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FEBRUARY 1998 #64

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This One



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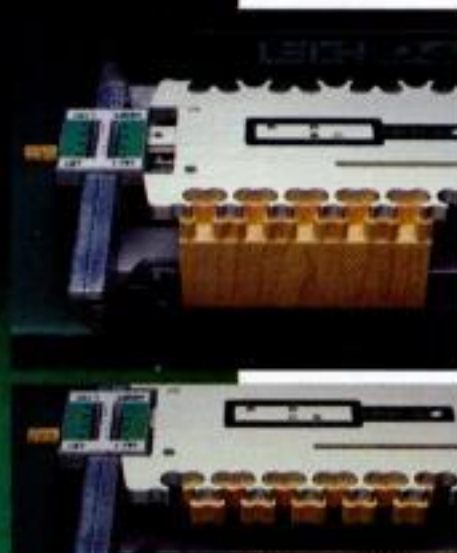
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American Woodworker Magazine, December 1996

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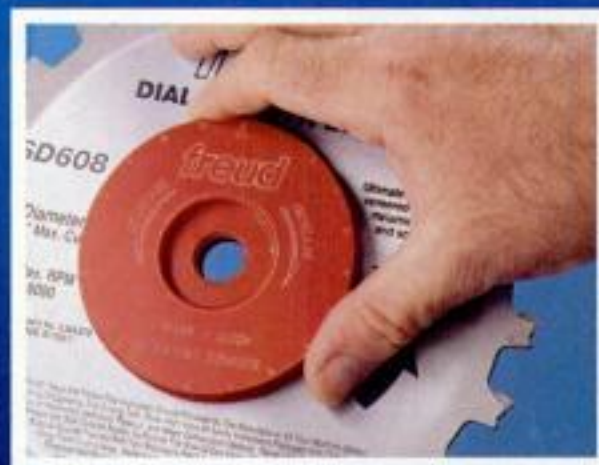
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# It's Not Scrap

*The best ways to make a lot from a little*

I've never liked the term "scrap wood." Scrap, after all, is closely related to waste, and I can't use either term to describe something that's so difficult to throw away. "Offcuts" works better, but still isn't ideal. Can you think of a short way to say "small, valuable pieces of wood left over from various projects?"

The true test for offcuts addiction is moving your house and shop, which I did recently with my wife, Barbara, our two children, and our two dogs. Of course my offcuts came with me. In fact, they're now better organized than ever, and temporarily free of the sawdust that had covered many choice pieces.

I know there are plenty of other woodworkers who hold onto offcuts and hope to use them. Here's where AMERICAN WOODWORKER comes in. Our aim is to discover and share new, interesting, and rewarding ways to transform timber into treasures. Nothing beats creating something beautiful from your "scrap" pile.

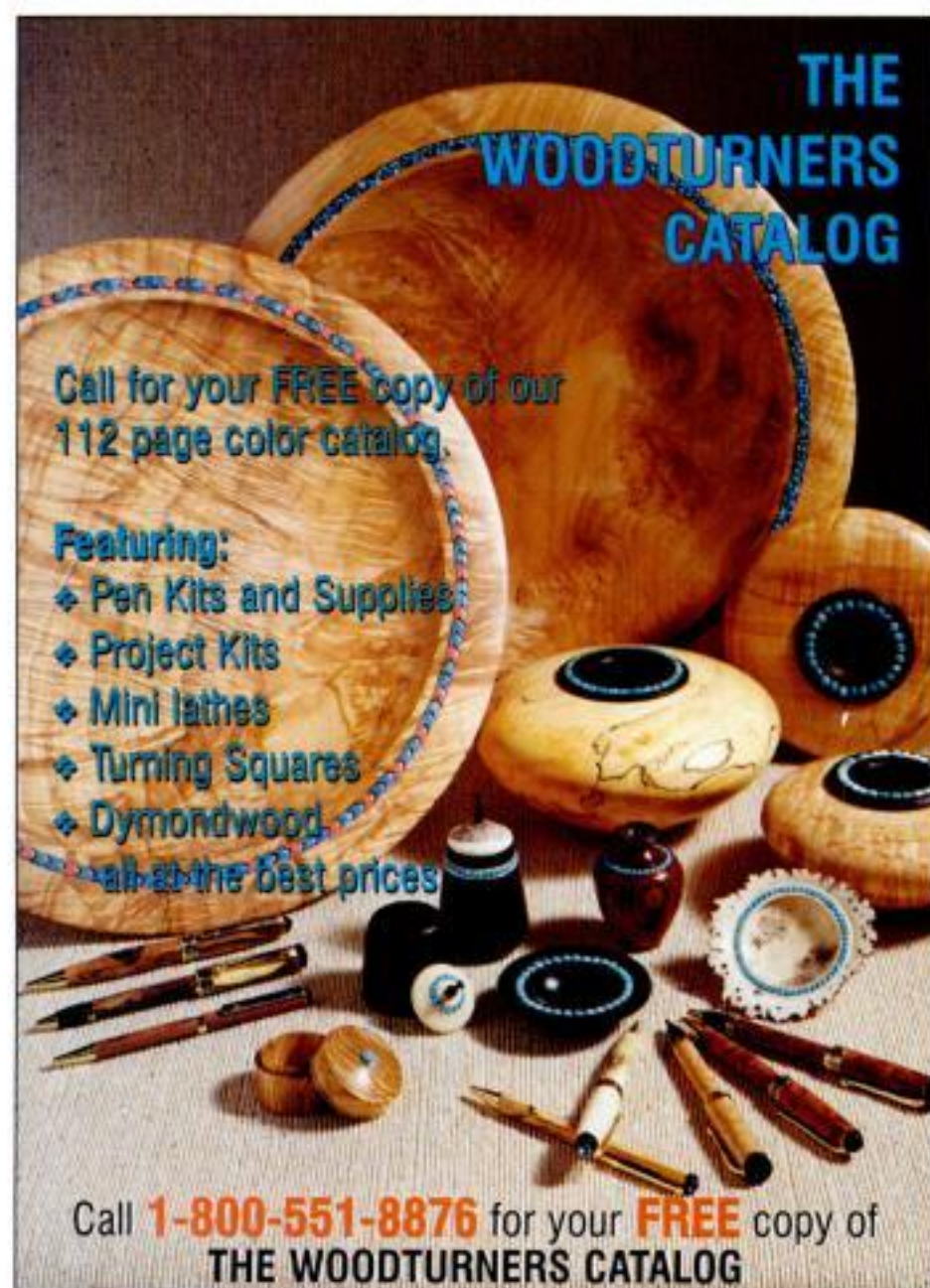
The offcuts "stars" in this issue are Frank Pollaro's veneered box (page 56) and Mike Jagielo's bar clamp bookends (page 68). You can make them entirely from leftovers. If you're still flush with offcuts after building these gems, try Andy Rae's hardware box (page 104) or the nifty ideas in "Tech Tips" (page 30).

It's great to have Norm Abram on board for this issue. 10 years ago, Norm was just beginning to work on *The New Yankee Workshop*. I had the privilege of participating in the launch of this enormously successful PBS series, as coauthor of the first two *New Yankee* books. Thanks to Norm for getting together with us once again. (His last article appeared in our 1996 Buyer's Guide issue.) And thanks to the many, many readers who help this magazine to get better and better. Keep the ideas and feedback coming. ▲

*Tim Snyder*  
Executive editor

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## Mortising Jig Advice

I built Andy Rae's self-centering mortising jig (AW #54), but it did not come out exactly as planned—the clamping beams weren't perfectly centered under the router bit.

I found that if you mark an "X" on the face sides of all pieces to be mortised and make sure that all the X's face the same way in the jig, the joints will be perfectly flush.

David Craven  
San Antonio, TX

### CAD Feedback



The article on choosing CAD programs (AW #60) mentions that the programs under \$50 don't always do what they say. They are right about that—I have tried many and returned many.

The problems with most CAD programs are that they're costly and complicated to learn and to use. Some of them even require classes. If I'm going to end up spending all that time and money on a program, I might as well draw it by hand.

I did find one that is fairly simple to use and doesn't cost an arm and a leg. It's called Key Cad Pro by Soft Key. It costs about \$30 and does a lot for a little CAD program.

David Billock

### Golden Proportion

Nearly 3000 years ago, the Greeks discovered that a very pleasing visual effect could be obtained by using what they called the "golden triangle"—a right triangle whose longer side is 1.618 times the length of its shorter side. Windows and door openings in ancient buildings—and later, furniture and picture frames—were built using these proportions, always with very pleasing results. Anything done with this particular ratio "looked right."

In Bill McCarthy's article "Glass Light Doors" (AW #54), the same applies to the top door in the sidebar on page 50, whose glass lights are almost exactly of golden triangle ratio. This door looks better than any of the others, including the Gothic door below it, which is close.

If you use this proportion in your own work, it will produce an effect you will really like and cries of appreciation from your visitors. The interesting thing is, they won't know why "it looks just right."

E.F. Wale  
Porters Lake, Nova Scotia

### "Excellence" at Anaheim

On behalf of the 1997 Woodworking Machinery & Furniture Supply Fair, I would like to thank you for all of your help and cooperation in making our second annual Design '97 exhibition such a huge success.

The Woodworking Fair was certainly the biggest and most spectacular Fair ever. And AMERICAN WOODWORKER's Excellence in Craftsmanship® photo showcase enriched the overall experience of Design '97. Comments overheard included "beautiful," "incredible," and "such craftsmanship."

Once again, many thanks for sharing your winners with the thousands of attendees and exhibitors at this year's Woodworking Fair.

Sharon Coyle  
Awards Coordinator  
1997 Woodworking Machinery  
& Furniture Supply Fair

### Cecil's Legacy

When I read the late Cecil Pierce's article on dovetailing in AW #54, I discovered what those funny-shaped, sharp-screwdriver-looking things were that my 88-year-old grandfather gave

me nine years ago and that I never touched before reading Cecil's article. They're chisels—go figure!

I got inspired after reading Cecil's article, and I've read it about 200 times since then, just for the pleasure. I know firsthand how valuable an old-timer's advice can be; if it were not for such information, we would all know a lot less. The result for me is the pure love of woodworking I have developed since reading Cecil's article. Thanks!

Curt Allen  
Mandeville, LA

### Two-Screw Solution

I have solved the problem of loose motor pulleys ("Q&A," AW #60) several times by using two setscrews. Tighten one on the shaft, then tighten another one on top of the first.

Bruce Stephan  
Lake Havasu City, AZ

### Brushes and Thinner



Mr. Dresdner's article on buying good brushes ("Just Finishing," AW #61) is absolutely correct. I use Purdy brushes—which aren't the Rolls-Royce, but maybe the Mercedes-Benz—and I have some that are 15 or 20 years old.

On another note, I always recycle my paint thinner into about 10 different jugs and rotate them, using the oldest discarded thinner first. I pour off the sediment at the bottom into a paint can. Over time, the can is filled with just pigment, and as that process goes along, I siphon off the clear thinner back into the jugs. I buy one can of thinner a year, and I have a constant supply of about 8 gallons of recycled thinner that just keep on ticking. I've found it to be a great system—hope it works for you, too.

John Ley

**STAY IN TOUCH!** If you have comments, corrections or news to share, we want to hear from you.

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B. Schoenbauer,  
Charlotte Hall, MD

**A:** Wood Kote manufactures a paste grain filler called **WoodPerfect™** so the consumer will not confuse it with a wood patch. Paste grain (or wood) fillers are used to fill the pores in the grain of "open" woods such as walnut, oak and mahogany. They are not formulated to fill scratches, knicks or nail holes. Generally,

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## Varnish Removal

In response to Michael Dresdner's statement that varnish is hard to remove from your hands ("All About Varnish," AW #61), I always work about a tablespoon of olive oil into my hands and follow it with the same amount of Softsoap-brand hand soap—without water. I rinse off the Softsoap, then add more and keep washing. When the Softsoap starts to bubble, you know that the oil or varnish is gone. And the olive oil leaves your hands soft and smooth.

Liz Bancevich  
Comstock Park, MI

## Folding Rules Are Best

I first got started in the "sawdust" business in 1937, working for Corbett Cabinet Company in St. Marys, PA. You name it, and we made it. Those were the good old days, when a mistake could get you a kick in the pants—or even get you fired. You learned the trade or else.

These days, I'm teaching a young man my "old tricks," including the many uses of a Stanley 3-ft. boxwood folding rule.

I explained to him that the rule is exactly 1 in. wide and  $\frac{3}{8}$  in. thick when folded, and  $\frac{1}{2}$  in. wide and  $\frac{3}{16}$  in. thick when unfolded.

These rules are much better to have around the shop than tape measures. You have to dig around in your pocket or apron to find a tape measure, and they always seem to fill with sawdust and jam just when you need them. The 3-ft. folding rules are 9 in. long when folded, so that they stick up out of your rear pocket, always ready for use. I've even used them for a quick push stick on the tablesaw.

Daniel A. Bunn  
Penfield, PA

*Stanley manufactured more than a hundred different models of specialized wooden rules between 1854 and 1984, including at least eleven 3-ft. folding*

*rules. Model 66 $\frac{1}{2}$ , which was manufactured between 1870 and 1957, is the one that you're most likely to find at flea markets or tool auctions, for approximately \$10 to \$20.—Eds.*

## One Last Project?



Do all of the people who manufacture caskets regard the plans as a deep, dark secret? I have been working myself to death trying to dig up some plans before I drop dead.

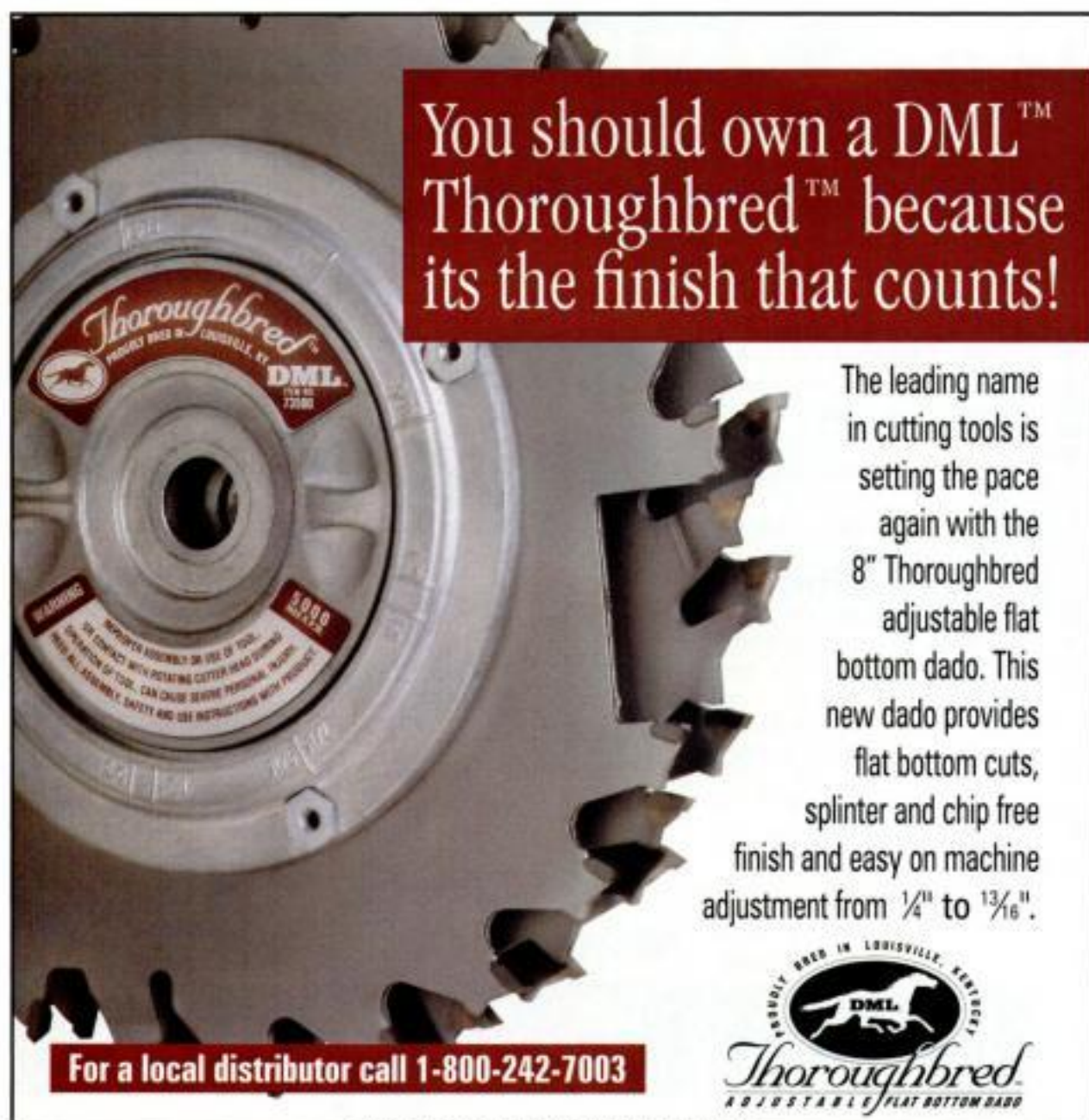
If you have the will, please grant my final request and bequeath me a source so that I may rest in peace.

Kevin Kuechenmeister

*Casket plans, anyone?—Eds.*

## Finding the Fence

The Sears XR 2424 tablesaw fence mentioned in our review of tablesaw fences (AW #61) is Sears part #29902. It can be found in the 1997/1998 *Craftsman Power and Hand Tool Catalog*, page 124.



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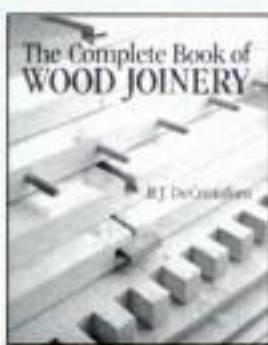
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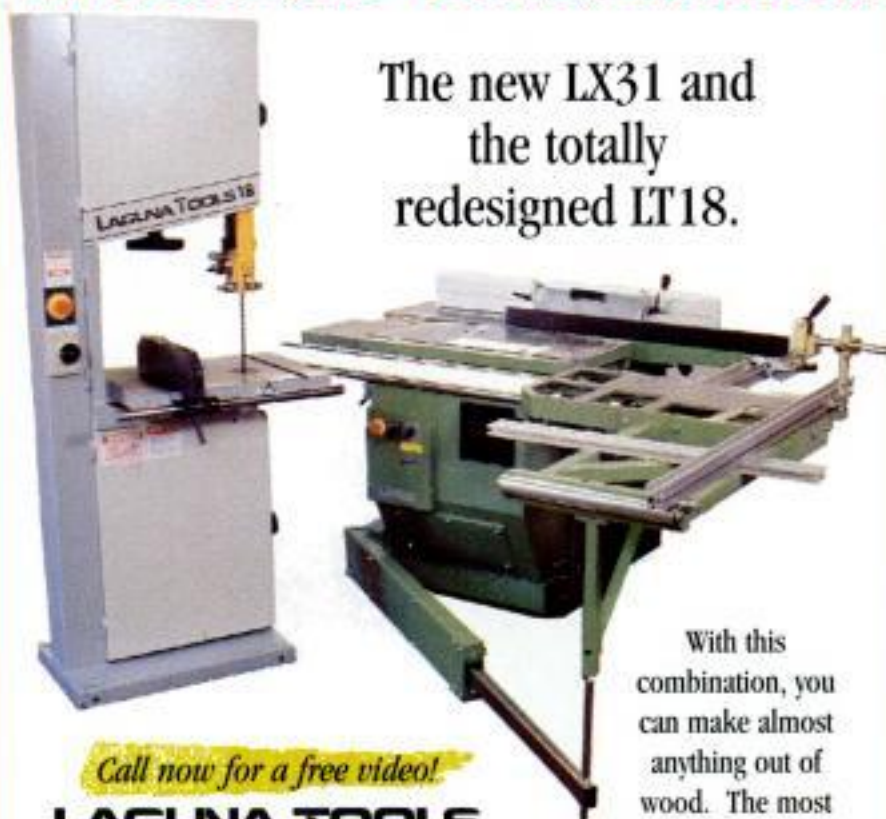


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# A Simple Jig for Routing Hinge Mortises

**Q** I'm making several jewelry boxes to give as presents, and I don't want to cut all the mortises for the butt hinges by hand. Is there any kind of jig available for routing small hinge mortises?

Michele Gaston  
Whittier, CA

**A** Most hinge-mortise templates and jigs in woodworking catalogs are made for use on large entry doors and cabinet doors. But it's easy and inexpensive to make your own for smaller mortises.

This simple jig works for butt hinges that are all the same length. (See drawing, right.) The top must be large enough for at least two clamps to hold it to the box, and the clamps must be far enough from the cutouts to stay clear of your router base. By adjusting the depth of your cutout, you can rout a through mortise or a stopped mortise. Be sure to make the cutouts enough oversize to accommodate your router bit's guide bushing.

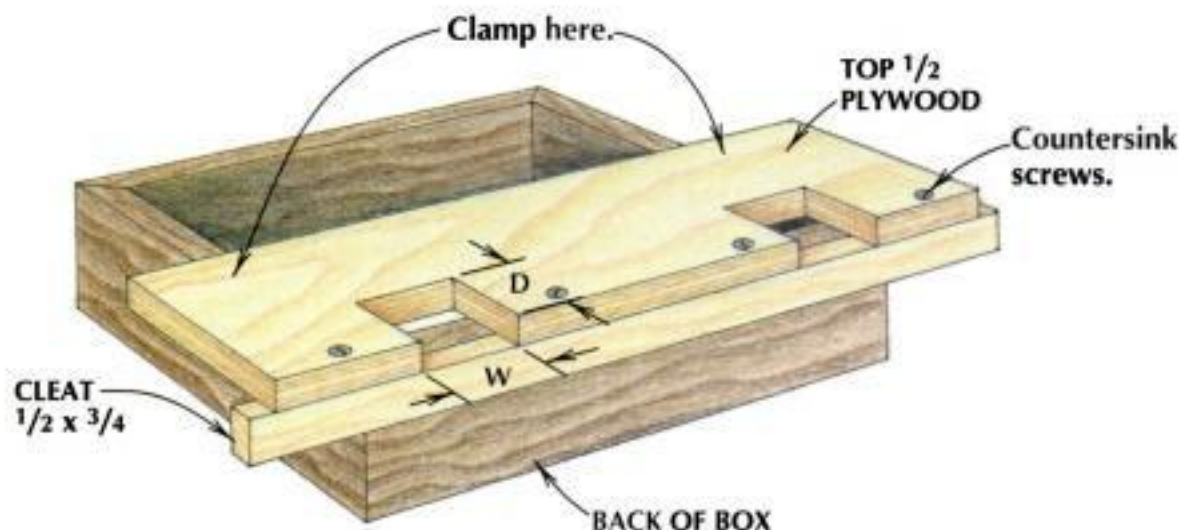
If you're mortising both the lid and the box, set your router bit depth to match the radius of the hinge barrel. It's OK if you set it a hair shallower, but absolutely not deeper. If you're mortising only the box and flush-mounting the hinge to the lid, set the router bit depth to match the diameter of the hinge barrel. Test the setting on scrap before routing the box. When you're finished routing, clean up the corners with a chisel.

Dave Freedman  
Associate editor

## HINGE-MORTISING ROUTER JIG

This jig consists of a simple plywood template screwed to a cleat. Your router's guide bushing rides against the cutout while the straight bit routs the mortise.

$W$  = hinge length +  $2F$ . (See detail.)  $D$  = hinge leaf width + cleat thickness +  $F$ .

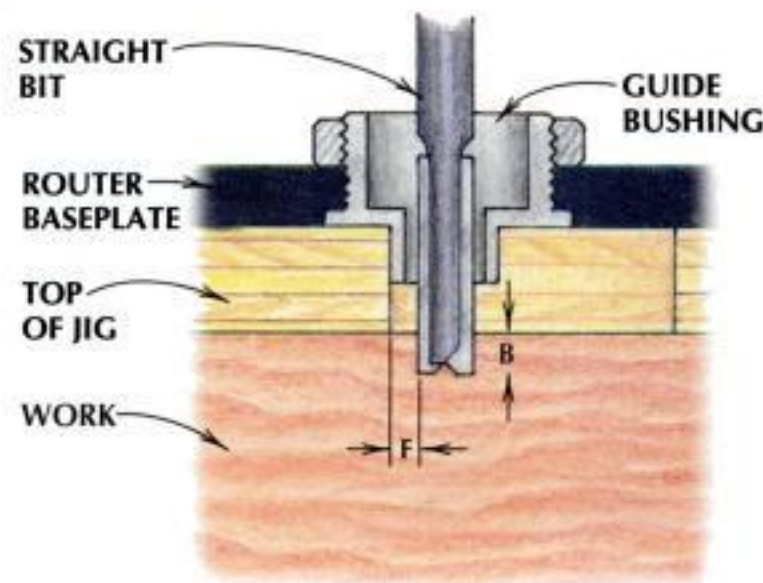


## SECTION THROUGH JIG

$F$  = Guide bushing radius minus bit radius.

If mortising both lid and box,  
 $B$  = hinge barrel radius.

If mortising box only,  
 $B$  = hinge barrel diameter.



## Block Plane Vs. Bench Plane Cutting Angles

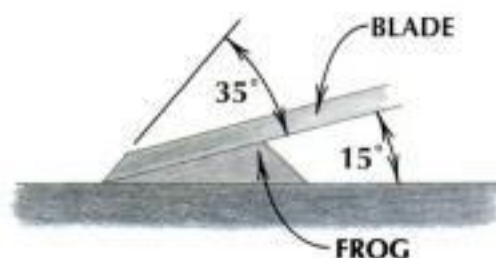
**Q** I recently purchased a fine bench plane, and now I'm thinking of investing in a low-angle block plane. Does the block plane's low angle design make it easier to plane end grain?

Billie Young  
Biloxi, MS

**A** No. End grain takes more energy and strength to plane than any other face of a board. The block plane has two deficiencies here: It's too small to grasp firmly, and it has virtually no heft.

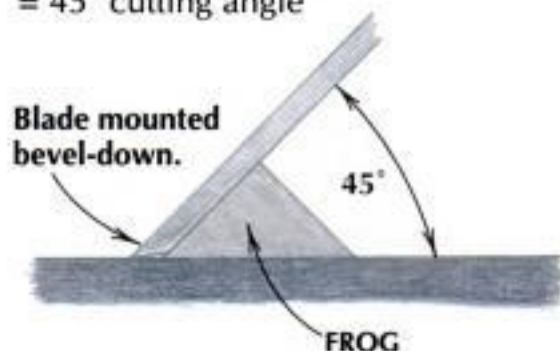
### BLOCK PLANE

$15^\circ$  frog angle +  $35^\circ$  blade angle  
=  $50^\circ$  cutting angle



### BENCH PLANE

$45^\circ$  frog angle + bevel-down blade  
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These weaknesses are relative; if you are planing 1/4-in.-thick by 3-in.-wide end grain, then a block plane will work. But most end-grain planing is on faces much larger than this, so you'll need a larger plane such as a Stanley No. 4 or 4 1/2, or a Stanley No. 7.

The block plane's "low angle" refers to the frog. The cutting angle on a block plane may actually be *higher* than a bench plane, depending on the frog angle and the sharpening angle. (See drawing, previous page.) But the slight difference in angle makes little difference in performance. The variables inherent in the process of planing—sharpness of the blade, sharpening angle, strength and grip of the worker—are all profound factors in the end result, and that's what matters. We prefer to plane end grain with a No. 7 lubricated with paraffin wax.

You may wonder why the manufacturers bothered with a lower frog at all. To make a sleek jobsite tool that would fit in one hand and stow neatly in a carpenter's bag, they eschewed a cap iron and flipped

the blade upside down so that its flat face sat directly on the frog. They had to lower the frog angle in order to compensate for the higher blade angle.

Ian J. Kirby and John Kelsey  
Woodworkers and writers

## Spraying Varnish

**Q** I enjoyed Michael Dresdner's article about varnish (AW #61). However, it did not discuss spraying techniques. Is it possible to spray varnish with an HVLP sprayer?

Rahula Chowdary  
Binghamton, NY

**A** Although varnish is formulated for brushing, you can spray it. Choose a very thick varnish, such as Red Devil Polyurethane, and reduce it 50/50 with acetone. The acetone will allow it to spray easily and will flash off very quickly.

Spray a very light "fog" coat on the entire piece, wait about 5 minutes for the solvents to flash off, then spray a very thin wet coat. The fog coat will

help the wet coat hang without running.

You can also apply varnish with airless sprayers, such as the Wagner power sprayer. With these tools, there's no need to reduce the varnish. Simply spray it very thin and ignore the "orange peel"—it will come out as the varnish cures.

Michael Dresdner  
Industrial finishing consultant  
and AW contributor  
Puyallup, WA

## WHERE TO FIND IT

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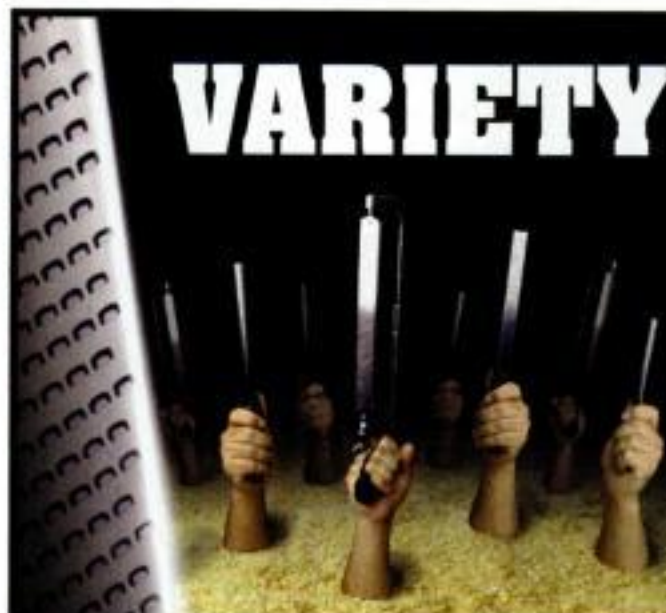
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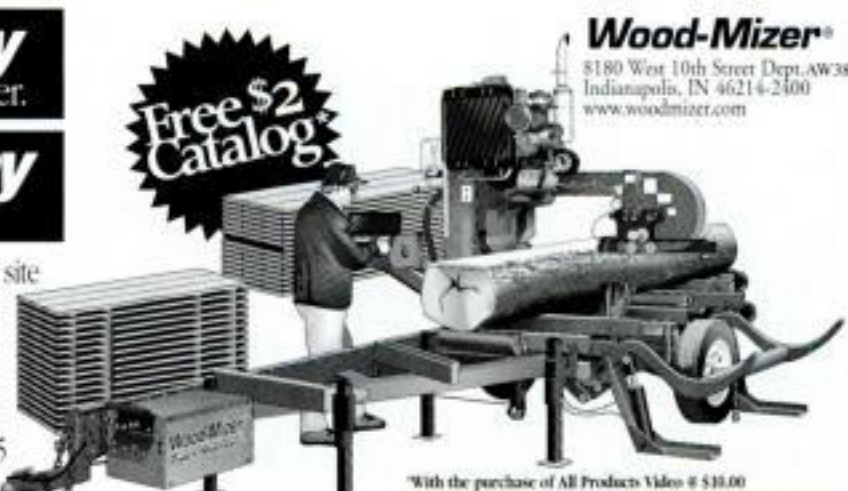
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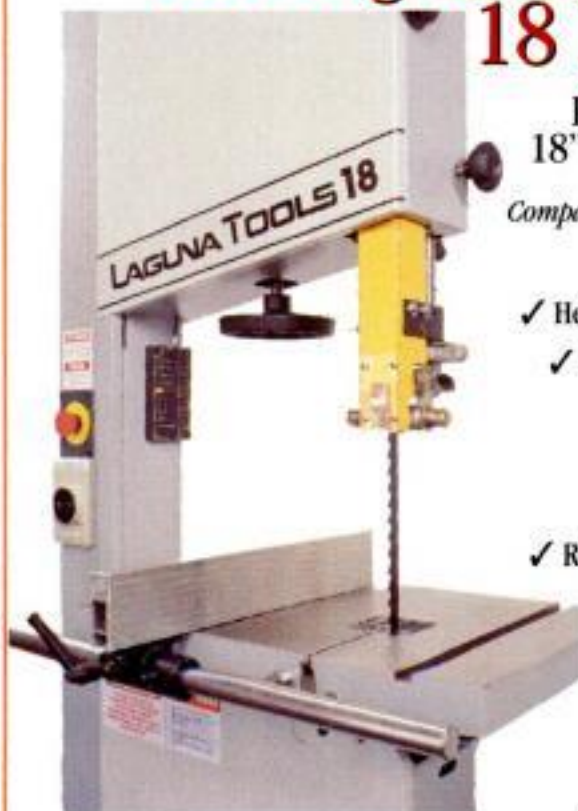
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CIRCLE NO. 58 ON PRODUCT INFORMATION FORM



## Cut-and-Dried Oak

**Q** I'm planning to harvest some red oak trees this spring, saw them up myself, and store the lumber in my basement. But I've heard that you shouldn't cut trees for lumber once the sap has risen in early spring. Is this true?

Bill Morris  
Kershaw, SC

**A** Like most hardwoods, oak should be cut in the fall or winter when the sap is down. It will save you an immense amount of drying time, and it will also decrease the risk of fungal attacks that can discolor the wood.

Oak is one of the most difficult woods to dry, whether air- or kiln-dried. It needs to dry very slowly, with good ventilation.

For best results, sticker the lumber carefully. To help prevent checking and warping, it's best to sticker the lumber outdoors for a while. Find a flat place and lay down a sheet of 6-mil polyethylene. Put down a row of 4x4s 18 in.

apart. Then put down your first layer of lumber. (All your lumber will run perpendicular to the 4x4s.) Between each layer of lumber, place 1/4-in-thick lath strips at the exact same intervals as the 4x4s—no farther apart. To prevent sagging and warping, each lath strip should fall in a vertical line with the strip in the layer below it. Also leave about 1/2 in. of air space between the edges and ends of the boards, so air can circulate freely. Put corrugated roofing on top of the pile to deflect rain and snow, and weight it down so it can't blow away.

Keep tabs on the lumber's moisture content (MC) with a moisture meter. (See AW #34.) When the wood reaches 15% to 20% MC, move it indoors to an area that's about as dry or humid as the place where your furniture will be. Sticker it and let it dry until it reaches 8% MC. The entire air-drying process takes about a year per inch of thickness.

Paul McClure  
Wood technologist  
Denver, CO

## Fear Not Shellac

**Q** In "Just Finishing," AW #60, Michael Dresdner says shellac is "compatible with almost all finishes." So why do most finishes I buy say not to apply them over shellac?

Mark Stryker  
Jersey Shore, PA

**A** What finish manufacturers fear is not shellac, but the wax it can contain. Finish won't adhere well to wax.

Wax occurs naturally in shellac, but it is often removed in refinement. To be safe, buy *de-waxed* shellac flakes and mix your own finish from them. I add one quart of denatured alcohol to 8 ounces of dewaxed flakes.

Michael Dresdner

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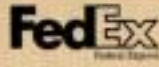
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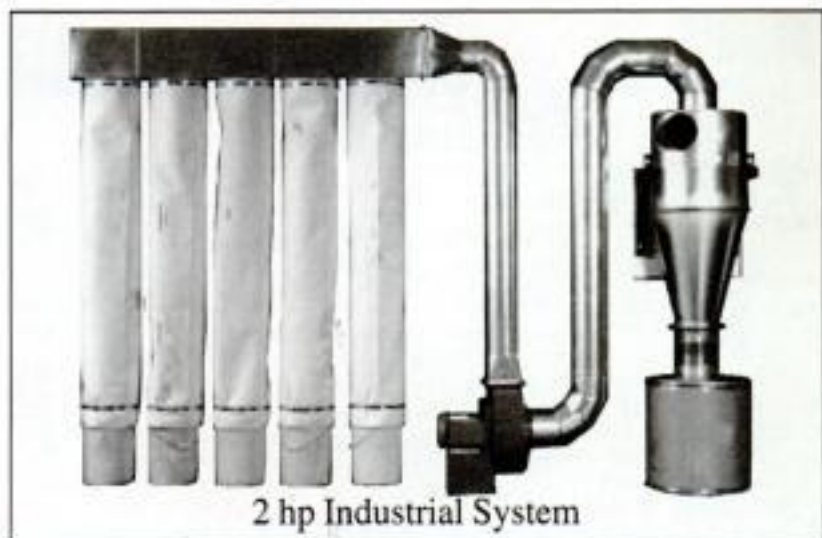
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# offcuts

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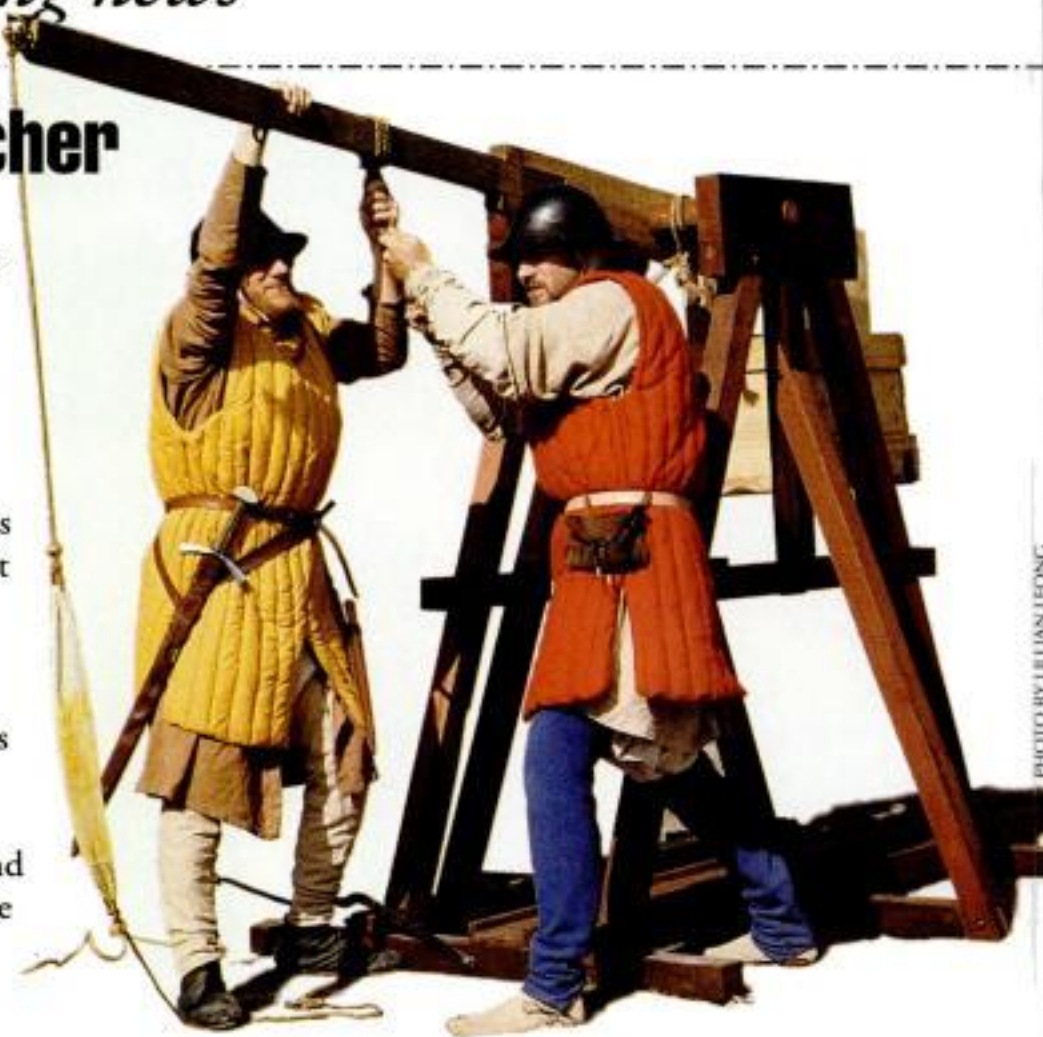
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## Larger Launcher

**R**ussell Miners, author of our recent story on building a miniature trebuchet (AW #63), has also built larger versions that hurl 2-pound balls, teddy bears, and soft-drink cans as far as 200 ft. Miners' largest treb is about one-sixth the size of a giant medieval trebuchet that was capable of launching 1-ton boulders over fortress walls.

