AMERICAN WOODWORKER

December 1990, Issue No. 17

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Build a Classic Cherry Side Table

Making Wooden Lights: Tips from an Expert

All About Wood Stains

Five Great Projects for Holiday Gifts

CONTENTS

Issue No. 17
November/December, 1990
COVER PHOTO: Mitch Mandel
Side Table by Kelly Mehler

PROJECTS AND FEATURES

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IN MEMORY OF ROBERT RODALE

Robert Rodale, Chairman of the Board of Rodale Press, died in an auto accident on September 20th, in Moscow. Mr. Rodale had been working with a Soviet publisher to co-publish a Russian-language edition of THE NEW FARM, a Rodale Press magazine devoted to organic farming methods.

Mr. Rodale was a gentle, soft-spoken, compassionate man who devoted his life to making the world a better place. He was a leader in the areas of agriculture, conservation, nutrition, health, and fitness. Through his non-profit Rodale Institute, he developed programs to show farmers around the world how to grow crops without the use of pesticides and chemical fertilizers. He received many prestigious awards for his work, including the Presidential "World Without Hunger" award in 1984.

Mr. Rodale, an ardent conservationist, established the "Center for Working Trees" at his farm near Allentown, Pennsylvania and gave generously of his time and money to preserve farmland and parkland in the community.

We at AMERICAN WOODWORKER mourn the loss of this remarkable individual. He advised us, inspired us, and set an example we'll strive hard to live up to.

LETTERS

A Different Slant on Mission Mortises

In your plans for the "Mission Oak Arm Chair" (May/June 1990 *AW* #14) I noticed that the mortise-and-tenon detail is different from any Mission piece I've ever seen in my furniture repair work. In virtually every case, the mortise sides are perpendicular to the face of the legs or posts. Likewise, the tenons are perpendicular to the shoulders of the stretchers and frame pieces. The same goes for the crest rails and back rails.

I realize that most of the Arts and Crafts/Mission pieces I deal with are production pieces, but I have a couple of reasons for preferring the perpendicular mortise and tenon. First, there is the time saved in setting up for an angled mortise. The only angles necessary are on the stretcher shoulders and tenon. The second reason is a selfish reason. When I'm repairing a chair, and drilling out a broken-off tenon, I'm almost always sure that if I drill my starter hole perpendicular to the leg face I'll hit the mortise bottom. If I had to guess at every angle I would surely fall into Murphy's Law and seldom hit the mortise bottom correctly.

I do concede that the angled tenon and mortise is marginally stronger, since the tenon follows the grain, but keeping the tenons perpendicular is time-saving and much kinder to the future repairer.

JOHN ANDRADE

On Guard

I had previously built a sliding table-saw cutoff box similar to the one in your June 1990 *AW* (#14). I also noted that the saw blade passes through the fence. Instead of painting a red stripe as mentioned in the article, I screwed a 1-in. strip of wood on each side of the kerf where the saw comes through the fence. This gives me a tactile rather than a visual reminder of where my hands are. My eyes are usually following the cut.

JOSEPH A. SONIA
Trona, CA

More on Shop Wiring: 115V vs. 230V

Stuart Sharp's letter about shop wiring in the June issue (*AW* #14) misses the real reason that large motors can have problems when operated on 115 volt lines. Motor start-up considerations dominate the choice between 115 volt and 230 volt operation because motor current demand is extremely high at the beginning of the start-up phase.

In the typical home shop, most large woodworking machines are driven by either a split-phase induction motor or a capacitor-start induction-run motor (the more popular choice for new machines). Depending on the start-up load and certain motor design details, the peak start-up current for the split-phase induction motor ranges from 4 to 7 times the full load run current. Peak start-up current for the capacitor-start induction-run motor is somewhat less, 3 to 5 times the full-load run current.

In either case, the peak starting current is so high that it can cause

LETTERS

drops in line voltage large enough to adversely affect motor start-up performance. If the voltage at the motor isn't high enough, during the start phase, to bring the motor up to speed quickly (in a second or two at most), the start winding, which is designed for short-term duty only, will not be switched off soon enough to prevent it from overheating—and the motor can be damaged quickly.

230 volt motor operation has a big advantage in this regard, because its peak starting current, as well as its full-load run current, is about half that required for a motor of the same type and H.P. rating operating on 115 volt power.

So how can you decide if you need to install a 230 volt line for the new machine you just bought? If a motor starts well on 115 volts it will probably run well on 115 volts. Using 230 volts for motors rated at 1 H.P. and above is a good rule of thumb. However, if the motor power receptacle isn't far from the power entrance box, or the power line resistance is low enough, 1 H.P. and even 1½ H.P. motors can operate on 115 volts. If the motor has a capacitor-start circuit and the starting load is light (the usual case for woodworking equipment), so much the better.

Probably the best way to decide is to make the 115-volt connection and turn on the machine a few times while carefully observing how quickly the motor comes up to speed. If the motor accelerates quickly, and the start switch click can be heard within a second or so after the power is switched on, you can be confident that the voltage is adequate for that machine. If it doesn't accelerate quickly, turn off the power immediately and consider 230 volt wiring.

The only question remaining is how much lower the line voltage might be when the power company demand is high: will starting be satisfactory then? If you always pay attention to the motor's start-up time you can avoid problems here. In any event, you should avoid running more than one large motor at a time on a 115 volt circuit.

JOE RANSIL
Saratoga, CA

News Ain't Fit to Print

I enjoyed Karl Shumaker's article on veneering (*AW* #17) but I think he did not emphasize [a point] that could cause a novice some disappointment. He says "pop your panel in the press with a sheet of newspaper underneath the panel to catch the glue drips." He should have said "news*print*" paper or brown kraft paper or even the type of paper used to wrap meat for freezing. Too many people will use the evening paper and end up with ink on the veneer that is impossible to get out.

VERN W. VOSS
Medford, OR

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

Hollow Chisel Mortiser

Q. *I'm thinking about buying a hollow-chisel mortising attachment for my old Delta drill press. Will this attachment get in the way when I want to use the drill press for drilling?*

ELLIS TREECE
Anchorage, AK

A. Generally, a mortising attachment mounts on the quill (the part of the drill press that moves up and down) right above the chuck. The attachment's housing extends about 2½ in. below the drill's chuck. The hollow mortising chisel is inserted in a hole in the bottom of this housing. The drill bit for the mortising attachment extends through the hollow chisel, up into the chuck.

You can use the drill press for regular drilling by removing the hollow chisel and bit from the housing, inserting a drill bit up through the hole in the housing and into the chuck. But the useable length of the drill will be shortened by about 2½ in. and its shank diameter limited to just under ⅝-in. (the diameter of the hole in the housing). Most small bits and hole saws are too short to use with the housing on the drill press.

On my drill press, I try to leave the mortising attachment on most of the time so I can set up for mortising easily. But for drilling small holes, I just have to remove it.

BEN ERICKSON
Custom furniture maker
Eutaw, AL

Source for Moulding Planes

Q. *I'm interested in 18th-Century furniture reproduction and prefer to use hand tools whenever I can. Where can I obtain reproductions of old wooden moulding planes?*

ROBERT A. WILTSHIRE II
East Aurora, NY

A. Using a well-tuned moulding plane is one of woodworking's most pleasurable experiences. You can shape a dozen feet of handmade moulding in the time it would take to set up a router or shaper. I'm not aware of any company now producing moulding planes, but if you're just looking for one or two, you can have them custom made by Stuart Worthing, P.O. Box 834, York, ME 03911, 207-439-5486. He charges anywhere from $200 to $600 for each plane, depending on the profile.

Otherwise you can still buy old moulding planes for reasonable prices at auctions, antique shops and old tool dealers around the country. The trick is to get your name on the mailing lists of auctioneers and old tool dealers, so they'll keep you informed of their inventory. The quickest way to find these people is to join Early American Industries Association, Box 2128, Empire State Plaza Station, Albany, NY 12220. EAIA's newsletter, "Shavings," lists upcoming auctions as well as tool dealers

who have published catalogs. Reputable dealers grade old tools with a system developed by *Fine Tool Journal*. If you buy only planes graded "New" or "Fine," you will not have to recondition them. In my view, however, reconditioning an old tool is the best way to become familiar with it and to learn how it works.

MIKE DUNBAR
Contributing Editor
Portsmouth, NH

Natural vs. Synthetic Brushes

Q. *I've been told that oil-based paints and varnishes should be applied only with a natural bristle brush. At the hardware store I found polyester bristle brushes that say "for all paints." Will these brushes work as well as the more expensive natural bristle brushes?*

ROSCOE MILLER
Pawtucket, RI

A. Probably not. But both types of brushes vary in quality. The bristles used in the best natural bristle brushes come from Chinese hogs, and they can't be beat for use with solvent-based varnish or enamel paint. But the best polyester or nylon bristle brushes *can* produce excellent results with solvent-based products.

I doubt that you're looking at the best quality synthetic bristle brushes if they're less expensive than the natural China bristle brushes. Top-of-the-line synthetic brushes cost about 50% more than the best natural bristle brushes. Here's how to determine if the synthetic brush is top quality. First, the bristles should be tapered—thicker at the top near the metal ferrule than they are at the tip. Second, the tips should be flagged (split), just as they are on the natural China bristles. This allows the brush to carry more material and aids in achieving a smooth finish. If the bristles are not tapered and are cut off flat at the tip, the brush will probably cost less; but it won't perform nearly as well as the tapered and flagged China bristle bushes.

BOB FLEXNER
Refinishing Consultant
Norman, OK

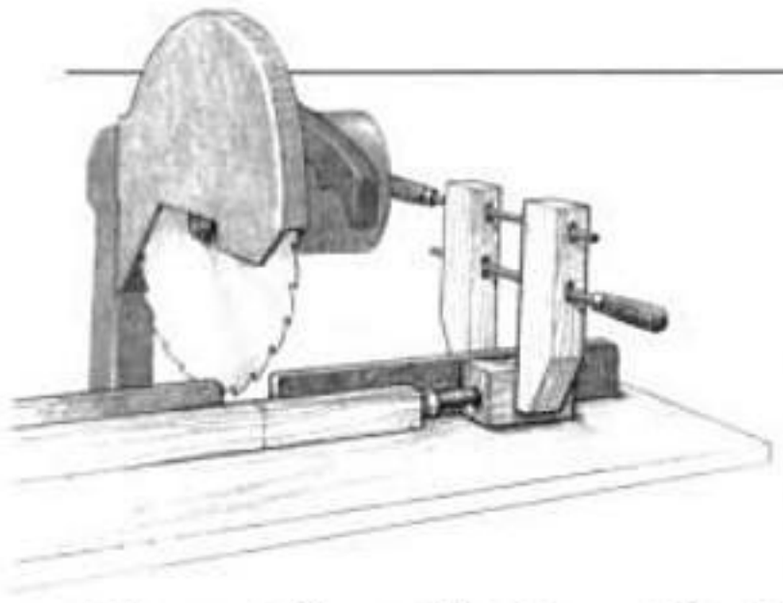
Where To Find It

Natural cane in a wide variety of strands and webbing for chairs, baskets and other projects is available from Frank's Cane & Rush Supply, 7252 Heil Ave., Huntington Beach, CA 92647.

Musical instrument fret rules, with fret scales etched in black on steel rule to simplify fret layout for guitars and banjos, is available from Frog Tool Co., Ltd., P.O. Box 8325, Chicago, IL 60680.

Got a woodworking question for the experts? Send it to Q&A, AMERICAN WOODWORKER, *33 E. Minor St., Emmaus, PA 18098.*

TECH TIPS



Micro-Adjustable Stop Block

A bolt screwed into a snug (but not tight) hole in a block of wood becomes a finely-adjustable stop block with the added advantage that debris doesn't accumulate in front of the block.

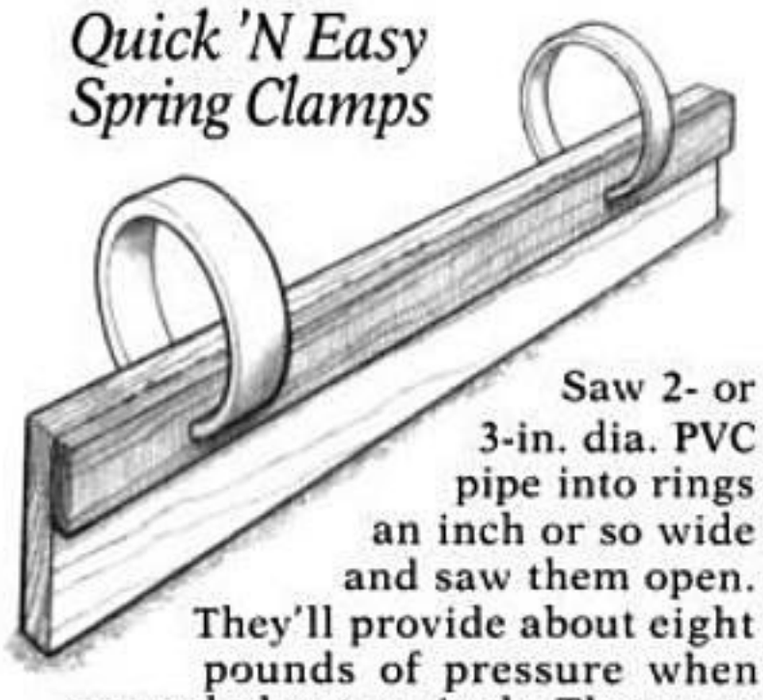
TREBOR NAROM
Onaled, NM

Custom Contoured Cabinet Scrapers

A router bit can clean up after itself. After I rout a moulding, I use the same bit as a miniature hand scraper to clean up burns or other minor imperfections.

