

10
TOOL STORAGE
SOLUTIONS

Special: Outdoor Projects

WORKBENCH[®]

WOODWORKING TO IMPROVE YOUR HOME[®]
June 2003

Furniture with Flair

PATIO SET

MADE EASY!



INVITING LIGHTING

WALL LANTERN

with scroll-sawn inserts

CLAMPS

that hold where others won't



EDITOR'S NOTES

Ask any group of DIY'ers about their latest home improvement projects, and you're likely to hear everything from building a simple shelf or bookcase to remodeling an entire kitchen or bath.

And quite often, the projects that are mentioned extend *beyond* the rooms of the house. After all, the backyard, garden, porch, and patio are as much a part of the home as a kitchen or family room.

That's why I look forward to the warmer weather — it gives me the chance to start enjoying *and* improving my "outdoor home" again.

OUTDOOR PROJECTS ISSUE

Speaking of outdoor home improvements, this special issue is dedicated to exactly that. It features a couple of great project ideas, tips on building them to withstand the weather, and also some nifty ways to personalize the projects to fit your outdoor lifestyle.

Painted Patio Set — For starters, there's a set of painted patio furniture. As you can see in the *Photo*

above, it includes a bench, a patio table, and a side table. If you're more of a porch sitter, making one small modification in the bench plans converts it to a swing.

Now I know, building an entire set of patio furniture may sound like a difficult, time-consuming task. But that's just not the case with this set.

Made with dimensional lumber (2x cedar and cedar decking), it's assembled with simple half laps and miter joints. And many of the same tool setups can be used for both the bench *and* the tables. The point is you can probably knock out the entire set of furniture in a few spring weekends — just in time for summertime sitting.

Front-Entry Wall Lantern — The second outdoor project focuses on the front entry of the house. It's a wall-mounted, white oak lantern with colored glass panels and decorative metal inserts. These inserts — a flower and an address placard — are scroll sawn from thin sheets of metal. When you turn on the light, the inserts are backlit, creating beautiful silhouettes that make for a warm, welcoming entry.

Tim

WORKBENCH

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June 2003

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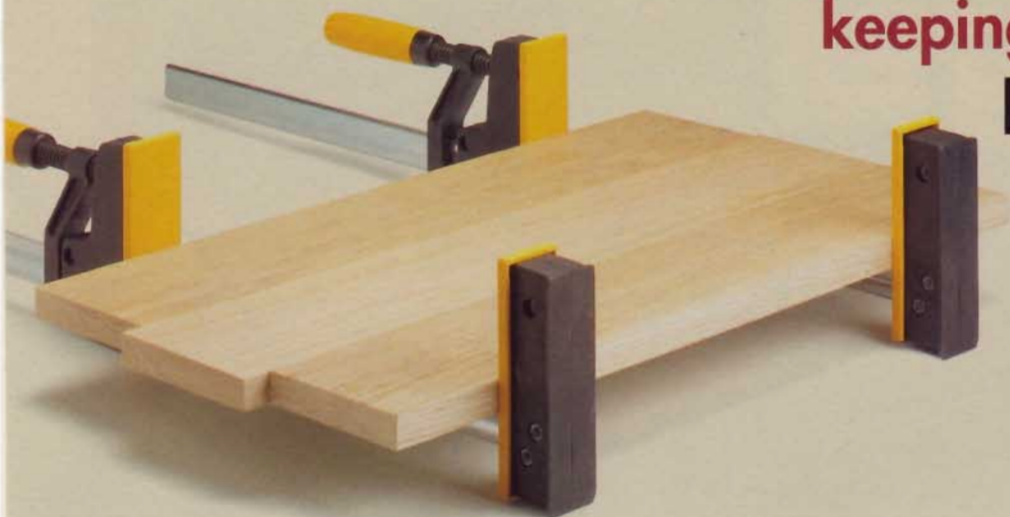


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keeping it flat & square PARALLEL JAW CLAMPS



Q I've been considering buying some parallel jaw clamps. But since I can get nearly twice as many pipe clamps for the same money, I'm curious whether you think the parallel jaw clamps are worth the extra bucks?

Jake Howard
Montgomery, AL

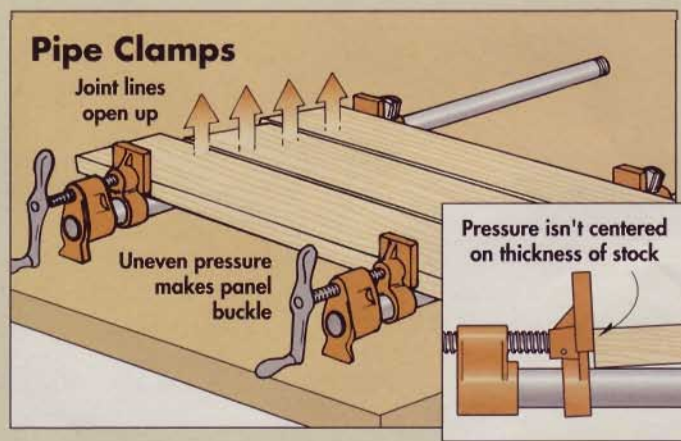
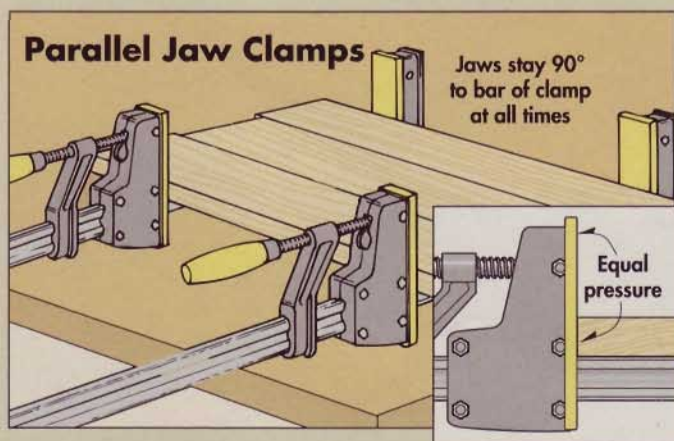
A Parallel jaw clamps do cost more. But they're a sound investment that will pay off in the long run.

There are two big advantages to using parallel jaw clamps. First, they make it easier to end up with a perfectly flat panel when edge-gluing boards together. The second advantage is that parallel jaw clamps won't rack

a cabinet out of square. The reason for both of these things has to do with the jaws of the clamp. When clamping pressure is applied, the jaws remain at 90° to the bar of the clamp (parallel with each other). As a result, pressure gets distributed evenly from top to bottom of the jaw no matter where it's applied against the panel or case (see *Parallel Jaw Clamps*).

With traditional pipe clamps on the other hand, pressure is applied in line with the clamp head screw. So if you set a 3/4"-thick panel directly on the pipe clamps, for example, pressure is applied near the top edge, which causes the panel to buckle (*Pipe Clamp Illustration*).

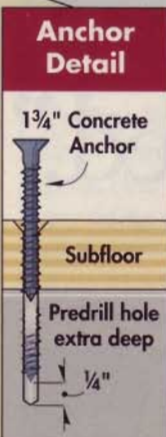
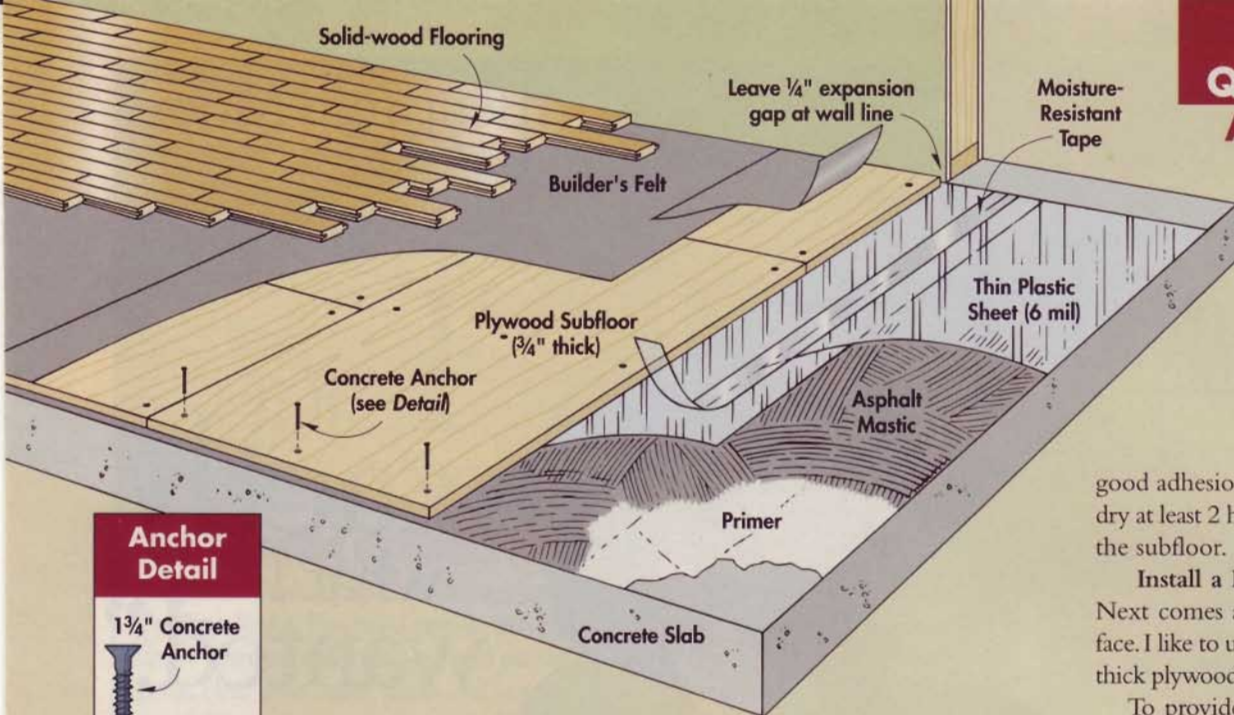
The sidebar below shows one way to get around this.



Tip for Using Pipe Clamps

If you use pipe clamps when gluing up a solid-wood panel, it's important that the clamping pressure is centered on the thickness of the panel. Otherwise, the panel will buckle, as shown in the *Pipe Clamps Illustration* above.

One way to center the pressure is to fit a dowel that's the same diameter as the thickness of the panel between the clamp jaws and the panel (see *Photo at left*). The dowel redistributes the clamping pressure so it's centered on the workpiece. The result is a perfectly flat, glued-up panel.



wood floor on concrete? LAY IT DOWN IN LAYERS

Q My house sits on a concrete slab rather than a raised foundation. I would like to install solid-wood flooring, but I'm not sure how to do that on concrete. Any suggestions?
Terry Weller
Via the Internet

A The key to installing solid-wood flooring on a concrete slab is to use the proper moisture barrier and attach the flooring to a solid subfloor.

As easy as that sounds, there are quite a few things to consider before and during the installation, starting with making sure the concrete is dry.

Watch Out for Water — Slabs that have had less than 60 days to cure are generally too wet for flooring installation. But even if it's an older slab, it's a good idea to test for moisture (check out the sidebar below).

Put Down a Vapor Barrier — After you're satisfied the slab is dry enough for the installation, the first step is to install a vapor barrier. A sheet of thin plastic (6 mil) is a good choice. To apply it, clean the entire surface, paint the concrete with primer, then trowel on asphalt mastic.

Next, unroll the plastic, overlap and tape the edges, then press the plastic firmly into the mastic for

good adhesion. Allow the mastic to dry at least 2 hours before starting on the subfloor.

Install a Plywood Subfloor — Next comes a subfloor nailing surface. I like to use exterior-grade 3/4"-thick plywood over the vapor barrier.

To provide rigid support, install the plywood panels *perpendicular* to the flooring as shown. Also, stagger the end joints of the plywood. This eliminates long joint lines that could cause the joints between the strips of flooring above them to separate.

When it comes to fastening the subfloor to the concrete slab, I'd recommend using concrete anchors like the ones shown in the *Anchor Detail* at left. To ensure the plywood remains flat, start fastening in the center of each panel, making sure the heads of the anchors are flush (use at least nine anchors per panel).

Create a Smooth Surface — With the subfloor secured, create a clean, smooth worksurface by laying down a layer of builder's felt.

Install the Flooring — Now you're ready to install the solid-wood flooring. Use pneumatic nailers to secure the flooring strips to the plywood subfloor.

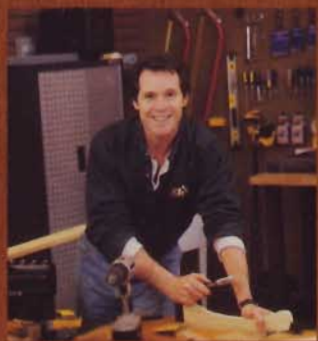


Tell-Tale Moisture Test

Here's a quick way to check whether a concrete slab is dry enough to install solid-wood flooring. Cut enough 1-ft. squares from a sheet of plastic to place one in each corner and a few throughout the rest of the room. Then tape them to the slab, being sure to seal all the edges tightly with moisture-resistant tape. After 24 hours, remove the tape and lift up the plastic (see *Illustration*). If no moisture has accumulated on the underneath side of the plastic, the slab should be dry enough to install solid-wood flooring.

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Questions & ANSWERS

quick bit change ONE-HANDED WONDER



Q *In the tool review that appeared in the April 2003 issue of *Workbench*, you seem to favor cordless drills with "single-sleeve ratcheting chucks." So just what is this type of chuck and why is it better?*

Marty Christensen
Portland, OR



▲ The outer sleeve is large and knurled for a positive, one-handed grip and powerful tightening.

A Single-sleeve ratcheting chucks take their name from two things: a large outer sleeve that's used to tighten the bit (see *Photo below*) and the fact that the jaws of the chuck actually "ratchet" down on the bit as you turn the outer sleeve.

This ratcheting action is evidenced by an audible "click-click-click." Each click means the drill bit is that much more secure. After about a dozen clicks, the sleeve stops turning, and the jaws are as tight as they're going to get.

The real advantage of a single-sleeve chuck is that tightening or loosening a bit is a one-handed operation. The large outer sleeve makes it easy to get your whole hand around it (even with gloves on). This lets you tighten the chuck without having to "strangle" it.

chalk one up for spray-on CHALKBOARD PAINTING

Q *I like the idea for the kitchen chalkboard message center you included in the April 2003 issue of *Workbench* (see *Photo*). But I can't find a chalkboard that's the size I need. Any suggestions?*

Christina Perez
Commerce, TX

A I'd suggest making your own. It's easy thanks to a special spray-on chalkboard paint that's available at most hardware stores and home centers.

To make your own chalkboard, spray a piece of 1/4" hardboard to create a tough, slate-like finish (see *Photo*). Then wrap the chalkboard with a wood frame.

Note: Spray in a well-ventilated area, and follow the instructions on the can.



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out of room? HANG IT UP

I have a small area in the corner of my garage for a shop. To get the most out of this space, I use benchtop tools. Unfortunately, there's still not enough room. So to save space, I hang the tools on the wall (see Photo).

All this takes is a piece of $\frac{3}{4}$ " plywood bolted to the legs (or base) of the tool.

To hang the tools, I screwed lag screws into the wall studs. Then I drilled a couple of large holes in each base to fit over the screws. I drilled the holes a couple of inches in from the edge of the plywood to prevent the weight of the tool from splitting the base.

Robert Gnage
Rushville, NY



ORBITAL BUFF

I like the look of a project that's been waxed and buffed. What I don't care for is the elbow grease and aching muscles that come with trying to get that professional hand-polished look.

To save time and energy, I use a soft cotton cloth and my random orbit-sander to do the heavy work of buffing the project. Be sure to remove the sandpaper first. Then press firmly on the cloth when you turn the sander on and polish the waxed surface to an even sheen.

Kevin Heinert
Dickinson, ND



Surgical Solution



Last winter, a remodeling project I was working on left my hands so dry that they cracked and bled. To nurse them back to health, I used hand lotion and wore disposable rubber gloves. (These can be picked up in the paint department of any hardware store.)

Not only did the gloves help my hands heal quickly, I found that they provided an extra grip that made handling drywall much easier.

Gil Fremont
Taylors, SC

dust collector

3-FUNCTION JUNCTION BOX

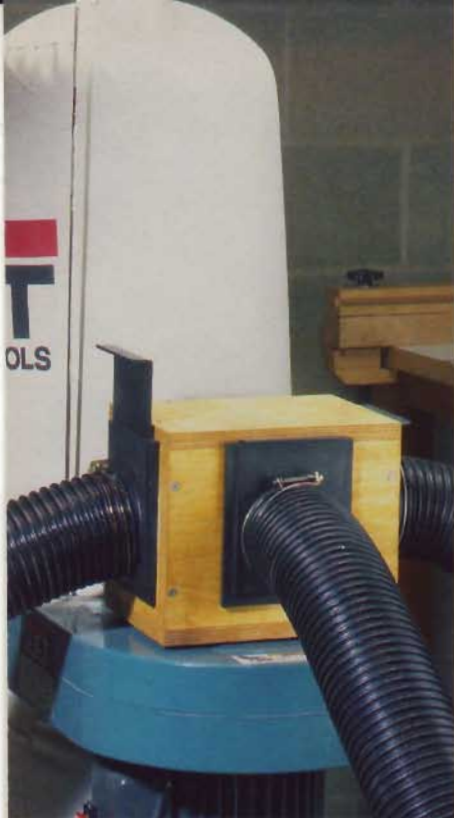
I recently added a small (650 cfm) dust collector to my shop, which works great. The only problem is that a dust collector of this size works with just one tool at a time. And pulling off the hose and moving it from machine to machine is a hassle. To solve this problem, I made a junction box with three blast gates that mounts on my dust collector (see Photo). The box consists of a top and bottom, two sides, and a front and back piece, all made from 3/4" Baltic birch plywood (see Illustration).

To mount the blast gates, I cut centered 4"-dia. holes in all the pieces except the top and bottom. Then I glued the gates in place

with construction adhesive. I also cut a hole in the bottom of the box to fit snugly over the "neck" of the dust collector. This eliminated the need for fasteners. With the holes cut, I screwed the box together.

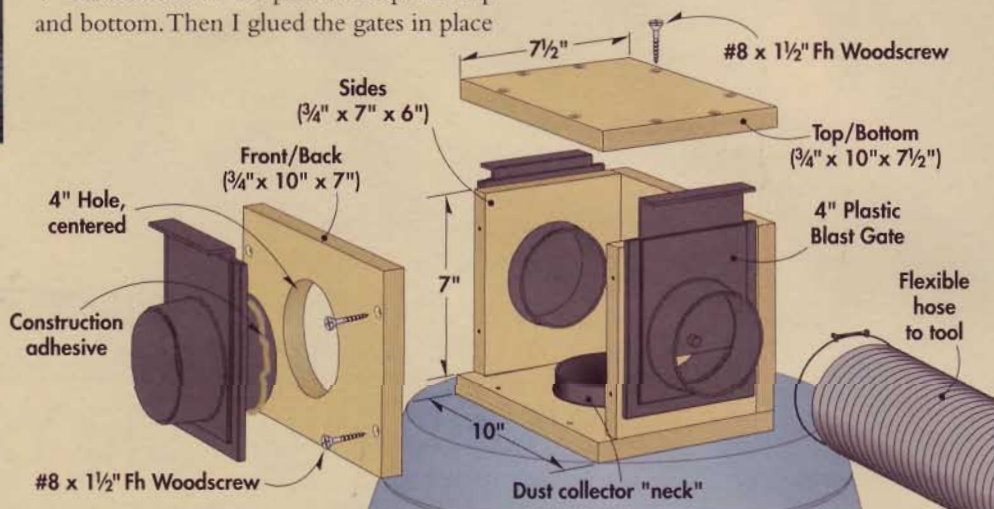
Two of the hoses always remain attached to my table saw and band saw. As for the third hose, I swap it from tool to tool. Note: For maximum draw, close all the gates except the one you're using.

Keith Benjamin
Painted Post, NY



▲ Instead of one outlet, this junction box provides three. This gives you options that normally come with larger, more-expensive dust collection systems.

NOTE:
All parts for junction box
are 3/4" Baltic birch plywood



working with primer END MESSY BUILDUP



Primer paint dries fast — sometimes *too* fast. And the dried paint in the lip of the can prevents the lid from sealing properly. There are two things I do to solve this problem. First, I punch a couple of holes in the lip with a painter's putty knife to let the paint drain back into the can (Photo A). Then before putting the lid back on, I wipe out any remaining paint with a cotton swab (Photo B).

Samuel Lewis
Milton, PA

TOOLS FOR TIPS!

This issue's Featured Tip winner
receives a Stanley Rolling Workshop
filled with premium tools!

Do you have an original shop or home improvement tip to share with other *Workbench* readers? Just write down your tip and mail it to:

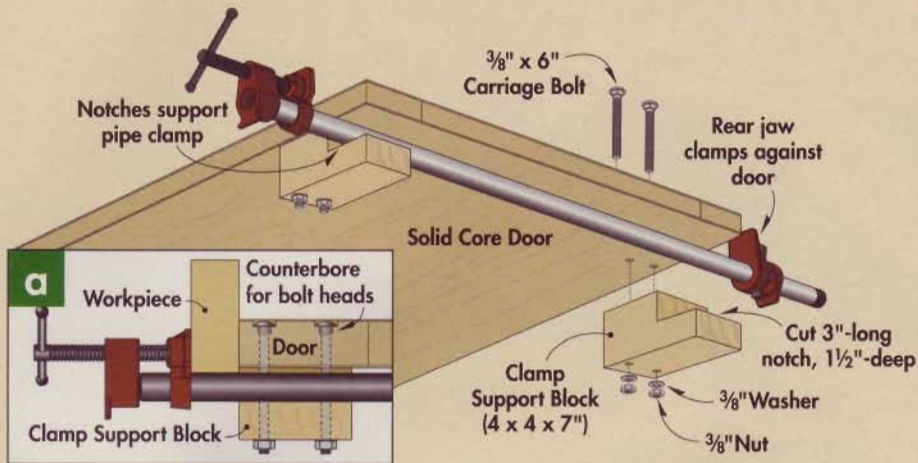
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Editor@Workbenchmag.com



pipe clamp vise PUTTING THE SQUEEZE ON



I have a solid-core door that I use as a portable workbench. The only problem is it doesn't have a vise. To solve this, I made a quick vise out of a pipe clamp and a couple of 4x4 wood blocks (see *Illustration*).

First, I cut matching notches in the 4x4's to hold the tail end of the pipe clamp at the back and to support the bar at the head end. Then I attached each block to the underside of the portable bench with

two carriage bolts, countersunk into the table top to keep the worksurface flat.

To use the vise, simply slide the tail end of the pipe clamp into the notch in the far block and set the adjustable jaw against the door edge to hold it in place. The clamp head now automatically becomes a vise, clamping work against the edge of the door (see *Detail a*).

George Person
Costa Mesa, CA

right on time BATTERY SAVER

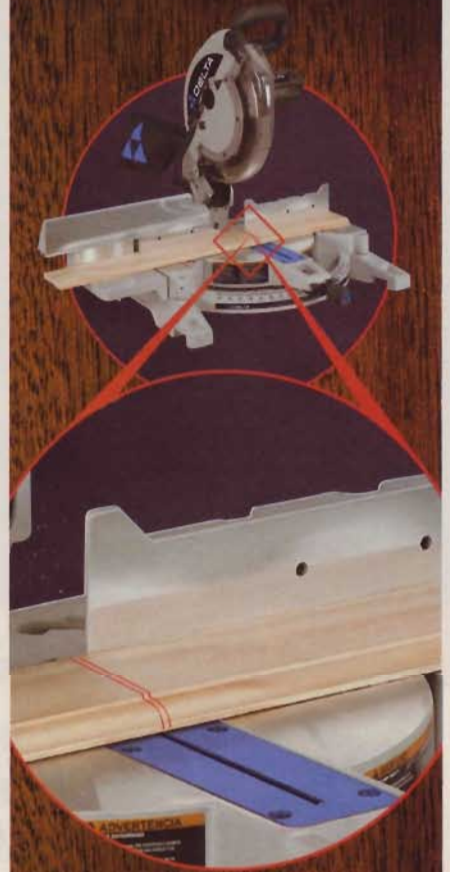


When I begin work on a project, it's nice to have the batteries for my cordless tools fully charged and ready to go. But I don't want to leave them charging all the time, since that can ruin batteries.

To prevent this from happening, I plug the charger into an electric timer and set the dial for the battery's recommended charge time. When the time is up, the power is automatically shut off to the charger.

Gene Wales
University Place, WA

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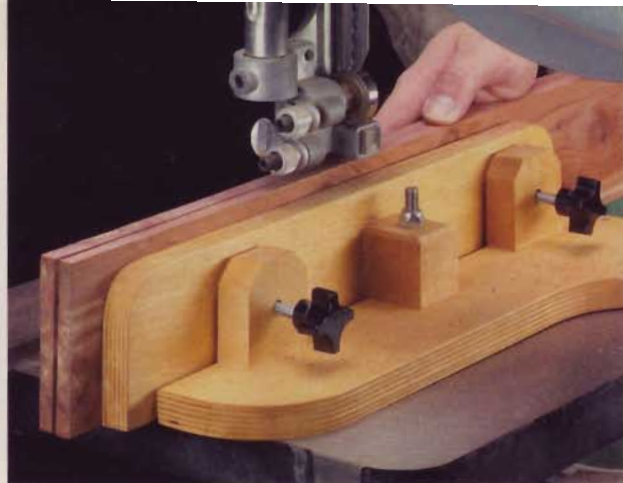
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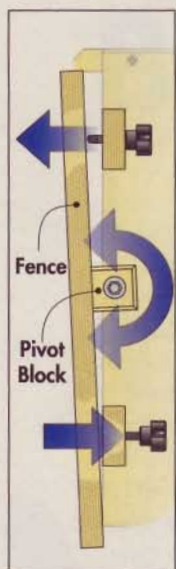
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dealing with drift BAND SAW FENCE



There's no getting around it — band saw blades "pull" a workpiece at an angle as you make a cut. This adjustable fence offers a simple solution.



When making a cut on a band saw, the blade has a tendency to pull the workpiece at an angle. This is called "drift," and it happens because the teeth on the blade are bent outward (set) more on one side than the other. As a result, the blade cuts more aggressively on that side, leading the workpiece off course.

There's no cure for a blade with uneven set. But recently, John Yates of Allison Park, Pennsylvania sent us a project idea that offers a nifty solution for dealing with drift — a band saw fence that can be quickly and easily adjusted to compensate for drift (see *Photo above*).

