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#108 July 2004

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Japanese saw review
Greene & Greene table



A READER'S DIGEST PUBLICATION

AMERICAN WOODWORKER®

#108, July 2004

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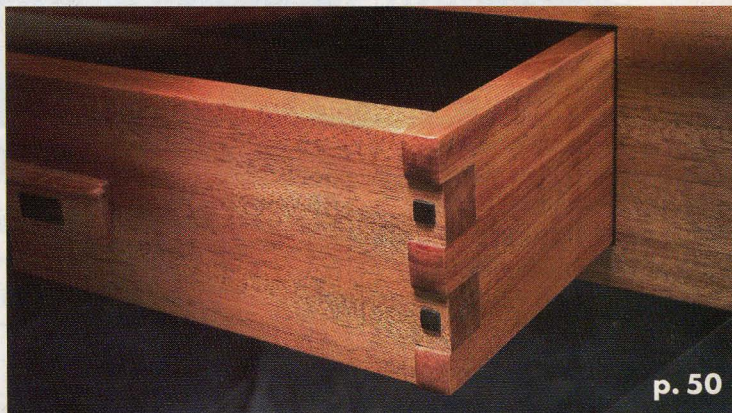
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Phone: (651) 454-9200
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Question & Answer

Slop-Free Miter Gauge

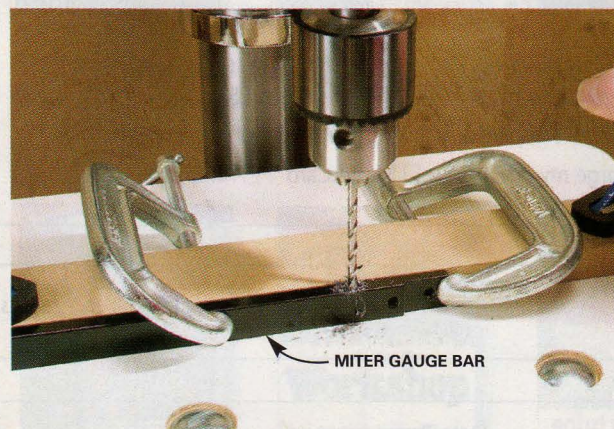
Q. My miter gauge is so loose in its slot that I can't get the precise cuts I want from my saw. Is there a fix?

A. A \$15 kit called the True-Fit Miter Bar System is a fine solution. It's an easy-to-adjust system similar to those used in premium miter gauges costing \$100 or more. The kit uses phenolic plugs, or Cool Blocks, inserted into holes drilled through your miter gauge bar. The plugs are backed by a threaded insert. Turning an Allen screw in the insert adjusts the plug in and out for a perfect fit in your miter slot (see photo, above). The phenolic plugs are self-lubricating and will last many years. To install them, you only need a drill press and a center punch.

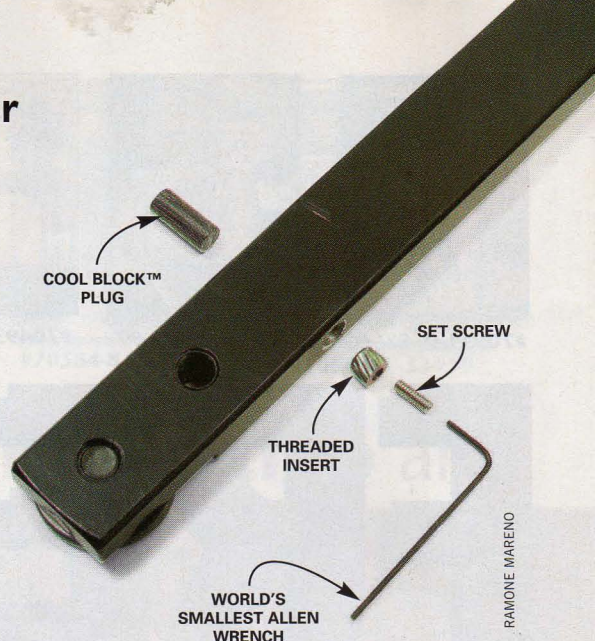
Here are a few installation tips to ensure good results.

1. Mark the hole locations with a center punch. The dimple prevents the bit from skating around when it starts the cut.

2. Firmly clamp the miter bar to a fence when drilling to ensure uniform holes (Photo 1).



1 Clamp the miter gauge bar firmly to a fence for precisely sized holes. Drill four holes through the bar to accept the threaded inserts and rods.



3. Only use a quality, brand-name American-made 3/16-in.-dia. drill bit. Cheap bits tend to drill oversized holes.

4. Press-fit the threaded inserts with a small C-clamp (Photo 2).

You can skip the installation work altogether by sending your bar to Prairie River Woodworking, the makers of the True-Fit System. For \$5 plus shipping, the company's technicians will install the inserts for you. That's a heck of a deal. Of course, you'll have to make do without a miter gauge for a week or two.

Sources

Prairie River Woodworking LLC
(888) 536-1870, www.prairieriverwoodworking.com
True-Fit Miter Bar System, \$15. Factory installation is available for an additional \$5 plus shipping.

Hardware store
Hanson, Blu-Mol or Irwin, 3/16-in. twist bit, \$3 to \$4.



2 Press the tapered side of the threaded insert into the hole with a small C clamp. The insert holds a tiny Allen screw that bears against the phenolic rod. Turning the screw adjusts the phenolic rod in or out for a perfect fit.



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Question & Answer

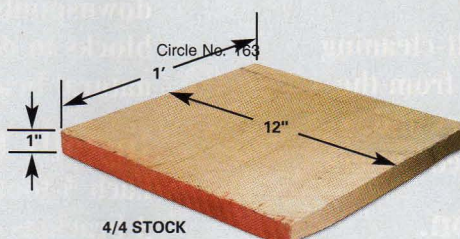
What's a Board Foot?

Q. I'm confused by the term *board foot* and the fractions, 4/4, 5/4, etc. Do I need to multiply the number of board feet by the thickness to get the right amount of wood for a project?

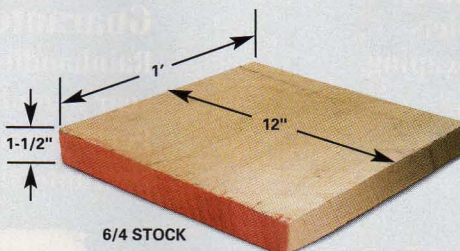
A. There's no need to multiply board feet by the thickness of the wood, because the thickness is already factored in. Here's how it works. A board foot (bd. ft.) is a volume measurement equal to a piece of wood that is 1 inch thick by 12 inches wide by 1 foot long. Mathematically, the formula is Thickness (in inches) x Width (in inches) x Length (in feet) divided by 12 equals the number of board feet in a board. The thickness of roughsawn wood is expressed to the nearest quarter inch as a nonsimplified fraction. In other words, a 1-inch-thick board is four quarters (4/4), while a 1-1/2-in.-thick board is six quarters (6/4), and so on. Thus, a 4/4 board that's 12 in. long and 12 in. wide equals a board foot (1 bd. ft.). A 6/4 board of the same length and width would equal 1-1/2 bd. ft. and an 8/4 would be twice the size at 2 bd. ft.

FORMULA:

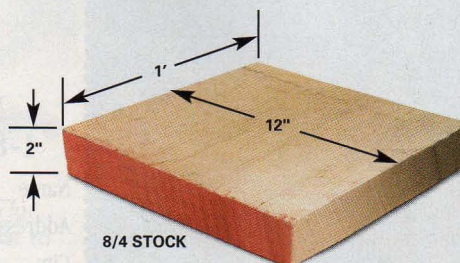
$$\frac{\text{THICKNESS (IN.)} \times \text{WIDTH (IN.)} \times \text{LENGTH (FT.)}}{12} = \# \text{ OF BOARD FEET}$$



$$\frac{1 \times 12 \times 1}{12} = \frac{12}{12} = 1 \text{ BD. FT.}$$



$$\frac{1.5 \times 12 \times 1}{12} = \frac{18}{12} = 1.5 \text{ BD. FT.}$$



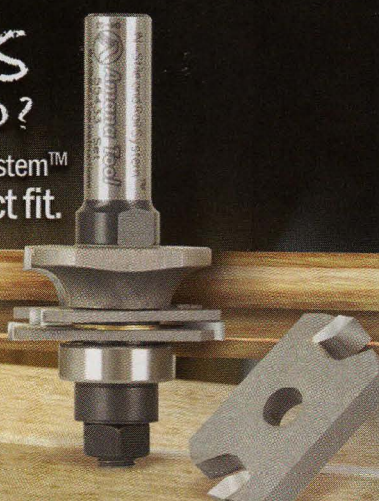
$$\frac{2 \times 12 \times 1}{12} = \frac{24}{12} = 2 \text{ BD. FT.}$$

Recycling Cordless Tool Batteries

Q. How do I properly dispose of my worn-out cordless tool batteries?

LOOSE PANELS GOT YOU RATTLED?

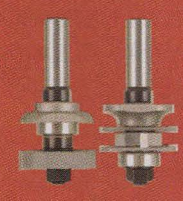
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Circle No. 2



A. We wrote about this question a few years back but it is such an important topic, and with the flood of cordless tools on the market, we feel it's well worth revisiting. Recycling worn-out batteries is hassle-free, thanks to the Rechargeable Battery Recycling Corp. (RBRC). Just go to the Web site, www.rbrc.org, click on "Find a Drop-Off Site Near You," enter your zip code and a list of nearby sites will appear. I tried it and I was amazed; even though I live in a small town, there were three sites a few blocks from my home. Another way to find a drop-off site is to call (800) 822-8837 (1-800-8-BATTERY). These centers will take all your rechargeable batteries, including nickel-cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium-ion (Li-ion) and small sealed lead (Pb) batteries weighing up to 2 lbs. (1kg).

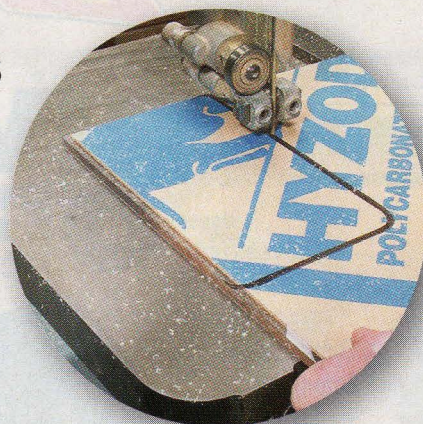
In an effort to increase public awareness, most manufacturers affix RBRC's updated recycle seal onto their battery packs. The new seal gives the RBRC toll-free

number. In addition to battery recycling, the retail drop-off sites will soon accept discarded cellphones. Now I know what to do with my old cellphone collection, too.

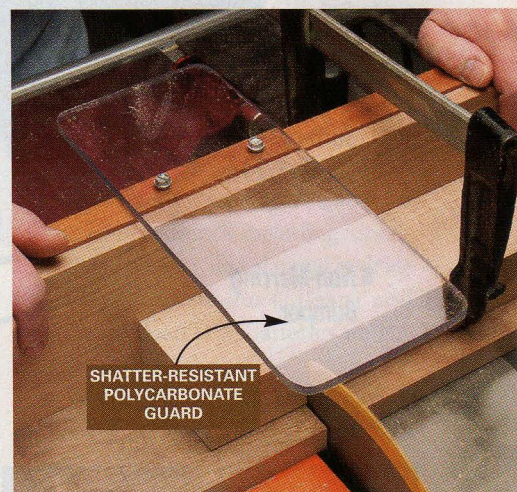


Best Plastic for Shop-Made Guards

Q. I want to make a transparent guard for my tablesaw crosscut sled. My hardware store carries acrylic and polycarbonate plastic. Which should I buy?



A. Polycarbonate plastic is your best choice for shop-made guards. Polycarbonate is more shatter-resistant than acrylic. In fact, it's the stuff most safety glasses are made from. Because it's softer and more flexible than acrylic plastic, polycarbonate is also easier to cut and drill. We recommend using a bandsaw to cut it. Tablesaw blades generate enough heat to melt the plastic and gum up the blade. Be sure to use a hold-down when drilling, because the plastic has a tendency to climb up the bit.

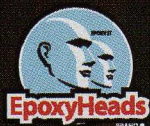


Acrylic has uses in a shop as well. It's a very stiff plastic better suited for things that hold weight, like a router table insert. **AW**

Sources

Industrial Plastic Supply Inc.
(866) 832-9315, www.indplastic.com
Polycarbonate sheet, 0.236-in.-thick
(0.236-in. is considered 1/4-in.),
\$7 for a 12-in. x 12-in. piece.

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Circle No. 10

The Well-Equipped

Big-Featured, Low-Priced Tablesaws

Craftsman started from the ground up when redesigning its 10-in. tablesaws. Sears' designers did their homework on these machines by listening to customers and addressing their tablesaw concerns. The three new models have some great features and sell at prices that won't break the bank.

All three saws look like cabinet saws. In fact, their trunnion system more closely resembles the type found on a cabinet saw than on a contractor or hybrid saw. The trunnions, which hold the saw's arbor, are mounted to the cabinet instead of the bottom of the table. This makes the trunnion system more rigid and greatly simplifies blade-to-table alignment during setup and tune-ups. The new saws are all left-tilt machines. They have 4-in. dust collection hookups and built-in rip fence storage hooks. Mounting and removing the blade cover and splitter is tool-free and thus hassle-free. The blades that come with the saws are good-quality carbide-tipped blades that, unlike many tablesaws, don't need immediate replacement.

Source

Sears
(800) 549-4505
www.craftsman.com



Model 22124, \$950

- 1-3/4-hp 120/240-volt motor.
- 30-in. rip capacity to the right of the blade.
- Cast-iron side tables and folding outfeed table.
- 4-in. miter gauge fence extension.
- Beisemeyer rip fence.



Model 22104, \$530

- 1-1/2-hp 120-volt motor.
- 24-in. rip capacity to the right of the blade.
- Stamped steel side tables.



Model 22114, \$650

- 1-1/2-hp 120/240-volt motor.
- 24-in. rip capacity to the right of the blade.
- Cast-iron side tables.
- 4-in. miter gauge fence extension.
- Adjustable rip fence extension.

By George Vondrisk

ppped Shop

New Tools, Supplies and Materials

Cool New Jigsaws

Hey, the days of Grandpa's noisy old hard-to-steer, blade-poppin' saber saw are over. New jigsaws from Bosch and Metabo are fine examples of today's what-a-pleasure-to-use jigsaws.

The Bosch 1590EVSK and Metabo STE105 Plus share great features, such as tool-free blade changes, variable speed and dust collection. Both machines have blade guides close to the foot, providing great blade support for accurate cuts. Electronic variable speed keeps both machines plowing through even thick stock at a constant speed. Both saws come with zero-clearance inserts that help reduce splintering on the blade's upstroke, no-mar bases to prevent scratching delicate surfaces and blowers to keep the line of cut clear.

The Bosch machine has a 6.4-amp motor, which Bosch says is the most powerful on the market. Setting the foot for angled cuts is tool-free. When the blade release is activated, the blade, or what's left of it, is spit out with gusto. This is handy when blades break off right at the end of the motor shaft. The blower can be turned on if you're not using dust collection or off when you're using a vacuum. The dust hose hookup is an accessory. This saw is available as a top handle; a barrel grip is expected to be ready in September.

The Metabo STE105 Plus saw has a 6-amp motor. An Allen wrench is required for changing the foot angle. Blade changes are tool-free, but you must pull the old blade out of the motor shaft. The dust hose hookup is included. The saw is available with a top handle or barrel grip.



Sources

Bosch
(877) Bosch99, www.boschtools.com
Jigsaw, 1590EVSK, \$170
Dust hose hookup, JA1005, \$20.

Metabo
(800) 638-2264, www.metabousa.com
Jigsaw, STE105 Plus, \$180.



Dry Lubricant for Woodworking Machines

Forget the gym—I've been getting a workout from raising and lowering the blade on my tablesaw. Years of dust and the inherent friction between cast-iron parts made adjustments a real drag. ProGold's PG2000, \$7 for 12 oz., rescued me and my saw, making adjustments silky smooth again.



PG2000 loosens parts that are sticking together and leaves behind a coating that takes the drag out of making machine adjustments. Because it's a dry coating, it won't grab the dust the tool is spitting out. PG2000 is a petroleum-based product that contains no solids, so it can't build up. In other words, there's no such thing as using too much. Use it anyplace metal parts are in contact or where you're arm wrestling parts to make them work together. It works great on the outside of router motors, making it easier to slide the router in and out of the base—a bonus for any router, but especially one in a router table.

PG2000 comes in an aerosol can with a long nozzle so you can get into tight spots. A 12-oz. can holds a lot of spritzes, so one can will last a long time. It's not a tabletop lubricant but is designed just for internal parts.

Source

Woodcraft Supply
(800) 225-1153, www.woodcraft.com
ProGold PG2000, #816335, \$7 for 12 oz.

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RAMR-S model shown with table router/shaper elevator. Uses 14 lb. flywheel to raise and lower.

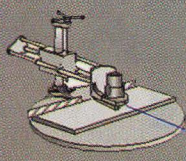


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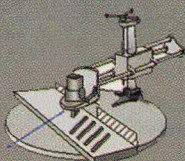
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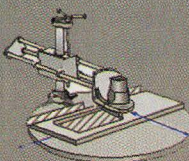
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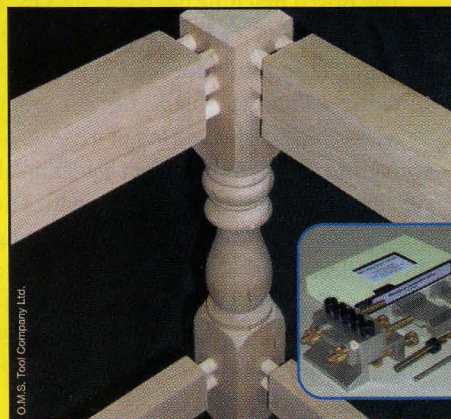
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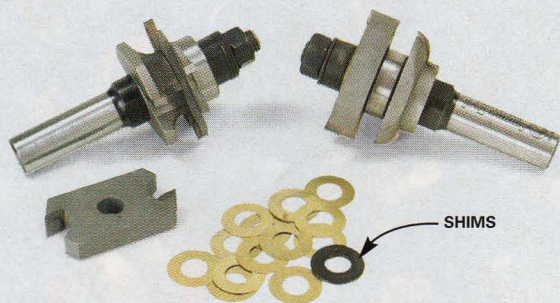
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Adjustable Slot Rail and Stile Set

Have you ever slid a piece of 1/4-in. plywood into a 1/4-in. groove? It ain't pretty. It's a fact of life that plywood is undersized in thickness and this results in ugly gaps in doors with plywood panels. So here's the skinny—skinny bit, that is. With Amana Tools' new In-Stile and Rail System router bit set for \$155, you can match the size of the groove to the exact size of the plywood. This allows easily custom fitting the groove to the panel. The set works for undersized 1/4-in. and 1/2-in. plywood in rail and stile material from 3/4 in. to 1-1/4 in. thick.



Each two-piece matched set works like a stackable dado. It comes with a variety of shims, spacers and cutters that allow making grooves (and the matching tongues) in two size ranges: from 0.197 in. to 0.272 in. (approximately 3/16 in. to 9/32 in.) and 0.433 in. to 0.523 in. (approximately 7/16 in. to 17/32 in.).

It takes test cuts and trial and error to get the bit set up right, depending on your panel material's thickness, but instructions from Amana simplify the process. When you've found the perfect setup, using the bits is no different from using any other matched bit set. Sets are available in three profiles: ogee, bead and concave (pictured). All have 1/2-in. shanks and produce a 3/8-in.-long tongue. The price of each set is slightly higher than prices for matched sets that don't allow customizing the groove size.

Source

Amana Tools
(800) 445-0077, www.amanatool.com
In-Stile and Rail System: ogee, #55436; bead, #55437;
or concave, #55433; \$155.



SK-250TS series

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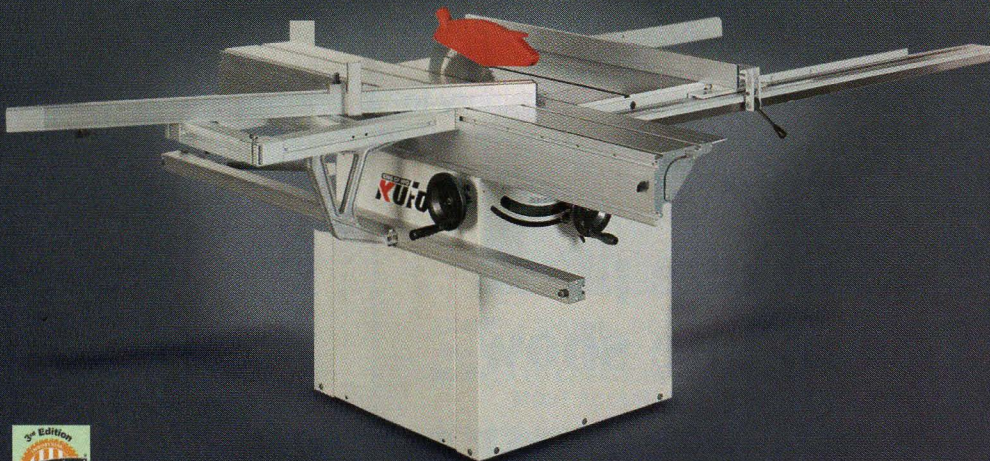
KUFO table saw model SK-250TS-L comes with professional features built-in.



10" tilting arbor blade and 3-1/2" scoring sawblade keep tearout to a minimum.

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Request a free full-line catalog, please call 1888-558-4628, e-mail: kufoseco@kufogroup.com

New Glue for Outdoor Projects

Franklin International has built the better mousetrap and introduced Titebond III. It has a longer open working time and lower working temperature. The open working time is 10 minutes as compared to the 5 minutes of Titebond II. Titebond III can also be used at temperatures down to 47 degrees while Titebond II is only good down to 55 degrees. Titebond III is good news for woodworkers whose shop is on the chilly side.

On the down side, Titebond III has a shelf life of only one year, whereas Titebond II will stay good for up to four years. Titebond III also costs about 25 percent more than Titebond II.

Polyurethane glue is another good glue for outdoor wood projects and has the added benefit of bonding nonwood materials to wood, something Titebond II and III don't offer. Polyurethane has an open working time of 20 minutes, which

is good when you have a complex project to assemble.

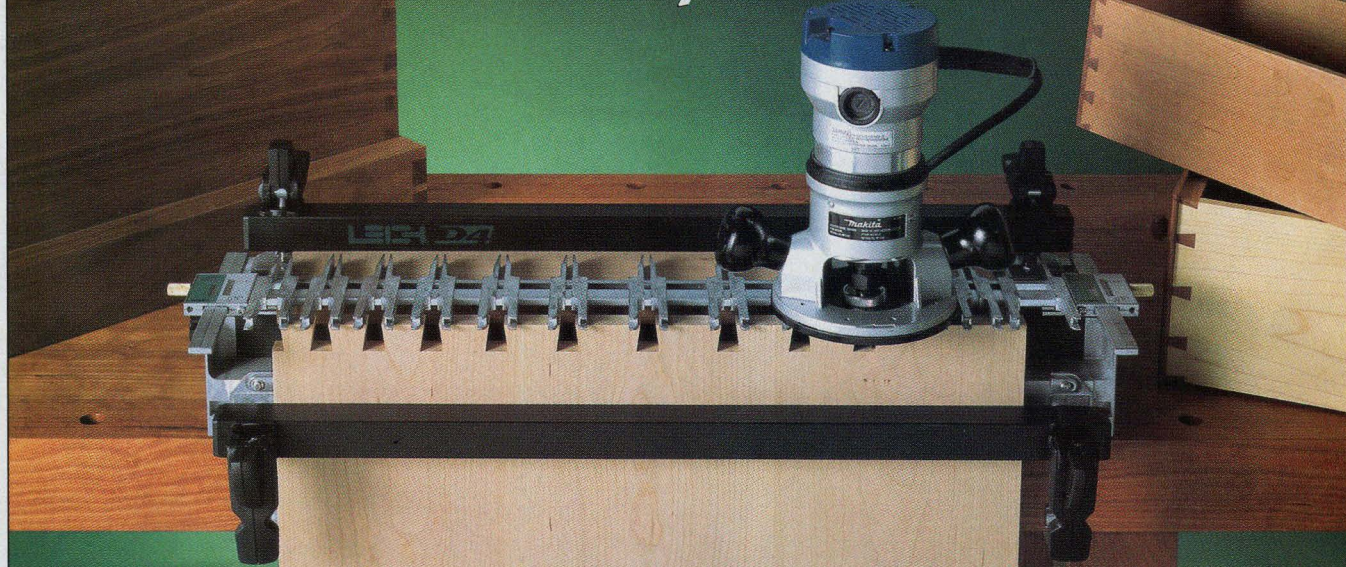
Polyurethane needs moisture present in order to cure, making it a good choice when bonding wood with high moisture content, such as construction lumber that has only been air-dried. Excessive moisture retards the curing of Titebond III.

Squeeze-out from polyurethane glue can be a real bear to clean up and requires the use of mineral spirits. Polyurethane is also about twice the price of Titebond III. **M**

Franklin International
(800) 877-4583
www.titebond.com
Titebond III, \$5 for 8 oz.



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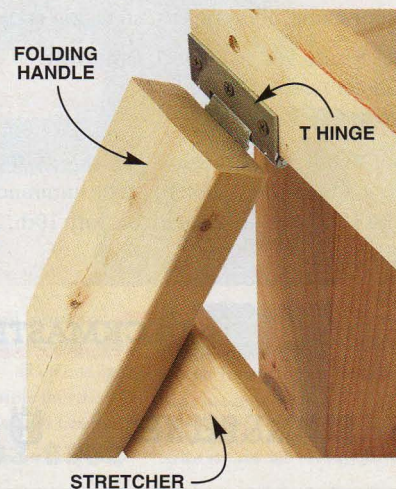
Small Shop Tips

Wheelbarrow Planer Stand

A mobile planer stand isn't new, but the modifications I added to mine just might be. When I lift the handles, the legs lift off the floor for easy moving, just like a wheelbarrow. When I set it down, all the feet sit firmly on the ground and the handles fold down and out of the way. The whole stand with hardware cost me about \$35.

