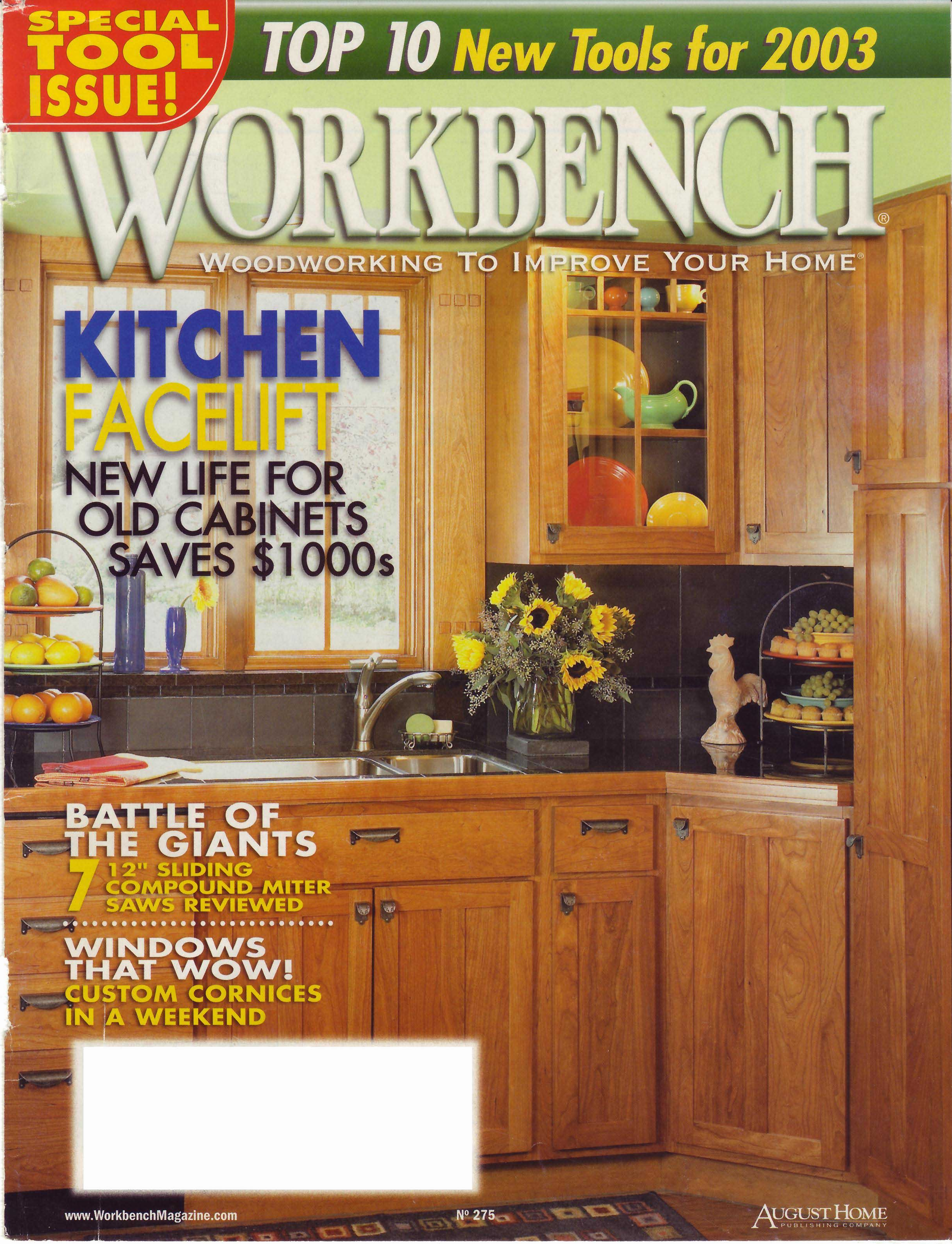
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BATTLE OF THE GIANTS
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EDITOR'S NOTES

Quick — what's the first thing that comes to mind when you think of remodeling a kitchen? A large-scale, expensive project? Dealing with a big construction mess? Eating microwave meals for a month while you put the kitchen back together?

If any of these things hit a nerve, I have a hunch you'll be especially interested in our *Workbench Home* project this issue. Unlike a large, budget-buster remodel, this kitchen update is modest in scale *and* cost. Plus, most of the work is done in the shop, so it won't put your kitchen out of commission for weeks on end.

Better yet, this project offers a few simple techniques that you can use to transform any kitchen into a real showpiece. To see what I mean, take a look at the 'before' and 'after' photos shown above.

REFACE CABINETS. At first glance, it appears we've installed brand new cabinets. But actually, all we did was *reface* them. This involved gluing thin strips of wood onto the existing cabinets *(Photo A)*, adding new faces to the old drawers *(Photo B)*, and building new doors *(Photo C)*.

Besides saving time, the benefit of refacing the cabinets is it only costs a fraction of having to buy new cabinets. And by eliminating the tearout, it reduces the mess in the busiest room in your home.

COMING UP. In addition to the cabinet facelift, we installed built-in appliances, a granite tile countertop, and low-voltage halogen lighting. I'll tell you more about these projects in the April 2003 issue of *Workbench*.

WINDOW CORNICES. Another project that has maximum impact with minimum mess and money are the window cornices that are featured on page 30. Depending on the look you're after, you can choose from three different styles of cornices. And once you decide on a style, you can easily knock out several cornices in a weekend.

Tim

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WORKBENCH® February 2003

FEATURES

DEPARTMENTS

Questions & Answers

Worm- or Direct-Drive Saws: What's the Real Difference?

Q *I'm getting ready to buy a new circular saw, and I keep hearing about worm-drive and direct-drive saws. What's the difference? And is one better than the other?*

Jason McCallister
Fort Wayne, IN

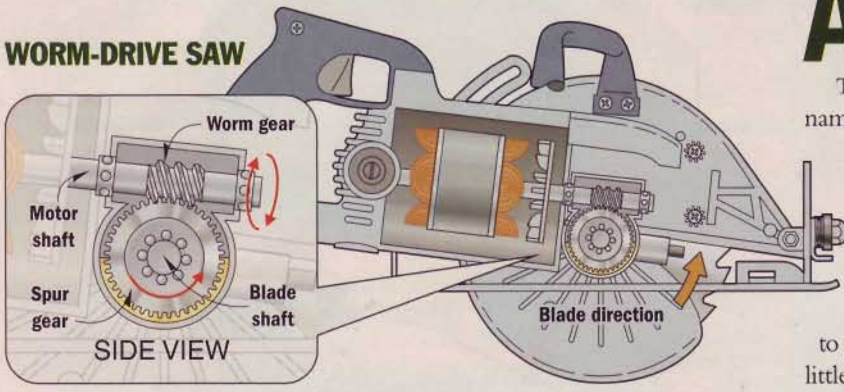
A The biggest difference between these two types of circular saws is how each one transfers power from the motor to the blade.

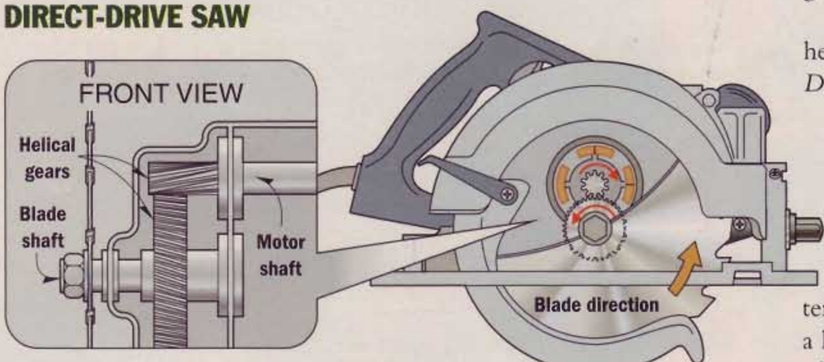
TRANSFER OF POWER. A worm-drive saw gets its name from the gearing mechanism that transmits power from the motor to the blade. A worm gear on the end of the motor shaft drives a gear on the blade arbor *(see Worm-Drive Saw)*.

To prevent overheating and limit wear, these gears run in a crankcase filled with thick oil that keeps them lubricated. This allows manufacturers to gear down their machines to achieve lots of torque with little risk of the blade stalling when it gets pinched in wet or dense lumber. The result is a saw that can cut knotty, green framing lumber day after day.

Direct-drive saws, on the other hand, are driven by helical gears that step down the speed of the motor *(see Direct-Drive Saw)*. A direct-drive saw lacks the torque of a worm-drive saw, which is why it may bog down noticeably during a heavy cut.

WHICH TO CHOOSE? Personal preferences aside, it really depends on what you need the saw to do. If you're only going to trim sheet goods or cut a few 2x4's on occasion, you're probably better off with a direct-drive saw. But if you plan on doing a lot of framing where the saw will get heavy use day after day, get yourself a good-quality worm-drive saw.



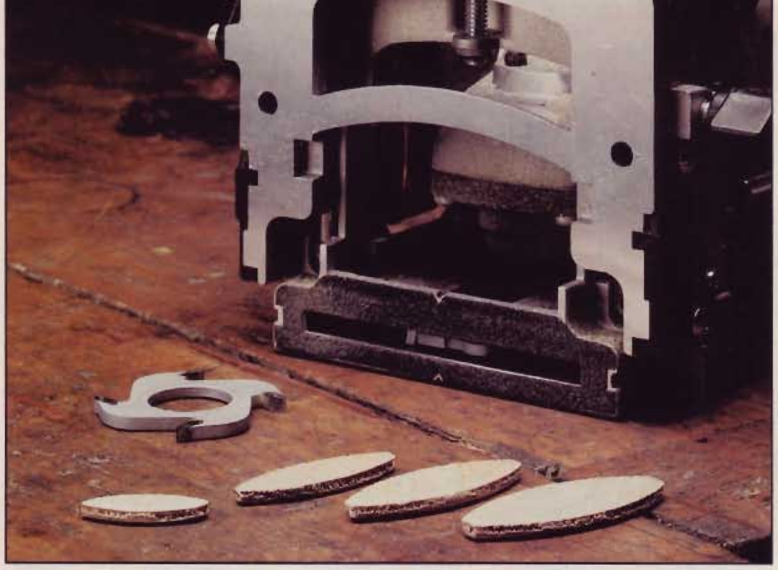


Chamfering a Dowel

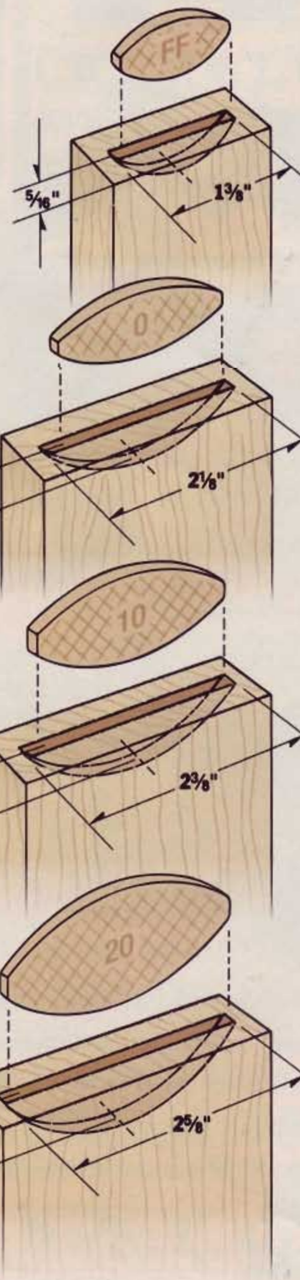
Q *Is there a quick way to chamfer the end of a dowel on the router table?*

Pam Allsgood
Finger Lakes, NY

A The key is to create a "channel" for the dowel to ride in so that it doesn't roll around. A simple way to do this is to clamp a scrap piece to the router table, then capture the dowel between the scrap and the fence, as shown. The dowel should fit snugly in the channel. Now to chamfer the dowel, raise the bit so the bearing is slightly above the table and a tiny bit of the cutter is exposed. Then slowly feed the dowel into the bit until the end hits the bearing. Rotate the dowel to complete the cut.



Small Biscuits to the Rescue



Q *I'm making face frames for cabinets and I'd like to assemble them with biscuits. The only problem is cutting the slots in the ends of the frame pieces. Even with the smallest biscuit slot, the blade cuts all the way through to the edge of the frame piece. Any suggestions?*

Sam Hellman
Topeka, KS

A In order to assemble cabinet face frames with biscuits, the workpieces must be *wider* than the length of the slot cut by the plate joiner. Even with the smallest standard (#0) biscuit, the slot is 2 1/8" long *(see Illustrations at left)*. So the workpieces have to be at least 2 1/4" wide.

To cut a shorter slot for narrower stock, you need a smaller-diameter blade. The Porter-Cable 557 is the only full-size plate joiner I've seen that comes equipped with a smaller blade (2" dia.) that allows you to cut slots for face-frame sized (FF) biscuits. A FF biscuit is a smaller biscuit (approx. 1 1/4" x 1/2") made especially for assembling face frame material less than 2 1/4" wide *(see Top Illustration)*. This smaller blade means you can cut slots in stock as narrow as 1 1/2".

Lamello also offers a blade that's designed especially for cutting slots in narrow face frames. The small biscuits, called H9 biscuits, as well as the blade need to be purchased separately. **Source:** Colonial Saw, 909-390-5465, or online at www.csaw.com

Obey the Drill Press Speed Limits

Q *I bought some new drill bits for my drill press recently, but I'm still having problems drilling a clean hole. Any suggestions?*

Doug Withersby
Via the Internet

A If your bits are sharp and they're causing tearout, I'd say the drill press speed is set too slow. There are several factors that determine the proper drilling speed, including the size and type of bit, plus the density of the material being drilled. The chart below provides a range of drill press speeds that should work well.

Type of Drill Bit	Size of Drill Bit	Hardwood Speed (rpm)	Softwood Speed (rpm)
Brad Point	1/8"-1/4"	1000	2000
	3/8"-1/2"	750	1800
	5/8"-3/4"	375	1600
	7/8"-1"	250	1000
Forstner	1/4"-3/8"	750	2200
	1/2"-5/8"	500	2000
	3/4"-1"	500	1600
	1 1/8"-1 1/4"	250	1000
	1 3/8"-2"	250	500
	2 1/8"-3"	250	250
Spade Bit	1/4"-5/8"	1800	2200
	3/4"-1"	1600	1800
	1 1/4"-1 1/2"	1200	1600
Countersink	Fluted	1000	1200
	Shearcutting	800	1000

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Looking for basic helpful hints or some good common-sense solutions to everyday woodworking and home improvement problems? If so, send us your best questions. We're happy to answer your question and share the tips, tricks, and great woodworking ideas we've collected over the years.

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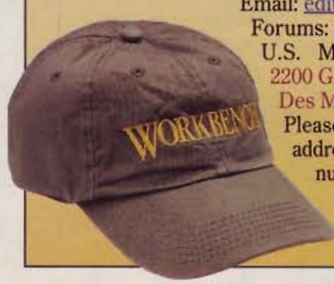


Please include your full name, address, and daytime telephone number. You'll receive one of our handsome and fashionable *Workbench* caps if we publish your letter.

Finish Nailer Follow-Up

Along with our comparison of conventional 16-ga. finish nailers for the December 2002 issue of *Workbench*, we also evaluated two *cordless* 16-ga. nailers. Both of these tools have the benefit of eliminating the tether between nailer and compressor, allowing you to move more freely about the shop or jobsite.

PASLODE TRIM MASTER F-16

SENCO AIR-FREE 32

PASLODE TRIM MASTER F-16

This nailer is powered by a small internal combustion engine. The engine is fed by a fuel cell that loads in the head of the machine. A rechargeable battery provides a spark to ignite a small quantity of the fuel each time the trigger is pulled. Igniting the fuel drives a piston that provides the force to drive a nail. A charged battery and full fuel cell will get you through about 1,000 nails.

The lightweight and angled magazine on this tool has made it a *Workbench* favorite both in the shop and on the jobsite. It has proven to be dependable, durable, and infinitely adjustable. Its only faults are the acrid exhaust smell that comes from the internal combustion and the fact that it comes with only one battery (which takes two hours to charge).

The Paslode Trim Master F-16 retails for $370. Visit www.Paslode.com or call 1-847-634-1900 for more information.

SENCO AIR-FREE 32

The Air-Free 32, 16-ga. brad nailer from Senco arrived at *Workbench* just in time to be put to use in a second-story remodel job. And I can assure you that not having to lug a compressor up and down the stairs earned this tool the admiration of everyone involved in the project. To date, the nailer has fired flawlessly and has provided adequate power and battery life for a full day's work. Also, the electronic depth-of-drive adjustment has proven quite effective.

This design uses an internal flywheel powered by a 14.4v rechargeable battery to drive the nail. It's a bit unusual in that, each time you pull the trigger, the nailer "winds up" to drive the fastener. That makes for a slight delay between driving nails, but it's still plenty fast when you consider you're not dragging an air hose behind you every step of the way.

The Air-Free 32 retails for $330. Visit www.Senco.com or call 1-800-543-4596 for more information.

Tips & Techniques

FEATURED TIP

Folding Work Table

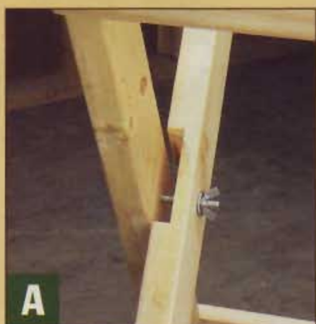
Space has always been limited in my shop. My bench tools occupy most of the workbench, leaving little room for layouts and glue-ups.

To get the most from the available space, I built a folding work table. The table is supported by a pair of crossleg assemblies that are stabilized with 1x4 stretchers. One leg of each assembly is dadoed to accept its mate, and a carriage bolt and wing nut keep them secured. To set up *or* fold up the table, simply loosen the wing nut so you can separate the legs *(see Photo A)*.

When building the work table, be sure the two leg assemblies are identical. If you dado the right leg in one assembly, do the same in the other. Assemble each mating pair of legs first, using the carriage bolt, washer, and wing nut. Then attach a bottom stretcher to the side of each leg assembly. This stabilizes the base enough to let you screw a top stretcher on each side, resulting in a sturdy base.

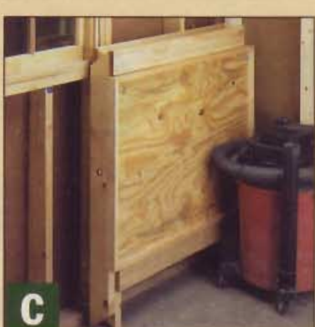
To make the tabletop, cut a piece of plywood to size, then glue and nail solid wood edgebanding to all four sides of the top. This edgebanding helps hold the top in place *(see Photo B)*. For easy storage, drill two holes in the top to attach it to the side of the legs with hanger bolts *(see Photo C and Storage Detail)*.

Dischmond L. Spurrier
Wellsburg, WV



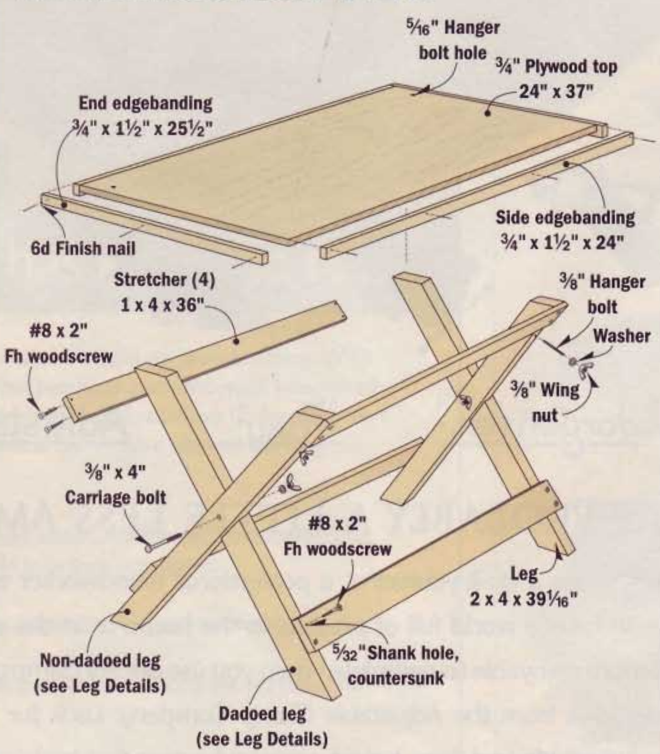
▲ **The key to the work table's knock-down flexibility is the dado/carriage bolt assembly.**

▲ **The tabletop simply screws onto the tops of the legs to provide a sturdy work surface.**



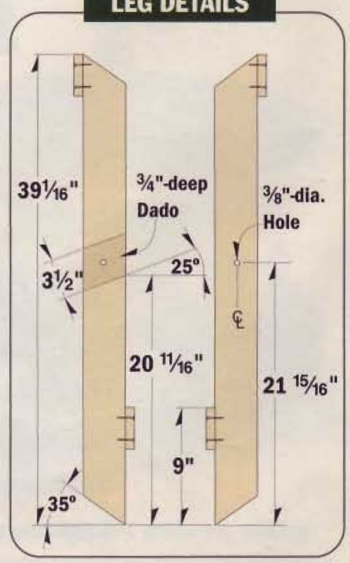
▲ **When the job is finished, the work table folds up completely to tuck away in a corner.**

CONSTRUCTION VIEW



STORAGE DETAIL

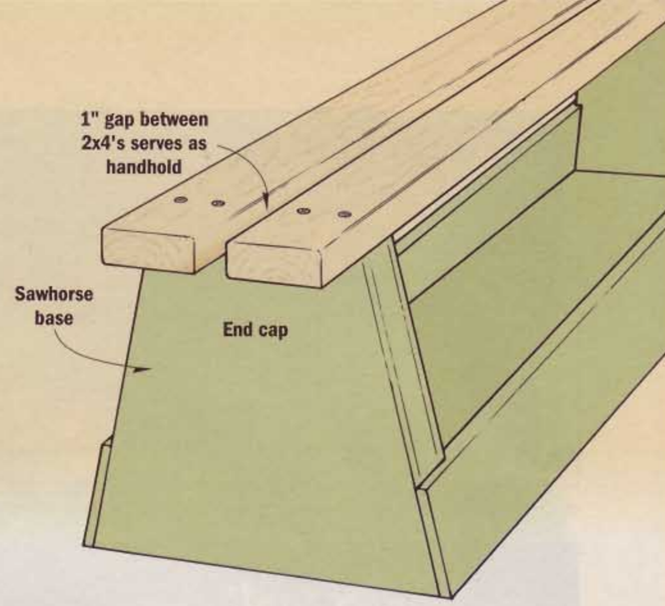
LEG DETAILS



A Different Horse Handle

I decided to build the three-in-one sawhorses featured in your October 2002 issue. During the building, I got to thinking about the Douglas fir top. I didn't have a wide enough piece of fir to fashion the top, but I had plenty of 2x4's lying around the shop. So I cut a 2x4 into two 38"-long pieces. I rounded off the edges and screwed the 2x4s into the tops of the end caps. The result was a beefy handle with space for a handhold, without the hassle of having to cut and rout the hand holes. And using 2x4s ensures you'll always have plenty of replacement material when the top gets beat up.

John Sadler
Cheyenne, WY



Free Stubborn Sanding Sleeves

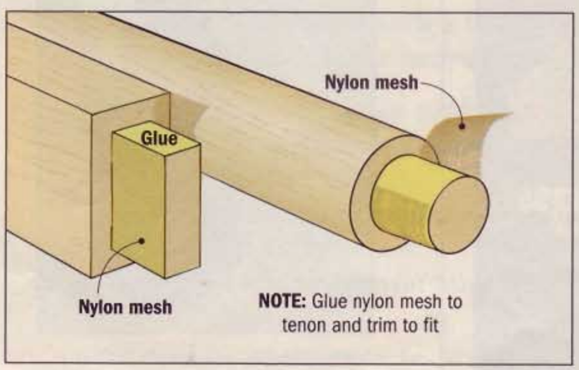
I read your tip on placing a drum sander spindle in the freezer overnight to shrink the spindle and loosen the old sanding sleeve. But I think I have an even quicker solution. When the sanding sleeve on my drum sander wouldn't let go, I decided to try another technique that didn't require an overnight wait. (Patience is not one of my virtues.) First, I backed off the nut to loosen the assembly as much as possible. Then I placed the spindle on the floor and gently rolled it with my foot. The pressure flexed the rubber spindle, and the sleeve worked off easily.

Jim Kreisel
Yakima, WA

Loose Tenon Fix

There's a quick and easy way to repair tenons that fit too loosely in the mortise, be it an old piece of furniture or a brand new project. I cut an old pair of nylon stockings and into small sections to fit around the tenon. The nylon mesh wraps easily around any shape of tenon, and the mesh provides a good gluing surface. Plus, the nylon mesh usually provides just the right thickness to make the tenon fit snugly in the mortise.

Ken Lustig
Coeur D'alene, ID



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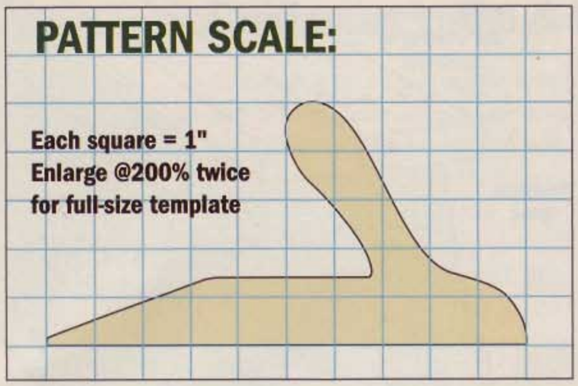
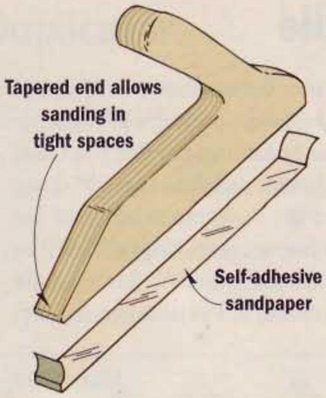
SKIL

This issue's Featured Tip winner receives a hand-painted Limited Edition Model 77 Skilsaw!





Sanding Tight Spaces

Many of the projects I have around the house seem to require sanding into tight places. I finally tired of continuously folding sandpaper to accomodate the situation, and thought there must be a better way. So I made a detail sander out of $^3/_4$" plywood in my shop *(Pattern at left)*.

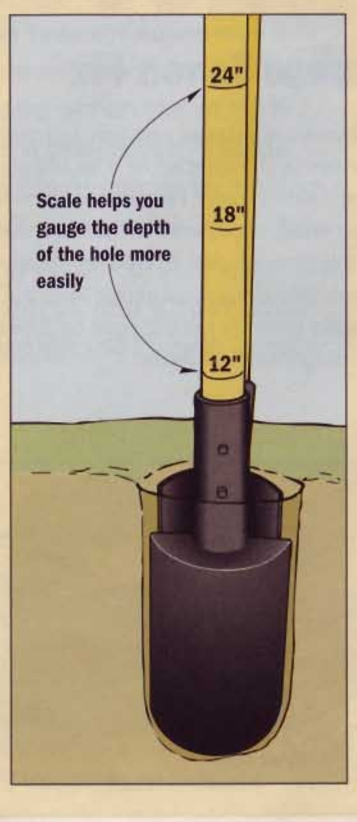
To use the sander, I cut a narrow strip of self-adhesive sandpaper and apply it to the bottom and both ends. The sander looks just like a push stick and allows me to put sanding pressure exactly in the places it's needed.

Isador Schultz
Lake Havasu City, AZ

Post Hole Gauge

When using a post-hole digger, I have a way to avoid repeatedly using a tape measure to check the depth of the hole. I simply mark the depth increments on the handle of the digger. This makes it easy to check my progress as I dig.

Steve Boarman
Philpot, KY



Low-Cost, High-Impact
Kitchen Facelift

Save time and money by refacing — not replacing — your kitchen cabinets.

▲ Although this kitchen was quite usable, the knotty pine cabinets, worn countertop, and old appliances all needed updating.

Sometimes less is more. For example, this kitchen remodel was considerably *less* expensive, *less* time consuming, and required *less* demolition than many similar projects I've seen. Even so, if you compare the "before" photo at left with the "after" photo above, I think you'll agree that this relatively small-scale project made a big improvement in the appearance of this kitchen.

New Life for Old Cabinets

One of the biggest improvements was to the kitchen cabinets. The original cabinets were quite functional, and the overall layout worked well. Even so, the homeowners wanted to update them. So rather than tear out the old cabinets, we gave them a "facelift" instead.

SHOP-MADE CLADDING. For starters, we refaced the existing cabinets by applying shop-made cladding. The ends of the cabinets are covered with $^1/_4$"-thick cherry plywood. And we glued $^1/_4$"-thick strips of solid cherry to the rails and stiles on the face frames.

SOLID-WOOD DOORS. As for the cabinet doors, they needed attention, too. So we built new frame-and-panel, solid-wood doors.

▲ A built-in oven and stovetop is a major improvement over the old slide-in stove (see *"Before" photo on page 18*). We also installed a slide-out vent hood and built a message board to conceal the duct.

◄ A granite tile countertop, color-matched epoxy grout, and an under-counter stainless steel sink complete this elegant kitchen remodel.

Making solid-wood panels for the doors takes more time than using plywood panels. But once the finish is applied, it results in a much more uniform color than using plywood. Solid wood also means that the panels look good both inside *and* out.

DISPLAY DOORS. Speaking of looks, the homeowners had a special collection of colorful dishes they wanted to display. The solution was to convert two of the cabinets into display units by adding glass doors. Low-voltage lighting installed in the display cabinets highlights the dishes.