How It Works — To understand how the fence works, take a look at the *Construction View* below. Notice that it's fastened to a pivot block that

in turn is mounted to a base plate. Two threaded knobs housed in a pair of adjustment blocks let you change the angle of the fence.

To do that, tighten one knob against the fence and back off the other, as shown at left. This swings the fence at an angle to match the angle of drift. (To learn how to determine the angle of drift, see page 24.)

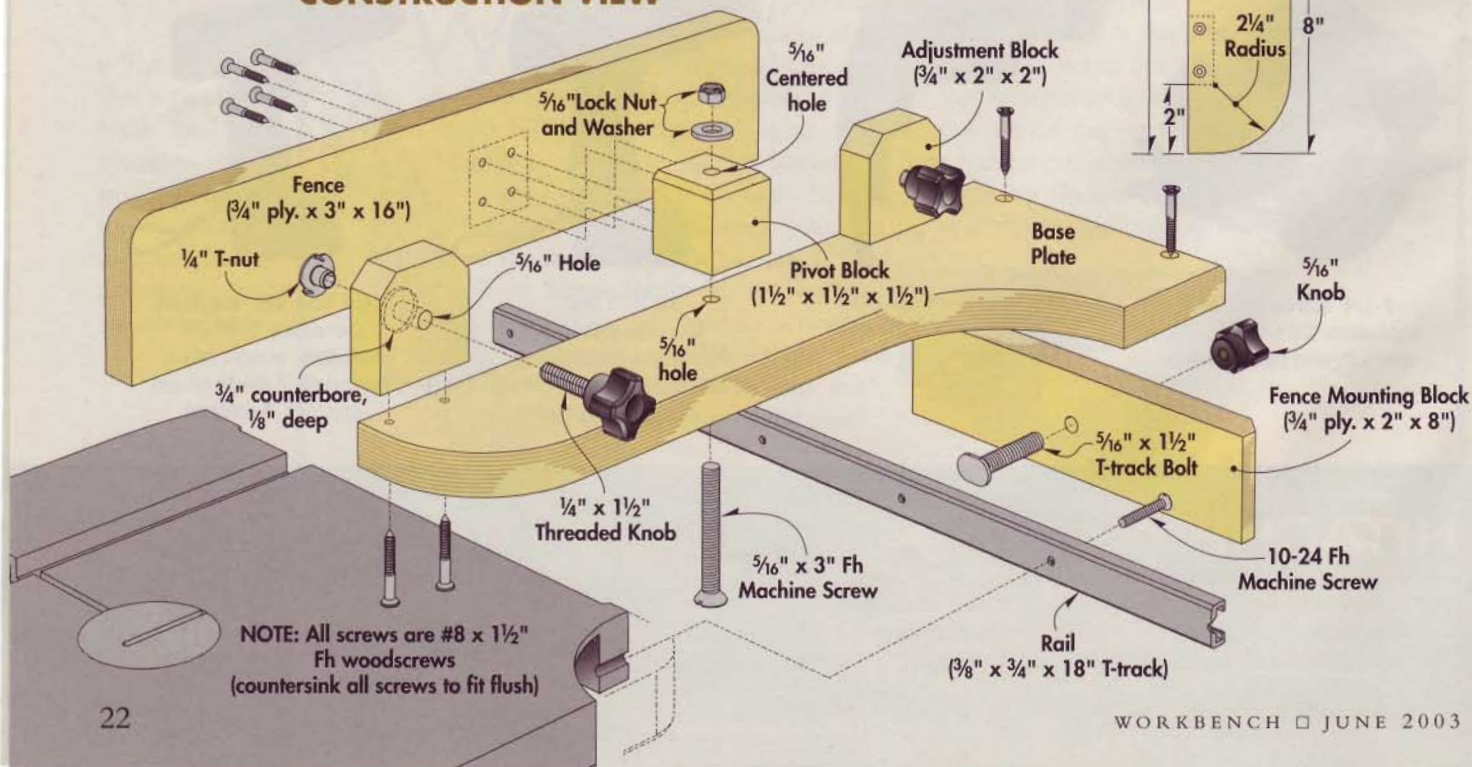
Construction — The construction of the fence is pretty straightforward. Even so, there are a couple of things to note before you get started.

Take the shape of the base plate for instance. It's wide at one end to create a mounting surface for a block that's used to attach the fence to the band saw. Then it gets narrower to provide clearance for the fence to slide all the way to the side.

Also, notice that the pivot block overhangs the base plate by $\frac{1}{4}$ " (*Base Plate Illustration*). This provides clearance as you adjust the angle of the fence. To allow the block to pivot, it's mounted to the base plate with a machine screw and lock nut. Note: For instructions on mounting the fence to the band saw, see page 24.

▲ To make the fence adjustable, it's mounted to a wood block that pivots as you tighten or loosen a pair of knobs.

CONSTRUCTION VIEW



Mounting the Fence

To make the fence adjustable from side to side, it's designed to slide on a metal rail attached to the table of the band saw (see *Photo at right*). Tightening a knob on a bolt housed inside the rail "locks" the fence in place (*Mounting Detail*).

T-Track — The rail is a piece of metal T-track. You can order it from WoodSmithstore.com (515-255-8979) and Rockler.com (800-279-4441), among other sources.

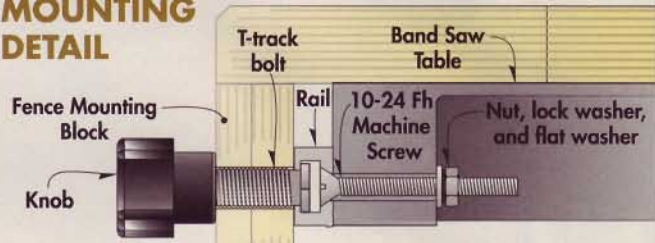
Aside from cutting the T-track to length, there's not much involved in making the rail. Just be sure it's long enough so you can adjust the fence

to the full cutting capacity of the band saw. In this case, the rail is 8" longer than the width of the table.

Mount the Rail — As for mounting the rail, it's held in place with machine screws that pass through countersunk holes drilled in the T-track and the pre-drilled holes in the band saw table (see *Construction View on page 22 and Mounting Detail at right*). To keep vibration from the saw from loosening the rail, use lock washers and nuts to secure it. Also, be sure to mount the rail low enough so it clears the miter gauge slot in the table.



MOUNTING DETAIL



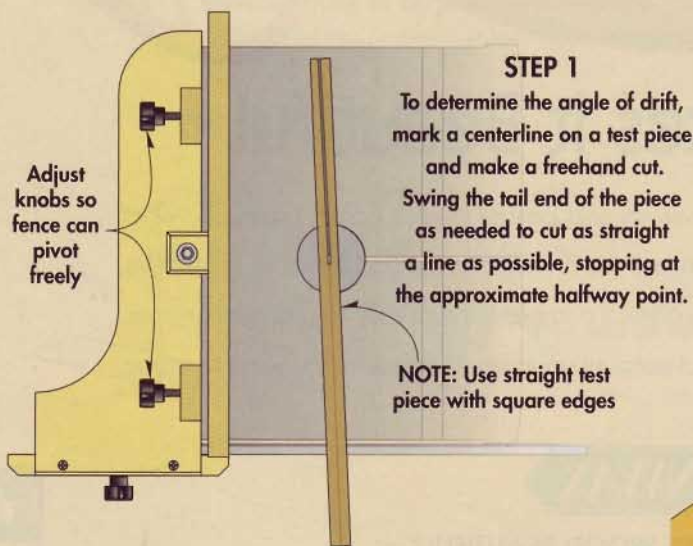
Adjusting the Fence to Match the "Drift Angle"

It only takes a few minutes to adjust the fence to match the "drift angle" of the blade.

Determine Drift — An easy way to determine the drift angle is to make a test cut *without* using the fence. Start by marking a line on the top edge of a test piece and then feed it into the blade (*Step 1*). If the blade drifts to the right or left of the line, swing the tail end of the

piece *toward* the direction of drift. When you reach the halfway point, stop, turn off the saw, and without moving the piece, clamp it to the table. This is the "drift angle" of the blade.

Adjust Fence — To adjust the angle of the fence, slide it close to the test piece and lock it in place. Now adjust the knobs as needed to "snug" the fence against the test piece (*Step 2*).



WORKBENCH
HOME

A woman with curly hair, wearing a bright yellow long-sleeved shirt and light-colored pants, sits on a white plastic patio bench. A young girl with blonde hair, wearing a blue short-sleeved shirt and light-colored pants, sits next to her. They are both looking at an open book held by the girl. The bench is part of a 4-piece set, including a matching coffee table in front of it. The setting is outdoors on a stone patio with a wooden fence in the background.

4-piece
easy-to-build
Patio Set



Keep it simple with a bench and two complementary tables. Or lose the legs and swing in style.

Spring was indeed “sprung” on me this year. Grass was growing and birds were singing, but the patio furniture I’d been promising myself since last fall was still just a promise. With the season upon me, I figured there was no way I’d get an entire set of furniture built in time to enjoy it this year.

Once again, however, the *Workbench* design staff mobilized to bail me out with this beautiful set of outdoor furniture that’s — most importantly — a quick build, but also sturdy, stylish, and adaptable.

Interestingly enough, the fact that the furniture is sturdy and easy to build comes from the same thing — the right joinery for the job — half laps and dadoes. The stylishness is the product of a few decorative touches, like the diamond-shaped cutouts in the table tops and top slat of the bench. Those diamond-shapes are mirrored by three applied blocks that adorn the rails of the tables and benches. Finally, the top slat of the bench is cut in a stepped pattern to lend it more visual interest.

The set really is adaptable, too. The plans for the bench can easily be turned into a swing (pictured above) or a chair available at WorkbenchMagazine.com.



fashioning a cedar Bench Frame

The framework of this bench is built in subassemblies — two end assemblies, two middle assemblies, and two rails that hold the assemblies together (see the *Frame Construction View* below). The really interesting thing about this approach, though, is the way these parts virtually “lock” together because of the way the joinery is structured.

To see what I mean, take a look at the *End Assembly* drawing on the next page. The rear leg (A) and front leg (B) are dadoed for the seat support (C). The support itself is rabbeted to create a half-lap joint with the rear leg, but simply rests in the dado on the front leg. Also notice that the seat support doesn't cover

the full width of the dado in the front or rear leg. This allows space for the rails to be fit into place and tie the entire frame together.

Having joinery lock together is, of course, a bit oversimplified. Every one of these joints is actually fastened with polyurethane glue and stainless steel screws — two important ingredients for weatherproof joinery. For some tips on using “poly” glue, see the sidebar on the facing page.

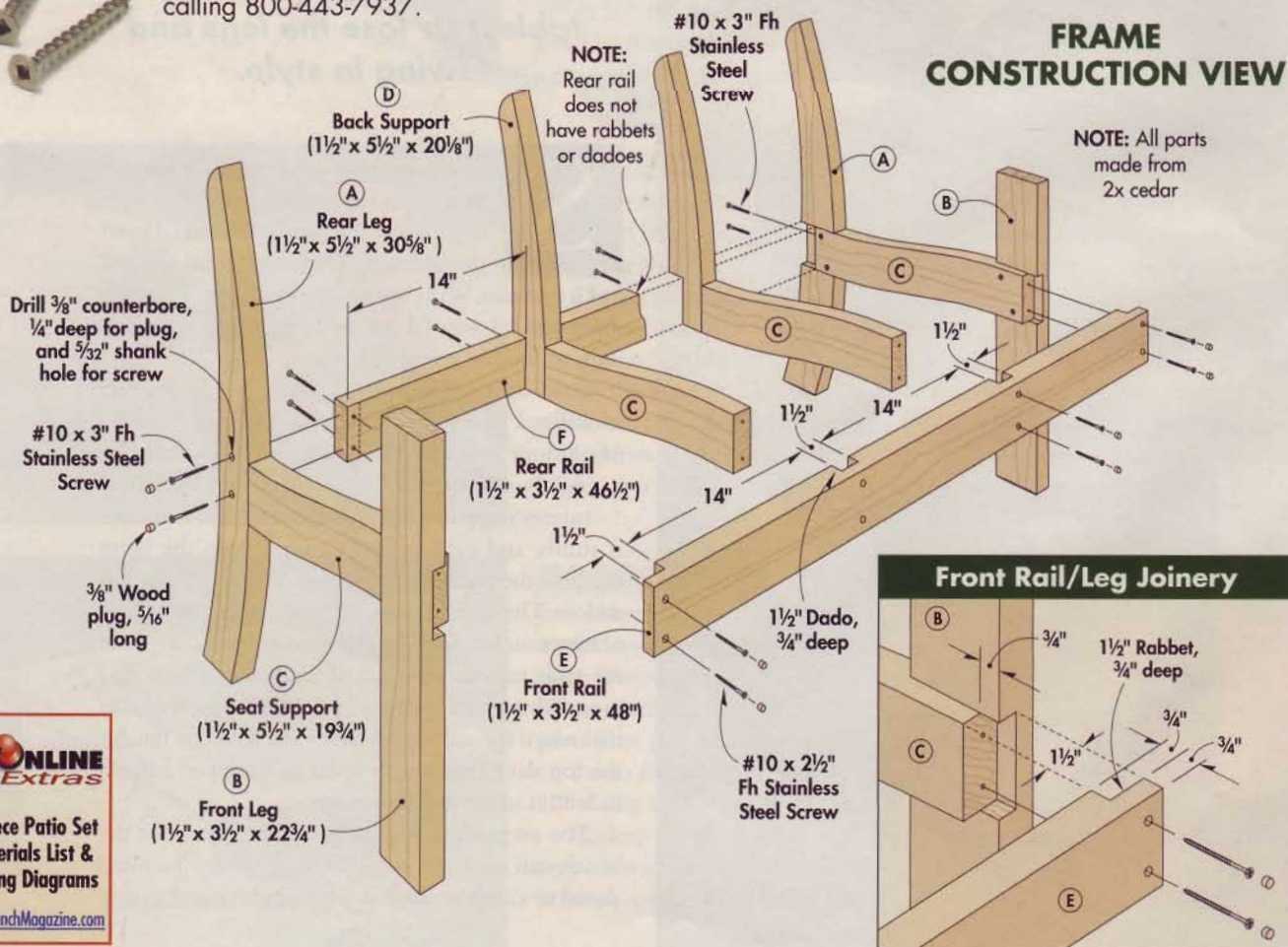
End Assemblies

As you begin building the end assemblies, one thing to note is that these are a *mirrored set*. It's surprisingly easy to get mixed up and acci-

▲ Building the frame is done in subassemblies — two end assemblies and two middle assemblies. These are joined with a front and rear rail.



◀ To avoid rust, use stainless steel screws. They're available from McFeelys.com or by calling 800-443-7937.



ONLINE Extras
4-Piece Patio Set Materials List & Cutting Diagrams
WorkbenchMagazine.com

dentally cut a half lap on the wrong side of one of the pieces. So pay close attention to the layout and check your work as you go.

To make the rear leg and seat support, simply lay out the shape on a cedar 2x6 (see *Patterns below*), cut the dados and rabbets to form the half laps, and then shape the pieces on a band saw. For the front legs, trim them to final length and cut the dados.

Middle Assemblies

Next come the middle assemblies. These consist of a seat support (C) and back support (D). The order of operation here is the same as for the end assemblies — draw patterns onto blanks, cut the joinery, and band saw the shapes. There is one important difference to note about the back supports. Notice that the rabbet in the back support is notched to provide clearance for the rear rail.

Rails

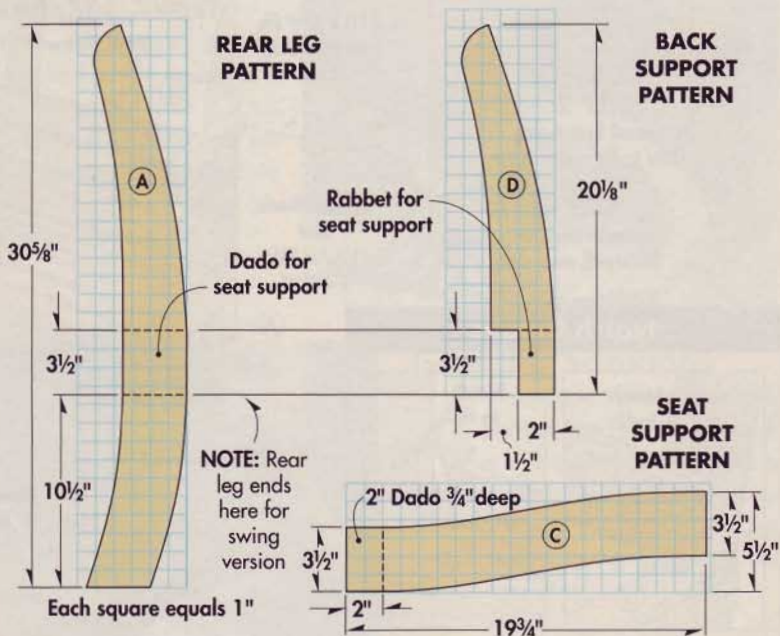
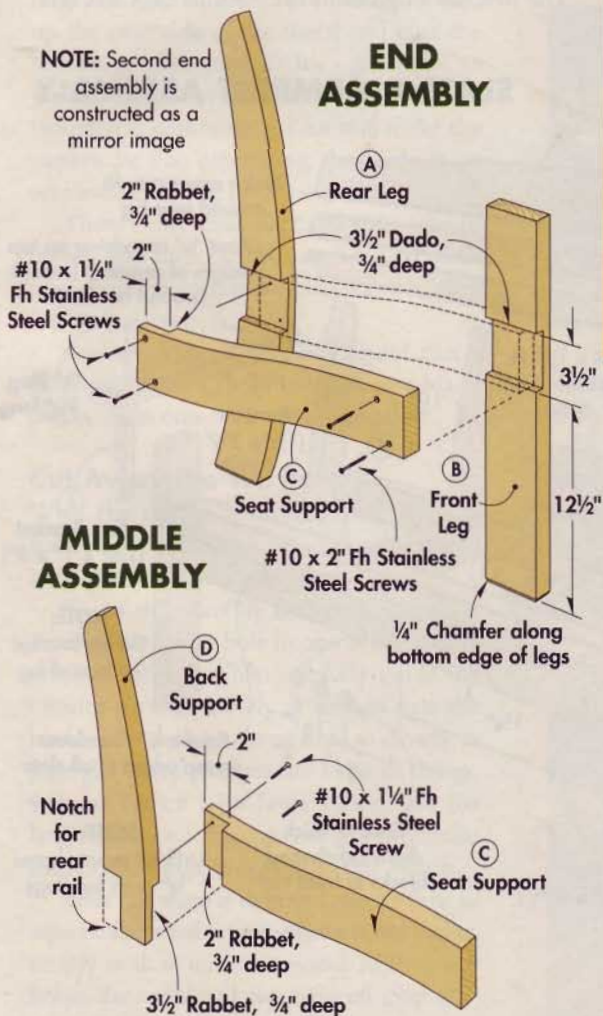
The final pieces of the framework are the rails. The front rail (E) is rabbeted and dadoed to join with the end and middle assemblies. The rear rail (F) is simply cut to length and fits into the dados in the rear legs. The middle assemblies rest on top of the rail.

Using Polyurethane Glue

► Begin by lightly dampening the wood with a spray bottle. This opens up the pores of the wood and speeds the curing of the glue. Spread a moderate amount of glue into the joint. (This stuff foams to three times its original volume).



▼ After three to four hours, the glue will be fully cured. The hardened foam can then be easily removed with a chisel or scraper.



custom-fit Seat Slats



▲ The slats are simple to make from cedar decking material, but require some fitting for the best results.

► Fitting a slat around the armrests can be done accurately by scribing the cutout onto a piece of scrap.



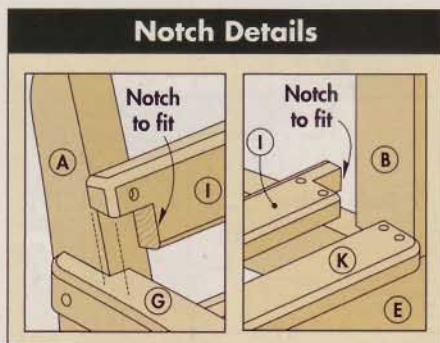
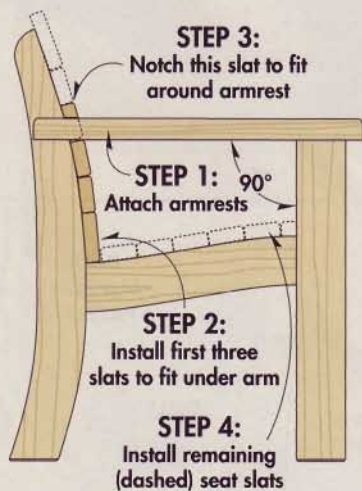
With the structure of the bench done, adding the slats and armrests seems like a pretty straightforward procedure. But if you look closely at the *Assembly* drawing below, you'll see that there's a certain amount of fitting necessary to make these parts look their best when the bench is assembled. Specifically, one of the back slats needs to be cut to fit around the armrests, which in turn are notched to fit around the rear legs (*Notch Details*). Also, one seat slat needs to be fit around the front legs.

Start at the Back — To make all these pieces fit together with minimal fuss, I laid out an order of assembly that's detailed in the *Slat Installation* drawing below left. The first step is attaching the armrests (G). These are cut from 2x4s following the pattern on the facing page.

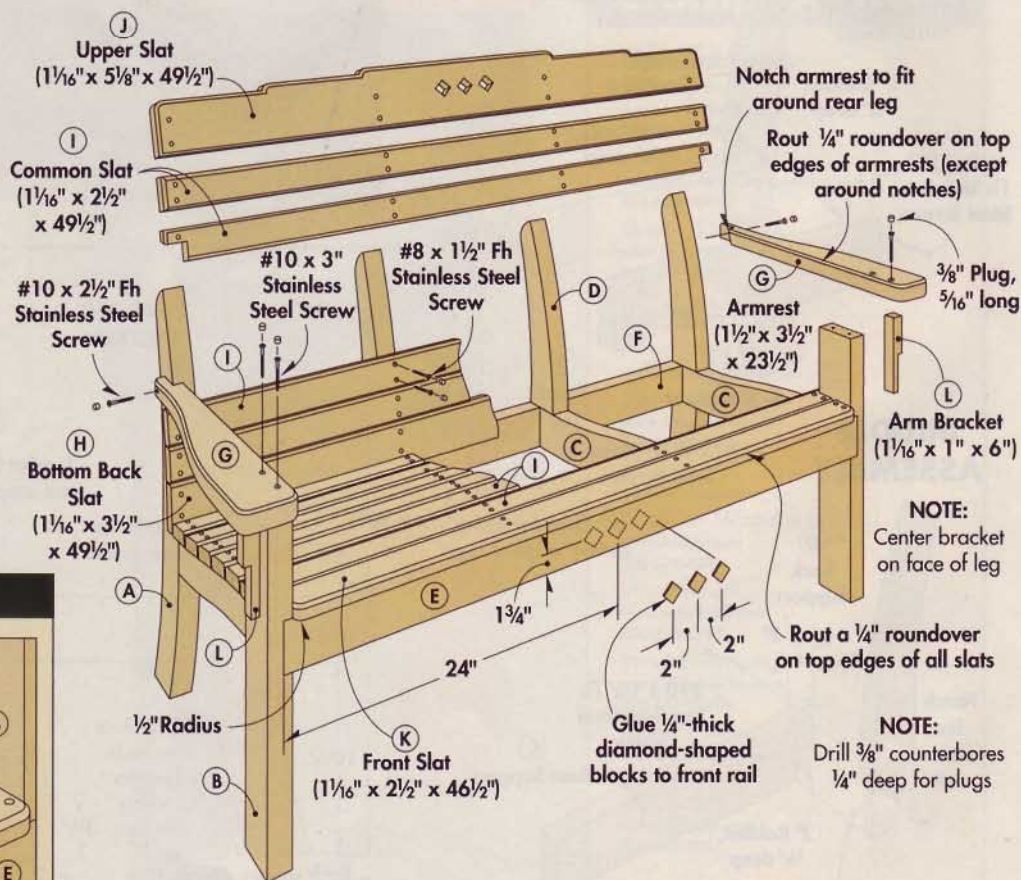
With both armrests in place, you can begin placing the back slats. These are all cut from 5/4 cedar decking (1 1/16"-thick boards). The slats vary in length, width, and even shape, depending on where they are placed on the bench.

The first slat to go on is the bottom back slat (H).

SLAT INSTALLATION



SLATS & ARMREST ASSEMBLY



This slat rests on the seat supports and is screwed to the back supports. Notice here that all the slats are attached with stainless steel screws. The screws are driven into pre-drilled counterbored shank holes. As a final step, all the counterbores will be filled with cedar plugs. But first, you need to get the rest of the slats in place.

With the lower slat attached, you can now add two common slats (I), dividing the space between the bottom slat and armrests.

Now you'll need to fit a slat around the armrests. This is one of the common slats that's notched to rest on the arms. To lay out the notches, scribe the shape onto a scrap piece as shown in the *Inset Photo* on page 32. Cut the notch in the scrap, then transfer the shape onto the slat and cut it to fit. From here, you can attach one more common slat and the upper slat (J).

The decorative "stairstep" profile of the upper slat is shown in the *Upper Slat* draw-

ing below. And making the diamond cutouts is explained at the bottom of the page.

Seat Slats — With the back assembled, the seat slats are next. These are mostly common slats (I), though one does need to be notched around the front legs. The front slat (K) is shortened to fit between the legs and has radiused corners for a finished look.

Finishing Details — Just a few small things left to complete the patio bench. First, are the cedar arm brackets (L). These are cut from decking and glued in place (see *Arm Bracket*, below).

Next are the plugs I mentioned earlier. The sidebar at right offers a few pointers for getting tight-fitting plugs.