The nonswiveling 3-in. wheels are attached to support boards that extend 6 in. beyond the front legs. I installed the supports so the wheels are about 1/8 in. off the floor when the stand is resting on all four legs. The handles, which taper to 1-1/2 in. at the grip end, are joined to each other with a stretcher and attached to the rear apron with 3-in. T hinges. I attached the strap leaf to the underside of the handle first and attached the other leaf to the rear apron. I installed the hinges this way because the screws hold better in the handles' face grain than in their end grain. The 20-in. x 20-in. top is 2x4s glued together. The rest of the stand is simply glued and screwed together. To prevent the planer from sliding, I bolted it to the stand.

Fred Adams



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2hp Commercial



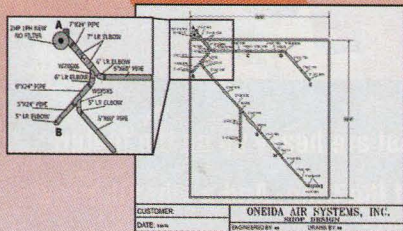
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Small Shop Tips



Router Rack

I like to keep my fix-based routers handy and ready to go with my favorite bits. Of course the bits prevent me from storing the routers standing up. That's why I built this rack with cutouts for the bits. I made it using 3/4-in. MDF. It measures 4 in. tall by 9-1/2 in. deep by 16 in. wide. Each slot measures 2 in. wide by 6 in. deep. I drilled a 2-in. hole at the back of each slot and cut out the rest of the slot on my bandsaw. My router wrenches and extra collets fit nicely under each router.

Al McGregor



Cordless Drill Stand

Even though most cordless drills are designed to stand on their own, they still fall over easily. Mine took one too many dives off the workbench. This drove me to build this stand to give my drill a secure home. It also provides a handy place to keep my most commonly used driver bits.

To make the stand, I glued and screwed

together boards that are 1 in. thick by 6 in. wide. I positioned the holster board (B) at a comfortable grabbing angle of 60 degrees. The holster slot measures 2 in. wide by 3-1/2 in. deep. The angles on the brace (A) are 15 degrees at the top and 45 degrees at the bottom. You may need to adjust the angles and dimensions to match your particular drill.

Arden L. Johnson

Part	L
A Brace	3-3/4"
B Holster	12"
C Support	5"
D Base	10"



by Jock and
Susan Holmen

*this
classic clock
tells time,
but keeps
a secret*

Desktop Clock

THIS CLOCK HOLDS A SECRET, and its construction involves a few secrets as well. The case is made from 1/2-in.-thick mahogany plywood. You won't find this at most lumberyards, but you can make your own by gluing together two layers of 1/4-in. plywood.

Another secret to building this clock is to glue the moldings to the plywood case material first and then miter the parts. It simplifies the building and sure beats mitering all the molding parts individually. Gold painted trim adds sparkle to the finished clock.

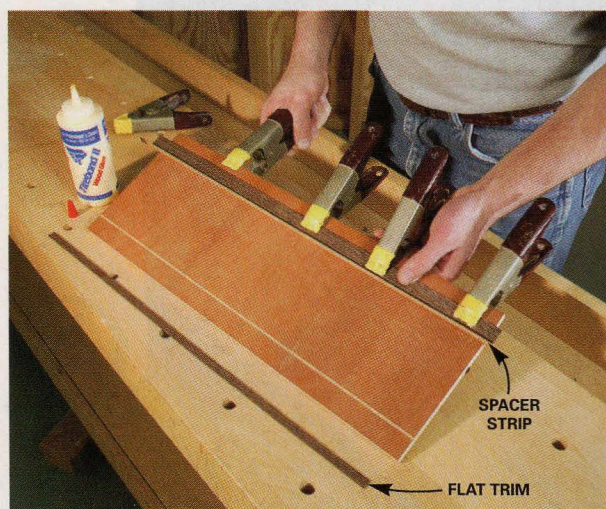




1 Make your own 1/2-in. mahogany plywood for the clock case, because finding it at a lumberyard can be difficult. Use several bricks as clamps and a piece of cardboard to protect the plywood from getting scratched.



2 Cut two 1/8-in. dadoes in the face of the plywood panel. A thin molding that goes all the way around the clock will later be fit into the dadoes. Use a push block for safety and to maintain even pressure while sawing.



3 Glue and clamp the flat trim pieces onto the plywood panel. Put a 1/8-in. x 1/4-in. spacer strip into the dadoes (without glue) and push the flat trim up against it. Remove the spacer strip after you've attached the clamps.



4 Rout the top and bottom moldings with a classic router bit. Use feather boards to hold the molding against the fence and table for the smoothest cut.

Tools and Materials

To build this clock, you'll need a table saw, a planer, a router in a router table and a drill press. You'll also need a couple of special router bits: a classic bit and a 1/8-in. round-over bit. An adjustable circle cutter is used to cut the round clock opening (see Sources, page 37).

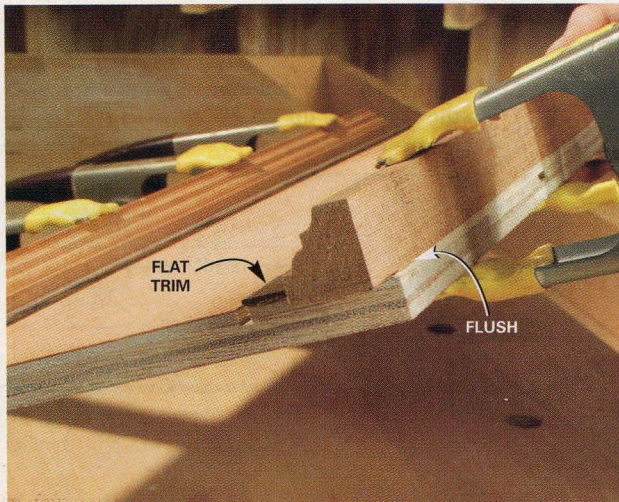
The clock is made from Honduras mahogany plywood and lumber, as

well as wenge (pronounced *Wen-gay* or *wenj*). Wenge is a dark-brown tropical hardwood that nicely complements the mahogany's reddish-brown.

For the clock case, you'll need 1/4-in.-thick mahogany plywood. It doesn't take much, so buy a partial sheet unless you plan to make several clocks. You'll also need a 3/4-in. x 6-in. x 48-in. piece of mahogany lumber and a chunk of wenge. Buy a piece of wenge that's at

least 3 in. wide by 32 in. long. It's more than you actually need, but it's easier and safer to cut the parts from a piece this size, rather than one that's smaller.

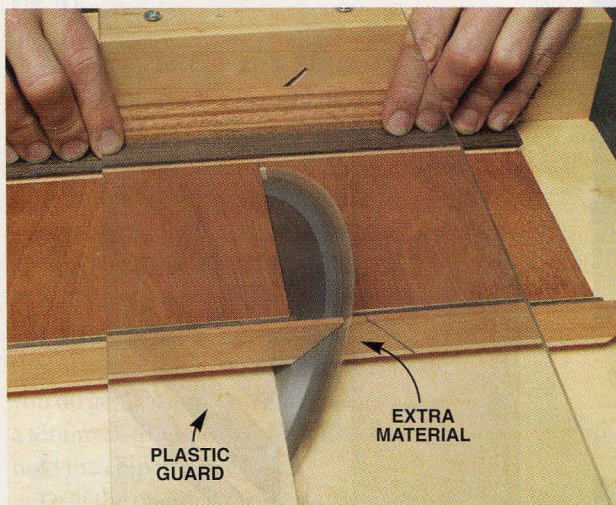
The battery-powered clock mechanism is a one-piece insert, which is simply friction-fit into a hole in the clock front. This makes it easy to change the batteries or the time. The total cost to make this clock is about \$65 (see Sources, page 37).



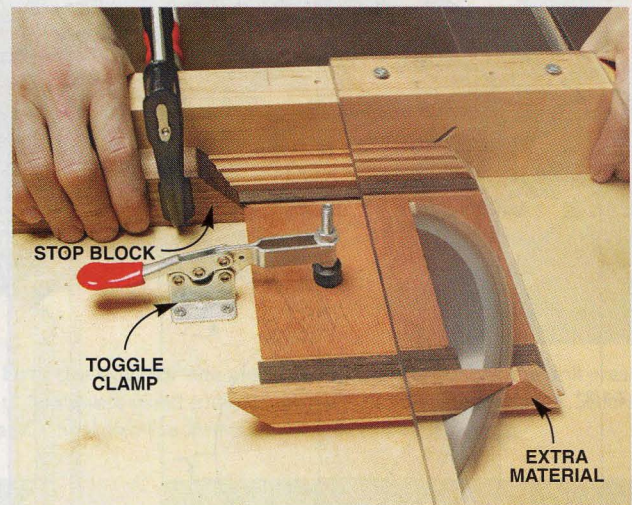
5 Glue and clamp the classic molding tight against the edge of the flat trim. The molding's outer side should be flush with the plywood edge. Trim off any molding or plywood overhang with your tablesaw.



6 Cut two rabbets in the plywood panel for the lid and bottom. Put a temporary wooden fence on your saw so you can push the fence right up to the dado blade.



7 Cut one miter on all four case sides with a shop-made saw sled. Cut the sides a little extra wide at this step. Pushing more slowly than normal helps reduce chip-out on the moldings.



8 Miter the sides to final width. Hold each piece in place with a toggle clamp. This ensures a straight cut and keeps your hands out of harm's way.

Laminate the Plywood First

Cut two 32-in. x 8-in. pieces of 1/4-in. mahogany plywood (Fig. B, page 35). Notice that the grain runs the short dimension on these parts. Glue these together to form the 1/2-in. mahogany plywood needed for the clock case (Photo 1). After the glue has dried, rip the 1/2-in. plywood to 7-1/2 in. wide on the tablesaw. Take about 1/4 in. off both edges so they are straight and parallel.

Next, cut the two 1/8-in. dadoes in the face of the plywood (Photo 2, Fig. A, page 34).

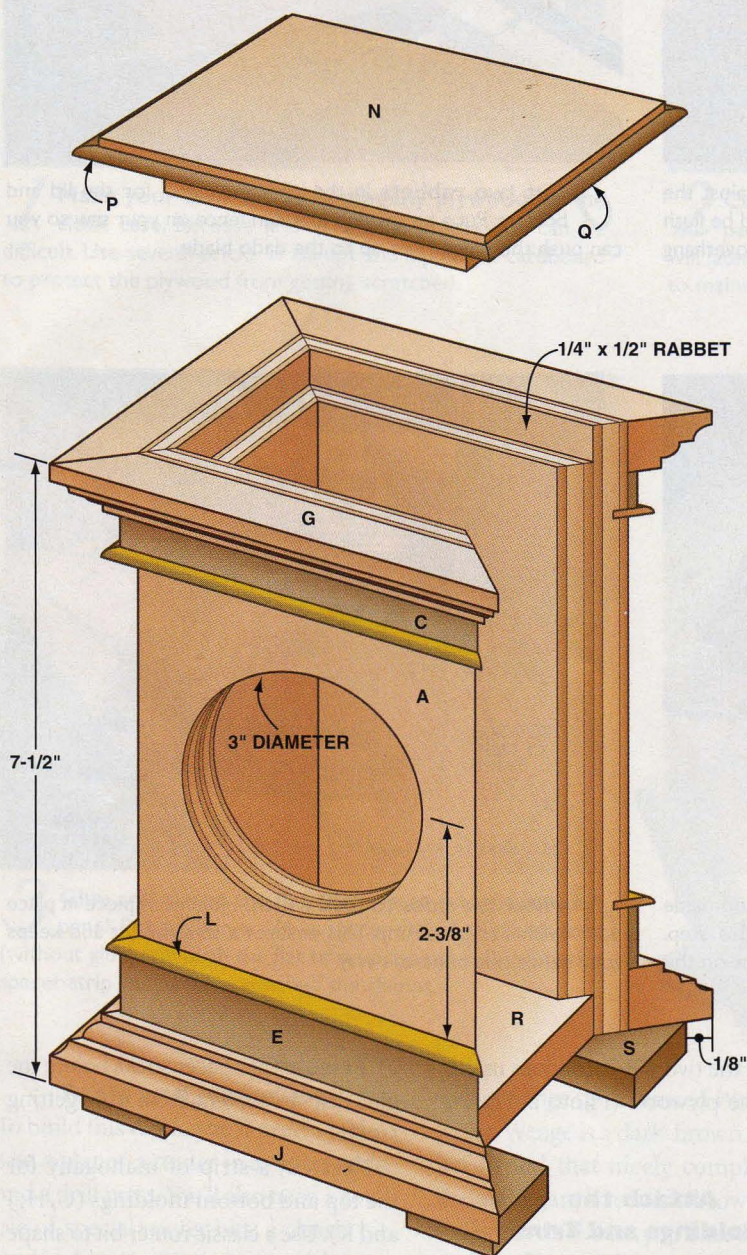
Attach the Moldings and Trim

Make the upper and lower flat trim pieces (C, D, E and F). Place spacer strips in the small dadoes in the panel to provide a stop for the flat trim to push up against, and glue the flat trim to the 1/2-in. plywood panel (Photo

3). Remove the spacer sticks before the glue dries to prevent them from getting stuck.

Next cut a strip of mahogany for the top and bottom moldings (G, H, J and K). Use a classic router bit to shape them (Photo 4). Note that the top molding is 1/8 in. thinner than the bottom molding and they are attached to the plywood so they mirror each other (Fig. A). Glue and clamp them to the plywood (Photo 5). The edge of

Fig. A
Exploded view.



Detail 1
Dimensions for the rabbets
on the bottom of the lid.

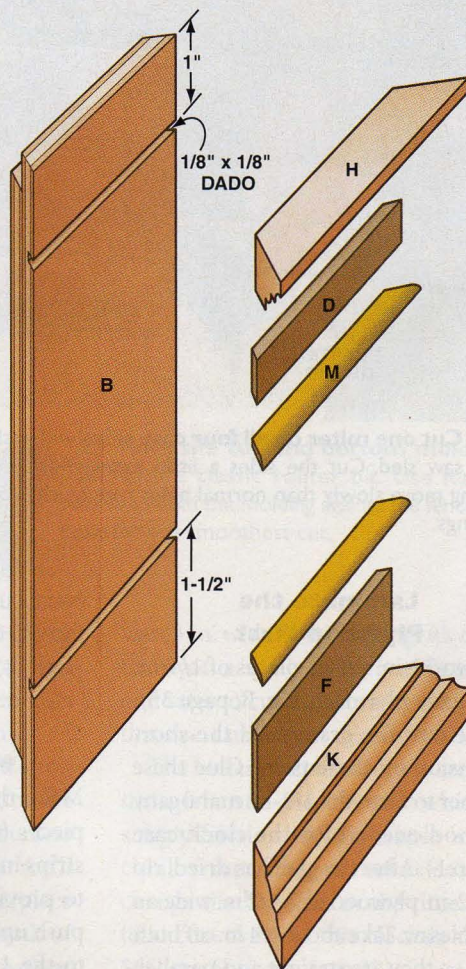
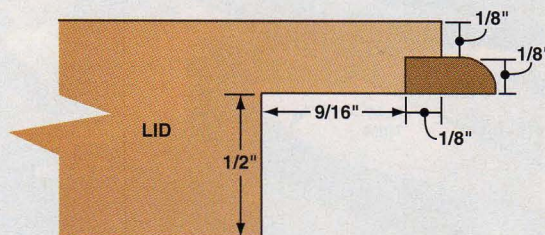


Fig. B

Plywood cutting diagram.

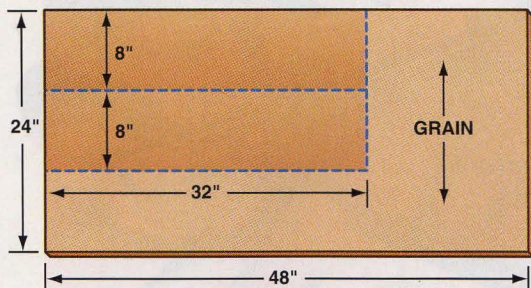
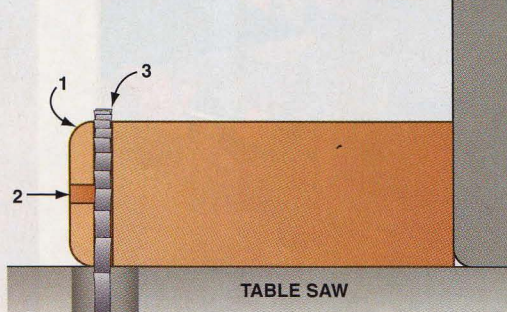


Fig. C

Cutting sequence for the half-bead trim.



1. Rout the corners with a 1/8-in. round-over bit.
2. Saw a 1/4-in.-deep slot down the middle of the edge.
3. Rip the trim off. Position your saw fence as shown so the trim falls away from the blade at the end of the cut.

the molding and the plywood should be flush. If they're not, wait until the glue has dried and trim the parts flush on your tablesaw. Complete the 1/2-in. plywood panel by cutting a rabbet at the top and bottom on the back side (Photo 6, Fig. A).

Miter the Sides

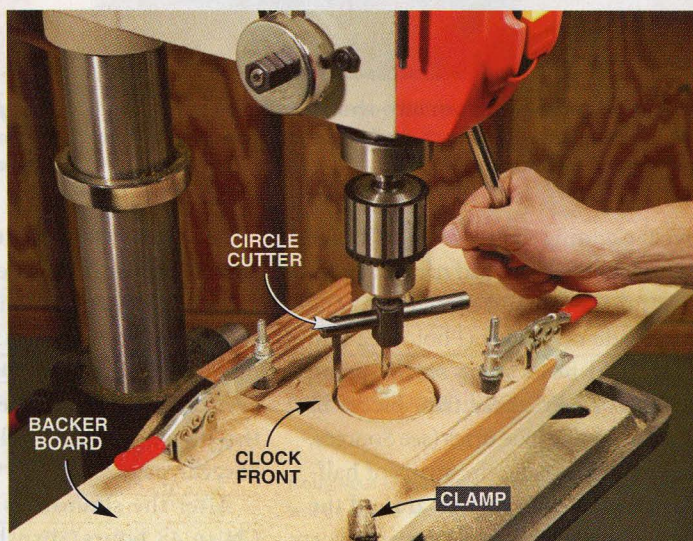
Set your tablesaw blade to 45 degrees and miter some test boards. Then use a tablesaw sled to miter the clock's four sides. Start by cutting the sides about 1/4 in. oversize (Photo 7). It's OK to leave the extra material on one edge. It will be cut off when you cut the parts to final width (Photo 8). Cut slowly to avoid chip-out on the moldings. Wenge is particularly prone to chip-out, but cutting at a slower rate helps avoid that problem. If you do get a chip, save it and glue it back on. Use a toothpick to apply the glue and masking tape to hold the chip in place.

Drill the opening for the clock insert into the clock case front (A, Photo 9). The clock insert is centered vertically on the case front between the two gold half-bead trim pieces (L).

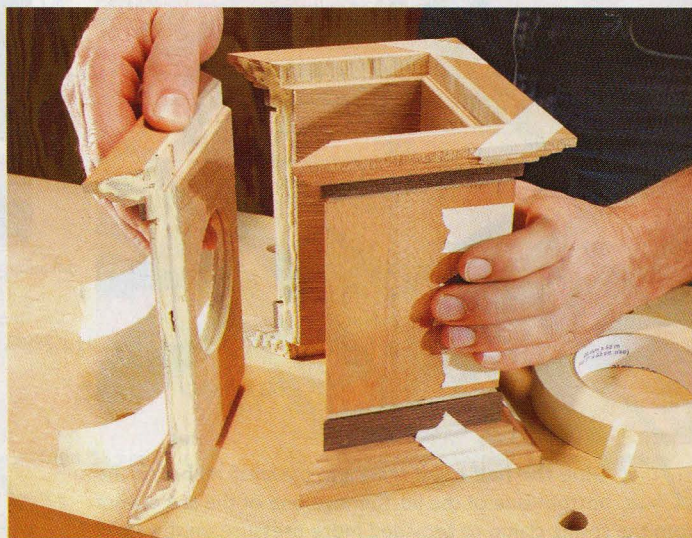
Assemble the Case

Apply glue to two sides first and hold them together with masking tape. Add the other two sides one at a time. Stretch the tape, so it pulls the parts tightly together (Photo 10). Then glue in the bottom and add the four feet (S, Photo 11). Next make the lid (N). Cut the rabbets on the bottom of the lid (Detail 1). Check that the lid fits easily into the rabbet in the top of the clock case.

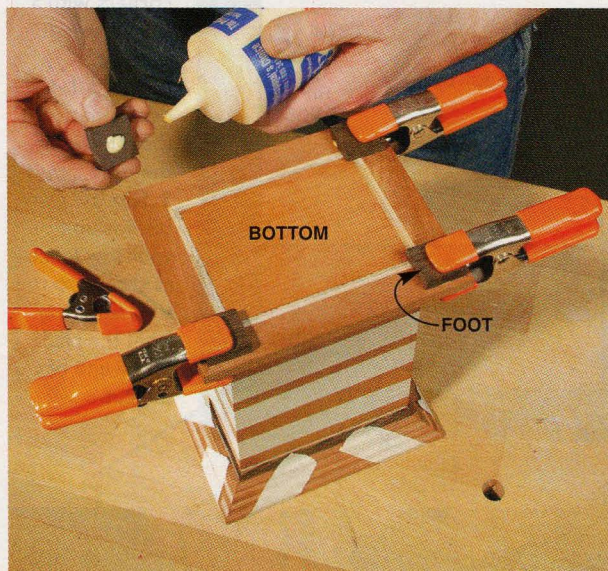
Now make the half-bead trim (L, M, P, Q) that goes around the case and the lid. This trim is very small, but is easy to make using our step-



- 9** Drill the hole for the clock with a circle cutter. Set the drill press to its slowest speed and hold the part with two toggle clamps. Secure the backer board to the drill table with a couple of clamps.



- 10** Assemble the sides with glue and masking tape. Pull the masking tape tight and check that the miters align tightly.



11 Glue the bottom into the rabbet that runs around the sides. Then attach the feet. Set the feet 1/8 in. in from the edge of the molding.



12 Miter the half-bead trim using a small handsaw and mitering jig. The jig is simply two mitered boards glued to a piece of plywood.

by-step cutting sequence (Fig. C, page 35). Miter the half-bead trim that goes around the lid and attach it to the underside of the lid (Photos 12 and 13). You'll need some small spring clamps to hold these trim pieces in place while the glue dries (see Sources, page 37). Set aside the strips of half-bead trim (L, M) that go around the case. They will be used later.

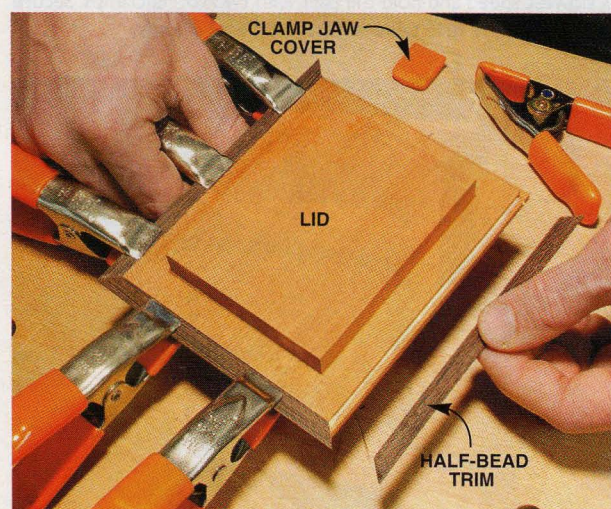
Finishing Touches

Sand the entire clock case and lid with 180-grit paper and stain it (Photo 14). A red mahogany stain gives the mahogany a deep rich tone and helps even out any color difference between the plywood and the lumber (see Sources, page 37).

After the stain dries thoroughly (24 to 48 hours), brush on a satin

polyurethane varnish (see Sources, page 37).

While the stain and finish dry, paint the half-bead trim gold (L, M, Photo 15). Miter it to final length and glue it into the dadoes on the clock case. All that's left now is to install the battery in the clock mechanism, set the time and insert it into the clock case (Photo 16). Oh, yeah, don't forget to add the candy.



13 Glue the half-bead trim into the small rabbet on the bottom side of the lid. Remove one of the jaw covers from the spring clamp to provided more pressure on the small trim. Leave the other jaw cover on to protect the lid's top from getting dented.



14 Stain the clock case to even out any differences in wood color between the solid lumber and plywood parts. When the stain is dry, apply a clear finish.



15 Apply three coats of gold paint to the half-bead trim that goes around the clock case. Sand between coats to remove any roughness. Install the trim after the paint is dry.



16 Install the clock mechanism. It's simply a pressure fit, requiring no fasteners.

Cutting List Overall Dimensions: 8 in. x 6-3/8 in. x 5-3/8 in.

Part Name	Qty	Material	Dimensions			Notes
			T	W	L	
A Front and back	2	Mahogany plywood	1/2"	4-3/4"	7-1/2"	Cut to final widths after attaching moldings C through K (see Photo 8).
B Sides	2	Mahogany plywood	1/2"	3-3/4"	7-1/2"	
C Upper flat trim (front/back)	2	Wenge	1/8"	3/8"	5"	Rough-cut these parts 32 in. long. They will be cut to final length after they are attached to the 1/2-in. plywood that makes up parts A and B (see Photo 8).
D Upper flat trim (sides)	2	Wenge	1/8"	3/8"	4"	
E Lower flat trim (front/back)	2	Wenge	1/8"	3/4"	5"	
F Lower flat trim (sides)	2	Wenge	1/8"	3/4"	4"	
G Top classic molding (front/back)	2	Mahogany	5/8"	3/4"	6-1/4"	
H Top classic molding (sides)	2	Mahogany	5/8"	3/4"	5-1/4"	
J Bottom classic molding (front/back)	2	Mahogany	3/4"	3/4"	6-1/4"	
K Bottom classic molding (sides)	2	Mahogany	3/4"	3/4"	5-1/4"	Paint with gold leaf paint before cutting to final size.
L Gold half-bead trim (front and back)	4	Mahogany	1/8"	5/16"	5-1/8"	
M Gold half-bead trim (sides)	4	Mahogany	1/8"	5/16"	4-1/8"	
N Lid	1	Mahogany	3/4"	4-5/8"	5-5/8"	
P Half-bead trim for lid (front/back)	2	Wenge	1/8"	5/16"	6"	
Q Half-bead trim for lid (sides)	2	Wenge	1/8"	5/16"	5"	
R Bottom	1	Mahogany	1/2"	3-1/4"	4-1/4"	
S Feet	4	Wenge	5/16"	1"	1"	

Sources

Woodworker's Supply
(800) 645-9292, www.woodworker.com
Circle cutter, #829-757, \$18 each
1-in. spring clamps, #125-033, \$2 each.
MLCS
(800) 533-9298,
www.mlcswoodworking.com
1/4-in. classic router bit, #6491,
\$26 each
1/8-in. round-over router bit, #6350
\$11 each.

