

AMERICAN WOODWORKER

August 1991, Issue No. 21



Backyard Lumbermaking: Sawing and Drying Your Own Wood

Build a Fluting Jig for Your Drill Press

Plans for a Four-Poster Bed

A Sketchbook of Unusual Joints

\$4.50



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A WORD FROM THE EDITOR

DRY IT, YOU'LL LIKE IT



In this issue, we've devoted a lot of space to wood: ways to find it, saw it and dry it yourself. We think it's important reading for all woodworkers, even if you never plan to touch a log in your life. We all work with wood, but it's surprising how few of us really understand the stuff. Sure, we've heard that wood moves, but we don't know quite how or just what to do about it. We've all seen

boards warp, twist, split, check and cup, but we aren't sure just why or how to avoid it. We've heard furniture wood should be "dry" before building with it, but we don't know how to tell if it is.

If you're serious about woodworking, you need to know. Why? Because you'll build better furniture (turnings, carvings, etc.) if you understand the properties and characteristics of your material.

You can learn quite a bit by drying your own wood. Air drying is easy and doesn't take much to get started—just some freshly sawn boards and a dry place to stack them. The article on page 52 explains how. You'll get to observe, first hand, how much water a freshly sawn board contains and how it shrinks across the grain as this moisture evaporates. You'll learn a lot about wood, and you'll get some good lumber besides.

If you don't have the space, or inclination, to get involved with drying large boards, experiment on a smaller scale. Try sawing up wood from your firewood pile or a yard tree. Dogwood, mesquite, apple, laburnum, boxwood and lots of other ornamental trees and shrubs are small enough in diameter to be sawn into "boards" with a bandsaw. Build a miniature lumber pile and air dry your "boards." You'll learn more about wood and end up with some interesting material for making small treasures like boxes or jewelry.

DAVID SLOAN
Editor

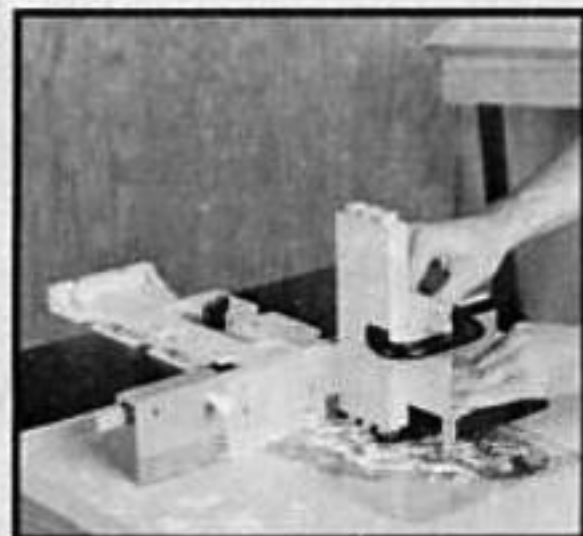
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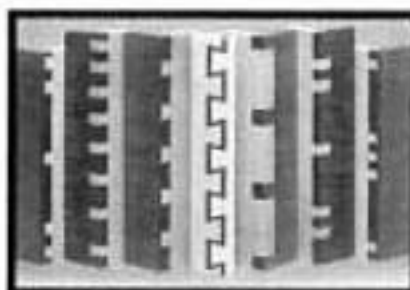


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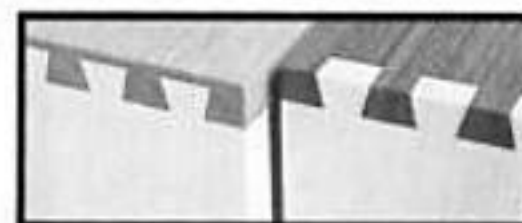


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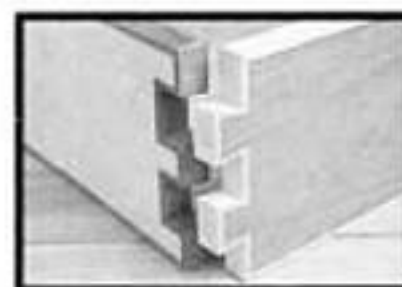


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This One



Wooden Lights Followup

Re: Wooden Lights feature (AW, #20). Charles Linn's article on making wooden light fixtures was very informative. I wanted to learn more, so I was interested to note that Mr. Linn had been editor of a magazine called *Architectural Lighting*. Great, I thought, I'll look for a copy. And I looked, and looked.

If you could provide me with an address for this magazine I'd be very grateful.

C. LEGRICE
Ferndale, WA

The address for Architectural Lighting magazine is 1515 Broadway, New York, NY 10036, (212) 869-1300.

On Cabinet Hinges

Thanks for the article, All About Hinges (AW, #20). This kind of article is great to have around as a reference, and I hope you plan to do more on other kinds of furniture hardware in the future. How about a follow-up article with more information on European hinges?

KEN OSTERLY
Cairo, IL

Fed Up With Federal

I've had it up to here with old-timey furniture! Shaker this, Queen Anne that, Fuddy-duddy Federal in each and every issue. You'd think that woodworkers all lived in museums! There are lots of good craftsmen out there designing stylish, modern furniture. Why don't you people show more of it? Some of us out here would like to see plans for more modern designs.

JEFFREY BRAWLEY
Oakland, CA

Check out Glenn Hughes' glass-top desk in this issue. How about it readers? Any of you designing good-looking contemporary furniture? Send us some photos, and we'll contact you if we decide to publish your design. For more information on submitting your ideas and photos, call (215) 967-8315 and ask for a copy of our "Guidelines for Authors."

Touchy About Teak

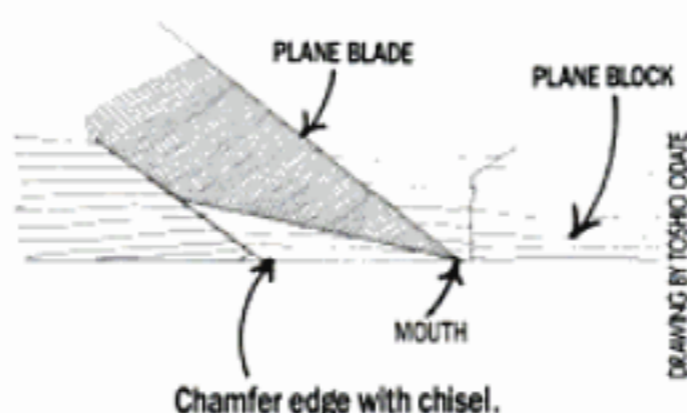
It's an admirable thing to get on a soapbox and preach about teak as an endangered species (AW, #19), but your solution—buy plantation-grown teak—is bogus at best. How can you prove where the teak comes from? A disreputable lumber dealer can tell you anything you want to hear, and how can you prove that he's wrong? A better solution is to boycott teak and all other endangered tropical hardwoods. There are plenty of beautiful North American woods to work with.

GARY REPERT
Valley Stream, NY

Follow-Up on Chipped Plane Soles

I would like to write a follow-up to the Q&A about chips in the sole of a wooden plane at the sharp corner just behind the blade (AW, #18).

This corner, where the sole and the bed intersect, is very sharp. The blade may cut cleanly, but sometimes the edge of the grain will lift slightly and be caught by this sharp wooden edge. The grain then tears out, especially when you are planing soft woods like pine and cedar.



This sharp edge also works like a snow plow and catches dust and chips. You can sometimes find large splints between the blade and the block, stuck so hard that even a fingernail could not pull them out. For this reason, the sharp edge of the plane sole chips.

Avoiding all this is very easy. You just do a very simple thing. Chamfer this sharp edge with a chisel. (See drawing.) Of course, nothing is 100% accident free, but you can avoid these troubles most of the time.

TOSHIO ODATE
Woodbury, CT

Technical Drawings: Pro...

When AW comes to my house I can hardly put down the magazine to eat supper. The draftsmen that draw all those plans are really top shelf!

Thanks for a great publication.

BRIAN HONEY
Barrie, Ontario

...and Con

Somewhere in my engineering career I learned that it isn't considered a good practice to put the same dimension on a piece in two places; it seems to have something to do with tolerances. Also, if it is possible to add or subtract a number of dimensions and come up with the length of a piece, you don't dimension the length. However, some [illustrators] carry this procedure too far. We are not making Class A drawings for a government contract. We are making drawings for people who enjoy doing woodworking as a hobby.

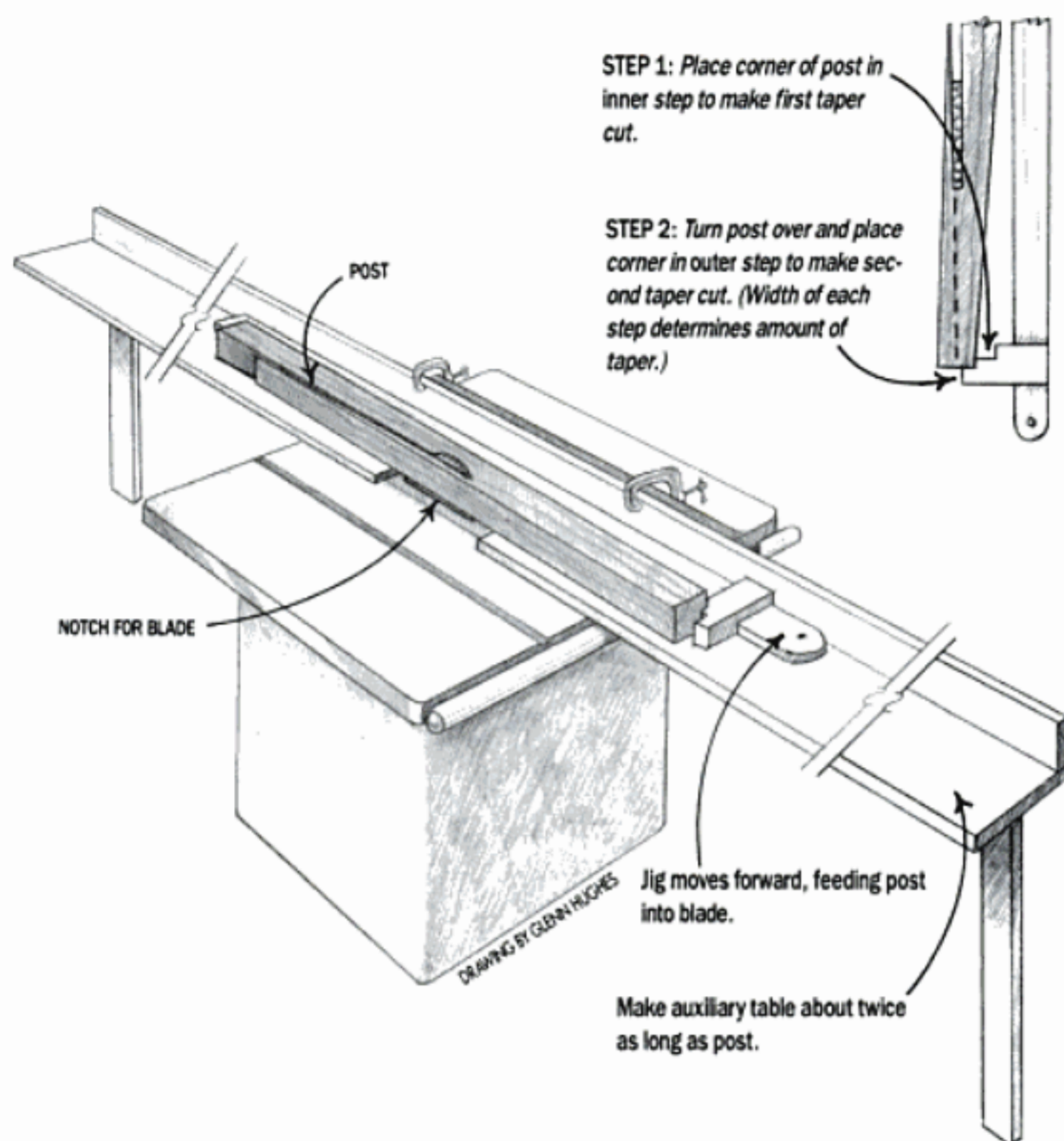
A good example is the beautiful "Neo-Egyptian" coffee table in AW, #16. You got a little too cute in trying to make a drawing with a minimum of dimensions. Perhaps, in the future, you will over dimension your drawings and risk being criticized as unprofessional.

GEORGE L. HARVEY
Goldsboro, NC

We try to follow drafting conventions, but we bend the rules a little if a by-the-book drawing will be difficult to read. We want our drawings to be readable even if you don't have a background in mechanical drawing.

That said, we aren't perfect. There are a couple of important dimensions missing from the coffee table drawing, as Mr. Harvey pointed out in his letter (edited here for publication). The legs of the table are 17 3/4 in. long and the strips along the edge of the top are 1/2 in. thick.

Tell us what you think. Send your comments, compliments, complaints and corrections to: Editor, AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098.



Tablesaw Tapers

Q. I'm planning on making a bed with 80-in. bed posts. Can you recommend a jig to cut tapers on the posts using a tablesaw?

JERRY HUGHITT
Northfield, MN

A. A shop-built taper jig for a tablesaw is simple to make. It consists of a rail and a stepped block. (See drawing.) Use a straight 7-ft. or 8-ft. 1×4 board for the rail to match the length of the post. Cut the stepped block from a short length of 2×4. The steps on the block position the post at the correct angle for the blade to cut the desired taper. Size the block so the width of each "step" is equal to the amount of taper on each side of the post.

A jig this long will need to be supported by a temporary auxiliary table. This auxiliary table should be long enough to hold the entire length of the jig and post on both the infeed and outfeed sides of the saw. To accommodate an 80-in. post, the table should be about 14 ft. long.

Make the "L"-shaped auxiliary table with a 1×4 for the vertical "fence" and a 1×10 for the base, notched to accommodate the saw blade. Clamp the table to the saw's metal fence, and add makeshift 1×4 legs to the ends of the table to prevent sagging.

To cut a taper, place the jig on the auxiliary table and the post beside the jig with its corner in the inner step of the stepped block. Adjust the saw's fence (along with the table and jig) until the saw blade lines up with the taper line marked on the post. Lock the fence. Move the jig forward to feed the post into the blade and cut the first taper. (Get a helper—two pairs of hands can more safely handle a jig this long.) Turn the post over, set the corner on the outer step of the block and make the second taper cut. Repeat the same sequence to cut tapers on the other two sides of the post. Make the taper cuts about 1/16 in. shy of their final depth so you can clean up any saw or burn marks with a jointer or hand plane.

BERNIE MAAS
Associate professor of art
Edinboro, PA

Teak Tricks

Q. Makers of Scandinavian teak furniture claim to use only an oil finish. But the color you get when you put oil on teak is much darker and less uniform than the color on store-bought teak furniture. Can you tell me how these manufacturers treat their teak? Is there some bleaching?

JAN A. SOMMERWIL
Niagara on the Lake
Ontario, Canada

A. You're right. You can't imitate the color of store-bought teak furniture by putting oil on raw teak because (get ready) teak furniture from Scandinavia is not oiled. It's commonly finished with catalyzed lacquer or another modern factory-applied, heat-cured amino resin. These are tough, durable finishes that provide excellent protection even when applied thin to imitate the appearance of an oil finish. But they don't penetrate the wood and darken it as much as oil does. To imitate the factory finish, you'll need a less-penetrating finish such as nitrocellulose lacquer, varnish or polyurethane.

The notion that Scandinavian furniture is oiled seems to be quite entrenched. When I visited stores and showrooms in Denmark several years ago, most salespeople thought their teak furniture was oiled. I had to go fairly high up the sales hierarchy to find people who knew better. I was never able to get a satisfactory explanation for the confusion.

BOB FLEXNER
Finishing consultant
Norman, OK

Forbidden Fruit?

Q. I just acquired several logs of pear wood that I want to use for carving. I'm concerned about the big doses of pesticides that are sprayed on most fruit trees year after year. (I believe apple trees were once sprayed with lead arsenate.) Do these toxins accumulate in the wood, and are they released and ingested when the wood is sawn or sanded?

LARRY LAFFREY
La Crosse, WI

A. There has been much recent legislation that restricts the use of highly toxic pesticides. Consequently, most current pesticides have a short effective life, that is they break down into less harmful substances before the fruit is harvested. However, a log from a commercial fruit tree or a plank of fruitwood lumber of any substantial size was most likely growing during the time when toxic pesticides were being used. These pesticides were probably not absorbed directly by the bark or leaves of the tree. Trace amounts of the toxins could be absorbed into the groundwater around the tree and then absorbed into the trunk through the roots. The chemicals would be deposited in the cambium layer (the growing part of the tree right under the bark), and thereby into the annual growth rings.

Sawing, sanding or other operations that generate sawdust would release the toxins into the air where

they could be ingested by breathing. It is possible to develop serious problems from inhaling sawdust by itself, let alone sawdust that's contaminated with pesticides. Also, arsenic is naturally present in cherry wood, spalted wood contains an active fungus, and pressure-treated wood contains arsenic compounds.

Toxins or no toxins, woodworkers should wear protective masks to avoid inhalation of sawdust, and shops should be well-ventilated or employ a dust-collection system. If you're really concerned, you could send a wood sample from a specific log to a lab to be tested for pesticide contamination—but this can be very expensive because there are so many chemicals to test for. Contact your county agricultural extension agent or state university department of agriculture or plant pathology.

DICK BOAK
Martin Guitar Co.
Nazareth, PA

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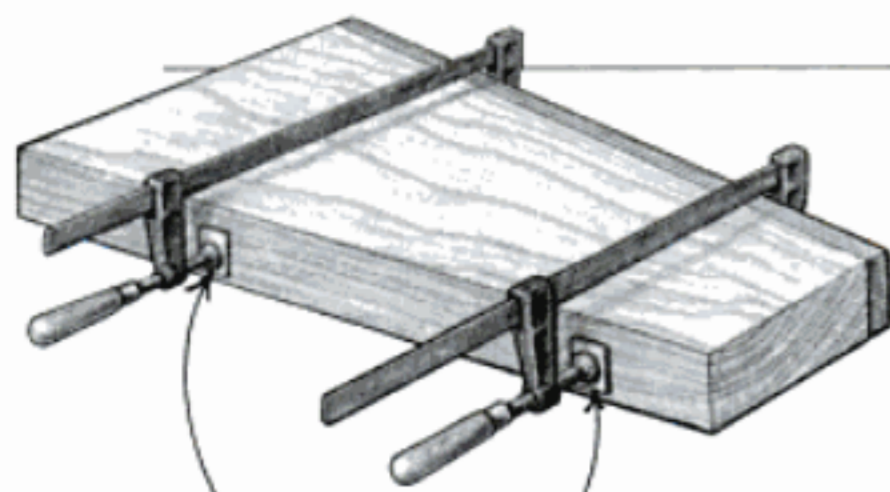
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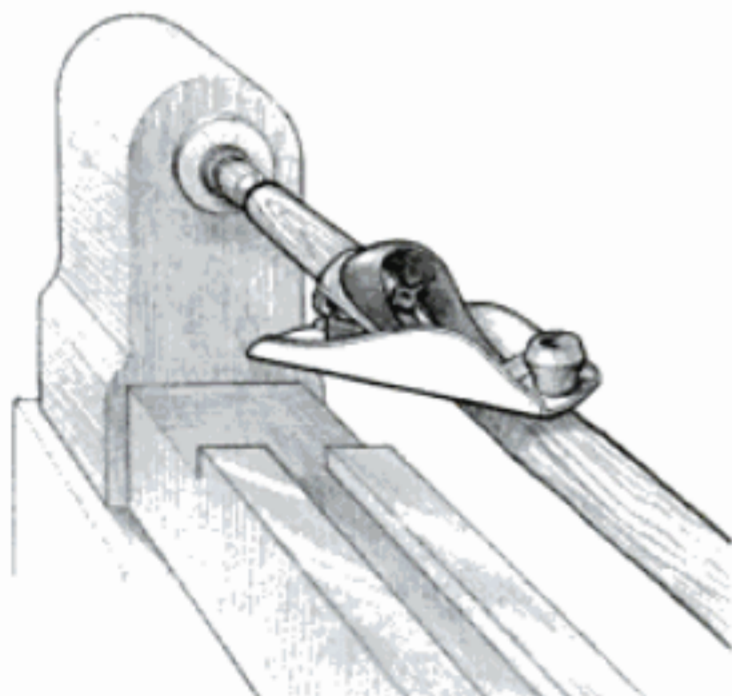
No-Slip Clamp

When I use my bar clamps at an angle, I prevent the clamps from slipping with foam tape that has adhesive on both sides. It helps protect the wood, too. If necessary, a little naphtha removes leftover tape.

M. SCALLY
Albuquerque, NM

Whipping Whip on the Lathe

Long, thin spindles that whip and chatter on the lathe can be tamed with a steadyrest, but then you have to move the steadyrest to turn the center section. When I'm turning straight, tapered or slightly curved surfaces, I find that they whip and chatter much less if I use a hand plane instead of a skew chisel.



After roughing out the spindle with a gouge, I set the lathe speed as low as possible and "plane" the spindle with slow, even strokes. Experiment with blade settings, the angle of the plane to the spindle, the speed of your stroke, and lathe speed for the results you want.

If you're still getting some chatter, try bearing down slightly on the plane or supporting the spindle from behind with your hand.

FRED MATLACK
Emmaus, PA

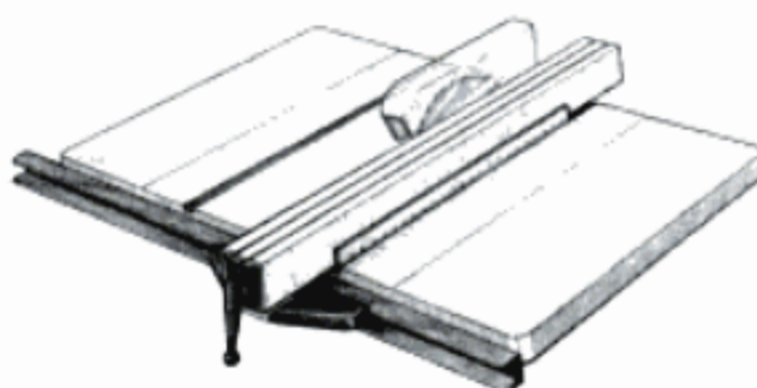
Handy Wax

A finish nail goes into hard wood much more easily, and is less likely to curl up and die, if it is waxed first. I drill a hole in the end of my ham-



mer handle and fill it with melted candle wax or paraffin to keep it handy. You couldn't find a better place to keep the wax.

BRADLEY HANKINS
Arlington, TX



Aligning a Saw Fence

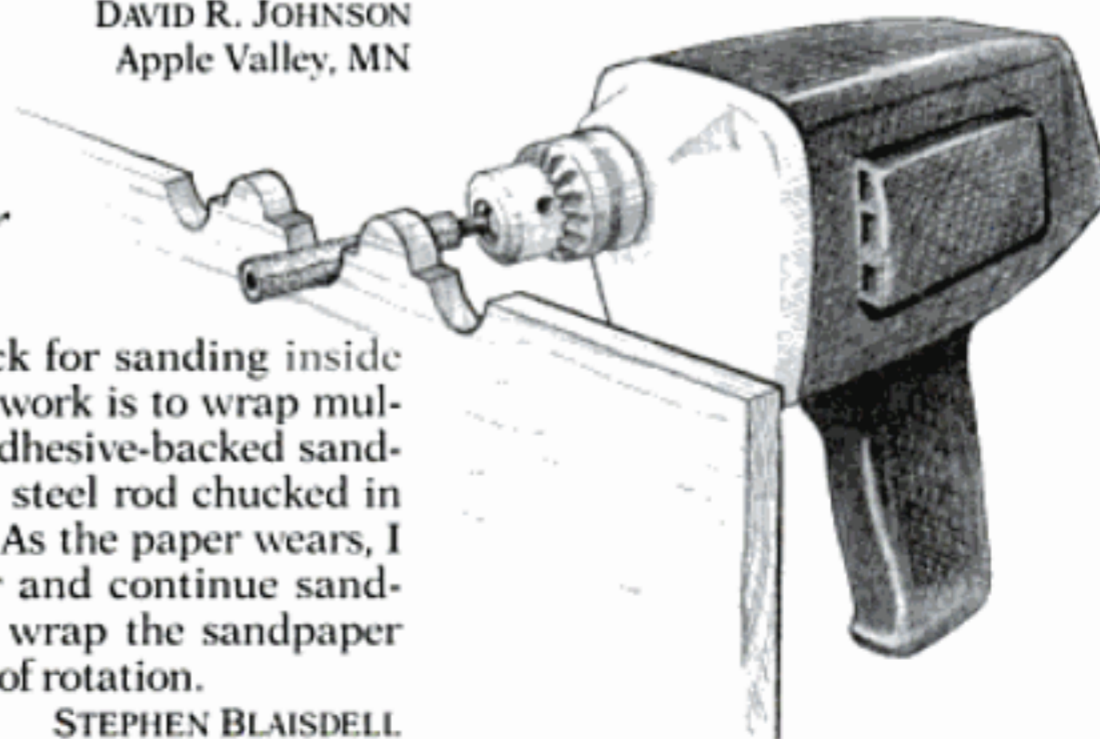
Here's a quick and easy way to align your table saw rip fence with a miter-gauge slot. Loosen the screws that lock the fence alignment, then press the fence against a long, steel rule or framing square in the miter-gauge slot. Retighten the screws while holding the fence tight against the rule.

DAVID R. JOHNSON
Apple Valley, MN

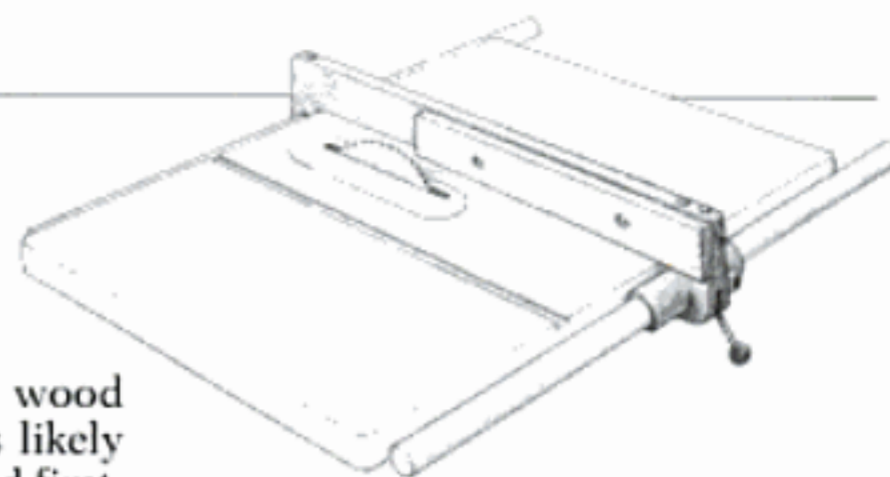
Quick Paper Renewal

My slickest trick for sanding inside curves on scrollwork is to wrap multiple layers of adhesive-backed sandpaper around a steel rod chucked in a drill or lathe. As the paper wears, I peel off a layer and continue sanding. Be sure to wrap the sandpaper in the direction of rotation.

STEPHEN BLAISDELL
Naugatuck, CT



DRAWINGS BY HEATHER BENE LAMBERT



Rip Fence for Solid Wood

Wood often twists and bends when internal stresses are released during ripping. A rip fence that ends at the midpoint of the blade gives the wood room to do its own thing without binding between the fence and blade. I get the effect of a half-length fence by bolting a half-length board to the side of my full-length fence. Now the saw runs more easily and rarely, if ever, kicks back.

JIM TURBYVILLE
Westland, MI

The King of Shims

I find that playing cards of known thickness come in handy when shimming a specific amount. You can find the thickness of a single card by dividing the thickness of the deck by the number of cards; mine are .012 in. Three of them are approximately 1/32 in. (.036), five are 1/16 in. (.060) and so on. A decimal-fraction conversion chart is a handy accessory to the deck of cards.

WILLIAM GUTHRIE
Sylvan Lake, MI

Know a better way of doing something? Designed a clever jig? Send your woodworking tips, along with a sketch or a snapshot to: Tech Tips, AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. We'll pay you \$35 if we publish your tip.

Ryobi Tablesaw

Ryobi's BT3000 Precision Woodcutting System is a benchtop tablesaw with several new features. It has a unique sliding table with its own fence that supports stock very close to the blade for accurate crosscuts, miters and bevel-miter cuts. The saw is made of die-cast and extruded aluminum parts, weighs 75 lbs. and has a 13-amp motor. The 10-in. thin-kerf carbide blade will cut up to 2½ in. thick at 45°, 3⅞ in. thick at 90° and will rip to 30 in. wide. Blade guard and anti-kickback pawls are standard. Optional accessories include a metal stand, wide-table kit, extra-long miter/rip fence, miter clamping kit and dust bag. (Price: \$600)

CIRCLE NO. 46 ON PRODUCT LITERATURE CARD



■ Ryobi America Corp., Dept. AWT,
1424 Pearman Dairy Rd., Anderson,
SC 29625, (800) 323-4615.

SHOP TEST

Ruffian Canvas Toolbag

Tested By Fiona Wilson

Not all of us are blessed with a fully equipped home shop. I do most of my woodworking at a shop two blocks from home, though it's not unusual to find me surrounded by tools on my living-room floor. As you can guess, I frequently have to shuttle my tools back and forth between home and shop. This might have been a drag, but for the outstanding tool bag I discovered.

The Ruffian Canvas Toolbag from The Woodworker's Store is a gem of a tool tote. Made of heavy-duty canvas with a leather bottom, leather-reinforced upper edge and handles, this bag is made to last. What's more it's well designed. The bag is divided into a series of pockets, both large and small, and is sturdy without being heavy. Its 8-in. × 13-in. × 11½-in. dimensions mean the bag is roomy—you can fit plenty of tools in it. The central compartment is the largest, and I find it ideal for planes.



There are side pockets both within the bag and outside of it. The inner pockets can hold such items as marking gauges, try squares, sliding bevels and the like.

The outside pockets also come in two different sizes, with larger pockets on the ends and smaller pockets on either side. One excellent feature is the elastic cord that stretches

above the outer pockets on each side. These cords are designed to hold down the protruding handles of long tools like chisels and files. I find this especially appealing because I can spot the tool I need immediately instead of scavenging about inside a big, dark bag. (This is both impractical and unsafe, as when the chisel finds your hand before you find it.)

The Ruffian Toolbag is designed with tool protection in mind. Rather than having one, vast interior compartment where tools jostle and damage each other, the pockets keep tools apart.

I use this bag as both a full-time storage for my tools and a tool tote. This way I don't have to pack them up everytime I take off for the shop. Once I'm in the shop, I can park this bag o' tools right next to me wherever I happen to be working. It's like a portable tool cabinet. I recommend the bag as a well-made, practical answer to both toting and storing tools. The Ruffian Toolbag gets my vote for the King of Tool Totes. It's both well-designed and comfortable to carry. After all, if one has to be a beast of burden, the burden should be easy to bear. (Price: \$43.95)

■ The Woodworker's Store, Dept. AWT, 21801 Industrial Blvd., Rogers, MN 55374, (612) 428-2199.

CIRCLE NO. 51 ON PRODUCT LITERATURE CARD



Close-Quarters Sander

Conventional pad sanders work great on open areas of wood but can't reach into corners and narrow openings. The Fein MSx 636 sander is an industrial-duty German import that's designed to get into places you'd normally have to sand by hand. Its triangular sanding pad can get inside tight spots and sand right up to adjacent surfaces without damaging them. The pad moves back

and forth in a small arc of just 2° at a speed of 20,000 oscillations per minute. This tiny motion allows aggressive sanding that's easy to control. The Fein sander weighs 3 lbs. and comes with a metal carrying case and a supply of precut sanding sheets in various grits. Options include a dust-extraction system and a small sawing blade. (Price: \$330)

■ Fein Power Tools, Inc., Dept. AWT, 3019 W. Carson St., Pittsburgh, PA 15204, (800) 441-9878.



Crackle in a Can

If antique reproduction is your bag, you should know about Cracklin' Finish. It's a new product that simulates the appearance of a naturally aged and worn finish by creating a "crackled" look on a painted surface. It can be used on old "restored" antiques or new reproductions, or for a decorative effect on wood turnings, architectural pieces and other wood projects. Cracklin' Finish is sprayed on in a two-step process with a base coat and a top coat. It's available in six different contrasting pairs of colors. (Price: \$12.95)

■ Plasti-Kote, Dept. AWT, P.O. Box 708, Medina, OH 44258, (800) 431-5928.

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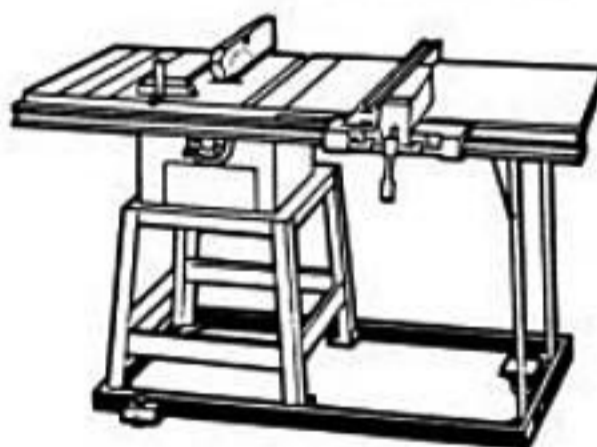
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CIRCLE NO. 21 ON PRODUCT LITERATURE CARD

*Discover the
Pleasures of This
Traditional
Hand Tool*



Two of the author's handmade spokeshaves were fitted with antique blades.

MAKING WOODEN SPOKESHAVES

BY ANDY BARNUM

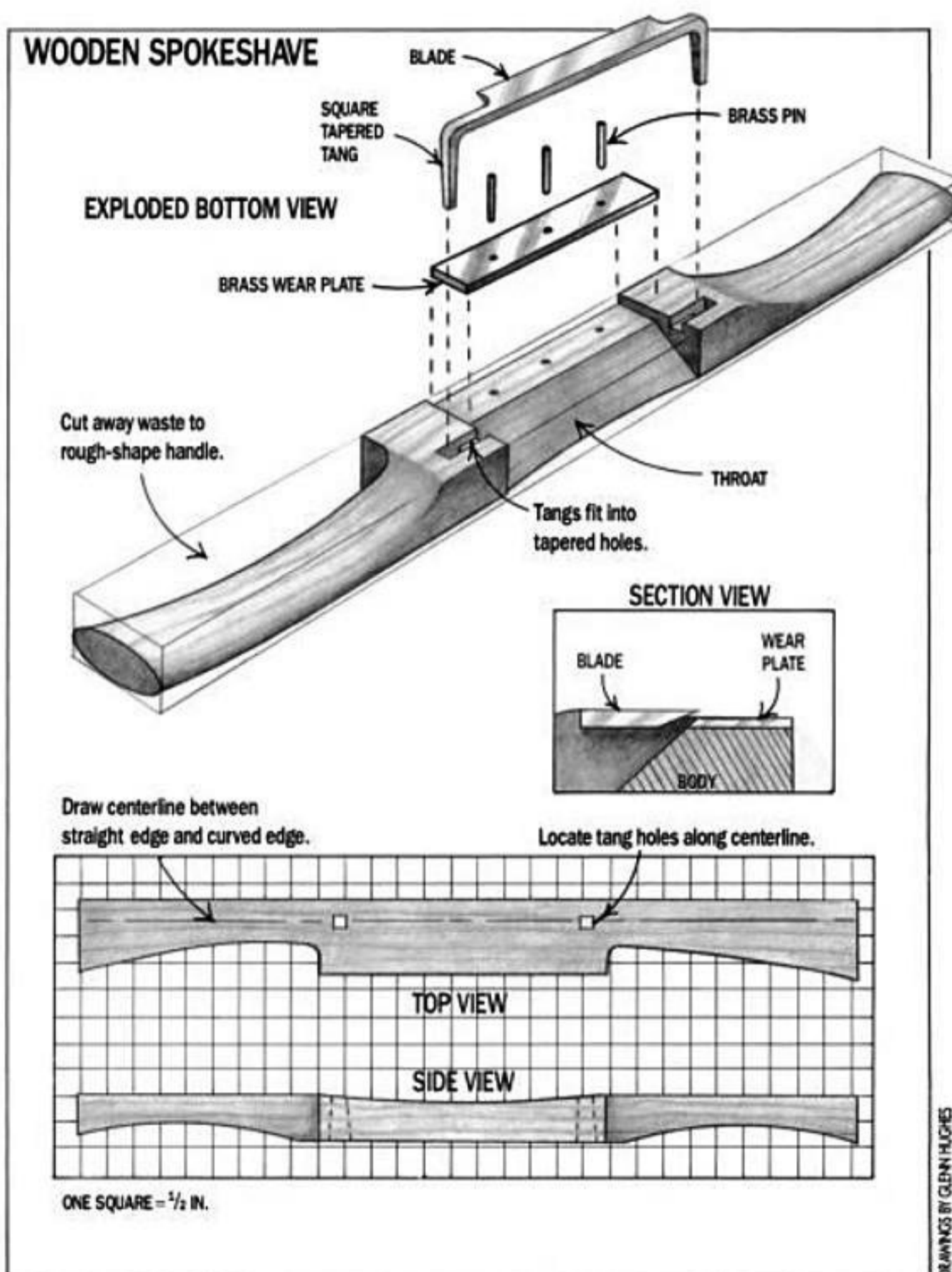
Wooden spokeshaves were once among the most common woodworking tools—no woodworker would have been without one. Perhaps that's why they're still relatively easy to find at flea markets and antique tool shops.

Nowadays, wooden spokeshaves have been largely replaced by metal-bodied spokeshaves, which have the blade set at a high angle to cut like a plane blade. Unfortunately, this can cause the blade to chatter, especially when taking a heavy cut. In the old wooden shaves, the blade is nearly flat on the work, making it cut more like a paring chisel, with a smoother action. A good, sharp, wooden shave can take a fine shaving off end grain, leaving it smooth and crisp. You just can't do that with a modern metal shave.

Years ago, I fashioned my own wooden spokeshaves, made with a couple of vintage blades I'd picked up on my travels. One spokeshave was ebony, and the other was rosewood. Each had an ivory wear plate let into its sole. (Now I'd use brass or bone for the wear plate instead of ivory.) Among all the tools I use, these spokeshaves quickly became my favorites. Since they work so well for me, I want to share my method of making wooden spokeshaves with other woodworkers.

Spokeshave Blades

Before you begin making a spokeshave, you need to get a blade. There



are two ways to go—recycle an old blade from an antique spokeshave or buy a new blade. I prefer an old traditional blade that has two square tangs that fit into the wooden body of the spokeshave. You can find these blades in antique shops and flea markets that sell old tools, or perhaps on an old spokeshave with a worn or damaged wooden body. (I wouldn't recommend sacrificing a good wooden-bodied shave just for the blade.)

The spokeshave you see here (in the procedure photos) has an old blade I found at a flea market. The blade has two tapered, square tangs bent at right angles to the cutting edge. The tangs fit tightly into square holes in the wooden body of the shave—just as they do in the antique wooden shaves.

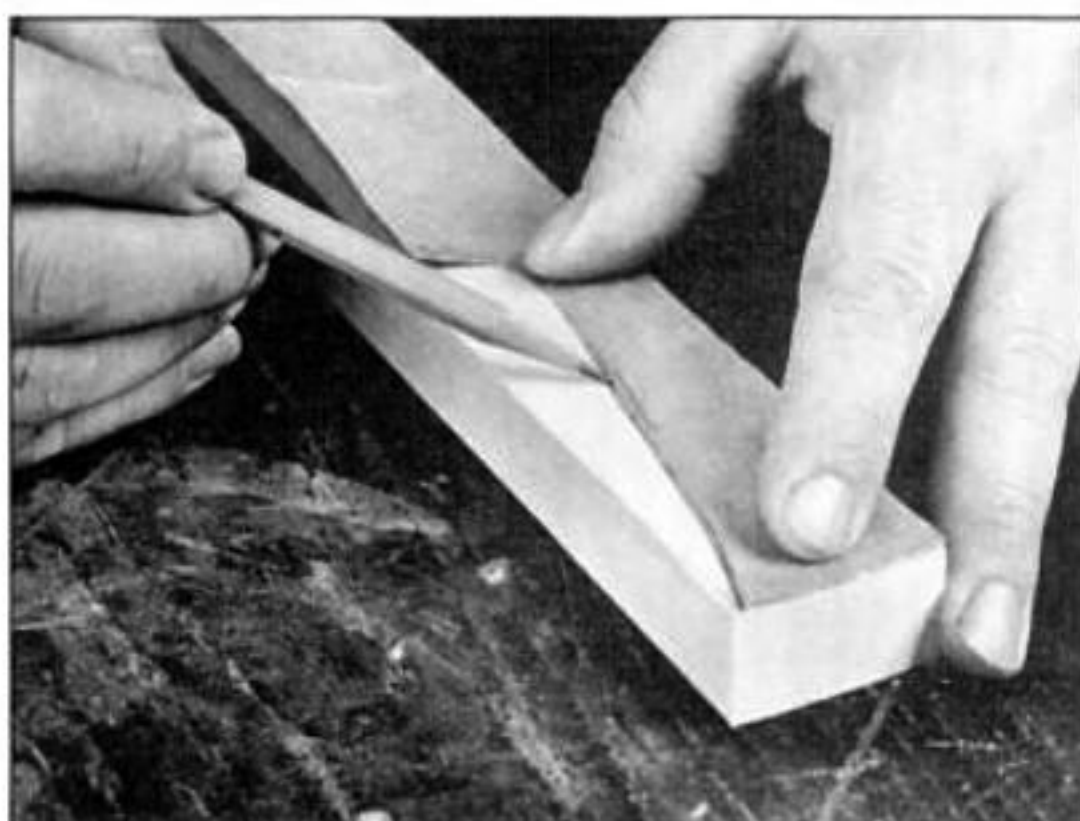
If hunting for an old blade doesn't appeal to you, you have a couple of choices. A British tool company has begun to make reproductions of the old tanged blades (\$19.00 from Bristol Design Tools, Ltd., 14 Perry Rd., Bristol, BS1 5BG, England, Phone: 01144272-291740). Or, you can buy a new blade with adjustable threaded posts instead of tangs. This blade comes in a kit that includes two knurled brass nuts for the posts, two brass adjustment inserts and a set of instructions (\$24.95 from Conover Woodcraft, Division of Byrom International, P.O. Box 246, Chardon, OH 44024, 800-722-5447).

I've written this article about how to make a spokeshave to accommodate one of the old tanged blades. If you want to use a new blade with a threaded post, the procedure is essentially the same—but you'll need to drill the holes larger for the brass adjustment inserts and you won't need to file them square. The instructions that come with the kit explain the process.