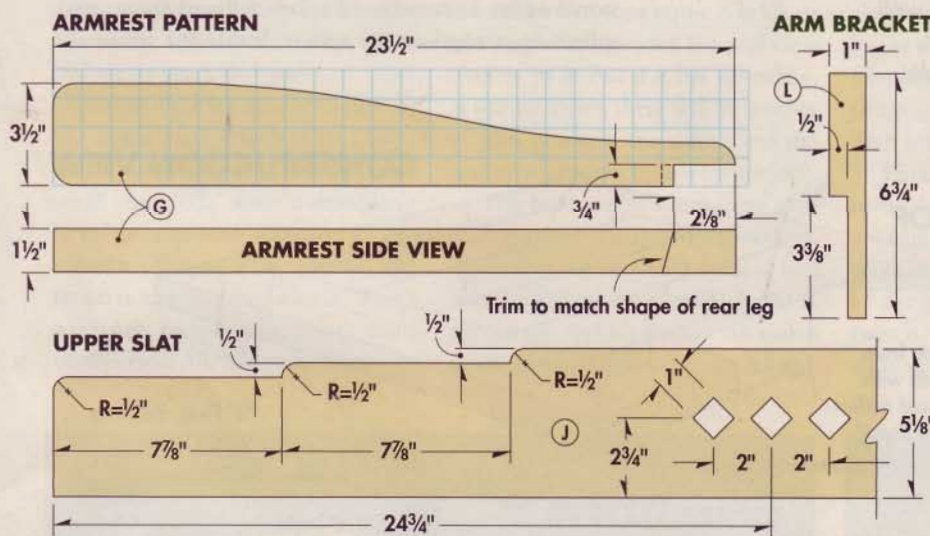
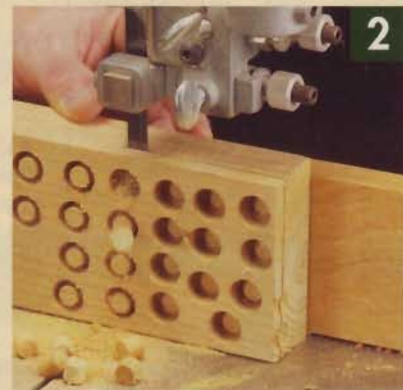
Finally, you can add the diamond-shaped blocks to the front rail. Take another look at the *Adding Decorative Diamonds* sidebar below to see how I made these blocks. Then glue and clamp them in place.

Tapered Plugs



A tapered wood plug fits more snugly into a hole than a straight-sided plug. You can make your own tapered plugs using a special plug cutting bit. To do that, drill the plugs in a scrap (Fig. 1) and then "free" them on the band saw (Fig. 2).

Sources: For tapered plug cutting bits, call Rockler (800-233-9359) or McFeely's (800-847-7136).

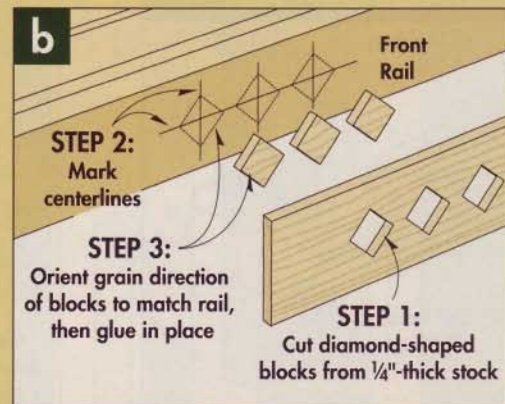
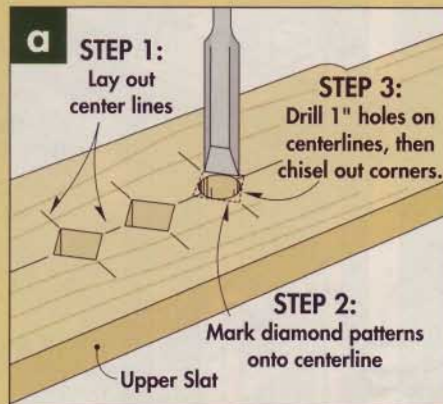


Adding Decorative Diamonds

This bench has two diamond-shaped decorative elements: the cutouts in the upper slat and the applied blocks on the front rail.

Cutouts — The sequence shown in *Figure a* will ensure crisp, clean sides in the cutouts. I used a sanding stick for final touch-up work.

Applied Blocks — The diamond-shaped blocks are cut from 1/4"-thick stock (Fig. b) and attached with polyurethane glue.



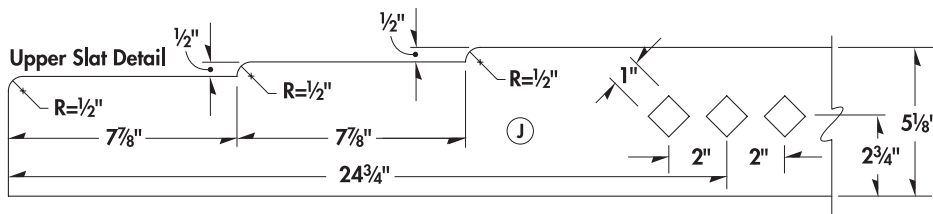
MATERIAL AND HARDWARE LIST

A (2) Rear Leg (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $30\frac{5}{8}$ "
B (2) Front Leg (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $22\frac{3}{4}$ "
C (4) Seat Support (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $19\frac{3}{4}$ "
D (2) Back Support (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $20\frac{1}{8}$ "
E (1) Front Rail (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x 48"
F (1) Rear Rail (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $46\frac{1}{2}$ "
G (2) Arm Rest (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $23\frac{1}{2}$ "
H (1) Bottom Back Slat (1x6 decking)	$1\frac{1}{16}$ " x $3\frac{1}{2}$ " x $49\frac{1}{2}$ "
I (10) Common Slat (1x6 decking)	$1\frac{1}{16}$ " x $2\frac{1}{2}$ " x $49\frac{1}{2}$ "
J (1) Upper Slat (1x6 decking)	$1\frac{1}{16}$ " x $5\frac{1}{8}$ " x $49\frac{1}{2}$ "
K (1) Front Slat (1x6 decking)	$1\frac{1}{16}$ " x $2\frac{1}{2}$ " x $46\frac{1}{2}$ "
L (2) Arm Bracket (1x6 decking)	$1\frac{1}{16}$ " x 1" x 6"
M (3) Decorative Diamonds (1x6 decking)	$\frac{1}{4}$ " x 1" x 1"

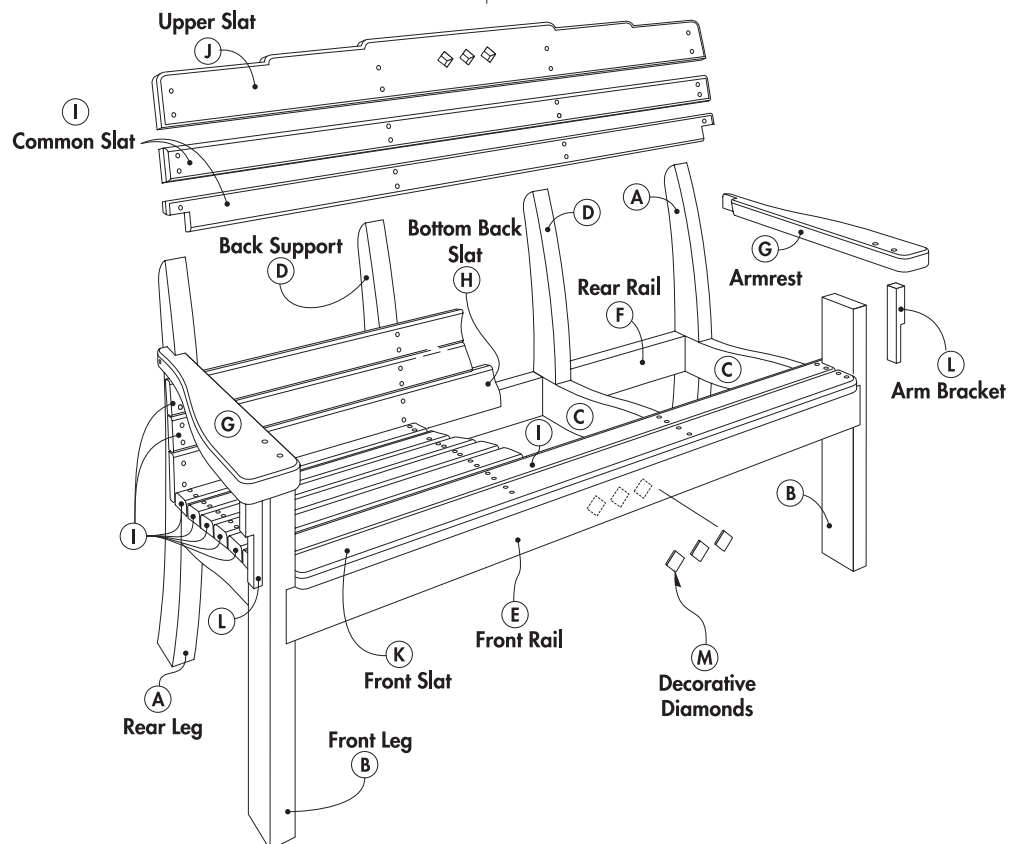
HARDWARE

- (16) #10 x 3" Stainless Steel Screws
- (10) #10 x $2\frac{1}{2}$ " Stainless Steel Screws
- (4) #10 x 2" Stainless Steel Screws
- (8) #10 x $1\frac{1}{4}$ " Stainless Steel Screws
- (102) #8 x $1\frac{1}{2}$ " Stainless Steel Screws
- (140) $\frac{3}{8}$ " Wood plugs, $\frac{5}{16}$ " long

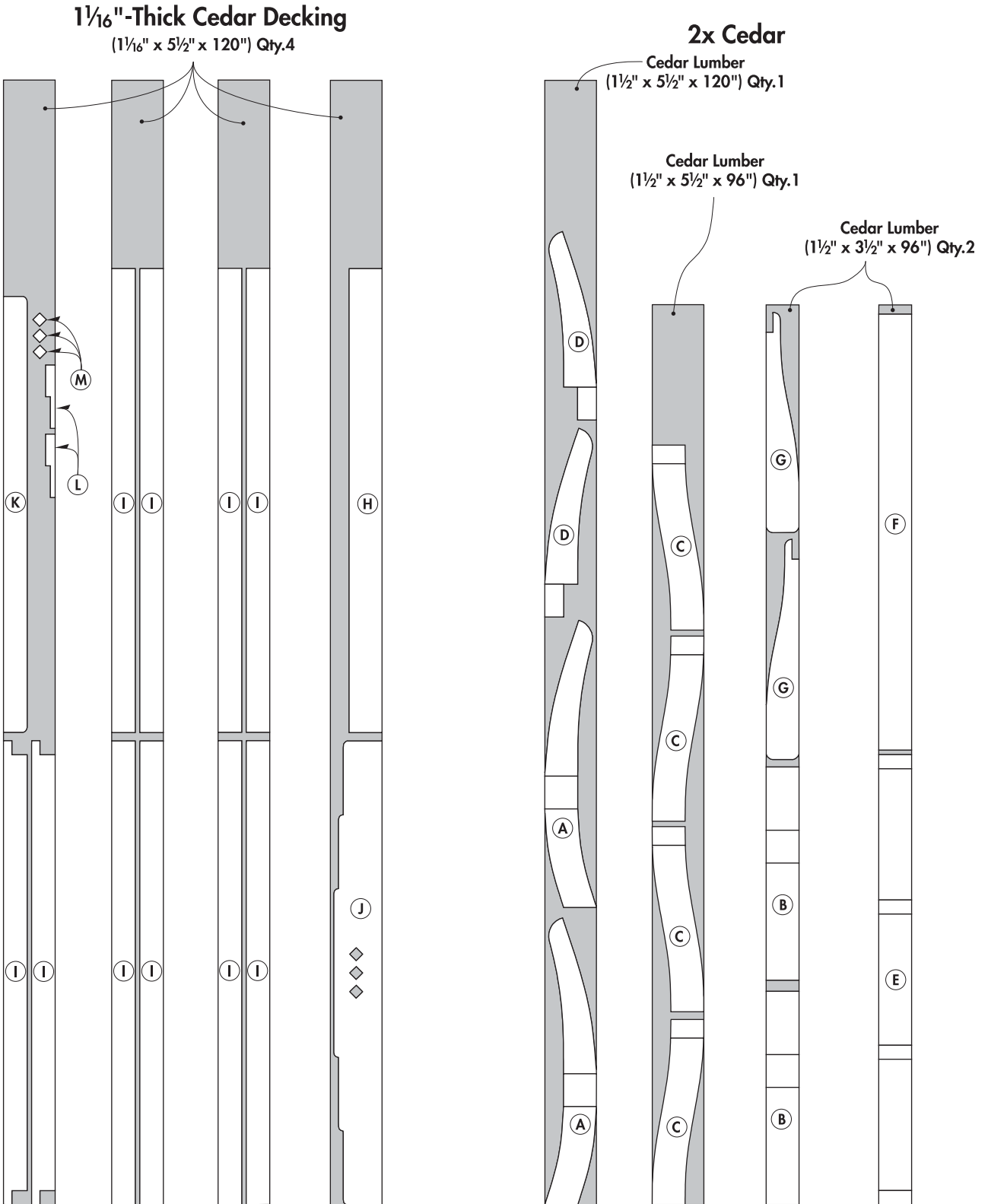
BENCH CONSTRUCTION VIEW



Joinery details can be found in the Patio Set article of issue 277 of Workbench Magazine (Pages 28-37)



CUTTING DIAGRAM



MATERIAL AND HARDWARE LIST

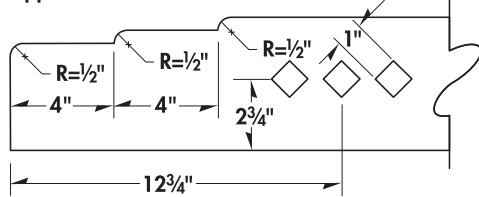
A (2) Rear Leg (2x6)	$1\frac{1}{2}'' \times 5\frac{1}{2}'' \times 30\frac{5}{8}''$
B (2) Front Leg (2x4)	$1\frac{1}{2}'' \times 3\frac{1}{2}'' \times 22\frac{3}{4}''$
C (2) Seat Support (2x6)	$1\frac{1}{2}'' \times 5\frac{1}{2}'' \times 19\frac{3}{4}''$
D (2) Arm Rest (2x4)	$1\frac{1}{2}'' \times 3\frac{1}{2}'' \times 23\frac{1}{2}''$
E (1) Front Rail (2x4)	$1\frac{1}{2}'' \times 3\frac{1}{2}'' \times 24''$
F (1) Rear Rail (2x4)	$1\frac{1}{2}'' \times 3\frac{1}{2}'' \times 22\frac{1}{2}''$
G (3) Decorative Diamonds (1x6 decking)	$1\frac{1}{4}'' \times 1'' \times 1''$
H (1) Upper Slat (1x6 decking)	$1\frac{1}{16}'' \times 5\frac{1}{8}'' \times 25\frac{1}{2}''$
I (10) Common Slat (1x6 decking)	$1\frac{1}{16}'' \times 2\frac{1}{2}'' \times 25\frac{1}{2}''$
J (1) Bottom Back Slat (1x6 decking)	$1\frac{1}{16}'' \times 3\frac{1}{2}'' \times 25\frac{1}{2}''$
K (1) Front Slat (1x6 decking)	$1\frac{1}{16}'' \times 2\frac{1}{2}'' \times 22\frac{1}{2}''$
L(2) Arm Bracket (1x6 decking)	$1\frac{1}{16}'' \times 1'' \times 6''$

HARDWARE

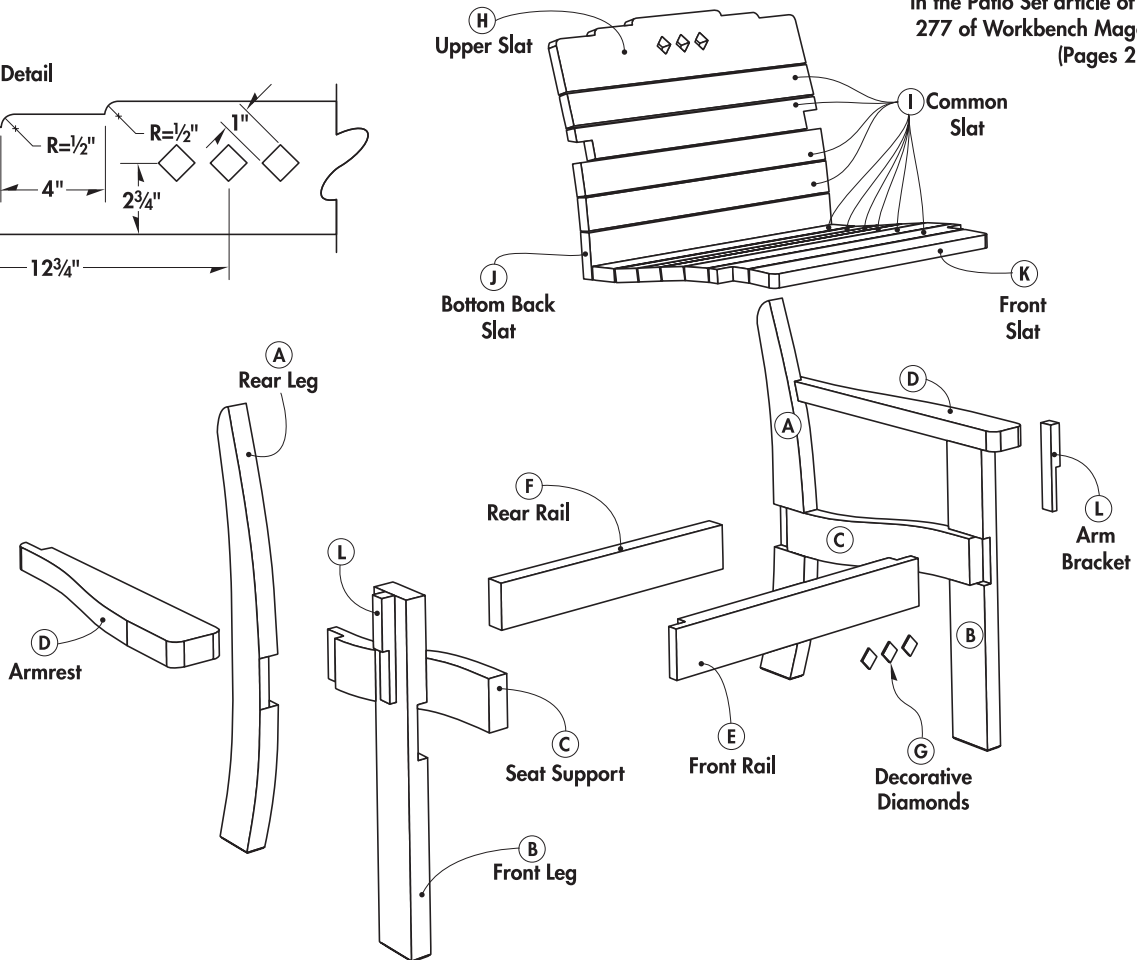
- (12) #10 x 3" Stainless Steel Screws
- (6) #10 x 2 1/2" Stainless Steel Screws
- (52) #8 x 1 1/2" Fh Stainless Steel Screws
- (70) 3/8" Wood plugs, 5/16" long

CHAIR CONSTRUCTION VIEW

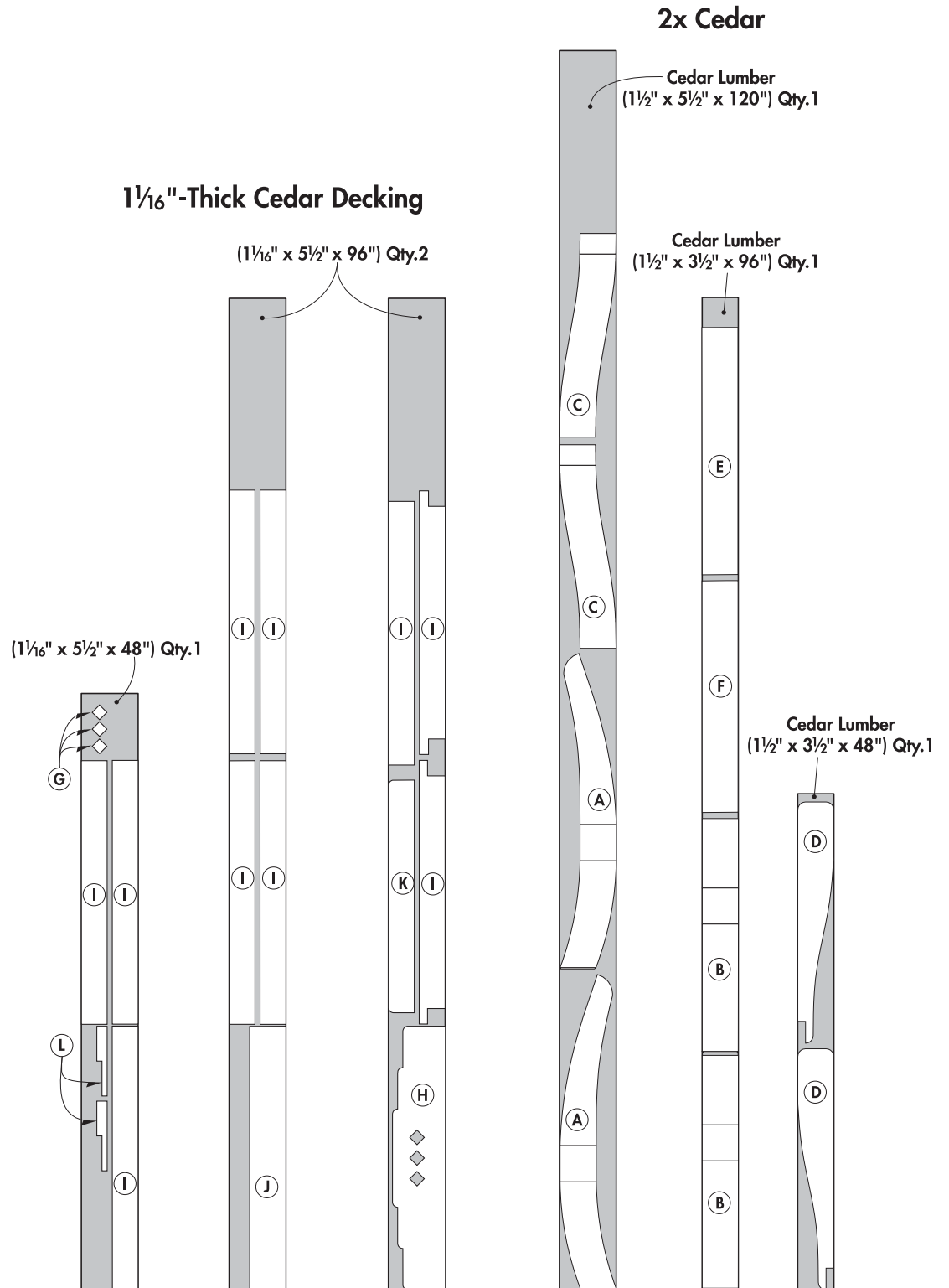
Upper Slat Detail



Joinery details can be found in the Patio Set article of issue 277 of Workbench Magazine (Pages 28-37)



CUTTING DIAGRAM





picture-perfect Patio Table

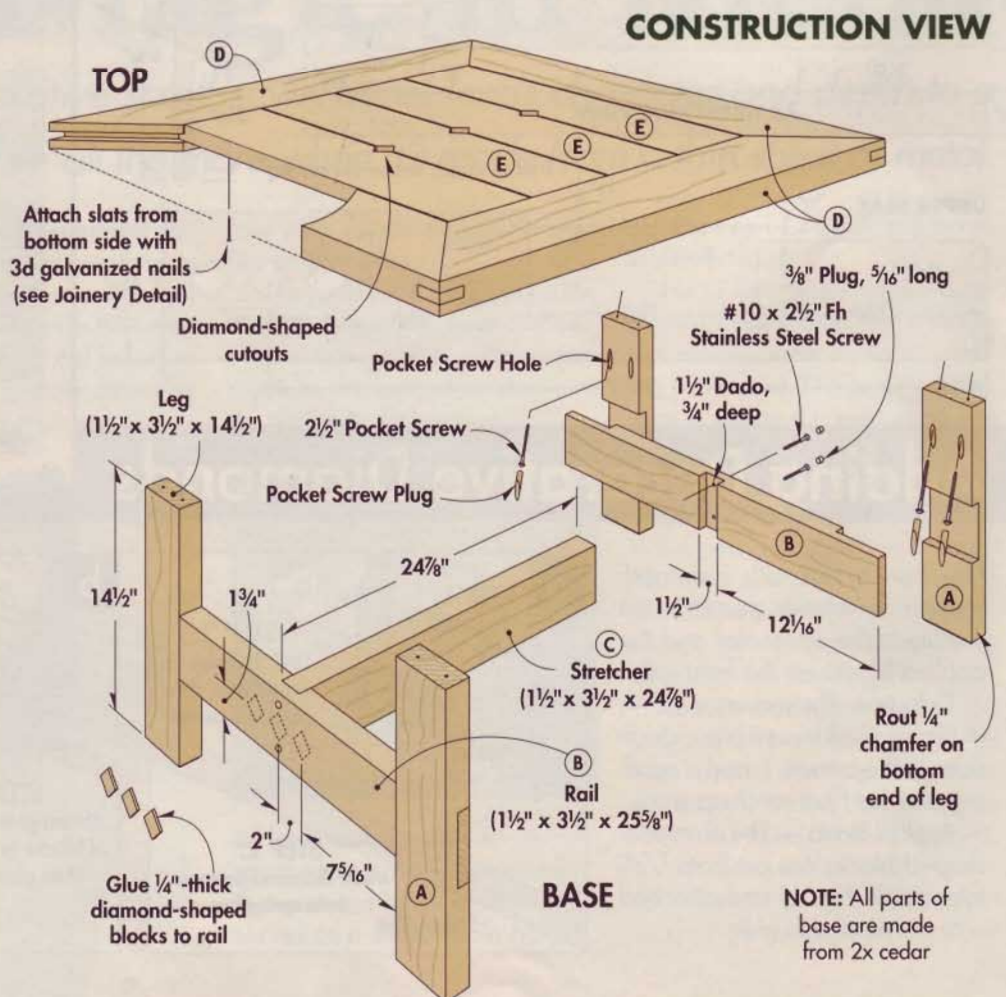
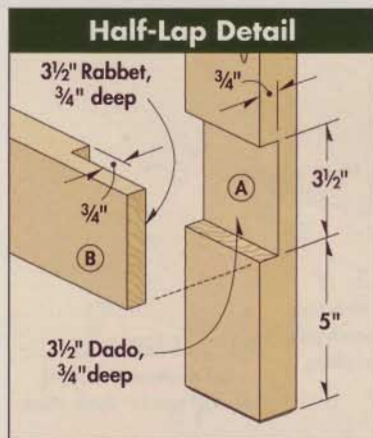
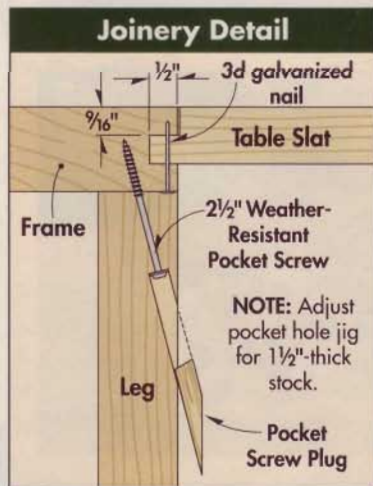
This painted patio table is a perfect companion piece to the bench. Like the bench, the table has a simple, straightforward design that makes it quick and easy to build. Plus it carries over the decorative, diamond-shaped details to visually tie the table and bench together.