The construction of the display doors is similar to the solid-wood doors. Here though, we fit a shop-made divider and a glass panel into the door frame.

DRAWERS. Another part of this cabinet facelift focused on the drawers. As it turned out, the existing drawers were sturdy and well-made, so it didn't make sense to build new ones. Instead, we cut each of the old drawer fronts free on the table saw. Then, after adding a new front for the drawer box itself, we installed a false front made of solid cherry. (For more information about this technique, see page 26.)

FINISH. But there's more to this kitchen remodel than the cabinet facelift. The water, steam, and spills that are part of a kitchen's everyday life demand a tough finish. To accomplish that, I used a finishing process that included a stain covered with three coats of polyurethane.

The rich, warm color you see is produced by a mixture of three parts Zar Cherry Stain and one part Wood-Kote Cherry Jel'd Stain. The gel stain minimizes blotching that can sometimes occur with cherry.

MORE IMPROVEMENTS. In addition to the cabinets, we also made several other improvements to make this kitchen as functional as it is attractive *(see Photos above)*. For information about these products, refer to the Buyer's Guide on page 28.

▲ The face frames of the cabinets are clad with strips of solid wood that are glued and clamped in place. I used tape to "clamp" hard-to-reach areas.

cladding the cabinets

One of the appealing things about a kitchen facelift is there's no need to tear out the existing cabinets. By covering the old cabinets with *cladding*, you can make them look brand new.

MATERIALS. I used two types of material for the cladding. The exposed end panels of the cabinets are covered with 1/4" cherry plywood *(Construction View below)*. And I applied 1/4"-thick solid cherry to the face frames and toekick.

So why not cover the face frames with veneer instead of solid stock? Two reasons. First, solid wood lays flat, so it's easier to glue and clamp. Second, the joints can be sanded flush without worrying about sanding through the thin veneer.

Getting Started

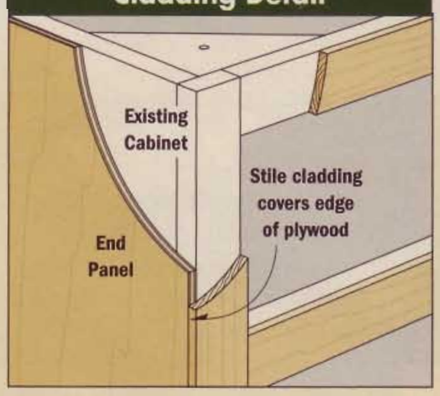
As with any project, there are a few preliminary things to take care of before you get started. First of all, you'll need to remove all the cabinet doors, drawers, and trim.

Once that's accomplished, check the outer stile (vertical frame piece) on the face frame of your cabinets. Sometimes in order to create a more finished appearance, the stile extends past the end of the cabinet, forming a small lip *(Figs. 1 and 1a)*. If so, you'll have to remove it. Otherwise, the plywood and the solid-wood cladding won't fit tightly together.

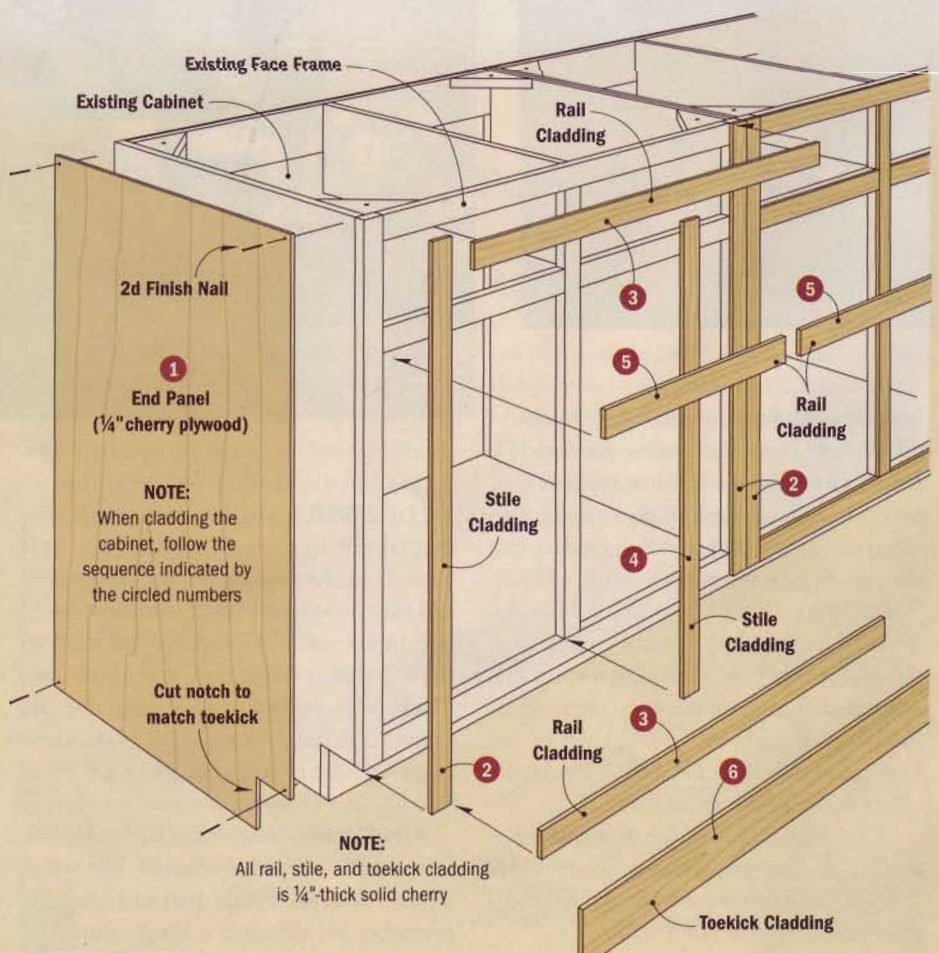
ROUT THE LIP. An easy way to remove this lip is to use a router and a flush trim bit *(Fig. 1)*. As you rout,

CONSTRUCTION VIEW

Cladding Detail



Toekick Detail



the bearing on the bit should ride against the end of the cabinet *(Fig. 1a)*. This way the cutting edges of the bit will trim the overhanging lip flush with the end panel.

Just a note about routing the lip on the upper cabinets. The base of the router won't allow you to rout the lip near the ceiling. To get around that, just pare off the lip near the ceiling with a chisel.

CLEAN & SAND. After the lip is removed, clean all the surfaces that will be clad with a household degreaser. Then, to ensure a good glue bond, sand each surface with a random-orbit sander, using either 80- or 100-grit sandpaper.

Time for the Cladding

Now that the cabinets are prepared, you can concentrate on the cladding.

END PANELS. As I mentioned, the ends of the cabinets are covered with 1/4" plywood panels. Each panel is cut to size to fit flush with the front of the existing face frame. You'll also need to cut a notch for the toe-kick, as shown in the *Construction View*. By the way, don't worry about the exposed front edge of the plywood. It will be concealed by the cladding on the face frame *(Cladding Detail)*.

The end panel is glued on with panel adhesive. Apply the adhesive to the cabinet and press the panel into place *(Fig. 2)*. Tack brads at the corners of the panel to keep it from shifting as the adhesive cures.

FACE FRAMES. The next step is to add the thin, solid-wood cladding to the face frames. So where do you get *thin* wood? A quick and easy way is to make your own by resawing a thick board into two (or more) thin pieces *(see Sidebar at right)*.

When resawing, you'll want to work with extra-long pieces that are ripped to final width. I ripped all the pieces to match the width of the rails and stiles on the face frames — with one exception. To cover the edge of the 1/4" plywood end panels, I made the side stile near the exposed end of each cabinet 1/4" wider.

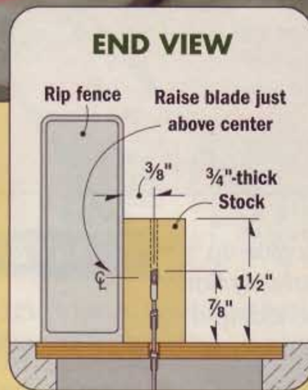
Keeping those things in mind, go ahead and prepare the pieces for resawing. Plan on making a few extras to allow for mistakes. Then resaw the stock and plane the cladding to its final thickness (1/4").

At this point, it's time to attach the cladding to the face frame. I used simple butt joints where the end of one strip meets the adjoining piece. So to produce tight-fitting joints, it's important that each piece of cladding is accurately cut to length.

To accomplish that, follow the sequence in the *Construction View*, cutting each piece of cladding to fit. As you glue on each piece (I used yellow glue), make sure the clamping pressure is evenly distributed across the cladding *(Fig. 3)*. To get more "reach," remove the clamp pad from the inner jaw *(Fig. 3a)*.

SAND FLUSH. After gluing on the cladding, sand the faces flush with each other. A random-orbit sander makes quick work of this.

RESAWING ON THE TABLE SAW



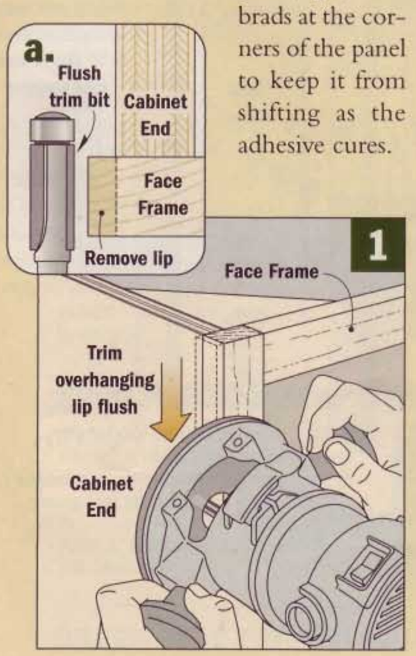
Resawing is cutting thin pieces of wood from a thick piece of stock. (In effect, ripping on edge.) A quick way to do this is on the table saw.

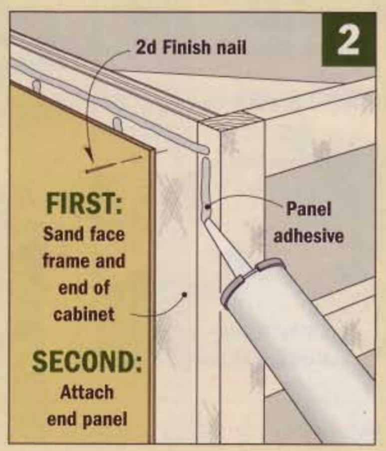
Before you get started though, there are two safety precautions that are a "must." First, to reduce the chance of kickback, use a "zero-clearance" insert with a splitter *(see Photo above)*. Second, be sure to use a push block when making a cut.

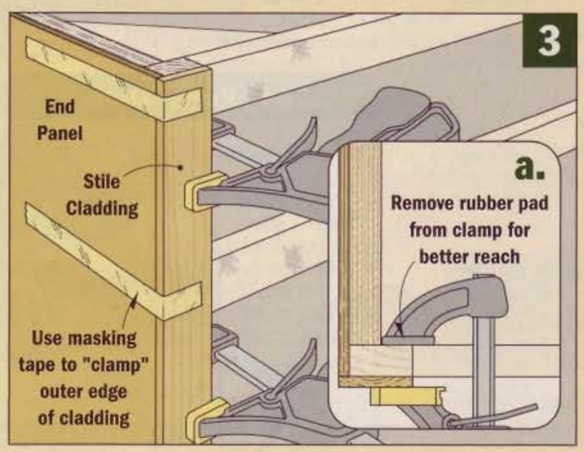
When resawing, set the rip fence so you end up with slightly thicker workpieces than needed. That way you can sand or plane pieces to final thickness.

To avoid bogging down the saw, I use a two-pass method. Start with the blade raised just over half the width of the piece *(End View)*. Then make two passes at this setting, flipping the piece over between passes. Note: Always keep the same face against the fence.

ONLINE Extras
Zero-Clearance Table Saw Inserts
WorkbenchMagazine.com







▲ To glue up a perfectly flat door, clamp a *straight* scrap of wood across each end. Use wax paper to avoid gluing the scrap to the door.

building solid-wood doors

The cabinet doors for this kitchen facelift feature frame-and-panel, solid-wood construction. For ease of installation, I decided to make overlay doors, which means they lay on top of the face frames. The amount of overlay is 1/2" on all sides, so the doors are 1" wider and taller than the openings in the face frame.

Build the Frames

The first step in building the doors is to make the frames that surround the solid-wood panels.

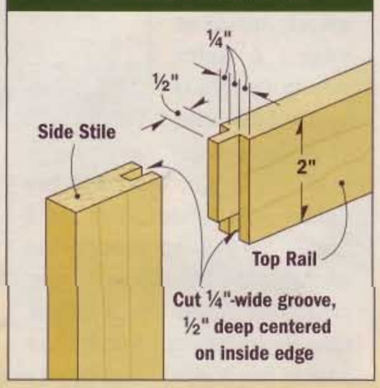
As you can see in the *Door Assembly* illustration below, each frame consists of three vertical stiles (two sides and a center stile) and two horizontal rails. Note: For narrow doors (less than 12" wide), I left out the center stile.

JOINERY. To simplify construction, the frames are assembled with stub tenon and groove joints. Both ends of each rail have a short tenon that fits into a groove in the stile *(Rail & Stile Detail)*. And a tenon on each end of the center stile fits into grooves in the rails *(Center Stile Detail)*.

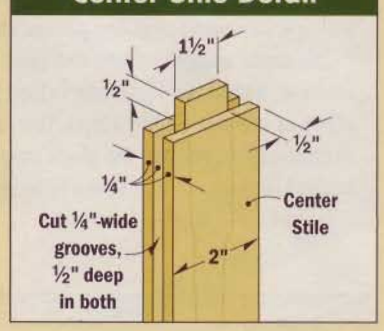
CONSTRUCTION. After taking the joinery into account, cut the rails and stiles to size from 3/4"-thick hardwood. Be sure to label each piece to avoid getting them mixed up. Also, mark the *outside* face to use as a reference when machining the parts.

CUT GROOVES. Now you're ready to cut grooves in the rails and stiles. I mounted a 1/4" dado blade in the table saw to do this *(Fig. 4)*. For consistent results, run the *outside* face of each piece against the fence.

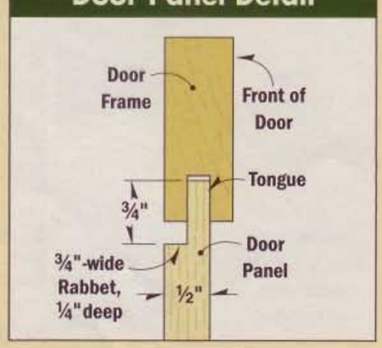
Rail & Stile Detail



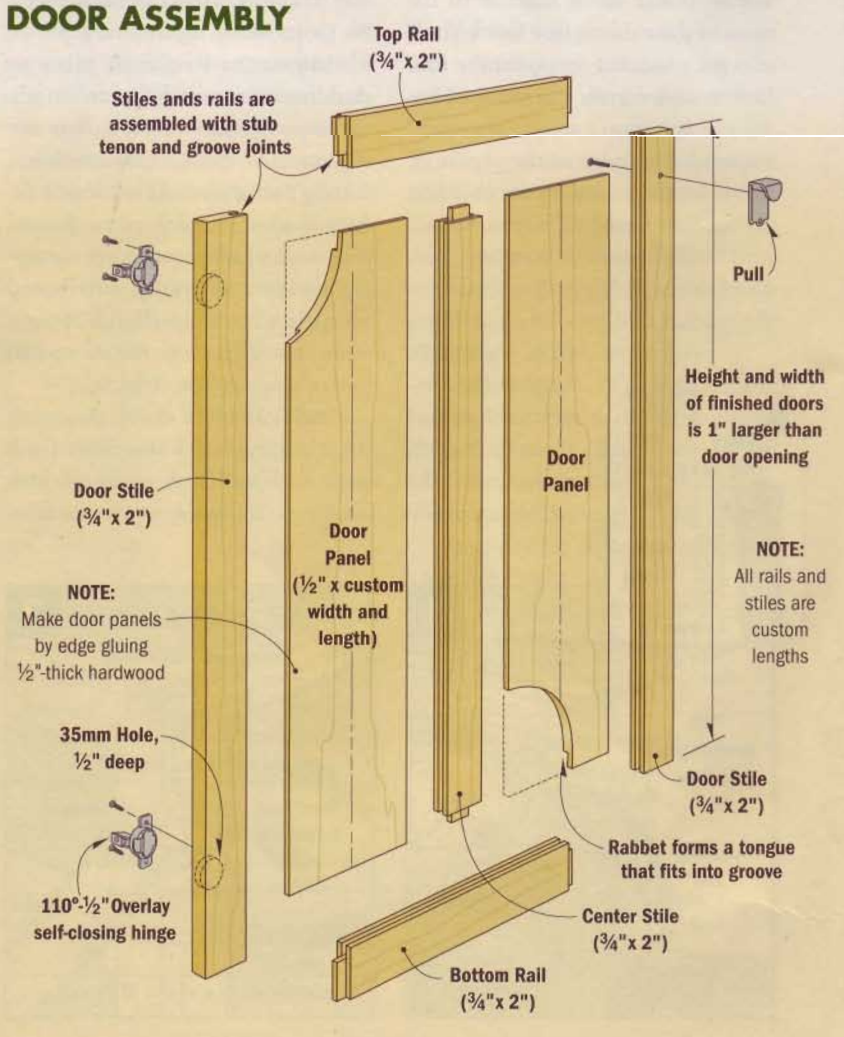
Center Stile Detail



Door Panel Detail



DOOR ASSEMBLY



TIME FOR TENONS. The next step is to cut stub (short) tenons to fit the grooves. The tenons are $1/2$" long. So here again, I used a dado blade, setting it up to cut roughly $5/8$" wide. To ensure consistent-length tenons, use an auxiliary fence as a stop and "bury" part of the blade in the fence *(Figs. 5 and 5a)*.

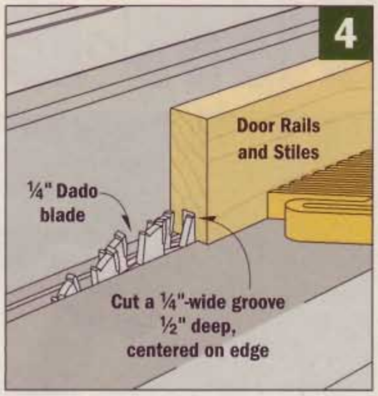
A handy way to establish the *thickness* of the tenons is to use one of the grooved pieces as a gauge for setting the blade height *(Fig. 5b)*. Check the setup by making test cuts. Then cut tenons in the actual workpieces, using the miter gauge to guide each piece through the blade. Making two passes, one on each side, should result in a tenon that fits snug.

Solid-Wood Panels

With the door frames complete, it's time to start on the solid-wood panels. Instead of going with a traditional raised-panel look, I wanted the door panels to be *flat* on the outside for a clean, simple look *(Door Panel Detail)*.

GLUE UP PANELS. The door panels are made by edge-gluing $1/2$"-thick cherry. It's best to start with panels that are about 2" larger than you need in length and width, then trim them to size after the glue-up.

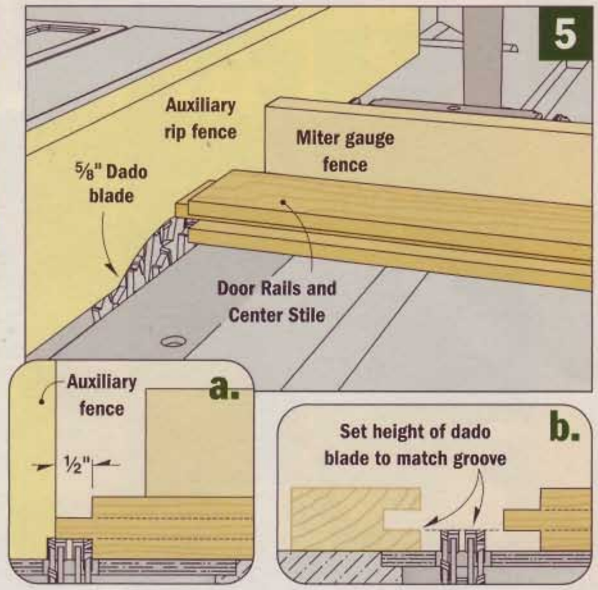
To determine the final size of the panels, dry assemble the frames, measure the openings, and then add $7/8$". That's $1/8$" *less* than the combined depth of the grooves. When the door is assembled, this will allow the panel to expand and contract with changes in humidity.



TONGUES. If you look at the *Door Assembly* illustration again, you can see there's a tongue on all four edges of the door panel that fits into the grooves in the frame pieces. The tongue is formed by cutting a rabbet in the back of the door panel.

To cut the rabbet, I used a two-step process on the table saw. First, with the panel lying flat, cut four shallow, crisscross kerfs *(Figs. 6 and 6a)*. Second, stand the panel on edge and run it against a tall auxiliary fence to remove the remaining waste material, leaving a $1/4$"-thick tongue *(Fig. 7)*.

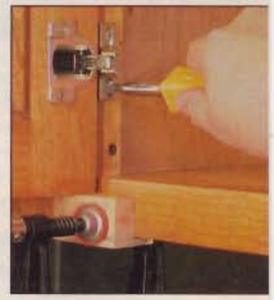
After sanding the tongues smooth, dry-clamp the doors to check for final fit before glue-up. If you plan to stain the doors, now is a good time to do it. This way, if the panel shrinks a bit, it won't expose unstained wood.



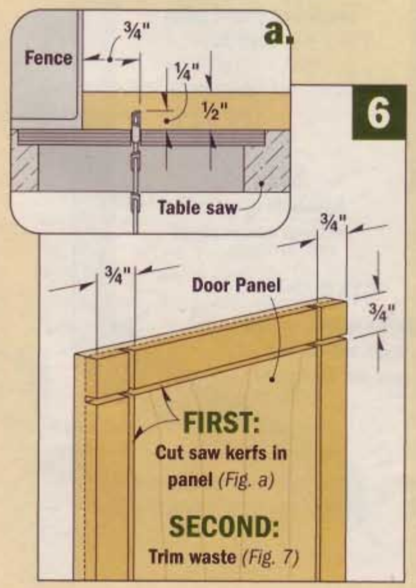
FINAL ASSEMBLY. When assembling the doors, keep in mind that only the rails and stiles are glued together — the panels should "float" in the frames to allow for wood movement. Also, be sure the door is square and flat while the glue dries *(see Photo on page 22)*.

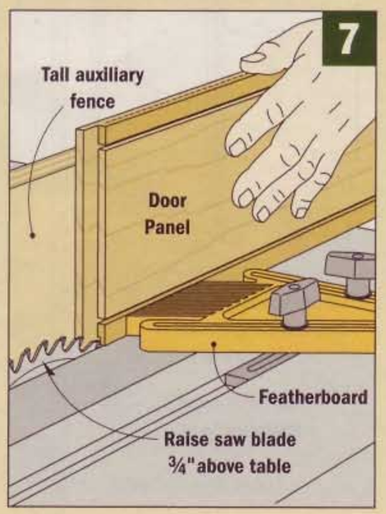
MOUNT DOORS. After removing the clamps and sanding the doors smooth, the next step is to drill two large holes in the back of each door to hold the hinges *(Fig. 8)*. This requires a 35mm drill bit that's designed for just this purpose.

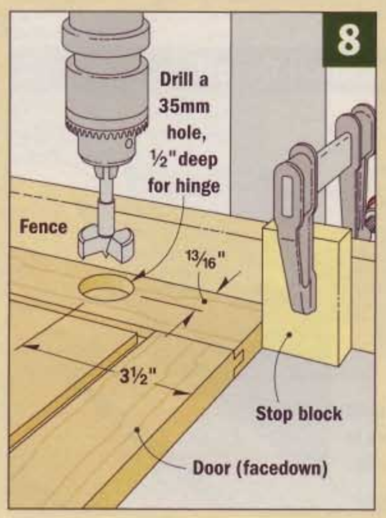
Finally, after staining and finishing the doors, I installed the hinges and mounted the doors to the cabinets, using the alignment tip shown in the margin.



▲ To ensure that all the doors align, set each one on an L-shaped block that's clamped to the face frame. Then screw the hinges to the cabinet.







▲ This easy-to-build, elegant display door is made using simple techniques that can be applied to any kitchen remodeling project.

display doors & dividers

As an option, you may want to make glass display doors for your kitchen cabinets. By installing a wood divider and a piece of glass in the door frame, it's easy to convert a kitchen cabinet into an elegant display case *(Photo at left)*.

Frame First

The frame for the display doors is similar to the other doors. It's an overlay door that's 1" larger than the cabinet opening. Here again, it's assembled with stub tenon and groove joints *(Display Door Assembly)*.

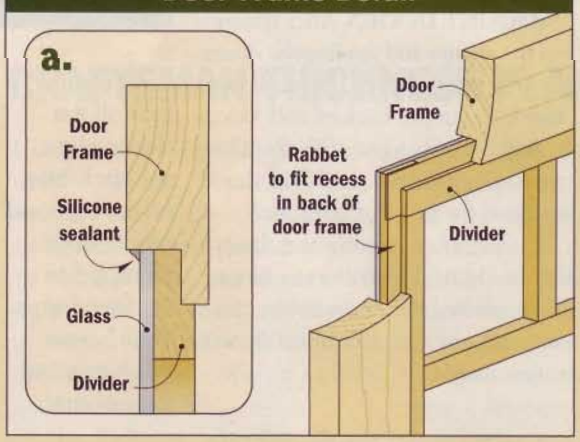
Of course, the thing that's different about this frame is it's assembled without a solid-wood panel. What's not so obvious is how the wood divider *and* the glass fit into the grooves in the frame. The answer is, they don't. Let me explain.

In order to insert the divider and the glass in the frame, the back lip of the groove must be removed. This forms a large rabbet in the back of the door frame that holds the divider and glass *(Door Frame Detail)*.

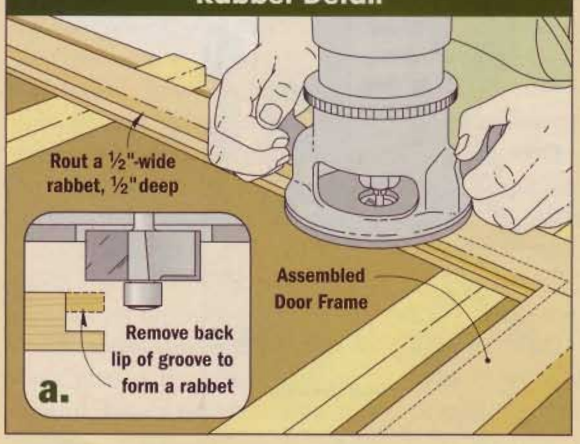
RABBET THE BACK. An easy way to trim off the back lip is to lay the frame face down on a bench and use a hand-held router with a rabbet bit *(Rabbet Detail)*. Just a word of caution here. The lip is fairly thin, which could cause it to split as you're routing. To avoid that, make a couple of *light* passes, routing from left to right. Then, with the bearing riding against the lower lip, make a full-depth cut.

The bit will leave rounded corners, which are easily squared up with a chisel. This is also a good time to drill holes for the hinge cups, using the same method shown on page 23.

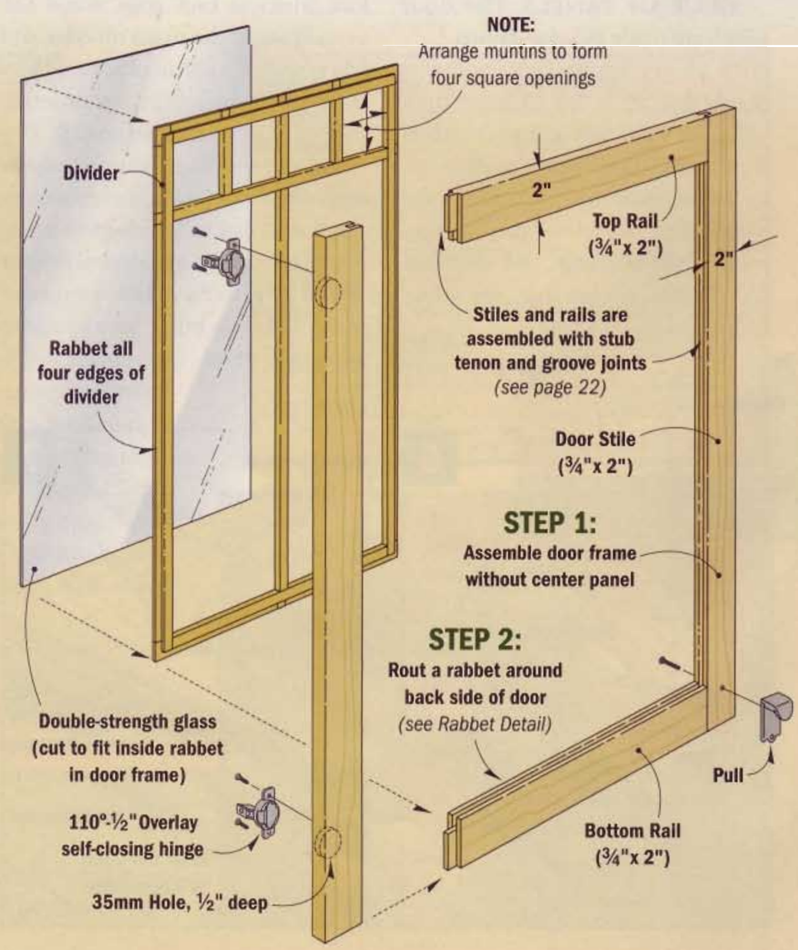
Door Frame Detail



Rabbet Detail



DISPLAY DOOR ASSEMBLY



Simple Division

Once the frame is complete, the next step is to build the wood divider that creates what appears to be the individual panes of glass. The divider is made up of narrow strips of hardwood that are assembled with half-lap joints *(Divider Assembly)*.