DANIEL C. URBANIK
Washington, PA

Quick 'N Easy Spring Clamps



Saw 2- or 3-in. dia. PVC pipe into rings an inch or so wide and saw them open. They'll provide about eight pounds of pressure when opened about an inch. They may not be as convenient as one-handed spring clamps, but since you'll get more than a hundred of them from a ten-foot length of PVC pipe, at least the price is right.

TOM WHALEN
Cohoes, NY

Bug Off!!!

Citronella candles, available from hardware stores, repel all types of flying insects. Use them to keep gnats and such out of freshly-applied finishes during the buggy time of year.

TIM MUZIC
Fountain Valley, CA

Crepe Cleaning Sticks

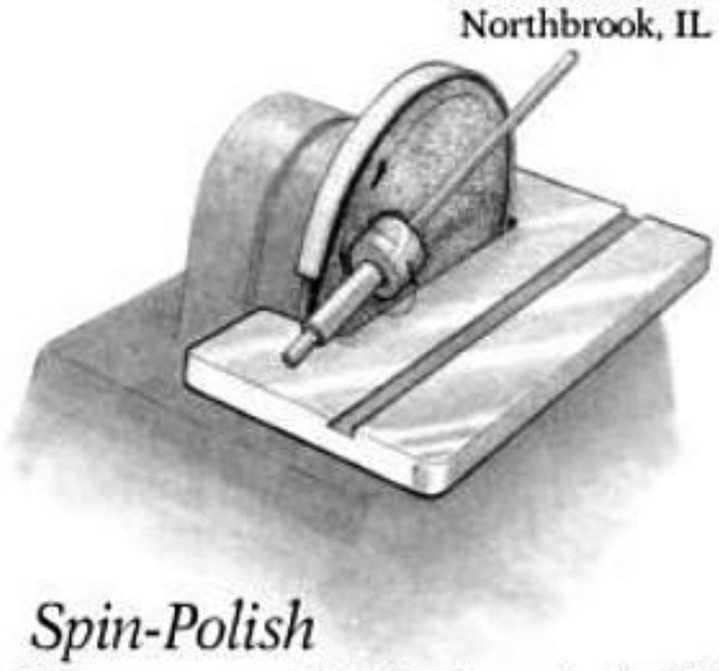
Get an extra mile from an old pair of crepe-soled shoes or boots. Cut off the heels and use them as you would use a gum-rubber cleaning stick to clean sanding belts.

G. M. GAUGER
Laurinburg, NC

High Class Furniture Levelers

Elegant leveling feet can be an integral part of your furniture design. Epoxy a carriage bolt into a turning blank, then spin it into the "screw" chuck shown to turn it to suit your taste. A threaded insert in the bottom of the furniture leg completes the arrangement.

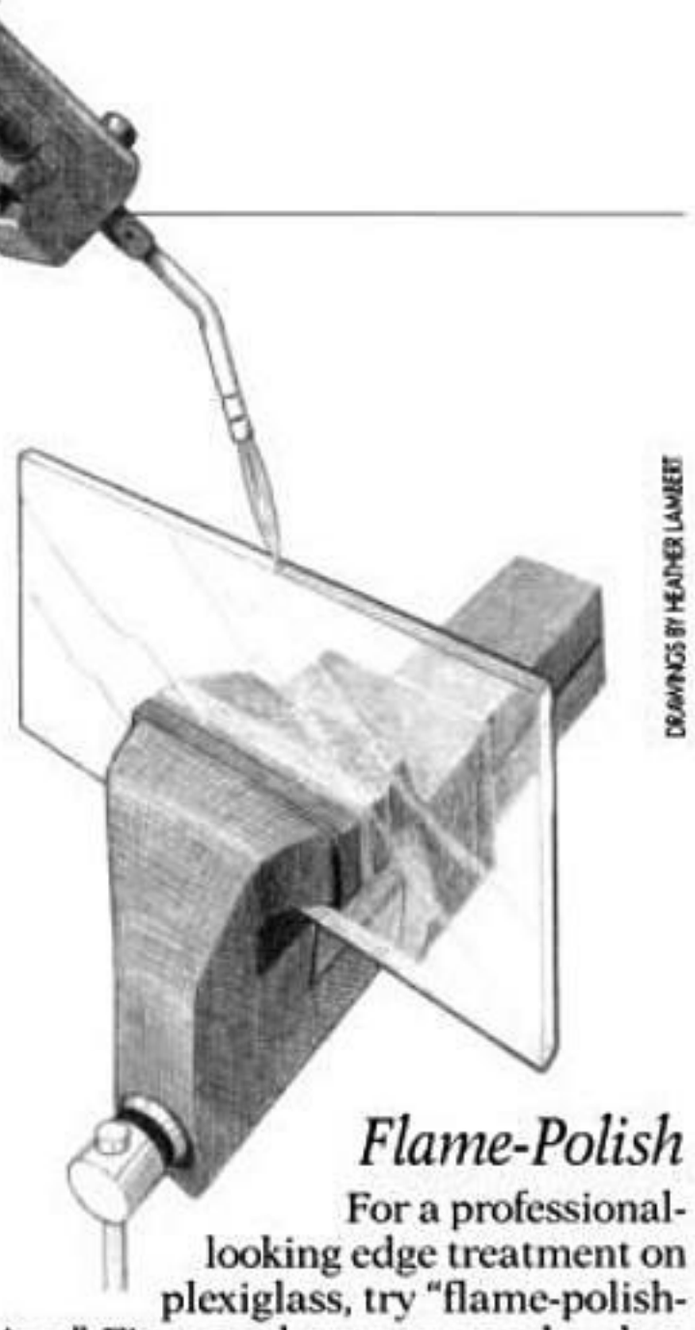
GORDON KRUPP
Northbrook, IL



Spin-Polish

You can sand (wire-brush, buff) small round objects like knobs by mounting them on a slightly loose-fitting dowel or rod and letting the tool spin them as it does its sanding. Adjust the angle between the rod and the tool to get the amount of spin and abrasion that you want. A piece of tubing over the rod will help to keep the knob from running off the end.

RUSSELL FIELD
Federal Way, WA



DRAWINGS BY HEATHER LAMBERT

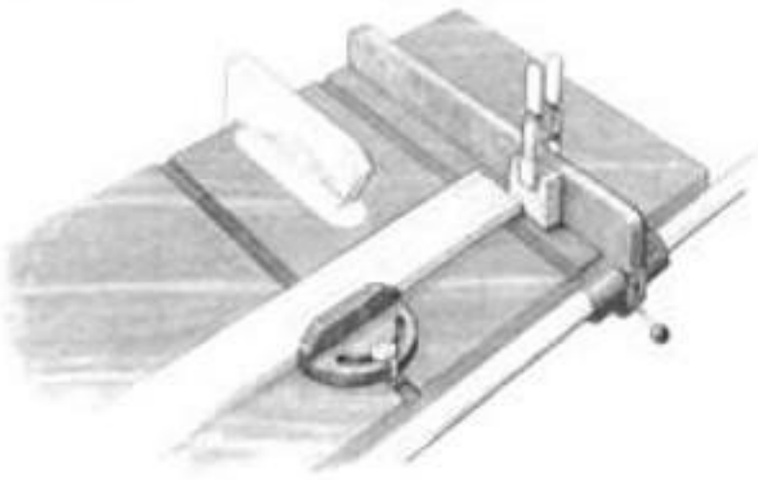
Flame-Polish

For a professional-looking edge treatment on plexiglass, try "flame-polishing." First sand out saw marks, then lick the edges lightly with a propane torch. The scratches disappear and the edge takes on a glossy finish. Practice on scrap to get a feel for the process.

DAVID BLOCH
Barnwell, SC

Worth Repeating

Never use a rip fence by itself as a stop block for cutting equal length parts with a miter-gauge. Always



use a gauge block, positioned well before the blade, so the cut-off piece poses no danger of becoming jammed between the saw blade and the rip fence.

TOM MOORE
Madison, VA

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.*

Self-Cleaning Router Bit

Have a problem with glue buildup on router bits when edge-trimming plastic laminate? The Black Knight 1/2-in. laminate trimming bit has a new space-age polymer coating that does for this bit what Teflon did for frying pans—no stick. In the past you had to stop trimming and clean the glue from the bit, especially the bearing surface. But the coating on this bit keeps the cutter and bearing clean while you trim. Available in 1/4-in. shank with 1/2-in. or 1-in. long cutters. (Price: $24, either size)

■ *Success Engineering and Manufacturing, Dept. AWT, P.O. Box 25648, Cleveland, OH 44125, (216) 883-1200.*

CIRCLE NO. 50 ON PRODUCT LITERATURE CARD

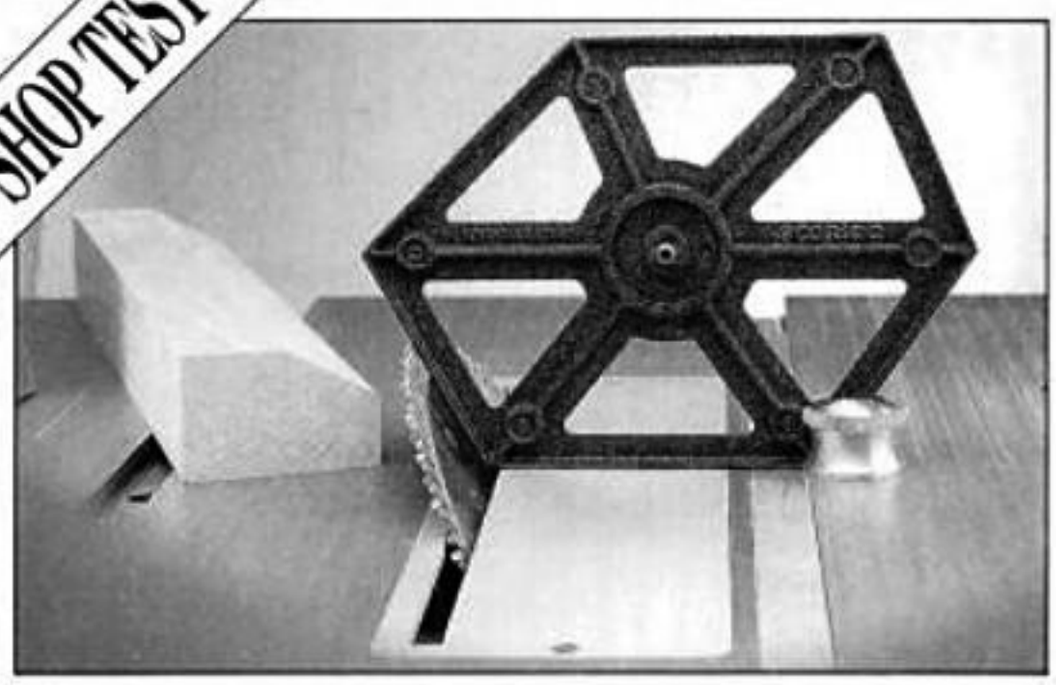
Non-Toxic Finishes ▲

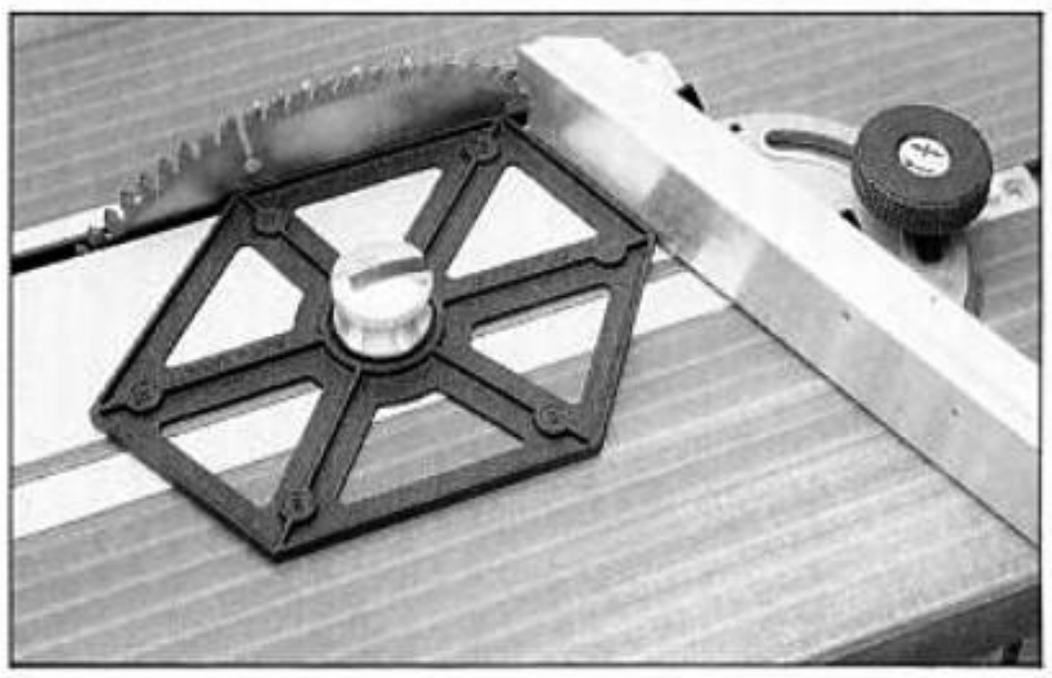
Stricter environmental regulations for finishing products are on the way. The new Safe & Simple finishes and stains by Carver Tripp will satisfy the new laws. They're made with a water base so they're non-toxic, non-flammable and have no harmful fumes or odors—you can work with them in any room without special ventilation. The finish system includes Super Poly Finish (for extra abrasion resistance and exteriors), Clear Finish (for interiors), Hardener, and Stain (in five colors). Drying time is a fast 45 minutes. (Price: $13.99/qt. Poly Finish, $10.99/qt. Clear Finish, $7.99/qt. Stain)

■ *Mail order from: The Woodworker's Store, Dept. AWT, 21801 Industrial Blvd., Rogers, MN 55374, (612) 428-4101.*

CIRCLE NO. 62 ON PRODUCT LITERATURE CARD

SHOP TEST





Veritas Poly Gauge

The Poly Gauge is a jig for accurately setting angles on jointer fences and saw blades. At first glance, it didn't look like much for $25. But after using the Poly Gauge in my shop for a few weeks, I realized it's a very useful jig, and I'd suggest you give it a closer look.