Rockler Companies, Inc.
(800) 279-4441
www.rockler.com
Clock insert, #23995, \$11 each.
Jo-Ann Stores
(800) 525-4951
www.joann.com
Liquid Leaf Classic Gold, \$5 per 2 oz.
Woodworkers Source
(800) 423-2450
www.woodworkerssource.com
3/4-in.-thick wenge, \$15 per bd. ft.

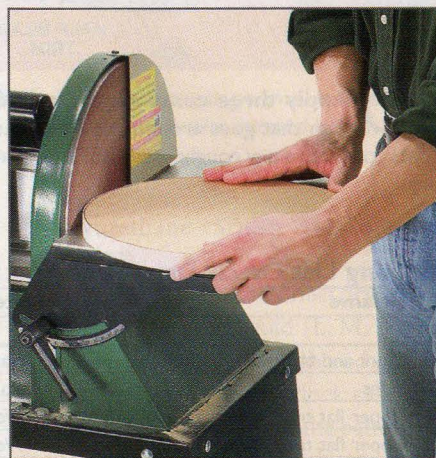
Wood & Shop Inc.
(314) 731-2761, www.woodshop.com
1/4-in. mahogany plywood, 48-in. x 24-in.,
\$20 per piece.
Minwax Co.
(800) 523-9299 (for dealer locations)
www.minwax.com
Satin Polyurethane Varnish, \$12 per quart
Red Mahogany Stain, #225,
\$8 per quart.

AW

TOOL TEST:

Belt-Dis

Hog it down or true it up,



Shape edges.

ART: DIRECTION, PATRICK HUNTER AND EVANGELINE FLEBERG • PHOTOGRAPHY: RAMON MORENO. ALL OTHERS STAFF, UNLESS INDICATED OTHERWISE, AT THE STATION. FRANK K. ROHRBACH

by Tim Johnson

c Sanders

combo sanders shape wood with ease.



Flatten surfaces.



Bevel any angle.

A combination belt-disc sander is similar to a mid-round draft choice on an athletic team. It's not a priority purchase, like a tablesaw or planer, but it's valuable in a woodworking shop as a role player. It's two tools in one. The disc is great for precise edge work, like fitting miter joints and truing outside curves. The belt allows you to flatten faces and edges, shape contours and smooth inside curves.

We tested 18 combination sanders that cost \$500 or less. Some are benchtop models; others come with stands. All these sanders are equipped with 6-in. x 48-in. belts and 9- to 12-in.-dia. discs. These are not industrial-quality machines (see "Consider These Alternatives," page 47), but they're a good fit in small pro or home shops where they won't be used constantly.

The sanders in our test fall into two categories (Figs. A and B, page 40). Machines priced under \$300 have limitations in capacity, power and ease of operation compared with those that cost more. Still, the fact is some of these lightweights deliver good value. We found several likeable sanders in the \$300 to \$500 category, including some real workhorses.

Sanders priced less than \$500 divide into two categories.

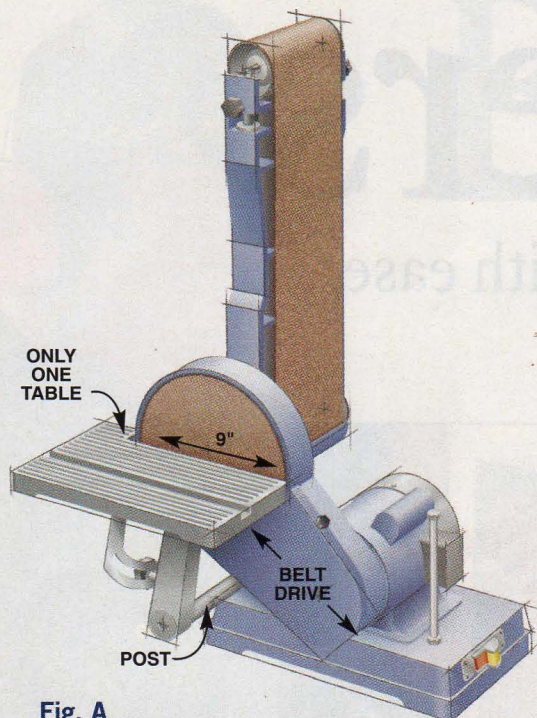


Fig. A

Light-duty sanders cost less than \$300. They are compact (about 20 in. x 30 in.), because they're belt driven. Discs are usually 9 in. dia. Belt arms and platens are either cast iron or stamped steel. Motors are rated at 1 hp or less. Most of these sanders have a single table that serves both disc and belt. This table mounts on a post that locks in holes drilled in the base.

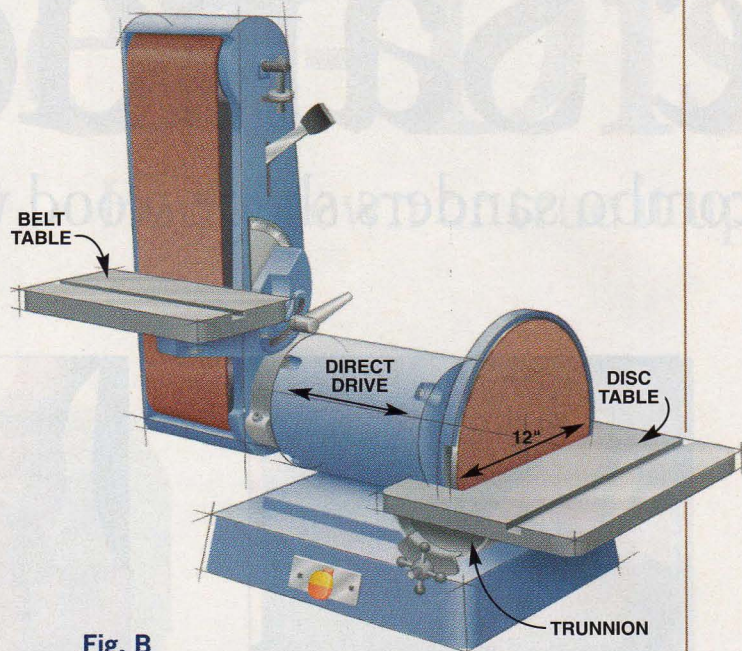
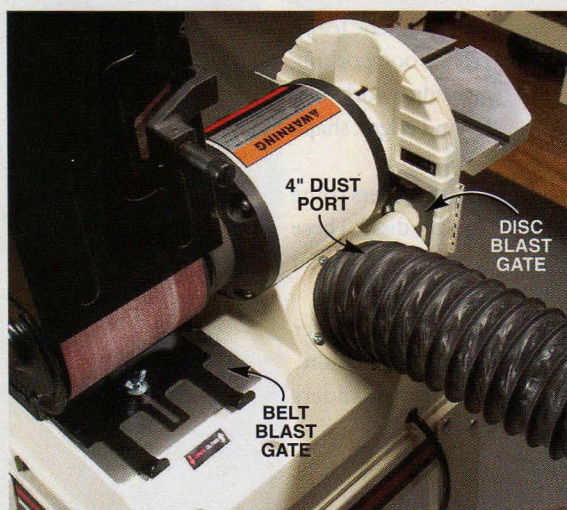


Fig. B

Medium-duty sanders have a wide footprint (about 30 in. x 30 in.) because the motor sits between the belt and disc. These direct-drive machines are usually equipped with more powerful motors, 12-in.-dia. discs and separate tables for the disc and belt. The tables are supported by trunnions or pivot arms. Belt arms and platens are either cast iron or stamped steel.

Features We Like



Effective dust collection is a top priority, because combination sanders spew clouds of fine dust. Blast gates concentrate the suction to the tool being used.

Effective Dust collection

Don't buy a sander that doesn't provide ports for dust collection. Look for large-diameter ports, which restrict airflow the least.

Most sanders we tested have separate ports for the belt and disc. These machines require two separate hoses (and blast gates) or moving a single hose to the disc or belt, depending on the job. Many machines make moving the hose inconvenient, because the two ports are different sizes or awkwardly located.

Sanders with a single dust port for both disc and belt are most convenient to hook up (see photo, left), but unless they have separate blast gates for the disc and belt, they aren't as effective as separate ports.

Sanders with onboard dust collection are only worth considering if you don't have a dust collector or shop vacuum. Onboard collection is definitely better than nothing, but it's not as effective as collection with a separate machine. A dedicated dust collector equipped with a filter bag capable of removing the tiniest dust particles is your best choice. A shop vac with good filtration is an adequate substitute.



Full shrouds protect against accidental contact with the abrasive—and instant regret. A removable top allows you to sand inside curves on the roller.

Protective Shrouds

Combination sanders and your fingers don't mix. Both disc and belt operate simultaneously, even though you only work on one of them at a time. Unintentional contact with the abrasive can be painful. Belt and disc shrouds minimize your exposure (see photo, above left).

The best belt shrouds cover the bottom, back and top of the belt. Many machines leave the top and back uncovered, which is especially dangerous if the belt is positioned vertically. For durability, we prefer metal shrouds. Sanders from Bridgewood and Lobo come with covers that shield the front of the disc when you're working on the belt. Every machine should have them—and similar covers for the belt.

Plenty of Power

The disc or belt shouldn't slow significantly during use. Horsepower and amperage ratings don't tell the whole story, because they don't indicate how effectively the power is transferred. Belts can slip and pulleys can be out of alignment. Both conditions eat power.

In our tests, sanders with direct drive were less likely to slow

Great for coarse shaping, combination sanders are even better for delicately tweaking tough-to-fit joints and assemblies.



Direct-drive systems transmit power efficiently and reduce vibration by eliminating pulleys and belts. Instead, the belt and disc mount directly to the motor's driveshaft.

down than belt-driven models with motors of similar size (see photo, above right). The downside of direct-drive sanders is that the dedicated motor may be both expensive and difficult to replace.

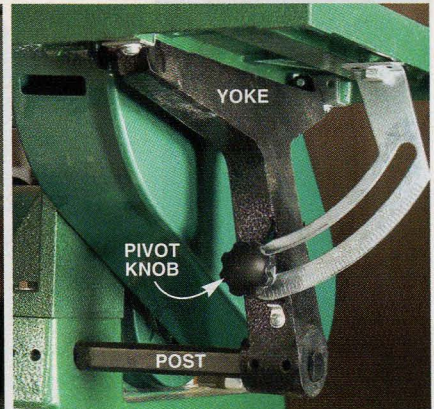
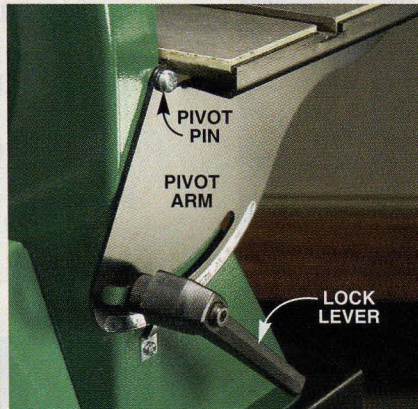
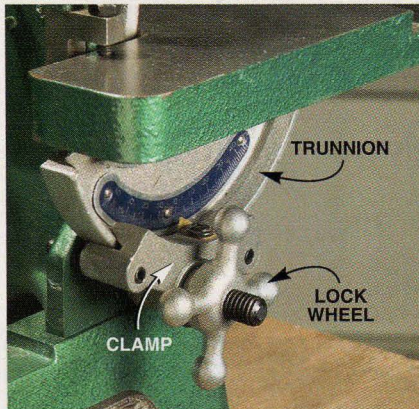
We were able to find "sweet-spot" speeds for both belt and disc sanding on the variable speed sanders, which are belt driven.

User-Friendly Speed

Speed, abrasive choice and feed rate are all related. For safety, and for fast results without clogging the abrasive or burning the wood, we prefer the combination of coarse abrasive (60 grit), slow speed and a light touch. Sanders with variable speed control allow you to dial in exactly the speed you want.

Sanders with 9-in. discs rotating above 3,000 rpm (the case with several light-duty sanders) are scary-fast. Sanding with one of these speed demons requires an experienced operator. All the 12-in. discs rotate at about 1,720 rpm, which we found to be effective and user-friendly. Belt speeds under 1,500 feet-per-minute (fpm) are too darn slow.

Securely locking tables are a must.



We prefer tables mounted on trunnions (left) or pivot arms (center) because they lock securely. Cast trunnions (typically found on industrial sanders) are the traditional choice, but stamped steel pivot arms are just as effective. Long levers are best for locking the table securely. Tables mounted on a single post (right) are much less effective. They can work loose and allow the table to rotate.

Dedicated Tables that Lock Securely

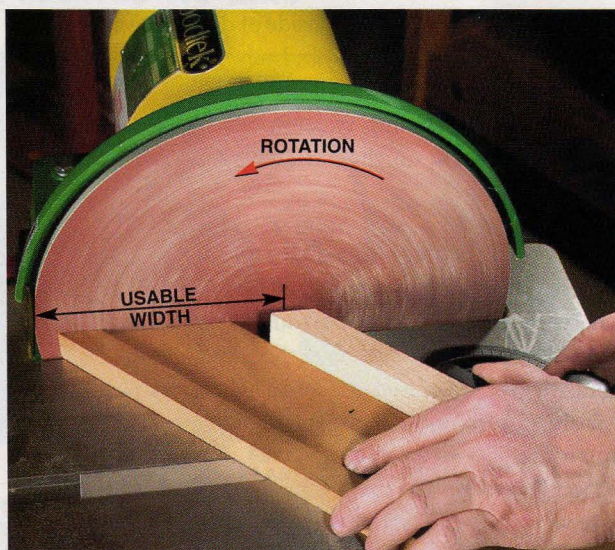
We recommend sanders with separate tables for the disc and belt. Light-duty sanders often have only one table that serves both. These dual-service tables mount on a post, which is only held in place by setscrews. No matter how tightly you reef on the setscrews, typical back-and-forth sanding action can cause the table to work loose.

Most medium-duty sanders have dedicated tables mounted on trunnions or pivot arms (see photos, above). Trunnions are cast iron or aluminum alloy. Stamped steel

pivot arms depend on a perfect fit at the pivot pin. Usually the pin is threaded, so you can tighten it.

Cast Iron Where It Counts

Cast-iron tables are best because they dampen vibration. Large tables provide better support. Most of the sanders we tested come with miter gauges that are merely adequate. Tables with standard-size miter slots make it easy to upgrade to a better-quality miter gauge.



A 12-in.-dia. disc has 6 in. of usable width, because only the portion that rotates toward the table can be used safely. You lose 1-1/2 in. of usable width with a 9-in. disc.

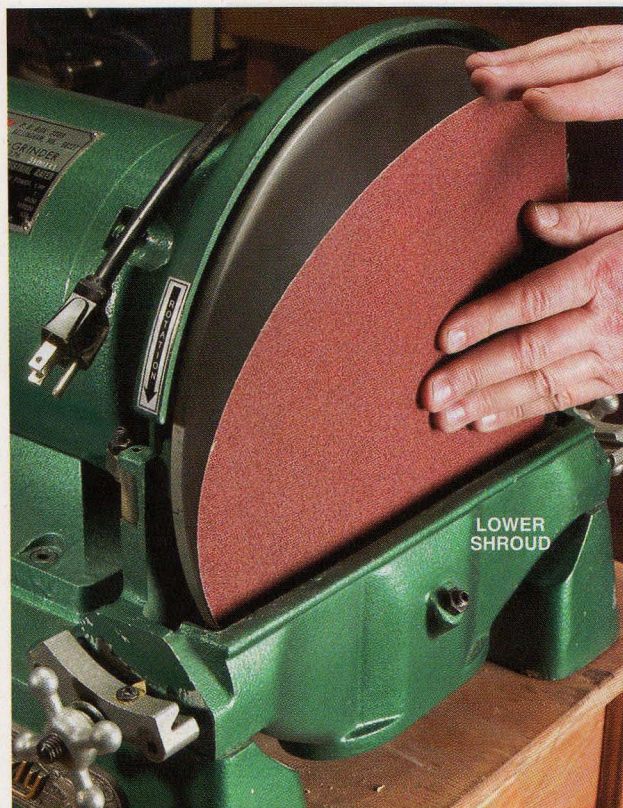
A 12-in. Disc and a Large Drive Shaft

Because of its rotation, you can only use half of the disc safely. Sanding on the half that rotates away from the table is dangerous—be sure to use only the half that rotates down toward the table (see photo, left).

Opting for a bigger disc seems like a no-brainer. A 12-in. disc allows sanding widths up to 6 in., so you can true up miters on pieces as wide as 4 in. A 9-in. disc maxes out at 4-1/2-in. widths and can only handle miters on 3-in.-wide stock.

Almost all of the discs in this test are made of aluminum (industrial sanders have discs made of machined steel or cast iron). While the 9-in. aluminum discs were similar from sander to sander, we found significant variations in the 12-in. discs (see photo, right). The heaviest 12-in. discs weighed 25 percent more than the lightest and had almost twice the wall thickness.

For precision work like truing up miters, the disc must be rigid. Deflection wasn't an issue on the sanders we tested with 9-in. discs, but it was on some sanders with 12-in. discs. We found that the most rigid 12-in. discs were mounted on sanders that had large-diameter drive shafts—at least 3/4 in. (19mm).



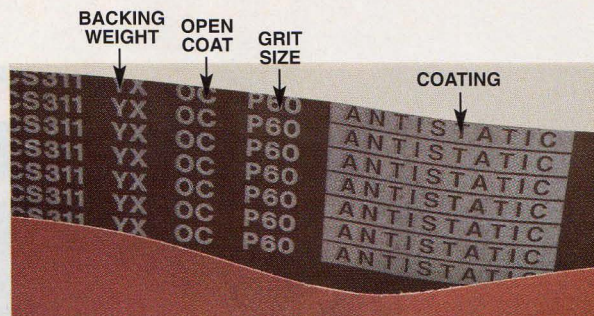
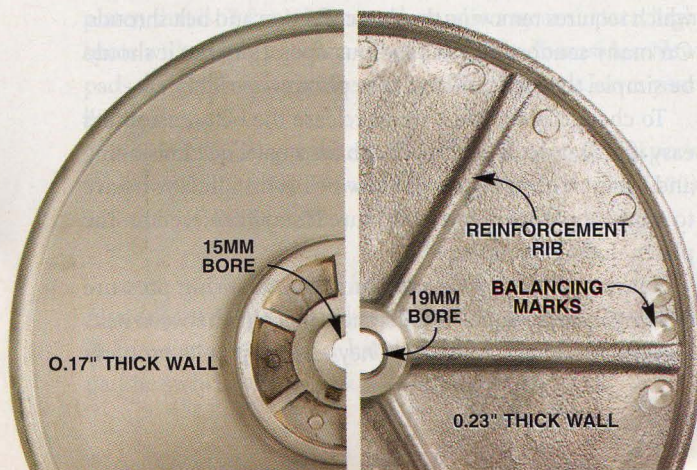
Disc abrasive changes are easiest if the lower shroud gives you room. On many sanders, you have to remove a cover that's screwed to the shroud.

Easy Access for Disc Changes

You probably won't change the disc abrasive as often as you should if you can't get to it. This task always requires removing the disc table, but on the best sanders, that's all you have to do (see photo, above).

Here's a tip: Put away the lacquer thinner. Use a citrus-based adhesive remover to clean the disc before installing the new abrasive (3M's citrus-base adhesive remover is available at www.OfficeMart.com, MMM6040, 5-oz. aerosol, \$5).

All 12-in. discs aren't created equal. Better ones are thicker, reinforced and balanced, and they have a larger bore.



Choosing Abrasive Belts and Discs

Choosing the "right" belts and discs isn't a life or death decision, because they aren't very expensive. Top-quality belts cost less than \$10 and discs less than \$5. Economy abrasives cost about half as much. Here are some guidelines for good sanding service.

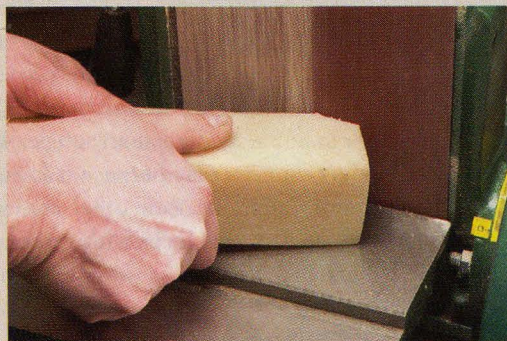
1. A coarse, "open-coat" abrasive (60 to 80 grit) is the best choice for most general-purpose sanding. It cuts aggressively, so you can sand with a light touch, which is easier on the sander and safer for you.

2. Sanding belts with a heavy backing material (X- or Y-weight fabric) stay cooler and hold their shape better during use. Unlike belts, sanding discs are firmly attached to a solid surface, so lighter-weight backings are fine for them.

3. Aluminum oxide or zirconium oxide abrasives are the best choices for sanding wood. Silicon carbide is best for sanding metal.

4. An antistatic coating on the belt or disc removes static charges created by sanding. Did you ever notice how sanding dust sticks to everything? That's because sanded particles are statically charged. Using belts and discs with an antistatic coating can leave you with a cleaner shop: Noncharged sanded particles remain suspended, so they're more easily captured by your dust collector. Don't use antistatic belts or discs without dust collection—the particles will just hang in the air.

5. Keep a belt-cleaning stick at hand and use it often (8-in.-long stick, BS99801, \$8, Klingspor's Woodworking Shop, (800) 228-0000, www.woodworkingshop.com).



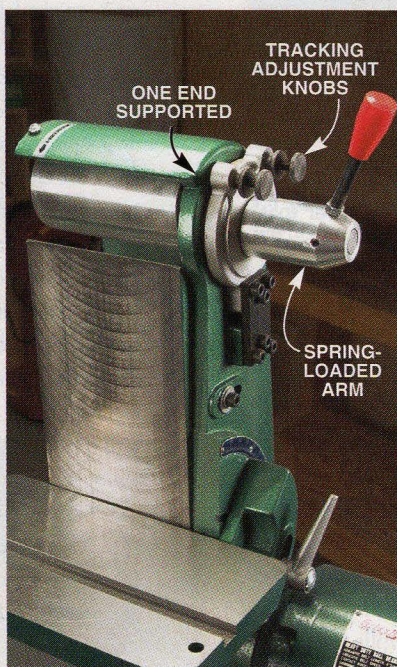
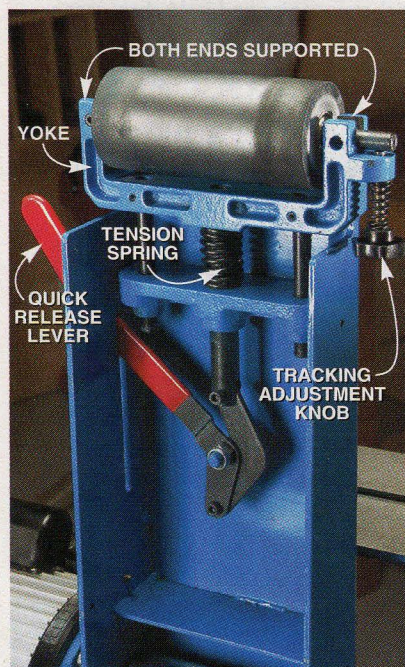
A cleaning stick extends the life of any belt or disc. Used frequently, it's the best abrasive-related investment you can make.



Adjusting the belt arm should be simple. A split collar lock mechanism is best.



Gaining access for belt changes shouldn't be too complex. Some sanders require more than one tool and leave you with numerous loose parts.



Automatic tensioning

makes belt changes easy. We prefer mechanisms with a yoke that supports both ends of the roller and an on-off lever to set and remove the tension (see photo, far left). Belt tracking adjustments are simple because they're made with a single knob.

Side-mounted mechanisms are harder to use, because they're spring-loaded (see photo, left). You have to hold the lever down with one hand while removing or installing the belt with the other. Belt tracking adjustments require two knobs.

Easy Belt Arm Positioning

The belt arm pivots to allow sanding at any angle. A split collar makes position changes easy because it locks at a single point (see photo, top left). Your other choice is a slotted dual-ring mechanism that locks with two or three bolts, which are often hard to reach.

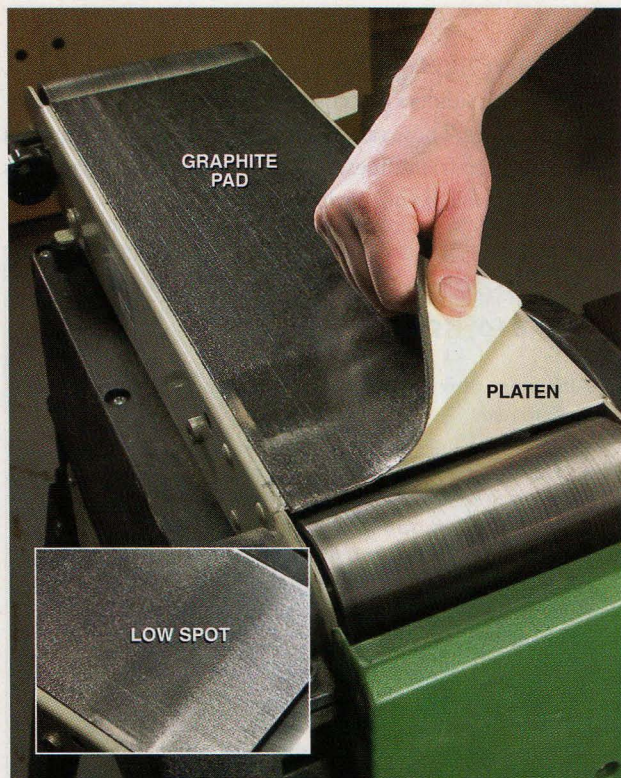
Easy Belt Change and Adjustment

Changing abrasive belts takes multiple steps, and getting hung up on any one of them makes the job a chore, especially if you change belts often. First you have to get to the belt,

which requires removing the dust collection and belt shrouds. On many sanders, this is a tedious operation, but it should be simple, tool-free and fast (see photo, top right).

To change belts, you have to release the belt tension. It's easy if the sander is equipped with automatic belt tensioning and a pain if it isn't. After the new belt is installed, you have to adjust the tracking to make sure it stays centered on the platen during operation.