Build the Base — The base of the table is made up of two leg assemblies connected by a stretcher (*Construction View*). Here again, I used 2x cedar for all the base parts.

Each leg assembly consists of two legs (A) and a rail (B) that are assembled with half-lap joints. You'll need to cut a dado in each rail to accept a stretcher (C). After gluing and screwing the leg assemblies together, add the stretcher. Then glue and clamp the diamond-shaped blocks to both rails.

Table Top — The table top is also built with dimensional cedar. It consists of a 2x6 mitered frame with splines to strengthen the miters. Inside the frame is a

▲ The simple construction of the bench, as well as the diamond-shaped decorative accents, carry over to this complementary patio table.



series of slats made of cedar decking. The slats are joined to the frame with tongue-and-groove joinery (see *Joinery Detail*).

Building the top begins with mitering the frame pieces (D) to length. Then cut a groove in two — and only two — of the frame pieces to accept the tongues of the slats.

At this point, you're ready to cut a groove in each miter to accept the splines. This is an unusual operation that's made much easier with the proper setup. The *Photo* at the top of this page shows the table saw technique I use to hold the board at the proper angle and keep it tight against the fence for an accurate cut.

Make Matching Splines — With the spline grooves cut, you can now make the splines to match. To get the most strength out of these pieces, you need to consider the grain direction in the spline. The goal here is to have the grain in the

splines running perpendicular to the joint. That means you'll want to cut the splines from the *length* of the board (see *margin Photo*).

Add the Slats — The slats (E) for the table come next and are cut to length from cedar decking. After cutting them to length, you can cut the diamond-shaped patterns in each slat at the band saw (*Diamond Detail*). The only other preparation they require is to have a tongue cut on each end (*Joinery Detail*). This can be done at the table saw using a dado blade.

Assemble the Top — To assemble the top, start by placing the slats into the grooved frame pieces and spacing them evenly. Next, glue the splines into the mitered frame ends and clamp the assembly together. The splines will need to be trimmed flush once the glue has dried.

One final detail is to tack each slat in place, centering the nail on the width of the slat. This will hold



▲ A block clamped to the mitered frame piece and a featherboard ensure accuracy and safety when cutting the grooves for the splines.

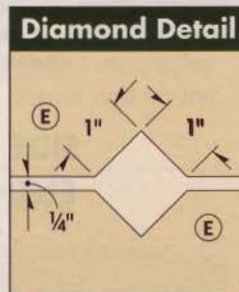
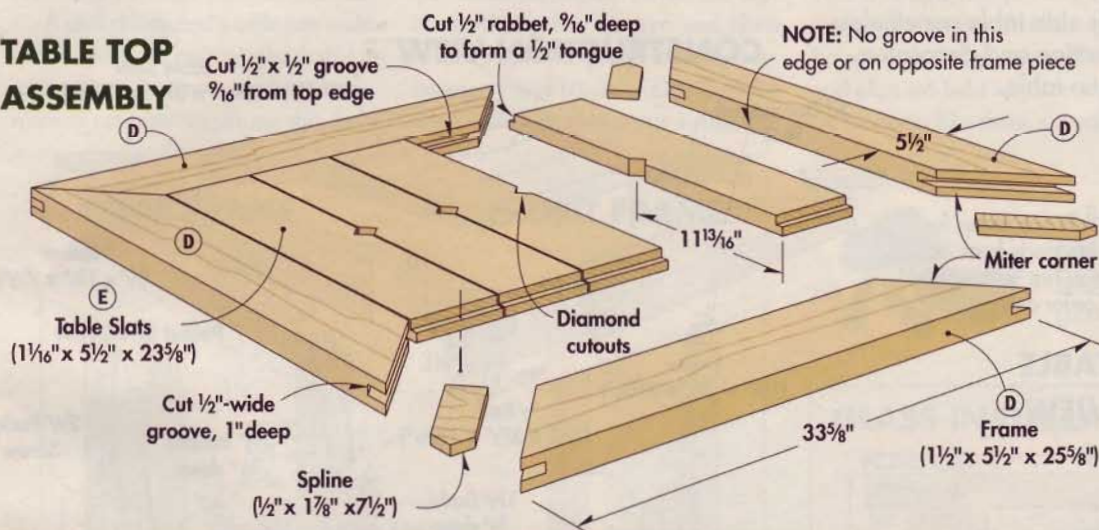
the slat in place, but still allow it to expand and contract.

Now you're ready to attach the top to the base. I chose pocket screws for this (*Joinery Detail*). The sidebar below has a few tips for making the pocket hole joints weatherproof and virtually invisible.



▲ Cutting splines from the length of the board creates the strongest joint.

TABLE TOP ASSEMBLY



Pocket-Hole Plugs

Plugging pocket holes is more about making them invisible than waterproof.

Start by dampening the pocket holes and applying the polyurethane glue (Fig. 1). Next, clamp the plugs in place while the glue dries. Then, trim the plug flush with the surface of the leg (Fig. 2).

Sources: Pocket hole plugs are available at many woodworking stores. Or, call the Kreg Tool Company (800-447-8638) or visit them online at KregTool.com



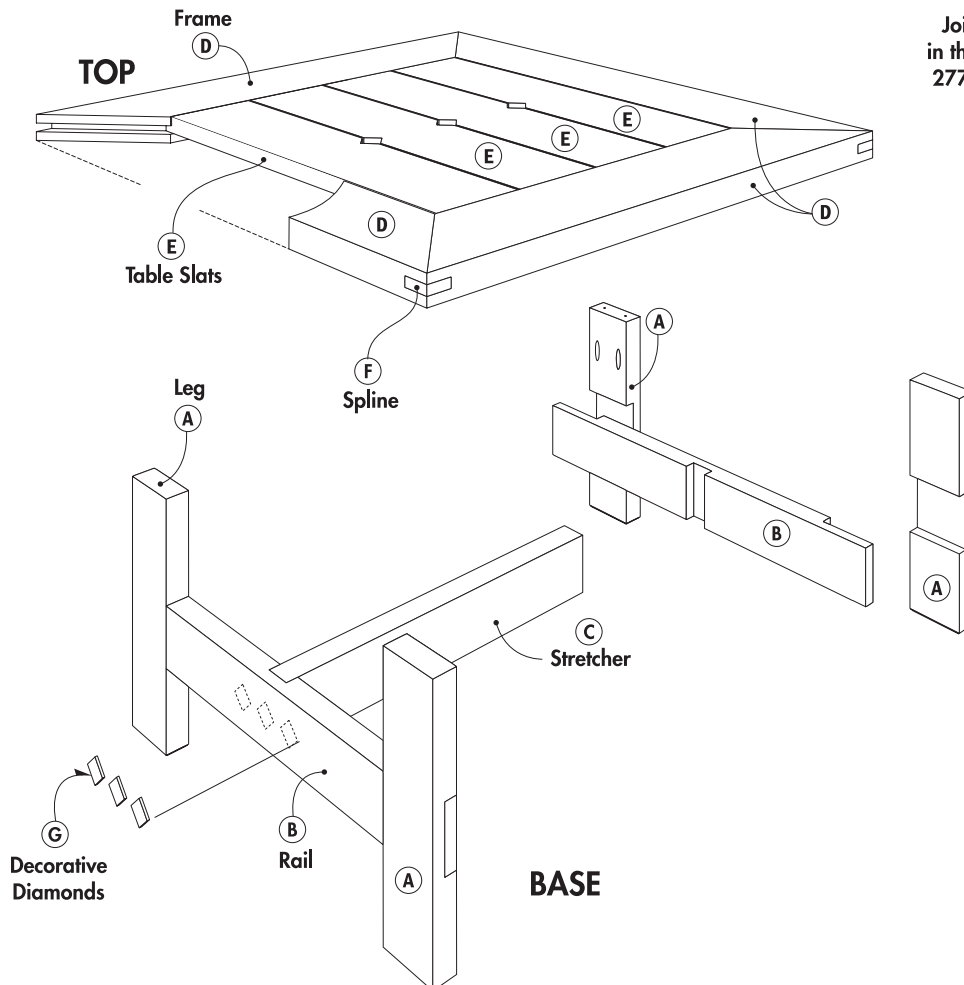
MATERIAL AND HARDWARE LIST

A (4) Leg (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $14\frac{1}{2}$ "
B (2) Rail (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $25\frac{5}{8}$ "
C (1) Stretcher (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $24\frac{7}{8}$ "
D (4) Frame (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $25\frac{5}{8}$ "
E (4) Table Slats (1x6 decking)	$1\frac{1}{16}$ " x $5\frac{1}{2}$ " x $23\frac{5}{8}$ "
F (4) Spline (1x8)	$\frac{1}{2}$ " x $1\frac{7}{8}$ " x $7\frac{1}{2}$ "
G (6) Decorative Diamonds (1x8)	$\frac{1}{4}$ " x 1 " x 1 "

HARDWARE

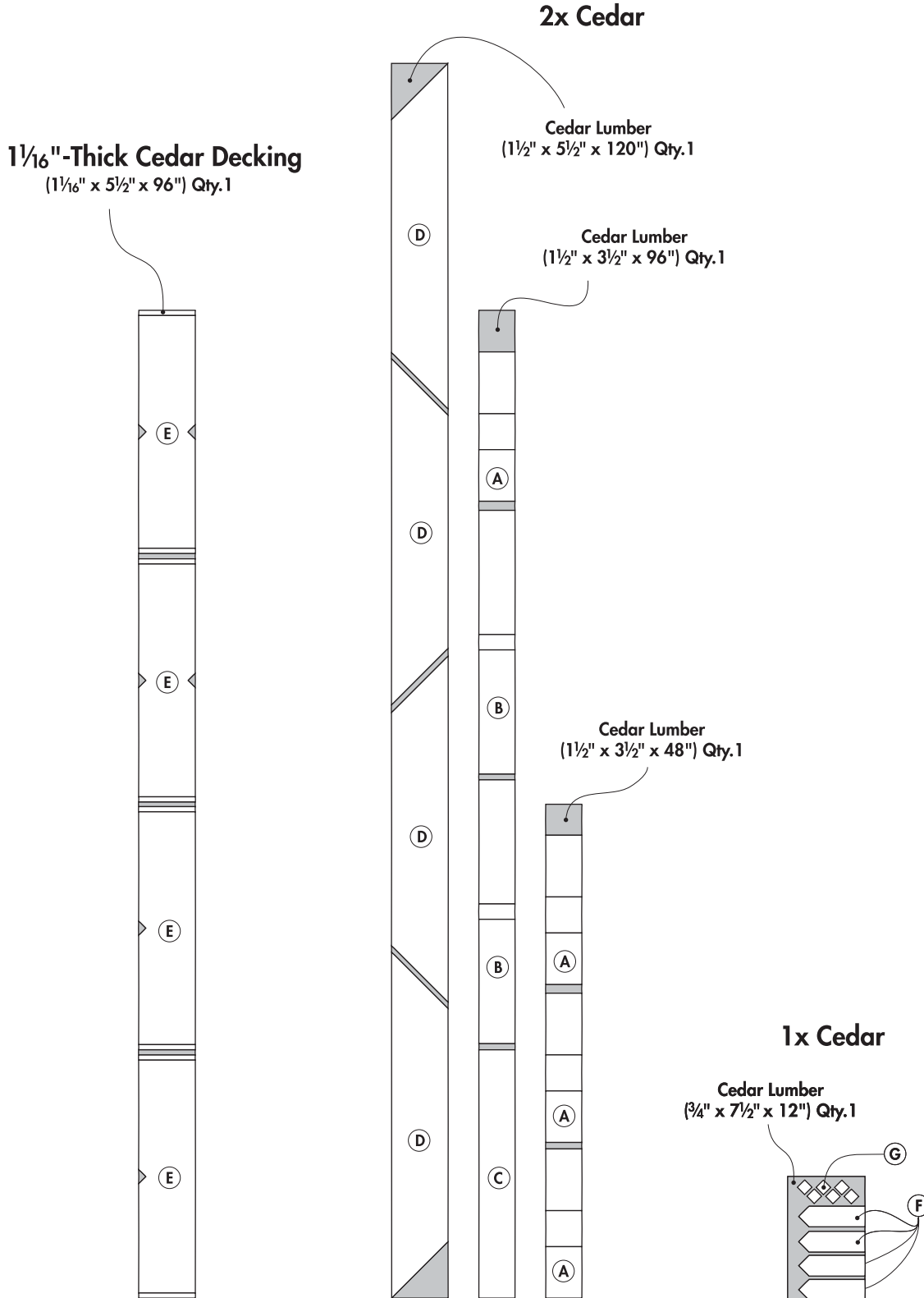
- (10) #10 x $2\frac{1}{2}$ " Stainless Steel Screws
- (8) $2\frac{1}{2}$ " Pocket Screws
- (8) Pocket Screw Plugs
- (8) 3d Galvanized Nails
- (4) $\frac{3}{8}$ " Wood plugs, $\frac{5}{16}$ " long

PATIO TABLE CONSTRUCTION VIEW



Joinery details can be found
in the Patio Set article of issue
277 of Workbench Magazine
(Pages 28-37)

CUTTING DIAGRAM





high-standing Side Table

The final piece of this patio set is the side table. Except for a few changes in dimensions — specifically it's built to sit just below the height of the bench armrests — this table is constructed just like the larger patio table.

The table base, although taller than the coffee table, has all the same parts as its shorter companion. Two end assemblies, consisting of legs and a rail, are connected by a single 2x4 stretcher. Here again, applied diamond-shaped blocks adorn each rail.

The joinery is the same for this top as for the larger version on the patio table. Miters with splines connect the frame pieces. And I used tongue-and-groove joints to assemble the slats and the frame. As before, diamond-shaped cutouts in the slats provide a decorative touch.

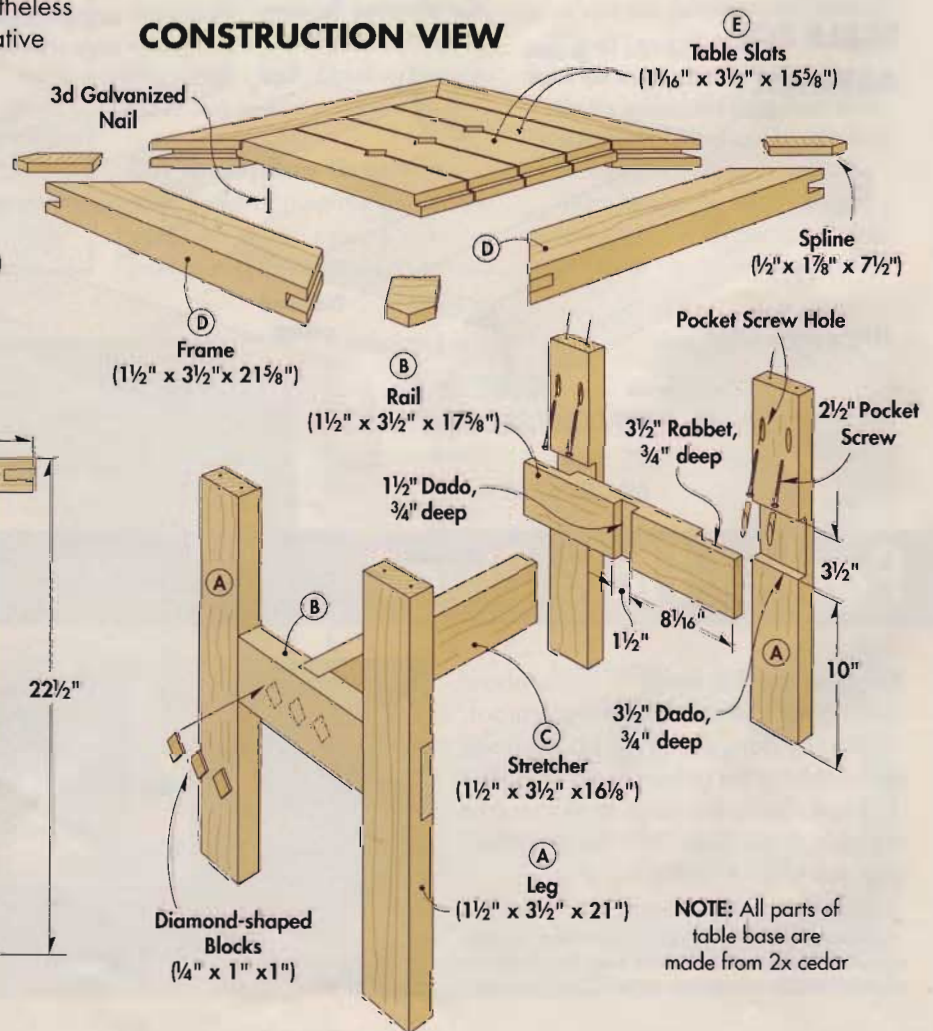
The top and base are again connected with pocket hole joinery. With this table, it's particularly important to plug the pocket holes, as the taller profile will make them easier to see.

▲ Taller and thinner, this side table nonetheless shares the same construction and decorative details found on the patio table.

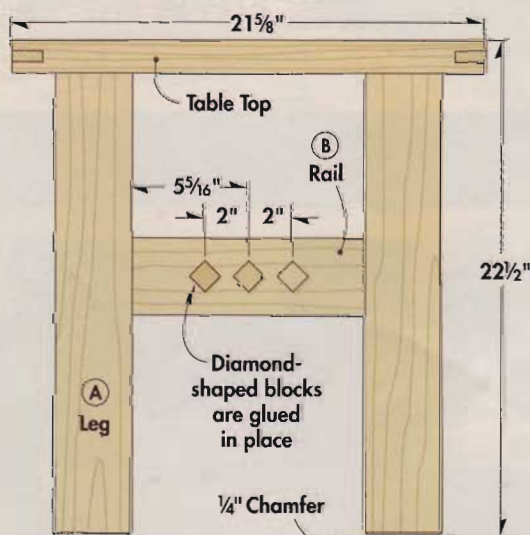
**WORKBENCH
HOME**

NOTE: Frame pieces for top are made from 2x cedar; slats are $\frac{3}{4}$ ($1\frac{1}{16}$ " thick) cedar decking

CONSTRUCTION VIEW



SIDE TABLE END VIEW



NOTE: All parts of table base are made from 2x cedar

MATERIAL AND HARDWARE LIST

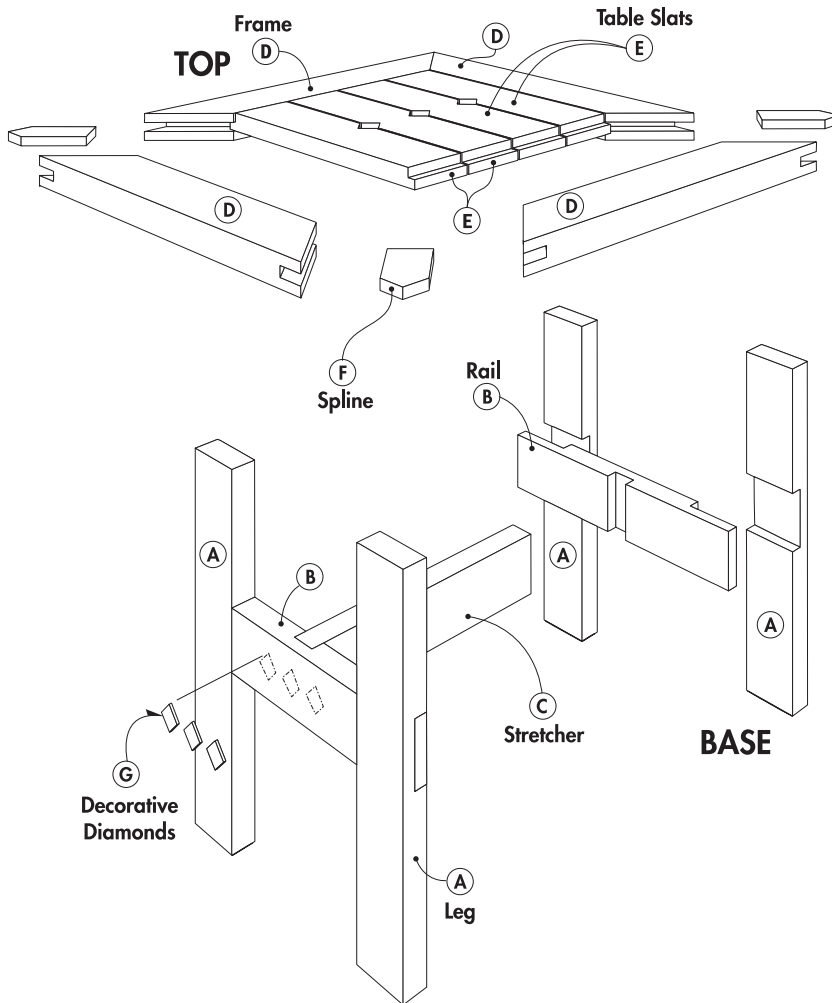
- A (4) Leg (2x4)
- B (2) Rail (2x4)
- C (1) Stretcher (2x4)
- D (4) Frame (2x4)
- E (4) Table Slats (1x6 decking)
- F (4) Spline (1x8)
- G (6) Decorative Diamonds (1x8)

- $1\frac{1}{2}$ " x $3\frac{1}{2}$ " x 21"
- $1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $17\frac{5}{8}$ "
- $1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $16\frac{1}{8}$ "
- $1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $21\frac{5}{8}$ "
- $1\frac{1}{16}$ " x $3\frac{1}{2}$ " x $15\frac{5}{8}$ "
- $\frac{1}{2}$ " x $1\frac{7}{8}$ " x $7\frac{1}{2}$ "
- $\frac{1}{4}$ " x 1" x 1"

HARDWARE

- (10) #10 x $2\frac{1}{2}$ " Stainless Steel Screws
- (8) $2\frac{1}{2}$ " Pocket Screws
- (8) Pocket Screw Plugs
- (8) 3d Galvanized Nails
- (4) $\frac{3}{8}$ " Wood plugs, $\frac{5}{16}$ " long

PATIO SIDE TABLE CONSTRUCTION VIEW

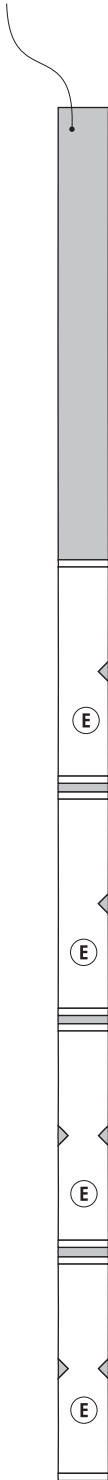


Joinery details can be found in the Patio Set article of issue 277 of Workbench Magazine (Pages 28-37)

CUTTING DIAGRAM

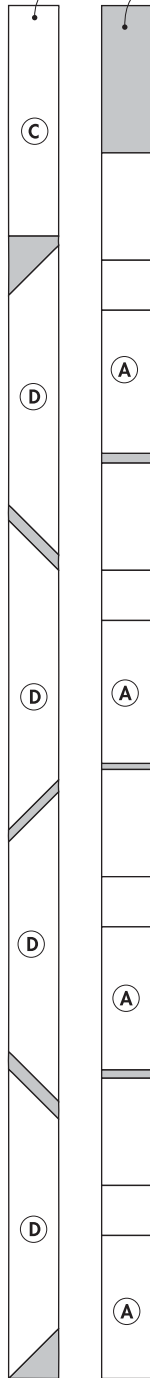
1 1/16"-Thick Cedar Decking

(1 1/16" x 3 1/2" x 96") Qty. 1

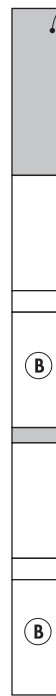


2x Cedar

Cedar Lumber
(1 1/2" x 3 1/2" x 96") Qty 2

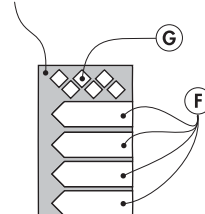


Cedar Lumber
(1 1/2" x 3 1/2" x 48") Qty. 1



1x Cedar

Cedar Lumber
(3/4" x 7 1/2" x 12") Qty. 1





simple & stylish Patio Swing

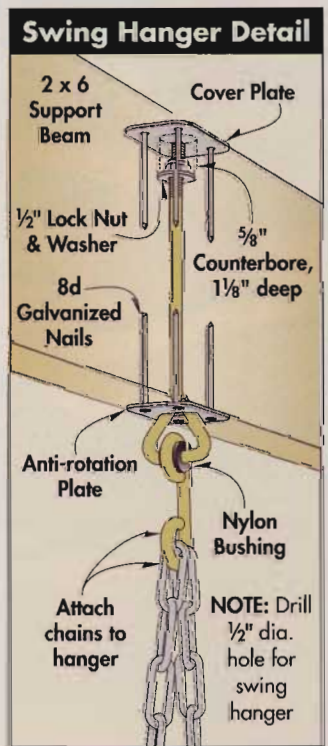
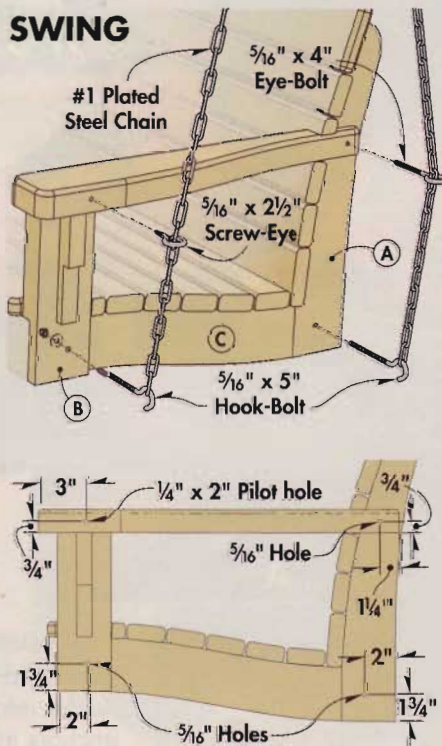
Hung from a garden arbor, or gracing a front porch, this simple variation of the bench will put swing into your spring.

