises using your table saw. Now finish sand everything. I went to 150 grit using my random-orbit sander and hand sanded the whole piece with 180 grit. Yes, it makes a noticeable difference.

Now glue the front rail between the front legs and the back rail between the back legs. Clamp and allow your glue to dry. Use 1/4" dowels to pin the tenons from the inside of the chair. This strengthens the weakest point of this chair. It's at this joint where the original chair came loose.

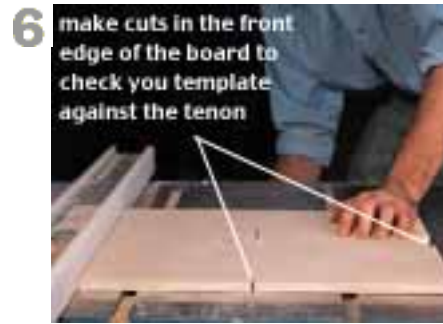
Glue the side rails between the front and back legs and you can see your chair take shape.

Learn to Make Square Templates

Now you need to work on the arms. First glue the arm buildup pieces to the front of the arms. Then get ready to cut the mortises on the arms that will hold the tenons on the legs and side slats. A word of advice here. Mock up an arm out of scrap wood and practice on it first.

To make plywood templates for the mortises, you need to make a square hole in the middle of a piece of ply. The best way to do this is by making plunge cuts into your plywood on your table saw. Refer to the photo earlier in the story to see how to do this.

Now cut your mortises. I used a template bit with cutters on the bottom and a guide bearing on top. If you don't have a bit with cutters on the bottom, you can still plunge with a straight bit. Just plunge slowly and wiggle the router a bit as you go. Cut the mortises in two passes.



3 To make a template for the mortises in the arms and the cutouts on the side slats, position your plywood over your table saw and raise the blade into the ply. Move the fence over and repeat. Then turn the pattern 90 degrees and repeat for the other edges of the pattern. Note that I made cuts in the front of the pattern to help me size the pattern to the tenons.



Be sure to make a full-size mock-up of the legs and sides to determine the angle you need to cut on the bottom of the legs.



When you determine that angle, use a grease pencil or magic marker to paint the bottom of the legs. I cut the back and front legs simultaneously. Slowly inch your legs in after each cut until the color is all gone.



Peg the tenons that join the front rail to the front legs and the back rail to the back legs. If you've ever pegged tenons before, y

After you're sure the arms fit on the legs, cut the curve on the front of the arm. Attach the full-size pattern to your arm and cut the shape on a band saw. Clean up the cuts with a stationary belt sander. Now taper the arms with your band saw and clean up the cut with your jointer. Glue the arms and slats in place.

Now shape the back rod that adjusts the seat back angle. Bevel one edge of the rod on your jointer and cut notches on the ends so the rod fits between the arms. Attach the back to the seat frame with a piano hinge. Screw the cleats to the front and back of the frame in the locations shown in the diagram; slip the seat in place.

Finishing

This takes some effort, but it is well worth it. The first step is to dye the chair with an alcohol-based aniline dye that's reddish. See the supplies list for ordering information. Then apply one coat of boiled linseed oil to the chair. You can get this at any home center store. Wipe off the excess and let it dry overnight. The linseed oil helps seal the wood before your final coloring step and helps bring out the ray flake.

Now wipe on a thin coat of Lilly's warm brown glaze. We live and die by this stuff when finishing Arts & Crafts furniture. We're not aware of a catalog that sells it, but you can visit Lilly's website (at the address in the supplies box) to find a paint store that carries this glaze. Wipe the glaze until you achieve an even tone. Allow it to dry overnight. Finally, apply three coats of a clear finish -- whatever you're comfortable with.

7 know that dowels can be wildly different sizes than they're supposed to be. Here's a trick. If your dowel is a bit undersized, glue it in place and cut it nearly flush to the surface. Then put several drops of thinned glue on the end grain of the dowel. It wicks in the glue, expands and glues up tight. When the glue is dry, cut the dowel flush.



Be sure to make a test arm before you go mortising the real thing. You'll be glad you did.

74

TANSU CHEST



Schedule of Materials Step Tansu

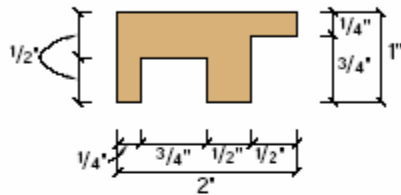
Lower Cabinet

No.	Item	Dimensions T W L	Material
2	Top & bot.	3/4" x 17" x 51"	Pty
4	Cabinet stiles	1" x 2" x 16"	M
2	Side panels	3/4" x 15" x 16"	Pty
1	Back panel	3/4" x 16" x 47"	Pty
4	Dr stiles	3/4" x 2" x 16"	M
4	Dr rails	3/4" x 2" x 21"	M
2	Thin rails	3/4" x 1" x 21"	M
2	Top panel	1/4" x 7 1/16" x 21"	Pty
2	Lower panel	1/4" x 4 1/16" x 21"	Pty
4	Interior stiles	1/4" x 1" x 7"	M
4	Runners	1/4" x 1/4" x 46"	M
1	Partition	3/4" x 13" x 16"	Pty
3	Cleats	3/4" x 3/4" x 13"	M

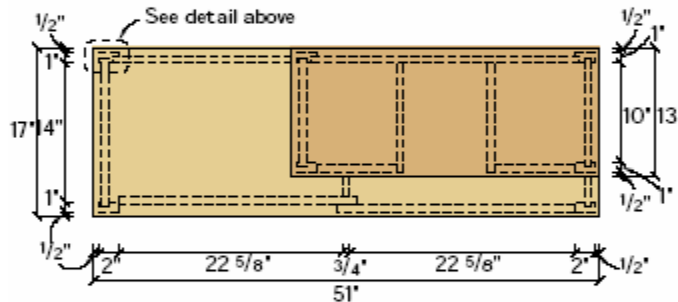
Upper Cabinet

No.	Item	Dimensions T W L	Material
2	Top & bot.	3/4" x 13" x 31"	Pty
4	Cabinet stiles	1" x 2" x 11"	M
2	Side panels	3/4" x 11" x 11"	Pty
1	Back panel	3/4" x 11" x 27"	Pty
2	Vert dividers	3/4" x 10 1/2" x 11"	Pty
4	Lg drw frts	3/4" x 4" x 8"	M
8	Drw sides	1/2" x 4" x 10 1/8"	Pty
4	Drw backs	1/2" x 4" x 7 1/2"	Pty
6	Drw bot	1/4" x 7 1/2" x 9 3/4"	Pty
2	Sm drw frts	3/4" x 3" x 8"	M
2	Drw sides	1/2" x 3" x 10 1/8"	Pty
4	Drw backs	1/2" x 3" x 7 1/2"	Pty

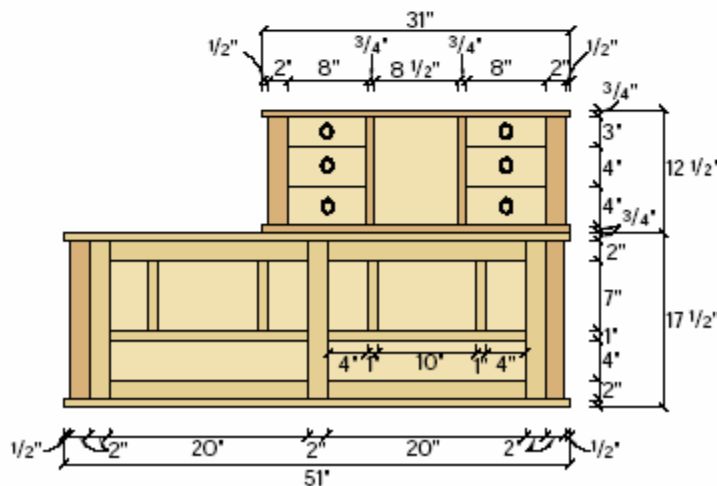
M= Hard maple, Pty= Maple plywood



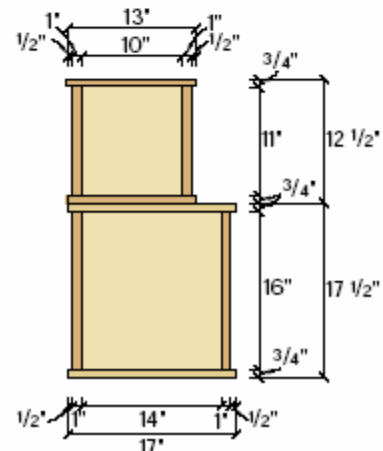
Detail of back cabinet stiles



Plan



Elevation



Profile

Construction of this chest is simple. You'll need a sheet and a half of 3/4" maple plywood, one board of 1"-thick maple that's about 8' long and 8" wide and some 1/2" and 1/4" plywood scraps for the drawers. The carcasses of the upper and lower cabinets are built the same way. First cut all your pieces to size and iron on veneer edge tape to cover all the exposed plywood edges.

Now cut the grooves and rabbets on the cabinet stiles. The side panels are glued into 1/2"-deep x 3/4"-wide grooves milled 1/4" in from the edge of the cabinet stiles. The back panel is nailed and glued into a 1/2"-deep x 3/4"-wide rabbet on the inside of the stiles. Screw each assembly to its bottom board. Glue and nail the partitions in place.

the thin rails, which should be 1/4" wide and 1/4" deep. Also, the interior stiles are merely applied to the doors after construction; they are not structural. After dry-assembling your doors, glue up and clamp them up.

When dry, glue the interior stiles in place and cut a 1/4"-wide by 1/2"-deep groove on the top and bottom of each door that will allow the door to slide on the runners. Then cut the four runners; make sure they slide smoothly in the doors' grooves. Attach the runners to the top and bottom of the lower cabinet using brads and glue.

I spaced my runners so that the front door is flush to the front edge of the cabinet stiles. Then I left a 1/16" gap between the two doors. Fit the doors to the opening in the chest. Now screw the top to the carcass through cleats that are screwed to the sides and partition of the case.

Upper Cabinet Drawers

Here's how I built my drawers. Cut 1/2" x 3/8" rabbets on the ends of the drawer fronts. Then cut 1/2" x 1/4" rabbets on the back edge of the sides to hold the back piece. Then cut a 1/4" x 1/4" groove to hold the drawer bottom on the sides, back and front that's 1/4" up from the bottom edge. Glue and nail the sides to the drawer front. Slip the bottom in place. Glue and nail the back to the sides.

How you hang the drawers is up to you. I cut 1/4"-deep x 5/8"-wide stopped dados that were centered on each side of the drawer. Then I nailed drawer runners to the carcass's partitions and drawer runners with plywood build-up strips to the sides. When the drawers move smoothly, nail the top to the case. Putty any nail holes. Apply three coats of a clear finish

You might have noticed from the photo that I made the grain direction of the drawers run vertically instead of horizontally. This is OK for such small drawers, and I did this because each bank of drawers now reminds me of one of those Japanese landscape paintings

75 STORAGE CABINET



SHAKER STORAGE CABINET

NO.	LET.	ITEM	DIMENSIONS (INCHES)			MATERIAL
			T	W	L	
Face Frame						
□ 2	A	Sides	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	51 $\frac{1}{4}$ "	Poplar
□ 1	B	Top rail*	$\frac{3}{4}$ "	2"	45"	Poplar
□ 1	C	Bottom rail*	$\frac{3}{4}$ "	5 $\frac{1}{2}$ "	45"	Poplar
Doors						
□ 4	D	Sides	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	43 $\frac{3}{4}$ "	Poplar
□ 6	E	Rails*	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	18 $\frac{1}{2}$ "	Poplar
□ 4	F	Panel	$\frac{5}{8}$ "	17"	18 $\frac{3}{8}$ "	Poplar
Carcass						
□ 1	G	Top	$\frac{3}{4}$ "	19"	50"	Maple
□ 2	H	Sides	$\frac{3}{4}$ "	17 $\frac{1}{4}$ "	51 $\frac{1}{4}$ "	Poplar
□ 1	I	Bottom	$\frac{3}{4}$ "	16 $\frac{3}{4}$ "	47"	Poplar
□ 2	J	Dividers	$\frac{3}{4}$ "	16 $\frac{3}{4}$ "	45 $\frac{1}{2}$ "	Poplar
□ 1	K	Nailing strip	$\frac{3}{4}$ "	1 $\frac{1}{2}$ "	46 $\frac{1}{2}$ "	Poplar
□ 1	L	Blocking 1	$\frac{3}{4}$ "	2 $\frac{1}{4}$ "	45 $\frac{1}{2}$ "	Poplar
□ 1	M	Blocking 2	$\frac{1}{2}$ "	1 $\frac{1}{4}$ "	45 $\frac{1}{2}$ "	Poplar
□ 5	N	Adj. shelves	$\frac{3}{4}$ "	16 $\frac{3}{4}$ "	22 $\frac{7}{8}$ "	Poplar
□ 10	O	Masonite shelves	$\frac{1}{4}$ "	16 $\frac{3}{4}$ "	20 $\frac{1}{4}$ "	Masonite
□ 1	P	Back	$\frac{1}{2}$ "	47"	51 $\frac{1}{4}$ "	Ply

* = 1" tenon on both ends

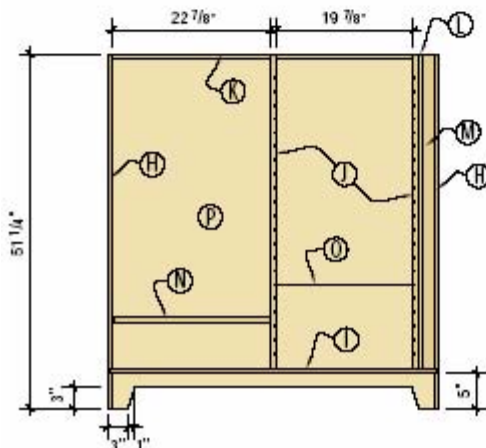
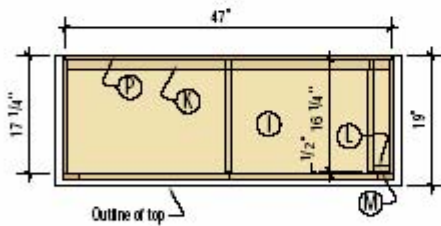
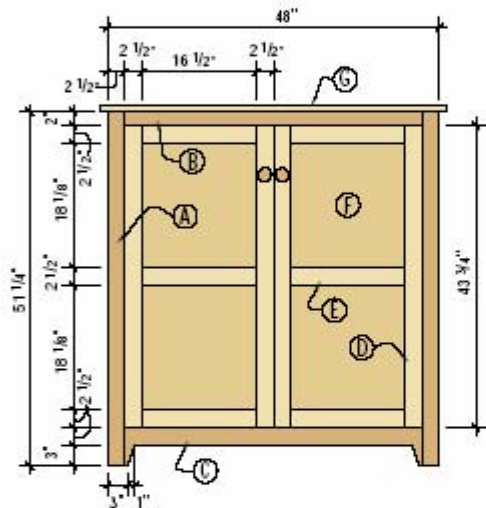
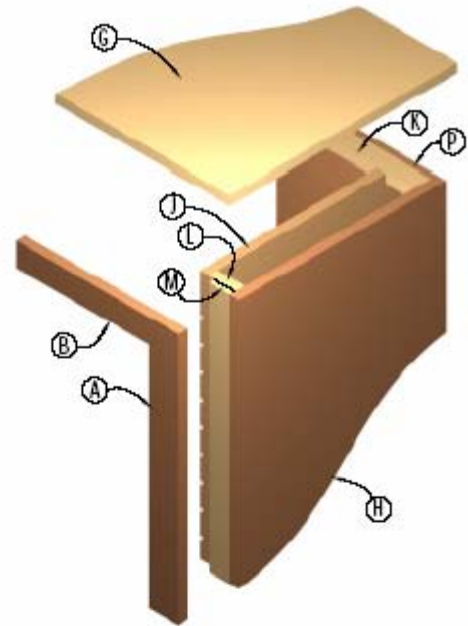
SUPPLIES

Woodworker's Supply
800-645-9292

Amerock non-mortising hinges,
#891-740, \$2.95 each

Horton Brasses
800-754-9127

Maple knobs, #MK-3, 1 $\frac{1}{2}$ " diam-
eter, call for pricing



How to Pack Lots of Stuff Into Small Spaces

Organizing clutter is an interesting problem that you also might face as you design storage in your home or case pieces. Here's what I did: Behind the left door I put a series of five $\frac{3}{4}$ "-thick adjustable solid-wood shelves. These would handle the heavier games and books. Behind the right door is a series of $\frac{1}{4}$ "-thick tempered Masonite shelves. These 10 shelves slide in and out of $\frac{1}{4}$ " x $\frac{1}{4}$ " dados.

The Masonite won't hold a lot of weight, but it's just right for storing lightweight objects. Think home office, and you'll know what I mean. Masonite (sometimes called "hardboard") shelves are perfect for storing letterhead, envelopes, CDs and any other paper goods in an office. The other challenge in this piece was getting the shelves, doors and face frame positioned so they didn't interfere with one another. As you'll see in the drawings, it took a few pieces of "blocking" to get everything to work in this cabinet.

Face Frame First

This seems backwards, I know, but begin construction by building the face frame. The size of the case and doors are determined by your face frame, so it's clearly the place to begin.

When ripping out the material for the face frame stiles, cut them each about $\frac{1}{16}$ " wider than the dimension called for in the cutting list. This will make your face frame hang over the edge of the case sides. Once the face frame is attached, you can trim it flush for a perfect fit.

I use mortise-and-tenon joinery to build both the face frames and doors. The tenons are $\frac{3}{8}$ " thick and 1" long, and I usually cut a $\frac{3}{8}$ " to $\frac{1}{2}$ " shoulder on the edges. Be sure to cut your mortises $1\text{-}\frac{1}{16}$ " deep so your tenons don't bottom out. When everything fits, put glue in the mortises, clamp the frame and allow the glue to cure.

Doors are Second

Next, build the doors. It's much easier to fit the doors into your face frame before it's attached to the case. Build the doors much like you did your face frame by using mortise-and-tenon joints. The only difference is that you need to cut a $\frac{3}{8}$ " x $\frac{3}{8}$ " groove in the rails and stiles to hold the door panels.

I cut my grooves along the entire length of the stiles; as a result, I cut my tenons with a "haunch" to fill in that extra space on the ends of the stiles. The panels are flat on the front, and beveled on the backside so they fit in the grooves in the rails and stiles. I cut that bevel by setting my table saw blade to 7° and slicing off a little of the backside of each door until the panels fit snug and without rattling.

Sand the panels up to your final grit (120 will be fine for a painted piece) and assemble the doors. Sand the assembled doors and face frame and then peg the tenons if you like. I used square pegs that I pounded into round holes.

Finally, the Case

The case goes together quickly thanks to my nail gun. Begin construction by cutting a $\frac{3}{4}$ "-wide by $\frac{1}{4}$ "-deep dado in the side pieces for the bottom of the cabinet. I like to use a dado stack in my table saw for this operation. Now cut a $\frac{1}{2}$ " x $\frac{1}{2}$ " rabbet on the back edges of the sides to hold the plywood back in place. Sand the inside of the case and get ready for the first bit of assembly.

Put the case together on its back. First put glue in the dados in the sides and fit the bottom in there. Nail the bottom in place from the outside of the case. I use a finish nailer for this task.

Now put the nailing strip in place at the top of the case. The diagrams show you where this needs to be, but essentially it's flush with both the rabbets in the sides and top of the case. Nail it home. Glue and nail the face frame to the case using brads. Trim the face frame flush



Behind the left door are five $\frac{3}{4}$ "-thick adjustable solid-wood shelves, perfect for heavier games and books. Behind the right door are 10 $\frac{1}{4}$ "-tempered Masonite shelves, perfect for storing letterhead, envelopes, CDs and other home-office related items.



I'm not perfect, and neither are you. If your face frame is exactly the width of your case, it's going to be difficult to fasten it square. Make life easier by ripping your stiles $\frac{1}{16}$ " oversize in width. After you nail and glue the face frame to the case, use a flush-trimming bit in your router to trim the face frame flush with the side of the cabinet's case.

to the case.

All the Insides

There's nothing complicated about the insides once you have a plan. Begin by cutting the $\frac{1}{4}$ " x $\frac{1}{4}$ " dados in the dividers. These are spaced 2" apart, and there are 21 of them. I used a dado stack in my table saw and simply moved the fence $1\frac{3}{4}$ " after each pass.

Now it's time to add the dividers to the case. Turn the case on its head. Cut a notch in each divider so it will fit around the nailing strip. Get the divider right where it needs to be and nail it in place through the bottom and the nailing strip. Now nail the two blocking pieces shown on the diagram in place. The blocking does a couple things. First, it allows the Masonite shelves to be slid in and out without having to swing the doors wide open. Second, the thinner piece of blocking fills in the gap between the divider and face frame and leaves room for the hinges.

Now drill the holes in the left side of the case and the center divider for the adjustable solid-wood shelves. I'm partial to 5 mm holes spaced $1\frac{3}{8}$ " on center.

Mark the base cutouts on the sides, front and plywood back of the case using the diagrams as a guide. Use a jigsaw to make these cuts and clean up your work with sandpaper.

Cut your top to size. I used a piece of bird's-eye maple. You have a couple options for attaching the top. You could use pocket holes, figure-8 fasteners or wooden cleats. No matter which way you go, prepare the case for the top but don't attach it. I like to glue the top to the front edge of the case after finishing.

Finishing

On the knobs, top and all the inside pieces (except the Masonite), I wiped on a light honey-colored stain. Then I painted the case a dark red and added a topcoat of lacquer to protect the paint. Hang the doors, nail in the back and add the knobs.



You can see the haunch on the tenons on the rail closest to the camera. When it comes to fitting your panels, remember to work tight in summer and loose in winter. Panels of this size will shrink and contract noticeably.



You could use a router and a straight bit to make this cut as long as you had a reliable way of guiding the router (such as an edge guide). I find a table saw is much faster for this operation.



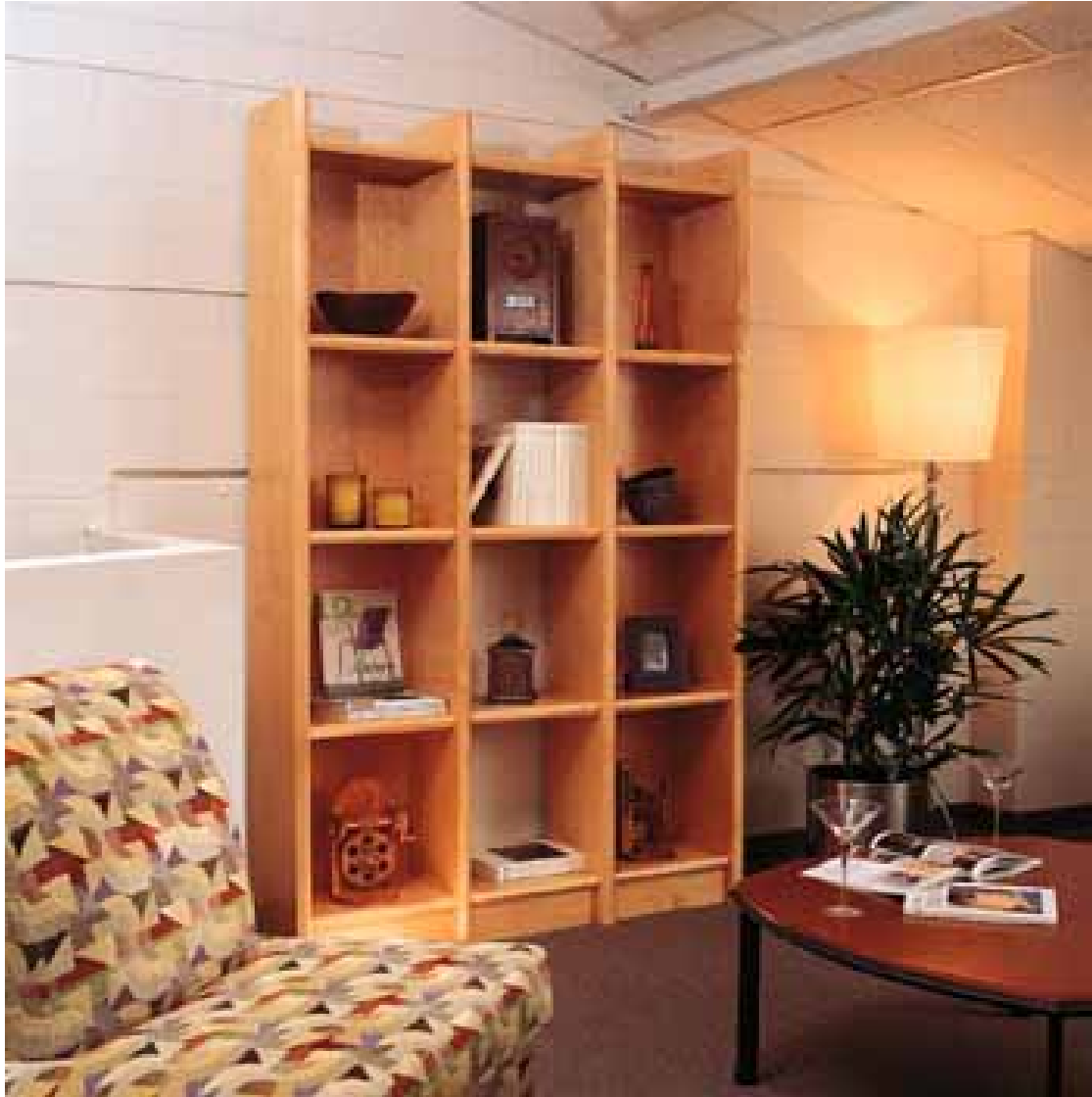
Once you nail the dividers in place through the bottom piece, turn the case over on its feet and nail through the nailing strip into the dividers.

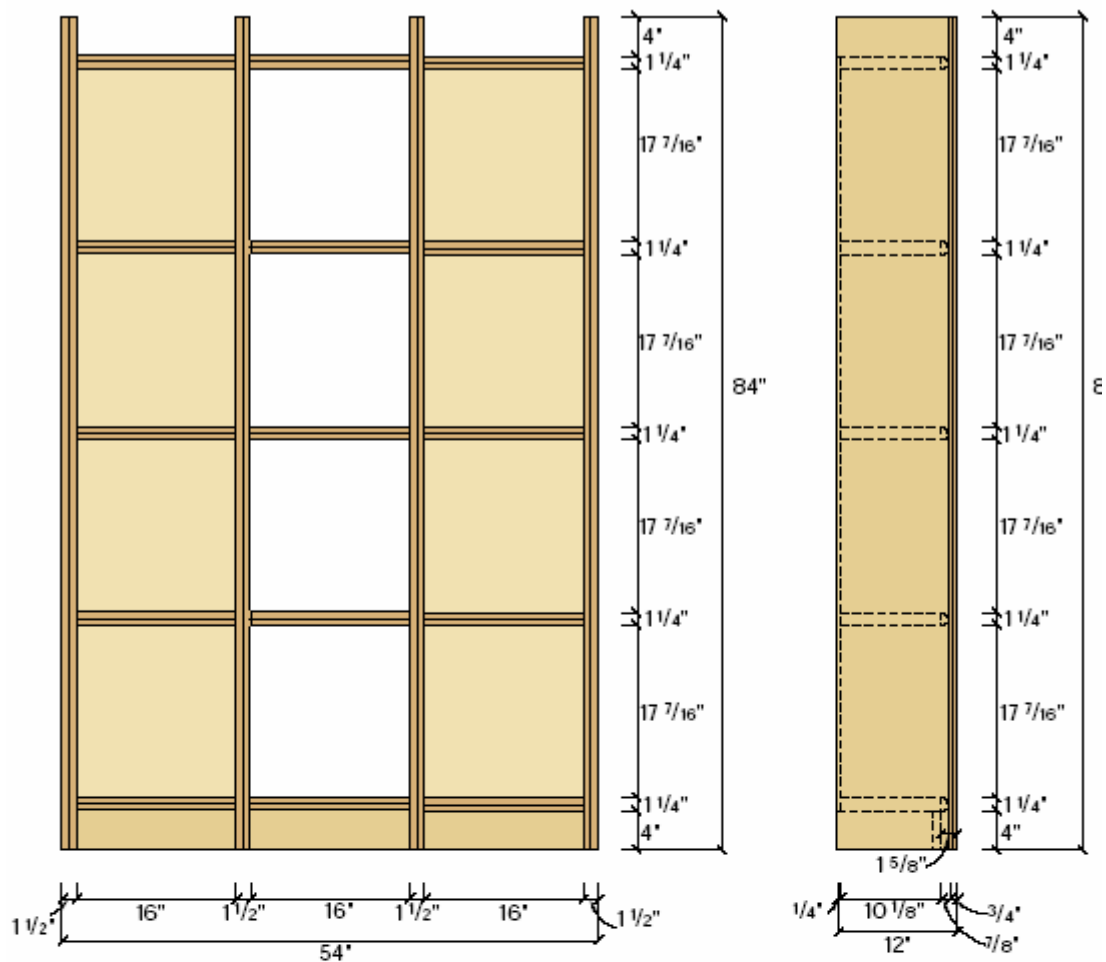


In addition to cutting this detail on the sides and front, I also cut it on the bottom of the plywood back, which gives it a finished look when the cabinet is viewed from down low or from a distance.

76

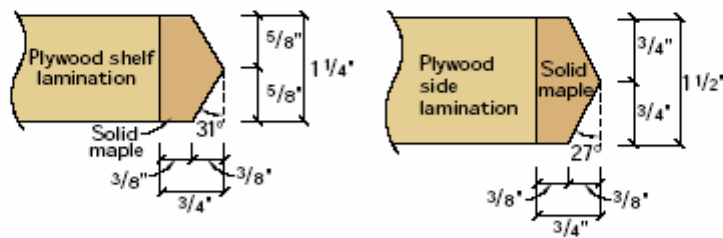
SHELVES





Elevation

Profile



Detail of bevel profiles

Schedule of Materials: Contemporary Shelves			
No.	Item	Dimensions T W L	Material
4	Sides	3/4" x 11 1/4" x 84"	Plywood
4	Sides	3/4" x 11" x 84"	Plywood
10	Outr. shelf tops	3/4" x 10 1/8" x 16"	Plywood
10	Outr. shelf bottoms	1/2" x 10 1/8" x 16"	Plywood
5	Cntr. shelf tops	3/4" x 10 3/8" x 16"	Plywood
5	Cntr. shelf bottoms	1/2" x 10 3/8" x 16"	Plywood
2	Backs	1/4" x 17 1/2" x 76"	Plywood
3	Aprons	3/4" x 4" x 16"	Plywood
4	Side edging	3/4" x 1 1/2" x 84"	Maple
15	Shelf edging	3/4" x 1 1/4" x 16"	Maple

Supplies: Woodworkers' Supply (800-645-9292), 12 6" taper connectors, # 928273 \$4.95/pkg. of four. 18 wire shelf supports, # 826028, \$1.45 apiece for 10+.

It's rare that bookshelves look as interesting as the objects you display on them. After all, how much can you decorate the edges of your shelves and sides? This unit is unusual because the shelves and sides are beefier than you would normally see, and the two bevel cuts on the front edges give these shelves nice visual interest. Best of all, perhaps, is that this piece is simple and quick to build.

Dividers and Shelves

Start by cutting out the sides and shelves. The 1-1/2"-thick sides are made by gluing two pieces of 3/4"-thick plywood together. The 1-1/4"-thick shelves are made by gluing 3/4"-thick plywood to a 1/2"-thick piece. Note that the finished sides have a 3/4" x 1/4" rabbet for the back that's formed by gluing a narrower piece to a wider one. The adjustable and fixed shelves in the side openings are all the same width. The center shelves are 1/4" wider to account for the lack of a back.

To cut the sides, crosscut a whole sheet of plywood to the length of the sides first, then rip them to width (11" and 11-1/4"). Cut the sides a little wide (1/16"), initially, to give yourself a little room to saw off a square straight edge. This will give you a clean edge for attaching a piece of maple later. Now nail and glue the dividers together, remembering to offset the back edge for the rabbet. Place your nails so the shelves will hide them.

Here's an easy way to cut the shelves. Rip them to width from a full piece of plywood, then nail and glue up a length of shelving. Then crosscut the shelves to length from the long pieces. You can get five 16" shelves out of a 96" rip. For even less work, cut the shelves to length after attaching the edging.

Edges and Angles

The edges for the bookshelves are solid maple. Because the thickness of 3/4" and 1/2" plywood is considered "nominal," you will end up with finished thicknesses about 1/16" less. Rip your edging stock a little wide and attach it with biscuits and glue. With a flush-cut bearing bit in a router, trim the edging flush to the sides and shelves, then clean up your work with a plane or scraper.

The last step is to bevel the edging. The photo shows how I did this on the table saw. Remember that the setup must change for the different width pieces.

Making it a Stand-Up Unit

The next step is to mill stopped grooves in the topmost and bottommost shelves to accept the tapered sliding connectors that attach the sides together. The grooves in the ends of the shelves are 3/4" wide by approximately 3/8" deep, and milled with a dado set on the table saw. It helps to make a practice joint because the depth of the groove is critical to a snug fit using this style of connector.

Installing the Shelves

After cutting the slots in the shelves, lay out and mount the small part of the tapered connector to the side. The large connector will mount to the shelf groove with the wide end towards the shelf front. Do a test fit on the shelves. The shelves in the side units should be flush to the rabbet in the back edge of the sides. The center shelves should be flush with the back.

The next step is to cut the stopped grooves in the rest of the shelves for the hidden wire shelf supports. If your blade is too narrow, take two cuts to get the 1/8" groove necessary to slide the shelf onto the wire supports. Some drill and chisel work will be necessary to lengthen the kerf to accept the entire 9-3/4" length of the shelf wire. This requires drilling and chiselling into the end of the front edge. Lay out and drill the locations for the wire supports in the side and center sections so the shelf heights will match across the bookcase.

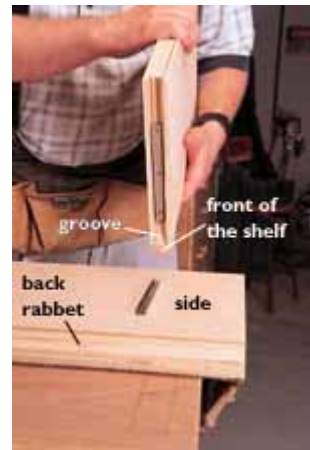
Now it's time for all the parts come together. Begin by assembling the two outside units



Face-Glue the Parts: Once you've got your parts cut to size, glue and nail them together leaving the rabbet at the back. Set and putty the nails, then rip the dividers to their final width.



Profile: The bevels on the edges are basically a "V" shape on the entire edge. See the diagram at right for the details and cutting angles. Clean up your saw marks with a plane.



Mount Knockdown Hardware: Use a dado stack to cut a 3/4" x 3/8" groove from the joint where the edge attaches to the shelf to the back of the shelf. The knockdown hardware is mounted in about the middle of the shelf. It pulls together pretty tightly, so you might want to sand any bumps or ridges off the ends of the shelves to keep from scratching the sides.

of the bookcase. Tip them onto their backs and attach the aprons to the bottom shelf using cleats and screws. Next attach the side units together forming the center section. The best way to do this is to assemble with the front facing up. Use a handscrew clamp to hold up the sides while you're assembling. The apron on the center bottom can be screwed onto the shelf and braced with corner blocks prior to assembly. Push the lower shelf into place and mark the location of the apron, also called a "kick" or a base. Then remove the shelf and add two stop blocks to the sides to support the center apron from behind.

When you're happy with the fit of the parts, disassemble the bookcase and finish. I applied a coat of light stain to give the maple an aged appearance. (I used about two ounces of linseed oil and colored it with Olympic stains, one-half Early American #41552, and one-half Red Oak #41567. 1/4 teaspoon of each.) Wipe on an even coat of oil. Wipe off the excess and let it dry for 24 hours. The next day, lightly sand the surfaces and clean them with a tack rag. Finish with two or three coats of a clear finish.

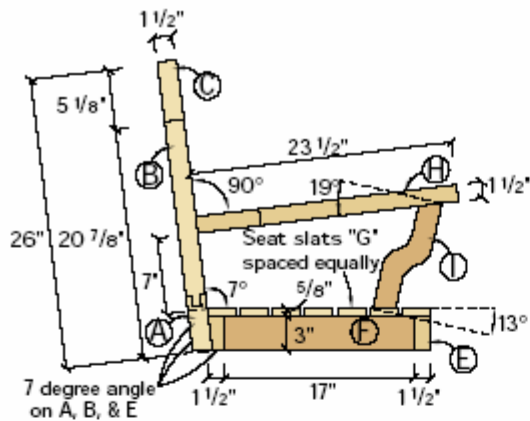


Magic Wire: After cutting the 1/8" grooves in the shelf sides, assemble the case. Tap the wire shelf supports in and slide the loose shelves in place.

77

GARDEN SWING

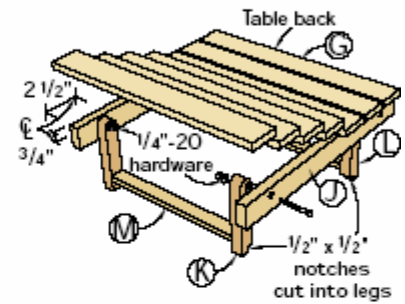
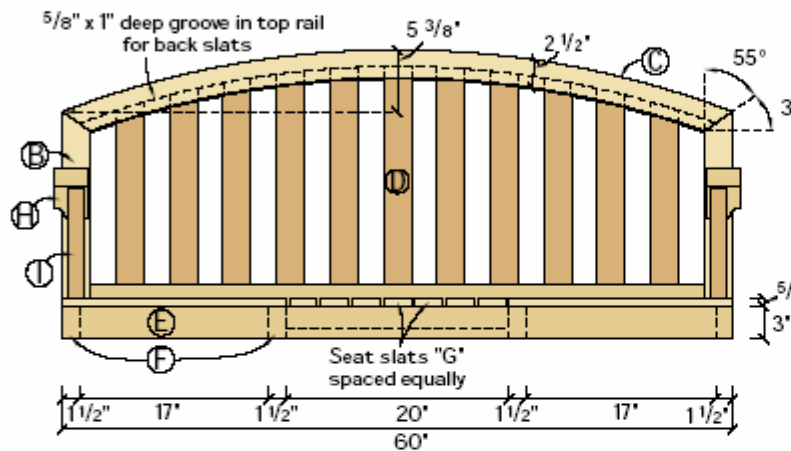




Schedule of Materials: Garden Swing

No.	Ltr.	Item	Dimensions T W L	Material
1	A	Bottom back rail	1 1/2" x 5" x 55"	Cedar
2	B	Back stiles	1 1/2" x 2 1/2" x 20 7/8"	Cedar
1	C	Top back rail	1 1/2" x 8" x 60"	Cedar
11	D	Back slats	5/8" x 2 1/2" x 20 1/2"	Cedar
2	E	Seat rails	1 1/2" x 3" x 60"	Cedar
4	F	Seat stringers	1 1/2" x 3" x 17"	Cedar
21	G	Seat slats	5/8" x 2 1/2" x 20"	Cedar
2	H	Arms	1 1/4" x 3" x 23 1/2"	Cedar
2	I	Arm supports	1 1/2" x 4" x 12"	Cedar
2	J	Table battens	3/4" x 1 1/2" x 19 7/8"	Cedar
2	K	Table legs	1" x 1 1/4" x 6 1/2"	Cedar
2	L	Table legs	1" x 1 1/4" x 8 1/4"	Cedar
2	M	Table leg braces	5/8" x 1 1/4" x 13"	Cedar
2	N	Table support seats	1" x 2" x 20"	Cedar

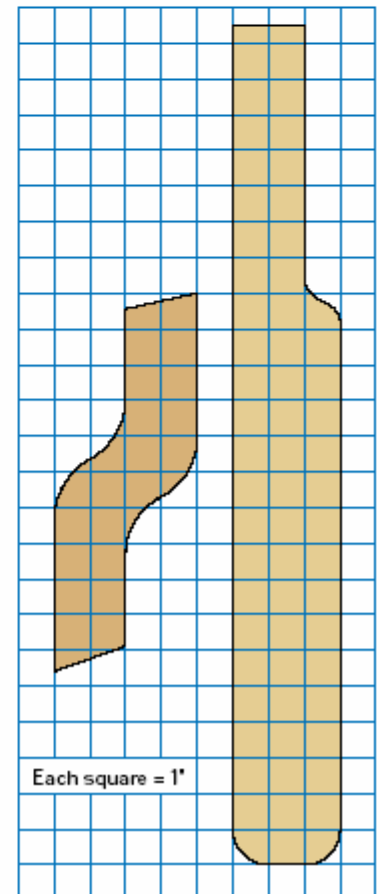
*Longest slat, cut to fit. **Length oversize to allow fitting.



Schedule of Materials: Swing A-Frame

No.	Item	Dim. T W L	Material
4	Frame legs	4 x 4 x 96"	PTP
1	Top center rail	4 x 4 x 96"	PTP
2	Top outer rails	2 x 4 x 96"	PTP
2	Leg supports	2 x 6 x 48"	PTP
4	Swing-N-Slide EZ Frame Braces		
4	Swing-N-Slide Leg top braces		
2	3/8" x 6" eye bolts		
4	3/8" flat washers		
4	3/8" nuts		
8	S-connectors		
4	6-foot lengths of chain		

PTP = pressure treated pine



Start the project by heading to the lumber yard. The six-foot swing as shown required one 2x8, one 2x6, five 2x4s, and 10 1x4s all in eight-foot lengths. I chose western red cedar because it's a durable, lightweight, outdoor wood and is less expensive than redwood. At Midwest prices, the lumber cost about \$120.

Seat Frame

Once back in the shop, start construction by cutting the seat rails and stringers from the 2x4s. As you probably know, dimensional lumber comes with rounded edges. You'll need to get rid of them. Cut the pieces for the rails and stringers to their 3" thickness by first running one edge over the jointer until they have a square edge, then rip them to 3" wide. To give the seat a comfortable back angle, set your saw blade to an 7-degree bevel and run the back rail on edge to give a 7-degree angle to the back.

Now cut the pieces to length and screw the stringers between the rails, spacing them as shown. The center section spacing is critical because the pop-up table needs to be square so it can be lifted out and turned in place and the legs lowered. Use 2" galvanized deck screws when screwing the seat frame together.

Mill all the slats at the same time because they are essentially the same size. Cut the 1x4s into 24" lengths, and plane the boards to 5/8" thickness. Then rip them to their 2½" width and crosscut the seat slats to 20". To give the swing a finished look, cut an 1/8" roundover on all four top edges of each seat slat using a bit mounted in a router table.

Attach the slats for the permanent seats, running the slats from side to side. They should flush up in length to the outside edges of the stringers, and the front slat should be flush to the front rail. Use about 3/8" spacing between the slats. I decided to attach the slats to the frame using finish nails and an air nailer. This left a much smaller hole than screws, and it was very quick.

To finish the seat I decided to build the top surface of the table at this point. The spacing works the same as on the side seats, but run the slats from front to back. The slats are attached to two table battens (¾" x 1-½" x 19-7/8") that are held 1/16" or so away from the inside face of the front and rear rails. This gap should allow the table to lift out without binding, but some slight fitting may be necessary. Don't worry about the legs yet, we'll do that later.

Build the Back

Next, turn to the back of the swing. Mill the bottom back rail and two stiles to size as described earlier to leave crisp edges. Run the bottom edge of the bottom back rail and both stiles through the saw at an 83-degree angle to match the bevel on the seat. Then take the 2x8 top rail and lay out the top arch of the swing by marking the center of the rail, then mark 2-½" down from the top at the center. Tap a small brad nail into the board at this spot, then put two more brad nails into the board at the bottom corner of the board at either end. Then take an eight-foot strip of ¼"-thick wood and bend it across the top nail, attaching the strip to the two lower nails with spring clamps. The arch formed by the strip can then be marked with a pencil, and then a second line (2-½" above the first line), marked. Jigsaw the piece to the outside of these lines, then sand the piece smooth.

To determine the length of the top rail, lay the bottom rail and side stiles flat with the bottom rail between the stiles. Clamp these pieces in place, then lay the top rail across the tops of the stiles, flush to the top outside corner of each stile. With the top rail in place, mark the point where the inside curve of the rail intersects the inside edge of the stiles. Connect the two points and this is the angle to cut on the top edges of the stiles and on the ends of the top rail, to form mitered joints. The back frame will be held together with a double helping of biscuits, but first you need to cut the groove in the top and bottom rails to hold the slats.



With the seat frame assembled, nailing the slats in place was a cinch with a pneumatic finish nailer and stainless steel nails. Note the 7-degree bevel on the rear of the back seat rail.



Holding the arched top rail steady was the most difficult part of routing the top groove for the slats. Remember to make the cut in two passes on each side. In this photo you can see that the rail hasn't been cut for length yet, allowing extra support for the router at the beginning and end of the cut.



With the miters cut on the top rail and back stiles, space the slats and use the top rail to mark the angle and length of each slat, (adding 1").

Running the groove in the bottom rail is fairly simple. Set up a router with a straight bit (or an up-spiral bit) of either 3/8" or 1/2" diameter. Next set up a fence on the router 7/16" from the bit, and set the bit for a 1/2" depth. (The final depth is 1", but take it in two passes.) By running the router on both long edges of the rail, the groove will be centered on the piece. Check the fit of the back slats in the rail (or better, a test piece), then make the groove.

To cut the same groove in the arched top rail, see the photo at left. You will need to adjust the depth of the final cut a bit to compensate for the curve of the arch.

Miter the top rail to length, then check the fit of your slats in the grooves. The spacing between the slats should be about 2-1/4", but double-check your dimensions.

After cutting the double biscuits at the joints, place the slats in the bottom groove and locate the top rail in position on the slats. Mark the height and curve on each slat. Remove the slats, numbering them as you do. Now add 1" in length to the marks on the slats and cut them to their finished length using the band saw. You're now ready to glue up. I used polyurethane glue for all my glued joints. The polyurethane adhesive provides a strong water-resistant bond in even long-grain to short-grain joints. Don't glue the slats in place, however. Place them in the grooves in their approximate positions, then after the frame has dried, use a brad nailer to tack the slats in place with a single brad at top and bottom, from the back. To protect the lower rail from rot from standing water in the groove, cut blocks, (called fillets), the size of the spaces and glue them in place.

You're now ready to glue and bolt the back to the seat. I used four 1/4" threaded bolts with washers to bolt the bottom rail of the back to the back rail of the seat. Hold the bottom edges of each flush, and again use polyurethane glue on this joint.

Next cut the two arms and arm supports from 2x4 material and cut them to shape using the scaled drawings on the next page. You may want to cut the angle on the bottom of the support and on the back end of the arms, then fit them in place and confirm the location and angle of the top end of the supports. Attach the arms to the back with a long deck screw through the back stile. Glue the support to the arm and to the seat with 1/2" dowels between.

The last step is to put the legs on the table, and to notch and fit the support cleats. Start by cutting the leg pieces to the sizes given in the Schedule of Materials. They are two different lengths to allow the table to sit parallel to the ground, even though the swing itself is angled back. Round over the top end of each leg to allow it to swivel without catching, then drill 1/4" clearance holes, 1/2" down and centered on the legs. Drill clearance holes in the table battens 1/2" up from the bottom edge, and 1" in from the inside corners. Attach the legs using 1/4" x 2 1/2" bolts with two washers on either side of the leg and a nylon-lined nut to hold the legs tight, but not immobile.

Check the spacing between the legs (near the bolts) then cut the leg braces to fit, and screw them in place between the legs.

Now head back to the saw and cut the two table support cleats to fit between the inside stringers. Clamp these in place, center the table in place left to right and mark the location of the legs.

Remove the cleats and cut 7/8" x 1" notches on the leg locations. Then use a handsaw to trim the ends of the legs to form tongues to fit into the mortises you've just created in the cleats. Glue the cleats in place, and once dry, the table will drop into place in the cleats, holding the table steady.

After adding 3/8" x 4" eye bolts to the front and rear of the swing seat, the swing is ready to hang. If you've got a porch, find a sturdy joist and get the lemonade. If you happen to be missing a porch, construct a simple A-frame structure to let you swing in style anywhere in your yard.



The back of the arm is simply screwed in place through the back stile, while the support is attached to the arm and seat with dowels and polyurethane glue. Notice the foamy squeeze-out of the glue at the joints.



With the notches cut in the support cleats, the two pieces can be glued in place in the seat frame.



Last, but not least, bolt the table legs in place to the table battens. Note the notches on the ends of the legs which drop into the previously cut notches to stabilize the table.

78

GLOBE STAND





You might prefer a tapered-leg taboret with wedged tenons...



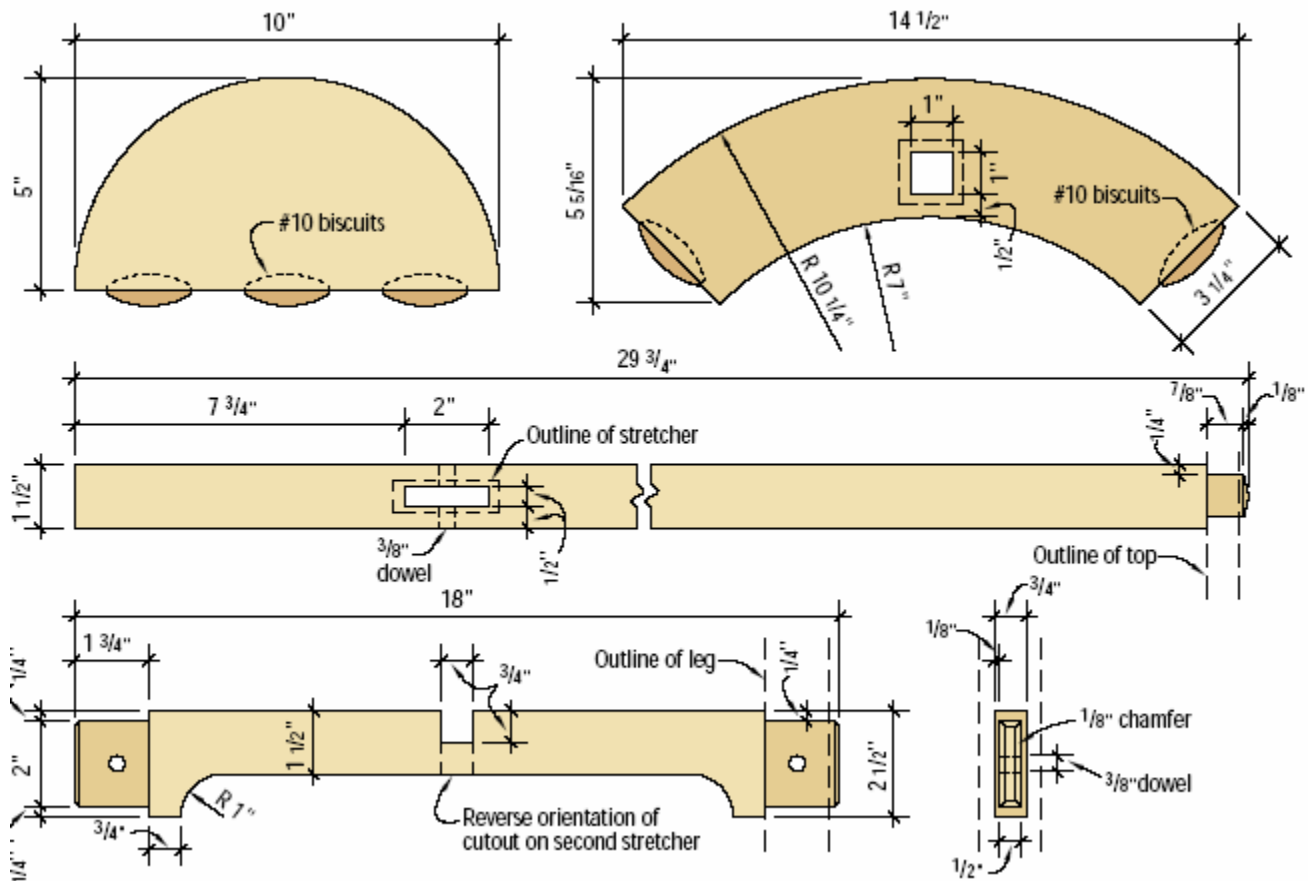
...or a globe stand in the style of Frank Lloyd Wright...

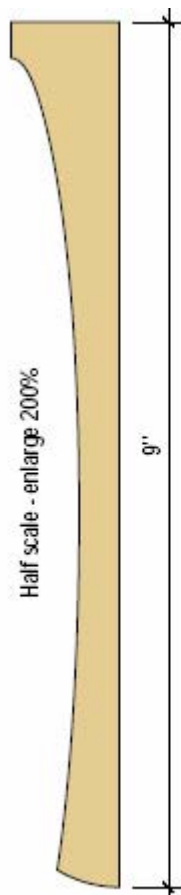


...or even in the style of a Gustav Stickley end table.

ARTS & CRAFTS GLOBE STAND

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
		T	W	L	
4	Top pieces	$\frac{3}{4}$	$5\frac{5}{16}$	$14\frac{1}{2}$	Cherry
2	Table pieces	$\frac{3}{4}$	5	10	Cherry
4	Legs	$1\frac{1}{2}$	$1\frac{1}{2}$	$29\frac{3}{4}$	Cherry
2	Stretchers	$\frac{3}{4}$	$2\frac{1}{2}$	18	Cherry
4	Corbels	$\frac{3}{4}$	$\frac{7}{8}$	9	Cherry





Around the World in Four Easy Pieces

Start by laying out the four top quadrants. With the exception of the legs, all the parts for this project are sized to be cut from 1 x 6 stock. Before turning to your band saw to test your eye/hand coordination on the outside curves, cut the 1" x 1" mortises. They're easier to form when there are still flat sides to press against a fence.

While splined joints might have been another "trick" that I could have thrown into the mix, I opted for the ease and familiarity of biscuits when assembling the ring. After gluing up the ring, cut the arcs slightly wide of the line on the band saw. I used a shop-made circle-cutting jig on my router table to refine the outside edge. Then I used a router edge guide to trim the inside edge to a perfect circle.

I also used biscuits to join the two halves of the lower table. I added another level of detail with a 1/4" x 1/4" chamfer on the top edge of both the ring and table. Finally, I plowed two 1/4"-deep x 3/4"-wide grooves that crossed in the middle of the bottom of the table to position it squarely on the stretchers.

The legs are formed from 2 x 2 stock. Although the 1/2" x 2" through-mortises were made on the legs with a straightforward series of cuts with a 1/2" mortising chisel, the through-tenons required some attention to detail. After cutting the tenons on the ends of the legs to fit the mortises, I determined that a 14° bevel would give me an 1/8"-high pyramidal top. The tenon is sized to allow for an 1/8" vertical rise above the top before transitioning into the slopes. I like the look, and it's more forgiving than trying to align four pyramid bases exactly with the tabletop.

The stretchers are joined with a simple half lap. The ends of the through-tenons are chamfered at a 45° angle. I then pegged each tenon using 3/8" cherry dowels through



Use the plans from the diagrams to lay out your mortises on your top pieces. Draw the mortise locations on paper, photocopy the plans and use rubber cement or a spray adhesive to attach them to your wood. Then it's simple matter of cutting where the lines tell you to.



After you've cut your top to size, you need to clean up the band-sawn edges using a router table, a straight bit and the shop-made jig shown here. First cut a piece of 1/4"-thick plywood to the same size as your top and attach it to the top using a spray adhesive. Nail the center of the 1/4" plywood to a sub-base of 3/4" plywood. My router table is part of my table saw setup, so I attached a miter bar to the 3/4" plywood, which allowed me to slide the jig into position. If you don't have a miter slot, you

23/64" holes after slightly tapering the ends of the dowels. With the holding power of contemporary glues, they're only for show anyway.

Speaking of show, the corbels that "support" the top are structurally unnecessary to this project. Visually, however, they're the icing on the cake. Glue them in place and clamp them up.

To mount the globe on the stand, you need to cut two 1/4"-long x 1/4"-deep notches in the inner edge of the ring. Rather than setting up my router and a jig for the operation, I chucked a 1/4" Forstner bit into my drill press, made a 1/4"-deep hole that was tangent to the inner edge, and squared up the bore with a sharp utility knife. See the photo at left for details.

Because cherry darkens quickly enough through oxidation and exposure to ultraviolet rays, I used a clear wipe-on oil finish to emphasize the contrast between the end grain of the through-tenons and pegs and the face grain of the legs and top. If you've got 'em, you might as well flaunt 'em.

might need to first clamp the jig in place and raise the router bit while it's running to get your cut started.



Once you get the outside shaped perfectly, you can use that edge to guide your router. I used a commercial edge guide (the [Micro Fence](#)). Essentially, two rounded guides ride along the outside edge of the top, ensuring the straight bit cuts a perfectly circular path. You also could make this cut using a commercial or shop-made circle-cutting jig for a router.



Though there are many complicated ways to attach corbels to legs, I prefer to simply glue and clamp them in place.

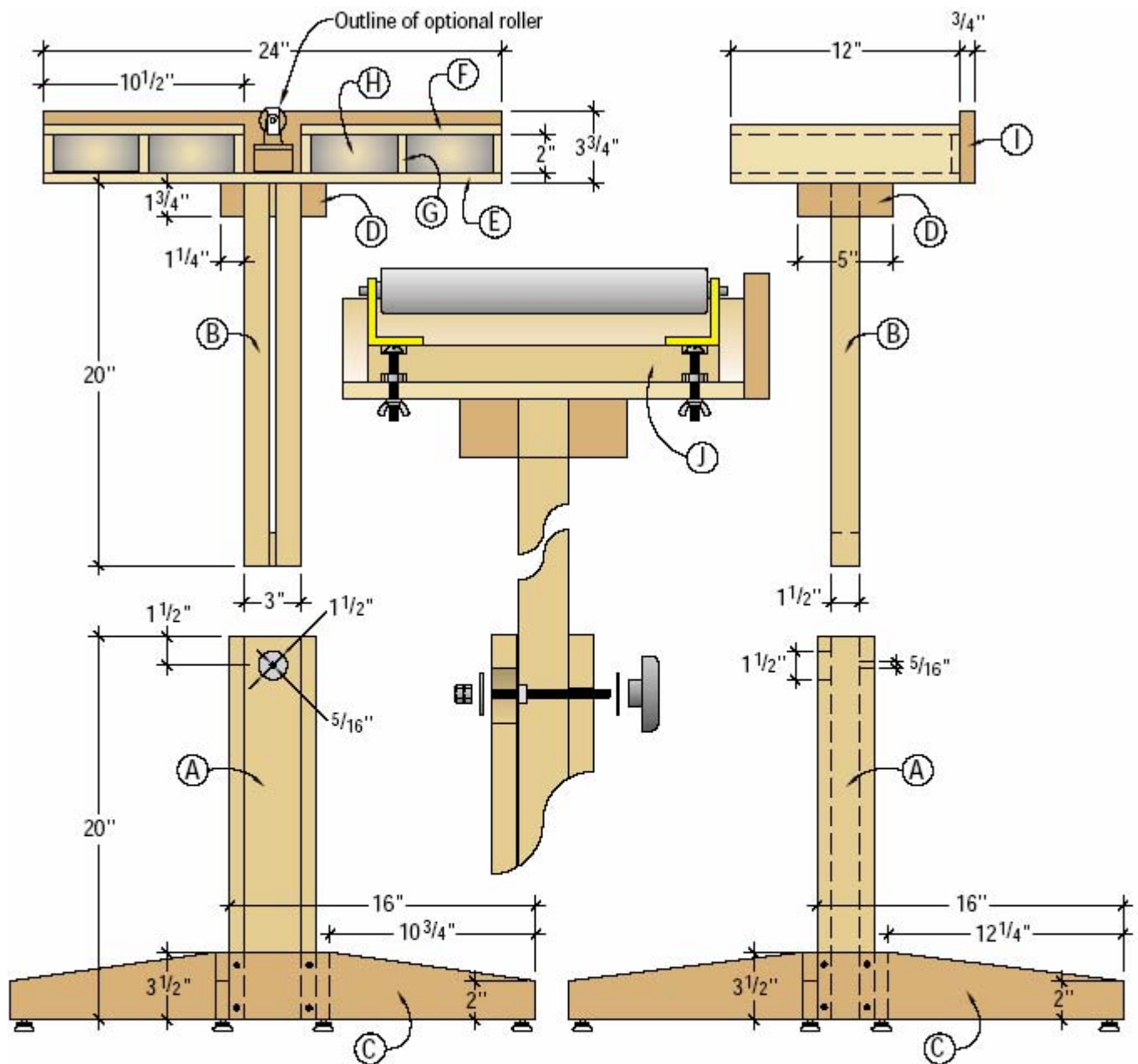


Here's a close look at the notches in the top that hold the pins on the globe.

79

LUMBER CUT-OFF STAND





CUT-OFF STAND

NO.	LET.	ITEM	DIMENSIONS (INCHES)			MATERIAL	HARDWARE			
			T	W	L		NO.	ITEM		
□	4	A	Column sides	3/4	3	20	Hardwood	□	1	Star knob, (item# 862214)*, \$1.49
□	1	B	Post	1 1/2	3	20	Hardwood	□	1	Threaded rod, 1/4"-20 x 3 1/2"
□	4	C	Feet	3/4	3 1/2	16	Hardwood	□	4	1/4"-20 hexagonal nuts
□	2	D	Mounting blocks	1 1/4	1 3/4	5	Hardwood	□	1	1/4"-20 square nut
□	1	E	Bottom	1/2	12	24	Plywood	□	2	1/16" x 1 1/2" fender washers
□	2	F	Tops	1/2	12	10 1/2	Plywood	□	2	1/4"-20 x 1 3/4" machine bolts
□	6	G	Dividers	1/2	2	12	Plywood	□	2	1/4"-20 wing nuts
□	4	H	Backs	1/2	2	4 1/2	Plywood	□	2	1/4" lock washers
□	1	I	Fence	3/4	3 3/4	24	Hardwood	□	1	10" roller (item #921635)*, \$7.69
□	1	J	Roller block	1 1/8	2	9 1/2	Hardwood	□	1	Bracket set (item #95-505)*, \$3.29

The stand is remarkably simple to build. Make the lower support using 3/4"-thick hardwood of your choice that's glued and screwed together using butt joints. The slotted post supporting the top section is formed by cutting, then regluing the pieces – no complicated router work. The top is 1/2"-thick Baltic birch plywood pieces nailed together to form a torsion box for extra strength.

From the Bottom Up

To make the stand easily adjustable in height, I chose a post-in-sleeve design. Start with the post. The finished size of the post is given in the materials list, but start with a length of wood that is 1/4" wider, thicker and longer than the finished size. This leaves room for saw cuts to form the slotted post and fitting room for overall size.

Next, take a look at the square 1/4"-20 nut you have for the locking hardware. Measure the width across the nut and add a fraction of an inch to that dimension. This will be the gap that you want to leave in the center of the post. The square nut will need to move freely up and down the gap, but not turn in the space.

Form the post by ripping the board into three lengths, with the two outer pieces being equal in width, and the center piece being the same width as the nut. Then crosscut the narrow piece into two 1-3/4"-long pieces. Glue those between the long outer sections and your post is almost complete.

Once the glue has dried, remove it from the clamps and run it through your planer to fine tune the thickness. Trim the post to length and move on to the sleeve.

The sleeve is formed by cutting the pieces to size, then simply gluing the four pieces together to form a rectangular column. Be careful to align the pieces to avoid cleanup and provide a square (and glue-free) center sleeve.

Lock-n-slide

The locking mechanism for the post is a length of threaded rod with nuts, a couple of fender washers and a handle slipped through the column. To make the clearance holes in the column, measure down 1-1/2" from the top on the front side and make a mark in the center of the column. Take the column to your drill press and, using a 5/16"-diameter drill bit, drill completely through both sides of the column.

Now switch to a 1-1/2"-diameter Forstner bit and, using the 5/16" hole on the back side as your center, drill a larger hole in the back.

The rest is hardware. Spin the two hex nuts onto the end of the threaded rod and use wrenches or pliers to tighten the nuts against one another to lock them in place. Then slip one fender washer on the long end of the rod and against the pair of hex nuts.

Now thread the square nut on after the washer and tighten it against the washer and hex nuts. Insert the assembly (long end first) into the larger hole in the back of the column, threading it into the center slot in the post (which you've slipped into place).

When the threaded rod pokes out the 5/16" hole on the front side, add another washer and the star handle. You're done. Make sure the square nut is rotated to slip into the slot to make a tight fit.

Add the Feet

The last part of the base is the feet. These are just four boards screwed to the bottom of the column. I trimmed a long taper on the top of each to make it a little more aesthetically pleasing.

When you drill the clearance holes for the screws, pay attention to where the screws are located, or you'll end up drilling into another screw. Offset them slightly and you'll be fine.

With the feet attached, I added four adjustable leveler feet to make sure the stand would



To form the post, the rough piece is ripped into three pieces, the center piece is cut to form two small blocks, and then the whole thing is glued back together.



As you glue up the column, use the post to check the spacing. The post should slip easily into the sleeved column. You want the post to move easily, but don't make it too loose or you'll make the stand wobbly.



The feet are attached to the column with flat-head screws. Watch the screw alignment or you'll drill into another screw.



Some simple hardware from your local home center store allows you to lock the post solidly, but quickly loosen the post and readjust for any height. The hardware is shown at right, resting on top of the

sit solidly on my uneven garage floor.

Torsion-box Top

I wanted to make the top of the stand as lightweight and strong as possible, but still stable. To accomplish this I used ½"-thick Baltic birch plywood and built an open-front torsion box.

Before making the box, locate the center position on the bottom plywood piece and mark where the top of the post will meet the box. Then screw two 1-¼" x 1-¾" x 5" solid-wood blocks to the underside of the plywood, centered and on either side of the post's location. Use these two mounting blocks to attach the table to the post after you have completed the table.

To form the box, simply assemble it with a brad nailer, making sure to align all the edges to keep things square. The two tops are held flush to the outside ends, leaving a 3"-wide gap in the center to allow plenty of room for a circular saw or jigsaw blade. The space in "the valley" ends up at a 2-½" depth, which should allow clearance for almost any jigsaw blade and lots of room for the blade of a circular saw.

With the table frame complete, nail ½" x 2" x 4-½" backs into the spaces at the rear of the box, closing up the opening. The hardwood fence is next. Drill four clearance holes and screw the fence to the back of the box, screwing into the backs.

To avoid any concern of binding a saw blade during the first few uses, cut a notch in the fence 1" wide and as deep as the blade depth you're most likely to use.

You're now ready to attach the table to the base. Drill clearance holes in the center of the mounting blocks under the table, then screw the table to the post.

A Little Something Extra

The roller is really inexpensive, and is quick to put together and attach. Simply drill two ¼" clearance holes in the 1-1/8" x 2" x 9-½" roller block, 1-½" from each end, and centered on the block. Use a ½"-diameter drill bit to countersink the top of the holes to fit the head of a machine bolt and a locking washer. Then flip the block over and use a 1-½" Forstner bit to countersink the bottom of the hole to accept a hex nut.

Before attaching the hardware, place the block in the table valley and use a pencil to mark the hole locations on the table bottom. Then drill oversized ¼" holes at those locations.

With the bolts inserted and tightened down, screw the roller mounting brackets in place on the block. The ends of the bolts will slide easily into the holes in the table, and the roller can then be attached using two wing nuts. When the roller isn't needed, it fits snugly inside any one of the open-end spaces in the table.

No matter where you use this stand, you'll find rough-cutting lumber a more pleasant experience. I'm pretty sure there are a few other uses for this stand as well. Just give me some time.

column before being attached through the holes.



This shot shows the partially assembled table, with three exposed dividers and the other side covered with the top. You can also see the screws through the bottom that hold the mounting blocks in place. While the box itself is nailed together, the fence is attached with screws to allow for replacement if it gets cut up too much in use.

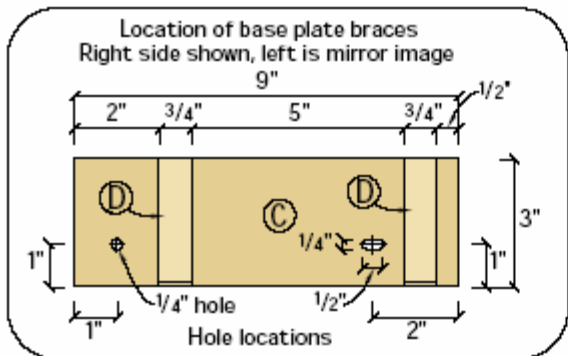
80

DRILL PRESS TABLE

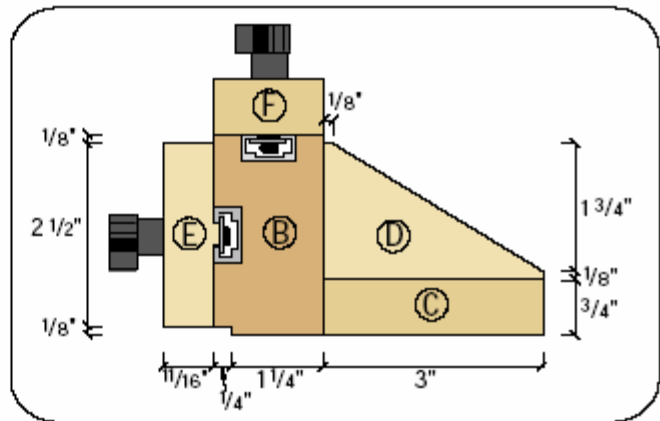


Schedule of Materials: Drill press table

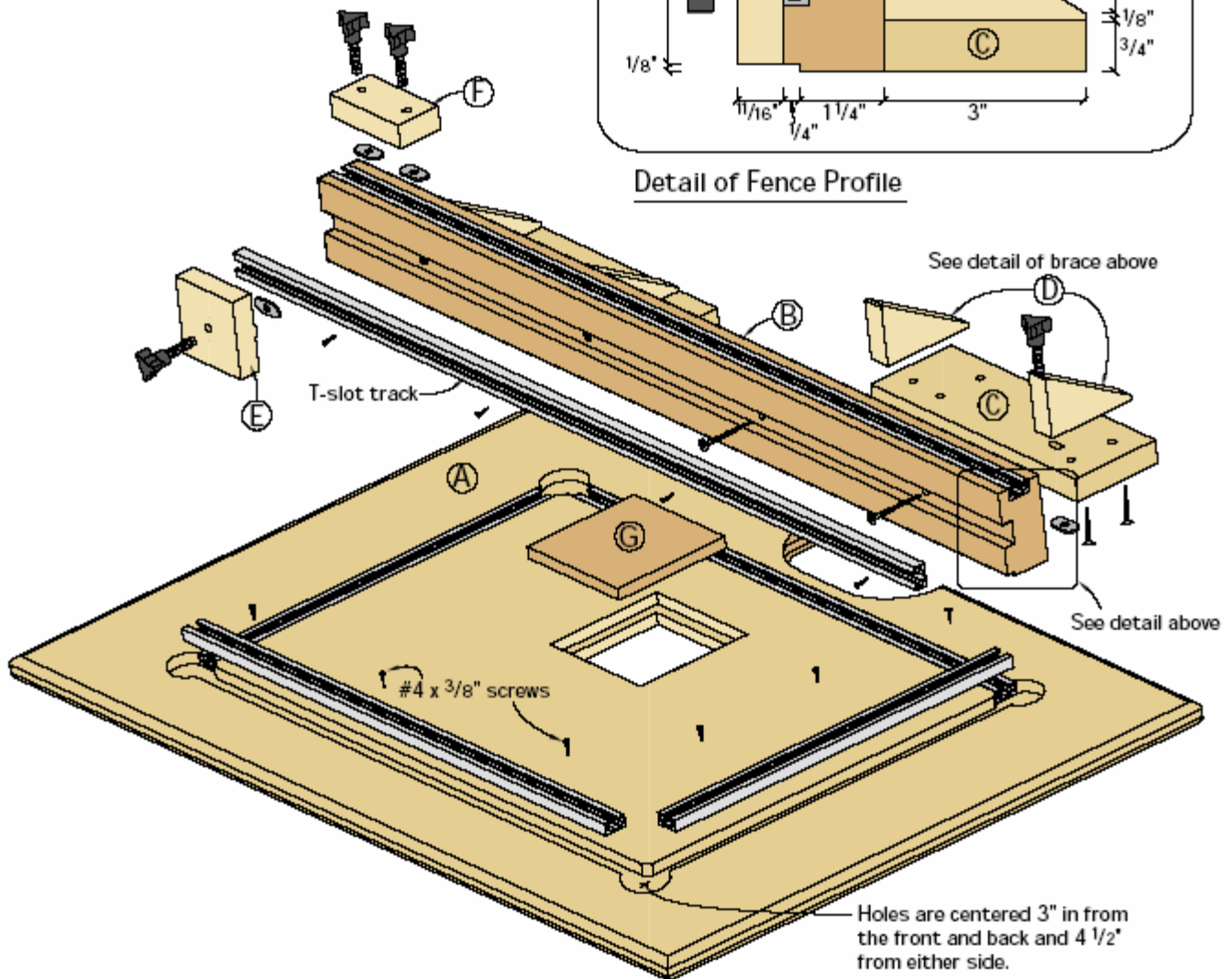
No.	Let.	Item	Dimensions T W L	Material
1	A	Platform	3/4" x 20" x 29"	Plywood
1	B	Fence	1 1/2" x 2 3/4" x 30"	Hardwood
2	C	Fence base plates	3/4" x 3" x 9"	Plywood
4	D	Base plate braces	3/4" x 3" x 1 7/8"	Hardwood
2	E	Stops	3/4" x 2 1/2" x 2 1/2"	Hardwood
2	F	Hold-down plates	3/4" x 1 1/2" x 3"	Hardwood
1	G	Insert plate	3/8" x 4" x 4"	Plywood
2 Part #88F05.02 DeStaCo clamps — \$14.50 ea.				
6 Part #12K7901 24" T-slot track — \$4.95 ea.				
8 Part #00M5102 1 1/8" 3-wing knobs — \$6 for 10				
8 Part #05J2115 T-nuts — \$1.15 for 10				
All hardware available from Lee Valley 800-871-8158				



Plan detail of hole locations for base plate



Detail of Fence Profile



Start With the Base-ics

The base platform for the table is made from 3/4" plywood, which should be void-free. Again, adjust the size as necessary to fit your drill press. First you need to get the table ready for the T-track, which is what holds the fence and hold-downs in place. Start by locating the four recessed holes that allow the T-slot mechanism to slip into the track without disassembling the mechanism. Each hole is 1-1/2" in diameter and 3/8" deep.

Next, locate the grooves in the center of the holes and use a router with a 3/4"-wide straight bit to cut the grooves to a 3/8" depth. The T-slot track should fit into the grooves with the top surface just below that of the plywood table. The grooves should be as parallel as possible to one another to allow smooth movement of the fence.

Replaceable Center

Now cut the hole for the 4" x 4" replaceable insert. First locate and mark the position centered on your table, then mark in from that line by 3/8" to locate your cutting line. Drill clearance holes in two corners of the square, then use a jigsaw to cut out the center piece. Next, determine the thickness of the material you will use for your insert (the 3/8"-thick Baltic Birch we used is actually metric and shy of 3/8") and set a 3/8" piloted rabbeting bit in a router to a height to hold the insert flush to the top surface of the table.

While your jigsaw is still out, locate, mark and cut out the notch in the back of the table. This allows the table to move closer to the drill press' post and tilt without interference.

As a final friendly touch on the table, I used a 3/8" roundover bit in my router to soften all the edges on the table, both top and bottom. You'll get fewer splinters if you do this.

Milling the Fence

The fence is the heart of the table, and the wood should be chosen for durability and straightness. Quartersawn hardwood, carefully surfaced and planed, will do nicely. After cutting the fence to size, use a dado stack to mill two 3/8"-deep by 3/4"-wide grooves in the fence. The first is centered on the top surface of the fence, and as in the grooves in the base platform, a piece of T-slot track should be used to confirm that the groove is deep enough to allow the track to fit just below the surface of the wood. The second groove is then cut centered on the face of the fence. One other bit of table saw work is the 1/8" x 1/4" wide rabbet cut on the inside bottom edge of the fence. This rabbet allows dust and debris to be pushed into the rabbet, so your work will fit against the fence.

One option that I considered was adding an indexing tape measure on the fence. Every time the table is moved the tape would need to be readjusted to zero, and for the infrequent use the tape would see I decided against it. A stick-on tape can easily be added to the fence face if that's more to your personal taste and needs.

Fence Support Braces

Unlike the fence on a router table, the fence on a drill press table won't see a lot of lateral pressure. So the main purpose of the braces is to hold the fence square to the table at the drilling point. In my case I've also given the braces the job of mounting the fence to the table.

Start by cutting the two base plates and the four braces to size. The braces are triangles with the bottom edge 3" long and the adjoining right angle edge 1-7/8" long. The third side is determined by simply connecting the corners. Locate the braces on the base plates according to the diagrams and pre-drill and countersink 3/16" diameter holes in the base plates to attach the braces to the plates.

To mount the support braces to the fence, again refer to the diagrams to locate the proper spacing on the fence. Then drill and countersink screw holes through the face groove in the fence. Clamp the brace to the fence and screw the brace in place.

With the braces attached to the fence, use the T-slot fastener locations on the diagrams



Another view of the drill-press table. Here I'm cutting pocket holes in a table apron.



ROUT THE GROOVE The grooves for the T-slot track allow the fence to be used left-to-right and front-to-back on the table to take advantage of the built-in tilting feature of the existing table.



RABBET FOR THE INSERT After cutting the hole with a jigsaw, the opening is rabbeted using a bearing-piloted router bit. Then chisel the corners square and fit the replaceable center tightly into the rabbet. Make a couple extras.



ROCK SOLID The fence is made of a sturdy, stable hardwood. Cut a groove the length of the top and face of the fence. The grooves support T-slot tracks, which can be used for stops, hold-downs and other accessories.

as a starting point for drilling the holes in the base plates, but check the location against your table for the best fit. Two holes are drilled in each plate to allow the fence to be moved to the perpendicular position (either to the right or left of the quill), by simply relocating one of the T-slot fasteners. Check each hole in relationship to that position.

Attaching the Track

Assuming you purchased the 24" lengths of track listed in the Schedule of Materials, you should be able to cut the tracks for the table first, leaving fall off that can be added to the two remaining full length tracks to give you the necessary 30" lengths of track for the fence. When attaching the track, first pilot drill the hole in the center of the track (a groove is provided in the track to simplify that location), then use a countersink to widen the hole to accommodate a #4 x 5/8" flat head screw. Keeping the screws as flush as possible to the inner surface of the track will make the stops and hold-downs move much easier.

Finishing Touches

Stops and hold-downs designed for use in T-tracks make the drill press most useful. The stops are simply square blocks of wood with one side milled to leave an indexing strip that fits into the slot on the T-slot track. By using the saw to cut tall but shallow rabbets on two edges of each block, the stops are completed fairly easily. For safety, run the rabbet on a longer 2-1/2" wide piece of wood, then cut the stops to square afterward. The T-slot fasteners are simply inserted into a 1/4" hole drilled in the center of each stop block.

The hold-downs are simply blocks of wood with DeStaCo clamps mounted to the top. Each block is drilled for two T-slot fasteners, one on either end. Then the clamp is screwed to the top surface of the block. While the DeStaCos are good for this application, they aren't as versatile as I wanted. I replaced the threaded-rod plunger with longer all-thread (1/4" x 36) to provide maximum benefit from the clamps. The rubber tip of the plunger is important to the function of the clamp, and if you can manage to reuse the existing tip it's very helpful. If not, I found rubber stoppers in a variety of sizes in the local Sears hardware store. After carefully drilling a 1/4"-diameter hole two-thirds of the way into the stopper I was able to screw it onto the rod with little difficulty.

Attaching and Personalizing

The table should attach easily to your existing drill press table using four lag bolts countersunk flush into the surface of the auxiliary table. Once attached you should find that the auxiliary table overhangs the metal table quite a bit. One personalized touch I want to suggest is adding small drawers to the underside of the table to store bits, wrenches and chuck keys..



FENCE BRACES The fence is supported by two simple brackets screwed to the rear of the fence. The location of the triangular braces is important to the track orientation, so follow the diagrams carefully for location.



LAYING TRACKS Install the T-slot tracks in the grooves with flat head screws countersunk into the track. The braces are attached to the fence by screwing through the face groove prior to attaching the T-slot track.



HOLD IT The hold-downs and stops are made from 3/4" hardwood. To make the guide to hold the stops square to the fence, cut a 1/16" x 1-1/8" rabbet on both sides of the inside face.

81

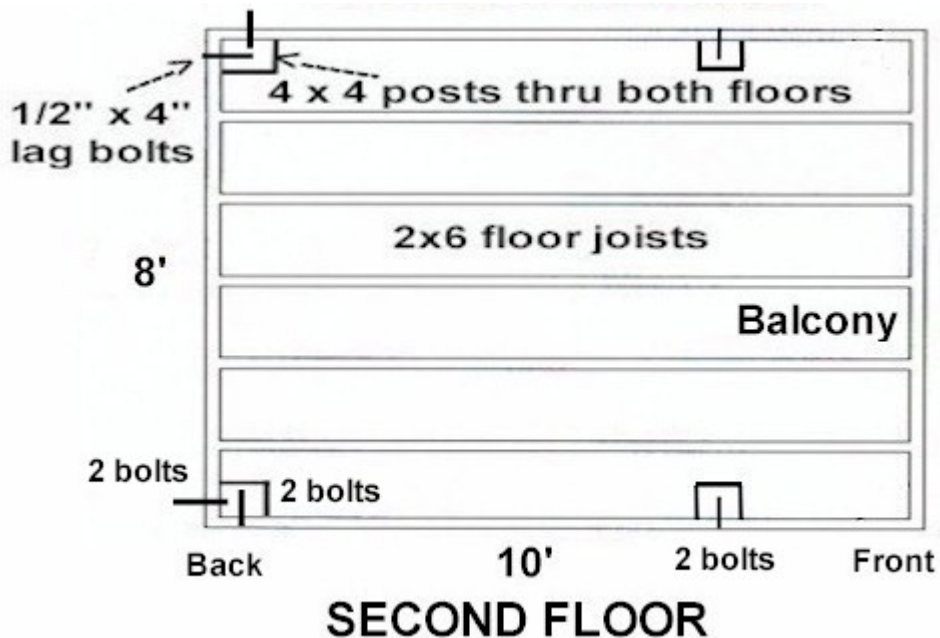
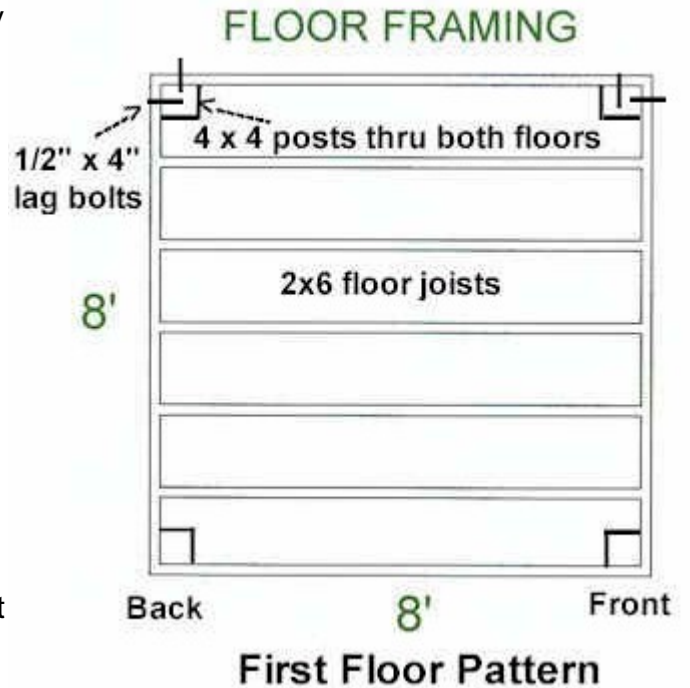
FORT PLAYHOUSE



Step 1: Frame 1st and 2nd floor system following diagrams shown. Use 2x6x8' pressure treated lumber and measure to have outside to outside dimensions exactly 8' x 8' on first floor, and 8' x 10' for the 2nd floor.

Step 2: The lumber and measurements on the next step will be determined by what you are going to do with this structure. If you will be making the bottom a storage shed, the height you will need will be taller than if it is a playhouse. For a children's playhouse use 4x4x10' PT lumber uprights. Measure 60" from one end (make that the bottom) and mark a line. This is the mark for the **bottom** of the second floor joists.

Step 3: Install 4 - 4x4x10' uprights to first and second floor framed sections following measurements given in step 2. Bolt these uprights in place with 2 - 1/2"x4" Galv. lag bolts at each attachment point. On corners place 2 on each side of the corner.



Note: The easiest way to accomplish step 3 is to assemble the unit on it's side. Use a helper when lifting the structure to the upright position.

Step 4: With the unit in the upright position we are ready to level and brace it. Level the first floor on the ground. Using a level, temporarily plumb and brace the vertical uprights, while 45 degree braces are installed on the first floor that are shown in the picture. Cut the

long with a 45 degree angle in each end. Bolt these to the bottom of the second floor joists and the 4x4 upright as shown.

Step 5: Now it's time to install the plywood floor. Add 3 1/2" long nailers to the sides of the 4x4 uprights at the spot where the plywood floor meets the upright. (the cut out is necessary to allow the upright post to pass through the plywood floor). If you do not add these nailers the floor will be springy. Measure, cut and install the plywood floor on both floors. Use pressure treated 5/8" plywood if possible. (1/2" will work if 5/8" cannot be located)

Note: The extra 4x4's in the photo at the front entrance are optional (location A) . They are in place to hold the railing on both floors.

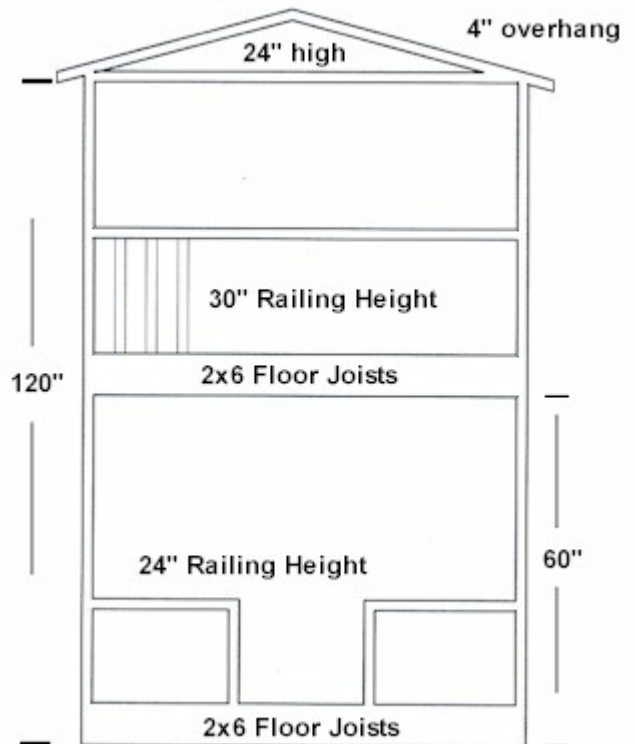
Another Note: This design uses a simple 2x4 ladder (location C) that is mounted in the back of the first floor. The ladder is vertical with a 16"x24" hole cut in the second floor plywood for the visitors to climb through. If you are building a shed in the bottom, you could place the ladder up the outside in the back and cut a section of railing out. Another choice is to have the entrance on the side of the front balcony.

Step 6: Install siding as shown, covering the floor joists as well as the railing area. The siding (location B) can be T-111 plywood siding (or individual fence boards). Siding on the gable ends (location E) use the same materials and instructions.

Note: The 45 degree braces on the second floor are 14" long.

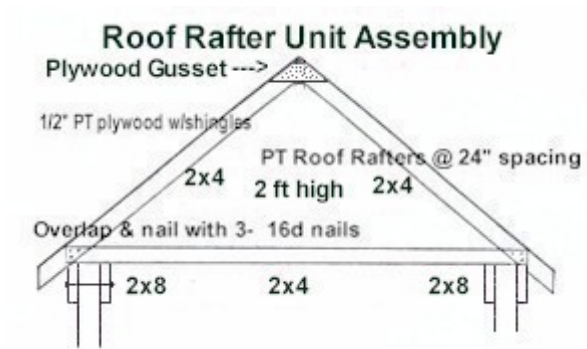
Step 7: Install railing on front balcony. This railing can be any style you desire. The picket style railing shown fits the rustic western theme of the entire structure.

The railing shown is simple to install. It uses the pickets as the supports...there are no corner supports holding the railing. Note in the photograph how the pickets are bevel cut at the bottom. They are securely fastened to the floor joists on 3 1/2" spacing. The top rail is two 2x6 boards nailed together in an "L" shape. The pickets are nailed in the crook of the "L" as shown. Miter cut the left and right corners of the railing.



Step 8: Measure, cut and install the roof. Start by installing the double 2x8 header on each side of the 4x4 uprights. Install header flush with the top of the 4x4's, and bolt assembly together with 1/2" x 8" galv. carriage bolt. Roof system uses 2x4 rafter assemblies on 24" centers with 1/2" plywood sheathing. Make 7 roof rafter assemblies following the measurements in the drawing below. Make these assemblies on a flat surface, and install them 1 at a time with 24" spacing from front to back of the playhouse. After all 7 assemblies are in place and temporarily braced, install the roof sheathing. Overhang the plywood roof sheathing 2 inches all around as shown in the pictures.

Install shingle molding on the outside of the gable ends, on top of the siding at the underside of the roof sheathing. (location F) Install roof shingles of your choice.



82

CHILDREN'S PLAY STRUCTURE

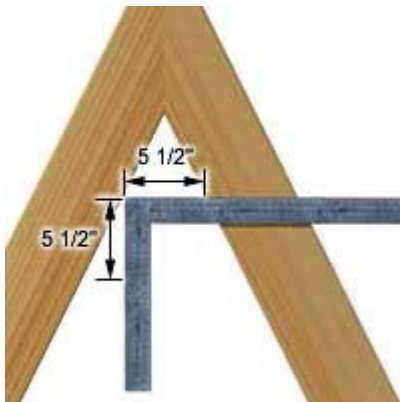


1. Raise the structure

- 1.1** With stakes and strings, mark off the perimeter of the area where you will need to dig a 10 x 8 ft. (3 x 2.4 m) hole.
- 1.2** Excavate the entire surface to a depth of 6 in. (152 mm). At each corner (inside the perimeter) dig an 8 x 8 in. (203 x 203 mm) square ten inches (approx. 250 mm) deep for the structure's four posts, which will be driven in at a 63° angle.
- 1.3** Cut one end of each of the four 6 x 6 in. (152 x 152 mm) posts at a 27° angle. These posts will then be joined in pairs to form two peaks.



- 1.4** We suggest assembling the structure on the ground before placing it in the excavated area. Lay your two 6 x 6 in. (152 x 152 mm) posts flat on the ground to form a "V" and screw or nail them together.
- 1.5** Mark the two posts where the gap between them is 5 1/2 in. (140 mm). Mark again 5 1/2 in. (140 mm) lower, in line with the peak, at the centre of the two posts. This second line will mark the top of the beam support. As a precaution, leave an extra 1/4 in. (6 mm) clearance for easier insertion of the beam.



- 1.6** Cut the beam supports (a total of 4) out of 2 x 8 in. (50 x 203 mm) planks, cutting the ends at a 63° angle so that they align with the peak, along the posts (at 27°).



1.7 Bolt the supports to the posts or attach them using lag screws (two at each end).

1.8 Now place the two rafters sideways on the ground and insert the 6 x 6 in. (152 x 152 mm) by 14 ft.-long (4.3 m) beam into the two spaces provided so that they protrude by 36 1/2 in. (927 mm) at each end. Nail it at a 45° angle into the two support boards. Use wood scraps to make one or two blocking pieces that you will insert into the remaining (triangular-shaped) space. Toe nail them in.



1.9 Trace and cut out four gussets (pieces of wood to stop the legs spreading) from a 1/2 in. (13 mm) sheet of plywood. They will be used to close the two sides of each peak. Cut out a space at the base of each one to insert the beam. A head to tail layout on your plywood will limit the number of cuts and save plywood (see sheet 5/6 of the attached Planimage plan). Using an electric drill, screw in the gussets on each side of the posts.

1.10 Stand the structure upright and place it inside the perimeter, inserting the posts into the corners. Pack top soil around the base of the posts.

2. Make a sandbox

2.1 Spread a geotextile sheet over the entire excavated area.

2.2 Nail together the four 2 x 10 in. (50 x 254 mm) planks that will edge the sandbox and place them inside the perimeter (over the geotextile sheet) and resting against the posts at the four corners, without extending beyond the borders. According to this plan, your sandbox will be 9 1/2 x 7 ft. (2.9 x 2.1 m).

The border will be buried 4 in. (100 mm) into the ground. Backfill the outside.

2.3 Attach the four corners of the border to the four posts with lag screws.

3. Place the beams of the platform

3.1 Cut six 4 x 4 in. (100 x 100 mm) posts into 7 ft. (2.1 m) lengths. Using a table saw, make a notch 1 1/2 in. (38 mm) deep and 9 1/2 in. (241 mm) long at the bottom of the six posts.

3.2 Set the height of your circular saw blade at 1/2 in. (13 mm) before making a notch into the six posts, at 2 ft. 7 in. (0.8 m) from the unnotched end. On the four posts already notched, this second notch should be on one of the lateral sides in relation to the previous notch so that the two notches are on adjacent sides. More on the subject in the "corner posts" section on page 6/6 of the plan.

3.3 To make the roof, cut a 1/2 in. 4 ft. x 8 ft. sheet of plywood in two, to obtain two 2 x 8 ft. boards. Rip one of the long ends of each board at a 45° angle. Attach the two boards to each side of the beams to form the roof.

3.4 To build the platform beams, cut four 2 x 6 in. (50 x 152 mm) planks into 5 ft. 5 in. (1.7 m) lengths. In your plywood, cut out two boards 5 1/2 in. (140 mm) wide by 5 ft. 5 in. (1.7 m) long. Make two beams by inserting a plywood board between two 2 x 6 in. (50 x 152 mm) planks. Glue and bolt the three boards together (see page 6/6 of the plan).

3.5 Insert each beam into the lateral notches in the two corner posts and, using an electric drill, screw them in opposite the notches from outside the posts.



3.6 Place the notches at the bottom of the corner posts on the sandbox border and centre the frame between the structure posts (peaks).

Bolt to the structure and to the sandbox border.

4. Install the joists of the platform

4.1 Place metal hangers for the 2 x 6 in. (50 x 152 mm) floor joists on the beams so that once installed, they will be centered 12 in. (305 mm) apart.

4.2 Cut joists out of 2 x 6 in. (50 mm x 152 mm) boards. You will need seven 9 ft. (2.7 m) long joists for the ends. Also plan two other 9 ft. 7 in. (2.9 m) long joists for the ends.

4.3 Attach the joists to the hangers and double the border joists by attaching the two boards that make up the ends of the posts to the outside edges of the border joists.

4.4 To make the studs, cut three 4 x 4 in. (100 x 100 mm) posts into 3 ft. 1/2 in. (0.9 m) lengths. At one end of each, make a notch 2 in. (50 mm) deep and 5 1/2 in. (140 mm) long.

4.5 Position the two remaining 4 x 4 in. (100 x 100 mm) posts, placing the notches out, over the border joist before attaching them to the joists. The first post will be attached to the joist 26 in. (660 mm) from the outside end of the 6 x 6 in. (152 x 152 mm) post and the second 18 1/2 in. (470 mm) from the first measurement.



4.6 Use the same procedure to attach the three studs. Position the first stud 18 1/2 in. (470 mm) from the last stud attached in the preceding step, and the other two at the opposite end of the platform, each 26 in. (660 mm) from the outer edge of the 6 x 6 in. (152 x 152 mm) structure, on the border joist (notch out).

5. Build the floor of the platform

5.1 Cut 1 1/4 x 6 in. (32 x 152 mm) boards into 6 ft. (1.8 m) lengths. Following this plan, you should require about fifteen of these boards.

5.2 Use an electric drill to screw the boards to each floor joist, leaving a 1/8 in. (3 mm) clearance between each.

To ensure uniform spacing, temporarily insert the tip of a 1/8 in. (3 mm) diameter nail into each joist.

5.3 Where there are posts, measure and mark the cutting line on the board. Use a jigsaw to cut the appropriate opening.

6. Add a railing to the platform

6.1 To build the railing, cut two 2 x 4 in. (50 x 100 mm) boards into 5 ft. 2 in. (1.6 m) lengths for the two sections that will be between the 6 x 6 in. (152 x 152 mm) posts. Cut the boards into 26 in. (660 mm) lengths for the four other sections.



6.2 Screw the long railing sections to the 4 x 4 in. (100 x 100 mm) posts at a 45° angle (the height of both being equal).

6.3 Cut 32 in. (810 mm) rails out of 2 x 2 in. (50 x 50 mm) boards. Make a 45 degree cut at one end of each for finishing. Calculate the number of rails required, keeping in mind that they will be centered 4 in. (100 mm) apart.

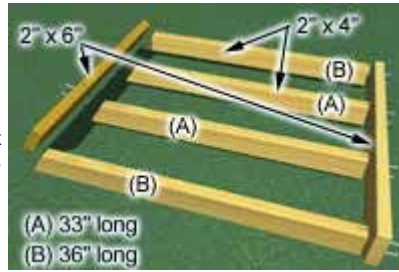
6.4 Attach the rails (bevelled end up) to the ramp and the border joist or post, as the case may be, screwing them in with an electric drill. Set them 1 1/2 in. (38 mm) from the top of the ramp. Make sure they are level.

7. Dress up the access ramp

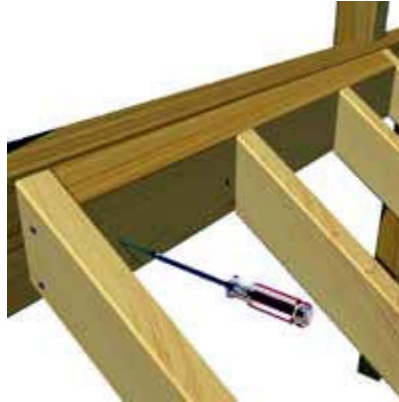
7.1 Cut four 2 x 4 in. (50 x 100 mm) planks, two for the outside pieces, 7 ft. (2.1 m) long and the two others, for the inside pieces, 6 ft. 10.5 in. (2.09 m) long. Cut one end of all four pieces at a 54° angle. Cut two 2 x 6 in. (50 x 152 mm) planks, one to a length of 36 in. (914 mm) and the second 33 in. (838 mm) long. Bevel the ends of the 33 in. (838 mm) plank at a 54° angle.

- 7.2** Build the access ramp upside down on the ground. Center the right angle ends of the 2 x 4 in. (50 x 100 mm) boards to the 36 in. (914 mm) long 2 x 6 in. (50 x 152 mm) board every 12 in. (305 mm).

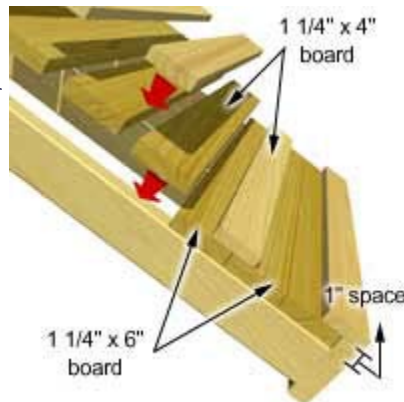
Be sure to leave a 1 in. (25 mm) clearance on the 2 x 6 in. (50 x 152 mm) to attach the floor. House the 33 in. (305 mm) long 2 x 6 in. (50 x 152 mm) into the other end of the ramp and attach it to the 2 x 4 in. (50 x 100 mm).



- 7.3** Flip the assembled component right side up and screw it to the main structure. Working from the bottom up, finish the access ramp floor by nailing in 36 in. (914 mm) long 1 1/4 x 6 in. (32 x 152 mm) boards.



- 7.4** Starting at the ground section of the access ramp, attach 1 1/4 x 4 in. (32 x 100 mm) boards to every second floorboard, making sure to center the boards over the voids. These boards will be used as stairs for easier access to the structure's upper level.



8. Build the bridge

- 8.1** Out of two 2 x 6 in (50 x 152 mm) boards, make two 21 in. (533 mm) and two 18 1/2 in. (470 mm) long boards. Attach the two longest boards perpendicular to the sandbox border and to the ladder posts by screwing or nailing them in at a 45° angle.
- 8.2** Nail the two other boards perpendicular to the first two, equidistant from the ends and at a 45° angle.
- 8.3** Finish the floor the same way as for the platform floor, with four 22 1/2 in. (570 mm) long 1 1/4 x 6 in. (32 x 152 mm) boards.

9. Fix the ladder

9.1 Attach a 2 x 2 in. (50 x 50 mm) board to the top of the bridge.

9.2 Next, determine the height of the four 21 1/2 in. long (546 mm) 2 x 4 in. (50 x 100 mm) boards that will be used as steps by calculating the distance between the platform floor and the top of the 2 x 2 in. (50 x 50 mm) board attached at step 1. The steps should be evenly spaced.

9.3 Screw the steps to the posts with an electric drill.

10. Install the swings

10.1 In a 2 x 8 in. (50 x 203 mm) board, cut two 18 in. (460 mm) lengths and drill a hole 2 in. (50 mm) from each end, for the ropes.

10.2 For each swing, drill two holes at the centre of the beam, leaving a 4 in. (100 mm) space at the end of the beam. The two holes should be 14 in. (355 mm) apart. Bolt the two support hooks into the holes.

10.3 Thread the rope through the holes in the swing and tie securely.

10.4 Cut the rope so that the height between the ground and the top of the seat of the swing is 18 in. (460 mm).

Fill the base with sand, sit back, relax and watch the kids delight in your new creation!

Have a great summer!

Tools list

- Carpenter's Pencil
- Carpenter's level
- Circular saw
- Drill
- Hammer
- Jig saw
- Safety goggles
- Shovel
- Speed Square
- Table saw
- Work gloves

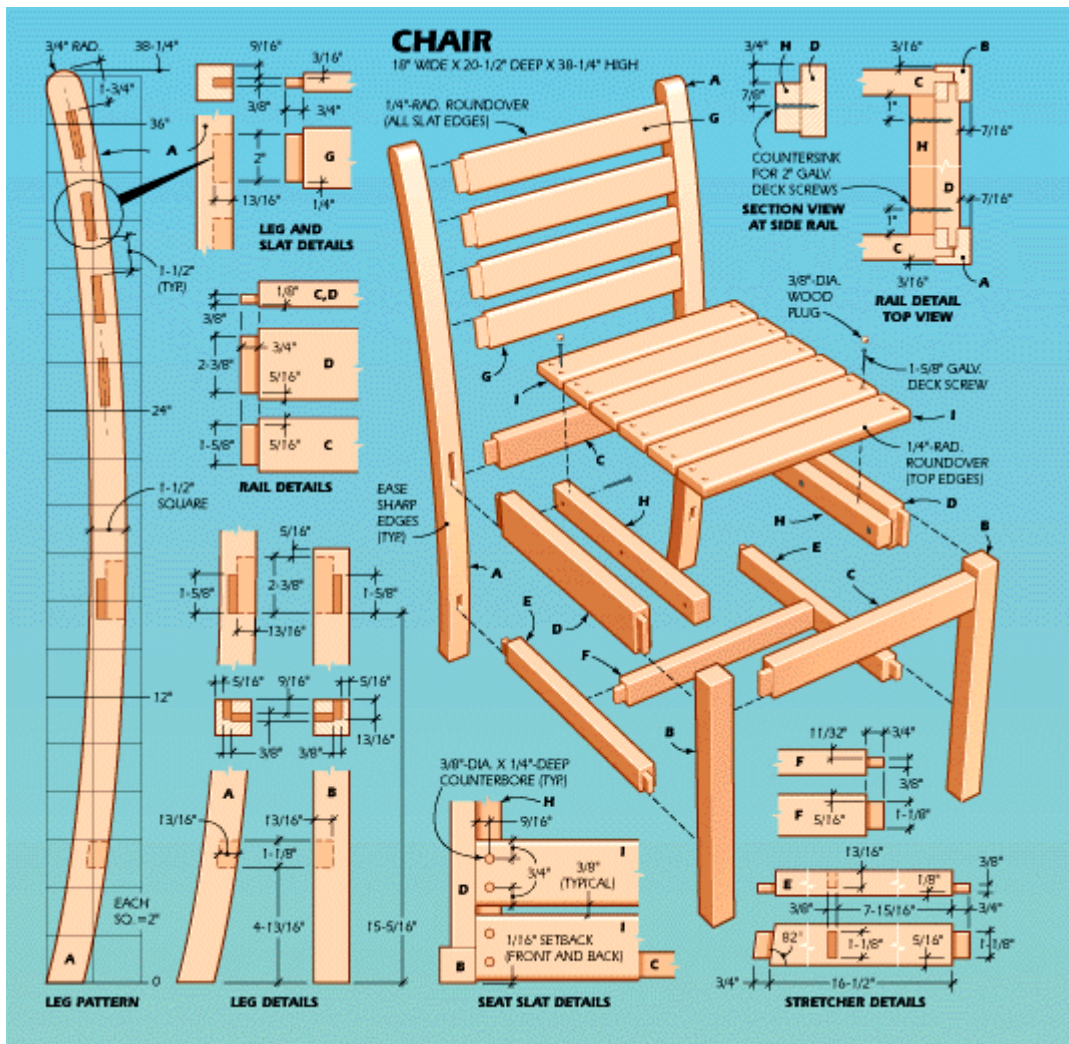
Material list

- "Cool Wave " slide NE4675 (see Swing-N-Slide® Co.)
- 1 x 6 in. (25 x 152 mm) boards
- 1/2 in. (13 mm) plywood
- 2 x 10 in. (50 x 254 mm) planks
- 2 x 2 in. (50 x 50 mm) planks
- 2 x 8 in. (50 x 203 mm) planks
- 4 x 4 in. (100 x 100 mm) posts
- 6 x 6 in. (152 x 152 mm) posts
- Geotextile sheet
- Metal hangers
- Nails
- Sand
- Treated wood screws

83

OUTDOOR CEDAR TABLE AND CHAIRS





MATERIALS LIST—TABLE AND CHAIRS

Key	No.	Size and description (use)
A	2	1 1/2 x 3 1/2 x 38 1/4 in. cedar (leg)
B	2	1 1/2 x 1 1/2 x 18 in. cedar (leg)
C	2	1 1/16 x 2 1/4 x 16 1/2 in. cedar (rail)
D	2	1 1/16 x 3 x 17 in. cedar (rail)
E	2	1 1/16 x 1 3/4 x 18 in. cedar (stretcher)
F	1	1 1/16 x 1 3/4 x 16 1/2 in. cedar (stretcher)
G	4	3/4 x 2 1/2 x 16 1/2 in. cedar (slats)
H	2	1 1/16 x 1 3/4 x 16 in. cedar (cleats)
I	6	3/4 x 2 1/2 x 15 in. cedar (slats)
J	4	3/4 x 3 x 37 1 1/16 in. cedar (apron)
K	4	3 x 3 x 28 15/16 in. cedar (leg)
L	4	1 1/16 x 3 x 50 in. cedar (rail)
M	1	1 1/16 x 3 x 46 1/2 in. cedar (rail)
N	4	7/8 x 1 1/4 x 3 in. cedar (block)
O	9	1 1/16 x 5 1/4 x 50 1/4 in. cedar (slat)

First, make the trammel base for the router. Install a 3/4-in.-dia. straight bit in the router, and bore a 3/8-in.-dia. hole through the trammel so that the hole's center is 24 in. from the outside of the router bit. Use a short length of 3/8-in. dowel to pin the trammel to a large piece of MDF. Now, make three passes with the router to cut an arc through the stock (**Photo 1**). Temporarily leave a section of the panel connected at each end of the arc. Make a set of alignment marks across the arc, and use the router to cut the panel into two sections. Use the two sections as templates. Cut slightly oversize blanks from the remaining panel stock. Screw a template to each blank, and use the router with a flush-trimming bit to cut the blanks to finished radius (**Photo 2**). Each routed piece becomes the pattern. To prevent glue from sticking to the form, apply a coat of varnish to it. Then wax it after the varnish dries.



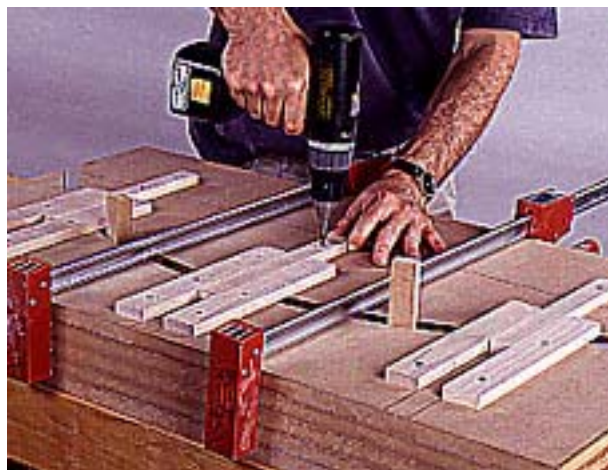
1 Make the bending form template with a plunge router on a trammel arm. Cut an arc in a sheet of MDF.



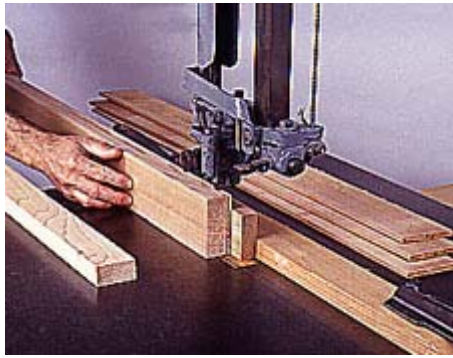
2 The remaining pieces of the form are trimmed to size using the template, router and flush-trimming bit.

Next, place 3/4-in.-thick blocks between the bending forms, and temporarily clamp the forms together. Fasten alignment strips to the surfaces of the forms (**Photo 3**).

Set up the band saw with a tall rip fence and a 1/2-in.-wide, four-tooth-per-inch blade. Rip 1/8-in.-thick, 48-in.-long cedar strips (**Photo 4**).



3 Use 3/4-in.-thick spacers between the bending form pieces. Clamp the form pieces together and fasten alignment strips.

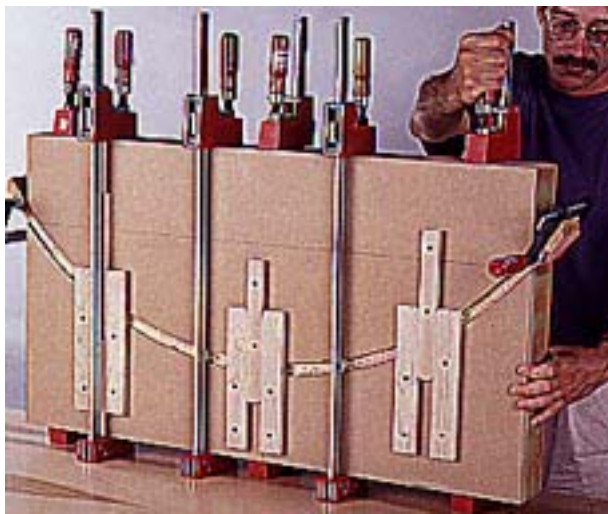


4 Resaw the 1/8-in.-thick apron laminate strips on the band saw. Use a pushstick at the end of the cut.

Spread glue on the strips, and place the six strips stacked in the form. Clamp the form together (**Photo 5**).

When all the apron blanks have been glued up, plane a square, straight edge on each blank, then rip the apron blanks to finished dimension.

Next, make a plywood cradle with a radius that matches the apron's finished outside length. Clamp the cradle to a long auxiliary fence attached to the table saw's miter gauge. The first cut removes one rough end from the apron (**Photo 6**). Turn the apron around, and crosscut the apron to finished length.



5 Clamp the laminate strips at either end to keep them from shifting. Apply pressure with equally spaced clamps.



6 Make a cradle. Then crosscut the apron blank to finished length. The apron length and cradle arc length are equal.

Use the cradle again to hold the apron as you cut the biscuit slot in each end (**Photo 7**). Assemble the apron. Then apply glue to the apron ends, the biscuit slots and the biscuits. Use a band clamp to apply clamping pressure (**Photo 8**). Check the apron diameter for distortion, and adjust it if necessary. Rip, joint and crosscut the leg stock to finished dimension. To cut the curved notch in the leg, first make a 90-degree cut and then use a sharp chisel to pare the curve.



7 Transfer the cradle to a bench, and use it to hold the apron section in place while cutting the biscuit slots.



8 Glue and clamp the apron sections together using a strap clamp. Check its diameter at several points.

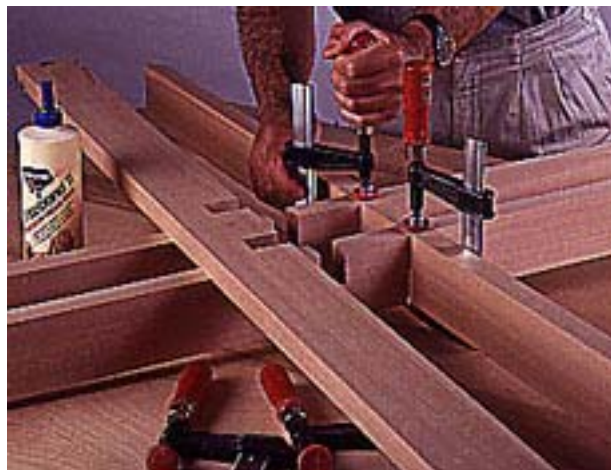
Rip, crosscut and notch the table rails and chamfer the edges. Spread glue on the notches, and clamp the pieces together (**Photo 9**).

Position a table leg between a pair of rails, and counterbore the screw holes. Fasten the legs and rails with galvanized deck screws.

Center a leg over each apron joint. Countersink the screw holes, and drive screws into each leg (**Photo 10**).

Now cut the crossrail to size. Place the crossrail into the leg assembly, and cut the glue blocks to fit at its ends. Glue the blocks in place.

Rip and crosscut the top slats to size. Use a rounding-over bit in the router to ease the slat edges. Clamp the center slat in position, bore its pilot holes and fasten it to the apron. Fasten the remaining slats to the apron.



9 Glue and clamp together the half-lapped rail assembly. Check that the parts are square to one another.

from each other. Mark out the top's diameter (**Photo 11**) and cut it to shape with a sabre saw. Sand the slat ends smooth, then use the router and rounding-over bit to ease their edges.

Use a plug cutter in your drill press to make the plugs to cover the screwholes. Glue the plugs over the screwheads, and use a chisel to pare the plugs smooth. Sand the table smooth with 120-grit sandpaper.



10 Position the apron so each of its joints is centered on a leg. Use four screws at each joint to attach the apron to the legs.



11 Space the boards equally, and screw them to the crossrail. Draw the outline of the top on the boards.

Chair Construction

The first step in chair construction is to make a thin plywood template for the rear leg. Rip and crosscut the rear leg blanks, then trace around the pattern onto the leg (**Photo 12**). Cut the outside of the leg to shape, and smooth its outline with a block plane (**Photo 13**). Cut its inside surface to shape, and smooth it with a spokeshave.

The other chair components are ripped, crosscut and planed to final dimension. Lay out the mortises and tenons on these pieces. The mortises are most easily cut with a router and a spiral up-cutting bit (**Photo 14**). This will require that you cut the ends of the mortises square with a chisel. However, this process will not work on the inside surfaces of the rear leg because the router fence does not have a straight edge. Copyright 2004 by The McGraw-Hill Companies



12 The first step in building each chair is to make a template for the rear leg, and trace it on the leg blanks.

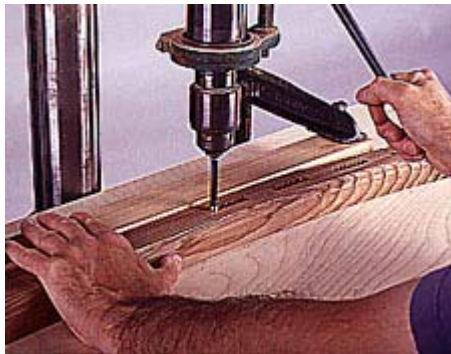
laying the leg against a fence on a drill press table. Bore a series of overlapping holes (**Photo 15**). Then cut the mortises square with a chisel.



13 Cut the outside curve on the leg. Clamp it to the bench, and smooth the curve with a block plane.



14 Use a plunge router with its fence positioned on the leg's straight face. Cut the side rail and stretcher mortises.



15 Remove the bulk of the side rail mortises on the drill press. Chisel the mortise sides and ends square.

Cut the tenons on the back slats, rails and stretchers using a dado blade installed in the table saw (**Photo 16**). On the rails and stretchers, be careful to keep track of which face of the component you are working on because the tenon is not centrally positioned on these pieces. Adjust the height of the dado blade accordingly. Also, note that the tenon that joins the side stretcher to the rear leg has an angled shoulder. Cut this by hand using a dovetail saw or backsaw.



16 Clamp a stop to the miter gauge fence. Use a dado blade to cut the tenons on the rails, stretchers and back slats.

Begin the final assembly by gluing and clamping together the side stretchers and the cross stretcher (**Photo 17**). Measure diagonally from both corners of the assembly to check it for square. Next, glue and clamp together the rear legs, slats and rail (**Photo 18**). Glue and clamp the front legs and rail. Then, glue and clamp together all the subassemblies (**Photo 19**). Cut and install the cleats and the seat slats. Install wood plugs.



17 Glue and clamp together two side stretchers with a cross stretcher. Check the assembly for square.

The chairs and tables were finished with a clear coat of Cabot Decking Stain No. 1400.



18 Clamp together the rear legs, a rear rail and four back slats. Use one clamp at each joint location.

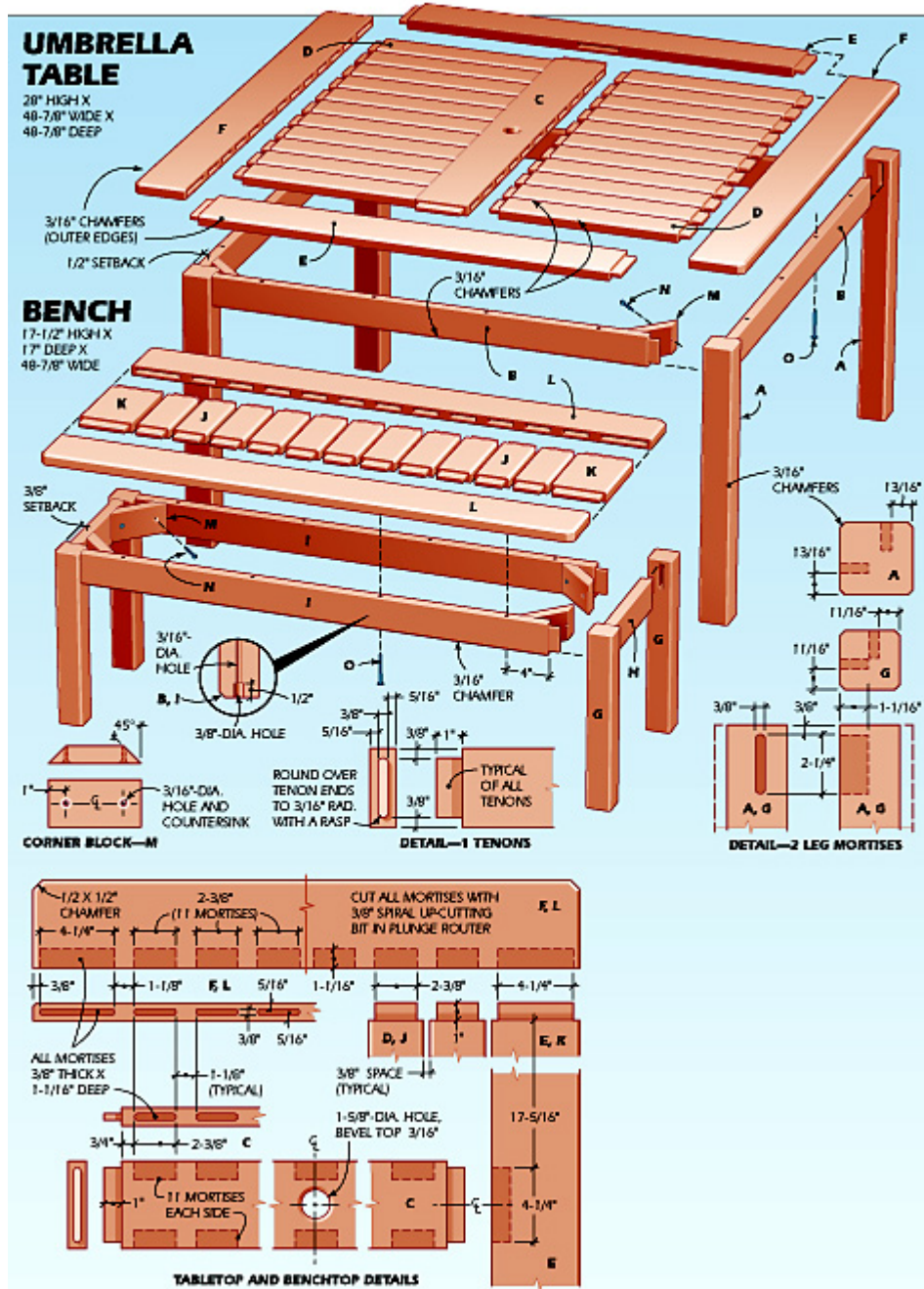


19 Glue and clamp together the rear leg subassembly, the front legs and the stretcher subassembly.

84

OUTDOOR TABLE AND BENCH





MATERIALS LIST--UMBRELLA TABLE AND BENCH

Key	No.	Size & Description (use)
A	4	2 3/4 x 2 3/4 x 27" cedar (leg)
B	4	1 x 3 x 43 7/8" cedar (apron)
C	1	1 x 5 x 40 7/8" cedar (rail)
D	22	1 x 3 1/8 x 18 15/16" cedar (slats)
E	2	1 x 5 x 40 7/8" cedar (rail)
F	2	1 x 5 x 48 7/8" cedar (stile)
G	16	2 1/4 x 2 1/4 x 16 1/2" cedar (leg)
H	8	1 x 3 x 12" cedar (apron)
I	8	1 x 3 x 44 7/8" cedar (apron)

J	44	1 x 3 1/8 x 9" cedar (slats)
K	8	1 x 5 x 9" cedar (rail)
L	8	1 x 5 x 48 7/8" cedar (stile)
M	20	1 x 2 3/4 x 5 1/4" cedar (block)
N	40	2" No. 8 fh galvanized screw
O	48	3" No. 8 fh galvanized screw

Making The Parts

The table legs are cut from 4 x 4 stock (or they can be glued up from thinner material). When using 4 x 4 stock, cut each leg to rough length. Next, clamp a fence to the band saw table, and rip the blanks to a 2 3/4 x 2 3/4-in. square (**Photo 1**). Then clamp the leg to a workbench, and use a razor-sharp plane to remove the saw marks (**Photo 2**). Unless you are very experienced with a hand plane, check the workpiece frequently as you go. The edges of the leg must remain square to one another. Remember that you are only smoothing the surface, so do not remove too much material.



Rip the table leg stock out of a cedar 4 x 4. Clamp a temporary rip fence to the band saw table to do this.



Clamp a table leg to a benchtop and remove saw marks with a hand plane. To make a smooth cut, push the plane at an angle.

Use a miter gauge on the band saw to crosscut the leg blanks to finished dimension (**Photo 3**).

Since the bench legs are smaller than the table legs, it is a better use of materials to glue them up from three pieces of 3/4-in.-thick stock. You can simplify the job if you plan to make the blanks large enough to cut four legs from each glued-up stack.



Crosscut the legs on the band saw. Here, a shopmade crosscutting table and a miter gauge are used to make the cut.

Rip and crosscut material for the leg blanks slightly oversize, then use a foam roller to spread glue on the mating surfaces of each piece. Assemble the pieces into a stack, and clamp the pieces together (**Photo 4**). After about 20 minutes, scrape off the glue that has squeezed from the joints, then allow the glue to fully set.



For the bench legs, spread glue on 3/4-in.-thick stock. Lay disposable material under the pieces and clamp them together.

Now use the table saw to rip the blanks to 2 1/4 in. wide, and crosscut the bench legs to finished length.

Lay out the mortise locations in all the legs for the apron joints. You can speed the process by clamping four legs together with their ends perfectly aligned. Then, mark across the stack using a square (**Photo 5**). Next, use the router and edge guide to cut the leg mortises (**Photo 6**). It's best to use a spiral up-cutting bit in the router because that type of bit pulls the dust and chips out of the cut, and reduces the strain on the motor. This also keeps the bit's cutting edge cooler.



Rip and crosscut the individual bench legs to size, and then clamp them together. Mark out mortise locations on the legs.



Using a spiral up-cutting bit in a plunge router, cut the table leg mortises. Two legs clamped together provide a stable base.

Rip and crosscut 1-in.-thick stock for the table and bench aprons as well as for the top frames and slats. Install dado blades in the table saw, and then use the miter gauge to guide the workpiece over the saw blades when cutting tenons (**Photo 7**). Note that you can use the rip fence as a stop to gauge the tenon length. Since the tenons are 1 in. long, you need to make two passes to complete each cheek.



Use a dado blade setup in the table saw to cut the tenons on the apron pieces. Butt each apron to the fence, and make the cut.

Cut the tenons across the width of each workpiece, then adjust the blade height and move each workpiece over the blade on edge to cut the shoulder (**Photo 8**). Clamp each workpiece upright in a vise and gently round over the tenon's edges using a wood rasp (**Photo 9**).



To cut the shoulders on a tenon, stand the apron up, and hold it firmly to the miter gauge. Butt it to the fence and make the cut.



Round off a tenon with a rasp. The tenon's radius matches the radius left by the spiral up-cutting bit used to cut the mortise.

Lay out the mortise locations for the tabletop and benchtop joints. Use a router with an edge guide and a spiral up-cutting bit to cut the mortises (**Photo 10**). It is best to clamp three workpieces of the same width together when routing to form a wide and stable base for the plunge router.

Mark the location of the umbrella posthole in the center rail of the tabletop, and then use a Forstner bit in the drill press to bore the hole.

After laying out the locations of the holes in the aprons for mounting the top, use a Forstner bit in the drill press to counterbore a recess for each screwhead. Next, use a 3/16-in.-dia. bit to drill the pilot holes for the screw shanks. Each of these holes is centered in a recess.

To complete the part-making process, install a chamfer bit in the router table, then use it to cut the 3/16-in.-deep chamfer on the table and bench legs, aprons and top parts as shown in the plans (**Photo 11**). Note that not all edges are chamfered.



To cut the long row of mortises in each stile and rail, clamp three of the work-pieces together to support the router.



Use a chamfer bit in the router table to cut the chamfer on all four edges of the legs for the benches and table.

Assembly

Begin assembly with the benches, since they are smaller and are much easier to work with. After you refine your technique on them, you can assemble the table.

It's worth noting that all the parts for the table and benches should be dry assembled before glue is applied. With the assemblies joined in this manner, make reference marks and numbers on the backs of the parts or in some other discreet location. Before proceeding to gluing and clamping, gather the parts together in batches so they are not confused during the assembly process. In some cases, you'll want to make a second dry fit midway through the assembly process, such as when gluing and clamping a stile or rail to multiple slats that have been glued to a stile or rail on the opposite side. This is a necessary evil to ensure that the parts go together smoothly--the parts may have fit the first time you tried them but shifted slightly when they were glued up as a subassembly.



Glue and clamp together a pair of bench legs and one short apron. Make two of these subassemblies.

Apply glue to the mortises of two bench legs and on the tenons of one short apron. Use a small wood shim to spread glue on the mortise walls, and use a small brush to coat the tenons. Press the legs together, the apron and legs, and

then clamp the subassembly to pull the joints tight (**Photo 12**).

When the glue is dry on these parts, glue and clamp the long bench aprons to the end subassemblies (**Photo 13**). It's best to do this on a flat work surface to ensure that the base assembly is not twisted.

Assemble the table base in the same manner as the bench bases. Make two subassemblies consisting of a pair of legs and one apron. When the glue has set on these, join the subassemblies spanned by a pair of aprons.



Join two leg-apron subassemblies spanned by a long pair of aprons. Glue and clamp this to complete a bench base.

Now move on to assembling the benchtops. Since there are several slats in each top, assemble each top in stages. First, glue and clamp the slats to one long rail (**Photo 14**). After the glue sets on those joints, apply the opposite rail.



The first stage in assembling a benchtop is to glue and clamp slats to one stile. Use one clamp in the center of each slat.



Multiple subassemblies are made in assembling the tabletop. First, slats are joined to the center rail.

Approach the tabletop assembly in the same manner. Begin by gluing and clamping a slat at each end of the center rail. Fill in between these two slats with more slats (**Photo 15**). When the glue is dry on this subassembly, glue and clamp slats to the opposite side (**Photo 16**). Next, glue and clamp the side rails to this subassembly (**Photo 17**). When the glue is set on that subassembly, position clamps across it and then glue and clamp one stile to it (**Photo 18**). Complete the top by gluing and clamping the second stile.



A second set of slats is glued and clamped to the center rail. Again, use one clamp in the center of each slat.

Using this technique, you will not have to worry about getting all the parts together before the glue begins to set. Your results will be better, and the stress of a frantic assembly is eliminated.



Glue and clamp a side rail to the center rail. One clamp, carefully centered, should provide enough force.

Mark the benchtops and tabletop for the 45 degree corner cuts, and make these cuts with a sabre saw. Sand the cut corners smooth, then use the chamfer bit in the router to shape the table edges and benchtops. Use the router and chamfer bit to shape the top edge of the umbrella hole as well.



Clamp one stile at each end of the top subassembly. Space clamps evenly and at the center of a tenon.

Rip, crosscut and miter the 1-in.-thick stock to make corner blocks. Bore and countersink pilot holes in each block, and then attach them with screws to the aprons for the table and benches (**Photo 19**).



A corner block is installed at each leg on the table and the benches. A pair of screws holds each block to the aprons.

Invert the tabletop on a padded surface, then place the base over it. Adjust the base so there is an even reveal on all sides of the top, and then attach the base to the top with screws (**Photo 20**). Assemble the benches in the same manner.



Attach the tabletop to the base with several screws. Drive each screw into its matching counterbored hole in the apron.

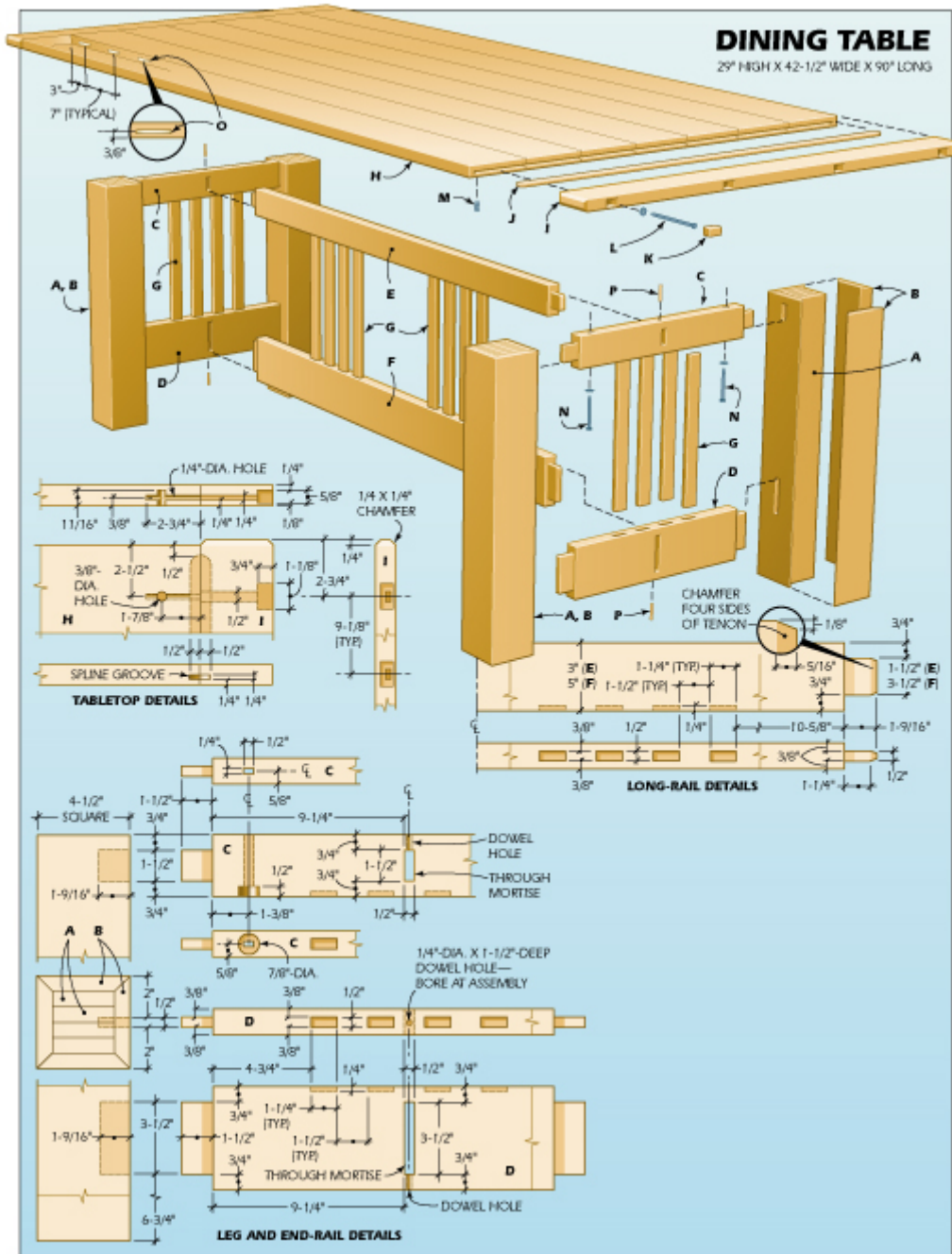
Sand all surfaces with 120-grit and 140-grit sandpaper, and remove all dust with a tack cloth. While cedar is resistant to rot and insect infestation, it will weather if left untreated. To preserve its natural color and protect it from the elements, apply a penetrating finish with a high-quality brush.

A pigmented stain could easily be used on this project. In fact, pigmented finishes provide greater protection against weather damage--even if they do obscure the wood's grain. Although most people prefer white, green or redwood-colored finishes for outdoor wood furniture, there's nothing to prevent you from being a bit more creative. The finish could be color matched to other outdoor furnishings, or to the house itself.

For maximum protection against the elements, use a paintable water-repellent preservative, followed by a compatible primer and topcoat. Visit your paint store to buy these three products and check that they are fully compatible.

85
OAK DINING TABLE





MATERIALS LIST--DINING TABLE		
Key	No.	Size and description (use)
A	16	3/4 x 3 x 28" oak (leg core)
B	16	3/4 x 4-1/2 x 28" oak (leg face board)
C	2	1-1/4 x 3 x 22" oak (end top rail)
D	2	1-1/4 x 5 x 22" oak (end bottom rail)
E	1	1-1/4 x 3 x 55 7/8" oak (long top rail)

F	1	1-1/4 x 5 x 55-7/8" oak (long bottom rail)
G	16	1/2 x 1-1/4 x 14-1/2" oak (slat)
H*	1	1 x 42 x 83" oak (top panel)
I	2	1 x 3-1/2 x 42-1/2" oak (breadboard end)
J	2	1/4 x 1 x 41" oak (spline)
K**	8	3/8 x 5/8 x 1-1/8" oak (plug)
L	8	1/4"-20 x 5" rh machine screw, washer
M***	8	1/4"-20 steel cross dowel
N	4	1/4"-dia. x 3" lagscrew, washer
O	as reqd.	No. 20 joining plate
P**	4	1/4"-dia. x 1-1/2" dowel
Misc.: Medium Fumed Oak aniline dye (No. W1190) available from Woodworker's Supply, 5604 Alameda Place N.E., Albuquerque, NM 87113; Waterlox Original Sealer/Finish (Waterlox Coatings Corp., 9808 Meech Ave., Cleveland, OH 44105).		
* Overall size, laminate from available stock.		
** Finished dimension. Cut oversize and trim flush.		
*** Cross dowel (No. 31823)		

Leg Construction

Each leg is formed by surrounding a solid core with mitered face boards. First rip stock for the leg cores, using up any wood that has defects in its appearance. Crosscut these boards a few inches longer than finished length. Spread glue, assemble them in stacks of four, and apply clamps. After about 20 minutes, scrape off glue that has oozed from the joints. Secure a tall auxiliary fence to the table saw rip fence and clamp a holddown featherboard to the auxiliary fence. Set the table saw blade at 45° and rip bevels along both edges of each face board (Photo 1). Then, crosscut the boards to match the cores.

Apply glue to the face-board mating surfaces and to all sides of a core for one of the legs. Assemble the leg, alternating clamp direction so that even pressure is applied on all sides (Photo 2). Construct the remaining legs in the same manner and scrape off excess glue after about 20 minutes. When the glue is dry, use a band saw and miter gauge to crosscut the legs to finished length.

Lay out the leg mortises as shown in the drawing. Then, use a plunge router with a spiral up-cutting bit and edge guide to cut them (Photo 3). Take two or three passes to reach the full mortise depth so you don't burn the bit or overload the router. Square the ends of the mortises with a sharp chisel.



With a featherboard holding the stock against the table, rip a 45° bevel on both edges of each leg face board.

The Rails And Slats

Use a dado blade in the table saw to cut the rail tenons (Photo 4). Since the blade will leave small ridges, it's best to cut the tenons about 1/32 in. oversize and then pare to the exact size. Clamp a stopblock to the saw table to set the tenon length. Hold the rails on edge to cut the shoulders at the top and bottom edges. Use a sharp chisel to pare the small ridges off the faces of each tenon.

Lay out the through mortises in the end rails and use a 7/16-in.-dia. bit in the drill press to bore slightly overlapping holes that remove most of the waste from each mortise (Photo 5). Use a sharp chisel to finish cutting the joints (Photo 6). Work halfway through the joint from one face, then turn the rail over to finish from the other side.



Spread glue on joint surfaces and clamp the face boards to the leg core. Alternate clamp directions to pull the joints tight.



Rout the leg mortises with a spiral upcutting bit. Reach finished depth in several passes to reduce router strain.



Use a dado blade in the table saw to cut the rail tenons. A stopblock clamped to the table ensures consistent cuts.



Using a 7/16-in.-dia. bit, bore slightly overlapping holes to remove most of the waste from the end-rail mortises.



Finish the through mortises with a sharp chisel. Work halfway through from each face to avoid tearing the wood surfaces.



Test fit each through tenon in its mortise. Mark around each tenon end to indicate the outer surface of the rail. Using this line as a guide, chamfer the tenon ends (Photo 7). Rip and crosscut the base slats to size and lay out the slat locations on the rails. Use the plunge router with edge guide to make the cuts (Photo 8). Clamp two rails together to provide a wider base for the router. Square the ends of each mortise with a chisel, and test fit the slats.

Next, mark the hole locations in the end top rails for fastening the tabletop. Use a Forstner bit to counterbore the recess for each bolt head (Photo 9), and then bore two side-by-side 1/4-in.-dia. holes for each bolt. Use a sharp chisel to remove the waste between the holes, leaving elongated slots. These wide bolt holes will allow the top to move with seasonal changes in humidity.

Base Assembly

Begin assembly of the base by joining the slats to the

mortises.



Lay out the slat locations in the rails and rout the mortises. Clamp two rails together to form a base for the router.



Use a Forstner bit and drill press to counterbore recesses for the lagscrews in the bottom edges of the top end rails.



end rails. It's not necessary to use glue unless the slats are too loose. Use two clamps to hold the assembly together until it's joined to the legs (Photo 10).

Spread glue in the leg mortises and on the rail tenons for one end of the table. Join the end rails to the legs, apply clamps, and compare opposite diagonal measurements to be sure that the assembly is square (Photo 11). Then, let the glue cure and repeat the procedure for the other table end.

Join the slats and long rails, install clamps and then compare diagonal measurements. Spread glue on the through-tenon joints and assemble the table base. Use clamps on either side of the through tenons to apply even pressure (Photo 12).

Bore holes through the top rails and into the through tenons for dowels that will secure the joints. Apply glue and drive each pin into place (Photo 13). Cut off the dowel about 1/16 in. above the rail surface and use a sharp chisel to pare it flush. Turn the base over and install dowels through the bottom tenons.

Assemble the end rails and slats. Use two clamps to hold the pieces together until the rails are glued to the legs.



Join the end assembly to the legs and clamp. Compare opposite diagonals to be sure that the assembly is square.



Assemble the slats and long rails and glue the long rails to the ends. Use clamps to pull the joints tight.



Lock the tenons to the rails by gluing a dowel through the joint. Turn the base over and repeat on the bottom joints.

The Tabletop

Select the stock for the tabletop, rip the boards to width, and crosscut a few inches longer than finished length. Plane or joint the edges of each board so they're straight and square, and then lay out joining-plate slots spaced about 7 in. on center. When cutting the slots, hold both the plate joiner and board tightly to your worktable so the slots will be accurately positioned.

Since the boards are long and heavy, it's best to begin assembly by joining only two. Then, after the glue cures, add one board at a time until the panel is complete. Use clamps every 6 to 8 in. along the joint to pull the boards together. After about 20 minutes, scrape off the excess glue, then wait another 30 minutes before adding the next board (Photo 14).

While the joining plates will ensure a reasonably flat panel, you'll need to plane the top to achieve a truly smooth and even surface. Use a jointer or jack plane to level the top. Make sure that the plane is razor-sharp, and work diagonally across the panel, taking light cuts (Photo 15). Use a cabinet scraper parallel to the grain to remove the plane marks, and then plane the edges parallel and to finished width.

Cut the top 1/2 in. longer than its final dimension with a circular saw or sabre saw. To make the finished cuts, first mount a 1/2-in. shank, top-bearing template bit in your router. Clamp a straightedge guide across the top panel, 1/4 in. from the end, and double-check that it's square to the panel edge. Then trim the end, allowing the router bearing to follow the straightedge guide (Photo 16). Use a scrap block clamped to the edge of the panel to prevent tearout at the end of the cut. Trim the opposite end using the same technique.

Rip and crosscut the two breadboard ends to finished size. Next, use a sharp block plane to cut the chamfered profile on the ends of each strip.

Use a slotting cutter to rout the 1/4-in.-wide x 1/2-in.-deep spline groove in the ends of the top panel. Note that the groove stops short of the panel edges. Use the same bit to cut a matching groove in one edge of each breadboard end.

Cut a spline with a 1/2-in. radius on the ends for each breadboard-end joint. Fit each spline into its groove in the top panel (Photo 17), install the breadboard ends and temporarily clamp them in place. Using a doweling jig and a long 1/4-in.-dia. bit, bore holes for machine screws that will fasten the breadboard ends to the top panel (Photo 18). When that's done, turn the top panel upside down and bore holes for the steel cross dowels using a brad-point bit with depth stop.

Remove the end pieces and use a sharp chisel to widen the four corners back to 1/2 in. Then, use a router



Begin assembly of the top by joining only two boards. After the glue cures, add one board at a time to reach full width.



Use a jointer or jack plane to flatten the panel. Set the plane to take a very light cut, and work diagonally across the top.



To trim the ends of the tabletop, use a template routing bit that follows a straightedge clamped to the

with edge guide to cut a mortise centered over each hole. Square the ends of the mortises with a sharp chisel as shown in the drawing.

workpiece.



Cut splines for the breadboard-end joints. A 1/2-in. radius on the ends matches the slot profile.



Clamp the breadboard end to the tabletop and use a doweling jig to bore through the strip into the end of the top.



Install the steel cross dowels, aligning the holes with the machine screwholes. Then tighten the screws.

Assemble the breadboard ends and the top panel, but don't use any glue on the joints. Insert a cross dowel in each tabletop hole, aligning the hole in the dowel with the machine screwhole in the breadboard end (Photo 19). Install the screws and washers to hold the ends in place.

Cut small blocks to plug the mortises over the screwheads, and glue the blocks in place (Photo 20). Let each block protrude from the edge of the strip. When the glue has cured, use a small block plane to trim the blocks flush.

Set the tabletop on the base, adjust it for proper overhang on all sides, bore pilot holes and install the 3-in. lagscrews and washers. Then, remove the top and sand all table surfaces to 220 grit.

Finishing

We stained our table with a water-based aniline dye. To prepare for staining, wipe all surfaces with a damp sponge to intentionally raise the grain. When the wood is dry, lightly smooth the table with 220-grit sandpaper.



Apply the dye solution with a brush or rag, working quickly to avoid lap marks. Let the table dry overnight before applying the first coat of finish. If the wood surface is still a bit rough, lightly wipe with 320-grit sandpaper. Don't sand aggressively or you'll create light patches in the dyed surface. Clean with a tack cloth before proceeding.

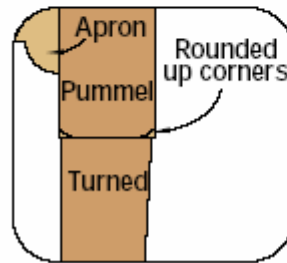
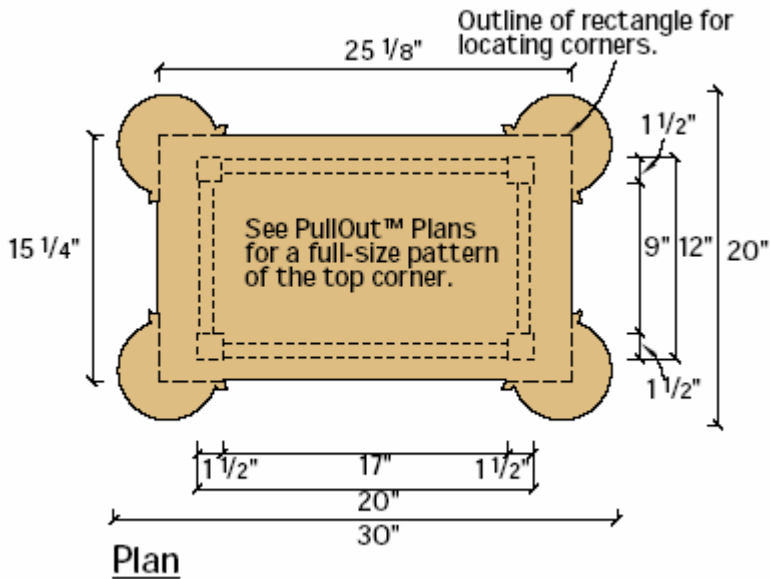
We finished our table with four coats of Waterlox Original Sealer/Finish. Brush or wipe on the first coat and let it dry overnight. Lightly sand with 320-grit paper and remove all dust. For the remaining coats, let the finish sit on the wood for about 30 minutes, wipe off all excess, and let it dry over-night. When the last coat has fully cured, burnish with 4/0 steel wool and polish with a soft cloth.

Cover the screwheads with small blocks glued into squared recesses. After the glue cures, trim the blocks flush.

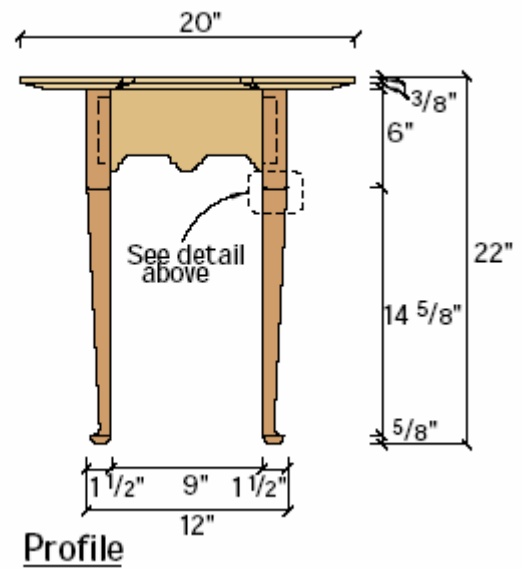
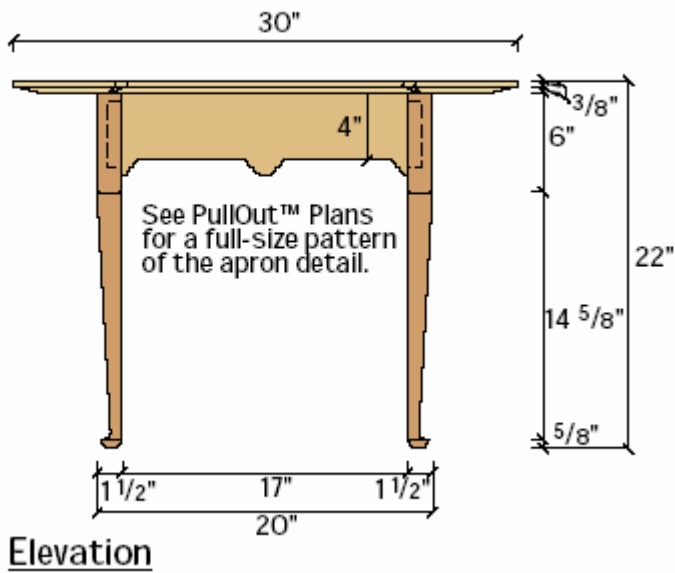
86

QUEEN ANN SIDE TABLES





Detail of leg transition at top of turning



Schedule of Materials: Queen Anne Side Tables

No.	Item	Dimensions	Material
1	Top	3/4" x 20" x 30"	Maple
4	Legs	1-1/2" x 1-1/2" x 21-1/4"	Maple
2	Long Aprons	3/4" x 5" x 18-3/4"	Maple
2	Short Aprons	3/4" x 5" x 10-3/4"	Maple

Making Aprons • These tables were made with simple mortise-and-tenon construction. Start by cutting the apron parts according to the Schedule of Materials. Next cut the 3/8" x 4"-wide x 7/8"-long tenons on the ends of the aprons.

Making Pockets • The last thing to do on the aprons is to drill the pocket holes for attaching the base to the top. Do this on a drill press with a 1-1/4" Forstner bit. Use a shop-built jig to hold the aprons in place for drilling.

Leg Blanks • Although the legs look complicated, they are not. The secret is an offset turning technique. First cut the blanks 1/8" longer than in the schedule. This gives you some room to work with when turning the pad on the end of the foot.

Use a straight edge to make an "X" from corner to corner on both ends of the blank. This will aid in finding the center as well as marking the offset. Now, on the bottom of the legs, determine which corner will face out. On the bottom of each leg, measure 1/2" from the center to the corner opposite the outside corner. This is the offset for the leg. Remember, the farther away from the center you go, the thinner the ankle (the area just above the pad) will be. Going any farther than 1/2" is dangerously close to having a leg pop off your lathe.

Mark a line completely around the blank 6" down from the top of the blank. To save time roughing the blank, lay out a 1-1/2" diameter circle on the bottom of the blank. Set your jointer to 45 degrees. Using the circle as a guide, lower the infeed table to the point where you can take the corner off, leaving about 1/32" to the circle. Go slow and joint to within 1/8" of the line where the turning starts. Now mount the blank in the lathe.

After mounting a blank between centers with the top towards the drive center, cut a small kerf at the line where the turning stops. Don't cut too far or you won't be able to remove the kerf. With a roughing gouge and skew chisel, turn a cylindrical blank from the saw kerf to the foot. At this point use a skew chisel round the corners of the pommel, the square part of the leg, where it meets the turned portion. Repeat on all the legs and you're ready to do the offset turning.

Turning the Offset • Before resetting the legs, measure up from the bottom 1/8" and from that mark another 5/8". Turn the lathe on and follow the marks around with a pencil. Take a parting tool and set it on its side. Cut a small incision at the 5/8" mark. This creates a shadow line from which to begin the offset turning. Set the lathe for its lowest speed and reset the tailstock so the leg center is mounted in the offset mark. This might look like an awkward setup but as you remove material the leg will turn with more stability. Finish the straight part of the leg with a skew chisel and the ankle with a roughing gouge. Finally, turn the pad foot as shown in photo 5. Now is the time to sand the legs. Start with 120 grit sandpaper and finish with 150 grit.

Now cut the 3/8" x 7/8" x 4" mortises in the legs, 5/16" in from the edge and 1/2" down from the top. Be careful when marking the locations of your mortises to make sure the turned feet face out. You'll notice that the mortises meet slightly at their bottoms. Simply plane away a little of the tenon where they meet. Now glue the base together. Start by gluing the short ends together and then attaching them to the long aprons.



SCROLLING THE APRONS • Lay out the scrollwork on the bottom of the aprons using the patterns supplied in the PDF from the "Making Pockets" step. Glue the patterns to 1/4" plywood, cut them out, trace the pattern on your aprons and cut them out on a band saw. Make relief cuts on the inside radii so you can scroll them out easier.



DRILL POCKET HOLES • Make sure that the bottom of the pocket is at least 7/8" from the top edge of the apron to prevent the screws from poking through.



CUTTING CORNERS • First mount a blank between centers with the top towards the drive center. Then use a saw to cut a small kerf on each corner at the line 6" from the top. Don't cut too far or you won't be able to remove the kerf. With a roughing gouge and skew chisel, turn a cylindrical blank from the saw kerf to the foot. At this point use a skew chisel to cut a small rounding up on the square corners of the top (see diagram). Repeat on all the legs and you're ready to do the offset turning.

After the glue is dry, finish sand the entire base, then lay out the holes for the cherry pegs. Any dark hardwood will do for the pegs, but cherry sands smooth and the end grain stains a dark color. Drill a 1/4" hole 1" deep. Follow suit with 3/16" and 1/8" bits, creating a tapered hole. After shaping 16 square pegs (tapered on four sides to a point), tap one in until you feel and hear it seat. The sound of the hammer hitting the peg makes a distinctly different sound when it seats. No glue is required for this as you are running a peg completely through the leg. It won't be coming out anytime soon. Cut the pegs, leaving 1/32" showing and sand until it is a rounded-over bump. Drill 1/4" holes into the pockets from the top of the base for attaching the top.

Make and Attach the Top • The top is the easiest part, but it can make or break the whole project. Wood selection is key. One hundred years ago, you could get extremely wide, highly figured curly maple at a low price. Amazingly most old porringers were one- or two-board tops. That's clear-figured wood 10- to 20-inches wide! Regrettably, those days are gone, and you will have to make do with the painfully high-priced, narrow lumber you get today.

Poplar is easy to get in a decent width and length, but I had to try the Amish sawmills in eastern Pennsylvania to find a retail source for decent curly maple (see the Schedule of Materials for one such mill). I managed to find decent 4/4 that's about 7" wide and a nice piece of 8/4 for the legs (I wasn't sure how thick the legs would be when I started so you could probably get away with 6/4 for leg stock).

The tops for both types of tables are the same size. They just require a different edge pattern. For the porringer top, lay out a 15-1/4" x 25-1/8" rectangle in the center of the top. Make a pattern for the top with 1/4" plywood as you did with the aprons. When you lay the inside corner of the pattern over the outside corner of the drawn rectangle, the outside of the radius should just touch the edge of the top. Trace the pattern on all four corners and jigsaw the top out.

For the "clover" shaped top, things are easier. Trace the double radius on all four corners. When you are done cutting the shape of the top out, chamfer the edges.

Chamfering the edges lightens the overall look of the table, and the chisel work underneath has a very sculptural feel. Before chamfering, use a marking gauge to mark a line that is half the thickness of the top on the entire outside edge of the top. Next, use an adjustable square to mark a line around the underside of the top. For the porringer the measurement is 1-1/2" and for the clover use a 2-1/4" line.

I chamfered the edges with a power planer. It's a tool used mostly by carpenters to remove material from doors when fitting and installing them. And in that role, this tool is unequalled. Finish sand the top to 150 grit.

The last assembly chore is to screw the top to the base. Begin by laying the top upside down on a blanket. Center the base on the top and screw it down with #10 x 1-1/2" wood screws.

In finishing the clover table, I sprayed on a custom-mixed aniline dye followed by three coats of clear finish. This turned the poplar to a mahogany-like color.

The porringer was a different story. To begin with, I hand scraped the top with a Stanley #80 cabinet scraper. With the lack of abrasive sandpaper 250 years ago, this is how the old tables were made ready to finish. Scraping with a properly prepared scraper blade will show up as rows of slight depressions (1/32" deep) with ridges about 2-1/2" apart. I stained the wood with aniline



A WELL-TURNED ANKLE • When you turn the lathe on, the leg's spinning creates a ghost image of what the finished leg will look like. Remove that "ghost" material with a roughing gouge. Stop at the second line that you drew earlier. Lay the gouge on its left side at the second line and slowly rotate the gouge clockwise as you go to the left. Go very slowly until you get the hang of how the wood reacts to the gouge.



TURNING THE PAD • The last thing to do on the legs is turning the pad on the foot. You do this last, as removing the foot material also removes the offset center. Reset the bottom of the leg into the original center and using a parting tool, turn away this "extra" length until it's about 3/8" diameter. This gives you some extra distance from the live center. Then using a small spindle gouge, turn the pad of the foot till it meets the 3/8" diameter. Sand the pad the same as the leg and you're done turning.



SCULPTING UNDERNEATH • When you've done all you can with a power plane, use chisels and planes to remove material down to the marked line.

How thick is it anyway?

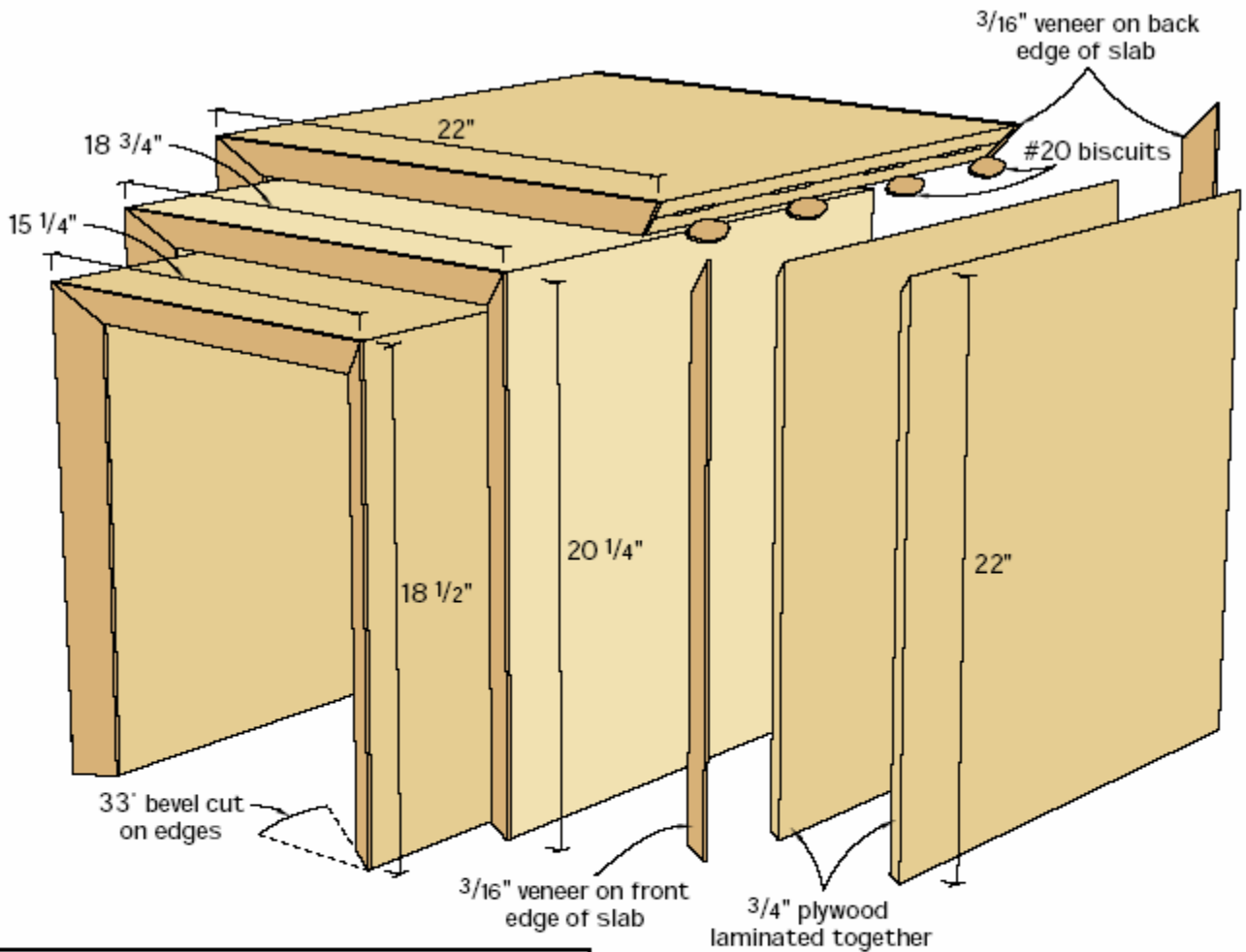
When lumber yards count up the board footage that you buy, it's referred to as a tally. The "tallyman" carries a special notebook and a strange floppy stick called a "tallystick" (go figure!) with odd measurements on it. The lumber you buy is sorted by how many quarters of an inch thick it is. This system starts at 4/4 for 1" thickness on up to 16/4 for 4" lumber

dye and then applied one coat of boiled linseed oil and finished the table with four coats of dark shellac. This imparts a nice honey brown color to the curly maple and is easy to repair. Now where did I put that drink?

87

NESTING TABLES





Nesting Tables

No.	Item	Dimensions T W L	Material
4	Sides*	$\frac{3}{4}$ " x 22" x 22"	Birch ply
2	Tops*	$\frac{3}{4}$ " x 22" x 22"	Birch ply
4	Sides*	$\frac{3}{4}$ " x 21" x $20\frac{1}{4}$ "	Birch ply
2	Tops*	$\frac{3}{4}$ " x 21" x $18\frac{3}{4}$ "	Birch ply
4	Sides*	$\frac{3}{4}$ " x 20" x $18\frac{1}{2}$ "	Birch ply
2	Tops*	$\frac{3}{4}$ " x 20" x $15\frac{1}{4}$ "	Birch ply
6	Veneer edges	$\frac{3}{16}$ " x 2" x 96"	Birch/Maple

*Sizes are of finished components, not cutting sizes.

Make a Slab

Start the tables by ripping three sheets of plywood in half to just under 24" in width. You won't need all that width, but it will come in handy later. As for the lengths, using the full 96" is a little wasteful, but it makes gluing the two halves together easier.

After ripping the sheets, determine which three faces are most attractive and mark these as the outsides of the tables. Next glue the pairs together. To keep the sheets from sliding around during glue-up, pound a nail into each slab



Glue up the Slabs • Spacers underneath the slab allow the solid wood edging to hang over to evenly cover the edges. It doesn't take a lot of pressure to clamp the

about 1" from the ends. These ends will be cut off anyway, and it makes glue-up much easier. Stack the three pairs together, then clamp across the stack using stout wood braces to spread the pressure.

After the glue is dry, square off one end of each slab. Then cut the slabs to 68", 62-½" and 55" in length. Don't pitch the fall-off pieces, they'll be useful later. Next rip each slab to 23" wide to give you one flat edge. You could run one edge over a jointer, but the adhesive in plywood is murder on high speed steel knives. When you have one square edge, set the table saw's blade to bevel at 33° and rip the three slabs to 21-5/8", 20-5/8" and 19-5/8" wide respectively. Again, save the fall-off.

Homemade Veneer

You're now ready to run some solid lumber to cover the plywood edges. I used soft maple edging on my birch ply tables.

Run out six lengths of 3/16"-thick solid wood for the edges. To plane wood that thin, you probably will have to put an extra board over the bed of your planer — most planers aren't designed for wood that thin.

With the strips ready, it's time to glue them to the slabs. Go find the fall-off from the bevel cuts and grab a couple other sturdy solid strips. Use the fall-off as a caul for clamping. By gluing the edges on the slabs with the bevel facing up, gravity is on your side. I also cheated a little by tacking the edge strips in place with a few small brads at either end. Once again, the extra inch in length will be cut off, so the nail holes won't show.

Glue the edging to the three slabs, then trim the edging flush to the plywood. I used a router with a flush-cutting bit for the back edges, and I used a jack plane to get the beveled edges nearly flush. Then I used a random orbit sander to flush the edges perfectly. To soften the edges I used some 120 grit paper and a block of wood to round over the sharp edges.

Make Your Miters

The tables slip inside one another with a ¼" gap between each, so accurate cutting and spacing is important. To make the mitered corners and still maintain the grain pattern on the table tops, first crosscut the three slabs into three parts. Use the table saw with the blade set to 90°. Start by marking the middle of each slab and cut the top section from the middle of each slab, allowing the excess length to remain on the leg sections.

You're now ready to do the precision cutting, and you'll see quickly why a sharp blade is important. Start with the largest top (22" x 22") and set the blade bevel to exactly 45° and the rip fence to cut the miter exactly to the width of the top. If you have a left-beveling table saw you're in luck as the inside of the table is on the tearout side. If you have a right tilt, that sharp blade is important. Make the first bevel cut on one end, then spin the top and make the cut on the opposite end. Again, with a right tilt you have the extra difficulty of the first miter trying to slide under the rip fence. Adjust your cut for any variance and consider adding an auxiliary fence that fits tight to the table surface. Repeat this with all three tops.

You're now ready to make the miter cuts on the legs. Start with the 22"-high legs and work through the 20¼"- and 18½"-high legs, checking the spacing between the tables by "dry-nesting" as you go.

edges, and too much pressure will force the front edge caul to slide.



Center-cut Slab • The first miter cut on the center slab (on a right-tilt saw) will balance the fall-off piece on the blade. Be aware of possible kickback of the scrap piece.



Disappearing Miter Trick • Unless your rip fence is tight to the saw table, the miter will have a tendency to slide under the fence during the second cut (on right tilt saws). Recheck your measurements to accommodate this, or add a tight-fitting auxiliary fence to the standard rip fence.



A Little to the Left • Enough clamps and careful adjustment during glue-up will ensure tight miters and an evenly spaced opening from top to bottom.

Assembly

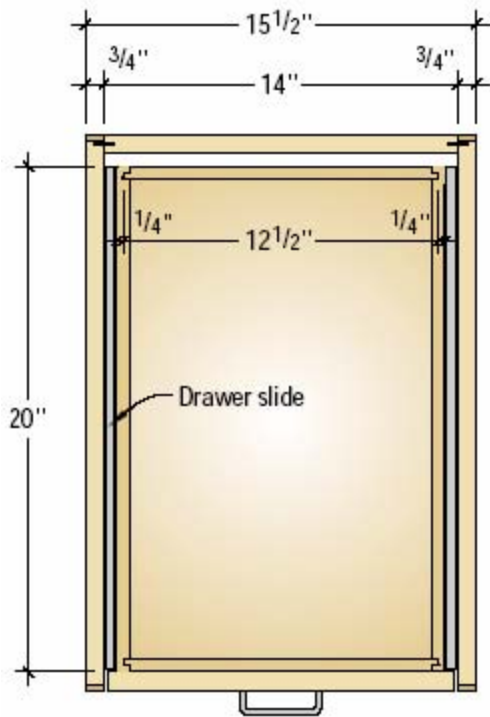
The hard part is done. The rest is biscuits and clamps. I used four #20 biscuits for each miter joint. With the biscuits cut, the fall-off pieces from cutting the slabs to length come into play. You'll stick them between the legs while gluing up the miters. It makes glue-up much easier. First check the internal dimension between the miters on each table top. Try to be as exact as possible, then cut spacers from the fall-off pieces for each table. Finish sand the interior faces of each table and the beveled front edge of each piece before assembly. Put glue on the miters and biscuits and glue the tables. Pay careful attention to the miter joint where the top and legs join. Unlike the hardwood edging, you only have about 1/16" of veneer to sand to match the joint.

With the tables assembled sand the outer faces, paying extra care with the mitered joint. You're now ready to finish. I chose to simply add a few coats of clear finish to the tables, but any number of stains to match an existing decor will work well.

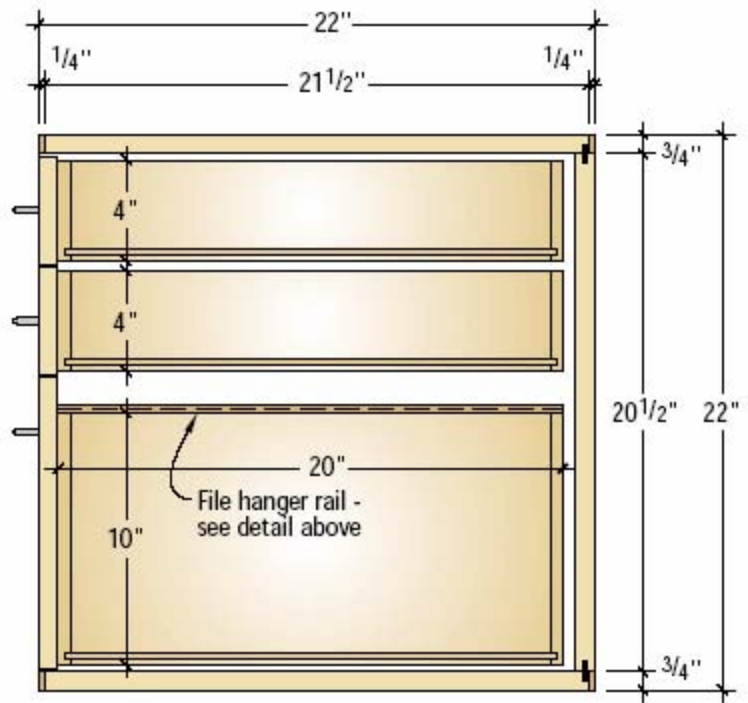
88

MOBILE FILE CABINET

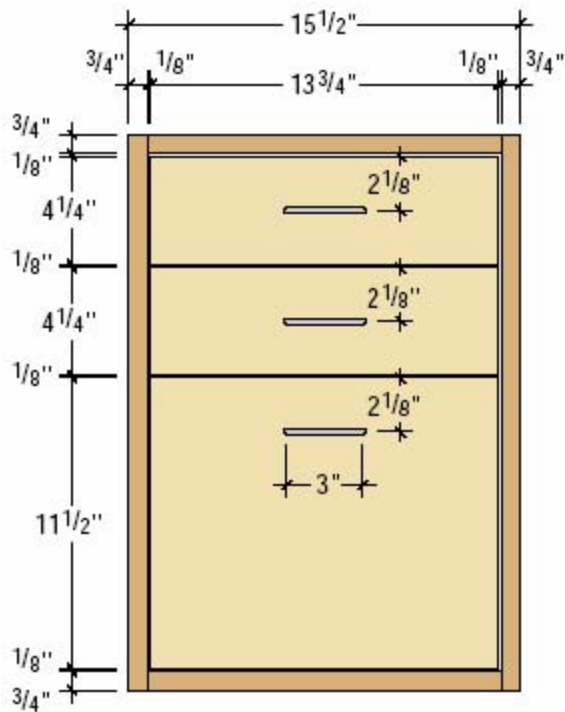




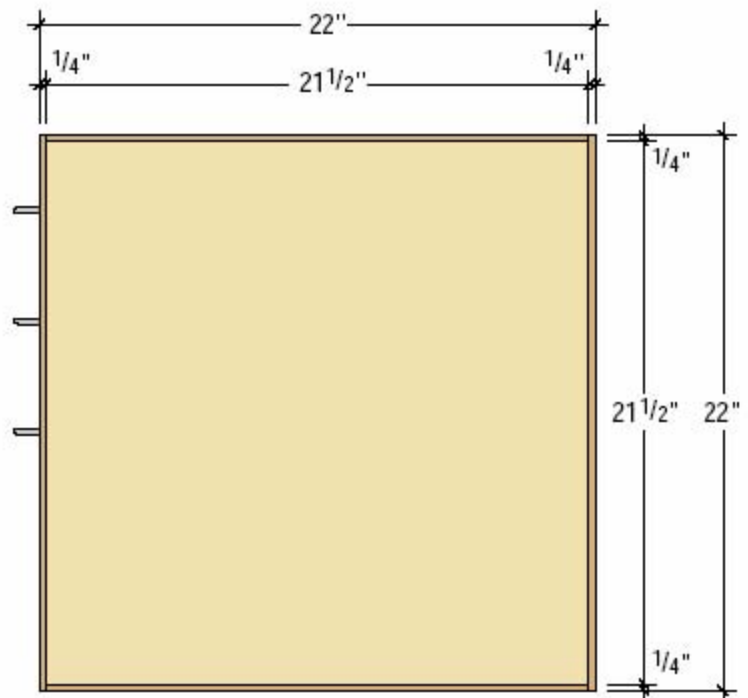
Horizontal section



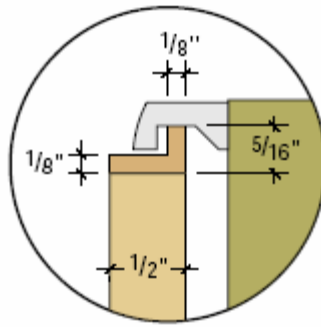
Profile section



Elevation



Profile



Hanger rail section

Cutting and Edge-banding the Cabinet Parts

First inspect the edges of the plywood, because the joint between the solid-wood edge-banding and the plywood panel needs to be crisp. Although it is tempting, you can't assume that a factory edge is up to snuff, and a quick glance may reveal numerous dings, dents and scratches. I often end up ripping $\frac{1}{2}$ " off of each factory edge. To minimize tear-out on cross-cuts, I use a sharp plywood blade and a zero-clearance throat plate. Feeding the panels more slowly, good-side facing up, also helps keep the cuts free of tear-out.

Once your panels are neatly trimmed to size, it's time to mill some edge-banding. I use cherry because I like the color that it darkens to, but substitute as you like: I've also used walnut with pleasing results. I simply plane the cherry to $\frac{3}{4}$ ", then rip it into $\frac{1}{4}$ " strips. Precision is critical, as inaccurately sized strips will either overhang the plywood panels and need to be trimmed, or they won't cover the edge entirely and you'll have to make new ones. I usually mill some extra stock in case I notice a defect in one of the strips that wasn't evident beforehand. The cut list calls for 12 strips, which allows for one extra.

I own a few clamps that are designed for attaching solid-wood edge-banding, but they end up gathering dust for several reasons. To edge-band a number of panels requires more clamps than I'm willing to buy, and some clamps seem to lack the clamping pressure that I'd like. I also hate lugging heavy, clamp-laden panels around the shop while I wait for glue to dry. My solution is probably not original, but it is highly practical: I use blue painter's-grade masking tape. It is quick, inexpensive and lightweight. You can even stack a series of panels on top of each other to use space efficiently. And because an ounce of prevention is worth a pound of cure, I use just enough glue to create a tiny amount of squeeze out, which I then wipe up.

Because the edge-banding may overhang a bit, I use a router with a flush-trim bit to carefully remove the offending cherry; a careful touch with a random-orbit sander will remove any glue residue left over. The side panels need to be edge-banded on all four edges, and the top and bottom panels get edge-banded on their front and back edges only. The back receives no edge-banding at all. As a word of caution, veneered plywood is notoriously unforgiving when it comes to sanding. I've learned the hard way that there is no adequate method for repairing sand-throughs in the top layer of veneer, so work carefully to ensure that you'll have to do a minimal amount of sanding.

Assembling the Cabinet

I use biscuits here because they are strong and reliable. In addition, they are invisible once the cabinet goes together, and I didn't want any filled nail holes or plugged screws interfering with the lines of the piece or interrupting the flow of the grain.



During the second stage of cabinet assembly, laying the cabinet on its side keeps you from fighting with gravity. The cabinet comes together relatively easily, and the alignment is a snap thanks to the biscuits.



Go slowly while rounding over the edges, as the cherry can tear out and splinter if a cut is rushed. The roundover is key to the smooth, clean feel of the piece.

bottom, and once the glue there has set, I sandwich that assembly between the sides. For the first step, I clamp the three parts together and line them up precisely. After marking the locations for biscuits, I pull off the clamps and cut the slots. After dry-fitting, I glue it up and wait a few hours. For the second step, I place one side panel flat on the table, inside facing up. I position the top-back-bottom assembly correctly on top of that, and finally place the remaining side on top of it all. With a couple of clamps holding the parts snugly in place, I mark the biscuit locations, then repeat the process I used on the first half of the cabinet assembly.

With a roundover bit in a router, I ease each edge, which softens the sharp lines of the cabinet. By routing the edge-banding after the cabinet is assembled, the inside corners of the edge-banding flow together smoothly, and the eye is swept through graceful little curves that add a fine detail to the finished piece.

Making the Drawers

I build the drawers out of Baltic birch plywood because it is attractive, stable and inexpensive. If you like, you can mill solid-wood panels for the drawer parts – if you do, dress the stock to $7/16$ ", as the Baltic birch plywood sold as $1/2$ " actually measures out at $1/16$ " less. Refer to the cut list for the quantities and dimensions you'll need here. Once you've got the drawer parts cut, rip a groove in the bottom of each – you could use a dado blade here, but for a small number of parts like this, I don't take the time to change blades: I just make two passes side-by-side for the $1/4$ " groove.

For this project, I use a rabbet-dado joint to lock the drawer parts together. It is a strong mechanical joint with plenty of surface area for glue. I sketch it full-sized on paper, then set up my table saw to cut the dado on the inside face of the sides.

I use my miter gauge with a stop attached to make sure the dados are cut at a consistent distance from the ends of the drawer sides. This will take two passes. I then cut the rabbet in the drawer fronts and backs with a similar setup – just change the blade height and move the stop on your miter gauge to correctly position the cut. Test the fit of the joint now while you're still set up to make changes.

Once the rabbets and dados fit snugly, cut out the drawer bottoms. During glue-up, check that the drawers are square by measuring their diagonals. This ensures that the drawer fronts will line up evenly. If a drawer is slightly out of square, clamp it across the longer diagonal and apply pressure until it conforms. Once the glue dries, it should remain in the correct position.

So that hanging file folders can be easily slid forward and backward in the bottom drawer, you'll need to make two rails that mount on the top edges of the drawer sides. I mill two 20" strips of cherry to $1/2$ "x $5/16$ ". I then make two cuts with the table saw to create the "L"-shaped piece needed. The piece can then be screwed into the tops of the drawer sides – be sure to countersink the heads so that they don't stick up and interfere with the movement of files across the rails.

Installing the Drawers

I use 20" Accuride slides because they're smooth and reliable. Each drawer requires one pair of slides, and each slide can be separated into two pieces: The larger one mounts inside the cabinet, and the smaller one attaches to the drawer. I keep the slides together during installation, and I use plywood spacers to lay them out evenly. With the cabinet on its side, I insert the lower spacer ($4-5/8$ " wide), the first drawer slide, the middle spacer ($6-1/4$ " wide), the second drawer slide, the upper spacer ($2-7/8$ " wide), and finally the upper drawer slide. Then I simply screw the slides in place with three screws. After flipping the cabinet onto its other side, I repeat the process.

With the cabinet upright on my bench, I push the bottom drawer halfway in and place $1/8$ " shims underneath it to establish a consistent and correct height for the drawer. I push the drawer in (it should have a snug fit, but not excruciatingly tight) and



Using spacers to position the drawer slides eliminates one of the leading causes of poor-fitting drawers: inconsistent spacing of slides. Before putting in the spacers, be sure to brush out any sawdust or woodchips that may have accumulated inside the cabinet. A $1/16$ " discrepancy at this point could cause an annoying misalignment that you'll have to backtrack to correct later on.



A consistent reveal is key to the crisp feel of the piece. The shims shouldn't bow the cabinet sides out at all, but should fit snugly to ensure that the drawer front is centered and that the reveal is even on both sides.

line them up with the front edges of the drawer. I screw in the front edges of the slides, and then pull the drawer out all the way. With the shims still under the back edge of the drawer, I screw in the back-ends of the drawer slide. The top two drawers go in the same way, except I use thicker shims on top of the bottom drawer because it receives a taller drawer front to hide the tabs on file folders that protrude above the drawer box.

Trim your false drawer fronts to size on the table saw and iron on veneer tape to all four edges. To attach the drawer fronts, I remove the top two drawers and push the bottom drawer all the way into the cabinet. I then set the drawer front into position, using 1/8" shims on the bottom and sides to ensure a correct reveal all the way around. I use spring clamps to hold the drawer front in place, then I run screws into it from the inside of the drawer. The middle drawer front attaches the same way, but the top one doesn't have room to get a clamp around it. I solve this dilemma by dabbing some quick-set epoxy on the back of the drawer front then pressing it into position. Flipping the cabinet onto its back and shimming around the edges of the drawer front assures that it will remain aligned. Once the epoxy has cured, the drawer front can be secured with screws like the others.

To attach the drawer pulls, I make a template from a scrap of 1/4"-thick plywood and cut it to the same size as the upper drawer fronts. I draw lines across the vertical and horizontal centers of the template, and center my pull relative to these crosshairs. Once the holes are drilled on your template, you can place it directly on the drawer fronts and drill through your pre-positioned holes. Using a template like this might seem like extra work but, it saves time and guarantees consistent placement on each drawer front.

Finishing it Up

For an office environment, I favor the durability of oil-based polyurethanes, although if I were building this for my home, I might be tempted by the hand-rubbed feel of the newer gel varnishes. When your finishing process is completed, simply screw on four 2"-diameter wheels (locking casters will keep it from rolling around while you open and shut drawers), and bolt on the drawer pulls.

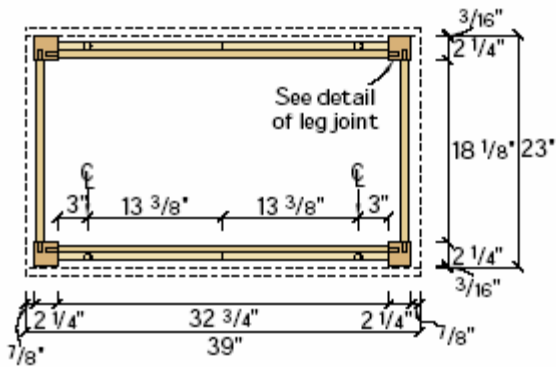
And now, the moment you've been waiting for: Go ahead and fill those drawers with all the stuff that usually clutters up your desk.

While I can't promise that you'll be more efficient or productive as you tend to whatever paperwork keeps you away from the workshop, I'm confident that you'll enjoy the smooth, crisp look of your new rolling file cabinet. And the clean desktop isn't half bad, either.

89

DROP-LEAF TABLE





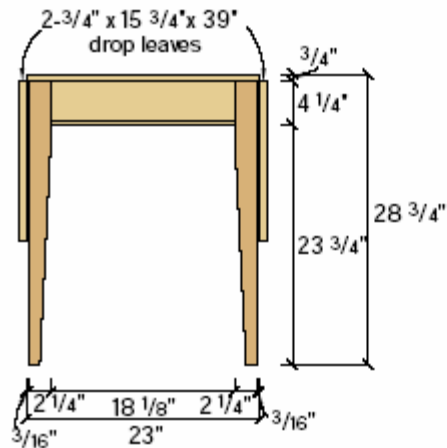
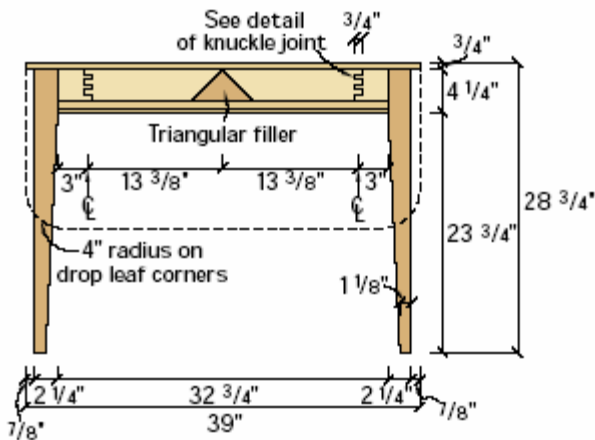
Schedule of Materials: Drop-Leaf Table

No.	Item	Dimensions T W L	Material	Notes
1	Table top	3/4" x 23" x 39"	Mahogany	
2	Leaves	3/4" x 15 3/4" x 39"	Mahogany	
4	Legs	2 1/4" x 2 1/4" x 28"	Mahogany	
2	Short aprons	3/4" x 4 1/4" x 20 1/8"	Mahogany	1" TBE; 1/4" offset
2	Long aprons	3/4" x 4 1/4" x 34 3/4"	Mahogany	1" TBE; 1 1/4" offset
4	Leaf supports	3/4" x 3 1/4" x 18"	Mahogany	
2	Triangles	3/4" x 3 1/4" x 6 1/2"	Mahogany	

Supplies

- 4 Hinges for drop-leaves; Rockler part number 29249; \$4.29 for 2 hinges
 - 6 Tabletop fasteners; Rockler part number 34215; \$1.99 for 8 fasteners
- Rockler can be reached at www.rockler.com or 800-279-4441

TBE- Tenon, both ends; * cut to fit



Start with the Basics

After cutting all your rough stock to length, surface your wood down to 3/4" thick (except for the legs). The original 19th-century table's top was only one board. You can still find mahogany in these widths, but I couldn't. To obtain the appropriate width, I had to glue up two boards for both the leaves and the tabletop. I used three biscuits at each joint to keep the boards aligned during glue-up. Also, if you can't get 2 1/4"-thick stock for the legs, ask for turning blanks at the lumber store instead; you might just get lucky.

Mortises, Tenons and Tapers

The first step is to make mortise-and-tenon joints where the aprons join the legs. I made the tenons using a dado stack on the table saw. Cut the shoulders as shown in the photo on the next page. Make the tenons 3/8" thick, 1" long and 3 1/4" wide. After cutting your tenons, cut a groove in the aprons for the tabletop

fasteners, which will attach the top to the table's base. Make this slot by cutting a kerf in the aprons that's 7/16" down from the top edge. For a nice detail, I routed a bead on the bottom edge of the aprons.

The mortises on all the legs are made 1-7/16" from the inside for the short aprons and 7/16" from the inside for the long aprons as shown in the diagram below. Cut your mortises on the legs; I used a mortiser, but you can use a chisel or Forstner bit.

The original table had turned legs, but in order to simplify things, I tapered the legs. Tapering jigs for the table saw can be tricky, so I used a band saw to cut the tapers about 1/16" shy of my line and then cleaned up the cut on the jointer. The taper should start 1" below where the aprons end and result in a leg that tapers to one-half the original thickness. Remember: taper only the sides that have mortises.

Install the Hinges

After tapering, sand the legs and aprons. Start with 100-grit sandpaper, move up to 150-grit, then finish with 220-grit. Next, glue up the legs and aprons and clamp. After gluing up the base, turn your attention to the top.

Install the hinges that connect the tabletop to the leaves. Use two on each side, and place them 7 1/4" inches from the end to allow room for the leaf supports. Lay out the location of the hinges by first placing a 1/16" spacer (I used pieces of plastic laminate) between the leaf and tabletop. Clamp the pieces together, put the hinges down and trace them with a pencil. Use a router with a straight bit to hog out most of the area. Then use a chisel to define the corners. Install the hinges and make sure they work properly.

A 4" radius on the outside corners of the leaves on the original table was a nice touch. In order to recreate this, I traced the curve from the original and made a template using a piece of plywood. Cut the shape to size on a band saw and then use the template with a router and straight bit to finish the radius.

Make the Leaf Supports

To keep the leaves upright, assemble two supports for each side. These are basically two pieces of wood finger-jointed together to form a "knuckle" joint hinge. The 1/2" knuckle joints are made on a table saw using a finger-jointing jig. Round the edges of the "fingers" with a rasp or sandpaper so the joint pivots. Then drill a 1/4" hole through the fingers and tap a 1/4" dowel in place. Instant wooden hinges. One note: you'll have to cut a notch in the two supports so they'll clear the hinge barrels on the top. Mark the location of the notch when you dry-assemble the table. The angle cuts on the supports form a triangular hole against the apron. Cut a triangular piece of mahogany to fill this space, being careful not to let the filler rub against the supports. For simplicity, you may use brass hinges instead of knuckle joints.

Sanding and Finishing

Remove the hinges from the tabletop and sand the table. Because the top will be the most visible surface, I chose to go up to 220 grit. The bottom requires only 150 grit. In order to simplify finishing, I waited to attach the supports until after finishing. This requires masking off the area where the support will be glued. For the finish, I applied a dark mahogany stain made by United Gilsonite Laboratories (P.O. Box 70, Scranton, Penn. 18501; 800-272-3235; www.ugl.com). The color is called "118 Dark Mahogany," order number 11811, LR1294. Both the phone number and the website can refer you to a retailer in



To cut the tenons, use a dado stack on the table saw. Reduce the tenon in thickness by 3/16" on each side.



Cut 1/2" shoulders on each side of the aprons.



You will need to fasten the tabletop using tabletop fasteners, which requires making a kerf in the aprons. I made this kerf on the table saw 7/16" from the edge and 1/4" deep.

your area. After letting the stain cure, I applied four coats of clear lacquer.

Final Construction Details

After the lacquer has dried, attach the supports and the triangle with glue and nails through the inside of the aprons. Place the top on the base and make sure the supports keep the leaves level. Now attach the top. Because of the expansion and contraction of wood, you will need to attach the aprons to the tabletop using tabletop fasteners. These fasteners are available from Rockler and are listed in the Schedule of Materials. The tabletop fasteners are installed by simply screwing the fasteners into place. Because the wood will move more in width than in length over time, be sure to leave more space on the long apron sides for the fasteners.

Overall, I was extremely pleased with the results of my project. I think my great-great-grandfather would be proud to know that I've continued the family tradition.



I made the mortises using a mortiser. In order to form the holes more safely, you should think of the path of least resistance. Instead of just going in a straight line from left to right or right to left, make two holes with a slight gap between. Then clear out the gap. If you simply work in a straight line, the mortiser's chisel could bend or break.

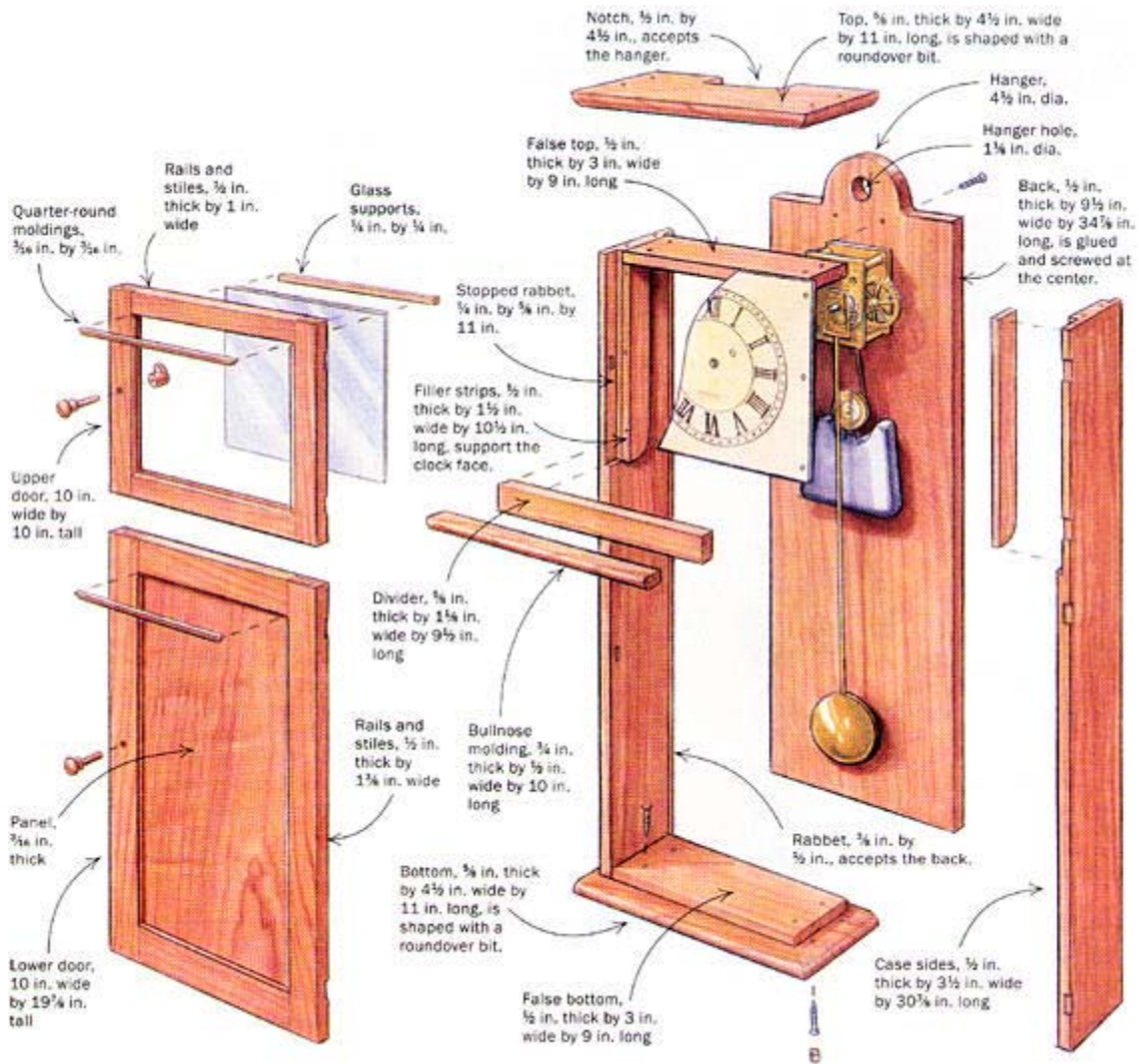


I tapered the legs on a band saw, then ran the legs over the jointer in order to make them smooth.

90

SHAKER WALL CLOCK





Make the case to fit the clock parts

I never start construction on a clock until I have the movement, dial and hands. Having these at the ready makes it much easier to fit the dial and allow proper clearance between the shaft, the hands and the glass, as well as the clock movement and the case back. I hate surprises.

Once you have the clock parts, you can cut the sides of the case to size. Then cut $\frac{3}{8}$ -in. by $\frac{1}{2}$ -in. rabbets to accept the back. The front of each side receives a stopped rabbet to accept the face. You could simply make the clock an inch wider and avoid cutting rabbets in the front, but -- for reasons more aesthetic than historical -- I prefer to keep proportions closer to the original.

Next, cut the top and bottom pieces and mold them with a quarter-round router bit. The back of the top is notched out 1/2 in. by 4-1/2 in. to allow for the hanger on the back of the case.

On the original, the top and bottom were merely nailed onto the sides. I use long, thin screws and plugs. Another alternative is dowels. I once had a student who attempted to use sliding dovetails, only to discover that they lasted from 12 until noon. With only 9/16 in. of overhang on the sides and part of that cut away by the rabbet, the remaining end grain is extremely fragile.

I prefer to use a false bottom and top, which not only make glue-up easier but also act as a doorstop in front and create rabbets to house the back. Glue the false top and bottom to the sides using butt joints. Once the glue dries, center the actual top and bottom on the case and screw them into the sides.



The false top and false bottom are simply butt-joined and glued to the sides. The actual top and bottom will reinforce this joint. Before the glue sets, check to make sure the case is level and square.



The top is screwed straight into the sides, then plugged and trimmed flush.



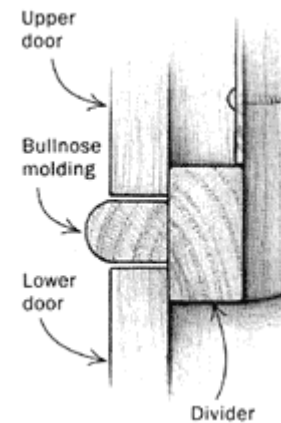
The back is screwed only near the center. The edges are then nailed into place, allowing for seasonal movement.

The clock back simply butts up against the false top and bottom and is screwed into place from behind. However, this is where wood movement comes into play. The back is about 9-1/2 in. wide, which means that a piece of flatsawn cherry will move about 5/32 in. (from 6% moisture content in winter to 13% moisture content in summer). If you can locate or glue up a quartersawn back, the amount of movement is cut in half, to 5/64 in. So, if you're building in the summer, when the back has reached a moisture content of near 12% or 13%, the back can be fitted tightly. In the winter, when the moisture content of the back is closer to 6%, a gap of just under 3/64 in. is required on each side. Also, leave a small gap where the half-round hanger protrudes through the top.

Another change I make is to increase the size of the hanger hole, from 1/2 in. to 1-1/8 in., to allow the clock to be hung on a Shaker peg. The back is merely nailed into place, with a dab of glue in the center to ensure that wood movement is equal in both directions.



The horizontal divider is sized to act as a doorstop for both doors. It is set into the stopped rabbet that holds the clock face.



Bullnose molding separates top and bottom doors. Shape the profile using a roundover bit, then cut it to fit flush with the sides.

Next, let in the two-piece molded divider between the top and bottom doors. A horizontal divider, which also acts as a doorstop, is set into the rabbet flush with the face, and then a bullnose molding is glued over it.

At this point it pays to plan ahead. Measure the depth of the movement to check that you have proper clearance for both the shaft and the glass of the door. Mechanical movements are either attached directly to the back -- as I've done -- or sit on a shelf. Quartz movements, being much shallower, are usually attached to the dial. If you use a spacer, the movement can also be attached to the case back. Planning ahead allows you to position the dial so that the hand shaft is close to the glass but does not touch it. Once you've established the location of the dial, glue two vertical filler strips to the inside of the case. Thick metal dials like the one I used can be screwed to these strips directly, while thin metal or paper dials should be adhered to 1/4-in.-thick plywood backings.

Simple joinery for the doors

The doors are relatively straightforward, mortised and tenoned at each corner. Cut haunched mortise-and-tenon joints on center, and make sure to offset the glass and panel grooves to allow room for the thumbnail profile along the fronts. The frames are 1/2 in. thick, and the bottom panel is only 3/16 in. thick. The 3/16-in. quarter-round moldings are added after the panel is in place. On the top door, add the quarter-round moldings to hold the glass on the outside, and add 3/16-in. glass supports, nailed from the inside, to hold the back of the glass.



The quarter-round molding is shaped on the router, then mitered to fit the door. Becksvoort simply glues the molding to the rails and the stiles.



After the glass is set into the rabbet, small glass supports are nailed into place.



Before applying glue, carefully dry-fit the doors and see that they fit the case.

As far as a finish goes, I am partial to Tried & True Varnish Oil. It leaves a silky, penetrating finish that I prefer. More accurate for this clock would be a shellac finish, which was used on the original.

When hanging the clock from a peg board, carve a 1/2-in. flat spot at the top of the peg where it meets the hanger, leaving a slight ridge, to keep the clock from sliding forward on the peg. If the peg board is 3/4 in. thick, use a 3/4-in. spacer behind and near the bottom of the clock. A toggle bolt or similar anchor will attach the spacer to drywall or plaster if there is no stud nearby. Once the clock is perfectly plumb and running smoothly, drill a hole through the back into the spacer and anchor the clock with a screw. This keeps it from shifting during winding or an accidental bump.

91

GREEK KEY DESK

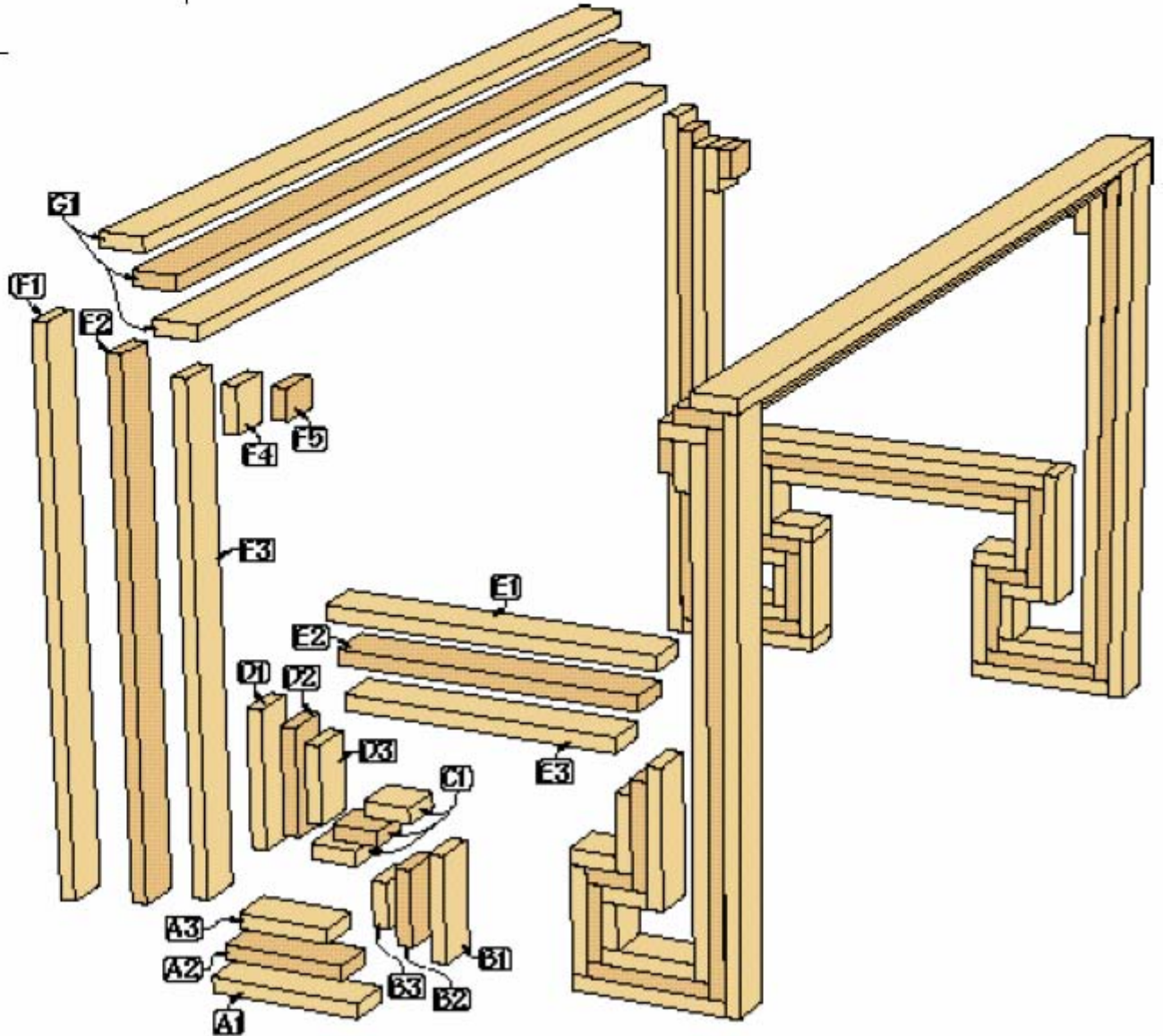


Schedule of Materials:

Greek Key Desk

No.	Item	Dimensions T W L
4	A1	3/4" x 2 1/4" x 7 1/2"
4	A2 (*all)	3/4" x 2 1/4" x 6"
4	A3	3/4" x 2 1/4" x 4 1/2"
4	B1	3/4" x 2 1/4" x 5 1/4"
4	B2 (*all)	3/4" x 2 1/4" x 3 3/4"
4	B3	3/4" x 2 1/4" x 2 1/4"
12	C1 (*4)	3/4" x 2 1/4" x 2 1/4"
4	D1	3/4" x 2 1/4" x 6 3/4"
4	D2 (*all)	3/4" x 2 1/4" x 5 1/4"
4	D3	3/4" x 2 1/4" x 3 3/4"
2	E1	3/4" x 2 1/4" x 16 1/2"
2	E2 (*all)	3/4" x 2 1/4" x 15"
2	E3	3/4" x 2 1/4" x 13 1/2"
4	F1	3/4" x 2 1/4" x 27 3/4"
4	F2 (*all)	3/4" x 2 1/4" x 26 1/4"
4	F3	3/4" x 2 1/4" x 24 3/4"
4	F4	3/4" x 2 1/4" x 2 1/4"
4	F5 (*all)	3/4" x 2 1/4" x 1 1/2"
6	G1 (*2)	3/4" x 2 1/4" x 48"

*Indicate darker wood pieces



The desk is constructed by laminating strips of wood together. By making some of the layers shorter than others, you make the joints for attaching that lamination to another. As a result, all of the materials for this project must be machined precisely. Any variances will show up as gaps in the joints after final assembly.

Tricks to Dead-on Components

There are two tricks to make sure your pieces are all the right size and won't slide around when you glue them up. First, when cutting out the pieces for this desk, I found it easier to cut them grouped by letters, such as A1, A2, A3. A1 is the longest piece, A2 is 1½" shorter, and A3 is 3" shorter than A1. Because all of the desk's components are stepped like this, I came up with a quick way to make these cuts. Cut the longest piece first using a stopblock on the fence of your table saw's sled or miter gauge. Then take two scrap pieces of ¾"-thick wood from the project and glue them together to form a 1½"-thick spacer. Hold this piece against the stop block to cut the second piece. Then make a second spacer using two more scraps and use both spacers to cut the third piece. This method makes the desk components perfectly sized. Cut out all your pieces, then get ready to glue them up.

To keep your pieces from sliding around during gluing, make a jig from two pieces of melamine-faced particleboard put together lengthwise at a right angle to create a straight fence. Then put a small piece of wood on the end of the jig to act as a stop. This gives you a square corner to work out of.

On to Assembly

Start by gluing the E pieces and two sets of the D pieces together to form a shallow "U." (When gluing these step-mitered joints, I found it best to use polyurethane glue. It provides a strong bond for this type of joint.) I dry-fit all the parts to be sure I would be able to get all the pieces to come together tightly. After applying the glue, clamp the length of the E pieces first. By using ¾" spacers at the ends of the D parts, applying even clamping pressure is easy on the lengths of the D parts. Make two of these assemblies.

The next assembly consists of the C, B and A parts. The glue-up of this assembly is done the same way as the E and D assembly. Make four of these assemblies.

Next glue one of the E and D assemblies and two of the ABC assemblies together to form the Greek key part of the end assembly. I had to clean the glue squeeze-out at the joints and pare the wood down in a couple places with a chisel to get a tight fit. If your pieces don't come together tightly, your joints will not be strong.

For the next assembly, put two glue-up jigs at a right angle. This makes the glue-up of the two legs (F) to the Greek key assembly easy to keep square.

Glue the F4 and F5 pieces to the tops of each leg. Use a stop block to keep the pieces even with the end of the F3 piece of each leg.

The G pieces attach the two end assemblies together. It is easier to control gluing and alignment of the G1 pieces if they are glued into place one at a time, starting at the bottom and working up.

Sanding and Finishing

I used a random orbital sander, going up to 150 grit sandpaper. Break all the sharp edges with a sanding block using 150 grit sandpaper. For a top coat, I applied three coats of a clear finish.

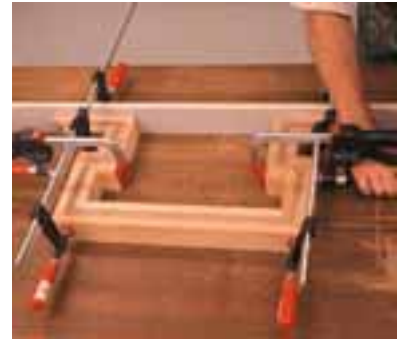
For the top I used a ½"-thick piece of 30" x 50" tempered glass polished on all edges. (To keep the glass from sliding around, I used corner bumpers applied to the top



Here I'm cutting the A2 piece with one of the spacers in place. To cut the A3 piece, use two of the spacer blocks.



Here I'm clamping the E and D pieces together. Use spacers on the ends of the D parts to hold them in place against your gluing jig.



This is where your parts start to look like something. Joining the three assemblies creates the Greek key at the bottom of the base.



When assembling the legs to the Greek key, I used a spacer (seen at the bottom of the photo above) to keep the legs spaced properly while gluing-up.

stretchers.) It wasn't until I completed this desk and had the glass top in place that I appreciated how striking it looked.



The stop block clamped at the end of the glue-up jig keeps the F4 and F5 pieces level with the top of the G3 piece.



Start by gluing G1 in place, then work your way up. As you can see in the photo, I clamped the entire leg to my assembly bench to make things easier.

PICNIC TABLE



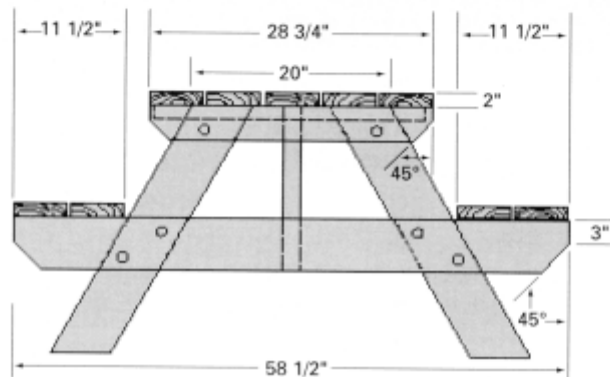
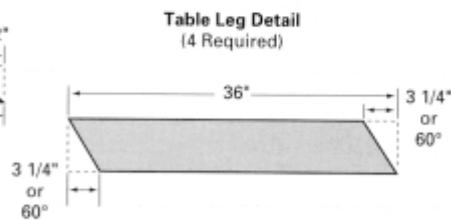
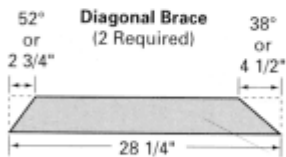
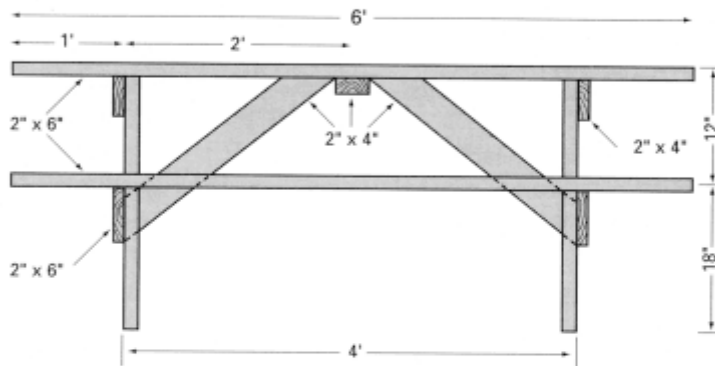
Picnic Table

Lumber

- ▲ Seat, Top, Legs: (6) 2" x 6" - 12'
- ▲ Seat Supports: (1) 2" x 6" - 10'
- ▲ Table Supports, Braces: (2) 2" x 4" - 10'

Hardware

- ▲ (12) Galvanized Carriage Bolts: 3/8" x 3 1/2"
- ▲ (12) 3/8" Flat Washers
- ▲ 2 1/2" Galvanized Nails as required



CHATAHOOCHEE CHAIR

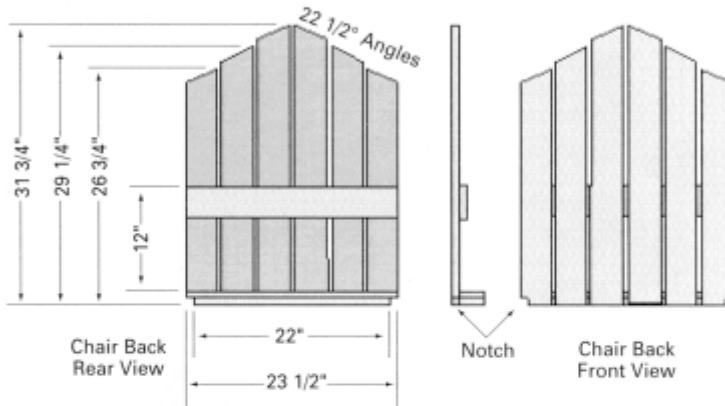


Chattahoochee Chair

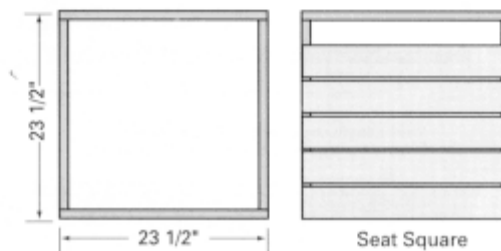
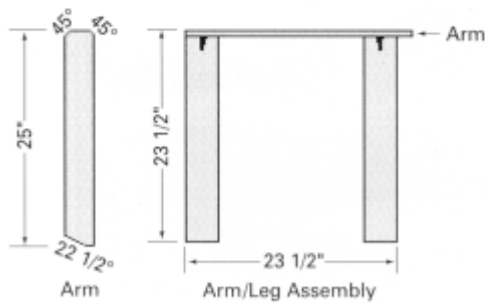
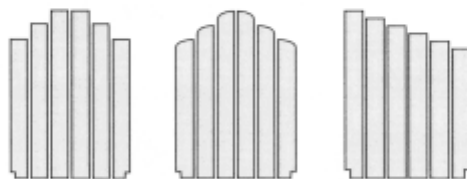
Lumber

- ▲ (7) 1" x 4" - 8' [4' waste]
- or
- ▲ (5) 1" x 4" - 8' and
- ▲ (1) 1" x 4" - 12' [4' waste]

Hardware as required



Chair Back Variations



PLANTER BENCH



Planter Bench

Lumber

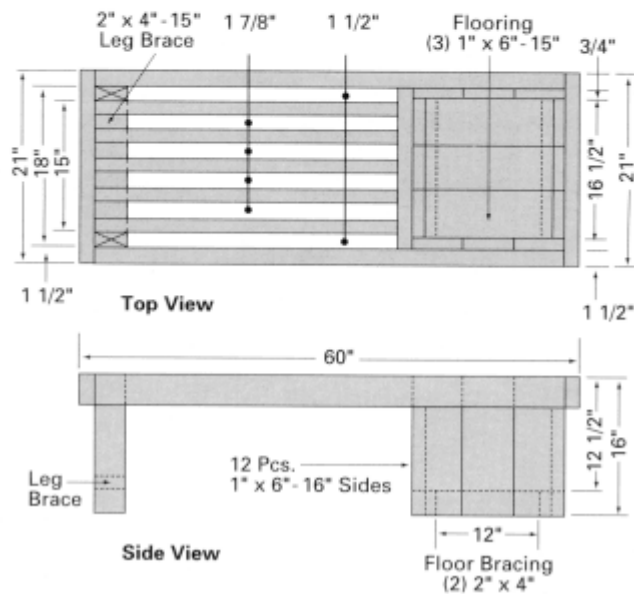
▲ (6) 2" x 4" - 8'

▲ (3) 1" x 6" - 8'

Hardware

▲ 6d Galvanized Nails as required

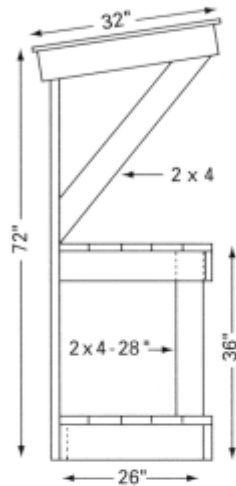
▲ 16d Galvanized Nails as required



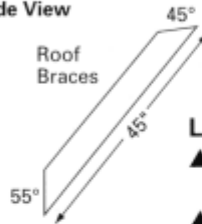
GARDEN WORK BENCH



Garden Work Bench



Side View

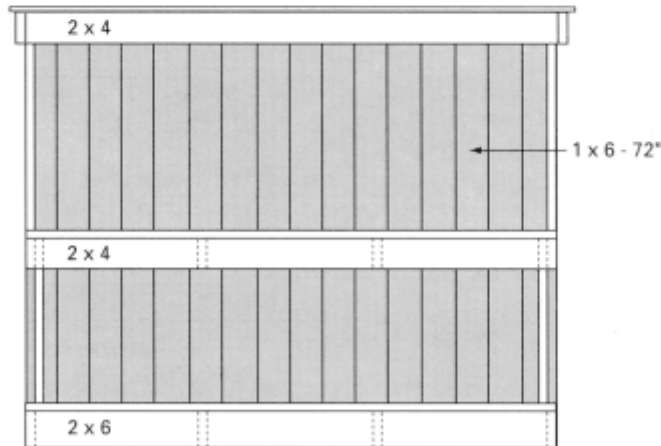


Roof Braces

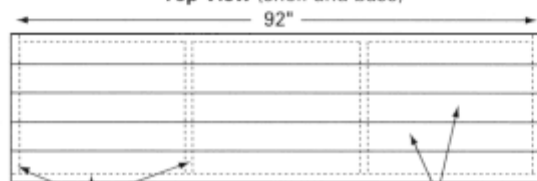
Lumber

- ▲ (1) 4'x8'- 1/2" Plywood
 - ▲ (3) 2"x4"- 8'
 - ▲ (3) 2"x4"- 12'
 - ▲ (5) 2"x6"- 8'
 - ▲ (2) 2"x6"- 12'
 - ▲ (5) 1"x6"- 8'
 - ▲ (8) 1"x6"- 12'
- Choice of Roof Covering
Hardware as required

Front View



Top View (shelf and base)



Base frame 2 x 6s
Shelf frame 2 x 4s

Base 2 x 6s
Shelf 1 x 6s

PLANTER BOX



Planter Box

(2) 2" x 4" - 63"
2' x 4' Lattice

Lumber

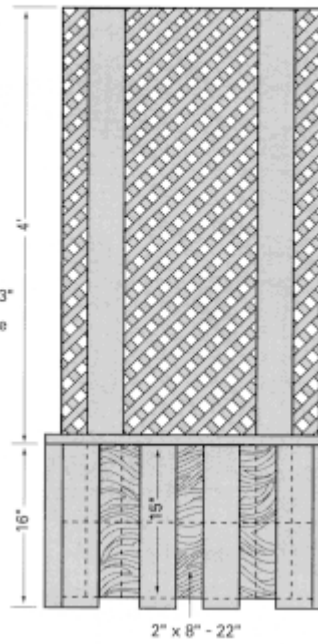
- ▲ Base, Top Trim, Sides:
(3) 2" x 4" - 12'
- ▲ Sides: (2) 2" x 4" - 8'
- ▲ Sides: (2) 2" x 8" - 8'

Hardware / Nails

- ▲ Base to Floor: 3" galvanized as required
- ▲ Sides 2" x 4" to 2" x 8": 2 1/2" galvanized as required
- ▲ Sides 2" x 8" to 2" x 8": 3" galvanized as required

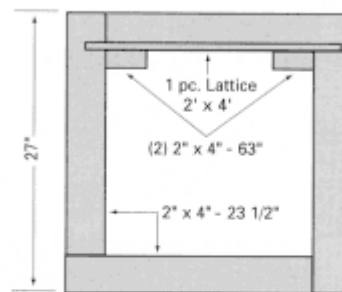
Optional Lattice Work

- ▲ (1) 2' x 4' Lattice
- ▲ (2) 2" x 4" - 63"
- [(1) 2" x 4" - 12']

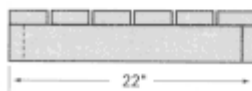
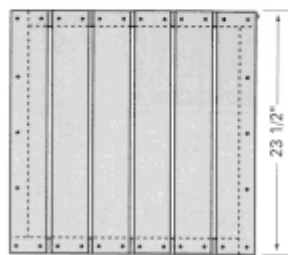


Box Front View

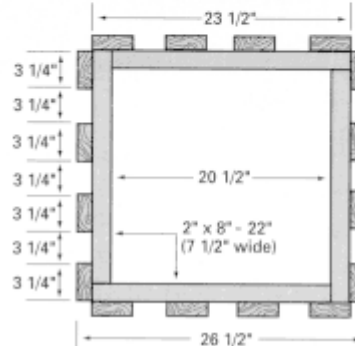
Top Trim



Base Top View



Base End View



Box Top View

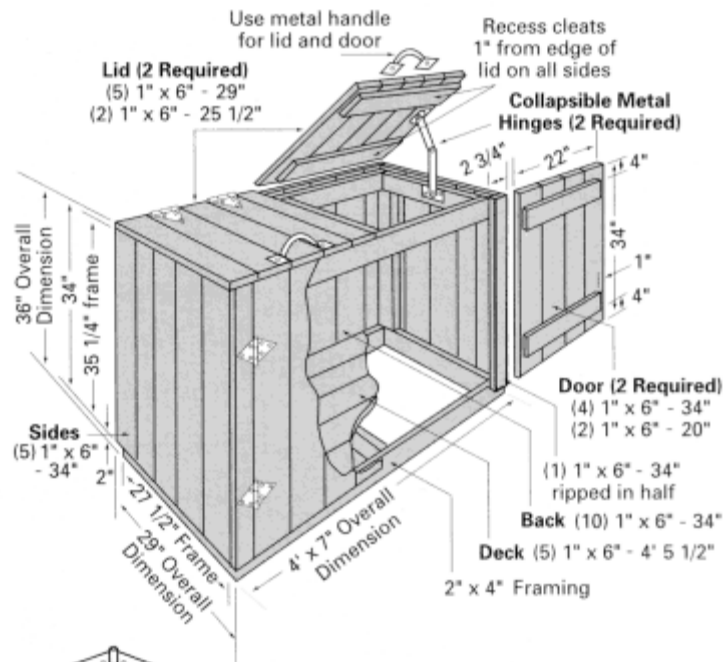
STORAGE AND TRASH CAN BIN



Storage and Trash Can Bin

Lumber

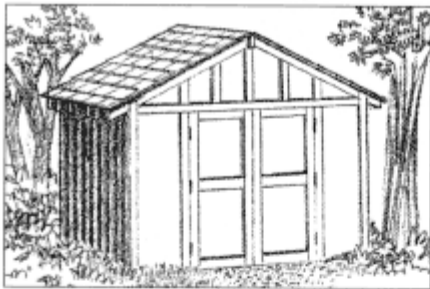
- ▲ Frame: (2) 2"x 4" - 14'
- ▲ Front, Back, Sides, Deck, Lids and Doors:
 - (20) 1"x 6" - 6'
 - (2) 1"x 6" - 8'
 - (3) 1"x 6" - 10'



Hardware

- ▲ Frame to Frame: 2" Nails as required
- ▲ All other 1" material: 1 1/2" Nails as required
- ▲ Lids: 2 pr. 5" Strap Hinges
 (2) 5" Handles
- ▲ Doors: 2 pr. 2" Strap Hinges
 (2) 5" Handles
- ▲ (1) Small Gate Latch

STORAGE SHED



Storage Shed

SHED Lumber

- Framing:**
- ▲ (44) 2" x 4" - 8'
 - ▲ (11) 2" x 4" - 10'
 - ▲ (5) 2" x 4" - 12'
- Ridge Beam:**
- ▲ (1) 2" x 6" - 14'
- Door Trim:**
- ▲ (1) 1" x 4" - 8'
 - ▲ (4) 1" x 4" - 10'
- Doorway and Gable End Batten:**
- ▲ (8) 1" x 4" - 8'
 - ▲ (2) 1" x 4" - 6'

Batten Trim:

- ▲ (2) 1" x 4" - 10'
- ▲ (2) 1" x 4" - 12'
- ▲ (36) 1" x 4" - 8'

Wall, Roof, Door and Gable End Covering:
20 sheets 4' x 8' x 1/2" Exterior Plywood

Hardware and Other Materials

- ▲ 3d, 6d, 10d and 20d Nails as required
- ▲ Steel 'T' Door Hinges: 3 pr.
- ▲ Safety Hasp: 1 pc.
- ▲ Shingles: Sufficient amount for 170 sq. ft. Roof Area plus 13 ft. of Ridge and 26 ft. of Eaves

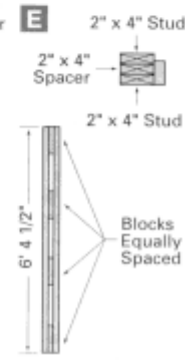
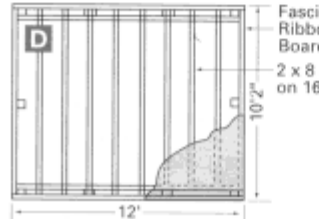
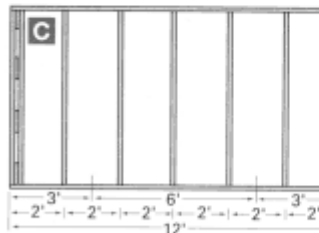
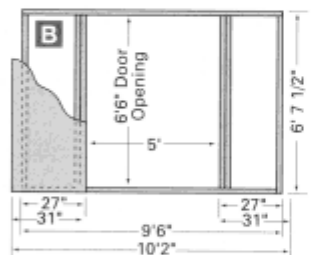
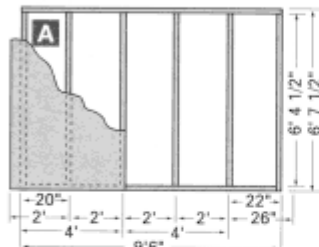
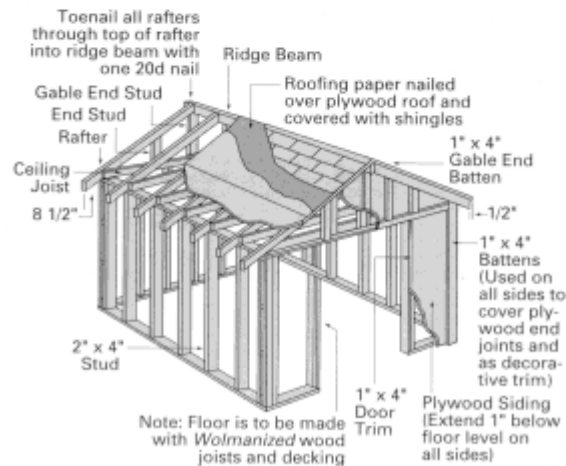
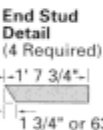
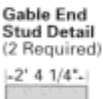
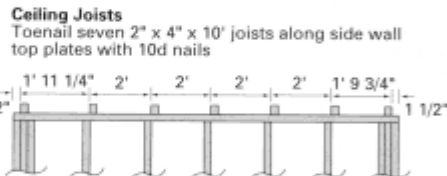
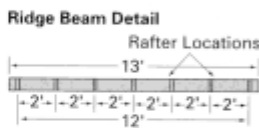
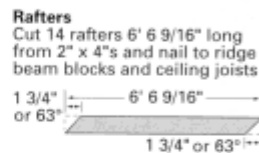
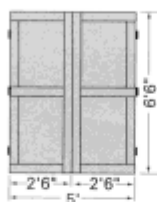
- ▲ Asphalt Roofing Paper: 2 rolls
- ▲ 7/16" Roofing Nails as required

FLOOR Lumber

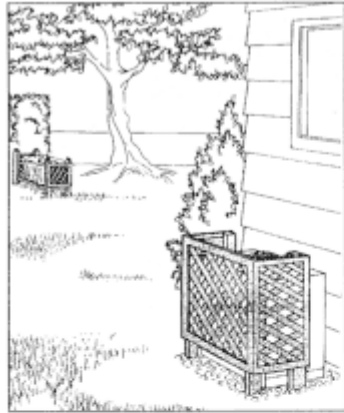
- ▲ (12) 4" x 4" - 4' Main Support Posts (length may vary according to terrain)
- ▲ (4) 2" x 8" - 12' Header Boards
- ▲ (2) 2" x 8" - 12' Fascia Ribbon Boards
- ▲ (2) 2" x 8" - 10' Fascia Ribbon Boards
- ▲ (8) 2" x 8" - 10' Joists
- ▲ (22) 5/4" x 6" - 12' Floor Decking

- A. Rear Wall Framing
- B. Front Wall Framing
- C. Side Wall Framing
- D. Floor Decking
- E. Corner Post Assembly and Top View

Doors
Cut Double Doors from 2 sheets of 1/2" Wolmanized plywood and attach 1" x 4" Wolmanized trim as shown



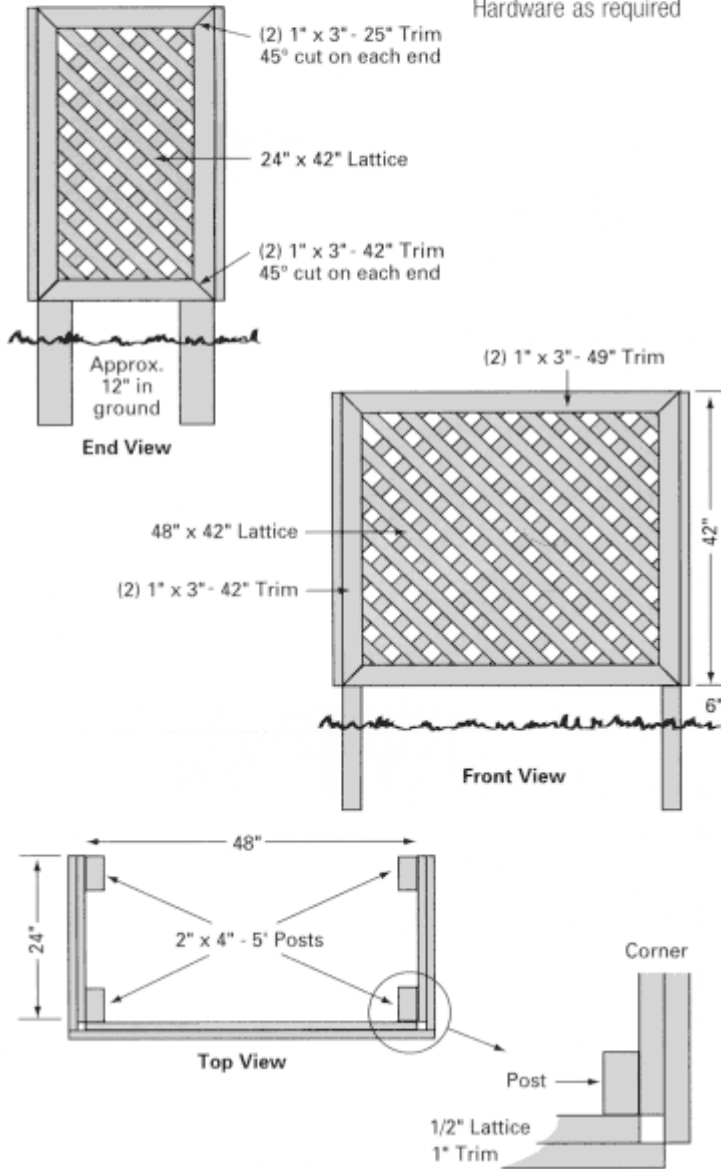
UTILITY SCREEN



Utility Screen

Lumber

- ▲ (4) 2" x 4" - 5' Posts
[2 pcs. 2" x 4" - 10']
 - ▲ (1) 4' x 4' Lattice*
 - ▲ (2) 2' x 4' Lattice*
 - ▲ (1) 1" x 3" - 49" **
 - ▲ (6) 1" x 3" - 42" **
 - ▲ (4) 1" x 3" - 25" **
- [* 1 pc. 4' x 8' Lattice]
[** 3 pcs. 1" x 6" - 8']
Hardware as required



BATHROOM TOWEL RACK

Wood Selection

The two basic categories of wood used most often in wood working projects are hardwood and softwood. Hardwood is more durable and less prone to dents and scratches. It is also more expensive but will finish to a better advantage. Soft woods, like pine, are more prone to dents and scratches and do not have the durability of hardwood. Softwoods are much less expensive and easier to find.

Ask your lumber supplier to show you "Class 1 " or "Select Grade" lumber. Make sure it is properly dried, straight, and free of knots and defects. (It may be impossible to be completely free of defects but be sure you understand how to cut around these.)

Ask your Lumber supplier for assistance when purchasing your wood. Similar to laying a pattern out on a piece of cloth, often you can cut several different pieces of the same thickness of wood out of a single piece. It is a good idea to add up the total number of board feet, being careful to make sure you group short pieces in a board with long pieces to minimize waste.

This project could be built out of scrap wood already in your workshop. If you choose to use new stock from the lumber yard, both hardwoods and softwood are good choices.

Note: Developing a good relationship with Your lumber suppliers is important. They can help guide you in making material selections as well as making special orders for a type of wood you may desire for a project.

Now that you have reviewed safety hints, learned the mistakes to avoid, reviewed the basic components and gathered your tools and materials for your projects - you are ready to BEGIN!

Steps to follow:

1. Cut the wood to size
2. Cut the dados for the shelves
3. Band saw the design
4. Drill holes for the rack or racks. (Depending on the size of your sides you can have one or two towel bars)
5. Assemble the bathroom rack

Cut the Wood to Size

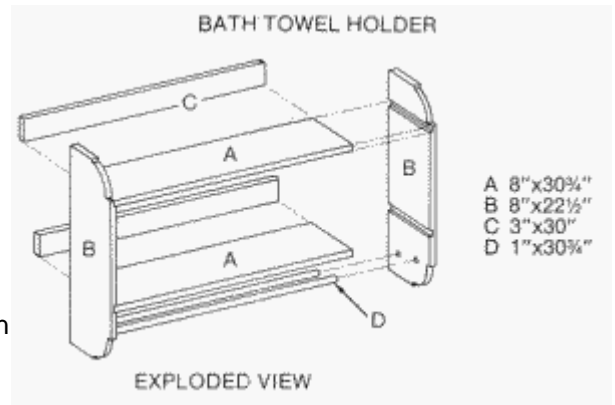
For this project you will need two shelves, and the backs for the shelves. Wood from a lumber yard may not be square so square the ends before cutting the stock.

1. Crosscut the stock to length using a table saw with a stop block. Guide the wood through with the miter gauge. Note: Do not use a miter gauge with the rip fence as it may cause the wood to bind.
2. Rip the stock. Measure from the rip fence to the inside of the blade so that the cut is made on the scrap side of the wood and is the proper dimension.

Cut the Dadoes for the Shelves

Check your plans for the exact location of the dado cuts.

1. Use a table saw with a dado set to make the cuts. A miter gauge with an extension fence and stop block will assure an accurate cut. A router with a guide board clamped at the correct distance can also be used to make the dado cuts. Note: Always start the router away from the wood and ease it up after the bit is on speed to make a clean cut.



Cutting the Curve

1. Measure and mark the wood for the design that you wish to make. The one shown is two straight lines using a coffee can top to join the ends of the marks.
2. Using a band saw or a jig saw, cut the two straight marks first, then on the waste side of the curve, cut in and make short curved cut first, then going slowly cut the long side of the curve.
3. Repeat this process on the other ends.

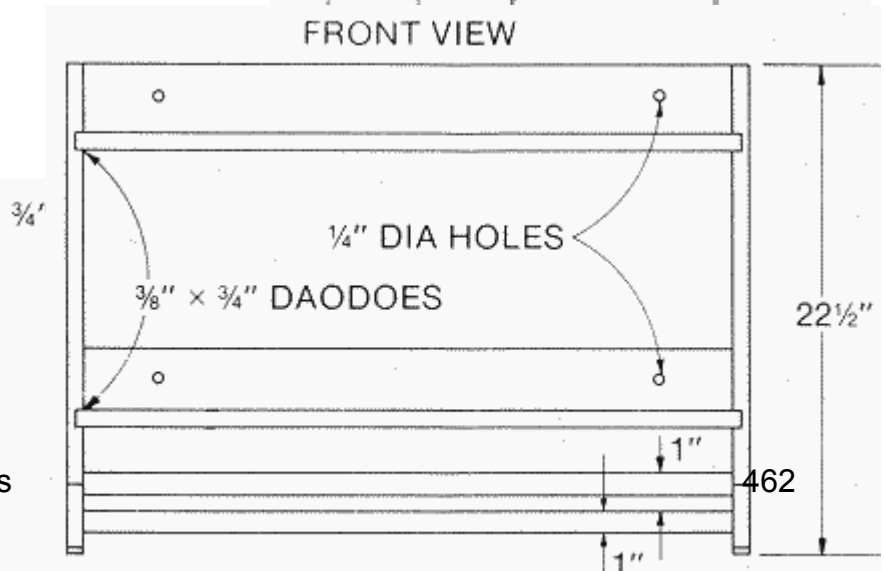
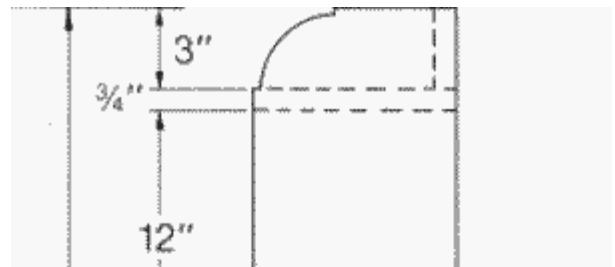
Drill the Holes for the Towel Rods

Use a drill or a drill press to make the holes.

1. Measure according to the plans for the hole locations and mark them.
2. Set the depth for the hole to be drilled. A depth gauge can be made with a piece of tape wrapped around the bit if you are not using a stationary tool.
3. Drill the holes for the towel bar.

Assemble the Bathroom Rack

1. Sand the pieces before assembling.
2. Assemble the unit dry to check for proper fit.
3. Apply wood glue to all edges and rod ends. Then use clamps to hold tight while drying.
4. Apply finishing nails while drying for additional strength.
5. Sand the rack and apply the finish you have selected according to the manufacturers instruction. There are helpful hints on finishing at the end of this pamphlet.



BANDSAW BOX

Materials

Wood Selection

The two basic categories of wood used most often in wood working projects are hardwood and softwood. Hardwood is more durable and less prone to dents and scratches. It is also more expensive but will finish to a better advantage. Soft woods, like pine, are more prone to dents and scratches and do not have the durability of hardwood. Softwoods are much less expensive and easier to find.

Ask your lumber supplier to show you "Class 1 " or "Select Grade" lumber. Make sure it is properly dried, straight, and free of knots and defects. (It may be impossible to be completely free of defects but be sure you understand how to cut around these.)

Ask your Lumber supplier for assistance when purchasing your wood. Similar to laying a pattern out on a piece of cloth, often you can cut several different pieces of the same thickness of wood out of a single piece. It is a good idea to add up the total number of board feet, being careful to make sure you group short pieces in a board with long pieces to minimize waste.

This project could be built out of scrap wood already in your workshop. If you choose to use new stock from the lumber yard, both hardwoods and softwood are good choices.

Note: Developing a good relationship with Your lumber suppliers is important. They can help guide you in making material selections as well as making special orders for a type of wood you may desire for a project.

Now that you have reviewed safety hints, learned the mistakes to avoid, reviewed the basic components and gathered your tools and materials for your projects - you are ready to BEGIN!

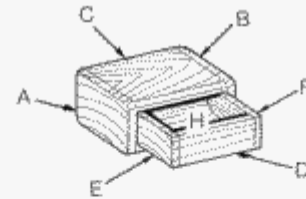
Steps to Follow:

For this project you can use scrap pieces of wood from other projects or a solid block of wood to create a beautiful box. The steps to follow for this project are:

1. Laminate the pieces of wood (if not using a solid block).
2. Cut the block to size.
3. Make the drawers.
4. Finish sand the drawers and carcass.

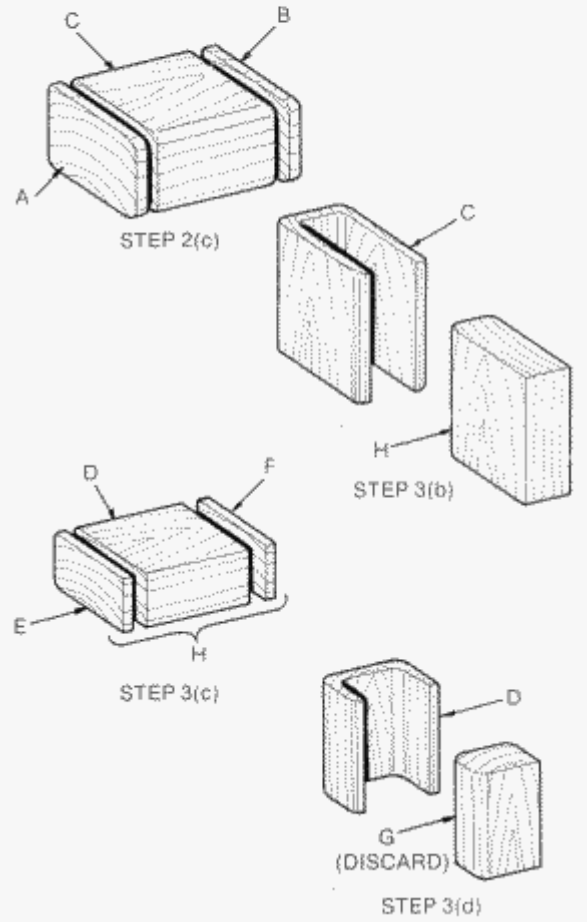
Laminate the Scrap Pieces of Wood

1. Stack scrap wood of approximate width and length together for a stack that can be cut by your band saw blade.
2. Use wood glue on the inside pieces of the stack and clamp together and set over night to dry. Alternating the grains is a nice touch depending on the wood scraps that you are using.



Cutting the Sides (A & B)

1. Using a ¼" width band saw blade cut the block to size. A ¼" blade will be used for all the following cuts because it will provide a tighter fit for the drawers and a neater cut.
2. Mark the sides of the box, a "V" will do so that later when you glue the box you know which side belongs where.
3. Using the band saw cut the sides off being careful to make the cuts straight and accurate for later assembling of the box. The tape makes this cut at ½" into the solid wood.



Making the Drawers

1. On the center block (C) mark the interior of the box for your drawer. Make the corners rounded so that the band saw will not bind when making the cut.
2. Cut out the drawer (H) making sure to go slowly and stay on the scrap side of the mark.
3. Cut off the sides of the drawers (E&F) being careful to mark their proper location for gluing later.
4. Cut the interior of the drawer out, again being careful to round the turns so that the band saw does not bind.
5. Sand lightly all the pieces before gluing on the sides.
6. F. Glue the sides on the carcass and the drawers. Use clamps to hold tight till the glue dries, over night is suggested.

Finish Sanding the Drawers and Carcass

1. Using a belt sander finish sand the carcass. This can be used to round the edges as well as smooth the glue joints on the carcass.
2. The belt sander and fine sand paper can finish the drawer. Make sure that as you sand, check the drawer often for smooth opening and closing.

CUTTING BOARD

Materials

Wood Selection

The two basic categories of wood used most often in wood working projects are hardwood and softwood. Hardwood is more durable and less prone to dents and scratches. It is also more expensive but will finish to a better advantage. Soft woods, like pine, are more prone to dents and scratches and do not have the durability of hardwood. Softwoods are much less expensive and easier to find.

Ask your lumber supplier to show you "Class 1 " or "Select Grade" lumber. Make sure it is properly dried, straight, and free of knots and defects. (It may be impossible to be completely free of defects but be sure you understand how to cut around these.)

Ask your Lumber supplier for assistance when purchasing your wood. Similar to laying a pattern out on a piece of cloth, often you can cut several different pieces of the same thickness of wood out of a single piece. It is a good idea to add up the total number of board feet, being careful to make sure you group short pieces in a board with long pieces to minimize waste.

This project could be built out of scrap wood already in your workshop. If you choose to use new stock from the lumber yard, both hardwoods and softwood are good choices.

Note: Developing a good relationship with Your lumber suppliers is important. They can help guide you in making material selections as well as making special orders for a type of wood you may desire for a project.

Now that you have reviewed safety hints, learned the mistakes to avoid, reviewed the basic components and gathered your tools and materials for your projects - you are ready to BEGIN!

These are the steps to follow for the cutting board:

1. Cut the stock
2. Laminate the boards
3. Finish the board

Cut the Stock

1. The block thickness is determined by the width you cut the individual pieces. Example: For a block to be 1 1/4" thick you will cut the stock 1" wide because of the lamination process which will group the boards together.

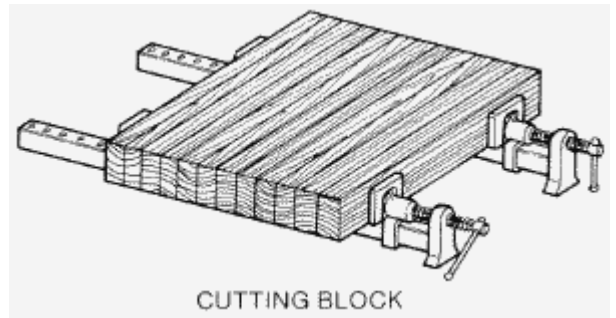
2. Cut the stock a little longer than you wish the length of the cutting board to be. You will cut the board to the finished side after it has been laminated and sanded.

Laminating the Stock

1. Use resorcinol glue on both sides of the stock to glue them together. Resorcinol glue is water proof and will provide stability if the board is soaked in water.
2. After gluing, clamp the boards together and let dry overnight.
3. Scrub off extra glue before it dries to prevent chipping the cuffing blades when finishing and shaping.

Finishing the Cutting Board

1. • After the board dries, take out of the clamps and use a belt sander to smooth the top and bottom surfaces.
2. Using a table saw or circular saw, cut the board to length. If using a table saw be sure that the cutting blade does not exceed 1/4" above the cutting board to prevent drag.
3. Using a shaper or router put around over edge on the top surface of the cutting board. Be careful to follow the guidelines reviewed in the tape.
4. Use a non-toxic finish such as mineral oil or a salad bowl finish for this project.