SUB-FRAME & MUNTINS. As you can see, the divider consists of a rectangular sub-frame and several individual muntins (a fancy word for window dividers). All of the pieces for the sub-frame and muntins are made from 3/8"-thick hardwood.

Although their thickness is identical, the *width* of these pieces is different. The rails and stiles of the sub-frame are 1" wide while the muntins are only 1/2" wide.

To understand the reason for the different widths, take a look at the *Door Frame Detail* on page 24. Notice that the divider is rabbeted to fit into the rabbet in the back of the door frame. This accomplishes two things. First, it positions the divider closer to the front face of the door frame. Second, since the wider pieces of the sub-frame are partially concealed behind the door frame, they will ultimately *appear* to be the same width as the muntins (1/2").

CONSTRUCTION. Once you understand how the divider goes together, construction should go fairly quickly. Start by planing the stock for the rails, stiles, and muntins to thickness. Then simply rip the pieces to width on the table saw.

To determine the length of these pieces, measure the shoulder-to-shoulder distance of the rabbets in the back of the door frame. Then cut the rails and stiles of the sub-frame and the *long* vertical and horizontal muntins to match. As for the short muntins, I wanted them to form four *square* openings at the top of the divider, so I cut them to length accordingly *(Display Door Assembly)*.

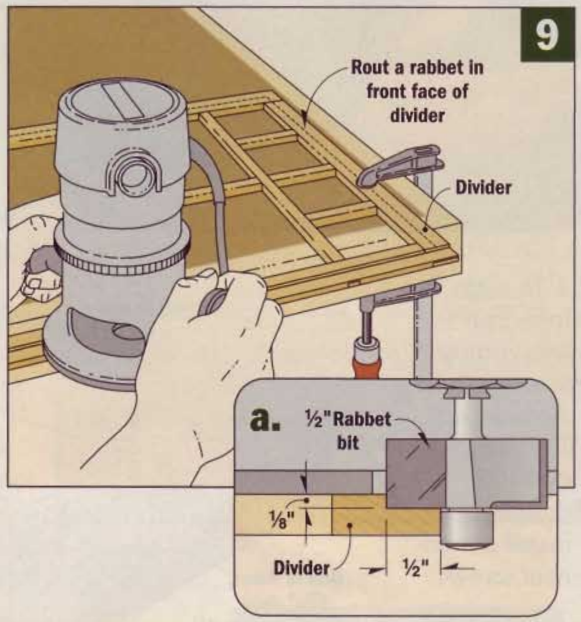
HALF-LAPS. Once the pieces are cut to length, you can lay out and cut the half-laps. To get consistent results, I used a simple jig that attaches to the miter gauge on the table saw. (For more on this, see page 60.)

ASSEMBLY. Now it's just a matter of gluing and clamping the divider together, as shown in *Steps 1 and 2* in the *Divider Assembly* below.

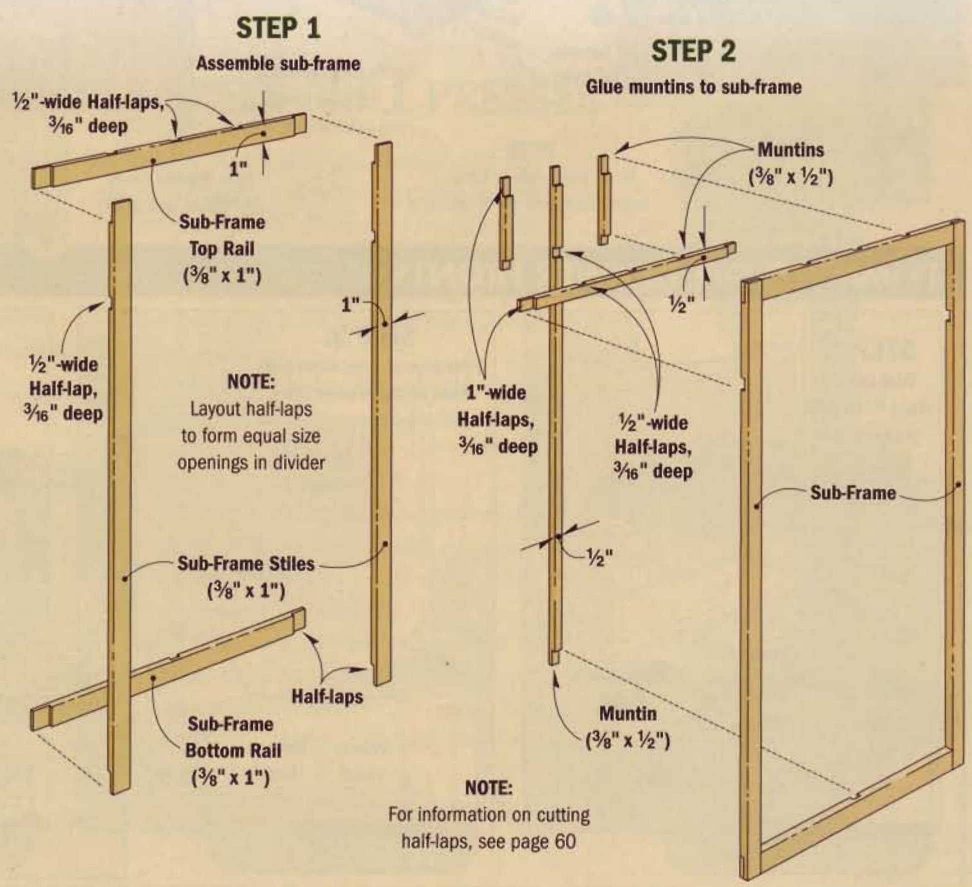
CUT RABBET. After sanding the divider smooth, it's time to cut the rabbet in the front face of the divider that I mentioned earlier. Here again, a handheld router with a rabbet bit makes quick work of this task *(Figs. 9 and 9a)*.

FINAL DETAILS. At this point, you're almost ready to install the divider in the door frame. But first, you'll need to have a piece of glass cut to fit into the rabbeted opening in the back of the frame. (I bought double-strength glass.) To allow for wood movement, it should be 1/8" smaller in length and width than the opening in the door frame.

To install the glass, lay the door frame face down on a padded surface. Then fit the divider and glass into the rabbet. To hold them in place, apply a small bead of clear silicone sealant around all four edges *(Door Frame Detail)*. Be sure that the sealant is forced down into the small gap between the edge of the glass and the door frame. Let the door and glass sit until the sealant cures fully, usually at least 24 hours.



DIVIDER ASSEMBLY



▲ To align the false fronts, temporarily screw them to the drawers. Then simply open the drawer and install permanent screws.

adding new drawer fronts

Building all new drawers for an entire kitchen can be expensive and time consuming. Fortunately, I didn't have to build new drawers — I just reused the old drawers and installed new false fronts, as shown at left.

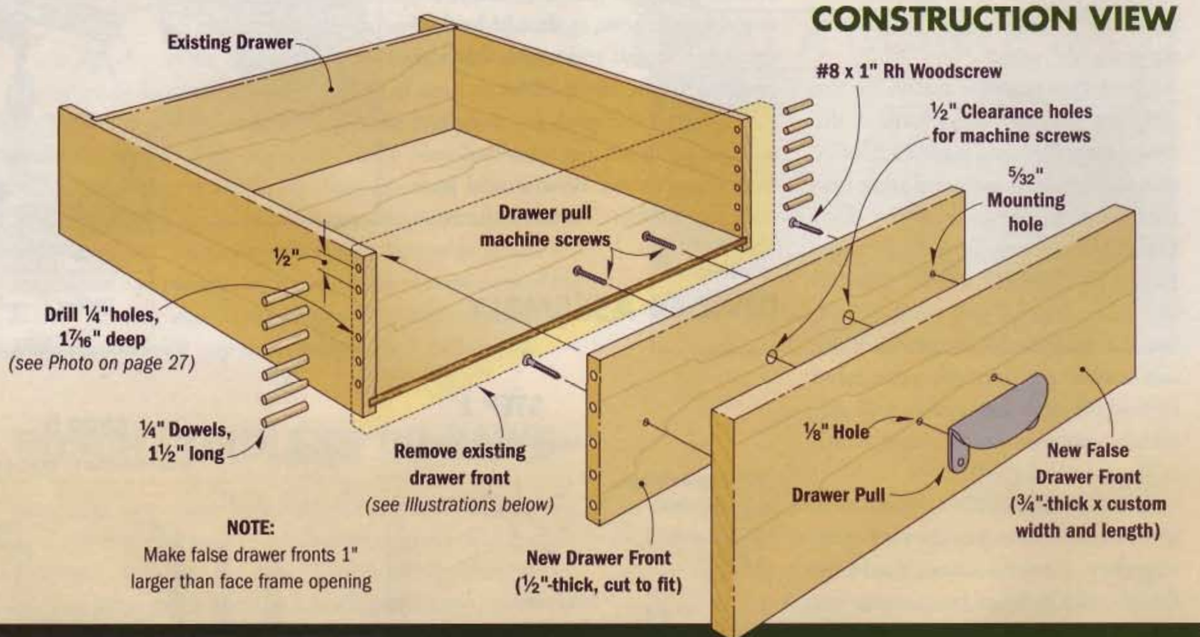
The type of drawers you have determines how to replace the drawer fronts. Some drawers already have a separate false front mounted to the drawer box. In that case, just replace the old false fronts with new ones.

But if the drawer front is an integral part of the box like mine, it's a bit more involved. The old drawer front has to be trimmed off and then replaced with a new one *(Construction View below)*. Then a new false front is added to the drawer box.

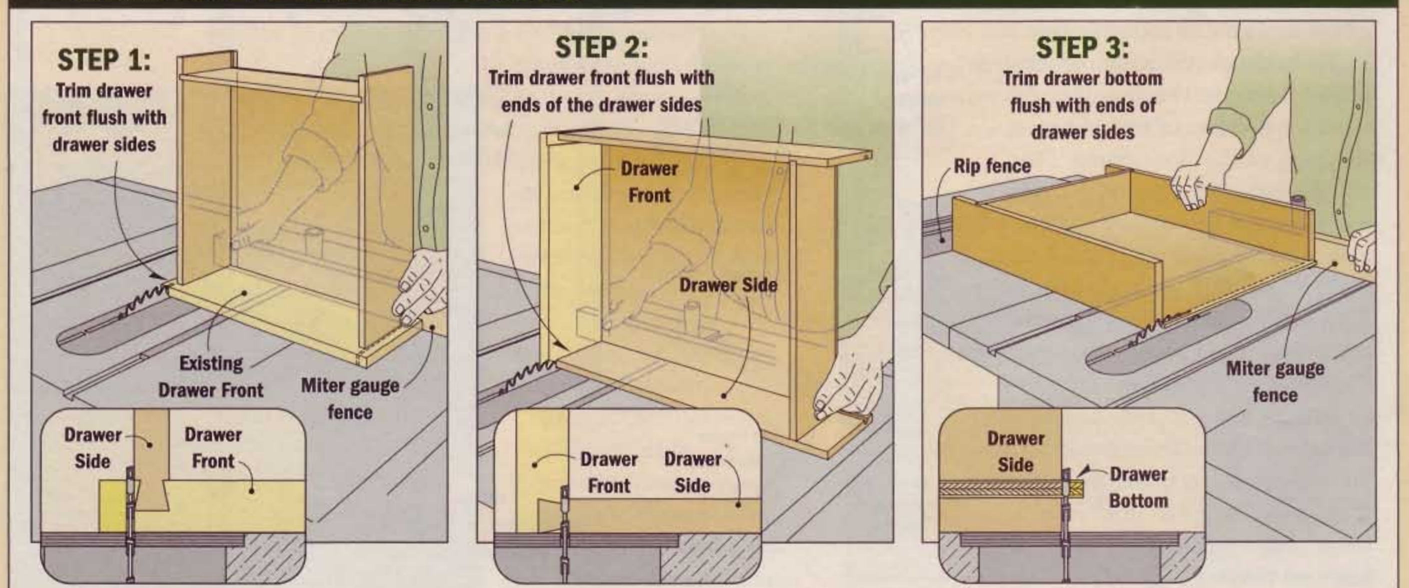
REMOVE FRONTS. To remove the old drawer fronts, start by taking off the slides and pulls. Then use the table saw to trim off the front, following the three-step process shown in the illustrations below.

ADD NEW FRONT. The next step is to add the new drawer front. This is a piece of $1/2$"-thick hard-

CONSTRUCTION VIEW



TRIMMING OFF DRAWER FRONTS



wood cut to fit between the drawer sides. To make it easy to attach the false front later, drill a couple of mounting holes now. Then glue and clamp the front flush with the ends of the drawer sides.

DOWELS. To strengthen the connection, I used 1/4" dowels to "pin" the joints. This requires drilling holes through the drawer sides into the front. To drill these holes quickly and accurately, I used the drill-press setup shown in the *Photo* at right.

Notice that a fence and stop block are used to position the drawer. I also used four spacer blocks to index the location of the dowel holes. To accomplish this, set the drawer against the spacer blocks and drill the first hole. Then remove a spacer and drill the second hole. Continue like this until the box is against the fence and then drill the last hole.

After drilling the holes, glue in the dowels. They'll stand a bit "proud" at this point, so after the glue dries, just sand the ends smooth.

FINISH & INSTALLATION. You'll want to apply a finish on the ends of the dowels, as well as the drawer front. Then reattach the drawer slides and install the drawers.

Adding the False Fronts

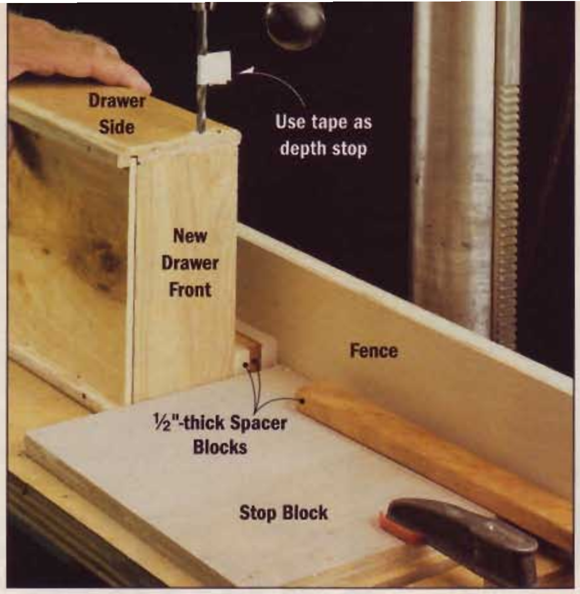
All that's left to complete this kitchen facelift is to add the false fronts.

Like the doors, the false fronts are made from 3/4"-thick hardwood. Here again, they're 1" larger than the opening in the face frame.

Design Note: If a drawer is directly above a door, it's more important to match their widths since even a small difference is quite noticeable.

ATTACH FALSE FRONTS. After cutting the false fronts to size, the final step is to attach them to the drawers. To ensure proper alignment, I used an old trick here.

Start by drilling mounting holes for the drawer pulls in the false front. Then hold the false front in position and temporarily install screws through the mounting holes to attach it to the drawer *(Photo on page 26)*. Next, open the drawer and screw it to the false front from the back. Now remove the temporary screws and drill the mounting holes for the pulls all the way through the drawer with an 1/8" bit. Finally, using the points where the tip of the bit breaks through as centerpoints, drill 1/2" clearance holes for the machine screws used to mount the pulls.



▲ A set of 1/2"-thick spacer blocks makes it easy to index the holes for the 1/4" dowels.

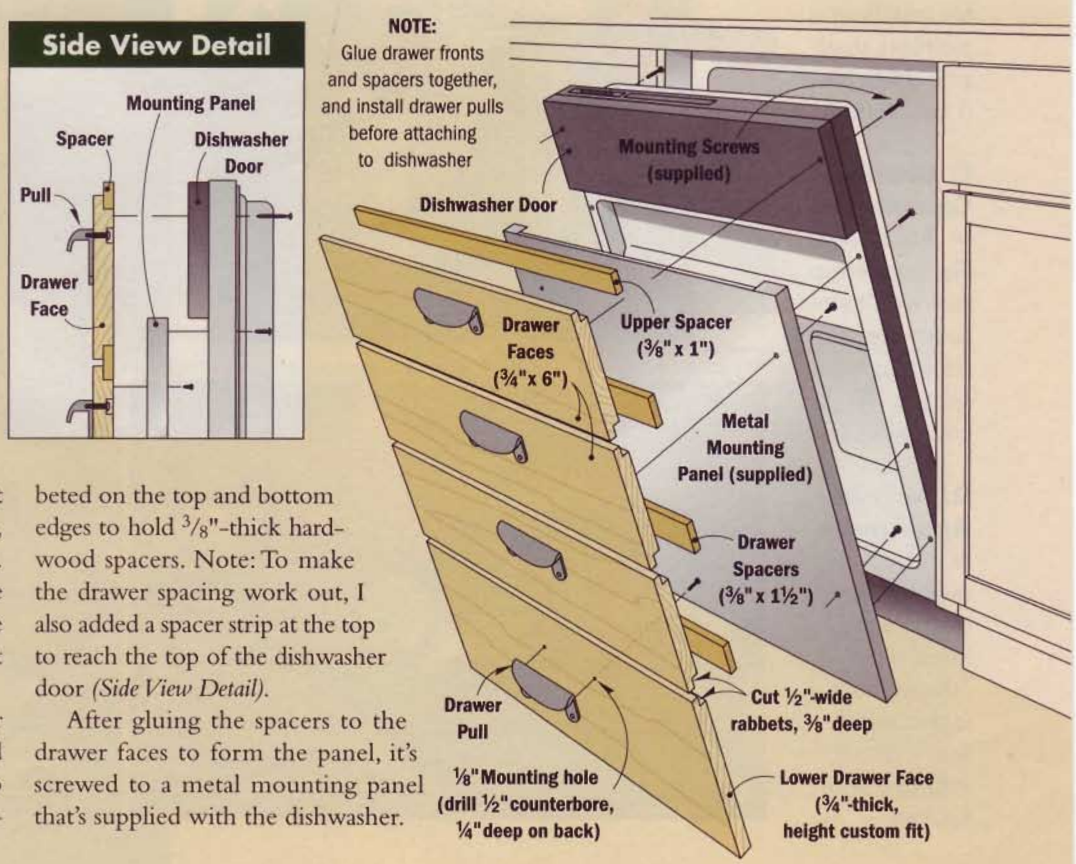
custom dishwasher panels

We chose a dishwasher for this project that's designed to accept a shop-made, front panel (a *fully-integrated* dishwasher).

Most diswashers like this use a large plywood door panel. But to tie the kitchen together, I made a panel that *appears* to be a bank of four drawers.

This panel starts out as four drawer faces made from 3/4"-thick hardwood *(Illustration at right)*. To create a gap between the "drawers," the faces are rabbeted on the top and bottom edges to hold 3/8"-thick hardwood spacers. Note: To make the drawer spacing work out, I also added a spacer strip at the top to reach the top of the dishwasher door *(Side View Detail)*.

After gluing the spacers to the drawer faces to form the panel, it's screwed to a metal mounting panel that's supplied with the dishwasher.



buyer's guide

Appliances
KitchenAid
- Dishwasher (KUDS01FKPA)
- Cooktop (KECC508GBT)
- Vent (KWVU205YBA)
- Oven (KEBC107KSS)
- Refrigerator (KTRC22EKSS)

www.KitchenAid.com

Handles & Pulls
Amerock
Inspiration Series
- Drawer pulls (1592-WID)
- Door pulls (1583-WID)

www.Amerock.com

Hinges
Blum
Compact Series 33
- 110° - ½" Overlay Self-Closing Hinges

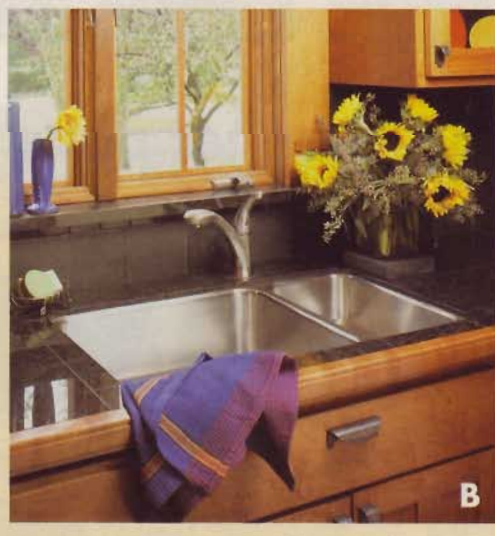
www.Blum.com

Coming Next Issue . . .

A. Accent Lighting
► In the April 2003 issue of *Workbench*, we'll show you how to install low-voltage halogen lighting — a simple way to create dramatic accents in your kitchen.

A

B. Stainless Steel Sink
► Also, be sure to check out our special technique for installing a stainless steel sink *underneath* a countertop.



B

C. Granite Countertops
► At last — a tile countertop that won't stain. Learn the secret as we install granite tile countertops.

C

D. Built-In Appliances
► A built-in oven, cooktop, and a vent hood that "disappears" is a combo that's sure to improve your kitchen.

D

Build Your Own Custom Window Cornices

Elegant, simple, and inexpensive — these three shop-made cornices are just the ticket for "dressing up" plain-looking windows.

I'm always amazed at how a simple woodworking project can quickly change the look and feel of a room. The key is to focus on a single element — in this case the windows.

One of the quickest and least expensive ways to give a room a whole new look is to add a decorative window cornice. Besides concealing drapery hardware or the tops of mini-blinds, a cornice also brings a new dimension to your decorating efforts.

ELEGANT LOOK. Think of a window cornice like frosting on a cake. Besides tasting good, frosting also makes a cake more appealing. Likewise, an elegant cornice adds visual interest to a room.

But there's more. A cornice should also complement the existing decor of your home. To make that a little easier, we've included three distinctly different styles of cornices for you to choose from: cottage-style *(shown above)*, contemporary, and traditional *(both shown on page 31)*.

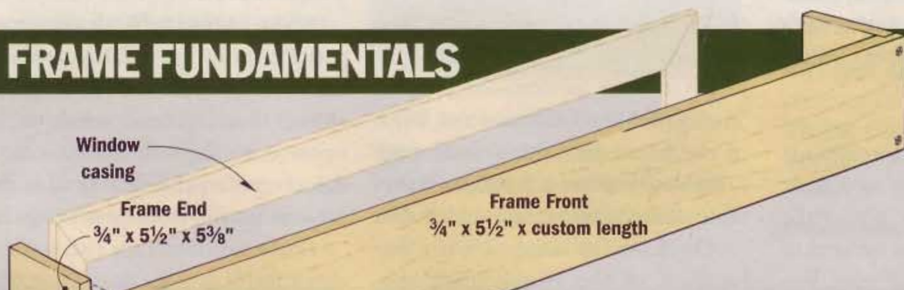
SIMPLE CONSTRUCTION. Even though these cornices may look complicated, the construction is really pretty straightforward. All three start with a U-shaped plywood frame *(see sidebar on page 31)*. The frame is covered with 1/4" plywood (or beadboard) and then different moldings are applied to give each cornice its own unique look.

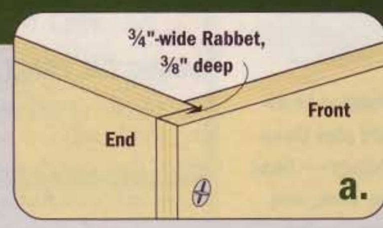
INEXPENSIVE MATERIALS. Another thing you'll like about this project is that the cornices are quick to build. In fact, you can probably knock out one in the morning and hang it that afternoon. And unlike some pre-made cornices that can cost hundreds of dollars, these cornices can be built for under $50 with readily available materials.

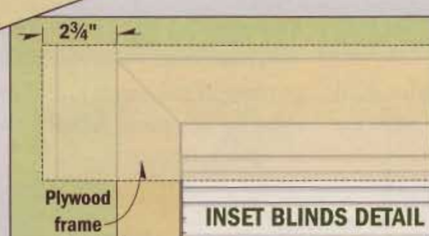
▲ **CONTEMPORARY.** Shop-made maple moldings create a nice contrast to the cherry plywood on this cornice. A graceful arc on the bottom of the cornice adds to the clean, contemporary look.

▲ **TRADITIONAL.** For a more formal look, use straight-grained oak plywood on the cornice. Then add off-the-shelf crown molding around the top and cove molding on the bottom.

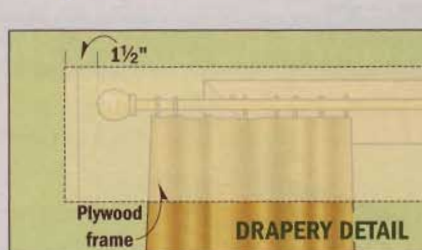
FRAME FUNDAMENTALS







INSET BLINDS DETAIL



DRAPERY DETAIL

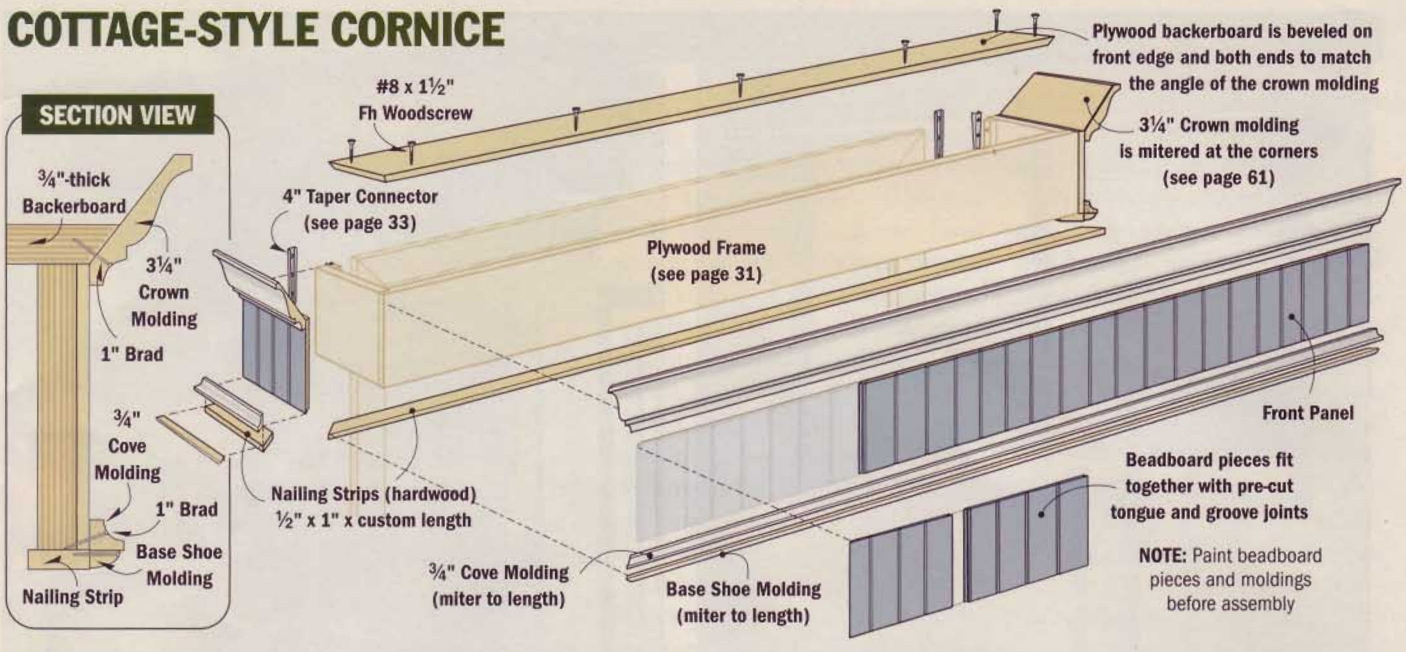
Each cornice begins with a U-shaped plywood frame that's open in the back, as well as on the top and bottom. I used $^3/_4$" birch plywood to build the frame. It consists of three pieces: a long front and two identical ends, as shown above. The front is rabbeted to accept the ends, which are glued and screwed in place *(Detail a)*.

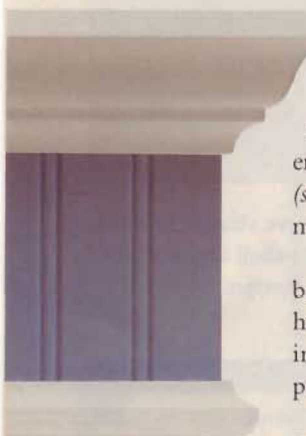
SIZING BASICS. Before cutting any of the pieces, you need to determine the size of the frame. There are two things to consider: the mounting hardware, which is added later, and any window treatments.

To give the cornices a substantial look, I made the frame $5^1/_2$" tall and $5^3/_4$" deep ($5^3/_8$"-long end fit into $^3/_8$"-deep rabbet).

As for the length of the frame, it needs to extend far enough past the outside edges of the window casing or the ends of the curtain rod to provide clearance for the mounting hardware. To establish this length, measure the distance between the outside edges of the window casing. Then add $2^3/_4$" on each end for windows with inset blinds *(Inset Blinds Detail)*. For windows with curtains, measure from the ends of the curtain rod and add $1^1/_2$" *(Drapery Detail)*.

COTTAGE-STYLE CORNICE





▲ **Painted beadboard plus three moldings — base shoe, cove, and crown — give this cornice its cottage charm.**

To create a casual cottage look, this cornice features painted beadboard panels. Then for an elegant touch, three different off-the-shelf moldings were added *(see Margin Photo)*. The panels and moldings are all mitered to fit.

I used medium-density fiberboard (MDF) beadboard from a local home center for the panels. It comes in 32"-long vertical strips with pre-cut tongue and groove joints.