As an option, you may want to build this swing instead of the bench. The construction of the swing is identical to the bench except that all four legs are shortened to end flush with the bottom edge of the seat supports (refer to the Pattern on page 33).

Hanging the Swing — Another important consideration for this swing is how to hang it. There's nothing special about the chain itself, or the hook-bolts, eye-bolts, and screw-eyes that connect it to the swing — these are common hardware store items.

At the top of the chain, though, I used a different type of hardware. These swing hangers (*Swing Hanger Detail*) allow the bench to swing freely and quietly — more than it would if the chain hung from a regular eye-bolt.

Sources — Swing hangers are available in many places where playground equipment is sold, or contact Timber-Bilt at 800-888-1232 or www.Swing-n-Slide.com



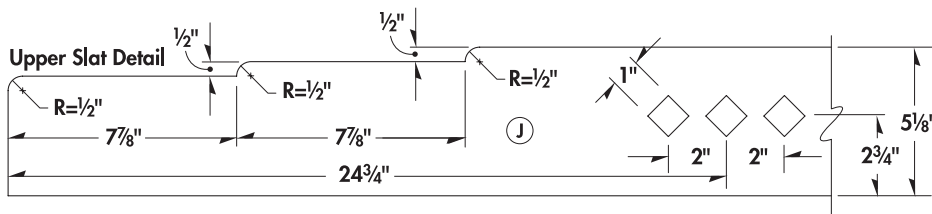
MATERIAL AND HARDWARE LIST

A (2) Rear Leg (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $20\frac{1}{8}$ "
B (2) Front Leg (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $10\frac{1}{4}$ "
C (4) Seat Support (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $19\frac{3}{4}$ "
D (2) Back support (2x6)	$1\frac{1}{2}$ " x $5\frac{1}{2}$ " x $20\frac{1}{8}$ "
E (1) Front Rail (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x 48"
F (1) Rear Rail (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $46\frac{1}{2}$ "
G (2) Arm Rest (2x4)	$1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $23\frac{1}{2}$ "
H (1) Bottom Back Slat (1x6 decking)	$1\frac{1}{16}$ " x $3\frac{1}{2}$ " x $49\frac{1}{2}$ "
I (8) Common Slat (1x6 decking)	$1\frac{1}{16}$ " x $2\frac{1}{2}$ " x $49\frac{1}{2}$ "
J (1) Upper Slat (1x6 decking)	$1\frac{1}{16}$ " x $5\frac{1}{8}$ " x $49\frac{1}{2}$ "
K (1) Front Slat (1x6 decking)	$1\frac{1}{16}$ " x $2\frac{1}{2}$ " x $49\frac{1}{2}$ "
L (2) Arm Bracket (1x6 decking)	$1\frac{1}{16}$ " x 1" x 6"
M (3) Decorative Diamonds (1x6 decking)	$\frac{1}{4}$ " x 1" x 1"

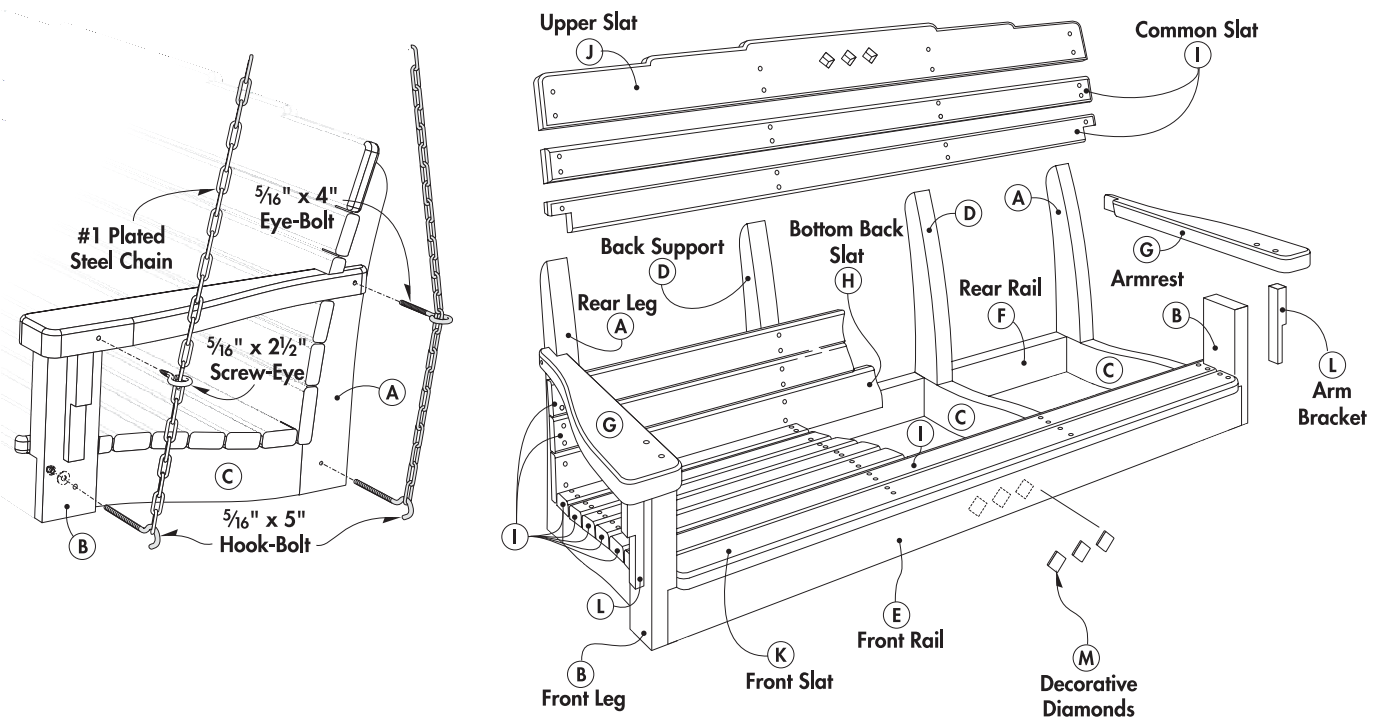
HARDWARE

- (16) #10 x 3" Stainless Steel Screws
- (10) #10 x $2\frac{1}{2}$ " Stainless Steel Screws
- (4) #10 x 2" Stainless Steel Screws
- (8) #10 x $1\frac{1}{4}$ " Stainless Steel Screws
- (102) #8 x $1\frac{1}{2}$ " Stainless Steel Screws
- (140) $\frac{3}{8}$ " Wood plugs, $\frac{5}{16}$ " long
- (2) $\frac{5}{16}$ " x $2\frac{1}{2}$ " Screw-Eyes
- (2) $\frac{5}{16}$ " x 4" Eye-Bolts
- (4) $\frac{5}{16}$ " x 5" Hook-Bolts
- (4) #1 Plated Steel Chain Lengths (lengths will vary)
- (2) Swing Hangers
- (8) 8d Galvanized Nails
- (6) $\frac{5}{16}$ " Washers
- (6) $\frac{5}{16}$ " Lock Nuts

SWING CONSTRUCTION VIEW

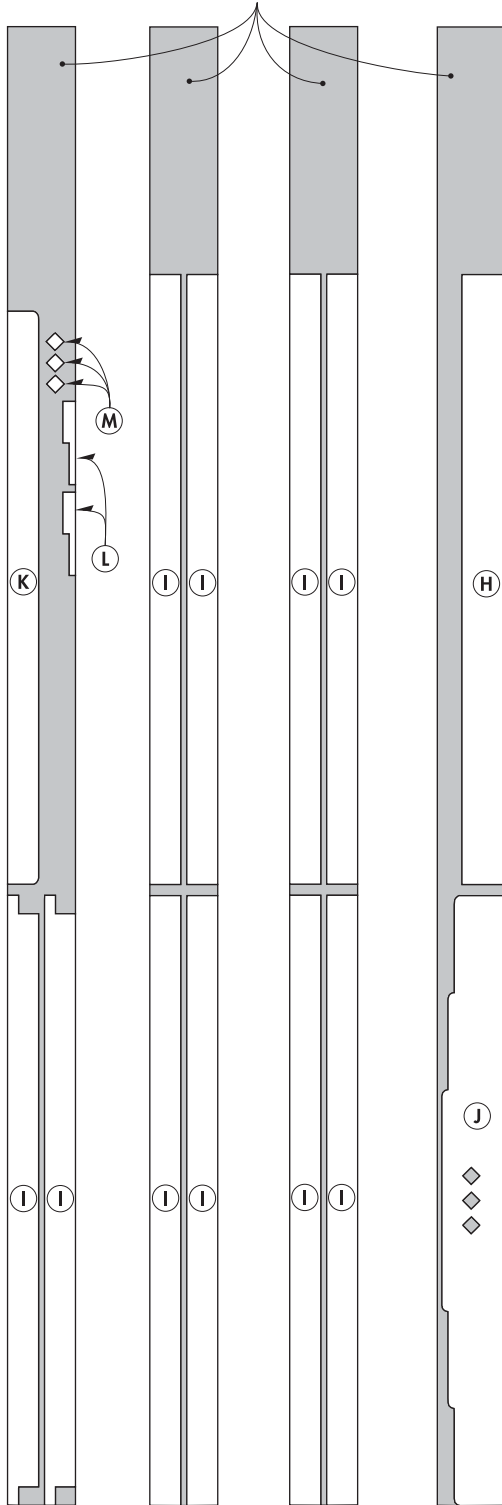


Joinery details can be found in the Patio Set article of issue 277 of Workbench Magazine (Pages 28-37)



CUTTING DIAGRAM

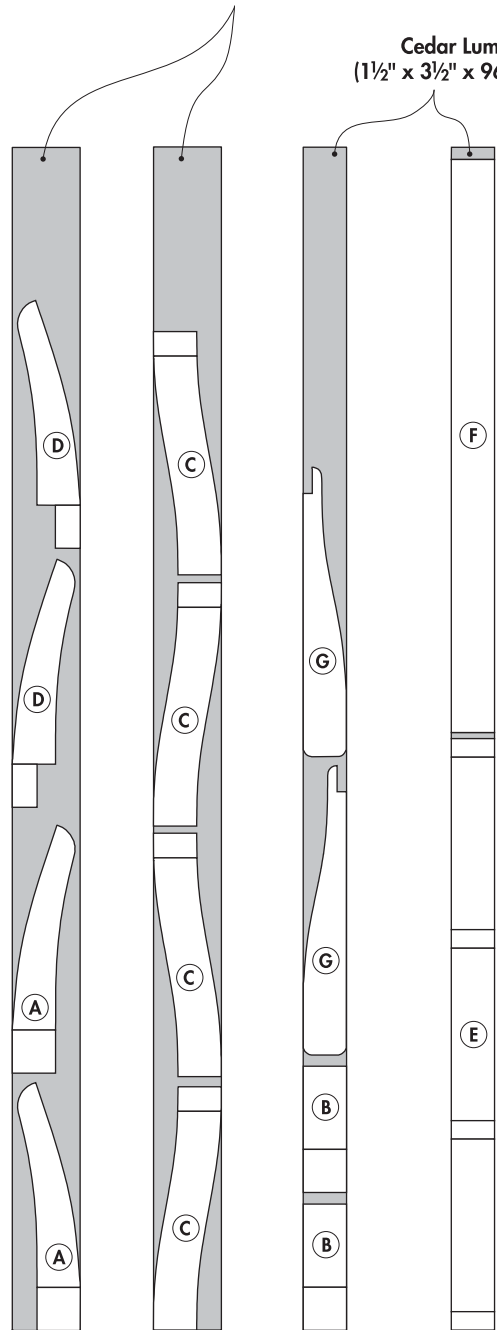
1 1/16"-Thick Cedar Decking
(1 1/16" x 5 1/2" x 120") Qty.4



2x Cedar

Cedar Lumber
(1 1/2" x 5 1/2" x 96") Qty.2

Cedar Lumber
(1 1/2" x 3 1/2" x 96") Qty.2



10 ways to peg

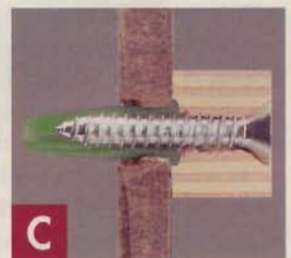
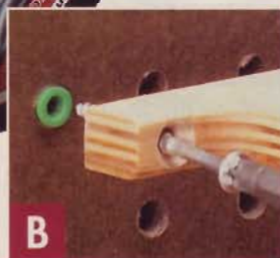
TOOL STORAGE

Make your own custom pegboard tool holders from scrap pieces of material and plastic wall anchors.

One sheet of pegboard and the right collection of tool holders can go a long way toward organizing a shop. Unfortunately, typical pegboard tool hangers have a couple of frustrating limitations that nearly had me swearing off pegboard forever. First off, those simple metal hangers aren't designed to hold many of the tools that I need to keep organized. And even more annoying is the habit they have of pulling out of the pegboard every time I take a tool down.

The solution to both problems turned out to be custom-built tool holders and some of those plastic wall anchors you can find at any hardware store. By building my own tool holders, I could customize each one to accommodate a specific tool — no more forcing a square tool onto a round peg, so to speak.

The plastic wall anchors (*see Photos below*) offer plenty of holding power — even for heavy tools. Plus they make it easy to reposition a holder as the need arises. Just remove the screws, anchors, and tool holder, and then reinstall them in a new location on the pegboard.

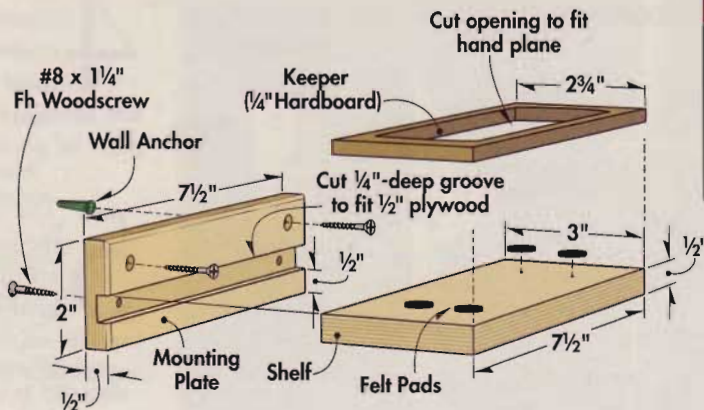


▲ To install each holder, push plastic wall anchors into the pegboard holes (*Photo A*). Then drive screws through the holder into each anchor (*Photo B*). The screws expand the anchors in the pegboard, securing the holders (*Photo C*).

Plane Perch

1 A simple shelf makes a great perch for a block plane. The shelf fits into a groove cut in a mounting plate. The plane itself “nests” in a $\frac{1}{4}$ " hardboard keeper. And felt pads keep the blade elevated while the plane is stored on the shelf.

Mounting Note — To make the perch (and all the rest of the tool holders) sit flat against the pegboard, drill shallow counterbores in back of the mounting plate to fit over the lip of the wall anchors (*Mounting Detail*).



Mounting Detail

Shallow counterbore fits over lip of anchor



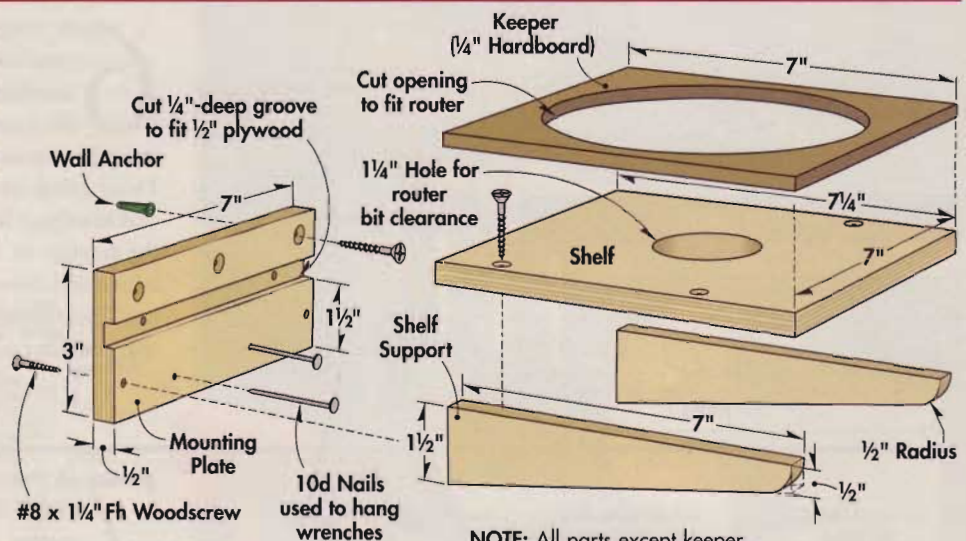
NOTE: Shelf and mounting plate are $\frac{1}{2}$ " plywood

Router Platform

2 A heavy power tool like a router needs more support. So I made a sturdy platform and then added two shelf supports.

Like the plane perch, the router platform is made up of a plywood shelf that fits into a groove in a mounting plate. A circular opening in the shelf lets you set the router in place without removing the bit. Here again, a hardboard keeper is glued to the shelf to hold the base of the router.

To make the shelf supports, it's just a matter of cutting a gradual taper in each piece. Then screw them in place.



NOTE: All parts except keeper are made of $\frac{1}{2}$ " plywood

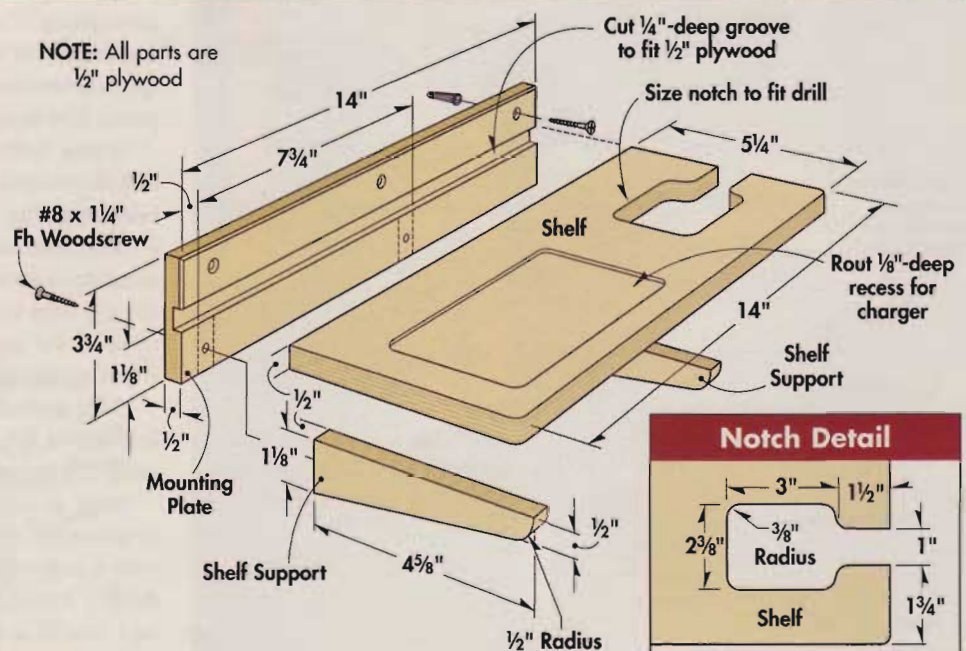
Cordless Drill Station

3 Weight was also an issue when building a station to hold my cordless drill and battery charger. And once again, a pair of shelf supports were the solution. Note: To provide clearance for the drill, there's no shelf support at one end.

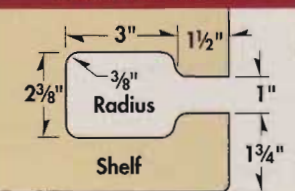
The drill fits into a square notch in the end of the shelf, which acts as a “holster.” You may have to experiment a bit with the size and shape of the notch. To avoid activating the trigger on the drill, I cut an open-ended notch, as shown in the *Notch Detail*.

Also, note the shallow recess routed in the shelf. It keeps the battery charger from slipping off the shelf.

Note: If your battery charger sits on individual “feet,” you can drill a shallow counterbore for each foot.

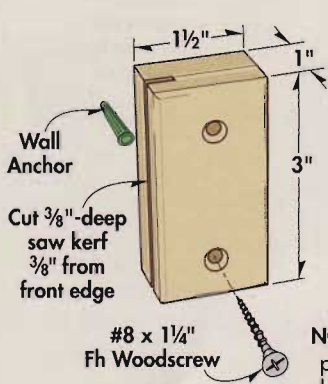


Notch Detail

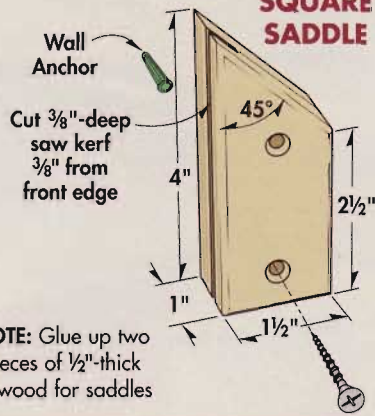


Saddles for Squares

TRI SQUARE SADDLE



COMBINATION SQUARE SADDLE

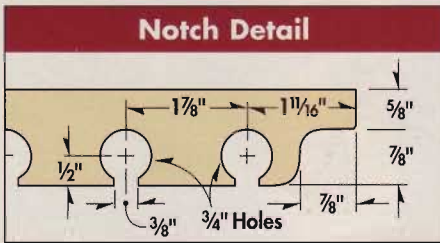
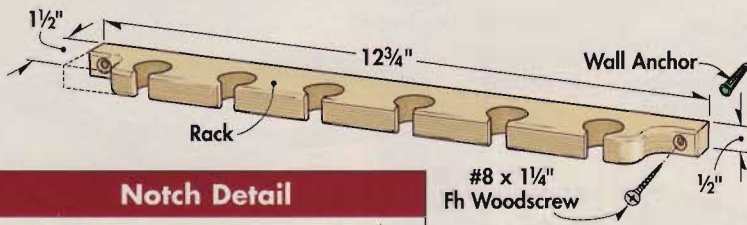


NOTE: Glue up two pieces of 1/2"-thick plywood for saddles

4 A 1"-thick plywood block makes a simple "saddle" to hold a try square. The body of the square rests on top of the block, while the blade fits into a saw kerf cut in the edge. Note: For safety, it's best to make the kerf in an extra-long piece of stock, then trim the saddle to length.

5 The saddle for the combination square uses the same basic idea as the try square saddle — a thick block with a saw kerf in the edge to hold the blade of the square. Only here, the top end of the block is mitered at 45° to match the angled face on the body of the square.

Chisel Rack

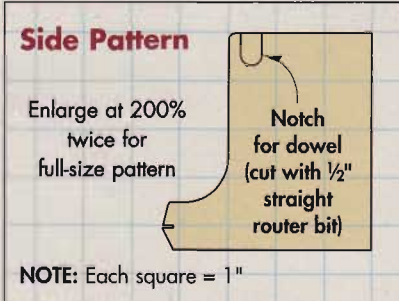
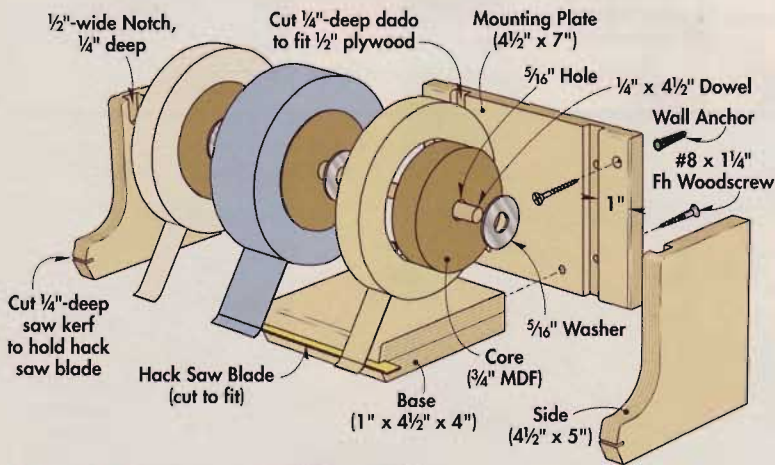


NOTE: Rack is made of 1/2" plywood

6 A strip of plywood with keyhole-shaped notches makes a handy chisel rack. The size, location, and number of these notches depends on your set of chisels, so you'll want to have them nearby as you build the rack. A look at the *Notch Detail* at left shows the layout details for my rack.

One thing to note is the notches are sized to accept the ferrules of the chisels. To cut each notch, just drill a hole and then use a hand saw to complete the opening. Then shape each end of the rack to form an "ear" that provides a way to mount the rack.

Tape Dispenser



NOTE: Sides and mounting plate are 1/2" plywood; base is made by gluing up two pieces of 1/2" plywood

7 If you use tape as much as I do in the shop, you'll appreciate the convenience of this dispenser. It holds three rolls of tape, plus it has a cutter to make it easy to tear off strips of tape.

The dispenser is made up of two sides, a mounting plate, and a 1"-thick plywood base. The sides fit into dados cut in the mounting plate. And a dowel that spans between the sides holds three disk-shaped core pieces that fit inside the rolls of tape.

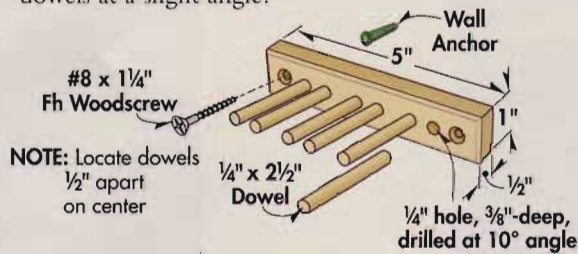
If you look at the *Side Pattern* at left, you can see that the sides are shaped like a boot. The "toe" of the boot (together with the front edge of the base) holds a cutoff hack saw blade that's used as a cutter. Another thing to note is that each side has a shallow notch in the top edge to support the dowel. The notches are left open at the top so you can easily lift out the dowel when replacing a roll of tape.

After assembling the dispenser, you'll need to cut a kerf across the front edge for the hack saw blade. A small amount of epoxy holds it in place.

Now all that's needed is to add the core pieces that fit inside the rolls of tape. Each core is a 3/4" MDF disk with a centered hole so you can slip it onto the dowel. Adding a washer between each core allows the rolls of tape to spin independently of each other.