Choose a close-grained, split-resistant hardwood like hard maple, apple or pear for your wooden shave. Boxwood and beech are the best choices but may be hard to get. I made one of my shaves from a choice piece of curly persimmon given to me by a friend. Persimmon has a special quality for me that even the most exotic wood can't match.

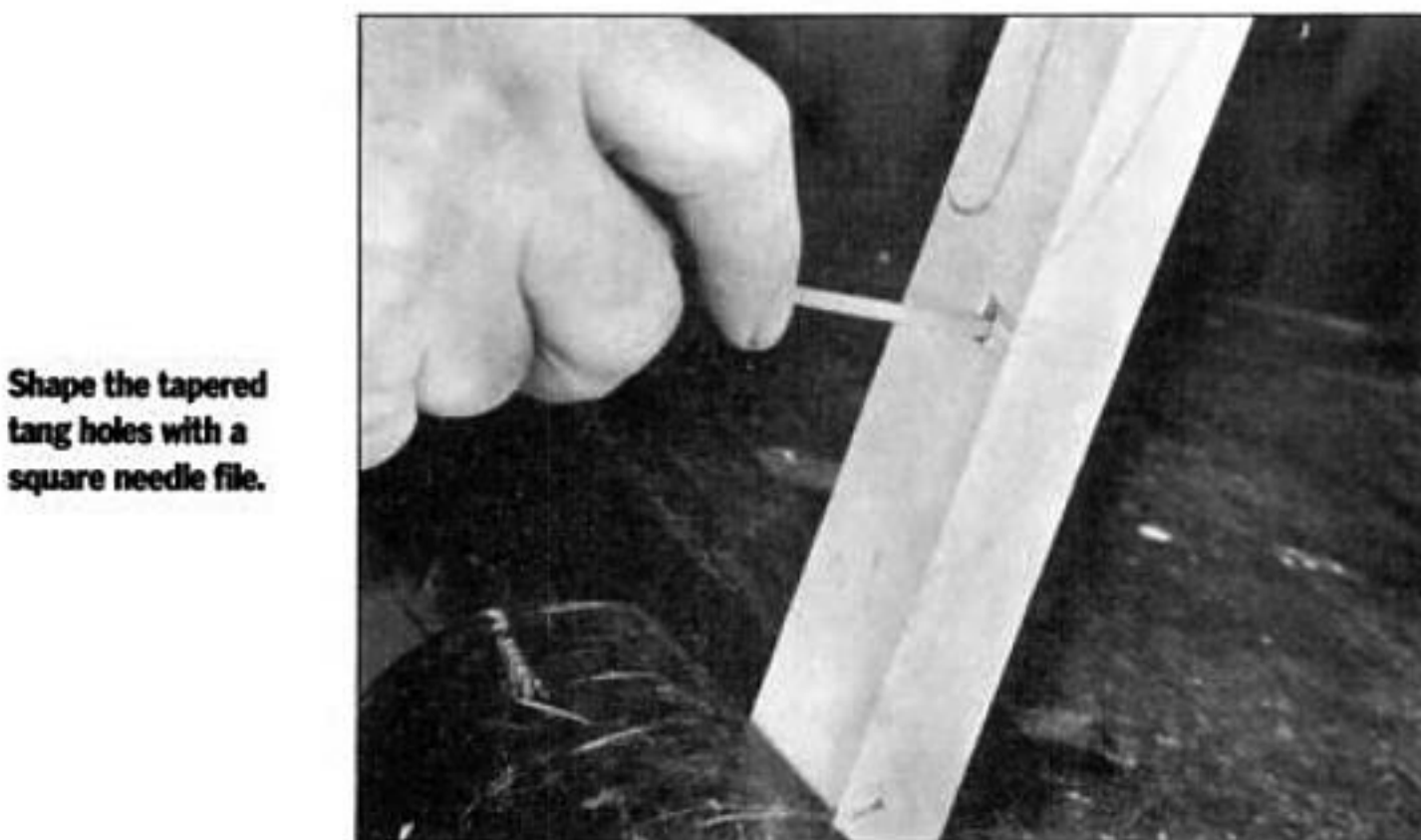
Making the Body

First, select and square up a block of wood to match the size of the shave you want to make. The exact dimensions aren't critical. Most typical shaves are 12 in. to 15 in. long. I started with a $7/8$ -in. \times $1\frac{3}{8}$ -in. \times $14\frac{1}{2}$ -

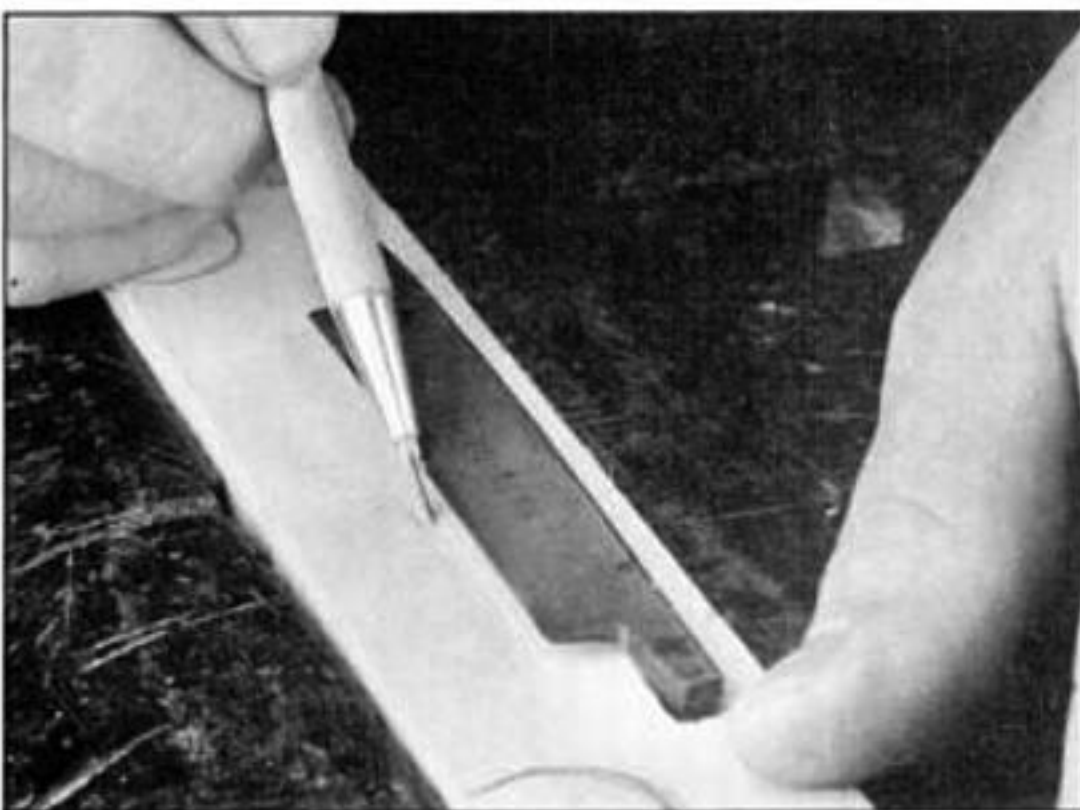


PHOTOS BY ED LANDROCK

Trace the contour of the handles on the spokeshave blank with a paper pattern.



Shape the tapered tang holes with a square needle file.



Fit the tangs into the tang holes, then trace along the edge of the blade to mark the edge of the throat.

in. blank to make the shave shown here. The shape is inspired by the hundreds of shaves I've looked at over the years, but I lean toward giving mine a lighter and more delicate appearance. Shape the length and contour of the spokeshave handles to fit your hands.

As a guide to the cuts you'll need to make on the bandsaw, cut out

paper patterns of the curves on the handles. (See drawing.) As shown in the photo on page 18, trace these curves on the spokeshave blank—use one pattern for the top and bottom, and one pattern for the front and back. You'll cut out these handle curves in a later step.

Before this, you'll need to mount the blade and cut out the throat of

the shave. Begin by laying out the tang holes. Lay the blade on the bench with its tangs up (or posts up if it's a blade with threaded posts) beside the wooden blank, centered along its length. Mark the location of the tangs across the top of the blank. Now draw a longitudinal centerline on the top of the blank, as shown in the drawing. Mark the centers for the tang holes where these lines cross.

Drill the tang holes undersize, and file them square and tapered to match the tangs. A square coarse needle file works great for this, as shown in the photo. The filing and fitting of the tang holes is the most critical step in the process. Take your time and work carefully. You want the tangs to seat in the holes with a tight press fit when the blade is fully inserted. Too loose, and the blade won't stay adjusted; too tight, and the tangs could split the wood.

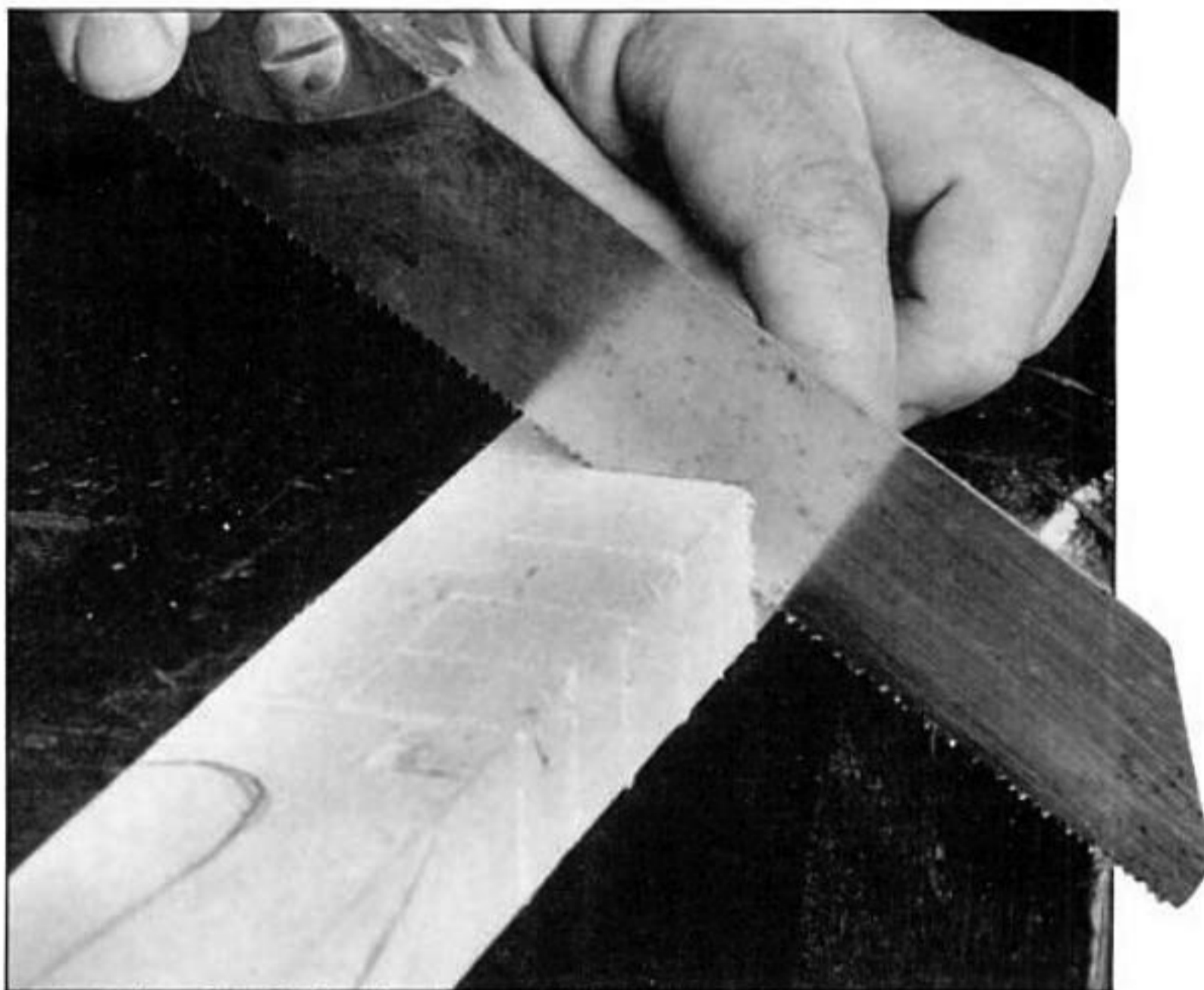
To press the blade in, insert the tangs loosely in the tang holes, then grasp the blank in your hands and push down on the spokeshave with the blade flat against the benchtop. To remove the blade, turn the blank upside down and press the tips of the tangs down against the bench.

Once you fit the blade in the spokeshave blank, you're ready to saw and chisel out the throat and the tiny mortises for the narrow section of the blade near each tang, as shown in the exploded view of the drawing. To do this, insert the blade until it lies flat against the wooden blank. Trace around the edge of the blade to mark the edge of the throat and the tang mortises. (See photo, page 19.) Remove the blade, and with a small saw cut out the throat by making several saw kerfs along the angle of the throat, as shown in the photo. Chisel out the waste and clean up the throat's angled surface with a file. (See photo.) This open throat leaves space for the shavings to escape.

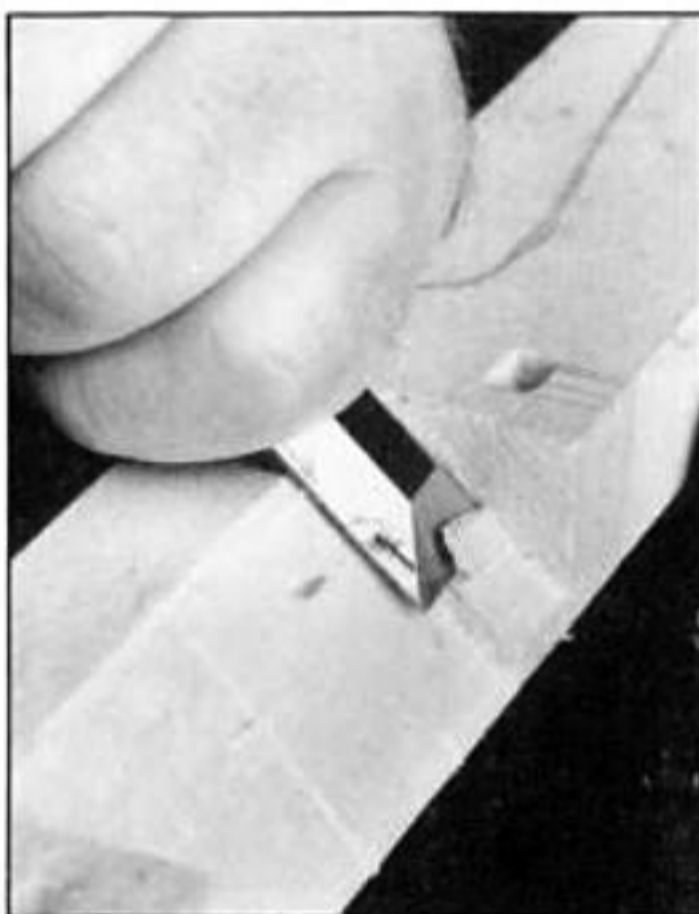
Now cut the small mortises for the tangs with a small backsaw and chisel. (See photo, page 19.) Pare away the bottom of these mortises and fit the blade until the blade sits flush with the surface of the wooden body.

Making the Wear Plate

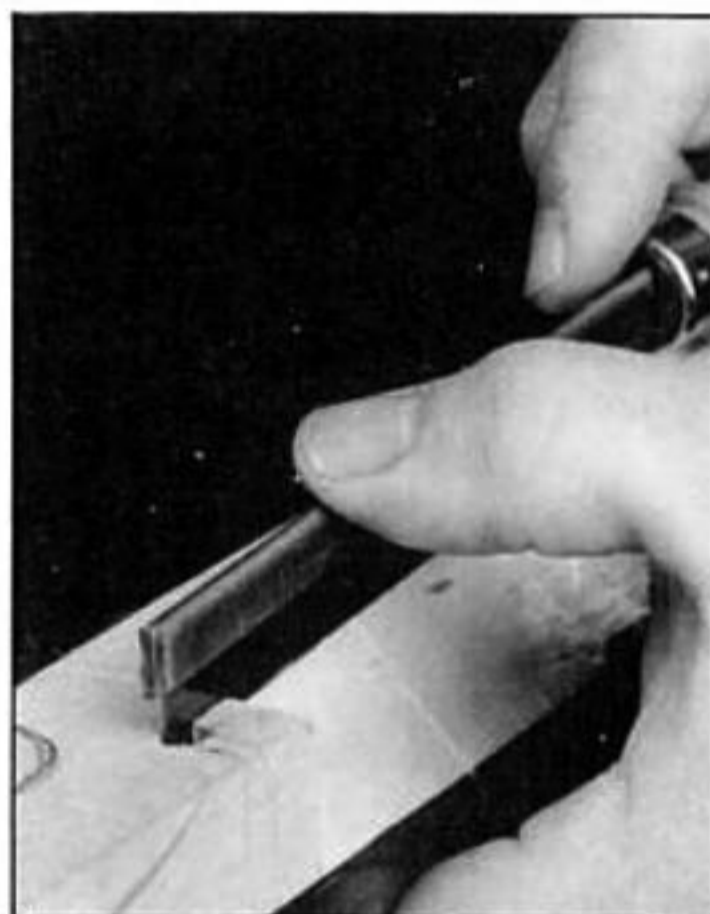
I use a piece of $\frac{1}{16}$ -in. thick brass for the wear plate. You can sometimes find brass stock at hardware stores or hobby shops (also available from Small Parts, Inc., 6891 N.E. Third Ave., P.O. Box 381736, Miami, FL 33238, 305-751-0856). Cut a piece of brass to fit the space between the



Rough out the waste for the throat by cutting multiple kerfs with a small saw.



Pare the surface of the throat smooth with a chisel.



Cut the tiny mortises for the ends of the blade with a small backsaw.

cutting edge of the blade and the edge of the wooden body, as shown in the drawing.

To fit the wear plate, pare out a shallow recess for it on the body and smooth the recess with a file. Be careful not to cut too deep—the wear plate should be installed flush with the body and right up next to the blade edge. Test the fit of the wear plate by installing the wear plate and the blade and holding a straight-edge over the two surfaces—they should be parallel to each other in the same plane, as the photo shows.

To mount the wear plate, I apply Hot Stuff cyanoacrylate glue (available from Woodcraft Supply, 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102, 800-225-1153) or epoxy glue, and clamp it in place. To add a finishing touch, I install three thin brass pins through the wear plate. (See drawing.) I cut the pins from $\frac{1}{16}$ -in. dia. brazing rod about $\frac{1}{2}$ in. long. I drill pilot holes through the wear plate into the wood, drive in the pins leaving them slightly proud of the plate, then carefully peen the ends of the

pins to secure them. Clean up the wear plate's surface with a file.

Finishing the Spokeshave

Now it's time to cut out the handle shapes you drew earlier on the wooden blank. I like to use a bow saw to cut away the waste portions of the handles, though a bandsaw is faster. Saw out the two waste pieces from the sides and two from the bottom. This provides finger clearance and a contour for the handles.

Next, I simply work the handles to a finished shape, beginning with a rasp and then a fine mill file. I draw a football-shaped profile on the ends of the handles to guide the shaping process, as shown in the photo. My

handles are only about $\frac{1}{2}$ in. thick at their ends when I've finished shaping. I smooth all the contours of the wooden body with the file, followed by a cabinet scraper and sandpaper. When you're satisfied with the shape of the body, apply a finish if you like. Beeswax and the oil from my hands are all the finish I've needed to give a warm patina to the dense, close-grained woods I use. Try an oil finish or any finish of your choice. Personally, I think modern finishes like polyurethane seem out of place on a traditional tool.

Using the Spokeshave

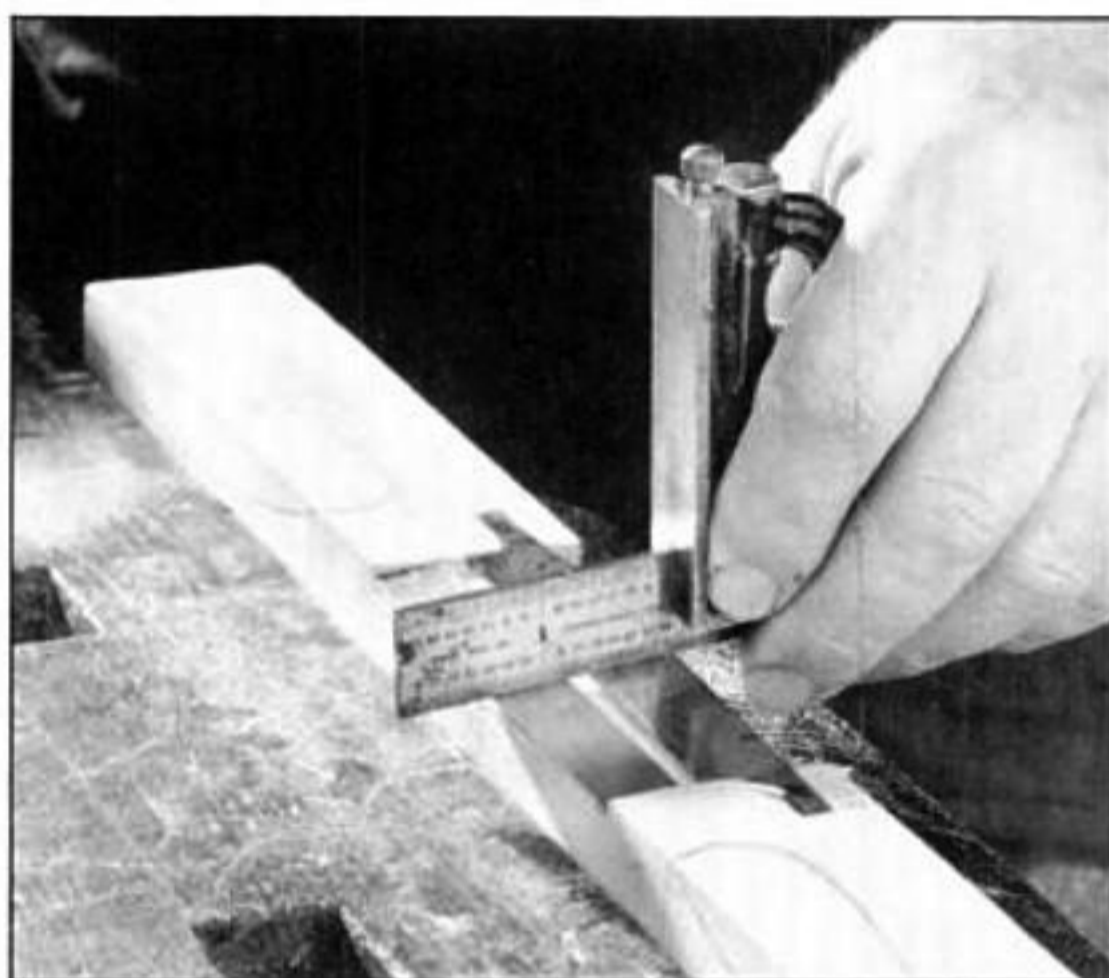
After all this work, you're ready to make some shavings. First, you'll

need to fine-tune the tool. Do this by filing evenly across the top of the wear plate to open up the mouth of the shave bit by bit. Before you start filing, the mouth of the shave between the cutting edge of the blade and the wear plate should be nice and tight—the spokeshave might not cut at all, yet. That's alright because it means you can adjust the shave to make very fine shavings. Use a smooth file to evenly trim off a little brass from the wear plate, then try the shave. Take your time, and remember, you can take more brass off later, but you can't put it back on. Trim the wear plate in tiny increments until you get a good shaving with the blade fully seated. (Of course, the blade must be sharp.)

Once I have the tool tuned up, I adjust the depth-of-cut by tapping the tangs lightly against my vise. This moves the blade out slightly to allow for thicker shavings. If I want a thinner shaving, I gently tap the blade back in. If you fit the tangs well, they'll still hold tightly in the square holes. (If you're working with a Conover blade with threaded posts, adjustments are made by turning the set screws in the brass adjustment inserts.)

There are no rules when it comes to pushing or pulling the shave. Grain direction and the way you hold the work are the determining factors. If you want to hold the piece you're working on in a shaving horse, you should pull the shave toward you. (See *AW*, #14, page 39.) When I use a spokeshave, I hold the work in my bench vise so I'm well above it. I put my thumbs behind the tangs and push away from me. If the grain direction changes, I reverse the shave and pull. Holding the tool at a skew angle seems to make the best shavings—curly and perfect—leaving a smooth, polished surface. ▲

Check the alignment of the wear plate to the blade with a straightedge.



Shape the handles to their final contour with a coarse rasp.



Andy Barnum is a professional turner in New York state. He is a founder and president of the Nutmeg Woodturner's League.

He makes and uses wooden spokeshaves out of a love for old tools. As he puts it, "For me, hand tools symbolize empowerment—the ability to make things—and I like that."



JOHN HAMEL

BY FRED MATLACK

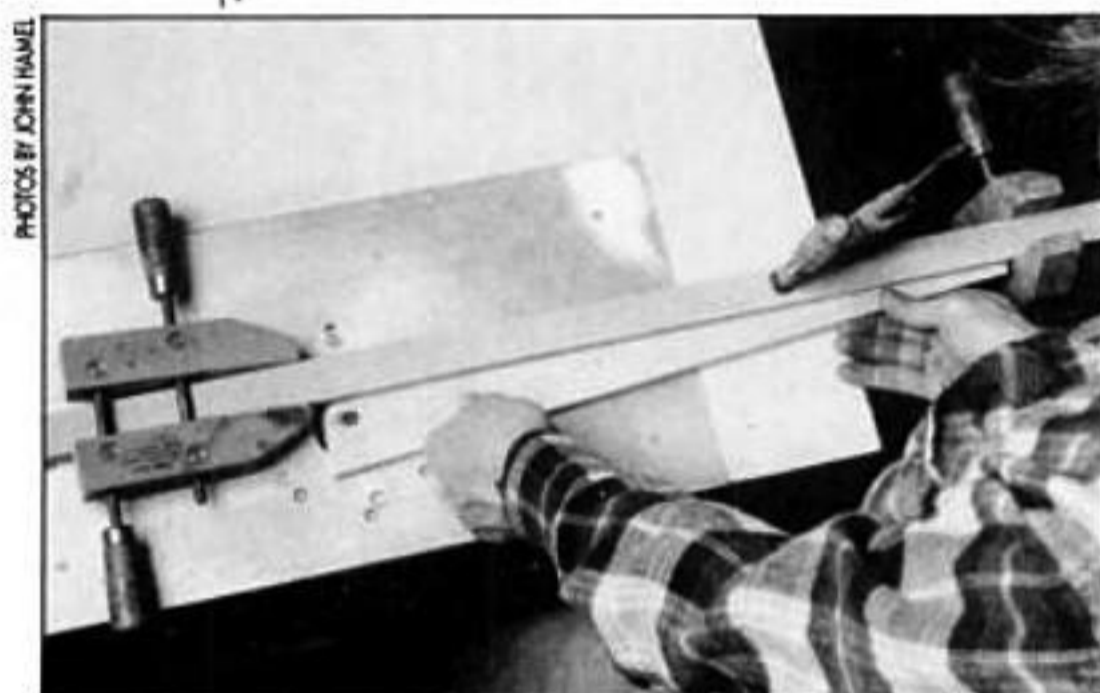
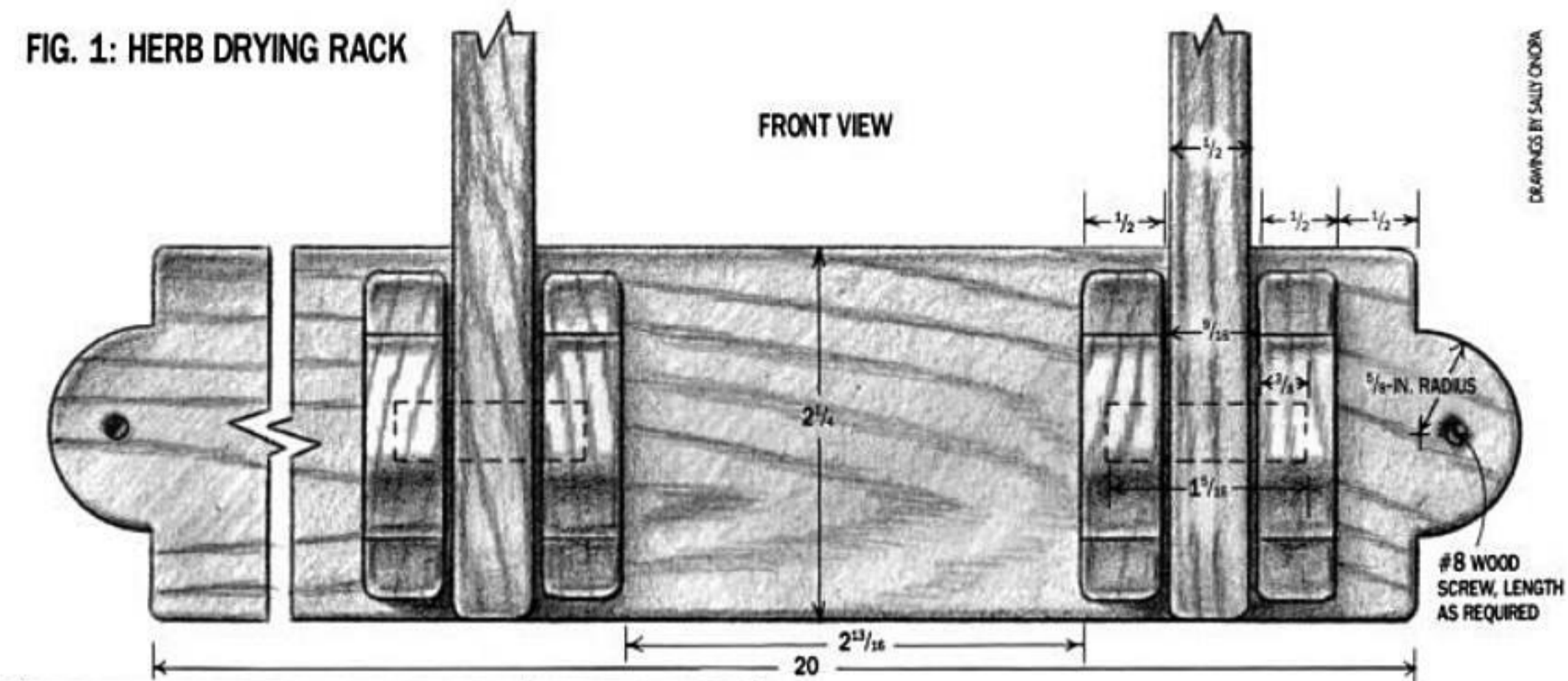
Even if you're not into herbs, you're sure to find a use for this drying rack. Designed by the editors of Rodale's *Organic Gardening* magazine, the drying arms lock in an up, out-of-the-way position when they're not needed. Lifting an arm releases it to swing down to the horizontal position for use. In the kitchen, the rack is useful for dish towels when it's not covered with drying herbs or flowers. In the bathroom, perhaps with shorter arms, you can use it for hand towels or

HERB DRYING RACK

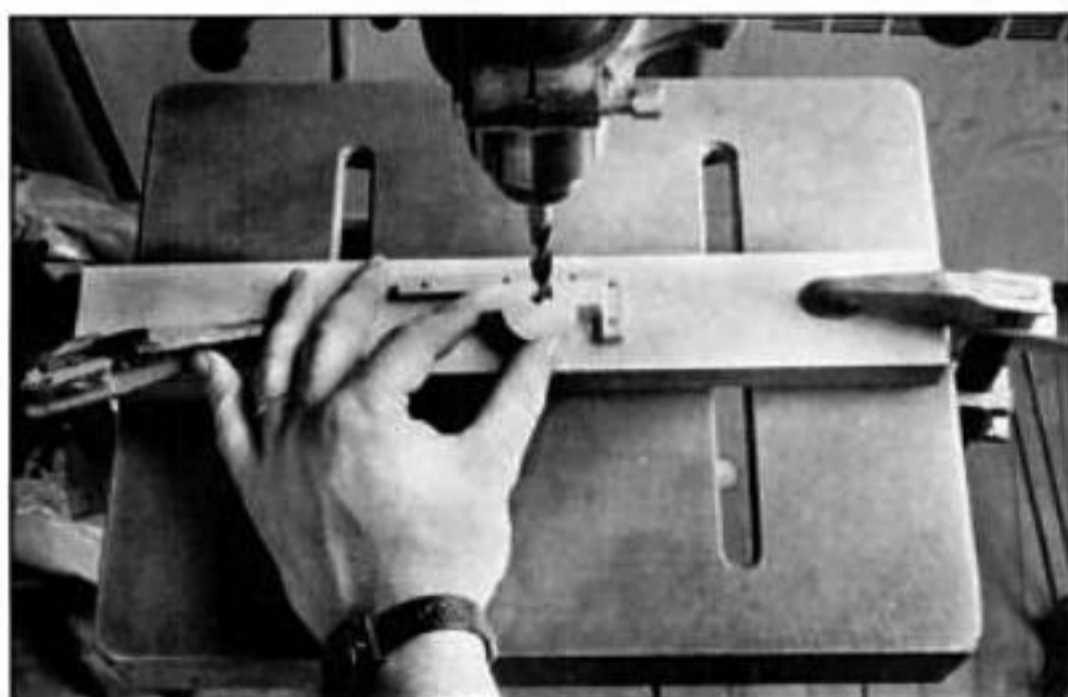
Arms Fold Down When the Harvest Comes 'Round

FIG. 1: HERB DRYING RACK

DRAWINGS BY SALLY ONORA



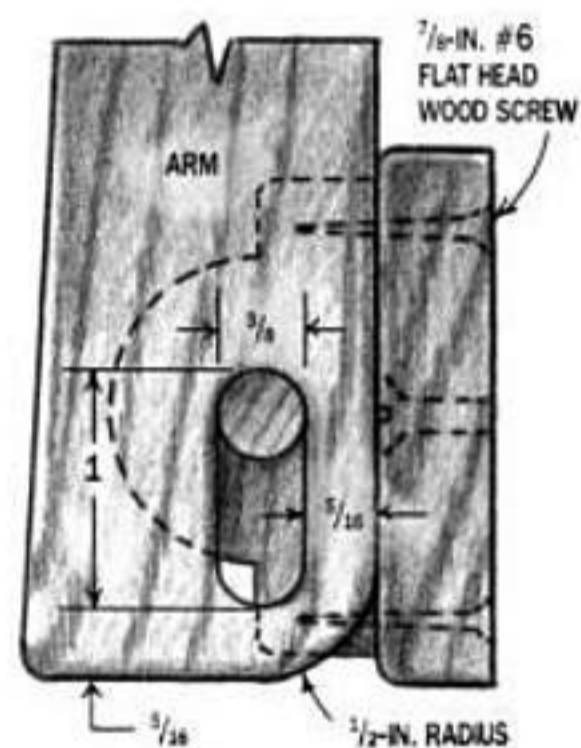
To rout the slots in all of the arms in the same position, clamp a fence to the router table and set up stops to limit the travel of the arms.



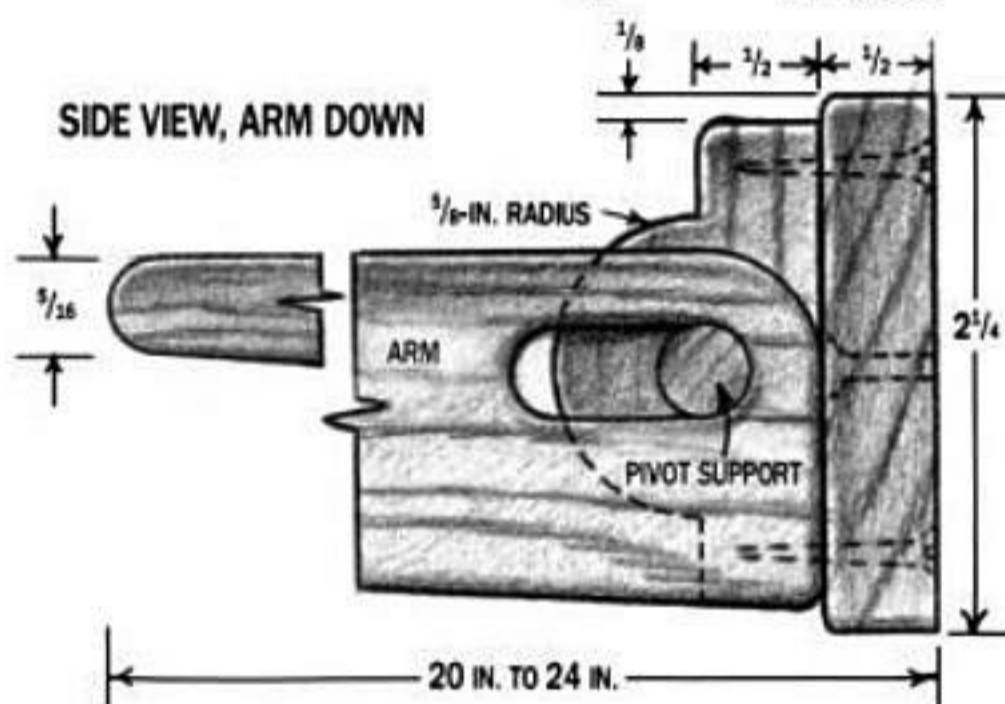
To drill the pivot holes in the pivot supports, tack two stops to a backup board and clamp to the drill-press table.

SIDE VIEW, ARM UP

Right-hand bracket removed for clarity.



SIDE VIEW, ARM DOWN



wash cloths. The rack could even hold wet hats and mittens over a warm-air register, or next to a woodstove. It'll earn its keep somewhere in any house.

Construction

Make the rack out of a strong wood that won't split when you assemble it with screws. I made the one in the photo out of oak. Maple, elm or cherry would also be good choices.

To make the arms, I first cut the taper on the band-saw, then the slots, and finally the $\frac{1}{2}$ -in. radius on the upper corner. I then cut out the pivot supports and bored the holes for the dowels. Be as accurate and consistent as possible when making these parts so the arms will line up in a nice, neat row when you assemble the rack. The last part I cut out was the backboard. After that I eased the exposed edges on all of the parts with a $\frac{1}{8}$ -in. radius round-over bit in the router (available from MLCS Ltd., P.O. Box 4053 AE, Rydal, PA 19046, 800-533-9298). A light easing with fine sandpaper would give the rack a crisper appearance.

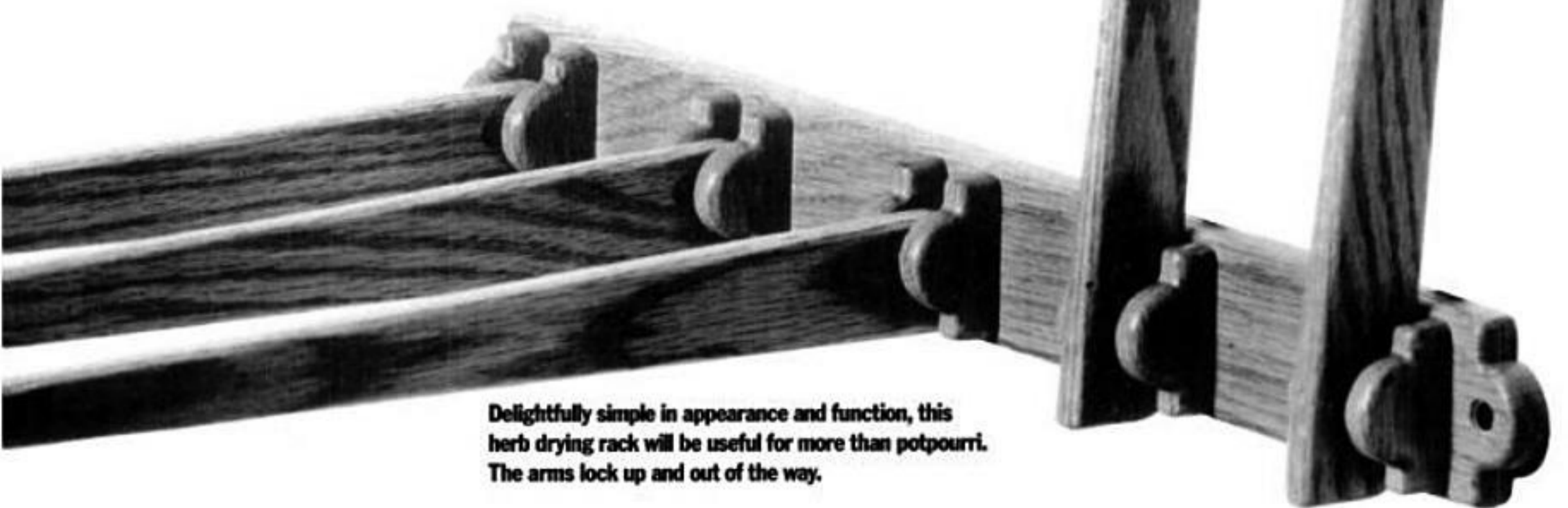
Before putting it all together, you'll need to go over the arms and pivot assemblies with a sanding block and/or a finely tuned block plane to adjust clearances. You want the arms to move freely without being sloppy. (See *AW*, #17, page 38 for a discussion of Dimensions, Tolerances, Fit and Feel.)

When everything fits the way you like it, bore and countersink pilot and shank holes for the screws that hold the pivot supports to the backboard, then screw the rack together. You can adjust the way the arms line up in the horizontal position by carefully sanding the ends of the arms where they touch the backboard.