MAKING THE PANELS

To make the panels, start by crosscutting the beadboard strips into short pieces that match the height of the plywood frame. As for the number of pieces, I ended up using nine. You may need a different number based on the size of your frame.

After cutting the individual pieces, go ahead and set two aside for the end panels. We'll get to them in a moment. But first, there's some work to do on the front panel.

FRONT PANEL. Right off the bat, you need to mark where the miters will be cut. The goal is to center the beadboard pattern on the frame so that the two outer beads end up the same distance from the corners.

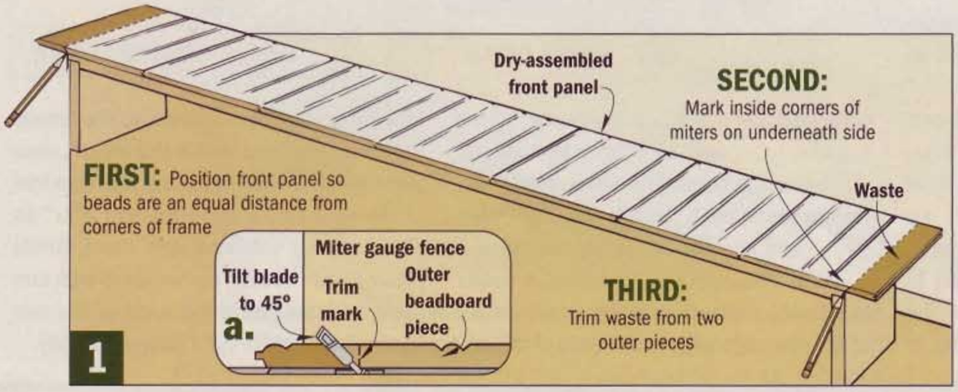
The best way I found to achieve this symmetrical look is to dry assemble enough of the beadboard pieces to make an extra-long panel. Then lay the panel across the front of the frame and slide it back and forth until the beads are located the same distance from each end.

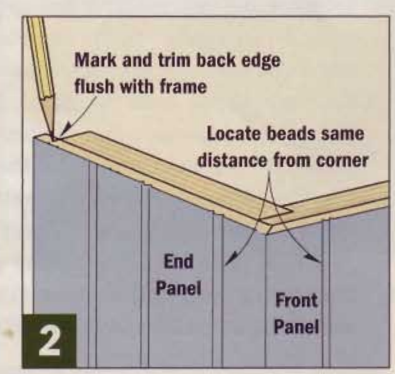
Once you're satisfied with the location of the panel, mark the underneath side on both ends *(Fig. 1)*. These marks represent the *inside* corners of the miter cuts. Now disassemble the panel, take the two outside pieces that were marked to the table saw, and trim the waste off the ends *(Fig. 1a.)*.

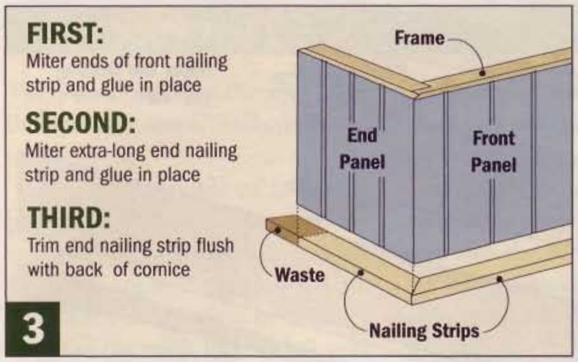
At this point, I went ahead and painted all of the beadboard pieces before reassembling the front panel and gluing it to the frame. That way I made sure the tongues were also painted just in case the panel shrinks a bit later on.

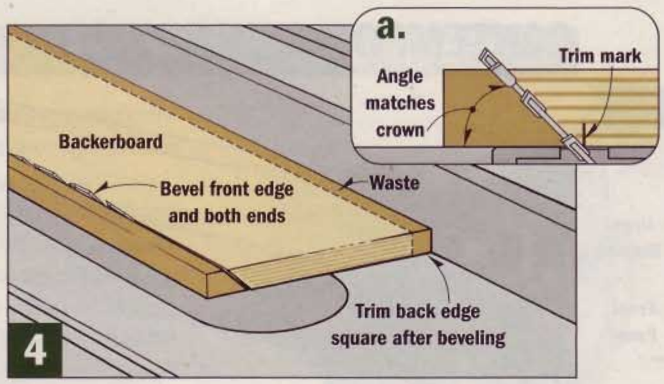
END PANELS. With the front panel secured, you can turn your attention to the two end panels. Here again, these pieces need to be mitered so that the distance from the corner to the first bead is the same as on the front panel *(Fig. 2)*.

Once the miters are cut, double-check the fit one last time. Then trim the end panels flush with the ends of the box. Now simply glue the end panels to the plywood box just like you did with the front panel.









ADDING THE MOLDINGS

I used three common moldings on this cottage cornice. There's base shoe and cove at the bottom. Crown molding wraps around the top.

BASE SHOE & COVE. Notice in the *Section View* on page 32 how both the base shoe and cove moldings are nailed to the cornice rather than glued like the beadboard. For a nailing surface, I ripped $^1/_2$"-thick hardwood strips to width and attached them to the bottom edge of the cornice.

To ensure tight-fitting miters at the corners, you can put away your tape measure and follow a cut-to-fit method instead *(Fig. 3)*. The idea is to first miter both ends of a long front piece. Next, glue this piece to the cornice and use it to accurately position the end pieces. Once the end nailing strips are glued in place, trim the overhanging end flush with the back of the cornice. Now simply follow this same cut-to-fit technique for both the base shoe molding and the cove molding.

CROWN MOLDING. Now it's time to focus on the upper part of the cornice. Notice in the *Section View* (page 32) how the crown molding tilts out at an angle. To hold the molding at the correct angle, and to create a nailing surface, you'll need to add a backerboard to the top of the cornice. This is a piece of $^3/_4$" plywood that's beveled on the front edge and ends to match the tilt of the molding.

To make the backerboard, it's best to start with an extra-wide piece. Then tilt the saw blade on the table saw to match the angle of the crown and rip a bevel on the front edge *(Fig. 4)*. For a tip on determining the proper angle, turn to page 61.

Now to complete the backerboard, use a miter gauge on the table saw to bevel the ends. Then screw the backerboard in place.

With the backerboard in place, it's just a matter of mitering the crown molding to fit around the corners *(see page 61)*.

If you plan to paint the crown molding, it's easiest to do it before nailing it on. Then just hang the cornice, as explained below.

HANG IT QUICKLY WITH TAPER CONNECTORS

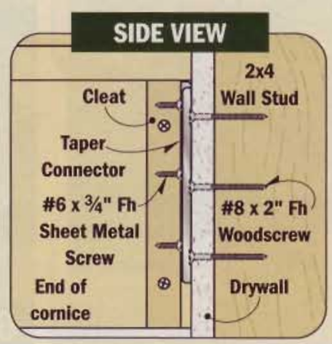
Two pairs of interlocking wedge-shaped connectors make mounting the cornice to the wall about as simple as hanging a picture. Each pair has an inner and an outer connector. The inner connector is screwed to a $^3/_4$"-square x $5^1/_2$"-long cleat fastened to the cornice. It's best to screw the outer connector directly into a 2x4 wall stud. But if that's not possible, just make sure to use wall anchors.

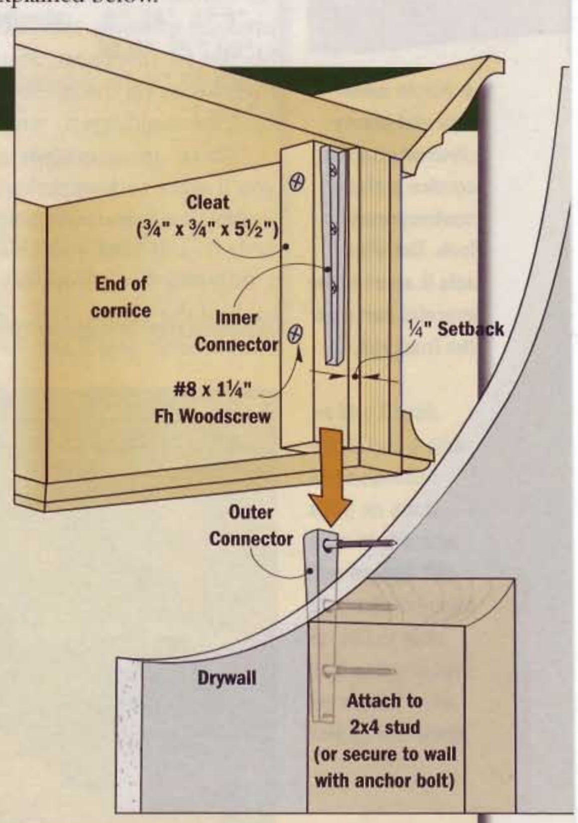
Start by screwing the cleat to the cornice, set back $^1/_4$" from the back edge *(Illustration, above right)*. This provides clearance for the connectors, allowing the cornice to sit flat against the wall.

The inner connector is centered on the thickness of the cleat and flush with the top. As for the mating outer connectors, they need to be level with each other and spaced the same distance apart as the inner connectors.

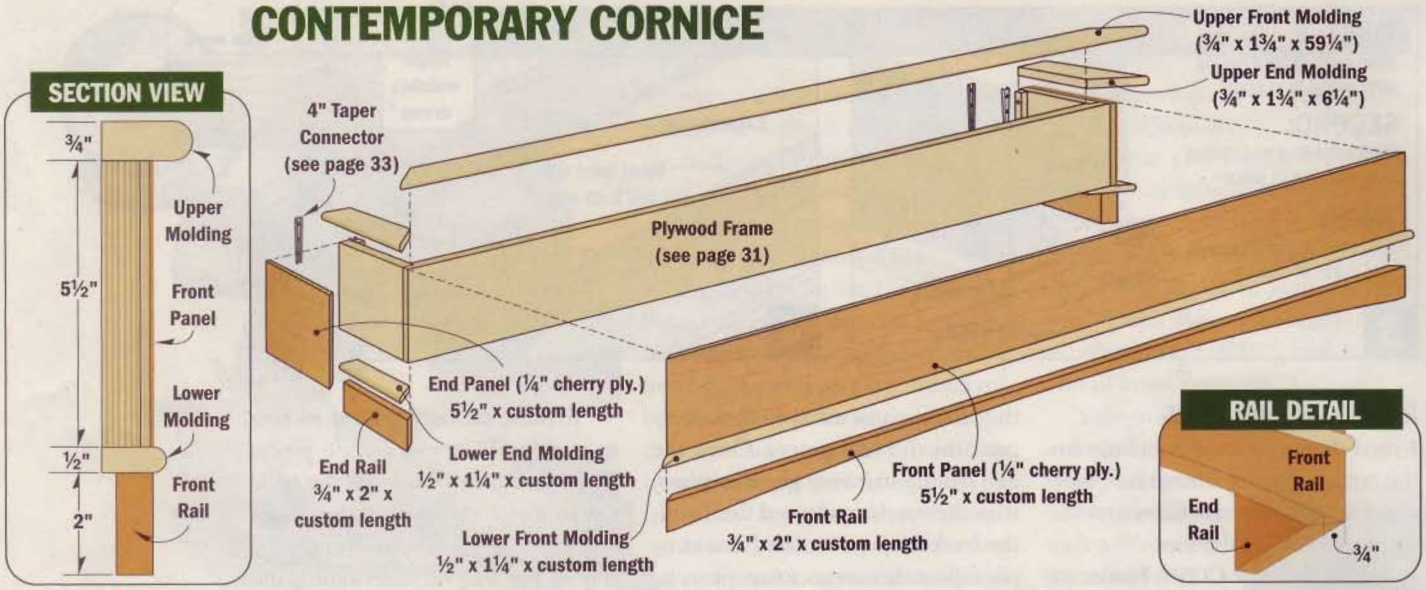
Once the connectors are attached, you're going to need help lifting the cornice into position to slide the connectors together. If the cornice needs to be repositioned or you want to remove it, all you have to do is tap the bottom edge to loosen the hold.

SOURCE: Rockler Woodworking, 1-800-279-4441 or online at www.rockler.com





CONTEMPORARY CORNICE



▲ **Maple moldings and cherry plywood give this cornice a clean, contemporary look. But what sets it apart is the graceful curve on the front rail.**

What distinguishes this contemporary-looking cornice are the contrasting colors of wood and a long, graceful curve in the front rail *(see Margin Photo)*.

MAKING THE MOLDINGS

As you can see in the *Section View*, this cornice has two moldings: a wide upper molding that's 3/4" thick, and a narrow lower molding that's 1/2" thick. Making the moldings involves planing two extra-wide blanks to thickness, routing full roundovers on the blanks, then ripping the moldings to width.

There are a couple of things you'll want to keep in mind when routing the roundovers on the router table *(Fig. 5)*. First, you'll need to use a different size round-over bit for each of the blanks *(Figs. 5a and 5b)*. And second, you'll also have to flip each blank over once and rout both edges to get the full profile.

After that's done, take both blanks to the table saw and rip the molding strips to final width *(Fig. 6)*. Don't forget to adjust the rip fence to make the two different-width moldings *(Figs. 6a and 6b)*.

Now to complete the moldings, miter them to length using the cut-to-fit method shown on page 33 and glue them to the frame. To position the moldings, align the back edges *(Section View)*. I attached the upper front molding first and let the glue dry before adding the end pieces. Then flip the cornice over and attach the lower moldings the same way.

ADDING PLYWOOD PANELS

With the moldings attached, the next step is to cover the frame with 1/4" cherry plywood panels.

One thing to pay attention to here is matching up the grain. For the best look, you want it to "wrap" around the cornice from the end panels to the front panel.

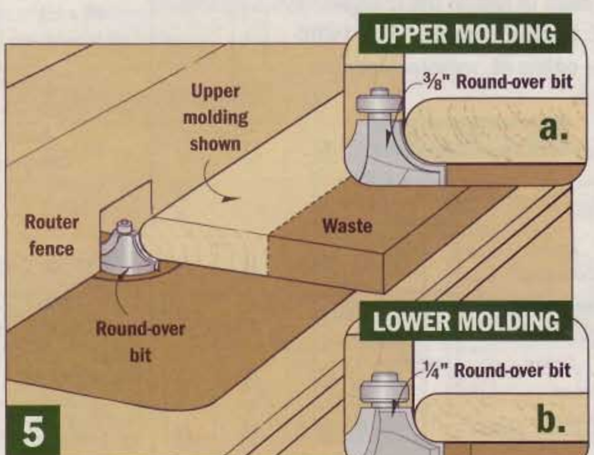
To get this continous-grain look, I started with an extra-long panel that's ripped to width to fit between the upper and lower moldings.

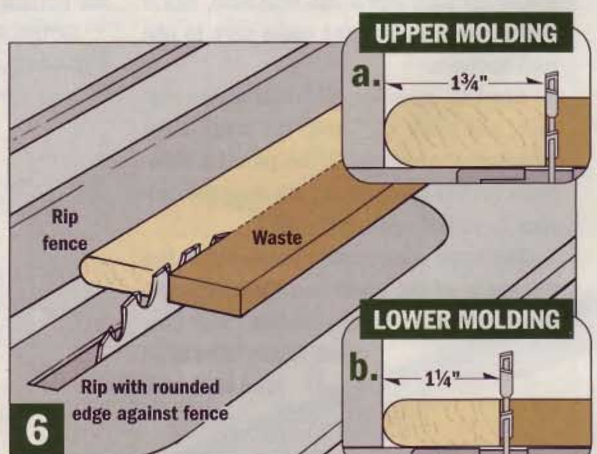
Next, miter the panels to length and glue them on.

SOLID CHERRY RAILS

In addition to the cherry plywood panels, this cornice also requires three pieces of 3/4"-thick *solid* cherry for a long front rail and two short end rails. All three rail pieces are mitered to fit where they meet at the corners.

ARC FRONT. As I mentioned, the long front rail has a curve cut in it. In order for the miters to fit at the





corners, it's important to note that this curve doesn't extend clear to the ends of the rail. Instead, it begins 3/4" in from both ends *(Rail Detail)*.

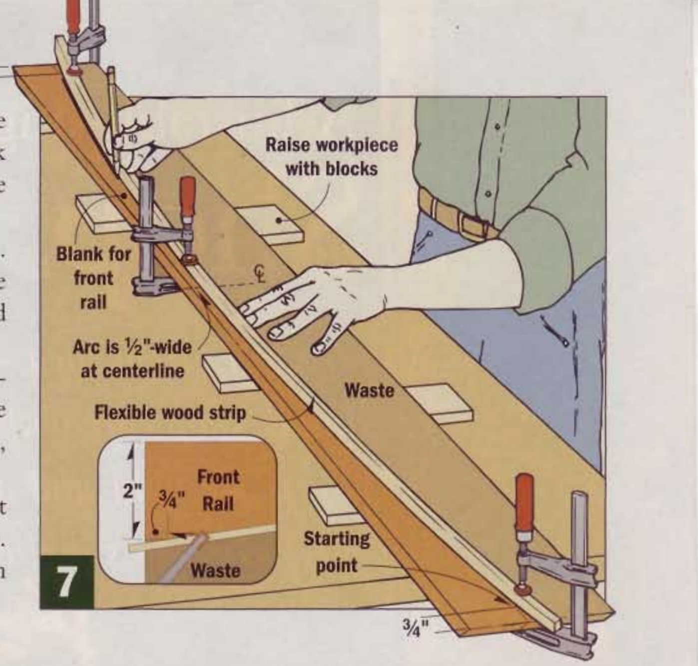
To establish the starting points, lay out the arc on an extra-wide blank with the ends already mitered. This is simple if you use a thin flexible strip of wood. Flex the strip between the two starting points of the arc and use clamps to hold it in place. Then mark the curve, as shown in *Figure 7*.

Once the arc is marked, a jig saw makes quick work of rough cutting the rail to shape. Then sand the bottom edge smooth before gluing the front rail to the cornice. Take a look at page 62 for an easy-to-make sanding block.

The end rails come next. Remember these don't have a curve cut in them. They're simply mitered to length and glued in place.

FINISH. To finish this contemporary cornice, I brushed on three coats of varnish. For a smooth finish, be sure to sand between coats.

The only thing left at this point is to attach the hanging hardware. Turn to page 33 for information about hanging the cornice.



Traditional Cornice

If you'd like a more formal-looking window unit, this traditional cornice is just the ticket. It's designed with 1/4" oak plywood panels, crown molding around the top, and a single strip of cove molding around the bottom *(see Margin Photo)*.

One thing to note as you get ready to build this cornice is that it also uses 1/4"-thick trim strips to create reveals around the moldings *(Section View)*. You should be able to find these trim strips at a local home center. If not, you can make them yourself by ripping and planing some hardwood stock to size.

PANELS & TRIM. The place to start is with the plywood panels. Again, in order to make it look like the grain on the panels wraps around the corners of the cornice, I cut them from an extra-long blank. Next I mitered the panels and glued them in place around the box.

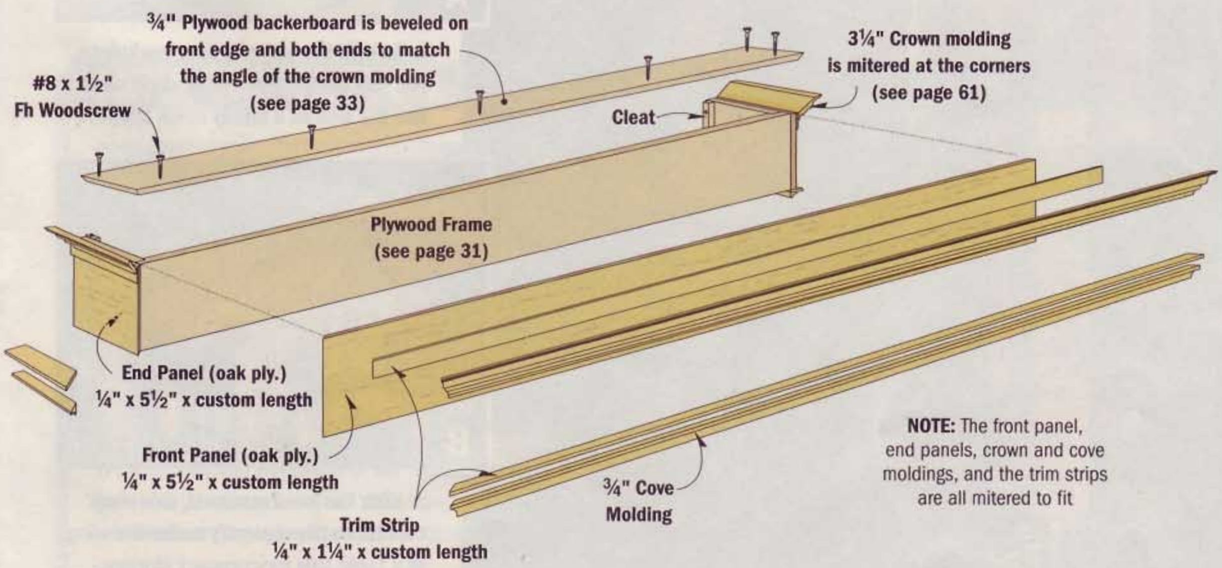
The next step is to attach the flat trim strips. They're simply glued on.

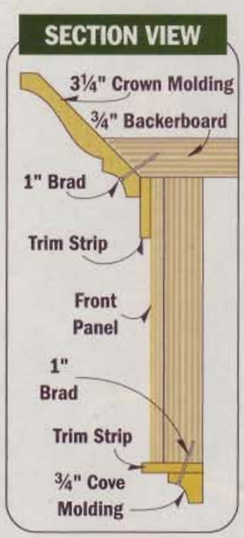
MOLDINGS. Now it's time for the moldings. The crown molding around the top of the cornice is again nailed to a beveled backerboard for support. The technique for cutting the bevels and attaching the backerboard is shown on page 33. For information about mitering the crown, turn to page 61.

The cove molding strips at the base complete the assembly. Be sure to align them flush with the back edge of the frame.

▲ **Oak plywood and oak moldings combine to create a formal-looking cornice.**

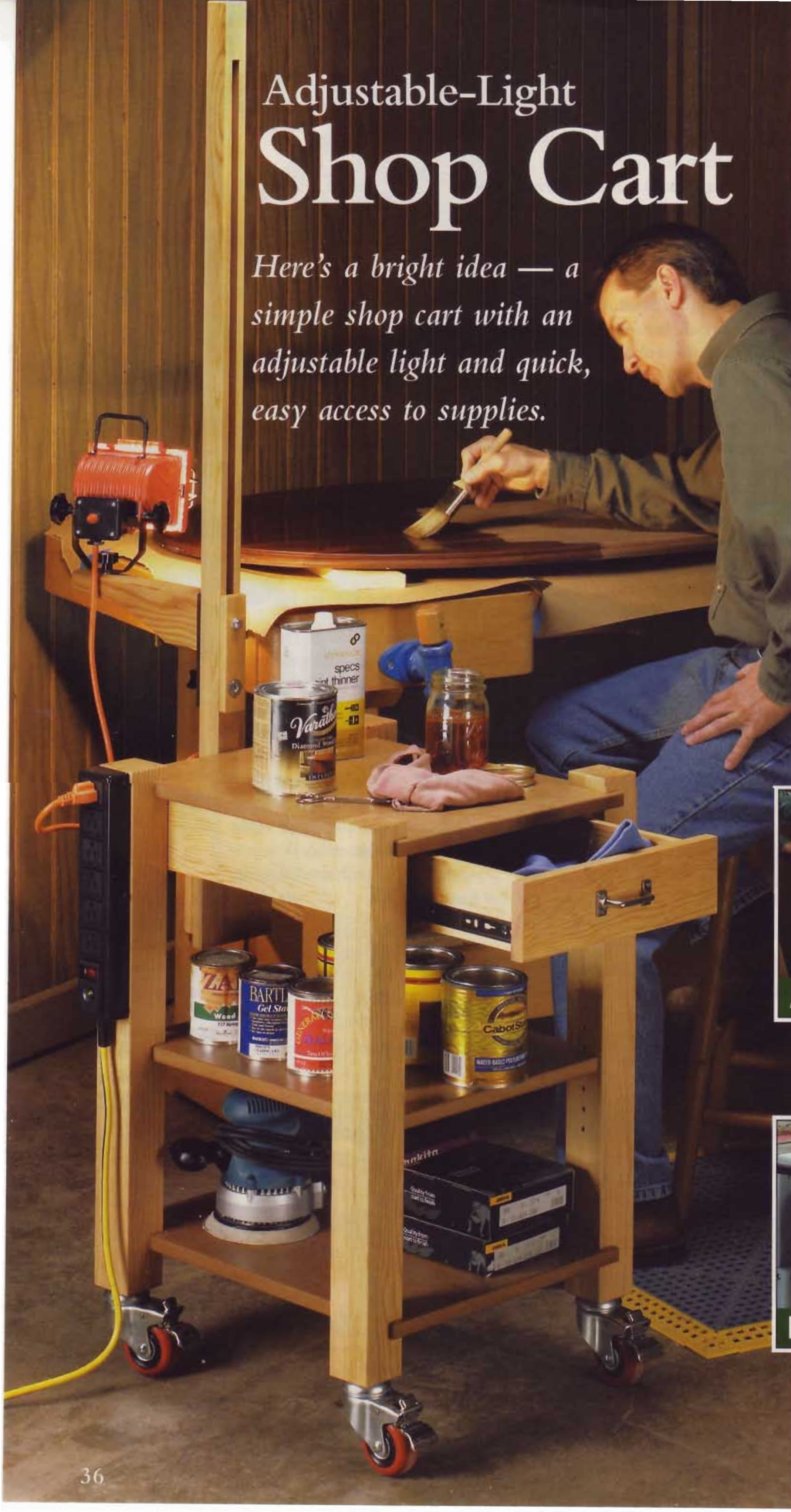
TRADITIONAL CORNICE





Adjustable-Light Shop Cart

Here's a bright idea — a simple shop cart with an adjustable light and quick, easy access to supplies.



A cart is a handy thing to have around the shop. You can put tools and supplies on it, roll it up next to the project you're working on, or use it as a light-duty benchtop. In short, it's a great shop helper.

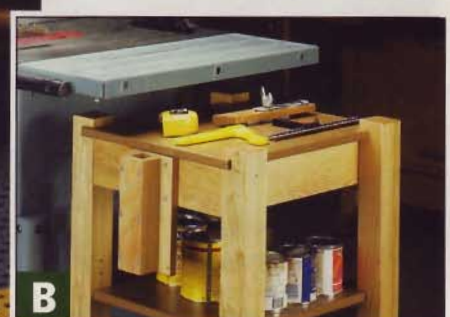
That's not to say you can't improve on a good thing. The shop cart shown at left is a good example.

ADJUSTABLE LIGHT. To shine light right where you need it, the cart has a tall "mast" with an *adjustable* worklight. The light is secured to a support arm that you can slide up and down the mast.

Lowering the arm, lets you shine light at a low, raking angle. That makes it ideal for seeing small irregularities as you sand or apply a finish. To illuminate a larger area, just raise the arm like a flag on a pole.

SUPPORT & STORAGE. The worklight is just one of the bright spots on this versatile cart. You can quickly remove the light and use the arm as a stock support *(Photo A below)*. For storage, simply remove the mast and roll the cart under a table saw *(Photo B)*.

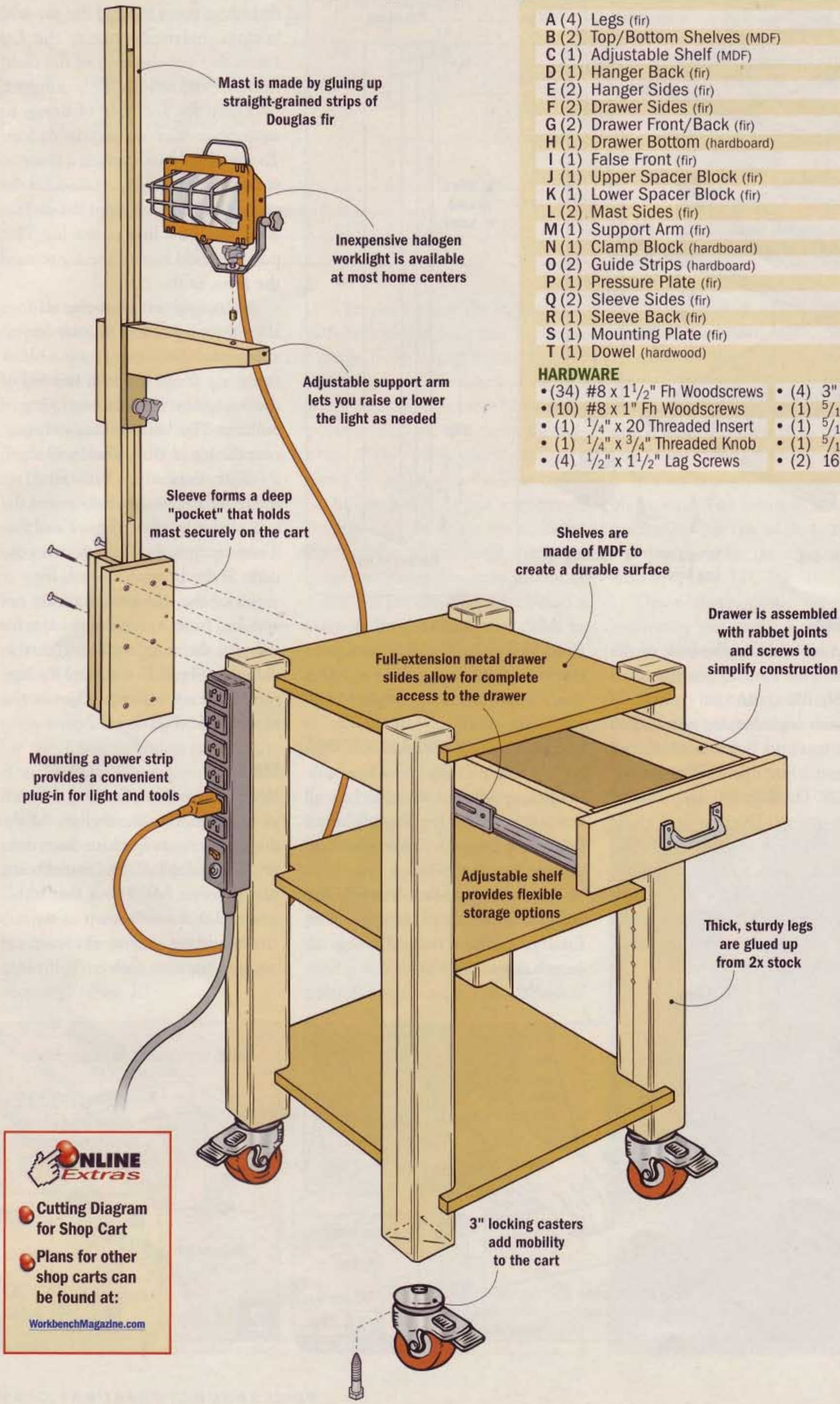
▲ To hold the end of a long workpiece, you can quickly remove the light and use the arm as a handy stock support.