CASSETTE HOLDER

Materials

Wood Selection

The two basic categories of wood used most often in wood working projects are hardwood and softwood. Hardwood is more durable and less prone to dents and scratches. It is also more expensive but will finish to a better advantage. Soft woods, like pine, are more prone to dents and scratches and do not have the durability of hardwood. Softwoods are much less expensive and easier to find.

Ask your lumber supplier to show you "Class 1 " or "Select Grade" lumber. Make sure it is properly dried, straight, and free of knots and defects. (It may be impossible to be completely free of defects but be sure you understand how to cut around these.)

Ask your Lumber supplier for assistance when purchasing your wood. Similar to laying a pattern out on a piece of cloth, often you can cut several different pieces of the same thickness of wood out of a single piece. It is a good idea to add up the total number of board feet, being careful to make sure you group short pieces in a board with long pieces to minimize waste.

This project could be built out of scrap wood already in your workshop. If you choose to use new stock from the lumber yard, both hardwoods and softwood are good choices.

Note: Developing a good relationship with Your lumber suppliers is important. They can help guide you in making material selections as well as making special orders for a type of wood you may desire for a project.

Now that you have reviewed safety hints, learned the mistakes to avoid, reviewed the basic components and gathered your tools and materials for your projects - you are ready to BEGIN!

Steps to follow:



1. Cut the wood to size.
2. Cut the dados for the shelves.
3. Bevel the shelves.
4. Drill holes for the rods. (Depending on the size of your sides you can have one or two sets of rods.)
5. Assemble the cassette holder.

Cut the Wood to Size

For this project there are two sides, two shelves, and rods. Wood from a lumber yard may not be square so square the ends before cutting the stock.

1. Crosscut the stock using a table saw with a stop block. Note: do not cut the shelves at this time because of the bevel cuts to be made later. Guide the wood through with the miter gauge. Note: Do not use a miter gauge with the rip fence as it may cause the wood to bind.
2. Rip the stock. Measure from the rip fence to the inside of the blade so that the cut is made on the scrap side of the wood and is the proper dimension.

Cut the Dadoes for the Shelves

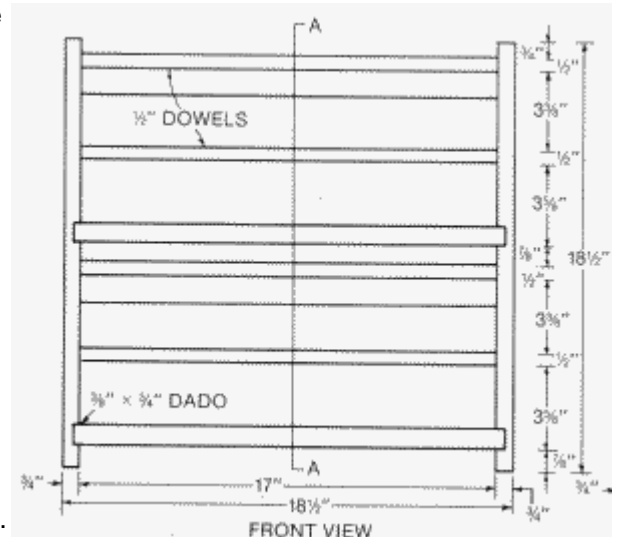
Check your plans for the exact location of the dado cuts.

1. The dadoes on this project are cut at a 45 degree angle. Use a table saw with a dado set to make the cuts. A miter gauge with an extension fence and stop block will assure an accurate cut. A router with a guide board clamped at the correct angle can also be used to make the dado cuts. Note: Always start the router away from the wood and ease it up after the bit is up to speed, to make a clean cut.

Bevel the Shelves

Tilt the table or the table saw blade at a 45 degree angle. A circular saw can be used for this step by tilting the guide and blade at a 45 degree angle.

1. If you are using a circular saw, clamp on a guide to assure accuracy.
2. Check to make sure the angle is correct, and cut the shelves.



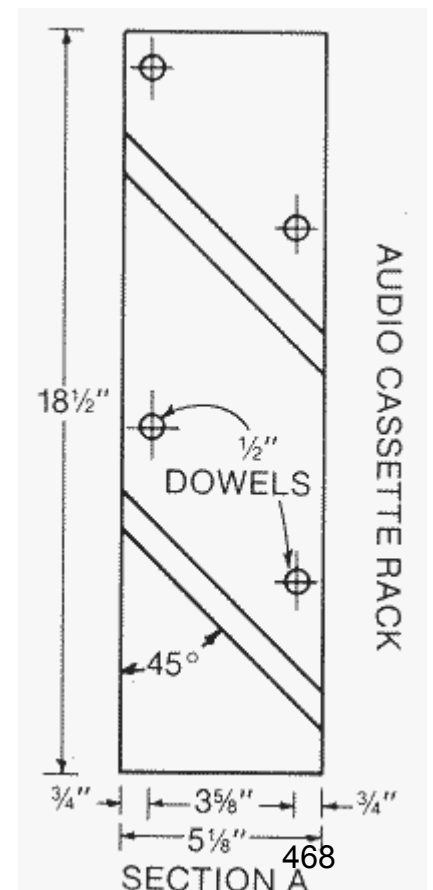
Drill the Holes for the Rods

Use a drill or a drill press to make the holes.

1. Measure according to the plans for the hole locations and mark them.
2. Set the depth for the hole to be drilled. A depth gauge can be made with a piece of tape wrapped around the bit if you are not using a stationary tool.
3. Drill the holes for the bars.

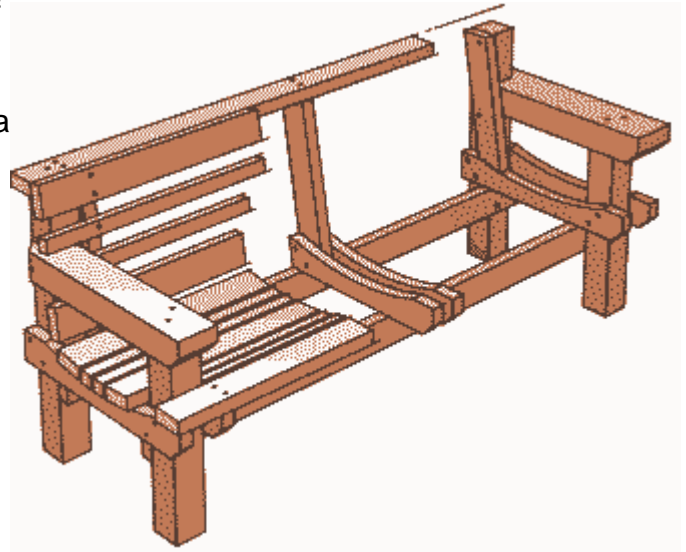
Assemble the Cassette Holder

1. Sand the pieces before assembling.
2. Assemble the unit dry to check for proper fit.
3. Apply wood glue to all edges and rod ends. Then use clamps to hold tight while drying.
4. Apply finishing nails while drying for additional strength.
5. Sand the rack and apply the finish you have selected according to the manufacturer's instructions. There are helpful hints on finishing at the end of this pamphlet.



BENCH SEAT

The clean, horizontal lines and rich redwood tones of this bench design reflect the simple beauty of Northern California. Comfortable and elegant with a gracefully curved seat and angled backrest, it offers a standing invitation to sit, relax and enjoy. This freestanding bench uses Construction Common or Deck Common redwood grades that have a pleasing mix of heartwood and sapwood. Where increased decay resistance is needed, use all-heartwood grades: Construction Heart or Deck Heart. Use only corrosion-resistant deck screws to prevent staining. Counter-sink and plug screw attachments.

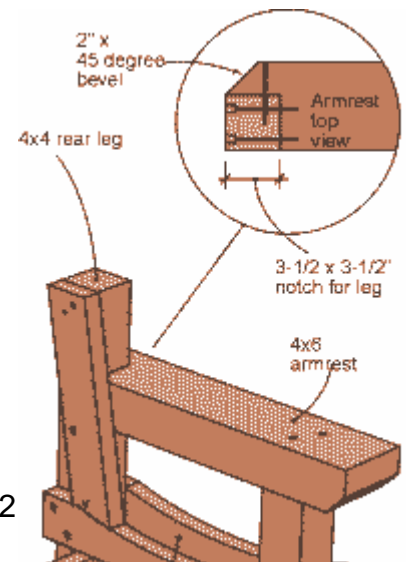


Materials for Benches

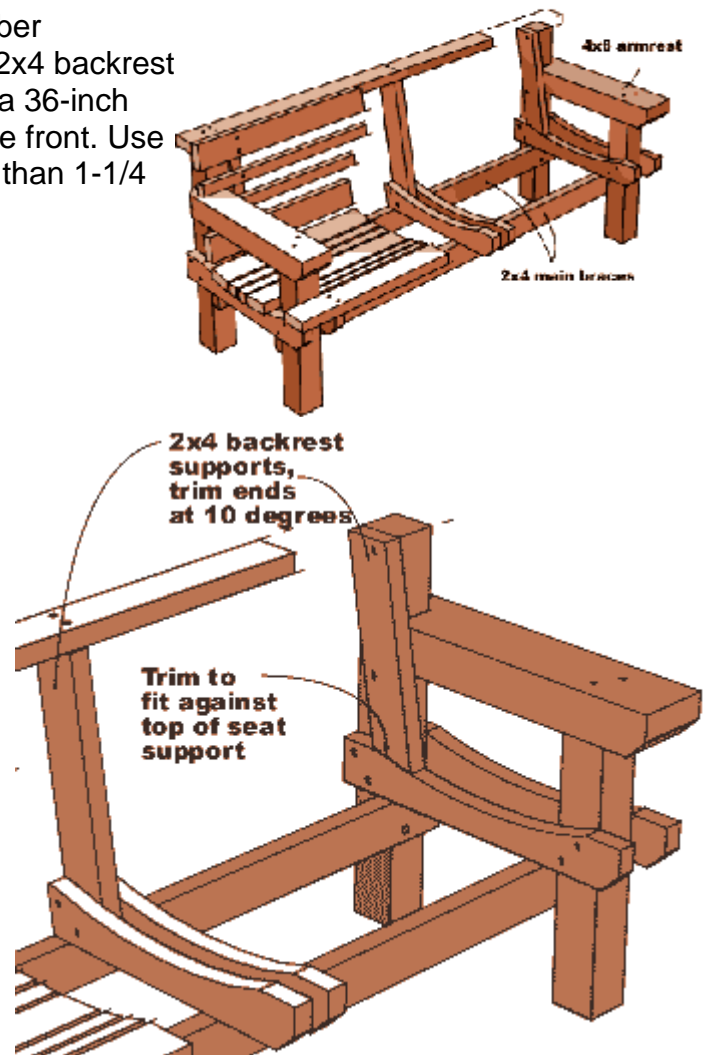
	Quantity	Size	Length
Top, Seat and Backrest Rails	6	2x4	6 feet
Seat and Backrest Rails	6	2x2	6 feet
Main Braces	2	2x4	5 foot 9 inches
Seat and Backrest Supports	9	2x4	26 inches
Front Legs	2	4x4	20-1/2 inches
Back Legs	2	4x4	30-1/2 inches
Armrests	2	4x6	26 inches
Deck Screws	1-1/2 pounds	3 and 4 inches	

Trim and Notch the Armrests

Start building the bench by trimming and notching the armrests. Trim the front end of each 4x6 armrest at a 45 degree angle, beginning 1-1/2 inches down from top. Notch the inside back of each armrest where it will wrap the rear leg. Finish with a 45 degree bevel cut. See armrest detail.



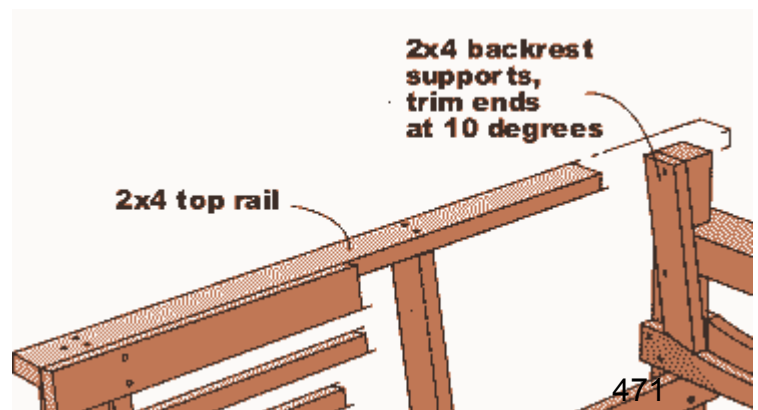
The curved seat supports are made up of 2x4 lumber sandwiching either the 4x4 rear legs or the single 2x4 backrest support. To shape the curve, make a template for a 36-inch radius cut. Mark the cut to start 3 inches in from the front. Use a bandsaw to cut the radius to a depth of no more than 1-1/4 inches.



Finish the seat supports with a 45 degree bevel cut to match the armrests. Note that the end and center seat supports differ slightly in length and attachments. End seat supports Trim four 2x4s to 25-1/2 inches. Attach the inside seat supports to the rear and front legs so they rest on the top edge of the 2x4 main braces. Attach the outside seat supports level with the inside ones.

Center Seat Supports

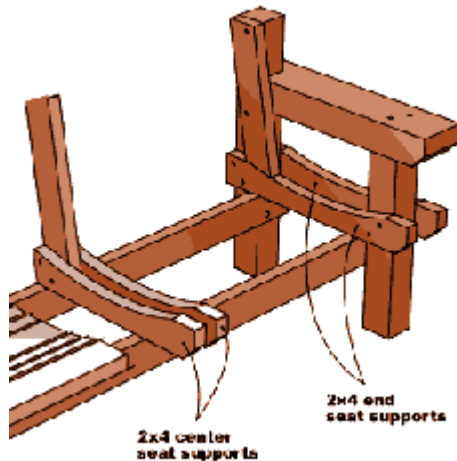
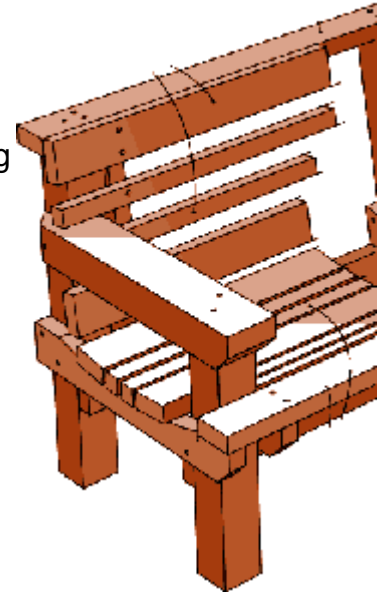
Trim the two center seat supports to 22 inches. Using a scrap piece of 2x4 as a temporary spacer for the backrest, attach these seat supports across the main braces flush with the back edge of the rear brace. Use two 3-inch screws for each joint, angled from below and inside. Remove the spacer.



Backrest Supports

Trim the 2x4 backrest supports to a 10 degree angle at the top edge. The two end backrest supports start at the top of the 4x4 rear leg and trim to rest on top of the seat supports.

The center backrest trims flush to the bottom edges of the two center seat supports. Attach the end backrest supports to the inside of the 4x4 rear leg with two screws. The bottoms should fit snugly to the top of the seat supports and can be secured with screws driven at an angle from below. You should install the top rail before trimming and attaching the center backrest.

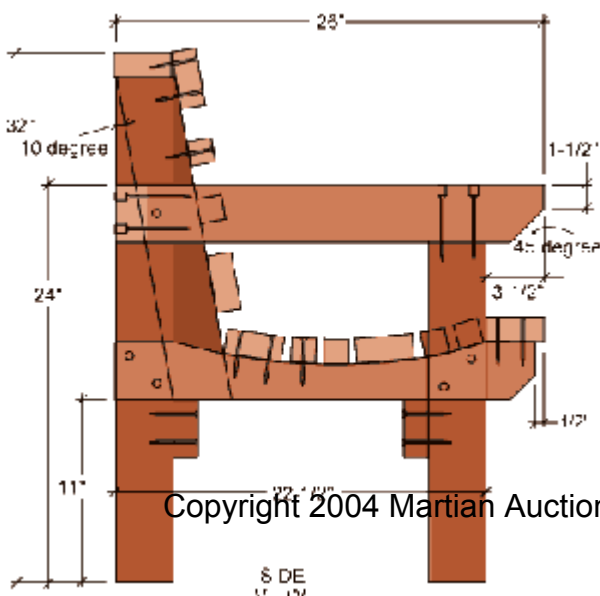


Top Rail

Attach the 2x4 top rail to the rear legs with three deck screws at each end. Measure and trim the center backrest. Install between the seat supports and flush to the underside of the top rail. Secure with screws.

Seat and Backrest Rails

Trim one 2x2 backrest rail to fit between the armrests. Trim the other 2x2 and 2x4 seat and backrest rails to six feet. Install the front seat rail so that it overlaps the seat support by 1/2 inch, and attach with two deck screws at each joint.



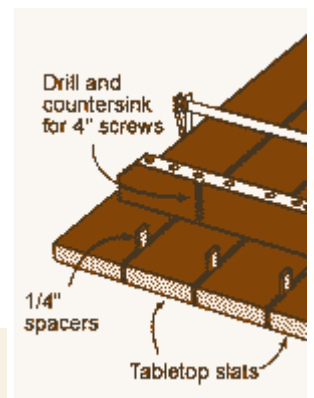
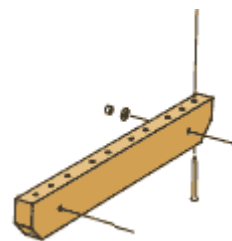
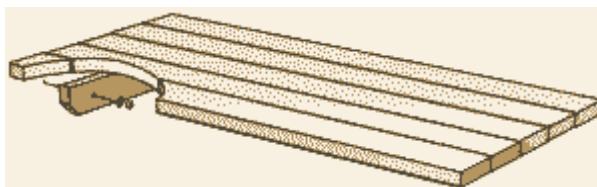
Attach the rear seat rail to each support with two deck screws. Adjust the spacing of the remaining seat rails before attaching. Space the backrest rails equally, and attach to supports with a single screw at each 2x2 and two screws at each 2x4.

105

PICNIC TABLE

An excellent weekend project, this easy-to-build picnic table will soon become the focal point of your backyard. Redwood's beauty and durability will ensure countless summers filled with barbecues, picnics and outdoor parties.

The economical, knotty redwood garden grades, such as Construction Common or Deck Common, are great choices for building your table. For maximum durability, choose Construction Heart or Deck Heart.

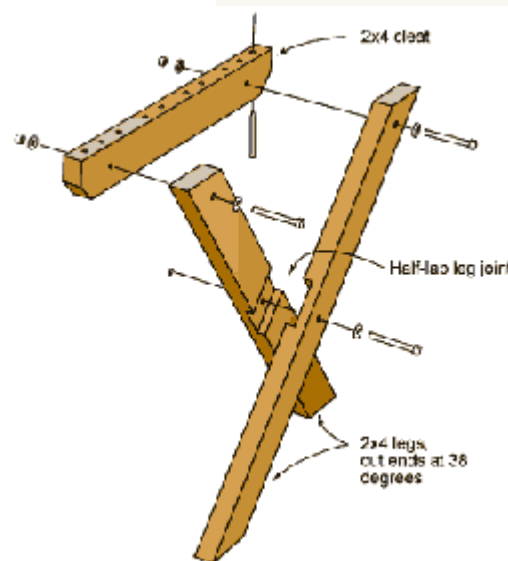
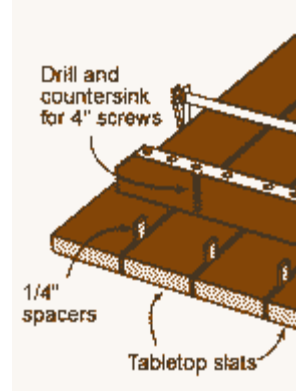


Materials for Table

	Quantity	Size	Length
Top Slats	5	2x6	60 inches
Cleats	2	2x4	27 inches
Legs	4	2x4	40 inches
Braces	2	2x4	30 inches
Machine Bolts, Washers and Nuts	6 sets	3-1/2 inches x 1/4 inch	
Deck Screws	1 pound	4 inches	

Build the Table Top

Measure and cut the 2x6 slats. Lay the slats on a clean and stable work surface with their most attractive sides down. Separate the slats with 1¼-inch spacers and square. Clamp the slats together with a bar clamp.



Fasten the Cleats

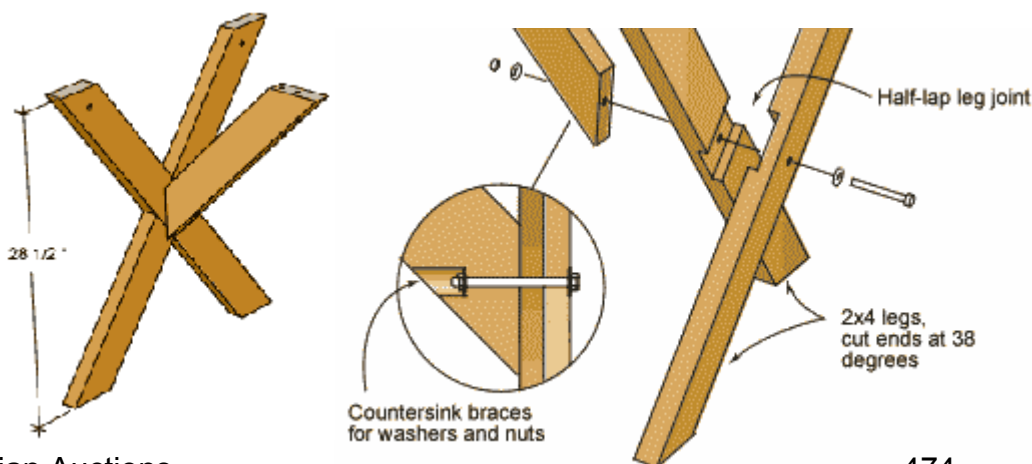
Cut the 2x4 cleats to 27 inches and trim the ends at 45 degree angles starting 2 inches down from top edge. Place a cleat on edge 7 inches from each end of the table top. Allow a 3/4-inch margin from the table's edges. With the combination countersink bit, drill two screw holes into the cleat above each slat, deep enough to set the screw heads below the surface. Fasten to slats with 4-inch screws.

Assemble the Legs

Cut the legs to 39 inches with 38 degree parallel angles top and bottom. Loosely clamp legs together at their centers with C clamps. Adjust the tension in the clamp until you can open the legs to make a cross with a 28-1/2-inch span at each side, with tops and bottoms aligned. Mark along the sides of each leg where they cross. Remove the clamp and cut the half laps from each 2x4 leg. Reclamp the legs in position. Attach leg assemblies to table top cleat with two 3-1/2-inch x 1/4-inch machine bolts at each connection.

Attach the Braces and Legs

Mark and cut table braces to fit between the table leg assembly and the table top with 45 degree angles at both ends. Attach braces to table top with 4-inch screws from below. Drill bolt holes through the "X" of the legs and completely through the angled ends of each 2x4 brace. Countersink the



105

Teddy Bear Bank



coins), fit the shaft with its dowels and end plates, glue-fix the bear to the top of the box, run the control cords down into the box and then variously tie the cords to the spring or shaft.

MATERIALS LIST—

MAKING THE TEDDY BEAR BANK

Having studied the working drawings for making the box and carefully selected your wood, set out the various dimensions and cut out the ten component parts—the four sides, the base, the top and the four inside-corner fillets. Cut the rabbets at the corners and glue up. Round over the edges of the base and lid with a quarter-curve profile and fit with countersunk screws.

Trace the side-view profile of the bear through to your chosen wood—best if it's a soft easy-to-carve timber like lime, jelutong or basswood—and cut it out on the scroll saw. Rerun this procedure for the front views. You should finish up with six parts—the head, the body, two arms

and two legs. Drill 1/2"-diameter holes down through the body, up into the head, through the shoulder and into the arm, and fit stubs of 1/2"-dowel for the neck and for the jointed arm.

When you have made the basic parts for the bear, use a knife to swiftly whittle the cutouts to shape. Don't try for anything fancy, just go for uncomplicated and stylized chunky forms.

Finally, having first used a scalpel and sandpaper to tidy up and create a good finish, use a dash of black acrylic paint to detail the nose, eyes and mouth.

PUTTING IT TOGETHER

Once you have made the box and all the parts that go to make the bear, then comes the difficult task of putting the whole thing together. It's not so much that any single stage is difficult, but that everything has got to be just right. If one of the control strings is too slack, or the shaft is too tight, or whatever, then the movement won't work.

Start by running 1/16"-diameter holes through the neck and arm stubs. The neck needs a side-to-side hole for the pivot and a front-to-back hole for the control cords, while the arm needs a single front-to-back through-hole for both the control cords and the pivot strings. In essence, the controls are beautifully simple. There are four cords—one to pull the head down, one to pull the head up, one to pull the arm down and one to pull the arm up. And of course, depending upon how you want the action to go, fix either the "up" or the "down" cords to a lightweight tension "pulling" spring so the lever action becomes the positive movement.

Copyright 2004 Marian Auctions
 To apply the positive movement, cut two slots in the box (one for the lever and one for the

TEDDY BEAR

A Head (1)	2" × 2" × 2"
B Body (1)	2" × 2" × 3"
C Arms (2)	1" × 3/4" × 3"
D Legs (2)	3/4" × 2" × 3"

Note that all the above pieces are oversize and allow for cutting waste.

BOX

E Front (2)	3" × 4 1/4" × 6 1/2"
F Shaft plates (2)	1/4" × 2" × 2"
G Top (1)	1/2" × 5 1/2" × 7 1/2"
H Bottom (1)	1/2" × 5 3/4" × 7 3/4"
I End (2)	3/8" × 5" × 4 1/4"
J Corner fillets (4)	5/8" triangular section at 4 1/2" long

HARDWARE AND EXTRAS

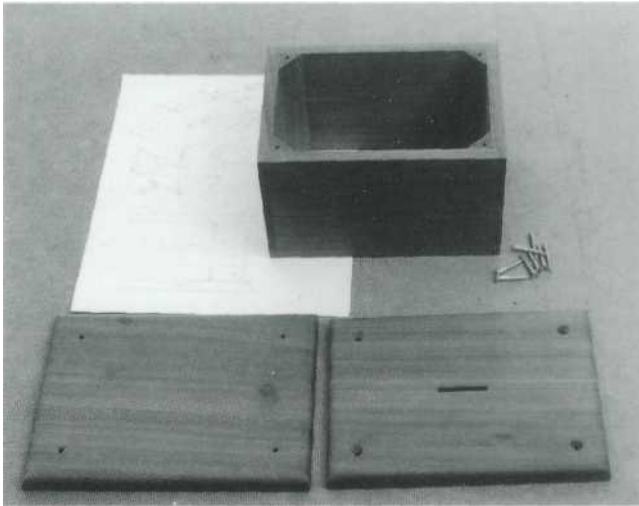
K Drive shaft (1)	broomstick dowel—cut to fit
L Slot and lever bars (2)	1/4" dowel—cut to fit
M Strong cord	—to fit
N Brass screws	—various
O Small quantity of black acrylic paint	

Note that all box measurements are to size.

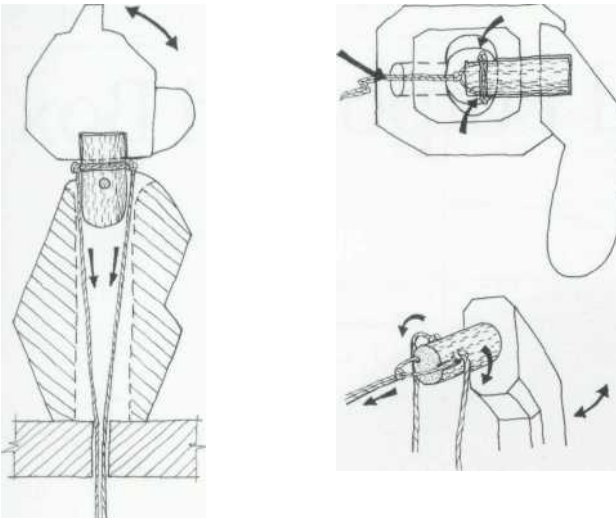
SPECIAL TIP: GLUING

For swiftly fitting and fixing all the control cords, you can't do better than a cyanoacrylate. It's good for holding the knots tight, for little trial-and-error holds, for fixing the bear to the top of the box. In fact, it's just about perfect for everything.

STEP-BY-STEP STAGES



The finished box, with the bottom and top slabs ready to fit. Note how the fixing screws are placed so they run into the corner fillets.

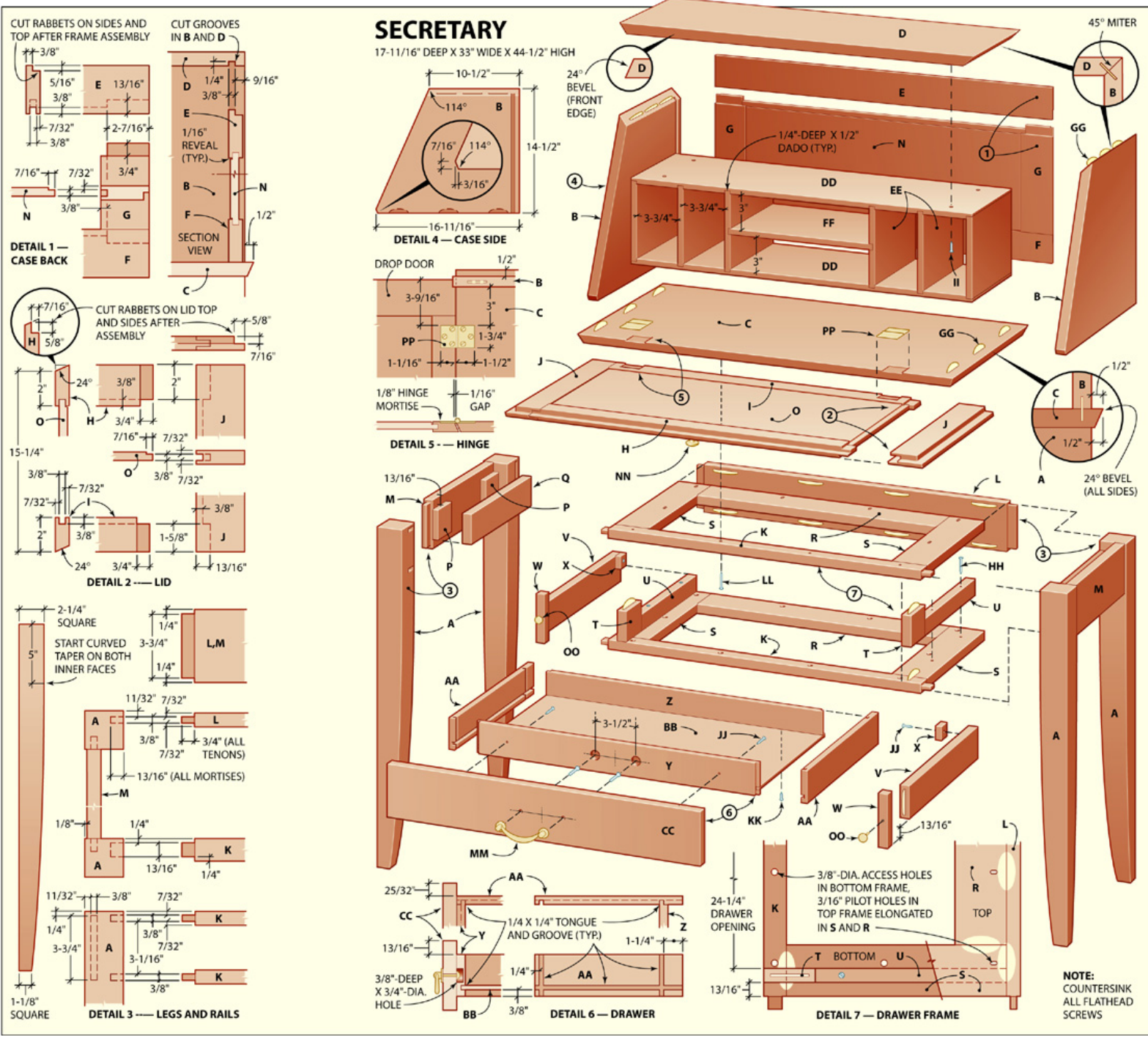


2. Next we string the bear. This cross section shows how the control cords operate the up-and-down movement of the head on the pivot. Be sure to use strong twine and nonslip knots. Notice the plan view at top right, showing how the arm is both pivoted and controlled by the cords. A detail of the cord is shown at bottom right. See how one cord pulls and pivots the arm, while the other two cords operate the up-and-down movement.

107

SHAKER STYLE TABLE





MATERIALS LIST--SECRETARY

Key	No.	Size and description (use)
A	4	2-1/4 x 2-1/4 x 29-3/16" mahogany (leg)
B	2	13/16 x 14-1/2 x 16-11/16" mahogany (side)
C	1	13/16 x 17 x 33" mahogany (bottom)
D	1	13/16 x 10-7/8 x 32" mahogany (top)
E	1	13/16 x 2-13/16 x 30-7/8" mahogany (back rail)
F	1	13/16 x 2-1/2 x 30-7/8" mahogany (back rail)
G	2	13/16 x 2-13/16 x 10-1/8" mahogany (back stile)
H	1	13/16 x 2-3/8 x 27-3/8" mahogany (lid rail)

I	1	13/16 x 2 x 27-3/8" mahogany (lid rail)
J	2	13/16 x 2-13/16 x 15-5/8" mahogany (lid stile)
K	2	13/16 x 1-5/16 x 29" mahogany (base rail)
L	1	13/16 x 4-1/4 x 29" mahogany (base rail)
M	2	13/16 x 4-1/4 x 13" mahogany (base rail)
N*	1	1/2 x 9-3/8 x 26" flakeboard (back panel)
O*	1	1/2 x 12 x 26-5/8" flakeboard (lid panel)
P	4	1/2 x 2-1/2 x 2-5/8" mahogany (spacer)
Q	2	13/16 x 2-5/8 x 11-1/2" mahogany (guide)
R	2	13/16 x 3 x 21-1/2" mahogany (frame rail)
S	4	13/16 x 3 x 12-13/16" mahogany
		(frame side)
T	2	13/16 x 2-5/8 x 3" mahogany (frame divider)
U	2	13/16 x 1-7/16 x 11-1/8" mahogany (blocking)
V	2	3/4 x 2-9/16 x 14-1/8" mahogany
		(lid support)
W	2	3/4 x 13/16 x 4-3/16" mahogany (facing)
X	2	1/2 x 1-1/8 x 1-1/8" mahogany (stop)
Y	1	1/2 x 2-9/16 x 23-11/16" mahogany (front)
Z	1	1/2 x 1-15/16 x 23-11/16" mahogany (back)
AA	2	1/2 x 2-9/16 x 14-1/8" mahogany (side)
BB	1	1/4 x 12-7/8 x 23-11/16" plywood (bottom)
CC	1	13/16 x 4-3/16 x 25-3/4" mahogany (drawer face)
DD	2	1/2 x 9 x 30-3/8" mahogany (insert top/bottom)
EE	6	1/2 x 7 x 9" mahogany (insert partition)
FF	1	1/2 x 9 x 12-7/8" mahogany (insert shelf)
GG	as reqd.	No. 20 plate
HH	4	2" No. 8 fh woodscrew
II	4	1" No. 6 fh brass woodscrew
JJ	4	1" No. 8 rh woodscrew
KK	3	3/4" No. 6 fh woodscrew
LL	10	1 1/4" No. 8 fh woodscrew
MM**	1	Drawer pull, Whitechapel No. 13PWLID
NN**	1	Lid pull, Whitechapel No. 76KSB2P
OO**	2	Support pull, Whitechapel No. 76KSP
PP**	2	Hinge, Whitechapel No. 166HISP

Making The Legs

We ripped the four legs from one board. First, crosscut the board a few inches longer than required and plane one edge straight and square. Use a circular saw and ripping guide to cut blanks slightly wider than specified so you can plane the edges smooth and to exact size. Rip each piece by cutting half the depth from opposite faces to reduce the strain on your saw (Photo 1).

Mark the mortise locations and use a router and edge guide to cut the side- and back-rail mortises (Photo 2). Use a block clamped across each front leg to guide the horizontal front-rail cuts. Square all the mortises with a sharp chisel.

Make a full-size template to transfer the tapering leg shape onto two sides of each leg blank. Then, use a sharp plane to trim the faces to the line. When all legs have been shaped, crosscut them to finished length.

Case Panels

The wide panels are made by gluing together narrower stock. We used a router table and a straight bit to true the edges for good joints. To joint stock in a router table, set up the fence to take a fine surfacing cut on the board edge. Then offset, through shims or adjustment, the outfeed side of the fence so it's aligned with the bit and will support the wood after the cut. Some commercial router tables have this feature built in. After adjusting the table for jointing, pass the mating edges of the stock past the cutter to trim them straight (Photo 3).

Use joining plates spaced 6 to 8 in. apart when gluing the panel pieces. After about 30 minutes, scrape excess glue from the surfaces and let the glue dry. Then, saw the panels to size with the appropriate beveled cuts (Photo 4). Keep the blade on the waste side of the layout line and plane the cut edges smooth.



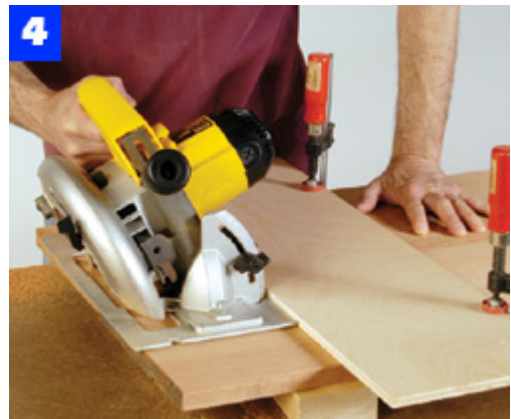
Use a circular saw to create the leg blanks. Cut halfway through the stock, then flip it over to complete the cut.



Lay out the mortise locations and use a router and edge guide to cut the mortises. Square the ends with a chisel.



Shim the outfeed fence of a router table so it's aligned with the bit, and use your table to joint the stock edges.



After gluing up the panels, use a circular saw to cut the panels to size with the appropriate angled ends and edges.



Cut all of the tenons with a router table and miter gauge. Use scrap stock behind

Lay out and cut the joining plate slots at the miter joints between the top and sides, and the joints between the bottom and sides. Then, rout the grooves in the side and top panels that house the case back. Rip and crosscut frame parts for the case back and drop-front lid to specified dimensions. At the same time, cut the rail stock for the desk base to finished size.

Rout the tenon cheeks on the back-frame stiles, lid rails and base rails with a 3/4-in. straight bit and router table (Photo 5). A scrap board behind the workpiece prevents tearout at the end of the cuts. With the cheeks shaped, use a backsaw to cut the shoulders at the top and bottom edges of the base rails.

Install a 3/8-in.-dia. bit in the router table and cut the grooves along the inside edges of the door and back-panel parts. Re-adjust the height of the bit to cut the mortises in the ends of

the back rails and lid stiles, and square the mortise ends with a sharp chisel. Rout the rabbets around the back and lid panels, and test the fit of the panel edges in the frame grooves.

Apply glue to the back mortise-and-tenon joints and assemble the stiles to the bottom rail. Slide the panel into position (Photo 6) and then add the top rail. Check for square, and assemble the lid in a similar manner.

Saw the beveled edges at the top and bottom of the door. Then, rout the rabbets around three sides of the back panel and along the top and ends of the door.

Case Assembly

Apply glue to the case miter joints, slots and plates, and join the sides to the top. Clamp the parts in both directions to pull the joints tight (Photo 7), and check that the assembly is square.

Slide the back panel into the grooves (Photo 8), and join the sides to the case bottom panel.

the work to prevent splintering.



Assemble the back-panel rail and stiles, then slide the panel in its groove and add the remaining rail.



Apply glue and clamp the sides to the top. Clamp in both directions and check that the assembly is square.



Slide the back panel into the grooves in the case sides. After the glue dries, join the bottom to the sides with plate joints.

Building The Base

Spread glue on the side-rail/leg joints and clamp each side subassembly. Cut the spacer blocks and guide strips to size, and glue them to the side rails as shown in the drawing on the first page.

Cut the parts for the drawer frames to size, and add the joining plate slots. Spread glue on the frame joints and assemble the top and bottom frames. Then, use plate joints to attach the frame divider. Bore and countersink pilot holes in the drawer guide strips, and secure them to the bottom frame with screws (Photo 9).

Lay out and cut the plate slots for joining the back rail to the drawer frames. Also, bore and countersink holes in the top frame for mounting the case. Note that some of the holes in the top frame are elongated to allow the case bottom to expand and contract. Then, bore access holes in the bottom frame.

Join the top frame to the bottom frame assembly, and then join the back rail to both drawer frames. When the glue has set, join the drawer-frame/rail assembly to the two leg subassemblies (Photo 10).

Cut the lid supports and facing strips to size and join the parts with plates and glue. Cut the stopblocks from 1/2-in.-thick stock and bore the pilot holes for securing them to the supports. Slide each support into its slot and fasten the stopblock. You'll remove the stop when it comes time to apply the finish. Place the case on top of the desk base, and fasten the parts temporarily.

Lay out the hinge locations on the case bottom and door. Use a sharp chisel to cut the mortises (Photo 11). Mount the hinges and test the operation of the door. If it binds against the case side, simply sand or trim the side or door rabbet until it works smoothly.

Drawer And Storage Insert

Cut the drawer parts to size and use a router table to make the joints. Apply glue to the sides, front and back, and then assemble the box and check for square. Slide the bottom panel into place and screw it to the drawer back.

Mount the drawer pull to the drawer face, and screw the face to the drawer box. Test the fit of the drawer in its opening and trim where necessary. Then, temporarily mount the lid pulls and the support pulls.

Cut the parts for the storage insert and rout the dadoes in the top, bottom and center partitions. Apply glue and assemble the parts (Photo 12). Bore and countersink screwholes in the top of the insert, slide it into position and screw it to the case top.

Finishing

Disassemble the secretary and sand all parts with 120-, 150-, 180- and 220-grit sandpaper. To achieve a smooth finished surface, we applied Behlen Pore-O-Pac filler before staining. First, thin the filler with filler solvent until it has the consistency of thick cream. Working on only a small area at a time, brush the filler into the woodgrain and let it set until it appears dull. Rub the filler off the surface and into the grain with burlap cloths and remove all excess. Allow the filler to dry overnight and sand lightly to remove any residue.

To achieve a deep reddish brown, we applied Behlen Solar Lux Medium Brown Mahogany stain. This is a solvent-based dye that dries quickly, so it's best to add Solar Lux retarder to slow the drying time and prevent lap marks. Let the stain dry overnight before applying the first coat of finish.

For our surface finish, we applied three coats of Waterlox Original Sealer/Finish. Liberally soak the wood surface with finish and wait about 20 minutes before wiping off the excess. After overnight drying, lightly sand the surface with 320-grit sandpaper and dust it off thoroughly before applying a second coat. Apply the final coat using the same technique. When the last coat is dry, rub the surface with 4/0 steel wool to remove any dust nibs and give the piece a warm glow. Polish with a soft cloth. Reassemble the desk and install the hardware. To ease drawer and door-support operation, apply a light coat of paste wax to the parts and then polish.

108

ADIRONDACK CHAIR

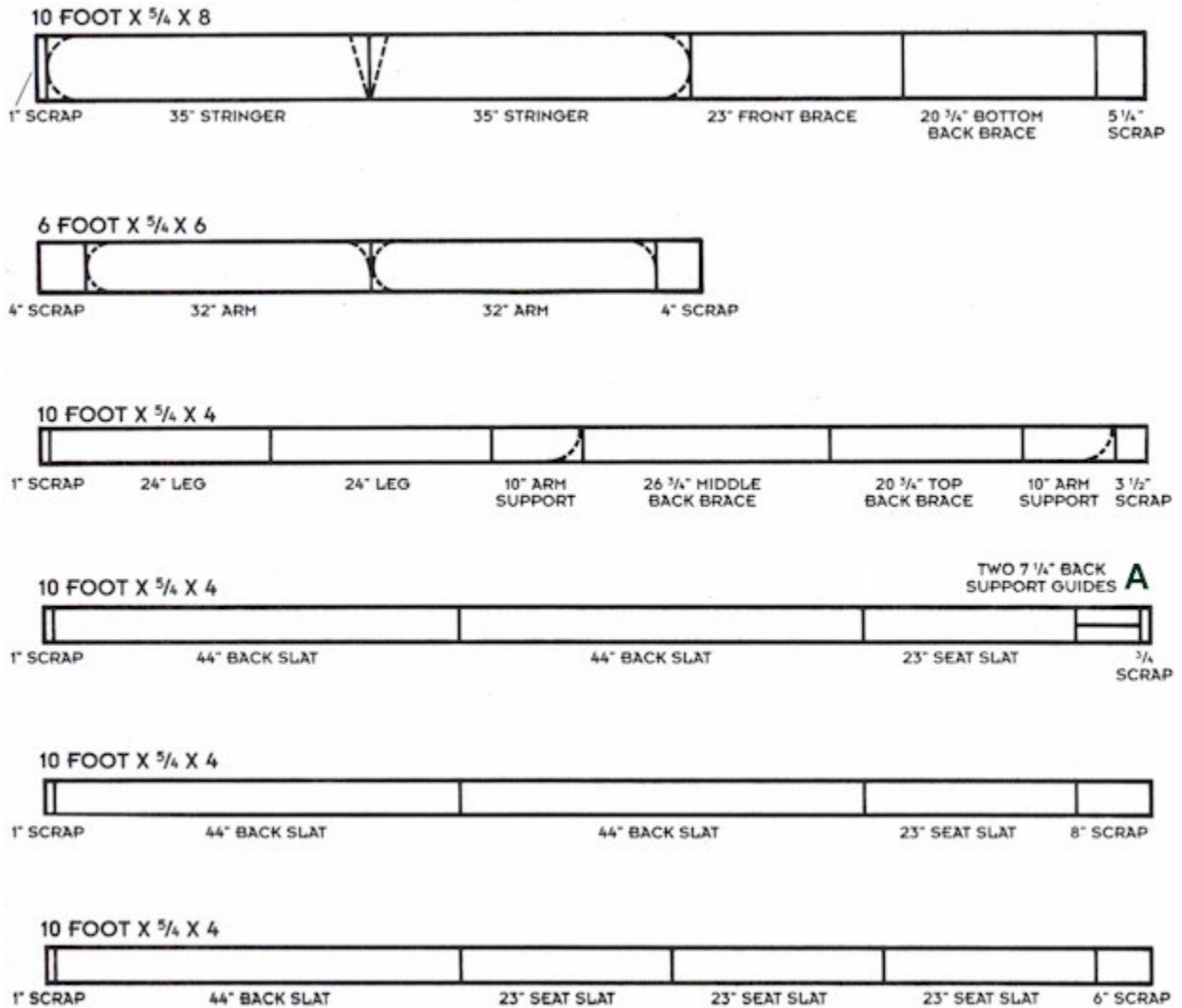


Overview: Adirondack chairs can be made from a variety of woods. The most common wood used in their construction is 5/4 pine. My recommendation is to use southern yellow pine (SYP) because it's high resin content makes it naturally resistant to decay. If you have

trouble locating 5/4 SYP look for pine stair tread material. Stair tread material comes almost free of knots because it comes from the center of the tree. Let's get started...

Step 1: Mark and cut your materials per the cutting diagram on the next page. Sand and smooth each piece in preparation for assembly.

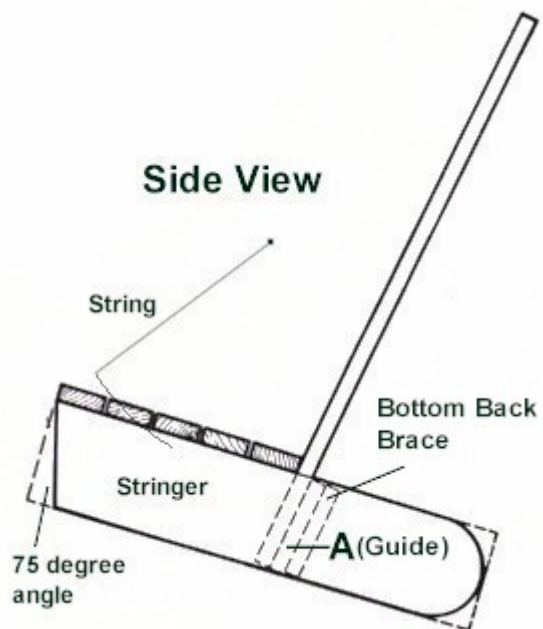
Wood Cutting Diagram



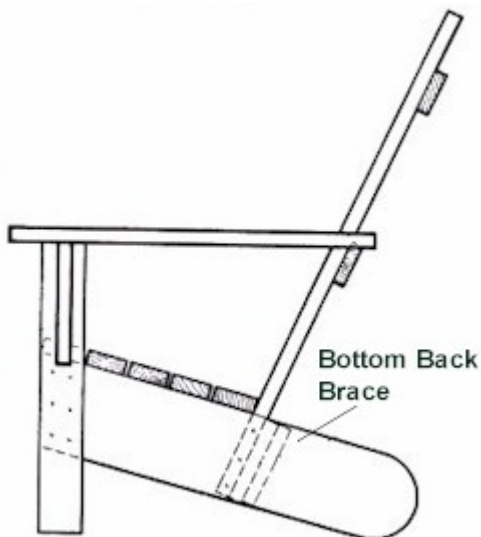
Step 2: After the wood is cut and sanded it's time to start assembly. We start with the two back legs (which we are calling stringers) The 2 stringers are the heart of the chair as they hold everything else together.

Use wood screws that are 1 5/8" to 1 3/4" long for all assembly, except where noted. Always pre-drill the holes to prevent splitting.

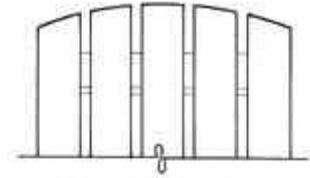
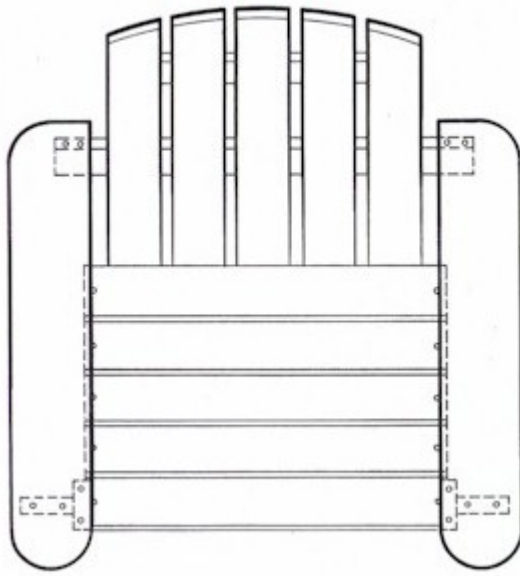
Note: Most assembly will be simply fitting the appropriate pieces together. The guides at location "A" (drawing on right) are noted on wood cutout diagram above.



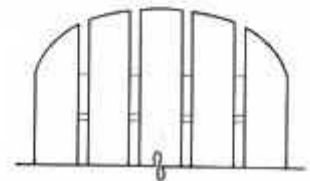
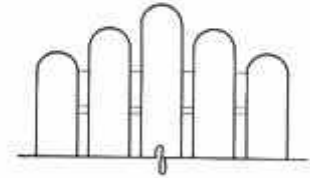
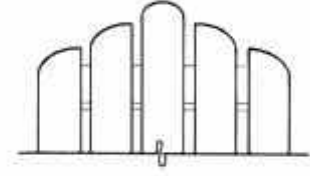
The string shown in the drawing above indicates how to cut curves for the seat or the back (if desired).



Top View



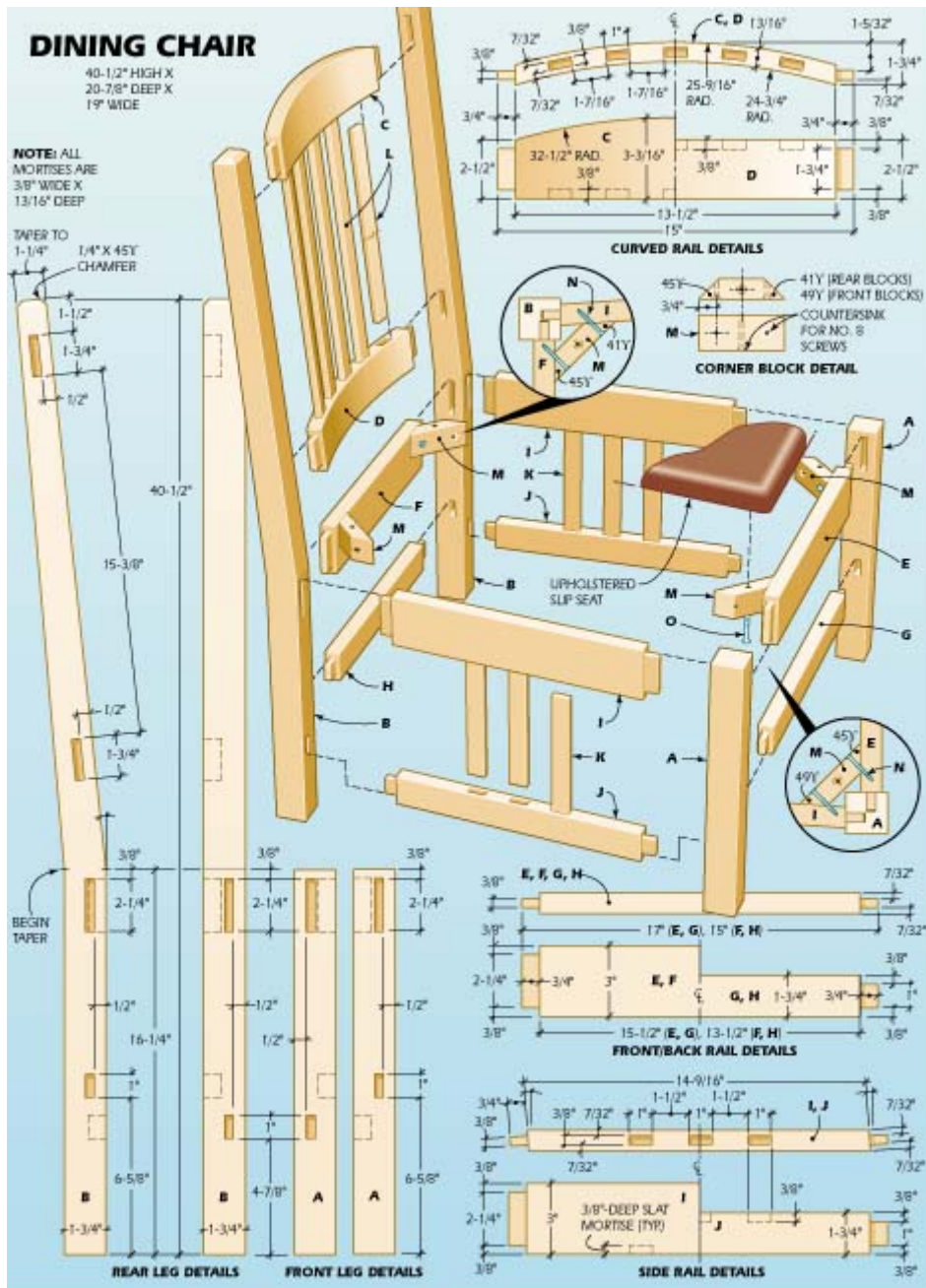
Back Styles



109

**ARTS AND CRAFTS
CHAIR**





MATERIALS LIST--DINING CHAIR		
Key	No.	Size and description (use)
A	2	1-3/4 x 1-3/4 x 16-1/4" oak (front leg)
B	2	1-3/4 x 3-3/4 x 40-1/2" oak (rear leg)
C	1	1-3/4 x 3-3/16 x 15" oak (top rail)
D	1	1-3/4 x 2-1/2 x 15" oak (bottom rail)
E	1	13/16 x 3 x 17" oak (top front rail)
F	1	13/16 x 3 x 15" oak (top back

		rail)
G	1	13/16 x 1-3/4 x 17" (lower front rail)
H	1	13/16 x 1-3/4 x 15" oak (lower back rail)
I	2	13/16 x 3 x 16-1/4" oak (top side rail)
J	2	13/16 x 1-3/4 x 16-1/4" (lower side rail)
K	6	3/8 x 1 x 7-3/4" oak (side slat)
L	5	3/8 x 1 x 15-3/8" oak (back slat)
M	4	13/16 x 1-1/2 x 3-5/8" (corner block)
N	8	1-1/2" No. 8 fh woodscrew
O	4	2-1/4" No. 8 fh woodscrew
Misc.: Medium Fumed Oak aniline dye (No. W1190)		

Making The Parts

Begin construction by ripping and crosscutting stock to size for the front legs. Then, cut two 4 x 42-in. blanks for the rear legs. Make a cardboard template for the rear legs and trace around it to transfer the shape to each blank. Saw to the waste side of the line with a band saw or sabre saw, and use a sharp plane to trim each leg square and to finished dimension (Photo 1).

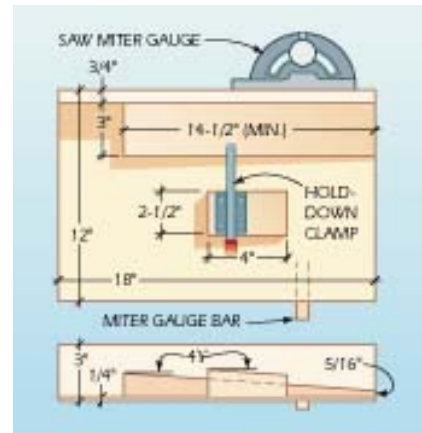
Mark the mortise locations on all legs. To make this job easier, clamp several legs together with the ends held even and mark across them using a straightedge or square as a guide. Install a 3/8-in.-dia. spiral up-cutting bit in your router, and use an edge guide to rout the mortises in the legs (Photo 2). Square the rounded mortise ends with a sharp chisel.

Cut blanks of 1-3/4-in.-thick stock for the curved back rails. Before cutting their curved profiles, use a table saw and dado blade to cut the tenons at the ends of the pieces (Photo 3). Note that the tenons are not centered across the thickness of the blanks. Cut one side of all the tenons first, then readjust the blade height to cut the other side. It's best to cut the tenons about 1/32 in. thicker than indicated, and then use a sharp chisel to pare the surfaces smooth and bring the tenons to finished dimension.

Make a cardboard template for the back-rail shape and use it to transfer the shape to each blank. Use a band saw to cut the inside curve of each rail (Photo 4). Then, remove the saw marks and smooth the curved shape with a spokeshave (Photo 5). Go back to the band saw to cut the outside curve and smooth that surface with either a block plane or spokeshave. Don't cut the arched profile of the top rails at this time.

Cut stock for the lower front and back rails to finished dimension and use a dado blade in the table saw to cut the tenons. Readjust the blade height and hold the rails on edge to cut the top and bottom shoulders at each rail end.

Next, cut stock to size for the side rails. Study the drawing to be sure you understand the angled tenons on these pieces. Label each rail with its



ANGLED-TENON JIG



After sawing the rear leg shape, use a sharp plane to remove saw marks and trim the leg to exact size.

location in the chair to avoid confusion when it comes time to cut the joints.

We built a jig to cut the angled tenons. To make the jig, first attach a hardwood fence to a plywood base, and then screw the assembly to your table saw miter gauge. Glue up four pieces of 3/4-in.-thick stock and band saw the stack into a ramp with an angle of 4°. Screw the ramp to the plywood base. To use the jig, hold a rail on the ramp and push the jig past the dado blade. We used a holddown clamp mounted on a tapered hardwood block to hold the workpiece.



Mark the mortise locations in the chair legs, and use a plunge router with an edge guide to cut the mortises.



Use a table saw and dado blade to cut the tenons in the blanks for the curved back rails. These tenons are not centered.



Lay out the back-rail curve onto the edge of each rail blank. Then, cut the inside curve on the band saw.



Use a spokeshave to smooth the inside curve of the back rail, and then cut and smooth the outer curve.

Cut one surface of each tenon with the ramp angled down toward the dado blade (Photo 6). Then, secure the ramp in the opposite direction and readjust the blade height for the opposite side of each tenon (Photo 7). If you're using the holddown clamp, you'll need to remount it. Then, use the miter gauge without the jig to make the angled cuts for the top and bottom shoulders of the side rails (Photo 8). Cut strips for the side and back slats. Crosscut the slats to finished length, and set them aside.

Lay out the slat mortises in the side rails and in the curved back rails. Mark the side-rail mortises by clamping several rails together and marking across the stack with a square. Mark the curved rails individually.

Install a 5/16-in.-dia. bit in the drill press and bore slightly overlapping holes to remove most of the waste from the mortises in both the curved and straight rails (Photo 9). Then, use a sharp chisel to pare the walls and square the ends of the mortises (Photo 10). Test a slat in each mortise--the fit should be snug. Make another template for the arched shape of the top back rail and use the template to trace the shape onto the workpiece. Use a sabre saw to cut the profile (Photo 11).



To cut the angled tenons on the side rails, support the stock in a table saw jig that holds the work at a 4° angle.



When cutting the opposite tenon faces on the rails, reverse the ramp on the jig and readjust the dado blade height.



Finish the rail tenons by cutting the top and bottom shoulders with the miter gauge and dado blade.



Use a 5/16-in.-dia. bit to bore slightly overlapping holes to remove most of the waste from each slat mortise.



Trim and square the slat-mortise walls with a sharp chisel. Then, test fit the slats--they should be quite snug.



Use a template to lay out the arched profile of the upper back rail. Then, cut to the line with a sabre saw and smooth.

Mark the shoulders on the top and bottom edges of the curved back rails and use a small backsaw to make the cuts (Photo 12). First, make the cuts into the endgrain of the tenon. Then finish the shoulder by cutting across the grain.

Place guide marks for the 1/4-in. chamfer at the top end of each rear leg. Clamp a leg in the bench vise and use a sharp block plane to cut the chamfers.

Assembly

First, sand all parts with 120-, 150-, 180- and 220-grit paper, dusting off thoroughly between grits.

Spread glue on the mating surfaces for the front-leg/front-rail joints. Use a small shim to spread glue in the leg mortises and a small brush for the tenons. Spread the glue sparingly on the tenons to avoid excessive squeeze-out at the joints.

Join the rails to the front legs, then clamp the joints and compare opposite diagonal measurements to be sure the assembly is square (Photo 13). Let the glue set for about 20 minutes and use an old chisel to pare off any excess glue.

Next, insert the side slats in the mortises of the bottom side rails and position the top side rail over the slat ends. While you don't need glue in the slat joints, a drop of glue in a loose joint will keep the slat from rattling. Temporarily clamp the rails and slats (Photo 14).

Spread glue in the open mortises of the front-leg assembly and on the front tenons of the side rails, and join the side rails to the legs (Photo 15).

Join the back slats to the curved rails (Photo 16) and temporarily clamp the assembly. Again, it's not necessary to glue these joints unless a slat is loose in its mortise.

Spread glue on the tenons of the back rails and in the matching mortises in the back legs. Join the rails to the legs, clamp and compare opposite diagonal measurements (Photo 17).



Cut the shoulders of the curved back rail tenons with a small backsaw. First cut in from the end, then across the grain.



Join the front rails to the legs, and clamp. Compare opposite diagonal measurements to check for square.



Join the side slats to the rails. It's not necessary to use glue since the slats are held captive between the rails.



Spread glue on the rail and leg mating surfaces. Join the side rails to the front leg assembly and clamp.



Join the back slats to the curved rails. If a slat is too loose in its mortise, add a drop of glue to keep it from rattling.



Join the back rail and slats to the legs. Apply the glue sparingly, clamp, and check that the diagonals are equal.

Once the glue has set on the subassemblies, complete the chair frame by joining the side rails to the back-leg assembly. Spread glue on the mating surfaces and position the joints. Apply clamps to pull the joints tight. Set the chair upright on a flat worktable to be sure that all four legs sit evenly (Photo 18). Adjust the clamps and joints, if necessary, until any rocking is eliminated.

Cut corner blocks to reinforce the joints and provide a means for attaching the seat. Note that the angles for the blocks at the front of the chair are different than those for the rear blocks. Use a miterbox to cut the blocks. If your miterbox won't handle the 41° angle for the rear blocks, make the cuts on a band saw.

Bore and countersink pilot holes through the width of the blocks for attaching the seats. Use a clamp to hold each block in place while you bore and countersink pilot holes for attaching it to the rails (Photo 19). A combination bit and countersink is the most efficient tool for the job. Fasten the blocks to the rails with 1-1/2-in. No. 8 screws.

Finishing

First inspect each chair for scratches, and sand if necessary. We used a water-soluble aniline dye for a beautiful, clear and lightfast color. To eliminate raised grain problems, wipe the chairs with a sponge dampened with clean water. Let the wood dry completely and lightly sand the surface with 220-grit paper.

Follow the manufacturer's directions for mixing and applying the dye, and be sure to allow sufficient drying time before applying a finish.

For our finish, we used Waterlox Original Sealer/Finish. Brush or wipe on the first coat, which will soak into the wood readily. Allow the finish to dry overnight. Lightly sand with 320-grit paper and remove all dust. For the next and subsequent coats, apply the finish and let it sit for about 30 minutes before wiping off any excess. Then, let the finish dry overnight. At this point, you will sand between coats only if the finish is rough. After three or four coats, burnish the surface with 4/0 steel wool to remove any rough spots, and polish with a soft cloth.

Finally, attach the finished slip seats to the frames with screws installed through the corner blocks into the underside of each seat.



Join the back subassembly to the front-leg/side-rail assembly. Work on a flat surface so the legs remain even.



110

KENTUKY CHAIR



You start with three six foot 2x4s (I used pressure treated pine), ripped into nine equal 1 1/2 x 1 1/8 pieces. By judicious measuring, this should yield the following:

Seat: (A) 6 pieces 15" long) each piece has two 1/4" holes
(B) 2 pieces 35" long) drilled in the center of the wider side. Measure from the same end:
1st hole 1 1/2";
2nd hole 12".
(C) 9 pieces 9 5/8" long: Two holes, 1 1/2" from each end.

Back: (D) 4 pieces 31 1/2" long) Each piece has two holes, at
(E) 2 pieces 29" long) 1 1/2" and 25" measured
(F) 2 pieces 42" long) from the same end.

All held together with 9 gauge galvanized wire..

Align seat pieces as : A-A-B-A-A-B-A-A and hold together loosely at top with a length of wire through the upper (1 1/2" holes); At the lower (12")holes, intersperse each piece with a length of C. That is:

C-A-C-A-C-B-C-A-C-A-C-B-C-A-C-A-C. Wire and set aside.

Align back pieces in the order F-D-E-D-D-E-D-F, and again hold together loosely with a wire through the holes which are 1 1/2 from the end.

Now marry the two parts by threading wire through the remaining holes, with the C pieces acting as the connectors. The new joint should have the configuration: C-F-C-D-C-E-C-D-C-D-C-E-C-D-C-F-C.

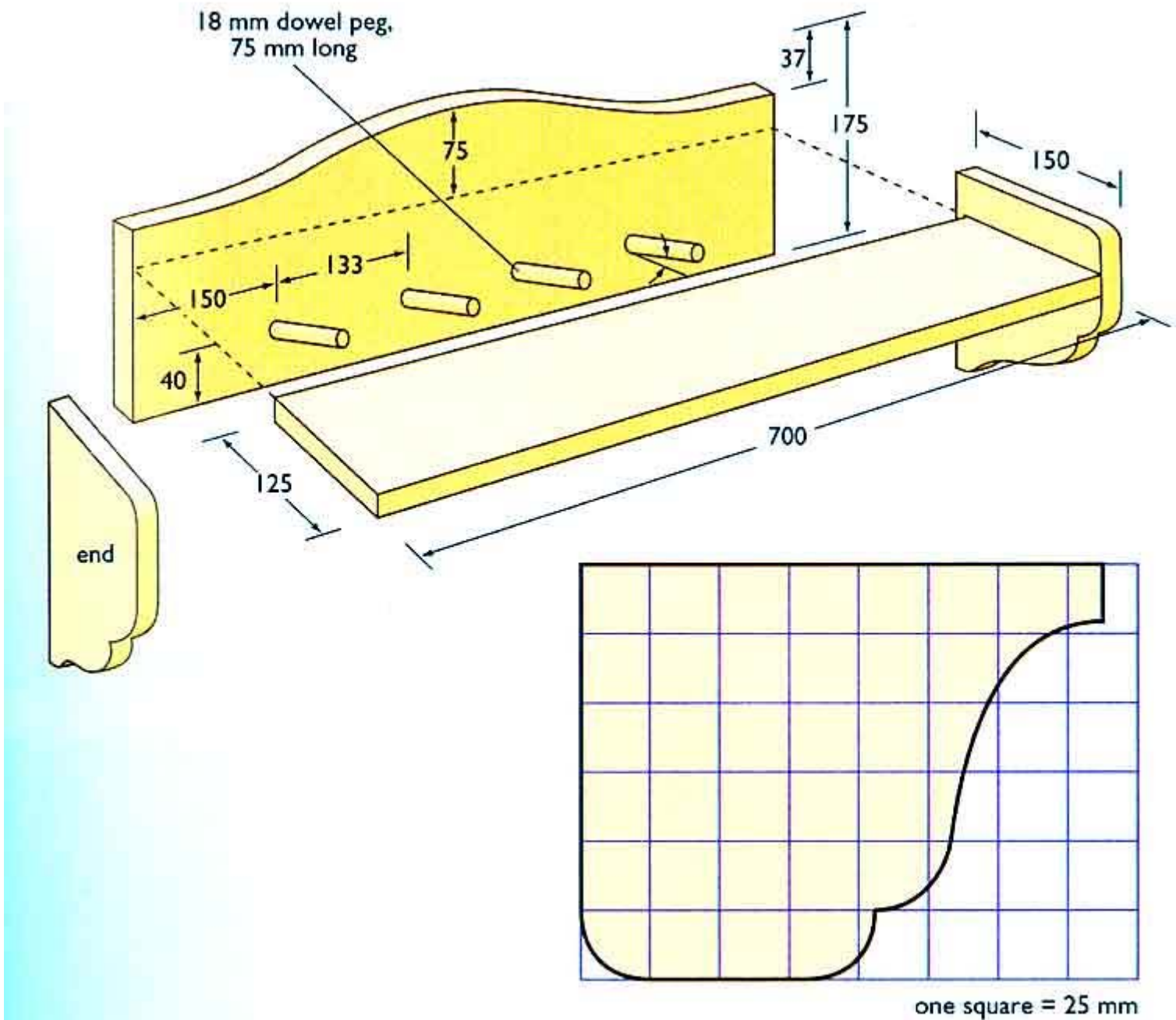
Draw all wires tight, cut off and secure ends somehow (I threaded them and used cap nuts).

Now take it all apart, sand as appropriate, finish as desired and reassemble.

111

BATHROOM SHELF





Item	Material
shelf (1)	140 x 19mm timber, cut and planed to measure 700 x 125mm
shelf back (1)	190 x 19mm timber, cut and planed to measure 700 x 175mm
shelf ends (2)	165 x 19mm timber (or 2 offcuts measuring 200 x 150mm)

You'll also need: 5 x 30mm countersunk screws; 4 x pieces 18mm dowel, each 75mm long; waterproof epoxy resin (if using in bathroom) or PVA glue; 120 grit sandpaper; polyurethane gloss varnish; fasteners to fit shelf to wall.

Here's how:

1. Click on the illustration at the top of this story to get a larger diagram. Transfer pattern for shelf end to graph paper. Cut out all the components as shown in the diagram. Plane to correct width. Use a jigsaw to cut the two shaped ends. Give the edges a rustic irregularity with a spoke shave or plane.
2. Drill and insert 30mm-long countersunk screws in three places through the back into the rear edge of the shelf and twice through each of the sides into the shelf ends.
3. Drill four 18mm peg holes 40mm up from the bottom (see diagram for spacing). Allow the drill to rest against the bottom of the shelf as you proceed. This will give your pegs an even upwards tilt. Glue and insert pegs.
4. Sand and triple-varnish the shelf before fixing it to the wall through the upper back using appropriate fasteners for the wall type.

112

SMALL BOX SHELF



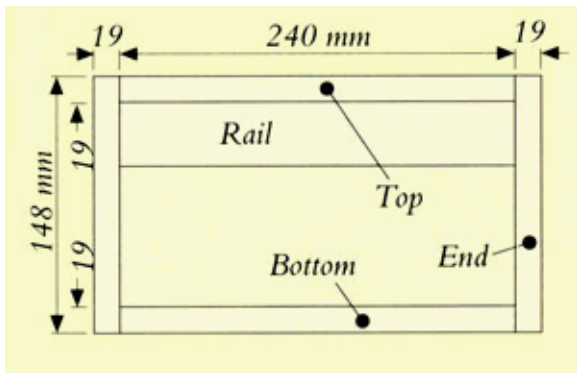
You'll need

Part	Material	Length
End (2)	150 x 25mm timber, DAR	148mm
Top/bottom (2)	150 x 25mm timber, DAR	240mm
Rail (1)	50 x 25mm timber, DAR	240mm

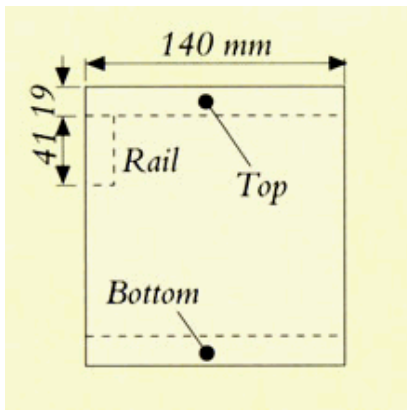
You'll also need: 40mm nails (12); PVA adhesive; wood putty; 50mm x 8 gauge countersunk screws (2) or hollow wall anchors.

Here's how Cutting out

1. Mark out the required lengths on the timber (see diagrams below), leaving 5mm between each part for the saw cut and for cleaning back. Use the square to square the lines across the face and around all sides of the timber. Check that the lines are square and, when you're satisfied, retrace the lines using a utility knife to cut the top fibres. This reduces the breaking out of fibres on the underside of the cut and reduces the need for putty at a later stage.
2. Cut the components to length. If you are using a circular saw, use a straight timber batten to run your saw against to ensure a square cut.
3. Take the timber parts of the same size and hold them together in the vice. Ensure the marking knife lines are aligned. With a fine set on the plane, plane the ends down to the correct length. Plane towards the centre from each side of the parts so as to prevent the timber chipping. Check that you have planed each part to a peak in the centre and that you are planing square to the face of the material. Then work from the centre towards the outside edges to plane the peak down flat. Regularly check your parts for square. Repeat this step for each part of the job, including the fixing rail.



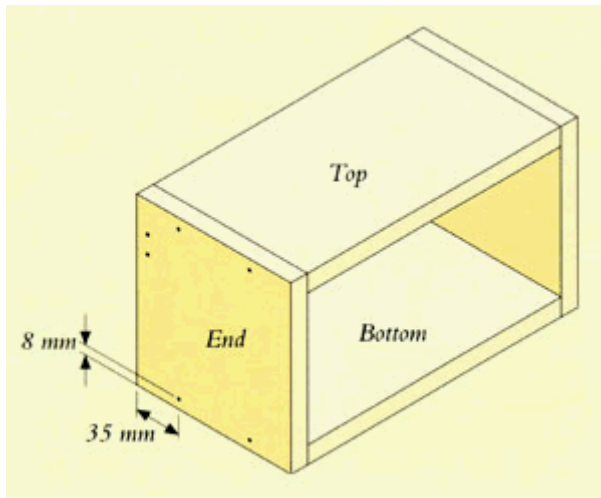
Front elevation.



End elevation

Assembly

4. Take the top and place it in the vice, end up. Take one end and determine the outside and front and top edges. On the outside, about 8mm down from the top edge and 35mm in from the front and back edges, start a 40mm nail off (see diagram below). Spread adhesive on the edge to be joined, use your finger to spread the adhesive and rub it in well. Apply a second thin coat of adhesive to the joint and bring the two parts together. Nail the joint together. Try to keep the face and edges flush.



Position for the nails

5. Following the same method, join the bottom to the end. Turn the box over and nail on the other end.
6. Insert the fixing rail and nail it home. Punch and putty nail heads.

Finishing and installation

7. Finish the shelf as desired. If painting your shelf, use two coats of paint, sanding between each with 180 grit sandpaper. Use a primer first to choke the timber grain and make it easier to sand. If you intend to use stain or clear lacquer, remove all excess adhesive first or the stain will not penetrate through into the timber and there will be white blotches.

8. Decide where the shelf should be fixed. If you're fixing the shelf to a masonry wall, drill two 6.5mm holes in the fixing rail about 180mm apart and 30mm down from the top edge. Position the unit on the wall, using a spirit level to make sure it is horizontal, and mark the position for drilling on the wall. Use a 6.5mm masonry bit to drill the holes in the walls, place plastic star plugs in the holes and screw the unit into position. If your

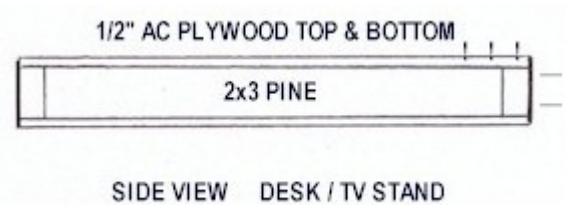
walls are not solid masonry, use hollow wall anchors to fix the shelf in position, following the manufacturer's instructions and using a spirit level to be sure it is positioned horizontally.

113

**WALL DESK AND TV
SHELF**



Step 1 - Prepare..... Hand select 2x3 or 2x4 construction grade lumber, looking for a few clean, straight and blemish free studs. If you use 2x4 studs...rip them down to 2x3 size (2 1/2"). The top is made from 1/2" A/C plywood. Determine width and length of your project to fit your needs.



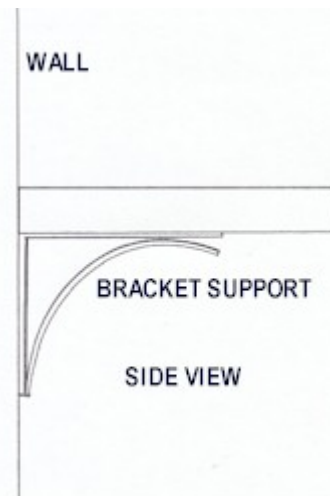
Step 2 - Cut 2 - 2x3 to length and 3 - 2x3 to the width needed to make the desk the size you desire. Nail or screw front 2x3 to side 2x3 as shown in above drawing. Nail or screw the 3rd 2x3 in the middle of this frame as a center support for the plywood top. Countersink the nails or screws and fill with wood dough.

Step 3 - Measure the outside dimensions of your frame and cut the plywood top and bottom to fit. Nail the top and bottom in place as shown. Countersink the nail heads and fill with wood dough.

Step 4 - The finishing of this project will take a good deal of sanding. Use a belt sander and smooth the sides of the desk until the plywood and 2x3 panels are flush and smooth. Smooth the top and bottom edge of the plywood being careful to not sand through the top veneer of the plywood sheet. Fill all voids in the plywood with a hardening wood putty (Plastic Wood type) Sand and finish with stain or paint.

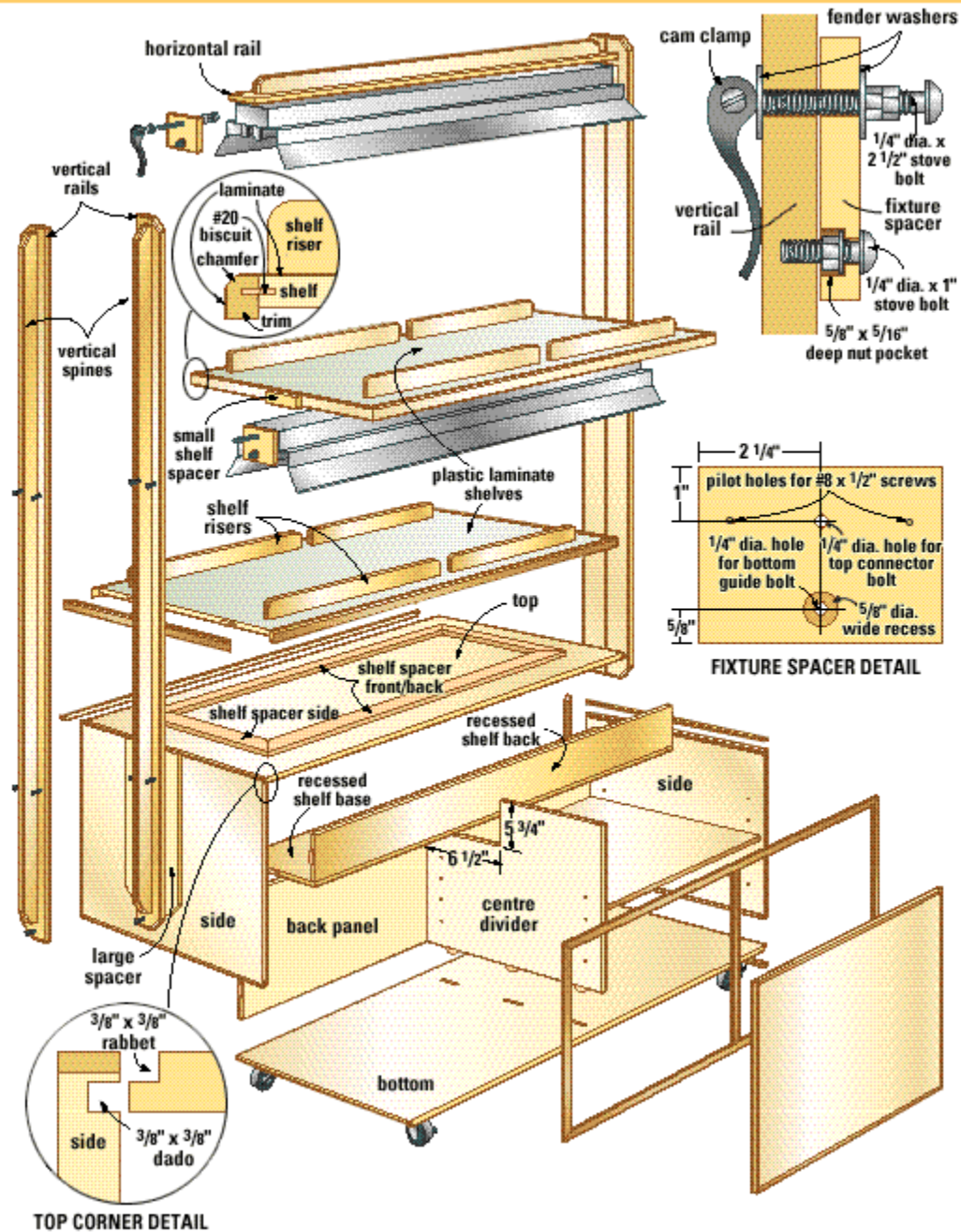
Step 5 - Mount project on wall at desired location using support from above or below as shown in our two examples. Make sure your supports from above or below are at a measurement that hits the framing studs in the wall.

Project mounted from below with brackets.



114 GROWING RACK





Make the Base Case

Begin by cutting panels for the sides, top and bottom. I used birch ply for these parts, but any 3/4"-thick sheet material will do. Next, cap the top and bottom edges of the side panels with 1/4"-thick strips of solid hardwood. The rest of the exposed plywood edges are capped later. Make the strips slightly wider than the thickness of your sheet material so the edges overhang the plywood, allowing it to be sanded flush later.

I used rabbet and dado grooves for the interlocking joinery that connect the corners of the box. First, cut the 3/8" x 3/8" rabbets on the ends of the top and bottom pieces, then cut the matching dado grooves in the side members.

Now is also the time to prepare plywood panels for the cabinet back, recessed shelf base, shelf back, and the centre divider. Although you're almost ready to assemble the box, first drill 5/16" dia. x 3/8"-deep holes on the inside faces of the

side panels and on both sides of the centre divider, to receive the adjustable-shelf-pin sleeves. Assemble the recessed shelf, then attach the shelf, back panel, and centre divider to the box using #20 biscuits. The plans show how it all fits together and where to plunge slots for the biscuit.

Dry-fit the base unit, then reassemble it with glue and clamps. Measure and equalize the diagonals to square the unit before you set it aside to dry.

Next, use a tablesaw to prepare plywood panels for the doors and adjustable shelves, then cover all exposed plywood edges on the base unit and the doors and shelves using the solid birch strips. The base unit rolls on lockable casters. Install these now.

I borrowed a couple of tricks from the kitchen-counter trade to make the two plant shelves for this project. Begin by preparing two 3/4" -thick plywood shelf panels and enough 3/4" x 1"-solid birch trim to wrap around the edges. Mark and cut the edging to fit with mitred corners, then fasten it to the ply using glue and #20 biscuits.

The high-pressure plastic laminate comes next. I used my tablesaw spinning a standard 80-tooth carbide-tipped combination blade to cut the laminate panels to size for the top and edges. To minimize chipping, make your cuts with the good side facing up and use a feather board or pushstick to keep the material pressed flat against the saw table. Cut all the laminate pieces you'll need for the shelf sides and tops, allowing about 1" of excess all around.

I prefer LePage's Pres-Tite Green Professional Quality contact cement for securing laminate. It cleans up with soap and water, and doesn't emit toxic fumes. Spread some on the back of the laminate and corresponding shelf faces before setting the parts aside to dry.

When the adhesive is no longer tacky, roll the laminate on to the substrate, keeping the edges aligned as you work. When you're done, apply pressure to the entire surface with a roller or the palm of your hand, working from the centre outwards, to consolidate the bond.

I used a hand-held router spinning a flush-trimming bit to remove the excess laminate from the top of the shelves. Next, I installed laminate on the shelf edges before using a 45° chamfering bit to reveal an angled face of solid wood around the perimeter.

The water-tight plastic plant trays are suspended from 13/4"-high risers attached to the top of the shelves. Make the risers from 3/4"-thick solid birch, then use the bandsaw to cut a decorative 5/8" -radius curve on the top corners. Sand, then install the risers using #8 x 2" screws, driven up through the underside of the shelves.

I also added a spacer under the lower shelf to raise it up slightly from the top of the base unit. Cut the four sides of the spacer frame from 3/4" solid birch, then assemble the parts using #20 biscuits and glue to strengthen the mitred corners. When dry, centre the frame on the bottom of the shelf and secure it with #10 x 11/4" screws. Countersink the heads so they don't interfere with the shelf when installed.

Fasten the shelf to the top of the base unit with #8 x 13/4" screws driven up through the underside of the cabinet top. Don't use glue. The shelf needs to come off later for finishing.

Cut the rail and spine stock you'll need from 3/4"-thick hardwood. To make these parts more pleasing to the eye, trim the outside corners to a 45° angle and chamfer the edges to match the profile routed on the shelves. Just leave the guide slots square.

With this done, attached the spines to the corresponding rails using glue and #8 x 11/4" screws. Pre-drill for the screws and counterbore their heads so they can be covered with tapered plugs. Mitre the corners of the large spacers to a 45° angle to match the profile on the ends of the rails. The corners of the small spacers are rounded over with sandpaper.



An electric timer saves effort and makes lighting more consistent, which is essential for optimum plant growth.



Light intensity is controlled by varying the lamp height. A well-adjusted cam clamp makes locking quick and simple.

Next, attach the large spacers to the ends of the base unit with glue and #8 x 1" screws. But before you install the rails, take time to cut temporary spacers to maintain a consistent slot gap while you work. The spacers should be a hair wider than 1/4", to allow the bolts that guide the fluorescent fixtures to travel freely in the slots as they slide up and down for adjustment.

Attach the upright assemblies using glue and #8 x 1 3/4" screws, with nickel-plated cup washers under the heads. As you install the upper shelf, it's a good idea to clamp a couple of temporary braces to the vertical rails. These will support the shelf while you work. With the shelf and small spacers in position between the rails, drill pilot holes for #8 x 2" screws. Next, remove the shelf and widen the pilot holes in the rails and spacers with a 3/16"-dia. bit. This prevents the narrow spacers from splitting as the screws are driven home. With the shelf back in position, install screws (with cup washers under the heads).

Let There Be Light

Home centres carry all sorts of 48" fluorescent light fixtures, but for this project the best choice is the type that comes prewired with a grounded electrical cord.

Before you begin, notice how a system of spacer blocks and bolts are added to the ends of the fixtures to make a connection with the vertical rails. Cut the spacer blocks from 1/2"-thick hardwood, then pair up each spacer with one of the fixture end plates. Take the time to mark the spacers and end plates to keep track of the pairings. The holes you will drill may not align if the pieces aren't returned to their original homes.

Use a drill press to bore a 1/4"-dia. hole through the centre of each end plate and corresponding spacer to receive the bolt that connects the fixtures to the rail assemblies. While you're at it, switch to a smaller bit and drill pilot holes for the screws that secure the spacers to the end plates.

With holes drilled and bolts installed, secure the spacer blocks to the corresponding end plates with #8 x 1/2" pan-head screws, inserted through the pilot holes you drilled earlier. Reinstall the end plates on the fixtures.

At first it may appear that the 1/4" dia. x 2 1/2" bolts used to connect the fixtures to the rail assemblies are too long. Don't be fooled. Tighten a pair of 1/4"-dia. nuts together on the bolt, close to the head, to serve as adjustable spacers. The spacers are used to alter the thread length that protrudes through the rail slots for the cam clamps. These clamps won't work properly unless the bolts they thread onto are just the right length. Spin the nuts onto the bolts, then add a fender washer to each before inserting the bolts through the fixture ends.

Tilt the light assemblies into place between the rails and engage the bolts in the rail slots. Add a fender washer and cam clamp to the end of each bolt protruding through the rails. Check to make sure the lights slide up and down without binding, then lock them in place by engaging the cam clamps.

Finishing Up

Remove the light assemblies and plant shelves before sanding the entire project up to the 220-grit level. I like the look of natural birch, so I brushed on three coats of semi-gloss polyurethane, sanding with 600-grit paper between coats. Don't forget about the chamfered edges on the plant shelves while you're finishing.

When everything's dry, reinstall the shelves and light assemblies with fluorescent tubes. Finish up by attaching the doors with piano hinge, then add the shelf pin sleeves, magnetic door catches, and door pulls.

Any basic electrical timer works fine for controlling the lights. For safety, use only a GFI-protected (ground fault interrupter) circuit to power this unit. Load up the base with supplies and tools and you're ready to get growing.



Locate the wooden risers to match your plastic seedling trays. The risers make it easier to pick up the trays when necessary.

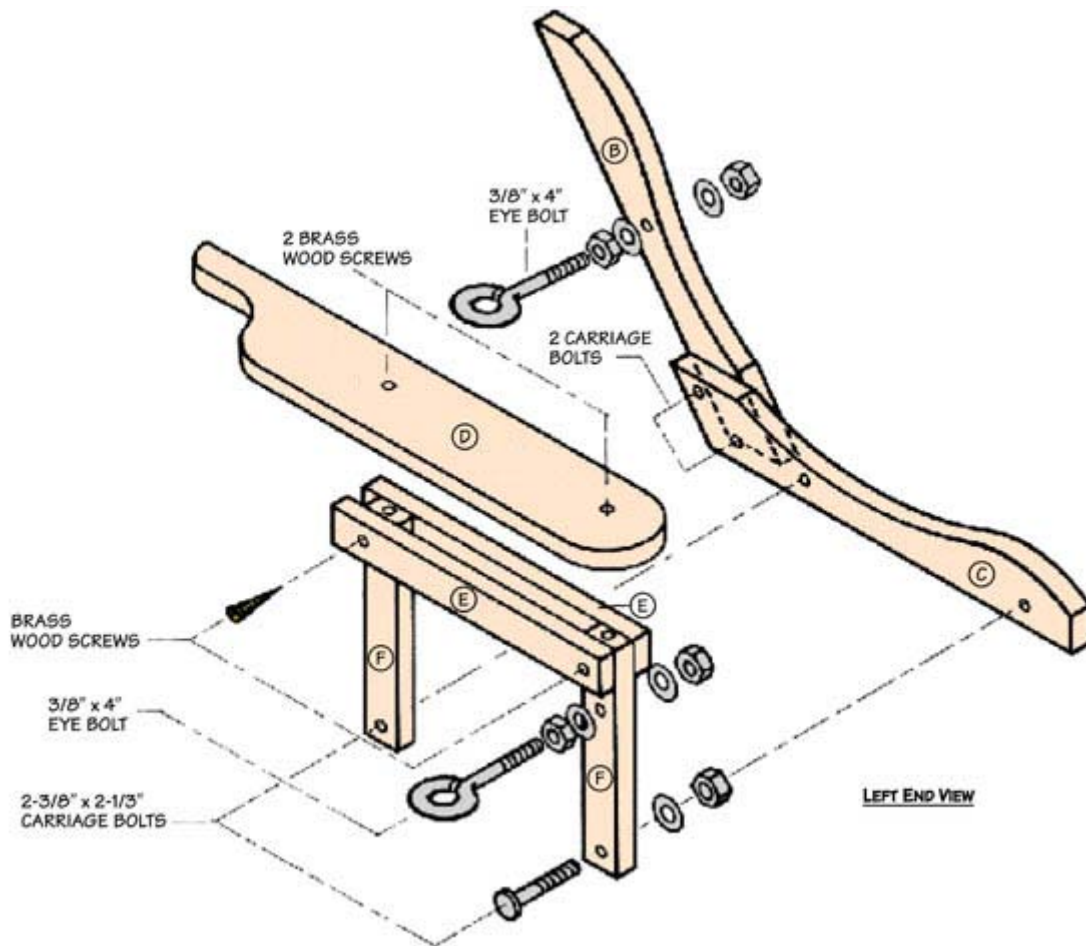
You will need:			
For the Base Unit	Material	Size	Quantity
Top and bottom	birch ply	3/4" x 20 3/4" x 47 1/4"	2
Sides	birch ply	3/4" x 19 1/2" x 20 3/4"	2
Centre divider	birch ply	3/4" x 18 1/2" x 20"	1
Recessed shelf base	birch ply	3/4" x 6 1/2" x 46 1/2"	1
Recessed shelf back	birch ply	3/4" x 5" x 46 1/2"	1
Back panel	birch ply	3/4" x 12 3/4" x 46 1/2"	1
Doors	birch ply	3/4" x 19 1/2" x 23 1/2"	2
Adjustable shelves	birch ply	3/4" x 19 3/4" x 22 1/4"	2
Edging	hardwood	1/4" x 3/4" x 70' *	1
For the Supports and Braces			
Vertical rails	hardwood	3/4" x 2 1/2" x 66"	4
Vertical spines	hardwood	3/4" x 1" x 63"	4
Horizontal rail	hardwood	3/4" x 3" x 49"	1
Horizontal spine	hardwood	3/4" x 1" x 47"	1
Large spacers	hardwood	1/2" x 4 1/2" x 15"	2
Small spacers	hardwood	1/2" x 3/4" x 4 1/2"	2
Fixture spacers	hardwood	1/2" x 3 1/4" x 4 1/2"	4
For the Fixed Shelves			
Shelf panels	birch ply	3/4" x 20 1/2" x 46 1/2"	2
Edging	hardwood	3/4" x 1" x 25'*	1
Shelf surface	plastic laminate	24" x 48"	3
Shelf risers	hardwood	3/4" x 1 3/4" x 22"	8
Shelf spacer sides	hardwood	3/4" x 3" x 19"	2
Shelf spacer front and back	hardwood	3/4" x 3" x 45"	2
Accessories and Hardware			
Fluorescent fixtures		48"-long	2
Timer			1
Power Bar			1
Plant trays		LV#PK404	4
Door pull	trowel	LV#01W94.08	1
Door Pull	fork	LV#01W94.07	1
Magnetic catches			2
Casters		3" dia.	4
Bolts		1/4" dia. x 1"	4
Bolts		1/4" dia. x 2 1/2"	4
Nuts		1/4" dia.	12
Fender washers		1/4" dia.	8
Cam clamps		LV#05J51.01	4

Shelf pin sleeves			24
Shelf pins			8
Cup washers	nickel plated	for #8 screws	24
Piano hinges		3/4"-wide x 20"	2
Piano hinge screws		#5 x 1/2"-long	approx. 100
Flathead screws		#8 x 2"	36
		#8 x 1"	18
		#8 x 1 3/4"	22
		#8 x 1 1/4"	40
Pan head screws		#8 x 1/2"	8
		#8 x 3/4"	16
*total length required			

115

PORCH SWING





List of Materials

(finished dimensions in inches)

A	Slats (21)	3/8 x 1-1/2 x 52
B	Back Supports (3)	7/8 x 2-1/2 x 19-1/4
C	Bottom Supports (3)	7/8 x 2-1/2 x 19-1/4
D	Arm Rests (2)	3/4 x 4 x 23-1/2
E	Arm Braces (4)	3/4 x 1-1/2 x 13
F	Arm Posts (4)	7/8 x 1-1/2 x 9-1/2

Hardware

(all dimensions in inches)

Eye Bolts (2) – Heavy Gauge	3/8 x 4
Carriage Bolts (10)	3/8 x 2-1/2
Washers (14) – To fit Carriage Bolts	3/8
Nuts (14) – To fit Carriage Bolts	3/8
Brass Wood Screws (68)	#8 x 1-1/4
Brass Wood Screws (6)	#8 x 1
Heavy-Gauge Chain	25 feet

STEP 1:

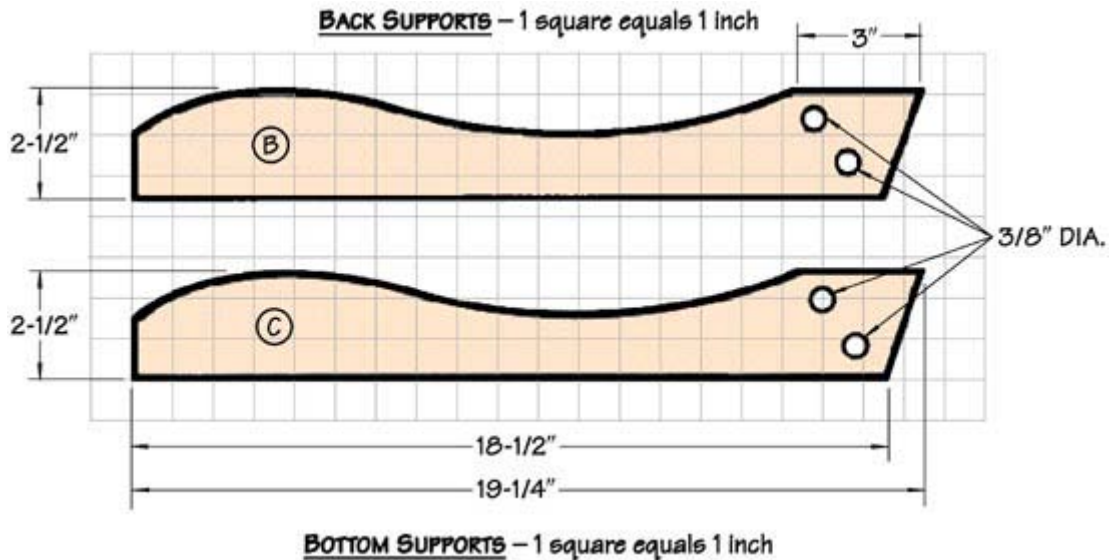
Plane your stock for the three back supports ([B](#)), three bottom supports ([C](#)) and 21 slats ([A](#)) to the desired thickness. Our guidelines call for 7/8-inch, 7/8-inch and 5/8-inch, respectively. Remember, you may choose to make these parts thicker if you are lengthening the swing or using lumber that may not be as strong as oak.

STEP 2:

Cut the back supports (B), bottom supports (C) and slats (A) to size/length, according to the [List of Materials](#).

STEP 3:

Using your bandsaw or scroll saw, cut out the contours for the [back and bottom supports \(B & C\)](#). For best results, use the pad sawing technique with double-faced tape to cut multiples of the same profile at the same time.



STEP 4:

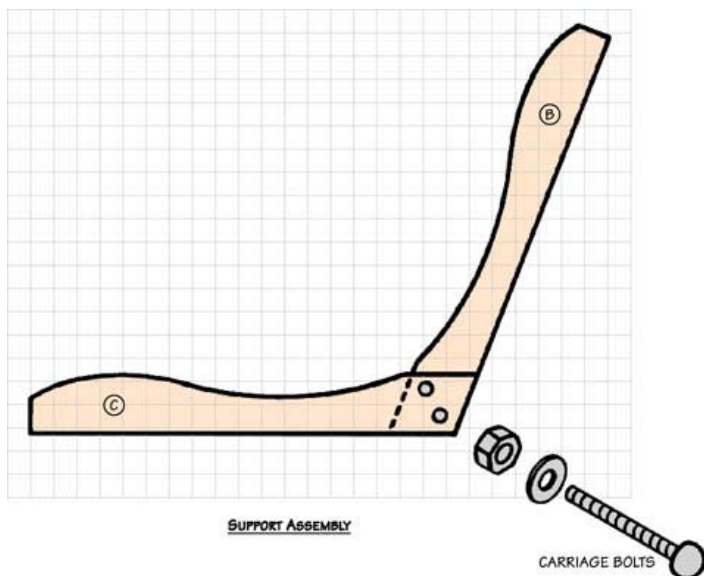
Using your drum sander, sand all the support profiles (B & C) while they're still taped together.

STEP 5:

Again . . . while they're still taped together . . . drill 3/8-inch diameter holes at the locations indicated in the [support pattern](#).

STEP 6:

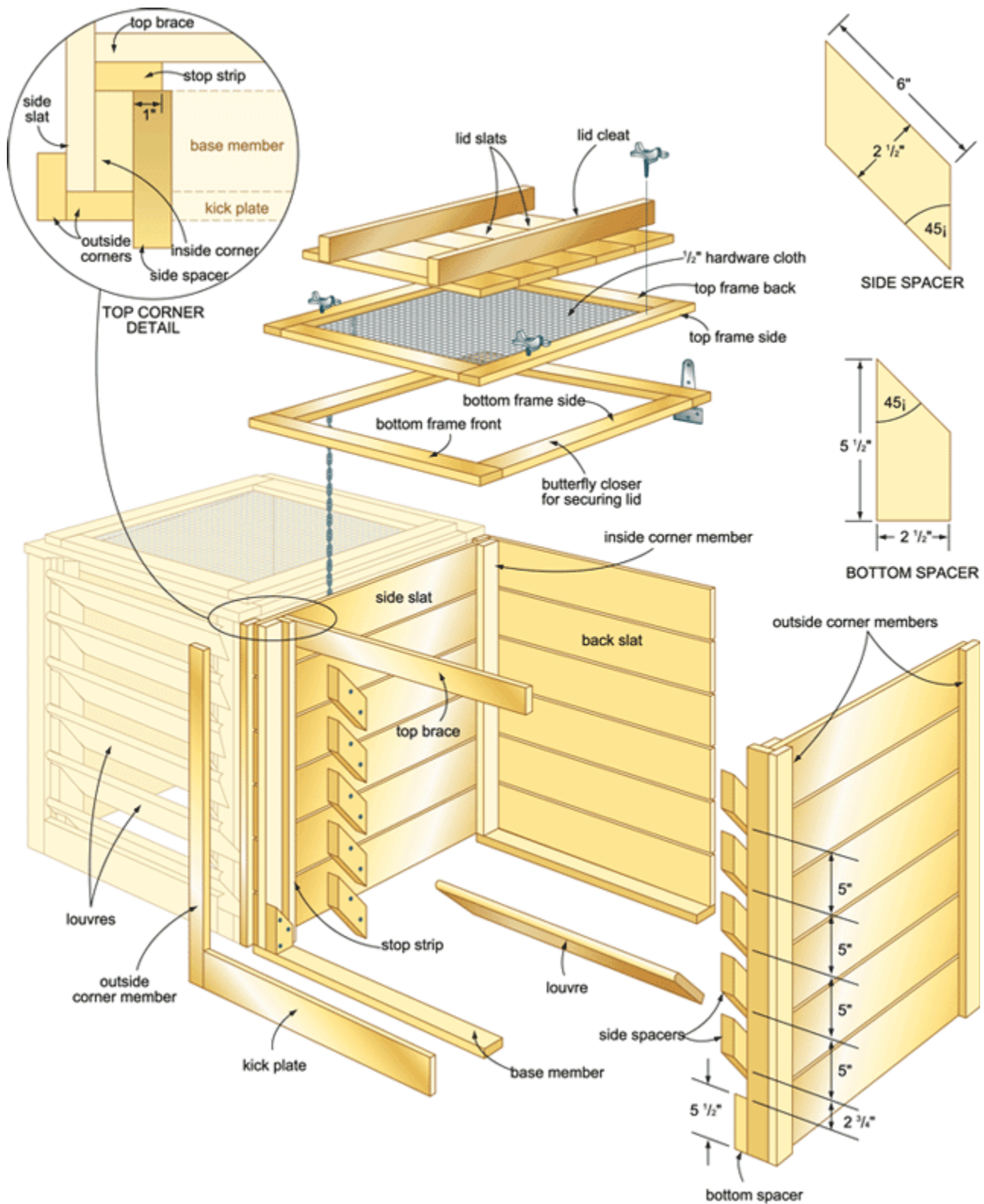
Untape the back and bottom supports (B & C) and assemble them with carriage bolts, washers and nuts. Tighten securely (see [Support Assembly](#)).



116

GARDEN COMPOST BIN





Start building the box by cutting 18 side and back slats, and four spruce inside corner members. Next, place two corners on your workbench, 34" apart, with their 2 1/2" faces down. Now attach six side slats to these parts, ends flush with the outer edges of the corner members and a 1/2" space between each slat. Fasten the slats and corners with one screw per joint initially, then square the frame by equalizing diagonal measurements taken corner to corner before adding two more screws per joint to lock the assembly firm. Build the opposite side frame exactly the same, then stand both upright, 34" apart, and join them with the remaining six slats to produce a three-sided, free-standing box.

Next, prepare the six outside corner members and add one to each back corner of the box, flush with the back face as shown on the plans. Attach two more outside corners to the front face of sides, and the final two on the outside faces of the sides.

you'll discover, the outside corner members add considerable strength to the unit, and cover the exposed ends of the slats, for a neater, trimmed look.

Cut the two stop strips to size and attach them to the backside of the front inside corners. The plans show how these strips overlap the inside corners by 1" along their length and prevent the removable louvres from dropping into the composter.



Louvres help aerate your compost pile, and because they're removable, you can take a few out to reach finished compost at the bottom, or take them all out and turn the whole pile over.

them in place as shown on the plans. Cut and install the base members while you're at it. These are designed to snug into the ground, boosting stability. Cut the removable baffles next, slide them home, and the body of your composter is done.

The composter lid has two parts: an outer, screened double frame and an inner lid that sits within it. Start by joining the top and bottom members together into two frames using weatherproof glue and biscuits or dowels. Next, stretch and staple the hardware cloth to the top surface of bottom frame. Place the smaller frame on top, then clamp the assembly together before joining the two frames with 2" screws driven from underneath.

The removable portion of the lid is simply five pieces of wood laid edge to edge and joined into one unit with two top cleats screwed 2" from the lid slat ends. Attach four butterfly closers to the top of the frame to hold the lid in place, a chain to stop the lid from flopping back too far when open, and hinges.

Occasionally you'll want to remove the lid to screen finished compost into a wheelbarrow or a bucket. Remove the hinge pin by grinding off one end and replace it with a large spring pin—a kind of removable cotter pin you can get at hardware stores. Now when you want to move the screen, just pull the pins out.

Once you've screened out any pieces that haven't composted completely, you'll have struck gold—pure, black, garden gold.

You Will Need

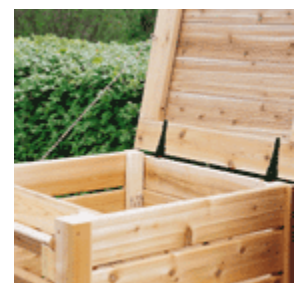
For the Body	Material	Size	Qty.
Side and back slats	cedar	1" x 5 1/2" x 34"	18
Inside corner members	spruce	1 1/2" x 2 1/2" x 35 1/2"	4
Outside corner members	cedar	1" x 2 1/2" x 35 1/2"	6
Stop strips	cedar	1" x 2 1/2" x 35 1/2"	2
Bottom spacers	spruce	1 1/2" x 2 1/2" x 5 1/2"	2
Side spacers	spruce	1 1/2" x 2 1/2" x 8 1/2"	10
Kickplate	cedar	1" x 5" x 29"	1
Top brace	cedar	1" x 4" x 32"	1
Base members	spruce	1" x 2 1/2" x 34"	2
Baffles	cedar	1" x 5 1/2" x 28 7/8"	6

For the Lid

Bottom frame front & back	cedar	1" x 5" x 38"	2
Bottom frame sides	cedar	1" x 5" x 26 1/2"	2
Top frame sides	cedar	1" x 4" x 35 1/2"	2
Top frame front & back	cedar	1" x 4" x 29"	2
Lid slats	cedar	1" x 5 1/4" x 28 7/8"	5
Lid cleats	cedar	1" x 1 3/4" x 29 1/2"	2

Hardware

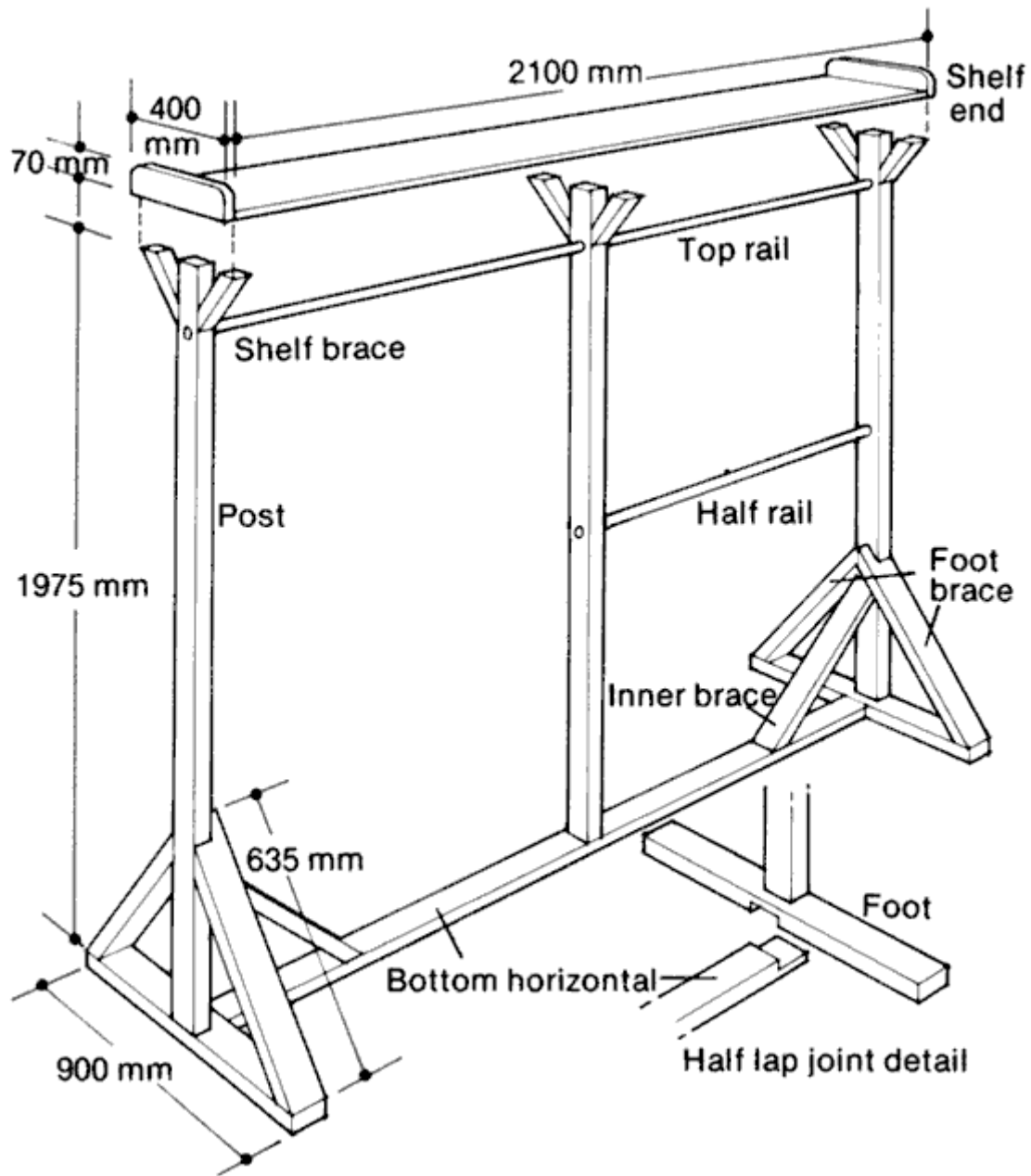
approx. 250 #8 x 2 1/2" deck screws; approx. 40 #7 x 2" deck screws; one 32" x 32" hardware cloth; a 3ft. chain and two eye-bolts; a pair of 5" strap hinges; one handle and 4 butterfly closers



Strong corner construction is essential for durability. Your composter has to withstand the forces of weather from the outside and the strain of a heavy pile of hot, rotting compost on the inside.

117 **CLOTHES RACK**





Part	Material	Length in mm
post (3)	70 x 37mm pine	1975
bottom horizontal (1)	70 x 37mm pine	2100
feet (2)	70 x 37mm pine	900
feet braces (4)	70 x 37mm pine	635
inner braces (2)	70 x 37mm pine	625
shelf (1)	19mm edged particleboard	2100
		x
		400
shelf ends (2)	70 x 19mm pine	400
top rail (1)	25mm dowel	2063
half rail	25mm dowel	1031

You'll also need: 40mm and 60mm countersunk screws; wood filler.

Tools

Basic carpentry kit including a drill and mitre box.

Here's how:

1 Start by joining the feet to the bottom horizontal using half-lap joints. Drill and screw through the joints and into the bottom of the posts, using two screws for each joint.

2 To fit the leg braces, cut 45 degree angles at either end and saw out a 37mm x 35mm section at the top end to enable them to fit around the post and the foot. Mitre the ends of the inner braces and screw in place. Screw the central post in place through the bottom of the horizontal.



Right foot and brace, see diagram above.

3 Glue and screw shelf ends in to the shelf. Screw through the shelf into the top of the end posts, remembering to face the finished timber edge of the shelf to the front.

4 Drill holes in the posts to take dowel rails. Position the top dowel 150mm below the shelf and half rail 900mm up from the floor. Drill holes slightly larger than the dowels, noting that you should drill only halfway in to the outer posts to accommodate the ends of the dowels. Drill and screw into the dowel ends through the posts.

5 Fit and screw the shelf braces in place and fill and sand all screw holes. Paint if required.

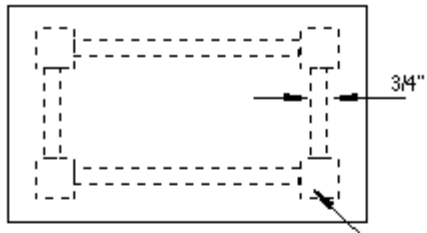


Right upper shelf and brace, see diagram above.

118

BEDSIDE TABLE





OAK
CHERRY
MAHOAGANY

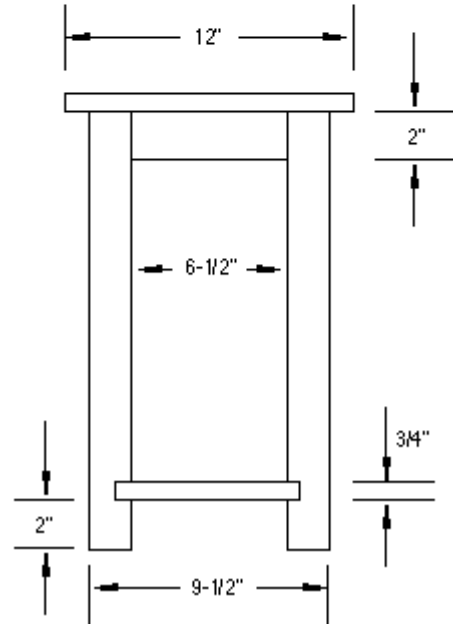
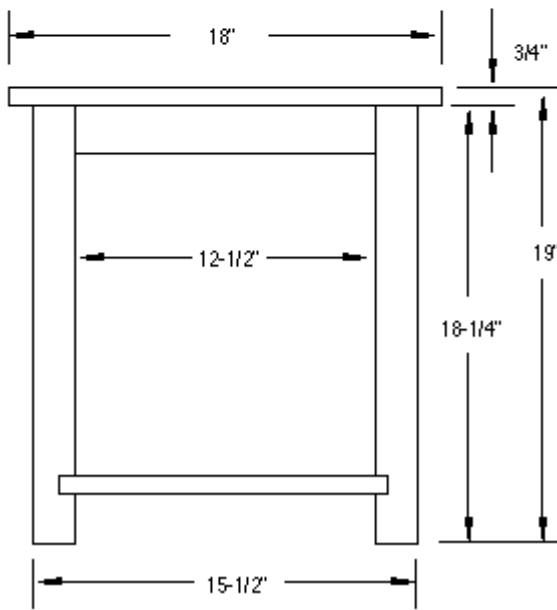
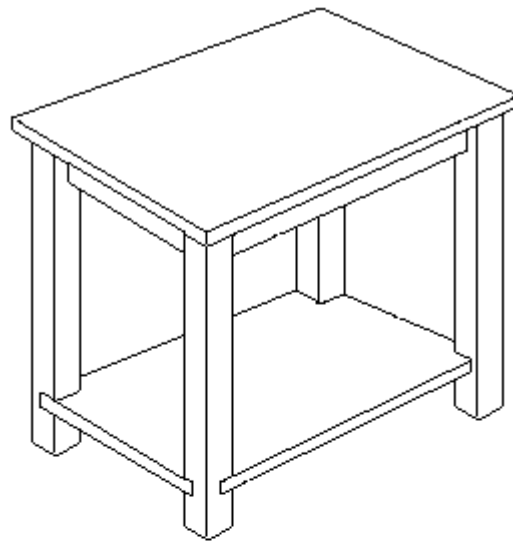
WALNUT
WILLOW
MAPLE

1-1/2" sq.

RAILS DOWELED
TO THE LEGS

RAILS SCREWED
TO THE TOP

SHELF FITS
INTO DADOES
IN THE LEGS



Procedure

I. Top and Shelf

1. Lay out rough dimensions of all parts on wood.
2. Cut pieces to rough dimension lengths.
3. Joint one edge of each piece.
4. Cut and glue pieces edge to edge to make the top. (Glue oversize.)
5. Cut and glue pieces edge to edge to make the shelf. (Glue oversize.)
6. Let glue cure overnight.
7. Plane to 3/4" thick. * If you started with 3/4" stock, keep it as thick as possible.
8. Cut to finished size on the table saw.
9. Sand smooth.

10. Rout the top edge of the top with whatever edge-forming bit you like. * DO NOT ROUT THE SHELF!
11. On the shelf only, cut a 3/4" X 3/4" square off each corner to fit into the legs.

II. Legs

1. Face-glue two 3/4" thick by 1 1/2" wide leg pieces to make four leg blanks 1-1/2" X 1-1/2" X 20". Use straight finished wood.
2. Using the router table, rout a 3/8" roundover on each edge.
3. Square cut one end of each leg on the miter box.
4. Measuring from the squared end, mark and cut the other end of each leg to 18-3/4".
5. Sand smooth.

III. Rails

1. Cut rails to 2" wide.* You may wish to cut slightly oversized and joint to 2". Machine the two short rails together as one piece and cut into two short lengths after all machining is done. * Make sure to use proper push blocks and safety procedure for the jointer.
2. Cut one end of each rail square on the miter box or table saw.
3. Measuring from the squared end, mark and cut two long rails at 12-1/2" and one extra long rail into two short rails at 6-1/2".
4. Drill a 3/8" hole 1" into the edge of each rail. Then drill a 9/64" pilot hole the rest of the way through. (The holes will be used to attach the top to the table.) * The hole should be approximately centered on each piece.
5. Elongate the hole on the upper side by coming in from the top with a drill and carefully wiggling the drill around to end up with a tapered hole. This will allow for a little movement in the table. Wood shrinks and expands with changes in temperature and humidity, and without an allowance for movement, the table could crack at some point in time.

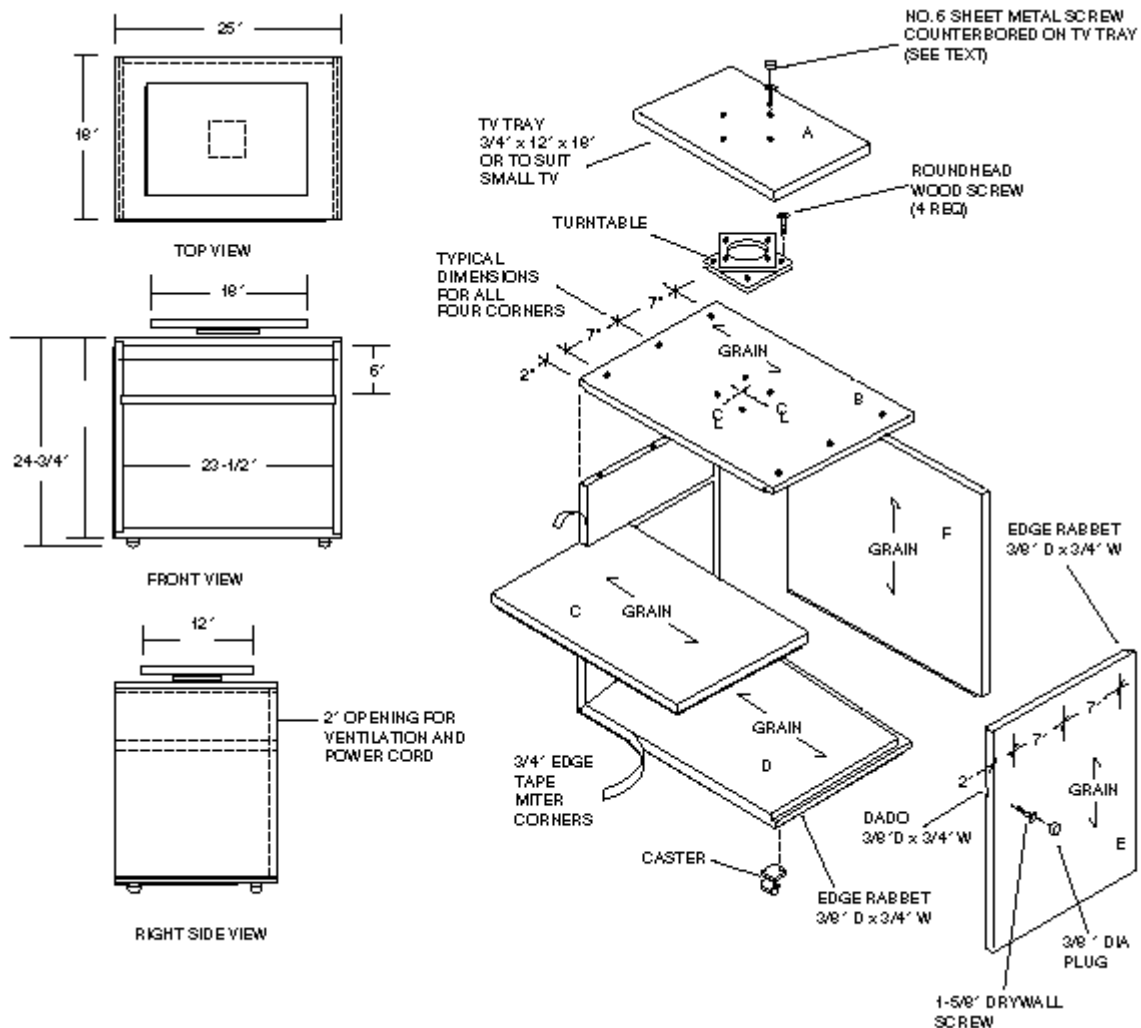
IV. Assembly

1. Take the four legs and cut a 3/4" dado 3/4" deep in two adjacent edges approximately 2" in from one end. * These dados support the shelf.
2. Finish sand all pieces.
3. Use either dowels or biscuits to attach the rails to the legs.* You must insert the shelf before you glue the rails to the legs.
4. Attach the top using four #6 X 1-5/8" drywall screws. * The screws slide through the holes that you drilled in your rails.

119

TV/DVD CABINET





Builder's Tip: When building quality furniture, remember all wood grains should "run" in a certain direction. For this project: sides and back - vertical; top and bottom - left to right.

1. After checking direction of wood grain, rough cut all members (slightly oversized). Note: The easiest way to work a large sheet of plywood initially is by placing it on top of three lengths of 2x3s laid across a pair of sawhorses. This improvised "table" puts the material at a convenient height.
2. Using a securely-clamped 4-ft. T-square as the straightedge, carefully trim the top, shelf, bottom and side pieces to size. Note: Back and tray piece will be trimmed later.

Builder's Tip: Whether you use a table, radial arm, or portable circular saw, a fine tooth, plywood veneer blade should be installed to ensure perfectly clean cuts. Always cut wood with the veneer side down when using a portable circular saw, and with the veneer side up when cutting with table and radial arm saws.

3. Mark locations for ploughing all dados and rabbets on sides, top and bottom pieces.

Builder's Tip: No edge rabbet is required at back edge of the top piece to accommodate the back piece because the back is installed with a 2" space between its top edge and the cabinet top. This space ensures ventilation for the VCR, plus easy ingress/egress for the cords.

4. Plough grooves and rabbets using a 3/4" straight bit in the router guided by a securely-clamped straightedge. If necessary, set up dado heads in the table saw to make these cuts.

Builder's Tip: Cut edge rabbets for bottom piece in veneer side of plywood, so "good" side will face up into the cabinet. All other rabbets should be cut into the non-veneer or "lesser" side of the plywood panels.

1. Temporarily assemble cabinet by tack-nailing parts together with partially driven 1-1/4" finishing nails; if necessary, use several bar clamps as well. Note: Try to position nails where 1-5/8" drywall screws will eventually be driven, so nail holes will not be visible in veneer.
2. With piece assembled, bore screw holes using a counterbore bit, which makes the pilot, shank, countersink and counterbore holes in one step. Note: Drive home several strategically-placed screws to secure the piece until all the holes are bored.
3. With piece assembled, measure and trim back piece to size; temporarily install with veneer side out.
4. Lightly sand cabinet using 150-grit paper in the pad sander; always use with-the-grain strokes. Thoroughly dust all surfaces and disassemble.
5. Reassemble cabinet using carpenter's glue and 1-5/8" drywall screws. Immediately install back piece to ensure that cabinet remains square during glue drying period. Note: Since you may want access to cabinet from the back in the future, install back using screws only - no glue.
6. Use flexible veneer tape to cover exposed plywood edges:
 - a. Cut tape slightly overlength for each edge.
 - b. Work one edge at a time; apply contact cement to back of tape and mating surface, allowing adhesive to dry until it can be touched with a piece of clean brown paper without sticking.
 - c. Carefully position first end of tape and guide along edge. Trim off any overlap.
 - d. Allow entire assembly to rest for at least four hours.

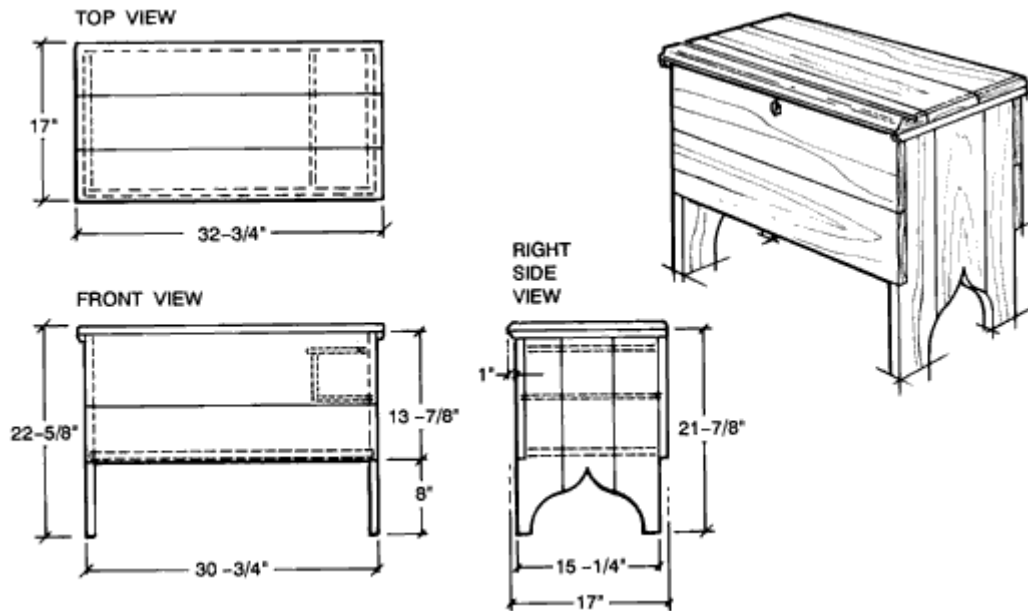
III. TV Tray

1. Trim TV tray to size.
2. Install turntable (swivel) hardware. Note: Select and install turntable hardware that will accommodate the size and weight of the television it will support.
 - a. Center "blind" side of turntable on tray's underside and mark screw holes.
 - b. Remove turntable and bore holes for four No. 6 (1" long) self-tapping screws. On top side of tray, bore countersink holes (about 1/4" deep) using drill and countersink bit, so screw heads will be slightly below the wood surface when turned home.
 - c. To make certain that self-tapping screws are correct length and won't interfere with turntable operation, temporarily attach the tray to the turntable by driving at least two of the screws into the turntable's small holes.
 - d. Remove turntable from tray.
 - e. Center turntable on top of cabinet; "blind" side up, mark and bore pilot screw holes for bottom plate.
 - f. Lubricate turntable's ball bearings with a light to heavy oil, depending on the degree of rotating action wanted.
 - g. Mount turntable on cabinet using four 1" No. 8 roundhead wood screws.
 - h. Place the tray on the turntable using 6d finishing nails as guide pins to position the pre-drilled holes over the small turntable holes. Remove nails one at a time and drive home four self-tapping screws.
3. Cut the required number of 1/4" long dowel plugs from a length of 3/8" dowel to conceal screws holding cabinet together. To keep sanding on veneer surface to a minimum, do not cut plugs too long. Squirt glue into each hole and press plugs into place. Immediately remove excess glue from surface with clean, damp rag. Allow glue to dry overnight if possible.
4. Position plate casters on underside of bottom piece; mark for screws and bore pilot holes.
5. Fasten casters to cabinet bottom using screws that come with the hardware.
6. Inspect cabinet inside and out for smoothness. Sand lightly where necessary and wipe clean.

120

PINE BLANKET CHEST

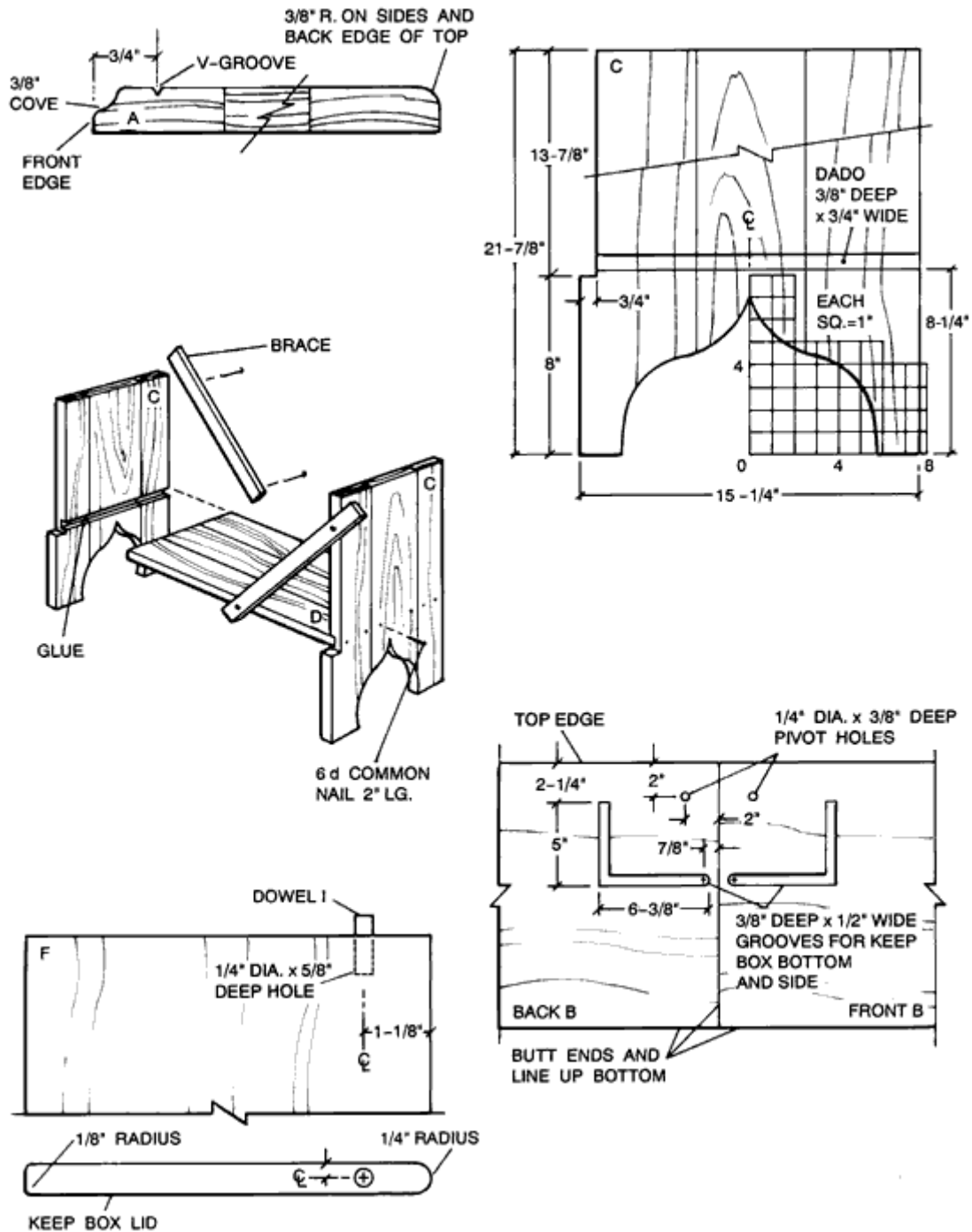




Steps for building the Pine Blanket Chest:

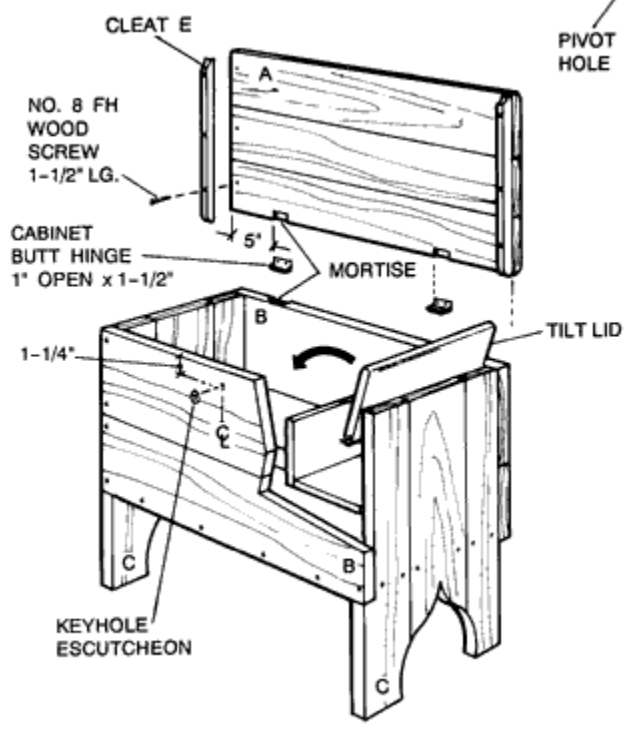
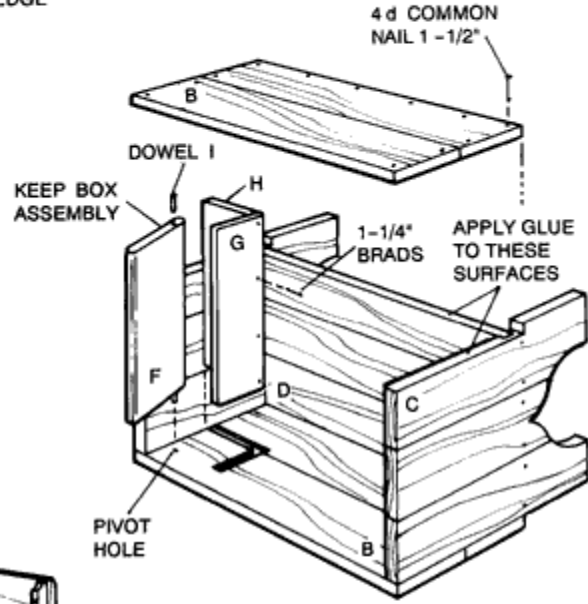
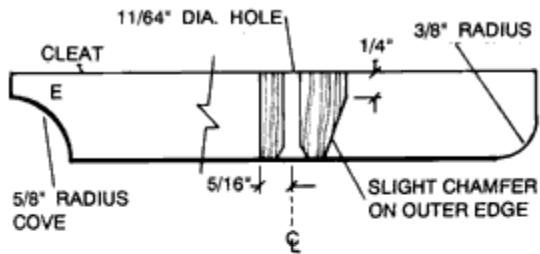
1. Cut all parts to size (see the cutting list); note that Parts A, B, C and D are initially cut slightly over-length to make edge-joining easier. Using glue and no. 20 biscuits, join the boards to make up six members (front, back, ends, bottom and top): use bar clamps to keep all sections tightly joined while the glue dries. The next day, these parts can be cut to their actual sizes, as shown in the drawing.
2. Shape the front edge of top A with a cove cutter chucked in the router. Then, replace the cove cutter with a V-groove cutter to rout the shallow V-cut along the front edge as shown. Finally, switch to a 3/8-in. rounding-over bit to shape the ends and back edges of top, A.
3. Lay out the leg shape on 1/4-in. plywood or hardboard and cut it out. Sand the cut edges smooth to remove any irregularities left by the saw blade. Set the pattern aside for use in Step 5.
4. Position the end panels back-edge to back-edge with inside surfaces up. With a framing square, check across leg bottoms to make certain they are perfectly aligned. When they are, apply light pressure with a bar clamp to hold them in place. Then, lay out the location of the dado, which will receive the bottom member, on the interior surfaces. After determining the router shoe offset (i.e.; the distance from cutter edge to shoe edge) with the 3/4-in. straight cutter in its chuck, clamp or tack a straightedge to serve as a guide for ploughing the dado across both boards at one time.
5. Next, tack the two end pieces together, with inside surfaces (the planes with dadoes) abutting. Trace the leg pattern onto the top member. Cut out the notch at front using a band saw or handsaws (rip and crosscut). Then, cut out the leg shape using either a saber or scroll saw.
6. After all chest parts have been cut to shape and size, plane the surfaces to remove any squeezeout where boards are joined. Smooth all boards beginning with 100-grit sandpaper and finish with 120-grit.
7. Cut the parts for the Keep Box to size.
8. Then, position the chest front and back members edge-to-edge (i.e.; the front's right edge should abut the back member's left edge, with their top edges aligned) so the grooves to receive the Keep Box front and bottom panels can be laid out. Rout grooves 3/8-in. deep using a 1/2-in. straight cutter; make certain you also use tacked-on guides to prevent the router from "walking off" the cutting line when you rout. At this time, also lay out and bore the blind holes, which will receive the lid's dowel hinges.
9. Round over the front edge of the Keep Box lid and bore the dowel holes. Glue-in the dowel "hinges."
10. Final pre-assembly step; shape the cleats as shown, bore the screw pilot and countersink holes and attach cleats to the underside of the top using glue and wood screws, as shown.

Cabinetmaker's Tip: Notice the shape (cross-section view) of these cleats. You will find it easier to obtain this shape if you chamfer cleats before installing them on the top.



Assembling the Pine Chest

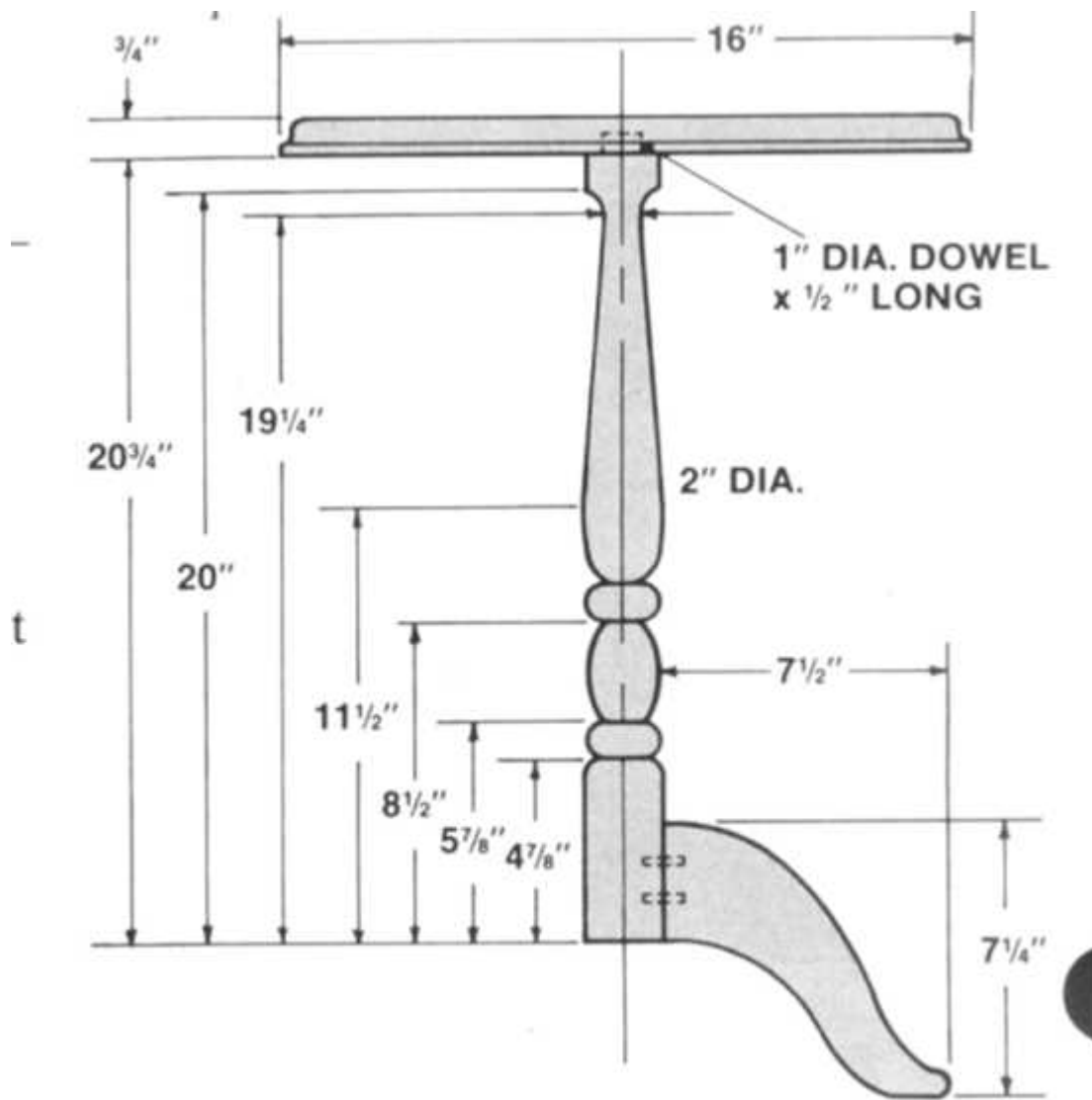
11. Fasten the back to the chest bottom and legs using glue and 1-1/2 in. common nails. (Nail heads should be set slightly below the surface after the cabinet is fully assembled.)
12. Lay the carcass on its back and install the Keep Box bottom and front into the slots in the carcass back, without glue. If necessary, apply clamp pressure to ensure that these parts are fully seated in their slots. Nail Keep Box front to bottom front using 1-1/4 in. brads.
13. Apply glue to front edges of chest legs and bottom and install front with Keep Box parts positioned in the slots in front member and the lid dowel hinge placed in its respective hole. When all is in place, fasten front to carcass with glue and nails.
14. Stand the chest upright and put the top in place. Then, mark and cut the hinge mortises in both top and back members.
15. Locate the position for the false keyhole at front; bore a small hole, about 1/4-in. deep. Paint the hole interior black or, use a permanent black ink marker.
16. Install hinges and the keyhole escutcheon plate so you can make certain that carcass and top align. Make any necessary adjustments if they do not. When satisfied with the fit, remove the hardware so you can move on to the next step--finishing.



121

CONCORD TABLE





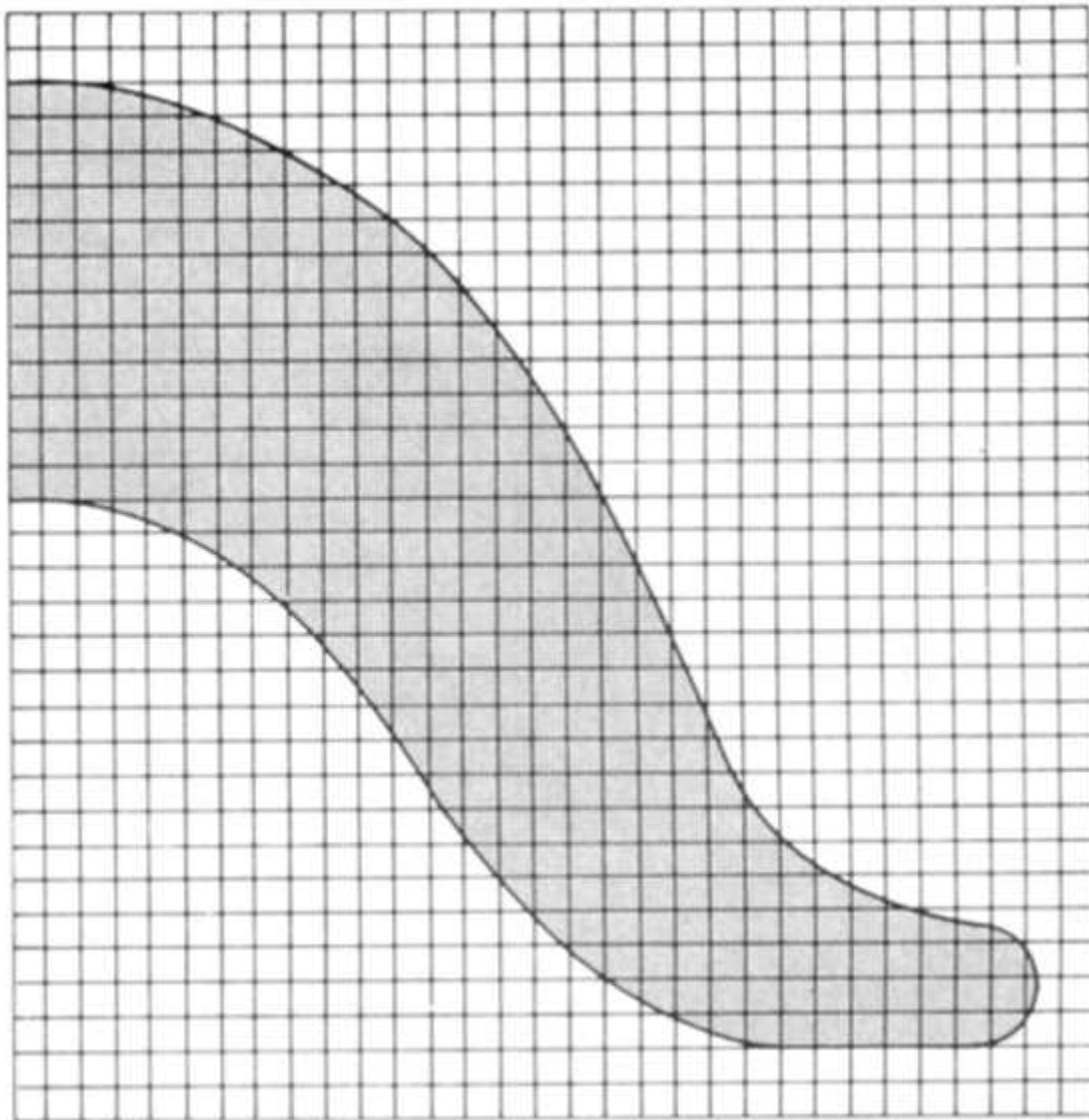
LIST OF MATERIALS

Finished dimensions in inches

- A. Spindle 2 dia. x 21 1/4 stock
- B. Top 3/4 x 16 dia. Stock
- C. Leg (3) 3/4 x 7 1/4 x 7 1/2
- D. Dowels (10) 3/8 dia. X 1 1/2 (hardwood)
- E. Top Brace 3/4 x 3 x 12

1. Cut stock to size according to List of Materials. Layout the spindle pattern (A) on a piece of 1/4" thick stock.
2. Use a scroll saw, Bandsaw or jigsaw to cut out the pattern and sand all sawn edges smooth. You now have the template for the lathe duplicator.
3. Mount the template on the lathe duplicator per your Owner's Manual.
4. Turn part A from a piece of 2" diameter x 21 1/4" stock.

5. Sand the spindle.
6. With the Mark V in the horizontal boring mode, drill the 3/8" diameter holes for the dowels "D" in the legs "C."
7. Use the grid pattern to layout the pattern for the legs "C."
8. Transfer the pattern to three pieces of stock 3/4" x 7 1/4" x 7 1/2".
9. Use a scroll saw, Bandsaw or jigsaw to cut out the legs. Save one piece of scrap from the outside curve for future use.
10. Use a drum sander to sand the curves of the legs.
11. Use a router with a piloted 1/4" rounding over bit to shape the curved edges of the legs. Do not shape the straight section.
12. Use a drum sander to sand a concave curve in the straight portion of the leg. This makes for a better fit when attaching the legs to the spindle.
13. Sand the legs and set aside.
14. Divide the base diameter of the spindle into three equal parts 120 degrees apart. Draw vertical lines on the base of the spindle to form the centerlines for the leg dowel holes.
15. Use dowel centers to mark the holes to be drilled in the spindle. In the vertical drill press mode, drill the 3/8" diameter holes in the spindle. Set up the table and rip fence to form a V-block to cradle the turning.
16. Glue and clamp the legs to the spindle, one at a time, to allow each leg time to set up. The scrap cutting from Step 9 will aid in clamping. With a square, check the bottom of the leg to assure it's square to the outside of the spindle.
17. Glue and clamp the stock to form the 16" x 16" piece for the top (B). Let glue dry for at least 24 hours.



1/4" Squares

1. Layout the 16" diameter circle for the top. Belt and surface of top blank smooth.

NOTE: Mark the center for future use.

2. With a scroll saw, Bandsaw or jigsaw cut out the top (B).
3. Disc sand the edges of the top.
4. Use a router with a 1/4" Roman ogee bit to shape the top edge of B. **NOTE:** The surface with the marked center should be on the bottom.
5. On the bottom of the table top, use a 1" Forstner or Brad-point bit to drill a 1" diameter hold through to brace (E).
6. Sand the table top.
7. Cut angled ends on brace with Bandsaw. Sand with disc sander or belt sander. Drill for screw holes.
8. Screw the top brace to the spindle.
9. Screw the brace to top.
10. Apply the finish of your choice.

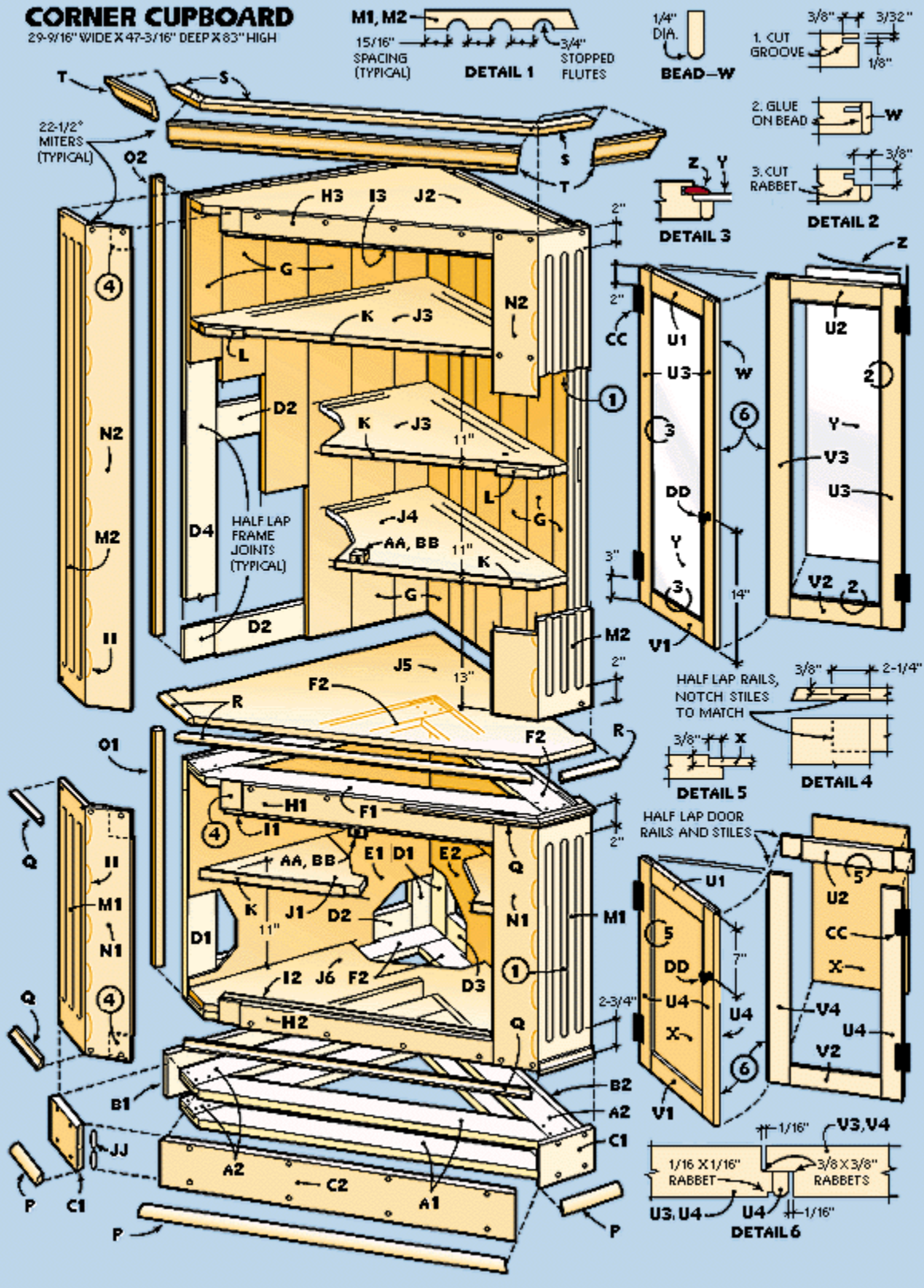
122

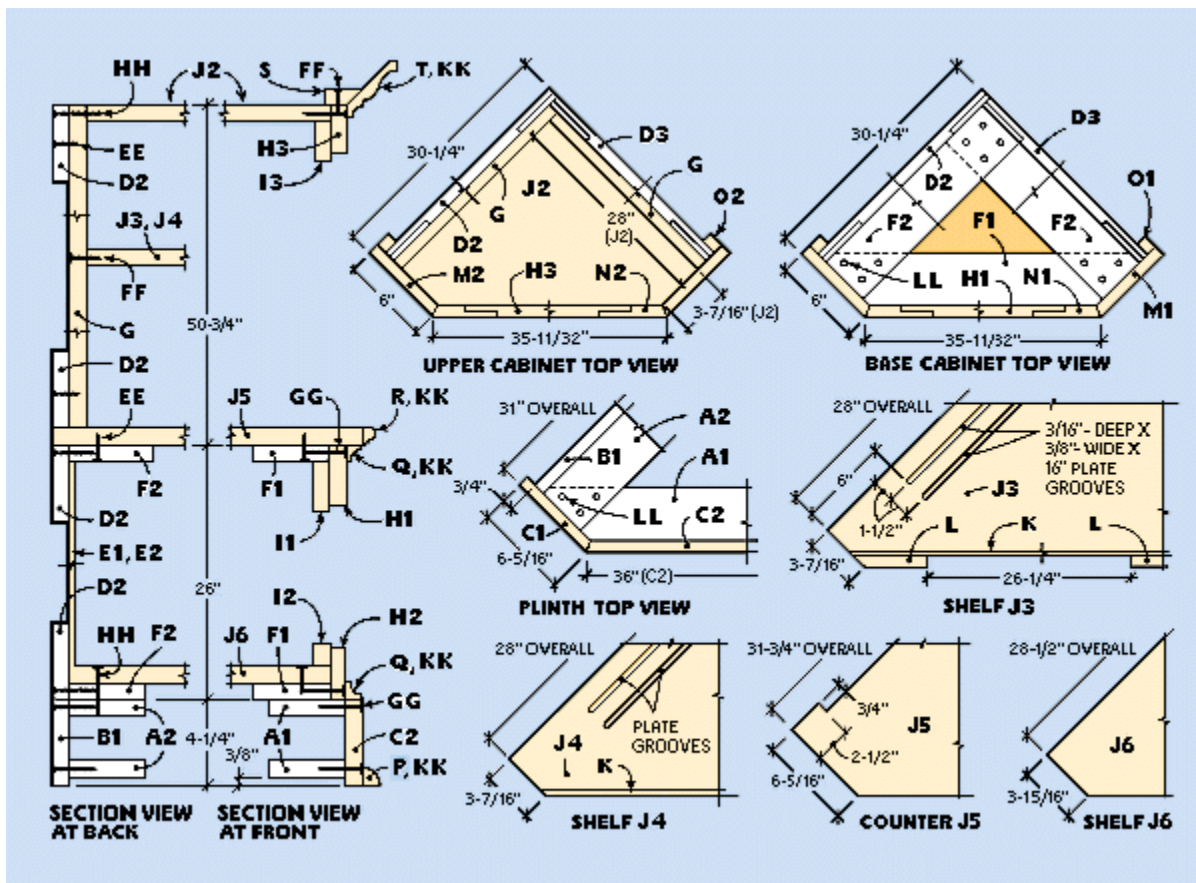
CORNER CUPBOARD



CORNER CUPBOARD

29-9/16" WIDE X 47-3/16" DEEP X 83" HIGH





Materials List

Key	No.	Size and description (use)
A1	2	3/4 x 3 1/2 x 41 3/4" pine (plinth frame)
A2	4	3/4 X 3 1/2 X 29 1/2" pine (plinth frame)
B1	1	3/4 X 4 1/4 X 30 1/4" pine (plinth back)
B2	1	3/4 X 4 1/4 X 29 1/2" pine (plinth back)
C1	2	3/4 X 4 1/4 X 6 5/16" pine (plinth front)
C2	1	3/4 X 4 1/4 X 36" pine (plinth front)
D1	4	3/4 X 3 1/2 X 26" pine (back frame)
D2	5	3/4 X 3 1/2 X 29 1/2" pine (back frame)
D3	5	3/4 X 3 1/2 X 28 3/4" pine (back frame)
D4	4	3/4 X 3 1/2 X 50" pine (back frame)
E1	1	1/4 X 24 1/2 X 28 3/4" plywood (back panel)
E2	1	1/4 X 24 1/2 X 28 1/2" plywood (back panel)
F1	2	3/4 X 3 1/2 X 40 5/8" pine (frame)
F2	4	3/4 X 3 1/2 X 28 3/4" pine (frame)
G	12	3/4 X 5 1/2 X 50" pine (back panel)*
H1	1	3/4 X 2 3/4 X 30 9/16" pine (rail)

H2	1	3/4 X 2 3/8 X 30 9/16" pine (rail)
H3	1	3/4 X 2 1/4 X 30 9/16" pine (rail)
I1	1	3/4 X 2 1/4 X 30" pine (doorstop)
I2	1	3/4 X 1 X 30" pine (doorstop)
I3	1	3/4 X 1 3/4 X 30" pine (doorstop)
J1	1	3/4 X 26 5/8 X 26 5/8" plywood (shelf)
J2	1	3/4 X 28 X 28" plywood (top)
J3	1	3/4 X 28 X 28" plywood (shelf)
J4	1	3/4 X 28 X 28" plywood (shelf)
J5	1	3/4 X 31 3/4 X 31 3/4" plywood (counter)
J6	1	3/4 X 28 1/2 X 28 1/2" plywood (bottom)
K	1	1/4 X 3/4" X 12' pine (edge band)**
L	4	3/4 X 3/4 X 5" pine (spacer)***
M1	2	3/4 X 6 X 26" pine (side)
M2	2	3/4 X 6 X 50" pine (side)
N1	2	3/4 X 4 5/8 X 26" pine (stile)
N2	2	3/4 X 4 5/8 X 50" pine (stile)
O1	2	3/4 X 1 X 26" pine (cleat)
O2	2	3/4 X 1 X 50" pine (cleat)
P	1	3/4" X 5' pine quarter round (trim)**
Q	1	5/8 X 3/4" X 10' pine cove (trim)**
R	1	5/8 X 3/4" X 5' pine cove & nose(trim)**
S	1	3/4 X 1 3/4" X 5' pine (cleat)**
T	1	3 1/2" X 5' pine crown (trim)
U1	2	3/4 X 1 7/8 X 12 7/8" pine (top door rail)
U2	2	3/4 X 1 7/8 X 13 1/8" pine (top door rail)
U3	3	3/4 X 1 7/8 X 35" pine (top door stile)
U4	3	3/4 X 1 7/8 X 20 3/4" pine (lower door stile)
V1	2	3/4 X 2 1/4 X 12 7/8" pine (lower door rail)
V2	2	3/4 X 2 1/4 X 13 1/8" pine (lower door rail)
V3	1	3/4 X 2 1/8 X 35" pine (top door stile)
V4	1	3/4 X 2 1/8 X 20 3/4" pine (lower door stile)
W	1	1/4 X 3/4" X 22' pine lattice (beading)**
X	2	1/4 X 9 1/4 X 17" plywood (door panel)
Y	2	1/10 X 9 5/8 X 31 3/4" glass (door glass)
Z	1	15' glass retainer, No. 27078**†
AA	2	3/4 X 1 X 1 3/8" pine (latch block)
BB	2	magnetic latch
CC	2	pair H hinges, No. 76067

DD	4	knob, No. 76117
EE	As reqd.	1 1/4" drywall screw
FF	As reqd.	1 1/2" drywall screw
GG	As reqd.	2" drywall screw
HH	As reqd.	2 1/2" drywall screw
II	As reqd.	No. 20 joining plate
JJ	As reqd.	No. 0 joining plate
KK	As reqd.	1 1/4" finishing nail
LL	As reqd.	3/4" finishing nail
Misc: Glue, paint, and 1/8"-radius half-round router bit (part #TF82102) available at <i>Trendlines</i> , 135 American Legion Highway, Revere, MA 02151; call 800/767-9999 to order).		
* 1x6" beaded tongue-and-groove ** Overall quantity indicated, cut to length as required. *** Cut to fit †(available at <i>The Woodworkers' Store</i> , 4365 Willow Drive, Medina MN 55340; call 800/610-0883 to order)		

Case Construction

Begin by cutting 1 x 4 stock to length for all of the 31/2-in. frame members. Rip 1 x 6 stock to 41/4 in. for the wider plinth frame pieces. Mark all of the square half lap joints for the vertical and horizontal frames, and code the pieces with letters so you won't get them mixed up.

Build a router lapping jig by securing two 16-in.-long 1 x 6 boards to a worksurface so they're 31/2 in. apart. At one end of the space between the 1 x 6s, secure a 6-in.-long 1 x 4 stopblock between the boards. Then place the first workpiece between the 1 x 6s and against the stopblock. Measure the distance from the edge of your router's baseplate to the cutting edge of a 3/4-in. straight bit, and use this dimension to locate the four guide strips that will limit the router's path to the size of the half lap joint.

With the bit set for a 3/8-in.-deep cut and the workpiece butted against the stopblock, shape the half lap while moving the router within the four guide strips **(Photo 1)**. To cut the angled half lap joints in the horizontal frames, first lay the parts together and mark the 45 degree joints. Then, build similar jigs for these pieces and rout the half lap joints.



1 --Rout the half lap joints with a straight bit. Hold workpiece in a jig that has guide strips to confine the cut to the lap area.

Apply glue to the mating surfaces of all the joints, assemble and then drive four 3/4-in. nails from each side of each joint. Double-check that the frames are square and set them aside until the glue dries.

Crosscut boards for the upper and lower case sides and stiles to finished length. Then, plane one edge of each board straight and smooth. Adjust your circular saw for a 22 1/2 degree bevel and tack a straight-edge guide strip to each piece to cut the beveled edges **(Photo 2)** and plane smooth. Mark the joining plate locations and cut the slots with a plate joiner. If your plate joiner fence can't be set for the angled edge of the work, construct a 22 1/2 degree platform jig to hold the joiner square to the edge **(Photo 3)**.



2 --After planing one edge of the case sides and stiles, use a circular saw to cut 22 1/2 degree bevel. Use a straight strip to guide saw.

Before joining the case sides to the stiles, install a 3/4-in. corebox bit in your router and cut the stopped flutes in the sides. Use a router to make the cuts, as shown. If you don't have a router fence, mount your router to a shop-built sliding carriage **(Photo 4)**. Set the fence to make the two outer flutes first, then reset it for the middle flute. Rout the blind half laps at the top of the upper case stiles and at the top and bottom of the lower case stiles.



3 --Cut the plate joint slots in the beveled edges of the case sides and stiles. Build a jig to hold the joiner at 22 1/2 degrees if required.

To join the sides to the stiles, first make a set of L-shaped clamping brackets **(Photo 5)**. Cut the upper edge of the short leg of each bracket at 45 degree. Apply glue to the plate joints and along the beveled edges. Clamp the brackets to the case sides, and draw the sides to the stiles with bar or pipe clamps.

Next, glue and screw together the two rear
Copyright 2004 Martian Auctions

frame subassemblies to create the back corner frame for the upper and lower cases. Cut to length 12 50-in. pieces of 1 x 6 beaded tongue-and-groove pine. Then, starting at the corner of the upper case frame, attach the boards with glue and screws driven from the back of the frame (**Photo 6**). Rip the last board on each side to exact width before installing. Follow this step by adding the 3/4 x 1-in. cleats, as shown. Cut to size the plywood shelves, the upper case top, lower case bottom and counter with a circular saw and plywood blade. Use a sabre saw to finish the long notch on each back edge of the counter. Use a 3/8-in.-dia. corebox bit to rout the 3/16-in.-deep plate grooves in the three upper shelves.

Temporarily clamp the top and the three shelves to the upper case back assembly. Tack triangular blocks to the panels to provide clamping surfaces (**Photo 7**). Then, bore screw pilot holes for attaching the panels to the back assembly. Remove the shelves, add the edge banding and attach the spacer blocks, as shown. Reassemble the shelves and back with screws and glue. Mark the exact position of the upper face rail and install. Finally, bore countersunk pilot holes for installing the side/stile subassemblies and install with glue and screws (**Photo 8**). Join the triangular lower case frames to the rear frames with screws and glue (**Photo 9**).



4 --Use a corebox bit and router to make the stopped flutes. A shopmade carriage supports router in correct position.



5 --Attach L-shaped pieces to side to facilitate clamping side to stile. When the glue has cured, scrape away excess.



6 --After back frames have been assembled, secure the beaded paneling

with glue and screws driven from the back of frame.



7 --After cutting shelf panels, tack triangular blocks to corners and clamp panels to back assembly. Bore screw pilot holes.



8 --Join shelves to back with screws and glue. Then, apply glue and install side and stile assemblies with countersunk screws.

Attach the 1/4-in. plywood panels with glue and nails. Screw and glue the case bottom and shelf to the assembly, and add the face rails **(Photo 10)**. Finally, secure the side/stile subassemblies.



Miter the ends of the plinth face pieces and slot for plate joints. Then, screw and glue the plinth backs to the triangular frames. Add the long front face piece, and finish the assembly by attaching the ends **(Photo 11)**.

9 --Use screws and glue to join the triangular lower frames to the back frames. Bore pilot holes to avoid splitting the wood.

Doors And Trim

Rip the beveled cornice support cleat to size with a 45 degree bevel on one edge. Then, use a simple wood miterbox to cut the 22 1/2 degree miters at the exact length. Next, glue and nail the cleats to the case top.

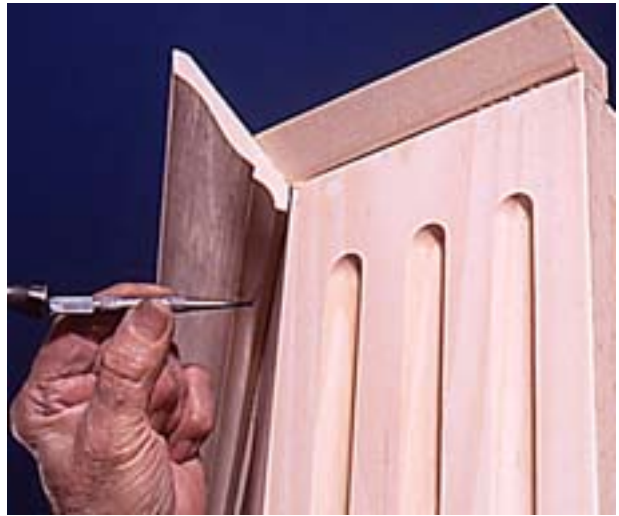


To cut the compound cornice miters, place the stock in the miterbox and tilt it at a 45 degree angle so its top edge is on the base of the miterbox and the back edge rests against the back of the miterbox. Cut the long section first. Then, cut the miters for the case sides to exact length. Attach the crown molding with glue and finishing nails **(Photo 12)**. Miter the remaining trimpieces to exact length, and install with glue and finishing nails **(Photo 13)**. Set all nails below the surface, fill and sand smooth.

10 --After the lower case frame and back panels have been assembled, add the rails that go across the top and bottom.



11 --Use plates to join the plinth face pieces. Join the long piece to the plinth frame first, then add the short endpieces.



12 --Attach the long crown section first. Miter the endpieces to exact length, and then glue and nail to cleat. Set nails and fill.



13 --Miter remaining molding to length, and install each profile, long piece first. Use glue and finishing nails.

After the molding has been installed, secure the plinth to the lower cabinet section with 2 1/2-in. screws. Use 2-in. screws to attach the counter to the upper case, and then attach the upper case to the lower case with 1 1/2-in. screws driven up into the bottom of the counter. Cut the door rails and stiles from 1 x 3 stock. Use a router to shape the half lap joints. Then, use a 1/8-in. slotting cutter to rout the stopped grooves in the upper doors for the glass-retaining strips (**Photo 14**). Set up your router table with a 1/8-in.-rad. half-round bit, and round one edge of the 1/4-in.-thick pine lattice for the door beading (**Photo 15**). Use the miterbox to cut the lattice to length. Then, attach the beading to the inside perimeter of the upper door frames -- and along the opening edge of the upper and lower left doors--with glue and 3/4-in. brads placed near the outer face of the door (**Photo 16**). Rout the rabbet for the glass, and square the corners with a sharp chisel. Then, rout the overlapping rabbets along the door-opening edges, as shown.

Install the glass, cutting the plastic retaining strips to exact length with a knife, and glue the 1/4-in. plywood panels in the lower doors. Finally, shim the doors, mark the hinge and knob screw locations and install the hardware (**Photo 17**).

To finish the cabinet, remove the glass and disassemble the sections. Apply one coat of latex primer, tinted to the final color, followed by one finish coat of paint. We used Sherwin-Williams Birdseye Maple Latex Satin House and Trim Paint. After it's dry, reassemble the cabinet.



14 --Use a router with a piloted slotting bit to cut the slots in the upper door frames for the plastic glass-retaining strips.



15 --Make the beading from 1/4-in. lattice. Cut the round edge with a 1/8-in.-rad. half-round bit mounted in a router table.



16 --Nail and glue the beading to the door-frame pieces. Then, cut glass and door overlap rabbets with a router and straight bit.

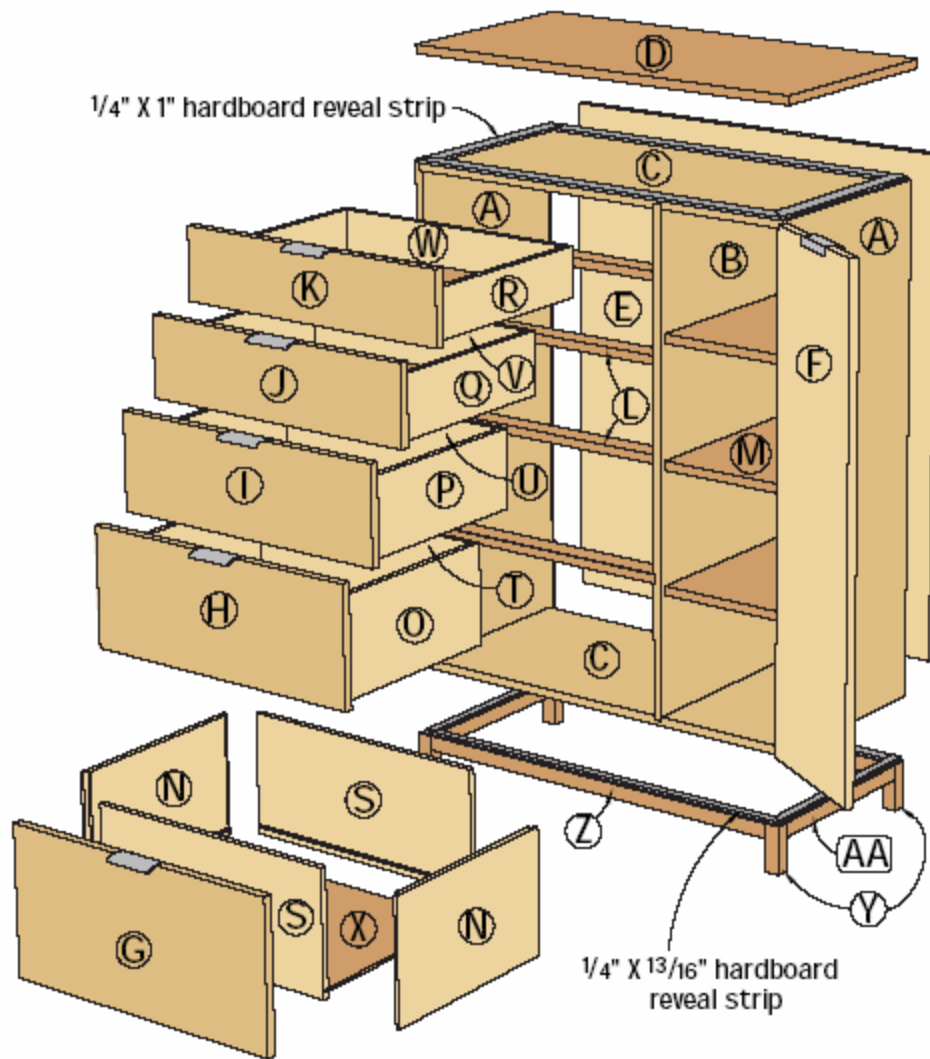


17 --Clamp upper doors in place and shim to achieve equal clearance all around the frame. Then, install the H hinges.

123

WARDROBE





Construction begins by cutting the case pieces to size. Next, cut 3/8" x 3/4" rabbets on the back, top and bottom of both side pieces to accept the back, top and bottom. Also rabbet the top and bottom pieces on the back edge to hold the back. Now cut a 3/8"-deep x 3/4"-wide dado in the top and bottom pieces to leave an 11" opening between the right side and the vertical partition.

Before rushing to assemble the case, there are a few things to do first. Cut your four drawer dividers to size and apply veneer tape to the front edge of each. Mark the location of the drawer dividers and decide whether you want to use biscuits or dowels to hold the drawer dividers in place between the left side and the partition. The drawer openings are graduated in size and should be as follows from top to bottom: 5"; 5-7/8"; 7-1/4"; 9" and 11-1/8".

Because the door section of the wardrobe is only 11" wide, it's a good idea to pre-drill the right side and partition for shelf pins and also for the European-style hinge plates before assembly. One more pre-assembly task: sand the inside of the shelf section and the part of the back that's visible. You'll be glad you did.

Now assemble the case using glue and by driving nails through the top and bottom pieces into the sides and partition. When in place, the drawer dividers should be proud of the front edge of the case by the thickness of the veneer tape. Lastly, nail



SHELF PIN SETUP • Before assembly it's best to mark and drill the locations for the shelf pins, and to lay out and mount the base plates for the hinges. As always, a little masking tape on the drill bit makes a handy depth stop.

the back in place into the rabbets. This will square up the case.

With the case assembled, go nab your spouse's iron. Apply veneer tape to the front edges of the case, and to the top of the case on the front edge and sides to hide the rabet joint. The 7/8"-wide tape is plenty because the reveal will only show 1/4" of the top of the case.

The false top is simply a piece of plywood edged with veneer tape. Check the size against the finished size of the assembled case to make sure the false top will flush up with the sides, front and back. Remember that the false top extends over the door and drawers and should flush up to them. The 1/4" reveal between the top and case is created using strips of 1/4" x 1" hardboard, with one edge spray painted black. Fit the strips to the underside of the top, allowing the 1/4" setback on the front and sides. Add a fourth strip flush to the rear of the top to level it out. With the strips fit, use black spray enamel paint to coat the visible edge and the underside of the front piece, then attach the reveal strips to the underside of the top.

Now attach the false top to the case. Drill clearance holes through the case and attach the false top using screws up through the inside of the case, again, flushing the back edges of the case and the false top.

The base is a simple frame held together by biscuits, dowels or mortise-and-tenon joinery, with the legs attached between the stretchers at the corners. With the base glued and assembled, add 1/4" x 13/16" hardboard strips to the top edge as you did to the underside of the top. Next, finish the base and strip with black paint to add visual "weight" at the base of the chest. When dry, attach the base to the cabinet using metal chair braces at the corners.

Now build the drawers using simple 1/4" x 1/2" rabet joints on the sides, with the fronts and backs captured between the sides. The bottoms slide into 1/4" x 1/4" grooves in the sides and front that are cut 1/2" up from the bottoms of the drawer pieces. The back is cut 1/2" shorter than the front to allow the bottoms to slide into place. Use the bottoms to hold the drawers square while the glue dries, then remove them to make finishing the drawers easier. I set up a 1/4" radius router bit in a router table and ran the top edges of the drawer parts (both sides) to make them more finger-friendly. Don't round over the front edge where the drawer face will attach. With the drawers assembled, attach the drawer slides to the cabinet and to the drawer sides and check for smooth operation.

Cover the edges of the drawer faces and the door with veneer tape. Then rout the a shallow mortise centered in the top edge of each for the pulls. Use a router with a straight bit. See the photo above for the jig I built for this.

I want to mention that the screws provided with the pulls are round-head screws. In an effort to keep things flush and simple I used a countersink on the clearance holes in the pulls and then used flat-head screws to attach the pulls. Now attach the drawer faces to the drawers using the hardware shown in the photo at right. This allows for easy adjustment.

Now drill the door to accept the European hinges and mount them to the cabinet. If you haven't used concealed hinges before, take a few minutes to play with the adjustment to get a feel for the versatility of these hinges.

Lastly, cut a groove the length of both sides of the shelves and then add veneer tape to the front edge. The shelf pins shown slip into the slots in the shelves and provide invisible support. It's your choice whether to make the shelf locations adjustable by adding more shelf pin holes. I preferred to use set locations to keep the interior clean and unmarred.

The case is now ready to finish. Remove the hardware and finish sand. Use a clear



HARDBOARD REVEAL • The hardboard reveal strip is painted black, then mitered to extend beyond the front of the cabinet itself. The reveal strip is recessed 1/4" in from the edges of the top.

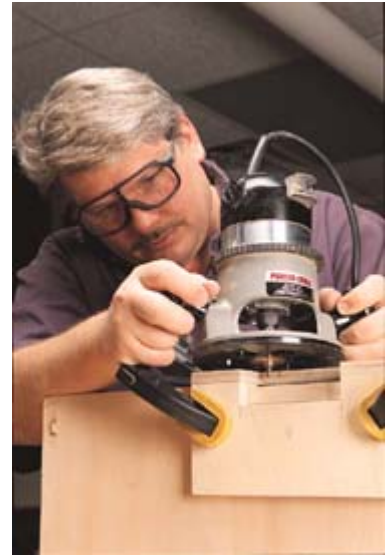


LEARN SOMETHING FROM THE EUROPEANS• European hardware is a broad term covering a number of hinges and shelving systems. Best known for its use in commercial furniture, I chose to use it in this piece for a number of reasons. The door hinges allow adjustment of the door in three dimensions after the door is attached, and it is invisible from the exterior of the piece, keeping the lines clean and simple. The hinges do require a 35mm Forstner bit (\$14.99) to insert the hinges in the side of the cabinet, and a jig designed just for installing 3cup² hinges is available from Rockler (800-279-4441) for \$29.99, (item #10260).

Contemporary decorative hardware can be tricky to find, so I was pleased to find Spokane Hardware on the Internet. Offering a large and varied selection of contemporary, fanciful and traditional hardware for sale on the web, this saves a lot of time running from store to store. The pulls selected for this piece are commercially available to cabinet shops, but it's nice to find them accessible for the home woodworker as well.

This was the first time I'd used the drawer front adjusters, though they've been available for years. Having fought with adjusting drawer fronts on inset and flush-mount drawers forever, I found these clever plastic devices to be a big help. Allowing 1/8" adjustment in any direction, fine-tuning a drawer front is now a snap rather than a chore. Though the instructions specify a 25mm bit to mount the adjuster in the drawer face, a 1" Forstner works admirably with a little shimming.

finish everywhere, and don't worry about coating the black accent strips. After the finish has dried, attach the hardware and hang the door. Adjust the drawer fronts and door to make all the spaces equal. Then step back and enjoy the clean simple lines of your work -- until the tastes of the furniture world swing back the other way. Then perhaps you'll have to apply some fancy moulding or something.



JIG FOR THE PULLS • I cut the top and back recesses for the handles using the same jig. Unfortunately I made my jig a little short and had to move the clamps between cuts. Make your jig the width of the drawer and to fit your own router template guides and you'll be in good shape.



ADJUSTABLE DRAWERS • The drawer face adjusters are attached by first drilling two clearance holes in the drawer box front. Then locate the approximate spacing of the drawer face on the drawer front (the closer the better) and make a mark through the clearance hole on the back of the face with a scratch awl. Remove the drawer box and drill the 1" holes for the adjusters. Then just screw the face on and adjust.

Schedule of Materials: Modern Wardrobe

No.	Item	Dimensions	Material
2	Sides (A)	3/4" x 17-1/4" x 42-3/4"	Maple ply
1	Partition (B)	3/4" x 16-1/2" x 42"	Maple ply
2	Top/bottom	3/4" x 17-1/4" x 35-1/2"	Maple ply
1	False top (D)	3/4" x 18" x 36"	Maple ply
1	Back (E)	3/4" x 35-1/4" x 42"	Maple ply
1	Door (F)	3/4" x 12" x 42-1/2"	Maple ply
1	Drawer face (G)	3/4" x 12" x 23-7/8"	Maple ply
1	Drawer face (H)	3/4" x 9-9/16" x 23-7/8"	Maple ply
1	Drawer face (I)	3/4" x 7-13/16" x 23-7/8"	Maple ply
1	Drawer face (J)	3/4" x 6-7/16" x 23-7/8"	Maple ply
1	Drawer face (K)	3/4" x 5-7/8" x 23-7/8"	Maple ply
4	Drawer dividers (L)	3/4" x 2" x 22-7/8"	Maple ply
3	Shelves (M)	3/4" x 16" x 10-15/16"	Maple ply
2	Drawer sides (N)	1/2" x 10-1/16" x 16"	Baltic birch
2	Drawer sides (O)	1/2" x 8-1/16" x 16"	Baltic birch
2	Drawer sides (P)	1/2" x 6-1/4" x 16"	Baltic birch
2	Drawer sides (Q)	1/2" x 5" x 16"	Baltic birch
2	Drawer sides (R)	1/2" x 4" x 16"	Baltic birch
2	Drawer frt & Back (S)* (R)	1/2" x 10-1/16" x 21-1/4"	Baltic birch
2	Drawer frt & back (T)*	1/2" x 8-1/16" x 21-1/4"	Baltic birch
2	Drawer frt & back (U)* (R)	1/2" x 6-1/4" x 21-1/4"	Baltic birch
2	Drawer frt & back (V)*	1/2" x 5" x 21-1/4"	Baltic birch
2	Drawer frt & back (W)*	1/2" x 4" x 21-1/4"	Baltic birch
5	Drawer bottoms (X)	1/4" x 21-1/4" x 15-3/4"	Luan
4	Legs (Y)	1-1/4" x 1-1/4" x 4"	Poplar
2	Base stretchers (Z)	3/4" x 1-1/4" x 33-7/16"	Poplar
2	Base stretchers (AA)	3/4" x 1-1/4" x 15-9/16"	Poplar

9 - Linear feet each of 1/4" x 1" and 1/4" x 13/16" hardboard reveal strip

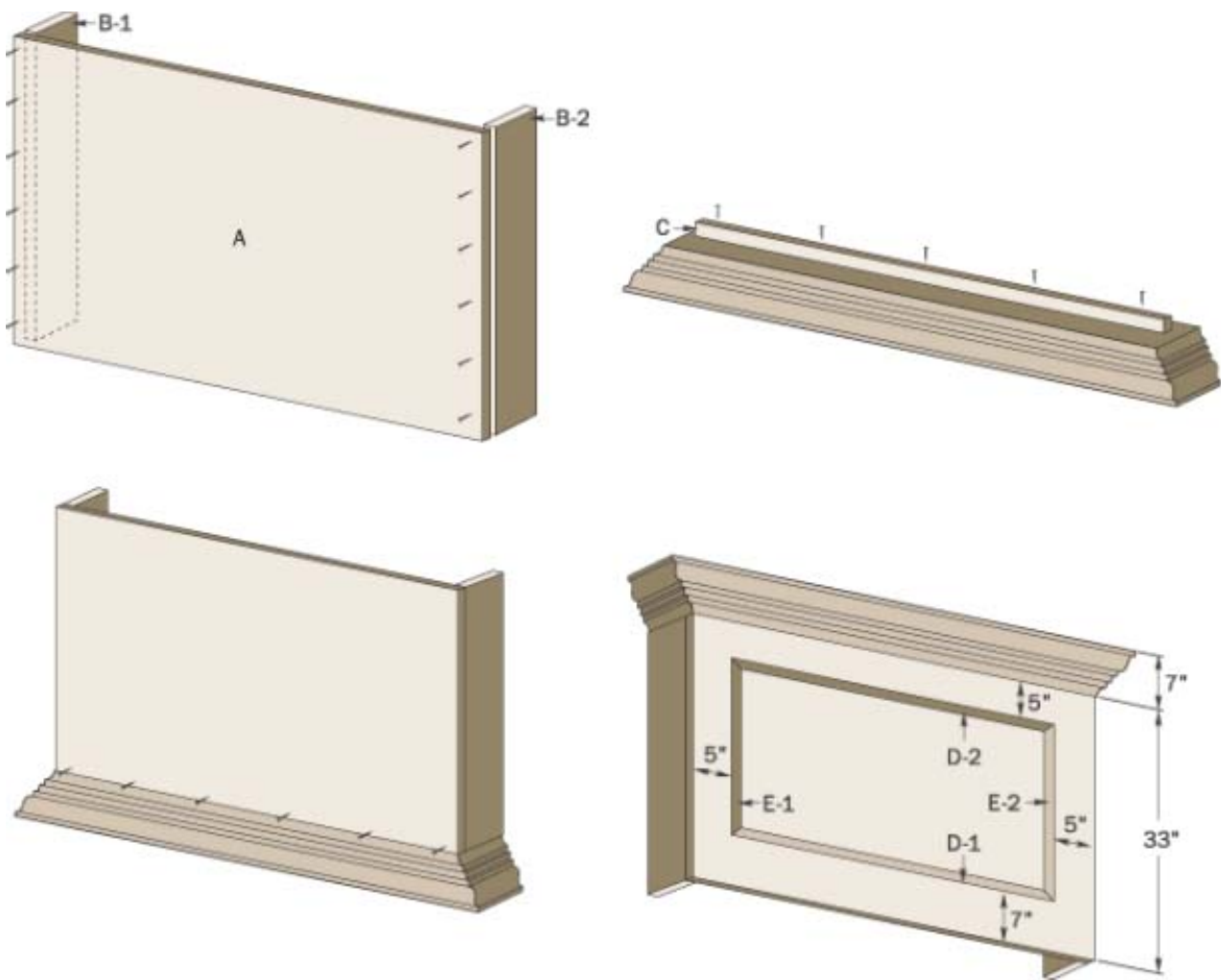
75 - Linear feet of 7/8" maple veneer tape

*If using a "slide in" drawer bottom, subtract 1/2" from the height on the drawer backs.

124

HEADBOARD





Construction Materials

- 1 (76") mantel shelf (special order in millwork department)
- 1 sheet (3/4") birch plywood
- 1 (6') 1 x 3 poplar board
- 1 (8') 2 x 2 furring strip
- 2 (8') lengths of picture molding
- 12 8d sinker nails
- 36 8d finishing nails
- 20 4d finishing nails

Cut List

Part	Material	Cut Size	Qty
(A) Front panel	3/4" plywood	33 x 74-1/2"	1
(B) Side panels	1 x 3 board	33"	2
(C) Nailing cleat	2 x 2 board	73-1/2"	1
(D) Molding strips	picture molding	miter to 66"	2
(E) Molding strips	picture molding	miter to 21"	2

Step 1: Before cutting materials, measure the exact width of the underside of the mantel from inside edge to inside edge. Each mantel is custom made, and you will want your base to fit snugly against it. This will determine the width of the front panel. The mantel pictured here begins with a 74 1/2 x 33" front panel.

Step 2: Cut all other materials per list.

Step 3: Attach side panels to front panel using wood glue and 2 1/2", 8d finishing nails. Set aside for glue to dry. This will be the base of the headboard.

Step 4: (Note: Steps 4 and 6 require at least two people.) Place the mantel upside down on a flat work surface, and position the base on the underside flush with the front inside edges, or lip, of the mantel. Trace with a pencil along the base to indicate where the cleat needs to be attached. This should be approximately 3/4" from the front and two sides of the mantel lip.

Step 5: Attach a 2 x 2 cleat along the guideline with wood glue and 8d sinker nails placed 6 inches apart. Allow to dry.

Step 6: Reposition base on the underside of mantel, and attach to the cleat, nailing from the front of the base into the cleat with 8d finishing nails every 6".

Step 7: Miter and attach picture molding on the front using 4d finishing nails.

Step 8: Countersink nails, fill holes with wood putty, and then sand.

Step 9: Prime and paint headboard to match the room's decor. For the look of the one pictured, begin with a coat of American Tradition, Belle Grove Light Amber #94-1B, satin. Next, dilute some mocha glaze with water, and brush it on generously. Wipe away some of the glaze with smooth clean cotton rags. Apply a second layer to darken the glaze. The more layers applied, the more aged the headboard will appear.

Step 10: Allow to dry for 24 hours. Apply a coat of polyurethane to protect the finish.

Step 11: Hang the headboard per manufacturer's instructions for mounting mantel.

125

JEWELRY BOX



Bill of Material

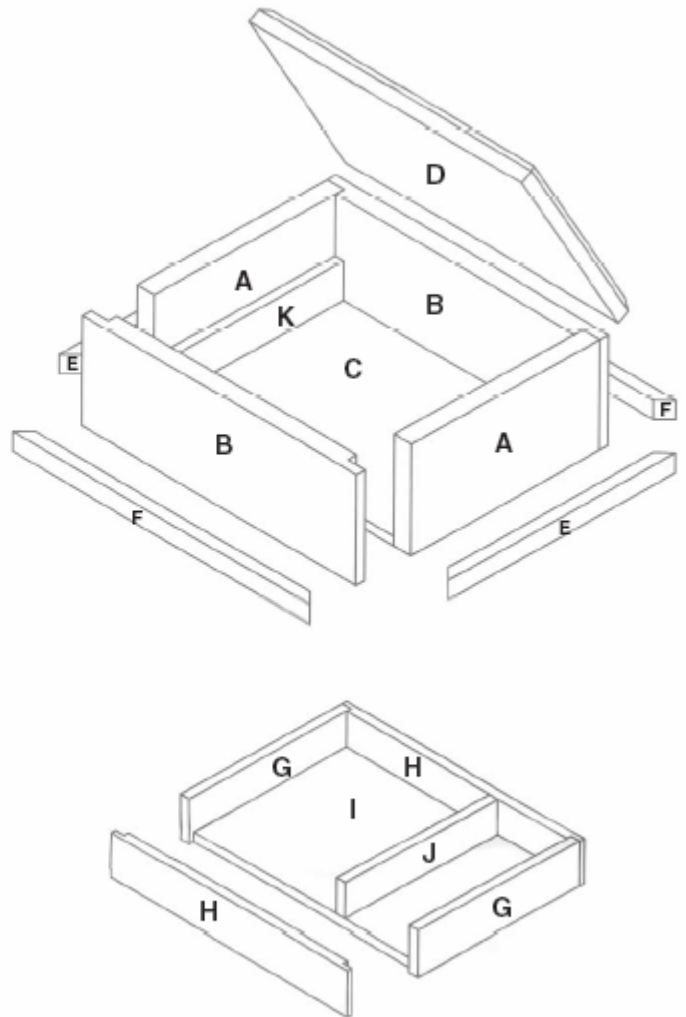
Quantity	Size	Material	Item
1	3/4" x 6" x 6'	Maple	A, B, D
1	3/8" x 6" x 6'	Maple	C, G, H, I, J, K
1	1/2" x 3/4" x 5'	Maple Molding	E, F
1 Pair	1 1/2"	Butt Hinges	
1		Small Box Lock	
1	Small Bottle	Wood Glue	
1	Pint	Finish	

Cutting Schedule

Part	Qty	T	W	L	Material
A	2	3/4"	4 1/4"	8 1/4"	Maple
B	2	3/4"	4 1/4"	12"	Maple
C	1	3/8"	7 1/2"	10 1/2"	Maple
D	1	3/4"	9"	12"	Maple
E	2	1/2"	3/4"	10"	Maple
F	2	1/2"	3/4"	13"	Maple
G	2	3/8"	1 3/4"	7"	Maple
H	2	3/8"	1 3/4"	10 3/8"	Maple
I	1	3/8"	6 5/8"	9 5/8"	Maple
J	1	3/8"	1 3/8"	6 5/8"	Maple
K	2	3/8"	1 1/2"	7 1/2"	Maple

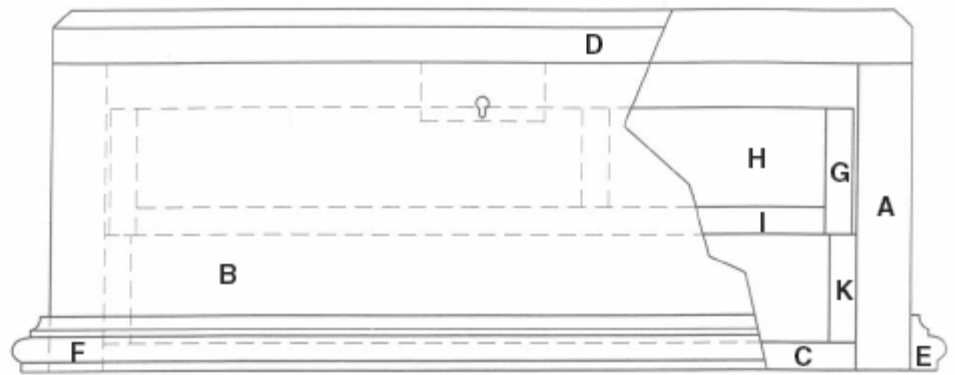
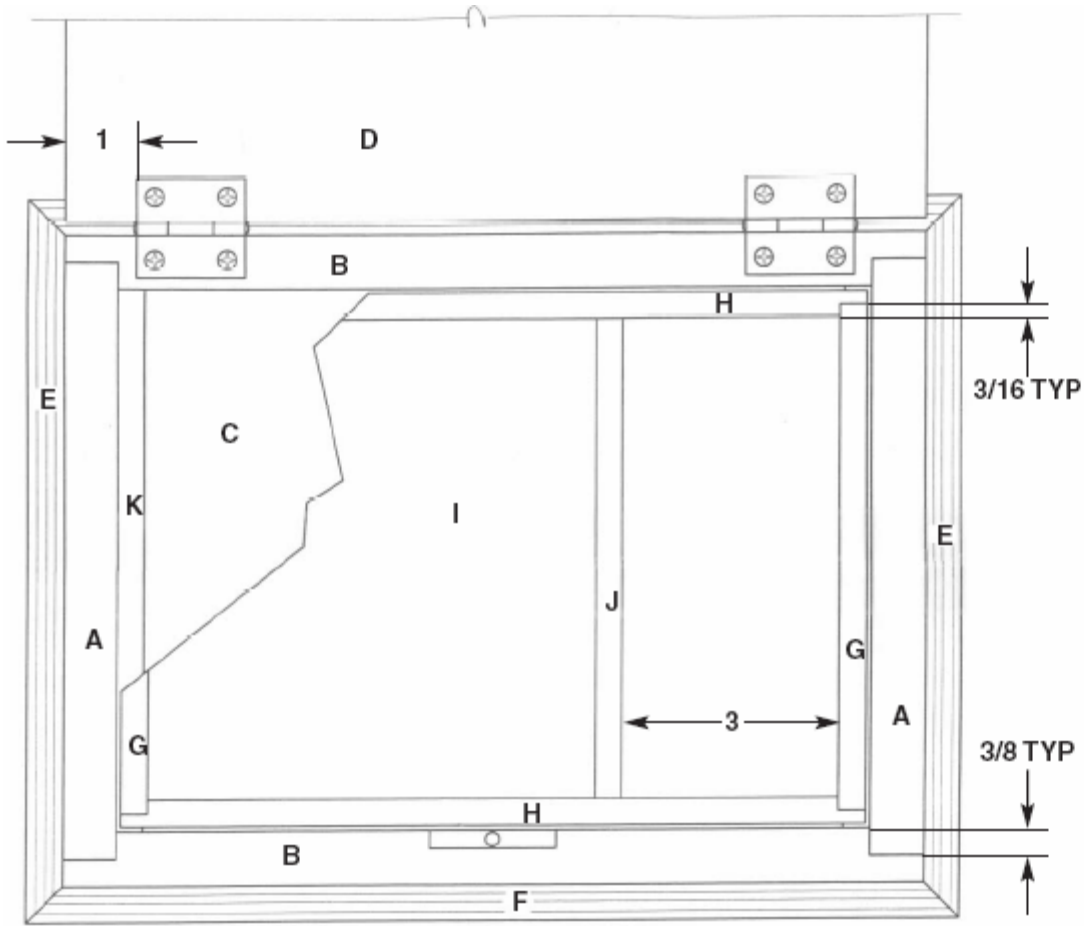
NOTES

1. Although maple is preferred for this project, other wood may be substituted.
2. You may add more partitions to or relocate board (J) in the removable tray.
3. Always wear safety glasses.
4. Read manufacturer's instructions before operating equipment.



Assembly Instructions

1. Read all instructions before beginning any work.
2. Cut all material to sizes shown in cutting schedule. (This is a good time to cut out the area for installing a lock.)
3. Glue and clamp boards (B) to boards (A). Check assembly for squareness.
4. Glue the bottom of the box (C) to assembly (A, B).
5. Glue and clamp boards (G) to boards (H). Check assembly for squareness. Glue the bottom of the box (I) to assembly (G, H).
6. Install board (J) with glue to tray assembly. Cut tray supports (K) to fit box assembly.
7. Cut 45 degree miter on molding pieces (E) and (F) and glue to box.
8. Sand, apply finish and install hardware.



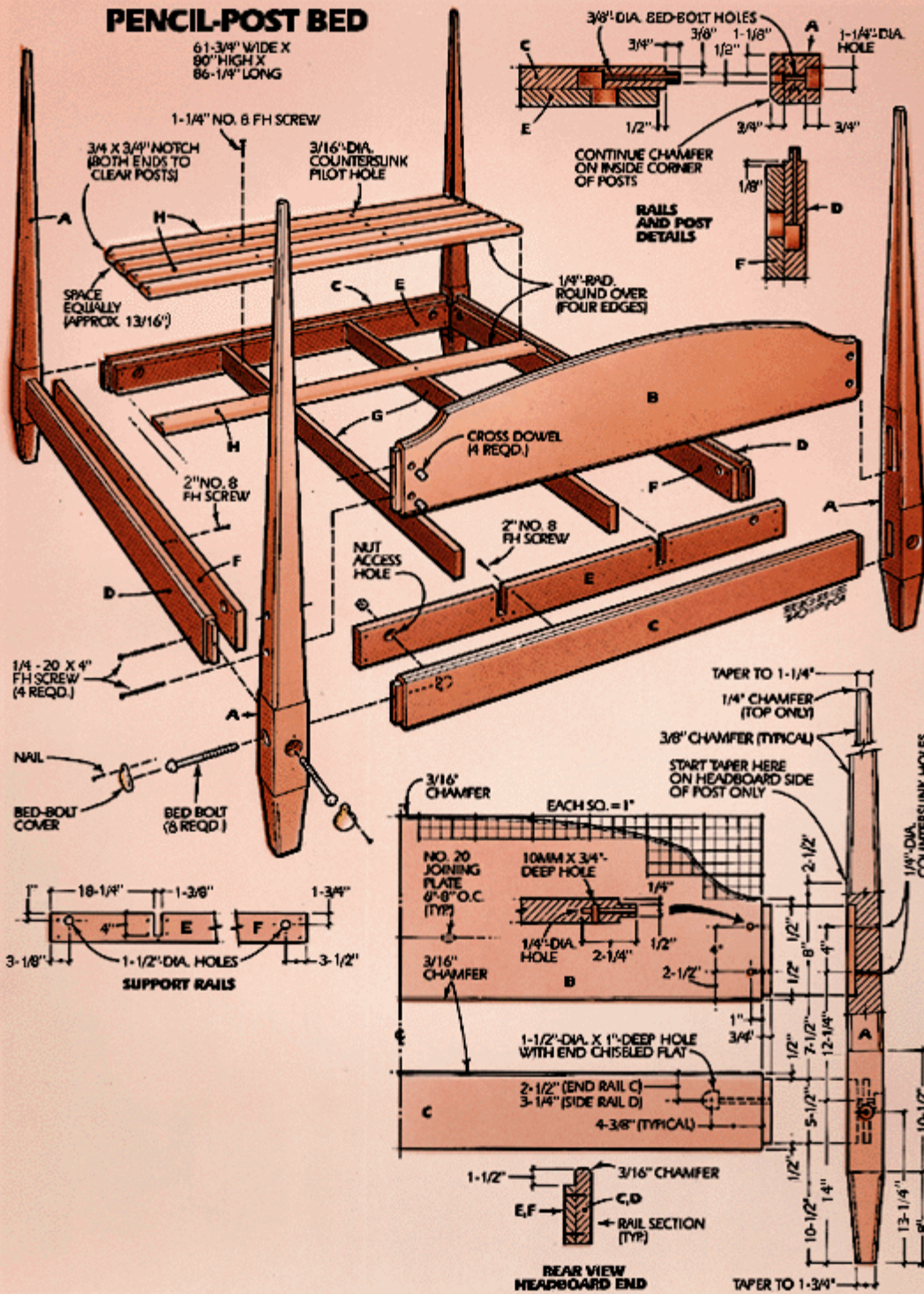
126

PENCIL BED



PENCIL-POST BED

61-3/4" WIDE X
80" HIGH X
86-1/4" LONG



Materials List Pencil-post bed

Key	No.	Size and Description (use)
A	4	2 3/4 x 2 3/4 x 80" cherry (post)
B	1	1 x 16 x 60 3/4" cherry (headboard)
C	2	1 1/4 x 6 1/2 x 60 3/4" cherry (end rail)
D	2	1 1/4 x 6 1/2 x 80 3/4" cherry (side rail)
E	2	1 x 5 x 58 1/4" poplar (end support rail)
F	2	1 x 5 x 79" poplar (side support rail)
G	2	1 3/8 x 4 x 80 3/4" poplar (side support)
H	14	3/4 x 5 x 60 3/4" maple (slat)

The Posts

Begin by preparing the blanks for the bedposts. Glue up stock if necessary, then joint, rip and crosscut the blanks to 2 3/4 in. wide € 80 in. long. Use a long straightedge to lay out the tapers on each side of the posts (**Photo 1**). The taper on the inside edge of the headboard posts begins 15 in. higher than the other tapers. This allows for a square joint with the headboard.



1 Rip and crosscut the post blanks, and use a long straightedge to mark the taper. Also mark the mortise positions.

Lay out and cut the mortises in each post at this point -- it's easier to do this now, while the posts are straight, than after the tapers are cut. The quickest way to cut the post mortises is by using a plunge router with a 1/2-in.-dia. straight bit. Clamp the workpiece between bench dogs, and use an edge guide on the router to make the cut (**Photo 2**). Cut each mortise in two or three passes to avoid overloading the router. After making each cut, use a sharp chisel to chop the mortise square (**Photo 3**).



2 Cut the post mortises before sawing the tapers. Use a plunge router or bore out the mortises on the drill press.

To make the bed easier to move, its joints are bolted together rather than glued. This construction requires that you bore a hole through the mortise bottoms and bore a matching hole into the tenons on the rails and headboard. Use the drill press to bore the 3/8-in.-dia. holes through the rail mortises and the 1/4-in.-dia. holes through the post mortises for the headboard.

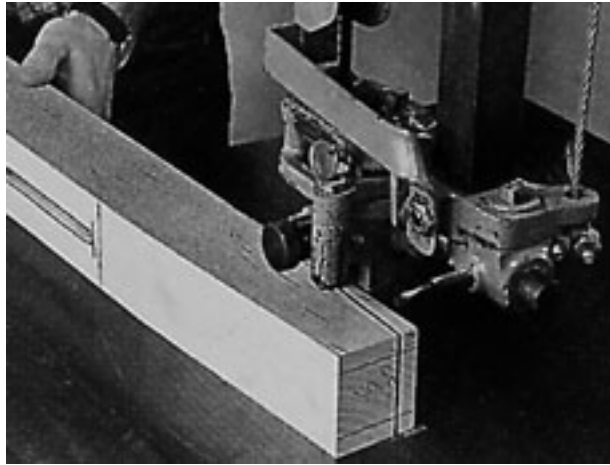
Use the band saw to cut the tapers on each post. Note that the tapers are also marked on the posts' ends (**Photo 4**). Cut two tapers, then use the marks on the ends of the posts to draw the tapers on the newly sawed surfaces. Also, use a roller stand or have a second person help you when sawing the tapers. The posts are simply too long to saw without support. Use a sharp and finely set hand plane to smooth the cut surfaces and to refine the tapers (**Photo 5**).



Next, use a Forstner or multispur bit to counterbore the bolt holes on the outside surface of each post (**Photo 6**). Then use a countersink to recess the holes for the headboard screws.

3 Clamp the posts firmly to the bench, and chop the ends of the post mortises square using a sharp chisel.

Cut the 3/8-in.-wide chamfers along the tapered edges of each post using a chamfer bit in the router. The chamfers on the inside post corners run the length of the post, while the remaining chamfers are stopped just above the point where the rails join the post. Use a sharp plane or chisel to cut the chamfers at the top of each post.



4 Saw two tapers, then use the marks on the ends of the posts to redraw the tapers on the sawed surfaces.



5 Smooth the sawed surfaces and refine the taper with a hand plane. Set the plane to take a fine shaving.



6 Counterbore the bed bolt holes and headboard screwholes in the posts. Use a Forstner bit in the drill press.

The Headboard and Rails

Rip, crosscut and joint the stock for the headboard so it forms an oversize blank. Also rip, crosscut and joint the stock for the bed rails and the support rails.

Position the headboard stock so it forms a blank with the grain positioned attractively, then mark it for joining plate slots 6 in. to 8 in. on center along the mating board edges. Don't position a plate too close to the blank edge -- you might expose the plate when cutting the headboard to shape. Hold the headboard pieces firmly to a flat, clean worksurface, center the plate joiner on the mark and make the plunge cut (Photo 7).

Apply glue to the board edges, slots and the biscuits. Clamp the assembly, and when the glue sets, plane and scrape it smooth.

The headboard joins the two front posts with two tenons that run nearly the width of the headboard. To ensure tight-fitting joints, it's important that the headboard be perfectly rectangular. Crosscut the headboard blank on the radial-arm saw or table saw. With either machine, be sure you are making a square cut.

Cut the tenons on the ends of the headboard and on the bed rails using the dado blade in the table saw (Photo 8). The headboard and rails have shoulders on the top and bottom of the tenon. To cut the shoulders on the rails, readjust the blade height on the table saw, stand the rail on edge and cut the shoulder. The headboard shoulders are cut later with a handsaw.

Lay out the curved shape of the headboard, and make the cut with a sabre saw just to the outside of the line. Clamp



7 Rip and crosscut the headboard stock oversize. Cut joining plate slots in the stock, then glue and clamp the stock.



8 Saw the headboard tenons using a dado head on the table saw. The tenon width here requires great accuracy.



the workpiece in a vise, and use a sharp and finely set plane and spokeshave to smooth the cut surfaces and work down to the line (Photo 9). Then mark the shoulders on the top and bottom edges of the headboard tenon, and make the cuts using a dovetail saw (Photo 10).

Next, using a router and chamfer bit, cut chamfers on the top edges of the bed rails and the top and bottom edges of the headboard.

Dry assemble the headboard and head rail to the posts. Clamp the subassembly, and use a long 3/8-in.-dia. bit to bore slowly through the post into the end of the rail tenons (Photo 11). Use a 1/4-in.-dia. bit for the headboard joints. Bore the other holes for each bolted joint.

Now, lay out and bore the pocket holes for the bed bolt nuts on the inside of the bed rails. Use a Forstner bit in the drill press to bore the holes, then use a chisel to square the sides of each hole, forming a flat surface on which the nut can bear (Photo 12).

Using the drill press, bore the 10mm-dia. holes for the cross dowels in the back of the headboard. To get the hole in a cross dowel aligned with the hole in the end of a tenon, poke a screw into the tenon and twist the cross dowel with a screwdriver so you can thread the screw into the cross dowel (Photo 13).

Rip and crosscut the poplar stock for the end support rails. Then, bore the access holes for the rail bolts. Remember to bore the holes so they are offset from those in the outer rails. When the two rails are joined, this allows better access to the rail nuts than if the holes were aligned.

Cut the notches in the end support rails with a handsaw (Photo 14), and then chop the notches square with a chisel.

9 Saw the headboard to shape. Smooth away saw marks and refine the shape using a smooth plane and spokeshave.



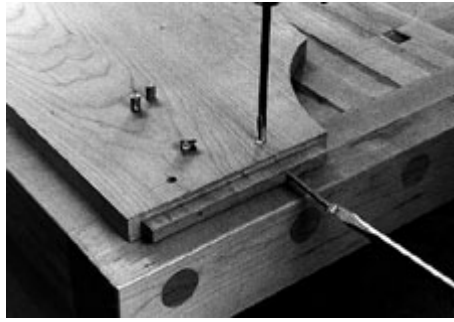
10 With the headboard edges smoothed, mark and cut the shoulders at the top and bottom of the tenon.



11 Use a long bit to bore slowly through the post holes and into the headboard and rail tenons.



12 Use a chisel to cut a flat surface into the hole on the side rails. The bed bolt nut bears on the flat surface.



13 Bore 10mm holes for cross dowels in the back of the headboard. Turn the dowel to align its hole with the screw.



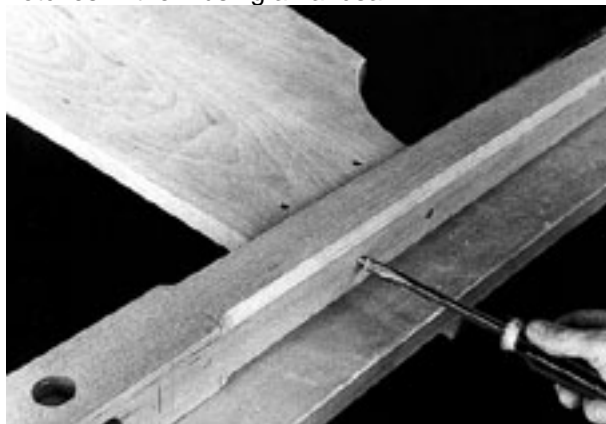
14 Clamp the end support rails firmly together, and cut the cross support notches in them using a handsaw.

Assembly

Bore and counterbore pilot holes through the poplar rails to screw them to the cherry rails. Bore a screw hole below the notches in the head and foot rails. Clamp the rails together, and drive screws through the holes. Screw the headboard to the posts (Photo 15), and use bed bolts to attach the head rail to the posts. Follow the same procedure for the foot rail and posts. Have an assistant help you bolt together the head and foot assemblies with the side rails. Tighten the bolts using a bed bolt wrench (Photo 16).

After the frame is assembled, install the cross supports by sliding each into its notches (Photo 17).

Rip and crosscut the maple bed slats, then cut the notches in the slats at the head and foot of the bed to fit around the posts (Photo 18). Bore and counterbore pilot holes in the slats, then use a 1/4-in.-rad. rounding-over bit mounted in a router table to cut the slats' edges. Screw the slats to the cross supports using 13/16-in. spacer blocks between each (Photo 19).



15 Fit the head rail and headboard between two posts. Drive screws through the posts and into the cross dowels.

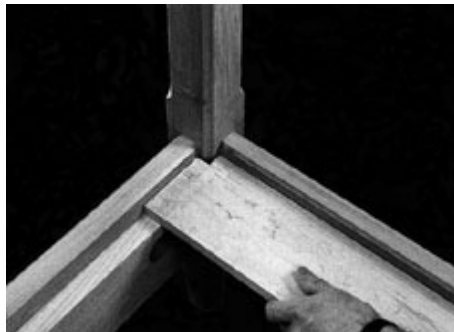
Disassemble the bed, and sand all parts with 220-grit sandpaper followed by 320-grit paper. Apply four coats of Watco Danish Oil Finish using a brush or rag, and let it soak in for 20 to 30 minutes, then wipe it off. Let the piece dry overnight between coats. After the final coat has dried, rub it smooth with 4/0 steel wool. The maple slats need no finish, but a coat of varnish seals them. Reassemble the bed and nail the bed bolt covers in place. Each cover should be loose enough to swivel.



16 Use a bed bolt wrench and an open-end wrench to tighten the connection between the rails and posts.



17 Prepare for installing the slats by fitting the cross supports into the notches that are cut in the end support rails.



18 Cut the slat stock. Cut notches in the slats at the foot and at the head of the bed so they fit around the posts.



19 Position 13/16-in.-wide spacer blocks between the slats, and screw the slats to the cross supports.

127

QUILT RACK



Materials:

- Lumber of your choice sufficient for the pieces listed in the quilt rack dimensions
- Wood screws: 8 flat-head wood screws #6 x 1 1/2"; 4 flathead wood screws #6 x 1"
- 3/8" wooden pegs
- Assorted grit sandpaper
- Finishing materials

Quilt Rack Dimensions

These dimensions may be altered slightly, but keep in mind that drastic alterations may not work. For example, a quilt rack that is too tall may be top-heavy and likely to topple over.

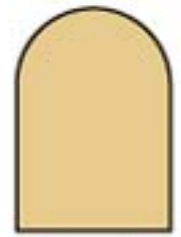
The quilt rack is made up of eight simple components.

- 2 stiles— 1" x 8" x 32" each. (The main vertical uprights that frame the piece.)
- 4 horizontal cross members— 1" x 2" x 26" each. (3 at the top as hangers for the quilt and one at the bottom as a brace. The inside measurement from stile to stile is 26")
- 2 horizontal feet— 1" x 2" x 10" each. (These are secured to the bottom of the stiles and help stabilize the rack.)

Shaping

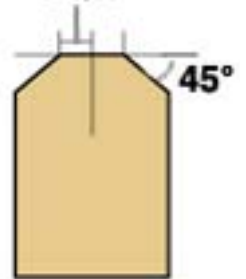
Now that the eight pieces are sized, it's time to put the final touches on four of them before assembly.

- Let's start with the feet. Using your power miter saw or miter box, trim the ends of each 1" x 2" x 10" piece at a 45° angle. The angles slant toward each other at the top of each foot.
- Choose the particular cut you want for the top of the stiles. You can use a rounded-top cut, which will require a band saw, jigsaw or scroll saw, or select a simple dog-eared cut. For a rounded-top stile, mark the piece for the round cut by locating and marking the width center. Make another mark the same distance from the top. Use a compass to scribe the curve from the marked center point.
- For a dog-eared look, determine the center of the top edge of one of the 1" x 8" x 32" stiles. From that center point, measure 1 1/2" out on each side. You now have the middle 3" of the top edge of the stile. From each side of that 3" mark, use a combination square and pencil to mark a 45° angle to the long, vertical side of the stile. After you mark and cut one stile, you may use it as a pattern for the second. Place the ends of the pieces against a stationary, vertical surface in order to ensure two equal pieces when cut.



Rounded

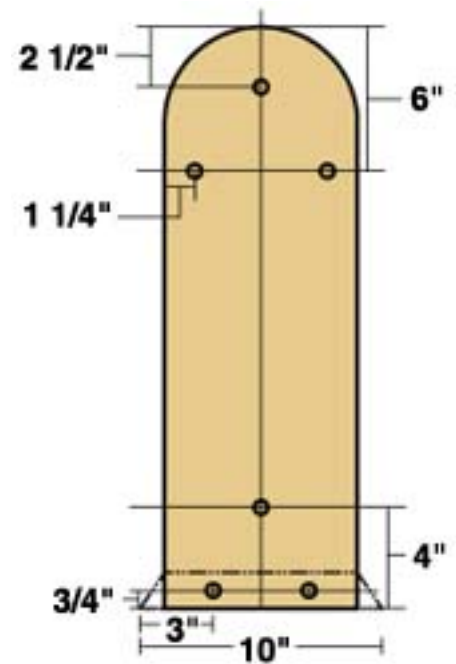
1 1/2"



"Dog Eared"

Drilling and Assembling

1. First, use a square and pencil to transfer the center mark at the top of the stiles down about 7" on the outside face parallel with the long edges. Determine the side to face out by choosing the most favorable wood grain.
2. Make a mark perpendicular to the first mark 6" from the top all the way across the stile to form an upside-down "T." Make certain that the respective marks are parallel to the top and sides of the stile since the "T" will determine where you will drill the holes for the recessed screws.
3. Measure and mark the spot for each hole, as described below, making a small pencil mark across the respective lines of the "T." The three spots where the lines intersect will mark the centers of your holes.
 - o The first hole, which will hold the screw for the top cross member, will be 2 1/2" from the top of the stile, centered on the 7" pencil mark.
 - o The other two holes will be located 1 1/4" from each outside edge of the stiles, intersecting the pencil mark running across the piece.



Drill holes as indicated in the drawing.

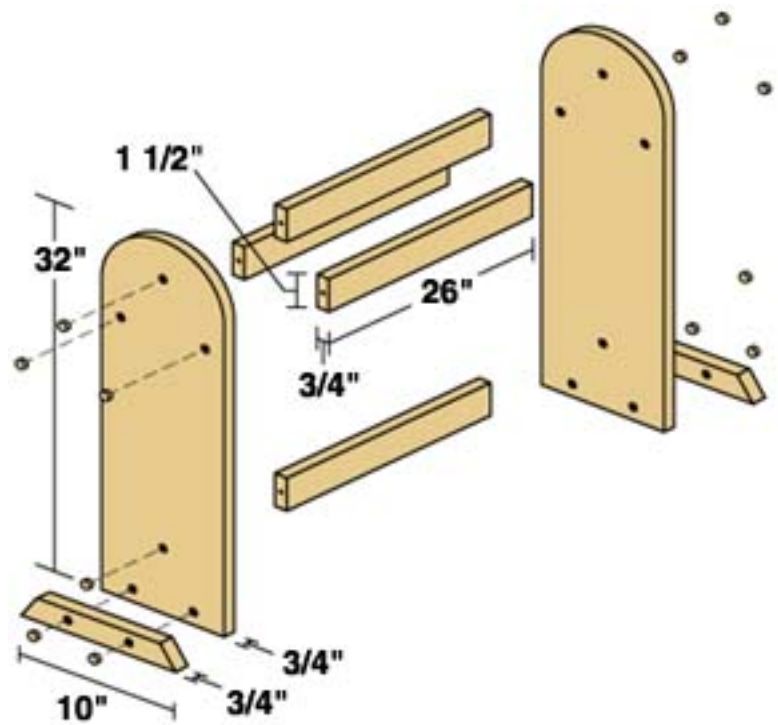
4. For the bottom cross member, which serves primarily as a brace, determine the center point of the stile at the bottom and use a light pencil mark to transfer that point 5" up. Then measure 4" from the bottom, making a small pencil mark across the previous 5" mark. That will be the spot for your bottom brace.

5.

6. Once you have marked one of the stiles, lay it down on a flat, smooth surface. The marks you just made are for countersink holes for the screws that will hold the piece together, so they need to be just 1/4" deep.

7. Now that the countersink holes are drilled, drill pilot holes for the screws. Use a 1/16" twist bit to drill through the center of the countersink holes and all the way through the stiles.

8. After drilling the pilot holes in the stiles, do the same in both ends of each 26" cross member: Determine the center of each end by marking diagonal lines from corner to corner. The intersection of the lines will be the center point. Now drill pilot holes approximately 1/4" deep, using the same 1/16" twist bit used on the stiles.



Exploded view of the quilt rack.

Assembly

1. Start with the top cross member. Place a screw in the top recessed hole of one of the stiles and, using a Phillips screwdriver, turn the screw into the pilot hole until the tip begins to emerge on the other side. Now place one of the cross members against the screw tip, align the pilot hole, and turn the screw into the wood. Repeat for the other stile. Continue until you have put all of the cross members, including the bottom brace, in place. Be sure not to overtighten, so that you can adjust the cross members if needed.
2. After installing the cross members, measure 3" from each end of both "feet." Then measure up from those points about 3/4" (approximately to the center) of the feet. If everything fits together properly and is correctly adjusted, tighten all screws.

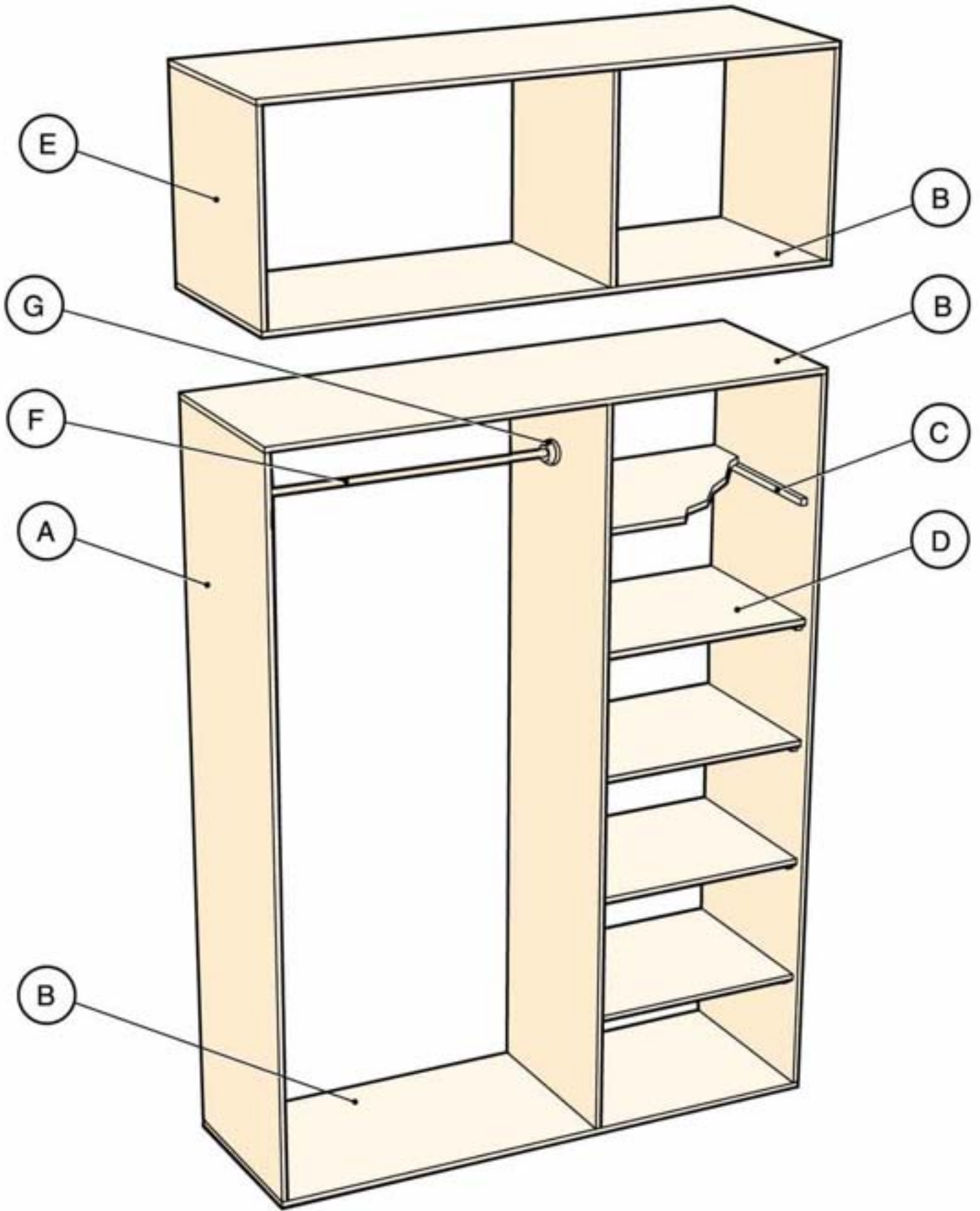


Assembled view of the quilt rack.

128

OPEN WARDROBE





You'll need:

Materials

Item	Part	Size	Material
A	Tall sides/divider (3)	2068 x 550 x 16mm	Melamine board
B	Bases/tops (4)	1630 x 550 x 16mm	Melamine board
C	Cleats (10)	19 x 19 x 500mm	pine
D	Shelves (5)	632 x 540 x 16mm	Melamine board
E	Short sides/divider (3)	518 x 550 x 16mm	Melamine board
F	Hanging rail	940 x 19mm diameter	chrome steel rod
G	Rod sockets (2)	19 internal diameter	chrome steel
H	Trim – optional (total)	19 x 19 x 7200mm	pine/maple

You'll also need contact adhesive for gluing, 30mm and 45mm cross-head screws, wet & dry sandpaper and white snap caps. Standard, 16mm thick x 600mm wide, Melamine-coated particleboard shelving is available in sheet lengths of 1.8m and 2.4m. Our unit used 8 x 2.4m sheets.

Here's how:

1. The crucial measurements are the opening where the unit will be built and the size of the chest of drawers you will use. Often walls aren't quite square, so subtract about 20mm all around – this also allows for the thickness of skirtings. Leave enough space above the chest of drawers to hang clothes. We made our unit in two sections for easy installation in a room with a ceiling height of 2.7m. Our two units were 2100mm and 550mm high, by 1630mm wide and 550mm deep, with an opening of 950mm for the drawers.
2. Cut the three tall sides (**A**) and a base (**B**). Use a power saw for the cuts, setting the blade just deep enough to cut the panels. Work with the good side (the one most likely to be seen) face down, as there is likely to be some minor chipping of the Melamine on the saw side.
3. To fix bottom and top to two sides, pre-drill for four screws per joint and countersink for the screw heads. Working with panels on their back edge, apply a small amount of contact adhesive, then screw together, making sure front edges are flush. It's best to get someone to help hold the panels.
4. From the inside edge of one side, measure 950mm along the top and bottom of carcass. Square a line across the board and use this as a guide to pre-drill and countersink the top and bottom. Glue and screw divider in place.
5. From the top, measure down both sides of the narrow opening at increments of 346mm – that is, 346mm, 692mm, 1038mm, 1384mm and 1730mm. Square a line from the back to within 50mm of the front. Cut the cleats (**C**) with an optional 45° mitre on the front ends, and paint them to match if you wish. Glue and screw the cleats to the sides with the top edges on the lines and the back flush with the rear of the panels. Use the shorter 30mm screws.
6. Cut the shelving (**D**) to suit. Ours is set back 10mm from the front. After pre-drilling, screw shelves to battens with two 30mm screws per cleat.
7. Get help to stand the unit in place – it will be quite floppy - and check the fit. Check with the spirit level to make sure the sides are vertical. Measure the gaps between the sides and the wall; measure the wall in three places and mark these positions. Lay down the unit, and cut offcuts of shelving or plywood to make up the thickness of packing required, and nail to wall studs or plug into masonry. Carefully slide the unit back in

place and screw the sides into the packers to hold it in place.

8. Make the top unit the same way as the bottom one by screwing the top and bottom **(B)** to the sides and the divider **(E)**. Fit packing pieces to the wall near where the top of the unit will be, then slide the unit in place. Screw the top unit into the top of the bottom one with 30mm screws, as well as to the packers.

9. Cut the chrome hanging rail **(F)** with a hacksaw so it fits the wide opening. Smooth the ends with wet & dry sandpaper and loosely fit on the rod sockets **(G)**. Centre and space the rail from the underside of the top to allow easy removal of clothes hangers and mark screw holes at both ends. Pre-drill holes for the sockets, then install with screws provided. Finish off by pressing small snap caps into any exposed screw heads. Slide in the chest of drawers and your open robe is finished.

129

KITCHEN BASE CABINET



There are two sorts of kitchen cabinets: base cabinets, which sit on the floor, and wall cabinets. Base cabinets provide both storage space and work surfaces. They often house sinks, such large appliances as dishwashers, and sometimes smaller

conveniences, such as slide-out shelves or cutting boards.

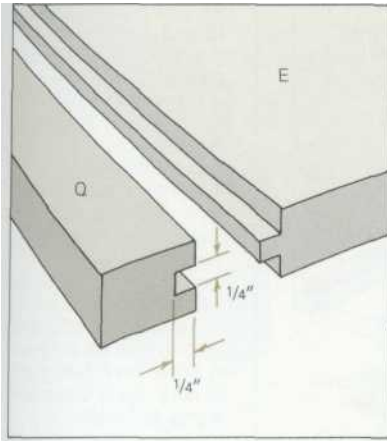
Construction: The basic cabinet is made of a plywood case (sides, floor, and back) and a counter top covered with plastic laminate. Hardwood trim defines

Parts list						
Part	Name	Quantity	Thickness	Width	Length	Material
A	Right (wall) side	1	3/4"	22 1/2"	31"	Birch plywood
B	Left (outer) side	1	3/4"	23 1/4"	35 1/4"	Cherry plywood
C	Divider	1	3/4"	22 1/4"	31"	Birch plywood
D	Cabinet floor	1	3/4"	22 1/2"	46 1/2"	Birch plywood
E	Shelf	1	3/4"	8"	22 1/2"	Birch plywood
F	Drawer side	6	1/2"	4 1/2"	22"	Birch plywood
G	Drawer side	4	1/2"	8"	22"	Birch plywood
H	Drawer front and back	4	1/2"	8"	21"*	Birch plywood
I	Drawer front and back	6	1/2"	4 1/2"	21"*	Birch plywood
J	Drawer bottom	2	1/4"	20 7/8"*	21"*	Birch plywood
K	Drawer bottom	3	1/4"	20 7/8"*	21"*	Birch plywood
L	Back	1	1/4"	31 3/4"	46 1/4"	Birch plywood
M	Door panel	1	1/4"	19 3/8"	21 1/8"	Cherry plywood
N	Drawer face	2	1 3/16"	9 3/8"	23"	4/4 cherry
O	Drawer face	3	1 3/16"	5 1/8"	23"	4/4 cherry
P	Kickplate	1	1 3/16"	3 1/2"	48"*	4/4 cherry
Q	Trim	9	1 3/16"	1 1/4"	†	4/4 cherry
R	Door stile	2	1 3/16"	2"	25 1/8"	4/4 cherry
S	Door rail	2	1 3/16"	2"	20 1/2"	4/4 cherry
T	Door panel clip	4	3/8"	1 3/16"	1/8"	4/4 cherry
U	Plug	24	3/8" dia	—	1/4"	4/4 cherry
V	Bracing strip	2	3/4"	1 1/2"	45 1/2"	1 x 2 pine
W	Bracing strip	2	3/4"	1 1/2"	19 1/2"	1 x 2 pine
X	Batting strip	1	1/2"	1/2"	72"*	1 x 2 pine
Y	Batting strip	1	1/2"	1/2"	24 1/2"*	1 x 2 pine
Z	Platform beam	2	1 1/2"	3 1/2"	46 1/4"	2 x 4 fir
AA	Platform beam	2	1 1/2"	3 1/2"	16"	2 x 4 fir
BB	Counter top	1	3/4"	25"*	73"*	Particle board
CC	Backsplash (optional)	1	3/4"	18"*	73"*	Particle board

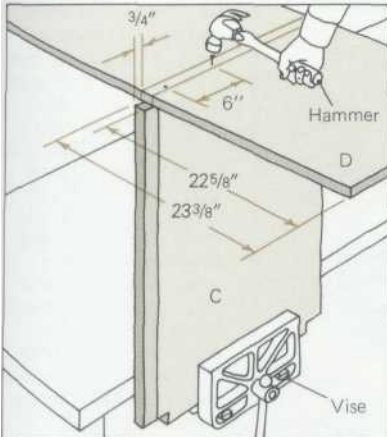
*Measurement is approximate; cut to fit during construction.
†One piece 30 1/4" long for divider, one 22 1/8" long for shelf; and two 22 3/8" long, two 32 1/4" long, and three 45 1/2" long for cabinet face. Check measurements before cutting.

Tools and materials: Radial arm or table saw with dado head. Saber saw, backsaw. Router with straight veneer trimmer, bevel veneer cutter, arbor, and pilot, 3/8" rabbeting bit, and 45° chamfer bit. Electric drill with set of twist bits, No. 10 plug cutter, and Nos. 8 and 10 combination pilot, clearance, and Counterbore bits. Wide chisel, 3/16" chisel, fine laminate file Hammer screwdriver. Several 5' pipe or bar clamps, several 6" C-clamps, vise. Framing square, combination square, level, steel tape rule, compass, utility knife, pencil. Rubber-surfaced pressure roller or rolling pin. Belt sander with No. 120 sanding belt Nos 80, 100, 150, and 220 sandpaper. Masking tape, carpenter's glue, construction adhesive, contact cement Lacquer thinner

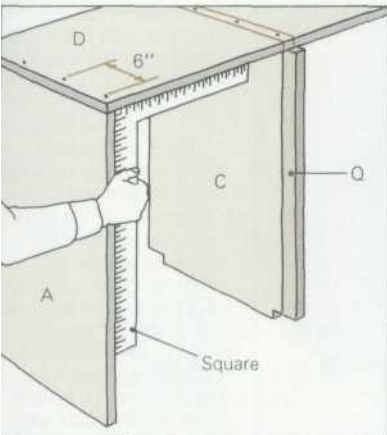
or equivalent solvent, tung oil, soft cloths One 4' x 8' panel each of 1/4", 1/2", and 3/4" birch-veneer lumber-core plywood and of 3/4" high-density particle board. One 2' x 4' panel each of 1/4" and 3/4" cherry-veneer lumber-core plywood, 48' of 4/4 cherry, 20' of 1 x 2 clear pine, and 11' of 2 x 4 fir Cedar shingles. Enough 1/16" plastic laminate to cover surface and edges of counter top Two flush-mounted pivot hinges, five pairs of 20" metal drawer slides, one magnetic door catch, six small round drawer/door pulls. 2d, 3d, 4d, 8d, and 12d common nails, 4d and 6d finishing nails, 7/8" No 6 roundhead wood screws and the following flathead wood screws: 5/8" No 4, 1/2" No 6 1", 1 1/2", and 2" No 8, and 1 1/4" No 10



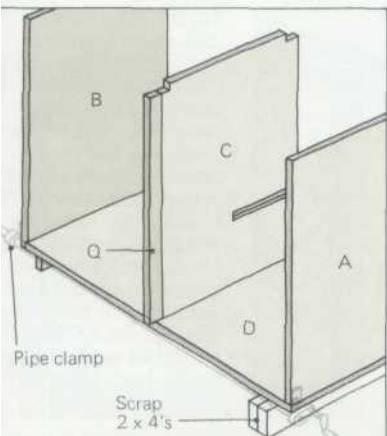
1. Cut parts A-E to sizes in chart
Then cut dados, rabbets, and notches shown in patterns Cut trim (Q) for divider (C) and shelf (E) and cut a 1/4- x 1/4-in. dado down center of back edge of each trim piece. Apply glue to dados, push trim onto tongues created by rabbets in divider and shelf. Clamp until dry. Belt-sand trim flush with divider and shelf.



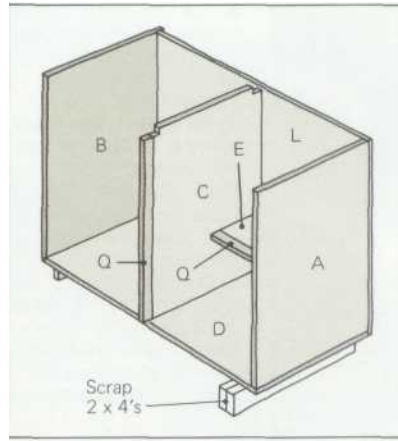
2. Draw lines across top of cabinet floor (D) 22 5/8 and 23 3/8 in. from left edge. Continue lines on bottom of floor Clamp divider (C) upside down in vise and glue floor to its bottom edge so that divider meets floor between lines and divider trim extends 3/4 in beyond front of floor. Using lines on bottom of floor as guide, drive 4d common nails through floor into bottom of divider every 6 in. Keep connection squared while doing so.



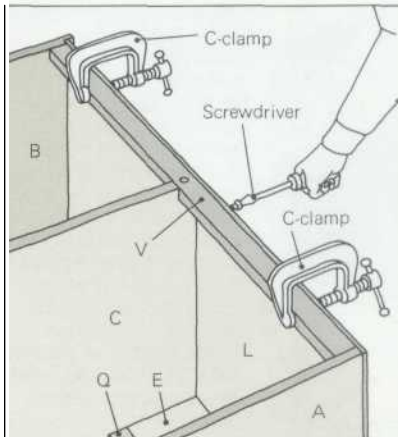
3. Apply glue to bottom edge of right cabinet side (A) and set cabinet floor (D) upside down on top of it so that all outer edges of the two pieces are flush. Drive 4d common nails through cabinet floor into bottom edge of side every 6 in., stopping to check for squareness after driving in each nail. It is of utmost importance that the cabinet be square, as the smooth operation of the drawers and door will depend upon it.



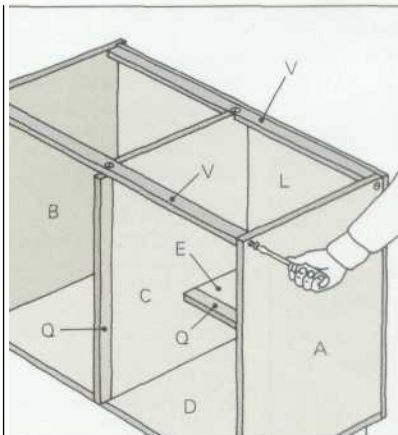
4. Turn assembly right side up Apply glue to long horizontal dado in left cabinet side (B) and insert left edge of cabinet floor into it so that front edges of floor and side are flush. Clamp unit and prop up opposite side of cabinet floor with two scrap 2 x 4's set on edge so that cabinet will sit level until the glue dries.



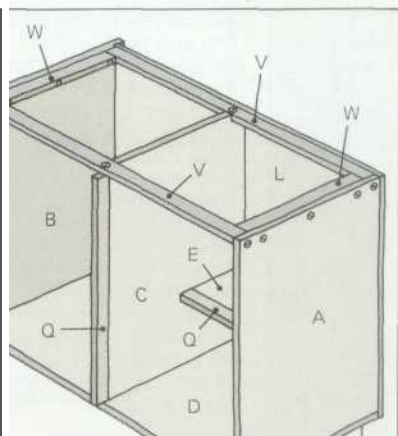
5. Slide shelf (E), with its trim facing the front, into dados in divider (C) and right side (A) Cut back (L) to size and glue it in place so that it sits in rabbet in left side and is flush with bottom of cabinet floor (D) and outer edge of right side Tongue of left side will extend a bit beyond back Secure back with 4d common nails.



6. Check measurement and cut long bracing strips (V) to size. Clamp one strip along inside of back (L), fitting it into notch at top of divider (C) so that its ends touch inside of cabinet sides (A and B) Use No. 8 combination bit to drill five evenly spaced pilot holes through back into bracing strip Also drill down through bracing strip into top of divider. Drive in 1 1/2-in. No 8 screws and remove clamps

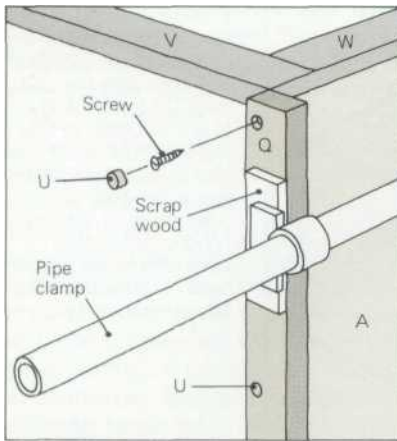


7. Fit other long bracing strip (V) into notch at front of divider so that its ends are flush with tops and fronts of cabinet sides. (Trim on divider will protrude 3/4 in. at front) Use No 8 bit to drill through front bracing strip into divider and drive in a 1 1/2-in No 8 screw. Drill one hole through each side into each end of each long bracing strip and drive 2-in No 8 screws into the holes

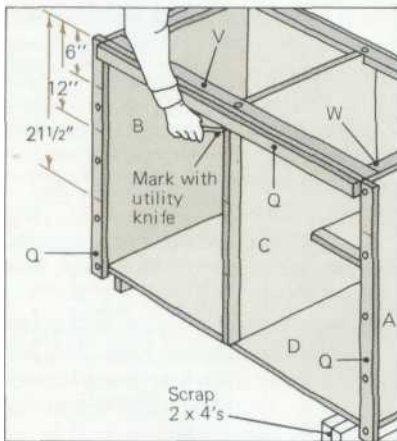


8. Check measurement and cut short bracing strips (W). Clamp one strip against inside of right cabinet side (A) with its ends butting long bracing strips (V). Use No. 8 combination bit to drill three holes through cabinet side into short bracing strip. Clamp other strip to left side. This time, drill pilot holes through strip into side Attach strips with 2-in No 8 screws. Sand inside of cabinet with Nos. 80, 100, 150, and 220 paper

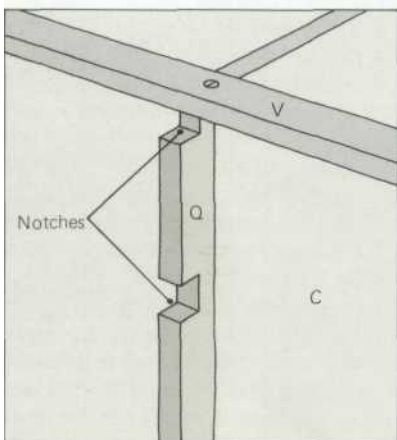
Kitchen base cabinet



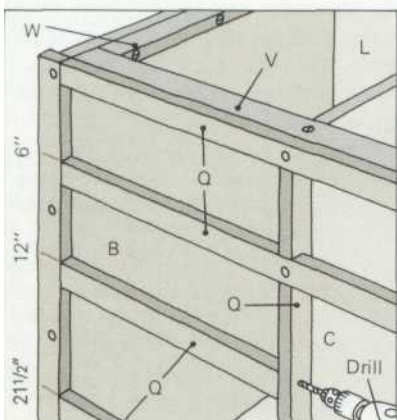
9. Cut trim (Q) for front edges of cabinet sides, and clamp trim flush with inner edges and tops of sides. Use No. 10 bit to drill pilot holes every 8 in. through trim into front edges of sides. Counterbore holes $\frac{3}{8}$ in. deep. Glue and screw trim in place. Remove clamps when glue is dry. Use No. 10 plug cutter to cut plugs (U) from cherry. Glue plugs into screw holes, and chisel and sand their tops flush with trim.