The Poly Gauge is intended to set the most commonly used angles in stave constuction to build polygons of 4, 5, 6, 8 and 12 sides. For most woodworkers, setting these angles to produce polygons with perfect joints is an exercise in trial and error at best. With the Poly Gauge you can set these angles in one direct step on tablesaws, radial arm saws, and bandsaws, as well as jointers and drill presses. Use it to set blade tilts, table tilts, miter gauges and even for general layout work.

The jig is made of hardened aluminum, with angles said to be accurate within plus or minus 1/12 of a degree. It has a nicely-machined, heavy brass knob that screws into the middle of the jig when you're using it in a horizontal position (like setting a miter gauge). The knob can be removed to serve as a stabilizing base for holding the jig in a vertical position (like setting tablesaw blade tilt), so your hands are free to make adjustments. The angles are each marked with a number which indicates the number of sides a polygon will have if that angle is used to cut the pieces (it does *not* indicate the number of degrees of the angle). So if you want, say, an octagon, you use the angle marked 8. I carefully scraped the black finish off the high part of the embossed numbers to make them more visible.

I wouldn't say the Poly Gauge is "foolproof," as advertised, because nothing is—but it is a very accurate tool. I measured the angles with a Starrett machinist's protractor and an eye loupe, and found them to be more accurate than my ability to measure using these tools. But please keep in mind that even the most accurate setup won't compensate for blade flexing, play in machine parts, varying material density and other variables which could effect the final cut angle on the wood. So test cuts are still advisable.

I've set a lot of angles with good setup tools and some not so good setup tools. I found the Poly Gauge to be a well-designed jig that helped me set the angles I wanted easily and more conveniently than other tools I've used. (Price: $24.95)

■ *Woodcraft Supply, Dept. AWT, 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102, (800) 225-1153.*

GILES GILSON

CIRCLE NO. 48 ON PRODUCT LITERATURE CARD

TOOLBOX

The Air You Wear

Breathing sawdust particles day after day can be hazardous to your health, especially if you develop an allergy to the dust. And have you ever tried wearing a full-face dust mask or respirator with a beard or glasses? Now there's an alternative. The Airstream AGH-1 is a safety helmet, face shield and air filter all in one self-contained unit. It has a small fan that draws air through a two-stage filter system and then directs the clean air downward across your face. The clear plastic visor has rubber strips which seal lightly against your cheeks. The constant air flow creates a slight positive pressure so contaminated air can't get in, even though the helmet and visor aren't constricting. A rechargeable battery pack clips to your belt and runs the fan for about ten hours. The unit weighs 1.9 lbs., and you get to keep your beard—no problem. Turners really like it. (Price: $279)

■ *Airstream Dust Helmets, Dept. AWT, P.O. Box 975, Elbow Lake, MN 56531, (800) 328-1792.*

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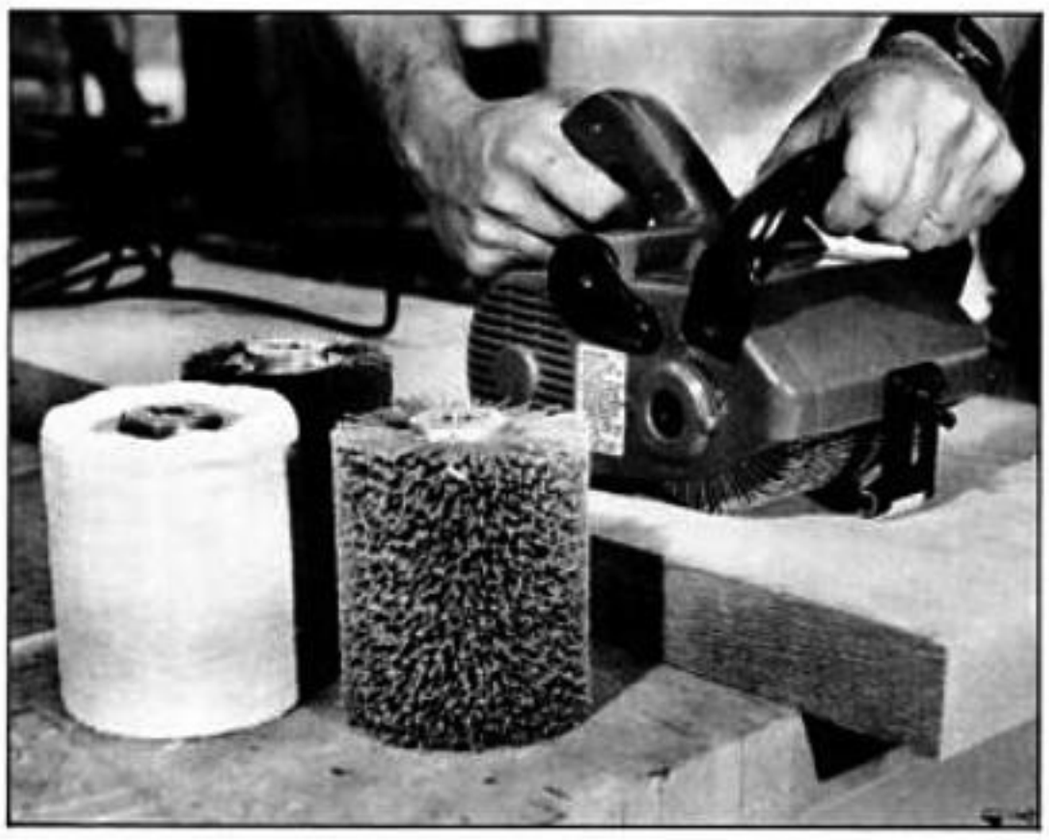


Different Strokes ▲

You've probably seen a rotary flap sander on a drill press or in a portable drill. Now Makita's #9741 Wheel Sander takes that approach in a totally new power sanding tool. It uses a 4¾-in. wide, 4-in. diameter sanding wheel made up of many individual radial sandpaper flaps. It's a heavy duty sander with a 7.8-amp motor for rapid, aggressive stock removal. The sanding wheels are available in four different grits. The tool also accepts other rotary accessories— nylon brush wheel, wire brush wheel, and cotton buff wheel. The nylon wheel is great for accentuating wood grain. (Price: $616)

■ *Makita U.S.A. Inc., Dept. AWT, 14930 Northam St., La Mirada, CA 90638, (714) 522-8088.*

Attention to details—well-chosen figure, delicate dovetails, a silky-smooth drawer—will subtley enhance the clean, simple lines of this little side table.

CHERRY SIDE TABLE

It's the Details that Make the Difference

BY KELLY MEHLER

This delightful little side table can adapt to a variety of settings in either the home or the office. Its clean Shaker lines make it suitable as a bedside table, end table, or telephone table. The small dovetailed drawer is simple enough for the first-time drawer maker; or you can skip the drawer entirely to simplify the project. In this article I'll suggest how you can adapt the dimensions of the table to suit various needs, I'll explain my approach to selecting and rough milling the wood, and I'll describe a few of my joinery methods. Except for some details, which I'll explain, the table construction is straightforward enough to build from the drawings.

The drawings give the dimensions for a stand-alone side table, but you should consider changing the dimensions to adapt the table to your intended use. As a bedside table, the height of the tabletop should be about even with the top of your mattress. The depth could be between 14 and 16 in. and the width could suit your space.

End tables next to a sofa or easy chair generally come up to the height of the arms. The depth from front to back is usually greater than the width. Many end tables are about 24 in. high, 14 to 16 in. wide and 20 to 23 in. deep.

A side table, say along a wall, can be up to 28 in. high and usually is somewhat wider than an end table —maybe 20 to 24 in.

I work out any design variations to suit the intended function of the table and then make a sketch with dimensions. Working from the sketch, I make a cutting list and study it. This helps in the selection and purchase of the lumber. With a clear idea of what I need for the project, I'm better prepared to cut the wood economically.

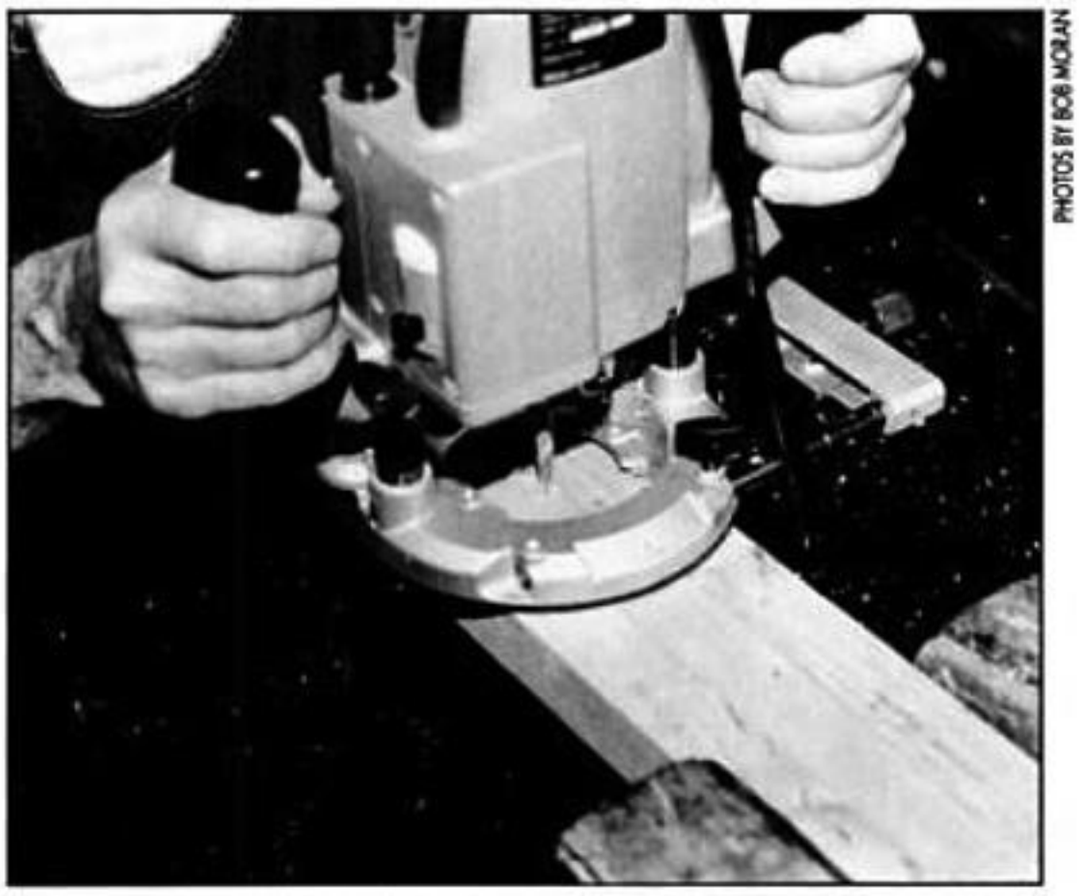
Look over the wood that you intend to use for the table and use chalk to roughly mark out the parts that are needed. Take your time when you do this to decide where the best available grain figure should appear in the table; the visual impact of the finished table depends largely on your layout decisions. I choose the wood for the top first, because it's the largest and most visible piece. As you can see in the photo, I resawed thick stock and bookmatched two pieces for an attractive figure pattern (see "Joining Edge-to-Edge," in this issue).

Making the Legs

After sawing and planing the legs to the dimensions provided in the Bill of Materials, decide which two will be the front legs and which way they will face. Then mark the faces of the legs that will be mortised. Remember that the rear legs get two mortises, but the front legs get mortised only for the side aprons. Be careful: it's treacherously easy to cut a mortise where it doesn't belong.

I cut the mortises in the legs with a plunge router and fence. I lay out a mortise on one marked face, then transfer the top and bottom lines to the marked faces of the other legs using a square. I clamp three legs side by side in the bench vise to provide a flat surface for the router base, as shown in the photo below. The middle leg of the three is the one that will be mortised, so my first setup will have the leg with the fully laid-out mortise in the middle. I set the router fence to ride against one of the outside legs, then adjust the router's plunge depth turret so the first cut will be 1/4 in. deep (the bottom of the haunch) and the rest of the mortise depth will be cut in two or three additional steps. Note that the mortises are not centered in the width of the legs; half of them are off-center one way and half the other way.