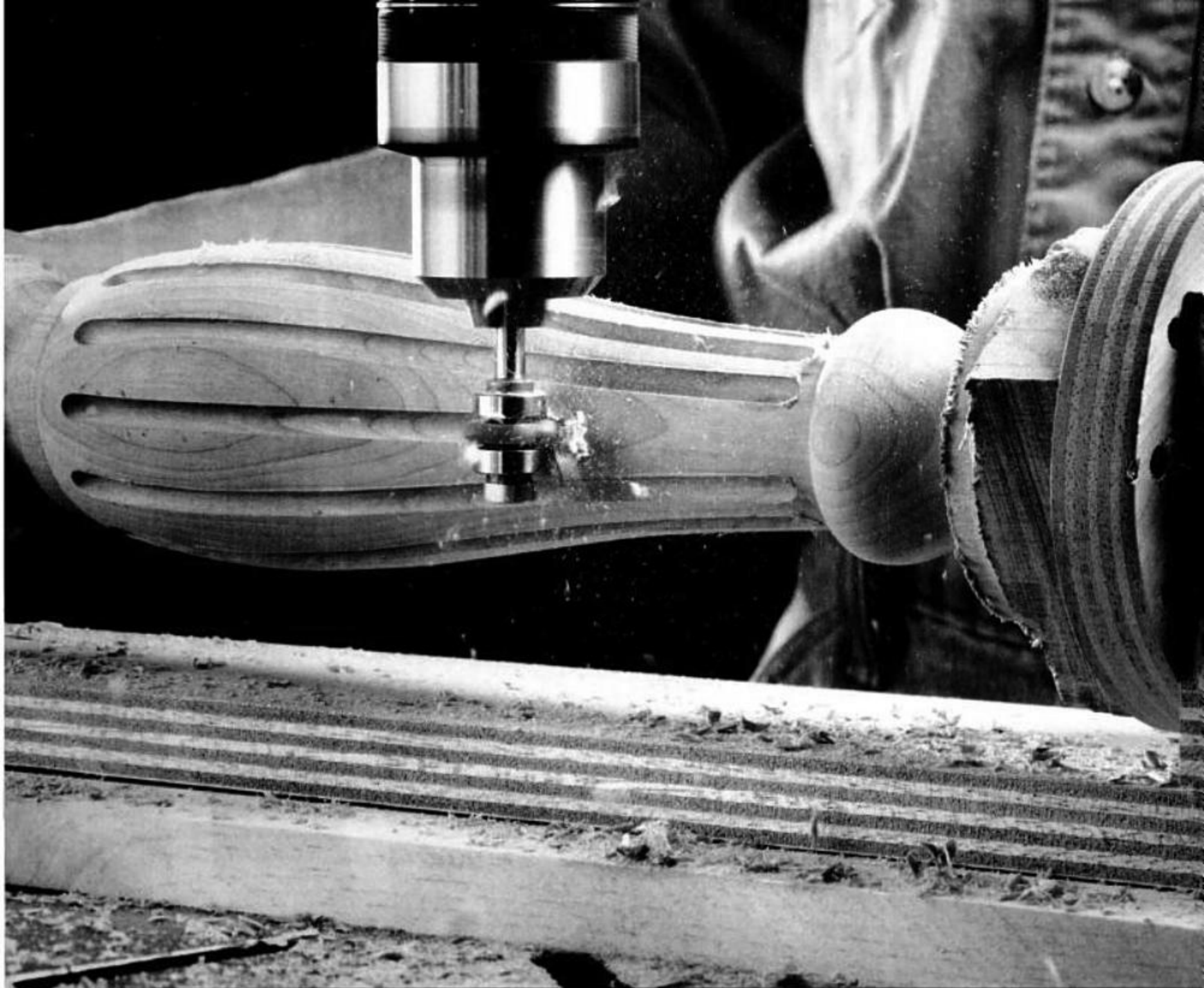
I put a finish on mine, but you could just as well leave it unfinished. ▲



Fred Matlack heads the Rodale Press Design Group where he practices woodworking, metal working and almost every other craft you can name. Fred's ongoing passion is for restoring and using antique pedal-powered woodworking machines.



Delightfully simple in appearance and function, this herb drying rack will be useful for more than potpourri. The arms lock up and out of the way.



HEAD-STOCK DETAIL

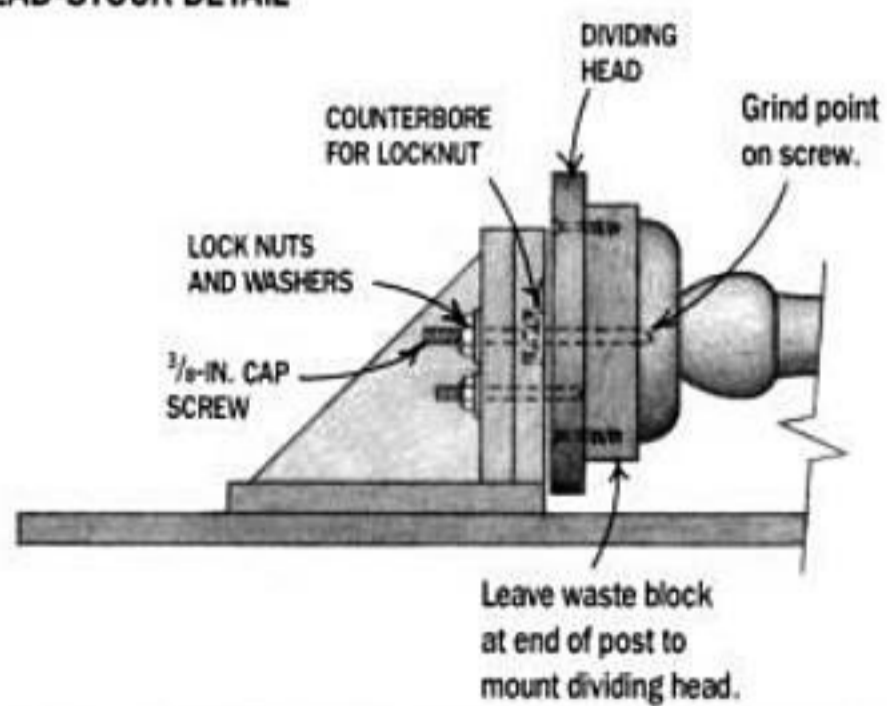
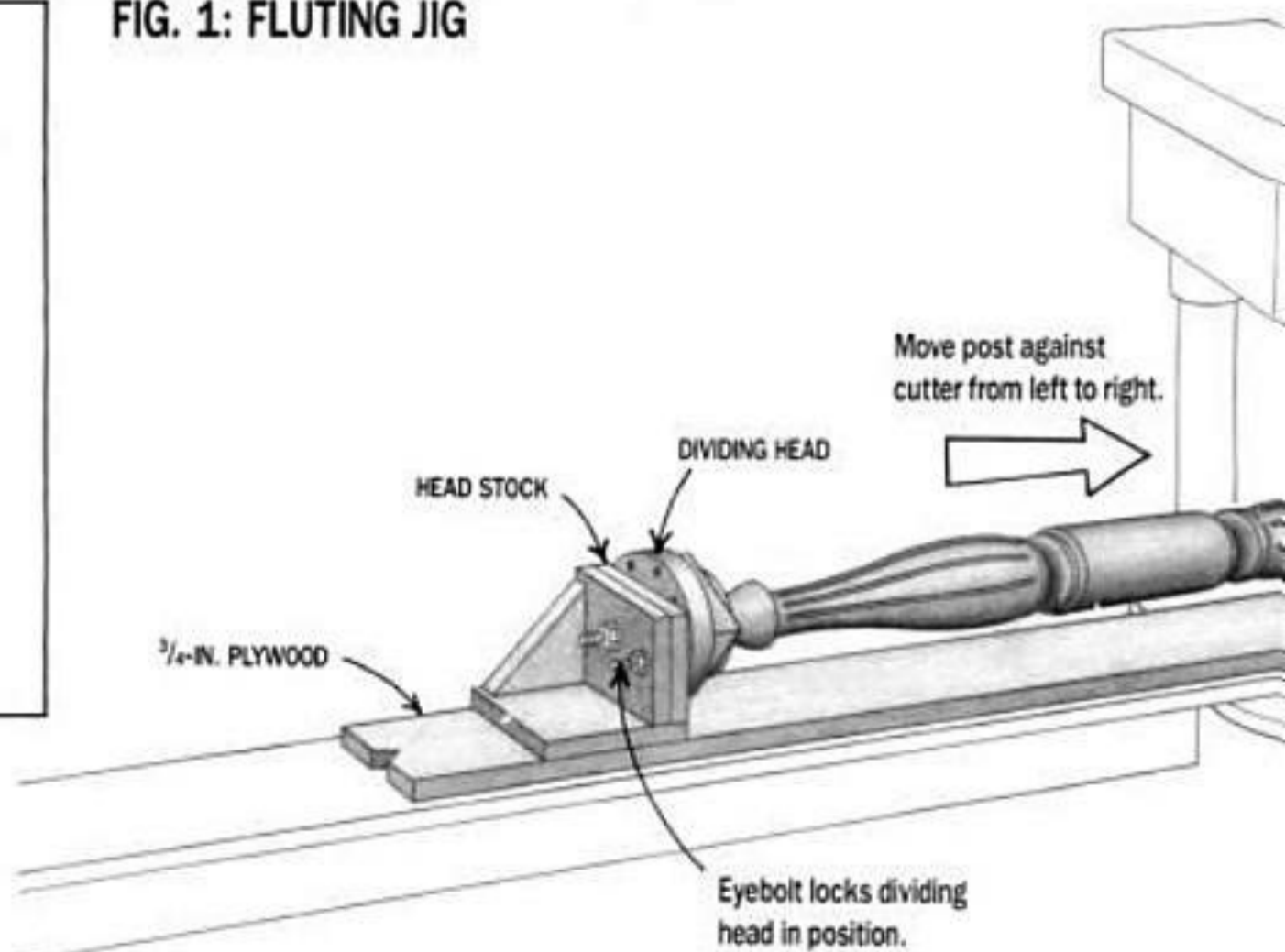
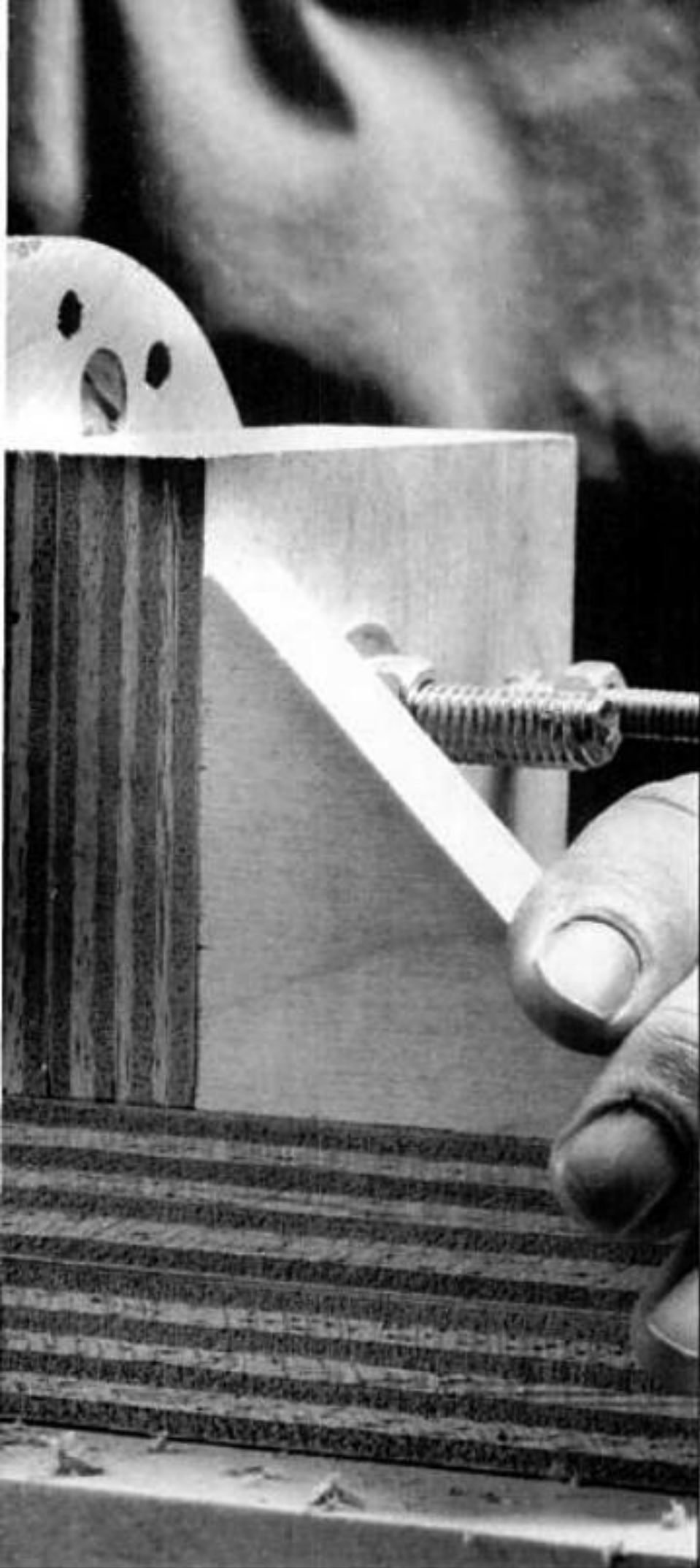


FIG. 1: FLUTING JIG





FLUTING ON THE DRILL PRESS

Grooving a Post—No Problem With This Jig

BY WILLIAM F. DENT

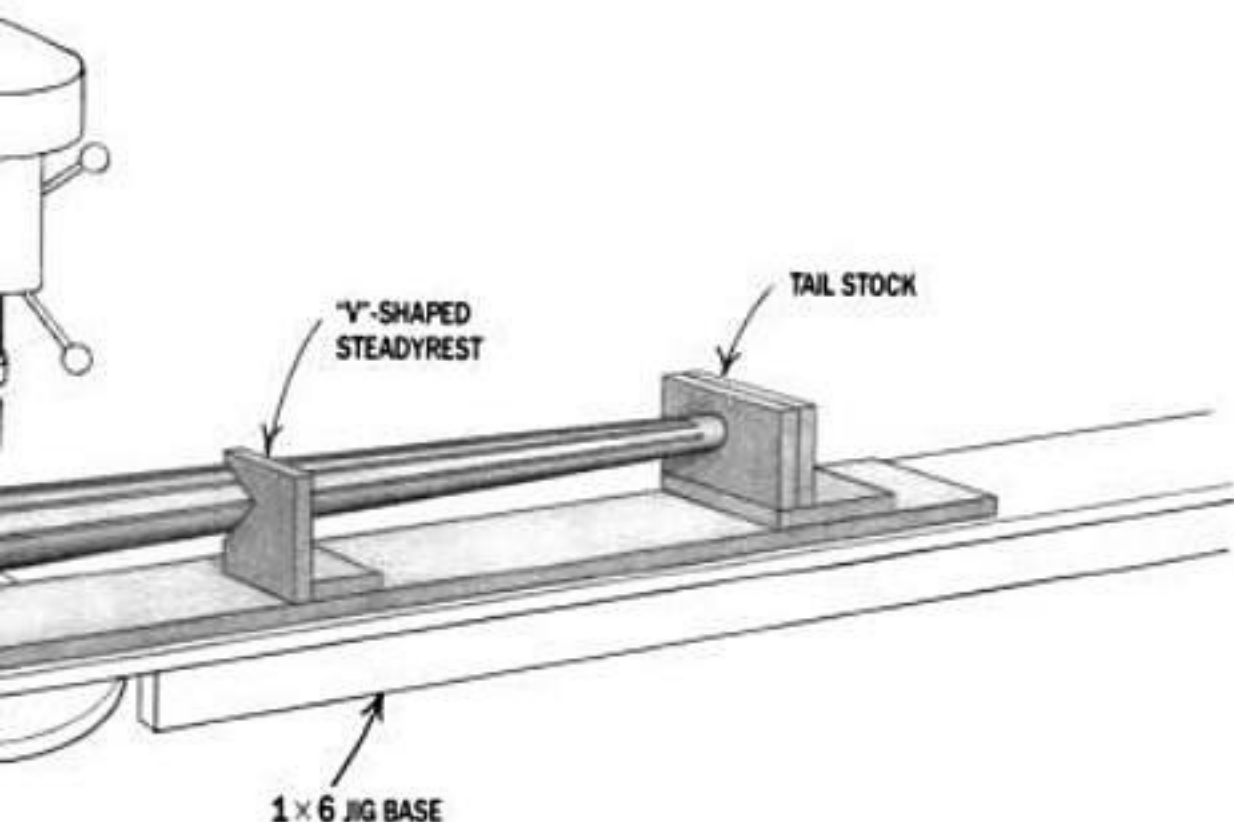


I recently made a four-poster bed with 6-ft. high turned posts. I wanted to cut longitudinal flutes in the turned

sections of the posts, but I realized neither my router nor my shaper could be adapted to the task. They'd work fine for cutting flutes on a post shaped like a straight cylinder, but I had turned my posts with gently curving contours along their length. I needed a flute-cutting setup that would follow the contour of the post as it cut flutes of uniform depth.

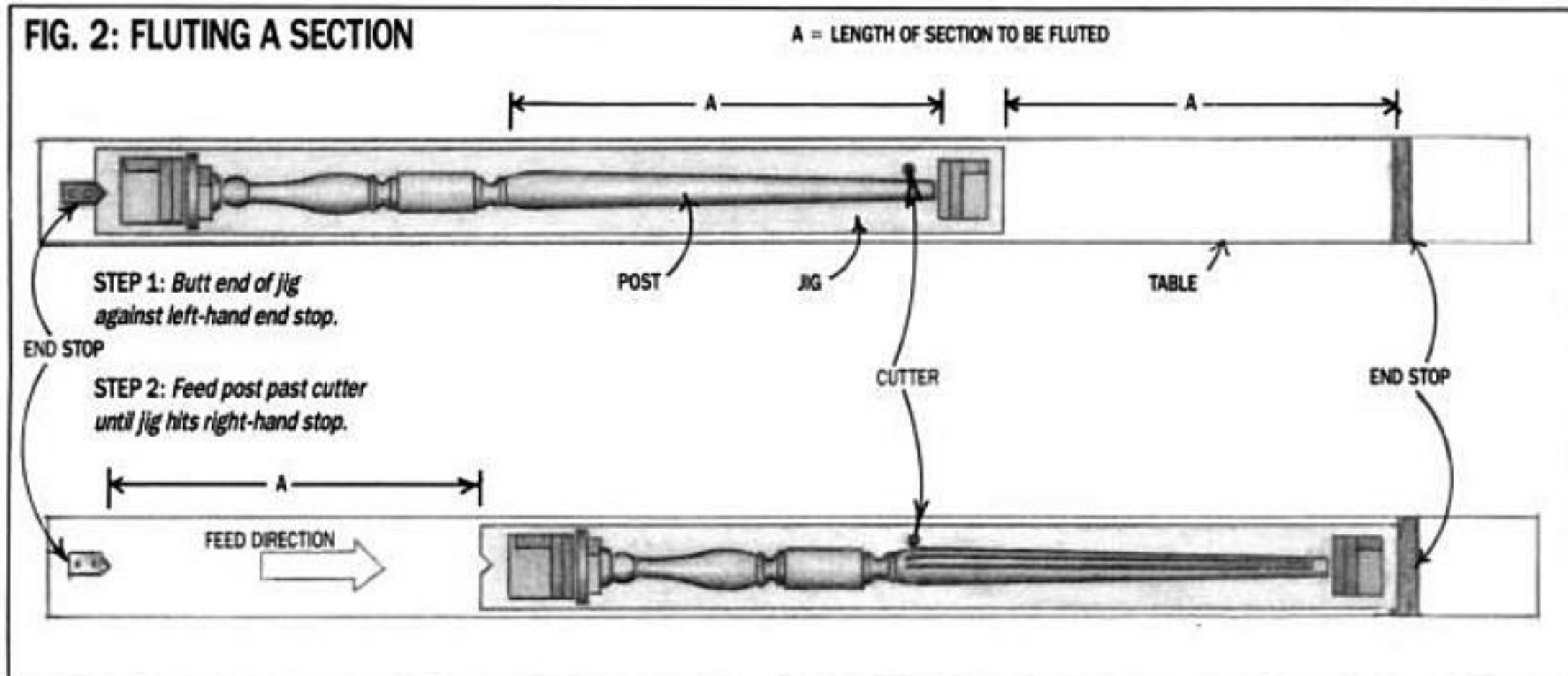
To solve this dilemma, I built a fluting jig so I could cut the flutes with a commercially available router bit (part #C1361 available from Cascade Tools, Inc., Box 3110, Bellingham, WA 98227, 800-235-0272) on my drill press. The router bit has a carbide fluting cutter and two pilot bearings on it that ride against the profile of the post. The bearings guide the cutter as it forms semicircular flutes $\frac{1}{8}$ in. deep and $\frac{1}{4}$ in. wide. The jig I made holds the post horizontally so you can push the post against the bit spinning in the drill press chuck. Cutting a flute is similar to running a piece of stock past a router bit on a router table. (The bit's shaft isn't long enough for this method to work in a router table.)

The jig holds the turned post between centers like a lathe does. (See Fig. 1.) I added a simple indexing device (called a "dividing head") to the jig that enables you to rotate and lock the post in equal increments to



PHOTOS BY MITCH MANDEL

FIG. 2: FLUTING A SECTION



space the flutes evenly around the post's circumference. The jig slides back and forth on a long, temporary table, which is fastened to the drill-press table. Because the temporary table is quite long, I fastened legs to the end to support it. (See photo.) Once the post is mounted in the jig, you simply move the jig so the post travels past the cutter.

Making the Jig

I made the base of the jig from a 1×6 about 2 ft. longer than the post. I used a double thickness of $\frac{3}{4}$ -in. plywood for the head stock and tail stock of the jig. The dimensions aren't critical—just cut out the pieces for the head and tail stock, as shown in Fig. 1. Drill a hole through the center of each of the double $\frac{3}{4}$ -in. plywood pieces and mount a long $\frac{3}{8}$ -in. cap screw with a point ground on its end. These pointed $\frac{3}{8}$ -in. screws in the head and tail stock hold the post "between centers." To make sure the bolts hold the post securely, I drilled a $\frac{3}{8}$ -in. hole about $\frac{1}{2}$ in. deep in each end of the post.

The dividing head is simply a $\frac{3}{4}$ -in. plywood disk with a series of indexing holes drilled through it near the rim. Drill as many indexing holes, evenly spaced around the dividing head, as the number of flutes you want to cut. The dividing head is fastened to the waste end of the post with wood screws much the way a lathe faceplate would be mounted. The pointed screw passes through the center of the head stock and the dividing head and into the center hole in the end of the turned post. An eyebolt passed through another hole in the head stock and into one of the dividing head's index holes locks the post in position for cutting each flute. I also made a "V"-shaped steadyrest from $\frac{3}{4}$ -in. plywood to support the post during cutting.

Cutting Flutes

To make flutes, mount the router bit in the drill-press chuck, as shown in the photo. Fasten the dividing head to one waste end of the turned post. Mount the post between the head stock and tail stock of the fixture with the pointed $\frac{3}{8}$ -in. bolts and lock nuts. Fasten stops on the temporary table (see Fig. 2) to begin and end the travel of the jig to coincide with the ends of the fluting cuts. The left stop is pointed so the post can be pivoted into the cutter. Because I cut flutes in different sections on my posts, I relocated the stops as needed.



A temporary table extends the drill-press table to support the sliding jig.

Now adjust the height of the router-bit cutter so it contacts the post along its centerline. Adjust the drill press to its maximum speed. Move the post horizontally against the cutter from left to right to make the flutes. When each flute is finished, remove the eyebolt, turn the dividing head to the next index hole and lock it with the eyebolt, and cut the next flute. ▲



William Dent is a mechanical engineer from Alabama. He has designed and built furniture of all kinds, and done wood sculpture for 45 years.

BEYOND THE BASICS

*A Sketchbook of Unusual
Woodworking Joints*

BY KARL SHUMAKER

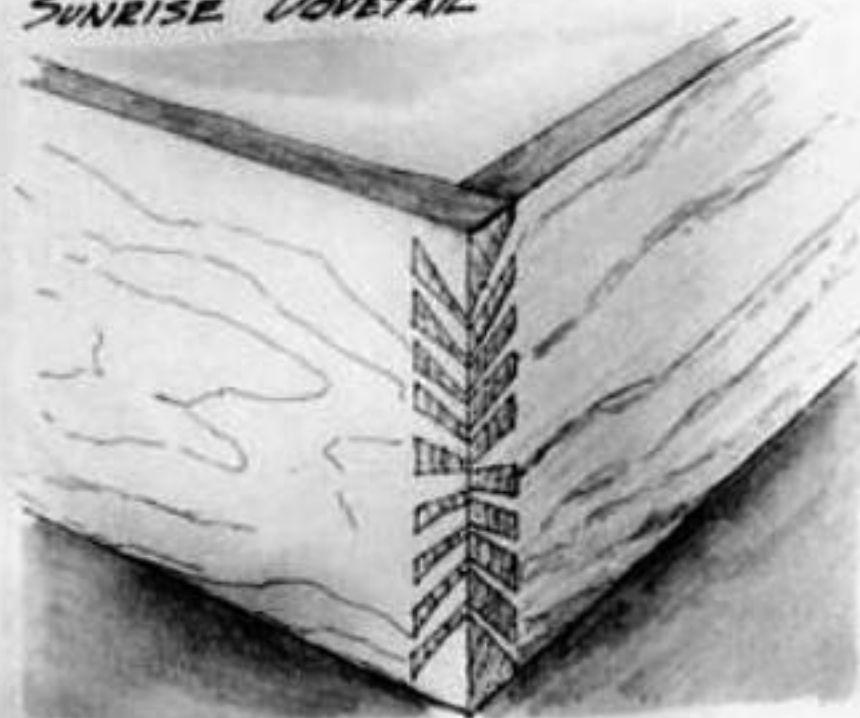
If your furniture projects haven't been wow-ing friends and family like they used to, maybe it's time to impress them with a whole new repertoire of joinery. Take a look at the joints shown here. Some of them are easier to make than they appear. Others present a bit more of a challenge. While a few of them are simply crowd pleasers, many have a definite structural value. They're all variants of the basic woodworking joints: mortise and tenon, bridle, half lap, splined, dovetail and mitered. At the end of the article, you'll find an explanation of how to make the radial-dovetail joint. I'll explain how to make some of the other joints shown here in future issues. Meanwhile, if you've got an interesting joint you'd like to share, or one you'd like to learn about, let us know. We'll try to feature that one, too. ▲



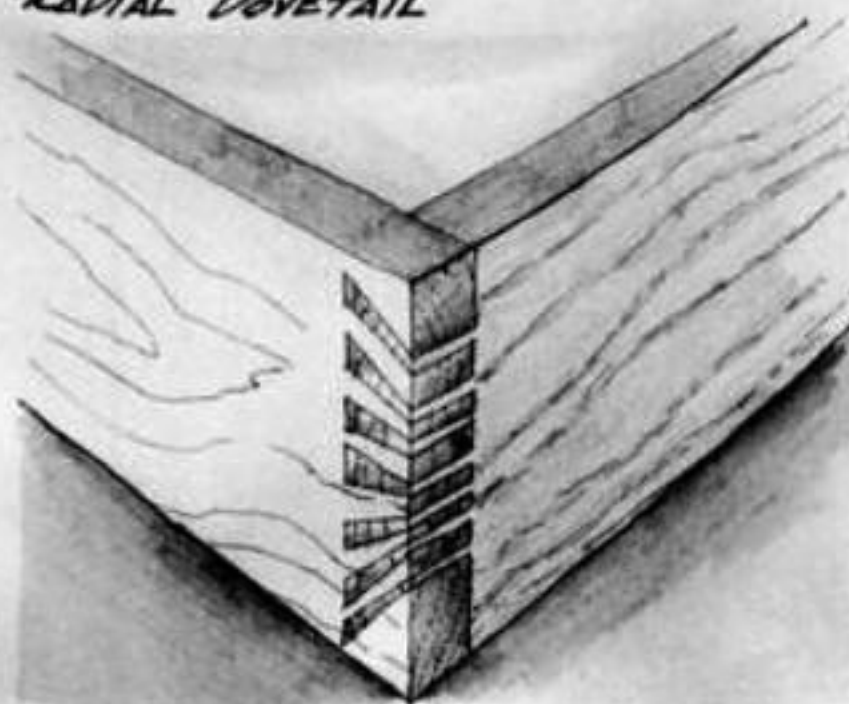
Karl Shumaker is a professional woodworker in California. He does custom design and one-of-a-kind pieces for galleries. He's also an illustrator for AW.

ANIMATIONS

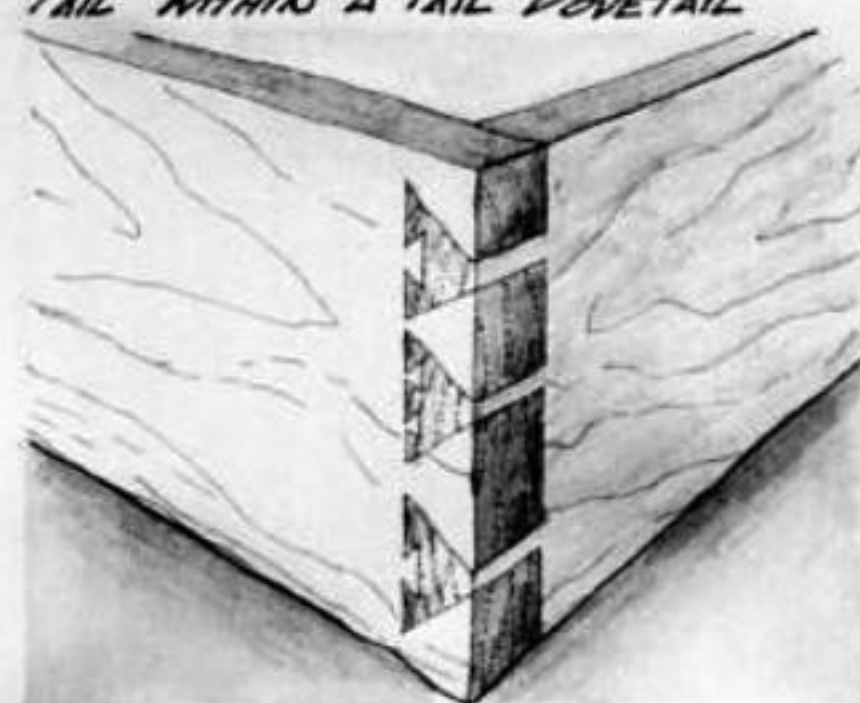
SUNRISE DOVETAIL



RADIAL DOVETAIL



TAIL WITHIN A TAIL DOVETAIL



THREE VARIATIONS ON THE OLD STANDARD

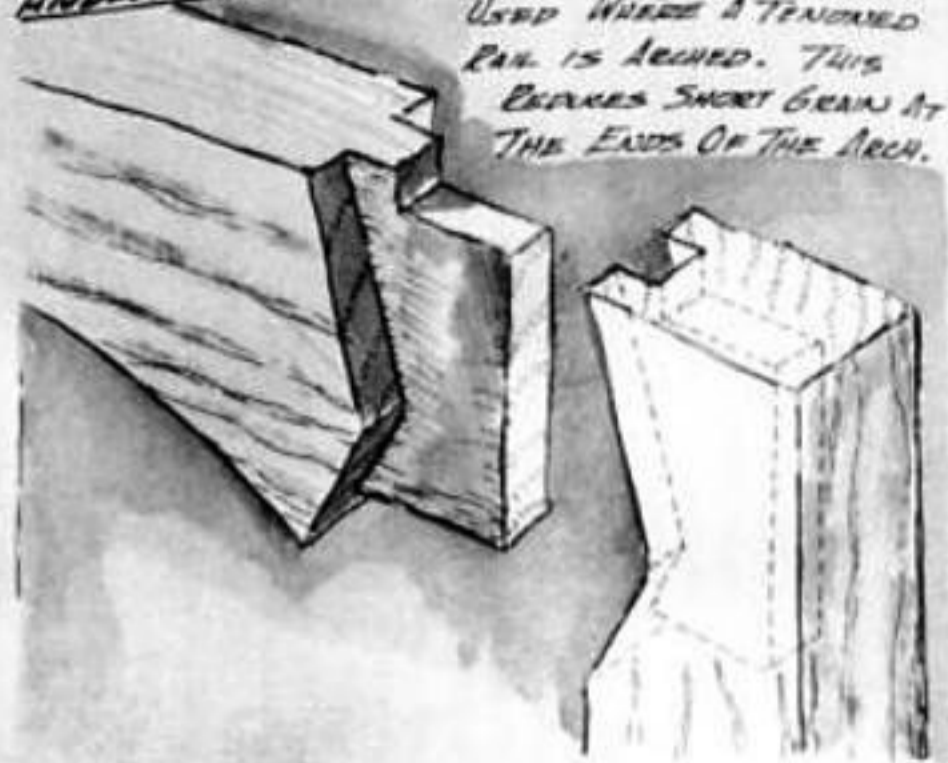
DRAWINGS BY KARL SHUMAKER

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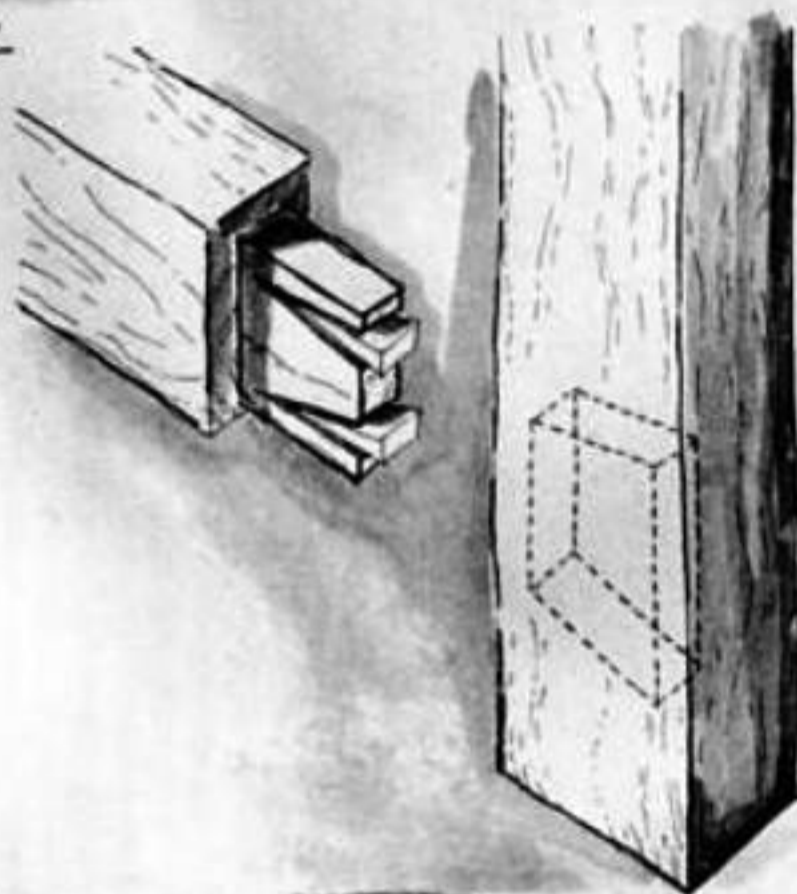


DOUBLE-DOVETAIL HALF LAP
STRENGTHENS THE HALF LAP
AGAINST TWIST AND INCREASES
GLUE SURFACE.

ANGLED SHOULDER MORTISE AND TENON



USED WHERE A TENONED
RAIL IS ARCHED. THIS
PROVIDES SHORT GRAIN AT
THE ENDS OF THE ARCH.

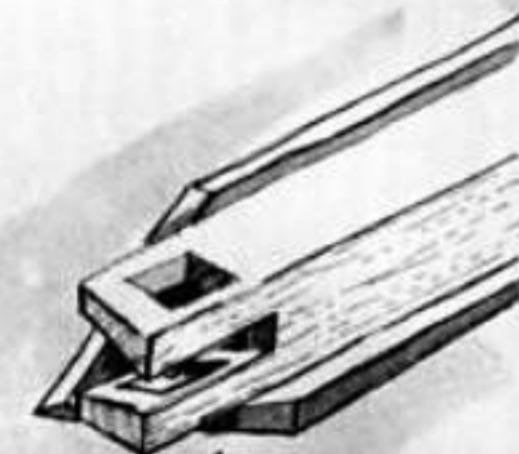
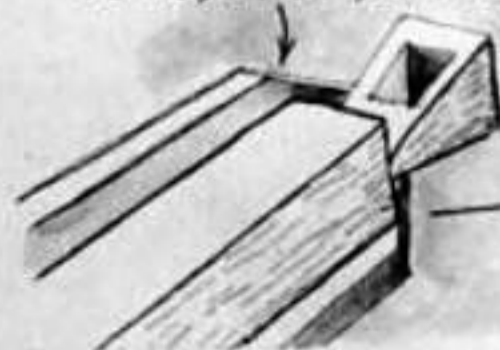


FOX-WEDGED
MORTISE AND TENON

A WAY OF BLIND WEDGING
A TENON (PERMANENTLY).

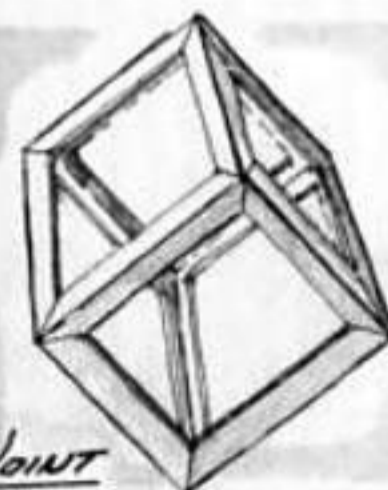


TURN PIECE 90°
TO ASSEMBLE DOVETAIL

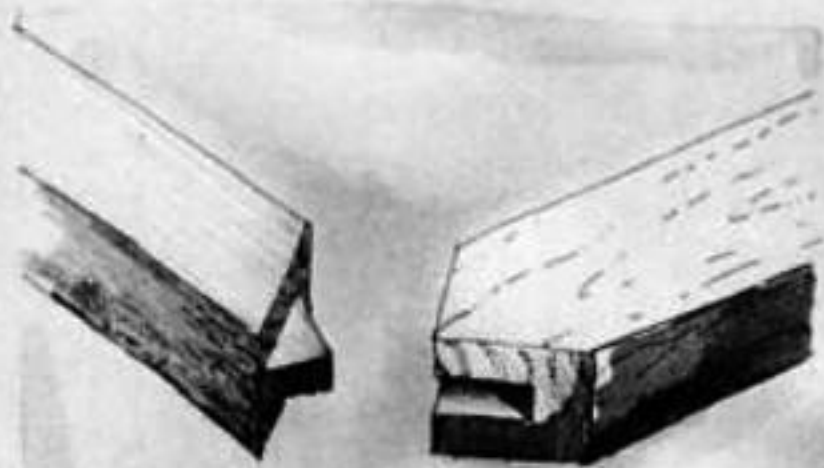


THREE-WAY MITERED SHOWCASE JOINT

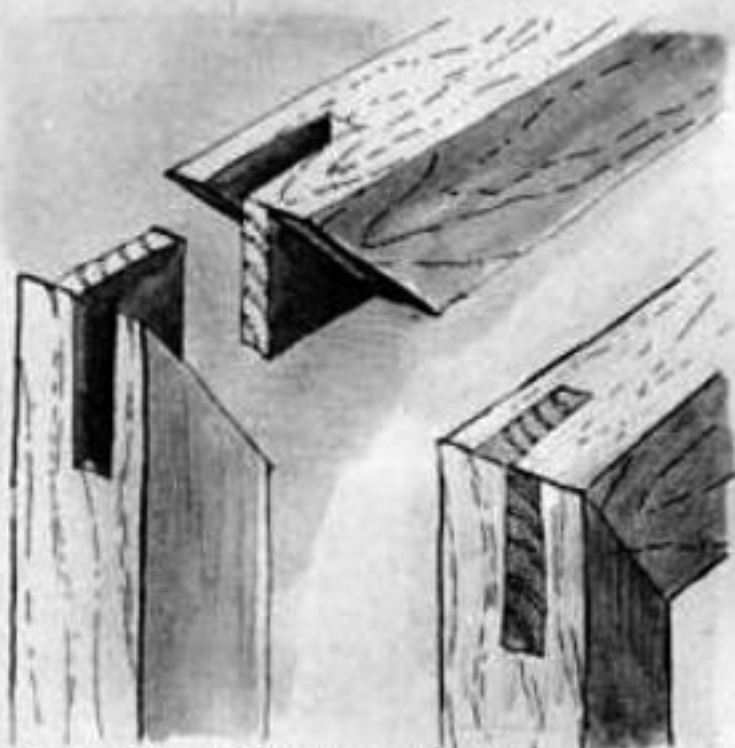
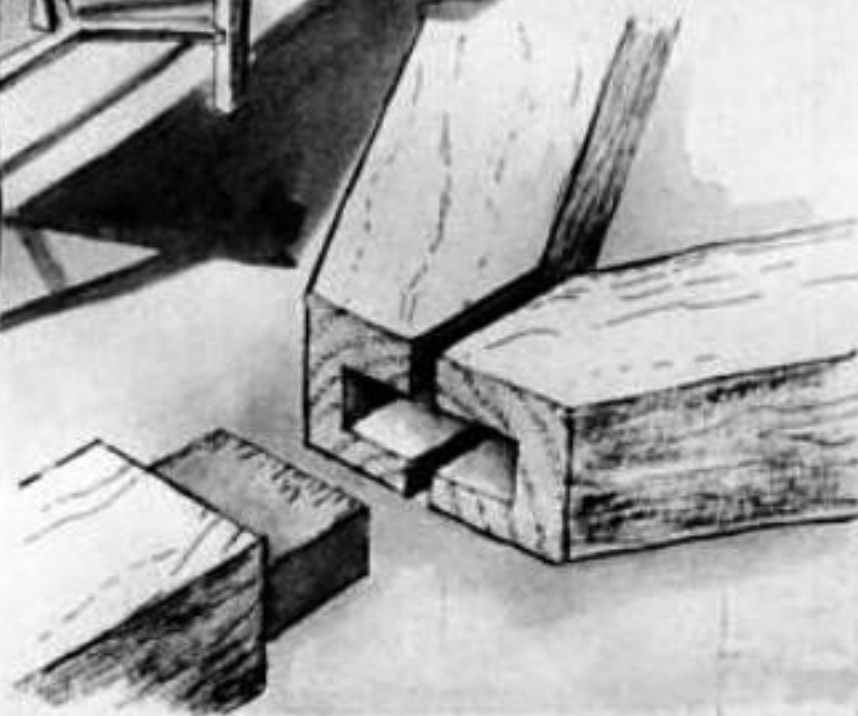
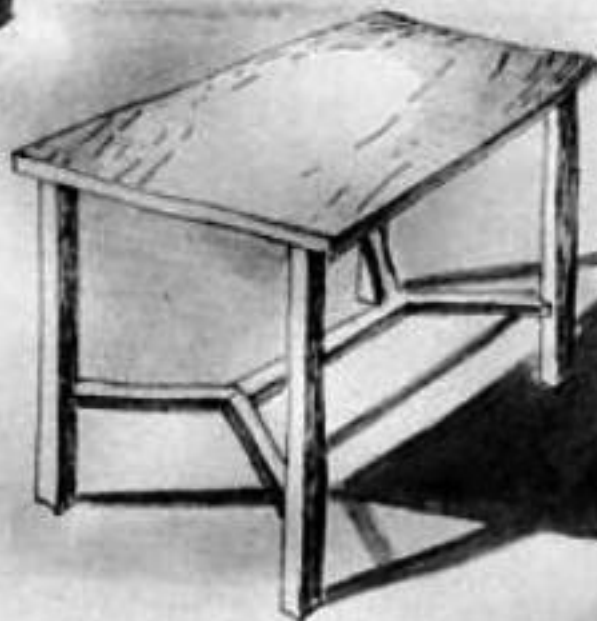
A TRICKY BUT STRONG WAY
OF JOINING ALL JOINTS IN
A THREE-WAY MITER.