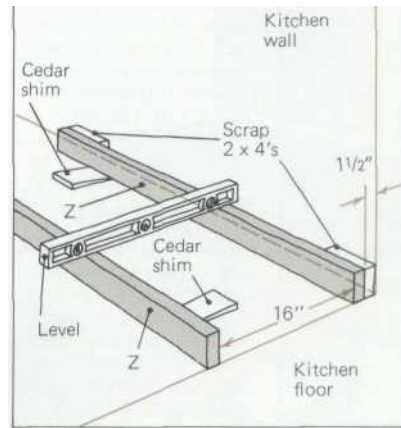
10. Mark trim on cabinet sides 6 in. from top. Mark trim on divider and left side 12 in. and 21 1/2 in. from top. Cut a piece of trim and position it across cabinet front flush with tops of trim on sides. Use a knife to mark divider where trim crosses it. Cut and position a second piece of trim with top edge at 6-in mark and a third piece with top edge flush with top of cabinet floor. Mark divider where these pieces cross it.



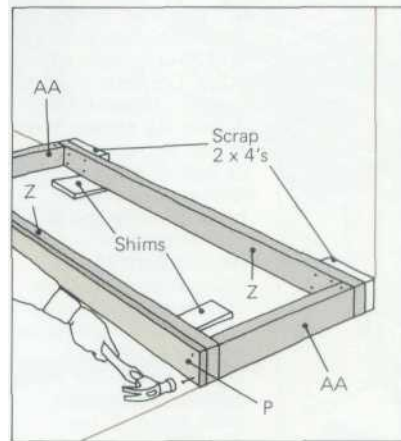
11. Use saber saw to cut $\frac{13}{16}$ -in.-deep notches in divider trim where horizontal trim will hit it, using knife marks as guides. With No. 10 bit drill a deep hole through each piece of trim into divider. Glue and screw trim to divider. Drill pilot holes and glue and screw top trim to bracing and bottom trim to cabinet floor. Plug all holes. Use No. 8 bit to drill through trim on sides into ends of horizontal trim. Drive in 2-in. screws



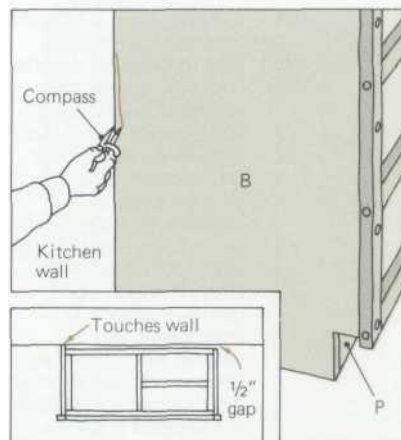
12. Cut two pieces of trim and position them between trim on divider and left cabinet side so that top of one piece is at 12-in. mark and top of other piece is at 21 1/2-in. mark made in Step 10. Use No. 10 bit to drill holes through trim on divider and on left cabinet side into ends of short horizontal trim. Drive in No. 10 screws. Use router with chamfer bit to bevel any edges of trim that will face the door or a drawer.



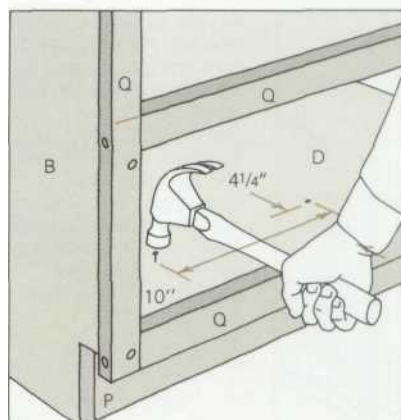
13. Cut platform beams (Z and AA) to size parallel to wall and 1 1/2 in from it. Put two short 2 x 4 scraps into gap to maintain spacing and serve as nailing surfaces. Position other long beam parallel to first and 16 in away. Level each beam, if necessary, by pushing a cedar shingle under it as far as needed. Level beams with each other in same way, being sure to keep each beam level along its length



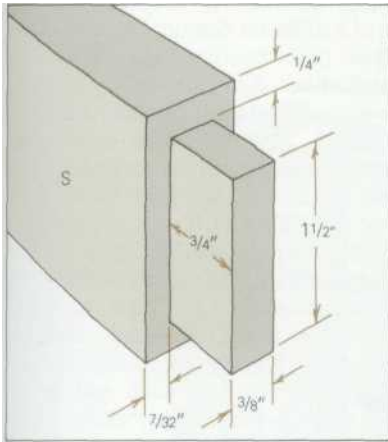
14. Position the short beams (AA) between ends of long ones. Level short beams, then level all beams with each other. Use 12d nails to toenail the 2 x 4 scraps to wall, face-nail inner long beam to scraps, toenail short beams to inner long beam, and face-nail outer long beam to short beams. Also toenail each piece to kitchen floor. Cut kickplate (P), and nail it flush with top of outside beam with 6d finishing nails every 10 in



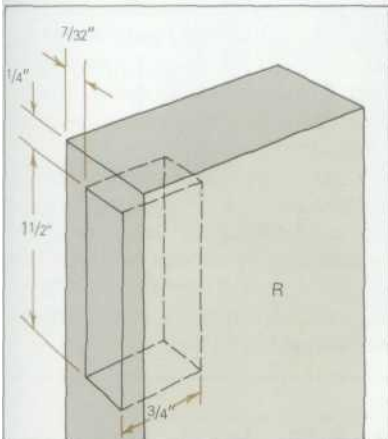
15. Position cabinet on platform with back edge of left side (B) touching wall and cabinet back (L) 1/2 in. from wall. Front of cabinet should be 2 3/4 in from kickplate. If there are gaps between left side and wall, set a compass with its point and pencil as wide apart as widest gap. Draw point of compass down wall so that pencil will mark contours of wall on left side. Plane or sand away wood behind marks to make side fit flush with wall.



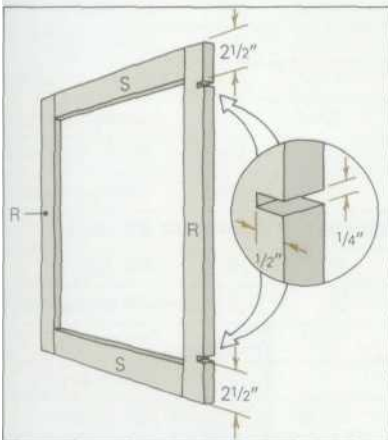
16. Drive 8d nails through cabinet floor into platform every 10 in. Using dimensions in chart on page 115 for parts F-K, make three small and two large drawers. To do so, cut drawer faces (N and O) to size, then follow the directions for making drawers in platform bed, but skip Steps 16-18 and use 20-in. slides instead of the larger ones required for the bed. Sand and set aside drawers. **584**



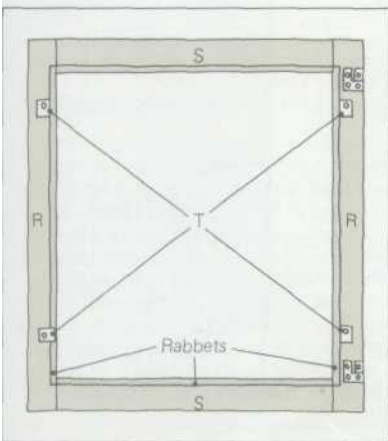
17. Cut door stiles (R) and rails (S) to size. Mark off both ends of both rails for tenons. Each tenon should be 3/4 in. long, 3/8 in. thick, and 1 1/2 in. wide, and have four shoulders. The long shoulders should be 7/32 in. wide and the short shoulders should be 1/4 in. wide as shown. Use table or radial arm saw with dado head to cut the tenons.



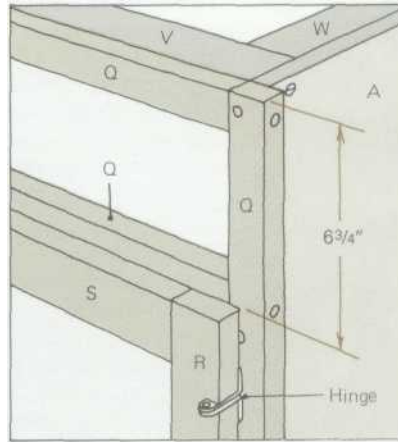
18. Draw cutting lines for mortises on door stiles (R) 1/4 and 1 3/4 in. from each end of each stile and 7/32 in. from each side edge. Test-fit door-rail tenons inside the lines. Cut blind mortises 3/4 in. deep. Glue together, clamp, and square off door frame. When glue is dry, unclamp frame and make rabbets 3/8 in. wide and 1/4 in. deep along inside perimeter of door frame to accept panel. Chisel corners of rabbets square.



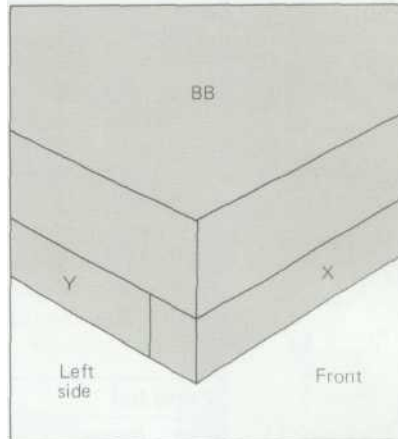
19. Sand door frame with Nos. 80, 100, 150, and 220 paper. Cut two slots on outside face of one door stile, each 1/2 in. wide and 1/2 in. deep. Position one slot 2 1/2 in. from top of stile and other slot 2 1/2 in. from bottom. Set hinges into these slots and use pencil to mark positions of hinge screw holes. Drill pilot holes, and screw hinges to stile.



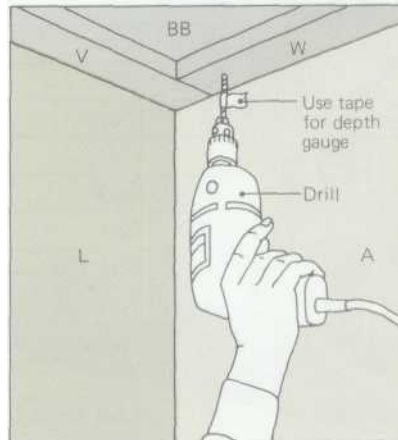
20. Cut door panel clips (T) and drill a 1/8-in. hole 3/16 in. from one end of each. Sand clips and position them on inside of door frame so that when screwed on they can be turned one way to cover rabbets and the other to leave rabbets unobstructed. Mark clip holes on frame, drill 5/64-in. pilot holes, and attach clips to frame with No 6 roundhead screws, but leave rabbets loose enough that clips can be turned.



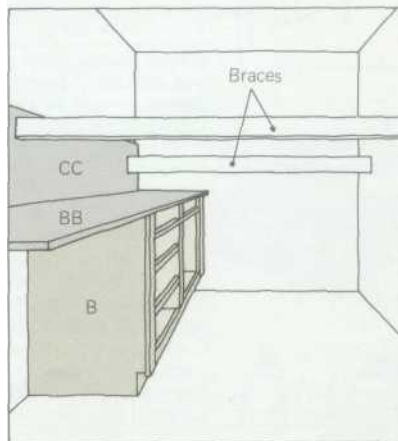
21. Cut door panel (M) to size and test its fit in frame. Trim it to fit if necessary, then sand it. Remove panel and hold frame against cabinet face with rabbets facing in and hinges at right. Top edge of frame should be 6 3/4 in. below top edge of cabinet. Level door frame, then mark cabinet with location of screw holes in hinges. Remove door frame and drill holes for hinge screws. Secure panel in frame, but do not install door yet.



22. Cut counter top (BB) and batting strips (X and Y) to size. Attach batting strips to underside of counter top, flush with its front and side edges, with glue and 3d common nails. Cut plastic laminate for top surface and exposed edges of counter top, allowing for 1/4-in. overhang on all sides. Apply laminate to side edge, front edge, and then top surface of counter top. Trim each piece and bevel edges.



23. Position counter top on cabinet with its long batting strip overhanging cabinet front and its right side flush against wall. Use No 8 bit to drill up through bracing (V and W) into counter top in each corner (Do not drill deeper than 1 1/8 in. or you may pierce top.) Drive in 1 1/4-in. screws. Sand exterior of cabinet, then rub down wood with tung oil. Attach drawer/door pulls; install door, door catch, and drawers.



24. If you are installing a backsplash (CC), cut it to size and apply plastic laminate to edges that will show, then to front. Test-fit backsplash on wall. If there are gaps, trim as in Step 15. Glue backsplash to wall with construction adhesive. If possible, brace it with lumber wedged against opposite wall until adhesive dries. Drill pilot holes and drive 2-in. screws through bottom of the counter top into bottom of the backsplash.

130
CHERRY END TABLE



Time-honored techniques of hand joinery, executed with the help of modern tools and equipment, make this a project any craftsman can be proud of. Whether your decor is stark contemporary or cozy Early American, this end table's clean, elegant lines, highlighted by the rich tones and delicate figuring of oiled cherry, will fit right in.

Wood: For the greatest economy and the best results in matching color and figure, try to find a single piece of cherry stock that will yield all the solid parts of the table. Brush a little paint thinner on the surface to get an idea of the color and figure—it will dry harmlessly—then look for a matching piece of cherry-veneer plywood for the shelf.

With careful cutting, you can get all the solid pieces from a board that is 2 inches thick, 6 1/2 inches wide, and 10 1/2 feet long. First, cut a 32-inch length and rip it into two 3-inch widths for the legs. Then cut a 6-inch length and rip it into four 1 1/4-inch widths for the wings (B). Cut three 20-inch lengths for the top. Rip the remainder into 2 1/2-inch widths for the aprons (C and D), then rip these pieces to a thickness of 1 1/4 inches. The edging (E and F) and screw blocks (H) can be made from the scrap.

Construction: The table is built in three clearly defined phases, each of which is shown on a separate page. First, the legs, wings, and aprons are cut roughly to shape and jointed to make the basic table structure. Then these parts are more carefully shaped, the shelf is fitted into notches in the legs, and the struc-

ture is assembled with glue. Finally, the top is formed and joined to the structure by means of slotted screw blocks. Because of the inevitable imprecision of mortise-and-tenon joints, both the shelf and the top should be cut and shaped to fit the assembled leg-and-apron structure—not cut according to predetermined dimensions.

It may be difficult to find 2-inch-thick boards wide enough to make the legs according to the diagram on the opposite page (Step 1). If so, you can cut all four legs 1 3/4 inches square and 24 7/8 inches long and join two wings to each, rather than one as we have done, in order to make the corner units. When rough-cutting the curved part of the tapered legs (Step 3, opposite page), guard against accidents by first making a series of parallel cuts about 1/4 inch apart. If you use a band saw for the job, tape a piece of scrap wood to the lower part of the leg, as shown in Step 3, just thick enough to keep the piece level on the saw table.

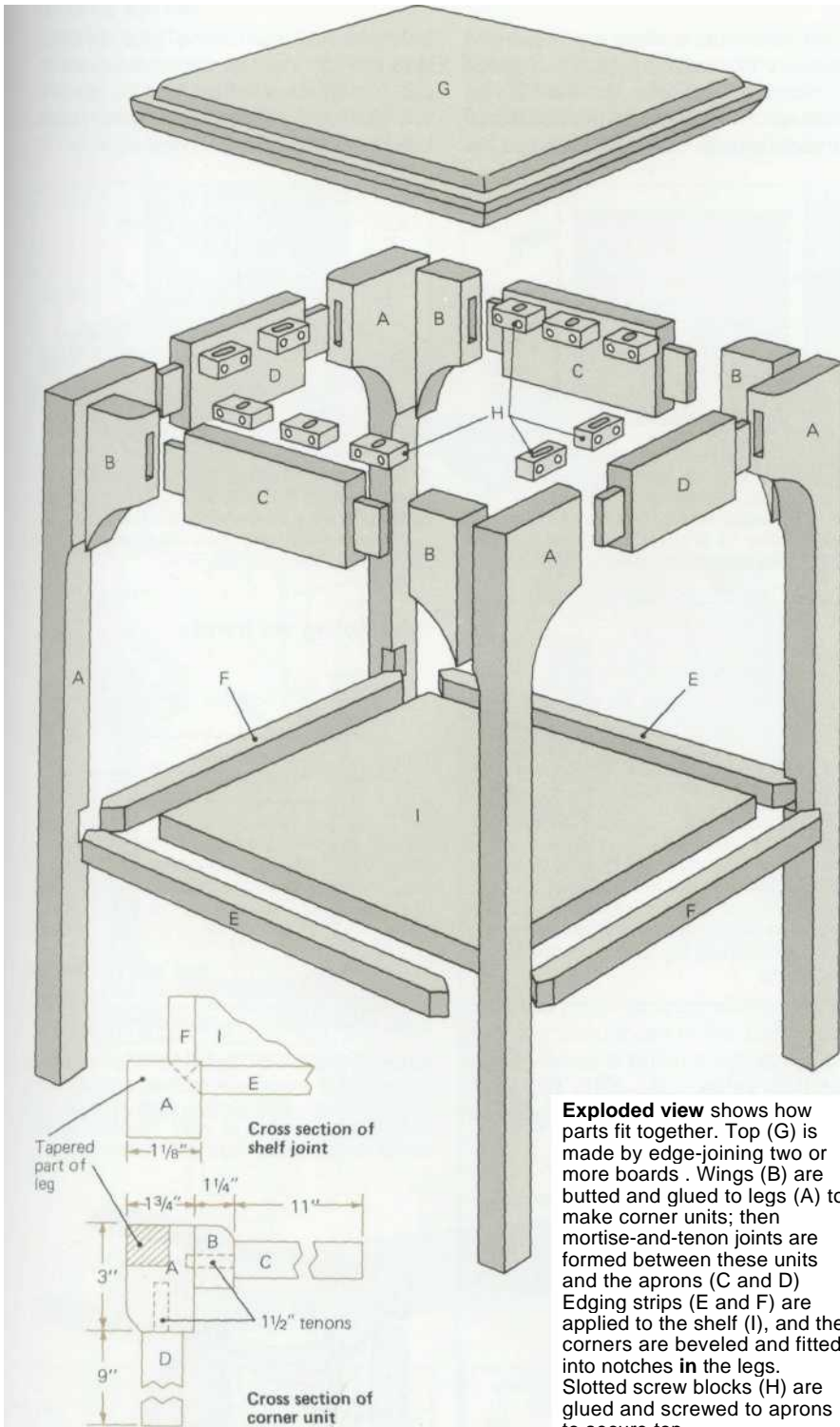
Finishing: After construction is completed, use a block plane or spokeshave to gently round all sharp edges—how much you round them is a matter of personal taste and esthetic judgment. Then sand with Nos. 100, 150, and 220 sandpaper to achieve a smooth surface. To bring out the natural color and figure of the wood, apply several coats of penetrating oil, such as linseed oil, tung oil, or a commercially prepared Danish-style natural finish. If you want a protective, glossy surface, wait about a week before rubbing in a coat of wax.

Parts list						
Part	Name	Quantity	Thickness	Width	Length	Material
A	Leg	4	1 3/4"	3" *	24 7/8"	Cherry
B	Wing	4	1 3/4"	1 1/4"	8" *	Cherry
C	Side apron	2	1"	2 1/2"	14"	Cherry
D	End apron	2	1"	2 1/2"	12"	Cherry
E	Side edging	2	1/2"	7/8" *	16" *	Cherry
F	End edging	2	1/2"	7/8" *	14" *	Cherry
G	Top	1	1 3/8"	16 1/2"	18 1/2"	Cherry
H	Screw block	10	5/8"	1"	1 1/2"	Cherry
I	Shelf	1	3/4"	12 7/8" *	14 1/2" *	A-2 cherry plywood

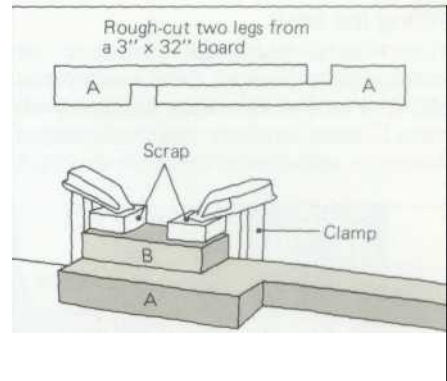
* Measurement is approximate; cut to fit during construction.

Tools and materials: Table saw with combination blade. Band saw, saber saw, or coping saw. Backsaw, miter box. Drill with 3/32", 11/64", and 5/16" twist bits. Framing and combination squares, T bevel, steel tape rule, marking gauge, mortising gauge (optional), pencil, awl, mat knife. Screwdriver. Jack plane, block plane, shoulder plane (optional), spokeshave or drawknife. Straight chisels: 1/8", 3/8", 1/2", 3/4", 1", and 1 1/2". Mallet. Six 3' bar or pipe clamps, several assorted

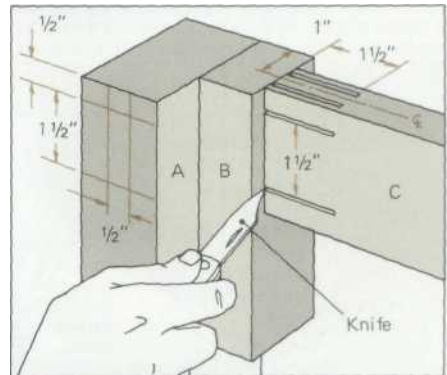
C-clamps. Orbital sander (optional), sanding block. Nos. 80, 100, 150, and 220 sandpaper. Yellow carpenter's glue, penetrating oil. Wax (optional). Wax paper, heavy paper. 3/16" washers, 1 1/4" and 1 1/2" No. 8 roundhead screws. A 2" x 6 1/2" x 10 1/2" board of cherry stock or the equivalent. An 18" square of 3/4" A-2 cherry plywood.



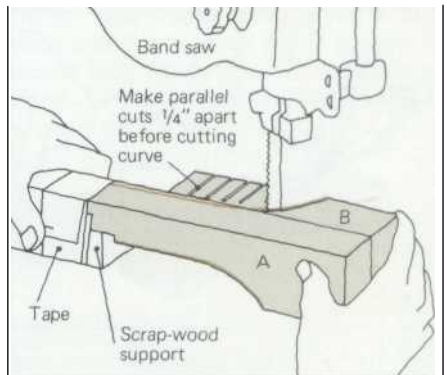
Exploded view shows how parts fit together. Top (G) is made by edge-joining two or more boards. Wings (B) are butted and glued to legs (A) to make corner units; then mortise-and-tenon joints are formed between these units and the aprons (C and D). Edging strips (E and F) are applied to the shelf (I), and the corners are beveled and fitted into notches in the legs. Slotted screw blocks (H) are glued and screwed to aprons to secure top



1. Plane stock to thickness for legs (A), wings (B), and aprons (C and D). Cut to length and width. Glue and clamp wings to legs to form corner units, making sure that the top edges are flush and the joints are square

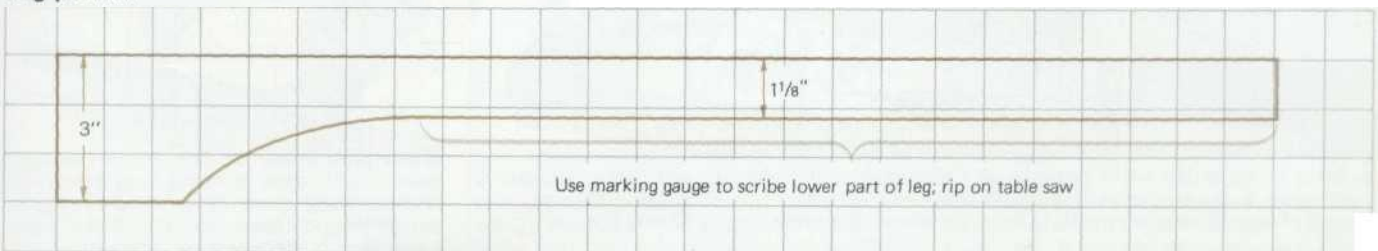


2. Use a table saw to cut cheeks of tenons 1 1/2 in. deep in ends of apron pieces (C and D). Position aprons flush with tops of corner units and mark for mortises. Cut tenon shoulders and make mortises



3. Use pattern below to scribe outline of tapered leg on both outer faces of corner units. Rough-cut to within 1/8 in. of scribed lines. Rip straight sections on table saw, use band, saber, or coping saw to cut curves

Leg pattern



Use 1-in. grid to make full-size pattern of tapered leg on heavy paper. Scribe pattern on both outer faces of corner units.

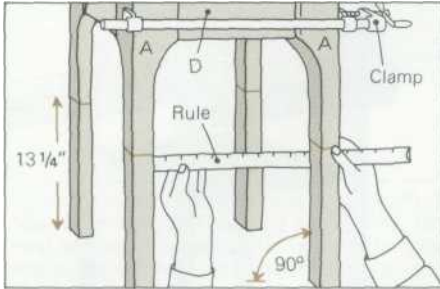
Cherry end table

Fitting the shelf

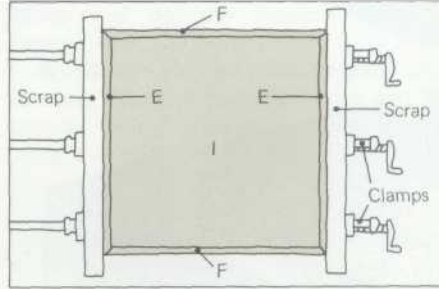
The table's sturdiness depends on custom-fitting the shelf. First, use a plane and spokeshave to reduce the rough-cut corner units to their scribed shapes. Assemble and clamp the table structure

dry (no glue) with all four legs square to the ground. Cut and edge the shelf (Steps 1-3). The shelf corners are beveled so that the notches they must fit into can be cut straight across. Mark the bevel points

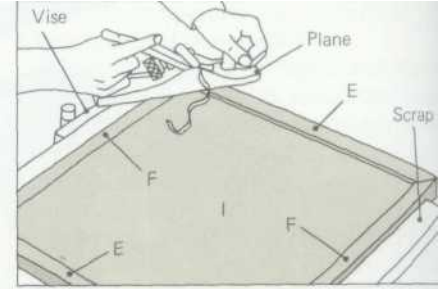
(thickness of the edging plus 1/16 inch), then use the shelf corners themselves as patterns for the notches. After the notches are cut, doublecheck the bevel points before sawing off shelf corners.



1. Rule a line around each leg 13 1/4 in. from the floor. Measure the distances between the legs at these marks. Add 1/8 in. to each dimension to determine the size of the shelf (I). Cut shelf from 3/4-in. plywood.

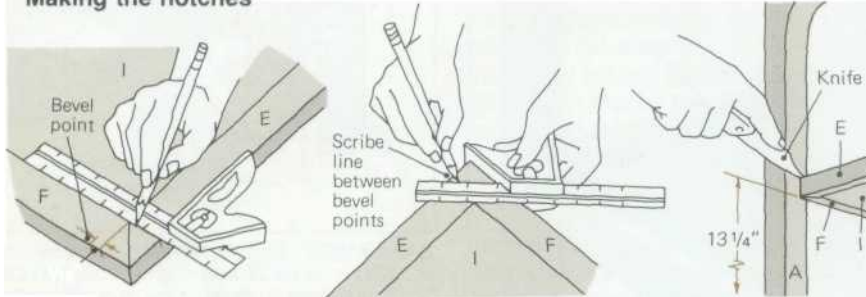


2. Miter one end of each side edging (E). Clamp to sides of shelf and cut an end edging (F) to fit between miters. Mark and cut miters on opposite ends of parts E and fit other end edging. Glue and clamp edging in place.



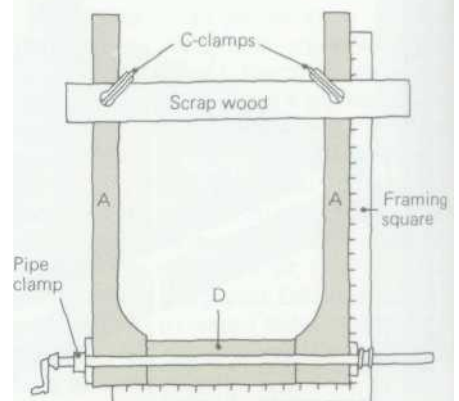
3. Plane parts E and F and sand with No. 220 sandpaper so that they are flush with both surfaces of shelf. Label each shelf corner and the corresponding leg before disassembling the table to cut the notches.

Making the notches

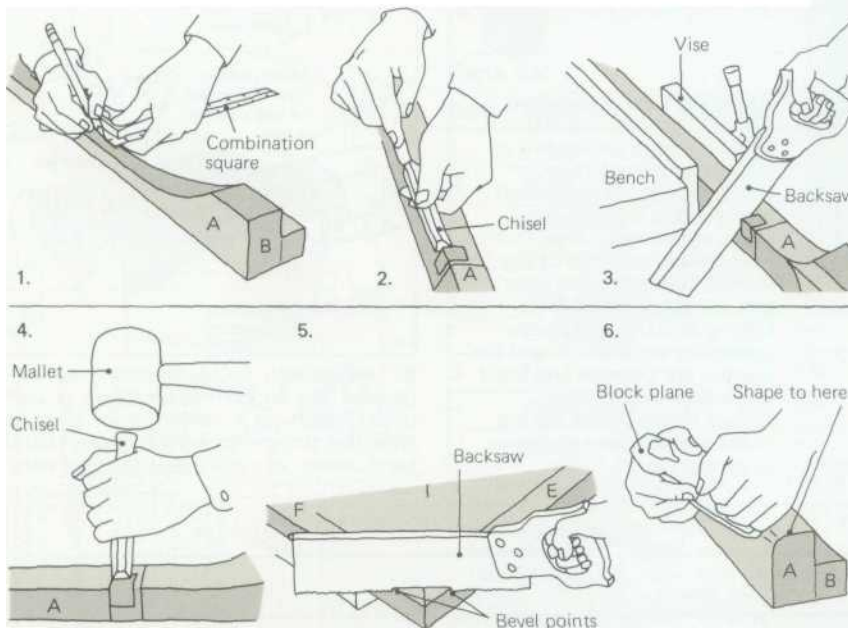


Extend outline of shelf (I) across edging (E and F); mark bevel points 1/16 in. farther from corners. Hold each shelf corner against inner faces of its matching leg, and mark shelf thickness plus distance from corner to bevel points on leg.

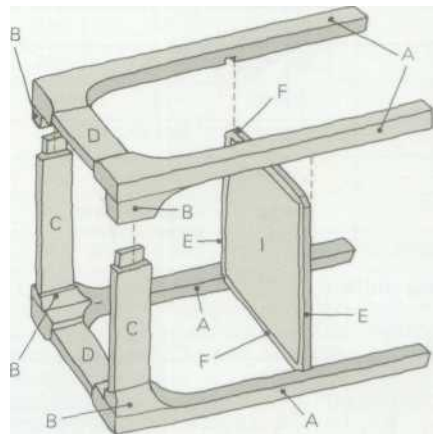
Assembling the frames



Sand all parts with Nos. 100, 150, and 220 paper. Glue tenons of end aprons (D) into their mortises and apply pipe clamps. To ensure squareness of end frames, secure scrap wood across legs with C-clamps.



1. Scribe outline of each notch. 2. Nick corner of each leg to ensure a clean saw cut. 3. Cut notch to depth with backsaw. 4. Chisel out notch, making its base flat or slightly concave. 5. Doublecheck bevel points and saw off shelf corners. 6. Shape upper corners of legs (A) and wings (B) to the point where they meet aprons (C and D).



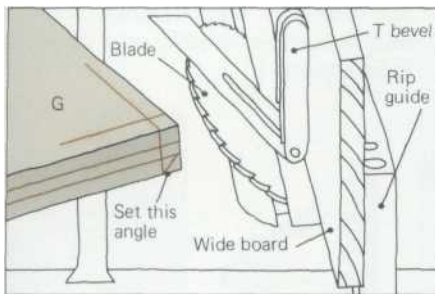
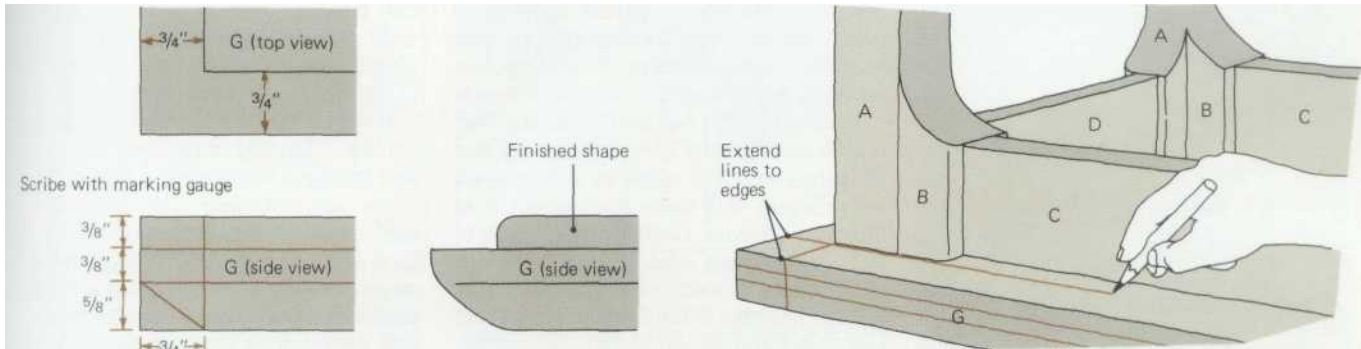
When glue dries, lay one end frame face down. Apply glue to mortises and notches and insert side aprons (C) and shelf; then glue the other end frame in place. Stand table frame upright, square it up, and apply pipe clamps across legs.

Shaping the top

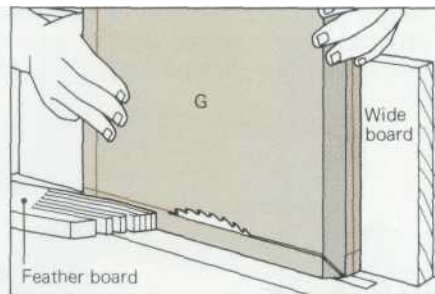
The upper surface of the top is rabbeted all around to create a raised center panel. Viewed in silhouette, the edges of this panel should align with the outer surfaces of the table legs. The top's lower edge is

beveled at an angle of about 40° to meet the upper edges of the corner units (A and B). Before beveling, center the table frame upside down on the underside of the top and outline the corner units; then

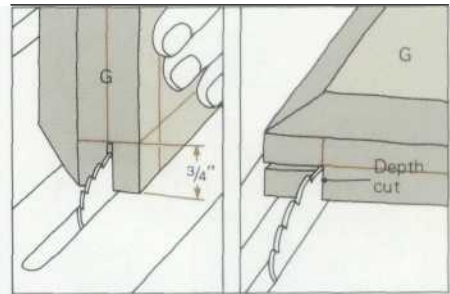
set the angle of the table saw to cut just a hair outside these lines. Gently round all sharp corners with a plane and No. 80 sandpaper to give the top a graceful form. Attach the top as shown below.



1. Use T bevel to transfer the angle from an edge of the marked-out top (G) to the table saw. The blades of most saws can be tilted only to the right, so the rip guide must be moved to the left of the blade.



2. Make test cuts with scrap wood to find proper settings, then cut bevels along bottom edges of four sides of top.



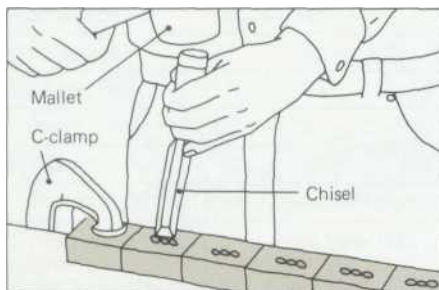
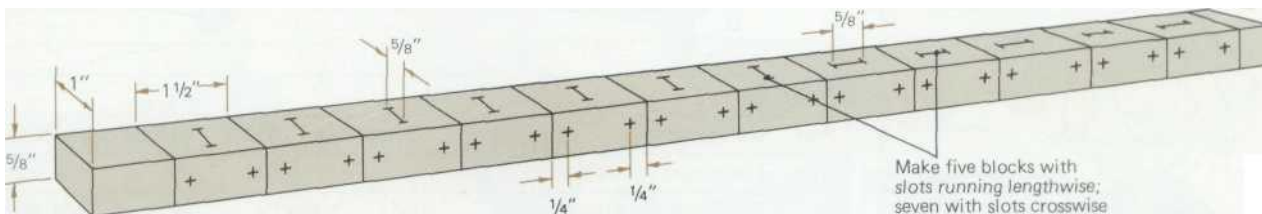
3. Move rip fence back to right side of blade and reset blade to 90°. Cut 3/4-in rabbets in all four edges of top. Lower blade to 5/16 in. and adjust rip fence for depth cuts. Finish rabbets with chisel or shoulder plane.

Attaching the top

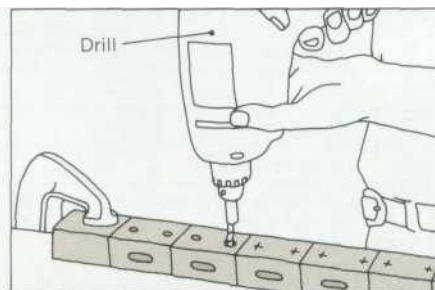
Changes in humidity will cause the top to swell and shrink. If the top is firmly secured to the table structure, such movement will eventually weaken the mortise-and-tenon joints and may cause the top to

split. The problem is solved by attaching slotted screw blocks to the apron pieces, with all the slots running across the grain of the top, then driving screws through the slots and into the top. Make all the

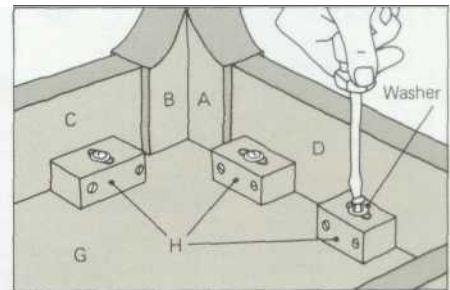
blocks from a strip of hardwood 5/8 inch thick and 1 inch wide that is at least 20 inches long. Mark out a dozen blocks as shown below—10 are needed, the other two are spares.



1. To make 5/8-in. slots in blocks, first drill three holes, using an 11/64-in. bit (Drill center hole first.) Then cut through waste from both sides with 1/2-in. chisel. Finally, clean out the slots with 1/8-in. chisel.



2. Use an 11/64-in. bit to drill two shank holes through each block for the screws that will secure the blocks to the aprons. Center the holes 1/4 in. from the ends of the blocks. Then cut the blocks apart.



3. Use glue and 1 1/2-in. No. 8 screws to mount three blocks on each side apron (C) and two on each end apron (D). Attach top (G) with 1 1/4-in. No. 8 roundhead screws and 3/16-in. washers. (Use 5/32-in. bit for pilot holes.)

131
DINING TABLE



An exotic wood from Africa, zebrawood gives a new look to this classic extension-leaf dining table. Zebrawood is not easy to work; your tools and saw blades must be extremely sharp to handle it. But the dramatic grain of zebrawood is unsurpassed by any other. If you prefer a more subdued look, use any hardwood that is available as veneered lumber-core plywood, such as oak, teak, walnut, or cherry.

The veneered plywood top is trimmed with mitered hardwood edge strips; it measures 35 1/2 inches x 56 inches and rests on a bearer rail and two leaves. Each leaf is 22 1/2 inches x 35 1/2 inches, including the edge strips. The stationary bearer rail supports the top when the two leaves are pulled out. The leaves are screwed to tapered slides, and as they are withdrawn from their storage position, the taper of the slides causes the table top to rise gradually. When the leaves are fully extended, the table top drops onto the bearer rail (see diagrams on opposite page, bottom left). It is a good idea to use your hand to support the top so that it drops gently. Dowels glued into the

underside of the top are seated in the bearer rail to keep the top in position To return the leaves to their storage position, lift the table top and slide the leaves back under it (see illustration opposite)

In order to prevent scratches, the underside of the top is covered with felt where it touches the leaves. To compensate for the thickness of the felt at the ends of the top, plastic laminate is glued to the underside of the bearer rail.

In the chart the dimensions for the legs are given as though they were a single piece of wood; actually, each leg is made from two pieces of hardwood, each 1 3/8 inches thick, glued face to face. Be sure the slides are perfectly straight or the leaves will not operate smoothly. Wood of a thickness of the slides (1/2 inches) is likely to change shape after being cut because of the release of fibers. Therefore, it is a good idea to cut the wood close to the required width, joint it again (see Step 7), and then cut it to the final width. When making crosscuts, follow a similar practice; cut close to the line on the first pass, then make the second pass with the

Parts list

Part	Name	Quantity	Thickness	Width	Length	Material
A	Top	1	3/4"	33"	53 1/2"	Plywood
B	Leaf	2	3/4"	33"	20"	Plywood
C	Top side edge strip	2	3/4" ☆	1 1/2"	56" †	Zebrawood
D	End edge strip	6	3/4" ☆	1 1/2"	35 1/2" †	Zebrawood
E	Leaf side edge strip	4	3/4" ☆	1 1/2"	22 1/2" †	Zebrawood
F	Leg	4	2 3/4"	2 3/4"	28 1/2"	Zebrawood
G	Side apron	2	1 1/2"	2 3/4"	48"	Zebrawood
H	End apron	2	1 1/2"	2 3/4"	27 1/2"	Zebrawood
I	Bearer rail	1	3/4"	8 1/2"	33"	Plywood
J	Bearer end edge strip	2	3/4" ☆	1 1/2"	32 1/2" †	Zebrawood
K	Bearer side edge strip	2	3/4" ☆	1 1/2"	11" †	Zebrawood
L	Slide	4	1 1/2"	1 1/2"	49 1/2"	Hardwood
M	Center support	1	1 1/2"	2 3/4"	30" †	Hardwood
N	Slide stop dowel	4	3/8" dia.	—	1 1/2"	Dowel
O	Joining dowel	16	1/2" dia.	—	3 3/4"	Dowel
P	Positioning dowel	2	1/2" dia.	—	2"	Dowel

☆ Buy 1/2" thick stock and plane to 3/4".

† Measurement is approximate; cut to fit during construction.

Tools and materials: Table saw with fine-tooth carbide-tipped blade, carbide-tipped rip blade, miter gauge, and crosscut tray. Circular saw with plywood blade. Router with 1/4" straight bit, 1/2" or 3/4" straight bit, 1/4" rounding-over bit, and 3/4" core-box bit. Drill with 1/2" twist bit, countersink bit, and doweling jig. Tenon saw, 1 1/2" chisel, wooden mallet, rabbet plane, smooth plane Steel tape rule, combination square, framing square, straightedge, pencil Standard screwdriver, spiral-ratchet screwdriver, awl. Vise, two quick-action clamps, two 6" C-clamps. Bar or pipe clamps as follows: seven 3', five 4', four 6'. Two sawhorses White glue, contact

cement, masking tape Nos. 80, 100, 120. and 150 sandpaper. No. 220 open-coat silicon carbide paper. 0000 steel wool. High-gloss polyurethane varnish, paste wax, paraffin, cloths. A 4' x 8' panel of 3/4" zebrawood lumber-core plywood. Solid zebrawood milled to 13/16", 1 3/8", and 1 1/2" (see chart and Step 7). Hardwood milled to 1 1/2" (see chart), 1/2" plywood scraps. Two 1/2" hardwood dowels 3' long, a 3/8" hardwood dowel 6" long. Plastic laminate 8 1/2" x 32 1/2". 2/3 yd felt Four furniture glides for bottoms of legs Flathead wood screws: eight 1 1/2" No 8, four 2" No 10, two 1 3/4" No 12, ten 2" No 12, and two 2'A" No 12.

blade on the outer edge of the cutting line. This technique will give the cut a straighter surface.

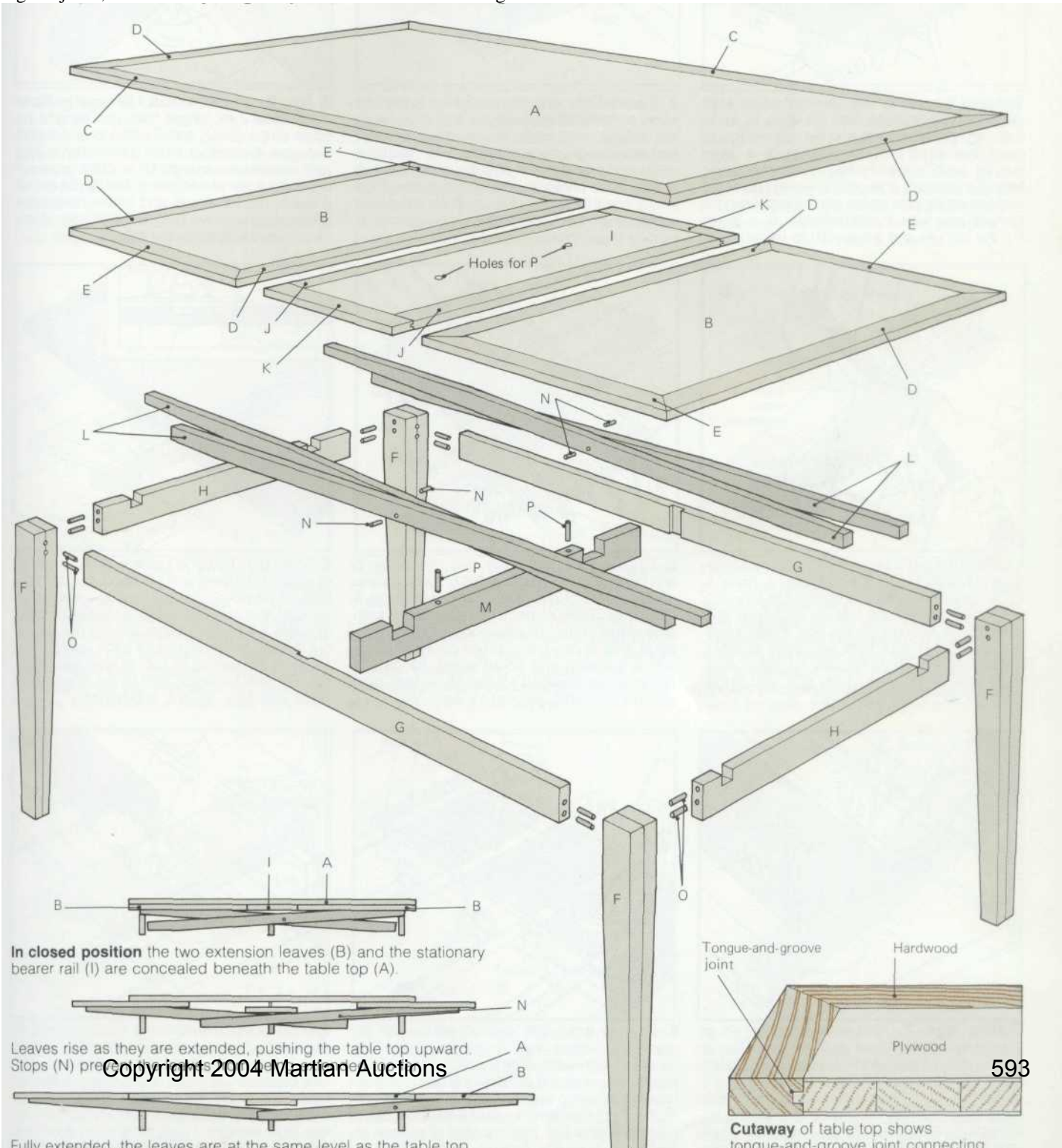
The project calls for a number of bar or pipe clamps in several sizes. If you use pipe clamps, you will need seven pairs of head and tail pieces; then you can buy black pipe, threaded on one end, cut to the required lengths. Whenever you glue joints,

have someone on hand to help wipe off the excess glue, position the clamps, and move heavy assemblies.

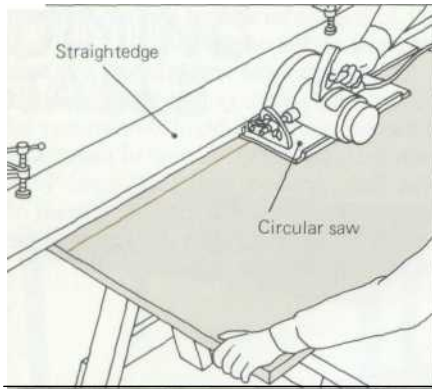
After you complete the step-by-step instructions, remove the top and leaves; then sand and finish all parts. Sand the hardwood with Nos. 80, 100, 120, and 150 paper; sand the plywood surfaces carefully with Nos. 100 and 150 paper so that you do not break through the veneer. Glue the

felt to the underside of the top and put furniture glides on the legs.

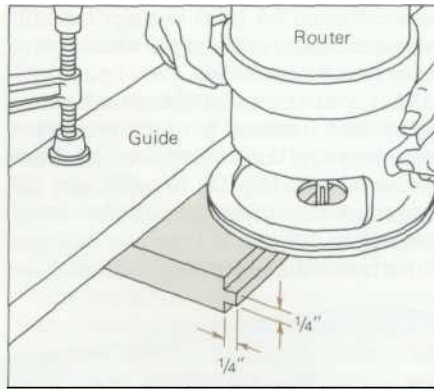
This dining table was finished with four coats of high-gloss polyurethane, sanded between coats with No. 220 open-coat silicon carbide paper. A coat of paste wax was then applied with 0000 steel wool. (Alternative finishes might be tung oil or Danish oil.) Paraffin was used to wax the slides and their notches



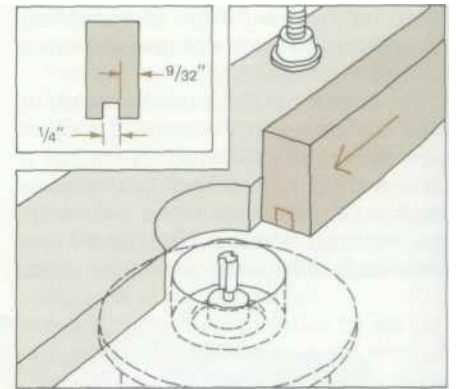
Dining table



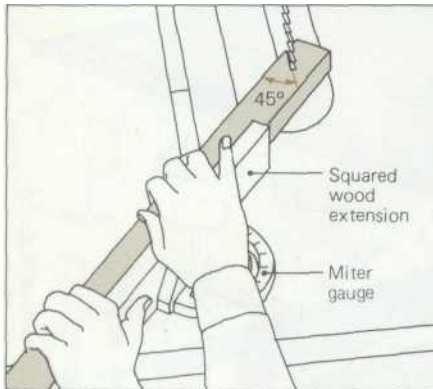
Top and leaves: 1. Rip plywood lengthwise on table saw, making first cut $33 \frac{3}{8}$ in wide; then turn piece around and rip other edge to get a final width of 33 in. (This gives a clean cut on both edges.) Place cloths on sawhorses to protect plywood, then rest plywood on sawhorses with better side down. Using a circular saw with a straightedge as a guide, cut the top (A) and leaves (B) to length.



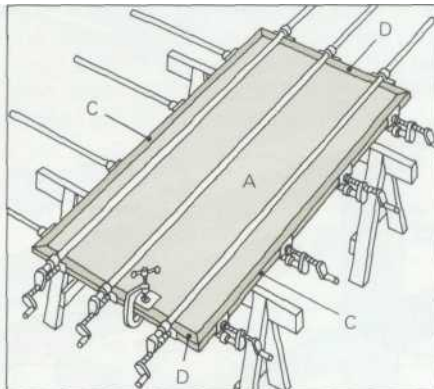
2. Practice this and the next step on scrap wood before cutting tongues and grooves in top, leaves, and edge strips. Using a router and any straight bit larger than $\frac{1}{4}$ in., clamp a guide and adjust depth of cut to make a cut $\frac{1}{4}$ in. x $\frac{1}{4}$ in. in plywood edges. If plywood measures less than $\frac{3}{4}$ in. thick, reduce the depth of the cut on the underside to leave a tongue exactly $\frac{1}{4}$ in. thick.



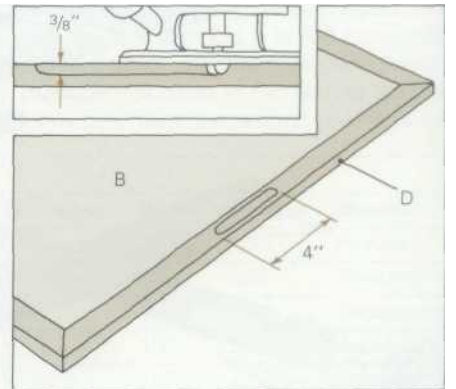
3. Rip $\frac{13}{16}$ -in. zebra wood $1 \frac{1}{2}$ in. wide. Crosscut pieces 2 in longer than final lengths for edge strips (C, D, and E) for top and leaves. Set up a router in a table and use a $\frac{1}{4}$ -in. straight bit to cut a groove in one long edge of each strip. Set the bit so that it leaves $\frac{9}{32}$ in. above and below the groove. (The extra $\frac{1}{32}$ in. will be planed off later.) Mark all pieces as to their orientation.



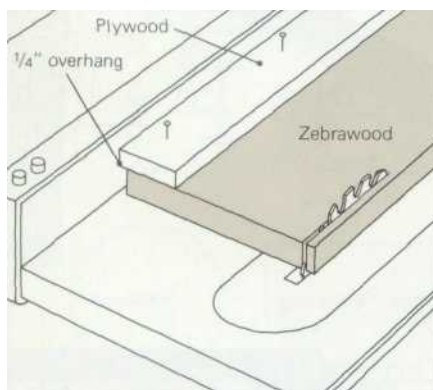
4. Extend the table saw miter gauge by screwing a squared piece of wood onto it. Mark a 45° angle on one end of an end edge strip (D); saw in two passes, the first $\frac{1}{16}$ in. outside the line and the second on the line. Place edge strip on top (A) and mark 45° angle at other end, saw as before. Repeat for other end edge strip, side edge strips (C), and edge strips (D and E) on leaves (B).



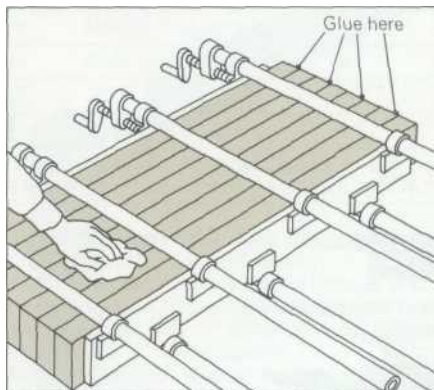
5. To glue each end edge strip to top, run a thin bead of glue on both sides of tongues and on shoulders of grooves. Clamp with three 6-ft. clamps. Then immediately glue and clamp side edge strips. (If plywood is higher than edge strip at any point, press plywood down with a C-clamp and scrap wood; be careful not to break plywood.) Wipe off excess glue with damp cloths. Repeat for each leaf.



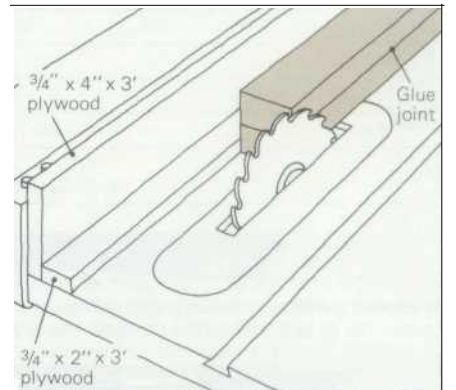
6. When glue has dried, plane upper surfaces of edge strips level with plywood, put masking tape on plywood to avoid nicking veneer. Use a router and $\frac{3}{8}$ -in. core-box bit set $\frac{3}{8}$ in. deep to make a 4-in.-long finger groove (for pulling out leaves) on underside of each leaf. Plunge router at beginning of cut; at end turn motor off, wait until bit stops, and lift out. Sand edge strips with Nos. 80 and 150 paper.



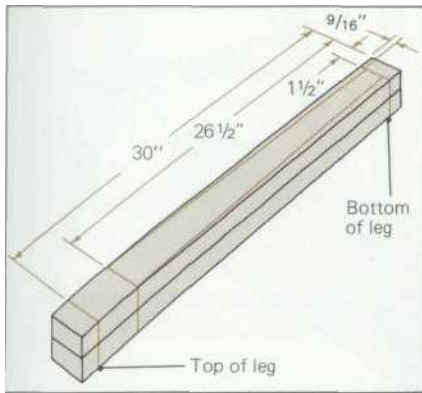
Cutting legs: 7. Joint one edge of $1 \frac{3}{8}$ -in. zebra wood stock. Make a straightedge by ripping a strip of $\frac{3}{4}$ -in. plywood about 3 in. wide. Nail it to one edge of stock so it overhangs $\frac{1}{4}$ in. Trim $\frac{1}{4}$ - $\frac{1}{2}$ in. from other edge. Then with the edge you just cut riding the fence, rip enough boards to $2 \frac{13}{16}$ in. wide for eight lengths of 31 in. Each leg (F) is made of two well-matched pieces glued together.



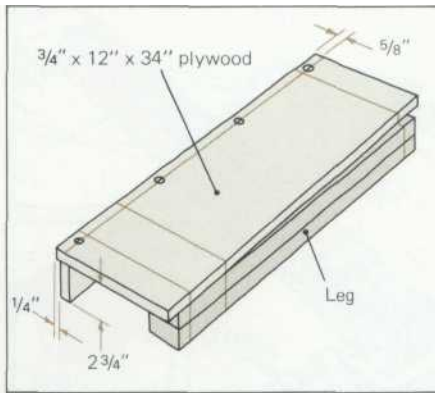
8. Lay out three 3-ft. clamps and place all eight leg pieces across clamps, inner surfaces up. Spread glue on these surfaces. Turn pieces on edge and press two glued surfaces together, making sure all ends and edges are flush. Tighten clamps and add four more clamps across top. Wipe excess glue from all surfaces. Loosen, remove, and retighten clamps one at a time to wipe beneath them.



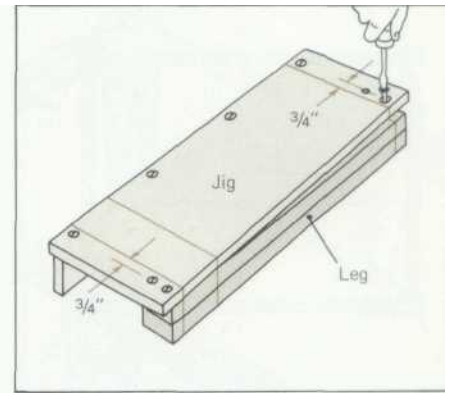
9. Screw a fence of $\frac{3}{4}$ -x-4-in. plywood to table saw fence. Screw a second piece of plywood $\frac{3}{4}$ in. x 2 in. x 3 ft to this fence as shown. Set saw blade $2 \frac{3}{4}$ in. high, and set fence so that blade will shave $\frac{1}{32}$ in. from one surface of each leg where the glue joint shows. Saw all four legs; remove small piece of plywood, set saw for a $2 \frac{3}{4}$ cut, and saw opposite surface of each leg flush.



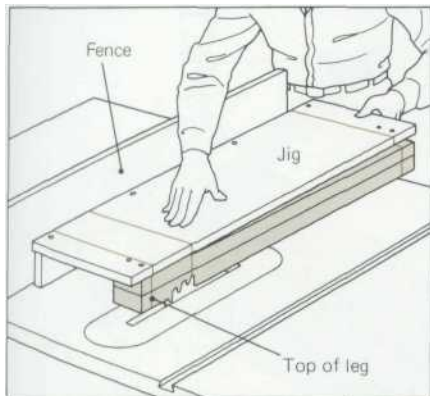
Shaping legs: 10. Use combination square to draw lines around each leg at 1 1/2 in., 26 1/2 in. and 30 in. from bottom. The span between 1 1/2 in. and 30 in. is the final length of the legs. 28 1/2 in. Mark corners of each leg for taper by measuring in 9/16 in. from each edge along first line from bottom. Use a straightedge to draw lines from these points to outer edge of each leg at 26 1/2-in. line.



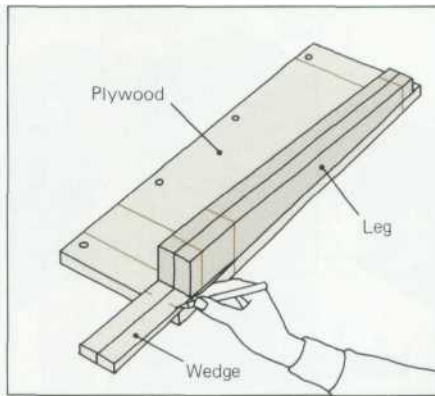
11. Make a jig for cutting tapers from a squared piece of plywood 3/4 x 12 x 34 in. Transfer the lines from one of the legs to the plywood and mark them across plywood. Draw a line 5/8 in. from one edge of plywood. Cut another piece of plywood 3/4 x 2 3/4 x 34 in. Set small piece perpendicular to large piece 1/4 in. from edge and below 5/8-in. line. Insert four 1 1/2-in. No. 8 screws along that line.



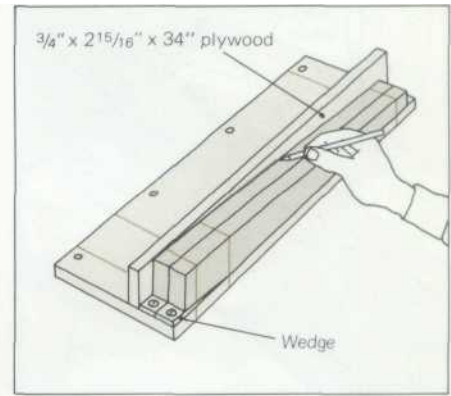
12. Drill four holes with a 3/16-in. bit in the large piece of plywood 3/4 in. outside the lines indicating the top and bottom of the leg; drill two holes at each end. Align a leg's taper line, drawn in Step 10, with the edge of the jig and match the top and bottom lines of the leg with the corresponding lines in the jig. Drill into the leg through the four holes in the jig with a 3/32-in. bit; insert 1 1/2-in. No. 8 screws



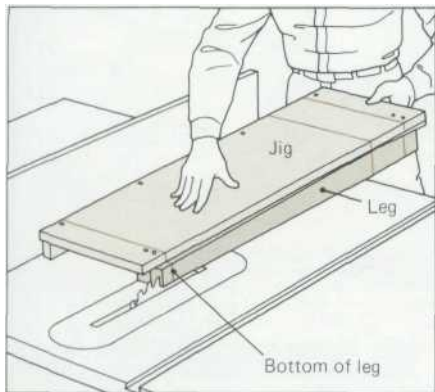
13. Set fence for a 12 1/32-in. rip cut. Because of the thickness of the legs, make several passes, raising the blade about 1 in. for each pass. Reset fence for a 12-in. cut; shave off final 1/32 in. in one pass for a clean cut. Redraw lines across cut surface with combination square. Then saw opposite surface of leg by reversing it on jig; redraw lines. Save the wedges. Repeat on the other three legs.



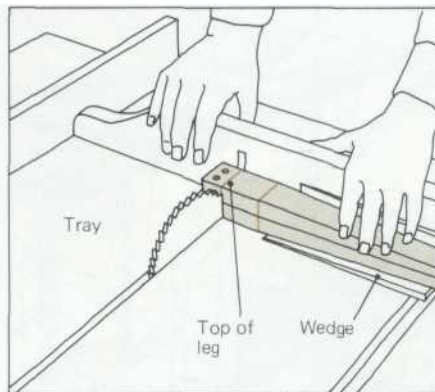
14. Before tapering other two surfaces of legs jig must be remade to fit tapers just cut. Unscrew small plywood piece. Lay large piece of plywood on table, place a leg on it, lining up top and bottom marks. Hold down tapered portion of leg, and fit a wedge between plywood and untapered part of leg. Mark wedge where it intersects end of jig, saw at this line, and screw wedge to jig.



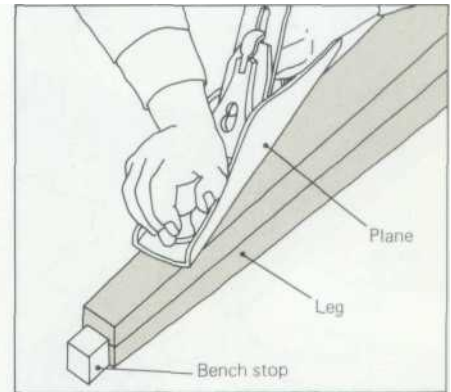
15. Mark taper on remaining surfaces. Screw a leg to large plywood piece, tapered surface up. Cut a plywood piece 3/4 x 2 15/16 x 34 in. Hold this against leg and mark taper on it. Unscrew leg, nail large plywood piece along taper line just marked, and saw along that line with fence set at 12 in. Remove nails. Screw tapered piece to underside of large plywood piece, as before, with edge just cut down.



16. When you cut the final two tapers, the leg must always be oriented the same way on the jig, with the bottom of the leg being fed through the saw blade first. Saw the tapers in several passes, raising the blade for each pass, with the fence set first at 12 1/32 in., then at 12 in., as you did in Step 13. Once again be sure to redraw all the squared lines as soon as you finish cutting each surface.

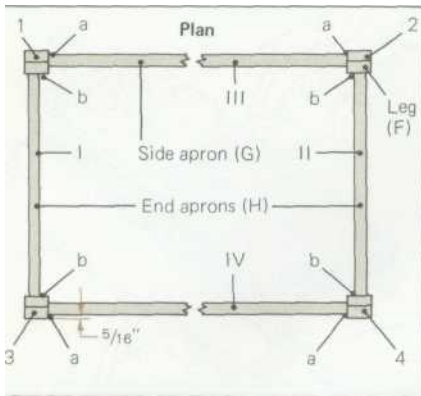


17. To saw legs to final 28 1/2-in. lengths, you will need a crosscut tray wide enough to accommodate the length of the taper. (If you have a radial arm saw, use that instead.) Put leftover wedges beneath and behind each leg to square it with the back and base of tray. Cut off excess at tops of legs. Reverse wedges, set a stop on tray so that all four legs will be the same, and make cuts at bottoms.

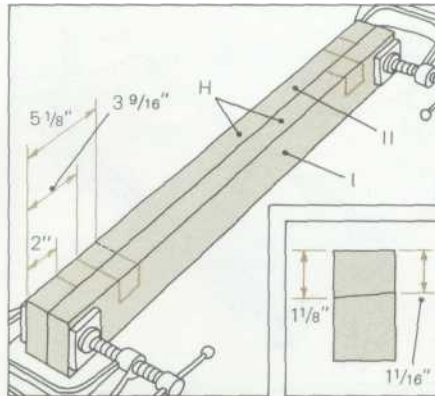


18. To remove saw marks, plane tapered surfaces very lightly with a smooth plane. Do not touch untapered parts. Decide on placement of legs (glue joints should face ends of table), and number them 1-4. Designate each joint surface as a or b; a will be joined to a side apron, b to an end apron. On a plan label aprons I-IV (see next step), and write on each joint face the part to which it will be joined.

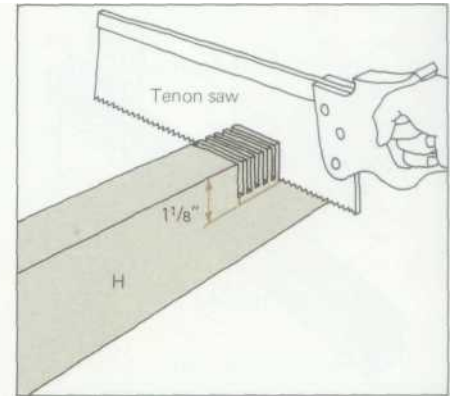
Dining table



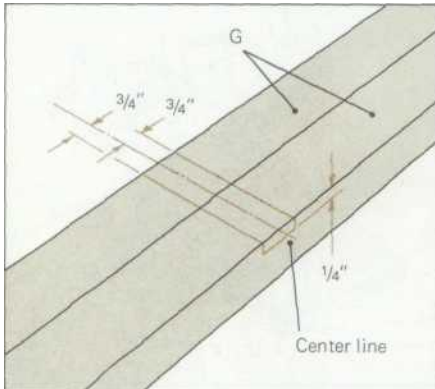
Making the aprons: 19. Joint 1 1/2-in. stock, using method shown in Step 7. Rip and crosscut aprons (G and H) slightly larger than their final widths and lengths. Then joint each piece; rip and crosscut to final widths and lengths (Joining twice helps ensure straightness, as wood changes shape when fibers are released by sawing.) Mark end aprons I and II, side aprons III and IV.



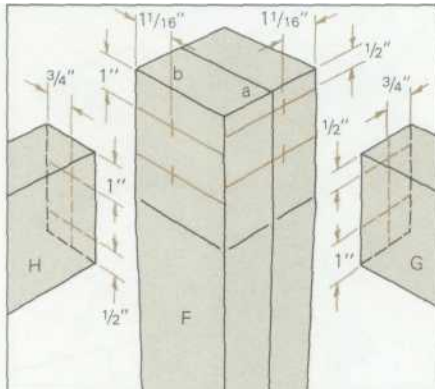
20. To mark end aprons (H) for slide grooves, clamp them inner face to inner face with ends flush. Using combination square, draw lines across top at 2 in., 3 9/16 in., and 5 1/8 in. from each end. Unclamp. Draw lines across both faces of end apron I at 3 9/16 in. and 5 1/8 in.; draw lines across faces of end apron II at 2 in. and 3 9/16 in. Mark depth of grooves: 1 1/16 in. on the outer faces and 1 1/8 in. on the inner faces.



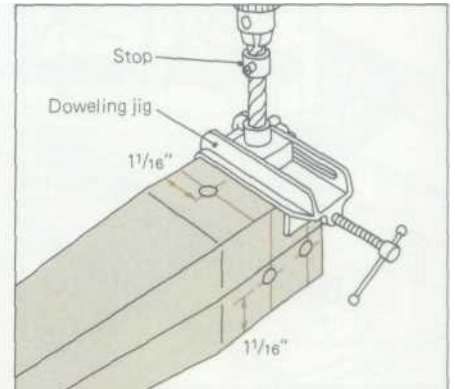
21. Set crosscut blade on the table saw to height of 1 1/16 in. and make parallel cuts in the grooves, keeping the blade inside the lines drawn (or use dado head in table saw). Use a tenon saw to angle the cuts to the 1 1/8-in. depth on inner face. Use a 1 1/2-in. chisel and a wooden mallet to chop out the remaining waste. Clean the bottom of the cut with the chisel held beveled side up.



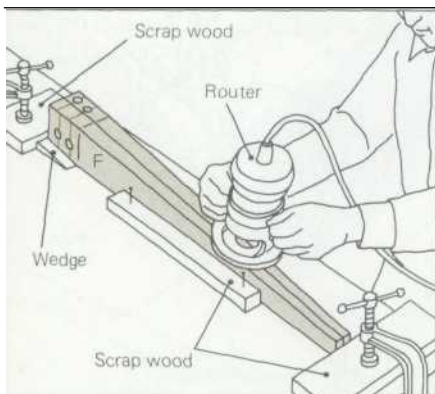
22. Clamp side aprons (G) side by side, and mark a center line across width of their inner faces (those that will face center of table). Draw lines 3/4 in. to each side of center line for grooves. Unclamp pieces; mark grooves for 1/4-in. depth. Cut these 1 1/2-in.-wide grooves with a dado head in the table saw, or use a router with any straight bit. Plane outer surfaces of all aprons to remove saw marks.



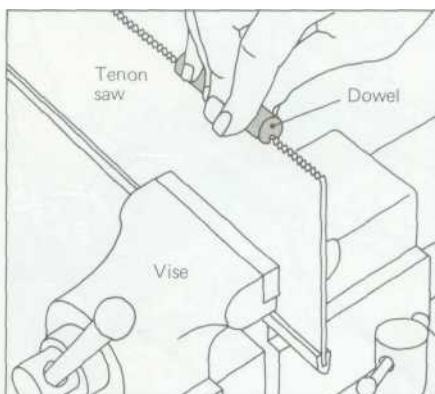
23. Lay out positions of dowel joints on apron ends. For joint a on side aprons (G), measure 1/2 in. from top and 1 in. from bottom. Using a combination square, draw lines across ends of aprons. For joint b on end aprons (H), draw lines 1 in. from top and 1/2 in. from bottom. Clamp each leg in vise and hold matching apron at right angles to it. Transfer lines to leg, using sharp pencil. Draw lines across legs



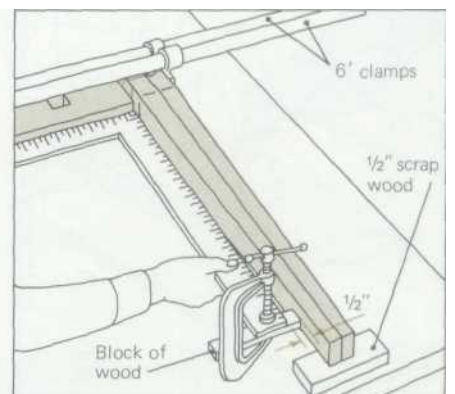
24. Set commercial doweling jig so that dowel holes will be 3/4 in. from outer faces of aprons. Use a 1/2-in. twist bit, and set a drill stop at 2 in. plus the thickness of your doweling jig. Align the doweling jig with marks made on apron ends. Drill holes, pushing down on drill and withdrawing it several times to get rid of waste. Set jig to drill holes in legs 1 1/16 in. from corners of legs.



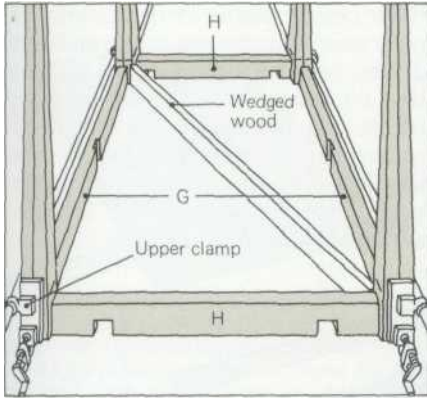
25. Round corners of legs with a router and a 1/4-in. piloted rounding-over bit. To hold a leg while doing this, wedge it between bench stops of scrap wood clamped to work surface. Nail or clamp another piece of scrap behind leg to prevent its moving away from router. Start router at small end of leg and move it to the other end. Turn leg to do other



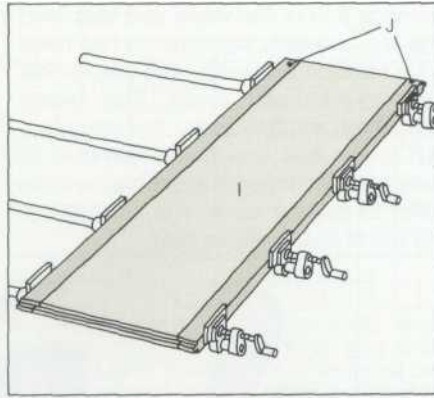
26. Cut 16 dowels (O), each 3 3/4 in. long. Fit them in joints; if any dowels are too tight, sand them. Make a glue channel in each dowel by clamping a tenon saw in a vise, teeth up, and rubbing the dowels on the saw teeth. Test-fit legs and aprons. To check squareness of legs during assembly, clamp a small block of wood so it protrudes 1/2 in. from outer edge of



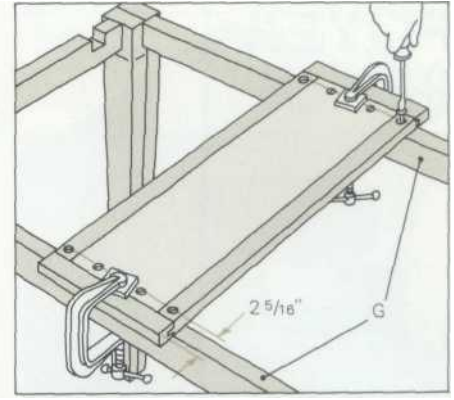
27. When gluing legs to each end apron, apply glue around edges of holes, on ends of legs on 1/2-in.-thick scrap wood. Clamp across top and face of apron with 6-ft. clamps. Check squareness of legs to apron. Measure from work surface to each leg bottom; distance should be 9/16 in. Wipe off glue; if it leaks into



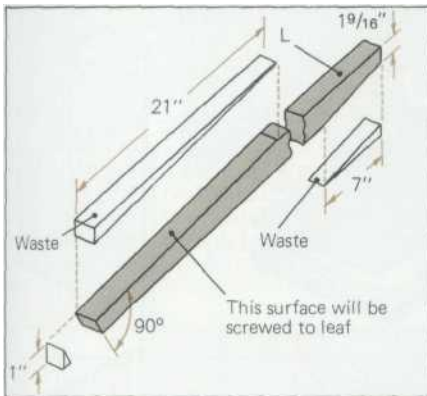
28. Glue side aprons to end assemblies, placing two 6-ft. clamps on each side. Check squareness. Adjust legs by manipulating clamps: tighten upper clamp to bring legs closer; tighten lower one to spread legs. Measure corner to corner; if measurements are unequal, cut a piece of wood the length of shorter measurement plus half the difference between the two. Wedge it diagonally.



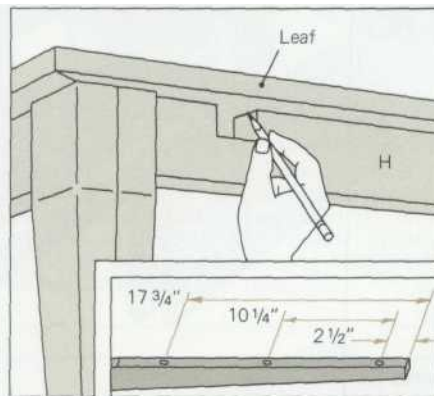
Understructure: 29. Glue plastic laminate to underside of beamer rail (I). Cut grooves in edge strips (J and K) as you did in Step 3. Cut tongues on long edges of beamer rail, and glue on end edge strips (J). Then cut tongues on short edges of beamer rail and across ends of edge strips just attached (corners are not mitered). Glue on side edge strips (K). Plane edge strips flush with plywood and laminate.



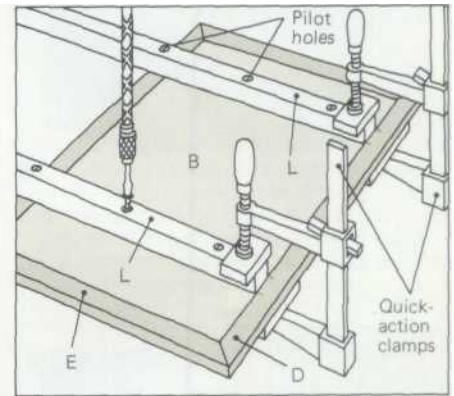
30. Center the beamer rail on side aprons, and make sure it overhangs them exactly the same distance on each side. Clamp the beamer rail in place. Draw a line $2\frac{5}{16}$ in. from each short edge of beamer rail. Drill and countersink pilot holes for four 2-in. No. 12 screws along the line on each side—two through the edge strips and two through the plywood. Insert the screws.



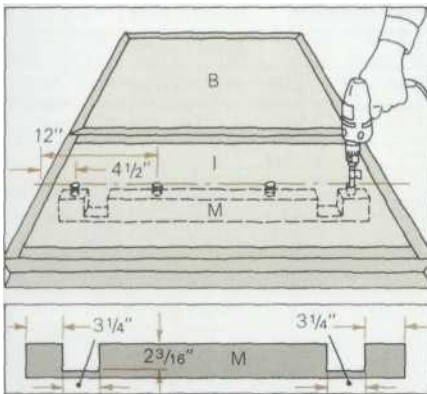
31. Mark slides (L) for taper cuts as shown. With same type of jig used for the leg tapers (Steps 11 and 12), cut the long taper on one side, use this as a template to mark other slides. Saw those tapers, then repeat procedure for short tapers. Long tapered surfaces will be attached to undersides of leaves and will be horizontal, mark and saw adjacent ends at right angles to these surfaces.



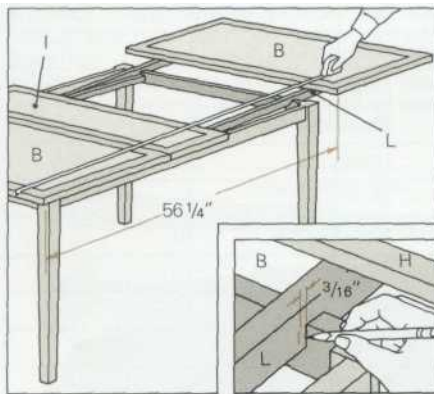
32. Place leaves in their closed position on top of aprons; mark the locations of the notches in the end aprons on undersides of leaves. Remove leaves and use a framing square to extend the lines across undersides of leaves. Mark undersides of slides at $2\frac{1}{2}$, $10\frac{1}{4}$ and $17\frac{3}{4}$ in. from ends of long tapers. Drill and countersink pilot holes for No. 12 screws at these points. Screws are inserted in next step.



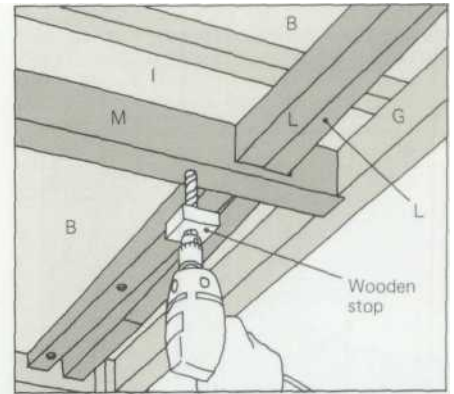
33. Center each slide between lines on undersides of leaves, aligning narrow ends with inner edges of edge strips. Clamp in place. At several points check that distance between them measures the same. Make starter holes in leaves with awl through pilot holes. Starting at narrow ends, use a spiral ratchet screwdriver to drive $1\frac{3}{4}$ in., 2 in., and $2\frac{1}{4}$ in. screws in that order, in each slide.



34. Cut center support (M) to fit into dados in side aprons. Cut notches for slides in its top $3\frac{1}{4}$ in. from ends, $3\frac{1}{4}$ in. wide, and $2\frac{3}{16}$ in. deep. Glue center support to side aprons. Using combination square, mark its position on top of beamer rail. When glue is dry, drill and countersink $7/32$ -in. pilot holes in beamer rail and center support at $4\frac{1}{2}$ and 12 in. from each edge of rail. Insert 2-in. No. 10 screws.



35. Position one leaf so that its inner edge is $56\frac{1}{4}$ in. from outer edge of other leaf. Mark inner faces of slides where they intersect notches in end aprons. Make a second set of marks $3/16$ in. farther in from the first set. Drill $3/8$ -in. holes 1 in. deep in the centers of the slides at these second marks. Insert but do not glue slide-stop dowels (N). Repeat on outer faces of slides for other leaf.



36. Top (A) is held in place by dowels (P). Drill holes for them 11 in. from one edge of beamer rail and 13 in. from other into and through center support. With leaves closed, clamp top in position, making sure all edges are flush. Put a wooden stop on drill bit at 4 in. Drill up through dowel holes into underside of top. Taper dowels to fit holes, sand them, and glue into top only.

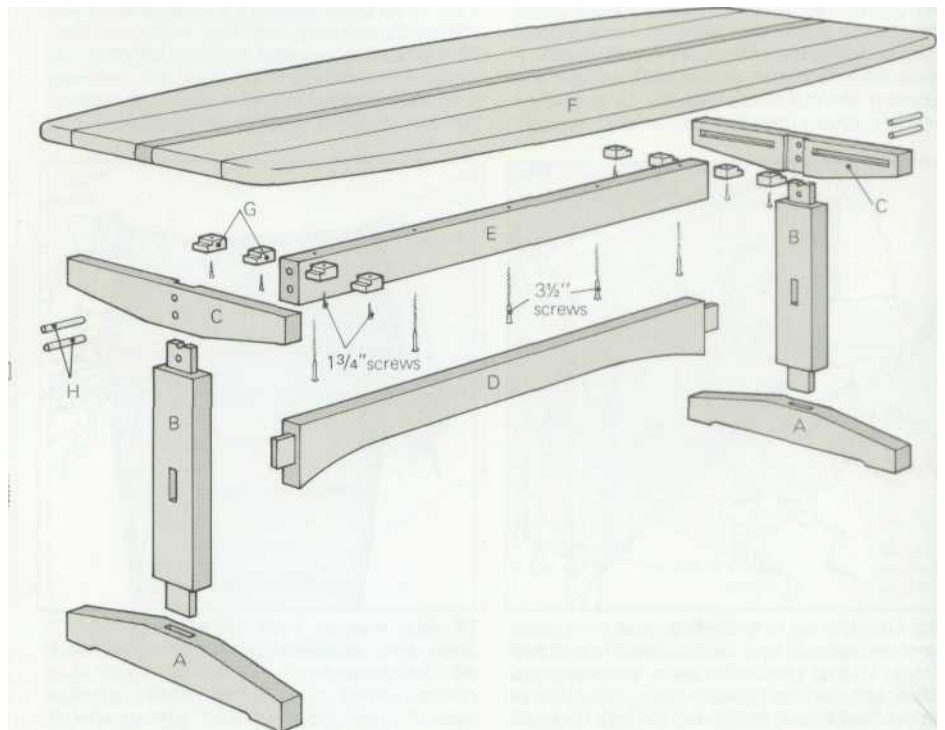
132
TRESTLE COFFEE TABLE



Subtle shaping brings out the beauty of the birchwood in this coffee table with a trestle base. The top is made of five edge-glued boards. The narrow center board is darker than the others and is 1 5/6 inches wide; the other four boards measure between 4 inches and 5 1/2 inches each—enough to add up to the total width of 20 1/2 inches. Buy the lumber dressed to the thicknesses given below, and rip the boards using a straightedge to ensure that they are square. Order from 25% to 30% more than the amount specified, and spend time matching the boards in different ways before you begin

cutting those for the top to the final length. Measurements given in the chart for the feet (A), crosspieces (C), lower stretcher (D), and top (F) are for the boards before they are shaped. The step-by-step directions show how to cut tapers and shape curves. Be sure to cut all the joints before shaping the parts.

The top is screwed to the base with movable buttons, allowing the wood to contract and expand with changes in humidity while being held fast.



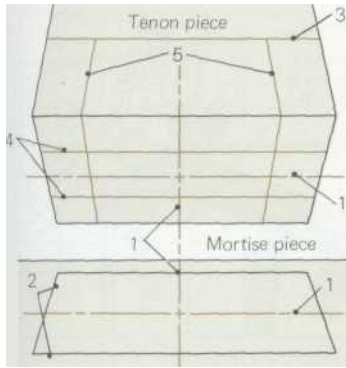
Parts list

Part	Name	Quantity	Thickness	Width	Length	Material
A	Foot	2	1 3/4"	2 3/4"	16"	Birch
B	Leg	2	1 1/4"	3"	15"	Birch
C	Crosspiece	2	1 1/4"	2 1/2"	14"	Birch
D	Lower stretcher	1	1 1/4"	3 7/8"	32 1/2"	Birch
E	Upper stretcher	1	1 3/8"	2 1/2"	29 7/8"	Birch
F	Top	1	1 1/4"	20 1/2"	50"	Birch
G	Button	8	1"	1 1/4"	7/8"	Birch
H	Dowel	4	1/2" dia.	—	2 3/8"	Dowel

Tools and materials: Table saw with combination blade, dado head, tenoning jig. Crosscut tray (optional). Band, saber, or coping saw. Dovetail saw. Router with 3/8" straight bit. Drill with 9/64", 13/64", 25/64" straight bits and 1/2" brad-point bit. Brace with 7/8" auger bit and depth gauge. Drill press and large hand screw (optional). Four 3' bar clamps, four 6" C-clamps. Smooth plane, fore or jack plane. Rasp, spokeshave or

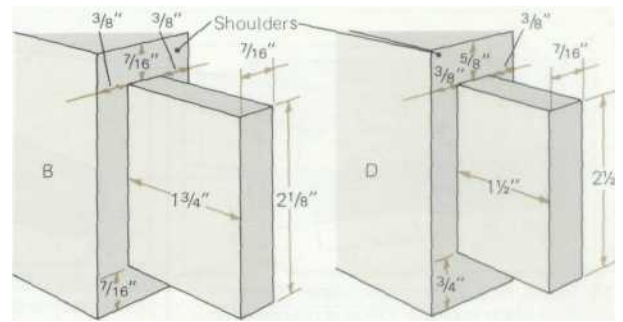
Surform, cabinet scraper, 1" bevel-edged chisel, 3/8" mortise chisel. Framing square, combination square, steel tape rule, mortise gauge, knife. Wooden mallet, standard screwdriver, stubby screwdriver, hammer. Carpenter's glue, wax paper. Nos. 80, 120, and 220 sandpaper. Tung oil, 0000 steel wool, hard wax, cloths. Wood (see above). Eight 1 3/4" and five 3 1/2" No. 10 flathead wood screws.

Mortise-and-tenon joints



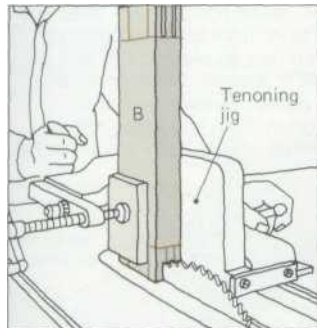
Cut and fit mortises and tenons prior to shaping parts. To lay out joints on legs (B), lower stretcher (D), feet (A), and crosspieces (C), mark in numbered order as at left.

1. Mark center lines.
2. Hold each piece that will have a tenon against its mortise piece (see captions at right for placement). Match center lines, and outline tenon pieces on mortise pieces.
3. Mark shoulder line of each tenon.
4. Use a mortise gauge to mark the thickness of each tenon on the end and sides of the tenon piece.
5. Mark the length of each tenon. Mark mortises in Steps 7 and 10.

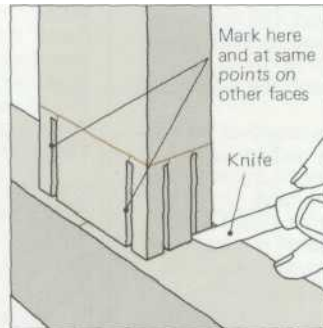


Cut this tenon on both ends of legs (B). Mortises are centered in the feet (A) and the crosspieces (C).

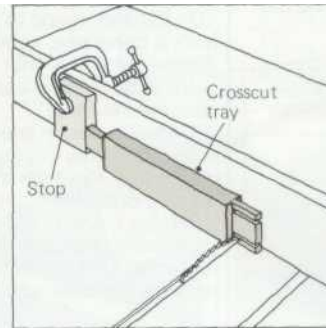
For tenons on lower stretcher (D), measure 4 in. from shoulders of top tenons on legs to top of D in Step 2.



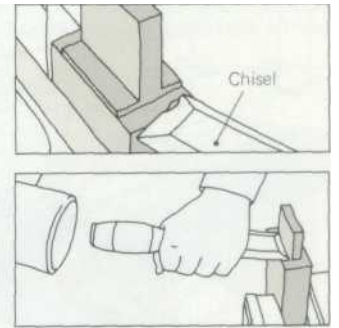
Cutting the tenons: 6. Use a tenoning jig on the table saw, and set the blade so that it cuts a scant 1/16 in. below the shoulder lines. On each tenon on both legs (B) cut one face; then reverse the work in the jig and cut the other face. Make all similar cuts before resetting the jig to make the next cut.



7. Before sawing the waste at the shoulders, center each tenon piece over its mortise piece. Hold a knife against the inner surface made by each saw cut and use it to mark the dimensions of each tenon on its mortise piece. These lines will later be extended (Step 10) to mark the outlines of the mortises.



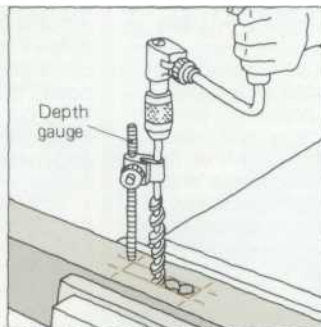
8. Clamp a scrap of wood to the crosscut tray as a stop; position it so that the saw will cut a scant 1/16 in. from the shoulder lines. Adjust the blade height, and cut off all the waste, turning each leg and holding it against the stop. If you do not have a crosscut tray, saw off the waste with a dovetail saw or other fine-tooth saw.



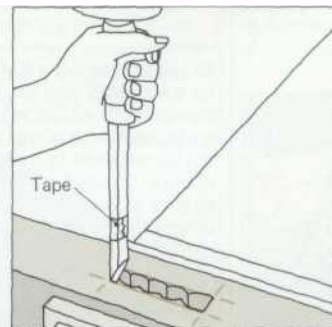
9. Trim each joint to the shoulder line with a narrow chisel, held with its beveled side up. Take paring cuts (do not use the mallet), working from one side, then the other. Trim along the long edge with your widest chisel and a wooden mallet. Follow the same procedure for the through tenons on the lower stretcher (D).



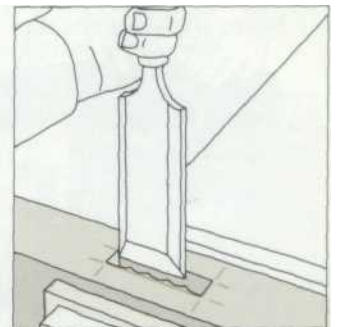
Marking and cutting mortises: 10. Set mortise gauge by marks made in Step 7; mark sides of each mortise. Using a combination square, mark the ends. Mark through mortises on each leg (B) the same way, and square markings around to opposite face. Have mortise gauge bear on same edge of each piece.



11. Using a brace and 3/8-in. auger bit, set depth gauge so that the bit will bore a scant amount deeper than each tenon's length. Drill on center line, making several holes. For each through mortise, bit should just pierce opposite surface. Turn work over and drill from that point or from center line.

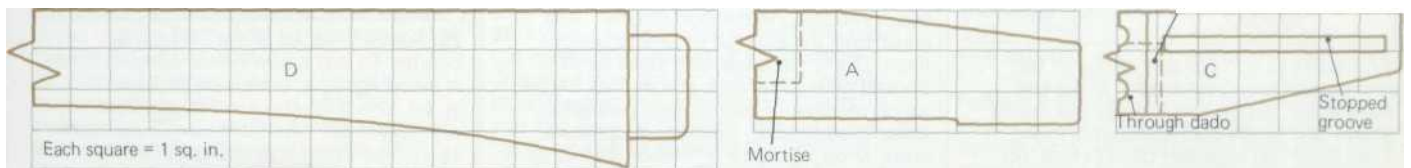


12. Mark the mortise depth on the mortise chisel by wrapping it with tape to match the length of each tenon. Use the chisel and a mallet to chop out the waste at the ends and in the bottom of the mortises. Work inward from both faces of the legs toward the center of the through mortises to clean their ends.



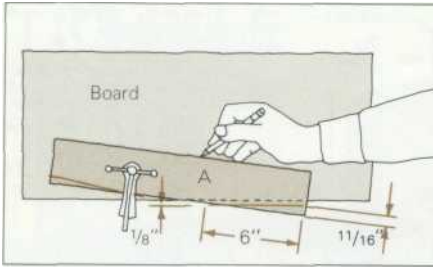
13. Use a wide chisel (but not a mallet) to take paring cuts that will smooth the sides of each mortise. Pare off 1/32 in. from both sides to allow the tenons an easy fit; keep trying the pieces so that the joints will not be loose. Work from both faces of each through mortise so that the edges will not splinter.

Scale drawings of trestle base parts

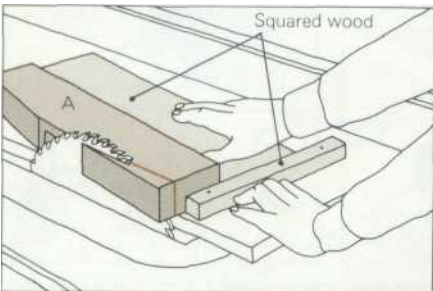


Each scale drawing represents half a member; the opposite half is identical.

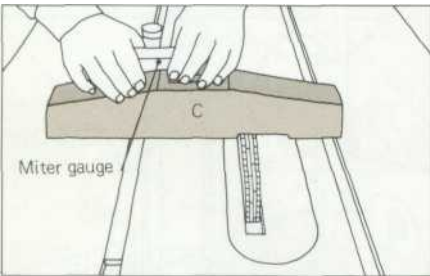
Trestle coffee table



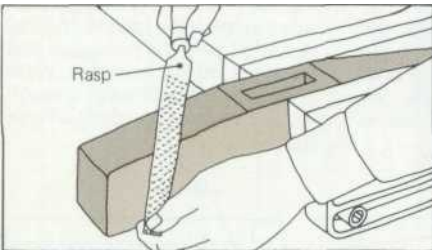
14. Measure 6 in. from each end on top edge of each foot (A). Draw a diagonal line from that point to form a triangle with an 11/16-in. base (see scale drawing, p.73). To construct a jig, clamp one foot to a squared board that is a third longer than the foot so that the taper line is parallel to the board's edge and overhangs it by 1/8 in. Outline the foot on the board, then unclamp it.



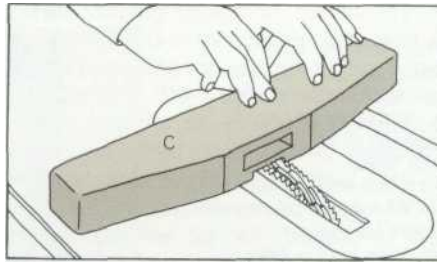
15. Nail two squared pieces of wood to the board along the side and back lines. Place each foot in this jig and saw along the taper, reverse each foot to saw the taper on the other end of the foot. Use the same jig for cutting each crosspiece (C); remove a triangle 1 in. at the base and 5 in. along the lower edge of each part C.



16. Shape the underside of each foot by setting the dado head at 5/32 in. high and making repeated crosscuts using the miter gauge. Or you can use a Surfform tool to remove and shape the wood.



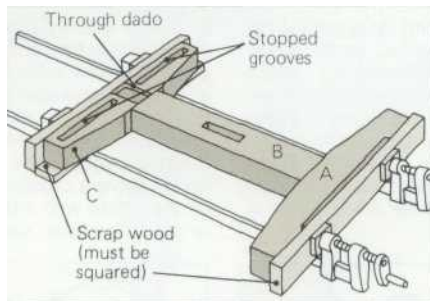
17. Round all corners and edges of feet and crosspieces with a rasp. Make one pass at 45°, and rasp off additional facets above and below until apparently round. Then finish the rounding off with Nos. 80, 120, and 220 sandpaper. Rasp and sand the underside of each foot.



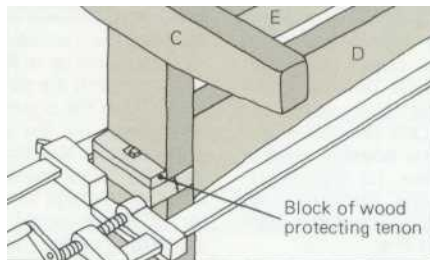
18. Use a dado head in the table saw, or a router and a straight bit, to cut a through dado in each crosspiece (C). Make it 3/16 in. deep and 13/8 in. wide. To cut the stopped grooves in the crosspieces, use a 3/8-in. straight bit in the router.

19. Enlarge the scale drawing on page 73 to make a template for the lower stretcher (D); transfer shape to wood. Cut the curve with a band saw, saber saw, or coping saw. Refine the shape with a rasp using its curved side. Rasp and sand the edges round as in Step 17.

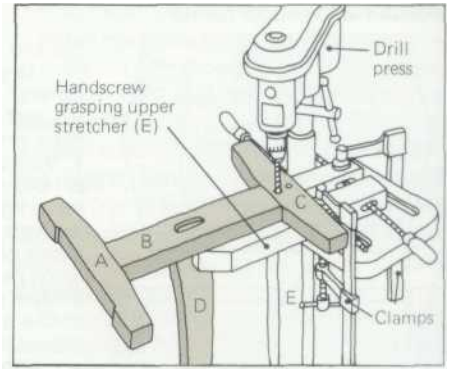
20. Mark a center line the length of the upper stretcher (E) on its bottom surface. Along that line mark the positions of the five screws that will secure the table top to the stretcher—one in the center, one 1 1/2 in. from each end, and the other two halfway between. Drill shank holes with 13/64-in. bit, and Counterbore with 25/64-in. bit.



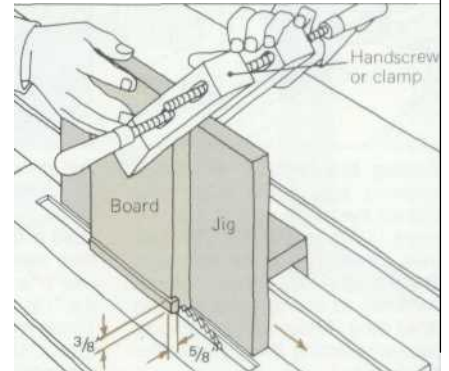
21. Glue one leg into foot and crosspiece for each end. Lay the pieces on two bar clamps with scrap wood protecting the surfaces and a scrap piece on one side of the crosspiece to make it lie evenly on the clamps. Spread glue on all surfaces of the tenons except the ends. Tighten clamps. Check that each side of the assembly is the same height; tighten clamp on longer side. Repeat for other end of base.



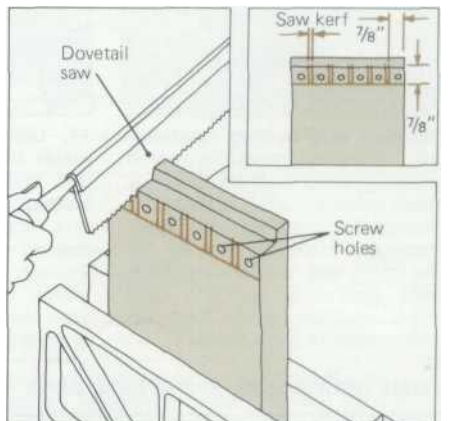
22. Cut two blocks of wood 3/4 in. x 3 in. x 3 in., and in each make a channel to accommodate the through tenons. Tape these over the through tenons to protect them. Dry-fit the base; trim joints for fit. Spread glue on tenon surfaces that will be inside mortises. Place clamps parallel to lower stretcher with handles at opposite ends. Drop the upper stretcher (E) into its dado, but glue it later. Check diagonally for squareness.



23. Clamp each leg assembly to a drill press table as shown, and drill holes for dowels (H) in each crosspiece with a 1/2-in. brad-point bit. Make holes 2 1/4 in. deep and center them 5/8 in. from top and bottom of crosspiece. Or use an electric drill with drill guide so hole is straight. Chamfer entering end of each dowel. Spread glue onto dowels and drive them into holes with a mallet. Saw ends almost flush and plane flat.

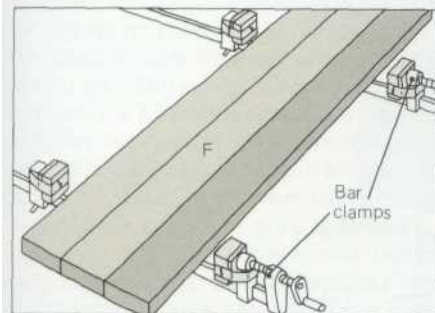
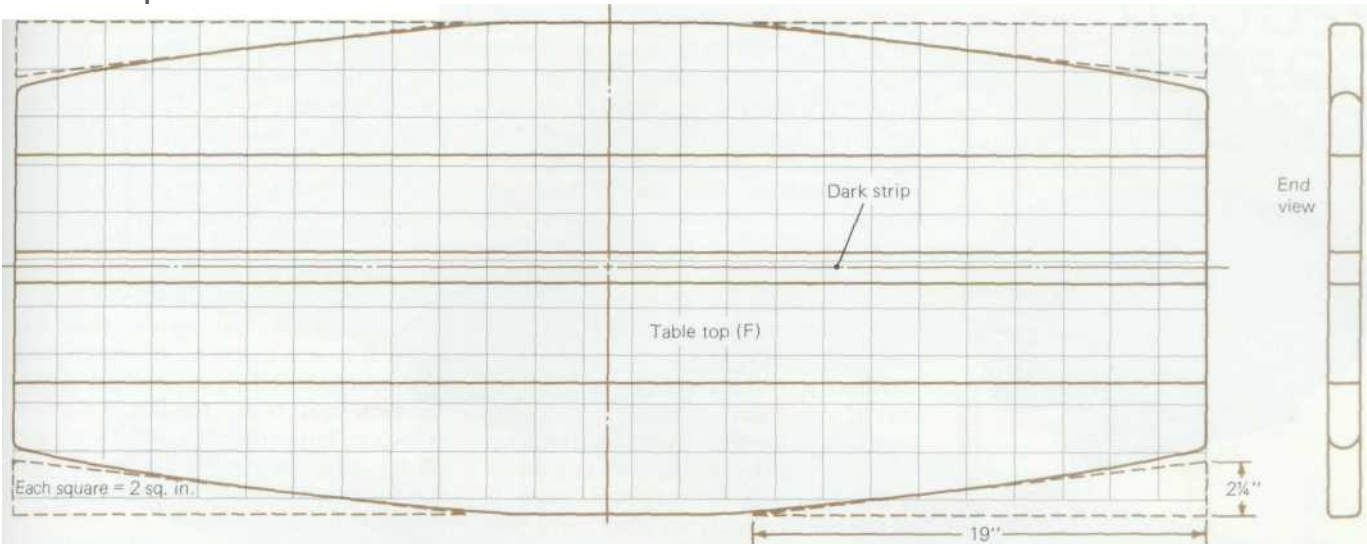


24. To make buttons (G), square and plane a board to 1 in. thick, 5-6 in. wide, and about 1 ft long. Use the table saw to cut a cross-grained rabbet at both ends of the board 5/8 in. deep and 3/8 in. wide. Make the 5/8-in. cut into the thickness of the board then stand the board on end in tenoning jig and make a 3/8-in. cut (Rabbet can also be cut with a router.)

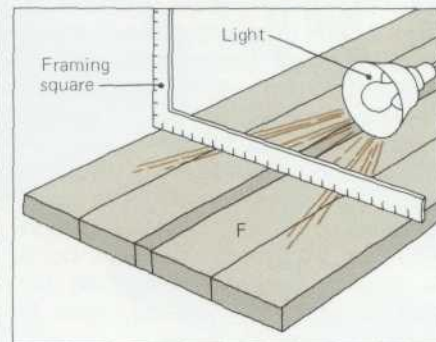


25. Scribe lines, as shown, on top of boards. To drill screw holes, clamp a scrap of wood tightly to underside and use a 13/64-in. bit. Drill through to scrap; Counterbore with 25/64-in. bit. Use table saw or dovetail saw to cut along right margin of each button to the 7/8-in. line. Saw along that line to separate buttons.

The table top



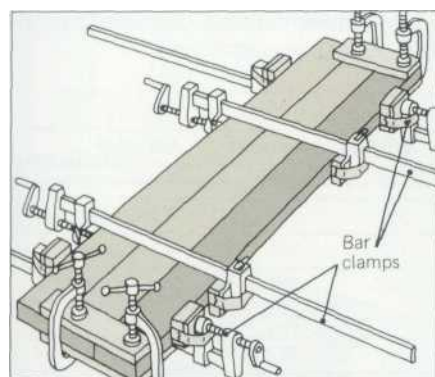
26. Check board for squareness; plane if necessary. Leave board from which you will cut center strip its full width until Step 28 to make planing easier. Tape scrap wood to laws of four bar clamps; place two clamps on work surface with wax paper across bars. Do a dry assembly to check procedure. Apply glue to one edge of dark center board and to two boards flanking that side. Join and rest boards on clamps.



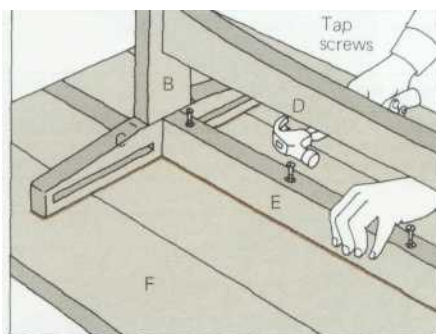
29. Scrape glue from surfaces. Beam a strong light across top, and move a framing square the length of the surface to check that it is level. Make pencil marks on high spots—where light does not show through. Plane down these high spots with a fore or jack plane, moving it in the same direction as the grain. Use a smooth plane to remove any remaining rough spots.



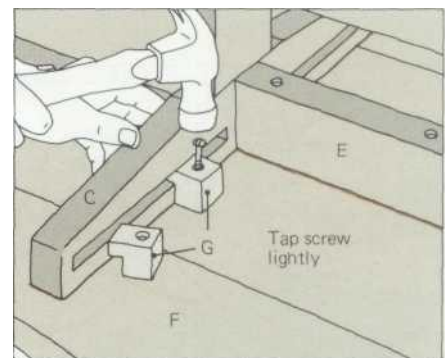
33. If remaining waste is wide enough, saw it off with a dovetail saw, otherwise use a smooth plane. Enlarge the scale drawing at top right. Transfer the curve to the ends of the table top. Use a spokeshave or a Surform tool, followed by a rasp, to shape the curve. Continue rounding along the side edges, but gradually decrease the curve toward the center so that only the corners of the vertical surface are rounded.



27. Place C-clamps directly over the glued edges at each end, protecting table top (F) with scraps of wood rubbed with paraffin. Tighten C-clamps to bring edges flush. Check with hand along the length of joint that all edges are flush; pound with wooden mallet to align them. Add bar clamps across top; tighten all bar clamps. Remove clamps after 2-4 hr, and saw center board to final width. Check for squareness and plane the sawed edge. Glue together the other two boards, as in Steps 26 and 27, then glue them to the first three boards.



31. Center base on underside of table and draw its outline. Insert a 3 1/2-in. screw in each hole in the upper stretcher, then tap screws to mark their positions on underside of table. Drill pilot holes 1 in. deep using a 9/64-in. bit. (Wrap the bit with tape to serve as a depth gauge.)
32. Make a template for shaping the table top from scale drawing at top of page. Construct a jig similar to the one used to taper the feet and crosspieces (Steps 14 and 15). Saw off triangles that are 2 1/4 in. at the base and 19 in. along the table-top edge. Tape the cutoff pieces back in place while sawing triangles from the other end.



34. Place table top face down. Set base onto outline made in Step 31. Place buttons in grooves in each crosspiece. Insert a 1 3/4-in. screw in each hole; tap it to mark its position. Remove base and buttons. Drill pilot holes 3/4 in. deep with a 9/64-in. bit.
35. Insert 3 1/2-in. screws in upper stretcher and tighten with a stubby screwdriver. Screw buttons in place. Sand table with Nos. 80, 120, and 220 sandpaper. Wet top with a cloth and let dry overnight. Resand with used No. 220 paper. Apply three or more coats of tung oil; rub each section hard until warm, then wipe dry immediately. Let sit overnight, and remove residue with 0000 steel wool. Wax if desired.

133
**JOINTED HARDWOOD
BOOKCASE**



The softly flowing lines and sturdy jointed construction of this hardwood bookcase can be achieved only by careful workmanship, fitting and shaping each part to blend with the whole. It is a job for an experienced craftsman.

The care begins with the selection of wood. The sides are of richly textured cherry, noted for its graceful figuring, and the horizontal members are of light-colored ash, straight grained and durable. These hardwoods are seldom found at reasonable prices in the widths needed for the project; therefore, it is necessary to edge-join narrower boards (see opposite page). Choose the boards carefully so that the colors and figures will blend; to bring up the figure of unplanned wood so that you can see it, brush a little paint thinner on the surface. In any case, the faces of the boards must be planed flat before edge-joining and planed again afterward for a good, flush surface. Buy rough lumber at least 1/4 inch thicker than specified in the chart below; buy dressed lumber at least 1/8 inch thicker.

The joinery looks deceptively simple. The shelves are glued into dados in the sides with no attempt to conceal the joints. This means that the dados must be precisely cut to the thickness of the shelves—there is no tolerance for error. In this project instructions are given for fitting these and the several tongue-and-groove joints when using a dado head on a radial arm or table saw.

All edges and corners are rounded and

shaped by hand. This is a matter of esthetic judgment, based in part on the figure and quality of the wood you are using. A spokeshave and drawknife are the tools of choice, but you can use a rasp, plane, Surform tool, and sandpaper to good effect. Note that the edge of the plinth front (H) is 3/16 inch below the upper face of the bottom piece (E) and that both corners are rounded where they meet. This is a traditional way of turning a possible defect into a design advantage. The shelf unit is not joined to the plinth; if the two surfaces were flush, the crack between them would always show. In this way, the crack is concealed at the bottom of a graceful ripple.

Because the weight of a full bookcase will tend to force the joints of the plinth apart, the mitered joints are reinforced with splines, and laminated corner blocks are glued all around.

Finishing: To bring out the warmth of the wood, rub in several coats of tung oil, allowing plenty of drying time.

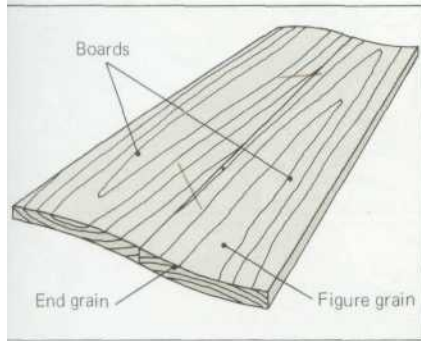
Parts list						
Part	Name	Quantity	Thickness	Width	Length	Material
A	Side	2	3/4"	12" ☆	44 1/2"	Cherry
B	Top shelf	1	3/4"	7 3/4"	24 7/8"	Ash
C	Middle shelf	1	3/4"	9 5/8"	24 7/8"	Ash
D	Bottom shelf	1	3/4"	11 3/4"	24 7/8"	Ash
E	Bottom	1	1 3/8"	11 3/4"	25 1/8"	Ash
F	Top	1	1 1/4"	10"	27 1/4"	Ash
G	Back	1	3/4"	25 1/8" ☆	44 3/4" ☆	A-2 cherry plywood
H	Plinth front	1	1 1/4"	4"	29"	Ash
I	Plinth side	2	1 1/4"	4"	14" ☆	Ash
J	Plinth back	1	1 1/4"	3"	26 5/8"	Ash
K	Plinth spacer	1	1 1/4"	3" ☆	10 5/8" ☆	Ash
L	Spline	6	5/16"	1 1/2"	2"	Ash
M	Corner block laminate	28	3/4"	1 1/4"	1 1/4"	Ash

☆ Measurement is approximate; cut to fit during construction.

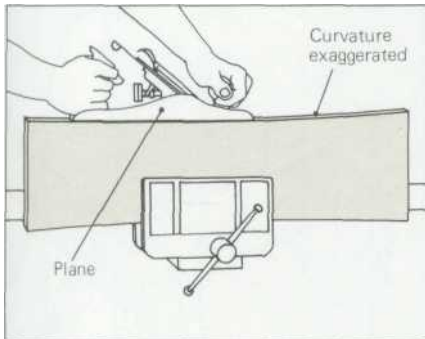
Tools and materials: Drill with twist bits and countersink. Table saw or radial arm saw with combination blade, dado head, and splining jig. Band, saber, or coping saw. Several 6" C-clamps and 6' bar or pipe clamps, quick-action clamps (optional). Smooth plane, jack plane, block plane. Rasp, spokeshave, drawknife, and/or Surform tool. Wooden mallet, 1/4" and 3/8" straight chisels. Try square, combination square, framing square, steel ruler, steel tape rule, wooden extension rule, knife, pencil. Nos. 60, 80, 120, and 220 sandpaper. Paraffin or beeswax, carpenter's glue. Wood (see above). One 2 1/4" No 10

flathead wood screw, 3/4" No 6 panhead wood screws.

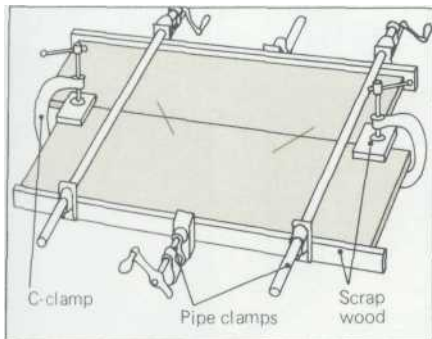
Edge-joining boards



Choosing boards. First, look at the end grain. As a board ages, it will tend to cup in the opposite direction from the arch of the annual rings. To minimize the effect of this warpage, lay boards side by side so that the direction of the arch alternates. Align boards so that their figures blend into an attractive pattern. Use a pencil to make a few slanting lines across each joint to guide in realignment. Saw boards to approximate length.

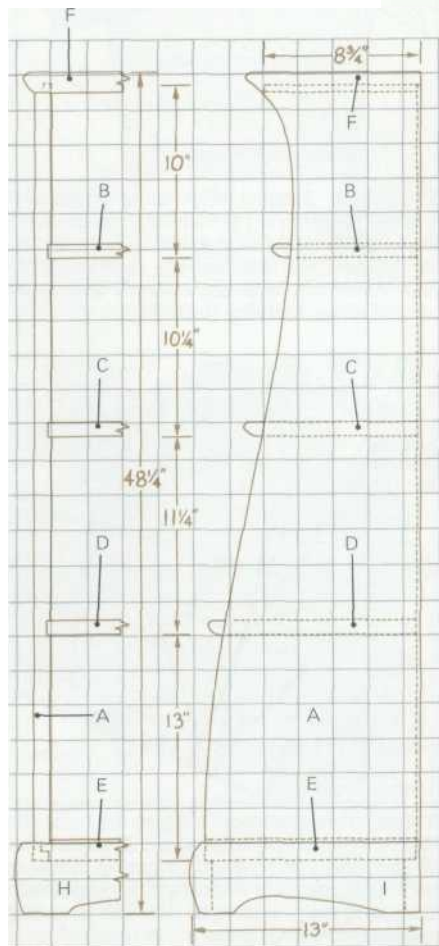
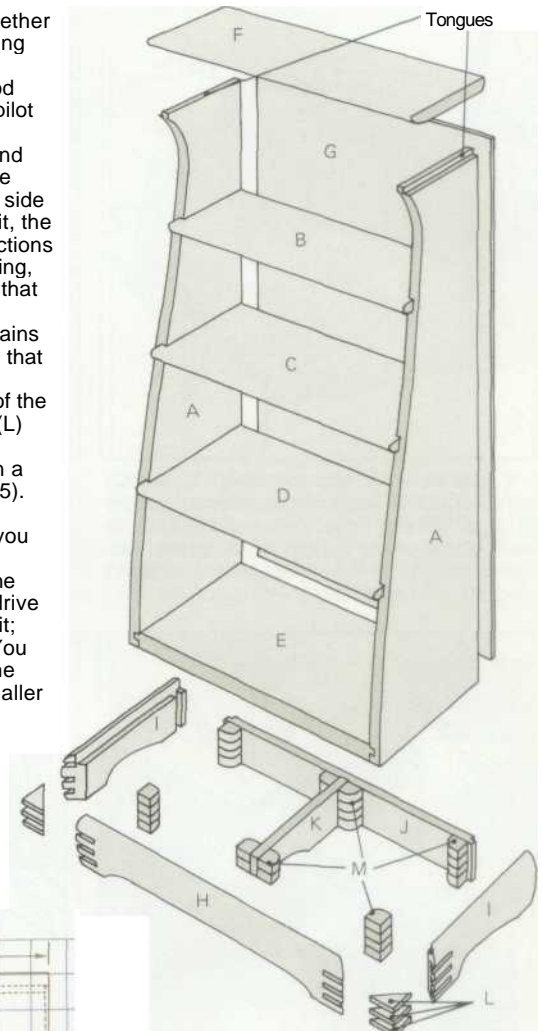


Preparing boards. Plane to within 1/8 in. of final thickness. Plane edges smooth and square. The boards will eventually shrink a little more across the ends than across the middle; to prevent the wood from splitting at the ends when this happens, plane both edges of joint slightly concave—the center of the joint should be separated by a gap that you can squeeze shut with your hands (less than 1/64 in.).



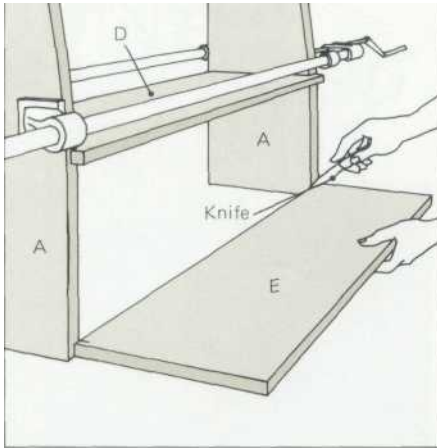
Gluing and clamping. Apply all clamps before gluing, mark positions and order of application. Then unclamp and apply a thin even coat of glue to both edges of joint. Reclamp quickly, tightening firmly but not forcing out all glue. First, use C-clamps to align faces of boards at both ends. Then apply bar or pipe clamp across center, forcing faces of boards into alignment, if necessary, as you tighten. Remaining clamps should alternate top and bottom.

Exploded view shows how parts fit together. All joints are glued except those securing the back (G) to the shelf unit which are secured with 3/4-in. No. 6 panhead wood screws (Step 18); use a 5/64-in. bit for pilot holes. The shelf unit is not joined to the plinth but rests on the plinth back (J) and spacer (K) and inside the rabbets of the plinth front (H) and sides (I)—if a plinth side were glued to a side (A) of the shelf unit, the fact that the grains run in opposite directions would cause stress, and probably splitting, in the shelf side. The corner blocks (M) that reinforce the joints of the plinth are intentionally laminated with the wood grains running in alternate directions, ensuring that no joint is compromised by the sole presence of end grain. The front joints of the plinth are further reinforced by splines (L) 1/2 in. thick; order ash stock planed to thickness, or cut a strip to thickness on a table saw, then dado slots to fit (Step 15). There is little danger of the shelf unit slipping backward on the plinth, but if you wish to ensure its security, drill and countersink a 3/16-in. hole up through the front part of the plinth spacer (K) and drive a 2 1/4-in. No. 10 wood screw through it; drill a 1/64-in. pilot hole in the bottom. You can also glue two slotted blocks onto the plinth back (J) to receive additional, smaller screws.

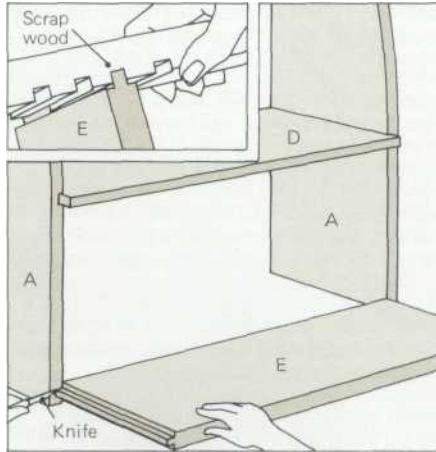


After joining boards for sides (A), shelves (B, C, and D), bottom (E), and top (F), cut all stock to final length, and plane to final thickness. Rip shelves, top, and bottom to width. Use 2-in. grid (see p.48) to make full-size patterns for sides (A), plinth front (H), and plinth sides (I) and to guide in shaping the protruding edges of the top and shelves (Step 4). To make the pattern for the plinth front, duplicate the section shown and its mirror image, connect the lines for the cutout portion with an arc that rises to the same height as the cutouts in the sides.

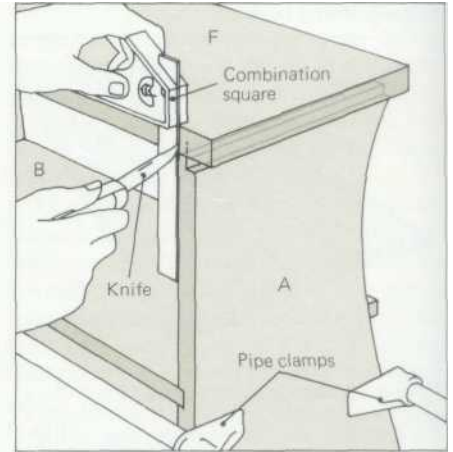
Trace patterns onto side pieces (A). Before cutting the long S curve, use a table saw or radial arm saw to make a square cut from the top edge of each piece, 83/4 in from the back, for the front of the tongues. Then rough-cut the pieces individually with a band saw, saber saw, or coping saw. Clamp them back to back, and shape them simultaneously to the line with a rasp, drawknife, or spokeshave. Cut rabbets into the top outer edges of the sides, leaving tongues 1/2 in. thick and 1/2 in. deep. Cut the dados for the shelves 1/4 in. deep, marking the width of each dado from the thickness of the shelf that will fit into it. (Measurements between shelf dados are given from bottom edge to bottom edge; to achieve dado cuts that match the thickness of the wood, make test cuts in scrap wood inserting paper washers between dado heads as necessary.) To ensure that the shelves will be level, lay the side pieces side by side and mark across both at once.



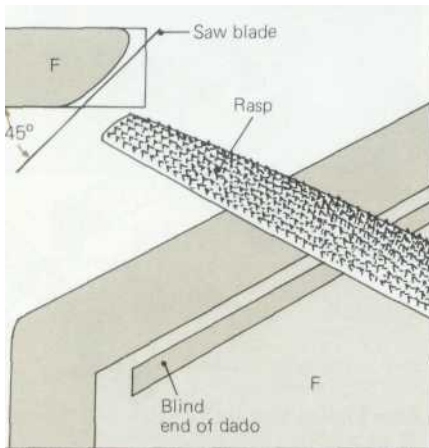
1. Clamp sides (A) and shelves (B, C, and D) together with all joints square. Center bottom (E) against front edge; use a sharp knife to mark points where bottom meets sides. Rabbit both ends of E to these marks, leaving tongues centered and 1/2 in thick.



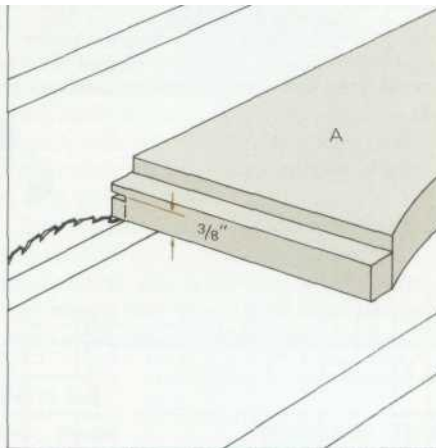
2. With a sharp knife mark position and thickness of tongues on front and back of sides (A). Make test cuts in scrap wood to set dado heads to exact width and depth needed; then cut dados in sides to receive tongues of bottom. Reassemble unit with bottom in place.



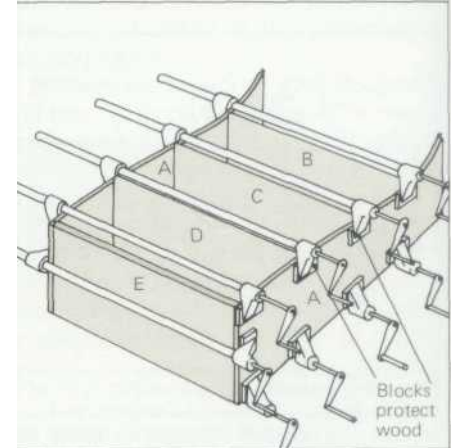
3. Position top (F) so its back is flush and overhang is equal on sides. Mark width of tongues on back of top and mark front of tongues on underside. Cut dados to receive tongues (see Step 2). Dados do not go all the way through; finish blind ends with a chisel.



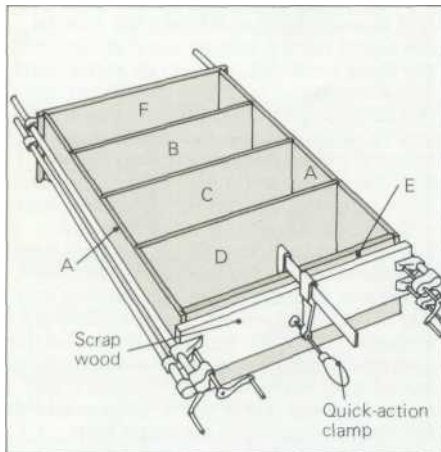
4. With top in place, sketch rounded patterns on edges of top (F) and shelves (B, C, and D). Disassemble unit and shape edges; use table saw set at 45° to remove the main body of wood from lower edge. Finish shaping with jack plane, rasp, and No 60 sandpaper.



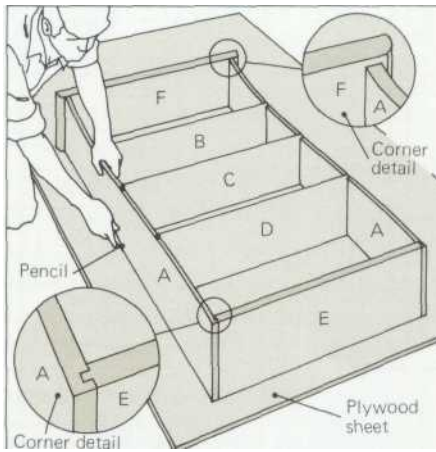
5. Cut 1/4-in rabbets 3/8 in deep in back of sides (A) and top (F) to receive 1/4-in. plywood back. Sand all interior surfaces with No 80 sandpaper, then with No 120, and finally No 220. Assemble shelves, bottom, and sides without glue, applying all clamps.



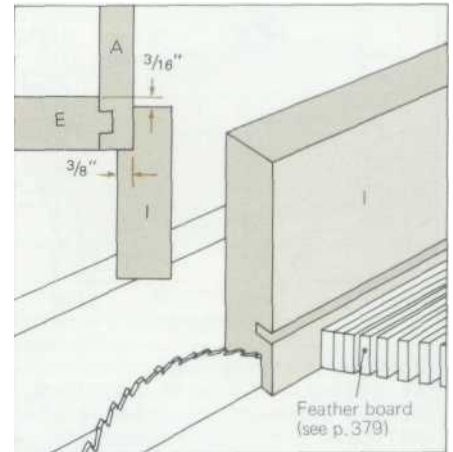
6. Use a bar or pipe clamp across the front and back of each shelf and the bottom, and apply another across center of bottom to prevent buckling. Mark placement of clamps and disassemble. Apply glue to dados and re-clamp quickly. Let glue dry.



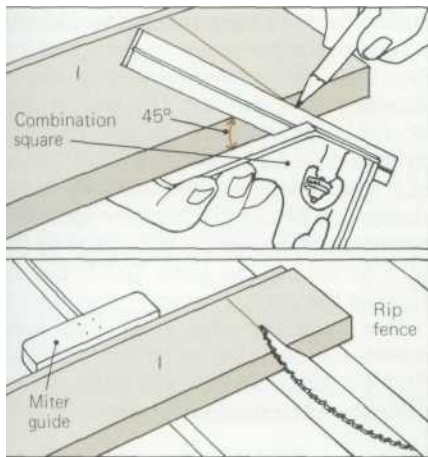
7. Before gluing top (F) to its tongues, cut a piece of scrap the same length as top to overhang the bottom and equalize the pressure of clamping. Apply glue to dados and clamp top in place, using two bar or pipe clamps.



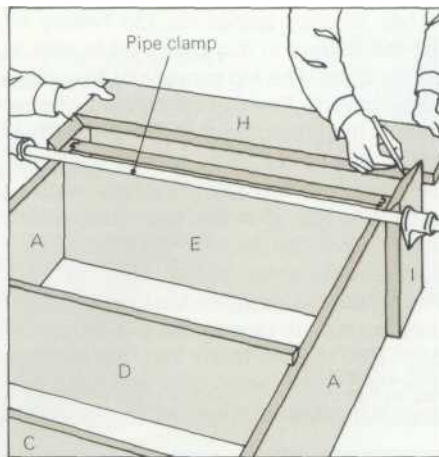
8. To find most attractive figure for back (G) lay shelf unit on plywood sheet. Trace outline of unit, and cut plywood to outline. Then fit back precisely within rabbets on sides and top. Sand back with Nos 80, 120, and 220 sandpaper; do not secure it to unit.



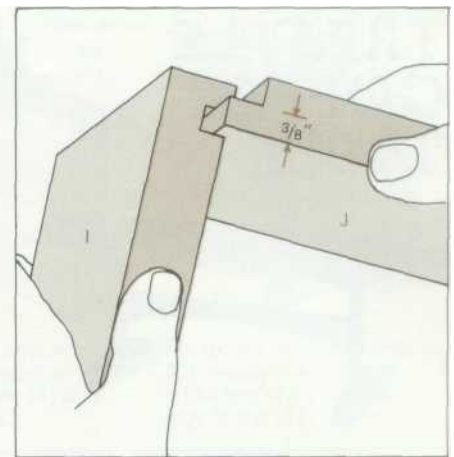
9. Rip stock for plinth front (H) and sides (I), and plane to width. Cut each piece 3-4 in. longer than specified. Cut rabbets 3/8 in. deep along one face of each piece to receive shelf unit; to find width of rabbets, deduct 3/16 in. from thickness of bottom (E).



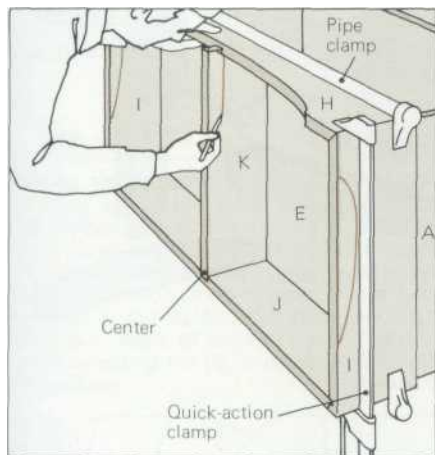
10. Cut 45° bevels on front end of each plinth side (I) and one end of front (H) For accurate cuts, scribe edge of wood first with combination square; set table saw to 45° and cut 1/16 in too long, then shave to line, adjusting blade if needed Check cuts with square



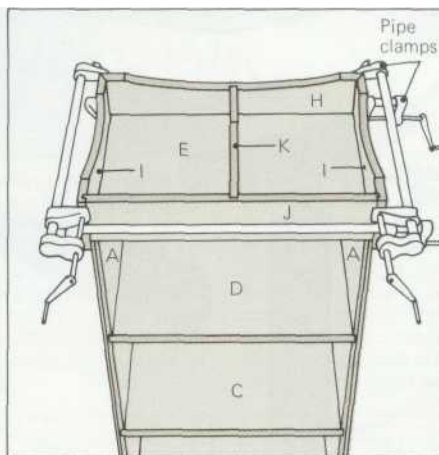
11. Clamp plinth sides (I) to shelf unit so beveled ends align with front of unit Fit plinth front (H) by holding beveled end against one side bevel and marking other end; cut overlong, then shave a little at a time until both mitered joints fit snugly Cut sides to length



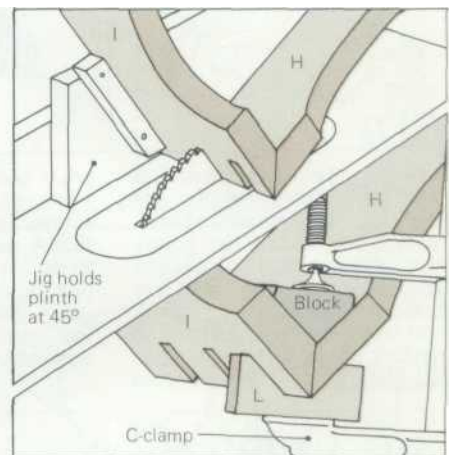
12. Rip and plane stock for plinth back (J) and spacer (K) to width of unrabbeted portion of sides. Cut plinth back to length Rabbet both rear corners, leaving tongues 3/8 in thick Mark and cut dadoes in plinth sides (I) to fit (See Steps 1 and 2.)



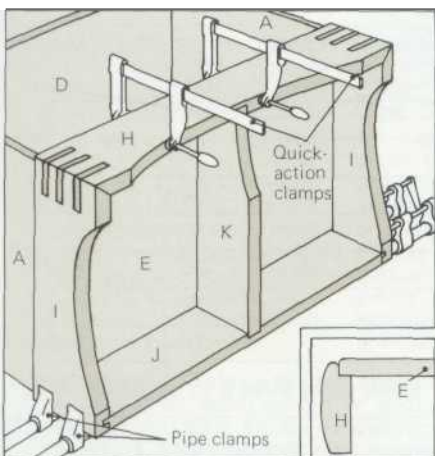
13. Cut dadoes to receive spacer 1/4 in deep across center of inner faces of plinth front and back Clamp plinth pieces in place around shelf unit and cut spacer to fit between dadoes Scribe and rough-cut cutouts on plinth front and sides and front end of spacer.



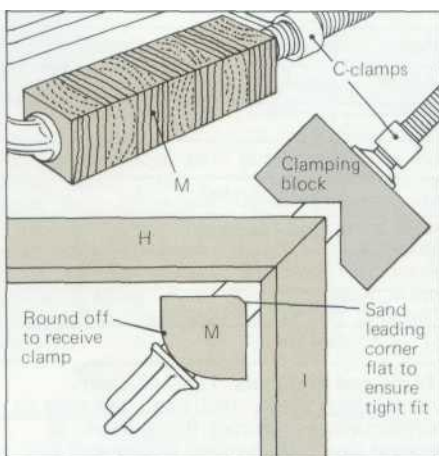
14. Rub wax on front corners of shelf unit. Then, after establishing clamping procedure with a dry run, apply a thin coat of glue to all mitered ends and clamp plinth together around shelf unit. (Put back and spacer in place for clamping, but do not glue them)



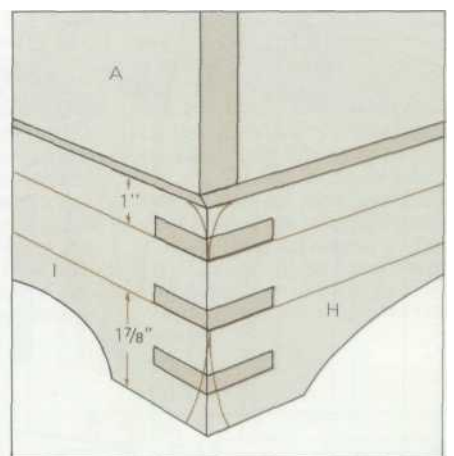
15. Dado three slots across each mitered corner, using scrap wood to set width and depth of saw. Cut splines (L) square to length of slots. Apply glue Use a C-clamp to force each into its slot When glue dries, saw splines parallel to wood surface; plane flush



16. With rasp and sandpaper, shape inner edges of plinth sides and front, finish shaping cutout sections, and round front edge of bottom piece (E). Clamp plinth to unit, gluing tongues of back (J) into their dadoes. When dry, glue and clamp spacer (K) in place.



17. Glue corner block laminates (M) in stacks, alternating grain direction. Saw to lengths needed Glue and clamp into joints of plinth. When glue is dry, begin shaping plinth First, rule lines along face of front (H) and sides (I) 1 in. from top edge and 1 7/8 in from bottom.



18. Trace pattern for rounding plinth onto both faces of front corners and onto rear edge Plane to desired shape Complete shaping all edges with No. 80 sandpaper, then sand with Nos 120 and 220. Finish shelf unit, plinth and back, then screw back in place

134
**EARLY AMERICA
BOOKCASE**



This Early American bookcase is versatile enough to blend with almost any decor. If you eliminate the decorative molding, the bookcase is not only easier to build, but it will also fit in with most modern or traditional furnishings. As shown, the bookcase is 7 feet high, 30 inches wide, and about 12 inches deep, but its design can be varied to suit your needs. The bookcase can also be used as a unit in wall-to-wall bookcases.

If you plan to build wall-to-wall bookcases, omit the molding supports where the sides of two units meet, since the moldings will get sufficient support from the adjoining sides. You can also omit the mitered joints and the side sections of the crown and baseboard moldings.

Construction: Begin the construction of the bookcase by cutting and assembling the shell. Cut the two sides (A), bottom (B), and top (C) of the shell from three 8-foot-long 1 x 12's. The top and bottom pieces fit into dadoes in the sides of the shell. The plywood back (E) is fitted into rabbets in the sides. (Directions are given in Steps 4-8 for cutting dadoes and rabbets with a circular saw. Before you assemble the shell, you must drill holes for the shelf supports at uniform 2-inch intervals. It is very important to space the holes properly, otherwise the shelves will not hang evenly. To avoid problems, use a homemade template as described in Step 9.

After the top, bottom, and sides are assembled, use the actual dimensions of the shell as a guide for cutting the shelves (D), the plywood back (E), the moldings (F-K), and the molding supports (L). Cut the shelves from two 8-foot-long 1 x 12 boards. Make each shelf 3/16 inch shorter than the interior width of the assembled shell and test-fit the first shelf before cutting the other five.

If you do not wish to use the exact moldings shown on the following page, you can substitute other moldings, but be sure to use moldings of the same width as those indicated in the chart, or adjust the measurements accordingly. Cut the shelf molding (F) from two 8-foot lengths. Cut the other molding and molding supports from 7-foot lengths of the appropriate material. Order extra molding to allow for possible errors in mitering. You may want to substitute simple 3-inch baseboard molding for the crown moldings (J and K), as the latter require an extra-deep miter box in order to be cut.

Never apply clamps directly to the surface of wood or they may leave unsightly marks. Always cushion the clamp by placing bits of scrap wood between the clamp and the good wood.

Before applying stain to the finished bookcase, test it on a piece of scrap wood. The longer you leave the stain on the wood before wiping off the excess, the darker the wood will become, so experiment on scrap wood in order to get the shade you prefer on the finished unit.

Parts list						
Part	Name	Quantity	Thickness	Width	Length	Material
A	Side	2	3/4"	11 1/2"	82"	1 x 12 knotty pine
B	Bottom	1	3/4"	11 1/4"	29"	1 x 12 knotty pine
C	Top	1	3/4"	11 1/4"	29"	1 x 12 knotty pine
D	Shelf	6	3/4"	10 1/8"*	28 3/16"*	1 x 12 knotty pine
E	Back	1	1/4"	29 1/4"*	78 1/2"*	Birch plywood
F	Shelf molding	6	—	7/8"	26 7/8"*	Pine
G	Front baseboard molding	1	—	3 1/2"	30 1/2"*	Pine
H	Side baseboard molding	2	—	3 1/2"	11 1/2"*	Pine
I	Fluted molding	2	—	1 1/2"	77"*	Pine
J	Front crown molding	1	—	3"	30 1/2"*	Pine
K	Side crown molding	2	—	3"	11 1/2"*	Pine
L	Molding support	2	3/4"	3/4"	77"*	1 x 1 pine

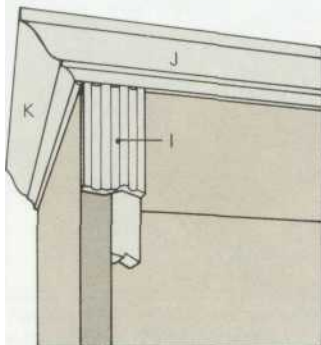
*Measurements are approximate. Parts D-L should be measured against the assembled bookcase shell before cutting.

Tools and materials: Circular saw with adjustable blade depth or table saw or radial arm saw. Electric drill with set of twist bits. Backsaw, deep miter box. Orbital sander (optional). Combination square, framing square, steel tape rule, pencil. Four 5" C-clamps. Hammer, nail set. Paintbrush. Wood putty. Nos. 80, 100, 150, and 220

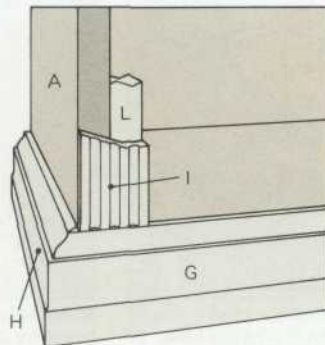
sandpaper, 0000 steel wool, oil stain, satin finish polyurethane, turpentine, paste wax, carpenter's glue. Tack cloth, soft cloths. Wood and molding (see above) and 3" x 82" scrap of 1/4" pegboard. Box of 3/4" 19-gauge wire brads. 3d, 4d, and 6d finishing nails, 3d common nails. Twenty-four metal shelf rests.



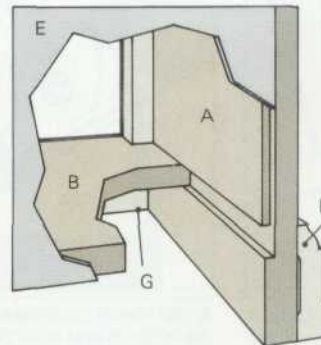
Decorative moldings



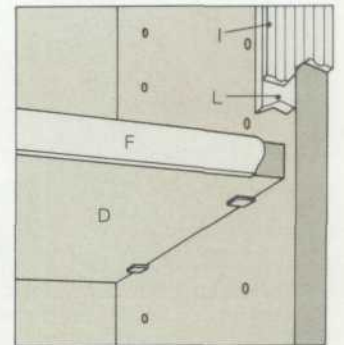
The fluted moldings (I) on the front edges of the bookcase meet the flared crown moldings (J and K) at the top corners.



The fluted moldings (I) also meet baseboard moldings (G and H) and are attached to bookcase sides (A) and supports (L).

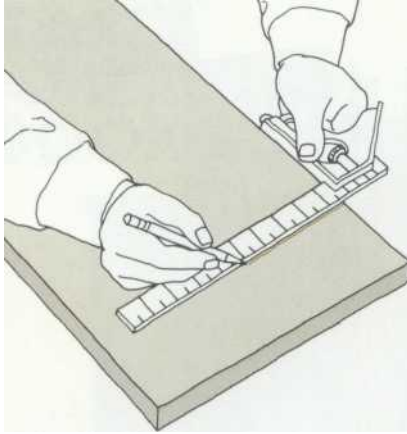


The bookcase back (E) fits into the rabbets cut into bookcase sides (A); it is flush with lower edge of bookcase bottom (B).

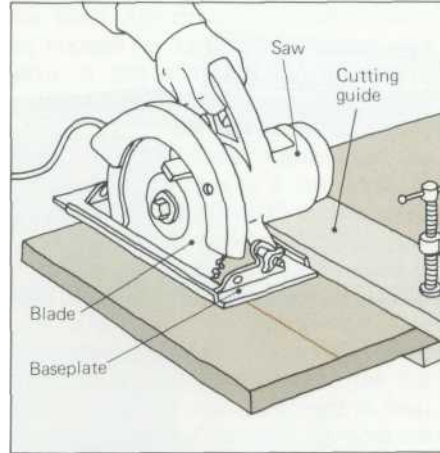


Each shelf (D) is faced with 7/8-in. pine molding (F) that fits with a small clearance against supports (L) at each side.

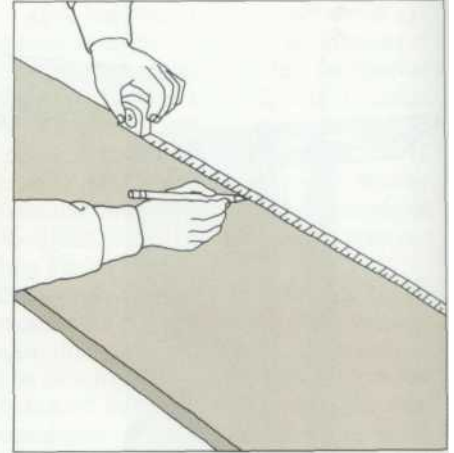
Early American bookcase



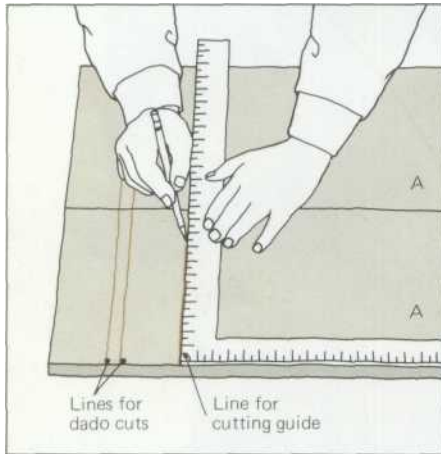
1. Cut 1/4 in from width of lumber for bookcase bottom (B) and top (C) using a circular saw with a rip blade and a guide (see Step 2). Use a combination square and pencil to draw a squared-off line for first crosscut near ends of this lumber and lumber for sides (A).



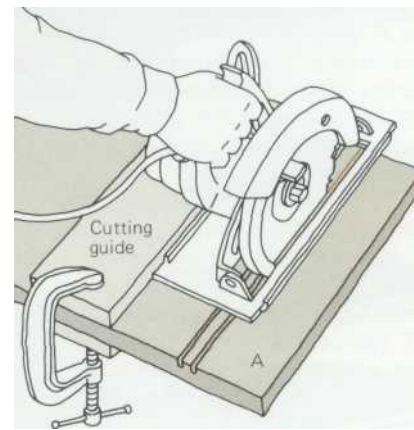
2. Use a circular saw with a crosscut blade to cut along the line. Clamp a straight strip of wood to the piece being sawed to act as a cutting guide; the distance between guide and cutting line must equal the distance between the saw's baseplate and blade.



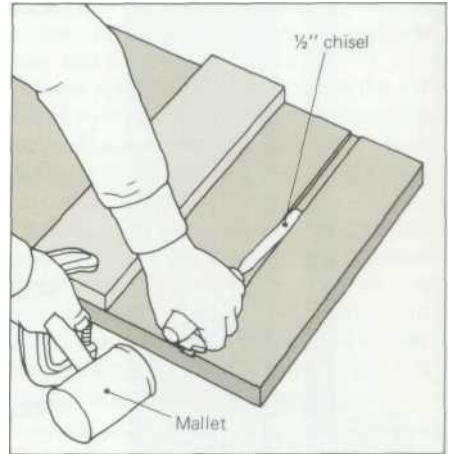
3. Following the dimensions given in the chart, measure the correct distance from the squared end of the board to the next cut, then use combination square to draw a line for the next crosscut and cut along it. Label each piece as you cut it for easy identification.



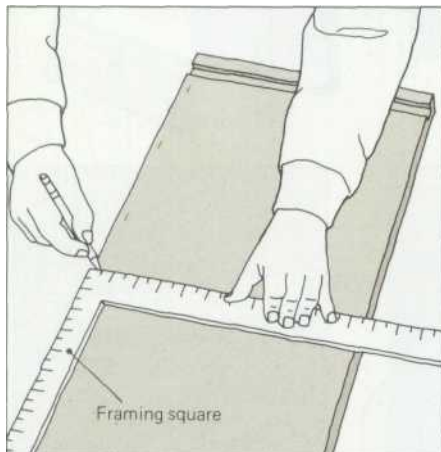
4. Lay the sides (A) side by side. Draw cutting lines for the bottom dados across both sides 2 3/4 in. and 3 1/2 in. from one end. Set the blade of the circular saw to cut to a depth of 1/4 in. and cut dados between the pairs of cutting lines into one side at a time (Steps 5 and 6).



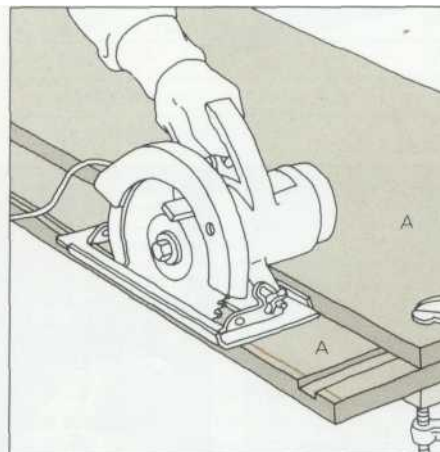
5. Clamp a scrap-wood cutting guide to each side (A), in turn, so that when the baseplate of the saw butts against the guide, the saw blade is just inside one rule. Cut along the rule. Move the guide and cut along the other rule. Make several parallel cuts between these two



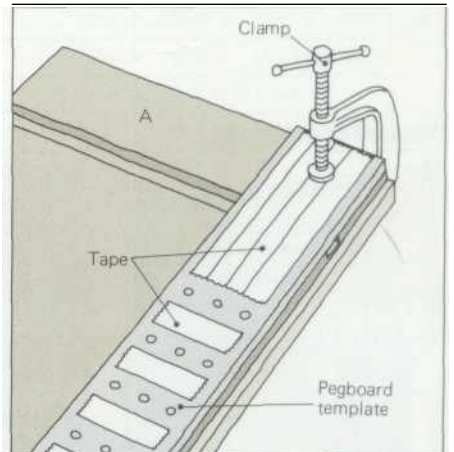
6. Remove the waste wood with the saw or with a chisel and mallet. Measure and mark off cutting lines for the top dados 3/4 in. and 1 1/2 in. from the opposite ends of the side pieces. Cut 1/4-in.-deep dados between these pairs of cutting lines as you did for bottom dados.



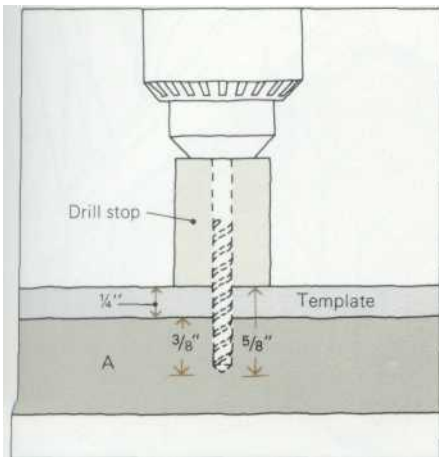
7. Use a framing square and a pencil to mark off points along the inside of the two bookcase sides (A) 1/4 in. from the back edges. Draw rules through these points from top dado to bottom dado. These lines are for the rabbets the plywood back (E) will fit into.



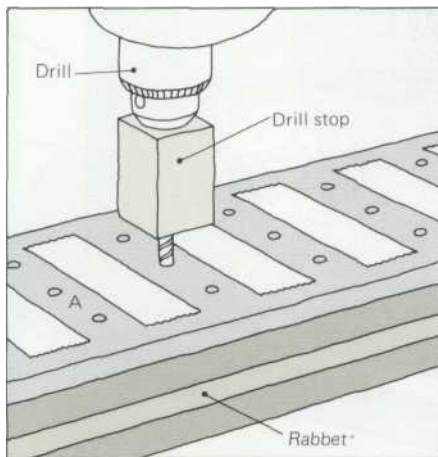
8. Set the circular saw blade for a 3/8-in.-deep cut. Clamp one side (A) on top of the other to serve as a cutting guide and cut along the rule. Reposition the cutting guide and cut the remaining wood from the edge. Repeat this process to cut the rabbet on the other side.



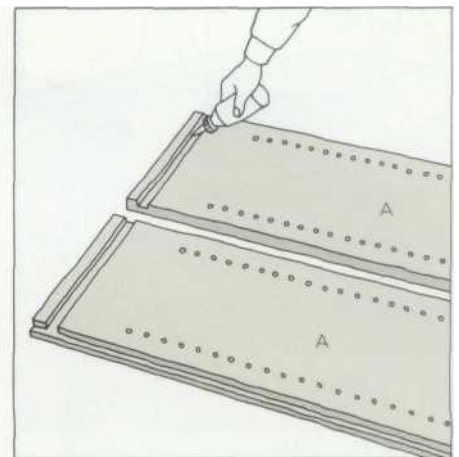
9. Make a template for drilling shelf-support holes by cutting a scrap of 1/4-in. pegboard 3 in. wide by 82 in. long with a row of holes at its exact center. Clamp template to the front inside edge of one bookcase side (A). Block alternate rows of holes with tape



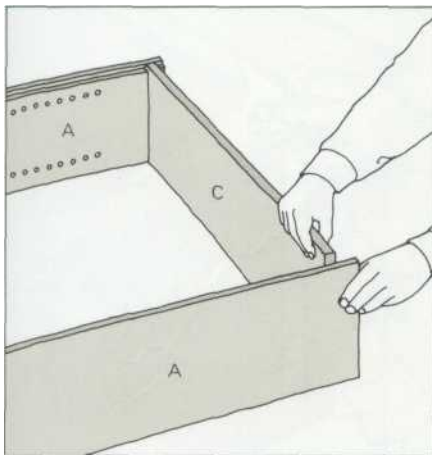
10. Make a drill stop by cutting a piece of scrap wood so that when the drill goes through it, 5/8 in. of the drill protrudes, excluding its point. This will allow the drill to pass through the Win. template and bore exactly 3/8 in. into the side (A).



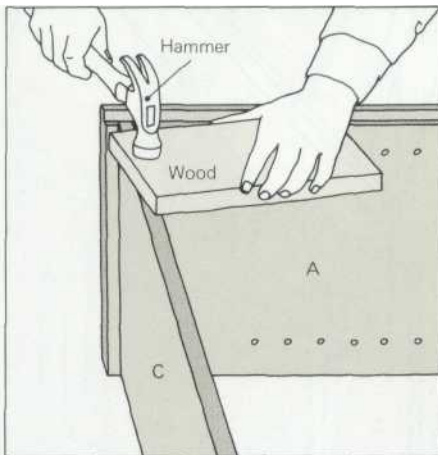
11. Drill into the center holes of the untaped rows in the template. Slide the template to the back edge of the side (A) and drill into the same holes. Move the template, with the same side facing up and its ends pointing in the same direction, to the second side.



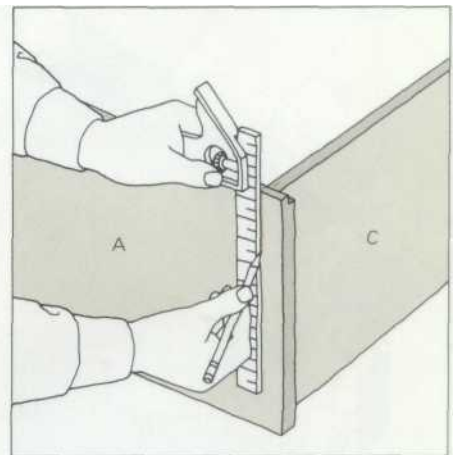
12. Bore shelf-support holes into the second side (A) as you did into the first. Sand the inner portions of the sides, bottom (B), and top (C) with Nos. 80, 100, and then 150 sandpaper. Lay out the sides, inner portions up, and apply glue to the dados.



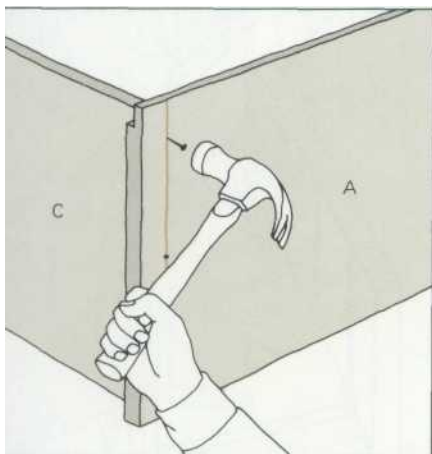
13. Be sure to apply enough glue to completely cover the bottoms and sides of the dados, then fit the bookcase bottom (B) and top (C) into the dados of one side (A) and then the other. (Position the bookcase shell with the rabbets facing up.)



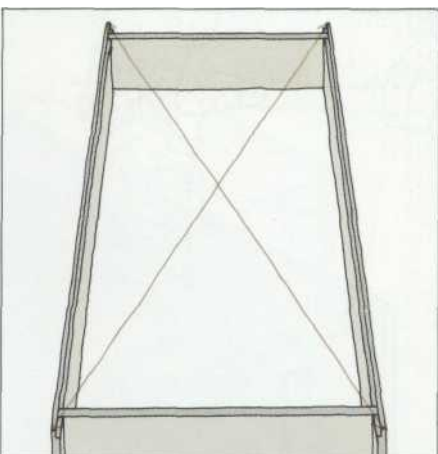
14. Before glue dries, wipe off all excess with a damp cloth. Align the top and bottom of the bookcase with the back edges of the dados by tapping them gently near the joints with a hammer that is buffered with a piece of wood, as shown, or with a mallet.



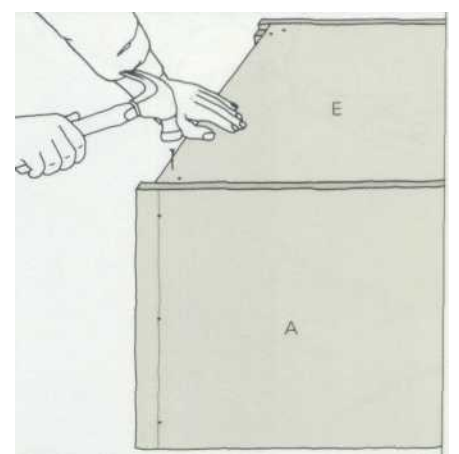
15. Mark the center of the top and bottom dado joints on the outside of the bookcase sides. Use a combination square and pencil to extend each mark along each side, forming rules that can be used to guide the proper placement of the reinforcing nails.



16. Nail the bookcase sides (A) to the bookcase bottom (B) and top (C) with 6d finishing nails. Use about three nails for each joint and drive them in along the guide rules that were drawn in Step 15. Use a nail set and hammer to set all the nails.

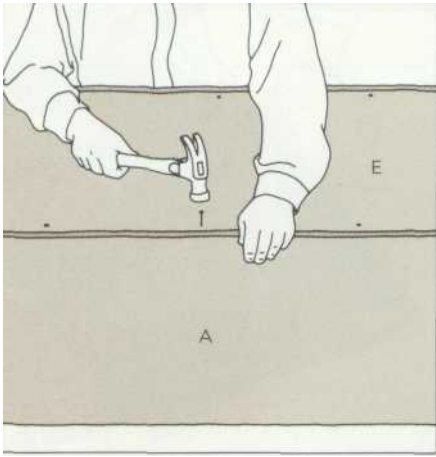


17. Check the bookcase shell for squareness by measuring its front from the upper lefthand corner to the lower right and the upper right to the lower left. If the two measurements are not identical, the bookcase is not square. Adjust the squareness before the glue dries.

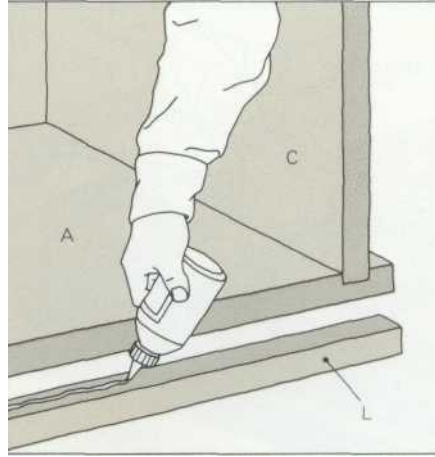


18. Get exact measurements for the bookcase back (E) from the shell, cut the plywood accordingly, and sand one side with Nos. 80, 100, and then 150 paper. Position back over shell, sanded side down, and nail each of its corners to shell with two 3d nails.

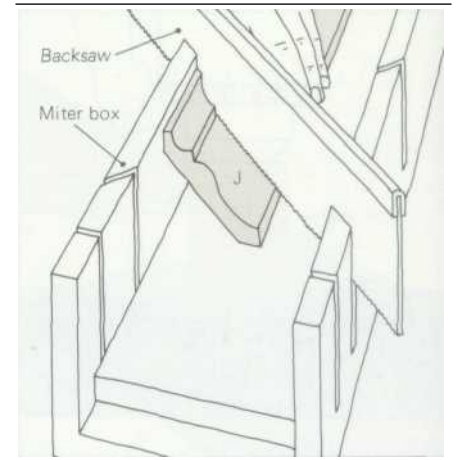
Early American bookcase



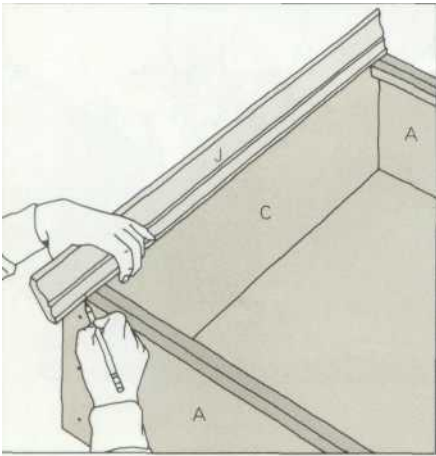
19. Drive more nails through the back into the sides, bottom, and top of the bookcase. Use one nail about every 8 in. If the bookcase sides bow out, pull them inward as you drive the nails home along the center portions of the sides. Do not set the nails



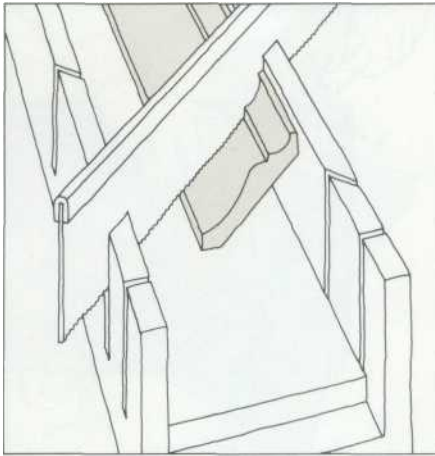
20. Measure and cut the molding supports (L), and then glue and nail them to the inside front edges of the bookcase sides (A). These will support the thin fluted moldings that run down the front of the bookcase. Use 3d finishing nails and set them.



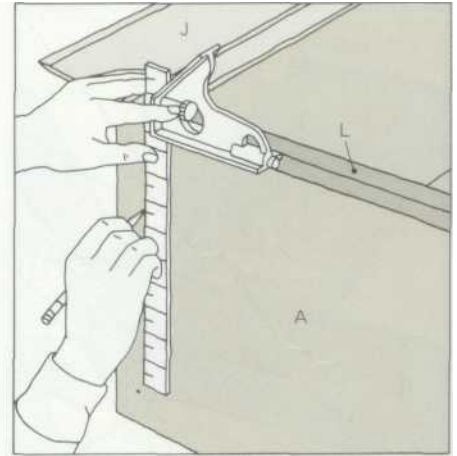
21. Clamp a length of crown molding (J) into a deep miter box with the top of the molding facing down. Angle the molding, as shown, with its bottom flush against the side of the box and its top against the floor of the box. Make a 45° miter cut with a backsaw



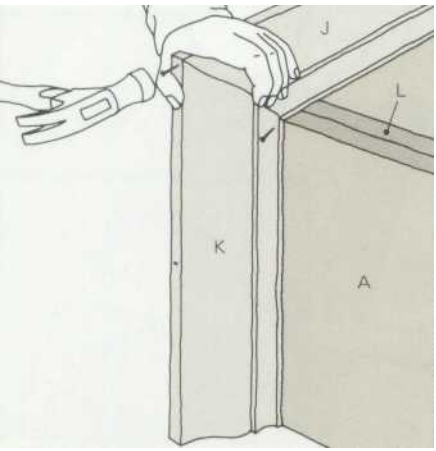
22. Place the cut piece of crown molding against the top of the bookcase shell, with the shorter cut corner of the molding against one front top corner of the shell. Mark the molding for the second miter cut where it meets the other side of the bookcase shell.



23. Return the molding to the miter box, but this time place it against the opposite side of the box with the cutting mark against a saw slot that runs in the opposite direction from the first. Hold the molding firmly in place and make the second miter cut.



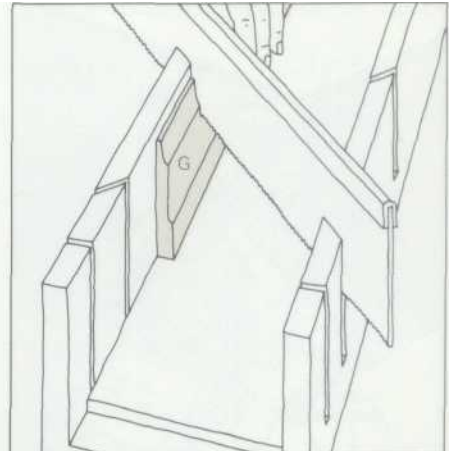
24. Glue and nail the mitered molding to the top of the bookcase with 4d finishing nails, but do not drive the nails all the way in. Use a combination square to draw rules on the sides of the bookcase to extend the bottom line of the front molding (J) along the sides (A)



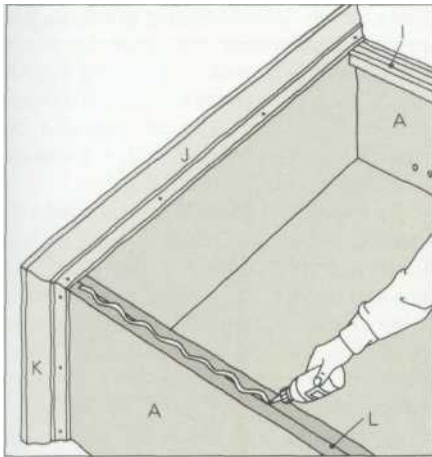
25. Measure the side crown moldings (K) against the bookcase and cut miters in one side. Cut the opposite side flush with the back of the bookcase. Rub glue into the mitered edges and position the side moldings on the



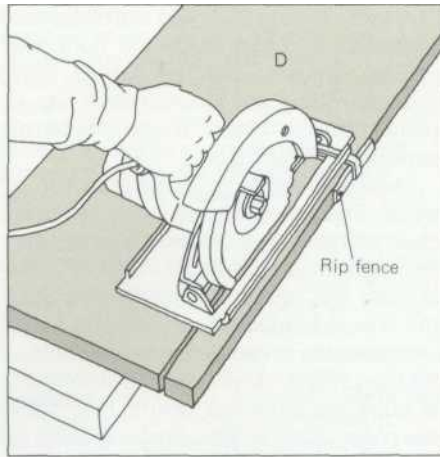
26. Align the mitered joints and carefully wipe off all the excess glue with a well-dampened cloth. (The stain will not penetrate the glue, so it is important to remove all the excess.) Drive all the nails home and use a nail set and hammer to set them.



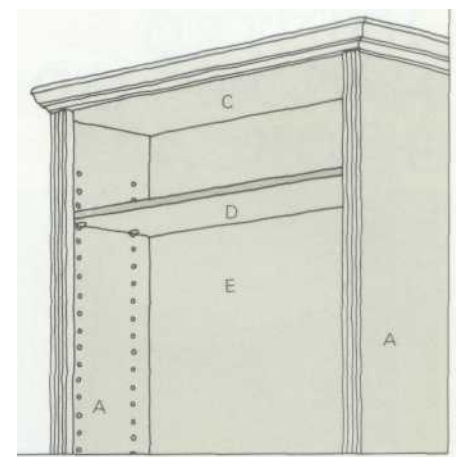
27. Measure, mark, cut, and attach the front and side baseboard moldings (G and H) as you did the crown moldings in Steps 21 -26, but when cutting the miters in the baseboard moldings, hold each molding flush against the side of the miter box, as shown here.



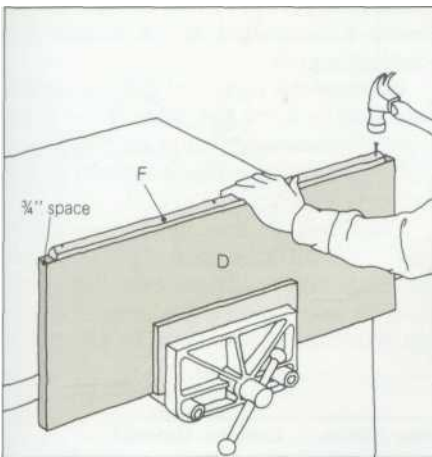
28. Measure the fluted moldings (I) against the sides of the bookcase and cut them. Glue them to the sides and molding supports, and wipe off the excess glue with a damp cloth. Nail the moldings down with 3/4-in. 19-gauge wire brads. Set the brads.



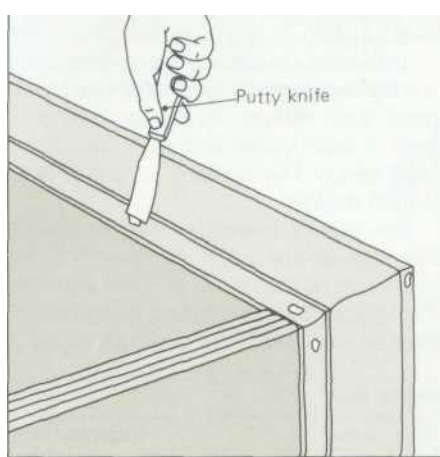
29. In order to fit properly, the shelves (D) must be narrower than the boards they are cut from. Use a circular saw with a rip blade and rip fence to cut the boards to a width of 10 1/8 in. Set fence for amount of wood to be removed and cut along length of each shelf.



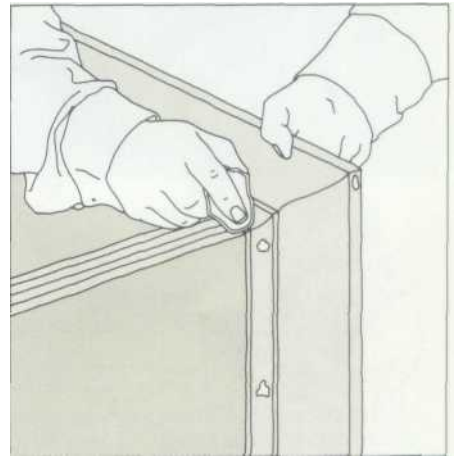
30. Measure the inside width of the bookcase and cut the first shelf 3/16 in. shorter than the measurement you get. Test-fit shelf by placing it into position. It should fit in easily without forcing. Adjust your measurements, if necessary, and cut the other five shelves.



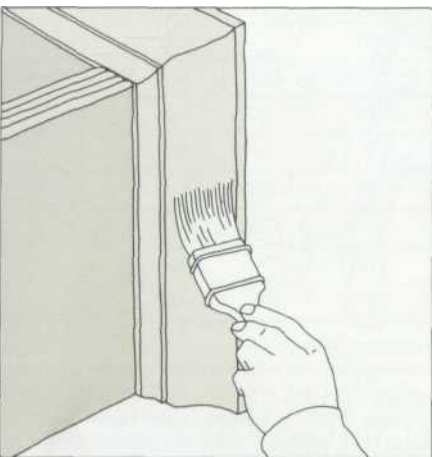
31. Clamp each shelf to the workbench, in turn, with the front edge up. Measure the shelf molding (F) against the shelf, leaving 3/4 in. on each side. Cut the molding, and glue and nail it to the shelf with 4d finishing nails. Set the nails with a nail set.



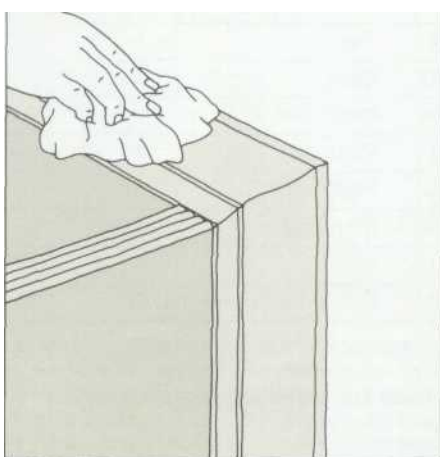
32. Fill all the holes left by these nails with putty. Use your finger or a small putty knife to work the putty firmly into the holes. Leave the putty a little higher than the surface of the wood; it will shrink as it dries, and if it is still too high, you can sand it down.



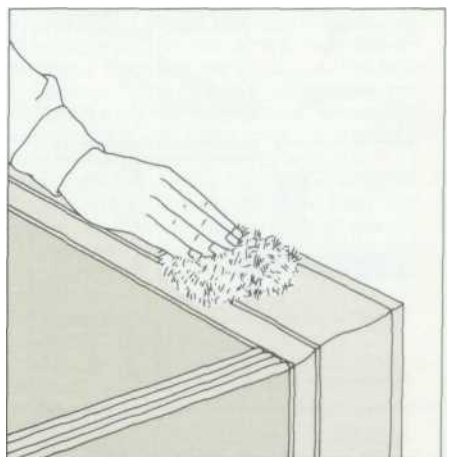
33. When the putty is dry, sand the bookcase and shelves with Nos. 80, 100, and then 150 sandpaper. When sanding moldings, use No. 100, then No. 150 paper and bend it around your finger. When sanding near mitered joints, sand away from joints along molding.



34. Brush the sanded bookcase and shelves with a tack cloth to remove the sawdust created by the sanding. Use a small brush to paint on the stain. Let the stain sit for 10 min., and then wipe off the excess with a clean, soft cloth. Let the stain dry for 24 hr.



35. So that the first coat of polyurethane penetrates more deeply, brush on a coat of sealer made up of 70% satin polyurethane and 30% turpentine. Wipe off the excess after 10 min. After 4 hr. brush on a coat of full-strength polyurethane. Let it dry for 24 hr.



36. Sand all surfaces lightly with No. 220 sandpaper, then remove the sawdust with a tack cloth. Brush on another coat of full-strength polyurethane and let it dry for 24 hr. Apply paste wax with 0000 steel wool using medium pressure. Buff with a soft cloth.

135 ROLLTOP DESK



For the person who hates to clear off a desk, who wants to leave everything where it is overnight yet still have the clutter hidden, a rolltop desk is a godsend. The tambour hides everything! Our design, a modern interpretation of the 19th-century design, goes well with contemporary or traditional furnishings.

Lumber-core plywood is used for most of the desk, supplemented by solid hard-

wood stock: walnut, maple, oak, or cherry. The edges of the plywood are covered with a matching veneer tape.

The need for extreme accuracy in measuring and cutting cannot be stressed too strongly. With one exception, all the construction is ambitious but straightforward—that exception is the tambour, which is made up of thirty ³/₄-inch-wide hardwood slats. A scant ¹/₄-inch tongue at

Parts list						
Part	Name	Quantity	Thickness	Width	Length	Material
Tambour case						
A	Side	2	³ / ₄ "	15 ¹ / ₂ "	30 ¹ / ₄ "	Plywood
B	Back	2	¹ / ₄ "	14 ⁵ / ₈ "	56"	Plywood
C	Top	1	³ / ₄ "	11 ¹ / ₂ "	56"	Plywood
D	Rail	1	³ / ₄ "	¹ / ₈ "	55 ¹ / ₂ "	Plywood
Cubbyhole unit						
E	Top	1	³ / ₄ "	10"	55 ¹ / ₂ "	Plywood
F	Shelf	1	¹ / ₂ "	9 ³ / ₄ "	28 ³ / ₄ "	Plywood
G	Shelf	4	¹ / ₂ "	9 ³ / ₄ "	10 ¹ / ₄ "	Plywood
H	Side	2	¹ / ₂ "	9 ³ / ₄ "	12 ¹ / ₄ "	Plywood
I	Back	1	¹ / ₄ "	12 ¹ / ₄ "	55 ¹ / ₂ "	Plywood
J	Divider	2	¹ / ₂ "	9 ³ / ₄ "	12 ¹ / ₄ "	Plywood
K	Divider	5	¹ / ₂ "	9 ³ / ₄ "	3 ³ / ₈ "	Plywood
L	Divider	2	¹ / ₂ "	9 ³ / ₄ "	8 ¹ / ₄ "	Plywood
M	Cleat	1	³ / ₄ "	³ / ₄ "	55 ¹ / ₂ "	1 x 6 hardwood
Tambour						
N	Handle	1	1 ¹ / ₂ "	1 ⁵ / ₈ "	56"	2 x 8 hardwood
O	Slat	30	³ / ₄ "	³ / ₄ "	56"	1 x 6 hardwood
P	Retaining strip	1	¹ / ₄ "	1"	55 ¹ / ₂ "	1 x 6 hardwood
Q	Backing	1	—	23 ⁵ / ₈ "	55 ¹ / ₂ "	Canvas
Desk-top unit						
R	Top	1	³ / ₄ "	29 ¹ / ₄ "	60"	Plywood
S	Bottom	1	³ / ₄ "	29 ¹ / ₄ "	59"	Plywood
T	Side	2	³ / ₄ "	5 ¹ / ₂ "	29 ¹ / ₄ "	Plywood
U	Back	1	¹ / ₄ "	4 ³ / ₄ "*	59 ¹ / ₄ "*	Plywood
V	Partition	2	³ / ₄ "	4 ¹ / ₂ "	29"	Plywood
W	Horizontal trim	2	³ / ₄ "	³ / ₄ "	60"	1 x 6 hardwood
X	Side trim	2	³ / ₄ "	³ / ₄ "	5 ¹ / ₂ "	1 x 6 hardwood
Y	Partition trim	2	³ / ₄ "	³ / ₄ "	4 ¹ / ₄ "	1 x 6 hardwood
Z	Spline	2	¹ / ₈ "	³ / ₄ "	29 ¹ / ₄ "	1 x 6 hardwood
Base units						
AA	Top	2	³ / ₄ "	16"	26 ¹ / ₄ "	Plywood
BB	Bottom	2	³ / ₄ "	16"	25 ¹ / ₂ "	Plywood
CC	Front	2	³ / ₄ "	3 ³ / ₄ "	16"	Plywood
DD	Side	4	³ / ₄ "	24 ¹ / ₂ "	27 ¹ / ₂ "	Plywood
EE	Back	2	¹ / ₄ "	16 ¹ / ₄ "*	24 ¹ / ₈ "*	Plywood
FF	Pin	8	¹ / ₄ " dia.	—	³ / ₄ "	Hardwood dowel

* Measurement is approximate; cut to fit during construction.

Tools and materials: Radial arm or table saw with carbide-tipped or planing blade and dado head. Saber saw. Router with ¹/₄" straight bit and ⁵/₈" cove bit. Drill with ¹/₄" twist bit. Hammer, mallet, screwdriver. Two web clamps. Framing square, steel tape rule. Orbital sander and sanding block with Nos. 100, 150, and 220 sandpaper. Hide or resin glue, adhesive sponge. Wood stain, varnish, paste wax. Candle stub. 1 ²/₃ yd. of canvas at least 26" wide. Veneer

tape. Lumber-core plywood: one panel ¹/₄" x 4' x 8', 1 ¹/₂ panels ¹/₂" x 4' x 8', three panels ³/₄" x 4' x 8'. A ¹/₈" x 4' x 8' panel of tempered hardboard. Six 5' lengths of 1 x 6 hardwood boards, one 5' length of 2 x 8 hardwood board. One ¹/₄" dowel. Four ¹/₄" dowel centers. Nine pairs of drawer slides (metal or hardwood). A 55 ¹/₂" length of weather stripping. Four ¹/₂" No. 6 brass wood screws, four 1 ¹/₂" No 10 brass wood screws, 1" box nails. 616

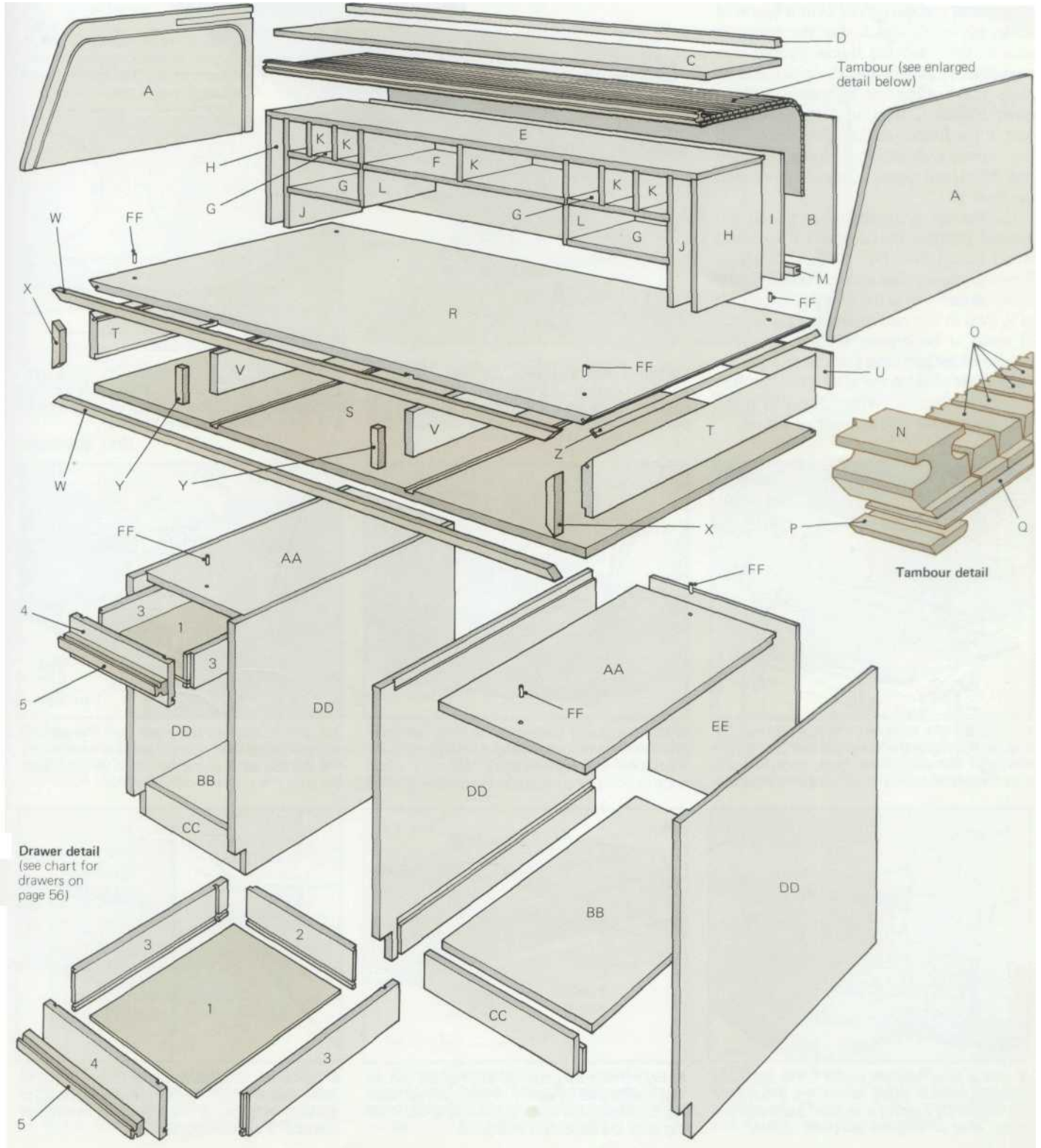
each end of each slat allows the tambour to slide up and down in 1/4-inch grooves that have been routed in the sides of the tambour case (see diagram, p. 55). Where the grooves curve, they will have to be widened a bit to accommodate the width of the slats as they make the turn.

The tambour slats should be finished and waxed before they are glued to the canvas backing; it would be impossible to

finish them once they are glued down. However, do not finish the bottoms of the slats; these must accept the glue.

The finish you choose depends on the hardwood you select for the desk. For light woods, such as oak or maple, you may want to apply a stain, followed by varnish and wax. But darker woods may need no more than light sanding and tung oil.

You may find it easier to finish the individual sections of the desk—the tambour and case, desk-top unit, base units, drawers, and cubbyhole unit—before assembly. If so, take extra care during assembly that you do not mar the finish. Build the cubbyhole unit after the tambour case has been built and fitted to the desk top in order to be sure that the cubbyhole unit fits perfectly within the case.

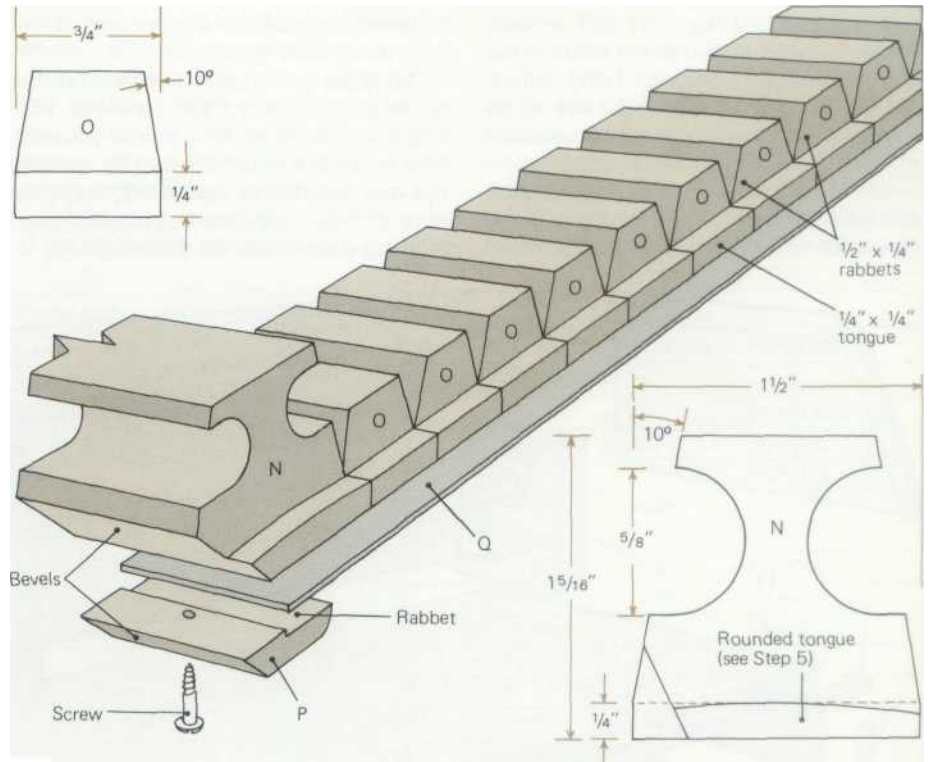


Tambour and case

Cut 30 slats (O), 3/4 inch square and 56 inches long, from 1 x 6 hardwood boards. Set the table saw blade at a 10° angle and position the fence so that the blade will cut a 10° bevel, ending 1/4 inch above the base of each slat. Cut a rabbet 1/2 inch deep and 1/4 inch wide into each end of each slat. Finish the slats.

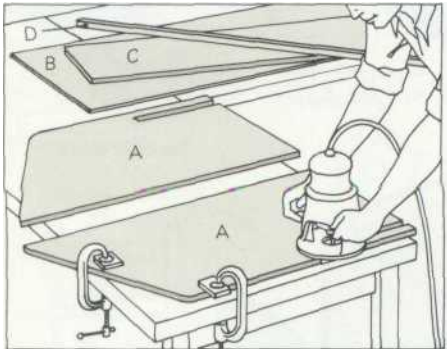
Build a frame of scrap lumber with inside dimensions of 25 x 56 inches. Stretch the canvas tightly over a piece of scrap plywood; check that the frame is square, then nail the frame through the canvas and to the plywood. Apply hide or resin glue to a third of the canvas and put down 10 slats. Clamp the slats against one end of the frame, holding them down on the canvas with weights. When the glue has dried, put down 10 more slats, then the final 10.

Cut slats for the tambour handle (N) and drawer handles by ripping a 2 x 8 hardwood board into 1 1/2- x 1 5/16-inch strips. Bevel as shown. Use a 5/8-inch cove router bit to cut grooves in the handles to a depth of 1/2. inch in two passes, removing 1/4 inch of wood at each pass. Cut the tambour handle 56 inches long and cut a rabbet in each end to match the slats. Glue the handle to the canvas. When the glue dries, trim the canvas to the tambour edges.

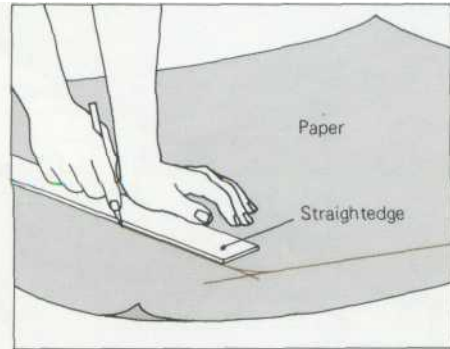


Tambour detail shows canvas (Q) sandwiched between handle (N) and retaining strip (P). Bevel front edge of strip to match the bevel on handle. Cut a shallow rabbet in the

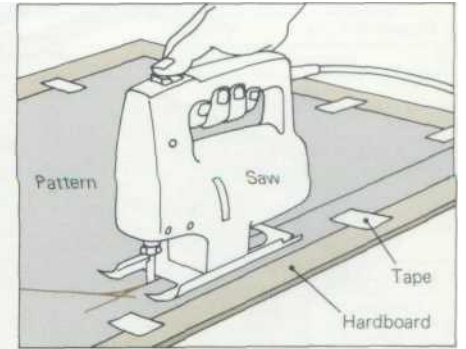
retaining strip to accommodate the thickness of the canvas. Finish the lower side of the strip, then glue it to the canvas. Drill pilot holes and screw parts N and P together



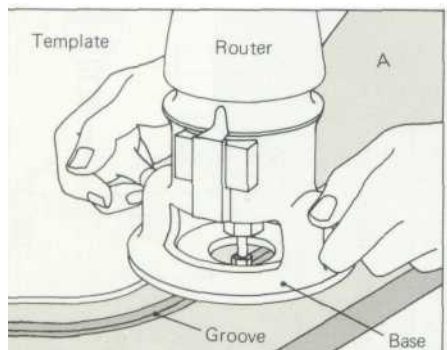
1. Cut sides (A), back (B), top (C), and rail (D) to size. Following the diagram at top of opposite page, cut a 1/4 x 3/4-in. blind dado in each side for top and 1/8- x 3/8-in. rabbet for back.



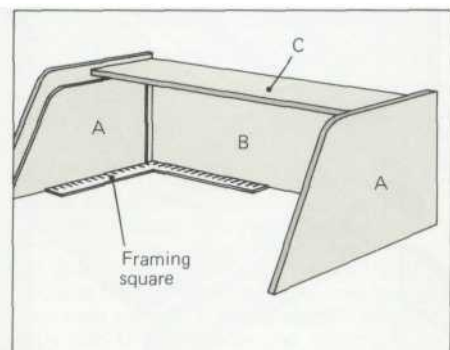
2. Make a paper pattern for cutting tambour grooves with a router and template guide (see illustration, opposite page), allowing clearance needed by your guide



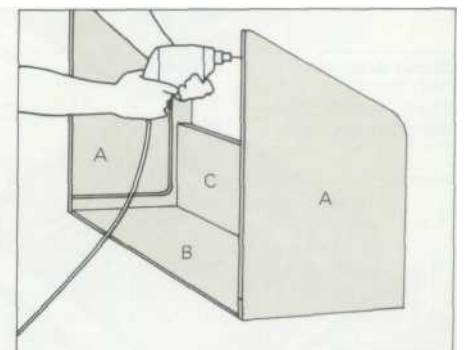
3. Cut a hardboard template from the pattern, using a saber saw. A 2-in. radius is needed on the curves so that the tambour will not bind. Be sure the curves flow smoothly.



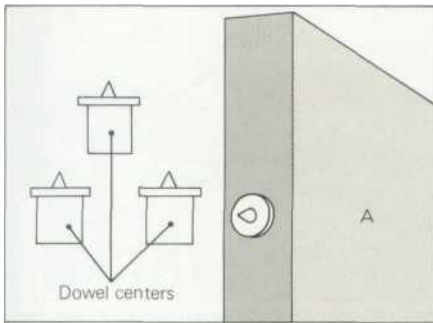
4. Use a 1/4-in. straight router bit to cut 1/4-in.-deep grooves in sides. Widen the grooves at the curves by making a second pass with the router after shifting the template slightly.



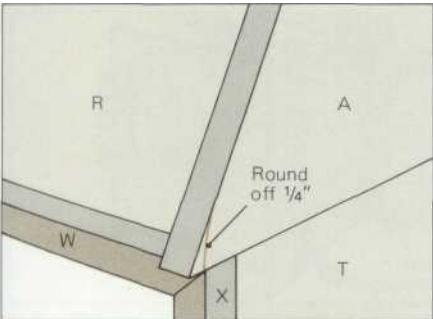
5. Round the tongues on the handle (N) so that it will travel smoothly in the grooves. Glue top to sides. Glue back to sides and top, making sure the assembly is square.



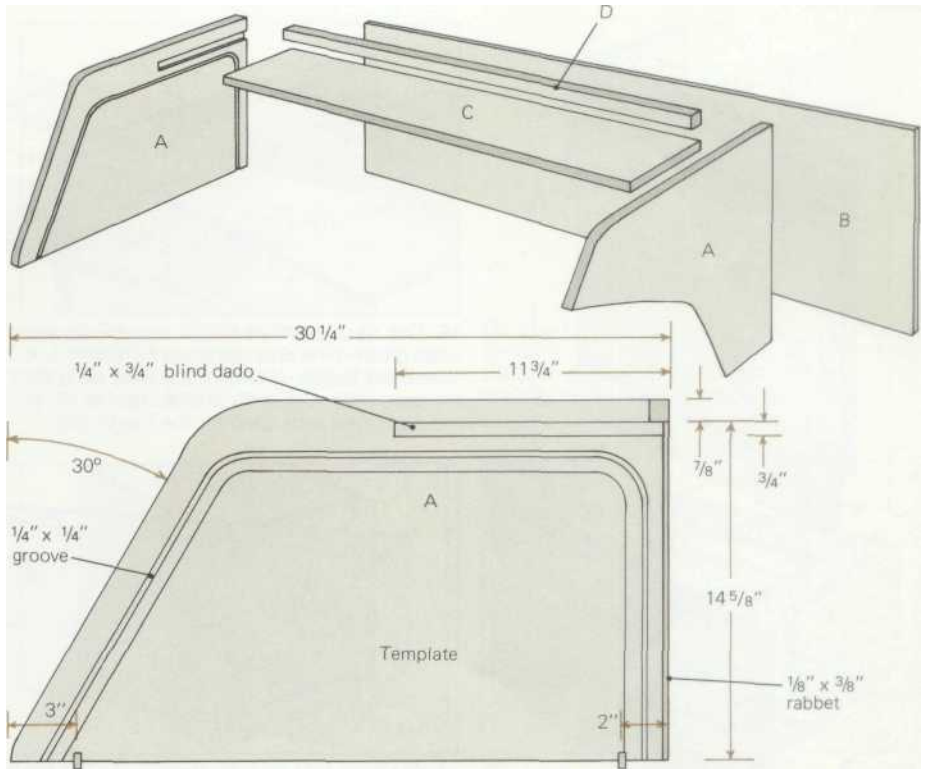
6. Nail back to sides and top. Glue rail (D) to sides and top. Drill 1/4-in. holes 1/4 in. deep in the bottom edges of the sides 2 in. from back corners, 3 in. from front corners.



7. Purchase four Win, dowel centers to insert into the holes drilled in Step 6. These will be used in Steps 23-26 to mark the positions of the dowel holes in the desk top.



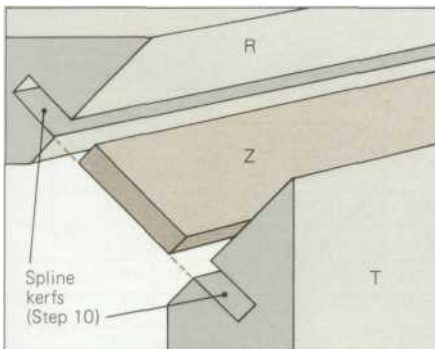
8. After completing desk-top unit (below), position tambour case on desk top (R). Round off front corners of case flush with top. Apply veneer tape to exposed plywood edges.



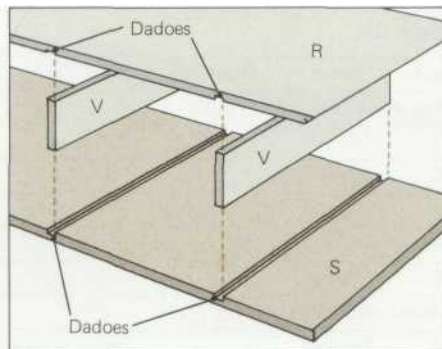
Drawings show assembly of parts for tambour case (top) and dimensions and locations for dowel holes, dado, and rabbet (bottom). The template for cutting the grooves in the

sides (A) must be made to conform to the thickness of the template guide for your router. Use a 2-in. radius for the curves of the grooves

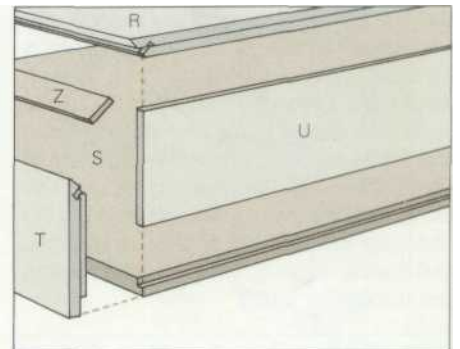
Desk-top unit



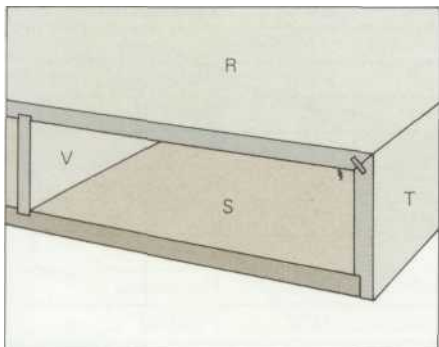
9. Cut parts R-Z to size (see chart, p.52), but do not cut the back (U) yet. Grain must run the length of splines (Z). Cut 45° bevels in top (R) and sides (T) as shown



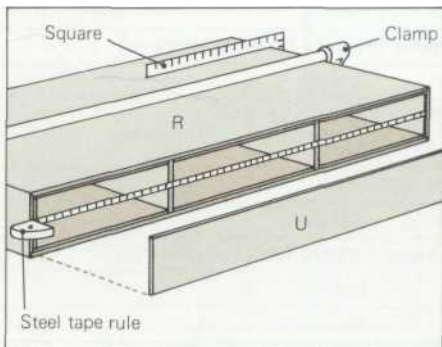
10. Cut 1/8-in.-wide spline kerfs 3/8 in. deep into the top and sides. Cut dadoes 1/4 in. deep and 3/4 in. wide into the bottom (S) and top (R) for partitions (V).



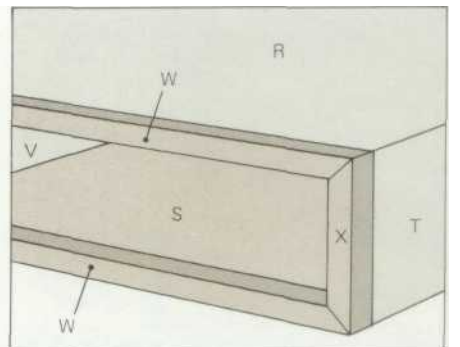
11. Cut a 1/4- x 3/4-in. rabbet into the bottom edges of the sides (T) to accept the bottom (S). Cut a 3/8- x 1/4-in rabbet into the back edges of parts R, S, and T for back (U)



12. Test-fit all pieces, check for squareness, make adjustments; assemble with glue. Glue splines (Z) to top and sides (T); glue partitions (V) to top. Glue bottom to parts T and V

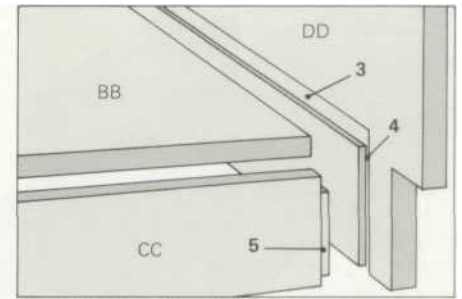
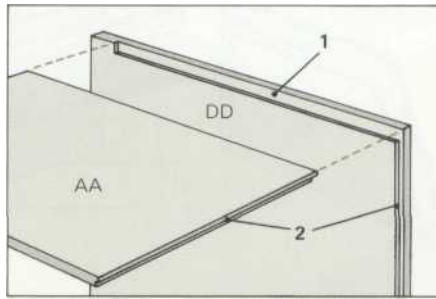
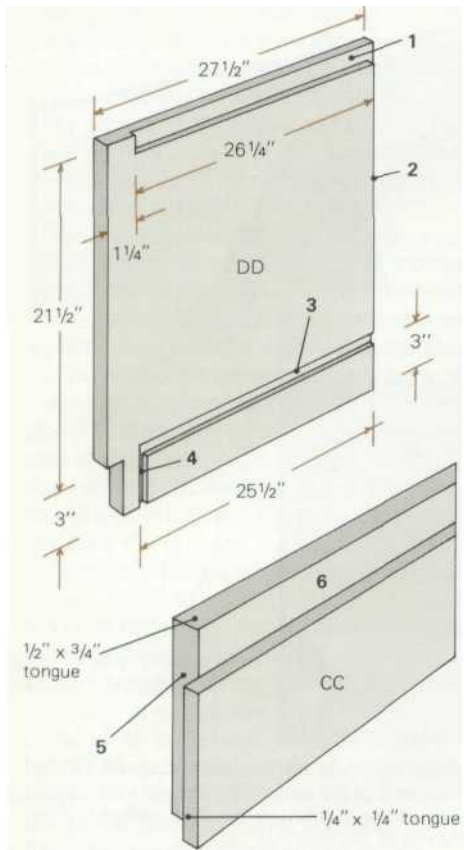


13. Clamp assembly, making certain front is square, and brace it diagonally with scrap wood. Measure opening inside rabbets, then cut back (U) to fit opening exactly



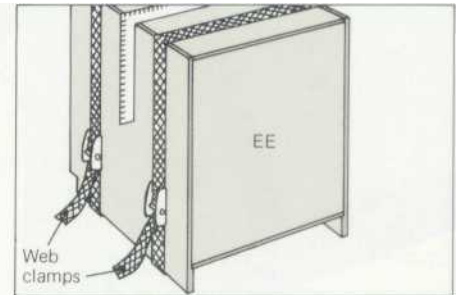
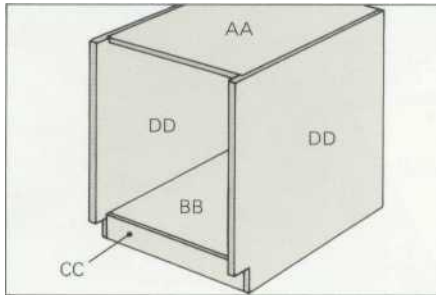
14. Glue the back to parts R, S, T, and V. Check that assembly is still square and nail back piece in place. Test-fit the trim (W, X and Y), then glue trim in position.

Base units



15. Cut base parts (AA-DD and FF) to the sizes given in the chart on page 52. Cut a 1/4- x 3/4-in. blind rabbet (1) into each side (DD) for the tops (AA). Cut a 3/8- x 1/4-in. rabbet (2) in the sides and tops (AA) for the backs (DD).

16. Cut a 1/4- x 3/4-in. blind dado (3) into the sides for the bottoms (BB). Cut a 1/4- x 1/4-in. dado (4) in the sides for the fronts (CC). Cut a 1/4- x 1/2-in. rabbet (5) at each end of the fronts (CC) to make 1/4- x 1/4-in. tongues (EE).

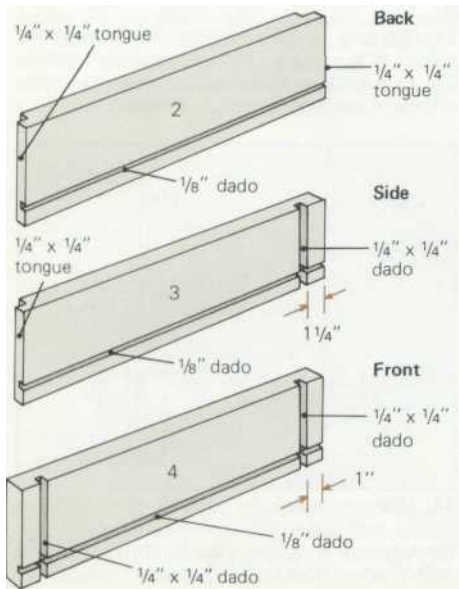


17. Cut a 1/4- x 3/4-in. rabbet (6) along the top of each front (CC). Test-fit pieces and make any necessary adjustments. Glue the fronts to the bottoms; then glue these and their tops (AA) into dados in sides.

18. Clamp each base assembly with web clamps. Square the fronts with a framing square and prop up with diagonal braces. Measure openings and cut backs (EE) to fit. Glue and nail backs in place.

Drawers

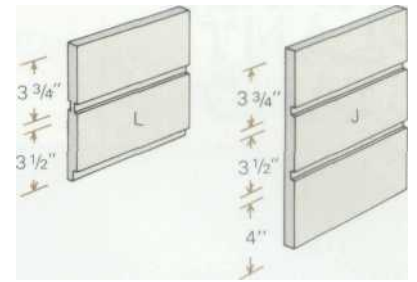
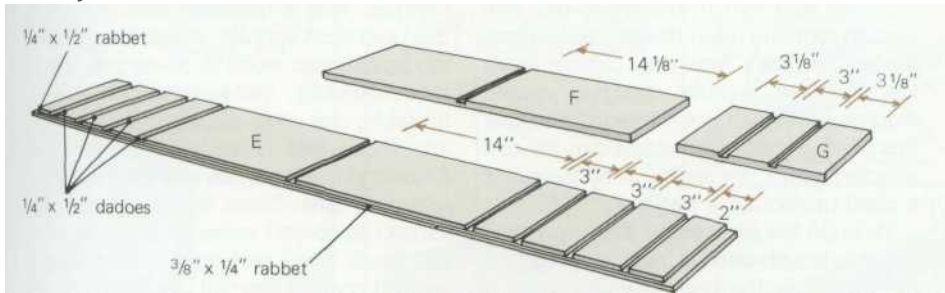
Cut the drawer fronts from 3/4-inch plywood, the sides and backs from 1/2-inch plywood, and the bottoms from 1/8-inch hardboard (see chart at right). Cut dados and rabbets into the backs, sides, and fronts, following the drawings below. The drawer handles were shaped at the same time as the tambour handle and must now be cut to length.



Parts list

Part	Name	Quantity	Thickness	Width	Length	Material
Side desk-top drawers (2)						
S1	Bottom	2	1/8"	15 1/2"	23 1/8"	Hardboard
S2	Back	2	1/2"	3 1/2"	15 1/2"	Plywood
S3	Side	4	1/2"	3 1/2"	23 7/8"	Plywood
S4	Front	2	3/4"	4"	17"	Plywood
S5	Handle	2	1 1/2"	1 5/16"	17"	2 x 8 hardwood
Center desk-top drawer (1)						
C1	Bottom	1	1/8"	21 1/2"	23 1/8"	Hardboard
C2	Back	1	1/2"	3 1/2"	21 1/2"	Plywood
C3	Side	2	1/2"	3 1/2"	23 7/8"	Plywood
C4	Front	1	3/4"	4"	23"	Plywood
C5	Handle	1	1 1/2"	1 5/16"	23"	2 x 8 hardwood
Upper drawers for base units (4)						
U1	Bottom	4	1/8"	14"	23 1/8"	Hardboard
U2	Back	4	1/2"	3 1/2"	14"	Plywood
U3	Side	8	1/2"	3 1/2"	23 7/8"	Plywood
U4	Front	4	3/4"	4"	15 1/2"	Plywood
U5	Handle	4	1 1/2"	1 5/16"	15 1/2"	2 x 8 hardwood
Lower drawers for base units (2)						
L1	Bottom	2	1/8"	14"	23 1/8"	Hardboard
L2	Back	2	1/2"	11 1/2"	14"	Plywood
L3	Side	4	1/2"	11 1/2"	23 7/8"	Plywood
L4	Front	2	3/4"	12"	15 1/2"	Plywood
L5	Handle	2	1 1/2"	1 5/16"	15 1/2"	2 x 8 hardwood

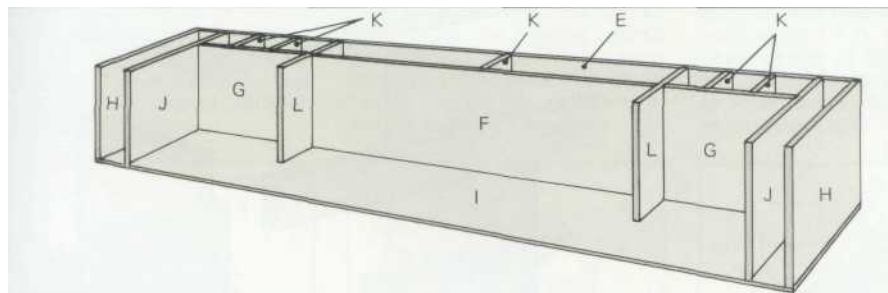
Cubbyhole unit



19. Cut the top (E), the shelves (F and G), the sides (H), the back (I), the dividers (J, K, and L), and the cleat (M) to size (see chart). Cut dadoes and rabbets 1/4 in. deep and 1/2 in.

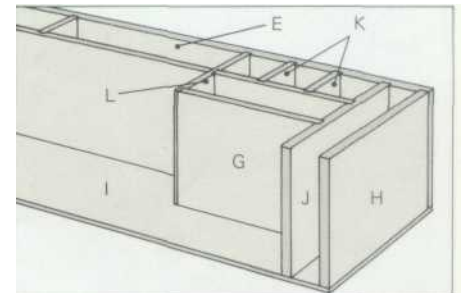
wide into the top (E) for parts H, J, K, and L. Cut a rabbet 3/8 in. deep and 1/4 in. wide into the top for the back (I). Cut 1/8- x 1/2-in. dadoes into the shelves for dividers K

20. Cut 1/8- x 1/2-in. dadoes and rabbets into dividers L to receive the shelves (F and G). Cut 1/8- x 1/2-in. dadoes into dividers J for shelves G Set pieces aside



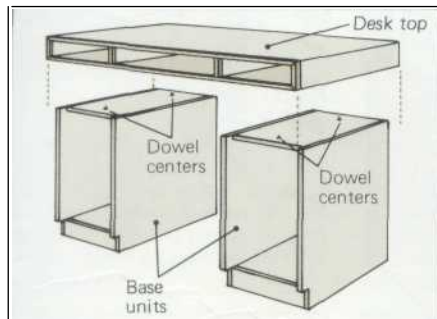
21. Test-fit all pieces and check the fit of the unit within the tambour case. Then glue and nail top (E) to sides (H). Glue back (I) to top and sides; square assembly, then nail. Glue

parts L, F, and center divider K to each other and to top. Glue remaining dividers K to top, and upper shelves G to dividers K and L. Then glue dividers J to top and upper shelves G.

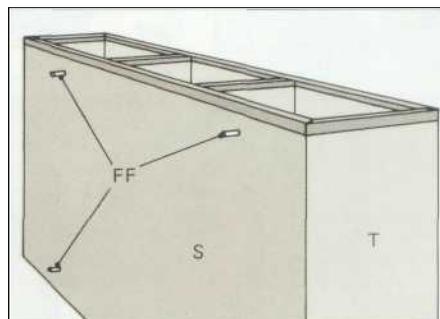


22. Glue remaining shelves G to dividers J and L. Square up assembly, draw center lines of parts F, G, J, K, and L on the back (I) Then nail through I into F, G, J, K, and L

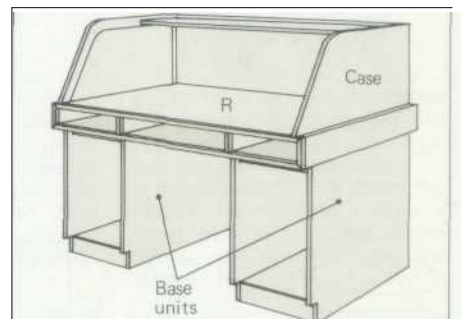
Final assembly



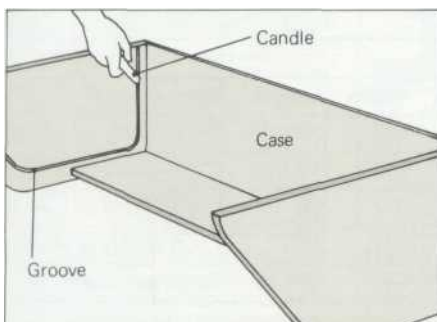
23. Drill 1/4-in. holes 12 in. deep in the center of the base tops (AA) near the front and back edges Place dowel centers in the holes. Set base units against a wall, 23 in. apart, and carefully center desk-top unit over bases.



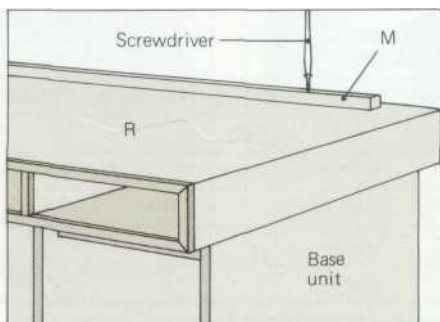
24. Press down on desk-top unit, then remove it; dowel centers will make marks on underside of desk-top unit Drill 1/4 in. holes 1 1/2 in. deep at these marks. Insert 1/4- x 3/4-in. pins (FF) into holes and set desk-top unit on bases.



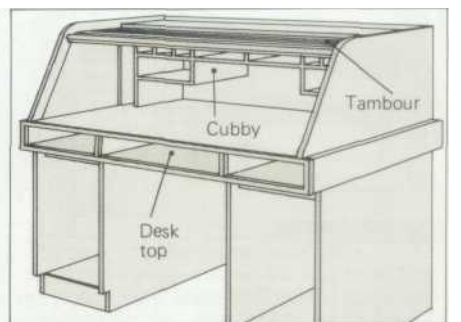
25. Place dowel centers into the holes drilled in the tambour case in Step 6. Lightly position the case on desk top (R). When it is in the proper position, press down firmly on the case so the dowel centers mark the top below



26. Remove the case and the dowel centers. At the marks drill four 1/4-in. holes 1/2 in. deep and insert 3/4-in.-long pins. On a clean surface invert the tambour case and rub a candle stub in the tambour grooves

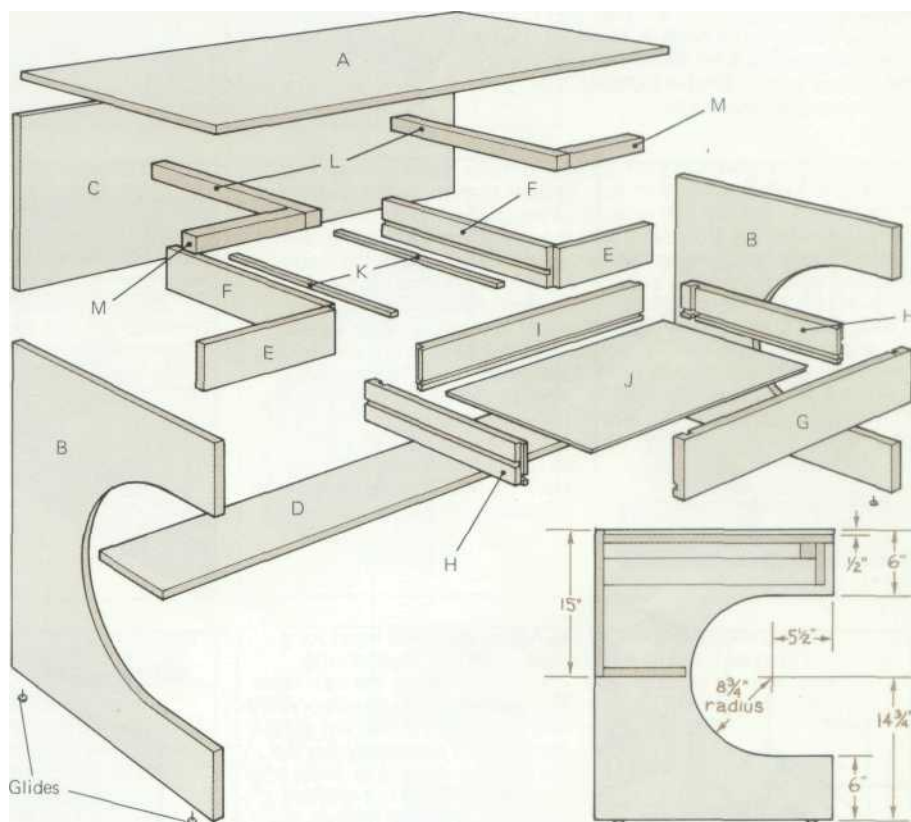


27. Center the cleat (M) on the desk top (R) 2 1/2 in. from the rear edge of the top. Tape or clamp the cleat in place, drill four 7/64-in pilot holes 1 1/2 in. deep, and attach the cleat to the top with No. 10 brass screws.



28. Rub candle wax on tongues of tambour Carefully feed tambour into its case from the front. Lower the case over the pins (FF) in the desk top. Position the cubbyhole unit so that its back touches the cleat (M)

136 PLYWOOD DESK



Simple in design and inexpensive, this plywood desk is made from a single 4-x 8-foot panel. Plywood is available with many hardwood veneers; it can also be covered with plastic laminate, which is well suited for a work surface. Since you have many options for the materials and colors of the desk, you could use one wood veneer or one laminate throughout, mix wood veneers, or mix a wood veneer and plastic

When you cut plywood with a power saw, the better side of the wood must be kept face down so that it does not splinter as the teeth of the saw pass through it. If you use a handsaw, whose teeth cut on the downward stroke, cut the wood with the good side facing up.

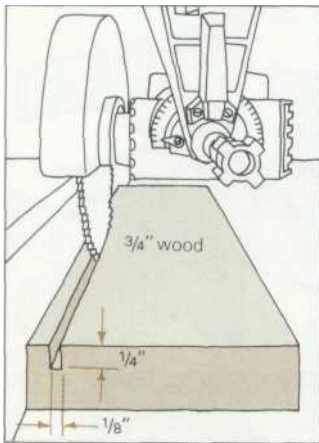
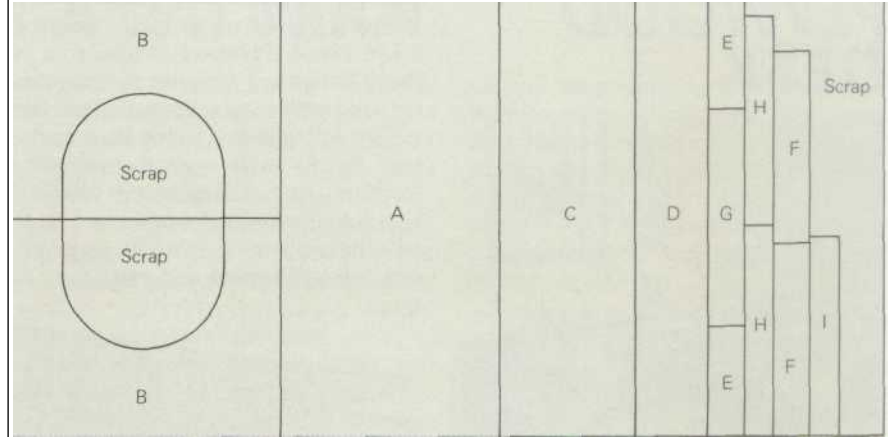
When the desk is completed, cover the exposed edges of the plywood with strips of the same laminate or veneer that covers the faces of the panels.

Parts list						
Part	Name	Quantity	Thickness	Width	Length	Material
A	Top	1	3/4"	23 3/8"	48"	Plywood
B	Side	2	3/4"	23 1/8"	29 1/2"	Plywood
C	Back	1	3/4"	15"	48"	Plywood
D	Shelf	1	3/4"	8"	48"	Plywood
E	Front	2	3/4"	4"	12"	Plywood
F	Drawer support	2	3/4"	4"	21 3/8"	Plywood
G	Drawer front	1	3/4"	4"	23 3/8"	Plywood
H	Drawer side	2	3/4"	3 1/4"	23"	Plywood
I	Drawer back	1	3/4"	3 1/4"	21 3/4"	Plywood
J	Drawer bottom	1	1/8"	21 1/2"	21 3/4"	Masonite
K	Drawer slide	2	1/2"	3/4"	23 3/8"	Maple (or any hardwood)
L	Drawer glue block	2	1 1/2"	1 1/2"	21 3/8"	Maple (or any hardwood)
M	Front glue block	2	1 1/2"	1 1/2"	10 1/4"	Maple (or any hardwood)

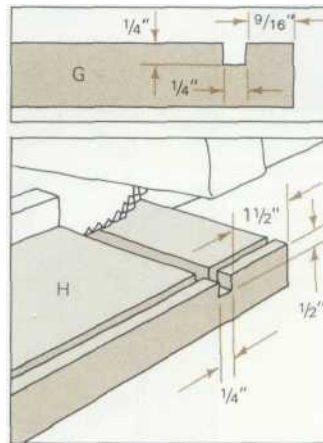
Tools and materials: Radial arm saw with a dado head and a fine-tooth blade Saber saw Electric drill with 2" Screwmate drill bit. Steel tape rule, combination square, pencil. Clamps. Screwdriver, hammer, rubber

roller. Sanding block, No, 100 sandpaper Wood glue, contact cement A candle stub Veneer tape 3/4" wide. Wood (see above) Four nail-in metal or plastic glides Four doz 2" No. 10 flathead wood screws.

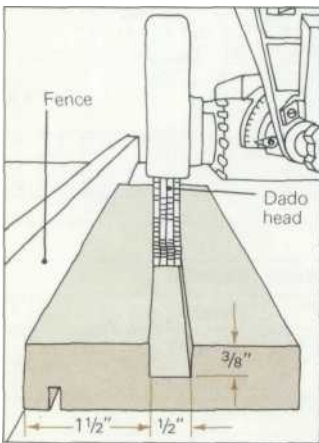
You can cut all plywood pieces required for this project from a standard 4- x 8-ft. panel of 3/4-in. plywood. Use a steel tape rule to measure off the widths of parts A, B, C, D, E, F, H, and I across the plywood panel. Be sure to add the kerf (the thickness of the cut made by your saw blade) to each measurement. Make a short test cut in the upper right-hand corner of the panel and measure its width. (Or measure, mark, and cut one piece at a time, using the dimensions in the chart on page 49, and always cut just outside the pencil line on the plywood.) Use the framing square to draw cutting lines across the plywood. Measure off the lengths of parts B, E, F, G, H, and I, and use the square to mark off their edges. Use a compass, yardstick, or string and nail to draw the circular part of B. Use a saber saw for the curves.



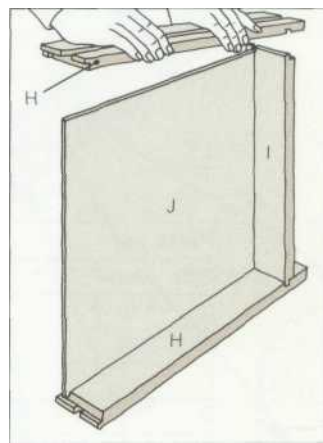
1. To make dado cuts for the drawer bottom on the four sides of the drawer (G, H, and I), fit the radial arm saw with a 1/8-in. dado head. Position the dado head 1/2 in. above the saw table. Cut through a piece of scrap wood 3/4 thick, then measure the cut, it should be 1/8 in. wide and 1/4 in. deep. Make adjustments, if necessary, until part J fits snugly into the cut. Then cut dados along the length of the drawer sides (H), back (I), and front (G) 1/4 in. from the bottom edges of each part.



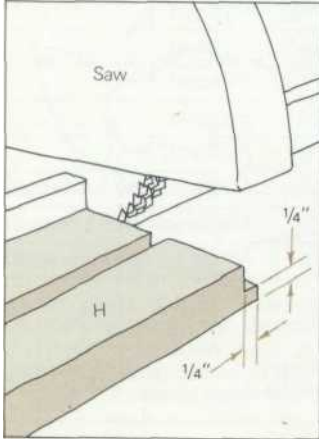
4. Set the dado head to make a 1/4-in.-wide cut and raise it to 1/2 in. above the saw table. Cut through a piece of 3/4-in. scrap wood. If the tongues you made in Step 3 do not fit snugly into this dado, adjust the saw to make a dado that will fit snugly. Then cut two vertical dados on the inner face of the drawer front (G) 9/16 in. from each end. Also cut one vertical dado 1/4 in. wide and 1/2 in. deep on the inner face of each drawer side (H) 1 1/2 in. from the back ends.



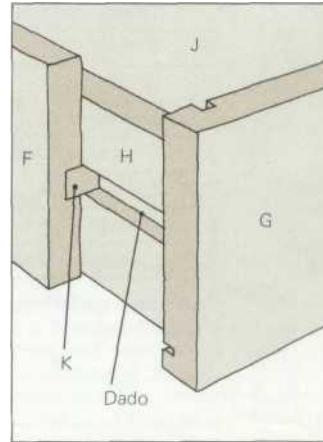
2. Adjust the dado head for a 1/2-in.-wide cut. Position the blade 3/8 in. above the saw table. Cut another piece of scrap wood and measure the cut, adjusting the blade, if necessary, so that the cut is exactly 1/2 in. wide and 3/8 in. deep. Then cut dados along the length of the two drawer sides (H) on the faces opposite the 1/8-in. dados cut in Step 1, positioned 1 1/2 in. from the lower edges. Make identical cuts on the inner faces of the drawer supports (F).



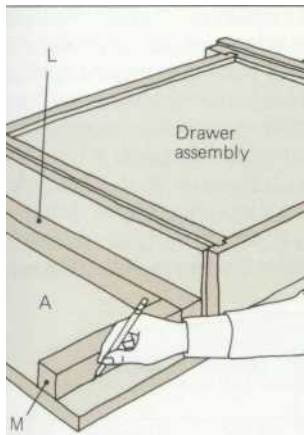
5. To check that the drawer assembly fits snugly, slip together one side and the back and slide in the bottom (J). Then add the other side and the front. If they do not fit snugly, make adjustments before you go any further. Sand dados that are too tight; discard parts that are too loose and cut replacements. When everything fits properly, pull the pieces apart and reassemble them in the same sequence, this time gluing all joints as you go.



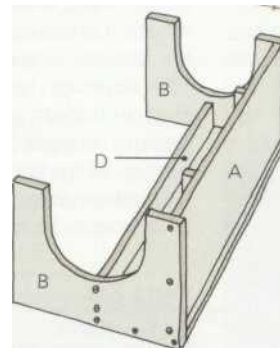
3. Cutting away a section 1/4 in. wide and 1/2 in. deep from the front ends of the drawer sides (H) and both ends of the drawer back (I) will create tongues 1/4 in thick. To do so, lower the dado head to 1/4 in above the table. Make a mark 1/4 in. from each end of I and from the front ends of parts H. Lay each drawer side flat on the table with the 1/8-in. dadoes you have already cut facing down; then cut away the 1/4 in. between your marks and the ends of the parts. Lay the drawer back on the table, its Win. dado facing down, and cut 1/4-in. sections from both ends, making two tongues.



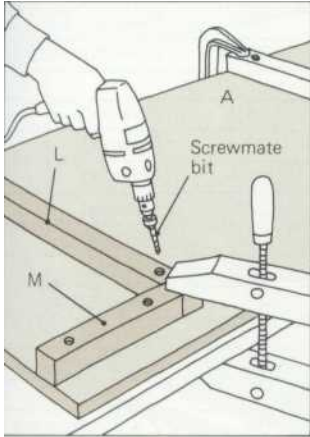
6. Fit the hardwood slides (K) into the dadoes in the drawer supports (F). They should fit snugly. If they are too tight, sand the dadoes. If they are too loose cut new slides. When the slides fit properly, glue them in place. After the glue dries, place the supports beside the drawer to see if the drawer sits well on the slides and can move easily along them; if not, sand down the slides. Rub a candle over the slides and along the dadoes to lubricate them.



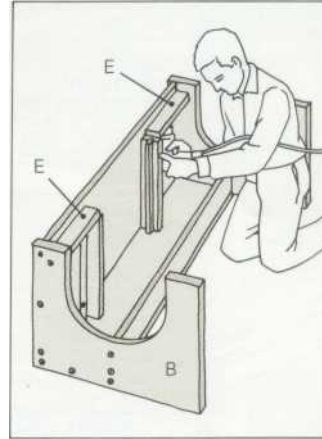
7. Place the desk top (A) upside down. Place the supports and slides into the sides of the drawer, leaving a slight clearance on each side, then position this assembly carefully on the desk top. Place two glue blocks (L) beside the supports, and place the other blocks (M) perpendicular to them. Mark the positions of the four glue blocks carefully on the desk top.



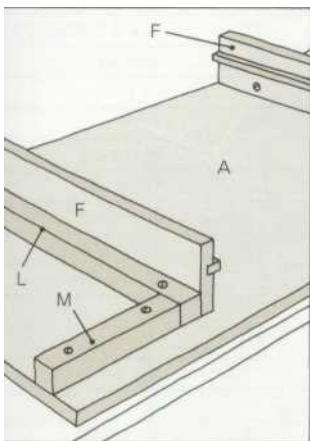
11. Prop the desk top (A) between the sides so that its top surface is vertical and 1/2 in. below the top edges of the back and sides. Drill three holes through each side and into the top, using the Screwmate bit. Attach the top with six screws. Turn the desk upright and drill six more holes through the back of the desk and into the top, and insert screws. Put the shelf (D) in place, its bottom flush with the bottom edge of the back, and attach it to the sides in the same way as the top, using two screws on each end and six along the back.



8. Remove the drawer and supports from the desk top. Align the glue blocks on the marks you just drew. Use a 2-in No 10 Screwmate bit to drill countersink, clearance, and pilot holes through each block and into the desk top. Drill holes for two screws into each glue block about 2 in. from each end.



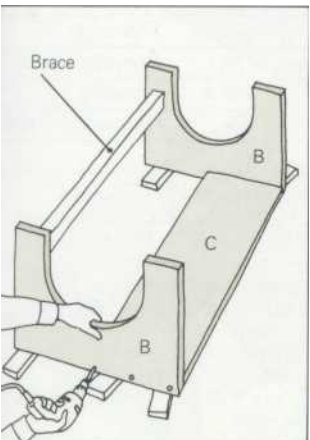
12. Put the fronts (E) in place so that they rest against the glue blocks (M) and the sides (B) of the desk. Use the Screwmate bit to drill a hole through each side into the centers of the edges of the front pieces. Drill one hole through the center of each glue block (M) into each front piece. Place glue on the outside edges of the front pieces and over the faces of the glue blocks. Insert 2-in. screws into pilot holes.



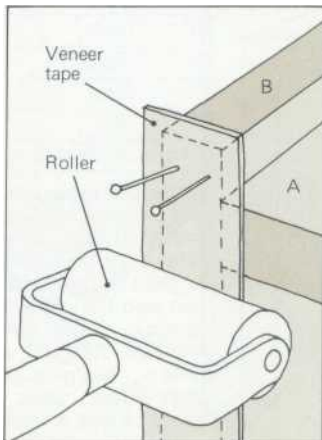
9. Spread glue on the bottom of each block, then screw all four of them to the desk top with 2-in. No. 10 flathead wood screws. Put the drawer supports (F) in place beside the glue blocks. Use the Screwmate bit to drill holes through each drawer support into the glue blocks about 4 in from each end.



13. Turn the desk onto its top, and hammer two glides into the bottom edge of each side (B) about 3 in from the front and back corners.



10. Lay the desk sides (B) on their back edges (so the Us face upward) with the back (C) between them. Align the edges and corners, and prop up the sides so they are perpendicular to the back, then nail a temporary brace between the sides. Drill three holes through each side into the back, using the Screwmate bit. Apply glue to the edges of the back and assemble the parts with 2-in screws. Remove brace.



14. Cover the cut edges of the plywood wherever they are exposed with 3/4-in. veneer tape that matches the faces of the plywood. Measure the exposed edges, cut strips of tape to the proper length, cover them with contact cement, and let cement become tacky. Carefully position the tape and press it in place with a rubber roller. If necessary, sand the tape down to the width of the plywood with No. 100 paper. Be careful not to damage the veneer on the faces of the plywood. Stain and finish the veneer.

137 WADDLING DUCK



Here's a toy that's sure to fascinate children: a duck that waddles across tabletops. It's powered by a 5/8" steel hex nut that acts as a drive weight. Just hang the hex nut over the edge of a table and give the duck a nudge sideways; it will rock from side to side and walk toward the edge of the table.

1. Make full-size templates for the body (A) and legs (B) using the patterns provided. Cut out the shapes and rout or sand all edges.
2. Drill a 1/4"-diameter eye hole and a 1/4"-diameter hole to accommodate the leg pivot (C) in the body where indicated.

3. After cutting the leg pivot to size, drill a 3/32"-diameter hole 3/16" in from each end to accept the drawstrings.

4. Glue the leg pivot in place in the body.

5. Drill a 9/32"-diameter hole in each leg where indicated to accept the leg pivot.

6. Sand the bottom edge of each leg so that it angles 10° up toward the outside.

7. Slide two flat washers and one leg onto each side of the leg pivot.

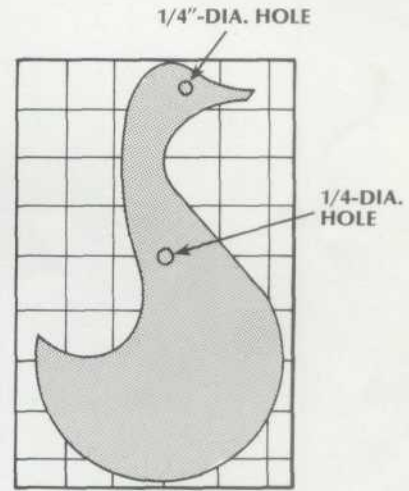
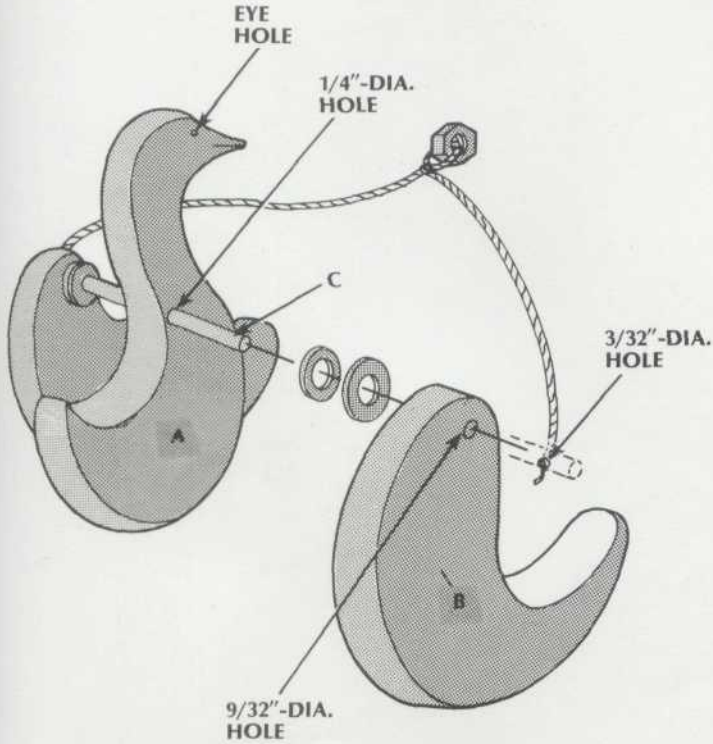
8. Tie a drawstring to each end of the leg pivot, and tie the free ends of both drawstrings to the hex nut.

9. Finish as desired, and the duck will be ready to waddle.

LIST OF MATERIALS

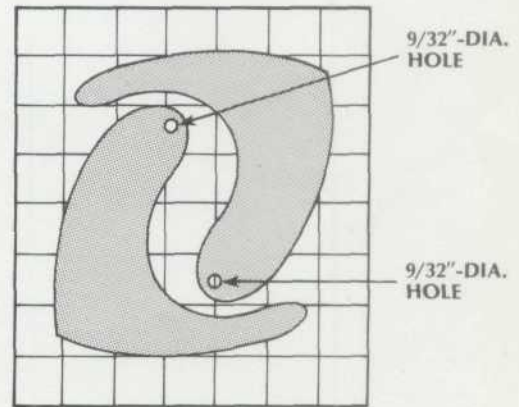
(finished dimensions in inches)

A	Body	$3/4 \times 5 \times 8-1/2$
B	Legs (2)	$1-1/8 \times 4-3/4 \times 5$
C	Leg pivot	$1/4$ dia. \times 4
	Flat washers (4)	
	Drawstring	#18 nylon cord
	Steel hex nut	$5/8$
	Wood glue	



BODY CUTTING
DETAIL

ONE SQUARE = 1"



LEG CUTTING
DETAIL

138

ROCKING HORSE



A rocking horse is one of those toys that never goes out of style. The one shown here is designed for sturdiness as well as stability. The runners are spread far enough apart to prevent a small child from tipping over, and the tail is left mostly connected with the body so it cannot easily be broken off. The horse shown in the photo was made from 5/4 Philippine mahogany stepping material, except for the handle, which was formed from a hardwood dowel. Substitute other woods if you like, but always use quality material for a toy that can be passed along in your family for generations to come.

1. Use the pattern provided to make a template for cutting out the horse's body (A). Tape or glue the pattern to a 23" length of 5/4x12 stock, then cut out the profile with a bandsaw or saber saw.

2. While the pattern is still attached to the body, bore a starter hole for the teardrop opening in the tail area, then use a saber saw to complete the cut. Also, mark and drill a 1/2"-diameter hole through the head for insertion of the handle (F) and two pairs of holes of the same

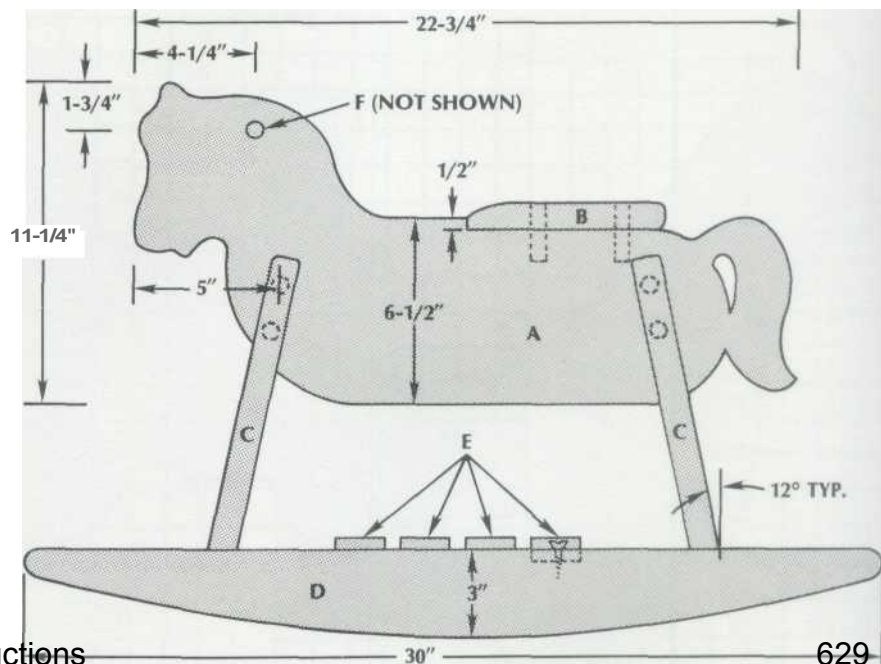
size in the areas where you want to attach the legs (C). 3. Since exact duplicates are needed for the four legs, it is a good idea to make the leg tem-

plate out of cardboard. With careful arrangement you should be able to lay out all four legs on an 18" length of 5/4 x 12 stock. Cut out the legs with a bandsaw or saber saw.

NOTE: The edge of the notch at the bottom of each leg must be angled 12° off square so that all four legs will slope in toward the horse's middle. If you prefer, cut out the legs without notches first, then figure out the notches during assembly. The length of the notches is not critical, so long as they are the same on all four legs and the tips of the legs remain above the bottom of the runners after assembly.

4. Lay out the two runners (D) on one side of a 31" length of 5/4 x 12 stock. Set them closely together so that enough width remains on the board for cutting out the seat. Use a bandsaw or saber saw to cut out the runners.

5. Lay out the seat (B) on one end of the board from which the runners were taken. Cut out the seat



with a bandsaw or saber saw, then use a drawknife or other appropriate tool to slope its front so that it ends up only about 9/16" thick at the point where it will join the middle of the horse's back.

6. Rip and crosscut the remainder of the 31"-long board into the four runner spacer slats (E). Then sand all the pieces cut thus far and round over their sharp edges.

7. Begin the assembly by drilling holes in the legs for fastening them to the body. Hold a leg in place and drill through the holes already in the body into that leg. Then remove the leg and repeat the procedure with the leg that fits on the opposite side of the horse.

8. Once all four legs are properly drilled, fasten them to the horse using glue and 1/2"-diameter dowels. Be sure to check the relationship of the dowel length and hole depths before gluing.

9. Once the legs are in place, fit the runners beneath them. Fasten the legs to the runners using glue and #8x1-1/4" flathead wood screws. Counterbore the screws.

10. Measure the distance between runners, then rabbet the ends of all the runner spacer slats so that they fit snugly into that space. The depth of the rabbets is a matter of taste; just make sure all are cut the same. Center the entire group of slats between the legs and space them about 1/2" apart.

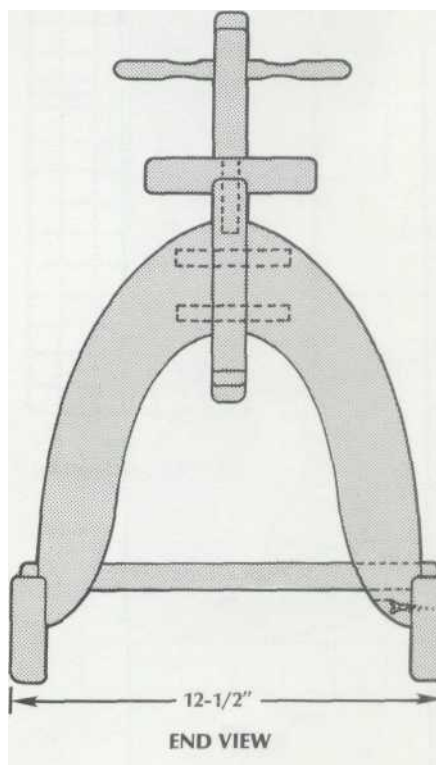
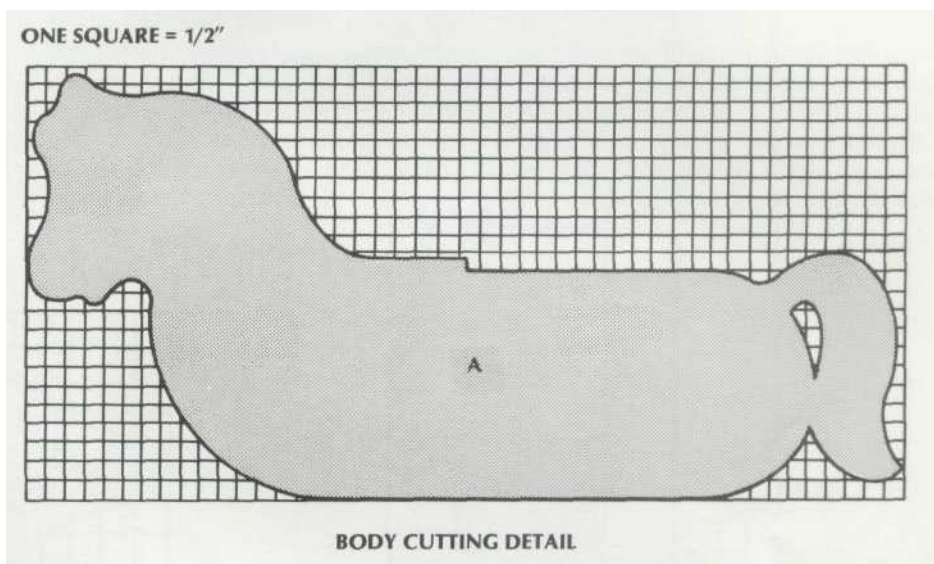
11. Fasten the slats to the runners using glue and #8 x 1-1/4" flathead wood screws. Counterbore the screws slightly below the surface.