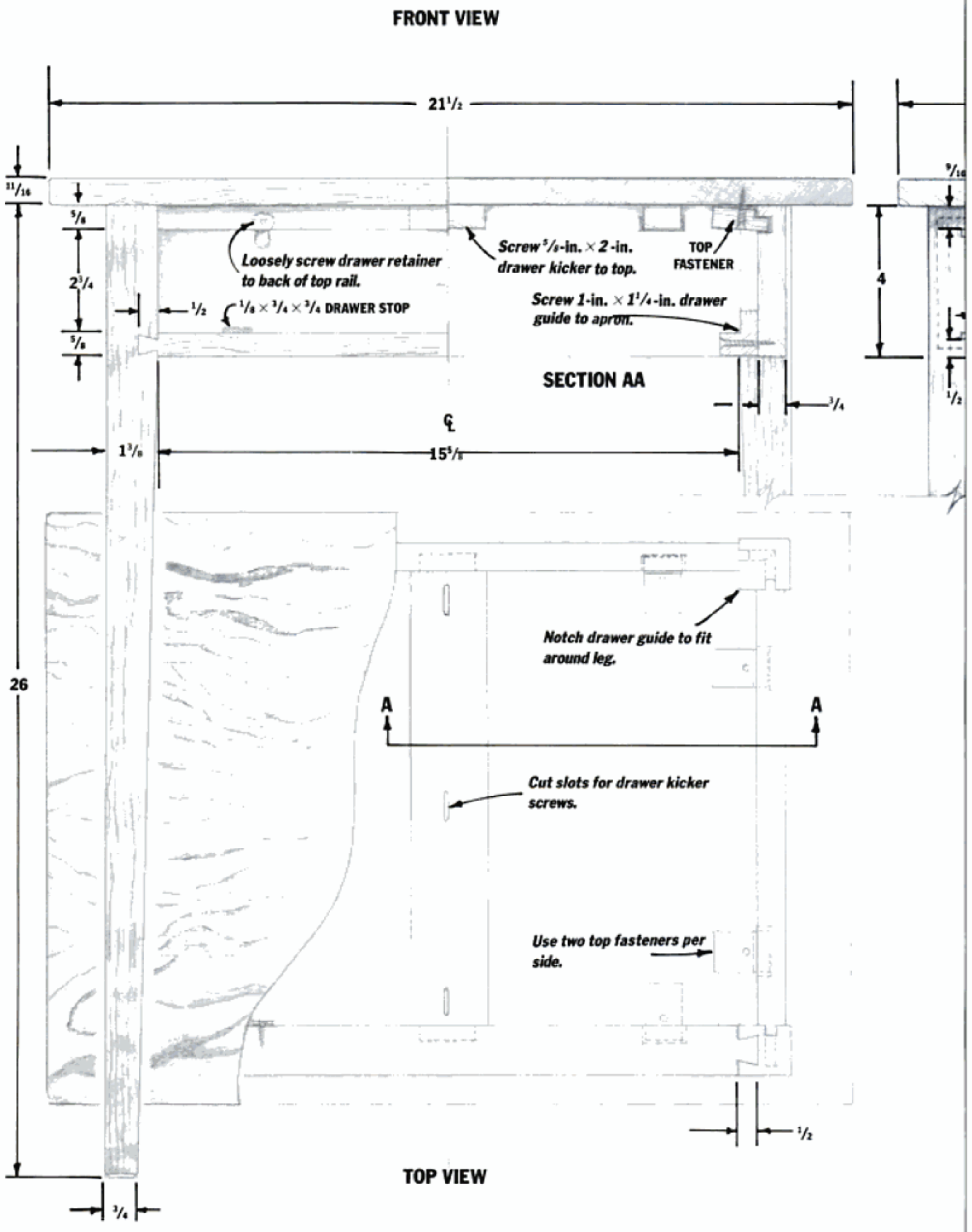
Once the legs are mortised, taper them on their two inner sides. I do this on the jointer. I lower the infeed table to about a 1/8-in. cut, then clamp a stop block on

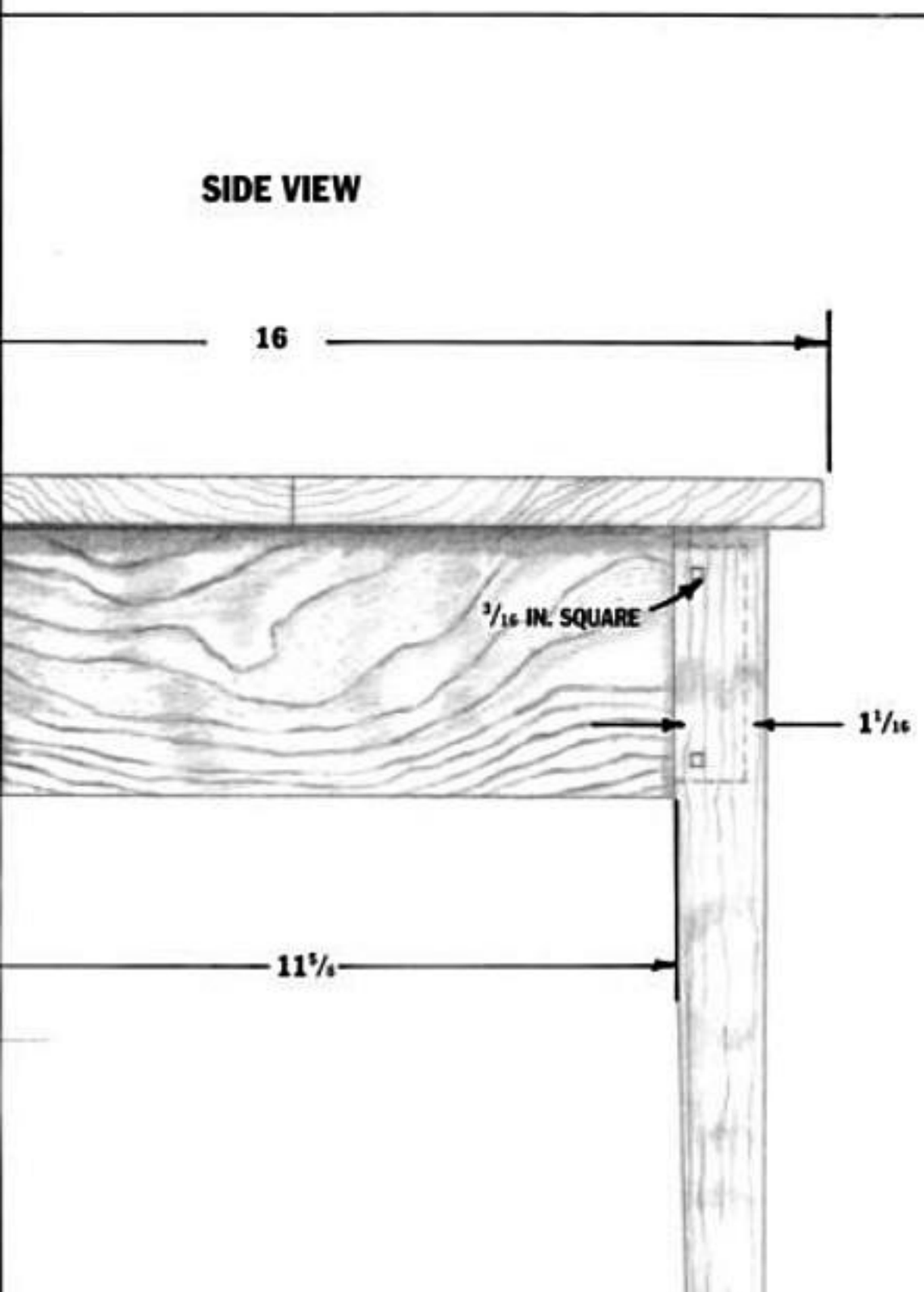


PHOTOS BY BOB MORAN

Rout the leg mortises by clamping three table legs side by side in the vise. The fence rides against the outer leg to mortise the leg in the middle. All the mortises can be cut with the same fence setting by rearranging the legs in the vise.

FIG. 1: CHERRY SIDE TABLE





nder drawer dovetails and coving on the top edge of the wer front enhance the impression of delicacy, while the etail joining the bottom drawer rail, and pegged tenon, vey a feeling of structural integrity.

DRAWINGS BY KARL SHUMAKER

To taper the legs on the jointer, UNPLUG THE JOINTER, position the start of the taper over the high point of the cutterheads's arc and clamp a stop block to the infeed table. Start the cut by lowering the leg on the spinning cutter. Repeated passes increase the taper. DANGER! THIS OPERATION EXPOSES THE CUTTERHEAD. KEEP HANDS AWAY!

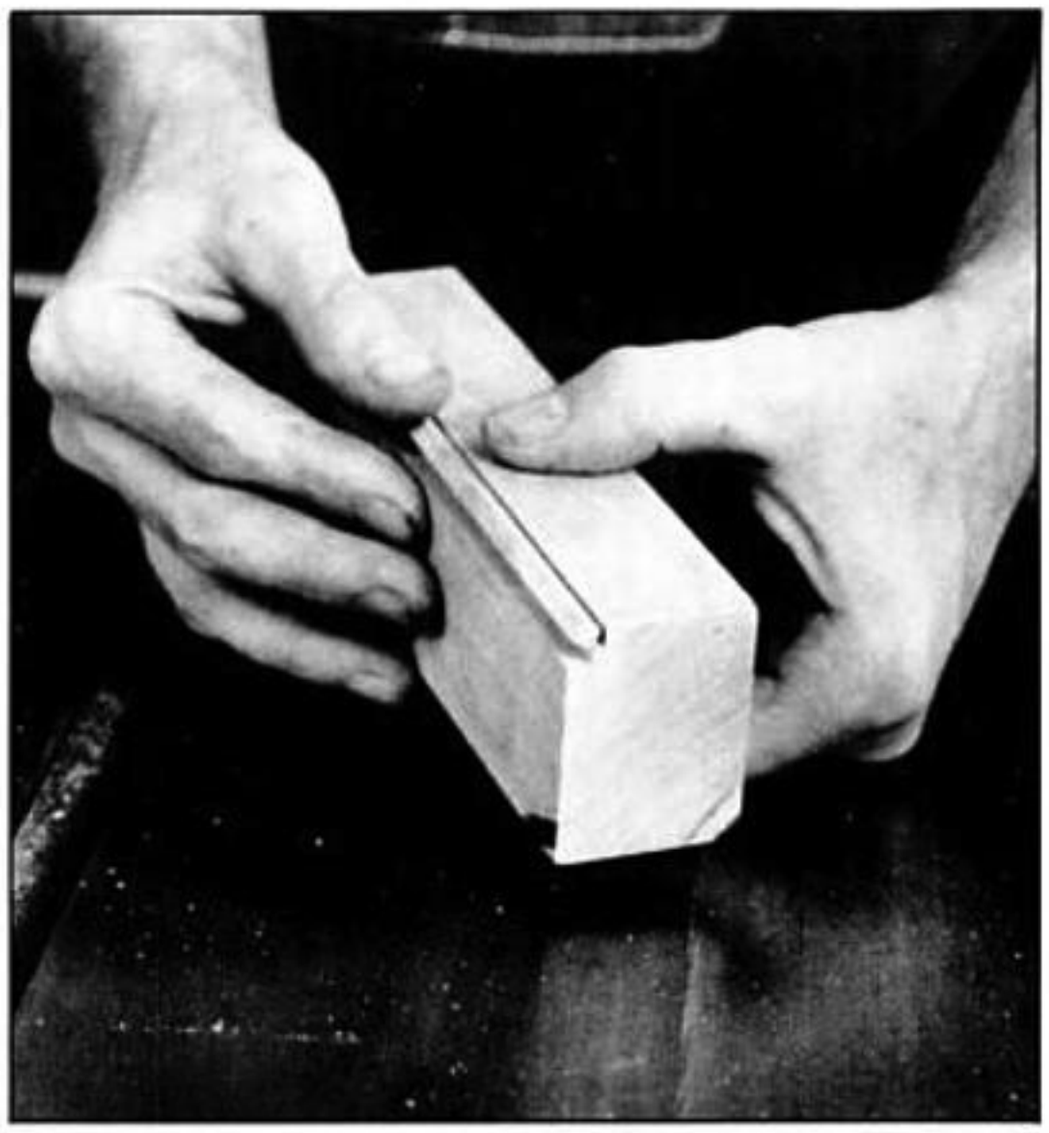
the infeed table so that when the bottom of a leg is butted against the stop block, about 5 in. of the top of the leg extends past the high point of the cutterhead over the outfeed table (see photo). The stop block is only about 3/8-in. thick to leave room for a push stick to grab the bottom end of the leg. I start the cut by lowering the leg onto the spinning cutter while the foot of the leg is positioned against the stop block. By making repetitive passes in this way, I end up with a taper. (For more detailed information on jointer tapers, see the Jan./Feb. 1989 *AW*, p. 48.) When both tapers are done on all four legs, set them out of harm's way and work on the aprons and rails.

Aprons and Rails

I used both the tablesaw and router table to cut the haunched tenons on the aprons. I cut the shoulders on the tablesaw, then removed the waste from the cheek on the router table. I take the same approach with both machines—setting the height of the cutter so that a pass on opposite faces will leave a tenon in the middle that is a nice, snug fit in the mortise. For this method to work, the stock must be uniform in thickness and the machines must be finely adjustable. Any adjustment affects both sides of the tenon. For example, adjusting the height of the cutter by 1/128 in. changes the tenon thickness 1/64 in.

After cutting the tenons, take a piece of coarse- to medium-grit cloth abrasive (like a piece of a sanding belt) and use a shoe-shine action to round the tenons to fit the routed mortises. A wood rasp also works well. Finally, bevel the ends of the tenons that join inside the rear legs so that the tenons don't interfere with each other inside the mortises. Chamfer the remaining tenon edges to make assembly easier. When you test the fit of the side aprons to the front legs, make a good, accurate mark where the bottom of the apron meets the leg. The bottom edge of the bottom

The flat dovetail mortises in the front leg tops are strictly a tap, tap, chop, chop operation. The only secrets are a sharp chisel, a secure hold-down, a good eye, and patient care.



Saw the small square pegs for the leg joints from the corners of scrap stock. To cut them safely, adjust the blade almost high enough for the two cuts from opposite sides to meet, then break the corner out.

drawer rail should be lined up with the bottoms of the aprons. (See Fig. 1.)