A handful of historical-reenactment societies around the world, particularly those whose primary interest is medieval combat, have recently sparked a sort of trebuchet revival. Some of these retro-warriors build full-scale "siege engines," test the trebuchet's limits in range and accuracy, and launch some outrageous projectiles: grand pianos, flaming toilets, Buicks—you get the picture.



**Retro-warriors.** Russell Miners (left) and John Southall, of western Australia, wear medieval combat garb as they cock the trebuchet's beam to prepare for launching.

Miners can knock down his midsize "treb" (see photo, above) to a pile of timbers and bolts. He transports it to reenactment festivals around

Australia, where he lives.

For more information, see Miners' trebuchet website: [www.iinet.net.au/~rmine/gctrebs.html](http://www.iinet.net.au/~rmine/gctrebs.html).

## GUILD'S CHARITY WARMS HEARTS



**Instead of empty stockings,** some 125 disadvantaged kids in the Los Angeles area received toy bulldozers this holiday season, thanks to the San Fernando Valley Woodworkers (SFVW).

Every summer the SFVW meets to design a new wood toy and to plan its production. Local businesses and civic groups donate wood, supplies, and use of a commercial-size shop

### **Holiday spirit.**

San Fernando Valley (CA) Woodworkers show off the toy bulldozers they made.

facility. Members of the SFVW make the toys with assembly line efficiency at the end of summer. Local charitable organizations then distribute the toys to children in December.

For more information about the SFVW, call Mac Pace, the guild's president, at (818) 341-7135.





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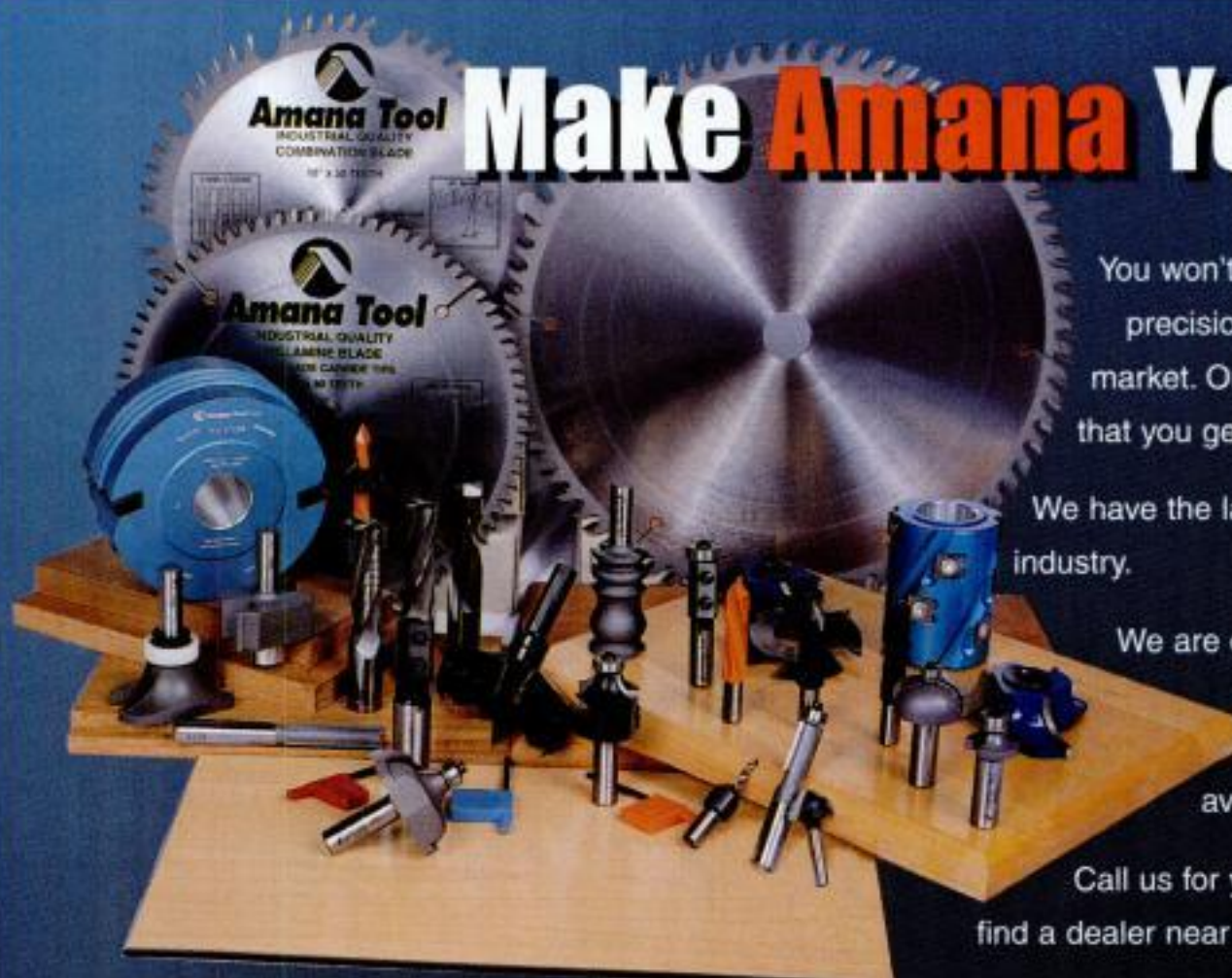
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## Detroit Area Wowed by The AMERICAN WOODWORKER Show™



**Odate on shoji making.** Toshio Odate demonstrates on a traditional planing beam.

**N**ever before have so many master woodworkers come together to share their secrets! Thousands of woodworking enthusiasts came to learn from the experts last September, when The AMERICAN WOODWORKER Show™ hosted an impressive exposition in Novi, MI (near Detroit).

Showgoers were treated to expert advice and demonstrations on hand-tool joinery, sharpening, router techniques, shop layout, shoji making, carving, and furniture design—just to name a few.

The Los Angeles area is the next destination for The AMERICAN WOODWORKER Show™. The action begins March 6 at the Ontario Convention Center and runs through March 8. For information, call

800-914-9395 or visit The AMERICAN WOODWORKER Show™ website at <http://americanwoodworker.show.com>.



**Weber on bodging.** Don Weber shows how he makes chair spindles on his pole lathe.

## TOY CONTEST WINNER

"Toying with Wood" was the theme of the fourth annual Wharton Esherick Woodworking Competition last summer. That's exactly what John Morgan was doing when he designed his winning entry, "Dangerous Weapon." (See photo, right.) Morgan carved the 5½ by 7 by 2-in. caricature mainly out of pine and basswood, studded it with dowel pegs, and painted it with enamel. Squeezing a plywood trigger in the neck activates spring-loaded brass rods that open the eyelids and extend the tongue. Morgan won \$500 for his imaginative efforts.

The contest was sponsored by the Wharton Esherick Museum in Paoli, PA. Wharton Esherick was an imaginative woodcarver, furniture maker, and teacher who encouraged



**A tongue with a trigger.** John Morgan's carved, painted character opens its eyes and sticks out its tongue when you squeeze its neck.

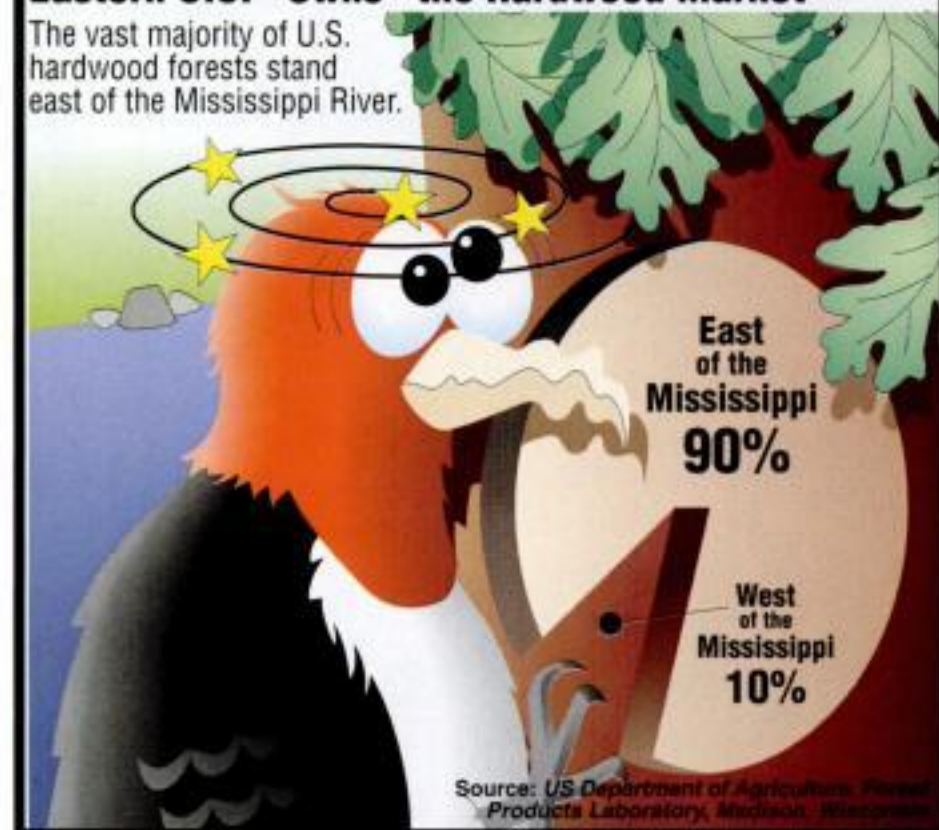
his students to have fun and to develop nontraditional styles. Morgan is an associate professor of art at Auburn University in Alabama.

The theme of next year's competition is "Three-Legged Stools." For more information about the Wharton Esherick Museum and its annual competition, call (610) 644-5822.

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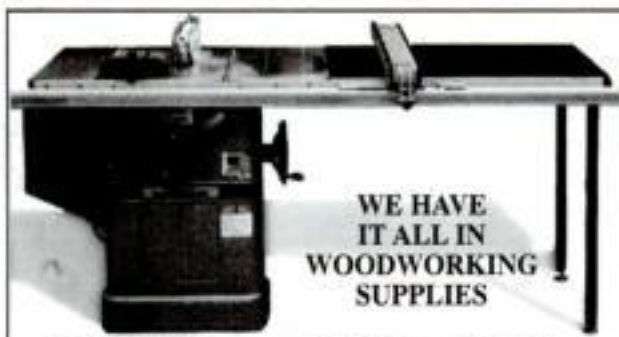
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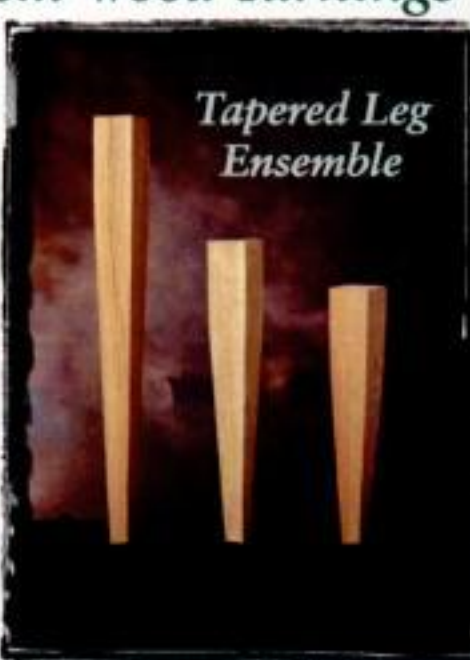
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|------------------------------|------------------|---------------------|----------------------|
| 10" x 30 T (1/8" or 3/32" K) | <del>\$99</del>  | \$89                | \$79                 |
| 10" x 40 T (1/8" or 3/32" K) | <del>\$119</del> | \$107               | \$95                 |
| 12" x 40 T                   | <del>\$129</del> | \$116               | \$103                |
| 8" or 8 1/4" x 40 T          | <del>\$99</del>  | \$89                | \$79                 |
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|         | Sale Price       | 10% Off First Dado | 15% Off Second Dado |
|---------|------------------|--------------------|---------------------|
| 6" set  | <del>\$269</del> | \$242              | \$229               |
| 8" set  | <del>\$289</del> | \$260              | \$245               |
| 10" set | <del>\$349</del> | \$314              | \$297               |



### WOODWORKER I: 7 1/4"-14" dia. avail.

Designed for radial arm or tablesaws—fine crosscut.

|                               | Sale Price       | 10% Off First Blade | 20% Off Second Blade |
|-------------------------------|------------------|---------------------|----------------------|
| 8", 8 1/4", 7 1/4" x 60 Tooth | <del>\$109</del> | \$98                | \$87                 |
| 10" x 60 Tooth                | <del>\$129</del> | \$116               | \$103                |
| 12" x 60 Tooth                | <del>\$139</del> | \$125               | \$111                |

### DURALINE HI A/T: 7 1/4"-16" dia. avail.

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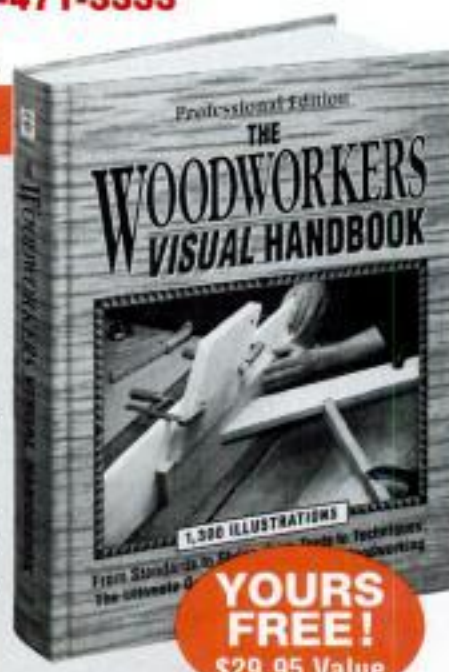
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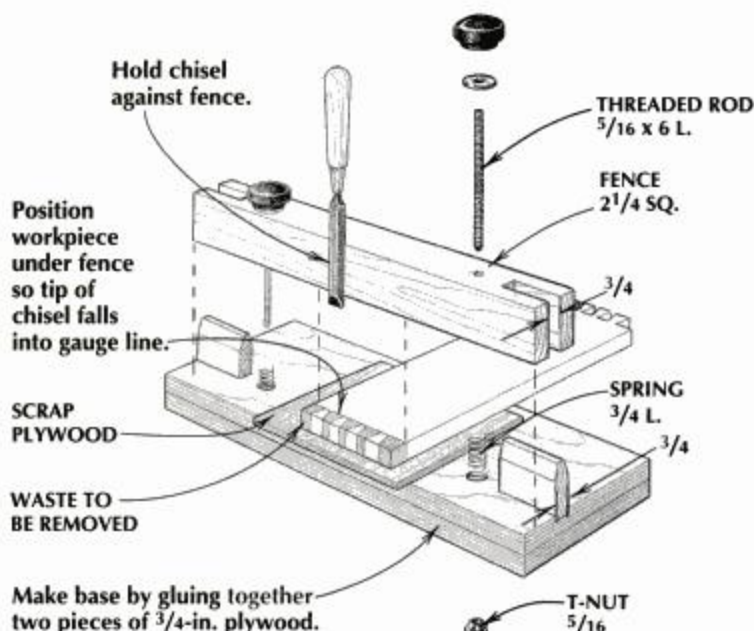


# Chopping Square

*Best tip of the issue*

Most of the dovetails I produce are cut by hand. The fixture shown here helps me keep my chisels square to the face of the work when chopping out the waste. To use the device, clamp the workpiece under the fence so the tip of a chisel falls into the gauge line. Use a piece of 1/4-in.-thick scrap plywood under the workpiece to prevent chiseling into the base of the fixture.

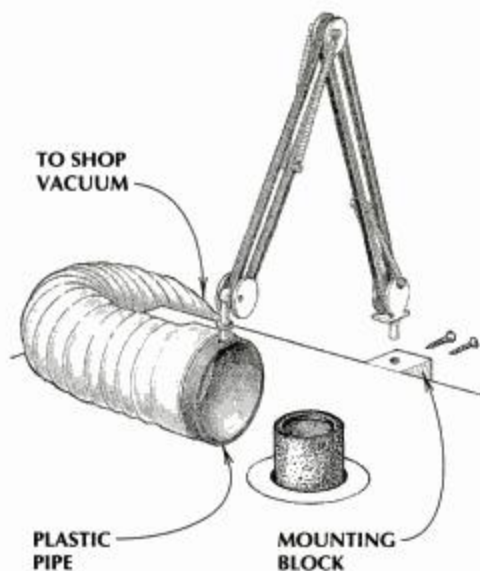
William White  
Williston, VT



**Best tip wins \$200.** Know a better way of doing something? Designed a clever jig? Send your original woodworking tips, along with a sketch or a snapshot to: "Tech Tips," American Woodworker, 33 E. Minor St., Emmaus, PA 18098. We'll pay \$50 for each tip we publish and \$200 for the best tip of the issue.

## Vacuum-Hose Holder

I made this vacuum-hose holder so I could position the suction exactly where it was needed. I removed the bulb hold-



er and shade from a folding-arm desk lamp and replaced them with a short piece of 4-in. plastic pipe. This swivels to give maximum flexibility. I then connected the vacuum through a 5-ft. length of flexible hose and attached the lamp base to a block screwed to the side of my oscillating spindle sander table.

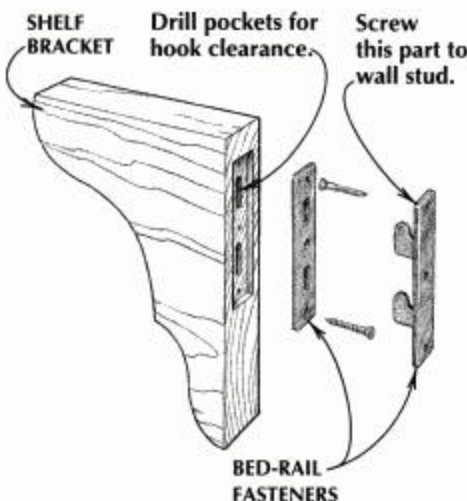
This has proved so effective in collecting dust that I've screwed mounting blocks to my drill press, router table, and even my workbench.

David Bedrosian  
Beaverton, OR

## Invisible Shelf Supports

I needed to support a shelf in a newly remodeled kitchen without any visible screws or hardware. It struck me that bed hardware was the perfect answer. I screwed the hook side into a stud in the wall, then routed a recess for the latch in the bracket. Bed-rail fasteners are available from common mail-order catalogs in 4-, 5- and 6-in. lengths.

Allen Maddy  
Columbia, MO



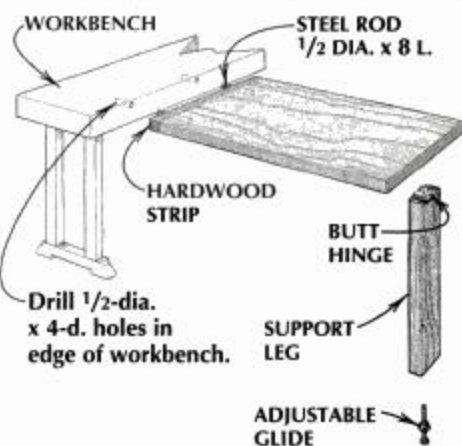
## Spring-Clamp Storage

My father always kept his spring clamps on a leather belt and hung the buckle on a nail. This takes up very little room and is portable—you can readily move the entire belt over to your project.

Scott Taylor  
Greenleaf, WI

## Workbench Extension Table

Being perpetually short of bench space, I came up with this removable extension table. Metal rods connect table and bench so both surfaces are flush. This



also allows the table to be pulled back a few inches for those drill-through jobs. You can install an adjustable-height glide on the end of the leg to make up for small height differences. If you use a hollow-core door, reinforce the edge with a solid wood strip as shown. When the table isn't needed, I fold the support leg and stack it against a wall.

Carl DiTullio  
Weymouth, MA

## Drawing Spirals

Here is a simple way to draw a spiral: Decide how much you want the circle to diminish with each complete turn—3/4



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| 1-3/8" x 1/8" Hearts | \$6/100  | — |
| 1-3/8" x 1/4" Hearts | \$8/100  | — |
| 1-3/8" x 1/2" Hearts | \$11/100 | — |
| 2" x 1/2" Hearts     | \$19/100 | — |

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|----------------------------|------------|------|
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| 1/2" Maple Buttons         | \$2.35/100 | —    |
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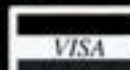
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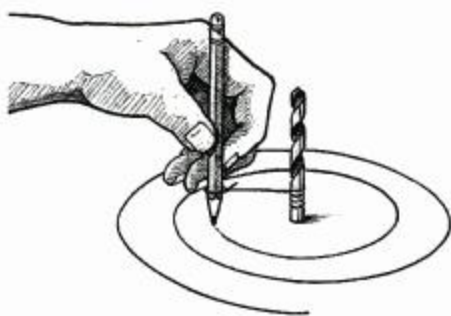


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in., for example. Dividing that by 3.14 gives you 0.24 in., so select a 1/4-in. drill bit. Drill a 1/4-in. hole in scrap wood, tuck the end of the string down

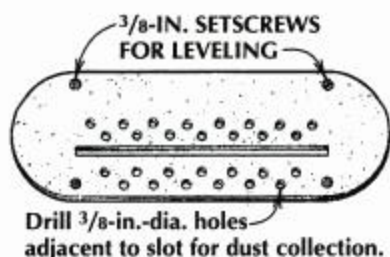


the hole, and insert the drill. Now make a loop in the string for the pencil and draw the spiral.

Michael Burton  
Ogden, UT

## Teflon Table Inserts

Tablesaw inserts have too big an opening for many applications, so I made a zero-clearance insert from a 3/8-in.-thick plastic cutting board (sold at kitchen supply centers). Using the existing insert as a pattern, I cut out the shape and drilled and tapped it for four 3/8-in.



leveling screws. Then I clamped a piece of wood across both saw table and insert, turned the motor on, and slowly raised the blade up through the new insert. If your saw is connected to a vacuum system, drill holes adjacent to the slot for better dust pickup.

Tom Moore  
Clarksville, VA

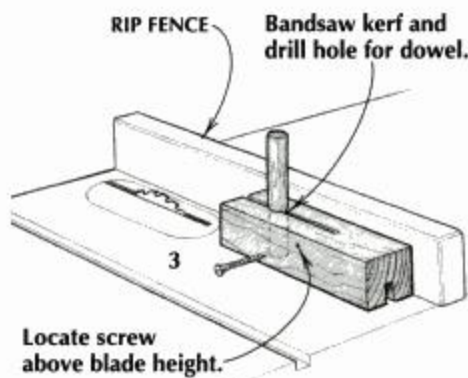
## Scrapers for Free

I recently discovered that I could cut my dull Japanese saw blades with tin snips. Instead of discarding the dull blades, I now grind them into scrapers of various shapes and even into putty knives. They can be sharpened like a regular cabinet scraper.

Paul Fleming  
Oklahoma City, OK

## Dowel-Slotting Jig

This jig holds a dowel vertically so you can cut a slot in one end on the tablesaw. Start with a straight, square block at least 12 in. long, and drill a hole near one end the same diameter as the dowel you want to slot. Then bandsaw a kerf through the hole, about 2/3 the length of the block.



Install a screw (above blade level) that can tighten the jig to keep the dowel from rotating. When you use the jig, feed its entire length through the blade.

Mike Jagielo  
Almond, WI

## Shop-Made Parting Tool

I turn a lot of bowls and needed a curved parting tool so I could "nest" several bowls from one block of wood. The local junkyard provided a leaf spring with a good curve—then a friend with a cutting torch notched it as shown. After I had ground a parting



tool profile on the narrow end, the new tool was ready to go. The steel is very hard and really holds an edge.

Kip Stratton  
Morris, NY

## Renewing Velcro Sanding Pads

The Velcro pad on my random-orbit sander finally lost its grip. Instead of ordering a new one (\$20 and two trips to town), I got a hook-and-loop conversion

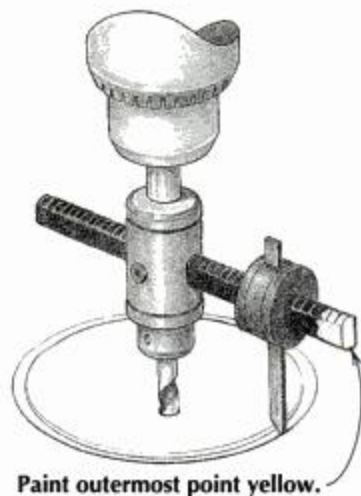
kit for \$11.95 (available from Woodworker's Supply, 800-645-9292, item #901-872). I removed the worn pad and cleaned the exposed disc surface with rubbing alcohol. Then I cut a circle out of the self-adhesive fabric and stuck it to the disc. I figure there is enough material for eight new discs.

Steve Toschik  
Broken Arrow, OK

## Circle-Cutter Hazard

Jet engine rotors are painted so you can tell at a glance when they have stopped revolving—or haven't. I've taken this as a caution and marked the outermost point of my circle cutter in yellow paint. Now I know exactly where not to put my hand or sleeve.

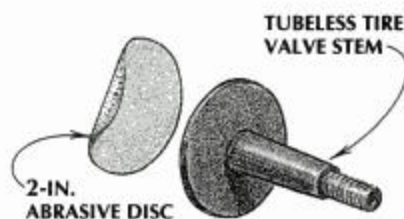
Patrick Nichols  
Crockett, CA



## Economy Detail Sander

Needing a small detail sander, I bought a valve stem from an auto parts store. I chucked it in my 3/8-in. drill and applied a 2-in.-dia. self-adhesive abrasive disc. For even greater economy, you could buy the abrasive in rolls (available from Industrial Abrasives, 800-428-2222), and cut your own discs.

Jack Cornish  
Sinks Grove, WV





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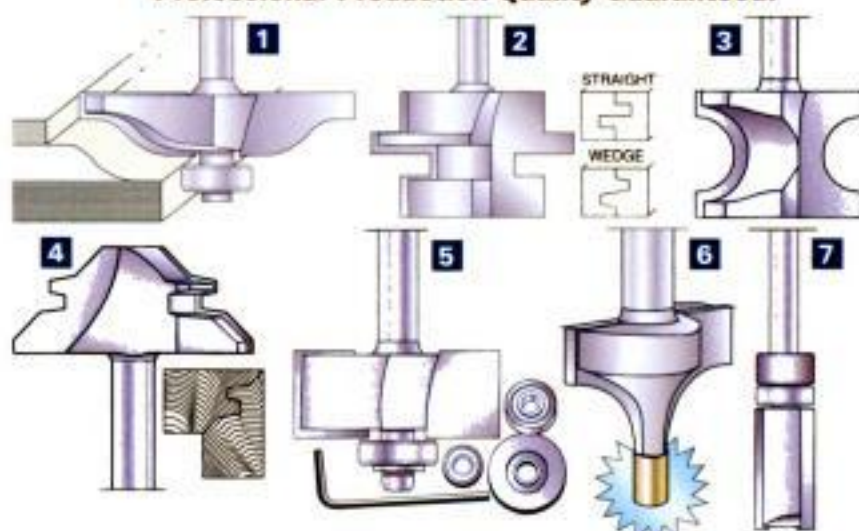
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# Rolling Shop Cabinet

*A mobile shop helper from The New Yankee Workshop*

by Norm Abram

Space is precious in any workshop, so workshop accessories really have to earn their keep. That's why I like my rolling shop cabinet. Its multi-purpose personality makes it a valuable helper.

Providing outfeed support for my tablesaw is the cabinet's most important function. When you work alone as I usually do, it's helpful to expand the tablesaw's working surface. My cabinet's top is at the same height as the top of my tablesaw, and its plastic laminate surface is super smooth for wood to slide across. The plastic laminate is durable too, and wood glue doesn't stick to it very well.

Another use for my cabinet is as a stand for benchtop tools like my portable planer. (See photo, opposite.) The cabinet's locking casters ensure a solid stance, but also make it easy to roll the unit out of the way easily.

With a drawer to hold small items and a large lower compartment, the cabinet offers plenty of storage space. Heavy-duty (100-lb.) full-extension slides enable the drawer to carry plenty of weight and slide out for maximum access. I use a similar slide mechanism designed for slide-out shelves on the lower compartment's shelf. This hardware is available at building supply outlets and from mail-order catalogs.

## Tools and Materials

Just about all the wood that goes into this project is plywood. I recommend using hardwood plywood. The hardwood face veneers will provide a much better appearance than softwood,

and they sand and finish nicely. You will need about 1½ sheets of ¾-in.-thick plywood to make the parts for this cabinet.

## Case Joinery Details

The case joinery is simple—mostly dado joints that are fastened with glue and 1½-in. drywall screws. Start your case work by cutting the sides, bottom, back, and top rail pieces to size. Then set up your dado cutter in the tablesaw. Adjust the cutting width to match the thickness of these parts and raise the cutter ¼ in. above the table. Now you can cut three dados in each side, two dados in the back, and a dado across the inside face of the top rail. Guide the workpiece against the rip fence to make each cut. As shown in Fig. 1, all the dados extend the full length or width of the sides. There's no need to cut stopped dados because edge banding will cover the through dados as well as the exposed plywood edges.

## Assembling the Case

Glue the bottom and back to the sides, then pull the joints tight with drywall screws, driven in counterbored pilot holes. Fill the resulting holes with wood plugs. Add the corner blocks, which fit in the upper dados. Then glue small, solid wood filler blocks (four per side) to fit in the open dado areas near the edges of the sides. These filler pieces will provide solid backing for the edge banding strips.

Now screw the two shelf cleats inside the lower part of the cabinet. You can use these simply to support a fixed shelf, but my preference is for a shelf that

slides out on full-extension hardware similar to that used on the drawer. This lets you access what's on the shelf without getting down on your knees. I put lipped edges on my slide-out shelf to prevent stored objects from falling off. (See cover photo.)

Now you can edge-band the case. I really like the self-adhesive wood edge banding that you can get at most home centers and building supply outlets. These rolls of ⅓-in.-thick wood edging are easy to use, and they offer a quick, inexpensive way to conceal plywood edges. The adhesive is heat activated, so you can adhere it with an iron set on low. Simply place the edging on the edge to be covered and run the iron slowly over the strip.

After applying the edge banding, I used a router and flush-trim bit to trim any protruding banding from along the edges. This is also a good time to trim the dowel plugs flush with the cabinet sides and then sand the case.

## Top Construction

The top has a high-density particleboard core, reinforced with 1½-in.-thick cleats and solid oak edging. (See Fig. 3.) The top's stiffness and the fact that the edges overhang the sides make it a great clamping surface.

To make the top, start by cutting the particleboard to its finished dimensions and the plastic laminate sheet about ½ in. larger than its final size. Then attach the cleats and oak edging. Miter the oak pieces where they meet at the corners, then install them with glue and 1¼-in. screws, driven in counterbored

*Roll-around utility for any room. You might have to build two versions of Norm's cabinet—one for the shop and one for the kitchen.*

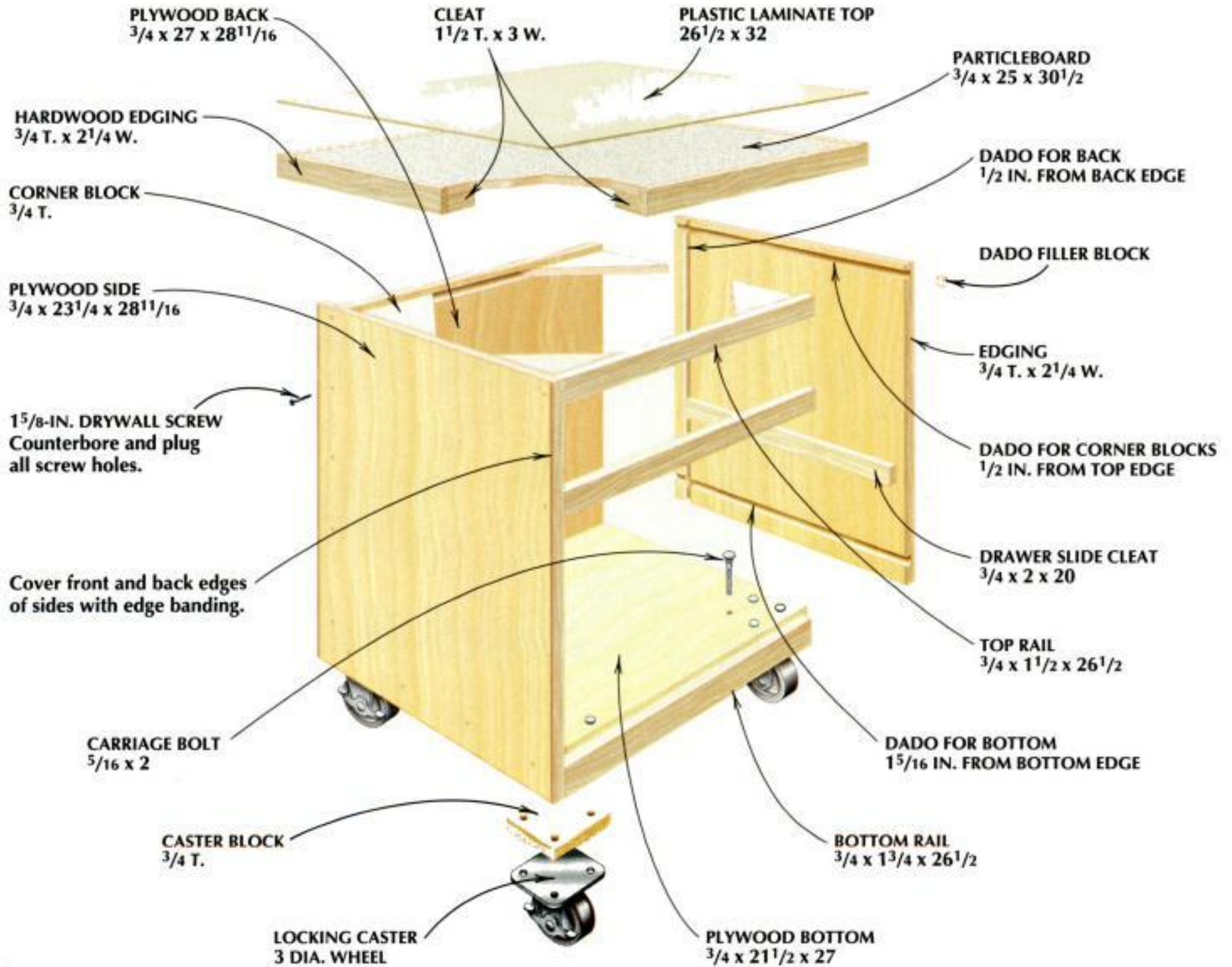






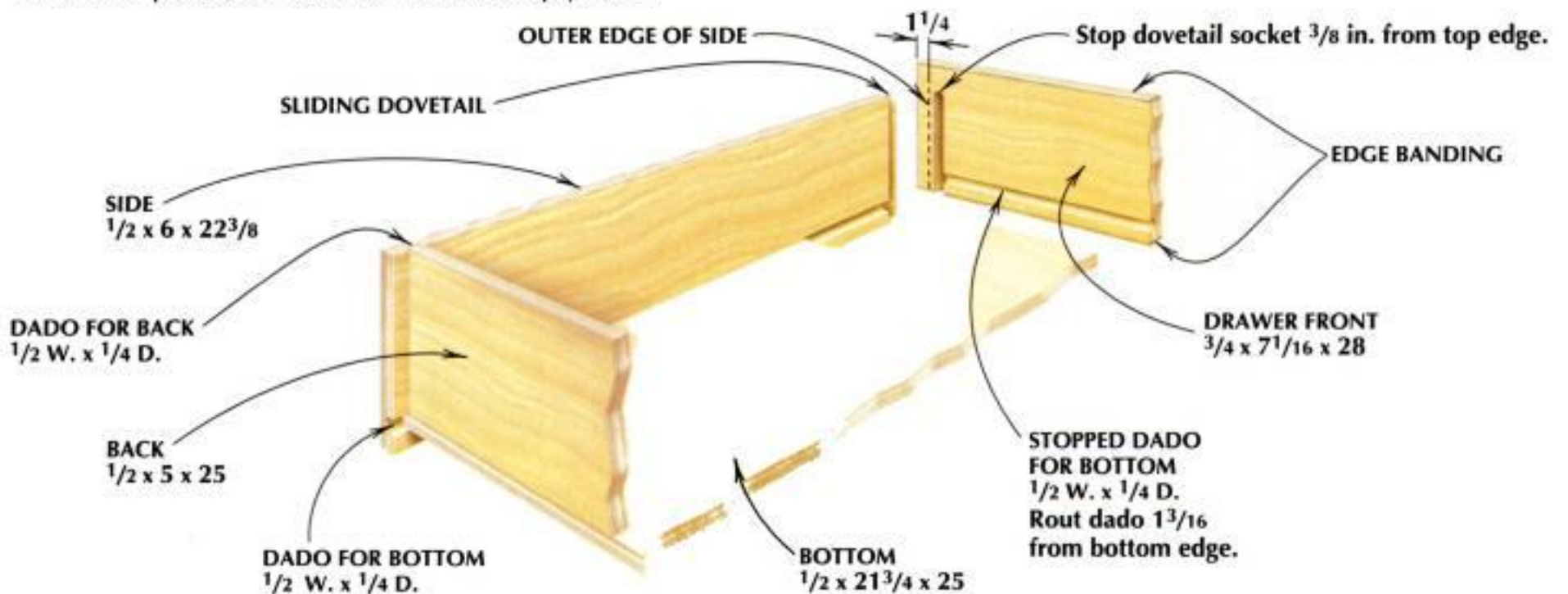
## FIG. 1: CASE CONSTRUCTION

Make all dados  $\frac{3}{4}$  in. wide,  $\frac{1}{4}$  in. deep. After assembling the case, glue filler blocks in voids left at ends of dados. Then cover exposed plywood edges with edge banding.



## FIG. 2: DRAWER CONSTRUCTION CUTAWAY VIEW

All drawer parts are made from hardwood plywood.





holes. The top edge of each oak piece should be flush with the top surface of the particleboard. It's good to sand the particleboard after edging it, to ensure you've got a smooth, flat surface for the laminate. Fill the counterbored holes with wood plugs.

Spread an even coat of contact cement on the substrate and on the underside of the laminate. When the adhesive is dry to the touch, you're ready to laminate. You don't get a second chance to align the laminate on the substrate, so take care with this step. With a small top like this one, you can align the back edge of the laminate with the back edge of the substrate and slowly drop the laminate down until full contact is made. Use a roller or a flat, heavy block of wood to press the laminate down firmly.

To finish up the top, rout a chamfer along the outside edge. A 45° carbide-tipped chamfering bit will trim the excess laminate from around the top edges and also cut a smooth chamfer into the oak edge strips. This gives the top a crisp finished appearance.