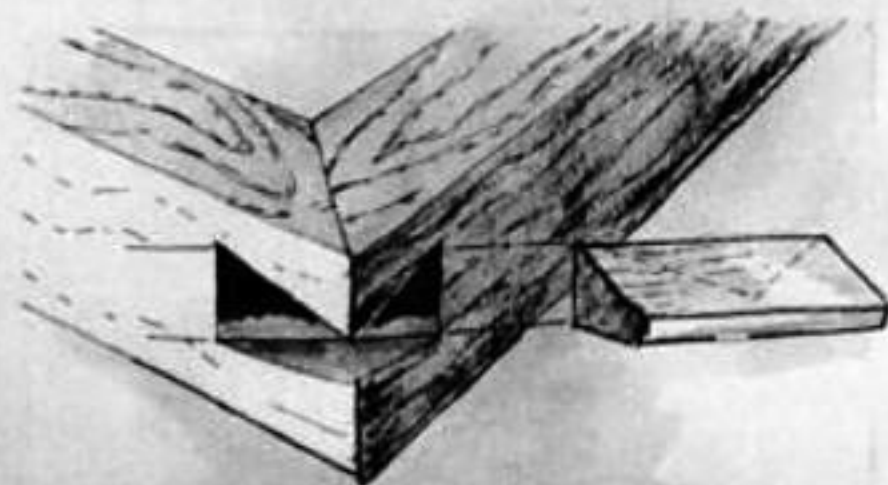
A SKETCHBOOK OF JOINTS



THREE WAY MORTISE AND TENON
TWO METHODS OF JOINING THREE
MEMBERS, AS IN A TABLE STRETCHER
ASSEMBLY.

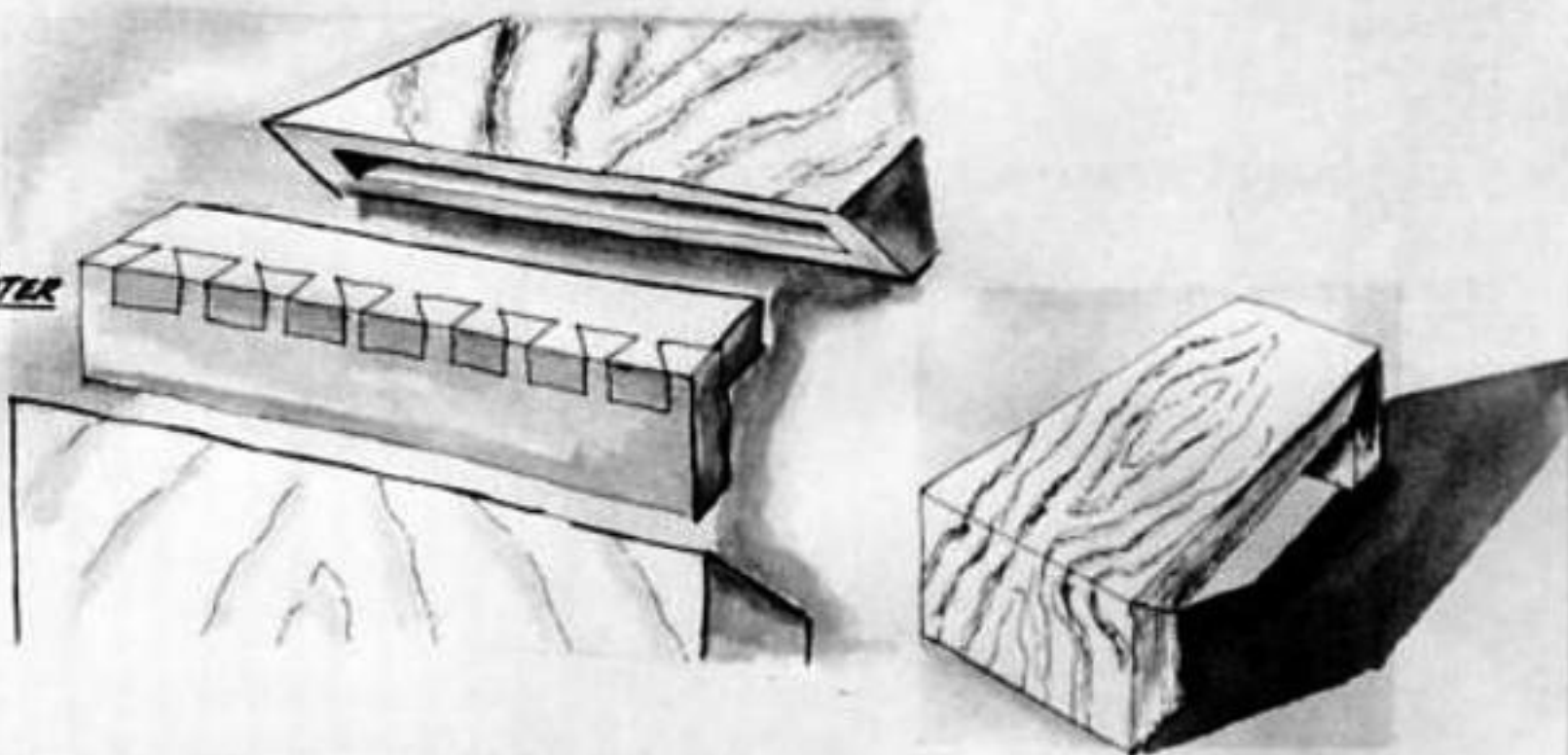


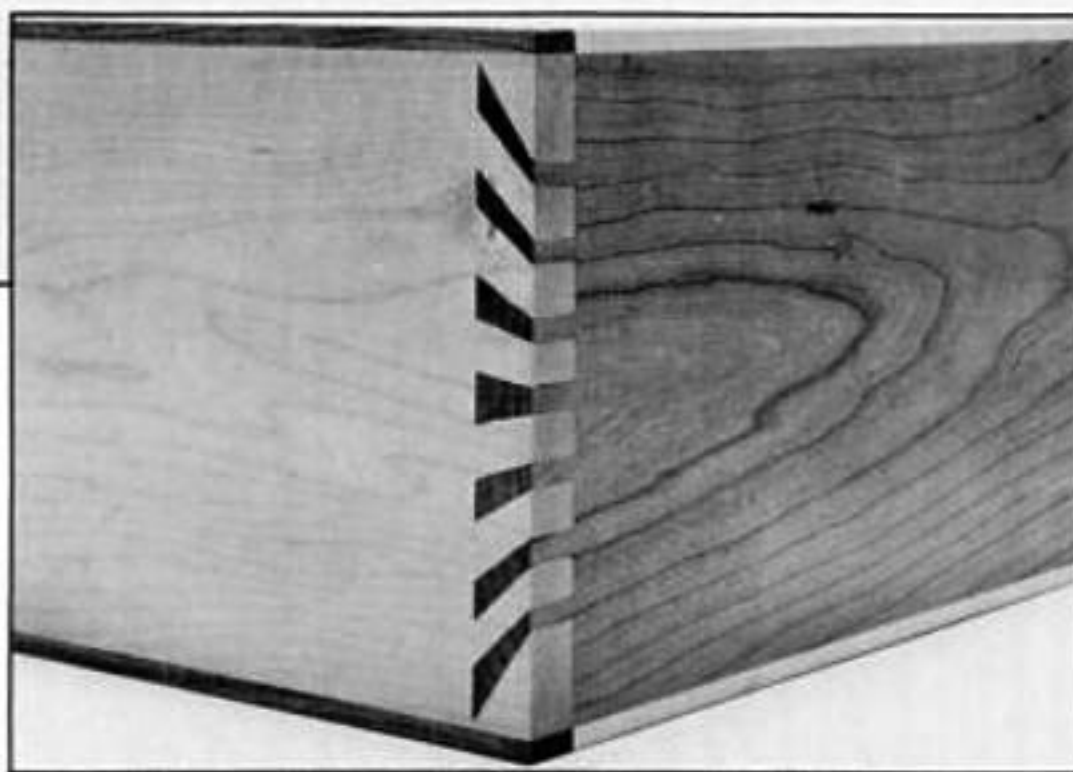
DOUBLE-BRIDGE MITER
A MITER WITH DECORATIVE
FLARE AND PLENTY OF GLUE
SURFACE.



DOVETAIL-SPLINE MITER
A DECORATIVE WAY TO LOCK
A MITER TOGETHER.

DOVETAILED SLIP-TENONED MITER
THE DOVETAILED SPLINE (HIDDEN
WHEN THE JOINT IS ASSEMBLED)
GIVES MAXIMUM STRENGTH TO
AN OTHERWISE WEAK JOINT.





The radial dovetail is a bit more of a challenge than a normal through dovetail, but the fancy result is worth it.

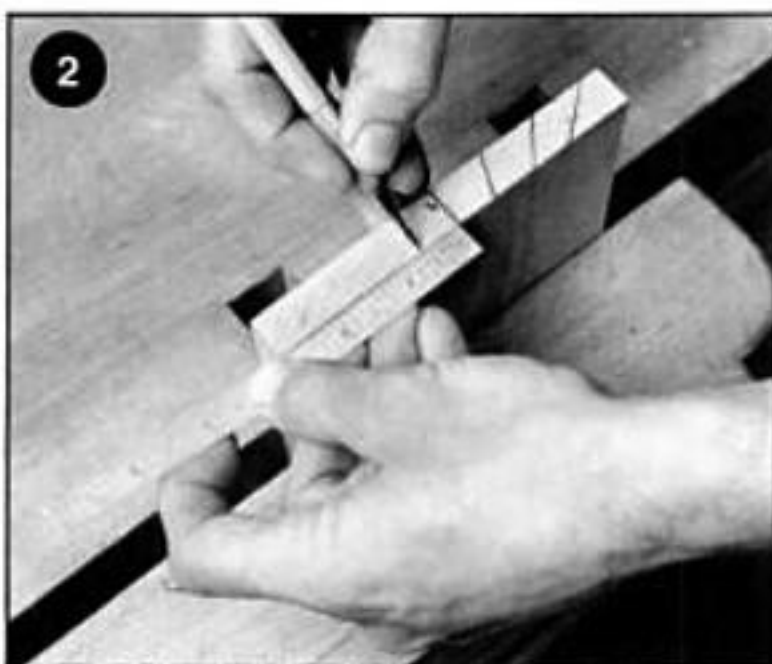
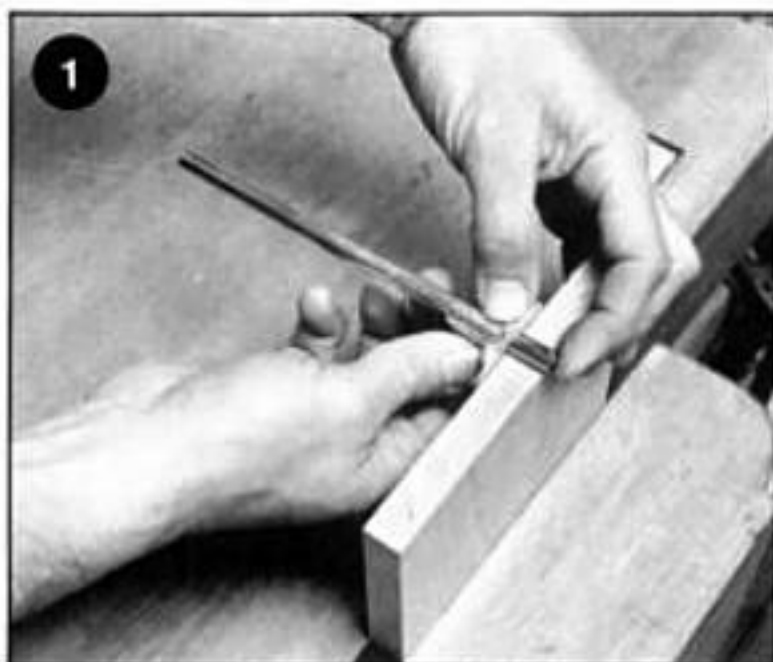
CUTTING RADIAL DOVETAILS

How about a new approach to the classic dovetail? There's no need to reinvent the wheel. We're merely rearranging the spokes. The spacing of the pins and tails in the radial dovetail is everything, as the poetry of any dovetail joint is in the layout.

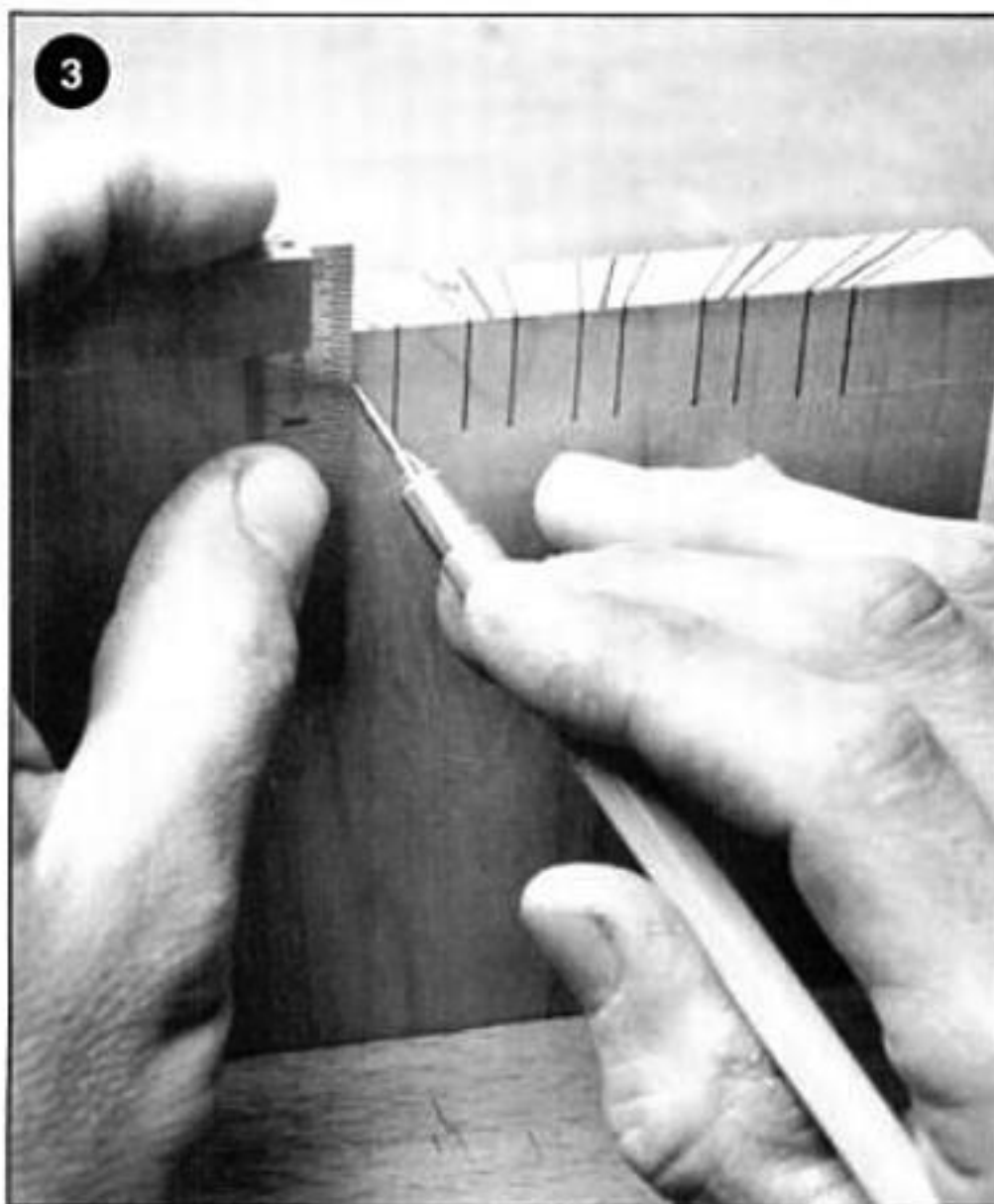
The radial dovetail isn't the easiest joint you'll ever cut; the angles of the tails present a challenge. But a steady hand and sharp, narrow chis-

els make the task a bit easier (2-mm and 4-mm available from Luthier's Mercantile, P.O. Box 774, Healdsburg, CA 95448, 707-433-1823). If your early attempts aren't quite perfect, don't worry. Just keep chopping. They'll get tighter and faster with time. The success of this joint lies in your ability to saw square to the layout lines. Saw to the line and the rest will be easy. The drawings here show how to do it.—K.S.

1.) Set your marking gauge to the board thickness and scribe a line around all four sides of both boards, just as you would with regular dovetails.

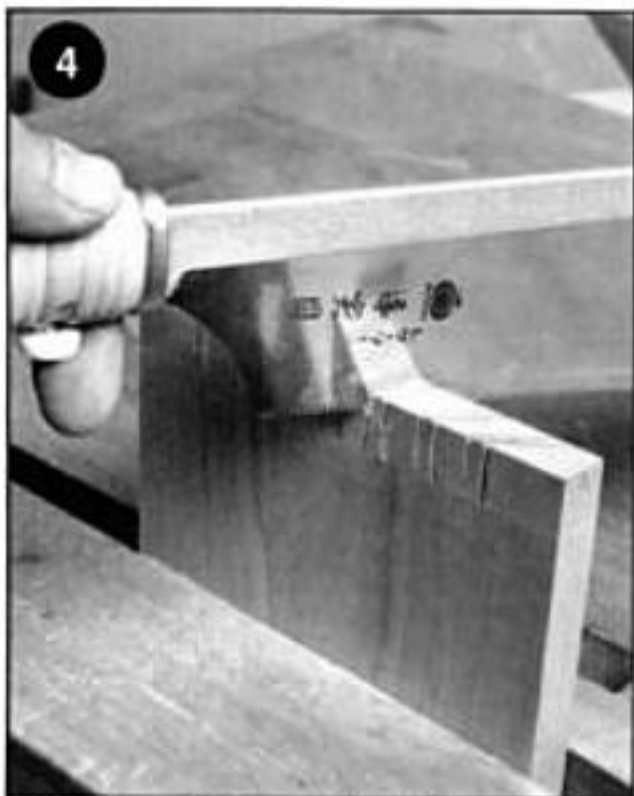


2.) Lay out the pins first. With a square, mark the middle pin's center on the centerline of the board. With a ruler, space the other pin centerlines to please the eye. The centerlines should fan out, as shown.

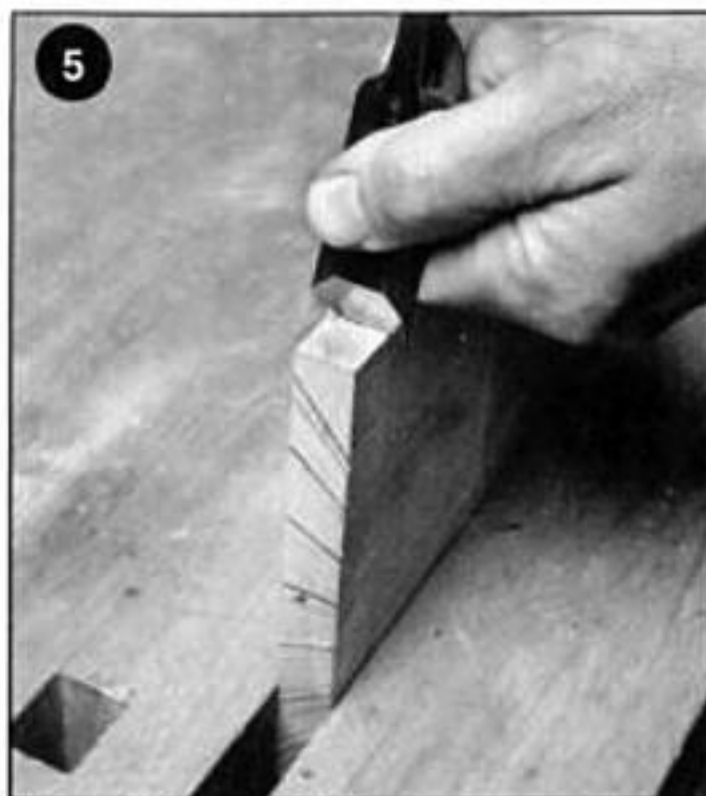


3.) Using the pin centerlines as your guide, draw the flared pins. Then hold a square against the edge and draw verticals down from your pin lines to the scribe line.

PHOTOS BY NUTT PRINCE



4.) Next, carefully saw along the waste side of the pin lines.



5.) To guide the saw for the two corner cuts, chisel a starter notch on the waste side of the scribe line.



6.) Saw on the waste side of the scribed line (very carefully)!



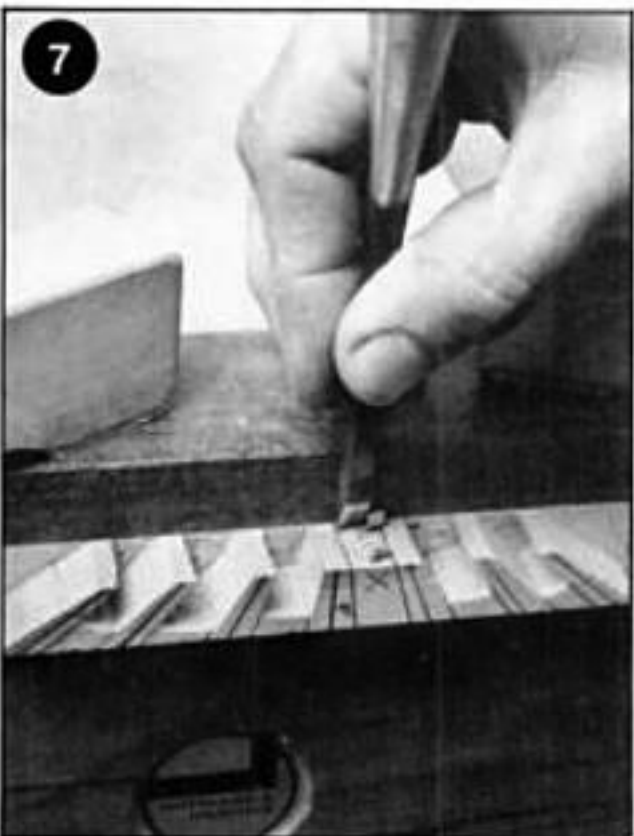
11.) Again, chop out the waste from both sides. This is where a really narrow chisel comes in handy.



10.) Here's where ultimate care pays off. Saw the waste exactly to the line. Kneel down so you can see what you're doing, and say a little prayer to the spirit of dovetails. (It couldn't hurt.)



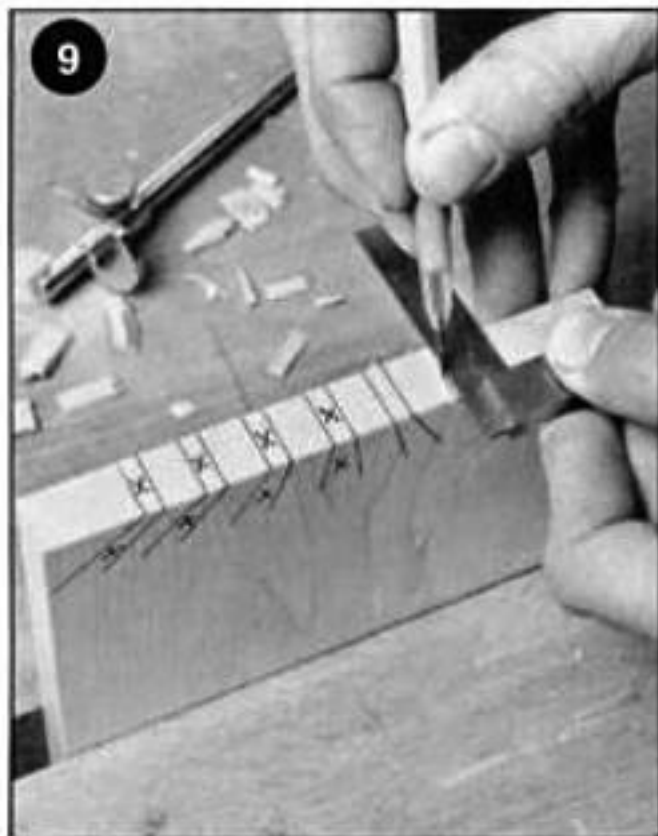
12.) Clean up the tight corners with a knife, and fit the joint together.



7.) With a narrow chisel, chop $\frac{2}{3}$ of the way through on one side of the waste, then chop through from the other side.



8.) With a very sharp pencil, trace the outline of the pins onto the other board.



9.) Draw verticals on the end grain with a square as your guide. To avoid chopping out the tails, mark the waste portions.

CORNER CUPBOARD

A Southern Country Cabinet Built With Butt Joints and Nails



MICHAEL COTELLESE

BY JONATHAN CLARKE

Near my home in rural North Carolina, the flea markets and antique shops are full of a homespun style of rustic furniture built with simple butted or lapped joints and nails. While some might call this construction "primitive," it's practical and expedient. It was a homesteader's way of making serviceable furniture at a low cost in time and materials. These pieces were made of both hardwood and softwood, and they've survived the rigors of a century here in the South. In New England, similarly made furniture might be 200 years old.

The simplicity of this furniture appealed to me, and I began to keep my eyes open for different examples of this style, built with old-fashioned forged or cut nails instead of glue. (See sidebar.)

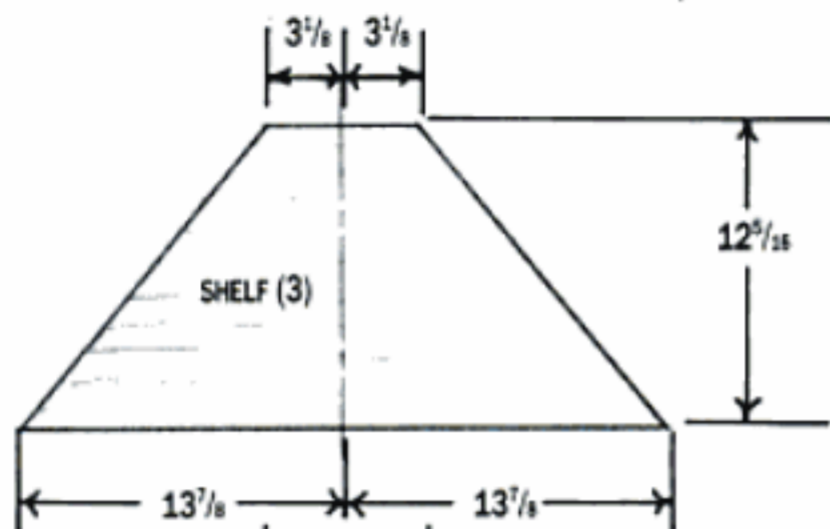
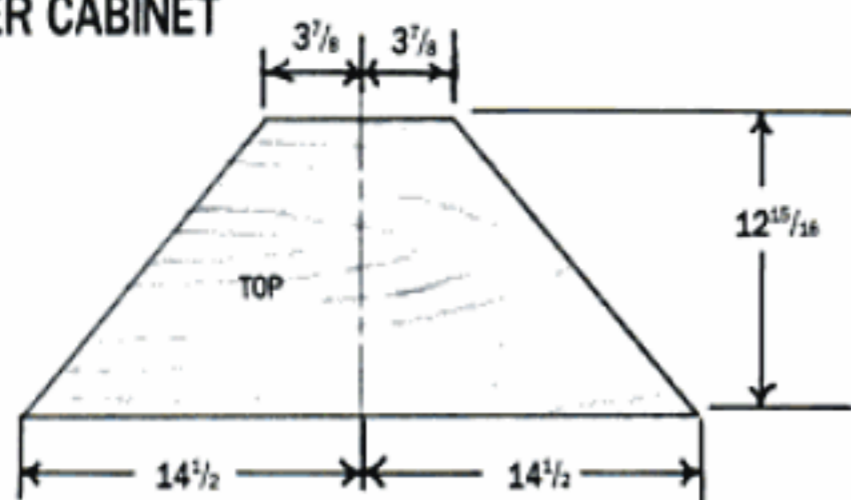
This corner cupboard is typical. I spotted the original in a western North Carolina antique shop, and I

liked it immediately. I thought it had a refined and tasteful air, despite its modest size and origin. The curved cornice piece and legs were a rural craftsman's way of duplicating the fancy carvings and turnings seen on urban furniture or in a pattern book. Those old cabinetmakers often lacked the tools or skills required for high-style details, but they could mimic the style with simple sawn curves.

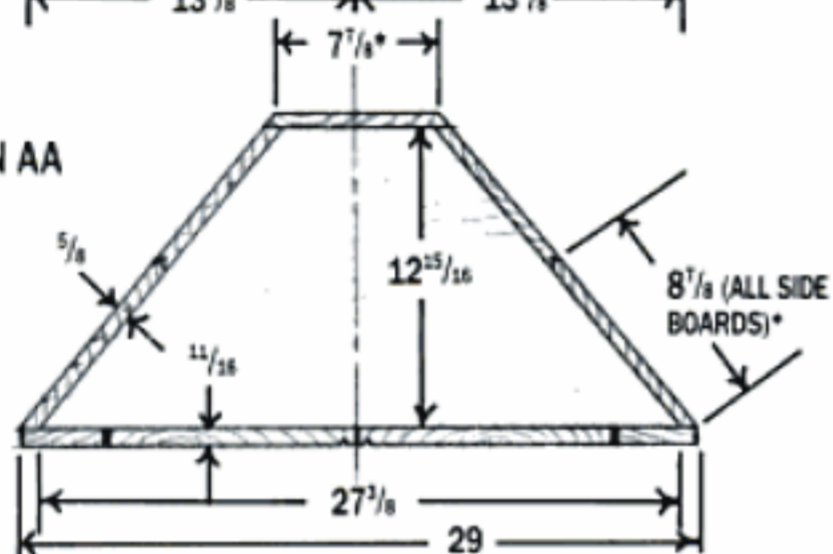
The original cupboard was walnut and could have been built anytime from about 1850 to the turn of the century. One unusual design detail is that the angle between the two sides of the cupboard (where it fits into a corner) is only about 80°. Normally, this angle on a corner cupboard is slightly greater than 90° so it will sit back fully against the walls in an irregular corner. By making the angle on this cupboard smaller than 90°, the stiles stand clear of the walls by a few inches, giving an impression of volume without exposing the unfinished sides.

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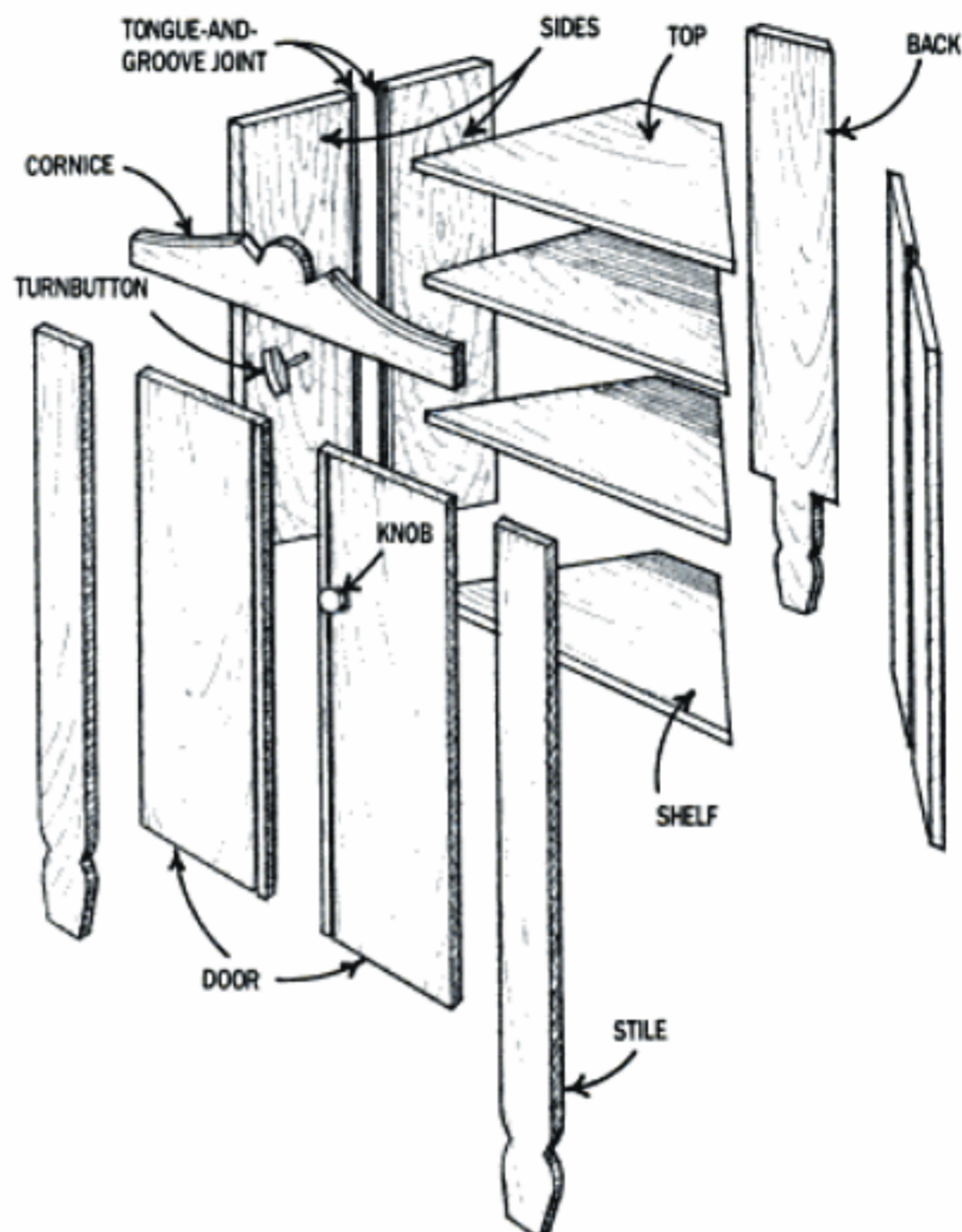
CORNER CABINET



SECTION AA



EXPLODED VIEW

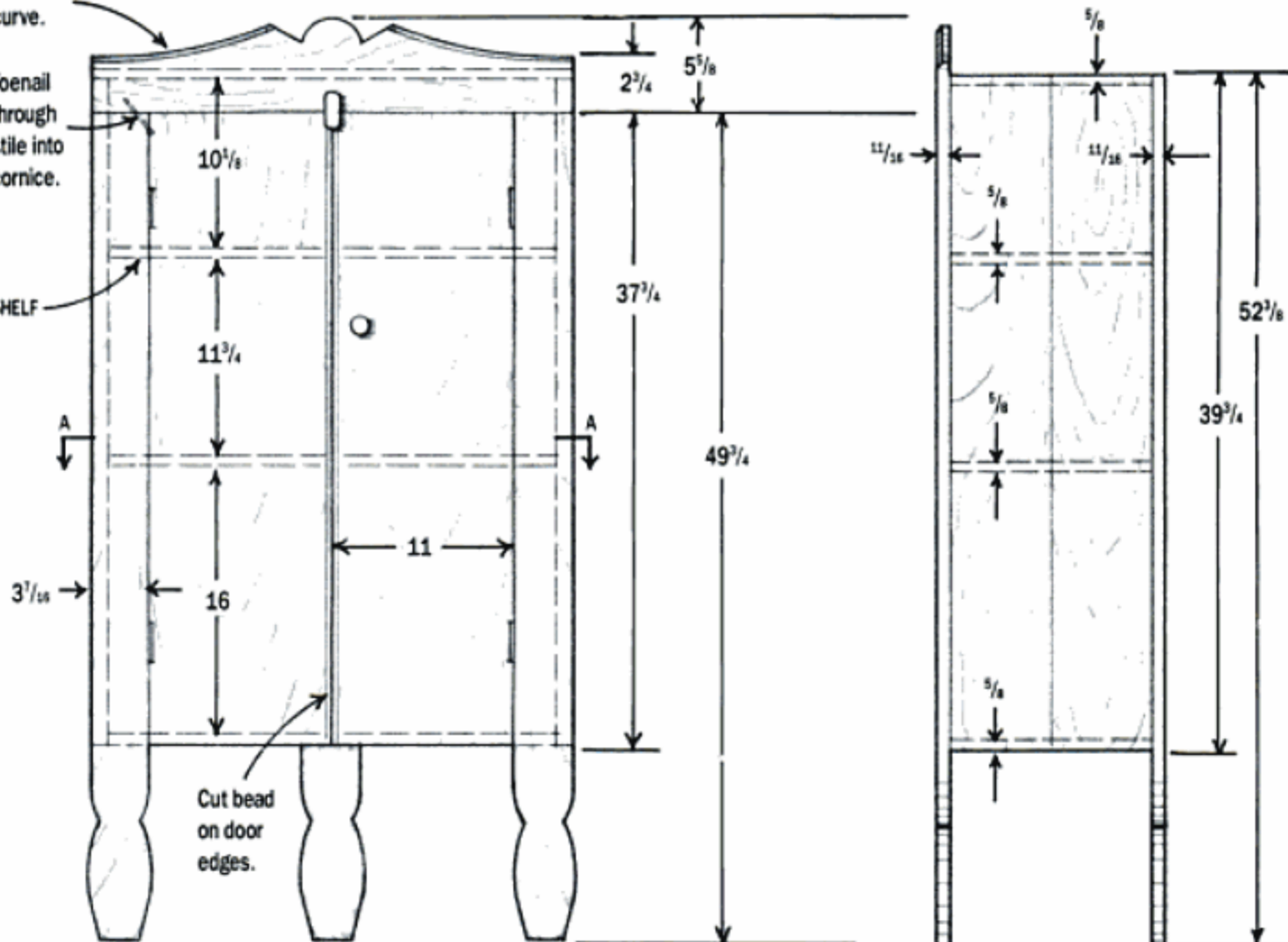


*Nominal dimension. Bevel edge to fit after nailing.

Chamfer curve.

Toenail through stile into cornice.

SHELF



As a transplanted Yankee, I decided to make my version of the corner cupboard in white pine. I used clear, rough-sawn boards that I had air dried myself. As all the parts either butt or lap, the layout is quick and simple. Extreme accuracy in cutting is not necessary because there is no precision joinery. The shelves determine the size of the cupboard, as the sides and back are merely sheathing. The width of the sides and back are slightly oversize in the drawing to allow for trimming. When I prepared the stock, I left everything a little more than nominal thickness to allow for some finishing with a hand plane to clean up visible machine marks.

To duplicate the nails in the original cupboard, I used reproduction old-style cut nails (available from Tremont Nail Co., P.O. Box 111, Wareham, MA 02571, 508-295-0038). I used 1½-in. box nails for most of the construction and 1¼-in. finishing nails where more delicate joining was required.

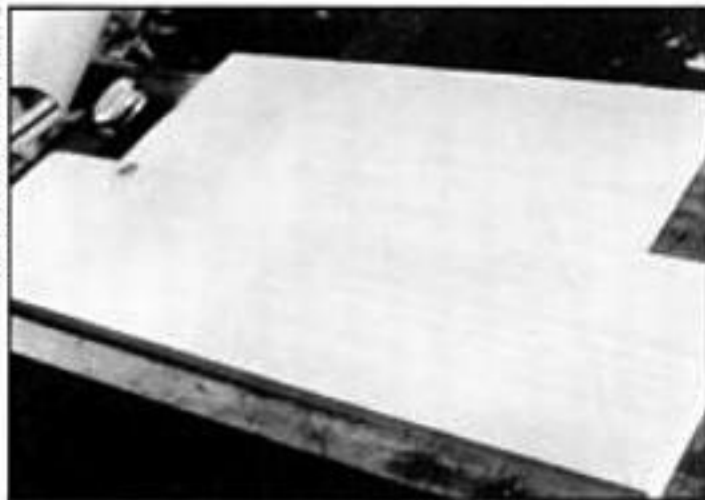
Making the Cupboard

Begin by making the top and shelves, which are shaped like triangles with the tops cut off (truncated). The top is slightly larger than the shelves so it can overlap the side boards. For each shelf, I edge joined two slightly oversize boards. Because of the shape, you can join a short and a long board for each piece to save stock. (See photo.) It's best to lay out the triangular shape of the top and shelves using the linear dimensions given in the drawing. (Don't try to lay out the triangular shapes with a protractor to measure the angles.) I use knife cuts in the layout lines to prevent breaking out past the lines when sawing. With a crosscut saw, I saw just outside the line, then trim to the line with a hand plane. You could just as well use a bandsaw or a portable circular saw with an edge guide to make these cuts.

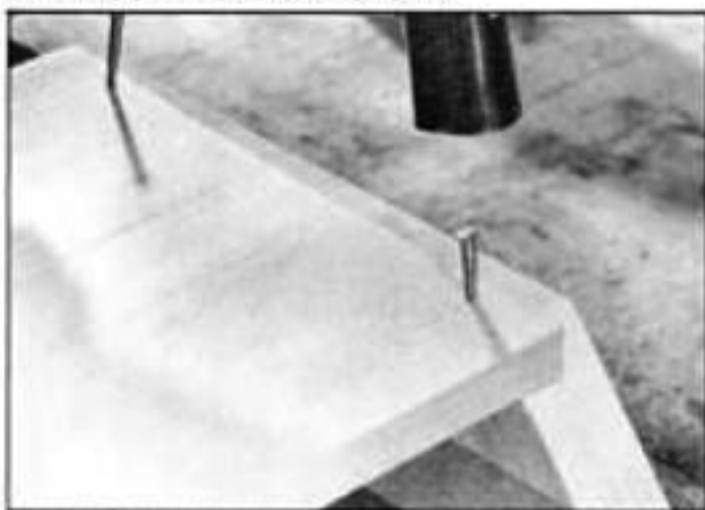
Next, on the tablesaw I cut out the sides and the tongues and grooves on the long edges of the sides. I temporarily assemble the two pairs of tongue-and-groove boards on my benchtop. If the boards take a cup, match them in pairs to form continuous outward bows—the nails will draw them flat later. With a pencil, mark the position of the shelves on the inside and the outside surfaces of the sides.

Begin assembly of the cupboard by nailing the side boards to the bottom shelf. Clamp the bottom shelf in a bench vise, side edge facing up, as shown in the photo. Line up the rear edge of a side board with the back corner of the bottom shelf. Fix the side to the bottom shelf with two nails. It's easier to line up the side board if you stack a scrap board in the bench vise behind the bottom shelf and slightly staggered above it. The scrap board will act as a stop to position the side for nailing.