Automatic tensioning mechanisms use spring pressure to compensate for minute differences in length between belts (see photos, above, bottom). They also keep belts properly



A graphite pad improves sanding by reducing friction. Concentrated sanding can create a low spot (inset photo), but the pad is easy to reposition and inexpensive to replace.

tensioned as they stretch during use. Most of the sanders we tested use one of two types.

Mechanisms designed around a post-mounted yoke are most user-friendly. Contour sanding using the top roller isn't possible with side-mounted mechanisms, because only one end of the roller is supported.

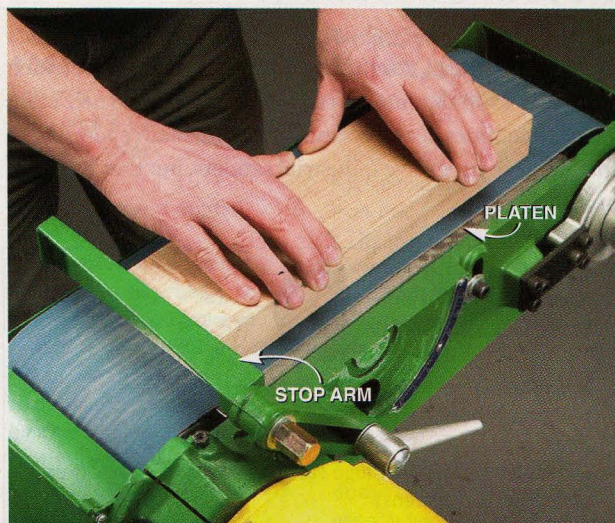
A Graphite Platen Pad

Many sanders have a graphite-covered pad affixed to the platen to reduce friction between the platen and belt (see photo, above). With a pad, the belt slides more easily and requires less power, so it's less likely to slow significantly during use. The belt also stays cooler, so it'll last longer. In addition, the pad dampens vibration and compensates for a platen that isn't flat—because the pad is a wear surface, high spots will simply be worn down. The only downsides: New pads slough bits of graphite and handling the pads leaves your hands dirty.

A 6-in. x 36-in. graphite roll is available from Klingspor's Woodworking Shop, www.woodworkingshop.com, (800) 228-0000, GR03062, \$7.

A Paddle-Style Off Switch

A paddle-style switch makes it easy to shut down the sander in an emergency. If your hands are busy, you can operate a paddle switch with your knee.



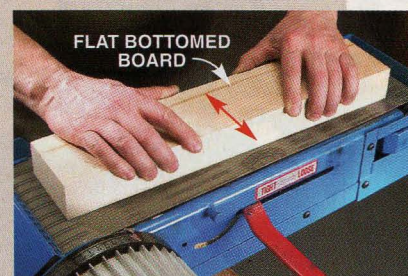
A stop arm makes sanding easier and safer, because it keeps the belt from ripping the workpiece out of your hands. Its location should allow full-length use of the belt platen.

Flatten the Platen

A cast-iron belt platen isn't necessarily better or flatter than one made of stamped steel. The least-expensive machines we tested have cast-iron platens; some of the more expensive machines employ stamped steel. We didn't notice significant differences between them during our test, but we did find an easy way to flatten platens made of both materials.

A perfectly flat platen isn't absolutely necessary, because the belt isn't intended for precision work. However, sanders ran more smoothly and quietly after their platens were flattened, reward enough for the 10 minutes we spent doing the job and the belt that we sacrificed.

First, joint the face of a 3- to 4-in.-wide board that's long enough to bridge the platen's entire length. Disconnect the dust collection hose. Turn a clean used belt inside out and install it abrasive-side down. Start the sander, position the flattening board on the platen and bear down lightly as you move it back and forth. Don't bear down hard enough to stop the belt, or you'll score the rollers. Stop and check the results frequently.



Flatten the platen with an inside-out belt and a flat-bottomed board.

Recommendations

We found several combination sanders priced between \$400 and \$500 that are worthy of your hard-earned cash. These machines feature sanding performance similar to that of more expensive industrial sanders, but they're not as heavily built.

Bridgewood

BW648BD, \$430



In addition to being a top performer, this sander is a great value.

Pros

- The platen is heavy gauge steel (twice as thick as other stamped steel platens).
- The cast-iron belt tensioning mechanism is one of the best.
- The well-made disc threads onto the 1-in. drive shaft and doesn't visibly deflect.
- Both tables lock solidly.
- Dust collection is excellent.
- Belt and disc are both fully shrouded, including front covers for the disc.

Cons

- Access to the disc for abrasive changes is sub-par.
- Adjusting both the belt table and the belt arm requires a wrench.
- The miter gauge is only average.
- Heavy sanding pressure slows the belt slightly.



Woodtek

923-810, \$500



Aluminum-alloy body castings lend an industrial-quality appearance.

Pros

- Its 2-hp motor is powerful.
- Cast-iron tables and belt platen are rock-solid.
- The disc shows no visible deflection during use.
- Access to both belt and disc is easy.
- Adjusting the belt arm is easy.
- The backs of both belt and disc are fully shrouded.
- The miter gauge is above average.
- Dust collection is good. We made it better by replacing the small disc port with a larger shop-made one.

Cons

- The operating mechanics of the belt-tensioning arm and belt-tracking knobs are hard to figure out, and the operator's manual is of little help. Once you understand the system, though, it works well.
- Sanding on the top roller isn't recommended, because the roller is not supported on both ends.
- The disc table is hard to lock, because the adjustment wheels are small and located too close to the trunnions.
- The belt table is easy to adjust, but it's a pain to remove.



Palmgren 81091, \$300



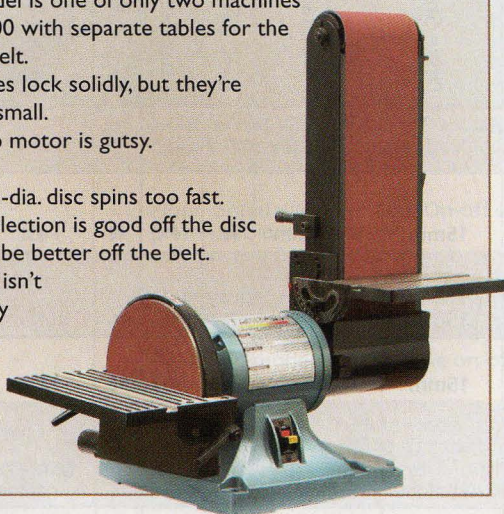
This benchtop model is the most compact direct-drive sander in the test.

Pros

- This model is one of only two machines under \$300 with separate tables for the disc and belt.
- The tables lock solidly, but they're relatively small.
- The 1-hp motor is gutsy.

Cons

- The 9-in.-dia. disc spins too fast.
- Dust collection is good off the disc but could be better off the belt.
- The belt isn't completely shrouded.



Craftsman Sanding Center 21516, \$470 Palmgren Sanding Center 81221, \$500



These unusual machines give you three sanding tools for the price of two. Mechanically, they are identical.

Pros

- The oscillating spindle easily makes these sanders best-in-the-test for shaping concave curves.
- Variable speed control allows you to match sanding speed with the job or your comfort level.
- The dedicated trunnion-mounted cast-iron tables are equipped with long lock levers.
- The 1-1/2-hp motor has good power through normal speed range (though it loses torque above 2,400 rpm/1,900 fpm).

Cons

- These are big, heavy machines; moving one is a two-person job.
- The onboard dust collection doesn't work well enough on the belt.
- The disc deflects slightly.
- The belt wanders a bit.
- The belt isn't completely shrouded.



Worth a Look

Central Machinery 40643, \$290

The only sander priced under \$300 with a 12-in. disc and two cast-iron tables

Pros

- The trunnion-mounted tables lock solidly.
- Dust collection ports are barbaric, but surprisingly effective, once you make your own hose adaptor for the disc.
- A cam-operated quick-release lever sets and releases belt tension.

Cons

- The disc deflects noticeably.
- The belt slows easily.
- Belt tensioning and tracking adjustments require an Allen wrench.
- The miter gauge is a toy.
- Table slots are milled too wide for a standard-size replacement.
- There's no belt shroud.

Grizzly 1014Z, \$220

The best of the rest.

Pros

- It has plenty of power.
- It's equipped with a cast-iron disc.
- The platen/belt arm assembly is cast iron.
- It features adjustable belt tensioning with a quick-release lever.
- Dust collection is very good.

Cons

- The post-mounted table doesn't lock solidly enough, especially on the belt, where the post mounts off to the side, instead of under the sanding action.
- The belt stop limits usable platen length.
- The belt isn't completely shrouded.

Consider These Alternatives

Industrial Belt-Disc Sanders

A \$200 price jump from the most expensive sanders in our test gets you an entry-level industrial sander. The Delta 31-300 (\$700) features a machined steel 12-in. disc, a cast-iron belt arm-platen assembly and huge cast-iron tables mounted on machined steel trunnions. Other features include full shrouding, easy belt and disc changes and adjustments, user-friendly knobs and handles and through-the-base dust collection with a single 4-in. port.



Stand-Alone Disc Sander

Benchtop 12-in. disc sanders feature trunnion-mounted cast-iron tables and dust collection ports. Prices start well under \$200.



Edge Sander

An edge sander turns the belt on its side and features a long table that adjusts vertically, so you can use the belt's entire width. On more expensive machines, the belt oscillates. A second table around the end roller makes it easy to sand concave profiles. Prices start around \$400.



Different Sander Combinations

The Grizzly G0529 (\$395) features a 12-in. disc with an extra-deep cast-iron table mounted on stamped steel pivot arms. The spindle oscillates in a 1-in. vertical stroke, accommodates up to 2-in.-dia. sanding drums and is surrounded by a generous cast-iron table. Power is supplied by a 1-hp, 1,725 rpm, direct-drive motor.



Brand	Street Price	Motor Ratings	Disc/Belt Speeds*	Direct Drive	Drive Shaft Dia.**	Disc Dia./Bore	Easy Disc Access	Dust Collection	Two Cast-Iron Tables	Table Support	Fully Shrouded Belt	Toolless Belt Access
Bridgewood BW648BD EDITOR'S CHOICE	\$430	1-1/2 hp/16A 1,720 rpm	1,720 rpm 2,470 fpm	Y	25mm	12"/19mm	N	EX	Y	Pivot arms	Y	Y
Central Machinery 6852	\$200	1 hp/12.8A 3,450 rpm	1,720 rpm 1,280 fpm	N	15mm	9"/15mm	N	P	N	Post	N	N
Central Machinery 40643	\$290	1 hp/12A 3,450 rpm	1,850 rpm 1,440 fpm	N	15mm	12"/15mm	N	G	Y	Trunnions	N	N
Craftsman 22593	\$230	3/4 hp/11A 3,450 rpm	3,500 rpm 2,700 fpm	N	15mm	9"/15mm	N	F	N	Post	N	N
Craftsman 21516 BEST BUY	\$470	1-1/2 hp/13A 750-3,600 rpm	750-3,600 rpm 585-2,800 fpm	VS	23mm	12"/15mm	N	G	Y	Trunnions	N	N
Delta 31-695	\$270	1 hp/10A 3,450 rpm	2,800 rpm 2,200 fpm	N	17mm	9"/16mm	N	VG	N	Post	N	N
Enco 163-4900	\$190	3/4 hp/13.8A 3,450 rpm	2,700 rpm 2,100 fpm	N	15mm	9"/15mm	Y	P	N	Post	N	N
Grizzly G1014Z	\$220	3/4 hp/10A 3,450 rpm	3,450 rpm 2,300 fpm	N	15mm	9"/15mm	Y	VG	N	Post	N	Y
Grizzly G1276	\$440	1 hp/12A 1,725 rpm	1,725 rpm 2,500 fpm	Y	30mm	12"/19mm	Y	F	Y	Trunnions	Y	N
Jet 708596K	\$400	3/4 hp/10A 1,725 rpm	1,725 rpm 2,258 fpm	Y	25mm	9"/19mm	Y	EX	N	Post	N	Y
Lobo SD-0612	\$480	1-1/2 hp/16A 1,720 rpm	1,720 rpm 2,470 fpm	Y	25mm	12"/19mm	N	EX	N	Pivot arms	Y	Y
Palmgren † 81192	\$250	3/4 hp/11A 3,450 rpm	3,500 rpm 2,700 fpm	N	15mm	9"/15mm	N	F	N	Post	N	N
Palmgren † 81091 BEST BUY	\$300	1 hp/9A 3,450 rpm	3,450 rpm 2,700 fpm	Y	25mm	9"/15mm	N	VG	N	Trunnions	N	N
Palmgren † 81221 BEST BUY	\$500	1-1/2 hp/13A 750-3,600 rpm	750-3,600 rpm 585-2,800 fpm	VS	23mm	12"/15mm	N	G	Y	Trunnions	N	N
Shop Fox W1676	\$395	1 hp/14A 3,450 rpm	2,420 rpm 1,900 fpm	N	17mm	10"/17mm	Y	VG	N	Post	N	N
Shop Fox W1712	\$495	1-1/2 hp/12A 1,720 rpm	1,725 rpm 878 fpm	Y	16mm	12"/14mm	Y	EX	Y	Pivot arms	Y	Y
Woodtek 814-253	\$250	3/4 hp/12A 1,720 rpm	1,720 rpm 2,100 fpm	N	15mm	9"/15mm	Y	F	N	Post	N	Y
Woodtek 923-810 EDITOR'S CHOICE	\$500	2 hp/16A 1,720 rpm	1,720 rpm 2,500 fpm	Y	30mm	12"/19mm	Y	G	Y	Trunnions	Y	Y

*disc rpm at center, fpm = feet per minute **19mm = 3/4" 25.4mm=1" ***allows full-length use of platen
† Palmgren Steel Products has been manufacturing woodworking tools for the last 15 years, but only started marketing them under the Palmgren brand in 2003.

	Auto. Belt Tensioning	Easy Belt Arm Adj.	Useful Stop Arm***	Graphite Pad	Comments	Contact
	Y	N	Y	Y	Floor model w/open stand. Paddle-style on-off switch. Stamped steel platen. Disc shroud has removable covers. Motor has overload protection.	(800) 235-2100 www.wilkemach.com
	N	N	N	N	Floor model w/open stand. On-off switch is awkwardly located. Cast-iron platen. No dust collection.	(800) 423-2567 www.harborfreight.com
	N	N	N	Y	Floor model w/open stand. Cast-iron platen. No dust collection port on disc.	(800) 423-2567 www.harborfreight.com
	Y	Y	N	N	Benchtop model. Paddle-style on-off switch. Stamped steel platen. Onboard dust collection.	(800) 377-7414 www.craftsman.com
	Y	Y	No stop provided	N	Benchtop model. Includes oscillating spindle sander with cast-iron table and 1/2" and 1" sanding drums (drums up to 3"-dia. are available). 5/8" stroke. Variable speed drive. Motor slows under load at speeds above 2,400 rpm/1,850 fpm. Onboard dust collection.	(800) 377-7414 www.craftsman.com
	Y	Y	Y	Y	Floor model w/open stand. Miter gauge is extra-cost accessory. Stamped steel platen.	(800) 438-2486 www.deltawoodworking.com
	N	N	N	N	Floor model/with open stand. On-off switch is awkwardly located. Cast-iron platen. No dust collection.	(800) 873-3626 www.use-enco.com
	N	N	N	Y	Floor model w/open stand. On-off switch is awkwardly located. Cast-iron platen. Cast-iron disc. Belt dust port crimps hose when vertical.	(800) 523-4777 www.grizzly.com
	Y	Y	No stop provided	N	Benchtop model. Push button on-off switches. Cast-iron platen is adjustable. Contour sanding on the end roller isn't possible, because you can't remove the shroud. Trunnion lock wheels are hard to tighten. Good miter gauge.	(800) 523-4777 www.grizzly.com
	Y	Y	No stop provided	Y	Floor model w/open stand. Paddle-style on-off switch. Belt isn't shrouded near blast gate, which could cause injury. Disc table is extra deep. Comes with circle-sanding pin. Good miter gauge. Stamped steel platen. Belt table doesn't lock securely. Available w/enclosed base (model 708597K, \$500).	(800) 274-6848 www.wmhtoolgroup.com
	Y	N	Y	Y	Benchtop model. Paddle-style on-off switch. Stamped steel platen. Disc shroud has removable cover. Motor has overload protection.	(800) 786-5626 www.lobomachine.com
	Y	Y	N	N	Benchtop model. Paddle-style on-off switch. Stamped steel platen. Onboard dust collection. Stand is \$79 option.	(800) 621-6145 www.palmgren.com
	Y	Y	Y	N	Benchtop model; stand is \$79 option. Stamped steel platen.	(800) 621-6145 www.palmgren.com
	Y	Y	No stop provided	N	Benchtop model. Includes oscillating spindle sander with cast-iron table and 1/2" and 1" sanding drums (drums up to 3"-dia. are available). 5/8" stroke. Variable speed drive. Motor slows under load at speeds above 2,400 rpm/1,850 fpm. Onboard dust collection. Stand is \$79 option.	(800) 621-6145 www.palmgren.com
	N	N	N	Y	Floor model w/enclosed base. Paddle-style on-off switch. Cast-iron platen. Cast-iron disc. Good miter gauge.	(800) 840-8420 www.shopfox.biz
	Y	Y	Y	N	Floor model w/enclosed base. Paddle-style on-off switch. Large tables, but lock handles and knobs are too small. Stamped steel platen.	(800) 840-8420 www.shopfox.biz
	N	N	N	N	Floor model w/open stand. On-off switch is awkwardly located. Cast-iron platen.	(800) 645-9292 www.woodworker.com
	Y	Y	Y	N	Floor model w/open stand. Push button on-off switch. Cast-iron platen is adjustable. Contour sanding on the end roller isn't recommended. Trunnion lock wheels are hard to tighten. Good miter gauge.	(800) 645-9292 www.woodworker.com

Greene
& Greene
HALL
TABLE

by Bruce Kieffer



Exquisite detailing turns ordinary into extraordinary.

People just love this wonderful little table with its soft-colored mahogany, ebony accents and finger-jointed drawer. The spectacular detailing is characteristic of furniture designed by Charles and Henry Greene. The Greene brothers were prominent architects and furniture designers in Pasadena, Calif., during the early 20th century. They worked closely with Swedish master woodworkers John and Peter Hall to design one-of-a-kind furniture.

The top's breadboard ends with ebony splines was a favorite Greene & Greene design element. Breadboard ends are short boards fastened to each end of the top. The breadboards keep the top flat and conceal unsightly end grain. The Greenes' unique design allows the solid wood top to expand and contract, even though the breadboard ends are fastened cross-grain. Ebony splines (R) cover the breadboard's tongue-and-groove joints and help conceal the movement of the top (Fig. B, page 55). The ebony plugs (S, T, Fig. A, page 52) serve as covers for screw holes.

Cutting List Overall Dimensions: 48" W x 30" T x 15-1/4" D

	Part	Name	Qty.	Dimensions	Notes
Mahogany	A	Top	1	7/8" x 15" x 44"	Made from three 5-in.-wide boards.
	B	Breadboard ends	2	15/16" x 2-1/2" x 15-1/4"	
	C	Legs	4	1-3/4" x 1-3/4" x 29-1/16"	
	D	Front and back aprons	2	3/4" x 5-5/8" x 41-1/4"	Leave front apron 7/8" x 6" x 42".
	E	Side aprons	2	3/4" x 5-5/8" x 10"	
	F	Drawer front	1	3/4" x 3-3/8" x 26"	Cut 1/8" long and trim to fit after drawer assembly.
	G	Drawer sides	2	1/2" x 3-3/8" x 12-3/8"	Plane to 5/8" thickness to start.
	H	Drawer back	1	1/2" x 2-7/8" x 25-1/2"	
	J	Drawer handle front	1	3/8" x 7/8" x 16"	Cut a 3"-wide piece to start.
	K	Drawer handle back	1	1/2" x 1/2" x 15"	Glue to back of drawer handle.
Poplar	L	Apron cleats	4	3/4" x 1" x 41-1/4"	
	M	Drawer runners/kickers	4	3/4" x 2-1/2" x 9-1/2"	
	N	Drawer guides	2	3/4" x 1" x 11-1/2"	
	P	Drawer stop	1	1/4" x 3/4" x 1-11/16"	
	Q	Drawer bottom	1	1/4" x 11-3/8" x 25-1/2"	Glue up 1/2"-thick stock and plane to size.
Ebony	R	Breadboard end splines	4	3/8" x 5/16" x 4-1/2"	Glue in top spline grooves only.
	S	Breadboard end plugs	2	3/8" x 3/8" x 3-1/2"	
	T	Breadboard end plugs	4	3/8" x 3/8" x 1/2"	
	U	Drawer handle plugs	1	3/8" x 3/16" x 3-1/2"	
	V	Drawer handle plugs	2	3/8" x 3/16" x 3/4"	
	X	Leg/drawer front plugs	28	1/4" x 1/4" x 1/4"	

Sources

Groff & Groff Lumber Inc. (800) 342-0001 www.groffslumber.com Two 7-in. x 12-ft. 5/4 mahogany, \$50 ea. One 7-in. x 6-ft. 5/4 mahogany, \$25 6-in. x 6-ft. 8/4 rift-sawn mahogany, \$35 Two 6-in. x 8-ft. 4/4 poplar, \$10 ea. 1/2 bd. ft. 4/4 ebony, \$30 ea.	www.boltdepot.com Six #6 x 2-1/2-in. round-head wood screws, #7384, \$1 total. MLCS (800) 533-9298 www.mlcswoodworking.com 1/4-in. x 1/2-in.-deep, 1/4-in. shank (1/2-in. shank also avail- able), 3-wing slot cutter assem- bly with arbor and bearing, #5348, \$16 5/32-in. 3-wing slot cutter,	#306, \$12 1/2-in.-deep, 1/2-in. shank rab- beting bit, #7693, \$17 3/8-in.-dia. x 1-in., 1/4-in. shank (1/2-in. shank also available), straight bit, #5472, \$7 1/4-in.-dia. x 3/4-in., 1/4-in. shank (1/2-in. shank also available), straight bit, #5470, \$7 1/2-in.-dia. x 1-in., 1/4-in. shank, pattern/flush trim bit, top bear- ing, #6506, \$15 1/4-in.-radius, 1/4-in. shank (1/2-	in. shank also available), round- over bit, #6352 \$13 1/8-in.-radius, 1/4-in. shank (1/2- in. shank also available), round- over bit, #6350, \$11. Woodcraft Supply (800) 535-4482 www.woodcraft.com 3/8-in. mortising machine chisel and bit set, #143998, \$11 1/4-in. mortising machine chisel and bit set, #143996, \$10.
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Materials and Machines

The drawer is a real eye-catcher. It features protruding, unequally spaced finger joints and a gently curved drawer handle. The "cloud lifts" on the aprons are another well-known Greene & Greene design element. Without the details, this table just wouldn't be the same.

Building the drawer is not as difficult as you might think. We devised a simple system using spacers to position the cuts. You'll see how easy it is after you've made a few test finger joints.

Don't let all the decorative plugs scare you, either. A couple of inexpensive mortising machine chisels take the tedium out of making square holes and guarantee perfect results.

This project requires you to work with precision. At the same time, the techniques we've developed will minimize the headaches. Be sure to make plenty of extra pieces to test your router and saw setups before machining the final pieces.

We ordered two 12-ft.-long pieces of 5/4 mahogany and asked that the boards come sequentially from the same tree.

We cut each 12-ft.-long board into three 47-in. boards. The resulting six boards, from which we'll choose our top, share similar grain and color. The remaining boards will be used for the aprons. The wood will cost you about \$250.

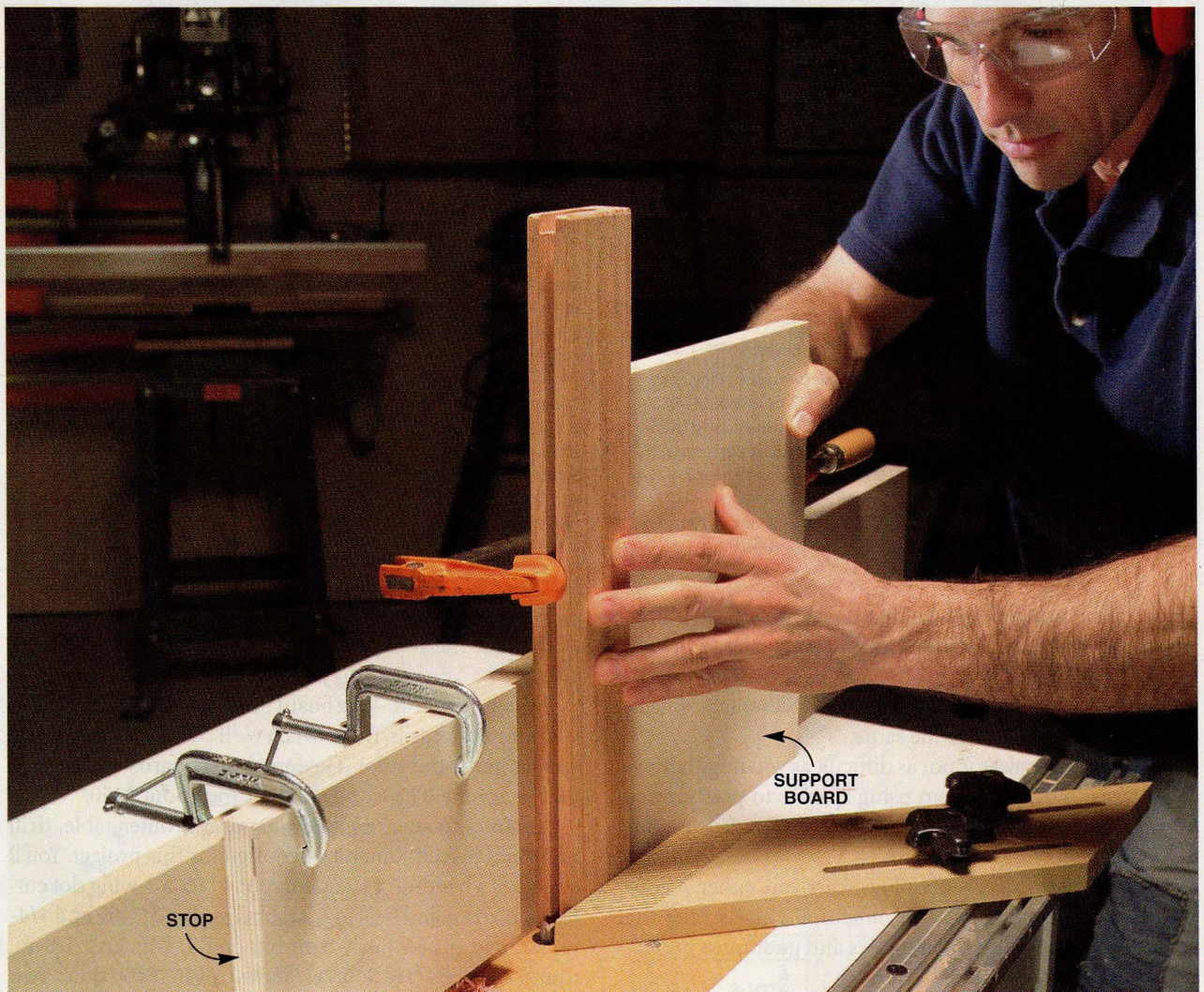
A jointer, planer, tablesaw, bandsaw, router table, drill press and biscuit joiner are required for this project. You'll also need a handful of standard router bits: a 3-wing slot cutter with arbor and bearing, a rabbeting bit, 3/8-in. and 1/4-in. straight bits, a flush-trim bit, and 1/4-in. and 1/8-in. round-over bits (see Sources, above). Even if you don't own a mortising machine, you'll want a pair of 3/8-in. and 1/4-in. mortising chisels to square all the holes and slots for the ebony plugs. They're much faster and more accurate than using a regular chisel. OK, enough talk; let's cut some wood.