### Doors and a Drawer

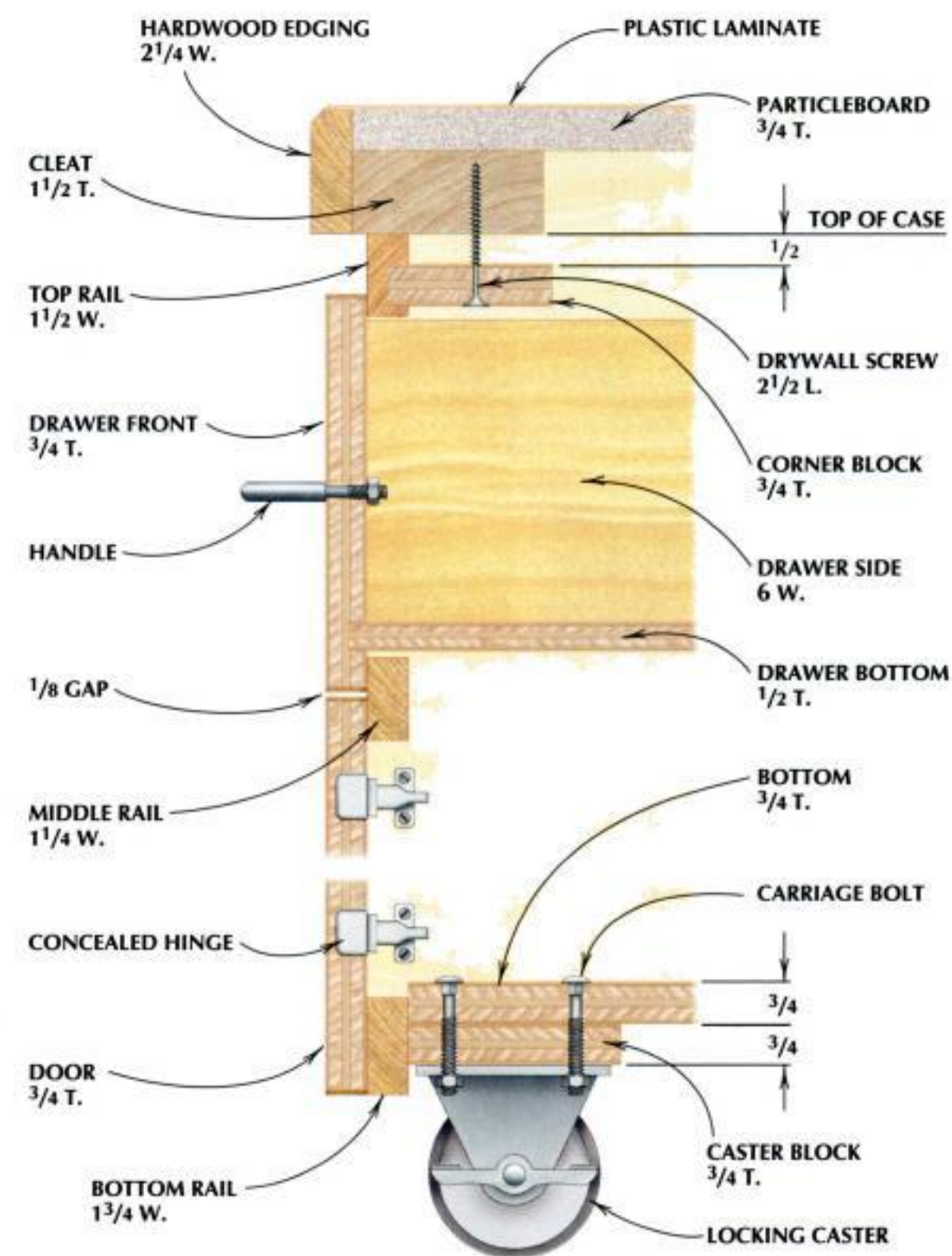
The full overlay doors are two identically sized pieces of edge-banded plywood. I allowed for a 1/8-in. gap between the doors when they're closed. To hang the doors, you'll need four concealed, European-style hinges that open 125°. Mail order suppliers and woodworking supply outlets stock different brands of these hinges. Order self-closing versions so you won't need to mount door catches. You'll also need to buy a matching mounting plate for each hinge.

If you haven't used European-style hinges before, you'll be surprised at how easy they are to install. Following the manufacturer's instructions, drill two 35-mm-dia. holes in each door for the hinge cups. Then screw the mounting plates to the cabinet sides and attach the hinges to the plates. The hinges allow you to adjust door alignment easily.

Strength is important for workshop drawers. So I joined the drawer sides to the front with sliding dovetails. (See Fig. 2.) This type of joint is easy to make with a router and a dovetail bit. Always cut the dovetail socket first. Lay out each socket centerline 1 1/2 in. from each end of the drawer front and stop the socket 3/8 in. from the front's top edge. Cut the sliding tails in the sides on the router table, using the same dovetail bit. Guide the faces of each side against the router table fence to

## FIG. 3: CASE SECTION DETAILS

The cabinet's doors and drawer front overlay the sides and rails. Fasten the top to the cabinet by driving a screw through each corner block.



cut snug-fitting dovetails. (For an alternate method of making these "French" dovetail drawers, see page 40.)

Complete the remaining drawer joinery as shown in Fig. 2, then assemble the drawer and install the slide hardware. The shelf slide hardware mounts to cleats inside the case and has angle brackets so that it can be screwed to the underside of the slide-out shelf.

### Finishing Up

After a final sanding, two coats of polyurethane will make your cabinet not only look good, but also hold up well. Make sure to finish the interior of the cabinet too.

Here's some advice about installing the casters. You might need to adjust the thickness of the caster blocks to get the top of your cabinet even with the top surface of your tablesaw.

Once you've completed a shop cabinet like mine, you'll be surprised at how useful it is. And if your spouse gets a look at it, you might have to explain why it shouldn't move into the kitchen. ▲

Tune in to the tenth season of *The New Yankee Workshop* as host Norm Abram builds furniture inspired by antiques from the southeastern United States.





*Strength, speed, and precision. The author's drawer-making system offers the strength of sliding dovetails where drawer sides meet the front. Here, he uses an air nailer to secure the back to the sides.*

# French-Dovetailed Drawers, *the easy way*

**Build strong drawers fast with a router jig and a dovetail bit**

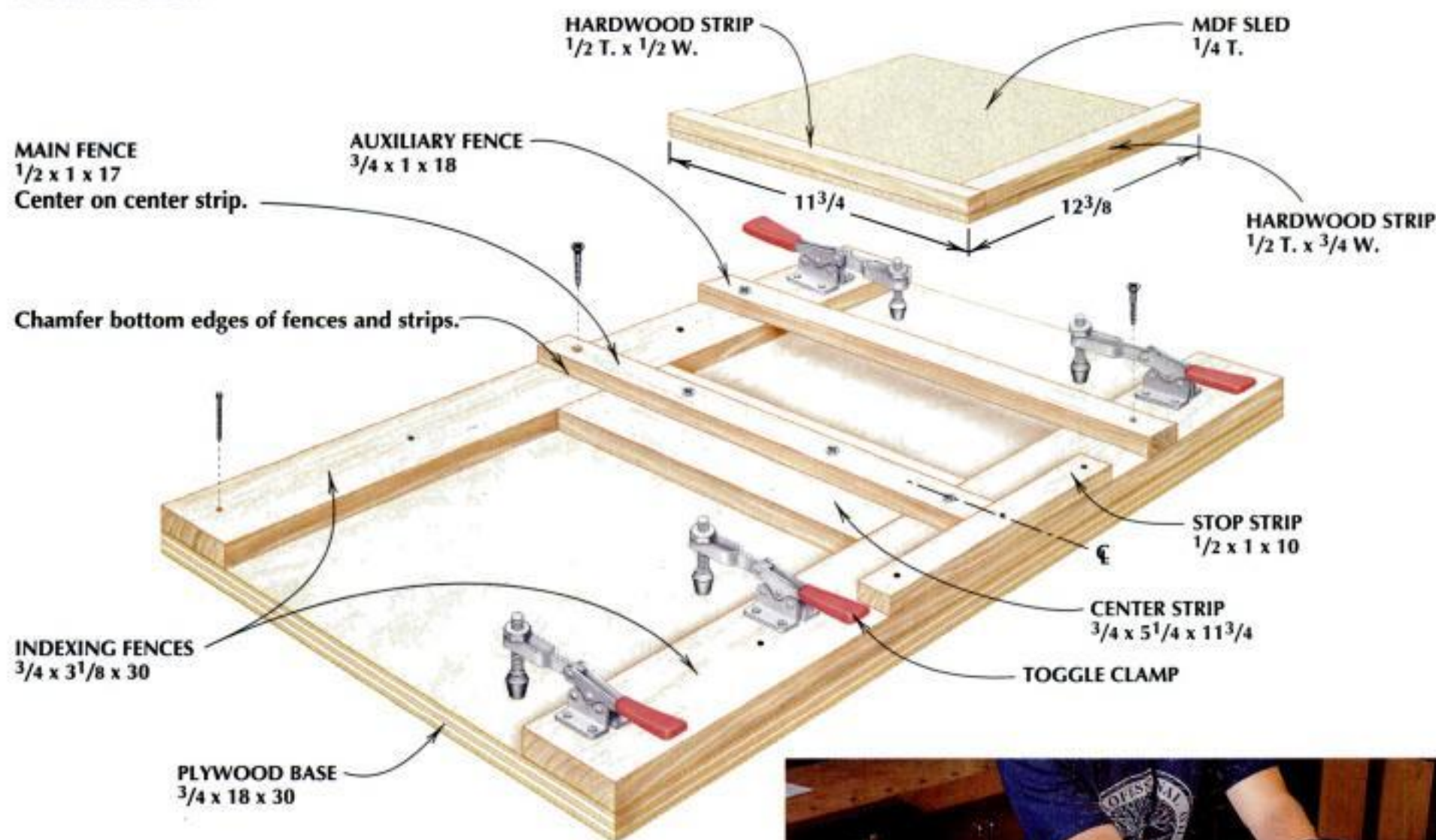
**by Paul Saporito**

**T**he sliding—or French—dovetail is a wonderfully strong joint for a drawer. Full-length dovetails on the ends of the drawer sides are glued into dovetailed sockets in the drawer front, making an unbeatable mechanical joint that resists pulling apart. With a French dovetail, the drawer front extends past the drawer sides, making this joint a good choice when you're using mechanical slides, or where a drawer overlays the front of a cabinet.



## FIG. 1: DOVETAIL JIG

This jig allows you to rout a  $\frac{1}{2}$ -in.-wide dovetail socket with a  $\frac{1}{2}$ -in. offset in  $\frac{3}{4}$ -in.-thick drawer fronts. By inserting a sled in the jig, you can rout a half-dovetail socket in  $\frac{1}{2}$ -in.-thick drawer sides. The dimensions shown fit a router with a  $5\frac{3}{4}$ -in.-dia. baseplate; you'll need to alter the position of the fences and strips to suit your own router's baseplate diameter or to change the desired offset.



Making a French dovetail accurately usually involves lengthy trial-and-error tool setups and tedious test-fitting. With my jig-based approach, you can cut all of the drawer joinery shown in Fig. 3 with a few simple setups.

For maximum efficiency, you can do what I do—use two routers and two identical  $\frac{1}{2}$ -in. dovetail bits. But this system will also work with a single router and a single bit. Either way, you'll be able to make strong, high-quality drawers quickly and accurately.

My drawer-making system really depends on a single jig that's used for cutting the dovetail notches in the drawer fronts and the half-dovetail notches in the sides. I'll describe how to make the jig first, then go on to explain how to make a set of drawers.

### Making the Dovetail Jig

The key to routing precise dovetail and half-dovetail notches is to take the time to make the jig accurately. A woodworking friend once told me that a good jig may take hours to make, but only moments to use, time after time.

The jig shown in Fig. 1 is designed to make drawers with  $\frac{3}{4}$ -in.-thick fronts and  $\frac{1}{2}$ -in.-thick sides and backs. It can accommodate drawer fronts up to  $11\frac{3}{4}$  in. wide, such as those for a file drawer.

It's important to use stable and durable materials when making this jig—or any jig, for that matter. Hardwood plywood or medium density fiberboard (MDF) are suitable materials for the base. Use MDF or hardboard for the sled. If you can't find hardboard exactly  $\frac{1}{4}$  in. thick, use strips of masking tape underneath the sled to shim it up to the correct height.

Use a durable hardwood such as maple or mahogany for the fences and strips. While most of the parts can be glued and nailed together, I suggest screwing the main and auxiliary fences in place so you can make adjustments later if necessary.



### Routing sockets double-time.

The author routs the dovetail sockets in two drawer fronts at once with his jig. Blocks underneath the jig raise it to a comfortable working height.

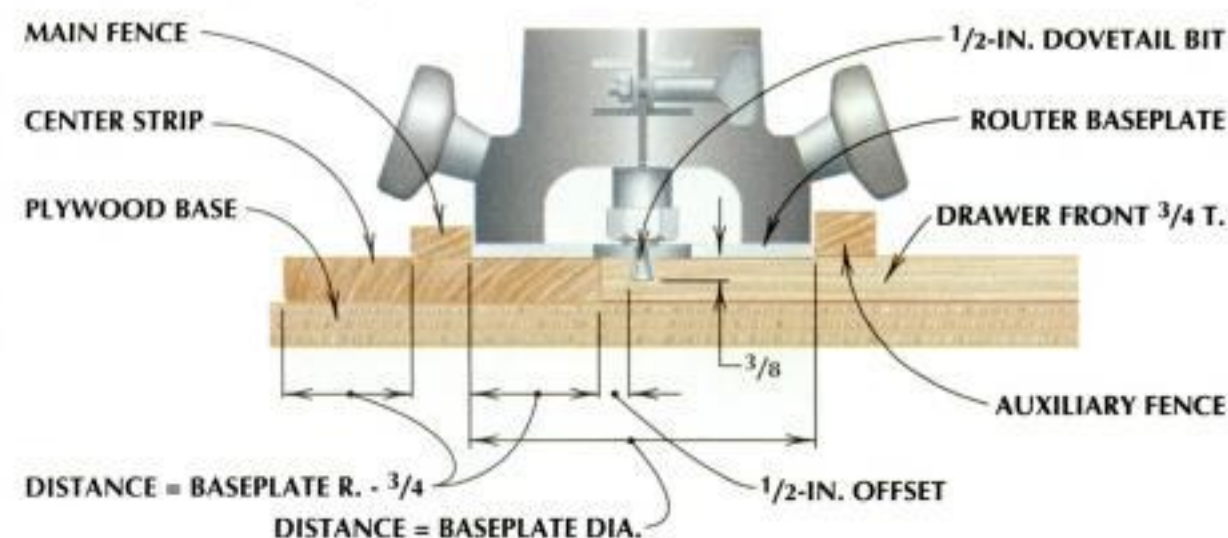
Your router's baseplate diameter and the placement of the fences on the jig will determine where the dovetail socket will be located on the drawer front. The jig shown in Fig. 1 will produce a socket with a  $\frac{1}{2}$ -in. offset when used with a router that has a  $5\frac{3}{4}$ -in.-dia. baseplate.



## FIG. 2: HOW THE DOVETAIL JIG WORKS

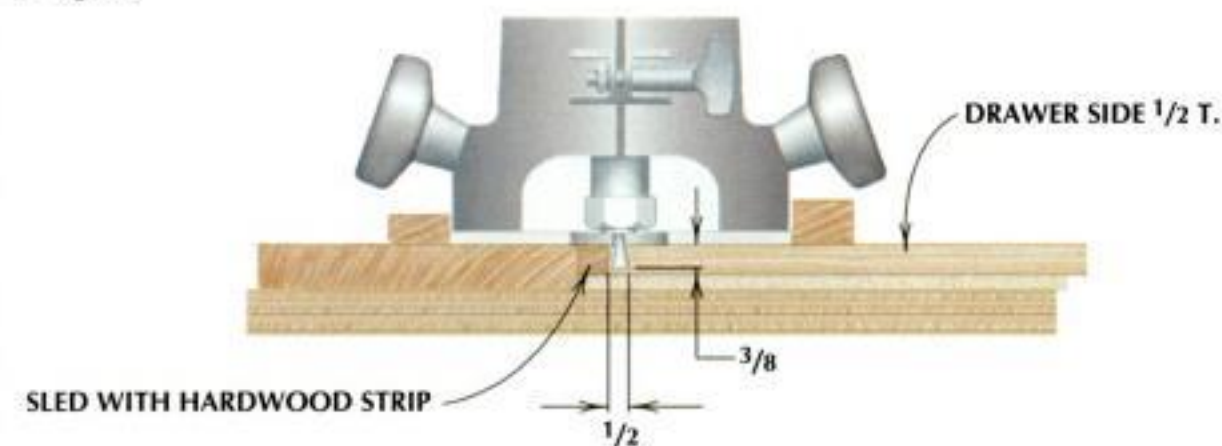
### ROUTING A DOVETAIL SOCKET

Position the drawer front face down on the plywood base and against the center strip. Set bit depth to  $\frac{3}{8}$  in.



### ROUTING A HALF-DOVETAIL SOCKET

Insert the sled in the jig. Position a drawer side outside-face-down on the sled, with the back of the drawer side against the hardwood strip. Bit depth remains at  $\frac{3}{8}$  in.



In practice, I've set up the jig in my shop to produce a  $\frac{15}{32}$ -in. offset—perfect for the commercial metal slides that I use.

Your router's baseplate diameter also determines the stop strip's location. (See Fig. 1.) The strip automatically stops the dovetail socket  $\frac{1}{2}$  in. from the top edge

of the drawer front. This conceals the joint at the top of the drawer, which I find aesthetically pleasing. If you want a through dovetail, simply position a  $\frac{3}{4}$ -in.-wide strip of wood between the drawer front and the stop strip so the bit will cut the full width of your workpiece.

You'll need four toggle clamps to hold the workpieces when you're routing (available from Woodworker's Supply, 800-645-9292). Two clamps to the right (as you face the jig; see photo, previous page) hold a drawer front as you rout on the right side of the main fence. A third clamp, on the left side of the main fence, holds a drawer front or a drawer side as you rout on the fence's left side. This single clamp can hold the workpiece because the rotation of the bit forces the part firmly against the center strip. (See Fig. 1.) A fourth clamp on the left side works with the third clamp to hold wider stock.

### Making Drawers

Once you make the jig, you can use it for one drawer or a production run. Here's how to make two or more drawers:

•**Dimension your stock.** For the jig to work correctly, drawer front stock must be exactly  $\frac{3}{4}$  in. thick, and sides and backs must be  $\frac{1}{2}$  in. thick. To make sure my stock is right on the money, I use a vernier caliper when thickness-planing the stock.

If you're making a concealed French dovetail, rip the drawer sides  $\frac{1}{2}$  in. narrower than the drawer fronts. (See Fig. 3.) Then rip the backs  $\frac{1}{2}$  in. narrower than the sides. But don't cut the backs to final length yet. Instead, wait until you've cut the joinery in the sides and in the front. Then you can dry-fit the drawer together, cut the backs to their final length, and rout their half dovetails.

Once I've dimensioned all the parts, I round over the top edges of the sides and backs with a  $\frac{1}{4}$ -in. round-over bit on the router table. You can forgo this step if you wish and simply ease any sharp edges after assembly.

•**Dovetail the drawer fronts.** Slide two drawer fronts face down into the jig, one on each side of the center strip, and clamp them in place. Set bit depth to  $\frac{3}{8}$  in., and rout a  $\frac{1}{2}$ -in.-wide socket in one end of each piece. (See photo, previous page, and Fig. 2.) Then switch the workpieces and rout the sockets on the opposite ends.

•**Half-dovetail the sides.** Fit the sled into the jig, then place a drawer side outside-face-down on the sled and clamp the workpiece and sled. Without changing the bit depth, rout a half-dovetail socket in the rear end of each side. (See Fig. 2 and photo, left.)

•**Dovetail the sides.** Using the same  $\frac{1}{2}$ -in.-dia. router bit in the router table, rout a full dovetail in the front of each drawer side by making a pass on each side of the workpiece. (See photo, opposite page.) I cut a test dovetail in scrap first, aiming to get a tight fit in the dovetailed socket. After routing all the dovetails, I fold a piece of 80-grit sandpaper in half and carefully sand each side of the dovetail equally until it fits into the socket with light taps from a hammer. If you're making a concealed French dovetail, remember to file over the top edge of each dovetail to fit the rounded ends of the stopped socket. (See photo, opposite page.)

•**Half-dovetail the backs.** Use the same router table setup—without adjusting the fence—to rout the half dovetail on both ends of each back. A single pass cuts each end.

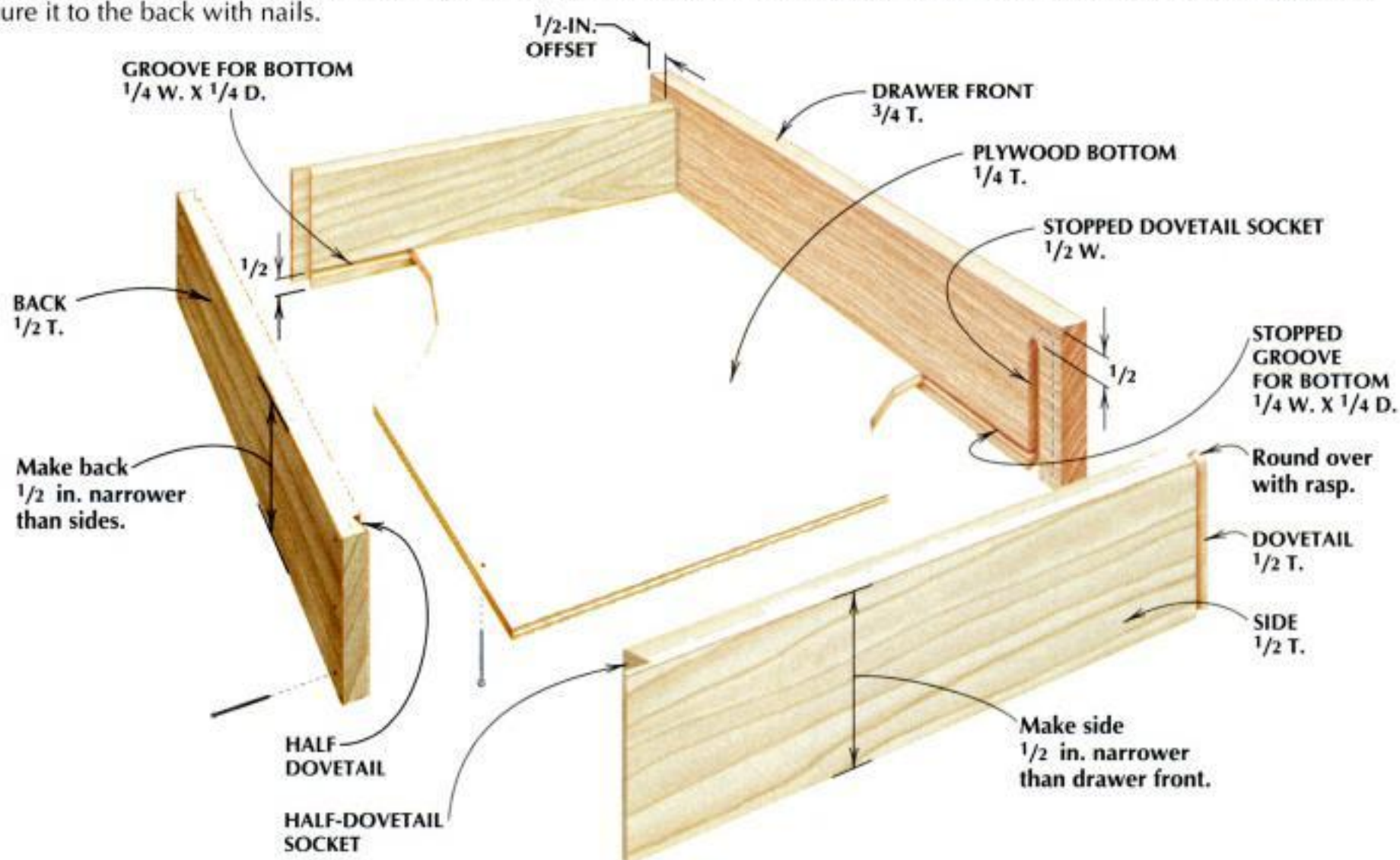


*The jig does the sides, too.* Insert the sled and—without changing any settings—rout the half-dovetail socket at the back of the drawer side.



## FIG. 3: DRAWER CONSTRUCTION

Sliding, or French, dovetails connect the front to the sides, leaving a 1/2-in. offset between the sides and the ends of the front. Half dovetails at the back of the drawer join the sides to the back. Slide the bottom into grooves in the front and sides, then secure it to the back with nails.



•**Groove the fronts and sides.** There are several approaches when it comes to cutting grooves, but cutting stopped grooves, such as in the drawer fronts, can be tricky. A safe method is to rout the stopped grooves using an edge guide in your router. (See bottom right photo.)

•**Assemble the drawers.** Working on one drawer at a time, start by joining the sides to the front. Brush glue on the leading half of the tail and into the leading half of the socket. As you slide the tail into the socket, the glue will automatically spread to the rest of the joint. Then apply glue to the half dovetails and secure the joints by driving finish nails through the back and into the sides. Finally, slide the bottom in place, check the assembly for square, and secure the bottom to the back with box nails every 5 in. or so. ▲



**PAUL SAPORITO**  
is a professional furniture maker who operates a cabinet shop in northern New Jersey.



**Tails on the router table.** With the same dovetail bit used in the jig, rout the full dovetail on each drawer side. Hold the stock vertically against the fence and make one pass on each side of the stock.



**Stop the tail.** Use a rasp to round over the top of the dovetail in the side.



**Rout the groove.** A straight bit and an edge guide let you safely make the stopped groove in the drawer front.



# Sleigh Bed

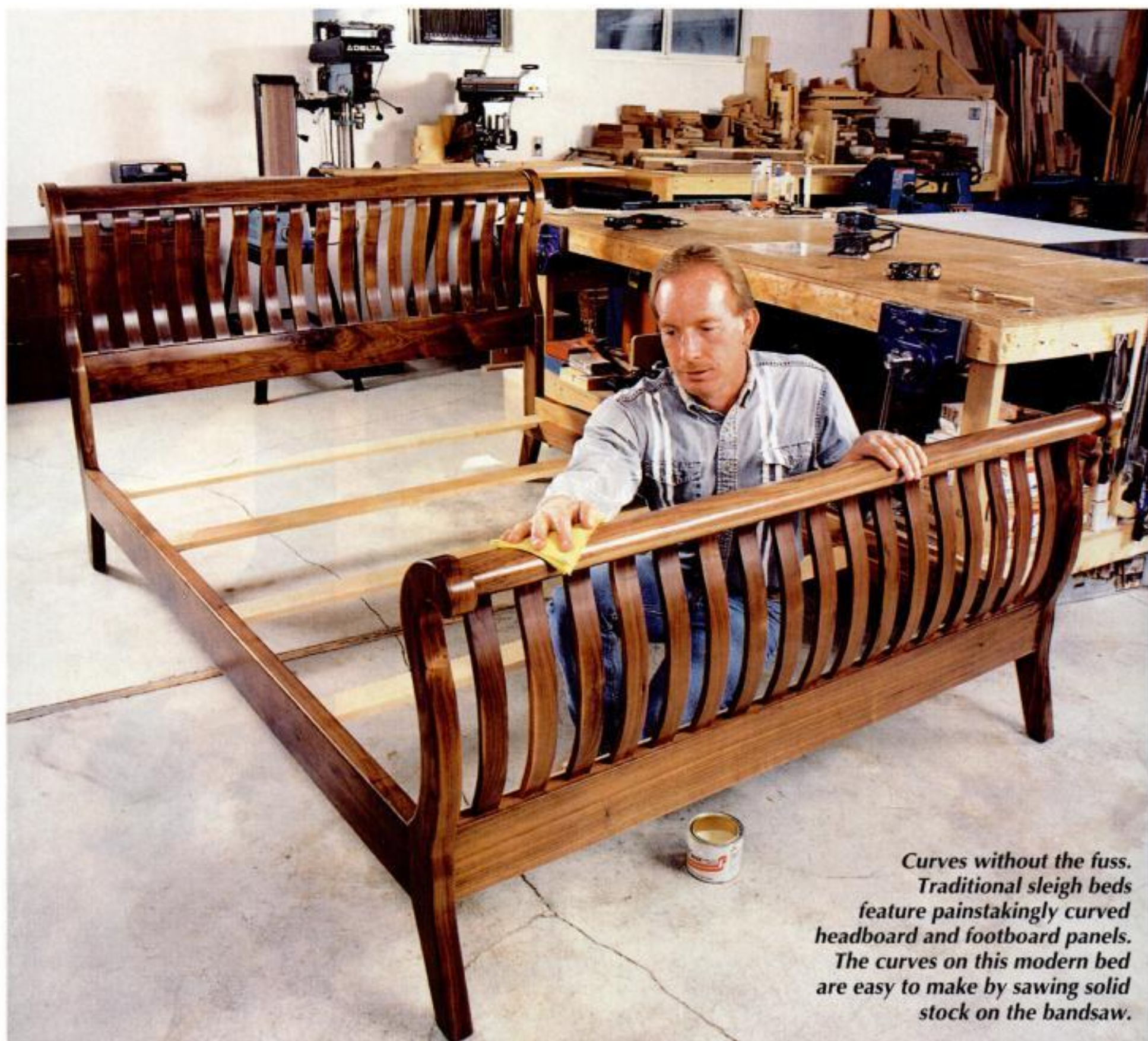
*Replace solid curves with slats to lighten a classic form*

by Randy Sorenson

In the early nineteenth century, a new style of bed glided into the furniture world. Called a "sleigh bed" because it resembled a horse-drawn sleigh, it featured a headboard and footboard that curved outward in a graceful "S" shape. Both headboard and footboard were usually the same height and contained wooden panels bent or laminated to the curve.

My slatted sleigh bed is just as graceful as an original version, but not as massive. And by lowering the footboard, I increased both convenience and visibility. (See photo, below.)

Don't let the curved work in this project fool you. There's no wood to bend or any shaper work required; all of the curves are sawn from solid stock.

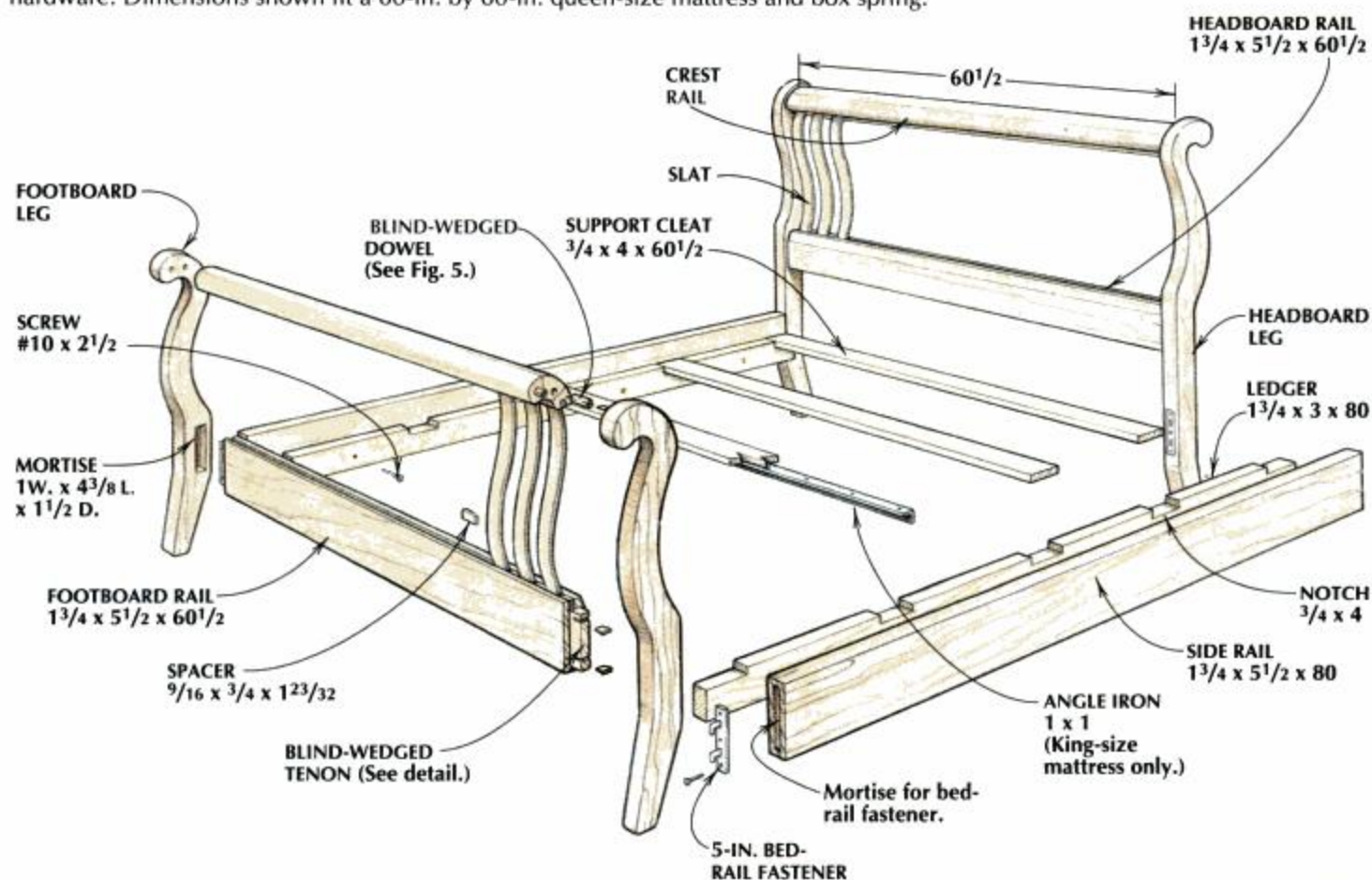


*Curves without the fuss. Traditional sleigh beds feature painstakingly curved headboard and footboard panels. The curves on this modern bed are easy to make by sawing solid stock on the bandsaw.*



## FIG. 1: SLEIGH BED

The curved legs, slats, and crest rails in this bed are sawn from solid stock—no bending is involved. Wedged dowels and wedged tenons secure the headboard and footboard rails to the legs. The side rails attach with standard knockdown bed-rail hardware. Dimensions shown fit a 60-in. by 80-in. queen-size mattress and box spring.



I made the walnut bed shown here to fit a 60-in. by 80-in. queen-size mattress and box spring. Mattress sizes can vary, so be sure to buy your mattress first, and then build the bed to suit its specific measurements.

### Start with the Templates

Begin construction by making full-scale templates for the slats and legs as shown in Fig. 2. I used  $\frac{1}{2}$ -in.-thick medium density fiberboard (MDF) for the slat template, and  $\frac{1}{4}$ -in. hardboard for the leg templates.

Drill a  $\frac{1}{16}$ -in.-dia. hole in the footboard template to locate the center of the upper dowel hole, and extend the line for the top of the footboard mortise as shown in Fig. 2. As I'll explain later, these two reference points will make it easy to accurately locate the joints on the leg stock.

Keep in mind that the slat template is longer than the finished pieces. You'll trim the slats to a perfect fit during installation.

### Make the Legs First

Lay out each leg on a  $1\frac{3}{4}$ -in.-thick blank you've jointed on one edge. Align the straight edge of the template with the jointed edge of the stock as noted in Fig. 2.

Bandsaw the legs to shape and sand their edges to 120 grit. After sanding, rout all four edges on each leg with a  $\frac{1}{4}$ -in. round-over bit. Stop short of the area where the legs join the side rails.

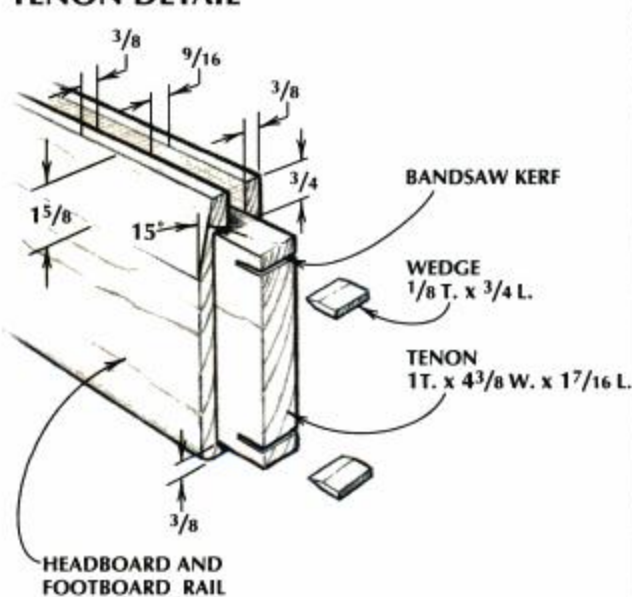
### The Rails Are Next

Make the headboard and footboard rails as shown in Fig. 1. Plow the groove, rip the face bevel, then cut the tenons. Tenons are generally cut to fit mortises but, in this case, I fit the mortises to the

tenons because the rails are too big to handle easily for test fitting.

I cut the tenons using a simple router jig that I clamp to the ends of each rail. This is easier than trying to maneuver the long rails on the tablesaw. I use a

### TENON DETAIL



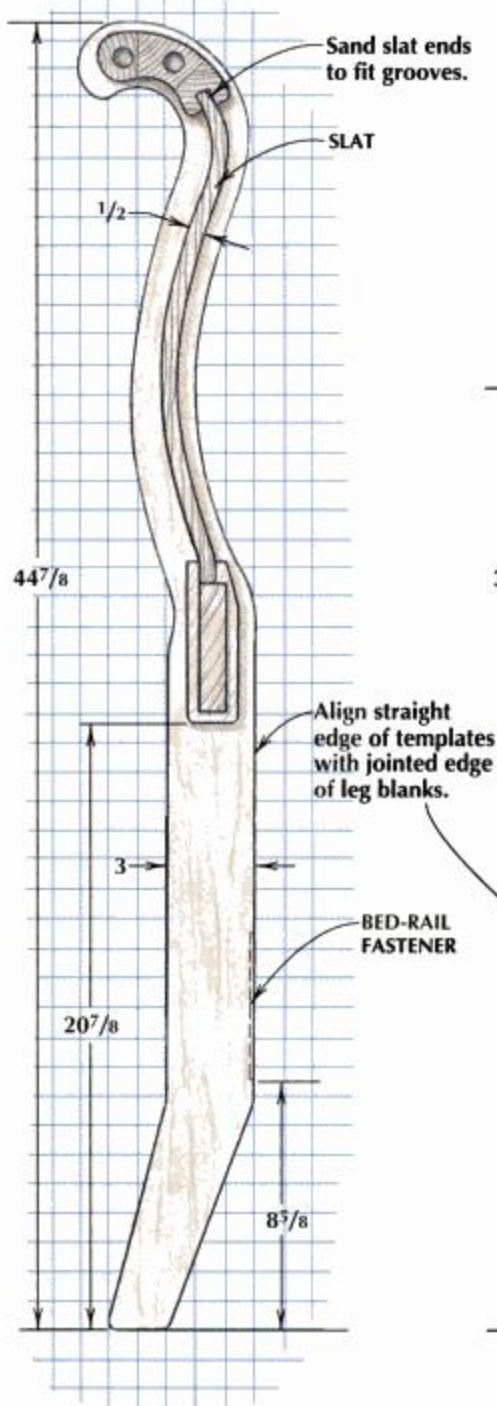


## FIG. 2: LEG AND SLAT TEMPLATES

Make full-scale templates of the leg and slat patterns, then use the templates to lay out the leg and slat blanks. On the footboard template, drill a  $\frac{1}{16}$ -in.-dia. hole at the upper dowel position and extend the mortise height lines to help with joint layout later. Slat shape and size is the same for both legs.

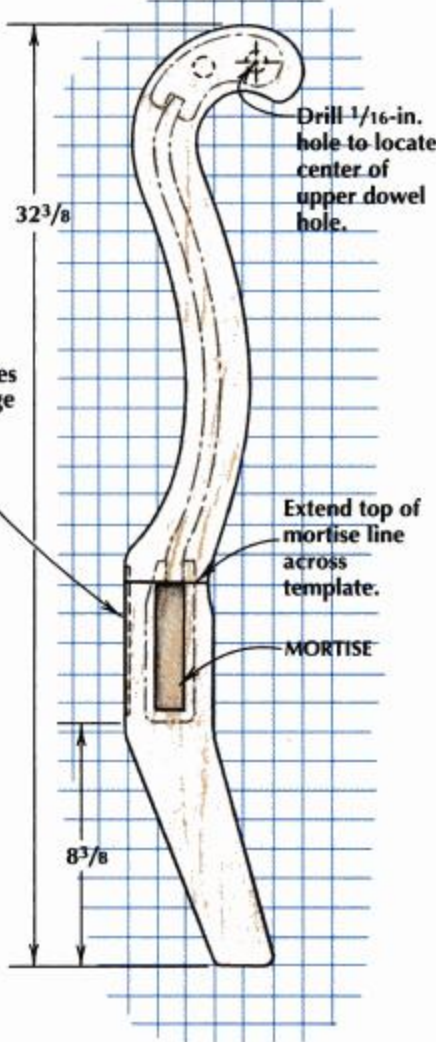
### HEADBOARD LEG AND SLAT TEMPLATE

Make leg from  $1\frac{3}{4} \times 6\frac{1}{4} \times 45\frac{1}{4}$  blank;  
make slat from  $1\frac{3}{4}$  thick  $\times 17$  long stock.