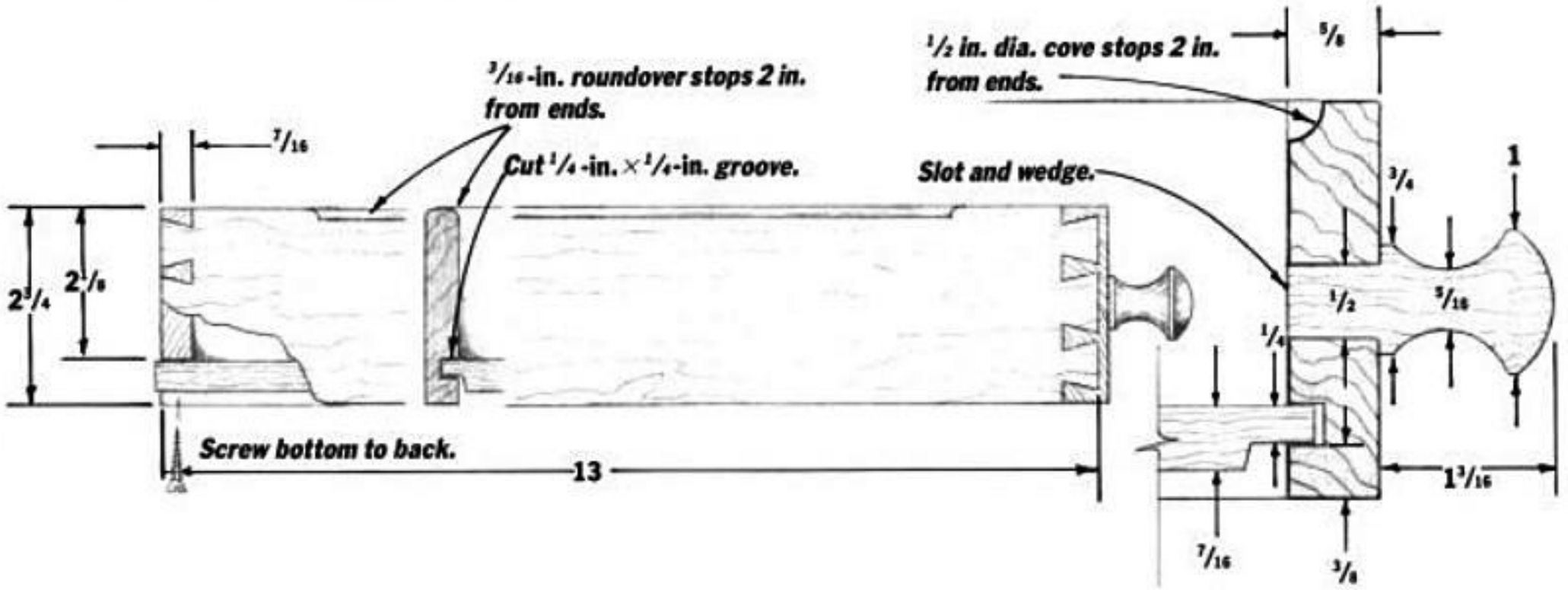
The drawer rails are the next pieces to fit. Both drawer rails are dovetailed into the front legs, but in different ways. The bottom rail joins with a sliding dovetail, while the top rail joins with a single broad dovetail into the top of the leg.

Cut the sliding dovetail socket by clamping the two front legs together front face to front face, and clamp a fence across the inside faces to guide a router. I use a 1/2-in. 14° dovetail bit and make the socket 1/2 in. deep. The center line of this cut must coincide with the center line of the drawer rail. It's easy to lay out if you marked where the bottom edge of the apron falls, as suggested above.

On the router table, I cut matching dovetails on the ends of the bottom rail. I use a tall fence and a square-cornered backing/pushing board to guide the rail, on end, past the bit. Move the fence to adjust the width of the dovetail for a proper fit in the socket.

The top rail gets flat dovetails. I lay them out with a bevel gauge, cut them on the bandsaw, and trim the dovetails with a sharp chisel. The picture (above, left) shows how I go about chopping the matching socket in the leg. I reinforce this dovetail with a screw at final assembly.

FIG. 2: DRAWER DIMENSIONS



Peg the apron tenons into the leg mortises. First saw, then chisel the protruding peg to bring it down flush with the leg.

With the rails fitted, you can measure the opening to make the drawer. The drawer is supported in this opening by two drawer guides screwed to the side aprons with countersunk screws (see Fig. 1). Measure your actual table before cutting the guides to the dimensions given in the drawing.

Making the Drawer

The drawer has traditional details: dovetailed corners, "raised" panel bottom, and a turned knob with a wedged tenon. The bottom fits into grooves in the front and the sides and is fastened to the drawer back with two screws. The grain of the bottom panel runs across the width of the drawer and the screw holes are slotted to allow the panel to expand and contract across the grain. The bottom of the drawer deserves as much care and attention as the other parts. Carefully-chosen figured grain, perhaps bookmatched, can be a delightful surprise when discovered in a place where we are more accustomed to finding plywood or hardboard. Select your wood carefully.

I resaw the drawer sides, back, and bottom from thicker stock and match the grain. I rout the grooves for the bottom *before* laying out the dovetails as a reminder to position a tail over the groove.

After the dovetails have been cut, trimmed, and properly fit, I like to shape the top edges of the drawer parts with a router, as shown in Fig. 2, to give the drawer a more delicate appearance. Be sure that the drawer is square and sits flat when you assemble it to avoid trouble when you fit the drawer to the table.

I like to see a drawer front that's slightly recessed in its opening. To get that appearance I first fit the drawer stops shown in Fig. 1, positioning them so that the drawer is flush with the drawer opening. With the drawer in place, I then sand the drawer front and table front at the same time to ensure that they're flush. Finally, I trim 1/64 in. from the front edges of the drawer stops so the drawer front is recessed 1/64 in.

The gap between the drawer front and the table should be even all around the opening. To adjust the gap at the bottom to match the sides and top, I plane the bottom edge of the drawer front only—the plane doesn't touch the bottom edge of the drawer sides. When I'm happy with the fit and the gap, I slightly round the edges of the drawer and drawer opening with sandpaper.

When turning the drawer knob on the lathe, I include a 1/2-in. tenon. Then I saw a groove in the tenon (for a wedge) and glue and wedge the knob into the drawer front. To keep the drawer from coming all the way out of the table accidentally, I loosely screw a small turn-cleat to the inside edge of the top rail to act as a drawer retainer. The cleat must be swung up to remove the drawer.

Peg Joints

When the table is fully assembled and the glue dry, I pin the mortise and tenon joints with square pegs. I drill two 3/16-in. holes through each joint. The photo shows how to cut the pegs safely on the tablesaw. I use the 3/16-in. drill bit to set the distance between the fence and the blade. I square up the tops of the holes with a small chisel and glue in the pegs, then saw off the excess and pare them flush with a chisel.

The attractiveness of the finished table will depend largely on small details: the slight rounding of edges, the slight recess of the drawer and the smoothness of its operation, the square pegs, the pleasant surprise of care taken even if it shows only on the inside, not to mention care in choosing and matching grain patterns. If you are careful and patient throughout the whole process of making the table, it will have an integrity that will make it as delightful to use as it is to look at. ▲

Kelly Mehler is a professional furnituremaker and the owner of "Tree-Finery," a furnituremaking shop and gallery in Berea, Kentucky.

BILL OF MATERIALS

PART	QTY.	DIMENSIONS T	W	L
Top	1	11/16"	16"	21 1/2"
Side apron	2	3/4"	4"	13 3/4"
Back apron	1	3/4"	4"	17 3/4"
Legs	4	1 3/8"	1 3/8"	26"
Bottom rail	1	5/8"	1 3/8"	16 5/8"
Top rail	1	5/8"	1 3/8"	16 5/8"
Drawer guides	2	1 1/4"	1"	12 1/8"
Top fasteners	6	9/16"	1"	1 1/2"
Top fasteners	2	7/16"	1"	1 1/2"
Kick rail	1	5/8"	2"	13"
Drawer front	1	5/8"	2 3/4"	15 5/8"
Drawer back	1	7/16"	2 3/4"	15 5/8"
Drawer sides	2	7/16"	2 3/4"	13"
Drawer bottom	1	7/16"	12 3/4"	15 1/4"
Drawer knob	1	1"	1"	1 7/8"

JOINING EDGE-

BY ROGER HOLMES

A while back, I had lunch with a friend who's in the antique business. As we ate, he called my attention to the old trestle table at which we sat. "Top's a single plank," he said. "Don't see many like it today." I had to agree. Oak planks two inches thick, three feet wide and ten feet long are hard to come by. To make a tabletop like that today, you'd almost certainly have to glue several narrow boards edge to edge.

Even if we *could* find nice wide boards for tabletops and cabinet sides, not many of us have a jointer and thickness planer large enough to handle them. But there doesn't have to be anything second-rate about a glued-up panel. Narrow boards can often be combined to produce patterns of grain or color more interesting than those of a single, wide plank. By picking and choosing from a dealer's pile you can usually piece together a handsome panel—see Fig. 1 for tips. Even better, if you can buy boards cut from the same tree, or resaw thick planks, you can make symmetrical or repeating patterns, much as you would with veneers. (See Sept./Oct. 1988 *AW* on resawing and Sept./Oct. 1990 *AW* on veneering.)

Laying Out the Panel

I select and arrange the boards before doing anything to the edges. As you arrange the boards, keep an eye on grain direction as well as appearance. If you can lay out the boards so that all rising grain rises in the same direction, the planing and scraping you do after you glue up will be much easier. (See July/Aug. 1990 *AW*, p. 34.) If the pattern I want requires alternating grain direction, I usually put up with having to change planing direction on the glued-up panel.

Pay attention to the orientation of the growth rings on the ends of the boards in a panel. If a board cups, it will cup away from the heart side, as shown in Fig. 2. If I'm making an unsupported tabletop, one that isn't fastened firmly to some understructure, I'll alternate the orientation of the rings as shown in the drawing. But for tabletops and cabinet sides fixed firmly across their width, I let the grain patterns on the boards' faces determine the arrangement.

When you've selected the boards, cut them roughly to length and, if necessary, rip them to produce roughly parallel edges. Then flatten a face on each and plane them to thickness. (See July/Aug. 1990 *AW*, p. 30.) Flattening is a crucial step. It is very difficult to