1 Choose your best boards for the top. Look for boards with similar grain and color. With luck, the joints will be almost invisible on the finished top.



2 Rout a tongue groove on the breadboard ends using a slot cutter. These boards help the top stay flat. Featherboards make routing safer and more accurate.



3 Rout stopped grooves for ebony splines in the breadboard ends using a straight cutter. Clamp a stop to your fence to limit the groove's length. Clamp a support board to the breadboard end and push them together for greater stability.

Note: One groove is cut with the top surface against the fence; the other with the underside against the fence. This requires testing and resetting the fence for each pair of grooves.

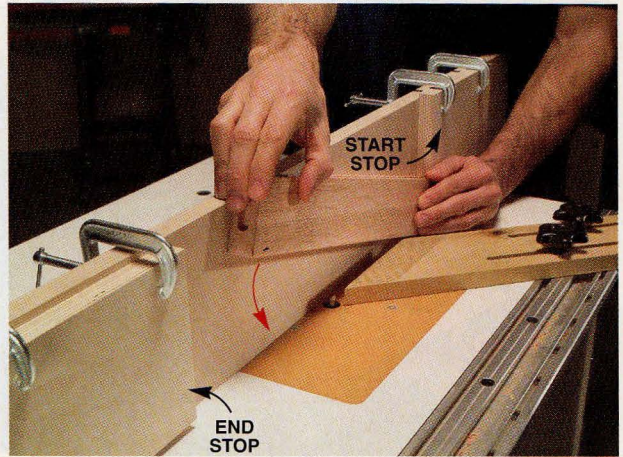
Make the Top

1. Joint and plane the rough stock to 1-in. thick. Choose your best mahogany boards for the top (A) (Photo 1) and rip them to 5 in. wide. Plane these boards to 7/8-in. thickness.
2. Edge glue the top boards one joint at a time to ensure the joints are absolutely flush.
3. Sand the top with 120-grit paper to remove any irregularities. Then cut the top to its final length.
4. Plane some scrap wood to the same thickness as the sanded top for testing router table setups.

The Breadboard Ends

The breadboard ends (B) are thicker than the top. The tongue-and-groove joint is offset so the breadboard end is flush with the top's bottom and stands proud of the upper surface. This offset calls for special care when machining the breadboard ends, because the tongue on the top is centered but the corresponding groove in the breadboard end is not. It's easy to get disoriented and rout a groove or a slot in the wrong place. The same is true with the grooves for the ebony splines and plugs (Fig. B). Be sure to clearly mark the top and bottom of each piece.

5. Cut and plane the breadboard ends to size. Make four scrap wood extras exactly the same size for testing all the routing setups.
6. Rout a radius on the outside edges and outside corners of the breadboard ends with a 1/8-in round-over bit. Ease the top inside edges and inside corners to about a 1/16-in. radius (Fig. B, below).
7. Cut the tongue grooves (Fig. B) on the mahogany breadboard ends (Photo 2) and on your test pieces.
8. Rout the offset 3/8-in.-wide spline grooves (Fig. B) in the breadboard ends (Photo 3).
9. Rout the 3/8-in.-wide plug grooves (Fig. B) on the edge of the breadboard ends (Photo 4).
10. Square the corners of the spline and plug grooves (Photo 5).

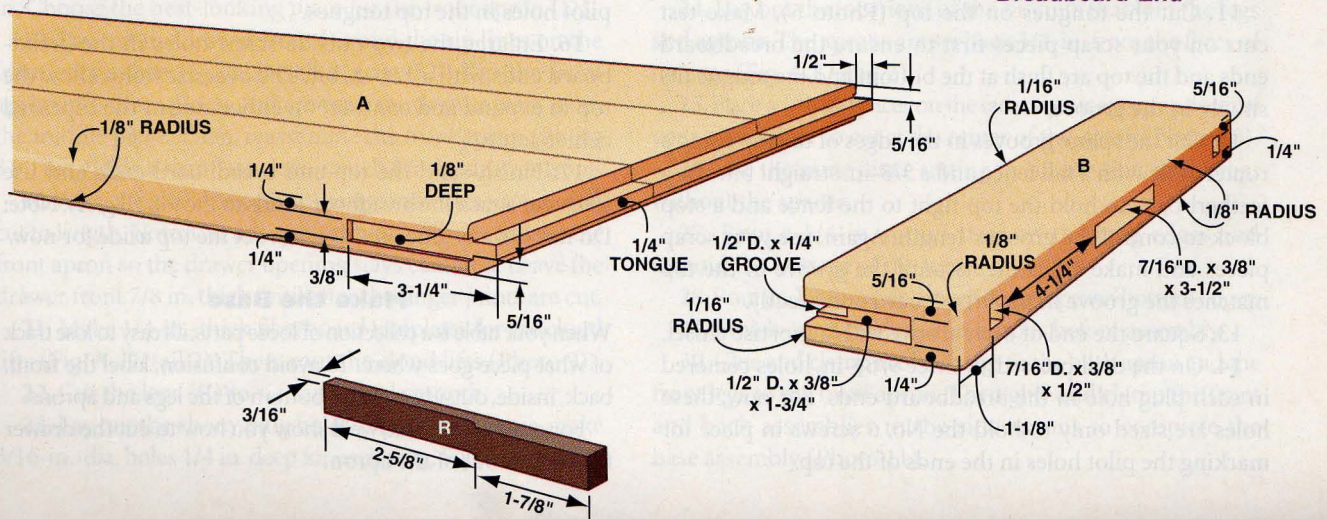


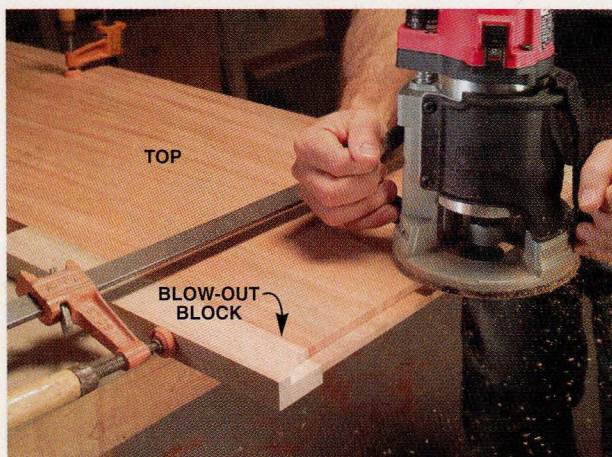
4. Rout plug grooves in the breadboard ends. Stops establish the beginning and end of each groove. Drop the piece onto the bit, slide it forward and then lift it off. Use scrap cut to the same size to fine-tune the setup.



5. Square the ends of the plug grooves with a mortising machine chisel. A wooden mallet prevents damage to the top of the chisel.

Fig. B
Breadboard End





6 Rout tongues on the top with a rabbeting bit. Clamp blocks to both edges to prevent the ends from chipping out. The blocks also prevent the router from accidentally sneaking around a corner and cutting on the front or back edge.



7 Mark the screw holes' location on the top by lightly tapping the screw heads. Make sure the breadboard ends are centered on the top. Remove the breadboard end and drill the pilot holes in the top.

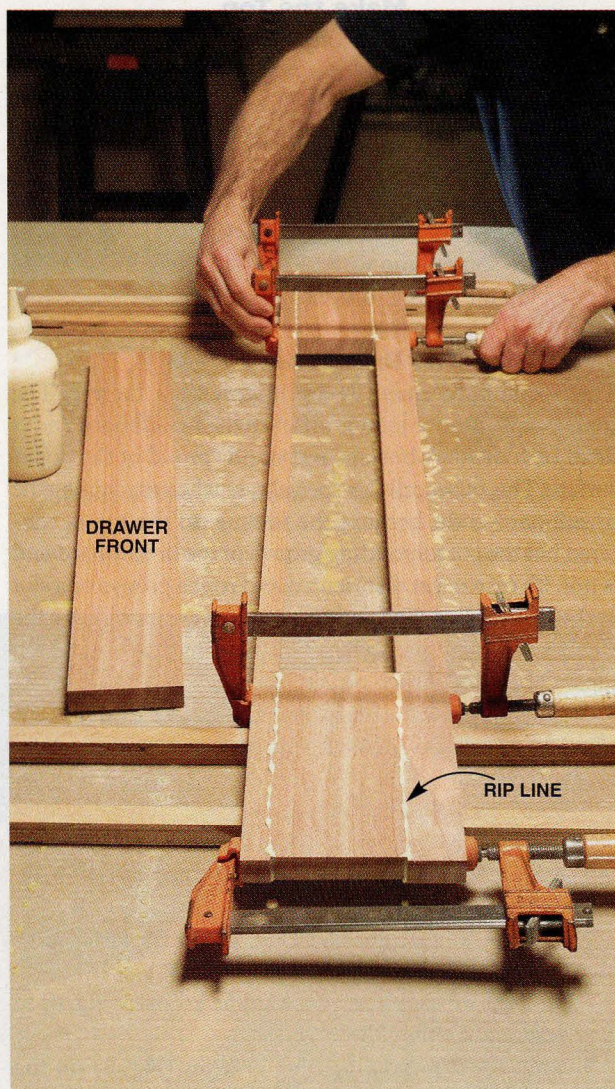
Fit the Breadboard Ends to the Top

11. Cut the tongues on the top (Photo 6). Make test cuts on your scrap pieces first to ensure the breadboard ends and the top are flush at the bottom and the tongue fits snugly in the groove.

12. Cut the spline grooves in the edges of the top using a router table with a tall fence and a 3/8-in. straight bit. Use a featherboard to hold the top tight to the fence and a stop block to control the grooves' length. Again, use your scrap pieces and make adjustments until the groove in the top matches the groove in the breadboard end exactly.

13. Square the end of each groove with a mortise chisel.

14. On the drill press, drill three 9/64-in. holes centered in each plug hole in the breadboard ends. For now, these holes are sized only to hold the No. 6 screws in place for marking the pilot holes in the ends of the top.



8 Glue the front apron back together after it's been ripped and crosscut into five pieces. Because the drawer front is cut out of the apron, it seamlessly blends into the surrounding pieces.

15. Mark the screw locations on the top (Photo 7). Drill pilot holes in the top tongues.

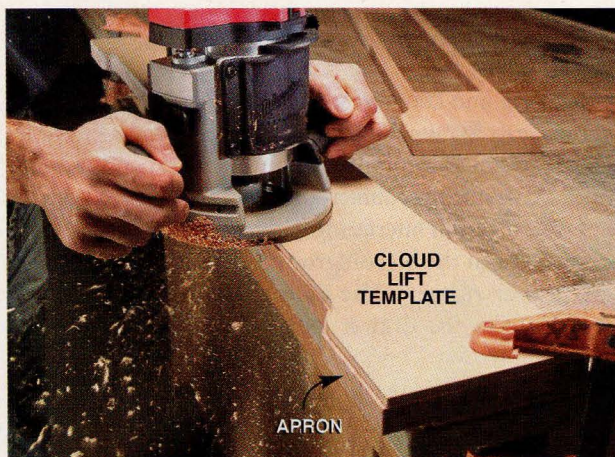
16. Enlarge the two outside screw holes in the breadboard ends with a 1/4-in. bit. The oversize holes allow the top to expand and contract on either side of the captured center screw.

17. Finish-sand the top and breadboard ends and use screws to attach the breadboard ends to the top (Fig. A). **Note:** Do not use any glue on this joint. Set the top aside for now.

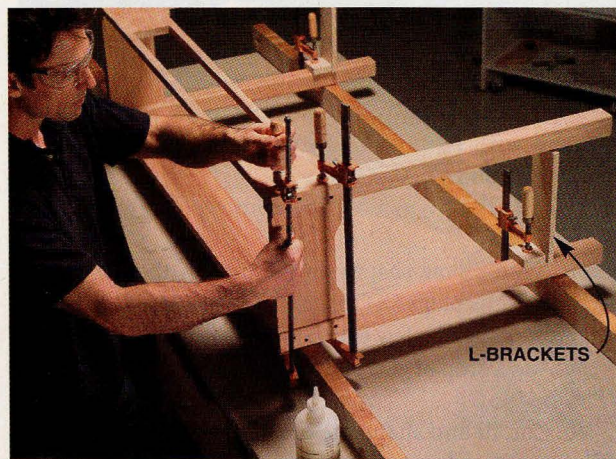
Make the Base

When your table is a collection of loose parts, it's easy to lose track of what piece goes where. To avoid confusion, label the front, back, inside, outside, top and bottom of the legs and aprons.

For a seamless look, we'll show you how to cut the drawer front right out of the apron.



9 Shape the bottom of the aprons with a router, flush-trim bit and template. This creates the Chinese-inspired “cloud lift” curve widely used by the Greene brothers. Most of the waste is removed with a bandsaw prior to routing.



11 Glue and clamp the base together. Two 10-in.-tall L brackets are like having an extra pair of hands to support the front assembly as you apply the clamps.

18. Plane the 1-in. stock left from making the top to 7/8 in. Choose the best-looking piece for the front apron (D).

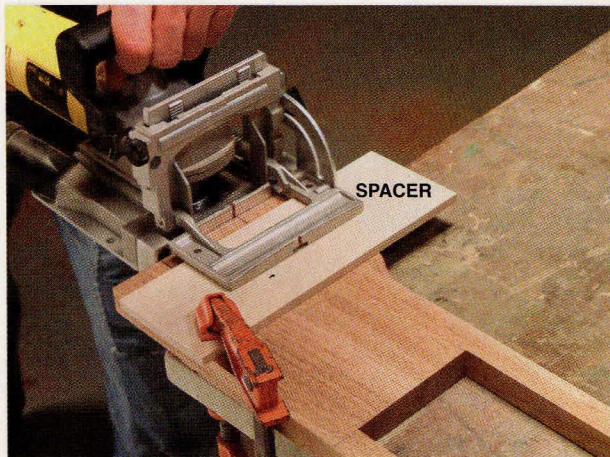
19. Lay out the drawer front (F) and the rip lines on the front apron (see Fig. A, Detail 2, page 52). Rip the front apron into three pieces and crosscut the drawer front from the middle piece. Then, reassemble the front apron (Photo 8). This yields a seamless grain match for the drawer front.

20. After the glue dries, plane the apron stock to 3/4 in. and cut to length. Note: Cut an equal amount off both ends of the front apron so the drawer opening stays centered. Leave the drawer front 7/8 in. thick until after the finger joints are cut.

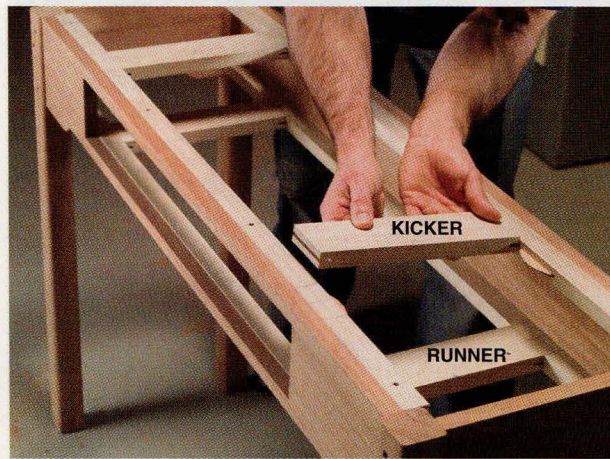
21. Make 1/4-in.-thick fiberboard templates for the cloud lifts (Fig. A, Detail 2). Then, rout the cloud lifts (Photo 9).

22. Cut the legs (C) to size and sand smooth.

23. Lay out the ebony plug holes. On the drill press, make 3/16-in.-dia. holes 1/4 in. deep for each plug. Square the holes



10 Join the apron to the legs with biscuits. Offset the joint by placing a 1/4-in.-thick spacer under the biscuit joiner's fence when cutting the aprons. Remove the spacer for the legs.



12 Glue the drawer kickers and runners into place. Create the long grooves on the ends of each piece with a 5/32-in. slot cutter.

with a 1/4-in. mortise machine chisel.

24. Lay out the locations of the biscuits that join the legs and aprons. The aprons are set back 1/4-in. from the faces of the legs (Fig. A, Detail 2).

25. Place a 1/4-in. spacer on the face of your apron and adjust your plate joiner to cut at the center of the apron (Photo 10).

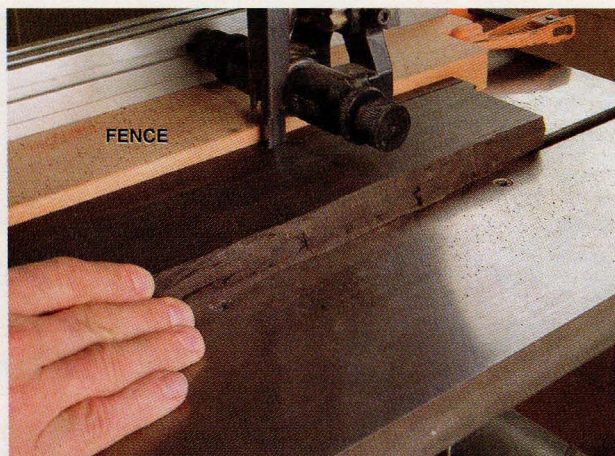
26. Use the same fence setting to cut the slots in the legs without the spacer.

27. Rout a 1/4-in. round-over on the long edges and around the bottom of the legs.

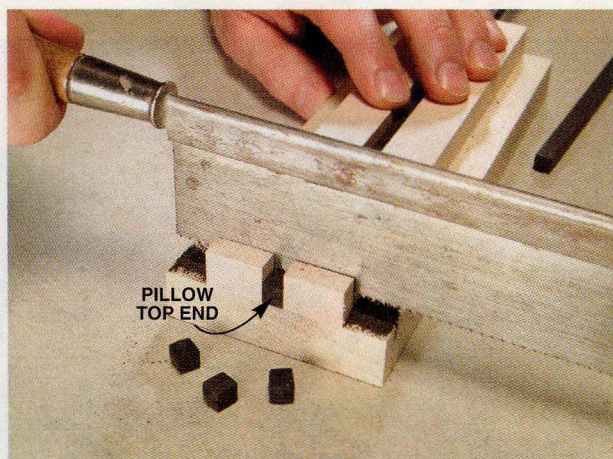
28. Rout an 1/8-in. round-over on the aprons' bottom edges.

29. Finish-sand the legs and aprons before assembly.

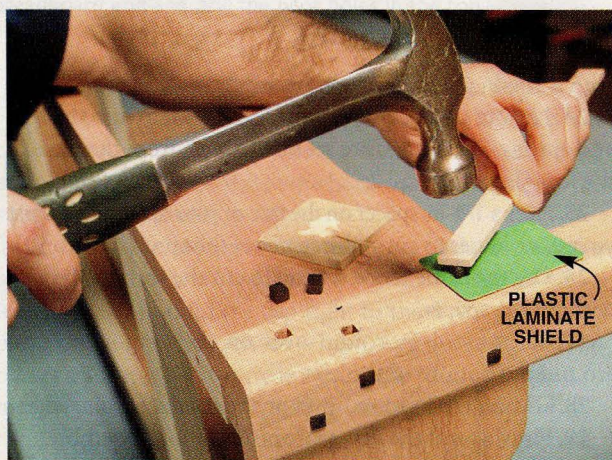
30. Glue and clamp the back legs to the back apron and the front legs to the front apron. Then glue and clamp the front and back assemblies to the side aprons to complete the base assembly (Photo 11).



13 Rip the ebony into strips on the bandsaw. It's safer than a tablesaw and wastes less of this expensive wood. A fine-toothed saw blade makes a smooth cut that requires minimal sanding.



14 Cut short plugs after sanding the gently rounded shape on the end. A simple wooden jig holds the ebony strips in place.



15 Tap the plugs into their holes. The plugs stand slightly proud of the surface. Use a spacer made from plastic laminate to make sure all the plugs are equal in height.

31. Cut the apron cleats (L), drawer runners (M) and drawer guides (N) to size.

32. Drill and counterbore the screw holes in the upper apron cleats for attaching the top. Elongate the screw holes in the upper rear apron cleat so the top can expand and contract. Make sure the counterbore is deep enough to keep the screw heads from interfering with the drawer.

33. Lay out the biscuit grooves in the apron cleats for the drawer runners. Use a biscuit joiner to cut these grooves. Cut the drawer stop notch (Fig. A, Detail 1, page 52).

34. Cut the grooves all the way across the ends of the drawer runners using a router table and a 5/32-in. x 1/2-in.-deep slot cutter.

35. Glue and clamp the apron cleats to the assembled base. The lower apron cleats are set 1/16 in. above the lower edge of the drawer opening in the front apron (Fig. A, Detail 1).

36. Glue biscuits in the apron cleat biscuit grooves and add the drawer runners (Photo 12).

Add the Ebony Accents

Despite being one of the denser woods on the planet, ebony is surprisingly easy to work with. If you've ever worked with hard maple, you won't find ebony to be much different.

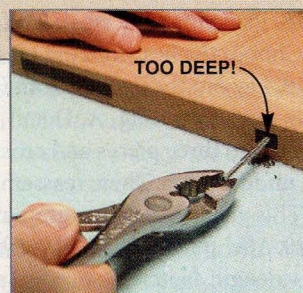
37. Rip the blanks for the ebony plugs and splines (Photo 13).

38. Sand pillow shapes on the tops of the ebony plug strips. Cut the plugs (X) to length (Photo 14). Repeat until all the plugs (and a few extra) are made.

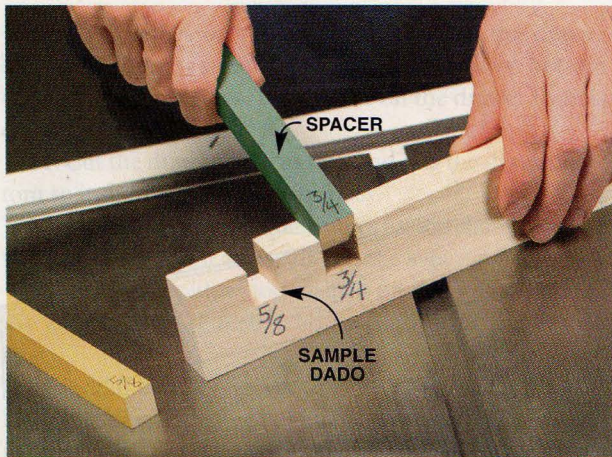
39. Add a drop of glue to the hole and tap the plug in place (Photo 15).

40. Cut, fit and shape the breadboard end splines (R). When you're done, glue the splines to the top spline grooves only.

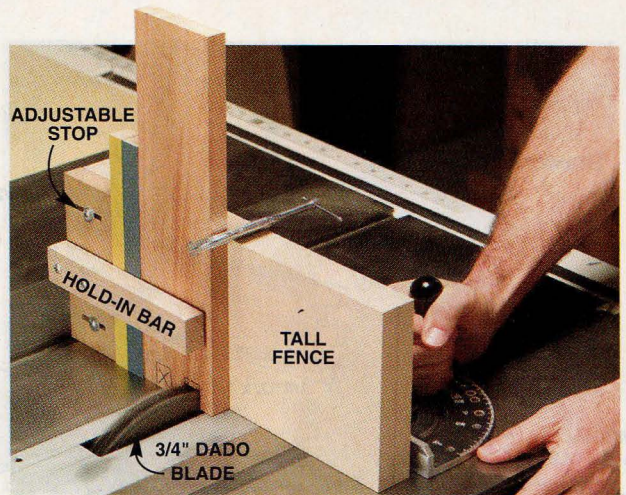
Oops!



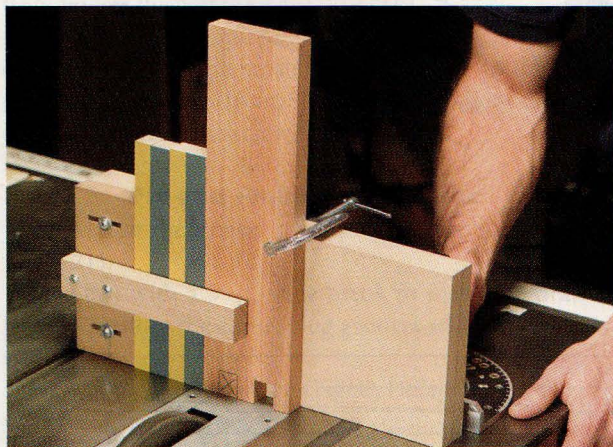
I knocked one of my ebony breadboard end plugs too deep. It was a real mess digging out that plug. Here's how to avoid repeating my mistake. Have a drill, screw and pliers close at hand when you're installing the ebony details. If you set one too deep, quickly drill a hole in it, insert the screw and use the pliers to yank out the plug before the glue can set.



16 Make spacers that exactly fit cuts made by your dado set. The spacers are used to cut the finger joints in the drawer. Test-fit fiberboard spacers into 5/8-in. and 3/4-in. notches cut by your dado set. Shoot for a snug fit.



17 Cut the first finger joint on the drawer side using a 5/8-in. and a 3/4-in. spacer. The tall fence is screwed to the miter gauge and has an adjustable stop to fine-tune the setup. The spacers are held in place with a short hold-in bar.