▲ With the mast removed, this shop cart tucks conveniently under the wing of a table saw for compact storage.

SHOP CART CONSTRUCTION VIEW

Overall Dimensions: 22" W x 22" D x $68\frac{1}{2}$" T (including casters)



MATERIALS LIST

A (4) Legs (fir)	$2\frac{1}{2}$" x $2\frac{1}{2}$" x 26"
B (2) Top/Bottom Shelves (MDF)	$\frac{3}{4}$" x 16" x 20"
C (1) Adjustable Shelf (MDF)	$\frac{3}{4}$" x 16" x $18\frac{1}{2}$"
D (1) Hanger Back (fir)	$\frac{3}{4}$" x $3\frac{3}{4}$" x 14"
E (2) Hanger Sides (fir)	$\frac{3}{4}$" x $3\frac{3}{4}$" x $18\frac{1}{8}$"
F (2) Drawer Sides (fir)	$\frac{1}{2}$" x $3\frac{1}{2}$" x 17"
G (2) Drawer Front/Back (fir)	$\frac{1}{2}$" x $3\frac{1}{2}$" x 11"
H (1) Drawer Bottom (hardboard)	$\frac{1}{4}$" x 11" x $16\frac{1}{2}$"
I (1) False Front (fir)	$\frac{3}{4}$" x $3\frac{11}{16}$" x $13\frac{7}{8}$"
J (1) Upper Spacer Block (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 3"
K (1) Lower Spacer Block (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 11"
L (2) Mast Sides (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 48"
M (1) Support Arm (fir)	$1\frac{1}{2}$" x 3" x 10"
N (1) Clamp Block (hardboard)	$\frac{1}{4}$" x $1\frac{1}{2}$" x 6"
O (2) Guide Strips (hardboard)	$\frac{1}{4}$" x $\frac{1}{2}$" x 6"
P (1) Pressure Plate (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 6"
Q (2) Sleeve Sides (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x $8\frac{3}{4}$"
R (1) Sleeve Back (fir)	$\frac{1}{2}$" x $2\frac{1}{2}$" x $8\frac{3}{4}$"
S (1) Mounting Plate (fir)	$\frac{3}{4}$" x 5" x 9"
T (1) Dowel (hardwood)	$\frac{3}{8}$" x $2\frac{1}{2}$"

HARDWARE

• (34) #8 x $1\frac{1}{2}$" Fh Woodscrews	• (4) 3" Locking Casters
• (10) #8 x 1" Fh Woodscrews	• (1) $\frac{5}{16}$" x $2\frac{1}{4}$" Threaded Knob
• (1) $\frac{1}{4}$" x 20 Threaded Insert	• (1) $\frac{5}{16}$ " T-Nut
• (1) $\frac{1}{4}$" x $\frac{3}{4}$" Threaded Knob	• (1) $\frac{5}{16}$" x 3" Lag Screw
• (4) $\frac{1}{2}$" x $1\frac{1}{2}$" Lag Screws	• (2) 16" Full-Extension Drawer Slides

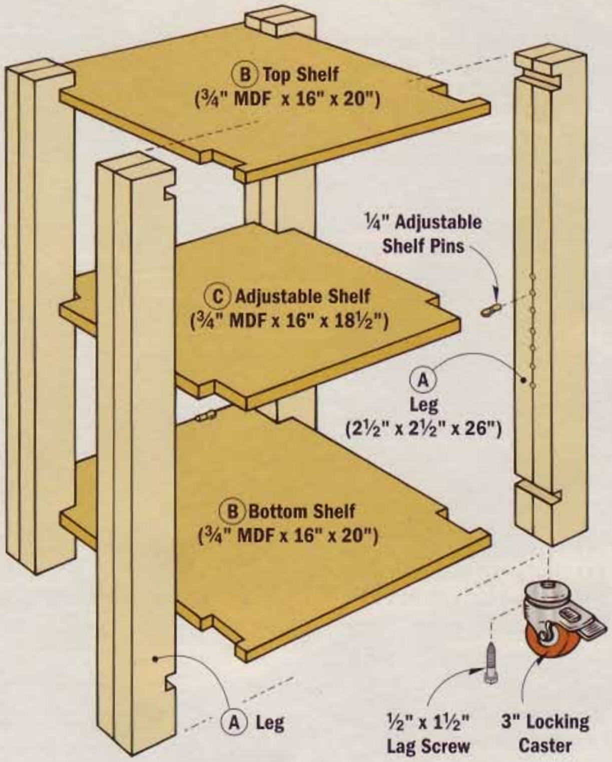
ONLINE Extras

- Cutting Diagram for Shop Cart
- Plans for other shop carts can be found at:

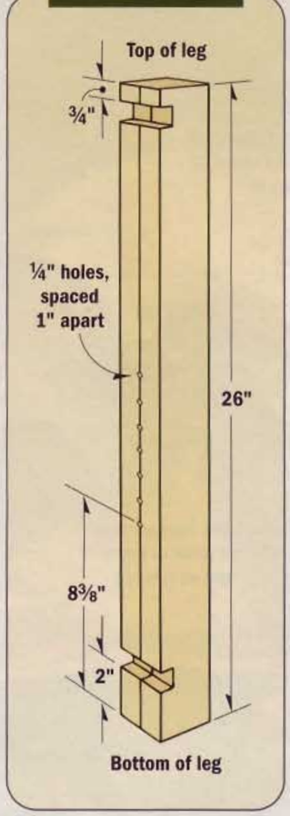
WorkbenchMagazine.com

▲ **To shine light right where you need it, the worklight is supported by an adjustable arm that slides up and down a tall mast.**

BASE ASSEMBLY



LEG DETAIL



THE LEGS

I began by building the base of the cart. As you can see in the *Base Assembly* illustration, it consists of four thick legs that are notched to hold a top and bottom shelf, and there's an adjustable shelf between.

LEGS. The legs (A) are made of straight-grained Douglas fir. I chose Douglas fir because of its availability, strength, economy, and ease of milling. Even though the legs are $2^1/_2$" square, consider buying 2x8s or 2x10s so you can get the straightest grain possible. To see why, turn to *Page 62*.

After buying the lumber, it's a good idea to let it acclimate in your shop for awhile (a week or so). This way if a board bows, splits, or twists, you can weed it out before it becomes part of the project.

GLUE-UP LEGS. Once the lumber has adjusted, go ahead and cut all the pieces for the legs slightly larger than their final size. Then glue and clamp them face to face.

After the glue has dried on the leg blanks, joint and plane them to final size. Then trim the legs to length at the table saw.

LEG DADOES. Now that the legs are prepared, the next step is to cut dadoes in them to hold the top and bottom shelves. Notice in the *Leg Detail* that the distance of the dado from the end of each leg is different.

There are a couple of things to remember when cutting the dadoes. To prevent chipout, attach a fence to your miter gauge *(Fig. 1)*. Also, for the sake of appearance, I cut the dadoes *across* the joint line of the leg. This puts the solid face of the leg toward the front of the cart.

It's important that the dadoes align from leg to leg. An easy way to accomplish that is to clamp a block to the rip fence and butt the end of the leg against it at the beginning of each cut. This will automatically register the leg so the dadoes will align.

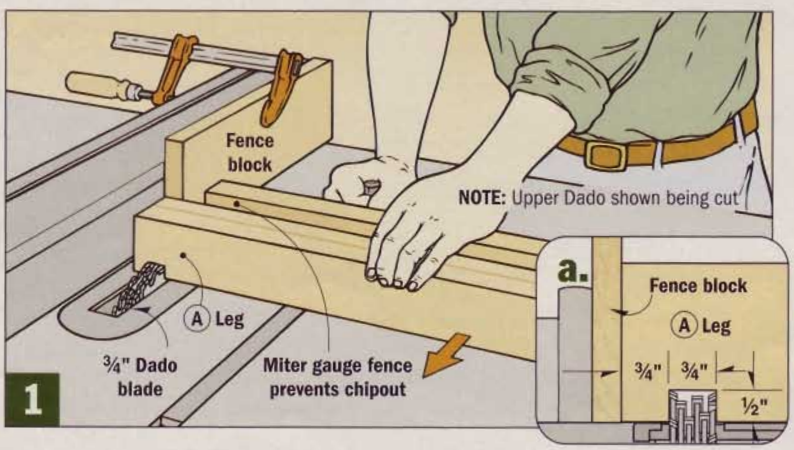
With these things in mind, set the fence to cut the dado across the top of the leg first *(Figs 1 and 1a)*. Then readjust the fence and cut the dado at the bottom of each leg.

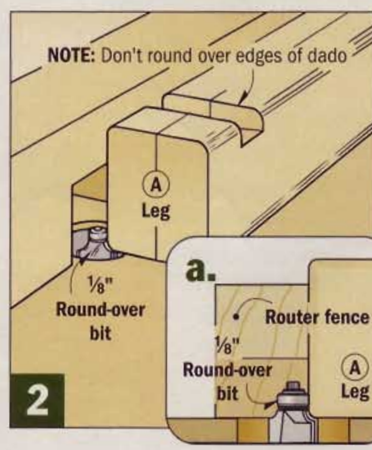
Once the dadoes are cut, lay out and drill holes in each of the legs for the pins that support the adjustable shelf *(Leg Detail)*. To complete the legs, round over the sharp edges at the router table *(Figs. 2 and 2a)*.

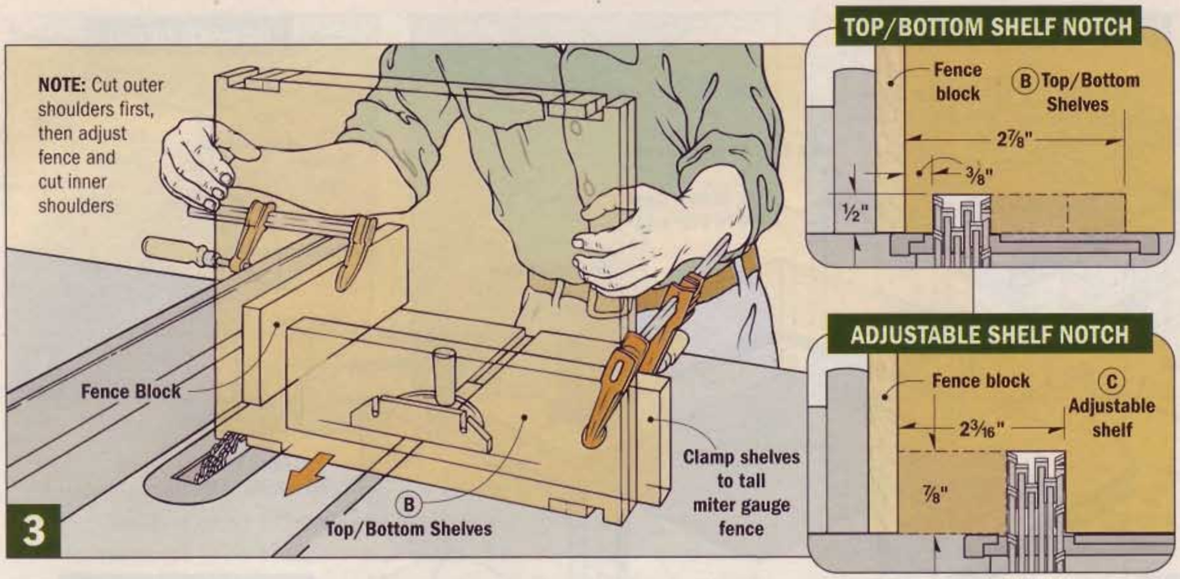
SHELVES

With the legs complete, you can turn your attention to the shelves. All the shelves are made from medium density fiberboard (MDF). Besides being inexpensive, MDF is a flat, stable material that won't warp or twist.

To add rigidity to the cart, the top and bottom shelves (B) fit into







the dadoes on the legs. The adjustable shelf (C) simply rests on metal pins installed in the holes you drilled earlier *(Base Assembly)*.

First, I cut the three shelves to size, then I set the adjustable shelf aside for awhile and focused on the top and bottom shelves.

TOP & BOTTOM SHELVES. To fit around the legs, you'll need to cut notches in the top and bottom shelves. These notches allow the shelves to wrap around the legs, forming a small "ear" on each corner. Since these shelves are identical, I ganged them together and cut them at the same time. To provide support for the two shelves, I screwed a tall fence to my miter gauge *(Fig 3)*.

I started by making the outer shoulder cut of the shelves. To do this, set the fence so the distance from the fence block to the near side of the blade is 3/8". By flipping and turning the shelves you can make all four cuts with the same table-saw setup *(Top/Bottom Shelf Notch)*.

Once the outer shoulders are cut, adjust the rip fence to make the inner shoulder cut. (Measure to the far side of the blade this time.) After you cut each inner shoulder *(Fixed Shelf Notch)*, go ahead and make several passes to remove the rest of the waste material.

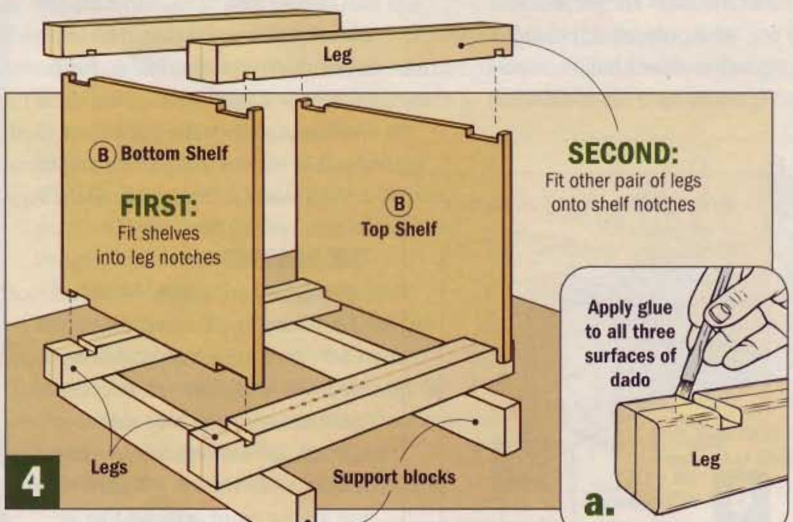
ADJUSTABLE SHELF. Now you can move on to the adjustable shelf. To fit between the legs, the notches in this shelf are deeper, and they have only one shoulder. So set the fence up to cut this shoulder, then nibble away the remaining material *(Adjustable Shelf Notch)*. To wrap up, ease all the edges on the shelves with a sanding block.

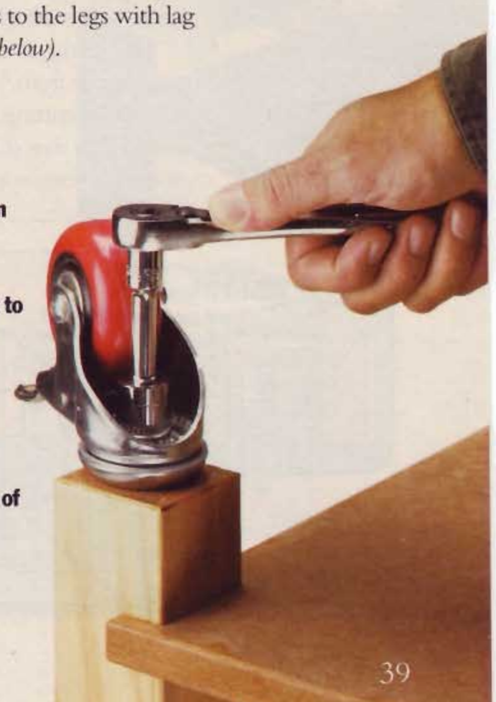
BASE ASSEMBLY

Gluing up the base is quite easy. To start, lay two of the legs on a couple of support blocks to provide clearance underneath for clamps *(Fig. 4)*. Then apply glue to all three surfaces of the dadoes in the legs *(Fig. 4a)*. Now fit the shelves into the dadoes.

After putting glue in the dadoes on the other two legs, fit them over the notches in the shelves. Then clamp up the base.

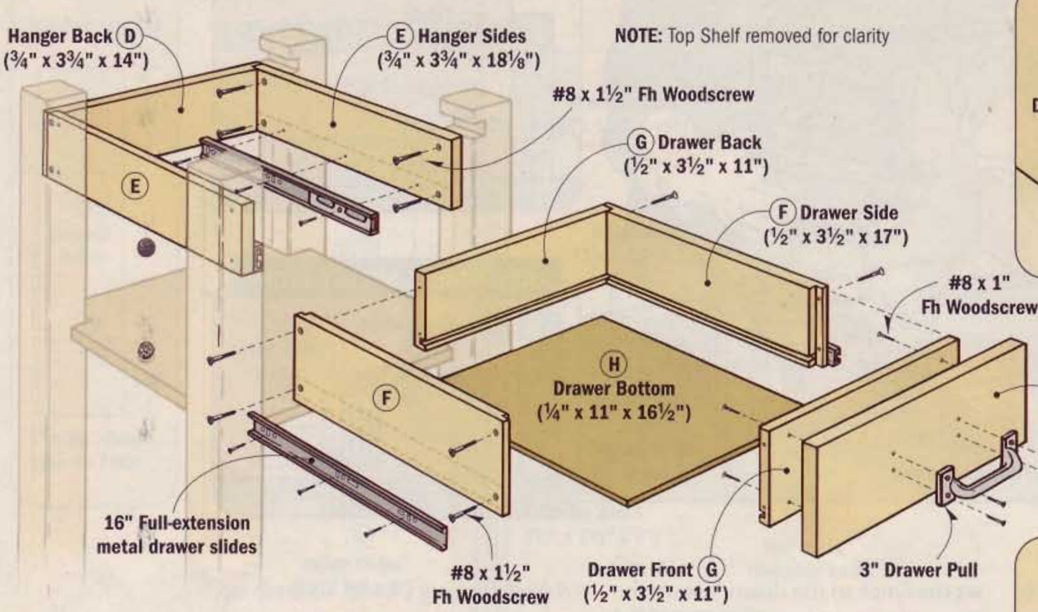
When the glue dries, go ahead and flip the base on its top and drill the pilot holes for the casters. Then just mount the casters to the legs with lag screws *(see Photo below)*.

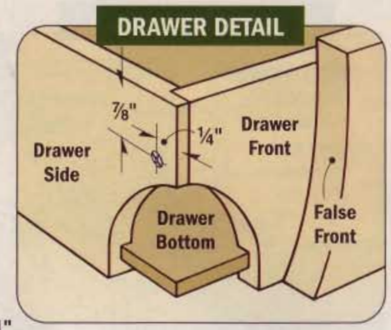




► The combination of a sturdy shop caster and a lag screw anchoring it to the leg will let the shop cart stand years of use. An extension on a socket wrench makes quick work of installation.

DRAWER & HANGER ASSEMBLY





THE DRAWER DETAILS

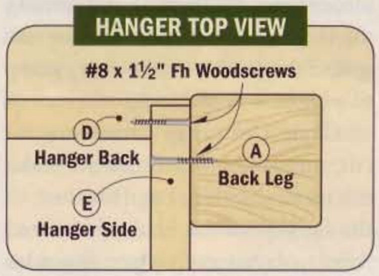
The drawer on this cart provides a handy place to keep stir sticks, foam brushes, and a few extra rags — the odds and ends that you often have to hunt around for.

To provide easy access to these supplies, the drawer rides on a set of full-extension metal drawer slides. The slides, in turn, are mounted to a U-shaped hanger that's fastened to the legs *(Drawer and Hanger Assembly)*.

THE HANGER

To simplify the construction the hanger is assembled as a unit with rabbet joints and screws. Then the entire unit is attached to the legs.

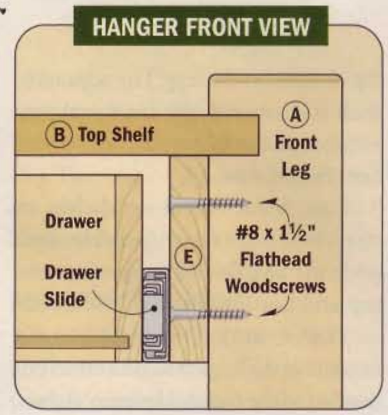
The hanger consists of three pieces made from 3/4"-thick Douglas fir. Start by cutting the back (D) and sides (E) to size *(Drawer and Hanger Assembly)*. Then cut the rabbet in the



ends of the back piece to hold the sides *(Fig. 5 and 5a)*. I cut this rabbet extra deep to give me plenty of surface for screwing the hanger together *(Hanger Top View)*. As a side benefit, the deep rabbet hides the end grain of the hanger sides.

Now that the rabbets in the hanger back are done, you can focus on the sides of the hanger.

The only work required on these pieces is to drill six countersunk shank holes in each side. Two of these



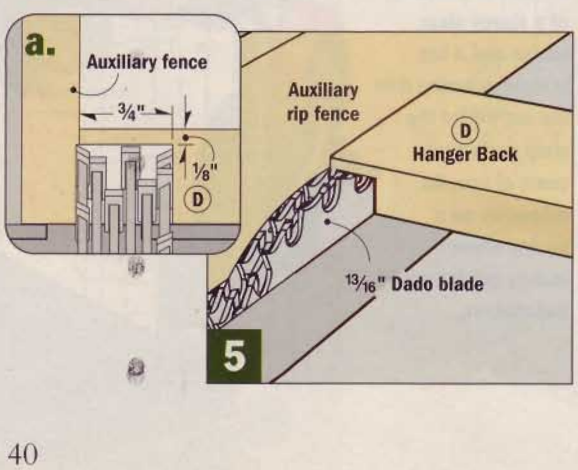
holes will be used when screwing the side and back of the hanger *(Hanger Top View)*. The other four holes are for mounting the hanger to the legs *(Hanger Front View)*.

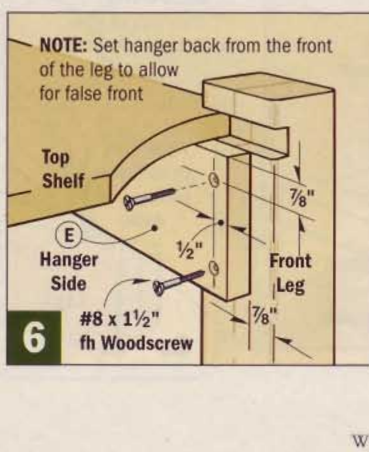
Once the hanger is built, it's easy to install. Just flip the cart upside down and set the hanger on the underside of the top shelf.

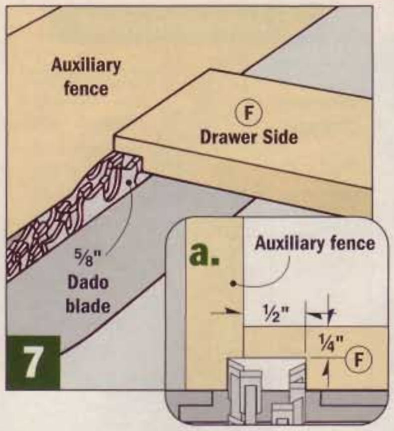
Before you screw the hanger in place, check the distance it's set back from the front of the legs. As shown in *Figure 6*, this needs to be 7/8". This will ultimately make the drawer (with the false front attached) sit back about a 1/8" from the front edge of the legs.

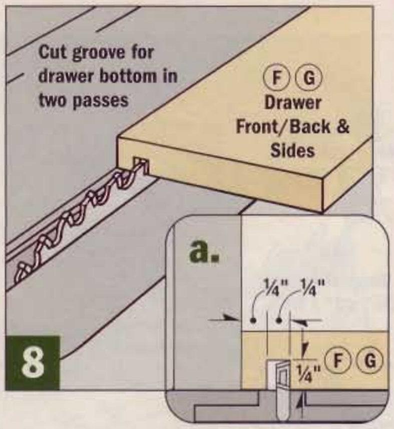
THE DRAWER

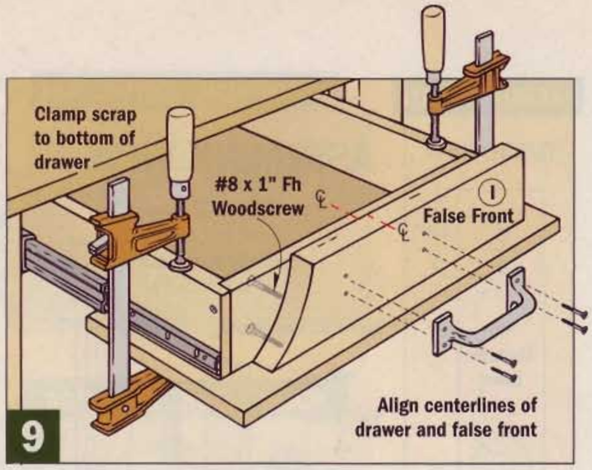
Now that the hanger is installed, you can move on to the drawer. The drawer is a simple box that's assembled with rabbets and screws just like the hanger. Only this time, the rabbets are in the drawer sides and they're not as deep. Also, the drawer has a false front attached to it.











Figuring out the size of the drawer is the first order of business. The drawer needs to be 1" narrower than the opening. This allows $^1/_2$" clearance on each side for the drawer slides. As for the length, it's not critical, as long as it's shorter than the depth of the hanger opening *(Drawer and Hanger Assembly)*.

Since the rabbets are in the drawer sides (F), I started with them. Once the sides are cut to length, I cut the rabbets in the ends at the table saw *(Fig. 7 and 7a)*. Now cut the front and back (G) to final size. Just remember to account for the rabbets in the sides.

The next step is to cut a groove in all four drawer pieces to hold the $^1/_4$" hardboard bottom (H), as shown in *Figure 8*. This groove needs to match the thickness of the hardboard. The material I used wasn't exactly $^1/_4$"-thick. So I cut the groove by making two passes, sneaking up on a snug fit *(Fig. 8a)*.

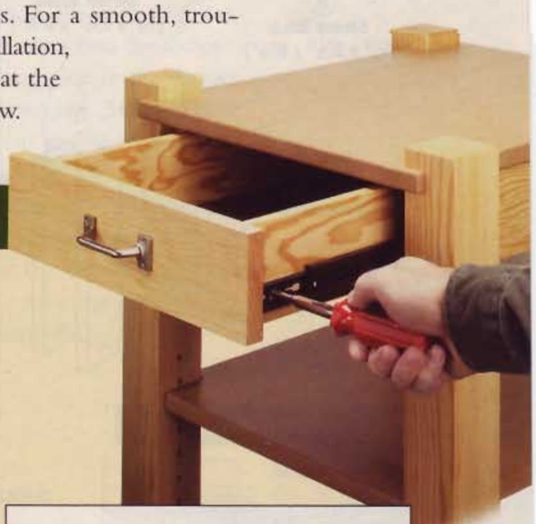
DRAWER ASSEMBLY. Now that the grooves for the drawer bottom are complete, you're almost ready to assemble the drawer box. But first, you need to drill four countersunk shank holes in the drawer sides so you can screw the drawer together *(Drawer and Hanger Assembly)*.

With all the pieces for the drawer completed, it's time to assemble them. To do this, glue and screw the sides to one end, slide the bottom in place, then attach the other end.

FALSE FRONT. The false front (I) is made out of a $^3/_4$"-thick piece of Douglas fir and serves to hide the ends of the metal slides and the end grain of the drawer sides.

Figure 9 shows an easy way to align and install the false front at the same time. First, draw a line centered on the length of the drawer front *and* the false front. Then set the false front on a flat scrap piece that's clamped to the drawer. Align the centerlines and screw the two pieces together.

DRAWER SLIDES. Finally, it's just a matter of installing the metal drawer slides. For a smooth, trouble-free installation, take a look at the sidebar below.



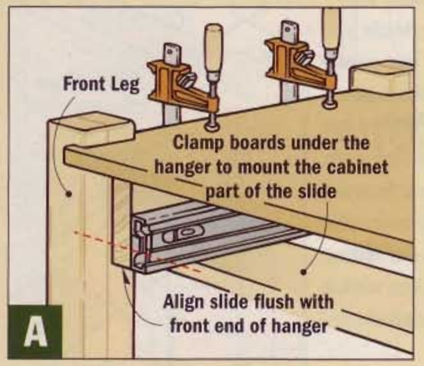
DRAWER SLIDE INSTALLATION

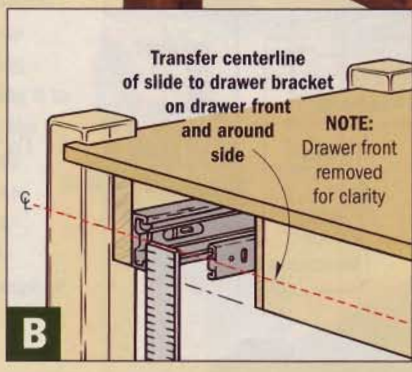
To install full-extension metal drawer slides, you'll need to separate them into two parts. One part mounts to the cabinet (the hanger in this case). And the other part attaches to the drawer.