12. Lay out and drill parallel 1/2"-diameter holes in the seat and in the horse's back. Fasten the seat in place using glue and 1/2"-diameter dowels.

13. Cut a piece of 1/2"-diameter dowel 7" in length and run it through the hole in the horse's head. Center the dowel, then secure it in place by driving a screw

down through the head into the dowel. Use a wood rasp and sandpaper to shape the dowel into a form comfortable for small hands.

14. If you wish, fill the counter-bored screw holes with wood plugs or putty. Give the horse a final touchup sanding and apply the nontoxic finish of your choice.

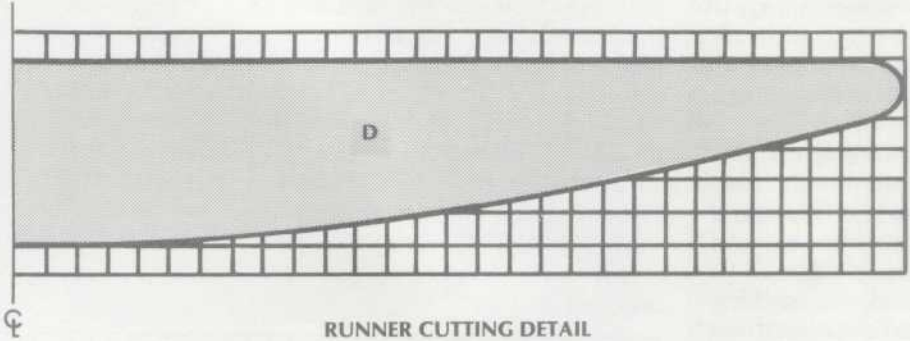


LIST OF MATERIALS

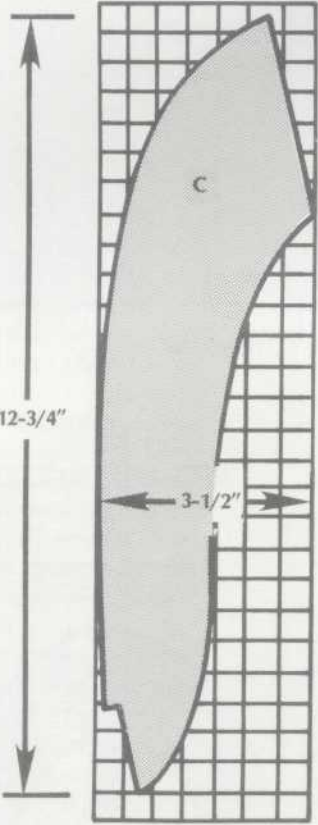
(finished dimensions in inches)

A	Body	1-1/8 x 11-1/4 x 22-3/4
B	Seat	1-1/8 x 5 x 6-7/8
C	Legs (4)	1-1/8 x 3-1/2 x 12-3/4
D	Runners (2)	1-1/8 x 3 x 30
E	Spacer slats (4)	1-1/8 x 1-3/4 x 12
F	Handle	1/2 dia. x 7
	Dowels (4)	1/2 dia. x 5
	Flathead wood screws	#8 x 1-1/4
	Wood glue	

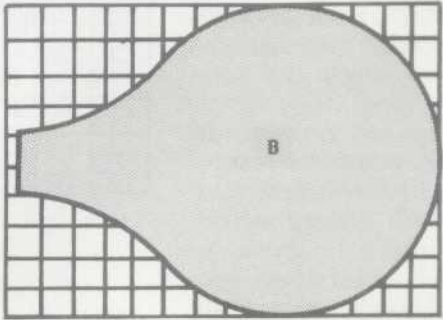
ONE SQUARE = 1/2"



RUNNER CUTTING DETAIL



LEG CUTTING DETAIL

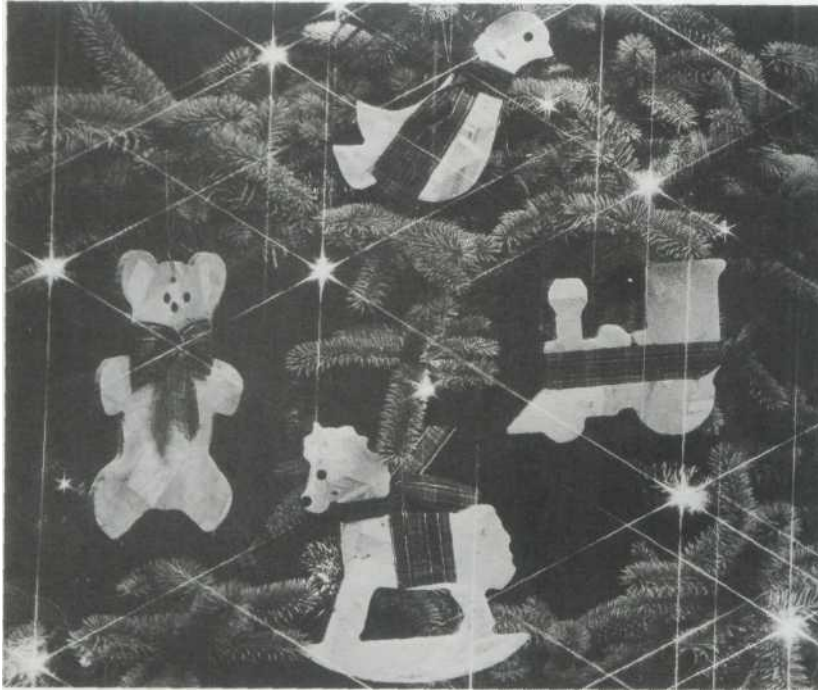


SEAT CUTTING DETAIL

ONE SQUARE = 1/2"

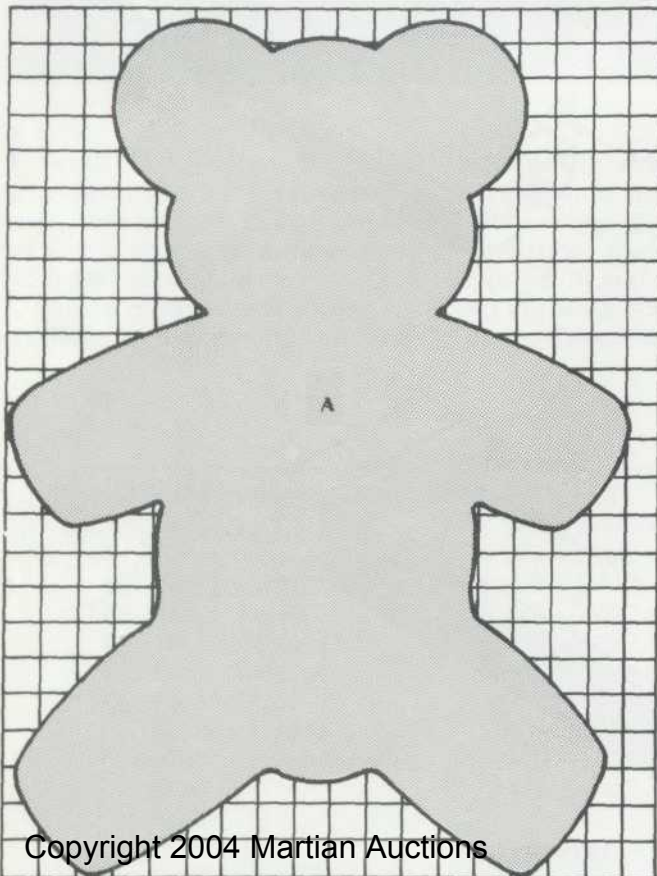
139

CHRISTMAS ORNAMENTS



Nothing adds to the beauty and wonder of the family Christmas tree quite like homemade ornaments. These eye-catching figurines can be made easily from 1/2" wood on a bandsaw or jigsaw. Your children are sure to want them all: the bear (A), dove (B), hobbyhorse (C), and train (D).

1. Make a template of the figurines using the patterns provided.
2. Cut out the shapes on a band saw or jigsaw, then use a disc sander or belt sander to sand all of the outside surfaces.
3. Finish the figurines as desired, or leave them unfinished for a more rustic look. Add ribbon as shown for a final touch.



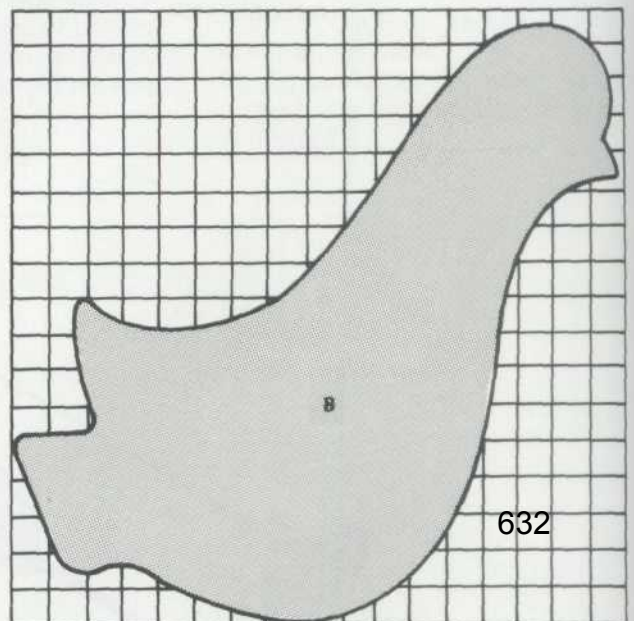
Copyright 2004 Martian Auctions

LIST OF MATERIALS

(finished dimensions in inches)

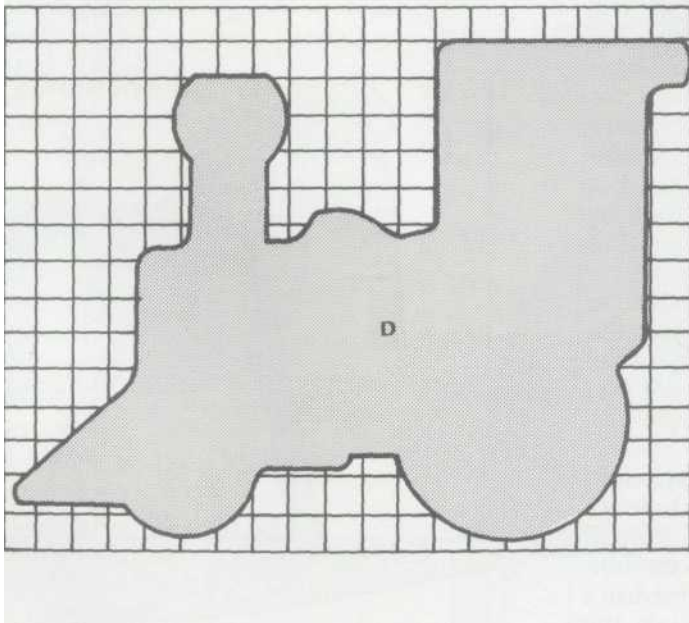
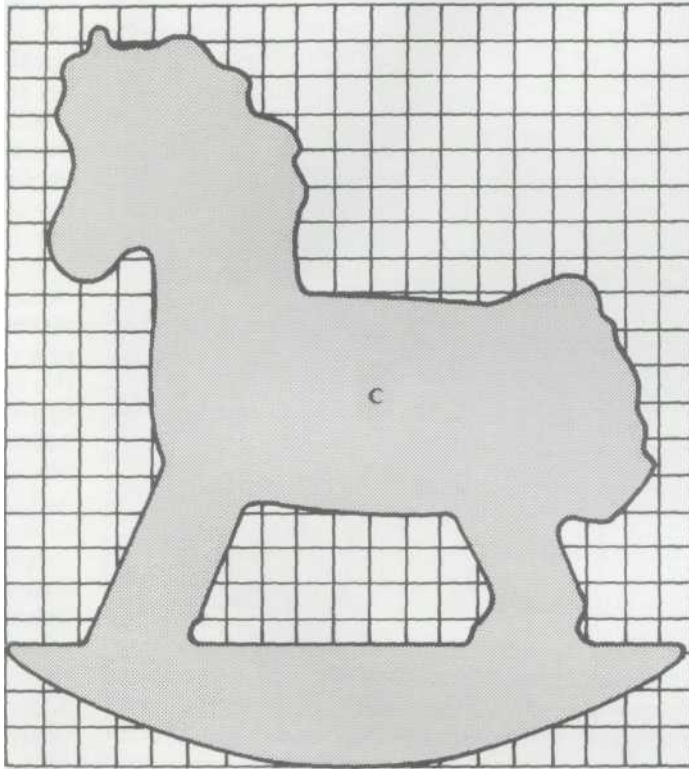
A	Bear	1/2 × 3-1/4 × 4-1/2
B	Dove	1/2 × 3-1/8 × 3-1/8
C	Hobbyhorse	1/2 × 3-1/2 × 2-7/8

ONE SQUARE = 3/16"



632

ONE SQUARE = 3/16"



140

CHILD'S EASEL

Here's a project guaranteed to provide hours of fun for your children: a lightweight, collapsible easel with a dent-free surface made from 1/4" hardboard. 1. Cut all of the pieces to size according to the dimensions pro-

vided. Cut a dado 3/8" deep and 2-1/2" wide approximately 12-1/2" from the bottom of each leg (A). 2. Rabbet the ends of the crosspieces (B) and the tops of the legs to the same dimensions as the dado cuts made in the previous step.

3. Glue and clamp the legs and crosspieces together.

4. Cut one end of each tray side (D) at a 10° angle; the other end is mitered 45° as shown. The tray fronts (C) are mitered 45° on each end.

5. Cut a groove 3/8" deep and 1/4" wide 3/8" above the bottom of the tray fronts and sides.

6. With the tray bottoms (E) in place, construct the trays using glue and 1-1/4" brads. Attach two glue blocks (F) to each tray with a slight setback to hold the trays snug when screwed to the frame.

7. Connect the two easel frames with a piano hinge and folding leg braces. Position the braces to allow the easel to open wide enough to prevent it from tipping over.

8. Fasten the faces (G) to the easel frames using glue and #8 flathead wood screws, making their top edges flush. Drill three evenly spaced 1/4"-diameter holes through each face and into the top crosspiece on each side. In each hole, glue a 1/4"-diameter dowel that has been tapered to a dull point.

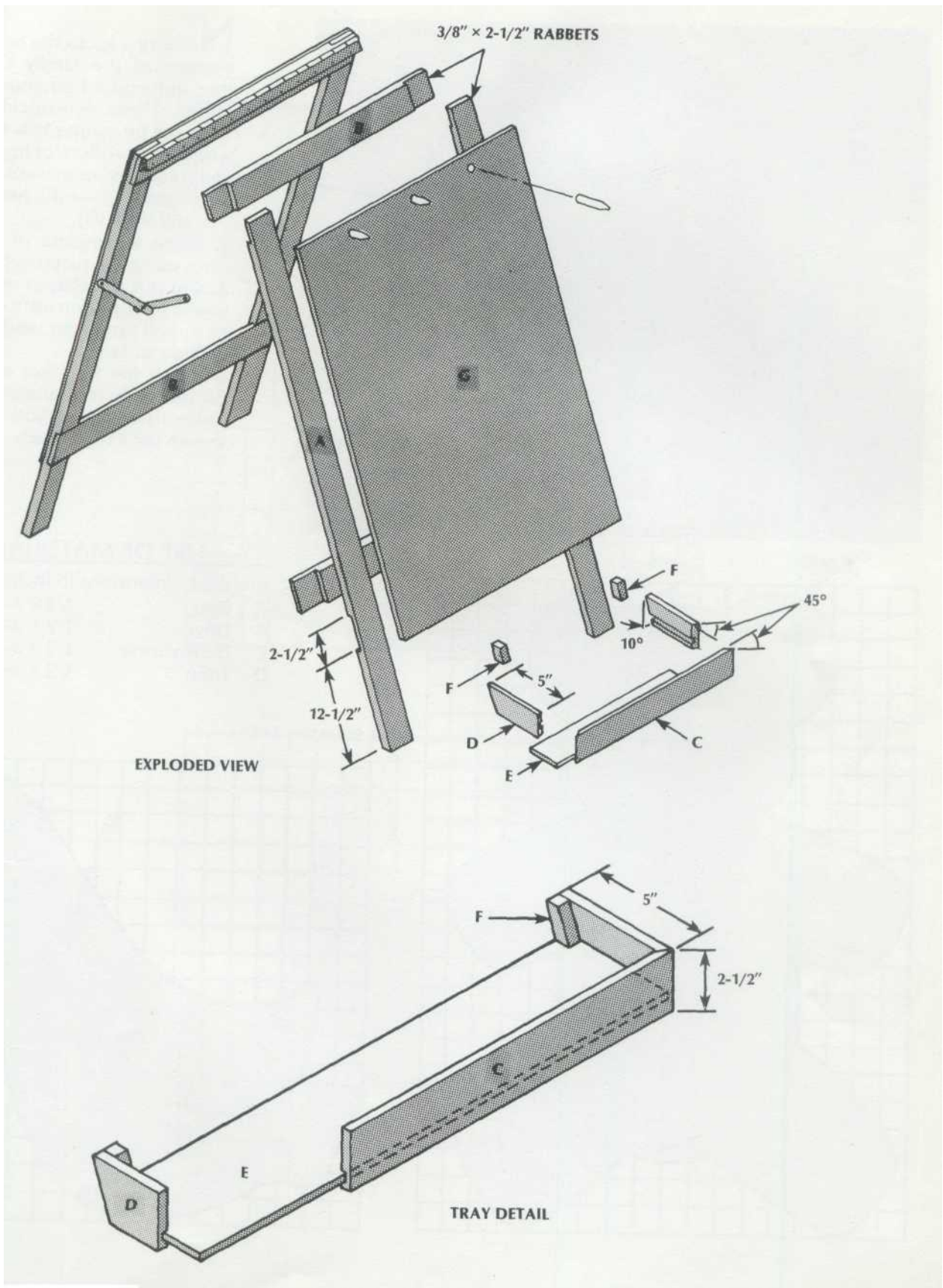
9. Fasten the trays to the easel faces using glue and #10 flathead wood screws. Center the trays across the width of the faces and make their lower edges flush.

10. To complete the easel, fill all screw holes with putty, and finish as desired.

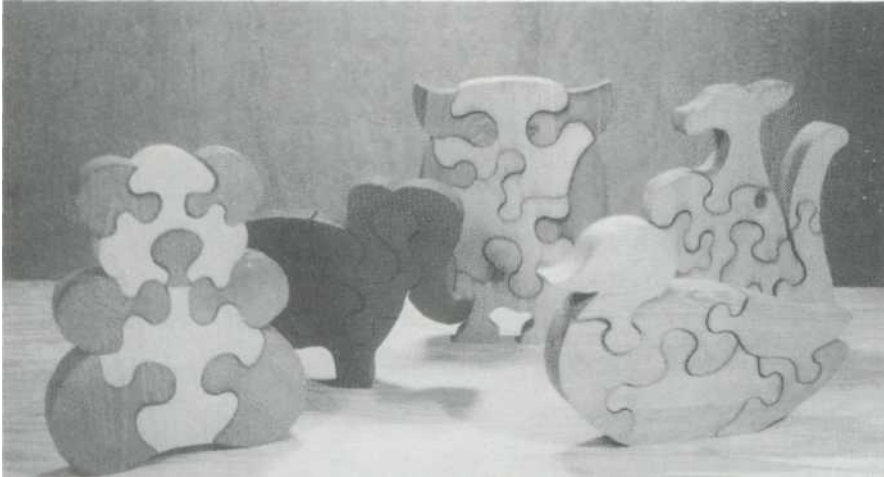
LIST OF MATERIALS

(finished dimensions in inches)

A	Legs (4)	3/4 × 2-1/2 × 60
B	Crosspieces (4)	3/4 × 2-1/2 × 30
C	Tray fronts (2)	3/4 × 2-1/2 × 22
D	Tray sides (4)	3/4 × 2-1/2 × 5
E	Tray bottoms (2)	1/4 × 4-1/2 × 21-1/4
F	Glue blocks (4)	3/4 × 3/4 × 2
G	Faces (2)	1/4 × 30 × 47-1/2
	Flathead wood screws	#8 × 1
	Flathead wood screws	#10 × 1-1/4
	Dowels	1/4 dia. × 2-1/2
	Brads	
	Piano hinge	
	Folding leg braces (2)	
	Wood glue	



141 PUZZLES



Puzzles have always fascinated children and adults alike. Here are five fun animal puzzles you can make on a bandsaw or jigsaw: a bear (A), owl (B), duck (C), elephant (D), and kangaroo (E).

1. Make two templates of each puzzle design—one template for the outside shape and one for the inside individual pieces. Use 1-1/2"-thick stock or two pieces of 3/4" stock face-laminated together, cutting the pieces 1/4" wider and 1/4" longer than the dimensions called for.

2. Trace the outside and inside patterns on the workpieces. On a bandsaw or jigsaw, cut the outside shape first, then cut the individual pieces apart.

3. Using a disc sander or belt sander, sand all of the outside surfaces of the puzzle pieces.

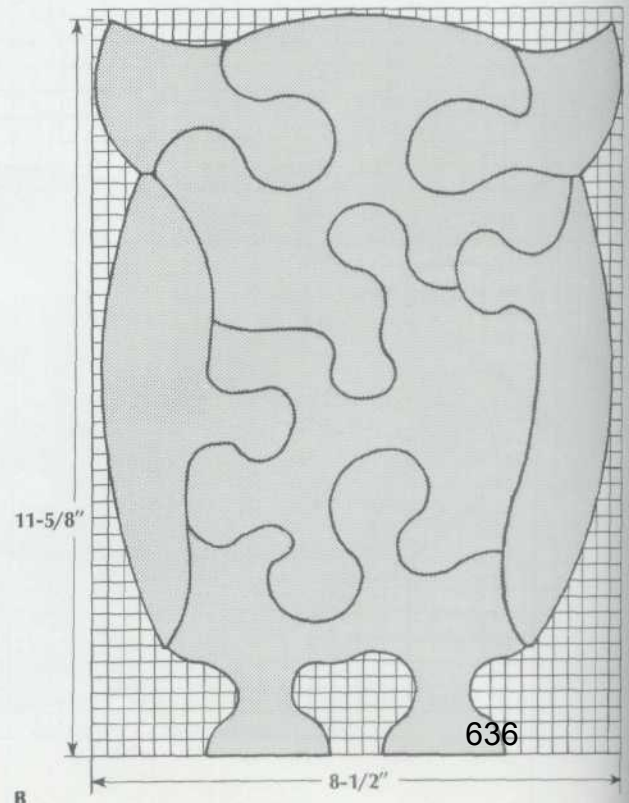
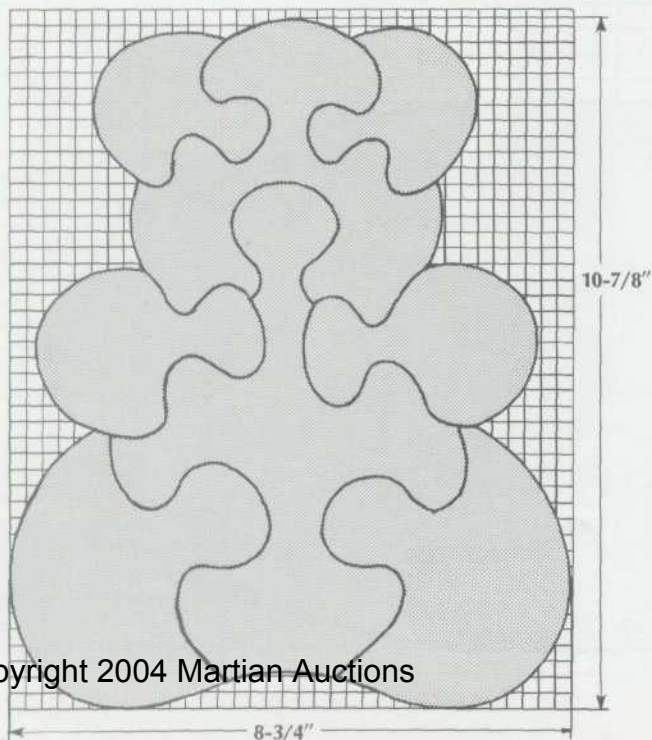
4. If desired, use a nontoxic stain, such as food coloring, to highlight certain parts of the puzzles or to create contrasts between parts.

LIST OF MATERIALS

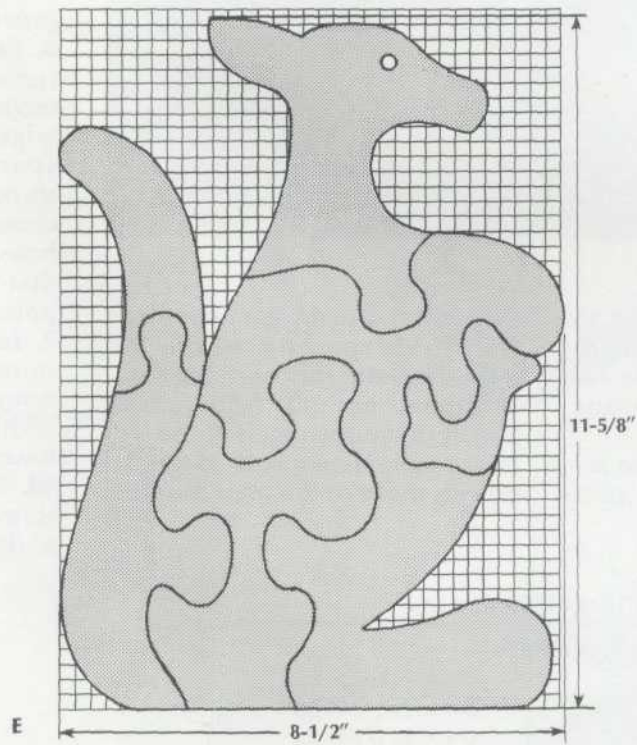
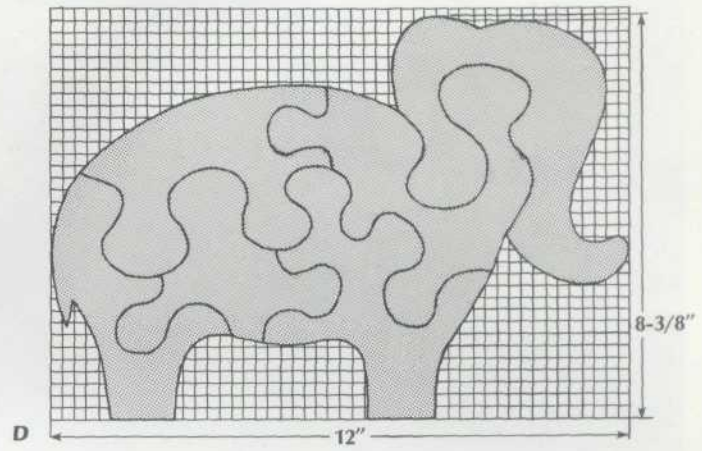
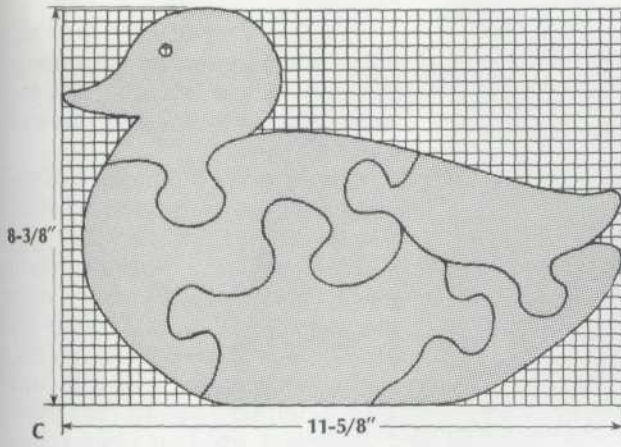
(finished dimensions in inches)

A Bear	1-1/2 × 8-3/4 × 10-7/8
B Owl	1-1/2 × 8-1/2 × 11-5/8
C Duck	1-1/2 × 11-5/8 × 8-3/8
D Elephant	1-1/2 × 12 × 8-3/8
E Kangaroo	1-1/2 × 8-1/2 × 11-5/8

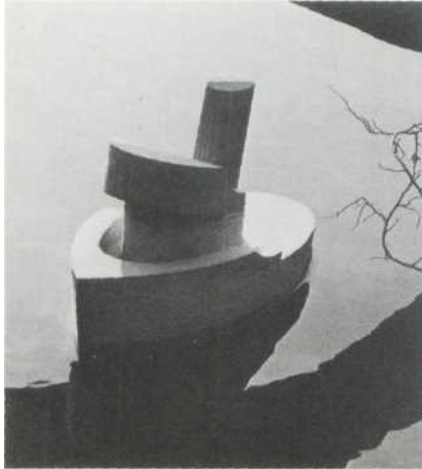
ONE SQUARE = 1/4"



ONE SQUARE = 1/4"



142 TUGBOAT



This sturdy tugboat floats on water, so a child can enjoy it in the bathtub or swimming pool. The all-wood design makes it safe to play with, and it can be built in no time

at all. Be sure to use waterproof glue when assembling.

1. Cut blanks for the thicker pieces from 3/4" stock face-laminated with water-resistant glue. Cut all pieces to the listed dimensions.

2. Cut out the shapes on a band saw using the patterns provided. When cutting the hull (A), set the bandsaw table at a 10° tilt; this will reduce the sanding needed to shape the contour.

3. Turn the smokestack (E) round on a lathe, then remove stock by sanding or rasping from both sides of the cylinder to make it oval-shaped. Angle the top of the smokestack and the deck house (C) at 10°.

4. Use a belt sander with a sanding drum to make the inside concave curves on the railing (B) and pilot house (D). Shape the hull with

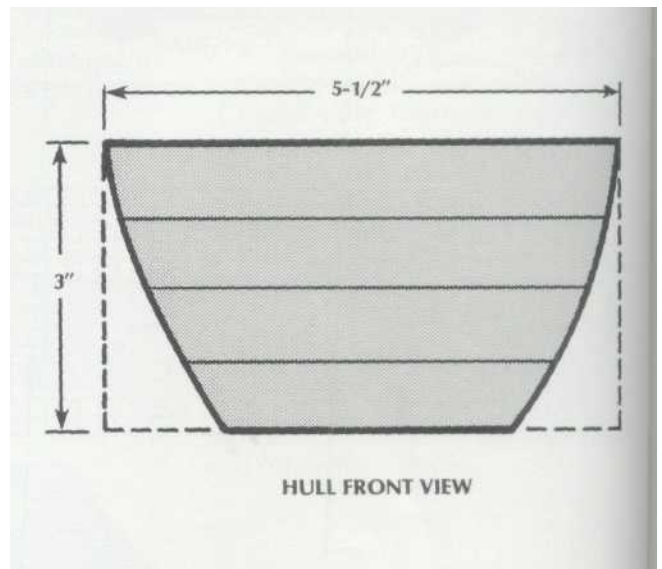
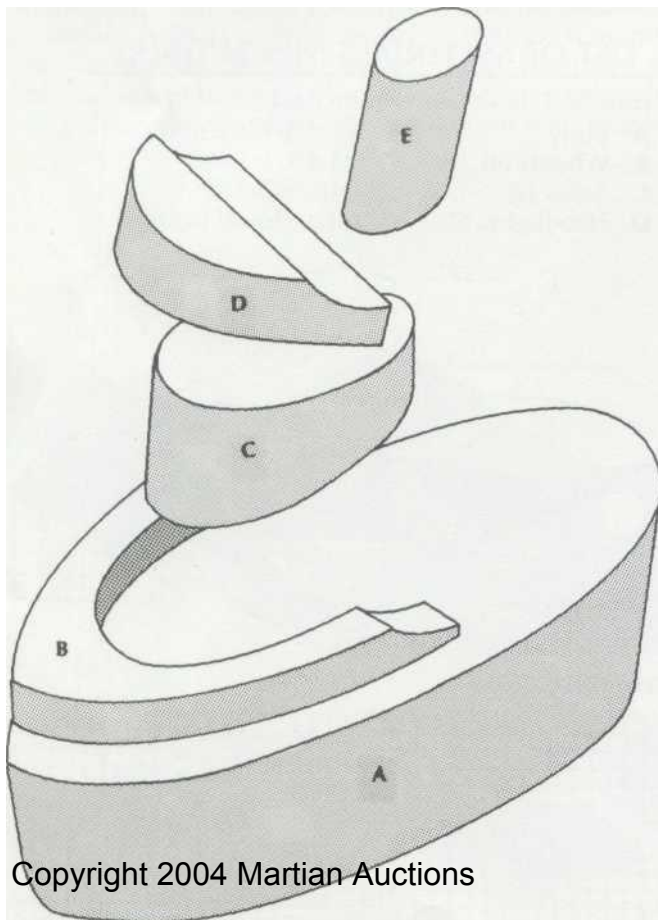
a convex curve as the sides taper in toward the keel, gradually at first and then sharply toward the bottom.

5. Rough sand all the pieces with coarse sandpaper, then repeat with gradually finer grits. If using a belt sander, always keep the workpiece moving to eliminate any large flat spots in the contour.

6. Before final assembly, test the tugboat to make sure it floats evenly. Attach the railing to the hull and carefully set them in the water. Move the pilot house, deck house, and smokestack into a position that enables the tugboat to float up right and level.

7. Mark the exact position of the parts, then assemble using water proof glue and clamps. Dowels can also be used for added strength.

8. Finish as desired.

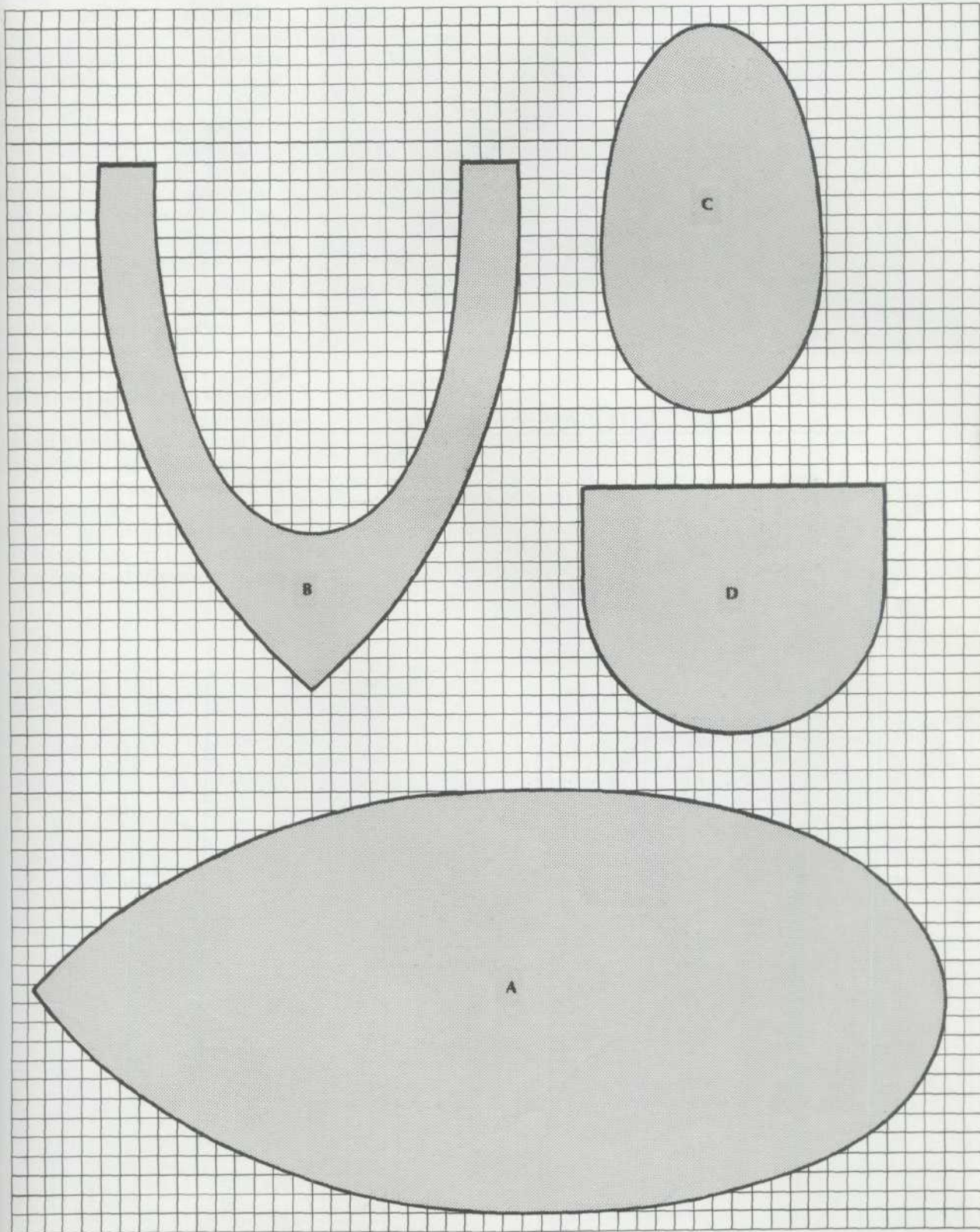


LIST OF MATERIALS

(finished dimensions in inches)

A	Hull	3 × 5-1/2 × 12
B	Railing	3/4 × 5-1/2 × 7
C	Deck house	2-1/4 × 3 × 5
D	Pilot house	1-1/2 × 4 × 3-1/4
E	Smokestack	1-1/2 × 1-1/2 × 4
	Water-resistant wood glue	

ONE SQUARE = 1/4"

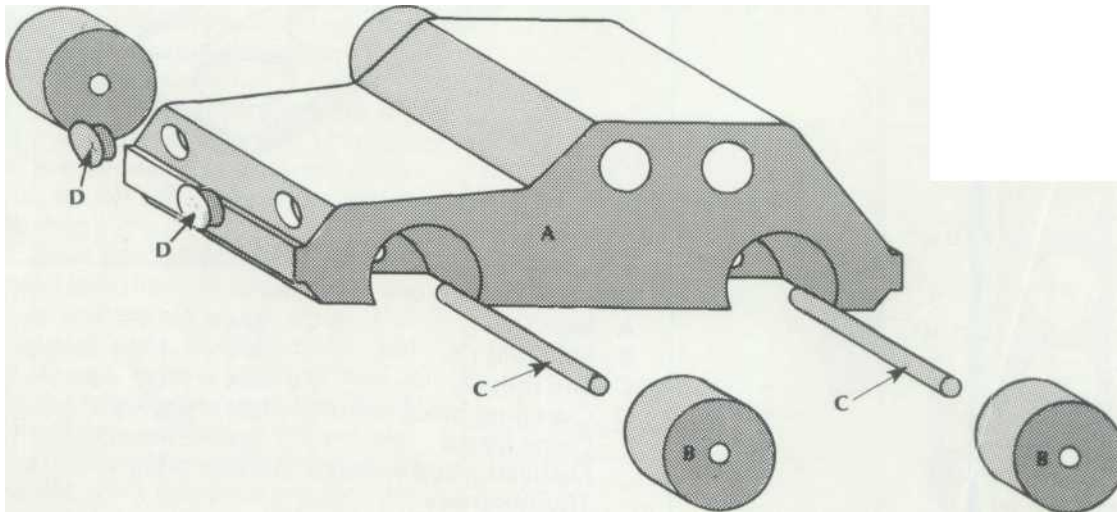


143

TOY CARS

Remember how those toy cars you played with as a child never wore out? Now you can make those sturdy, all-wood toys again by following these simple plans. While

specific features vary, each of these toy cars is made in the same fashion. Naturally, you might want to experiment with the designs to suit your own tastes.



1. Make a cardboard template of the car design. Trace the pattern on a 4 x 4.
2. Cut the desired car body shape (A) with a bandsaw.
3. Drill the various holes for the windows, wheel wells, headlights, and axles. Use a Forstner bit to cut the wheel wells.
4. Using a hole saw, cut four wheels (B) to the dimensions given out of 3/4" scrap stock. The hole saw will simultaneously cut the outside contour and mark the axle hole of the wheel. Drill the 1/4"-diameter axle holes. As an alternative, the wheels can also be turned on your lathe. Drill a 1/4"-diameter axle hole through the middle of the block before turning, then turn the cylinder and cut it into wheels.
5. Before assembling the car, power sand and file each of the individual pieces.
6. Finish sand the pieces with a fine sandpaper (100 grit or finer).
7. To assemble the car, rub paraffin on the middle part of the axles (C) and slide them through the holes in the car body. Glue the wheels to the axle ends. Finally, glue the 1/2"-diameter dowel buttons into the headlight holes.
8. Check to make sure that the wheels and headlights cannot be removed by a child, then give the car a nontoxic finish.

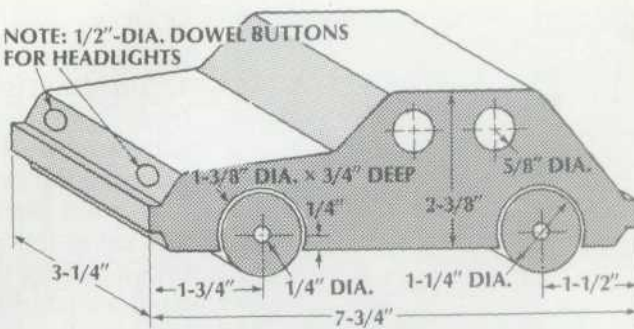
In the future use these guidelines and your imagination to design vans, buses, taxis, fire engines, and other toy vehicles.

LIST OF MATERIALS (Sedan)

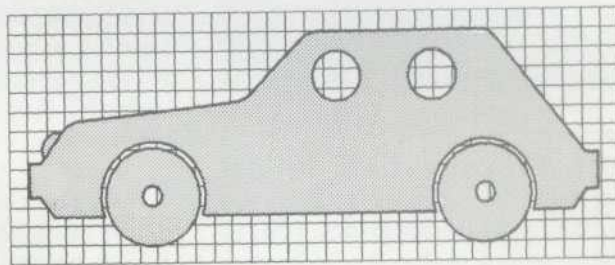
(finished dimensions in inches)

- A Body 2-3/8 × 3-1/4 × 7-3/4
- B Wheels (4) 1/4 dia. × 3/4
- C Axles (2) 1/4 dia. × 3-1/4
- D Headlights (2) 1/2-dia. dowel buttons

NOTE: 1/2"-DIA. DOWEL BUTTONS FOR HEADLIGHTS

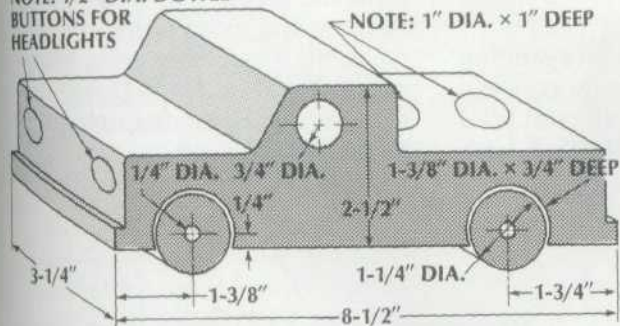


ONE SQUARE = 1/4"

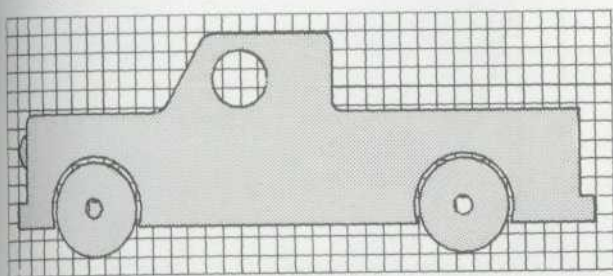


NOTE: 1/2"-DIA. DOWEL BUTTONS FOR HEADLIGHTS

NOTE: 1" DIA. × 1" DEEP



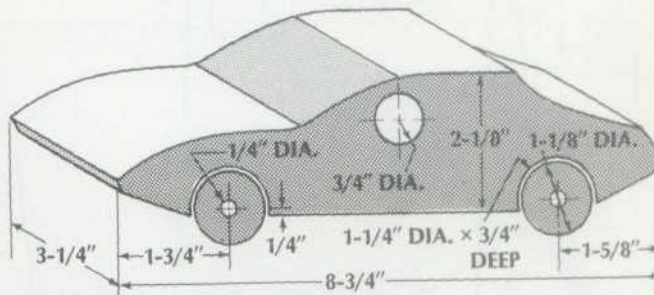
ONE SQUARE = 1/4"



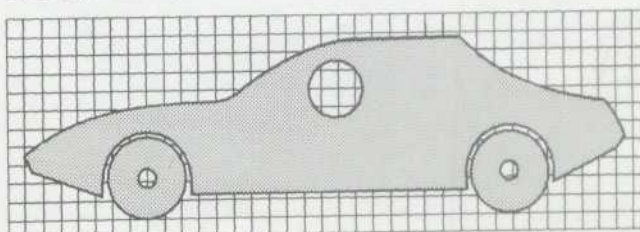
LIST OF MATERIALS (Pickup Truck)

(finished dimensions in inches)

- A Body 2-1/2 × 3-1/4 × 8-1/2
- B Wheels (4) 1-1/4 dia. × 3/4
- C Axles (2) 1/4 dia. × 3-1/4
- D Headlights (2) 1/2-dia. dowel buttons



ONE SQUARE = 1/4"



LIST OF MATERIALS (Sports Car)

(finished dimensions in inches)

- A Body 2-1/8 × 3-1/4 × 8-3/4
- B Wheels (4) 1-1/8 dia. × 3/4
- C Axles (2) 1/4 dia. × 3-1/4

144

COFFEE TABLE

This coffee table can be built from clear grade redwood and features a tongue-and-groove board top. Feel free to use another variety of wood, either stained or left natural color.

1. Cut all of the pieces to size using the dimensions given.

2. Construct the inner legs (D, E) then connect them in two pairs by fastening a top support (H) to the backs of the wide inner leg pieces. The upper edge of the top supports should be flush with the top of the inner legs.

3. Fasten the outer legs (B, C) to the inner legs. To achieve a good corner joint, place a square block inside the inner legs and use band clamps to hold the assembly while it dries.

4. Set the side frame pieces (F) on the outer legs, their ends flush with the corner on the outer legs. Glue and nail in place, then fasten the end frame pieces (G) in position.

5. Rip one top piece (A) down the middle. Set the tongue section on the table and push its ripped edge against the side frame. Then fit the other three uncut pieces in place. Trim the ripped edge of the remaining piece as needed to fit it in and complete the top.

6. Make sure the outer pieces of the top are flush with the top of the side frames, then drive a few finishing nails through the frames into those top pieces. Also, drive nails through the ends of the top pieces into the top supports.

7. Turn the table over on its top. Fit the two cross braces (J) in place, then drive a couple of finishing nails through the side frames into the ends of each brace. Install glue blocks or metal corner bracing between the cross braces and the side frames.

8. Turn the table right side up and drive a pair of finishing nails through each full top piece, then drive one through each narrow piece into the brace.

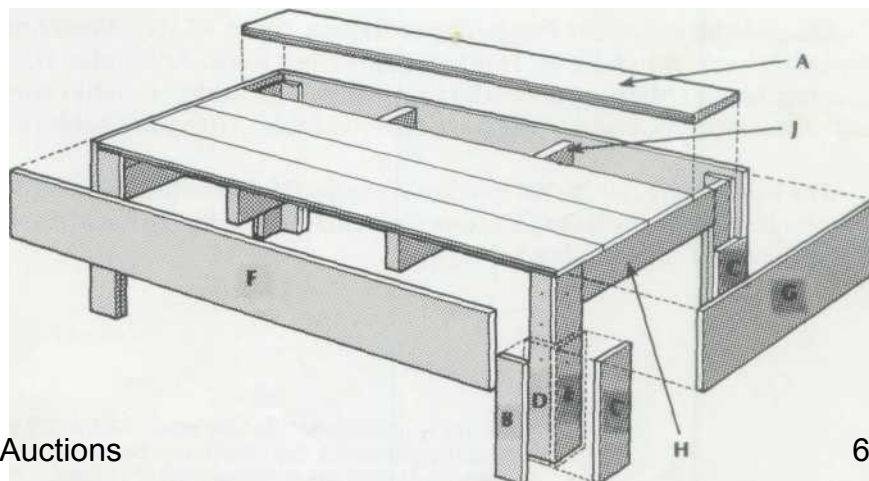
9. Set all nails, fill the holes with putty, sand, and finish the table as desired.



LIST OF MATERIALS

(finished dimensions in inches)

A	Top pieces (4)	3/4 × 5-1/2 × 52-1/2 (tongue and groove)
B	Outer leg pieces (4)	3/4 × 3-1/2 × 12-1/2
C	Outer leg pieces (4)	3/4 × 2-1/2 × 12-1/2
D	Inner leg pieces (4)	3/4 × 2-1/2 × 17-1/4
E	Inner leg pieces (4)	3/4 × 1-1/2 × 17-1/4
F	Side frame pieces (2)	3/4 × 5-1/2 × 54
G	End frame pieces (2)	3/4 × 5-1/2 × 20-3/4
H	Top supports (2)	3/4 × 3-1/2 × 19-1/4
J	Cross braces (2)	1-1/2 × 3-1/2 × 20-3/4
	Wood screws	#8 × 1-1/4
	4d finishing nails	
	Glue blocks or metal corner bracing	
	Wood glue	



145

CHILD'S CRADLE

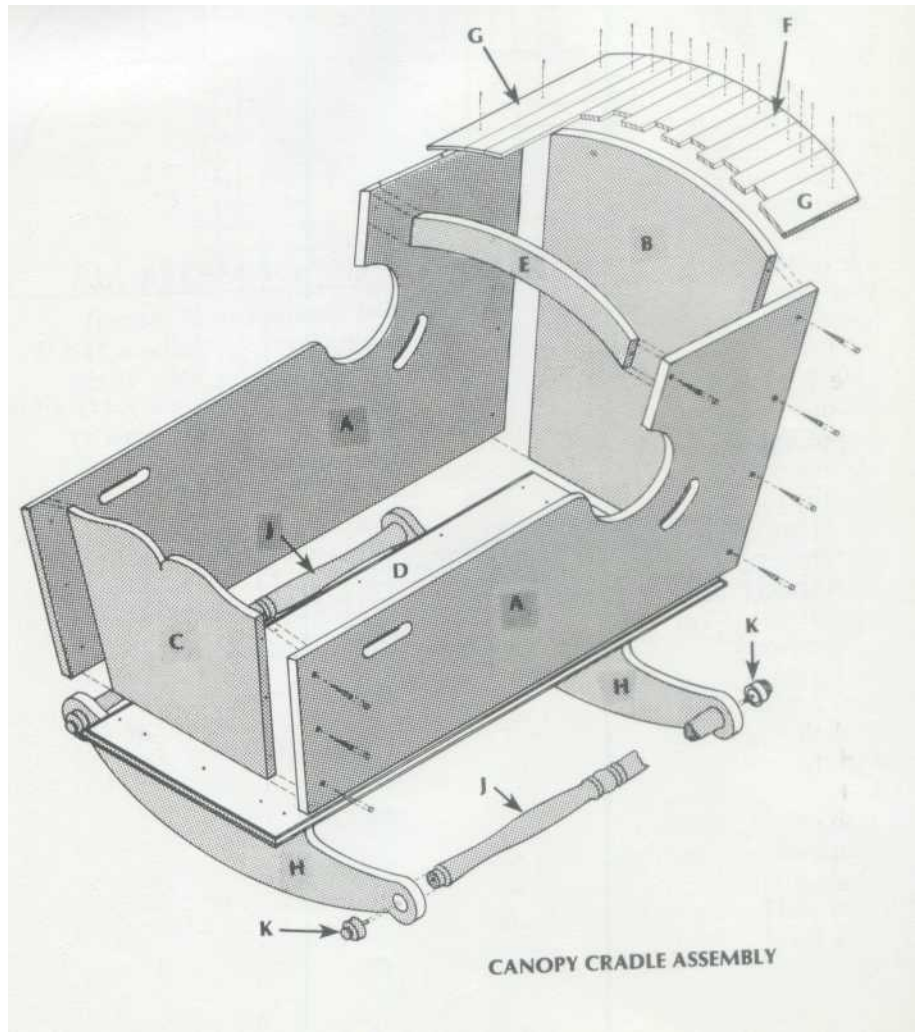
You'll love this old-fashioned cradle as much as your ancestors did. The lightly arched canopy protects a baby's sensitive eyes from harsh light. The convenient treadle bars allow you to rock the cradle with one foot while reading or knitting. In short, it's the perfect way to rock your child to sleep.

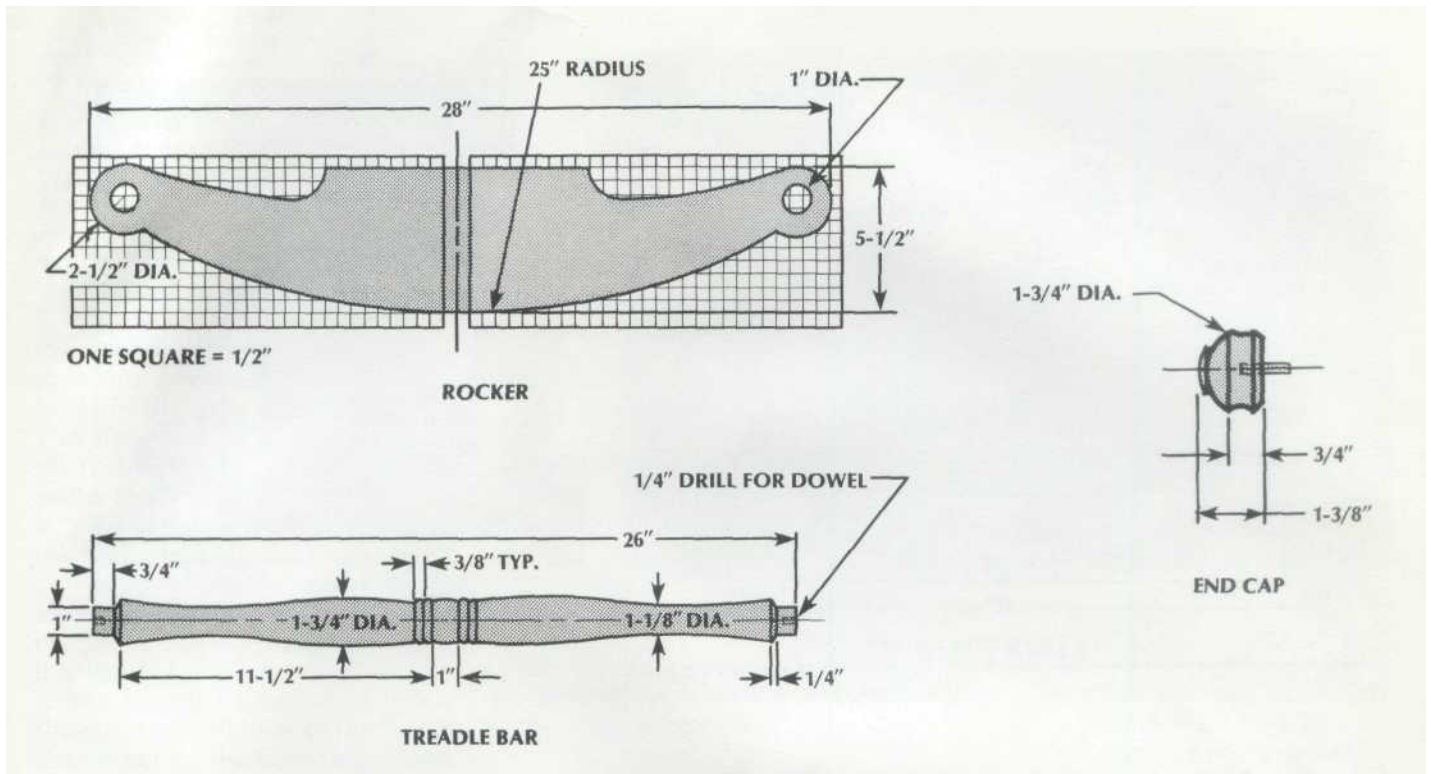
1. Use the patterns provided to cut the shapes of the sides (A), headboard (B), and footboard (C) to the dimensions provided. Cut the angle ends and bevel edges as shown.
2. Cut the handles in the sides, and shape the top edge of each piece as shown.
3. Shape the edge of the base (D) to the profile of your choice; the pattern shown is a radius bead. To minimize splintering, shape the ends of the base first, then do the sides.
4. Sand all of the pieces smooth. A drum sander will be necessary to sand the curve in the sides and the pattern cut in the footboard.
5. Assemble the sides to the headboard and footboard with glue and counterbored #8 x 1-1/2" flathead wood screws. Transfer the pattern to the canopy support (E) stock.

Hold it up to the assembled sides to mark the angles on the ends. Span the canopy support between the sides and secure it in place with glue and screws.

6. Attach the base to the bottom edge of the sides, headboard, and footboard with glue and counterbored screws from underneath.
7. Cut the canopy pieces (F, G) to size. While cutting to width, rip a 2° bevel on both edges of the center pieces and on the inner edge of each edge piece so the pieces form an arc as shown.

8. Starting in the center and working toward the ends, attach the canopy pieces with brads. When finished, sand the top for a smooth, rounded contour.
9. Cut two pieces of stock to 1-3/4"





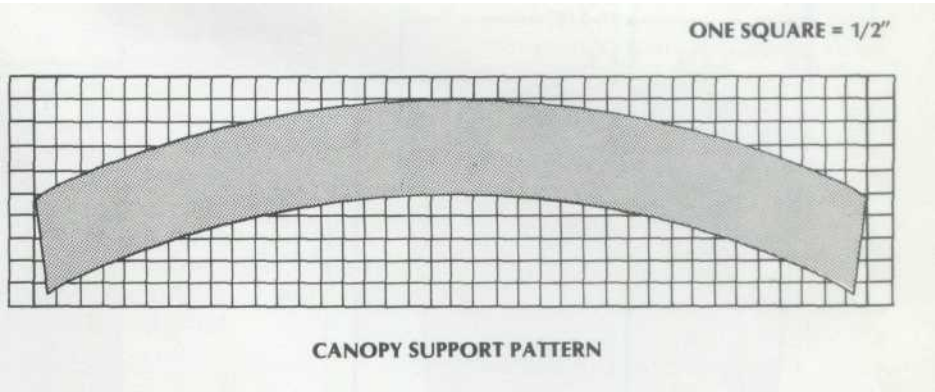
bar (J) and two end caps (K) from each piece. Cut off the end caps and trim each piece to finished length.
 10. Cut two pieces of stock to the listed dimensions for the rockers (H), then shape the pieces according to the pattern provided. Drill 1"-diameter holes in the rockers for the treadle bars.

11. Drill a 1/4"-diameter dowel hole 1/2" deep in each end of the treadle bars and in the adjoining end of each end cap.

12. Insert the ends of the treadle bars through the holes in the rockers. Attach the end caps with 1/4"-diameter x 1" dowels and glue. Then attach the rockers to the bottom of the base with glue and counterbored wood screws.

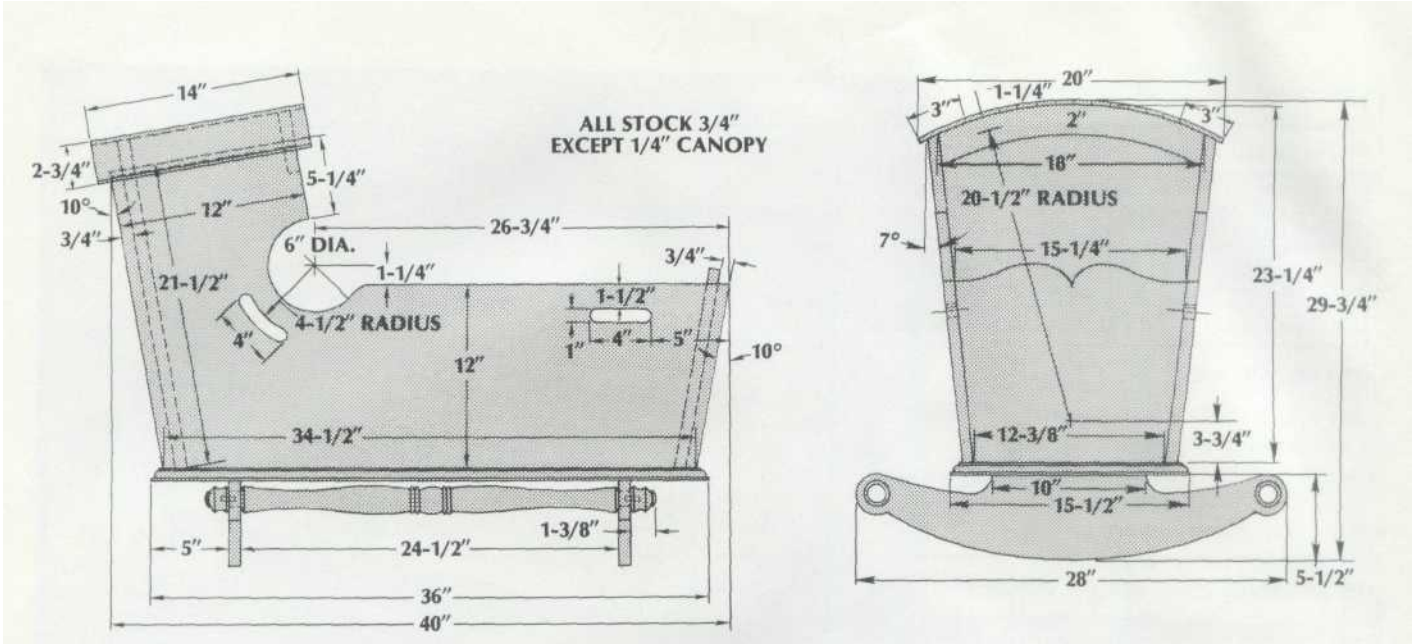
13. Cover all counterbored screws with 3/8"-diameter dowel plugs. Sand the plugs flush, then finish sand the cradle.

14. Finish as desired; a nontoxic finish is best. Make sure the finish is applied well in advance of the baby's arrival in order for the finish to dry and lose its odor. A polyurethane finish is best.

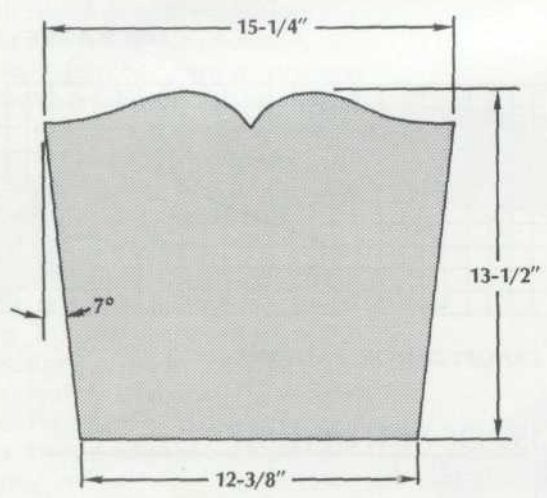


LIST OF MATERIALS

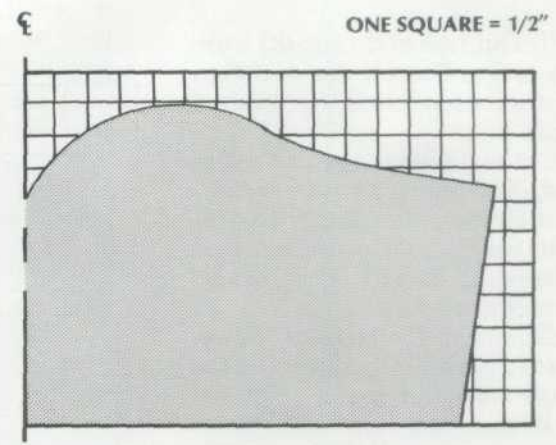
(finished dimensions in inches)	
A Sides (2)	3/4 × 21-1/2 × 40
B Headboard	3/4 × 23-1/4 × 19
C Footboard	3/4 × 13-1/2 × 15-1/4
D Base	3/4 × 15-1/2 × 36
E Canopy support	3/4 × 4 × 19
F Canopy center pieces (12)	1/4 × 1-1/4 × 14
G Canopy edge pieces (2)	1/4 × 3 × 14
H Rockers (2)	3/4 × 5-1/2 × 28
J Treadle bars (2)	1-3/4 dia. × 26 dowels
K End caps (4)	1-3/4 dia. × 1-3/8
Dowels	1/4 dia. × 1
Dowel plugs	3/8 dia. × 1/4
Flathead wood screws	#8 × 1-1/2
Brads	#18 × 1
Wood glue	



CANOPY CRADLE



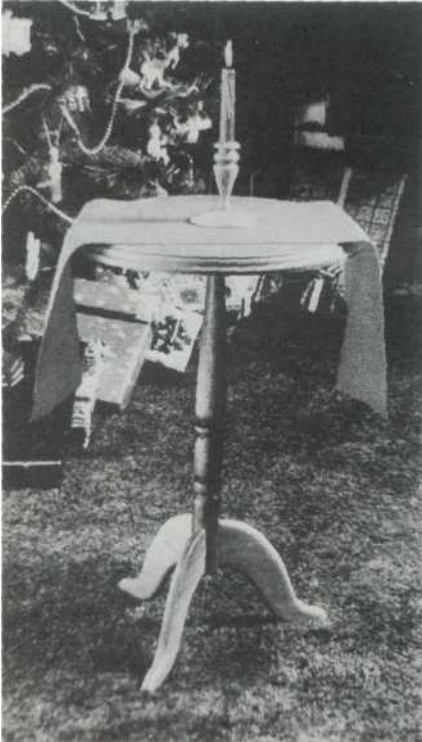
FOOTBOARD



TOP OF FOOTBOARD PATTERN

146

CONCORD TABLE



Also known as a candle stand table, this traditional favorite can be made quickly using a lathe. It lends itself to being a gift item as well.

1. Cut the stock to size according to the dimensions provided.
2. To make the template for the spindle (A), lay out the pattern on a piece of 1/4"-thick stock. Use a scroll saw, bandsaw, or jigsaw to cut out the pattern, and sand the edges smooth.
3. Mount the spindle stock on the lathe, turn the spindle, then sand. (If you glue up stock, it must be clamped for at least 24 hours before turning.)
4. Make a template for the legs (C) in the same manner, cut out the

legs, and sand the curves on a drum sander.

Drill 3/8"-diameter holes to accommodate the dowels in the legs as shown.

6. Use a router with a 1/4" rounding over bit to shape the curved edges of the legs. Do not shape the straight sections.

7. On the drum sander, sand a concave curve in the straight portion of the legs. This will provide a better fit when attaching the legs to the spindle.

8. Mark and drill two 3/8"-diameter holes in the spindle base as shown to accommodate the dowels. Glue the legs to the spindle, one at a time, and allow each leg

time to set up. Make sure the bottoms of the legs are square to the outside of the spindle.

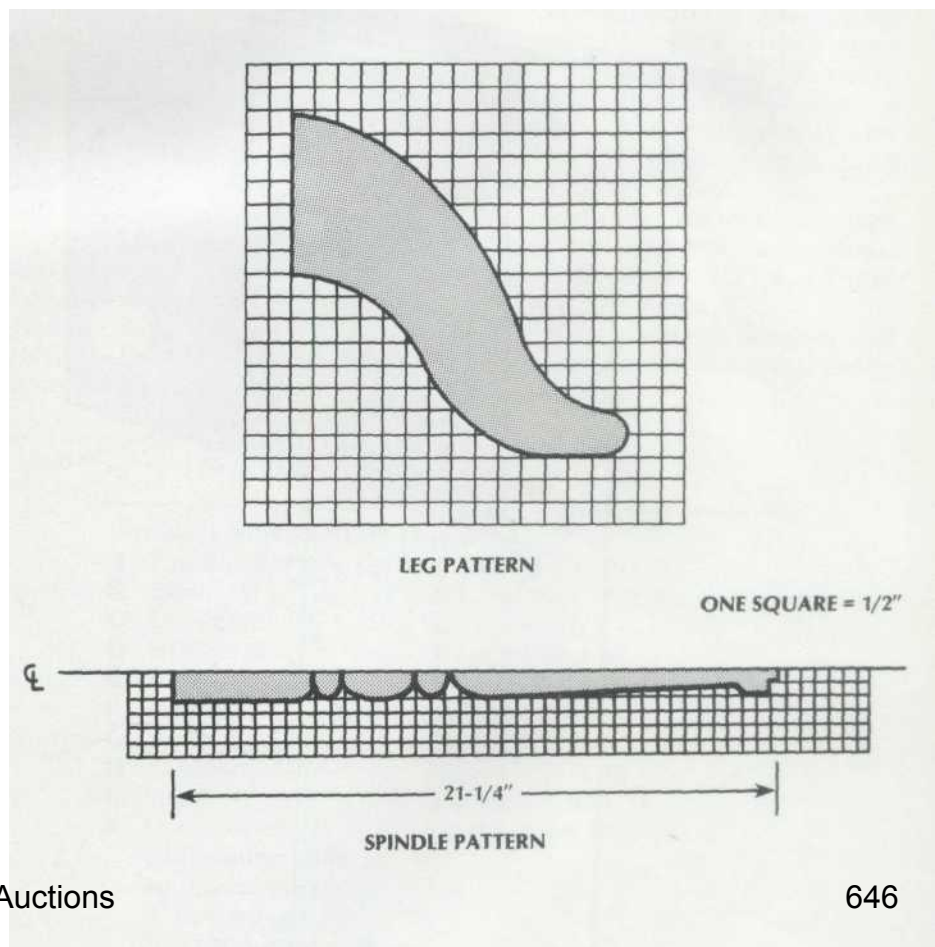
9. Glue and clamp the stock for the top (B). When the glue has dried, lay out the 16"-diameter circle and cut it out using a scroll saw, bandsaw, or jigsaw.

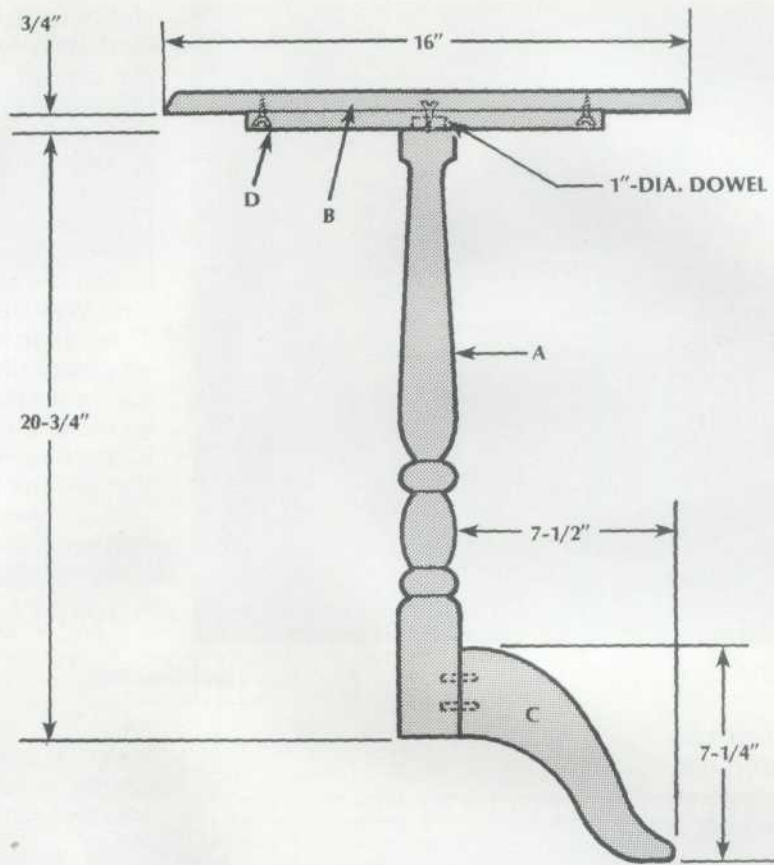
10. Disc sand the edges of the top. The top edge can be shaped with a router and a roman ogee bit.

11. Drill a 1"-diameter hole in the center of the top brace (D) to accommodate the dowel.

12. Screw the top brace to the spindle, then screw the top to the top brace. Glue can be used for extra reinforcement.

13. Finish the table as desired.





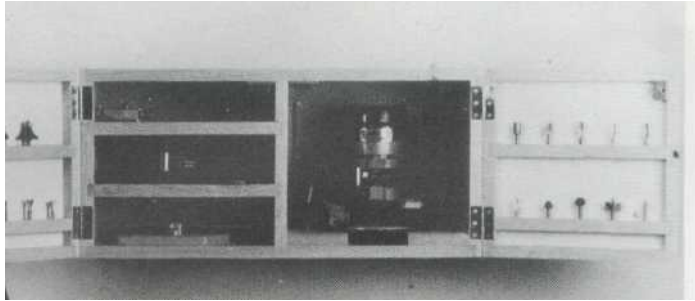
LIST OF MATERIALS

(finished dimensions in inches)

A	Spindle	2 dia. × 21-1/4
B	Top	3/4 × 16 dia.
C	Legs (3)	3/4 × 7-1/4 × 7-1/2
D	Top brace	3/4 × 3 × 12
	Wood screws	
	Dowels (10)	3/8 dia. × 1-1/2
	Wood glue	

147

ROUTER CADDY



The router is one of the most versatile tools in any workshop. There is little you cannot do with a router and the proper accessories. The router caddy shown here is designed to store your router on a pad so that the router bit does not have to be removed from the collet. Extra bits are displayed in the recessed door frames against a white background that makes identification easy. Three shelves are large enough to hold wrenches, guides, and other accessories.

The plans and dimensions given here are for a typical 1 to 1-1/2 horsepower router. If your router requires more or less space, adjust the dimensions to suit.

1. Begin by cutting the top and bottom (A) and sides (B) to length. Rabbet the top and bottom edge of the sides 3/4" wide and 3/8" deep.
2. Machine a 1/4" x 1/4" rabbet in the back edge of the sides, top, and bottom for the back panel. Dado the top and bottom along the centerline 3/4" x 3/8".

3. Cut the divider (C) and shelves (D) to length. Rip 1/4" from the back edge of each to allow room

for the back panel. Machine 3/4" x 3/8" dados in the divider and left side to accept the shelves.

4. Assemble the sides, top, bottom, divider, and shelves. Glue and nail together with 4d finishing nails.

5. Cut the back (E) to size and let into the back rabbet. Secure with glue and 4d finishing nails.

6. Cut the pads (F) to size and round the front edge using a 1/2" edge rounding router bit. Glue and nail to the bottom of the router compartment as shown. Sand and finish the caddy as desired.

7. Cut the 3/4" x 1" door frame members to size. Rabbet the stiles (G) to accept the rails (H) in a half-lap joint. Machine the notches 3/4" wide and 5/8" deep.

8. Machine 3/4" x 1/4" dados in the side frame members to accept the struts (J). Cut the struts to size and drill holes spaced 1" apart to accept the router bit shanks.

9. Cut the door panels (K) to size. Paint the inside of the door panels white.

10. Glue and nail the door frames together. Rout a 1/4" x 1/4" rabbet in the inside edge of the frame.

11. Square the corners and secure the door panel in the rabbet with glue and 2d finishing nails. Sand and finish as desired.

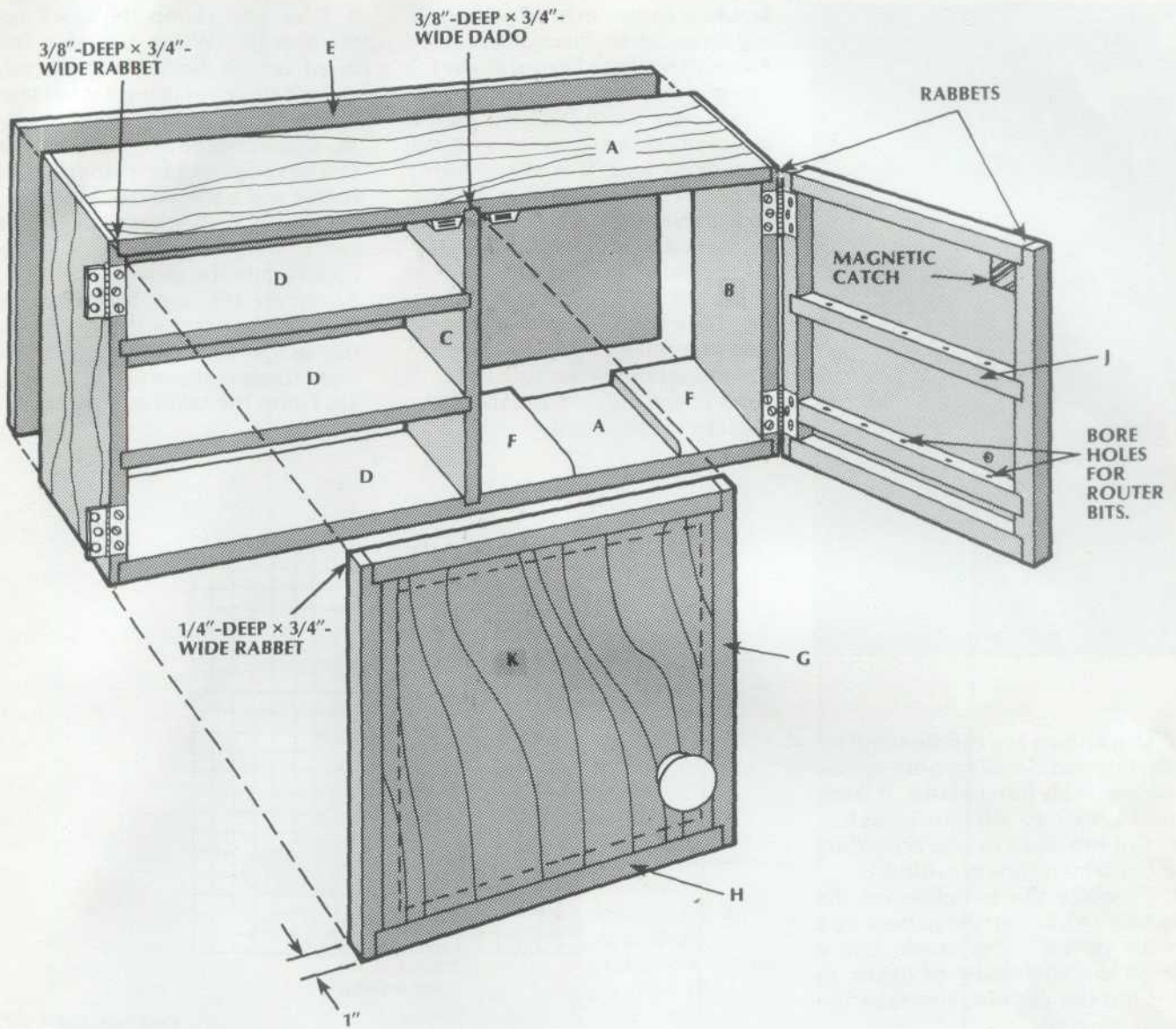
12. Mortise hinges into each door frame and into the caddy sides. Space the doors 1/8" apart and fasten to the caddy.

13. Attach magnetic catches and porcelain knobs. Hang the caddy at chest level.

LIST OF MATERIALS

(finished dimensions in inches)

A	Top and bottom (2)	3/4 x 7-1/4 x 21-1/2
B	Sides (2)	3/4 x 7-1/4 x 10-1/4
C	Divider	3/4 x 7 x 9-1/2
D	Shelves (2)	3/4 x 7 x 10-3/4
E	Back	1/4 x 10-3/4 x 21-1/2 plywood
F	Pads (2)	3/4 x 3-1/2 x 7
G	Stiles (4)	3/4 x 1 x 10-1/4
H	Rails (4)	3/4 x 1 x 10-1/16
J	Struts (4)	3/4 x 3/4 x 10-1/16
K	Door panels (2)	1/4 x 9-1/4 x 10-1/16
	2d finishing nails	
	4d finishing nails	
	2" butt hinges (4)	
	Porcelain knobs (2)	
	Magnetic latches (2)	
	Wood glue	



148
HERB DRYING RACK



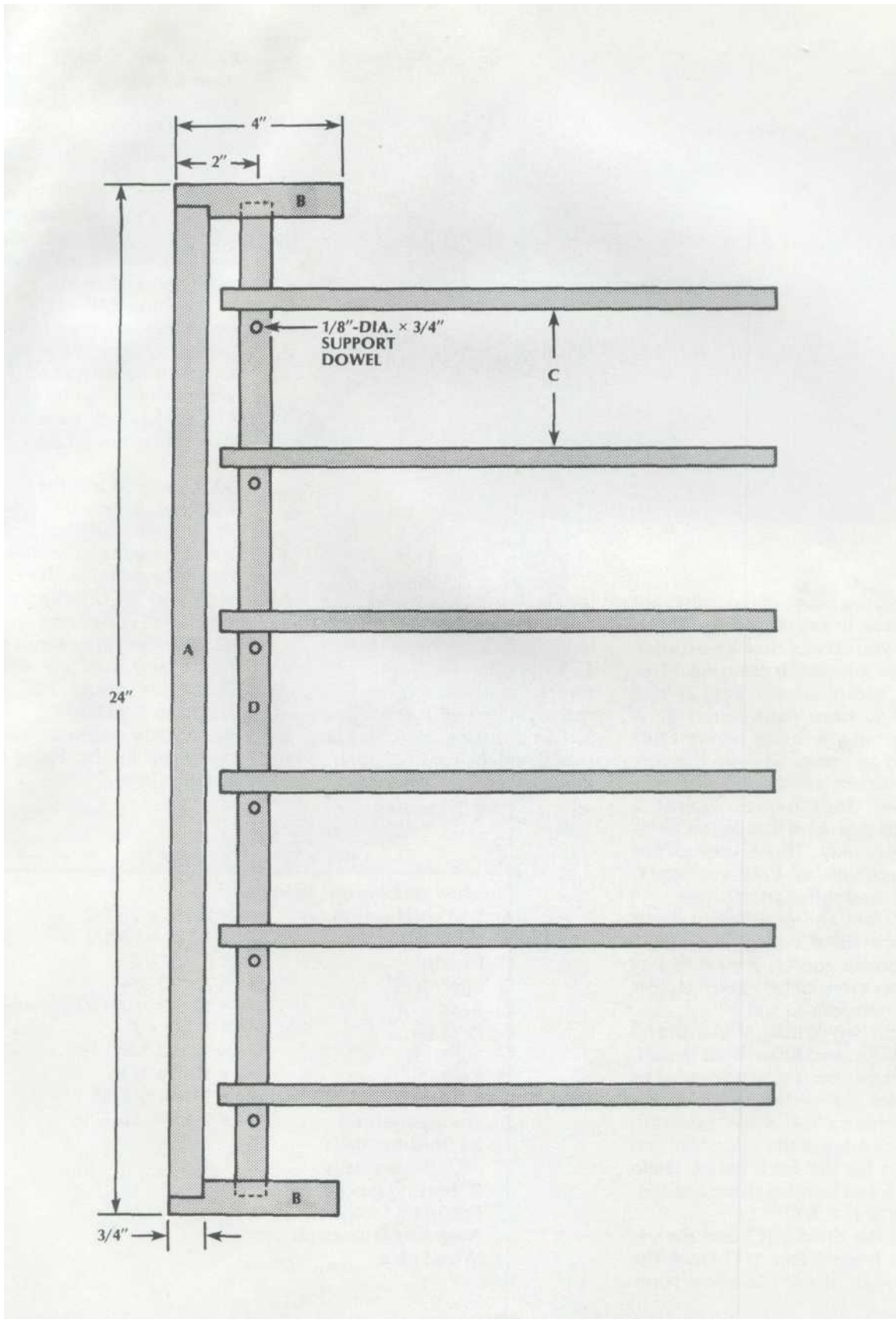
Whether or not you are an herb gardener, you will enjoy the rustic flavor this herb drying rack will add to your kitchen. Designed after a much larger Shaker herb rack, this project can be used to display dried flowers, hanging pots, or whatever else your imagination can muster. The rack is designed to be fastened to a wall. When not in use, the horizontal drying bars fold conveniently against the wall, out of the way of traffic. When in use for the summer herb harvest, it provides a handy place to hang bundles of herbs. Best of all, the simplicity of design allows this project to be completed in an afternoon, with basic hand or power tools. The dimensions can be lengthened or shortened to suit individual tastes.

1. Cut all the pieces to size.
2. Round the front edges of the top and bottom end pieces (B) on a jigsaw or bandsaw.
3. Drill a 1/2"-diameter hole, 3/8" deep, in the middle of the top surface of the bottom end piece and the bottom surface of the top end piece. NOTE: Drill the holes about 2" away from the back edge to allow the horizontal pieces (C) to pivot without hitting the wall piece (A).
4. Drill a 1/2" hole through the center of each horizontal piece, 1" from the back edge for insertion of the support dowel (D).
5. Cut a 3/8"-deep * 3/4"-wide rabbet on the back edge of the top and bottom end pieces for joining to the wall piece.
6. Cut a tapering chamfer on all four edges of each horizontal piece. Start the chamfer 5" in from the back edge of the piece, increasing the taper to a full 1/4" at the front edge.
7. Drill dowel holes in the support dowel at the desired positions underneath the horizontal pieces (as shown).
8. Sand all pieces. If the support dowel fits too tightly, sand it. Do not redrill the holes or you risk making the horizontal pieces fit in a flimsy way.
9. Assemble the horizontal pieces

on the support dowel, place the dowel in the holes in the top and bottom end pieces, then glue and nail the end and wall pieces together.

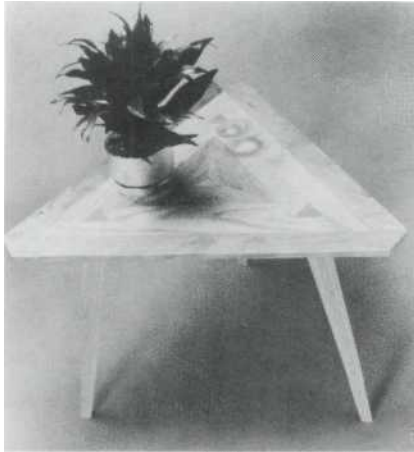
10. Finish as desired.

LIST OF MATERIALS	
(finished dimensions in inches)	
A	Wall piece 3/4 × 3-1/2 × 23-3/4
B	End pieces (2) 3/4 × 3-1/2 × 4
C	Horizontal pieces (6) 3/4 × 1-1/4 × 20
D	Support dowel 1/2 dia. × 23-3/4
	1/8-dia. × 3/4 dowels
	4d finishing nails
	Wood glue



149

TRIANGULAR TABLE



Here's the solution to uneven tables that constantly wobble: a three-legged triangular table. While the idea is a simple one, figuring out the angles provided a challenge. The result is a sturdy table with tapered legs that fit into mortises formed by bevels and compound miters. To build it, use the following step-by-step procedure:

1. Choose wood for this project that is both strong and stable. Ash and cherry were used in this example; the harder ash is ideal for the legs and leg mortises, with the cherry serving as a contrast in the areas of less strain.

2. Because the tapered legs (E) go entirely through the tabletop, the mortises into which they fit must be a particular angle and shape. The easiest way to accomplish this is to construct these angled mortises with beveled and angled parts to make up the tabletop. Begin construction by cutting out on a bandsaw the three isosceles triangles that form the inside of the tabletop (A).

3. Disc sand the triangles so they are identical, then mark the bottom of each one with an X. Cut 1/4"-wide x 1/2"-deep spline grooves on the two inside edges of each triangle, starting 1/2" from the X and tapering away from the rip fence.

4. Glue and clamp the triangles together. After the glue has dried, use a disc sander to touch up the outside edges of this inner triangle.

5. The top middle pieces (B, C) also form the leg mortises. This means that each part must have one beveled edge, one mitered end, and one compound mitered end. First, cut three pieces of stock that measure 1-1/2" x 1-3/4" x 14".

6. Tilt the saw table 5° and bevel one edge of each board. Mark an X on the wide edge of each board to indicate the bottom side. Now return the table to 0°, set the miter gauge at 60°, and miter one end of each board.

7. Place the three boards (B) around the inner triangle and mark

for length. With the miter gauge still set at 60°, tilt the table 14° and cut the opposite end of each board. The undersides should now be longer and wider than the tops.

8. Cut matching spline grooves in each of the boards, identical to those made in step 3. Glue and clamp the boards to the inner triangle.

9. To complete the leg mortises, cut three pieces of stock (C) that measure 1-1/2" x 1-5/8" x 20". Tilt the saw table 5° and bevel one edge of each piece. This bevel matches those made in step 6 on the shorter middle boards (B); the result is that these boards will be wider on the top than on the bottom.

10. Mark the lengths of the three boards from the assembled central section. With the table set at 5° and the miter gauge set at 60°, miter one end of each piece.

11. The final operation on these boards is to bevel the undersides. Tilt the table 30° and, with the 5° beveled side facing up, cut each board so it tapers from 1-1/2" thick on the beveled edge to 3/4" thick on the outside edge.

12. Glue and clamp the boards to the central assembly. When the glue has dried, disc sand the cor-

ners on the underside of the table to match the bevel.

13. Drill a 3/8"-diameter hole 3-1/2" deep through the long middle boards as shown, joint, and glue dowels in place to reinforce the joints.

14. The edge pieces (D) complete the top. Cut the pieces to size, then set the table at 0°. With the miter gauge set at 60°, miter one end of each piece.

15. Tilt the table 15° and bevel the bottom side of each piece, tapering the bottom from 3/4" down to a 1/2" edge.

16. Glue and clamp the edge pieces to the main assembly. With the bandsaw, cut off the corners and disc sand to the final dimension.

17. To make the legs (E), start with three 4"-wide pieces of 1-3/4"-thick stock. Tilt the table to 30° and adjust a tapering jig to cut a 2-1/2" taper on a 20"-long piece of stock. Mark an X on the top of each leg, then make one pass on each leg. Use a push stick for this to keep the wood secure.

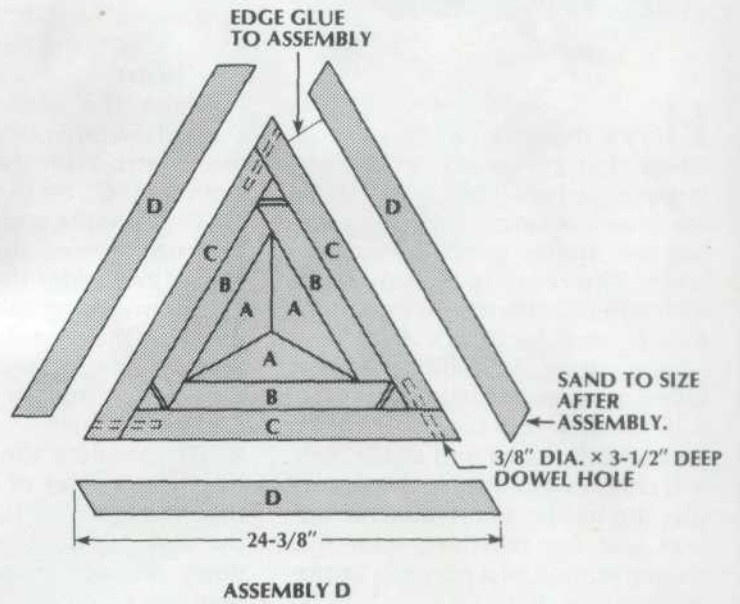
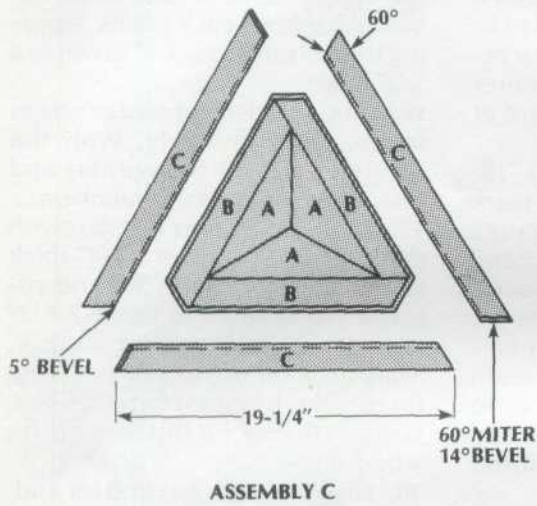
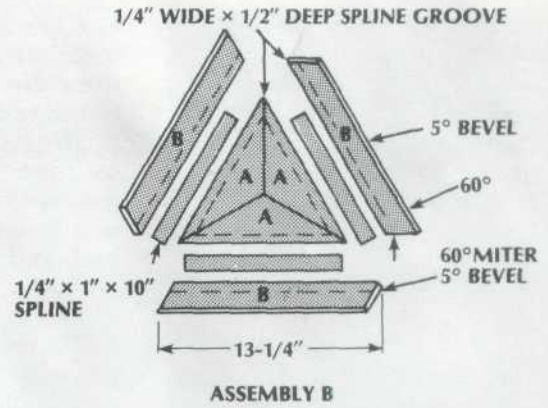
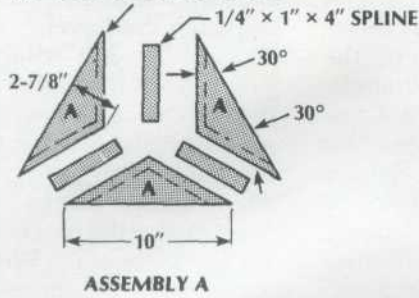
18. Flip the stock over end for end; the X should now be on the underside of the legs. Move the rip fence about 1/2" closer to the blade; the triangle formed by the saw kerf and the blade should be 3/4" on each side.

19. Cut the remaining tapers, then test-fit the legs in the mortises. Mark the legs where they come through the bottom of the tabletop, then remove them. With the miter gauge set at 14°, disc sand the legs to equal length.

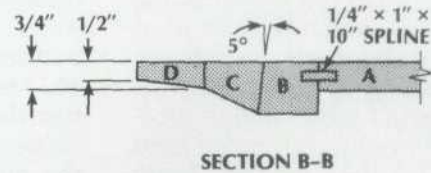
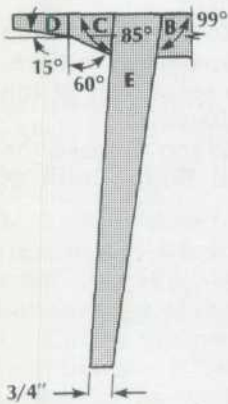
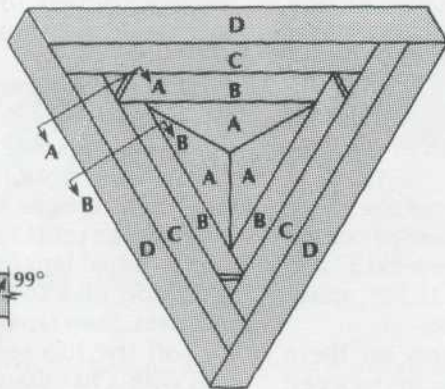
20. Apply glue to the legs and the mortises, then tap the legs in place. Cut off the top remainder of the legs with a handsaw.

21. Belt sand the top to make the tabletop surface flush. Finish as desired.

1/4" WIDE x 1/2" DEEP SPLINE GROOVE



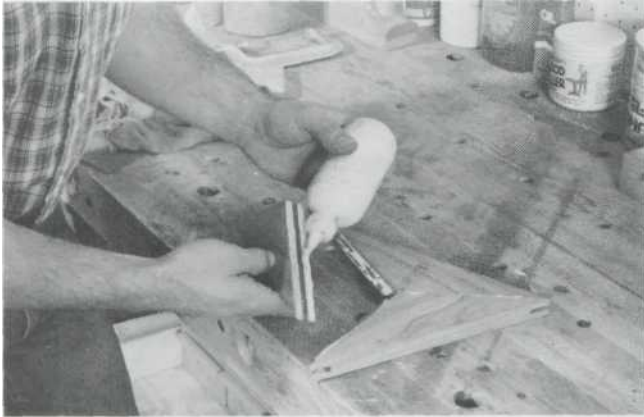
FINAL ASSEMBLY DETAIL



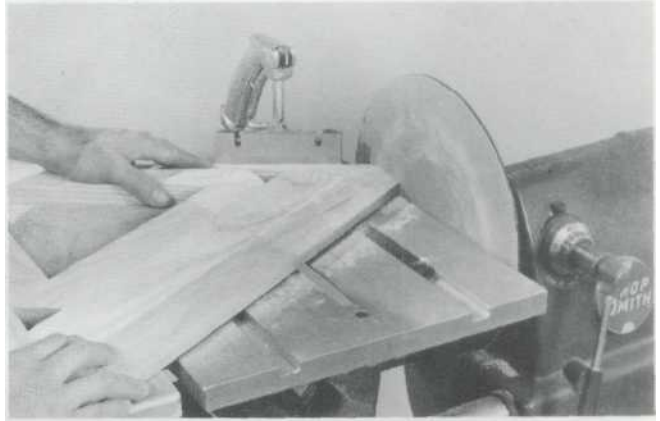
LIST OF MATERIALS

(finished dimensions in inches)

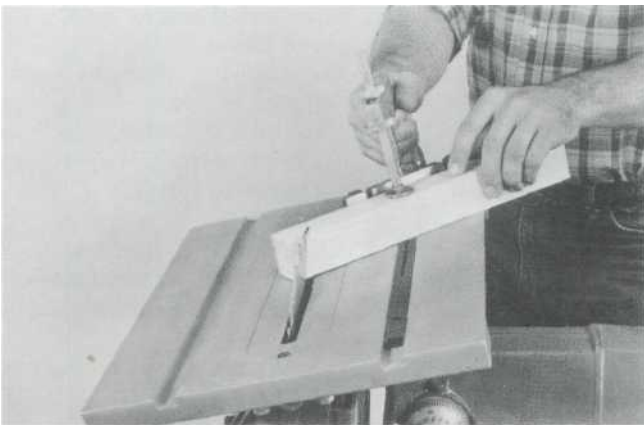
A	Top, inside pieces (3)	3/4 x 2-7/8 x 10
B	Top, middle pieces (3)	1-1/2 x 1-3/4 x 13-1/4
C	Top, middle pieces (3)	1-1/2 x 1-5/8 x 19-1/4
D	Top, edge pieces (3)	3/4 x 2 x 24-3/8
E	Legs (3)	1-3/4 x 2 x 16
	Dowels (3)	3/8 dia. x 3-1/2
	Spline material	1/4 x 1 x 42 tempered hardboard
	Wood glue	



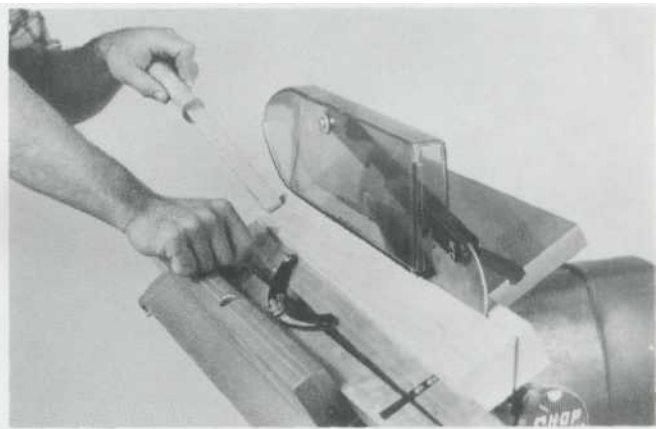
Glue and clamp triangles together.



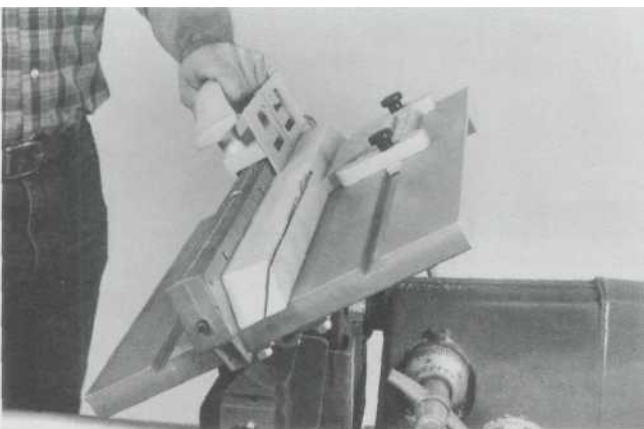
With bandsaw, cut off corners and disc sand to final dimension.



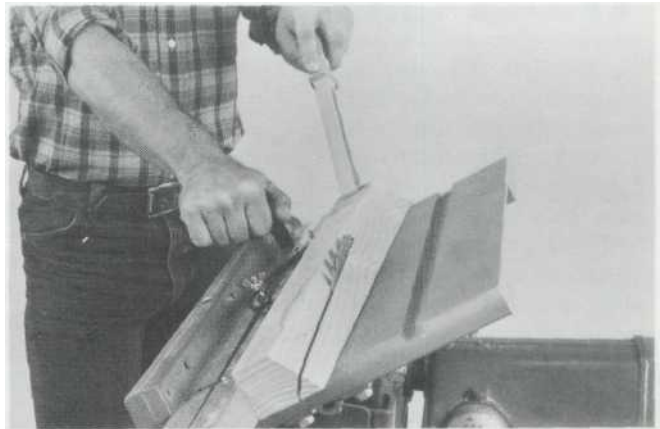
With miter gauge set at 60°, tilt table 14° and cut other end of each part. (Saw guard removed for clarity only.)



Make one pass on each leg.



Cut stock so it tapers from 1-1/2" thick on beveled edge to 3/4" thick on outside edge. (Saw guard removed for clarity only.)



Triangle formed by saw kerf and blade should be 3/4" on each side. (Saw guard removed for clarity only.)

150

ARTIST EASEL



Here's a materials list with everything you need to follow the plans. I'll explain in more detail later, but the easel I built will hold a 7' tall painting, has a 4' wide shelf and stands about 7 1/2' tall total.

Wood:

- (8) 2x4, 8' pine
- (1) 1x2, 8' poplar

- (1) 1x2, 2' pine
- (1) 1/2" hardwood dowel

Hardware:

- approx. 50 3" all-purpose phillips coarse thread screws
- (1) 3/8" thumb screw (about 1.5" in length should do)
- (4) 3 1/2" door hinges with screws
- (4) lockable wheel casters (2 1/2" diameter)
- (2) 4" long, 1/2" diameter carriage bolts
- (6) 1/2" washers
- (2) 1/2" hex lock nuts (nylon insert)
- (2) 4" long, 3/8" diameter hex bolts
- (2) 3/8" washers
- (2) 3/8" wing nuts
- (1) 3/8" square nut

Tools:

- smallish crosscut hand saw
- backsaw w/ mitre box
- dovetail saw (optional)
- 1/2" wood chisel
- phillips screwdriver
- adjustable carpenter's square (with bubble level)
- tape measure
- power drill w/ bit set (up to 1/2")
- jigsaw with wood cutting blade
- a table or bench to construct on
- some clamps

Below you'll find the plans to the easel I built, with all the lengths, dimensions, etc. However, as we go along, I'll point out what you need to do to extend this design to suit any size painting.



fig. 1: side angle



fig. 2: front angle

Above are pictures of the finished easel and its supporting measured drawing below. I will stick with this format throughout the site. The diagrams are fairly self-explanatory, but let me explain the few possibly confusing things. In figure 4, notice where it says 'chisel for ctr. support'. If you look at the photo above, you may be able to tell that the center support (1x2x7.5) is actually sitting inside of the bottom

horizontal brace, so that its face is flush with the brace. Here's a closeup of the front of the bottom brace:



fig. 3: bottom brace with chiseled center support recess

This is essential so that the adjustable shelf, which isn't attached to that center support in any way, lies flush against it. This way, if you have a painting which is narrower than 3 feet, it can simply lay against the center support. Also notice the spacers in Fig. 5. These are narrower than the center support so that the top clamp can easily slide up and down the center support (more later).

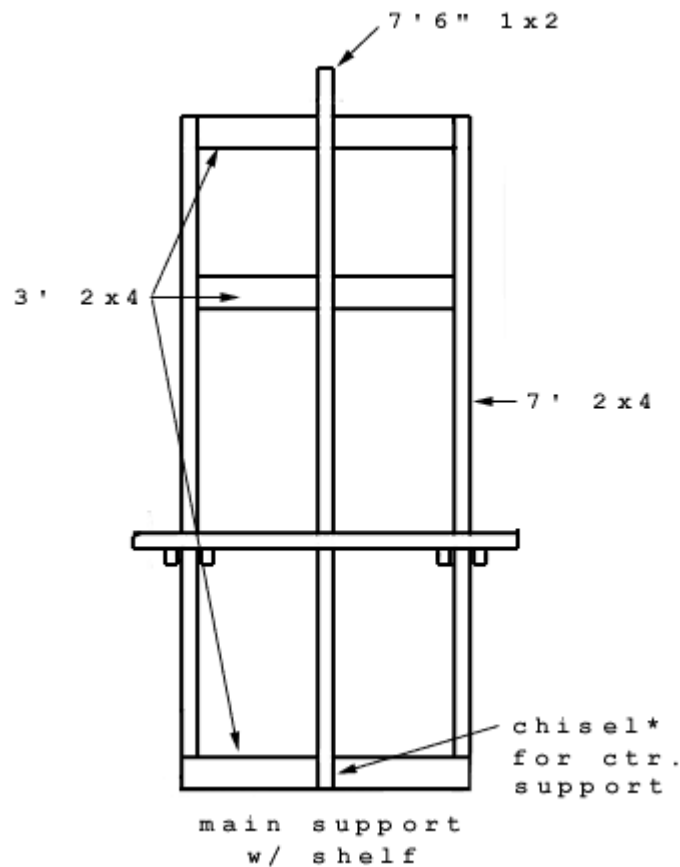


fig. 4: front angle (measurements)

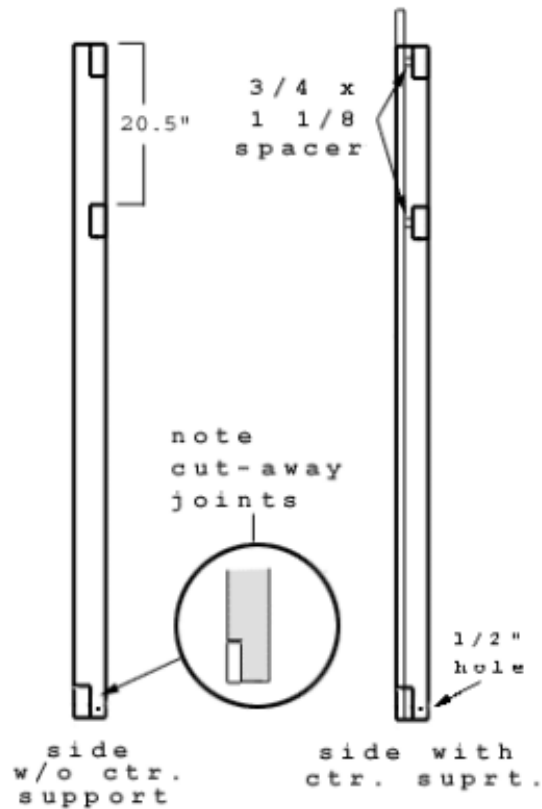


fig. 5: side angle (measurements)

All of the lengths of the pieces for this section of the easel are listed in the drawings above. All pieces are screwed together with No. 8 x 3" screws (as listed in the [materials list](#)). Make sure you drill pilot holes for each screw before you drive it...something like 3/32 should do it. You might want to experiment on a test piece first.

Notice the joints--I've cut out pieces of the vertical supports to hold the horizontal supports in place. The top two supports are attached on the back half of the vertical supports so that the shelf can slide freely up and down the vertical supports. See the close-up drawing in Fig. 5 or look closely at the joints in the easel pictures.

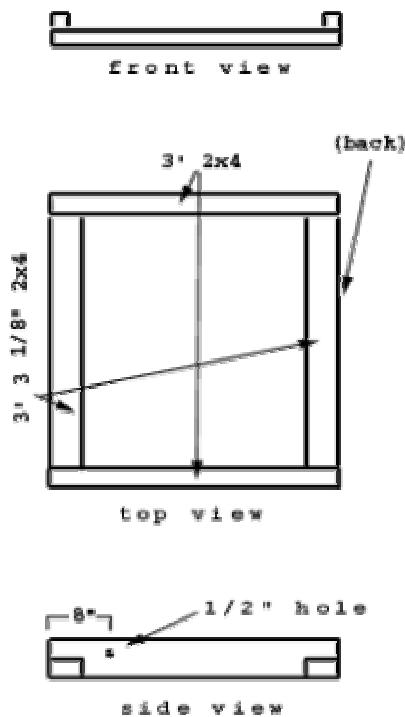
NOTE: This is the piece you want to modify if you want this easel to hold taller paintings. Essentially all you need to hold a taller painting will be a taller center support. Simply change the 7'6" support to whatever height you want. However, if you think you will go *much* higher, say 10'+, you might want to consider increasing the length of the whole piece by extending the two outside vertical supports as well.



fig. 1: side angle



fig. 2: front angle



The base is very simple to build. Its side pieces are 3' each and attached in a tall orientation. Its front and back are 3' 3 1/8" each in a laid-down orientation. The extra length on the front and back is so that the distance between the two side pieces is large enough to accommodate the 3'-wide frame in addition to a bit of wiggle room for a couple washers. Notches are cut into each side piece to accommodate the flat front/back pieces (see side view). One hole is drilled on each side piece, 8 inches back from the front of the base. This hole will accept a 1/2" x 4" hex bolt w/ washers to bolt the main support to the base. By using a bolt here, the main support's angle is adjustable (and secured with the back-side slot setup--more later).

fig. 3: front/top/side angle (measurements)

Not much more to it than that for the base. The locking casters will attach to the bottom of this piece, but I put those on last. Not sure if that made the most sense, but I didn't want the thing rolling around while I was trying to put it together. For the casters, I used 2 1/2" tall locking casters and some wood screws to screw them directly into the base on each corner. You need to make sure they are close enough to the corners so that you can get at the locks with your feet. In hindsight, larger casters might have been a better choice.

The rear supports allow you to tilt the angle of the main support to a comfortable position. By loosening the two wing nuts, you can adjust the angle from 90 degrees (straight up) to 45 degrees back, to even a little forward (i.e. 90+)--good for pastels..

The rear supports look more complicated in the diagrams than they really are. Each support basically consists of two 2x4's, one slotted and one with a bolt that slides in the slot. By tightening the wing nut on the bolt, you can set the adjustment where you want.



fig. 1: rear supports

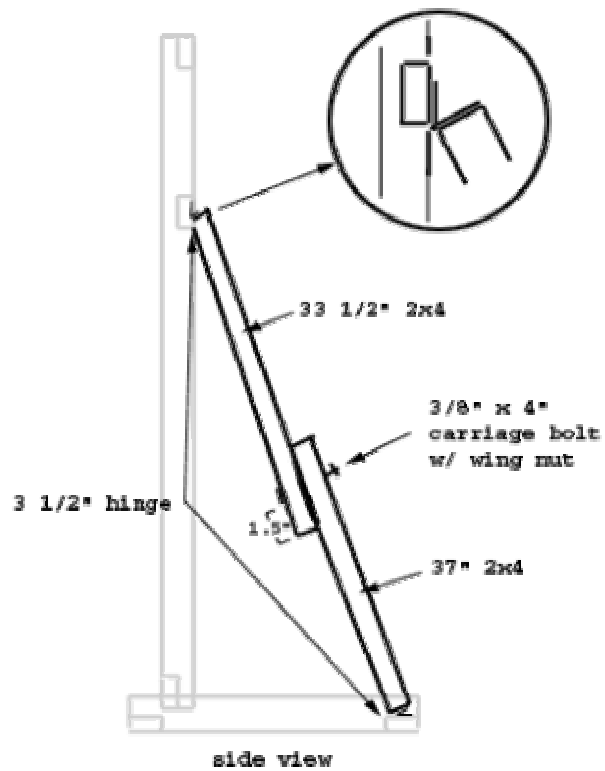


fig. 2: side view of rear supports (measurements)

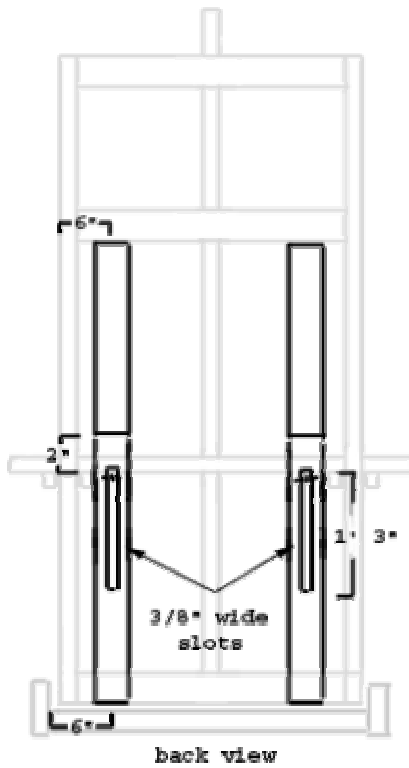


fig. 3: rear view of rear supports (measurements)

Cut two 33 1/2" 2x4's and two 37" 2x4's. 1.5" from the end of the 33" 2x4's, drill a 3/8" hole in the center. This hole will hold a 4" long, 3/8" diam. carriage bolt. The carriage bolt has a square bit under the head so that it digs into the wood. This enables you to tighten the wing nut w/o having to hold onto the other end of the bolt. Kind of like embedding the bolt into the wood. On the other end of each of these pieces, attach one side of a 3 1/2" wide hinge. This hinge will eventually get attached to the appropriate brace on the main support.



fig. 4: rear support detail (front)



fig. 5: rear support detail (rear)

In the 37" 2x4 you will need to cut a 1' 3" long slot which is 3/8" wide. This is the slot that the carriage bolt will slide through when you adjust the angle. I cut this slot using a jigsaw (also called a scroll saw). First, mark the beginning and end of the slot. Using a 3/8" drill bit, drill a hole at the beginning and end of the slot. This will give you a starting and ending point from which to insert the jigsaw blade. Draw an outline of the slot between each hole so you have a guide and saw out the slot. I found this a bit tough (hadn't used a jigsaw before), but as long as you don't go way outside the lines, you can always fix it up. Once you've drilled out the slot, take a 3/8" bolt and slide it through the length of it to make sure you have sufficient width along the entire length. (Those with routers already know how easy this will be for them).

Steve Baird from Australia sent in the great suggestion of clamping down another board to act as a guide for the jigsaw to ride against. He says "simply measure the distance between the blade and the edge of the base on the saw to calculate the position to clamp the guide. Don't forget to allow for the width of the saw blade. If the rear support is not wide enough then clamp another piece of timber next to it to support your guide."

Attach another hinge to the bottom of this piece, in the same manner you did to the top piece. Leave the assembly until we've completed a few more steps.

The adjustable shelf is just that; it allows you to change the height at which the painting is supported; both to allow accommodate large supports, as well as to provide a comfortable painting height for sitting and standing.



fig. 1: shelf front angle

Admittedly, the shelf design is a potential weak spot in my design. It doesn't slide up and down as easily as I would like. Once you get the hang of it, it works. This is really the part that could benefit from some higher-end tools. If you look at easels in stores, you'll see the shelf design either utilizes wood cuts that you can't do by hand or specialized metal components. I will say one thing for my shelf, though--its is VERY sturdy. I figure with huge paintings, I also won't be raising and lowering all the time either. If someone has an improvement on this design that can be made with (or without) fancier tools, I'd be happy to include it here.

Others who have built this easel have tried various modifications of this shelf design. One person used joist hangers to support the shelf. Another put a slot in the main support and tightened the shelf into

place, like I do with the rear supports.

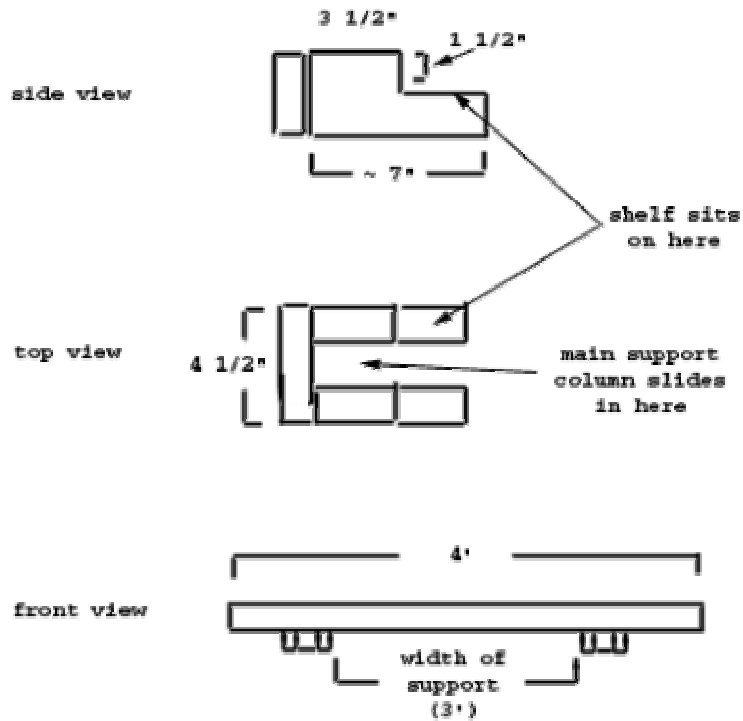


fig 2: shelf diagram (measurements)

The shelf is made up of two identical U-shaped pieces which attach to the shelf itself. The shelf is a simple a 4' 2x4. Each U piece wraps around the vertical outer pieces of the main support (see figure 3). The best way to measure up this piece is to lay the pieces up against your actual support and mark the pieces so they fit just right. However, my measurements should be close and give you a starting point. The idea is to make the center gap *just* the width of the main support piece, so that the U piece can slide firmly up and down the support.

The order to build this is to build each U-shaped piece first. Then, once you have those done, put them in place on the main support, lay the shelf on and try it out while holding the shelf and U-pieces together with your hand. If it's satisfactory, put a couple screws in each shelf while its actually in place (at his point, you have no other way to actually get the shelf on the thing).



fig 3: shelf support detail (rear)



fig 4: shelf (up)

The final piece of the shelf system is the shelf support rods. Each side of the shelf is locked into place by placing a 1/2" diameter dowel rod into a pre-drilled hole along the main support (see Fig. 4). The holes are drilled in the face of the main support and each hole is 2" apart, and centered horizontally. The holes are 1/2" in diameter. Drill them up as high as you want the shelf to go. This does hold the shelf very sturdily in place.

I borrowed a tool called a 'dowel-cutting jig' to drill the holes accurately. The jig is basically a clamp with a guide in it. You set the guide where you want (in this case, so that the center of the hole is in the center of the support), clamp it into place, and drill away. This helped me keep each hole nicely lined up. You could do this w/o, but if you can borrow one of these things, it makes it easier. They cost about \$30 (too much for one use), but my dad had one in his basement he hadn't used in 30 years that worked perfectly (and the pricetag on the box was \$6!).

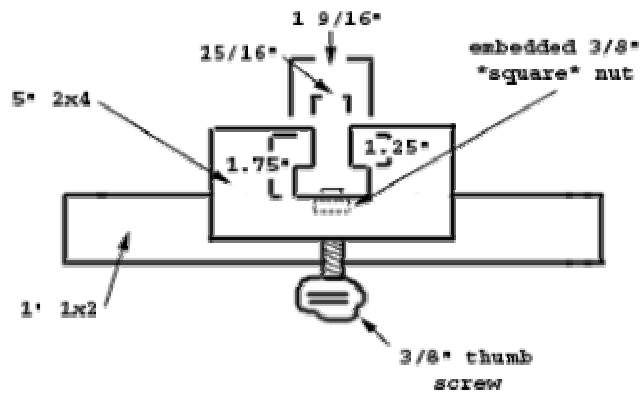
Finally, cut a couple pieces of 1/2" dowel and slip them into place.

The top clamp allows you to clamp down a canvas once it's on the shelf. This keeps it from flopping around or falling forward. The way I did it, the clamp is a bit tricky to make, but not too bad. One could easily substitute multiple pieces instead of cutting out the 'T' shape like I did (as Pat B.--see the [gallery](#)).

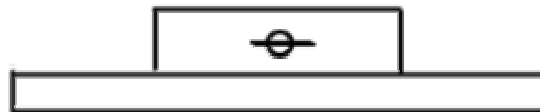


fig. 1: clamp (front)

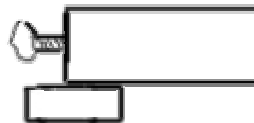
The clamp is made from two pieces; a 5" 2x4 and a 1' 1x2. The 2x4 has a "T" shape cut out of the back of it (see Fig. 2). The top of the T slides down the center support, and thus is just a bit larger than the 1x2. The skinny part of the T is about 1" wide, just a bit wider than the spacers that sit between the center support and the horizontal braces on the main structure.



top view



front view



side view

fig 2: top clamp diagram (measurements)

To cut the slot out of the 2x4, I cut a $1 \frac{9}{16}$ " cut all the way back 1.75". Then, I used a my jigsaw to rough-cut the larger portion and finished it off with a chisel (see Fig. 3). Not easy and takes some to get it to fit, but it works. Then, in the center of the back of the cut, you need to chisel out a square hole *just* big enough for a square $\frac{3}{8}$ " nut. This nut is what the thumb-screw screws into. It's square so that when you turn the screw it doesn't also turn the nut (the square nut stays firm in its square hole). Finally, drill a $\frac{3}{8}$ " hole directly into the center front, through to the newly-cut opening.

To finish it off, glue the 1x2 to the bottom of the 2x4 as shown, screw the thumbscrew into place and you're set for the clamp.

Note that it's really best to measure against your exact pieces here, instead of following my directions. Hold the 2x4 up against the center support and draw around it. Do the same with one of the spacers behind the center support (or measure if you can't get to it). My measurements should work for you, but you'll get a better fit if you measure against the actual pieces. This piece works best if it really *just* fits. That way, you can raise the clamp and don't have to tighten the screw just to keep it up for a minute while you raise the shelf, etc.

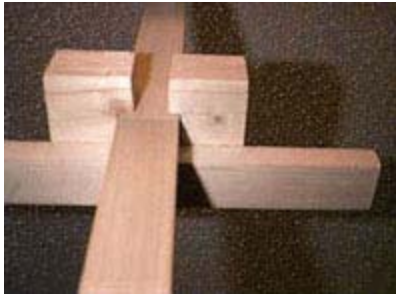


fig 3: clamp cutout detail (rear)

As an aside, I should say that my first clamp finally broke one day. While wood glue will fix it up just fine, the point at which it broke is in the middle where I had cut out the most wood. For this reason, I highly suggest trying the multiple piece design illustrated so well by Pat B.

You now have all the pieces and can put the whole thing together!



fig. 1: side angle



fig. 2: front angle

If you want wheels, now is the easiest time to add them. Turn the base over and lay it on the floor. Get your casters, line them up on the edges of each corner and screw them in.

Now you need to screw the main support into the base. You'll want the easel against a wall, or actually, a doorway works well, so you can get behind the easel easily. This way the main support has something to rest on. Take your 4" x 1/2" bolt and stick it into the hole so it just pokes through the other side of the base. Then get one of your washers and hang it on the bolt so that it obscures the bolt. Then you can slide the main support into place. Wiggle around a bit and you should be able to get the bolt all the way through the main support. On the other end, place another washer, and then a 'locking' hex nut. The locking nut 'locks' because it has a bit of nylon on the outer end, which gives it some good anti-slip once it's on (you can still remove it if you need to). Lock-tight or other similar products would work here as well. Follow the same procedure for the other bolt on the other side.

Now you want to add the rear supports. If you followed the directions previously, you have hinges screwed to the supports already. Now you need to screw the other end of the hinge into the appropriate place on the base for the 37" pieces, and the second horizontal piece on the main support. Look back at the diagrams in '[rear supports](#)' if you don't remember (the placement of the hinges is presented there in fig. 3). Once you have the hinges screwed in, you can put the carriage bolt of each top piece into the slotted bottoms pieces--add a washer and your wing nut.

If you didn't actually screw on the shelf before, now's the time to do it. Place the U-shaped pieces around the vertical pieces on the main support. Place the shelf into place--measure each side to make sure you have it centered, and put a couple screws on each side to screw the shelf onto the U-shaped pieces.

If you haven't already, go ahead and slide the clamp onto the center support...

151

BABY CHANGING TABLE



Construction

Tools required: router, drill, sander

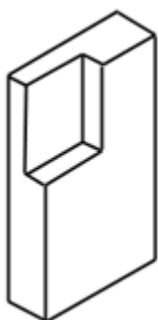
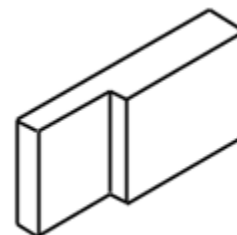
Wood required: pine and plywood

Description	Qty	Width	Thickness	Length
Front frame				
Small verticals	2	2 1/4"	3/4"	32"
Long verticals	2	2 1/4"	3/4"	35 1/2"
Top/Middle long horizontals	3	2 1/4"	3/4"	30 1/2"
Base plank	1	2 1/4"	3/4"	47"
Top/Middle short horizontals	2	2 1/4"	3/4"	14"
Rear Frame				
Small verticals	2	2 1/4"	3/4"	32"
Long verticals	2	2 1/4"	3/4"	35 1/2"
Top long horizontals	1	2 1/4"	3/4"	30 1/2"
Base plank	1	2 1/4"	3/4"	47"
Top short horizontal	1	2 1/4"	3/4"	14"
Side panel (small)				
Verticals	2	2 1/4"	3/4"	32"
Top/bottom	2	2 1/4"	3/4"	16 1/2"
Side panel (large)				
Verticals	2	2 1/4"	3/4"	35 1/2"
Top/bottom	2	2 1/4"	3/4"	16 1/2"
Middle panel (plywood)				
	1	16 1/2"	1/2"	4"
Tops				
Large (plywood)	1	19 1/2"	1/2"	34 1/4"
Small (plywood)	1	19 1/2"	1/2"	18 1/2"
Edging (large top)	1	3/4"	1/8"	55"
Edging (small top)	1	3/4"	1/8"	60"

Molding (large top)	1	3/4"	3/4"	55"
Molding (small top)	1	3/4"	3/4"	60"
Base board				
Front	1	3"	3/4"	51"
Side	2	3"	3/4"	19"
Large drawers				
Sides	6	5 1/2"	3/4"	16 1/2"
Inner Front/back	6	5 1/2"	3/4"	26"
Front	3	9"	3/4"	30 1/2"
Knobs	6			
Narrow drawers				
Sides	4	10"	3/4"	16 1/2"
Inner Front/back	4	10"	3/4"	9 3/4"
Front	2	14"	3/4"	16 1/2"
Knobs	2			
Back panels				
Large (hardboard/plywood)	1	32"	1/8"	32"
Small (hardboard/plywood)	1	16"	1/8"	35 1/2"

1. Prepare front frame pieces (left side)

Firstly, cut lap joints that are 1 1/2" in from each end into the two top pieces (long and short), the middle drawer pieces (two long, one short) and the base plank. Next, cut a slot out of the base plank 13" from the right and 29 1/2" from the left (hence, 4 1/2" wide). Note that when deciding which end is the right and left of this plank, lie the plank flat on the ground with the cut out lap joint part facing upwards (see diagram).



Now that all of the horizontal pieces are prepared, we need to prepare the vertical planks. Firstly, take one of the two shorter vertical pieces and nominate it as the left vertical. Cut out grooves that are 3/8" deep and 1 1/2" in (matching the cut on the horizontal pieces) at the following positions from the bottom:

- Bottom to 2 1/4" high
- 10 3/4" to 13"
- 20 1/2" to 22 3/4"
- 29 3/4" to top

Next, take the second small vertical and nominate it as the middle-right vertical. Make a mirror image of the above grooves in this piece, so that the horizontal planks will slot in. The one difference is that the base to 2 1/4" high cut should be made as a lap joint (i.e. all the way across the wood, rather than just 1 1/2" in) in order to slot into the middle groove cut out of the base plank.

2. Prepare front frame pieces (left side)

Now take one of the two longer vertical planks and nominate it as the right vertical. Cut out grooves that are 3/8" deep and 1 1/2" in (matching the cut on the horizontal pieces) at the following positions from the bottom:

- Bottom to 2 1/4" high
- 17 1/2" to 19 3/4"
- 33 1/4" to top

Next, take the second long vertical and nominate it as the middle-left vertical. Make a mirror image of the above grooves in this piece, so that the horizontal planks will slot in. The one difference is that the base-to-2 1/4" high cut should be made as a lap joint (i.e. all the way across the wood, rather than just 1 1/2" in) in order to slot into the middle groove cut out of the base plank.

Finally, take the middle-right and taller middle-left planks and glue them together, side by side. To make this joint use either dowel joints or biscuits. The result should be a double width piece that has one side taller than the other. Note that when looking at this piece from the front, it should look like one solid piece - the grooves should be in the back, not the front.

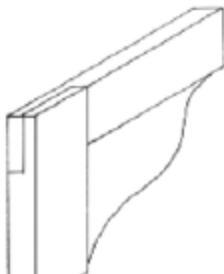
3. Glue front frame together

Once the middle, double plank has dried, it is time to connect the rest of the front together. Glue and screw the pieces together, ensuring that the finished frame is square. To help build a solid frame, clamp overnight to ensure a strong bond.



4. Prepare back frame

The back frame is relatively simple to construct as it consists only of an outer frame. Repeat step 2, but omit the horizontal planks that define the drawer spaces (but include the inner-left and inner-right vertical planks that are glued together as on the front). One prepared, glue the pieces together (as with the front). Again, ensure that the frame is square.



5. Build left (small) side panel

Take the two vertical side pieces and cut lap joints into them, and matching lap joints in the two small horizontal pieces. By so doing, the four pieces should fit together into a rectangular frame (see diagram). Next, rout out a groove on the inner, back edge of all four pieces. This groove should cut in 1/2" and be 1/2" deep.

By making this groove all the way around the inside edge, the plywood sheet that forms the side panel can rest in place. Once routed, glue and screw the four side planks together - making sure the joints are square - and then glue the plywood panel into place in the center (which will help strengthen the unit).

6. Build right (larger) side frame

Repeat step 5 for the right hand panel. Remember that this panel is larger due to the fact that the right side of the front frame is also taller.

7. Build main frame

Now that the two sides, front and back have been built, it is time to put them together. Sandwich the left hand side panel between the front and back panels and screw the three pieces together by driving screws through the front frame into the side as well as from the back frame into the side panel. Then attach the right hand panel to complete the frame. Make sure that the completed frame is square.

8. Add middle panel

Next, add the small middle panel, gluing and screwing it into place. This panel should fill the small void at the point where the front/back steps up from the lower height to the taller level. At this time you should also add a small strengthening bar to the bottom middle of the frame, running from front to back. To add it, glue and screw into place from the front and back.

9. Add tops

The final strengthening trick is adding to table tops. First add the larger, lower top. This should overhang the front and left hand side by 1", over-hanging the back by 1/2". To attach this top, glue and nail - or screw - down into the frame.

Add the smaller top to the higher part of the table next. Again, the overhang should be 1" to the front and both sides.

10. Add edging strip and molding to top

Add the edging strip to front and sides of both tops. Use glue and small finishing nails to hold the strip into place against the plywood edge of the table top. Next, add the small molding to the meeting point between the top and the main frame, thus making the two look more like one unit.



11. Make base panel and attach to base.

To finish off the main unit we need to add a base board that will serve as feet. This is one solid plank that runs the entire length of the unit. Route a curve out of the top side to round it off (see diagram). Add to front and sides - using a mitered cut at each end - using screws and glue. The board should overlap 1" with the frame, providing adequate bonding space.

12. Make drawers

Take the two side pieces, the back and the inner front piece. Cut a groove in each one that is 1/4" from the bottom of each piece and is 1/4" wide. This groove will allow the base to slot into the drawer frame. Once you have cut the groove, glue and screw the sides to the back piece, slot the base into the groove and then glue and crew the inner front board. Make sure that the unit is square. The result is a box without a lid.

Attach a 16" drawer runner mechanism to each side of the drawer, and to the corresponding "hole" in the main unit of the chest. Ensure that all drawer mechanisms are attached at the same height, so that the drawers are interchangeable in the unit. To attach the runners to the main frame, you may need to add a strip of wood to the rear verticals.

Finally, you need to add the front of the drawer to the box unit. However, before doing this, you need to shape the front of the drawer. The edge of this should be rounded using the same router bit as you used for the edging around the bottom of the main unit. Once you have routed all four sides of the drawer front, attach it to the drawer unit by gluing and screwing from the inside of the drawer outwards.

13. Finishing

Finally, nail the two back panel pieces on to the back of the unit and sand the entire unit thoroughly and paint.

152

BARRISTER BOOKCASES



Not too far from our workshop here in Cincinnati, Globe Furniture made thousands of these so-called "barristers bookcases" for lawyers and bureaucrats across the nation. Many were made of oak, but the company also made them from other species of wood and even made a steel version.

Though this style of bookcase was first used exclusively by attorneys and government-types, the stackable units are now extremely popular (and pricey) in antique stores. And no wonder. You can use them to store just about anything anywhere. While most people use them for books or their favorite collectibles, I know one person who uses them in her bathroom to keep her toiletries.

I designed these bookcases so you can make any number of units that can be stacked on one another and stacked side-by-side as well. And there's a complete economy of material use because the top of one also serves as bottom of the case above it. In constructing the three cases shown, I used two different heights for the boxes. The shorter one accommodates books that are 9" tall or less; the larger case accepts books up to 13" tall.

Other than the extra time and the expense of more material, it makes a lot of sense to make several boxes because the set-ups to build the boxes are perfect for the "short production run" approach to building. That means setting up the machine -- in this case a router in a table and a drill press -- then running the parts. Because it can take longer to accurately set up the machine than run a part or two, running a few more parts makes real sense. Remember that accuracy is the key to the project because each unit has to be able to mate with all the other units.

After you've determined the quantity and size of the cases you want to build, prepare enough wood to glue into the panels you need. Glue up your panels, then sand the joints flush, making sure to keep all the panels the same thickness. Cut the panels to the finished sizes indicated in the Schedule of Materials.

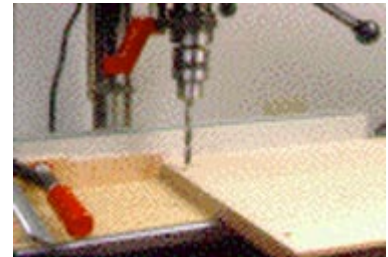
Mill the Cases • The joinery for the cases is straightforward. The plywood back is captured in a rabbet made on the sides and bottom (although the bottom rabbet is stopped 1/2" from both ends so you can't see it from the outside). Then the bottom is biscuited to the sides. The cases stack on one another using dowels in the tops of each case and holes on the bottom. Begin construction by chucking a straight bit in a router mounted to a table and make the 1/2" x 1/2" rabbets in the sides and bottoms.

Now it's time to do some additional routing to make the mechanism for the door slides and some hole drilling. While you can purchase special slides for barrister bookcases, my homemade method is cheaper, works just as well and is almost as easy as installing slides. Each of these steps requires real accuracy, and you must pay attention to which parts are for the right and left sides, fronts and backs, tops and bottoms. The best way to keep this straight is to organize your parts by kind, then stack them so they are oriented the way you want them. Marking them with a pencil adds another measure of insurance.

Begin by routing the stopped dado in the case sides that makes up part of the sliding door mechanism (the other part of the mechanism



DOOR SLIDE • With a 1/2" straight bit set in a router and mounted in a router table, set the height of the cutter to make a 3/8" deep cut. Now set up a fence on the router table so that the cut starts 5/8" from the edge (see diagram detail). Now set a stop on the fence so that the cut you make stops 3/8" from the front edge of the sides. (Remember that you will have to change the stop when switching from right to left sides.) Because the peg used is 1/2" thick, you'll need to create a very slight amount of clearance, say 1/32", so that the peg moves easily through the dado. Do this by adjusting the fence away from the cutter. Then rerun the parts.



THESE HOLES HOLD IT TOGETHER • If you want your cases to mate correctly, accuracy is key. Use stop blocks on your drill press when drilling the bottom and a doweling jig on the sides.



BISCUITS ARE A GOOD FIT • After cutting my slots for my biscuits, I assembled the cases. By the way, I used polyurethane glue. While not necessary, it does provide a stronger joint in this situation because of its ability to provide some glue strength to the end grain/cross grain joint where the sides join the bottom (see related story in this issue about polyurethane glues).

is simply a peg inserted into the edge of the door).

Now drill the holes in the case bottoms. These holes are used to receive the indexing pins that are inserted in the tops of the sides. This interlocking quality keeps the cases from sliding while stacked atop one another and holds the sides in position. Remember that the holes are drilled in the bottom piece and line up with each case's sides. Set up the drill press with a 3/8" diameter bit, using the fence and a stop block, and drill the holes as indicated in the diagram detail to a depth of 3/8". Bear in mind that the holes are a different distance from the front and back edge so the fence set-up must change accordingly.

Make Perfect Holes • Now drill the corresponding holes in the top edges of the sides, again to a depth of 3/8". These holes are for the dowel pins. Again, accuracy is key. I used a self-centering doweling jig for drilling these holes. Mark the drilling locations carefully, a combination square will provide a consistent marking gauge. Refer to the diagram detail for drilling locations.

Biscuit the Sides • Next cut the biscuit slots for joining the sides to the bottom. I used three biscuits in each side, a #20 size in the middle and back, and a #10 in the front. I used the #10 so the slot didn't interfere with the hole drilled in the bottom. The three biscuits provided a very sound joint. The last thing to do before final assembly is to run a roundover detail on the front edge of the bottom. To make my profile, I used a 1/2"-radius bit on the top edge and a 1/4"-radius bit on the bottom edge. Again, use the router table and fence for the cut, even if you have router bits with guide bearings on them. You can rely on the bearing for the first cut. But on the second cut the bearing would ride on the previously cut radius, which sweeps away from the edge.

Assemble and glue the sides to the bottoms. I set the case backs in place to help keep them square during the glue-up. Here's how I glued these up: Put glue on the mating parts and set them in place. Then set the back in and clamp across the back and sides. Next, while making sure the back edge of the side was flush to the back edge of the bottom, clamp the side and bottom from top to bottom. With all the clamps in place, check for square and adjust as needed. Do not attach the backs until after finishing the piece.

Next I made the base of the bookcases. Rout the ogee profile on the top edge of the front piece only before biscuiting and gluing the base together. The sides simply butt to the back side of the front piece, and the plywood back piece butts into the sides. The back piece is narrower than the sides and front to leave some space at the floor for any base moulding on your floors. So attach the back piece flush to the top of the base assembly. I also elected not to attach to base permanently to one of the cases. Instead I screwed indexing blocks to the case bottom that allow the lower case to nest into the base. This allows you to level the base when you install it and then simply stack the cases on top.

Frame and Panel Doors • The frames for the glass doors were the last chore to tackle before moving on to sanding and finishing. Because I wanted the relatively small doors to have a delicate appearance, I made my stiles and rails just 1 1/4" wide. For a strong corner joint and a pretty detail on the inside edge of the frame, I used a matched stile-and-rail router bit set normally used for frame-and-



ROUTING THE DOORS • First run the ogee detail on the inside edges of both the stiles and rails. Set the height of the cutter so that it leaves just a slight bead on the face of the parts, say 1/32". After running the parts, switch to the "coping" cutter and cut the matching opposite detail on the ends of the rails only. Make sure you use a back up block, also called a coping block, to stabilize the narrow part while running it through the router bit.

base and complemented the rounded front edge of the case bottoms.

Again, make sure you cut your stiles and rails to the exact length needed using a stop block. This will help ensure you make a frame that's square. Because the router bits are intended to be used with fixed panels, and the glass needs to be removable, it's necessary to cut away part of the edge detail on the back, changing it from a groove to a rabbet. Using a table saw, it's a simple procedure for the rails because you can run the part all the way through. For the stiles, however, you need to make a stopped cut because the piece you leave at the ends is part of the "mortise" joint made by the matching router profiles. Mark the stiles from the ends where you want to stop the cut (it can vary slightly depending on the cutters you use), then mark the table saw's fence at the point where the blade projects above the table when it is set to the correct height for the cut you're making. While holding the part firmly to the fence, slowly lower it onto the blade with the motor running, then cut the part to the matching lines on both the part and the saw fence.

Now you can glue up the stile and rail assembly, making sure you check for square and adjust as needed. When dry, chisel out the corner of the back of the stile where the waste piece remained from the stop cut you just made. Lastly, cut and fit the strips that will hold the glass in place on the back side of the frames.

Critical Dowel • Check the fit of the doors. You should have a 1/16" gap on the sides and bottom and a 1/8" gap left for the top (this allows the door to pivot up without touching the piece above it). If the fit is good, drill a 1/2" hole in the door's edge that's 1/2" deep. Locate the hole in the center of the edge so that the hole centers 5/8" down from the top edge. Use your combination square as a marking gauge and a doweling jig for accurate drilling. Drill these holes on both edges of each door. Insert a 7/8" length of dowel or other 1/2" rod into the door edge. Place the doors in the grooves in the sides of the case (this is easily done with the top open). Bring the doors forward and gently lower them down into position.

The last bit of fussing with the doors is setting the pin below the groove where the doors slide in their grooves. Carefully positioning the pin provides not only the spot where the door rest when open, but also coaxes it into the proper location at the top when closed.

Next sand your parts with 120 and 150 grit paper using a random orbit sander. Also make sure no glue was left behind that would interfere with making a nice finish. For the final finish, I tried something I'd never done before. I added a slight amount of oil-base stain to boiled linseed oil. Linseed oil on cherry brings out the grain of the wood more than does a film finish like varnish, shellac or lacquer. The wee bit of color added (I used about a thimbleful of stain to 10 ounces of oil) gave the new cherry a bit of "maturity" that the new wood always lacks. I tend to think that new cherry without any color added looks anemic. But too much color causes cherry to blotch if you don't apply a wash coat first or use a stain controller.

If you choose to use an oil-only finish, apply a couple more coats of boiled linseed oil making sure you thoroughly wipe off all excess oil after applying. For my bookcases, I allowed the oil to dry for several days then sprayed the pieces with clear lacquer. Brushing on varnish, shellac or polyurethane will work as well. Finally, put your doors back

into the cases and screw the backs into the sides and bottom.

When it comes time to set up your barrister bookcases, their modular construction and variety of arrangements should prove a real asset. That is, unless you can't agree with your "significant other" just how they should go. In that case, you might just need a barrister to settle the bookcase dispute.

Schedule of Materials: Barrister Bookcases, tall unit			
N o.	Item	Dimensions	Material
1	Top or bottom	3/4" x 12 5/8" x 34 1/4"	Cherry
2	Sides	3/4" x 12" x 13 1/4"*	Cherry
1	Back	1/2" x 33 1/4" x 13 3/4"*	Cherry ply
2	Door rails	3/4" x 1 1/4" x 30 3/8"	Cherry
2	Door stiles	3/4" x 1 1/4" x 13 1/16"*	Cherry
1	Base front	1" x 3 1/2" x 34 3/16"	Cherry
2	Base sides	3/4" x 3 1/2" x 11 7/8"	Cherry
1	Base back	3/4" x 3" x 32 11/16"	Cherry
1	Glass	1/8" x 12 1/4" x 30 5/16"	
	Glass stops	3/8" x 7/16" x 8 ft.	Cherry
* Subtract 2" from these dimensions for a shorter unit.			

153

BIRDHOUSE

ITEM #	QTY	DESCRIPTION
1	1	1" x 6" x 5'-0" LONG CEDAR FENCE BOARD
2	35	1-1/2" LONG FINISH NAILS
3	1	OUTDOOR WOOD GLUE
4	4"	3/8" DIAMETER ROUND WOOD DOWEL

NOTE: All parts to be made from 1"x6" (3/4" thick by 5-1/2" wide) cedar fence board. Therefore, all dimensions shown 5-1/2" will not require cutting. If a board other than 5-1/2" wide will require additional cuts.

STEP #1

Make (2) side wall panels as shown in Figure #1.

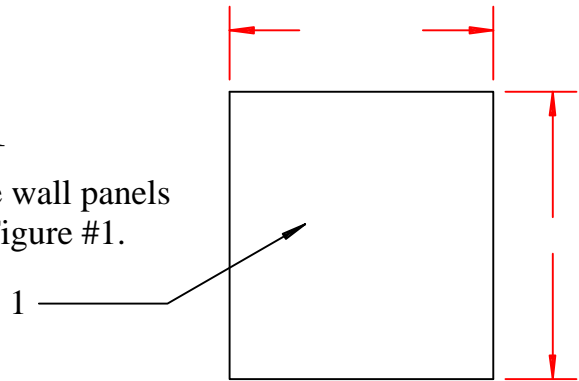


FIGURE #1

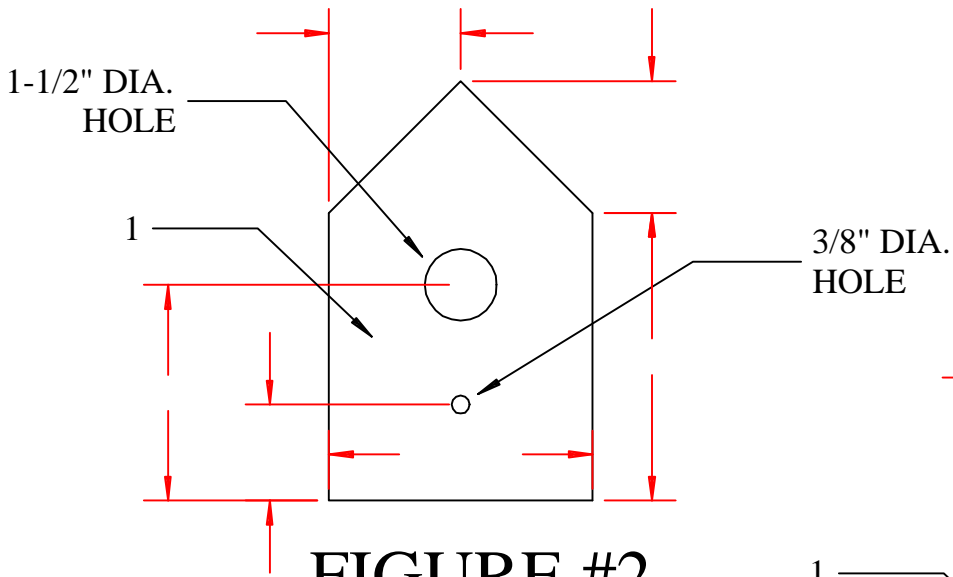


FIGURE #2

STEP #2

Make (1) front wall panel as shown in Figure #2.

3/8" DIA. HOLE

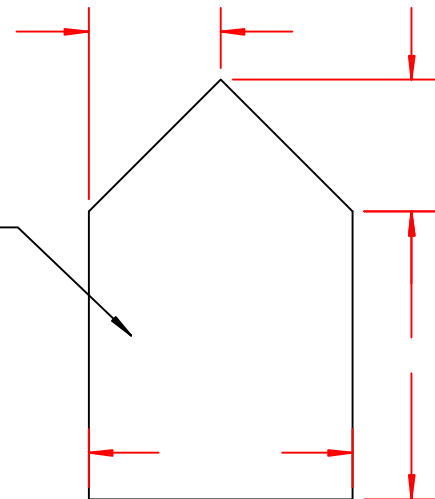


FIGURE #3

STEP #3

Make (1) back wall panel as shown in Figure #3. Use front panel as a template for back panel to ensure both panels are identical.

STEP #4

Assemble (2) sides, front, and back panels as shown in Figure #4. Glue and nail (3 nails per joint) each joint.

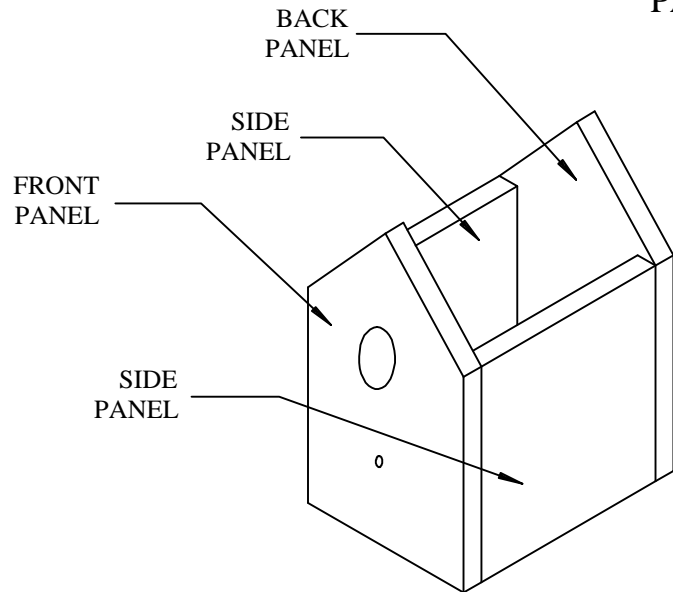


FIGURE #4

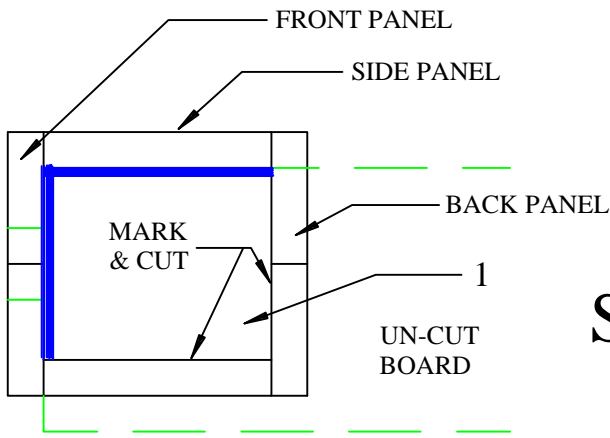


FIGURE #5
TOP VIEW

STEP #5

Make (1) bottom panel by placing assembled walls on top of oversized, future bottom panel, board as shown in Figure #5. Mark (2) edges to be cut from inside of birdhouse as shown in Figure #5. Cut on marked lines. Install bottom panel inside assembled walls with glue and nails (2 nails per side).

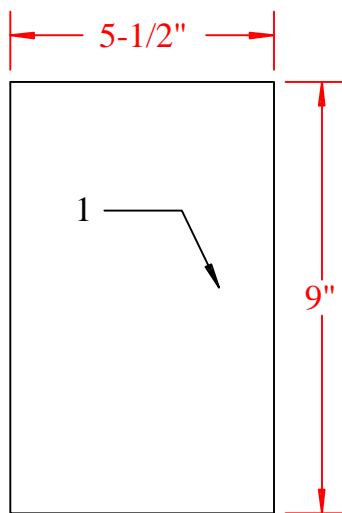


FIGURE #6a
RIGHT ROOF PANEL

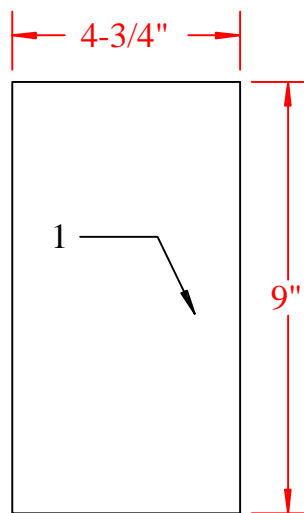


FIGURE #6b
LEFT ROOF PANEL

STEP #6

Make (1) right roof panel and (1) left roof panel as shown in Figure #6a and Figure #6b.

STEP #7

Install roof panels on house walls as shown in Figure #7a and Figure #7b. Glue and nail (2 nails per end and 3 nails along ridge) roof panels.

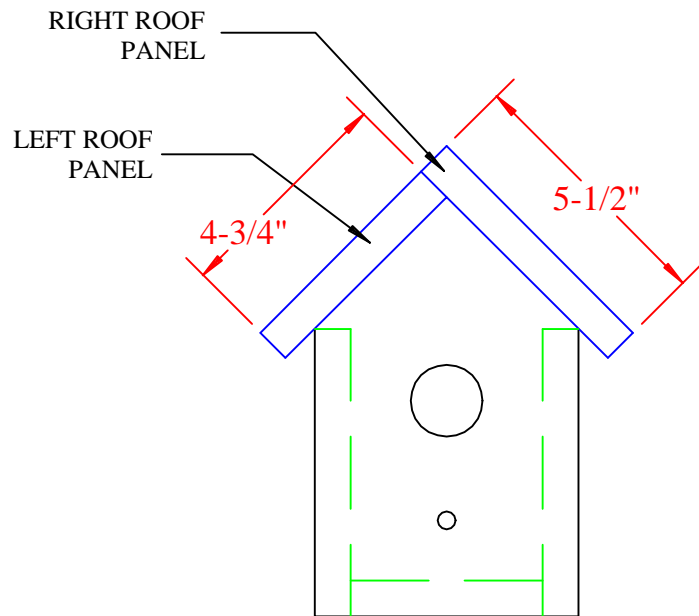


FIGURE #7a
FRONT VIEW

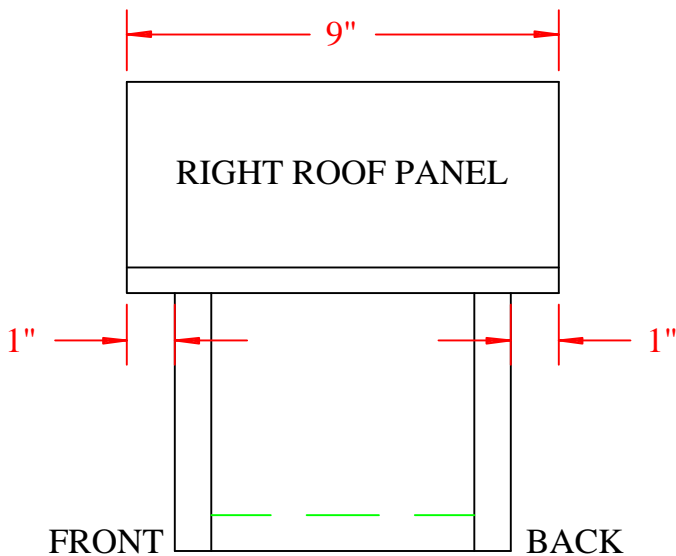


FIGURE #7b
SIDE VIEW

STEP #8

Cut a 4" long piece of 3/8" diameter wood dowel. Glue and insert dowel into 3/8" diameter hole previously cut into front panel of bird house.

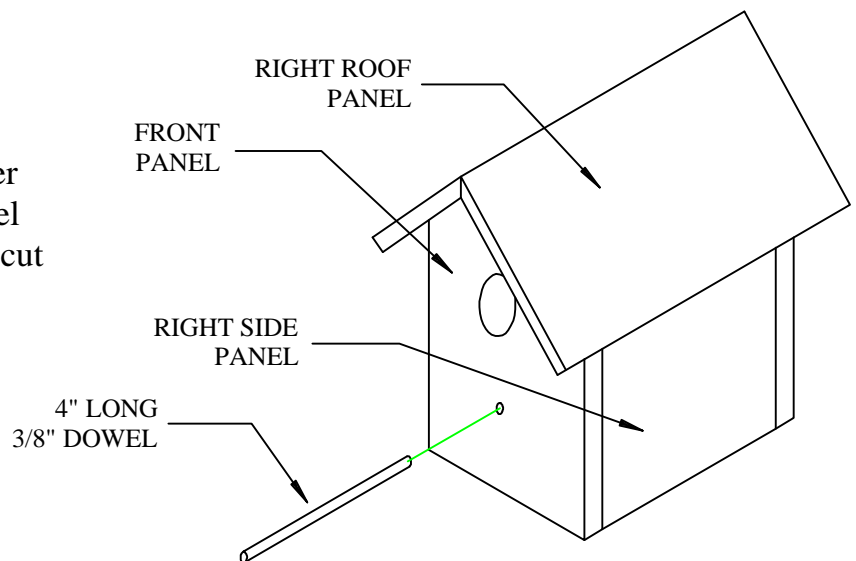
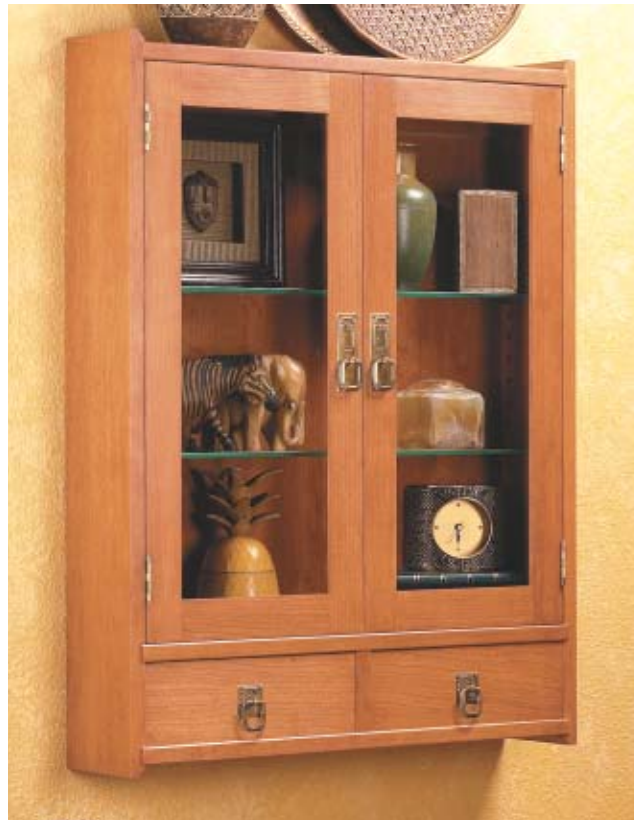


FIGURE #8

154
DISPLAY CABINET





▲ Though this case has some unique features, it's built with basic dado construction. For more on cutting dados and grooves, see our **Woodworking Basics** series at PlansNOW.com

Case

The basic case of this display cabinet is quite simple — just a pair of sides that trap a top, bottom and a single, fixed shelf, as you can see in Fig. 1. Later, you'll add a vertical divider to create the drawer openings, a cleat for hanging the cabinet, and a plywood back. But for now, you can focus on the basic case pieces.

SIDES, TOP, BOTTOM & SHELF.

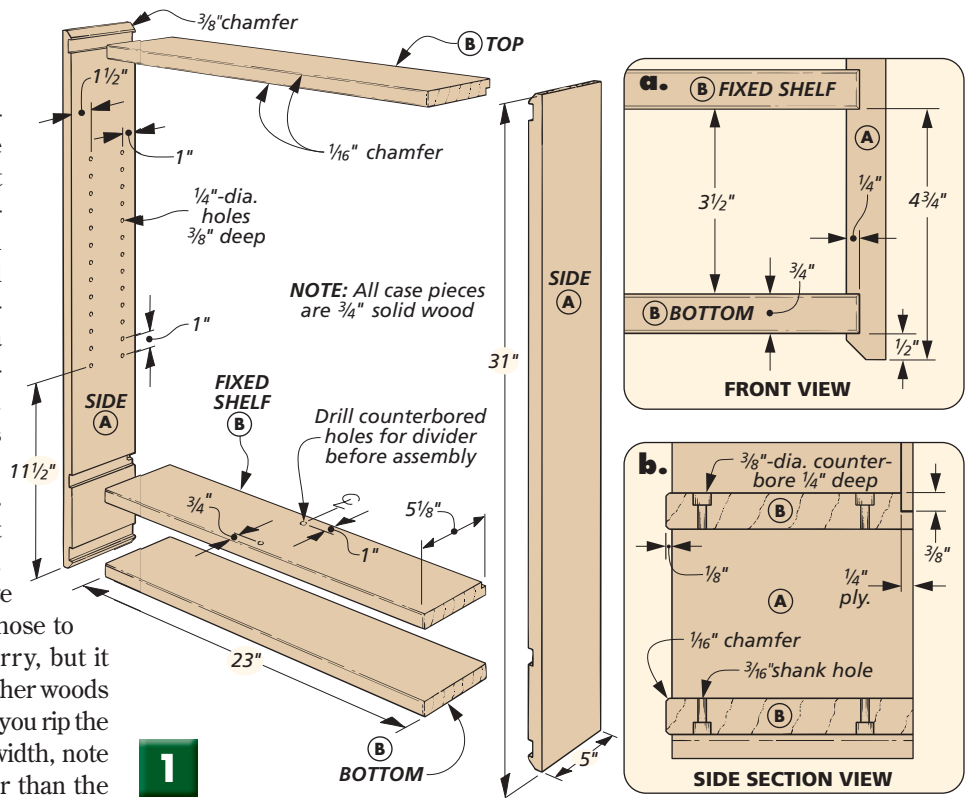
The first thing to do is cut the sides (A) and the top, bottom and shelf (B) to size from $\frac{3}{4}$ "-thick stock. (I chose to build this cabinet in cherry, but it would also look great in other woods like oak or maple.) Before you rip the top, bottom and shelf to width, note that they're slightly wider than the sides so they will stand $\frac{1}{8}$ " proud, as shown in the photo at left and Fig. 1b.

The sides require the most work, so I started with them. First, I cut a chamfer on both ends, as shown in Fig. 2. This is a fairly deep chamfer, so instead of cutting it in multiple passes with a router bit, I cut it on the table saw using an auxiliary miter gauge fence to support the piece.

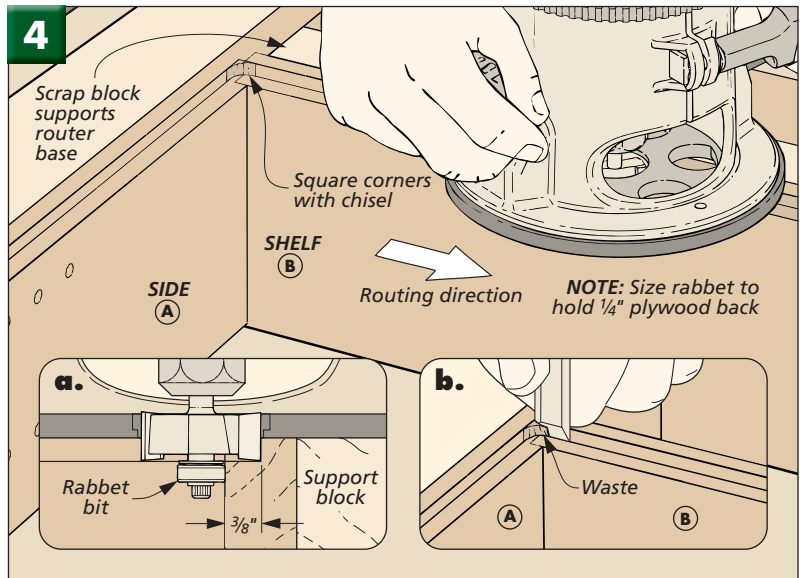
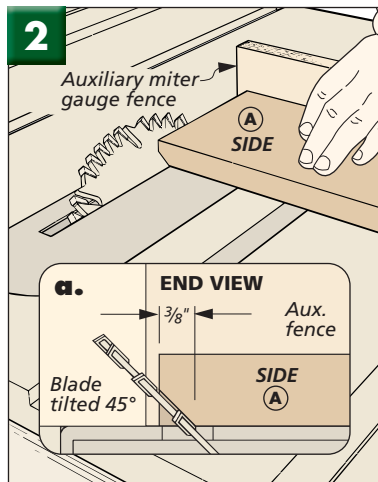
You can leave the auxiliary fence in place while you cut the dados to hold the top, bottom, and shelf, as shown in Figs. 1a and 3. And to make sure the dados line up across from each other, you'll want to either add a stop to the end of the auxiliary fence or use the rip fence as a stop, as I did in Fig. 3. (You can do this because the cuts don't go all the way through, so there are no waste pieces to kick back at you.)

The last thing to do on the side pieces is drill the series of $\frac{3}{8}$ "-deep holes for the L-shaped shelf supports that will hold the glass shelves.

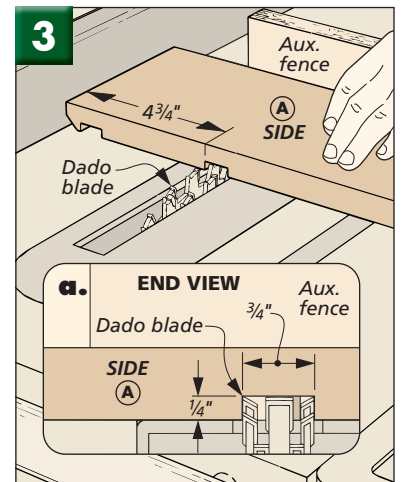
Before the case can be assembled, you'll need to do a little work on the top, bottom and shelf. First, the front edge of each needs a $\frac{1}{16}$ " chamfer, as indicated in Fig. 1b. Then in the shelf and bottom pieces, you'll want to drill the two counterbored shank holes that will hold the drawer divider.



1



2



3

4

(It would be a bit awkward to do this after assembly.)

Gluing this case together isn't hard. Just remember the top, bottom and shelf stand proud in front of the case and are flush in back.

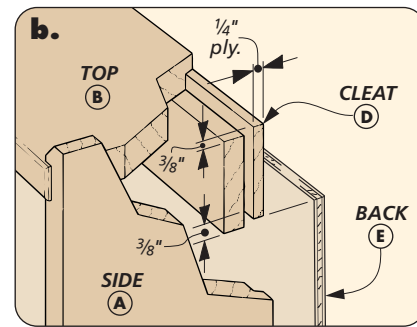
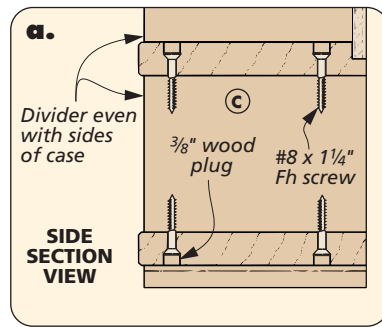
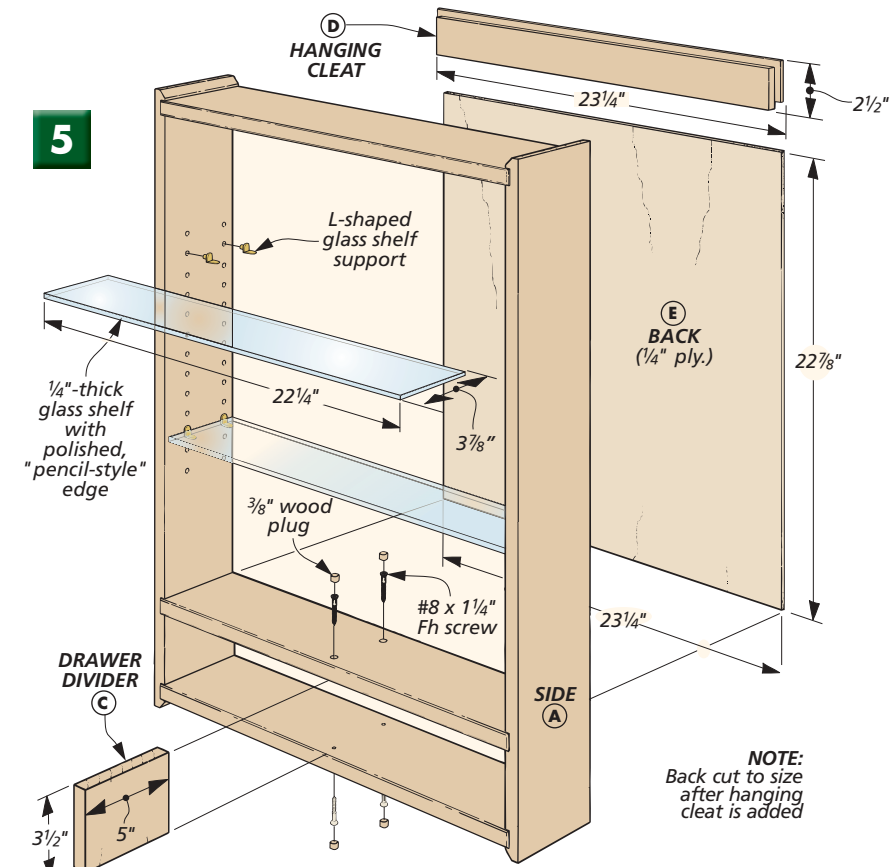
After the glue on the case is dry, the next thing to do is rout the rabbet for the 1/4" plywood back panel. As you can see in Figs. 4 and 4a, I did this with a hand-held router, using scrap blocks to help support the router base so it wouldn't tip. Then I came back and cleaned up the corners with a chisel (Fig. 4b).

DRAWER DIVIDER. Before you cut the back to size, there are two other pieces to make. First I cut a *drawer divider* (C) to fit between the shelf and bottom, as shown in Fig. 5. But note that the front of the divider sets back 1/8", just like the sides (Fig. 5a).

After screwing the divider in place (Fig. 5a), the screws can be covered with 3/8"-dia. wood plugs. (I'd recommend you use face grain plugs here so they'll be less noticeable.)

HANGING CLEAT. The next piece I added was a *hanging cleat* (D), as you can see in Fig. 5. This way, when hanging the cabinet on the wall later, I had a 3/4"-thick solid-wood piece to screw through, instead of the 1/4" plywood back.

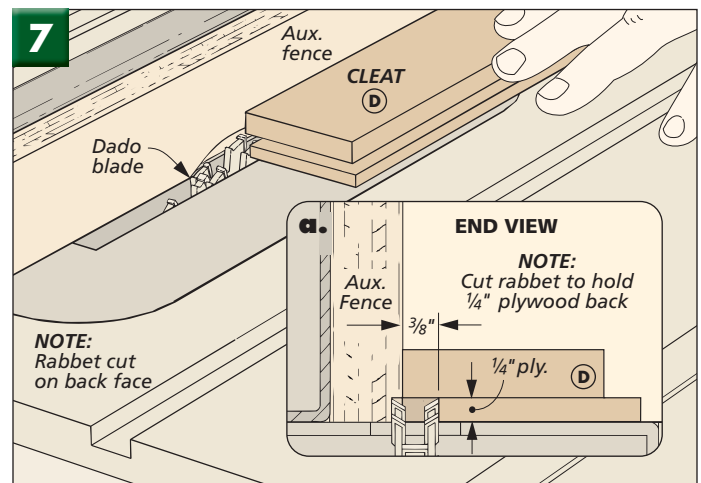
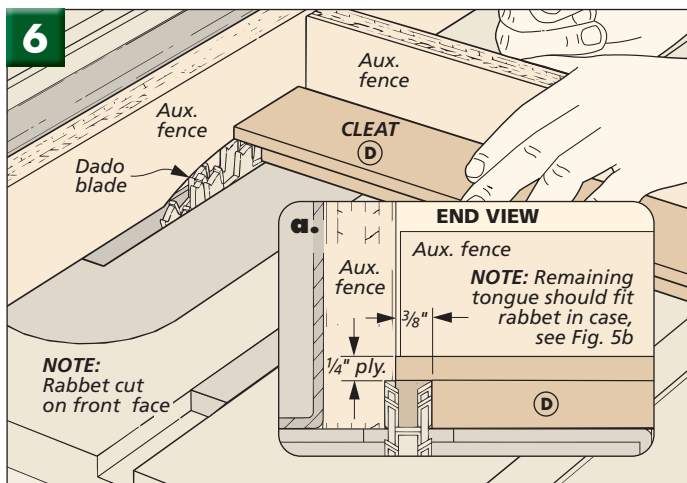
Making the cleat is a two-step process. It's cut to fit between the rabbets for the back, but to get it to fit flush with the back, you'll need to cut a rabbet around three edges of its front face, as shown in Figs. 5b and 6. The second step is just cutting another rabbet — this time, to match



the rabbets in the case for the back, as you can see in Fig. 7.

BACK. When the cleat has been glued in place, you can cut the plywood back (E) to size and glue it into the rabbet (Fig. 5b).

GLASS SHELVES. You really don't need to order the glass for the shelves until you order the glass for the doors later. But I'll just mention here that I used 1/4"-thick glass that had polished, "pencil-style" edges.



Doors

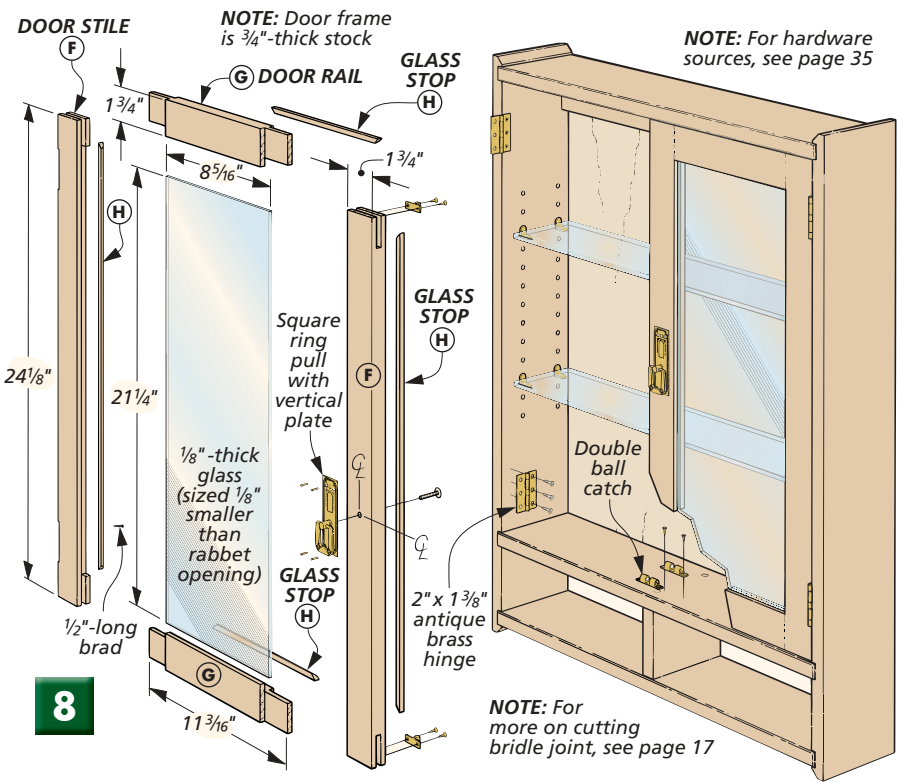
At this point, the case is ready for the doors, and whether you build them with glass or wood panels, the procedure starts out the same. The door frames are built with a grooved bridge joint. But more on that in a minute.

CUT TO SIZE. Before cutting the door stiles (F) and rails (G) to size (Fig. 8), measure your case so the door pieces can be cut to fit its opening. The stiles are sized so there will be a $\frac{1}{16}$ " gap at the top and bottom of each door. The rails are a bit more work, but at least with a bridge joint, they're the full width of the door. Here, I allowed for a $\frac{1}{16}$ " gap on the sides of the case but no gap between the two doors. (Later, you'll trim the edges where the doors meet, as in Fig. 8b.)

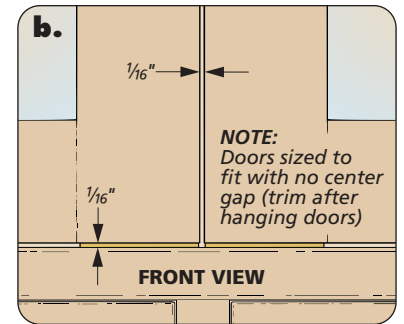
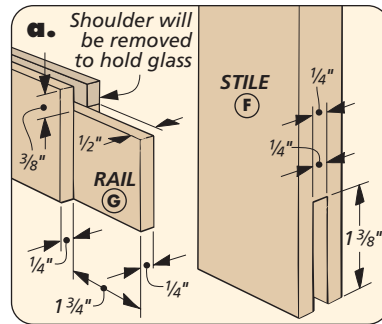
BRIDLE JOINT. With the pieces cut to size, you're ready to cut the bridge joint, see Fig. 8a. I came up with a quick jig (shown in the margin photo) that eliminates one of the setups. And I've described the jig (and how to cut the bridge joint) on page 8 and 9.

DOOR PANELS. If you're building the doors with wood panels, you'll need to make them *before* you glue up the frame, see bottom of page 6. For glass doors, you can glue up the frames now. (Later, you'll rout a rabbet for the glass to fit into.)

HINGE MORTISES. With the door frames glued up, I cut the mortises for the hinges next, as shown in Fig. 9. This can be done at the table saw, and I sized the mortises to match the full depth of the hinge barrel, minus $\frac{1}{16}$ "



8

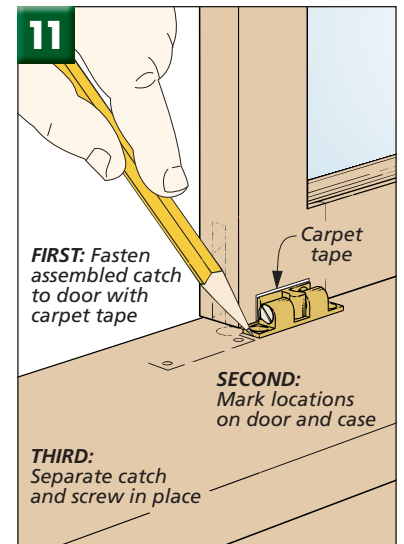
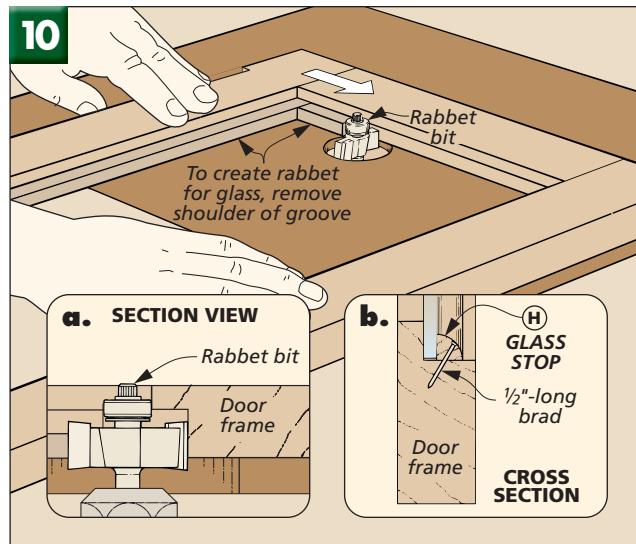
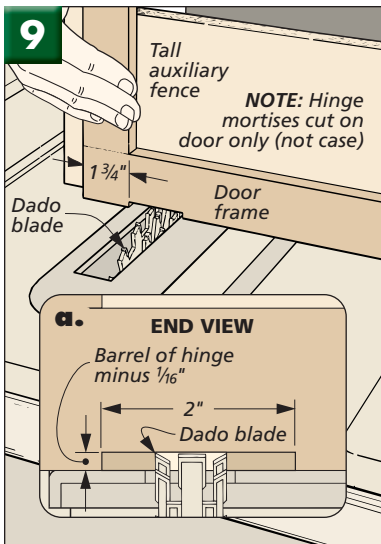


for the gap. (The hinges are simply screwed to the inside of the case.)

Now you can rout the back edges of the doors to hold the glass, as in Fig. 10. I used $\frac{1}{4}$ " glass stop (H) to mount the glass (Fig. 10b). And on page 8, there's a "miter box" I used to

cut the stops to length. (But you don't want to add the glass until the finish has been applied to the project.)

HANG DOORS. At this point, the doors can be hung in the case. Then you can trim their inside edges to create the $\frac{1}{16}$ " gap (Fig. 8a) and add the pulls



and catches. The double ball catches I used can't be adjusted after they're screwed in place, so for an accurate installation, I positioned them with carpet tape, as described in Fig. 11.

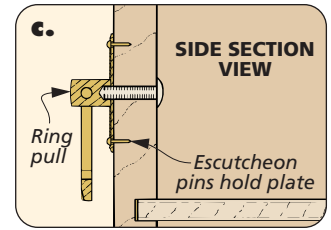
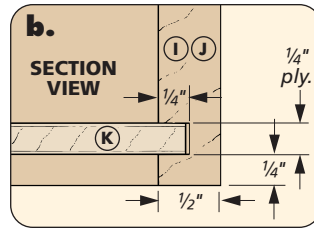
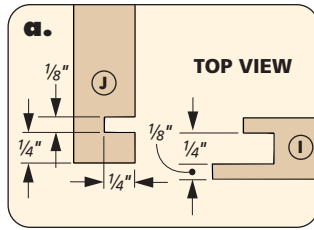
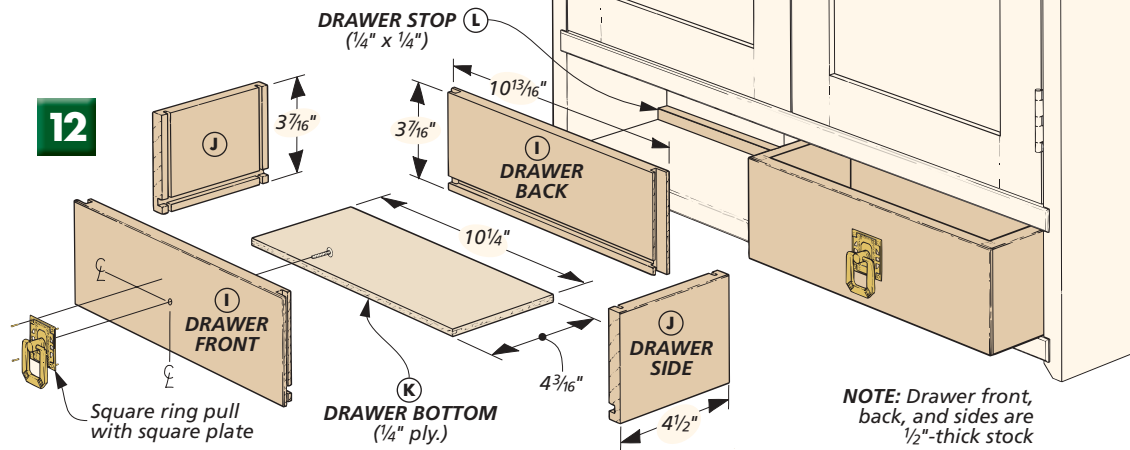
DRAWERS

All that's left now is to build the two small drawers, as shown in Fig. 12. I sized the $\frac{1}{2}$ "-thick *fronts* (I) and *backs* (I) so the drawers would be $\frac{1}{16}$ " smaller than the openings in height and width. And the *sides* (J) are sized so the drawers would stop $\frac{1}{4}$ " short of the back of the case.

LOCKING RABBET. To create a strong drawer without a lot of fuss, I decided to use a locking rabbet joint (Fig. 12a). It looks more complicated than it really is. In fact it can be cut in three quick steps on the table saw.

First, a centered groove is cut on the ends of the front and back pieces, as shown in Fig. 13. The key here is that the height of the blade matches the thickness of the drawer sides.

Next, I trimmed the inside face of the front and back pieces to create a



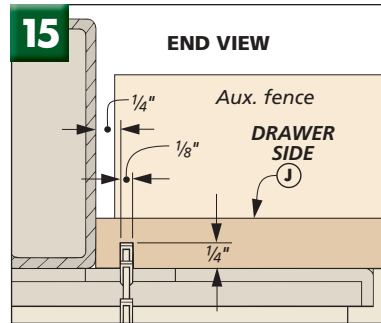
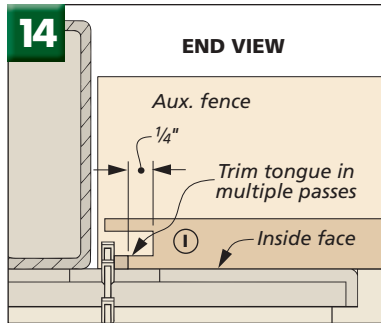
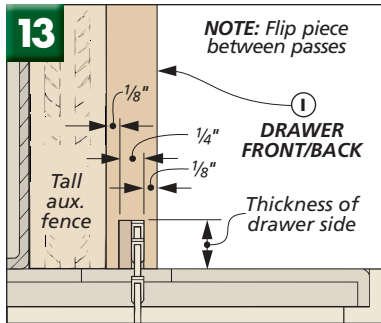
$\frac{1}{4}$ "-long tongue, as shown in Fig. 14.

The last step is to cut dados on the sides (Fig. 15). Just position the dados to line up with the tongues cut in the fronts and backs (Fig. 12a).

BOTTOM. Now each drawer piece is ready for a groove that will hold the $\frac{1}{4}$ " plywood *bottom* (K), as in Fig.

12b. Then when the bottoms are cut to size, you can glue the drawers together and add the pulls (Fig. 12c).

STOP. All that's left now is to cut two *stops* (L) for the back of the case. They're sized so the drawer will end up flush with the *sides* of the case. (Mine were $\frac{1}{4}$ " wide.)

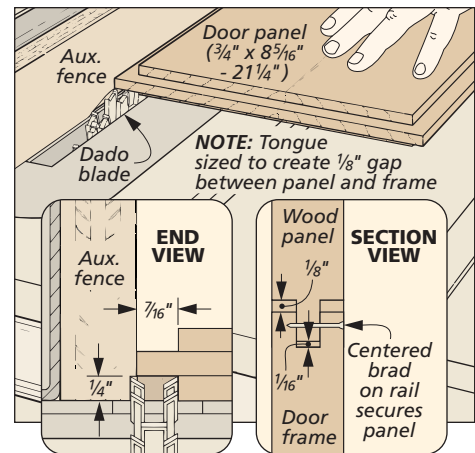


WOOD PANEL DOOR



For an elegant *storage* cabinet, you can build the doors with wood panels instead of glass. (You can also add wood shelves inside.)

Each panel is sized so it'll fit in the grooves when the door is glued together. (Be sure to allow a small gap on each side so the panel can expand and contract.) To create the tongue, all you need to do is rabbet each face, see drawing. And when assembling the frame and panel, remember *not* to glue the panel into the frame.



STORING HAND TOOLS

The display cabinet is sized just right to make a great tool cabinet for those special hand tools you want to keep accessible — and protected. Of course, whether you build a “fine” cabinet (with cherry and ash, like the one here) or choose less expensive wood is up to you. Either way, there are a few things to keep in mind as you’re adapting this cabinet for tool storage.

WOOD PANELS. To make the best use of the space inside the cabinet, I decided to build the doors with solid-wood panels instead of glass. This way, I could store tools on the doors, as well as

on the shelves (and back). But to do this, you have to make sure there will be enough clearance inside the cabinet. This means cutting shallow recesses in the front edges of the shelves or cutting narrower shelves (and changing the locations of the holes for the shelf pins), as in the drawing above.

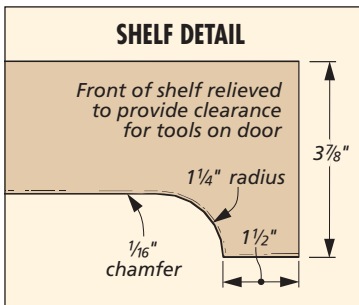
TOOL HOLDERS. It’s not hard to design and build your own custom tool holders. The goal is to get them to hang securely so they don’t fall (or swing) whenever the door is opened. At the same time, you want them as easy to lift off and set back on as possible. Plus, if there are sharp edges, like the teeth on a hand saw or the point of an awl, you want to be sure that other tools (and your hands) are protected.

There are a number of ways to accomplish this, as you can see in the photos below. Simple kerfs are great for holding the blades of saws, squares, and rulers. For awls, chisels, and files, I drill counterbored holes that trap the handles and then cut slots for easy access. And for marking gauges and block planes, you can make a small shelf platform. Here, you’ll want to add small cleats

to the edges so the tools won’t slide off as the door is opened and closed.

When you’re making these small holders, it’s best to do as much work as you can with the pieces oversized. This keeps your hands as far away from the blade as possible.

The photos below show just a few of the tool holder ideas we came up with for our cabinet. To see some more ideas, go to the Online Extras section on our web site:



ORGANIZING TOOLS. In order to get the most use out of the doors, I decided to spend a little time planning which tools would work best where. To do this, I simply laid the cab-



Scratch awl. An open hole traps the handle of this awl. And to protect your hands (and other tools), the point sits in a base.



Hand saw. A kerf can be used to protect the teeth of a hand saw. To support the saw, I added a simple base, see main photo.



Marking gauge. For this marking gauge, a notched block supports the head, and a small lip keeps the tool from sliding off.



Combination square. A small angled block with a shallow kerf is all you need to capture a combination square.

SHOP NOTES



Mitering Glass Stop

When mitering glass stop, the trick is to work with the fragile $\frac{1}{4}'' \times \frac{1}{4}''$ strips safely. So when it was time to cut the stop for the glass doors on the display cabinet, I decided to leave my table saw turned off and miter the pieces with a hand saw, as shown in the photo at right.

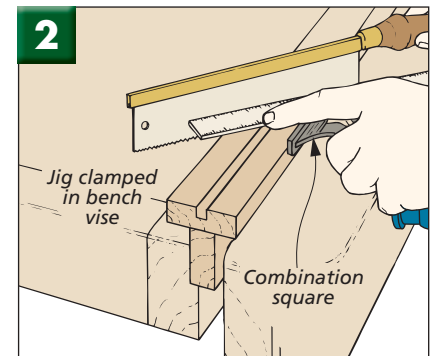
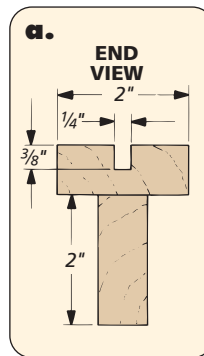
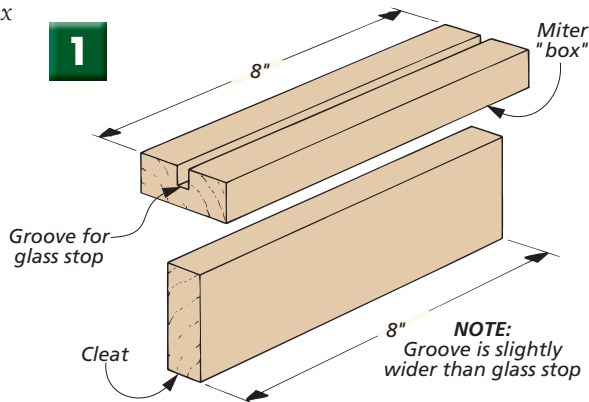
MITER BOX JIG. To do this accurately, I made a quick

miter "box" sized for small strips. As you can see in Fig. 1, this is just a piece with a groove cut in it to hold the glass stop blanks. (The stops shouldn't fit the groove tight, or you'll have a hard time adjusting them from side-to-side.) This miter "box" is glued to a cleat so the T-shaped jig can be clamped into a bench vise.

Of course the critical part of making this jig is accurately cutting the kerfs that guide the hand saw. And to do this, I used my combination square, as shown in Fig. 2. Then to hold the small

strips in place, I gripped them with my fingers. But I found that the saw tended to bind in the kerf. So for a quick solution, I rubbed a little wax on the blade, as in the margin photo at left. **W**

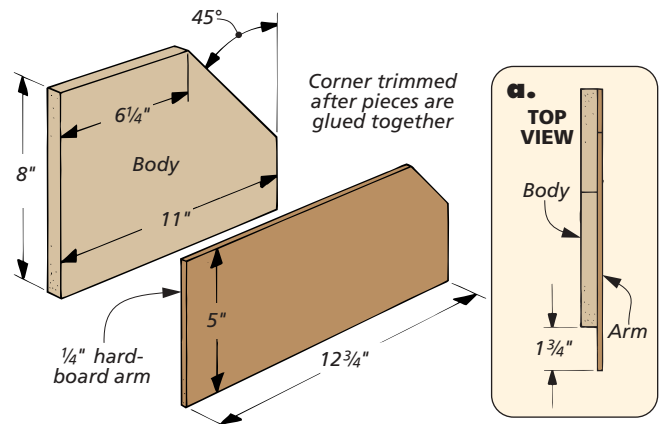
▲ To allow my hand saw to slide smoothly in this miter "box," I applied a little wax to each face.



▲ This push block lets you cut the mortises without having to reset the fence.

Make a Bridle Jig

I needed a simple push block to support the stiles while the mortises were being cut. Plus, I wanted to use the same fence setting as the groove setup so the mortises would align with the grooves. This push block does the trick. Its body matches the stile's thickness ($\frac{3}{4}''$), and the hardboard arm extends past the front of the body to prevent the piece from tipping as it's pushed across the blade.



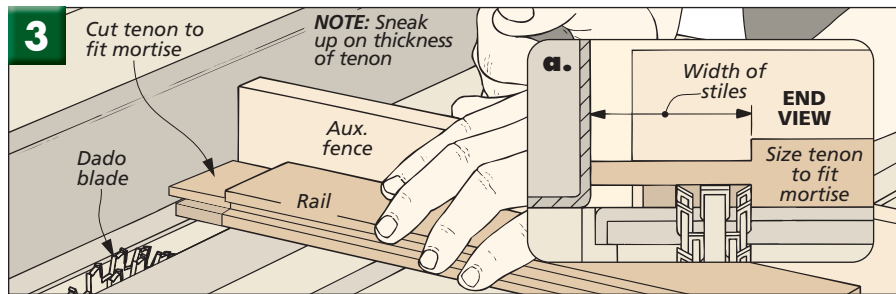
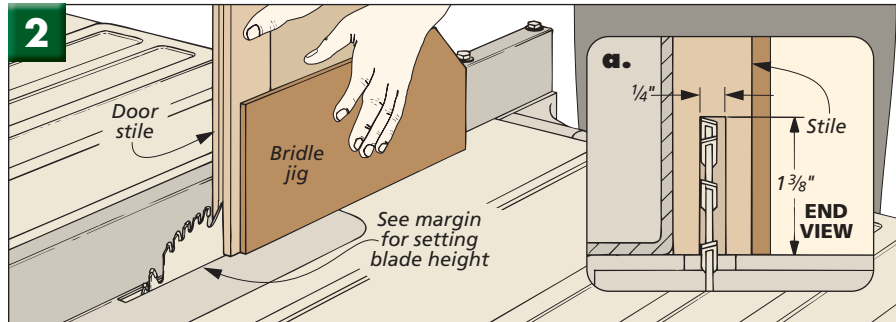
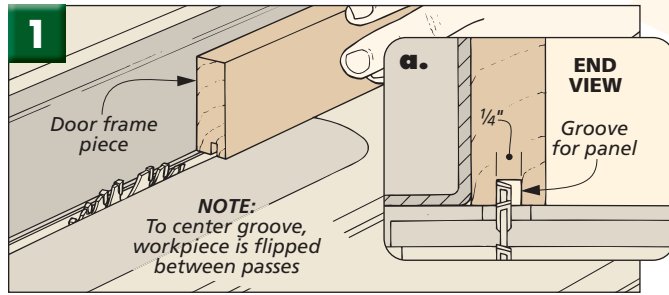
Bridle Joint

This display cabinet has door frames with grooves on their inside edges to hold a panel. As you can see in the upper photo at right, a bridle joint (or open mortise and tenon) is a good choice for this type of frame. It's plenty strong to hold a glass panel, and the whole process can be done on the table saw. All you need is the simple bridle jig (see page 8). Be sure to build the jig *before* you get started on the joint.

GROOVE. The first step to building the frames is to make a centered groove on each piece, as in Fig. 1. Technically, this isn't part of the joint, but you'll use this same fence setting to cut the mortise next.

To cut the groove, I made a couple passes over a regular blade. Flipping the pieces between passes automatically centers the groove. And you'll want to sneak up on the position of the fence until the grooves are $\frac{1}{4}$ " wide.

MORTISE. Now you can cut the mortises in the stile pieces, as in Fig. 2. You don't want to change the fence for this step. The mortises should align with



the grooves. But you will need to raise the blade to set the depth of the mortises, as indicated in the lower margin photo. This way, the mortise's depth will automatically match the width of the tenon.

Cutting the mortises is

the same two-step process you used when cutting the grooves. Only this time, the workpieces will be cut standing on end (supported by the jig).

TENON. All that's left now is to cut a tenon to fit the mortise. As you can see in

Fig. 3, I laid the rails down for this step, making multiple passes over a dado blade. Set the fence so the tenon matches the width of the stiles. Then sneak up on the height of the blade until the tenon fits snug in the mortise.



▲ Unlike a traditional mortise and tenon, a bridle joint can be cut completely on the table saw.

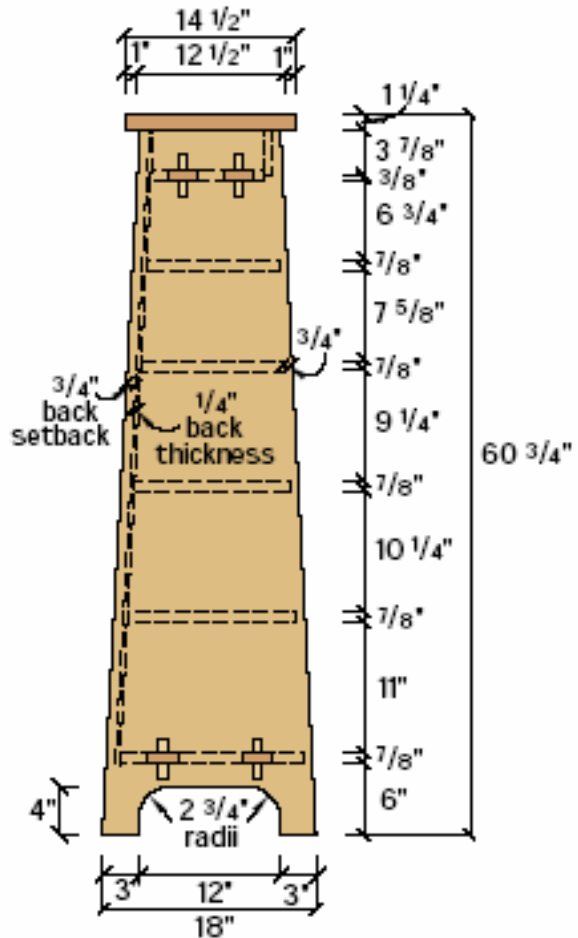
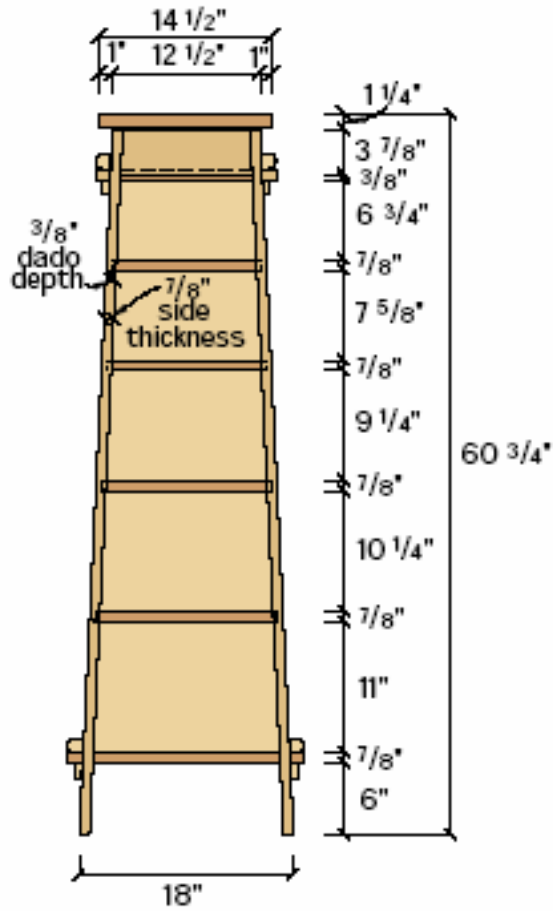
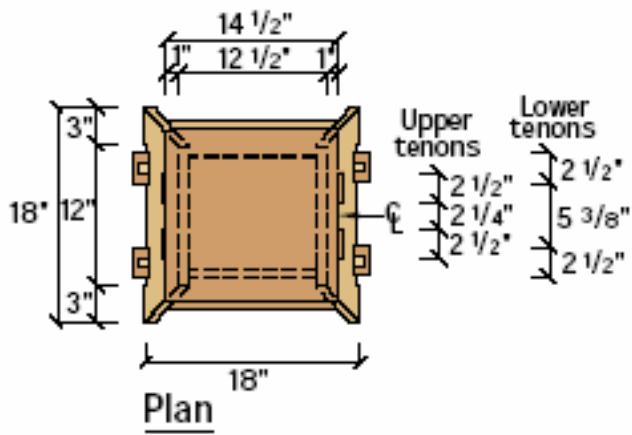


▲ To set the blade at the right height for the mortise of the bridle joint, raise it until it aligns with the groove in one of the rail pieces.

155

MANTLE CLOCK





During the Arts & Crafts heyday at the turn of the 20th century there were an extraordinary number of designs for bookcase and magazine stands offered to the public as completed pieces and construction plans. Most included simple designs and straightforward construction.

Slabs • In keeping with the Arts & Crafts style of stout furniture, the sides and shelves of this piece are called out as 7/8"-thick material. You may find the design more economically feasible by changing that to 3/4" material. Start by milling and matching the grain patterns on the two side pieces. If possible, try and use only two boards per side for the width. If this isn't possible, the trapezoidal design will allow you to use two 7"-wide boards for the center of each side, adding a 2" strip on the front and back edges of the lower half, keeping the exposed glue lines to a minimum.

With the sides glued, squared up and sanded flat, mark the location of the shelves as shown on the diagram. The top and bottom shelves will have angled through-mortises cut into the sides, while the other four shelves are captured between the sides in 3/8"-deep stopped dadoes. To mark the start and stop locations of the dadoes, draw the shape of the sides on the side blanks, then measure in 3/4" from the front and back edges.

Cut the dadoes with a plunge router and a router guide. Even though the sides of the stand are angled 3 degrees, the dadoes can be cut at a 90-degree angle to the side leaving only a slight gap on the underside of each shelf. If you prefer to eliminate the gap, a wood strip can be used to tilt the router at a 3-degree angle. If you opt for the angled dadoes, run a test piece or you may inadvertently transfer your gap to the top of the shelf.

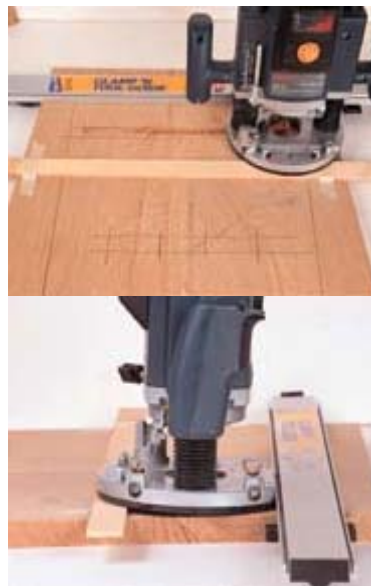
The through-mortises can also be cut using a router with the base tilted to a 3-degree angle or marked and hand cut. In either case, cut from the outside surface to keep any tearout to the inside of the case. Use a scrap backing board to reduce the tearout even further.

Trapezoids & Shelves • With the dadoes and through-mortises complete, crosscut the top and bottom edges of the sides at a 3-degree angle, then use a band saw or a jigsaw and a plane to shape the sides. Next, mark and cut the elongated half-oval at the base of each side to form the legs. Lastly, mark the back edge of each side for a 1/4" wide x 3/8" groove for the back. The groove should be set in 1/2" from the back edge and start 6" up on the sides, running through at the top.

Next cut the shelves to size. The four center shelves can be cut to the sizes given in the Schedule of Materials, with all four edges cut on a 3-degree angle. The top and bottom shelves are a little more complicated. Each must have the through-tenons cut to size and shape.

And the end of the shelf should be pared with a chisel on a 3-degree angle to match the inside surface of the sides. Don't cut the mortises for the wedges at this time. See the wedge diagram on the next page.

Back & Drawer • This next step can be a little awkward, so if you have a friend handy, give him or her a call. Dry-assemble the stand



MILL THE SIDES • A 1/4"-thick strip of wood is taped in place on the side slab to give a 3-degree angle to the shelf dadoes and the through mortises. Using a 1/2" straight router bit required moving the set-up once for each dado to achieve the 7/8" width necessary.



TAPERS EVERYWHERE • The sides are tapered only after all the necessary milling in the sides is completed. I used a jigsaw to cut the sides to size, then smoothed up the edges with a bench plane.



DRAWER • The drawer is made of 1/2" Baltic birch plywood, and it uses tongue-and-groove construction. A more complex joint could have been used, but the drawer is unlikely to see any heavy use and could be left out altogether.

by laying one side flat so the through-mortises hang over the edge of the table. Place the shelves in their respective dadoes and insert the through-tenons into the mortises. Then place the other side over the tenons and insert the shelves. To hold everything in place, use soft-jawed clamps across the width of the stand placed underneath the through-tenons. This should pull the tenons and the shelves into place. Check the fit and adjust as necessary.

With the stand still dry-assembled, measure for the trapezoidal back, allowing as tight a fit in the back grooves as possible. The bottom of the back will overlay the back edge of the bottom shelf and be tacked in place to the shelf. The top of the back should be flush to the top of the sides.

With the stand still dry-assembled, mark the location of the sides on the top and bottom surfaces of the shelf tenons extending through the sides. Then disassemble the stand and drill out or hand cut through-mortises through each tenon to accept the wedges. Note that the inside edge of the mortise should be 1/8" or so inside your marks to allow the wedges to draw the stand up tight. The diagram at right shows how the joint works. Cut the wedges a little oversized, reassemble the stand and fit the wedges in place. Make sure you mark the wedges so you'll be able to reassemble the piece easily.

If you hadn't noticed, this stand includes a little drawer just below the top. While not of a size to store a great many things, it's a good place for hiding an extra set of keys. The drawer itself is of simple box construction using tongue-and-groove joinery with a bottom captured in a groove. The angled sides of the stand serve as indexing runners to keep the drawer centered left-to-right. The drawer face is cut to match the shape of the sides and overlaps the top shelf, which serves as a drawer stop. Screw the face to the drawer box from the inside.

Topping Things Off • The top is a simple slab of wood that is attached to the sides by dowels. I carefully drilled dowel locations in the tops of the assembled sides, I then used dowel centers placed in the holes to locate the mating locations on the underside of the top piece. With the top fit, disassemble the stand again and sand all the pieces through 220 grit. As a finish for the piece I first applied a coat of brown mahogany gel stain. When the stain was dry, I applied a coat of clear lacquer, sanded and then applied a coat of warm, brown glaze. After the glaze had dried overnight, I added two more coats of lacquer. Assemble the stand as you did during the dry fit, tapping the wedges in place to hold the stand tightly together. If you plan on ever disassembling the piece, use a couple of screws to attach the back to the lower shelf and to the two center shelves for support. Then slip the top into place over the dowels. If you won't be disassembling the piece, use brads to attach the back and add some glue to the dowels to secure the top. PW

Schedule of Materials: Magazine Stand

No.	Item	Dimensions	Material
1	Top	1-1/4" x 14-1/2" x 14-1/2"	White Oak
2	Sides	7/8" x 18" x 59-1/2"	White Oak

1	Bottom Shelf	7/8" x 15-9/16" x 20"	White Oak
1	Shelf	7/8" x 14-5/16" x 15-7/16"	White Oak
1	Shelf	7/8" x 13-3/16" x 14-3/8"	White Oak
1	Shelf	7/8" x 12-1/8" x 13-7/16"	White Oak
1	Shelf	7/8" x 11-1/4" x 12-11/16"	White Oak
1	Top Shelf	7/8" x 9-1/2" x 15-5/16"	White Oak
8	Wedges	3/4" x 1-1/4" x 3-1/2"	White Oak
1	Back	1/4" x 16" x 53-1/2"	White Oak ply
1	False drw front	3/4" x 3-7/8" x 10-9/16"	White Oak
2	Drw sides	3/4" x 3" x 8"	Baltic birch
2	Drw ends	3/4" x 3" x 9-1/4"	Baltic birch
1	Drw bott	1/4" x 7-1/2" x 9-1/4"	Baltic birch

156

BREAD BOX



Bread Box

Bread boxes are very easy to make and it is almost a crime to consider buying one -- unless for some reason wood will not go in your kitchen. This particular bread box is based on one of the more common designs and is therefore easier to build than one with a roll-top lid. Bread box fanatics (presuming such a person exists) are split into two camps: those that want air holes and those that don't. We're not about to pin our colors to either side of the argument and, instead, offer a choice depending upon your own preference.

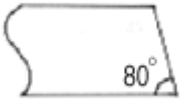
Construction

Tools required: Drill, sander, jigsaw, router

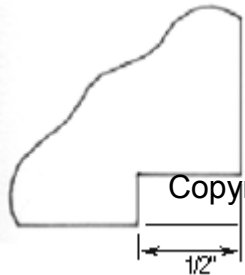
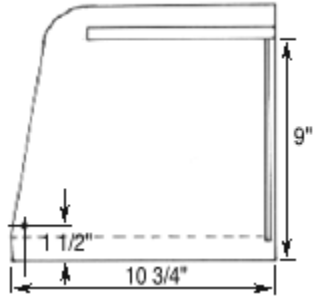
Wood required (pine):

Description	Qty	Thickness	Width	Length
Base	1	3/4"	10 3/4"	18 5/8"
Sides	2	3/4"	10 1/2"	10 3/4"
Top(see note)	1	1/2"	8 9/16"	19 1/8"
Door	1	1/2"	8 1/8"	18 5/8"
Back (plywood)	1	1/8"	9 1/2"	19 1/8"
Hinge (dowel)	2	1/8"	1/8"	1 1/2"
Handle	1	3/4"	1"	5 1/2"

Note: When cutting the top to shape, the front length should be cut at a 80 degree angle. This is to ensure that the bread box door rests against the top evenly, rather than on a very thin edge (see diagram on left).



Cut the two side pieces to the correct shape (see diagram on right), rounding off the top with a smooth curve. Decide which face of each side piece is the inside face and mark it accordingly. Then cut the groove in each of these inside faces. The groove should be 1/2" wide, 1/4" deep and 8 1/16" long (measured from the back edge): it should be cut parallel to the bottom of the side piece at a height of 9" to 9 1/2" from the bottom. [The top of the bread box slots into this groove, thus strengthening the construction.] Finally, drill a 1/8" hole in either side piece, as shown in the diagram. This should be 1 1/2" from the bottom of the side piece, and in 1/4" from the front. The purpose of this hole is that the hinge dowel will pass through this, into each side of the door.



As mentioned above, the top piece slots into the side-wall groove. However, for the sake of neatness, you will notice that the side groove is not quite as long as the top piece is wide. Because of this, it is necessary to cut a small niche out of each end of the top piece (see diagram on left).

It is now necessary to make a groove in the top of the base piece, the inside of both sides and the underside of the top piece. This groove should be 1/8" wide, and 1/4" deep and should be 1/4" from the back of each piece. The back panel slots into this groove, ensuring a nice tight fit. When creating the groove for the two side pieces, do not extend the slot all the way to the top of the sides. Instead, only run the vertical 1/8" slot up to where it intersects the 1/2" horizontal groove.

The final step prior to putting everything together is to prepare the bread box' door. Dry fit the sides, base and top and make sure that the door is the correct length to fit snugly between the sides. Then, round off the bottom length of the door, so that the side profile looks like a semi circle (see diagram).

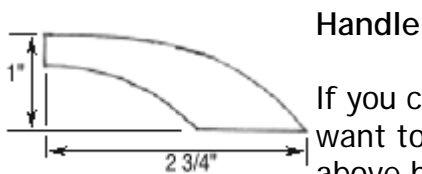


Now, glue and nail (use small pin nails so that they won't show) the sides to the base. Then, glue in the back plywood and add the top, so completing the box shape. Clamp until the glue is dry. Once everything is dry, remove the clamps and place the door into place. Then, drill through the 1/8" holes in each side, into the side of the door. Put a little bit of glue onto each dowel, at least 1/2" from the end, and then slide the dowel hinges through the side pieces into the door. The idea is to glue the dowel into the side pieces, while leaving the door to rotate smoothly around the dowel hinge (it is a good idea to wax the very end of the dowel before gluing it).

Sand everything down, ensuring that the top of the door is flush with the top piece. Screw and glue the handle onto the front and then oil the bread box. To finish the bread box, we recommend mineral oil as it is a non-toxic oil.

Air Holes

If you have decided to add air holes to the bread box, drill 1/8" holes into the upper part of the back plywood.

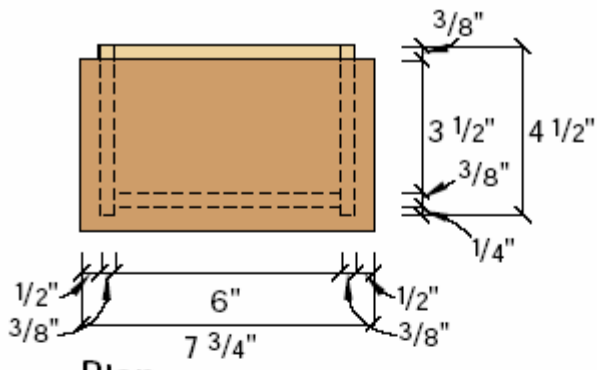


If you cannot find a satisfactory handle for the bread box, you may decide that you want to make one from scratch. If so, this is the plan for the handle used on the above box. Note that the thickness of the handle is 3/4". Also note that the plan provided is only half a plan. Simply sketch this out onto a block of wood, and then turn the plan over to sketch out the other side. This approach helps to ensure that the handle is uniform. Once you have cut out the shape, carefully sand it until you have a nice rounded shape.

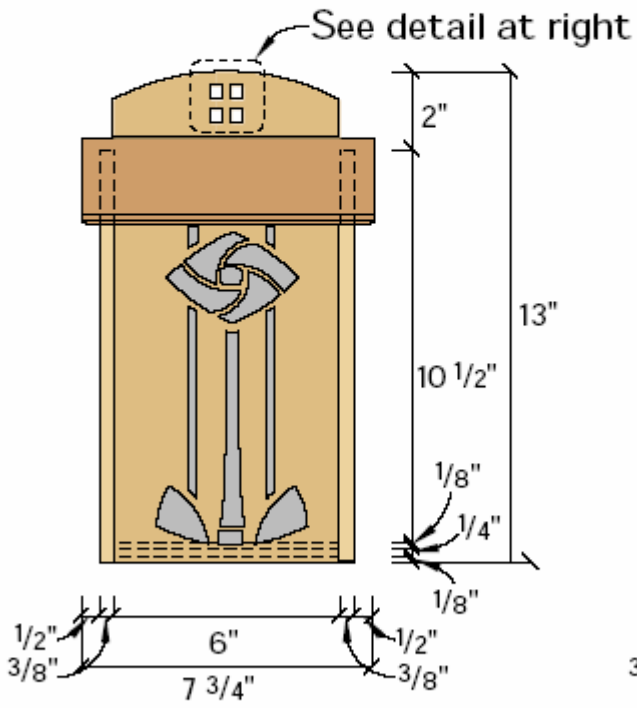
157

BUNGALOW MAILBOX

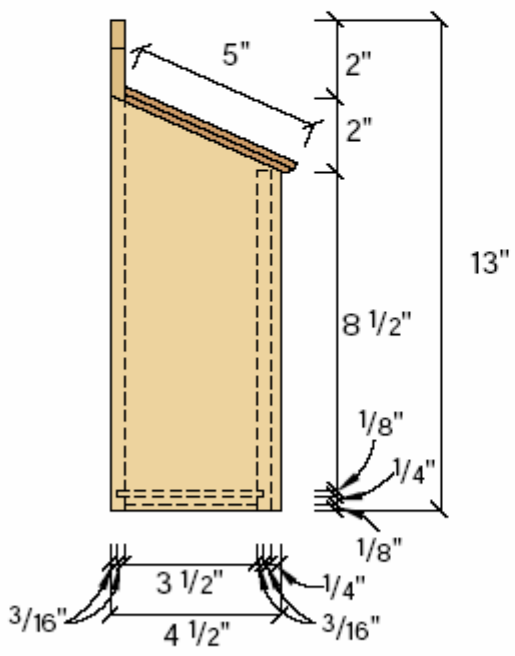




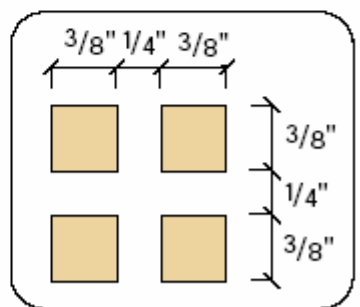
Plan



Elevation



Profile



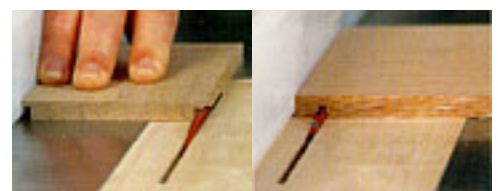
Four square detail

This project was by request. As I live in the 'burbs and have to walk to the curb to pick up my bills, a mailbox mounted next to my front door would be purely decorative. But a friend lucky enough to have postal delivery right to his door asked if I could come up with an appropriate design for his Arts & Crafts-style bungalow home.

After a little research I settled on a design reminiscent of the work of Charles Rennie Mackintosh. Arguably Scotland's greatest 20th century architect and designer, Mackintosh inspired much of the European Arts & Crafts movement during the early 1900s. A stylized flower motif is found on many of his pieces.

Mostly Glue • The joinery for the box is primarily glue and butt joints, utilizing the long grain-to-long grain orientation of the sides, back and front. The bottom, however sits in a tongue-and-groove joint between the front and back pieces to allow the wood to move.

After cutting the pieces according to the Schedule of Materials, cut a 1/4" x 1/8" rabbet on the underside of the two long edges of the bottom. This will leave a 1/8" x 1/8" tongue on the front and back of the bottom (photo one, left). Then cut the dados on the inside bottom of the front



1 BOTTOM JOINERY • The bottom fits into the front and back pieces using a tongue and groove method. The sides are not attached to the bottom, and in fact the bottom is cut to allow a 1/16" gap on either side. Should water happen to get into the mailbox, these gaps will allow it to escape rather than pool up in the bottom.

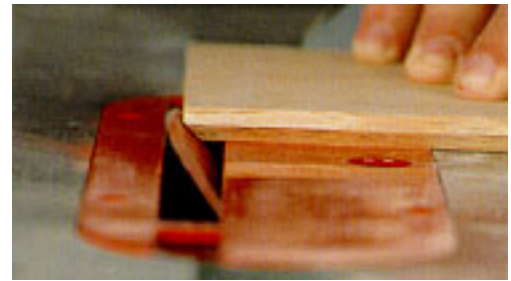
and back pieces by setting the rip fence for 1/2" and the blade height to 3/16" (photo one, right).

Adding the Angles • Now cut the sides of the mailbox on an angle so you can attach the mailbox to your house without cramming a tool inside the box. The sides slope at a 25-degree angle with the front edge measuring 9" tall and the back edge 11" tall. Now cut the chamfer on the underside of the lid. The front and two sides are chamfered at a 45-degree angle on the table saw, leaving a 3/16" flat edge to the top of the lid. The back edge of the lid is cut at a 25-degree angle to mate with the box's back.

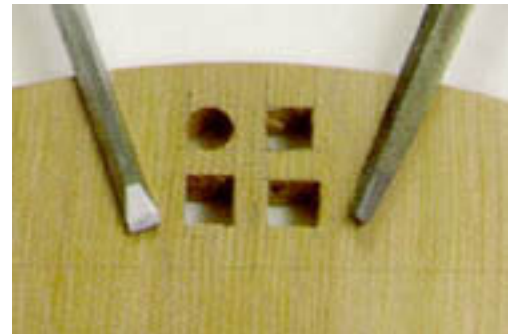
Detailing the Back • To add another Mackintosh feature, I cut a four-square pattern centered in the top of the curved back. First mark the location of the four-square pattern as shown on the diagram. Use a 3/8" drill bit to remove most of the waste from the squares. Then use a chisel and a triangular file to clean up the cuts. To make the curve, draw a 6" radius along the top edge of the back and cut to the mark on the band saw. After sanding, you're ready to glue up the box. The front is set back 1/4" on the sides, while the back is flush to the back edge. The bottom is left loose in the assembly. Now cut out the applied detail from 1/8" stock on the scroll saw.

Finishing Touches

Before gluing the flower to the box, stain the box a rustic-looking gray-brown by applying a black aniline dye wash. The wash was made by diluting the dye eight-to-one with denatured alcohol. I then colored the flower and stem pieces with undiluted aniline dye. Attach the flower pieces using cyanoacrylate glue. To finish, use a coat of spar urethane for outdoor protection. The final tasks are installing a small jewelry box continuous hinge for the lid and the copper magazine hooks. I made the hooks from a couple pieces of 3/4" copper tubing. Flatten the piece with a dead blow hammer, then use a ball-peen hammer to add a dimpled, hand-hammered appearance. I then "antiqued" the copper using a product called Patina Green from a company called Modern Options (415-252-5580). The product quickly adds a nice green patina. Now screw the two hooks to the back, and the mailbox is ready to hang.



2 TOP CHAMFER • The top is chamfer cut on three edges, and angle cut on the back edge. By moving my rip fence to the left of the blade, my right-tilt saw is able to make the cuts safely, allowing the waste to fall away from the blade.



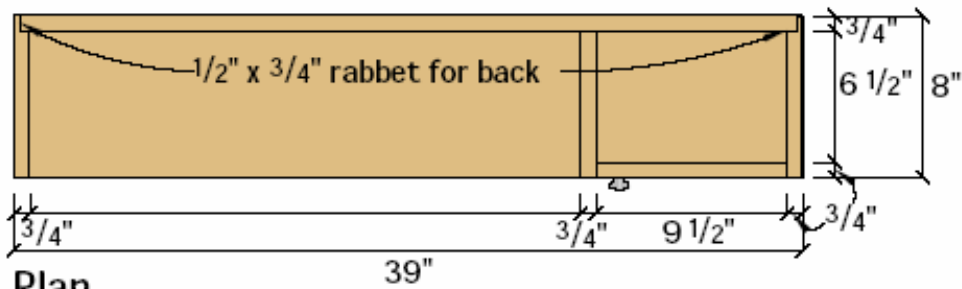
3 FOUR-SQUARE • After drilling the holes, use a 1/8" chisel and a triangular file to clean up the hole. The top left hole is shown after drilling, while the two lower holes have been completed.

Schedule of Materials: Bungalow Mailbox			
No.	Item	Dimensions	Material
2	Sides	3/8" x 4 1/2" x 11"	White Oak
1	Front	3/8" x 6" x 9"	White Oak
1	Back	3/8" x 6" x 13"	White Oak
1	Bottom	3/8" x 3 11/16" x 5 7/8"	White Oak
1	Top	3/8" x 5" x 7 3/4"	White Oak
1	Applied detail	1/8" x 6" x 9"	White Oak
Copyright © 2004 Martine Auctions			

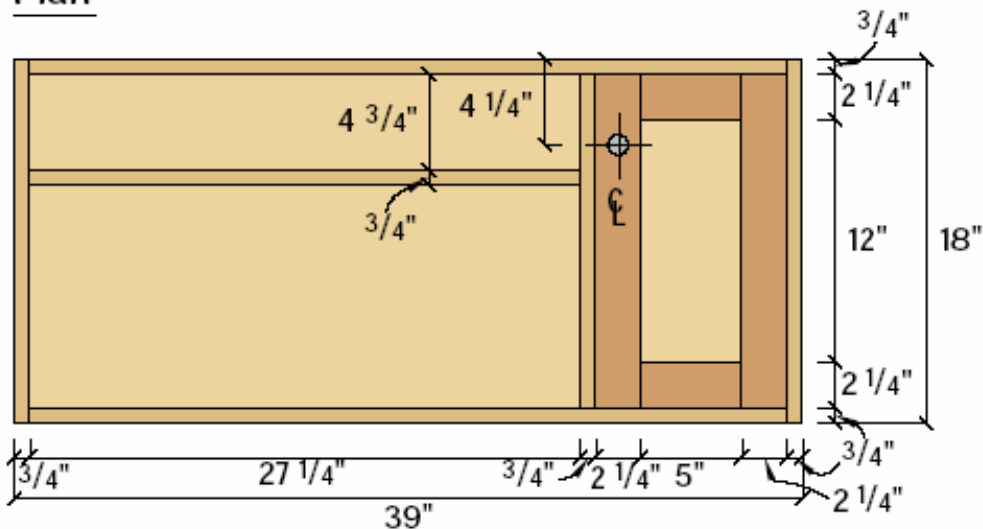
158

BYRDCLIFFE CABINET

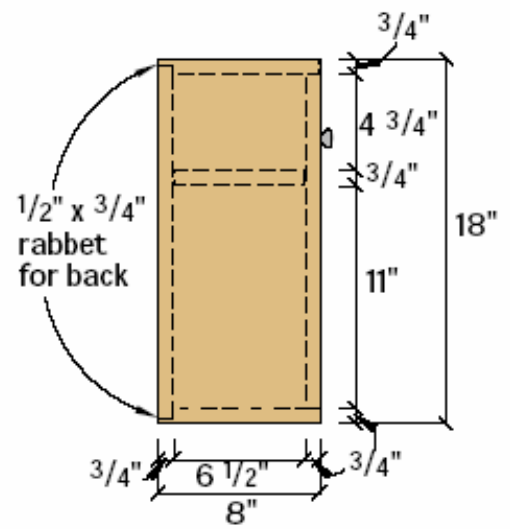




Plan



Elevation



Profile

Assemble the Cabinet • Cut the pieces to size according to the Schedule of Materials. Pre-sand the cabinet parts, then assemble the frame with biscuits or dowels. Make sure the shelf and divider are flush to the front of the cabinet. Glue and clamp until dry.

Make the Door • Next rip the rails and stiles for the door, making a 1/4" wide by 5/8" deep groove in the center of one long edge of all four pieces to receive the panel. The groove also holds the tenons in the rails. Then cut 1/4" x 9/16" tenons on both ends of the door's rails using a dado stack. Cut a 1/4" x 1/2" rabbet on all four edges of the panel. Sand the parts, then assemble the door with the rabbet facing the back of the door. Glue and clamp.

Add the Back • Cut a 1/4" x 3/4" rabbet in the back of the cabinet with a rabbeting bit chucked in a router. Glue up the poplar for the back. When dry, nail the back into place. Be sure to allow some space for the back to expand. If you want to make the cabinet weigh less, use 1/2" poplar plywood for the back, but be sure to then cut the shelf and divider 1/4" wider. (Don't use less than 1/2" plywood if you plan to hang the cabinet by screwing through the back.)

Finish the Cabinet • Cut mortises for the hinges and hang the door before finishing. Finish sand the cabinet. The best way to stain the cabinet green is by spraying on aniline dye diluted with alcohol. I used an inexpensive Preval™ Power Unit aerosol can (it costs about \$4 at craft and hardware stores). After you spray the dye on, wipe it down immediately with a rag moistened with denatured alcohol to minimize blotching.

Add the Flower • Cut the iris flower pattern from 1/4" poplar with a scroll saw or coping saw. Dye the pieces, then glue them to the panel with a "super" glue. Cover the cabinet with two coats of clear finish.

Schedule of Materials: Byrdcliffe Cabinet

No.	Item	Dimensions	Material
2	Sides	3/4" x 8" x 18"	Poplar
2	Top & Bott.	3/4" x 8" x 37 1/2"	Poplar
1	Shelf	3/4" x 7 1/4" x 27 1/4"	Poplar
1	Divider	3/4" x 7 1/4" x 16 1/2"	Poplar
1	Back	3/4" x 17 1/8" x 38 1/8"	Poplar
2	Rails	3/4" x 2 1/4" x 6"	Poplar
2	Stiles	3/4" x 2 1/4" x 16 1/2"	Poplar
1	Panel	1/2" x 6" x 13"	Poplar

Approx. a 1/4" x 6" x 13" piece of poplar for the Iris pattern

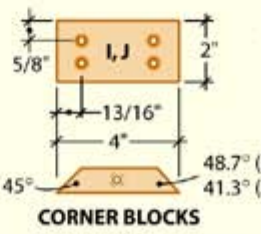
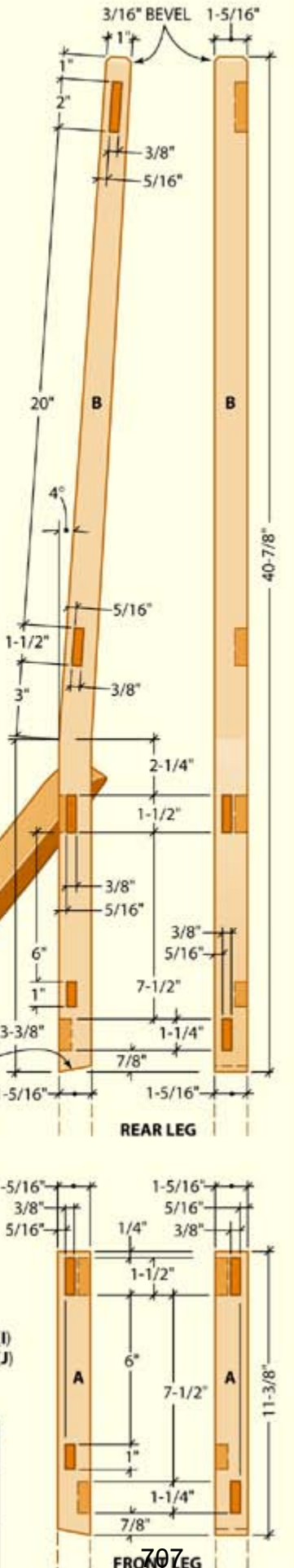
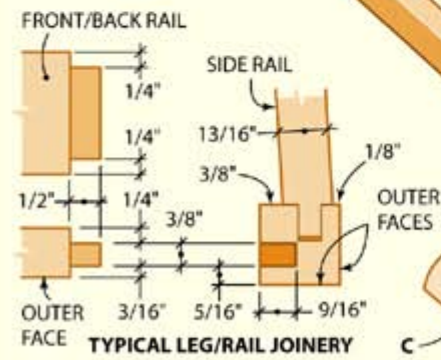
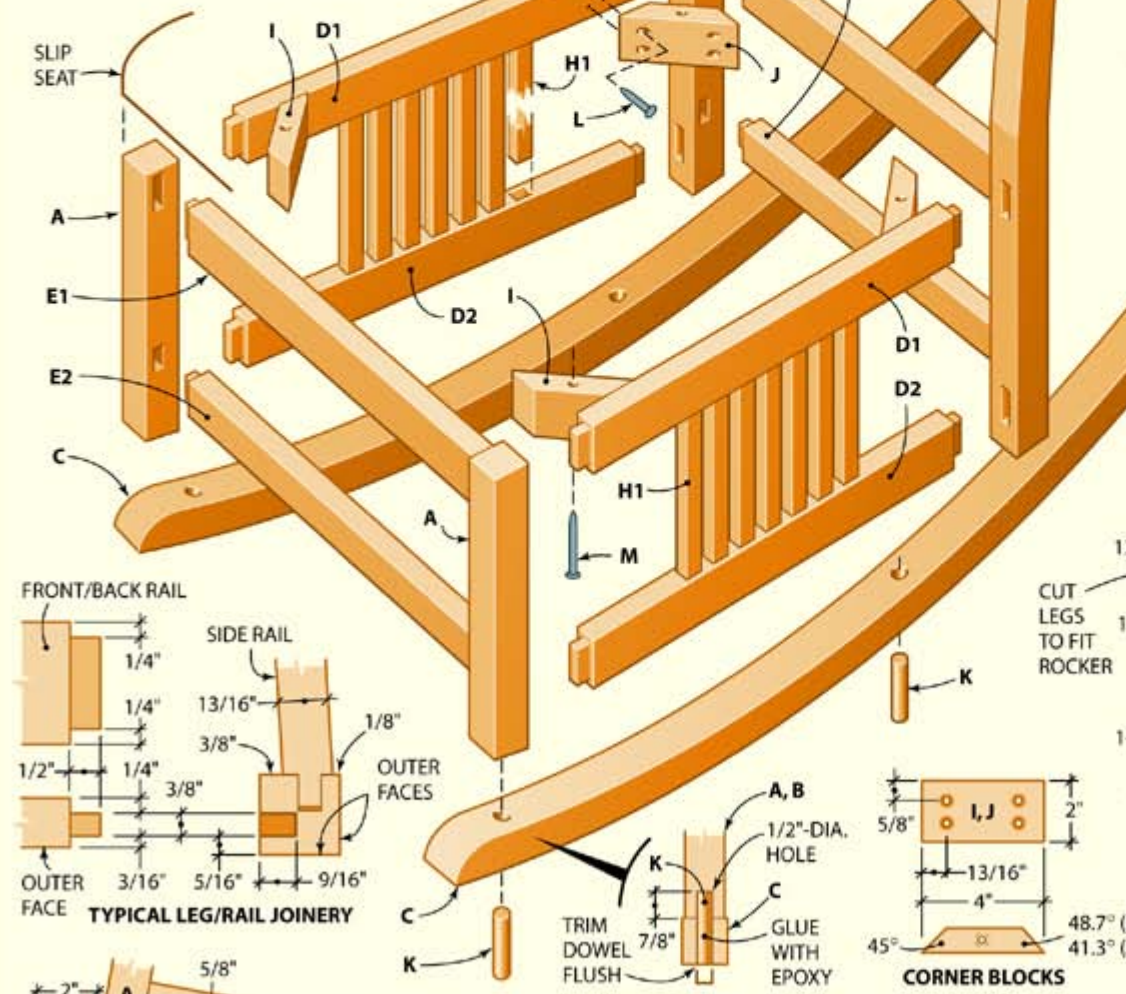
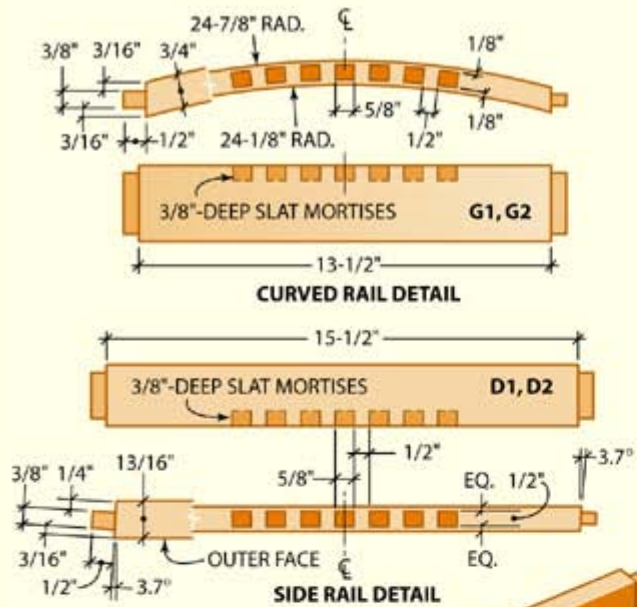
159

CLASIC ROCKER



ARTS & CRAFTS ROCKER

18-5/8" WIDE X 35-1/2" DEEP X 40-3/4" HIGH



Materials List--Rocker

Key	No.	Size and description (use)
A*	2	1-5/16 x 1-5/16 x 11-3/8" oak (front leg)
B*	2	1-5/16 x 3 x 40-7/8" oak (rear leg)
C	2	1-1/2 x 5-1/2 x 35-1/2" oak (rocker)
D1	2	13/16 x 2 x 16-1/2" oak (side top rail)
D2	2	13/16 x 1-3/4 x 16-1/2" oak (side bottom rail)
E1	1	13/16 x 2 x 16-1/2" oak (front top rail)
E2	1	13/16 x 1-1/2 x 16-1/2" oak (front bottom rail)
F1	1	13/16 x 2 x 14-1/2" oak (rear top rail)
F2	1	13/16 x 1-1/2 x 14-1/2" oak (rear bottom rail)
G1	1	1-3/4 x 2-1/2 x 14-1/2" oak (back top rail)
G2	1	1-3/4 x 2 x 14-1/2" oak (back bottom rail)
H1	14	1/2 x 5/8 x 7-3/4" oak (side slat)
H2	7	1/2 x 5/8 x 20-1/4" oak (back slat)
I	2	13/16 x 2 x 4" oak (corner block)
J	2	13/16 x 2 x 4" oak (corner block)
K	4	1/2"-dia. x 3"-long dowel (rocker pin)
L	16	1-1/2" No. 8 fh woodscrew
M	4	2-1/2" No. 8 fh woodscrew

* Leave leg bottoms several inches longer to be trimmed when rockers are installed.

Preparing The Pieces

Use a ripping guide and circular saw to bring your stock down to the required widths (Photo 1). To make the cuts safely and accurately, clamp the wide stock to some scrap blocks on your worktable and use two hands to control the saw. Rip the slat and rail blanks slightly oversize, and use a plane and sandpaper to smooth the sawn surfaces. Then use a speed square as a guide to crosscut the stock to size (Photo 2). When cutting the chair legs, leave the blanks several inches longer than specified. You'll trim the legs to finished size after assembling the frame.

Next, make a template for the rockers from a piece of 1/4-in.-thick plywood or hardboard. Trace the outline of the template onto the rocker stock. By nesting the two rockers on the blank, you'll minimize waste. Cut the rockers from the blank with a sabre saw (Photo 3), keeping the blade on the waste side of the line.

Clamp one of the rockers to the worktable and use a sharp spokeshave to smooth the inside curve (Photo 4). Turn the rocker over and use either a plane or the spokeshave to smooth the other side.

Copyright 2004 Martian Auctions

Make a template for the rear leg, trace the shape onto the



Use a circular saw and ripping guide to rip the stock. Clamp the work to your table so both hands control the saw.

leg blanks and cut out the legs with a sabre saw. Clamp two legs together, plane away the saw marks and bring them to final shape. On the back sides, you'll have to use a spokeshave and sandpaper in the area where the straight bottom portion of the leg meets the tapered top section.



Clamp a speed square to the chair rail stock, and use it to guide the saw and ensure accurate crosscuts.



After marking the rocker shapes with a template, use a sabre saw to cut to the waste side of the lines.



Use a spokeshave to smooth the inside surface. A spokeshave or plane will work on the other side.

Chair Joinery

Mark the locations of rail mortises in the chair legs, and use a plunge router with a spiral up-cutting bit and edge guide to cut the mortises (Photo 5). You could also bore a series of holes using a doweling jig to guide the drill. In either case, use a sharp chisel to finish the mortises.

Carefully lay out the tenons on the ends of the straight chair rails. Note that the side rails have angled tenons and tenon shoulders. Clamp a rail against the edge of the worktable with one end facing up, then use a backsaw to cut the tenon cheeks (Photo 6). Keep the saw kerf on the waste side of the layout line.

After making all the cheek cuts, make a guide from a 2-in.-thick block of wood for cutting the tenon shoulders. For the side rails, cut the end of the guide block at the specified angle (Photo 7). Lay out and cut the shoulders at the top and bottom edges of each tenon. Finally, use a sharp chisel to pare the tenon cheeks so the tenons fit their respective mortises.

Lay out the curved back-rail shape, including the tenons, on the appropriate blanks, then cut the tenons using the same technique. Clamp one of the blanks, inside face up, to the worktable and make a series of cuts with your circular saw to define the inside face of the rail (Photo 8).



Use a plunge router and edge guide to cut the mortises. Clamp a second leg to the workpiece for extra support.



Clamp a chair rail to the side of your worktable and use a backsaw to make the tenon cheek cuts.



Make a guide by cutting the side-rail angle on 2-in. stock. Clamp it to the rail and hold the saw against its end.



Use your circular saw to make a series of cuts that stop about 1/16 in. above the inside curve of each back rail.



Then, use a sharp chisel and a mallet to chop away the waste from the inside curve of the back rails.



Smooth the curve with a spokeshave. Work from both ends toward the center to avoid tearing out the grain.

Keep the cuts about 1/16 in. above the layout line. Then chop away the large waste chunks with a chisel (Photo 9). Smooth the concave surface with a spokeshave, working from both ends toward the center to keep the grain from tearing (Photo 10).

Turn the blank over, chop away most of the waste from the convex surface of the rail (Photo 11) and smooth with a block plane or spokeshave.

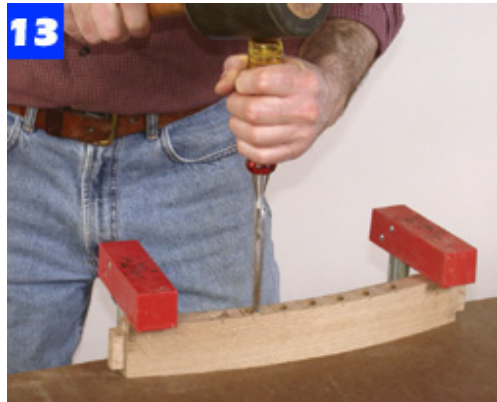
Lay out the slat mortises in the side and back rails, and use a 1/2-in.-dia. drill bit, depth stop and doweling jig to bore away most of the waste from each mortise (Photo 12). Finish the mortises with a chisel (Photo 13) and chamfer the top of each rear leg as shown in the drawing.



Use a chisel to remove most of the waste from the convex side. Then smooth with a plane or spokeshave.



Use a 1/2-in.-dia. bit, doweling jig and depth stop to bore out most of the waste from each slat mortise.



Securely clamp a rail to the worktable, square the mortise walls and remove the remaining waste.

Assembly

Install the slats in a bottom side rail (Photo 14), then fit the top rail over the slat ends. Repeat for the opposite side and set the two subassemblies aside. You don't need any glue if the slats fit snugly.

Assemble the slats with the curved back rails. Then, apply glue to the upper and lower back-rail tenons and leg mortises, and join the back parts. Clamp the joints and compare opposite diagonals to check that the frame is square (Photo 15).

Apply glue to the front-rail/leg joints, assemble the parts and clamp. When the glue has set, join the side-rail/slat subassemblies to the front and rear legs (Photo 16). Stand the chair on a flat surface to check that the legs are even. If necessary, adjust the clamps to pull the frame into alignment.

Lay out the corner-block angled ends and cut them to length with a backsaw. Bore and countersink pilot holes as shown in the drawing, and install the blocks with 1-1/2-in. flathead screws (Photo 17).

Lay the chair on its side and clamp one of the rockers to the legs, positioning it as shown in the drawing. Mark the location of the rocker on two of the legs (Photo 18), remove the rocker and cut the legs with a backsaw. Repeat for the other rocker. Test the fit between the legs and the rockers, and make any necessary adjustments so the rockers fit tightly against the leg ends.

When you're satisfied with the fit, clamp the rockers to the chair and drill a 1/2-in.-dia. hole through the rockers into the bottom end of each leg (Photo 19). Cut a dowel for each joint about 1/2 in. longer than the hole depth. Use a sharp chisel to cut a small groove down the length of each dowel to allow any trapped glue to escape.

To ensure a strong joint, we used epoxy for the leg/rocker joints. Mix the epoxy according to the instructions and spread some in the holes and on the dowel surfaces. Tap the dowels into the holes and allow the epoxy to cure. Saw the protruding dowels about 1/16 in. above the rockers, and pare the remaining waste with a sharp chisel.

Finishing

Sand all of the chair surfaces with 120-, 150-, 180- and 220-grit sandpaper, dusting off thoroughly when changing grits.

To achieve a traditional medium brown finish, we stained our chair with Behlen Solar Lux American Walnut. This solvent-based stain dries very quickly, so for application



Install slats in the rails. You don't need glue unless the slats are too loose. Then add the remaining rails.



Spread glue and assemble the back frame. Clamp and compare diagonals to check that the assembly is square.



Join the front and rear leg assemblies to the side rails. Set the chair on a flat surface and clamp the joints.

with a brush or rag it is best to add Behlen's retarder to slow drying and prevent lap marks. Follow the manufacturer's directions for application.

Allow the stain to dry thoroughly before applying a surface finish. We used three coats of Waterlox Original Sealer/Finish. Liberally coat all surfaces using a brush or rag. Allow the finish to soak into the wood for about 30 minutes, then wipe off any excess and let it dry overnight. Lightly sand the surface with 320-grit sandpaper and remove sanding dust before applying a second coat. Apply the third coat the same way. After overnight drying, burnish with 4/0 steel wool and polish with a soft cloth.

Take your chair to an upholsterer to have a slip seat made. While we chose a leather seat, you can use any material that suits your decor. Fasten the seat to the chair with screws driven through the corner blocks into the seat base platform.



Cut corner blocks and countersink pilot holes. Install the blocks to the chair rails with 1-1/2-in. flathead screws.



Clamp a rocker to the chair legs and mark the position of the rocker joint. Carefully cut the legs and test the fit.



Clamp the rockers in place and bore a 1/2-in. hole through the rockers into the legs. Epoxy a dowel into each hole.