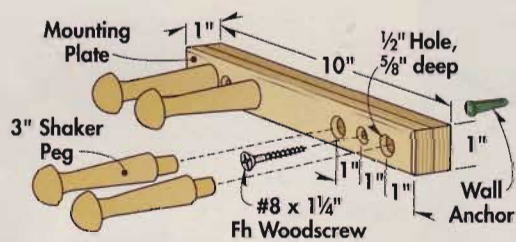
Hand Saw Storage

8 To make a home for my hand saws, I used some closely spaced dowels installed in a mounting plate. The dowels let me slide each saw into the holder so it rests on its handle. To ensure the saws stay put, I drilled the holes for the dowels at a slight angle.



Hammer & Mallet Hanger

9 This hammer and mallet hanger is similar to the hand saw holder with two exceptions. First, to support the weight of these tools, I used a 1"-thick mounting plate and substituted Shaker pegs for the dowels. And second, since the flared ends of the pegs keep the hammers and mallets from slipping out, there's no need to drill angled holes.

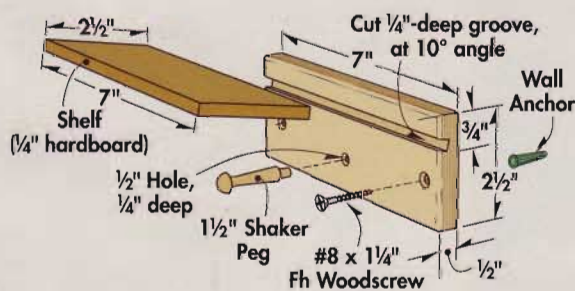


Safety Station

10 Last but not least, I wanted a place to store the most important "tools" in my shop — my safety glasses and ear protectors. This safety station consists of a hardboard shelf and a mounting plate made of 1/2" plywood.

To prevent the glasses from slipping off, the shelf is tilted at an angle. This is accomplished by cutting the groove in the mounting plate at a slight angle.

Now all that's left is to install a peg underneath the shelf for hanging ear protectors.





create a friendly front entrance

Inviting Lighting

Scroll-sawn decorative metal inserts lit from behind add a warm, personal touch to this hanging wall lantern.

I never really gave my front entry light much thought — as long as it turned on when I flipped the switch. But when replacing a burned out bulb recently, it occurred to me that the utility light fixture (*Before Photo below*) wasn't very attractive — or inviting.

So the urge to create a more welcoming front entry and a weekend in the shop resulted in the hanging wall lantern you see here.

Decorative Metal Inserts — The most distinctive feature of this lantern is clearly the decorative flower and address insert. I cut both of these out of thin sheets of metal using my scroll saw.

Granted, this is a bit of a departure from scroll sawing wood, but aside from a few setup differences, there's nothing particularly trying about the technique. To find out just how easy it is to scroll saw these decorative metal inserts — or a

variety of other projects for your home — turn to the article that begins on page 48.

As you can see in the sidebar below, we've included some additional ideas so you can add your own personal touch to the lantern. But regardless of the pattern, the results speak for themselves. A flip of the switch is all it takes to display beautifully backlit silhouettes against a colored glass panel. Note: For a different look, you can also change the glass. Check your local glass shop for colors, and have it cut to size at the shop.

Making It Weatherproof — But don't think for a minute that the beauty of this wall lantern is skin deep. To withstand the weather, I used white oak to build the lantern — a good choice for outdoor projects because it resists rot caused by moisture.

The frames that hold the glass panels are made with strong half-lap joints. Then the frames are assembled with splined miter joints and glued together with water-resistant glue (I used Titebond II).

Finally, everything got a coating of spar varnish for a durable, protective finish.



Pick a Pattern to Personalize Your Lantern

Sunflower



Poppy



Dragonfly



Pine Cone



◀ Patterns for these metal inserts (including the numbers) are available online, see below.



Wall Lantern
Materials List

Half Lap
How-to

Patterns for the
metal inserts can
be found at:

WorkbenchMagazine.com



build a three-sided LANTERN "BOX"

The lantern "box" consists of three wood frames: a wide front frame and two narrow side frames (see *Construction View* below). These frames are assembled with half-lap joints. Then they're joined together into a U-shaped assembly using splined miter joints (see *Photo* at left).

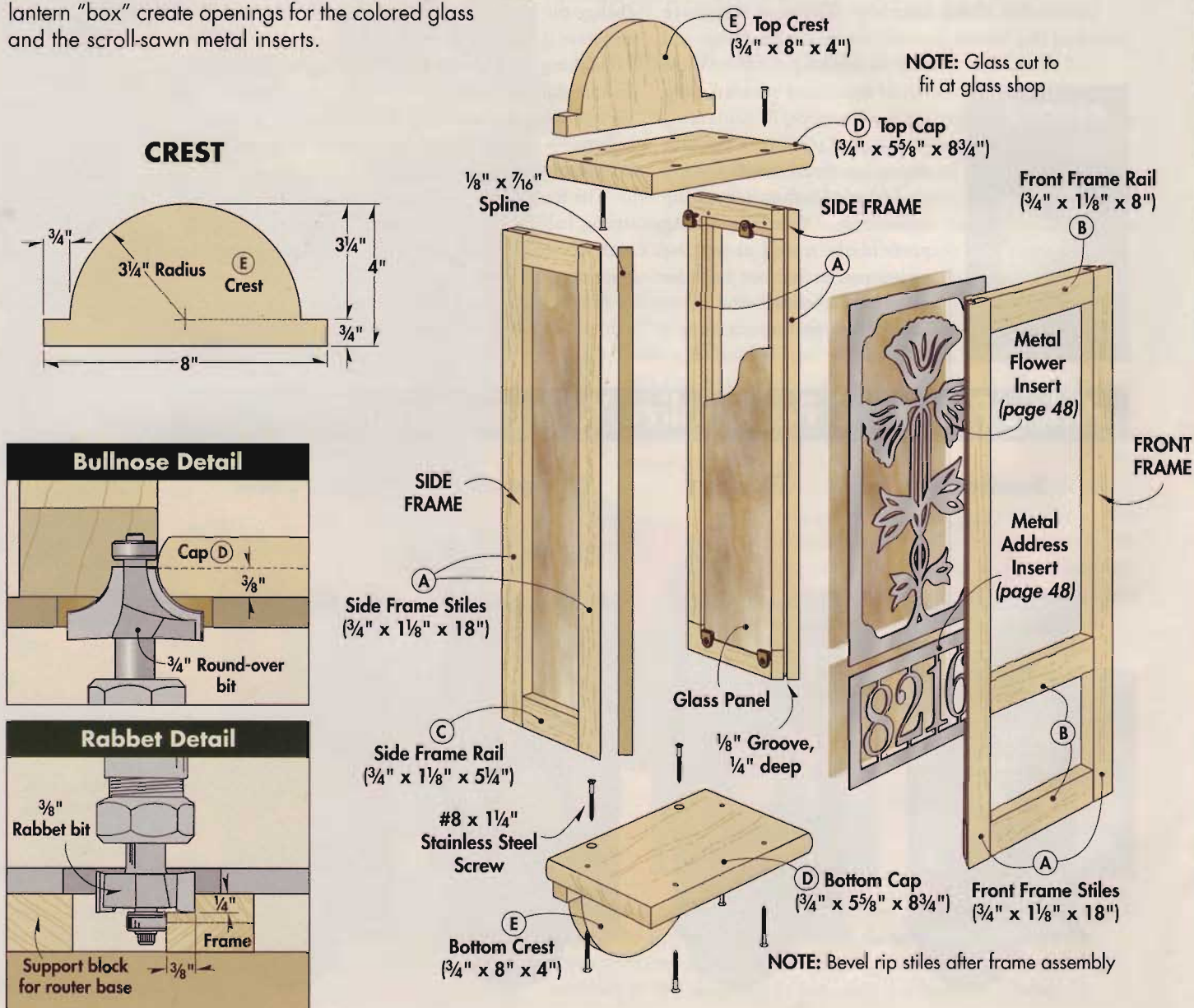
Build the Frames — The *Side and Front Frame Illustrations* on page 45 provide all the details you need to

build the three frames. Each one is made up of two vertical stiles (A) and either two or three horizontal rails (B, C). Specifically, the front frame has three rails that divide it into two separate openings (one for the metal flower insert and the other for the address insert).

Sizing the Pieces — All of the frame pieces are made from $\frac{3}{4}$ "-thick hardwood. These pieces will end up

▲ The three solid-wood frames that make up the lantern "box" create openings for the colored glass and the scroll-sawn metal inserts.

CONSTRUCTION VIEW



identical in width (1 1/8"). But they don't all start out the same width.

Notice that *both* stiles on the front frame and the *front* stiles on the side frames are extra-wide pieces (1 3/8"). The reason for this is simple. Once the frames are assembled, these stiles will be bevel ripped to form the splined miter joints (see page 46 for more on this). The extra width allows you to rip the bevels and still end up with 1 1/8"-wide stiles.

With that in mind, go ahead and rip all the frame pieces to the widths shown. Then crosscut them to final length.

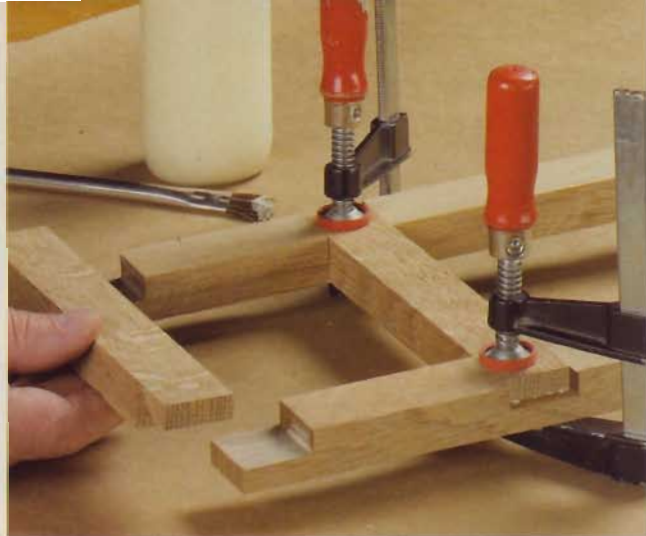
Half Laps — At this point, you can concentrate on the half-lap joints. Depending on the location of the joint, it's called an end lap or a cross lap. But regardless of the name, the same principle applies — to remove *half* the thickness of the stock from each piece. This way, when the two pieces overlap, their faces will be flush with each other.

A dado blade and a table saw make quick work of cutting the half-lap joints. Note: For more in-depth information on how to set up the dado

blade and cut half-lap joints, visit workbenchmagazine.com.

Glue Up Frames — After cutting all the half-lap joints, you're ready to glue up the frames (Photo at right). The shoulders of the half laps make it easy to register the pieces, and they keep the frames square.

Once the glue dries, it's just a matter of routing a rabbet in back of each frame to hold the glass and metal inserts (see *Rabbet Detail on page 44*). Then cut the splined miter joints, as shown on page 46, and glue and clamp the frames together.



The Crowning Touches

At this point, you're ready for the crowning touches: cap pieces that enclose the top and bottom of the lantern, two curved crests, and of course, the colored glass and scroll-sawn inserts (*Construction View*).

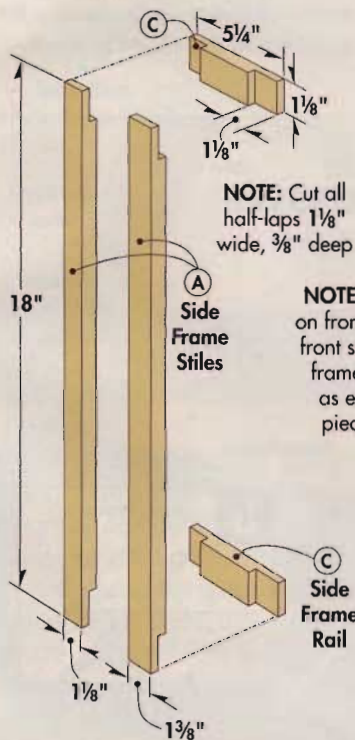
Caps & Crests — The caps (D) and crests (E) are both made from 3/4"-thick hardwood. I sized the caps to overhang the lantern and then routed a bullnose profile on the overhanging edges (*Bullnose Detail*). As for the crests, lay them out using the

dimensions shown on page 44. Then cut them to shape on a band saw and sand the edges smooth. The crests are simply screwed to the cap pieces, which in turn are fastened to the lantern box with screws.

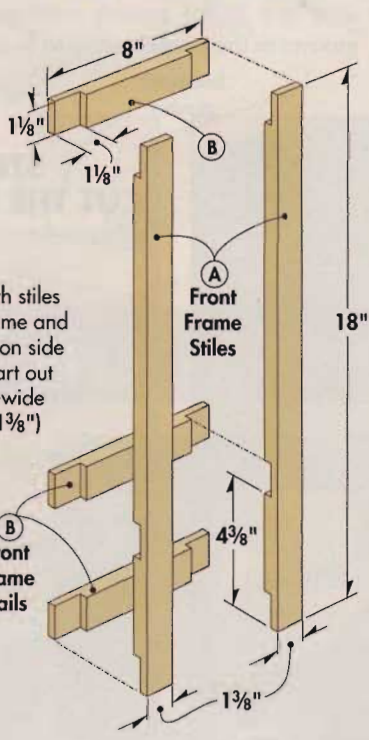
Inserts & Glass — All that's left to complete the lantern is to add the scroll-sawn metal inserts and colored glass. The article on page 48 will walk you through the process of scroll sawing the inserts. And the glass can be cut to fit at a glass store. The inserts and glass are held in place with plastic retainers like those shown below.

▲ Half-lap joints get their strength from large, face-to-face glue surfaces. Be sure to tighten the clamps directly over the joints.

SIDE FRAME

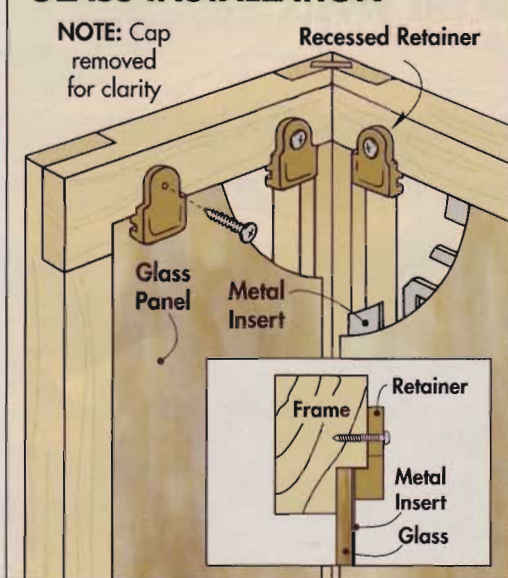


FRONT FRAME

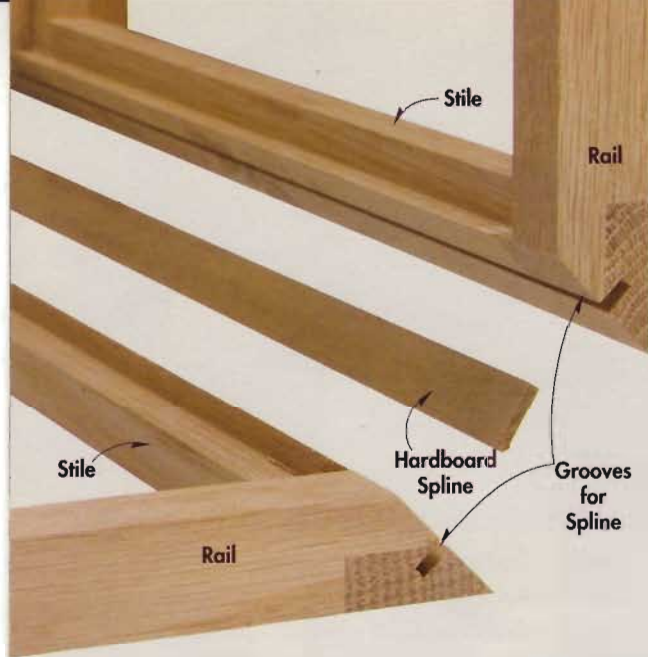


◀ Recessed retainers from Rockler (800-279-4441) or Rockler.com secure the glass panels and inserts.

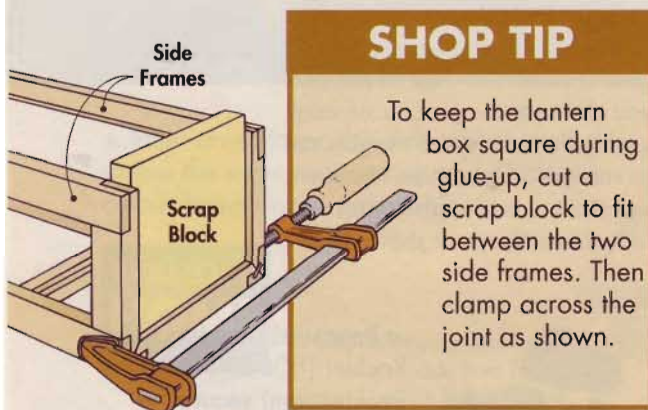
GLASS INSTALLATION



align with splines for TIGHT MITERS



▲ To ensure accurate alignment, and to strengthen the miter joint, glue a hardboard spline into grooves cut in the beveled edges of the stiles.



Splined miter joints are a great way to assemble the frames of the lantern. To see why, take a look at the *Photo* at left.

The splined miter joint is formed by first ripping a bevel in the stiles of the frames. When you fit the beveled edges together, the end grain of the rails is covered up. This also lets you cut a groove in both sides of the joint to hold a hardboard spline. The spline makes it easy to keep the miter joints aligned during glue-up.

Bevel Rip the Frames

The first step in making a splined miter joint is to bevel rip both stiles of the front frame and the front stile of each side frame. Start by tilting the rip fence so the waste gets cut to the outside (see *Step 1*) and the stile ends up $1\frac{1}{8}$ " wide (*Step 1, Detail a*). Then go ahead and make the cuts.

Cut the Spline Grooves

After bevel ripping the frames, the next step in the process is to cut grooves in the beveled edges to hold

hardboard splines. (I used $\frac{1}{8}$ " splines, so a single saw kerf is all that's needed to make the grooves.)

You can keep the blade tilted to 45° for this operation. But to prevent the blade from cutting into the metal rip fence, you'll need to attach an auxiliary fence (see *Step 2*).

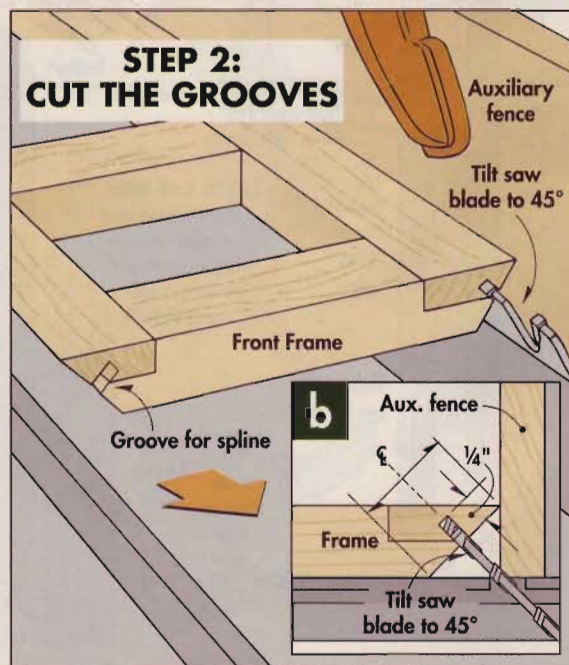
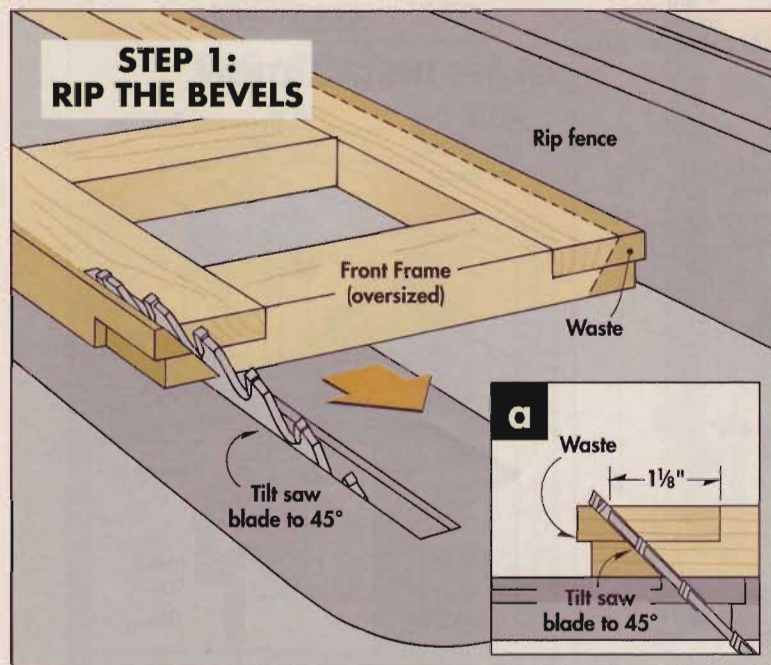
Then reposition the rip fence and adjust the blade height to cut a groove that's centered on the beveled edge (*Step 2, Detail a*). Now cut the grooves for the splines.

Add Hardboard Splines

The final part of the process is to add the hardboard splines. You'll want to make the splines slightly narrower than the combined depth of the grooves in the two mating frames. That way the splines won't "bottom out" in the grooves, which would prevent the miters from closing up.

As for length, cut the splines extra-long for now. (They can be trimmed to final length later.)

With splines in hand, it's just a matter of gluing up the lantern box as shown in the *Shop Tip* at left.



getting the hang of it

MOUNTING TIPS

One thing I like about this wall lantern is it doesn't require any tricky electrical work. Simply remove the old light and fixture, then install a new cover plate and a bulb socket (as shown here) over the existing junction box.



Note: If there isn't an existing light already on your house, you'll need to have a junction box installed by an electrician.

Two Cleats —

Once that's done, the lantern can be installed using a two-part interlocking cleat system. Take a look at the Illustrations below to see how these two cleats work together.

A wall cleat (F) that's beveled on the top edge is attached to a filler block (more on that later). And a small cleat (G) with a matching bevel is attached directly to the lantern. When you install the lantern, the beveled cleats "nest" together, forming a strong, solid connection (see Mounting Detail).

To make this work, the wall cleat is ripped to width to fit inside the opening in the back of the lantern. As you can see in the *Lantern Installation* drawing, it's quite tall. This height is important as it keeps the lantern from shifting from side to side. Just be sure it's not too tall. To allow for the lantern cleat, which is $\frac{3}{4}$ " wide, and also a little "extra" for lifting the lantern into place, I cut the wall cleat $17\frac{1}{8}$ " long.

As for the lantern cleat itself, it's bevel ripped to width, cut to length to fit inside the opening, and then glued to the cap of the lantern.

Mount the Lantern — Now you're ready to mount the lantern. If the exterior of your house is brick or stucco, you can mount the wall cleat directly to it. But if it has lap siding, as shown above, there will be a series of gaps between the siding and the wall cleat (a perfect place for spiders).

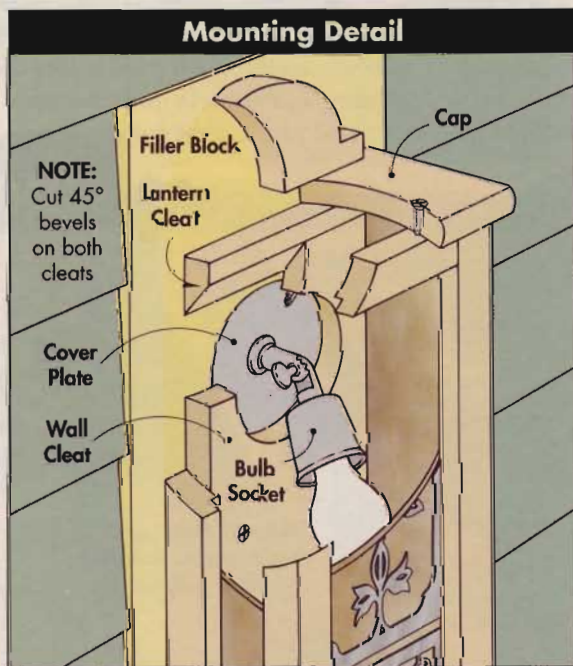
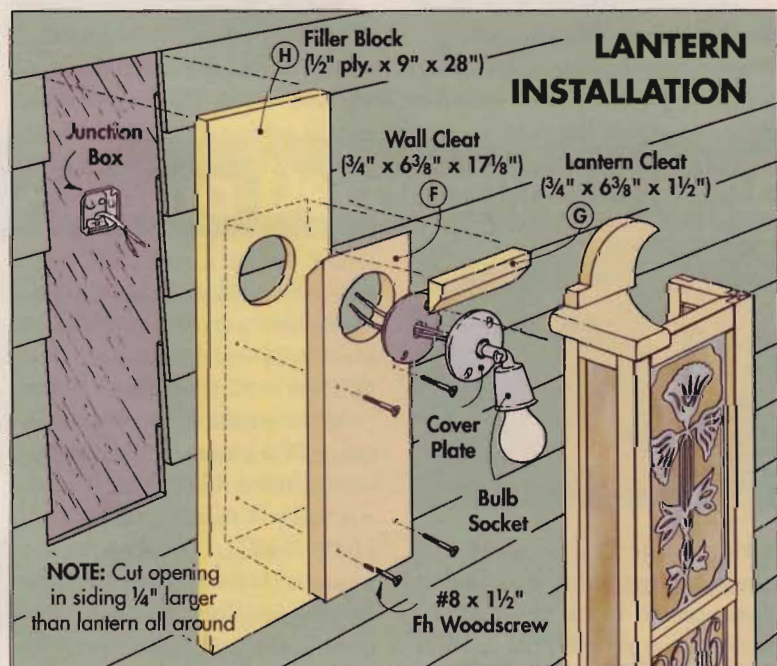
The best way to avoid these gaps is to create a flat mounting surface. To do that, I removed the siding and installed a plywood filler block (H). A circular saw set for a shallow cut makes quick work of removing the siding.



After sizing the filler block to fit the opening, cut a circular opening in it to fit over the cover plate. You'll also need to cut a matching opening in the wall cleat. Now attach the filler block with screws, caulk around the edges to seal out moisture, and then screw the wall cleat in place.

Final Details — Just a few final notes about the installation. To create a warm, even glow without any "hot" spots, use a 40-watt light bulb. Then lift the lantern into place, flip on the switch, and enjoy the warm, welcoming feel of your front entry.