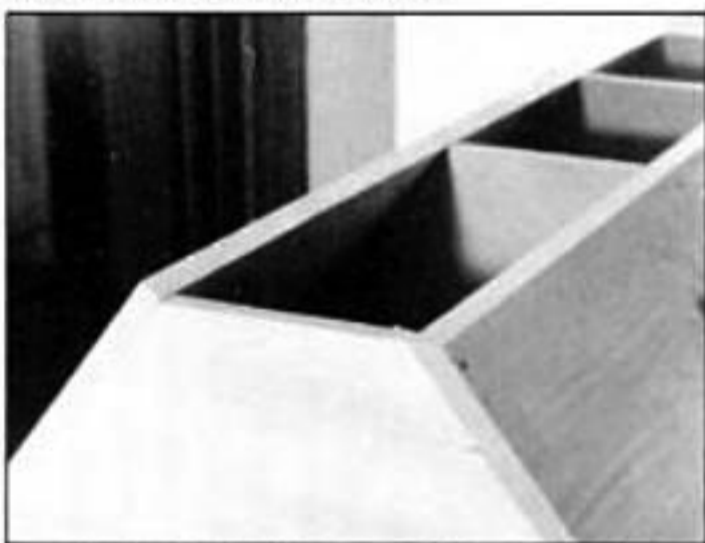
PHOTOS BY JONATHAN CLARKE



Lay out the shape of the top and shelves on edge-glued boards. You can use one long and one short board to save stock.



Nail one of the side boards to the edge of the bottom shelf by fixing the shelf in a vise along with a backup board as a stop.



Plane the long edges of the side boards even with the front and back of the shelves.

Next, nail the front side board to the bottom shelf, leaving a 1/16-in. gap in the tongue-and-groove joint. Drive the front nail in this board at an angle so you don't break out through the front corner of the shelf. In the drawing, the dimensions for the sides leave extra wood on the side edges for trimming to match the angles at the front and back of the cupboard. Now turn the assembly over in the vise and nail the two side boards on the other side of the bottom shelf.

I nailed the top piece *onto* the tops of the sides, ensuring the tongue-and-groove gap in the sides was even top and bottom. Then I placed the whole carcass face down on the benchtop and nailed the remaining shelves in place, following the pencil lines as guides. Any bowing in the shelves was worked out as I nailed across. Next, I beveled the long edges of the sides with a plane until they came flush to the front and back edges of the shelves. (See photo.)

Lay out the curved profiles on the legs and the sunburst profile on the cornice by referring to the gridded lines in the drawing. I cut these profiles out with a scroll saw, then cleaned up any roughness with a razor-sharp chisel, taking oblique paring cuts. Small variations in the profiles won't be noticed. The two outermost curves on the cornice are chamfered. I marked a pencil line about 1/2 in. from each face, and then cut the chamfer with a flat-soled spokeshave. (See photo.)

Next, I cut out and attached the back with its leg. I drove the top and bottom nails at an angle to catch the side boards, and drove other nails straight into the middle shelves. I planed the long edges of the back piece flush to the line of the sides. Beware of nail heads!

The front stiles with their legs went on next. First, I measured the actual length of the back leg from the bottom shelf to the floor, then I marked off this same distance on the backs of the front stiles. These marks served as a guide to position the front stiles so all three legs were equal length. (This leaves a space at the top of the stiles for the cornice.) I fastened the stiles with a nail into each shelf and a row of 1¼-in. 3d finish nails toed to run into the angled sides. (See photo.)

The cornice is held on with three or four nails driven into the front edge of the top. As shown in the drawing, a finish nail is toed up through the inside top edge of each stile and into the bottom edge of the cornice. This holds these pieces flush and steadies the stile at this unsupported corner. Sink these nail heads with a nail set so the doors have clearance.

Making the Doors

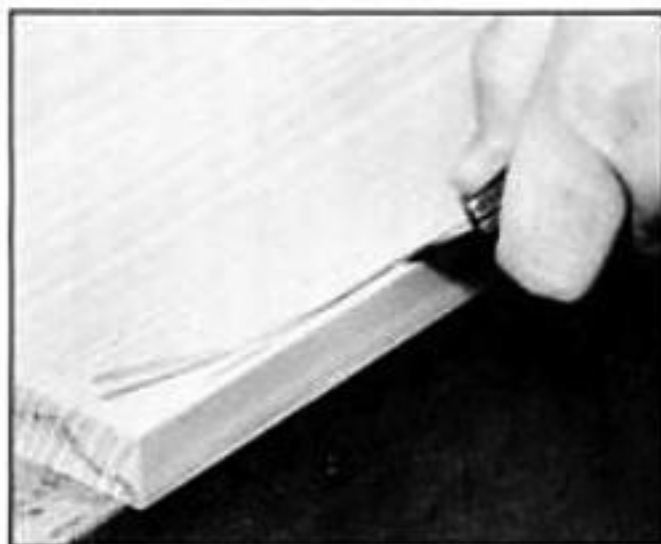
The doors are simply boards planed flat and hung on steel butt hinges. I put a bead along the edges of the



Chamfer the two outside curves on the sunburst cornice with a spokeshave, taking one long continuous stroke on the last pass.

SALLY ULLMAN

To make the bead along the door edges, run a marking gauge with a knife point along the edge, then cut out a long thin strip, as shown, by making an angled knife cut. Finish the radius on the bead with a shoulder plane, and then sandpaper.



doors where they meet. You can use a scratch stock or a router bit to make the beads if you like. I made the beads by cutting a line along the edge of the door with a marking gauge fitted with a knife point. Next, I drew a knife just inside this line at an angle to intersect it, cutting out a long, thin strip, as shown in the photo. I then shaped the radius of the bead with a shoulder plane and a block plane. Finally, I mortised the hinges and hung the doors.

The doors are held shut with a wooden catch spinning on a clinched nail. I gave the catch some clearance by slipping a thin piece of cardboard behind the catch and removing it after the nail was hammered over. Finally, I installed a simple wooden knob on each door.

Finishing the Cupboard

If you make a cupboard out of pine, I suggest you paint it a traditional color, such as cabinetmaker's blue or Indian red. An oil finish would look nice on a hardwood cupboard. I finished my cupboard in a faux-grained mahogany glaze, as it goes nicely with my other furniture. To do this, I first made an opaque stain by mixing yellow ocher artist's oil color (available at any art supply store) with enough turpentine to make a thin paint. I applied this with old rags and let it dry to form a base coat. I followed this with a glaze made of equal parts of linseed oil and turpentine mixed with enough burnt sienna artist's oil color to make a creamy consistency. I applied the glaze with a brush and then went back over it lightly with just the tip of the brush to impart a grain-like effect. There are no hard and fast rules with this finishing process. I experimented as I went along until I got the effect I was looking for. Don't be afraid to try different ideas. ▲



Jonathan Clarke is a woodworker, furniture maker and timber framer whose main job is single-handedly raising his 8-year-old son.

NAILING SAVVY

During the late 1700s, the first nail-making machines were developed. They cut the nails from a long metal strip—hence the name “cut” nails. Prior to that, nails were forged by hand, one at a time. The blunt end and shape of these old-fashioned forged or cut nails made them less prone to splitting the wood, and gave them more holding power than modern wire nails with their smooth, straight shank and pointed end.

Most cut nails you find today at the hardware store are flooring or masonry nails. Unlike the old-time cut nails, the cut nails of today have a broad taper that makes them more likely to split the wood. Masonry nails are also hardened, so they can't be bent over, or “clinched,” as old-fashioned nails often were.

I prefer to use old-fashioned cut nails for furniture making. I buy reproduction cut nails in 3d size and 4d box size for projects like this cupboard (available from Tremont Nail Co., P.O. Box 111, Wareham, MA 02571, 508-295-0038). These nails re-create the historic feel of the piece, and they hold well, too.

Unlike gluing up, nailing a piece of furniture together is not a race against time, so you can relax. However, nailed furniture is nothing but a loose bundle of boards until you get a few parts together, so it's wise to have a helper to hold dangling ends while you nail. Even if you're working alone, you can usually cobble up some way to hold parts in alignment, and you have the advantage of taking as much time as you need before you seal your fate with a nail.

Cut nails should be driven so the head is parallel to the grain of the wood. This will help to prevent splitting, even close to the end of a board. Where two boards cross one another at right angles, the nail must be driven parallel to the grain in one but at right angles to the grain in the other. In that case, you should decide which board is less likely to split based on the grain patterns or the amount of wood around the nail.

Nailing into small sections of end grain tends to split the wood. Even in side grain, a nail sometimes deflects along the harder annular rings of the wood, causing splitting or running out. Drilling small pilot holes helps, but they reduce holding power. You can usually keep an errant nail on course by propping a strong thumb against it to keep it straight as you drive it in.—J.C.



FOUR-POSTER BED

*A Diamond
in the Rough*

BY FIONA WILSON

The bed you see here isn't the first bed I've built. In fact, it's proof that I've learned from the mistakes of my past. The first bed I ever built had a plywood platform. That might have been fine, except for the fact that I lived in the San Francisco Bay area. Every time an earthquake hit, that bed would multiply the tremor by a factor of ten. I'd be sleeping one moment and riding a Brahma bull the next. When I left the Bay area, I gleefully bid that bed "good-bye and good riddance."

Pennsylvania isn't prone to quakes, but you just never know. I designed this bed with the unexpected in mind. It's everything my first bed wasn't—comfortable, playful and sturdy enough to deal with Mother Nature. As with all my furniture designs, I can never quite pin down the style. How about Neo-Grecian Carnival style?

I designed this bed for a double-size futon (a thin mattress made of cotton batting), but you could just as well put a conventional mattress on it. Because a conventional mattress is a few inches thicker than a futon, I'd recommend adjusting the height of the headboard and footboard to allow for the extra inches. You'll have to make the bed wider if you want to accommodate a queen-size or king-size mattress. I don't recommend using a box spring. The platform of this bed is made of sturdy oak slats, so no box spring is needed. (Also, a box spring would make the mattress too high and throw off all the proportions.)

Making the Bed Posts

A bed is a very satisfying project to undertake. You end up with a substantial piece of furniture for a relatively small amount of work.

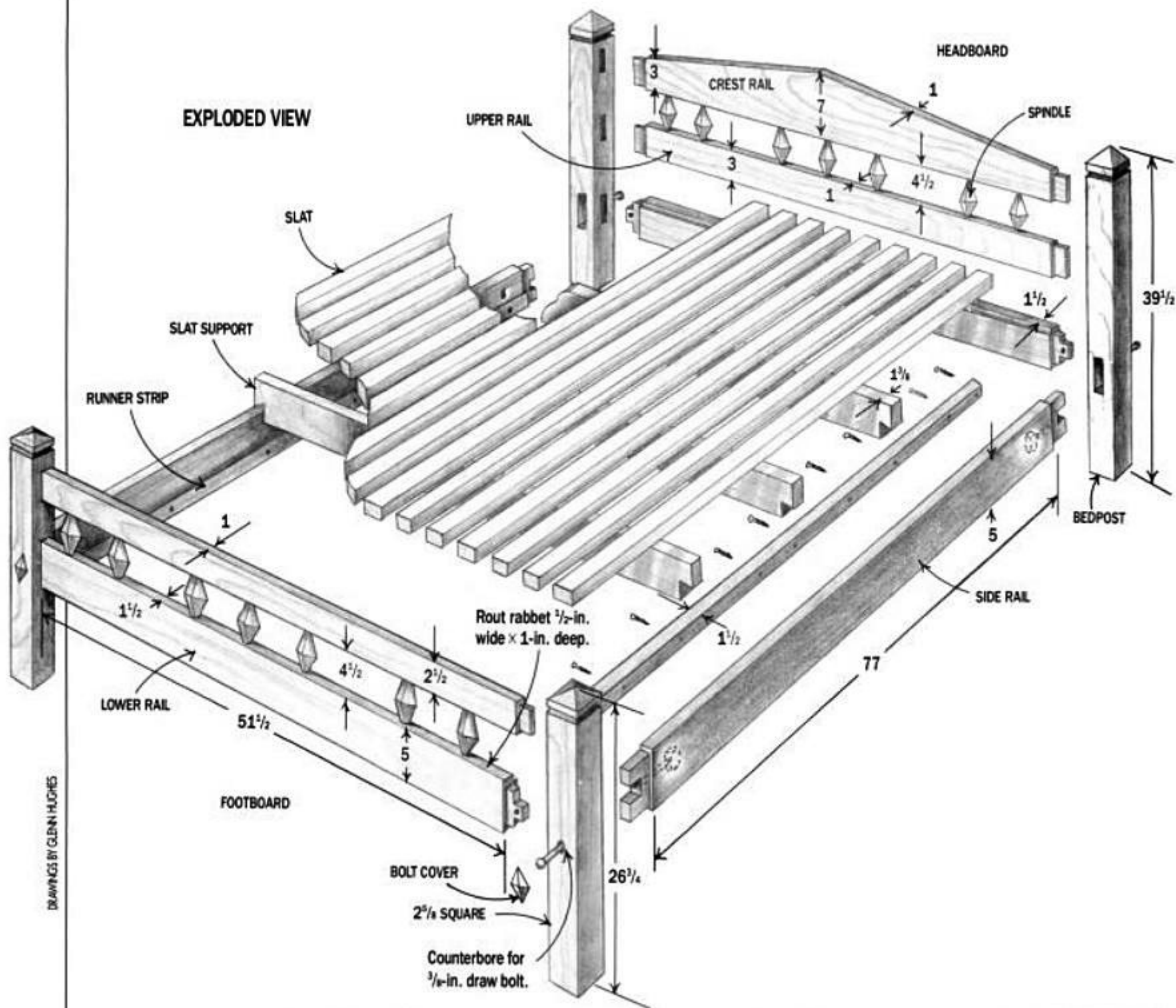
Start by cutting out and dimensioning all your lumber. (See Fig. 1.) I used cherry for the bed frame, but you can use whatever hardwood you like. I recommend oak or some other strong wood for the slats.

Start with the four posts. Before you cut the posts to their final length, cut the angles of the top caps. This is a simple bandsaw operation, as shown in the photo.

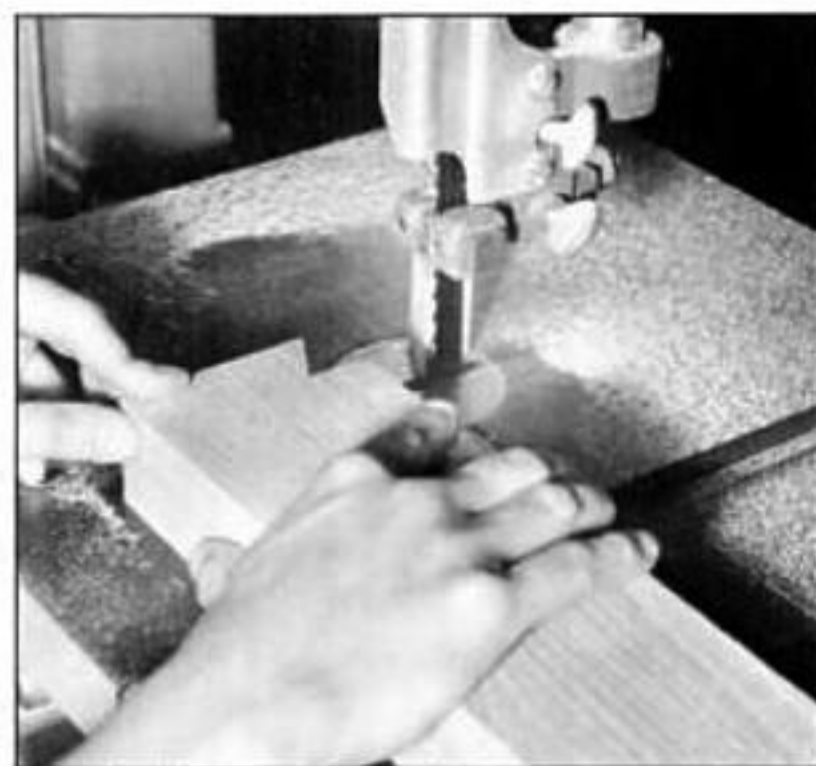
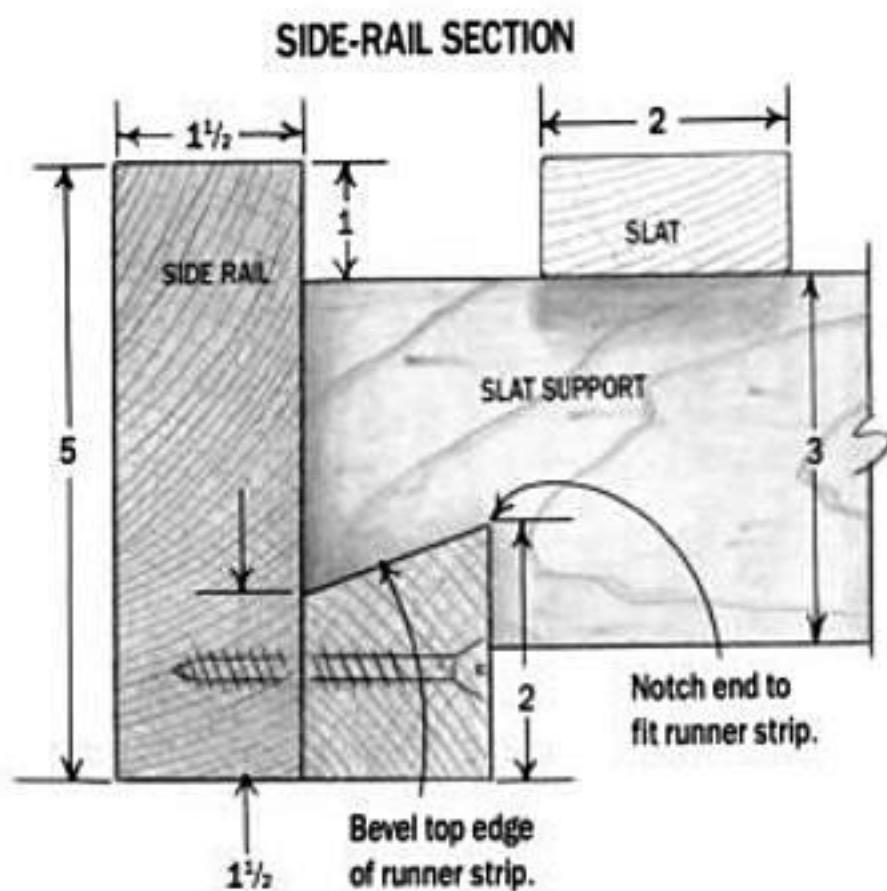


MITCH MANDEL

FIG. 1: FOUR-POSTER BED



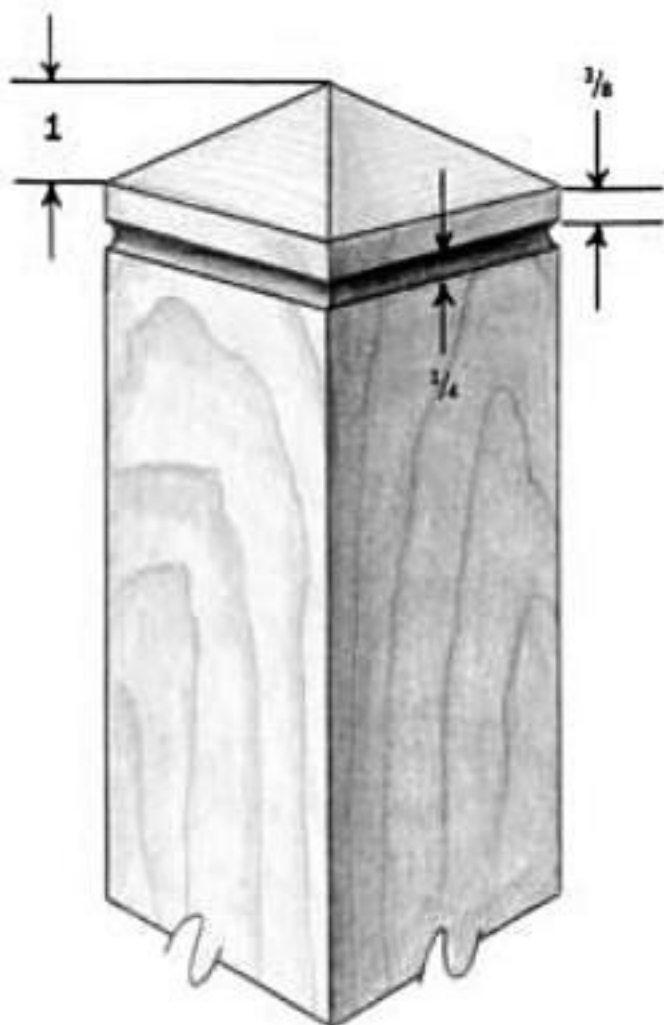
DRAWINGS BY GLENN HUGHES



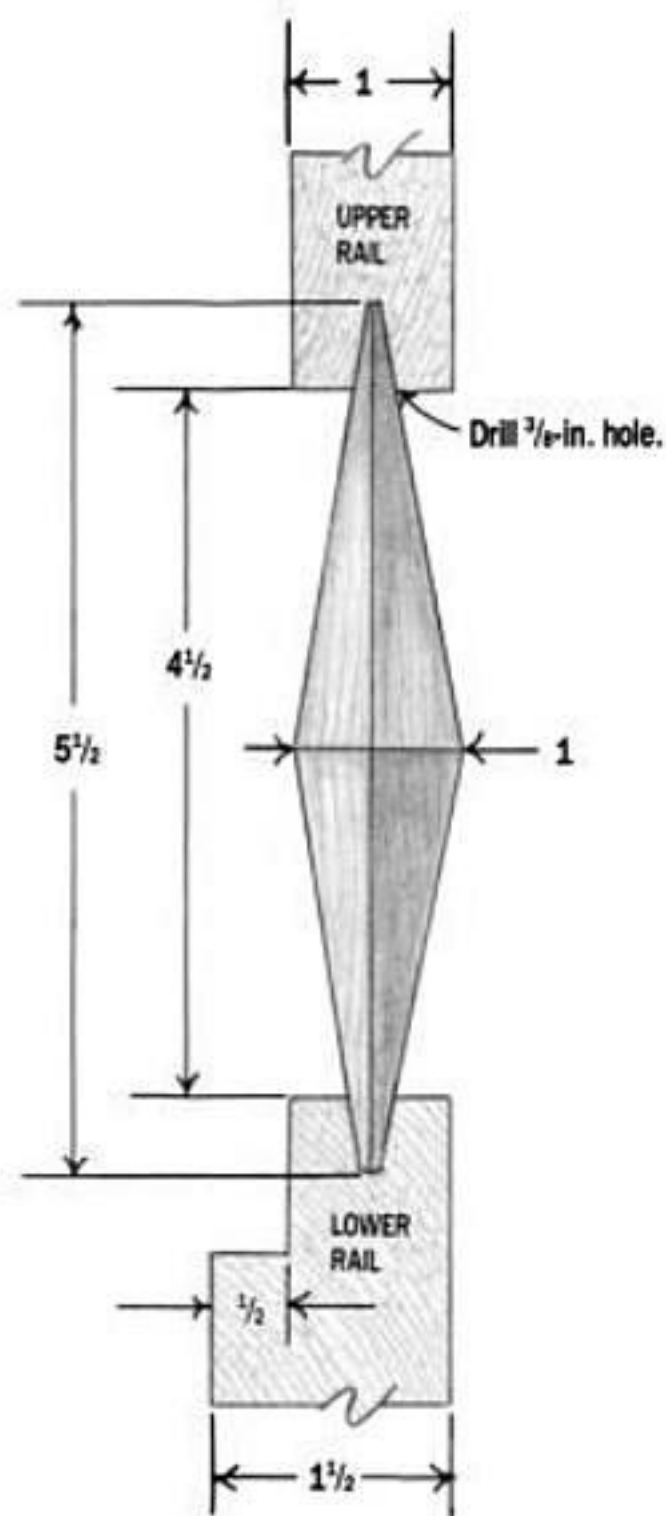
DAVE SELLERS

Notch the slat-support ends to fit over the runner strips. Cut the notches on the bandsaw.

POST-CAP DETAIL



FOOTBOARD SECTION



Cut the roof-shaped bedpost caps on the bandsaw with a miter gauge set to the required angle (top). Rout the grooves below the bedpost caps with a router guided by a fence clamped across all four bedposts.



Square up the spindle holes on the bed rails with a chisel. This fixes the spindles so they don't spin in their holes.

Draw out a 1-in. high triangle on two sides of each post. Make a few practice cuts on the waste side of the line until you sense the right miter-gauge angle for cutting along the line. Set the miter gauge to this angle. If you mess up the first one, you still have extra length to have another try. Once you've set the correct angle on the miter gauge, you can cut the angles on all four posts.

The next step is to rout the ornamental grooves that run below the roof-shaped caps. I did this by setting up a router fence across all four posts at once and cutting the grooves with a 1/4-in. core box bit in one pass, as shown in the photo. (Do this on all four sides of each post.) It can be a bit tricky to have all four grooves on one post line up with each other where they meet at a corner, but set the fence up with patience and you'll get good results.

Now you're ready to tackle the joinery. I designed this bed with sturdy mortise-and-tenon joints, for reasons already mentioned. The headboard and footboard rails are glued to the posts permanently, but the side rails are attached to each post with a bolt running through the tenon for disassembly. (See Fig. 1.)

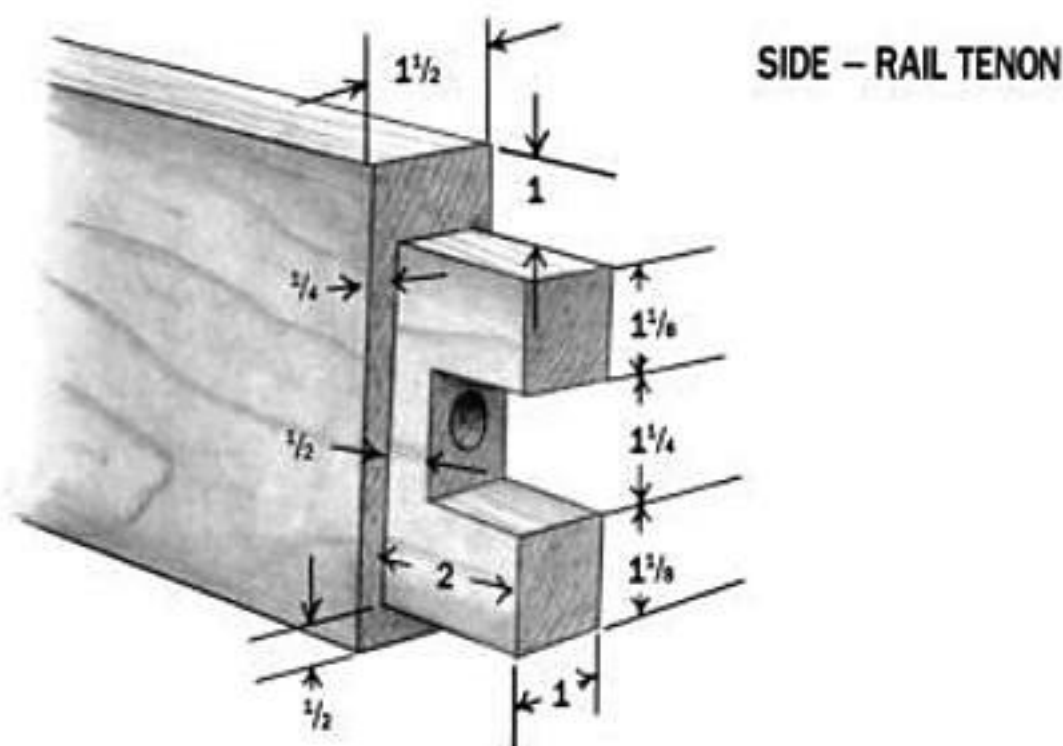
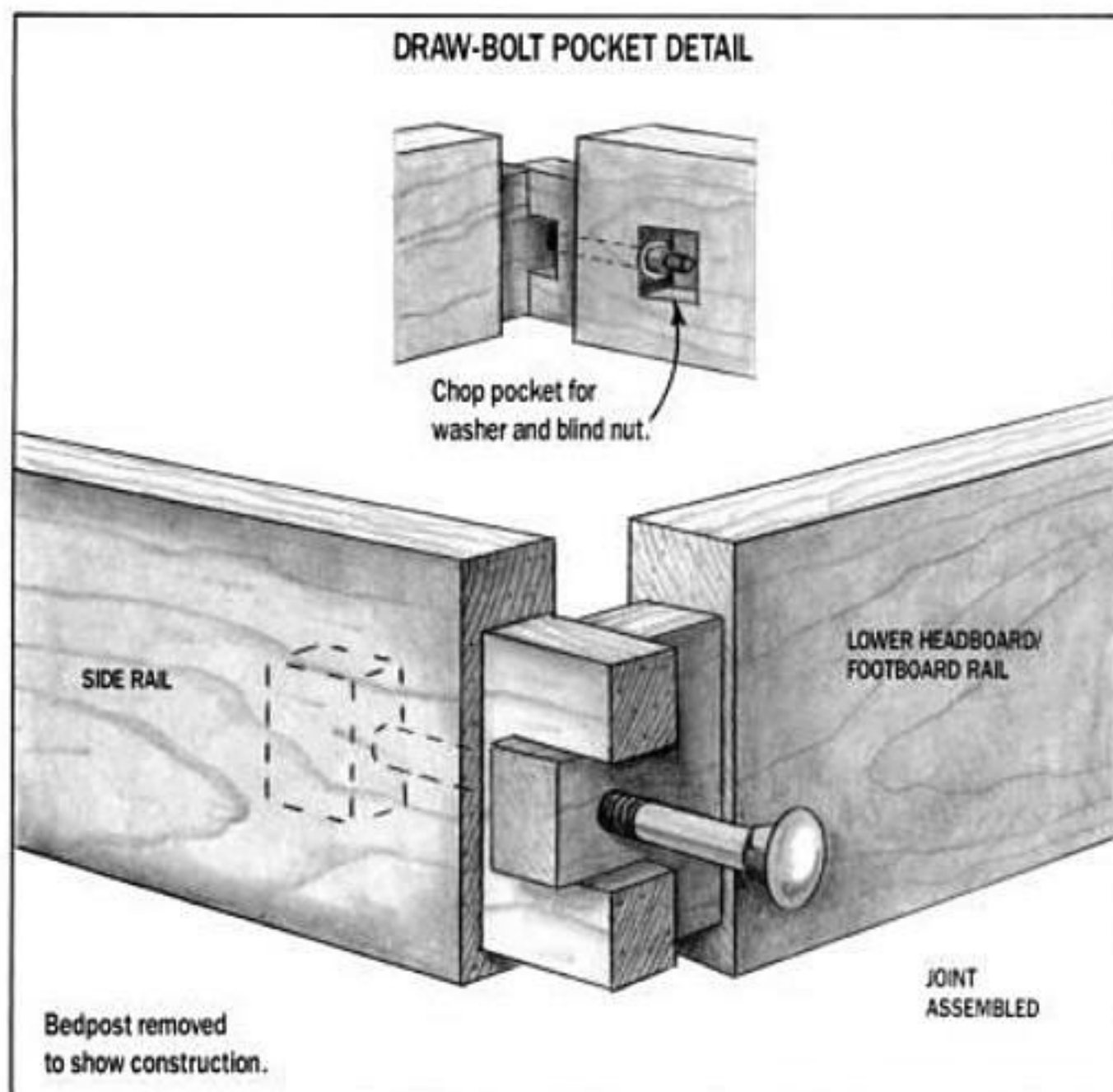
Cut the mortises first. I used a hollow chisel mortiser on the drill press, but you could just as well cut these mortises by hand or with a router. The mortises for the upper headboard/footboard rails are simple 2-in. deep slots. The mortises for the lower headboard/footboard rails and the side rails are a bit more complicated because the tenons overlap. Study Fig. 2 carefully, and make sure you mark and cut the mortises so the side rails and lower headboard/footboard rails are oriented correctly. If you cut the mortises on the drill press, you may need to clean up the sides of the mortises with a chisel. If you're pressed for time (and full of cunning) you can contract this work out to your apprentice. My father did a fine job of straightening the mortises out. Thanks Dad.

To finish up work on the bed posts, cut them to their proper lengths, as shown in Fig. 1. Now you're ready to cut the tenons on all the rails.

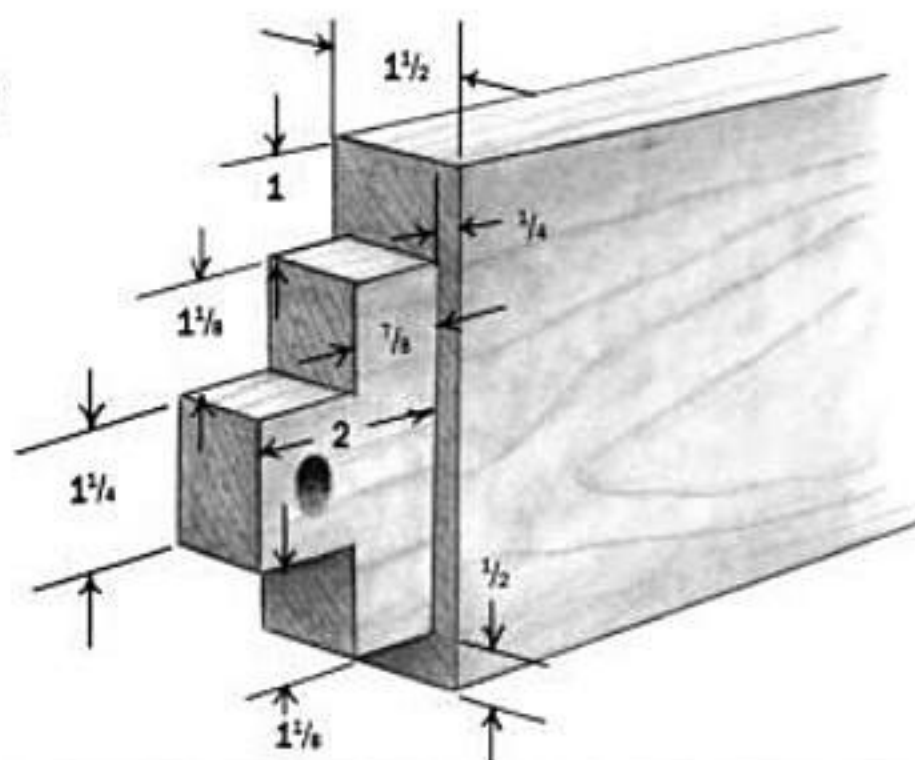
Cutting the Rail Tenons

I cut all the tenons on the headboard and footboard rails and the side rails at the same time. Cut these in two batches. First, cut the 1-in. wide tenons on the lower footboard and headboard rails and the side rails. Next, cut the 5/8-in. wide tenons

FIG. 2: LOWER-RAIL JOINT



LOWER HEADBOARD/ FOOTBOARD RAIL



on the upper headboard and footboard rails. I cut the tenons by scribing the correct width on each rail end, then cutting to this line with a dado head on the radial arm saw. I prefer to cut tenons on the bandsaw, but I found the size of these rails a bit unwieldy. I cut both cheeks of each tenon on the radial arm saw, then I cut the smaller shoulders on the edges of the tenons with a backsaw. Leave the tenons on the thick side and fit them with a rabbet plane and a file once you're ready to assemble the bed.

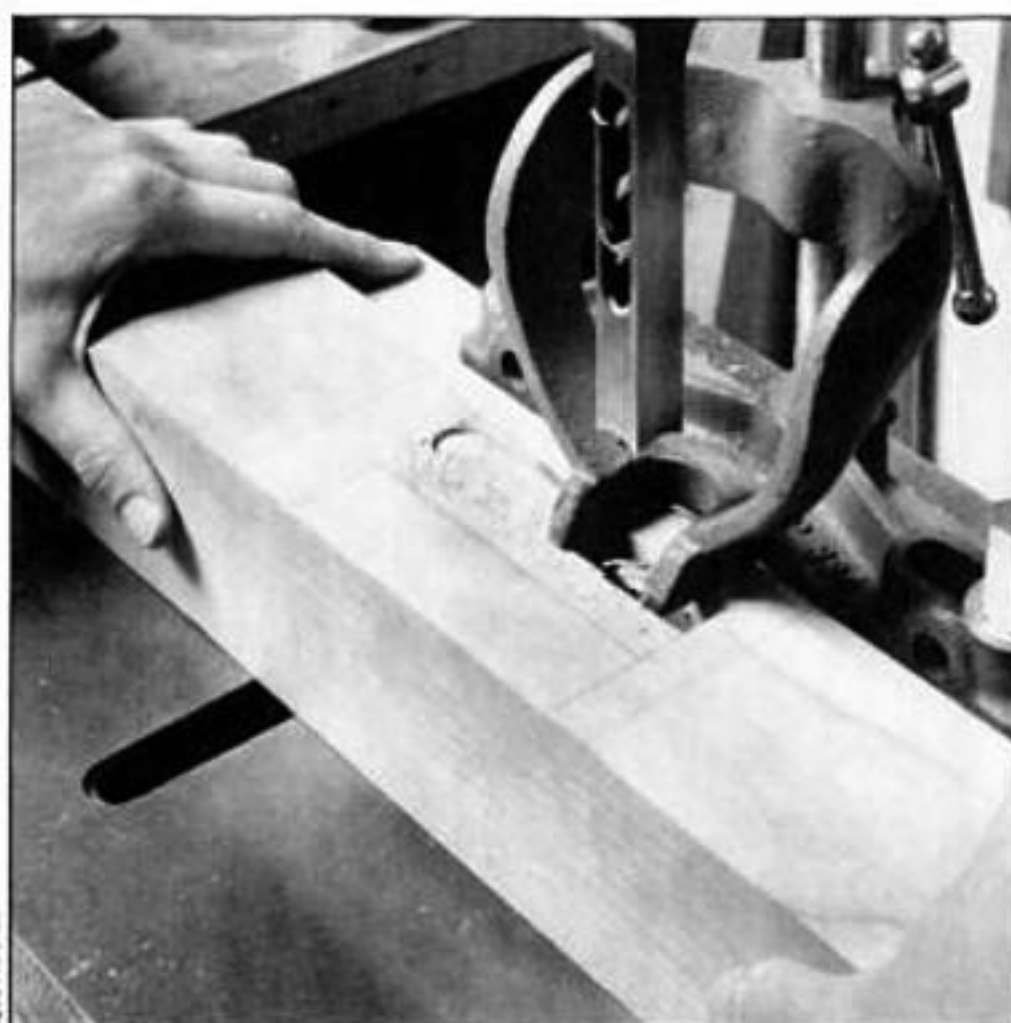
Before you can cut the tenons on the crest rail of the headboard, you'll need to cut out the roof-shaped profile. I did this with a saber saw, and cleaned it up with a hand plane. Also, now's the time to cut the 1/2-in. wide rabbets on the lower headboard and footboard rails. (See Fig. 1.) This is easily done on the table-saw with a dado blade.

The slat supports of the bed rest on runner strips that have a beveled top edge. (See Fig. 1.) The slat supports have a wedge cut out at each end that fits into the bevel on the runner strips. Rip the bevel on these strips on the tablesaw. Cut them to the length of the side rails (minus the tenons) and glue and screw them to the side rails. Once these are attached, dry assemble the bed. Measure the inside dimension between side rails and cut the slat supports to this length, then draw and bandsaw the wedges out. (See photo.) Remember that the top edge of these slat supports should register 1 in. below the top edge of the side rails. This is so the 1-in. slats that lie on top of the supports are flush with the side rails. (See Fig. 1.) Cut the slats to the proper length, but wait until the bed is assembled to screw them down.

Making and installing the diamond-shaped spindles is the last part of the construction. These can be cut quite quickly on the bandsaw. First, dimension a long strip of wood to 1-in. square. Draw the 5 1/2-in. long diamond shape on one side at one end of this long strip. (I found it safer to work with the strip long.) Saw out one half of the diamond shape on the side on which you've drawn the diamond. Next, draw the diamond shape on a second, adjacent side. Saw out the entire diamond from both sides, then bandsaw the spindle to length. The cuts off the bandsaw may be a bit rough, but it's easy to clean these spindles up on a belt sander. Make sure when you do this that both halves of each spindle are

Cut the mortises in the bed posts on the drill press with a hollow chisel mortiser.

JOHN HAMEL



Cut the tenons on the bed rails on the radial arm saw. First, scribe the tenon thickness you require, and lower the radial arm saw until it cuts to the scribe line.

GLENN HUGHES



To attach the siderails, chisel out a pocket for the blind nuts, then drill for the draw bolts.

DAVID SOAN



symmetrical.

Next, mark off the $\frac{3}{8}$ -in. holes for the spindles in the rails. These holes are centered on the thickness of all the members, except for the lower footboard rail. The holes on this rail are off-center because of the thickness of the rabbet. (See Fig. 1.) Because the spindles are square in section, their holes must be squared up with a chisel. (You could drill a square hole, but I found a round hole with a squared opening held best.)

Finishing and Glue-Up

I'm a big fan of color, so I finished my bed off with a McCloskey Tung-seal tung oil varnish which I colored by adding oil-based paints. I then put on several sealer coats of a waterborne semi-gloss lacquer. To achieve the color I wanted in the varnish undercoat, I added only enough color to tint the varnish. The effect was a translucent wash, through which you could see the wood grain. The color pattern I settled on is as follows: The frame is blue; the top edge of all the rails and the routed grooves are green, and the spindles red and yellow.

After you've sanded the entire bed and applied your chosen finish (taking care to protect the mortises and tenons), you're ready to glue up the headboard and footboard. You probably don't have clamps that span the full distance of the headboard/footboard. Don't worry. You can attach pipe clamps together with a threaded-pipe coupler from the hardware store to get the length you need. After the glue is dry, insert the side rails, and measure for the $\frac{3}{8}$ -in. dia. \times 6-in. draw bolt. Chop out the pockets for the blind nut first, as shown in the photo. Next, drill and counterbore through each post for the draw bolts. Once you bolt the side rails, cover the bolts with bolt covers. I made diamond-shaped bolt covers out of brass. Place the slat supports on the runner strips and screw the slats down. A couple of screws per slat is sufficient. Throw your mattress on, and you're done. You've made your bed, now lie in it. ▲



Fiona Wilson is assistant managing editor of AW, and has proven there's more than one way for a woman to make a bed.



ROUTING PERFECT PATCHES

*Fast Template
Method for
Invisible Repairs*

BY PAT WARNER

To err is human ... but that's small consolation when you've just ruined a beautiful piece of walnut with a slip of the router, or you've cut a clean hinge mortise—in the wrong place. Or perhaps you've found just the right size piece of stock you need, but it has an ugly defect that can be seen from 10 ft. away.

To help save my stock pile, and my temper, from being lost to such mistakes, I developed a simple method for repairing defects along or near the edges of boards. Basically, I rout out a gently curved, concave recess at the site of the defect and plug the recess with a complementary convex piece of wood, which I also cut to shape with the router.