### FOOTBOARD LEG TEMPLATE

Make leg from  $1\frac{3}{4} \times 6\frac{1}{4} \times 32\frac{3}{4}$  blank.



two-flute straight bit in my router, which does a good job of cutting clean shoulders and cheeks. Last, rout the bottom edges of the rails with a  $\frac{1}{4}$ -in. round-over bit and ease the top edges with a few passes of a block plane.

**Each crest rail** is made by bevel-ripping a single board into three pieces, then gluing the rippings back together and coving the underside on the table-saw. Here's where I use my prettiest stock, since the crest rails are the most visually prominent parts of the bed.

Make the rails 3 in. longer than their final length. As I'll explain later, you'll need the extra length to make a drill guide and to test your coving cuts when shaping the rails' undersides. Rip the rail stock as shown in Fig. 3. This keeps the material intact until the final cuts and prevents the waste pieces from kicking back on the saw. With this sawing procedure, you'll end up with a continuous grain pattern on the top of the rails. I use a premium combination blade to rip the bevels, then I smooth the sawn surfaces with a bench plane.

To glue the pieces back together, I use #20 biscuits, spacing the slots about 2 in. in from the ends and about 8 in. apart. (See top left photo, opposite page.) Also place biscuits in the extra 3-in.-long section.

Dry-assemble the crest rail pieces before glue-up so you can rehearse your clamping procedure. You'll need angled clamping blocks like the ones I'm using in the top right photo, opposite page. Make enough blocks to allow clamping approximately every 12 in. When you glue up each rail, use plenty of glue and adjust your clamps as necessary to pull the joints tight.

To shape a crest rail, you'll cove the underside on the tablesaw, plow the slat groove, round over the rail's edges, then hand-plane its top curve.

Trim the end of one rail square so you can lay out the curved profile. The easiest way to lay out the curve is to clamp the rail cove-side down on the bench with the end of the rail flush with the edge of the bench. Hold a compass leg on the edge of the bench and draw the arcs on the rail's end, adjusting the compass until the arc sweeps between the outermost edges of the stock as shown in Fig. 5. Once you've drawn the curve, lay out the dowel-hole centers. After shaping the rail, you'll cut this end off and use it as a guide for drilling the dowel holes.



## MAKING THE CREST RAIL



**Cutting slots for biscuits.** Slot the beveled rails with a biscuit joiner, setting the joiner's fence to  $22\frac{1}{2}^\circ$  and centering the slots in the stock's thickness.



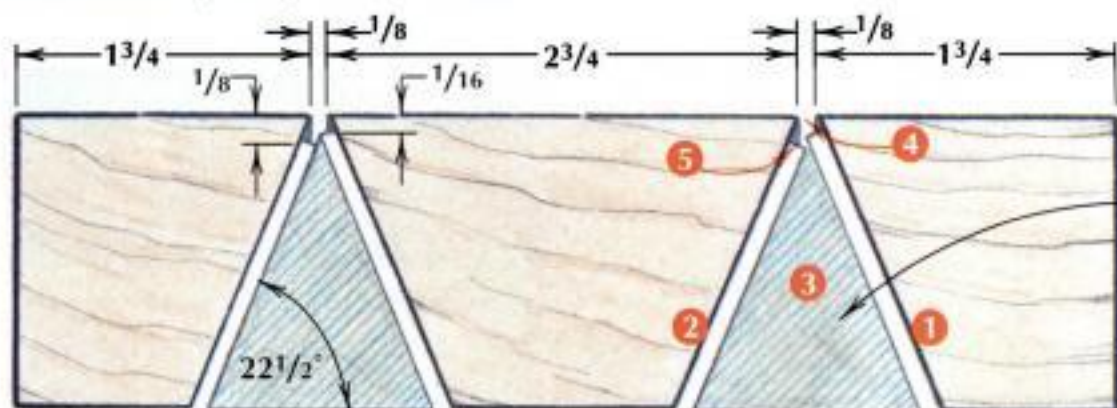
**Clamping to a rough curve.** Pull each of the three sections of rail together using sets of four clamping blocks, spacing each set about a foot apart.

### FIG. 3: BEVELING THE CREST RAIL BLANK

Each curved crest rail is made from a single  $6\frac{1}{2}$ -in.-wide blank that is ripped into three beveled pieces, then glued together at the bevels. For each pair of bevel cuts, follow the five-step sequence described below. This will enable you to cut the blank safely without risking kickback from trapped pieces.

#### END VIEW OF CREST RAIL BLANK

Make rail from  $1\frac{3}{4} \times 6\frac{1}{2} \times 63\frac{1}{2}$  blank.



1. First cut,  $\frac{1}{16}$  in. shy of full depth.
2. Second cut,  $\frac{1}{8}$  in. shy of full depth.
3. Pry out waste piece.
4. Rip blanks apart at  $90^\circ$ .
5. Hand-plane off remainder.

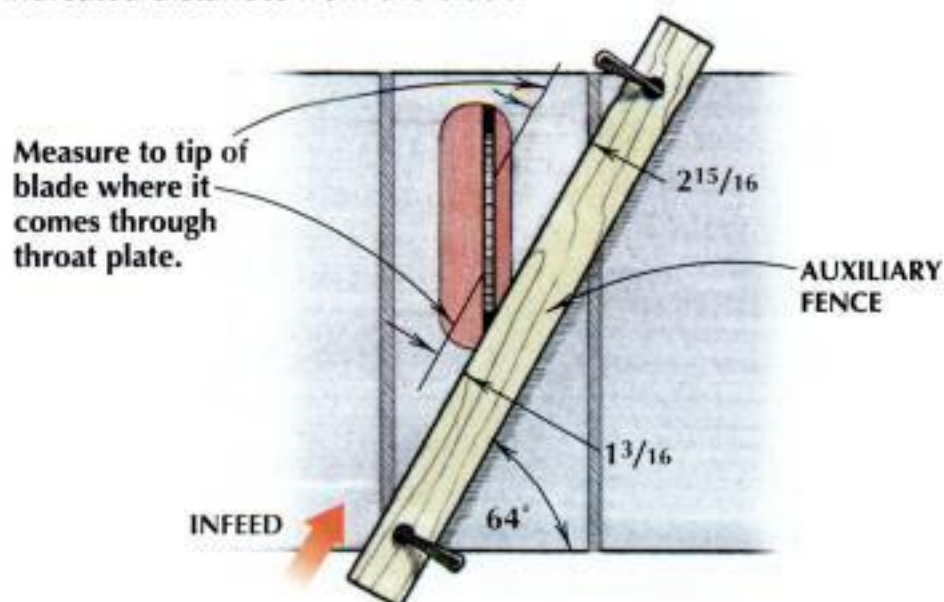
WASTE



**Coving the rail.** Cut the curve in the underside of the rail by feeding the work at an angle to the saw blade. A straight-edge clamped to the saw table safely guides the work.

### FIG. 4: TABLESAW COVING SETUP

Set up your saw for coving the crest rail by raising the blade 1 in. at its center. Then clamp an auxiliary fence at the indicated distances from the blade.



Measure to tip of blade where it comes through throat plate.

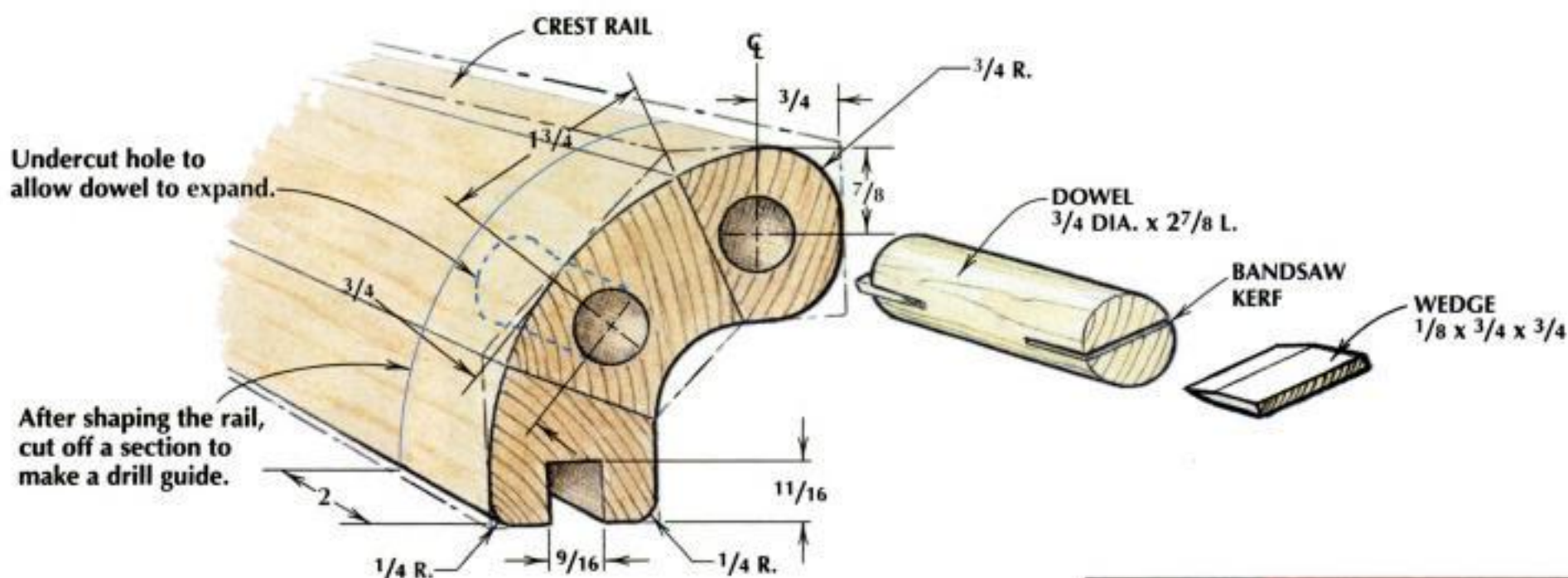
AUXILIARY FENCE

INFEED



## FIG. 5: CREST RAIL-TO-LEG ASSEMBLY

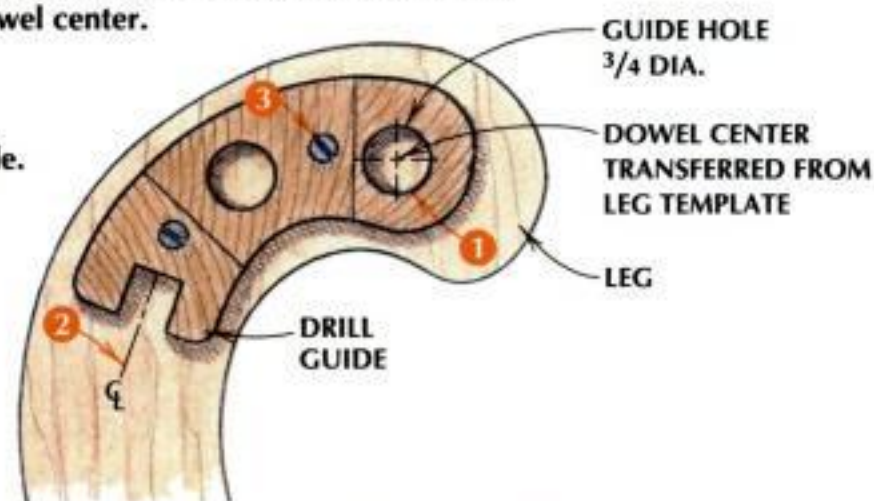
Blind-wedged dowels connect the crest rail to the leg. Drill 1½-in.-deep holes for the dowels by using a drill guide made from a section of the rail. Mark the guide's hole centers while the stock is still square (indicated by the dotted lines).



## USING THE DRILL GUIDE

### DOWEL CENTER TRANSFERRED FROM LEG TEMPLATE

1. Center guide hole over dowel center.
2. Center groove on leg.
3. Attach drill guide to leg with #10 x 3 screws.
4. Bore two holes, using guide.



The tablesaw is your shaping tool for cutting the cove on each crest rail. You can make the cut with a roundnose knife in a molding head, as Mark Duginske suggests in AW #60, or you can simply use your saw blade as I do.

Set up your tablesaw as shown in Fig. 4, then feed the rail into the running blade just enough to see if the blade is following the cutline. Adjust the blade height and fence angle if you need to. When you're satisfied with the setup, lower the blade and cove both crest rails by making successive passes, raising the blade no more than 1/8 in. each time.

I clean up the saw marks, sanding by hand with 3-in.-dia. drum sander sleeves. These sleeves are stiff enough to make excellent hand-sanding tools.

Once you've shaped and smoothed the cove, position the rail so its outer flat edges bear against the saw table and

fence to plow the slot groove. Set your fence to center the groove in the edge of the rail as shown in Fig. 5.

Next, rout and hand-plane the rail to the finished shape shown in Fig. 5. I rout the 3/4-in. round-overs on my router table and the 1/4-in. round-overs with a handheld router. Then I curve the top of the rail with a No. 4 plane. Start by knocking off the high points, running the plane the length of the stock. Then plane the entire surface, eyeballing your progress by watching the curve take shape on the end grain of the stock. When the curve is fair, finish up by hand-sanding through 120 grit.

Now cut each rail to its finished length, making sure to crosscut the end with the dowel-hole locations to 2 in. long. This piece will serve as your drill guide. Take the offcut to your drill press and drill the two 3/4-in.-dia. holes to make the guide.



**Drilling for dowels.** Drill the dowel holes in the ends of the crest rail using a drill guide made from a section of the rail. Holes in the drill guide direct the drill bit.

### Drilling and Mortising

Now it's time to drill the dowel holes and cut the mortises. First, drill the holes in the crest rails. Screw the drill guide onto the end of each rail and use a 3/4-in. drill bit to drill 1½-in.-deep holes in the rails. (See drawing and photo, above.)

Next, lay out the dowel holes and mortises in the legs. Position the footboard leg template at the top of each leg and transfer its dowel-hole center to the leg with an awl. Mark out the top of the mortise on each leg, using the same template. Remove the template and finish laying out the mortise on the blank, centering it on the leg as shown in Fig. 2.



Drill the dowel holes in each leg, using your drill guide. Screw it to the leg as shown in Fig. 5 and, as before, drill 1½-in.-deep holes.

Once you've drilled the holes for the dowels, you can cut the mortises. I drill them out with a 1-in.-dia. Forstner bit and use bench chisels to square up the walls. Pare until you have a slip-fit with no slop between the mortises and tenons.

Now dry-assemble the headboard and footboard and check to see that everything fits well. Leave everything assembled for fitting the slats.

### Making and Fitting the Slats

For a queen-size bed, you'll need 17 slats for each end of the bed (34 in all), but I cut extra in case of defects. Lay the slats out on edge on 1¾-in.-thick blanks, using the slat template. I space the slats about 3/16 in. apart so I can separate two with one bandsaw cut and stay a bit outside the cutline. Sand the slats down to their final ½-in. thickness with a drum or spindle sander. The Robo Sander, a drum sander with a pilot bearing that rides on your template, works great for this (available from Ken Picou Designs, 512-454-3425, see "Toolbox," AW #30).

Once you've sanded all the slats, fit one slat into the grooves in the bed, then use this slat to mark all of the others. Cut the slat about ¼ in. shy of the distance between the bottom of the grooves in the bed rails, then sand its ends to fit into the grooves as shown in Fig. 2. Install the slat by angling it into the grooves as shown in the photo above. Once you've fit the first slat, trace its shape onto the others. You can gang-saw the remaining slats to length, then sand each to the traced lines.

Install all the slats into their respective headboard and footboard ends, then slide them to one end and measure the remaining distance. Divide this distance by the number of spaces (one more than the number of slats) to determine the exact length of each spacer that will go between the slats. (See Fig. 1.) Rip your spacer stock to fit snugly into the grooves, then cut individual spacers using a stop block on your saw. Dry-fit all of the spacers between the slats, sanding their ends lightly to adjust the fit if necessary.

### Making the Side Rails

The bed's side rails connect to the headboard and footboard with 5-in. bed-rail fasteners, available from



**Installing the slats.** Slip each slat into place by angling it between the grooves in the rails. Blocks between the slats keep the spacing correct.

Woodcraft Supply (800-225-1153). Ledgers attached to the rails carry the box spring support slats. For extra support on king-size beds, I screw 1-in. angle iron to the underside of the slats as shown in Fig. 1.

Use defect-free lumber for the side rails—they carry a lot of weight. Mortise the bed-rail fasteners into the ends of the rails, centering them and recessing them about 1/32 in. below the surface. I cut these shallow end-grain mortises with razor-sharp chisels. Mortise the mating fasteners into the bed legs 8⅝ in. up from the bottom as shown in Fig. 2. Connect the rails to the legs and check the fit. If there is any slop between the rail and the leg, remove one of the fittings and recess it a bit more.

When the rails fit tightly to the legs, and with the rails still connected, round over the top edges and outside bottom edge of the rails, continuing onto the sections of the legs where you stopped short before. Then make the ledgers and set them aside.

At this point, all of your bed's parts are made. All that's left to do is to disassemble the bed, blind-wedge the headboard and footboard joints, and glue everything up.

### Creating the Blind-Wedged Joints

I blind-wedged the rail joints, installing small wedges in slots cut in the dowels and tenons. (See Figs. 1 and 5.) When the joints are pulled together, the wedges are forced into the tenons and the dowels, expanding them and locking the joints. If you want to forgo the blind wedge, you can pin the joints with dowels instead.

I cut the narrow dowel and tenon kerfs on the bandsaw, but a handsaw will also work. Undercut the bottoms of the dowel holes and mortises to allow the dowels and tenons to expand.

Assembling a blind-wedged joint is a one-shot affair; you can't disassemble it to make corrections. If you haven't made blind-wedged joints before, take the time to make a couple of test joints before committing to the real thing.

### Gluing Up

Prepare for glue-up by sanding all the parts through 220 grit. If you're going to stain, stain the slats before assembly.

Glue a crest rail and bottom rail into one leg, then the other, with the wedges inserted lightly into their slots. Pull the joints together using bar clamps. This is the best way to assemble wedged joints. Make sure each assembly is square before setting it aside to dry.

After the glue has set, you can install the slats and spacers. Only the spacers are glued, with just a dab of glue at the bottom of the groove. Then attach the side rails to the legs, and glue and screw the ledgers to the rails. Last, make the support slats and set them unglued into their notches. On a king-size bed, I install ½-in.-dia. dowels through the ends of the slats and into the ledgers.

### Finishing Up

You can use an oil finish, a varnish, or practically any type of film finish on the bed. My preference is to spray on several coats of high-gloss lacquer, sanding between coats with 220 grit. Lacquer is easy to apply, dries fast, and offers a protective coating for everyday use. ▲



**RANDY SORENSON**

is a professional furniture maker. He lives in Salt Lake City, UT.





# Coloring Bowls

*Transform your turning with a splash of color*

by Michael O'Donnell



**A**s a woodturner married to an artist, I have the good fortune to be able to collaborate with my wife, Elizabeth, on my work. That's how we came upon the technique of coloring the bowls and goblets that we make.

I use only locally available woods—sycamore and beech—in my turned work. The blandness of these woods, with their fine texture and minimal grain patterns, led me to look for a way to liven up my turnings. With Elizabeth's help, I started experimenting with various color applications. The results, shown here, convinced us that a splash of color is a great way to add a new decorative element to your turnings.

**Wooden rainbows.** The author's turned wooden vessels are dyed in a rainbow of colors, making an otherwise bland wood exciting.



## Choosing Your Wood

We like coloring end-grain bowls best. With an end-grain turning you get more even color penetration; a side-grain piece tends to look blotchy.

Bland, light-colored woods with an even, fine texture work best for coloring. Maple is an excellent choice for a beginner. After you get a feel for the technique, you can introduce other species and grain patterns into your repertoire.

We work primarily with green wood. Once a piece is turned, we sand it up to 220 grit on the lathe. Then we start the coloring process. If you're coloring a piece that was turned dry, raise the grain first by wetting the surface with water. Let the bowl dry, then cut off the raised fibers by sanding lightly with 220 grit.

## Coloring Materials

You'll get the best color if you work with water-soluble dyes—not pigments. Dyes penetrate the cells of the wood, producing rich, transparent colors that let the natural grain show through.

We've had success with many types of water-based dyes, including inks and fabric dyes. But we get the best results when we use water-based aniline dye powders, available from Garrett Wade (800-221-2942). These easy-to-apply dyes come in a wide range of colors, and the powders are concentrated. You can choose between intense, vibrant colors or soft, muted tones, depending on how much water you dilute them with. Experiment with your powder-to-water ratios to get a feel for the intensity you want.

Have some common household bleach on hand. We find it indispensable for creating interesting patterns in conjunction with the coloring process. Make sure to wear protective gloves so your skin won't be burned by the bleach.

You'll need an assortment of brushes to apply the color. We prefer large Chinese calligraphy brushes, available at art supply stores. We also use sponges and clean rags, and we apply small dabs of bleach with toothpicks, twigs, or tissues. You can use a brush to bleach larger areas, but test the brush first. Synthetic brushes work best; natural bristles tend to "melt" when they contact bleach.

## Coloring a Bowl

There are three things to consider when coloring a piece: the wood's grain patterns and markings, the color combinations, and the application method.

**Grain.** Different grain patterns result in different effects. End grain absorbs more color and tends to darken more than side grain. Color tends to bleed through the wood on end-grain areas, showing up as interesting speckles on the opposite surface.

**Color.** Generally, a combination of colors looks better than one hue. We like color combinations on the inside surfaces that contrast with the outside color.

**Application.** The coloring process is fast, so have your colors ready-mixed. A small bowl should take only a few minutes. It's important for the wood to be wet when applying colors. This way, the colors will have soft edges where they overlap, and they'll blend more harmoniously with each other. This isn't a problem with green stock, but you should dampen dry work with a sponge and water before applying color.

You can use bleach as a "resist," dabbing or brushing it on first to lighten the color that will follow and add interesting mottled effects. After applying color, you can add bleach on top of the color as a "discharge," making a variety of lighter lines or spots. (See photo, bottom right.) If you don't like the color you have, use bleach to remove most of the dye so you can start again.

## Edges and Rims

You can leave the rims and edges of your work as they are, or you can accent them. We paint some of our wide-rim bowls with artist's acrylics, using whatever colors seem appropriate for each piece. On thin-walled pieces, we usually like a dark rim. You can also darken the rim with a black felt-tip pen, or you can burn the rim with a commercial branding tool, available from common mail-order woodworking catalogs.

## Surface Protection

Dyes don't protect the surface, so you'll need to seal the stain and the wood with finish. We use lacquer because we like the look, but an oil finish will work as well. Any clear finish will darken the overall color slightly and make the piece glow. ▲



**MICK AND LIZ O'DONNELL**

*work as an art and craft team. They live in northern Scotland.*



**A woodworker's palette.** Water-soluble dye powders, bleach, brushes, sponges, and rags are the essential ingredients for coloring bowls.

## COLORING A BOWL



**Bleach it first.** Start by randomly swabbing household bleach on the surface of the bowl. Use a synthetic brush.



**Then add color.** Apply a blue stain over the bleached areas to produce a lighter shade of blue. Unbleached areas turn dark.



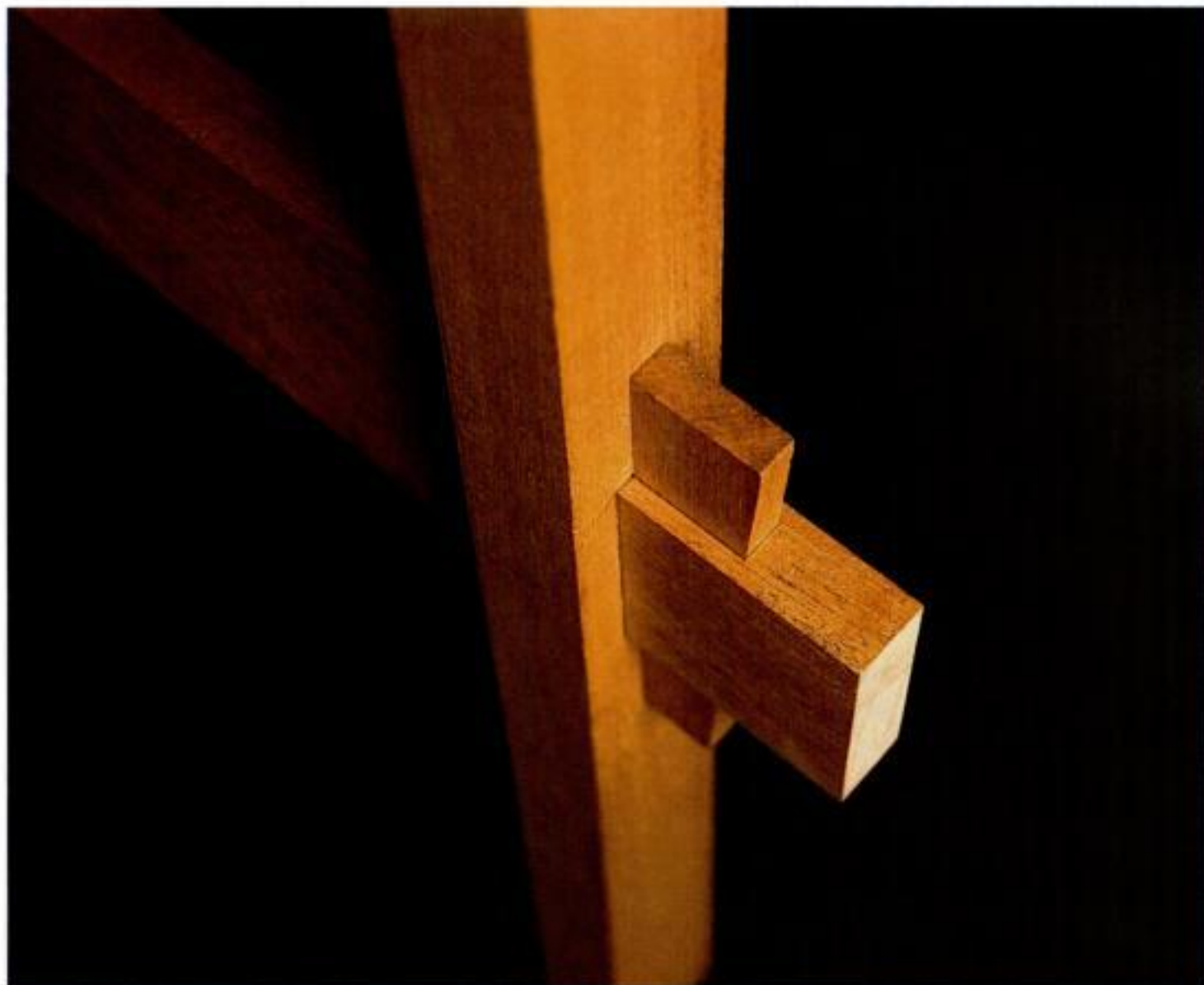
**Bleach again.** Dab bleach over the wet color coat to lighten it. Use the tip of a toothpick dipped in bleach to draw fine lines.



# Making Tusk Tenons

*Knockdown joinery makes strong, handsome furniture*

by Ian J. Kirby and John Kelsey



**Bold detail.**  
*Simplicity, strength,  
and honesty are  
the greatest virtues  
of the tusk tenon.*

**The tusk tenon** is the original all-wood knockdown joint. You find it on traditional trestle tables and early furniture of all sorts. It's also been used for centuries on timber-frame houses. The joint has great furniture potential because its intricacies are so visually interesting. It's strong and durable, it can be made large or small, it tightens to accommodate seasonal movement, and it can be tailored to fit various styles of furniture. (See drawings, opposite.)

To make one joint, you have to cut two mortises, one for the tusk tenon (the tusk mortise) and the other for the wedge (the wedge mortise). So it's a double-jointed joint. The wedge makes the joint self-clamping, which is especially useful in large constructions. However, it's important to fit the parts so that they slide together easily—not a drive fit, but not a loose rattle either.

Hand-tool woodworkers will find the joint a workout for their chisel skills. Machine woodworkers probably will find the router and drill press to be the best weapons, though sloping the wedge mortise requires some paring with a chisel. Even here there are several good alternatives to the sloping wedge mortise, including the dowel wedge, the folding wedge (which fits a square mortise), and the forked-wedge-with-dowel, where the mortise is simply drilled.

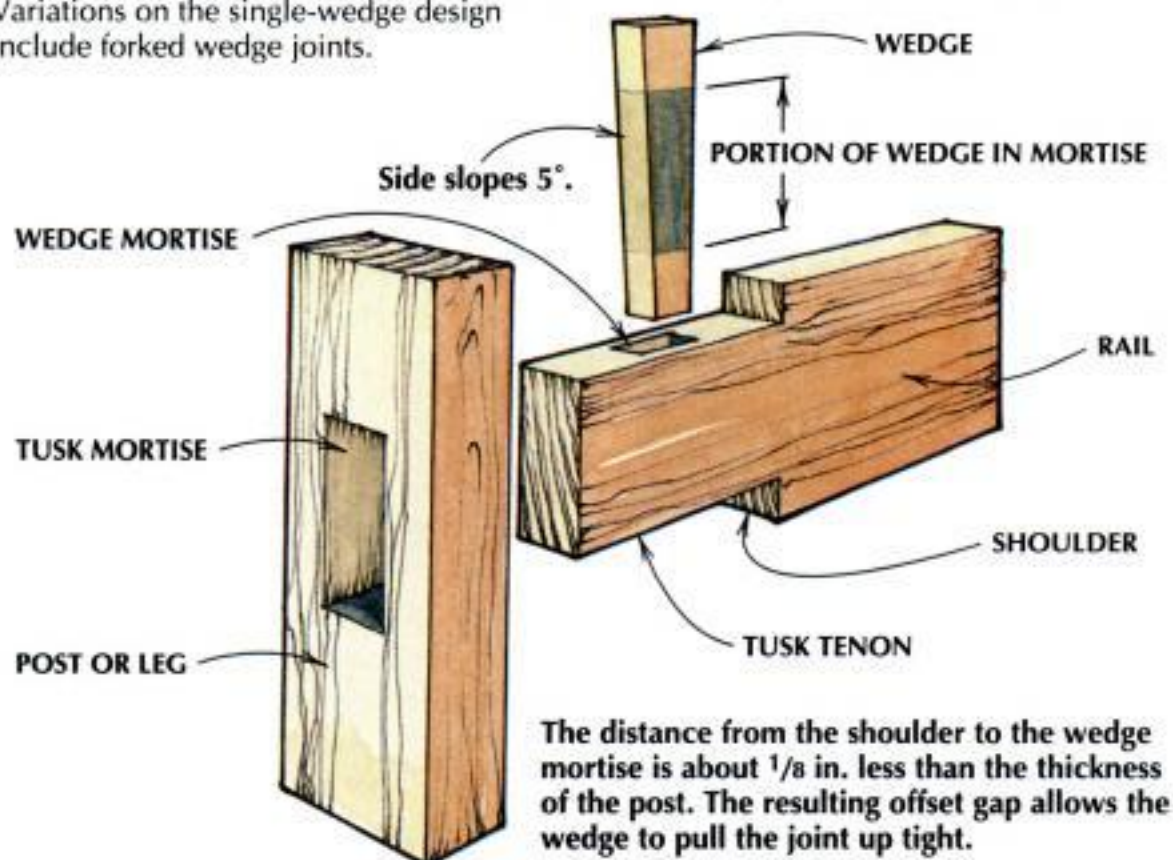


## TUSK TENON JOINTS

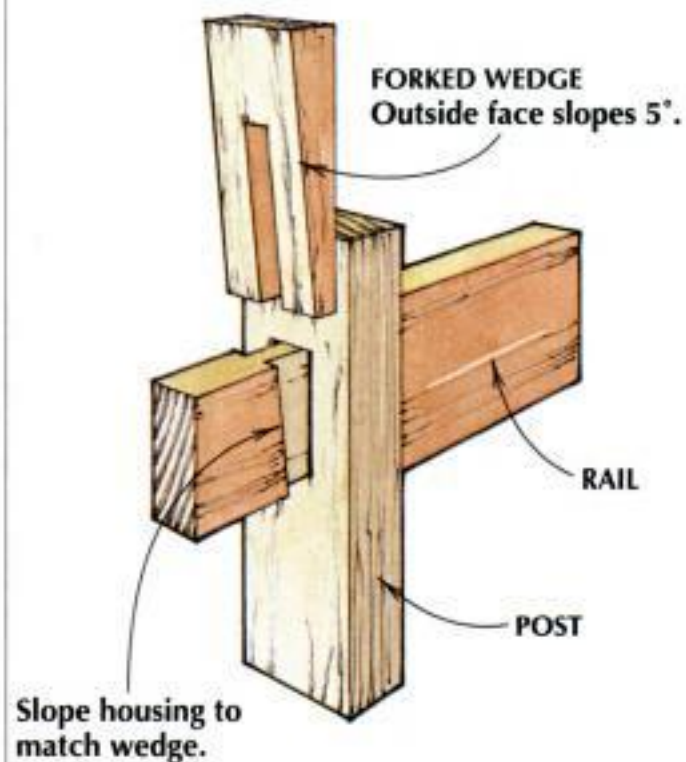
This take-apart joint can be fashioned in different sizes and configurations, but the working principle remains the same. A shouldered tenon is drawn up tight to a through-mortised leg or post by means of one or more wedges.

### SINGLE WEDGE

This common type of tusk tenon joint works well on tables, stools, and benches. Variations on the single-wedge design include forked wedge joints.

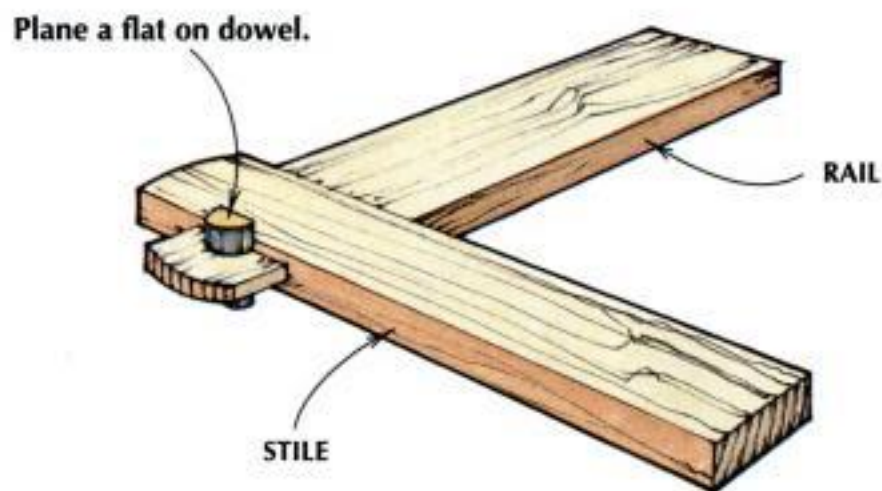


### FORKED WEDGE

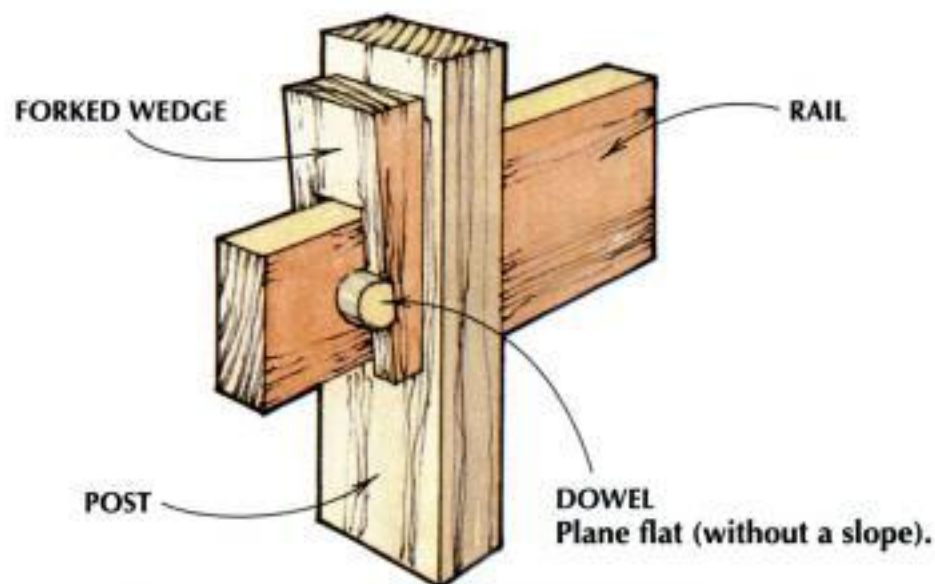


### DOWEL WEDGE

Tusk-tenoned rails make frames for mirrors, pictures, and quilting.

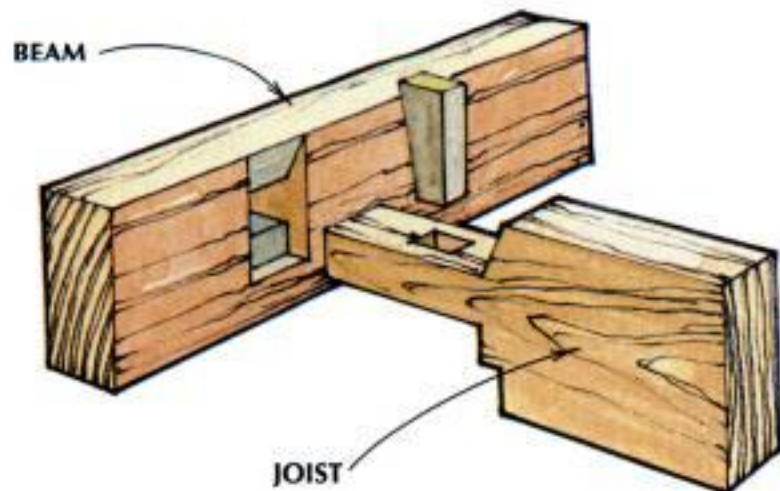


### FORKED WEDGE WITH DOWEL



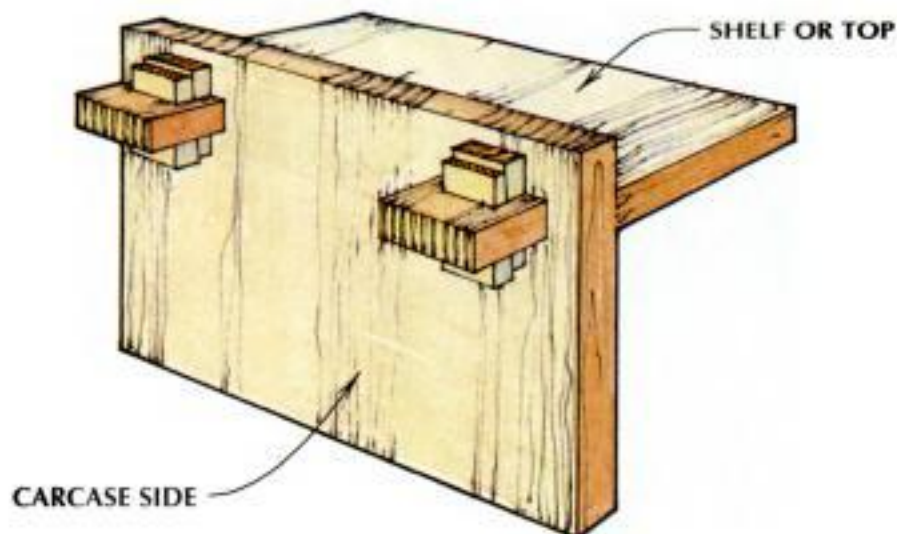
### HOUSED TENON

In a timber-frame building, tusk tenons can be used to draw a joist up tight to a beam without clamping. Load-bearing joists must be housed.