160

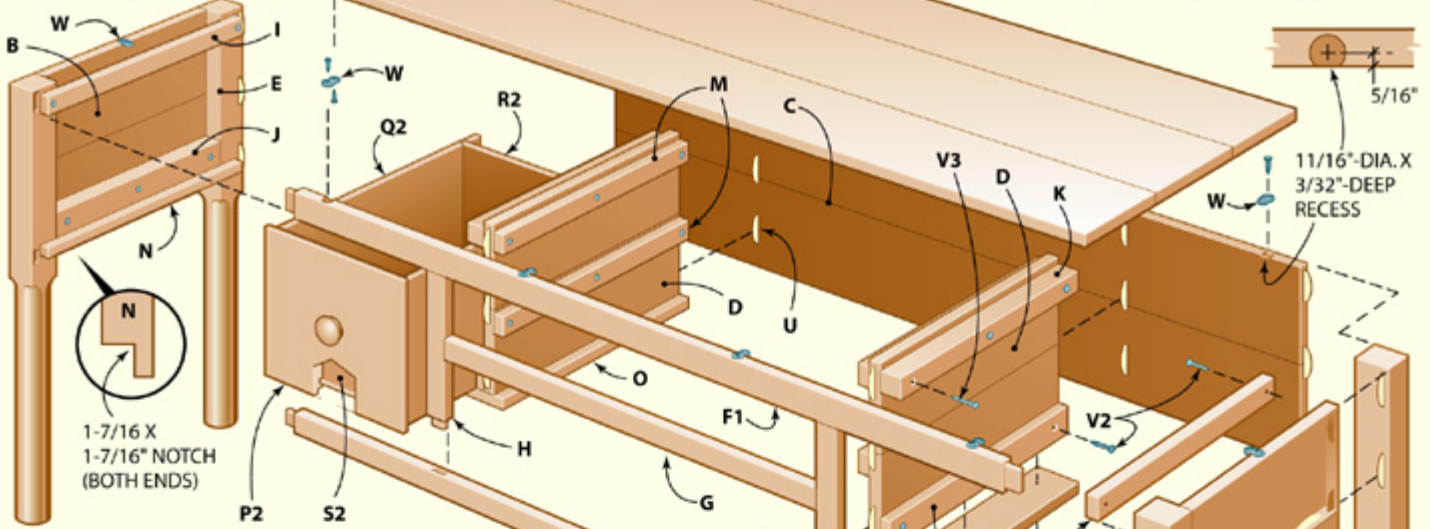
SHAKER STYLE TABLE



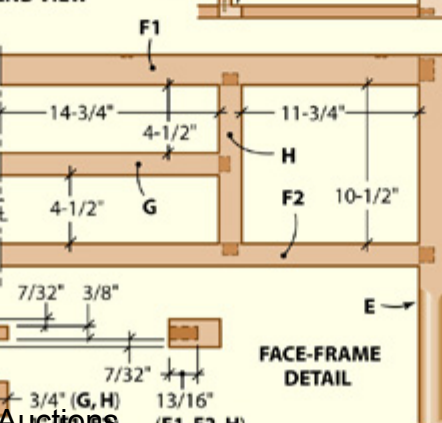
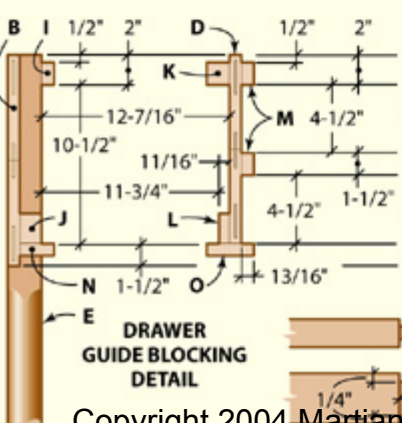
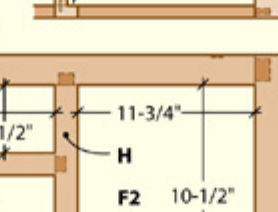
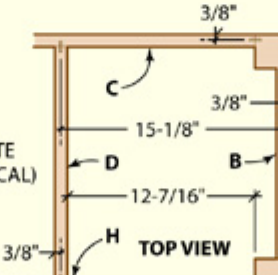
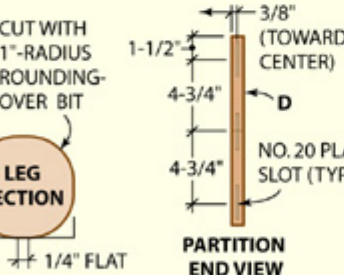
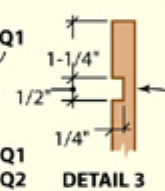
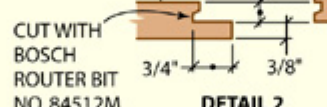
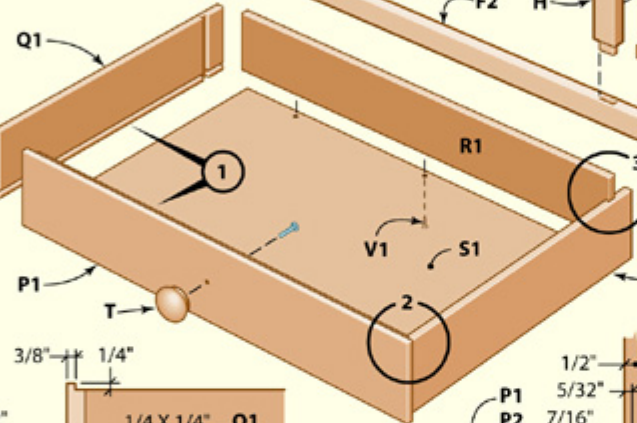
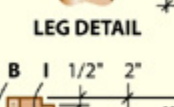
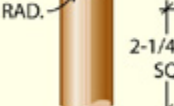
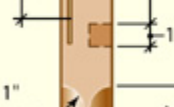
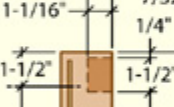
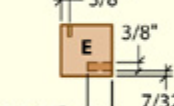
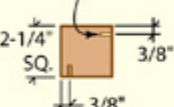
SHAKER UTILITY TABLE

22" DEEP X 35-5/16" HIGH X 68-1/2" WIDE

NOTE:
CENTER TABLETOP
OVER TABLE BASE



NO. 20 PLATE
SLOTS (TYPICAL)



MATERIALS LIST--SHAKER TABLE

Key	No.	Size and description (use)
A*	1	13/16 x 22 x 68-1/2" maple (top)
B*	2	13/16 x 14 x 15-1/2" maple (end)
C*	1	13/16 x 14 x 56" maple (back)
D*	2	13/16 x 12-1/2 x 18-3/8" maple (partition)
E	4	2-1/4 x 2-1/4 x 34-1/2" maple (leg)
F1	1	13/16 x 2 x 58" maple (top rail)
F2	1	13/16 x 1-1/2 x 58" maple (bottom rail)
G	1	13/16 x 1-1/2 x 31" maple (center rail)
H	2	13/16 x 1-1/2 x 12" maple (mullion)
I	2	13/16 x 1-1/2 x 18-3/8" maple (runner)
J	2	1-7/16 x 2 x 15-1/2" maple (runner)
K	2	1-1/2 x 1-1/2 x 18-3/8" maple (runner)
L	2	11/16 x 2 x 18-3/8" maple (runner)
M	4	13/16 x 1-1/2 x 18-3/8" maple (runner)
N	2	13/16 x 2-1/4 x 18-3/8" maple (runner)
O	2	13/16 x 3-1/8 x 18-3/8" maple (runner)
P1	2	13/16 x 4-15/16 x 29-7/8" maple (drawer face)
P2*	2	13/16 x 10-15/16 x 12-1/8" maple (drawer face)
Q1	4	1/2 x 4-7/16 x 19-3/16" maple (drawer side)
Q2*	4	1/2 x 10-7/16 x 19-3/16" maple (drawer side)
R1	2	1/2 x 3-15/16 x 28-7/8" maple (drawer back)
R2*	2	1/2 x 9-15/16 x 11-1/8" maple (drawer back)
S1	2	1/4 x 17-3/4 x 28-7/8" plywood (drawer bottom)
S2	2	1/4 x 17-3/4 x 11-1/8" plywood (drawer bottom)
T	4	drawer pull
U	as reqd.	No. 20 joining plate
V1	as reqd.	1" No. 6 rh woodscrew
V2	as reqd.	1-1/2" No. 8 fh woodscrew
V3	as reqd.	2" No. 8 fh woodscrew
W**	10	tabletop fastener, Rockler No. 21650

Stock Preparation

The first step is to straighten, or joint, the edges of the pieces you'll glue together to make the wide panels. To do the job with a router, first make a straightedge guide. A 4- or 5-in.-wide piece ripped from the edge of a sheet of plywood or hardboard should work.

Clamp the straightedge guide to each maple piece and run the base of the router against the guide to trim the edges of the boards (Photo 1).

Determine the widths of the pieces you'll need for the tabletop and the side and back panels. Then, use a circular saw with a ripping guide to cut the stock to width. Leave each piece about 1/16 in. wider than necessary so you can joint the cut edge and remove the saw marks. Crosscut the pieces at least 2 in. longer than the finished panel lengths.

While you don't need them for strength, your assembly will be easier if you use joining plates to align the panels. Mark the locations of the plates and cut the slots (Photo 2).

Apply glue to the mating edges of the panels and also spread glue in the plate slots and plates. Assemble the panels, clamping the joints to pull them tight (Photo 3). After the glue on each panel has set for 20 to 30 minutes, scrape off any excess.

When the glue has completely set, remove the clamps and crosscut the panels to length (Photo 4).



Install a straight 1/2-in. bit in your router and use a straightedge guide to joint the edges of the maple stock.



Clamp your work to the table, and cut the joining plate slots for assembling the wide top, side and back panels.



Use clamps to pull the panel joints tight. A clamp every 10 to 12 in. should provide adequate pressure.



Clamp a straight board squarely across each panel and use it as a guide for crosscutting with your circular saw.

Making The Legs

While your circular saw may have the capacity for a 2-1/2-in. cut, maple is very hard and can be tough on a saw. It's best to rip the table legs in two stages. Using a ripping guide, cut halfway through the stock, then flip the piece over and finish from the other side (Photo 5). Repeat for each leg. Rip the leg blanks 1/16 in. wider than finished dimension and use a plane to bring the pieces to correct size. To make shaping the legs easier, leave the leg blanks several inches longer than required.

Mark the round-to-square transition points on each leg, and leave at least 2 or 3 extra inches at the bottom end of the blanks for clamping. Clamp one of the blanks to your worktable and use a 1-in.-rad. rounding-over bit to rout each corner of each leg (Photo 6). Stop the cuts about 1/4 in. shy of the transition points.

After routing all of the legs, use a gouge or rasps and files to shape the transition between the rounded and square portions of the legs (Photo 7).

Note that the legs won't be perfectly round, but will have a small flat surface on each side. When sanded smooth, however, you'll barely notice that they are not shaped to a perfect cylinder.

Cutting The Joints

Lay out and rout the mortises in the legs and square the ends with a chisel (Photo 8). Then, crosscut the legs to finished length. Locate and cut the plate slots for joining the back and side panels to the legs (Photo 9).

Rip and crosscut the face-frame parts to size, and lay out the mortise-and-tenon joints according to the plan. Rout the mortises in the mullions and the top and bottom rails, and square the ends with a chisel.

Install a straight bit in a router table, and use a miter gauge to guide the pieces as you cut the tenon cheeks (Photo 10).

Mark the tenon shoulders on each piece, and use a dovetail saw or backsaw to make these cuts. Test fit each joint. If one is too snug, sand the cheeks until the parts slide together smoothly. If a joint is too loose, glue a veneer shim to the tenon cheek.



Use a ripping guide to help saw the leg stock. Cut half the depth from each face to avoid overloading the saw.



For the look of lathe-turned legs, use a router with a 1-in.-rad. rounding-over bit on each leg corner.



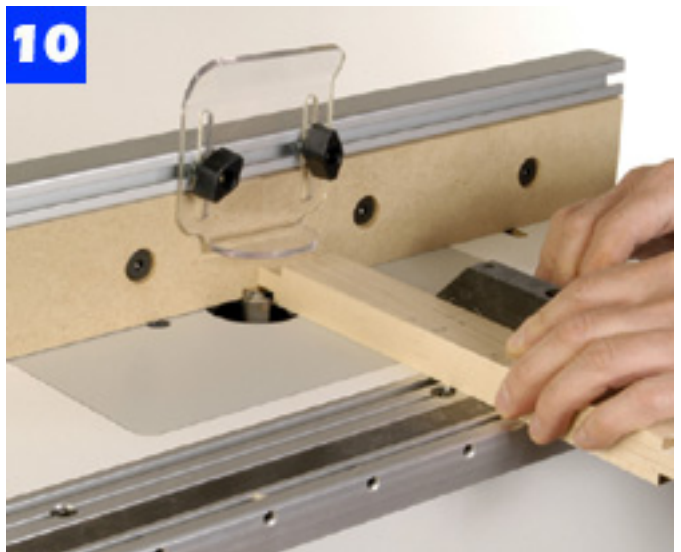
the transition between the round and square sections of each leg.



Rout the leg mortises with a 3/8-in.-dia. spiral up-cutting bit. Then, square the mortise ends with a sharp chisel.



Cut the plate slots in the legs for joining the sides and back. Cut corresponding slots in the side and back panels.



Assembly

Spread glue in the face-frame mortises and on the mullion and center-rail tenons (Photo 11). Assemble the frame, apply clamps, and compare opposite diagonals to see if the frame is square. Next, glue and assemble the leg/face-frame parts (Photo 12).

Glue and clamp the rear leg to the back-panel joints. When the glue has set, lay out the positions of the partitions and joining plate slots. Clamp a straightedge to the back and face frame as a guide for cutting these slots.

Apply glue for securing the sides and partitions with the face-frame assembly. Position the panels, clamp them to the frame, and use a square to check that the panels are perpendicular to the face (Photo 13). Next, join the back-leg assembly to the side and partition panels. Apply clamps and check for square (Photo 14).

Cut the drawer runners to size. Bore and countersink pilot holes in each piece and install them to the side and partition panels (Photo 15).



Coat all face-frame joint surfaces with glue. A small brush and wooden applicator make the job go smoothly.



After assembling the face-frame parts, join the frame to the front legs. Keep the clamps in place until the glue has set.



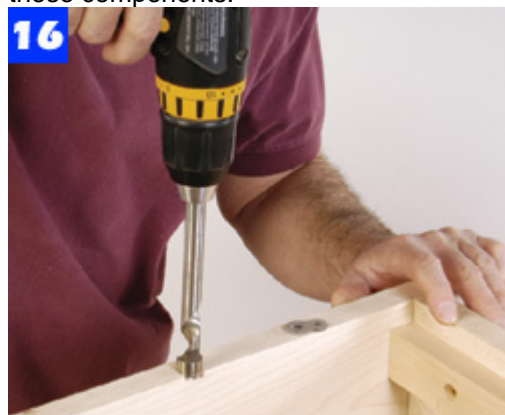
Join the partitions and sides to the face-frame assembly with plate joints. Check the assembly with a square.



Complete the table base by joining the back subassembly to the sides and partitions. Then check for square.



After cutting the drawer runners to fit, bore the pilot holes for the screws and install these components.



Bore recesses for the tabletop fasteners. Install the fasteners and mark their

Mark the locations of tabletop fasteners along the top edge of the table base. Use an 11/16-in.-dia. multispur bit to bore the 3/32-in.-deep recess for each fastener (Photo 16), then bore pilot holes for the screws and install the hardware.

Invert the tabletop on a padded surface and position the base over it with the proper overhang on each edge. Bore holes for tabletop-fastener screws, and attach the top to the base.

Drawer Construction

Glue up the face, side and back panels for the deep drawers, the Original 2094 Multi-Drawer. We cut the joints between the drawer sides and faces with a

drawer-lock-joint router bit (Bosch No. 84512M). Install the bit in the router table and use it to cut the locking joint on the drawer-face ends (Photo 17). Since this is a deep cut, take two or three passes to reach the full profile.

Readjust the router table to cut the mating joints on the drawer sides (Photo 18). Clamp a backer board to the trailing edge to prevent chipping.

Use a 1/2-in.-dia. straight bit in the router table to cut the rabbet at the top and bottom edges of the drawer faces, and the dado in drawer sides for the backs. Then, install a 1/4-in. bit and cut the grooves for drawer bottoms.

Assemble the drawers with glue and clamps (Photo 19). When the glue has set, remove the clamps and slide the bottoms in place. Fasten them with screws driven into the drawer backs. Bore pilot holes for the drawer pulls and install them.

Finishing

Remove the tabletop from the base and sand all table parts to 220 grit. To achieve our golden brown color, we first applied a coat of Bartley Country Maple Gel Stain. Spread the stain with a brush or rag, allow it to set for a few minutes, then wipe off any excess. Allow the stain to dry overnight.

Then, apply two coats of Zinsser Bulls Eye amber shellac. Use a good-quality, natural-bristle brush, and avoid excessive brushing. Allow the shellac to dry for at least 2 hours before lightly sanding with 220-grit sandpaper. Remove any dust and apply two more coats.

Burnish the dry surface with 4/0 steel wool and then buff with a soft cloth. Reattach the tabletop to the base and install the drawers.

positions on the underside of the top.



Use a drawer-lock-joint bit in the router table to shape joints on each end of the front drawer panels.



Hold the stock on end to rout the drawer joint on the drawer sides. A backer board clamped in place prevents tearout.

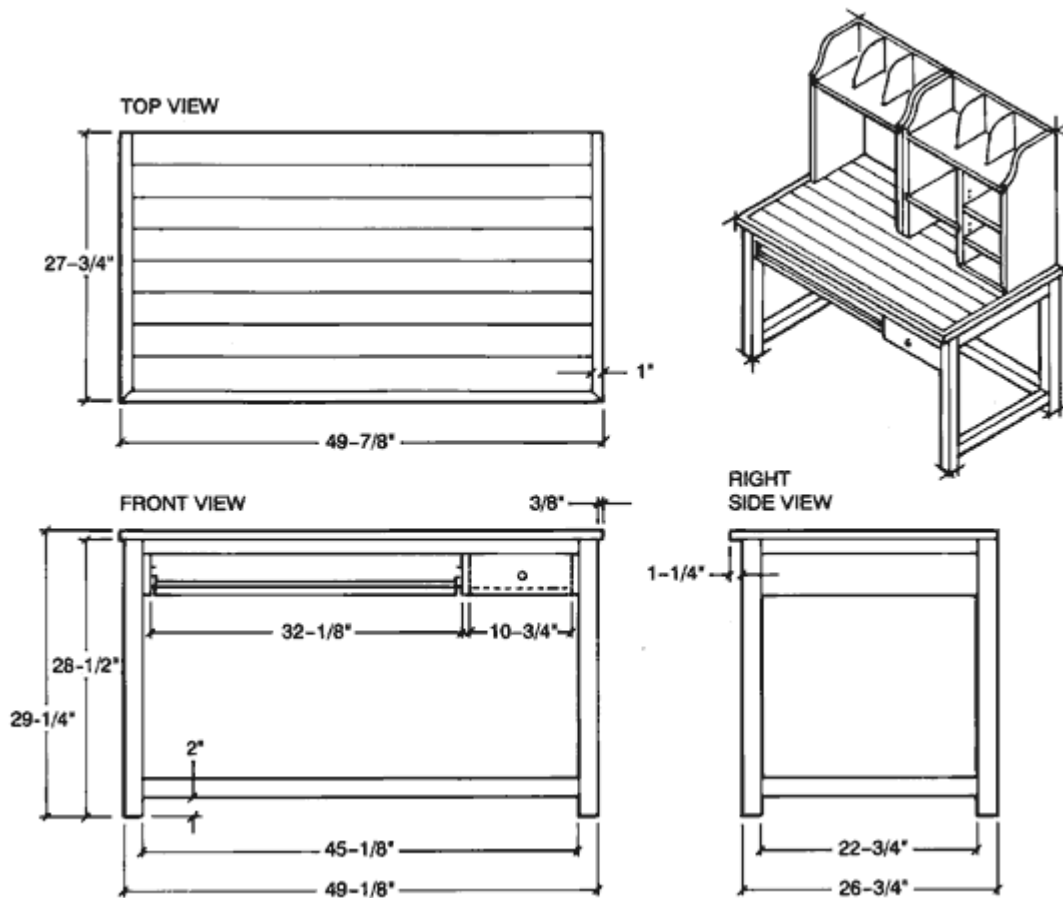


After routing the drawer-face rabbets and the grooves for the bottoms, apply glue and assemble the drawers.

161

**COMPUTER
WORKSTATION**





Computer Workstation Buying and Cutting List

Key	Parts	Pcs.	Size	Material	Cut From (buy) *see Notes
A	Top	1	3/4 x 26-3/4 x 47-7/8" (OA)	Pine	4/8, 1 x 4
B	Edging, ends top	2	3/4 x 1 x 27-3/4"	Pine	All edging from 1/5, 1 x 6
C	Edging, front top	1	3/4 x 1 x 49-7/8"	Pine	"
D	Legs	4	2 x 2 x 28-1/2"	Pine	1/5, 8/4 x 6
E	Top rails, front and rear	2	3/4 x 1-1/2 x 47-1/8"	Pine	All rails from 1/7, 1 x 4
F	Top rails, ends	2	3/4 x 1-1/2 x 24-3/4"	Pine	"
G	Rear stretcher	1	1-3/4 x 1-5/8 x 47-1/8"	Pine	All stretchers cut from 1/7, 8/4 x 8" board
H	End stretchers	2	1-3/4 x 1-5/8 x 24-3/4"	Pine	"
I	Dividers	3	3/4 x 4-1/4 x 26-1/2"	Pine	1/8, 1 x 6
J	Cleat	1	3/4 x 1-1/2 x 22-3/4"	Pine	Scrap box
K	Drawer shelf	1	3/4 x 12-1/4 x 26-1/4"	Pine	1/5, 1 x 8
Drawer					
L	Drawer sides	2	1/2 x 2-5/8 x 12-1/2"	Pine	1/5, 1 x 4
M	Drawer back	1	1/2 x 1-7/8 x 10-5/8"	Pine	1/1, 1 x 4
N	Drawer front	1	3/4 x 4-3/16 x 12-1/4"	Pine	1/18, 1 x 6
O	Drawer bottom	1	1/4 x 10-1/16 x 11-15/16"	Plywood	1 sq. ft.
Keyboard Platform					
P	Keyboard platform	1	3/4 x 14-5/8 x 30-7/8"	Pine	1/5, 1 x 4
Q**	Hand rest	1	3/4 x 2 x 30-7/8"	Pine	1/1, 1 x 4
R	Stop blocks	2	3/4 x 3/4 x 3-1/2"	Pine	1/18, 1 x 6

Procedure

Construction begins with the workstation table. Be aware that the dimensions used are standard, since the aim is to create a piece of furniture that provides optimum comfort for the person working at it. The monitor and keyboard elevations are of primary importance. You may want to evaluate the most comfortable heights for working at a computer and, should they vary from the shown dimensions, make changes on the drawings so you can custom-build the table to suit your own needs.

You are advised to work with the dimensions given on the drawing, however, since these are in accord with accepted architectural standards.

START WITH THE TABLE

1. Start by cutting the 1 x 4 stock for the top slightly longer than the top's finished length.
2. Check all edges for warp, cupping and square: Board edges must be perfectly true if you are to achieve almost-invisible joints in edge-joined work. To be sure that yours will be, run all board edges through the jointer.
3. Next, lay out the boards on your worktable and arrange them so they produce the most pleasing grain appearance. At the same time, make sure you flip the boards so that the annular rings in abutting boards alternate (i.e.: The rings of the third board should be positioned the same as the rings of board number one, and, so on). Annular rings are alternated in edge-joining to further minimize chance of warping or cupping.
4. When satisfied with board arrangement for the top, using a pencil, make marks where the biscuits are to go.
5. Using a plate joiner and the marks you just made, plough the biscuit grooves to suit no. 20 biscuits.
6. Assemble the table top using glue and no. 20 biscuits.
7. Use at least three bar clamps to hold the setup securely while the glue dries. Place one near each end and the third, centered on the opposite side of the table top.
8. Allow clamped setup to dry for 24 hours.
9. The next day, remove clamps and scrape off any glue squeeze-out using a sharp cabinet scraper. Finish the smoothing step by belt-sanding the complete top; first with 80-grit abrasive, then with 100-grit.
10. Finally lay out the top for exact width and length. Using either a table or circular saw, cut the ends to produce top's exact length. Then, rip the top to its exact width on the table saw. Note that the top (at this point) is cut to the dimensions shown in the drawing--without the edging strips in place on front and side edges. Set top aside.
11. Rip edging strips B and C to size and install them on the top using glue and 1-1/2 in. finishing nails. Use miter joints at the corners and be sure to use glue in those joints. The next day, after the glue has dried, secure the miter joints by driving a pair of opposing 1-1/4 in. brads through each mitered corner. Finally, set all nailheads slightly below the surface. Set top aside.

Cabinetmaker's Tip: When gluing up a table top, professionals never use boards wider than 1 x 4 nominal. Be aware that wider boards greatly increase the risk of warping and cupping as the wood dries, generally during the winter months or in a heated home.

12. Cut the remaining structural members for the table to size and length. Notice that the legs are a full 2-in. square. You may be required to alter the leg dimensions, depending upon what your lumberyard has in stock. If you cannot get full 8/4 stock, it may be necessary to trim the stock you have to create legs either 1-3/4 or 1-7/8 in. square.

Cabinetmaker's Tip: Do not cut any of the materials for either the keyboard platform or drawer until after your basic table is built and assembled. At that time you can take actual dimensions, sizes, etc. for these members directly from the table. This will ensure both perfect fit and minimal wasted materials.

13. Carefully lay out for the mortises in the legs. If available, use a bench top mortiser to bore the mortises in the legs. If your shop lacks this useful tool, create the mortises by boring overlapping 1/2-in.-dia. holes and cleaning the holes square using sharp chisels.
14. Lay out the stretchers (to legs) and make mating match marks where each stretcher meets a leg. (Note: Use marks that won't confuse later like I, II, III and so on.) Then mark each piece for tenon to be cut so it will mate tightly with its mating leg mortise. Carefully cut the tenons using a back saw; clean up tenons as necessary with a sharp wide chisel. Test-fit all undercarriage pieces with tenons in their respective leg mortises. Do this testing dry, without glue, before proceeding with final assembly.

15. Next, set up the table saw with dado head and rip fence so you can plough the grooves, which will receive the tabletop hold-downs. These will be ploughed in the inside surfaces of the front and back rails.
16. Because it goes a lot faster with the parts disassembled, sand all parts smooth using a belt sander and 120-grit paper.
17. Assemble the table as shown in the drawing, using glue. Working quickly, locate the dowel positions on the legs and bore the necessary holes so that the fully seated dowels will be inserted through the tenons and into the leg on the far side. Apply glue to dowels before inserting them into their holes; tap dowels home with a wooden mallet.
18. Check the table setup for square using a framing square. When satisfied with squareness, secure the carcass by tacking diagonal braces across opposing corners. Then clamp the setup so the joints will be immobile while glue sets.
19. Use appropriate-length bar clamps: You will need two with 5-ft. capacity and three with 30-in. capacity.
20. The next day, the top can be positioned on a worktable, bottom-side up, and the table undercarriage (also turned upside down) located on it. Check with a ruler to make certain the top's ends are equally distant from the end stretcher plane, and that the top's rear edge is flush at back. When the undercarriage is properly positioned, hold it that way with a couple of c-clamps while you position and install the hold-downs with wood screws. When all is secured, remove the c-clamps and flip the table right side up.

Cabinetmaker's Tip: Though it is a basic technique, make sure you protect the wood surfaces when clamping. If your clamps do not have plastic shields, use scrap wood between clamp jaws and wood surface to prevent jaw marks from clamp pressure.

21. Cut parts I and K for the drawer compartment to size and install on the table using carpenter's glue and 1-1/4 in. screws (or air-driven 1-1/2 in. nails). (see illustration)
22. Cut the parts for the drawer and sand all members smooth, working up to 120-grit paper before assembling the drawer. Take time to study the drawing to be sure you understand how the drawer front is rabbeted; i.e., the drawer front should conceal the compartment members (parts I in illustration).
23. Lay out and bore the hole for the drawer knob in the drawer front.
24. Insert drawer into its recess and position it in the closed position. Check the front to make sure that it fits, and conceals the vertical members behind the front. Make any necessary adjustments.
25. To prevent the (short) drawer from falling out if pulled forward too vigorously, install the shaped 1/4-in. plywood stop as shown. Bore a pilot hole through the plywood. Then, hold the stop in place with a 5/8-in. rh screw. Tighten the screw until the stop can be rotated to stay in the vertical position. Finally, install the drawer and rotate the stop to the vertical (drawer stop) position, and tighten the screw a tad more to ensure it remains vertical.
26. Next, go to work on the keyboard platform. Cut the boards for it and edge-join them using glue and no. 10 biscuits. As you did for the tabletop, alternate the annular rings of abutting boards to minimize chance of warping. Apply clamp pressure and leave the setup overnight.
27. Next, lay out and install the platform's slide hardware on table and platform sides. Install the keyboard platform's stop blocks at the ends of the table-mounted slides. Note: Do not use glue on the stop blocks since you may have to reposition them in the future.
28. Insert platform into the table.
29. Push platform to the closed position to make sure it is flush with table front; adjust stop blocks if it is not.
30. Cut the piece of lumber for the hand rest and shape it using a block plane and belt sander. When satisfied with its contour, install it on the platform using glue and countersunk wood screws from below.

Except for its final sanding and the finishing steps, your table is now complete.

Optional: You may want to install furniture glides on the bottom surface of all legs to prevent (or, at least minimize) the table from rocking should it eventually be placed on an uneven floor. If you do decide to add glides, buy the 3-prong type of at least 7/8-in. dia.

Building the Hutch Top

The hutch top for the Computer Workstation is easier to build than the desk. However, since the upper section of this project is in prominent view, build and finish it with the same care, patience and precise workmanship that you used in building the table.

Build the hutch top in two sections; these are then joined for maximum rigidity after being installed on the desktop. By doing this, it's possible to alter the design of one or both units to suit your equipment and taste.

The hutch size, overall, is determined by two factors:

- (a) The left unit is sized to accommodate a 21-in. monitor and,
- (b) The right hutch will store computer-related paraphernalia such as CDs, floppies, notepads, etc.

As mentioned earlier, hutch sizes can be altered. If your monitor varies from 21 in. or if you want to customize the unit to adapt it for other uses or storage, you may take some liberties in its design.

Before You Begin

1. Start by cutting the boards for the legs (sides) to length, but cut them slightly longer than the finished sides will be. (In this case, that means about 30 in.) Note that each side consists of two lengths of 1 x 6 and one length 1 x 4. This will give you four stacks of three boards each which, when joined, will be both longer and wider than the required 13 in.
2. Lay out each set of three boards to achieve the best grain match for each leg and, at the same time, try to alternate annular rings on abutting boards to minimize chance of warping or cupping. When satisfied with arrangement, lightly draw a cabinetmaker's triangle across the face of each of each setup: This way each set of three boards can be quickly returned to your preferred layout of them.
3. Next, joint all edges in the four piles; check the mating edges as you go (an easy step because you have the cabinetmaker's triangle for reference) to ensure that joints will be tight and neatly matched when the boards are joined.
4. Align the first set of three boards for the first leg and carefully mark biscuit locations. Important: make sure you do not position a biscuit in the top portion of each leg area, which is shaped later; you do not want the shaping to expose a biscuit in the edge. Plough the mortises to receive the no. 20 biscuits. Then, making certain you keep the three boards together as a set, put them aside on the work bench while you repeat this procedure for the following three sides (legs).
5. Start by gluing-up the boards for the 13-in.-wide "legs" or sides. Refer to your cabinetmaker's triangle to quickly return the boards to the preferred grain layout you selected earlier. Position each set of boards as you work. For legs glue-up, you will need at least 12 bar clamps, 3 per setup. Have these, as well as the glue, a glue brush and biscuits at hand before starting the assembly step.
6. Apply glue to mating board edges and biscuits and assemble the first three boards. Ends should be aligned and boards should lie flat against bars (i.e., no bow) when clamp pressure is applied. To minimize the chance of cupping or bowing occurring when clamp pressure is applied, use a pair of clamps on one side of the boards, positioned about 4 in. from each end and one clamp at center on the opposite side. Put the clamped setup aside and allow to dry for 24 hours. Repeat assembly procedure for the remaining three sides.
7. The next day, remove the clamps and trim the four legs so all four are exactly the same size--13 in. wide by 29 in. long. Crosscut all boards to length on the radial arm saw, using a stop block to ensure all are the same length. Then, on the table saw, rip boards to width, taking some stock off both front and back edges (this will remove any edges dented during handling, clamping, etc.).
8. Tack two of the legs together for the right hutch (R1) and two for the left (L1) after aligning each pair so all edges are flush. Hold them that way for the shaping which follows, using a half-dozen or so 1-1/4 in. brads driven flush.
9. Refer to the drawing of the shaped top, shown on 1-in. squares in the drawing, to make a template of 1/4-in. hardboard or plywood. When satisfied with template's layout, cut it out using saber or scroll saw. Sand the cut edge smooth.
10. Use this template to trace the shaped tops to the two pairs of legs you previously tacked together. Cut out the shape using saber or scroll saw.
11. Sand the scroll shapes smooth using either a spindle or drum sander chucked in the drill press.

Note: Since the dividers used on the fixed top shelves repeat the symmetry of the scroll shape used on the legs, set the scroll template aside for reuse later. When you come to make the dividers, you can simply refer to the drawing for shape then re-cut the template for use as a divider template.

12. Repeat the board layout and edge-joining steps to make all the shelves for your two units both finished and adjustable. All of these should be slightly oversize overall when they're glued-up; they will be trimmed to fit exactly after hutch units are assembled.

Cabinetmaker's Tip: You can edge-join the boards for both hutch tops in a single session as long as you use identifying marks. Make marks lightly with a soft pencil on the back edges of boards. (Use R for right cabinet; L for left.)

Cabinetmaker's Tip: Since you have cut your boards so that each side (leg) setup will be slightly oversize when assembled, there is no need to place scrap blocks between the clamp faces and wood (to prevent marred edges). Board lengths and widths will be trimmed in the next step, and clamp marks will be cut off.

Note: The following instructions take you through the steps for building the left hutch, the one that houses the monitor. The same construction steps are used to build the right hutch except for the addition of the adjustable shelves. The required steps for installing these are explained below.

13. Before laying out the shelf dados on the legs for the left hutch, measure the monitor that will be used on your workstation. Everything begins with that dimension. Make sure that the distance from leg bottom edge to bottom plane of dado provides adequate clearance for your monitor's height. (Your monitor size determines the fixed shelf location in the left hutch.) You will have to alter the right hutch dimensions so the two fixed shelves remain in line. Also, if the left hutch width dimensions are altered, the right hutch must be adjusted a corresponding measurement so that the hutch sits on the table with a 1-in. setback from table edge, left and right.
14. Since the legs (L1) for the unit have already been sized (step 7), you can now lay out the dados to receive the fixed shelf (L2).
15. The dados for the fixed shelf should be perfect mirror images in left and right legs, so make sure the legs will be exactly opposite each other in the finished cabinet. Here's how to do it:
16. Position the two legs on your worktable back-edge to back-edge and clamp them so they cannot move.
17. Lay out for the dado to be rabbeted in both legs and plough it using a 3/4-in. straight router cutter set to a depth of 3/8-in.

Cabinetmaker's Tip: On work such as this, where there is no room for error, you must always use a guide when ploughing with a router. Be certain you clamp on a guide which puts the router cutter right on the mark. Hold the router shoe firmly against the guide as you cut and, to further minimize chance of a cutting error, push the router with a slow, easy-to-control feed rate. To be extra safe, you can clamp a guide so both sides of the router shoe will be guided and to eliminate any possibility of the router "walking" off the cutting mark. If you opt to cut your dados using the table saw, make certain you use a miter gauge hold-down to prevent lateral movement of the work piece as the saw blade does its cutting. You must use a stop to position each workpiece accurately before it is pushed into the spinning blade. This ensures that the dados in both legs are positioned the exact distance from the leg end. If you have never done repetitive crosscutting on the table saw, discuss this step with your instructor before proceeding.

18. Next, insert a 3/8-in. rabbet cutter in your router and plough the blind rabbets in the back edges of both legs to receive the back (L3).
19. Assemble the two legs, fixed shelf and back without glue so you can check all for fit; use small (1-1/4 in.) brads if necessary to temporarily hold the parts together so you can do your visual check. Now lay out for the 5/16-in.-wide dados that will hold the dividers used in the fixed top shelf. Mark both the shelf and the back at this time.
20. When satisfied with fit, disassemble the hutch and abut the fixed shelf and back with the marks for the dados lined up. Clamp the boards together so they will not move and, starting at the back edge, rout the dados across, stopping shy of the front edge in order to create the blind dado as shown in the drawing. After routing, the front round corner can quickly be made square (to receive the divider) using a sharp 1/4-in.-wide chisel.
21. Reassemble the hutch using glue and fasteners of choice. Note: Because of their superior holding ability, you can use pneumatically driven 1-1/2 in. nails to join parts here. These are driven slightly below the surface and the indents can be filled with Wood Filler. Or, if preferred, 1-1/2 in. fh wood screws which are then covered with dowel plugs. If you opt for the latter, remember that you must lay out for the screw pilot holes - for body, shank and counterbore - before you start the assembly step.
22. With left hutch complete, stand it upright on the workstation table, flush at back and with approximately 1-in. setback from the left table edge. Then, measure the distance from the outside plane of the right leg to the same width setback at the right table edge. This measurement is the outside (i.e., overall) width dimension of your right-hand hutch. As stated earlier, this measurement may differ from our drawing depending upon how the left-hand hutch is sized. If there is variance with the plan drawing, now is the time to calculate all dimensional changes and to mark them on your drawing--before starting any work on your project wood for the right hutch.
23. The right-hand hutch is constructed using the same procedure as for the left--except for two steps you must take before assembly: a) The joints for the adjustable shelves should be laid out and bored; you won't be able to fit a drift between legs

R1 and R4 after the unit is assembled. And, b) the dado for the middle leg (R4) must be routed in the underside of fixed shelf. Attempting this after assembly could result in damage to shelf legs. When the right unit is complete, set it atop the table abutting the left unit. Recheck both the left and right setbacks, the tabletop reveal, to make sure the left and right legs are equally distant from table edge. If the distance varies, even slightly, move units left or right to achieve that goal.

24. When satisfied with their location, position a pair of handscrew clamps on the legs at center to hold the two units together. With a pencil, lightly mark the front corner of both the left and right (outside) legs and make match marks on tabletop. Next, carefully locate the points and make marks on both the tabletop and the legs to indicate where you must bore the holes to receive the dowels, which serve as keepers when the unit is assembled. Note that this is back about 1 in. from front edge of vertical and centered on leg width.
25. With handscrew clamps still in place, lay out for the Teenuts® to be installed on the middle legs. The fastener's locations aren't critical but, for the sake of craftsmanship, they should look precisely placed. Then bore the needed holes.
26. From the left side (i.e., the monitor's hutch), start by boring the large dia. holes to suit the Teenut, to 1/2-in. depth. Then insert a 5/16-in. bit and bore through at center of each counterbore to receive the machine screw.
27. Then switch to a countersink and, in the right hutch, countersink all four holes to receive the machine screw head.
28. Tap the Teenuts in place and secure them with the machine screws.
29. With the hutch unit still aligned on the table, position the mending plates on the three legs; one on each outside leg and the third on the center leg. Mark the four screw hole locations for each plate. Bore all screw pilot holes but do not install the mending plates as yet.
30. Carefully tilt the hutch back until it is fully supported and resting on its back. Next, bore the 3/8-in.-dia. holes in outside legs and the table top to receive the keeper dowels. Then, glue the dowels into the legs so just about 3/4-in. of dowel protrudes. Glue is used in the one side only so the hutch can be lifted off whenever necessary (i.e., for a move).
31. Wait one day, to make certain dowels are permanently affixed into the legs, then, bring the hutch to the upright position and insert the dowels into the mating holes in the table top. Now you can install the mending plates using the screw holes you bored earlier.
32. Your Computer Workstation is now complete. We also give instructions for an optional box which can be used to hold CDs close at hand. You may, however, prefer to custom design a box to suit the "extras" you frequently work with. In this case, the box shown here is a good starting point for your box.

Note: Leave your workstation assembled until you have completed constructing all the peripheral parts (CD holder, dividers, etc.), because you want to be able to test fit these pieces before finishing the table. When satisfied all parts fit as they should, you can disassemble the hutch and table to simplify the finishing step. Be sure to save all of the hardware and fasteners in a covered container so you won't have to hunt for them when it is time to reassemble your workstation.

Dividers for Top Shelves

To ensure the wood in the dividers matching the wood used in the workstation, we planed 3/4-in. stock from the same pile to 1/2-in. thickness, then created tenons on the bottom and back edges (see below). You could use 1/4-in. plywood here and save a little work, but because of the exposed ply edges, the finished look will not be nearly as handsome.

Since the table saw is used to remove a scant amount of material from the divider stock to create the tenons, read the Cabinetmaker's Tips below to learn the safe way to do this.

Here are the steps for making the dividers:

1. Cut the 1/2-in. stock to the divider size given in cutting list.
2. Next, to work production-fashion, align the edges of the four pieces. Then, while holding them fast, drive three 1-in. brads through the pile.
3. Using your previously made pattern, trace the divider's scroll shape onto the top work piece.
4. Cut all four at one time using the bandsaw.

5. Sand all edges smooth using the stationary belt sander along the straight edges and the spindle sander for the scroll shape. Lacking a spindle sander, chuck a sanding drum in either portable drill or drill press.
6. Separate the pile, remove and discard nails and set dividers aside.
7. Set up the table saw so you can safely remove about 1/8-in. from both sides of each divider, along the bottom and back edges. See Cabinetmaker's Tips, below. Note: The exact thickness to remove will be determined by the actual thickness of your stock and the width of the dadoes ploughed in shelf and back. The tenons you create on the dividers must fit freely in those dadoes.

Cabinetmaker's Tips: Never lay out a shape on your project wood; always make a template or pattern first. You can use either 1/4-in. hardboard or plywood--or even sturdy cardboard. Lay the shape out on your template material following the pattern given in the plan. Cut it out using saber or scroll saw (or razor knife if template is cardboard). File and sand all cut wooden edges to remove "whiskers" before using the pattern to transfer the shape to your project wood.

When a small, identical amount of wood must be removed from a number of surfaces, the most accurate technique is to set up the saw so that the waste is between the blade and fence. That is the case here, where approximately 1/8-in. is removed from both sides of the bottom and back edges. This creates tenons to fit in the dadoes provided for them. However, whenever the saw blade is this close to the fence, there is very real risk of the blade engaging the metal fence: this can be dangerous at worst, blade damaging at best.

For safety, always install and work with a wooden auxiliary fence whenever you are faced with doing this type of cutting on the table saw. In order to cut the dadoes on the 7 x 9-in. dividers, make an auxiliary fence from a length of 1 x 6." Line the board up with the rip fence and with an awl, make prick marks through the holes on your fence. Use 3/16-in. dia. fh machine screws and wingnuts to secure the auxiliary fence to rip fence. Caution: Make certain the screw heads are perfectly flush with the wood's surface when the board is secured tight against the fence by the wingnuts: the work piece must be able to slide past without interference when you make your cuts.

If you have never installed and worked with an auxiliary fence on a table saw, make sure you discuss the setup with your teacher before its installation and use.

The CD Box

The box shown in the plan was built to house a commercially available plastic CD box ([see Materials list](#)). Slotted plastic sheets are created for CD storage. Many mail order woodworker's supply houses offer these. They are available in both end and center CD holder configurations and are installed using polyurethane glue. If you want to build a custom CD box, make sure the box (i.e., its overall dimensions) fits in the right-hand hutch.

Making the Box

1. After cutting all parts to sizes shown in drawing, sand them smooth starting with 100-grit and finishing with 120-grit abrasive paper.
2. The corners are mitered and held secure with no.0 biscuits. Or, if preferred, you can use splines. Here, simply pass the miter faces through the table saw blade to a depth of about 3/4-in. and join the mitered corners using 1-1/2 in.-wide splines. If you opt for the latter technique, you may want to cut thin strips of molding to glue on the front edge to conceal the splined corners.
3. The back is of 1/4-in. cabinet grade plywood; install it using glue and 1-in. brads.

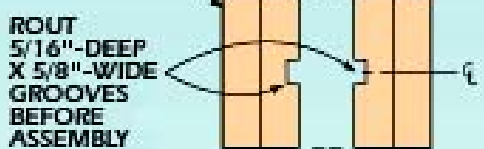
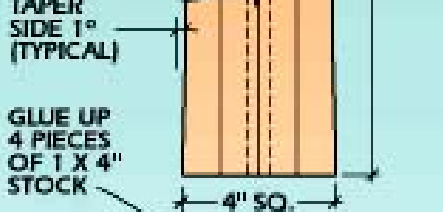
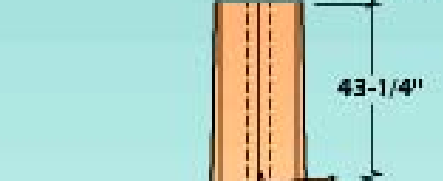
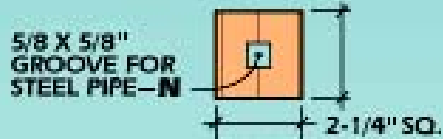
162

FLOOR LAMP

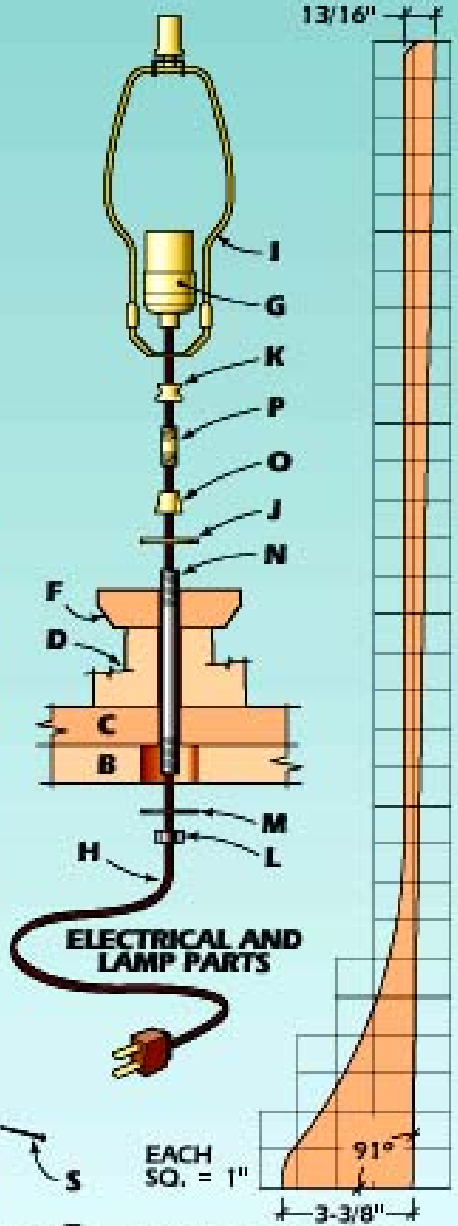
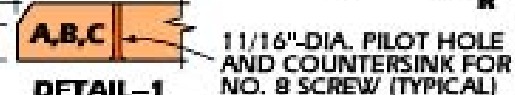
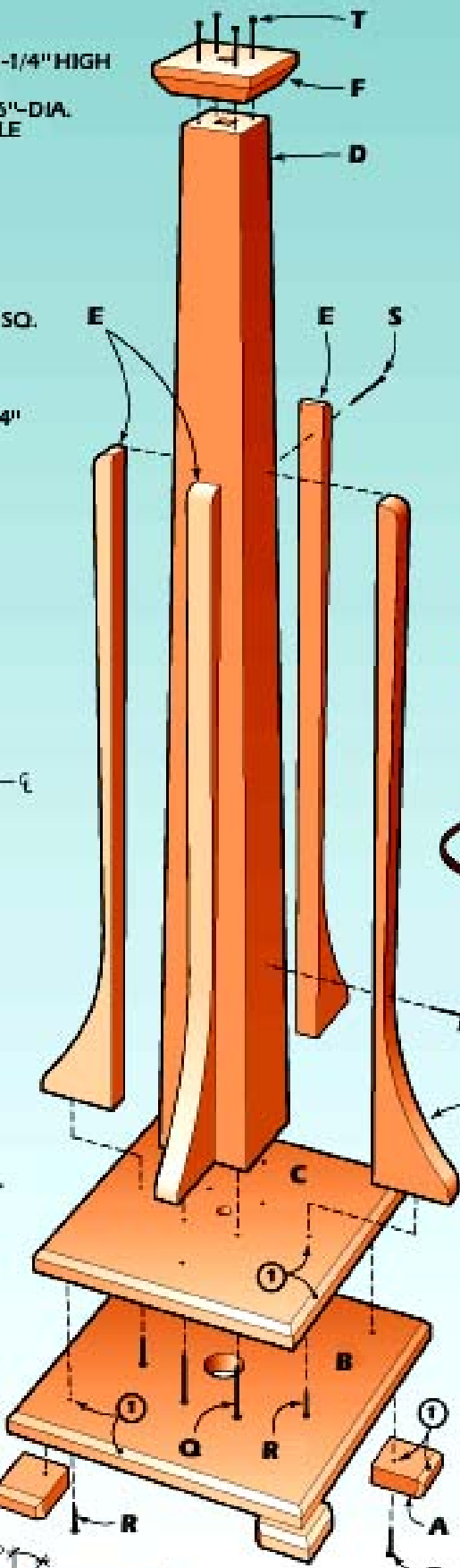
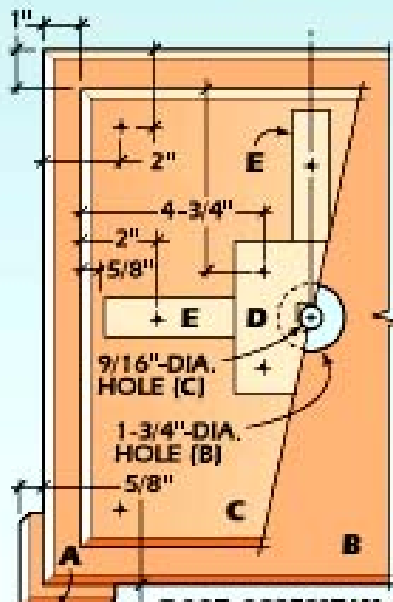


FLOOR LAMP

15-1/4" WIDE X 15-1/4" DEEP X 48-1/4" HIGH



POST-D



CORBEL BRACKET-E

MATERIALS LIST—FLOOR LAMP		
Key	No.	Size and description (use)
A	4	1 x 2 1/2 x 2 1/2" oak (foot)
B	1	1 x 14 x 14" oak (lower base)
C	1	1 x 12 x 12" oak (upper base)
D	1	4 x 4 x 43 1/4" oak (post)
E	4	1 x 4 x 30" oak (corbel bracket)
F	1	1 x 3 3/4 x 3 3/4" oak (top)
G	1	3-way-turn knob socket
H	1	10-ft. brown cord set
I	1	10" harp (size depends on shade)
J	1	1/4 IP x 1 1/2" brass check ring
K	1	1/4 IP x 7/16" tapped brass spindle
L	1	1/4 IP steel hexnut
M	1	1/4 IP x 1 1/2" steel washer
N	1	1/2" O.D. x 46" steel pipe with 1/4 IP threads on both ends
O	1	1/4 IP female x 1/8 IP female brass tapered coupling
P	1	1/8 IP x 1" steel nipple
Q	4	3" No. 8 fh screws
R	8	1 1/2" No. 8 fh screws
S	8	4d finishing nails
T	4	6d finishing nails

Stock preparation

Begin by ripping the four post boards to size and crosscutting them 2 or 3 in. longer than the finished length. Spread glue on the mating surfaces of two of the boards, then clamp them together with their edges perfectly aligned. Repeat this process with the remaining two boards.

Set up the router with a 5/8-in. straight bit and an edge guide. Clamp one of the post halves between bench dogs, then rout a 5/16-in.-deep groove down the center of the blank (Photo 1). Repeat for the



second post half. Then, crosscut each half of the post to finished length. Spread glue on the mating faces of the post halves, then clamp them together. Be sure to align the ends and edges of the post halves before setting the assembly aside.

Lay out the post taper on two opposite sides of the blank, then use a band saw to make the cuts (Photo 2). Remember to keep the saw kerf to the waste side of the layout lines. Next, clamp the post between bench dogs and use a sharp plane to remove the saw marks and bring the taper right to the layout lines. Transfer the tapered profile to the other two sides and repeat the procedure to finish shaping the post. Sand the surfaces smooth.

Cut the lamp top cap from a piece of 1-in.-thick stock, then use a table saw and miter gauge to cut a 35 degrees bevel on all sides (Photo 3). Next, bore a 9/16-in.-dia. hole through the center of this cap and sand the piece smooth. Then place the cap on top of the post, adjusting it for an even overhang on all edges. Bore pilot holes for 6d finish nails, then apply glue and nail the cap in place (Photo 4). Set the nails below the wood surface and fill the holes with a stainable wood filler.

Glue two oversized blanks together for the base panels. You can use joining plates to align the boards while gluing them. Just be sure to keep the plates far enough back from the finished ends of the panels so they will not be exposed when you make the final cuts. After the glue cures on the panels, rip and crosscut them to size. Make sure that both panels are perfectly square. Use a table saw to cut the bevels around the panel edges. Bore a 9/16-in.-dia. hole in the center of the upper panel, then bore and countersink pilot holes for fastening it to the post. Sand this panel smooth, then use 3-in. No. 8 fh screws and glue to fasten this panel to the post (Photo 5).

1--Rout a groove down the center for both halves of the lamp post. Use a 5/8-in.-dia. straight bit and a router edge guide.



2--Lay out the taper on opposite sides of the post. Then, cut off the waste with a band saw. Mark the other sides and cut them.



3--Cut the top cap to size, then use a table saw to cut a bevel on the bottom edge. Clamp the block to the miter gauge.



4--Bore a 9/16-in. hole through the top cap, then glue and nail the cap to the top of the post. Bore pilot holes for the nails.

Next, make a template for the corbel brackets from 1/4-in.-thick plywood or hardboard. After cutting out your template, hold it in place against the lamp post and base. Once you are satisfied with the fit, use it to trace the shape onto oversized blanks for the actual brackets. Clamp a blank between bench dogs, with the bracket outline overhanging the bench. Then, use a sabre saw to make the cut (Photo 6). Repeat the same process for each bracket. Sand all the brackets.



5--Cut the upper base to size and bore a 9/16-in. hole through its centerpoint. Attach it with glue and screws.



6--Lay out the corbel shapes on a board. Then clamp the stock between bench dogs and cut the outline with a sabre saw.

Assembly

Place small guide marks on the post and base to indicate the locations of each bracket. Then apply glue to the back and bottom edges of each bracket and use 4d finish nails to pin them to the post (Photo 7), making sure to bore pilot holes and set the nailheads. Then bore and countersink pilot holes and drive one 1 1/2-in. No. 8 fh screw through the base into the bottom end of each bracket.



Cut the feet to size and shape, then bore and countersink pilot holes for attaching them to the lower base. Set the feet aside and bore a 1 3/4-in.-dia. hole through the

7--Attach the corbel brackets to the post sides with glue and nails. Attach them to the base with screws driven from below.

center of the lower base panel. Then, bore and countersink pilot holes for fastening this panel to the upper base panel. Sand the panel smooth, mark the location of each base foot, then apply glue to the joints and fasten the feet with screws.

Clamp the lamp post upside down in the bench vise, then spread glue and position the lower base panel over the upper base panel. Adjust the parts for equal overhang on all edges. Then temporarily clamp them together and fasten the parts together with screws (Photo 8).

Installing lamp parts

Next, lay the lamp post on a padded table and slide the threaded steel pipe into the base hole (Photo 9). Before pushing the pipe all the way into the base, slip a washer over the end and thread on the steel nut. You can adjust how much the pipe protrudes past the top of the hole by tightening or loosening the nut. The pipe should extend about 3/8 in. beyond the top cap.

Place the brass check ring over the top end of the tubing, then thread on the tapered brass coupling. This fitting makes the transition between the 1/4 IP thread of the long pipe and the 1/8 IP thread of the steel nipple that connects the lamp fixtures. Next, thread the 1-in.-long steel nipple into the top end of the coupling. Allow this nipple to extend out of the coupling by about 3/4 in. Then place the tapped brass spindle over the nipple and tighten it against the coupling (Photo 10). The spindle will lock the nipple in place.

Push the lamp cord through the bottom of the steel pipe until it extends out the top of the nipple by about 3 in. Then feed the cord through the socket base and thread the base onto the nipple until it bottoms out on the harp bracket. Tighten the lock screw on the base.

Connect the lamp cord to the terminals on the socket (Photo 11), and push the excess cord back down through the post so that the socket can sit firmly on its base.



8--Cut the feet and lower base to size. Then attach the feet and join the two base pieces with glue and screws.



9--Install a washer and nut on one end of the steel pipe, then slide it into the post's hole. Adjust the height by turning the nut.



10--Slide the brass check ring over the steel pipe. Then thread on the tapered coupling, steel nipple and brass spindle.

Then, snap the socket cover in place by pushing it down until you hear a click. Install the harp by compressing it and slipping each end into its bracket. Then, slide a locking ring over each bracket.

Before staining the lamp, apply masking tape to the parts for protection during the finishing process. Apply stain and finish, using the techniques described in "Rocking Chair." Once the finish has cured, remove the masking tape and install a bulb and lampshade. Our shade came unfinished, so we could match the finish on the rest of the piece (Photo 12).



11--Slide the lamp cord through the pipe and thread the socket onto the nipple. Attach the wires to the socket screws.



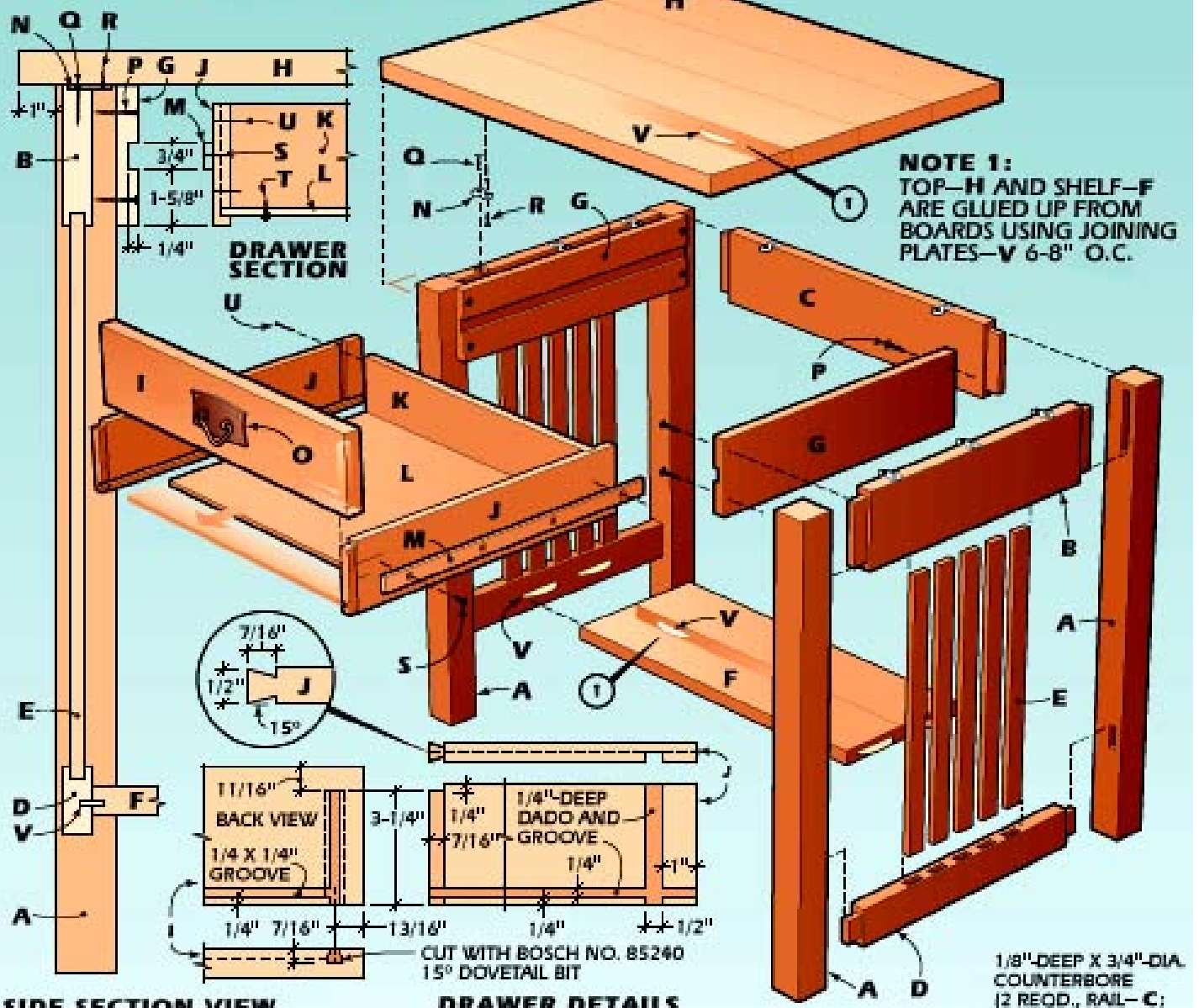
12--The lampshade comes unfinished. Remove the glass panels, then stain and apply a finish to match the lamp base.

163

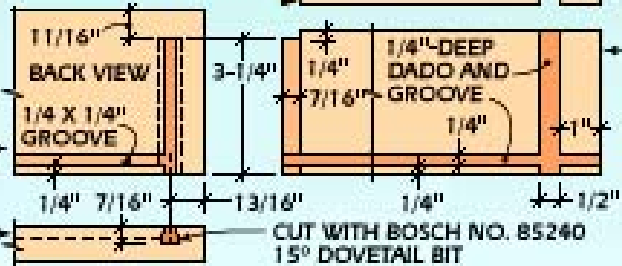
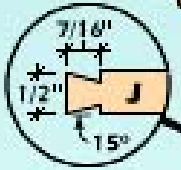
SIDE TABLE



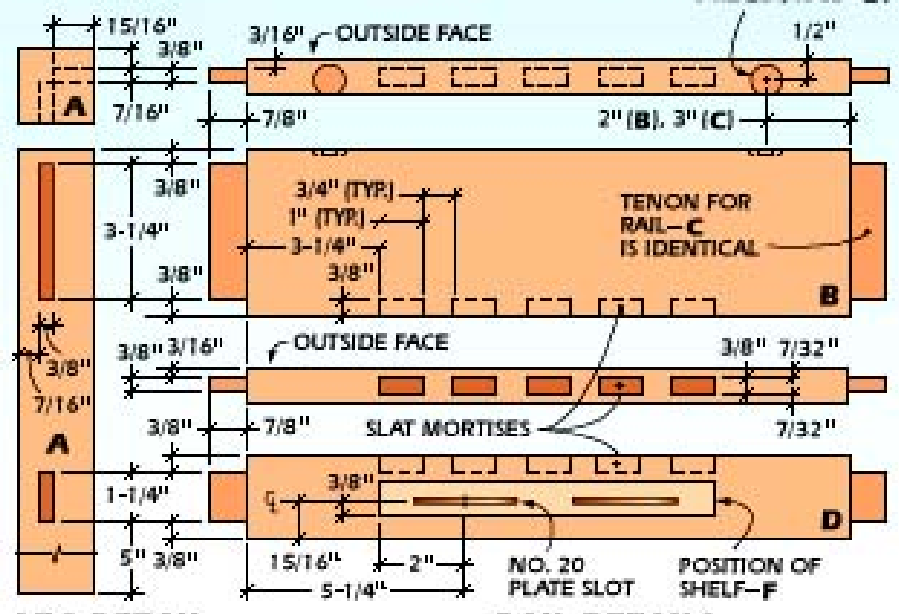
SIDE TABLE 20" DEEP X 24" WIDE X 26" HIGH



SIDE SECTION VIEW



DRAWER DETAILS



LEG DETAIL

RAIL DETAILS

Stock preparation

Like the rocker and bookcase, the material used in this table is quarter- sawn white oak. The legs are cut from 8/4 solid stock, the top from 5/4 material and the rest from 4/4 lumber. For the drawer sides, you will have to either plane 4/4 stock to 1/2-in. thickness or have your lumber dealer plane the lumber to the finished size. The same holds true for the drawer guides, which are 5/8 in. thick.

The panels for the bottom shelf and tabletop are glued up from narrow boards. Cut stock slightly longer and a bit wider than required to yield the finished panel. Edge-joint each piece, then lay out the locations of the No. 20 joining plate slots every 6 to 8 in. along the mating edges. Keep the end slots about 3 in. from the finished ends of the panels.

Use the plate joiner to cut the slots, registering the cuts against a flat work surface. Then apply glue to the slots, plates and edges and assemble the panels. Use clamps to pull the joints tight, then let the glue set for about 20 minutes. After the glue fully cures, rip and crosscut the panels to finished dimension.

Joinery

Rip and crosscut the remaining parts for the table base to finished dimension. Then, lay out the mortise in the table legs. Use a router with an edge guide and 1/2-in.-dia. up-cut spiral bit to make these cuts (Photo 1). Use a sharp chisel to square the ends of each mortise (Photo 2).

Use a dado blade in your table saw to cut the tenons on the side and back rails. Since the tenons are 7/8 in. long, you will have to make two passes for each tenon cheek. Readjust the blade height to cut the shoulders at the top and bottom edges of the tenons (Photo 3). Check the fit of each tenon in its matching mortise.

Mark the locations of the slat mortises in the side rails. Clamp a tall fence to the drill-press table to help locate the rails,



1--Use a router with an up-cut spiral bit and an edge guide to cut the rail mortises in the table legs. Make several passes.



2--When the routing is done, carefully square the ends and flatten the sides of each mortise with a sharp chisel.



3--Use a dado blade in a table saw to cut the rail tenons. First cut the cheeks, then readjust the saw to cut the shoulders.

then bore overlapping 3/8-in.-dia. holes to remove most of the waste (Photo 4). Complete the mortises by smoothing the walls and squaring the ends with a sharp chisel.



4--Cut the slat mortises in the rails using a drill press to remove most of the waste and a sharp chisel to finish the cuts.

Lay out the joining plate slots on the bottom shelf and side rails. Use the plate joiner to cut the slots in the shelf ends, registering the cut on a flat workbench or on the top of your table saw (Photo 5). To cut the slots in the side rails, you must use a spacer block under the plate joiner to yield the proper slot position (Photo 6).

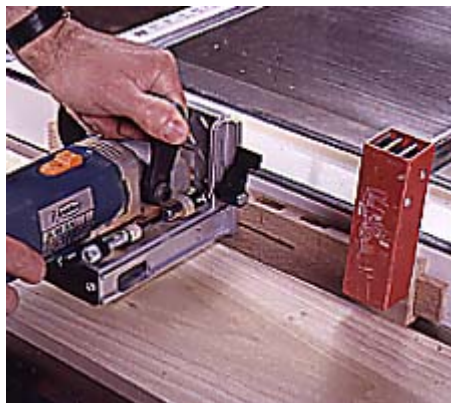


Before beginning to assemble the base, sand all the parts with 120- and 220-grit sandpaper, then dust off the pieces thoroughly. It is much easier to do a good job of sanding at this stage than it is once the base is together.

Base assembly

Position the side slats in their mortises in one bottom side rail (Photo 7). If the parts fit properly, you need not apply glue to these joints, since the slats will be held captive between the rails. Place the top side rail over the slat ends, then clamp the assembly temporarily to be sure that the slats are completely seated in the mortises.

5--Clamp the bottom shelf securely to a workbench. Then use a plate joiner to cut joining slots in both ends of the shelf.



Apply glue to the rail tenons and leg mortises, then assemble the table side. Clamp the joints tight, then compare opposite diagonal measurements to be sure that the assembly is square (Photo 8).

6--Clamp the bottom rails to your table

Follow the same procedure for the other side. Apply glue to the joining plate slots, mortises, tenons and plates for assembling the shelf and back rail to the sides. Join the rail and shelf to one side (Photo 9), then place the opposite side over the shelf and rail ends. Stand the base on a flat work surface and clamp the joints tight (Photo 10). Check for square.

Use a router with an edge guide to cut a 1/4-in.-deep x 3/4-in.-wide dado in each drawer guide (Photo 11). Bore and countersink pilot holes for mounting screws in the guides, then sand the guides with 220-grit sandpaper before fastening them to the table legs (Photo 12).

saw fence. Then use a plate joiner to cut joining slots in one side of both rails.



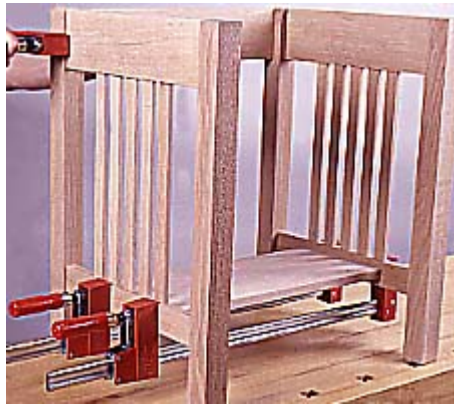
7--Test fit the side slats in the rail mortises. Sand or trim the joints, if necessary, to achieve a tight fit for each slat.



8--Apply glue to the mortises and tenons, then clamp the parts. Check for square by comparing diagonal measurements.



9--To join the sides to the back rail and bottom shelf, apply glue to the slots and plates, and to the mortises and tenons.



10--Clamp the side assemblies to the back rail and shelf and check the parts for square. Readjust the clamps if necessary.

Mark the locations of the tabletop fasteners on the top edge of the side and back rails. Use a 3/4-in. Forstner or multispur bit to bore the 1/8-in.-deep recess for the fasteners. Bore a pilot hole for each, then attach the fasteners with 1-in.-long No. 8 fh screws.

Drawers

Cut stock to finished size for the drawer sides and back, and rip stock for the drawer face, but don't cut it to length yet. Instead, leave the drawer face blank about 12 in. long. The drawer sides are joined to the face with sliding dovetails. These joints are not difficult to cut, and they provide a nice compromise when you do not want to invest the time required for traditional dovetail corner joints. In order to cut these stopped dovetail slots, construct a U-shaped jig to guide the router. You can build this jig by screwing together three strips of scrap lumber or plywood. The dimensions of these pieces are not critical. But it is important that the three pieces are assembled square to each other.

Set the dovetail bit—we used a Bosch No. 85240—to cut 7/16 in. deep, then make an indexing cut into the fence of your jig to make locating your cut easy. Mark the position of the two slots—along with an end mark for each slot—on the inside surface of the drawer face, centered on the length of the face blank. Use the router routing jig with the indexing cut centered



13--Rout slots in the drawer face for the drawer sides with a dovetail bit. Use a square U-shaped jig to guide the router.



14--Use the same dovetail bit in a router

on one mark. Slide the router bit into the slot, turn on the motor and guide the tool along the jig to the end mark of the slot (Photo 13). Turn off the router and slide the bit back to the indexing cut to remove it. Repeat for the other slot. Cut the face to finished length.

Use the same dovetail bit in the router table to cut the dovetail shape on the ends of the drawer sides (Photo 14). For the joint with the drawer back, use a dado blade in the table saw to cut a simple dado. Then use a 1/4-in.-dia. straight bit in the router, and an edge guide, to cut the grooves for the drawer bottom in the face and drawer sides (Photo 15). Note that the groove in the face runs only between the dovetail slots.

Use a small backsaw to cut the shoulder at the top of the dovetail on each drawer side. Then dry assemble the drawer box to be sure that all joints fit properly. If all the joints are correct, sand all drawer parts, then apply glue and reassemble the drawer (Photo 16). Use brads to reinforce the glue joints between the back and drawer sides. Then clamp the drawer parts together. Check that the assembly is square.

Cut the drawer bottom from 1/4-in.-thick plywood, then slide it into place, and fasten it to the bottom edge of the drawer back with screws. You can remove the bottom later to make finishing the drawer easier.

Cut the drawer hanger strips to size, then bore and countersink pilot holes for attaching them to the drawer sides. Clamp the strips to the drawer sides, then fasten them with screws (Photo 17). Finish the drawer assembly by marking the locations of mounting screws for the drawer pull. Bore pilot holes and attach the pull.

table to cut both sides of the dovetails on the ends of each drawer side.



15--Cut a dado between the dovetail slots on the drawer face for the bottom panel. Cut matching dados in the drawer sides.



16--Apply glue to all the drawer joints, then clamp the box together. Reinforce the side-to-back joints with brads.



17--Slide the drawer bottom in place and attach it to the back with screws. Also, screw the guide strips to the sides.



18--Center the base over the top and mark the fastener holes. Then bore pilot holes in the top and attach the base.

Assembly

Sand the tabletop smooth with 220-grit sandpaper, then place it upside down on a padded surface. Invert the base on the top and adjust it for an even reveal on all sides. Next, mark the locations of the screwholes for the tabletop fasteners (Photo 18). Use a clamp to maintain the proper spacing between the front table legs.

Remove the base from the top and bore pilot holes for the tabletop fastener screws. Then, replace the base and install the screws. You'll need a screwdriver with a magnetic tip to start the screws between the drawer guides and side rails. Apply the same stain and finish that's described in "Rocking Chair."

MATERIALS LIST–SIDE TABLE

Key	No.	Size and description (use)
A	4	1 3/4 x 1 3/4 x 25" oak (leg)
B	2	13/16 x 4 x 16 1/4" oak (rail)
C	1	13/16 x 4 x 20 1/4" oak (rail)
D	2	13/16 x 2 x 16 1/4" oak (rail)
E	10	3/8 x 1 x 15 1/8" oak (slat)
F	1	13/16 x 8 x 19 7/8" oak (shelf)
G	2	5/8 x 4 x 15 7/8" oak (drawer guide)
H	1	1 x 20 x 24" oak (top)
I	1	13/16 x 3 15/16 x 18 3/8" oak (drawer face)
J	2	1/2 x 3 1/2 x 16 1/4" oak (drawer side)
K	1	1/2 x 3 x 16 3/4" oak (drawer back)
L	1	1/4 x 15 1/16 x 16 3/4" oak plywood (drawer bottom)
M	2	1/4 x 3/4 x 15 13/16" oak (drawer guide strip)
N	8	Knape & Vogt No. 1547STL tabletop fastener
O	1	Whitechapel No. 106STH2 drawer pull
P	8	1 1/4" No. 8 fh screws
Q	8	1" No. 8 fh screws
R	8	5/8" No. 8 fh screws
S	8	1/2" No. 6 fh screws
T	3	5/8" No. 6 rh screws
U	8	3/4" x 16-ga. brads
V	16	No. 20 joining plates

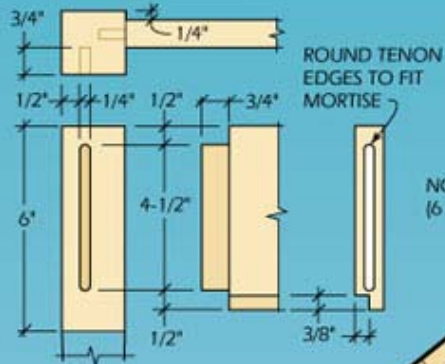
164

COFFEE TABLE

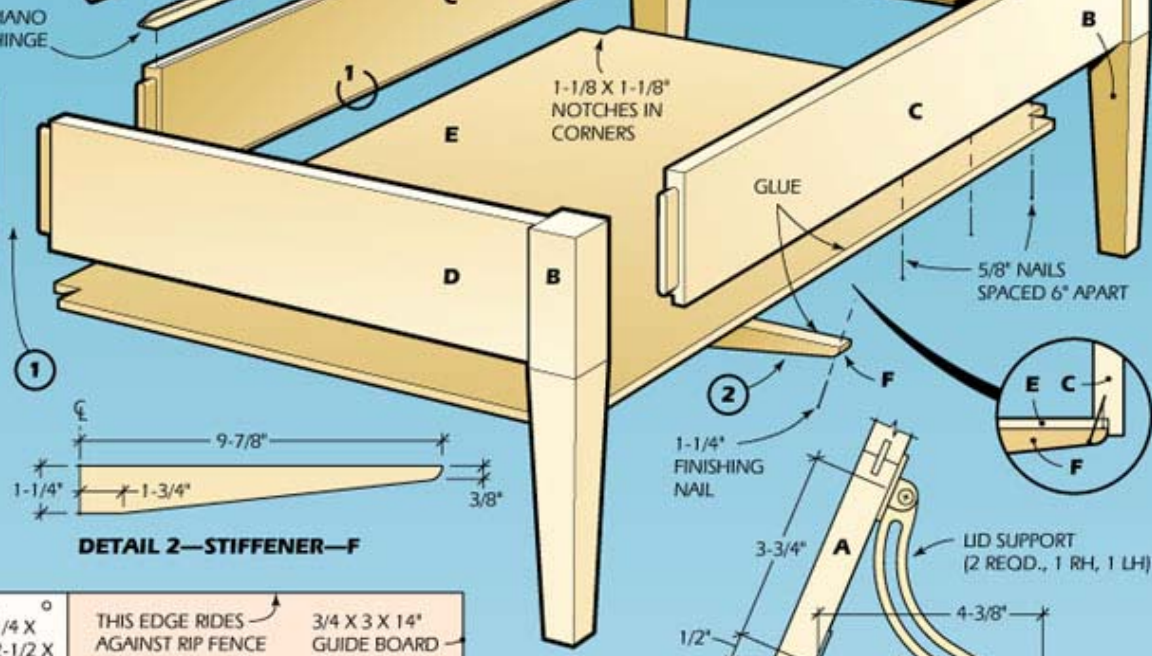
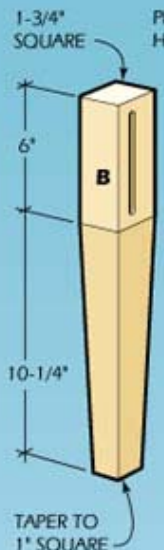
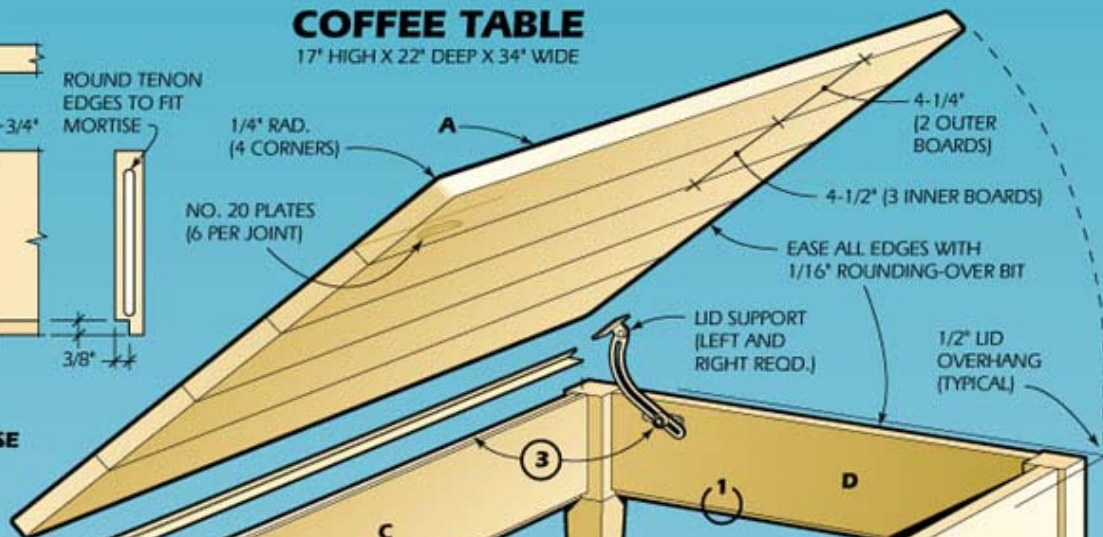


COFFEE TABLE

17" HIGH X 22" DEEP X 34" WIDE



**DETAIL 1
TENON AND MORTISE**



DETAIL 2—STIFFENER—F

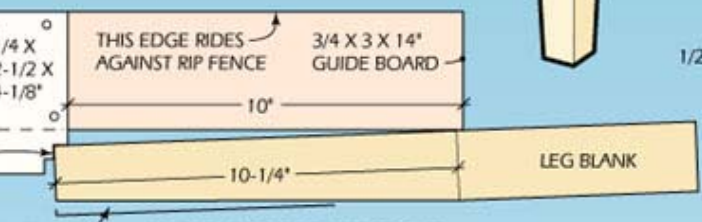
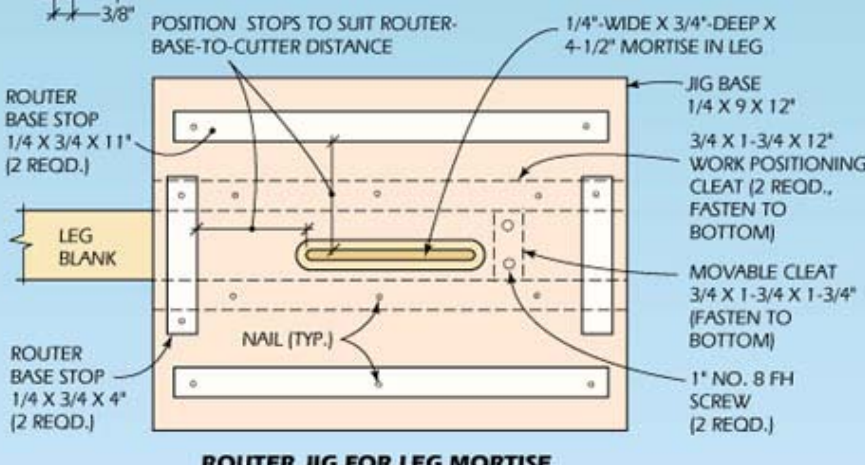


TABLE SAW TAPERING JIG



ROUTER JIG FOR LEG MORTISE

DETAIL 3—LID SUPPORT

MATERIALS LIST—COFFEE TABLE

Key	No.	Size and description (use)
A	1	3/4 x 22 x 34" maple (lid)
B	4	1 3/4 x 1 3/4 x 16 1/8" maple (leg)
C	2	3/4 x 5 1/2 x 31" maple (apron)
D	2	3/4 x 5 1/2 x 19" maple (apron)
E	1	1/4 x 19 3/4 x 31 3/4" lauan plywood (bottom)
F	1	3/4 x 1 1/4 x 19 3/4" maple (stiffener)

Misc: Curved friction lid supports, Part Nos. 25619 and 25627, brass 1 1/2-in.-wide x 48-in.-long piano hinge,

The Top And Legs

The panel for the tabletop is assembled by edge gluing five boards. Begin construction by ripping and crosscutting the stock slightly oversize, 4 1/2 in. wide x 35 in. long.

If you have a plate joiner, use it to cut the slots for six joining plates for each edge joint. Arrange the boards to produce the most attractive grain pattern. And make sure the endgrain growth ring directions alternate between the boards.

Mark centerlines for the slot positions along each joint line, then clamp each board to a flat benchtop while the slots are cut (Photo 1).

Inserting the plates and applying and evenly spreading the glue on eight edges can be difficult to do before the glue begins to set. To make the job easier, preglue the plates in each board. Use a small-nozzle squeeze bottle to apply glue in the slots without getting any on the edges (Photo 2).

To assemble the panel, you'll need four or five long clamps, six smaller clamps and six cauls. This arrangement will apply even pressure across the panel to prevent it from cupping. Rub paste wax on each caul's contact surface to prevent it from sticking to the boards.

Apply glue to the edges and plates, slide the boards together, then apply pressure to the cauls and the long clamps (Photo 3).



1--Joint the edges of the boards for the tabletop and cut the slots in them to receive the joining plates.



2--Save glue application time by pregluing

Remove the hardened glue that has squeezed from the joint using a scraper, belt sander and finishing sander, in that order. Next, crosscut the panel to finished size.

Rip and crosscut the legs to size and joint their four faces so they are square to one another and smooth. Lay out the mortise positions on adjacent faces and install a 1/4-in.-dia. straight bit in your plunge router for cutting the mortises. You can use a router edge guide to make the cuts, but the simple jig shown enables you to do the job more quickly and easily. The jig is made of 1/4-in. plywood with cleats attached to the bottom to secure the leg. A removable end cleat allows the leg to be repositioned so that one jig can be used to cut the mortises on both leg faces. On top of the jig, four strips guide the router and stop its travel.

Make mortise cuts in several passes (Photo 4). When the first mortise has been cut on each leg, reposition the jig's end cleat, insert the blank from the other end and proceed to cut the mortise on the adjacent face.

The tapers are cut on the table saw with the aid of a simple step jig. The taper is cut on two adjacent faces with the leg positioned in the first step of the jig. The end of the leg is placed in the second step to cut the two remaining tapers (Photo 5).

the joining plates in their slots. A small-nozzle bottle is handy here.



3--Glue and clamp the top using cauls above and below. Wax the cauls to prevent glue from sticking to them.



4--Use a jig and a plunge router to cut the leg mortises. The stops are positioned to suit the router's base.



5--Use a stepped jig on the table saw to cut the leg tapers. Each step positions the leg to cut two tapers.

Smooth the inner leg surfaces using a sander, but sand the mortised faces gently by hand to avoid distorting the surface surrounding the mortise. The mortise surface has to remain flat and square.

To complete the legs, set up a 1/16-in.-rad. rounding-over bit in a router table and round the corners (Photo 6).

Aprons And Assembly

Rip and crosscut the aprons, then set up a dado blade on the table saw to cut the apron tenons. Clamp a stop-block to the miter gauge fence, elevate the blade for a 1/2-in.-deep cut, and cut the tenon in four passes (Photo 7). Next, cut the rabbets for the bottom panel on the inside edges of the four aprons.

After using a chisel to round the ends of the tenons to match the mortises, the table is ready for assembly. Use four clamps and four cauls to assemble the legs and aprons (Photo 8). Apply glue sparingly to the tenons, and draw the assembly together. Check the assembly for square. If necessary, adjust the clamps to make the assembly square.

After the glue has set, use the router with a straight bit to cut the hinge rabbet. To do this, clamp two pieces of scrap flush with the apron's top edge to provide a stable surface for the router. Set the router to make a 5/32-in.-deep cut (Photo 9). Note that the rabbet's 1/2-in. width is critical. It positions the hinge so the top can tilt without striking the leg's corner.

Next, crosscut the piano hinge to fit the rabbet and install it temporarily. Do this by placing the lid on the workbench with the bottom facing up. Then place the table, bottom up, onto the lid and mark the position of the hinge on the lid. Remove the hinge, mark the screw centers, and bore the screw pilot holes. Attach the hinge to the table first, then to the lid.

Once the hinge is installed, mark and bore the screw pilot holes for lid supports. Attach the supports to the aprons first,



6--Round the bottom of the leg corners on the router table. Don't round the top of the leg where it abuts the apron.



7--Use a stopblock clamped to the miter gauge and a dado blade in the table saw to cut the apron tenons.



8--Glue and clamp the aprons and legs. Heavy cauls distribute clamping pressure across each apron.

then the lid (Photo 10).

Cut the plywood bottom to size and install it with glue and nails. Also, glue the stiffener strip to the bottom. Remove the lid to allow finishing.

We finished the table with three coats of polyurethane lightly tinted with a few drops of yellow ochre to give it a warm honey color.

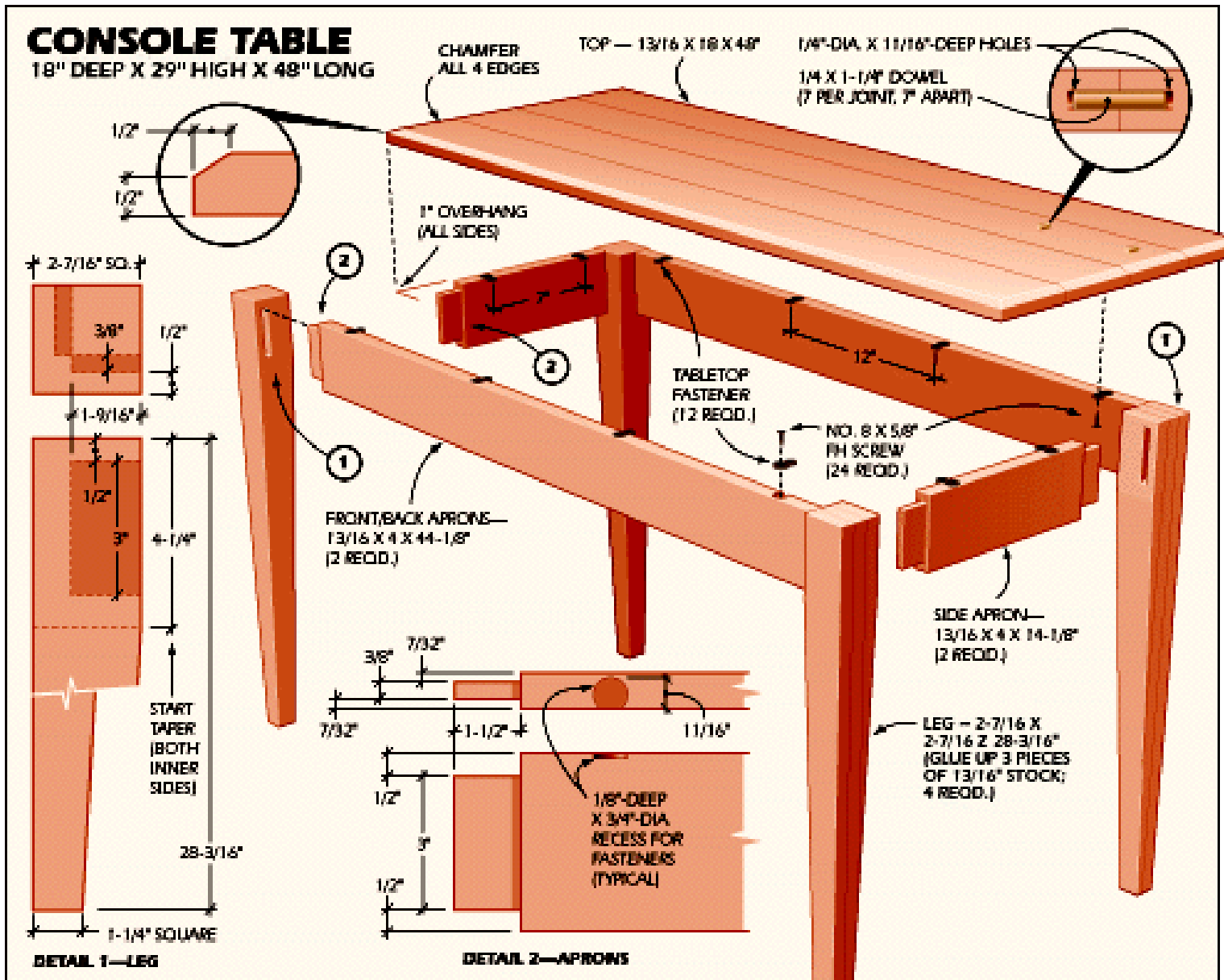


9--Clamp scrap to the rear apron to provide a base for the router, then cut the hinge rabbet using a straight bit.



10--Sequence is important when attaching the top's support hardware. Attach it to the apron first, then the top.

CONSOLE TABLE



This simple console table is a great beginner's project. Its straightforward lines are reminiscent of Shaker pieces built over 100 years ago. But simple doesn't have to mean unsophisticated. This solid cherry piece is well-tailored, crisply built and can fit just about anywhere: your front hall, behind a living room sofa, in an upstairs bedroom, or even in your bathroom if it's blessed with enough extra space.

But good design isn't the whole story. This piece is also easy for a beginner to build. It has only nine parts: four legs, four rails and a top. And we show you how to build it with nothing more than hand tools and a few portable power tools. Everything you need is described in "Beginner's Toolbox".

Perhaps the best part of this design, however, is that it puts to good use everything that comes before it in this Woodworking Guide. If you start this table now, your gratification won't be delayed much longer. You should be able to finish it up in just a few weeks of spare time—even if you just learned how to sharpen a chisel or cut a mortise-and-tenon joint.

Cherry Stock

The material we used for this piece is solid cherry stock that we bought flattened on both sides and jointed on one edge. You'll have to pay more for this service, but it's worth the cost. The standard thickness for this type of hardwood is 13/16 in.

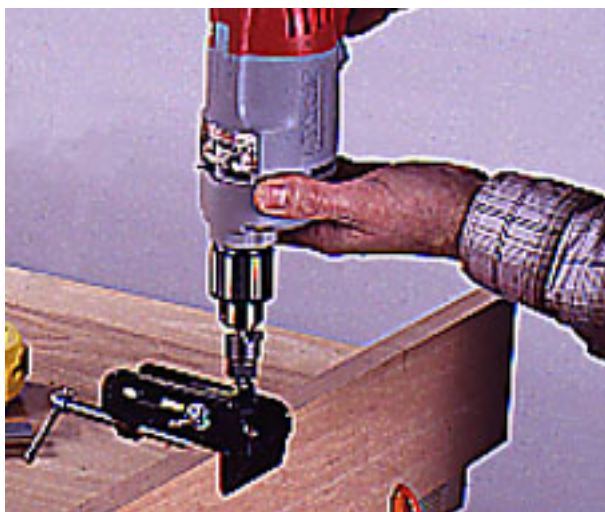
The first step in preparing the lumber is to crosscut all parts to rough length, a couple of inches longer than their finished lengths. Then check the jointed edge of each piece for flatness and square. If some refinements are required, clamp the board to the side of your worktable and use a bench plane to true the edge (Photo 1). Next, cut the boards to finished width using a circular saw with a rip guide (Photo 2). Clean up any saw marks with a bench plane.



1--Begin the top by flattening one edge of each board, using a bench plane. Make sure the edge is planed square to the face.



2--Cut each top board to width using a circular saw and rip guide. Make sure the rip guide follows the planed edge.



3--Lay out the location of the alignment dowels on the board edges. Then use a doweling jig and drill to bore the holes.



4--Cover the edges and dowel holes with glue, insert the dowels and bring the boards together with pipe clamps.



5--When the glue is dry remove any squeeze-out, then let the assembly cure. Flatten joints if necessary with a plane.



6--Mark the finished length on both ends of the top panel. Then make the cuts with a saw and straightedge guide.

Tabletop

This tabletop was made from four smaller boards that were glued together. Using multiple boards helps keep the top flat over time. If your stock is wide enough to use only three boards, that's fine. Begin work by laying the boards on a flat surface and choosing the most attractive grain pattern by arranging the boards in several ways. Then lay out the dowel locations on all the joints and bore the dowel holes using a doweling jig and a portable drill (Photo 3).

Next, place a drop of glue in each dowel hole and gently tap the dowel in place. Then spread the glue evenly on all the mating edges and push the boards together. Tighten the joints, using pipe clamps (Photo 4), and check that the panel is flat before letting the glue set. If it's not, readjust the clamps until the surface is flat. After 20 minutes scrape off any excess glue from the joints and let the panel dry overnight.

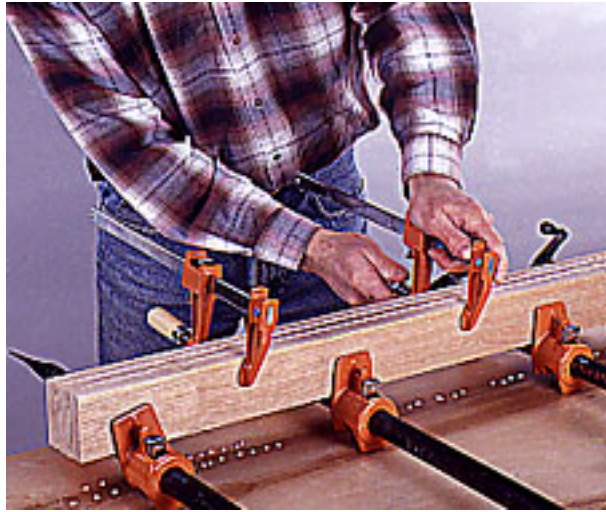
When you remove the clamps, check the panel surface carefully. If the joints are flush, set the panel aside. If they aren't, use a bench plane to smooth the surface (Photo 5). Hold the plane at a 30 degrees angle to the wood grain and make shearing cuts.

Next, cut the panel to finished length, using a circular saw and a straightedge guide (Photo 6). Make sure that both ends are square to the sides before making the cuts. Next, mark guidelines for the edge chamfer around the perimeter of the top and use a block plane to create these bevels (Photo 7). Be sure to clamp a scrap block to each long edge to keep them from splitting when you're working on the end grain.

Complete the tabletop by sanding smooth both sides and all the edges. Begin with 120-grit paper and move through a sequence of 150-, 180- and 220-grits.



7--Mark the chamfer around the top and plane the edges to this line. A scrap block keeps the side edge from splitting.



8--Cut the leg stock to size, then apply glue to the mating surfaces. Keep the board edges flush when clamping.

Legs And Rails

Crosscut the leg stock to finished length. Note that each leg is formed from three pieces of stock that are glued together. Apply glue to the three boards that make up each leg and clamp them together (Photo 8). Scrape off the excess glue after 20 minutes, and leave each leg assembly clamped for at least an hour. Don't do any further work on these pieces until the glue has cured for 24 hours.



9--Lay out the tenons on the ends of the table rails with a marking gauge. Keep the

legs with a marking gauge. Then use a doweling jig and a portable drill to remove most of the waste (Photo 12). Finish up the mortise by squaring the ends and sides with a sharp chisel.

Once the joinery is done, cut the tapers on both inside edges of each leg, as shown in the drawing below. Use a circular saw and be sure to cut on the waste side of the layout lines. Finish these tapers with a bench plane (Photo 13), making sure to check for square as you work. Before the legs and rails are assembled, it's a good idea to finish sand all the parts with the same progression of grits that was discussed earlier.

gauge base flat on the board surface.



10--Make the cheek cuts on the tenons using a backsaw. Keep the blade kerf just to the waste side of the layout lines.



11--Make the tenon shoulder cuts with a backsaw. Clamp a scrap block to the board to help guide the saw blade.



12--Remove the waste from the mortise using a drill and doweling jig. Square the ends and walls with a sharp chisel.

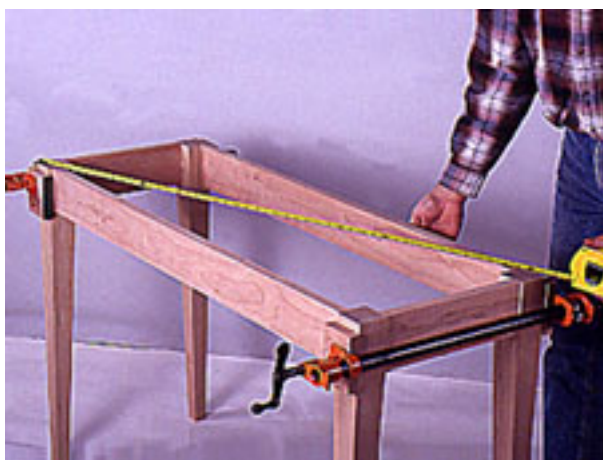
Assembly

Begin by joining a long rail to a pair of legs. Spread the glue evenly on the tenons and mortises, and then clamp the pieces together. Do the same with the other legs and long rail. When the glue has cured on these two assemblies, join them together with the short rails. Assemble the parts on a flat surface. Once the clamps are in place, compare opposite diagonal measurements to check for square (Photo 14). If the assembly isn't square, readjust the clamps until it is.

When the base joints have cured, lay out and bore the holes in the rails for the tabletop fasteners. Then turn the top upside down on a padded table and place the inverted base assembly on the underside of the top. Adjust the base so it's centered on the top. Then mark the location of the fastener holes. Bore pilot holes and screw the base to the top (Photo 15).



13--Rough cut the leg tapers with a circular saw. Then reduce the edges to finished thickness with a bench plane.



14--Glue and clamp the legs to the rails. Then check for a square assembly by comparing diagonal measurements.

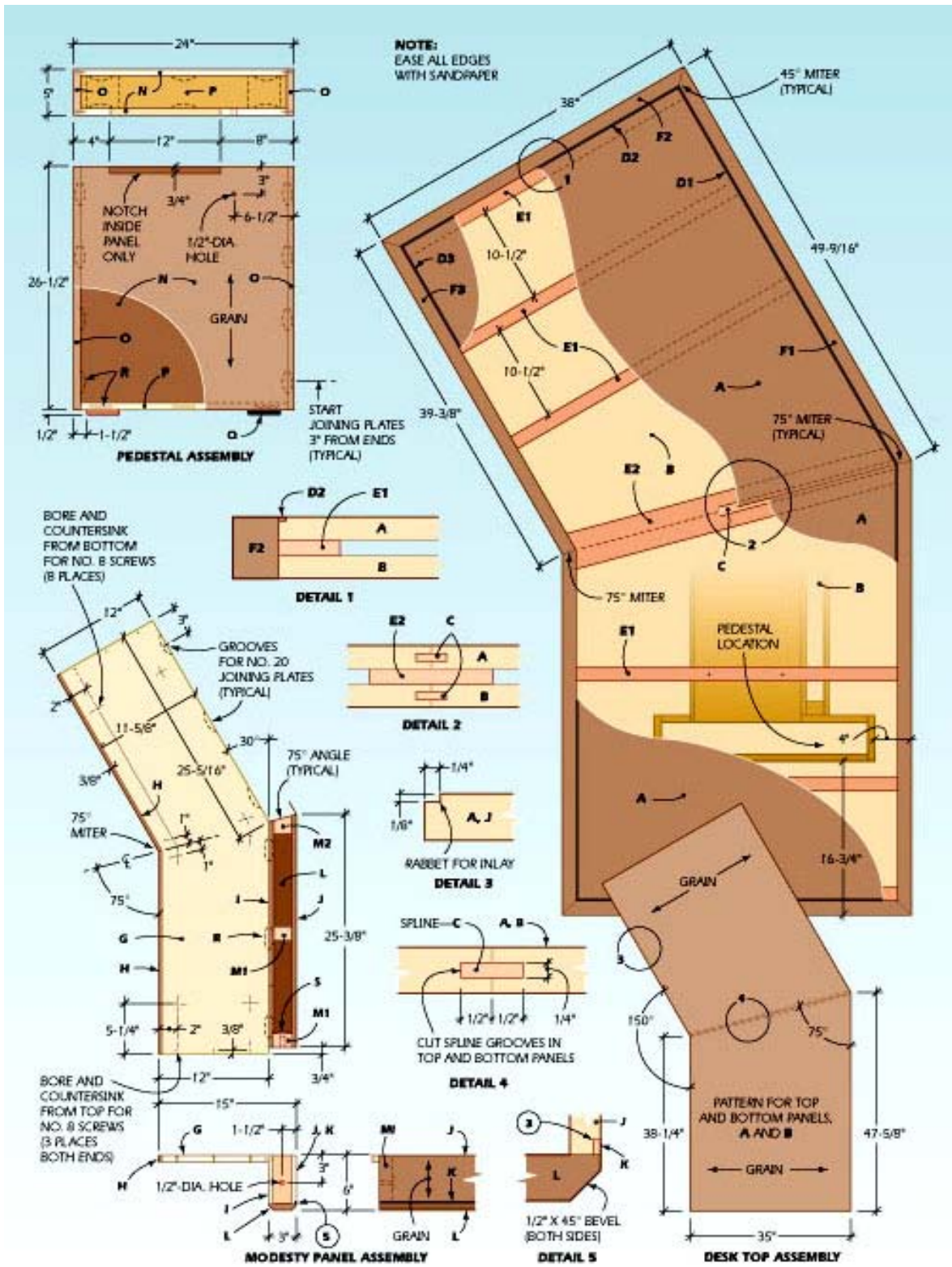


15--Attach the tabletop fasteners to the rails. Then turn the table parts over and screw the fasteners to the underside of the top.

166

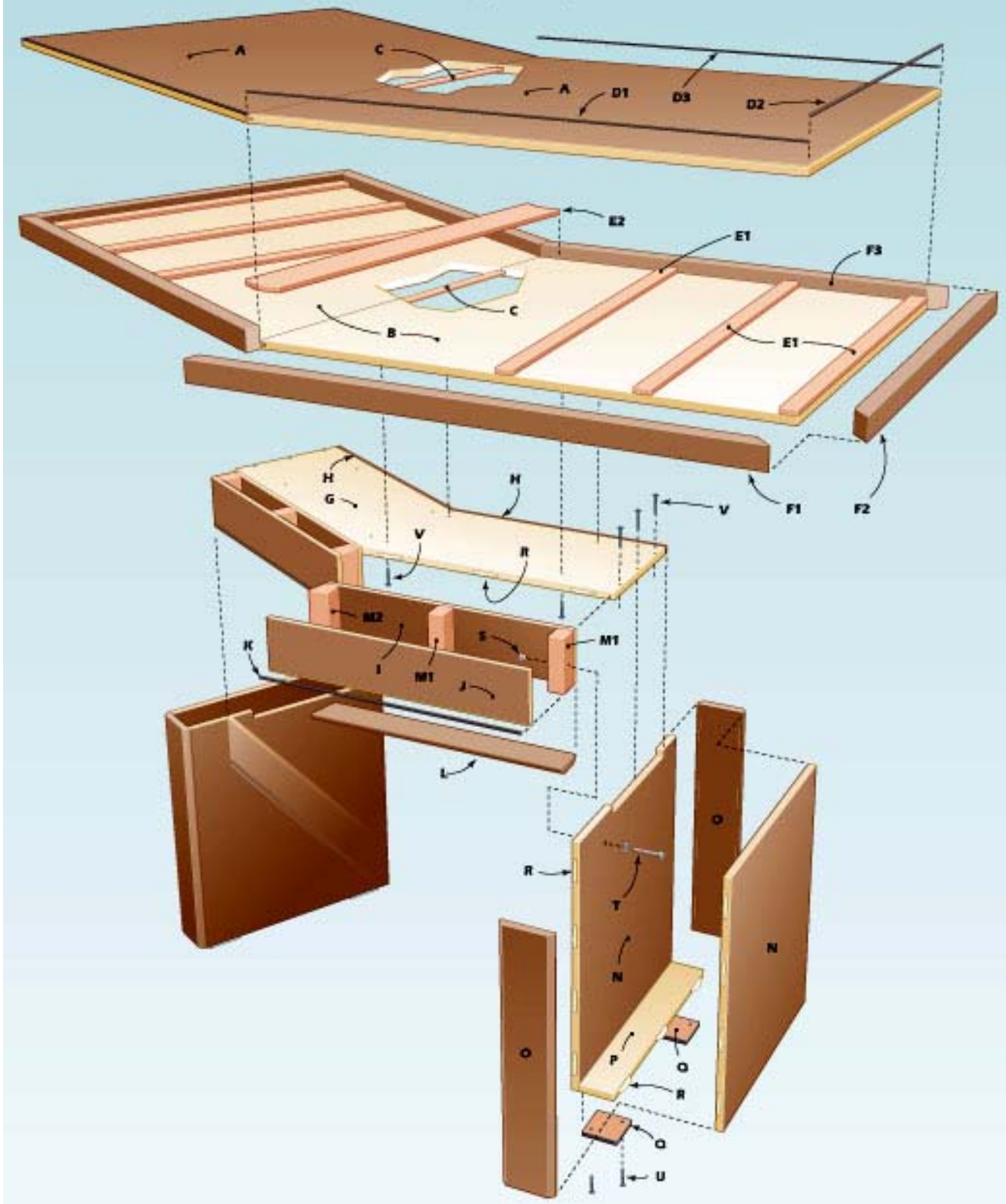
OFFICE DESK





DESK

29" HIGH X 49-1/2" DEEP X 95-3/4" WIDE



MATERIALS LIST—OFFICE DESK

Key	No.	Size and description (use)
A	2	3/4 X 35 X 47-5/8" walnut panel stock* (upper top)
B	2	3/4 X 35 X 47-5/8" panel stock** (lower top)
C	2	1/4 X 1 X 36-3/8" maple (spline)
D1	2	1/8 X 1/4 X 47-5/8" maple† (inlay)
D2	2	1/8 X 1/4 X 35" maple† (inlay)
D3	2	1/8 X 1/4 X 38-5/16" maple† (inlay)
E1	6	1/2 X 1-1/2 X 35" poplar (spacer)
E2	2	1/2 X 4 X 36-3/4" poplar (spacer)
F1	2	1-1/2 X 2 X 49-9/16" walnut (edge)
F2	2	1-1/2 X 2 X 38" walnut (edge)
F3	1	1-1/2 X 2 X 39-3/4" walnut (edge)
G	1	3/4 X 17-13/16 X 48-15/16" panel stock** (subtop)
H	2	3/8 X 3/4 X 22-1/4" walnut (edge band)
I	2	3/4 X 5-1/4 X 24-11/16" walnut panel stock (inner panel)
J	2	3/4 X 5-1/4 X 25-3/8" walnut panel stock (outer panel)
K	2	1/8 X 1/4 X 25-3/8" maple† (inlay)
L	2	3/4 X 3 X 25-3/8" walnut (bottom cap)
M1	4	1-1/2 X 2 X 5-1/2" poplar (block)
M2	2	2 X 2 X 5-1/2" poplar (block)
N	4	3/4 X 22-1/2 X 26-1/2" walnut panel stock (pedestal side)
O	4	3/4 X 5 X 26-1/2" walnut (pedestal endcap)
P	2	3/4 X 3-1/2 X 22-1/2" poplar (pedestal base)
Q	4	1/2 X 3-1/2 X 3-1/2" maple†† (foot)
R	50	No. 20 joining plate
S	2	3/8" T-nut
T	2	3/8 X 2-1/2" hexhead bolt and washer
U	8	1-1/4" No. 8 fh woodscrew
V	14	2" No. 8 fh woodscrew

The modern executive office desk isn't simply a place to hold a telephone. These days, it's the launching platform for grand ideas and big decisions. It's the basic real estate for projects, proposals, plans and programs. And, like any other business commodity, the more you have, the more work you get done.

Our custom desk is designed with a generous surface area and is ideal for those who need to spread out their work. While the broad V shape imparts a strong, dynamic visual effect, it also makes the space more accessible.

Of course, a high-end desk needs to look the part, as well. Our design features matched walnut-veneer panels with a decorative black inlay. The result is an elegant surface that's as functional as it is eye-catching.

To achieve the mirrored effect of the matched veneer panels, you'll need to order stock that has walnut veneers cut sequentially from the log. When you order the panels, specify that they be "sequence matched

and numbered." The panel manufacturer will glue each veneer to its panel substrate in the same order that the veneers were cut. Each panel has a number that indicates its place in the sequence. When you plan the material for your desk, lay out your cut lines to make the best use of matching grain.

For our piece, we used walnut veneer on an MDF (medium-density fiberboard) core. These panels tend to be flatter and more stable than those with a veneer core (plywood). They also are about twice the weight of veneer-core panels, so you'll need a helper to move the parts around the shop.

The Pedestals

The two pedestal bases that support the desktop are constructed of veneered side panels with solid-walnut caps, all joined over a solid-poplar base. Study the plans to be sure you understand the construction details, then cut the pedestal sides (N), endcaps (O) and bases (P) to exact size. Mark the position of the joining plate slots in these pieces and use a plate joiner to make the cuts.

Lay out the notches on the two inner pedestal panels and cut these with a sabre saw. Then lay out and bore the hole in each panel for the bolt that connects each pedestal to the modesty panel assembly.

Apply glue to the slots, plates and edges of one of the poplar base pieces (P), install the plates and join two sides to the base. Use clamps to pull the joints tight and let the glue set. Repeat the process for the second pedestal.

Next glue the endcaps to the pedestal subassemblies using plate joints as shown. When the glue has dried, use a router and chamfer bit to cut the 1/2-in. bevel along the vertical edges of the pedestal faces.

The Modesty Panel

Cut the parts for the modesty panel to size. Pay close attention to the veneer on the front panels (J) so that, when assembled, one side of the modesty panel is a mirror image of the other. Begin assembly by joining the two mitered poplar blocks (M2) that form the core of the panel. Apply glue to the mating surfaces and clamp the blocks together. While the glue is drying, bore the 1/2-in.-dia. holes in the two end blocks (M1). Install a 3/8-in. T-nut on the inner surface of each block by tapping it into the hole with a hammer.

Next, glue and clamp one of the inner panels (I) to the center block assembly. Join the end and middle spacer blocks in the same way. Note that the end block must have the T-nut on its inner surface. Join the opposite inner panel to the center block and add the two spacers. When the subassembly is dry, glue the outer panels in place. Pay close attention to the quality of the miter joint at the front as this spot is quite prominent.

Use a router with straightedge guide to cut the rabbet along the bottom front edge of the modesty panel. Cut pieces of 1/8 X 1/4-in. black inlay strips (K) to size, and then apply glue to the rabbet and position the strips. Use pieces of masking tape placed about 2 in. apart to clamp the strips in place. Let the glue set for about 30 minutes, then remove the tape and scrape off any excess glue.

Apply glue to the bottom edges of the modesty panel and to the solid-walnut bottom caps (L). Then clamp the caps to the panel. After the glue sets, use a chamfer bit in the router to bevel the bottom edges of the cap.

Cut the subtop (G) to size and shape. Rip 3/8 X 3/4-in. edgeband strips of solid walnut (H) and glue them to the exposed edge of the subtop. Lay out and cut the joining-plate slots in the subtop edge and on the inside surface of the modesty panel. Then apply glue and join the parts. Bore and countersink holes in the subtop for fastening it to the pedestals and to the desktop.

The Desktop

In order to guarantee accuracy in cutting the desktop parts, make a template for one-half of the assembled desktop panel. You can then use this template to first outline and then cut the panel parts to finished dimension. Use a sheet of 1/4-in. tempered hardboard for the pattern, trimming it to exact size with a router and straight bit guided by a straightedge.

Lay out the desktop panels (A, B) by tracing around the template. Pay particular attention to achieving a good veneer match across the center joint of the top panel pieces. The bottom panels can be made out of a less expensive material or you can stick to walnut for consistency.

To accurately cut the panels, first use a sabre saw to rough cut them within 1/4 in. of finished dimensions. For final trimming, clamp the template to the panel and use the router with a flush-trimming bit to make the cuts. This leaves the smoothest possible surface with the least chance of chipped veneer.

Use a slotting cutter in the router to cut the spline grooves along the central panel joints. Then cut the poplar blocking strips (E1, E2) and maple splines (C) to size. The splines should be snug in their grooves, but not so tight that they need to be forced into place.

Join the two halves of the bottom panel first, so that you can get the feel for the process before moving on to the more critical top joint. Apply glue to the spline, spline groove and mating edges. Insert the spline and bring the two halves together. Use long bar clamps to gently pull the joint tight. Place pads under the clamp jaws to be sure that the clamps don't damage the panel edges. Follow the same procedure for the top panel. Handle these panels very carefully because the joint is rather fragile until the entire top is assembled.

Apply glue to the poplar spacing blocks and position them on the top surface of the bottom panel as shown in the drawing. Use clamps to hold the blocks in place until the glue sets. Then apply glue to the top of the blocks and position the top panel. Carefully check that the top and bottom panels are perfectly aligned before clamping them together.

Use long cauls across the width of the top to distribute the clamping pressure. The cauls work best if they have a slight bow and are used with the convex side toward the work. If the cauls happen to be straight, place a veneer shim under the center of each caul to ensure adequate pressure in the middle of the panel.

Use a router and straightedge guide to cut the rabbet around the desktop. Cut the black-dyed inlay strips (D1, D2, D3) to size, then apply glue to the rabbet, position the strips and use masking tape to clamp them until the glue sets. Carefully scrape off any excess glue from the top and edge of the panel.

Cut the solid walnut edge (F1, F2, F3) for the desktop from 2-in. stock. Installing one walnut edge at a time, apply glue to the mating surfaces and clamp each piece in place. At the ends, use special edging clamps that grip the panel surfaces to apply pressure on the edge.

Finishing

Sand the desktop, modesty panel and pedestals with 120-, 180- and 220-grit sandpaper, dusting off thoroughly between grits. Be sure to ease all edges and corners. Remove all sanding dust, then wipe the surfaces with a tack cloth.

In order to achieve a glass-smooth finish on the desktop, we used a paste filler on the top to fill the open grain of the walnut. These open pores are not a problem on the vertical surfaces, but on a horizontal surface, they would catch the light and be a distraction from the veneer pattern.

We used Behlen's Pore-O-Pac paste wood filler in Van Dyke Brown. Spread the filler across the grain of the top with a brush or rubber squeegee. Then, lightly reapply the filler with the grain. When the filler takes on a dull appearance, use a plastic scraper to remove the excess, and vigorously wipe the surface with burlap cloths to remove any remaining filler. Let the top dry overnight to allow any solvent to evaporate.

To provide a tough, yet attractive, finish for the desk, we used three coats of Behlen's Rockhard Table Top Varnish. Thin the first coat approximately 20% with the appropriate reducer and use a quality bristle brush to apply the finish. Allow the finish to dry at least 12 hours, then sand lightly with 400-grit paper and dust off thoroughly. Allow the second coat to dry overnight, then lightly sand before flowing on the final coat.

While you wait for the finish to dry between coats, you can cut, bore and countersink the maple feet for the pedestals. Sand the edges smooth, then use black enamel paint to finish the feet. Apply two or three coats as required for a good finish. When the paint and varnish are dry, screw the feet to the bottom of the pedestals.

To achieve a smooth, satin finish, you should rub out the varnish, especially on the desktop. Since this varnish is extremely hard, it should be rubbed and polished within 20 hours of applying the last coat. First, sand the top with 600-grit waterproof paper, using paraffin oil as a lubricant. When all dust particles and uneven spots are leveled, wipe the surface with a clean cloth and use No. 0000 steel wool to burnish the surface to an even satin glow. Polish the top with a soft cloth.

Join the modesty panel to the two pedestals. Use 3/8 X 2-1/2-in. hexhead bolts with washers to connect the parts. Then install screws through the subtop into the pedestal sides. Position the desktop over the base and fasten it with 2-in. No. 8 screws.

*Walnut-veneer MDF or veneer-core panel

** Walnut-, maple- or birch-veneer MDF or veneer-core panel

† Black-dyed inlay strips available from Dover Inlay Mfg. Co. Inc., Box 151, Williamsport, MD 21795

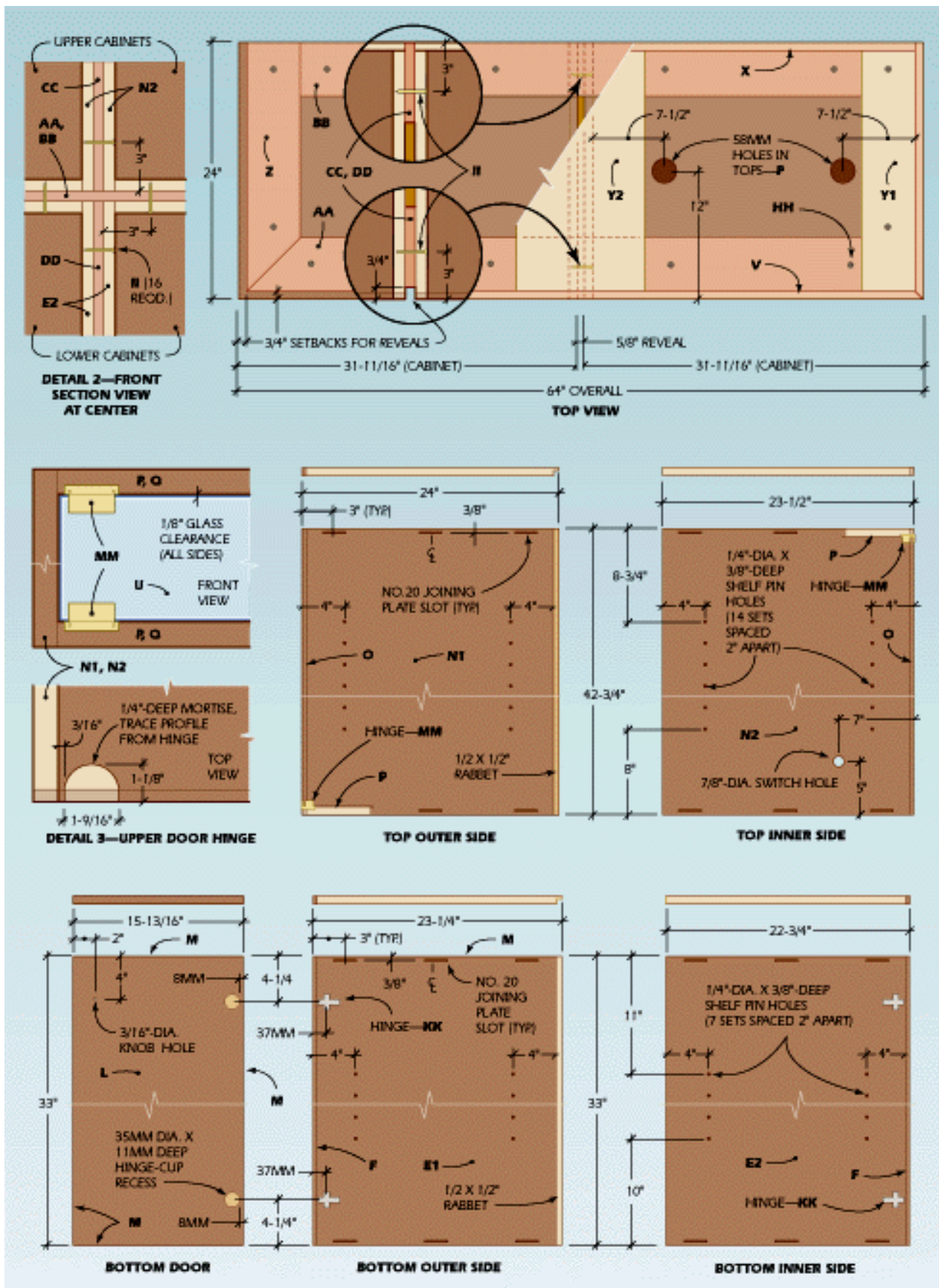
†† Painted black

Misc: Glue; 120-, 180-, 220- and 400-grit sandpaper; 600-grit waterproof paper; Behlen's Pore-O-Pac paste wood filler (Van Dyke Brown) No. B744-IF346; Behlen's Rockhard Table Top Varnish No. B603-28507; Behlen's Rockhard Varnish Reducer; black satin enamel paint.

167

DISPLAY CABINET





MATERIALS LIST—OFFICE DISPLAY CABINET

Qty	No.	Size and description (use)
A	1	3/4 X 3 X 62" maple† (base front)

B	2	3/4 X 3 X 22" maple† (base side)
C	1	3/4 X 3 X 60-1/2" maple† (base back)
D1	2	3/4 X 5 X 20-1/2" panel stock** (side gusset)
D2	1	3/4 X 10 X 20-1/2" panel stock** (center gusset)
E1	2	3/4 X 22-7/8 X 33" walnut panel stock* †† (outer side)
E2	2	3/4 X 22-3/8 X 33" walnut panel stock* (inner side)
F	4	3/8 X 3/4 X 33" walnut (edge band)
G	4	3/4 X 22-3/8 X 30-3/16" walnut panel stock* (top/bottom)
H	4	3/8 X 3/4 X 30-3/16" walnut (edge band)
I	2	1/2 X 31-7/16 X 33" panel stock** †† (back)
J	4	3/4 X 22-5/16 X 30-1/16" walnut panel stock* (shelf)
K	4	3/8 X 3/4 X 30-1/16" walnut (edge band)
L	4	3/4 X 15-13/16 X 33" walnut panel stock* †† (door)
M	as reqd.	walnut-veneer tape
N1	2	3/4 X 23-5/8 X 42-3/4" walnut panel stock* (outer side)
N2	2	3/4 X 23-1/8 X 42-3/4" walnut panel stock* (inner side)
O	4	3/8 X 3/4 X 42-3/4" walnut (edge band)
P	4	3/4 X 23-1/8 X 30-3/16" walnut panel stock* (top/bottom)
Q	4	3/8 X 3/4 X 30-3/16" walnut (edge band)
R	2	1/2 X 31-7/16 X 42-3/4" panel stock** (back)
S	2	1/4 X 30-1/8 X 41-3/16" mirror
T	6	1/4 X 23-1/8 X 30-1/16" tempered glass (shelf)
U	4	1/4 X 14-7/8 X 41" tempered glass (door)
V	1	3/4 X 4 X 64" maple† (soffit front)
W	2	3/4 X 4 X 24" maple† (soffit side)
X	1	3/4 X 4 X 62-1/2" maple† (soffit back)
Y1	2	3/4 X 5 X 22-1/2" panel stock** (gusset)
Y2	1	3/4 X 12 X 22-1/2" panel stock** (gusset)
Z	4	5/8 X 5 X 23-1/4" maple† (side horizontal spacer)
AA	2	5/8 X 5 X 62-1/2" maple† (front horizontal spacer)
BB	2	5/8 X 5 X 52-1/2" maple† (back horizontal spacer)
CC	2	5/8 X 5 X 42-3/4" maple† (upper vertical spacer)
DD	2	5/8 X 5 X 33" maple† (lower vertical spacer)
EE	as reqd.	No. 20 joining plates
FF	as reqd.	4d finishing nails
GG	as reqd.	1" No. 5 fh woodscrews
HH	as reqd.	1-1/4" No. 8 fh woodscrews
II	as reqd.	2" No. 8 fh brass woodscrews
JJ	40	1/4" shelf pin–No. 62067†††
KK	4	pair bottom cabinet hinges–No. 34710†††
LL	4	polished brass door pull–Sugatsune No. GLA-16
MM	4	pair upper cabinet hinges–Hafele No. 361.49.809
NN	4	touch latch–Hafele No. 245.80.310
OO	4	touch latch strike–Hafele No. 245.63.826
PP	2	light switch–Hafele No. 823.78.327
QQ	1	halogen lamp–Hafele No. 823.29.850
RR	2	transformer–Hafele No. 823.24.436

*Walnut-veneer MDF or veneer-core panel

**Walnut-, maple- or birch-veneer MDF or veneer-core panel (plywood)

† Painted black

†† Dimension includes walnut veneer-tape edge

††† Available from The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374

Case Construction

Begin by cutting the walnut panels for the upper and lower cases. Pay special attention to matching the veneer on the outer sides so that the grain runs continuously from the lower- to upper-case side. Cut the panels slightly oversize, add the solid-walnut edge band (O, F) to the front edges of all panels and add the walnut veneer tape (M) to the top edges of the lower-case outer sides (E1). Then cut the panels to finished size.

Use the router with straightedge guide to cut the rabbet in the outer case sides (E1, N1) that hide the cabinet backs. Lay out the joining-plate slots in sides, tops and bottoms, and cut the slots with the plate joiner.

Make a boring template for the shelf-pin holes in the lower cabinets and a second template for the pin holes in the upper cabinets. A strip of 1/2-in. plywood or MDF is perfect for the template. Clamp the appropriate template to a cabinet side, and use it as a guide in boring the holes. A stop on the drill bit ensures uniform hole depth.

Mark the locations of the glass-hinge mortises on the upper-case top and bottom panels (P). Trace the hinges for the proper mortise shape. Use a router and straight bit to remove most of the waste from the mortises and finish with a sharp chisel and gouge. Test fit the hinge bases and make any necessary adjustments.

Lay out and bore the 7/8-in.-dia. holes for the light switches in the upper-case sides (N2). Use an adjustable circle cutter to bore the 58-mm-dia. holes for the halogen lights in the upper-case tops.

Sand the interior surfaces of the cabinet parts before assembly, finishing with 220-grit paper. Then, completely dust off the parts.

To assemble one of the cases, spread glue on each plate and in its slot before inserting the plate. Join the top and bottom to one of the case sides, then position the opposite side and apply clamps to pull the joints tight. Compare opposite diagonal measurements to check that the cabinet is square and adjust the clamps if necessary. Let the glue set for at least 30 minutes before removing the clamps. Repeat the process for the remaining cases.

Cut the 1/2-in. panels for the case backs (I, R). Note that the top edge of the lower-case backs must be covered with walnut-veneer tape. Apply the tape to the edge before cutting the panel to finished size. Bore pilot holes and temporarily fasten the backs to the cases with 1-in. No. 5 fh screws.

The Spacers, Base And Soffit

Prepare the maple spacers that fit between the cabinets and between the upper cases and the soffit. Temporarily screw the upper vertical spacers (CC) to an upper-case side and attach the lower vertical spacers (DD) to a lower case.

Cut the maple parts for the base and soffit, as well as the 3/4-in. gussets (Y1, Y2, D1, D2). Assemble the base and soffit with 4d finishing nails and glue. Set and fill the nail holes. When the filler dries, sand the assemblies.

Lay the two bottom cases on their backs and clamp them together so that they are properly aligned. Bore pilot holes and temporarily screw the two cases together. Next, temporarily screw the base to the case bottoms. Stand the assembly on the floor. If necessary, shim the base so the assembly is level and stable.

Bore and countersink pilot holes in the spacers that separate the top and bottom cases. Then temporarily screw them to the top of the lower case assembly. Position the upper cases over the lower subassembly. Screw the upper cases together and fasten the upper half to the lower half by screwing through the tops of the lower cabinets. Then, temporarily install the top spacers (Z, AA, BB), place the soffit in position and temporarily secure it.

The Doors And Shelves

Select the panels for the lower cabinet doors so there will be a uniform, matching grain pattern across the lower cases. Cut the panels to size and apply walnut-veneer tape on all edges. Bore the 35mm recesses for the hinges in each door and mount the hinges on the doors. Attach the hinge mounting plates to the lower-case sides, mount the doors and adjust the hinges for proper spacing. Bore 3/16-in. holes for the door pulls and fasten the pulls to the doors.

For safety's sake, it's best to use tempered glass for the display case doors. Tempered glass must be specially ordered and cannot be altered once the tempering process is complete. Specify that the glass have polished edges and "dubbed" (slightly rounded or chamfered) corners.

Mount the glass-door hinge base plates to the cabinet, then attach the hinges to the tempered glass panels. First install the self-adhesive pressure plates to the corners of the glass doors. Then slide the hinges over the glass and gently tighten the screws. Carefully slide the door assembly into the base-plate tracks and thread in the door stops. Adjust the position of the glass doors for even spacing on all edges. Then install the strikes along the bottom edges of the glass doors. Mount the magnetic touch latches to the upper-case bottom panels.

Cut walnut panels for the lower-cabinet shelves and glue a walnut edge band to the front edge of each panel. Install shelf pins in the lower cases and test the fit of each shelf.

Use a dark pencil to outline the inside profile of each upper cabinet on the 1/2-in. backs. These marks will serve as registration guides for the mirrors. At this point, you can disassemble the cabinet for finishing. Any final adjustments and fitting can be done later. Remove all hardware, spacers, and the soffit and base. Sand all parts with 120-, 180- and 220-grit sandpaper, dusting off thoroughly between grits. When the sanding is complete, wipe all surfaces with a tack cloth.

Finishing

Paint the spacers, soffit and base with three coats of black satin enamel. Sand lightly between coats to achieve a smooth, even finish.

Apply three coats of varnish to the walnut case parts. We used Behlen's Rockhard Table Top Varnish. Thin the first coat 20% with Behlen's Rockhard Varnish Reducer and sand lightly with 400-grit paper after drying for 12 hours. Apply two more coats, full strength, again sanding lightly between coats. Let the last coat cure for no longer than 20 hours. Then wet-sand with 600-grit waterproof paper and paraffin oil to remove any dust particles. Wipe dry with clean cotton cloths, then buff with No. 0000 steel wool. Polish the finish with a clean, dry and soft cotton cloth.

Final Assembly

Use mirror mastic to mount the mirrors to the upper-cabinet backs. Lay the backs flat on a worktable and apply the mastic to the panels. Position the mirrors over the backs, aligning them within the registration marks. Let the mastic cure overnight before reinstalling the backs.

Reattach the spacers to the lower- and upper-cabinet sides. Join the lower cabinets together and reattach the base assembly.

Install the halogen lights in the tops of the upper cabinets and connect the wiring according to the diagrams that come with the lights. The halogen low-voltage system includes the lamps and a separate transformer, mounting block and light switch for each case. Fasten the transformers and mounting blocks to the top of each cabinet. Locate these parts so that they do not interfere with the placement of the spacers or soffit gussets. Install the switches on the case sides and route the wires up the sides and behind the vertical spacers. Use small electrical staples to hold the wires in place. Plug in the lights and check their operation before completing the cabinet assembly.

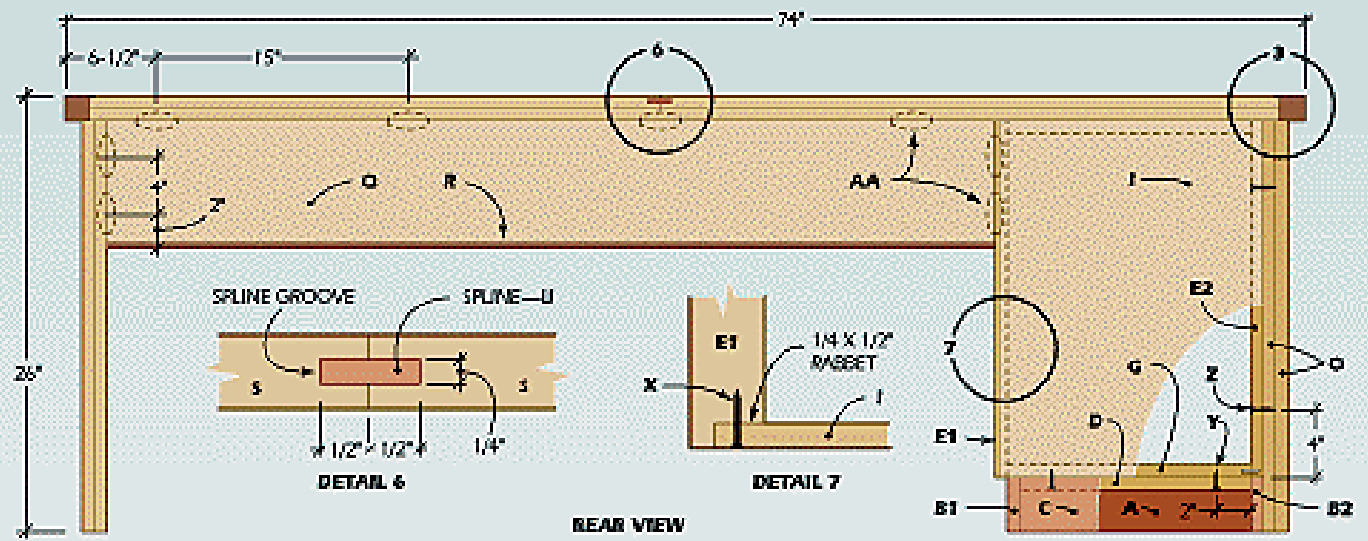
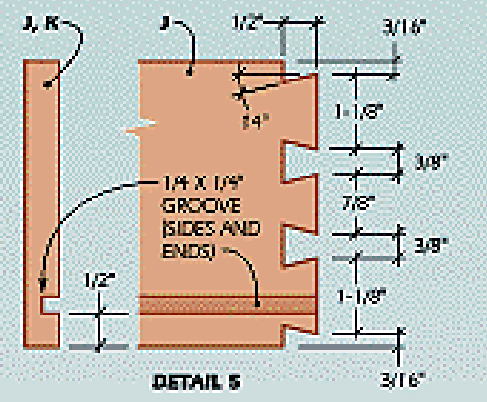
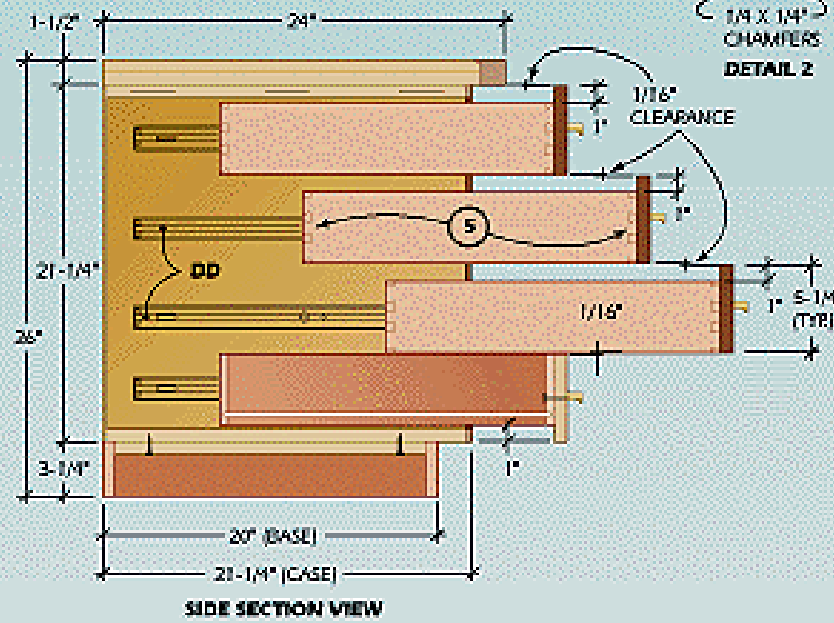
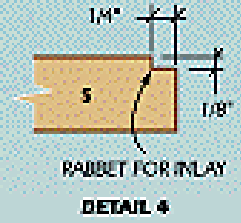
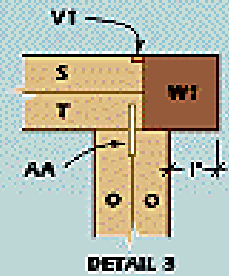
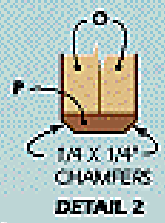
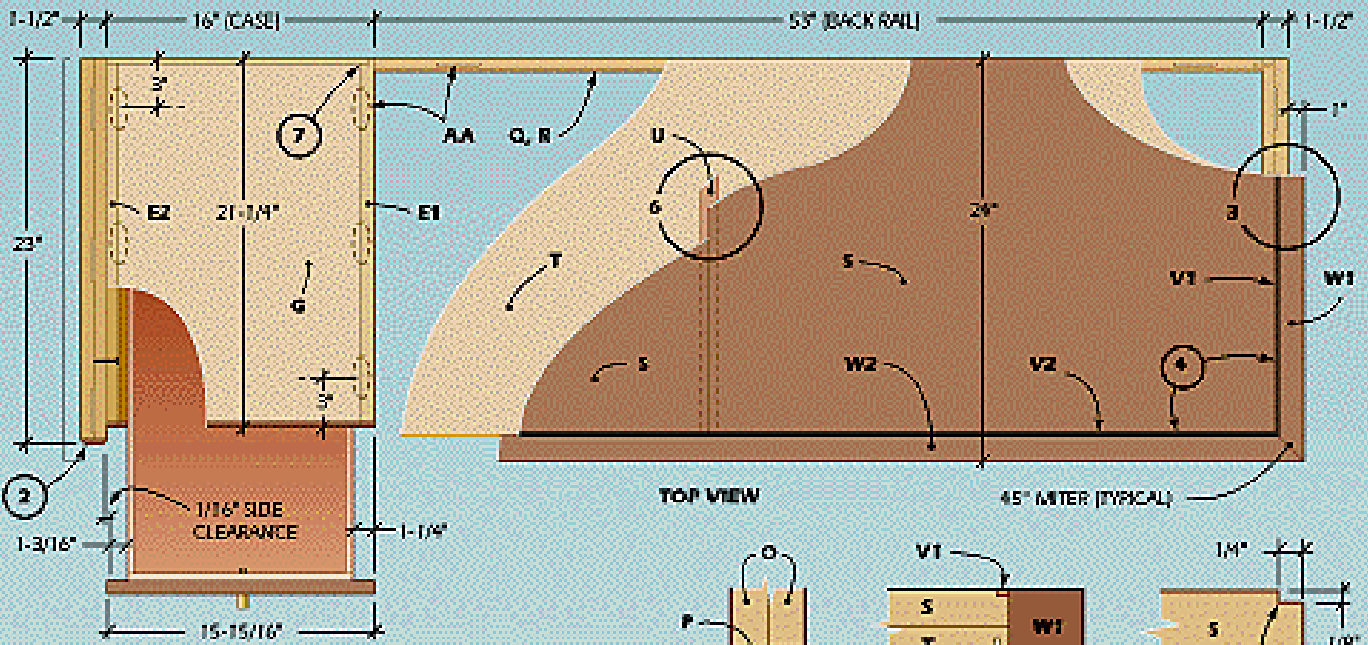
Replace the horizontal spacers on the lower-cabinet tops. Next, place the upper cabinets on the base, join them to each other and fasten them to the lower half. Reinstall the top spacers and attach the soffit. You can bore a 1-1/2-in. hole centered in the back of the soffit to allow the light cords to pass through, or you can simply let the cords drape over the top of the soffit.

Mount the hinges and mounting plates for the lower-case doors and rehang the doors. Rehang the glass doors and attach all door pulls. Finally, install the shelves.

168

CREDENZA





MATERIALS LIST—CREDENZA

Key	No.	Size and description (use)
A	1	3/4 X 3-1/4 X 15-1/4" maple†† (base front)
B1	1	3/4 X 3-1/4 X 20" maple†† (base right side)
B2	1	3/4 X 3-1/4 X 19-1/4" maple†† (base left side)
C	1	3/4 X 3-1/4 X 13-3/4" maple†† (base back)
D	1	3/4 X 13-3/4 X 18-1/2" panel stock** (base top)
E1	1	3/4 X 21-1/4 X 20-7/8" walnut panel stock* (case right side)
E2	1	3/4 X 21-1/4 X 20-5/8" walnut panel stock* (case left side)
F	2	3/8 X 3/4 X 21-1/4" walnut (edge band)
G	2	3/4 X 14-1/2 X 21-3/8" panel stock** (case top/bottom)
H	2	3/8 X 3/4 X 14-1/2" walnut (edge band)
I	1	1/4 X 15-3/4 X 21-1/4" plywood (case back)
J	8	1/2 X 4-1/4 X 20" maple (drawer side)
K	8	1/2 X 4-1/4 X 13-1/2" maple (drawer end)
L	4	1/4 X 13 X 19-1/2" maple plywood (drawer bottom)
M	4	3/4 X 5-1/4 X 15-15/16" walnut panel stock*††† (drawer front)
N	as reqd.	walnut veneer tape
O	4	3/4 X 22-5/8 X 24-1/2" walnut panel stock* (leg panel)
P	2	3/8 X 1-1/2 X 24-1/2" walnut (edge band)
Q	1	3/4 X 7-5/8 X 53" walnut panel stock* (rail)
R	1	3/8 X 3/4 X 53" walnut (edge band)
S	2	3/4 X 22-1/2 X 35-1/2" walnut panel stock* (upper top panel)
T	1	3/4 X 22-1/2 X 71" panel stock** (lower top panel)
U	1	1/4 X 1 X 22-1/2" maple (spline)
V1	2	1/8 X 1/4 X 22-1/2" maple† (inlay)
V2	1	1/8 X 1/4 X 71" maple† (inlay)
W1	2	1-1/2 X 1-1/2 X 24" walnut (edge)
W2	1	1-1/2 X 1-1/2 X 74" walnut (edge)
X	as reqd.	3/4" No. 5 fh wood screw**
Y	as reqd.	1-1/4" No. 8 fh wood screw**
Z	as reqd.	1-1/2" No. 8 fh wood screw**
AA	as reqd.	No. 20 joining plate**
BB	as reqd.	4d finishing nail**
CC	4	drawer pull—Sugatsune No. GLA-16, polished brass
DD	4	20" full-extension drawer slide—No. 32839 ††††

*Walnut-veneer MDF or veneer-core panel

**Walnut-, maple- or birch-veneer MDF or veneer-core panel (plywood)

† Black-dyed inlay strips available from Dover Inlay Mfg. Co. Inc., Box 151, Williamsport, MD 21795

†† Painted black

††† Dimension includes walnut veneer-tape edge

†††† Available from The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374

Begin by cutting the case parts (E1, E2, G) to size. Cut edge band strips (F) from solid walnut and glue them to the front edges of the panels. Use a router with an edge guide to cut the rabbet along the back edge of the exposed side of the base.

Lay out the joining-plate slots in the case parts and use a plate joiner to cut the slots. Apply glue to the slots and joining plates, install the plates and assemble the case. Use bar or pipe clamps to pull the joints tight and check that the assembly is square by comparing opposite diagonal measurements. Adjust the clamps if necessary and allow the glue to cure for at least 30 minutes before removing the clamps. Cut the 1/4-in. back panel (I) to size, bore pilot holes and install it on the case with 3/4-in. No. 5 fh wood screws.

Cut solid-maple stock to size for the base (A, B1, B2, C), and cut the 3/4-in. plywood base top panel (D) to size. Join the maple pieces to the panel and to each other at the corners with 4d finishing nails and glue. Make sure that the miter joint on the exposed corner is tight. Set and fill the nail holes. When the filler is completely dry, sand the base smooth with 120-, 180- and 220-grit sandpaper. Bore pilot holes in the base top and fasten the base to the case.

The Legs And Rail

Cut walnut panels to size for the legs (O). Apply glue to a pair of panels for each leg, then clamp them together until the glue sets. Cut a walnut edge band (F) for each leg assembly. Apply glue to one of the strips and the front edge of one of the legs, then clamp the strip in place. Repeat for the other leg. After the glue sets, scrape off any excess. Use a router and chamfer bit to cut the bevels along the front edges of the legs.

Cut the back rail to size and glue the walnut edge band (R) along its bottom edge. Lay out and cut the joining-plate slots in the ends and top edge of the rail and also in the leg panels and inner case side. Set these parts aside until the top is complete.

The Top

Cut the panels to size for the desktop. The top is formed by sandwiching together two pieces of 3/4-in. stock. The grain of the top panel (S) runs across the top, so the upper panels must be joined in the center. Pay close attention to matching the grain. Since the bottom panel (T) is not visible, cut it in one piece with the grain running along its length.

Use the router with a slotting cutter to cut the spline grooves in the mating edges of the top panels. Cut a maple spline to fit the groove, apply glue to the grooves, edges and spline and assemble the panel. Pull the joint tight with clamps and allow the glue to set. Spread glue on the desktop panels and stack them together with all edges perfectly flush. Use enough clamps and cauls to distribute even pressure across the top. Let the glue set for at least 1 hour.

Use a router and edge guide to cut the rabbet around the front and ends of the top. Trim the black inlay strips (V1, V2) to size. Since the strips come in 3-ft. lengths, there will be joints along the front edge of the top. To keep these seams hidden, use 45 degree scarf joints instead of butt joints. Apply glue to the rabbet and install the inlay strips. Use masking tape spaced 2 in. apart to hold the inlay while the glue sets. After 30 minutes, remove the tape and scrape off excess glue.

Cut the solid-walnut edge (W1, W2) to size from 2-in. stock. Spread glue on both the panel edge and one of the solid edge pieces, and clamp the piece in place. Be sure to keep the top surfaces of the veneered panel and walnut edging perfectly flush. Repeat the process for each edge.

Assembly

Lay out the joining-plate slots on the bottom side of the desktop and use the plate joiner to cut the slots. Sand the desk parts with 120-, 180- and 220-grit sandpaper.

Spread glue in the joining-plate slots at the ends of the back rail and in the mating slots at the case and right leg. Spread glue on the joining plates, install the plates and join the rail to the case and leg. Use bar clamps to pull the joints tight. While the glue sets, bore and countersink pilot holes through the left case side to attach the left leg and fasten the leg with screws.

Apply glue to the slots in the desktop and on the top edges of the base parts. Spread glue on the joining plates, install them and place the top on the base. Be sure to use pads under the clamp jaws when pulling the joint tight.

Drawer Construction

Cut maple to size for the drawer parts. We used a Leigh dovetail jig and a router to cut the drawer joints. If you use another type of jig, or decide to cut the joints by hand, the layout may vary. Follow the directions that come with your jig for cutting the joints.

Use a dado blade in the table saw to cut the drawer-bottom grooves in the other drawer parts. Cut the bottoms from 1/4-in. maple or birch plywood. Sand the inside surfaces of each drawer part with 120-, 180- and 220-grit sandpaper, but be careful to not sand the joint surfaces or the dovetails will not fit properly.

Use a small brush to spread glue on the dovetail-joint surfaces, then assemble one of the sides to a front and back. Slide the drawer bottom into position, then join the remaining side. If the joints fit properly, you will not need to clamp the drawer together. Just compare opposite diagonal measurements to be sure that the drawer is square and set it aside until the glue sets. When the glue is fully cured, sand the exterior of all drawers.

Cut the drawer faces from a single walnut panel so the grain will run continuously when the drawers are in place. Number the faces on the back side so that you can keep them in the proper order and apply walnut-veneer tape on all edges. The tape comes with hot-melt glue applied to its back side so you can use a household iron to adhere it.

Sand the drawer faces, then attach them to the drawer boxes with 1-in. No. 8 screws. Note that the position of the bottom face, relative to the drawer box, is different from that of the other faces. Install the drawer slides according to the instructions that come with them. Bore pilot holes for the drawer pulls and install them with the appropriate screws.

Remove the drawers and sand the credenza to eliminate any scuffs and scratches and thoroughly remove all dust. Wipe all surfaces with a tack cloth.

Finishing

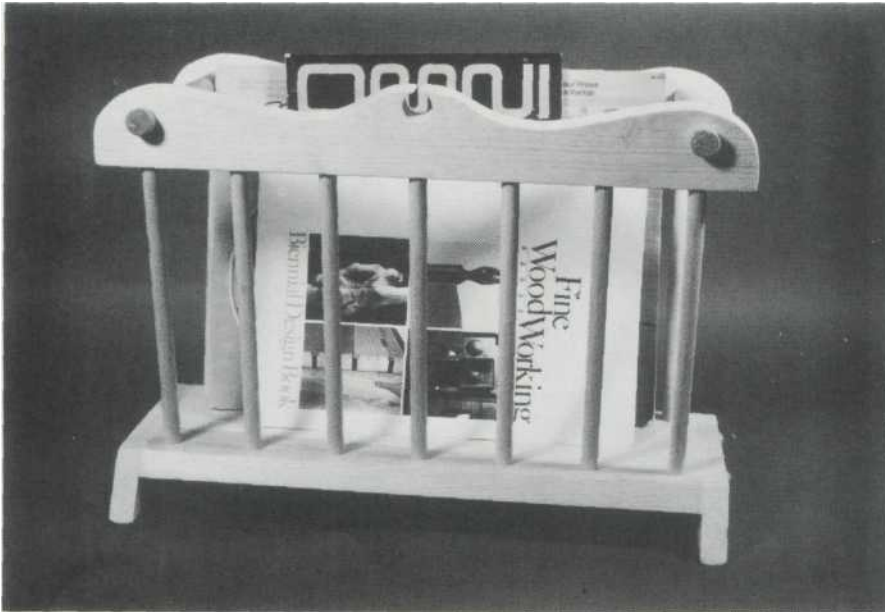
First, finish the case base by applying two or three coats of satin black enamel. Lightly sand between coats to ensure a smooth surface.

Apply Behlen's Pore-O-Pac (Van Dyke Brown) paste wood filler to the top using a brush or rubber squeegee. Spread the filler across the grain, then re-apply it with the grain. When the paste takes on a dull appearance, remove the excess with a plastic scraper, then buff the surface vigorously with burlap cloths. Let the top dry overnight before proceeding.

Use three coats of Behlen's Rockhard Table Top Varnish for the final finish. Thin the first coat 20% with Rockhard Varnish Reducer. After 12 hours drying time, lightly sand the surface with 400-grit paper and wipe with a tack cloth. Apply two more coats, allowing overnight drying and light sanding between coats.

Let the final coat cure for no longer than 20 hours, then wet-sand the surface with 600-grit paper and paraffin oil. When all dust and uneven spots are gone, wipe the surface with a soft cloth to remove the oil and slurry. Use No. 0000 steel wool to burnish the surface, then polish the desk with a soft, lint-free cloth.

MAGAZINE RACK



What better place to store your periodicals than in this inexpensive magazine rack? Using standard size left over from other projects, you can build it in no time at all.

1. Sand all stock with 100-grit paper to remove mill marks.

2. Mark the location of all holes to be drilled. The fourteen 1/2"-diameter column holes in the base (A) and the four 3/4"-diameter brace holes in the rails (C) must be drilled at 10° angles.

3. Change the drill press table back to 90° to drill the fourteen 1/2"-

diameter column holes and the 3/4"-diameter decorative holes in the top rails.

4. Using the patterns provided, cut the contours of the top rails and the feet (B).

5. With a handsaw or table saw, cut a 60° bevel on the edges of the base and the ends of the feet. Make sure the pieces are exactly the same width and the same angle where they join.

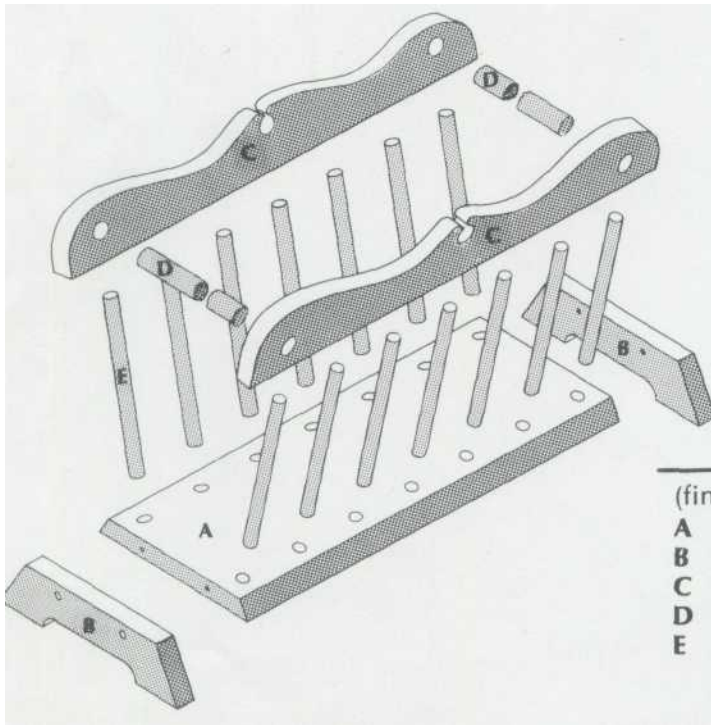
6. Cut the braces (D) and columns (E) to length, making sure to knock off any burrs on the ends.

7. To assemble, first attach the feet to the base using glue and #8 x 1-1/2" flathead wood screws. Countersink the screws.

8. To complete the rack assembly, use glue to fasten the ends of the columns and braces. Be sure to wipe off any excess glue immediately with a damp rag.

9. Use a sanding block to round over all sharp edges, including the protruding ends of the braces, and to smooth the joints between the base and legs.

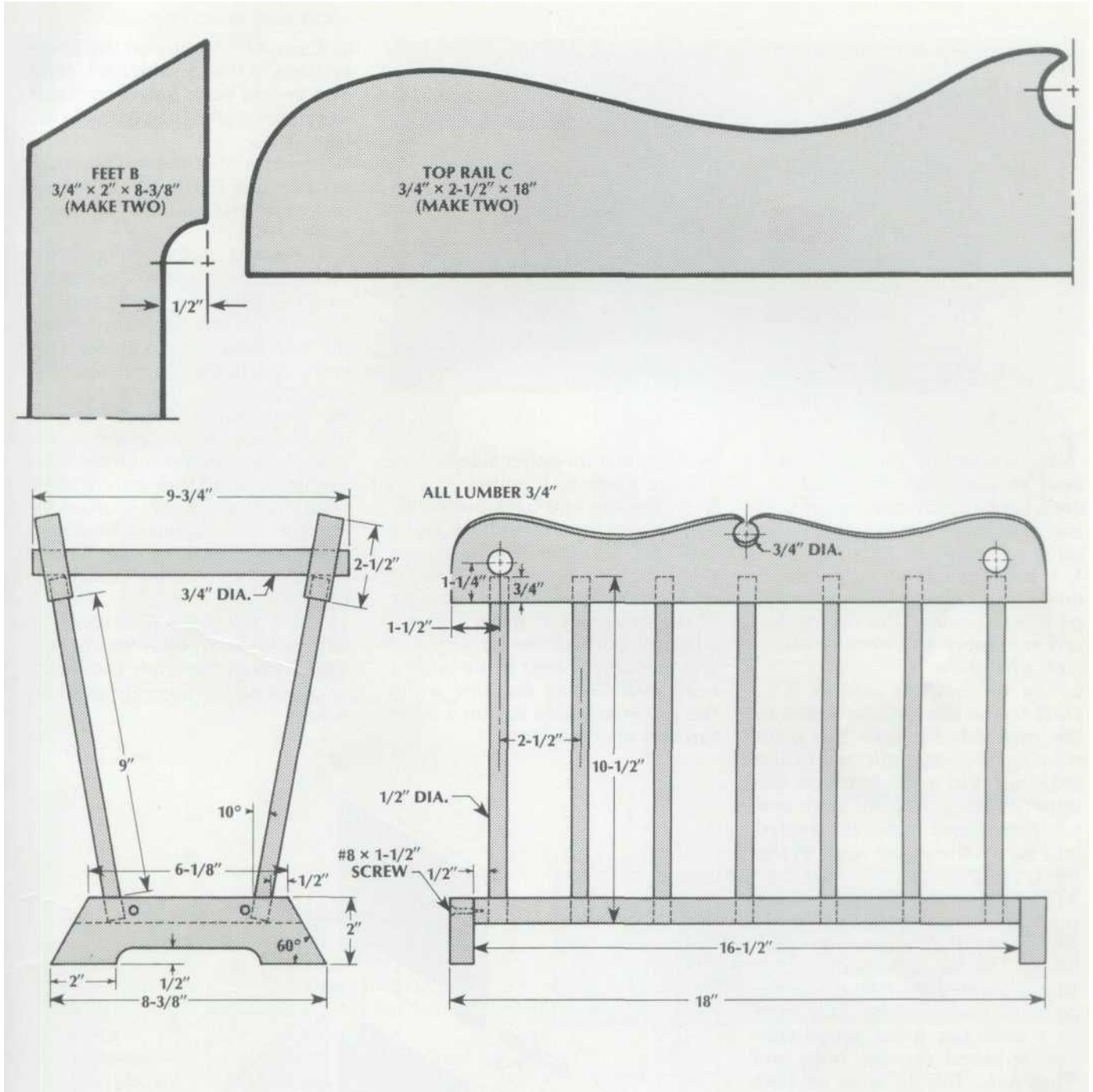
10. Stain the rack with an Early American stain. Natural oil is recommended for the finish.



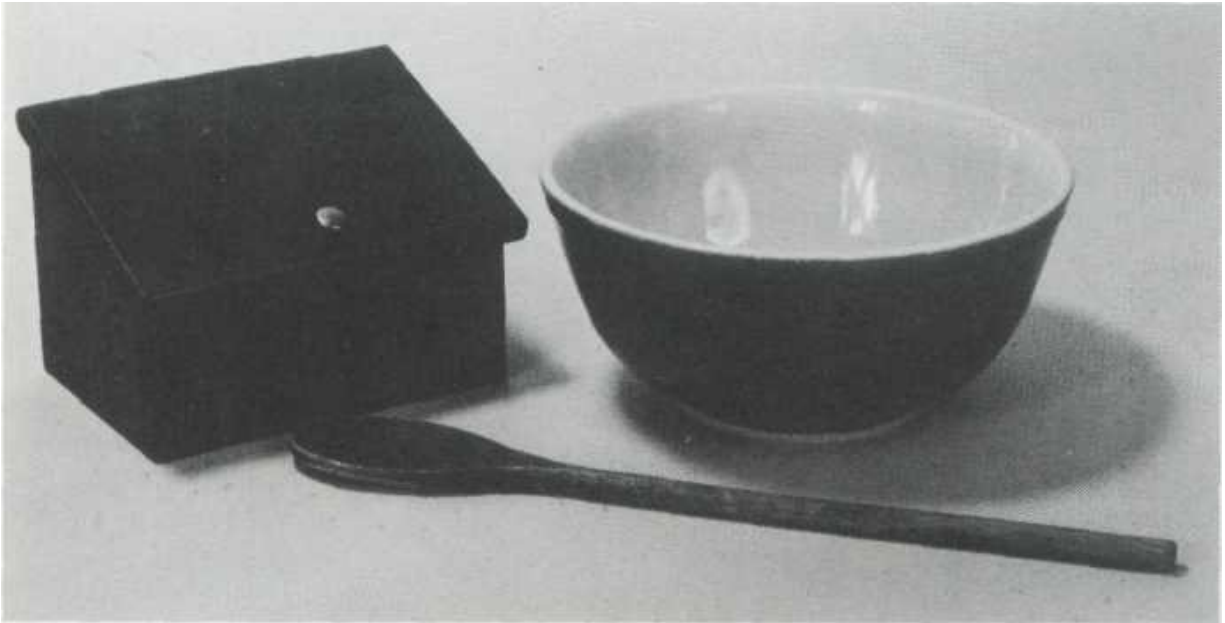
LIST OF MATERIALS

(finished dimensions in inches)

A	Base	$3/4 \times 7 \times 16-1/2$
B	Feet (2)	$3/4 \times 2 \times 8-3/8$
C	Rails (2)	$3/4 \times 2-1/2 \times 18$
D	Braces (2)	$3/4\text{-dia.} \times 9-3/4$ dowels
E	Columns (14)	$1/2\text{-dia.} \times 10-1/2$ dowels
	Flathead wood screws	#8 \times 1-1/2
	Wood glue	



170
RECIPE BOX



This recipe box can hold more than recipe cards—buttons, address cards, candy, crayons, almost any little thing around the house can find a home in it.

1. If you are unable to purchase the 1/2" stock needed for the recipe box, custom plane the necessary amount of 3/4" stock or resaw it on a bandsaw.

2. Cut the basic box parts (A, B, C, D, E) to the dimensions found in the materials list with the grain running the way indicated in the drawings. Rip a 70° bevel on the upper edges of the front, back, and top pieces and make 70° angled cuts across the upper ends of the sides.

3. Make a simple jig to hold the top and back pieces at a 70° angle while you make the cutouts for the hinge. The jig consists of a 2 x 4 with a beveled front face (see the jig layout end view) that is fastened to a table saw miter gauge with counterbored carriage bolts and wing nuts. The jig must be long enough to be used on either side of the saw blade. (A 12" length should suffice for most saws.)

4. Cut the notches on the top and back pieces with your saw blade (or dado blades, if you have them) set to a height of 9/16". Hold each piece firmly against the jig and keep its beveled edge flush with the table top while cutting. Make the notch at the center of the top piece wide enough to create 1/64" of clearance on either side where the two pieces fit together.

Fit the top and back pieces together with their faces flush and a 1/16"-thick spacer holding them slightly apart. Center and drill 1/4"-diameter holes through each wing of the top piece 1" deep into the adjacent part of the back piece. This process is best done with a horizontal boring machine while the pieces are held flat on a table top and against a fence.

6. Cut a 1/2" radius on the hinge sections of the top and back. Sand one end of each dowel so that it will rotate easily when fit inside the back.

6. Dry assemble the top and back to make sure the dowels fit and the hinge operates properly. Sand parts as needed.

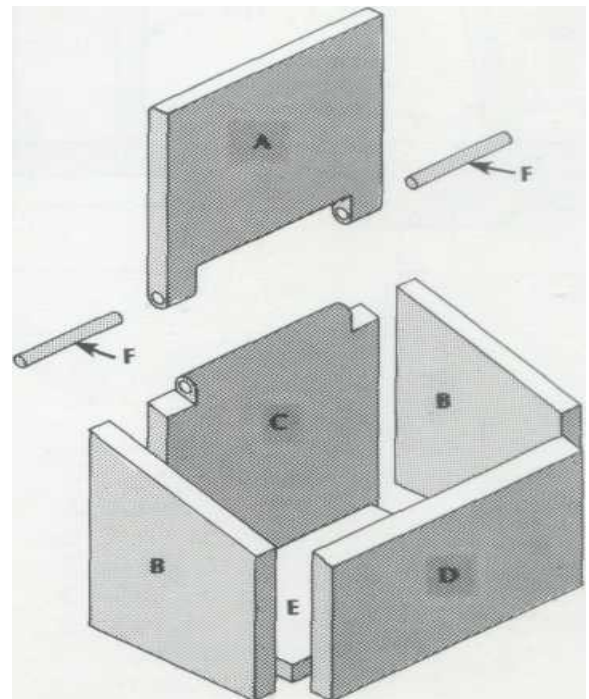
7. If desired, cut a scallop in the inside edge of the front to make it easier to get to the front cards.

8. Glue the box together without the top. Keep excess glue off the visible parts and clamp until the glue dries.

10. Set the top in place lining up its dowel holes with those of the back. Push the dowels through the holes

in the top until they barely penetrate the back. Apply glue on the last 3/4" of each dowel, then push them the rest of the way in until they are flush with the sides of the top.

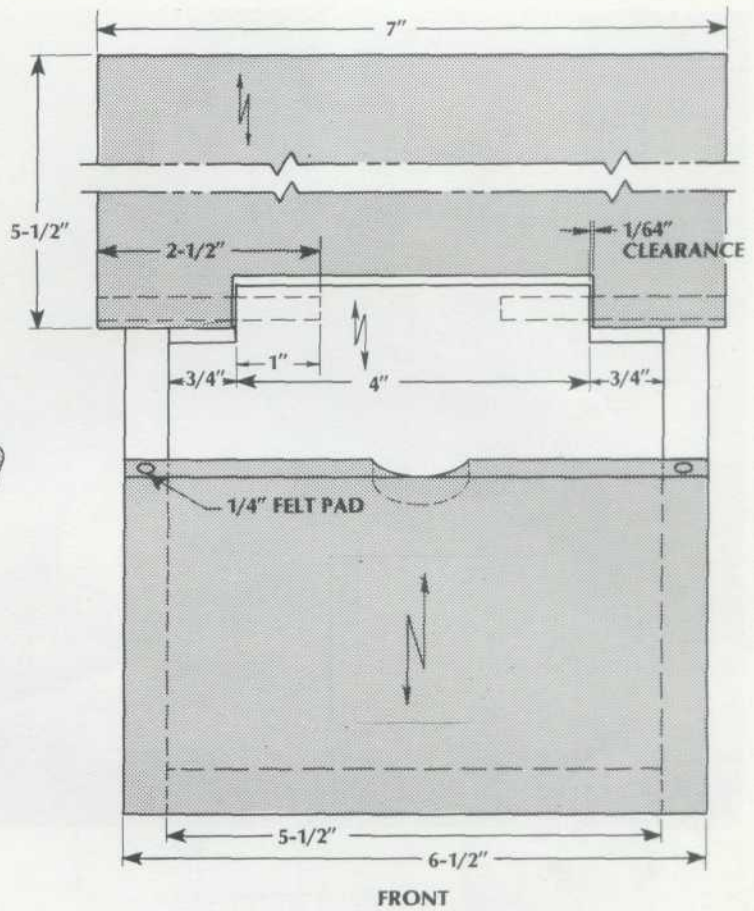
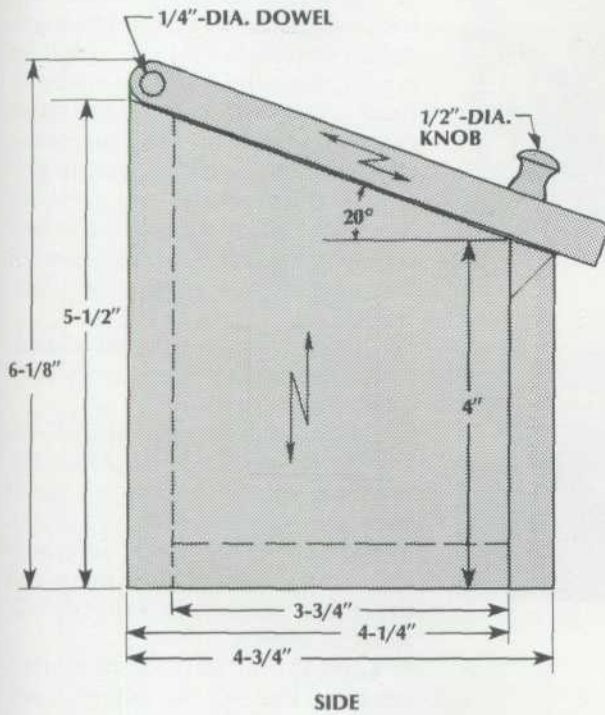
11. Give the box a final touch up with sandpaper, then finish as desired. Attach the knob and mount felt pads on the upper edge of the front.



DENOTES GRAIN DIRECTION



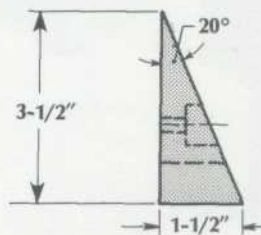
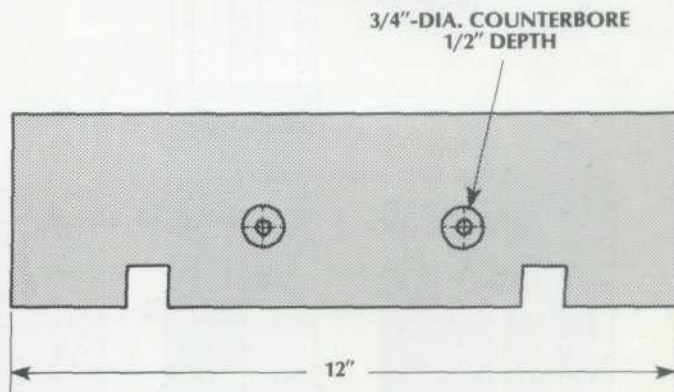
NOTE: ALL STOCK 1/2"



LIST OF MATERIALS

(finished dimensions in inches)

A	Top	1/2 × 7 × 5-1/2
B	Sides (2)	1/2 × 4-1/4 × 5-1/2
C	Back	1/2 × 5-1/2 × 6-1/8
D	Front	1/2 × 6-1/2 × 4
E	Bottom	1/2 × 3-3/4 × 5-1/2
F	Dowels (2)	1/4 dia. × 2-1/2
	Felt pad (2)	
	Knob (optional)	
	Carriage bolts	
	Wing nuts	
	Wood glue	



SAWING JIG LAYOUT

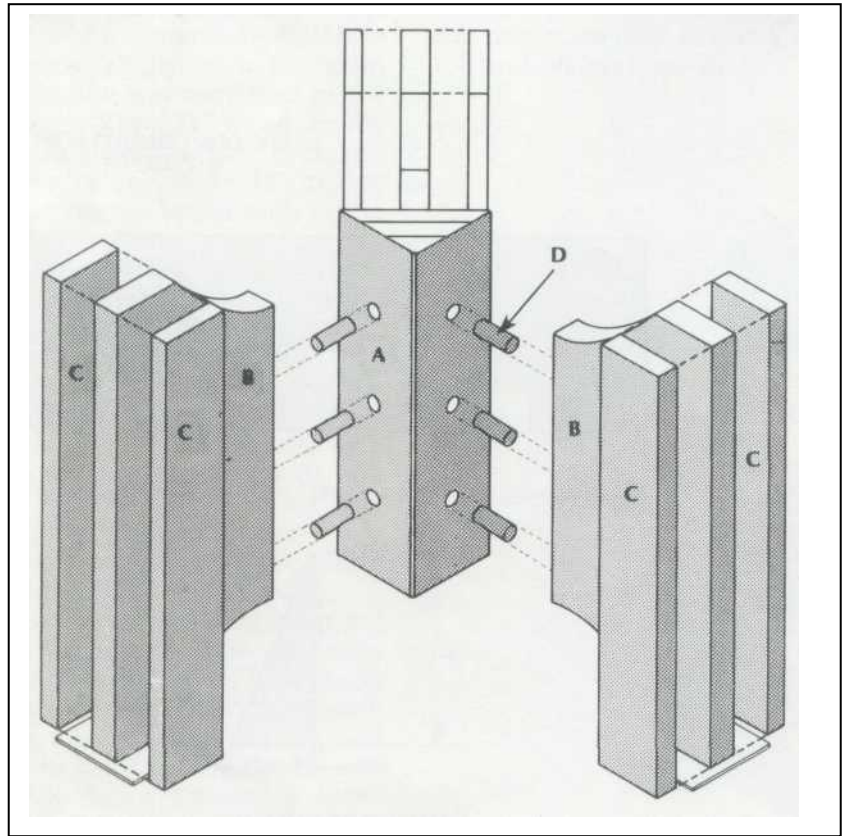
171

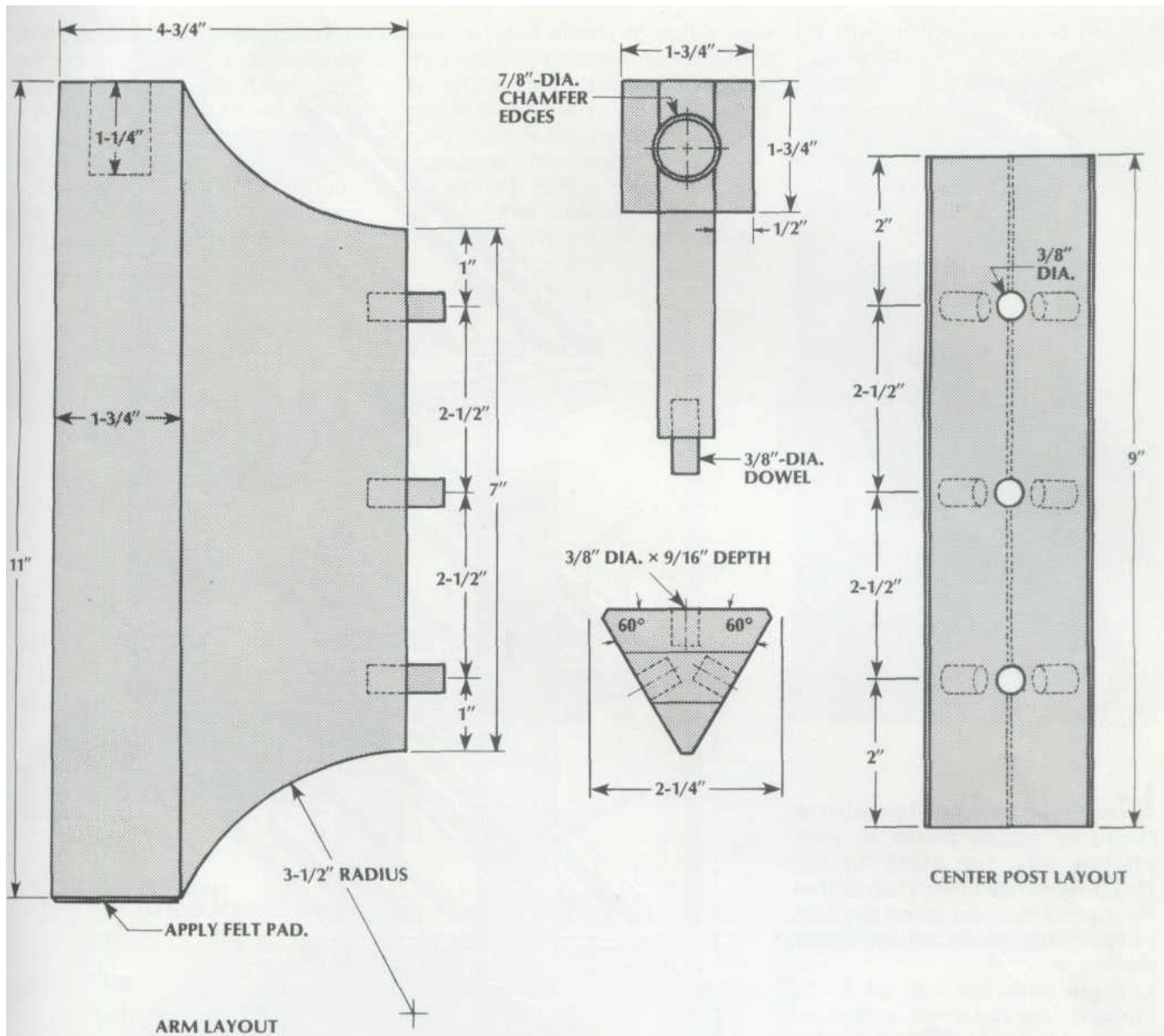
CANDELABRA



This candelabra will add a touch of elegance to most any table or room. The attractive centerpiece holds three candles, making it just right for a quiet candlelight dinner or for emergency lighting.

1. Cut all pieces to size according to the dimensions given. The triangular center post (A) can either be cut from a solid piece of wood or from glued-up stock. In the latter case, it is a good idea to make some of the 60° beveled cuts prior to gluing up the material and finishing the job with a hand plane and belt sander. Flatten the sharp corners of the post with a sander or block plane.
2. Cut out the arms (B) on a band-saw, then sand the edges smooth with a drum sander.
3. Drill matching sets of 3/8"-diameter holes 9/16" deep into the center post and the inside edge of each arm for doweling the pieces together. Center the middle hole along the length of each piece and space the remaining holes 2-1/2" apart as shown.
4. Glue the sides (C) to the arms, keeping their outer edges flush. After the glue has dried, sand the assembled arms.
5. Center and drill a 7/8"-diameter hole 1-1/4" deep in the top of each arm to hold a candle. Chamfer the edges of the holes with a 1"-diameter countersink or by hand sanding; this will allow the candles to fit in more easily.
6. Attach the arms to the center post using glue and dowels (D). Clamp until the glue has dried. Finish the candelabra as desired. Glue felt pads to the bottoms of the arms to prevent furniture from being scratched.





LIST OF MATERIALS

(finished dimensions in inches)

A	Center post	2-1/4 x 2-1/4 x 2-1/4 x 9
B	Arms (3)	3/4 x 4-3/4 x 11
C	Sides (6)	1/2 x 1-3/4 x 11
D	Dowels (9)	3/8 dia. x 1
	Felt pads (3)	1-3/4 x 1-3/4
	Wood glue	

172
PLANT DISPLAY



Here's the perfect alternative to crowding potted plants in your window sills: the plant display. This project has three shelves that are slatted to allow more sunlight to reach the plants on the lower shelves.

1. Begin with ten feet of 1 x 12 lumber. Use redwood, cedar, or pressure-treated lumber if the display is intended for outdoor use.

2. Cut all pieces to size on a table saw.

3. Lay out and mark the various angles on the ends of the top shelf sides (A), middle shelf sides (B), and the base pieces (C). Cut these angles using a bandsaw and 1/4" blade.

4. Using a router or a saw fitted with dado blades, cut 1/8"-deep dados and rabbets in the posts (D) for the shelf sides and base pieces.

5. Drill screw holes in the shelf sides and the base pieces, and corresponding pilot holes in the posts. Drill pilot holes in the shelf slats (E) and center pieces (F) to accommodate 6d finishing nails. (Use one of the nails as a drill bit to assure that the diameter of the pilot holes is drilled accurately.)

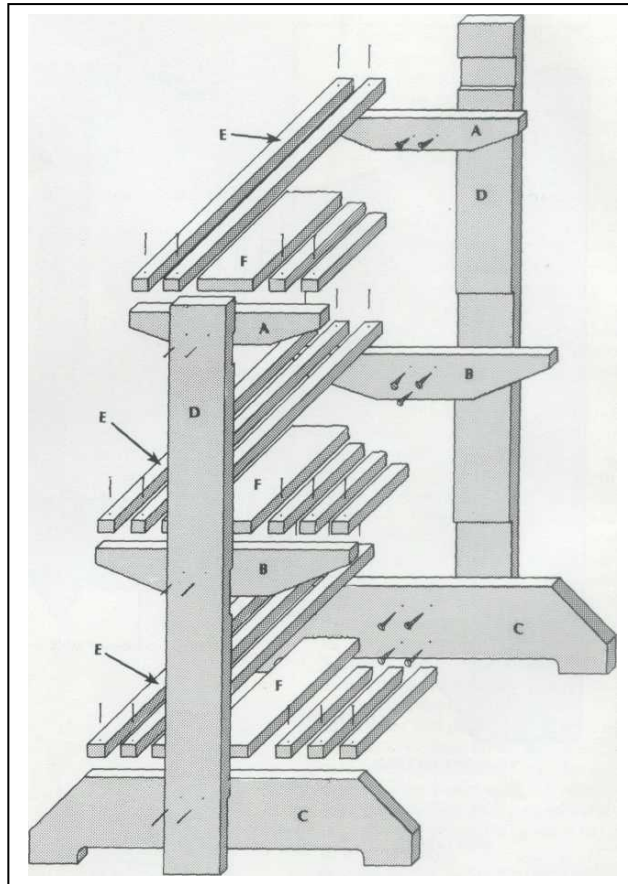
6. Sand all of the pieces smooth. The sawed edges should be given an extra sanding, or be touched up

with a hand plane, to make sure they are sufficiently smooth.

7. Attach the slats and shelf center pieces to the sides with 6d finishing nails. Attach the centers first, and then install the slats at 1" intervals. Set all nails below the surface and fill the holes with wood putty that matches the finish you plan to use.

8. Attach the shelves to the posts using #8 x 1-1/4" flathead wood screws.

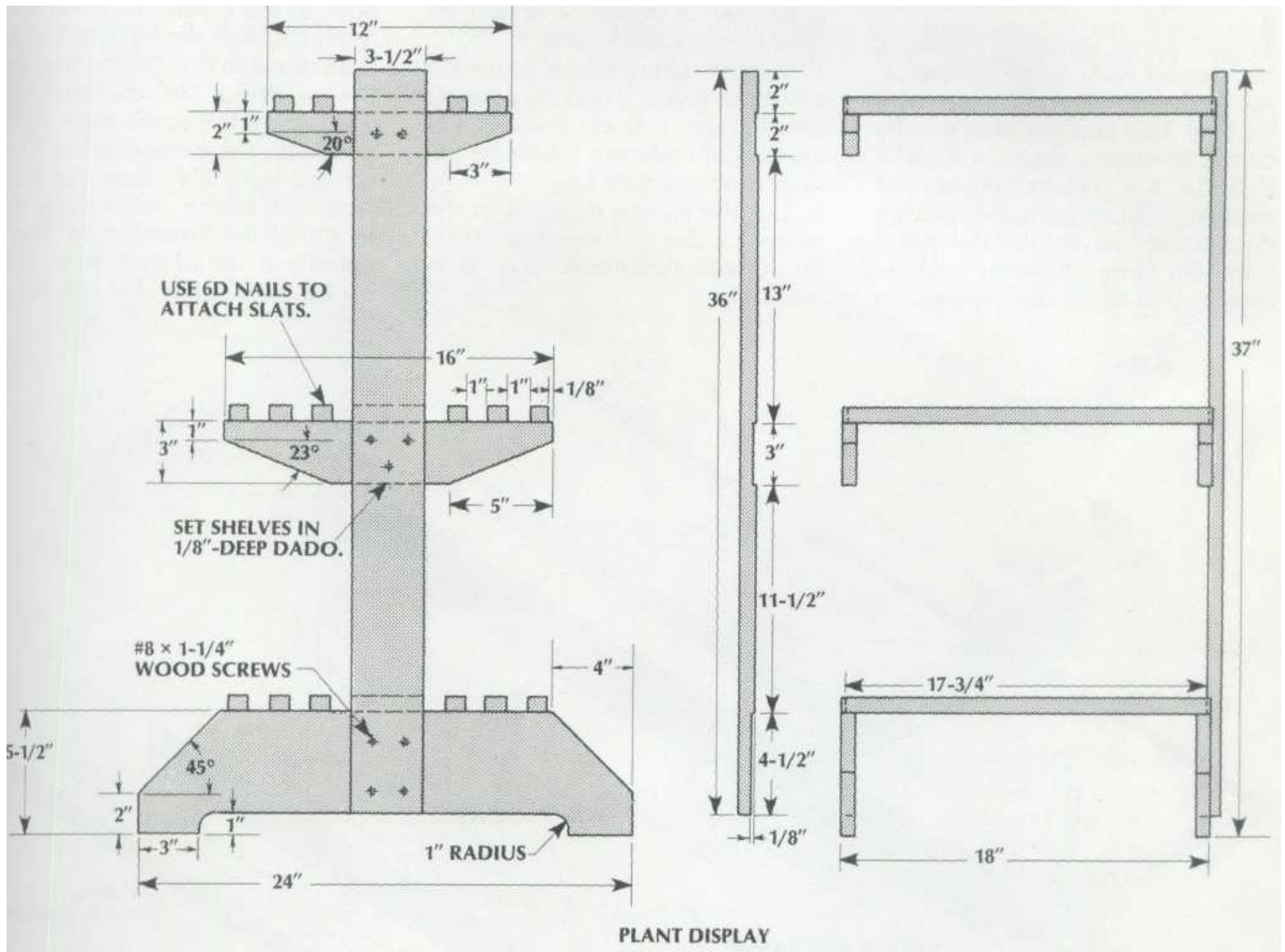
9. Finish the plant display with polyurethane or some other water-resistant finish if it is not made of redwood, cedar, or pressure-treated lumber.



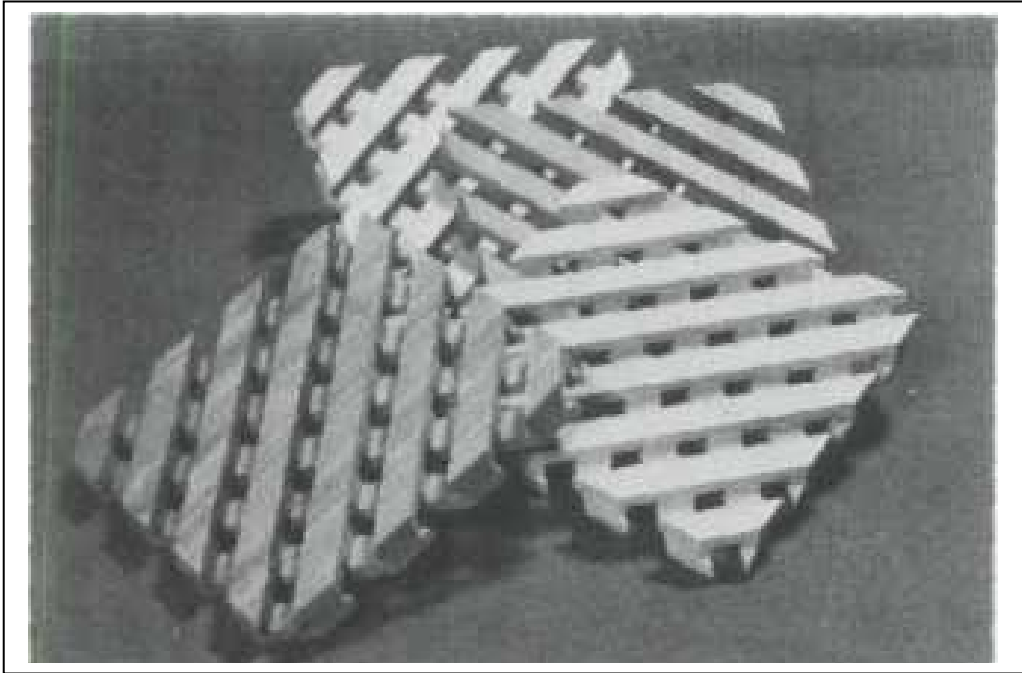
LIST OF MATERIALS

(finished dimensions in inches)

A	Top shelf sides (2)	3/4 x 2 x 12
B	Middle shelf sides (2)	3/4 x 3 x 16
C	Base pieces (2)	3/4 x 5-1/2 x 24
D	Posts (2)	3/4 x 3-1/2 x 36
E	Shelf slats (16)	3/4 x 1 x 18
F	Shelf center pieces (3)	3/4 x 3-1/2 x 17-3/4
	Flathead wood screws	#8 x 1-1/4
	6d finishing nails	



173
TRIVETS



If you've ever scorched a table or countertop with a hot container, you know the value of trivets in the kitchen. This popular item usually comes in three sizes: 4" x 4", 6" x 6", and 8" x 8". The technique used involves making multi-intersecting decorative cuts, similar to what is done on larger projects such as door panels and room dividers. To do this, you will need a simple fixture and a table saw or router arm, such as the homeowner model made by Shopsmith.

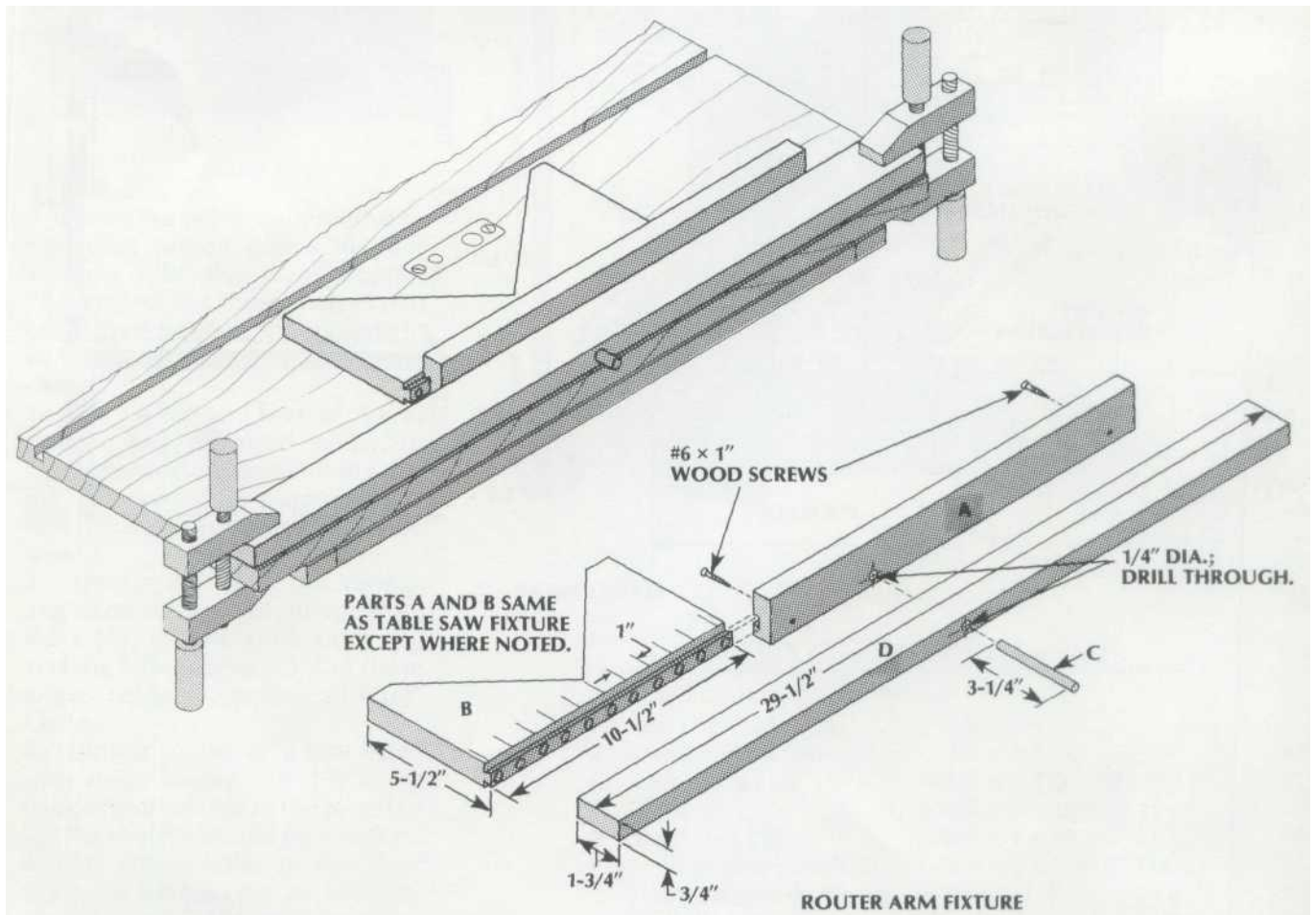
MAKING THE FIXTURE

The purpose of the fixture is to make straight, accurate cuts while holding the blanks securely in place. Construction of the fixture varies, depending on whether a table saw or router arm will be used to make the trivets.

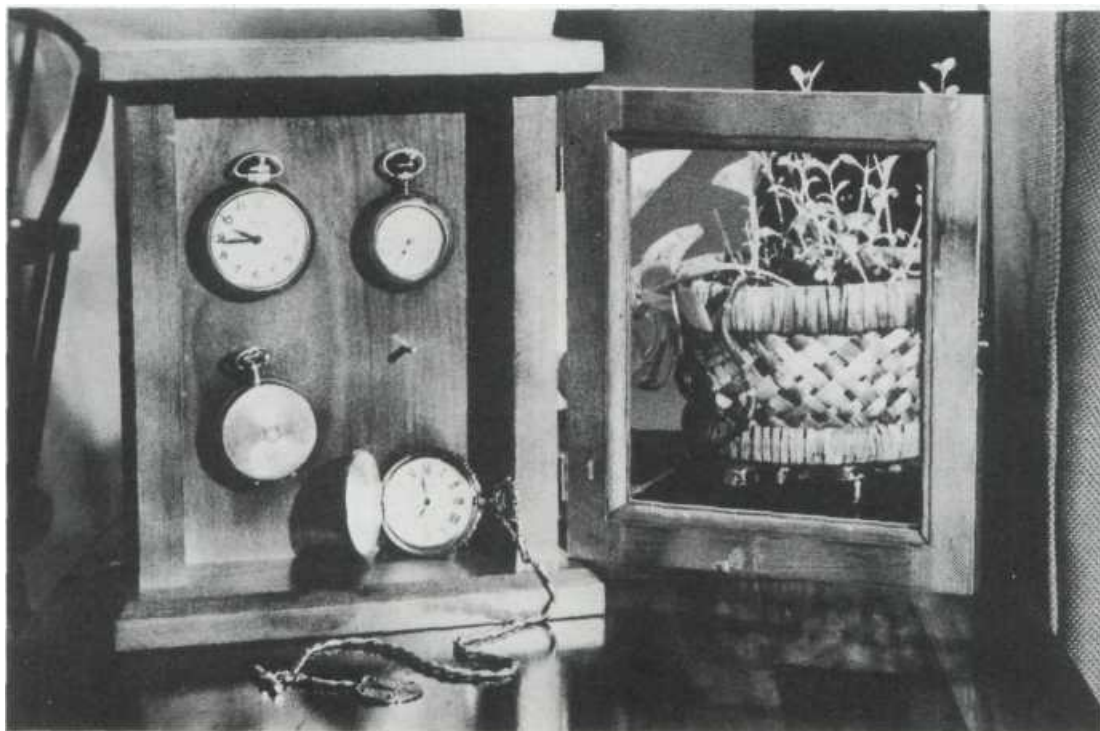
1. Cut the fixture pieces to the dimensions given. If making a router arm fixture, a back brace (D) is needed; if making a table saw fixture, omit the back brace.
2. Cut the sliding dovetail in the extension bar (A) and the cradle (B). Check the fit—it must slide smoothly.

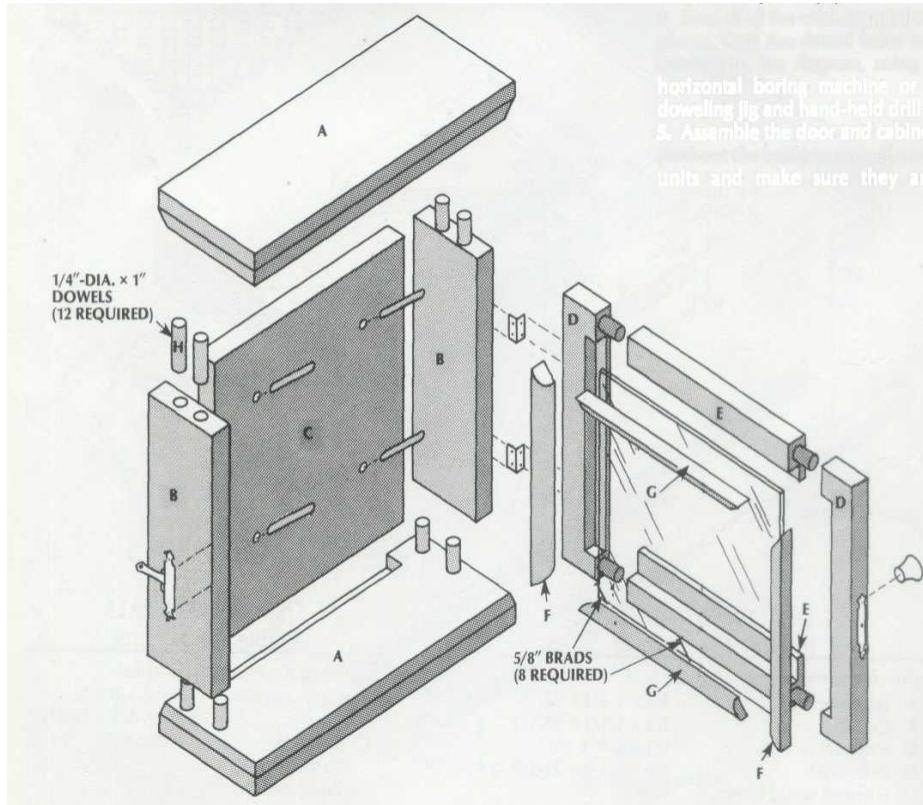
3. Place the extension bar and cradle on the table saw or router arm table, lining up the center of the cradle V-notch with the cutter. Mark a centerline on the cradle and extension bar, then mark one inch increments on both sides of the centerline.

4. On the router arm fixture, center and drill 1/4"-diameter indexing holes 3/8" deep into the back edge of the cradle; drill matching holes through the back brace and the extension bar. On the table saw fixture, drill a 1/4"-diameter hole down from the upper edge 2-1/4" deep into the extension bar. Center the hole 1/4" from the front face and at the point along the length of the extension bar that is directly in line with the saw's dado blades. Make indexing notches in



174
WATCH KEEP





horizontal boring machine or a doweling jig and hand-held drill.
 5. Assemble the door and cabinet units and make sure they are

Pocket watches are a beautiful link to the past, and this watch keep is ideal for displaying these old treasures.

1. This project is constructed of 1 x 4 stock and 1/4"-radius quarter-round molding. The material used for the cabinet sides (B) and back (C) and the door stiles (D) and rails (E) must be planed or resawn and sanded down to 1/2" thickness.
2. Begin by edge-gluing two 9" lengths of 3/4" stock to serve as the basis for the back panel. After the glue has dried on the panel, cut all the parts for the cabinet case and door to the finished dimensions.
3. Using a table saw, router, or hand plane, cut a 45° chamfer on the front and side edges of the top and bottom pieces (A).
4. Sand all of the cabinet and door pieces. Drill the dowel holes according to the diagram, using a horizontal boring machine or a doweling jig and hand-held drill.
5. Assemble the door and cabinet (without the back) as two separate units and make sure they are

square. Clamp them together until the glue dries.

6. Rout a 1/4"-wide x 1/4"-deep rabbet in the back of the door, using a straight router bit. Square the corners using a hand chisel.

7. Cut a 1/4"-deep x 1/2"-wide x 6"-long stop rabbet in the back edge of both the top and bottom cabinet pieces.

8. Prior to installing the back, drill 1/8"-diameter holes in the back for the hanging pegs. Drill the holes at a 5° slant to the depth of 3/8". If using wooden pegs, install them; if using brass rods, wait until after finishing the watch keep to install them.

9. Nail and glue the back into the cabinet. Miter the ends of the glass retainer molding (F, G) for the door while you wait for the glue to dry.

10. If necessary, sand the top and bottom of the door to prevent

them from rubbing or binding. Sand the sides so they fit flush with the cabinet.

11. Finish all the pieces, including the quarter-round glass retainers.

12. Install the glass with the glass retainers. Drill holes in the retain-

ers for brads, then attach the retainers with brads.

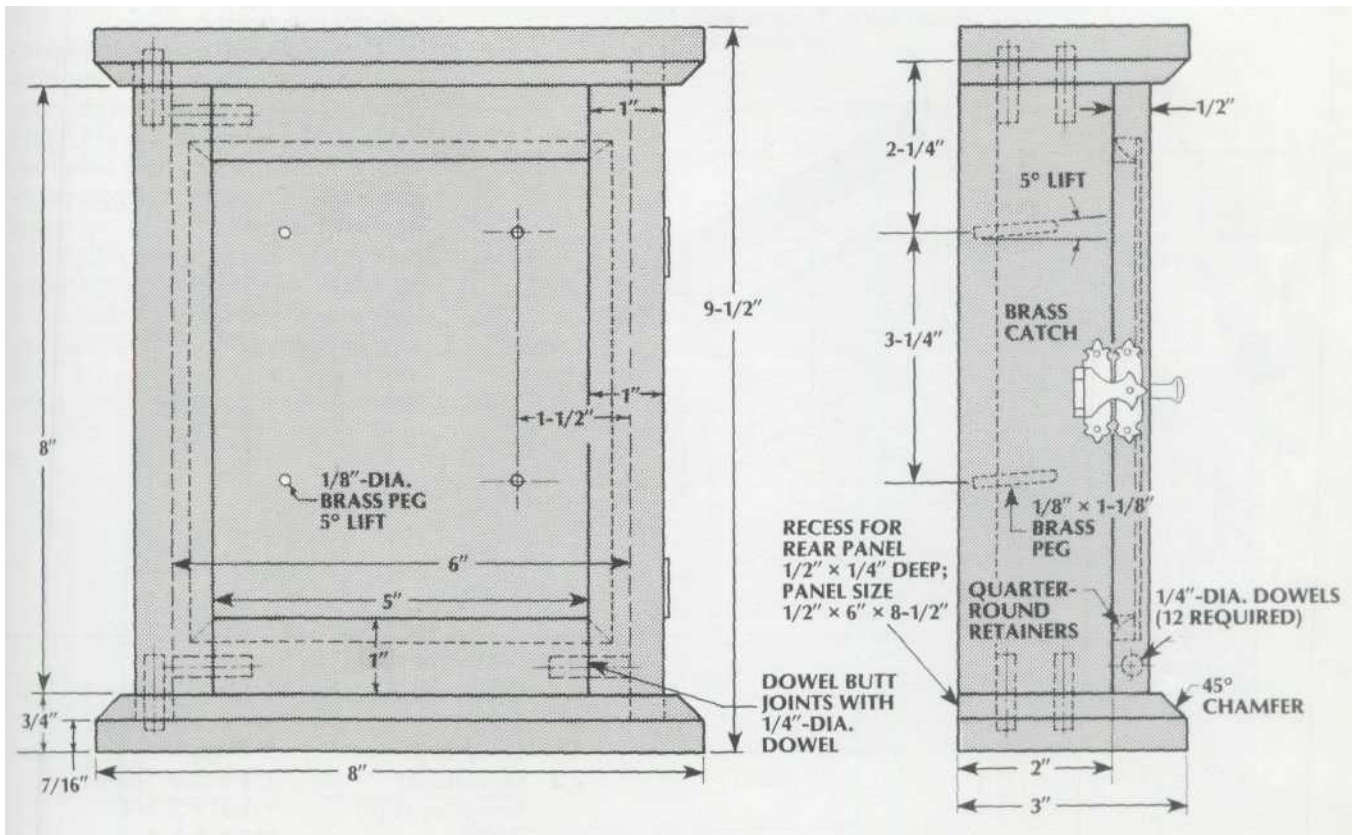
13. If using brass hanging pegs, install them now.

14. Install the hinges with screws to mount the door. Install the knob and latch to complete the keep.

LIST OF MATERIALS

(finished dimensions in inches)

A	Top and bottom (2)	3/4 × 3 × 8
B	Sides (2)	1/2 × 2 × 8
C	Back	1/2 × 6 × 8-1/2
D	Door stiles (2)	1/2 × 1 × 8
E	Door rails (2)	1/2 × 1 × 5
F	Side glass retainers (2)	1/4 × 1/4 × 6-1/2
G	Top & bottom glass retainers (2)	1/4 × 1/4 × 5-1/2
H	Dowels (12)	1-1/4 dia. × 1
	Knob	1/2 dia.
	Hanging pegs (4)	1/8 dia. × 1-1/8
	Glass	1/8 × 5-3/8 × 6-3/8
	Brads	#18 × 5/8
	Hinge with screws (pair)	
	Door latch	
	Wood glue	



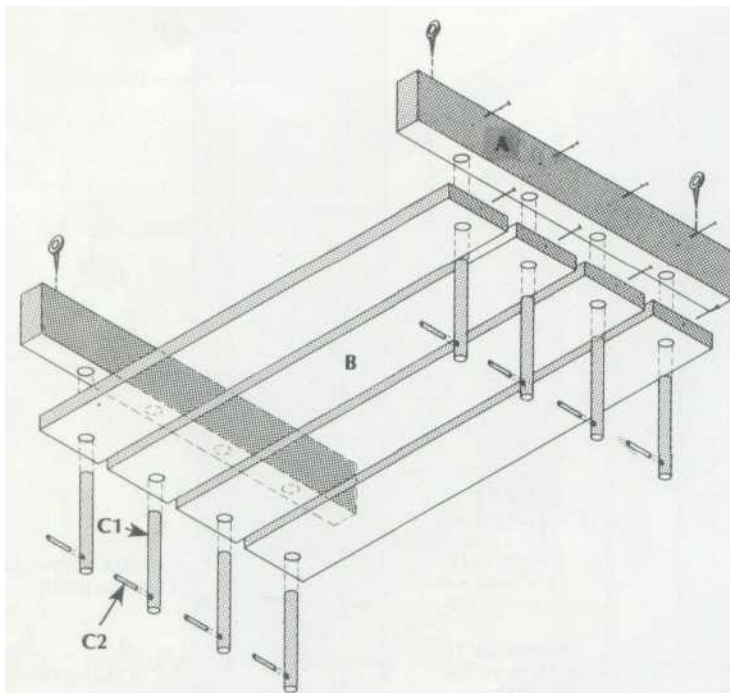
175
**HANGING WINE
GLASS RACK**



With this decorative hanging rack you can show off your fine wine glasses. It's useful in any kitchen or above any bar; it is attractive, and also helps solve your storage problems.

1. To make the wine glass rack, start with a 38" length of 2 x 4, a 49" length of 1 x 8, and two dowel rods (one 1/4" in diameter and one 3/4" in diameter).
2. Crosscut the 2 x 4 into two 18-1/2"-long pieces. Rip, then plane or sand these pieces to a thickness of 1-1/4" and a width of 2-1/2" to make the crosspieces (A).
3. Crosscut the 3/4"-thick stock into 24"-long boards, then rip these boards into 3-1/2"-wide pieces for the rails (B).

4. Cut the 3/4"-diameter dowel rod (C1) into eight 5"-long pieces. Cut the 1/4"-diameter dowel rod (C2) into eight 1-1/4"-long pieces. To make sure that the pieces are the same length, use a stop block when crosscutting.
5. Clamp the adjacent rails together two at a time to drill the glass stem recesses. From the ends, measure in 3" and mark a point. From these marks, space the other recesses 4-1/2" apart. Using a countersink bit, drill a 1/4"-deep recess where the edges of the rails meet.
6. Mark the centerpoints for the screw eye and dowel holes in the upper edge of the crosspieces. Center the screw eye holes 1-1/2" in from each end and the dowel holes



5. Clamp the adjacent rails together

Clamp the adjacent rails together two at a time to drill the glass stem recesses. From the ends, measure in 3" and mark a point. From these marks, space the other recesses 4-1/2" apart. Using a countersink bit, drill a 1/4"-deep recess where the edges of the rails meet.

LIST OF MATERIALS

(finished dimensions in inches)		
A	Crosspieces (2)	1-1/4 x 2-1/2 x 18-1/2
B	Rails (4)	3/4 x 3-1/2 x 24
C1	Dowels (8)	3/4 dia. x 5
C2	Dowels (8)	1/4 dia. x 1-1/4
	Screw eyes (4)	1 dia. x 2-1/4
	Brads	#16 x 1-1/4
	Wood glue	

3-1/4" in from the ends and 4" apart. Mark the dowel hole centers 1" from the ends and midway across the lower faces on the rails.

7. Drill pilot holes for the screw eyes 1" deep into the crosspieces. Drill 3/4"-diameter dowel holes completely through the crosspieces and the rails. To avoid tear-out when drilling the dowel holes, drill only until the tip of the bit penetrates the far side of each piece, then flip the piece over to complete the hole.

8. Center and drill a 1/4"-diameter hole through each 3/4"-diameter dowel 5/8" from one end. Hold the dowels steady for drilling by placing them in a V-groove plowed down the middle of a block of scrap lumber. Position the block so that the drill bit will strike the center of the groove, then clamp it to

the table or hold it firmly against a fence.

9. Sand all pieces before assembling.

10. Drive the 1/4"-diameter dowels through the ends of the larger dowels so that their ends extend the same distance to either side. Then fit the rails onto the larger dowels and push them down until they are stopped by the smaller dowels.

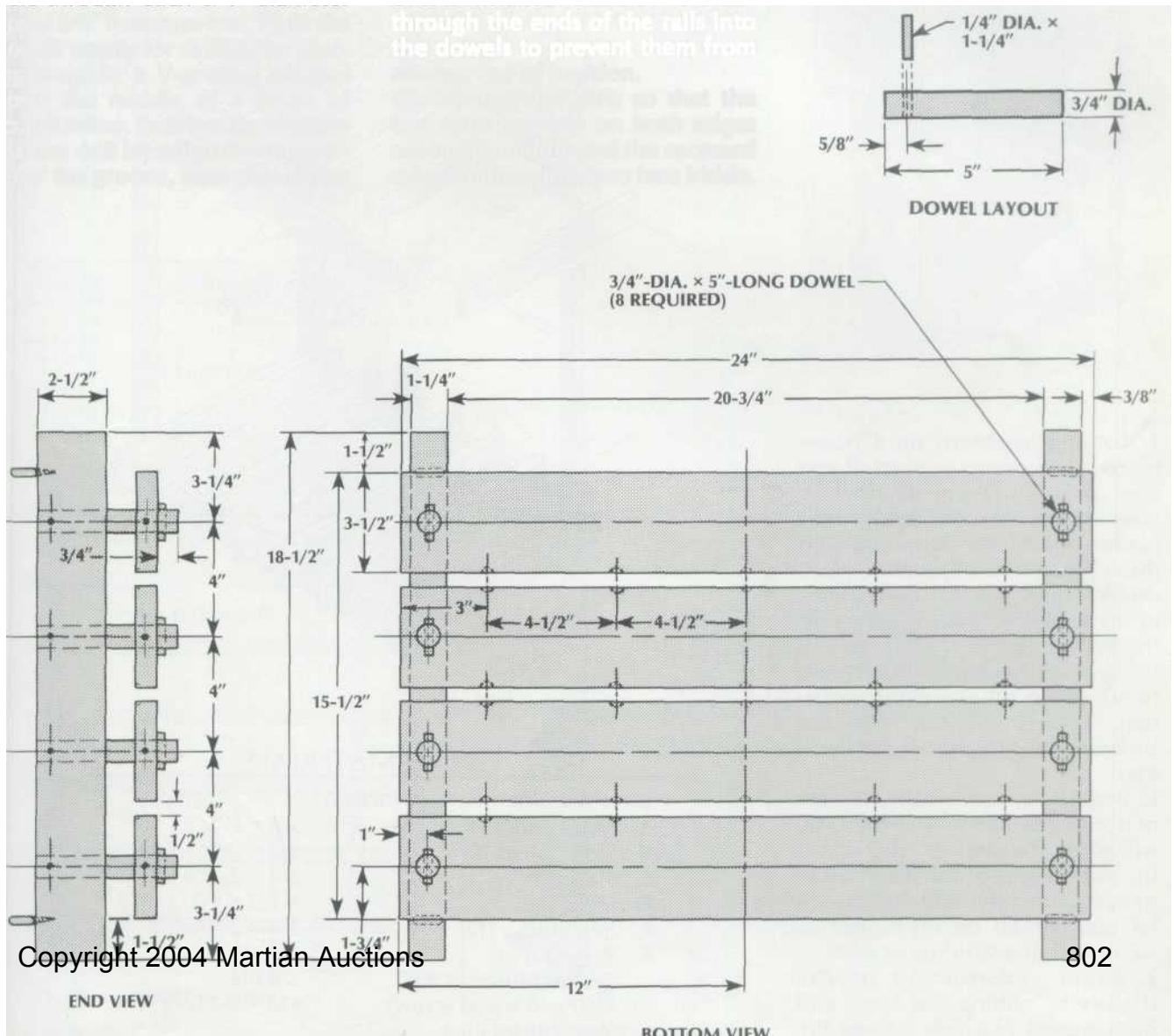
11. Make sure the rails are turned so that the tapered recesses on their edges will face up when the unit is installed. Then drive brads through the ends of the rails into the dowels to prevent them from moving out of position.

12. Arrange the rails so that the two with recesses on both edges are in the middle and the recessed edges of the other two face inside.

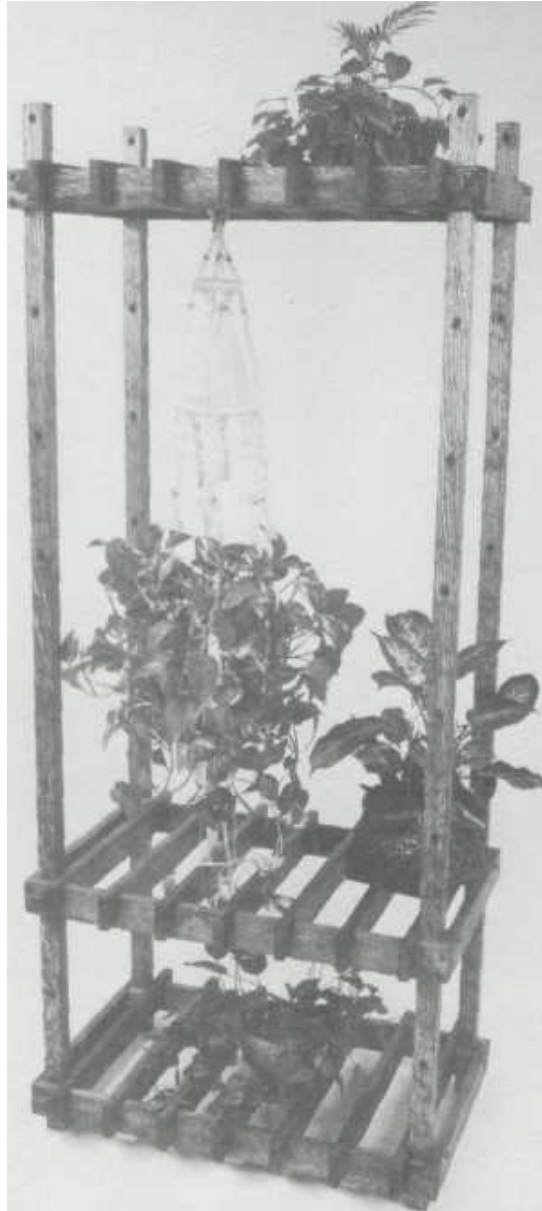
Spread glue inside the dowel holes in the crosspieces and the upper ends of the dowels. Then insert the dowels into the underside of the crosspieces, pushing them up until their upper ends barely emerge from the crosspieces. After the glue dries, sand the dowel ends flush with the crosspieces.

13. If you want to stain the assembly, do it at this time, then rub with steel wool.

14. Finally, install the screw eyes and hang the rack.

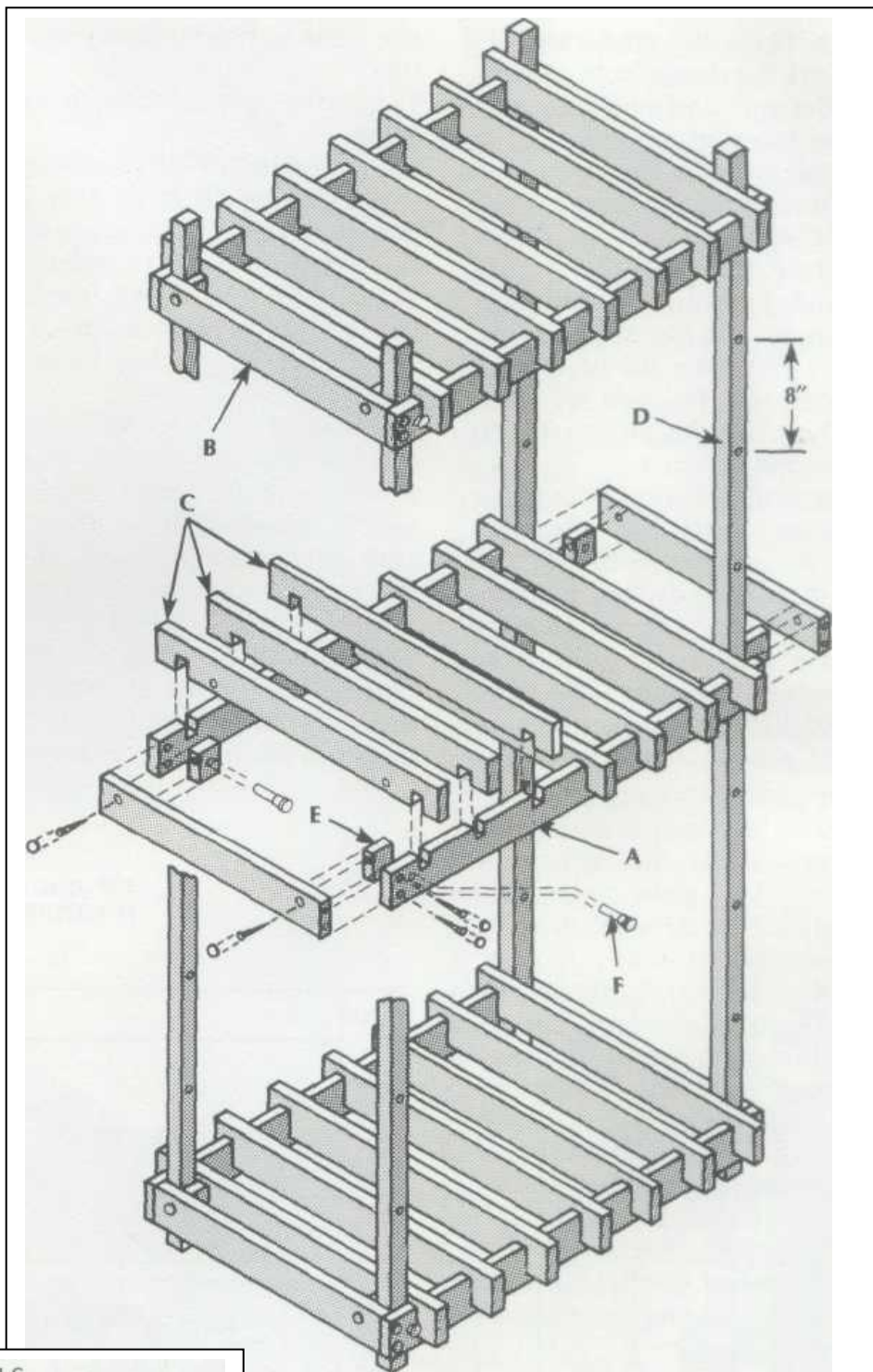


176
**ADJUSTABLE
PLANT SHELVES**



Nothing brightens up a home better than a hanging plant. If you have a south-facing window or glass doors, you can bring your garden indoors for the winter with these attractive adjustable plant shelves. The shelves are slatted rather than solid so that the plants on the bottom can receive more light. If you build the shelves with cedar, redwood, or other weather-resistant lumber, you can keep the shelves outdoors during the summer.

1. Begin by measuring the window or door opening next to which you will place the shelves, and adjust the dimensions of the materials as needed. Keep in mind that the total unit should be no higher or wider than the window or door.
2. Begin construction of the shelves by cutting the front and back frames (A), side frames (B),
- 3.



LIST OF MATERIALS

(finished dimensions in inches)

A	Front and back frames (6)	$3/4 \times 2-1/2 \times 30$
B	Side frames (6)	$3/4 \times 2-1/2 \times 17$
C	Slats (21)	$3/4 \times 2-1/2 \times 21-1/2$
D	Stiles (4)	$1-1/2 \times 1-1/2 \times 72$
E	Peg blocks (12)	$3/4 \times 2 \times 1-1/2$
F	Pegs (12)	1 dia. \times 2-1/2
	Dowel buttons (36)	3/8 dia.
	Flathead wood screws	#10 \times 1-1/2

slats (C), and peg blocks (E) to size from 1 x 3 stock.

3. The slats and the front and back frame members are joined together using cross lap joints as shown in the exploded-view drawing. These joints are formed by cutting 3/4"-wide dados 1" deep in both sets of pieces.

4. Lay out and cut the dados on the front and back frames as shown

in the front frame and shelf layout drawings. Note that the middle dado is centered along the length of the frames and that all dados are 3-3/8" apart.

5. Lay out and cut a pair of dados on each slat as shown in the slat detail drawing. Note that these dados are set 1-1/2" from the ends of the pieces.

6. Drill 1/2"-diameter peg holes through the front frames and back peg blocks. The holes in the front frames are centered 1" below the upper edge and 1-1/2" from each end. The holes in the blocks are centered on both width and length. Counterbore screw holes in the front and back frames, side frames, and the outermost slats of each shelf. Then sand all the shelf pieces.

7. Assemble the frames, using weatherproof glue and #10 x 1-1/2" flat-head wood screws. Do not glue in the five middle slats of the top shelf; with these slats left unglued and detachable it is much easier to put up and take down your plants.

8. Cover the counterbored screws with 3/8"-diameter dowel buttons.

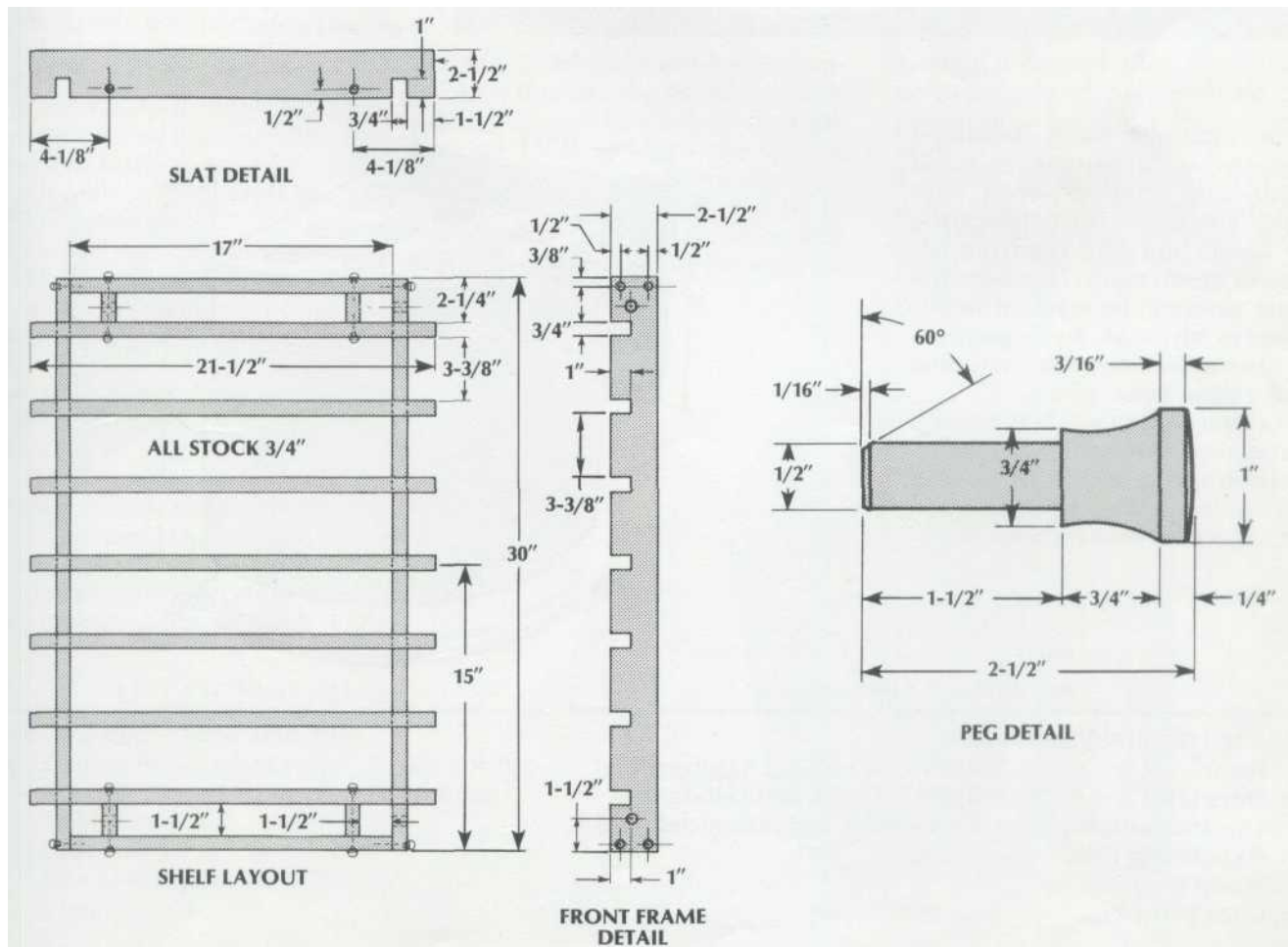
9. Cut the four stiles (D) from 2 x 2 stock. Center and drill 1/2"-diameter peg holes at 8" intervals along the length of each stile, beginning 4" from either end. Sand the stiles.

10. Turn the pegs (F) on a lathe from scrap 2 x 2 stock to the profile

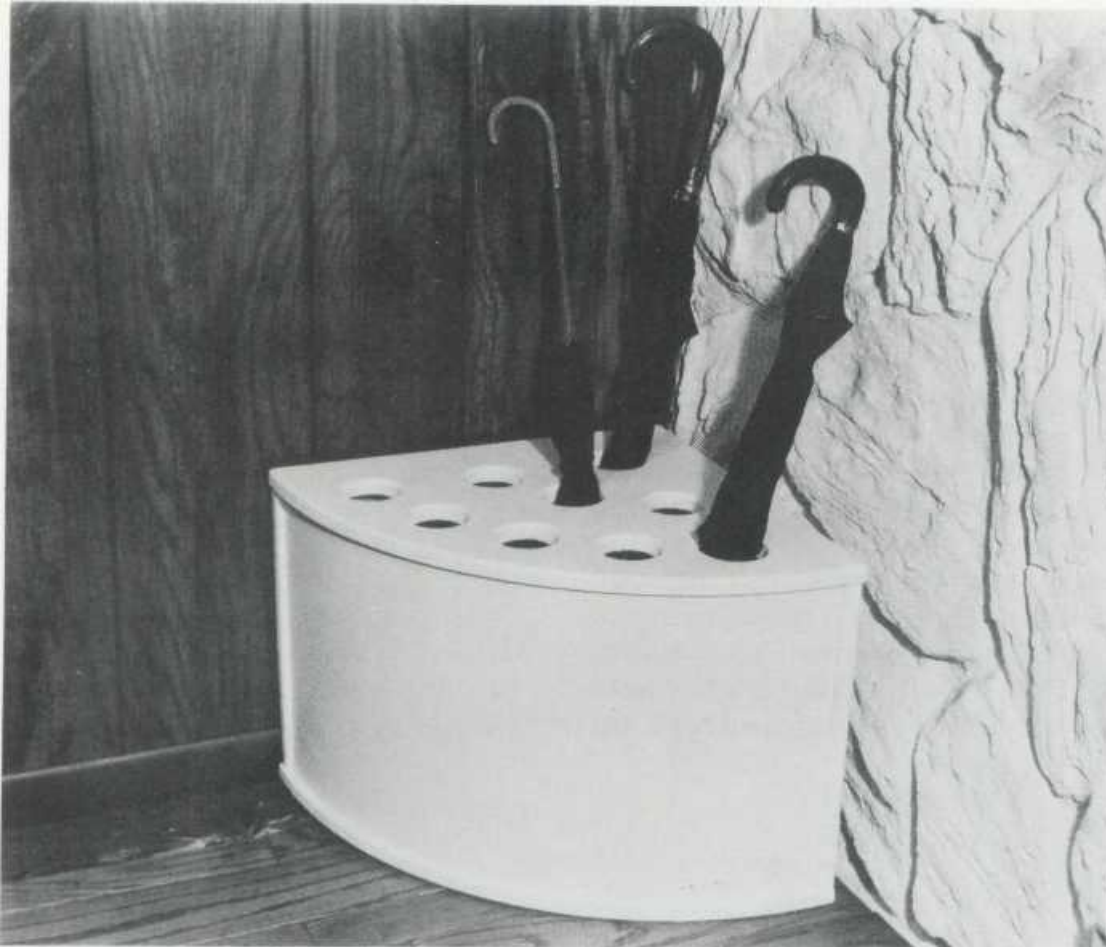
shown in the peg detail. Sand and finish the pegs on the lathe.

11. If you are planning to use the shelves outdoors, finish with a good outdoor finish such as spar varnish or polyurethane. (If you used cedar, redwood, or weather-resistant lumber, no finish is necessary.)

12. Finish the assembly by sliding the shelves over the ends of the stiles. Position the shelves and secure them with the pegs.



177
**CORNER UMBRELLA
STAND**



The umbrella stand described here was built of particleboard and hardboard, then covered with white latex paint. The hardboard is the ideal choice for the front because it bends easily. However, the other parts can be made of waferboard or plywood, if you prefer.

1. Cut the pieces to size according to the dimensions given.
2. Lay out and cut an 18-1/2" radius across the front corner of the top and bottom pieces (C). Then rout a 1/8"-wide x 1/4"-deep groove in each piece to receive the front (A). Set the grooves 1/2" back of the radiused edges of the pieces.
3. Rout a 1/8"-wide x 1/4"-deep dado across each side piece (B) 3/8" in from the front edge to receive the ends of the front panel.
4. Lay out and cut nine 2-1/2"-diameter holes in the top, arranged as shown in the drawing. Sand the edges of the holes and any other rough edges on any of the pieces.
5. Dry assemble the stand to check the fit. Keep the outside faces of

the sides flush with the straight edges of the top and bottom. Trim one end of the front panel if necessary to get a good fit.

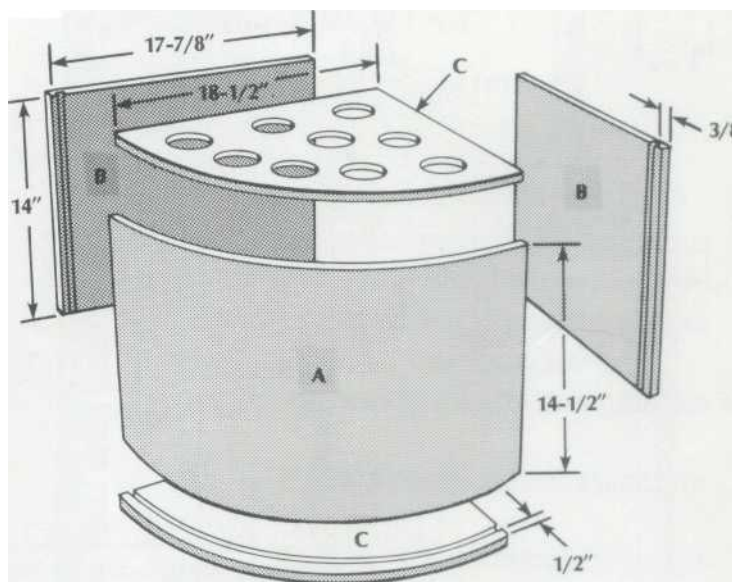
6. Run a bead of glue inside the grooves and dados and along all edges where parts will join. Assemble the stand, using 4d finishing nails to fasten the top and bottom to the sides while the glue dries.

7. Finish the stand with two coats of latex paint.

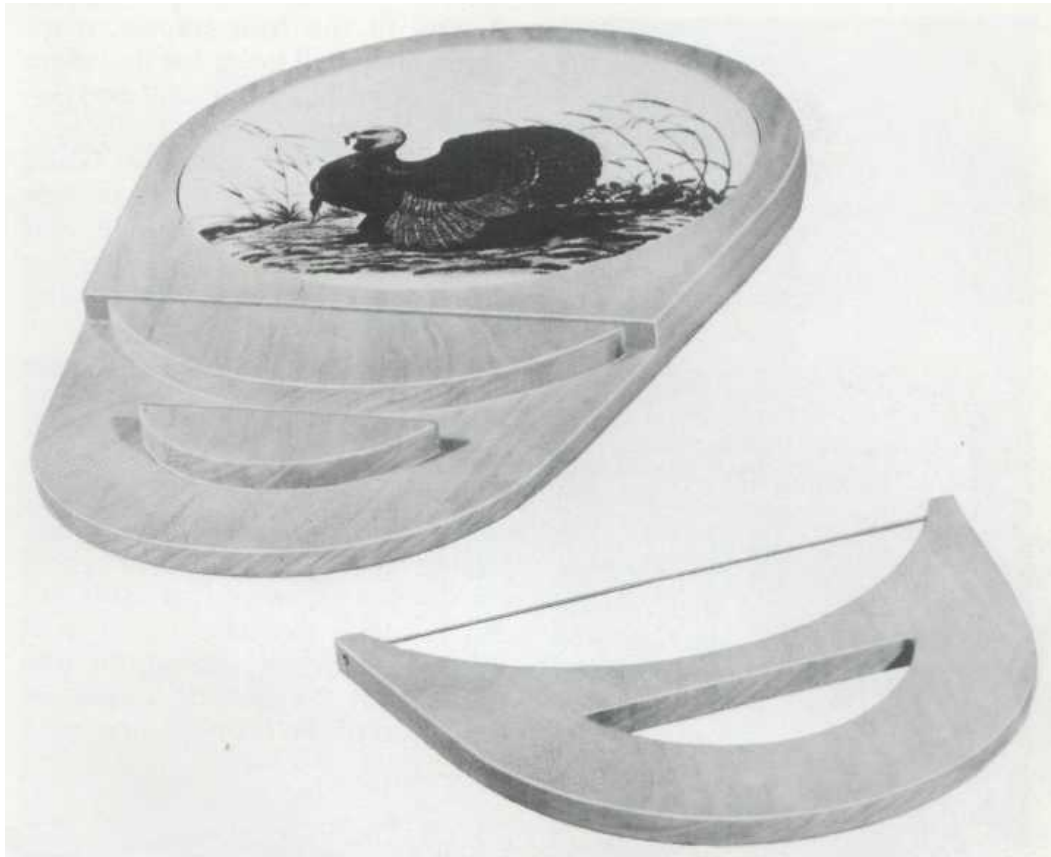
LIST OF MATERIALS

(finished dimensions in inches)

A Front	1/8 × 14-1/2 × 28-1/2 hardboard
B Sides (2)	1/2 × 14 × 17-7/8 particleboard
C Top and bottom	1/2 × 18-1/2 × 18-1/2 particleboard
	4d finishing nails
	Wood glue
	Latex paint



178
CUTTING BOARD



A brightly colored, round ceramic tile makes the perfect working surface for this wooden cutting board. As an added attraction, the wire bladed knife is designed to fit right into the board, so it's at your fingertips when you need it.

1. The cutting board is made from two 7" x 11" pieces of maple or cherry. Begin the project by resawing or planing both boards to 5/16" in thickness and trimming them to the overall shape shown in the drawing.

2. Leave one board whole to serve as the base. Cut the knife handle, the two knife holders, and the opening for the tile out of the other piece following the instructions given in the drawings. Adapt the dimensions as needed to fit the precise dimensions of your ceramic tile.

3. Since the pieces cut out of the knife handle are used as the knife holders, the cuts must be made with minimal waste. Begin by drilling a tiny hole through the piece on one cutting line and slipping a jeweler's blade through. Then fasten the blade in a scroll saw and complete the cut.

4. Use glue to fasten the tile holder and knife holder pieces to the cutting board base, clamping the pieces until the glue dries. Use the knife handle to properly position the knife holder pieces, but be careful not to accidentally glue it in place.

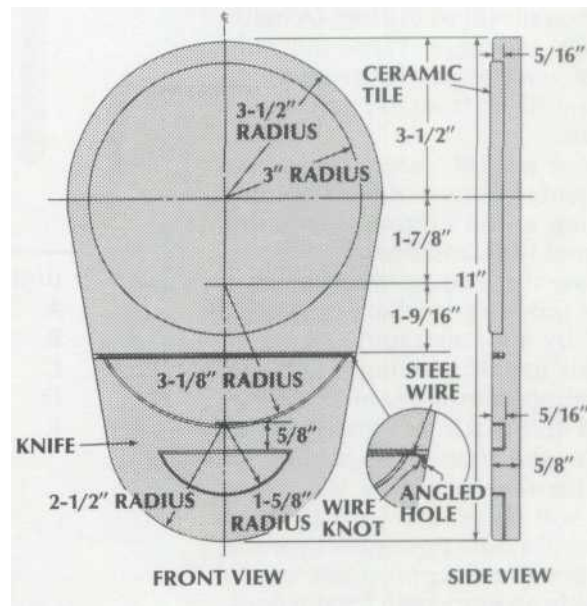
5. When the glue has set, sand the cutting board and knife handle with fine sandpaper to round all sharp corners.

6. Use an unwound steel musical instrument string for the knife

blade. Drill holes for the wire diagonally through the tips of the knife handle to minimize chances of the wood splitting when the wire is tensioned. Counterbore the outside ends of the holes slightly to make room for the anchor on one end of the string and the knot on the other end.

7. Stain if desired, then apply one or two coats of polyurethane or penetrating oil finish for protection.

8. Attach three small tack feet to the bottom of the cutting board to prevent it from sliding when in use. Install the tile, and the board is ready for use.

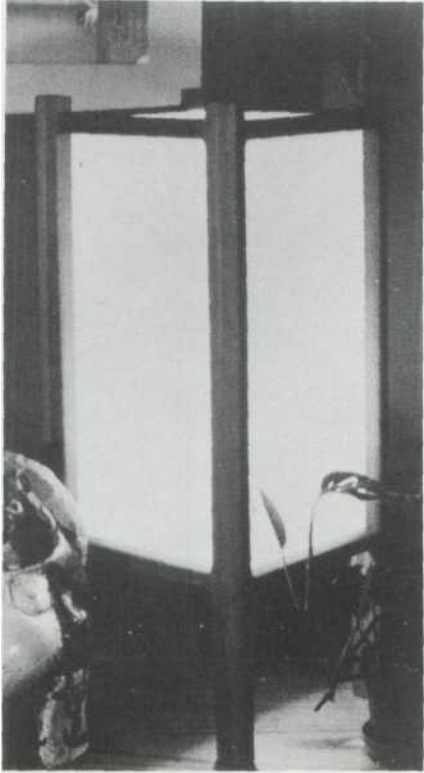


LIST OF MATERIALS

(finished dimensions in inches)

- A Cutting board blanks (2) 5/16 x 7 x 11
- Ceramic tile 3/8 x 6 dia.
- Steel wire
- Tack feet
- Fine sandpaper
- Wood glue

179
SHOJI LAMP



This lantern-style lamp and shoji screen can be used indoors or out. It's constructed easily with glue and small brads; however, remember to nail carefully to avoid splitting the wood.

1. After cutting all the pieces to size, assemble the frames by attaching the rails (B) to the legs (A) with dowels and glue. Place the rails 3/4" down from the tops of the legs and 6-3/8" up from the bottoms as shown.

2. Rout a 6-1/4"-long channel up the center of one of the legs, beginning at the bottom. Make the channel wide and deep enough to enclose the lamp cord and place it on an outside edge that can be covered by an overlapping frame as shown in the drawing. Then, on the adjacent inside face of the leg, drill a hole that intersects the upper end of the channel to provide an exit for the cord. Pick the frame that will cover the cord channel and drill a hole through it near the bottom of the appropriate leg to provide an entry path for the cord.

3. Dry fit the four frames, mark them, and drill holes for doweling them together. Then sand and finish the frames as desired.

4. Cut a piece of fiberglass fabric large enough to cover the rectangular opening in each frame. Fasten the fiberglass panels to the inner face of each frame using small wire nails.

5. Drill a hole through the base (C), centered along its length and 1-1/2" from one side. Size the hole to accept the pipe nipple found in the lamp socket kit.

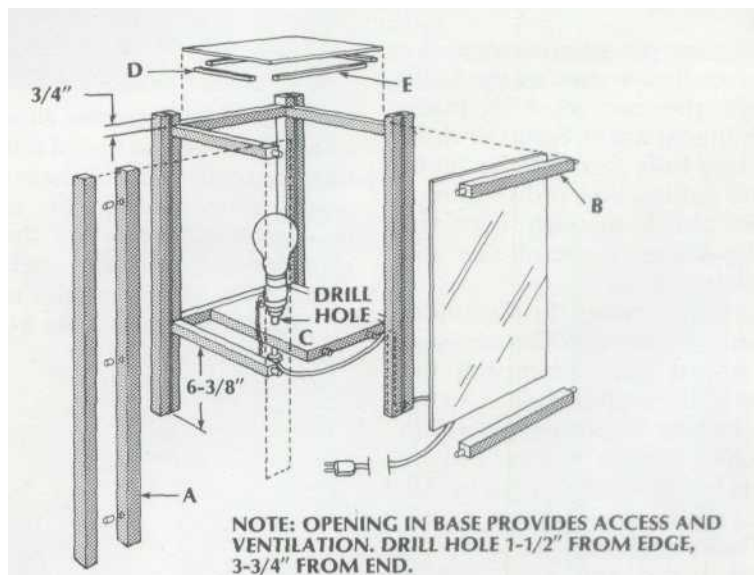
6. Fasten the base between the frame with the cord channel and one other frame using dowels and glue. Make the base side that is farthest from the pipe nipple hole flush with the outside edges on one side of the frames to create a

ventilation and access space on the other side.

7. Lace the lamp cord through the holes and channel in the two frames, pulling enough out the upper end for connecting with the socket. Fasten the four frames together using glue and dowels. Then glue and tack the support strips (D, E) to the backs of the upper rails, keeping their lower edges flush.

8. Insert the pipe nipple into the base, keeping the nut on the lower end. Run the cord up through the nipple and fasten it to the socket, then mount the socket on the nipple. Rotate the socket to place the pull chain side next to the ventilation hole, then tighten the nut.

9. Cut a piece of fiberglass to serve as the top of the lamp. Glue and tack it to the top edges of the support strips.



LIST OF MATERIALS

(finished dimensions in inches)

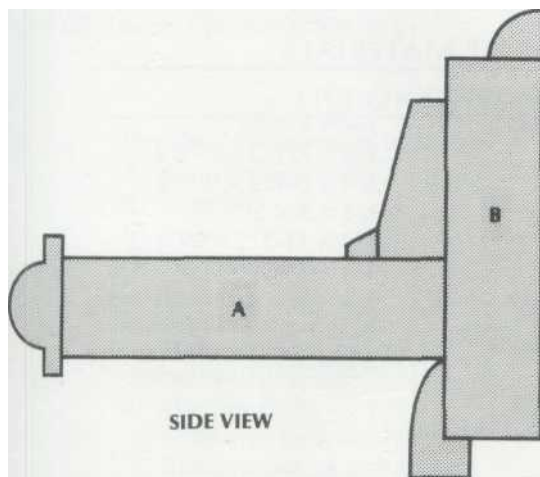
A	Legs (8)	3/4 × 3/4 × 24
B	Rails (8)	3/4 × 3/4 × 7-1/2
C	Base	3/4 × 6 × 7-1/2
D	Support strips (2)	5/16 × 1/2 × 7-1/2
E	Support strips (2)	5/16 × 1/2 × 8-3/8
	Dowels	3/8 dia. × 1-1/2
	Wire nails	
	Lamp socket kit	
	(socket, pull chain, cord, pipe nipple, and nut)	
	Fiberglass fabric	
	Wood glue	

180

UTENSIL HOLDER

kitchen utensils have a way of getting lost just when you need them. Such confusion can be avoided by building this special holder for them.

1. Cut the rack (A) and base (B) to size.
2. Drill appropriately sized holes in the rack to accommodate large spoons and other utensils.
3. Glue and tack a piece of decorative molding to the front of the rack as shown.
4. Butt the rack against the base, or rout a shallow groove for it. Fasten them together using glue and screws inserted from behind.
5. Dress up the holder by nailing various moldings to the front, top, and bottom edges of the base. The ones used on the original are profiled below, but choose moldings to suit your own taste.
6. Finish the holder as desired, then mount it on the wall or the side of a cabinet.



LIST OF MATERIALS

(finished dimensions in inches)

A	Rack	$3/4 \times 3-1/2 \times 12$
B	Base	$3/4 \times 3-1/2 \times 12$
	Wood screws	
	Finishing nails	
	Decorative moldings	
	Wood glue	

181
PLANT STAND



Here's a handsome pedestal to display your favorite plant. The original was made of clear grade redwood. The wider pieces were glued up from narrower stock and custom cut to the dimensions listed.

1. Cut all of the pieces to size according to the dimensions given.

2. Cut three plug holes in each column side (A) as shown. Locate the holes 2-1/2" from each end, with the remaining hole in between. All of the holes should be centered 3/8" from one edge of the piece.