The router cuts are guided by a pair of templates that I make in one step from a piece of 1/2-in. MDF (medium density fiberboard). One template has a concave curve for routing the recess in the defective piece of stock; the other (complementary) template has a convex curve for routing the curved edge of the repair patch. I use a homemade plywood circle-cutting attachment (see Fig. 1) on my router for cutting both curved MDF templates at the same time. You could just as well use a factory-made circle-cutting accessory that fits your router.

Three different shank carbide router bits are needed to cut the templates and make the patches—a 3/8-in. straight bit, a 1/2-in. flush-trimming bit and a 5/8-in. straight bit with a 1/2-in. shank. The 5/8-in. straight bit requires a special pilot bearing with a 1/2-in. I.D. and 1 3/8-in. O.D. (part #1621RS available from Valley Chain & Gear, 1320 Grand Ave., Unit #2, San Marcos, CA 92069, 619-744-4200).

Got a defect near the edge of a board? Rout a recess and a patch to fit. Properly done, the repair is nearly invisible. Can you spot the patch in the bottom photo?

STEP 1: Make the templates. Get a piece of $\frac{1}{2}$ -in. MDF about 1 ft. square. Make a circle-cutting attachment for your router, as shown in Fig. 1 (or use a commercial circle-cutting attachment). Set the circle cutter for a radius of about $2\frac{1}{2}$ in. to $3\frac{1}{2}$ in. (bigger radius for larger defects). Clamp or screw the MDF to a piece of scrap plywood. In one smooth pass, rout an arc across the center of the MDF with a $\frac{3}{8}$ -in. straight bit set to full depth to cut the MDF into two pieces. These pieces will form the two templates for routing the recess and the patch.

STEP 2: Rout recess at defect. Clamp the template with the concave curve to the piece to be repaired, as shown in Fig. 2. Position the concave part around the defect. Rout out a $\frac{3}{8}$ -in. deep recess with a $\frac{1}{2}$ -in. flush-trimming bit fitted with a shank-mounted pilot bearing. The pilot bearing follows the template to cut away the defect and give a concave recess.

STEP 3: Rout patch. Select a matching piece of wood for the patch. Look for a close match in figure and color. The patch should be slightly thicker than the piece being patched—it'll be sanded flush later. Clamp the convex template to the patch wood. Position the template so it covers a section of the patch where the grain matches the piece to be repaired. Mount the $\frac{5}{8}$ -in. straight router bit with the large pilot bearing in the router. Rout a convex arc across the edge of the patch wood, then remove the template. If necessary, trim the other end of the patch (not the routed curve) to make it a convenient size for gluing in the recess.

STEP 4: Trim patch to size. Place the curved patch in the recess and mark a line on the underside of the patch using the repaired piece as a guide, as shown. Remove the patch and saw on the line to trim the patch so it just fits the recess. Now glue and clamp the patch in the recess. Sand the patch flush when the glue dries, and continue your project as if nothing ever happened. ▲



Pat Warner designs and builds furniture, writes about woodworking and teaches router techniques at Palomar College in San Marcos, California.

FIG. 1: ROUTER CIRCLE-CUTTING JIG

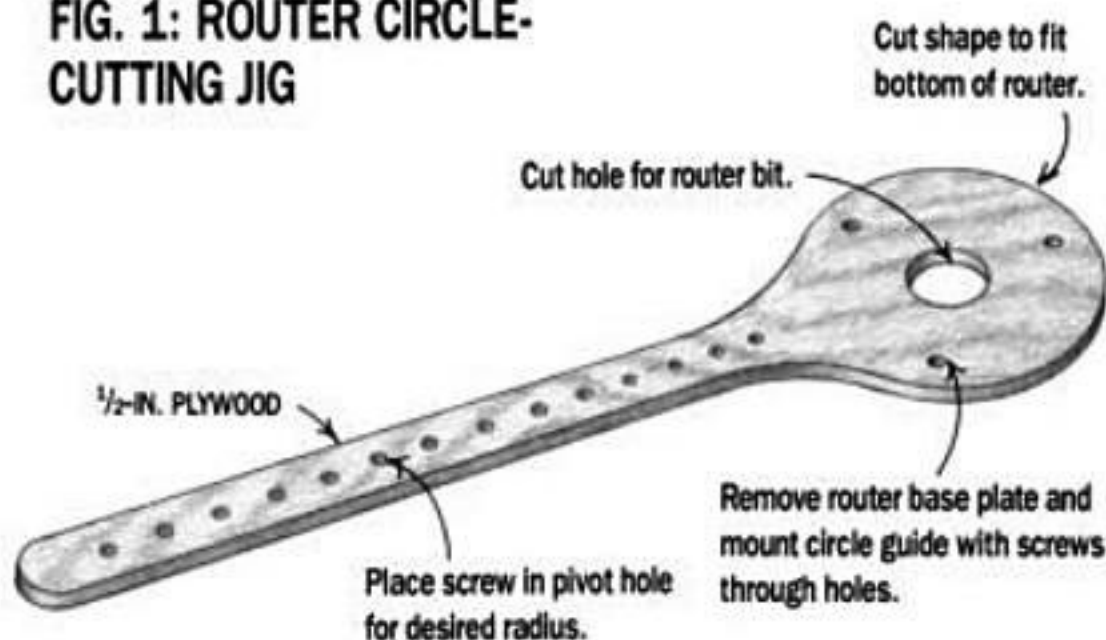
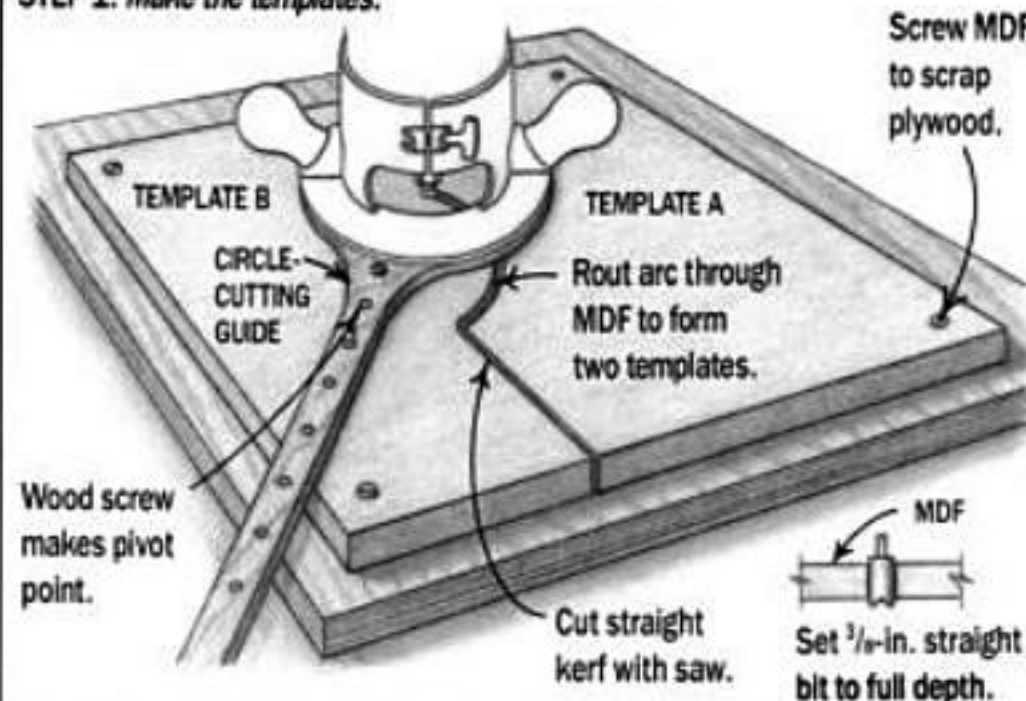
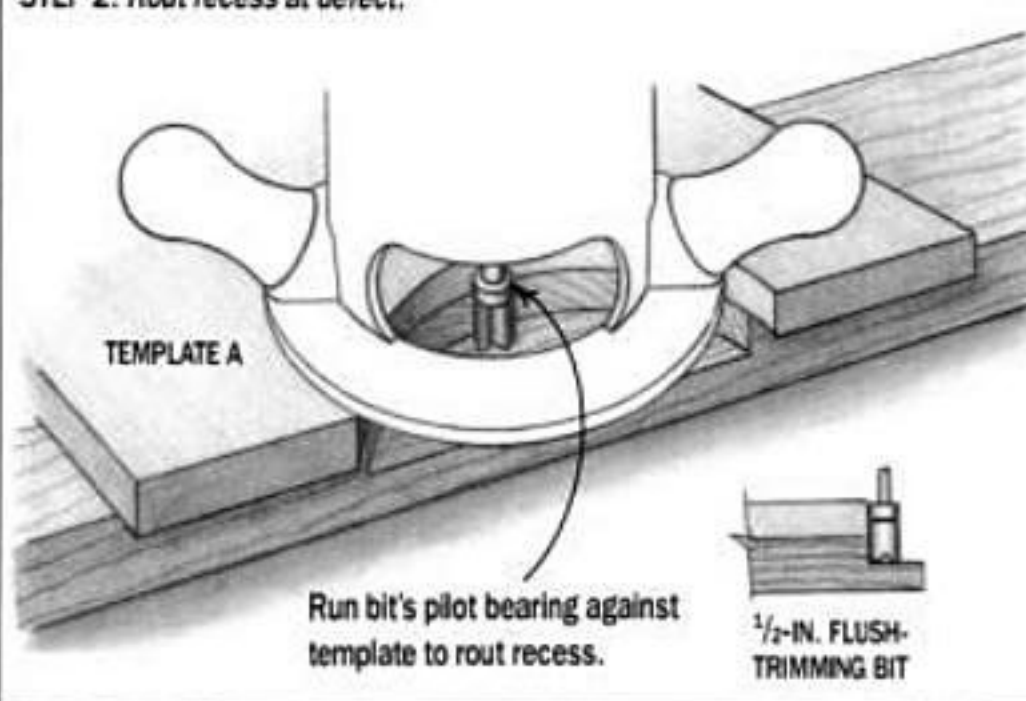


FIG. 2: MAKING PATCHES WITH A ROUTER

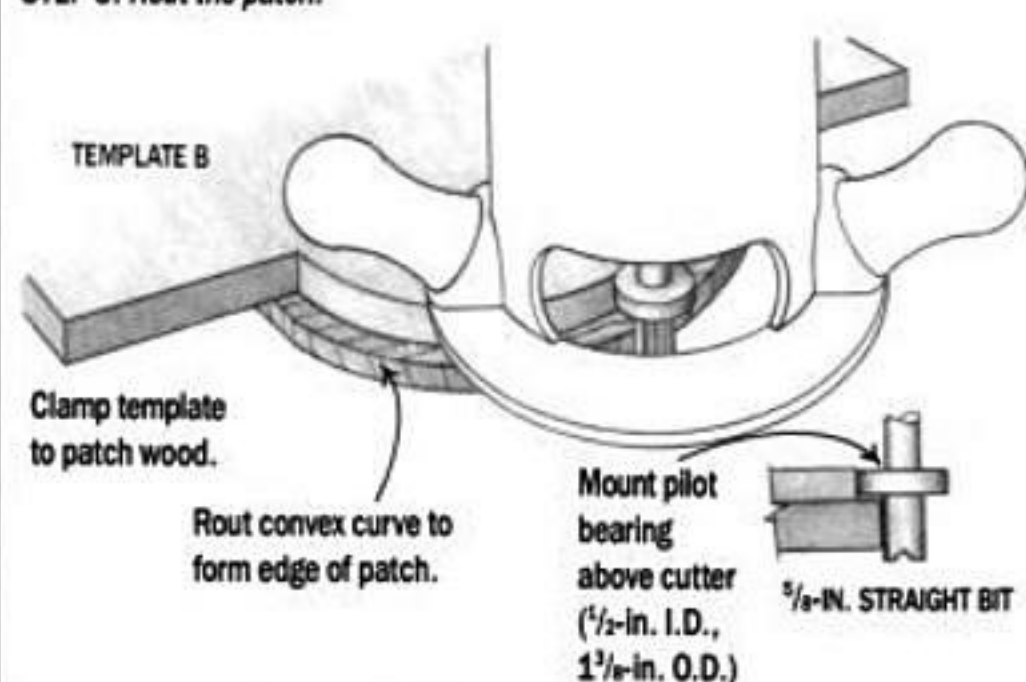
STEP 1: Make the templates.



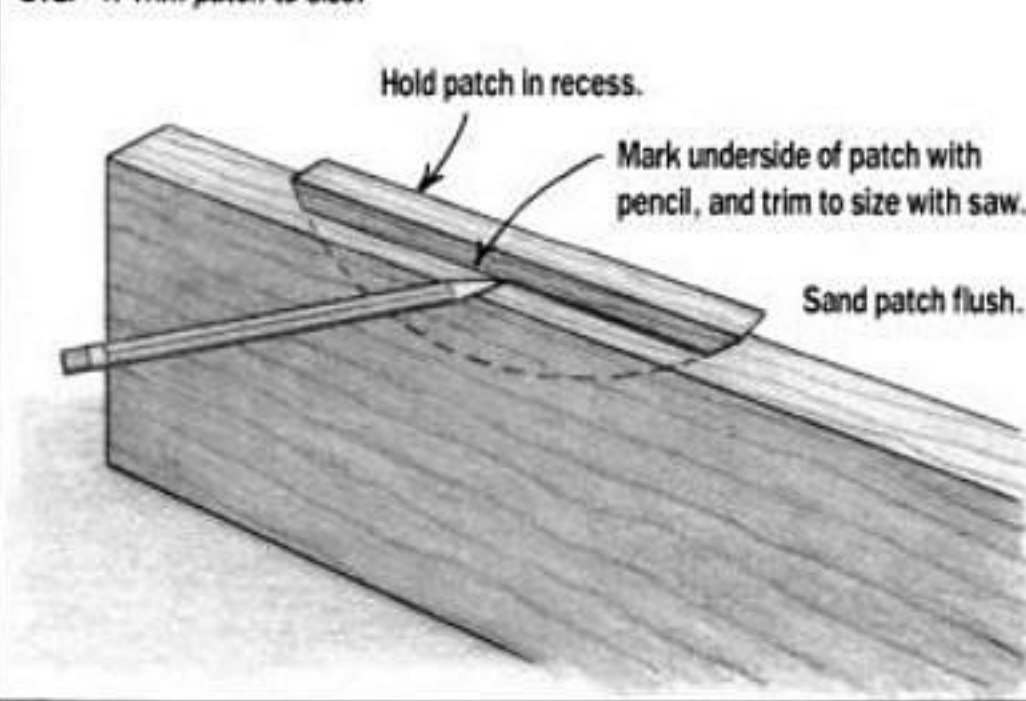
STEP 2: Rout recess at defect.



STEP 3: Rout the patch.



STEP 4: Trim patch to size.



BACKYARD LUMBERMAKING

Options for Sawing and Drying Your Own Wood

BY BOB MORAN

You see it all the time. Somebody cuts down a big, beautiful shade tree and splits it up for firewood. The things you could have made with that wood! ... If only you had a sawmill....

Well, stop dreaming and start planning. Sawing and drying your own wood is a viable option for the serious furniture maker or part-time entrepreneur. Portable sawmills can saw up a tree where it falls. Whether you buy a mill yourself or hire someone who owns one, custom, on-site milling can supply you (and your friends) with some extra-special wood.

In this article, I'll take a look at some practical options for finding, sawing and drying your own wood. In *Finding Good Wood* you'll learn where to buy or scrounge trees and logs. In the section, *Sawing a Log* you'll see how to cut up a log. In *Small-Scale Sawmills* I'll review some saws, from inexpensive chainsaw rigs to versatile bandmills you can tow with a pickup. In *Drying Your Own Wood* you'll learn various ways you can dry your own boards.

Who knows? Once you get started, you might find lumbermaking as much fun as making furniture. ▲

Finding Good Wood—Page 45
Sawing a Log—Page 47
Small-Scale Sawmills—Page 48
Drying Your Own Wood—Page 52
Sources—Page 51 and 54

Bob Moran is
assistant editor
of **AMERICAN
WOODWORKER**.



FINDING GOOD WOOD



A big burl may make a log worthless to a commercial sawyer but produce magnificent grain patterns for the craftsman. Note the well-stickered lumber in the background.

In a nutshell, logs are where you find trees. If you ask yourself where trees go when they die, you're well on your way to finding logs.

In an urban location, you can find trees by driving around after a wind storm, but it's easier to let the trees find you. Spread the word that you're looking for logs.

Check the Yellow Pages for tree-service companies. These companies cut down trees and haul them away. Many end up as firewood, while others end up in landfills because nobody wants them. Get to know these companies. Let them know what you're looking for. Just remember that they're in business to please their customers who simply want the trees gone. If the tree is in a customer's yard, you'll probably have to truck the logs someplace else for sawing.

A word of warning about yard trees: They often contain nails or other metal that can wreck a saw blade and present a hazard to the saw operator. Check questionable logs with a metal detector. (See *Final Pass*, page 72.)

Firewood dealers are another good source of logs. Check the Yellow Pages and the classified ads in the newspaper. Let these guys know what you'll buy. Windsor chairmaker Mike Dunbar gets a few choice logs from his firewood supplier. Mike uses the best sections for chairmaking and saws the rest up for firewood.

If you live in the country you may be able to buy trees directly from the landowner. If you live near an area where logging is done commercially, don't brush aside

the possibility of buying logs from a logger. A lot of magnificent wood is left to rot because commercial sawyers won't handle large crotches or burls or logs less than 8 ft. long. A logger who knows you're interested in this kind of wood may keep you well-supplied at bargain-basement prices. You're not likely to find loggers in the Yellow Pages, though. You can track them down through your state or county forester.

Turners have it easy. All they need is a chainsaw and a pickup to get their hands on good turning wood. Windblown trees that have been down for a while are potential gold mines for spalted wood. You can spot a burl on a tree from a distance, in autumn after the leaves have fallen. The landowner may let you have it cheap, maybe for free, if you saw the rest of the tree into firewood for him. You can chain-saw a burl into turning blanks and carry the blanks out of the woods by hand.

Wherever you get your logs, keep in mind that logs are big and heavy. Portable sawmills go to the log, but if the log has to come to you, try to arrange delivery from the logger or tree-service company. On site, be prepared to muscle lots of weight. A forklift is handy if you happen to have one, but you can manage with winches, peaveys and a few local football players. (See *Sources*, page 54, for log-handling tools.)

When the word gets out that you want logs, you may get *more* than you want. When I ran a woodworking shop, I had more logs offered to me than I could use.



KNOW WHAT YOU'RE LOOKING FOR

Wild and irregular grain typifies the furniture of woodworkers like the late George Nakashima. Large crotches produce slabs like the one behind the lamp in the Nakashima showroom.



Before you go looking for logs, know what kind of wood you want. Know the species, the length and diameter of the logs you'll consider buying. Give some thought to the role wood plays in the furniture you make.

Some woodworkers—the late George Nakashima is a good example—design their furniture as a “celebration of wood.” The wood itself is the main attraction. The furniture parts function like a frame around a painting, drawing the eye to the textures and patterns in the wood. A tree that is well-suited for this kind of design may be quite gnarly, or have a large crotch or a huge burl. An irregular, convoluted surface on the log is an indication of wild and convoluted grain within. Bowl turners or jewelry-box makers often want wood with the same kind of flamboyant grain.

If wild wood is your specialty, you're in luck. Commercial sawmills won't touch this kind of log, so you can often get it cheap.

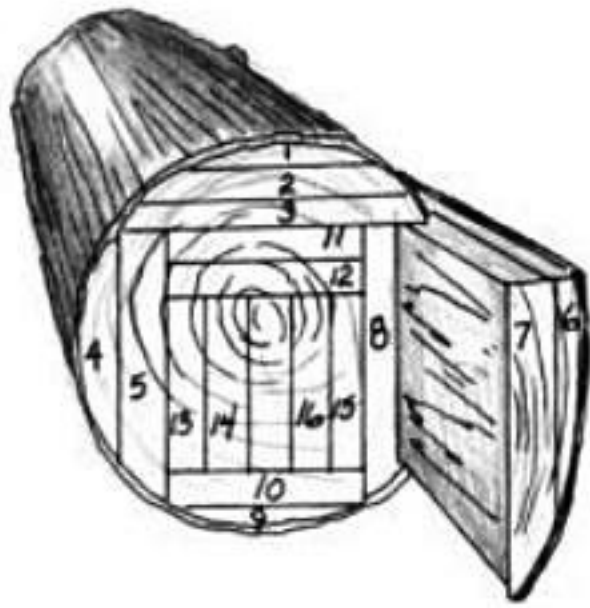
Other woodworkers view wood as a complement to the furniture design. For them, the design and the wood are a marriage, each contributing to the whole but neither dominating. Too much flamboyance in the grain of the wood can spoil such a design. Some of James Krenov's work falls into this category. For this kind of woodwork, fairly straight, uniform logs without knots or scars will provide you with wood that has beautiful, but subdued, subtle grain patterns. Depending on how you saw it (see page 47) you can get different grain effects. A quartersawn board from such a log will have edge-grain, a pattern of parallel lines.



More subdued, sometimes even plain grain is appropriate where the design and the wood work together as equals. In this cabinet by James Krenov, the design and the wood share equally. Less-spectacular logs produce figure like this.

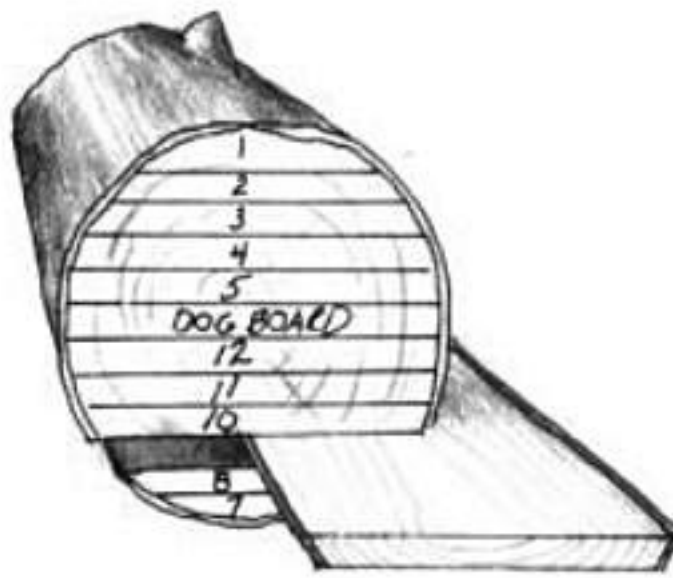
BENJAMIN CALEEN

SAWING A LOG



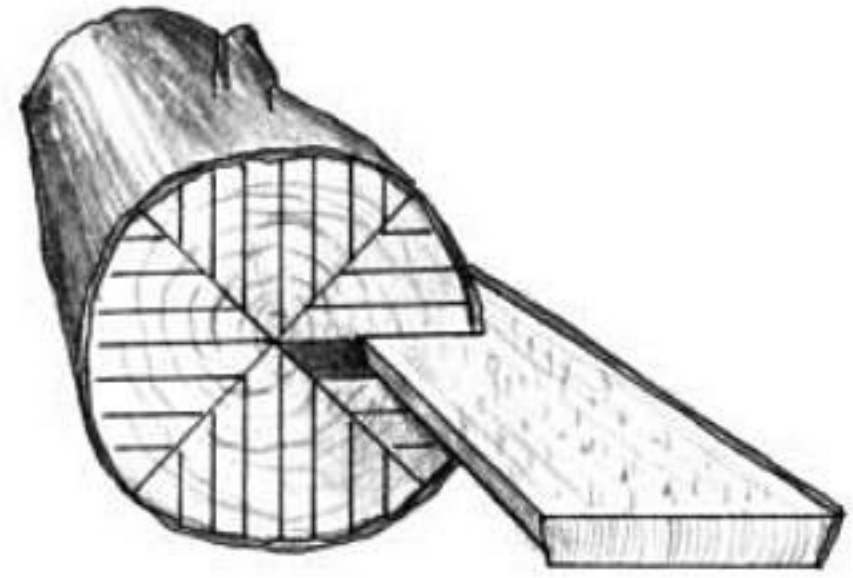
GRADE SAWING

When grade sawing, the sawyer rotates the log to whatever face gives the highest-grade board. The drawing shows how one particular log might be cut.



LIVE SAWING

All cuts are parallel. The sawyer saws to near the center of the log, then rotates the log 180° and saws the second half.



QUARTERSAWING

The sawyer first saws the log into four quarters. He then saws each quarter radially to obtain edge-grain boards.

DRAWINGS BY MICHAEL MANDRUANO

There are three basic ways to saw a log into boards: grade sawing (also called sawing around the log), live sawing (also called sawing through-and-through), and quartersawing.

Grade sawing is the most common commercial sawing technique in America. When grade sawing a log, the sawyer saws from the best face of the log until he uncovers defects inside the log. As the sawyer finds imperfections, he rotates the log to a better face and continues to saw and rotate the log so that he is always sawing from the best face. Many sawyers firmly believe that this method produces the maximum amount of high-grade lumber. (More on that subject in a bit.) Virtually all grade-sawn lumber is flat grain.

Live sawing is more common in Europe than here. When live sawing a log, the sawyer saws from one face to near the center of the log, then he rotates the log 180° and saws the rest. The result is wide boards with a mixture of flat-grain and edge-grain lumber. In Europe, and increasingly in this country, lumber from a live-sawn log is left waney (not edged) and is stacked together as a unit by reassembling the log with stickers between the boards. A live-sawn log kept as a unit is known as a *boule* (rhymes with "pool"). Live sawing is usually the least labor-intensive sawing method.

Quartersawing produces the maximum amount of edge-grain lumber from a log. The term "quartersawn" is often used for any edge-grain lumber, even though several sawing techniques or variations can produce the same grain pattern. True quartersawing consists of sawing the log into four quarters and then radially sawing each quarter. While quartersawing produces edge-grain lumber from the entire log, it is the most labor-intensive sawing method and produces the fewest wide boards.

As I mentioned, many sawyers believe that grade sawing produces the most valuable (highest grade) lumber. If so, that would be an important consideration in choosing which of the three sawing methods to use. Studies published in *Forest Products Journal* show, however, that live sawing, not grade sawing, produces higher-value lumber.

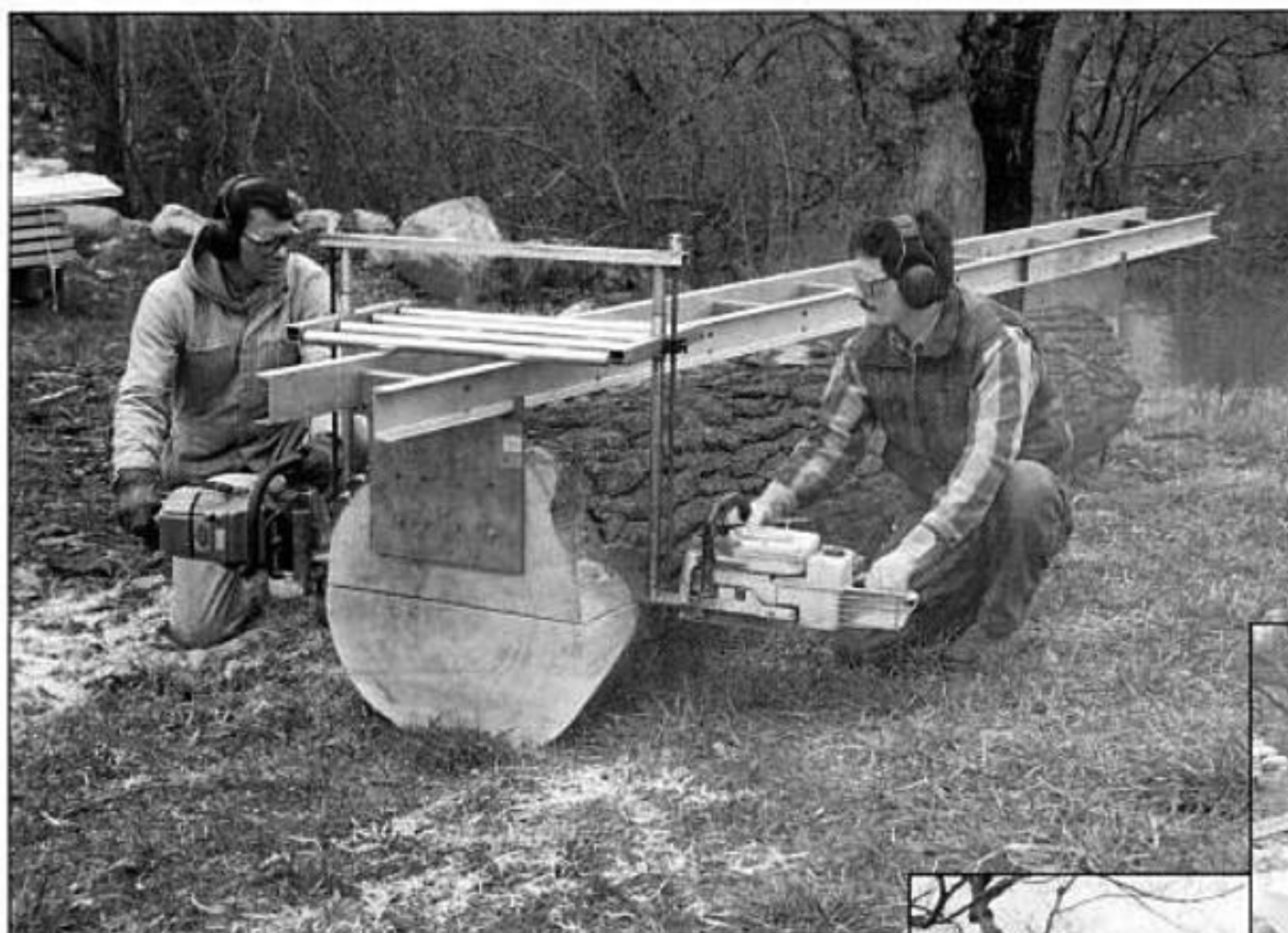


An enviable stockpile of live-sawn boules awaits the craftsmen at the Nakashima workshops near New Hope, Pennsylvania.

When it comes to sawing burls, crotches and stumps, you're on your own, because each log is unique. Some woodworkers will want to use a burl or crotch for free-form tabletops; others will want small, thin boards for jewelry boxes; still others will want turning squares. Here, more than anywhere else, you need knowledge gained through experience. You need the ability to visualize a slab or board within a stump or burl. You need to know how wood grain twists and turns within a tree. As George Nakashima put it, "You have to know what you're doing ... and there's no way to find out except by doing it."

My personal preference for general furniture making is live-sawn boules. When all of the wood in a project comes from the same log, it all has the same color tone and takes finishes in the same way. With a full variety of cuts, from flat grain to perfect 90° edge-grain, it's much easier to select grain patterns to suit a particular part of a project. Strongly vertical parts like legs or door stiles can have fairly straight, parallel grain, while broad and relatively short parts like door panels can have more figured grain. A boule is the only economical way a small shop can get wood with matching grain.

SMALL-SCALE SAWMILLS



1. The most common approach to chainsaw milling begins with halving the log. A flat surface for the mill's rollers to follow must be attached to the log for this opening cut.

2. Once the log is halved, roll the top half over. Keep it on top of the second half so you can saw it at a more convenient height.



At Colonial Williamsburg in Virginia, logs are still sawn in saw pits by hand. One sawyer stands in a pit, under the log, pulling the long, two-handled rip saw down on the cutting stroke, getting showered with sawdust. Another man stands over the log and pulls the saw back up. Up and down, up and down, it's dirty, sweaty, back-breaking work.

At the other end of the technological spectrum, logs are sawn in fully automated sawmills with laser beams to show the sawyer where the next cut will come.

Between these two extremes are some small, gasoline-powered, one-man or two-man sawmills. In this section, I'll review two general types of small-scale sawmill. "Portable sawmills" are lightweight mills that you can carry by hand. "Mobile sawmills" are larger sawmills that you can tow behind a pickup.

Portable Sawmills

A saw that you can pick up and carry has a lot of advantages. You can take the saw to the log instead of having to lug an enormous log to the saw. That can be an important consideration even if you're equipped to move heavy logs. A suburban tree can be carried out of a backyard as boards, without chopping up the lawn.

When you're not using the portable mill, it can hang in your garage or basement instead of being parked out-



3. Sawing up the two halves is quick, simple, and straightforward. The saw follows the previously cut surface, producing planks of uniform thickness. A log of this size can be sawn up in an hour.

PHOTOS BY BOB MORAN

side. Portable sawmills are a lot less expensive than mobile sawmills.

There are two types of portable sawmill, chainsaw mills and a small bandsaw mill called the "Ripsaw."

Chainsaw mills—When it comes to chainsaw mills, you have several options. For \$50 you can equip your present chainsaw with ripping chain for freehand sawing. At the other extreme, \$3,000 buys a 50-in. capacity mill complete with two Stihl chainsaw motors.

If you own a chainsaw, try freehand sawing. I've found I can saw 3-ft. to 4-ft. "bolts" by standing them on end and securely bracing them. (A bolt is a log less than 8 ft. long.) The first bolt or two that I sawed gave me boards that required $\frac{1}{4}$ -in. or so of planing on each side to flatten out. With experience, my boards improved to about $\frac{1}{8}$ in. out of flat. If you cut your own firewood and come across a promising bolt, saw it into boards just for the experience. Ripping chain (see Sources, page 54) will greatly speed up the sawing.

The next step up from freehand sawing is a simple accessory that clamps to the bar of a chainsaw to provide a flat surface perpendicular to the bar much like the bottom of a portable circular saw. Granberg International makes one called the Mini-Mill. At \$79.95 the Mini-Mill is the lowest-price lumbermaking aid I found.

For the first cut, you spike a plank to the log so you have a flat surface for the Mini-Mill to follow. From then on, the Mini-Mill follows a previously cut face of the log. I used one many years ago and didn't find it any more accurate than practiced freehand sawing, but it did permit me to saw lumber more than 4 ft. long, my practical limit for vertical freehand sawing.

A more sophisticated chainsaw-mill approach is Granberg's Alaskan Mark III or the similar Sperber mill. With these mills, you saw parallel to a previous cut instead of perpendicular to it. Like the Mini-Mill, you start with a flat surface provided by a spiked-on plank, then use previous cuts as the reference surface for successive cuts. Because the saw cuts are parallel to the surface, these attachments are well-suited to live sawing logs that are to be kept together as boules.

These chainsaw mills are serious tools. Adequately powered, properly sharpened, run by two experienced operators, they will saw a 2½-ft. dia. × 8-ft. long oak log into 2-in. planks in little more than an hour, including a stop to sharpen the chain. They are noisy, but not intolerable if you wear ear protection. Using them is good exercise, but you don't need to be Paul Bunyan to handle them effectively. Their only real drawback is a big $\frac{5}{16}$ -in. wide kerf. That wide kerf wastes a lot of wood. Bandsaw mills have a $\frac{1}{16}$ -in. kerf; a lot less wood gets chewed into sawdust.

Chainsaw mills come in various sizes. The small ones can handle logs up to 1½ ft. in diameter. The largest will saw logs more than 4 ft. in diameter. Prices range from \$155 to over \$600 plus the cost of the chainsaw motors to run them. More money buys a larger-capacity mill with a double-end bar that takes two chainsaw motors at once.

If big logs are your thing, you should know that some large chainsaw mills are capable of sawing larger-diameter logs than many commercial saw mills. Yet, they'll fit in the back of a car and cost less than a snowmobile or a boat.

Portable bandsaws—The Ripsaw is a 45-lb. portable bandsaw for sawing logs into lumber. A few years back, Delta introduced a similar machine, the Delta Lumbermaker, but it's no longer available.



PHOTO COURTESY OF GRANBERG INTERNATIONAL

Granberg's Mini-Mill is a \$79.95 metal plate that clamps to a chainsaw bar to guide the saw perpendicular to a previous cut. It does the job with a minimal investment.



PHOTO COURTESY BETTER BUILD CORP.

The Ripsaw portable bandsaw mill can be handled by one man and cuts a lumber-saving $\frac{1}{16}$ -in. kerf, but it is limited to sawing boards no wider than 14 in.

Several models of the Ripsaw are available, ranging from an electric-powered model that can saw boards up to 10 in. wide to a gasoline-powered model that can saw boards up to 14 in. wide. Prices, including the motors, range from \$1,049 to \$1,820.

Like the chainsaw attachments, sawing a log with the Ripsaw starts with attaching a board to the log for the first cut, then referencing the previously cut surface for each successive cut. Unlike the chainsaw mills, the Ripsaw cuts a $\frac{1}{16}$ -in. kerf.

Portable bandsaw mills are relatively new and haven't had the widespread use that chainsaw mills have had, but the owners that I talked with were well pleased. The only complaints that I heard were about the limited board-width capacity and the need for frequent sharpening on hardwoods like hickory. A retired gentleman who owns both the Ripsaw and a chainsaw mill was pleased that he could use the Ripsaw by himself. If you can live with a 10-in. or 14-in. sawing width, the Ripsaw is worth your attention.

Mobile Sawmills

The next step up from a portable sawmill is a mobile mill—a sawmill on wheels that you can tow behind a pickup truck. These mills are suitable for amateurs but do professional-quality sawing. They're more powerful and saw faster than portable sawmills. They're also more expensive.

I found nine manufacturers of mobile sawmills, with prices ranging from \$5,000 to \$25,000. Some offer a choice of gasoline, electric or diesel power, while others offer only gasoline engines. There are two kinds of mobile sawmill, circular saws and bandsaws.

Mobile circular sawmills like the Mighty Mite and the Mobile Dimension Saw use three circular saw blades—a main blade and two edger blades—that all cut simultaneously. As the saws pass through the log, the main saw cuts the face of a board while the edger blades cut the board to width. While these saws are limited to cutting a maximum board width of about a foot,

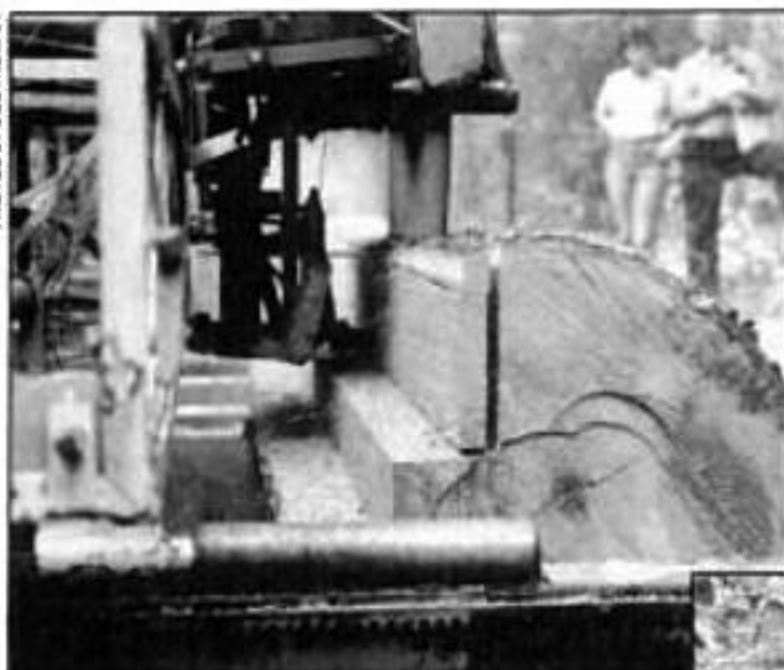
they are unique in that they can make lumber out of literally any diameter log. These mills will cost you from \$10,000 to \$25,000 and are particularly well-suited for sawing dimension lumber.

At the economy end of circular sawmills, Foley Bel-saw makes a \$5,000 mill that you power with a farm tractor, but it isn't mobile.

Mobile bandsaw mills are horizontal bandsaws that saw boards off the top of the log. The saw is suspended over the log and moves along a track from one end of the log to the other. When a cut is complete, you take the board off the top, return the saw to the end of the log, lower the saw for the next cut, and repeat.

Mobile bandsaw mills are ideal for supplying the special needs of a small furniture or cabinet shop. First, they cut wider boards than circular mills, typically more than double the 1-ft. limit of the circular mills mentioned. Second, with their $\frac{1}{16}$ -in. kerf, you can saw 4/4 or thinner stock directly from the log and still have a pile of lumber bigger than the pile of sawdust.

PHOTOS BY BOB MOYAN



The Mobile Dimension three-blade circular sawmill saws and edges one or two boards at a time, slicing them out of an ever-growing notch in the log. These saws work quickly to reduce huge logs to dimension lumber.

A mobile circular sawmill like this Mobile Dimension saw is a particularly good choice for sawing construction lumber.



Turning a 28-in. dia. oak log without hydraulic log-handling equipment is not a one-man operation.



Mobile bandsaw mills range in price from under \$5,000 to \$25,000, depending on log-diameter capacity, engine size, and the extent of the mill's hydraulic log-handling capability. Log capacities range from 17½-in. dia. on the smaller Ross mill (\$4,950) to 36-in. dia. on several others. Motor power ranges from a low of 8 HP on the smallest Wood-Mizer up to 65 HP on the largest Paul Bunyan. Log-handling capability ranges from entirely manual to mills with full-hydraulic loading, log-turning and leveling controls. There are lots of options with mobile bandmills.

The mobile bandmill that I came across most often was the Wood-Mizer; in fact it's the only mobile bandmill that I saw in action. I got to compare two Wood-Mizer mills—one with hydraulic log-handling equipment and one without. Both did a great job sawing up logs, but the owners of the manual model spent a lot of time muscling logs up onto the saw. The owner of the hydraulic-equipped Wood-Mizer never seemed to work up a sweat. The hydraulics lifted the log, rolled it onto

the saw and turned the log till you found the best face.

To sum up, each type of small-scale sawmill has its own best application. Chainsaw mills saw the widest logs and are the least expensive way to get into lumber-making. The Ripsaw portable bandsaw combines the portability and modest cost of the chainsaw mills with the ⅜-in. kerf of the mobile bandsaw mills. The trade-off is the limited maximum board width.

Mobile circular mills are efficient and productive rigs for sawing out dimension lumber, especially for construction purposes. Mobile bandsaw mills seem to me to be the most versatile for sawing furniture-shop lumber. I found it interesting that Lee Stitzinger of Brookville Wood Products in Brookville, Pennsylvania, a good-size commercial sawing operation with a conventional sawing setup, uses a Breezewood bandsaw mill to cut up his finest specialty logs.

Don't rely entirely on my opinions. Contact the manufacturers (see Sources) to find out where you can see their mill in operation in your part of the country.



Mobile bandsaw mills are great for sawing high-grade boards. The gas-powered saw moves on a track. The thin blade cuts a narrow kerf and wastes less wood than a chainsaw mill.

Mobile bandsaw mills slice boards off the top of the log. To get edged boards, square the log before sawing it up.