### FOLDING WEDGES

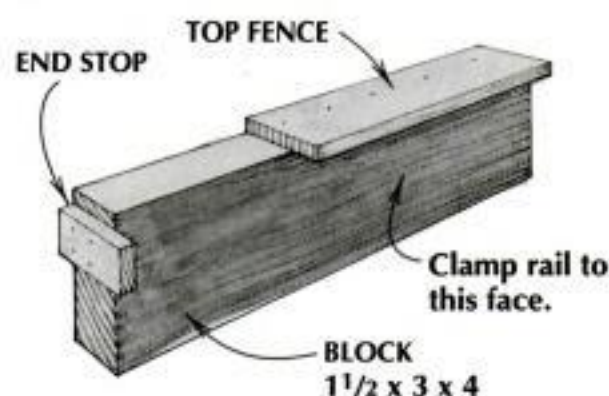
Folding wedges don't require a sloped face in their mortises. You can use two or more tusk tenons in a row to make cabinets, shelves, and other case pieces.



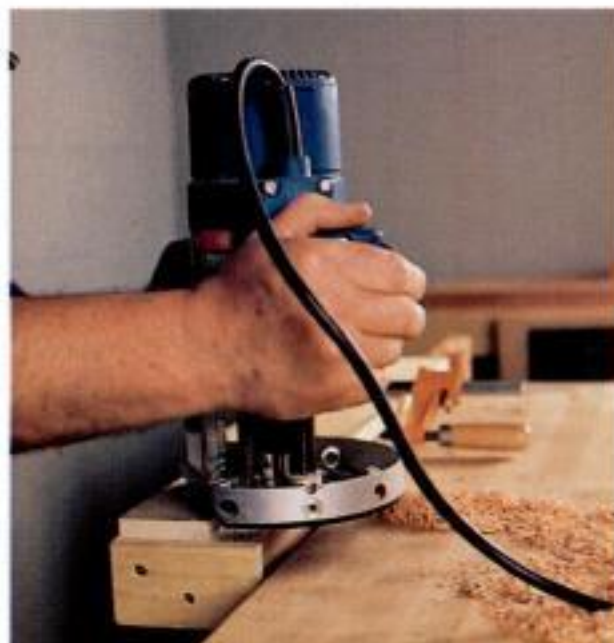


## CUTTING THE TENON AND MORTISE

Use this jig with a router to form the tenon's shoulders. The distance from the top fence to the end stop is the length of the tusk tenon plus the router-base offset.



**Jig up.** Clamp the rail to the router jig, then hold both in the vise. Here the bottom shoulder has already been cut.



**Route the tenon shoulder.** Support the router on the top of the jig. A spiral-fluted end mill works best. Allow the bit to cut down into the jig.



**Drill the wedge mortise.** Stand the tusk tenon against a tall fence and make sure it's square to the bit, so you can drill from both sides.



**Lay out the slope.** Set the sliding bevel to the slope of the wedge, here 1:12.



**Pare the slope.** Grab the tusk tenon in the vise so you can see the top and bottom of the slope. Pare the wedge mortise flat and smooth.

The traditional form of the joint has a single wedge mortised through the edge of the tusk tenon. In old work the wedge often has a rounded, chamfered, or angled head. You can shape the head to suit yourself.

The wider the tusk-tenoned rail, the better it resists racking, because resistance comes from the tenon shoulders at top and bottom.

Leave plenty of tusk tenon extending beyond the wedge, because driving the wedge can shear the wood along the grain. In furniture-scale work, leave about 1½ in. of wood there, more or less according to the species. Use straight-grained rails to avoid grain runout at the tenon's end. When you want to minimize tenon projection, reinforce the shear lines with pegs or slips. (See "Reinforcing the Joint," opposite page.)

### Cut the Tusk

In a typical example the post is 1½ in. thick, the wedge adds another 1¼ in., and the tusk tenon projects another 1 in. to 2 in. The total length of the tusk tenon is 5 in., too deep to cut on the tablesaw. You can handsaw or bandsaw the tenon, or knock together a block jig and rout the tenons, as shown at left.

Transfer the tusk tenon's dimensions to the face of the post to lay out the tusk mortise. Extend the layout marks around the wood. Then drill out the waste, working from both sides to avoid tearout. Pare the mortise back to the layout lines with bench chisels. You want a clean and neat sliding fit. An alternative technique is to make a hardboard template and plunge-route the mortise, using a straight bit with a template guide bushing.

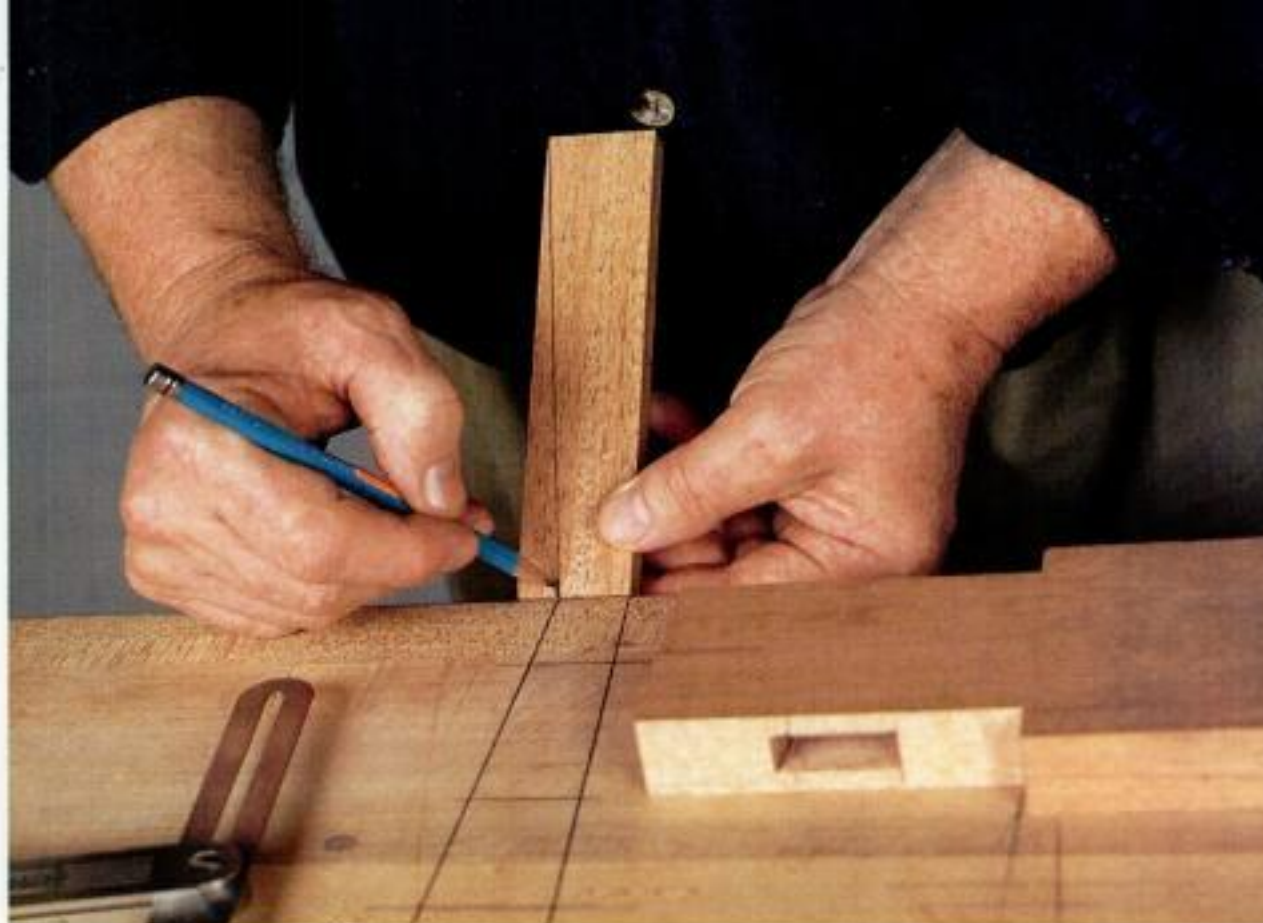
### Make the Wedge Mortise Next

Transfer the thickness of the rail onto the face of the tusk tenon, then offset the line about ⅛ in. closer to the shoulder. This ensures that the joint will draw up tight no matter how much the wood shrinks.

Working from the offset line, lay out a rectangular through-mortise at least 1 in. long. The wedge needs to be stout enough to resist bending into the gap. Make the wedge mortise about half the thickness of the tusk tenon. Extend the layout lines around the tenon, so you can drill and pare from both sides.

Bore out the mortise on the drill press, bracing the work against a high fence. Then pare the mortise square. (See photo, near left.)





**Lay out the wedge.** Take the wedge dimensions directly from the full-size drawing to the wedge blank. Use the sliding bevel to transfer the slope of the wedge mortise.

### Slope the Wedge Mortise

The outward edge of the wedge mortise must slope to accommodate a tapered wedge. A good working taper is about 5°, a gradient of 1:12. Steeper than this and it tends to pop out; shallower, and it draws too slowly.

Set your bevel gauge to a 1:12 gradient and lay it across the face of the tusk tenon, indexing from the bottom outside corner of the mortise. Square the top of the slope across the top edge of the tusk tenon. Then set the rail in the vise in good light. This way, you can see the slope to pare, as shown in the bottom right photo, opposite. The sloping surface should be flat and smooth. A hollow or a hill concentrates the wedging pressure, which tends to split the wood.

### Finally, Make the Wedge

Lay out the wedge to match the slope of the mortise. Working on paper or directly on the benchtop, make a full-size drawing of the wedge, as shown above. Transfer the width of each end of the wedge directly from the drawing.

Cut the wedge a few inches too long. You can trim it later to center the rail vertically and to shape the ends.

### Tusk Tenon Variations

The folding wedge form of the joint gets around the problem of matching the slopes of wedge and mortise. The mortise stays square, while two identical wedges work against one another. (See [drawing, page 53.](#)) To draw up the joint, center the wedges with finger pressure, then tap them both at once.

The forked wedge converts the sloping mortise into a pair of sloped housings cut into the thickness of the tusk tenon. The housings are easier to cut because the whole surface is visible. The dowel version of the joint does away with the sloped housings. These two versions can be made quite large, so they become a strong element in the furniture design.

The drawback to the tusk tenon joint is that it can't make a flush corner—it always leaves a projecting tenon. So it's not the universal soldier. But even so, this kit of parts can solve a lot of furniture design problems. ▲



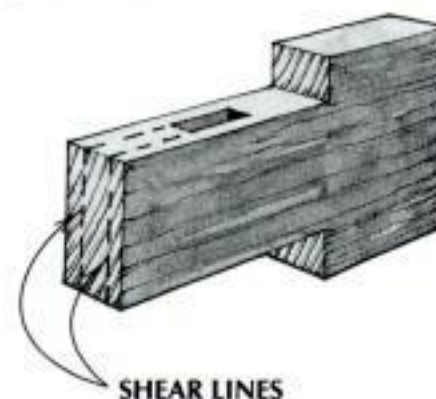
**IAN J. KIRBY**  
is a furniture designer  
and teacher  
with studios in  
Connecticut.



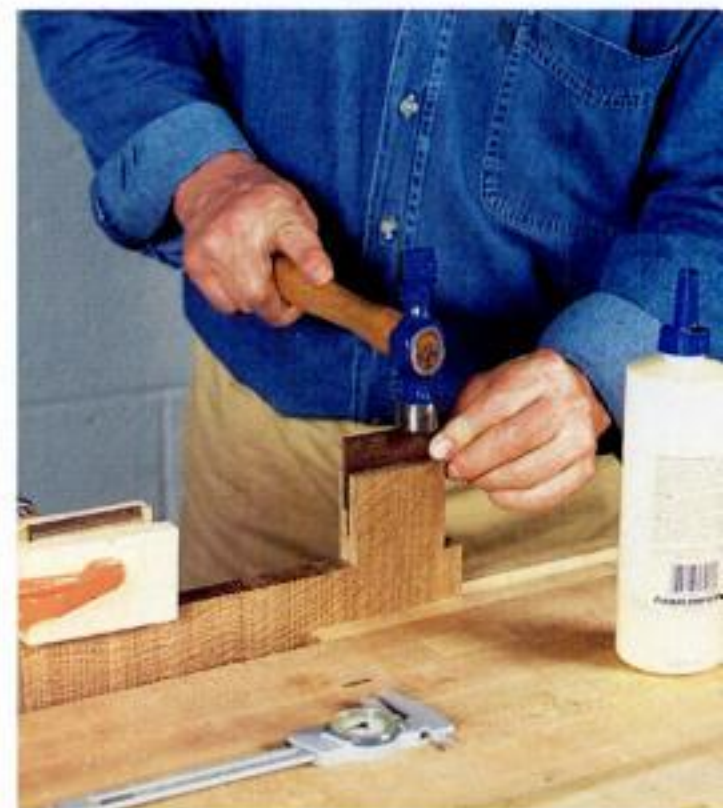
**JOHN KELSEY**  
is a writer  
and occasional  
woodworker in  
Connecticut.

## REINFORCING THE JOINT

If you want to reduce the length of the tenon beyond the wedge, reinforce the joint, so the wedge doesn't split the wood along the shear lines.



**Drive pegs.** Drill the peg holes, then pare them square. Trim the pegs flush after the glue dries.



**Insert slips.** Double-tenoned shelf has slips glued cross-grain in tablesawn slots.



# *satinwood box*

*Create a masterpiece using basic veneer techniques*

by Frank Pollaro

**V**eneer work is a specialty in my shop. We spend most of our time on large commissions—tables, desks, and Art Deco reproductions. The veneer bill alone for these projects can be staggering. That's why I enjoy making small veneered boxes like this one whenever I get the chance. Veneer is still the star of the show, but for less than \$20



*The best use for beautiful wood. The author's box has turned feet and inlay dots made from tagua nut. Holly strips frame the top panel. The tray is lined with suede installed over foam padding.*



you can use the best and most beautiful veneer that money can buy. Ceylon satinwood was my choice for the box shown here, but I've also used macassar ebony, amboyna burl, curly koa, and curly maple on similar boxes. You'll need about 4 sq. ft. of veneer to make a 2¼ by 6 by 8-in. box.

Don't let the small size of this project fool you. It's a great opportunity to improve your veneering techniques, and you won't need any special equipment to get the job done. I do all of the cutting and joinery work on the tablesaw. To cut and trim the veneer, you'll need a sharp veneer saw. (See

Sources.) If you want to inlay a holly border in the top, as I did with my box, I suggest using a laminate trimmer or a small router and a ⅛-in.-dia. straight bit. But the box also looks beautiful without this accent treatment.



**Splines, grooves, and rabbets.** Pollaro uses this joinery to build a single closed box; then he saws the box apart to separate the top from the bottom. Trimming the corners on splines and rabbets ensures that the joints will close tightly and easily.

the sides and ends of the box together. The top and bottom panels have rabbeted edges that fit in grooves cut in the sides and ends. I cut the grooves in the panels on the tablesaw, using a thin-kerf (⅜-in.) blade.

## The Cut-Apart Approach

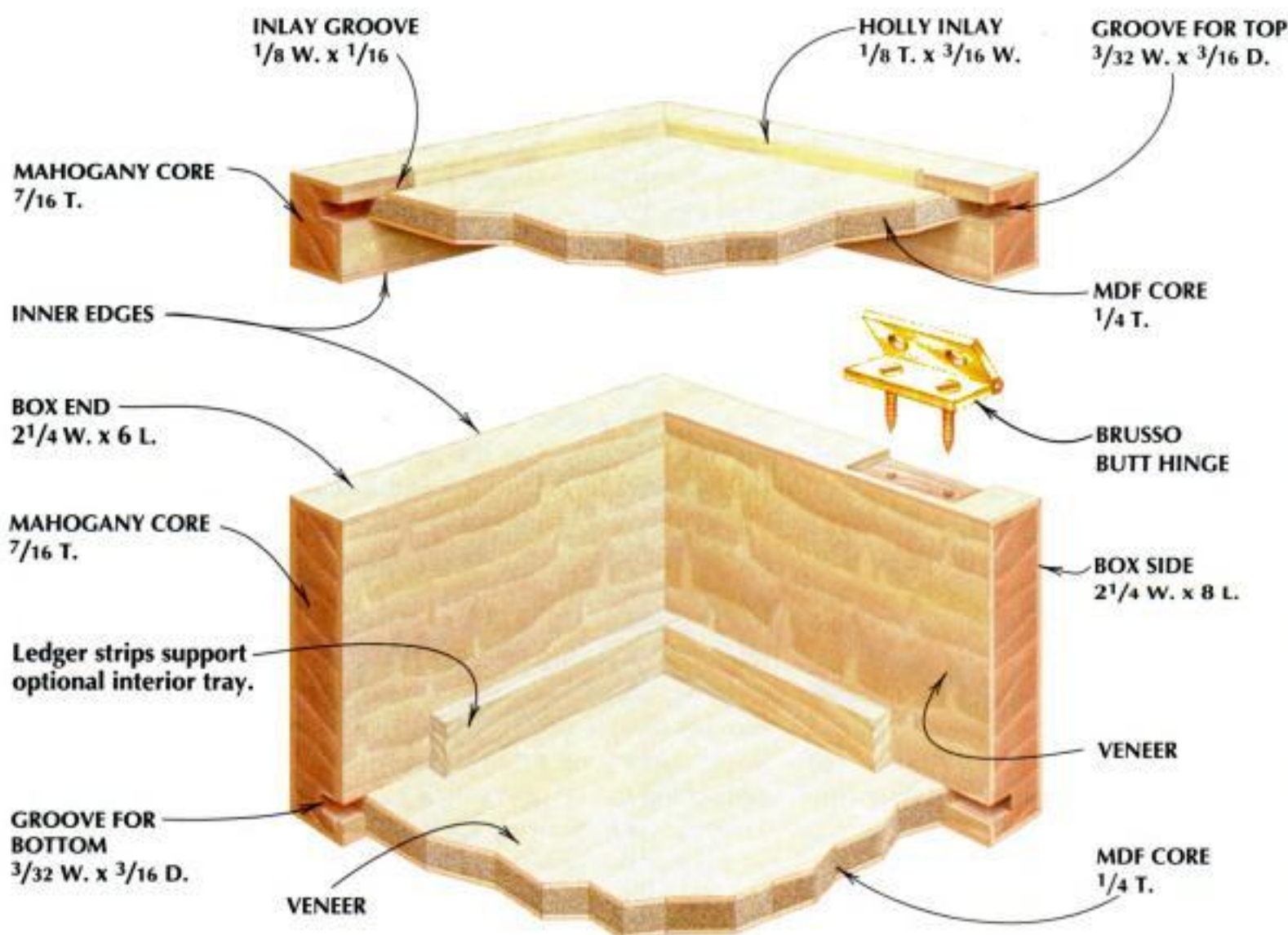
When making a lidded box, I prefer to build a totally enclosed box, then cut it apart on the tablesaw to create the top and bottom. This strategy has several advantages. It requires less work than making the top and bottom of the box individually. But even more importantly, it ensures a nice, precise fit between parts. It also guarantees perfectly matching grain.

The construction sequence is discussed and shown on the next two pages. Construction details are shown in the photo at left and in the drawing below.

I use splined miter joints to join the sides and ends of the box together. The top and bottom panels have rabbeted edges that fit in grooves cut in the sides and ends. I cut the grooves in the panels on the tablesaw, using a thin-kerf (⅜-in.) blade.

## BOX CONSTRUCTION DETAILS

You can substitute medium-density fiberboard (MDF) for mahogany core stock. Veneer the inner edges of the top and bottom after you cut the box apart. (See photos, pages 58 and 59.)



## SOURCES

Ceylon satinwood veneer, veneer saws, and tagua nuts are available from Flamingo Specialty Veneer Co. (201-672-7600) Circle #605 and from Constantine's (800-223-8087). Circle #606

### Other sources for veneer:

Certainly Wood (716-655-2769) Circle #607  
Wood Shed (716-876-4252) Circle #608  
B&B Rare Woods (303-986-2585) Circle #609

Brusso hinges are available from Woodcraft Supply Corp. (800-225-1153). Circle #610



# BUILDING THE BOX FROM START TO FINISH



**Veneer the core pieces.** Pollaro veneers a single mahogany core piece from which the box sides and ends will be cut. This takes less time than veneering parts individually. The outer cauls are 1 1/4-in.-thick MDF. The inner cauls are 1/4-in.-thick, melamine-coated particleboard.



**Cut kerfs for spline slots.** The rip fence and a square MDF backer block guide the workpiece as Pollaro cuts spline slots in the mitered sides and ends.



**Veneer the edges.** Strips of melamine-coated particleboard make good clamping cauls for veneering the edges of side and end pieces.

**M**aking a small, intricate veneer project doesn't mean veneering lots of tiny parts. You don't need elaborate vacuum-veneering or veneer-press equipment either. Bar clamps, medium-density fiberboard (MDF), and melamine-coated particleboard (MCP) will handle your glue-ups. I recommend a good, sharp veneer saw for trimming veneer flush.

My cutting and veneering sequence avoids a lot of fussy work and also gives you the crisp edges and joints that woodworkers and customers appreciate. Major steps are described below and in the photos on these two pages.

- Veneer the sides, ends, top, and bottom. I veneered a single 5-in. x 16-in. piece of 7/16-in.-thick mahogany for the box sides and ends. The core for the top and bottom pieces is 1/4-in.-thick MDF. Clamps and cauls can handle this glue-up. (See Photo 1.)

- Sand the veneered pieces. Scrape glue squeeze-out from the faces and edges of your stock and sand it to 220 grit.

- Cut the sides and ends to finished dimensions. Rip these parts to width first, then miter the ends.

- Cut spline slots in the miters. The tablesaw setup I use for this job is shown in Photo 2. Make sure your saw blade is set to a true 45° angle.

- Veneer the edges of the side and end pieces. Short lengths of 3/4-in.-thick MCP work well as cauls for this glue-up. (See Photo 3.)

- Trim the veneered edges flush. A sharp veneer saw makes quick work of this job. (See Photo 4.)

- Cut grooves and rabbets. The top and bottom panels are rabbeted to fit in grooves that are cut in sides and ends. (See drawing, previous page.) I lay out these joints so that the bottom fits flush and the top is recessed 1/16 in. Trim off the rabbeted corners on the top and bottom so that the splines can extend the full length of their slots. (See photo, previous page.) Then cut and test-fit the splines.

- Glue up the box. I use two band clamps to close the box corners around the top and bottom. Then I pull the joints tight with deep-throated bar clamps.

- Cut the box apart. Use a high auxiliary fence on the table-





**Trim the veneer.** A sharp veneer saw is all you need to trim excess veneer from sides and ends.



**Cut the box apart.** A high, flat auxiliary fence promotes control when separating the box top and bottom. Pollaro sets the blade  $\frac{1}{16}$  in. higher than box side thickness.



**Sand the top and bottom flat.** Sheets of sandpaper glued to an MDF base provide a flat abrasive surface. To flatten the mating edges of the top and bottom, apply even downward pressure and move each piece in a figure-eight pattern.



**Final veneering.** Cover the exposed core edges of the top and bottom assemblies with a single sheet of veneer. After the glue dries, flush-trim the veneer and file the inside corners square.

saw, and set blade height just a tad ( $\frac{1}{16}$  in.) higher than your side thickness. (See Photo 5.)

- Flatten the inner edges. It's crucial to remove any sawmarks or other irregularities on the surfaces you've just cut. This is easy if you have a sanding board like mine. (See Photo 6.) Make one by using spray adhesive to glue standard 9x11 sandpaper sheets to both sides of an MDF base. I put 120-grit sandpaper on one side for initial flattening, and 220-grit on the other for finishing up.

- Veneer the inner edges. Glue and clamp the top and bottom to separate sheets of veneer. (See Photo 7.) When the glue has dried, flush-trim the veneer with a laminate trimmer (or router) and a flush-trim bit. Square up the inside corners with a mill file.

- Install hinges and feet. I mortise a pair of Brusso brass hinges into the top and bottom. Then I install four turned tagua nut feet. (See Sources.) Brass bar stock and hardwood scraps can also be fashioned into attractive feet.

- Add some options. The basic box is complete and ready for

finishing, unless you want to add some options, as I did. One is the holly inlay that frames the panel on the top of my box. The four inlay pieces are mitered together where they join at the corners, and fit in shallow routed grooves. In the center of each side and end, I inlaid a  $\frac{1}{8}$ -in.-dia. tagua nut dot. Finally, I built an inner tray to make the box more useful for storing small items. I made my tray from satinwood, dovetailing the corners, dividing it according to the golden rectangle, and then adding a liner of suede over foam. No jewel could ask for a finer home. If you're making a tray, add ledger strips to the bottom of your box and you'll gain a lower compartment. (See drawing, page 57.)

- Make it "pop." Great veneer deserves a great finish. Three coats of gloss lacquer, sprayed on and rubbed out, really make the satinwood glow. ▲

**Frank Pollaro** owns a custom furniture shop in northern New Jersey. He is also a partner in the Flamingo Specialty Veneer Co., which supplied the veneer for this project.



# THE WORLD'S

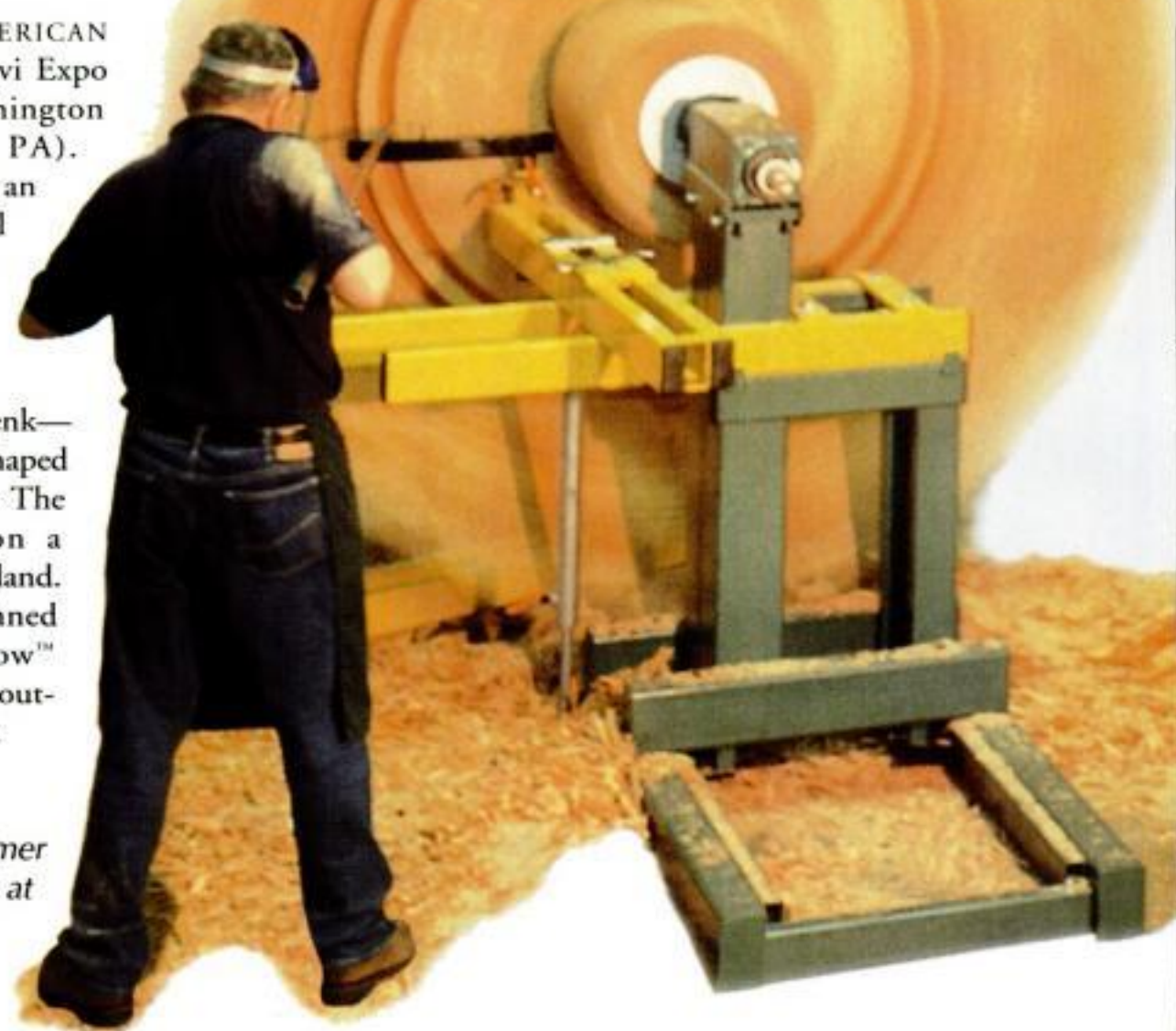
## A record-breaking bowl gets turned at The AMERICAN WOODWORKER Show™

**I**t happened last fall, when the AMERICAN WOODWORKER Show,™ came to the Novi Expo Center (in Novi, MI) and the Fort Washington Expo Center (in Fort Washington, PA). Thousands of showgoers were greeted with an amazing sight—the world's largest bowl being turned by renowned British turner Stuart Mortimer.

During the three days of each show, Mortimer and a team of assistants—including AW contributing editor Steve Blenk—enthralled the crowds as they hollowed and shaped the 8-ft.-dia., two-ton chunk of Sitka spruce. The blank spun slowly (about 25 rpm) on a Tyme/Multico lathe brought over from England. Another gigantic turning adventure is planned when The AMERICAN WOODWORKER Show™ comes to the Ontario Convention Center, outside Los Angeles, from March 6 through 8. ▲

***Big spin.** Turner Stuart Mortimer turns the world's largest bowl at The AMERICAN WOODWORKER Show™ in Novi, MI.*

PHOTO BY JIM RAWLINSON



## THE BIRTH OF A BOWL



**1** ***Bucking a chunk.** David J. Borek of Maple Specialties in Washington slices off a 5,600-lb., 8-ft.-dia. bowl blank from the butt end of a spruce log. The tree that yielded this behemoth blank was 285 ft. tall.*

PHOTO BY DAVID J. BOREK



**2** ***Cutting away the waste.** Mortimer removes excess wood from the inside and outside of the blank with a chainsaw, reducing the weight to around two tons. A center stem is left for attaching to the lathe's tailstock.*

PHOTO BY ANDY RAE



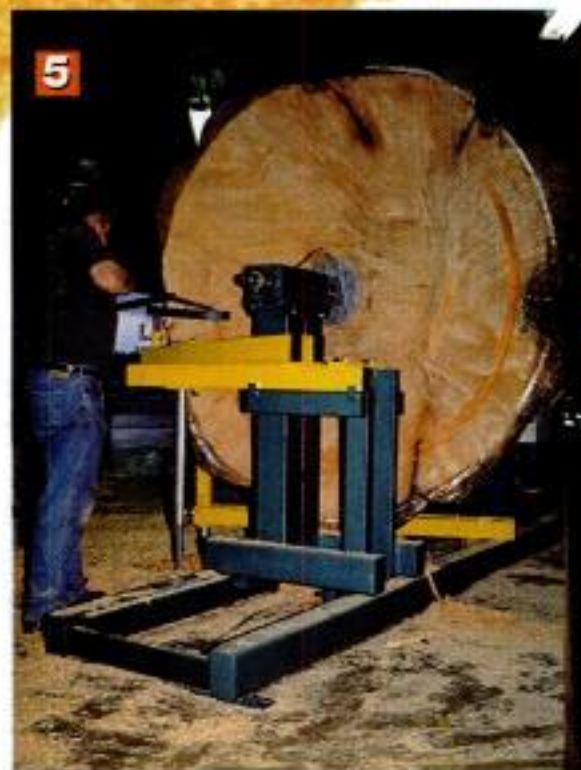
# BIGGEST BOWL



**3 Finding center.** Mortimer and AW contributing editor Steve Blenk find the center for attaching the faceplate by pivoting a weighted string around the outside of the blank.



**4 Mounting on the lathe.** Chains, heavy strapping, and a forklift hoist the big blank onto the headstock. A unique pivoting chuck on the tailstock allows for slight imbalances as the blank spins.



**5 First inside cut.** Using an 8-ft.-long, custom-made gouge with a replaceable cutting tip, Mortimer makes the first inside cuts.



**6 Two-time turning.** Mortimer and Blenk do double duty turning the outside of the blank.



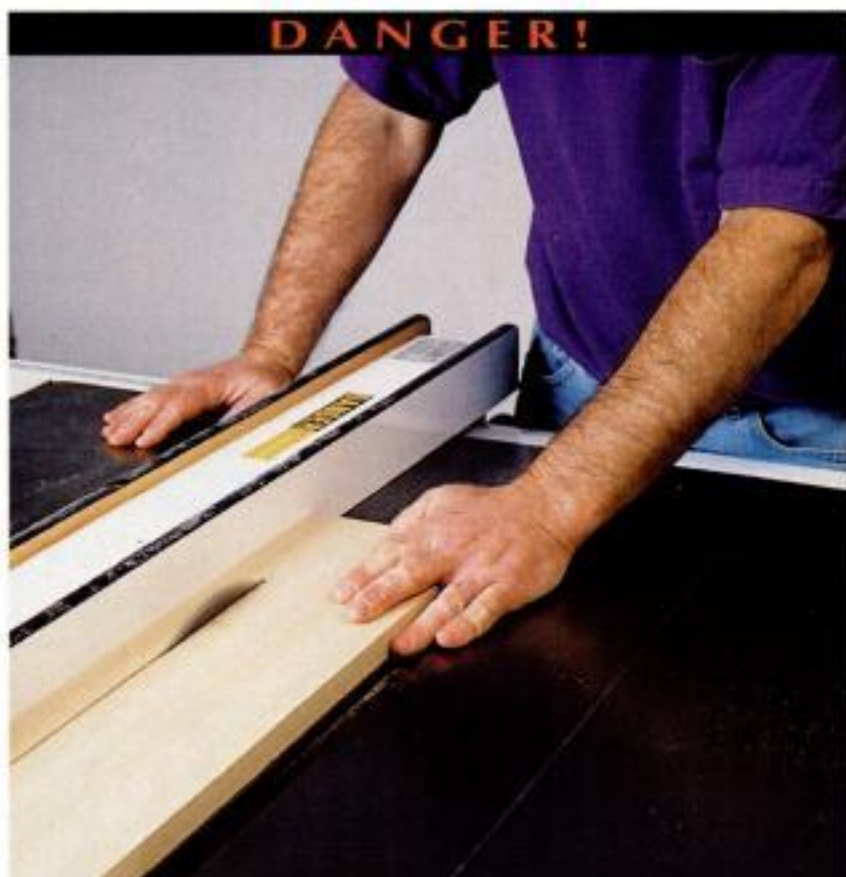
**7 Big finish.** Mortimer brushes on several gallons of Danish oil to slow down the drying of the green bowl and prevent cracking.



# Preventing Tablesaw Accidents

How to work safely with the most dangerous power tool

by Dave Freedman



Pushing the "waste" side of the workpiece, especially without a splitter, almost guarantees kickback. **Never** stand directly behind the board.



Feed the stock with your right hand between the blade and fence. Use a push stick whenever your hand gets within 6 in. of the blade.

Mike Schwarz is an anesthesiology technician and a woodworker. Displayed prominently on the wall of his workshop is an unusual but effective safety device. It's a Polaroid photo that he took in a hospital emergency room. The photo shows the mangled hand of a woodworker who had suffered the painful consequences of kickback on his tablesaw. It's Schwarz's stark reminder to play it safe.

In many workshops, the tablesaw is the hardest-working power tool. It's also the most dangerous. That's why this article is so important. Instead of compiling a list of basic "do's and don'ts," we've selected actual case studies that represent five of the most common accidents that occur with tablesaws. The blood is real. So are the techniques and precautions you can use to cut safely.

## Reaction Time: Zero

Most tablesaw accidents happen so fast that the operator has no warning, and can't react or adjust to avoid injury. That's why you must do everything possible *before* switching on the saw to prevent any accidents.

In each case, we'll describe the accident and then explain the methods of tablesaw use that could have prevented it, including the use of guards, splitters, and other safety devices.

## ACCIDENT #1

### TAKING CHANCES WITH KICKBACK

**THE FACTS:** A 28-year-old amateur woodworker was ripping a 1-in.-wide strip from a 5-in.-wide board. He positioned the narrow strip between the blade and fence, as shown in the top photo. He had removed the blade guard and splitter, and was standing directly behind the workpiece. Rather than try to squeeze his right-hand fingers between the blade and fence to finish the cut, he switched to his left hand and pushed the waste side of the board. He saw the board "ride up on top of the blade and shoot back" at his chest. The board broke a rib and removed a large slab of skin.

**THE SAFETY LESSON:** It's crucial to push only the portion of the board between the blade and fence. Keep firm pressure against the fence as you feed the board forward. (See bottom photo.) The left hand can guide the board too, but only up to a point even with the front of the blade.

Always use a pushing device when the distance between the blade and fence is less than 6 in. And never stand directly behind the board—stay safely out of its path in the event of kickback.

When cutting off a narrow strip, if possible, place the wider portion between the blade and fence, so that the narrow piece is on the "waste" side. If the strip is less than 1/2 in. wide, use a zero-clearance throat plate.

**GUARDS AND ACCESSORIES** Most blade-guard assemblies include a splitter, which can help prevent kickback. Always use it when ripping!



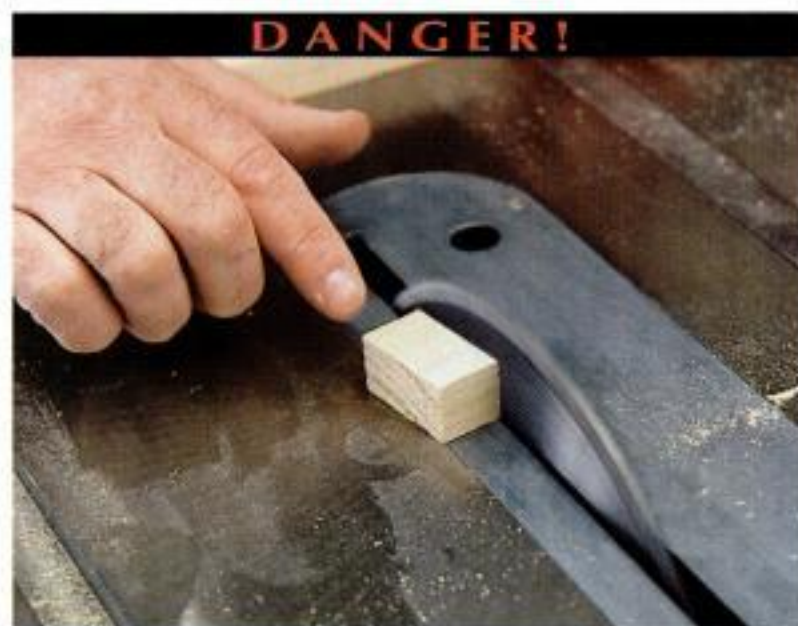
## ACCIDENT #2

### GETTING TOO CLOSE TO THE BLADE

**THE FACTS:** A 48-year-old amateur woodworker trimmed the end off a long board, using his miter gauge. He turned off the saw, and as the blade was slowing down he noticed that the offcut was “bumping against the blade.” He flipped the offcut away with his index finger, and in the process brought his thumb into the blade. He lost about 1/4 in. from the tip of his thumb.

**THE SAFETY LESSON:** Even a slow-spinning saw blade can cause grave injuries. As a rule, there should never be a reason to put your hand anywhere near a spinning blade. To remove an offcut near the blade, use the end of a long push stick or other long stick. If the offcut is “bouncing off” or perilously close to the blade, creating a potentially dangerous kickback situation, just turn off the saw and get out of the way.