3. Drill pilot holes for the wood screws in the center of the plug holes.

4. Assemble the column by gluing and screwing one corner at a time. Be sure that the assembly is square.

5. Round the edges of the column by sanding or routing with a 1/4" radius bit.

6. Cut 45° miters at the corners of the apron pieces (G).

7. Round or bead the upper edges of the top (E), then center the apron pieces on the underside of the top. Glue and screw through the apron into the top.

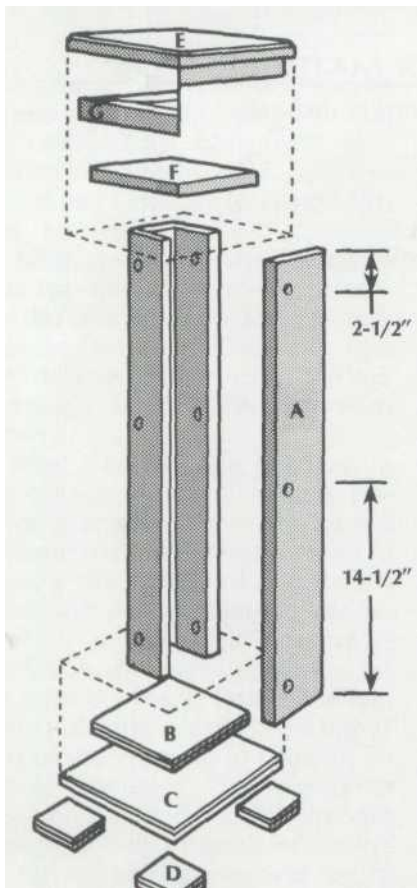
8. Center the bracket (F) on the column; then glue and screw it in place. Center the top/apron assembly on the bracket; glue and screw through the bracket into the apron.

9. Round or bead the upper edges of the base pieces (B, C) and feet (D); then sand.

10. Center the small base piece on the bottom of the column. Glue and screw it in place from underneath. Repeat with the large base piece.

11. Position the feet so they extend beyond the corners of the base as shown; secure with glue and screws.

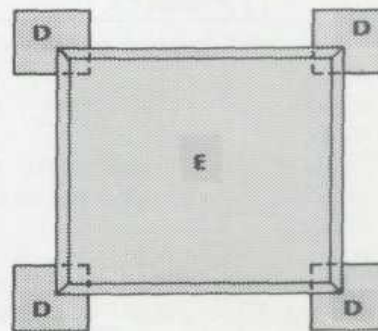
12. Sand the completed plant stand; finish as desired.



LIST OF MATERIALS

(finished dimensions in inches)

A	Column sides (4)	3/4 × 4 × 29
B	Base piece	3/4 × 7-1/2 × 7-1/2
C	Base piece	3/4 × 9-1/2 × 9-1/2
D	Feet (4)	3/4 × 3 × 3
E	Top	3/4 × 11-1/2 × 11-1/2
F	Bracket	3/4 × 7 × 7
G	Apron pieces (4)	3/4 × 3/4 × 10-1/2
	Flathead wood screws	#6 × 1-1/4
	Wood plugs	3/8 dia.
	Wood glue	



FOOT DETAIL

182
HALL TREE

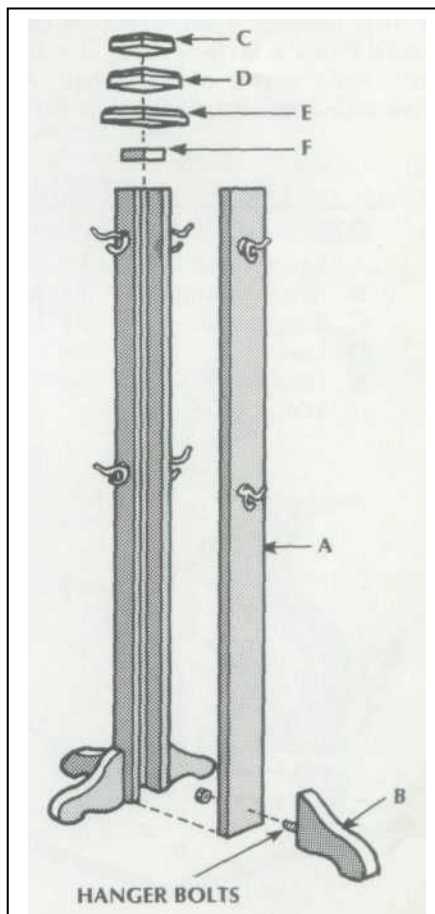


You'll always have a place to hang your hat with this easy-to-build hall tree. And by replacing the brass hooks with pot clips, you can turn it into a plant pole that is perfect for hanging vines. Either way, it's a useful addition to any home.

1. Begin by cutting all pieces to the listed dimensions.
2. Arrange the column sides (A) so their edges chase one another, creating a square column. Counterbore pilot holes and fasten the column sides together using wood glue and flathead wood screws. Fill the holes with wood plugs. (To avoid counterboring and plugging, use finishing nails instead of screws.) Sand the column, making the plugs flush with the other surfaces.
3. Center and drill a 5/16"-diameter hole through each column side 1-1/2" from the bottom to allow insertion of hanger bolts.
4. Lay out the final shape for the feet (B) using the template provided.

Drill 7/32"-diameter pilot holes for the hanger bolts in the back edge, then cut out the feet. Round over all edges except those that will meet the column.

5. Chamfer the upper edges on each of the three top pieces (C, D, E), then attach them to the bracket (F) using wood glue and finishing nails. Begin by fastening D to C, then E to D, and finally F to E. Make sure the smaller pieces are centered on the larger ones.
6. Round over the corners of the column and the sharp lower edges on the largest top piece. Spread glue on the bracket edges and fit it inside the upper end of the column.
7. Finish the tree and the feet as desired.
8. Screw the hanger bolts into the feet, then mount them on the tree, securing them with lock washers and nuts.
9. Install brass hooks and the tree is ready for your hats and coats.



LIST OF MATERIALS

(finished dimensions in inches)

A Column sides (4)	3/4 × 4 × 63
B Feet (4)	1-1/2 × 5-1/2 × 8-1/2
C Top	3/4 × 4-1/4 × 4-1/4
D Top	3/4 × 5-3/4 × 5-3/4
E Top	3/4 × 7-1/4 × 7-1/4
F Bracket	3/4 × 3-1/4 × 3-1/4
Flathead wood screws	#8 × 1-1/4
3d finishing nails	
Hanger bolts	1/4 dia. × 2-1/2
Nuts and lock washers	
Brass hooks or pot clips	
Wood plugs	3/8 dia.
Wood glue	

HANGER BOLT LOCATION

TEMPLATE FOR FEET

COLUMN TOP VIEW

183
CANDLE STANDS



Candles lend elegance and beauty to any occasion, and these attractive wooden candle stands will enhance all your candlelit moments.

1. This project is designed to be made from a 6' length of 1 x 10 with little waste of materials. A dark wood, such as walnut, is particularly nice, but pick the material you prefer.

2. Begin by cutting off a 12-1/2" length for the base (D). To minimize cupping, rip this piece into two or three pieces, square the edges, then glue the pieces back together, alternating the direction of the growth rings from piece to piece.

3. Next, cut a 33" length from the board. Rip the piece down the middle, then cut each half into three equal lengths. Face laminate the six pieces to create a blank for the large stand (A).

4. Rip a 2-1/4"-wide piece off the remainder of the board. Cut it into three equal lengths. Face laminate the three pieces to create a blank for the small stand (C).

5. Rip the rest of the board down the middle, then cut two equal lengths out of each half. Face laminate the four pieces to create a blank for the medium stand (B).

6. After the glue has dried, square up the four sides of each block. Cut the blocks to the finished dimensions in the list, then sand both

ends smooth on each. Center and drill 3/8"-diameter holes 3/4" deep into the bottom of each for later mounting on the base.

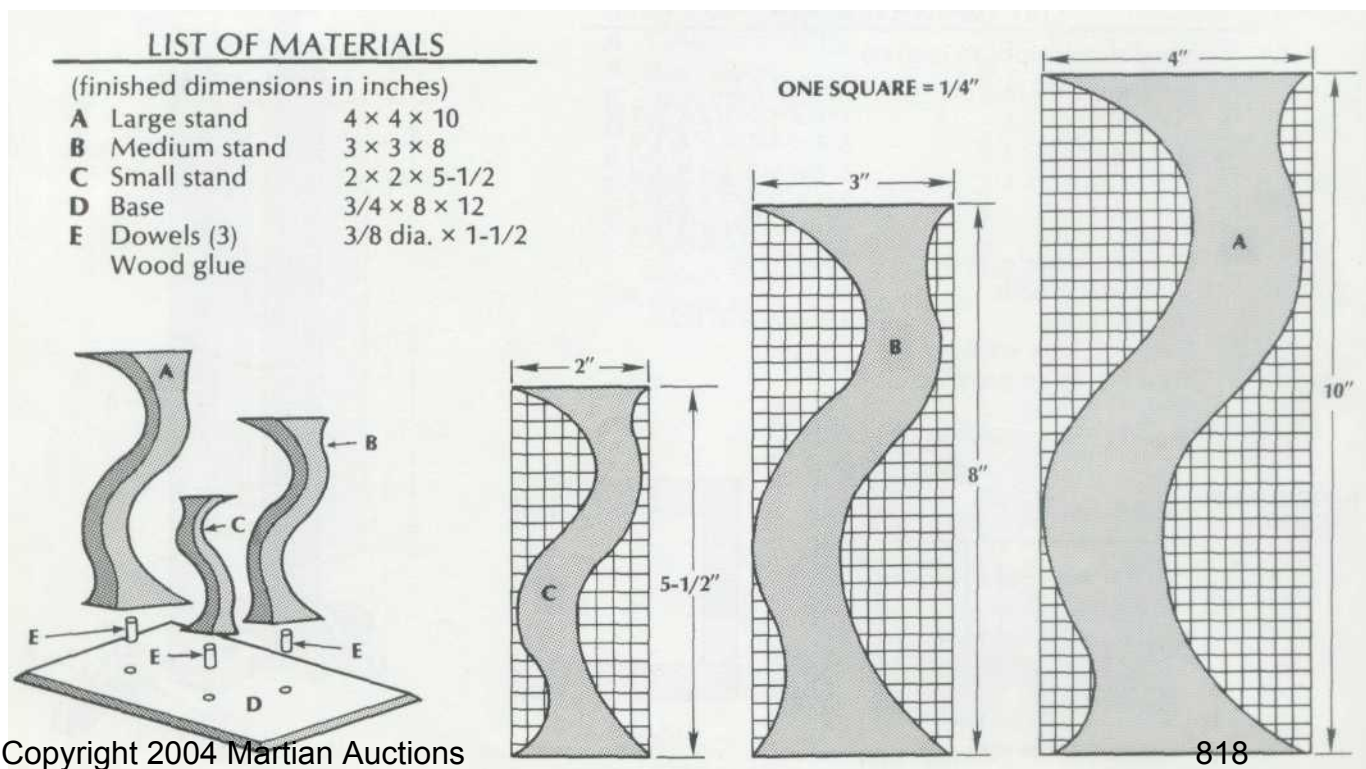
7. Make full-size templates for the blocks out of stiff cardboard or thin plywood. Trace the pattern onto two adjacent sides of each block.

8. Cut the blocks to their final shape on a bandsaw. Cut carefully along the lines on one face, then tape the waste back in place, flip the block 90°, and cut along the lines on the other marked face.

9. Cut the base to its final width and length, beveling the edges in about 15° toward the upper face.

10. Arrange the stands on the base and mark their position. Center and drill 3/8"-diameter holes through the base at the appropriate points for inserting the mounting dowels (E).

11. Sand the stands and base smooth, then assemble using glue and 3/8"-diameter dowels. After the glue dries, remove any dowel protruding through the bottom of the base. Apply your choice of finish.



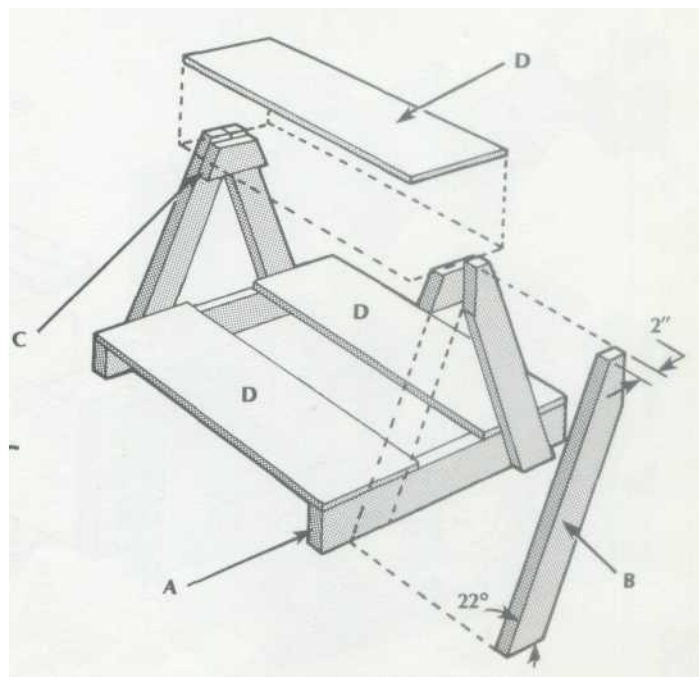
184

STEPLADDER PLANT STAND



If space is a problem around your home, this handy little plant stand could be the answer. The two bottom shelves provide ample space for small and medium size plants, while the top shelf can accommodate plants of slightly larger size.

1. Cut all the pieces to size according to the dimensions given.
2. Cut a 22° bevel on each end of each leg (B) so that, when installed, the legs will slant in but their ends will remain parallel.
3. Measure from the outside edge 2" across the beveled end at the top of each leg and square a line down from that point. Cut along those lines to create the joints between legs shown in the drawing.
4. Place a pair of legs together on a flat surface and lay a brace (C) across their upper ends. Adjust the brace so that its upper edge is parallel to and 3/4" below the upper ends of the legs. Mark and trim the ends of the brace so they will be flush with the outside edges of the legs. Repeat with the other brace and pair of legs.
5. Begin the assembly of the stand by laying each pair of legs across its brace and base piece (A). Make sure the bottom edges of the legs and base are flush and that the base extends an equal distance to either side. Fasten the legs to the base and brace using water-resistant wood glue and 10d galvanized nails. If working with redwood, blunt the ends of the nails before using.
6. Set the two leg units upright and fit the shelves (D) between them. Make sure the outer edge of each lower shelf is flush with the ends of the base and that the upper shelf is centered over the braces. Fasten the shelves in place using water-resistant wood glue and 10d galvanized nails.
7. Blunt any penetrating nail ends and break over all sharp edges. Apply a water-resistant finish.

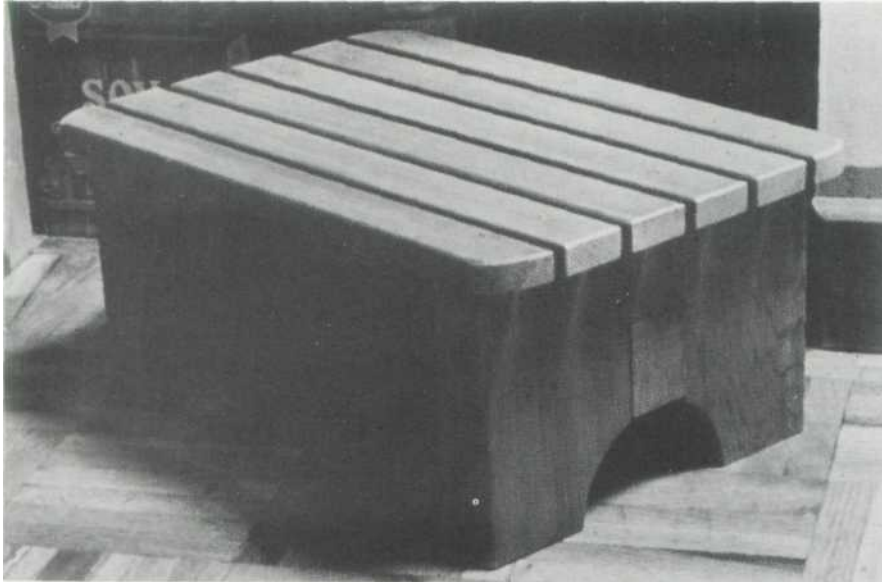


LIST OF MATERIALS

(finished dimensions in inches)

A	Base pieces (2)	1-1/2 × 3-1/2 × 22
B	Legs (4)	1-1/2 × 3-1/2 × 20
C	Braces (2)	1-1/2 × 3-1/2 × 7-1/2
D	Shelves (3)	3/4 × 7-1/4 × 30
	10d galvanized nails	
	Water-resistant wood glue	

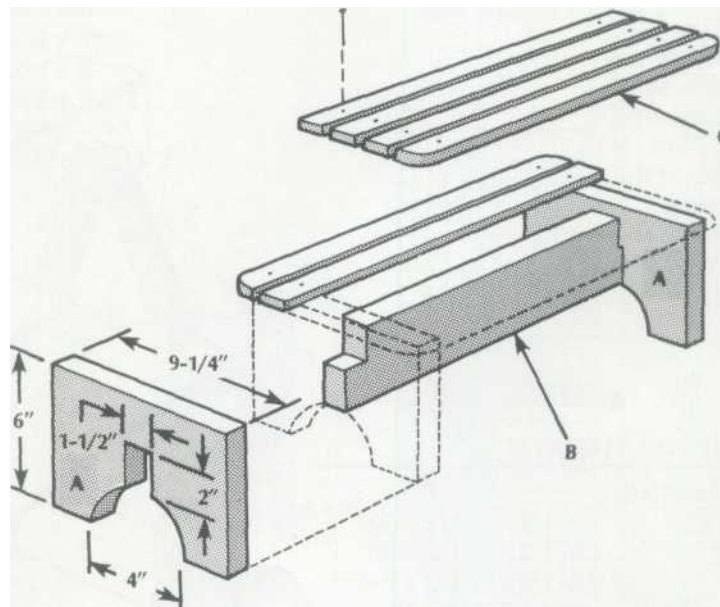
185 **GARDENING BENCH**



The functional design of this simple bench provides comfortable seating close to the ground, so you won't have to stoop or kneel. Besides being ideal for the garden or patio, it's also a natural in the bath or shower, if redwood or special-treated wood is used.

1. After cutting all of the pieces to size, round off the ends of the two outside top pieces (C).
2. Cut a 1-1/2" x 1-1/2" notch on each end of the cross brace (B) as shown to accommodate the legs (A).
3. Cut a 4"-diameter opening and 1-1/2" x 2" slot in the bottom of each leg as shown.
4. Glue and nail the legs to the cross brace. If working with red wood, blunt the ends of the nails before using.
5. Evenly space the top pieces on the legs, and secure them with glue and nails.
6. Sand and apply the water-resistant finish of your choice.

LIST OF MATERIALS		
(finished dimensions in inches)		
A	Legs (2)	1-1/2 × 9-1/4 × 6
B	Cross brace	1-1/2 × 3-1/2 × 12
C	Top (6)	3/4 × 1-1/2 × 15
	Galvanized nails	
	Wood glue	



186
WINE BOTTLE RACK



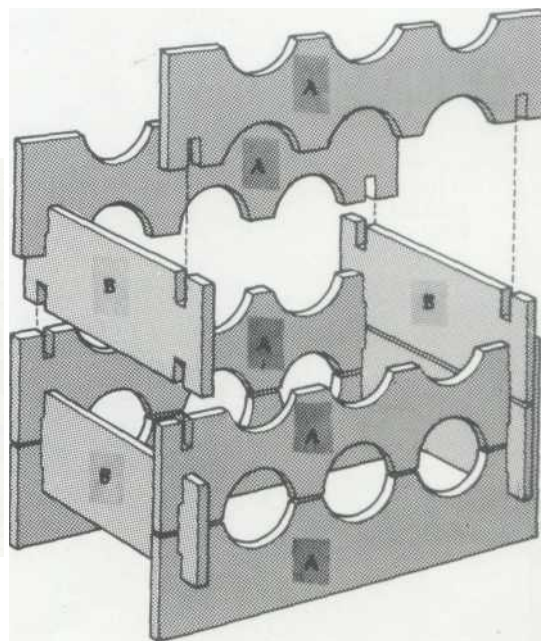
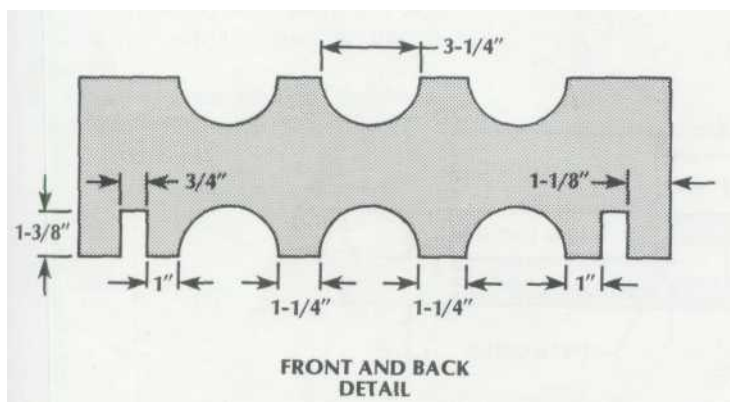
This wine bottle rack is expandable, so you can build the original three-tier module and add on later as your wine collection grows. Slotted construction enables it to go together quickly and be disassembled just as fast when it must be moved.

1. Make cardboard patterns of the front and back (A) and side pieces (B). Note that the front and back pieces have a $3/4"$ x $1-3/8"$ slot cut in each end, and three evenly spaced $3-1/4"$ -diameter cutouts as shown. The side pieces also have $3/4"$ x $1-3/8"$ slots cut in their ends.
2. Transfer the patterns to red wood (or any other wood of your choice), and cut as many pieces as needed for the number of tiers desired. Clamp the side pieces together to assure a uniform fit, and cut the slots on a table saw or radial arm saw. Note that the bottom edges of the bottom tier pieces and the upper edges of the top tier pieces need no slots.
3. Use a saber saw to make the round cuts on the front and back pieces. No round cuts are needed on the bottom edges of the bottom tier pieces.
4. Assemble the rack by fitting the slots together as shown. No glue or nails are required.

LIST OF MATERIALS

(finished dimensions in inches)

A	Front and back pieces (6)	$3/4 \times 5-1/2 \times 18$
B	Side pieces (4)	$3/4 \times 5-1/2 \times 10-1/2$



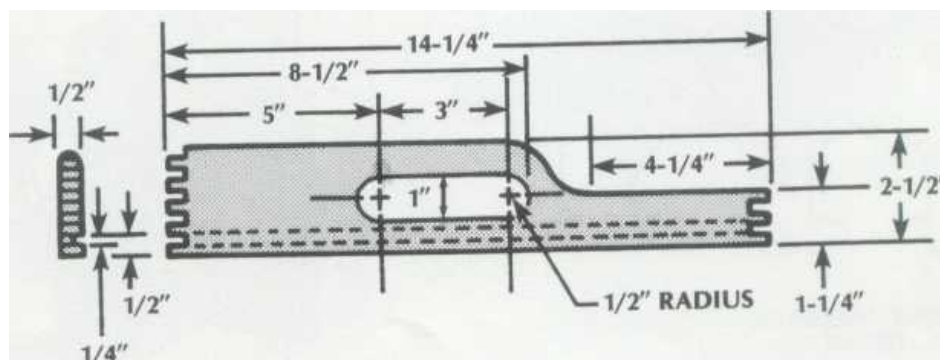
187
LAP TRAY AND COASTERS

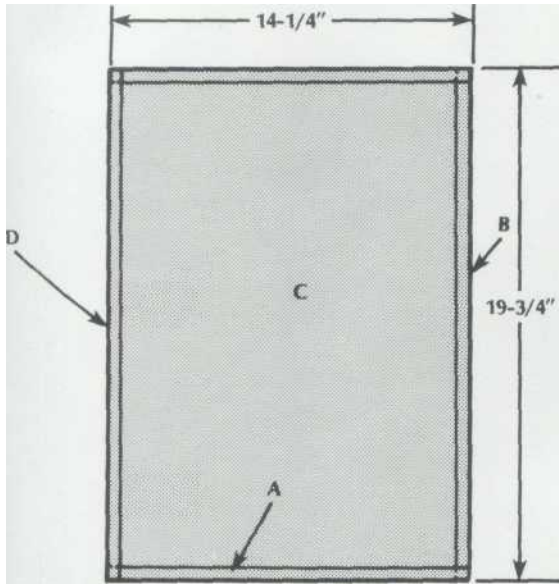


For serving everything from snacks to meals, this handsome tray will be a welcome addition to your kitchen. And, to complement the tray, the easy-to-make coasters are perfect. Once the coaster project is properly set up, you can make numerous sets to give as gifts.

LAP TRAY

1. Cut the various parts to size using the dimensions given.
2. Make a template for the sides (A) using the pattern provided. Use a scroll saw, bandsaw, or jigsaw to cut out the sides, then cut out the handle holes.
3. Smooth the curved surfaces with a small drum sander.
4. Using a router with a 1/4" rounding over bit, shape the top edge of the sides and the handle holes. Shape the top edge of the front (B) and back (D) as well.
5. Using a 1/4" dado head set to a depth of 1/2", cut the fingers for the box joint corners on both ends of the sides, bottom, and back.
6. Reset the dado head to a depth of 7/32", then cut the 1/4"-wide grooves in the sides, front, and back to accept the bottom (C).
7. Assemble the tray using glue in the corner joints, but leaving the bottom free to respond to movement of the other parts.
8. Sand the tray and finish as desired.





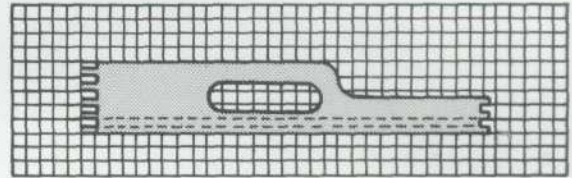
LIST OF MATERIALS (Lap Tray)

(finished dimensions in inches)

A	Sides (2)	$1/2 \times 2-1/2 \times 14-1/4$
B	Front	$1/2 \times 1-1/4 \times 19-3/4$
C	Bottom	$1/4 \times 13-5/8 \times 19-1/8$ plywood
D	Back	$1/2 \times 2-1/2 \times 19-3/4$

Wood glue

ONE SQUARE = $1/2''$



SIDE PATTERN

COASTERS

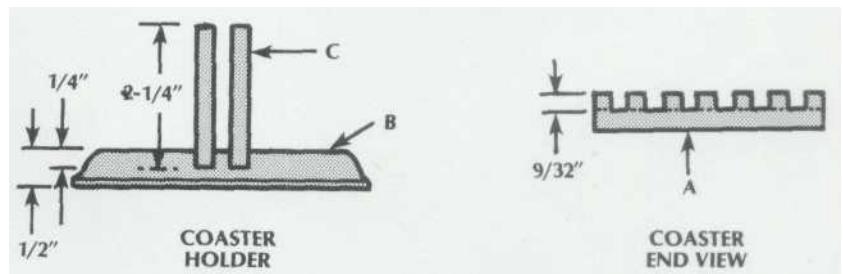
1. Cut the parts to size using the dimensions given, then sand smooth. Cut the coasters (A) so that the grain runs diagonally to all four edges.
2. Shape the edges of the base (B) using a hand-held router equipped with a roman ogee bit.
3. Use a $1/4''$ -inch dado head set to a depth of $9/32''$ to cut the grooves in the coasters. Cut grooves $1/4''$ apart on one side of each piece, flip the piece over, rotate it 90° , and cut a second set of grooves.
4. Drill $1/4''$ -diameter holes $1/4''$ deep in the base to accommodate the dowels (C).
5. Glue the holders in place and check for squareness. Finish as desired.
6. Finish the coasters and holder as desired.

LIST OF MATERIALS (Coasters)

(finished dimensions in inches)

A	Coasters (4)	$1/2 \times 3-1/4 \times 3-1/4$
B	Base	$1/2 \times 4-1/4 \times 4-1/4$
C	Dowels (2)	$1/4$ -dia. $\times 2-1/4$

Wood glue



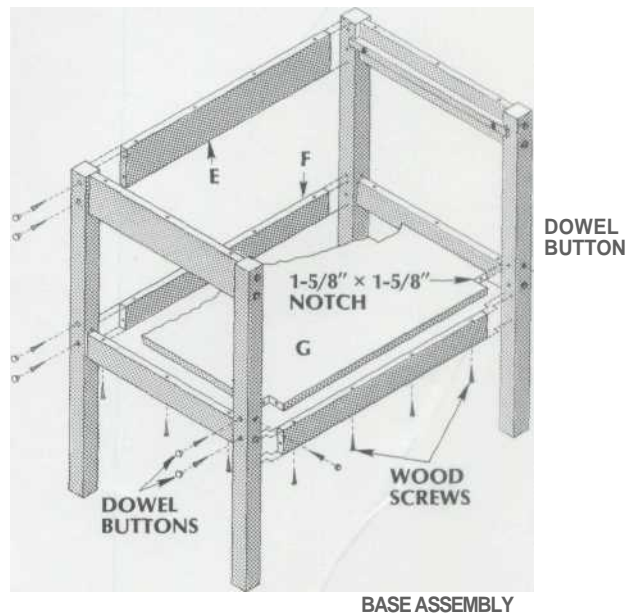
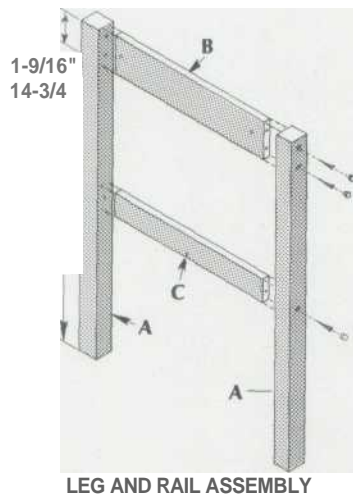
188
**BUTCHER BLOCK
MICROWAVE OVEN STAND**

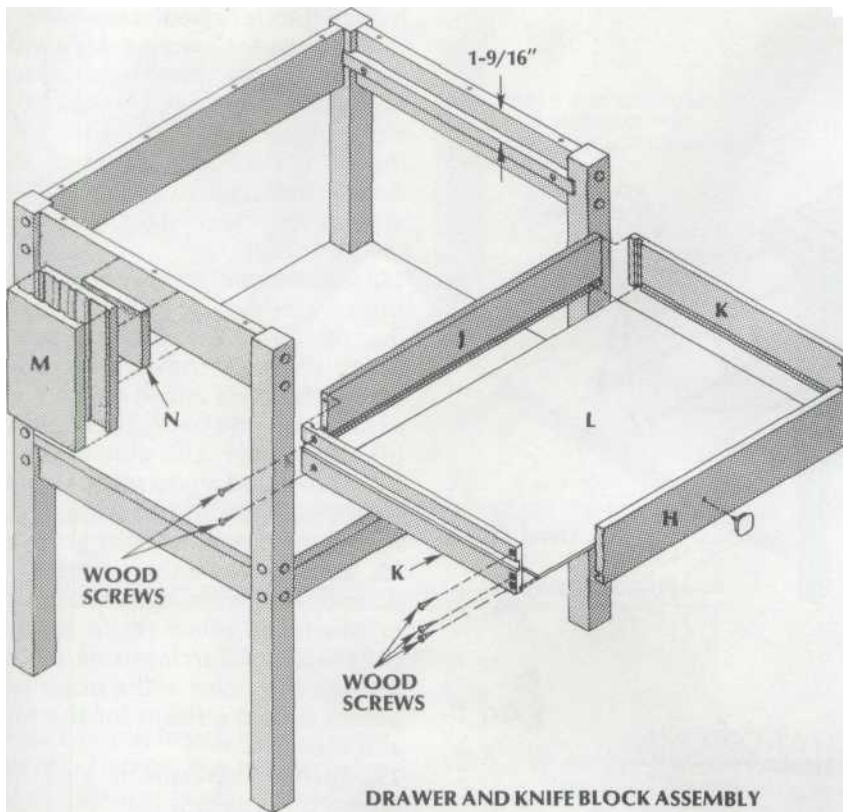


The butcher block has fallen out of favor in recent years, replaced by the countertop cutting board in an attempt to save space. This design, however, makes the butcher block a useful part of the kitchen once again. It has a drawer and shelves for storage, it can be moved to provide a cutting surface or extra counter space wherever needed, and it even has space for a microwave oven. In addition to the stand, plans are included for building a storage unit on the lower shelf in place of the oven.

MAKING THE STAND

1. Cut all pieces to size according to the dimensions given.
2. If you want to make the stand mobile and add casters to the legs (A), cut 2" off the length of the legs and drill a center hole in the bottom of each one to accept the caster shaft.
3. Lay out the positions of the rail joints on the legs as indicated in the drawings. Note that all rails are centered on the width of the legs and that the tops of the upper rails (B, E) and legs are flush. The lower rails (C, F) should be set 14-3/4"





1-5/8" x 1-5/8" notches on each corner of the shelf for fitting it between the legs.

7. Fasten the legs and rails together using wood glue and #8 x 1-3/4" wood screws. Then fasten the shelf in place, running #8 x 1-3/4" screws through the rails into its underside.

8. Position the drawer guides against the inside faces and 1-9/16" below the upper edges of the upper end rails. Fasten the guides to the rails using wood glue and #6 x 1-1/4" wood screws. Countersink the screws so their heads will not interfere with the operation of the drawers.

9. Cut a 3/4"-wide x 1/4"-deep groove 1" below the upper edge along the outside face of each drawer side (K). Check the fit between these grooves and the drawer guides. If necessary, widen the grooves to allow the drawer sides to slide smoothly back and forth on the guides.

10. Cut 1/2"-wide x 1/2"-deep rabbets across the ends of the drawer

above the bottoms of the legs, unless the shelf (G) will house a microwave oven. In that case, drop the lower rails 4".

4. Drill, countersink, and counterbore pilot holes for a pair of #8 wood screws at each joint between rails and legs. Drill through the legs into the ends of the rails and make the counterbores 3/8" in diameter and 3/4" deep.

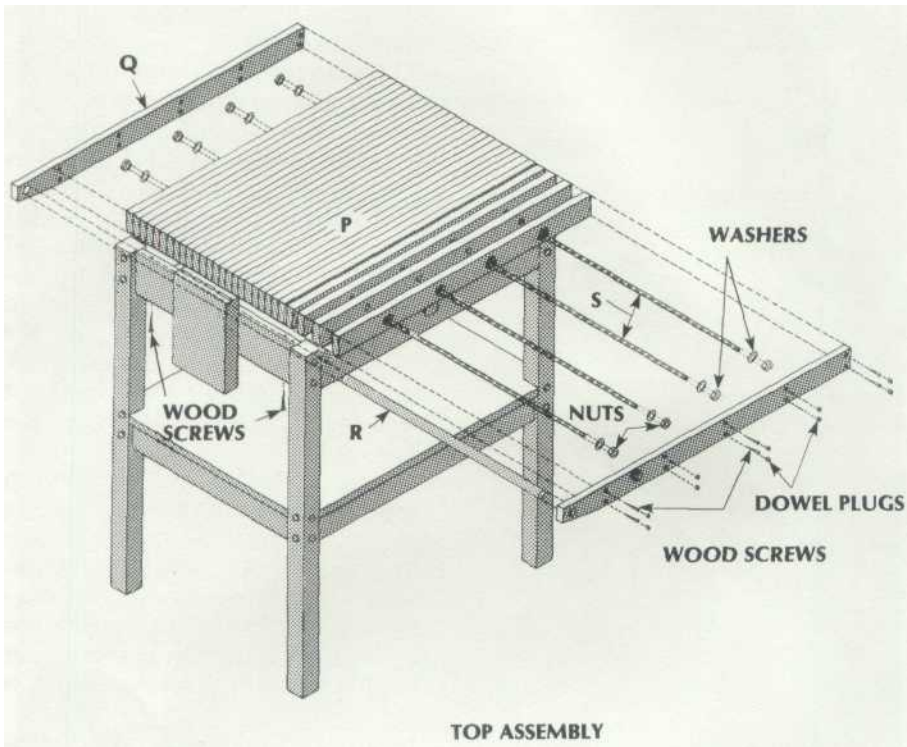
5. Drill another set of counterbored pilot holes for #8 screws through each of the lower rails—three holes in each end rail and four in each front and back rail. Run the holes through the width of the rails, from the lower to the upper edges, and make the counterbores 1-3/8" deep. It might help to drill the counterbores first, then use a long, thin bit to complete the pilot holes.

6. Cut 3/8"-wide x 1/2"-deep rabbets across the rear ends and 1" x 1/2" rabbets across the front ends of the drawer guides (D). Also, cut

LIST OF MATERIALS (Stand)

(finished dimensions in inches)

A	Legs (4)	1-3/4 x 1-3/4 x 34
B	Upper end rails (2)	3/4 x 4 x 18-3/4
C	Lower end rails (2)	3/4 x 2-1/2 x 18-3/4
D	Drawer guides (2)	3/4 x 3/4 x 20-1/8
E	Upper back rail (2)	3/4 x 4 x 24-3/4
F	Lower back and front rails (2)	3/4 x 2-1/2 x 24-3/4
G	Shelf	3/4 x 22 x 28
H	Drawer front	3/4 x 4 x 24-5/8
J	Drawer back	1/2 x 3-1/2 x 24-1/8
K	Drawer sides (2)	1/2 x 3-1/2 x 18
L	Drawer bottom	1/4 x 17-1/2 x 24-1/8 plywood
M	Knife block (2)	3/4 x 6 x 9
N	Spacer block	5/8 x 5 x 4
P	Butcher block top pieces (28)	3/4 x 2 x 28-1/2
Q	Top facings (2)	3/4 x 2 x 32-1/2
R	Handle	1 dia. x 22-1/2
	Threaded metal rods (4)	3/8 dia. x 20-7/8
	Flathead wood screws	#6 x 1-1/4
	Flathead wood screws	#8 x 1-1/2
	Flathead wood screws	#8 x 1-3/4
	Washers and nuts	
	Dowel buttons and dowel plugs	3/8 dia.
	Drawer pull	
	Wood glue	

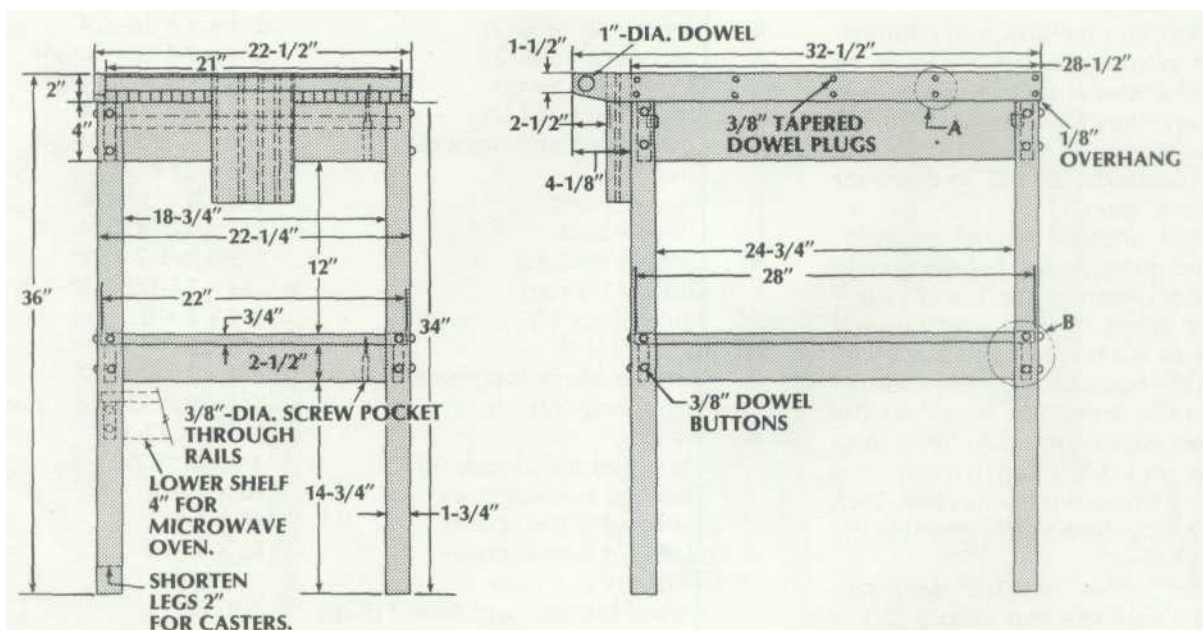


front (H) to receive the ends of the sides. Cut 1/4"-deep x 1/2"-wide dados across the drawer sides, 1/2" in from the rear, to receive the ends of the back (J). Cut 1/4"-deep x 1/4"-wide grooves in the drawer front, back, and sides, 1/4" above their lower edges, to receive the bottom (L).

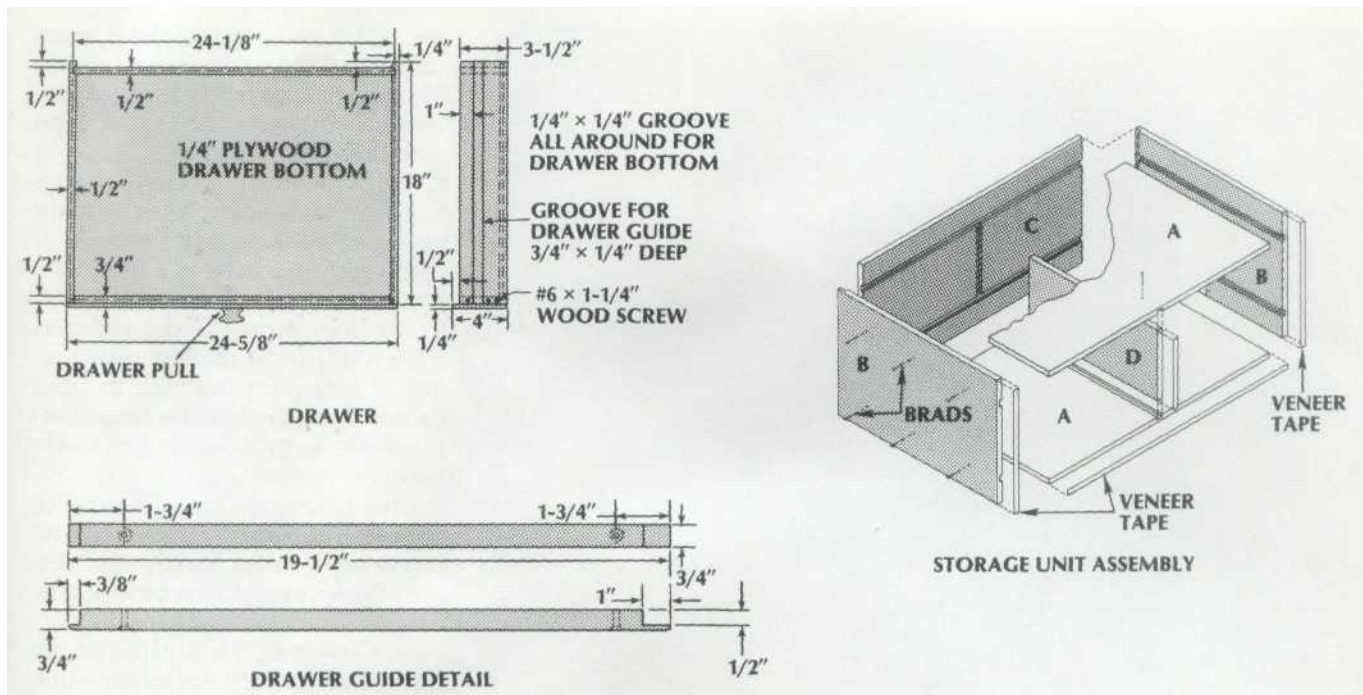
11. Center and drill a screw hole through the drawer front for attaching the pull. Countersink screw holes through the drawer sides where they will attach to the ends of the front and back. Then assemble the drawer. Use glue and #6 x 1-1/4" flathead wood screws to join the sides, front, and back, but leave the bottom unglued in the grooves.

12. Drill four evenly spaced 3/8"-diameter holes through each butcher block top piece (P) to receive the metal reinforcing rods. Counterbore the holes in the outer two pieces to make room for the nuts and washers.

13. Spread waterproof glue between all adjacent butcher block top pieces. Thread the rods through



BUTCHER BLOCK MICROWAVE STAND LAYOUT



the pieces and install the nuts and washers. Tighten the nuts to align and clamp the pieces while the glue dries.

14. Trim one end of each facing (Q) to the profile shown in the stand layout drawing and drill holes for the ends of the handle (R). Begin the tapers 3" from the ends and center the holes 1-1/4" from the ends of the facing pieces.

15. Fasten the facings to the top using waterproof glue and #8 x 1-1/2" flathead wood screws, making their right ends and upper edges flush. Glue the handle in place at the same time. Position the screw holes where you will not hit the metal rods. Counterbore the holes and fill them with 3/8"-diameter plugs.

16. Sand the top and facings flush, then finish them with mineral oil or a similar non toxic finish. Sand the rest of the stand, fill the counterbored holes with wood buttons, then apply polyurethane or another finish of choice.

17. Center the top on the frame and mark the position of the screw holes in the upper edges of the rails. Drill pilot holes into the un-

LIST OF MATERIALS (Storage Unit)	
(finished dimensions in inches)	
A	Top and bottom (2) 1/2 x 16-3/4 x 24 plywood
B	Sides (2) 1/2 x 11-1/2 x 17 plywood
C	Back 1/2 x 11-1/2 x 24 plywood
D	Divider 1/2 x 7 x 16-3/4 plywood
	Wire brads #17 x 1
	Veneer tape
	Wood filler
	Wood glue

derside of the block top, then fasten it to the rails using #8 x 1-3/4" flathead wood screws. 18. Cut matching 1/16"-deep grooves in the two halves of the knife block (M). Then glue the pieces together, aligning the grooves. Nail or screw the 5/8"-thick spacer block (N) to the left end rail, then glue the knife block to the spacer, making its top flush with the upper surface of the butcher block.

MAKING THE STORAGE UNIT

1. Cut all pieces to size from 1/2"-thick veneer plywood.

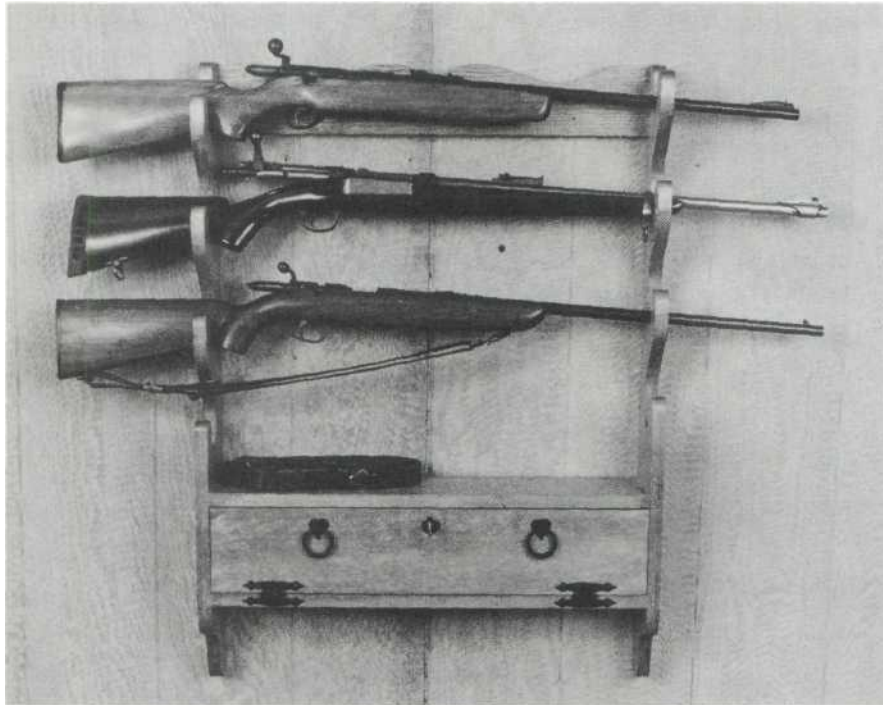
2. Cut 1/2"-wide x 1/4"-deep rabbets across the rear ends of the sides (B) and 1/2" x 1/4" grooves, spaced 6-1/2" apart, along the length of the sides and back (C). Also, cut 1/2" x 1/4" dados across the center of the top and bottom (A) and back. The dado on the back should only connect the two grooves.

3. Assemble the unit with glue and #17 x 1" wire brads. Set the brads and fill with a wood filler that matches the finish you will be using.

4. Cover all exposed edges of the plywood with veneer tape.

5. Finish the drawer to match the stand and storage unit, then install.

189
SPORTSMAN'S RACK



Here's the ideal method of storing those prized rifles and fishing rods—the sportsman's rack. Not only does it make an eye-catching display, but it also has a locking compartment for storing shells, lures, and other items.

1. Select two 8' lengths of good quality 1 x 6 lumber, hardwood or softwood. Cut the top (A), sides (B), shelves (C), and door (E) to length, then rip them to width. Rip the pieces 1/16" wide at first, then use a jointer or hand plane to clean up the ripped edges.
2. Cut a pair of 1/2"-wide x 1/4"-deep dadoes across the inner face of each side piece to receive the ends of the shelves. Space the dadoes 5" apart and set the lower one 5-1/2" above the bottom end of each board, as shown in the front view drawing.
3. Cut a 1/4"-wide x 1/4"-deep rabbet along the back edge of each side piece in the area between the dadoes to make room for the ends of the plywood back panel.
4. Cut 1/4"-wide x 1/4"-deep rabbets along what will become the inside rear edges of the shelves to

accept the upper and lower edges of the back panel.

5. Cut a 4"-long notch 3/4" deep into the rear edge at the upper end of each side piece to make room for the ends of the rack's top rail (A).
6. Dry assemble the pieces to make sure everything fits correctly. Fine tune the joinery as needed.
7. Begin the layout of the curved shapes on the top rail and side

pieces by making templates from cardboard or heavy paper using the patterns provided as guides. Then use the templates to trace the patterns onto the boards.

8. Before laying out the hook patterns on the side pieces, decide how you want to use the rack. If you want it to serve as a gun rack, set the hooks on the left side 1 -1/2" lower than those on the right, as shown in the front view drawing. But, if you want the rack to hold fishing gear, lay out the hook patterns the same way on both side pieces.

9. Use a bandsaw or saber saw to cut out the patterns traced on the top rail and sides. Make relief cuts into the hook pockets before cutting around the tight inside corners. Cut along the outside of the lines, then smooth the edges while sanding down to the lines.

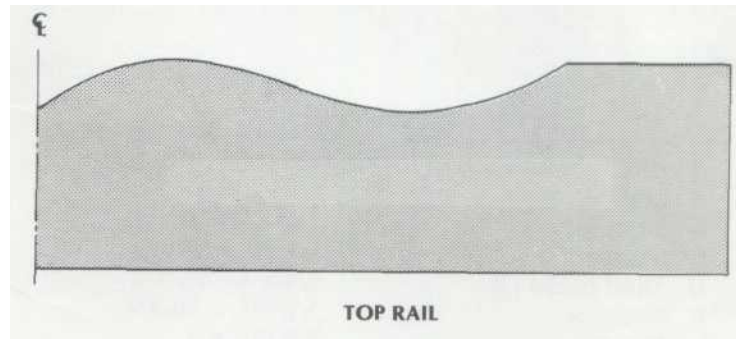
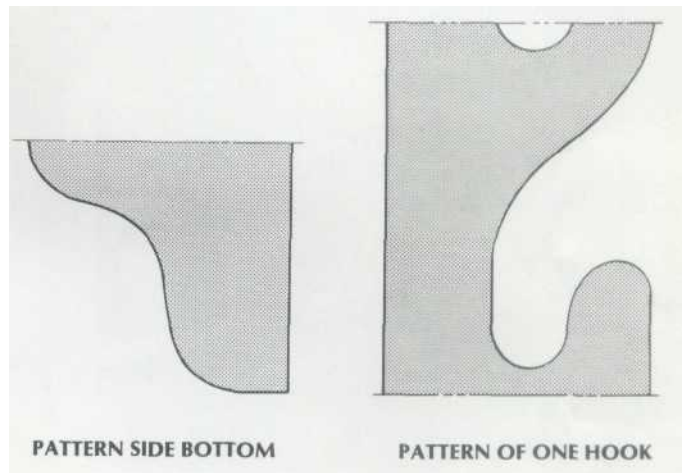
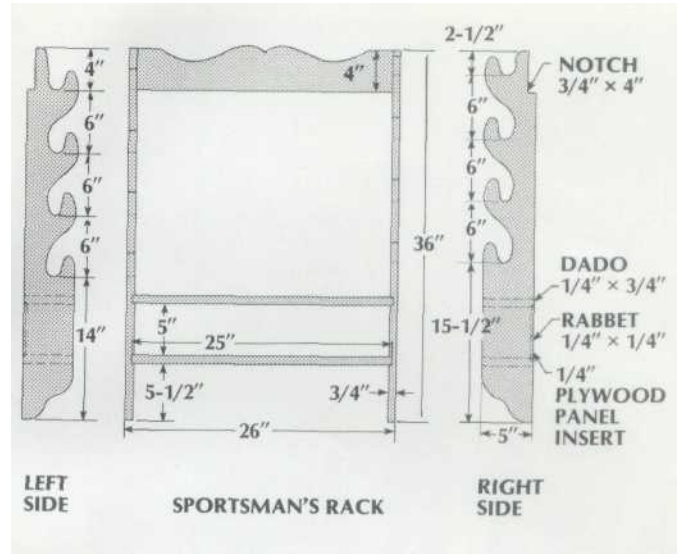
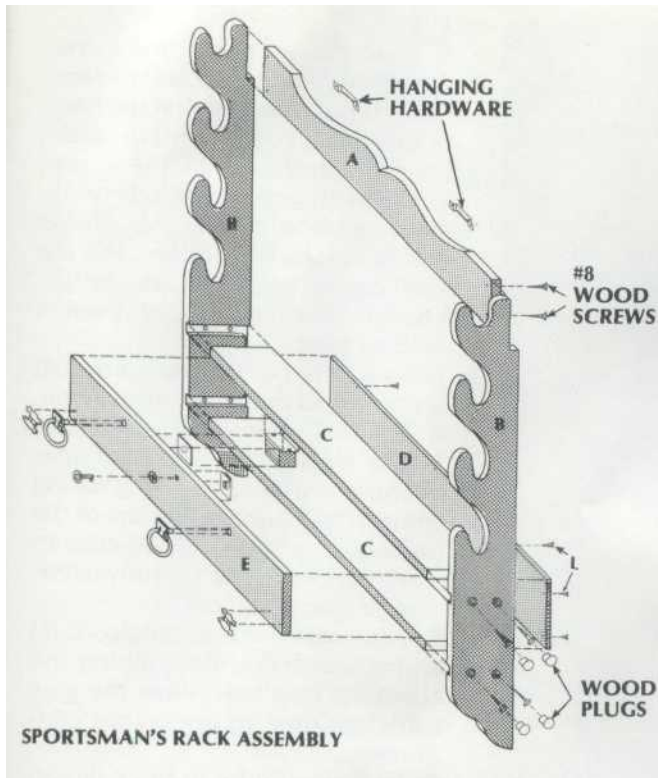
10. Center the latch plate part of the lock next to the front edge on the underside of the top shelf. Mark around it, then chisel out the shelf as needed for mounting the plate.

11. Clamp the top rail, sides, and shelves together while drilling pilot holes for #8 wood screws. Drill 3/8"-diameter x 1/4"-deep counterbore holes over the pilot holes in the sides and countersink the holes that run through the back of the top rail.

LIST OF MATERIALS

(finished dimensions in inches)

A Top	3/4 × 4 × 26
B Sides (2)	3/4 × 5 × 36
C Shelves (2)	3/4 × 5 × 25
D Back	1/4 × 5-1/2 × 25
E Door	3/4 × 4-15/16 × 24-7/16
Dowel buttons or plugs	3/8 dia. × 1/4
Flathead wood screws	#8 × 1-1/4
Wire nails	
Hinges with screws (2 sets)	
Magnetic catch and plate	
Lock and key	
Door pulls	
Hanging hardware	
Wood glue	



12. Disassemble the rack and sand all the parts. Lightly round over all sharp edges that will be exposed after assembly. Then, reassemble the shelves, sides, and top rail using wood glue and #8 x 1-1/4" flat-head wood screws.

13. Cut a piece of 1/4" plywood to size for the back (D). Fasten the back to the shelves and sides using glue and wire nails.

14. Glue 3/8"-diameter wood plugs in the counterbored screw holes. After the glue dries, sand the plugs flush with the sides.

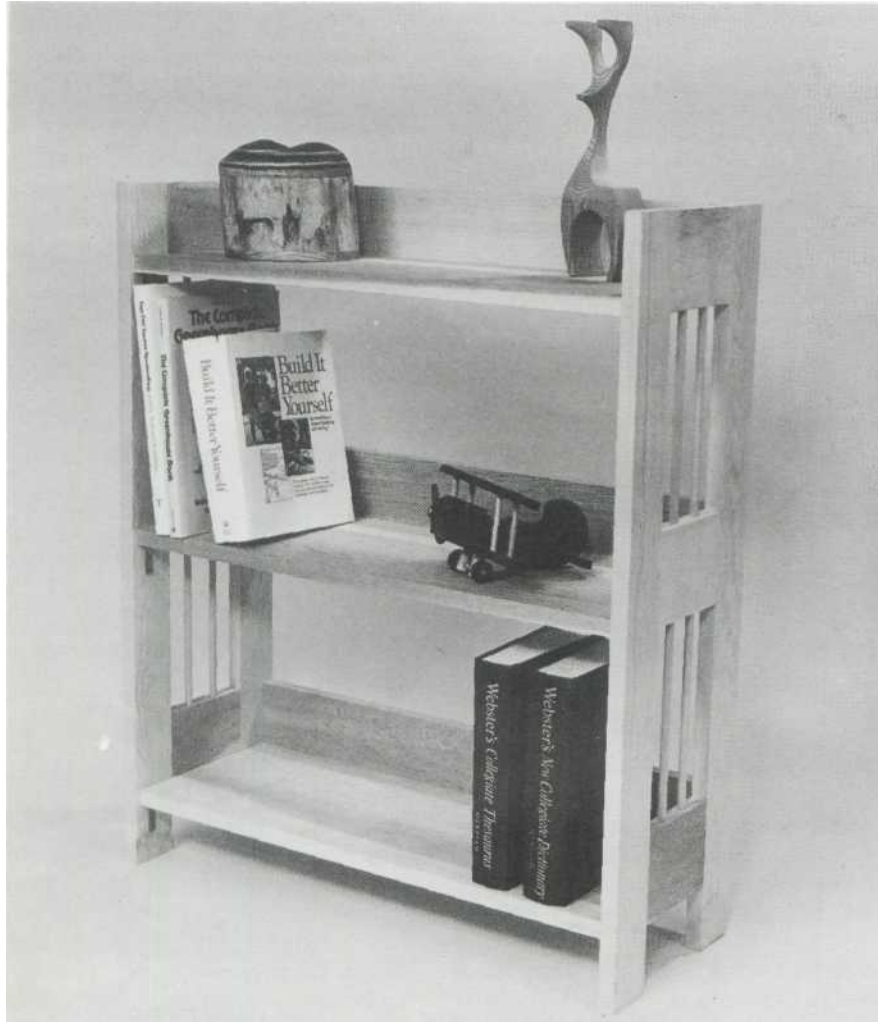
15. Temporarily mount the hinges on the door, then fit the door in place and fasten the hinges to the bottom shelf. Check to see that the door operates properly, then mark the location for the lock keyhole.

16. Remove the hinges from the door and shelf. Drill the keyhole in the door, as well as holes for the door pulls.

17. Sand the door, breaking all sharp edges. Apply the desired finish

to the door and the rest of the rack. After the finish has dried, mount all the hardware on the door and rack, including your choice of hardware for hanging the rack on the wall.

190 CHAIRSIDE BOOKCASE



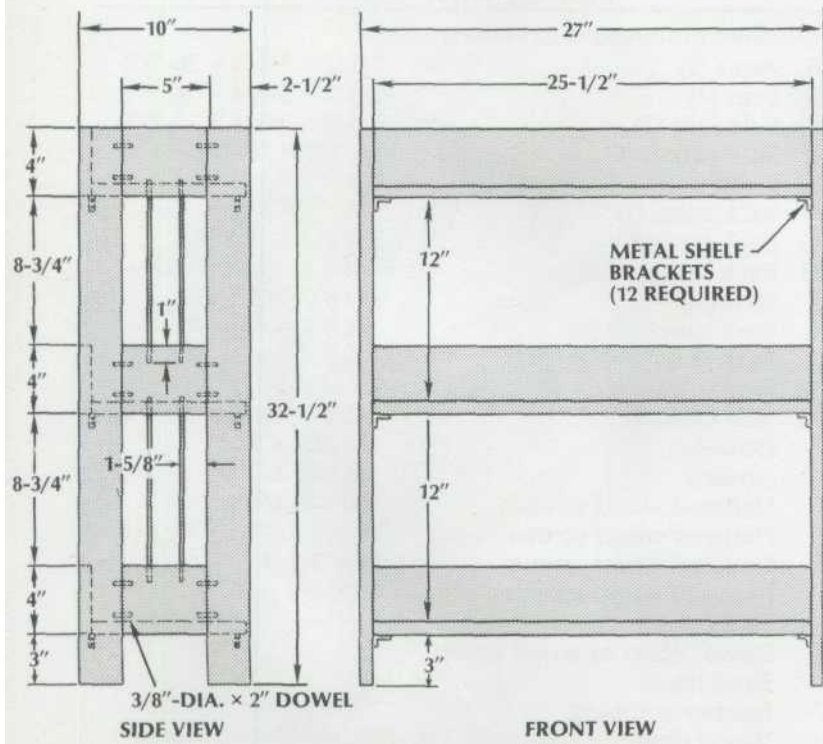
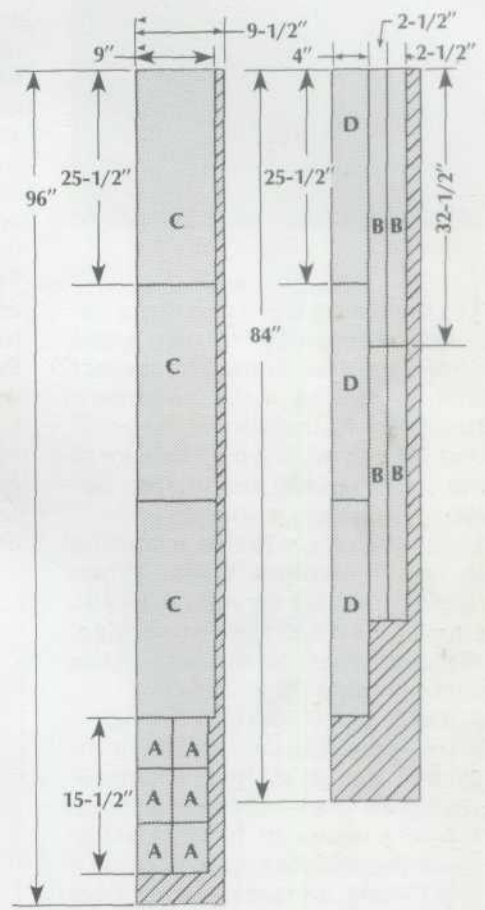
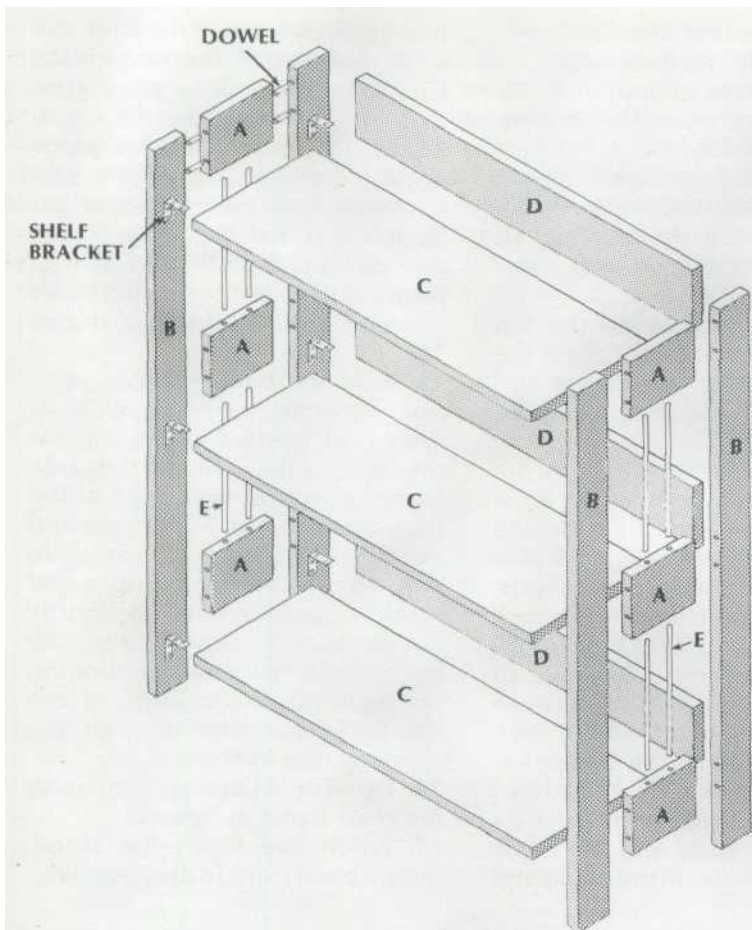
LIST OF MATERIALS

(finished dimensions in inches)

A	End rails (6)	$3/4 \times 4 \times 5$
B	Stiles (4)	$3/4 \times 2-1/2 \times 32-1/2$
C	Shelves (3)	$3/4 \times 9 \times 25-1/2$
D	Shelf backs (3)	$3/4 \times 4 \times 25-1/2$
E	Rods (8)	$3/8 \text{ dia.} \times 10-3/4$
	Dowels	$3/8 \text{ dia.} \times 2$
	Metal shelf brackets (12)	$3/8 \times 1-1/2 \times 1-1/2$
	6d finishing nails	
	Wood glue	

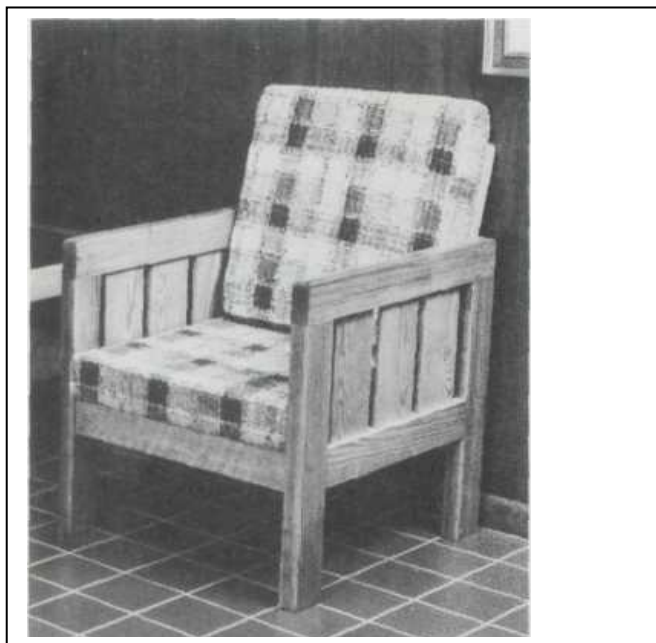
How many times have you stretched out on your favorite easy chair, only to realize that the book or magazine you wanted to read is on the other side of the room? With this attractive chairside bookcase, reading material is always within reach. In addition, the top shelf can be used to display knickknacks, small plants, or even a reading lamp.

1. To begin, cut the pieces to size according to the dimensions given.
2. Drill $3/8$ "-diameter dowel holes $1-1/16$ " deep in the ends and sides of the end rails (A). Using dowel centers, transfer the centers of the holes to the stiles (B). Be sure to mark the centers accurately to ensure proper assembly.
3. Assemble the end rails, rods (E) and rails with dowels by gluing and clamping in place. Allow the glue sufficient time to dry before continuing.
4. Drill pilot holes in the rails and shelves (C) for the bracket screws, and attach the brackets to the stiles.
5. Attach the shelf backs (D) to the stiles with 6d finishing nails.
6. To complete the assembly, attach the shelves to the brackets with screws.
7. Sand with 150-grit paper, followed by 180-grit. Finish as desired.



191

ARMCHAIR



It's becoming more and more expensive these days to own good handcrafted furniture. This project enables you to make your own armchair at a fraction of the retail cost. What's more, you'll be sure of the craftsmanship and quality, because you made it yourself.

1. Cut the pieces to size according to the dimensions given. When ripping the back cleat (L) to width, cut a 16° bevel on the ripped edge. Also, cut tapers on the ends of the back supports (K) as shown.
2. Drill 1-3/8"-deep x 1"-wide x 2-1/4"-long mortises in the arms (A) and legs (B) as shown. Remove any excess stock with a hand chisel.
3. Use a router or hand chisel to make the 1/2"-deep x 3/8"-wide x 2-1/2"-long mortises in the edges of the back rails (G, H). Leave the corners round.
4. Mark the locations for cutting tenons in the ends of the side rails (C), front rail (E), and back rails. To mark, score the wood with a knife to prevent splintering.
5. Use a dado blade to cut the 1"-thick x 2-1/4"-wide x 1-1/4"-long tenons.
6. Drill dowel holes in the arms, side rails, side panels (D), and back stiles (F), and rails. Drill these holes 1" deep.
7. Round the side edges of the slats (J) with a router and rounding

over bit. This will enable them to fit the mortises in the back rails.

8. Sand all pieces smooth with 150-grit paper. Dry-assemble the arm chair to check for fit.
9. Assemble the side frames. Begin by fitting the side rails between the legs, then install the side panels and the arms. Use glue in all joints and clamp until dry.
10. Fit the slats between the top and bottom back rails. Fasten the rails to the stiles using glue and dowels. Clamp and set aside for the glue to dry.
11. Assemble the front rail and the side frames using glue in the mortise and tenon joints. Clamp the assembly, then immediately install the front (M) and side (N) cleats. Butt the side cleats against the back of the front rail and set them 1/16" to 1/8" below the upper edges of the side rails. Drill pilot holes counterbored at least 1/4" deep, then fasten the cleats to the frames using glue and #10 x 2-1/4" flathead wood screws. If you prefer, dry assemble the frames and rail while drilling pilot holes in the cleats and

frames, then remove the front rail while you install the side cleats. Glue the front rail in place after that.

12. Fit the back cleat in place against the tail ends of the side cleats, making their upper edges flush. Fasten the back cleat to the side cleats using #10 x 2-1/4" flathead wood screws set in pilot holes counterbored to a depth of at least 1/2".
13. Hold the back frame in position between the sides with its lower rail pressed firmly against the back cleat. Mark the side frames along the rear edge of the back. Remove the back frame and install the back supports using glue and #8x1-1/4" flathead wood screws, countersunk or slightly counterbored. Then fasten the back frame in place by running screws through its bottom rail into the back cleat and through the supports into its stiles.
14. Do all final sanding, then finish the chair frame as desired.
15. When the finish has dried, mount band irons to the cleats with

LIST OF MATERIALS

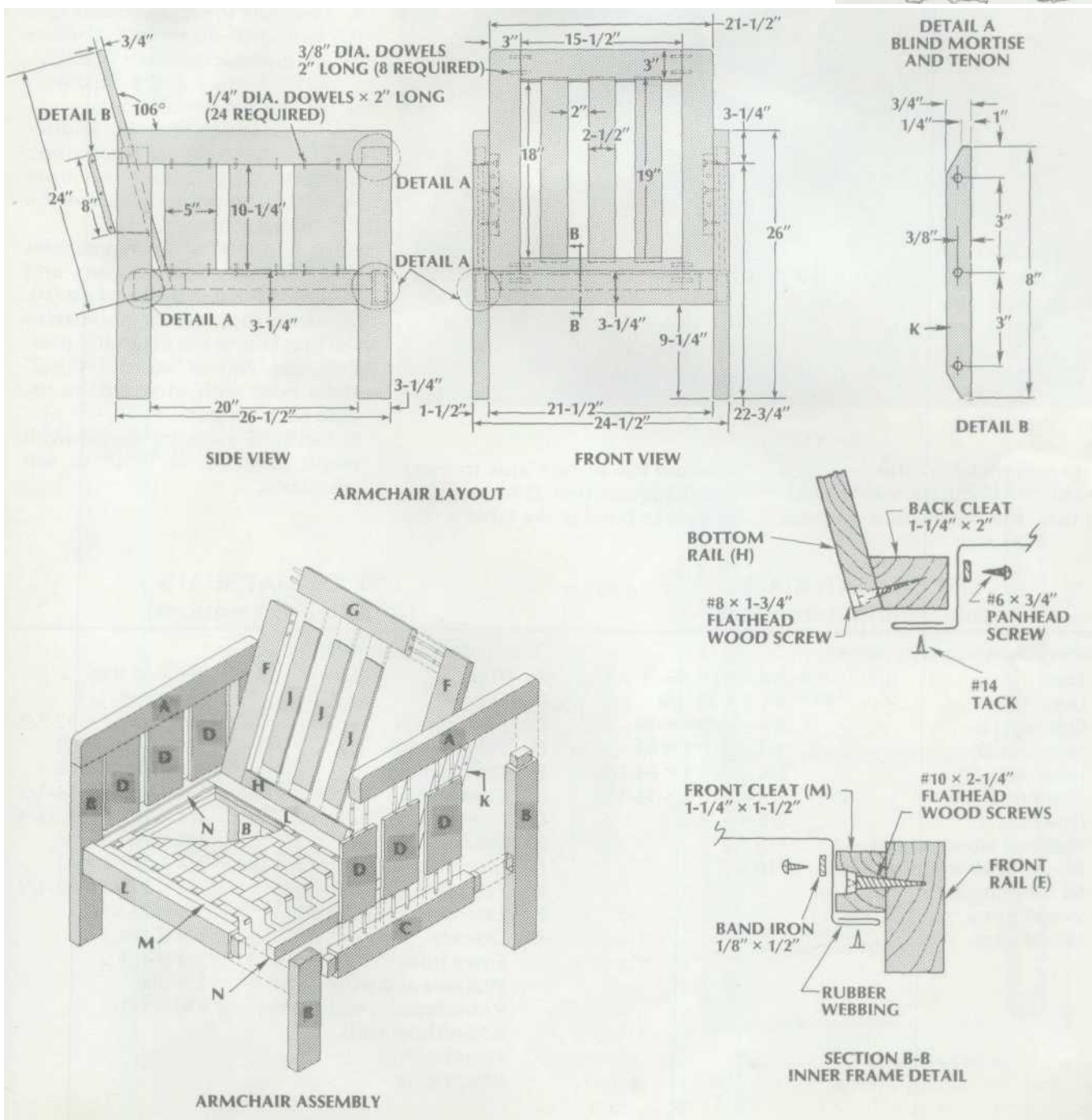
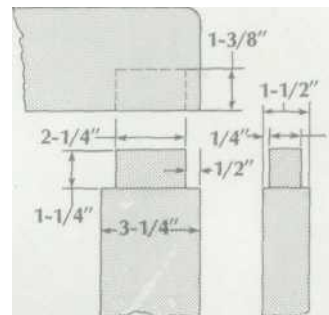
(finished dimensions in inches)

A Arms (2)	1-1/2 x 3-1/4 x 26-1/2
B Legs (4)	1-1/2 x 3-1/4 x 24
C Side rails (2)	1-1/2 x 3-1/4 x 22-1/2
D Side panels (6)	1/2 x 5 x 10-1/4
E Front rail	1-1/2 x 3-1/4 x 24
F Back stiles (2)	3/4 x 3 x 24
G Back top rail	3/4 x 3 x 15-1/2
H Back bottom rail	3/4 x 3 x 15-1/2
J Slats (3)	3/8 x 2-1/2 x 19
K Back supports (2)	3/4 x 3/4 x 8
L Back cleat	1-1/4 x 2 x 21-1/2
M Front cleat	1-1/4 x 1-1/2 x 19
N Side cleats (2)	1-1/4 x 1-1/2 x 17-1/2
Dowels	1/4 dia. x 2
Dowels	3/8 dia. x 2
Flathead wood screws	#10 x 2-1/4
Flathead wood screws	#8 x 1-3/4
Flathead wood screws	#8 x 1-1/4
Panhead wood screws	#6 x 3/4
Tacks	
Dowel plugs or wood putty	
Band irons	
Rubber webbing	
Wood glue	

#6 x 3/4" panhead screws. Do not screw the irons tight against the cleats; leave a 1/16" gap to pull the rubber webbing through. 16. Mark the proper spacing of the rubber webbing strips. Starting on one side, pull one strip through, double the end over, and tack fast. Repeat for each strip.

17. Stretch the strips across to the other side, and feed the end between the iron and cleat. Pull tight, then double the ends over and tack. Repeat this procedure for stretching the strips from front to back. Remember to interweave the webbing as shown.

18. Buy or make cushions to fit the armchair.



192

PARSONS TABLE



This parsons table offers a surface area of 19-1/4 square feet. By adding two table extensions, you can increase the surface area to more than 32 square feet. Either way you choose to build it, the table is sure to be a welcome addition to your dining room or kitchen.

1. Cut all pieces to size according to the dimensions given.
2. Drill 3/8"-diameter dowel holes in the legs, side rails (D) and end rails (C), as shown.

3. Construct the frame (C,E,F) using 6d finishing nails, then nail and glue the top (A) in place. Be sure to fill all nail holes with wood putty.

4. Assemble the legs and side rails (D) with 3/8"-diameter x 2" dowels, glue, and screws (see Detail A).

NOTE: Steps 5 and 6 deal with tables that have extensions.

5. The extension table has shorter end rails (C) to allow the extension supports (G) to extend out from the ends. The supports receive the

extensions as shown.

6. Drill four 9/16"-diameter holes in each extension support and matching holes in the brackets (H). When the supports are mounted to the brackets in the extended position, use two or more 1/4" x 2" stove bolts with wing nuts to secure each support.

7. Sand all surfaces. Cover with plastic laminate or finish to suit your taste.

LIST OF MATERIALS (Table without Extensions)

(finished dimensions in inches)

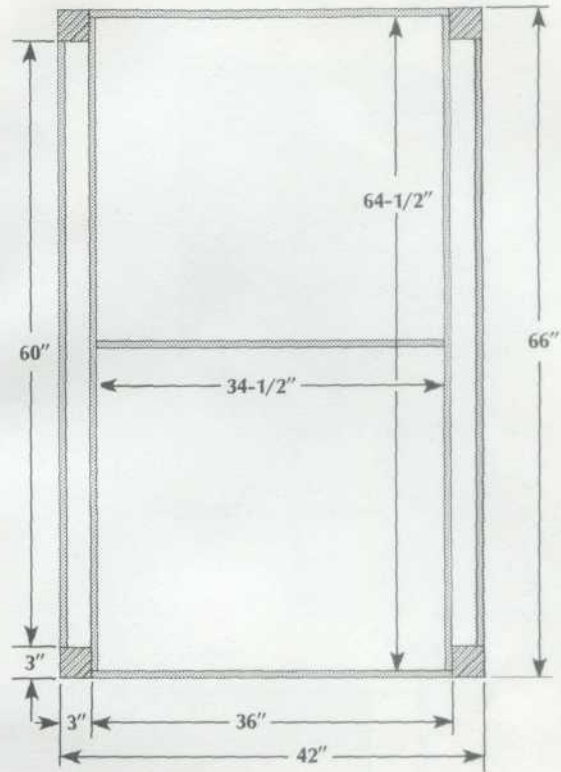
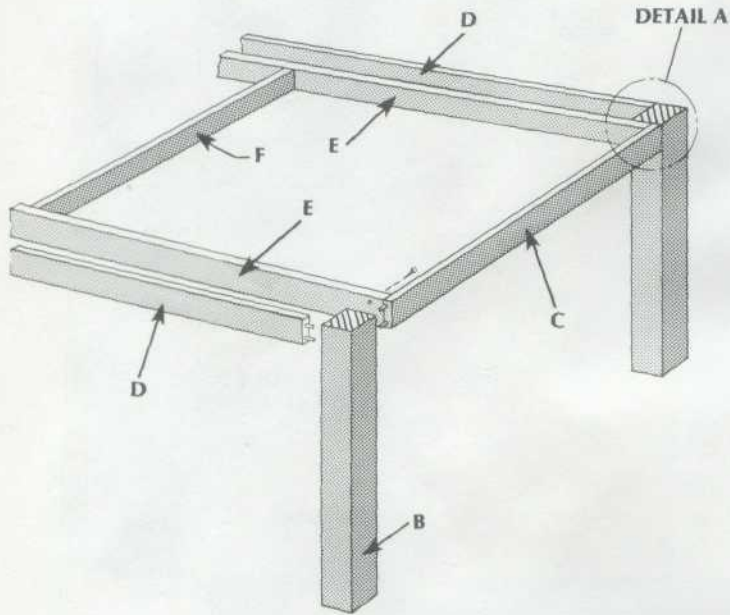
A Top	3/4 x 42 x 66
B Legs (4)	3 x 3 x 28-1/4
C End rails (2)	3/4 x 2-1/4 x 36
D Side rails (2)	3/4 x 2-1/4 x 60
E Inner rails (2)	3/4 x 2-1/4 x 64-1/2
F Center rail	3/4 x 2-1/4 x 34-1/2
Dowels	3/8 dia. x 2
Flathead wood screws	#10 x 2
Roundhead wood screws	#10 x 2
6d finishing nails	
Wood putty	
Wood glue	

LIST OF MATERIALS (Table with Extensions)

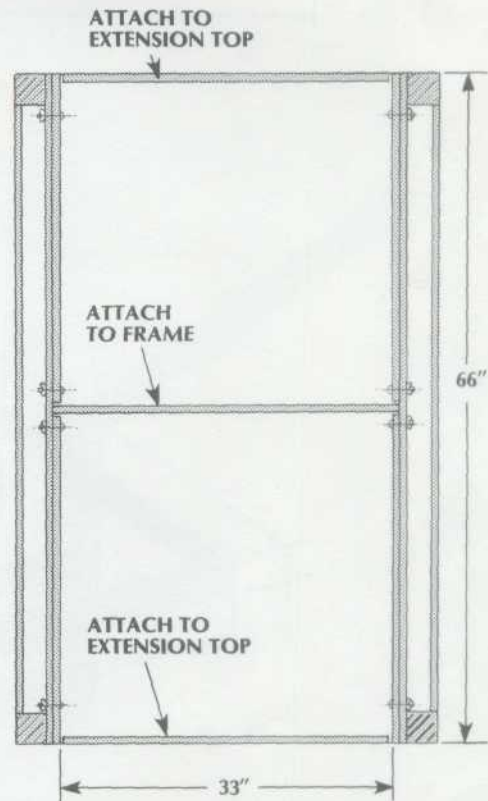
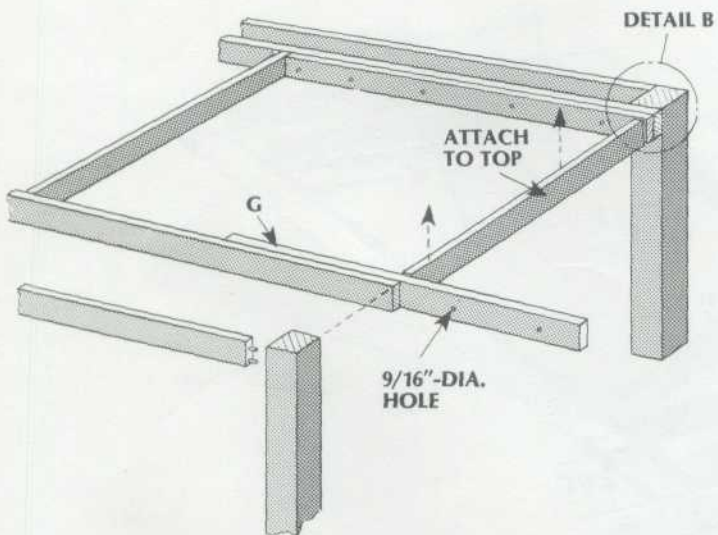
(finished dimensions in inches)

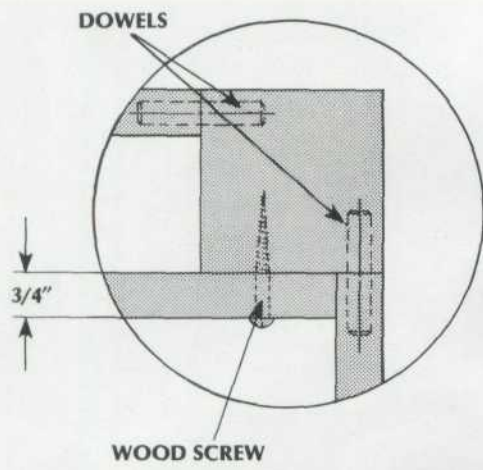
A Top	3/4 x 42 x 66
B Legs (4)	3 x 3 x 28-1/4
C End rails (2)	3/4 x 2-1/4 x 32-7/8
D Side rails (2)	3/4 x 2-1/4 x 60
E Inner rails (2)	3/4 x 2-1/4 x 66
F Center rail	3/4 x 2-1/4 x 34-1/2
G Extension supports (4)	3/4 x 2-1/4 x 32-3/4
H Brackets (8)	3/4 x 2 x 16
J Extension side rails (2)	3/4 x 2-1/4 x 42
K Extension end rails (4)	3/4 x 2-1/4 x 22-1/4
L Extension tops (2)	3/4 x 23 x 42
Dowels	3/8 dia. x 2
Stove bolts	1/4 dia. x 2
Washers and wing nuts	1/4 dia.
Roundhead wood screws	#10 x 1-1/2
6d finishing nails	
Wood putty	
Wood glue	

FRAME ASSEMBLY DIAGRAM
(WITHOUT EXTENSION)

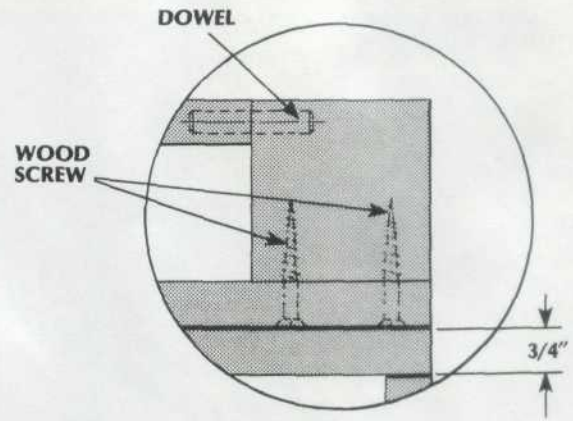


FRAME ASSEMBLY DIAGRAM
(WITH EXTENSION)

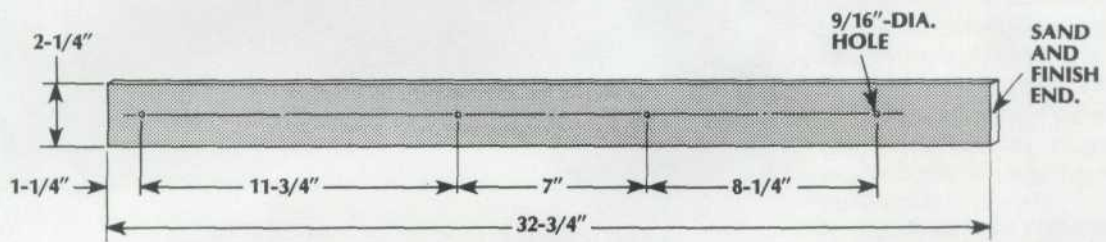




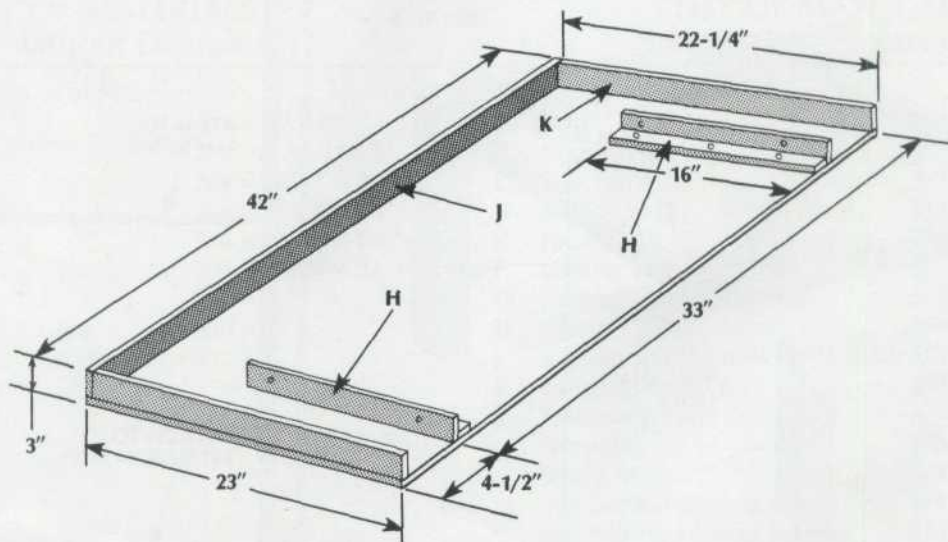
DETAIL A
(WITHOUT EXTENSION)



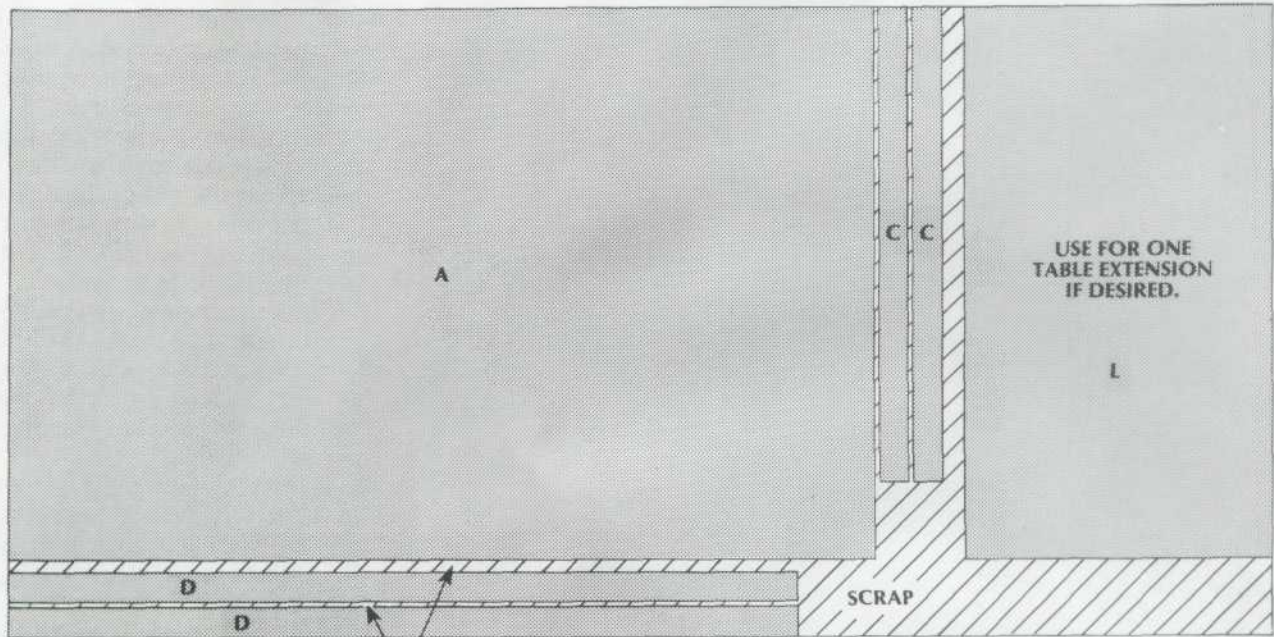
DETAIL B
(WITH EXTENSION)



EXTENSION
SUPPORT (G)



EXTENSION
DETAIL



NOTE: AMPLE ALLOWANCE NEEDED FOR SAW KERF.

3/4" x 4' x 8' PLYWOOD CUTTING LAYOUT

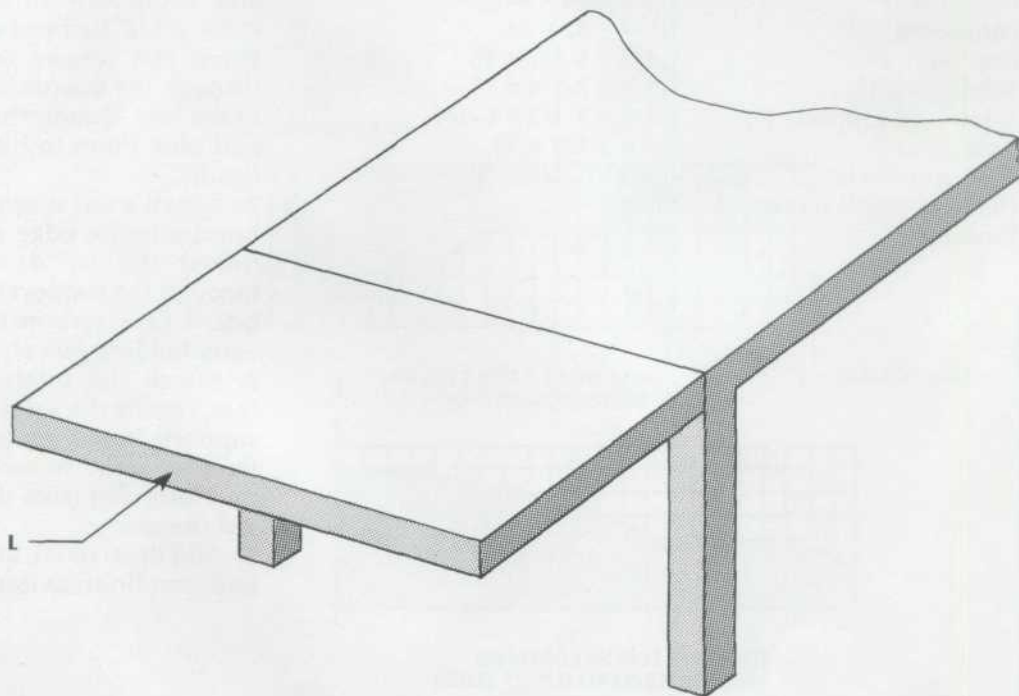


TABLE EXTENSION IN MOUNTED POSITION

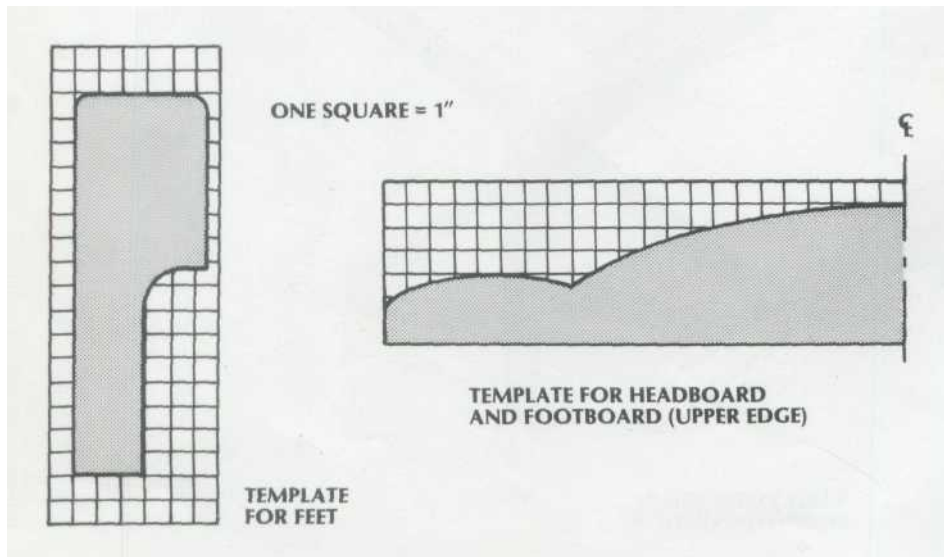
193
TWIN BED



LIST OF MATERIALS

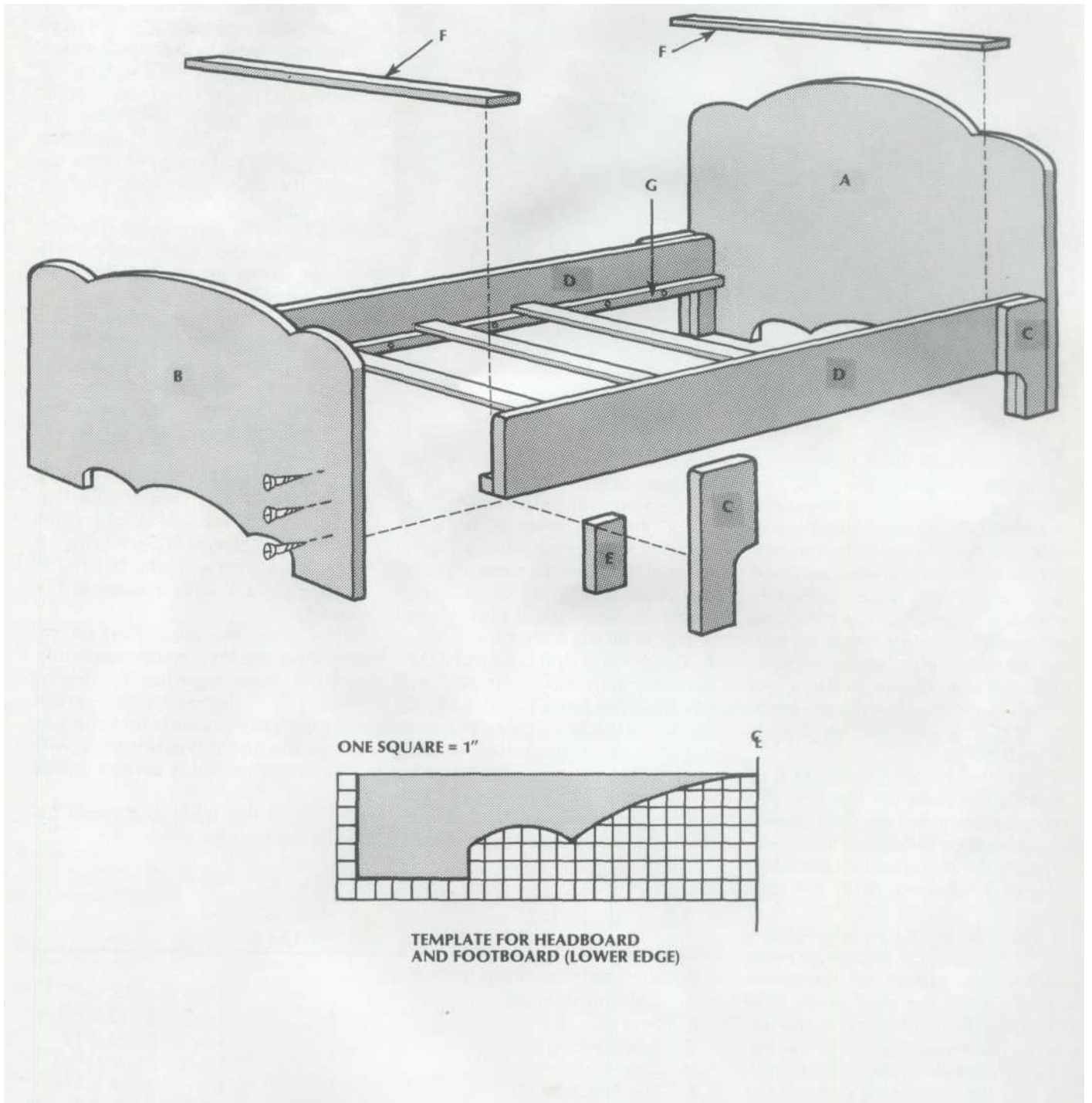
(finished dimensions in inches)

A	Headboard	1-1/2 × 38 × 44
B	Footboard	1-1/2 × 32 × 44
C	Feet (4)	1-1/2 × 5-1/2 × 16
D	Sideboards (2)	1-1/2 × 7-1/4 × 75
E	Sideboard supports (4)	1-1/2 × 3-1/2 × 6-3/4
F	Slats (5)	3/4 × 3-1/2 × 38
G	Slat supports (2)	1-1/2 × 1-1/2 × 75
	Flathead wood screws	#10 × 2-1/2
	Wood glue	



The basic design of this twin bed is very simple and sturdy. While templates are provided for the headboard and footboard, you can create your own pattern if you prefer. In fact, it might be a good idea to select a mattress first and then adjust the dimensions to fit.

1. Make full-size templates for the headboard (A) and footboard (B) using the patterns provided.
2. Glue up a pair of panels for the headboard and footboard from 2 x 6 and/or 2 x 8 stock. When the glue has dried, sand the panels smooth and cut them to the dimensions given.
3. Transfer the template designs to the panels. Cut out the headboard and footboard pieces, then sand their edges smooth.
4. Cut the remaining pieces to size using the dimensions provided.
5. Attach a sideboard support (E) to each foot (C) using flathead wood screws. Make two right-facing feet and two left-facing feet.
6. Fasten the feet to the headboard and footboard using glue and #10 x 2-1/2" flathead wood screws. Drive the screws counterbored through the boards into the edges of the feet. Counterbore the holes and plug them to hide the screw heads.
7. Attach a slat support (G) to the bottom inside edge of each sideboard (D) by driving screws through the support into the sideboard. Counterbore the screws for extra holding power.
8. Attach the sideboards to the feet, resting the sideboards on the supports inside the feet. Use four flathead wood screws at each corner, fastening from the inside. Do not use glue.
9. Add the slats (F), sand the entire bed, and finish as desired.



194
READING TABLE



Here is a basic table design that can accommodate many uses. The table shown in the photo was made of redwood and assembled using waterproof glue and galvanized fasteners. Because it was designed to serve as a deck table, it is somewhat low in height. However, you can easily substitute other woods, use standard glue and fasteners, and raise the column height a few inches to create a handsome reading or dining table for the interior of your home.

1. Use the pattern provided to make a template for the feet (B), then lay them out on the lumber. By alternating directions and overlapping the feet, you can cut them out of 2 x 8 stock with minimal waste.

2. Form the top (D) by edge-gluing three pieces of 2 x 8 stock (or more numerous pieces of narrower stock). After the glue dries, sand the panel flat and trim it to the finished dimensions given in the list. Round overall edges with a router.

3. Cut the remaining parts to the dimensions provided.

4. Arrange the column sides (A) with their edges chasing each other, then fasten them into square columns using wood glue and 3d finishing nails. Set the nails just below the surface.

5. On the stretcher face of each column, center and drill a pair of 5/16"-diameter pilot holes, one 2-1/2" and the other 5" from the bottom. Center and drill a pair of holes of the same diameter through the remaining faces of each column; locate these holes 1" and 3-1/2" from the bottom.

6. Center and drill a pair of 7/32"-diameter pilot holes into each end of the stretcher(C) and into the back of each foot, using the same 2-1/2" center-to-center spacing used on the columns. Set the lower holes in the feet 1" above the bottom edge of their backs as indicated in the template pattern. Locate the holes in the stretcher 1" up from the bottom and 1" down from the top edges. Drill these holes as deep as necessary for installing the lag-thread ends of the hanger bolts.

7. Lag the hanger bolts into the feet and the stretcher, then fasten these parts to the two columns. Secure the bolts with lock washers and nuts.

8. Center the top brackets (E) over the column tops and fasten them in place using #8x1-1/2 flathead wood screws.

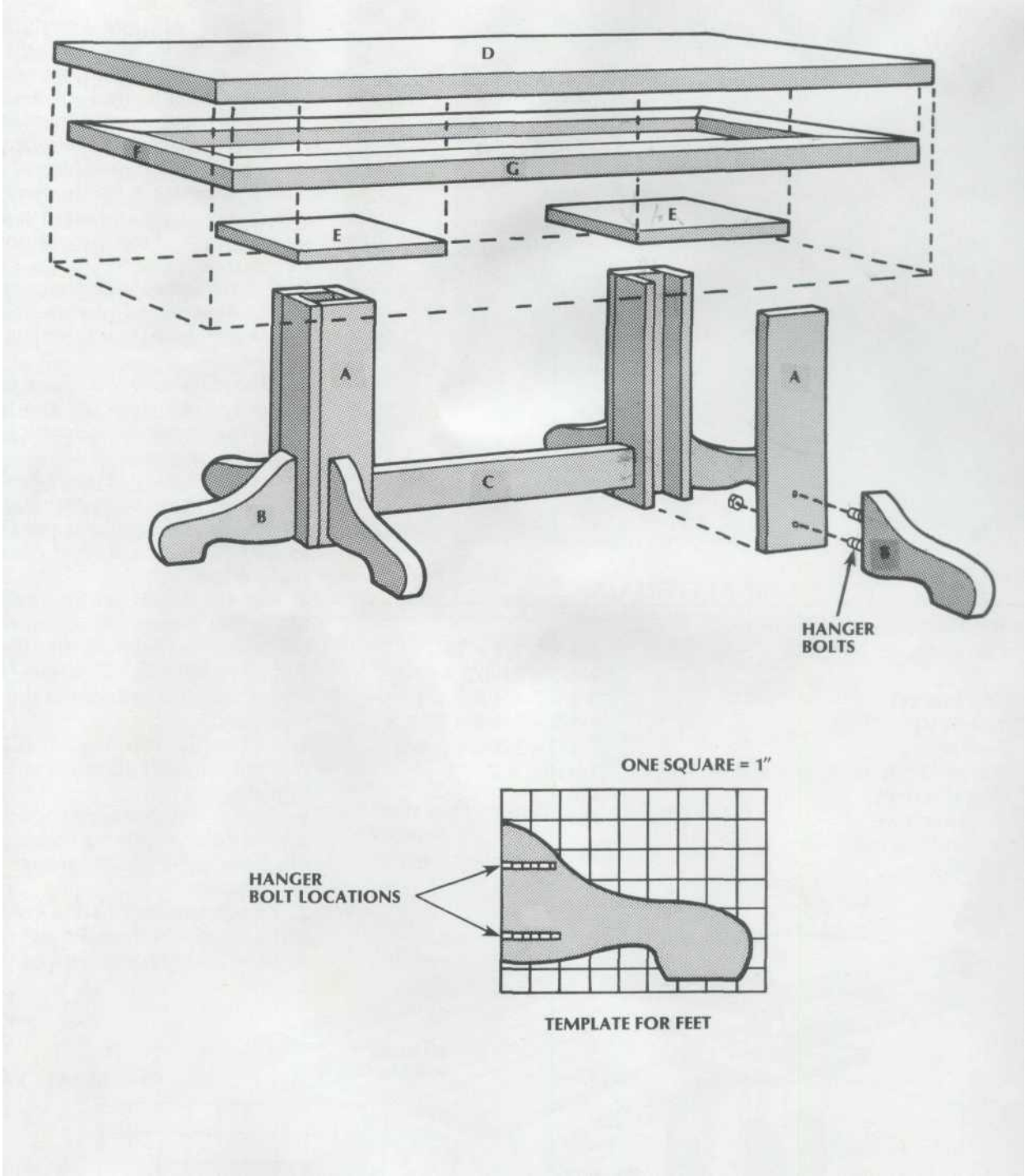
9. Lay the top upside down on a flat surface. Miter the ends of the apron pieces (F, G), then arrange them in a rectangle on the underside of the top. Make sure the apron is centered along the length and width.

10. Fasten the apron to the top using #10 x 2-1/2" countersunk flat-head wood screws. Avoid using glue in this assembly since both the top and apron will tend to expand and contract with changing humidity.

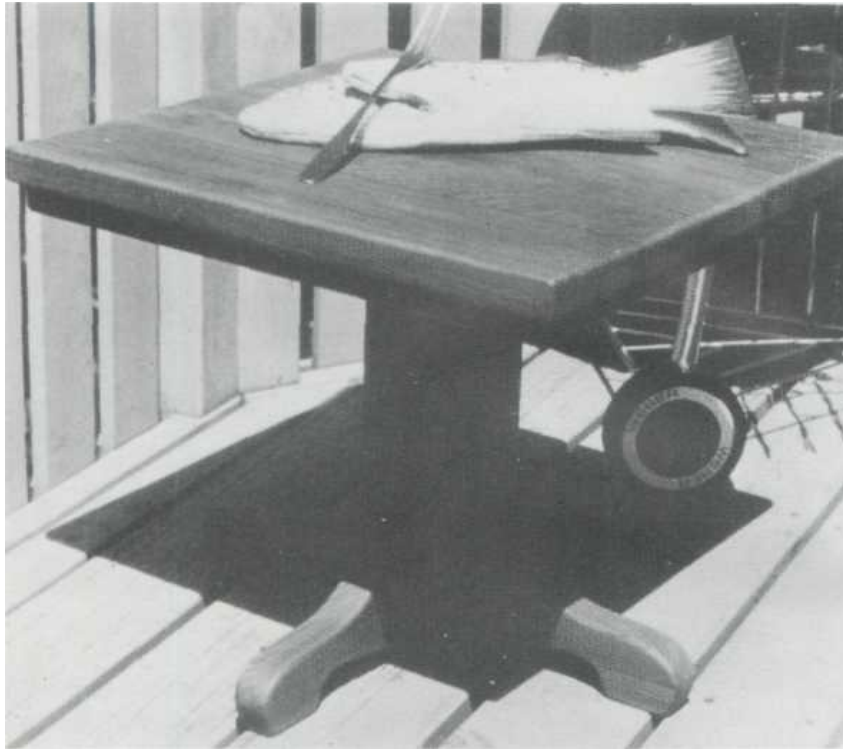
11. Center the apron/top assembly over the leg/column assembly. Fasten them together by driving #8 x 1-1/2" flathead wood screws through the brackets into the top. (You will find this easier to do with the entire assembly turned upside down.)

12. Sand the table and finish according to taste.

LIST OF MATERIALS	
(finished dimensions in inches)	
A Column sides (8)	3/4 x 3-1/2 x 14
B Feet (6)	1-1/2 x 5-1/2 x 8-1/2
C Stretcher	1-1/2 x 3-1/2 x 19
D Top	1-1/2 x 21-1/2 x 44
E Top brackets (2)	3/4 x 7-1/4 x 7-1/4
F End aprons (2)	1-1/2 x 3-1/2 x 18-1/2
G Side aprons (2)	1-1/2 x 3-1/2 x 41
Hanger bolts (with nuts and lock washers)	1/4 dia. x 2-1/2
Wood screws	#8 x 1-1/2
Wood screws	#10 x 2-1/2
3d finishing nails	
Wood glue	



195
END TABLE



This table will add beauty and convenience to any setting, indoors or out. The one shown here was made of redwood and assembled with waterproof fasteners. However, you can use the wood of your choice with conventional fasteners to create a lovely piece of indoor furniture. Adjust the column height and top dimensions to suit your tastes.

1. Cut the pieces to size according to the dimensions provided. Use the pattern to make a template for the feet (E).

2. Glue and screw or nail one edge of the column sides (A) at a time until the column is complete. Check for squareness.

3. Glue up the top (B) from 2 x 8 or narrower stock. After the glue dries, sand the panel flat and cut it to 21-1/2" square. Round over all sharp edges.

4. Cut 45° miters on the ends of the apron pieces (D). Center the pieces on the underside of the top, and drive #10 x 2-1/2" screws from underneath the apron into the top to secure.

5. Center the top bracket (C) on the column, and glue and screw it in place.

6. Center the top/apron assembly on the column, gluing and screwing from underneath through the top bracket.

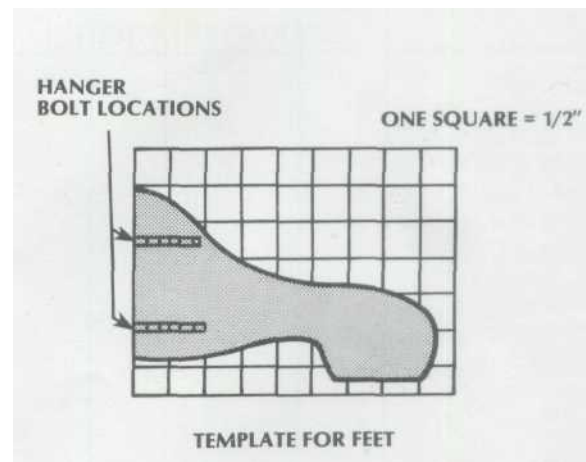
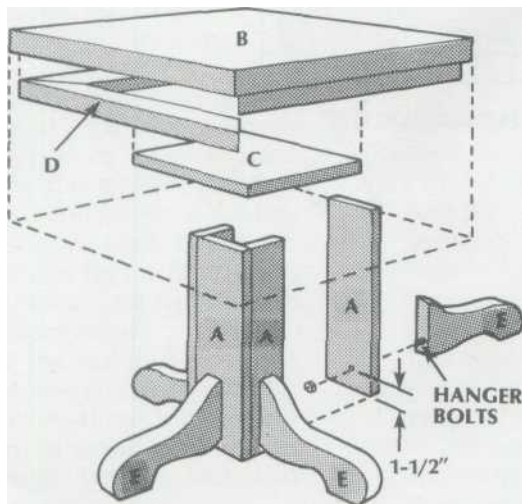
7. Attach the feet to the column using hanger bolts and nuts.

8. Sand and finish as desired.

LIST OF MATERIALS

(finished dimensions in inches)

A	Column sides (4)	3/4 x 3-1/2 x 16
B	Top	1-1/2 x 21-1/2 x 21-1/2
C	Top bracket	3/4 x 7-1/4 x 7-1/4
D	Apron (4)	1-1/2 x 3-1/2 x 20-1/4
E	Feet (4)	1-1/2 x 5-1/2 x 8-1/2
	Hanger bolts, nuts, and lock washers	1/4 dia. x 2-1/2
	Wood screws	#10 x 2-1/2
	Wood screws	#8 x 1-1/2
	3d finishing nails	
	Wood glue	



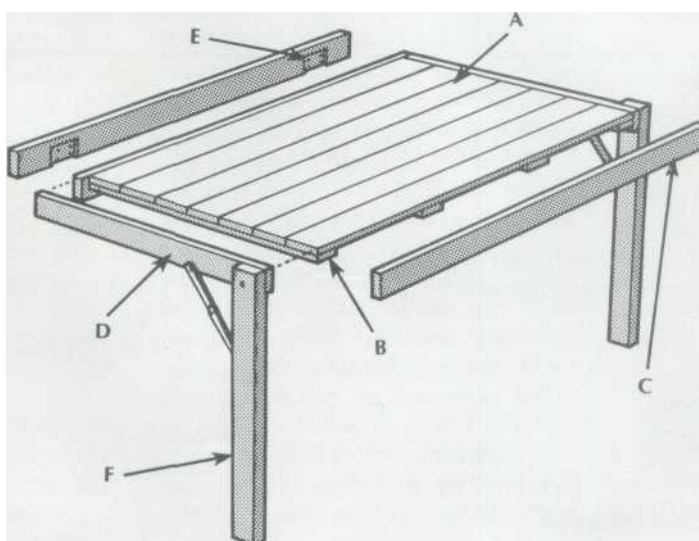
196 **DROP TABLE**



This multi-purpose table drops flush to the wall when not in use. The hinged legs fold out of sight when the table is down, and you can even mount it on a wall to use it as a serving table.

1. Cut the pieces to size according to the dimensions given.
2. Nail the top pieces (A) to the top supports (B), then add the sides (C) and ends (D).
3. Attach the legs (F) with carriage bolts. Use a washer between the leg and the table at the pivot point so the leg can swing up properly for storage.
4. Mount hinges to the table and hinge piece (E). Attach the hinge piece to the wall at the proper leg height as shown.
5. Finish the table according to individual preference.

LIST OF MATERIALS	
(finished dimensions in inches)	
A Top pieces (7)	$3/4 \times 3-1/2 \times 46-1/2$
B Top supports (4)	$3/4 \times 3-1/2 \times 24-1/2$
C Sides (2)	$3/4 \times 3-1/2 \times 48$
D Ends (2)	$3/4 \times 3-1/2 \times 24-1/2$
E Hinge piece	$3/4 \times 3-1/2 \times 48$
F Legs (2)	$3/4 \times 3-1/2 \times 30$
Carriage bolts and washers	$1/4 \text{ dia.} \times 3-1/4$
3d finishing nails	
Collapsible leg supports	



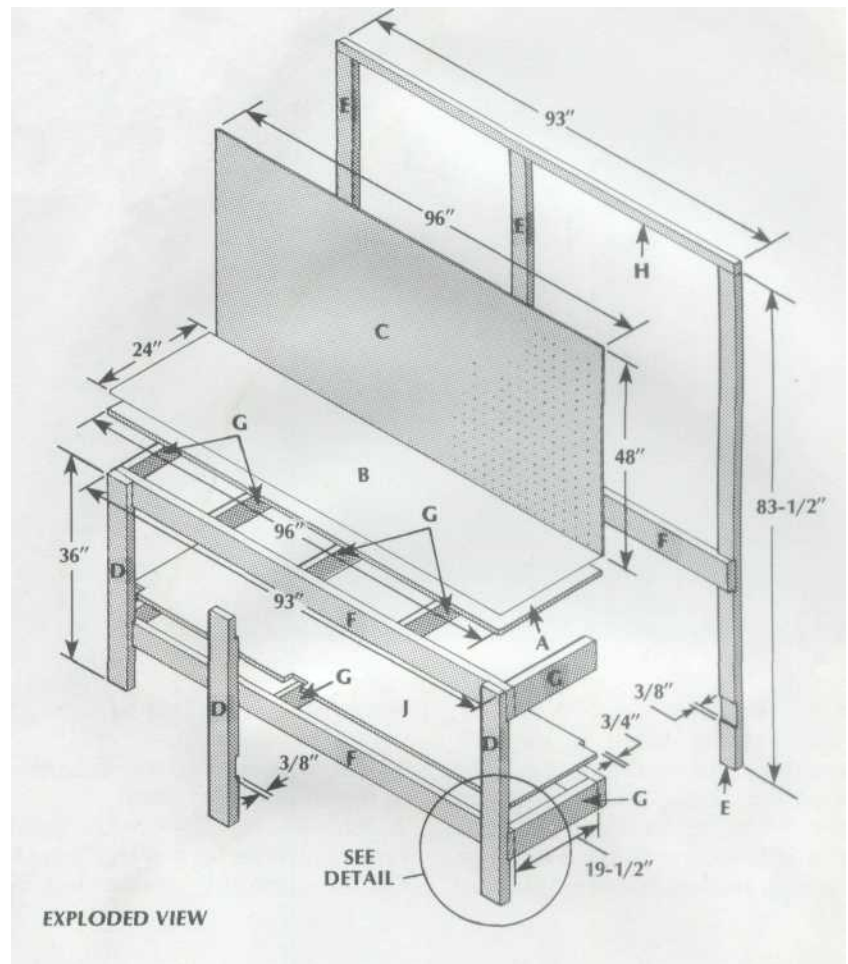
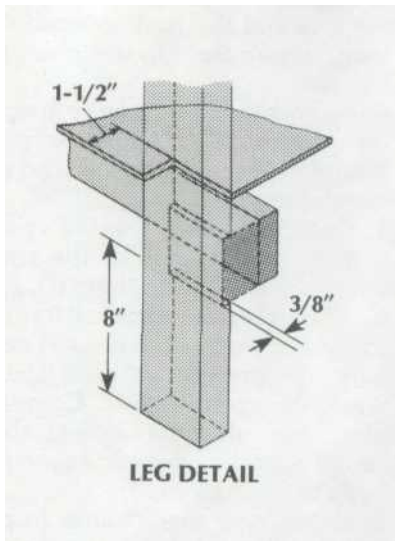
197 WORKBENCH



Any home handyman knows the value of a workbench. This one provides plenty of work space, a large shelf, and a perforated peg-board backing for hanging tools. The tabletop is made of 3/4" waferboard covered with 1/4" hardboard. The workbench shown here is 8' long, but you can make it any length to fit your work space.

1. Cut all pieces to size according to the dimensions given.
2. Assemble the support frames (F) for the tabletop (B) and the shelf (J) by fastening the fronts and backs to the crosspieces (G) using 12d nails. In both cases, position one crosspiece at each end and one across the middle. Add two more crosspieces to the top frame to help stiffen the tabletop work surface.
3. Cut a 3-1/2"-wide x 3/8"-deep rabbet across the top of each front leg (D) for fitting the top frame on the legs. Then cut dados of the same dimensions at a parallel location across each of the back legs (E). Also, cut parallel dados across each leg about 8" above the bottom for fitting the shelf frame between the legs.
4. Fasten the legs to the frames using #8x2-1/2" flathead wood screws countersunk flush with the leg surface. Use at least two screws per joint and offset them for increased frame stability.

LIST OF MATERIALS	
<i>(finished dimensions in inches)</i>	
A Tabletop base	3/4 x 24 x 96 waferboard
B Tabletop	1/4 x 24 x 96 hardboard
C Backing	1/4 x 48 x 96 perforated hardboard
D Front legs (3)	1-1/2 x 3-1/2 x 36
E Back legs (3)	1-1/2 x 3-1/2 x 83-1/2
F Top and shelf frame fronts and backs (4)	1-1/2 x 3-1/2 x 93
G Top and shelf frame crosspieces (8)	1-1/2 x 3-1/2 x 19-1/2
H Crossbar	1-1/2 x 1-1/2 x 93
J Shelf	3/4 x 23-7/8 x 93 waferboard
Wood screws	#6 x 7/8
Wood screws	#8 x 1-1/2
Wood screws	#8 x 2-1/2
Angle irons	1-1/2 or 2
12d nails	
Construction adhesive	



5. Cut 3-1/2"-wide x 1-1/2"-deep notches in the front edge of the shelf, one at each end and one in the middle, in order to fit the shelf around the front legs. Cut parallel notches of the same width, but 3/4" in depth, on the back edge of the shelf for fitting around the back legs.

6. Insert the shelf between the legs and fasten it to the support frame using #8 x 1-1/2" flathead wood screws, countersunk flush or driven slightly below the shelf surface. If you like, run a bead of construction adhesive along the upper edge of the frame before installing the shelf.

7. Set the tabletop base (A) on the top frame. Push the top against the back legs and center it along the length of the support frame.

8. Clamp or tack the top in place while drilling countersunk pilot holes for #8 screws through it into the frame. Space the holes about 12" apart. If you want to use construction adhesive, remove the top and spread a bead of adhesive on the top of the frame. Then reposition the top and fasten it in place using #8 x 1-1/2" flathead wood screws. Drive all the screws slightly below the surface of the tabletop.

9. Position the tabletop over the base, making all edges flush. Then fasten the top to the base using #6 x 7/8" flathead wood screws, driven slightly below the outer surface. This installation method will allow for periodic replacement of

the tabletop. For permanent installation, apply construction adhesive to the base, position the tabletop over it, and press it flat, then tack it in place.

10. Place the bench in the desired location and shim the legs as needed to make the top completely level and to stabilize the bench. Then use angle irons to fasten the legs to the floor, or run fasteners through the back legs into the wall, or do both.

11. Set the backing (C) on the tabletop. Center it along the length of the bench, then fasten it to the upper section of the back legs and to the crossbar (H) using #6 x 7/8" flathead wood screws.

198
GATELEG TABLE



stationary frame so it will not interfere with the movement of the gate leg.

This gateleg table is elegant enough for indoor dining, yet light enough to be carried outdoors when the occasion arises. It opens up to a surface area large enough to accommodate four people and is the perfect project to show off your craftsmanship.

1. Cut the pieces to size according to the dimensions given.

2. Cut 1/2"-deep x 3-1/2"-wide rabbets on the tops of the legs (A). On the same side of each leg, cut 1/2"-deep x 2-1/2"-wide dados 3" up from the bottom.

3. Round and sand the edges of the legs and the back sides of the long bottom and top stretchers (B, C).

4. Assemble the two large frames using glue and wood screws. Round over the edges and sand the faces of the frames.

5. Cut 3/4"-deep x 1-1/2"-wide rabbets in the ends of the short bottom and top stretchers (D, E).

6. Assemble the four small frames, using glue and two screws at each joint. The stretchers should lap the legs and protrude 1/4". Counter-bore and plug the holes; then round over the edges and sand the faces of the frames.

7. Fasten one small frame to the left side of each large frame. The leg on the small frame should sit against the leg on the large frame as shown. To do this, drive two screws from the back through the stretcher into the top and bottom of each leg.

8. Cut 3/4"-deep x 1-1/2"-wide laps in the ends of the bottom and top side stretchers (F, G). Sand the stretchers; then attach them to the frames using glue and screws. Plug the screw holes.

9. Attach the two remaining small frames to the base using butt hinges. This completes the base of the table.

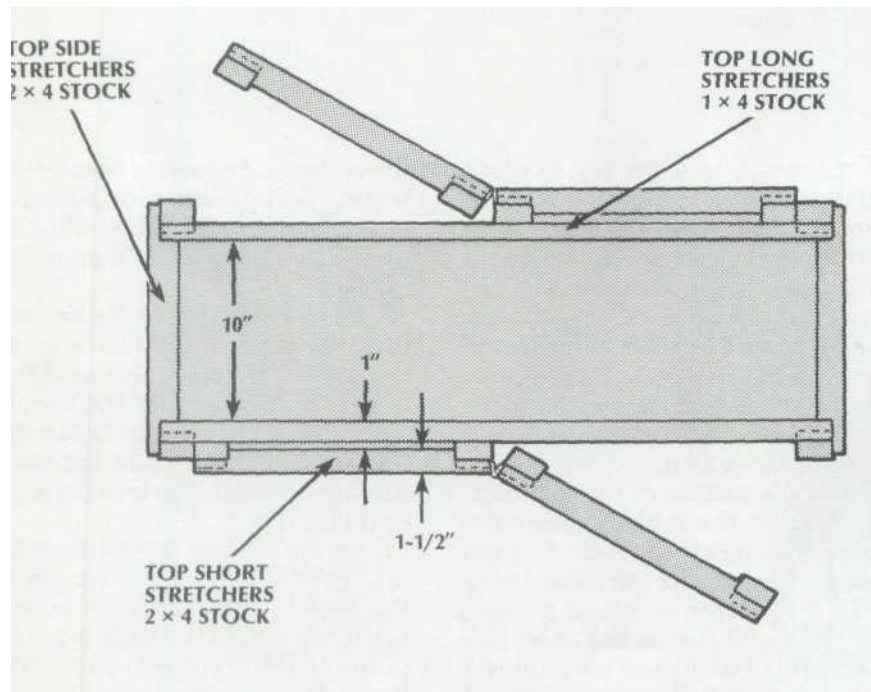
10. Glue up stock for the top and leaf pieces (H, J). The top will overhang the base 1-1/4" on each side to accommodate the hinges.

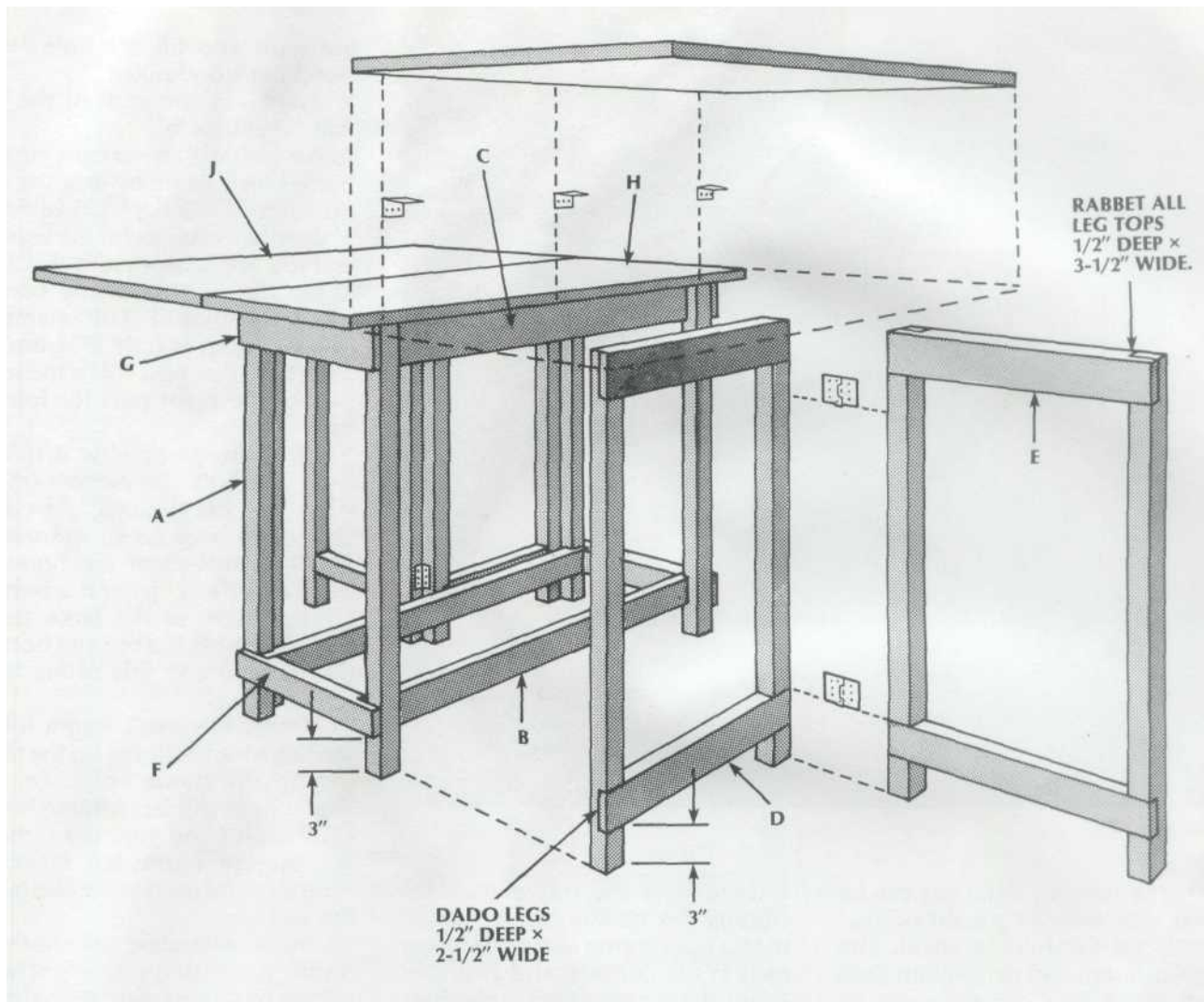
11. Mount the top to the base by screwing and plugging through the top into the stretchers.

12 Use three hinges to attach each

leaf to the center hinge. The center hinge is in front of the

13 Sand the entire table and finish as desired.





LIST OF MATERIALS

(finished dimensions in inches)

A	Legs (12)	1-1/2 x 1-1/2 x 28-1/2
B	Bottom long stretchers (2)	3/4 x 2-1/2 x 38-1/4
C	Top long stretchers (2)	3/4 x 3-1/2 x 38-1/4
D	Bottom short stretchers (4)	1-1/2 x 2-1/2 x 17-1/2
E	Top short stretchers (4)	1-1/2 x 3-1/2 x 17-1/2
F	Bottom side stretchers (2)	1-1/2 x 2-1/2 x 13
G	Top side stretchers (2)	1-1/2 x 3-1/2 x 13
H	Top	3/4 x 17-1/2 x 47-1/2
J	Leaves (2)	3/4 x 18-1/2 x 47-1/2
	Wood screws	#8 x 1
	Tabletop fasteners	
	Brass butt hinges (7)	1-1/2 x 2
	Wood plugs	
	Wood glue	

199
FOLDING TRAY



This generously sized tray can be used separately or placed permanently on the folding stand. The classic design and rich walnut goes well with either contemporary or country furnishings.

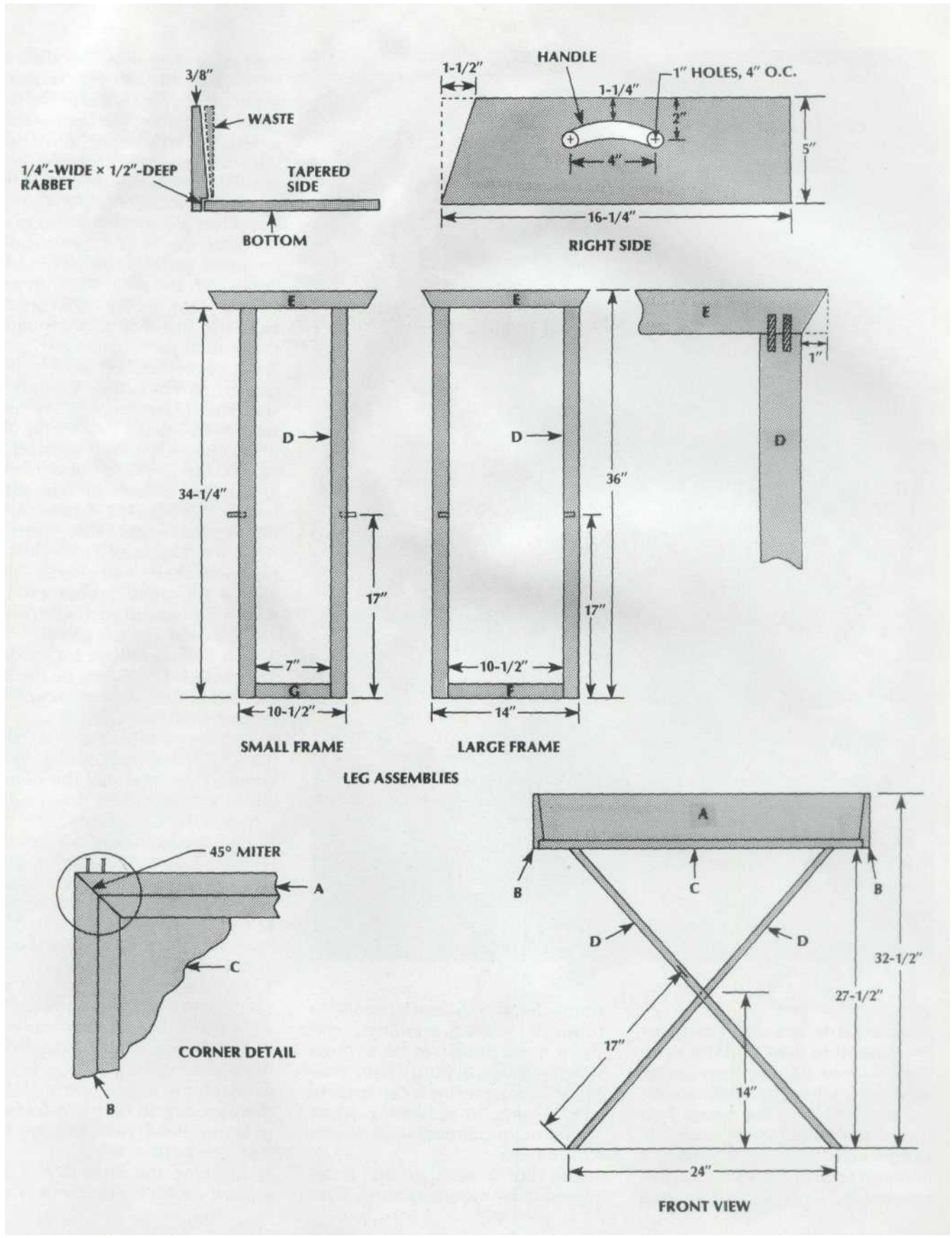
1. Cut all stock to size according to the dimensions provided.
2. Glue up random width stock to make the tray bottom (C) slightly oversized. When the glue has dried, sand on both sides and trim the bottom to final size.
3. Miter the corners for connecting the back (A) and the tray sides (B). Cut 1/4"-wide x 1/2"-deep rabbets on the lower inside edges of the back and sides. Taper the inner face on each piece down to 3/8" thickness, beginning the taper at the top of the rabbet as shown.
4. Drill and cut out the handholes on the tray sides as shown.

5. Final sand the tray pieces, including the handholes. Assemble the tray using glue and 4d finishing nails at the corners, and glue and 2d finishing nails through the bottom into the sides. Pre-drill all nail holes for easier construction; set

the nails and fill the holes with matching wood putty.

6. Angle-cut the ends of the top rails (E) as shown.
7. Assemble the narrow inside frames first. Begin by locating and drilling 1/4"-diameter dowel holes 1" deep at the joints for the legs (D) and top and bottom rails (E, G).
8. On the outside of the narrow frame legs, drill 1/4"-diameter holes 1" deep exactly 17" from the bottom of the legs. This is the location of the pivot pins for folding the stand.
9. Glue the pivot pins in place, then assemble the narrow frame. Glue the dowel joints and clamp until dry. Check for squareness.
10. Drill 1/4"-diameter holes 1" deep exactly 17" from the bottom of the inside of the large frame legs. Assemble the top and bottom (F) rails and one side of the large frame.
11. Insert the small frame inside the large frame, lining up the pivot pins in the frame holes. Do not glue pins in the large frame legs.
12. Position and glue the remaining outside frame leg in place. Sand all stand parts at the joints and the surface.
13. Finish with clear polyurethane finish. When dry, you might want to tack or staple fabric strapping to the underside of the top rails so the frame opens up to 24" in width.

LIST OF MATERIALS	
(finished dimensions in inches)	
A Back	3/4 x 5 x 30
B Tray sides (2)	3/4 x 5 x 16-1/4
C Tray bottom	1/2 x 16 x 29
D Legs (4)	3/4 x 1-3/4 x 34-1/4
E Top rails (2)	3/4 x 1-3/4 x 16
F Bottom rail	3/4 x 1-3/4 x 10-1/2
G Bottom rail	3/4 x 1-3/4 x 7
Grooved dowel pivot pins	1/4 dia. x 2
Fabric strapping	1-1/2 x 2 x 32
2d finishing nails	
4d finishing nails	
Wood putty	
Wood glue	



200 PLANT SHELF



Smart gardeners don't wait for the ground to thaw and the air to warm before starting their spring gardening. The first seeds are always sown inside the house in a spot that gets plenty of sunshine. Unfortunately, space is usually a limiting factor in most seed starting operations. Only a few windows normally get sufficient sunshine to produce healthy seedlings, and there never seems to be enough window ledge to satisfy your aspirations. However, you can expand your pre-season gardening space with the suspended seed starter shown here.

This four-tiered shelf unit is designed to be mounted into a standard window frame. The shelves, which are removable to facilitate larger plants, are supported by two metal side frames. The bottom shelf is designed to rest on the window sill; consequently, this and all other shelf dimensions must be sized

to your particular window. The unit receives plenty of light, takes up no floor space, and can be dismounted easily when not in use. Tools, soil, and miscellaneous gardening materials are conveniently stored in the two drawers under the bottom shelf.

1. To begin building your indoor garden, start by cutting the bottom shelf back (A) to length. Cut a 1/2"-wide x 3/8"-deep groove in the back, one inch from the top edge, to hold the plywood bottom.

2. Cut the bottom shelf sides (B) to length. Cut a 1/2"-wide x 3/8"-deep groove in each side, one inch from the top edge, to hold the plywood shelf. Machine a 3/4"-wide x 3/8"-deep rabbet on the back inside end of each side piece. Make a right and left piece.

3. Cut a blind rabbet 3/4" wide x 3/8" deep x 1-1/2" long on the uncut end of each side to accept the bottom shelf front (D).

4. Cut the middle drawer support (C) and the drawer glides (E) to length. Glue and nail the drawer glides to the middle drawer support and the side pieces.

5. Cut the bottom shelf front to length. Cut a 1/2"-high x 3/8"-deep rabbet in the bottom inside edge to accept the plywood shelf.

6. Cut the bottom shelf (F) to size. Assemble the shelf unit parts using glue and 5d finishing nails.

7. Cut the drawer fronts (G) and sides (H) to length. Machine a 3/4"-wide x 3/8"-deep rabbet on each end of the drawer fronts to accept the drawer sides.

8. Machine a 1/4"-wide x 3/8"-deep groove on each drawer front to accept the drawer bottom, 1/4" from the bottom edge.

9. Machine the same 1/4" x 3/8" groove on each side piece. Cut a

LIST OF MATERIALS

(finished dimensions in inches)

A	Bottom shelf back	3/4 × 5-1/2 × 35-1/4
B	Bottom shelf sides (2)	3/4 × 5-1/2 × 18
C	Middle drawer support	3/4 × 4 × 17-1/4
D	Bottom shelf front	3/4 × 1-1/2 × 35-1/4
E	Drawer glides (4)	3/8 × 3/4 × 16-7/8
F	Bottom shelf	1/2 × 17-1/4 × 35-1/4 plywood
G	Drawer fronts (2)	3/4 × 4 × 16-7/8
H	Drawer sides (4)	3/4 × 4 × 16-7/8
J	Drawer backs (2)	3/4 × 3-1/2 × 16-1/8
K	Drawer bottoms (2)	1/4 × 16-1/8 × 16-7/8 plywood
L	Shelf fronts and backs (6)	3/4 × 1-1/2 × 35-1/4
M	Top shelf ends (2)	3/4 × 1-1/2 × 7
N	Middle shelf ends (2)	3/4 × 1-1/2 × 10-1/2
P	Lower shelf ends (2)	3/4 × 1-1/2 × 14
Q	Top shelf	1/4 × 6-1/4 × 35-1/4 plywood
R	Middle shelf	1/4 × 9-3/4 × 35-1/4 plywood
S	Lower shelf	1/4 × 13-1/4 × 35-1/4

1/4"-dia. steel rod
 Finishing nails
 Roundhead wood screws
 Clear silicone caulk
 Wood glue

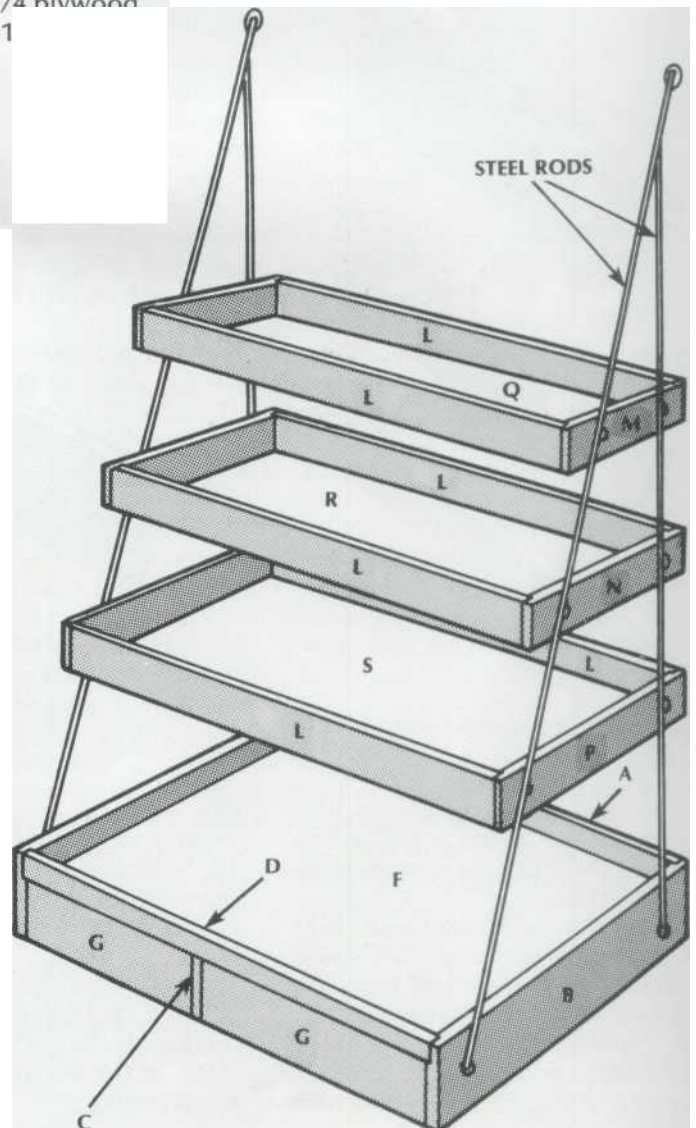
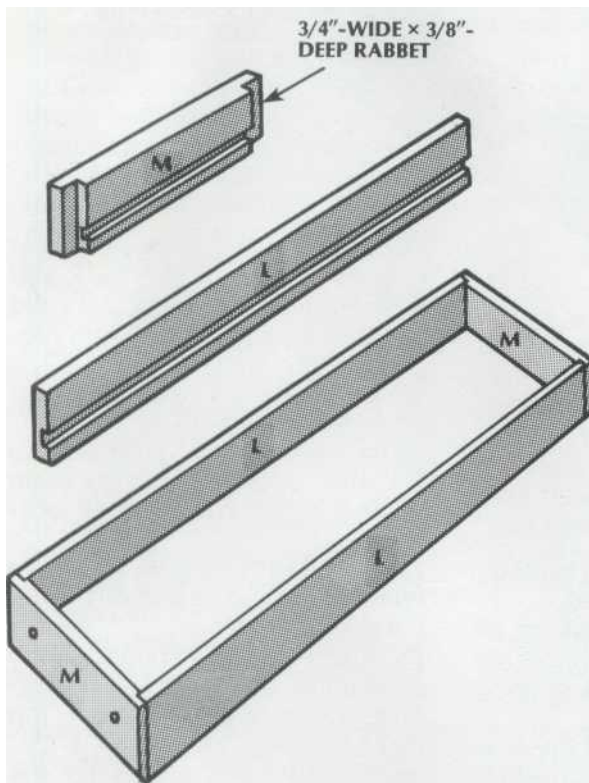
3/4"-wide x 3/8"-deep groove on the outside face of each drawer side for the drawer glides.

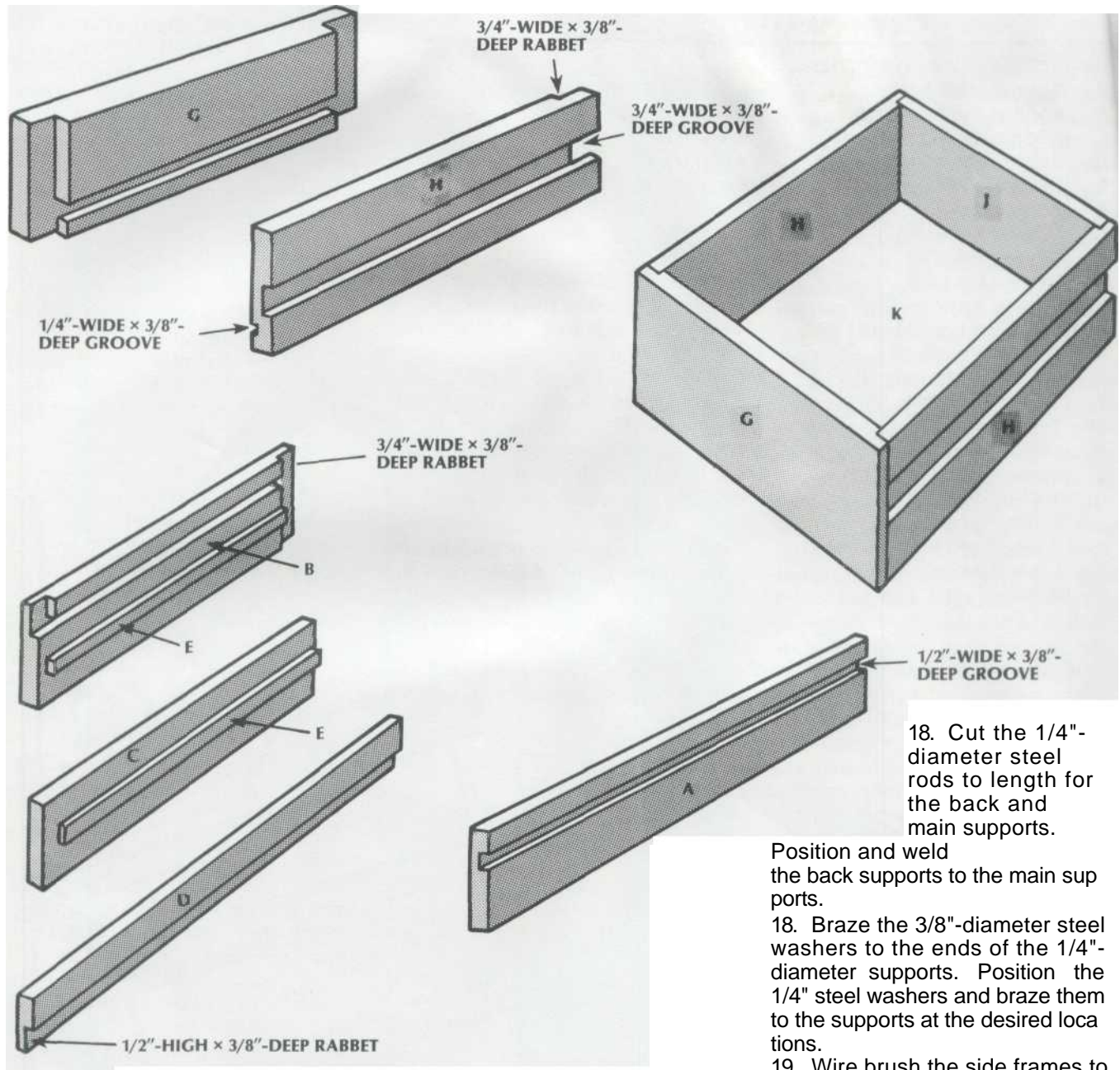
10. Machine a 3/4"-wide x 3/8"-deep rabbet on the end of each side piece to accept the back panel.

11. Cut the drawer backs (j) and drawer bottoms (K) to size.

12. Assemble the drawer sides, front, back, and bottom with glue and nails. Note that the back must be installed flush at the top; also, the bottom cannot be glued; it must always be nailed.

13. Cut the top, middle, and lower shelf ends (M, N, P) to length. Machine a 3/4"-wide x 3/8"-deep rabbet





18. Cut the 1/4"-diameter steel rods to length for the back and main supports.

Position and weld the back supports to the main supports.

18. Braze the 3/8"-diameter steel washers to the ends of the 1/4"-diameter supports. Position the 1/4" steel washers and braze them to the supports at the desired locations.

19. Wire brush the side frames to remove loose scale and dirt. Paint the side frames.

20. Attach the side frames to the shelf units. Use #12 x 3/4" round head wood screws for the top three shelves and #12x1-1/4" roundhead wood screws for the shelf with drawers.

21. Mount the unit to the window with #14 x 2-1/2" wood screws.

bet on each end of the pieces. Machine a 1/4"-wide x 3/8"-deep groove 1/4" from the bottom edge of each piece.

14. Cut the shelf fronts and backs (L) to length. Machine a 1/4"-wide x 3/8"-deep groove 1/4" from the bottom edge of each piece.

14. Cut the top, middle, and lower shelf bottoms (Q, R, S) to size. Assemble all the shelf elements with

glue and nails, except the bottom, which should not be glued.

16. Machine a 1/4" radius on all sharp edges of the shelf frames, or round them over with a sanding block.

16. Sand all surfaces and finish as desired; polyurethane varnish is recommended. Caulk the inside joints of the shelves with clear silicone caulking.

Teddy Bear Bank



When I was a kid about six years old or so, I was obsessed with money! Or as my brothers would have said—still say—I was a "Mr. Mean," a scrooge, a **tightwad**, a hoarder, a miser. Whenever my relatives came around for a visit, I would smile and give kisses, and generally do all the things most kids of that age hate to do, in the hope that my oh-so-wonderful behavior would put me in line for a monetary handout.

It rarely failed! When the moment came to say good-bye, my sycophantic behavior usually paid off, with my dotting uncles and aunts vying with each other to give me all their loose change. The funny thing was, I didn't really care about the money as such, I simply enjoyed putting coins in my automated money box!

This project draws its inspiration from my long-gone toy—when the lever is pushed down, it causes the coin

to fall through the slot, and causes the bear to raise his arm and nod his head.

MAKING THE TEDDY BEAR BANK

Having studied the working drawings for making the box and carefully selected your wood, set out the various dimensions and cut out the ten component parts—the four sides, the base, the top and the four inside-corner fillets. Cut the rabbets at the corners and glue up. Round over the edges of the base and lid with a quarter-curve profile and fit with countersunk screws.

Trace the side-view profile of the bear through to your chosen wood—best if it's a soft easy-to-carve timber like lime, jelutong or basswood—and cut it out on the scroll saw. Rerun this procedure for the front views. You should finish up with six parts—the head, the body, two arms

and two legs. Drill 1/2"-diameter holes down through the body, up into the head, through the shoulder and into the arm, and fit stubs of 1/2"-dowel for the neck and for the jointed arm.

When you have made the basic parts for the bear, use a knife to swiftly whittle the cutouts to shape. Don't try for anything fancy, just go for uncomplicated and stylized chunky forms.

Finally, having first used a scalpel and sandpaper to tidy up and create a good finish, use a dash of black acrylic paint to detail the nose, eyes and mouth.

PUTTING IT TOGETHER

Once you have made the box and all the parts that go to make the bear, then comes the difficult task of putting the whole thing together. It's not so much that any single

MATERIALS LIST—

TEDDY BEAR

A Head (1)	2"×2"×2"
B Body (1)	2"×2"×3"
C Arms (2)	1"×3/4"×3"
D Legs (2)	3/4"×2"×3"

Note that all the above pieces are oversize and allow for cutting waste.

BOX

E Front (2)	3"×4 1/4"×6 1/2"
F Shaft plates (2)	1/4"×2"×2"
G Top (1)	1/2"×5 1/2"×7 1/2"
H Bottom (1)	1/2"×5 3/4"×7 3/4"
I End (2)	3/8"×5"×4 1/4"
J Corner fillets (4)	5/8" triangular section at 4 1/2" long

HARDWARE AND EXTRAS

- K Drive shaft (1) broomstick dowel—cut to fit
- L Slot and lever bars (2) 1/4" dowel—cut to fit
- M Strong cord—to fit
- N Brass screws—various
- O Small quantity of black acrylic paint

Note that all box measurements are to size.

stage is difficult, but that everything has got to be just right. If one of the control strings is too slack, or the shaft is too tight, or whatever, then the movement won't work.

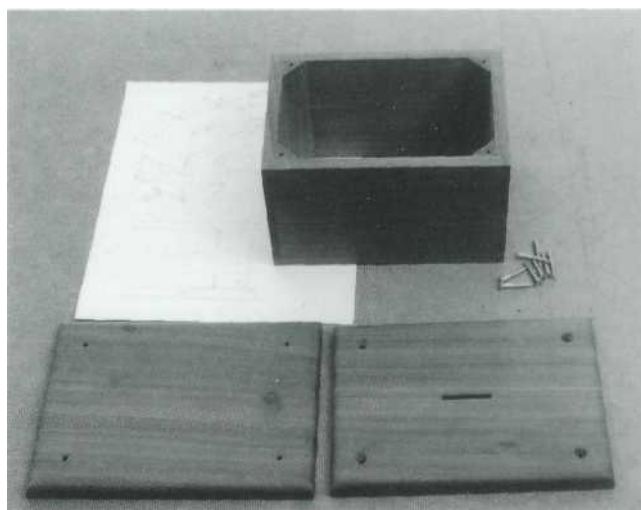
Start by running 1/16"-diameter holes through the neck and arm stubs. The neck needs a side-to-side hole for the pivot and a front-to-back hole for the control cords, while the arm needs a single front-to-back through-hole for both the control cords and the pivot strings. In essence, the controls are beautifully simple. There are four cords—one to pull the head down, one to pull the head up, one to pull the arm down and one to pull the arm up. And of course, depending upon how you want the action to go, fix either the "up" or the "down" cords to a lightweight tension "pulling" spring so the lever action becomes the positive movement.

Finally, when you are happy with the movement, cut two slots in the box (one for the lever and one for the coins), fit the shaft with its dowels and end plates, glue-fix the bear to the top of the box, run the control cords down into the box and then variously tie the cords to the spring or shaft.

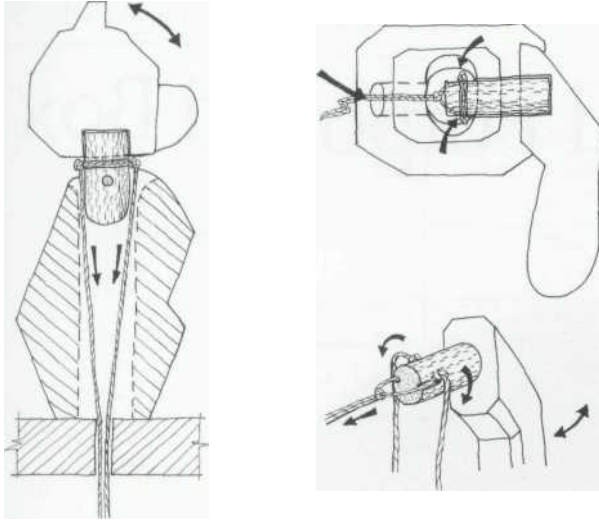
SPECIAL TIP: GLUING

For swiftly fitting and fixing all the control cords, you can't do better than a cyanoacrylate. It's good for holding the knots tight, for little trial-and-error holds, for fixing the bear to the top of the box. In fact, it's just about perfect for everything.

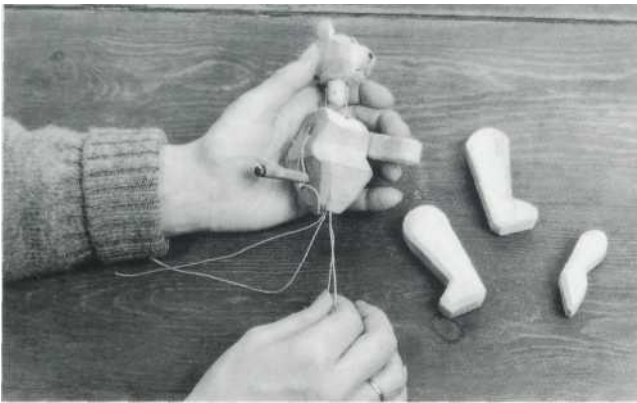
STEP-BY-STEP STAGES



The finished box, with the bottom and top slabs ready to fit. Note how the fixing screws are placed so they run into the corner fillets.



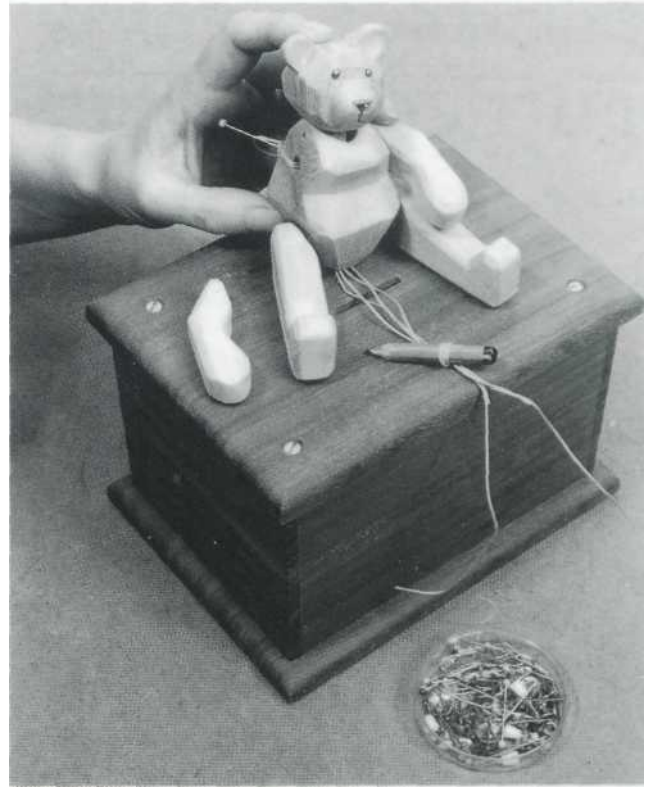
2. Next we string the bear. This cross section shows how the control cords operate the up-and-down movement of the head on the pivot. Be sure to use strong twine and nonslip knots. Notice the plan view at top right, showing how the arm is both pivoted and controlled by the cords. A detail of the cord is shown at bottom right. See how one cord pulls and pivots the arm, while the other two cords operate the up-and-down movement.



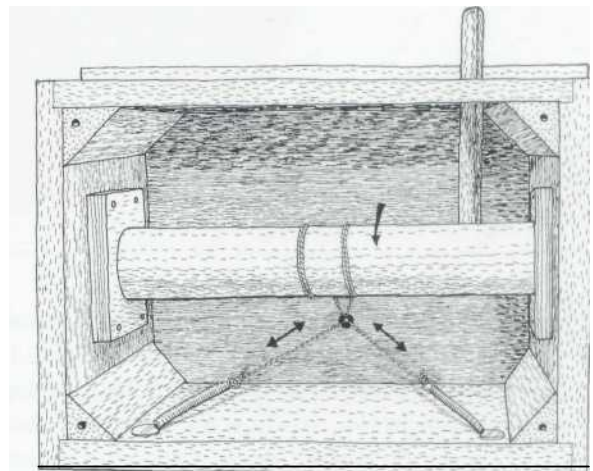
3 Have a **dry** run before you start gluing and fixing. Notice how I have left plenty of length to the cords.

SPECIAL TIP: MODELS

If you can't figure out how the movement works, make a working model with a card, pins and rubber bands. Make a card cutout of a bear, fix it to a board with thumbtacks at the joints, and then run cords from the various limbs in such a way that a pull-down on the cord results in the limb flipping up. If you now have rubber bands to pull the limbs back into the original position, then you have achieved an archetypal string-and-spring movement.



Sit the bear in place on top of the box and establish the position of the cord hole. If necessary, sand the various mating faces of the limbs and the body, so as to adjust the pose.



5 A view into the underside of the box shows the fixing of the four cords. One cord each from the arm and the head run down to the springs, while the other two cords are wrapped and glued around the shaft. In action, the lever turns the shaft, with the effect that the strings pull down on the arm and head.

Turned and Pierced Potpourri Box



Wood turning, cutting delicate frets with a scroll saw, and whittling are three of my favorite wood-working activities. The problem, when I first started thinking about this project, was how could I incorporate the three techniques to create a single unique item? After a good deal of thought I came up with the notion for this project—a turned box with a pierced lid, with a small amount of knife work in and around the piercing.

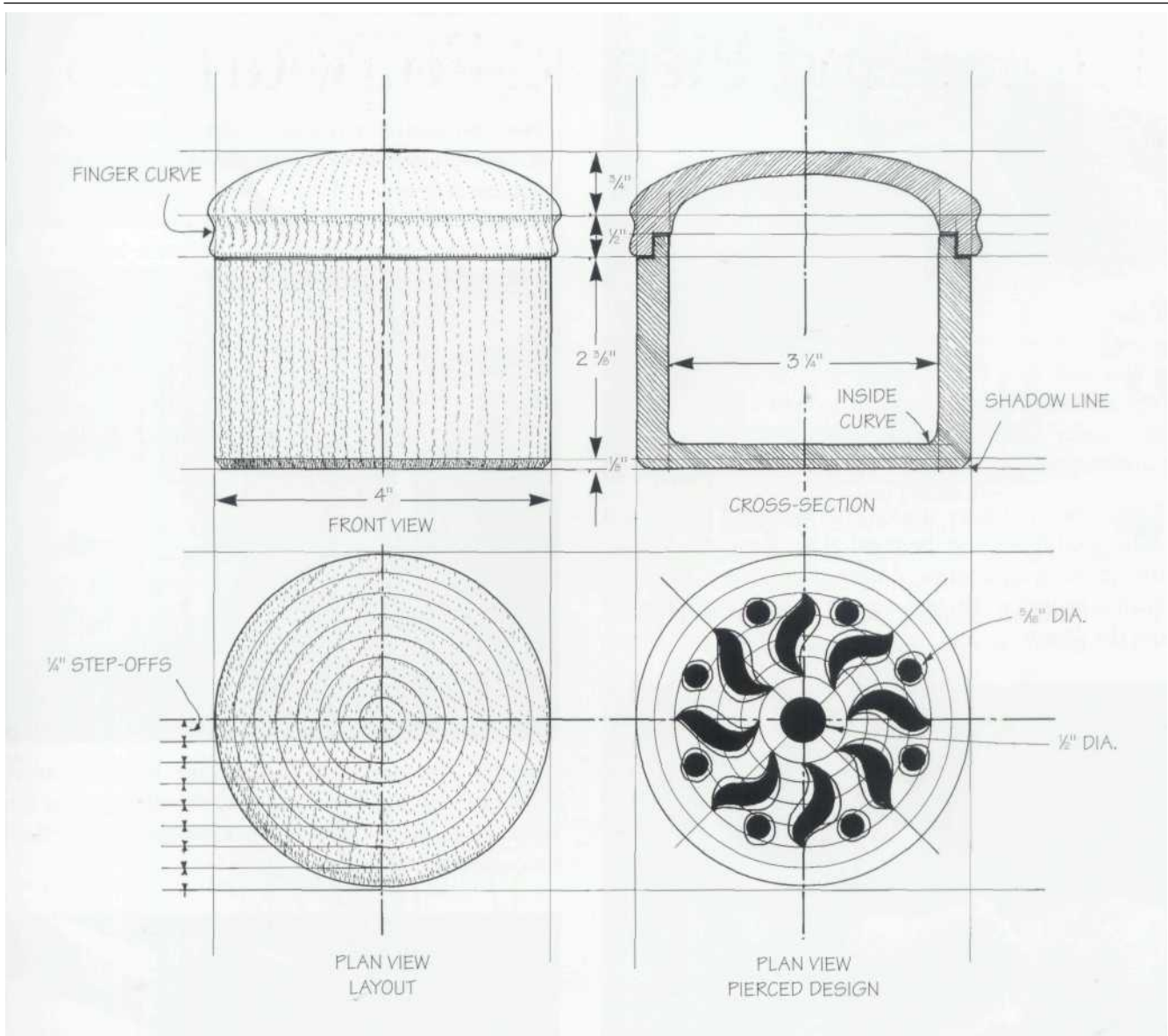
The design draws its inspiration from two of my **friends**, one a wood turner and the other a general wood-worker. However, they both needed a fresh angle to spark off their talents. Well, to cut a long story short, Gill came up with this great idea that they combine their talents so as to halve their workshop expenses and double their money-making potential. The good news is that they now

make the most beautiful turned and pierced containers, and they are both scooping up the rewards!

TURNING THE BOX

Though there are any number of ways of turning a small lidded box of this type and character, the best way is to use the four-jaw chuck technique. The procedure is wonderfully simple and direct. Having mounted the wood in the chuck, you start by turning the wood down to a 4"-diameter cylinder, and parting off the tailstock end of the cylinder for the lid. This done, you hollow turn the box and cut the step on the rim, then take the surface to a good finish and part off.

The next step is perhaps slightly tricky. You remount the lid section on the lathe and start by hollowing out the



lid and cutting the rim to fit the base. Then you remove the lid from the chuck, turn it over so that the expanding jaws of the chuck fit the **inside** of the rim, and finish up by turning the top of the lid. Don't forget to set the **lid** out with the 1/4" step-off lines to help later when you set **out the design**.

SPECIAL TIP: SCROLL SAW LIMITS

If you like the idea of this project but are planning to change the shape of the turned box, or even change the placing of the pierced holes, be mindful that the overall design is more or less governed by the use of the electric scroll saw. For example: As the saw is unable to cut wood thicker than about 1/4", the lid can't be high and/or domed. Also, the saw can't be used to fret a pierced design

around the box.

All that said, if you are keen to change the pierced design and/or the shape of the lid, you could possibly use a jeweler's piercing saw or perhaps a fine-blade hand fretsaw. It needs a bit of thinking about.

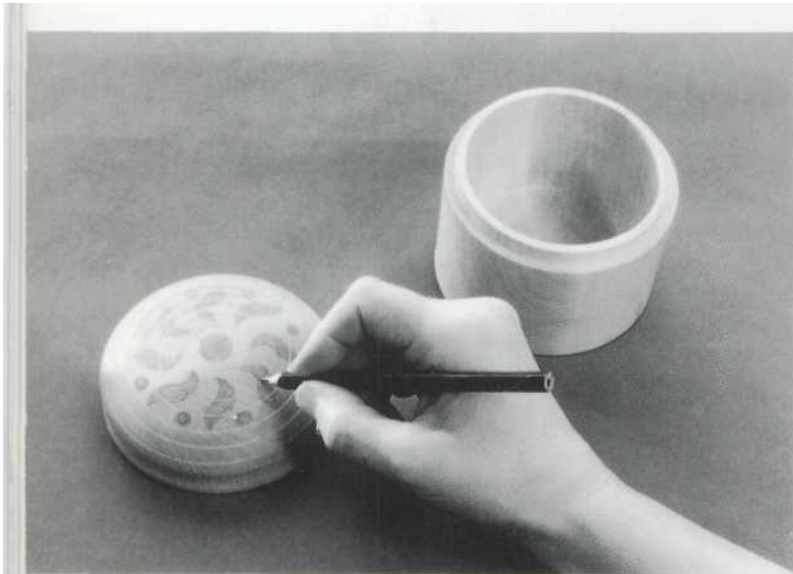
FRETTING, PIERCING AND WHITTLING THE LID

When you have made the turned box, with the lid nicely set out with the 1/4" guidelines, it's time to fret out the design. Pencil-press transfer the design through **to** the wood, bore out round holes with appropriate size bits, drill small **pilot** holes through the "windows" of the design, and fret out the shapes on the scroll saw. Finally, use the point of the knife to trim back the sharp edges of the piercings.

1 When you have sanded and smoothed the lid to a



good finish, use the point of the skew chisel to set the lid out with a series of rings. Space them about 1/4" apart. The idea is that you can use them as a guide to lay out the design.

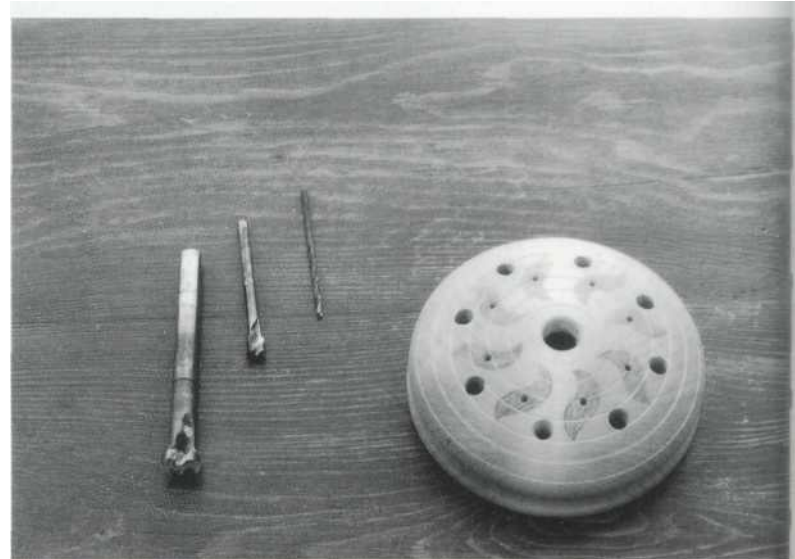


2 Shade in the pierced areas so that there is no doubt about the line of cut. If you are worried about the pencil smudging, then it's a good idea to give the whole lid a quick spray with pencil fixative as used by illustrators.

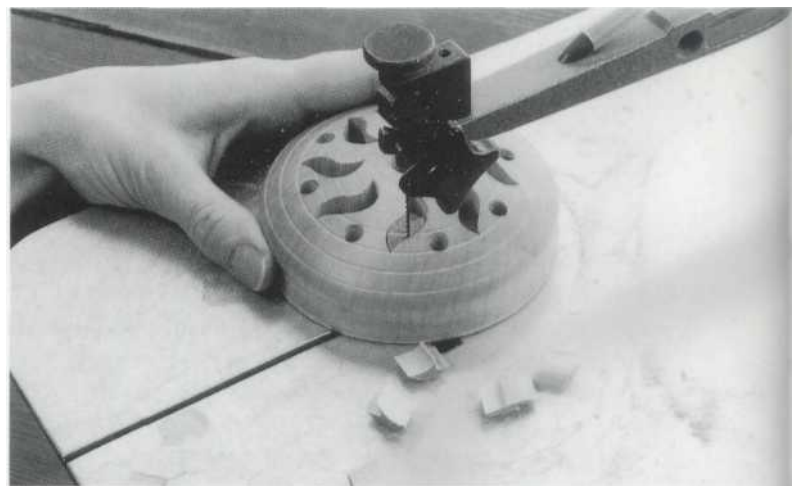
MATERIALS LIST

A Board (1) $4\frac{1}{2}'' \times 4\frac{1}{2}'' \times 6''$

Note: Because we were a bit short of wood, we decided to laminate two pieces to make the $4\frac{1}{2}'' \times 4\frac{1}{2}'' \times 6''$ section.



3 It's most important that you use Forstner bits for the large holes that make up the design. I say this because they are the only bit types that guarantee **perfect-every-time** holes.



Take two cuts for each end of the little curved shape. Work from the central pilot hole and down toward the point so that the point is crisp and sharp.

USING THE LATHE AND THE FOUR-JAW CHUCK

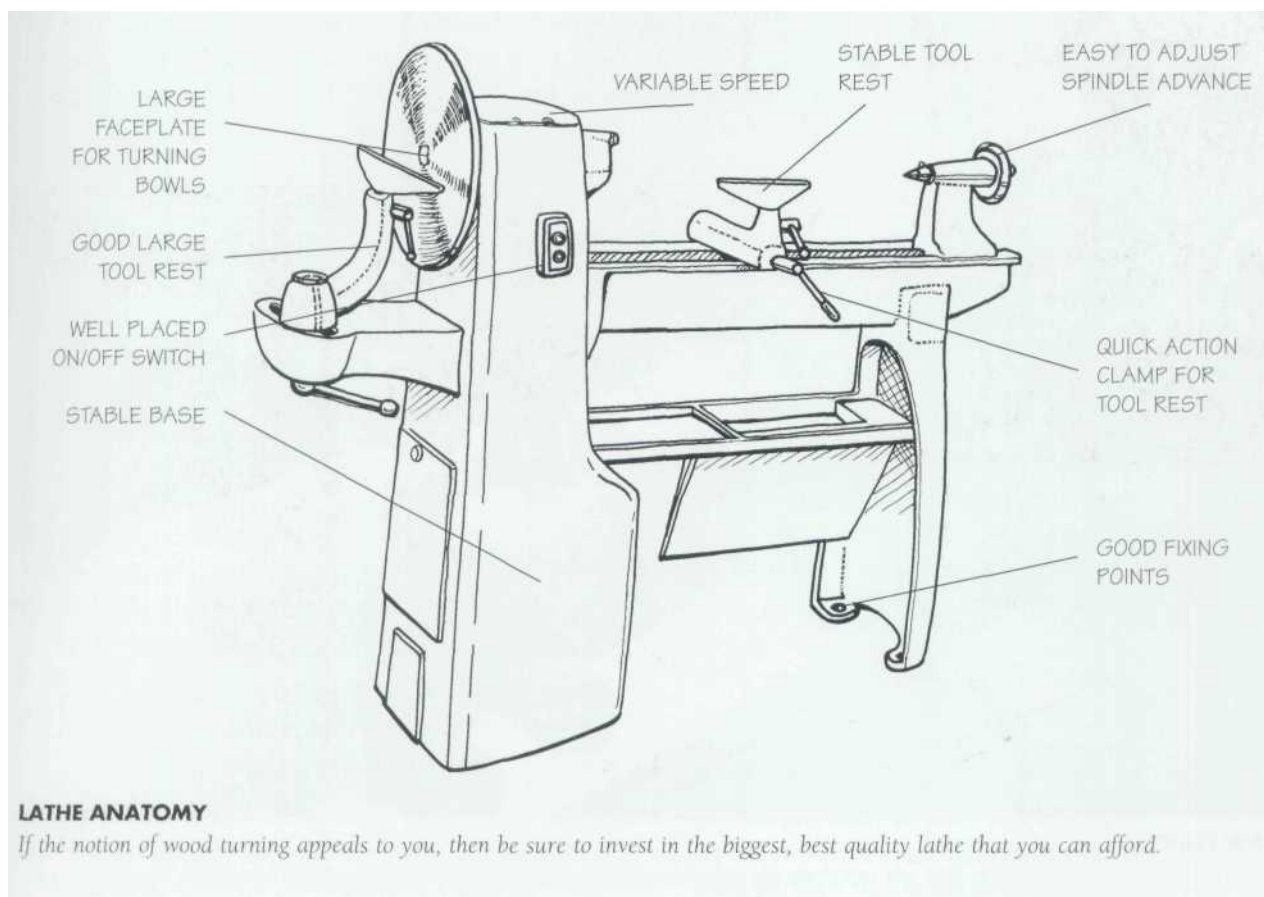
Though wood turning is one of the most important wood-working activities—vital for making just about everything from chair legs, stair balustrades, and bedposts, to boxes, candlesticks and bowls—it is also one of the most misunderstood of all the woodworking techniques. What happens **with** most beginners is that they purchase an "amateur" machine and a set of "starter" tools, and then become disenchanted when they can't make anything more exciting than small spindles. The problem, of course, is that small machines tend to wobble and shake, and the pronged center and the fixed tailstock center that are supplied **with** most small machines are totally inadequate and almost useless. As a result, many beginners soon get disillusioned and decide to give up wood turning. The **pity of it is** that the majority of these disillusioned beginners heap blame on themselves. Of course, what these beginners simply can't know is that turning is the one area of woodworking where the old adage "a poor workman always blames his tools" is a load of bunk! In the context of wood turning, the boring old adage ought more rightly read "poor results are nearly *always* the result of poor tools." All this adds up to the inescapable fact that exciting and varied wood turning can only really be

achieved if you have top quality tools and equipment.

So there you go. If you are a beginner looking to get started, the following pointers will show you the way.

Lathe

In essence, a lathe is a woodworking machine used for cutting and shaping wood into a round section. The wood is pivoted and spun between centers and/or held **in** a chuck, while at the same time handheld chisels or gouges are used **to** make the cuts. Though there are many lathe types—small ones, large ones, very long ones, some dedicated to making spindles, some dedicated to making bowls, some with fancy multispeed controls, and so on—experience tells me that a large traditional lathe, with a big motor and a heavy cast-iron frame, is by far the best option. I say this because while a miniature lathe might well be superb for making small items like lace bobbins, it can't be used to make larger pieces like bowls and chair legs. A large lathe, on the other hand, can be used to make everything from lace bobbins to bedposts. As for the cast-iron frame of a large lathe, there's no rust, no vibration, no nothing—it just sits there and does the job! I have a large old English lathe called a Harrison Jubilee, made about 1940. It is a wonderful machine.



HEADSTOCK AND TAILSTOCK

The headstock, the power-driven unit at the left-hand side of the lathe, carries the bearings in which the spindle revolves. The spindle has an external screw for chucks and **faceplates** and an internal taper for the pronged center. The tailstock, the movable unit at the right-hand side of the lathe, holds a pointed center. The distance between **the** headstock and the tailstock can be adjusted by winding the tailstock center in or out.

TOOL REST

The tool rest, sometimes called T-rest, is the unit that moves left or right along the bed on which the tools—meaning the gouges and chisels—are rested. Being mindful that the rest is a fulcrum for the levering action of the tools, it is essential that it can be swiftly and easily moved and put in place.

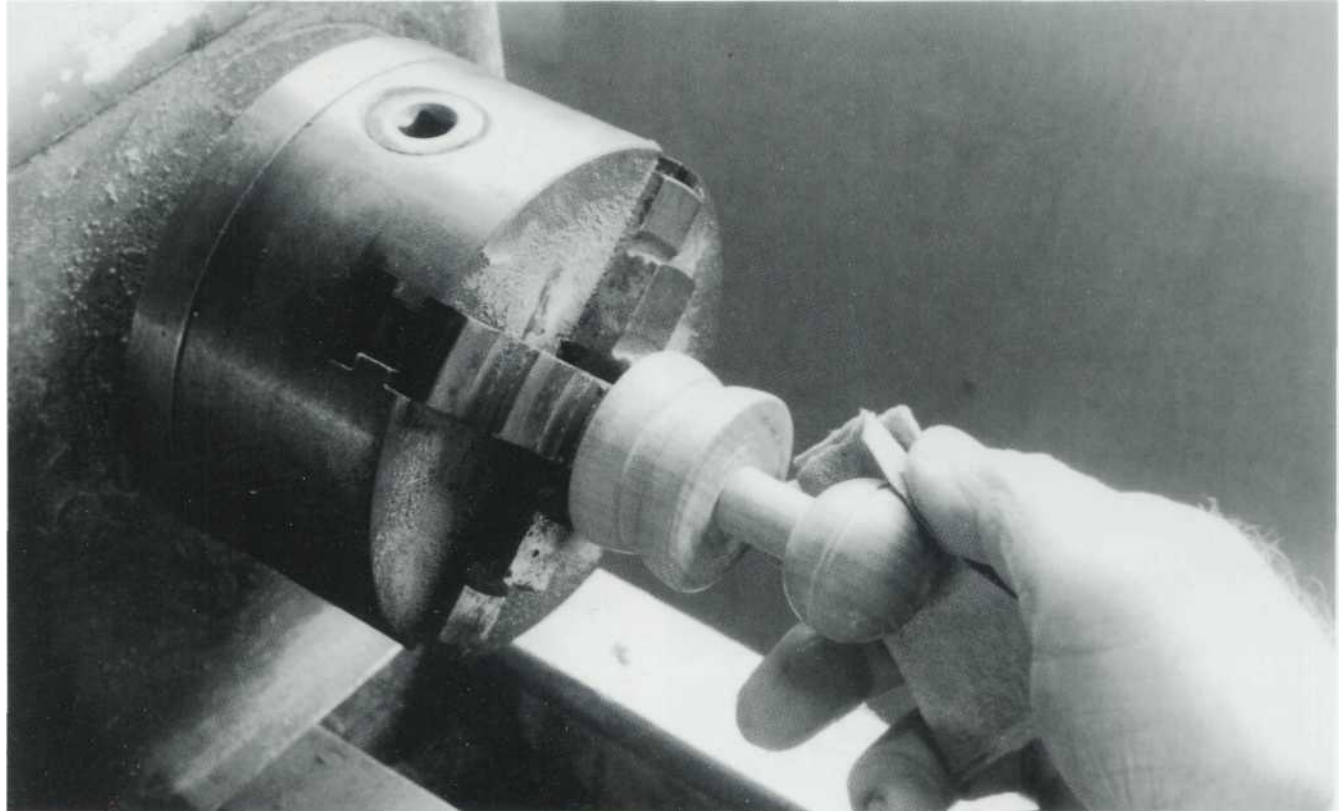
THE BED

The bed is the metal track, rods or rails that link the headstock to the tailstock, upon which the tool rest slides. Since it is vital that you are able to swiftly and easily move the tool rest, it is best to avoid narrow-slot, round-section bar beds that easily get clogged up with dust and shavings.

Four-Jaw Chuck

The four-jaw chuck is a mechanism used to hold the workpiece; it is a device that replaces the pronged center and all manner of other centers. Operated by a chuck key, the four jaws can be opened and closed in unison in such a way that they grip square sections. To my way of thinking the four-jaw chuck is essential. Okay, so four-jaw chucks are expensive—mine cost one-quarter the price of my secondhand lathe—and they do need to be fitted with a guard. But they grip wood without the need to turn it down to a round section—a huge time-saver—and once the wood is in the chuck, you can be confident that it's going to stay put.

When I said at the beginning that you can make just about everything you care to imagine on a large lathe, I should really have added the proviso: but only if you use a four-jaw chuck. You should see me at my lathe. I don't mess around with pronged centers or faceplates. I threw them away long since. I simply mount everything on the four-jaw chuck and get straight into the job. As well as holding square sections without the need for preparation, the jaws are good for other uses, such as holding rings and containers, holding a large screw—instead of using a screw center—and gripping round sections.



FOUR-JAW CHUCK

The *advantage* of the *four-jaw chuck* is that you can draw the tailstock center out of the way and approach the workpiece head-on.

Heart-Shaped Cheese Board



This project had its beginnings in our ever-pressing need to tidy up our workshop. The problem was, of course, what to do with the mountain of offcuts? I'm sure you know what I mean. The chair, table, box or whatever is finished, and you are left with great heaps of wood. Okay, maybe the longer lengths can be used for the next **job** in line, and the shavings can be used as fuel or as bedding for your chickens, and the dust can be swept up and put in the trash, but what to do with the medium-size bits and pieces that look too good to throw away? Well, after a deal of thought, we came up with the

super-brilliant idea of cutting all our small offcuts down to a uniform size, and then laminating the resultant blocks to make cutting boards and surfaces that needed to show end grain. Okay, so it is a solution that involves a **lot** of time, sweat and effort, but then again, the finished boards can be presented or marketed as choice handcrafted items.

So there you go. If you are up to your knees in offcuts, or you are short of cash and maybe know of a sawmill operator who is looking to give away his trimmings free, then perhaps this is the project for you!

MAKING THE BOARD

Collect all your waste wood and cut it down to the best overall section size. I went for a square section 1 3/4" X 1 3/4", but you can just as well go for 1" X 1" or 1" X 1 1/2", or whatever size best suits your material. And, of course, if **you** want to use a mix of sizes, then no matter, as long as the grain is running along the length and the corners are true at 90°. Having achieved your sawed size, plane the wood down to a smooth finish. When you are happy with the finish, saw it down to 1 1/8" slices. When you have a stockpile of 1 1/8" slices, pencil label the end-grain face, arrange the slices side by side in rows of about 12" long, and spend time working out how best to clamp them together. You can use a couple of G-clamps and a bar clamp, or a jig and wedges; no matter, as long as the arrangement is such that you can apply end pressure without the strips bending or bowing along their length.

Do the gluing-up in two stages: first the blocks side by side **to** make the strips, and then the strips side by side **to** make the slabs. Draw the design of the board on the slab, cut out the profile and sand the end-grain surfaces to a good finish. Fit the whittled feet and the cutting wire, give the whole works a coat of matte varnish and the **project** is finished.

SPECIAL TIP: DRY FIT FIRST

As the success of this project hinges on your being able to glue and clamp dozens of the little blocks together, it is important that you plan out the procedure. The best way is to have a trial dry run, with everything in place

MATERIALS LIST

A Board	1 3/4" X 1 3/4" offcuts—enough to suit the size of your board
B Feet (1)	1 1/2" X 1/2" X 6" 1/2" dowel X 4" long
C Toggle handle (1)	fancy hardwood 1/2" X 1" X 4"

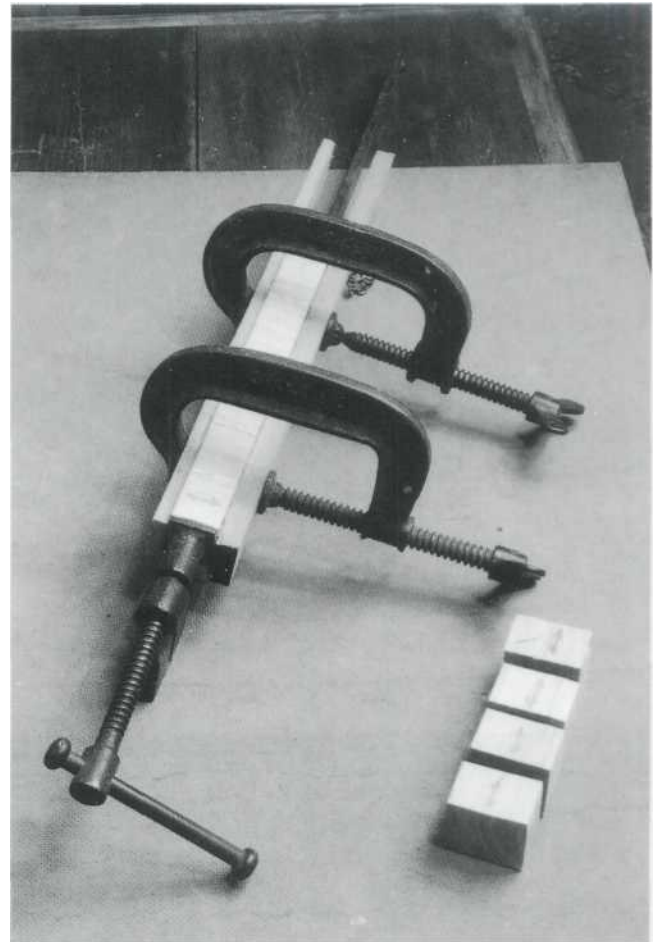
HARDWARE AND EXTRAS

D Cheese wire (1)	15" long
-------------------	----------

Note that all measurements allow for a small amount of cutting waste.

except the glue. You need to check out the glue type and make sure that it's suitable, clear an area and make sure that there is room to maneuver, have cloths and newspaper handy, and so on. And then you have to actually clamp-up the wood and see how your arrangement works out. Okay, so maybe my way of working does sound a bit fussy, but the horrible alternative is to have glue smeared all over the place, only to find that the clamp isn't long enough, or you have glued the wrong surfaces, or you are missing some vital piece of equipment.

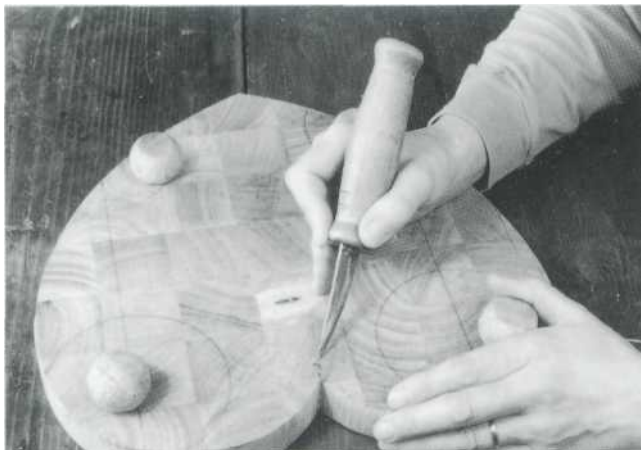
STEP-BY-STEP STAGES



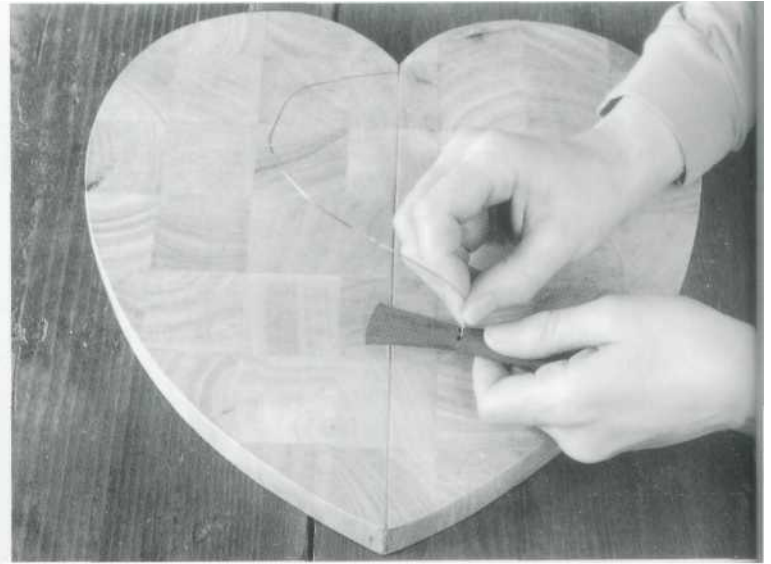
Saw the 1 3/4" X 1 3/4" square section of wood down into 1 1/8" thick slices—like slices off a loaf of bread—and then clamp up. With the arrows indicating the run of the grain, you can see how the slices of wood need to be realigned when it comes to gluing.



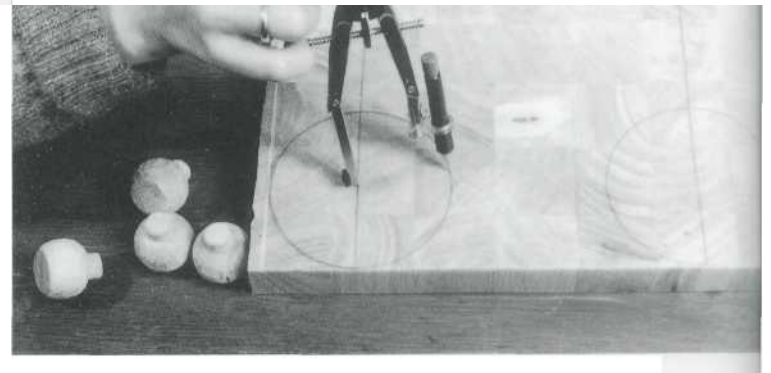
The best way of ensuring that the little ball feet stay in keeping with the total design is to whittle them to shape. I drilled and doweled four little square blocks, cut the corners off the blocks to make rough octagonals, and used a largish sloyd knife for the whittling.



3 To fix the wire, drill a 1/8"-diameter hole, set the wire in the hole and then follow it up with a glued dowel. Make a saw cut between the cheeks, wrap the wire over and around in the cut and follow it up with a glued sliver wedge.



Having whittled a small piece of hardwood to a butterfly shape and sanded it to a super smooth finish run two side-by-side 1/16"-diameter holes through the center of the bow, and knot the wire in place.



And just in case you have an aversion to heart shapes, there is no reason at all why you can't go for just about any shape that takes your fancy. For example, you can simply round the corners of a rectangular board.

DEBRIS COLLECTION AND WOODSHOP SAFETY

Woodshop debris, in the form of offcuts, shavings and sawdust scattered around on the floor and over the surfaces, is a dangerous nuisance. The shavings make the floor slippery and the loose offcuts are potential ankle-breakers. And of course, the wood dust not only clogs the machines, it is a fire risk, it creeps into the home, and it also harms the lungs.

Just how much dust is considered to be dangerous? The Occupational Safety and Health Administration (OSHA) suggests that if you can see wood dust floating around in the atmosphere when a shaft of sunlight shines across the workshop, then you have a problem that needs solving.

We tackle the problem in several ways: We cut the amount of dust down at the source by using filtered machines and by producing shavings rather than dust, and we have a large mobile vacuum system that we move around to service the various machines. We also wear a rubber dust/vapor mask for most tasks—like sawing, drilling, and when we are using varnish and such—and a full-face electric visor-helmet respirator when we are working at the lathe. As to which mask does the better job, the rubber mask is silent but uncomfortable and sweaty, while the electric full-face respirator is a bit heavy and noisy.

In the context of sawdust being bad for your lungs, I reckon that tried-and-trusted traditional American and European woods like ash, oak, beech, maple, willow, pear and pine are generally much safer than exotic species such as mahogany, obeche and iroko. All that said, if you find yourself sneezing, or your nose is running, or your skin develops a rash, then you best go for another wood type.

So what to do if you are really worried about dust and allergic reactions and such? Well, I think that for safety's sake, you need to stay with the following rules of thumb:

- Whenever possible use hand tool techniques that produce shavings rather than dust.
- Use traditional white-wood species that are non-oily to the touch.
- Use a vacuum machine to suck up the dust as it is produced—before it gets a chance to puff around the workshop.
- Wear a full-face mask, and always wash your hands and lace alter work.
- Always have a thorough sweep-up at the end of the day.
- If you have a health problem, then ask the advice of your doctor.



ELECTRIC VISOR-HELMET RESPIRATOR

*Though the choice of mask does in many ways depend upon your personal preference—they both have **their plus** points—/ usually wear the full-face respirator when I am working at the lathe, for the plain, simple reason that the **full-face** visor offers additional protection from flying debris.*

Laminated Keepsake Box



Though you might think that a box is a box is a box and not very exciting, this particular little box is rather special. Not only does it use wood that might otherwise be thrown away, but better yet, the layering technique allows you to very easily modify the length, width and height to suit your own needs. You could call it a "log cabin" box. This refers to the way the sections are layered one on top of another with the ends staggered, just the way the old timers built their log cabins.

MAKING THE BOX

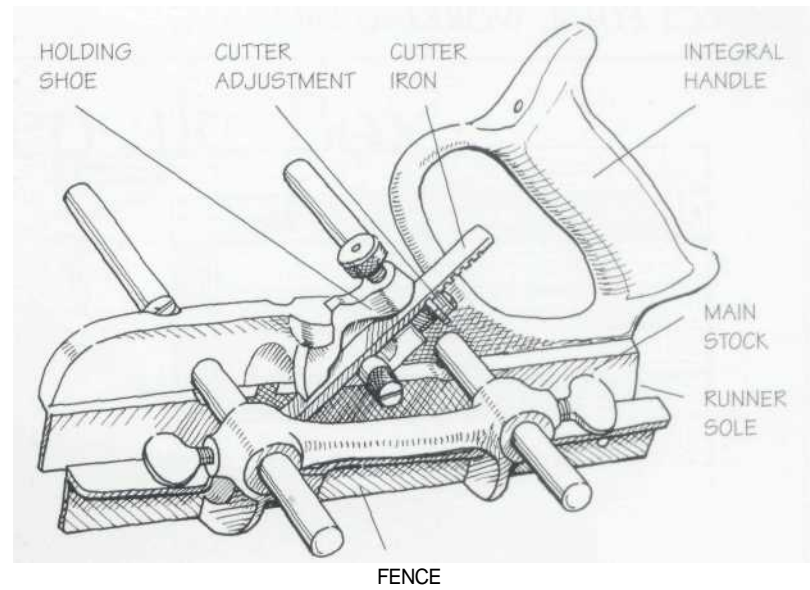
When you have studied the working drawings and seen how the lid and the base boards are set into slots—with the lid being able to slide in and out—then make decisions as to the size of your box, and size and plane the wood accordingly.

If you are going to stay with our design, you need twenty-four $1/2" \times 1/2"$ -square sections in all, twelve long and twelve short. All I did was search through my pile of offcuts, select two colors that went together to make a pleasant counterchange, and then pushed the wood through my portable surface planer. Having planed the wood to a crisp $1/2" \times 1/2"$ -square section, cut the wood to length so that it is perfectly square-ended and slightly oversize. As the long pieces need to end up at $5 1/2"$ —meaning when they are built into the finished 6"-long box—it's best to cut them at about $5 5/8"$, so you can plane and sand them back to a good fit and finish.

When you have made the twenty-four lengths, pile them up in a dry-run arrangement, in the order they are going to be in the finished box, and pencil mark the top and bottom layers of the stack. Draw in registration marks

SPECIAL TIP: USING OLD PLANES

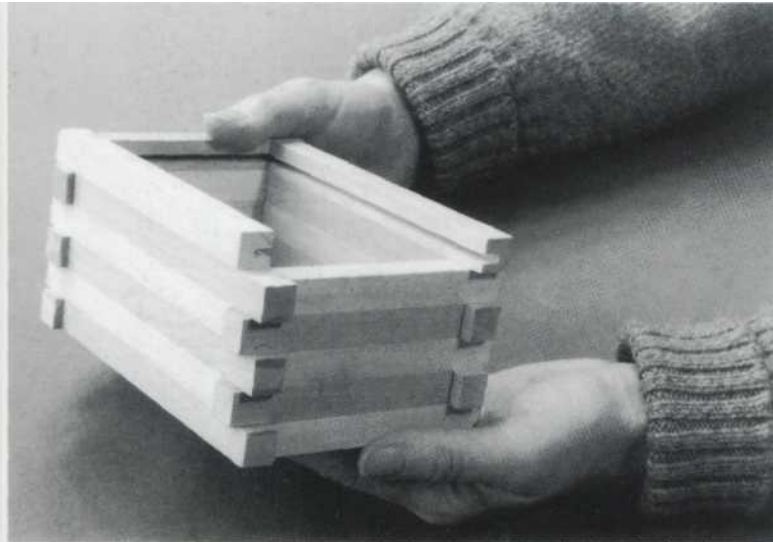
Though there are any number of ways of cutting tongues, grooves and rabbets, I think that the old metal grooving plane takes a bit of beating, meaning one of the old metal Stanley or Record planes. I use a Record 043 and 044, both made sometime before 1950. It's true they are no longer made, but I picked mine up at a flea market for no more than the cost of a new router bit. The Record 044 has eight blades that range in size from 1/8" to 9/16".



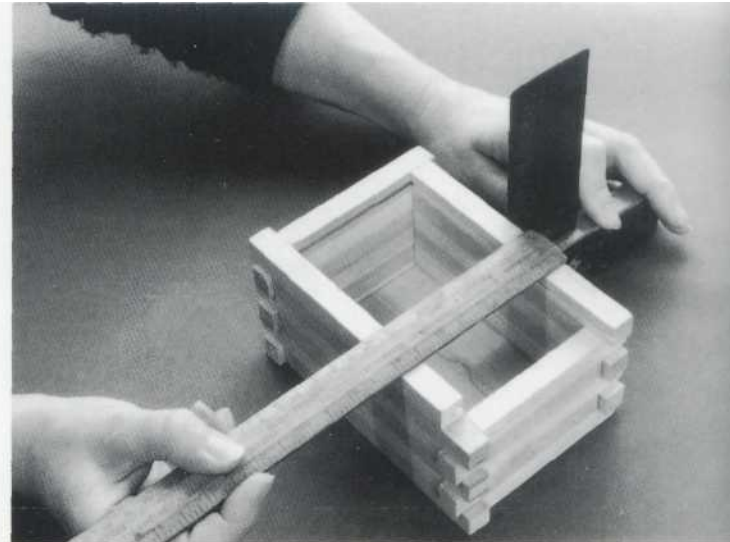
USING OLD PLANES

The classic Record 044 grooving plane is a beauty, easy to tune and pretty foolproof to use.

STEP-BY-STEP STAGES

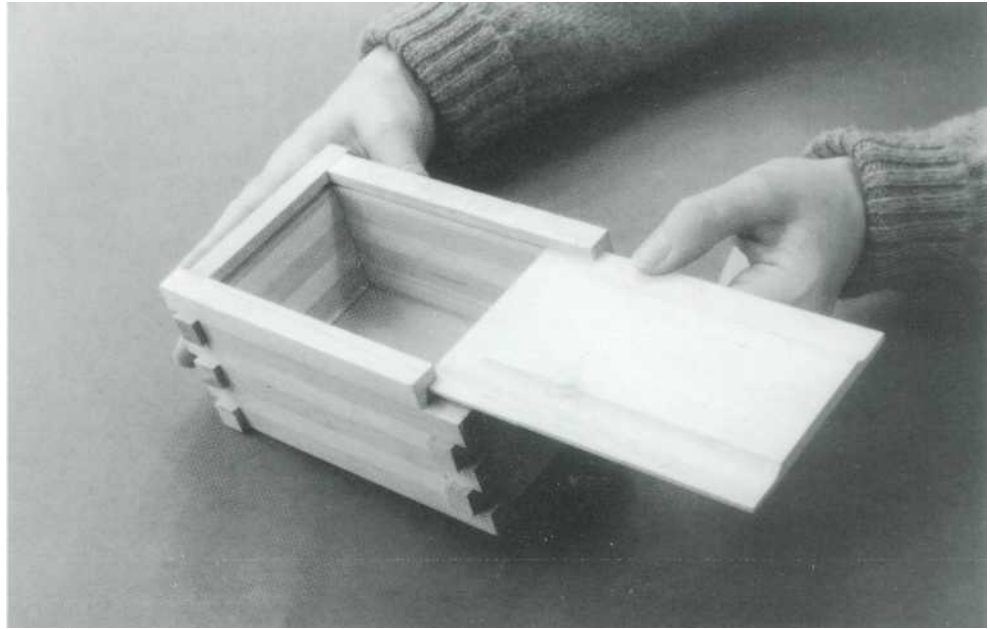


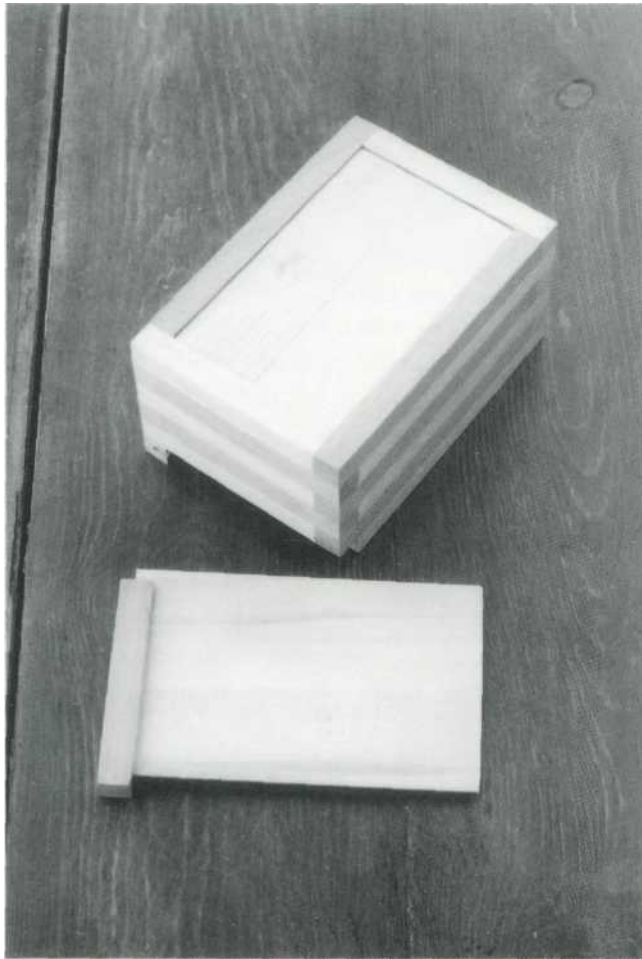
1 With the base dry fitted in place—meaning no glue—layer the square sections up log-cabin style so that the ends stick out beyond the corners. Pay particular attention to the alignment of the grooves.



2 When you are happy with the overall shape and alignment of the box, use a ruler and square to check for squareness.

3 Before you leave the glue to set, make sure that the lid is an easy but snug fit and that it runs right through to the end of the box, so that the end runs into the groove.





6 If all is correct, the base slab should be well con-
 unncd, but should fit loosely, so that the box side can
 move without splitting the base.



*The portable surface planer is a great bench machine. All you do is
 feed the wood in one side, between the cutter blades and the bed, and
 it comes out **the** other side nearly finished!*

PORTABLE SURFACE PLANER VS. HAND PLANES

If you are a beginner to woodworking, then sooner or later you will have to make decisions about your overall approach to the subject, or your "working philosophy." One of the main questions that you have to ask **yourself** is, do you want the emphasis to be on the bench power tools—meaning routers, press drills, planers and all **the** rest—or do you want to focus on using hand tools? Most woodworkers I know fit in one of four groups:

- Will not use power tools at any price.
- Will grudgingly use the occasional power tool, but much prefers hand tools.
- Enjoys using power tools for most of the work, and tidies up with the hand tools.
- Very much enjoys using power tools and is reluctant to use hand tools.

I reckon that Gill and I fit into group two. We much prefer working with hand tools but will sometimes use a power tool to speed things up.

Okay, so you must surely have gathered by now, that we're not very keen on power **tools**. It's not so much that we can't afford to power up, but rather that we both dislike all the dust, debris and noise that power tools generate. To our way of thinking, there is nothing quite so unpleasant as being covered with fine dust and blasted with noise.

All that said, I was so tuckered out one day last summer—when I was heavily involved in the strenuous and sweat-making procedure of hand planing a massive rough-sawn oak plank—that I decided, against my better judgment, to invest in a portable planer thicknesser. To cut a long story short—or you could say to plane a fat story thinner (ha!)—when I first saw this machine, I was firmly convinced that it was the beginning of the end of my way of working. My thinking was that it would somehow or other weaken my belief that slow-and-quiet is beautiful. However, there is no denying that it has changed the way I work. For example, where I once struggled and strained with a jointer plane, and then a smoothing plane, I now pass the wood a few times through the surface planer. In fact, I have to admit that it's a beautifully efficient machine that gets a lot of use. Of course, it is noisy, and I do have to house it in its own shed, and I did have to get myself a dust sucker and a full-face respirator mask, but against that, I can now spend much more time playing around with my various grooving, moulding and combination hand planes.

Most experts would agree that the best way is to start with hand tool techniques and then power up when you fully understand your needs.

Miniature Mantle Clock



Sometimes, when I am sitting alone in my workshop, I take up one or more pieces of choice wood and feast my eyes on the various colors that make up the character of the grain. To hold the wood up to the light and see the way the grain shimmers and glows, to see how two pieces of wood look when they are held side by side—and then to imagine how the wood might be used for a special project—these are unique quality-time experiences that should not be missed.

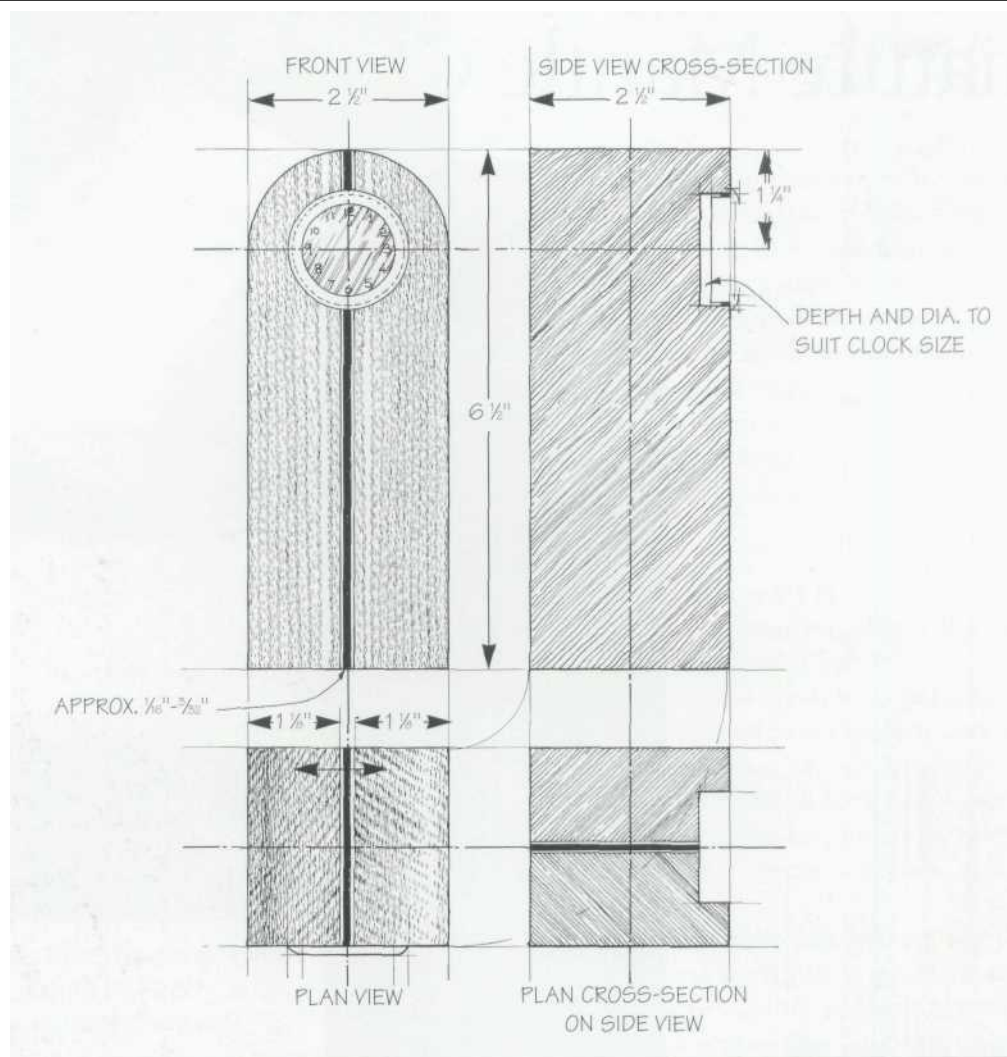
This project draws its inspiration from one of my alone-in-the-workshop musings. The problem was how to bring together three relatively small pieces of choice exotic wood—a scrap of ebony salvaged from an old long-gone piece of furniture, a sliver of silver sycamore veneer left over from a marquetry project, and a short length of dark wood that I've been using to prop open the door. Anyway,

I tossed all sorts of ideas around in my head—a small piece of laminated jewelry? a turning? a handle for a knife? a drawer pull? And then it came to me . . . why not make a small clock case!

MAKING THE CLOCK CASE

First things first. Before you do anything else, you need to search out a miniature watch-clock and a Forstner drill bit sized to fit. For example, as my clock (described in the catalog as a "watch-clock miniature suitable for block and drilled recess mounting") measures slightly under 1 5/16" diameter across the span of the back and about 1/4" in depth, I reckoned that I needed a drill size of 1 3/8".

When you have obtained the clock-watch and the drill size to suit, take your chosen pieces of wood and plane and sand the mating faces down to a true finish. This



done, smear white PVA glue on the mating faces and clamp up.

Having waited for the glue to cure, set the compass to a radius of $1\frac{1}{4}$ " , spike it on the center veneer at a point about $1\frac{3}{8}$ " down from top-center, and then strike off a $2\frac{1}{2}$ "-diameter half-circle. When you are happy with the way the lines of the design are set out on the wood, move to the band saw and cut out the curve that makes the top of the case.

Use a square to mark out the baseline, double-check that it is absolutely true, and then cut off the waste with a small-toothed backsaw. It's important that the baseline is square to the center line of the block, so spend time getting it right.

When you are sure that the block sits square and true, move to the drill press and bore out the recess for the clock. Bore down to a depth of about $\frac{3}{8}$ " .

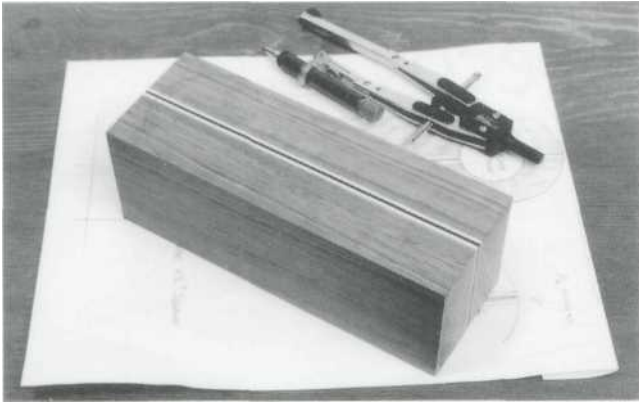
Having bored out the recess, take a scrap of sandpaper

and rub down the inside of the recess, so that the clock-watch is a tight push fit. If necessary, use a straight gouge to cut a little scoop for the hand-setting knob that sticks out at the side of clock case. When you have achieved a good fit of the clock-watch in the recess, rub the whole block down on a sheet of fine-grade abrasive paper. Finally, burnish the block with beeswax, slide the clock-watch mechanism in place, and the project is finished.

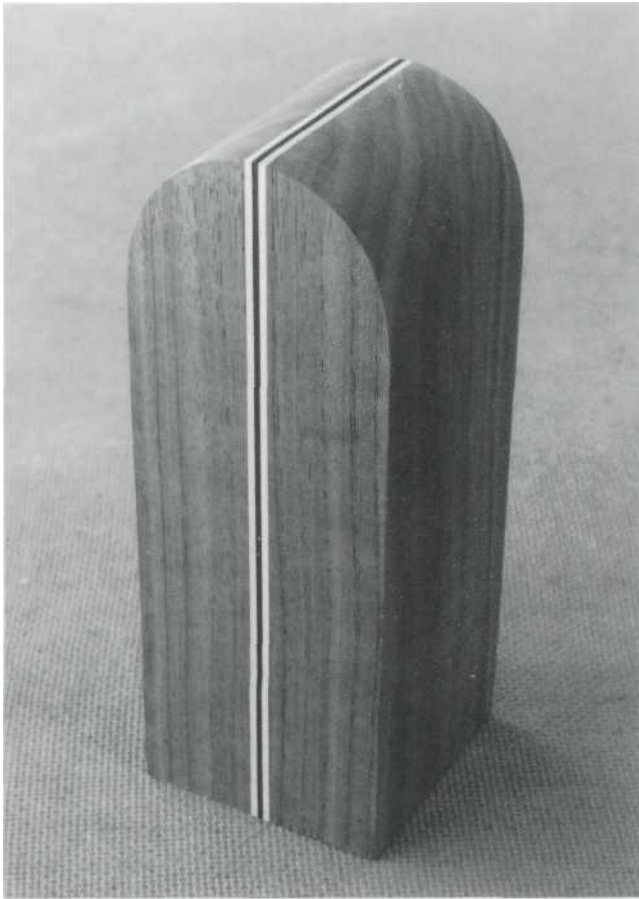
SPECIAL TIP: LAPPING

The best way of rubbing the faces of the block down to a smooth, true finish is to use a technique known as lapping. All you do is mount a sheet of medium-grade abrasive paper to a slab of $\frac{1}{2}$ "-thick plywood so that the grit side is uppermost. Then clamp the slab in place on the bench. In use, the workpiece is rubbed in the direction of the grain, backwards and forwards. The procedure is rerun with finer and finer grades of paper.

STEP-BY-STEP STAGES



1. pass radius to 1 1/4" and strike off the arc that makes the top of the case. Make sure that you spike the compass point on the middle of the fine black laminate.



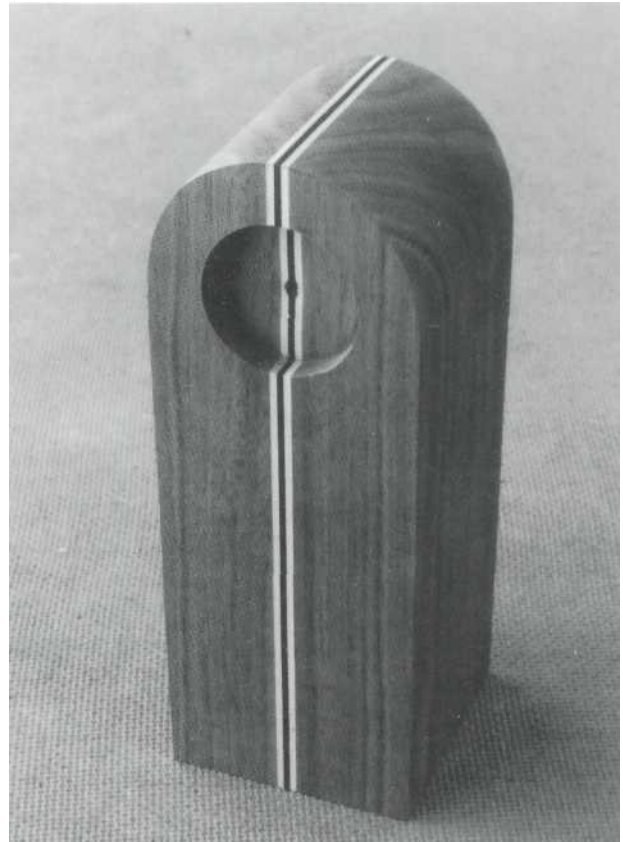
2. having cut the curve on the band saw, run the faces of the block down on a series of lapping boards. Work through the grit sizes, from a medium-fine through a super-line flour grade. Only work in the direction of the grain, and be careful that you don't blur the sharp corners.

MATERIALS LIST

- | | |
|----------------------------------|-----------------------------|
| A Outer faces (2) | 1 1/8" x 2 1/2" x 7" |
| B Central lamination (1) | 1/16" - 3/32" x 2 1/2" x 7" |
| C Side-of-center laminations (2) | 1/16" - 3/16" x 2 1/2" x 7" |

HARDWARE AND EXTRAS

- D Quartz clock-watch, 1 7/16" diameter—best if it has a push-fit rubber band friction fitting



3. Having selected a Forstner bit sized to fit the diameter of your clock, sink a recess to the appropriate depth. The success of the project hinges on the hole being perfectly placed, so spend time getting it right.

Swivel-Head Duck Decoy



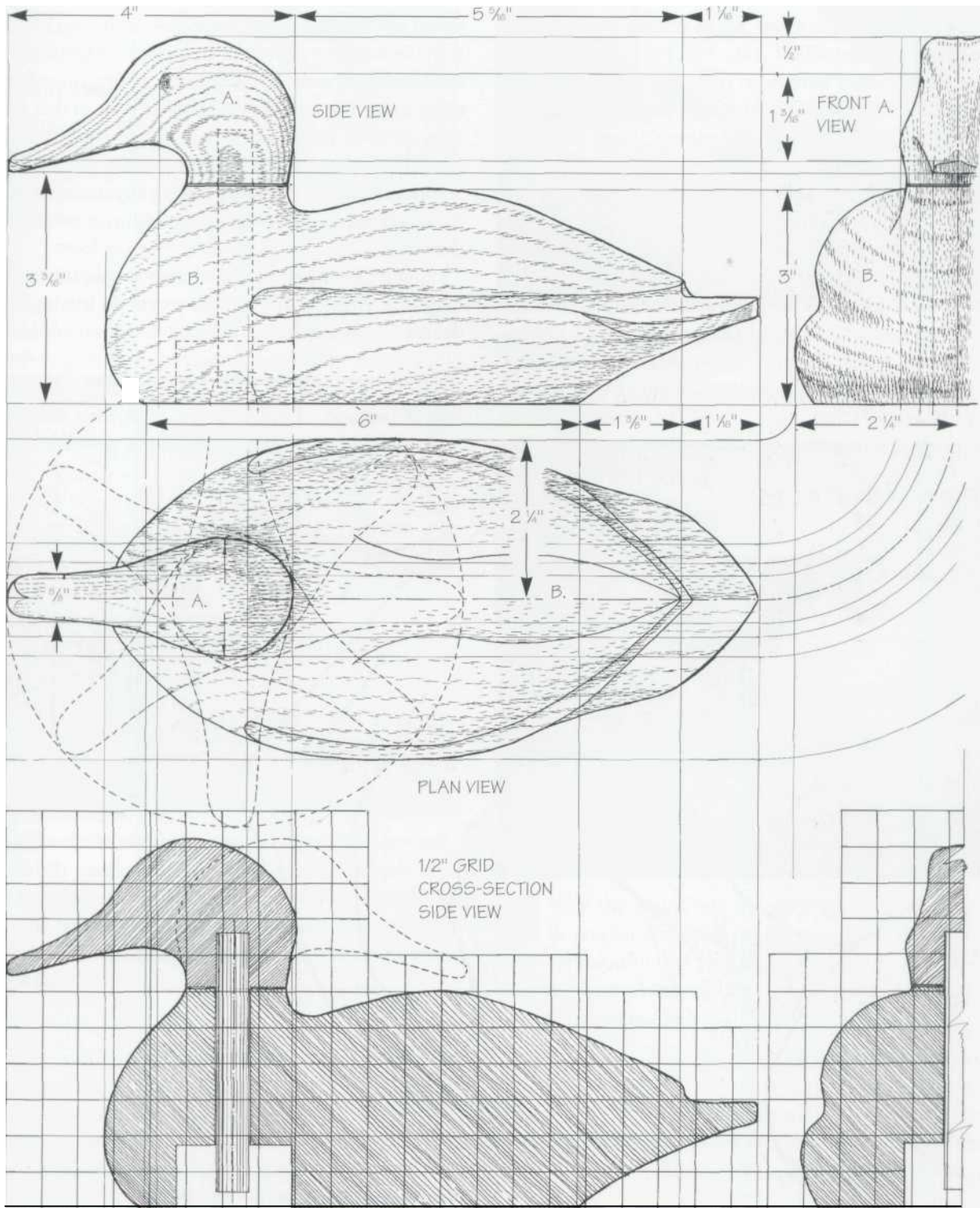
Duck decoys are no more than carved and whittled imitations of the real thing. The word *decoy* comes from the Dutch words *kooj* and *koye* meaning to lure or entice. Though old accounts suggest that decoys were first used by Native Americans, the notion was soon taken up by the white American settlers. It's a wonderfully simple idea: The carved wooden ducks are anchored out in the water, along comes a flock of ducks attracted by the decoys, they circle with a view to settling down on the water, and—Bang!—the hunter is provided with easy targets. Okay, so it's not very sporting, but when one must. . . . Though once upon a time duck decoys were swiftly carved and whittled by the hunters to their own design and then thrown in a corner for next season, they are now

considered to be extremely valuable and very collectible examples of American folk art.

MAKING THE DUCK

Having first studied the working drawings, and variously looked at pictures of ducks, collected magazine clippings, made sketches and drawings, and maybe even used a lump of Plasticine to make a model, take your two carefully selected blocks of wood and draw out the profiles as seen in side view. Make sure that the grain runs from head to tail through both the head and the body.

When you are happy with the imagery, use the tools of your choice to clear the waste. I used a band saw, but you can just as well use a bow saw, a straight saw and a



rasp, a large coping saw, a gouge and a drawknife, or whatever gets the job done. Next, set the two parts down on the bench—so that you can see them in plain view—and draw the top views out on the partially worked surfaces. Don't fuss around with the details, just go for the big broad shapes. Once again, when you are pleased with the imagery, use the tools of your choice to clear the waste.

When the shapes have been roughed out, then comes the fun of whittling and modeling the details. Having noticed that this is the point in the project when most raw beginners lose their cool and start to panic, I should point out that there are no hard-and-fast rules. If you want to stand up or sit down, or work out on the porch, or work in the kitchen, or whatever, then that's fine. That said, your wits and your knives need to be sharp, you do have to avoid cutting directly into end grain, and you do have to work with small controlled paring cuts.

Of course, much depends upon the wood and your strength, but I find that I tend to work either with a small thumb-braced paring cut—in much the same way as when peeling an apple—or with a thumb-pushing cut

that is managed by holding and pivoting the **knife** in one hand, while at the same time pushing against the back of the blade with the other hand. Either way, you do have to refrain from making slashing strokes.

When you come to the final modeling, start by sitting down and having a good long look at the duck. Compare it to the working drawings and any photographs that you have collected along the way. If necessary, rework selected areas until it feels right. When you reckon that the form is as good as it's going to get, use a rasp and a pack of graded sandpapers to rub the whole work down to a smooth finish. Avoid overworking any one spot; it is better to keep the rasp/sandpaper and the wood moving, all the while aiming to work on the whole form.

Finally, fit the neck dowel, run a hole down through the duck, drill out the washer recess on the underside of the base and the fixing hole on the front of the breast. Block in the imagery with watercolor **paint**, **give the** whole works a rubdown with the graded sandpapers, lay on a coat of beeswax or maybe a coat of varnish, and the duck is ready . . . not for shooting, but for showing!

STEP-BY-STEP STAGES



If you are looking to make a strong but controlled cut, you cannot do better than go for the thumb-pushing paring approach. In action, the cut is managed by holding and pivoting the knife in one hand, while at the same time pushing against the back of the knife with the thumb of the other hand. Notice how the direction of cuts runs at a slicing angle to the run of the grain.

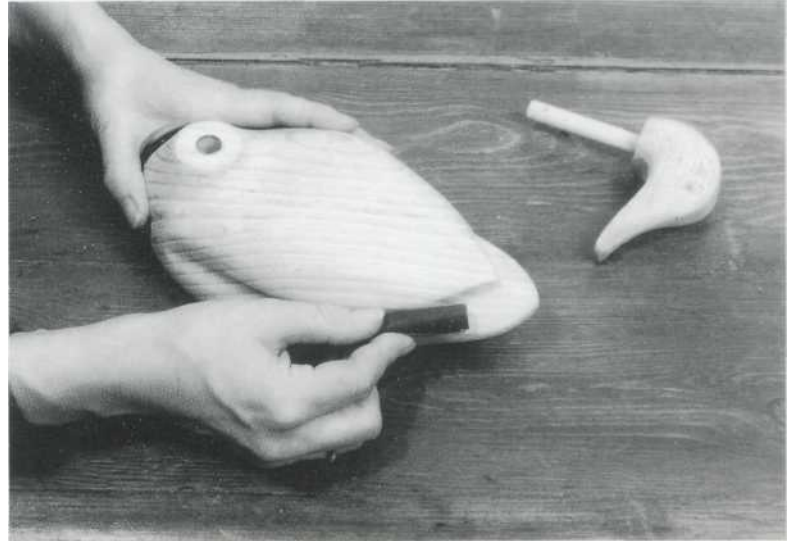
MATERIALS LIST

A Head (1)	$1\frac{1}{4}'' \times 2\frac{1}{2}'' \times 4\frac{1}{2}''$
B Body (1)	$3\frac{1}{2}'' \times 5\frac{1}{2}'' \times 10''$
C Neck pivot (1)	$\frac{1}{2}''$ dowel $\times 4''$ long

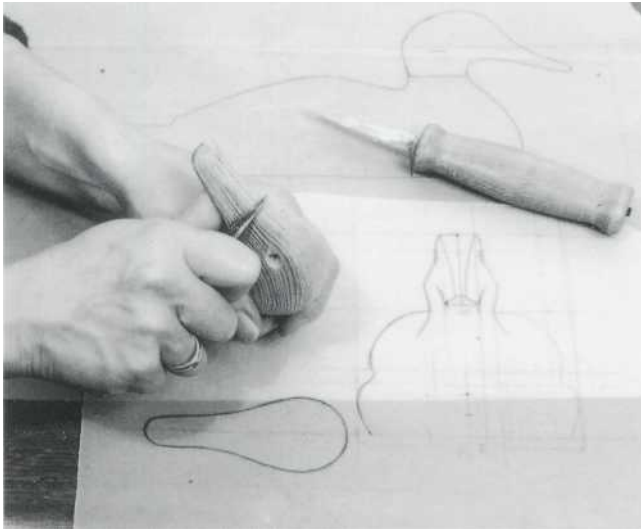
HARDWARE AND EXTRAS

- D Glass/plastic eyes (2)
- E Plastic washers to fit the dowel (2)
- F Watercolor paint as used by artists: gold-yellow, red-brown, dark green, white, gray, blue and black

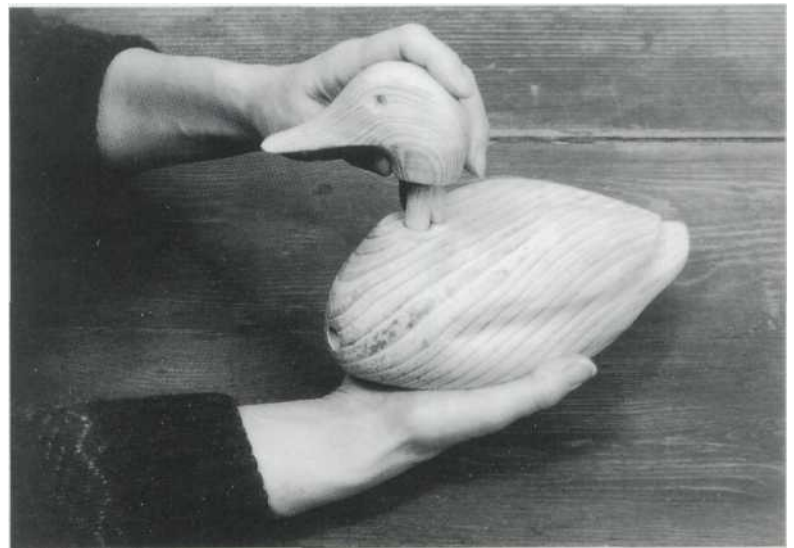
Note that all measurements allow for a small amount of cutting waste.



3 Use the graded abrasive papers to achieve a smooth finish. In this instance the paper is wrapped around a dowel that nicely fits the long scooped shape.



2 Use the thumb-braced paring cut to shape the characteristic cluck bill. This cut uses the thumb as a lever to increase the efficiency of the stroke. Always be ready to change knives to suit the cut—a small penknife blade for details, and a large sloyd knife when you want to move a lot of wood.



4 Slide the dowel into the neck socket and adjust the fit so that the head profile runs smoothly into the body. Be mindful that you might well need to modify the head and/or the body so that the two parts come together for a close-mating fit.



5 Now, with the washer in place, ease the pin/peg through the breast hole and push it into the dowel hole. Use plastic or leather washers to ensure a good tight-turning fit.

SPECIAL TIP: SAFETY WITH A KNIFE

The degree of safety when using a knife will depend to a great extent on your stance and concentration. Okay, so there is no denying that a knife is potentially a very dangerous tool, and it's not a tool to use when you are tired or stressed, but that said, if the knife is sharp and the wood easy to cut, then you shouldn't have problems.

If you have doubts, then have a try out on a piece of scrap wood. And don't forget . . . a good sharp knife is much safer than a blunt one that needs to be worried and bullied into action.

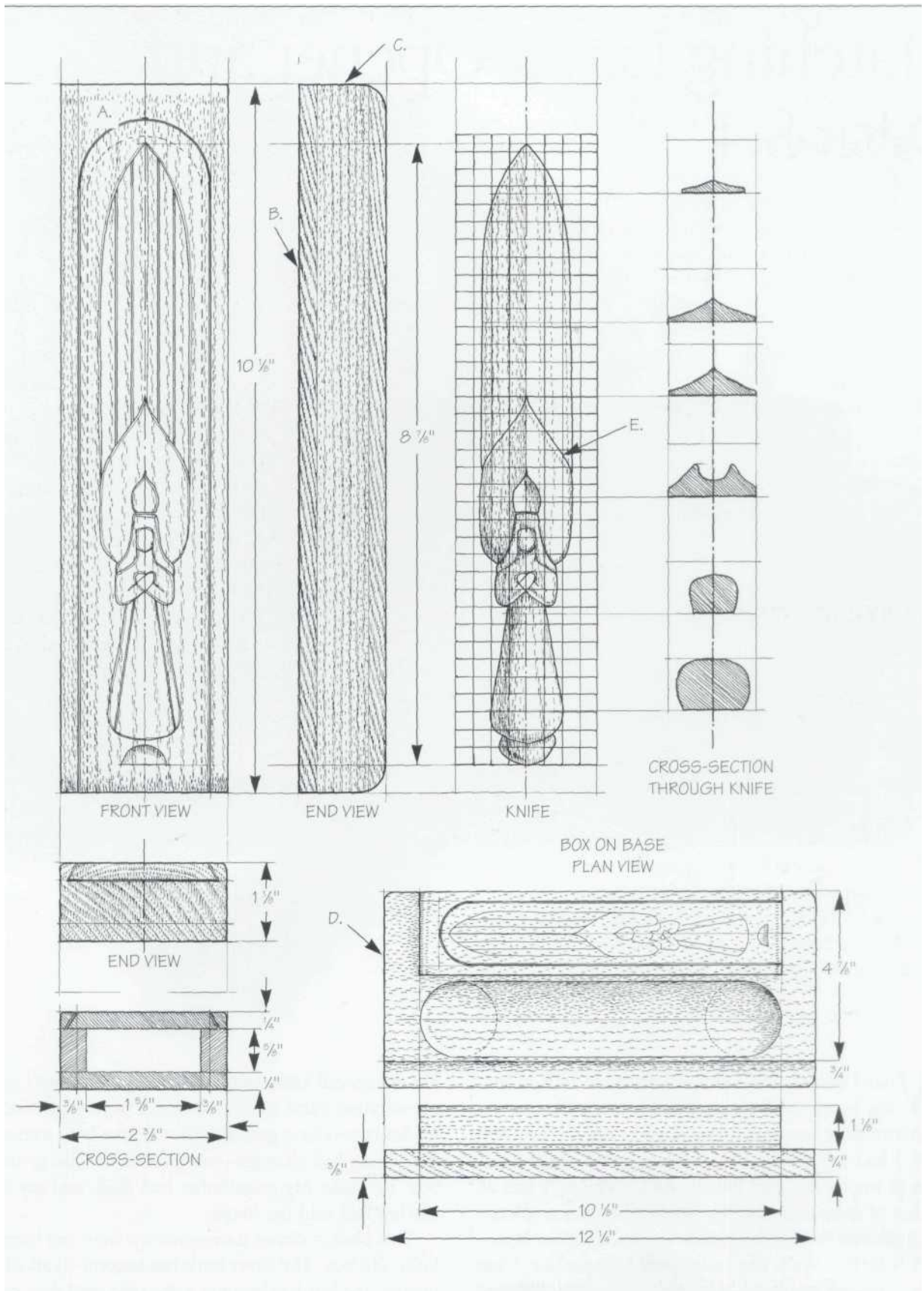
Matching Letter Opener and Desk Set



When I was a school kid, I was obsessed with collecting knives and boxes. I had a box with a secret compartment, a box with a swivel-and-twist lid, and best of all, I had a beautiful old pen case dated about 1880, given to me by my grandfather. As for knives, I had all manner of dirks and daggers. My favorite was a stiletto-type knife that had a silver handle and a red leather case—really beautiful! Well, you know what kids are like, I was forever making up games and adventures that involved hiding things. Anyway, to cut a long, sad story short, I

hid my special knife and box in my grandfather's garden, my vacation came to an end, and I went to school. And no doubt you have guessed when I came back a year later, everything had changed—no grandfather, no garden, no box, no knife. My grandfather had died, and my grandmother had sold the house.

This project draws its inspiration from my long-gone knife and box. The silver knife has become a carved letter opener, the box has become a pen case, and they both go together to make the perfect desk set.



MAKING THE BOX

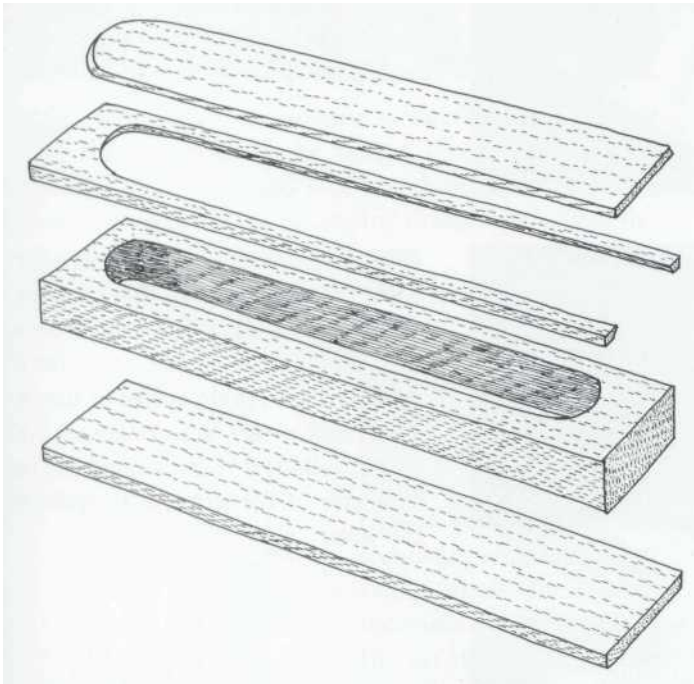
Having studied the working drawings and seen how the box is laminated up from three layers, take your three pieces of carefully chosen wood and pencil label them "lid," "middle" and "base." Set the middle section out with a center line, and use the 1 5/8"-diameter Forstner drill bit and the scroll saw to clear the waste. Clean out the cavity and take it to a good finish.

Take the lid piece and use a pencil, ruler and compass to draw out the design—meaning the shape of the sliding lid. This done, move to the scroll saw, set the table to "tilt," and fret out the lid. You should finish up with a lid edge miter that undercuts the lip of the frame.

When the four component parts for the project—the base, the hollowed-out middle section, the top frame and the lid—are all nicely finished, smear glue on the mating faces, sandwich them together and clamp up. Be sure to wipe up any glue that oozes into the inside of the box, or between the top of the middle section and the undercut lip of the frame.

Finally, the box is glue mounted on a simple pen tray base. Then the whole works is cleaned up with the plane and rubbed down to a smooth, round-cornered finish.

STEP-BY-STEP STAGES



CARVING THE BOX AND THE KNIFE

Carefully draw out the angel design, make a tracing, and then pencil-press transfer the imagery through to both the top of the sliding lid of the box, and the piece of wood that you have chosen for the knife. This done, take the tools of your choice and swiftly set in the lines of the lid design with a V-section trench. I prefer to use the knife to cut the incised lines, but you might well prefer to use a small V-tool.

When you work with the paper knife, start by fretting out the profile on the scroll saw. This done, take a small low-angled shoulder plane and clear the bulk of the waste from the blade. When you are happy with the basic form, use a knife to whittle the details. All you do is set the primary lines in with stop-cuts and then shave the wood down to the level of the cuts, so that selected areas are left standing in relief. For example: When you come to the skirt, slice a stop-cut around the line of the waist, and then shave the wood from the hem through to the waist, until the skirt takes on the characteristic conical and rounded shape. And so you continue, working here and there over the design, all the while setting in stop-cuts and cutting in towards the stop-cuts until you **achieve** what you consider to be a good form.

Finally, rub all the surfaces down to a smooth finish, give the whole works a thin coat of Danish oil, and then use beeswax to burnish to a sheen finish.

- 1 When you have made the four component parts for the box—the base, the hollowed-out middle section, the lid, and the frame into which the lid slides—take the finest graded sandpaper and rub the mating faces down to a good finish. Pay particular attention to the inside of the hollow and the mitered edge of the lid frame.

MATERIALS LIST

BOX

A Lid (1)	$\frac{3}{8}'' \times 2\frac{1}{2}'' \times 12''$
B Box center (1)	$\frac{3}{8}'' \times 2\frac{1}{2}'' \times 12''$
C Middle section (1)	$\frac{3}{4}'' \times 2\frac{1}{2}'' \times 12''$
D Base (1)	$\frac{3}{4}'' \times 5\frac{5}{8}'' \times 12\frac{1}{4}''$
E Knife (1)	$\frac{3}{4}'' \times 1\frac{1}{2}'' \times 9\frac{1}{2}''$

Note—I used American cherry throughout.

SPECIAL TIP: CARVING THE DETAILS

If you have any doubts at all as to how the carving ought to go—meaning the shape and the modeling of the details—the best way is to make a full-size Plasticine working model. All you do is roll out the Plasticine to the required $\frac{3}{4}''$ thickness, cut out the profile as seen in the plan view, and then whittle and model the form in much the same way as you would with the wood. Making and using a model is a winner on many counts. You can easily replace the Plasticine if you make a mistake, you can use the Plasticine to make trial cuts and, best of all, you can use dividers to take step-off measurements directly from the model through to the wood.



2 Transfer the angel design through to the top of the lid, and to the knife. Be mindful that in both instances it's important that the design be perfectly aligned with the center line. Use a hard pencil so that the lines are firmly indented.



3 Use a small penknife to cut the incised lines that make up the design of the lid. Work each V section incision or trench with three cuts—first a single stop-cut down the center of the V to establish the depth, followed by an angled cut to each side of the stop-cut to remove the waste.



4 Having made a Plasticine model to help figure out the intricacies of the design, take a small nosing shoulder-type plane and swiftly reduce the bulk of the waste. Shape the blade by angling down each side of the center line.

6 The broad modeling is best achieved by using a small-bladed penknife to make thumb-braced paring cuts. The technique wins on at least two counts—the thumb increases the efficiency of the stroke, while at the same time giving you maximum control. The cone shape of the skirt is achieved by first running a stop-cut around the waist, and then paring down at an angle toward the stop-cut.

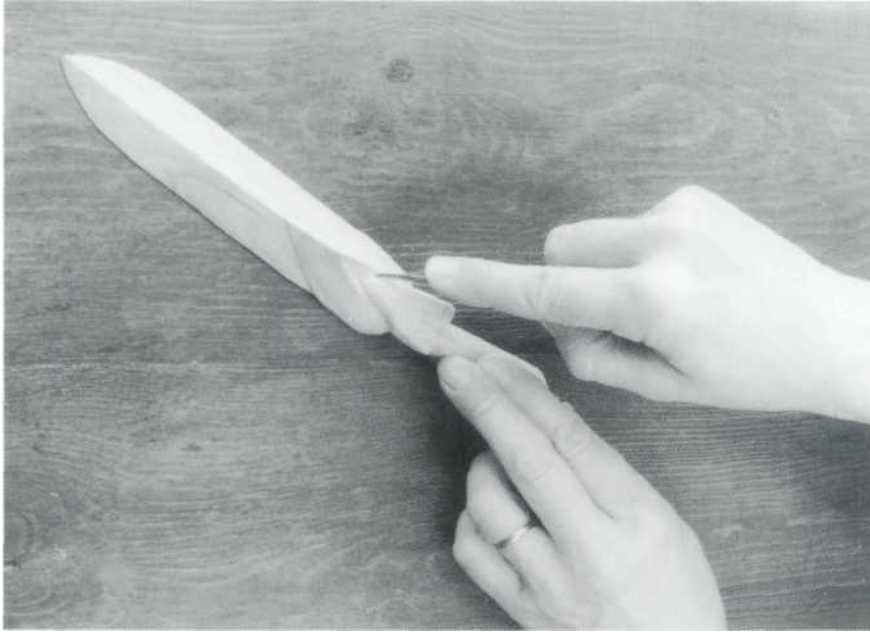


5 Use the three-stroke whittling method to block out and partially model the various basic forms.

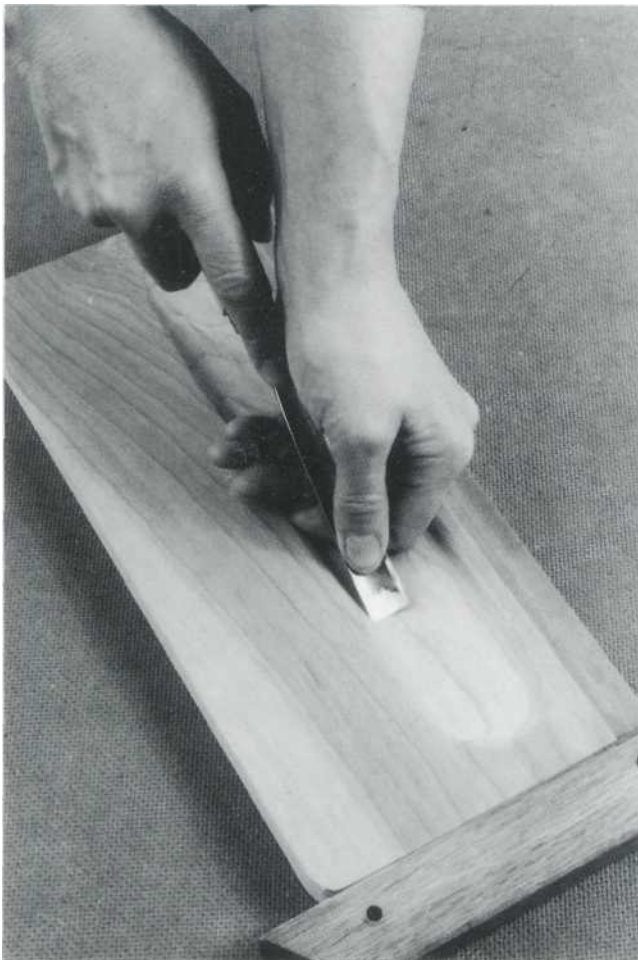
The working order is:

- Define the perimeter of the form—the skirt, head or whatever—by making stop-cuts straight down into the wood.
- Make angled cuts down into the stop-cuts to define the length and breadth of the form.
- Use restrained easing and paring cuts to rough out the details as seen in the plan side and end views.