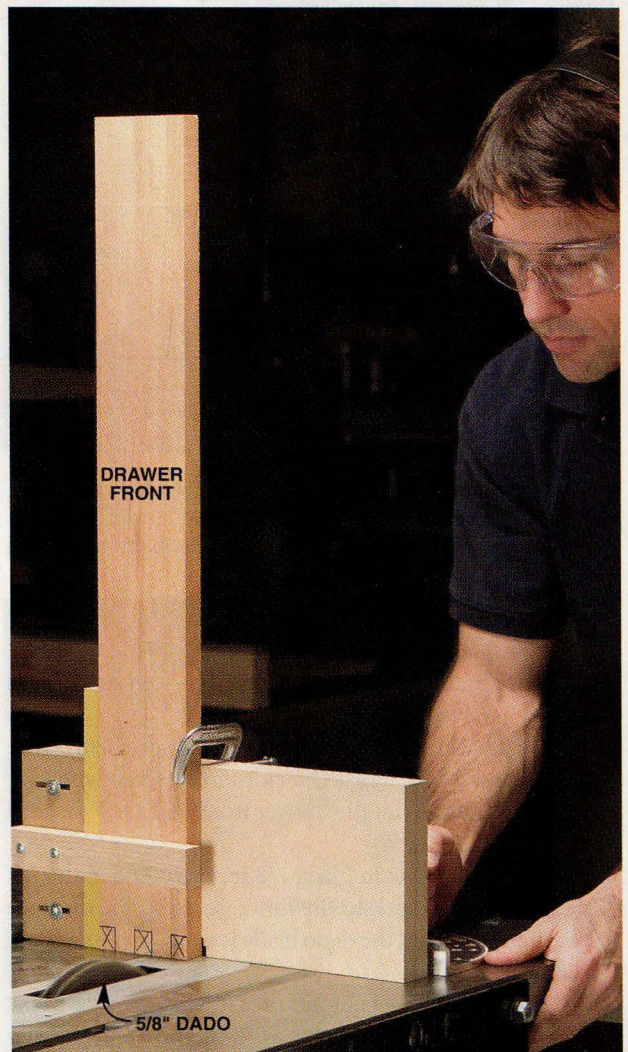


18 Add two more spacers for the second cut on the drawer sides.

41. Cut, fit and shape the breadboard end plugs (S and T). The long plugs need to be tapped in with care because the laminate shield can't be used here.

Build the Drawer

Spacer sticks are used to cut the unusual protruding fingers on the drawer joint. The 5/8-in. and 3/4-in. spacers must exactly equal the cut your dado blade makes. To size your spacers, use your dado blade to cut a 5/8-in. notch in a block of wood. Cut a second 3/4-in. notch. Cut test spacers from 3/4-in. fiberboard and check their fit in the notches (Photo 16). Adjust the width of the spacers until they slip into the notch with minimal pressure. You'll need three 5/8-in. x 7-in. spacers and two 3/4-in. x 7-in. spacers to cut the drawer joints. Label the fronts of the spacers so you keep them oriented correctly.

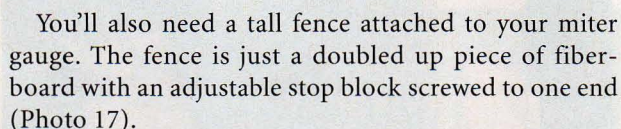


19 Cut the first finger joint groove on the drawer front with a single 5/8-in. spacer. Set a 5/8-in.-wide dado blade 9/16 in. high. Shim out the hold-in bar with washers to accommodate the 7/8-in.-thick drawer front.

Drawer Construction



Drawer Handle



42. Cut the drawer sides (G) to size, but leave them 5/8 in. thick for now. Make four extra sides from scrap wood for testing the setups. Trim the drawer front and a test piece to finish width.

43. Set a 3/4-in. dado blade 7/8 in. high. Attach the tall fence with a stop block to the miter gauge so the distance between the stop and the dado blade is equal to the width of the drawer front.

44. Lay out the finger cutouts on a test drawer side. Make the first cut on a side piece using a 5/8-in. and a 3/4-in. spacers (Photo 17). Always keep the top edges of the drawer pieces against the spacers.

45. Make the second cut (Photo 18). Then measure the outside fingers—a caliper works great for this. Adjust the stop

and keep making new test cuts until both fingers are equal in width. **Note:** Don't cut your final pieces yet.

46. Lay out the drawer front fingers on a test piece. Make the first cut on the drawer front (Photo 19). Add one 5/8-in. and one 3/4-in. spacer to the setup and make the second cut. Add another 5/8-in. and 3/4-in. pair of spacers for the third cut.

47. Check the fit of the two test pieces together. They should fit beautifully. If they're loose, your spacers need to be slightly wider. If they're tight, your spacers need to be slightly narrower.

48. When you get a good test fit, go ahead and make the cuts on your final drawer parts.

Assemble the Drawer

49. Plane the drawer sides and front to their final thickness. This should remove any blowout that might have occurred.

50. Cut dados on the drawer sides to fit the drawer back (H). Rout the stopped grooves for the drawer bottom (Q) in the drawer sides. The groove on the drawer front is cut all the way through.

51. Cut the drawer back to size, and size the drawer bottom so it slides easily in the grooves.

52. Drill and chop the square holes for the ebony plugs on the drawer front just as you did on the legs.

53. Sand the pillow-top shapes on the finger ends of the drawer sides. Finish sanding the rest of the drawer parts.

54. Add the ebony drawer front plugs (X) before assembly. **Note:** These plugs should fit easily in the holes. A tight fit could cause the short grain on the end of the drawer front to break out.

55. Glue and clamp the drawer parts together, making sure the drawer is square (Photo 20).

56. When the glued drawer parts are dry, sand the drawer front fingers flush to the sides.

57. Drill three elongated holes near the back edge of the drawer bottom. Put a small amount of glue in the dado groove in the drawer front. Slide the drawer bottom in the drawer and insert the screws.

Fit and Finish the Drawer

58. Mount the drawer guides (N) to the runners (M, Photo 21).

59. Start with a 3-in.-wide blank to make the drawer handle (J). Rout the ebony plug grooves while the stock is still square.

60. Cut the curved shape (Fig. C, Detail 1, page 60) on your bandsaw and rout the 1/8-in.-radius round-over on the edges.

61. Rip the drawer handle front off the blank on the tablesaw.

62. Use the remaining stock to make the drawer handle back (K). Glue and clamp the drawer handle front and back pieces together. Add the drawer handle plugs (U and V).

63. Make and attach the drawer stop (see Fig. A, Detail 1, page 52). Insert the screw head flush with the bottom of the apron cleat, so the stop will hang down and hit the back of the drawer.

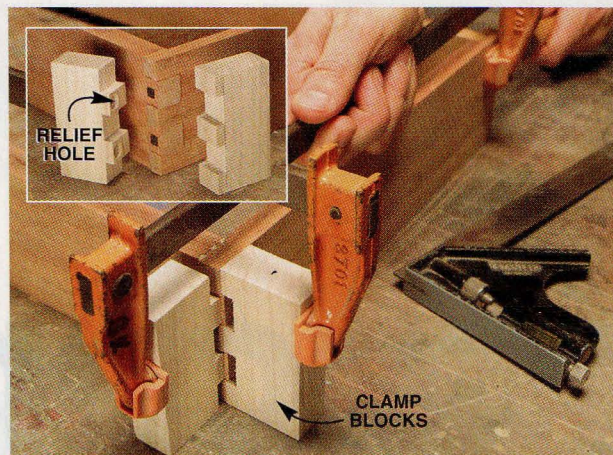
64. Drill the drawer handle screw mounting holes in the front of the drawer. Align and screw the drawer handle to the drawer.

Finishing Touches

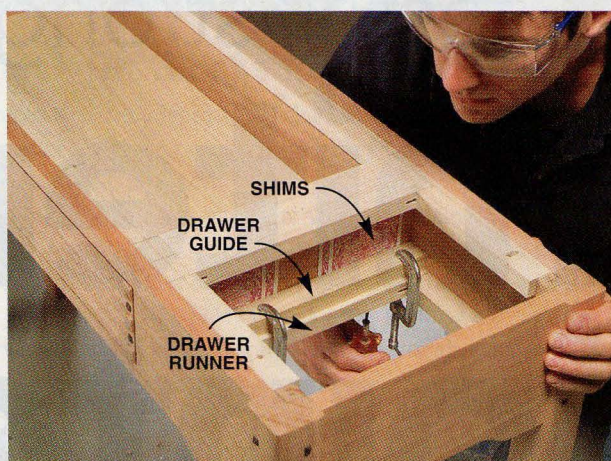
65. Align the base on the top and screw them together (Photo 22).

66. Unscrew and remove the top, drawer handle and drawer bottom. Do any additional finish sanding.

67. Apply two or three coats of natural Danish oil finish. When the finish is dry, reassemble the table. Then step back and be prepared to accept the kudos! **AW**



20 Assemble the drawer with bandsawn clamp blocks. The finger joints' ends stick out past each other. The blocks put pressure only where it's needed. Drill relief holes in one set of blocks to accommodate the plugs.



21 Screw guides to the drawer runners with the drawer in place. Create the perfect gap between the guides and the drawer sides with two playing-card shims.



22 Screw the base to the top. Make your own "sideways" screwdriver with a ratchet wrench to get into this tight space. Use a 1/4-in. socket and a screwdriver bit from a cordless drill.

10 techniques

for tighter,
faster, stronger

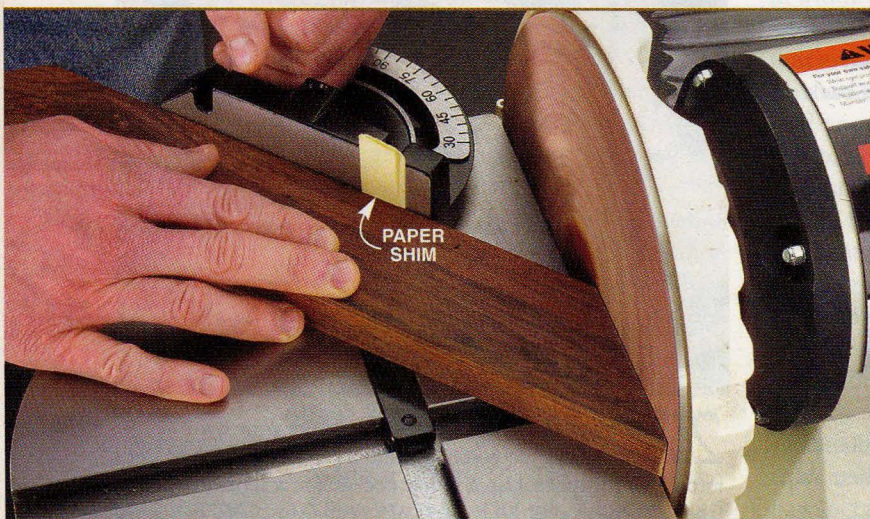
miter joints

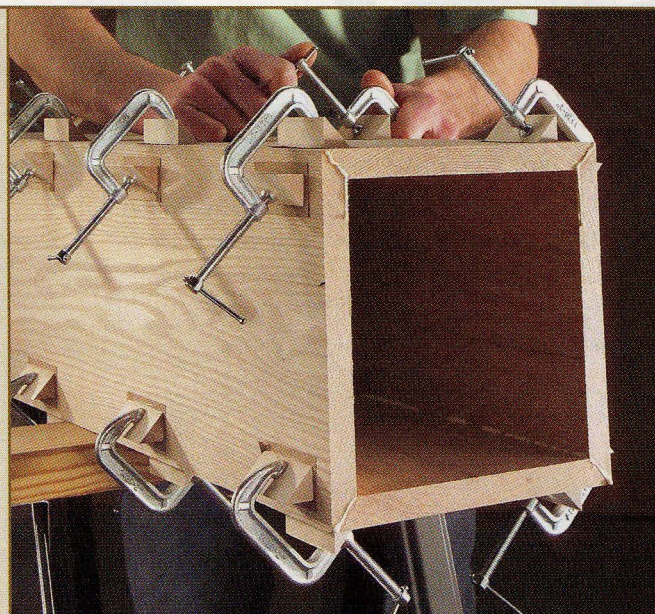
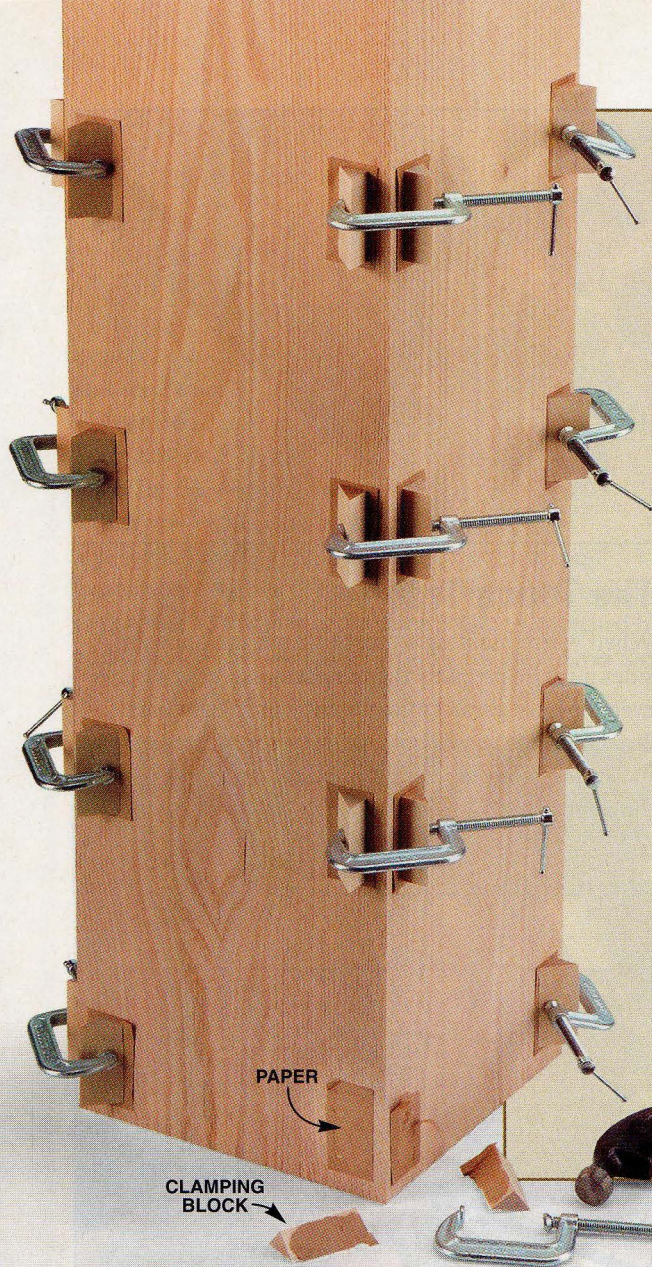
Miter joints provide one main advantage over other joints: A miter joint hides end grain and brings face grain neatly together. Everything else about miter joints is a hassle. They're fussy, time-consuming and easy to screw up. But there are ways to minimize those hassles.

by Gary Wentz

Make Micro Adjustments with a Disc Sander

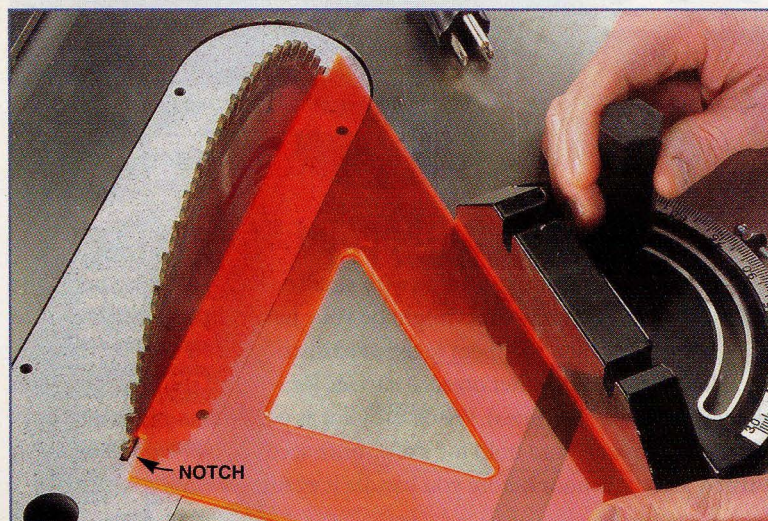
No tool can tweak a miter's fit as easily as a disc sander can. You can shorten the workpiece a hair with a quick touch of the disc. You can also adjust the angle by a fraction of a degree. Instead of fussing with the miter gauge, make tiny adjustments by sticking a paper shim between the gauge and the workpiece.





Knock-Off Blocks for Long Miters

Long miters are a nightmare to clamp, but adding temporary triangular blocks makes it a snap. The key is to use paper from a grocery bag. Dab some wood glue on both sides of the paper, stick the blocks wherever you need them and let the glue set overnight. When you're done clamping, remove each block with a hammer blow. The paper creates a weak spot in the glue bond, so the blocks break away without damage to the wood. Use hot water to soften any paper or glue left on the wood, then scrape it away and sand as usual.

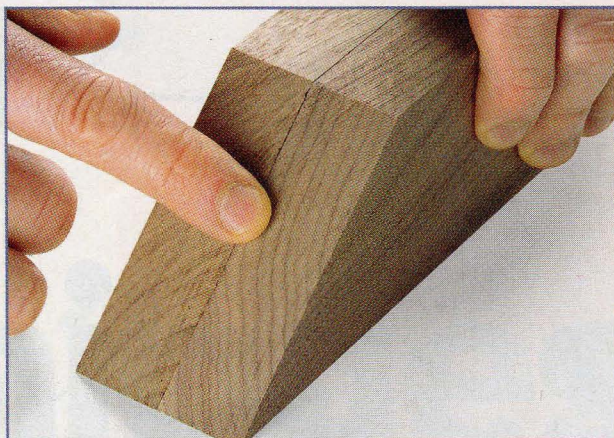
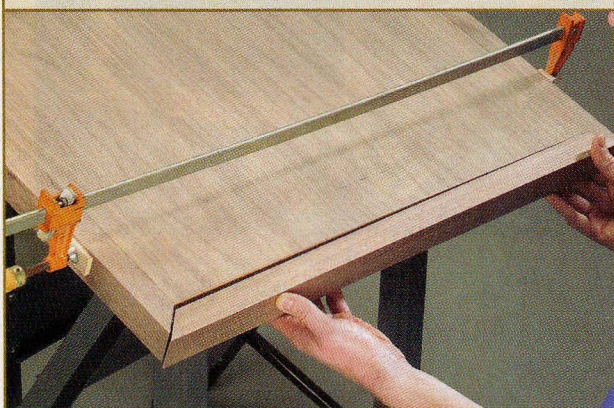


Customize a Drafting Square

Drafting squares are inexpensive, accurate and great for tool or jig setup. Because they're plastic, you can easily customize them to suit the job. We filed notches in this square to keep the saw teeth from interfering with setup. Drafting squares are available in various sizes for \$4 to \$10 at art and office supply stores.

Guides for Perfect Edging

Mitered guides clamped in place let you perfect the length and angle of mitered edging. Use the edging stock itself to guide the fit of each piece. Clamp the guides precisely in place and work your way around the tabletop, gluing each perfected piece in place as you go. After you glue and clamp a section of banding, remove the adjoining guides immediately so you don't accidentally glue them in place.



The Touch Test

When you're building a box or frame, the opposite sides must be precisely the same length. Otherwise, even the most perfect miters won't form a tight joint. To compare lengths, hold the parts together on a flat surface and feel the ends. Your finger can detect differences your eyes can't.

Stop Cutting Creep

When you're cutting miters on a miter saw, the spinning blade tends to push or pull the workpiece along the fence. A hold-down clamp will stop the creeping, but molded stock can be hard to clamp. In that case, dampen the back side of the wood. Moistened wood is less slippery and easier to hold in place.



CHEAP, HANDY
CLAMPS

The 60-Second Squeeze

When you're dealing with small or hard-to-clamp parts, the best clamping tools might be your hands. Simply apply glue to the parts; then rub them together to distribute and tack-set the glue. Hold the parts together on a flat surface for 30 to 60 seconds (although it may seem like 5 minutes). Watch the joint as you release pressure; if anything moves, squeeze and hold for a few more seconds. Let the assembly sit undisturbed for a half-hour before you handle it again.

Notched Blocks for No-Rush Glue-Up

Getting all four corners of a box or frame aligned and clamped before the glue sets can be a frantic rush.

Four notched blocks lower the frustration level by letting you tackle glue-up in manageable steps. Start by joining two corners to form the two halves of the box or frame. Allow those first two glue joints to cure for 30 minutes or so. Then rotate the notched blocks and complete the assembly by gluing the two halves together.

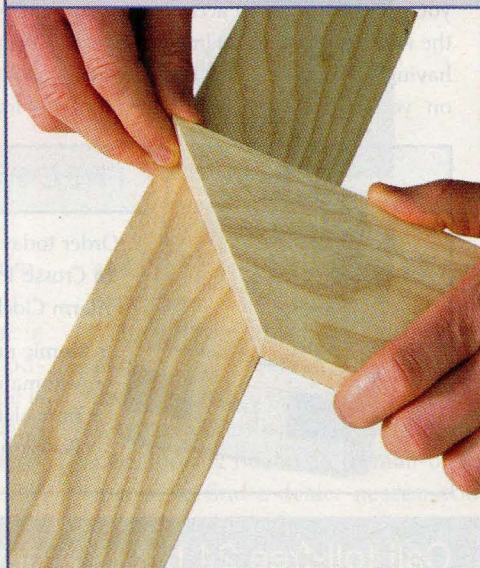


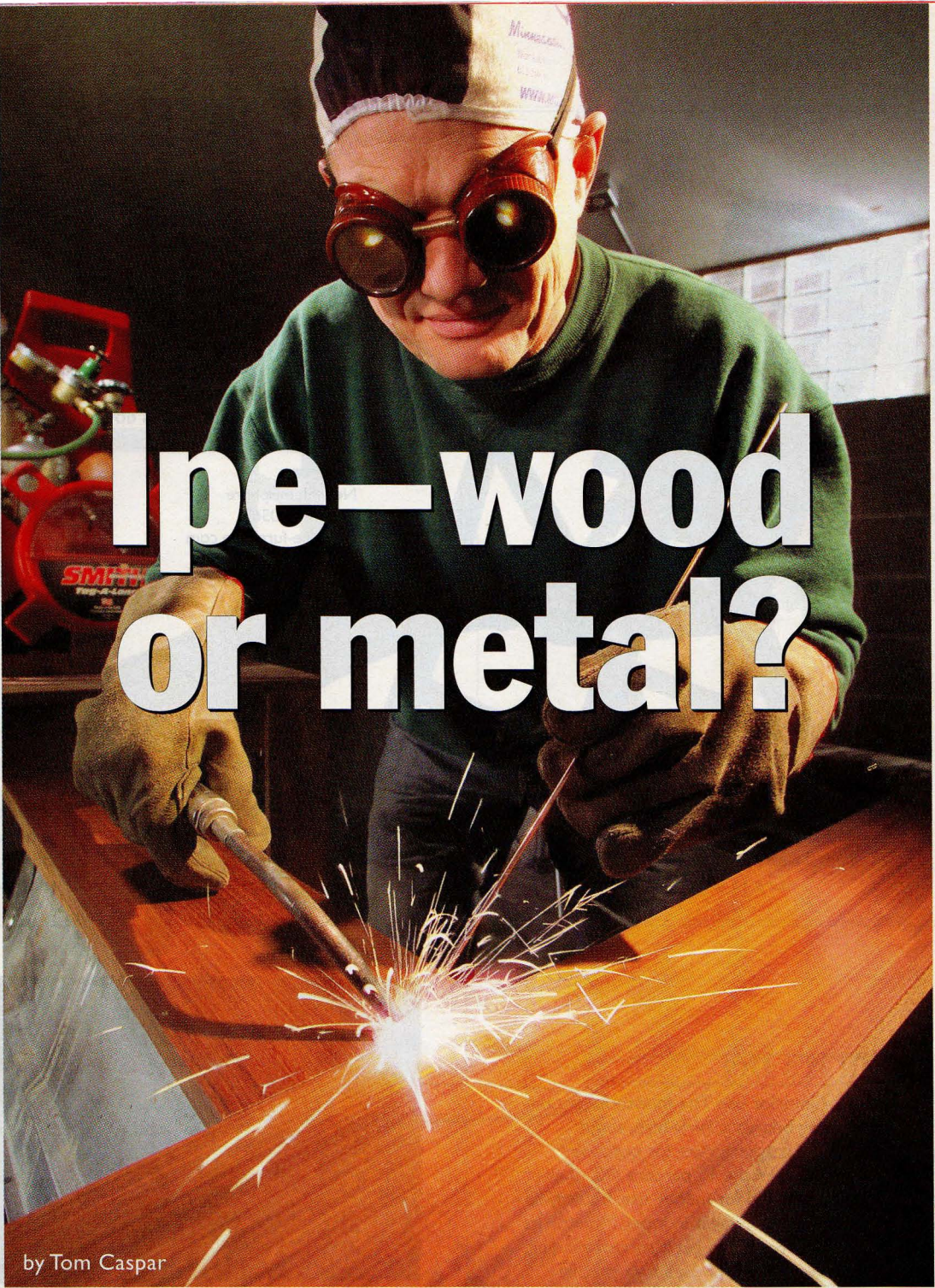
Join Miters First, Rout Later

Flat, square stock is easier to miter, align and clamp than shaped parts, so you'll often get better results by routing edges after assembly. To avoid splintering at corners, make a few light passes instead of one full-depth cut. Most importantly, start each pass on a side, not at a corner.

Grain Match Matters

It takes more than a precision fit to make a miter joint look good; the wood's grain and color should match, too. Using a single board to band a tabletop or build a picture frame makes color matching easier. Straight-grained boards are easier to match than those with wavy patterns. When matching wavy grain, try this: Miter one piece and then use it to find a matching area on the piece that will adjoin it. **AW**





Ipe—wood or metal?

by Tom Caspar

Ipe (pronounced E-pay) is a South American wood as exotic as its name. When you hold a piece, you know it's something special. Ipe sinks in water like cast iron, is hard as nails and polishes like brass. Of course, you don't really have to weld it, but working with ipe may make you question your sanity. Is it wood or metal?