▲ All that's needed to hang the lantern is to set it over a beveled wall cleat.





scroll-sawn decorative panels

Magic in Metal

A decorative scroll-sawn panel lends character and depth to a project — all the more when it's made from a thin sheet of metal.

**ONLINE
Extras**
Patterns for the
Bookmark, Note
Holder, and Door
Insert can
be found at:
WorkbenchMagazine.com

▼ This scroll-sawn copper bookmark makes a unique gift.

There's just no argument that the scroll-sawn metal inserts make the front entry wall lantern featured on page 42 something special. But the real beauty of using a scroll saw to make decorative metal panels is the variety of pro-

jects you can actually build around this simple technique.

The metal panel being cut on the scroll saw (above) is a good example. Notice how it adds a decorative touch to the entry door shown at the top of the facing page.

This technique also offers all kinds of different possibilities for

making one-of-a-kind craft items, as shown below.

For all that, there's nothing complicated about scroll sawing metal. In fact, it's remarkably similar to working with wood. The biggest difference is getting the right metal and preparing it properly to be cut.

Buy Thin Metal Sheets

Before you get started, you'll need a thin sheet of metal. For the projects shown here (and for the wall lantern), I used copper and aluminum (*see top left Photo on the facing page*).

What's most important is the gauge, or thickness, of the sheet. You want it to be thin so that it can be cut easily. I found that 20 gauge (.032" thickness) worked the best. It only costs about \$3 per 12" square for aluminum and \$9 for a copper sheet of the same size.



▲ Here, a decorative scroll-sawn copper panel attached to a painted block of wood serves as a simple note holder.

4 Steps to Success: METAL SCROLLING HOW-TO



▲ Thin 12" square sheets of aluminum and copper are available from ASAP, 877-668-0676, asapsource.com; or Online Metals, 800-704-2157, onlinemetals.com.

Make a Cutting Package

Once you have your metal, you'll need to prepare it to be cut. It can be difficult to make smooth, clean cuts in thin metal with a scroll saw because the flimsy material tends to bend and "catch" in the blade. The solution is to support the metal as it's being cut. To do that, I used 1/4"-thick plywood as a backer.

To get a good bond between the metal and backer, first "rough up" the metal, as shown in the sidebar at right (*Step 1*). Then secure the metal to the backer with white glue.

A paper pattern is the next part of the cutting package. To attach the pattern, rough up the *other* side of the metal and glue the pattern in place (*Step 2*). It's a good idea to weight the pattern down for a few hours before you start cutting. That will make the pattern lie flat, preventing the blade from accidentally lifting or tearing it.

There's one final detail to take care of before you turn on the saw. That's to drill small holes in each individual waste section for blade access.

And speaking of blades, I found that a standard No. 4 (15 TPI) scroll saw blade makes clean cuts with very little effort.

Cut Away the Waste

With the proper blade attached and the starter holes drilled, it's time to begin cutting away the inside waste sections.

To do this, start by threading the blade through the starter hole in one of the smaller sections (*Step 3*). Then carefully guide the cutting package slowly at first so that the blade follows the pattern lines as closely as possible. Once you get the hang of things, you can feed it a bit faster. Note: Save the larger sections for last so the panel remains more rigid while you cut the fine details.

After the waste is removed and it's time to separate the metal from the pattern and backer, simply soak it in warm water. After a few hours, the metal will pop right off (*Step 4*).

Off to a Clean Start

1 To prepare the sheet of metal and ensure a good glue bond, start by "roughing up" the surface of the metal with a Scotchbrite pad. Then use white glue to adhere a 1/4"-thick plywood backer to the roughed-up side of the metal.



Make a "Package"

2 After roughing up the exposed side of the metal, again apply white glue and attach whatever paper pattern you're using. Let the glue dry about six hours to ensure a strong bond between the pattern and the metal square.

Remove the Waste

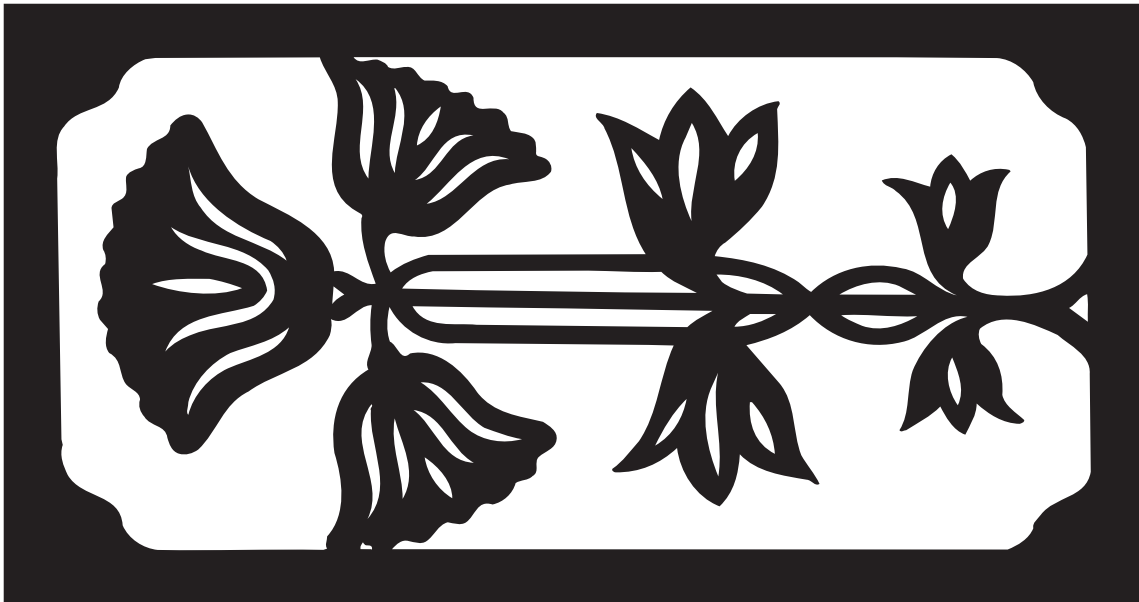
3 With the paper pattern attached to the metal, drill a 1/16" starter hole in each waste area to provide access for the blade. Remove the small waste sections first. Then follow up by cutting the large waste areas.



Give It a Soaking

4 To separate the metal from the pattern and backer, soak everything in warm water for a few hours (don't rush it). Finish up by cleaning the metal in hot soapy water and, if necessary, lightly buffing out any discoloration.

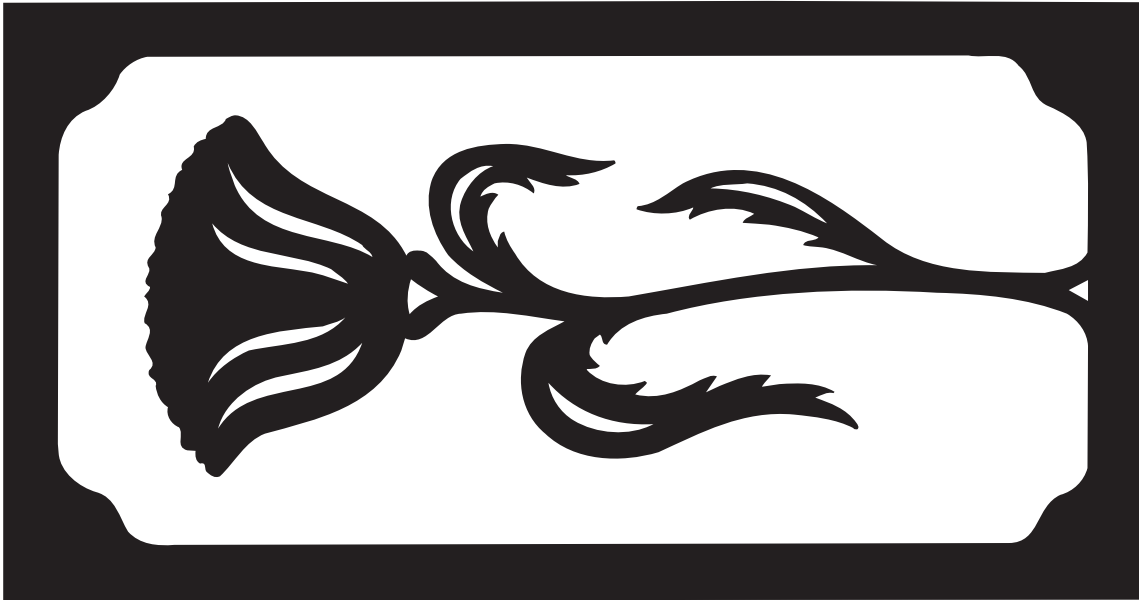
METAL INSERT PATTERNS



Three Flowers (NOTE: Enlarge 200 percent to final size of 11 $\frac{7}{8}$ " H x 6 $\frac{1}{4}$ " W)



Sunflower (NOTE: Enlarge 200 percent to final size of 11 $\frac{7}{8}$ " H x 6 $\frac{1}{4}$ " W)

METAL INSERT PATTERNS

Poppy (NOTE: Enlarge 200 percent to final size of 11 $\frac{7}{8}$ " H x 6 $\frac{1}{4}$ " W)



Dragonfly (NOTE: Enlarge 200 percent to final size of 11 $\frac{7}{8}$ " H x 6 $\frac{1}{4}$ " W)

METAL INSERT PATTERNS

Pine Cone (NOTE: Enlarge 200 percent to final size of 11 $\frac{7}{8}$ " H x 6 $\frac{1}{4}$ " W)



Noteholder (NOTE: Enlarge 200 percent to final size of 5 $\frac{7}{16}$ " H x 5 $\frac{11}{16}$ " W)

Bookmark (NOTE: Enlarge 200 percent to final size of 7 $\frac{9}{16}$ " H x 2" W)

METAL INSERT PATTERNS



Basic Number Frame with number spacing examples shown

House Numbers (3-Number Version)
(NOTE: Enlarge 200 percent to final size of 3¾" H x 6¼" W)



Alignment line

Alignment lines help lay out and square numbers inside frame

Alignment line

METAL INSERT PATTERNS



**Basic Number Frame with
number spacing examples shown**

**House Numbers
(4-Number Version)**
**(NOTE: Enlarge 200 percent to
final size of 3¾" H x 6¼" W)**



**Alignment lines
help lay out
and square
numbers
inside frame**

METAL INSERT PATTERNS



Basic Number Frame with number spacing examples shown

House Numbers (5-Number Version)
(NOTE: Enlarge 200 percent to final size of 3¾" H x 6¼" W)



Alignment lines help lay out and square numbers inside frame

MATERIAL AND HARDWARE LIST

MATERIALS

- A (6) Front & Side Frame Stiles (white oak)* $\frac{3}{4}$ " x $1\frac{3}{8}$ " x 18"
- B (3) Front Frame Rails (white oak) $\frac{3}{4}$ " x $1\frac{1}{8}$ " x 8"
- C (4) Side Frame Rails (white oak) $\frac{3}{4}$ " x $1\frac{1}{8}$ " x $5\frac{1}{4}$ "
- D (2) Top & Bottom Caps (white oak) $\frac{3}{4}$ " x $5\frac{5}{8}$ " x $8\frac{3}{4}$ "
- E (2) Top & Bottom Crests (white oak) $\frac{3}{4}$ " x 8" x 4"
- F (1) Wall Cleat (white oak) $\frac{3}{4}$ " x $6\frac{3}{8}$ " x $17\frac{1}{8}$ "
- G (1) Lantern Cleat (white oak) $\frac{3}{4}$ " x $6\frac{3}{8}$ " x $1\frac{1}{2}$ "
- H (1) Filler Block (plywood)** $\frac{1}{2}$ " x 9" x 28"
- (2) Splines (hardboard)*** $\frac{1}{8}$ " x $\frac{7}{16}$ " x 18"

HARDWARE

- (2) Scroll-Sawn Metal Inserts (see Metal Insert Patterns)
- (4) Colored Glass Panels (cut to fit at glass shop)
- (16) Recessed Retainers (plastic w/screws)
- (12) #8 x $1\frac{1}{4}$ " Stainless Steel Screws
- (10) #8 x $1\frac{1}{2}$ " Fh Woodscrew
- (1) Cover Plate
- (1) Bulb Socket

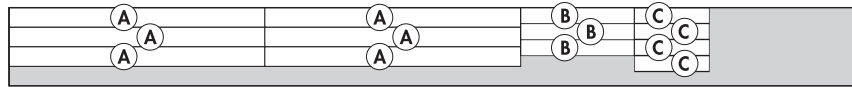
Note: If there isn't an existing junction box, have one installed by a qualified electrician

* Cut four extra-wide at $1\frac{3}{8}$ " to start; other two at $1\frac{1}{8}$ "

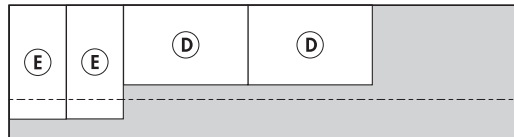
** Needed if exterior is lap siding; cut $\frac{1}{4}$ " larger than lantern all around

*** Cut splines extra-long to start then trim to final length

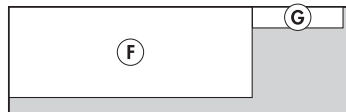
CUTTING DIAGRAM



$\frac{3}{4}$ " White Oak - $5\frac{1}{2}$ " x 60" (Qty: 1)




$\frac{3}{4}$ " White Oak - $9\frac{1}{2}$ " x 36" (Qty: 1) (NOTE: Glue-up from two boards if necessary)



$\frac{3}{4}$ " White Oak - $7\frac{1}{2}$ " x 24" (Qty: 1)



$\frac{1}{2}$ " Plywood - 12" x 36" (Qty: 1)



problem-solving Clamps

THAT HOLD WHERE OTHERS WON'T

At some point in nearly every woodworking project I undertake, there's at least one assembly that just can't be easily done with "regular" clamps. After plenty of experience with trying to fashion some makeshift solution, I've come to appreciate several of those "specialty" clamps that are all over the pages of the woodworking catalogs.

A few of the specialty clamps I've found to be the most useful are shown in the following pages. Granted, some of them are a bit pricey, but trust me when I say that you'll only have to use them once to appreciate their real value.

Clamp Sources

Manufacturers

Bessey

www.JamesMorton.com
585-344-1160

Jorgensen

www.AdjustableClamp.com
312-666-0640

Gross Stabil

www.GrossStabil.com
517-279-8040

Retailers

Plaza Hardware

www.PlazaHardware.com

Coastal Tool

www.CoastalTool.com
877-551-8665

Amazon

www.Amazon.com

Rockler Woodworking

www.Rockler.com
800-279-4441

Woodcraft

www.Woodcraft.com
800-225-1153

Woodworker's Supply

www.Woodworker.com
800-645-9292

Mike's Tools

www.MikesTools.com
877-434-3951

McFeely's

www.McFeelys.com
800-443-7937

Edge Clamps

When you build a project with sheet material, you're sure to be attaching quite a bit of solid-wood edgebanding. Here are the clamps I keep around my shop for those occasions.

JORGENSEN 3-WAY SPRING CLAMPS

This simple variation on a spring clamp has a piece of spring steel fixed between the jaws. The spring steel provides moderate pressure to the edgebanding while the jaws of the clamp hold onto the workpiece.

These are most useful for thin edgebanding where a tight glue line is not critical, such as on a cabinet where the edging will ultimately be

covered by the doors (see Photo at right). I've also found these to be useful for temporarily securing thicker edgebanding while I put more secure clamps in place.

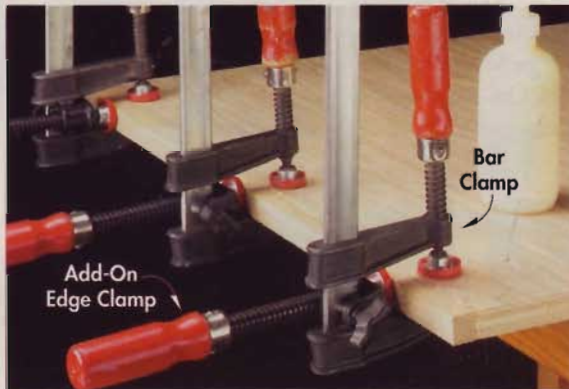
Priced at around \$5 each from Plaza Hardware, it makes a lot of sense to have a number of these little timesavers on hand for any size edgebanding project.



◀ Simple and affordable, these 3-way spring clamps from Jorgensen belong in any shop where edgebanding is applied.



▲ Bessey's edge clamp converts a standard bar clamp to a three-way clamp.



BESSEY EDGE CLAMPS

Bessey offers a smart solution for gluing on solid-wood edging with this simple accessory. The add-on accessory mounts to a bar clamp and converts it to an edge clamp. The long threaded spindle on the accessory allows you to apply plenty of pressure to the edging.

Because these work with any length of bar clamp, there's no limit to the reach of the edge clamp. And if you need more throat depth, just attach the edge clamp to the deep-throated bar clamps available from Bessey and others. The one shortcoming to this accessory is that it will still tie up your supply of bar clamps. But at just \$6.95 each (Coastal Tool), you could buy a decent supply of short bar clamps to use specifically for edging and still be money ahead compared to other, more expensive edge clamps.

THREE-WAY FACE FRAME CLAMPS

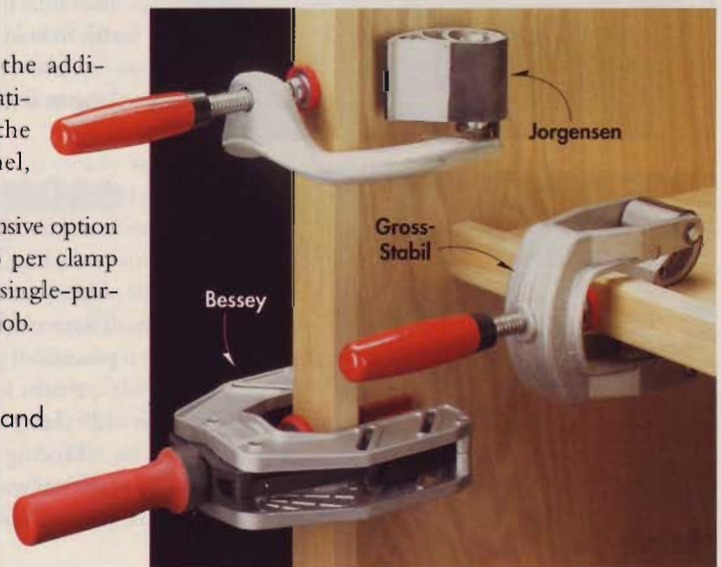
Face frames are similar to edging with a couple important differences. First, the frame material tends to be thicker and requires a bit more holding pressure for a strong joint. Secondly, the frame usually overhangs the edge of the workpiece, so a bit more throat space is often necessary to straddle the frame parts.

The clamps shown here are an excellent choice for this type of work. These clamps typically have wide openings that allow clearance for the frame material. And by twisting the handle, they simultaneously grip the panel and apply pressure to the frame.

These clamps have the additional benefit of automatically centering on the thickness of the panel, saving set-up time.

While this is an expensive option for edge clamping (\$45 per clamp at Coastal Tool), these single-purpose clamps do a great job.

► Jorgensen, Bessey, and Gross Stabil all offer their own, similarly-priced version of face frame clamps.



Parallel Jaw Clamps

Holding an assembly square is hard enough without your clamps working against you, which standard bar clamps tend to do. Parallel jaw clamps solve that problem.

**BESSEY
UNI-CLAMP**

BESSEY K-BODY

**JORGENSEN
CABINET MASTER**

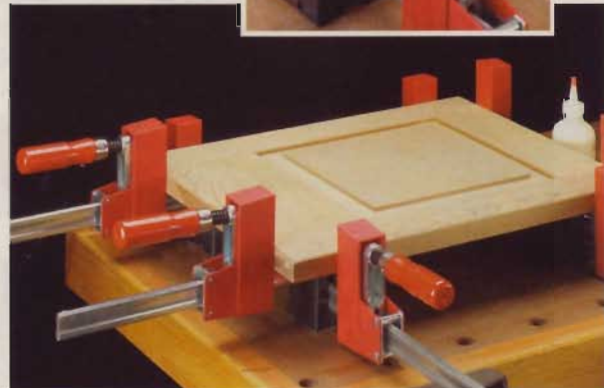
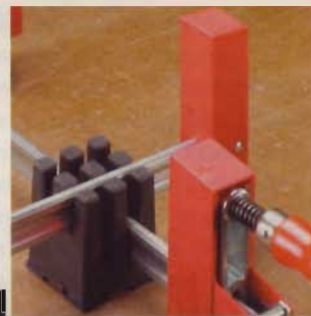
GROSS STABIL PC-2

BESSEY K-BODY

Bessey's K-Body is the original parallel jaw clamp — that is, the first clamp with jaws that stay parallel, thus eliminating the tendency for doors and panels to distort under pressure (see *Photo below*). This alone has made them worth their premium price to serious woodworkers for many years (\$33 for one 12" K-Body clamp through Woodcraft).

With a set of Bessey KP blocks (*Inset Photo*), K-Body clamps become the ultimate rail and stile clamping system.

K-Body's are available in lengths from 12" to 50". For smaller jobs, Uni-Klamps cover a range of 6" to 18".



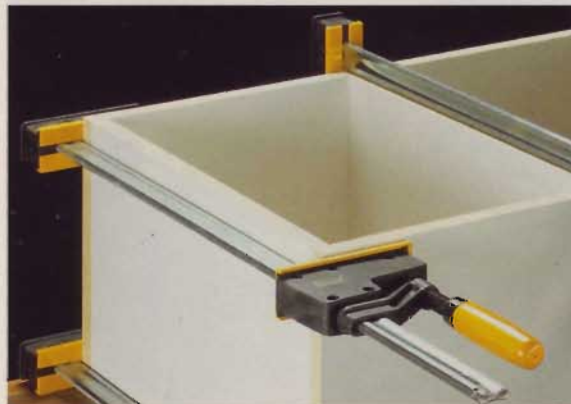
JORGENSEN CABINET MASTER

Jorgensen offers more than just a different color with their Cabinet Master line of parallel jaw clamps (see *Photo at left*). These relative newcomers sport a larger clamping surface, greater throat depth, and a bit more travel in the hand screw.

These clamps also have a reversible head, giving them the unique ability among this type of clamp to be used in spreading applications.

Standard on every Cabinet Master is an End Stop and Clamping Hanger (that little black block on the end of the bar). These also serve as excellent cradles to hold the clamps upright while you position the assembly inside the jaws.

Cabinet Masters are available from Rockler, Woodcraft, and others in lengths from 12" (about \$30 each) to 48" (about \$42 each).



GROSS STABIL PC2

Just when Jorgensen thought they had the "largest clamping surface" thing in the bag, along comes Gross Stabil with an even larger surface. And if that weren't enough, Gross Stabil's PC2 clamps are available in lengths up to 100". These clamps also boast of being capable of applying impressive 1,100 pounds of pressure — again, the most in the category.

Prices for these clamps are also pretty competitive — about \$37 for a 12" clamp up to almost \$80 for the 100" version.

Finding a Gross Stabil dealer in your area may be difficult, as these clamps aren't as widely available as other brands. One good source is Mike's Tools, or you can contact Gross Stabil (see *Buyer's Guide on page 50*) for help.

Panel Clamps

Gluing three or four boards into a solid-wood panel isn't all that difficult. Unless the boards won't cooperate. For those times, these are the clamps I reach for.

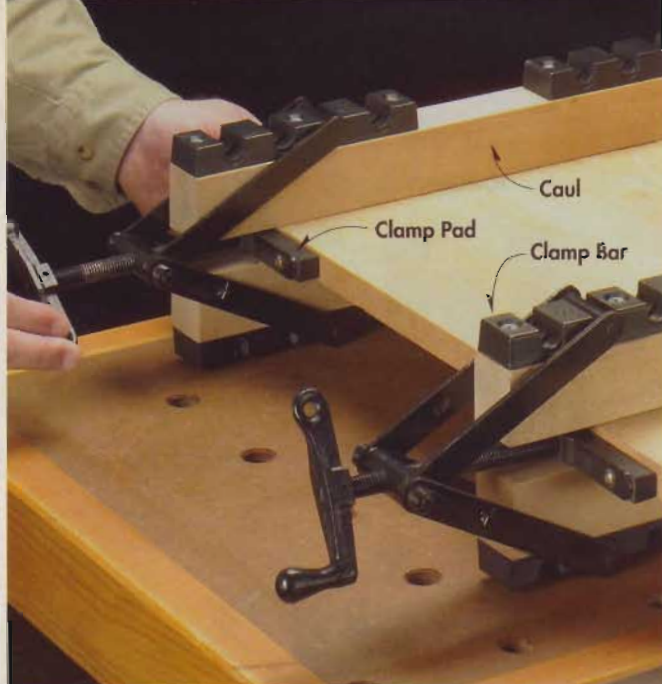
WOODCRAFT CLAMPING SYSTEM

This unusual looking configuration from Woodcraft leaves absolutely no wiggle room for even the most obstinate panels. Two hardwood cauls (supplied by you) hold all the panel pieces in the same plane while clamping pads apply pressure to the edge of the boards. Twisting the handle on the clamps applies equal pressure from all four directions.

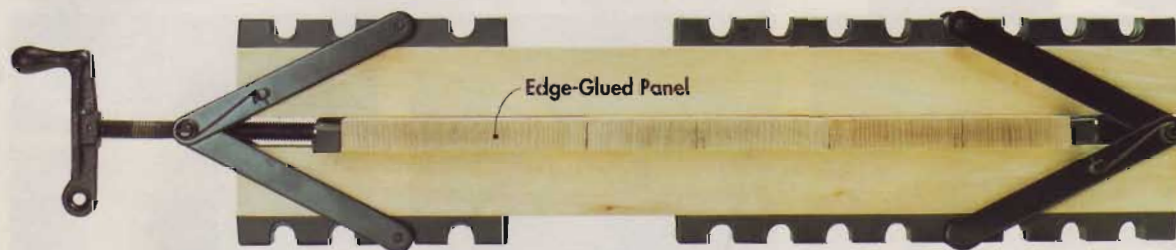
Since the cauls are supplied by you, there is no limit to the width of panel this mechanism will manage. For wider panels, cut longer cauls.

The clamp bars (those black things attached to the cauls) are adjustable for panels up to 6" thick.

If you've got a butcher block top in your future, this is the clamp for you. By spacing the clamps every 12" or so, you can easily manage even these challenging assemblies. Best of all, you won't have to break the bank to get enough of these clamps for even a large butcher block. Each assembly (minus the necessary hardwood) sells for about \$20 through Woodcraft.