FIG. 1: MATCHING UNRELATED BOARDS

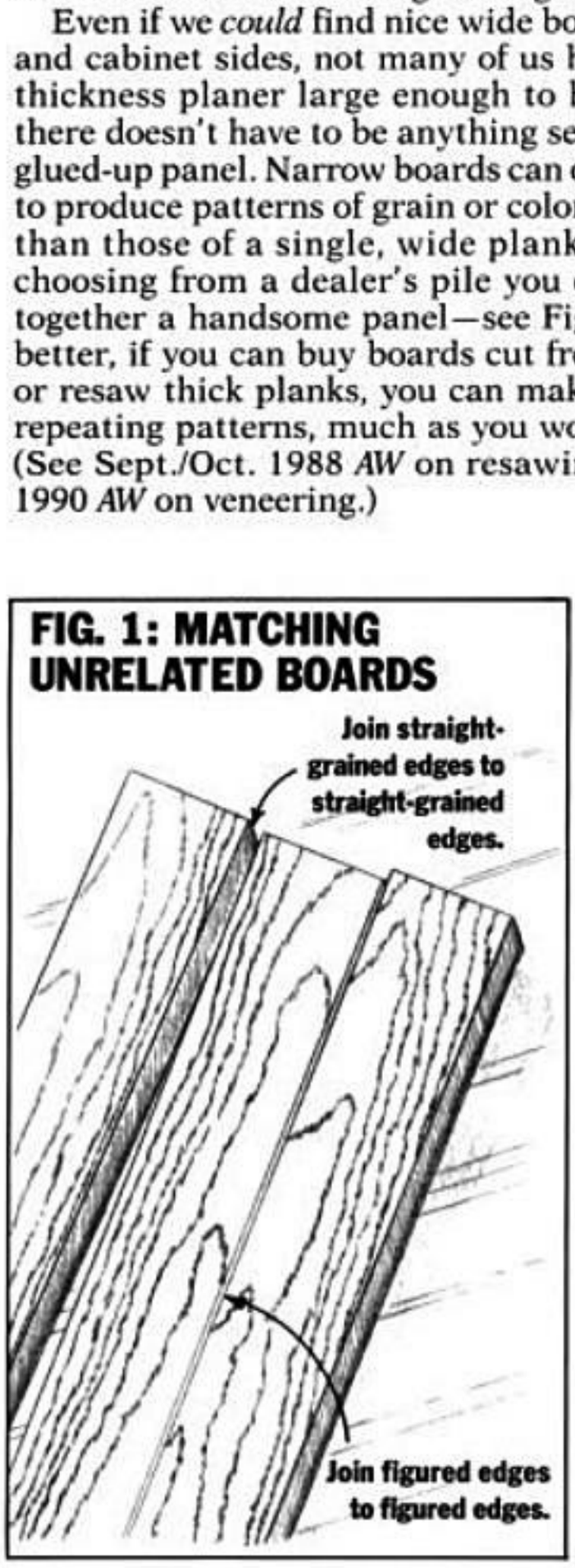
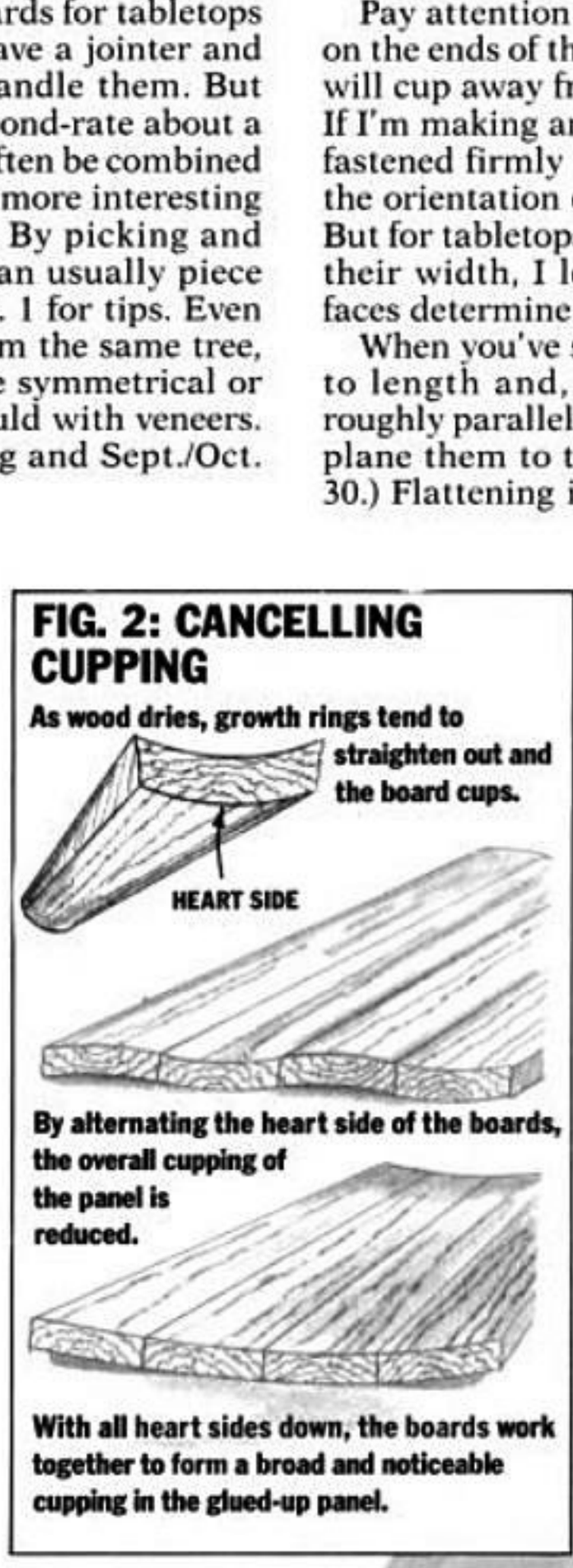
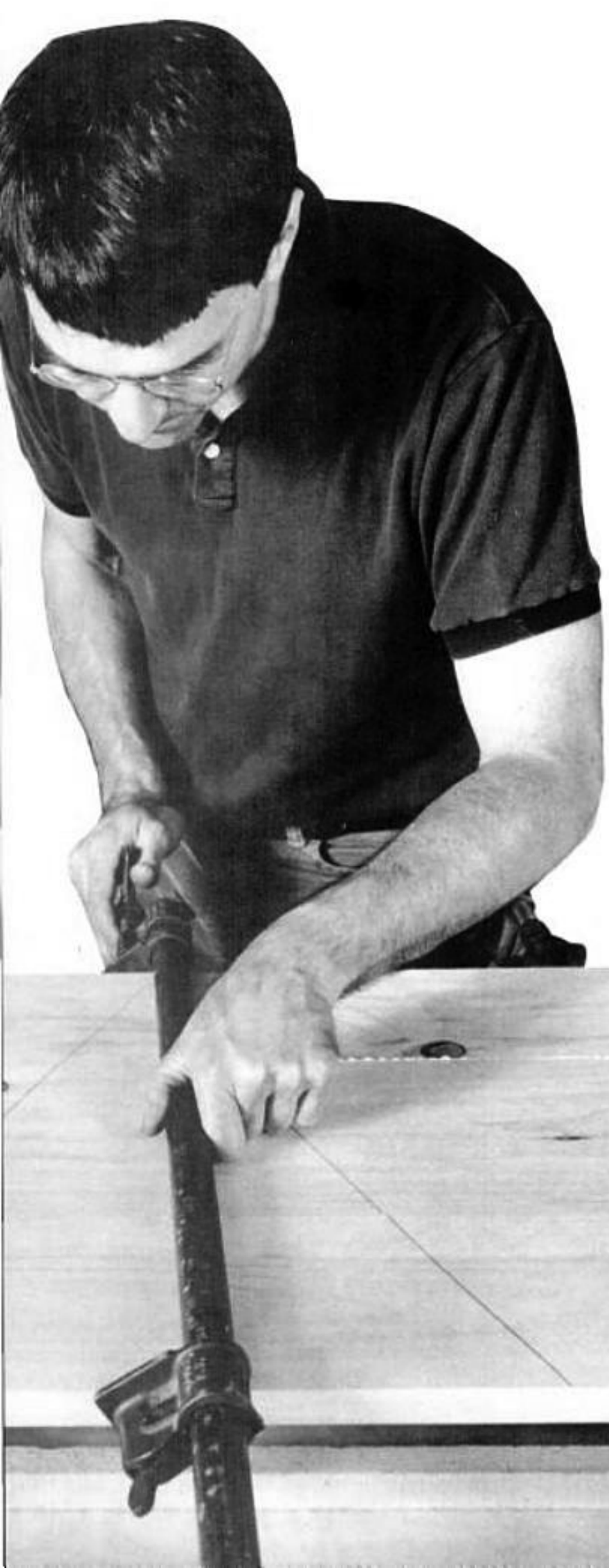


FIG. 2: CANCELLING CUPPING



TO-EDGE

How to Glue up Boards to Make Wood Wider



plane true edges on boards that are bowed, cupped or twisted. Lay out the surfaced boards, refine the arrangement if you wish, then mark two sides of a large triangle across their faces, as shown in the photo below. The marks will help you maintain the order of the boards through all subsequent steps.

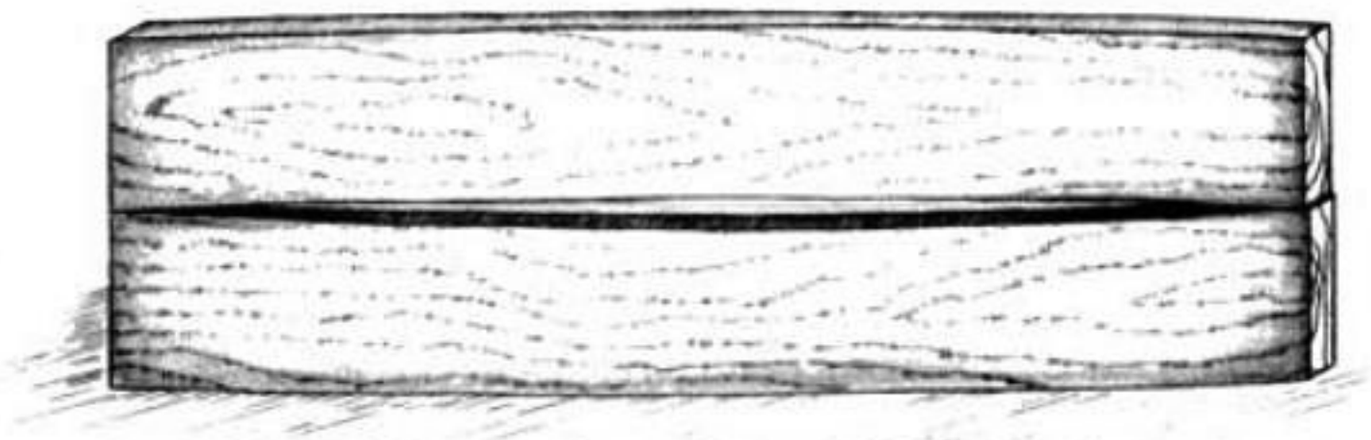
Jointing the Edges

Mating edges should be straight and square to the boards' faces; making them so is called jointing. You can joint edges with a hand plane or a machine jointer. Lots of woodworkers glue up boards straight from the jointer, and the joints are perfectly acceptable, but I prefer to combine hand and machine techniques. I establish flat, true edges on the jointer, removing lots of wood quickly if I need to. Then I plane off the tiny undulations left by the jointer knives and plane a slight hollow into each edge, so the joints "spring" together as shown in Fig. 3. I think this combination of techniques makes for a tighter, stronger joint, but the difference may be apparent only to me. (If you don't have a jointer, you can skip to the section on hand planing.)

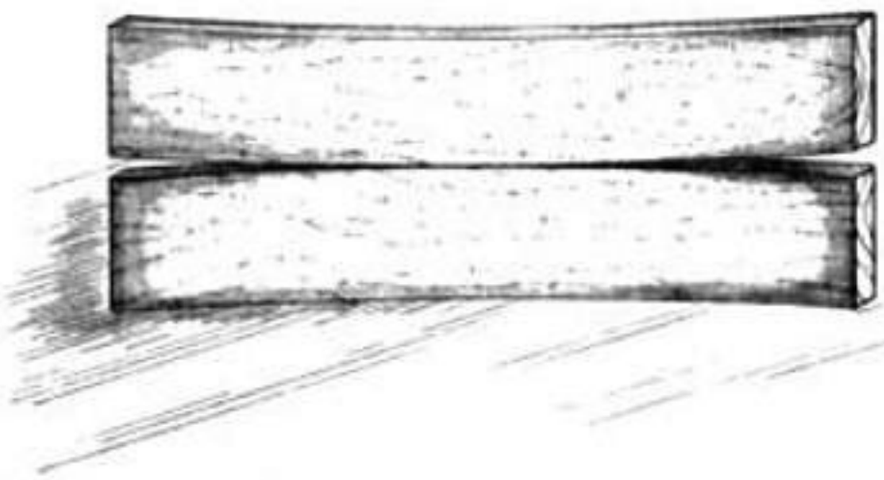
Jointing on the jointer—Machine jointing will be a breeze if you've flattened the faces of the boards, sharpened your jointer knives and set the outfeed table correctly. (See July/Aug. 1988 *AW* on tuning jointers.) Two edges make a joint; work them as a pair. Joint the first edge with the triangle-marked face against the fence and joint the mating edge with the unmarked face against the fence. Fig. 4 shows how al-

Basic edge joining skills let you glue up narrow boards to make wide ones. A triangular mark makes it easy to keep boards in order for glue-up.

FIG. 3: SPRINGING THE JOINT

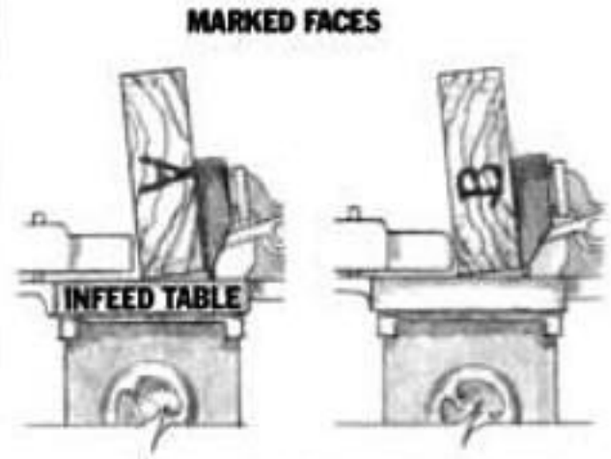


A sprung joint is tight at the ends, open in the middle. A good joint is slightly sprung; a gap of 1/32-in. over 3 ft. is plenty.

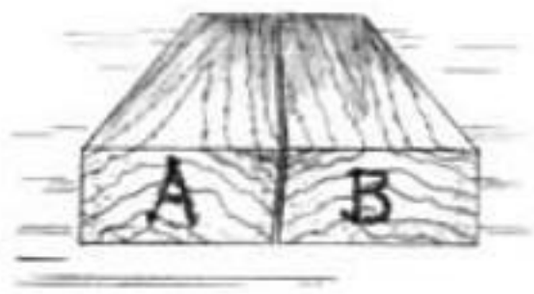


A bowed joint, open at the ends, is likely to open up at the ends after it is glued.

FIG. 4: COMPLEMENTARY ERRORS (ANGLES EXAGGERATED)



Out-of-square edges from an out-of-square jointer fence can still come together in a flat panel.



ternating the faces in this manner will produce a flat surface, even if the fence isn't set at exactly 90°. In general, slow feed rates and shallow cuts produce smoother edges. If you can't avoid working against the grain, a slow feed will minimize tearout.

When the edges are jointed, stack the boards edge-to-edge vertically, as shown in the photo, to see if the joint is tight. If an edge is concave, you'll need to take several passes on each end, then joint the full length of the edge, as shown in Fig. 5. If an edge is convex, the easiest solution is first to straighten the opposite, *concave* edge of the board, then rip the convex edge straight on the tablesaw and joint it. If you must correct a convex edge on the jointer, use the technique shown in Fig. 5. Be sure to keep the board from rocking during the first pass or two, until you've established a straight portion long enough to bear on the jointer tables.

When the joints are tight, you can either glue up the panel or finish the edges with a hand plane, like I do.

Hand planing—I use my 22-in. jointer plane for working edges because it contacts more of the edge than a shorter plane. No matter which size plane you use (the longer the better), a razor-sharp plane iron is essential. (See "Getting the Edge," Sept./Oct. 1990 *AW*.) Having already established (I hope) a flat, true edge on the jointer, I want the hand plane to remove only a thin shaving down the length of the edge. I set the chip breaker less than 1/32-in. from the cutting edge and position the blade so it's parallel to the sole and barely protruding from the throat. I lower the blade as I make the first few strokes until I can remove a wispy, but intact, shaving.