**GUARDS:** Some blade guards will prevent long offcuts from contacting the blade after the cut.



*A spinning but unpowered blade can still do serious damage. **Never** reach close to the blade when it's still moving.*

## ACCIDENT #3

### IGNORING THE DANGER OF LOOSE OBJECTS

**THE FACTS:** A student in a middle-school shop class was ripping a long board on the tablesaw. The board's kerf started to close on the outfeed side. To prevent the board from pinching the blade and kicking back, the student asked a classmate to stick a screwdriver into the kerf to hold it open. As she was passing the screwdriver to her classmate across the saw table, she dropped it. The screwdriver fell onto the unguarded, spinning saw blade, and was thrown toward the student's head. She suffered permanent brain damage.

**THE SAFETY LESSON:** Never reach across the blade while it's spinning, especially if you're holding something. An object dropped onto or near the blade can be thrown with extreme force.

Never retrieve a board you've just ripped by reaching over the blade to the outfeed side and bringing the board back near the blade. Instead, use an auxiliary outfeed table or a series of rollers mounted on sawhorses to catch the board; then walk around the saw and retrieve it.

Remember also that the tablesaw's vibration can cause objects to “skate” across the saw table and into the path of the workpiece or into the blade itself. Keep your table surface free of debris.

**GUARDS:** Keep your blade guard and splitter mounted on the saw whenever possible! A splitter would have made the screwdriver unnecessary, and a blade guard would help keep all objects (including fingers) away from the blade.

*[Text continued on page 66.](#)*



*A screwdriver is no substitute for the saw's splitter. Loose objects near the blade can become dangerous projectiles. And protect your eyes!*



# Use a premium blade guard...

## Invest in a guard that's easy to live with

by Ernie Conover

**A** tablesaw blade guard protects fingers from the spinning blade—but only when the guard is on the saw. The trouble is, the typical stock guard that comes with many saws is so frustrating to mount, align, adjust, remove, and work with, you're tempted to leave it off permanently.

If that's the sort of guard you have, I urge you to replace it with a high-quality aftermarket guard. There are at least four of them on the market that are very convenient to use and relatively hassle free. The security they offer makes tablesawing fun again, instead of a nervewracking exercise. They mount on just about any 10-in. contractor's saw or cabinet saw. Here are the four that I can recommend:

- **Delta Deluxe Uniguard**, \$250. Delta International Machinery Corp., (800) 223-7278. *Circle #611*
- **Biesemeyer T-Square BladeGuard**, \$400. Sold by Delta International Machinery Corp., (800) 223-7278. *Circle #611*
- **Excalibur Blade Cover**, \$269. Excalibur by Sommerville Design, (800) 357-4118. *Circle #612*
- **Brett-Guard**, \$435. HTC Products, (800) 624-2027. *Circle #613*

All four of these are overarm guards. You mount them on the right side of the saw instead of directly behind the blade. A support arm extends out over the table and suspends the blade cover above the blade. You can adjust the position of the cover up and down and side to side, or swing it out of the way to change blades or to use a tenoning jig. You can also remove and replace your splitter independent of the guard, for dadoing.

My favorite, and the one I have in my shop, is the Uniguard (see photos). It has a split blade cover that allows you to swing either half up and out of the way independently. For example, I can swing the right half out of the way to rip a narrow workpiece (using a push stick, of course), and still have the blade adequately guarded. The saw's on-off switch mounts on the arm.

*Ernie Conover teaches woodworking in Parkman, OH, and still has ten fingers.*



**Convenience and security.** The blade cover on Conover's Uniguard is suspended from a C-shaped support arm. Two halves of the guard can swing up independently—an advantage when ripping narrow boards.



**A clear line of sight.** Clear, high-strength plastic provides both protection and a good view of the blade. The splitter is attached to the table, independent of the blade guard.



# ...or improvise if you can't

## Shield the blade when you can't use the standard guard

by Bernie Maas

**A**s a consultant in several lawsuits involving tablesaw accidents, I've heard horror stories that wouldn't have happened if a blade guard had been in place. Blade guards keep fingers and other stray objects away from the blade. They also protect you from splinters that occasionally spew out of the blade.

If you can't use the guard that comes with the saw (or any other guard, for that matter), it's usually easy to make your own. In fact, for almost any tablesaw operation there's a way to cobble together a guard on the spot, using common shop scrap, clamps, and a little ingenuity. I'll show you three important examples.

One note about the clamps first: When you erect these guards on the saw, use bar clamps rather than C-clamps. The saw's vibration may tend to loosen C-clamps if they're slightly bent.

### Dadoing with the Rip Fence

When plowing grooves or rabbets in long stock, you can't use a blade guard that's attached to a splitter. Instead, you can pile shop scrap on the left side of the table, and clamp a guard on top of the pile so it extends out over the blade (see top photo). If you have some clear Plexiglas or polycarbonate handy, use that for the guard, so you can see what's going on under it. (Don't use acrylic for the guard, because it shatters easily.)

I also use featherboards to keep the workpiece flat on the table and firmly against the fence. Tension the featherboards against the board before clamping. This setup allows me to shove stock in at one end, feed the stock until my hand gets close to the guard, then walk around the saw and pull it out at the other end.

### Dadoing with the Miter Gauge

When you push stock over the dado blade with the miter gauge, you can cover the blade from the opposite direction. I clamp a 2x2 to the right side of the rip fence, flush with the top of the fence. Then clamp or nail the guard to the 2x2 as shown in the center photo. It's so simple it's astonishing!

### Cutting Large Panels

I use an "outrigger" guard when cutting large panels. (See bottom photo.) Outrigger featherboards guard the blade and hold the plywood sheet down as it's ripped. This way, it won't buck up over the blade as it occasionally wants to do.

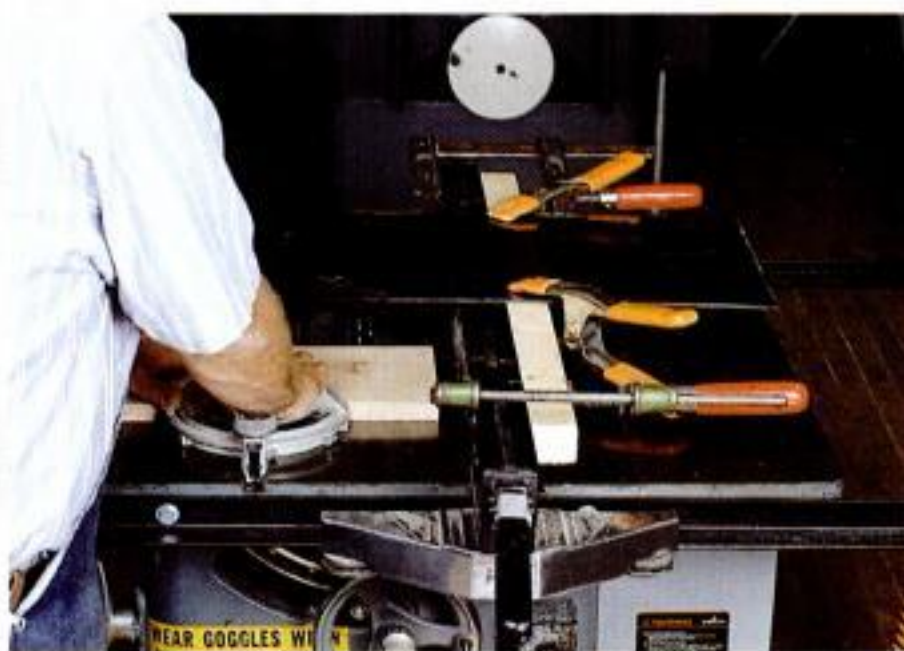
You can set up the outrigger with clamps, or make it more permanent with a handful of nails or screws.

To rig it up, clamp a 2x2 to the far side of the rip fence, again flush with the top of the fence. Set your fence for the cut you're going to make. Perpendicular to the 2x2, fasten appropriate lengths of 2x4s reaching just beyond the blade, and attach another 2x2 across their ends. Clamp featherboards just to the left of the blade, before and aft.

*Bernie Maas teaches woodworking at Edinboro University in Pennsylvania.*



**Grooving.** A scrap of Plexiglas clamped to a pile of scrap boards covers the dado blade. Pressure from featherboards lets you feed without getting near the blade.



**Dadoing.** When he uses the miter gauge to dado, the author clamps the see-through Plexiglas guard to a 2x2 scrap, which is clamped to the rip fence.



**Safe and stable.** Maas uses an outrigger for one-man cutting of sheet goods. The fixture not only guards the blade, it holds plywood sheets down on the table.



## ACCIDENT #4

### PLASTIC LAMINATE THAT SHIFTS AND SHATTERS

**THE FACTS:** A 47-year-old professional woodworker was cutting a sheet of plastic laminate on the tablesaw. He was in a hurry and didn't bother to install a zero-clearance auxiliary rip fence to prevent the sheet from sliding under the standard fence. He also had no blade guard. The laminate crept under the fence and "exploded in the saw blade," throwing razor-sharp fragments that broke a finger and caused severe skin lacerations.

**THE SAFETY LESSON:** "I was in a hurry" is one of the most oft-repeated phrases in hospital emergency rooms. When a laminate sheet creeps under the fence, its orientation to the blade shifts and it presses against the side of the blade. Because the material is so brittle, it shatters.

The simplest way to prevent this is to install an auxiliary rip fence that closes the gap between the stock fence and table. The auxiliary fence shown at right consists of two pieces: a scrap of  $\frac{3}{4}$ -in. hardwood-veneered MDF cut to the length and width of the existing fence and a  $1\frac{1}{2}$ -in.-wide strip of plastic laminate contact-cemented to the bottom edge of the MDF. The right edge of the laminate that you're cutting rides on the  $\frac{3}{4}$ -in. overhanging strip, so it can't dive below the fence.

**GUARDS:** A blade guard would contain most of the shattered pieces of laminate in such a case. Most guards would also be heavy enough to hold the laminate sheet down flat on the table surface.



*A thin plastic laminate sheet can sneak under the rip fence. It can easily bump the side of the blade and shatter.*



*An auxiliary fence closes the gap and prevents laminate sheets from sneaking under the fence.*

## ACCIDENT #5

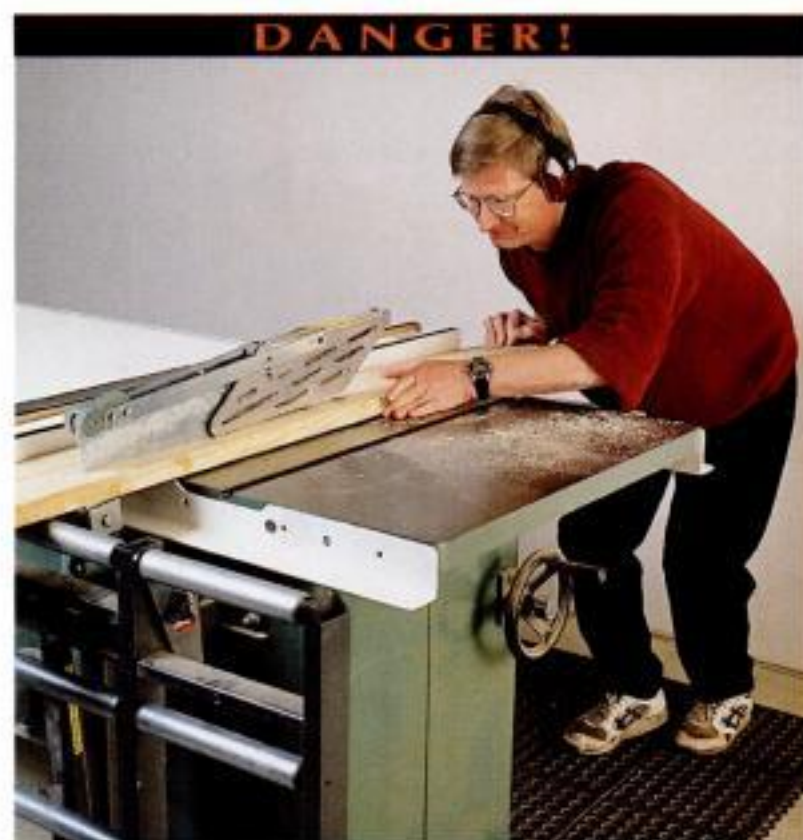
### LEANING INTO THE CUT

**THE FACTS:** An amateur woodworker was ripping a long, narrow board with a dull saw blade. The board hit a snag and hesitated. To compensate, he put more weight behind the board and pushed harder with his right hand. The board suddenly zipped through the blade. His hand plunged under the blade guard and into the blade.

**THE SAFETY LESSON:** Some accident victims describe a curious situation where the hand seems to be "pulled into the blade." Two factors contribute to this. The first is a high-pressure feed, and the second is an off-balance stance. When the blade gets past the kink and suddenly cuts through the wood easily, there is no time to react and break your body's forward thrust.

Replacing the dull blade with a sharp one would probably have saved the woodworker from serious injury. But even with a sharp blade, it's possible to encounter lumber that cuts unevenly. When this happens, remember to maintain a firm, balanced stance and a continuous feed rate. If the board hesitates, your reaction should depend on your saw's power. If your saw has 2 HP or more, continue feeding the board at the same rate—don't push harder. If your saw has less than 2 HP, stop feeding the board, turn off the saw, and finish the cut on the bandsaw. Don't let the blade guard give you a false sense of security—your hand can slip under it.

**GUARDS:** In this accident, the blade guard made the woodworker overconfident. The guard isn't designed to stop your hand or anything else from sliding into the blade from the front.



*Excessive feed pressure can make you lose your balance and run your hand or arm into the blade. Knotty or warped boards are especially dangerous; so is a dull blade.*



# Managing Tablesaw Accidents

## How to respond to workshop emergencies with a cool head

by James W. Follette, MD

In my career as a physician I have treated many patients with serious woodworking injuries, including amputations. I certainly don't want to discourage anyone from working with wood—it's a pastime I enjoy very much myself. But I do want to impress upon you that accidents can happen to veteran woodworkers and beginners alike. Do everything you can to prevent them—but always be ready to react if you should have an accident.

The following summary of what to do if you're seriously injured is not comprehensive. In all cases, contact your own healthcare provider for more detailed instructions.

### Stay Cool

If you believe you're seriously injured, the most important thing is to remain calm and keep a level head. Panicking will elevate your blood pressure, which only makes you bleed more. After you've calmed yourself down, here are the first steps to take:

- Turn off the machine.
- Stop the bleeding.
- Try to assess how severe the injury is. If you have any doubt, get an assessment from a reliable family member, friend, colleague, or neighbor.
- If it's serious, get a ride to the doctor or hospital emergency room—or call an ambulance. Don't take the chance of driving while light-headed from loss of blood.

The most serious injuries at the tablesaw involve amputations, lacerations, and eye injuries. Here's what to do in those cases.

### Amputations

If the saw blade should cut completely through a finger, hand, or arm, stop the bleeding as well as you can with direct pressure, using a clean rag, paper towel, bandage, or shirt.

Get help if any family members or neighbors are available. Preserve the severed part for possible reattachment. Wrap it in a saline-soaked cloth. (Saline, or physiologic salt water, is available in pharmacies—always keep some on hand.) Place it in a water-tight baggy and take it with you to the hospital in a cool-

er or other suitable container filled with ice. Do not freeze the part or allow it to be frostbitten. Take all severed body parts with you, even fragments that appear to be too badly damaged for reattachment, because they might be used for grafts.

### Lacerations

Cuts on the hands, arms, face, and torso are serious and require professional attention if they:

- are more than an inch long or one-half inch deep
- are near a joint
- cannot be closed or easily held closed with a bandage
- involve loss of feeling or any loss of motion range
- involve bone
- could leave an unattractive scar
- contain dirt, manure, or fragments of wood, metal, or other foreign substances.

To treat minor cuts yourself, clean first with mild soap and water, and then apply a clean bandage. Watch for signs of infection: spreading redness of the skin surrounding the cut, increased local pain, pus, local heat, or fever. If they occur, see your doctor.

### Eye Injuries

Because the outer coating of the eye is very sensitive, a speck can feel like a sheet of sandpaper. When a light foreign substance such as sawdust gets in your eye, you can usually flush it out with tap water, saline, or tears. Resist the urge to rub—you can scratch the delicate cornea, or outer layer.

Penetrating fragments, such as splinters or metal slivers,

must be removed from the eye by a physician. Have ferrous metal fragments removed as soon as possible, because oxidation rapidly produces rust, which leaches out into the tissue around the fragment and may permanently affect your vision. If a serious penetration should occur, hold the eyelid closed with gentle pressure while getting help.

*James Follette is a physician and part-time woodworker near Albany, NY.*

## EMERGENCY WORKSHOP FIRST-AID KIT

- ✦ 10 assorted bandages
- ✦ 5 gauze dressings (known as 4x4s)
- ✦ 1 long dressing gauze strip (known as Kerlex or Kling)
- ✦ 1 roll of adhesive tape
- ✦ 1 3-in. elastic bandage wrap (known as Ace)
- ✦ 1 pair of latex gloves
- ✦ 1 squeeze bottle of sterile saline
- ✦ 1 small mirror
- ✦ 1 splinter forceps (tweezers with fine tips)
- ✦ 1 magnifying lens
- ✦ 1 tube of gel cyanoacrylate glue (good for treating minor abrasions)
- ✦ Zip-lock baggies, 1 small and 1 large
- ✦ 1 chemical cold pak
- ✦ Index card with the date of your last tetanus shot
- ✦ Index card with phone numbers for your physician, the nearest emergency room, and an ambulance

## TABLESAW SAFETY RULES

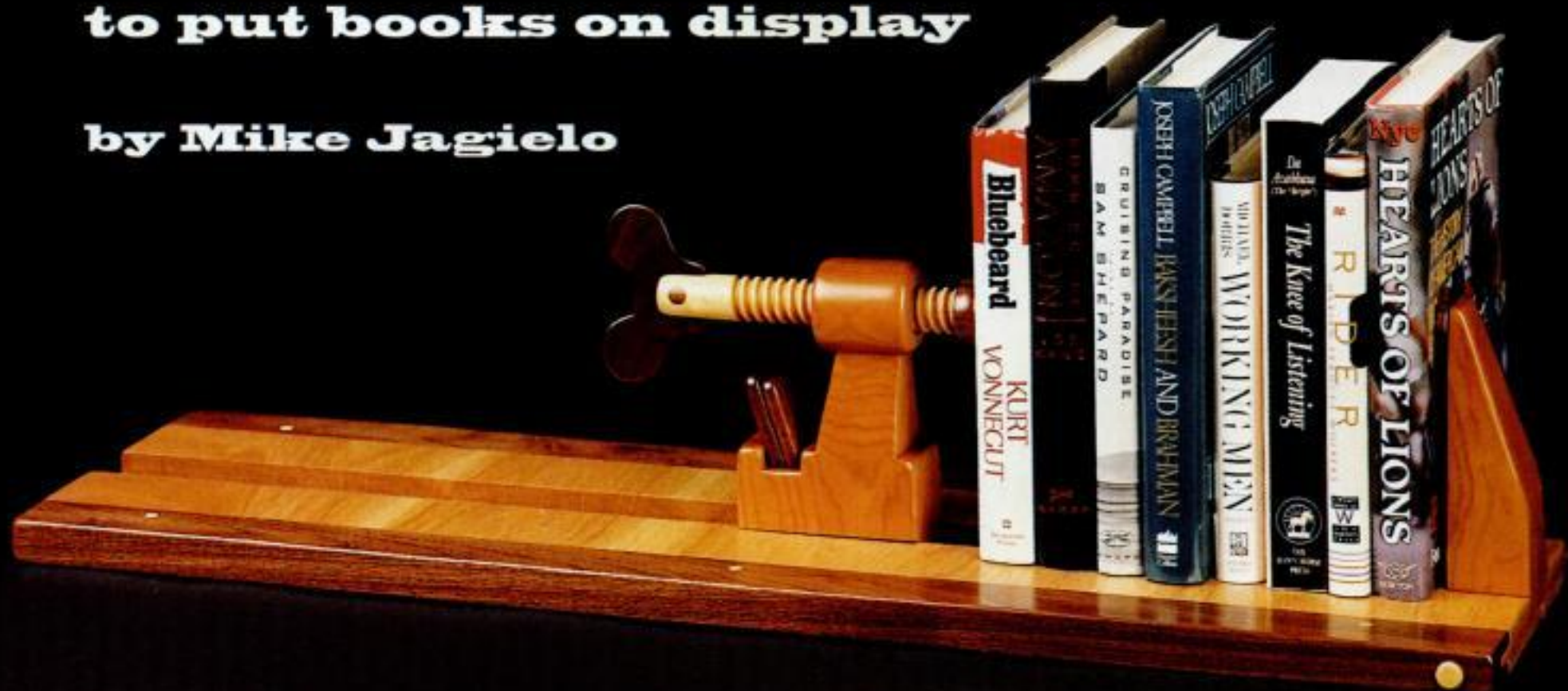
These five case studies cover many important safety concerns, but not all. For comprehensive guidelines, see the safety instructions that came with your tablesaw, and the following literature: ■ "Tablesaw Safety," AW #27 ■ "Power Tool Safety is Specific," a free booklet from the Power Tool Institute, 1300 Sumner Ave., Cleveland, OH 44115, (216) 241-7333.



# Bar Clamp Bookends

**A woodworker's way  
to put books on display**

**by Mike Jagielo**



*Novel clamp. These bookends operate just like a bar clamp. The mechanism is simple, and they're easy to make.*

**I**'ve been told more than once to keep my tools out of the house. But I got plenty of respect (and a few chuckles) when I brought this bar clamp into the family room.

Although it's made of wood, my bookshelf works like a steel bar clamp—the sliding head moves along the shelf bed and “tilt-locks” in place when you draw it up tight against a row of books.

The turnscrew in the sliding head really works. I used a woodthreading kit (available from Woodcraft, 800-225-1153) to thread the dowel and to tap a hole in the “barrel” on top of the head.

## Construction Notes

I made the shelf bed first, and then I made the two clamp heads. Here are some construction tips:

**Middle section**—I glued up scraps of white oak to make the middle section

of the shelf bed, orienting the grain the short way to eliminate any expansion and contraction across the dovetail groove. (See Fig. 1.)

**Breadboard ends**—I attached walnut breadboard “ends” using tongue-and-groove joinery, to keep the shelf bed flat and straight. I slotted the outside pin holes in the tongues to allow for seasonal movement, and pinned the joints with  $\frac{1}{4}$ -in.-dia. brass pins, glued in place with cyanoacrylate adhesive. Rounding over the ends of the tongues and grooves (see top photo, opposite page) makes seasonal expansion and contraction less obvious.

**Dovetail groove**—After assembling the shelf bed, I routed the dovetail groove (across the grain) on the router table. (See Fig. 1.) To make the routing easier, I first cut a square groove about 1 in. wide and  $\frac{7}{16}$  in. deep, using a dado head on the tablesaw.

**Dovetail tongues**—After sketching caricatures of real clamp heads, I started with one 2 by 6 by  $6\frac{3}{4}$ -in. cherry blank. I cut one dovetail tongue on the bottom of the blank on the router table, so that it fit tightly in the shelf bed's groove. Then I bandsawed the blank into two pieces—a fixed head and a sliding head. On the sliding head, I planed  $\frac{1}{16}$  in. off the bottom of the tongue, then trimmed the dovetail so that it could slide easily in the shelf bed's groove.

**Clamp heads**—Drill and tap the hole in the sliding head's “barrel” first. If you tap the hole after you shape the head, the barrel wall might split because it'll be much thinner. Then shape the two clamp heads on the bandsaw. (See Fig. 2.) Smooth the surfaces and curves with files and cloth-backed sandpaper. Glue the fixed head in place.

*Editor's note: Jagielo's bookends won top prize in the AMERICAN WOODWORKER Bookends Contest, which we announced last spring in our “Offcuts” department.*





**Fine details.** Maple plugs in the edges correspond to the rivets that keep the fixed head in place on a real bar clamp.

**Clutch plates**—Make two decorative clutch plates (see Fig. 2) and glue them together; then glue the clutch plates to the sliding head.

**Turnscrew and handle**—I turned the hard maple turnscrew on my lathe and cut threads over 5 in. of its length. Then I cut the notch for the butterfly handle, using a carriage jig made of wood scrap. (See “Tech Tips,” page 32.) I cut out the handle on the jigsaw, finish-sanded it, and then glued it into the notch.

**Clamp pads**—Next I turned the two clamp “pads” from a 2 by 2 by 4-in. blank. I glued the smaller pad to the fixed head. In the narrow end of the swivel pad, I drilled a shallow,  $\frac{7}{8}$ -in.-dia. socket to fit over the threaded end of the turnscrew.

**Turnscrew assembly**—Apply whatever finish you choose to all of the parts. Once the finish has cured, screw the turnscrew through the barrel and attach the swivel pad to the end of the turnscrew. I countersunk a wood screw through the swivel pad, but drilled the shank hole oversize—and left the screw loose enough to allow the pad to actually swivel slightly. Then I plugged the counterbored hole in the pad.

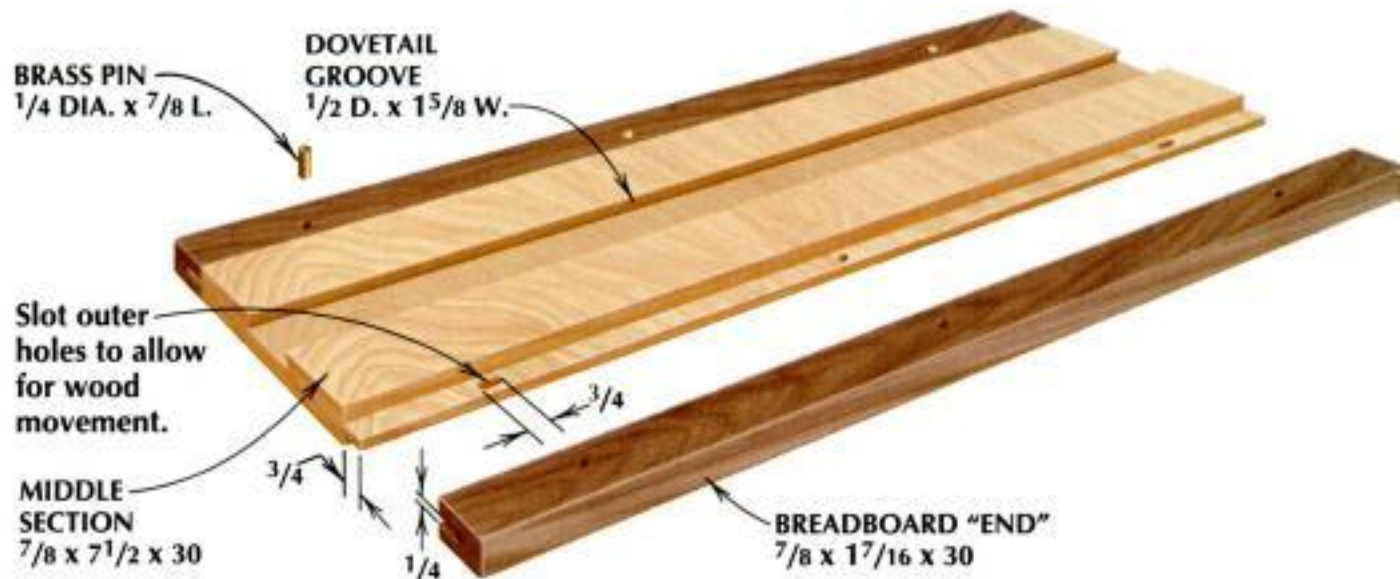
Finally, I applied six felt dots (available at craft supply stores and from woodworking catalogs) to the bottom of the shelf. ▲



**MIKE JAGIELO**  
is a custom furniture  
and cabinet maker in  
central Wisconsin.

## FIG. 1: SHELF BED

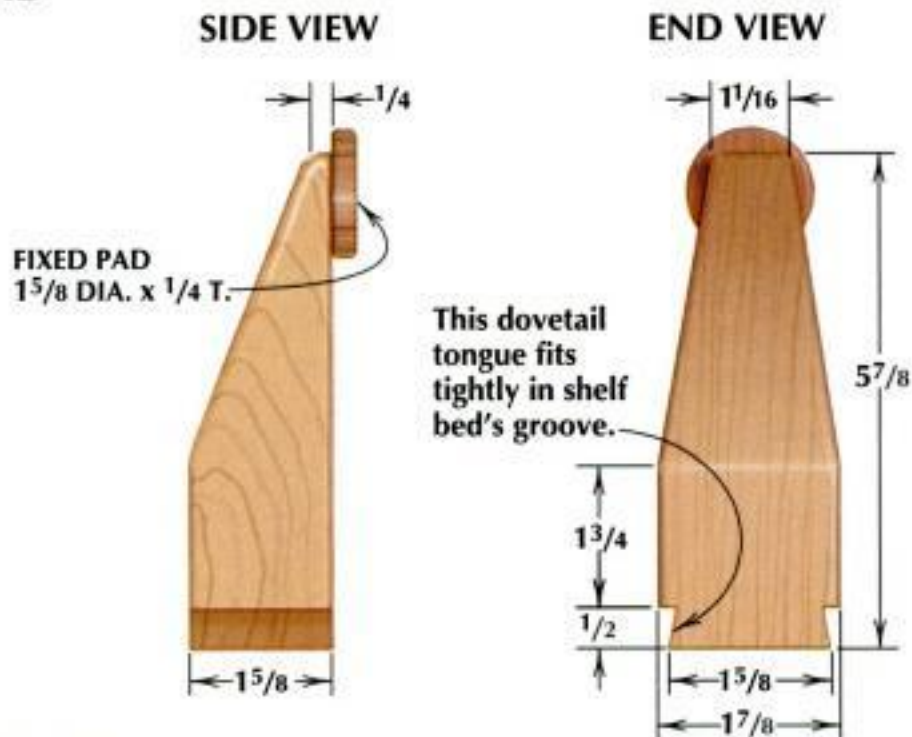
The shelf bed has a dovetail groove down the middle for the sliding clamp head. (See Fig. 2.) Breadboard “ends” keep the assembly flat.



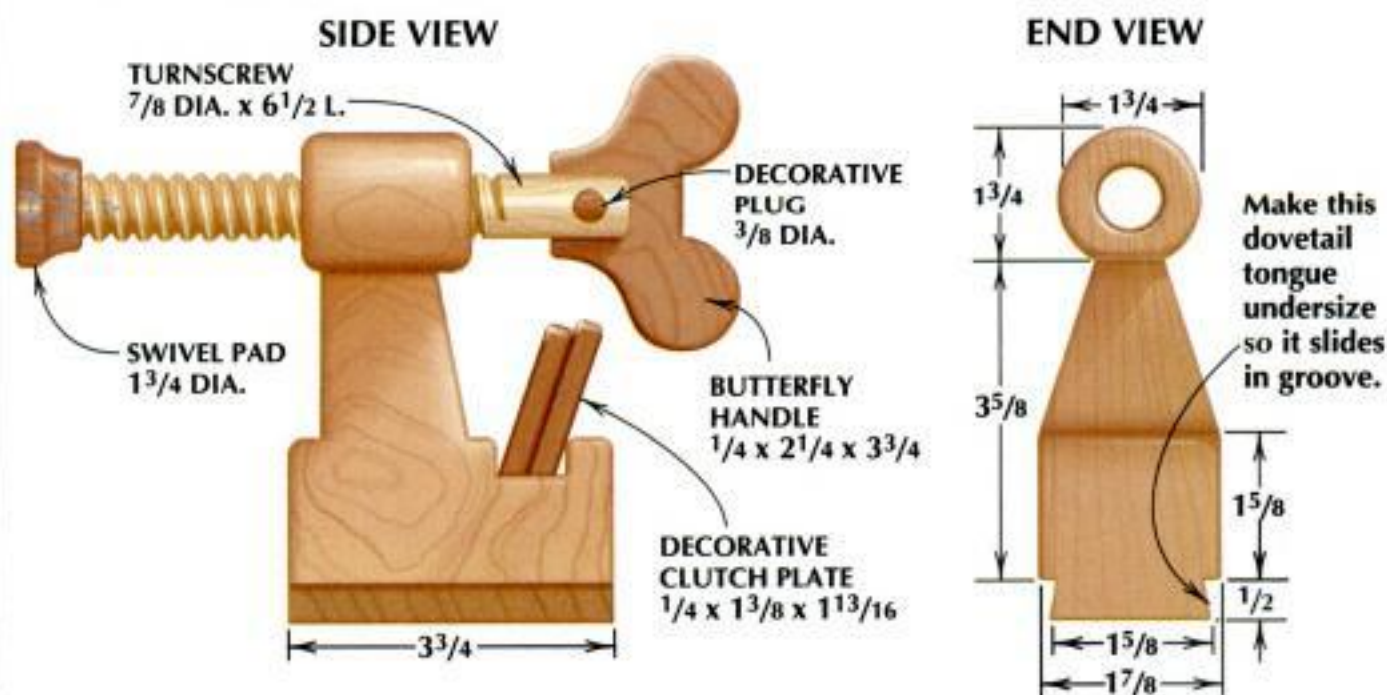
## FIG. 2: CLAMP HEAD ELEVATIONS

To make the two clamp heads, start by routing a dovetail tongue on a single 2 by 6 by  $2\frac{3}{4}$ -in. blank, then cut the blank into fixed and sliding heads. Drill and tap the hole in the sliding head. Bandsaw the head profiles, then shape and smooth them with files and sandpaper.

### FIXED HEAD



### SLIDING HEAD







*Cosmetic surgery. With a few simple tools and techniques, you can bring back the beauty to old veneered furniture. Here, the author selects material to patch a dresser door by matching grain to the surrounding veneer.*

# REPAIRING VENEER

## 5 EASY FIXES FOR DAMAGED VENEER

*by Sal Marino*

### COMMON CALLS FOR VENEER REPAIR



**Burns and gouges.** Wear, tear, and forgotten cigarettes are common causes of veneer damage.



**Chipped corners and edges.** Glue failure or snags from shoes and clothing can break off corners and edges.



**Blisters and cracks.** These occur when the adhesive fails, allowing the veneer to lift free of its substrate.



For hundreds of years, woodworkers have used veneer in their finest work. It's flexible enough to bend around the shapely surfaces of a bombe chest or Art Deco armoire. And because it's so thin, veneer is economical too. But there is a downside: Even veneer that's applied properly and handled with care can chip, crack, or bubble over the years as the glue breaks down. In this article, I'll show you how to repair the most common kinds of veneer damage: abrasions and burns, chipped corners and edges, and cracks and blisters. But first I'll share the tools and techniques that most of these repairs have in common.

### Common Tools and Tricks

Since I make a lot of veneer repairs, I've purchased a number of specialized tools to make certain jobs easier. (See Veneering Toolkit, right.) I'll explain how to use them as we go along. But there's one inexpensive tool that I use all the time—my X-Acto utility knife and a #11 blade. You can buy one at hardware and hobby stores for under \$10. The #11 is perfect for all sorts of veneer repair jobs: Its pointed tip cuts a fine, clean-edged patch or recess, and its small beveled edge can scrape old glue out of even the tightest spots.

**Choose new veneer carefully.** If your repair involves a patch, the new veneer must match the old in thickness, grain, and color. If you have a local veneer dealer, hand-pick the new veneer yourself. If you must order by mail, send the dealer a small sample from the old veneer to be patched. Or send a close-up color photo of the area to be patched. I've found that a detailed written description just isn't sufficient.

**Make the patch fit the recess.** Whether you're hand-cutting a patch or using a veneer punch (see page 72), always make the patch slightly larger than the damaged area, to ensure a good glue bond. To make the patch less obvious, its grain should run the same direction as the old veneer.

For a tight-fitting hand-cut patch, use a #11 X-Acto or a razor blade, and angle your knife for a beveled cut. (See bottom left photo, page 72.) You'll bevel the outline of the recess too, for a tidy, overlapping fit. On cross-grain cuts, make two cuts, working in from each edge of the patch or recess. This avoids splitting the veneer.

Whether you cut the outline of the recess by hand or with a veneer punch,

it's very important to remove all the old veneer and glue inside the patch area. If you don't, the patch won't fit neatly, and you might not get a good glue bond. I use a "dogleg" chisel instead of a conventional chisel to remove all the old veneer and glue—it fits better in small areas and leaves a flatter recess for the new veneer. (See top right photo, page 72.)

**Glue and clamp.** When the recess is completely clean and you've tested the patch for fit, it's time to glue. I usually brush on fresh yellow glue. On a patching job, always apply new glue only to the substrate—not to the underside of the veneer. Otherwise the veneer may swell and refuse to fit.

The bottom right photo on page 72 explains how to clamp all kinds of veneer patches. Do use clamps: A pile of books or a sandbag may not create enough pressure for a permanent bond.

**Finish the patch to match.** Experiment on a leftover scrap of new veneer until the finish matches the old veneer. Then finish the patch itself. If there's a visible seam where new veneer meets old, you can hide it with burn-in sticks. (See "Just Finishing," AW #49.)

Now, with these general tips in mind, let's take a look at the specific fixes...

### Fixing Abrasions & Burns

This type of damage can occur on edges or corners, or in the center of a panel. Your grandson's flying matchbox car, embers from a forgotten cigarette, or a scratch-happy feline is all it takes to leave a nasty mark. (See bottom left photo, opposite page.) Here are two fixes:

**Hand-cut a diamond patch.** With this technique you cut the patch first, then use it as a template to cut the outline of the recess. A diamond shape is less noticeable than a rectangle. The diamond's sides should be at about a 45° angle to the grain. Cut one side at a time, using the cross-grain technique. (See Common Tools and Tricks.)

**Place the diamond patch on the damaged area, line up the grain patterns as best you can, and score all the way around the patch with light pressure.** (See bottom left photo, page 72.) Make a second pass, applying more pressure to the knife so you cut all the way through the old veneer. Clean out the recess; then glue and clamp.

**A veneer punch patches it faster.** You use this tool to punch the outline of the recess; then you punch out a matching patch. A veneer punch isn't cheap—

## VENEERING TOOLKIT

Specialized tools make veneer repair a faster proposition. Shown top to bottom: curved metal burn-in spatula, dogleg chisel, edge-banding iron, deadblow mallet, veneer roller, veneer punch. All are available from Constantine's, 2050 Eastchester Rd., Bronx, New York 10461, (800) 223-8087.





## PATCHING WITH A VENEER PUNCH



**Punch it out.** A veneer punch is the quickest patching method. Punch out the damage first, then punch a matching patch.



**The dogleg advantage.** Use a "dog-leg" or "crankneck" chisel to excavate and flatten the patch area.

prices start at \$100 and increase with size—but it's worth the money if you make a lot of repairs. It's the quickest way to make a patch, and the irregularly shaped cutting edge makes the patch difficult to detect.

To outline the recess, put the punch on the damaged surface and make one strong, well-placed strike with a dead-blow mallet. (See photo, above.) If you strike more than once, your patch may not fit the recess perfectly. A deadblow mallet is least likely to bounce back.

To make the patch, lay your new veneer face down on a piece of hard wood, and punch through from the

back. This way, the punch will cut a slight bevel, just as your knife does in the diamond patch method. Clean out the recess; then glue and clamp.

### Fixing Chipped Corners and Edges

Veneered doors, tabletops, and drawers take a real beating in everyday use—especially the corners, which chip easily. (See bottom center photo, page 70.) I usually repair this kind of damage with a triangle-shaped patch. This technique works best on fairly uniform grain.

With the triangle technique, you cut the patch and its recess at the same time.

(See top photo, opposite.) Your new veneer should start out quite a bit larger than the damaged area you'll cut away. This way, you can line up the grain just right and still leave some overhang at the edge of the door or panel. (You'll trim the overhang later.)

Once you've aligned the grain, dry-clamp the new veneer to the old and make a beveled cut through both at once. Work in from each edge to avoid splitting the veneer. A bench rule or other straightedge will keep your knife from going too far afield.