The cabinet part attaches flush to the bottom edge and front end of the hanger. To mount the slide, clamp a couple of boards across the bottom of the hanger *(Fig. A)*. Then set the slides on the boards, position them flush to the front end of the hanger, and screw them in place.

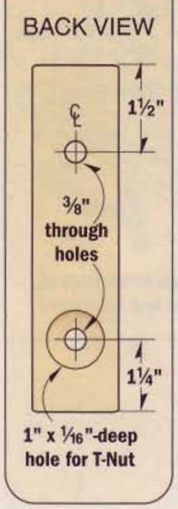
As for mounting the part of the slide that attaches to the drawer, find the center of the cabinet part (from the bottom edge). Now transfer this measurement to the drawer side, again measuring from the bottom of the drawer *(Fig. B)*. When attaching the drawer slide, butt it against the false front, center it on the line, and screw it in place.

Don't worry if you're "off" a little in transferring the measurements. The screw holes in the drawer slides are slotted to let you adjust the fit of the drawer once it's installed in the cabinet *(Photo at right)*.

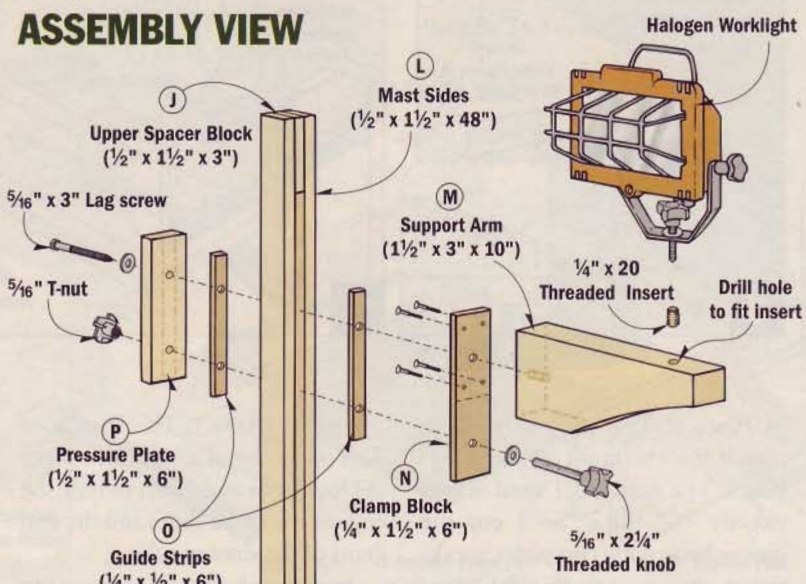




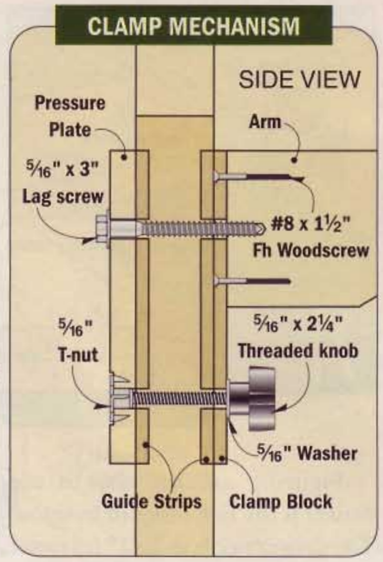
PRESSURE PLATE



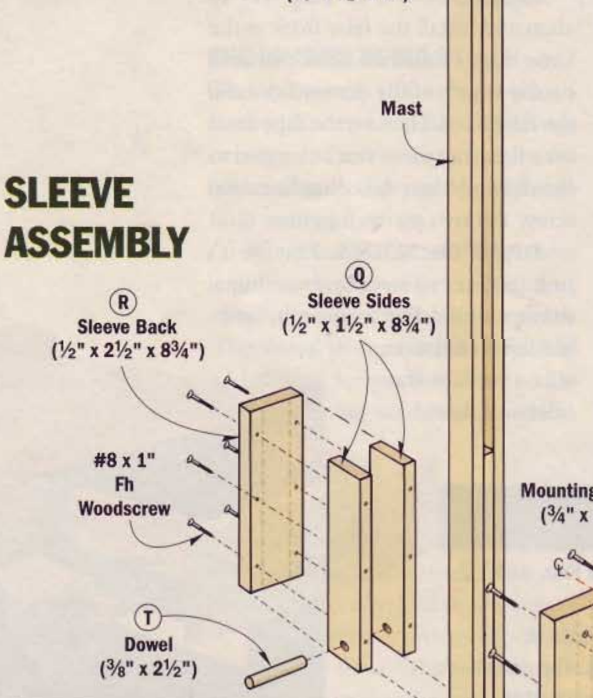
ASSEMBLY VIEW



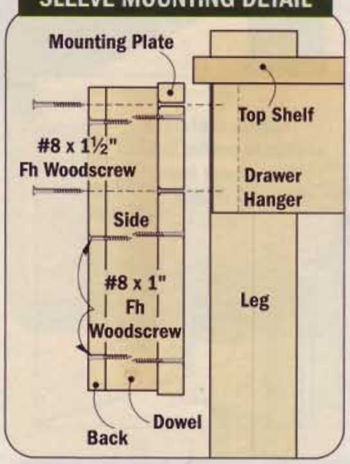
CLAMP MECHANISM



SLEEVE ASSEMBLY



SLEEVE MOUNTING DETAIL



A BRIGHT IDEA

The worklight is what really makes this project shine — literally, right where you want it. By purchasing an inexpensive halogen worklight at a home center you can illuminate any work area in your shop.

To make the light adjustable, the cart is designed with three parts: a tall mast, a sliding support, and a sleeve that holds the mast *(Assembly View)*.

MAKE THE MAST

I began by making the mast. It's a tall post with a long adjustment slot. To form this slot, the mast is made up of two spacer blocks (J, K) sandwiched between a pair of long side pieces (L). These are ½"-thick pieces that are glued face to face. Here again, I used straight-grained Douglas fir.

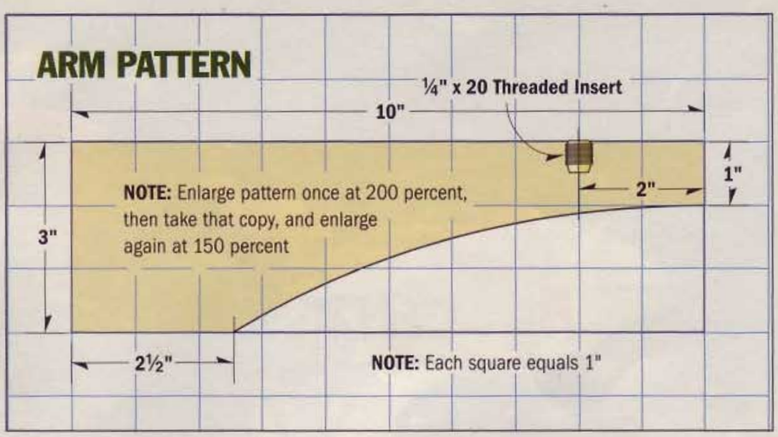
ADJUSTABLE SUPPORT

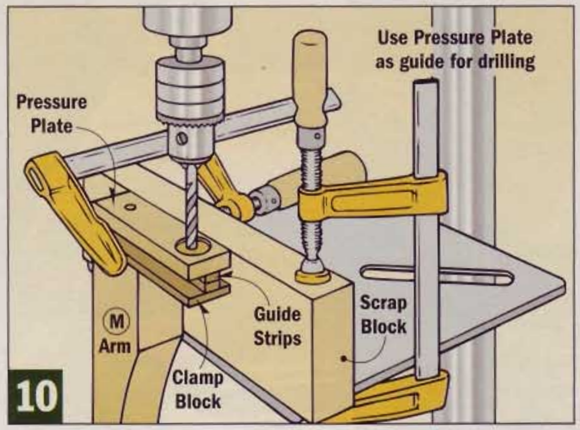
After gluing up the mast, you can concentrate on the adjustable support. It consists of two main parts: a sliding arm that holds the light and a clamp mechanism that "locks" the support on the mast.

SLIDING ARM. The support arm (M) is nothing more than a 2x block with a curved bottom edge *(see Arm Pattern on page 43)*. To hold the light, there's a threaded insert near the end that accepts a threaded knob. Take a look at the photo on page 43 for an easy way to install the insert square and straight into the block. Just be sure it's located far enough from the mast that the light can swivel 360°.

After installing the insert, I cut the curve in the bottom edge of the arm *(see Arm Pattern above)*. This created a slim profile that's more attractive than a squared-off block.

CLAMP MECHANISM. Although the arm holds the light, it's the clamp mechanism that makes it stay put. It consists of a ¼" hardboard clamp block (N), two hardboard guide strips (O), and a pressure plate (P) made from ½"-thick stock (Douglas fir).





The pressure is applied by a threaded knob that passes through a hole in the clamp block and guide strips, and into a T-nut in the pressure plate *(Clamp Mechanism)*. Tightening the knob "squeezes" the pressure plate and locks the arm.

In addition to the knob, there's a lag screw that connects the clamp mechanism to the arm. In use, this lag screw should be just snug — not so tight that the support won't slide, but not loose enough that the guide strips jump the tracks, so to speak.

ASSEMBLY. To make all this work, I followed a simple assembly sequence. First, drill a hole for the lag screw and a counterbored shank hole for the T-nut in the pressure plate (*Pressure Plate*). Next, glue and screw the clamp block to the arm. Now center and glue the guide strips in place, one to the pressure plate and the other to the clamp block.

At this point, you still need to complete the holes for the clamp hardware. To ensure perfect alignment, I used the drill press setup shown in *Figure 10*.

The idea is to use the holes you've already drilled in the pressure plate as a guide. To do this, swing the head of the drill press to the side and clamp a scrap block to the table. Now temporarily assemble the clamp mechanism with double-sided tape and clamp the arm against the scrap block.

At this point, it's just a matter of drilling a 3/8" hole for the threaded knob all the way through the guide strips and clamp block, as shown in *Figure 10*. For the lag screw, I used a "two-bit" method — a 3/8" bit to complete the shank hole in the guide strips and clamp block followed by a 1/4" bit for the pilot hole in the arm.

ADD THE SLEEVE

The mast and light are ready to go on the cart. All you need is a sleeve to hold them.

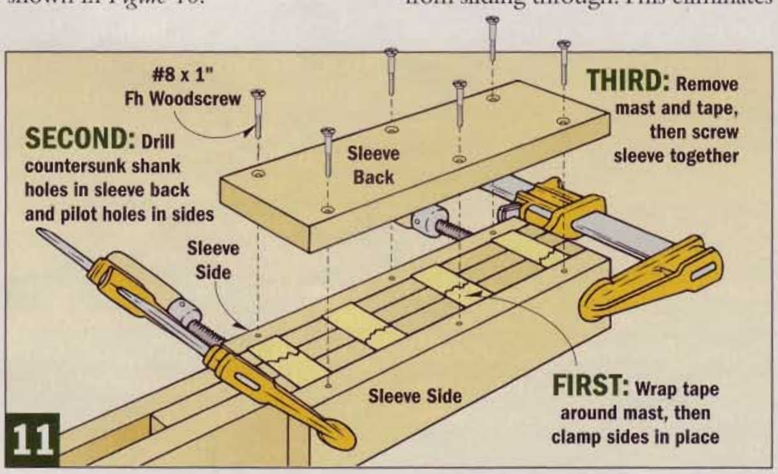
The sleeve is simply a four-sided box made up of two identical sides (Q), a back (R), and a mounting plate (S). Notice in the *Assembly View* that the sleeve has no bottom. Instead, I used a dowel (T) to stop the mast from sliding through. This eliminates the problem of dust building up in the bottom of the sleeve.

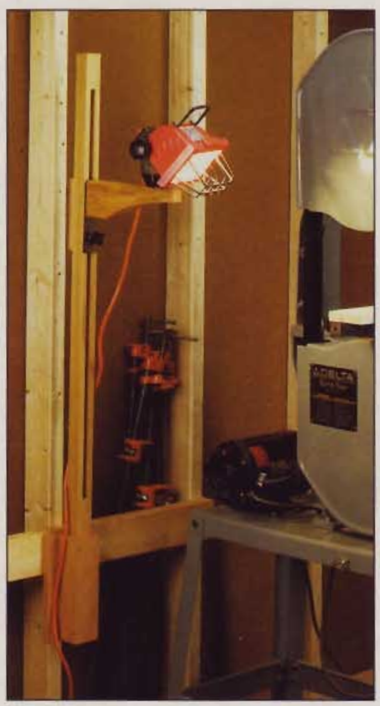
After drilling holes in the sides for the dowel, the only tricky part here is assembling the sleeve. You don't want the mast to bind when you insert it in the sleeve, yet it has to be snug enough so it doesn't wobble around. The solution is to temporarily wrap the mast with tape and then assemble the sides and back around it *(Fig. 11)*.

Once that's done, screw the mounting plate to the sleeve sides *(Sleeve Mounting Detail)*. Then screw the mounting plate to the cart.

FINAL DETAILS. To complete this project, I installed the worklight. Finally, I mounted a power strip to the leg of the cart *(see Construction View on page 36)*.

▲ To install a threaded insert, chuck a cutoff bolt with a couple of "jam" nuts in the drill press. Then turn the chuck *by hand*.





◄ If you need task lighting at a specific tool, mount an extra sleeve to the wall to hold the mast.

practical ideas
for your home

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WORKBENCH

SMALL SHOP CART

Issue 275 Volume 59 Number 1 February 2003

MATERIALS LIST

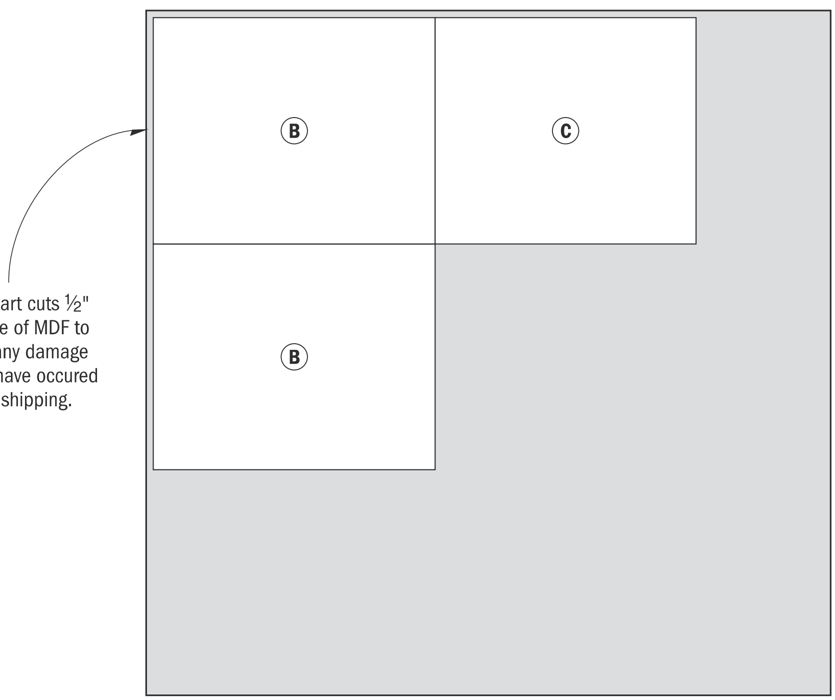
A (4)	Legs (fir)	$2\frac{1}{2}$" x $2\frac{1}{2}$" x 26"
B (2)	Top/Bottom Shelves (MDF)	$\frac{3}{4}$" x 16" x 20"
C (1)	Adjustable Shelf (MDF)	$\frac{3}{4}$" x 16" x $18\frac{1}{2}$"
D (1)	Hanger Back (fir)	$\frac{3}{4}$" x $3\frac{3}{4}$" x 14"
E (2)	Hanger Sides (fir)	$\frac{3}{4}$" x $3\frac{3}{4}$" x $18\frac{1}{8}$"
F (2)	Drawer Sides (fir)	$\frac{1}{2}$" x $3\frac{1}{2}$" x 17"
G (2)	Drawer Front/Back (fir)	$\frac{1}{2}$" x $3\frac{1}{2}$" x 11"
H (1)	Drawer Bottom (hardboard)	$\frac{1}{4}$" x 11" x $16\frac{1}{2}$"
I (1)	False Front (fir)	$\frac{3}{4}$" x $3\frac{11}{16}$" x $13\frac{7}{8}$"
J (1)	Upper Spacer Block (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 3"
K (1)	Lower Spacer Block (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 11"
L (2)	Mast Sides (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 48"
M (1)	Support Arm (fir)	$1\frac{1}{2}$" x 3" x 10"
N (1)	Clamp Block (hardboard)	$\frac{1}{4}$" x $1\frac{1}{2}$" x 6"
O (2)	Guide Strips (hardboard)	$\frac{1}{4}$" x $\frac{1}{2}$" x 6"
P (1)	Pressure Plate (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x 6"
Q (2)	Sleeve Sides (fir)	$\frac{1}{2}$" x $1\frac{1}{2}$" x $8\frac{3}{4}$"
R (1)	Sleeve Back (fir)	$\frac{1}{2}$" x $2\frac{1}{2}$" x $8\frac{3}{4}$"
S (1)	Mounting Plate (fir)	$\frac{3}{4}$" x 5" x 9"
T (1)	Dowel (hardwood)	$\frac{3}{8}$" x $2\frac{1}{2}$"

HARDWARE

- (34) #8 x $1\frac{1}{2}$" Fh Woodscrews
- (10) #8 x 1" Fh Woodscrews
- (1) $\frac{1}{4}$" x 20 Threaded Insert
- (1) $\frac{1}{4}$" x $\frac{3}{4}$" Threaded Knob
- (4) $\frac{1}{2}$" x $1\frac{1}{2}$" Lag Screws
- (4) 3" Locking Casters
- (1) $\frac{5}{16}$" x $2\frac{1}{4}$" Threaded Knob
- (1) $\frac{5}{16}$ " T-Nut
- (1) $\frac{5}{16}$" x 3" Lag Screw
- (2) 16" Full-Extension Drawer Slides

CUTTING DIAGRAM

NOTE: Start cuts ½" from edge of MDF to remove any damage that may have occured during shipping.



¾" MDF - 48" x 48" (Qty: 1)

12" Sliding Compound Miter Saw Test

Sliding compound miter saws... We tested the biggest to find the best. Find out which of these sliding, chopping, mitering, and beveling saws made the cut.

Compound miter saws can officially be considered a "must-have" tool for the home shop.

Having replaced the radial arm saw as the tool of choice for crosscutting long boards and making angled cuts, these saws have gained huge popularity among DIY'ers.

Tool manufacturers took notice of this, and we now have a bumper crop of high-quality saws at affordable prices. In particular, 12" sliding compound miter saws have become much more economical.

Beyond their massive cutting capacity, these saws offer a great deal of versatility with their wide range of bevel and miter settings. Some saws even have depth stops for cutting dadoes. And with motors as large as 15 amps, they have no trouble cutting stock at their maximum capacities. These saws do it all.

So we rounded up seven 12" sliders, including three that are just now showing up in stores, and tested, measured, and compared them down to their finest details.

We'll share those results in the next several pages, but first, take a look at *Details That Make a Difference* to see how you can do some comparison shopping of your own. Then read through *How We Tested* to see what we expected of these saws.

5 Details That Make a Difference

RIDGID

MAKITA

Controls & Adjustments

These tools are loaded with levers and knobs that let you rotate and tilt the saw and lock in the adjustment before making a cut. Since you'll be doing this all the time, it's important that the controls are conveniently located and easy to use.

So, as you shop for a miter saw, try to imagine every cut you might make and then set the saw up for that cut. You'll quickly discover which saws are the easiest to use.

Size & Portability

Although all of the saws in this test have similar cutting capacities, there's quite a difference in the size of the saws themselves.

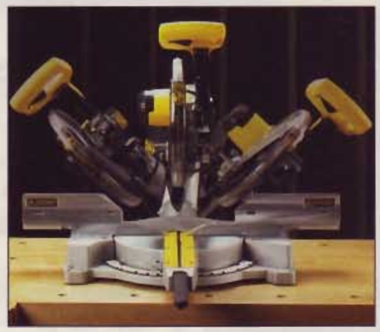
The Ridgid and the Makita, pictured at right, demonstrate that point particularly well. The Ridgid's massive size means it might not be a good match for a small shop or for someone who needs a portable tool. By contrast, the Makita is compact and relatively easy to move.

Fences & Tables

A flat table and parallel fences are crucial to the accuracy of a miter saw. If these surfaces aren't exact, it's virtually impossible to adjust the saw to make accurate cuts.

Checking the saw is a simple matter of placing a metal straightedge against the surfaces and looking for gaps *(see Photos)*. You can even do this right in the store. You're in the tool aisle, so there's probably a straightedge somewhere nearby. Grab one and give the saws a look. The table should be dead flat. The two halves of the fence should either be aligned with each other or allow for adjustment.

Left/Right Bevel



All seven of the saws we tested bevel to the left. Five of them bevel to the right, as well. We prefer the dual-bevel saws because they let you change the saw settings rather then having to flip and rotate the board around for certain cuts.

Another important consideration is the bevel gauge. Take a close look at this to make sure it's easy to read.

Blades

Nothing can enhance the performance of a miter saw like a high-quality blade. Look for a stiff, carbide-tipped blade with a high tooth count (60 teeth is passable, 80 is good, 96 is ideal).

HOW WE TESTED

▲ ACCURACY OF CUT

We checked the accuracy of 45° miters and bevels against a machined aluminum square and measured gaps with a feeler gauge.

▲ POWER

Crosscutting a 2"-thick block of hardwood tested the raw power and capacity of these miter saws.

▲ USABILITY

Each saw was graded on how easy it was to set up and how acurately it maintained its settings.

MAKITA LS1212

★★★★★

At a Glance:

Price:	**$650**
Motor:	**15 amp**
Drive:	**Direct**
Blade:	**96-tooth, carbide-tipped**
Weight:	**48.4 lbs**
Max. Cut: (in 3/4"-thick stock)	**$12^5/_{16}$"**
Miter Range:	**47°L/60°R**
Bevel Range:	**45°L/45°R**
Miter Detents:	**0°, 15°, 22.5°, 33.9°, 45°, 60°**
Bevel Detents:	**None**
Warranty:	**1 year**

Virtues: Accurate. Compact. Affordable. Excellent controls.
Vices: Mushy depth stop.
Verdict: The right saw in the right size at the right price.

Makita's LS 1212 proved to be the superior saw in this test on almost every count. It's compact, powerful, dead-on accurate, comes equipped with an outstanding 96-tooth carbide-tipped blade, and still has a moderate price tag.

This saw came out of the box closer to perfect than any other tool we tested. A small adjustment which is relatively easy to make (to set the blade at 90°) was all the tuning up this saw required.

Once it was tuned up, this saw made perfect bevels, miters, and compound cuts using only the factory detents for setup.

Makita also did a nice job with the controls on this saw by placing the rail lock (which locks or unlocks the saw's sliding action) up front with the miter lock *(Photo 1)*. This makes it easy to change between chop mode and slide mode *(see Two Ways to Cut below)* without reaching around behind the saw.

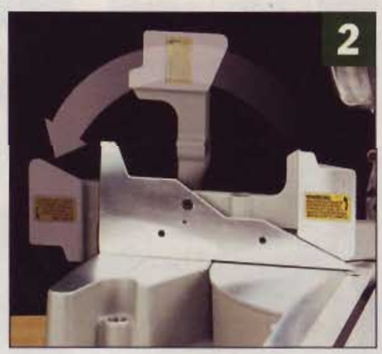
Another convenient feature of the Makita is the subfence *(Photo 2)*. This simply flips over to extend the fence or to move it out of the way so the saw can be set to its full left bevel.

A few other noteworthy features include the D-handle, safety switch, and trigger, which accommodate both right- and left-handed work equally well. We also appreciated the soft start and smooth-running motor.

The saw also ranked well for fit and finish thanks to its dead-flat table and fences, smooth sliding action, and overall solid construction.

Our only complaint is that the depth stop felt a bit mushy. Otherwise this saw is flawless.

▲ Makita made their saw user friendly with easy operating controls for the detent override (the lever) and rail lock (the thick collar).

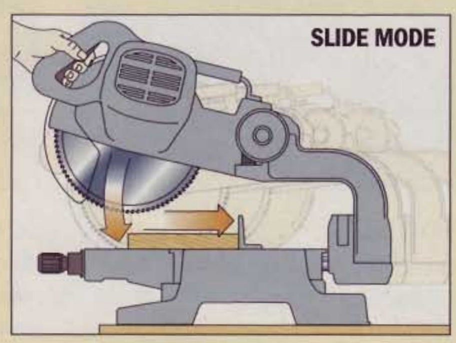


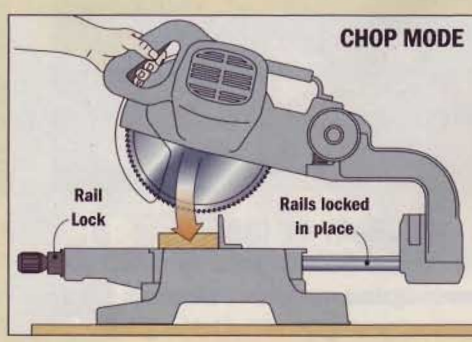
▲ Extending the subfence or moving it to allow the saw to bevel all the way to the left is a simple matter of flipping it out of the way.

TWO WAYS TO CUT

In slide mode, the saw moves on rails to gain maximum cutting capacity. The correct procedure is: slide out, chop down, slide in.

When cutting narrower stock, the rails should be locked so the saw is in "chop" mode. This holds the head assembly in a fixed position, just like a conventional miter saw.



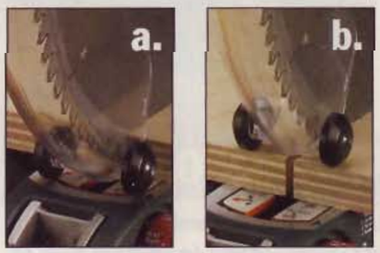


BOSCH 4412 ★★★★

The Bosch 4412 is the most well thought-out, user-friendly miter saw in this group.

The best example of this is the bevel lock. With most saws, you have to reach behind the saw to change the bevel angle. Bosch located the bevel lock at the *front* of the saw, alongside the miter lock. This feature makes a lot of sense for both convenience and safety, since reaching behind a tool is not something you generally want to do.

The miter lock itself seems pretty ordinary except for a detent override that locks out. A typical detent override is only engaged for as long as you're holding on to it. As soon as it's released, the detents are active again. That can be problematic when trying to set the saw near one of the detents (46° for instance). More often than not, as soon as the override is released, the saw will slide into the detent at 45°. Bosch's system eliminates that inconvenience by letting you disengage the detents completely. They will only take over again when you re-engage them.



▲ The guard covers the blade even when cutting. The wheels follow the shape of the board and raise the guard just enough to make the cut.

The handle on this saw is another welcome innovation. Bosch pretty well ends the debate over vertical vs. horizontal handle position with a four-position articulating handle *(Photo 1)*. You'll also notice that there's a safety switch on the left *and* right side of the handle, so the saw can be operated just as easily with either hand.

One less obvious feature that we really appreciated is the blade guard. Without getting too technical, the guard covers the blade almost entirely *at all times (Details a and b)*. This differs from most saws where much of the blade is exposed while cutting.

Sliding support wings with a flip-up stop round out the list of helpful features on this saw *(Photo 2)*.

Features notwithstanding, accurate cuts are the real measure of a saw, and Bosch more than measures up. Miters with this saw were perfect, and bevels were only slightly less precise. We did find that replacing the factory, 80-tooth blade with a 96-tooth Freud blade eliminated the tiny flaw that we saw in bevel cuts.

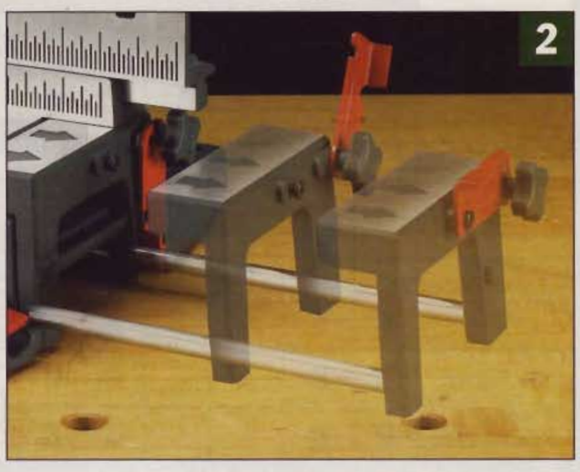
Our only trouble with this saw came during the tune-up. Adjusting the bevel settings is a two-person job and more complicated than on other saws. Otherwise, this saw nears perfection and achieves it with a slightly better blade.

At a Glance:

Price:	**$700**
Motor:	**15 amp**
Drive:	**Belt**
Blade:	**80-tooth, carbide-tipped**
Weight:	**59 lbs**
Max. Cut: (in 3/4"-thick stock)	**$12^{9}/_{16}$"**
Miter Range:	**52°L/60°R**
Bevel Range:	**47°L/47°R**
Miter Detents:	**0°, 15°, 22.5°, 31.6°, 45°, 60°**
Bevel Detents:	**0°, 33.9°, 45°**
Warranty:	**1 year**

Virtues: Great controls. Thoughtful features.
Vices: Bevel tune-up is awkward.
Verdict: Performance and features that justify the higher price.