7 The V section that goes around the top of the head is achieved by repeatedly making a sequence of three cuts—a deep straight-down stop-cut to establish the depth of the V, followed by two cuts that angle down and in towards the bottom of the stop-cut.



8 Once you have drawn out the shape and position of the pen tray, use a shallow sweep gouge to carve out a smooth-sided dip or depression.

USING THE SCROLL SAW

If you are new to woodworking and maybe a bit nervous, and you plan to make small fancy items like boxes, push-along, toys, chair backs or pieces of marquetry—meaning items using thin sections of wood that have a lot of delicately curved (fretworked profiles and pierced holes—then you can't do better than getting an electric scroll saw.

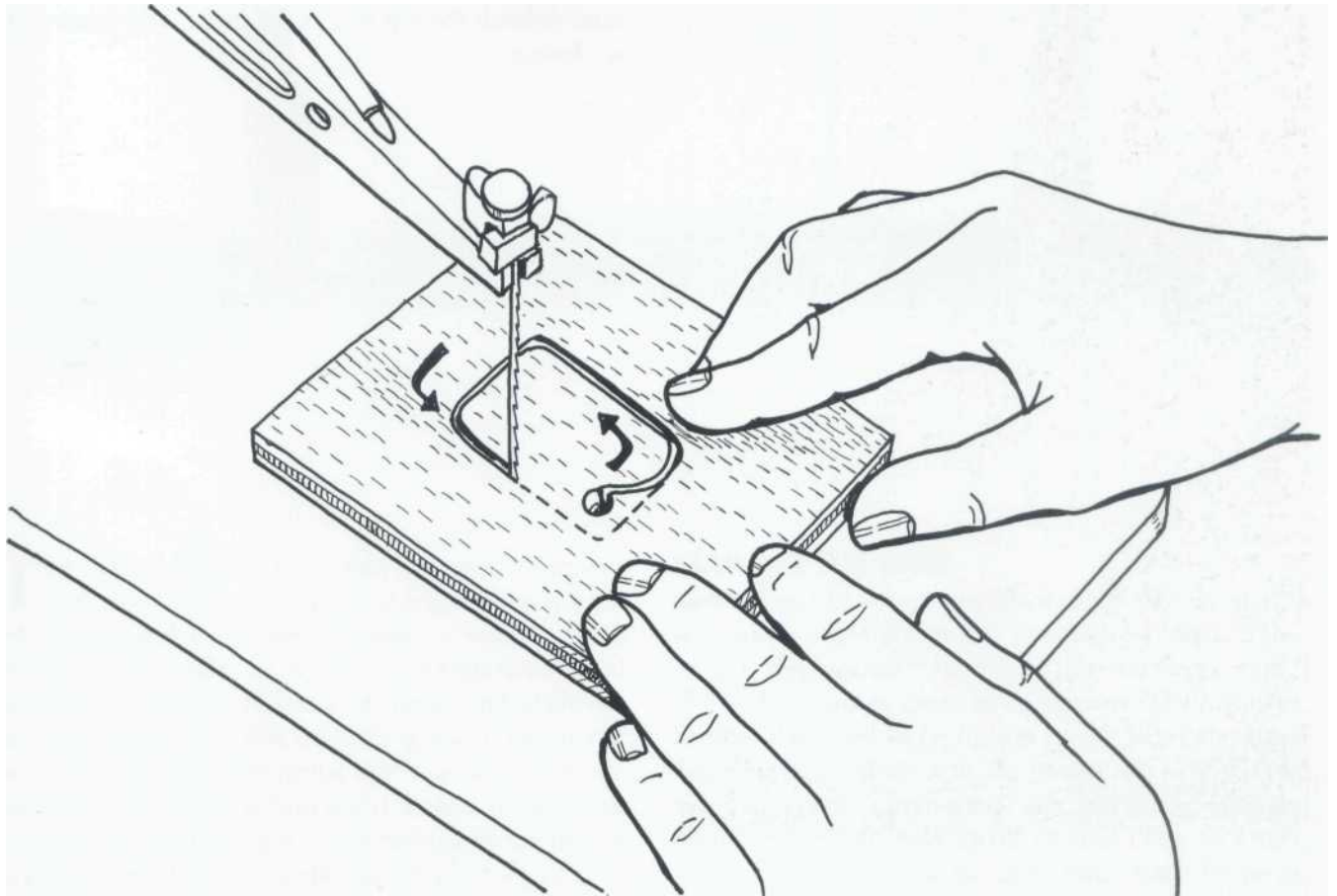
This machine, sometimes called an electric fretsaw or an electric jigsaw, is just about as safe as you can get. In truth, it is so safe that it is one of the few woodworking machines allowed in schools for young kids. In fact, I first saw one of these machines being used in a school by a ten-year-old—to make a jigsaw puzzle. Okay, so they can nip and worry fingers, but the working action is such that anything more than a grazed finger is almost impossible.

The scroll saw has a reciprocating blade, meaning a blade that joggles up and down as if to imitate the movement of a hand fret or coping saw. The bottom end of the blade is clamped in a chuck that is driven by the crankshaft, while the top end of the blade is clamped to the end of a spring-loaded arm. The blade is fitted with the teeth pointing downward, so that it cuts on the downstroke. In

use, the workpiece is advanced across the worktable toward the joggling blade, and maneuvered so that the moving blade is always presented with the line of the next cut. The wonderful thing about these saws is that the resultant cut edge is so clean that it hardly needs sanding. If you are thinking about buying and using an electric scroll saw, the following tips and pointers will help you on your way.

Saw Table—There are about six machines currently on the market—German, British, Canadian and American. Though they are all pretty good, it is most important that you get an up-to-date machine that has a table-tilt option. This feature allows you to tilt the worktable so you can make a cut that is variously angled to the working face, as in this project. A good tip is to rub over the work surface with a white candle before use. It lowers the wood-to-table friction so that the workpiece glides rather than staggers.

Blade Clamp—From one machine to another, there are all manner of weird and wonderful mechanisms used to clamp the blade. For example, one machine has a clamping block that is tightened by means of an Allen wrench/



CUTTING A PIERCED WINDOW

In use, the workpiece is maneuvered and advanced so that the moving blade is presented with the line of the next cut.

key, another has a pronged finger that supports pin-end blades, and yet another has a clamping block that is tightened by means of a large thumbscrew/wing nut. While each system has its good and bad points, I think overall the large thumb-screw is the best option. I say this because the Allen wrench option soon distorts, and the pin-holding mechanism on some machines is made of butter-soft, easy-to-bend metal.

Blades—The standard scroll saw blade is 5" long and flat-ended. Coming in a whole range of tooth sizes, from coarse through super fine, the blades are designed variously to cut everything from solid wood, plywood and plastic, to thin mild steel, brass and aluminum. If you find that the blade bends and drifts or burns the wood, then chances are it is badly tensioned and/or blunt and needs replacing.

Dust-Blowing Mechanism—When the saw is in use, the sawdust piles up and covers the line of cut so that you can't see where you are going. Though most scroll saws have a bellows and tube mechanism that blows the dust away from the drawn line, the pity of it is that the dust is blown directly into the user's face—all good fun! If this is a worry to you, then it's best to wear a face mask.

CUTTING AN INTERIOR PIERCED "WINDOW"

A good part of the pleasure of using a scroll saw is its ability to cut a perfect hole or "window" in the middle of a piece of sheet wood. For example, it is perfect for fretting out models, and for making pierced chair back slats—anything that is relatively small and intricate.

The working procedure for piercing enclosed "windows" is:

- Drill a pilot hole through the area of waste big enough to take the blade.
- With the machine unplugged, ease off the tension until the blade goes slack.
- Unhitch the top end of the blade from its clamping block.
- Pass the end of the blade up through the pilot hole and rehitch it to the top block.
- Retension the blade until it "pings" when plucked.
- Hold the workpiece firmly down on the table so that the blade is clear of the sides of the pilot hole, and then switch on the power.
- Fret out the "window" until the waste falls free.
- Finally, switch off the power and then release the tension, unhitch the top end of the blade, and remove the workpiece.

Classic Bow Saw



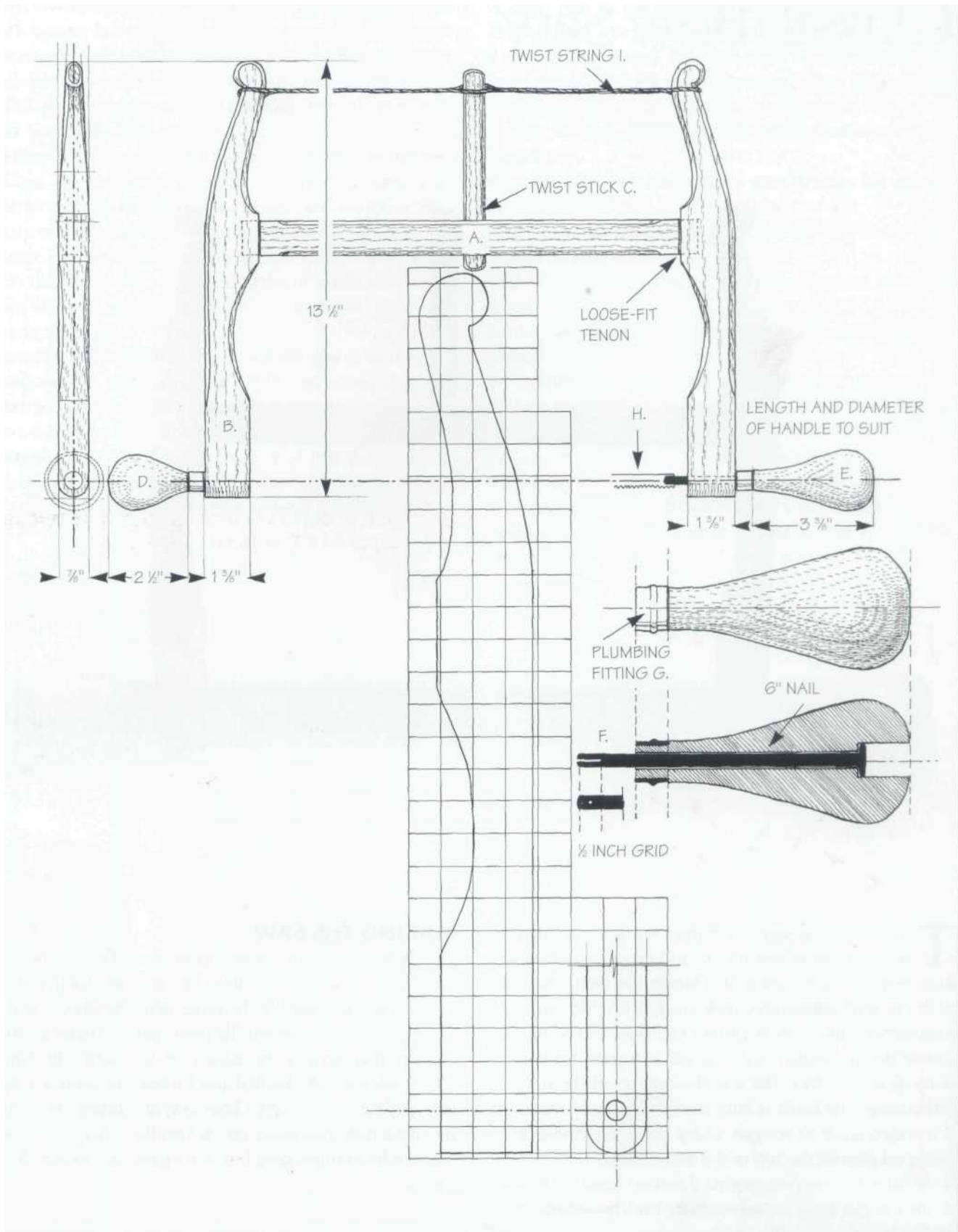
The classic bow saw, sometimes known as a Turner's saw, is a tool whose design and origins go way back into the dim and distant past. Though I've seen bow saws of this type illustrated on Greek vases, in English medieval manuscripts, in Albrecht Durer's etchings, and so on, the classic design is such that it is still as useful for curved work as it ever was. The actual workings of the saw are fascinating: The blade is held under tension by means of a wooden stick or tongue and a twisted twine that is wrapped around the top of the side cheeks.

What else to say, except that if you are looking to make a unique gift for a woodworking buddy—something really special—then this is a beauty!

MAKING THE SAW

First things first—buy your blade. I say this because, if your blade is a different size than the one used in this project, you can modify the other material sizes to suit.

The bow saw is made in three parts. There are the handles that need to be turned on the lathe; the fancy frame sides or cheeks that are fretted out with a scroll saw, coping saw or even a bow saw; and finally, there are the metal parts that make up the handles. Okay, so it does sound a bit complicated, but don't panic, it's as simple as can be.



SHAPING THE FRAME

Having pencil-press transferred the designs through to the wood, fretted out the shaped ends, and used a straight saw to cut out the crossbar, use a small spokeshave and a plane to skim the three component parts down to a good finish. Cut chamfered edges on the crossbar and the cheeks and generally round over the curved shapes, all as shown in the working drawings.

When you come to cutting the mortise and tenon joints—meaning where the crossbar fits into the end cheeks—all you have to remember is that the joints both need to be a loose fit. The best procedure is to cut the joint for a good push fit, and then trim the ends of the tenon to a rounded finish so that they are an easy rocking fit in the mortise.

Establish the handle centers on the bottom ends of the cheeks. Then run them through with a hole that is a loose fit for your 6" nails. Finally, use a piece of offcut to make the twist stick, sometimes called a toggle or a tongue.

TURNING THE HANDLES

Having studied the working drawings and seen how the two handles are quite different in length, take your chosen piece of wood—we used maple—and turn the two handles in one piece. Make sure the stubs or spigots fit your metal ferrules, and then rub them down on the lathe and part off.

As to how you drill the holes through the handles, it really depends on your workshop and equipment. I found that the best way was to grip and support the handle in the four-jaw chuck—meaning the chuck on the lathe—and then use a drill chuck mounted on the tailstock end of the lathe. The good thing about this method is that it is a foolproof way of making sure that the holes are perfectly centered. All I did was drill the larger diameter recess hole and then follow through with a smaller diameter hole.

When you have made the handles, all nicely smooth and drilled, then comes the tricky business of fitting the metal parts. It's best to start by fitting the ferrules. Take your metal tube (I used two copper plumbing fittings, but you can just as well use a slice off the end of a brass tube) and cut it off so that you have two 1/2" lengths or rings. Use a file and steel wool to polish the rings to a smooth, shiny finish, and then tap them in place on the turned handle stubs.

Finally, pass the 6" nails through the handles and the ends of the frame, cut them to length with a hacksaw, and cut slots into the ends of the nails so that they fit your chosen bow saw blades. Mark the position of the blade-end holes. Then run 3/32"-diameter holes through the nail ends, so that you can secure the blade ends with small nails or split pins.

PUTTING IT TOGETHER

When you have made all six component parts—the two scrolled cheeks, the crossbar, the two handles and the twist stick—then comes the fun of putting the saw together. Start by fitting the H-frame together. This done, pass the slotted nail ends through the bottom ends of the cheeks and fit the blade with the pins. Make sure that the teeth are looking away from the largest of the two handles. Wrap three or four turns of strong twine/cord around the fancy ends of the cheeks and knot the ends of the cords together to make a loop. Finally, slide the twist stick in place between the turns of twine and twist it over and over so that the cheeks pull apart and the blade is held under tension.

SPECIAL TIP

Since the bow saw cheeks are put under a lot of tension and stress, it's vital that you choose the best possible wood. I've checked around and seen that the handles are usually made from beech, maple or ebony, and the H-frame made from beech or ash. We have gone for an ash frame and maple handles.

MATERIALS LIST

FRAME

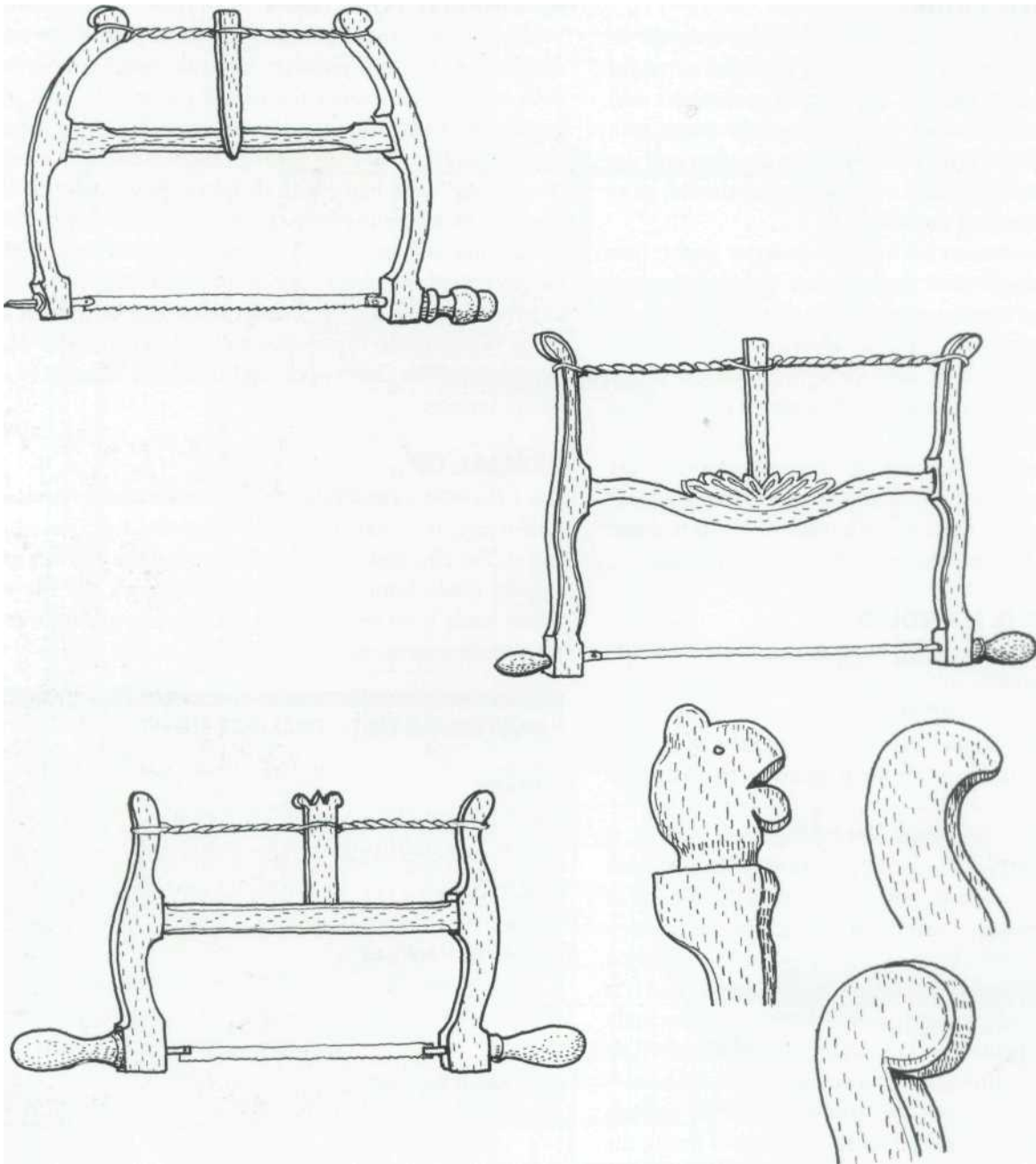
- A Crossbar (1) $\frac{1}{2}'' \times \frac{7}{8}'' \times 12''$
- B Frame cheeks (2) $\frac{7}{8}'' \times 2'' \times 14''$
- C Twist stick (1) $\frac{1}{4}'' \times \frac{3}{8}'' \times 6\frac{1}{2}''$

TURNED HANDLES

- D Large handle $2'' \times 2'' \times 14''$ —this length allows for a good amount of turning waste
- E Small support handle (1)

HARDWARE AND EXTRAS

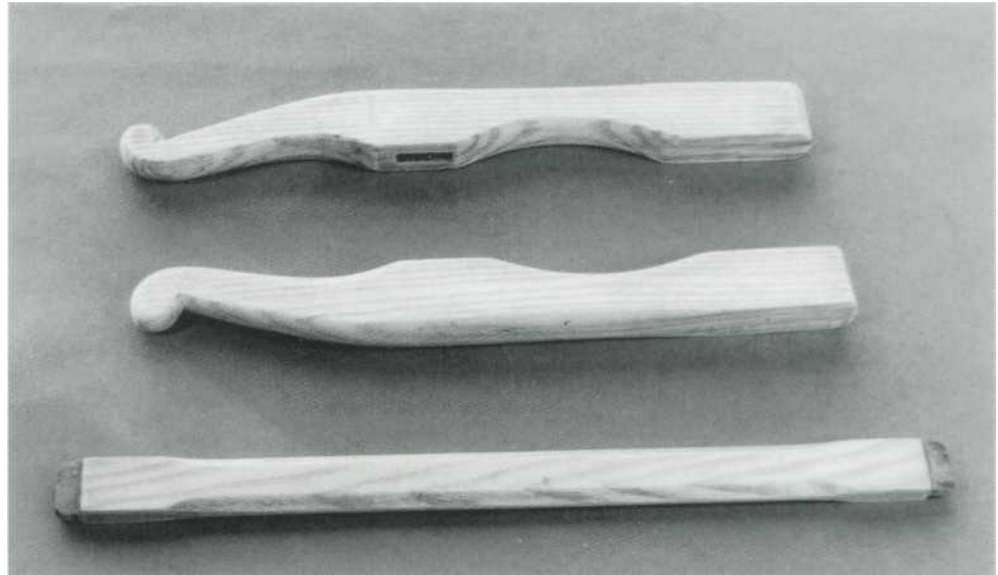
- F Metal rods to hold the blade 6" nails (2)
- G Metal ferrules $\frac{1}{2}''$ -diameter tube (2)
- H Bow saw blade 12" blade
twist cord, 60" long
- I Strong waxed twine 8' long
- J Split pin



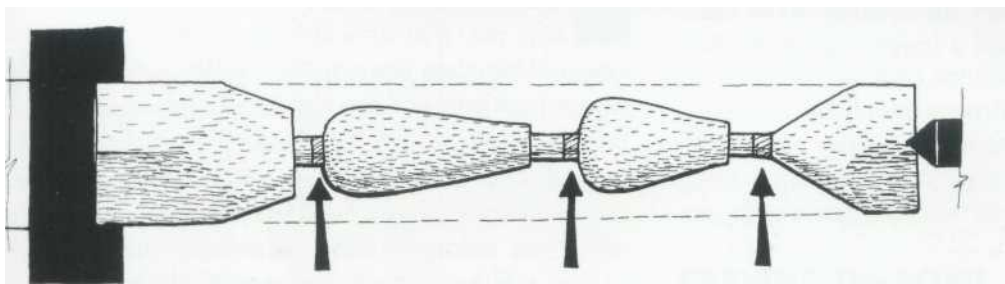
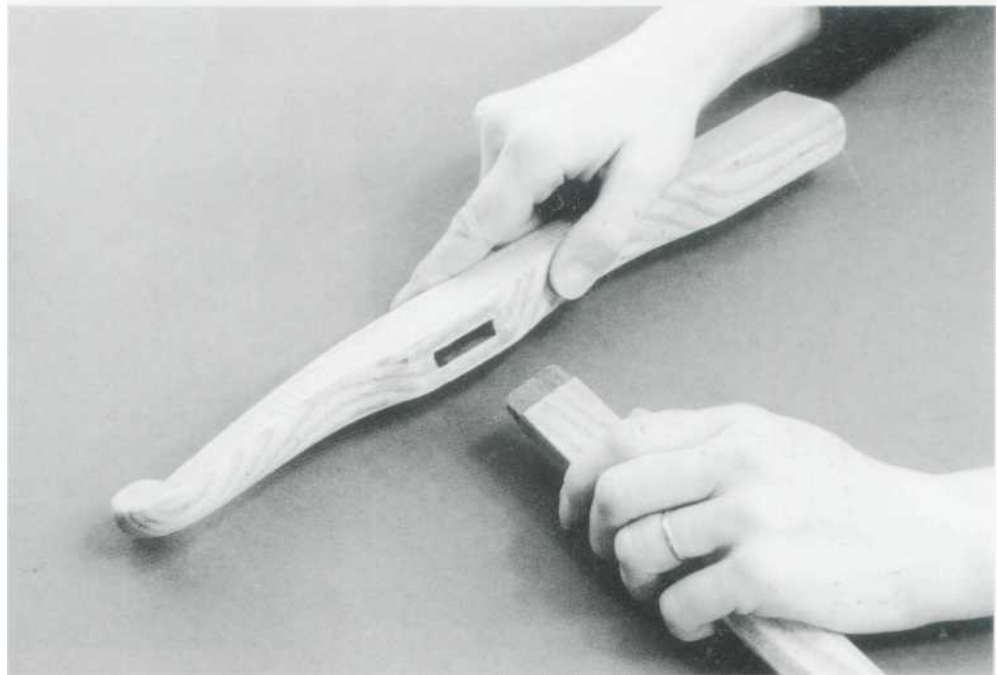
STEP-BY-STEP STAGES

1 An old English bow saw with curved cheeks and stop-chamfered details is shown at top left; an old English bow saw with unusual carved detail at top right. An English bow saw with a whittled twist stick is shown at center left; a selection of carved cheek scroll designs at center right. Shown at bottom, a European bow saw tends to be bigger, with straight cheeks and a much wider blade.

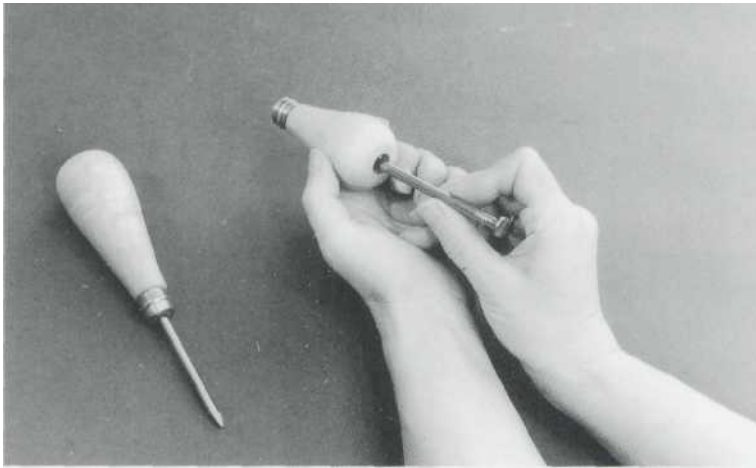
2 The three parts that go to make the H frame: the two scrolled cheeks and the crossbar. If you look closely at this photograph and compare it to the finished project, you will notice that I had to shorten the crossbar to fit the only available blade.



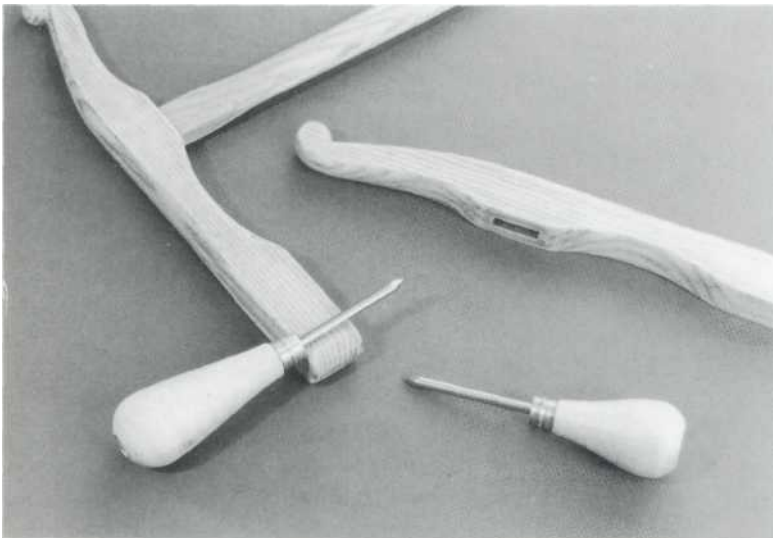
3 Trim and adjust the tenon so that it is a loose rocking fit in the mortise. Notice how the corners of the mortise need to be nipped off at an angle.



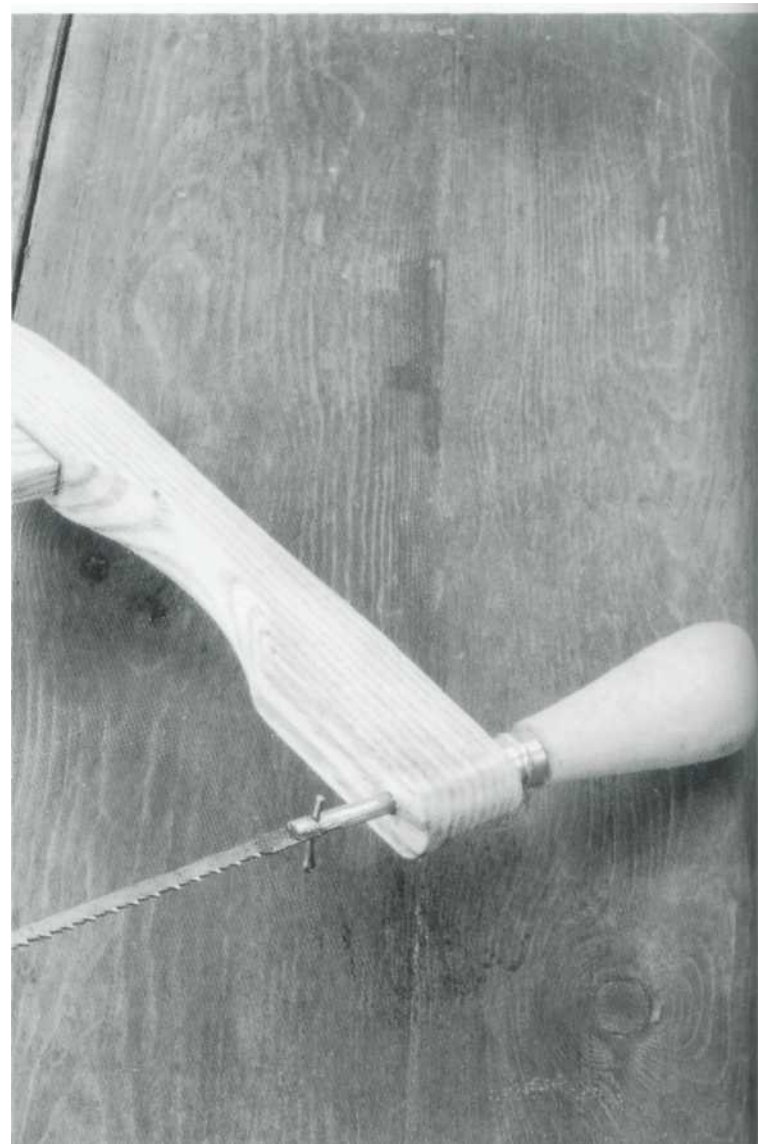
4 The on-lathe sequence—from left to right—the headstock waste, the parting waste, the large handle, the ferrule stub, the parting waste, the small handle, the ferrule stub, and finally the parting and tailstock waste. Note that the arrows indicate the parting waste.



5 Bend the nail slightly and pass it through the handle for a tight captured fit. See how the nail head fits snug and flush in the recess.



6 Check the length of the nail against the width of the frame and then mark the position of the blade slot accordingly. If you need a longer nail stub, then deepen the recess hole.



7 Slide the blade in the slot and fix it in place with a split pin. If at some time you need to fit a slightly longer blade, then you can slide washers on the nail between the ferrule and the cheek.

Carved Fruit Bowl



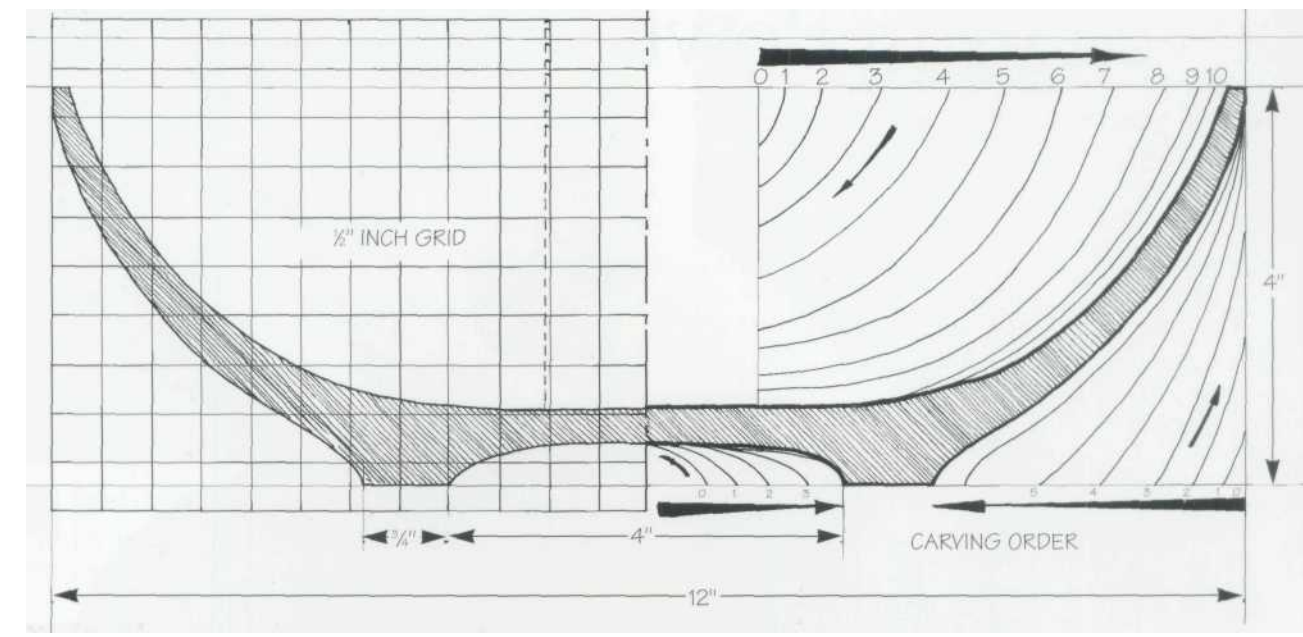
There is something magical about carving bowls. Do you know what I mean? One moment you have a slab of wood—nothing very special, just a piece of wood that might or might not end up on the fire—and the next moment you have a carved bowl that is a useful part and parcel of your life. We have this bowl that my Welsh grandfather made. It wouldn't win prizes and it isn't so beautiful, and it is a bit stained and has somehow been slightly scorched on one side, but for all that, it has always been with me. When I was a kid with chicken pox, the bowl was filled with apples and placed beside the bed; it was beside me when I was studying for my exams; it was given to me when I got married, and no doubt I will give

it to one of my sons somewhere along the line. It has become an heirloom, something precious!

So there you go, if you are looking to make a special gift, one that might well see the next millennium in and out, then perhaps this is the project for you.

CARVING THE BOWL

Before you do anything else, you need to search out a block of easy-to-carve wood about 4" thick, 12" wide, and 12" along the run of the grain. You could use a wood like lime, a fruit wood, a piece of yellow pine, or whatever, as long as it's relatively easy to carve and free from splits and knots.



Pencil label the two 12" X 12" faces, one "top rim" and the other "foot rim." Now, with the slab set "top rim" face uppermost, first draw crossed diagonals to establish top-center; then use the compass or dividers to scribe out two circles, one with a radius of 6" and one with a radius of 5 1/2". Rerun this procedure on the "foot rim" side of the slab, only this time have the two circles at 2 3/4" radius and 2" radius. When you're happy with the way the wood has been set out, use a band saw to cut out the blank. This done, move to the drill press and run a good size pilot hole into the center of the "top rim" side of the wood. Drill down to a depth of exactly 3 1/4". I used a 2"-diameter Forstner bit, but a 1"-diameter would be fine. Being mindful that the bottom of the hole marks both the level of the inside bowl and the thickness of the base, it is vital that you don't go deeper than 3 1/4".

With the workpiece set down on the bench so that the "top rim" face is uppermost, take a mallet and a straight, shallow sweep gouge and work around the rim of the drilled hole cutting back the waste. The working procedure should go something like this: Work once around the hole scooping out a ring of waste, work around this initial ring scooping out another ring of waste, and so on, all the while backing up until you reach what will become the inside rim of the bowl. When you have cleared one level of waste, return to the edge of the drilled hole and

start over. So you continue, clearing the waste level by level until you begin to establish the beautiful shape of the inside of the bowl.

Use whatever tools best do the job. For example, I started with the straight gouge and the mallet, then changed to a front-bent gouge, and finally I switched to using a small hooked knife for tidying up.

When the shape of the inside of the bowl is well established, turn the workpiece over so that the base is uppermost, and set to work carving and shaping in much the same way as already described. The carving procedure for the outside of the bowl is pretty straightforward, only this time you need to work in two directions—from the inside edge of the foot ring and in toward the center of the base, and from the outside edge of the foot ring and out and down towards the rim.

And so you resume, carving the inside of the foot ring a little, carving the bold convex shape of the outside of bowl profile, carving the inside of the bowl a tad more, and so on and on, until the wall thickness ranges between about 3/8" at the rim to 5/8" outside the foot ring. And of course, all along the way, you have to keep your tools razor sharp so that each and every cut is clean, crisp and controlled. As you get nearer to the beautiful bowl shape that is hidden just below the surface of the wood, you have to be more and more cautious with your cuts.

SPECIAL TIPS AND RULES OF THUMB

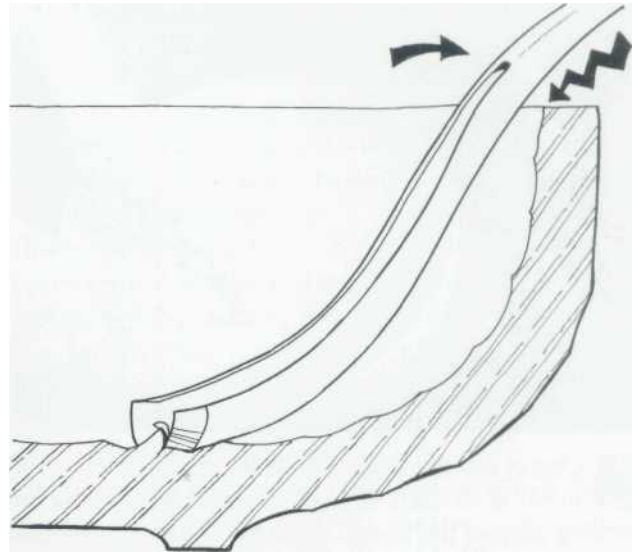
It's all straight forward, as long as you stay with the following guidelines:

- Try to set up a work rhythm—carve for a few minutes, then stroke the tool on the stone and strop, then stand back and be critical, and then go back to a few minutes of carving, and so on. You will find that this way of working ensures that everything is controlled . . . the tools stay sharp, you have time to assess your progress, and you don't get tired.

- As the bowl nears completion, you will find that it is more difficult to grip and hold the bowl. The best way is to either cradle it in your lap or nestle it on a pile of rags.

- When you are carving the inside of the bowl—when it's nearly finished—you have to be extra careful that you don't lever on and break the relatively fragile rim. To prevent this end, you might need to use one of the bent gouges rather than a straight gouge. I would recommend either a no. 5 bent gouge at about 3/4" wide, or perhaps a no. 7 spoon gouge at about the same width. Be mindful that the flatter the sweep (meaning the shape of the blade in cross section) the greater the chance that the corners of the blade will cut and tear the wood.

STEP-BY-STEP STAGES

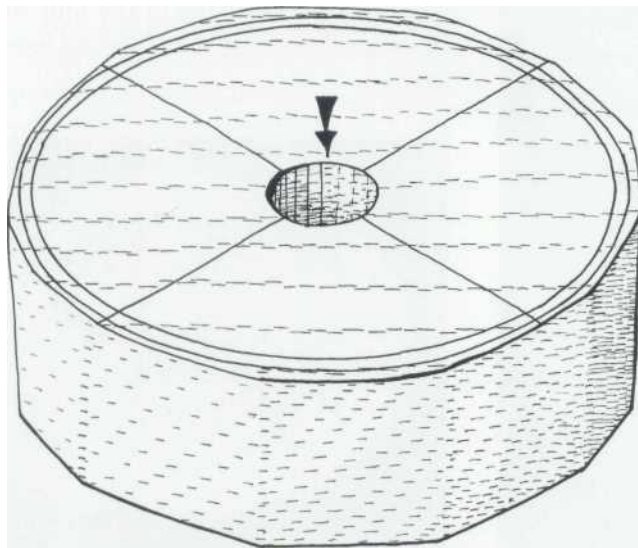


CARVING THE BOWL INTERIOR

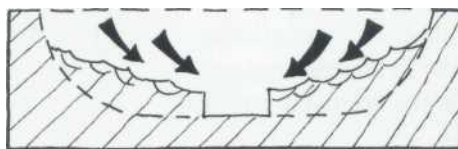
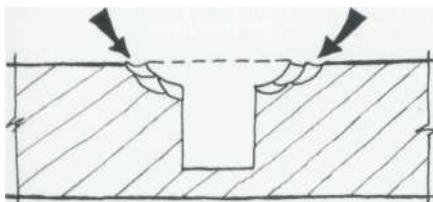
The swooping shape of the bent **gouge** lets you carve the concave curve without levering the shaft of the tool on the **fragile** rim.

MATERIALS LIST

A Piece of wood (1)	4"×12"×12"—with the grain running along the length, meaning across the bowl
---------------------	---



1 Having established the center of the square slab by drawing crossed diagonals and cutting the circular blank, use the 2" diameter Forstner bit to run a 3 1/4"-deep pilot hole down into the center (top). Work around the hole clearing the waste (bottom left). Clear the waste level by level, all the while backing up from the pilot hole through to the rim (bottom right).

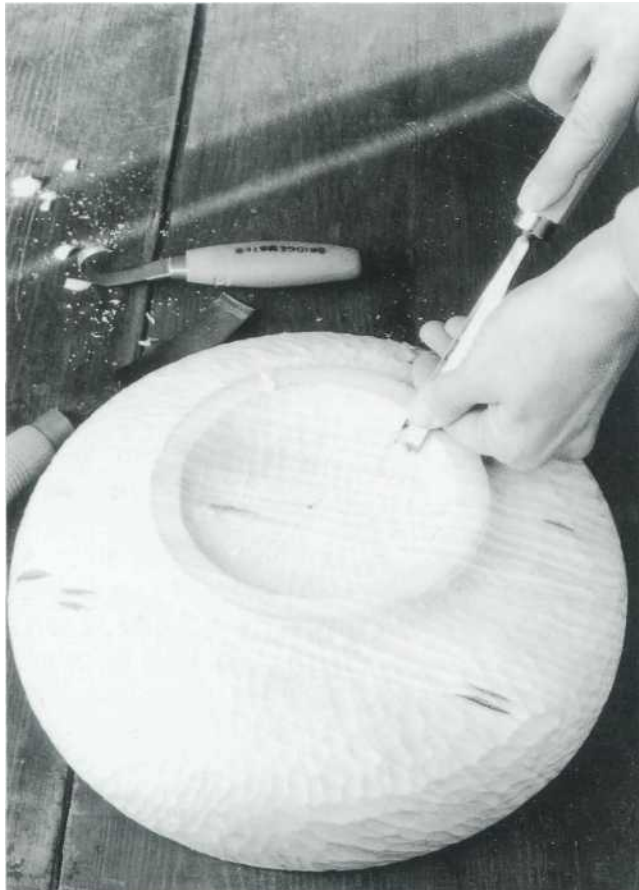




2 One of the easiest ways to bring the bowl to a good finish is to use a hooked sloyd knife. As you are working around the inside of the bowl, be mindful that all along the way you will need to adjust your angle of cut to suit the ever-changing run of the grain.



4 The beautiful concave curve shape that runs down from the outside of the foot rim is achieved by thrusting down with the blade and levering back with the handle.



3 When you come to carve the inside of the foot—meaning the inside of the base ring—use small, controlled cuts, with one hand pushing and the other guiding and being ready to break. Notice how in this instance you can lever the shank of the tool on the relatively strong foot rim.



5 All along the way you will have to make repeated checks with the caliper. Try to aim for a section that starts relatively thick at the base and gradually tapers up to a thin rim.

A GOOD WOOD GUIDE FOR CARVING

Wood carving is a wonderfully fulfilling and exciting area of woodworking, but only, if you choose the right wood. When I first started carving, I had in mind to carve a female torso, a Venus. I'm sure you know what I mean, a bit like Marilyn Monroe, but more so. Though my teacher told me to use lime, when I arrived at the wood yard and saw the astronomical prices, I was swiftly talked into buying—at a quarter of the price of lime—a massive piece of I-don't-know-what.

Well, when I got my "bargain" wood back to the workshop, it was a nightmare. The wood was green and wet, it was lull of iron-hard knots, it started to warp and split the moment I started carving, it made my tools rusty, the grain was wild and twisted—I could continue listing its terrible qualities. Yes, I did manage to finish my carving, but at what cost to my strength and sanity? It was truly awful, a sort of mad mix-up between Marilyn Monroe and a glandular Guernsey!

The moral of this sad little tale from my teenage years is there are no shortcuts, and there are very few bargains. You *must* use a piece of good wood. The following listing will help you on your way:

Alder—A sapwood tree common in low-lying areas. A wood traditionally used by North American Indians and early settlers, it is especially good for bowls and general kitchenwares.

American Whitewood—Known variously as tulipwood, basswood, canary wood, and many other names besides, this is a soft, easy-to-carve wood.

Apple—A hard dense, close-grained fruitwood, it comes in small sizes, carves well and takes a good polish. Apple is traditionally used for small items of treen (woodenware), and for kitchenwares.

Beech—A heavy, relatively easy-to-carve wood that has a yellow-gold sapwood and a reddish heart. Beech is particular! good for carved furniture.

Boxwood—A beautiful, pleasant-smelling, butter-smooth wood that is extremely hard and close-grained. If you want to carve items like jewelry, hair combs, small dishes and boxes, then boxwood is a good choice.

Cedar—Pencil Cedar is a favorite wood for carving. It cuts to a clear pink-brown finish.

Cherry—American cherry is a close-grained, hard-to-work, reddish brown wood that comes in relatively small widths. It carves well and can be brought to a wonderful high-shine finish.

Hickory—Straight-grained with a white sapwood and reddish brown heartwood, hickory is often the first choice for large sculptural carvings.

Horse Chestnut—White if it is felled in winter, and yellow-brown if it is felled later in the year, this wood is especially good for carved furniture details and for dairy and kitchenwares.

Holly—A close-grained, ivory-white wood that carves well and takes fine details, it is a good wood for small desktop toys, and kitchenwares.

Lime—English lime is one of my favorite woods. Butter-colored, close-grained and easy to carve, it is the traditional choice for architectural work, like mirror surrounds, coats-of-arms, small sculptures and interior trim. Though linden or basswood are often described as being the same as lime, they are to my way of thinking quite different.

Maple—Soft maple is the traditional choice for general carvers—used for making such things as furniture, domestic wares and musical instruments—while rock maple is preferred for heavier items like sports gear and some laundry wares.

Pear—A pink-brown wood that has a close-grained, satiny finish. It's really good for kitchenwares.

Plum—One of my favorite woods. Though it is certainly very difficult to carve, the color and texture are special—especially good for small presentation pieces.

Sycamore—A hard, light-colored wood, it carves and finishes well. Sycamore is a top choice for dairy and kitchenwares, where it is important that the wood leave no smell or taint.

Yellow Pine—White to reddish light brown, it is good for large sculptural carvings and interior details. It has been used traditionally in shipbuilding and interior joinery. If you order the wood unseen, be sure to specify "smooth first growth." If you don't, there is a good chance that you will be given poor-grade, coarse and knotty second growth.

Gilded Scroll Shelf

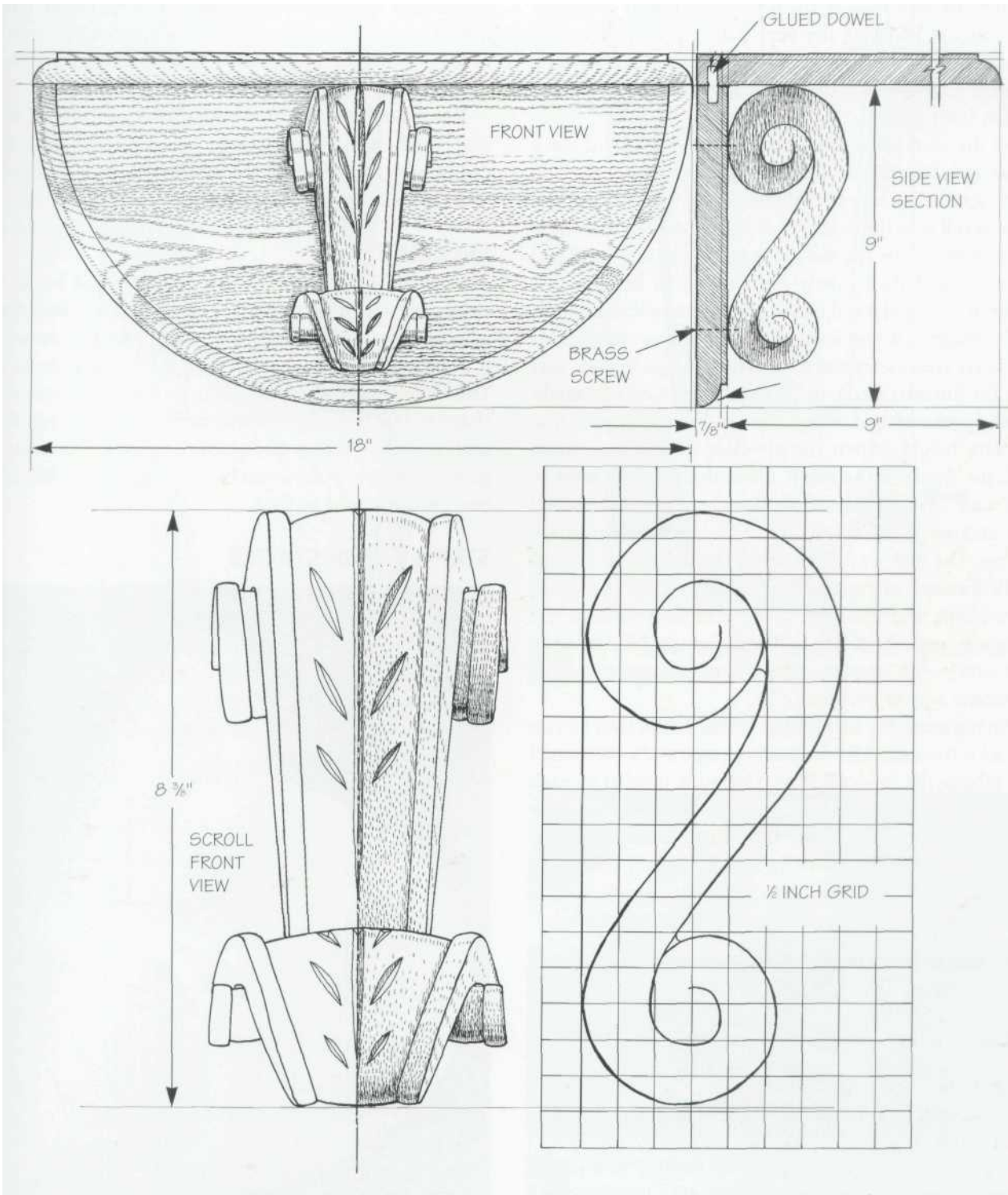


My dictionary defines a console shelf as being an ornamental bracket—especially one used to support a bust—while a scroll is described as being a decorative carving in the form of a stylized roll of parchment. Okay, not very exciting you might think, just a shelf and a bracket. But give the shelf a semicircular form and an ogee-type lip profile, embellish the scroll with a wee bit of carving and coat of gold paint, and then put the two together, and suddenly—Pow!—you have a really special eye-catching item, a truly unique and dynamic piece of woodwork.

MAKING THE SHELF

The actual shelf is very straightforward—really no more than two half-circles butted and dowelled at right angles. That said, you do have to be mindful at the layout stage that the top board—the one that will become the shelf surface—needs to measure the radius of the circle from front to back, plus the thickness of the wood.

Use a compass, ruler and square to set out the wood: Fret the two forms out with a band saw. Use a router or moulding plane to cut the lip profile. Then use glue and hidden dowels to butt the forms together at right angles.



MAKING THE BRACKET

Having chosen your block of easy-to-carve wood, press transfer the side view of the scroll through to the wood and then cut it out on the band saw. Then run a center line down the front face. Next, take some masking tape and use it to establish the tapered shape of the scroll as seen in front view.

Set the workpiece side-down on the bench and use a mallet and shallow-sweep straight gouge to lower the side of the scroll. The best way of visualizing the lowered side of the scroll is to think of it as a mountain road that starts at the center of the big end of the scroll, curls around and downhill, and then slowly back uphill to finish at the center of the small scroll. Staying with this mountain-and-roads imagery, if you leave the scroll on its side, and if you lower your viewpoint to bench level, you will see that with the finished scroll, the scroll centers—or you might say the peaks around which the roads curl—are both at the same height. When you are clear in your own mind as to the shape of the scroll, carve down to the level of the "road" on one side of the scroll, then flip the scroll over and work the other side in identical mirror-image reverse. The best way of ensuring that the scroll is symmetrical as seen in front view is to slightly lower the "road" on one side and then the other, and then back to the other side, and so on. You will find that this little-by-little approach—with constant reference to the center line—is the easiest way to proceed.

Having made the sides of the scroll, turn it over so you can see it front-on. Use the masking tape and a soft pencil to establish the 1/4"-wide track that runs parallel to each side edge. When you are happy with the guidelines, use a knife and gouge to work and model the central area until it is lowered by about 3/16" and is slightly convex.

When you have what you consider is a well-formed and modeled scroll, use the graded sandpapers to rub it

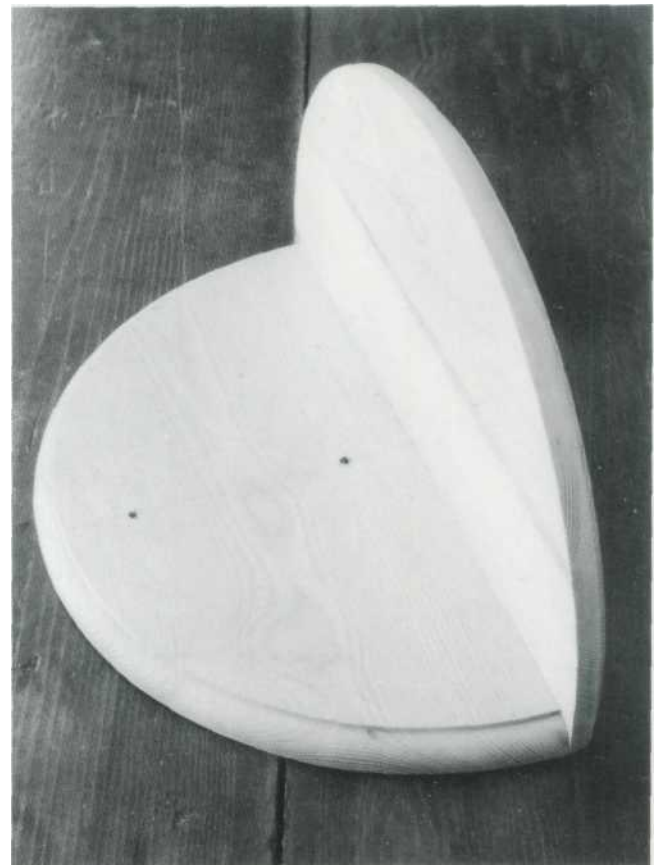
down to a smooth finish. Make sure that all the nooks and creases are crisp and clean. This done, draw the stylized foliage imagery on the front face of the scroll, incise it with the knife, and then give the whole works a coat of matte white undercoat paint, followed by a coat of best-quality gold paint.

Run a couple holes in from the back of the shelf support, use brass screws to fix the bracket to the shelf, and finally give the whole works a coat of thin varnish and/or a burnishing with beeswax polish.

SPECIAL TIP

Though generally in woodcarving your wood has to be attractive, straight-grained, free from splits and knots and relatively easy to carve, there are times when, as the wood is to be painted, you don't have to worry about its looks. This being the case, you could go for an inexpensive, characterless but easy-to-carve variety like jelutong. That said, if you relish the notion of the project but want to go for a uniform plain wood blond look, then I think your best choice would be lime.

STEP-BY-STEP STAGES



1 Butt the two halves of the shelf together and fit with glue and secret dowels.

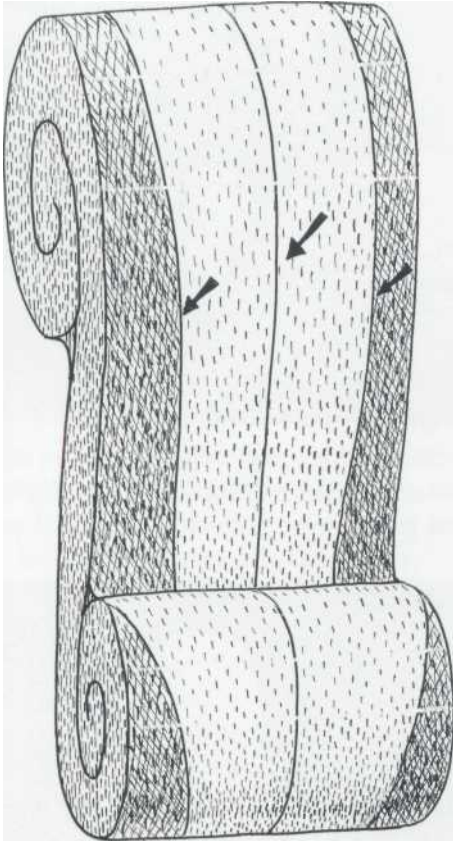
MATERIALS LIST

SHELF BRACKET

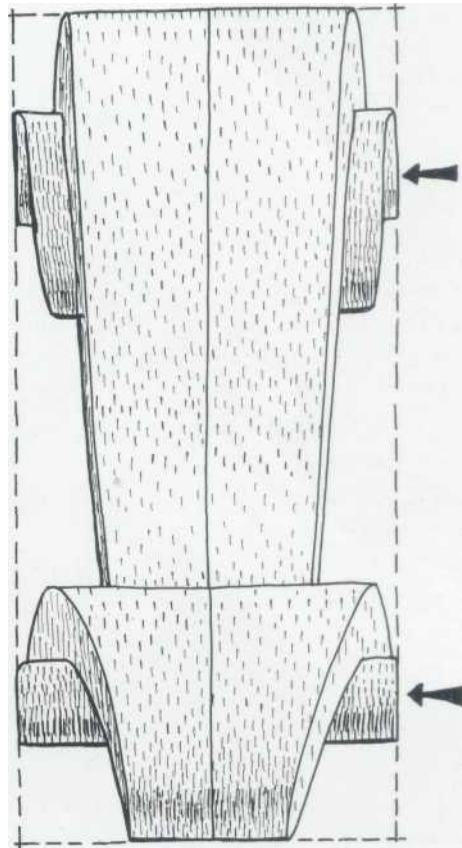
- A Top of shelf (1) $7/8" \times 9 7/8" \times 18"$
- B Back board (1) $7/8" \times 9" \times 18"$
- C Carved bracket (1) $4" \times 5" \times 10"$

HARDWARE AND EXTRAS

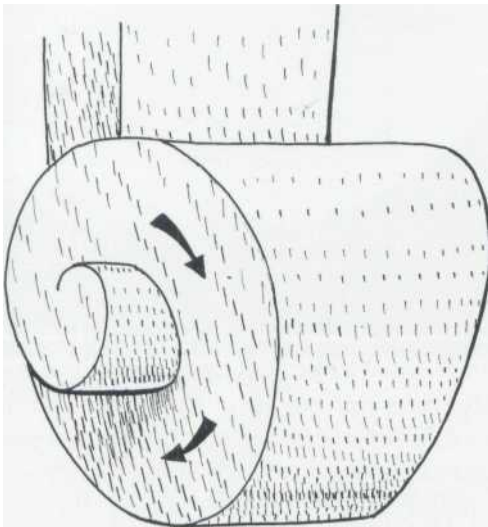
- D 2" brass countersunk screws (2)
- E White matte undercoat paint
- F Best-quality yellow-gold paint or gilding paste



2 When you have made the blank and used the masking tape to establish the shape of the bracket as seen in front view, shade in the waste that needs to be cut away. Note that the arrows indicate the center line and the sides.



3 If you have carved it correctly, you will see that the scroll peaks are at the same level.



4 The mountain road analogy perfectly describes how the side-face curls down, around and up. Be watchful as you lower the "road" that the "cliff face—meaning the face that in this view goes vertically up from the road and through to the peak—is cleanly worked.



5 Use a knife to clean up the sides and to deepen the stop-cut that defines the depth and shape of the camber.



6 The incised cuts are best worked with three strokes: one stop-cut to set in the center line and to establish the depth of the incision, followed up by an angled cut at each side to establish the width of the incision and to remove the waste.



7 Be careful when you are working the top of the small scroll that you don't dig too deeply into what will be end grain.



8 Having used a ruler and square to draw in the center line, do a dry-run fit of the scroll. Establish the position of the screw holes by taking your eye-level down to the face of the wood and identifying the scroll-to-shelf contact points.

GILDING THE SCROLL BRACKET

Woodworkers are forever coming up with new and exciting ideas. I'm sure you know what I mean. One moment you are half way through a project, and the next . . . Eureka! A new idea or variation springs to mind. And so it was with this project. The moment I had finished describing how to carve the bracket and give it a lick of gold paint, it suddenly occurred to me that perhaps it would be more in keeping with the wood carving tradition to gild the bracket.

Though gilding is a technique that requires a good deal of time and patience, the end result is stunning, well worth the effort. There are two methods of gilding: oil and water. I have opted for what is best described as the shortcut oil technique. That is to say, I follow the whole procedure for the gold painting, and then finish up with the gilding.

THE GILDING PROCEDURE

Give the finished carving a couple of coats of matte white undercoat paint followed by a coat of gold paint, and wait for the paint to dry. Then take a piece of fine-grade sandpaper and rub the carving down to a smooth-to-the-touch finish—the smoother the better.

Being mindful that the oil gold size dries in about 25 minutes, give a small area at the back of the bracket a swift thin coat. When the size is tacky—almost dry—slide one of the gold leaf sheets out onto the plywood and cut it into small postage-stamp pieces. Press straight down with the full length of the blade.

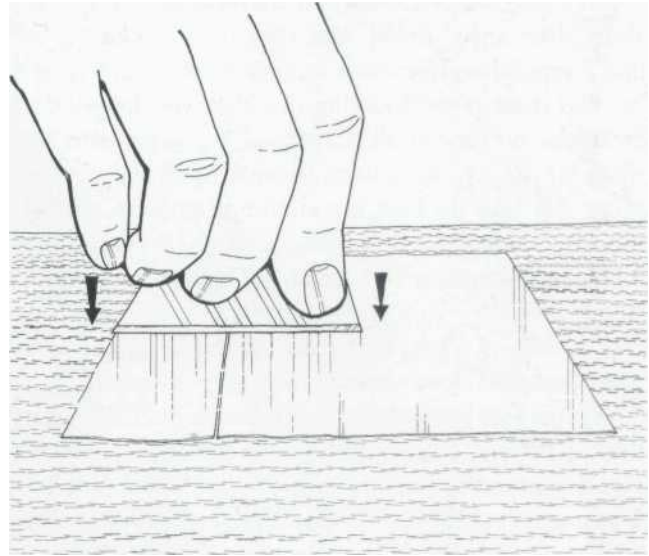
Now for the tricky part! Take the brush or tip, pass it a couple of times over your hair to increase the static, and then touch it down so that it picks up a small piece of gold leaf. Lay the gold leaf down onto the tacky size and dab it into place with a pad of lint-free cotton cloth. Take up the second piece of gold leaf and lay it down alongside the first so that there is a slight overlap. Continue until the whole surface of the bracket is covered in gold.

Finally, dust the surface with a dry brush to remove loose pieces of gold, and the job is done.

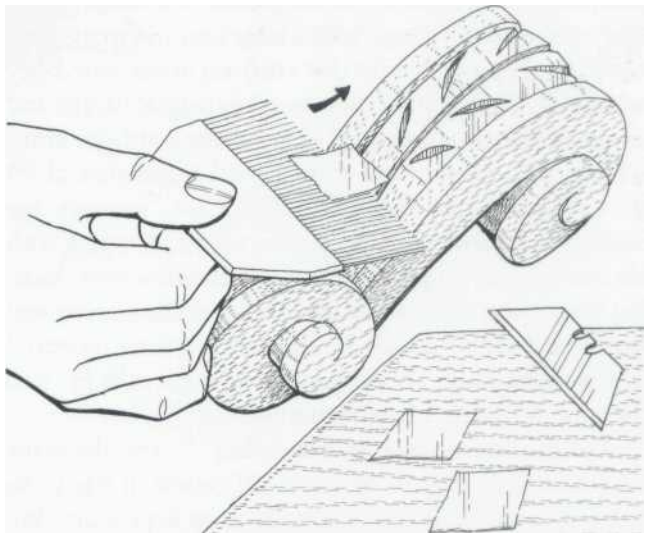
MATERIALS LIST: OPTION

- A Quick-drying oil gold size
- B 25-leaf book of gold leaf—or metal leaf (imitation gold) at a quarter of the price
- C Gilder's brush or tip
- D Craft knife blade
- E Piece of easy-to-hold plywood (12"×12")

STEP-BY-STEP STAGES



- 1 Having made sure that everything is clean, dry and free from dust—your hands, the blade and the plywood—take the blade and press the whole length of the cutting edge down hard on the gold leaf. Make the cut by slightly rocking the blade.



- 2 Wipe the brush over your hair to increase the static, then swiftly pick up the gold leaf and lay it down on the tacky gold size. Press the leaf down with a clean cotton pad.

COMBINATION AND MULTIPLANES

I don't like routers. Okay, so maybe they are the best thing since sliced bread. Yes, they do a wonderful job, and I agree that they aren't as expensive as they used to be, and there is no doubting that they get the job done in almost no time at all. I know all the arguments. The thing is, I don't like routers because of all the dust and noise. But how do I cut my moldings, grooves, tongues, rounds, hollows and all the other profiles? Well, the beautifully simple answer is, I use an old Stanley 45 combination plane.

The Stanley 45 is, to my way of thinking, one of the most beautiful woodworking tools ever invented.

It came into being at the end of the nineteenth century, when there was a huge push by the iron plane manufacturers to come up with a single do-it-all plane. You have to remember that up until that time, every type and size of slot, tongue, fillet and fancy profile needed to be worked with a dedicated plane. Can you imagine? If you were a keen woodworker in the nineteenth century, it's likely you would have needed 40 to 50 or more different wooden moulding planes!

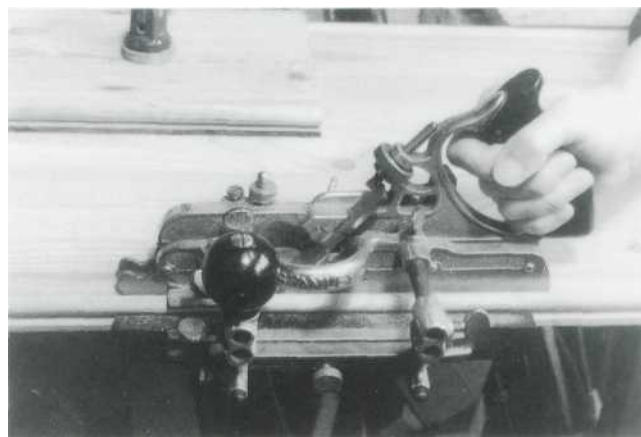
The Stanley 45 is a quality tool, more like a hand-built gun than a plane. It has a main body piece with a sledge-skate sole runner and a rosewood handle; a cutter clamp and integral depth gauge with a large knurled wheel; two nickel steel outrigger arms that are fixed to the main body with screws; a middle section with an integral handle and sledge-skate sole runner that fits onto the outrigger arms; a fence with a rosewood runner; and a selection of 45 plus cutting irons. And as if all that isn't enough, my Stanley 45 is covered in fancy cast metal motifs; dripping with chrome and nickel plate; heavy with thumbscrews, locking nuts, wing nuts, adjusting screws, cutting spurs and knobs; and supplied with the set of cutting irons packaged in a wooden wallet. Better yet, the whole works fits into the most attractive tin presentation box.

And just in case you are wondering . . . yes, the plane does indeed live up to its looks. Of course, it has to be carefully tuned and the irons need to be kept sharp, but that said, it is a most efficient tool.

Setting up the Plane

As to why Stanley stopped making the "45" way back in the 1960s, who can say. They are still being sought by today's woodworkers, and though they are relatively easy to obtain, the main problem is that most secondhand 45's come disassembled and without the necessary setting, tuning and using instructions.

And just in case you are one of the growing army of avid user-collectors who have a secondhand Stanley 45, and would dearly like to know how it needs to be sorted



STANLEY COMBINATION PLANE

The legendary Stanley 45 in action.

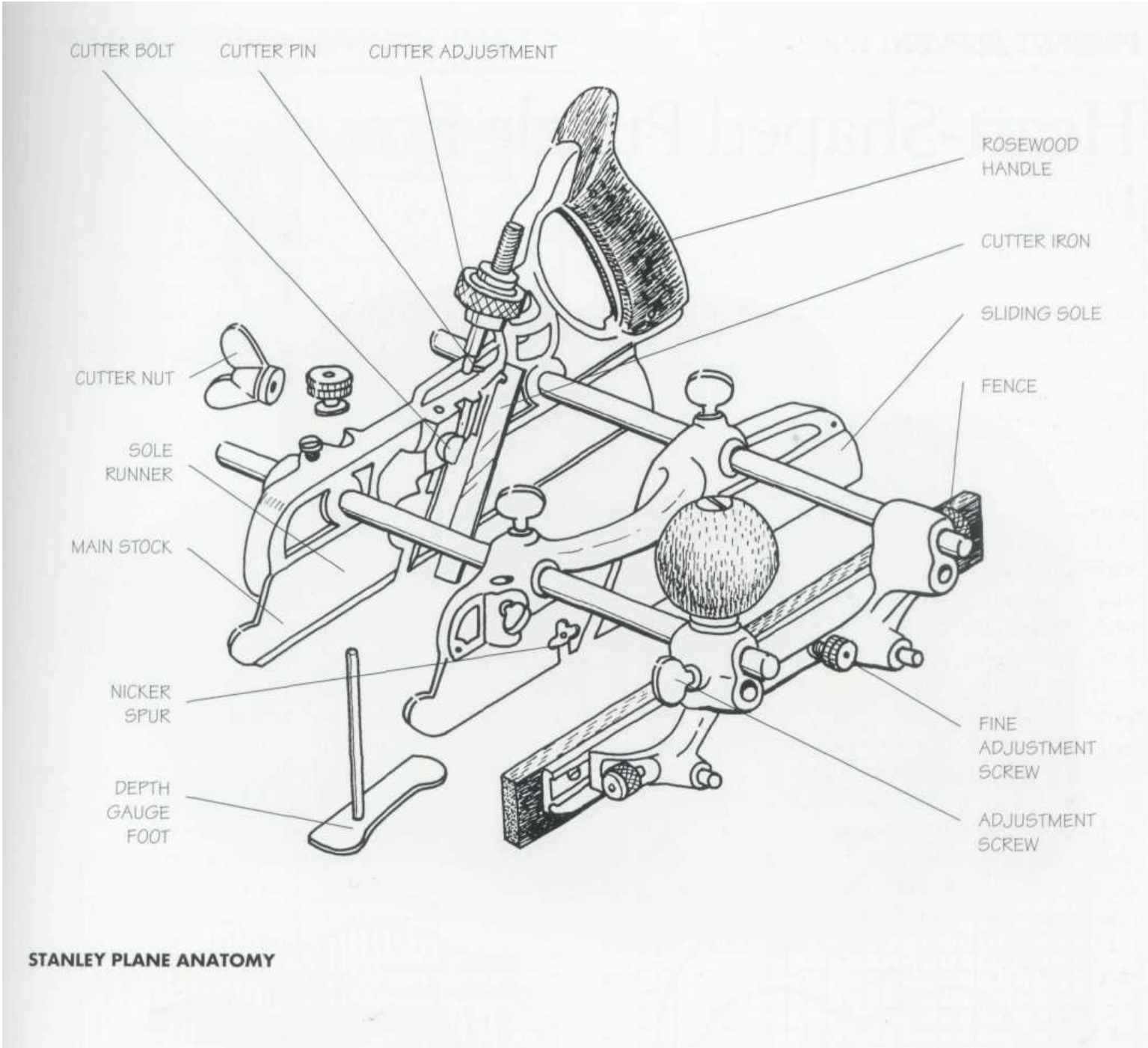
and tuned, then help is at hand.

The order of setting up or tuning—the way I do it—is as follows. I first select a cutting iron and check that the edge is clean and well honed. If necessary, I wipe it on the oilstone and use a slipstone and a strop to bring the cutter bevel to a razor-sharp, 35° edge. This done, I fit the cutting iron into the groove and adjust the wing nut so that the iron is held in position. Next, I slide the middle sole runner on the outrigger arms and slide it up to the body of the plane so that the blade has a runner at each side edge. If I am going to cut across the run of the grain, I set the spurs so that the little cutter or nicker blade is in the down position. Lastly, I measure and set the fence and the plane is ready for action.

Okay, the plane is well set up and tuned, you have a nice straight-grained piece of wood in the vise, and you are ready to go. The first thing to do is get a household candle and wipe it over the sole and fence of the plane. Certainly it sounds a bit strange, but a couple strokes with the candle will dramatically reduce the friction—it will just about cut your sweat by half. And just in case you don't believe me, try it without the candle—ha!

When you are ready to go, with the depth gauge set, set the runners down on the workpiece so that the fence is hanging over the side edge of the workpiece. Clench that fence hard up against the side edge, and then take repeated passes until the groove, tongue or profile is cut. The best procedure is to start at the end of the wood furthest away from you, and then gradually back up. Of course, you might need to adjust the depth of cut, but if you have it all together, with the plane nicely tuned and set up, the rest is easy.

As I said at the beginning, the Stanley 45 is a beautiful tool: no dust, no deafening noise, no need for a mask or ear plugs, no motors or dangling cables. Just a sweet slickkk . . . slickkk . . . as the paper-thin shavings curl up.



Heart-Shaped Puzzle Box



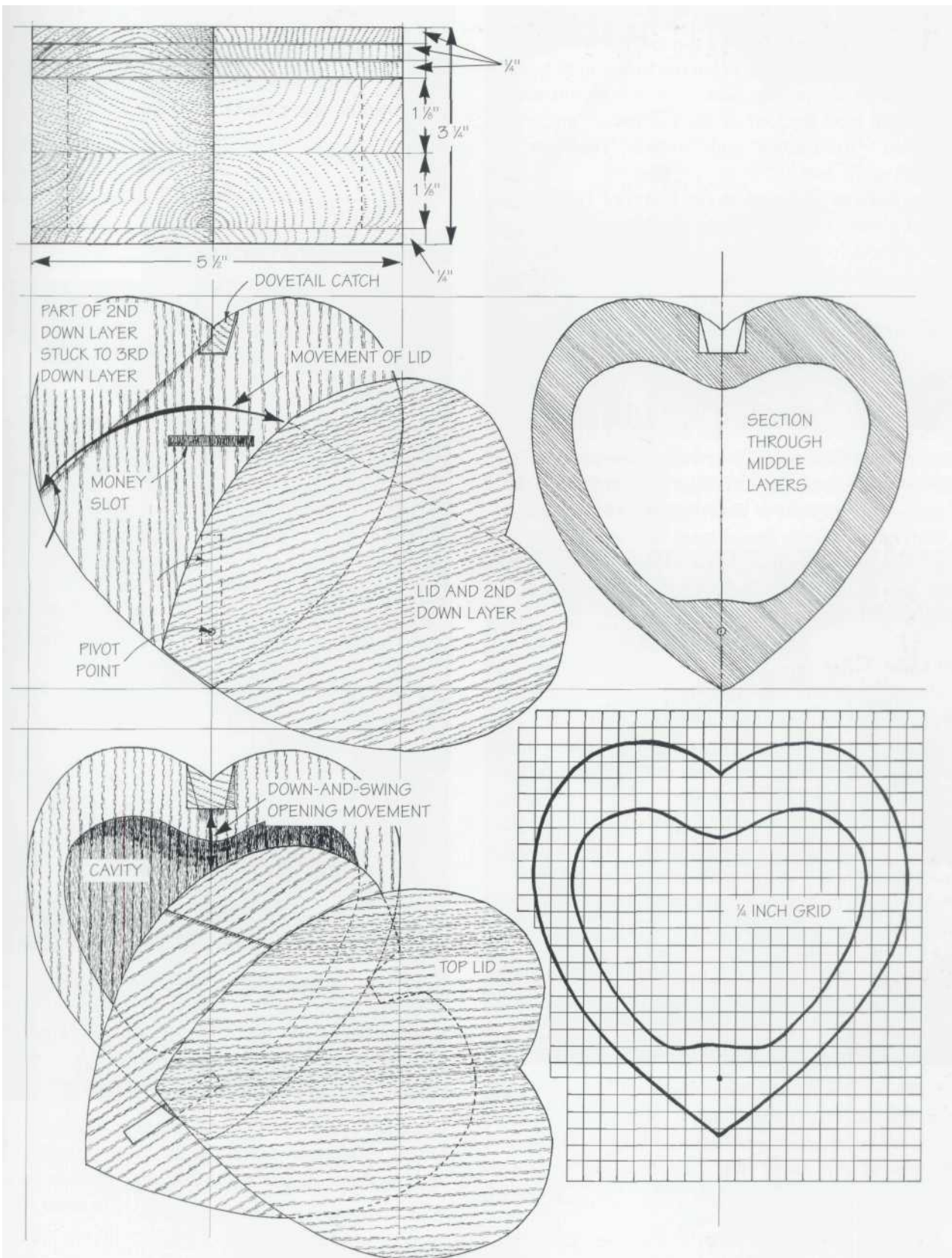
When I was a kid, an old woman left me a small wooden box in her will. The funny thing was that, although it appeared to be just an ordinary empty box with a small division to one side, when I shook it, it rattled. After variously pushing, pressing and sliding the sides and base of the box, I discovered that it had a secret compartment! It was very exciting. When I pressed down on one side of the bottom inside of the box, I was able to slide up one side of the little division to reveal a secret space. As for the rattling noise, it was a solid gold half sovereign!

This project draws its inspiration from that old wooden box. It has all the same elements: a secret area, a sliding lid, and a part that swivels open.

MAKING THE BOX

First things first, you must have a good long look at the working drawings and see how the box works. Of course, like all such boxes, it's pretty easy when you know how. To open the box, swivel the lid to the right to reveal the coin slot and the top of the dovetail key. Then, at the same time, slide and swivel the coin slot face of the box down and around to reveal the inside compartment.

When you have studied the design, draw out the heart shape. Make a tracing. Pencil press transfer the traced lines through to the layers of wood that go to make up the box. You need six layers in all: four at 1/4" thick and two at 1 1/8". Fret the shapes out on the scroll saw, so that they are all slightly oversize—meaning that the line of cut



is about 1/8" to the waste side of the drawn line. While you are at it, cut out the inside-box area.

Glue the two 1 1/8" layers together and use a gouge to pare the inside of the box to a clean finish. Next, use a fine saw and chisel to pare a channel from top to bottom of the box (at top-middle, where the two cheeks meet). Now, pencil label the four 1/4"-thick cutouts: "top," "second down," "third down" and "bottom." Then glue the "bottom" to the box.

Glue the rod of wood in the channel and cut the dovetail shape. This done, take the "third down" layer and cut the two slots and the dovetail location notch. When you are happy with the fit, take the "second down" layer, set the scroll saw cutting table at an angle, and run the wood through the saw to cut the miter across the top-left cheek.

When you have made all the component parts, then comes the not-so-easy part of putting the box together. The best procedure is to first fix the slotted layer and the bottom half of the mitered layer with a swivel screw. Then glue the two halves of the mitered layer together. Finish by gluing the lop layer to cover up the swivel screw.

Certainly it sounds complicated but, in fact, you will have it worked out in much less time than it takes to tell. Finally, you rub it down with the graded sandpapers and seal with Danish oil.

SPECIAL TIP

The secret of getting this box right has to do with the standard of the finishing and fitting. All the surfaces must be rubbed down to a super-smooth finish, especially the mating faces that are to be glued and the laces that are to slide over each other. As to the final gluing, the best procedure is to start off using double-sided sticky tape, and then use the glue for real when you know how it all goes together. I say this because it is the easiest thing in the world to make a complete mess-up by gluing the wrong two parts together. Be warned!

MATERIALS LIST

A Board (6)	1/4" x 6" x 7"—I used English yew throughout
-------------	--

HARDWARE AND EXTRAS

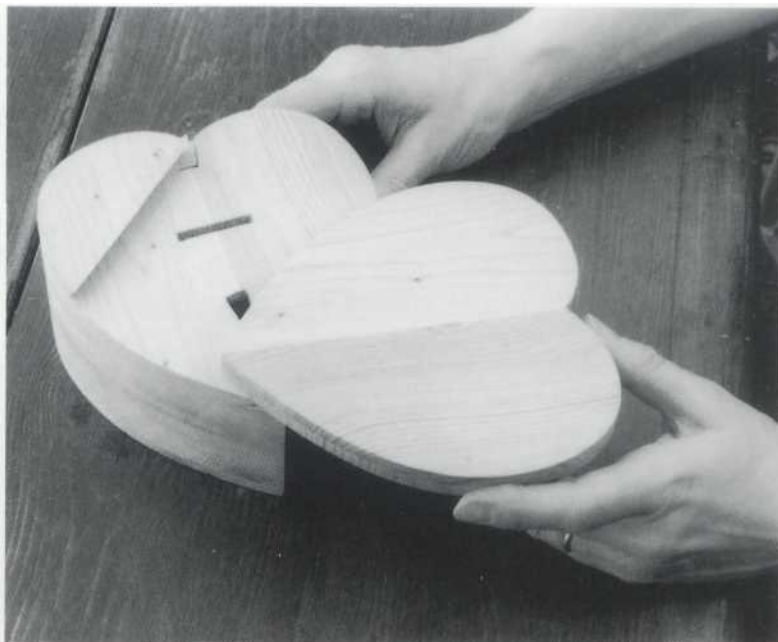
Swivel screw (1)	1/4"-long brass countersunk screw
------------------	-----------------------------------

STEP-BY-STEP STAGES



1 Detail showing how the square rod fits in the channel so that the dovetail at the top locates in the slotted layer. The procedure is to first glue and fit the rod, then cut the dovetail.

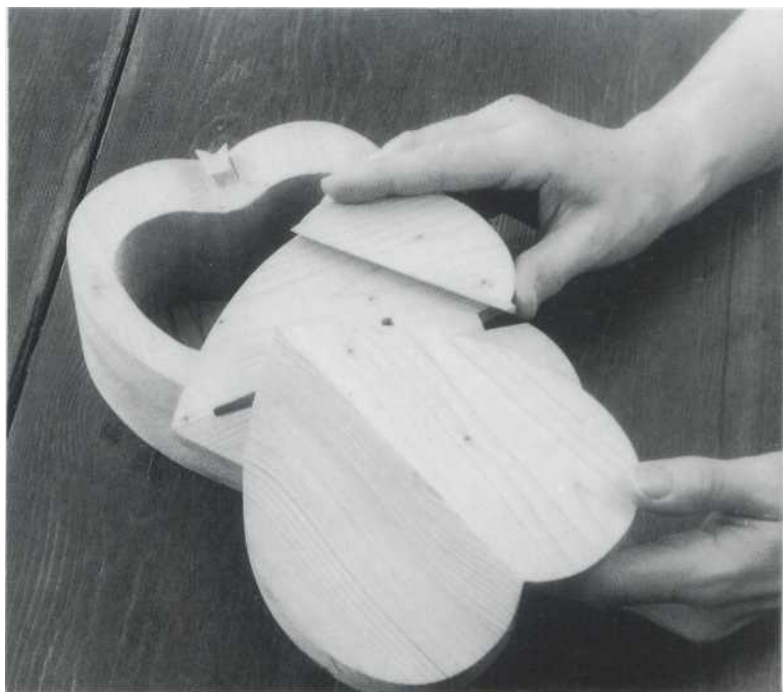
2 The miter cut on the second layer needs to be angled so that it looks toward the bottom of the heart. Be mindful that the finer the saw used to make the cut, the better the fit.



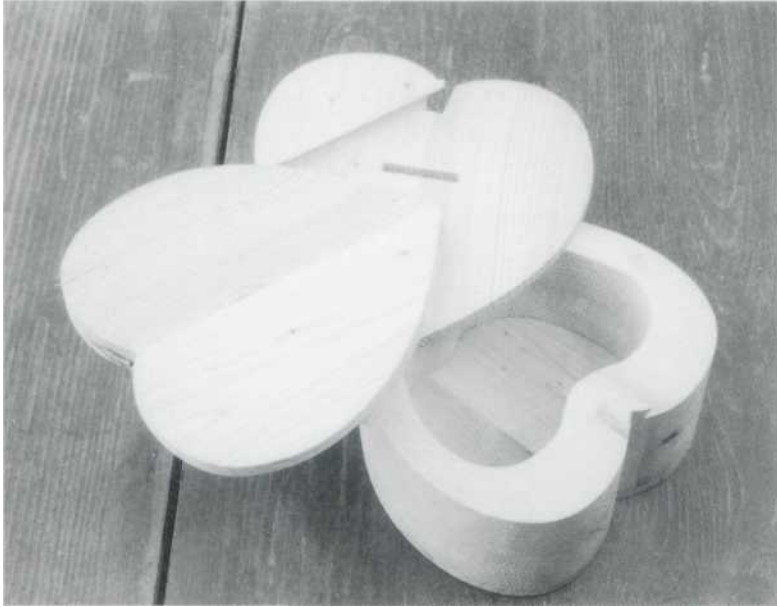
3 See how the top-left part of the mitered layer needs to be glued to the slotted layer, so that the topmost part of the miter hangs clear of the dovetail.



4 The pivot slot on the third layer needs to be adjusted so that the layer can be slid down and then swung over—so that the "cheeks" at the top of the heart just clear the dovetail.



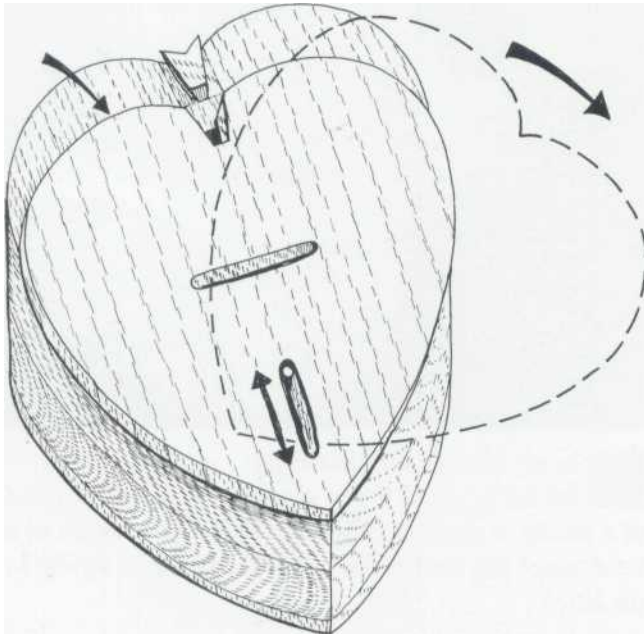
5 In my design, the slotted layer is able to swing to the left or right. If you want to make the box more of a puzzle, a good modification would be to build in a little "stop" peg so that the layer could only be swung to the left.



TWEAKING THE DESIGN

When you are fixing the swivel point and the slot, make sure that the slot is long enough for the cheeks to clear the underside of the dovetail.

6 Because I had quite a lot of trouble cutting out the center of the box—first with the drills and then with a gouge I think the next time around I will redesign the dovetail post so that it cuts right through the wall of the box. Then I can more easily clear the inside-box waste on my fine-bladed band saw.



PROTOTYPES

A prototype is a full-size working model that is made prior to the project. The idea is to use inexpensive materials to work out all the problems before you start using your precious materials.

As you can imagine, this heart-shaped box didn't drop from the sky perfect and ready-made—no way! In **fact**, it was rather difficult to sort out. Although the various views and cross sections looked fine on paper, I just couldn't figure out how the three layers that make the top of the box fit great together. In the end, after a deal of swearing and messing about, I decided that the best way was to make a full-size prototype from three pieces of 1/4"-thick hardboard.

The working procedure went as follows: First I cut out the three heart shapes and pencil labelled them "1," "2" and "3." Then I drew the heart shape out on the bench. Next, I took cutout number 3 and played around on the drawn-out heart with various placings of the swivel point and the sliding slot.

The main difficulty I found was positioning the miter in such a way that there was enough room for the "cheeks" of the heart to slide open.

When I had established the precise position of the swivel point and the length of the slot, I then tried out board number 2 and fixed the position of the miter slot. And, of course, when it came to making the box for real, I had the hardboard cutouts to use as templates.

And just in case you are thinking that you are so skilled that you can go straight in and make the toy, the table or whatever, without making a working model, yes, you might well be lucky once or even twice. But sooner or later you are going to make a mistake with one or all parts getting incorrectly cut and/or glued.

For example: I once designed the most beautiful chair. It looked wonderful on paper; the drawn elevations were a work of art! But when it was built, it was unstable, it was grossly uncomfortable, and it started to pull apart. Another time, I made a moving toy that looked good on paper, but when I made it full size, the friction between the wheels and the floor was so great that it simply didn't work.

All this is to say that the only sure way of knowing that a design is going to work is to make a full-size working model.

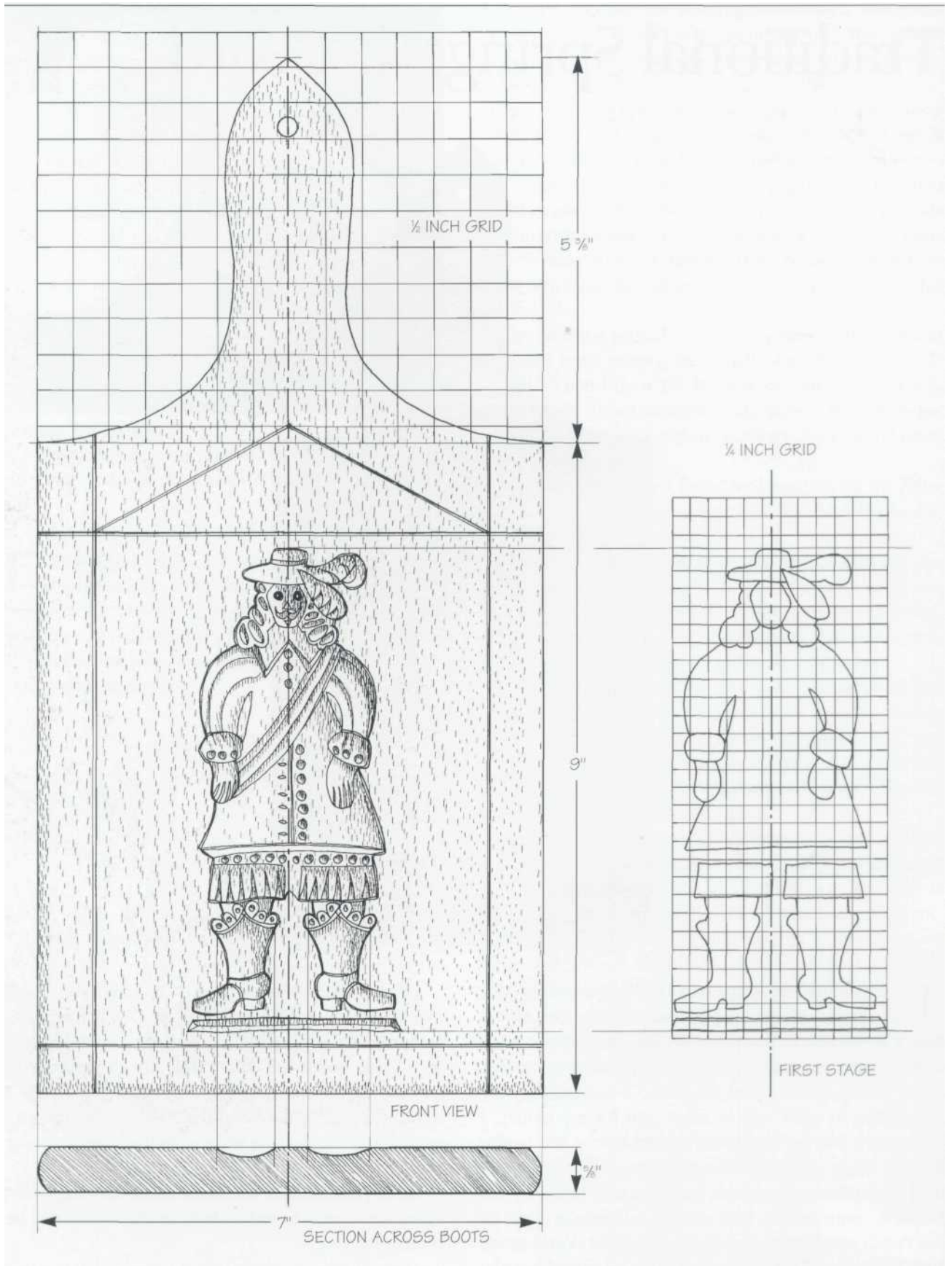
Traditional Springerle Board



The American Colonial kitchen or "keeping room" was an absolute treasury of fine woodwork. There were butter bowls and salt trays, boxes and knife racks, pipe-shelves, cutting boards, tables and chairs, all of them variously carved, pierced and detailed. Of course, they are all exciting in some way or other, but for my money, I particularly like the beautifully carved biscuit and cookie boards. There were shortcake molds made by the English and Scottish communities, breadboards made by the Swedish communities, little stamps and presses made by the Polish immigrants. Just about every Old World group had a unique style, form and tradition of carved boards.

Of all these "mother country" woodenwares, the German American Springerle cookie boards are perhaps the most delicate and fanciful. Every early Pennsylvania German home had them. The cookie dough was rolled thin and the carved hardwood board was pressed onto it to imprint the designs. When the cookies were baked, the resultant raised designs and motifs made an attractive table arrangement.

So if you like the notion of basic carving, and you know someone who enjoys baking, then this could be the project for you.



MAKING THE SPRINGERLE BOARD

This is the perfect project for nervous beginners who are looking for an easy way into the craft of woodcarving. All you need is a flat board, a bench clamp or holdfast, a V-section gouge, a straight gouge, a small spoon gouge, a sharp knife and a steel safety ruler, and you are ready to begin.

Trace the design on a slab of well-prepared, close-grained hardwood. We have chosen beech, but you could just as well go for plum, pear, sycamore or maple. Then carefully pencil-press transfer the primary lines of the design through to the wood. Next, cut out the shape of the board on a scroll saw and rub the edges down to a good finish. This done, secure the workpiece flat-down with the clamps or holdfast and use the spoon bit tool to scoop out the primary elements of the design. Don't try for any great depth, just settle for nice round depressions. It's all pretty easy, as long as you are careful that the tool doesn't dig too deeply into the grain and/or skid across the wood. Continue working with a controlled action, holding and guiding the tool with one hand and pushing, scooping and maneuvering with the other until you have achieved what you consider is a good strong design. You need to dish out the hat, the hair, the face, the coat and cuffs, and the boots. Being mindful that the design is in reverse, try to judge the depth of the carving so that the fullest part of the design has the deepest hollows. Aim to scoop out the little dips and hollows to a depth of about 1/4". Don't dig the tool too deep or try to lever the tool, but rather work with a delicate scooping and paring action. Cut across the grain wherever possible. Remove only small curls of wood and try to keep the carving crisp and controlled. If you feel at any time that the tool is cutting roughly, then approach the grain from another angle or sharpen the tool with a few strokes on the stone and leather. Bear in mind that each and every hollow needs to be worked smoothly—no rough surfaces or undercuts. It's a good idea from time to time to test out your carving

MATERIALS LIST

A Board (1) $\frac{3}{8}$ " \times 7" \times 15"—a piece of prepared wood like beech is best

Note that all measurements allow for a small amount of cutting waste.

by taking a piece of Plasticine and pressing it into the cut shapes, just as if you were pressing dough on the board. Once you have considered the shape and detail of the pressing, you can adjust your work accordingly. Ask yourself as you are working, could the little dips be deeper? are the shapes nicely rounded? and so on.

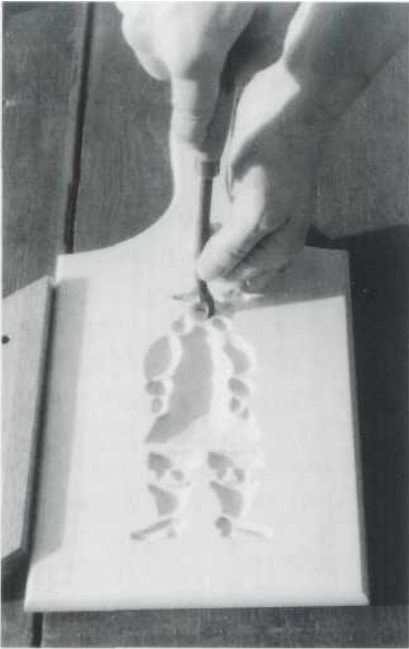
With the basic pattern in place, take the very smallest spoon gouge and scoop out the little dips that go to make up the small dot and dash details of the buttons and eyes.

Next, use your knives to cut in the fine details. For example, you need to cut in the features, the sash and belt, the tassels around the top of the boots, and so on. And of course, if at any time along the way you want to cut in pockets or bigger plumes or other details, then follow your fancies. Finally, use the knife *or* V-tool to cut in the simple frame shape.

STEP-BY-STEP STAGES



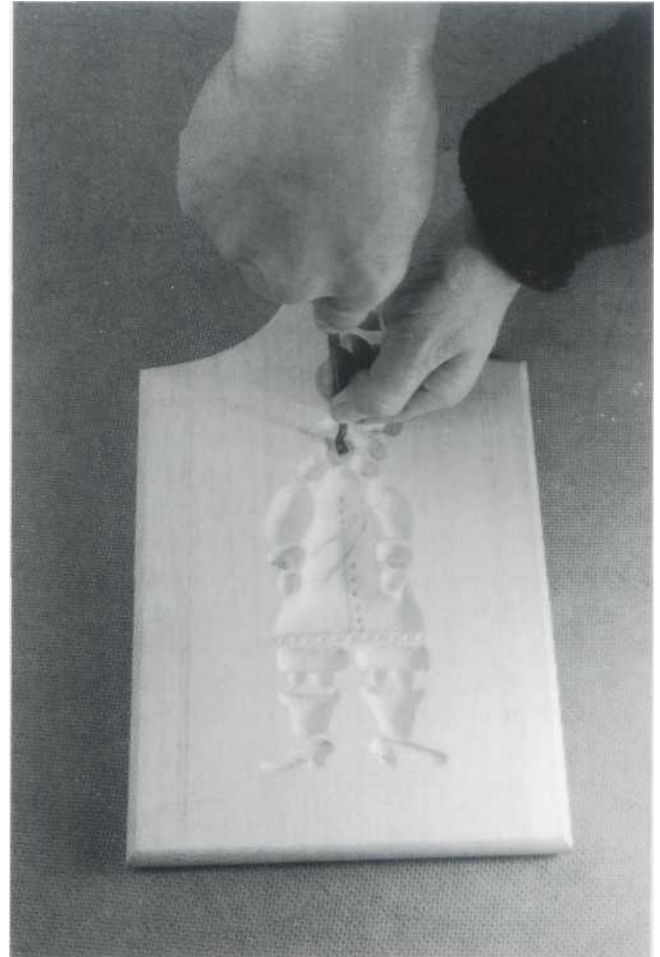
1 Go over the transferred lines with a soft pencil and then spray with pencil fixative to prevent



2 Use one of your spoon bent gouges to scoop out all the little hollows and depressions that will make up the design.



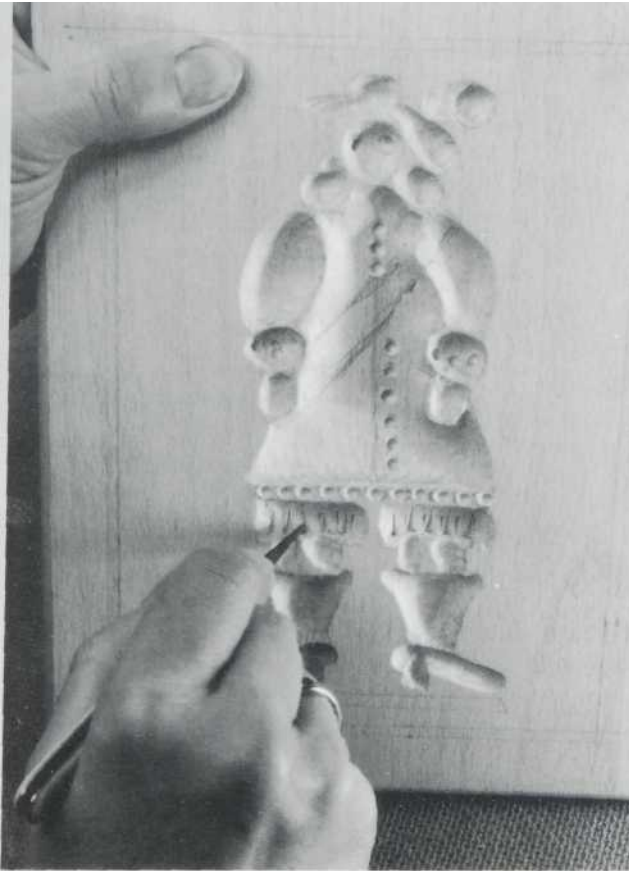
3 If the shape of the depression permits, cease with the spoon bit and change to using the straight gouge. You will find that the straight tool allows you to get a bit more weight behind the thrust.



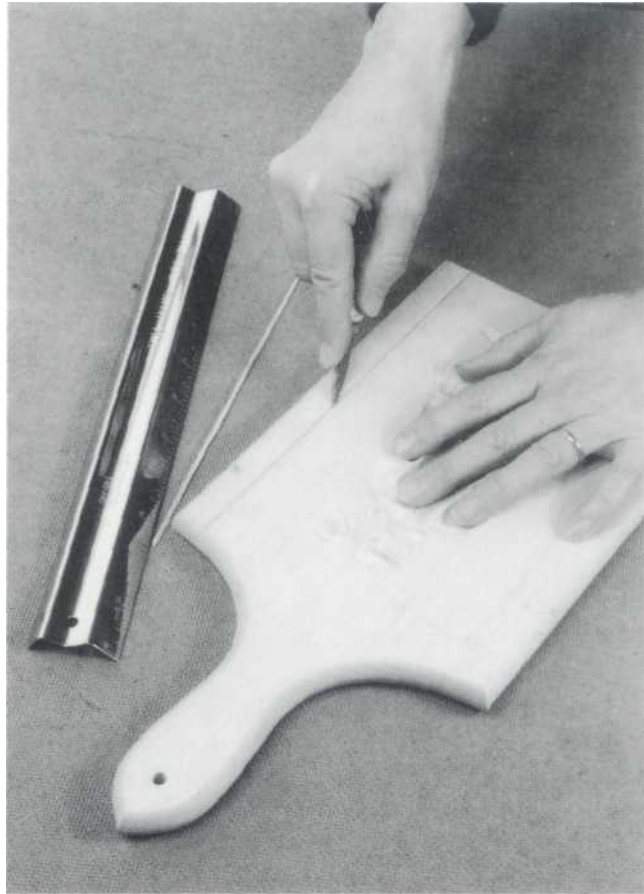
4 Use the smallest spoon bit gouge to "winkle" out the small dot-and-dash details of the eyes and trim. Stab the tool down vertically and twist it on the spot so that it "drills" out a pocket of waste.

SPECIAL TIP

If you find that your tools are cutting roughly, the chances are that the wood is damp or unsuitable or the tools are blunt and need sharpening. The best way to work is to set yourself a rhythm. That is, spend a few minutes carving and a few minutes standing back and assessing your progress, and then a few minutes rubbing the bevel of the knife or chisel on the fine stone, and so on. If you do this, the work will move along smoothly, with the carving being nicely considered and the tools kept at maximum sharpness.



5 Use the knife to cut the tassel details. Make three cuts for each tassel—a deep stabbing horizontal stop-cut to define the width of the tassel, followed by two downstrokes to clear the waste from the triangular pocket.



6 Use the steel safety ruler and the knife to cut the V-section frame detail. Each line is made with three cuts—a single straight-down stop-cut to define the depth of the V, followed by two angled cuts to clear the waste.

CHOOSING AND USING WOODCARVING TOOLS

There are so many woodcarving tools on the market that beginners are often bewildered when it comes to buying gouges and chisels. For example, I have just looked through a handful of current catalogs and I see hundreds of slightly different tools to choose from. Maybe you aren't going to need more than a handful of tools, but the big problem is which ones to buy.

The first question you have to ask yourself is what do you have in mind to carve? Are you excited about the notion of carving huge sculptural pieces? Or do you fancy caning intricate little birds? Or do you just want to try your hand at traditional flatwork like chip or relief carving, the sort of carving that you see on furniture?

When you decide on your area of woodcarving—sculptural, relief designs, miniatures or whatever—it's best to buy a modest starter kit of, say, four tools. For

example, you might get a couple of straight gouges, a V-tool and a bent gouge. Of course, once you actually start carving, the whole problem sorts itself out. You will soon discover that certain tricky details simply cannot be worked, or that you can't carve an undercut or some other detail with any one of your four tools. Then you have enough knowledge to buy a tool of a shape and size to suit. When I first started carving, my favorite tool was a medium-size, shallow-curve straight gouge—it still gets used more than any other tool. So you might start out with the four tools, and everything will be fine and dandy, until the time comes when you need to use a fishtail or a smaller spoon gouge, or yet another size straight gouge . . . and so the fun begins.

All that said, the single thing that bothers most beginners is that they are confused when it comes to the names and the numbers of woodcarving tools. If you don't know what I mean, look at various woodcarving tool catalogs.

From one manufacturer to another, there are all manner of descriptions that relate to the same tool types. Some manufacturers use letters and numbers, some use their own prefix codes, and so forth.

If you are a beginner and still undecided as to the correct gouges for your starter kit, then try the following method—it may help. Start by determining the width of blade you need. Let's say that you have chosen a 1/2" width. Next, consider the hollow or sweep of the blade. Ask yourself, do you want a shallow sweep or do you want a deep U-section sweep for bowls and such? Finally, decide on the profile or shape of the blade along its length. For example, do you want a straight blade or a curved or spoon bent? Once you have sorted out the blade width, the shape of the sweep and the profile of the blade, then all you do is walk into the store and point a finger.

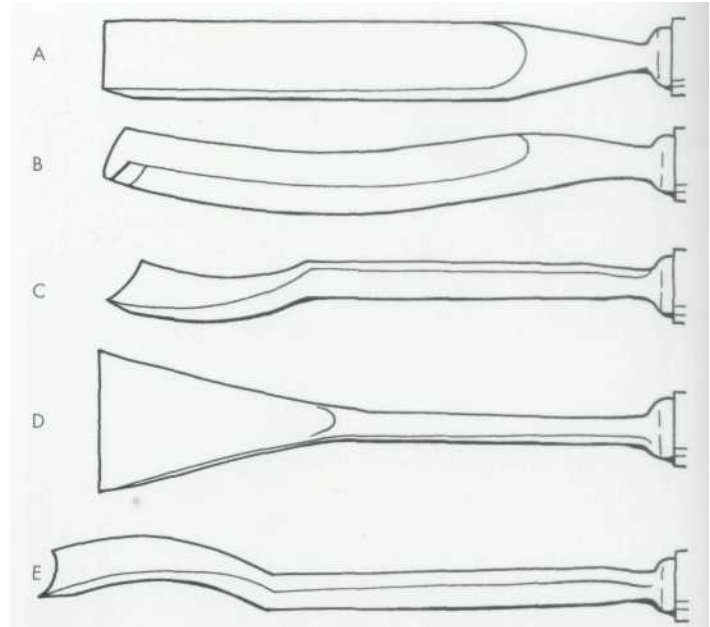
STRAIGHT CHISELS AND GOUGES

If you are still confused as to terms, the following glossary will show you the way.

Straight Chisel—A straight chisel is a flat-bladed tool that has a straight cutting edge. If you jab the cutting edge into the wood, it will leave a straight cut, like a dash. The term "straight" relates to the shape of the blade along its length. The size of the chisel is determined by the width of the cutting edge. In use, the chisel is held in one hand and then either pushed or struck with a mallet. **Straight Gouge**—Though the straight gouge is straight along its length—just like the straight chisel—the blade is hollow-curved in cross section. If you stab a gouge into the wood, it makes a curved cut, like a C or U. The shape of the curve is termed the "sweep." So when you are ordering a gouge, you need to know the width of the blade and the shape of the sweep. In use, the straight gouge is either pushed by hand or struck with a mallet.

CURVED OR BENT CHISELS AND GOUGES

Having established that the term "straight" describes the shape of the blade along its length, it follows that the terms "curved" or "bent" also describe the blade along its length. For example, you might have two gouges that make identical cuts, the only difference being that one is straight along its length and the other curved or bent. They make the same cut, but the bent tool allows you to



CURVED OR BENT CHISELS AND GOUGES

(A) Straight chisel; (B) deep sweep curved gouge; (C) shallow sweep spoon bent gouge; (D) shallow sweep fishtail gouge; (E) shallow sweep backbent gouge.

hook and scoop into hollows that the straight tool is unable to reach. Spoon bent, fishtail and back-bent tools are simply gouges that are more extremely shaped along their length. So, if you want the cutting edge of your gouge to be a certain width and sweep, you have to make a decision as to the shape of the blade along its length. Do you want a straight blade for heavy pushing or mallet work, a bent one for digging out a shallow bowl, a spoon shape for scooping out deep hollows, or a fishtail for cleaning out tight corners?

Handles—Once you have decided on the width of the blade, the size of the sweep—meaning the shape of the C section—and the shape of the blade along its length, then comes the choice of the handle. There are turned hardwood handles, plastic handles, handles with and without ferrules, and so on. I personally prefer the "London" pattern of turned and shaped octagonal boxwood handles on three counts. They are comfortable to hold, they look good, and best of all, the octagonal section prevents the tool rolling about or falling off the bench and doing damage.

Nautical Clock and Weather Station



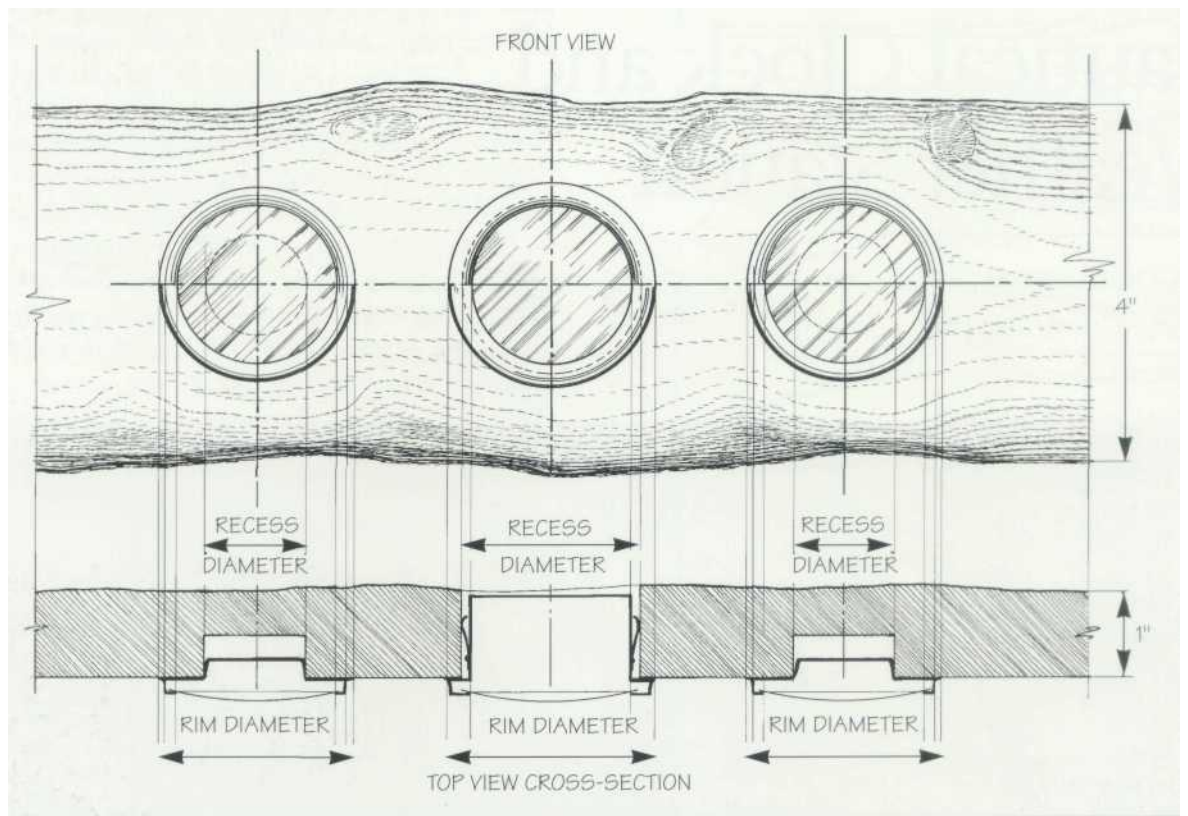
When we decided to move from a wild and windy part of the coast to a relatively mild hills-and- dales part of the country, we felt that we wanted to take a lasting memento with us. As we both love the sea, we felt that we wanted a reminder of our wonderful walks along the rugged cliffs, of the picnics on the lonely beaches, and of the exciting times we had with our many boats. After a great deal of thought that took in such notions as collecting sea shells and the like, it suddenly came to us. Why not take a piece of driftwood—perhaps part of an old boat—and turn it into a nautical clock and weather station? To our way of thinking, the whole project would be a lasting memento . . . of the beaches, the storms that smashed up the boats, and the constant need to keep one eye on the time, tide and weather.

So if you, too, want to make a memento gift that uses a piece of found wood, then this is a great project.

The wonderful thing about a design of this size, type and character is its flexibility. There are any number of amazingly exciting options. I say this because, as soon as I had made the sculpted and weathered board, Gill came up with the beautiful idea of using one of our old moulding planes to create a classic moulded board. Her thinking was that there must be thousands of woodworkers out there who own an old plane and are just looking for an excuse to tune it up and get started! She also had the bright idea that with a more formal board, the various instruments could be arranged so that the board could be mounted vertically or horizontally.

MAKING THE FOUND WOOD BOARD

This project is slightly unusual in that your found wood needs the minimum of preparation. Okay, it needs to be clean and the like, but that's about it—no jointing, no



extensive marking out, just three drilled holes and a small amount of planing and sanding. And, of course, there's no reason why your piece of found wood can't be a branch from a special tree, a part of an old house, a piece of wood found in the desert or mountains, or by a river, as long as it has some particular significance.

When you have found your piece of wood, set it down on the bench and consider how the instruments might best be placed. Are you going to settle for the clock, the thermometer and the hygrometer, (see page 73), or are you going to go for additional instruments like a tube barometer or maybe a special tide-time clock? Of course, much depends on the size of your piece of found wood.

Though I wanted three matching brass dials, with a clock having Arabic numerals, I found it impossible to get a good matchup. As you can see, I had to settle for a slightly nasty white-face clock with Roman numerals. Make sure that the instruments you choose are designed to fit into a shallow recess or hole, with the brass surround or rim overlapping the edge of the hole.

When you have decided where the instruments are going to be placed, use a wire brush to scour the grit and grime from the workpiece. If you see some part of the found wood that could be modified in some way, then so

much the better. For example, I knocked out two rusty old nails and wire brushed the resultant iron-stained holes so that they were big enough to take a piece of found rigging cordage, so that the clock and weather station could be hung on the wall.

Use the wire brush to sculpt the form, to extend and exaggerate the actions of nature. You can make contours that are rounded and rippled, much the same way as the wind, rain, sand and sea scour out the soft part of the grain, so that the hard grain and knots are left standing in relief.

When you have achieved what you consider is a good form, use a plane and sandpaper to prepare a level seating big enough for the instruments. Aim for a flat smooth surface that is slightly bigger than the instruments. Make sure that there are no nails, grit or other matter in the areas that are going to be drilled.

Having cleaned up the seating for the instruments so that it resembles a level plateau, bore the recess holes out with the Forstner bits. Then seal with a coat of varnish and use beeswax to burnish the whole works to a rich sheen finish. Finally, push fit the instruments in the holes, fit the rope or chain, and the project is finished and ready for hanging.

MATERIALS LIST

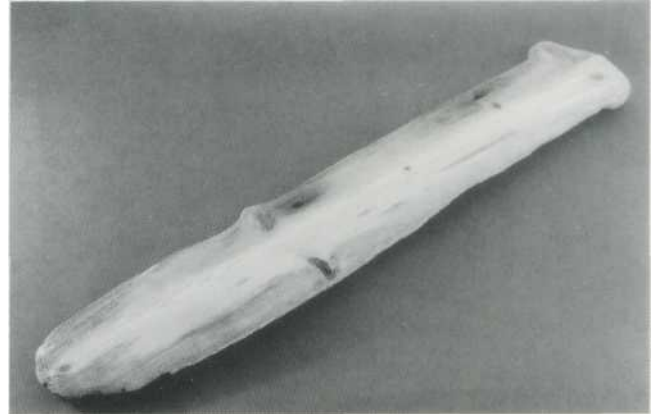
A Board (1)

A piece of found wood of a size and thickness to suit your instruments.

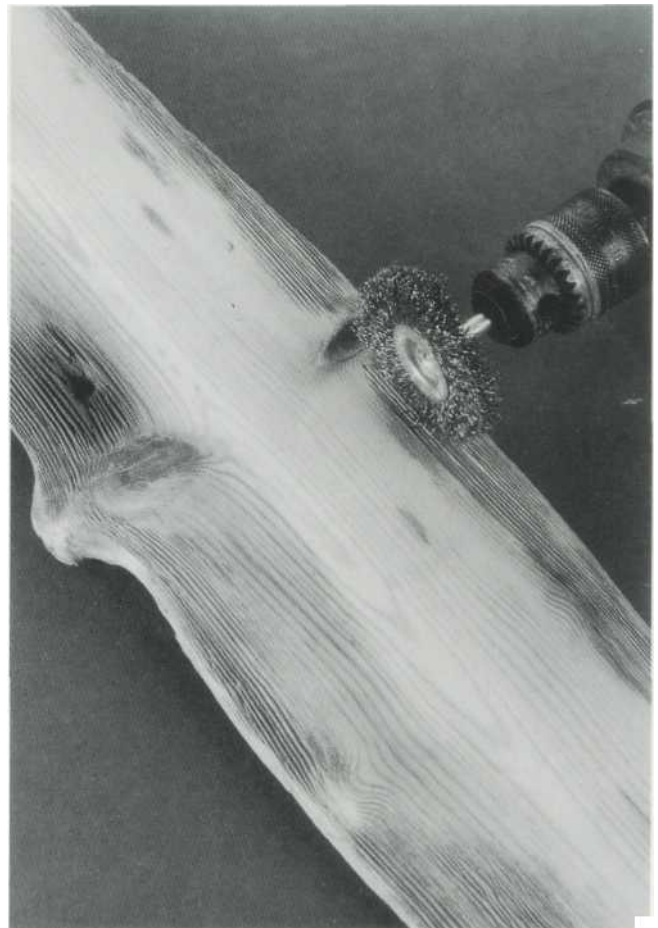
STEP-BY-STEP STAGES



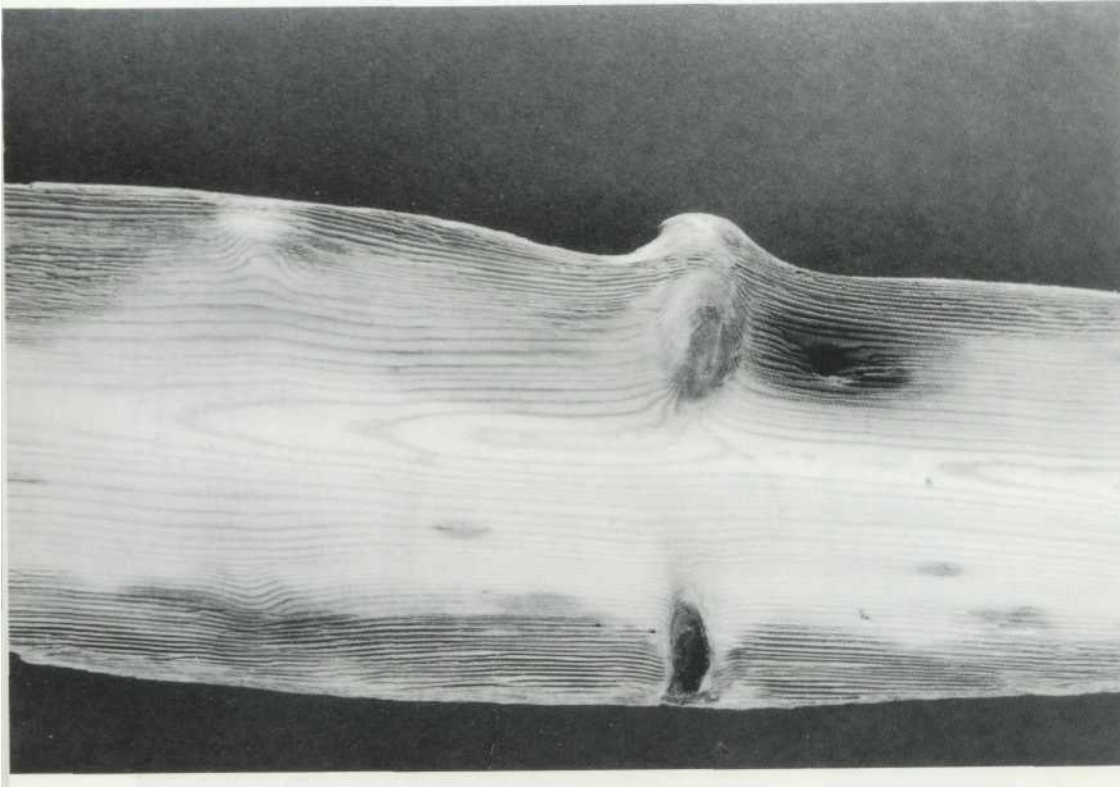
1 Having found your piece of wood, select a set of instruments to fit.



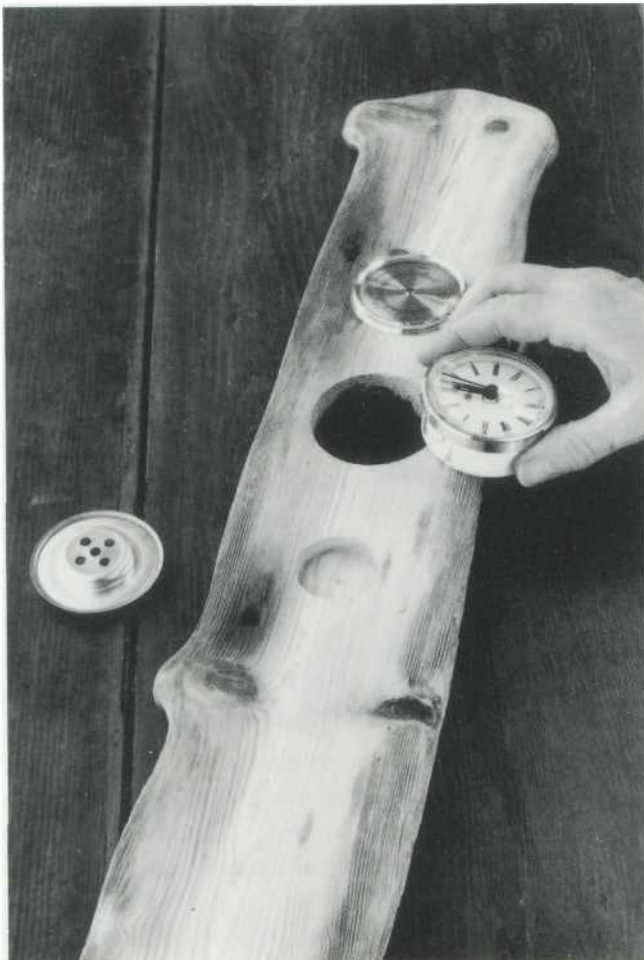
2 Remove the more obvious bits of rubbish—old nails, bits of tar, embedded grit and such. Wipe the wood with a damp cloth and leave it until it is good and dry.



3 Not forgetting to wear gloves and goggles, use a power drill fitted with a wire brush attachment to scour out the loose grain. The safest procedure is to have the workpiece either screwed or clamped to the bench.



4 A close-up showing how I have concentrated use of the wire brush along the edges and around the knots, so that there is a smooth, level central area.



5 If you have a drill bit size that fits the instrument, then so much the better; otherwise, you have to drill the nearest size hole. After drilling the hole, painstakingly file it to fit. I needed to remove an all-round strip about 1/8" wide.

Note—as I said earlier in the project, I don't much like the clock as shown. On consideration, I would much prefer the little watch-clock as shown in the miniature mantle clock case project.

MAKING A TRADITIONAL BEAD-MOULDED BOARD

Having measured and marked out the board and cut it to size, use the bench plane to bring it to a smooth finish. When you are happy that the board is square and true, secure it to the bench so that one long side is hanging over the edge.

Set your moulding plane up with $\frac{3}{8}$ "-wide beading iron. If like me, you are using a single-bead cutter to plane two beads side by side—a double reed—then adjust the fence to the position for the bead that is furthest in from the edge. The procedure is: First cut the bead that is furthest in from the edge. Then reset the fence and cut the bead nearest the edge. You repeat the procedure for the other edge of the board.

Finally, having used a block plane to chamfer the ends of the board, drill out the three large-diameter holes as already described in step 5.

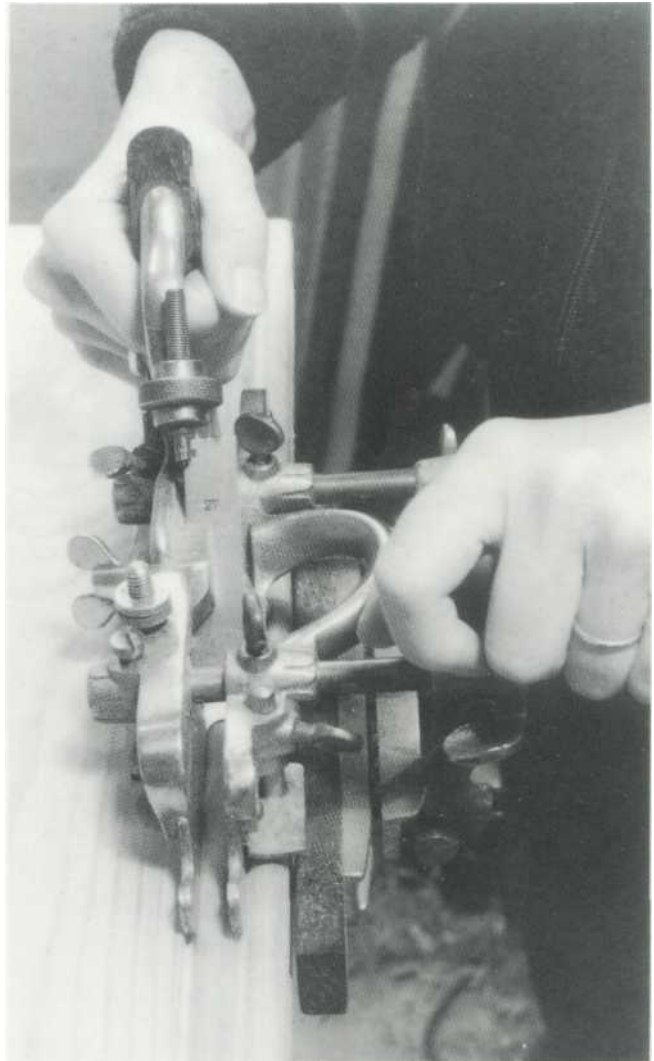
SPECIAL TIP

If you are looking to bore out clean-sided, flat-bottomed holes—relatively shallow holes as in this project—then you can't do better than using Forstner drill bits in conjunction with a drill press. We use a large Delta bench drill press. It doesn't wobble, or make odd noises, or require a great deal of attention. It just gets on with the job. As for the drill bits, we have a set of Forstner bits made by Freud. They do a beautiful job every single time. They bore down through end grain and hard knots, and just about anything we care to throw at them. Best of all, we like the fact that we can use them to bore out overlapping holes. Yes, they do cost about twice as much as most bits, but they last longer, stay sharp and are a pleasure to use.

MATERIALS LIST: OPTION

Board (1) $\frac{3}{4}$ " \times $5\frac{1}{4}$ " \times 15"—cherry

STEP-BY-STEP STAGES

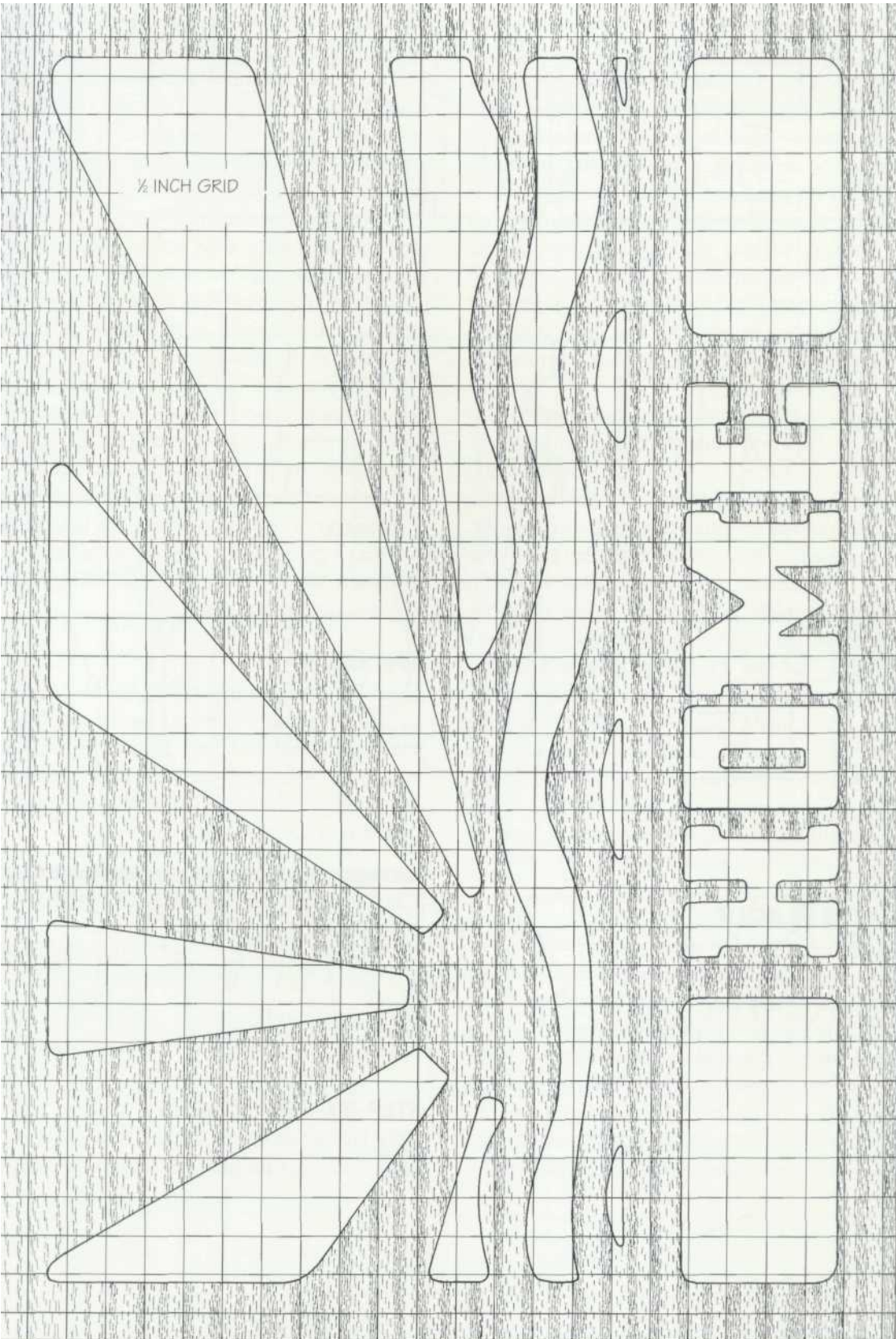


1 When you have used the plane to cut the two beads side by side, reset the blade to the very finest of skimming cuts and burnish the surface of the wood to a sheen finish. Be careful not to force the pace. Just let the weight of the plane do the work.

Raised Letter Address Plaque



When we first got married, one of the joys and pleasures was having our own home. Some of the first things we did when we moved into our infinitesimally minute cottage were to paint the front door bright red and design an address plaque. The red door didn't go down too well, but the plaque was a huge success! The neighbors admired it, the mailman said it added a touch of class—in fact the whole street made comments. So, if you want to make someone a unique gift, one that will beautify their home—be it ever so humble a house, cottage, bungalow, farm, ranch or riverboat—then a fretted address plaque is a great idea.



THOUGHTS ON DESIGN

Of all the projects in the book, the name board is perhaps both the easiest and the most complex. I say this because, while the fretting techniques are truly easy—**just** about as simple and direct as can be—the design is something again. The problem is, of course, how to achieve a good visual effect—meaning a balance between the solid wood and the pierced areas—while at the same time getting the message across and achieving a structure that is sound. For example, it's no good at all having a design that is so complex that it needs to be viewed closeup with a magnifying glass, or a house name that is more an epic saga than one or two words. Also, the shape of the pierced areas needs to be carefully thought through so that the imagery is rounded and easy to cut. You don't want lots of spiky, sharp-angled imagery that is almost impossible to cut.

We are not suggesting that you necessarily use the sunburst image and the word "Home." After all, it would be more than a little bit strange if you, your neighbors and all our readers had identical boards. What we have in mind is that you use our imagery as an inspirational guide. In fact, you can use just about any imagery that takes your fancy—birds, horses, cattle, mountains, trees or whatever. The chief design problem is being able to link the name and the imagery so that the total message gets across. Let's say, for example, that you are giving this board to your grandmother who lives by the sea in a cottage called "Harbor View." You might well have a galleon riding the waves, or seashells, or a crab, or an anchor, or gulls, or a steamer, or whatever sea-salt-and-briny imagery that suits. And your great aunt—the one who lives in the mountains—could have a plaque with peaks, or bears, or **fir** trees. So let your imagination run wild!

MAKING THE PLAQUE

First things first, you need to decide on the wood. I say this because in many ways the choice of the wood is essential to the design. While the wood must withstand the wind and the rain and be relatively easy to work, it must also be fitting for the task. For example, while oak is a good choice for our plaque which is to remain unpainted and mounted on a cottage near the sea, if you live in a pine forest or you plan to have the board painted, then you might as well use an inexpensive wood like pine.

When you have chosen your wood, and once you have achieved what you consider is a good design—with the spelling of the name double-checked—trace off the design, press transfer the imagery through to the wood, and shade in the areas of waste that need to be cut away. This done, take your drill and run pilot holes through the shaded areas. How you fret out the waste areas depends on your particular tool kit. I used an electric scroll saw, but you could just as well use a coping saw, a bow saw or even a large fretsaw.

No matter your choice of tool, the procedure is much the same. Make the pilot holes. Unhitch the saw blade and enter it through the hole. Refit the blade and adjust the tension. Then variously move and maneuver both the workpiece and the saw, so as to run the line of cut to the waste side of the drawn line.

When you have fretted out the design and used the graded sandpapers to rub the rough edges to a smooth finish, cut out the base board and bring it to a good finish. Use waterproof glue to bond the two boards together.

Finally, having first protected the wood with oil, paint or whatever seems appropriate, it's time to present the board as a gift. And if you really want to make it special, you could offer to mount the board on the wall, gate, post or other appropriate place.

SPECIAL TIP

If you are going to mount the board directly on a wall, say beside the front door, it's best to use brass or bronze screws and have the board distanced from the wall by an inch or so. That way, when the rain runs down the wall and dribbles behind the board, there is space enough for a good flow of drying air.

MATERIALS LIST

A	Front pierced board (1)	$\frac{1}{2}$ " \times $11\frac{3}{4}$ " \times 18"—we used oak
B	Base board (1)	$\frac{1}{2}$ " to $\frac{3}{4}$ " \times $11\frac{3}{4}$ " \times 18"

STEP-BY-STEP STAGES

- 1 Having settled on a good, easy-to-work style of lettering, spend time drawing the letters up to size.

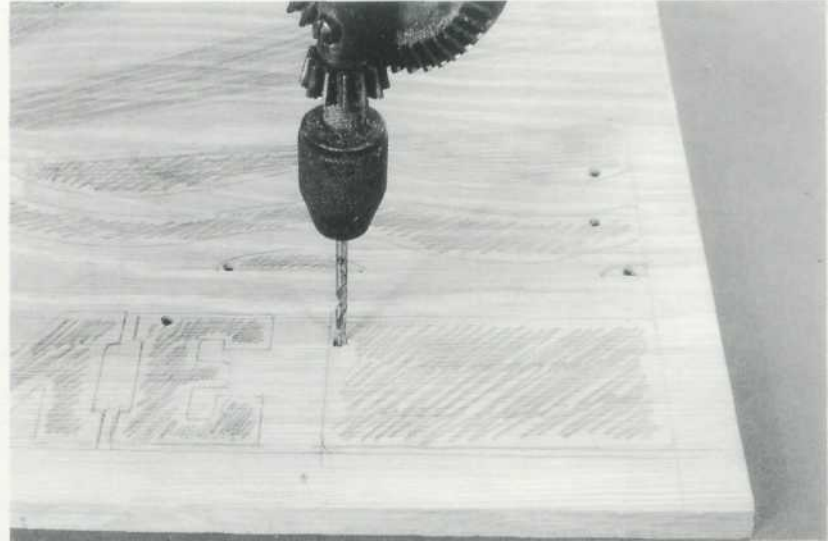
A B C D E F G

H I J K L M

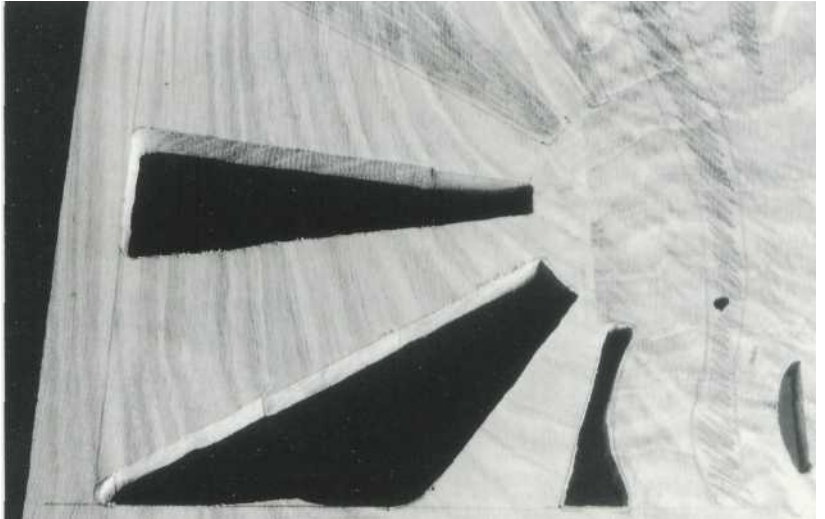
N O P Q R S T

U V W X Y Z

2 Run small pilot holes through the areas that need to be cut away. Be mindful if you are using a hand saw, that as some blades have pin fixings, you will have to choose a larger bit size.



3 As you can see, I had a bit of trouble keeping the line of cut on course. The problem was that the blade needed changing, the wood was amazingly tough and stringy, and I needed a rest. The only good thing you can say is that the bad cuts occur well to the waste side of the drawn line.



4 If you find that the workpiece doesn't want to move smoothly, then it's a good idea to rub a wax candle over both the surface of the cutting table and the underside of the workpiece. And don't be stingy with the blades. If the blade looks saggy or burns the wood, then change it!



FRETTED LETTERS IN RELIEF

If your workshop is anything like mine, you are forever wondering what you can do with the offcuts. Well, there we were fretting out the letter shapes when one of the kids next door, Michelle Edwards, asked me if she could have the "M" and "E" waste cutouts from the word "HOME," so that she could stick them on her bedroom door. And so it was that the idea came to us that we could design a house board that used the cutouts rather than the holes, if you see what I mean.

PROCEDURE

First, you need to draw the letter and/or number forms up to size—ours are 1 1/2" high—and trace them off. Arrange the tracing on the 1/4" wood so that the grain runs from side to side through the letters. Pencil press transfer the traced lines through to the wood.

As for the fretting out procedure, it's much the same as already described (see page 80), only easier. If you think about it, you will see that you only have to run the pilot holes through the enclosed forms—like the O and A—and you don't have to worry about saving the ground around the letters. All you do is run the line of cut in from the edge of the wood, travel around the letter and then move on to the next form.

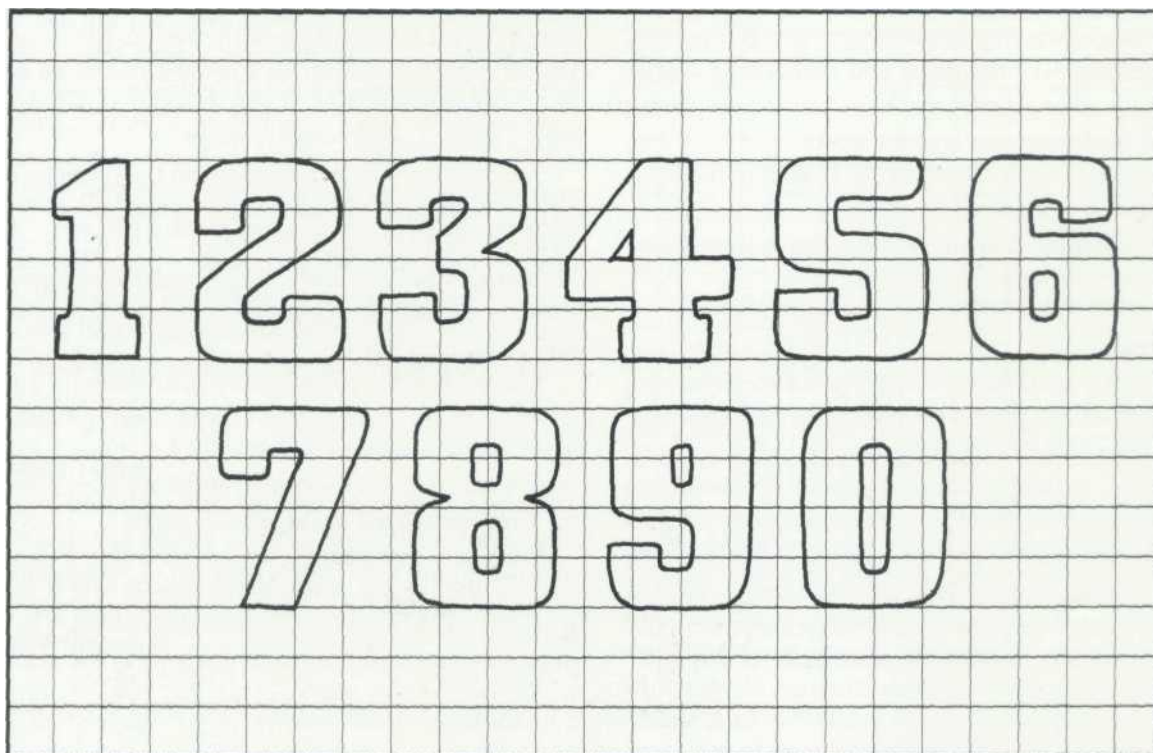
Once you have beveled off the edges of the ground board, then comes the tricky task of setting out the various

guidelines. I use the word *tricky* advisedly, because if the spacing between the letters is wrong, or the baseline on which the letters sit is crooked, or whatever, then the whole thing will be messed-up. The best procedure is to work the spacing out on tracing paper, and then use a square and straight edge to very carefully mark the base board with all the guidelines.

When you are happy with the guidelines and the spacing, smear the back of the letters with the PVA glue and dab them down on a piece of scrap wood to remove the excess. Then position them on the board and press down firmly. With all the letters/numbers in place, stand back to check the alignment and then leave them be until the glue has set. Finally, drill the four fixing holes and give the whole works a generous coat of yacht/spar varnish.

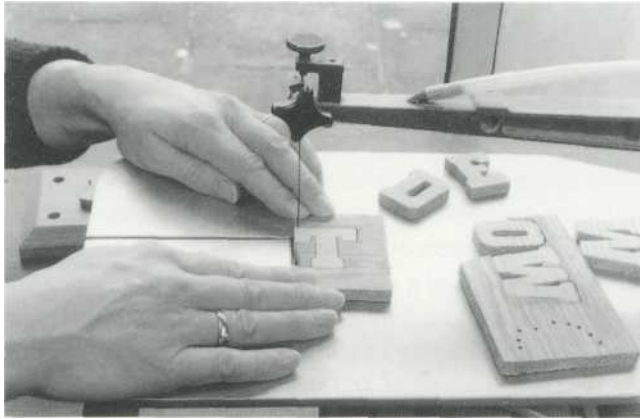
MATERIALS LIST: OPTION

- A Board (1) prepared 7/8" x 4" piece of American oak at a length to suit the name of your house
- B Board (1) 1/4"-thick piece of American oak—enough for all your letters
- C Exterior PVA glue
- D Yacht varnish

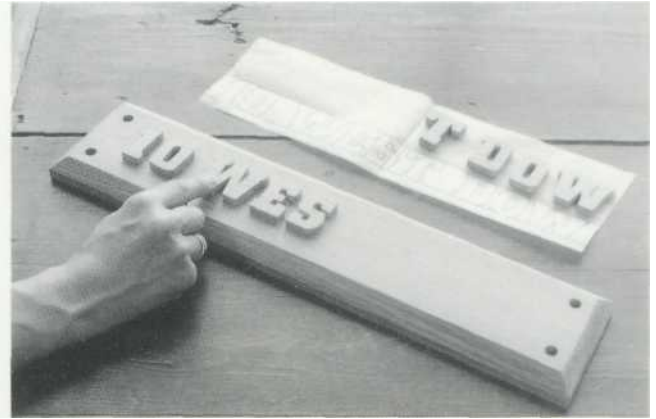


NUMBER PATTERNS

STEP-BY-STEP STAGES



1 Press transfer the various letters and numbers through to the 1/4"-thick wood. Shade in the waste so that there is no doubting the line of cut. Then fret out the letters and numbers on the scroll saw. Work at a very steady, easy pace, all the while making sure that the line of cut is fractionally to the waste side of the drawn line.



2 Check and double-check the spacing. Label the back of each letter "glue side," and then very carefully glue them in place. Do your best **to** avoid using so much glue that it oozes out.

DESIGNING AND TRANSFERRING

One of the chief difficulties for many woodworking beginners is that they make mistakes when it comes to designing and transferring. They make the first mistake when they draw the designs up to size, and the second when they transfer the designs through to the wood. The pity of it is that, by the very nature of things, the designing and transferring mistakes occur in the early stages. What invariably happens is that the beginners get so frustrated with the techniques of designing and transferring—what with using the wrong paper and with pencil lead getting smeared all over the paper and the wood—that they give up on the project before they ever get around to the wondrously exciting woodwork.

If you are having difficulties, then the following tips will help you sort out your problems.

Designing

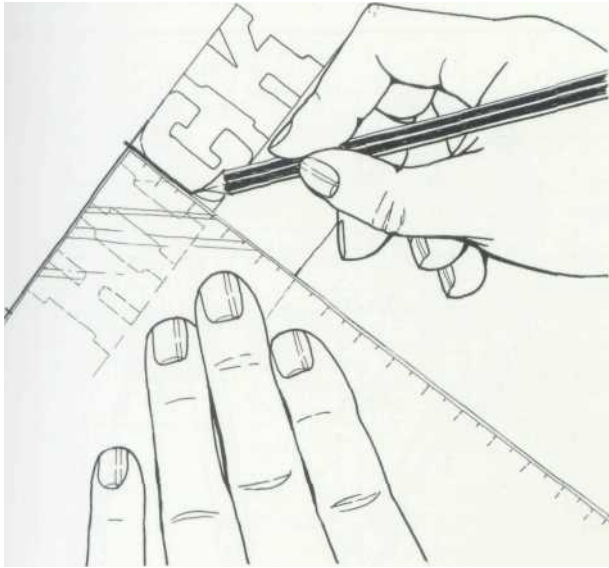
Designing is the procedure of working out the structure, pattern and form of a project by making various drawings, taking photographs and making models or prototypes. For example, with this address plaque the lettering needed a lot of thought. The problem was that while I personally prefer what might be described as classic Greek and Roman letter forms—with serifs and thick and thin strokes—it was pretty plain to see that such a style would be totally unsuitable in terms of wood and fretsaw work.

So we searched around in books until we came up with a strong, bold letter style, one that looked as if it might lend itself to being fretted out with a scroll saw. Then we modified the style slightly so that all the little angles became curves. We used a ruler and square to draw the letters to size on thin layout paper, and then, using tracing paper with ruled guidelines and a square, we played around with the spacing of the letters until the word looked right. Be warned that you must always use a square **in** all lettering projects. If you don't, you will finish up with a badly spaced, wobbly mess!

We did much the same thing with the sunburst design. Having settled on the idea of the sunburst, we drew the elements of the design on scraps of layout paper. We fiddled around with the placing and the size and then drew up a master design on white illustration board. Then we took a final tracing.

It sounds a bit complicated, but the whole idea of working in this way is that all the many roughs, ideas, alternatives, variations, scribbles and sketches are worked out on the relatively inexpensive layout paper, before they are ever transferred to the quality paper.

We take a tracing from the master drawing so that we can use the tracing in the workshop—where it generally gets creased, damaged and used to destruction. The master drawings, however, are stored safely away for next time.



DESIGN TOOLS

A *set square* is an essential piece of drawing equipment. It's best to *gel* the see-through type so you can see what's going on under the square.

Paper, Illustration Board, Layout and Tracing Paper

We use layout paper for the initial scribbles and sketches, good-quality glazed white illustration board for drawing out the master designs, and best-grade tracing paper for the transferring. It's not that we are fussy or faddish, and it's certainly not that we can afford to splash our money around. It's just that over the years we have learned that using the choice papers generally gets the job done faster and with fewer mistakes. Certainly you might think that we could use a flimsy-grade tracing paper for transferring, but again, experience has taught us that using a cheap-grade paper is a bad bet. It tears easily, it bleeds when used with ink and it doesn't take kindly to being scratched and scraped. And the same could be said about the pencils, the illustration board and all the other designing materials—the best is cheapest in the end! All that said, you can cut costs by visiting a printer and buying offcuts and ends of rolls/packs.

Masking Tape

We use an all-purpose paper, low-tack sticky tape to secure the card and tracing paper to the drawing board, and the tracing paper to the wood. We never use transparent tape simply because it is too sticky and damages both the paper and the wood.

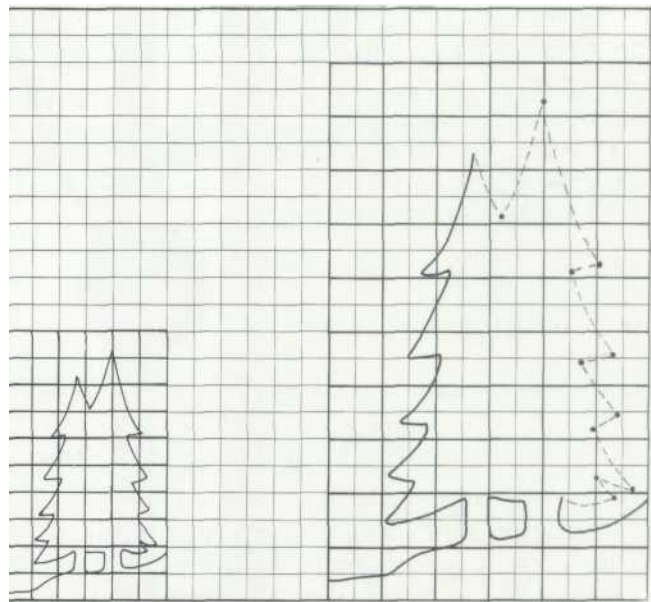
Gridded Working Drawings

A scaled square grid can be placed over a working drawing so that the object illustrated can be reduced or enlarged simply by changing the size of the grid. For example, if the grid is described as a "1" grid" or "one grid square to 1"" and the object is 6" long, and you want to finish up with an item 12" long, then all you do is double the scale and read each square off as being 2". And, of course, when you come to drawing the design up to size, you simply draw up a grid of the suggested size and transfer the contents of each square in the design through to your drawn grid.

Tracing and Pencil-Press Transferring

I usually describe the procedure of taking a tracing from the master design and then transferring the design through to the surface of the wood as "pencil-press transferring."

The procedure is: Work up the design on layout paper, make the master drawing with a hard pencil and take a tracing with a hard pencil. Next, pencil in the back of the tracing with a soft 2B pencil. Turn the tracing right side up, fix it to the wood with tabs of masking tape, and then rework the traced lines with a hard pencil or ball-point pen. This done, remove the tracing and rework the transferred lines on the wood. Finally, spray the surface of the wood with artist's fixative to prevent the pencil from smudging.



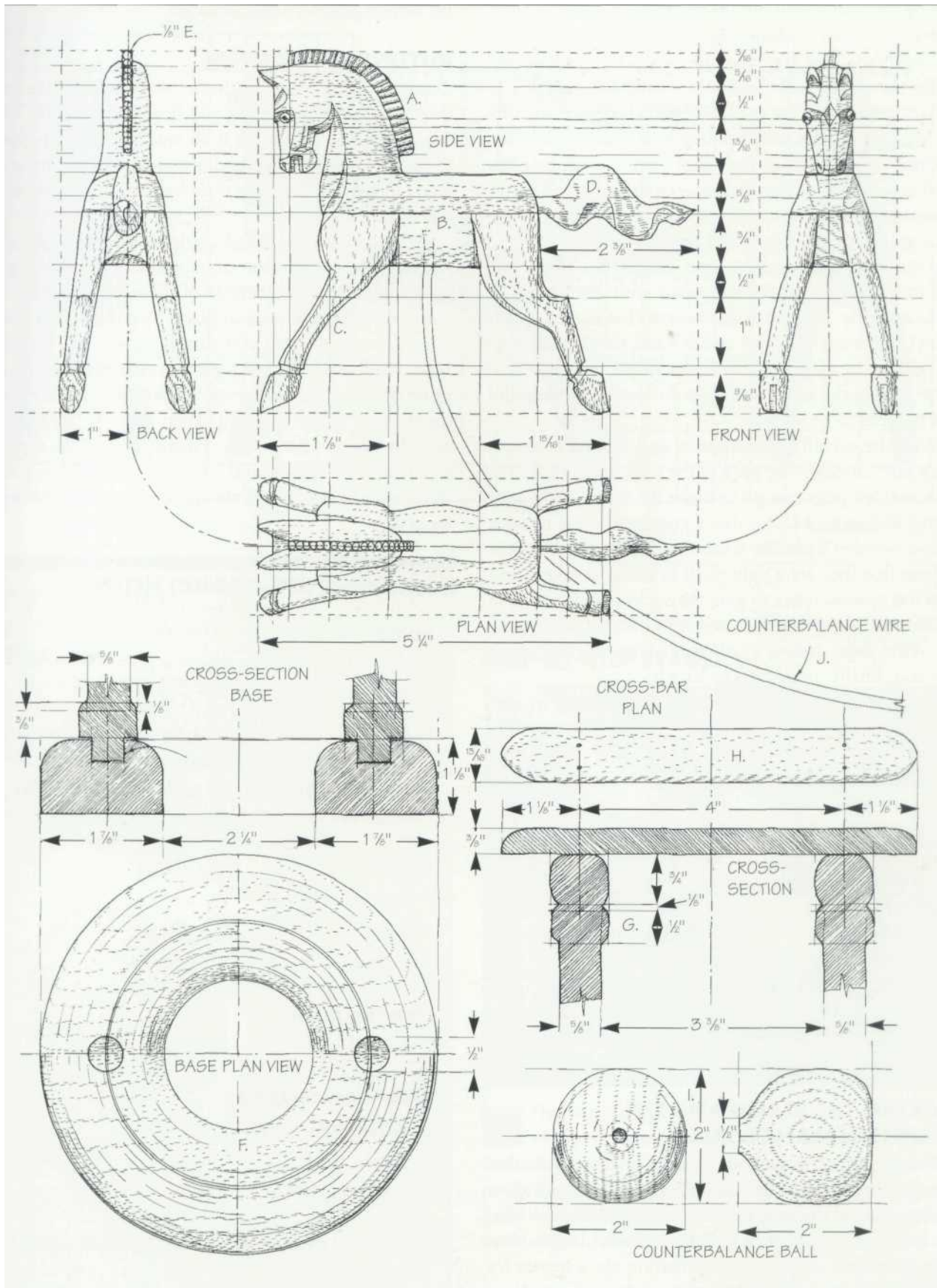
TRANSFERRING SCALED DRAWINGS

Having drawn a grid over the original design and another grid at a scale to suit—in this case I wanted to double up, so it is twice the size—then all you do is painstakingly transfer the contents of *each* square.

Counterbalance Horse Toy



One of the pleasures of making a traditional toy of this size, type and character is the fact that you can change the specifications, the working drawings, the imagery, and the techniques to suit your own needs and fancies. For example, you might prefer to go for an elephant or a tiger rather than the horse, or you might want a straight-sided slab rather than the turned base. Our advice is to have a good long look at the working drawings and the various photographs, and then either copy our design directly or go your own way and adjust the designs to suit.



MAKING THE HORSE

Having roughly fretted out the shape of the head and the four legs, begin by taking the seven component parts—the head, the four legs and the two body pieces—and gluing them together to make the blank. The best procedure is to first glue the two body parts together, then fix the legs to the body and finish with the head.

Once you have made the blank, then comes the pleasurable task of whittling the horse to shape. It's all pretty straightforward. All you do is round over the back of the neck and body, swiftly model the face and the hooves, trim the legs and so on. Of course, the degree of modeling **will** to a great extent depend upon your knowledge of horse anatomy. But that said, I believe that in the context of toys, the imagery is best stylized and simplified. Or to put it another way, yes, the horse needs to look like a horse, but at the same time you do have to be mindful that it needs to be strong.

With the overall horse whittled and sanded to shape, run a saw cut down the back of the neck and glue fix the little wooden pegs that go to make the mane. After a lot of trial and error, I found that a good method is to cut a couple wooden barbecue sticks into 1" lengths, slice the ends so that they are a tight push fit in the saw kerf, and then use cyanoacrylate to glue the sticks one at a time in the slots. When you are pleased with the shape and placing of the pegs, dribble a tad more glue along the whole row and, finally, trim them to length.

When you come to the tail, whittle it to shape as seen in the side view, and then whittle the shape as seen in the top **view**. It is a little bit tricky because the pine is relatively hard and grainy, but you don't have to get too fussed about the precise shape. Lastly, drill two holes in the horse—one for the tail and one for the wire. Then glue the tail into place.

Making the horse is pretty easy, but if you look closely at the photographs, you will see that I needed to correct various mistakes. For example, I needed to inset strips to strengthen the hooves, and I had to glue and dowel-pin one of the legs so as to strengthen the short grain. All I am saying is don't get in a sweat if a leg splits off or something else breaks. Just make a glue-and-peg repair and start over.

MAKING THE STAND AND THE COUNTERBALANCE BALL

The stand can be as plain or as fancy as the mood takes you. As long as the height and placing of the posts allow for the swing of the wire and the counterbalance ball, and the horizontal crossbar is level and parallel to the base, then the actual shape and construction are a matter for personal choice. I decided to go for a turned ring base,

and whittled posts, crossbar and ball, but you could go for turned posts or other changes.

PUTTING IT TOGETHER

Once you have made the horse, the stand and the ball, then comes the frustrating and finger-twisting, but very enjoyable, task of putting it all together. Start by gluing the posts in the base and gluing and pinning the crossbar. Don't forget that the posts must be parallel and the crossbar level.

Now, having first drilled a hole in the horse's belly and flattened one end of the counterbalance wire, dribble glue in the hole on the underside of the horse and push the flattened end of the wire in place. This done, drill a hole right through the ball and thread the ball on the wire. Next, bend the wire into a gentle curve and position the horse on the crossbar. Try out various curves of wire until the horse is nicely balanced. Then glue the ball in place and clip off the excess wire. Finally, give all the **surfaces** a thin coat of varnish and let it dry. Burnish the whole thing with beeswax, and the horse is finished and ready for action.

MATERIALS LIST—

HORSE

A Head (1)	1"×2"×2¼"
B Body (2)	1½"×¾"×3½"
C Legs (4)	½"×2"×3"
D Tail (1)	¾"×1"×3"
E Wooden barbecue sticks (2)	⅛" diameter

STAND

F Base (1)	1½"×6"×6"
G Posts (2)	1"×1"×14"
H Crossbar (1)	½"×7⁄8"×6½"

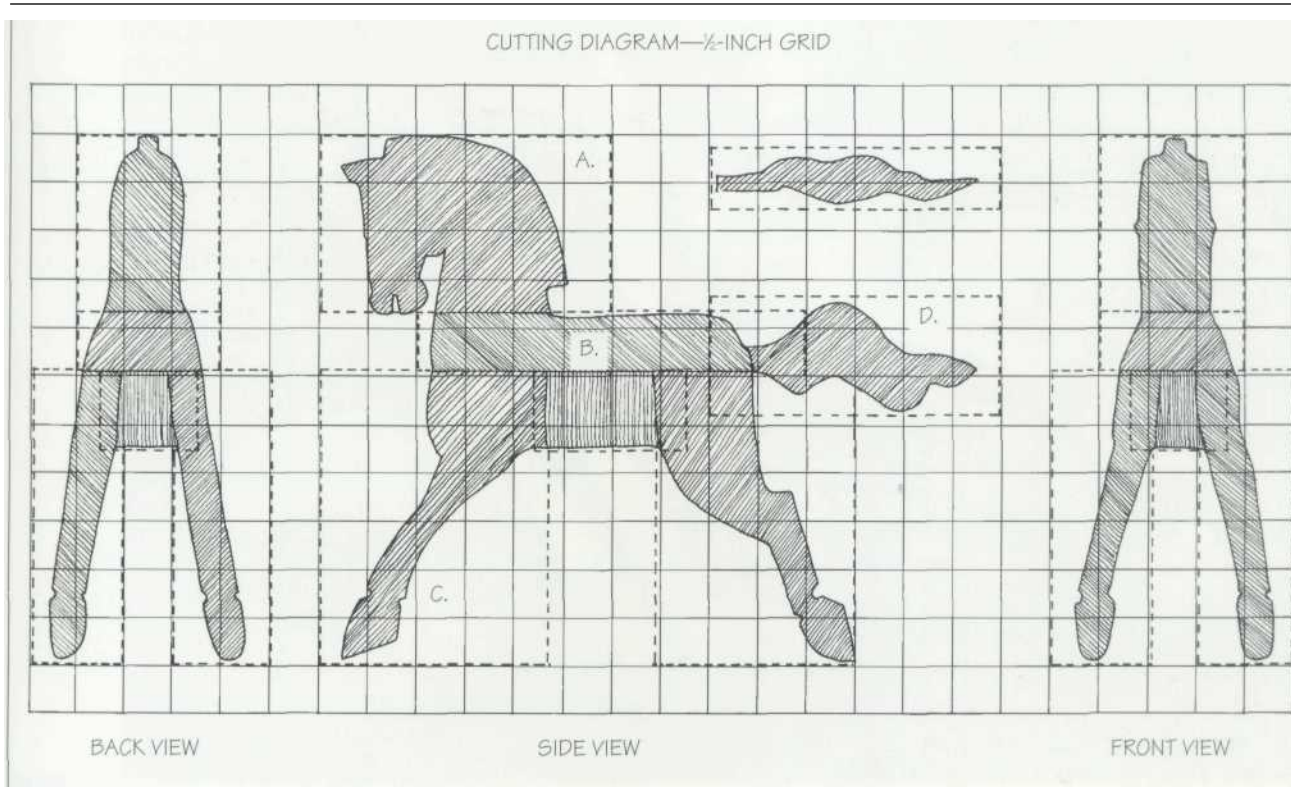
COUNTERBALANCE

I Ball (1)	2"×2"×2" cube
------------	---------------

HARDWARE AND EXTRAS

J Wire coathanger (1)	16"
K Screws and nails	various
L Cyanoacrylate	

Note that all measurements allow for a small amount of cutting waste.

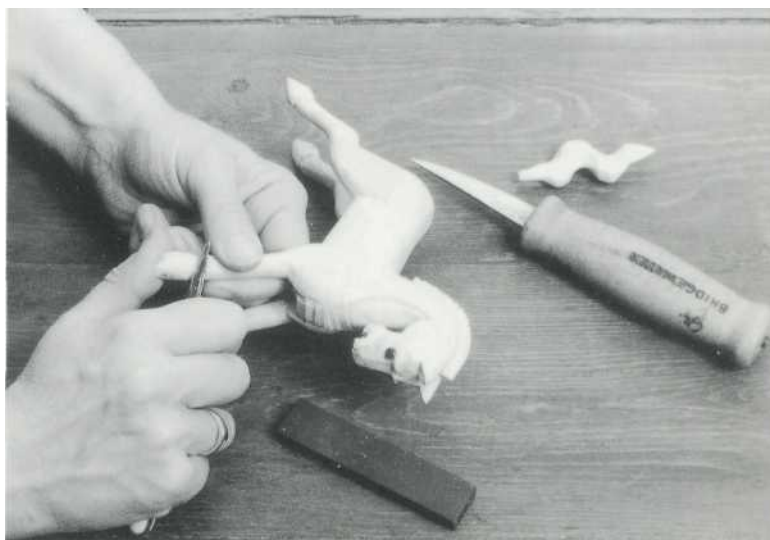


WORKING DRAWING B

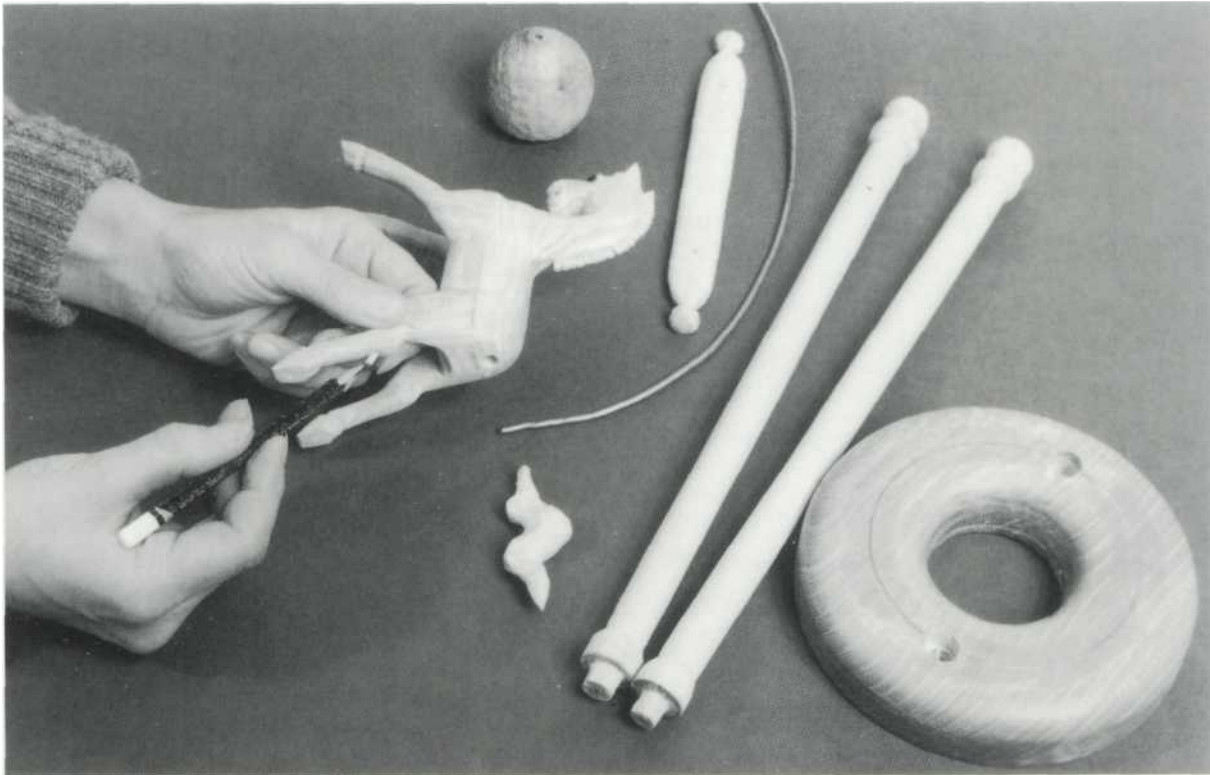
SPECIAL TIP

Gill—my wife and better half—has just pointed out that there are toys for babies, toys for toddlers and toys for adults. She says that while the balancing horse is the perfect toy for an adult—you know the sort of thing, a toy that can be played with at the dinner table when kids, friends and family are looking on—it's not the sort of toy that you give to a boisterous five-year-old!

STEP-BY-STEP STAGES



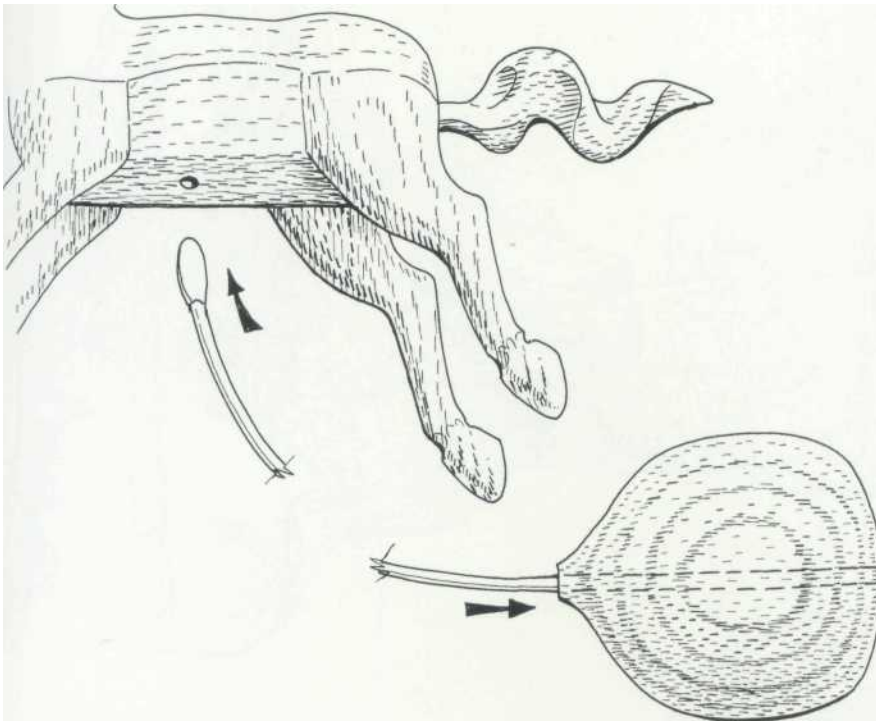
1 Having glued up the blank, use your knives to model the details. Use tightly controlled paring cuts, all the while being careful not to damage the relatively fragile short-grain areas like the ears. Note that I had a trial fitting of the eyes at this stage—I was eager to see how the overall image looked.



2 I had a bit of trouble when it came to the short grain on the back legs, so much so that I needed to reinforce one of them with a glued dowel. All I did was drill a hole across the run of the gram, dip a cocktail stick in glue and run it in the hole.

3 When you are gluing up, make sure that the posts are square to the base and parallel to each other. The good thing about using the PVA glue is that the long setting period allows you plenty of time to fiddle and fuss to get it right.

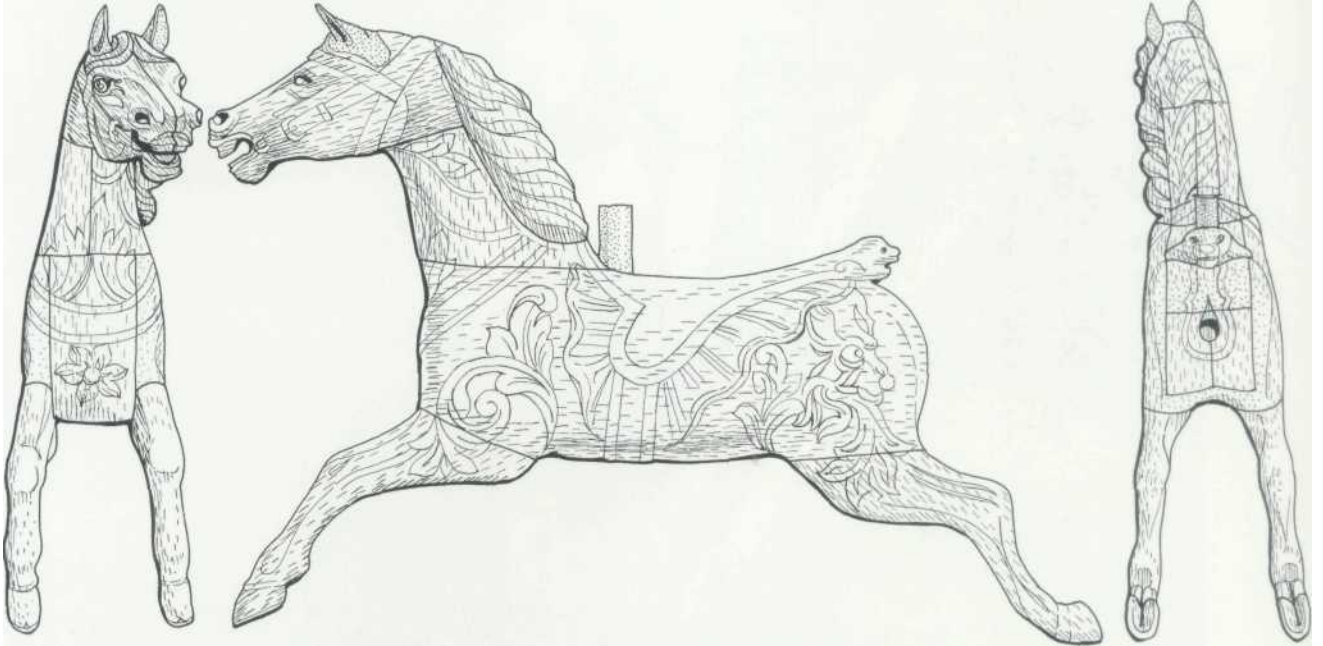




Flatten the end of the wire, smear it with glue, and then force it into the drilled hole (top). Having played around until the horse is more or less balanced, thread, glue and wedge the ball in place (bottom).



Finally, tweak the curve of the wire until the horse is perfectly posed.



DESIGN OPTION

Design for a single-seater galloper, circa 1895-1905, by J.R. Anderson. We drew a good part of our inspiration for this project from this design.



DESIGN OPTION

Here's a head detail from a carousel horse circa 1926, Circus World, Orlando, Florida (top), and a horse from the Crescent Park carousel, circa 1895, Riverside, East Providence (bottom).

Old-Fashioned Push-Along Toys

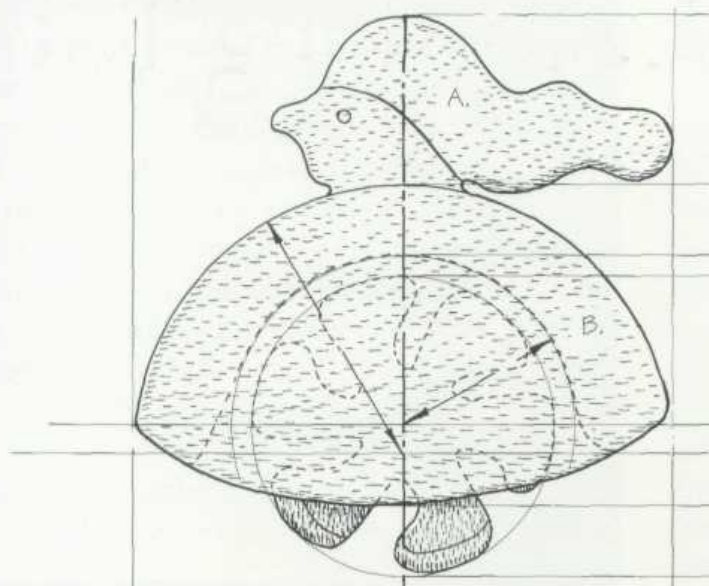


RUNNING ROSY

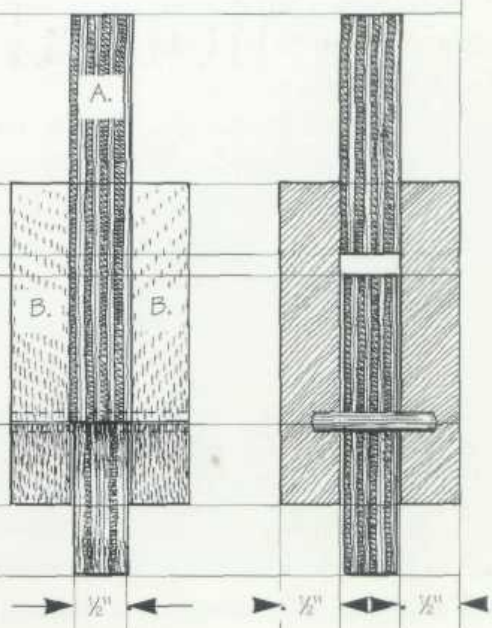
A doll to kiss, a doll to cuddle—at some time or other, most of us have sought the cozy, clinging comfort of a toy doll. Running Rosy is something more than a doll. She's a sort of doll in a hurry, the perfect push-along-the-carpet plaything for younger kids. This is a beautiful plaything, a real delight for kids and adults alike. She's strong, easy to make, nicely rounded for "learning" hands, but best of all, her wheel-turning movement is just right for active toddlers who like to push toys along the floor. If you are looking to make a unique toy for a unique kid, then this is the one.

MAKING THE TOY

When you have carefully studied the working drawings, take the tracing paper, a pencil, ruler and compass, and carefully set out the design on the wood. If you are going to stay with my choice of materials—plywood sandwiched between solid wood—then you need six cutouts in all: two solid wood outside body parts, two plywood head and body spacers, and two plywood foot-wheels. If you are wondering about my choice of materials, it's pretty straightforward and logical. While the head-and-body spacer and the wheel need to be strong in all directions across the grain, they also need to be safe for kids,

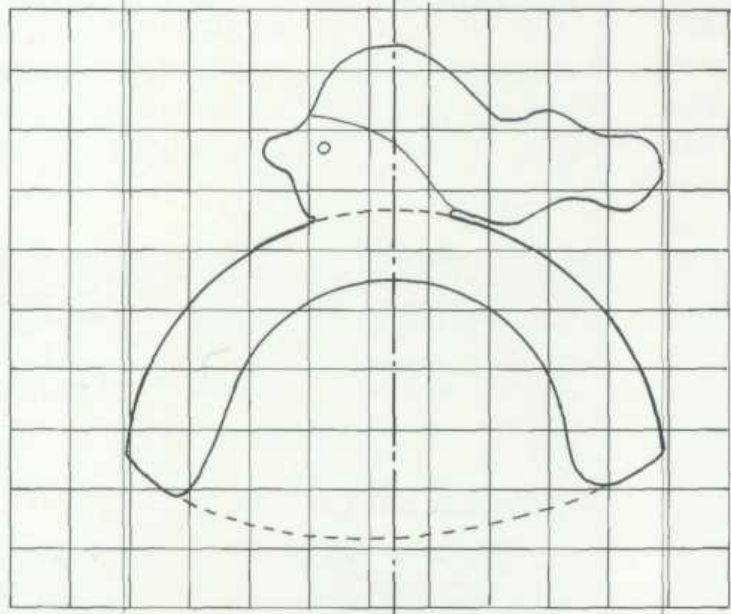


SIDE VIEW

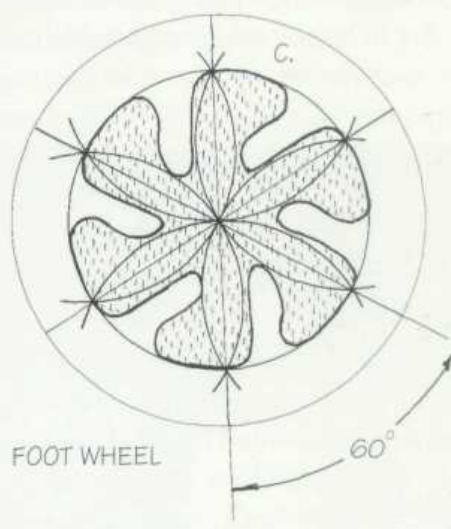


FRONT VIEW

SECTION VIEW

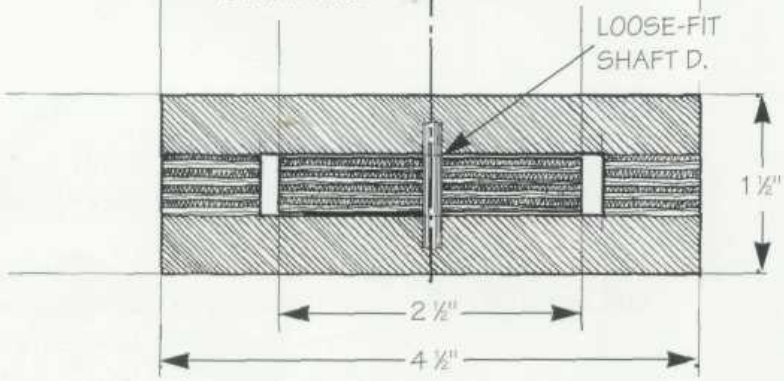


1/2-INCH GRID



FOOT WHEEL

60°



PLAN VIEW
CROSS-SECTION

as well as relatively easy to work with a coping saw. All things considered, we thought that best-quality 1/4"-thick multi-layer plywood was a winner on many counts. It's strong, it's stable, it's easy to cut, and it's easy to bond layers together to give extra strength.

When you have made all the cutouts, rub the two foot-wheels down to a smooth, round-edged finish—so that they are smooth to the touch and the total two-wheel thickness is something less than 1/2". Next, establish the position of the pivotal dowel holes through the wheel and into the inside face of each solid wood body part. Then drill them out with a bit size that gives you a slightly loose fit for your chosen dowel.

To assemble: Glue one body part to one side of the central head-body spacer. Set the two foot-wheels in the cavity so that the feet are facing in the correct direction. Slide the dowel in place, and, lastly, glue the other body part in place so that the foot-wheels and pivotal dowel are nicely contained.

When the glue is dry, rub the whole works down so that the corners are rounded and good to hold. Aim for a form that is going to be safe and comfortable in a toddler's hands. Finally, use watercolors to tint in the imagery, give the whole works one or more coats of clear varnish, and the toy is finished.

SPECIAL TIP

Wooden toys must be childproof! Being mindful that toddlers are, at the very least, going to stick the toy in their mouths, it's most important that all the fixtures, fittings and materials be totally secure and nontoxic. Perhaps most important of all, the wood must be splinter resistant. With all this in mind, we chose to use multi-ply for the central layer and for the wheels, for the simple reason that

it's easy to work, good to touch, strong across short grain "necks," and it glues and finishes well.

Don't think you can cut costs by using the coarse-centered plywood that goes by such names as "block ply," "stout heart" and "Malaysian." I say this because plywood of this type and character tends to be difficult to work, soft, almost impossible to sand to a good finish, and prone to splintering. No, when we say "multi-ply," we are specifically referring to the type of plywood that is built up in thin 1/16" layers or veneers. A plywood of this character has a smooth, white, close-grained face, it's tremendously strong and it's great to work. Ask for "best-quality, multi-ply, multilayer or multi-core plywood," and don't be talked into anything else.

Note, a sheet of 1/4"-thick multilayer plywood should be made up of four or five thin veneer layers.

MATERIALS LIST

A Head-body spacer (2)	1/4" × 5" × 5" plywood
B Outside body parts (2)	1/2" × 3" × 5" solid wood
C Foot-wheels (2)	1/4" × 3" × 3" plywood
D Pivotal dowel (1)	1/4" dowel × 1 1/4" long

Note that all measurements allow for a small amount of cutting waste.

HARDWARE AND EXTRAS

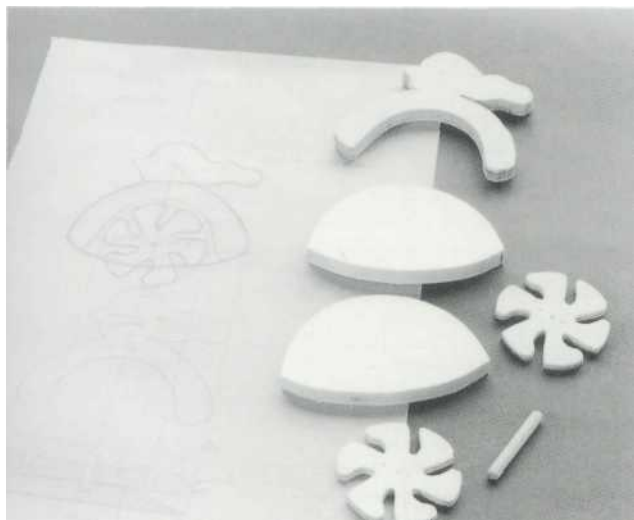
- E Artist's watercolor paints—colors to suit
- F Clear varnish

USING PLYWOOD

Best quality multi-ply is a first choice material for small cutout type toys. It is amazingly strong and it rubs down to a good smooth-to-touch finish.



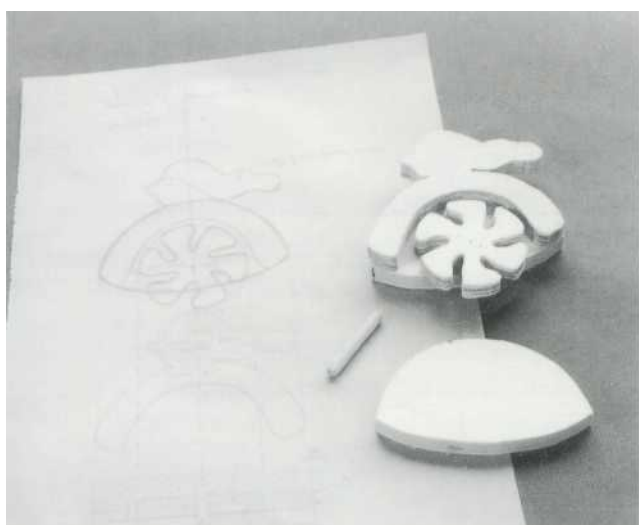
STEP-BY-STEP STAGES



1 Check the component parts against the working drawings. And just in case you are wondering why I opted to use two 1/4" thicknesses to make up the 1/2"-thick spacer—rather than a single 1/2" thickness—the simple answer is that I had lots of pieces of 1/4" ply that needed to be used up.



2 Fix the two wheels together with a piece of double-sided sticky tape and rub them down so that they are slightly less than 1/2" in total thickness. The use of the tape not only ensures that both wheels are identical, it also makes them easier to handle.



3 Test the wheels in the body cavity. They need to be an easy loose-turning fit. Note that in this test run I have the feet running in the wrong direction!



4 Rub the whole works down to a smooth finish. Close your eyes to test the finish—it's vital that every surface, edge and angle be supersmooth to the touch.

RUNNING REG IN HARDWOOD

Kids are so perceptive! When our Rosy toy was finished and up and running, I took it around to the 5-year-old girl next door for a bit of no-nonsense, in-depth criticism. Of course I was expecting a little bit of praise, but, oh no. All she said was, "But. . . where is running Reg?" So there you go, we had no other option but to make a Running Reg toy.

COUNTERCHANGE CUTTING

The clever thing about this project is not so much the design, but rather the way the two contrasting thicknesses of wood are cut and then counterchanged. It's an amazingly simple but subtle technique. All you do is sandwich two contrasting sheets of wood together, fret the design through both layers, and then swap the cutouts around so that the cutouts are contrasting.

PROCEDURE

Take the four pieces of wood—the sycamore, the mahogany, and the two pieces of plywood—and use the double-sided sticky tape to make a sandwich that has the plywood as the filling. When you are happy with the arrangement, carefully press transfer the traced imagery through to the sycamore side of the sandwich. Use the scroll saw to fret out the outside profile. This done, ease off the outside layers—the sycamore and the mahogany—and stick them together.

Cut out the **plywood** inner shape and the wheels. Then comes the very clever procedure of counterchange cutting. The method is beautifully simple. All you do is take the two profiles—the sycamore and the mahogany, all nicely stuck together with the double-sided tape—and saw them down into all the little parts that go to make up the design. For example, with this design I ran cuts through at either side of the hat band and under the chin. All you then do is swap the cutouts around and put the toy together in much the same way as already described.

2 Ease the layers apart, remove the double-sided tape and counter-change the parts. Note the little cut that goes to make the design of the mouth.

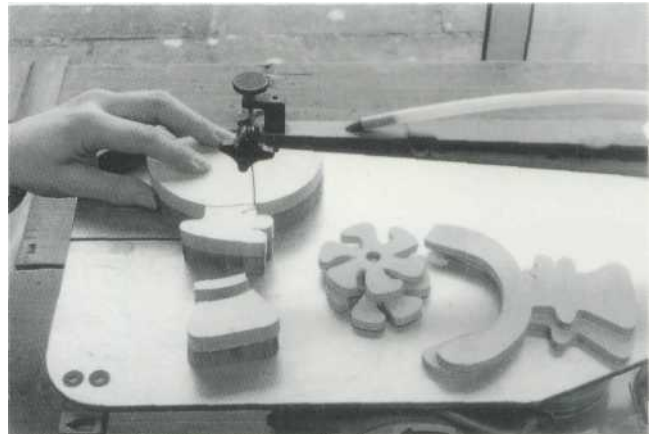
MATERIALS LIST: OPTION

- A (1) Prepared sycamore or maple wood— $\frac{1}{2}'' \times 5'' \times 6''$
- B (1) Prepared thick dark wood—I used a piece of salvaged mahogany— $\frac{1}{2}'' \times 5'' \times 6''$
- C (2) Pieces of plywood— $\frac{1}{4}'' \times 5'' \times 5''$

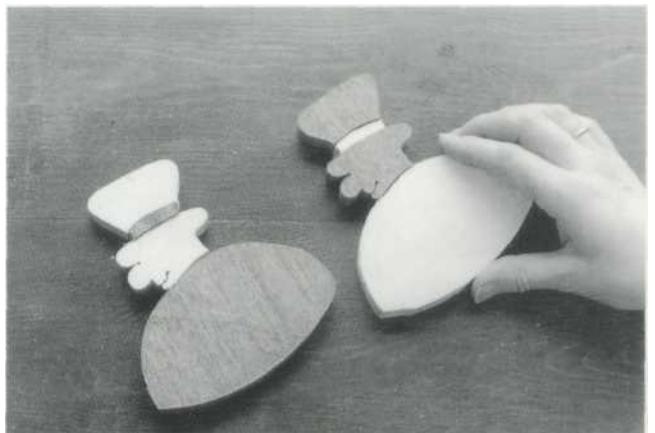
HARDWARE AND EXTRAS

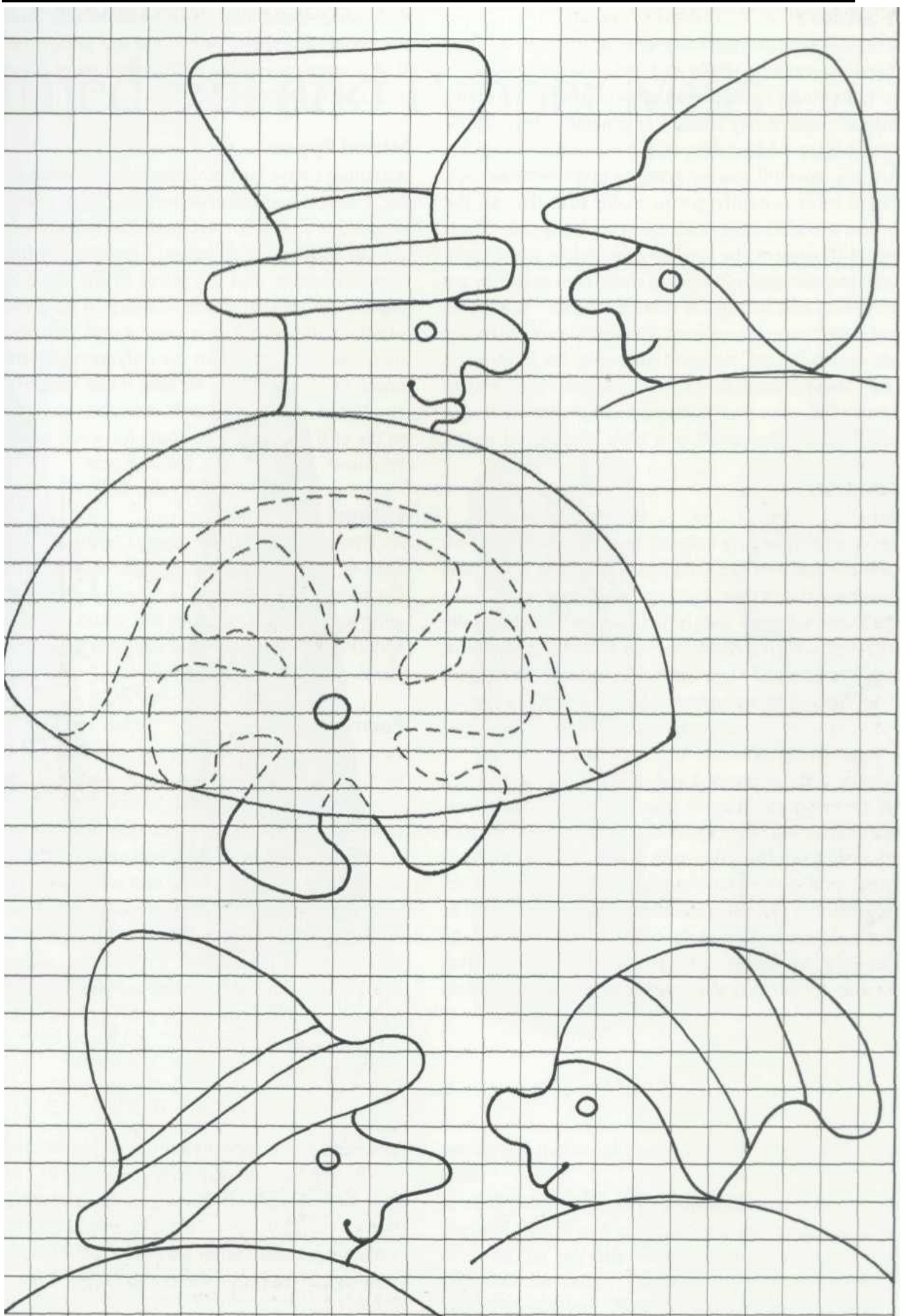
- D PVA glue
- E Yacht varnish
- F Double-sided sticky tape

STEP-BY-STEP STAGES



1 Having fitted the very finest blade in the scroll saw, very carefully cut the design down into its component parts. It's important that you use a new, well-tensioned blade and go at it slowly, so that each and every cut is well placed and square to the wood.





TOY SAFETY

Traditional wooden toys are enormous fun! Woodworkers like making them and kids like playing with them. But you do have to bear in mind that the average, intelligent finger-sticky toddler is generally going to do his level best to push the toy in his mouth and/or up his nose, if not worse! If you are going to make wooden toys, you have most certainly got to make sure that all the structures and all the materials are completely safe. If you are going to present the toys as gifts and/or make them for sale, you are legally bound to make sure that they are "safe, sound and fitting for their purpose." What this means is that you must ensure that every part of the toy is safe—no splinters, no toxic materials, no loose parts that can be swallowed. Be warned, ignorance is no excuse under the law—you *must make sure that everything is safe!* The following will provide you with some good sound guidelines.

Paint

Since kids like brightly colored toys, it's vital that you make sure that you use paints that are completely safe and nontoxic. Yes, your dad's old paint might still be in good condition, and, yes, it would give a wonderfully glossy, hard-wearing finish, but then again, it is almost certainly poisonous! Most old paints contain all manner of toxic mixes, everything from lead and antimony to arsenic. You must set out on the assumption that all old paints are dangerous.

When I asked around, I was assured that all modern paints are required by law to meet certain nontoxic, lead-free standards. But when I took it a bit further and phoned a paint manufacturer, they said that though their paints do most certainly come within safe standards, they don't necessarily come up to the standards required by the "Toy Safety" laws. As you can see, the whole area of paints and toy safety is somewhat difficult. I personally think that the best advice is either to use water stains and cover them

with water-based varnish or to use acrylic paints. If you are concerned about paints and toy safety, then it's best if you write to various well-known paint manufacturers and ask their advice.

Wood Types

Although I have had no personal experience in this matter, I do understand that certain exotic wood types are dangerous if they are chewed. For example, I read of a case in which a child chewed a wooden toy from a Third World country, and the juices in the wood caused the child to go into some sort of shock. If we err on the side of safety and take it that some wood varieties are toxic, then the best advice is to use only wood varieties that we know to be safe. So, if we take it that modern American and British toymakers know what they are doing, it looks to me as if we should be going for wood types like lime, sycamore, beech, birch, oak and pine.

Fittings

As I remember, kids are always trying to pry their toys apart in an effort to find out how they work. This being the case, it's a good idea to avoid nails, small pieces of wire, and component parts that could in any way crack, splinter or shatter. The best advice is to use brass screws, glued dowels and glued layers.

Form

In many ways, the form a toy takes is as important as its substance and structure. For example, if a toy has a component part that is long, thin and spiky, or a part that could be swallowed, or a part that could be inserted into the ear or nose, then it follows that the toy in question has been badly designed. If and when you are designing your toys, or if you decide to modify this one, you must make sure that it's safe. For example, it might be a good idea to extend the walking girl's hair so as to make more of a handle, but the question is—would it be safe?

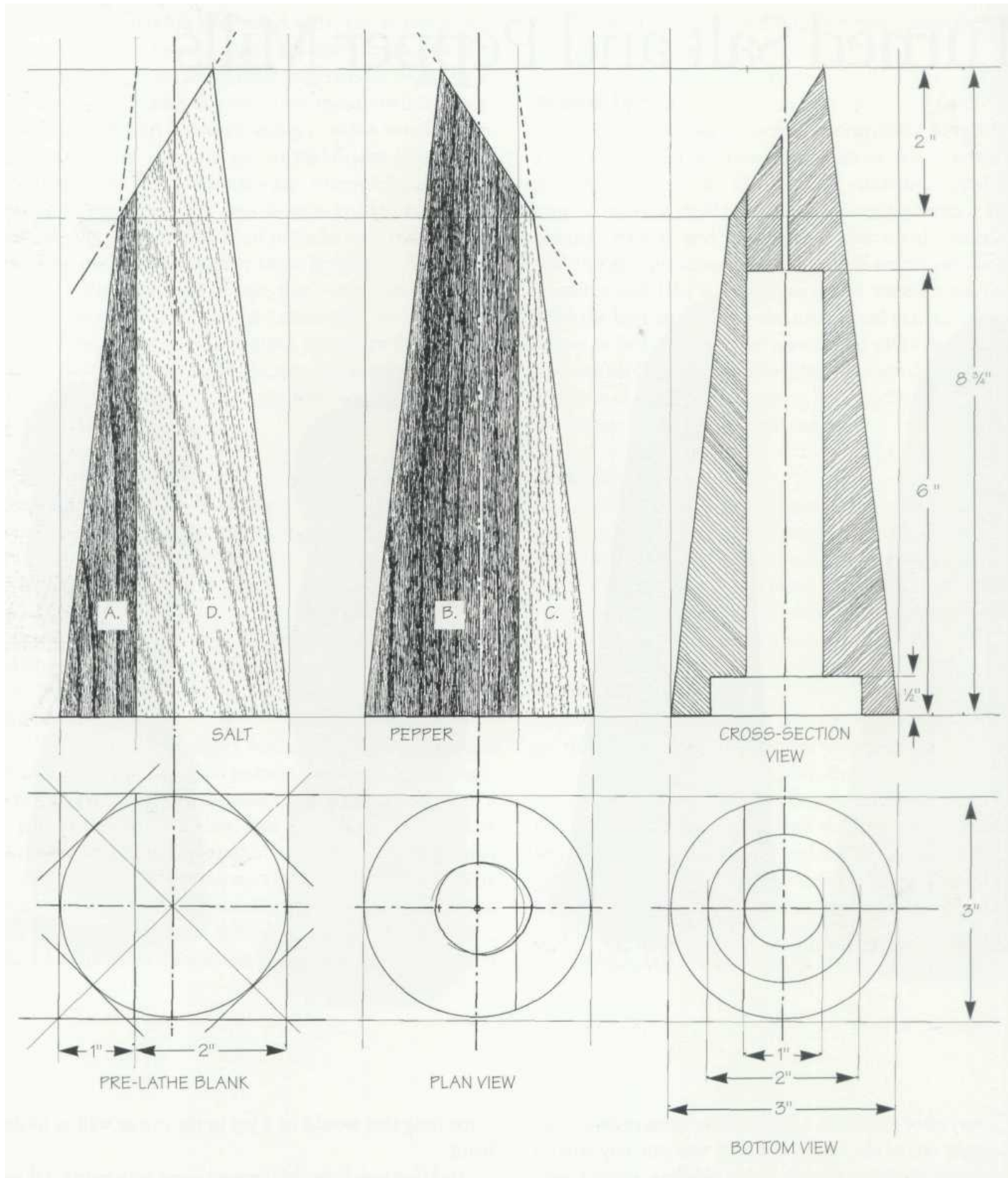
Turned Salt and Pepper Mills



Every once in awhile, a good project idea comes to me right out of the blue. And so it was one day when I was sitting down to dinner. I was fiddling around with our horrible diminutive, pressed plastic, difficult-to-hold salt and pepper mills, and trying to fill them for the umpteenth time, when the idea suddenly came to me—Eureka! I could make a couple of cone-shaped mills on the lathe—something really big, bold and sculptural, something that wouldn't need filling every ten minutes or so,

something that would be a joy to the eye as well as to the hand.

And that was how this project came into being. Okay, perhaps they aren't to everyone's taste and, yes, they are a bit on the big side—but they are certainly a unique conversation piece. The over-coffee chat usually goes something like, "Where did you get those er . . . big/strange/terrible/unusual/beautiful salt and pepper mills?"—ha!



MAKING THE SALT AND PEPPER MILLS

When you have studied the project and generally brought your lathe and tools to order, take your chosen wood and cut it to size. You need four 10" lengths in all: one dark and one light 1 1/4" X 3", and one dark and one light 2 1/4" X 3".

Plane the mating faces and glue and clamp them together so that you have two 3" X 3"-square sections. If you have done it right, the two blocks will be color counter-changed, so that one is predominantly dark with a light strip and the other visa versa. You can, of course, glue the wood up from larger section material—so that you have a single large lump—and then slice it down to size.

First establish the end centers of the blocks. Scribe out 3"-diameter circles and clear the bulk of the waste so that you more or less have octagonal sections. Then mount the wood on the lathe and swiftly turn it down to a 3"-diameter smooth, round section. With the workpiece held securely in the four-jaw chuck and pivoted on the tailstock center, take the dividers and mark off the total 8 3/4" length. Take the parting tool and sink a tool-width channel at each end. Run the tool in to a depth of 1" so that you are left with a 1"-diameter core at each end of the turning. Now, with the narrow end of the cone nearest the chuck, take the gouge and make repeated passes from right through to left.

When you have made the cone shape, carefully part the waste off at the tailstock end. With the drill chuck mounted in the tailstock, run two holes into the wide end of the cone—first a 2"-diameter hole at about 1/2" deep, followed up by a 1"-diameter hole at about 5" to 6" deep.

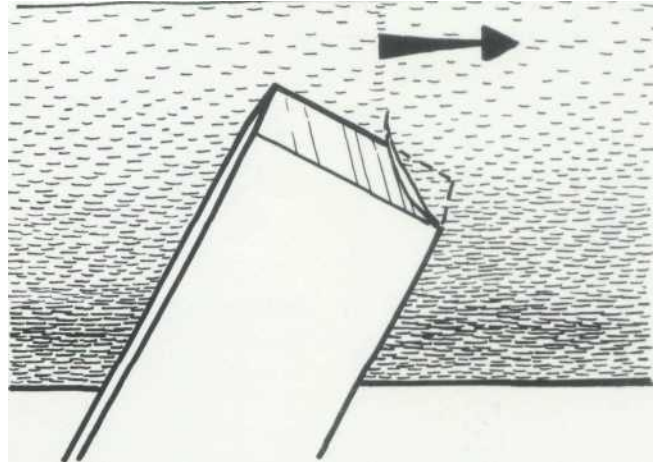
Finally, part the cone off from the lathe, run a 5/32"-diameter hole down into the top of the cone at top center, and saw off the top of the cone so that it is truncated at an angle. Rub down to a smooth finish and then burnish with a small amount of vegetable oil.

MATERIALS LIST

A	Dark wood (1)	1 1/4" X 3" X 10"—we used American Walnut
B	Dark wood (1)	2 1/4" X 3" X 10"
C	Light wood (1)	1 1/4" X 3" X 10"—we used English Hornbeam
D	Light wood (1)	2 1/4" X 3" X 10"

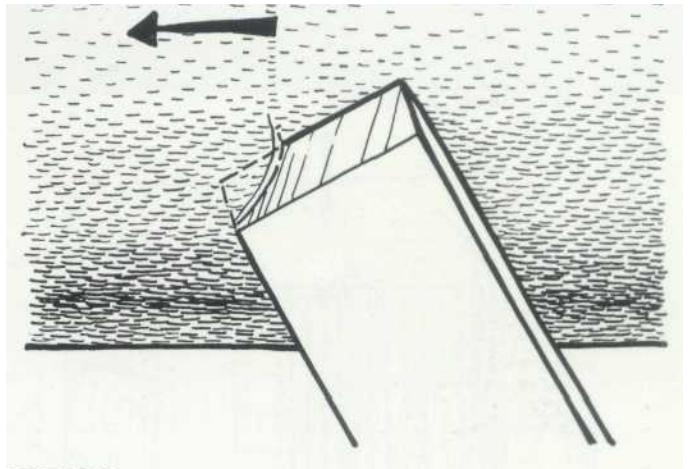
HARDWARE AND EXTRAS

E	Corks or plastic stoppers to fit the 1"-diameter holes
---	--



TOOL TIP

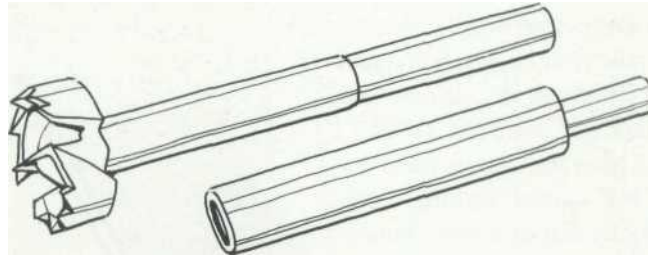
When you are using a turning chisel, the procedure is to lift the



handle up until the lower end of the cutting edge begins to bite, then advance the cut in the direction of the blade. If you work in this way, you will find that the skewed approach greatly minimizes tool pressure and consequent flexing of the workpiece.

SPECIAL TIP

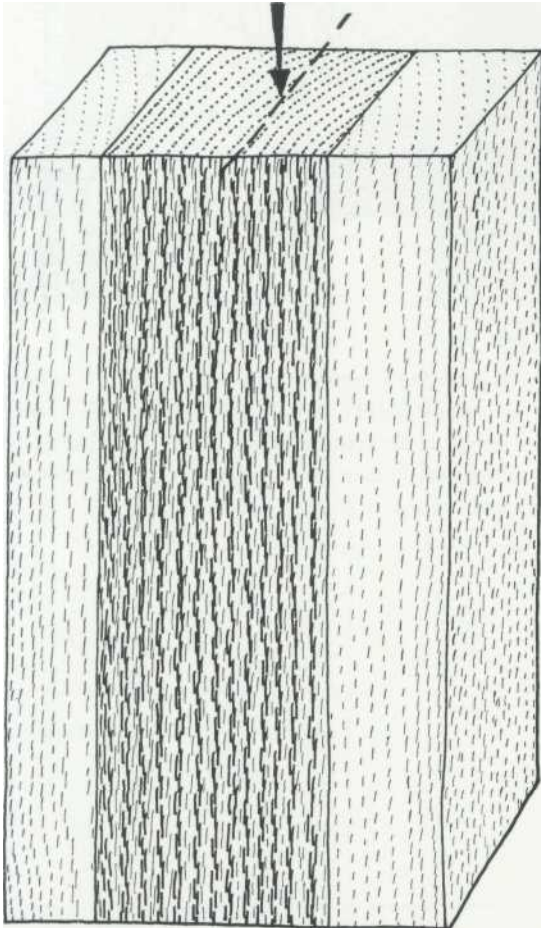
Because the gist of this project has to do with being able to drill deep, accurate, smooth-sided holes, I would always advise using either a Forstner bit or a saw tooth multi-spur-type bit. As to the actual drilling procedure, if you have to do it off the lathe—say on a drill press—then be warned, if you go off center, there is a big chance that you might break through the walls of the cone.



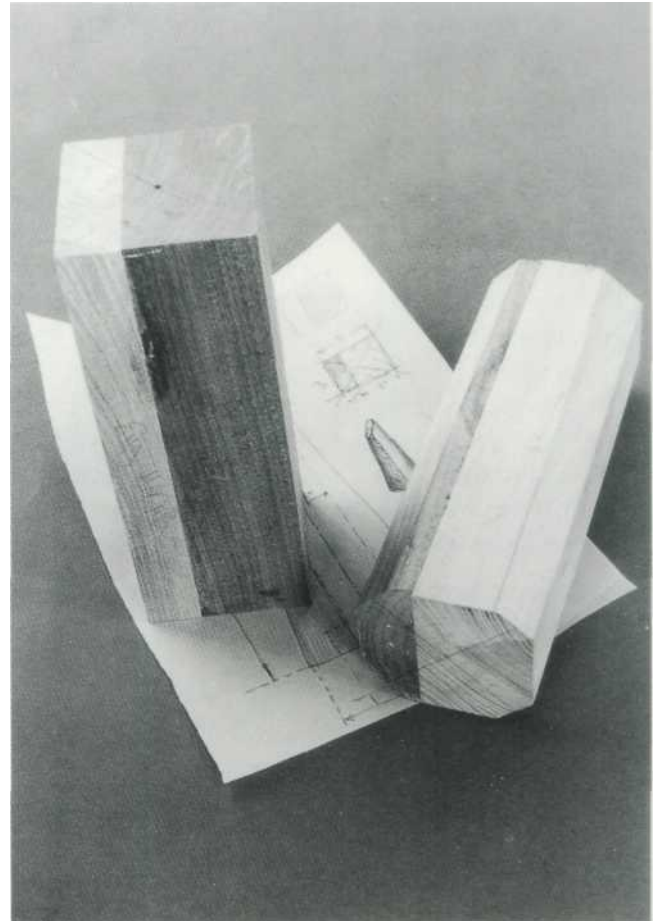
DRILLING HOLES ON THE LATHE

If you need to drill holes on the lathe, then it's best to get a Forstner or multi-spur bit with an extension bar.

STEP-BY-STEP STAGES

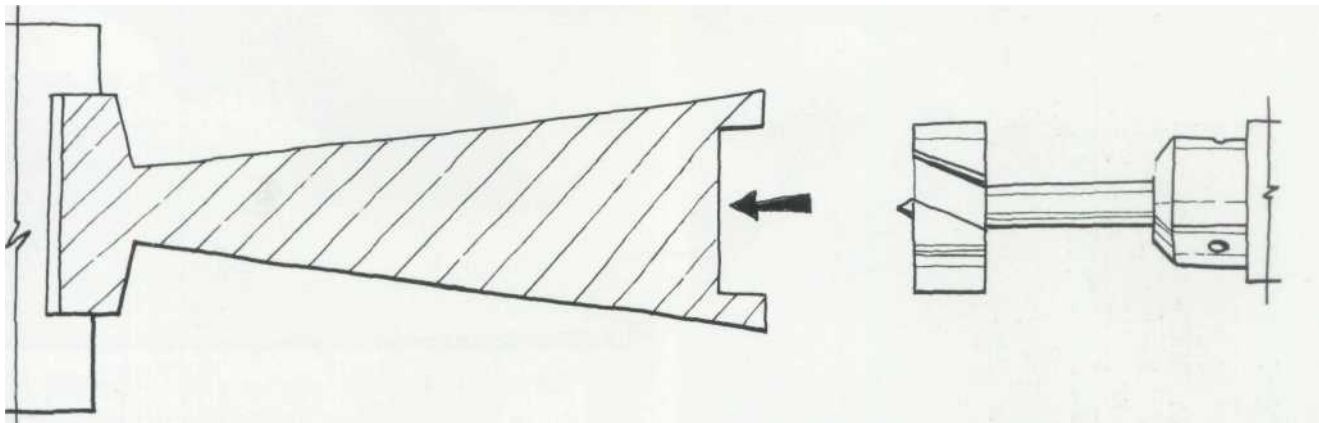
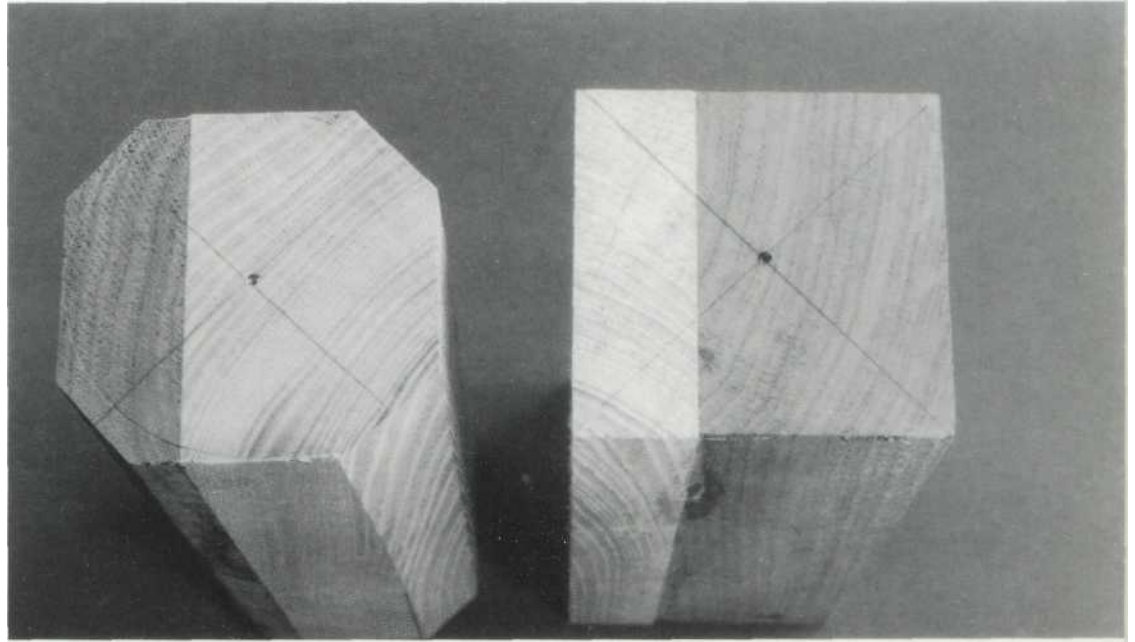


1 If you don't like the notion of gluing up small individual strips of wood or you are working with bigger pieces, a very economical method is to glue up the three blocks as shown, and then saw the resultant piece through from end to end.



2 If you are working on a small lathe, it's always a good idea to clear the bulk of the waste by planing the wood to an octagonal section. You need to finish up with two blanks, one predominantly light and the other predominantly dark.

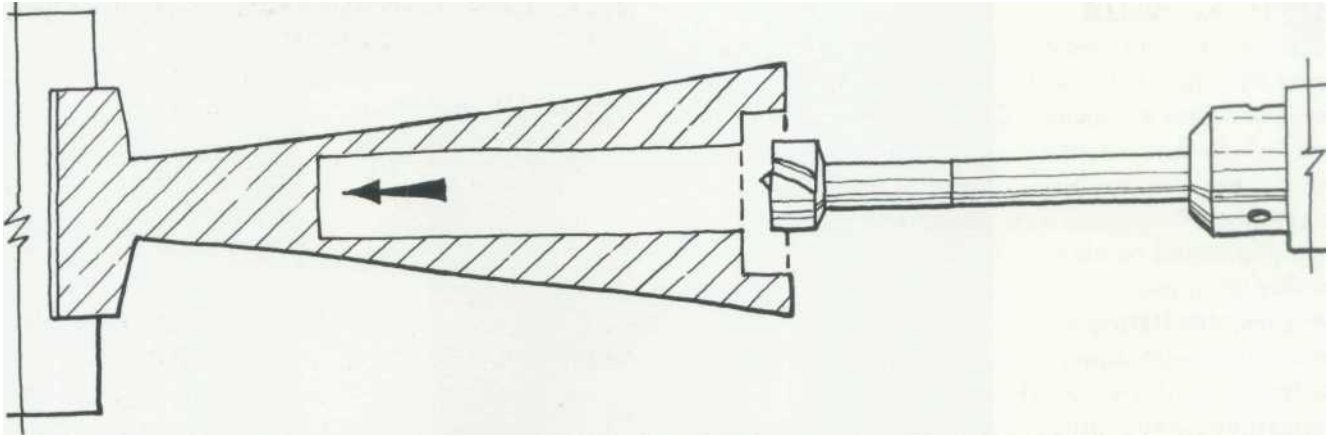
3 In the interest of safety, you must make absolutely sure that the laminations are sound and well glued. If you have any doubts at all, it's best to start over. Be warned, if ever you should decide to modify this project and go for different light-dark proportions—meaning a different gluing-up arrangement—you must make sure that the lamination line occurs well clear of the center of spin. If you don't, there is a danger that the tailstock point will force the wood apart.



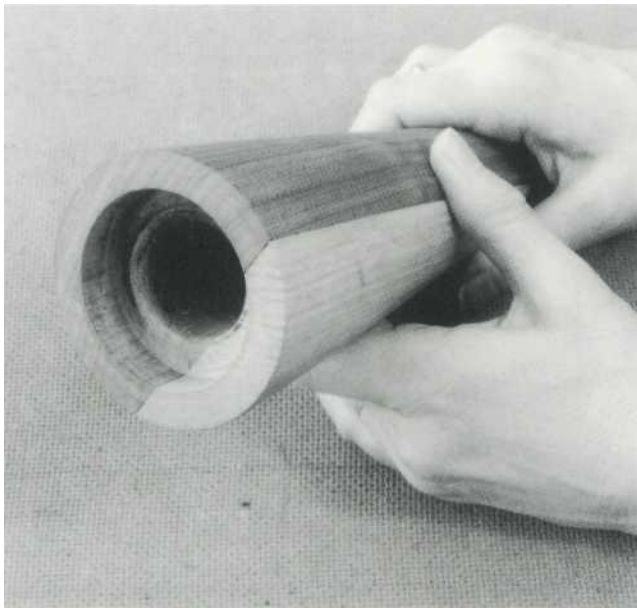
THE FACE PLATE

*Using a faceplate is a good, sound means of securing a large blank.
Notice the use of short, fat screws for maximum holding efficiency.*

4 With the workpiece held secure in the jaws of the chuck, lit a 2"-diameter Forstner bit in the tailstock chuck and run a 1/2"-deep hole into the end of the cone.



5 Having made the 2"-diameter hole, follow up with a 1" bit and sink a hole to a depth of about 5", 1/2" at a time. The procedure is, run the bit in 1/2" and then back out, and then back in another 1/2", and so on, so that you remove the waste little by little and give the bit a chance to cool off.



6 The drilled and recessed base allows you to fit all manner of corks and plugs. If you like the idea of the project but want to go for something a little more sophisticated, then many specialist suppliers stock small brass screw-stopper-and-collar units that can easily be fitted into the recess.



7 Having drilled the $\frac{3}{32}$ "-diameter hole down into the top of the cone—right through to the cavity—and used a fine-tooth backsaw to truncate the cone, use the graded sandpapers to achieve a smooth finish.

GRINDING MILLS

Traditional Colonial-style salt and pepper mills are fascinating! It's not so much the way they fit together and operate—although this is very interesting in itself—but the way they are made. There is something really exciting about the procedure. One moment you have a couple of lumps of wood and the next you have two little machines. Really good fun!

THE PROCEDURE

Having first made sure that the wood is free from splits and cavities, mount it on the lathe and swiftly turn the greater part of the length down to a 2 1/4"-diameter cylinder. Run guidelines around the cylinder so that the top part of the mill is nearest to the tailstock end of the lathe.

Turn the top of the mill—called a capstan—to shape and very carefully part off. Fit the tailstock drill chuck, set the 1 1/8"-diameter Forstner bit in the chuck, and run a hole into the end of the cylinder. Sink the hole in to a depth of about 3". Part off the 5 1/5"-long cylinder.

Wind the tailstock up so that the remaining short

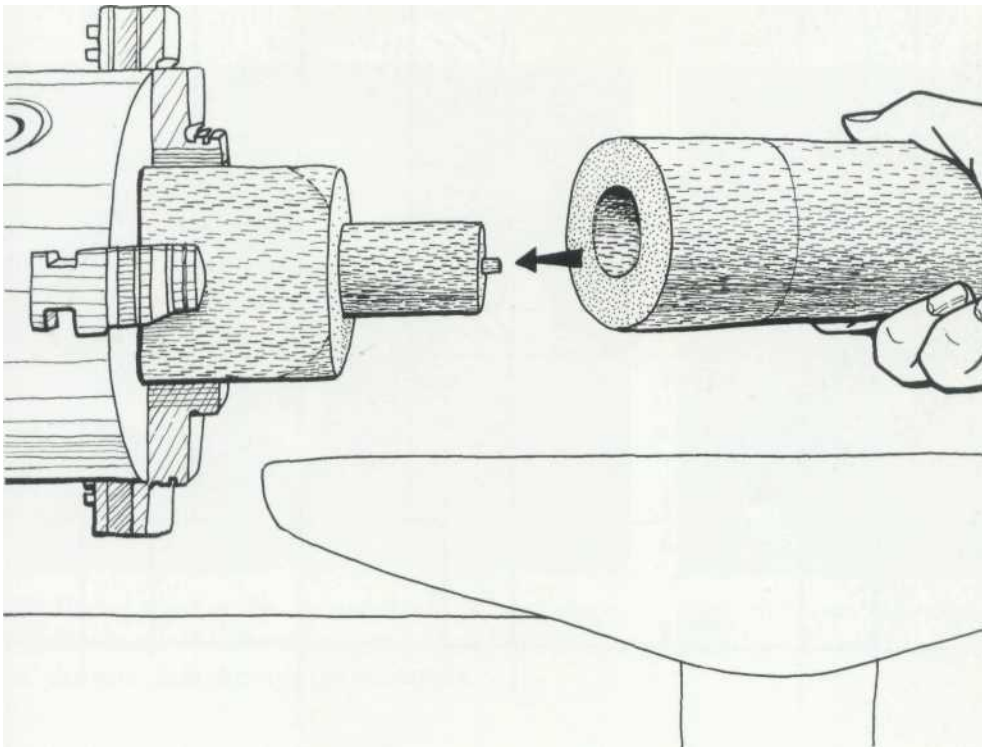
MATERIALS LIST: OPTION

- A (2) 2 1/2" × 2 1/2" × 12" pieces of beech
- B (2) 7 1/2"-long mechanisms—one for salt and the other for pepper

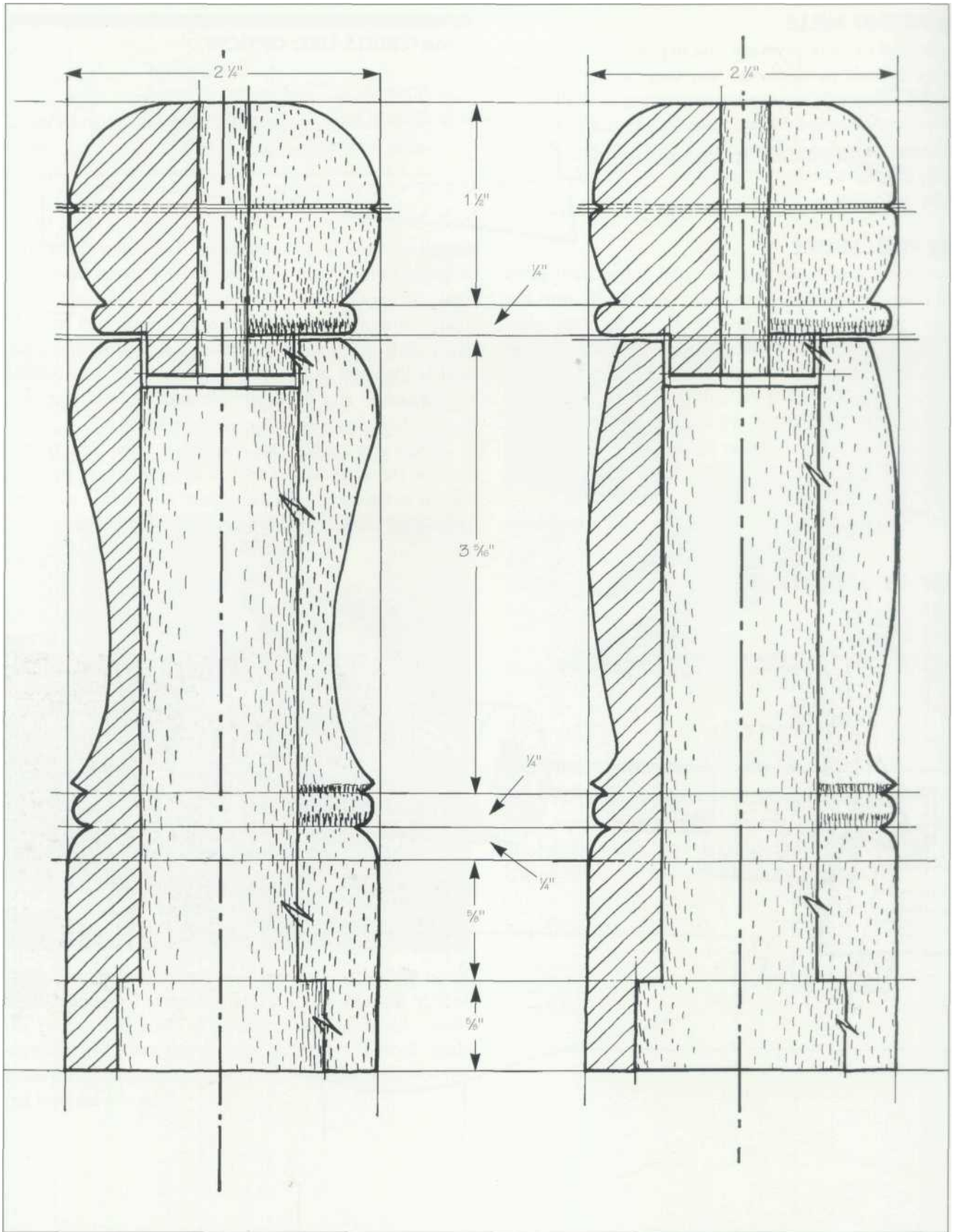
length of wood is well supported. Turn off a spigot that is going to be a tight push fit in the 1 1/8"-diameter hole that you have drilled into what will be the top end of the body. Now, slide the body onto the spigot, refit the tailstock drill chuck and bore different size holes into what will be the base of the mill body. Bore the first hole at 1 1/2"-diameter and 1/2" deep, followed up by the second hole at 1 1/8"-diameter and as deep as it will go.

When you are this far, the rest is easy. You simply reverse the body of the mill in the chuck—so that the base is in the chuck—fit the capstan on the mill, and then wind up the tailstock and turn the mill to shape.

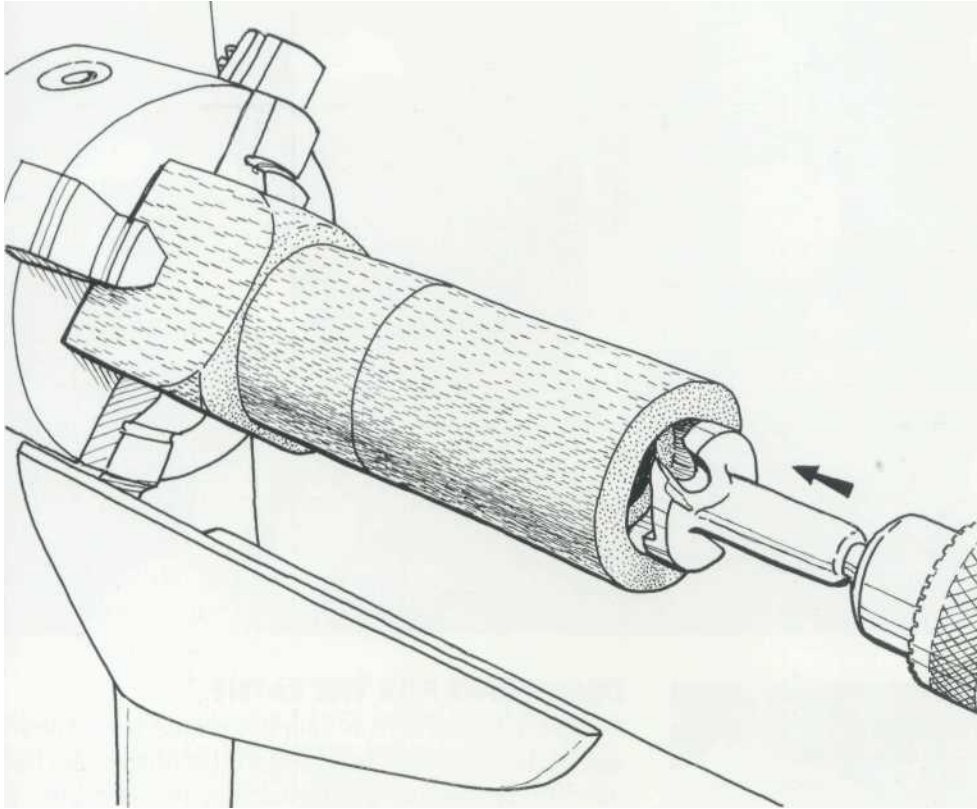
STEP-BY-STEP STAGES



1 Having turned the capstan to shape and parted off, drill a 1 1/8"-diameter hole into what will be the top of the body. Then push the cylinder onto the spigot.



WORKING DRAWING B



2 Bore two holes into the bottom of the mill—the first hole at 1/2" in diameter and 1/2" deep, followed by the second hole at 1 1/8" in diameter and as deep as it goes.

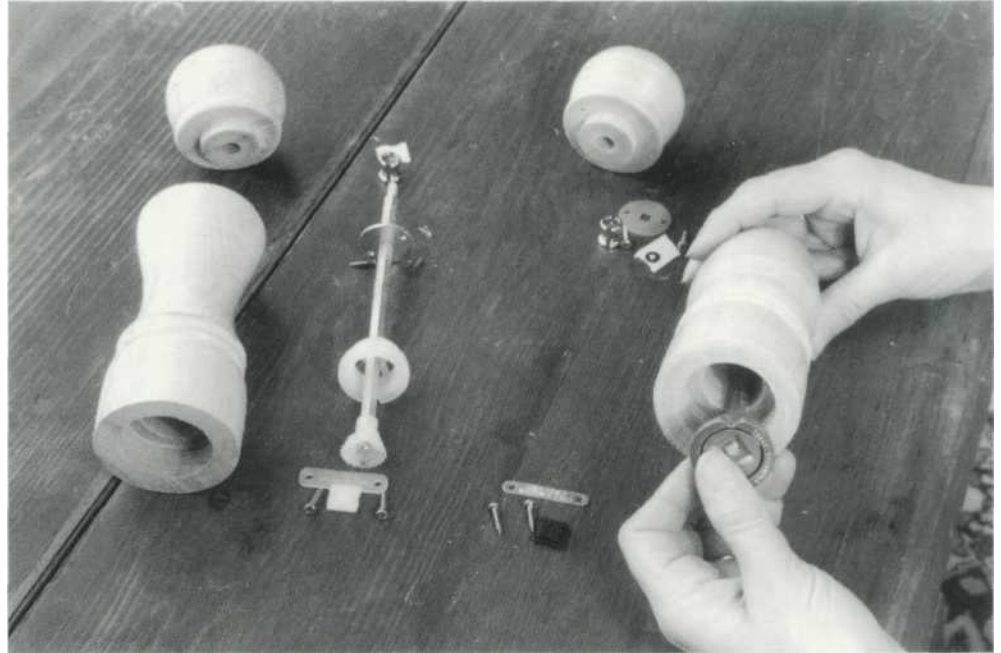


3 Having more or less turned the capstan to shape, fit it in the chuck and bring it to a good finish. Run a 3/8"-diameter hole through the workpiece.



4 Fit the whole works back on the lathe and sand and burnish to a good smooth finish.

5 Slide the mill mechanism up through the body and fix with the little bar and a couple of screws.



6 Having screwed the ring washer on the capstan spigot, slide the capstan on the threaded rod and fit with the fancy head screw.

DESIGNING FOR THE LATHE

Designing for the lathe is uniquely problematic. The success of the design not only hinges on aesthetics and function but also on the turning techniques. Of course, the same goes when you are designing a chair or whatever—you still have to make decisions about the tools and the techniques—but with turning, the tools and the techniques are paramount. Also, the design solution is very closely related to method. In chairmaking, the balance of concern is perhaps equally distributed between aesthetics, function and technique; with wood turning, the technique concerns far outweigh all others. In fact, when I'm designing for the lathe, my big worry is not whether it looks good or if it functions. Rather, I'm concerned with how I will hold, secure and approach the workpiece while it is being turned, and whether it is safe.

When I'm designing for wood turning, I always run through the following little how-will-I-do-it checklist:

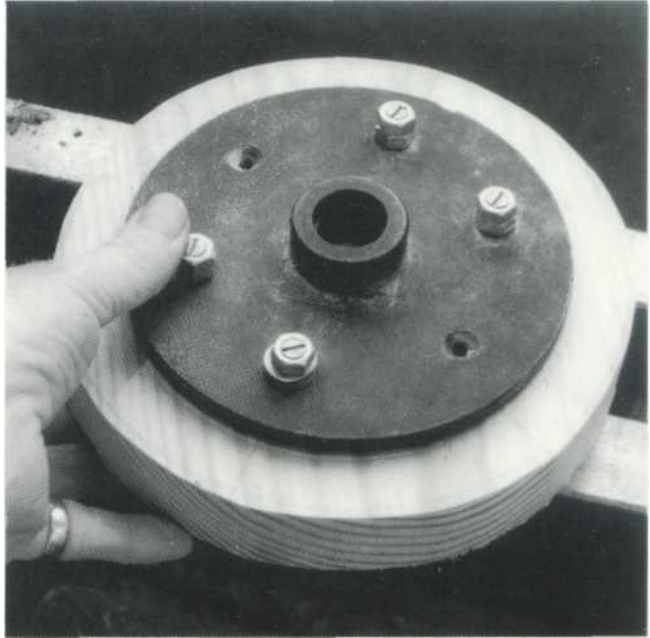
- Is the lathe powerful enough? Will the motor size happily shift the weight of the wood?
- Is the distance between centers long enough to accommodate the design?
- Is the radius of swing big enough? (Meaning, is the distance between the center of spin and the top of the bed great enough?)
- How am I going to hold the wood? Am I going to use the four-jaw chuck, the face plate, the screw chuck, the pronged center, or what?
- Will I turn multiples in one piece to be cut apart or as individual units?

- Will I need to use a drill chuck in the tailstock mandrel?
- Will I need to use special drill bits with extension pieces?
- Will I turn the item over the bed of the lathe? Or will I use the outboard bowl-turning option on the back of the lathe?
- Is the chosen wood type available in the size and quality I need? Will I need to laminate up?
- Is the wood the traditional choice for a turning of this size and character?
- Will I need to use special tools other than the usual scrapers, chisels and gouges?

As you can see, at least half of the design procedure has to do with the lathe and related tooling. Of course, just about all your questions are answered if you want to turn something like a baseball bat—your only worry is length—but if the turning is more complex with maybe two component parts that fit together, then it's not so easy and needs thinking about.

Let's say, for example, that you have set yourself the design problem of turning a large lidded container—the biggest diameter possible on your lathe—a form about as high as it is round. The first thing you do is measure the radius of swing and double it. If your lathe measures 3" from the center of the headstock down to the top face of the bed, you can reckon on a diameter of no more than 6". So, you are turning a container about 6" in diameter and 6" high.

Next, you have to decide how the block of wood is to be held and the order of work. Though there are many



ways of proceeding, I usually turn the wood down between centers—meaning the outside profile—then hold the wood in the four-jaw chuck while I hollow-turn the center. When I have cleared the waste from inside the container and maybe turned the rim, I then change the container around on the chuck—so that it is held by its rim—and finish up by turning the base.

What else to say, except that you must always think well ahead before you put tools to wood. And of course, as with all potentially dangerous machinery, you must always be wide awake and ready for the unexpected.

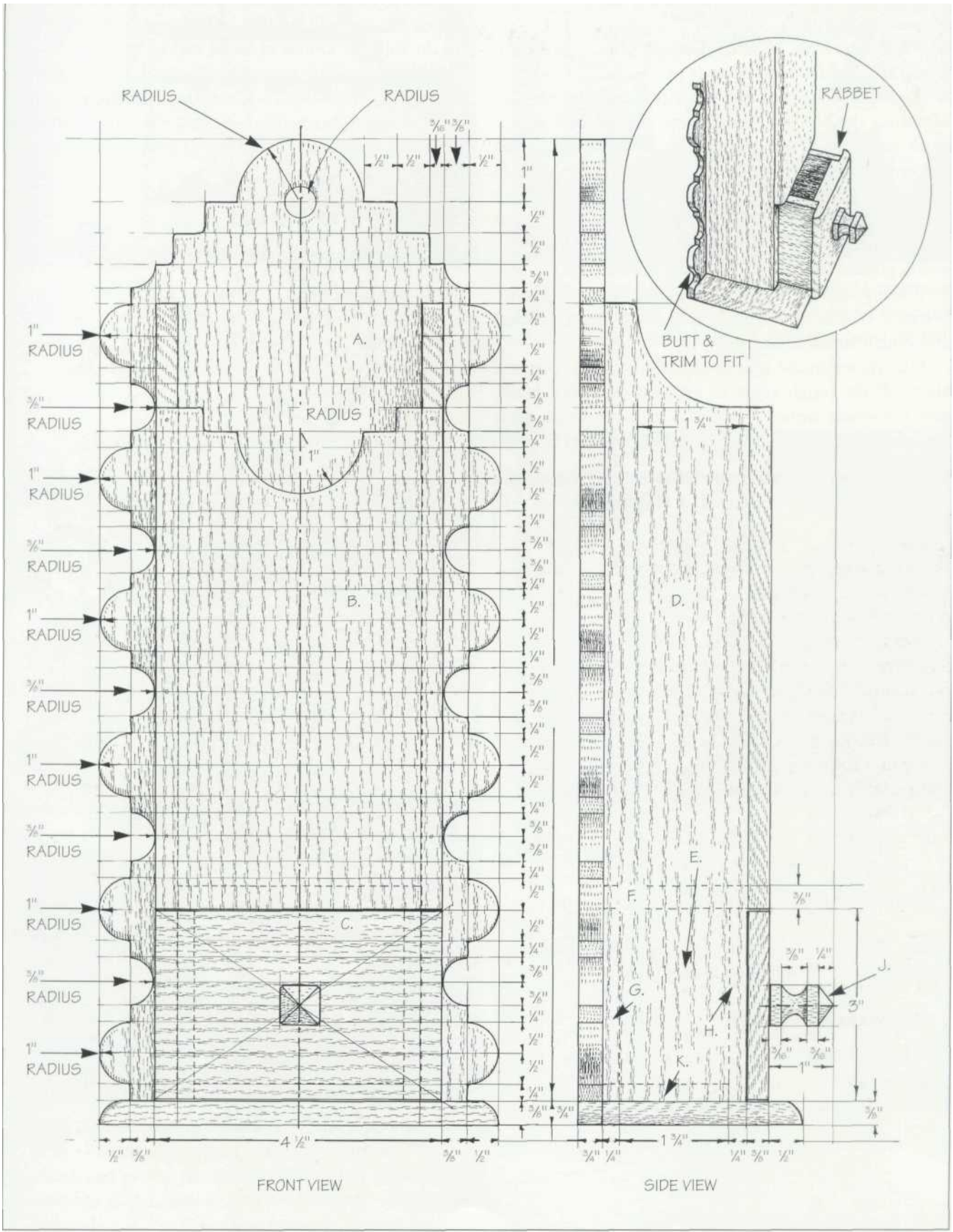
Folk Art Pipe Box

I wonder why our great-great-great-grandparents put such a huge amount of energy and enthusiasm into making pieces of woodwork that were used for everyday chores. Okay, so they had to have such functional items as dough troughs, candle boxes and flour bins. But remembering that every stick of wood had to be laboriously cut, planed, fretted and finished by hand, why did they put extra time and trouble into decorating their woodwork with so many fancy curlicues?

If you want to try your hand at a piece of woodwork that perfectly illustrates this point, then this pipe box is for you. Inspired by an English eighteenth-century folk art original, boxes of a similar type, design and construction can be found all over—in England, in Wales, in Scotland, in America—in fact, just about anyplace people smoked long-stemmed clay pipes. The design of the box is beautifully fitting for its task. The pipes fit in the top half of the box, the "makings" fit in the little drawer, and the whole works hangs on the wall alongside the fireplace.

As to the fancy compass-worked edge design, it can be found on all kinds of eighteenth- and nineteenth-century woodwork—on everything from overmantel and cupboard shelves to bench trim, door surrounds and plate racks.





MAKING THE PIPE BOX

Having set the wood out with all the dip-and-arch curves, fret out the design.

When you have made all the component parts and pencil labelled them so there is no doubting what goes where and how, then comes the tricky, sticky-finger task of putting the box together. I found that the best way to work was to drill, pin and glue the components in the following order: (1) the main backing board to the main baseboard; (2) the side boards to the backing board; (3) the inside-box piece that forms the bottom to the pipe part of the box; (4) the front to the box. And lastly, I glued, pinned and adjusted the little drawer to fit the box.

When you come to the little drawer knob, all you do is trim a $\frac{3}{4}$ " X $\frac{3}{4}$ "-square section of wood down to shape and plug it into a drilled hole.

Finally, when the glue is completely dry, trim and shape all the rough edges to a slightly rounded finish, give the whole works a rubdown with the finest-grade sandpaper, and then lay on a thin coat of wax or varnish.