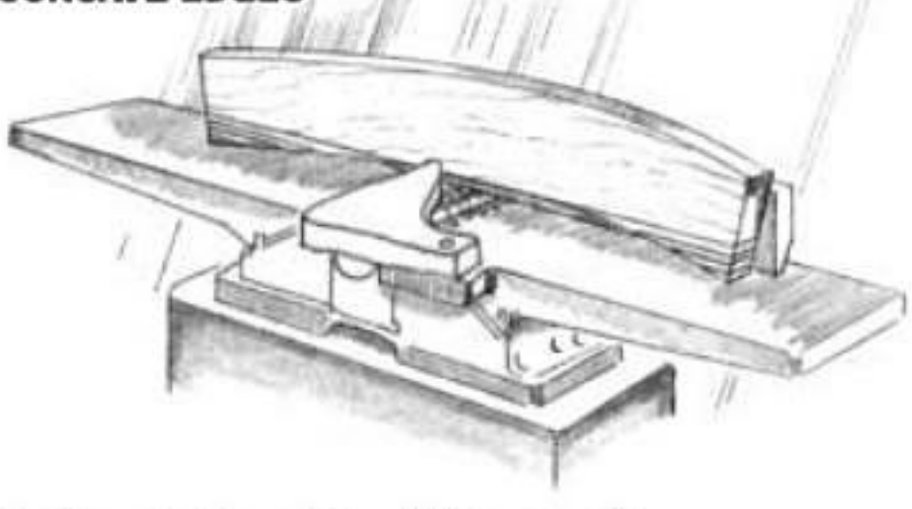
If you're jointing edges entirely by hand, first set the plane to take a heavy shaving and clean off the rough saw marks on all the edges. Straighten the convex and concave edges by removing the high spots as described above in the machine jointing section. Then reset the plane iron and finish plane the edges as described here.

I hold boards in the face vise on my bench. Some kind of adjustable support is handy for holding up the

A continuous whole-body motion sweeps the plane down the board's edge. The fingers of the left hand help to keep the plane square with the face of the board.

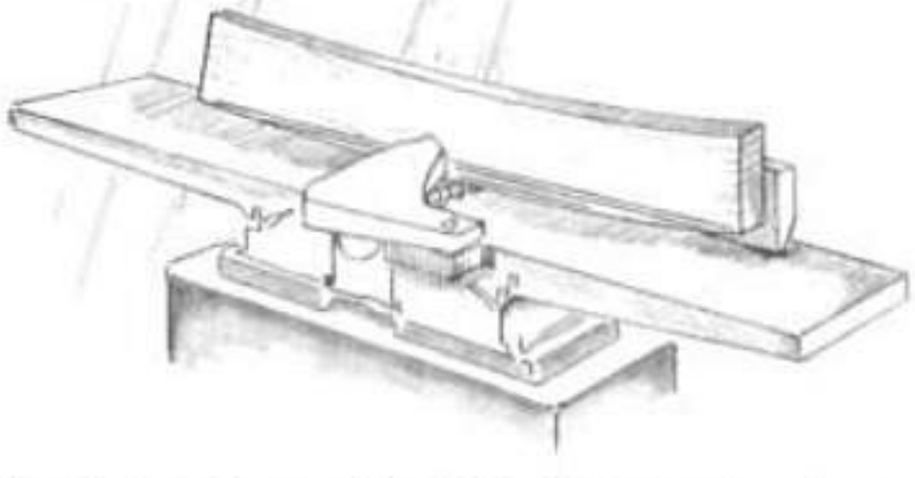
FIG. 5: STRAIGHTENING BOWED EDGES (DEFECTS EXAGGERATED)

CONCAVE EDGES



Cut the ends down with multiple passes, then joint the full length.

CONVEX EDGES



Keep the board from rocking for the first pass or two, then extend the flat with successive passes.

end of long boards. Held in a vise, very narrow boards might be distorted by the force of planing. If possible, plane them on the benchtop against a stop or between bench dogs.

The key to hand planing an edge is to keep the sole of the plane perpendicular to the faces of the board. I rest the sole of the plane squarely on the edge and lock my hands and wrists in position. (This locking is a mental as much as a physical action.) I find that keeping the fingers of my left hand in touch with the face of the board, as shown in the photos, helps me to keep the plane square.

The force for the stroke comes from my upper arms, shoulders, torso and legs. You can plane a short board in one motion, shifting your weight from back leg to front leg and extending your arms to finish the stroke, as shown in the photos, p. 28. Longer boards require a kind of choreographed shuffle down their lengths: arms, torso and legs shifting along as smoothly as possible while you keep the plane moving and square to the board's face. You may want to check your planing with a straightedge or square when you're starting out; but with practice, you'll learn to trust your skill and your eye and save yourself a lot of time.

When you've jointed a pair of edges, stack them in a vise as shown to check the joint. Ideally, the top board will rest firmly on the bottom, the edges will meet along their entire length, and there should be no visible gaps when viewed from either the front or back faces. A straightedge resting on the faces of the two boards will show them to be in a single plane.

Sometimes this actually happens. On those happy occasions, all that remains is to spring the joint slightly, as shown in Fig. 3, so the ends of the glued joint are less likely to open up when the humidity changes. Starting about three inches from one end, take a very thin shaving that finishes about 3 in. from the other end. I apply very little pressure on the plane at the beginning and end of the stroke, but a little more in the middle. After a stroke on each edge, I stack the boards and check the joint again before moving on to the next pair.

All too frequently, however, you'll find that you have more work to do before you can spring the edges —the stacked boards don't mate perfectly. Slightly concave edges are okay—the joint is already sprung. But if the edges are too concave or are convex you'll need to correct them with a hand plane. Establish flat surfaces on the ends (concave) or in the center (convex) and extend these along the entire edge.

A twisted edge, in which one pair of diagonal corners is higher than the other, is harder to see and to fix. With the boards stacked on edge, push down on one end of the top board and look closely at the joint from the other end. If the surfaces touch only at one corner, at least one of the two edges is twisted. (If the joint gaps all the way across the end, one of the edges is bowed.) You can also use a try square to check the angle of the edge to the face at each end. If the face is flat and the square reveals diagonally opposed high corners, the edge is twisted.

Correct a twisted edge by planing the high corners off. This isn't easy on a surface that's 3/4-in. wide and 5 ft. long, but it can be done. Again, the key is to keep the sole of the plane square to the board's face. The shaving starts from just the high corner at one end, widens to full width toward the center of the board, then tapers to the high corner at the other end. It may take several passes before you're taking a full-width shaving the entire length of the edge. Stack the boards and check the joint again. If it still rocks, check the other edge. If it *still* rocks ... well, keep at it.

Finally, check with a straightedge to see if the faces of the two boards form a single plane, as shown in the photo. If not, you need to adjust the angle of one of the edges. With the sole of the plane square to the face of the board, take one or more shavings off the high side of the edge and a final shaving across the full width. Then stack and check the boards again.

Learning to handle a plane to do such delicate work

Stack the boards on edge after you've planed them and check with a straightedge to see if they make a flat surface.

can be frustrating. Often you succeed in correcting one defect only to discover you've introduced another. If a hand-planed joint isn't clearly superior, why not glue up straight from the jointer? I can think of two reasons. The first is practical. If your jointer is slightly out of adjustment, it may not produce an acceptable joint; two minutes' work with a hand plane can fix it. The second reason is personal. For me, learning to use a tool with skill and precision is its own reward. My woodwork may not look any better, but I feel like I'm a better woodworker for it.

Gluing up—When all the edges are jointed and planed, you're ready to glue up. Clear off your workbench and spread a sheet of plastic to protect it from dripping glue.

The best clamps for the job are bar clamps, but for the price, it's hard to beat 3/4-in. pipe clamps. For panels up to about 4 or 5 ft. long, three clamps is usually enough: one placed about 3 to 6 in. from each end, the third in the center. I alternate the clamps top and bottom to prevent the panel from cupping. I usually clamp the panel dry first, to position the clamps and to make sure the panel will go together as I want it to. If you have to exert lots of pressure to draw this or that part of a joint together, something's wrong. Take the time to rework the edges so the joint closes with minimum pressure.

Elmer's Glue-All, a white glue, is still holding together furniture that my father made 30 years ago, so I continue to use it today. Various brands of yellow glue are supposed to be stronger, but I find they set up faster in the heat of summer, and I like as much time as possible to get the surfaces of the boards aligned. (For more on glues, see Sept./Oct. 1989 *AW*.)

I run a bead of glue down both edges of a mating pair. Better to use too much rather than too little glue; you can squeeze out excess glue, but you can't inject glue into a starved joint. I usually spread the glue over the edges with a stick or small brush. Then I lay the boards down on the clamps and rub the mating edges together, aligning the triangular marks (remember them?) on the faces. Begin tightening clamps at the center. If you're clamping thin boards, tilt the clamp heads so the pressure of the screw is centered on the edge, not above it. Make sure the faces of the boards are in continuous contact with the pipes or bars, particularly right at the clamp pad.

Lightly tighten the clamps, aligning the faces of the boards as you go. Then go back to the center and make small adjustments in the alignment as you tighten again. At first, you can slide the edges against each other to align the faces. But the glue gets tacky very quickly and more persuasion is soon needed. I bang a block of hardwood (to protect the boards) with a 16-oz. hammer. The banging can loosen clamps, so keep checking them. Use just enough clamp pressure to pull the joints snugly together, then give another nudge. If you have to crank really hard on a clamp, something's wrong.

Pushing the boards against the bars or pipes should keep the panel flat. But make sure the panel's surface lies in a single plane while the glue cures. I sight along the clamps to detect twist.

When the glue has thoroughly cured, remove the clamps and clean off the faces with a hand plane. It may take you a number of panels to get the hang of the tools and techniques, but it will all seem worth it the first time you have to hunt to locate a joint in a panel you've glued up. ▲

Roger Holmes works wood in Woodbury, CT.

NO DOWELS, THANK YOU

When I first started woodworking, I followed my father's practice of adding splines or dowels to edge joints. (Splines are loose tongues that fit into grooves cut in a pair of mated edges. "Biscuit" or plate-joinery is a modern refinement.) He did so, I'm pretty sure, because that's what many woodworking books and magazines in the 1950s recommended. The joints were easier to align, they said, and stronger. I never got the hang of doweling—it seemed far more trouble to align the dowel holes in the edges than to align the edges themselves. But for a time, I dutifully grooved edges and fit them with plywood splines. I even bought a "glue-joint" cutter for my shaper, which cut a fancy, interlocking, double tongue-and-groove joint.

A few years later, I learned I'd been wasting my time. Splined or doweled edge joints are not stronger in any meaningful way; nor, in most circumstances, are they appreciably easier to align. Given two accurately planed (or machine-jointed) edges and a decent modern woodworking glue, a simple edge-to-edge glue joint (long grain to long grain) will be stronger than the wood itself—subjected to enough stress, the wood will break before the joint.

If the boards you're gluing are flat and the edges planed true, alignment is an easy task. Sure, you may have to apply a little persuasion here and there with a block and mallet, but that takes far less time than you'd spend doweling, splining or cutting slots with a plate joiner.

Aligning edge joints with dowels, splines, or biscuits can make sense where tolerances for slippage are very small, such as when edge gluing two veneered panels to form a flat surface, or when assembling a large surface of a great many pieces. And in production set-ups where a lot of gluing is done, the time saved by assembling self-aligning shaper-cut edges can be considerable.

Although there may be edge joint situations where you feel reinforcement is a good hedge against joint failure, it's seldom, if ever, the best solution. If you're concerned about the strength of the joint, perhaps because the wood is resinous or oily, I think your time would be better spent finding the right glue than fiddling with dowels. —*R.H.*

SALLY SHENK ULLMAN

The Most Fun You'll Ever Have Behind Bars

XYLOPHONE

BY RAYMOND LEVY

I'm married to a lady who has a degree in music theory and many years of teaching experience, so musical instruments tend to materialize in my shop. The xylophone you see here has eight bars spanning a full octave (without the half-tones). It also has a sound box, which gives it a different tone than an open-platform xylophone might have. It's easy to build and requires no special tools or metalworking ability because the bars are made of wood. You're probably more familiar with metal xylophones. But the prefix "xylo" is derived from the Greek word for wood, so the term "xylophone" should really only be used for instruments with wooden bars.

Making the Bars

The bar dimensions given in Fig. 1 have been calculated for bars made of red oak. You can use another wood if you like, but you'll have to experiment to determine its sound qualities and the bar dimensions that will give you the proper notes. The bars on commercially-made xylophones are frequently made of Brazilian rosewood. I admit that rosewood has a beautiful tone, but it's an expensive and endangered species, so red oak suits me fine.

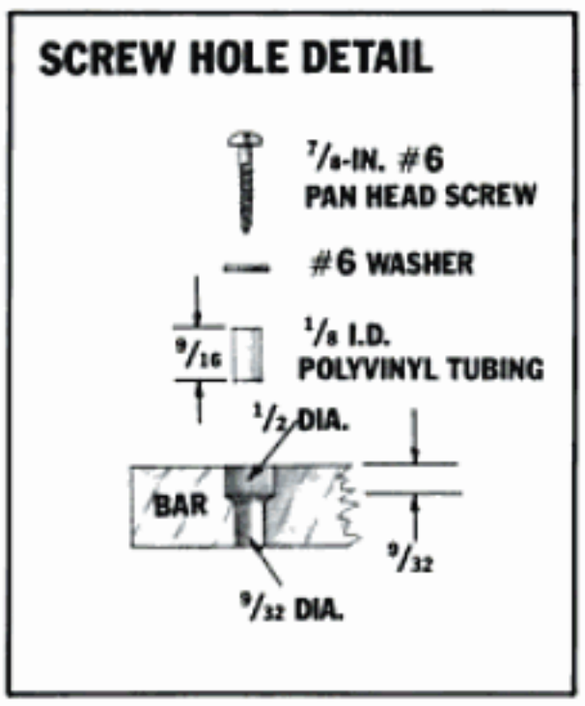
Select a uniform piece of wood with straight grain for the bars. Rip this piece into a strip roughly the width and thickness of the bars (see Fig. 1) and allow it to settle for a few days so the moisture content will equalize (preferably indoors, where the instrument will be staying). Plane the stock to a 3/4-in. thickness and cut the bars to the dimensions shown in Fig. 1.