Now unclamp the patch and clean out the recess. When you're done chiseling,

## PATCHING WITH A KNIFE



**Diamonds are a guy's best friend.** Cut a diamond patch with a #11 X-Acto. Then trace its outline on the old veneer, and chisel out the waste.



**Clamping up.** Put a piece of plastic bag over the repair, and top it with a felt pad and a wooden block. Add a caul if necessary, and then clamp.



## PATCHING A CORNER



**Triangle corner patch.** Cut the patch and the outline of the recess at the same time. Leave extra veneer overhanging each edge.

sand the recess lightly—you can do this on a corner without disturbing the surrounding veneer—and dust with a tack rag. Then glue and clamp. When the glue is dry, flush-trim the overhanging edges with your razor blade or knife, using the cross-grain technique discussed earlier.

### Fixing Blisters and Cracks

Blisters and cracks occur when the glue bond fails and the veneer lifts off its substrate. With a blister, the glue fails in the center of a veneer sheet, causing various sizes of bubbles. (See bottom right photo, page 70.) With a crack, the glue

fails at the edge of a sheet, and the veneer curls away from its substrate. You can repair most blisters and some cracks without patching. Here are the two no-patch methods I use most often:

**Heat works best on blisters.** Before World War II, most veneer was adhered with hide glue, which is heat activated. PVA glues can sometimes be reactivated with heat, too, though not as easily.

Prepare for clamping first. Old glue resets faster than new glue. To extend the working time, warm up the felt pad that goes on top of the glue joint. (See bottom right photo, opposite.) I do this by blowing hot air on it with a hairdryer, immediately before I heat the veneer itself. Second, when you clamp a heat repair, use brown paper instead of plastic

between the veneer and the felt. This keeps the warm felt from sticking to a heat-softened finish.

You can use your household iron as a heat source, or you can use an edge-banding iron. (See photo below.) The latter has a smaller footprint, so as not to disturb the surrounding glue bond. When repairing a crack with heat, I first inject a solution of 10% glycerine to 90% water under each flap of the crack, to soften the old glue.

Lightly dampen a cloth and place it over the blister or crack. Set your iron to medium heat and pass it over the cloth. Try to keep the heat localized to avoid

disturbing the glue around the blister. After a moment, the heat should reactivate the glue. Clamp immediately, and leave it overnight.

If heat doesn't work on a blister, you can remove the old glue and add new. If heat doesn't work on a crack, you probably won't be able to salvage the old veneer. If the crack is less than 6 in. long, or if the veneer is quartersawn, you can make a decent-looking patch. Otherwise it's best to re-veneer the panel.

**To reglue a blister,** first cut a slit down its center, parallel to the grain. Lift one flap, and scrape away any old glue with a #11 X-Acto or a razor blade. (See photo below.) To hold the blister open, I use a curved metal burn-in spatula. (To lift very small blisters, you can use an 1/8-in.-dia. dowel that's beveled on the end. Scrape out the old glue with a nail that's ground flat on one side.)

When all the old glue is gone, squirt fresh yellow glue under each flap with a glue injector. Use your knife or spatula to spread the glue around, then smooth the joint down with a veneer roller. (See [Veneering Toolkit, page 71.](#)) Wipe away any squeeze-out with a damp cloth, and clamp as you would for a patch. ▲



**SAL MARINO** is a woodworker and technical consultant for Constantine's and other companies. He also writes, lectures, and teaches.

## FIXING A BLISTER

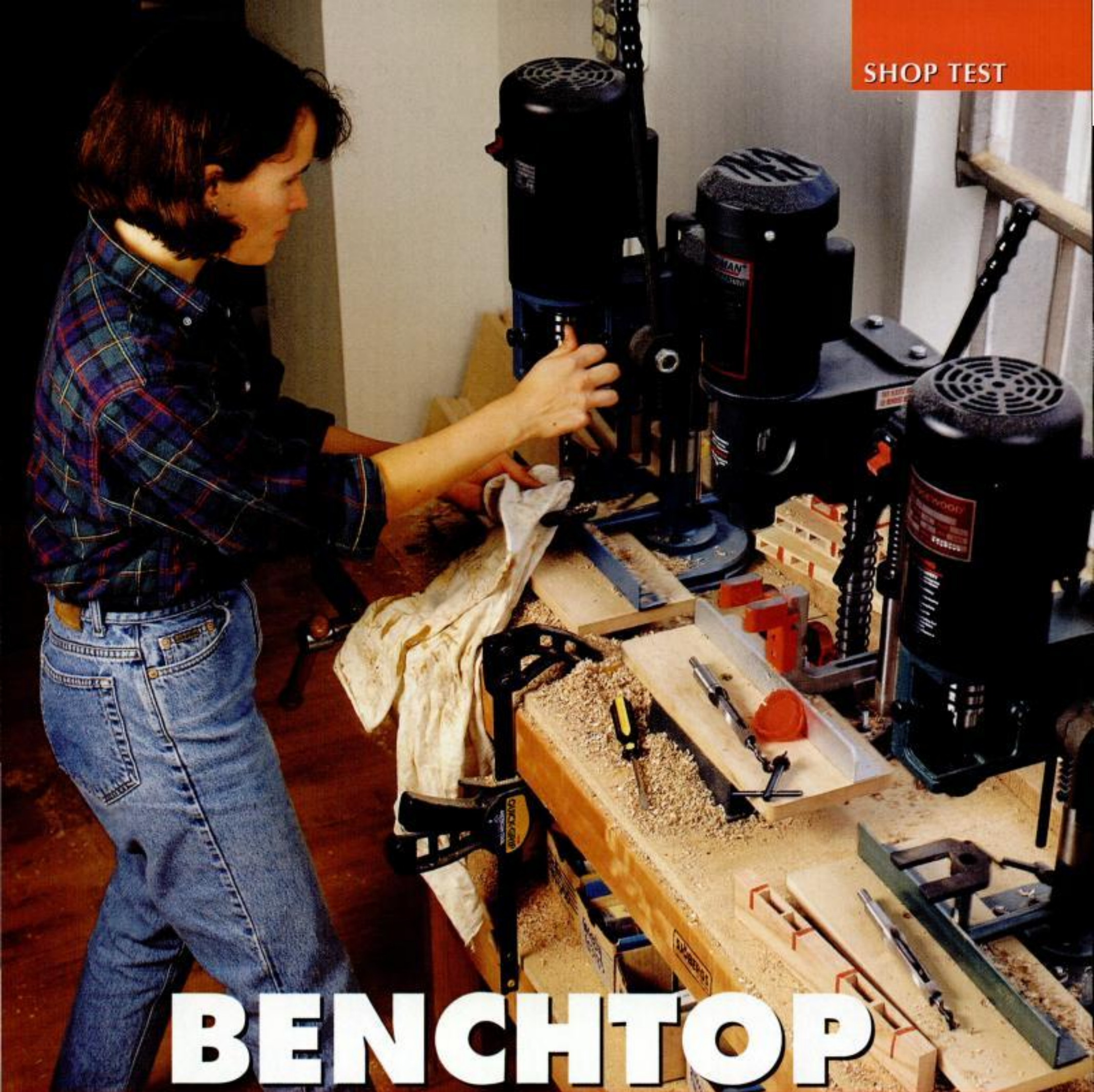


**Hot blister fix.** Put several layers of damp cloth over the blister, and pass an iron over the cloth at medium heat. This works well on hide-glued veneer.



**Cold blister fix.** Slit the blister with a #11 X-Acto or a razor blade, and scrape out the old glue. A curved metal burn-in spatula holds the veneer open.





# BENCHTOP MORTISERS

*We rate **8** dedicated machines  
for faster mortising*

*Mortising marathon. Square-edged holes are easy to make with a benchtop mortiser. The models in this test cost between \$220 and \$300. We evaluated ease of use, quality of cut, and other important factors.*





**T**he mortise and tenon is one of the most essential joints in a woodworker's repertoire. There are several ways to cut mortises: by hand with a mortising chisel, with a router and jig, or on the drill press with a hollow-chisel mortising attachment. Benchtop mortisers are a more recently available option. These scaled-down versions of industrial mortisers work like a drill-press mortising attachment, but they don't tie up your drill press. Benchtop mortisers are quieter and less dusty than routers, plus there are no fussy jigs to get in your

way. With a benchtop mortiser you just lay out your lines, line up the fence, and plunge the chisel into the wood. It's a great tool if you need to cut multiple mortises in a straight line.

For this article we tested eight benchtop mortisers that cost between \$220 and \$300. All of these machines except the British Multico are made in Taiwan. The Bridgewood, Grizzly, Star, and Woodtek look identical except for their paint jobs—they're most likely made in the same plant and private-labeled for each company. The Reliant and Tradesman are near-twins; the Delta and Multico are each unique.

The benchtop models we tested do have limits. Powering through dense hardwoods takes some muscle. Even with sharp bits and chisels, you wouldn't want to do it all day.

Capacity is limited, too. You can only fit a board about 5 in. thick under the chisel on most of these machines. And the distance from the fence to the center of the chisel limits the width of board you can mortise. Most of the test models can mortise in the middle of a board about 7 in. wide; only the Multico has a nearly 9-in. capacity. (See chart, page 76.) The biggest chisel you can use is 1/2 in. For really big work, you're better off with a heftier midsize or floor model, such as the Multico PM20 (see "Shop Test," AW #45).

### How They Work

To cut a mortise, you pull the handle on the side of the machine to raise or lower the head, which rides up and down on one or two columns or on dovetailed ways. The head contains the motor—1/2 HP on all these models—plus a keyed drill chuck that holds the bit, and a larger housing directly underneath that holds the hollow chisel and its bushing.

The bit bores a round hole and the square chisel follows it, chopping straight, square sides. A fence and hold-down keep the stock square to the chisel, and a depth stop halts the chisel when you've reached the bottom of the mortise.

### Features that Matter

A few features—especially hold-downs and depth stops—made a notable difference in our test:

**The fence** should be flat and square to the table. We accepted up to 1/64 in. of bowing out since it doesn't affect performance. (A bowed-in fence is no good—it doesn't support the stock at



**Cramped bit access.** It's hard to hold the chuck still on the Bridgewood, Grizzly, Star, and Woodtek machines.

the cut.) All the fences were acceptably flat and square, but the Delta was dead on. (See chart.)

**A good hold-down** is crucial: It helps hold the work steady while you plunge and retract the chisel. Our testers liked the Bridgewood, Delta, Grizzly, Star, and Woodtek hold-downs best. They're all sturdy and easy to tighten with an allen wrench. You can fit thicker stock under the Multico hold-down, but the small handle was difficult to tighten.

Our only serious hold-down problems occurred with the Reliant and Tradesman machines. Every time we tried to extract the chisel from oak or maple when using these two machines, the entire fence and hold-down assembly flexed, lifting the workpiece and jamming the chisel in the wood.

When through mortising on any of the mortisers, you should shim your work underneath to avoid cutting into the table. But on the Reliant and Tradesman, you must use a very thick shim—at least 1 5/8 in. thick—because the tips of the chisel won't even come close to touching the table.

**The depth stop** shouldn't slip—even when you exert considerable downward force on the handle. Two depth stops slipped in our tests: the Reliant and Tradesman. These two stops—just a plastic ring you tighten under the mortising head—slid under moderate pressure.





Delta 14-650



Grizzly G3183



Multico PM10



Bridgewood HM-11

## BENCHTOP MORTISERS

| Brand & Model                                                                                                                            | Street Price | PERFORMANCE RATINGS |             |                       |                | OVERALL RATINGS |   |   |   |   | SPECIFICATIONS             |                         |                             |            |           |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------|-------------|-----------------------|----------------|-----------------|---|---|---|---|----------------------------|-------------------------|-----------------------------|------------|-----------|
|                                                                                                                                          |              | Fence               | Ease of Use | Bit & Chisel Changing | Quality of Cut | 1               | 2 | 3 | 4 | 5 | Max Stock Thickness (in.)* | Max Stock Width (in.)** | Chisel Bushings Incl. (in.) | Motor Amps | Motor Rpm |
|  <b>Delta 14-650</b><br>(800) 438-2486<br>Circle #615  | \$249        | 5                   | 5           | 4                     | 4              | ██████████      |   |   |   |   | 4 1/8***                   | 6 3/4                   | 5/8                         | 5          | 1,725     |
| <b>Multico PM10</b><br>Garrett Wade<br>(800) 221-2942<br>Circle #616                                                                     | \$299        | 4                   | 4.5         | 4                     | 4              | ██████████      |   |   |   |   | 4 1/8***                   | 8 7/8                   | 5/8, 3/4                    | 4.8        | 2,800     |
| <b>Bridgewood HM-11</b><br>Wilke Machinery Co.<br>(800) 235-2100<br>Circle #617                                                          | \$235        | 4                   | 4.5         | 3                     | 3.5            | ██████████      |   |   |   |   | 4                          | 6 7/8                   | 5/8, 3/4                    | 6          | 3,400     |
| <b>Woodtek 876-775</b><br>Woodworker's Supply, Inc.<br>(800) 645-9292<br>Circle #618                                                     | \$240        | 4.5                 | 4.5         | 3                     | 3              | ██████████      |   |   |   |   | 4 1/16                     | 6 7/8                   | 5/8                         | 6          | 3,450     |
|  <b>Grizzly G3183</b><br>(800) 523-4777<br>Circle #619 | \$225        | 4                   | 4.5         | 3                     | 3              | ██████████      |   |   |   |   | 4                          | 6 7/8                   | 5/8, 3/4                    | 6          | 3,400     |
| <b>Star S4000</b><br>(888) 678-8777<br>Circle #620                                                                                       | \$235        | 4                   | 4.5         | 3                     | 3              | ██████████      |   |   |   |   | 4                          | 6 1/2                   | 5/8, 3/4                    | 6          | 3,400     |
| <b>Reliant DD136</b><br>Trend-lines<br>(800) 767-9999<br>Circle #621                                                                     | \$220        | 4.5                 | 2           | 3.5                   | 3.5            | ██████████      |   |   |   |   | 4 7/8                      | 6 7/8                   | 5/8                         | 8          | 3,400     |
| <b>Tradesman 8120</b><br>Power Tool Specialists, Inc.<br>(800) 243-5114<br>Circle #622                                                   | \$249        | 4.5                 | 1.5         | 3.5                   | 3.5            | ██████████      |   |   |   |   | 4 7/8                      | 6 7/8                   | 3/4                         | 5.5        | 3,400     |

### GUIDE TO THE RATINGS

5 = excellent, 4 = very good, 3 = good, 2 = fair, 1 = poor.

**Fence:** Straightness and squareness to table.

**Ease of use:** Hold-down adjustability and performance, depth stop performance, handle adjustability, and cutting effort.

**Bit & chisel changing:** How easy and convenient it is to change bit and chisel.

**Quality of cut:** How cleanly the mortiser cut oak, hard maple, cherry, poplar and pine using brand-new chisels from its own manufacturer.

**Overall rating:** This includes the four performance ratings, plus other performance factors.

\*Thickest board that fits under hold-down. (To get this maximum, all hold-downs but Multico must be flipped upside down.)

\*\*Widest board in which you can center a mortise. Divide by 2 to get distance from fence to center of chisel.

\*\*\*To mortise thicker stock, manufacturer suggests mounting head backwards on post.





Woodtek 876-775



Star S4000



Reliant DD136



Tradesman 8120

## COMMENTS

**Pros:** Best fence. Best type of hold-down. Slowest rpm gave the only burn-free cuts in our test.

**Cons:** Requires slightly slower feed rate than other machines. Chisels not included.

**Final cut:** The Volvo of benchtop mortisers: Built to last, with a slower speed for a cleaner, smoother cut.

**Pros:** Requires least effort to cut of any machine in our test.

**Cons:** Hold-down needs sturdier adjustment handle. Chisels not included.

**Final cut:** A very high-quality machine, priced slightly above the competition.

**Pros:** Best type of hold-down in our test.

**Cons:** Single access hole makes chuck hard to hold. [\(See photo, page 75.\)](#) Chisels not included.

**Final cut:** A good machine at an average price.

**Pros:** Best type of hold-down in our test.

**Cons:** Optional chisels gave roughest quality of cut in our test.

Single access hole makes chuck hard to hold. Chisels not included.

**Final cut:** A good machine with a decent price—but you'll want to buy a different brand of chisels.

**Pros:** Best type of hold-down in our test.

**Cons:** Single access hole makes chuck hard to hold. Chisels not included.

**Final cut:** A good machine at the lowest price in its class.

**Pros:** Best type of hold-down in our test.

**Cons:** Single access hole makes chuck hard to hold. Chisels not included.

**Final cut:** An average performer at an average price.

**Pros:** The lowest-priced machine we tested.

**Cons:** Hold-down flexes excessively. Depth stop slips under moderate pressure. Chisels not included.

**Final cut:** Bad hold-down and depth stop designs kept an otherwise good machine lagging behind.

**Pros:** Only model that includes chisels—1/4, 3/8 and 1/2 in.

**Cons:** Hold-down flexes excessively. Depth stop slips under moderate pressure.

Took most effort to cut of any mortiser tested.

**Final cut:** Bad hold-down and depth stop hurt overall rating; so did a bad score on cutting effort.

## HIGHS & LOWS

BEST INSTRUCTION  
MANUAL  
**Grizzly**

WORST INSTRUCTION  
MANUAL  
**Tradesman**

EASIEST CUT  
**Multico**

HARDEST CUT  
**Tradesman**

DEEPEST  
THROUGH MORTISE  
**Woodtek (3 3/4 in.)**

SHALLOWEST  
THROUGH MORTISE  
**Reliant & Tradesman (3 in.)**



Cleanest cut: Delta



Roughest cut: Woodtek



## HOLD-DOWN RATINGS



**First.** The Bridgewood, Delta, Grizzly, Star, and Woodtek have simple but sturdy hold-downs. You can flip them to accommodate thicker stock.



**Second.** The Multico hold-down offers the most vertical adjustment and doesn't require any tools, but it needs a beefier handle.



**Third.** The Tradesman and Reliant hold-downs flexed when we extracted the chisel from hard wood, jamming the chisel in the wood.

**An adjustable handle** saves time and fatigue, especially on repetitive jobs. With multiple positions, your arm won't have to go through the maximum range of rotary motion just to mortise a thin workpiece. Our testers liked the Delta's spring-loaded handle best: You can easily shift it to any of six positions, no tools needed. The Bridgewood, Grizzly, Star, and Woodtek handles have six positions but require a wrench to switch positions. The Multico has four positions; the Reliant and Tradesman have two—all adjusted with an allen wrench.

**Bit and chisel changing** on these machines is tedious at best. All the models we tested have keyed bit chucks hidden behind plastic or metal safety plates. Bit changing was easiest on the Delta, Multico, Reliant, and Tradesman. These models have two holes for chuck access—one on each side of the head—so you can hold the chuck still with one hand while you tighten or loosen it with the other. And the Delta, Reliant, and Tradesman safety plates come off without any tools, so you can get into the access holes easily.

We had the most trouble changing bits on the Bridgewood, Grizzly, Star, and Woodtek. It's hard to hold the chuck steady because you can't fit both hands comfortably inside the single access hole. (See photo, page 75.)

Our testers liked the big brass setscrew that tightens the chisel on the Bridge-

wood, Grizzly, Star, and Woodtek. It's easy to reach, and unlike the steel setscrews on the other models, it doesn't mar the chisel shank.

### Cutting Performance

To measure performance, we looked at two specific aspects of cutting—the effort necessary to cut in dense hardwoods such as oak or maple, and the quality of the finished mortise. Here's what we found:

**Cutting effort** becomes a big deal fast if you have a large number of mortises to make in hard wood. To test cutting effort, we installed brand-new identical 1/2-in. Jet chisels in all the machines and cut into hard maple. The Multico required slightly less cutting effort than the other machines. (See chart.) The Delta mortiser needs a slower feed rate—at 1,725 rpm, it operates at only half the speed of the other models—but it doesn't tire your arm as quickly as the other models.

**Quality of cut** depends on the chisel. The Tradesman is the only model we tested that came with chisels; all the other models offer chisels as an option. (See chart.) To test quality of cut, we ordered each machine's optional 1/2-in. chisel and mortised into oak and hard maple. Not all the mortises were pretty, but none were so rough that you couldn't get a decent glue bond. The Delta's cuts were consistently the cleanest. (See Highs & Lows, page 77.)

All the mortisers except the 1,725-rpm Delta produced a little smoke when mortising hardwoods, and left burn marks in the bottom of the mortise—the result of a too-high (2,800+) rpm. All the bits rattled from time to time, and many of the bits also turned blue around the edges. While blueness on tooling of this sort usually indicates a loss of temper, we didn't notice any performance problems with blue bits.

### Recommendations

If you make a lot of mortise-and-tenon furniture, benchtop mortisers are definitely worth a look. Our machines were closely matched, and all but the Tradesman and Reliant gave strong performances. (See chart.)

The Delta 14-650 earns our Editors' Choice award—best performance regardless of price. Its fence was dead flat and square, and with its slower 1,725 rpm, the bit doesn't burn the wood as on the other models. The Delta also has the only cast column of the bunch, for extra rigidity.

Though the Multico PM10 didn't win an award, it too performed very well—requiring less effort to cut than any other mortiser in our test.

The Grizzly G3183 gets our Best Buy award—best value for the money. The other three almost-identical machines (Bridgewood, Star and Woodtek) did a fine job, but at \$225 the Grizzly had the lowest street price. ▲



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Brian Boggs, a well-known chair maker from Kentucky, asked us to manufacture and market this concave spokeshave of his design. Various magazine reviews have been highly complimentary about its function. The tight mouth, the careful grinding, and the extra-thick (1/8") blade make it function more like a plane than a spokeshave. It is capable of very fine work; the A2 tool steel in the blade not only takes a fine edge, but will hold it many times longer than standard blades. Made from silicon bronze with rosewood handles, this is as beautiful as it is effective. It is 9" long with a 1 1/4" wide blade.

AW376 Boggs Spokeshave \$85.00  
AW377 Repl. Blade, 1 1/4" \$21.00

## C. Veritas® Sanding Block

Although there are quite a few sanding blocks on the market, they are generally ho-hum; this is a very good one. The hardwood body fits naturally in the palm of your hand without the need for a death grip. The felt-covered steel sole is flat but forgiving. Best of all, the four spring tips in the base automatically tension the sandpaper as you tighten the brass thumbscrew down. With a 3"x4" base, it efficiently uses exactly 1/6 of a sheet of sandpaper. Weighs 14 oz.

AW375 Veritas® Sanding Block \$18.95

## D. Skew Chisels

Just a shade under 1/2" wide, these are an excellent buy in skew chisels. If you have never used a low bevel (20°) skew for trimming shoulders, winking glue out of corners, or dressing end grain, you are missing some useful additions to your chisel selection. One left, one right, they solve a lot of problems. Overall length 10 1/2". Hardwood handle.

AW374 Pr. Skew Chisels - 1/2" \$14.95

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# Maple

by Paul L. McClure



Ever wonder where the Pilgrims got their sugar from? Maple trees. The local Indians taught them to catch the tree's sweet sap in birchbark buckets. To get *sirup*—as the French trappers called it—they'd boil the sap until it thickened. To get sugar, they'd let the water in the sap evaporate until only crystals were left.

Maples fall into two classes: hard and soft. Within each class, it's often hard to distinguish different species of lumber, so the common names are often confused. Sugar maple—the source of maple syrup—and black maple are both hard. Silver, red, box elder and big-leaf are soft.

## Appearance

Both hard and soft maple have reddish-brown heartwood and thick whitish sapwood. Both classes produce beautiful

figure: bird's eye, quilted, blistered, curly, and burl. (See photos, above.) Hard maple has the most dramatic figure.

Maple has no distinctive odor or taste. Exposure to sunlight turns the wood a light yellowish brown.

## Workability

Hard and soft maple both dull cutting edges moderately. End grain is prone to chipout during crosscutting, and the wood burns very easily in machining. To avoid burning, keep your cutters sharp and pay close attention to your feed rate. Highly figured maple is prone to major tearout; I recommend abrasive planing or scraping with a well-burred scraper.

Predrill for fasteners to avoid splitting. Drill at a very slow speed, and extract

the bit frequently to avoid building up shavings and burning or burnishing the hole. Fasteners will go in more easily if you coat them with beeswax.

Maple turns very well. It does not carve easily, but holds very fine detail.

Sand maple only to 220 grit: Anything finer will burnish the surface, impairing staining and hard-finish adhesion. Maple accepts oil-based stains, but since it isn't very porous the color will be lighter than the can suggests. Alcohol-based aniline dyes are best; they yield perfect color and accentuate maple's subdued grain.

## Uses

Maple is used for all kinds of furniture, boxes, and cabinetry, as well as bowls and cooking implements, pool cues, golf clubs, and musical instruments. ▲

## MAPLE

### SPECIES AND COMMON NAMES

#### Hard Maples

*Acer saccharum*—Sugar maple, rock or rock hard maple

*Acer nigrum*—Black maple, black sugar maple

The sapwood of both species is often called white maple.

#### Soft Maples

*Acer saccharinum*—Silver maple, river maple

*Acer rubrum*—Red maple, scarlet maple

Both species are sometimes called water maple or swamp maple. The sapwood of both is often called white maple.

*Acer negundo*—Box elder, ash-leaf maple, Manitoba maple

*Acer macrophyllum*—Big-leaf maple, Oregon maple

**GROWING RANGE** Sugar and black maple grow from Canada and Maine to Minnesota, south to Missouri and Alabama. Silver and red maple extend farther south and west. Box elder grows from Pennsylvania into central Canada and west to the Rockies. Big-leaf maple is limited to the Pacific Northwest.

**SPECIFIC GRAVITY** 0.45 (soft) to 0.70 (hard)

**DENSITY** 28 (soft) to 44 (hard) lbs. per cu. ft.

**WOOD MOVEMENT<sup>1</sup>:** Tangential (flatsawn):  $\frac{7}{64}$  in.

Radial (quartersawn):  $\frac{1}{4}$  in.

**DURABILITY** Not resistant to decay

**SUSTAINABILITY** Sustainable at current harvest levels

**AVAILABILITY** Hardwood lumberyards, mills, some home centers

**SIZE** Thickness:  $\frac{4}{4}$  through  $\frac{16}{4}$  Widths: 6 to 12 in. Lengths: 6 to 12 ft.

**COST** Lumber (all  $\frac{4}{4}$ ): Soft, \$2.60 per bd. ft. Hard, \$3.50 per bd. ft. Figured, \$15 per bd. ft. Musical instrument quality, \$30 per bd. ft.

Veneer: Soft rarely available. Hard plain 65 to 95 cents per sq. ft.; figured \$1.50 to \$6.95 per sq. ft.

<sup>1</sup>Indicates wood movement across the grain from 6% to 12% moisture content



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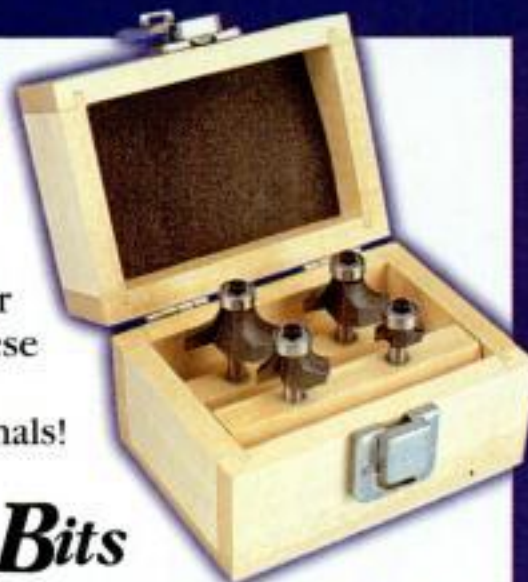


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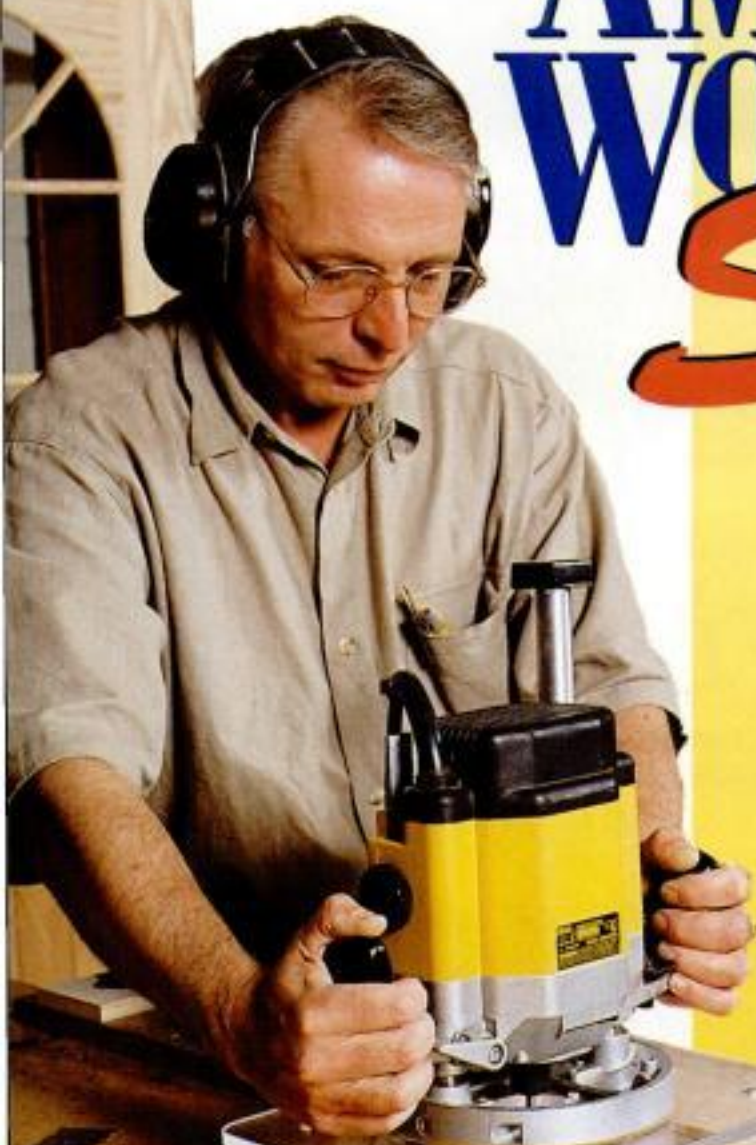
# Where Great

## DEALS

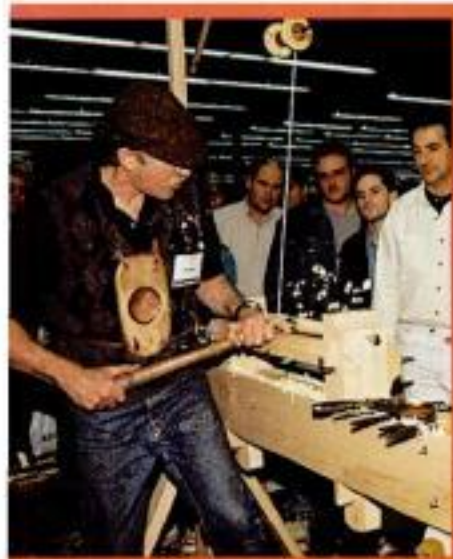
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**About the presenter:** Ernie Conover has been a woodworking teacher and demonstrator for 20 years. He and his wife Susan run Conover Workshops, a woodworking school in Parkman, OH.

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*Mark Duginske*

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- Work safely with the tablesaw
- Align and troubleshoot your tablesaw for top performance
- Choose the right blade for the job
- Use dado heads and molding heads

**Who should attend:** All woodworkers

**About the presenter:** A fourth-generation Wisconsin woodworker, Mark Duginske is a prolific writer, designer and inventor. His work has appeared in numerous magazines and books, including *Cutting Shapes and Profiles* (Rodale Press, 1997).

#### SHARPENING SECRETS

Friday 4:00pm-6:00pm  
Saturday 8:30am-10:30am

*Leonard Lee*

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- Sharpen chisels and plane blades
- Sharpen cabinet scrapers
- Sharpen carving and turning gouges
- Check an edge for sharpness
- Choose the right grindstones, bench stones, microabrasives and polishing compounds

**Who should attend:** All woodworkers

**About the presenter:** Author of books and magazine articles on planemaking and sharpening, Leonard Lee has been a woodworker for over 35 years. He is president of Veritas Tools Ltd. and Lee Valley Tools.

#### DESIGN AND BUILD GREAT FURNITURE

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*Ian Kirby*

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- Make the best design decisions
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- Integrate the key design elements—form, space, proportion and function

**Who should attend:** All woodworkers

**About the presenter:** Trained in England as a furniture maker, designer and wood technologist, Ian Kirby has taught and written extensively on woodworking in the United States and England for over 30 years.

#### FEARLESS FINISHING

Friday 8:30am-10:30am  
Saturday 4:00pm-6:00pm

*Michael Dresdner*

**In this seminar, you'll learn how to:**

- Select the best finish for the job
- Get a professional-looking finish on your project—from surface preparation to final polish
- Choose the right brush
- Understand wood stains and use them correctly

**Who should attend:** All woodworkers

**About the presenter:** A contributing editor of *AMERICAN WOODWORKER* magazine, Michael Dresdner writes our "Just Finishing" column and hosts our finishing "chat room" on the America Online computer service every Sunday night. He is the author of *The Woodfinishing Book* (Taunton Press, 1993).

#### SETTING UP SHOP

Friday 8:30am-10:30am  
Saturday 1:00pm-3:00pm

*Sandor Nagyszalanczy*

**In this seminar, you'll learn how to:**

- Decide which tools to buy, in which order
- Buy the right quality tools and equipment
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- Lay out your shop for best results
- Make the most efficient use of space
- Get dust and chips under control

**Who should attend:** Beginning to intermediate woodworkers

**About the presenter:** Furniture designer and author of four books, with 18 years of woodworking experience and six years as an editor of *Fine Woodworking* magazine, Sandor Nagyszalanczy writes and lectures frequently on woodworking topics.

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# Grain Enhancement, Part II

*How to bring out the best in open-pore woods*

by Michael Dresdner



In my last column, I showed you how dye stains and linseed oil can bring out the figure of closed-pore woods. (See AW #63.) To achieve this with open-pore or coarse-grain woods, we use pigment stains.

Coarse-grain woods like oak, ash, butternut, mahogany, and lauan have pronounced, often beautiful grain patterns. These patterns are formed by the contrast between earlywood and latewood in each growth ring. Earlywood tends to have large (open) pores, while latewood has smaller (closed) pores.

The best way to highlight these grain patterns is to darken the large pores so that they stand out against the surrounding tighter-grain wood.

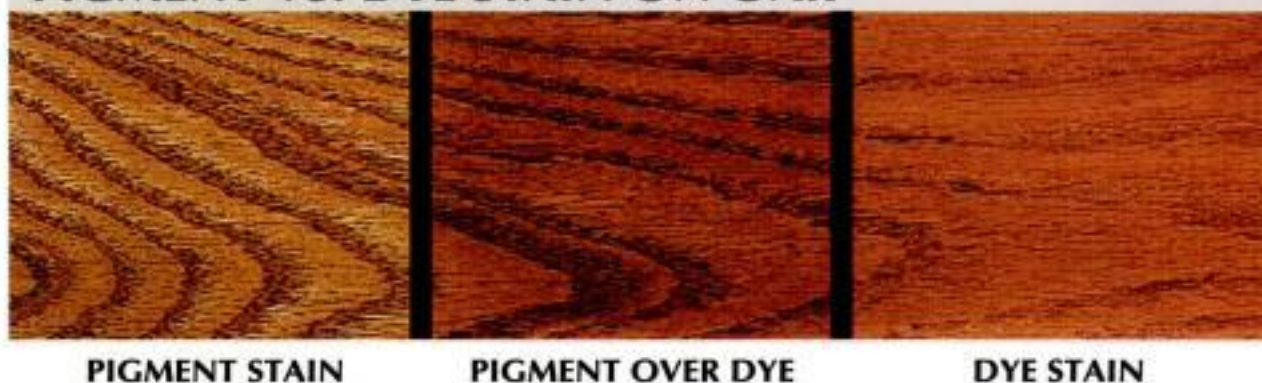
## Why Pigment?

Pigment particles are vastly larger than dye particles. Pigment will collect in the large pores, but tends to wipe off tight grain without leaving much color. The result is a more vivid contrast between the earlywood and latewood. That does not mean there is no place for dyes in treating coarse-grain woods. But let's deal with pigment stains first.

When you apply a pigment stain, leave as much stain on the wood as you like. If you wipe it off vigorously before it dries, you'll remove most of the color from the tight-grain areas and leave the dark color in the open pores. If you wipe the stain off gently, you can leave more color on the tight-grain areas. But pigments are opaque, so leaving too much stain on a surface will obscure the wood. This level of control makes these stains very versatile. When we set out to enhance the grain pattern, our object is to wipe off as much stain as possible, leaving a copious amount only in the open pores.

There are some stains on the market that contain nothing but pigment. They are sometimes called "wiping stains," or may say "100% pigment" on their labels. But most commercial stains are mixtures of pigments and dyes. For these techniques, we'll need "pigment

## PIGMENT VS. DYE STAIN ON OAK



PIGMENT STAIN

PIGMENT OVER DYE

DYE STAIN

only" stains. If you can't find them in the store, you can create your own pigment-only stains.

## Mixing a Pigment Stain

Pigment stains consist of ground-up, colored "dirt" (actually mineral particles) suspended in a liquid. In order to keep the "dirt" on the wood once the liquid dries, they all contain "binder," a film-forming material that glues the pigment to the wood. In most cases the binder is some type of drying oil like boiled linseed oil.

Mixing your own stain is quite simple. Buy artists' oils or Japan colors, which also contain oil, at your local art supply store or woodworking specialty store. Mix whatever colors you need to get the color of stain you want, and dilute them about 50% with either naphtha or mineral spirits. Of the two, naphtha evaporates a bit faster.

Using a slower solvent like mineral spirits to dilute the stain gives you more time to wipe it off or manipulate it. The solvent affects how quickly stain dries to the touch, but no matter how fast it dries, the oil in it still has to cure overnight.

Test the mixed stain on a sample board, and adjust the color by mixing in other pigments. You can reduce the intensity by diluting with more solvent.

Because pigmented stains always contain a binder, they act like thinned paints. In fact, you can use thinned-out paint as stain. That means you can wipe, spray, or brush them onto the wood and wipe off as much or as little as you want.

## Simple Pigment Staining

With some woods, simply staining the raw wood with a pigmented stain will do the trick. Try staining a flatsawn plank of oak or ash with a pigmented stain. Wipe it on and wipe off as much as you can while it is still wet.

You will notice that the stain barely colors the wood except for the deep pores that make up the cathedral pattern. (See left photo, above.) The darker the stain color, the more distinctly the cathedral grain pattern will stand out.

If we stained the same board with a dye, the opposite would occur. (See right photo, above.) The ash or oak would take color almost uniformly, and the cathedral pattern would be less obvious.

## BEAUTIFYING LAUAN



UNSTAINED

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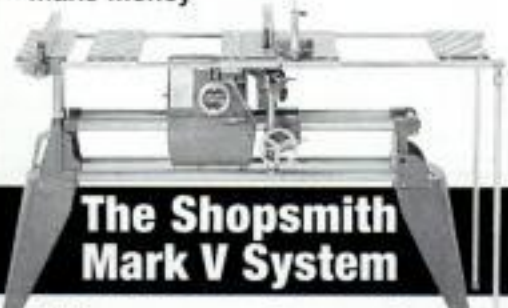
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## Pigment over Dye

But staining with dye does not preclude our using a pigment stain as well. In the top middle photo on page 86, I stained a piece of oak with a dye to create a uniform "background" color. This is called "ground staining." Without coating or sealing the wood, I followed that up with a pigment stain, which I wiped off as thoroughly as possible. That combination gives me the option of making the wood almost any color and still enhancing the grain with a contrasting pigment stain.

## Filler as Pigment Stain

In cases where you want a smooth, glossy finish over a wood with large pores, you would use a pore filler. Pore fillers are thick, pigmented liquids that fill in grain like packed mud in potholes. They contain a binder, solvent, and pigment, and are like thick versions of pigmented stains. Not surprisingly, pore fillers with colored pigments tend to enhance the grain of large-pore woods.