PHOTOS BY JOHN HAMEL

SOURCES

Additional information about the sawmills mentioned in this section is available from the following:

Portable Sawmills

BETTER BUILT CORP., 845 Woburn St.,
Wilmington, MA 01887, (508) 657-5636.

GRANBERG INTERNATIONAL, 200 S. Garrard
Blvd., Richmond, CA 94801, (800) 258-9905.

SPERBER TOOL WORKS INC., P.O. Box 439,
Bennington, VT 05201, (802) 442-8839.

Mobile Sawmills

BREEZEWOOD INC., P.O. Box 266, Reynolds-
ville, PA 15851, (814) 653-9500.

FOLEY-BELSAW CO., P.O. Box 1269, Minne-
apolis, MN 55440, (612) 789-8831.

KASCO MFG. CO., INC., R.R. 3, Box 393, Shelby-
ville, IN 46176, (317) 398-7973.

MIGHTY MITE INDUSTRIES INC., P.O. Box
20427, Portland, OR 97220, (503) 288-5923.

MOBILE MANUFACTURING CO., P.O. Box 258,
Troutdale, OR 97060, (503) 666-5593.

PAUL BUNYAN JR. INDUSTRIES, 27484 SE
Paul Bunyan Ln., Eagle Creek, OR 97022
(503) 637-3233.

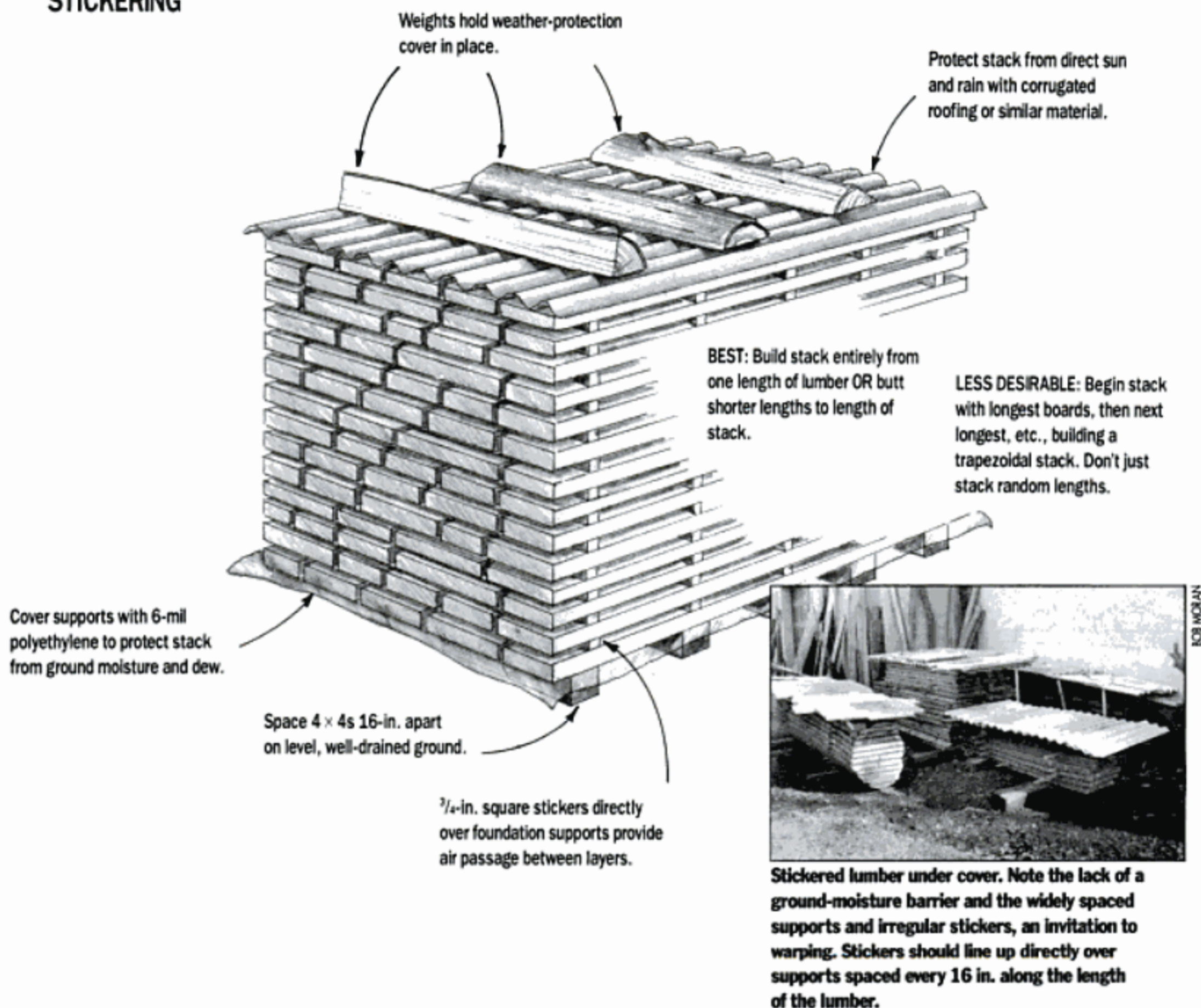
W.K. ROSS, INC., 640 Main St., West Hamp-
stead, NH 03841, (603) 329-6320.

SANBORN AUTOMATED SAWMILL
MACHINERY, South Waterford, ME 04081,
(207) 583-4669.

WOOD-MIZER PRODUCTS, 8180 W. 10th St.,
Indianapolis, IN 46214, (800) 553-0219.

DRYING YOUR OWN WOOD

STICKERING



Green wood contains a lot of water. Drying, or “seasoning,” is the process of removing water by allowing it to evaporate under controlled conditions. Too slow, and you risk infestations of fungi and mold. Too fast, and you end up with checks, cracks, and other drying-related defects referred to as “degrade.”

The backyard lumbermaker has three practical choices when it comes to drying wood: air drying, kiln drying with heat and dehumidification-kiln drying.

Air Drying

A lot of woodworkers and wood dealers believe that air drying won’t dry wood enough for making fine furniture. It ain’t so. Not many years ago, virtually *all* fine furniture was made from air-dried lumber.

Successful air drying involves:

1. Stacking and stickering the wood outdoors, and covering the pile to keep off rain and sun.
2. Monitoring the wood’s moisture content (MC) until it stops losing moisture.
3. Restickering the wood indoors in a drier environment to continue the drying process.

4. Monitoring the MC until it reaches 8%, or when the wood stops losing moisture.

Air drying starts outdoors or in an unheated building with good ventilation. Stack the lumber in a dry place that’s open to breezes. Fig. 4 shows how to sticker the boards, cover the stack and keep ground moisture away.

How long should you air dry outdoors? The rule of thumb says a year for every inch of board thickness, but the time can really vary. The only way to know for sure is to monitor the moisture content of the boards. Local humidity and temperature conditions determine how dry your lumber will get outdoors. In most parts of the U.S., outdoor air drying will eventually bring the MC down to about 15% to 20%.

Measuring and monitoring moisture content is essential when drying wood outdoors, indoors or in a kiln. The simplest and most practical way to measure moisture is with a moisture meter. My advice is to get one even if you buy all your lumber dry, then you know for sure how dry it is *today*.

Outdoor air drying is just the first step in the air-



With a moisture meter, you don't have to guess when your wood is dry. The Lignomat Mini Ligno E/C meter has two built-in probes that stick in the wood to measure moisture content. Optional remote probes and cable let you take readings in the middle of a stack.



The Delmhorst G-30 moisture meter and 26-ES slide-hammer electrode can measure the moisture content deep within thick lumber. This meter has a range of 6% to 30%.

drying process. There comes a time when the wood will stop losing moisture. At this point, it's said to have reached *equilibrium moisture content* (EMC). EMC means that the moisture content of the wood has stabilized with the relative humidity of the surrounding air. It won't gain or lose moisture unless the relative humidity of the air changes. The only way to dry the wood further is to move the wood to a drier environment.

Resticker the wood indoors, ideally in a space with the same temperature and humidity conditions as the room in which the finished furniture will be used. In a heated room, you can continue to air dry your lumber down to the 8% MC suitable for furniture making. Fans will improve air circulation and speed things up, and your moisture meter will tell you when you're done.

Kiln Drying

Kiln drying should not be regarded as a complete wood-drying process. It's a finishing process for wood that has been air dried outdoors to 15% to 20% MC. Kiln drying is really just indoor air drying with more control over temperature, humidity and air circulation. It has the advantage of being faster than air drying.

Two different types of kiln are appropriate for small-scale lumber drying. The first type uses a heat source to warm the air, lowering the relative humidity inside the kiln. The other type lowers the relative humidity by removing moisture from the air with a dehumidifier. Both approaches require enclosing the stickered stack of wood in some kind of drying chamber—a kiln.

The kiln is really just an insulated box several feet larger all around than the stack of stickered lumber to be dried. Fig. 5 shows the details that make for an efficient kiln.

Heated kilns—Heat for a kiln can come from a solar collector, a small hot-air furnace for a mobile home or camper or a loop from a steam or hot-water heating system. Heated kilns require vents to the outside to allow warm, moist air to exit and drier air to enter. Except for solar units, which need to be placed in the sun, you can locate a heated kiln any place that's convenient, indoors or out.

You can buy solar dry-kiln kits from Wood-Mizer.

DEFECT-FREE DRYING

Drying wood in a kiln is not as simple as popping frozen fish sticks in the oven. Drying wood too fast causes problems. To avoid warping, splitting and other degrade problems, temperature and humidity must be kept at levels that dry the wood slowly.

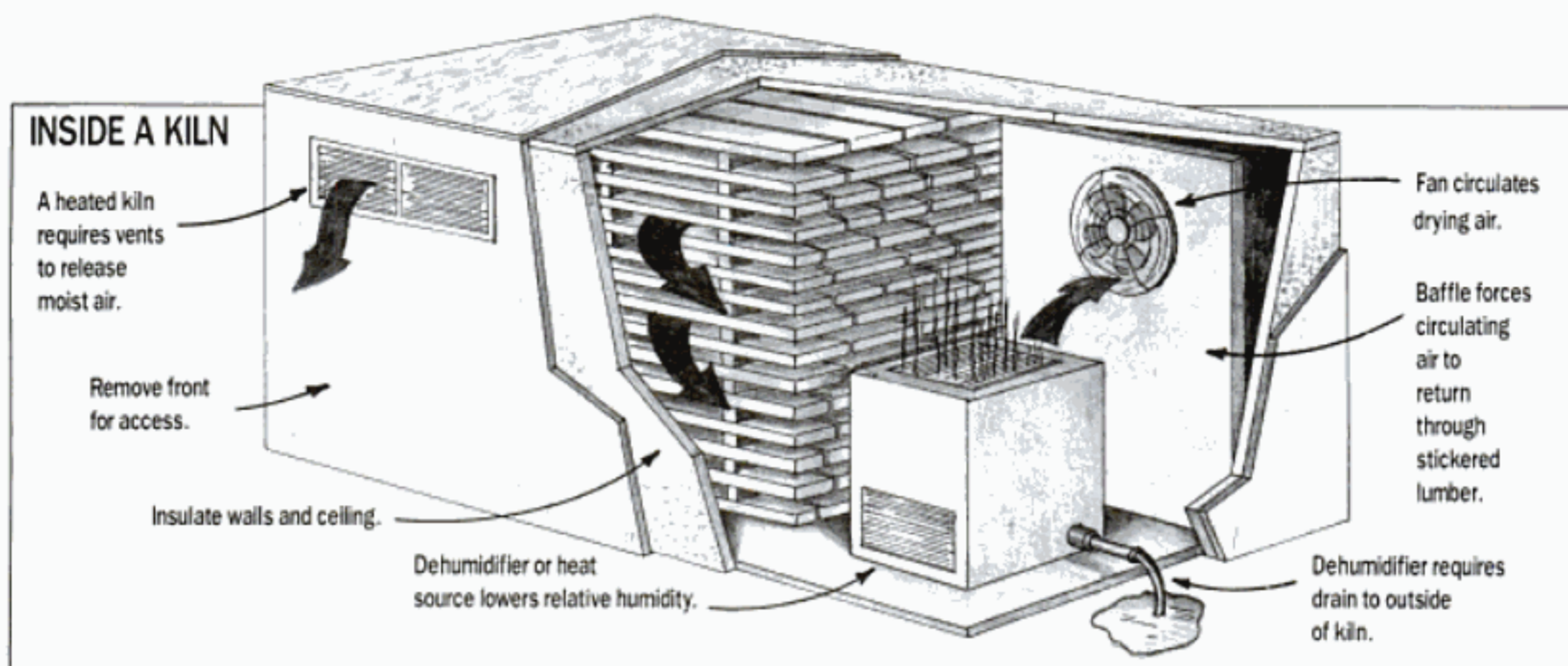
Wood shrinks when it dries out. This shrinkage creates internal stresses in the wood that can cause splits, checks, warp or honeycomb. Careful stickering will help keep warping under control. To control the other kinds of defects, you have to control the rate of moisture loss.

End checking results because the ends of a board or log lose moisture faster than the middle. These splits can run right on up a board, destroying it. You can reduce end checking by slowing the loss of moisture from the end grain.

As soon as logs have been trimmed and cut to length, coat all end-grain surfaces with a wax-emulsion end sealer such as Anchorseal. (See Sources.) You can brush it on in the woods and it will help protect against end checking right on through sawing and drying. (Oil-based paint is better than no sealer at all.) If you buy logs that haven't been end sealed you should seal them immediately. Prompt and proper end sealing is by far the most cost-effective (and most neglected) step you can take to ensure that you'll end up with high-quality lumber.

Surface checks are cracks that develop when the surface of the board shrinks faster than the interior. Protect sawn boards from surface checking by keeping them out of direct sunlight and by following recommended kiln schedules if you dry your lumber with heat or dehumidification.

Honeycomb is checking inside a board. Honeycomb is a drying-related defect caused by the stresses that result from drying a board too fast.



(See Sources.) Prices range from \$1,990 for a 750-board-ft. capacity model to \$7,450 for a 7,200-board-ft. model. The kits require that you supply additional construction materials for the kiln chamber.

Dehumidification kilns—Dehumidification drying has gained popularity in the last decade or so. A dehumidifier unit takes the place of the heat source inside the kiln. Vents are not needed because the dehumidifier condenses the moisture into water that drains out through a hose.

Dehumidifiers designed specifically for lumber drying are manufactured by two companies, Ebac and Nyle. (See Sources.) These are self-contained units that operate safely at higher temperatures than ordinary room dehumidifiers. They're built of materials that resist corrosion from the acids encountered in the kiln environment (tannic acid from oak, for example). The

makers also provide plans and guidelines for building suitable kiln chambers and drying schedules for drying your lumber with a minimum of degrade.

Both Ebac and Nyle make dehumidification units in many different sizes. They vary in size from 15 in. × 15 in. × 22 in. for the smallest units up to 6 ft. × 6 ft. × 6 ft. for the biggest commercial units. Ebac dehumidifiers begin with a 50-board-ft. to 250-board-ft. capacity unit that costs \$1,150. Nyle units begin at 300-board-ft. to 1,200-board-ft. capacity for \$1,995. Both companies make a wide range of dehumidifiers including large commercial units.

Keep in mind that dried wood won't necessarily stay dry. Moisture moves into wood as readily as it moves out. Bone-dry wood from the fanciest kiln will quickly pick up moisture if you store it in a damp basement.

SOURCES

Kiln Dehumidifiers

EBAC LUMBER DRYERS, 106 John Jefferson Rd., Suite 102, Williamsburg, VA 23185, (800) 433-9011.

NYLE CORP., P.O. Box 1107, Bangor, ME 04401, (800) 777-6953.

Moisture Meters

DELMHORST INSTRUMENT CO., P.O. Box 68, Towaco, NJ 07082, (201) 334-2557.

GANN SALES AND SERVICE, 12265 W. Bayaud Ave., Suite 105, Lakewood, CO 80228, (303) 980-8484.

LIGNOMAT USA, LTD., P.O. Box 30145, Portland, OR 97230, (800) 227-2105.

Miscellaneous Lumbermaking Supplies

End sealer for green wood: Anchorseal: U.C. Coatings Corp., P.O. Box 1066, Buffalo, NY 14215, (716) 833-9366.

Log-handling equipment: Bailey's, P.O. Box 550, Laytonville, CA 95454, (800) 322-4539.

Ripping chain: Granberg International and Sperber Tool Works, Inc. (See page 51.)

FOR MORE INFO

For more information about wood drying and small-kiln design and operation, see the following:

- *The Conversion and Seasoning of Wood*, by William H. Brown (1988, Linden Publishing Co., Inc., 3845 N. Blackstone, Fresno, CA 93726).

- *Understanding Wood*, by R. Bruce Hoadley (1980, Taunton Press, Box 355, Newtown, CT 06470).

- *Dry Kiln Operator's Handbook*, by Edmund F. Rasmussen (1961, U.S.D.A. Forest Products Laboratory Agriculture Handbook No. 188, U.S. Government Printing Office, Washington, D.C. 20401).

- *Air Drying of Lumber: A Guide to Industry Practices*, by Raymond C. Rietz and Rufus A. Page (1971, U.S.D.A. Forest Products Laboratory Agriculture Handbook No. 402, U.S. Government Printing Office, Washington, D.C. 20401).

- *Grading, Drying and Selling Lumber* videotape, by the Tennessee Valley Dry Kiln Association will be available mid-October. Write to: Bill Parrish, 13 Ridgeway Rd., Forestry Building, Norris, TN 37828.



MITCH MANDEL

If modern is your style, this desk will fill the bill. The glass top is supported by lacewood legs and a cabinet veneered in sycamore.

GLASS-TOP DESK

Form Follows Fun...ction

BY GLENN HUGHES

As a designer and builder of contemporary art furniture, I'm constantly striving to come up with new designs that are exciting to me. While art furniture—sometimes called “high touch,” sometimes called “trash”—is not everyone's cup of tea, it almost always is a springboard for debate, often landing in that gray area between craft and art. Whether you like it or not, everyone has an opinion about it. I find it challenging to create a functional object that is not totally familiar—a collage of different shapes that keeps the eye moving.

Whether you build my desk or not, if reading about it or just looking at it makes you think a bit differently about how furniture “should” look or be constructed, I've satisfied my purpose.

The desk has three basic components: top, cabinet and legs. (See Fig. 1.) The top of the desk is a sheet of $\frac{3}{4}$ -in. thick glass, supported on the right end by four, 2-in. thick lacewood legs. A threaded steel rod con-

cealed inside hollow dowel sections runs through all four legs near the bottom to keep the legs from racking. The other end of the glass is supported by a cabinet with three drawers.

I'll deal with each of these components—top, legs, and cabinet—separately.

The Glass Top

Before you start building the desk, order the $\frac{3}{4}$ -in. thick glass top. Be sure to specify a “polished edge with bumped corners;” the term “bumped corners” simply means that the corners have a small bevel. Most local glass companies will have to order the glass from their supplier. It may take a few weeks for the glass to arrive.

The glass top needs four holes drilled in one end for the screws that fasten the legs to the top. (See Fig. 1.) I recommend that the glass company drill the holes for you. Make sure the glass dealer has a scale drawing of the glass top indicating the size of the glass and the precise positions and diameters of the holes. **CONTINUED**

A decorative pattern was sandblasted onto the underside of the glass top. The pattern is a random distribution of shapes identical to the shape of the drawer handles. With an air compressor and an inexpensive sandblasting attachment, you could sandblast the glass yourself. Since I don't own a compressor, I jobbed out the sandblasting to a gentleman who inscribes grave-stones, or "burial monuments" as they're called in the trade. The best option is to have the sandblasting done at the shop where you buy the glass. Most glass companies provide this service.

I had to make a sandblasting template. I used a 30-in. wide adhesive-backed sheet of rubber stencil called Anchor Continental Rubber Stencil #120 to mask the glass (available by mail from Bruno's Monument Supply, 3132 Finch Dr., Danville, VA 24540, 804-836-1509). I cut the pattern in the stencil with an X-acto knife, and gave the stencil to the fellow who did the sandblasting.

Making the Legs

After ordering the glass, start working on the legs, but you won't be able to complete the legs until you have the glass.

Square up the 2-in. thick leg blanks and bandsaw the scallop design along one edge. Note that the sides of the



Drill the screw holes in the top of the legs by tilting the drill-press table 90° and clamping the leg to the table.

legs are beveled, as shown in Fig. 2. Cut these bevels *after* you drill the holes for the threaded rod and the dowels that connect the legs near the bottom. Hollow, 1-in. dia. dowel sections fit over the threaded rod to hide the rod and serve as spacers between the legs. (See Figs. 1 and 2.) The ends of these dowels fit into counterbores drilled on the rod-hole centers.

Drill the counterbore holes $\frac{3}{4}$ in. deep. Forstner bits work the best, leaving the cleanest and most accurately sized hole. After you've finished the larger holes, drill the $\frac{1}{2}$ -in. dia. holes all the way through each leg for the rod.

Next, bevel the sides of each leg. I did this by resawing the legs on the bandsaw with the setup shown in Fig. 2. If your bandsaw can't handle a $7\frac{1}{2}$ -in. depth-of-cut, you could bevel the legs with a hand plane.

Tilt the bandsaw table 5°. Clamp a wooden fence squarely to the table, just to the right of the blade and barely touching the teeth. (See Fig. 2.) With the straight edge of the leg on the table and one side held firmly against the fence, slowly feed the leg into the blade, cut-

A simple shop-made jig holds the dowels on end for drilling. Drill a 1-in. hole through a scrap of 4 × 4 and rip the stock down the center. Clamp the dowel between the jig halves to support the dowel for drilling.



NTA HUGHES

ting off that side. Turn the leg around, feeding the other end of the leg into the blade, and cut the opposite side of the leg. The rough surface left by the bandsaw can be cleaned up with a hand plane.

When the glass arrives, drill the holes in the top of the legs for the screws that attach the glass. (See Fig. 2.) Mark the centers for these holes through the holes in the glass itself so everything lines up. The screws will be hidden with plugs. Drill the larger-diameter plug-hole first, then drill the smaller hole for the screw. The photo shows how I did it on the drill press.

Next, saw out the "jaws," the slots on the legs that hold the glass. Lay out the slot on both sides of each leg, and saw out the slot with a Japanese handsaw, then chop out the waste with a chisel. Though it would be easier to cut this slot before bandsawing the bevels, I recommend that you do it after you've completed the bandsawing and drilling to lessen the risk of knocking off the fragile, short-grained piece at the top of the "jaw."

After you cut the jaw slots on all the legs, sand and finish the legs. I used Waterlox, a tung-oil varnish. I then slid a piece of $\frac{3}{4}$ -in. scrap into each slot and screwed it in place to protect the fragile top jaw until I was ready to attach the legs to the glass.

You're just about ready to attach the legs to the glass. First, you'll have to cut and drill the hollow dowel sections that fit over the threaded rod. I turned my own 1-in. dia. dowels out of curly maple to roughly match the sycamore veneer on the cabinet. You could just as well buy 1-in. dia. hardwood dowels.

To drill the dowels, you'll need an extra-long $\frac{1}{2}$ -in. dia. drill bit. You'll also need to make a simple jig to hold the dowel securely upright while drilling it on the drill press. (See photo.)

Cut three $5\frac{1}{2}$ -in. long sections of dowel and two 3-in. long sections. Bore a $\frac{1}{2}$ -in. dia. hole clear through the center of each $5\frac{1}{2}$ -in. section. These will become the spacers between the legs. In each 3-in. section, bore a $\frac{3}{4}$ -in. dia. hole just $1\frac{1}{2}$ in. deep in one end. These short sections are the end caps that fit over the nuts and the ends of the threaded rod. (See Fig. 1.)

Attaching the Legs

Now you're ready to attach the legs to the glass. First, pass the threaded rod through the four legs, sliding one of the $5\frac{1}{2}$ -in. long dowel sections on the rod between

FIG. 1: GLASS-TOP DESK

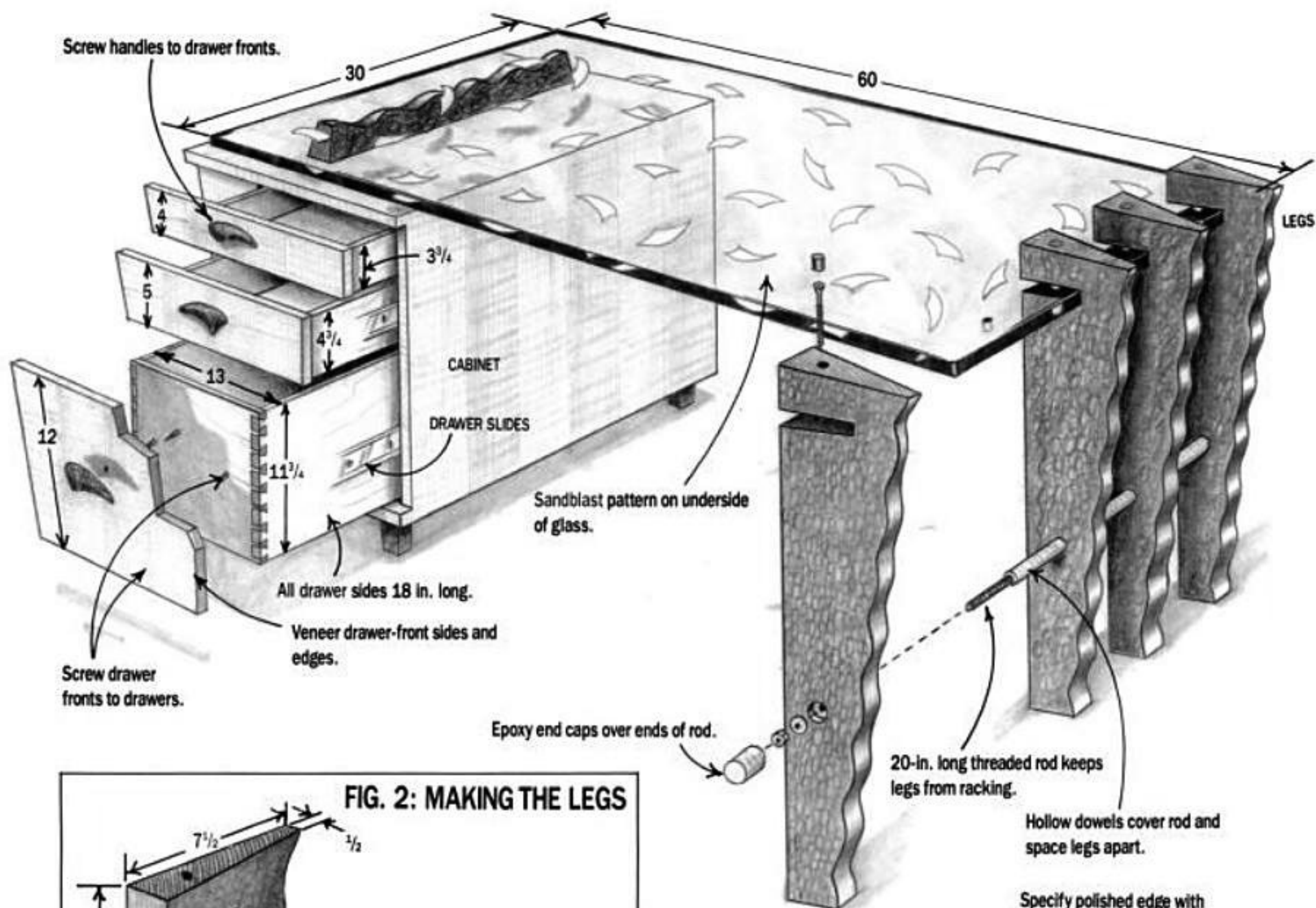
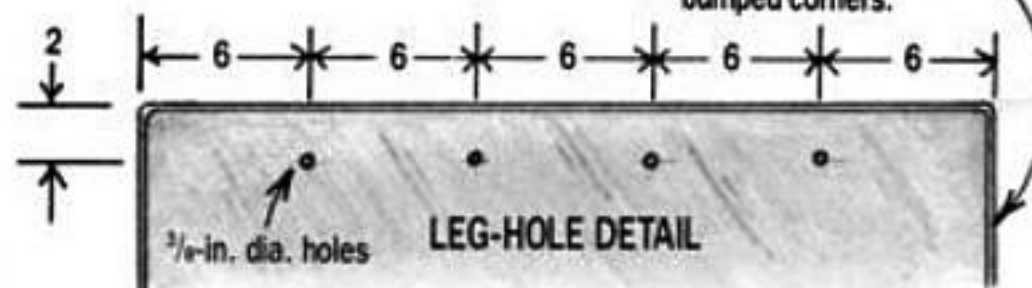
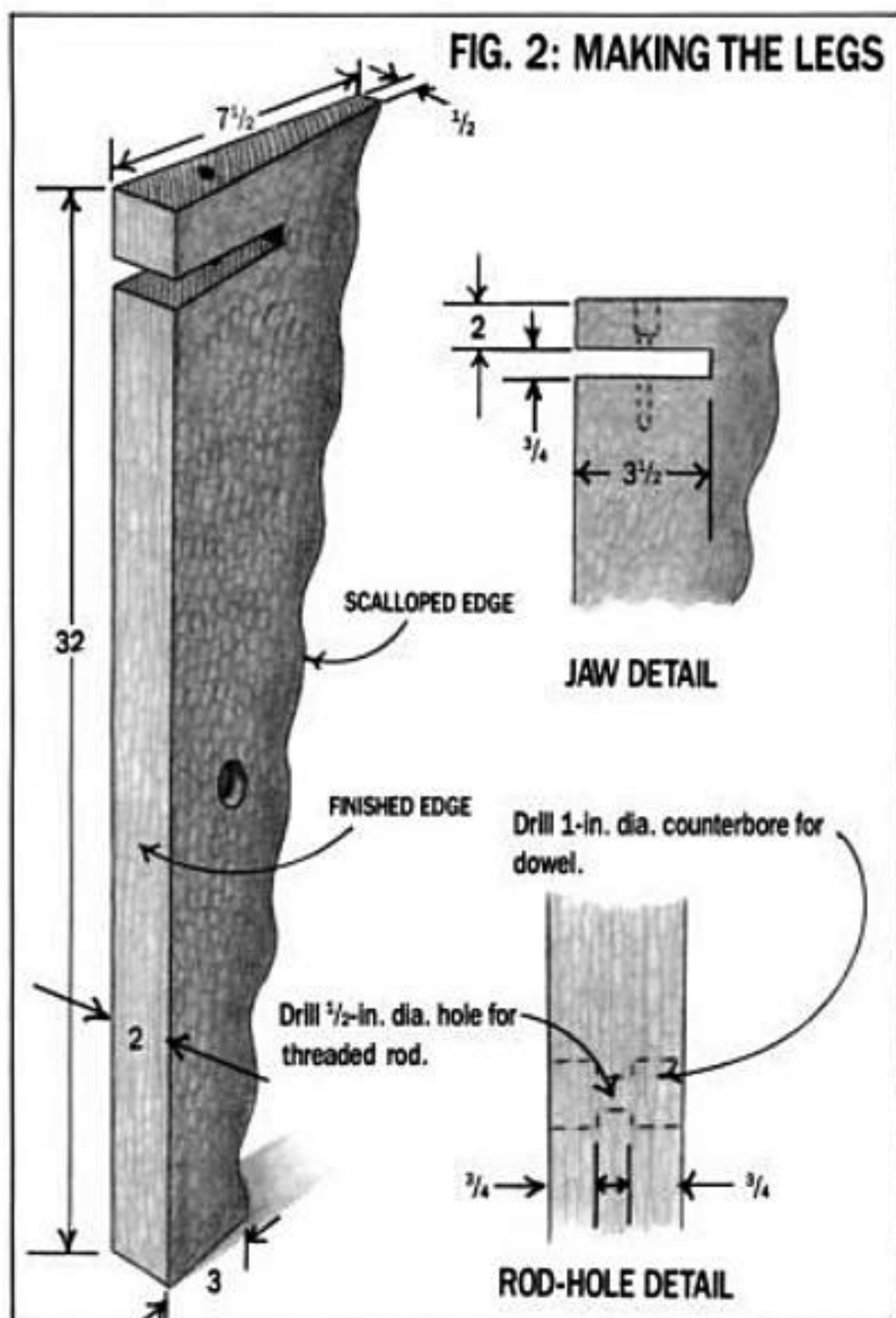
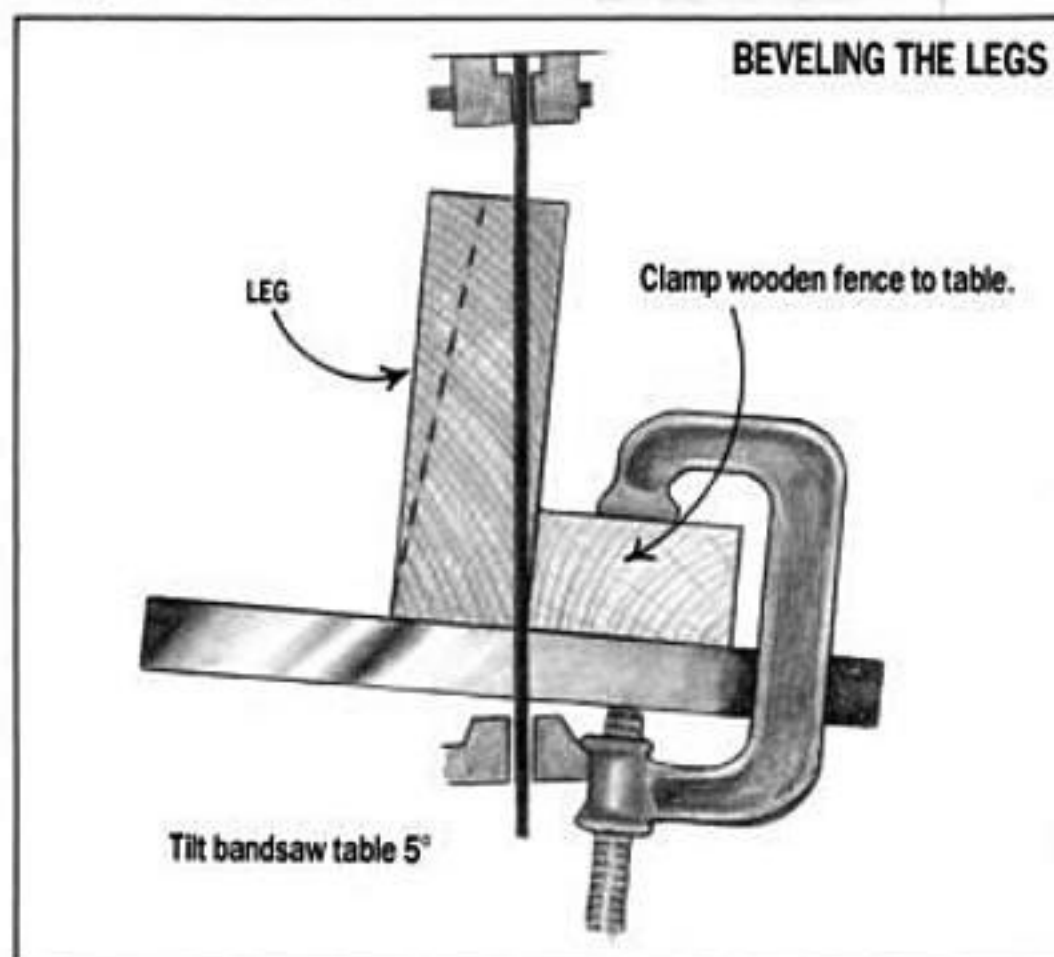


FIG. 2: MAKING THE LEGS

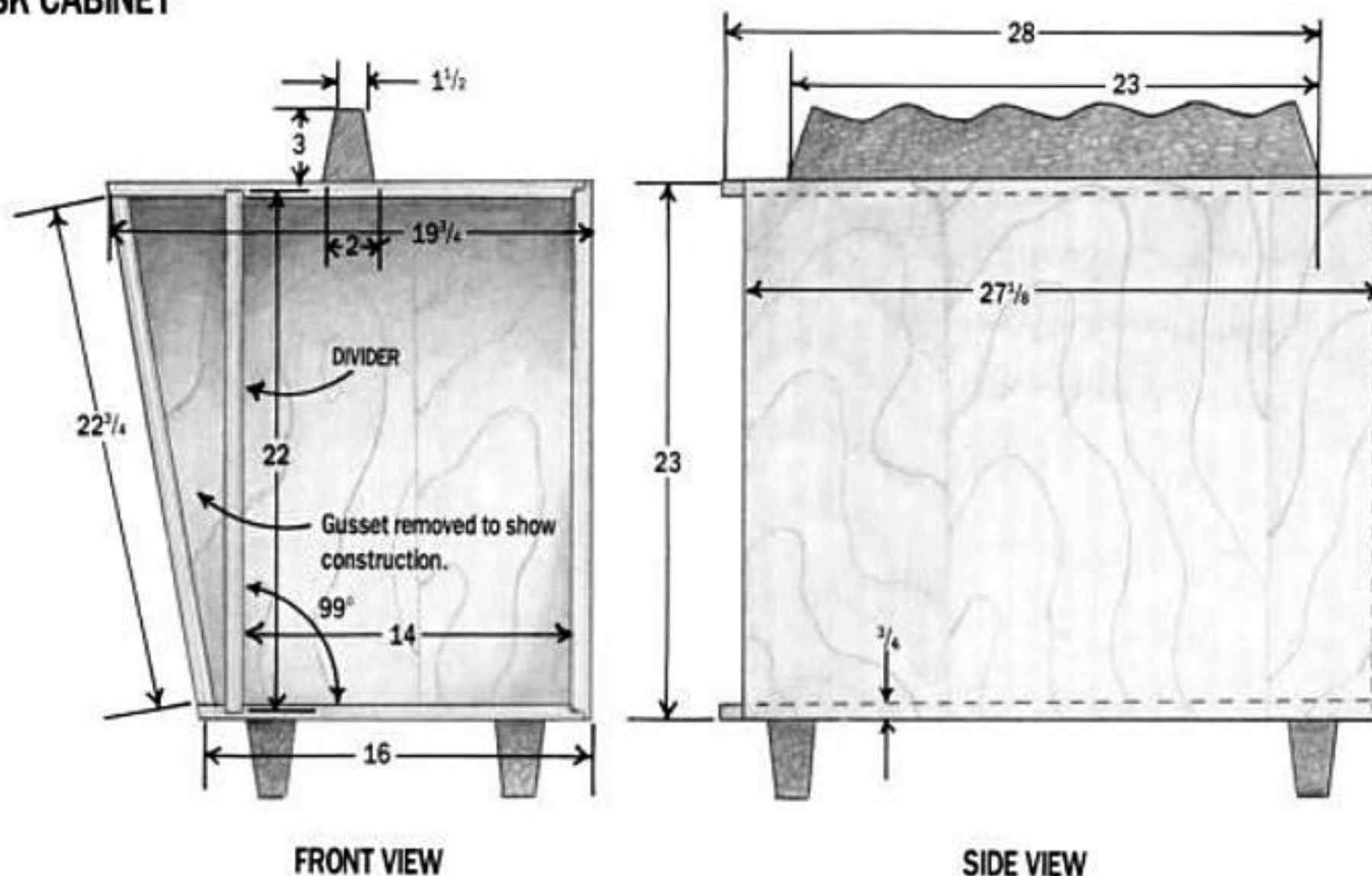


BEVELING THE LEGS



DRAWINGS BY GLEN HUGHES

FIG. 3: DESK CABINET



each leg. (See Fig. 1.) Bolt the assembly together with nuts and washers on the ends. Now carefully position the leg assembly onto the glass and line up the holes. Run a 3-in. #8 screw (I used square-drive screws) through the top of each leg. Once the assembly is secured to the glass, epoxy the end caps over the ends of the threaded rod.

With a plug cutter, cut the screw-hole plugs for the top of the legs, and finish. Tap them flush into the holes. I didn't glue the plugs in just in case I ever need to remove the leg assembly.

Making the Cabinet

The cabinet is made of 3/4-in. hardwood plywood joined with dadoes, rabbets, glue and screws. I veneered the outside of the cabinet with sycamore veneer. The inside of the cabinet is veneered with an inexpensive cherry veneer.

Underneath the veneer I applied a crossbanding material called Yorkite (available from Eaglewood Industries, Inc., 450 Oaktree Ave., S. Plainfield, NJ 07080, 800-321-2290). Yorkite is a wood by-product material that has no grain, so you don't have to worry about grain direction as you do when you use veneer as crossbanding. Yorkite is also perfectly flat—a big advantage. I glued both the Yorkite and the veneer with a contact-type veneer glue (available from Constantine's, 2050 Eastchester Rd., Bronx, NY 10461, 800-223-8087). (For more on veneering see *AW*, #16.)

Start by cutting the cabinet's top, bottom, divider, and "square" side to size. Be sure to bevel the edges of the top and bottom that touch the "angled" side of the cabinet. (See Fig 3.) The "angled" side of the cabinet can be cut to width, but leave the height oversize; you'll cut the angles on the top and bottom edges later. The back and the gusset will be cut to fit after the rest of the cabinet is glued up.

The veneering is done in several stages. At this point, glue the crossbanding and veneer to the inside surfaces

of the cabinet sides, top and bottom.