MATERIALS LIST

BOX

A Back board (1)	$\frac{3}{8}$ " \times $6\frac{1}{4}$ " \times $15\frac{1}{2}$ "—we used English oak throughout
B Front board (1)	$\frac{3}{8}$ " \times $4\frac{1}{2}$ " \times $7\frac{7}{8}$ "
C Side boards (2)	$\frac{3}{8}$ " \times $2\frac{1}{4}$ " \times $12\frac{1}{2}$ "
D Drawer sides (2)	$\frac{1}{4}$ " \times 3 " \times $2\frac{1}{4}$ "
E Inside-box bottom (1)	$\frac{3}{8}$ " \times $2\frac{1}{4}$ " \times $3\frac{3}{4}$ "
F Drawer back (1)	$\frac{1}{4}$ " \times 3 " \times $3\frac{1}{4}$ "
G Drawer front (1)	$\frac{5}{8}$ " \times 3 " \times $4\frac{1}{2}$ "
H Box base (1)	$\frac{3}{8}$ " \times $3\frac{1}{8}$ " \times $6\frac{1}{4}$ "
I Knob (1)	$\frac{5}{8}$ " \times $\frac{5}{8}$ " \times $1\frac{3}{8}$ "
J Drawer base (1)	$\frac{1}{4}$ " \times 2 " \times $3\frac{1}{4}$ "

Note that all measurements are to the mark—meaning they make no allowance for cutting waste.

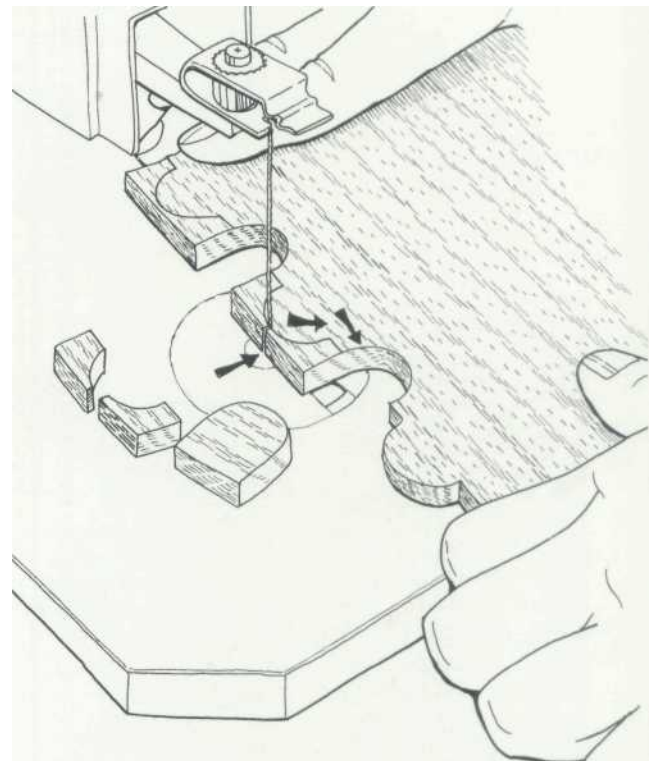
HARDWARE AND EXTRAS

- K Copper panel pins
- L PVA glue

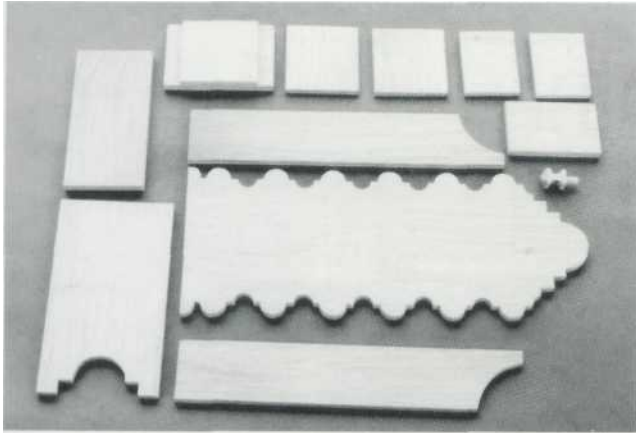
SPECIAL TIP

If you have a good close-up look at museum boxes of this character, you will see that a good part of the charm has to do with the choice of wood and the degree of finish. For example, while a good native wood looks beautifully fresh and understated—something like cherry, maple, pine or oak is just perfect—a fancy wood like mahogany or one of the exotic African woods tends to look too precious or "overdressed."

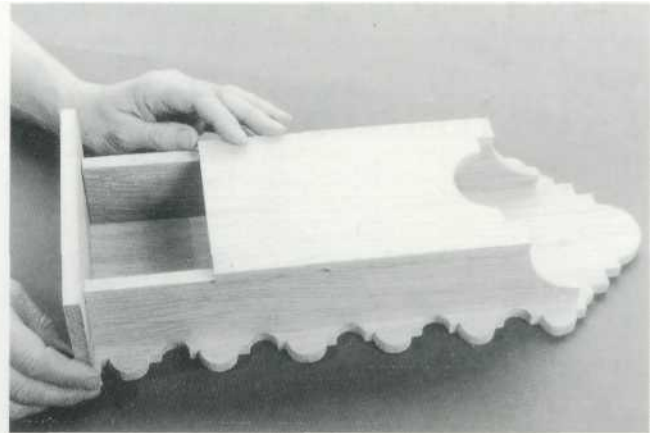
STEP-BY-STEP STAGES



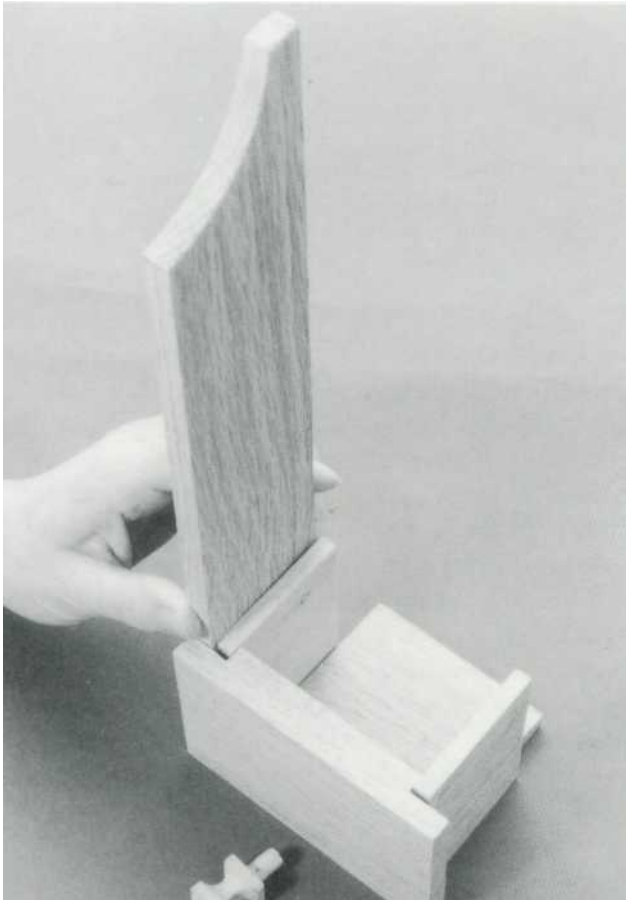
To work the fancy edge, start by cutting out all the deep concave U shapes—along the whole length of the wood—and then fret out the remaining convex forms. If you look at the arrows, you will notice that I always work in the direction of the grain—that is, two cuts that run down-and-out from the peak of the little bridge shape.



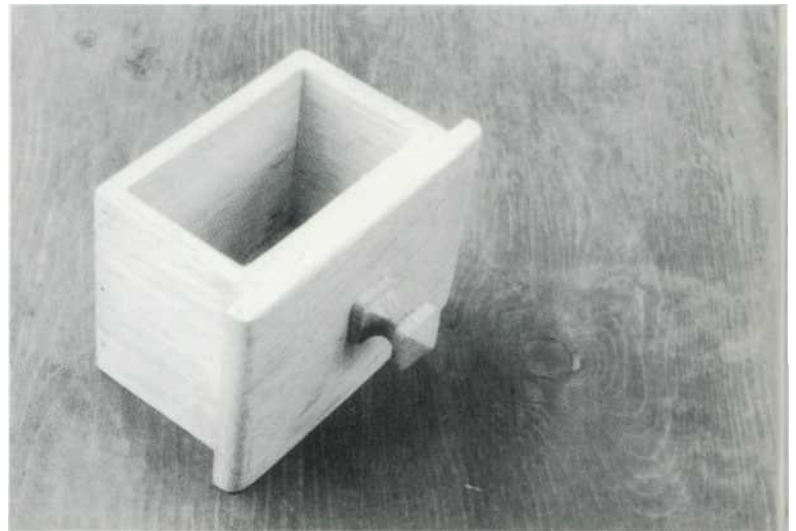
2 Having made all the component parts, pencil label them so that you know precisely how they fit one to another. If one side of a part is more attractive, or damaged, then now is the time to make decisions as to its placing.



3 Do a trial fitting to make sure that you haven't made any mistakes. Test for the squareness of the butting edges and mark in the position of the nail/panel pin holes.



4 Do a trial fitting of the sides of the box and the sides of the drawer. If necessary, you can trim back the rabbet and/or the thickness of the wood. Establish the position of the drawer pull by marking with crossed



5 Here's the finished drawer—all glued, pinned and rubbed down. Putting the drawer together is a little bit tricky, not because any single cut is complicated, but because the total form needs to be true, square and a good fit.

Laminated Jewelry Box



This project draws its inspiration from the English decorative woodworking technique known as Tunbridgeware. This ware is characterized by small items that give the appearance of being worked with delicate tessera inlay. The technique involves gluing colored sticks of wood together in bundles and then repeatedly slicing, repositioning and re-gluing.

With this little box, the slicing and laminating technique is used in conjunction with what has come to be called "band saw joinery."

MAKING THE LAMINATED BOX

First and foremost, you have to understand that with this project there are several steps along the way where there is a high risk of the whole thing falling to pieces. This being so, we decided at the outset to work on two boxes at the same time, just in case of mistakes. Well, as you can see in the photographs, we got so far with one box and—Splap!—it came to grief.

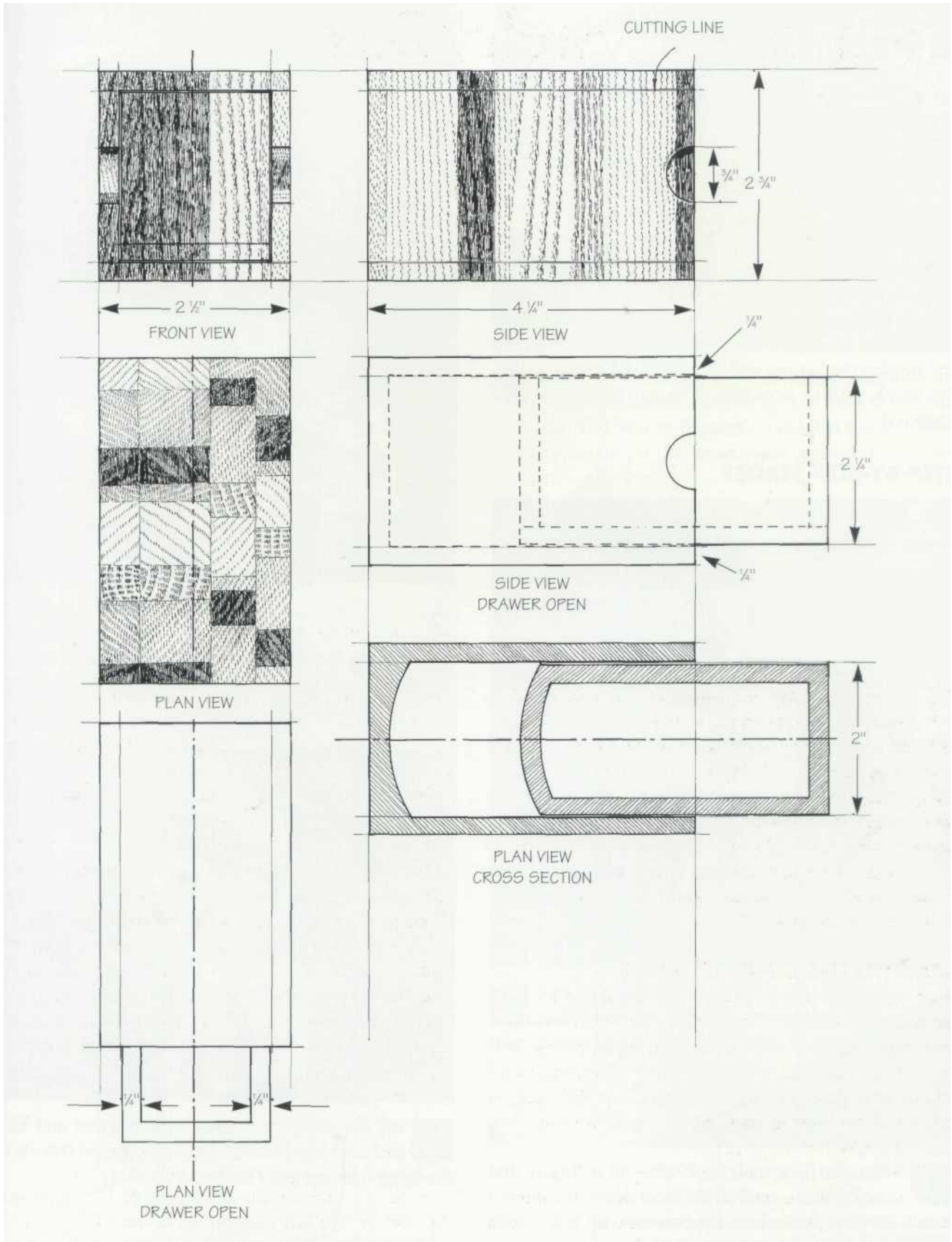
When you have studied the working drawings, gather your chosen offcuts, and plane them down to smooth-sided sections. Stick them together side by side, like a long fence. When the glue is dry, plane both sides of

the fence, cut it into short lengths, and then re-glue the resultant lengths into a layered sandwich. Continue slicing, planing, gluing and laminating, until you have what you consider an interesting multicolored brick. And of course, the more you slice and laminate, the smaller the design and the greater the complexity of the pattern.

Plane your brick to size so that it is $2\frac{1}{2}$ " X $2\frac{3}{4}$ " in section and 4" long, with all six sides being smooth and at right angles to each other. Pencil label the various sides "top," "bottom," "back," "front," "left side" and "right side."

Use the band saw to cut a $\frac{1}{4}$ " slice from the "top" and "bottom," label the slices and put them carefully to one side. This done, set the shape of the drawer out on the rough face of the block, and use either a fine-bladed band saw or a scroll saw to cut it out. Next, slice the bottom off the drawer, label it and put it to one side. Then use the scroll saw to clear away the waste from what will be the inside of the drawer. While the saw is handy, cut away the two finger holes and run a cut straight down back-center of the shell-like piece that wraps around the drawer.

When you have made all six component parts—the top and bottom slabs of the brick, the all-in-one-piece back and sides that has been cut into two halves, the



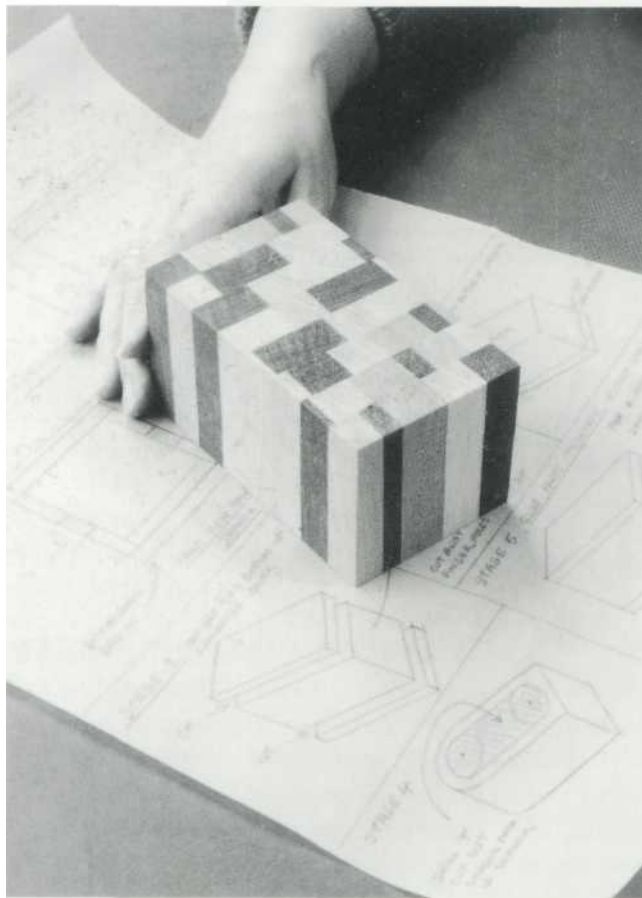
drawer with the inside cut away, and the bottom to the drawer—take the finest-grade sandpaper and rub all the sides and faces down to a smooth finish. Be careful that you don't blur the corners.

To put the little box together, start by gluing the base onto the drawer. Then smear glue on mating faces and reconstruct the block so that the drawer is nicely and closely contained. Finally, when the glue is dry, sand and finish the box.

SPECIAL TIP

If you like the idea of this project and want to try something a little more complex, you could experiment with cross-laminating. For example, you could turn the slices around at the sandwiching steps so that all faces of the brick show end grain. Then again, you could try swapping and turning the bottom and side slices of the box so that the block pattern becomes even more complex and staggered.

STEP-BY-STEP STAGES

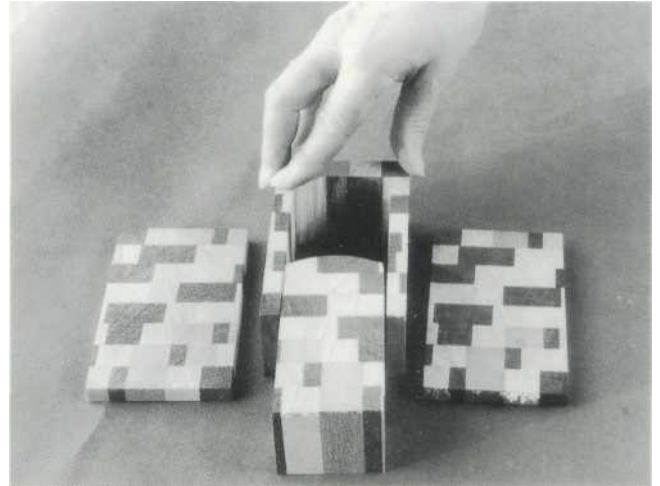


1 When you have made the block—all well glued and sawed to size—sand all the faces down to a smooth finish. Do your best to keep the corners crisp and at right angles.

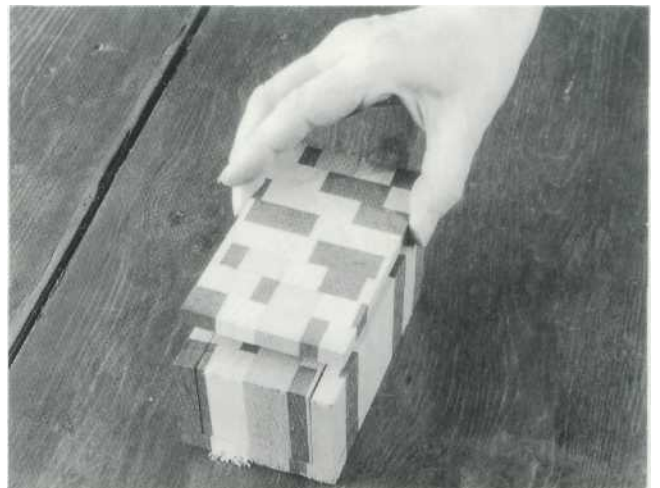
MATERIALS LIST

Box

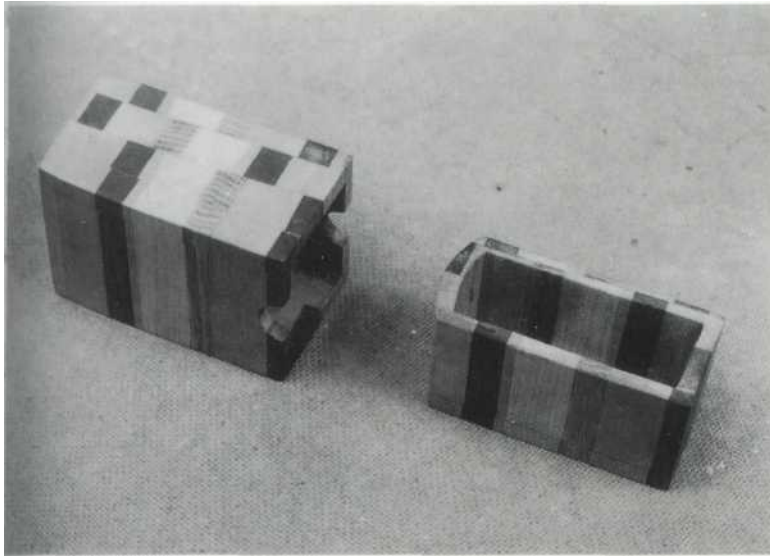
A selection of contrasting offcuts all sawed and planed—we used American walnut, oak, cherry and tulipwood—at about ½" thick and at various widths.



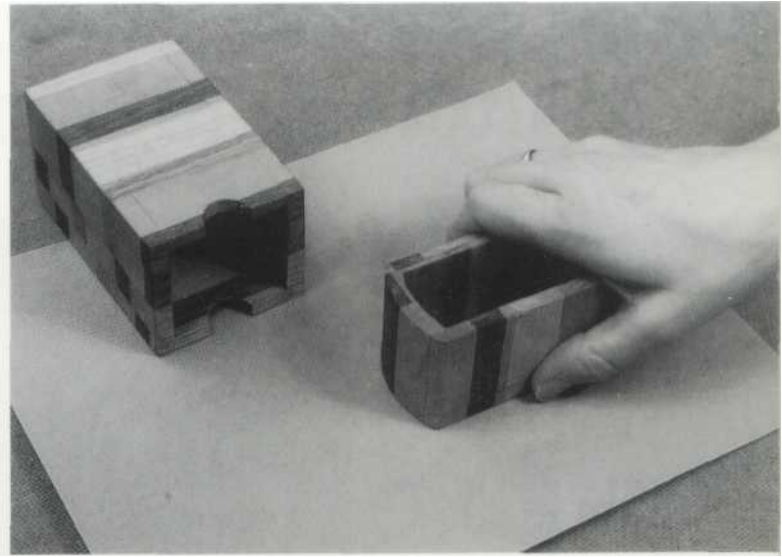
2 Saw slices off the top and bottom of the block and cut out the shape that goes to make the drawer. Be mindful that the drawer surround—meaning the piece that you see me holding—is very fragile at this stage and liable to break apart at the corners.



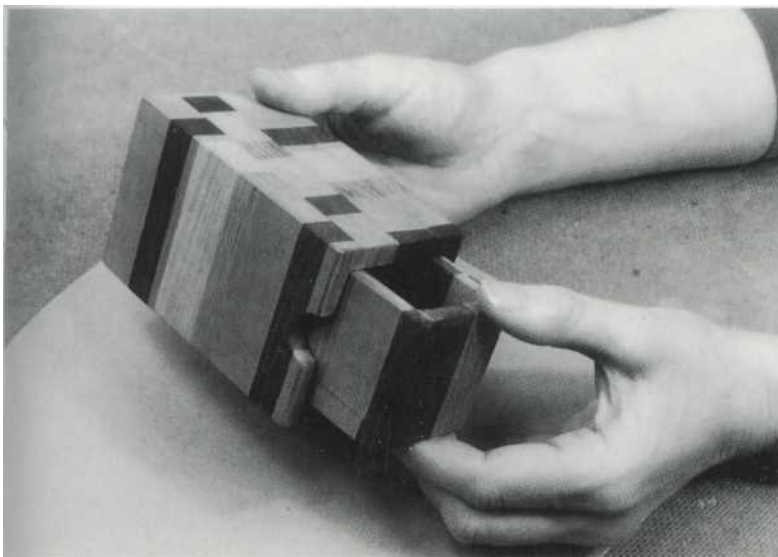
3 Put the component parts back together and label each and every face and mating edge, so there is no doubting how the parts fit one to another.



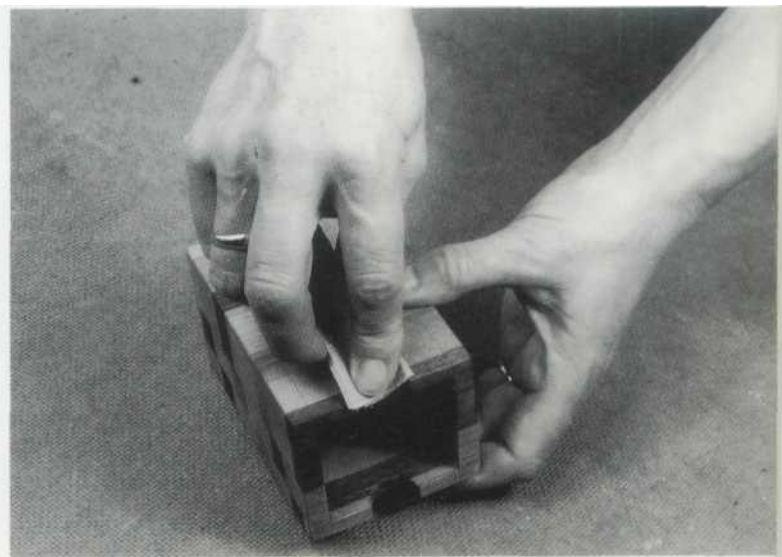
4 Having sliced off the bottom of the drawer block, saw out the inside-drawer waste and then glue the base back on the drawer. And just in case you have noticed that this photograph shows another block, the sad truth is the original block fell to bits when I was cutting the drawer. I think the problem was that I was a bit anxious and heavy-handed, and the glue hadn't quite cured.



Sanding the various faces is a very slow business for the simple reason that you have to work slowly and with care. You have to be most careful that you don't put undue pressure on the drawer—no squeezing the sides together.



6 If you find that the drawer is a somewhat loose fit, it's a good idea to give the inside of the box a couple of coats of sealer and then sand back to a nice push fit. The best procedure is to sand a little and test the fit, then sand some more, and so on until you are satisfied.



Sand the finger holes to a rounded finish. You have a choice at this stage . . . do you want to round and blur all the corners, or do you want to keep them sharp?

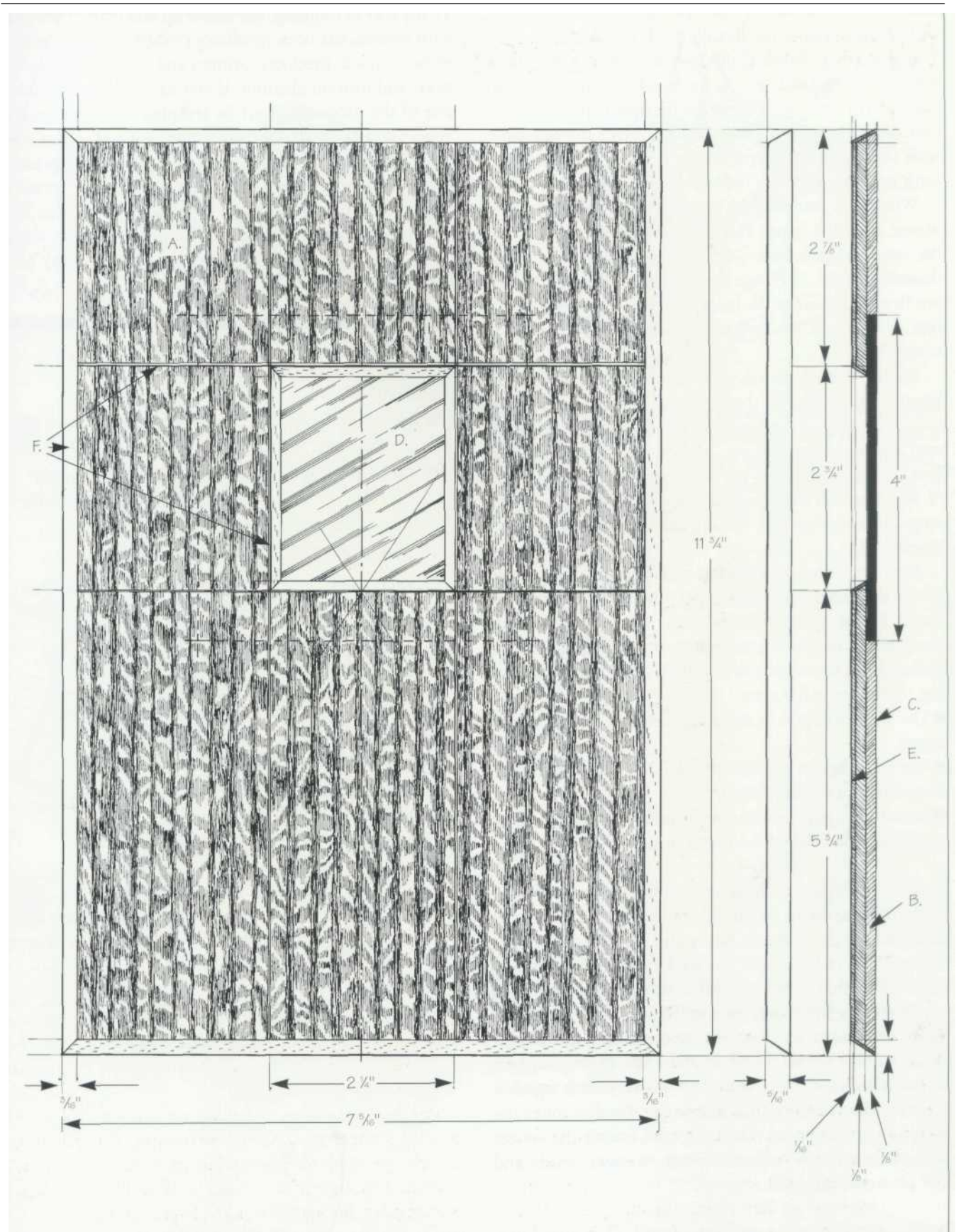
Marquetry Mirror



About five years ago, my son Glyn made a marquetry mirror for an English magazine called the *Woodworker*. It was a real success and there was lots of interest. This mirror draws its inspiration from that project. At first glance, this mirror appears to involve an incredibly complex and fine marquetry technique—very fine hairline inlays and a multitude of cuts. Certainly it is a most delicate and exquisite item, but appearances are not always what they seem! The marquetry surface is, in fact, made up from a sheet of specially printed and

pressed flexible veneer, while the hairline inlay is made from strips of sycamore veneer glued to the kerf face. As to the technique, it's no more than a few saw cuts and a bit of ironing.

For the actual shape and character of the mirror, there are any number of exciting possibilities. You can chop and change the veneer around to create different effects; you can rearrange the saw cuts so that the little "window" is triangular, hexagonal or star-shaped. In fact, you can go for just about any shape that takes your fancy.



MAKING THE MIRROR

Before you do anything else, you need to play around with the materials—the flexible veneer and the gluefilm. The gluefilm is wonderfully easy to use. All you do is position it paper-side up on the baseboard and iron it in place with a hot iron; remove the backing paper and position the marquetry on the gluefilm; cover the assembly with the backing paper and run the hot iron back and forth until the glue has melted.

When you understand how the gluefilm technique works, clear the bench ready for action. Start by cutting the two boards to size—the top board and the mirror thickness board. Then use the gluefilm to bond your chosen flexible veneer to the front face of the top board. And just in case you are wondering, yes, it is as easy as it sounds!

Having used a pencil, ruler and square to draw the lines of the design on the veneered surface so that they run off the edge of the board, sit awhile and consider your next move. As you can see, all you need to do is make four cuts straight across the board and at a mitered angle of 30°. Then fill the resultant saw-cut kerfs with a glued strip of veneer so that the angled veneer becomes the beveled edge.

Now there are two ways forward. You can either do as we do and make one cut straight down the length of the board, fill the cut up with the veneer strip and move onto the next cut, or you can make all four cuts and then fiddle about gluing up the whole assembly. Either way, the gluing procedure is the same.

- Use the scroll saw to make the beveled cut across the board.

- Use the gluefilm to bond the strip of sycamore veneer to one face of the kerf bevel.

- Smear PVA glue on the face of the sycamore strip and push the other side of the board in place.

Then continue making beveled cuts with the scroll saw, sticking veneer strip to one side of the bevel, sticking the other side of the board in place, and then on to the next cut until the task is done. The trick is to finish up with a mirror hole that is nicely beveled on all four edges.

When the glue is dry, use a small plane and the finest-grade sandpaper to clean the whole works down to a smooth finish so that the edges of the veneer strips appear as fine inlay lines. This done, glue the two boards together to make the recess for the mirror tile. Finally, miter the edge of the two-board thickness, trim it with the veneer strip, burnish the whole works with beeswax polish, and the project is finished.

SPECIAL TIP

To my way of thinking, the whole art and craft of working with veneers has been revolutionized by the introduction of two miracle products: printed and pressed flexible veneer, and iron-on gluefilm. If you have trouble obtaining one of the products, don't be tempted to use traditional veneer and hot-melt glue, but rather visit a specialist supplier and ask specifically for the products by generic name. You need "thermoplastic gluefilm," and "pressed and printed flexible veneer." Flexible veneers come in a whole range of designs and colors, everything from imitations of exotic veneers to designs that look as if they have been woven.

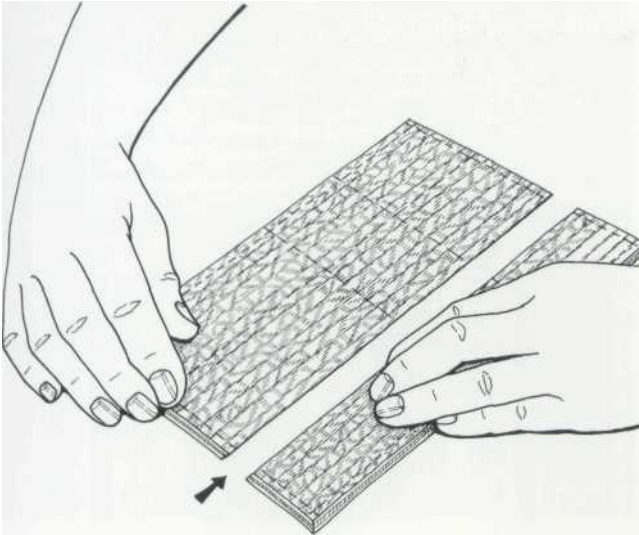
MATERIALS LIST

A Front board (1)	1/8" ply × 7 3/16" × 11 3/4"
B Mirror thickness board (1)	1/8" ply (same thickness as the mirror tile) × 7 3/16" × 11 3/4"
C Backing paper (1)	6" × 6"—sticky-back paper or plastic to hold the mirror secure
D Mirror tile (1)	4" × 4"-square tile
E Veneer (1)	printed and pressed flexible veneer 12" × 12"—this allows for cutting waste
F Inlay (1)	sycamore veneer 14" × 10"—this allows for a good amount of cutting waste

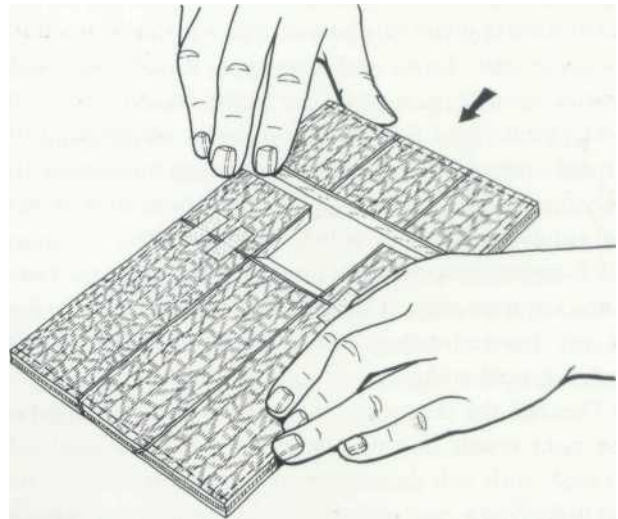
HARDWARE AND EXTRAS

G Thermoplastic gluefilm (1)	18" × 18"
H PVA glue	

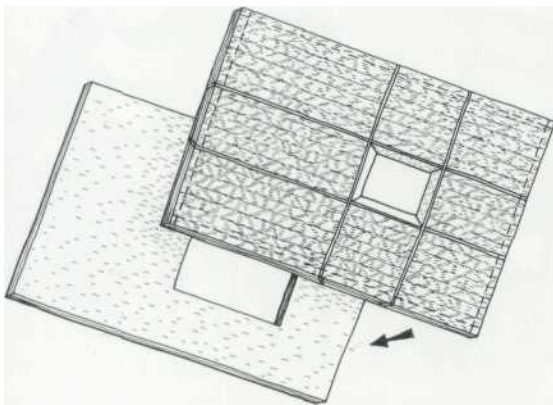
STEP-BY-STEP STAGES



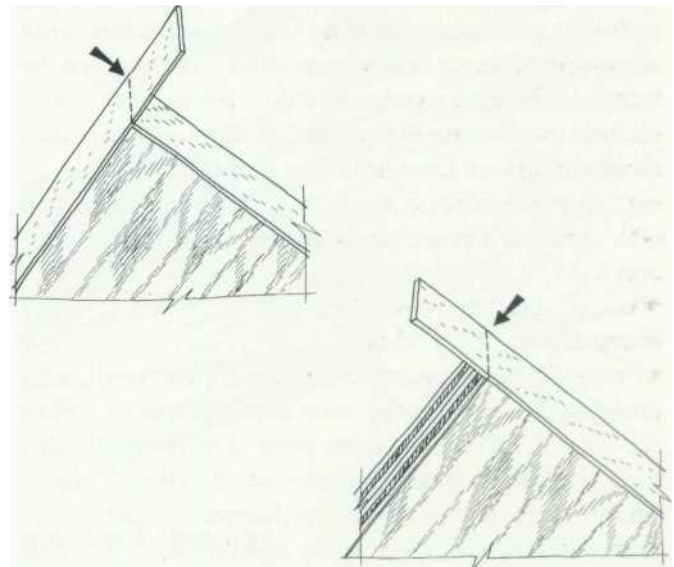
1 Set the saw table to a tilt angle of 30° and run a saw cut right across the length of the board. Then, glue a strip of veneer on the sawed edge and glue the two parts of the board back together.



2 Continue running straight saw cuts across the board and filling the kerf with veneer until the design is complete. If you do it right, the procedure will automatically result in the mitered edges of the mirror hole or window being veneered with the strip.



3 Glue the backing board in place so that you have the thickness of two boards. Then run a beveled cut around all four sides of the frame.



4 Glue the strips around the mitered edges and trim and sand the corners to a crisp finish.

MORE ABOUT THE CRAFT OF MARQUETRY AND INLAY

If you have enjoyed this project and want to know more about the craft of inlay and marquetry, then the following brief history will give you some useful leads.

Marquetry and inlay were originally inspired by the ancient craft of "intarsia"—the making of mosaics by the inlaying of precious and exotic materials into and/or onto a groundwork of solid wood. The Egyptians decorated much of their woodworking with inlay. In fact, in the tomb of the Egyptian king Tutankhamen, just about all the furniture is covered with an inlay made up of little briquettes of wood, gold and ivory.

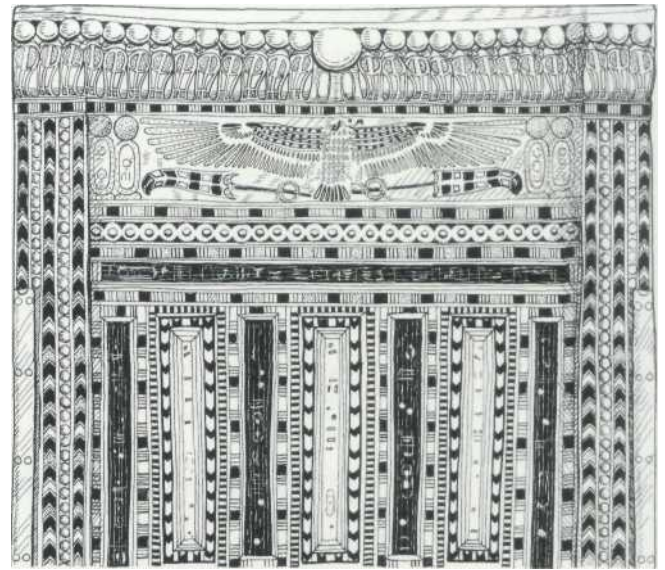
Through the centuries, in Egypt, Rome, Persia, Japan and right across Europe, the craft of inlaying gradually evolved, with rich patrons employing craftsmen to painstakingly cover base woods with rare and exotic woods. The craft involved importing rare woods, slicing the wood into little chunks, and then setting the chunks or briquettes one at a time into the base wood. The process of inlay was massively expensive in time and materials.

And so it might have continued had not some tired and weary woodworker—sometime toward the end of the sixteenth century—invented the jigsaw. From then on, the whole process became swifter and more efficient, until about the beginning of the seventeenth century, when the technique became so improved and refined that woodworkers were using thin sheets of wood—by this time called veneer—to glue directly to the base wood.

The craft as we now know it can be divided into four areas of study—veneering, parquetry, boule marquetry and window marquetry.

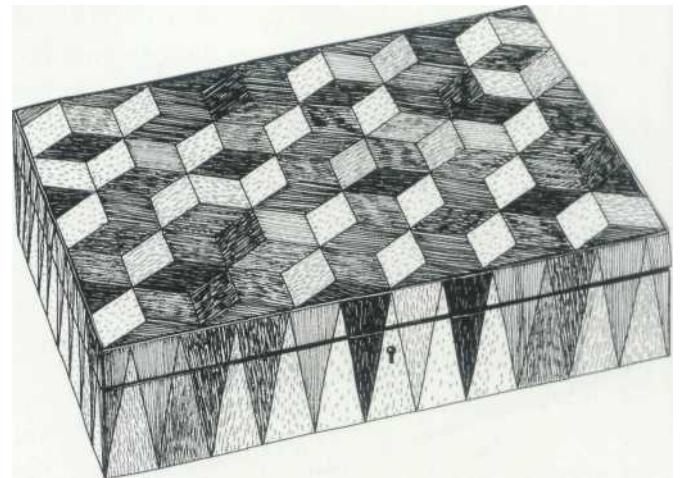
Veneering

In simple terms, the craft of veneering has to do with covering base wood with a more attractive species, to fool the eye into believing that the piece of furniture or other item is made of more expensive wood. Though at one time this area of the craft fell into disrepute, with the term "veneer" coming to mean tricky and/or cheap, it is now seeing a revival. Current thinking is that one way of saving rare and precious tree species is to make a little go a long way. For example, it is now possible to build a whole piece of furniture from a man-made sheet-wood material like MDF (medium density fiberboard), and then cover it with a pressed-and-painted flexible veneer—as in this project—or with plastic veneers or thin sheets of rare wood. One look through a batch of current woodworking magazines will bear out the fact that the time is fast coming when some woods will be so rare and costly that woodworkers will have no choice but to use thin decorative veneers on base-wood grounds. Interesting isn't it!



EGYPTIAN INLAY

Detail from the back of Tutankhamen's ceremonial chair—inlaid with exotic woods and precious stones.



NINETEENTH-CENTURY PARQUETRY

A classic example of a parquetry box—made in Tunbridge Wells, England, in the middle of the nineteenth century.

Parquetry

Squares, checkerboards, counterchanges, triangles, diamonds and zigzags—parquetry is the art and craft of math, geometry and the straight line. While marquetry involves pictures, patterns and all manner of wavy-line imagery, parquetry concentrates on straight lines and geometrical patterns.

Many American marquetry craftsmen think of parquetry as being similar to fabric patchwork. It's a good comparison. If you think of the geometrical patterns that make up a quilt, and if you go on to think of this same pattern in terms of tiles of veneer spread out over a piece of furniture, or maybe over a floor, then you have a parquetry. If you enjoy playing around with rulers and set squares, and if you enjoy logic, order and straight, crisp lines, then you will enjoy parquetry.

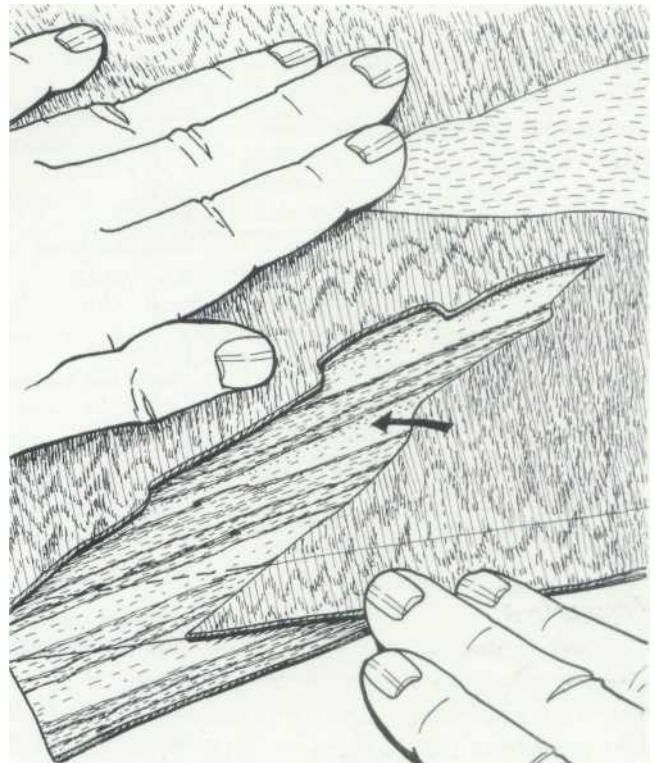
Boule Marquetry

Boule is a type of marquetry that was popular in France in the seventeenth and eighteenth centuries. The technique was named after Andre Charles Boule, a French marquetry craftsman under King Louis XIV. Now known as boule, boule, or even, buhl, the technique might best be described as getting two designs for the price of one. Traditionally, the boule technique involves setting two thin sheets of contrasting material together—usually brass and an exotic wood—and then cutting through both sheets at the same time to create a number of pairs of identical cutouts. For example, if you have two sheets of veneer sandwiched together—one black and the other white—and you cut a circle shape through both sheets and then swap the cutouts around, you will have a black sheet with a white circle at its center and a white sheet with a black circle. If you were to continue cutting out more complex shapes and swapping them around, you would finish up with two identical counterchanged designs—one white on black and the other black on white. If you sandwich four sheets of veneer together, then the technique really begins to lift off. If you enjoy intricate sawing, and exquisite pattern work—say on small boxes and the like—and if you like the notion of using up every last piece of veneer, then perhaps this is a technique that you need to explore.

Window Marquetry

Window marquetry, sometimes called picture marquetry, involves pencil-press, transferring the design through to a sheet of scrap veneer, then cutting out the elements of the design one step at a time and replacing them with more decorative veneers.

For example, if you draw a picture of an old sailing ship on the scrap veneer and cut out, say, one of the sails so that you have a hole, then you can slide the hole over your choice veneer and try out various grain patterns. When you have selected the veneer, you cut a piece to fill the hole. Then, you repeat the procedure with all the other elements that go to make the design—the sails, the masts, the hull, the clouds, and so on. Of course, if you continue in this manner, you will eventually finish up with a situation where just about all the base veneer has been replaced by little cutouts of contrasting veneer. When this point is reached, the resultant design can be mounted like a picture or built into something like a coffee table. Great fun!



WINDOW MARQUETRY

The technique is beautifully simple and direct. All you do is cut out an element of the design and then fill it with choice veneer.

[Chest, Toy](#)
["Paver" Table Plans](#)
[\\$175 Workbench](#)
[1926 Book Review: "Beautifying The Home Grounds"](#)
[25 Woods Wagon Handbill](#)
[9-Drawer Workshop Toolbox](#)
[A Contemporary Mobile File Cabinet](#)
[A Craftman's deck](#)
[A Desktop Weather Station Shop Project](#)
[A Good Saw \(Handsaw Introduction\)](#)
[A Little Light Construction](#)
[A Luthier's Labour](#)
[A sign of the Times](#)
[A Traditional Drop Leaf Table](#)
[A Traditional Drop Leaf Table](#)
[A Well-Crafted Furniture Book By Robert W. Lang](#)
[About Nails](#)
[Accurate cut sawbox](#)
[Address Plate \(ZIP\)](#)
[Adirondack Chairs](#)
[Adirondack Chairs](#)
[Adirondack Chairs](#)
[Adirondack Two-Seater Rocker](#)
[Adirondack \(Jake's\)](#)
[Adirondack Chair \(1\)](#)
[Adirondack Chair \(2\)](#)
[Adirondack Chair \(3\)](#)
[Adirondack Chair, Footstool and Table](#)
[Adjustable V-Block System \(PDF\)](#)
[Aeroplane, 1899 Wright Kite](#)
[Aeroplane, 1902 Wright Glider](#)
[Air Compressor Piping Diagram](#)
[Air Compressor Use and Safety](#)
[Air Filter](#)
[Air Filter](#)
[Air Filter, Downdraft Sanding Table](#)
[Air Filter, Shop Built](#)
[Air Filter, Shop-Built](#)
[Airplane](#)
[Airplane Model Plan "Bluebird" \(ZIP\)](#)
[Airplane Model Plan "Emeraude" \(ZIP\)](#)
[Airplane Model Plan "EZ-ED" \(ZIP\)](#)
[Airplane Model Plan "Grunt" \(ZIP\)](#)
[Airplane Model Plan "NOT-EZ Canard" \(ZIP\)](#)
[Airplane Model Plan "Sky Master" \(ZIP\)](#)
[Airplane Model Plan "Wildone" \(ZIP\)](#)
[Airplane Model Plan "WTF-225" \(ZIP\)](#)
[Airplane Model Plan "WTF-240" \(ZIP\)](#)
[Airplane Model Plans](#)
[Airplane Model Plans](#)



[All About Oil Based Varnish](#)
[American Tree Guide](#)
[Ammo Block \(ZIP\)](#)
[Ammunition Box - Small Arms](#)
[Antique Finishes](#)
[Apothecary Cabinet](#)
[Apothecary Cabinet -- Case Joinery and Assembly](#)
[Apothecary Cabinet -- Finishing Touches](#)
[Apothecary Cabinet -- Plywood Stock for Case](#)
[Apothecary Cabinet -- Top, Base and Drawers](#)
[Apple Press/Grinder/Masher](#)
[Applying Wood Veneers](#)
[Aquarium Stand](#)
[Arbor](#)
[Arbor Bench](#)
[Arbor Gate](#)
[Arbor Gate \(ZIP\)](#)
[Arbor Gate](#)
[Arbor pdf](#)
[Arbor, A Gourd](#)
[Arbor, A Movable Canopy](#)
[Arbor, Arched](#)
[Arbor, Build A](#)
[Arbor, Color Shade](#)
[Arbor, Easy](#)
[Arbor, Freestanding](#)
[Arbor, Grape](#)
[Arched Dorway](#)
[Archway, Create a Custom](#)
[Archway, Rustic Post and Beam - faux](#)
[Archway, Solid Wood - how to install](#)
[Arianna's Cradle](#)
[Armoir \(ZIP\)](#)
[Armour Stand](#)
[Aromatic Cedar FAQ](#)
[Arrow and Heart Puzzle](#)
[Arrow and Heart Puzzle](#)
[Arrows, Authentic Native-American \(PDF\)](#)
[Art Deco Umbrella Stand -- Assembly and Finish](#)
[Art Deco Umbrella Stand -- Book-Matched Maple Panels](#)
[Art Deco Umbrella Stand -- Purple Heart Base](#)
[Art Deco Umbrella Stand -- Purple Heart Frame](#)
[Artist Easel Project](#)
[Artist's Easel](#)
[Artists Easel \(1\)](#)
[Artists Easel \(2\)](#)
[Arts & Crafts Globe Stand](#)
[Arts and Crafts Bookcase](#)
[Arts and Crafts Library Desk -- Base Joinery and Assembly](#)
[Arts and Crafts Library Desk -- Drawers](#)



[Arts and Crafts Library Desk -- Top and Finishing Touches](#)
[Arts and Crafts Library Desk -- Upper Frame and Joinery](#)
[Arts and Crafts Nightstand -- Authentic Fume Wood Finish](#)
[Arts and Crafts Nightstand -- Drawer and Tabletop](#)
[Arts and Crafts Nightstand -- Tenons for Joinery](#)
[Arts-and-Crafts Book Stand -- Finishing Touches](#)
[Arts-and-Crafts Book Stand -- Sides, Shelf and Joinery](#)
[Arts-and-Crafts Book Stand -- Template and Side Stock](#)
[Arts-and-Crafts Book Stand -- Top and Assembly](#)
[Arts-and-Crafts Nightstand -- Legs and Mortises](#)
[Ask a pro](#)
[Ask a pro](#)
[Ask a pro](#)
[Ask a Pro](#)
[Attachments holder](#)
[Auburn Boat tail 12/00](#)
[Avoid Warp](#)
[Awning, Adjustable Window](#)
[Awning, Fixed Window](#)
[Baby Changing Table](#)
[Baby Changing Table](#)
[Back At... Clock](#)
[Back Yard Log Cabin Playhouse](#)
[Back Yard Log Cabin Playhouse](#)
[Backyard Gym That Grows With Child](#)
[Backyard See-Saw Ubuild](#)
[Backyard See-Saw Ubuild](#)
[Bagatelle](#)
[Bagatelle](#)
[Bagatelle Game](#)
[Banana](#)
[Band Saw Blade \(Folding\)](#)
[Band Saw Blade Welding](#)
[Bandsaw Table System - Resawing Techniques](#)
[Bandsaw Table, Auxiliary](#)
[Bandsaw Use and Safety](#)
[Bandsawn Boxes](#)
[Banjo, Bluegrass](#)
[Banjo, Bluegrass-Style 5-String](#)
[Bar \(Wet\)](#)
[Bar Counter](#)
[Bar Stool](#)
[Bar Stool \(Folding\)](#)
[Bar, Cappucino](#)
[Bar, Soda - for the outdoors](#)
[Barbecue Trolley](#)
[Barbecue Trolley](#)
[Barbecue, Brick](#)
[Barbeque Caddy](#)
[Barbeque Cart, Building a Roll-Around \(BBQ\)](#)



[Barbeque Trolley](#)
[Barefoot Basement](#)
[Barn Eave and Dormer Detail \(PDF\)](#)
[Barn Owl Nestbox Plans](#)
[Barns, Ventilation System for Cold Free Stall \(PDF\)](#)
[Base ballcoat rack](#)
[Base Cabinets, How to Install Kitchen](#)
[Basic Thread Cutting](#)
[Basket, Christmas Card Caddy](#)
[Basket, Duck](#)
[Basket, Egg](#)
[Basket, Egg II](#)
[Basket, Heart](#)
[Basket, House](#)
[Basket, Simple](#)
[Basket, Tulip](#)
[Basket, Weekender Waste](#)
[Basketball Court](#)
[Basketball Court](#)
[Basketball Court](#)
[Basketball Court](#)
[Bat - Johnson Bat](#)
[bat house](#)
[Bat House](#)
[Bat House](#)
[Bat House \(1\)](#)
[Bat House \(Nest Box 7\)](#)
[Bat House \(Rocket Box\)](#)
[Bat House](#)
[Bat House](#)
[Bat house](#)
[Bat House, Economy](#)
[Bat](#)
[Bath Tray](#)
[Bath Tray](#)
[Bath Vent, How to install a](#)
[Bathroom Cabinet](#)
[Bathroom fan](#)
[Bathroom Unit](#)
[Bathtub Tray](#)
[Bathtub Tray, Reading Frenzy](#)
[Battle Fleet](#)
[BBQ and Fire Pit](#)
[BBQ Brick Pit, Cinder Block Fire Place](#)
[BBQ Brick Pit, with Wood Storage Rack](#)
[BBQ Center](#)
[BBQ Pit \(PDF\)](#)
[Beach Shack - Tropical Building Home Page](#)
[Beautiful Wall Shelf](#)
[Beautiful Wall Shelf](#)



[Beautiful Wood Pot Rack You Make](#)
[Becky's Desk 3/00](#)
[Bed \(Car Style\)](#)
[Bed \(Four Poster\)](#)
[Bed \(Loft from Family Fun Site\)](#)
[Bed \(Mahogany\)](#)
[Bed \(Slat\)](#)
[Bed \(Sleigh\)](#)
[Bed \(Viking\)](#)
[Bed and Storage Boxes](#)
[Bed and Storage Boxes](#)
[Bed construction](#)
[Bed Headboards - 3 styles](#)
[Bed Measurements](#)
[Bed, Bunk](#)
[Bed, Bunk - gif image only](#)
[Bed, Child's - Race Car 'Wiggles'](#)
[Bed, Child's Loft - with storage](#)
[Bed, Childs](#)
[Bed, Doll \(ZIP\)](#)
[Bed, Doll Bunk \(ZIP\)](#)
[Bed, Doll Isometric \(ZIP\)](#)
[Bed, Doll](#)
[Bed, Four Poster](#)
[Bed, Four Poster \(ZIP\)](#)
[Bed, Futon \(ZIP\)](#)
[Bed, Headboard for a](#)
[Bed, Headboards - 3 ways](#)
[Bed, Heirloom - King Size \(PDF\)](#)
[Bed, Heirloom - Queen Size \(PDF\)](#)
[Bed, Heirloom - Twin Size \(PDF\)](#)
[Bed, Kid's bunk](#)
[Bed, Loft](#)
[Bed, Mission Style](#)
[Bed, Pencil Point](#)
[Bed, Platform with Storage](#)
[Bed, Portable Camp - Heraldric](#)
[Bed, Portable Wood Frame \(PDF\)](#)
[Bed, Poster](#)
[Bed, Rope](#)
[Bed, Scandanavian Kids](#)
[Bed, Shaker](#)
[Bed, Shaker Style \(PDF\)](#)
[Bed, Short Post \(ZIP\)](#)
[Bed, Slat](#)
[Bed, Sleigh](#)
[Bed, Sleigh - with coopered panels](#)
[Bed, The Anniversary - Centennial Bedroom Suite](#)
[Bed, Twin \(ZIP\)](#)
[Bed, Viking Age](#)



[Bedroom Canopy \(PDF\)](#)
[Beds, Bunk](#)
[Bedside Table](#)
[Bee hive](#)
[Bee Hive and Frame \(PDF\)](#)
[Bee Hive Deep Brood \(PDF\)](#)
[Bee Hive Honeycomb Uncapping Tank \(PDF\)](#)
[Bee Hive, Low Cost \(PDF\)](#)
[Beehive 10 Frame Assembly Jig for Frames \(PDF\)](#)
[Beehive 10 frame W.B.C. \(PDF\)](#)
[Beehive 20 Frame Honey Extractor \(PDF\)](#)
[Beehive 3 Frame Observation Hive \(PDF\)](#)
[Beehive 5 frame nuc - \(PDF\)](#)
[Beehive Bee Vac \(PDF\)](#)
[Beehive Datant Type Frames \(PDF\)](#)
[Beehive Double Screen Board \(PDF\)](#)
[Beehive Miller Type Feeder \(PDF\)](#)
[Beehive Removable Swarm Catching Frame \(PDF\)](#)
[Beehive Screen Bottom Board \(PDF\)](#)
[Beehive Slatted Bottom Rack \(PDF\)](#)
[Beehive Solar Warm Melter \(PDF\)](#)
[Beehive, 10 Frame Langstroth \(PDF\)](#)
[Beer Case](#)
[Beer Case, Wooden](#)
[Behind Closed Doors](#)
[Belt Guard](#)
[Belt Sander, Homemade](#)
[Bench](#)
[Bench \(Aldo Leopold\)](#)
[Bench \(Cricket\)](#)
[Bench \(Deck\)](#)
[Bench \(Easy Build\)](#)
[Bench \(Folding\)](#)
[Bench \(Mendocino\)](#)
[Bench \(Platform\)](#)
[Bench \(Shaker\)](#)
[Bench \(Simple Garden\)](#)
[Bench \(Tree\)](#)
[Bench \(Upholstered\)](#)
[Bench \(Utility\)](#)
[Bench 2x4 Legs](#)
[Bench for all Seasons - And Reasons](#)
[Bench Stop](#)
[Bench, Aldo Leopold](#)
[Bench, Classic Cedar Garden](#)
[Bench, Classic](#)
[Bench, Convertible Table](#)
[Bench, Cricket](#)
[Bench, Free-Form Green Wood](#)
[Bench, Free-Standing Relief Carver's](#)



[Bench, Garden](#)
[Bench, Garden Victorian](#)
[Bench, Love Seat](#)
[Bench, Mendocino](#)
[Bench, Mendocino](#)
[Bench, Mendocino \(PDF\)](#)
[Bench, Mendocino](#)
[Bench, Outdoor Patio Garden](#)
[Bench, Pine](#)
[Bench, Platform](#)
[Bench, Relief Woodcarver's - Free Standing](#)
[Bench, Shaker](#)
[Bench, Simple Gothic \(PDF\)](#)
[Bench, Small \(ZIP\)](#)
[Bench, Storage \(ZIP\)](#)
[Bench, Storage Cedar](#)
[Bench, Tree](#)
[Bench, Upholstered Bedside](#)
[Bench, Utility - bleacher style](#)
[Bench, Woodworker 01](#)
[Bench, Woodworker 04](#)
[Bench, Woodworker 06](#)
[Bench, Woodworker 07](#)
[Bench, Woodworker 12](#)
[Bench, Work](#)
[Bench/Chest Combination](#)
[Benches, Built In](#)
[Benches, Double-up](#)
[Benches, Greenhouse \(5 styles\) \(PDF\)](#)
[Benchtop Router Table](#)
[Bender dwelling](#)
[Bent-Laminate Lamp: Bending the Koa-Wood Laminates](#)
[Bent-Laminate Lamp: Center-Post and Legs](#)
[Bent-Laminate Lamp: Finishing Touches](#)
[Bent-Laminate Lamp: Making a Bending Form](#)
[Bent-Laminate Shelf Stand -- Curved Shelves](#)
[Bent-Laminate Shelf Stand -- Finishing Touches](#)
[Bent-Laminate Shelf Stand -- Legs and Joinery](#)
[Bent-Laminate Shelf Stand -- Template and Laminate Legs](#)
[Bible Box](#)
[Bible Box with Inlay Cross](#)
[Biesemeyer Fence, Cloned](#)
[Biesemeyer Table Saw Fence \(Clone\)](#)
Bike Rack
[Bike Rack](#)
[Bike Rack](#)
[Billy Cart](#)
[Bin, 2 Person Wooden Worm](#)
[Bird - American Kestrel, Northern Screech-owl](#)
[Bird - American Robin and Barn Swallow, Robins](#)



[Bird - Barn Owl Nest Box](#)
[Bird - Bird's Nesting Box](#)
[Bird - Birdhouse \(PDF\)](#)
[Bird - Blue Heron](#)
[Bird - Bluebird](#)
[Bird - Bluebird house plans](#)
[Bird - Building a birdbox - Ornithology at home](#)
[Bird - Culvert Nest](#)
[Bird - Hen House](#)
[Bird - Mallard](#)
[Bird - Martin 01](#)
[Bird - Martin House](#)
[Bird - Morning Dove](#)
[Bird - Nesting Box \(PDF\)](#)
[Bird - Northern Flicker](#)
[Bird - Owl](#)
[Bird - Sparrow Hawk / Screech Owl House](#)
[Bird - Tree Swallow](#)
[Bird - Wood Duck Nest Box](#)
[Bird - Wood Duck](#)
[Bird - Wren / Chickadee Box](#)
[Bird - Wren House](#)
[Bird - Wren](#)
[Bird - Wren](#)
[Bird \(Bluebird\)](#)
[Bird \(Bluejay\)](#)
[Bird \(Cardinal\)](#)
[Bird \(Chickadee\)](#)
[Bird \(Goldfinch\)](#)
[Bird \(Nuthatch\)](#)
[Bird Feeder](#)
[Bird Feeder \(1\)](#)
[Bird Feeder \(2\)](#)
[Bird Feeder \(3\)](#)
[Bird Feeder \(PDF\)](#)
[Bird Feeder 01](#)
[Bird Feeder](#)
[Bird Feeder, Dowel Suet](#)
[Bird Feeder, Folded Roof Model](#)
[Bird Feeder, Gourmet](#)
[Bird Feeder, Half and Half Roof](#)
[Bird Feeder, How to build](#)
[Bird Feeder, Linda Tray](#)
[Bird Feeder, Linda Tray](#)
[Bird Feeder, Milk Carton](#)
[Bird Feeder, Modern](#)
[Bird Feeder, On Line](#)
[Bird Feeder, Plastic Bottle](#)
[Bird Feeder, platform](#)
[Bird Feeder, Self](#)



[Bird Feeder, Self](#)
[Bird Feeder, Shed Roof](#)
[Bird Feeder, Simple](#)
[Bird Feeder, Suet](#)
[Bird House \(1\)](#)
[Bird House \(Bluebird 1\)](#)
[Bird House \(Bluebird 2\)](#)
[Bird House \(Bluebird 3\)](#)
[Bird House \(Swallow\)](#)
[Bird House \(Wood Duck\)](#)
[Bird House Lamp \(ZIP\)](#)
[Bird House](#)
[Bird House](#)
[Bird House, Barn Owl](#)
[Bird House, Basic](#)
[Bird house, Draft Proof](#)
[Bird House, Four](#)
[Bird House, Kestral, Screech-owl, and squirrels](#)
[Bird House, Peterson Bluebird](#)
[Bird House, Purple Martin](#)
[Bird House, Robin & Barn Swallow](#)
[Bird House, Small Bats](#)
[Bird House, Tall](#)
[Bird House, Tree Swallow and Eastern Bluebird](#)
[Bird House, Woodduck](#)
[Bird House, Wren, Chickadee, Nuthatch](#)
[Bird Houses](#)
[Bird Nesting Box](#)
[Bird Nesting Box](#)
[Bird Seed Feeder](#)
[Bird Table](#)
[Bird Table](#)
[Bird Table \(1\)](#)
[Bird, Martin House \(ZIP\)](#)
[Birdhouse](#)
[Birdhouse](#)
[Birdhouse](#)
[Birdhouse](#)
[Birdhouse - 3 Wren Houses](#)
[Birdhouse \(PDF\)](#)
[Birdhouse that kids build](#)
[Birdhouse](#)
[Birdhouse](#)
[Birdhouse](#)
[Birdhouse, Build A](#)
[Birdhouse, Build A](#)
[Birdhouse, Building A](#)
[Birdhouse, One Board](#)
[Birdhouse, Purple Martin \(PDF\)](#)



[Birdhouse, Round](#)
[Birdhouse, Swallow](#)
[Birdhouses, Wren and Bluejay](#)
[Blade Height Guages, Handy](#)
[Blanket Chest](#)
[Blanket Chest -- Adding Hinges and Finishing the Blanket Case](#)
[Blanket Chest -- Adding Hinges and Finishing the Blanket Case](#)
[Blanket Chest -- Adding Hinges and Finishing the Blanket Case](#)
[Blanket Chest -- Adding Hinges and Finishing the Blanket Case](#)
[Blanket Chest -- Dovetail Joinery](#)
[Blanket Chest -- Dovetail Joinery](#)
[Blanket Chest -- Dovetail Joinery](#)
[Blanket Chest -- Dovetail Joinery](#)
[Blanket Chest -- Making the Arts-and-Crafts Style Base](#)
[Blanket Chest -- Making the Arts-and-Crafts Style Base](#)
[Blanket Chest -- Making the Arts-and-Crafts Style Base](#)
[Blanket Chest -- Making the Arts-and-Crafts Style Base](#)
[Blanket Chest \(1\)](#)
[Blanket Chest \(2\)](#)
[Blanket Chest \(ZIP\)](#)
[Blanket Chest](#)
[Blanket Chest](#)
[Blanket Rack -- Assembly and Finishing Touches](#)
[Blanket Rack -- Curved Crest-Rail and Joinery](#)
[Blanket Rack -- Decorative Inlay](#)
[Blanket Rack -- Template and Cherry Stock](#)
[Blending in a New Fence Board](#)
Block Stacking Game
[Block Stacking Game](#)
[Block Stacking Game](#)
[Blocks, Rope Stropped](#)
[Bluebird House](#)
[Bluebird House](#)
[Bluebird House](#)
[Bluebird Pattern](#)
[Bluejay Bird Pattern](#)
[Board Size Chart](#)
[Boardwalk, Basic](#)
[Boardwalk, Build A](#)
[Boardwalk, Building A](#)
[Boardwalk, Building A](#)
[Boat - Corky the Sailing Inner Tube](#)
[Boat - Dory, Blackberry](#)
[Boat - LCB - Least Cuts Boat](#)
[Boat - Mini Sharpie Skiff](#)
[Boat - Pogo](#)
[Boat Bookcase Plan](#)
[Boat Dock and Shelter \(PDF\)](#)
[Boat In A Kit](#)
[Boat, Cabin Cruiser - Dolphin](#)



[Boat, Cabin Cruiser - Eager Eve](#)
[Boat, Cabin Cruiser - Sea Angler](#)
[Boat, Cabin Cruiser - Sea Hawk](#)
[Boat, Cruiser Flight 19 foot](#)
[Boat, Cruiser Sunapee 22 foot](#)
[Boat, Handy Andy](#)
[Boat, Herring Skiff](#)
[Boat, House - Bayou Belle](#)
[Boat, Houseboat](#)
[Boat, Hydroplae - Air Marine Special](#)
[Boat, Hydroplane - Yellow Jacket](#)
[Boat, Hydroplane Atomite](#)
[Boat, Hydroplane Doodlebug](#)
[Boat, Hydroplane Minimax](#)
[Boat, Hydroplane Minimost](#)
[Boat, Hydroplane Spitfire](#)
[Boat, Jitterbug Water Bicycle](#)
[Boat, Kayak - Baidarka style sea](#)
[Boat, Kayak - Hunting](#)
[Boat, Kayak - Qivitoq](#)
[Boat, Kayak Number 11](#)
[Boat, Micro Folding Dinghy](#)
[Boat, PakYak - prototype](#)
[Boat, Pirogue \(ZIP\)](#)
[Boat, Rowboat - Cant Sink](#)
[Boat, Rowboat - Pedal Cat](#)
[Boat, Rowboat - Sea Midge](#)
[Boat, Rowboat - Sea Skiff](#)
[Boat, Runabout - Bebop](#)
[Boat, Runabout - Blue Streak](#)
[Boat, Runabout - Buzz](#)
[Boat, Runabout - Chum](#)
[Boat, Runabout - JumpinJack](#)
[Boat, Runabout - Maximus](#)
[Boat, Runabout - Panther](#)
[Boat, Runabout - Playboy 14](#)
[Boat, Runabout - Riviera](#)
[Boat, Sail - Breeze Baby](#)
[Boat, Sail - Crescent](#)
[Boat, Sail - Falcon](#)
[Boat, Sail - Greafin](#)
[Boat, Sail - Petrel](#)
[Boat, Sail - Summer Breeze](#)
[Boat, Sail - Zephyr](#)
[Boat, Sailboat - Breeze Baby 12 ft](#)
[Boat, Sailboat - Corky 18 ft](#)
[Boat, Sailboat - Egoist](#)
[Boat, Sailboat - Mini Cup 12 ft](#)
[Boat, Sailboat - Tiny Bear 10 ft](#)
[Boat, Sailboat Super Sunray 15 ft](#)



[Boat, Sailing Scow](#)
[Boat, Sailing-Rowing Dinghy](#)
[Boat, Saucy Skimmer](#)
[Boat, Scow - basic](#)
[Boat, Scow - Double paddle for Kids](#)
[Boat, Scow - with wheel](#)
[Boat, Ski - Skeeto](#)
[Boat, Skiff](#)
[Boat, The Egoist](#)
[Boat, Utility - Dolly Varden](#)
[Boat, Utility - Jon](#)
[Boats, Sailing - many items](#)
[Boats, Steering Designs for](#)
[Bob's Bench Pages \(About Workbenches\)](#)
[Bombe Vitrine](#)
[Bombe Vitrine](#)
[Book Caddy](#)
[Book Case](#)
[Book Easel](#)
[Book Holder](#)
[Bookbinders Stationary Press \(PDF\)](#)
[Bookcase](#)
[Bookcase & Mantel](#)
[Bookcase \(Barristers \)](#)
[Bookcase \(Boat Shaped\)](#)
[Bookcase \(1\)](#)
[Bookcase \(2\)](#)
[Bookcase \(3\)](#)
[Bookcase \(PDF\)](#)
[Bookcase \(PDF\)](#)
[Bookcase \(PM Anniversary Plan\)](#)
[Bookcase \(Revolving\)](#)
[Bookcase \(Two Part\)](#)
[Bookcase \(ZIP\)](#)
[Bookcase \(ZIP\)](#)
[Bookcase \(ZIPPED\)](#)
[Bookcase and End Table \(PDF\)](#)
[Bookcase and Window Seat, Custom-Fit \(PDF\)](#)
[Bookcase in Oak](#)
[Bookcase Makeover](#)
[Bookcase Project](#)
[Bookcase Shelving](#)
[Bookcase](#)
[Bookcase](#)
[Bookcase](#)
[Bookcase, Arts & Crafts Style](#)
[Bookcase, Boat](#)
[Bookcase, Child's and Toy Storage Unit \(ZIP\)](#)
[Bookcase, Dollhouse shaped](#)
[Bookcase, Secretary \(ZIP\)](#)



[Bookcase, Simple](#)
[Bookcase, Simple Interior](#)
[Bookcase, The Anniversary - Centennial Suite](#)
[Bookcase, Traditional](#)
[Bookcase, Trapezoidal](#)
[Bookcase, Two Part](#)
[Bookcase/End Table](#)
[Bookcases, Building](#)
[Bookcases, Building - An Introduction](#)
[Bookends \(Teddy Bear \)](#)
[Bookends, Teddy Bear](#)
[Bookshelf](#)
[Bookshelf for Toys](#)
[Bookshelf Project, Ace](#)
[Bookshelf, Desktop and 8 bottle wine rack](#)
[Bookshelf, Dinghy](#)
[Bookshelf, Floor to Ceiling](#)
[Bookshelf, Tall](#)
[Bookshelves, Stand Alone](#)
[Boomerangs](#)
[Boot Bench](#)
[Boot Box](#)
[Boot Slide \(PDF\)](#)
[Bore Reamer, Wooden Bodied](#)
[Bosch](#)
[Bottle, Wardrobe Scent](#)
[Bountiful Harvest](#)
[Bow Saw](#)
[Bow Saw - with PDF](#)
[Bow Saw \(1\)](#)
[Bow Saw \(2\)](#)
[Bow Saw \(ZIP\)](#)
[Bow Shelf](#)
[Bowl Depth Gauge](#)
[Bowl Project](#)
[Bowl Project Plan](#)
[Bowl Turning on the Shopsmith MARK V](#)
[Bowl, Turned Wood](#)
[Bowl, Turned Wooden \(PDF\)](#)
[Box - Hand cut box joints](#)
[Box & Crown Molding, How to Build A Cornice](#)
[Box \(Bandsaw\)](#)
[Box \(Bandsawn\)](#)
[Box \(Hand cut box joints\)](#)
[Box \(Joiners\)](#)
[Box \(Mitered, no measure\)](#)
[Box \(Small made with router\)](#)
[Box Frames](#)
[Box Horse](#)
[Box Joint Jig \(1\)](#)



[Box Joint Jig \(2\)](#)
[Box Joint Jig '89](#)
[Box Planter](#)
[Box Sash Revival](#)
[Box, Band Saw](#)
[Box, Bandsaw](#)
[Box, Bandsawn](#)
[Box, Bat](#)
[Box, Bible](#)
[Box, Boy Scout Patrol Kitchen](#)
[Box, Bread](#)
[Box, Candle - rustic wooden](#)
[Box, CD Media](#)
[Box, Display \(ZIP\)](#)
[Box, Family Game](#)
[Box, Filing](#)
[Box, Flower](#)
[Box, Fruit Dryer \(PDF\)](#)
[Box, Garbage Hutch](#)
[Box, Gift](#)
[Box, Gift](#)
[Box, Glue Tote](#)
[Box, Grab-it-and-go glue tote](#)
[Box, Ice \(ZIP\)](#)
[Box, Indoor Window](#)
[Box, Jewelry \(ZIP\)](#)
[Box, Joiner's](#)
[Box, Keepsake](#)
[Box, Keyed Corner Jewelry](#)
[Box, Knockdown Hutch](#)
[Box, Lidded - Turned](#)
[Box, Lidded Turned](#)
[Box, Mah Jong](#)
[Box, Money](#)
[Box, Moving Picture](#)
[Box, Multimedia Storage Tower](#)
[Box, Mushroom Keepsake](#)
[Box, Music](#)
[Box, Music/Jewelry](#)
[Box, Newspaper Recycling](#)
[Box, Owl](#)
[Box, Patrol \(Camp\)](#)
[Box, Patrol Kitchen](#)
[Box, Poker Chip](#)
[Box, Portable Wood and Wire Bin](#)
[Box, Potatoe Onion Vegetable Bin](#)
[Box, Puzzle](#)
[Box, Raccoon and Common Merganser Nest](#)
[Box, Router Bit](#)
[Box, Router Bit](#)

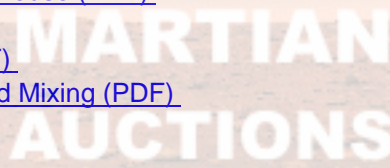


[Box, Saw Blade Storage \(PDF\)](#)
[Box, Scouting Patrol Kitchen](#)
[Box, Shaker Style Wall Candle](#)
[Box, Shallow](#)
[Box, Shoeshine \(ZIP\)](#)
[Box, Shop Built Gear \(PDF\)](#)
[Box, Small \(ZIP\)](#)
[Box, Solar Beeswax Extractor \(PDF\)](#)
[Box, Songbird](#)
[Box, Squirrel - Eastern Gray](#)
[Box, Stairway Storage](#)
[Box, Steam](#)
[Box, The First Class Letter](#)
[Box, Tote](#)
[Box, Toy](#)
[Box, Tracing](#)
[Box, Tracing](#)
[Box, Turtle Disk \(PDF\)](#)
[Box, Turtle Trap \(PDF\)](#)
[Box, Vegetable Bin](#)
[Box, Wood and Wire 3-Bin System](#)
[Box, Wood Duck](#)
[Box, Wooden Letter](#)
[Box, Woodland and Wildlife Nest](#)
[Box/Bench, Child's Toy](#)
[Boxes and Platforms](#)
[Boxes on castors](#)
[Boxes, Planter](#)
[Boxes, Shaker](#)
[Boxes, Small - made with your router](#)
[Boxes, Transportable Take-down](#)
[Bread Box](#)
[Bread Box \(1\)](#)
[Bread Box \(2\)](#)
[Bread Knife](#)
[Breakfast Bar](#)
[Breakfast Bar](#)
[Breakfast Bar](#)
[Breakfast Nook \(1\)](#)
[Breakfast Nook \(2\)](#)
[Breakfast Nook](#)
[Breakfast Nook, Custom](#)
[Breakfast Tray](#)
[Breath saver - protect your lungs](#)
[Bridge, Arched](#)
[Bridge, Garden](#)
[Bridges, Arched Garden - various lengths](#)
[Briefcase](#)
[Briefcase, Wooden](#)
[British Trees Guide](#)



[Bubinga-Veneer Coffee Table -- Aprons and Legs](#)
[Bubinga-Veneer Coffee Table -- Ebony Inlay and Finishing Touches](#)
[Bubinga-Veneer Coffee Table -- Tabletop Completion](#)
[Bubinga-Veneer Coffee Table -- Tabletop Veneer](#)
[Bucket \(Cedar\)](#)
[Bucket, Wooden](#)
[Buff Out That Backyard Shine](#)
[Bug Eyed Bird Slide \(PDF\)](#)
[Build A Bluegrass-Style 5-String Banjo](#)
[Build A Computer Armoire](#)
[Build A Display Cabinet For Firearms](#)
[Build a garden trellis](#)
[Build A Hallway Mirror](#)
[Build a Stardust Space Craft](#)
[Build a Stardust Space Craft](#)
[Build A Stereo Cabinet](#)
[Build A Storage Table For Tapes And CDs](#)
[Build A Storm Door](#)
[Build a Stylish Mendocino Bench](#)
[Build A TV Cabinet](#)
[Build a Website](#)
[Build An Easy Workbench](#)
[Build An Outdoor Table And Bench Set](#)
[Build the Classic Picnic Table](#)
[Build the Gracious Lake Tahoe Gazebo](#)
[Build the Practical Monterey Potting Center](#)
[Build the Windsor Shade Shelter](#)
[Build Your Own Backyard Pond](#)
[Build Your Own Backyard Pond](#)
[Building - Cabin, Tourist \(PDF\)](#)
[Building - Picnic Shelter \(PDF\)](#)
[Building - Picnic Shelter \(PDF\)](#)
[Building - Roadside Stand \(PDF\)](#)
[Building - Root Cellar \(PDF\)](#)
[Building - Smokehouse, 6x8x8, Gable Roof, Studwall \(PDF\)](#)
[Building a Child's Bookstand](#)
[Building a Gate](#)
[Building a Humidor](#)
[Building a Sleigh Bed](#)
[Building Blocks](#)
Building Fireplace Mantels: Simple Federal Mantel
[Building Model Cars](#)
[Building Model Cars](#)
[Building Wood Fences](#)
[Building, Bulk Fertilizer Storage - 40' x 48' Stud Frame \(PDF\)](#)
[Building, Bulk Fertilizer Storage - 40" x 48' Post Frame \(PDF\)](#)
[Building, Cabin \(PDF\)](#)
[Building, Cabin Guest House \(PDF\)](#)
[Building, Camp House \(PDF\)](#)
[Building, Campground Comfort Station \(PDF\)](#)

[Building, Cattle Shed and Auction Barn \(PDF\)](#)
[Building, Chicken House](#)
[Building, Comfort Shed \(Outhouse\)](#)
[Building, Comfort Station \(PDF\)](#)
[Building, Community House \(PDF\)](#)
[Building, Community House 40 x 80 ft \(PDF\)](#)
[Building, Community Log House \(PDF\)](#)
[Building, Custom Slaughterhouse-Sales \(PDF\)](#)
[Building, Elevated Sawdust \(PDF\)](#)
[Building, Farm Labor Bunkhouse \(PDF\)](#)
[Building, Farmhouse - Adobe style \(PDF\)](#)
[Building, Garage - One Car \(PDF\)](#)
[Building, General Barn \(PDF\)](#)
[Building, General Barn \(PDF\)](#)
[Building, Greenhouse and Storage \(PDF\)](#)
[Building, Guest Hoouse \(PDF\)](#)
[Building, Insulated Pump House \(PDF\)](#)
[Building, Large Capacity Bulk Feed Storage \(PDF\)](#)
[Building, Livestock Market Barn \(PDF\)](#)
[Building, Log Cabin \(PDF\)](#)
[Building, Log Cabin 3 room \(PDF\)](#)
[Building, Machinery Shed with living quarters \(PDF\)](#)
[Building, Nursery Planth Lath House \(PDF\)](#)
[Building, Outhouse \(PDF\)](#)
[Building, Outhouse Privy \(PDF\)](#)
[Building, Pesticide Storage and Mixing \(PDF\)](#)
[Building, Picnic Shelter \(PDF\)](#)
[Building, Picnic Shelter \(PDF\)](#)
[Building, Picnic Shelter with Kitchen \(PDF\)](#)
[Building, Portable Fertilizer Storage \(PDF\)](#)
[Building, Roadside Market \(PDF\)](#)
[Building, Roadside Stand \(PDF\)](#)
[Building, Roadside Stand \(PDF\)](#)
[Building, Salt and Sand Storage Shed \(PDF\)](#)
[Building, Smoke House \(PDF\)](#)
[Building, Storage \(PDF\)](#)
[Building, Storage \(PDF\)](#)
[Building, Storage \(PDF\)](#)
[Building, Storage Shed for Pesticides \(Raised\) \(PDF\)](#)
[Building, Storm or Storage Cellar \(PDF\)](#)
[Building, Sugar House \(PDF\)](#)
[Building, Townhouse - 2 bedroom \(PDF\)](#)
[Building, Townhouse - 3 bedroom \(PDF\)](#)
[Building, Townhouse - 4 bedroom \(PDF\)](#)
[Building, Vegetable Market \(PDF\)](#)
[Building, Walk In Cooler \(PDF\)](#)
[Buildings, Shed \(PDF\)](#)
[Bulletin Board](#)
[Bulletin Board, Shop Made](#)
[Bumble Bee Musical](#)

The logo for Martian Auctions features the words "MARTIAN" and "AUCTIONS" in a bold, white, sans-serif font. The text is set against a dark, textured rectangular background that has a slightly grainy appearance. The logo is positioned in the center of the page, overlapping the list of links.

[Bunk Bed \(1\)](#)
[Bunk Bed \(2\)](#)
[Bunk Bed, Build A](#)
[Burl-Veneer Occasional Table -- Apron and Veneer](#)
[Burl-Veneer Occasional Table -- Assembly and Finish](#)
[Burl-Veneer Occasional Table -- Table Legs](#)
[Burl-Veneer Occasional Table -- Tabletop](#)
[Bus](#)
[Bushel O' Piggies](#)
[Business Card Holder](#)
[Business Card Holder](#)
[Business Class: An Office Furniture Project](#)
[Business Class: An Office Furniture Project - Display Cabinet](#)
[Business Class: An Office Furniture Project - Office Credenza](#)
[Business Class: An Office Furniture Project - Office Desk](#)
[Butcher Block - redwood bench](#)
[Butcher Block Island](#)
[Butcher Block Table: Finishing Touches](#)
[Butcher Block Table: Shelf, Joinery and Base-Assembly](#)
[Butcher-Block Table: Base](#)
[Butcher-Block Table: Tabletop](#)
[Butterfly Hanging Decor](#)
[Butterfly House \(PDF\)](#)
[Buying "Log Run" Lumber](#)
[Cabinet \(Byrdcliffe \)](#)
[Cabinet \(Basic\)](#)
[Cabinet \(Corner\)](#)
[Cabinet \(Display\)](#)
[Cabinet \(Kneewall\)](#)
[Cabinet shake-up](#)
[Cabinet Wall Unit, Modular \(PDF\)](#)
[Cabinet, Antique Buffet Bathroom Vanity](#)
[Cabinet, Antique Sink Vanity](#)
[Cabinet, Base Unit - How to Build and Install](#)
[Cabinet, Basic](#)
[Cabinet, Bathroom \(PDF\)](#)
[Cabinet, Bathroom \(PDF\)](#)
[Cabinet, Bathroom Vanity](#)
[Cabinet, Bathroom Vanity](#)
[Cabinet, Bedside \(ZIP\)](#)
[Cabinet, Bedside \(ZIP\)](#)
[Cabinet, Building an Heirloom Curio](#)
[Cabinet, CD \(ZIP\)](#)
[Cabinet, Chest of Drawers](#)
[Cabinet, Chisel](#)
[Cabinet, Collector's](#)
[Cabinet, Colonial Dry Sink](#)
[Cabinet, Colonial Spice](#)
[Cabinet, Colonial Wall](#)
[Cabinet, Computer \(ZIP\)](#)



[Cabinet, Computer Armoire](#)
[Cabinet, Conservatory](#)
[Cabinet, Corner \(PDF\)](#)
[Cabinet, Corner \(ZIP\)](#)
[Cabinet, Corner Cupboard](#)
[Cabinet, Corner Entertainment Center](#)
[Cabinet, Corner Wall Mounted](#)
[Cabinet, Corner](#)
[Cabinet, Corner](#)
[Cabinet, Corner](#)
[Cabinet, Cubby Hole](#)
[Cabinet, Curio - How to Build](#)
[Cabinet, Curio \(ZIP\)](#)
[Cabinet, Curved bedside cabinets](#)
[Cabinet, Custom Home Entertainment Center](#)
[Cabinet, Davenport \(ZIP\)](#)
[Cabinet, Display \(PDF\)](#)
[Cabinet, Drafting - Reference Center](#)
[Cabinet, Dresser \(ZIP\)](#)
[Cabinet, Drill Press](#)
[Cabinet, Drill Press](#)
[Cabinet, Drinks](#)
[Cabinet, Dry Sink](#)
[Cabinet, Electric TV](#)
[Cabinet, Entertainment \(PDF\)](#)
[Cabinet, Entertainment Center - Architectural Home](#)
[Cabinet, Entertainment Center](#)
[Cabinet, Entertainment Center](#)
[Cabinet, Entertainment Center](#)
[Cabinet, Entertainment](#)
[Cabinet, Entertainment](#)
[Cabinet, Evaporative Cooling Pad \(PDF\)](#)
[Cabinet, Gun - Firearms](#)
[Cabinet, Gun](#)
[Cabinet, Hi-Fi](#)
[Cabinet, Home Office Furniture Cupboard](#)
[Cabinet, Hoosier](#)
[Cabinet, Ice Box - 1 door \(PDF\)](#)
[Cabinet, Ice Box - 2 door \(PDF\)](#)
[Cabinet, Italian Medicine](#)
[Cabinet, Kitchen Hutch \(ZIP\)](#)
[Cabinet, Kitchen Hutch 01](#)
[Cabinet, Kneewall](#)
[Cabinet, Laundry Work Island](#)
[Cabinet, Linen Closet \(PDF\)](#)
[Cabinet, Literature \(ZIP\)](#)
[Cabinet, Low Cupboard \(ZIP\)](#)
[Cabinet, Magazine Wall \(PDF\)](#)
[Cabinet, Medicine](#)
[Cabinet, Mini Pie Safe \(ZIPPED\)](#)



[Cabinet, Mission \(ZIP\)](#)
[Cabinet, Miter Saw \(ZIP\)](#)
[Cabinet, Office Display Case](#)
[Cabinet, Office Display](#)
[Cabinet, Open Wardrobe](#)
[Cabinet, Oriental](#)
[Cabinet, Pie Safe \(ZIP\)](#)
[Cabinet, Pie Safe Oak](#)
[Cabinet, Potable Tablesaw](#)
[Cabinet, Power Tool Storage](#)
[Cabinet, Room Divider](#)
[Cabinet, Rustic Cedar Wall](#)
[Cabinet, Sewing \(ZIP\)](#)
[Cabinet, Shaker Jelly](#)
[Cabinet, Shelf - Shadow box](#)
[Cabinet, Shop \(ZIP\)](#)
[Cabinet, Shot Glass \(ZIP\)](#)
[Cabinet, Sideboard - Arts and Crafts](#)
[Cabinet, Sliding-Door Wall \(PDF\)](#)
[Cabinet, Small Side](#)
[Cabinet, Spacious Vanity](#)
[Cabinet, Spice](#)
[Cabinet, Spice](#)
[Cabinet, Stereo \(ZIP\)](#)
[Cabinet, Stereo](#)
[Cabinet, Storage - Kid's](#)
[Cabinet, Storage - Shelves with boxes](#)
[Cabinet, Storage - Video Tape](#)
[Cabinet, Storage](#)
[Cabinet, Stylish Credenza](#)
[Cabinet, TV](#)
[Cabinet, TV](#)
[Cabinet, TV-VCR with Swivel Tray](#)
[Cabinet, Vanity](#)
[Cabinet, Wall - How to Build and Install](#)
[Cabinet, Wall Unit](#)
[Cabinet, Wall-Hung Curio](#)
[Cabinet, Washboard Cupboard](#)
[Cabinet, Window Screen](#)
[Cabinet, Wine \(ZIP\)](#)
[Cabinets](#)
[Cabinets, Built-in Wall](#)
[Cabinets, Modular Shop \(PDF\)](#)
[Cabinets, Sliding-Door Wall \(PDF\)](#)
[Cabriole Leg - How to Build](#)
[Cake Stand](#)
[Cake Stand](#)
[Calculate Gear and Pulley Speeds](#)
[Calendar Frame](#)
[Calender Frame](#)



[Cam Clamps](#)
[Camp Table and Patrol Box](#)
[Camp Table and Patrol Box](#)
[Canada Goose](#)
[Canadian Centre for Occupational Health and Safety - CCOHS](#)
[Canadian Home Workshop Show 2002](#)
[Candle Holder, Multiple](#)
[Candle Lamp](#)
[Candle Lantern, Copper and Etched Glass](#)
[Candle Sconce](#)
[Candle Sconce](#)
Candle Sconce and Desktop Pencil Holder
[Candle Sconce with copper reflector](#)
[Candle Stand](#)
[Candle Stick, Spiral](#)
[Candle Sticks](#)
[Candleholder, Metal & Plastic - or use wood](#)
[Candlestick, Turned Square Base](#)
[Candlestick/Wall Sconce \(PDF\)](#)
[Candy Cane Coat Rack](#)
[Canoe, Glide Easy](#)
[Canoe, Wacky Lassie](#)
[Cap Rack \(Baseball\)](#)
[Cape Hatteras Lighthouse](#)
Car
[Car & Horse Trailer](#)
[Car \(Swoopy Coupe\)](#)
[Car Gear Lever \(Stick Shift\) Knobs](#)
[Card Holder](#)
[Cardinal Bird Pattern](#)
[Carport \(PDF\)](#)
[Carport Coverup - Large](#)
[Carport, Construct A](#)
[Carport, Contemporary \(PDF\)](#)
[Carport, Free Standing](#)
[Cart, BBQ - portable](#)
[Cart, BBQ Caddy](#)
[Cart, BBQ Grilling \(PDF\)](#)
[Cart, Billy 01](#)
[Cart, Billy 03](#)
[Cart, Billy 04](#)
[Cart, Billy](#)
[Cart, Flower](#)
[Cart, Go](#)
[Cart, Kit Carson Pushmobile](#)
[Cart, Oseberg](#)
[Cart, Party](#)
[Cart, Roll-Around Shop \(PDF\)](#)
[Cart, Rolling - Block and Roll](#)
[Carve a Chain](#)



[Carved Fireplace and Surround](#)
[Carved Oak Barstool -- Assembly](#)
[Carved Oak Barstool -- Brass Pins and Sculpted Seat](#)
[Carved Oak Barstool -- Finishing Touches](#)
[Carved Oak Barstool -- Stock Cuts for Tapered and Angled Legs](#)
[Carved Owl](#)
[Carved Owl](#)
[Carving - Adding Drama through Shadows](#)
[Carving - American Heros](#)
[Carving - Emblem Boy Scout](#)
[Carving - Emblem USPS](#)
[Carving - Fish Decoy](#)
[Carving - Floral Clock](#)
[Carving - Landscape Relief](#)
[Carving - Low Relief Entry Level Project](#)
[Carving - Wood Spirit - The Braided Beard Man](#)
[Carving a Chain](#)
[Carving a Chain](#)
[Carving a Chain and Ball](#)
[Carving a Clam Shell](#)
[Carving Patterns, 12 Beginner's Wood](#)
[Carving Plywood](#)
[Carving tips and Techniques](#)
[Carving, Engraving Routing](#)
[Carving, Lettering Layouts Relief Wood](#)
[Carving, Macaw Relief Wood](#)
[Carving, Mock Russian Birch Bark](#)
[Case, Sharpening \(PDF\)](#)
[Cassette Holder](#)
[Cassette Holder](#)
[Castle, Medieval](#)
Cat Condo Cat Ladder
[Cat Tree and Scratching Post](#)
[Cat Tree and Scratching Post](#)
[Cat Tree](#)
[Cattle Feed Bunk \(PDF\)](#)
[CD Box, Alligator \(PDF\)](#)
[CD Box, Horse \(PDF\)](#)
CD Cabinet
[CD Cabinet](#)
[CD Cabinet](#)
[CD Cabinet](#)
[CD Cabinet](#)
[CD Carousel](#)
[CD Holder](#)
[CD Holder \(Dachshund\)](#)
[CD Holder, Shaker Style \(PDF\)](#)
[CD Rack](#)
[CD Rack, Shutter](#)
[CD Storage Box \(PDF\)](#)
[CD Storage Case](#)



[Chair, Arts and Crafts Style](#)
[Chair, Bannister Back Colonial Wing](#)
[Chair, Breakdown](#)
[Chair, Camp](#)
[Chair, Camp](#)
[Chair, Chattahoochee](#)
[Chair, Child's \(ZIP\)](#)
[Chair, Child's Stool \(ZIP\)](#)
[Chair, Child's](#)
[Chair, Flip Top \(ZIP\)](#)
[Chair, Florentine Folding](#)
[Chair, Folding \(PDF\)](#)
[Chair, Folding \(ZIP\)](#)
[Chair, Folding Director's](#)
[Chair, Four Post Turned](#)
[Chair, Gothic-Styled Box](#)
[Chair, Irish Taum \(PDF\)](#)
[Chair, Jake's](#)
[Chair, Jake's](#)
[Chair, Jake's](#)
[Chair, James' Porch](#)
[Chair, Kentucky](#)
[Chair, Keyed Camp](#)
[Chair, Little People](#)
[Chair, Medival](#)
[Chair, Morris \(ZIP\)](#)
[Chair, Morris](#)
[Chair, Patio Comfy](#)
[Chair, Patio](#)
[Chair, Reclining Verandah](#)
[Chair, Side \(ZIP\)](#)
[Chair, Slatted - Carved](#)
[Chair, Sligo \(PDF\)](#)
[Chair, Solid Wood Sun Lounger](#)
[Chair, Sunset Beach \(PDF\)](#)
[Chair, The Anniversary - Centennial Suite](#)
[Chair, Twig Willow](#)
[Chair, Viking Box \(PDF\)](#)
[Chair, Westport](#)
[Chairs, Gothic Arch break-down](#)
[Chaise Lounge](#)
[Chaise Lounge](#)
[Chaise Lounge](#)
[Chaise Recliner, Classic Redwood](#)
[Chaise, Convertible](#)
[Chattahoochee Chair](#)
[Chalkboard for Kids](#)
[Chalkboard, Child's](#)
[Checker/Chess Board](#)
[Cheese Press](#)



[Cheese Press](#)
[Cheesechucker - a trebuchet](#)
[Cherry and Maple Medicine Cabinet -- Door Completion](#)
[Cherry and Maple Medicine Cabinet -- Dovetail Joinery and Case](#)
[Cherry and Maple Medicine Cabinet -- Finishing Touches](#)
[Cherry and Maple Medicine Cabinet -- Maple Door-Frame](#)
[Cherry Bookshelf Plan](#)
[Cherry Bookshelf Plan Page 1](#)
[Cherry Corner-Shelf -- Curved Shelves and Banding](#)
[Cherry Corner-Shelf -- Finishing Touches](#)
[Cherry Corner-Shelf -- Legs and Assembly](#)
[Cherry Corner-Shelf -- Side Panels](#)
[Cherry Sofa-Table -- Curved Stretchers](#)
[Cherry Sofa-Table -- Finishing Touches](#)
[Cherry Sofa-Table -- Legs and Joinery](#)
[Cherry Sofa-Table -- Top and Assembly](#)
[Chess & Checker Pieces & Board](#)
[Chess & Checkers](#)
[Chess Board](#)
[Chess Board](#)
[Chess Pieces \(Cut with band saw\)](#)
[Chess Pieces \(Cut with band saw\)](#)
[Chess Set](#)
[Chess Set](#)
[Chess Set](#)
[Chess Set - Hand Turned Pieces](#)
[Chess Set](#)
[Chest \(16th Century Linenfold\)](#)
[Chest \(Pioneer\)](#)
[Chest \(Tansu\)](#)
[Chest \(Viking\)](#)
[Chest of Drawers](#)
[Chest of Drawers](#)
[Chest of Drawers \(Very Comprehensive\)](#)
[Chest of Drawers](#)
[Chest of Drawers, Tall](#)
[Chest, 16-Drawer Apothecary](#)
[Chest, 16th Century Linenfold](#)
[Chest, Basic Six Board](#)
[Chest, Basic](#)
[Chest, Blanket \(PDF\)](#)
[Chest, Blanket \(ZIP\)](#)
[Chest, Blanket Trunk on Legs \(PDF\)](#)
[Chest, Blanket](#)
[Chest, Blanket](#)
[Chest, Build A Storage](#)
[Chest, Faith](#)
[Chest, Medieval Wooden](#)
[Chest, Medieval](#)
[Chest, Pioneer](#)



[Chest, Silver](#)
[Chest, Simple \(PDF\)](#)
[Chest, Small \(ZIP\)](#)
[Chest, Storage \(ZIP\)](#)
[Chest, Storage 01](#)
[Chest, Sugar \(ZIP\)](#)
[Chest, The Little Canfield Coffe \(PDF\)](#)
[Chest, The Voxtorp Church](#)
[Chest, Toy](#)
[Chest, Treasure](#)
[Chest, Viking](#)
[Chickadee Bird Pattern](#)
[Chicken Coop](#)
[Chicken Coop](#)
[Child's Coat Tree \(ZIP\)](#)
[Child's Rocker \(PDF\)](#)
[Children's Bedroom Furniture Collection](#)
[Children's Play Structure, Build a](#)
[Children's Bed](#)
[Child's Desk and Chairs](#)
[Childs Vanity](#)
[Child's Workbench](#)
[China Cupboard](#)
[Chinese Abacus Lamp](#)
[Chinese Scroll Frame](#)
[Chinese Scroll Frame](#)
[Chinese Scroll Frame](#)
[Chippendale Side Table -- Finishing Touches](#)
[Chippendale Side Table -- Finishing Touches](#)
[Chippendale Side Table -- Finishing Touches](#)
[Chippendale Side Table -- Finishing Touches](#)
[Chippendale Side Table -- Shaping the Legs, Table Base Assembly and Making a Frame for the Tabletop](#)
[Chippendale Side Table -- Shaping the Legs, Table Base Assembly and Making a Frame for the Tabletop](#)
[Chippendale Side Table -- Shaping the Legs, Table Base Assembly and Making a Frame for the Tabletop](#)
[Chippendale Side Table -- Shaping the Legs, Table Base Assembly and Making a Frame for the Tabletop](#)
[Chippendale Side Table -- Table Assembly](#)
[Chippendale Side Table -- Table Assembly](#)
[Chippendale Side Table -- Table Assembly](#)
[Chippendale Side Table -- Table Assembly](#)
Chisel Basics
[Chisel Cabinet](#)
[Chisel Cabinet](#)
[Chisel Holder](#)
[Chisel Sharpening Jig](#)
[Chisel Sharpening Jig](#)
[Chisle Plane 5/01](#)
[Choosing a Finish \(by Jeff Jewitt\)](#)



[Christmas - Santa Caddy](#)
[Christmas Tree Ornaments](#)
[Christmas Tree Ornaments](#)
[Circle-cutting Jig \(Router\)](#)
[Circular Kitchen Table -- Final Assembly and Finishing Touches](#)
[Circular Kitchen Table -- Pedestal Base](#)
[Circular Kitchen Table -- Support Pieces](#)
[Circular Kitchen-Table -- Walnut Tabletop](#)
[Circular Saw Use and Safety](#)
[Clamp Blocks](#)
[Clamp Champs - Featherboard System](#)
[Clamp Champs](#)
[Clamp extensions, Long-reach](#)
Clamp it Jed
[Clamp Pads, Stay In Place](#)
[Clamp Rack \(ZIP\)](#)
[Clamp, Corner](#)
[Clamp, Shop Made](#)
[Clamp, Shop-built hold-down](#)
[Clamping Station \(PDF\)](#)
[Clamps, Cam](#)
[Clamps, Cam](#)
[Clamps, Home for Bar](#)
[Clamps, Wedge](#)
[Clapboard Siding](#)
[Clay Hammers](#)
[Clean Sawblades](#)
[Clock \(Shaker Wall\)](#)
[Clock \(Desk\)](#)
[Clock \(Tall, classic cherry\)](#)
[Clock \(Wall\)](#)
[Clock \(Wooden\)](#)
[Clock for your Workshop](#)
[Clock, Desk](#)
[Clock, Fine Timber](#)
[Clock, Grandfather - Curio](#)
[Clock, Grandfather - Part 1](#)
[Clock, Grandfather - Part 2](#)
[Clock, Mission Style Wall Clock](#)
[Clock, Mission Style Wall](#)
[Clock, Pocket Watch Wall](#)
[Clock, Rustic Regulator](#)
[Clock, Shaker \(ZIP\)](#)
[Clock, Shaker](#)
[Clock, Shaker](#)
[Clock, Tall Classic Cherry](#)
[Clock, Wall - Classic](#)
[Closet Organiser \(PDF\)](#)
[Closet Organiser](#)
[Closet Organizer](#)



[Closet Organizer \(1\)](#)
[Closet Organizer \(2\)](#)
[Closet Organizer \(PDF\)](#)
[Closet Organizer](#)
[Closet Organizer](#)
[Closet Organizer](#)
[Closet, Build a](#)
[Closet, Framing Out a](#)
[Clothes Drying Rack](#)
[Clothes Drying Rack](#)
[Clothes Rack](#)
[Clothes Tree](#)
[Clothes Tree](#)
[Club House](#)
[Club House \(PDF\)](#)
[Club House, The Ace](#)
[Coaster Set with Holder, Inlaid](#)
[Coat Rack](#)
[Coat Rack](#)
[Coat Rack \(ZIP\)](#)
[Coat Rack](#)
[Coat Rack, Candy Cane](#)
[Coat Rack, Shaker Style](#)
[Coffee Mill, Cast Iron Grinding - Rockler® Store](#)
[Coffee Table](#)
[Coffee Table \(Carved\)](#)
[Coffee Table \(Cedar Block\)](#)
[Coffee Table \(Danish Modern\)](#)
[Coffee Table \(Masterwood\)](#)
[Coffee Table \(Rectangular\)](#)
[Coffee Table \(Spiral\)](#)
[Coffee Table \(With Drawer\)](#)
[Cold Frame](#)
[Cold Frame \(PDF\)](#)
[Cold Frame](#)
[Cold Frame](#)
[Cold Frame](#)
Cold Frame Cold Frame
[Cold Frame, Build a](#)
[Cold Frame/Proporgating Bench](#)
[Collapsible Work Bench](#)
[Columns, Create Custom](#)
[Compact conservatory](#)
[Compact TV Stand](#)
[Compost Bin](#)
[Compost Bin](#)
[Compost Bin](#)
[Compost Bin, Build A](#)
[Compost boxes](#)
[Composter](#)



[Compound Miter cuts](#)
[Computer Desk \(Corner\)](#)
[Computer Desk \(from 1 sheet of plywood\)](#)
[Computer Workstation](#)
[Computer Workstation](#)
[Concord Table](#)
[Concord Table](#)
[Concord Table](#)
[Construction Glossary](#)
[Construction time again](#)
[Contemporary Dining Chair: Curved Laminate Back](#)
[Contemporary Dining Chair: Finishing Touches](#)
[Contemporary Dining Chair: Sculpted Seat and Legs](#)
[Contemporary Dining Chair: Templates, Jigs, and Laminates](#)
[Contemporary Headboard -- Frame Completion and Back-Panel](#)
[Contemporary Headboard -- Joinery](#)
[Contemporary Headboard -- Mockup, Template and Frame](#)
[Contemporary Headboard -- Shaping and Finishing](#)
[Contemporary Magazine Rack -- Assembly and Finishing Touches](#)
[Contemporary Magazine Rack -- Bent Lamination for the Legs](#)
[Contemporary Magazine Rack -- Curved Laminate Legs](#)
[Contemporary Magazine Rack -- Stretchers and Joinery](#)
[Contemporary Shelves](#)
[Contemporary Wall Mirror -- Assembly and Finish](#)
[Contemporary Wall Mirror -- Frame Template and Cherry Stock](#)
[Contemporary Wall Mirror -- Making a Circle from a Square](#)
[Contemporary Wall Mirror -- Wengae Accents](#)
[Contemporary Walnut Bench -- Base Form and Mortises](#)
[Contemporary Walnut Bench -- Copper Patina, Assembly and Wood Finish](#)
[Contemporary Walnut Bench -- Seat and Copper Finish](#)
[Contemporary Wine Caddy -- Assembly](#)
[Contemporary Wine Caddy -- Assembly](#)
[Contemporary Wine Caddy -- Brackets and Sides](#)
[Contemporary Wine Caddy -- Brackets and Sides](#)
[Contemporary Wine Caddy -- Finishing Touches](#)
[Contemporary Wine Caddy -- Finishing Touches](#)
[Contemporary Wine Caddy -- Joinery](#)
[Contemporary Wine Caddy -- Joinery](#)
[Contemporary Writing Desk: Apron Stock and Joinery](#)
[Contemporary Writing Desk: Finishing Touches](#)
[Contemporary Writing Desk: Legs and Drawer](#)
[Contemporary Writing Desk: Veneered Zebra-Wood Top](#)
[Cook Book Holder](#)
[Cookbook Holder](#)
[Cookbook Holder \(1\)](#)
[Cookbook Holder \(2\)](#)
[Cookbook Holder](#)
[Cookbook Stand - Part 1](#)
[Cookbook Stand - Part 2](#)
[Coopered Glass-Top Table: Assembling the Columns](#)

[Coopered Glass-Top Table: Column Stock](#)
[Coopered Glass-Top Table: Columns and Copper Patina](#)
[Coopered Glass-Top Table: Finishing Touches](#)
[Copper-Top Hall Table -- Copper Panel and Patina](#)
[Copper-Top Hall Table -- Finishing Touches](#)
[Copper-Top Hall Table -- Legs and Apron](#)
[Copper-Top Hall Table -- Tabletop Frame](#)
[Cord To Radius Calculator](#)
[Cornamuse \(Flute?\)](#)
[Corner Cabinet](#)
[Corner Cabinet \(PDF\)](#)
[Corner Cupboard](#)
[Corner Reloading Bench](#)
[Corner Reloading Bench](#)
[Cornice Treatments \(PDF\)](#)
[Counting Frame](#)
[Counting Frame - Developmental Toys](#)
[Country Clock \(ZIP\)](#)
[Country Flag Tray](#)
[Country Mail Boxes With Pizzazz](#)
[Country Mailboxes With Pizzazz](#)
[Country Mailboxes With Pizzazz](#)
[Couple](#)
[Couple](#)
[Cradle](#)
[Cradle](#)
[Cradle, Baby](#)
[Cradle, Doll](#)
[Crane \(1\)](#)
[Crane \(2\)](#)
[Crawling Bug](#)
[Create a Romantic Gazebo](#)
[Creating Shaped Furniture with Arbortech Tools](#)
[Credenza, Vintage Brushed Steel](#)
[Crib Safety \(From National Safety Council\)](#)
[Cricket Bench](#)
[Cricket Bench](#)
[Croquet Set](#)
[Croquet Set](#)
[Croquet Set](#)
[Cross](#)
[Cross, Wooden](#)
[Crosscut Sled \(PDF\)](#)
[Crosscutting Sled](#)
[Crown Molding, \(cutting from Dewalt\)](#)
[Crowning Touch](#)
[Cubby](#)
[Cubby House](#)
[Cupboard \(Wall\)](#)
[Cupola and Copper Weathervane, Installing A Custom](#)



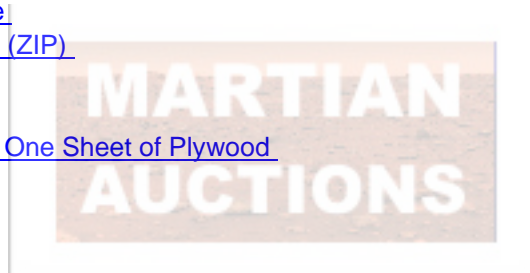
[Curio Cabinet](#)
[Curved Bedside Cabinets](#)
[Curved Cope and Stick](#)
[Curved Photo Stand](#)
[Curved Wood Walk With Arched Bridge](#)
[Curvy Stripe](#)
[Cut Inside Corners](#)
[Cutting Board](#)
[Cutting Board - Butcher Block](#)
[Cutting Board \(Butcher Block\)](#)
[Cutting Board](#)
[Cutting Board](#)
[Cutting Board](#)
[Cutting Board, Butcherblock](#)
[Cutting Board, info & plans](#)
[Cutting Board, Maple - Board Stiff](#)
[Cutting Box, Circular Saw Guide](#)
[Cutting Curved Coves on a Table Saw](#)
[Cutting Finger Lap Joints with the Table Saw](#)
[Cutting Tenons With a Router](#)
[Cutting Wide Boards](#)
[Dado Setup Jig](#)
[Dancing Duck](#)
[Dangers of Wood Dust](#)
[Dart Board Cabinet \(pdf\)](#)
[Dart Board Cabinet \(pdf\)](#)
[Dartboard Cabinet](#)
[Date Blocks](#)
[Date Blocks](#)
[Dealing with Dryrot](#)
[Dealing with Wood Movement](#)
[Decimal and Millimeter Equivalent Chart](#)
[Deck - How to Attach a Bench Seat to the Deck](#)
[Deck - Sundeck - custom deck setup](#)
[Deck - Sundeck](#)
[Deck - Sundeck](#)
[Deck \(PDF\)](#)
[Deck bench seat](#)
[Deck Bench](#)
[Deck Benches](#)
[Deck Benches](#)
[Deck Construction, Redwood \(PDF\)](#)
[Deck Construction, Step by Step](#)
[Deck Design, Wood](#)
[Deck Hailrails](#)
[Deck Lattice Installation](#)
[Deck Patio, Building a Two Level](#)
[Deck Plans & Materials Estimator](#)
[Deck Plans, Detailed](#)
[Deck Pool Perimeter, Above Ground](#)



[Deck Stairs, Installing and Building](#)
[Deck](#)
[Deck](#)
[Deck, A Bi-Level Porch](#)
[Deck, Angled](#)
[Deck, Build a Simple](#)
[Deck, Build A](#)
[Deck, Cedar - DIY Decks, Stairs and Railings](#)
[Deck, G-P Treated Lumber \(PDF\)](#)
[Deck, Hand Rail ad Steps](#)
[Deck, High Rectangular](#)
[Deck, How to Build A](#)
[Deck, Inside Corner](#)
[Deck, Island](#)
[Deck, Low Profile](#)
[Deck, One Level](#)
[Deck, Outdoor Porch \(PDF\)](#)
[Deck, Timber](#)
[Deck, Winsor Shade Shelter](#)
[Deck, Wraparound](#)
[Decorate With Chalk Boards](#)
[Decorate With Chalk Boards](#)
[Decorating with Cable Lights](#)
[Decorating With Cable Lights](#)
[Decorating With Cable Lights](#)
[Decorating With Model Trains](#)
[Decorative Chalk Boards](#)
[Decorative Hinges](#)
[Deer Stand](#)
[Delta](#)
[Delta Contractors Saw Alignment](#)
[Delta Tool FAQs](#)
[Delta Tool Parts List](#)
[Demilune Table -- Final Assembly and Wood Finish](#)
[Demilune Table -- Tabletop Veneer and Curved Apron](#)
[Demilune Table -- Tapered Legs and Bridle Joinery](#)
[Demilune Table -- Veneer Tabletop](#)
[Derby Track, Pine Wood](#)
[Desk](#)
[Desk & Chair Set](#)
[Desk & Shelf](#)
[Desk \(Davenport\)](#)
[Desk \(Greek Key\)](#)
[Desk \(PM Anniversary Plan\)](#)
[Desk \(Secretary\)](#)
[Desk \(Shirl's\)](#)
[Desk Accessory - Keyboard Shelf Add](#)
[Desk Accessory - Organizer](#)
[Desk Accessory - Slide Forward Monitor Bridge](#)
[Desk and Cabinet, Activity Centre](#)



[Desk and Chair, Child's](#)
[Desk and Shelf Unit](#)
[Desk and Shelf, Child's](#)
[Desk and Shelf, Kid's](#)
[Desk Caddy](#)
[Desk Clock](#)
[Desk Organizer](#)
[Desk Sign](#)
[Desk, Built-In](#)
[Desk, Bunkbed](#)
[Desk, Captain's \(ZIP\)](#)
[Desk, Child's \(ZIP\)](#)
[Desk, Computer - A Look Down](#)
[Desk, Computer - Child's Table](#)
[Desk, Computer - Corner Door](#)
[Desk, Computer - Door and File](#)
[Desk, Computer - made from cardboard](#)
[Desk, Computer - Mission Style](#)
[Desk, Computer - Student - make from recycled pallets](#)
[Desk, Computer - Typing Stand](#)
[Desk, Computer \(ZIP\)](#)
[Desk, Computer Armoire](#)
[Desk, Craftsman Rolltop \(ZIP\)](#)
[Desk, Davenport](#)
[Desk, Hanging Wall](#)
[Desk, Make a Desk with One Sheet of Plywood](#)
[Desk, Office Credenza](#)
[Desk, Office Credenza](#)
[Desk, Office](#)
[Desk, Office](#)
[Desk, Office](#)
[Desk, Personal Secretary](#)
[Desk, Rebuilt](#)
[Desk, Sawhorse](#)
[Desk, School Master's Country-Style Standing](#)
[Desk, Secretary](#)
[Desk, Slant Top \(ZIP\)](#)
[Desk, Student - Adjustable](#)
[Desk, Study \(ZIP\)](#)
[Desk, The Anniversary - Centennial Suite](#)
[Desk, The Classic Rolltop - Part I](#)
[Desk, The Classic Rolltop - Part II](#)
[Desk, Wall - or TV Shelf](#)
[Desk, Window](#)
[Desktop Filing Box: Keep your most-used files close at hand](#)
[Desktop Organizer](#)
[Desktop Weather Station Shop Project](#)
[Dewalt Radial Arm Saw Reconditioning pdf](#)
[DeWALT ServiceNET](#)
[Dining Set, PVC \(PDF\)](#)



[Dinosaur Bookends](#)
[Dish Towel Rack](#)
[Disk Sander](#)
[Disk Sander](#)
[Display Cabinet](#)
[Display Cabinet -- Final Touches and Finishing](#)
[Display Cabinet -- Final Touches and Finishing](#)
[Display Cabinet -- Final Touches and Finishing](#)
[Display Cabinet -- Final Touches and Finishing](#)
[Display Cabinet -- Making and Installing the Door Frame and Brass Hinges](#)
[Display Cabinet -- Making and Installing the Door Frame and Brass Hinges](#)
[Display Cabinet -- Making and Installing the Door Frame and Brass Hinges](#)
[Display Cabinet -- Making and Installing the Door Frame and Brass Hinges](#)
[Display Cabinet -- Making and Installing the Flame-Maple Back Panel](#)
[Display Cabinet -- Making and Installing the Flame-Maple Back Panel](#)
[Display Cabinet -- Making and Installing the Flame-Maple Back Panel](#)
[Display Cabinet -- Making and Installing the Flame-Maple Back Panel](#)
[Display Cabinet -- Shaping Cove Molding, Making Side Panels and Building Frame of the Door](#)
[Display Cabinet -- Shaping Cove Molding, Making Side Panels and Building Frame of the Door](#)
[Display Cabinet -- Shaping Cove Molding, Making Side Panels and Building Frame of the Door](#)
[Display Cabinet -- Shaping Cove Molding, Making Side Panels and Building Frame of the Door](#)
[Display Case \(ZIP\)](#)
[Display Table -- Base Pieces](#)
[Display Table -- Burl Veneer Top](#)
[Display Table -- Finishing Touches](#)
[Display Table -- Wengae Frame](#)
[Display, 3-D](#)
[Distress Pine Floor](#)
[Distressing Outdoor Projects](#)
[Dog Bed \(Trampoline Style\)](#)
[Dog Door, Installing a](#)
[Dog House \(1\)](#)
[Dog House \(2\)](#)
[Dog House \(3\)](#)
[Dog House \(4\)](#)
[Dog House \(5\)](#)
[Dog House \(PDF\)](#)
[Dog House pdf](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog House](#)
[Dog Houses \(PDF\)](#)
[Dog Kennel, Build A](#)
[Dog Pull Toy](#)
[Dog Sled](#)
Dog Sled Dog Sled



[Doghouse](#)
[Doghouse for Canadian Outdoor Dogs - Insulated](#)
[Doghouse](#)
[Doghouse](#)
[Doghouse](#)
[Doghouse, A Custom](#)
[Doghouse, Build A](#)
[Doghouse, Easy](#)
[Doghouse, G-P Plywood \(PDF\)](#)
[DoltYourselfers Glossary of Popular Construction Terms](#)
[Doll Bed](#)
[Doll Bed](#)
[Doll Cradle](#)
[Doll Cradle \(2\)](#)
[Doll Cradle \(Pine\)](#)
[Doll Cradle \(ZIP\)](#)
[Doll Cradle \(ZIP\)](#)
[Doll Cradle](#)
[Doll Cradle](#)
[Doll Crib \(ZIP\)](#)
[Doll Furniture, 1/12th Scale Mission Style Bedroom](#)
[Doll House \(Victorian\)](#)
[Doll House Furniture](#)
[Doll House, Victorian](#)
[Doll Table](#)
[Dolls House](#)
[Dome, Bamboo](#)
[Dome, Geodesic](#)
[Domino Effect](#)
[Dominos](#)
[Door Chime](#)
[Door Chime](#)
[Door Latch](#)
[Door Latch](#)
[Door Projects - Split or Slide](#)
[Door Projects - Split or Slide](#)
[Door Pull Designs](#)
[Door Pull Designs](#)
[Door Raised Panels done on the Table Saw](#)
[Door Raised Panels done on the Table Saw](#)
[Door, Raised Panel](#)
[Door, Raised Panel](#)
[Door, Red Oak Passage](#)
[Door, Red Oak Passage](#)
[Door, Storm](#)
[Door, Storm](#)
[Doorknob Apron-Rack](#)
[Doors, Insulated Storage \(PDF\)](#)
[Doors, Insulated Storage \(PDF\)](#)



[Doorway, Decorative](#)
[Doorway, Decorative](#)
[Double Duty](#)
[Double Hung Repair](#)
[Dove Shelf](#)
[Dovetail Jig](#)
[Dovetail Joints](#)
[Dovetail Joints for Drawers \(Handcut\)](#)
[Dowel Gauge](#)
[Dowel Jig](#)
[Downdraft Table](#)
[Drafting / Reference Center](#)
[Drafting Table with built in light](#)
[Draw an Elipse](#)
[Draw Geometric Shapes](#)
[Drawer Building 1-2-3](#)
[Drawer Front for Kitchen Cabinet, Faux](#)
[Drawer Organizer - simple](#)
[Drawer Organizer, Simple](#)
[Drawer Pulls, Shop-Made](#)
[Dreidels](#)
[Dreidels](#)
[Dresser](#)
[Dresser \(PM Anniversary Plan\)](#)
[Dresser \(ZIP\)](#)
[Dresser Valet](#)
[Dresser, Cherry Classic](#)
[Dresser, Kid's Furniture](#)
[Dresser, Kneewall](#)
[Dresser, The Anniversary - Centennial Bedroom Suite](#)
[Dried Flower Holder](#)
[Drill Doctor](#)
[Drill Holster](#)
[Drill Press Fence](#)
[Drill Press Speed Chart](#)
[Drill Press Stand](#)
[Drill Press Stand](#)
[Drill Press Table](#)
[Drill Press Table & Fence \(PDF\)](#)
[Drill Press Table \(PDF\)](#)
[Drill Press Use and Safety](#)
[Drill Press, Automatic Table Lift](#)
[Drinks Cabinet Plan](#)
[Drum Sander \(ZIP\) - Mike Randall](#)
[Drum Sander, Extra-Long](#)
[Drum, Bodhran - Celtic Traditional Drum](#)
[Drummer Boy Napkin Holder](#)
[Drumsticks 8/01](#)
[Dry Sink](#)
[Dry Sink \(Cherry\)](#)



[Dry Sink \(Colonial\)](#)
[Dry Sink \(Country\)](#)
[Dry Sink \(ZIP\)](#)
[Drying Lumber](#)
[Drying Rack for Shelves](#)
[Drywall Hole Repair](#)
[Duck Call](#)
[Duck Call](#)
[Duck Call](#)
[Duck Decoy](#)
[Duck Decoy](#)
[Ducklings Intarsia Pattern \(PDF\) - GekkoTimbers, Australia](#)
[Dust Collection Blast Gate](#)
[Dust Collection Monitor](#)
[Dust Collector using a Toro Leaf Blower](#)
[Dust Collector, Make your own](#)
[Dust Collector, Miny Cyclone](#)
[Dust Collector, Saw Top](#)
[Dust control](#)
[Dust Control, Box Fan Filter](#)
[Eagle \(Let Freedom Ring \)](#)
[Easel and Drawing Board](#)
[Easel Displays Framed Photo](#)
[Easel, Artist](#)
[Easel, Artist](#)
[Easel, Becky's Book](#)
[Easel, Child's](#)
[Easter Center Piece](#)
[Easter Shelf Decoration, Happy](#)
[Edge Gluing Fixture](#)
[Edge Sander](#)
[Edible Finishes](#)
[Egg Cups & Stand](#)
[Egg Cups and Stand](#)
[Egg Pricker](#)
[Electric Wizz-Bang Contraption for kids](#)
[Elephant Pull Toy](#)
[Ellipse Calculator](#)
[End Table](#)
[End Table](#)
[End Table \(1\)](#)
[End Table \(2\)](#)
[End Table \(3\)](#)
[Engineer's Edge \(Design Resources\)](#)
[Entertainment Center \(1\)](#)
[Entertainment Center \(2\)](#)
[Entertainment Center \(3\)](#)
[Entertainment Center \(advanced\)](#)
Entertainment Center (basic)
[Entertainment Center \(Traditional\)](#)



[Entertainment Center \(Walnut\)](#)
[Entertainment Center, Built In - Simple Design](#)
[Ergonomic Stool](#)
[Essential tenon tips](#)
[European Dish Rack -- Assembly and Finishing Touches](#)
[European Dish Rack -- Front Assembly](#)
[European Dish Rack -- Rails, Stiles and Joinery](#)
[European Dish Rack -- Side Panels and Fretwork](#)
[European Telephone Console](#)
[Exterior Finishes](#)
[Exterior Finishes](#)
[False Beam](#)
[False Beam, Installing A](#)
[Family Game Box](#)
[Family Game Box](#)
[Fan Chain Pulls](#)
[Fancy Wall Shelf That's Simple](#)
[FAQ: Colored Stains and Custom Accents](#)
[Farm Structure - Cattle Squeeze \(PDF\)](#)
[Farmboy Cutout](#)
[Farmer Bunny](#)
[Farmer Bunny](#)
[Fasten Table Tops](#)
[Fasten to Walls and Ceilings](#)
[Feather Board \(1\)](#)
[Feather Board \(2\)](#)
[Feather Board \(3\)](#)
[Feather Board](#)
[Feather Board](#)
[Feed Carts \(PDF\)](#)
[Feet, Chest/Cabinet \(ZIP\)](#)
[Fence - Board on Board \(GIF image\)](#)
[Fence - Board on Board \(GIF image\)](#)
[Fence - G-P Treated Lumber \(PDF\)](#)
[Fence - G-P Treated Lumber \(PDF\)](#)
[Fence - Lattice topped](#)
[Fence - Lattice topped](#)
[Fence - Picket - Classic style \(Gif image only\)](#)
[Fence - Picket - Classic style \(Gif image only\)](#)
[Fence - Picket - G-P Treated Lumber \(PDF\)](#)
[Fence - Picket - G-P Treated Lumber \(PDF\)](#)
[Fence - Picket with Gate Arbour](#)
[Fence - Picket with Gate Arbour](#)
[Fence - Post & Rail \(GIF image only\)](#)
[Fence - Post & Rail \(GIF image only\)](#)
[Fence - Privacy 02 - with lattice \(GIF image only\)](#)
[Fence - Privacy 02 - with lattice \(GIF image only\)](#)
[Fence - Solid Board \(GIF image only\)](#)
[Fence - Solid Board \(GIF image only\)](#)
[Fence - with Lattice](#)



[Fence - with Lattice](#)
[Fence \(Classic Picket\)](#)
[Fence \(How to Build\)](#)
[Fence \(PDF\)](#)
[Fence \(PDF\)](#)
[Fence \(Post and Rail\)](#)
[Fence \(Privacy with Lattice\)](#)
[Fence pdf](#)
[Fence Stop](#)
[Fence Window for pets](#)
[Fence Window for pets](#)
[Fence, A Rustic Pine Log](#)
[Fence, A Rustic Pine Log](#)
[Fence, Basic Board](#)
[Fence, Basic Board](#)
[Fence, Basic Board](#)
[Fence, Basic Board](#)
[Fence, Boards and Stringers](#)
[Fence, Boards and Stringers](#)
[Fence, Build A](#)
[Fence, Build A](#)
[Fence, Garden Picket](#)
[Fence, Garden Picket](#)
[Fence, How to Build](#)
[Fence, How to Build](#)
[Fence, Indoor](#)
[Fence, Indoor](#)
[Fence, Pine Pole](#)

Fence, Pine Pole Fence, Pool

[Fence, Pool](#)
[Fence, Post - without the post holes](#)
[Fence, Post - without the post holes](#)
[Fence, Wattle](#)
[Fence, Wattle](#)
[Fence, Wood](#)
[Fence, Wood](#)
[Fence, Wooden - Planning to build](#)
[Fence, Wooden - Planning to build](#)
[Fence, Wooden Panel](#)
[Fence, Wooden Panel](#)
[Fence, Wooden](#)
[Fence, Wooden](#)
[Fences - 10 designs \(PDF\)](#)
[Fences - 10 designs \(PDF\)](#)
[Fences - Different styles](#)
[Fences - Different styles](#)
[File Cabinet / Table](#)
[File Cabinet and a Table/Chest](#)
[Filing Cabinet Panel Re - facing](#)
[Find Centers](#)



[Find Studs](#)
[Finding Inspiration](#)
[Finger Joint Jewelry Box](#)
[Finishing Comparison Guide](#)
[Finishing Easel](#)
[Finishing Easel](#)
[Finishing Oily Woods](#)
[Fire Place Surround 6/00](#)
[Firemen Cutout](#)
[Fireplace Grill with Wood Picnic Table, Outside \(PDF\)](#)
[Fireplace Makeover](#)
[Fireplace Makeover](#)
[Fireplace Mantle \(PDF\)](#)
[Fireplace Mantle \(PDF\)](#)
[Fireplace Mantle](#)
[Fireplace Mantle](#)
[Fireplace Mantle, Custom Build](#)
[Fireplace Mantle, Custom Build](#)
[Fireplace Mantle, Custom](#)
[Fireplace Mantle, How to build a](#)
[Fireplace Mantle, How to build a](#)
[Fireplace Matle, Custom](#)
[Fireplace Plans & Instructions, Rumford](#)
[Fireplace Plans & Instructions, Rumford](#)
[Fireplace Screen, Fence-style](#)
[Fireplace Screen, Flower Garden theme](#)
[Fireplace Screen, Red Picket Fence](#)
[Fireplace Screen, Rustic](#)
[Fireplace Screen, Seashore theme](#)
[Fireplace Screen, Springtime theme](#)
[Fireplace Surround, Carved](#)
[Fish Puzzle](#)
[Fishing Cabinet](#)
[Fishing Lures](#)
[Fishing Lures](#)
[Fishing Rod Rack \(PDF\)](#)
[Fit and Trim - Dressing Up Doors and Windows](#)
[Fitting inset doors](#)
[Fix Sticking Drawers](#)
[Fixing Stuck Doors](#)
[Flag Case](#)
[Flag case](#)
[Flag Display Case \(1\)](#)
[Flag Display Case \(2\)](#)
[Flamingo](#)
[Floor Standing Router Table](#)
[Flower cart](#)
[Flower Press](#)
[Flush Trimming jig](#)
[Fluted Panels with a Table Saw](#)



[Fly Fishing Tying Table](#)
[Fold a Band Saw Blade \(Animated\)](#)
[Foot Bridge, Build a](#)
[Foot Stool \(1\)](#)
[Foot Stool \(2\)](#)
[Foot Stool \(3\)](#)
[Footbridge](#)
[Footstool from scraps](#)
[Footstool, 15th-Century Gothic](#)
[Forest Leaf Turkey Plaque](#)
[Forest Products Laboratory 1999 Handbook](#)
[Forge Bellows](#)
[Foundation Footing, Building](#)
[Foundation, Wooden Skid](#)
[Foundation, Wooden Skid](#)
[Fountain, Water](#)
[Fountain, Water](#)
[Four Poster Bed](#)
[Four Poster Bed](#)
[Frame a Roof, How to Plan and](#)
[Frame and Panels Plans \(PDF\)](#)
[Frame Of Reference](#)
[Frame Walls, How To Plan and](#)
[Frame, Box](#)
[Frame, Photo](#)
[Frame, Photo](#)
[Frame, Picture](#)
[Frame-and-Panel Door: Assembly](#)
[Frame-and-Panel Door: Finishing Touches](#)
[Frame-and-Panel Door: Shaping the Panels](#)
[Frame-and-Panel Door: Stock and Joinery](#)
[Frames, Natural Bark](#)
[Frames, Shop Made](#)
[Free Project Plan - Coffee Table](#)
[Freestanding Mirror -- Assembling the Base](#)
[Freestanding Mirror -- Bent-Lamination Legs](#)
[Freestanding Mirror -- Building the Frame](#)
[Freestanding Mirror -- Handcrafted Handles and Wood Finish](#)
[Freeze-proof taps](#)
[French Polish Old Furniture](#)
[Fresh And Tasty: Build Our Mahogany Cigar Humidor](#)
[Fresh laundry](#)
[Fruit Dryer, Cassette style \(PDF\)](#)
[Fruit Dryer, Solar \(PDF\)](#)
[Fundamentals of power shaping](#)
[Furniture Building Contest Winners](#)
[Furniture Building: An Arts & Crafts Style Bookcase](#)
[Furniture Building: An Arts & Crafts Style Floor Lamp](#)
[Furniture Building: An Arts & Crafts Style Rocking Chair](#)
[Furniture Building: An Arts & Crafts Style Side Table](#)



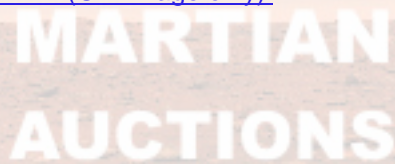
[Furniture Building: The Heritage Of Arts & Crafts Furniture](#)
[Furniture Finishing for Woodworkers.](#)
[Furniture Making: A Classic Rocker](#)
[Furniture Making: Personal Secretary](#)
[Furniture Making: Pure Utility](#)
[Furniture, Children's Fun Throne](#)
[Furniture, Reinforcing Seminar](#)
[Futon Plans \(PDF\)](#)
[Game Board -- Checkered Pattern](#)
[Game Board -- Finishing Touches](#)
[Game Board -- Frame and Inlaid Border](#)
[Game Board -- Joinery](#)
[Game, Bagatelle](#)
[Game, Block Stacking](#)
[Game, Croquet Set](#)
[Game, Marble Maze - Labrythspel](#)
[Game, Plinko](#)
[Game, Pyramid Peg](#)
[Game, Ring Toss](#)
[Game, Ring Toss](#)
[Game, Ring Toss](#)
[Game, Tic Tac Toe](#)
[Game, TicTacToe](#)
[Game, Wire and Bead Mazes](#)
[Garage - 2 car with loft](#)
[Garage Door, Framing A Sliding](#)
[Garage Plans](#)
[Garage, Building A](#)
[Garage, How to Build](#)
[Garbage Can](#)
[Garbage Can \(Kitchen\)](#)
[Garden Arbor Bench](#)
[Garden Arbor Structure](#)
[Garden Arbor](#)
[Garden Arbor](#)
[Garden Arbor, Arched Top \(PDF\)](#)
[Garden Arbor, Arched](#)
[Garden Arbor, G-P Treated Lumber \(PDF\)](#)
[Garden Arbor, Overhead](#)
[Garden Arbor, Rustic](#)
[Garden Arched Trellis](#)
[Garden Bamboo Fountain](#)
[Garden Bed, Raised \(PDF\)](#)
[Garden Bed, Raised Modular](#)
[Garden Bed, Raised](#)
[Garden Bed, Raised](#)
[Garden Bed, Raised](#)
[Garden Bed, Raised](#)
[Garden Bench](#)
[Garden Bench \(Twig\)](#)



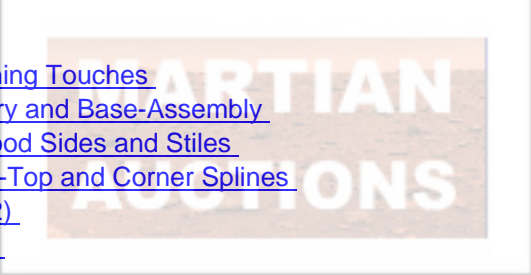
[Garden Bench \(ZIP\)](#)
[Garden Bench 03, G-P Treated Lumber \(PDF\)](#)
[Garden Bench pdf](#)
[Garden Bench with Lattice Screen](#)
[Garden Bench](#)
[Garden Bench](#)
[Garden Bench](#)
[Garden Bench](#)
[Garden Bench](#)
[Garden Bench, A Charming](#)
[Garden Bench, Rustic Twig](#)
[Garden Bench, Simple \(PDF\)](#)
[Garden Bridge \(1\)](#)
[Garden Bridge \(2\)](#)
[Garden Bridge \(3\)](#)
[Garden Bug Light](#)
[Garden Cedar Conversation Nook \(Seats facing each other\)](#)
[Garden Cedar Pergola Arbor](#)
[Garden Clothline Trellis](#)
[Garden Cold Frame \(PDF\)](#)
[Garden Compost Bin](#)
[Garden Compost Bin, Stackable Wooden](#)
[Garden Compost Bin, Wooden Pallet](#)
[Garden Compost Bins Systems](#)
[Garden Composter](#)
[Garden Covered Walkway](#)
[Garden Fan Trellis](#)
[Garden Fan Trellis](#)
[Garden Fire Pit](#)
[Garden Flower Tower](#)
[Garden Flower Tower](#)
[Garden Games Table](#)
[Garden Gate](#)
[Garden Gate, G-P Treated Lumber \(PDF\)](#)
[Garden Greenhouse](#)
[Garden Hose Hanger](#)
[Garden Lath Trellis](#)
[Garden Lathe Arch Rose Arbor](#)
[Garden Lily Pool or Sand Box](#)
[Garden Love Seat](#)
[Garden Love Seat Bench](#)
[Garden Mist Tent](#)
[Garden Obelisk - Edwardian Style](#)
[Garden Obelisk](#)
[Garden Obelisk, Rustic Bean Tower](#)
[Garden Obelisk, Urban Totem](#)
[Garden Pink Flamingo](#)
[Garden Plant Propagation Unit \(PDF\)](#)
[Garden Plant Stand \(tiered\), G-P Treated Lumber \(PDF\)](#)
[Garden Planter and Trellis \(PDF\)](#)



[Garden Planter Bench \(GIF image only\)](#)
[Garden Planter Bench, G-P Treated Lumber \(PDF\)](#)
[Garden Planter Box](#)
[Garden Planter Box, G-P Treated Lumber \(PDF\)](#)
[Garden Planter, Cathedral](#)
[Garden Planter, Pot-Holding](#)
[Garden Porch Seat to A Loveseat, Recycle A](#)
[Garden Post and Wire Trellis](#)
[Garden Privacy Fence](#)
[Garden Retaining Wall, Low](#)
[Garden Rose Arbor](#)
[Garden Rotating Barrel Composter](#)
[Garden Screen - Cloth Shade](#)
[Garden Screen \(PDF\)](#)
[Garden Seat - Trellis style](#)
[Garden Seat](#)
[Garden Sette, Covered](#)
[Garden Setting, Build A](#)
[Garden Shade Shelter, Windsor](#)
[Garden Shed pdf](#)
[Garden Shed with Clock](#)
[Garden Solar Greenhouse](#)
[Garden Storage and Trash Can Bin \(GIF image only\)](#)
[Garden Swing](#)
[Garden Swing](#)
[Garden Swing pdf](#)
[Garden Swing, Gliding](#)
[Garden Timber Retaining Wall](#)
[Garden Tool and Plant Caddy](#)
[Garden Trash Can Corral, G-P Treated Lumber \(PDF\)](#)
[Garden Trellis Fence](#)
[Garden Trellis Invisible Design](#)
[Garden Trellis Kitchen Whisk shape](#)
[Garden Trellis Using Lattice Panels](#)
[Garden Trellis](#)
[Garden Trellis](#)
[Garden Trellis](#)
[Garden Trellis](#)
[Garden Trellis, Copper](#)
[Garden Trug](#)
[Garden Trug - Wooden basket](#)
[Garden Utility Screen \(GIF image only\)](#)
[Garden Work Bench \(GIF image only\)](#)
[Garden Workbench \(PDF\)](#)
[Garden Wrap Around Post Trellis](#)
[Garden, Miniature Dry](#)
[Gate Topper, Pergola](#)
[Gate, A Garden Portal](#)
[Gate, A Rustic Garden](#)
[Gate, A Stained-Glass](#)

The logo for Martian Auctions features the words "MARTIAN" and "AUCTIONS" stacked vertically in a bold, white, sans-serif font. The text is centered within a light brown rectangular background that has a subtle, textured appearance. The entire logo is enclosed in a thin white border.

- [Gate, American Flag](#)
- [Gate, Build A Timber](#)
- [Gate, Garden Side Timber](#)
- [Gate, Moon](#)
- [Gate, Swinging \(PDF\)](#)
- [Gates \(How to Make\)](#)
- [Gazebo \(1\)](#)
- [Gazebo \(2\)](#)
- [Gazebo \(3\)](#)
- [Gazebo \(4\) pdf](#)
- [Gazebo \(PDF\)](#)
- [Gazebo, 8 ft Octagonal](#)
- [Gazebo, Basic Pavillion](#)
- [Gazebo, Basic Shed](#)
- [Gazebo, Build A](#)
- [Gazebo, G-P Lumber Treated \(PDF\)](#)
- [Gazebo, Lake Tahoe](#)
- [Gazebo, Lake Tahoe](#)
- [Gazebo, Octagonal](#)
- [Gazebo, Potting and Garden Shed](#)
- [Gazebo, The Gracious Lake Tahoe](#)
- [Gazebo, Victorian](#)
- [Giraffe](#)
- [Glass-Top Table -- Finishing Touches](#)
- [Glass-Top Table -- Joinery and Base-Assembly](#)
- [Glass-Top Table -- Plywood Sides and Stiles](#)
- [Glass-Top Table -- Table-Top and Corner Splines](#)
- [Glider \(Wright Bros. 1902\)](#)
- [Glove Grid and Bat Rack](#)
- [Goat Cart & Harness](#)
- [Goldfinch Bird Pattern](#)
- [Golf Ball Display Shelf](#)
- [Golf Ball Display Shelf](#)
- [Golf Ball Display Shelf](#)
- [Goose Cutout](#)
- [Gotta have 'em time-savers](#)
- [Grandfather Clock \(Part 1\)](#)
- [Grandfather Clock \(Part 2\)](#)
- [Grandfather Clock \(Part 3\)](#)
- [Grape Window Decor](#)
- [Great gifts for under \\$20](#)
- [Great on ice](#)
- [Greenhouse](#)
- [Greenhouse](#)
- [Greenhouse, Victorian](#)
- [Grill Buddy](#)
- [Grinding Chisels and Plane Irons](#)
- [Grinding Wheel Information](#)
- [Grizzly Industrial, Inc.](#)
- [Grommets, Wooden \(PDF\)](#)



[Growth Chart for Kids](#)
[Guide to Noning and Sharpening](#)
[Guide To Woodworking Glues](#)
[Guitar, Arched Top](#)
[Gumball Machine](#)
[Gumball Machine](#)
[Gun Cabinet](#)
[Gun Cabinet](#)
[Gun collectors showroom 1/02](#)
[Gun, Simple Rubber Band](#)
[Hall Chair](#)
[Hall Tree \(Made from French Door\)](#)
[Hall Tree \(ZIP\)](#)
[Hammock Frame \(PDF\)](#)
[Hammock Habitat, A](#)
[Hand Drill Use and Safety](#)
[Handle, Wooden](#)
[Hanging Bookcase -- Assembly](#)
[Hanging Bookcase -- Cutting and Fitting Shelves](#)
[Hanging Bookcase -- Finishing Touches](#)
[Hanging Bookcase -- Milling and Dovetail Techniques](#)
[Hardware Installation](#)
[Hardware Storage Cabinet \(PDF\)](#)
[Hardwood Floor Repair](#)
[Hardwood Floor Squeak Repair](#)
[Hardwood Handbook](#)
[Hardwood hanger](#)
[Hardwood Identification](#)
[Hardwood Man. Assoc. Species Guide](#)
[Harmonograph](#)
[Harp, Celtic](#)
[Harvesting Timber](#)
[Hat Rack](#)
[Hay Drying Wagon Box \(PDF\)](#)
Hay Stacker (PDF) Headboard - Mantle Style
[Headboard \(Mantle Style\)](#)
[Heart Napkin Holder](#)
[Heart Stand](#)
[Heart Wheel Jig](#)
[Heat Transferring Laser Printed Images](#)
[Heirloom Photo Album](#)
[Here's A Handy Boot Bench Project](#)
[Hidden Deck Fasteners](#)
[Hidden Storage Areas](#)
[High-Class Seating](#)
[Hinge, Wooden \(PDF\)](#)
[History of Wooden Oil Barrels](#)
[Hitachi Power Tools](#)
[Hnefatafl - Viking Strategic Game](#)
[Hnefatafl - Viking Strategic Game](#)

The logo for Martian Auctions features the words "MARTIAN" and "AUCTIONS" in a bold, white, sans-serif font. The text is centered within a rectangular area that has a light brown, textured background, resembling wood grain. The entire logo is set against a white background.

[Ho Fun Layouts Fir Kids](#)
[Ho Fun Layouts Fir Kids](#)
[HO Track Layouts](#)
[HO Track Layouts](#)
[Home Improvement Guide: Build A Spacious Vanity](#)
[Home Office Furniture Cupboard](#)
[Home Theater with Drywal, Building A](#)
[Home Theater](#)
[Home Wiring How to and Info](#)
[Homemade Telescope](#)
[Homemade Telescope](#)
[Honing](#)
[Hope Chest](#)
[Horse \(Viking Toy\)](#)
[Horseshoe Pit](#)
[Horseshoe Pit](#)
[Hose Hanger, Hardwood](#)
[Hose, Cord Holder](#)
[Hose/Cord Holder](#)
[Hot Stuff](#)
How Do I prevent my wood from splitting
[How shellac measures up](#)
[How to Avoid Splitting Fine Wood](#)
[How to Build a Band Saw Box](#)
[How to Build a Band Saw Box](#)
How to Build a Bathroom Towel Rack
[How to Build a Bathroom Towel Rack](#)
[How to Build a Bookcase](#)
[How to Build a Cassette Holder](#)
[How to Build a Cassette Holder](#)
[How To Build A Drawer](#)
[How To Build A Drawer](#)
[How To Build An Office Desk](#)
[How to Build Cutting Boards](#)
[How to Build Cutting Boards](#)
[How to Properly Finish a Band Saw Box](#)
[How to Properly Finish a Band Saw Box](#)
[How to Properly Finish a Bathroom Towel Rack](#)
[How to Properly Finish a Bathroom Towel Rack](#)
[How to Properly Finish a Cassette Holder](#)
[How to Properly Finish a Cassette Holder](#)
[How to Properly Finish Cutting Boards](#)
[How to Properly Finish Cutting Boards](#)
[How to Restore the Color of Exterior Redwood](#)
[How to Specify Redwood](#)
[How To Weave A Rush Seat](#)
[How to...Pickle wood finish](#)
[Humidor \(ZIP\)](#)
[Humidor, Building a](#)
[Humidor, Mahogany Cigar](#)



[Humidor, Maple](#)
[Hutch \(Tabletop\)](#)
[Ice Box](#)
[Ice Flyer](#)
[Ice Flyer](#)
[Ice Scraper](#)
[Igloo Building Tool](#)
[Iguana Cage Construction](#)
[In the Modern Style: A Stylish Credenza](#)
[Incense Burner, Log Cabin style](#)
[Indoor Playhouse Kids Will Love](#)
[In-Ground Swimming Pool](#)
[Inlaid Corner-Table -- Ebony Inlay and Scarf Joints](#)
[Inlaid Corner-Table -- Finishing Touches](#)
[Inlaid Corner-Table -- Tapered Legs, Base Assembly and Top](#)
[Inlaid Corner-Table -- Template and Joinery](#)
[Inlaid Serving Tray: Bottom Panel, Frame and Joinery](#)
[Inlaid Serving Tray: Finishing Touches](#)
[Inlaid Serving Tray: Marquetry Techniques](#)
[Inlaid Serving Tray: Veneers for Marquetry](#)
[Inlaid Spice Rack: Case Assembly and Drawers](#)
[Inlaid Spice Rack: Decorative Accents](#)
[Inlaid Spice Rack: Finishing Touches](#)
[Inlaid Spice Rack: Mahogany Case-Stock](#)
[Install a patio door](#)
[Install Interior Shutters](#)
[Install Molding](#)
[Installing 3-Way Switch](#)
[Installing A Custom Gate](#)
[Installing Cabinet Doors](#)
[Installing Cabinet Drawer Fronts](#)
[Introduction to Sharpening & Honing Carving Chisels](#)
[Ironman Towel Bar Repair](#)
[Ironman Towel Bar Repair](#)
[It Was a Closet... Now it's an Office](#)
[Jacobs Chuck Servicing and Repair](#)
[Jacob's Ladder](#)
[Japanese Lamp](#)
[Japanses Lamp](#)
[Jatoba Bookcase: Case Assembly and Molded Base](#)
[Jatoba Bookcase: Finishing Touches](#)
[Jatoba Bookcase: Shelves](#)
[Jatoba Bookcase: Template, Side Panels and Joinery](#)
[Jeep \(Pedal Car\)](#)
[-Jet DC1200A Dust Collector](#)
[Jet Tool Manuals](#)
[Jewelry Box](#)
[Jewelry Box \(Classic\)](#)
[Jewelry, Turned](#)
[Jig - Compound Miters on a Table Saw](#)



[Jig for assembling Drawer Pulls \(PDF\)](#)
[Jig for Threaded Inserts](#)
[Jig, 45degree Miter Clamping](#)
[Jig, Adjustable Angle](#)
[Jig, Arm Extender Helps You Carry Wallboard](#)
[Jig, Ball Drilling](#)
[Jig, Ball-Drilling](#)
[Jig, Bandsaw Circle Cutting](#)
[Jig, Bandsaw Fence](#)
[Jig, Bandsaw Resaw Sled](#)
[Jig, Bandsaw Resawing Guide](#)
[Jig, Bandsaw Saw Pusher](#)
[Jig, Bandsaw](#)
[Jig, Beam Compass - for router](#)
[Jig, Beam Compass \(for router\)](#)
[Jig, Bench Vise Face - Master of angles](#)
[Jig, Bowl Depth Gauge](#)
[Jig, Bowl Turning](#)
[Jig, Butterfly Templates\(ZIP\)](#)
[Jig, Checking Diagonals](#)
[Jig, Chip Chute \(ZIP\)](#)
[Jig, Chisel Sharpening](#)
[Jig, Circle Cutting 02](#)
[Jig, Circle Cutting Router](#)
[Jig, Circle Cutting](#)
[Jig, Circle Sanding](#)
[Jig, Circular Saw Crosscut](#)
[Jig, Circular Saw Guide Cutting Box](#)
[Jig, Circular Sawbox](#)
[Jig, Clamping Helpers](#)
[Jig, Corner Clamp for Miters](#)
[Jig, Corner](#)
[Jig, Creating Accurate Toy Wheels](#)
[Jig, Cross Cut Sled for Table Saw](#)
[Jig, Cross Cutting Sled](#)
[Jig, Cutting Beveling Strips](#)
[Jig, Cutting Identical Slots](#)
[Jig, Dado - Exact Width](#)
[Jig, Dado Setup](#)
[Jig, Dado](#)
[Jig, Depth of Hole Control](#)
[Jig, Disc Flattener](#)
[Jig, Disc Sander Circle](#)
[Jig, Double Checking Your Drill Press](#)
[Jig, Dovetail Trimming](#)
[Jig, Dowel](#)
[Jig, Drill Bit Spacer](#)
[Jig, Drill Press Clamp](#)
[Jig, Drill PRes I-Beam](#)
[Jig, Drill Press](#)



[Jig, Exact-Width Dado](#)
[Jig, Fail-Safe Hinge](#)
[Jig, Feather Board](#)
[Jig, Fingerjoint - Homemade](#)
[Jig, Finish Protector](#)
[Jig, Flush-Trimming - by Jim Mattson](#)
[Jig, Frame Miter Sled](#)
[Jig, Framing](#)
[Jig, French Curves](#)
[Jig, Handy Casing Cutting](#)
[Jig, Handy Glue Up](#)
[Jig, Hinge Mortise](#)
[Jig, Hole Drilling](#)
[Jig, Honing Guide](#)
[Jig, Indexing](#)
[Jig, Keyhole Slot Guide](#)
[Jig, Large Slot Cutting](#)
[Jig, Measuring](#)
[Jig, Miter Board](#)
[Jig, Miter Gauge Auxiliary Fence](#)
[Jig, Miter Gauge Extension](#)
[Jig, Molding Alignment](#)
[Jig, Oscillating Spindle Sander Jointer](#)
[Jig, Panel Cutting Sled](#)
[Jig, Piston Stop Block - for Drill Press](#)
[Jig, Plywood Cutting Platform](#)
[Jig, Plywood Panel Cutting](#)
[Jig, Pocket Hole Routing](#)
[Jig, Pocket Hole](#)
[Jig, Precision Miter Stop](#)
[Jig, Protractor \(ZIP\)](#)
[Jig, Rip Fence Saddle](#)
[Jig, Router - Fail Safe](#)
[Jig, Router - Two Styles](#)
[Jig, Router Base - Self Centering Plunge](#)
[Jig, Router Circle \(ZIP\)](#)
[Jig, Router Dado Guide](#)
[Jig, Router Edge Guide](#)
[Jig, Router Guide \(ZIP\)](#)
[Jig, Router Table Indexing](#)
[Jig, Router Trammel](#)
[Jig, Router Trammel](#)
[Jig, Sandpaper Holder \(ZIP\)](#)
[Jig, Shelf Hole Drilling](#)
[Jig, Shelf Pin \(ZIP\)](#)
[Jig, Shelf Pin 01](#)
[Jig, Shelf Pin](#)
[Jig, Shelf Staining \(ZIP\)](#)
[Jig, Shop Built Adjustable Cut Off](#)
[Jig, Skillsaw Cutting Guide Board](#)



[Jig, Solid Wood Edge Banding](#)
[Jig, Splined Miter \(ZIP\)](#)
[Jig, Spring Loaded Hold-Down](#)
[Jig, Step and Repeat](#)
[Jig, Step-and-Repeat](#)
[Jig, Stepped Stop to Set Depth of Drill](#)
[Jig, Straightening \(ZIP\)](#)
[Jig, Strip Cutting Gauge](#)
[Jig, Table Saw Cut Guide](#)
[Jig, Table Saw Insert with Splitter](#)
[Jig, Tablesaw - Compound Miter Sled](#)
[Jig, Tablesaw Taper](#)
[Jig, Taper 01](#)
[Jig, Taper and Straight Edge](#)
[Jig, Taper Super Simple](#)
[Jig, Tapering \(ZIP\)](#)
[Jig, T-Bar gluing/finishing \(ZIP\)](#)
[Jig, Tenoning Platform](#)
[Jig, Tenoning Sled](#)
[Jig, Tenoning](#)
[Jig, Thin Stock Rip Guide](#)
[Jig, Unisaw Insert \(ZIP\)](#)
[Jig, Vacuum Hose Bracket](#)
[Jig, Wooden Gear Cutting](#)
[Jigs for Making Wooden Train Tracks](#)
[Jigs for Making Wooden Train Tracks](#)
[Jigs, Circular Saw](#)
[Jigs, Three Router](#)
[Jointer Knife Setting Trick](#)
[Jointer Use and Safety](#)
[Just add water](#)
[Kaleidoscope, The](#)
[Kaleidoscopes](#)
[Keyboard Tray](#)
[Keyboard Tray \(ZIP\)](#)
[Keyhole Slot Guide](#)
[Kid's Tool Box](#)
[Kids Hockey Goal Headboard](#)
[Kids Hockey Goal Headboard](#)
[Kids Hockey Goal Headboard](#)
[Kids Konstruction - Birdhouse](#)
[Kids Konstruction - Boats](#)
[Kids Konstruction - Stilts](#)
[Kids Konstruction - Toolbox](#)
[Kids Konstruction Korner](#)
[Kid's Play House](#)
[Kids Rocking Table](#)
[Kids Stool 11/00](#)
[Kids Stool 11/00](#)
[Kiln Drier, Home](#)



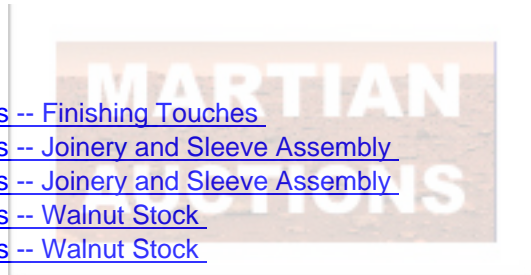
[Kiln, Charcoal producing](#)
[Kitchen Basics 1](#)
[Kitchen Basics 2](#)
[Kitchen Counter Canisters](#)
[Kitchen Garbage Can](#)
[Kitchen Island](#)
[Kitchen Island](#)
[Kitchen Office](#)
[Kitchen Organizer](#)
[Kitchen Organizer](#)
[Kitchen Organizer](#)
[Kitchen Pasta Tools](#)
[Kitchen Trash Can, Slide Out](#)
[Kitchen update](#)
[Kitchen Work Station](#)
[Kite String Winder](#)
[Kite String Winder](#)
[Kite, Buster \(PDF\)](#)
[Kite, Kid's](#)
[Kites](#)
[Kites](#)
[Kneeling Chair \(pdf\)](#)
[Kneeling Stool](#)
[Knickknack Shelf](#)
[Knife Block](#)
[Knife Block](#)
[Knife Block 02](#)
[Knife Block 04](#)
[Knife Rack](#)
[Knife Rack](#)
[Knitting Box](#)
[Knitting Box Free Project Plan](#)
[Knitting Needles](#)
[Knitting Needles](#)
[Knobs for Holddowns, Wooden \(PDF\)](#)
[Knot Tying Guide](#)
[Konane Board \(Hawaiian Game\)](#)
[Konane Board \(Hawaiian Game\)](#)
[Lacquer Finishes](#)
[Ladder \(Decorative\)](#)
[Laminate Shelving](#)
[Laminated Rockers 6/01](#)
[Lamp \(Chinese Abacus\)](#)
[Lamp \(Mission Style\)](#)
[Lamp, A Colonial Spinning Wheel Table](#)
[Lamp, Abacus](#)
[Lamp, Arts & Crafts Style Floor](#)
[Lamp, Candle](#)
[Lamp, Crooked Bedside](#)
[Lamp, English Style](#)



[Lamp, Japanese Style](#)
[Lamp, Oak Bucket](#)
[Lamp, Table Mission Style](#)
[Lamp, Turned Table](#)
[Lamp, Turned](#)
[Lamp, Wooden](#)
[Lamps, Steamed Veneer](#)
[Langcrest Loveseat](#)
[Lantern, Japanese Style Garden](#)
[Lanterns light the way](#)
[Lathe \(Build it with Steel, look in Articles\)](#)
[Lathe \(Build it with Wood\)](#)
[Lathe \(Poleless Pole\)](#)
[Lathe \(Treadle\)](#)
[Lathe Base, Portable](#)
[Lathe Reference Archive](#)
[Lathe Stand](#)
[Lathe Turning Tips](#)
[Lathe Turning Tips](#)
[Lathe, Build Your Own](#)
[Lathe, Treadle \(PDF\)](#)
[Lattice Wall Beneath Your Deck](#)
[Lattice, Build Outdoors with](#)
[Laundry Box](#)
[Laundry Folding Center](#)
[Laundry Hideaway](#)
[Laundry Trolley](#)
[Lazy Susan](#)
[Lazy Susan](#)
[Lazy Susan](#)
[Lazy Susan](#)
[Lazy Susan, Tabletop](#)
[Lead Paint -- What You Need To Know](#)
[Lemonade Stand](#)
[Letter Box](#)
[Letterbox, Construct a Timber](#)
[Lettering Plan](#)
[Lettering Plan](#)
[Lie-Nielson Instruction Sheets](#)
[Light Table](#)
[Lighthouse](#)
[Lighthouse](#)
[Lights, Cordless Bug](#)
[Lil' Bigger](#)
[Liquor Cabinet](#)
[Lock Bolt Mortise Jig](#)
[Lock Rabbet Joinery](#)
[Loft Bed](#)
[Log Camp, Adirondack Open](#)
[Log Camp, Dixie Winter](#)



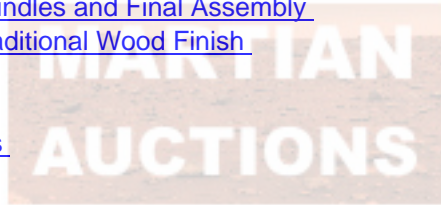
[Log Camp, North Woods](#)
[Log Ladders, Notched](#)
[Log Tent, Pontiac Birch Bark](#)
[Logs \(Interlocking\)](#)
[Lolly Dispenser - Gumball Machine](#)
[Long-lasting cabinet face frames](#)
[Loom \(Two Harness Tabletop\)](#)
[Loom Accessories and Attachments](#)
[Loom, Frame](#)
[Loom, Peg](#)
[Loom, Two Harness Tabletop](#)
[Lottery Display](#)
[Love Seat](#)
[Loveseat \(Rocker for Two\) \](#)
[Low Speed Sharpener pdf](#)
[Lumber \(Info from Black & Decker\)](#)
[Magazine Rack](#)
[Magazine Rack \(1\)](#)
[Magazine Rack \(2\)](#)
[Magazine Rack \(3\)](#)
[Magazine Rack and other bathroom projects](#)
[Magazine rack](#)
[Magazine Rack](#)
[Magazine Stand](#)
[Magazine Storage Boxes -- Finishing Touches](#)
[Magazine Storage Boxes -- Joinery and Sleeve Assembly](#)
[Magazine Storage Boxes -- Joinery and Sleeve Assembly](#)
[Magazine Storage Boxes -- Walnut Stock](#)
[Magazine Storage Boxes -- Walnut Stock](#)
[Magnetic Coat rack](#)
[Magnetic Coat Rack](#)
[Magnetic Stop Block](#)
[Mah Jong Box](#)
[Mahogany China Display -- Back Panel](#)
[Mahogany China Display -- Curved Frame and Joinery](#)
[Mahogany China Display -- Finishing Touches](#)
[Mahogany China Display -- Shelves and Curved Side-Supports](#)
[Mahogany End Table](#)
[Mahogany Headboard -- Assembly and Finish](#)
[Mahogany Headboard -- Joinery and Curves](#)
[Mahogany Headboard -- Stock for Legs and Rails](#)
[Mahogany Headboard -- Veneer Panels](#)
[Mahogany Piano Bench -- Aprons and Joinery](#)
[Mahogany Piano Bench -- Assembly](#)
[Mahogany Piano Bench -- Hinges and Finishing Touches](#)
[Mahogany Piano Bench -- Legs, Stretchers and Joinery](#)
[Mahogany Wine Rack -- Assembly](#)
[Mahogany Wine Rack -- Biscuit Joinery](#)
[Mahogany Wine Rack -- Finishing Touches](#)
[Mahogany Wine Rack -- Template and Stock](#)



[Mail Box \(1\)](#)
[Mail Box \(2\)](#)
[Mail Box \(3\)](#)
[Mail Box Bank](#)
[Mail Box Post \(PDF\)](#)
[Mail Box Stand and Planter](#)
[Mail Rack](#)
[Mail Rack](#)
[Mailbox - Planter and Stand \(GIF image only\)](#)
[Mailbox, Build a Custom - How To Build](#)
[Mailbox, Front Porch](#)
[Maintain a deck](#)
[Maintain a Porch Swing](#)
[Make Coped Joints](#)
[Make Milk Glue](#)
[Make Your Own Stain](#)
[Making A Furniture Shaper Blank](#)
[Making Accurate Straight Edges](#)
Making an End Table
[Making Finger Joints](#)
[Making Stairs](#)
[Making Strong Wood Joints](#)
[Making Your Own Quality Oil Stain](#)
[Mallet \(Dove-tail Puzzle\)](#)
[Mallet, Applewood](#)
[Mantle \(basic\)](#)
[Mantle, Greek \(ZIP\)](#)
[Mantlepiece, Simple](#)
[Maple and Bubinga Treasure-Box: Bending Form and Lid-Core](#)
[Maple and Bubinga Treasure-Box: Finishing Touches](#)
[Maple and Bubinga Treasure-Box: Veneered Lid](#)
[Maple and Walnut CD Cabinet -- Angled Base](#)
[Maple and Walnut CD Cabinet -- Finishing Touches](#)
[Maple and Walnut CD Cabinet -- Top and Door](#)
[Maple and Walnut CD Cabinet -- Walls and Trim](#)
[Marble Machine 6/99 - 8/99](#)
[Marble Race Track](#)
[Marine Mirror Frame](#)
[Marine Theme Mirror Frame](#)
[Marionette Puppet](#)
[Marking Gauge, make your own](#)
[Massage Table](#)
[Massager](#)
[Mauls and Mallets](#)
[Mauls and Mallets](#)
[Media Center](#)
[Menorah, Modern](#)
[Menu Board](#)
[Message Center](#)
[Metro Tool & Equip. Co. - Reference Library](#)



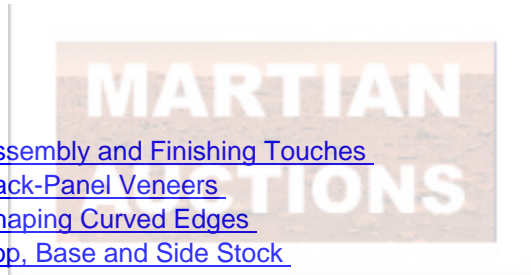
[Micro Adjustment on a homemade tenon jig](#)
[Milk Paint Recipe](#)
[Milking Stool](#)
[Millimeter, Fraction, Inch Conversion](#)
[Mini Sanding Station for Palm Sander](#)
[Mirror \(Infinity\)](#)
[Mirror \(Cheval\)](#)
[Mirror and Wall Organizer](#)
[Mirror and Wall Organizer](#)
[Mirror Frame](#)
[Mirror Frame \(ZIP\)](#)
[Mirror, Bathroom](#)
[Mirror, Cheval](#)
[Mirror, Hallway](#)
[Mirror, Lady's Hand](#)
[Mirror, Mission Style \(PDF\)](#)
[Mirror, Wall - Mission Style \(PDF\)](#)
[Mirror, Wall](#)
[mission bed](#)
[Mission Style Ottoman -- Cutting and Milling Wood Stock](#)
[Mission-Style Lamp](#)
[Mission-Style Ottoman -- Batch Techniques for Making Joinery](#)
[Mission-Style Ottoman -- Spindles and Final Assembly](#)
[Mission-Style Ottoman -- Traditional Wood Finish](#)
[Miter Angle Chart](#)
[Miter Gauge Extension](#)
[Miter Gauge for small pieces](#)
[Miter Saw Station](#)
[Miter Saw Use and Safety](#)
[Miter Setup Simplified](#)
[Miter Sled](#)
[Mittersaw Dust Hood](#)
[Mitre saws put to the test](#)
[Mitre Sled](#)
[Mobile Saw Cabinet 1/04](#)
Mockridge & Francis tool - used to install shutter staples Modular Cube
[Modern Wardrobe](#)
[Modular Lego Train Table](#)
[Molding Cornice Treatment \(PDF\)](#)
[Molding or Shaper? Choosing the best tool for you!](#)
[Molding or Shaper? Choosing the best tool for you!](#)
[Molding Projects, Combination](#)
[Molding: Instant Elegance](#)
[Moldings or Mouldings](#)
[More Wood Tips](#)
[More Wood Tips](#)
[More Wood Tips](#)
[More Wood Tips](#)
[More Wood Tips](#)
[More Wood Tips](#)



[More Wood Tips](#)
[Morris Chair](#)
[Morris Chair](#)
[Mortise and Tenon Joinery](#)
[Mortise and Tenon Joints](#)
[Mortise Chisel Box 5/99](#)
[Mortise Jig \(ZIP\)](#)
[Mortising Machine, Horizontal \(PDF\)](#)
[Mounting A Router In Table Top](#)
[Mug Holder Tree](#)
[Mug Rack Organizer](#)
[Music / Jewelry Box](#)
[Music Stand - or a Cook Book Stand](#)
[Music Stand](#)
[Music Stand, Single](#)
[Music Stands - Guitar, Footstool and Sheet](#)
[Music Trio](#)
[Musical Instrument - Bodhran](#)
[Musical Instrument - Bowed Psaltery](#)
[Musical Instrument, Hurdy Gurdy](#)
[Napkin Holder](#)
[Napkin Holder 01](#)
[Napkin Holder](#)
[Napkin Holder](#)
[Napkin Holder](#)
[Napkin Holder, Heart](#)
[National Institute for Occupational Safety and Health - NIOSH](#)
[Nativity Shed, Tabletop sized](#)
[Natural beauty](#)
[Needlepoint Stand](#)
[Nested Boxes](#)
[Nesting Tables](#)
[New England Pine Blanket Chest](#)
[Newspaper Recycling Box](#)
[Night Stand](#)
[Night Stand, Arts and Crafts style](#)
[Night Table \(PM Anniversary Plan\)](#)
[nightstand](#)
[Nine steps to a clean chimney](#)
[Notes on Carving the Human Torso](#)
[Notes on Carving the Human Torso](#)
[Noughts & Crosses Game](#)
[Noughts and Crosses](#)
[Noughts and Crosses](#)
[Nuthatch Bird Pattern](#)
[Oak Floor Repair](#)
[Oak Pie Safe](#)
[Oak Podium 7/01](#)
[Oak Step Ladder -- Assembly](#)
[Oak Step Ladder -- Finishing Touches](#)



[Oak Step Ladder -- Steps](#)
[Oak Stepladder -- Side Panels](#)
[Oar, Spruce Boat](#)
[Oars, Qucik and Dirty](#)
[Oars, Simple Boat](#)
[Obelisk](#)
[Obelisk \(Edwardian\)](#)
[Obelisk \(Rustic\)](#)
[Obelisk \(Urban Totem\)](#)
[Obelisk Planter](#)
[Observation Chair \(Astronomy\)](#)
[Observation Chair \(Astronomy\)](#)
[Occupational Safety & Health Administration - OSHA](#)
[Offering of 2 Free Plans from Better Homes and Gardens, Australia](#)
[Offering of Free Plans 3 from Better Homes and Gardens, Australia](#)
[Offering of Free Plans from Better Homes and Gardens, Australia](#)
[Office Furniture, Business Class](#)
[Oil Finishes](#)
[Oil Slick \(Part 2\).](#)
[Oil Slicks \(Part 1\)](#)
Oil Slicks" (Part 3)
[Old Tool Manuals](#)
[Oliver's step stool](#)
[Online Guide to Games](#)
[Online Guide to Games](#)
[Open Display-Case -- Assembly and Finishing Touches](#)
[Open Display-Case -- Back-Panel Veneers](#)
[Open Display-Case -- Shaping Curved Edges](#)
[Open Display-Case -- Top, Base and Side Stock](#)
[Oriental Box of Drawers](#)
[Oriental Cabinet](#)
[Original inspiration](#)
[Ottoman, Easy](#)
[Outdoor Balance Beam](#)
[Outdoor Camp Grills 4 types \(PDF\)](#)
[Outdoor Projects Requiring Wood](#)
[Outdoor Shower Enclosure](#)
[Outdoor tables](#)
[Outfeed Table, Folding](#)
[Outhouse \(1\)](#)
[Outhouse \(2\)](#)
[Oval Side Table](#)
[Overarm Pin Router](#)
[Overarm Table Saw Guard](#)
[Padding the truth](#)
[Paddle making](#)
[Painted Finishes](#)
[Pallet Bin 47 x 40 x 28" \(PDF\)](#)
[Pallet Bin 47 x 47 x 28" \(PDF\)](#)
[Pallet Bin 47 x 47 x 46" \(PDF\)](#)



[Pan Gripper - Casserole Fisher](#)
[Panel Cutting Sled \(PDF\)](#)
[Panel Saw \(ZIP\)](#)
[Panelling, Basement](#)
[Pantograph](#)
[Paper Towel Holder](#)
[Paper Towel Holder \(1\)](#)
[Paper Towel Holder \(2\)](#)
[Paper Towel Holder 01](#)
[Paper Towel Holder 02](#)
[Paper Towel Holder](#)
[Paper Towel Holder](#)
[Pasta Tools](#)
[Patch and Repair Drywall](#)
[Patio Chair](#)
[Patio Chair and Love Seat](#)
[Patio Enclosure](#)
[Patio Furniture](#)
[Patio Planter](#)
[Patio Trolley](#)
[Patio Trolley](#)
[Patio Wall & Planter](#)
[Patio Wall and Planter \(PDF\)](#)
[Patrol Table](#)
[Pattern - Clock Face Diagram, Arts and Crafts \(PDF\)](#)
[Pattern - Jewelry Box Scroll \(PDF\)](#)
[Pattern - Pineapple Bookends \(PDF\)](#)
[Pattern Cutting on the Table Saw](#)
[Pattern Sander](#)
[Paul's Place](#)
[Paul's place](#)
[Pecking Chickens](#)
[Pegboard \(Installing\)](#)
[Pegboard Garage Organizer, Painted](#)
[Pen Turning 2/02](#)
[Pencil And Stamp Holder](#)
[Pencil Holder](#)
[Pencil Sharpener, Razoo](#)
[Pergola - pitched roof \(PDF\)](#)
[Pergola \(PDF\)](#)
[Pergola Gate Topper](#)
[Pergola](#)
[Pergola](#)
[Pergola](#)
[Pergola, A Tile-Accented](#)
[Pergola, Building A](#)
[Pergola, Design and Build a](#)
[Pergola, Garden Walk-Through](#)
[Pergola, Lean-to](#)
[Pergola, Perfect - small version](#)



[Periscope \(PDF\)](#)
[Personal Caddy](#)
[Pet Hutch](#)
[Phone Center](#)
[Photo Frame](#)
[Photo Screen](#)
[Photo Stand, Curved](#)
[Pickling Wood Finish Technique](#)
[Pickling Wood Techniques](#)
[Pickup Truck](#)
[Picnic Table](#)
[Picnic Table](#)
[Picnic Table \(1\)](#)
[Picnic Table \(2\)](#)
[Picnic Table \(3\)](#)
[Picnic Table \(4\)](#)
[Picnic Table \(Hexagon\)](#)
[Picnic Table \(Kids\)](#)
[Picnic Table \(Knock-down\)](#)
[Picnic Table Construction](#)
[Picnic Table Design 101](#)
[Picnic Table To Go - Knockdown Style](#)
[Picnic Table To Go \(Interlocking\)](#)
[Picnic Table](#)
[Picnic Table](#)
[Picnic Table](#)
[Picnic Table](#)
[Picnic Table](#)
[Picnic Table, BBQ](#)
[Picnic Table, Classic](#)
[Picnic Table, Classic](#)
[Picnic Table, Hexagonal BBQ](#)
[Picnic Table, Kid's BBQ](#)
[Picnic Table, Octagonal](#)
[picture frame](#)
[Picture Frame](#)
[Picture Frame \(1\)](#)
[Picture Frame \(2\)](#)
[Picture Frame \(3\)](#)
[Picture Frame Clamp](#)
[Picture frame clamp](#)
[Picture Frame Jig](#)
[Picture Frame](#)
[Picture Frame](#)
[Picture Frames \(Easy\)](#)
[Picture Frames](#)
[Picture Molds \(PDF\)](#)
[Pie Safe](#)
[Piggy Bank, Turned](#)
[Pine Renaissance Carved Cabinet](#)



[Pine Renaissance Carved Cabinet](#)
[Pinewood Derby Car \(1\)](#)
[Pinewood Derby Car \(1\)](#)
[Pinewood Derby Car \(2\)](#)
[Pinewood Derby Car \(2\)](#)
[Pinewood Derby Track \(4 lane\)](#)
[Pinewood Derby Track \(4 lane\)](#)
[Ping Pong Table Dimensions](#)
[Ping Pong Table Dimensions](#)
[Pinhole Camera](#)
[Pioneer Bob Sled](#)
[Pioneer Bob Sled](#)
[Pipe Clamp Pads, Stay-Put Stand-Up](#)
[Pipe Organ, Homemade](#)
[Pizza Paddle](#)
[Pizza Paddle! 4/02](#)
[Pizza Peel - Paddle](#)

Plan ahead

[Plane - Build a Wooden](#)
[Plane \(Build a Wooden One\)](#)
[Plane \(From Popular Mechanics\)](#)
[Plane \(Wooden\)](#)
[Plane Blade Honing Jig](#)
[Plane, Benchtop Spill \(PDF\)](#)
[Plane, Chamfer \(PDF\)](#)
[Plane, How to build a Wooden Hand](#)
[Planer Cart](#)
[Planer Shootout](#)
[Planer Tool Cart](#)
[Planning the Perfect Deck](#)
[Plant Growth Chamber \(PDF\)](#)
[Plant Hanger, Scrolled](#)
[Plant Pedestal](#)
[Plant Pedestal](#)
[Plant Stand \(9 Pot\)](#)
[Plant Stand \(9 Pot\)](#)
[Plant Stand \(Tiered\)](#)
[Plant Stand](#)
[Plant Stand](#)
[Plant Stand, Tall and Slender](#)
[Planter \(Picket Fence\)](#)
[Planter Bench \(1\)](#)
[Planter Bench \(2\)](#)
[Planter Bench \(PDF\)](#)
[Planter Bench](#)
[Planter Bench](#)
[Planter Box \(1\)](#)
[Planter Box \(2\)](#)
[Planter Box](#)
[Planter Box](#)



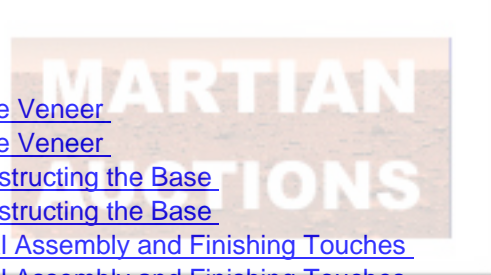
[Planter Box, Mirror](#)
[Planter Box, Tapered](#)
[Planter Trellis](#)
[Planter, 3 tiered](#)
[Planter, Deck Rail](#)
[Planter, Eight-sided](#)
[Planter, Hypertufa](#)
[Planter, Outdoor \(PDF\)](#)
[Planter, Petaluma \(PDF\)](#)
[Planter, Railing](#)
[Planter, Tiered \(PDF\)](#)
[Planter, Window Box](#)
[Planters, Flower Box Designs](#)
[Planters, Stylish Cedar](#)
[Plastics \(Whats What\)](#)
[Plate Joinery by Chuck Ring](#)
[Plate-Display Rack](#)
[Platform, Cutting - WOOD ONLINE](#)
[Platter, Turned Beech](#)
[Play a Musical Saw \(1\)](#)
[Play a Musical Saw \(2\)](#)
[Play Center, Kid's](#)
[Play Gym, Timber](#)
[Play Kitchen](#)
[Play Structure, Child's](#)
[Play Structure, Children's](#)
[Playground Equipment \(PDF\)](#)
[Playhouse \(1\)](#)
[Playhouse \(2\)](#)
[Playhouse \(Frontier\)](#)
[Playhouse \(Log cabin\)](#)
[Playhouse \(Two storey fort\)](#)
[Playhouse \(Victoria\) pdf](#)
[Playhouse \(Victorian\)](#)
[Playhouse \(Wendy\)](#)
[Playhouse](#)
[Playhouse](#)
[Playhouse](#)
[Playhouse, Backyard](#)
[Playhouse, Build A](#)
[Playhouse, Frontier](#)
[Playhouse, Outdoor](#)
[Playhouse, Secret](#)
[Playhouse, Victorian](#)
[Playhouse,Two Story Fort](#)
[Plough Plane Thread Repair](#)
[Plunge Router Mortising Jig \(PDF\)](#)
[Plywood Grades](#)
[Plywood Guide](#)
[Plywood helper \(Carrying Sheets\)](#)



[Plywood Lathe Guard](#)
[PM's 6 Frames Of Reference](#)
[PM's Mahogany Writing-Class Table](#)
[Po' Bears](#)
[Pocket Hole Jig](#)
[Podium, Oak](#)
[Polyurethane Finishes](#)
[Pool Table](#)
[Pool Table \(1\)](#)
[Pool Table \(1\)](#)
[Pool Table \(2\)](#)
[Pool Table \(2\)](#)
[Pool Table, How to Build a](#)
[Porch Lattice That Lasts](#)
[Porch Rail between Round Posts, How To Install](#)
[Porch Stairway](#)
[Porch Steps, Wooden](#)
[Porch Swing](#)
[Porch Swing \(1\)](#)
[Porch Swing \(2\)](#)
[Porch, Front](#)
[Porch, How To Screen In A](#)
[Porringer Table](#)
[Portable Planer Workpiece Supports](#)
[Pot Rack - Overhead](#)
[Pot Rack \(Overhead \)](#)
[Pot Rack \(Hanging\)](#)
[Pottery and Toys: Antique or New?](#)
[Potting Bench](#)
[Potting Bench](#)
[Potting Bench - mail in only](#)
[Potting Bench \(PDF\)](#)
[Potting Bench](#)
[Potting Bench](#)
[Potting Bench, Cedar Garden](#)
[Potting Bench, Design and Create a](#)
[Potting Bench, Garden](#)
[Potting Bench, Garden](#)
[Potting Bench, Garden](#)
[Potting Bench, Greenhouse](#)
[Potting Center Table, Garden Monterey](#)
[Potting Center Table, Monterey](#)
[Potting Center, Monterey](#)
[Potting Tray](#)
[Potting Tray](#)
[Poultry House 20 ft x 20 ft](#)
[Poultry House 8 ft x 8 ft](#)
[Poultry Housing](#)
[Pounding Bench](#)
[Power Tools Storage](#)



[Prairie Lantern](#)
[Prairie Schooner](#)
[Privacy Screen](#)
[Privacy Screen](#)
[Propeller](#)
[Protecting Your Firewood Investment](#)
[Pulpit \(ZIP\)](#)
[Push Block](#)
[Push Blocks](#)
[Push Sticks](#)
[Puzzle](#)
[Puzzle](#)
[Puzzle \(Bunny\)](#)
[Puzzle \(Cube\) 1](#)
[Puzzle \(Cube\) 2](#)
[Puzzle Box](#)
[Puzzle Box](#)
[Puzzle Box](#)
[Puzzle Box](#)
[Puzzle Box - 32 step box](#)
[Puzzle Box - 5 step box](#)
[Puzzle, 7 piece](#)
[Puzzle, Wooden Jack](#)
[Puzzles, Wooden](#)
[Pyramid Art Pedestal -- Base Veneer](#)
[Pyramid Art Pedestal -- Base Veneer](#)
[Pyramid Art Pedestal -- Constructing the Base](#)
[Pyramid Art Pedestal -- Constructing the Base](#)
[Pyramid Art Pedestal -- Final Assembly and Finishing Touches](#)
[Pyramid Art Pedestal -- Final Assembly and Finishing Touches](#)
[Pyramid Art Pedestal -- Platform Top](#)
[Pyramid Art Pedestal -- Platform Top](#)
[Pyrography - Coloring Your Carving](#)
[Pyrography Project - Carousel Horse](#)
[Quick fix - humidifiers](#)
[Quikrete Concrete Brick/Stone Walks](#)
[Quilt Hanger](#)
[Quilt Hanger](#)
[Quilt Hanger](#)
[Quilt Hanger](#)
[Quilt Rack](#)
[Quilting Frame](#)
[Rabbit Barn \(PDF\)](#)
[Rabbit Barn \(Raised\) \(PDF\)](#)
[Rabbit Barn, Double Row \(PDF\)](#)
[Rabbit Cage, Homemade](#)
[Rabbit House, 4 Row Caged \(PDF\)](#)
[Rabbit House, 6 Row Caged \(PDF\)](#)
[Rabbit House, Home Made Cages \(PDF\)](#)
[Rabbit Hutch](#)



[Rabbit Hutch \(PDF\)](#)
[Rabbit Live Trap II](#)
[Rabbit Live Trap](#)
[Rabbit Peg Rack](#)
[Rack, Bathroom Towel](#)
[Rack, Bike \(ZIP\)](#)
[Rack, Book](#)
[Rack, Bulletin and Display Storage \(PDF\)](#)
[Rack, Child's Baseball Coat](#)
[Rack, Clamp \(ZIP\)](#)
[Rack, Clothes Drying](#)
[Rack, Clothes](#)
[Rack, Coat - Child's Baseball](#)
[Rack, Coat](#)
[Rack, Cola \(ZIP\)](#)
[Rack, Cowboy Hat](#)
[Rack, Custom Shoe](#)
[Rack, Dowel Storage Workshop](#)
[Rack, Extension Cord](#)
[Rack, Flatbed Trailer \(PDF\)](#)
[Rack, Golf Ball Display](#)
[Rack, Gumboot](#)
[Rack, Lumber Storage \(PDF\)](#)
[Rack, Lumber Storage \(ZIP\)](#)
[Rack, Lumber Storage](#)
[Rack, Magazine \(ZIP\)](#)
[Rack, Magazine 02](#)
[Rack, Magazine](#)
[Rack, Magazine](#)
[Rack, Magazine](#)
[Rack, Over Garage Door Lumber Storage \(PDF\)](#)
[Rack, Plate - Euro Style](#)
[Rack, Plate Display](#)
[Rack, Plate](#)
[Rack, Pool Ball and Cue](#)
[Rack, Pot - Hanging](#)
[Rack, Pot - Saucepan hanger](#)
[Rack, Pot](#)
[Rack, Radio Stand/CD \(ZIP\)](#)
[Rack, Revolving Tool](#)
[Rack, Shoe - or Quilt](#)
[Rack, Spice \(ZIP\)](#)
[Rack, Spice](#)
[Rack, Spice](#)
[Rack, Spice](#)
[Rack, Thread](#)
[Rack, Tool - Planes](#)
[Rack, Towel - Expanding](#)
[Rack, Wine PVC](#)
[Rack, Wood Storage - Bob's](#)



[Racks, Pickup Truck \(PDF\)](#)
[Racks, Pipe Clamp](#)
[Radial Arm Saw Miter Gauge](#)
[Radial Arm Table Rebuild](#)
[Radial Arm Use and Safety](#)
[Radial Stone Steps in Rock Wall](#)
[Radial Stone Steps in Rock Wall](#)
[Radiator Cover](#)
[Radiator Cover](#)
[Radiator Covers](#)
[Radiator Covers](#)
[Rail, Arts and Crafts](#)
[Railing, Chippendale](#)
[Railing, Wooden Porch](#)
[Raised Panel Door 1/01](#)
[Raised Panel Doors, How to make](#)
[Raised Panels using hand tools](#)
[Raising the Bar](#)
[Ramp, Roller Blade](#)
[Ramps for Accessibility](#)
[rden Planter, Seat Bench](#)
[Read a Tape Measure](#)
[Reamer \(Wooden body\)](#)
[Reamers, Tapered](#)
[Recharging Station](#)
[Recipe Box](#)
[Recipes for Wax Coatings](#)
[Recycling Can Crusher](#)
[Redwood Trellis Adds Fun and Screens Sun](#)
[Refinishing a Peeling Porch](#)
[Refinishing a Pressure-Treated Deck](#)
[Refinishing a Redwood or Cedar Deck](#)
[Remarkable Redwood Railings](#)
[Remote Holder, TV, VCR and CD](#)
[Removin that post from my shop 8/00](#)
[Removing Stains from Wood](#)
[Removing Wood Flooring](#)
[Renewing Your Deck](#)
[Repair Furniture Surfaces: Dents](#)
[Repairing Decking and Joists](#)
[Repairing Rotted Wood](#)
[Repairing the bottom of a rotted post 12/99](#)
[Repairing Wood Drawers](#)
[Repairing Wood Drawers](#)
[Repairing Wood Siding](#)
[Reparing a rotted wall 8/99](#)
[Replacing a Deck Railing](#)
[Replacing a Stair Railing](#)
[Replacing a Step](#)
[Replacing Door Pulls](#)



[Replacing Hinges](#)
[Replacing Kitchen Cabinet Doors](#)
[Replanting Redwood: A Way of Life](#)
[Residential Playground Equipment](#)
[Restoration of a XVIII Century French Secretaire](#)
[Restoration Workshop](#)
[Restoration workshop](#)
[Restoration workshop](#)
[Restore An Antique Rocking Chair](#)
[Restore Your Butcher Block](#)
[Retaining Walls using Timbers](#)
[Reversing and Repair of Electric Motors](#)
[Rick's Woodworking Magazine Index](#)
[Ridgid Tools](#)
[Rifle Rack - Field \(PDF\)](#)
[Rifle Rack \(Field\)](#)
[Right Angle Triangle Solver](#)
[Rip Fence Setup Gauge](#)
[Ripping Thin Stock Jig](#)
[RoadRunner WhirlyGig](#)
[Robertson Screw Chart \(Square Drive\)](#)
[Rocker Furnishings](#)
[Rocker, Adirondack Style Two Seater](#)
[Rocker, Child's - Winsor Style](#)
[Rocker, Child's](#)
[Rocker, Child's](#)
[Rocker, Porch](#)
[Rocket, Cyclone Model](#)
[Rocking Chair](#)
[Rocking Chair \(ZIP\)](#)
[Rocking Chair, Classic](#)
[Rocking Chair, Double-Sided](#)
[Rocking Chair, Large \(ZIP\)](#)
[Rocking Chair, Mission-Style](#)
[Rocking Chairs, Handcrafted](#)
[Rocking Horse - With a PDF file](#)
[Rocking Horse \(1\)](#)
[Rocking Horse \(2\)](#)
[Rocking Horse \(3\) pdf](#)
[Rocking Horse](#)
[Rocking Horse](#)
[Rocking Horse](#)
[Rocking Horse](#)
[Rocking Horse](#)
[Rocking Horse 8/01](#)
[Rocking Horse-Chair](#)
[Rodeo Arena 140 x 240 ft \(PDF\)](#)
[Roller Blade Ramp!](#)
[Rollers, Shop Built Infeed and Outfeed](#)
[Rolling plant stand](#)



[Roofing - Cedar Shingles - How To](#)
[Roofing - Fascia and Sheathing - How To](#)
[Room Divider \(ZIP\)](#)
[Room Divider Shelves](#)
[Rope Carving](#)
[Rope Swing](#)
[Roto Zip](#)
[Rough Lumber Cut-off Stand](#)
[Round Birdhouse 10/00](#)
[Router Bases \(ZIP\) - Mike Randall](#)
[Router Bit Box](#)
[Router Bit Storage Solution](#)
[Router Compass to route grooves along an Jig](#)
[Router Dado Guide](#)
[Router Dado Jig](#)
[Router Fence for Table Saw](#)
[Router Insert Plate Installation](#)
[Router Storage System \(PDF\)](#)
[Router Table](#)
[Router Table - For Workmate](#)
[Router Table \(For Workmate\)](#)
[Router Table \(1\)](#)
[Router Table \(2\)](#)
[Router Table \(Jane's\)](#)
[Router Table \(PDF\)](#)
[Router Table 01](#)
[Router Table 03](#)
[Router Table by Joe Johns](#)
[Router Table Fence](#)
[Router Table for Woodworkers - by Joe Johns](#)
[Router Table](#)
[Router Table, Folding](#)
[Router Table, Gifkin's](#)
[Router Table, Jane's](#)
[Router Table, Making your own](#)
[Router Table-Mate](#)
[Router Table-mate](#)
[Router Tenon Cutting jig](#)
[Router Trammel](#)
[Router Use and Safety](#)
[Rustic Coffee Table](#)
[RV Ramp \(ZIP\)](#)
[Ryobi BT3000 Table Saw Review](#)
[Safari Kids Bedroom](#)
[Safari Kids Bedroom](#)
[Salt Shaker, Lil' Brown Jug](#)
[Sand box](#)
[Sand Box](#)
[Sand Paper Cutter](#)
[Sand Table 6/99](#)



[Sandbox](#)
[Sandbox](#)
[Sandbox](#)
[Sandbox](#)
[Sandbox, Sunshade](#)
[Sander Use and Safety](#)
[Sander, Building A Shop Made](#)
[Sanding Basics](#)
[Sanding Basics](#)
[Sanding Basics](#)
[Sanding Basics](#)
[Sanding Block](#)
[Sanding Block](#)
[Sanding Block](#)
[Sanding Station, Stationary](#)
[Sanding Table](#)
[Sandpit, Shaded](#)
[Santa](#)
[Santa & Reindeer Lawn Display](#)
[Santa \(How to Carve\)](#)
[Santa Caddy](#)
[Santa Sleigh](#)
[Santa Stop Here - Reindeer Crossing](#)
[Santa, Scroll Sawed Layers - Relief Wood Carving](#)
[Santa's Sleigh](#)
[Sauna](#)
[Saw Filing Treatise](#)
[Saw Horse](#)
[Saw, Utility Hand](#)
[Saw, Wood Plug Trim](#)
[Sawbench \(PDF\)](#)
[Saw-Blade Storage Holder](#)
[Sawhorse \(1\)](#)
[Sawhorse \(2\)](#)
[Sawhorse \(3\)](#)
[Sawhorse](#)
[Sawhorse](#)
[Sawhorse](#)
[Sawhorse, Build A Folding](#)
[Sawhorse, Five Legged](#)
[Sawhorse, Knock Down 03](#)
[Sawhorse, Knockdown \(ZIP\)](#)
[Sawhorses, Stacking \(ZIP\)](#)
[Sawhorses, Wide Top](#)
[Scalloped Fence Designs You Build](#)
[Scandinavian Kids Bed](#)
[Scarf Cutting Jig](#)
[Scary Sharp, The D & S System](#)
[Scary stuff](#)
[Sceen Divider](#)



[School Bus](#)
[Sconce, Candle and Desktop Pencil Holder](#)
[Scooter](#)
[Scratching Post](#)
[Screen, Garden Decorative](#)
[Screen, Outdoor \(PDF\)](#)
[Screen, Outdoor](#)
[Screen, Twig Privacy](#)
[Scroll Saw Patterns](#)
[Scroll Saw Project - Folding English Berry Baskets](#)
[Scroll Saw Station, Sitting - "Mrs. Wazooni"](#)
[Scrollsaw - 4th of July Bunnies](#)
[Scrollsaw - Back to School - worm and apple](#)
[Scrollsaw - Bracelet, Wooden](#)
[Scrollsaw - Dove Window Hanger](#)
[Scrollsaw - Lil' Bo Peep and sheep](#)
[Scrollsaw - Mr and Mrs Drake Shelf Decor](#)
[Scrollsaw - Santa Intarsia](#)
[Scrollsaw Macaw 2/00](#)
[Scrollsaw Pattern - 3 Po' Bears](#)
[Scrollsaw Pattern - Corner Critter - Firefighter Corner Hanger](#)
[Scrollsaw Pattern - Dolphin](#)
[Scrollsaw Pattern - Tulip Wreath](#)
[Scrollsaw Sillhouette - Parade](#)
[Scrollsaw Sillhouette - Walk In The Park Female](#)
[Scrollsaw Sillhouette - Walk in the Park](#)
[Scrollsaw Use and Safety](#)
[Scrollsaw-blade drawer](#)
[Sculpted Chair](#)
[Sculpted Elliptical Mirror -- Bubinga Frame-Stock and Joinery](#)
[Sculpted Elliptical Mirror -- Finishing Touches](#)
[Sculpted Elliptical Mirror -- Layout and Templates](#)
[Sculpted Elliptical Mirror -- Sculpting the Wood Frame](#)
[Sculpted Pedestal Table -- Assembly and Finish](#)
[Sculpted Pedestal Table -- Crescent Legs](#)
[Sculpted Pedestal Table -- Spiral Pedestal](#)
[Sculpted Pedestal Table -- Tabletop and Pedestal Stock](#)
[Seahorse Sculpture](#)
[Seahorse Sculpture](#)
[Seal of approval](#)
[Sears](#)
[Seater, Twin - PVC \(PDF\)](#)
[Secret Book Vault](#)
[Secretary Desk](#)
[See Saw](#)
[See-Saw](#)
[Select Molding](#)
[Self Feeder for Cattle \(PDF\)](#)
[Senco Tools](#)
[Serving Tongs, Finger Saver](#)



[Serving Tray](#)
[Serving Tray](#)
[Seven Day Deck](#)
[Sewing Table](#)
[Shade maker](#)
[Shade Protection for Patio or Porch](#)
[Shade Protection for Patio, Balcony or Porch](#)
[Shade Protector, Garden Vegetable](#)
[Shade Shelter](#)
[Shade Structure, Low Cost](#)
[Shadow Box](#)
[Shaker Storage Cabinet](#)
[Shaker-Inspired Magazine Rack](#)
[Shaker-Style Coat and Mitten Rack](#)
[Shaper Sander](#)
[Shaping Accessory Safety](#)
[Shaping Frequently Asked Questions](#)
[Sharpen Spade bits](#)
[Sharpening Spokeshaves, Drawknives and Scrapers](#)
[Sharpening Systems](#)
[Shaving Horse - Swiss](#)
[Shaving Horse \(Swiss\)](#)
[Shaving Horse 1850-1900](#)
[Shaving Horse](#)
[Shaving Horse, Swiss](#)
[Shed](#)
[Shed \(Garden\)](#)
[Shed \(Potting & Garden Combo\)](#)
[Shed \(Storage\)](#)
[Shed Construction Guide](#)
[Shed Floor Framing - How To](#)
[Shed, Basic](#)
[Shed, Building a](#)
[Shed, Cotten Storage \(PDF\)](#)
[Shed, Garden - Timber Framed](#)
[Shed, Garden - with Clock](#)
[Shed, Garden \(PDF\)](#)
[Shed, Garden](#)
[Shed, Garden](#)
[Shed, Portable Camping](#)
[Shed, Putter](#)
[Shed, Storage \(GIF image only\)](#)
[Shed, The Ultimate Storage](#)
[Sheet Goods Cutting Platform](#)
[Sheet Goods Mover 02](#)
[Sheet Rack \(Use when cutting with circular saw\)](#)
[Shelf \(Corner\)](#)
[Shelf \(Country\)](#)
[Shelf \(Ladder Style\)](#)
[Shelf \(Rustic Step\)](#)



[Shelf \(Simple\)](#)
[Shelf Hole Drilling Jig](#)
[Shelf Pin Holes Jig](#)
[Shelf Project](#)
[Shelf Sewing Thread Holder, The Tilting](#)
[Shelf Unit, Wall-mounted](#)
[Shelf, Ball Glove Wall \(ZIP\)](#)
[Shelf, Bath \(ZIP\)](#)
[Shelf, Bath Towel](#)
[Shelf, Bathroom Wall Peg](#)
[Shelf, Bathroom](#)
[Shelf, Bit](#)
[Shelf, Bow](#)
[Shelf, Box - simple](#)
[Shelf, Clock](#)
[Shelf, Corner](#)
[Shelf, Corner](#)
[Shelf, Corner](#)
[Shelf, Country \(ZIP\)](#)
[Shelf, Country Corner](#)
[Shelf, Crown Molding](#)
[Shelf, Fretwork Display](#)
[Shelf, Invisible Support](#)
[Shelf, Magazine](#)
[Shelf, Model Train](#)
[Shelf, Monitor](#)
[Shelf, Monitor](#)
[Shelf, Mug and Baseball Equipment](#)
[Shelf, Office - Cherry](#)
[Shelf, Over the door](#)
[Shelf, Over the Door](#)
[Shelf, Overhead Storage](#)
[Shelf, Pine Tree](#)
[Shelf, Pull-Out - Installation](#)
[Shelf, Pull-Out](#)
[Shelf, Shaker style \(PDF\)](#)
[Shelf, Slatted \(PDF\)](#)
[Shelf, Sled \(ZIP\)](#)
[Shelf, Southwest \(ZIP\)](#)
[Shelf, Stumps](#)
[Shelf, Three Heart](#)
[Shelf, Tool](#)
[Shelf, Trellis](#)
[Shelf, Turned](#)
[Shelf, TV Corner \(ZIP\)](#)
[Shelf, Utility Built In](#)
[Shelf, Wall Desk and TV - simple](#)
[Shelf, Wall](#)
[Shelf, Wall](#)
[Shellac Finishes](#)



[Shelter, New Brunswick Wood](#)
[Shelter, Windsor Shade \(PDF\)](#)
[Shelves - Various styles](#)
[Shelves with Boxes](#)
[Shelves, Alaska Bird Observatory](#)
[Shelves, Box](#)
[Shelves, Closet Door](#)
[Shelves, Copper Pipe](#)
[Shelves, Corner Decorative](#)
[Shelves, Garage Storage](#)
[Shelves, Krenov-style Wall Hung \(PDF\)](#)
[Shelves, Making Wide Plywood](#)
[Shelves, Making Wide Plywood](#)
[Shelves, Medium Height Pine \(PDF\)](#)
[Shelves, Plant](#)
[Shelves, Pullout Pantry - How To Build](#)
[Shelves, Recessed Wall](#)
[Shelves, Recessed](#)
[Shelves, Shutter](#)
[Shelves, Utility](#)
[Shelves, Wall Planter and](#)
[Shelves, Wood Framed Standard](#)
[Shelving System, Wall](#)
[Shelving Unit](#)
[Shelving Unit](#)
[Shelving Unit](#)
[Shelving Unit](#)
[Shelving Unit, Constructing Built In](#)
[Shelving Unit, Constructing Built In](#)
[Shelving, Built-In](#)
[Shelving, Closet Organizer](#)
[Shelving, Custom Decorative](#)
[Shelving, Ready To Hang](#)
[Shelving, Simple](#)
[Shelving, Storage](#)
[Shelving, Super - For Your Garage](#)
[Shelving, Unit](#)
[Shelving, Utility](#)
[Shishi Odoshi \[Bamboo Fountain\]](#)
[Shoe House](#)
[Shooting Board \(1\)](#)
[Shooting Board \(2\)](#)
[Shop Project: A Cedar Privacy Fence](#)
[Shop Project: Build A Cherry Dresser](#)
[Shop Project: Build A Classic Cedar Garden Bench](#)
[Shop Talk](#)
[Shop talk](#)
[Shop talk](#)
[Shop Tips - Turning A Plate](#)
[Shop Tips - Turning A Plate](#)



[Shop Vac Muffler Report](#)
[Shopping List Holder](#)
[Shopping List Holder](#)
[Shuffleboard, Dutch \(Sjoelbak\)](#)
[Shutters \(2\)](#)
[Shutters from the French Quarter](#)
[Shutters\(1\)](#)
[Side Table \(Oval\)](#)
[Side Tables Queen Anne](#)
[Sign, Routed](#)
[Signs for Safety and Fun - Parent Made Developmental Toys](#)
[Signs, Antique Advertising](#)
[Silver in cherry](#)
[Simple Bookcase You Make](#)
[Simple box shelves](#)
[Simple Corner Shelving](#)
[Simple Desk & TV Shelf](#)
[Simple Kids Stool](#)
[Simple Pleasures](#)
[Sitting Around: Build an Outdoor Table and Chairs](#)
[Sitting Bench -- Cutting and Milling Wood](#)
[Sitting Bench -- Finishing Touches](#)
[Sitting Bench -- Legs, Joinery and Accents](#)
[Sitting Bench -- Sculpting the Legs and Seat](#)
[Skate Board Ramp](#)
[Skateboard Ramp, Mini Mini](#)
[Skateboard Ramp, Bank to Bank](#)
[Skateboard Ramp, Drop In](#)
[Skateboard Ramp, Flat Bank](#)
[Skateboard Ramp, Fun Box](#)
[Skateboard Ramp, Funbox](#)
[Skateboard Ramp, Half Pipe \(PDF\)](#)
[Skateboard Ramp, Half Pipe \(ZIP\)](#)
[Skateboard Ramp, Half Pipe](#)
[Skateboard Ramp, Launch](#)
[Skateboard Ramp, Launcher](#)
[Skateboard Ramp, Pyramid](#)
[Skateboard Ramp, Quarter Pipe](#)
[Skateboard Ramp, Vert Mini](#)
[Skateboard Ramps - 3 designs](#)
[Skateboard Ramps \(1\)](#)
[Skateboard Ramps \(1\)](#)
[Skateboard Ramps \(2\)](#)
[Skateboard Ramps \(2\)](#)
[Skateboard Ramps](#)
[Skeleton](#)
[Skeleton](#)
[Ski Vise, Cross Country](#)
[Skil Power Tools](#)
[Skillsaw Cutting Guide Board](#)



[Slate Turkey Call](#)
[Slate Turkey Call](#)
[Slatted Dining Chair](#)
[Sled](#)
[Sled \(Child's\)](#)
[Sled \(Klondike\)](#)
[Sled \(Tree Ornament\)](#)
[Sled Plans, Klondike Derby](#)
[Sled, Ammunition](#)
[Sled, Basic Boy Scout Klondike Derby](#)
[Sled, Ben Hunt's Artic Hand](#)
[Sled, Ben Hunt's Eskimo Komatik](#)
[Sled, Dan Beard's Bob Sleigh](#)
[Sled, Dan Beard's Boy Pioneer Bob](#)
[Sled, Dan Beard's Double-Runner, or Bob](#)
[Sled, Dan Beard's Eskimo Dog](#)
[Sled, Dan Beard's Get There](#)
[Sled, Dan Beard's Gummer](#)
[Sled, Dan Beard's Jumper](#)
[Sled, Dan Beard's Ohio](#)
[Sled, Dan Beard's Skiboggan](#)
[Sled, Dan Beard's Toboggan](#)
[Sled, Dan Beard's Tom Thumb Ice Boat](#)
[Sled, Dan Beard's Van Kleeck Bob](#)
[Sled, Small Parts](#)
[Sled, Winter \(Classic\)](#)
[Sledge, Klondike](#)
[Sleds \(Assortment\)](#)
[Sleds, assortment](#)
[Sleeping Goose Shelf Sitter](#)
[Sleeping Goose Shelf Sitter](#)
[Slideout Computer Keyboard Tray](#)
[Sliding Crosscut Board \(ZIP\)](#)
[Sliding Kitchen Trash Can](#)
[Sliding Kitchen Trash Can](#)
[Small End Table](#)
[Smooth as Steel](#)
[Smooth Move: Sanding Wood to Perfection](#)
[Smooth Sailing: Build A Sailing-Rowing Dinghy](#)
[Snow Shoes \(How to Make\)](#)
[Snow Shoes \(How to Make\)](#)
[Snow Shoes \(Swiss Army\)](#)
[Snow Shoes \(Swiss Army\)](#)
[Snowmen](#)
[Snowmen](#)
[Snowshoe plans, Five](#)
[Snowshoes, Alaskan Eskimo](#)
[Snowshoes, Chippewa](#)
[Snowshoes, Indian](#)
[Snowshoes, Pioneer](#)



[Soap Dish](#)
[Socket Organizer](#)
[Soda Bar for the Lawn](#)
[Sofa, Craftsman Style](#)
[Solar Collector for Grain Drier \(PDF\)](#)
[Solar Kiln](#)
[Soma Cube Puzzle](#)
[Soma Cube Puzzle](#)
[Soundproofing Your Home](#)
[Spaceship Wagon](#)
[Spade Bits \(How to Sharpen\)](#)
[Spaghetti Measure pdf.](#)
[Spalted Maple Humidor](#)
[Speaker Stand](#)
[Speaker Stands \(ZIP\)](#)
[Special Fence Designs](#)
[Special Pantry Shelves](#)
[Special Pantry Shelves](#)
[Speedy Sorter](#)
[Spice Cabinet](#)
[Spice Cabinet \(Colonial\)](#)
[Spice Rack](#)
[Spinning Wheel](#)
[Spinning Wheel](#)
[Spinning Wheel](#)
[Spinning Wheel](#)
[Spiral Coffee table](#)
[Spiral Wind Thingy](#)
[Spiral Wooden Thing](#)
[Spokeshave \(How to Make\)](#)
[Spoon \(How to Carve\)](#)
[Spoon \(Welsh Love\)](#)
[Spoon, How to Carve a Wooden](#)
[Spoons and Ladles](#)
[Spoons, Welsh Love - carving](#)
[Squaring-Up Large Panels](#)
[Squirrel Den](#)
[Squirrel Feeder](#)
[Stain and Blemish Repair](#)
[Staircase Project](#)
[Stairs \(Outdoor\)](#)
[Stairs \(With Landing\)](#)
[Stairs \(How to Build\)](#)
[Stairs \(Outdoor\)](#)
[Stairs, Adding Pull Down](#)
[Stairs, Deck](#)
[Stairs, Drop-down](#)
[Stairs, Making](#)
[Stairs, Wooden Spiral](#)
[Stairway Railing](#)

The logo for Martian Auctions features the words "MARTIAN" and "AUCTIONS" stacked vertically in a bold, white, sans-serif font. The text is centered within a rectangular area that has a light brown, textured background, resembling a piece of wood or stone. The entire logo is enclosed in a thin black border.

[Stairway with a Landing, Building A](#)
[Stairway, Deck](#)
[Stall Tactics](#)
[Stamp Holder](#)
[Stand, Heart Shelf](#)
[Stand, Knick Knack](#)
[Stand, Mini Lathe \(PDF\)](#)
[Stand, Plant \(ZIP\)](#)
[Stand, Plant](#)
[Stand, Rolling Plant](#)
[Stand, TV](#)
[Stanley Plane Dating Page](#)
[Steam Box](#)
[Steam Box](#)
[Steam-Bending Wood](#)
[Steam-Bending Wood](#)
[Steel Square - How to Use](#)
[Step Stool \(1\)](#)
[Step Stool \(1\)](#)
[Step Stool \(2\)](#)
[Step Stool \(2\)](#)
[Stepping Stones](#)
[Steps, Exterior Deck](#)
[Steps, Shaker Sewing](#)
[Steps, Verandah Deck](#)
[Stick, Walking](#)
[Stilts, Wooden \(PDF\)](#)
[Stilt Chair](#)
[Stilts \(1\)](#)
[Stilts \(2\)](#)
[Stilts \(3\)](#)
[Stilts \(4\)](#)
[Stilts](#)
[Stilts](#)
[Stilts](#)
[Stilts, Rob's Build ya own](#)
[Stones](#)
[Stool \(Folding\)](#)
[Stool \(kids\)](#)
[Stool \(Milking\)](#)
[Stool \(Muscians\)](#)
[Stool \(Viking\)](#)
[Stool, Colonial American Foot](#)
[Stool, Colonial American Foot](#)
[Stool, Ergonomic](#)
[Stool, Foot](#)
[Stool, Heirloom Toddler](#)
[Stool, Kids](#)
[Stool, Kitchen](#)
[Stool, Lund Viking](#)



[Stool, Musician's](#)
[Stool, Step - Oliver's](#)
[Stool, Step](#)
[Stool, Step](#)
[Stopping Squeaks](#)
[Storage and Trash Can Bin](#)
[Storage Bench \(Cedar\)](#)
[Storage Bin, BBQ Grill](#)
[Storage Cabinet](#)
[Storage Center, Outdoor Garden](#)
[Storage Chest](#)
[Storage Rack, Tool](#)
[Storage Room, Fruit and Vegetable \(PDF\)](#)
[Storage Seat](#)
[Storage Shed, Firewood - Garbage Outdoor](#)
[Storage Shed, Outdoor Tool Bin](#)
[Storage Shelving](#)
[Storage Shelving](#)
[Storage Sofa](#)
[Storage Solution, Boxed](#)
[Storage two step](#)
[Storage Unit, Boots and Shoes](#)
[Storage Unit, Laundry Room \(PDF\)](#)
[Storage Unit, Play Center](#)
[Storage Unit, Under Bed](#)
[Storage, Cassette](#)
[Storage, Closet - with video clip](#)
[Storage, Lawn Tool \(PDF\)](#)
[Storm Door](#)
[Strip Cutting Gauge](#)
[Subfloor on a Concrete Slab, Building A](#)
[Sun Room, Adding A](#)
[Sundeck \(1\)](#)
[Sundeck \(2\)](#)
[Sunflower Frame \(PDF\)](#)
[Super Shelving for Your Garage](#)
[Super Smooth Oil Finish](#)
[Swan Neck \(How To Make\)](#)
[Swimming Platform - Shantydock](#)
[Swing Set](#)
[Swing, A Covered Garden](#)
[Swing, Child's Chair Rope](#)
[Swing, Child's Glider](#)
[Swing, G-P Treated Lumber \(PDF\)](#)
[Swing, Lawn - PVC \(PDF\)](#)
[Swing, Porch - Outdoor Project](#)
[Swing, Porch](#)
[Swing, Porch](#)
[Swing, Porch](#)
[Swing, The Porch](#)



[Swing, Tree Friendly Tire](#)
[Swiss Shaving Horse](#)
[Table & Chairs](#)
[Table \(Game, Tilt Top\)](#)
[Table \(Arts & Crafts Design\)](#)
[Table \(Bedside\)](#)
[Table \(Concord\)](#)
[Table \(Dining\) pdf](#)
[Table \(Dining, PM Anniversary Plan\)](#)
[Table \(Drop Leaf\)](#)
[Table \(Farm\)](#)
[Table \(Gate Leg\)](#)
[Table \(Hexagonal\)](#)
[Table \(Knock-down from sheet of plywood\)](#)
[Table \(Molly Brown\)](#)
[Table \(Sofa basic\)](#)
[Table \(Sofa\)](#)
[Table \(Tavern\)](#)
[Table \(Trestle\)](#)
[Table \(Viking\)](#)
[Table And Bench Set, Outdoor](#)
[Table and Bench](#)
[Table and Chairs, Children's](#)
[Table and Chairs, Childs - Juvenile Kitchen set](#)
[Table and Chairs, Outdoors](#)
[Table and Patrol Box, Camp](#)
[Table Hockey](#)
[Table Hockey](#)
[Table Hockey Game](#)
[Table Saw Cabinet \(PDF\)](#)
[Table Saw Cut Guide](#)
[Table Saw Mitre Jig](#)
[Table Saw Molding](#)
[Table Saw Sanding Table](#)
[Table Saw Sled \(AcuMiterTM\)](#)
[Table Saw Splitter](#)
[Table Saw Station, Benchtop \(PDF\)](#)
[Table Saw Workstation \(PDF\)](#)
[Table Top Button Detail](#)
[Table Top Fountain](#)
[Table](#)
[Table](#)
[Table, 'Antiqued'](#)
[Table, 1 Drawer Nite Stand \(ZIP\)](#)
[Table, A Simple](#)
[Table, Adjustable-Height Assembly \(PDF\)](#)
[Table, ArborTech® Coffee Glass-Topped](#)
[Table, Arts & Crafts Style Side](#)
[Table, Baby Changing Table](#)
[Table, Bedside - with breadboard ends \(PDF\)](#)



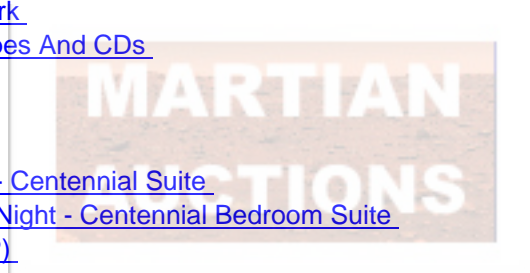
[Table, Bedside \(ZIP\)](#)
[Table, Bedside \(ZIP\)](#)
[Table, Bedside 02](#)
[Table, Bedside](#)
[Table, Birch Plywood Side](#)
[Table, Bottom Lit](#)
[Table, Bucket Coffee](#)
[Table, Butcher Block - Microwave Oven](#)
[Table, Carved Coffee](#)
[Table, Cherry Bedside \(PDF\)](#)
[Table, Children's Art Station](#)
[Table, Children's Vanity](#)
[Table, Cocktail \(ZIP\)](#)
[Table, Cocktail](#)
[Table, Coffee - Carved](#)
[Table, Coffee - Greene and Greene \(PDF\)](#)
[Table, Coffee - Mission Style \(PDF\)](#)
[Table, Coffee - on Castors](#)
[Table, Coffee \(ZIP\)](#)
[Table, Coffee](#)
[Table, Coffee](#)
[Table, Coffee](#)
[Table, Coffee](#)
[Table, Coffee](#)
[Table, Coffee](#)
[Table, Colonial Drop Leaf End](#)
[Table, Computer Workstation](#)
[Table, Craft](#)
[Table, Curio \(PDF\)](#)
[Table, Curio](#)
[Table, Custom Arts and CraftsTable - How To Build a](#)
[Table, Dining - Arts and Crafts](#)
[Table, Door](#)
[Table, Drafting-Reference Center](#)
[Table, Drawing \(ZIP\)](#)
[Table, Dressing \(ZIP\)](#)
[Table, Dressing Vanity](#)
[Table, Dressing](#)
[Table, Eastlake \(ZIP\)](#)
[Table, End - Arts and Crafts](#)
[Table, End - Greene and Greene \(PDF\)](#)
[Table, End - Mahogany](#)
[Table, End](#)
[Table, End](#)
[Table, End](#)
[Table, Entry - Mailbox](#)
[Table, Entry \(and mirror\)\(ZIP\)](#)
[Table, Farm](#)
[Table, Folding Outfeed \(ZIP\)](#)
[Table, Folding Walnut Utility](#)



[Table, Fold-out](#)
[Table, French Side \(ZIP\)](#)
[Table, Fruitful Furniture](#)
[Table, Garden Sheltered](#)
[Table, Garden](#)
[Table, Glass Top Accent](#)
[Table, Glass Top](#)
[Table, Glass Topped Display](#)
[Table, Glass Topped Display](#)
[Table, Hall - simple](#)
[Table, Hall \(ZIP\) - by David King](#)
[Table, Hall \(ZIP\) - by John McGaw](#)
[Table, Harvest](#)
[Table, Hideaway](#)
[Table, Hideaway](#)
[Table, Hi-Fi](#)
[Table, Kitchen \(ZIP\)](#)
[Table, Kitchen \(ZIP\)](#)
[Table, Knock Down Work](#)
[Table, Knockdown Assembly \(ZIP\)](#)
[Table, Leaf \(PDF\)](#)
[Table, Light - for drawing relief carving patterns](#)
[Table, Little](#)
[Table, Massage - Portable](#)
[Table, Massage \(portable\)](#)
[Table, Mini Router](#)
[Table, Mission style coffee table and end](#)
[Table, Mission style coffee table and end](#)
[Table, Mission](#)
[Table, Modern Round](#)
[Table, Modern Square](#)
[Table, Modular Lego Train](#)
[Table, Night Stand \(ZIP\)](#)
[Table, Nightstand \(ZIP\)](#)
[Table, Occasional - for the tv or rec room](#)
[Table, Outfeed](#)
[Table, Oval Side](#)
[Table, Patio - Deck](#)
[Table, Patio - Solid Wood](#)
[Table, Patio](#)
[Table, Patrol - Picnic](#)
[Table, Patrol](#)
[Table, Paver](#)
[Table, Paver](#)
[Table, Pedestal Drop Leaf](#)
[Table, Pembroke](#)
[Table, Picnic - Kid's](#)
[Table, Picnic - Sonoma \(PDF\)](#)
[Table, Picnic \(ZIP\)](#)
[Table, Picnic 01 \(GIF image only\)](#)



[Table, Picnic Sonoma](#)
[Table, Reference \(ZIP\)](#)
[Table, Round Picnic](#)
[Table, Router \(ZIP\)](#)
[Table, Sanding - fit to the Tablesaw](#)
[Table, Scouts Patrol](#)
[Table, Sewing - Duncan Phyfe](#)
[Table, Shaker \(ZIP\)](#)
[Table, Shaker-style](#)
[Table, Side - Arts and Crafts style](#)
[Table, Side - Outdoors](#)
[Table, Side - Patio](#)
[Table, Side - Picket Fence style](#)
[Table, Side \(ZIP\)](#)
[Table, Small Display \(ZIP\)](#)
[Table, Small Entrance \(ZIP\)](#)
[Table, Small Outdoor - with Umbrella](#)
[Table, Snack \(ZIP\)](#)
[Table, Solid Cherry Console](#)
[Table, Solid Wood Outdoor Occasional](#)
[Table, Spiral Coffee](#)
[Table, Standardized Work](#)
[Table, Storage - For Tapes And CDs](#)
[Table, Tavern](#)
[Table, Tea](#)
[Table, Tea or End](#)
[Table, The Anniversary - Centennial Suite](#)
[Table, The Anniversary Night - Centennial Bedroom Suite](#)
[Table, Tile Top End \(ZIP\)](#)
[Table, Tiled Top](#)
[Table, Tilt Top Game](#)
[Table, Traditional Pembroke](#)
[Table, Trestle Coffee](#)
[Table, Trestle](#)
[Table, Two Tone End](#)
[Table, Vanity](#)
[Table, Viking](#)
[Table, Vineyard](#)
[Table, Washboard Country Style](#)
[Table, Window Shutter Sofa](#)
[Table, Workshop \(Collapsible\)](#)
[Table, Writing](#)
[Table, Writing \(PDF\)](#)
[Table, Writing](#)
[Table, Writing](#)
[Table, Writing](#)
[Table, Writing-Class](#)
[Table, Coffee](#)
[Table, Dining](#)
[Table/Bench, Simple Slat](#)



[Tables \(Nesting 2\)](#)
[Tables \(Nesting 1\)](#)
[Tables, Nesting](#)
[Tables, Nesting](#)
[Tables, Nesting](#)
[Tables, Outdoor](#)
[Tables, The Queen Anne Living Room](#)
[Tablesaw Dust Collection Shroud](#)
[Tablesaw Outfeed Extension, Folding \(ZIP\)](#)
[Tablesaw Taper Jig](#)
[Table-Top Clock -- Case](#)
[Table-Top Clock -- Clock-Face](#)
[Table-Top Clock -- Finishing Touches](#)
[Table-Top Clock -- Stock for the Top and Face](#)
[Tabouret \(ZIP\)](#)
[Tabouret, Small \(ZIP\)](#)
[Take It Easy: Build A Classic Redwood Recliner](#)
[Taking It All In: Build An Adirondack Chair](#)
[Talk of the Town Sports Table](#)
[Tall Simple Bookcase](#)
[Tank for treating wood with preservative \(PDF\)](#)
[Tank, Sherman](#)
[Tansu](#)
[Taper and Straight Edge Guide](#)
[Taper Jig \(1\)](#)
[Tapered Reamers](#)
[Tea to go](#)
[Teapot Towel Holder](#)
[Technical Aspects of Wood used in making shaper blanks](#)
[Technical Guide to US Hardwoods](#)
[Teddy Bear Book Ends](#)
[Teddy Bear Book Ends](#)
[Teeter Totter](#)
[Teeter-Totter](#)
[Telescope Mirror Grinding Stand](#)
[Telescope Mount, Simple Equatorial](#)
[Telescope stand](#)
[Telescope stand](#)
[Telescope](#)
[Telescope, Dobsonian](#)
[Telescope, Sidewalk](#)
[Tennis Ball Launching Crossbow](#)
[Tennis Table, Build A](#)
[Tenon Jig](#)
[Tent, Children's Reading](#)
[Terracotta Torches, Trendy](#)
[Texturing Carvings](#)
[The \\$30 mitre saw station](#)
[The Arbortech Power Chisel,](#)
[The How's of Setting Saws](#)



[The more things change](#)
[The organized garage](#)
[The perfect go-anywhere bench](#)
[The right stuff](#)
[The space within](#)
[Theater, Mini Home](#)
[Thickness Planer Use and Safety](#)
[Thickness Sander](#)
[Thick-Slice Veneer](#)
[Thin Stock](#)
[Three Beautiful Fence Styles](#)
[Three Heart Shelf](#)
[Three-Panel Screen -- Faux-Ebony Finish](#)
[Three-Panel Screen -- Installing Wooden Hinges and Panels](#)
[Three-Panel Screen -- Lace-Wood Panels and Wooden Hinges](#)
[Three-Panel Screen -- Stiles, Tenons and Mortises](#)
[Tie Rack](#)
[Tie Rack](#)
[Tie Rack](#)
[Tie Rack](#)
[Tile Substrate is Key](#)
[Tilt Top Game Table](#)
[Timber Retaining Wall](#)
[Time on the Outside](#)
[Tin ceilings](#)
[Tin Patterns \(ZIP\)](#)
[Tissue Holder](#)
[Toast Tongs](#)
[Toast Tongs](#)
[Toast Tongs](#)
[Toilet Seat](#)
[Toilet seat, Timber](#)
[Toilet Tissue holder](#)
[Tole Paint a Bird House](#)
[Tombstones](#)
[Tombstones](#)
[Tool Bar, Swing Out](#)
[Tool Box - pic only](#)
[Tool Box \(1\)](#)
[Tool Box \(2\)](#)
[Tool Box \(3\)](#)
[Tool Box \(Portable\)](#)
[Tool Box](#)
[Tool Box](#)
[Tool Box](#)
[Tool Box](#)
[Tool Box, Kid's](#)
[Tool Box, Kid's](#)
[Tool Box, Rolling \(PDF\)](#)
[Tool Box, Simple](#)



[Tool Cabinet](#)
[Tool Caddy](#)
[Tool Cart, Roll Around \(PDF\)](#)
[Tool Chest](#)
[Tool Chest \(Classic\)](#)
[Tool Chest, Cabinetmaker's](#)
[Tool Chest, Classic](#)
[Tool Holders, Stay-Put](#)
[Tool Socket Holder](#)
[Tool Storage, Cordless \(PDF\)](#)
[Tool Tray, Ladder](#)
[Toolbox](#)
[Toolbox](#)
[Toolbox](#)
[toolbox](#)
[Toolbox](#)
[Toolbox, 9 Drawer](#)
[Toolbox, Carpenter's \(PDF\)](#)
[Toolbox, Wooden](#)
[Tools we love](#)
[Torsion Box -- Creating a Dead-Level Surface](#)
[Tote Box](#)
[Towel Bar](#)
[Towel Bar, Baseball Bat](#)
[Towel Hanger](#)
[Towel Rack](#)
[Towel Rack](#)
[Toy - Commando Course for Kids](#)
[Toy - Game Board, Tic Tac Toe](#)
[Toy Aircraft Carrier](#)
[Toy Battle Fleet, GrandDad's](#)
[Toy Box](#)
[Toy Box \(Truck\)](#)
[Toy box on castors](#)
[Toy Box, Truck](#)
[Toy Bus](#)
[Toy Camphor Boat](#)
[Toy Car](#)
[Toy Car](#)
[Toy Car, Wooden](#)
[Toy Cat, Collapsing](#)
[Toy Chest](#)
[Toy Chest](#)
[Toy Chest](#)
[Toy Chest](#)
[Toy Chest](#)
[Toy Chest](#)
[Toy Crane](#)
[Toy Dump Truck](#)
[Toy Float plane 11/00](#)



[Toy Giraffe](#)
[Toy Helicopter](#)
[Toy Horse Stable](#)
[Toy Loader](#)
[Toy Motorcycle](#)
[Toy Plane, Wooden](#)
[Toy Play Area, Fire Truck](#)
[Toy PT Boat](#)
[Toy Puzzles](#)
[Toy Road Roller](#)
[Toy Sports Car](#)
[Toy Storage](#)
[Toy Stove](#)
[Toy Top](#)
[Toy Train](#)
[Toy, Auto and House Trailer](#)
[Toy, Auto with removable roof](#)
[Toy, Building Logs](#)
[Toy, Buzz Saw](#)
[Toy, Car - Fast Pinewood](#)
[Toy, Car - Rumble Seat Rambler](#)
[Toy, Child's Dog Pull](#)
[Toy, Crane Project](#)
[Toy, Crane](#)
[Toy, Crawling Bug](#)
[Toy, Dancing Duck](#)
[Toy, Derby Car](#)
[Toy, Derby Car](#)
[Toy, Domino Effect](#)
[Toy, Duck Pull](#)
[Toy, Easter Pull](#)
Toy, Elephant Pull Toy, Interlocking Logs
[Toy, Impossible Stacking Sculpture](#)
[Toy, Jacob's Ladder](#)
[Toy, Jacob's Ladder](#)
[Toy, Kiddie Car](#)
[Toy, Marble Racer](#)
[Toy, Model Airplane](#)
[Toy, Paddle Boat](#)
[Toy, Pecking Chicks](#)
[Toy, Push Monkey](#)
[Toy, Rocking and Rolling](#)
[Toy, Rocking Horse](#)
[Toy, Showboat](#)
[Toy, Smoking Man](#)
[Toy, Spinner and Gameboard](#)
[Toy, The Child's Pounding Bench](#)
[Toy, The Climbing Bear](#)
[Toy, The Pecking Chickens](#)
[Toy, The Wooden Toy Top](#)



[Toy, Train - Wooden Steam Engine](#)
[Toy, Train Whistle](#)
[Toy, Tricky Hook Game](#)
[Toy, Wooden Boat](#)
[Toy, Wooden Scooter](#)
[Toy, Wooden Sled](#)
[Toy, Wooden Swoopy Coupe](#)
[Toys for spring](#)
[Tracing Box](#)
[Traditional Bookcase](#)
[Traditional Workbench](#)
[Train \(1\)](#)
[Train \(2\)](#)
[Train \(Ride In\)](#)
[Train \(Steam\)](#)
[Train Board, Model](#)
[Train Table](#)
[Train Whistle](#)
[Train Whistle](#)
[Training the Eye to See](#)
[Trammel, Simple Router](#)
[Trash Can Corral pdf](#)
[Tray, Breakfast](#)
[Tray, Cherry Serving](#)
[Tray, Country Flag](#)
[Tray, Crumb](#)
[Tray, Drop Down Tool Storage](#)
[Tray, Folding Party](#)
[Tray, Inlaid](#)
[Tray, Keyboard](#)
[Tray, Serving - Hardwood](#)
[Tray, Serving \(PDF\)](#)
[Tray, Serving](#)
[Tray, Serving](#)
[Tree Bench](#)
[Tree Bench](#)
[Tree Bench](#)
[Tree Bench, Build a Custom](#)
[Tree House Construction Guide, Patrick Fulton's](#)
[Tree House](#)
[Tree House, Build a](#)
[Tree Ornaments \(Turned\)](#)
[Tree Ornaments \(Turned\)](#)
[Tree Seat, Circular](#)
[Treehouse](#)
[Treehouse \(Treeless\)](#)
[Treehouse Construction](#)
[Treehouse Guide](#)
[Treehouse Ladder](#)
[Treehouse](#)



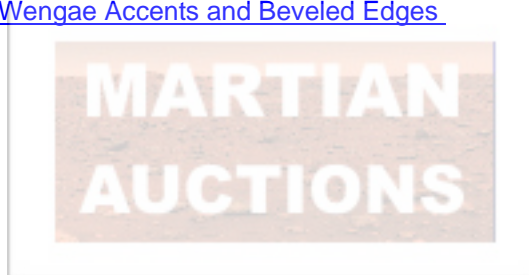
[Treeless Treehouse](#)
[Treeless Treehouse](#)
[Trellis \(1\)](#)
[Trellis \(About\)](#)
[Trellis \(Pyramid\)](#)
[Trellis \(Redwood\)](#)
[Trellis framing](#)
[Trellis to an Arbor, Adding A](#)
[Trellis, Windsor Shade Shelter](#)
[Trestle table](#)
[Trivet](#)
[Trivet](#)
[Trivet](#)
[Trivet, Ceramic Tile](#)
[Trivets](#)
[Trolley](#)
[Trolley](#)
[Trouble Melts Away](#)
[Trousers Butler](#)
[Truck \(Pull Toy\)](#)
[Trug, Garden - Carry All Box](#)
[Trunk, Steamer \(ZIP\)](#)
[Trunks, Brava](#)
[TS Cantruss \(ZIP\)](#)
[T-slot - jig and fixture holddown alternatives](#)
[Tulip Wreath](#)
[Turkey Box Call](#)
[Turkey Call](#)
[Turkey Call](#)
[Turning A Wooden Place Setting](#)
[Turnings, Inside - Outside](#)
[Turnings, Outside-Inside](#)
[TV Games Hideaway](#)
[TV Stand](#)
[TV/VCR Cabinet With Swivel Tray](#)
[Twig Furniture](#)
[Twisted Lamps](#)
[Two Story Playhouse](#)
[Two-Tone End Table](#)
[Ultimate basement contest winners](#)
[Ultimate growing rack](#)
[Umbrella Stand \(ZIP\)](#)
[Under The Big Top: A Coffee Table Shop Project](#)
[Understairs Work Center](#)
[Understanding Plywood](#)
[Unique Lighting](#)
[Unique Mug Rack Organizer](#)
[Unique Mug Rack Organizer](#)
[Unisaw FAQ](#)
[Up Front Shipmates](#)



[Use & Sharpening Instructions for Hand Scrapers](#)
[Using Aerosols](#)
[Using Aerosols](#)
[Using Aerosols](#)
[Using Aerosols](#)
[Using and Applying Caulk](#)
[Utility Screen](#)
[Vaccum, My Spiffy ShopVac](#)
[Valance, Build A](#)
[Vanity](#)
[Vanity \(Bathroom\)](#)
[Vanity Fair](#)
[Vanity, Bathroom Sink and](#)
[Various Hobbies](#)
[Various Hobbies](#)
[Various Hobbies](#)
[Various Hobbies](#)
[Various Hobbies](#)
[Various Hobbies](#)
[Various Hobbies](#)
[Varnish Finishes](#)
[Vase - Weed Pot](#)
[Vase, Carved and Turned](#)
[Vase, Dried Flower Holder](#)
[Vase, Laminated Rolling Pin and Dried Flower](#)
[Vee Block](#)
[Vee Block](#)
[Veneer Basics](#)
[Versatile versailles](#)
[Vertical Organizer](#)
[Vertical Organizer](#)
[Vertical Saw Till Project - Handsaw Holder Cabinet](#)
[Victorian Playhouse](#)
[Viewer's choice](#)
[Vineyard Table](#)
[Vise, Lathe Mounted](#)
[Vise, Wooden](#)
[Wagon \(Coaster\)](#)
[Wagon Rack for Tossed Bales \(PDF\)](#)
[Wagon Toy Box, Covered](#)
[Wagon Wheel 14"](#)
[Wagon, Coaster](#)
[Wagon, Tree Nursery \(PDF\)](#)
[Wainscoting, Raised Panel](#)
[Wainscoting](#)
[Walking Stick \(1\)](#)
[Walking Stick \(2\)](#)
[Walking Stick \(PDF\)](#)
[Walking Stick](#)
[Walking Stick](#)
[Walking Sticks](#)



[Walking Sticks.](#)
[Wall Dressing, Creative](#)
[Wall Frames, Create Decorative](#)
[Wall Frames, Create Decorative](#)
[Wall Hanger, Lighthouse](#)
[Wall Mirror](#)
[Wall Niche - inset display shelf](#)
[Wall Niche Installation](#)
[Wall Sconce - wood and copper](#)
[Wall Sconce \(wood and copper\)](#)
[Wall Shelf](#)
[Wall Train Track](#)
[Wall Train Track](#)
[Walls, Lights and Shelving](#)
[Walnut Coat Rack -- Center Post and Assembly](#)
[Walnut Coat Rack -- Finishing Touches](#)
[Walnut Coat Rack -- Making Bent-Laminate Legs](#)
[Walnut Coat Rack -- Shaping the Legs](#)
[Walnut Display Stand -- Finishing Touches](#)
[Walnut Display Stand -- Leg Pieces](#)
[Walnut Display Stand -- Shelf Supports](#)
[Walnut Display Stand -- Wengae Accents and Beveled Edges](#)
[Wardrobe](#)
[Wardrobe Cabinet](#)
[Wardrobe, Rotating](#)
[Wash Stand](#)
[Wash Stand \(ZIP\)](#)
[Wash Stand](#)
[Washers](#)
[Washers](#)
[Wastebasket](#)
[Wastebox \(Limbert\)](#)
[Water Tank Tower 20ft](#)
[Wax Coating Recipies](#)
[Waxed Paper Dispenser](#)
[Waxed Paper Dispenser](#)
[Waxes for Woodturners](#)
[Weather vane - moving parts](#)
[Weather Vane Propeller, How to make a \(PDF\)](#)
[Weave A Rush Seat](#)
[WEB EXTRA -- Treasure-Box: Materials List and Cut Sizes](#)
[WEB EXTRA: Copper-Patina Formula](#)
[WEB EXTRA: Copper-Patina Formula](#)
[WEB EXTRA: Fretwork-Design Download](#)
[Wedge Clamps](#)
[Welding Bandsaw Blades](#)
[Western Stockade Playhouse](#)
[Western Wood Products Assoc.](#)
[Wet Sanding with ArborOil?](#)
[What finish should I use](#)



[What You Must Know About Shelving](#)
[Wheel Barrow, Mini \(ZIP\)](#)
[Wheel, 4-1/4 inch Heart](#)
[Wheelbarrow](#)
[Wheelbarrow for flowers](#)
[Wheelbarrow Planter](#)
[Wheelbarrow](#)
[Wheelchair Ramps](#)
[Which Wood should I choose](#)
[Whirlygig, Road Runner](#)
[Whistle](#)
[Whistle](#)
[Whistles, Turned](#)
[Wildlife Blind 02](#)
[Wildlife Blinds](#)
[Wind Chimes](#)
[Wind Generator \(All wood\)](#)
[Wind Generator, All Wooden](#)
[Wind Screen, Build a](#)
[Windmill, Garden](#)
[Window Box](#)
[Window Box \(Cedar\)](#)
[Window Box \(PDF\)](#)
[Window Box Planter](#)
[Window Box Planter](#)
[Window Box style Collectible Shelves](#)
[Window Box](#)
[Window Box](#)
[Window Box](#)
[Window Box, How to Build a](#)
[Window Casing For New Windows, Building Traditional](#)
[Window in an old wall, Installing a](#)
[Window seat beds](#)
[Window Seat using prefab cabinets](#)
[Window Seat](#)
[Window Seat, Build a](#)
[Window Treatments \(PDF\)](#)
[Window, Building A Wooden](#)
[Window, Casement](#)
[Window, Replacing a](#)
[Windowsill Replacement](#)
[Windshield Ice Scraper](#)
[Windsors World of Woods \(Wood Properties\)](#)
[Wine Bottle Holder](#)
[Wine Bottle Holder](#)
[Wine Bottle Holder](#)
[Wine Cellar Room, Building A](#)
[Wine Holder](#)
[Wine Press](#)
[Wine Rack](#)



[Wine Rack \(Vertical\)](#)
[Wine Rack](#)
[Wine Rack](#)
[Wine Rack](#)
[Wine Rack, Cherry Wood](#)
[Wine Rack, Vertical](#)
[Wine Stopper Corks](#)
[Winemaking Press](#)
[Wing Bone Call](#)
[Wing Bone Call](#)
[Winnie The Pooh Bedroom](#)
[Winnie The Pooh Bedroom Theme](#)
[Winnie the Pooh™](#)
[Wiring 3-Way or 4-Way Switch](#)
[Wishing Well \(1\)](#)
[Wishing Well \(2\)](#)
[Wishing Well \(Cedar\)](#)
[Wishing Well \(ZIP\)](#)
[Wolf Song](#)
[Wood Basics](#)
[Wood Carving Introduction](#)
[Wood Derby Car](#)
[Wood Duck Nesting Box](#)
[Wood Letters](#)
[Wood Preservatives](#)
[Wood Screw Size Chart](#)
[Wood Shingles as Siding](#)
[Wood Spirits](#)
[Wood Spirits](#)
[Wood Walk With Arched Bridge](#)
[Woodburning Guide and Patterns](#)
[Woodburning Guide and Patterns](#)
[Wooden Boat](#)
[Wooden Car \(Lil Bugga\)](#)
[Wooden Fruit - Apple](#)
[Wooden Fruit - Banana](#)
[Wooden Fruit - Pears](#)
[Wooden Gear Cutting Jig](#)
[Wooden Hinges](#)
[Wooden Jack Puzzle](#)
[Wooden Jack Puzzle](#)
[Wooden Kids Stool](#)
[Wooden Massager](#)
[Wooden Pot Rack You Make](#)
[Wooden Pull Toy](#)
[Wooden Tool Chest -- Cutting Dovetail Joinery on a Band Saw](#)
[Wooden Tool Chest -- Cutting Dovetail Joinery on a Band Saw](#)
[Wooden Tool Chest -- Dados, Maple Panels and Assembly](#)
[Wooden Tool Chest -- Dados, Maple Panels and Assembly](#)
[Wooden Tool Chest -- Finishing Touches](#)



[Wooden Tool Chest -- Finishing Touches](#)
[Wooden Tool Chest -- Stock Preparation and Joinery Design](#)
[Wooden Tool Chest -- Stock Preparation and Joinery Design](#)
[Wooden Trains, How they Work](#)
[Wooden Truck](#)
[Wooden Vises](#)
[Woodturning: More Cretan Curves](#)
[Woodwork You Can Look Up To](#)
[Woodworking Book Review: Furniture & Cabinet Construction](#)
[Woodworking for Wildlife](#)
[Woodworking Glossary](#)
[Woodworking Guide: All The Tools For Beginners](#)
[Woodworking Guide: Arts & Crafts Chairs](#)
[Woodworking Guide: Arts & Crafts Sideboard](#)
[Woodworking Guide: Arts & Crafts Table](#)
[Woodworking Guide: Basic Joinery](#)
[Woodworking Guide: Build A Solid Cherry Console Table](#)
[Woodworking Guide: Build Great Kid's Furniture](#)
[Woodworking Guide: Build Great Kid's Furniture](#)
[Woodworking Guide: Build Great Kid's Furniture](#)
[Woodworking Guide: Build Great Kid's Furniture](#)
[Woodworking Guide: Build Great Kid's Furniture](#)
[Woodworking Guide: Build Great Kid's Furniture](#)
[Woodworking Guide: Everything About Abrasives](#)
[Woodworking Guide: Finishing Techniques](#)
[Woodworking Guide: Getting Started In Furniture Making](#)
[Woodworking Guide: How To Sharpen Dull Tools](#)
[Woodworking Guide: Understanding Different Types Of Glue](#)
[Woodworking Guide: Understanding Lumber And Plywood](#)
[Woodworking with Gene Johnson](#)
[Woodworking with Gene Johnson](#)
[Woodworking with Gene Johnson](#)
[Woodworking with Gene Johnson](#)
[Woodworking with Gene Johnson](#)
[Woodworking with Gene Johnson](#)
[Woodworking with Gene Johnson](#)
[Work Center](#)
[Work Table](#)
[Work Table, Utility](#)
[Workbench](#)
[Workbench - By Keith S. Rucker](#)
[Workbench \(Cheap and Sturdy\)](#)
[Workbench \(Ultimate tool stand\)](#)
[Workbench \(\\$175\)](#)
[Workbench \(1\)](#)
[Workbench \(2\)](#)
[Workbench \(3\)](#)
[Workbench \(4\)](#)
[Workbench \(5\)](#)
[Workbench \(Affordable\)](#)
[Workbench \(Beginners\)](#)

[Workbench \(Better Homes & Gardens\)](#)
[Workbench \(Cheap, Easy and Solid\)](#)
[Workbench \(Collapsible\)](#)
[Workbench \(From HGTV\)](#)
[Workbench \(Solid core door top\)](#)
[Workbench \(World's Easiest\)](#)
[Workbench \(ZIP\) - James Gimmell](#)
[Workbench \(ZIP\) - Jos van Diepen](#)
[Workbench \(ZIP\) - Roger Fischer](#)
[Workbench \(ZIP\)](#)
[Workbench Plans](#)
[Workbench Tool Crib](#)
[Workbench Tops with Holddown Tracks \(PDF\)](#)
[Workbench](#)
[Workbench](#)
[Workbench](#)
[Workbench](#)
[Workbench](#)
[Workbench](#)
[Workbench](#)
[Workbench, Beginners](#)
[Workbench, Bob's Ultimate](#)
[Workbench, Build a Custom](#)
[Workbench, Build A](#)
[Workbench, Build your own](#)
[Workbench, Cheap and Sturdy](#)
[Workbench, Cheap Sturdy \(PDF\)](#)
[Workbench, Child's](#)
[Workbench, Collapsible](#)
[Workbench, Designing the Perfect](#)
[Workbench, Easy](#)
[Workbench, Easy](#)
[Workbench, Fold Down \(PDF\)](#)
[Workbench, Heavy Duty \(PDF\)](#)
[Workbench, Mike Dunbar's](#)
[Workbench, Modular](#)
[Workbench, Simple Home Shop](#)
[Workbench, Simple](#)
[Workbench, Simple](#)
[Workbench, Space Saver \(PDF\)](#)
[Workbench, The Ever Indispensable](#)
[Workbench, Utility \(PDF\)](#)
[Workbenches](#)
[Workmate Extension Dogs](#)
Workshop awakening
[Workshop Bench](#)
[Workshop Safety - Lathe](#)
[Workstand, Mobile](#)
[worktable](#)
[Worm Bed \(PDF\)](#)



[Would Be Wood](#)
[Wright Kite](#)
[Writers Bureau](#)
[Writing Bureau Plan](#)
[Writing Table](#)
[WWA Wood Sampler](#)
[Yard Figure, Sleigh](#)
[Yard Figure, Snowman](#)
[Yarn Tree](#)
[Yarn Tree, Revolving](#)
[Yo Yo](#)
[Your own home theater !](#)
[Your own Swimming Pool](#)
[Yoyo](#)
[Yo-yo](#)
[Yoyo Toy](#)
[Yoyo](#)
[Zen Rock Garden](#)
[Zen Rock Garden](#)
[Zero Clearance Insert Plate](#)
[Zero-Clearance Insert](#)