For an exotic wood, it's not terribly

expensive. A 1-in.-thick board typically costs about \$6 per board foot.

You can buy ipe almost anywhere in the United States, but most woodworkers have never heard of it. Ipe is used for decks and outdoor structures because it's extremely rot-resistant, dries without warping, is free of knots and won't wear out. It's available in standard dimensions, such as 1x6

and 2x4. Deck offcuts are a blast to experiment with.

Ipe is marketed under a number of names. Dealers call it Ironwood, Diamond Deck, Pau Lope and Tiger Deck. It's sold as Brazilian walnut in the interior flooring business. To mail-order ipe, or to find a dealer nearest you, contact Cecco Trading, (414) 445-8989, www.ironwoods.com.

Properties



Use It Inside or Out

Ipe can be used for indoor or outdoor furniture. It's so heavy that this deck chair will never blow over in the wind!

Ipe is useful around the shop, too, because it's so hard and strong. An ipe carver's mallet lasts a lifetime. Ipe drawer runners never wear out. Best of all, an ipe workbench is downright awesome. Talk about sturdy!

Source

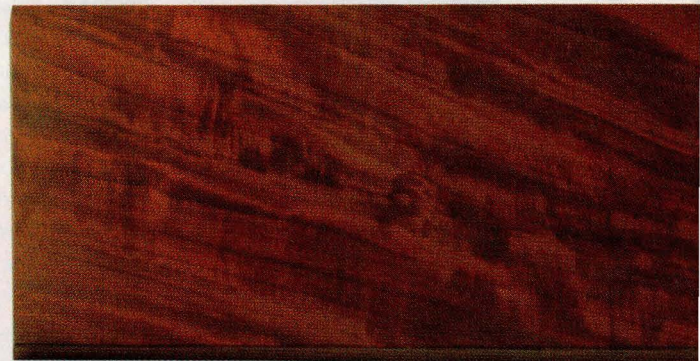
New Hemisphere
(866) 210-0567
www.ipe-furniture.com

PHOTO COURTESY OF NEW HEMISPHERE, CHRIS PAYNE

Wait 'Til It's Dry

Ipe isn't dried for interior use. The moisture content (MC) of ipe decking boards is fairly high, about 17 percent. This MC is appropriate for outdoor furniture, but higher than the 12 percent MC of air-dried hardwoods destined for indoor use. It's easy to air-dry ipe yourself by stacking it indoors. Monitor its MC with a moisture meter. (To get a correct reading, adjust for ipe's high specific gravity: 0.92.)

MOISTURE
METER



Dig for Beautiful Boards

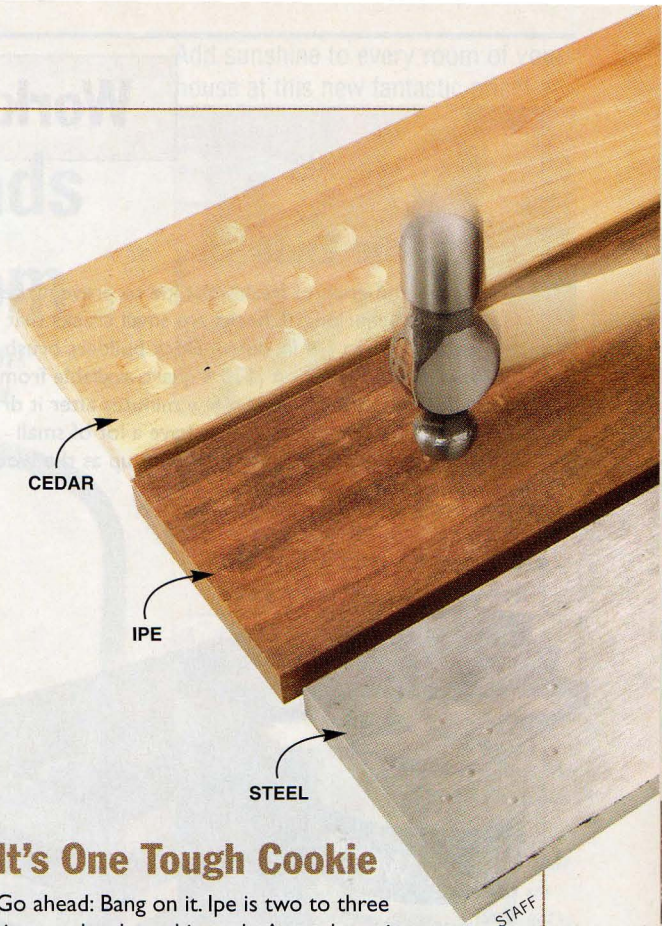
Some ipe boards are absolutely stunning. You'll find a wide variety of color and figure in a random pile of ipe, so good boards are worth digging for. Ipe's color ranges from olive green to chocolate brown.

Check out the unusual internal structure called interlocked grain in the board above. Here, the slope of the grain alternates direction every few growing seasons. This is a spectacular example of grain that's both curly and interlocked. Pencil-stripe interlocked grain is more common in ipe.



This is Strong Wood!

Every which way you look at it, ipe is an extreme wood. It's about 70 percent stiffer than hard maple. Outdoor furniture made from cedar, redwood and treated pine must have thick parts for strength, but ipe furniture can have the thin lines of metalwork. So be daring! The slender legs on this patio table are only 7/8 in. square.



It's One Tough Cookie

Go ahead: Bang on it. Ipe is two to three times as hard as white oak. A good portion of the Atlantic City boardwalk has been replaced with ipe. Twenty years later, it hardly shows any signs of wear.

Ipe Sinks in Water

Ipe is incredibly dense. When you pick up a piece, you'd swear it was a hunk of metal. Ipe weighs 69 to 80 lbs./ft.³ (compare that to red oak at 43 lbs./ft.³) That's right up there near ultradense exotics, such as ebony and lignum vitae. The darkest ipe boards are the heaviest ones.



Working with Ipe

Seal the Ends

Seal the end grain of freshly cut ipe to prevent the ends from checking. (Checks are small cracks that run from 1/32 in. to 1/4 in. deep.) Deck builders brush on a special wax emulsion (\$20 a quart, available from ipe dealers). It turns clear a few minutes after it dries. The surface of ipe boards may have a lot of small checks, but the checks actually close up as the wood continues to dry— weird.

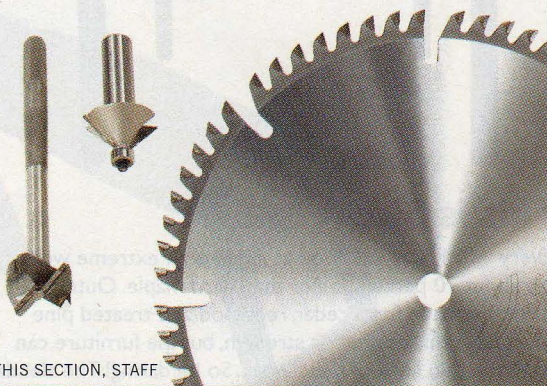


Use Carbide Tooling

Ipe is murder on ordinary carbon-steel blades. Use a carbide blade in a tablesaw and carbide bits in a router. Carbide blades are available for bandsaws, but they cost about \$120 for a standard 93-1/2-in. blade. Carbide isn't an option on most jointers or planers. Take light cuts if you absolutely must. Edges are best smoothed with a file, like brass. The surfacing machine that works best with ipe is a drum sander.

Ipe dust may make your skin itch and eyes water. Use dust collection on your tools and wear a dust mask.

CARBIDE
TEETH



PHOTOS THIS SECTION, STAFF

Joints & Glue

Screws and plugs are a fast, easy way to join ipe. Ipe's end grain holds screws well, unlike softer outdoor woods, but you must predrill pilot holes. Use stainless-steel screws with long, deep threads. Make your own plugs for an invisible joint that looks like welded metal.

Yellow glue works well with most ipe, but leave the clamps on overnight if the wood's MC is high. Some ipe boards are slightly oily. They should be wiped with acetone, then glued with epoxy. Experiment with your boards before deciding which glue to use.

PLUG

STAFF

STAFF

Finishing

Unfinished ipe turns silvery-gray outdoors. Apply an outdoor oil every year to keep ipe's natural color or to protect it from stains.

For indoor work, sand ipe up to 220 grit. Or go crazy: Push it to 400! Along the way, you'll be amazed at how burnished the surface becomes— just like metal.

Almost any finish will work. Floor wax preserves the color of the bizarre yellow-green streaks present in many ipe boards. These streaks are created by lapachol, a peculiar solid deposit in ipe's pores.



WEATHERED



WAXED



VARNISHED

workshop tips special

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from readers
like you!



Clandestine Tool Chest

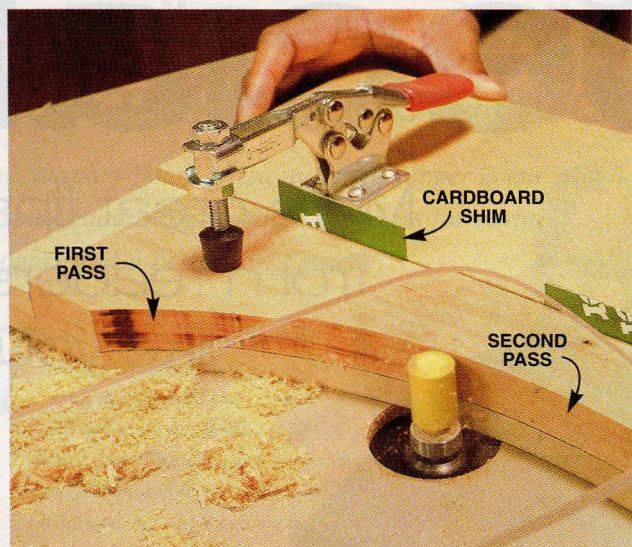
I transformed this dresser for my daughter, who didn't like the way her husband's metal tool chest looked in their apartment. For these newlyweds, shop space wasn't in their budget and he needed a place to park his tools.

My daughter had always liked this old relic, which occupied a corner of our attic for years. I simply knocked apart the two middle drawers and attached the fronts to a piece of plywood. I removed the divider that originally separated the two drawers and installed new plywood shelves, using the drawer runners as supports. I mounted the new door with a continuous hinge and installed a spring catch to hold it closed. My daughter loves the stylish addition to their décor and my son-in-law is happy to have his tools handy.

Patrick O'Donnell



BILL ZUEHLKE



Get the Burn Out

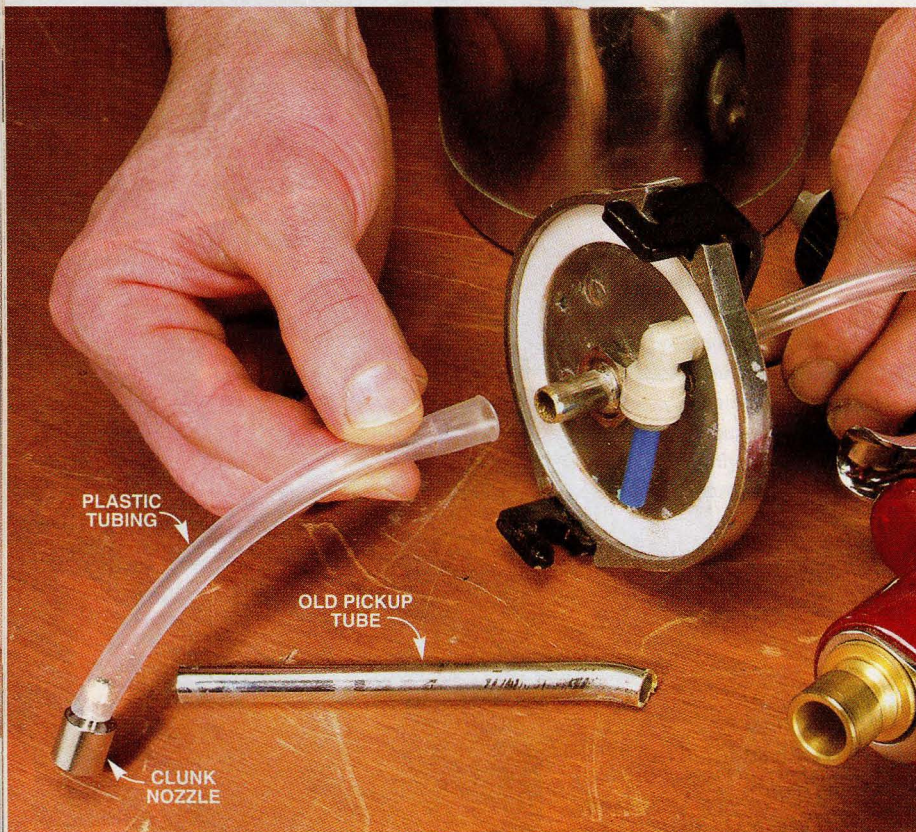
Arrgh, another burned cut! Don't you hate it when this happens? Here's a fix. Shim out the workpiece with thin cardboard and take a second light cut. Burning most commonly occurs on end grain or when you use a dull bit. Feeding the workpiece too slowly also can cause burning.

Dave Munkittrick

Longer-Lasting Polyurethane Glue

Polyurethane glue is great stuff but has a short shelf life after the bottle is opened. That's because the humidity in the air inside the bottle causes the glue to slowly cure. I found I can extend the shelf life by squeezing out the air. I keep the air from seeping back into the bottle by adding a spring clamp or two.

Jock Holman



Flexible Pickup Tube

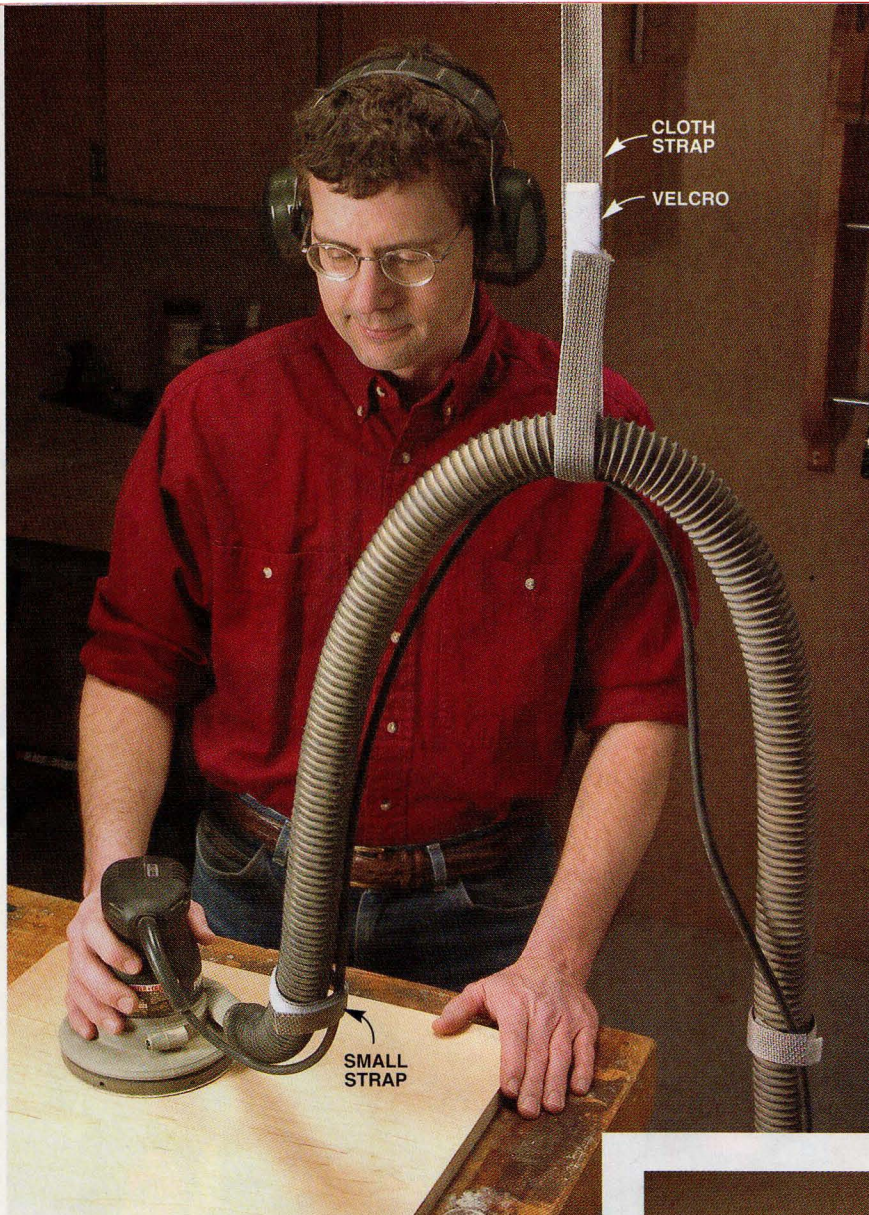
My HVLP spray gun came equipped with a standard metal fluid-pickup tube. It works fine until I tip my gun to get inside a cabinet. Then the gun sputters and spits because the pickup tube is no longer in the finish. I mentioned this problem to a buddy who flies remote-control model airplanes. He provided me with the perfect solution. It's called a *clunk*, as in *clunker*. It's a metal nozzle that model airplane hobbyists attach to the end of the fuel line in their airplanes. It keeps the fuel line in the fuel when they perform acrobatic flying. I bought the large 1/4-in version at a hobby store for \$2. I cut off the spray gun's original metal pickup tube and replaced it with a piece of 1/4-in. plastic tubing and the clunk. This modification won't make my gun fly, but at least it keeps the pickup tube in the finish no matter what angle I tip the gun.

Yaniv Matza

Snag-Free Hose

I love using dust collection with my orbital sander, but the hose always caught on the edge of my workbench. I fixed this problem by suspending the hose and cord using a 1-in.-wide cloth strap with some Velcro on the ends. One strap end is attached to a hook in the ceiling above my workbench. The other end loops around the dust hose and the power cord. I also made short sections of strapping to hold the power cord to the hose at a couple other spots. Cloth strap and Velcro are available at fabric or department stores.

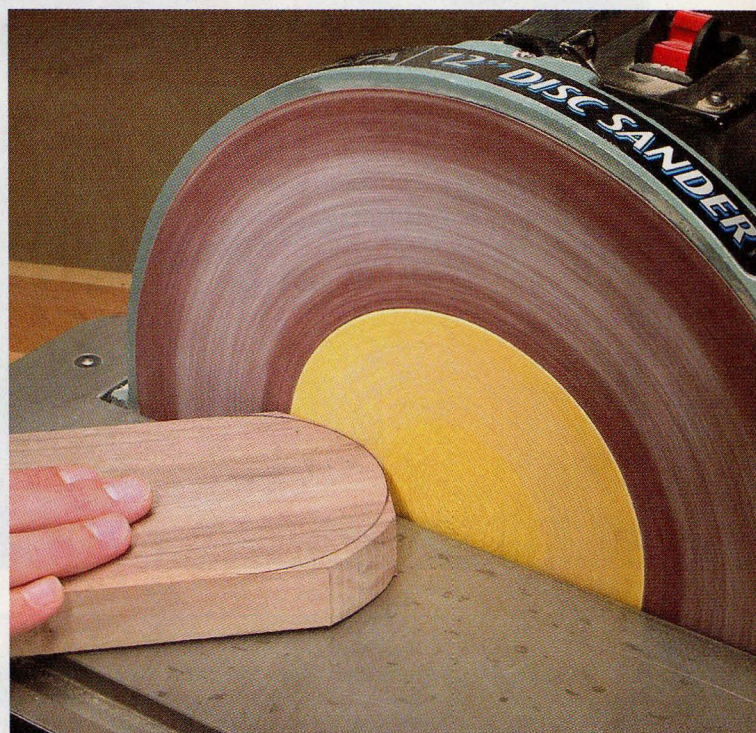
Peter Natoli



Dual-Grit Disc Sanding

My disc sander is indispensable for both quick wood removal and final smoothing. I got tired of changing and wasting discs every time I needed a different grit, though, so I made one disc out of two. To make the dual-grit disc, I lay two 12-in. discs together, one coarse and one fine grit. Then I cut a 6-in. circle out of the middle of them with a utility knife. This gives me two sets of dual-grit discs and nothing goes to waste. When I mount them to the disc sander, it's just like putting the doughnut hole back in the doughnut.

Dan Reeve



Window Shade Dust Control

Woodworking in my basement workshop used to leave a layer of dust everywhere until I hung window shades from the ceiling. Now I box myself into a temporary “clean room” before I start making dust. The shades are easy to wipe clean and they’re up and out of the way when not in use. The 6-ft.-wide shades I used cost about \$30 each. Shorter widths cost a little less.

Ellis J. Biderson



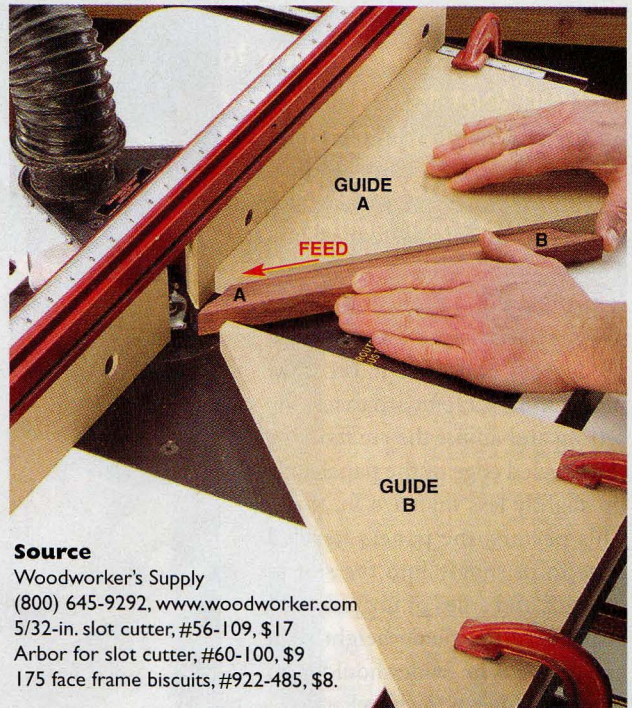
BILL ZUEHLKE

If you have an original Workshop Tip, send it to us with a sketch or photo. If we print it, you'll get \$100! Send to: **Workshop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121** or e-mail to workshoptips@readersdigest.com. Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions, and use them in all print and electronic media.

Reinforce Short Miters

To strengthen miter joints in narrow stock, use face frame biscuits. They're like standard biscuits but smaller (about 1-3/16 in. long), so you can use them in stock as narrow as 1 inch. To cut the slots, use a 5/32-in.-thick slot cutter in your router table. Set the router fence so the bit cuts a 5/16-in.-deep slot. Then clamp 45-degree guides to your router table. The guides make it easy to feed the workpiece into the slot cutter. Use one guide (A) for one end (A) and the other guide (B) for the other end (B). Test your setup before cutting actual parts of your project.

Gary Wentz



Source

Woodworker's Supply
(800) 645-9292, www.woodworker.com
5/32-in. slot cutter, #56-109, \$17
Arbor for slot cutter, #60-100, \$9
175 face frame biscuits, #922-485, \$8.

MIKE KRIWT

Flattening End Grain with a Router

My favorite woodworking projects are clocks—big ones or little ones. If it ticks, I'll make it.

My latest venture provided me with the challenge of flattening the face of some log sections that I wanted to make into clocks. Belt sanding was too slow and using a thickness planer is unsafe. In the planer, a log section, which is end grain, can break apart and shoot out at you, with results that are better imagined than experienced.

I devised this simple routing jig. I attached a sled to the bottom of my router that rides on the two side rails. If the log section rocks because it is uneven, add a shim until it's steady. When one side is done, flip it over and do the other. I do a final sanding on the surfaces with an orbital sander.

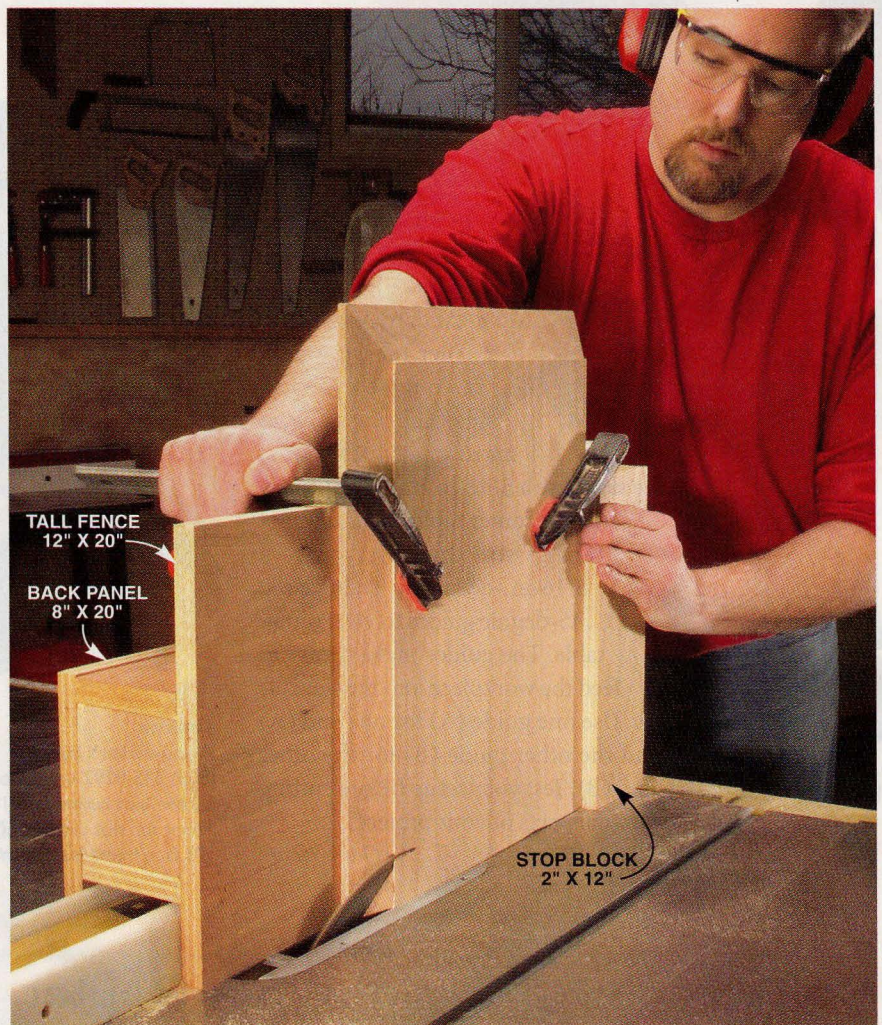
Jim Nessa



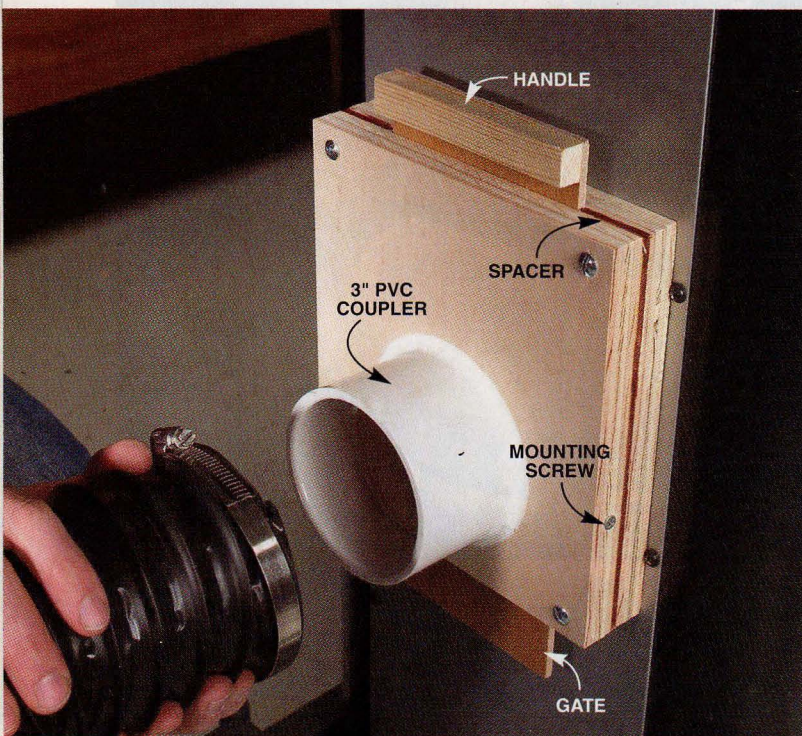
Raised-Panel Tablesaw Jig

Rather than buy a set of raised-panel router bits, I use this tall fence on my tablesaw. It's simply a plywood box that slides on the rip fence. I use two bar clamps to hold my 3/4-in.-thick panel to the fence. The stop at the back of the jig also keeps the panel from shifting. To saw the bevel, I set the saw blade at 15 degrees and raise it 1-1/2 in. high. I use a scrap board to test the setting and adjust the rip fence so the beveled edge of the panel ends up slightly less than 1/4 in. thick. This permits the panel's beveled edge to fit snugly into the slot in the rails and stiles of my project. I also adjust the blade height so it creates a 1/8-in.-wide shoulder on the inner edge of the bevel.