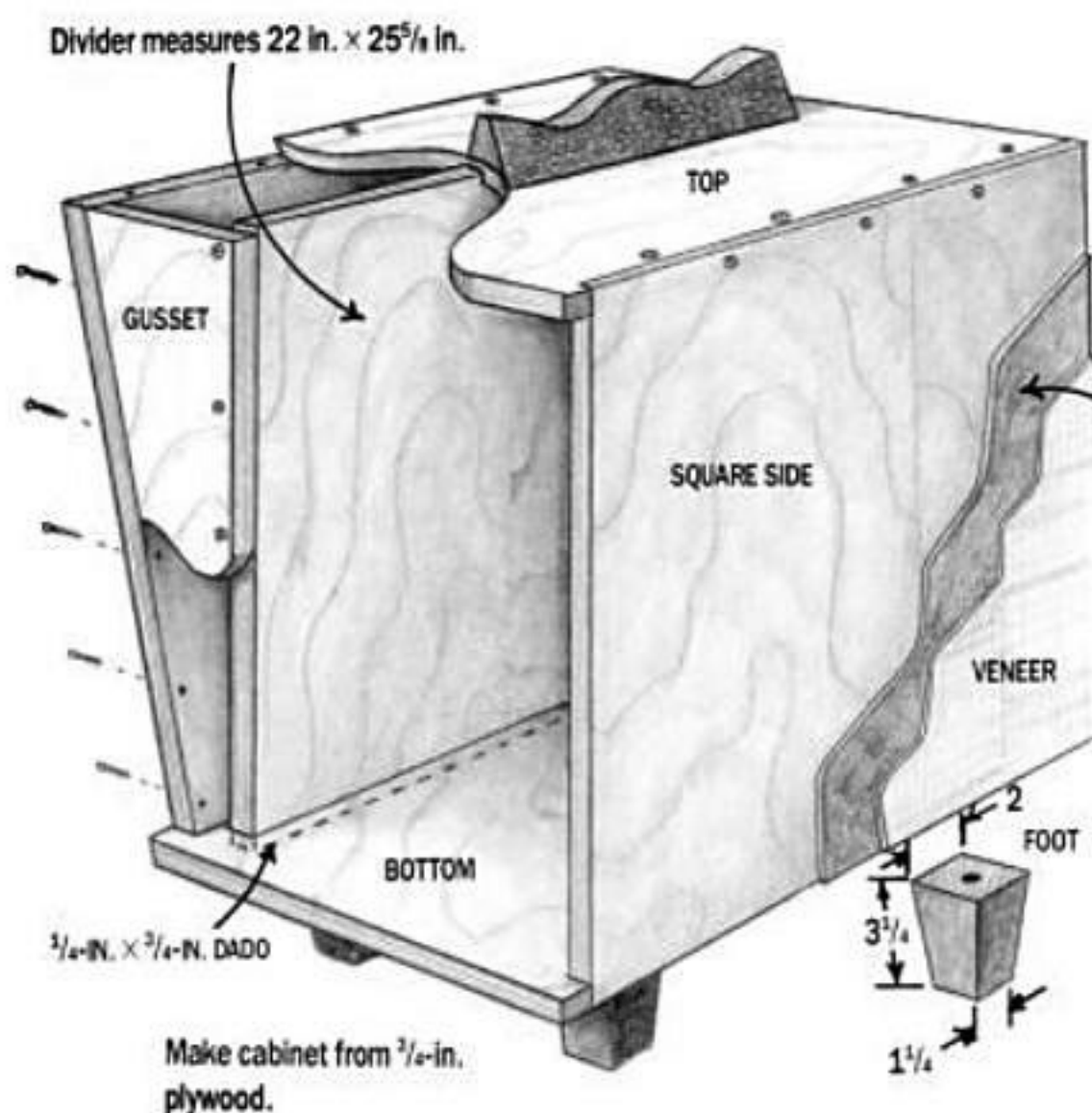
Now it's time to cut the rabbets and dadoes in the bottom, top and square side of the cabinet. I cut them with a router and a 3/4-in. straight bit, guiding the router base against a straightedge clamped across the work. The dadoes and rabbets stop short of the front edges of the top and bottom. (See Fig 3.) I squared up the ends with a chisel. I also rout a rabbet for the back panel on the rear edges of the sides, top, and bottom.

At this point, you're ready to cut the cabinet's "angled" side to its finished height. Dry clamp the cabinet's "square" side, divider, top, and bottom together. Hold the angled side with its rear edge butting up against the front edge of the cabinet, as shown in the photo. With a pencil, mark the location of the angled cuts. It's better to get these marks directly off the case than it is to trust your measurements. Tilt your tablesaw blade and use a crosscut box to cut the side to length.

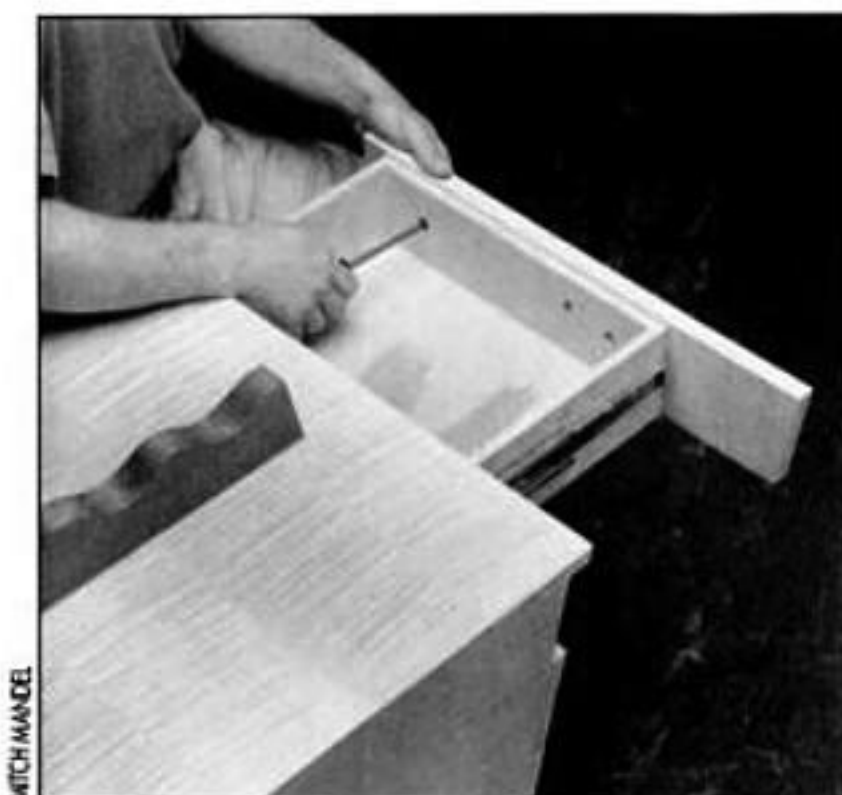
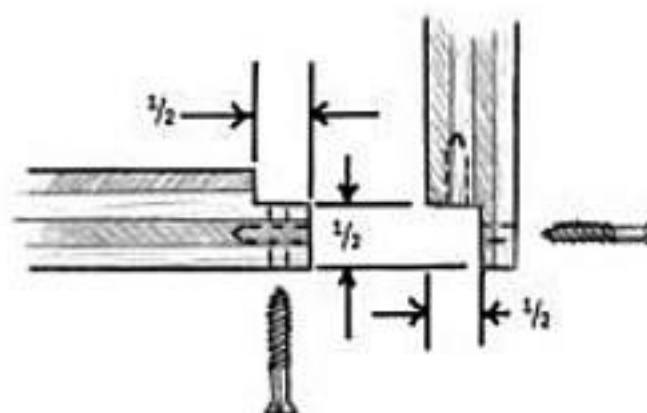
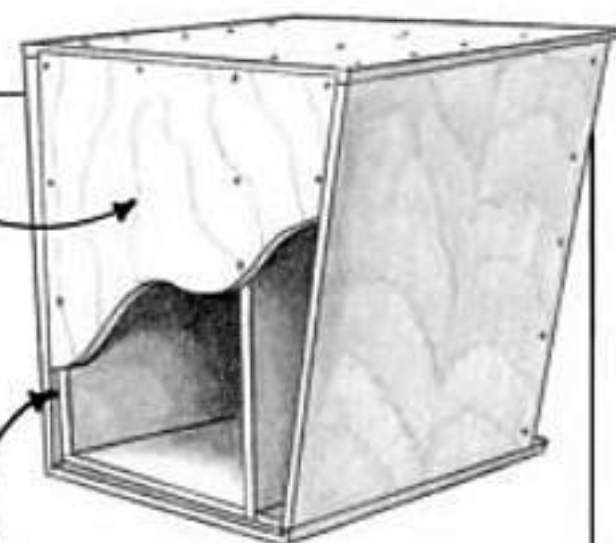
Before you glue the cabinet together, sand and finish the inside surfaces of the cabinet. I used clear, water-



To mark the angled edges of the side of the cabinet, place the back edge of the side piece against the front edge of the cabinet and mark out the angled cuts you need to make. Tilt the tablesaw blade to make these cuts.



Make back from 1/2-in. plywood.



The angled plywood drawer fronts are screwed to the fronts of square-sided drawers made of 1/2-in. maple, dovetailed at the corners.

based polyurethane. When the finish is dry, you're ready to assemble the cabinet. Glue and clamp the cabinet together. With the clamps still in place, drill pilot holes and countersink screws between the clamps. After an hour or two, remove the clamps and put in the remaining screws.

Once the glue is dry, you're ready to fit the back. Lay the cabinet with its back down on a sheet of 1/2-in. plywood. Trace around the inside perimeter of the rabbet at the back of the cabinet, then flip the cabinet over on its front and trace the gusset pattern onto a piece of plywood. Cut out these parts on the bandsaw or tablesaw, and glue and screw them in place. With the cabinet assembled, you're ready to apply the crossbanding and veneer to the outside.

To make the feet for the cabinet, I started with 2-in. square stock and cut it to length. (See Fig 3.) I cut the tapers on the bandsaw and finished them on a stationary belt sander. I attached them to the cabinet by driving a 2-in #8 screw through the inside bottom of the cabinet into the top of each foot.

The glass support that sits on top of the cabinet is made much like the legs. (See Fig. 1.) Dimension the stock and cut it to length with a 70° angle on each end. Cut the scalloped edge on a bandsaw. Because the glass support is not as wide as the legs, you can cut the beveled sides on a tablesaw. Screw the glass support to the cabinet from the inside as you did with the feet.

Making the Drawers

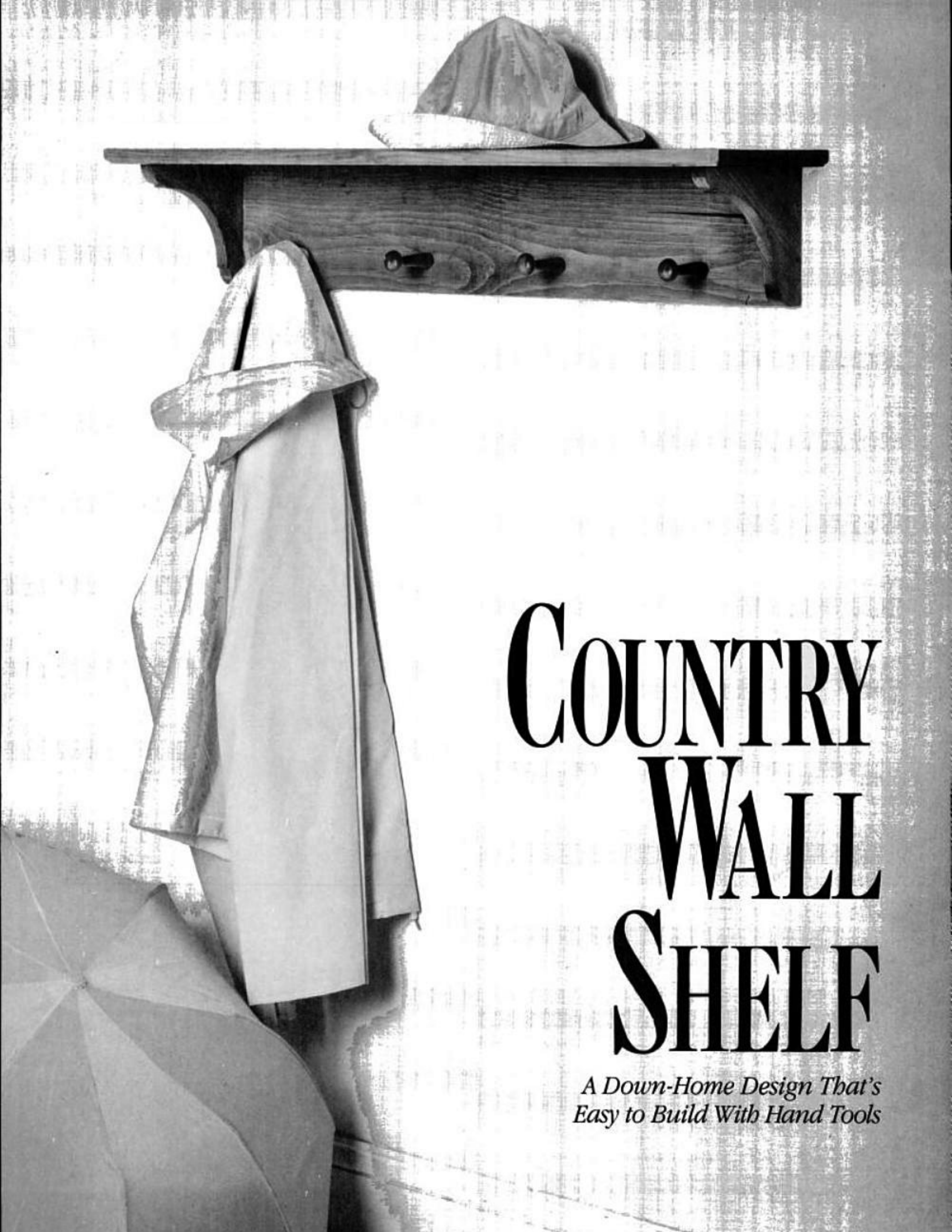
The drawers look complicated, but they're not. Only the drawer fronts are angled, not the drawers behind them. These applied drawer fronts are screwed to the fronts of conventional straight-sided drawers made of 1/2-in. maple with dovetailed corners. (See Fig 1.) I made the drawers 18 in. deep, but you could make the drawers as deep as 25 in. if you like. The drawers slide on 18-in. long Accuride full-extension drawer slides (part # C3832 available from The Woodworker's Store, 21801 Industrial Blvd., Rogers, MN 55374).

Make the drawers from 1/2-in. maple with 1/4-in. maple plywood bottoms. Cut the drawer fronts from 3/4-in. plywood, and glue crossbanding and veneer to all surfaces, inside and out. Screw the false fronts to the maple drawer fronts from the inside. I bandsawed the drawer handles to shape and refined the shape with a file. I finished the drawers and cabinet with water-based polyurethane and screwed the handles to the drawer fronts from the inside.

Once the glass, with the legs attached, is in place, all that's left to do is to fill your drawers with stuff.



Glenn Hughes is a professional woodworker and designer in Pennsylvania. He works as an art assistant for AW and moonlights as a singer in a rock band called Metro.



COUNTRY WALL SHELF

*A Down-Home Design That's
Easy to Build With Hand Tools*

DRAWINGS BY SALLY ONOFA



W

Whether you call it rustic, country, or just plain practical, this wall shelf has that honest, basic, down-to-earth

Building the Shelf

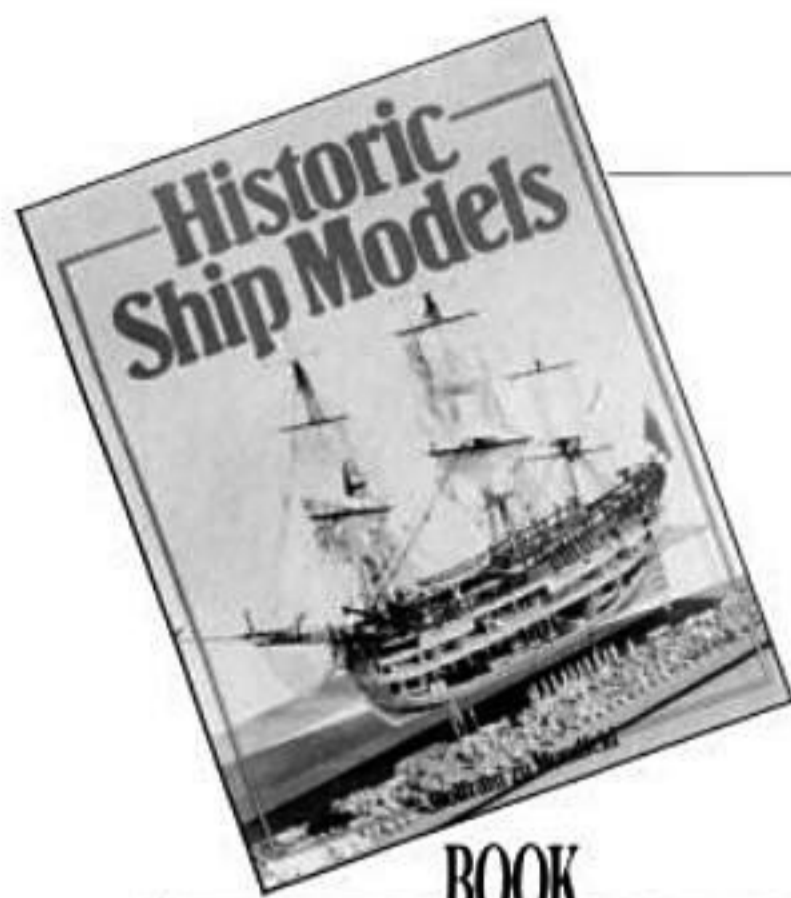
Lay out the shape of the two brackets so the grain

I put the shelf together with 6d finishing nails and glue, but you could also use dowels or screws. I like the look of hand-forged nails, so I shaped the heads of the finishing nails to give them a hand-forged appearance. (See drawing.) To do this, I hold the nail head against a vise and flatten it with a hammer, then I grip the shank in the vise with the head protruding and flatten the top into a diamond-shaped pattern.



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BOOKS & VIDEOS



BOOK

Historic Ship Models

by Wolfram zu Mondfeld
(1989, Sterling Publishing Co., Inc.,
387 Park Ave. S., New York, NY
10016) 352 pp; paperback, \$19.95
This detailed, informative book *Historic Ship Models* by Wolfram zu Mondfeld will be of great interest to the student of maritime history—whether a maker of models or not.

The tone is chatty but authoritative. This man clearly knows what he is talking about and does so from his own experience. After offering sensible advice about tools and how to organize your work space he says, "Theory is a fine thing and can be very useful now and again, but there's no substitute for practice."

The numerous line drawings are of excellent quality and clearly labeled. The black-and-white photos are adequate, often illustrating a particular point of construction, such as the hull, head or small details.

Zu Mondfeld frequently explains how an aspect of ship building was done in the old days. For example, filling the planking seams with tar was a common practice. He then tells how the model maker can get the same effect to scale, accomplished by painting the edges of a stack of planks black.

I especially appreciated a nautical glossary with the equivalents in six languages, alphabetized in each language. There's also a list of maritime museums in Europe, the Soviet Union, Turkey, Lebanon and Israel.

The only big flaw is in the binding. The pages are too narrow for their content on the chosen size format. The margin on one side of the page is so inadequate that the text is difficult to read, and the book is unlikely to lie flat on a workbench.

I don't plan on making any models, but I'd like this book on my shelf.

SIMON WATTS

VIDEO

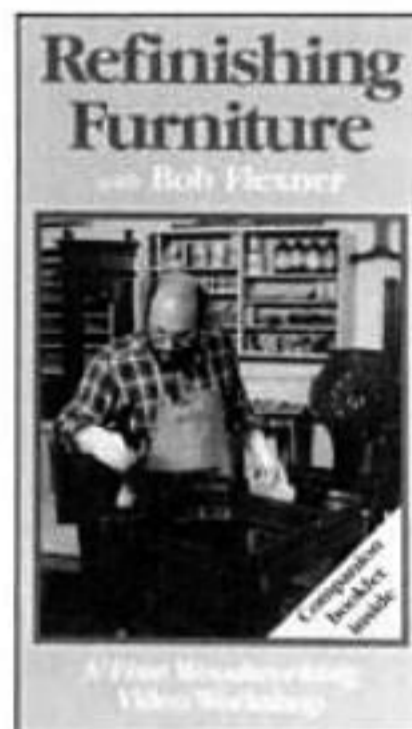
Refinishing Furniture

with Bob Flexner
(1988, Taunton Press, Inc., 63 S.
Main St., Box 355, Newtown, CT
06470) 60 min.; VHS, \$29.95

We've lost a lot of what was once-common knowledge about finishing. Such information has been left out of most recent books on the subject. Meanwhile, there are more finishing products on the market than ever before. Bob Flexner's video *Refinishing Furniture* clarifies how to pick and use these products to achieve the best-possible finish. It's a good introduction to the world of finish repairs, and watching an experienced hand on videotape brings these techniques to life.

Flexner demonstrates how to clean, rub out, and polish a finished surface. He also shows how to strip a finish, making the least alteration to the wood below. He argues against removing nicks and dents by sanding, and for keeping the texture of the piece consistent with its age.

This video offers a good selection of tips and techniques. But keep in



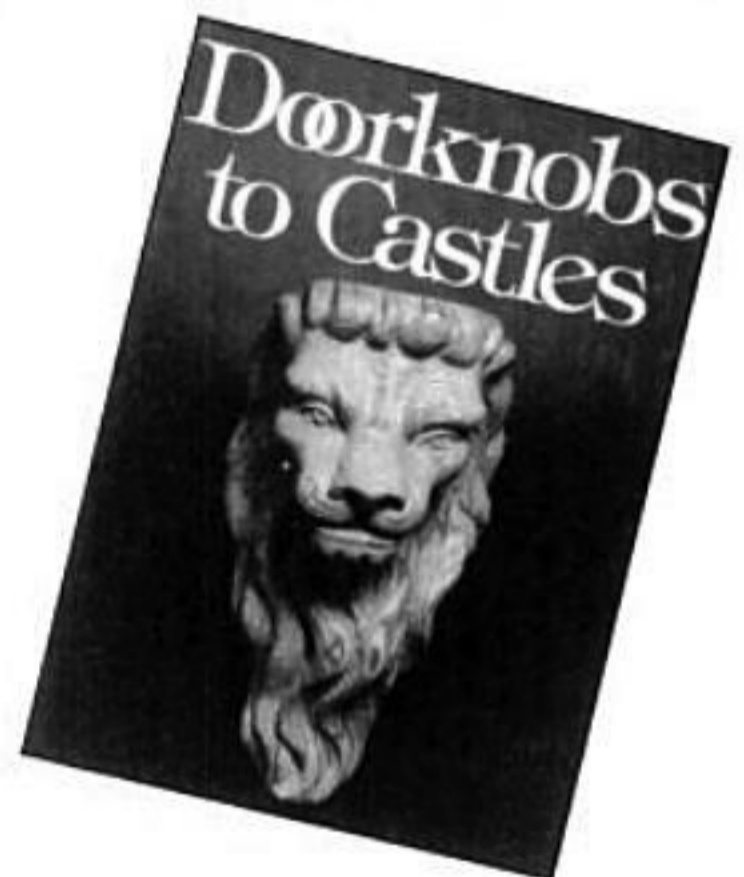
mind that the products and finishes shown are only a few of the variety available. Two highlighted materials are water aniline stains and French padding. Visual demonstrations of their application are most helpful. Flexner also features finishing sequences on clear stains, fillers, glazes and top coats.

Be forewarned. The span of 60 minutes is not long enough to explain all the tricks of the trade to the

inexperienced finisher. The booklet that accompanies this tape is very helpful for understanding the reasoning behind each technique, and there are several good books listed for further reference.

NANCY LINDQUIST

BOOK



Doorknobs to Castles

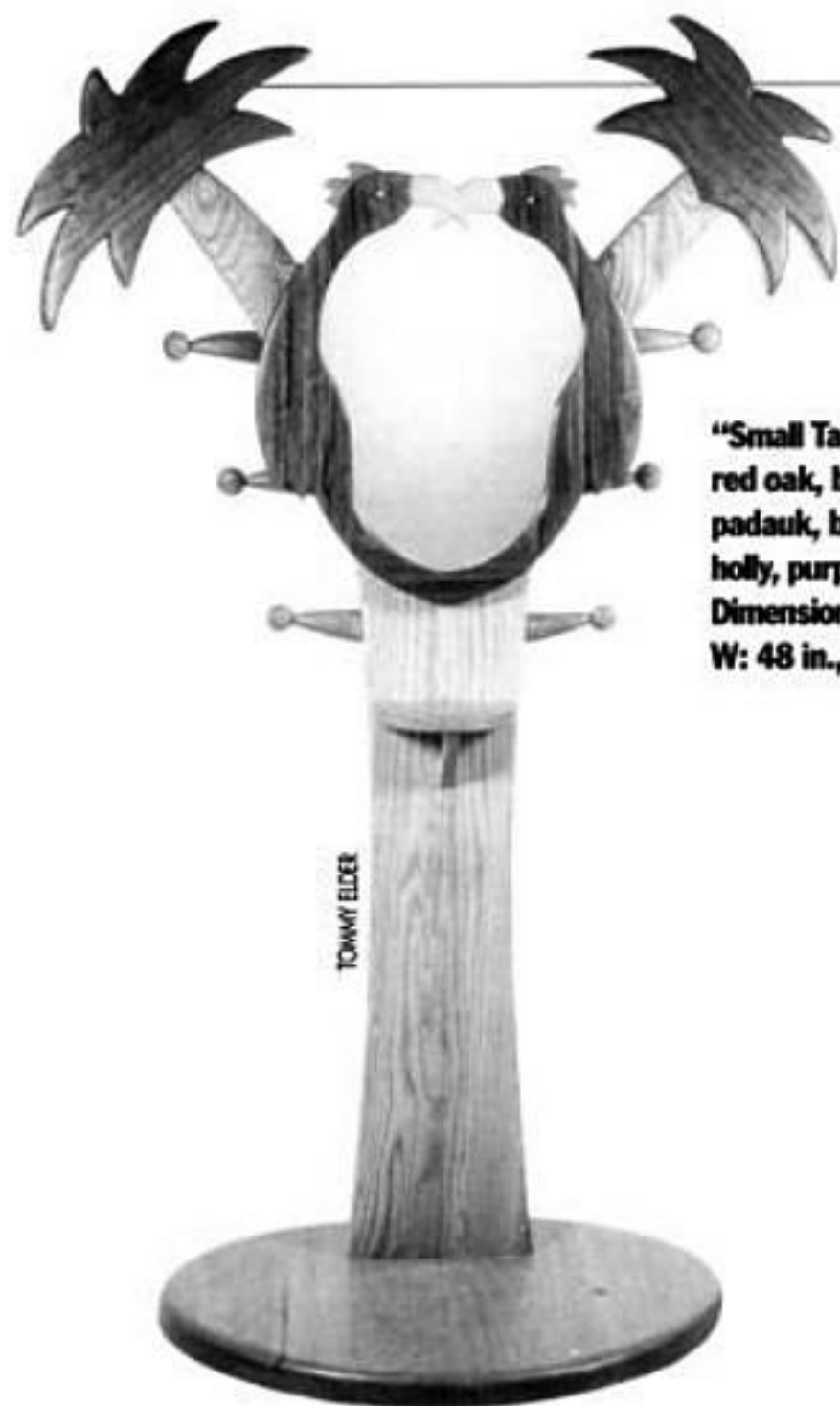
"Catalog" of Medieval Accessories
(1990, P.O. Box 23456, San Jose, CA
95153) 47 pp; paperback, \$45

Finding hardware that provides just the right touch can be difficult, making every unusual source worth saving. *Doorknobs to Castles* certainly supplies the unusual. This catalog specializes in things medieval; door knockers shaped like dragons and wolves, iron knobs, latches, pulls, and ornate iron strap hinges "made for creaking."

For windows, it offers casement stays and fasteners. Brighten your night with a solid-bronze Hanging Wolf Skull Oil Lamp or a Gargoyle Street Lamp up to 13 ft. high. Why not some reproduction armor, perhaps the Milanese. For distressing antique reproductions, try a real War Hammer or Spiked Flail.

The catalog is nicely done, 11 in. x 14 in., with clear, color photographs and quality printing—as well it should be for \$45.00, refundable with your first (\$100) order.

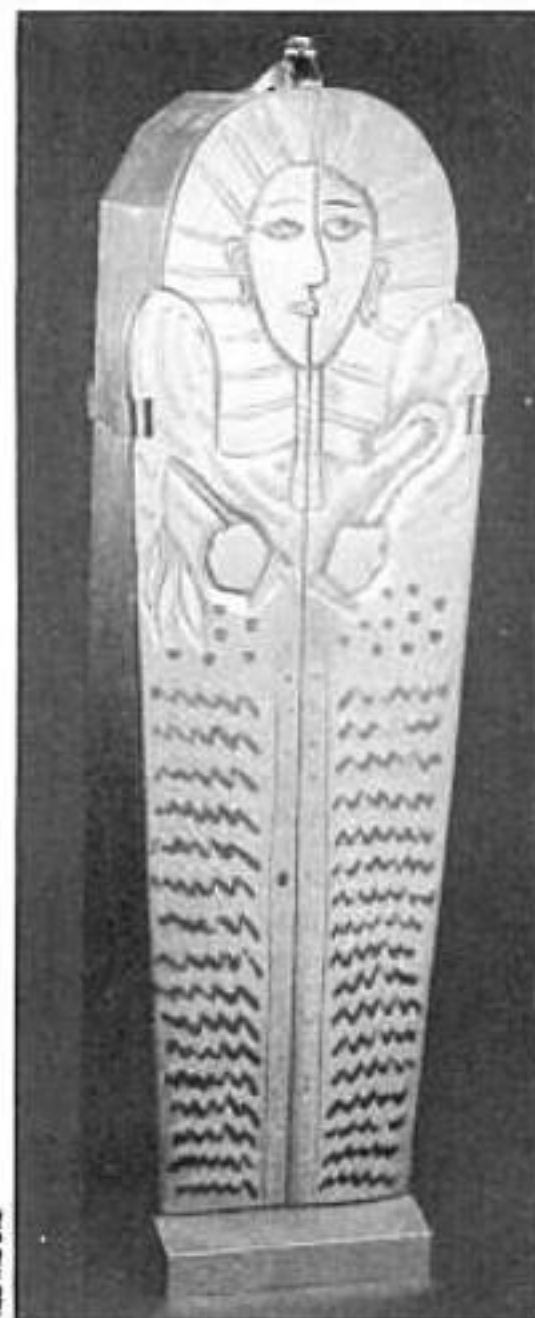
BOB MORAN



"Small Talk." Cherry, red oak, bubinga, padauk, black walnut, holly, purple heart. Dimensions: H: 84 in., W: 48 in., D: 36 in.

TOMMY ELDER

"King Tut Cabinet." Painted poplar. Dimensions: H: 60 in., W: 18 in., D: 12 in.



FRED MOORE

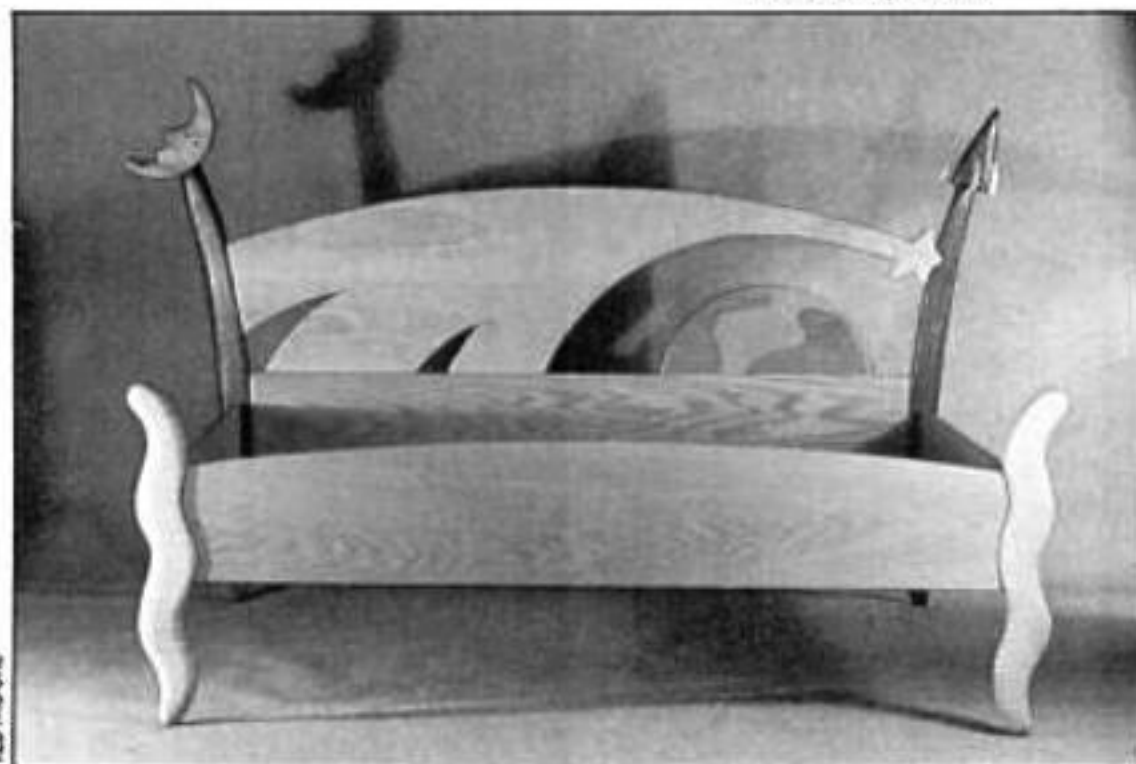
Furniture maker Steve Lohman dares to trust his imagination. Once he hits on an idea for a piece, he makes a quick sketch, then moves directly to the wood, trying to capture in three dimensions the spontaneity of that first, quick sketch. His furniture speaks for itself. Dr. Seuss, an admirer of Steve Lohman's furniture claims, "The world would be a better world by far were its inhabitants all able to Languish in Lohman Lounges ... or even Lounge in Lohman Languishes!"



"Jennifer's Chair." Tiger maple, purple heart. Dimensions: H: 35 in., W: 20 in., D: 15 in.

TOMMY ELDER

"Star Gazing." Tiger maple, bird's-eye maple, red oak, black walnut, silver. Dimensions: H: 45 in., W: 75 in., L: 84.

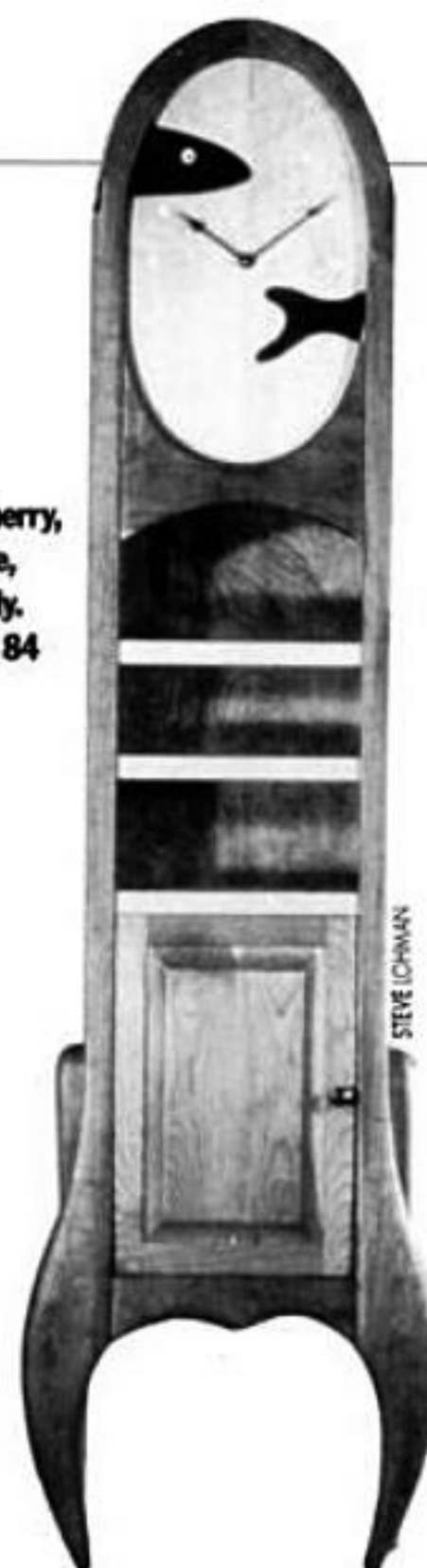


FRED MOORE



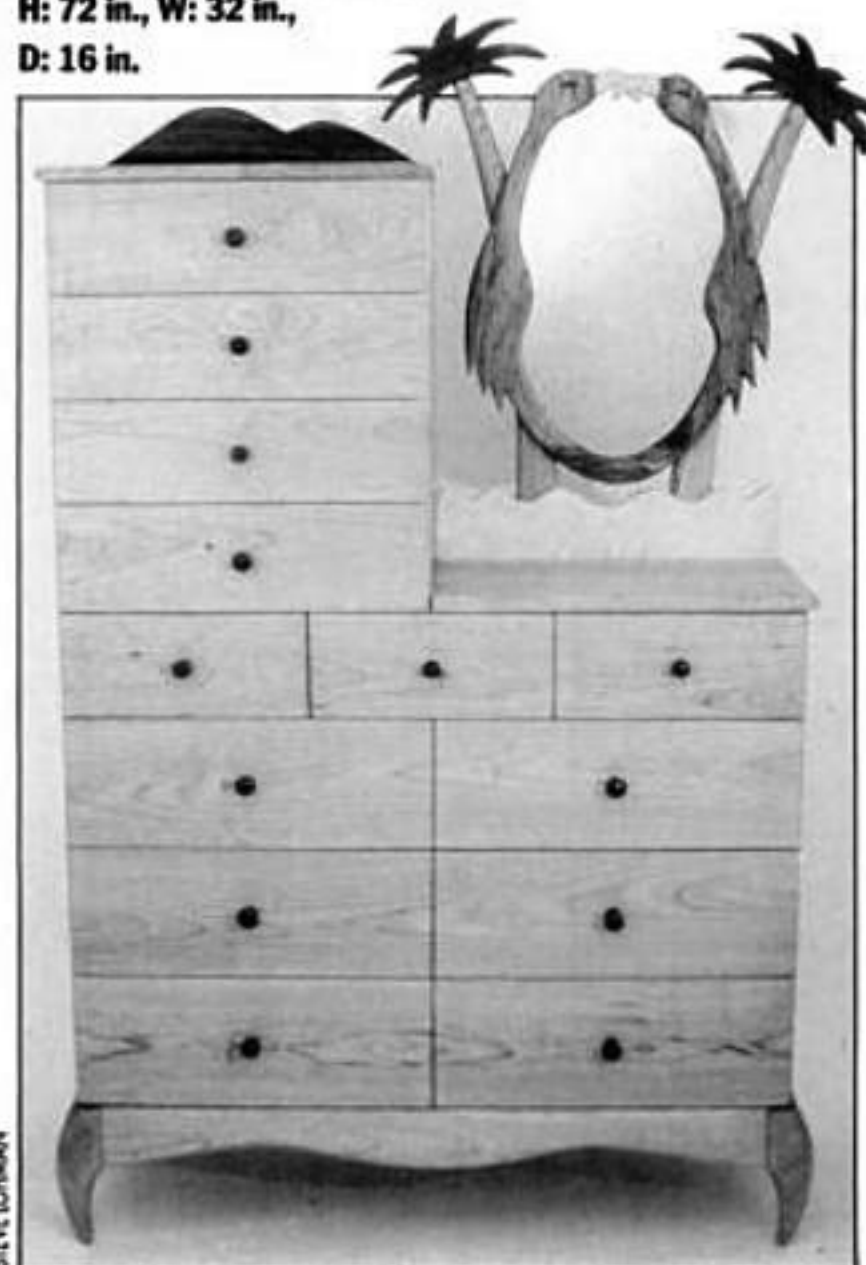
"Exit N.Y." Cherry, black walnut, maple, holly, silver, Shaker tape. Dimensions: H: 44 in., W: 22 in., D: 20 in.

Want to see your work in Gallery? Send photographs and a description of the piece to: AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. Only black-and-white prints (4 in. x 5 in. or larger) or color slides will be accepted. Please do not send color prints or snapshots. Enclose a self-addressed envelope for return of photos.



"Maritime." Cherry, bird's-eye maple, bloodwood, holly. Dimensions: H: 84 in., W: 20 in., D: 12 in.

"Island Dresser." Cherry, mahogany, bubinga, holly, bird's-eye maple. Dimensions: H: 72 in., W: 32 in., D: 16 in.



\$10,000 in Designs

If you're a college student and you've got some original furniture designs on your drawing board, roll them up, and enter them in the IWF Design Emphasis '92 furniture-design competition. It may be worth your while.

This biennial design competition is organized by the International Woodworking Machinery & Furniture Supply Fair and offers a total of \$10,000 in prize money. This amount will be shared among four furniture-design categories: case-goods, seating, ready-to-assemble, and design creativity. Winners in each category will receive \$1,250.

Designs can be an original idea or an innovative twist on an old standby. Entries are restricted to students from two-year and four-year accredited colleges and universities that register with IWF '92 as student sponsors. Call to see if your school qualifies. Details are available from Shirley Byron, IWF Headquarters, 8931 Shady Grove Court, Gaithersburg, MD 20877, (301) 948-5730.

Tradeswomen Together

If you're a woman working in a trade profession, you're probably pretty much going it alone. Well, now you don't have to. During the past year an organization was formed that's strictly for working women. The Association for Self-Employed Tradeswomen has about 150 members in the Northeast, from Philadelphia to Boston.

All members are either self-employed or employed in trades that include cabinetmakers, carpenters, woodworkers, plumbers, auto mechanics, general contractors, electricians, painters and engineers. Membership is open to other occupations that fit the guidelines.

The organization meets every other month and a newsletter keeps members informed during the months between meetings. Membership fee is \$12 a year and can be sent to: Hanna Gafni, 209 W. 104th St., Apt. 4 B, New York, NY 10025. For additional information contact: Janice Goldfrank, Octagon Custom Builders, P.O. Box 146, Chatham, NY 12037, (518) 392-5806.

Mystery Joint

Do you like woodworking puzzlers? Here's a challenge for you. Can you guess what joint connects the rails and the legs of the small display stand shown in the photo? One hint: It's an all wood-and-glue joint, no metal. The legs and rails are only 1/2 in. thick, and the marble shelves are removable. Send us a sketch and description of your solution. If you're the first one to guess correctly, we'll send you \$100. If you guess right but you're not the first, we'll send you an AW T-shirt. (Tell us your size.) Send your solution to Bob Moran, assistant editor, *AMERICAN WOODWORKER*, 33 E. Minor St., Emmaus, PA 18098.



Can you figure out the rail-to-leg joint on this stand? You'll win \$100 if you're the first to guess correctly.

Treasures from the Trunk

For more than 15 years, the sawmill at the C.F. Martin Guitar Co. had been cutting an assortment of large walnut logs for the late master woodworker George Nakashima.

Walnut trees are notorious among sawyers for containing metal (and other unexpected surprises) because walnuts were often planted close to farmhouses or along fence rows. This made them fair game for barbed wire, clothesline pulleys, target-practice bullets (including some from the Civil War), eye hooks, electrical insulators, and every size and shape of nail and screw ... probably from the backyard tree house.

When walnut trees come into a sawmill, it is common to run a metal detector across the log to locate any hidden metal pieces before cutting. Metal can strip the tips off a blade instantaneously and endanger the

lives of those operating the saw.

After determining there's a metal object in a log, a rough mortise is cut through the bark with a chainsaw, and the object is removed. Because the grain often envelopes such pieces, the metal can be buried at any depth within the grain. Logs containing a lot of metal can end up looking like "Swiss cheese" after the chainsaw digs repeatedly from many different angles. The presence of metal (ferric oxide) tends to produce an undesirable streaky black stain that spreads lengthwise with the grain.

The crew at Martin's sawmill has collected a box full of these special treasures, some of which have been laid out for posterity in the photo.

DICK BOAK



Beware sawyers! Metal objects can be buried deep inside trees. Here are some found by the folks at the C.F. Martin sawmill.