▲ No matter what angle the saw is set at, Bosch's articulating handle can be set to avoid awkward hand positions. Dual safety switches accommodate both hands.



◄ The Bosch 4412 has a sliding extension wing on each side of the saw. The orange flip-stop can be used on either side and can quickly be moved from one to the other.

DEWALT DW708

★★★★

At a Glance:

Price:	**$599**
Motor:	**15 amp**
Drive:	**Belt**
Blade:	**60-tooth, carbide-tipped**
Weight:	**57 lbs**
Max. Cut: (in 3/4"-thick stock)	**$12^3/_8$"**
Miter Range:	**50°L/60°R**
Bevel Range:	**48°L/48°R**
Miter Detents:	**0°, 15°, 22.5°, 31.6°, 45°, 60°**
Bevel Detents:	**0°, 45°**
Warranty:	**1 year**

Virtues: Accurate. Compact. Affordable. Friendly features.
Vices: 60-tooth blade.
Verdict: A great saw and a smart buy.

This saw made us wonder if DeWalt realizes how much other manufacturers charge for their tools. The outstanding quality and bargain price of this tool make it too good to pass up. So we gave it the *Top Value* award.

Big Yellow came through big time with ease of setup features. The saw did require a bit of tweaking from the factory to get it tuned up, but the adjustments were quick and easy to make, and they held true throughout our testing.

This saw also demonstrated excellent accuracy in all our test cuts, producing miters and bevels that we'd be happy to have on our furniture and trim projects.

The controls on the saw are also better than most. What we don't care for are the bevel lock controls. These are a star knob and a sliding lever that are mounted at the back of the saw. They work well, but it's a pain reaching back there to use them.

The miter lock and detent override are simple to use and allow for quick and accurate positioning of the saw table. That is, provided you're not too close to a detent, in which case the saw tended to slip into the notch. That cost it a few points.

The horizontal handle of the saw and long trigger also makes this saw comfortable for "righties" and "lefties" *(Photo 1)*. And a slotted blade guard offers a good view of the layout line *(Detail a)*.

Another plus for the DeWalt is that it's a relatively compact tool. That's nice for hauling the saw and makes it a welcome tool in small shops. And despite its compact size, it still boasts the second largest overall miter range (110°) and largest overall bevel range (96°).

The only improvements we'd make to this saw are replacing the factory blade with a 96-tooth blade and making the bevel controls more convenient.

▲ **The handle and trigger are easy to use with either hand. Slots in the blade guard offers a clear view of the intended cut line *(Detail a)*.**

SLIDING COMPOUND MITER SAWS

	TUNE-UP			ERGONOMICS									FIT & FINISH		
Model	Bevel	Miter	Blade Change	Fence Adjust	Miter Lock	Bevel Lock	Rail Lock	Depth Stop	Lock Down	Handle & Trigger	Detent Override	Scales	Table Flatness	Fence Flatness	Detent Quality
MAKITA	B+	B	B	A+	A+	B	A+	C	A	B	A	B	A	A+	A-
BOSCH	C	B	B	B+	A+	A+	B	A	A	A+	A+	B	C-	A+	A
DEWALT	A	B+	B	B	A+	B	B	B	A	A	B	A	A	C+	A-
RIDGID	C	B	B	B	A	A	B	D	B	B	A+	B	A+	B	B+
HITACHI	B	B	A	B	A	B	B	A	A	B	n/a	B	A+	A+	B
CRAFTSMAN	D	B-	A	C	A	B	B	D	A	D	n/a	B	A+	A+	C-
GENERAL INTERNATIONAL	D	B-	A	C	A	B	B	D	A	D	n/a	B	A+	C-	C

RIDGID MS1290 ★★★½

Ridgid took the road less traveled with this saw and came up with a tool that delivers accuracy, easy use, and huge cutting capacity.

In terms of accuracy, this saw beveled as well as any and produced miters that were only scarcely less accurate than the top tools.

Where Ridgid differs with their competitors is in the controls. The miter lock, as an example, is a wide lever with a small wheel in the center of it. The wheel is the detent override. It's different, to be sure, but we like the way it works.

The bevel lock is also unique. This is a lever that's mounted along the left side of the saw. The size of the lever makes it easy to lock securely and it's positioned within easy reach.

Another interesting difference in the Ridgid is a one-piece table *(Tale of the Tables below)*. The General and Craftsman also have one piece tables, the benefit of which is greater cutting capacity.

We also like the safety switch and power trigger combination. At first glance, the safety switch looks as though it's in a bad place for left-handed users. But it's actually perfectly placed to be activated by the heel of the left hand *(Photo 1)*. Right handers can simply depress the safety with their thumb. One thing about this saw that could be improved is how it's tuned up. Although adjusting the miter is easy enough — simply loosen the fence and adjust it 90° to the blade — the bevel setting was a bit difficult. This is done by loosening two bolts and adjusting the scale to match the angle of the blade. It's not a very sophisticated system and we found that the scale would move slightly as we tightened the bolts. Adding a lock washer to each bolt would likely remedy this problem.

If there's a knock against this tool, it's the size. This is one of the largest tools in the group. The tradeoff is that it also has the largest cutting capacity.

Overall, this is an excellent miter saw at a reasonable price.

▲ **The safety switch on the Ridgid appears to favor right-handed operation, but it's easily depressed with the heel of the left hand.**

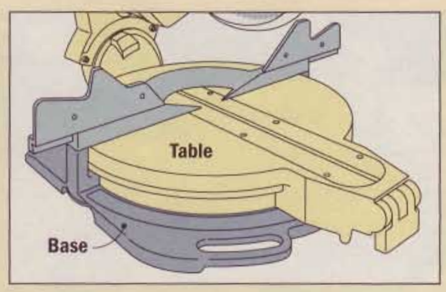
At a Glance:

Price:	**$597**
Motor:	**15 amp**
Drive:	**Belt**
Blade:	**60-tooth, carbide-tipped**
Weight:	**60 lbs.**
Max. Cut: (in 3/4"-thick stock)	**13 5/8"**
Miter Range:	**60°L/60°R**
Bevel Range:	**47°L/47°R**
Miter Detents:	**0°, 15°, 22.5°, 33.9°, 45°, 60°**
Bevel Detents:	**0°, 33.9°, 45°**
Warranty:	**Lifetime**

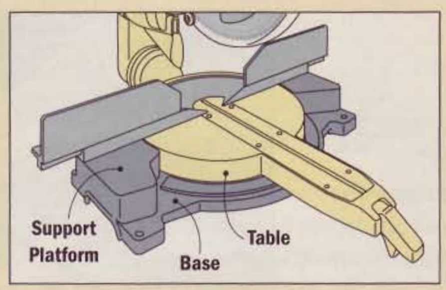
Virtues: Accurate. Convenient controls. Large capacity.
Vices: Poor bevel tuning. Large.
Verdict: A good tool at a competitive price.

CUTTING				
Quality		Accuracy		
90°	45°	90°	45° Miter	45° Bevel
A-	B+	A	A	A
A+	A-	A	B-	C+
A	A+	B+	A	A-
A	A-	A	B+	A
A+	A+	A+	A-	B
B	B	A	C	C
B	B	C	C-	B-

TALE OF THE TABLES: ONE PIECE OR TWO?



▲ **ONE-PIECE TABLE**
Ridgid, General International, and Craftsman have one-piece turntables rather than a turntable with support platforms.



▲ **TWO-PIECE TABLE**
This is an example of a two-piece table. which has a small turntable flanked by platforms that are part of the base.

HITACHI C12FSA ★★★½

At a Glance:

Price:	**$770**
Motor:	**12 amp**
Drive:	**Belt**
Blade:	**80-tooth, carbide-tipped**
Weight:	**55 lbs.**
Max. Cut: (in $^3/_4$"-thick stock)	**$12^9/_{16}$"**
Miter Range:	**57°L/57°R**
Bevel Range:	**45°L/45°R**
Miter Detents:	**0°, 15°, 22.5°, 31.6°, 35.3°, 45°**
Bevel Detents:	**None**
Warranty:	**1 year**

Virtues: Excellent accuracy. Easy tune up. Alignment "guard."
Vices: Open fence. High price.
Verdict: A premium quality saw at a premium price.

Nevermind that the Hitachi is listed fifth in this test. Because, quite honestly, the first five saws in this test performed so well that you could just about choose from among them based on your favorite color and never be disappointed.

This saw, in particular, has some outstanding features that could justify the higher price for certain users.

For instance, tuning it up is a breeze. Bevel adjustments are made with bolts that act as stops. These are threaded in or out until the saw is at the correct angle.

Truing up the miter angle is done by adjusting the fence. Or actually, the *fences*. This saw has a unique two-piece fence. In other words, the fence on the right of the blade is separate from the fence on the left side.

Most fences are one piece, so adjusting the one side also moves the other side. This is good in theory, but if the faces aren't perfectly parallel, there's nothing you can do about it.

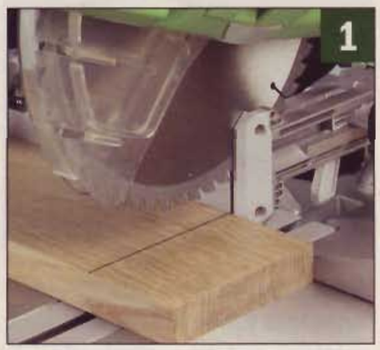
With the Hitachi, however, each side can be adjusted independently and brought into perfect parallel *(Photo 2)*. This is made even easier by the fact that both fences on the Hitachi were dead flat. The drawback to the Hitachi fence is that it's wide open toward the center, providing no support for cutting small pieces.

Aligning cuts, on the other hand, is incredibly accurate on the Hitachi. That's thanks to a unique piece that the instruction manual refers to simply as a "guard" *(Photo 1)*.

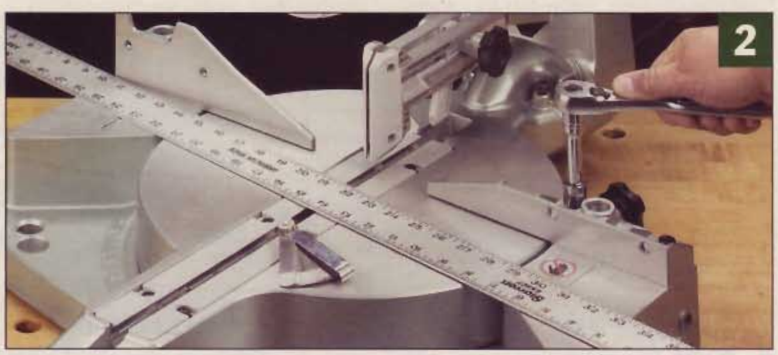
This "guard" is an adjustable rail with a plastic cap on it. By cutting a kerf in this cap, you create an alignment guide that's extremely precise.

In terms of performance, the Hitachi is quite impressive. The quality and accuracy of cuts throughout our testing was excellent. The motor is powerful and smooth-running. The controls are effective and simple to operate. The saw comes equipped with an 80-tooth carbide-tipped blade that you *won't* need to replace to make clean accurate cuts. Though should you ever want to use a different blade, installing a new one is a snap *(Photo 3)*.

As a whole, this is an expensive saw that lacks some of the bells and whistles of the other tools in this test. But based on pure performance, you'd never regret spending the extra money for this one.



▲ Hitachi's saw features a "guard" that serves as an accurate alignment device. The kerf in the guard is cut during the initial setup.



▲ Hitachi's two-piece fence lets you adjust both faces independently and make them perfectly parallel to each other. Other saws have one-piece fences that can only be adjusted for angle, not parallel.

▲ Blade changing on the Hitachi is easy thanks to a cover that offers quick access to the arbor.

CRAFTSMAN 21292 ★★½

At a Glance:

Price:	**$590**
Motor:	**15 amp**
Drive:	**Direct**
Blade:	**40-tooth, carbide-tipped**
Weight:	**57.8 lbs**
Max. Cut: (in 3/4"-thick stock)	**$13^5/_8$"**
Miter Range:	**47°L/47°R**
Bevel Range:	**45°L**
Miter Detents:	**0°,15°, 22.5°, 31.6°, 45°**
Bevel Detents:	**0°, 33.9°, 45°**
Warranty:	**1 year**

Virtues: Affordable. Easy blade changing. User-friendly controls.
Vices: Imperfect miters & bevels.
Verdict: Affordable and viable if precision isn't crucial.

The strong suits for Craftsman's saw are fit and finish and ergonomics. The fence and table of this saw were dead flat, and most of the controls were easy to reach and use.

Another high point for this saw is the blade changing. This is one of the few saws that don't require you to nearly remove the entire blade guard to get at the arbor bolt.

In terms of performance, this saw made excellent straight cuts (in chop and slide modes), but wasn't entirely accurate when mitering or beveling.

This is also a single-bevel saw. That limits its versatility somewhat, but also keeps the cost down. The low price may be worth considering if perfect cuts aren't crucial.

GENERAL INTERNATIONAL 50-700 ★★

At a Glance:

Price:	**$590**
Motor:	**15 amp**
Drive:	**Belt**
Blade:	**60-tooth, carbide-tipped**
Weight:	**57.8 lbs**
Max. Cut: (in 3/4"-thick stock)	**$13^5/_8$"**
Miter Range:	**47°L/47°R**
Bevel Range:	**45°L**
Miter Detents:	**0°, 15°, 22.5°, 31.6°, 45°**
Bevel Detents:	**0°, 33.9°, 45°**
Warranty:	**1 year**

Virtues: Low price.
Vices: Flimsy blade. Poor fit and finish. Inaccurate miters & bevels.
Verdict: We can't recommend this saw based on our results.

The General International has a great deal in common with the Craftsman, inlcuding being a single-bevel saw. The highlights of this tool are its low price and large cutting capacity.

Beyond that, we found several shortcomings on this saw. Of particular concern was the amount of vibration in the saw. This seemed to be caused by the blade, because as soon as we swapped it with a Freud blade, the vibration stopped almost entirely.

Nonetheless, this saw was the least accurate in the test group when cutting bevels and miters. If you go for the low price, you'll need to lower your expectations.

Final Recommendations

Makita packed a lot of performance into their compact saw, then followed it up with an equally low price. We've got nothing but good stuff to say about this one, so we named it *Editor's Choice*.

Running a close second is the Bosch. A few teeth (on the Makita blade) and a few dollars are all that separate the 4412 from the top spot.

DeWalt's reputation is built on quality, not price. So it's a treat when they deliver both in the same outstanding tool, as they did with the DW708. It's a natural for *Top Value*.

Ridgid also gets a tip of the *Workbench* cap for their unique design and exceptional quality.

MAKITA LS1212

DEWALT DW708

WORKBENCH TOP 10 MOST INNOVATIVE TOOLS

HOT NEW TOOLS for 2003

Genuine tool innovation makes your woodworking and home improvement projects better, easier, and more efficient. Here's our Top 10 list of innovative tools for 2003.

DEWALT PLUNGE/FIXED ROUTER COMBO

MOTOR

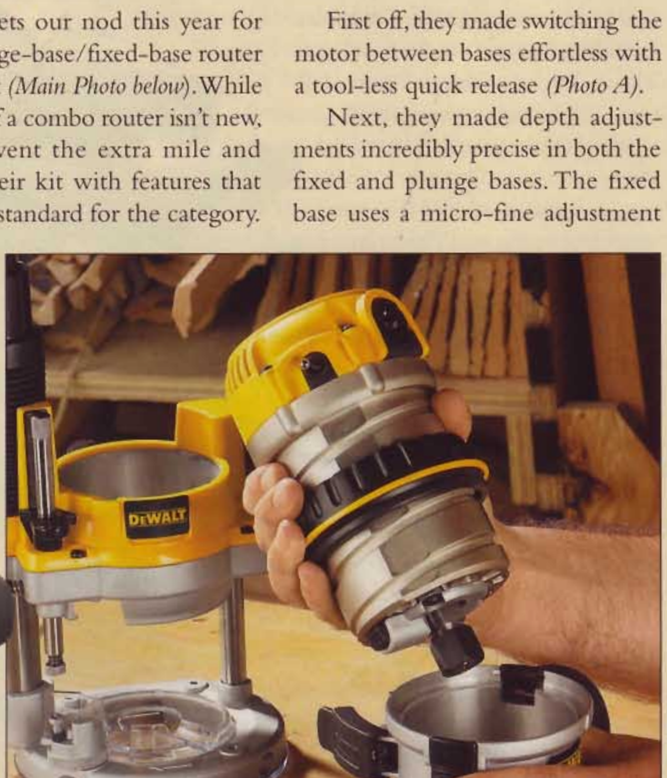
PLUNGE BASE

FIXED BASE

DeWalt gets our nod this year for their plunge-base/fixed-base router combo kit *(Main Photo below)*. While the idea of a combo router isn't new, DeWalt went the extra mile and packed their kit with features that set a new standard for the category.

First off, they made switching the motor between bases effortless with a tool-less quick release *(Photo A)*.

Next, they made depth adjustments incredibly precise in both the fixed and plunge bases. The fixed base uses a micro-fine adjustment ring that lets you raise and lower the bit by $^1/_{64}$". This is also nice because only the ring moves, not the motor. So the switch and power cord stay in the same position all the time.



The micro-fine adjustment knob on the plunge base raises or lowers the bit $^5/_{128}$" per turn, making precise settings for inlay and veneer routing easily achievable.

To guarantee smooth depth adjustments, the motor housing is nickel plated. The nickel plating eliminates the aluminum-to-aluminum connection that makes some other routers prone to wear and difficult to adjust smoothly.

Also in the interest of accuracy, this kit includes a special cone-shaped alignment device to guarantee that sub-bases can be mounted so the bit will be perfectly centered in the opening *(Photo B)*.

And speaking of sub-bases, this kit comes standard with two different sizes of clear Lexan bases. One base is used with small-diameter bits and it also accepts the popular Porter-Cable guide bushings. The second sub-base is for larger bits.

MAKITA M-FORCE DRILL

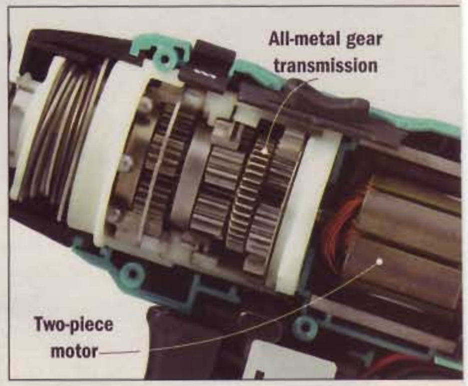
Makita's new M-Force cordless drills have several excellent features. Among them are an all-metal gear transmission, a keyless ratcheting chuck for quick bit changing, and two, 2.6 amp-hour Nickel Metal Hydride (Ni-Mh) batteries that provide longer run time (though fewer total recharges) than similar Nickel-Cadmium (Ni-Cad) batteries.

What really sets these drills apart, though, is the motor and clutch that Makita designed specifically for this line of tools.

The motor that powers these new drills is a heavy-duty, two-piece motor that produces 350 in. lbs. of torque in the 14.4v version and 400 in. lbs. of torque in the 18v model. The motor is also more compact than previous versions, making for a smaller, lighter tool.

The clutch system also got our attention on these drills. Like other drills, the M-Force has a multi-position clutch that allows you to set the torque of the drill to your particular job. What's unique about this tool is a shift lock lever that toggles the drill back and forth between drill and drive settings. In the drill mode, the clutch is locked out to deliver maximum power. In drive mode, the clutch is engaged. This allows you to change quickly from drilling holes to driving screws without changing the clutch setting.

M-Force drills are available in 12v, 14.4v, and 18v models. They're sold at home centers, hardware stores, and online for between $180 and $230.



AT A GLANCE

Price:	$180 - $230
Voltages:	12v, 14.4v, 18v
Batteries:	2 Ni-MH
Chuck:	$^3/_8$" or $^1/_2$"

Accessories: Battery charger. Phillips/slotted bit. Plastic carrying case.

Virtues: Lightweight and compact. Powerful motor. Easy change from drill to drive.

Makita 800-462-5482
www.Makita.com

The plunge base in this kit incorporates many of the outstanding features from DeWalt's conventional plunge routers. Among them are the "through-the-column" dust extraction system and bronze bushings for smooth plunging action.

One final touch that impressed us is a removable power cord *(Photo C)*. This is a valuable feature for a couple of reasons. First of all, the cord is the first thing to go bad on most power tools. DeWalt literally made it a snap to replace a damaged cord.

All these features notwithstanding, this router more than earns its place as a Top 10 tool just for performance.

The model we evaluated was the $1^3/_4$ hp, single speed DW616PK (a $2^1/_4$ hp variable speed version is also available). After using the router extensively for both handheld and table-mounted applications, we feel that DeWalt has effectively raised the bar for combination router kits.

The kits are available in home centers and tool retailers and sell for between $200 and $250.

AT A GLANCE

Price:	$200/$250
Motor:	$1\frac{3}{4}$ hp/$2\frac{1}{4}$ hp
Speed:	24,500 rpm/8,000 - 24,000 rpm
Collets:	$^1/_4$", $^1/_2$"

Accessories: Sub-base alignment gauge. Vacuum adapter. Plastic carrying case.

Virtues: Easy base changes. Precise depth adjustment. Alignment gauge. Compact size. Removable cord. Outstanding performance.

DeWalt 800-433-9258
www.DeWalt.com

VARATHANE FLOOR REFINISHING SYSTEM

Tools are supposed to make a difficult job easier to do. When it comes to refinishing floors, however, that just hasn't been the case.

The tools for this daunting job have been limited to a drum sander or a vibrating pad sander. A drum sander is difficult to operate and can quickly damage a floor. A pad sander doesn't do anything quickly, including removing the old finish.

Now Varathane has introduced a new tool, available for rental, that makes floor sanding an easy DIY project *(Main Photo)*.

Imagine a three-headed random orbit sander roughly the size of a lawnmower and you've got a good idea what the ezV sander is all about. The sander has three 7" random-orbiting heads attached to a larger rotating head *(Photo above right)*.

Operating the ezV couldn't be easier. The random action means there's no need to worry about grain direction or gouging the floor. It's the perfect blend of effective sanding with forgiving operation.

The sander also has a remarkably effective dust collection system. A canister mounted on the front of the handle holds a dust bag and filter. The dust is collected by an onboard vacuum. During my use, there was no airborne dust.

The ezV is available in rental centers and home centers, where it's displayed with the full line of Varathane floor finishes.

AT A GLANCE

Price:	**$40 per day**
Sandpaper Disc Size:	7"-dia.
Available Sandpaper Grits:	36-, 50-, 80-grit
Sanding Diameter:	16"
Weight:	130 lbs.

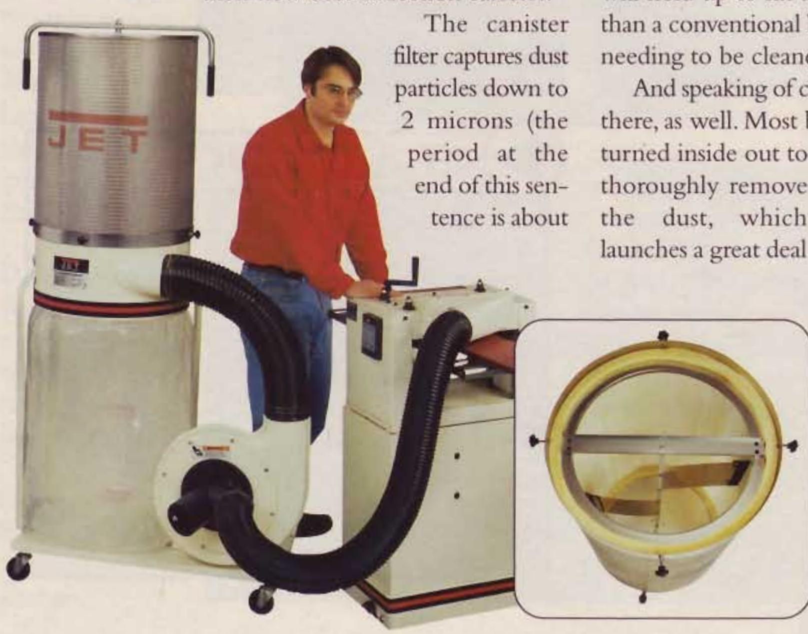
Virtues: Quiet. Easy to operate. Hook & loop sandpaper for easy disk changes. Dust free. Random orbit decreases likelihood of floor damage.

Varathane 800-553-8444
www.Varathane.com

DUST COLLECTION IS IN THE CAN WITH JET

You can quote me on this: If you build a better dust trap, the world will beat a path to your door.

Hence, Jet Tools should expect some traffic at their door thanks to their new dust collection canister.



The canister filter captures dust particles down to 2 microns (the period at the end of this sentence is about 397 microns). That's pretty impressive compared to the 30 micron filter bags standard on most systems.

The canister also beats the bag in terms of capacity. Jet's V-weave filter will hold up to six times more dust than a conventional bag filter before needing to be cleaned.

And speaking of cleaning, Jet rules there, as well. Most bags need to be turned inside out to thoroughly remove the dust, which launches a great deal of dust into the air. On the Jet, simply turn a handle on top of the canister. A cleaning flapper inside the canister shakes the dust free so it can fall into the collection bag.

The canister is available with three of Jet's dust collection systems or as an upgrade that fits most popular brands of dust collectors that use $18^{1}/_{2}$" or 20" dust collection bags.

AT A GLANCE

Price:	**$250 - $1,000**
Filter Efficiency:	2 microns
Compatibility:	$18^{1}/_{2}$" & 20" collectors
Surface Area:	2,062 - 6,656 sq. in.
Dimensions:	21" dia. x 29"H

Virtues: Highly efficient filtration. Huge collection capacity. Easy cleaning feature. Can be purchased in a Jet package or as a retrofit to most popular collection systems.

Jet 800-274-6848
www.JetTools.com

TRITON PLUNGE ROUTER

Triton Manufacturing, a well-known name in Australia, is making a good first impression on American woodworkers with an outstanding router. What makes the Triton plunge router so remarkable are its bit-changing features, depth-setting system, and safety details.

The router easily accommodates bit changes because the collet can be extended well past the base of the router, making it accessible with a wrench *(Photo a above right)*. Furthermore, an automatic collet lock is engaged, leaving both hands free for swapping bits.

Depth setting can be accomplished one of three ways. First is a winder handle that raises or lowers the bit with a rack-and-pinion mechanism. There's also a microadjuster for fine-tuning and a free-plunge setting. A twist insert in the winder handle disables the rack-and-pinion system and turns the unit into a conventional plunge router.

Safety features include a sliding door that covers the power switch to prevent unintentional start ups and a lighted switch that's illuminated anytime the router has power.

The router has a powerful $3^1/_4$ hp motor and a fully-enclosed base with built-in dust extraction. The router comes standard with $^1/_4$" and $^1/_2$" collets and a fence that doubles as a circle cutter.

AT A GLANCE

Price:	$329
Motor:	$3^1/_4$ hp
Speed:	8 -24,000 rpm
Collets:	$^1/_4$", $^1/_2$"
Accessories:	Fence. Straight bit.

Virtues: Compact and powerful. Easy bit changes. Very effective dust collection. Versatile depth-setting system.

Triton Manufacturing 888-874-8661
www.TritonWoodworking.com

DELTA BENCHTOP VARIABLE-SPEED DRILL PRESSES

Thanks to two new drill presses from Delta, home woodworkers can now enjoy the same fast, easy speed adjustments that the pros have long enjoyed.

Changing speeds on consumer-grade drill presses has historically been done by moving the drive belt between different diameter pulleys. It's an effective, though not terribly convenient, way of doing things. Larger drill presses, such as those used in commercial manufacturing, have long had the convenience of mechanical speed adjustment, which lets the operator change rpm by simply turning a lever.

Now Delta has brought this user-friendly variable-speed feature to its new 10" (DP250) and 12" (DP350) benchtop drill presses.

Despite this premium feature, the price of these tools is still quite reasonable — about $130 for the 10" model and $199 for the 12".

Both drill presses are powered by 120v induction motors that can be adjusted from 500 to 3,100 rpm. They have $^1/_2$" chucks, and quill travel on both models is $3^1/_4$".

These drill presses are available at home centers and tool retailers.

AT A GLANCE

Price:	$130 - $199
Chuck Size:	$^1/_2$"
Motor Size:	$^1/_3$ hp
Spindle Speeds:	500 - 3,100 rpm
Quill Travel:	$3^1/_4$"
Chuck to Table Dim.:	$10^1/_4$"/14"
Overall Dimensions:	10"W x 20"H x 33"D
	11"W x 22"H x 37"D

Virtues: Easy speed changes with mechanical lever. Affordable price.

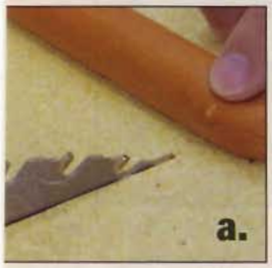
Delta 800-438-2486
www.DeltaWoodworking.com

SAWSTOP TECHNOLOGY SETS NEW SAFETY STANDARD

Table saw safety has long been limited to blade guards that are so inconvenient that removing them is a common first order of business.

About two years ago, however, a new company called SawStop introduced technology that promised to revolutionize table saws in terms of safety.

SawStop describes the way their safety system works this way:


a.

The SawStop system works by recognizing the difference in the electrical properties of wood and a user. The system induces a high-frequency electrical signal on the blade of a table saw and monitors this signal for changes caused by contact between the blade and a user's body. The signal remains unchanged when the blade cuts wood. However, when a user contacts the blade while the saw is operating, the electrical signal changes. The SawStop system detects this change in the electrical signal and immediately forces a brake into the teeth of the blade. The brake absorbs the energy of the blade, bringing the blade to a complete stop in approximately 5 milliseconds.