Pat Hunter



MIKE KRIVIT



\$1 Blast Gate

Adding a dust collection system to my shop was a great move, but it wasn't cheap. I did manage to save money by making my own blast gates. The main component of the dust gates is a 3-in. PVC coupler. It cost me only \$1 at my local home center, and a 4-in.-dia. dust hose fits perfectly over it.

With a jigsaw, I cut the hole for the coupler in the 3/4-in. plywood mounting board. I attached the coupler with a screw from each side and the bottom and added some caulk around the opening. I used 1/4-in. plywood for the spacers. The gate fit tightly, so I sanded it a little thinner with my belt sander to make it slide freely, but I left it snug enough so it stays up when open. The gate goes all the way through the mounting boards. This prevents dust from building up at the bottom of the gate. Instead, a small amount of air gets sucked through the bottom when the gate is open and keeps the slot clean.

Steve Langley
AW

NEW
Department

Tool Talk

By Tom Caspar

RAMON MORENO

*A terrific precision
saw can cost as
little as \$25.*

Japanese Dozuki Saws

What's the point of a handsaw in a shop full of power tools? If the saw doesn't cut worth a darn, not much at all. But if it's a Japanese dozuki saw, you'll wonder how you ever got along without one. Dozukis are hand-powered cutting machines. They cost an average of \$40 to \$50.

Handsaws go where machines can't. Sometimes a cut is awkward or time-consuming to set up with a machine, but a good handsaw can do it lickety-split. I used to be a big fan of English-style handsaws, but when I tried a dozuki saw, there was no turning back.

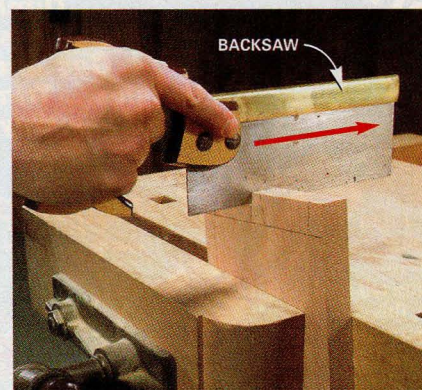
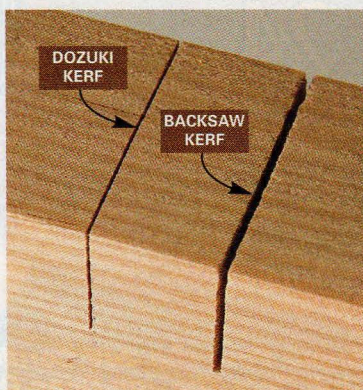
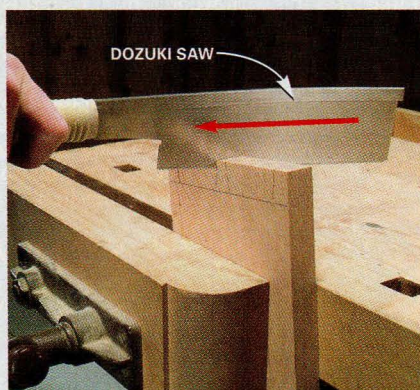
Let's first take a look at the differences between Japanese and Western joinery saws and what makes Japanese saws so good. Then we'll look at the general types of dozuki saws, and finally recommend some specific saws to buy.

Japanese and Western Saws

All Japanese saws cut on the pull stroke; Western saws, as we all know, cut on the push stroke. Once you've made the switch, you'll find the pull stroke quite natural. It has two overwhelming benefits: following a line is much easier, and that makes sawing far less fatiguing, both physically and mentally.

Japanese saws designed for cutting joints are called dozuki saws. (The word *dozuki* refers to the shoulder of a tenon.) Dozuki blades are very thin because they're pulled taut as you cut. All dozuki saws have a blade stiffener, or spine, that runs most of the length of the blade and into the handle. The handle itself is always long, narrow and generally wrapped with rattan to improve its grip. It can be held with one hand or with two for additional control. The entire saw is very lightweight.

Tool Talk



1 A Japanese **dozuki** saw is ideal for precision work because it's so easy to control. It cuts on the pull stroke. An English-style backsaw, of course, is just the opposite; it cuts on the push stroke. The dozuki saw blade is very thin and makes a much narrower kerf. The less wood you remove, the easier it is to guide the saw.

A Western-style saw for cutting joints also has a blade stiffer, or back, and so it's usually referred to as a backsaw. A backsaw's blade must be relatively thick so it doesn't buckle when pushed. The backsaw's handle can be an elaborately shaped grip or a simple turned knob. Both styles are held with one hand. Most backsaws are heavier than dozuki saws.

The dozuki saw's thin blade cuts an extremely narrow kerf (Photo 1). A backsaw's kerf is often twice as wide, or more. That means you're removing half as much wood with a dozuki and exerting half as much effort. Your muscles can relax, so you can concentrate on following the line (Photo 2). A backsaw requires much more effort and mental anguish, particularly when it's dull.

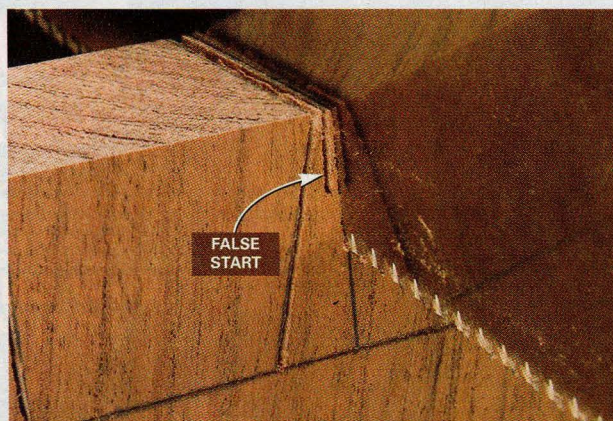
Dozuki saws stay sharp for a very long time. Most saws have tempered teeth so hard they can't be sharpened with a file. When the saw gets dull, you pop in a new blade. Back-

saws generally have softer teeth. When they get dull, you can file and set them yourself. Backsaw teeth are so small, however, that sharpening can be a real challenge. Most woodworkers don't bother and simply continue to use a dull saw, with disappointing results.

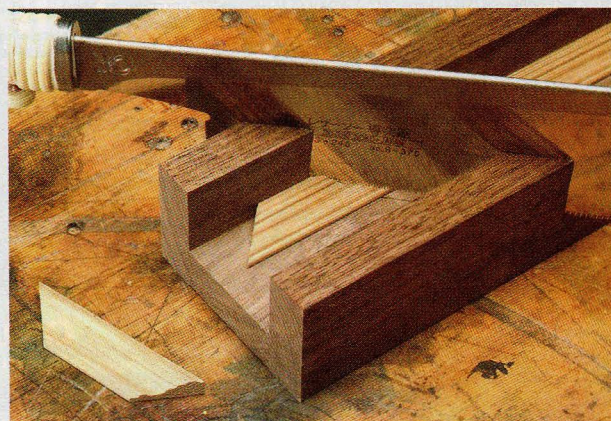
Dozuki Teeth: Crosscut and Rip

Dozuki saws excel at sawing across the grain (Photo 3). Most dozuki saws in American catalogs have crosscut teeth.

Crosscut dozukis also cut quite well *with* the grain. Rip cuts for tenons and dovetails are no problem as long as they don't go more than an inch deep. (The saw may bind if your cut isn't dead straight.) In fact, it's when cutting dovetails that most woodworkers really fall in love with their dozuki saws.

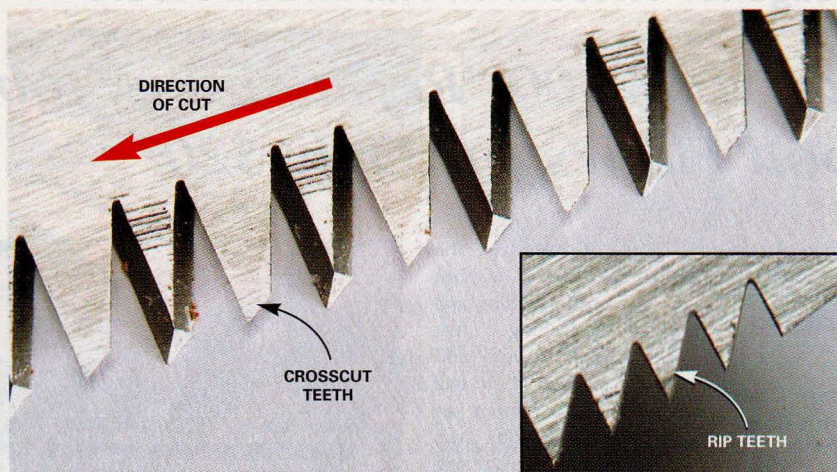


2 It's easy to cut right on the line with a dozuki saw because its tempered blade stays extremely sharp for a very long time. Even if you miss the line, you can start over again a hair breadth's away.



3 Cutting small parts is safe and easy with a dozuki saw. Dozukis are designed to make splinter-free crosscuts that are as smooth as glass. Make your own miter box to guide the cut.

Tool Talk



4 The teeth on most dozuki saws are designed for crosscutting. They have small, angled tips that score the wood like the blade of a knife. These teeth do a fine job with short rip cuts, such as dovetails, but some specialized dozuki saws have teeth designed primarily for ripping.

Dozuki saws designed specifically for ripping are just making their way to our shores. These saws are similar in most ways to their crosscut cousins, but their teeth are shaped differently (Photo 4). Rip-cut saws work across the grain fairly well, too. They're more expensive than crosscut saws. Our favorite rip-cut dozuki is a new model from Lee Valley, (800) 871-8158, www.leevalley.com, #60T04.04. It costs \$70. Its blade is not replaceable and cannot be resharpened, however.

If you've never used a dozuki, start with a standard crosscut saw. It's better for general-purpose work than a rip-cut saw. A crosscut saw is less aggressive, so learning to use one is easier.

Replaceable Blades

Most dozuki saws have replaceable blades (Photo 5). A second blade usually costs about half as much as the saw itself.

Each replacement blade is specifically made to fit only one brand of saw. When you find a saw you like, it's a good idea to buy a second blade before the first gets dull. Reserve the fresh blade for the cuts that really matter.

Teeth Per Inch

Dozuki saws have three different ranges of teeth size. Most saws have 22 to 27 teeth per inch (tpi). They work well in pieces from 1/8 in. to 1 in. thick. Saws

with large teeth have 13 to 18 tpi. They cut very aggressively and are best suited for stock that's at least 3/4 in. thick. Getting started on the first cut, without bouncing, takes some practice.

A few dozuki saws have incredibly small teeth (32 tpi). They're extremely easy to start without bouncing. They're not for beginners, however, because the blades are so thin and flexible. Our favorite is a 6-in. \$60 saw from Bridge City Tools, www.bridgecitytools.com, (800) 253-3332, #1101-171.

Blade Length

Dozuki saws have blades of two different lengths: short (6 to 8 in.) or long (9-1/2 to 10-1/2 in.). Length doesn't determine the size of the teeth.

Two blades of different lengths by the same maker usually have the same number of teeth per inch.

A saw with a long blade is best for most work. You can take a long stroke and cut fairly deep each time you pull the saw. Short blades are best suited for small work or shallow cuts, when fewer strokes are needed.



5 Most dozuki saws have replaceable blades. When your blade gets dull or damaged, just drop in another one. (Dozuki teeth are very hard, so it's virtually impossible to sharpen them.) This blade rotates out of its stiffening spine when you tap it against a block of wood.

Tips for Using a Dozuki Saw

If you're 10 years old and have never used any kind of handsaw before, learning to use a Japanese dozuki pull saw should be a breeze. For the rest of us, forget everything you know about saws. Dozukis are that different.

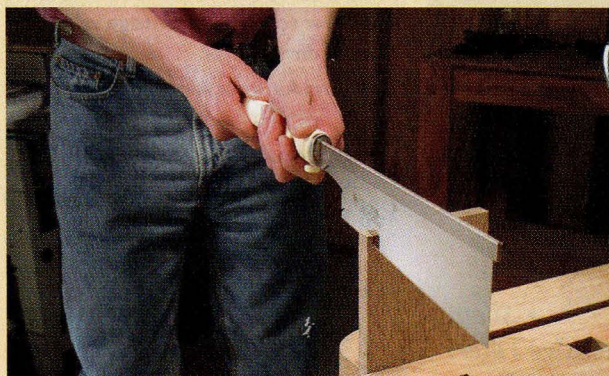
First, you have to get used to cutting on the pull stroke. The trick to doing this may seem silly, but it's very effective. Wear a blindfold. Don't worry about following a line. Just feel the saw cut.

Pull with your elbow, not your wrist. Steady the saw by locking your wrist in position.

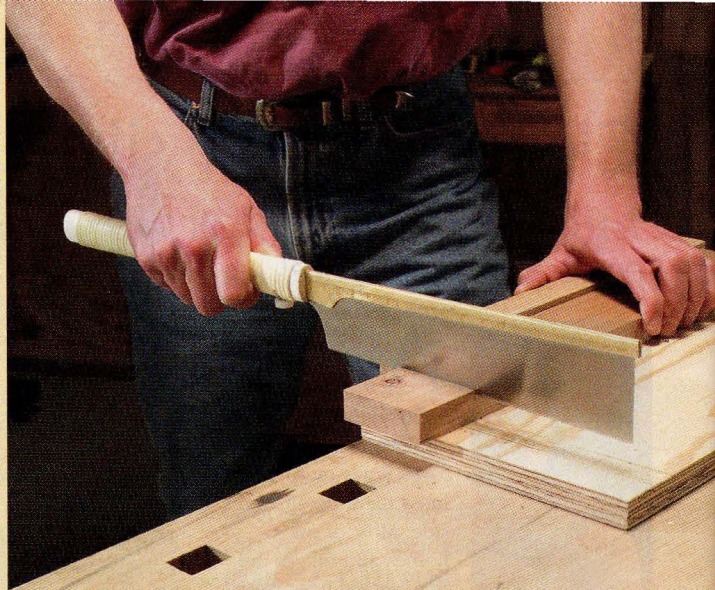
Don't press down hard. Let the saw do the work. Dozuki saws cut so effortlessly that the weight of the saw itself is almost enough to get it through the cut. Pushing down too



Start your cut on the far side of the workpiece. Dozuki saws cut on the pull stroke, so this rip cut is actually going downhill, with the grain. Lean the workpiece toward you for a better angle.



Hold your dozuki saw with two hands and pull it square to your body. Holding the saw with one hand, Western-style, works OK, but this method gives you even better control.

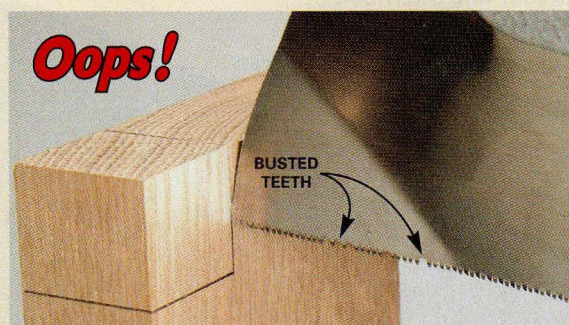


hard on a saw can make it bind or, in the worst case, break off some of the saw's teeth. (A dozuki will work OK with a few missing teeth, however.)

You can take off the blindfold now. Always start your cut on the far side of the workpiece (see photo, left). Take long strokes, but don't pull the blade out of the cut. Short strokes invite more error.

On crosscuts, tilt the blade up about 10 degrees. This is the ideal angle of attack for the blade's teeth.

Try sawing with two hands. Square yourself to the workpiece and pull the saw toward your belt buckle (see photo, bottom left). Put one hand in front of the other, or hold them side by side, as though you're praying for a good cut. Your plea will be answered! This stance makes it easier to steady the saw and stay on a line, but it's perfectly reasonable to stand to one side and saw Western-style.



Yup, this saw blade is history! I pulled too hard, and when the blade came out of the cut, I tried to push it right back in. Didn't make it. The thin blade bent at an awful angle (not to mention the teeth I busted off earlier), and now it's as useful as burnt toast for accurate cuts. I'll save it for rough work.

Dozuki saws take some getting used to. Mistakes like this (well, maybe not as bad) are common if you're too impulsive. It's a good thing these saws have replaceable blades!

Recommendations

It's hard to go wrong buying any dozuki saw because they're all made to very high standards. Most go for \$40 to \$50. For most woodworkers, this is all the saw you'll ever need.

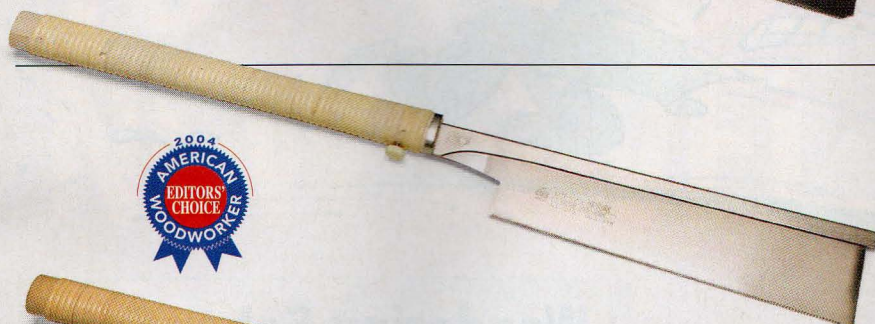
Dozuki saws are made in Japan, but we've identified each of our picks by the name of an American catalog, which often doesn't specify the actual manufacturer.



Lee Valley

(800) 871-8158, www.leevalley.com
Steel-backed dozuki, 25 tpi,
#60T55.01, \$22.

If you've never used a Dozuki before, buy this one to learn on. It cuts nearly as well as saws costing twice as much. The blade isn't replaceable and the handle isn't wrapped with rattan, but that's OK. It's a good, basic saw.



Japan Woodworker

(800) 537-7820
www.japanwoodworker.com
Razor saw, #19.210.0, 26 tpi, \$45.

This fine saw breaks down into two short pieces for easy storage.



Woodcraft Supply

(800) 225-1153 www.woodcraft.com
Dozuki Z saw, 26 tpi, #12F27,
\$40 (new blade, \$25).

This is a terrific, general-purpose saw.

Premium Saws



Misugi Designs

(707) 422-0734
www.misugidesigns.com
White steel rip-cut
dozuki, 13 tpi, \$138.

Expensive, yes, but cutting with this handmade saw is like driving a Porsche. It's very easy to track on a line. The blade is not replaceable. It can be resharpened, but only by an expert.

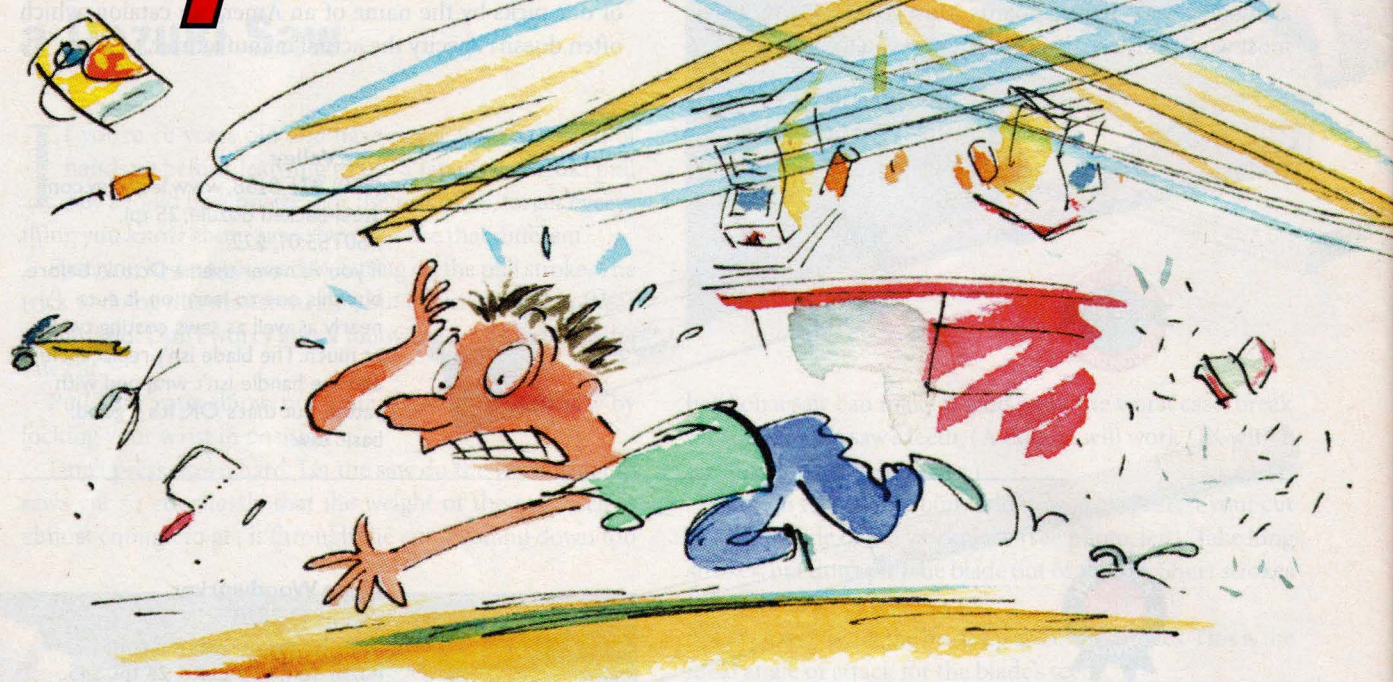
Some dozuki saws are still handmade by Japanese artisans. The blades of handmade saws are not replaceable and must be sent to a master sharpener when they get dull. These saws start at about \$100. Yes, that's a lot of money, but not for a tool that's the best in its class.

It's not just hype: Handmade saws are amazing tools. They're so sharp that it's very easy to follow a line. They cut extremely fast. With fewer strokes, there's less chance you'll wander off the cut.

A handmade saw should not be your first dozuki, however. Learn to use an inexpensive saw first. They work so well that you may be perfectly content and never need another.

AW

Oops!



Spindle Sander Whirlybird

To clean up the slot I had just cut in a long, narrow piece of white oak, I installed a sanding drum in my oscillating spindle sander. I dropped the slotted piece in place over the drum. The drum fit inside the slot perfectly, I thought. But when I turned on the sander, the piece ripped out of my hands and spun around like a propeller. The machine began to leap wildly about my bench.

Sensing imminent disaster, I hit the deck. I tried to reach the off switch but couldn't, because the sander kept jumping and the propeller kept threatening. Next, I tried to pull the plug from the socket, but it was mounted in the wall immediately behind the sander, where I didn't dare to reach. Finally, I ran to the electrical panel and hit the circuit breaker.

The resulting damage included a bent sander shaft and a very frazzled set of nerves. I learned two lessons. First, when sanding internal cutouts, always choose a sanding drum small enough to provide sufficient clearance. Second, have a backup shut-down procedure, in case the off switch suddenly becomes off-limits.

Mark Claypool

Wandering Saber Saw

To make the garden gate I was building look distinctive, I decided to cap it with a 48-in.-radius arched top. To match the thickness of the 4x4 uprights, I planned to make a pair of arches from thinner material and glue them together.

I carefully drew the arch on a pair of segmented, semicircular blanks that I had made by mitering the ends of short 2x6 pieces and gluing them together.

I cut the arches with my saber saw, carefully following my pattern lines. But when I stacked the arches, the curves were a wavy-edged mess.

I inspected both arches. The cuts were smooth and accurate on top, but on the bottom, they wandered back and forth by almost an inch. It was obvious that the saber saw blade had deflected badly while cutting through the thick wood.

I didn't want to start over, so I aligned the arches by facing the two accurately sawn edges. After gluing the arches together, I cleaned up the wavy outer edges with my belt sander.

John Clark

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