Just like pigment stains, it is easy to modify the color of pore fillers. I like to use Japan colors for this job, but you can also use oil colors in a pinch. However, keep in mind that adding a large amount of oil color will slow down the cure time of the pore filler—they generally take three days to cure even under good conditions.

## Filler over Dye

Just as we used pigment stain over dye stain on ash, we can use filler over dye to do the same thing on a filled-pore finish. In the sample in the bottom middle photo on page 86, I colored a piece of lauan with an amber dye stain. Then I sealed it with a coat of 2-lb.-cut shellac. Once the shellac was dry, I applied a cordovan pore filler to bring out the grain. (See bottom right photo, page 86.)

The shellac sealer helped to increase the contrast between the two colors by separating the filler and dye colors from one another. The dye provides a background color and the sealer keeps the

filler from coloring the wood anywhere except in the large pores. Unlike ash, lauan is porous enough that it would take in pigmented color not only in the large pores, but also throughout the wood surface.

I decided to use lauan for this sample because it is generally regarded as a bland, rather ugly wood with no real character. But with the right finishing techniques, it can look every bit as good as expensive mahogany. When used in the right combinations, grain enhancement is another one of those delightful tricks that can help make a silk purse of a sow's ear. ▲



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| 693PKX | 693PK WEDGE GUIDE & TEMP GUIDE SET             | 229 |
| 697    | ROUTER TABLE WITH 1 1/2 HP MOTOR               | 232 |
| 698    | ROUTER TABLE ONLY                              | 134 |
| 743K   | 7 1/4" FRAMERS SAW, LEFT SIDED WITH CASE       | 128 |
| 5116   | OMNI JIG                                       | 268 |
| 6931   | PLUNGE ROUTER BASE                             | 82  |
| 7116   | NEW 24" OMNIJIG                                | 299 |
| 7335   | 5" RANDOM ORBIT SANDER                         | 134 |
| 7336   | 6" RANDOM ORBIT SANDER                         | 137 |
| 7518   | 3 1/4 HP FIXED BASE ROUTER-1 SPEED             | 282 |
| 7519   | 3 1/4 HP FIXED BASE ROUTER-5 SPEED             | 254 |
| 7538   | 3 1/4 HP PLUNGE ROUTER-1 SPEED                 | 258 |
| 7539   | 3 1/4 HP PLUNGE ROUTER-5 SPEED                 | 278 |
| 7800   | DRYWALL SANDER                                 | 338 |
| 7810   | POWER TOOL TRIGGERED WET/DRY VAC               | 266 |
| 9118   | PORTA PLANE KIT W/CASE, CRBO BLD               | 234 |
| 9125   | 3 1/4" PLANER WITH CASE                        | 139 |
| 9444   | PROFILE SANDER KIT WITH ACCESSORIES            | 96  |
| 9444VS | VAR. SPEED PROFILE SANDER KIT                  | 112 |
| 9737   | RECIP TIGER SAW, 9.6A, QUICK CHNG CHUCK        | 159 |
| 9830   | 9.6V CORDLESS KIT W/2 BATTERIES, CASE          | 144 |
| 9862   | 12V CORDLESS KIT W/2 BATTERIES, CASE           | 174 |
| 9862F  | 12V KIT W/2 BATT, CHARGER & FLASHLIGHT         | 184 |
| 9863   | 12V BACK HANDLE KIT W/2 BATTERIES              | 178 |
| 9872   | 14.4V CORDLESS DRILL KIT W/2 BATT. & CASE      | 198 |
| 9873   | 14.4V BACK HANDLE KIT W/2 BATTERIES            | 206 |
| 97310  | LAMIN TRIMMER KIT W/3 BASES & CS               | 188 |
| 97549  | JIG SAW W/CASE & 3 BLADES                      | 139 |

# Panasonic

|             |                                       |     |
|-------------|---------------------------------------|-----|
| EY3502EQMKW | 12V CORDLESS METAL SAW                | 268 |
| EY3503FQKW  | 12V WOOD SAW KIT W/2 BATT             | 249 |
| EY6100EQKW  | 12V PREDATOR CORDLESS KIT             |     |
|             | W/KEYLESS CHUCK, 2 IRONMAN BATTERIES, |     |
|             | 15 MM. CHARGER & CASE, VSR            | 178 |
| EY6230FQKW  | 15.6V CORDLESS KIT COMPLETE           | 208 |

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# Milwaukee

|         |                                     |     |
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| 0415-21 | 12V KYLS CDS DRILL KIT W/2 BAT, CS  | 189 |
| 6490-6  | 10" MITER SAW                       | 264 |
| 6494-6  | 10" COMPOUND MITER SAW W/CARB BLADE | 314 |
| 6496-6  | NEW 10" SLIDE COMPOUND MITER SAW    | 565 |
| 6497-6  | 10" SLIDE COMPOUND SAW W/CARB       | 629 |
| 6537-22 | SUPER SAWZALL W/QUICKCHANGE CHUCK   | 175 |

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| 1003VSR     | 3/8" VSR DRILL W/KEYLESS CHUCK       | 76  |
| 1194VSR     | 1/2" VSR, 2 STAGE HAMMER DRILL       | 146 |
| 12740VS     | 3" X 21" VS DUSTLESS BELT SANDER     | 168 |
| 12750VS     | 3" X 24" VS DUSTLESS BELT SANDER     | 213 |
| 12760VS     | 4" X 24" VS DUSTLESS BELT SANDER     | 228 |
| 12950H      | 5" RANDOM ORBIT SANDER               | 82  |
| 13700EVS    | 6" VS DSTLS RNDM ORB SNDR            | 246 |
| 1584VS      | CLJC BARREL HANDLE JIG SAW, VS       | 142 |
| 1584VSW     | 1584VS JIG SAW W/CASE & 10 BLADES    | 159 |
| 1587AVSK-50 | 50TH ANNIV. JIG SAW KIT W/13 BLADES  | 156 |
| 1587DVS     | DUSTLESS VAR. SPEED JIG SAW          | 177 |
| 1587VS      | TOP HANDLE JIG SAW, VAR SP           | 142 |
| 1604A       | 1 3/4 HP ROUTER W/CASE & ROUTER PAD  | 144 |
| 1609AKX     | DELUXE INSTALLERS KIT W/4 BASES      | 229 |
| 1613EVS     | 2 HP VAR SP PLUNGE ROUTER            | 196 |
| 1613EYSK    | 1613EVS W/1601 DELUXE EDGE GUIDE     | 206 |
| 1613EYSKX   | 1613EVS, EDGE GUIDE, TEMP GUIDE KIT  | 229 |
| 3107DVS     | 5" RANDOM ORBIT SANDER, VS           | 96  |
| 3107DYSK    | 5" RANDOM ORBIT SANDER WITH CASE     | 114 |
| 3250VS      | 5" DUSTLESS VS RANDOM ORBIT SANDER   | 144 |
| 3272DVS     | 6" DUSTLESS VS RANDOM ORBIT SANDER   | 149 |
| 3272AK      | 3 1/4" PLANER KIT WITH CASE          | 118 |
| 3296K       | 3 1/4" PLANER KIT WITH CASE          | 178 |
| 3315K       | 12V CDRLS T HANDLE W/2 BAT, CS & CHR | 174 |
| 3619K       | 14.4V CDS DRILL KIT W/2 BATT         | 194 |
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| H1005-02 | BISCUIT JOINER                     | 134 |
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|       |                                    |     |
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| SLP20 | BRAD NAILER W/CASE 5/8"-1 5/8" CAP | 278 |
| SPN40 | FINISH NAILER 1 1/4"-2 1/2" CAP    | 389 |

# HITACHI

|        |                                        |     |
|--------|----------------------------------------|-----|
| C75BK  | 7 1/4" CIRCULAR SAW WITH CASE          | 102 |
| C6FB2  | 8 1/2" SLIDE COMPOUND MITER SAW        | 456 |
| C10FC  | 10" COMPOUND MITER SAW                 | 194 |
| C10FS  | 10" SLIDE COMPOUND MITER SAW           | 738 |
| DH35YE | 1 1/2" ROTARY HAMMER, 8 AMP            | 399 |
| G12SA  | 4 1/2" DISC GRINDER W/SIDE HANDLE      | 85  |
| M12V   | 3 HP VAR SPEED PLUNGE ROUTER           | 238 |
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| P20S8  | 3 1/4" PLANER                          | 79  |
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| 66      | 3 HP, 1 PH 10" T.A. SAW W/50" FENCE       | 1995 |
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| 75      | 3 HP DUST COLLECTOR W/LOWR CLOTH BAGS     | 675  |
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| BT3000SX | 10" TAYLOR SAW                    | 529 |
| CTH1442K | 14.4V CENTER HANDLE CDS DRILL KIT | 134 |
| DBJ50    | DETAIL BISCUIT JOINER             | 68  |
| DC500K   | DETAIL CARVER KIT                 | 62  |
| DS2000K  | 2 SP. DETAIL SANDR W/CS & ACCYS   | 62  |
| HT20VSX  | MULTI ROTARY TOOL W/CS & ACCYS    | 45  |
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|        |                                                                          |     |
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| 0252NK | 18 GA BRAD KIT 3/8"-1 1/4" WITH CASE                                     | 88  |
| 0565T  | ANGLE FINISH NAILER 1"-2 1/2"                                            | 202 |
| 0626NK | NARROW CROWN 1/4" STAPLER 1/2"-1" WITH CASE & 5000 STAPLES               | 103 |
| EZ-1   | SHOOTS 1/4", 3/8", 1/2" CRN STAPLES & BRADS, 5/8" CAP, W/CASE & FASTNERS | 96  |
| EZ-2   | SHOOTS BOTH BRADS & STAPLES                                              | 138 |

# Makita

|          |                                  |     |
|----------|----------------------------------|-----|
| 1912B    | 4 3/8" PLANER                    | 199 |
| 3901     | BISCUIT JOINER                   | 204 |
| 6007NBK  | 7 1/4" CIRC SAW W/CS & BLADE     | 124 |
| 6095DWE  | 9.6V CDS DRILL KIT W/2 BATT      | 124 |
| 6019DWE  | 7.2V CDS DRILL KIT W/2 BATT      | 96  |
| 62130WAE | 12V CORDLESS KIT W/2 BATTERIES   | 169 |
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| LS1013   | 10" DUAL COMPOUND MITER SAW      | 566 |
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| N1900B   | 3 1/4" PLANER                    | 138 |

# DELTA

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| 14-650  | HOLLOW CHISEL MORTISER              | 238  |
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# DEWALT

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| DW359K | 7 1/4" CIRCULAR SAW W/CASE        | 128 |
| DW411  | 1/4 SHEET SANDER                  | 57  |
| DW420  | 5" RANDOM ORBIT SANDER, PSA       | 68  |
| DW421  | 6" DSTLS RNDM ORB SANDER, VELCRO  | 69  |
| DW423  | 5" VS DSTLS RANDOM ORBIT SANDER   | 93  |
| DW431  | 3" X 21" DSTLS BELT SANDER VAR SP | 183 |
| DW443  | 6" ROS SANDER VAR SP, VELCRO      | 139 |
| DW610  | 1 1/2 HP ROUTER, 8 AMP            | 147 |
| DW615  | 1 1/4 HP PLUNGE ROUTER, VAR SP    | 162 |
| DW621  | 2 HP VS DSTLS PLUNGE ROUTER       | 214 |
| DW625  | 3 HP HYY DTY PLUNGE RTR, VAR SP   | 268 |
| DW673K | 7/8 HP LAMINATE TRIMMER KIT       | 185 |
| DW675K | PLANER KIT, 7.2 AMP W/STEEL CASE  | 159 |
| DW682K | BISCUIT JOINER KIT                | 132 |
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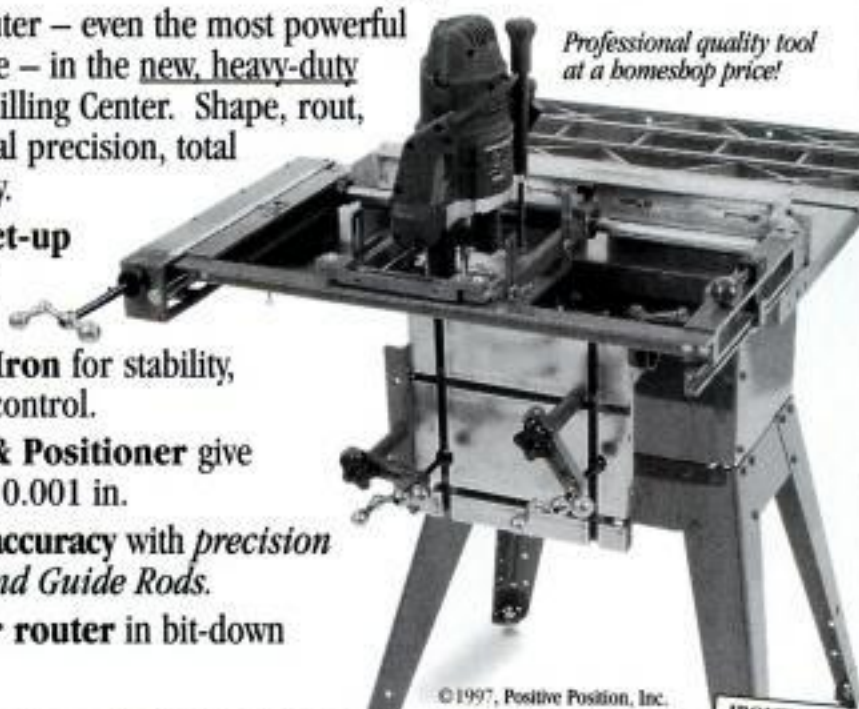
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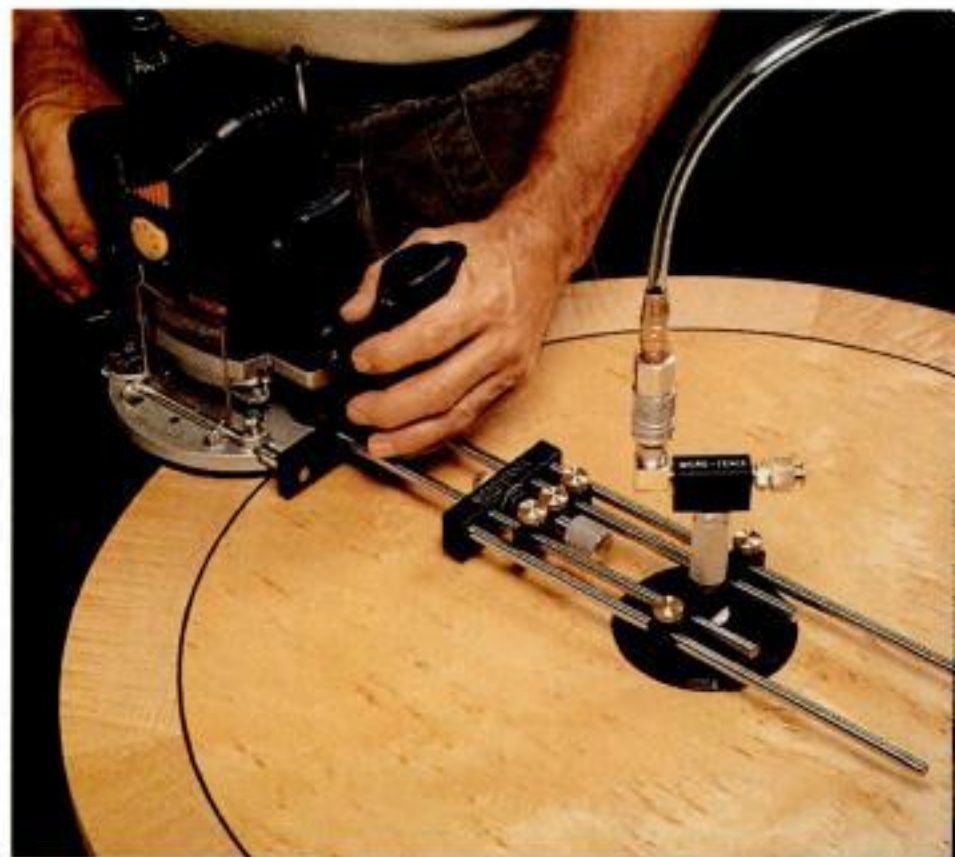
## One-Handed Clamp



**Bessey's Power Grip Clamp** is a heavy-duty tool that combines the convenience of one-handed clamping with strong clamping pressure. You advance the sliding jaw by squeezing the lever with one hand while gripping either the rail handle or the wooden screw handle. Non-slip pads to protect the work are included. The Power Grip is available in a 12-in. length for \$54.95 or 24-in. length for \$59.95. *American Clamping Corp., Dept. AWT, Box 399, Batavia, NY 14020, (800) 828-1004 in the U.S., (800) 265-8612 in Canada. Circle #601*

## Vacuum Router Trammel

Most circle cutting jigs require a center pilot hole or pin to act as a pivot point. Micro Fence's new accessory, the Vacuum Center Assembly, uses non-marring vacuum power to hold the center point securely for routing circles or curves with the company's Circle Jig. The Vacuum Center uses compressed air (80 to 100 psi) to generate the vacuum and includes a push button release for easy repositioning. The vacuum unit comes separately for \$279 or with the Circle Jig accessory for \$399. *Micro Fence, Dept. AWT, 11100 Cumpston St., Number 35, North Hollywood, CA 91601, (800) 480-6427. Circle #602*



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## Arched Doors The Easy Way



If you've shied away from making arched raised panel doors because of the expense and difficulty, CMT's new Sommerfeld Cabinetmaking Set could be your answer. The set consists of six router bits designed to be used with plastic templates (not included) that let you shape arched door parts safely and easily.

The bit set costs \$359. The templates are available in sets of 20 (for different door sizes), and in four different styles. Each template set costs \$95. *CMT USA, Dept. AWT, 307F Pomona Dr., Greensboro, NC 27407, (888) 228-9268. Circle #603*





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# Oneway 2036 Wood Lathe

by Steve Blenk

If you've got the urge to turn big bowls or vessels, you'll soon discover the limitations of a lightweight lathe: wicked vibration and instability, which are dangerous. Oneway's new model 2036 wood lathe was designed from scratch to handle large pieces. It's a great choice for serious turners.

This massive lathe weighs in at 700 lbs. and will handle bowls up to 20 in. diameter and spindle work up to 36 in. long. With the optional outboard attachment, it has a capacity up to 48 in. diameter. (Oneway also offers model 2436, with a 24-in. swing.) Add features like a rock-solid tool rest and an electronic drive system that won't bog down even under the heaviest cuts, and you've got a stable lathe for virtually any turning situation.

During testing, I turned an entire 12-in. bowl with a nickel resting on edge on the headstock, and it never budged! Stability like this comes from details such as a huge 33-mm-dia. headstock spindle that doesn't whip or vibrate—a problem on lighter-weight lathes. Unlike most lathes, which have cast-iron beds, the 2036 is constructed around a tubular steel body. Normally, I'm not a big fan of fabricated steel lathes, but this one is so massive that any debate of steel versus cast iron is not an issue.

The lathe comes with a 1½-HP motor with AC electronic variable speed ranging from 0 to 3000 rpm. (2- and 3-HP motors are optional.) I appreciated the way this drive system gives constant torque over practically the whole range—a valuable asset for turning big pieces at very low speeds. Using the whole speed range requires moving the belt on a three-stage step pulley, which was easy. There was no slippage or vibration in the drive. The electronic control includes a soft-



**Like a rock.** Welded steel construction, electronic variable speed, power, and a 20-in. swing make this massive lathe a natural for turning big bowls.

start/stop feature, and performed flawlessly during my tests. The control switches are mounted on a pivoting arm that you can position wherever you want for convenience and safety.

Other safety features on the lathe are faceplates and chucks with lock screws that fit into corresponding grooves on the spindle. Oneway even offers this machine with three different leg heights (at no extra charge) to accommodate woodturners of different heights.

The only feature that I didn't like was the #3 Morse taper in the tailstock. Oneway designed it this way to provide a solid mount for heavy-duty boring tools. It didn't cause functional problems, but all of my centers fit #2 Morse tapers, which are common

on most other lathes. To use my centers, I had to buy a #2 to #3 adaptor (available from MSC, 800-645-7270).

Optional items include the outboard turning attachment, which will let you turn monster blanks up to 48 in. diameter (\$990), and 16-in. and 60-in. bed extensions (\$266.25 and \$918.75). Both the 2036 and the 2436 are also available in short-bed versions measuring 16 in. between centers.

Bottom line: An ideal lathe for the professional turner or for the hobbyist who will not tolerate limitations from equipment. Priced at \$4,305 in the U.S., the 2036 is at the high end of the market. (The 2436 costs \$4,555.) But if you have the money, it's well worth the cost. *Oneway Manufacturing, Dept. AWT, 241 Monteith Ave., Stratford, Ontario, Canada, N5A 2P6, (800) 565-7288. Circle #604*

*Steve Blenk is a professional turner and a contributing editor to AMERICAN WOODWORKER.*



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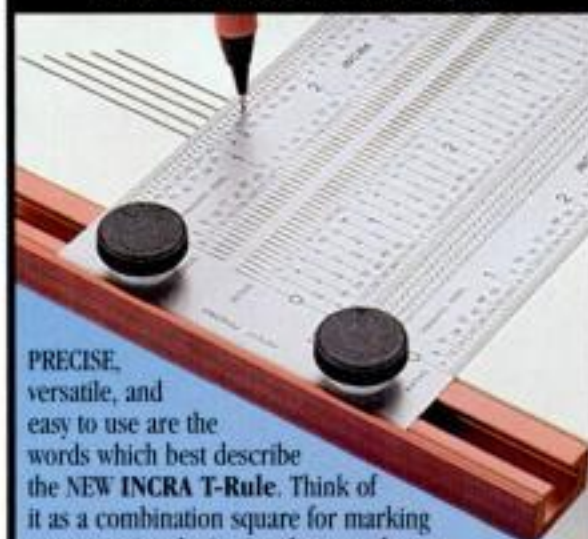
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| Fein Power Tools              | 33         | 30       | Simpson Machine Tool Co.           | 17    | 82       |
| Festo Tooltechnic             | 14         | 84       | Square 1 Woodworking Plans         | 14    | 83       |
| Forrest Mfg.                  | 29         | —        | Star Tools                         | 23    | 9        |
| Freud                         | 7          | 3        | Steelmaster Buildings              | 18    | 27       |
| Frog Tool Company Ltd.        | 34         | 503      | Steve Wall Lumber                  | 34    | 164      |
| Fuji Spray Equipment, Ltd.    | 14         | 80       | Sunhill Machinery                  | 34    | 59       |
| Garrett Wade                  | 13,87,93   | 35,36,37 | SuperShop                          | 22    | 33       |
| Gilliom Manufacturing, Inc.   | 20         | 201      | Target Enterprises                 | 100   | 117      |
| Good Hope Hardwoods           | 101        | 112      | Timberking                         | 101   | 100      |
| Gorilla Glue                  | 27         | 46       | Tool Crib of the North             | 21    | 10       |
| Gougeon Brothers Inc.         | 101        | 113      | Tropical Exotic Hardwoods          | 102   | 109      |
| Great Tools Direct            | 31         | 13       | Tuckaway Timber                    | 101   | 101      |
| Grizzly Imports, Inc.         | Cover 2,81 | 4,31     | University of Rio Grande           | 28    | —        |
| Groff & Groff Lumber Inc.     | 101        | 89       | U.S. Mahogany Corp.                | 101   | 119      |
| Hardwood Store of N. Carolina | 101        | 90       | Vac Sac                            | 100   | 106      |
| Hearne Hardwoods              | 100        | 91       | Vega Enterprises                   | 11    | 85       |
| Highland Hardware             | 28         | 18       | Wade Manufacturing                 | 100   | 94       |
| HTC Products                  | 6          | 66       | Waterlox Coatings                  | 100   | 102      |
| Hut Products                  | 85         | 47       | West Penn Hardwoods                | 100   | 103      |
| INCRA Rules                   | 91,93,95   | 72       | Wildwood Designs, Inc.             | 95    | 28       |
| International Correspondence  |            |          | Wilke Machinery                    | 27    | —        |
| School                        | 93         | —        | Woodcraft Supply Corp.             | 25,95 | 60,73    |
| International Tool Corp.      | 89         | 5        | Wood-Kote Products, Inc.           | 11    | 41       |
| Ironwood Mill-Right           | 91         | 39       | Woodline Arizona                   | 22    | 74       |
| ISI                           | 100        | 92       | Woodmaster Tools                   | 14,25 | —        |
| Jamestown Distributors        | 28         | 19       | Wood-Mizer Products, Inc.          | 19    | 202      |
| JBM Products, Inc.            | 102        | 105      | Wood-Ply Lumber Corp.              | 101   | 167      |
| Jesada Tools                  | Cover 3    | 6        | Woodsmith Store                    | 81    | 75       |
| Jet Equipment & Tools         | Cover 4    | 7        | Woodworkers Depot                  | 27    | 86       |
| Jointech Corp.                | 8          | 48       | Woodworkers Discount Books         | 13    | 76       |
| Keller Dovetails              | 18         | 67       | Woodworkers Source                 | 11    | 87       |
| Klockit                       | 28         | 68       | Woodworkers' Store                 | 11    | 61       |
| Laguna Tools                  | 14,19,     | 49,50,   | Woodworking Shows                  | 81    | 77       |
|                               | 31,88      | 51,52    | Woodwrite, Ltd.                    | 28    | 62       |



# Beautiful Boxes

Beyond their basic function as storage receptacles, boxes provide woodworkers with unlimited design possibilities. Material selection can run the gamut, too. The makers of the boxes shown here incorporated everything from veneer, inlay, and figured woods to plywood and found objects. Don't box yourself in—have fun and let your imagination run wild.



◀ Turned box by Ray Jones, Asheville, NC. Madrone burl, claro walnut, Indian tamarind, and Spanish cedar. W: 8½ in. D: 7½ in. H: 12½ in.

PHOTO BY TIM BARNWELL



▲ "Heron Towers" by Michael Elkan, Silverton, OR. Big-leaf maple burl. W: 12 in. D: 4 in. H: 19 in.

PHOTO BY G. POST



◀ "Packaged to Go" jewelry box by Nikolai Ossipov, Chino, CA. Black walnut. W: 5½ in. L: 9 in. H: 3 in.

PHOTO BY NIKOLAI OSSIPOV



▲ Curio box by Paul Lynch, Davis, CA. Cherry and walnut. W: 9 in. L: 20 in. H: 10 in.

PHOTO BY STUART ALLEN

▼ Box by Terry Dale Hufft, Walnut Creek, CA. Bird's-eye maple, pau ferro veneer, zebrawood lumber and veneer, and ebony. W: 7 in. L: 15 in. H: 6 in.

PHOTO BY G. POST





Box by Jeff Dilks,   
East Wenatchee, WA.  
Muninga, Sitka spruce, and  
Gabon ebony.  
W: 8 in. L: 11 in. H: 4½ in.

PHOTO BY JASON GETZIN



▼ "John's Box" by Buff Brown,  
Phoenixville, PA.  
Found wood, fur, cloth, wallpaper, and brass.  
W: 9 in. L: 12½ in. H: 6½ in.

PHOTO BY BUFF BROWN



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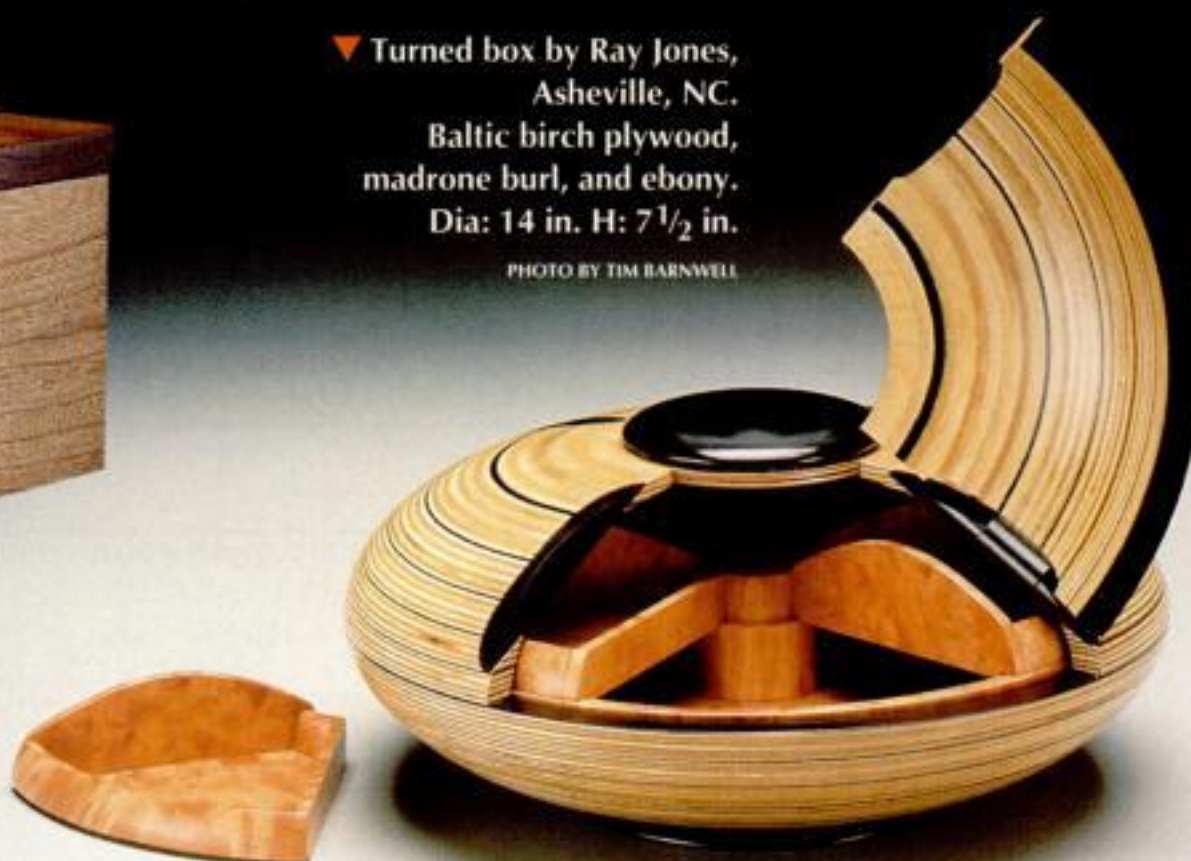


▲ "Shark Box"  
by Alan Bradstreet, Pownal, ME.  
Cherry and walnut.  
W: 3½ in. L: 7 in. H: 4 in.

PHOTO BY DIANA/DENNIS GRIGGS

▼ Turned box by Ray Jones,  
Asheville, NC.  
Baltic birch plywood,  
madrone burl, and ebony.  
Dia: 14 in. H: 7½ in.

PHOTO BY TIM BARNWELL





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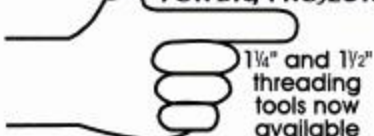
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# Portable Hardware Box

by Andy Rae

**T**ired of rooting through my jumbled pile of hardware for that odd screw, I decided to build a box that would organize the many types of hardware and fasteners I use frequently. My hardware box stores nails, screws, pneumatic fasteners, and oddball stuff like shelf pins, Molly bolts, and the like. Everything fits neatly in dedicated compartments in this three-tiered box. The nesting or graduated design makes it easy to lift out a tray to access any of the contents at a moment's notice.

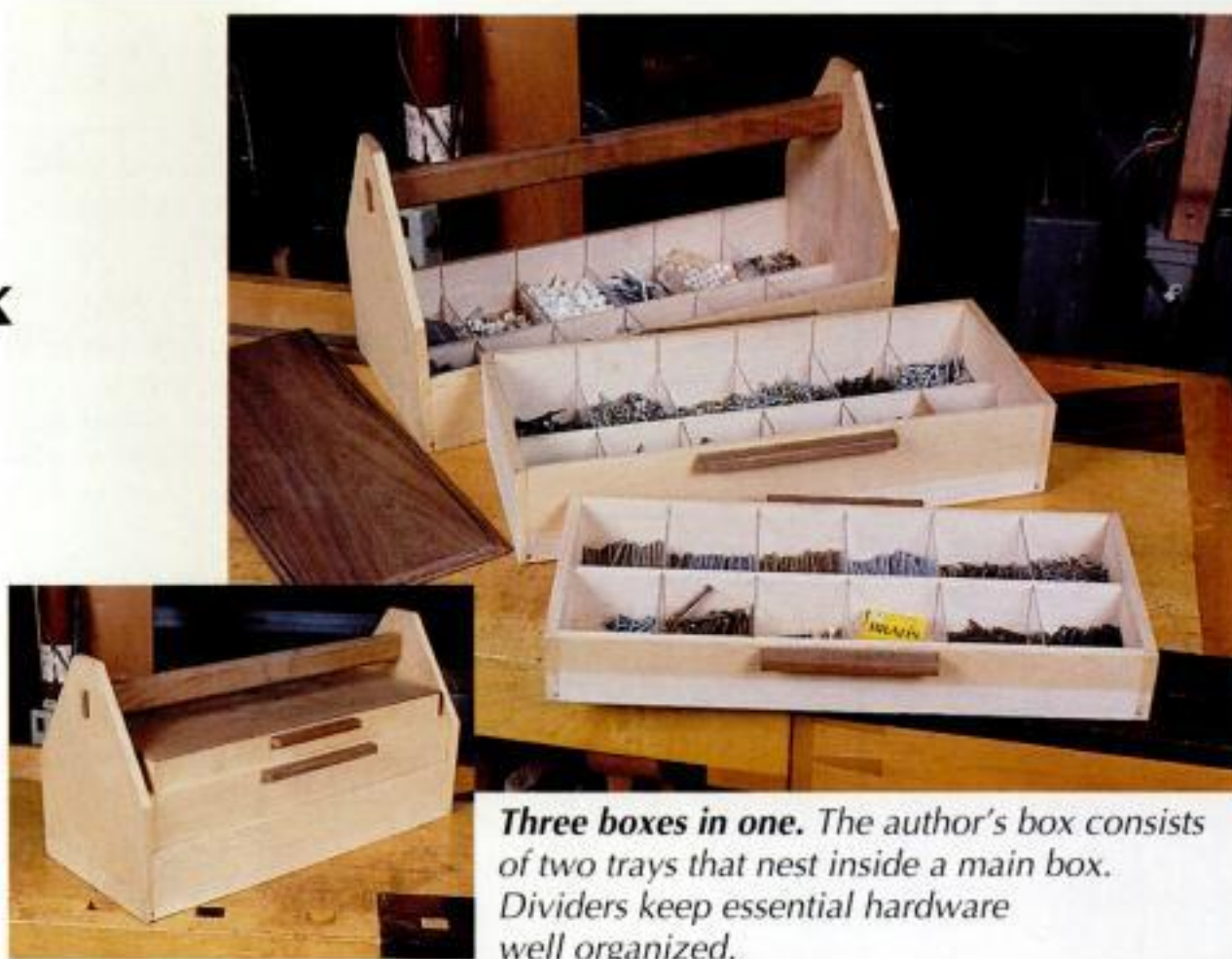
To keep the box and trays as light as possible, I used 1/2-in.-thick plywood for the ends and solid, 3/8-in.-thick maple for the sides and center strips. The sides and ends are grooved for 1/4-in.-thick plywood bottoms. I made the handles and lid from walnut. I joined the corners of the box with glue and #20 biscuits, although glue and countersunk screws will work just as well. To upgrade the raw plywood edges, I used iron-on edge banding. The carrying handle is joined to the ends of the bottom box with wedged through tenons for strength.

Once you've assembled the two trays, rout the bottom of each with a 1/4-in. round-over bit to make removal and replacement easier.

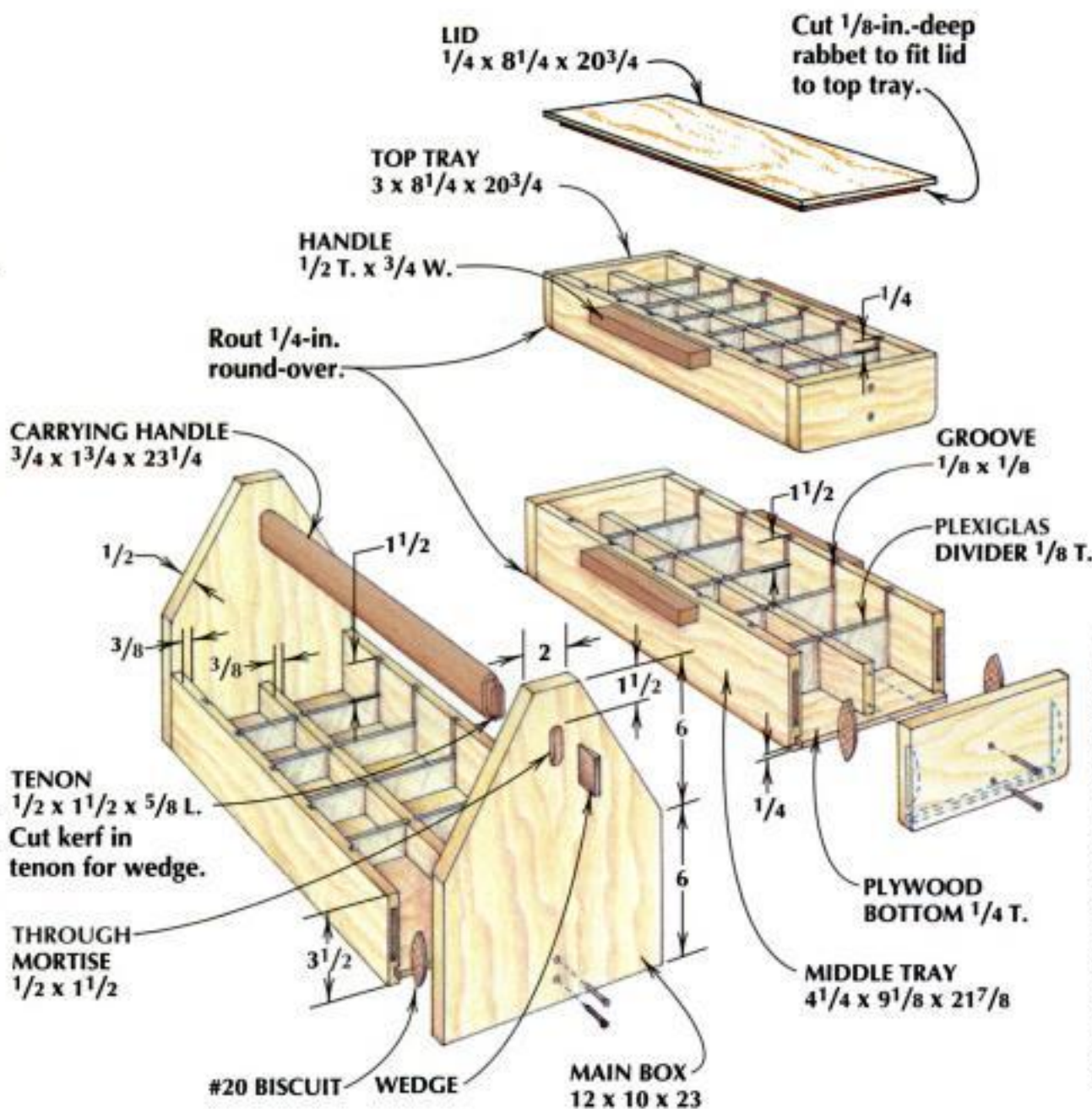
I used 1/8-in.-thick Plexiglas for the see-through dividers, sliding them into saw kerfs cut into the sides and center strips. Space the dividers according to the size of the hardware you plan on storing. If future hardware acquisitions call for more space, just increase the size of a compartment by removing a divider. ▲

**ANDY RAE**

*is an associate editor of AW.*



**Three boxes in one.** The author's box consists of two trays that nest inside a main box. Dividers keep essential hardware well organized.



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