Demonstrations of the SawStop draw large crowds at woodworking shows across the country as an operator cuts through a piece of plywood with a hot dog riding piggyback (the hot dog representing an ill-fated finger). The saw cuts normally through the plywood, but stops dead as soon as the blade contacts the hot dog *(Photo a at left)*.

SawStop had hoped to license the technology to saw manufacturers. After two years with little success, they've begun manufacturing their own line of table saws and are currently taking orders for their contractor and cabinet-grade saws. The company's website lists prices for these saws at $699 for a $1^1/_2$ hp, 115v contractor saw and $2,199 for a 3-hp, 230v cabinet saw. For more on the SawStop system, visit www.SawStop.com.

AT A GLANCE

Price:	**$699/$2,199**
Motor:	$1^1/_2$ hp, 115v/3 hp, 230v
Rip Fence:	30"/Options on cabinet saw
Table:	Cast iron/Cast iron w/extensions
Insert:	Standard/Zero clearance
Virtues:	Unprecedented safety.
SawStop	503-638-6201
	www.SawStop.com

BOSCH CORDLESS JIG SAWS

Bosch jig saws have long been considered among the best money can buy. Not surprising considering they practically invented the tool. (Ever heard the story about the guy who put a blade in a sewing machine and, thus, the jig saw was born? That guy worked for Bosch.)

Bosch's latest contributions to this category are three cordless jig saws that combine the best features from the corded line with the convenience of being cordless.

First off, these tools demonstrate the same smooth running, straight-cutting demeanor of their corded counterparts. And during my use of all three new models (14.4v, 18v, and 24v), I found no shortage of power.

Bosch also added a one-touch blade-change system that's easier to use than most other tool-less blade change systems on the market. This system has the added benefit of ejecting a hot or broken blade by simply pulling a lever (just make sure it's not pointed at your face). Actually, Bosch promised us this a couple years ago and is finally getting around to delivering it. It was worth waiting for, though.

Other features, such as a variable-speed trigger, large aluminum foot, and ambidextrous switch lock make these jig saws a sensible choice for any application.

The jig saws are available at most home centers and tool stores and cost between $199 and $279.

AT A GLANCE

Price:	**$199 - $279**
Blades:	T-shank
Blade Change:	Tool-less
Speed:	0 - 2,000 spm
Virtues:	One-touch, tool-less blade changing. Ejects hot blades. Powerful and smooth running. Long run time. Logical choice for a cordless tool.
Bosch	877-267-2499
	www.BoschTools.com

TIGERCLAW BY PORTER-CABLE

AT A GLANCE

Price:	**$280**
Motor:	11.5 amp
Stroke Length:	$1\frac{1}{4}$"
Speed:	0 -2,900 spm
Blade Change:	Tool-less

Virtues: Gear housing and blade housing rotate to accommodate almost any conceivable cutting situation. Powerful motor. Tool-less blade change.

Porter-Cable 800-487-8665
www.Porter-Cable.com

Porter-Cable quite literally added a twist to their new reciprocating saw, dubbed the TigerClaw, by giving the tool an articulating head that swivels on two different axes. Besides letting you contort the tool into some really cool shapes, the TigerClaw bends and twists to go where no reciprocating saw has gone before — like between floor joists, studs, or any other cramped area where recip saws are often called into action.

The magic of the TigerClaw is in two adjustable gear housings that allow the tool to bend while still maintaining an effective drive train. Of course, all that gearing does result in a slight power loss at the blade. Porter-Cable compensated for that by powering the saw with the same heavy-duty, 11.5 amp motor that drives their top-of-the-line, non-twisting recip saw. In my experience, the power loss from the gearing is negligible. The TigerClaw is as capable of aggressive cutting as any other quality reciprocating saw.

This saw also includes Porter-Cable's Quik-Change front shoe and blade changing system that puts more of the blade to use than conventional shoes and accommodates quick blade changes. There's even an adapter that comes with the saw that allows the use of universal *jigsaw* blades for jobs that require a bit more finesse.

The TigerClaw is sells at home centers and hardware stores for about $280. Visit www.PorterCable.com for more information.

CRAFTSMAN THICKNESS PLANERS

Craftsman added two great features to their 12" and 13" thickness planers. Just one of them would have earned these tools a spot on our Top 10 list. But two good ideas on the same tool? Now *that's* innovation.

First of all, Craftsman has tamed the biggest nuisance of using a planer — dust control.

No, that's not quite right. Planers don't make dust. Planers make chips. Great big chips that wind up all over the floor or clog your dust collector.

These new planers from Craftsman, however, feature an onboard dust collection system that feed the chips directly into a heavy-duty plastic bag or garbage can. I can attest to the effectiveness of this system after reducing a 2"-thick piece of hardwood to about $\frac{1}{2}$" with almost no chips on the floor.

The second innovative feature on these planers is a power elevation control. This is simply a lever that adjusts the planer's cutterhead between 1" and 6". It's an incredibly fast way to make gross adjustments on the planer. Of course, for fine adjustments, this planer still has a hand crank that will fine-tune the cutterhead at $\frac{1}{16}$" per revolution.

Both versions of this planer feature a four-post design that minimizes snipe and makes for a smooth operation. Both also have two high-speed steel, double-edged blades. Blade changes are made simple with an index pin system that makes blade alignment automatic (no blade setting gauge necessary).

The 12" planer runs at 9,400 rpm, producing 18,800 cuts per minute. The 13" model turns at 8,000 rpm for 16,000 cuts per minute.

The 12" (#21722) planer sells for $299.99 and the 13" model goes for $439.99 (#21743).

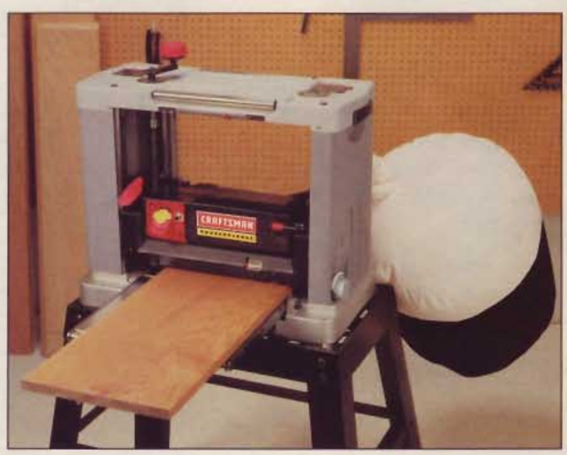
Both are available in Sears stores or online at www.Craftsman.com.

AT A GLANCE

Price:	**$300/$440**
Capacity:	$4\frac{1}{2}$" x 12"/6" x 13"
Feed Speed:	20 FPM/26 FPM
Cuts Per Minute:	18,800/16,000
Weight:	68.5 lbs/105 lbs.

Virtues: Excellent, onboard dust collection. Fast depth setting changes. Minimal snipe when locked. Easy-to-see depth scale.

Craftsman 800-279-4441
www.Craftsman.com



▲ **To use the cutting jig, butt the workpiece against a stop block clamped in place and use a scrap piece to hold the stock firmly against the base of the jig. Then use the miter gauge to slowly guide the jig over the dado blade to cut the half laps.**

In The Shop

Cutting Half-Lap Joints in Thin Stock

Cutting half-lap joints in narrow, thin stock on the table saw poses a few more challenges than working with thicker stock. Namely, the blade on the table saw has a tendency to make thin pieces chatter or bounce more than thicker pieces as you make a cut. This can cause an inconsistent depth of cut, creating a joint where the faces don't fit flush.

CUTTING JIG. One solution is to use a shop-made jig that attaches to the miter gauge to support the workpieces and raise them off the table during the cuts *(see Photo above)*.

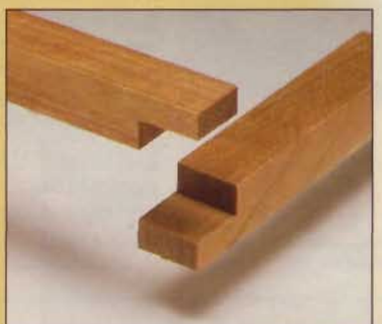
The jig consists of a hardboard base screwed to an auxiliary fence. A stop block clamped to the fence lets you maintain consistent cuts.

Another advantage of using the jig is that it bridges the throat plate on the table saw. This provides a smooth, flat surface for the workpieces to rest on all the way through the cut.

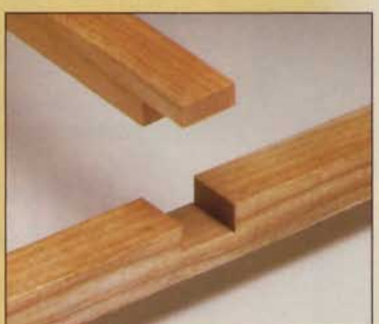
Once the jig is made, you're ready to cut the lap joints. Depending on where the cut is made in the workpiece, this can be an end lap, a T-shaped lap joint, or a cross lap *(see Photos at left)*.

Regardless of the type of lap joint, the goal is the same. The mating pieces should fit snug (not tight), and the faces should be flush. Both of these are accomplished with the proper setup.

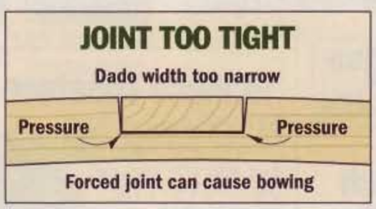
► END LAP
Half laps that join the ends of two boards provide plenty of face-to-face surface for a good glue joint.

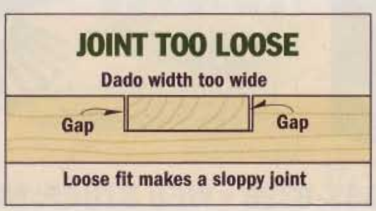


► "T" JOINT
A half lap on the end of one piece fits into a dado in the middle of the mating piece to create a T joint.



► CROSS LAP
Mating half laps cut in the middle of two pieces are often used to create a strong grid.





PROPER SETUP

Getting a snug-fitting joint is simply a matter of shimming the dado blade to match the width of your stock. You don't want to have to force the joint together. The pressure can cause the thin stock to bow *(Joint Too Tight)*. Likewise, there shouldn't be any visible gaps between the shoulders *(Joint Too Loose)*.

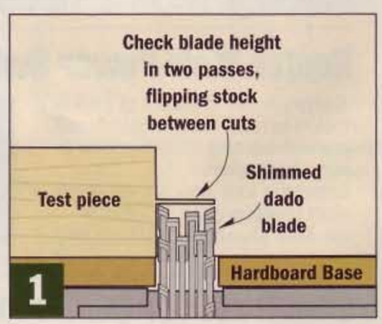
SET DEPTH OF CUT. Next, set the height of the dado blade so it's a little less than half the thickness of the workpiece. Then make some test cuts in a piece of scrap (scrap should be same thickness as the final stock) to sneak up on the final depth of cut *(Fig. 1)*.

To do this, make a cut on one end of the test piece, using the jig and miter gauge to guide the test piece. Now flip the piece over and make a second cut on the same end. At this point, you should have a thin sliver of material remaining.

Next raise the dado blade a hair and repeat the process. This time around, remove a little from each side of the sliver until it completely disappears on the second cut.

CHECK THE FIT. Now before cutting the final half-lap joints in the actual stock, double-check the blade setup by cutting a half lap on the end of a couple of test pieces. Then check the fit to make sure the faces are flush.

If everything looks good and you don't have to force the pieces together, go ahead and cut the final joints.



Setup Blocks for Mitered Crown Molding

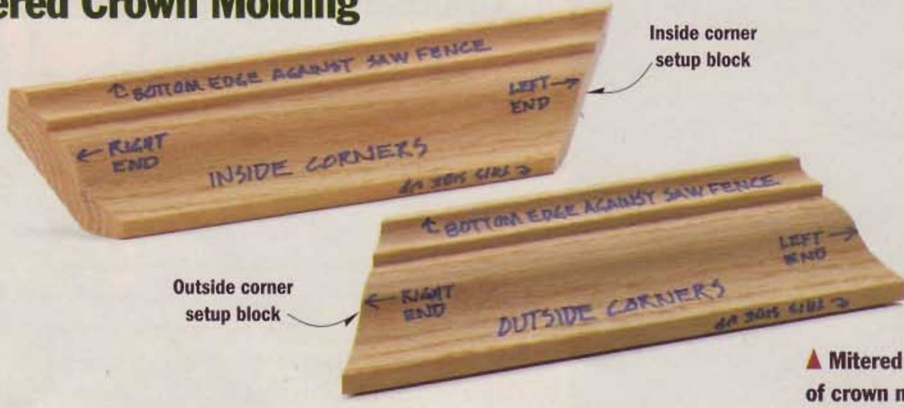
When mitering crown molding, it's easy to make a mistake and cut the wrong end of the molding or rotate the saw to the wrong side. To avoid this confusion, I like to use a couple of setup blocks *(see Photo at right)*. These blocks provide a clear picture of what the final molding pieces will look like once they're attached (either to a ceiling or a project such as the window cornices) before you make any cuts.

SETUP BLOCKS. The setup blocks are two scrap pieces of crown molding — one for an inside corner and one for an outside corner. The pieces are mitered at both ends and labeled "left end" and "right end" on their outside faces to avoid confusion.

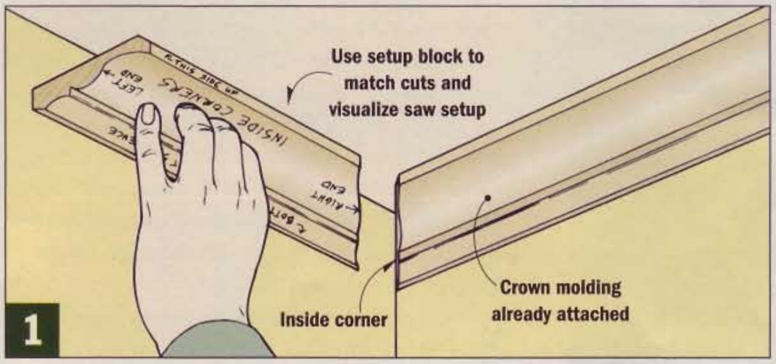
To use the setup blocks, simply hold one in the corner (inside or outside) where you're working to make sure it matches the desired cut *(Fig. 1)*. This will allow you to visualize which end of the crown molding to cut, and which way to rotate the saw to get the desired cut.

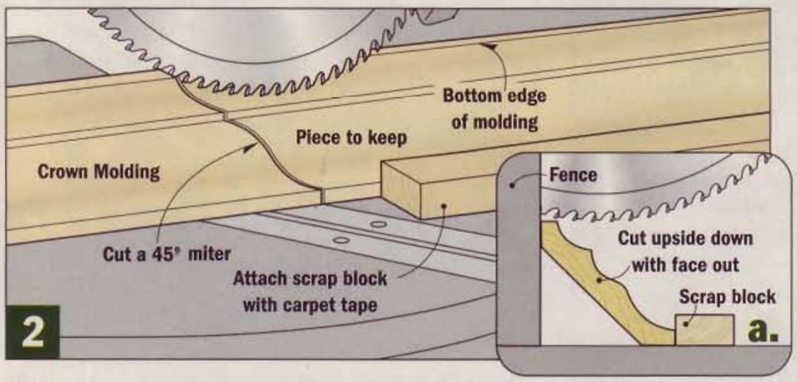
MITERING MOLDING. Then to prevent the workpiece from slipping while making the cuts, attach a scrap block to the miter saw base *(Fig. 2)*.

If the molding requires a backer for support (like on the cornices), you'll also have to bevel a backerboard to match the angle of the crown. See sidebar below for a tip on doing this.



▲ **Mitered pieces of crown molding with written instructions help you visualize the cuts and make the setup easier.**

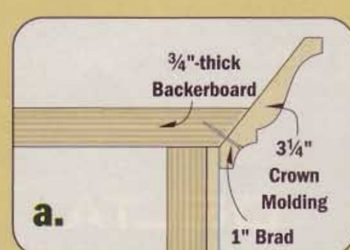




Crown Support: Determining the Bevel Angle

Crown molding "leans" forward when it's installed, so it often requires an additional nailing surface. This was the case with the window cornices (page 30), which use a $^3/_4$"-thick plywood backerboard for support. The backerboard needs to be beveled to match the angle of the crown molding *(Detail a)*.

An easy way to determine the bevel angle for the backerboard is to use a scrap piece of crown molding and a wood block. Use double-sided tape to attach the molding to the block and set the taped-up assembly on the table saw. Then simply tilt the saw blade to match the angle of the crown molding *(Photo at left)*.



Choose Straight Grain to Prevent Warp

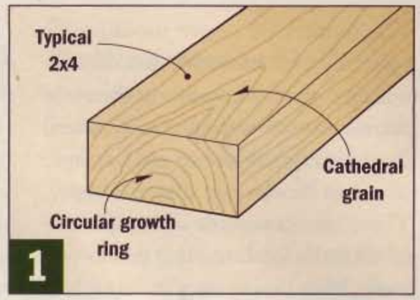
The legs for the shop cart (see page 36) are made by gluing pieces of 2x Douglas fir face-to-face. To prevent the legs from bowing or twisting, it's important to use straight-grained lumber for this.

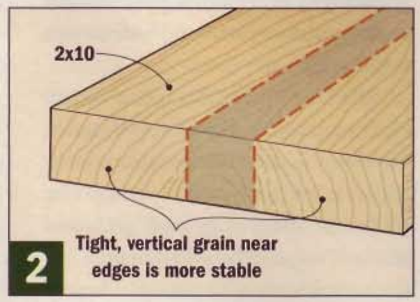
When you go to the lumberyard to pick up material, the natural tendency is to sort through a stack of 2x4's for the straightest boards you can find. But even a straight 2x4 can bow or twist when you get it back to the shop, or worse yet, after you machine it to its final dimensions.

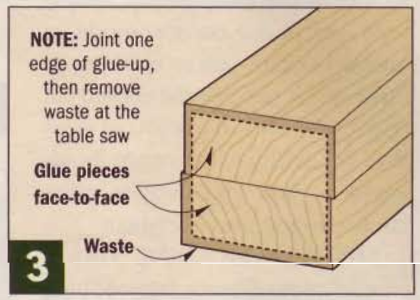
To get a better understanding of why this happens, take a look at the end of a 2x4. You'll notice that the growth rings are often circular rather than running vertically along the end of the board *(Fig. 1)*. This grain arrangement isn't the most desirable for face-gluing or stability.

One way to get around this is to select a wider board like a 2x8 or 2x10 that has a 2"- to 4"-wide strip of straight-grained material near each edge *(Fig. 2)*. Then rip off the edges to get the pieces needed for each leg.

Next glue the pieces face-to-face to make the legs *(Fig. 3)*. After the glue dries on each leg blank, you can joint one edge and rip the blank to final width on the table saw. Plane the legs to final thickness by removing material from both sides. Then go ahead and trim the legs to final length, too.





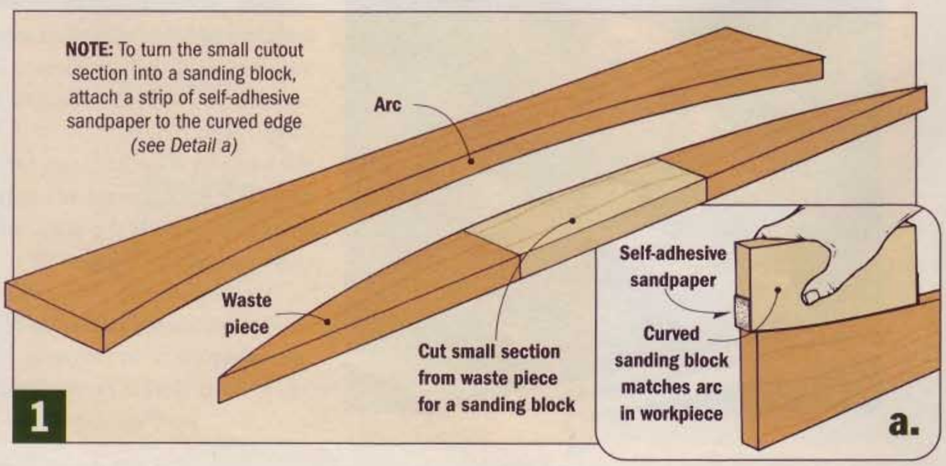


Sanding Block That's a Perfect Fit

Sanding a curved surface with a square sanding block is like trying to fit a square peg in a round hole. Luckily, a simple solution is usually lying right next to your scrap bin.

After cutting out an arc like the one on the contemporary window cornice (page 34), don't toss out the waste piece. It comes in real handy for making a perfect-sized curved sanding block that you can use to sand the bottom edge of the arc smooth.

Simply cut out a section from the middle of the waste piece *(Fig. 1)*. Then to turn this piece into a sanding block, attach a strip of self-adhesive sandpaper to the curved edge. The arc on the sanding block is a perfect match of the arc on the workpiece *(Fig. 1a)*.



Workbench Approved Tools & Products

Jet Disc Sander: Sand More, Eat Less

► **Jet's new 12" disc sander eats its own dust (down to an incredible 2 microns) so you don't have to.**

Among the myriad reasons to hate sanding is the layer of dust that it leaves around the shop, on your tools, and in your nose.

Jet's new 12" disc sander, however, makes sanding at least less dusty if not less tedious.

This 1-hp sander has a built-in impeller located directly behind the sanding disc. This impeller creates a large amount of airflow that pulls dust from around the outer edges of the disc and blows it through a 4" port on the bottom of the unit. The dust is then collected in a canister that filters all material down to 2 microns (most dust collection systems filter only to 30 microns).

The canister filter is standard equipment on the open-stand version of the sander. The benchtop model requires an external dust collection source, but it still benefits from the impeller to minimize airborne dust particles.

Both the open-stand and benchtop models include a miter gauge and circle-sanding jig.

The open-stand sander with dust canister sells for around $400, while the benchtop model goes for about $300. The dust canister alone sells for about $110.

Look for both sanders and the canisters in home centers and tool retailers. For more information on these and other Jet products, visit their website at www.JetTools.com.

▲ **BenchDog's FTB 400 (shown with optional drawers and casters) has a moderate price with professional features.**

Bench Dog Router Table

Bench Dog's FTB 400 Complete Router Table System is easily one of the best values going for manufactured router tables.

With a base price of right around $400, this router table costs about the same as many smaller, less complete router table packages.

The basic FTB 400 package starts with an enclosed cabinet to reduce noise and provide storage. It supports a 24" x 32" high-pressure laminate top with a phenolic insert plate, and an aluminum T-track that works for miter gauges or featherboards.

The router table package also includes a 24" ProFence with a bit guard, dust port, and sliding MDF faces that allow for different size bits. An aluminum T-track on the fence accomodates adjustable stop blocks or Bench Dog's featherboards.

The router table pictured here also includes a few of Bench Dog's outstanding accessories, namely the DB400 drawer bank, the Cab Loc leveling casters, and the Power Loc safety switch. All told, this setup runs about $580 and, when combined with a quality router, makes for a professional-grade, shaper-like setup for the home shop.

Best of all though, every component in this system can be purchased individually. So even if you have a good router table already, you can pick and choose from Bench Dog's accessories to make it even better.

Bench Dog router tables and woodworking accessories are sold at several woodworking suppliers, which you can locate by visiting www.BenchDog.com or by calling 1-800-786-8902.

Craftsman Lathe & Duplicator

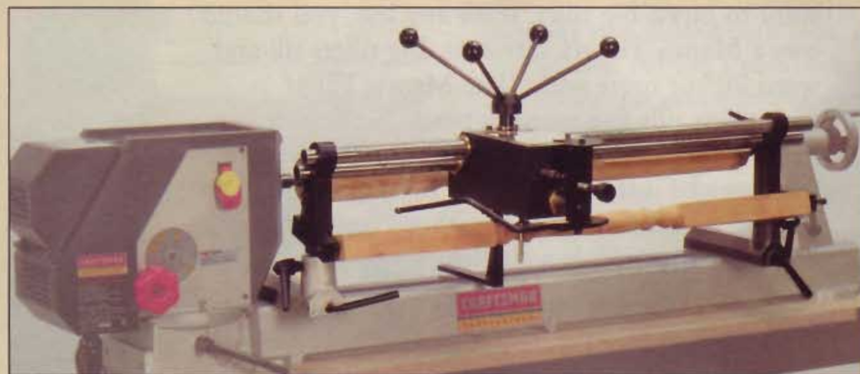
Craftsman took a real "turn for turning" this year, introducing four new lathe products. The two shown here are the Professional 15" Variable-Speed Wood Lathe and the Copy Crafter lathe duplicator.

The lathe features a cast-iron head stock, a 2-hp induction motor, and variable-speed control from 400 to 2,000 rpm. Capacities for the lathe are: 15" inboard bowl turning, 20" outboard bowl turning, and 38" between centers, .

The Copy Crafter is available for both the 15" or the new 12" Craftsman lathes. It can trace templates or original spindles for turning between centers and can even be positioned over the bed to duplicate bowls or cups.

The 15" lathe is $450, the Copy Crafter sells for $160. Both are available in Sears stores or online at www.Craftsman.com.

▲ **Craftsman's new 15" wood lathe boasts a 2-hp motor, 20" of outboard capacity, and 38" between centers for turning spindles.**



▲ **Adding a 15" Copy Crafter to Craftsman's 15" variable-speed lathe makes it a snap to turn duplicates from an original piece or from a template. The Copy Crafter will duplicate spindles up to 38"-long and bowls up to 4" in diameter.**

Black & Decker Retro Drill

More than just pretty packaging, Black & Decker's 85th Anniversary drill includes several features that make this drill as practical as it is nostalgic.

The drill features a two-position gear box for switching between high-torque and high-speed, a 24-position clutch, $^3/_8$" keyless chuck, a battery level indicator, and an electronic level.

The RD1440K is available at home centers and hardware stores for under $100. It includes a carrying case, three-hour charger, and a single 1.2-amp hour ni-cad battery.

► With its polished aluminum housing, Black & Decker's 85th Anniversary cordless drill has a retro look, but features the best of modern technology.

Delta's Spindle Sander

There are some sanding jobs where only a spindle sander will do. Unfortunately, spindle sanders tend to be quite expensive and not high on the priority list of most home woodworkers.

Recently, however, Delta introduced a new benchtop spindle sander that's more in line with a do-it-yourselfer budget, but doesn't skimp on the quality or accessories.

The SA350K is a $^1/_4$-hp spindle sander that turns at 60 strokes-per-minute and oscillates (moves up and down) $^7/_8$" for rapid stock removal. The sander has a large (18"-dia.) table and a built-in dust collection fan with dust bag.

Accessories include rubber spindles (1", $1^1/_2$", 2", and 3") and matching drum plates, abrasive sleeves, and table inserts.

The entire package sells for under $180 at home centers and hardware stores.

▲ Aggressive sanding and moderate pricing make this spindle sander an attractive choice for home woodworkers.

Pros and Cons of Pipe, Bar, and I-Beam Clamps

Q *Which clamps should I buy to get started in doing cabinet work?*

Cindy Cotterman
Boseman, MT

A The three clamps used most for assembling cabinets — pipe, aluminum bar, and I-beam *(see Photos)* — all work fine. But there are some differences worth noting.

PIPE CLAMP. Pipe clamps are a staple of many shops because they're fairly inexpensive ($10-$15, excluding the pipe). Plus, you can torque them down (when necessary) thanks to large threads and a big handle.

Another advantage of a pipe clamp is you can make different length clamps. Simply unscrew the clamp head and mount it on a different length of pipe (or use pipe couplers to join two short pipes and make a longer one).

One of the biggest drawbacks to pipe clamps is that the adjustable jaw has a tendency to flop out of line with the fixed jaw. Pipe clamps can also be a bit "tippy" when you're gluing up a panel.

ALUMINUM BAR CLAMP. Aluminum bar clamps (available in a variety of sizes) are the lightweights of the group. One advantage is that since the bar is rectangular in shape, the two jaws stay 90° to the bar.

As for cost, aluminum bar clamps are nearly twice as expensive as pipe clamps.

I-BEAM CLAMP. The bar on an I-beam clamp is made out of thick, solid steel just like a steel I-Beam (hence the name). This makes these clamps strong and rigid. The jaws on an I-beam clamp are also a bit larger and beefier than on the other two clamps. Even the handle is bigger, which provides more leverage.

Just remember, this added strength comes with a drawback — increased weight (about 50 percent more than a comparable pipe clamp, three times an aluminum bar clamp).

Surprisingly, an I-beam clamp costs only a few dollars more than an aluminum bar clamp.

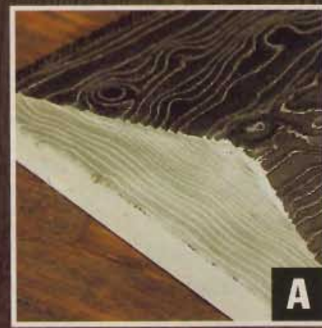
Wood Grain Chisels

"Tools should be heartwarming and communicative ... something you want to keep in your possession forever." Akio Tasai, chiselmaker

It only takes one use to quickly understand why Akio Tasai's handmade chisels are considered among the finest in the world. Tasai, who has been making chisels for more than 50 years, crafts each one by carefully folding a layer of nickel alloy into an iron backing *(Photo A)*. This compound is then forged to a hard steel plate and shaped into a chisel with an unmatched cutting quality and edge-holding ability.

But what really makes Tasai's chisels so intriguing is the "Mokume Shiage" (wood grain finish). This exotic look *(Photo B)* is achieved by burnishing the metals to actually raise their beautiful grain.

Chisel sets ($2,500 for the one shown) come in their own decorative box engraved with Mr. Tasai's "Hanko" or signature stamp *(Photo C)*.



A

B

C

Tasai chisels (singles and sets) are available through Hiraide America at 1-877-MY-BENCH or online at www.japanesetools.com