▲ The Woodcraft Clamping System accommodates panels up to 6" thick and can be customized to any length.



PINCH DOGS

A decidedly different approach to panel clamping are these pinch dogs. When driven into the end grain along a joint, these steel "clamps" draw the boards together for a tight joint.

The science of the pinch dogs is quite basic. The "teeth" are wedge-shaped, so as they're pushed into the wood, they force the boards together.

There are, however, limitations to these simple devices. I found that they are best used with panels no longer than 2 to 3 feet. Any longer than that and the force applied at the center of the panel probably won't be enough to ensure a strong joint.

Pinch Dogs are available from Woodcraft in three sizes ($\frac{1}{2}$ ", $1\frac{1}{2}$ ", and 2") and range in price from \$10 to \$30 for a package of 10.



▲ Though small in size, these steel clamps exert surprising pressure as they pinch boards together.

Right-Angle Clamps

When you get right down to it, a lot of woodworking is about constructing corners — miters, butt joints, or cabinet pieces. These are the clamps I use for corner control.



JORGENSEN



BESSEY



GROSS STABIL

CORNER CLAMPS

Bessey, Jorgensen, and Gross Stabil all offer variations on corner clamping.

The Bessey and Jorgensen angle clamps are very similar. Both will ensure a 90° corner in boards of the same or different thickness. Both will accommodate mitered corners, butt joints, or “T” joints. And with both of these clamps, there’s plenty of clearance to drill and drive screws into the pieces.

One important note about this style of angle clamp is that they don’t actually apply much force to the

joint itself, so a mechanical fastener of some sort is required.

Either of these clamps can be found through most woodworking suppliers for about \$20 per clamp.

Gross Stabil’s angle clamp differs slightly from the Bessey and Jorgensen designs in that this one *does* apply pressure at the joint, but doesn’t have clearance for drilling or driving screws while the corner is in the clamp.

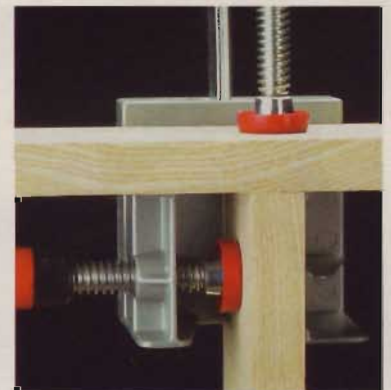
These clamps sell for around \$22 each through Mike’s Tools.



▲ To make up for the lack of clamping pressure, I’ll often use biscuits to reinforce miters.



▲ When butt joining two boards, drilling and driving screws is the best solution.



▲ Direct pressure on the joint creates a stronger bond, but I’d still use a biscuit here.

JET JOINING CLAMPS

Joining several cabinet parts at once is like trying to stand a nickel on edge — it can be done with enough patience, balance, and luck, but you’ve got to wonder if either problem is worth the effort.

Fortunately Jet offers a simple solution to the problem — of assembling cabinets that is. You’re on your own with the nickel thing.

Cleverly named Jet Angle Joining Clamps, these are simply L-shaped hunks of plastic with a spring clamp



on each leg. The clamp straddles the cabinet corner and holds the pieces from falling over or shifting out of alignment.

The clamps sell for about \$20 per pair through McFeely’s.



Miter Clamps

Build one octagon-shaped anything and you'll be begging for clamps that don't balk at angles like 22.5° . Here are my favorites.

GROSS STABIL GSP 8

Gross Stabil's miter clamp consists of two F-style bar clamps and a set of pressure pads mounted on a threaded spindle.

The bar clamps provide pressure to the pads, which hold both sides of the joint in the same plane. Then, by tightening the spindle on the pressure pads, the joint is drawn together.

What I like about this setup is that it's the only odd-angle solution

that forces the two pieces into the same plane. And as long as the clamps are tight, there's virtually no way to knock the boards out of alignment. This system is also infinitely adjustable to work with all angles.

One drawback to this system is cost — around \$50 through Rockler Woodworking. But it's a one-of-a-kind system that you'll find plenty of uses for.

▼ The pressure pads of this system can span between joints as wide as 4".



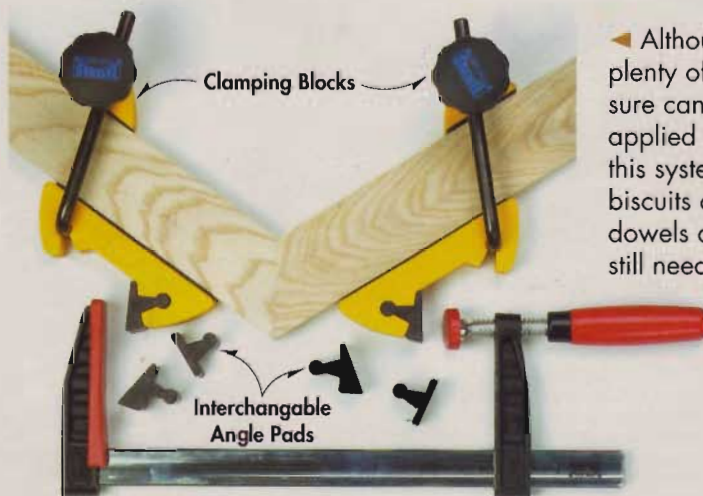
GROSS STABIL MC-X

Here's another interesting solution to odd angles from Gross Stabil. This "system" is comprised of two clamping blocks that straddle the workpiece. A bar clamp (not included) draws the joint together.

Since the system works with a standard bar clamp, it's possible to exert quite a bit of pressure on the joint (up to 770 pounds).

The blocks feature non-marring, no-slip surfaces to grip the workpiece without damaging it. The interchangeable pads that come with the system adapt the blocks for the angles of 22.5° , 30° , 45° , and 60° .

One set sells for about \$26 through Woodcraft.



◀ Although plenty of pressure can be applied with this system, biscuits or dowels are still needed.

BESSEY MULTI-ANGLE BAND CLAMP

While a band clamp is not a novel idea, Bessey's pivoting corner blocks distinguish this from the usual breed of band clamps. Each corner block has swiveling surfaces that can adapt to most angles and apply pressure in precisely the right direction.

The clamp exerts up to 1,100 pounds of pressure and has a built-in reel for strap storage. McFeely's sells this clamp for about \$40.



◀ Four variable-angle corner blocks make this clamp highly adaptable. Onboard strap storage makes it hassle free.



new generation JIG SAW BLADES

It's hard to beat the versatility of a jig saw. With the wide selection of blades available, you can use it to cut everything from wood and metal to ceramic tile and plastic. The trick is selecting the right blade for the job.

Teeth Per Inch — The first thing to consider is the number of teeth per inch (TPI). This ranges from 6 to 20 TPI for wood-cutting blades to as many as 36 TPI for metal-cutting blades. In general, the fewer the teeth, the faster the blade cuts. The tradeoff is that blades with fewer teeth make rougher cuts than those with more teeth (see *Illustration below left*).

Another thing to keep in mind is the thickness of material to be cut. As a rule, at least two teeth should be

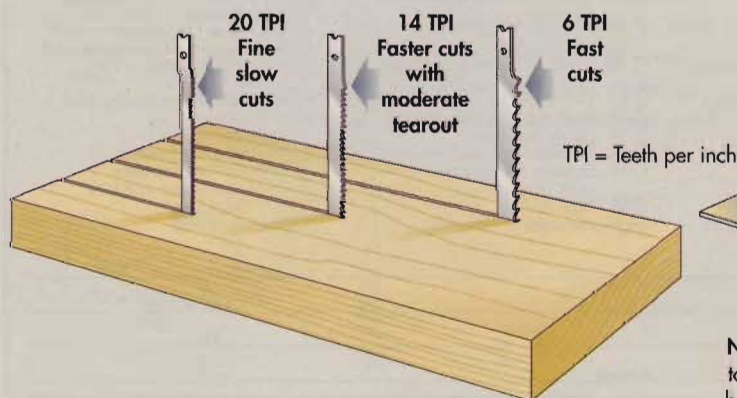
engaged in the work at all times. So for thin materials, select a blade with finer teeth (*Illustration below right*).

Blade Clearance — Regardless of the number of teeth, a jig saw blade must cut a kerf that provides enough clearance to keep it from binding. Understanding how this works will help you choose the right blade for the material you're cutting (*Blade Clearance, page 59*).

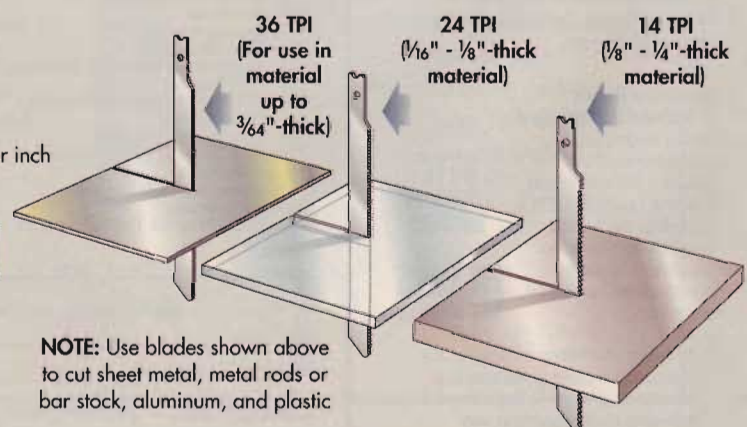
Type of Metal — Be aware that the metal used to make the blade will also affect its performance. Again, select a blade with the proper metal make-up for the material you're cutting (*It's the Metal that Matters*).

Special-Purpose Blades — Finally, be sure to check out the special-purpose jig saw blades shown on page 60.

TPI* & Quality of Cut



TPI & Material Thickness



blade clearance

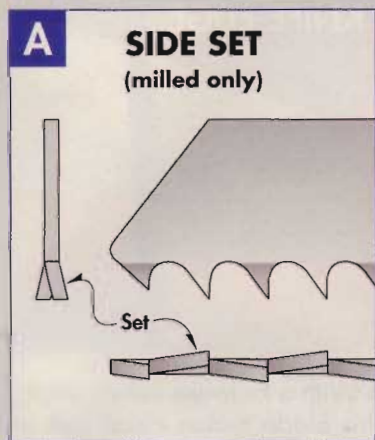
To prevent a jig saw blade from binding, it has to cut a kerf that's *wider* than the thickness of the blade.

Side Set Blades — To accomplish that, most wood-cutting jig saw blades have teeth that are “set,” or bent to the left and right in an alternating fashion (see *Illustrations A and B* below).

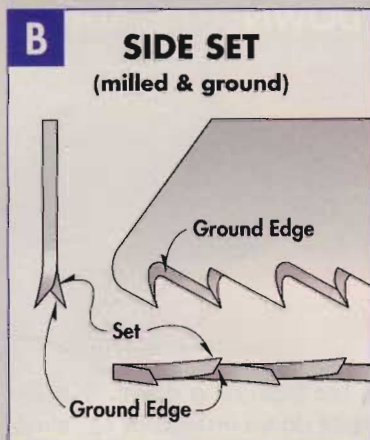
The teeth are set as the blade is milled at the factory. This milling process is sometimes followed up by grinding the teeth to a sharp edge. A blade that's milled *and* ground produces a cleaner cut than one that's just milled.

Tapered — On some blades, the teeth aren't set at all. Instead, the clearance is produced by tapering the sides of the blade (*Illustration C*).

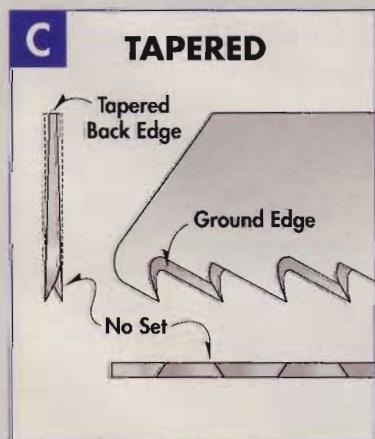
Wavy Set — For metal-cutting blades, the teeth are ground straight and then bent to form a wavy edge that forms a wide kerf (*Illustration D*).



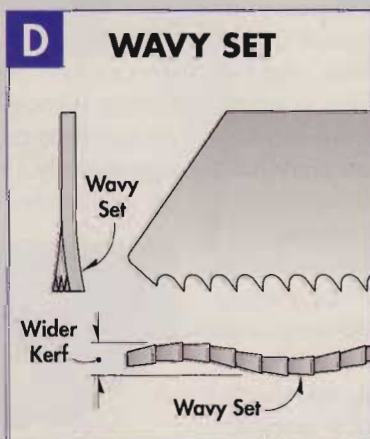
▲ The teeth on this jig saw blade are alternately set (bent) to the left and right. This produces a fast, though somewhat rough cut in hardwood or softwood.



▲ These teeth are also *ground* to produce a fast, smooth cut in wood. Here again, alternately set teeth create a wide “path” that prevents binding.



▲ The tapered sides produce the clearance for this blade. With sharply ground teeth, “tapered” blades produce smooth cuts in wood, metal, or plastic.



▲ A jig saw blade with wavy-set teeth cuts slower, but it's the best choice when working with metal. The undulating edge produces a wide kerf.

blade mounts: 3 TYPES

When choosing a jig saw blade, it's easy to overlook the obvious — making sure the blade is compatible with your saw. There are three types of blade mounts. A few saws will work with more than one type of mount.

Hook



T-Shank



Universal

It's the Metal that Matters

To get top performance from your jig saw, it pays to know what type of *metal* the blade is made of, and then to match the blade to the material you're working with.

High-Carbon Steel — Most jig saw blades are made of high-carbon steel. This is a relatively “soft,” flexible metal used to cut softer materials like wood, plastic, and laminates.

High-Speed Steel — For harder materials like aluminum or non-ferrous metals, it's best to use a blade made of high-speed steel. This is an *extremely* hard metal that will stay sharp longer than a carbon steel blade.

Bi-Metal — To get the best of both worlds, consider using a *bi-metal* blade. With this type of blade, the teeth are cut into a high-speed steel strip that's welded onto a carbon-steel body (thus the bi-metal name). This makes for a flexible blade that resists breaking, plus it holds an edge longer.

Bi-metal blades are ideal for tight scrolling cuts in metal or for cutting wood that may have nails embedded in it.

SHOP TIP!

If the information on a blade wears off (or the packaging is gone), it's hard to tell what type of metal it's made of. To identify blades at a glance, dip the shanks in different colors of paint.



The Cutting EDGE

SPECIAL PURPOSE BLADES

If you're faced with a specialized cutting job, chances are there's a jig saw blade designed for just that purpose (see *Photos at right*).

Carbide-Coated Blade — Take a carbide-coated blade for instance. The cutting edge is embedded with tiny grains of carbide, which makes it ideal for cutting hard, abrasive materials.

Scroll Blade — For making tight, curved cuts that are splinter free, choose a scroll blade with small, pointed teeth ground to a razor edge.

Downcut Blade — To cut a laminated or veneered surface, select a downcut blade. The teeth on this type of blade point down, so the blade cuts on the downstroke, eliminating chipout on the topside.

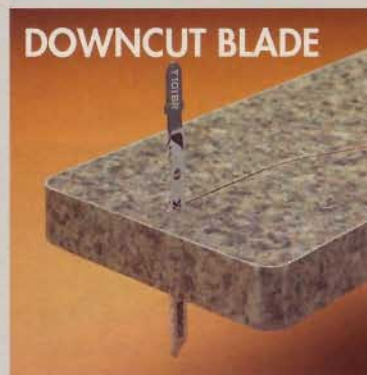
Knife-Edge Blade — A knife-edge blade has no teeth at all. The cutting edge is shaped like a knife, so it makes a slicing cut through the workpiece.



▲ A coating of carbide grit on the edge of this blade lets you cut tile, brick, and even cast iron.



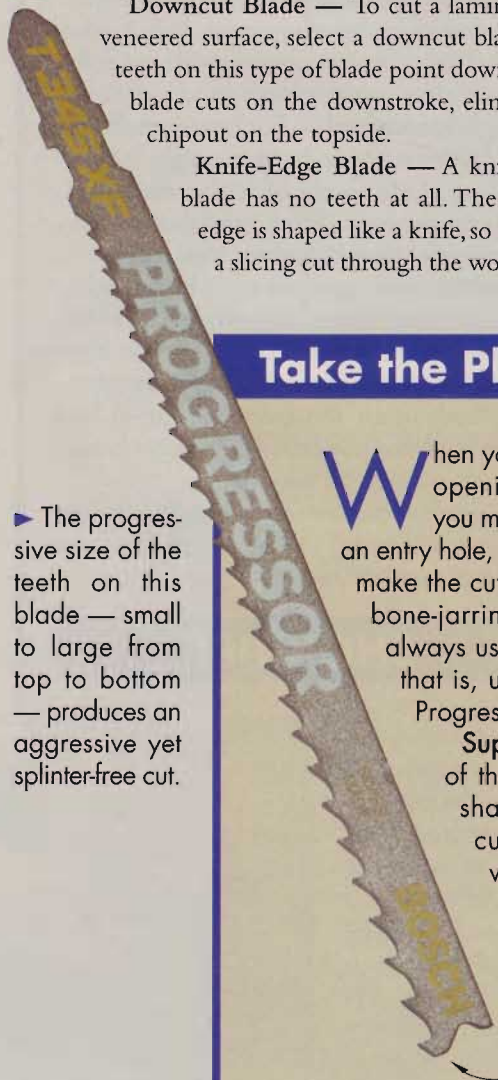
▲ A narrow body and closely spaced teeth make this blade ideal for splinter-free scroll cuts.



▲ The teeth on a downcut blade point down instead of up, eliminating chipout on the topside.



▲ With a knife-like cutting edge, this blade makes clean cuts in foam, leather, rubber and vinyl.



► The progressive size of the teeth on this blade — small to large from top to bottom — produces an aggressive yet splinter-free cut.

Take the Plunge with Progressor Jig Saw Blades

When you use a jig saw to cut an opening in a workpiece, do you make a plunge cut? Or drill an entry hole, insert the blade, and then make the cut? To avoid the skipping, bone-jarring entry of the blade, I always used to drill an entry hole, that is, until I discovered Bosch's Progressor jig saw blades.

Super-Sharp Tip — The tip of these blades has a razor-sharp tooth. When plunge cutting, it slices into the work smoothly, quickly, and with pinpoint accuracy (see *Photo at right*).

A sharp tooth on the tip of the blade makes for fast, smooth plunge cuts

Progressive Tooth Size — Another unique feature of this blade is the size of the teeth (see *Photo at left*). Notice that the teeth are small near the top, then get progressively larger toward the bottom (hence the name). The small teeth produce a clean cut, while the large teeth cut fast and aggressively. (To find out more about Progressor jig saw blades, go to BoschTools.com).





new Fat Max COVERS ITS NECK

Nails are contrary things. They're small enough to be easily missed by a swinging hammer, but large enough to damage the handle in the event of a wayward blow.

Stanley evidently has replaced enough shredded handles to know that this is a common problem. Their solution is the new Fat Max Framing Hammer with a steel "overstrike plate" to protect the handle.

Other noteworthy features include a solid-hickory, axe-style handle, and a 22-ounce head with an oversized strike surface and magnetic nail starter on top of the hammer head.

What I really like about this hammer, though, is that I no longer have to refer to my erratic swings as "misses" but rather "overstrikes." That's worth \$25 to me.

easy-to-install, space-saving GARAGE DOOR OPENER

Installing a garage door opener is the stuff that sitcoms are made of. Many a well-meaning DIY'er has been humbled by the springs, chains, hangers, wheels, pulleys, and other assorted hardware involved in a typical garage door opener.

The good news is, a much friendlier garage door opener is available from Wayne Dalton. Installation is easier because this is an enclosed-spring, direct-drive system, which means many of the parts I just listed are eliminated.

The real advantage of the system, though, is that it opens up the overhead space in your garage because there's no need for the usual opener support rail.

Besides that, this unique driver, which is extremely sensitive to resistance, doesn't require photo-eyes to keep you from being caught beneath a closing door.

Wayne Dalton products are sold in Menard's, Lowe's, and other distributors. Visit the website at www.WayneDalton.com or call 800-827-3667 to find a dealer in your area.



breathe easy

Face Mask

No more excuses for not wearing a mask in the shop. This new Moldex EZ-ON N95 Series respirator from Gempler's solves all the reasons you think you have for inhaling dust. It goes on easy with a single strap and is more comfortable than typical masks because of its large shield and flexible sides. The respirator is available with or without an exhalation valve. Order the respirators at www.Gemplers.com or by calling 800-382-8473. Expect to pay about \$27 for a bag of 10 masks.





affordable NAILER COMBOS

Loud, heavy, large, and expensive — that's the list of common complaints about compressors and air tools in general.

Senco has heard *and* responded with three finishing tool and compressor kits that effectively answer all those gripes.

The combos include a PC-1010 mini compressor that weighs 20 pounds, turns out 1-hp peak power, and delivers 20 to 44 drives per minute from its 1-gallon tank.

All the necessary apparatus is part of the kit as well, including air hose, fittings, a package of fasteners, tool oil, and the always fashionable safety glasses.

So with that as the starting point, you need only decide which air nailer best fits your needs.

For the DIY trim carpenter, there's the FinishPro 15. This is an 18-gauge brad nailer that uses fasteners in the 5/8" to 1 1/4" range and is perfect for cove molding, quarter round, or picture frames.



In the same vein, there's the FinishPro 18. This is also an 18-gauge nailer, but with a larger fastener range (5/8" to 2"). This is a good choice for larger trim projects or built-in cabinets or cases.

An excellent choice for the woodworker is the FinishPro 2N1. This one drives 18 gauge brads (5/8" to 1 1/4") and 18-gauge staples (1/2" to 1"). This is my choice for upholstery, cabinet backs, and other small projects.

The kits range in price from \$180 to \$220 — an exceptional value for all-inclusive kits. To find a dealer in your area, visit www.Senco.com or call 800-543-4596.

simple, low-voltage RADIANT FLOOR HEATING

Radiant floor heating is one of the most effective and comfortable systems for heating a room ever devised.

Unfortunately, the complexity of such systems puts them beyond the scope of most DIY'ers.

There is, however, one option available that

most DIY'ers will find well within their abilities to install.

The product is called NuHeat and consists of a simple heating mat and thermostat. The mat is embedded in a layer of mortar between the subfloor and floor tile (see Photos, left) and is no more difficult to install than the tile itself.

I received a quote of \$248 for a 2-ft. x 8-ft. mat plus another \$165 for the thermostat — so this isn't a cheap system. But the simplicity of the system and knowing I can install it myself make it worth the price.

NuHeat offers several standard size mats through their line of distributors, or custom mats can be made for rooms of unusual shape or size. Professional installation is also available.

To locate a dealer in your area, call NuHeat at 800-778-9276. To view more information on the product, including a downloadable installation guide, visit the company's website at www.NuHeat.com.



▲ A bed of mortar goes under the mat and another over it before installing the tile.





Ryobi resurrects THE BT SYSTEM

Ryobi's 10" Precision Woodcutting System, known previously as the BT3000, has been off the market for a couple of years now — much to the disappointment of its devoted following. Recently, however, Ryobi re-released their one-of-a-kind saw with some key upgrades and the new moniker of BT3100.

The enhancements include a powder-coated table-top finish for increased durability, an improved guard mounting system for easier removal and replacement of the blade guard, and a better motor mount that should extend the life of the saw.

Veterans of the BT will recognize the lightweight aluminum construction, dual-belt drive system, and 15-amp, 4,800 RPM motor. And, of course, all the optional add-ons that truly make the BT into a unique system are once again available. This time, however, the most



popular of those upgrades, including a router mounting kit, dado throat plate, miter clamping kit, and sliding miter table, are available in a single package for \$99. The saw itself sells for \$299 at Home Depot.

little saws with VERY BIG PULL

Saws that cut on the pull stroke, commonly referred to as Japanese pull saws, are well known to seasoned woodworkers. Their super-thin blades and razor-sharp teeth make them virtually effortless and efficient for all kinds of fine woodworking projects. Now a leading American manufacturer of these saws, Vaughan & Bushnell, is bringing the benefits of Japanese saws to other applications.

The company's line of Mini Bear Saws includes models for tree pruning and PVC cutting in addition to the woodworking models.

These saws feature a 7"-long blade and a lightweight plastic grip. They sell for around \$16 at

hardware stores and home centers. Visit the company's website VaughanMfg.com for more information.



utility vacs are IN THE HOUSE

Utility vacuums are no longer just for the shop. Black & Decker recently released a line of small- to medium-sized wet/dry vacs that make as much sense around the house as they do under your workbench.

The smallest of these is the UV200 2-gallon utility vacuum (pictured here). This lightweight, compact vacuum comes with a short hose for easy storage and a built-in carry handle.

Also available are an 8-gallon and 10-gallon version of the utility vacuums, both of which feature a removable blower for cleaning patios, driveways, and sidewalks.

All three of these models are available at home centers and hardware stores. You can expect to pay between \$24.99 and \$59.99.



PLANE PERFECTION

Perhaps the ultimate woodworking hand plane, this A6 “smoother” made by British plane maker Karl Holtey combines wood and metal in a flawless fit.

Like its name implies, a smoothing plane has a single purpose — to plane the surface of a board perfectly smooth. One of the most beautiful and efficient smoothing planes I’ve seen is this A6 made by British plane maker Karl

Holtey. A “museum-quality reproduction,” it’s patterned after the classic Norris A6 smoother — with several improvements.

Precision Adjustment — One of those improvements is a mechanism that lets you make precise vertical *and* lateral adjustments to the plane iron by simply “tweaking” the knurled knob. This mechanism is made of solid stock and has extra-fine threads that greatly reduce the amount of backlash.

Thick Plane Iron — Another outstanding feature is an extra-thick plane iron that resists chatter. Made out of powdered steel and hardened to Rc 64, it’s designed to hold a sharp edge longer and produce a

silky smooth surface. This plane iron is also cryogenically treated.

Fit & Finish — But what really sets this plane apart from others is its exquisite fit and finish. Dense hand-carved Indian rosewood is “infilled” or “stuffed” into the frame to provide mass to the plane. And the brass sides are dovetailed to a steel sole. These dovetails are then peened together so they lock in both directions.

A lot of hand work is involved in producing such a superb fit and finish. That’s why in 10 years, Holtey has made fewer than 200 planes total. Not surprising since each one is custom-made, requiring more than 150 hours of labor.

To see more of Karl Holtey’s handcrafted planes, check out Holteyplanes.com.