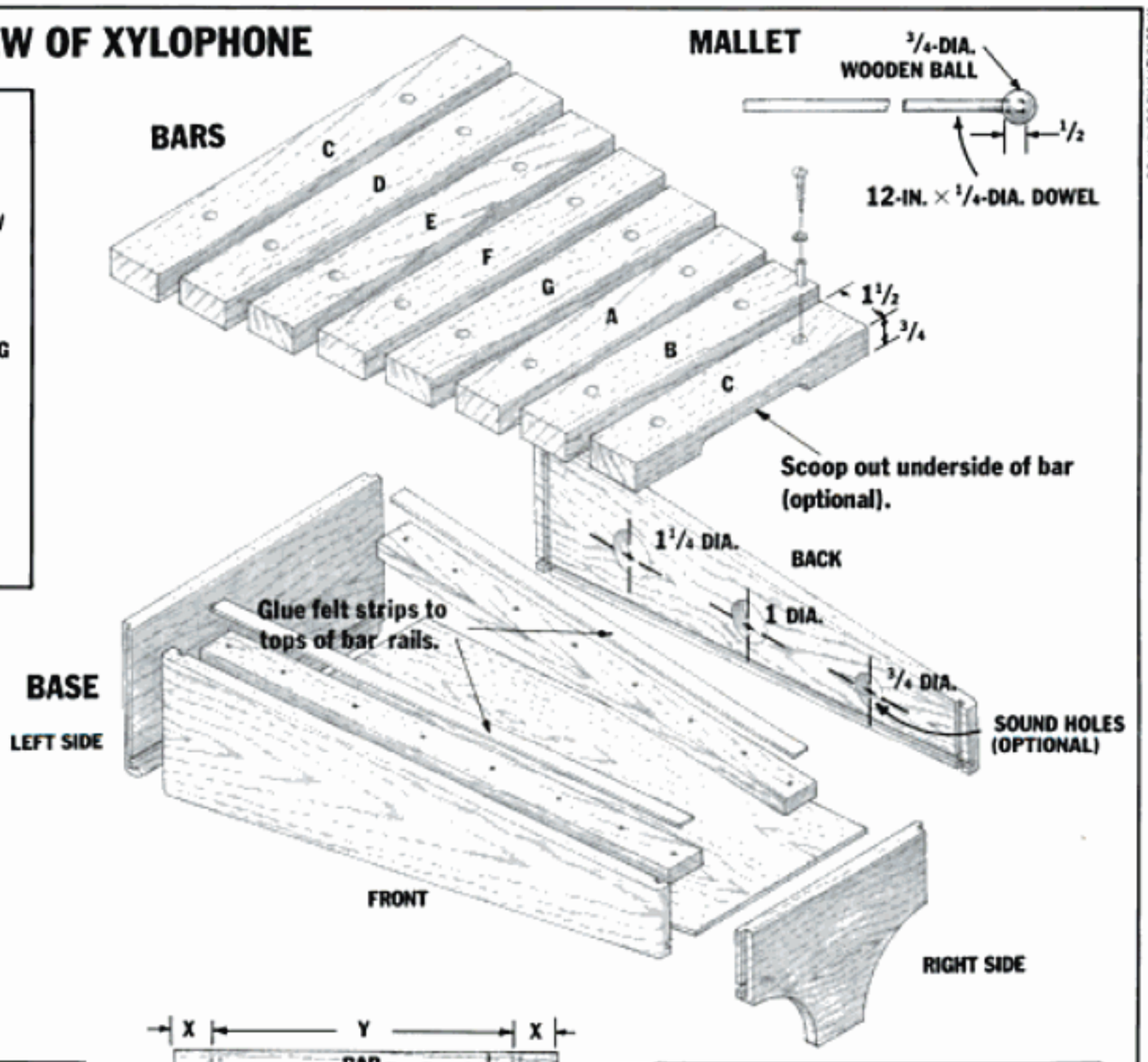
Next, lay out the centers of the screw holes on the bars, referring to the table in Fig. 1 for dimensions. I've calculated the positions of the screw holes so they lie at the nodal points of the bars—the points where the least vibration occurs—so you'll get the loudest possible tone from the bars. If you clamp a fence to the drill press table to position the bars, as shown in the photograph (p. 33), you won't need to scribe a center line down the length of each bar. Drill the hole for the screw and the counterbore for the screw head.

You can increase both the volume and resonance of your instrument if you scoop out the bottom of each bar, reducing the central portion to half its original thickness as shown in Fig. 1. You don't have to do this step, but it gives a much richer sound. It also drops the pitch of the bars one full octave.

Finish up the bars by rounding the edges with a router or by hand. Except for fine tuning, which you'll do later, your bars are complete.

FIG. 1: EXPLODED VIEW OF XYLOPHONE





DRAWINGS BY KATHY BRAY

BAR DIMENSIONS

NOTE	L	X	Y
C	$11^{11}/_{32}$	$2^{17}/_{32}$	$6^{1}/_{4}$
D	$10^{11}/_{16}$	$2^{11}/_{32}$	$5^{29}/_{32}$
E	$10^{3}/_{32}$	$2^{17}/_{64}$	$5^{19}/_{16}$
F	$9^{61}/_{64}$	$2^{7}/_{32}$	$5^{1}/_{2}$
G	$9^{5}/_{16}$	$2^{3}/_{32}$	$5^{9}/_{64}$
A	$8^{25}/_{32}$	$1^{31}/_{32}$	$4^{27}/_{32}$
B	$8^{1}/_{4}$	$1^{27}/_{32}$	$4^{9}/_{16}$
C	$8^{1}/_{64}$	$1^{51}/_{64}$	$4^{27}/_{64}$

Building the Base Assembly

I made the base for my xylophone from red oak, but you can use any hardwood; it won't affect the tone very much. As the top view in Fig. 2 shows, the base assembly has a trapezoidal shape. The corners are joined by tongue-and-groove joints. The joint is a little unusual because the grooves on the front and back pieces are cut at an angle, but the process is simple if you follow the sequence shown in Fig. 3. The tongues on the side pieces are cut at 90°.

Start by jointing and planing the front, back and side pieces for the base to their final width and thickness. Cut each piece a little bit longer than shown but don't cut the slope or shape the "leg" until after you've cut the joints.

Cut the corner-joint grooves on the front and back next (see Fig. 3). Tilt the tablesaw blade four degrees and cut the front and back pieces to final length, paying close attention to the directions of the angled cuts (see Fig. 3, Step 1). The front and back pieces must be mirror images of each other. If you mark the left, right, inside and outside of each piece, it'll help you to keep things organized. After you've cut the front and back to length, with the blade still tilted, lower it and cut a 5/32-in. deep angled groove on each end as shown in the drawing (Fig. 3, Step 2).

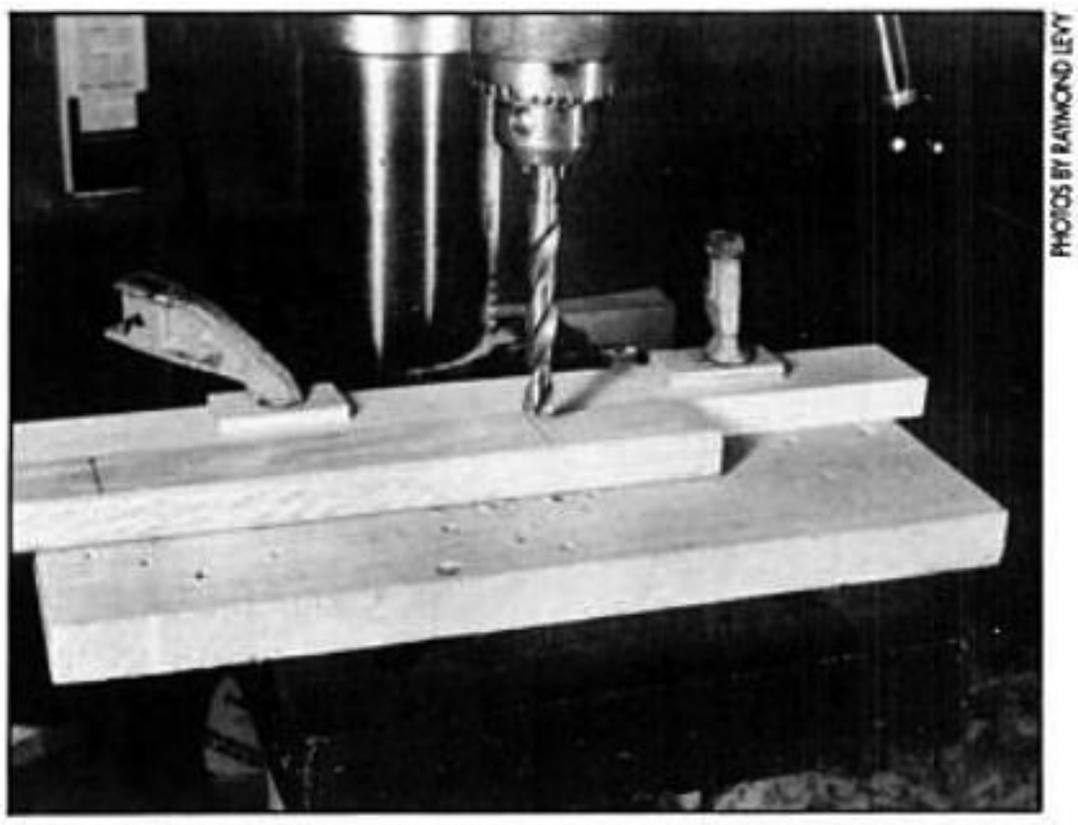
The next cut forms the outside shoulder of each groove (Fig. 3, Steps 3 and 4). With the blade at the same angle, make the cut with the stock on end, as shown. To make this cut safely, I recommend that you clamp the stock in a tenoning jig that rides on the rip fence (see May/June 1989 *AW*, p.32).

Cut the tongues on the side pieces next. These tongues are simple 90° cuts on the tablesaw. A dado blade works well for making this cut. Start by making trial cuts on scrap pieces, testing the fit of the tongues on the grooves in the front and back pieces. You're looking for a snug fit, but not too tight. Ease the fit with a file if necessary. Once you get the fit you want on the scrap piece, cut the tongues on the two side pieces and try the assembly. There should be no gaps showing anywhere when the box is lightly clamped together.

Cut the slope at the bottom edge of the front/back pieces next, as shown in Fig. 2. After making the cut, clamp the front and back pieces together and clean up the edges with a sharp hand plane. Now cut the panel grooves on the front and back pieces (see Fig. 2). To cut these, set the tablesaw blade at 90° to the table and space the fence 1/4 in. from the right side of the blade. With the saw set 5/32 in. above the table, cut the grooves.

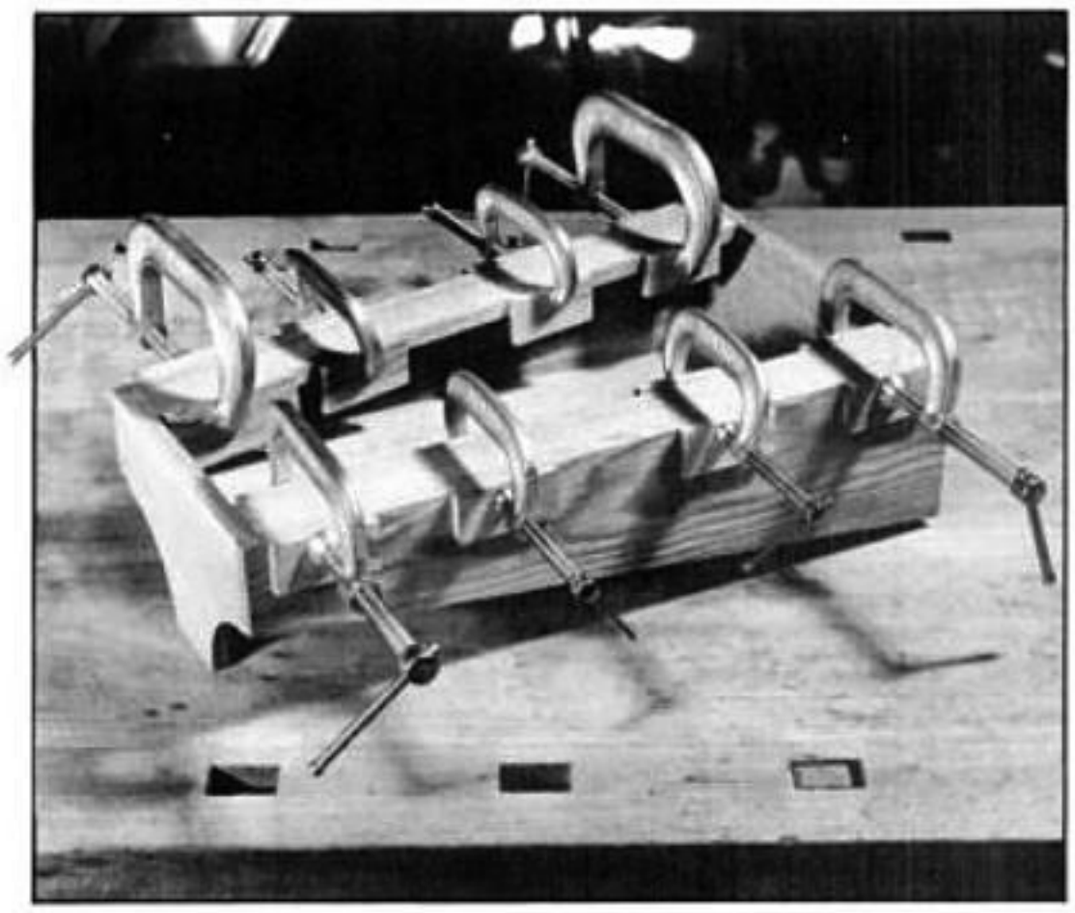
Next, cut the panel grooves in the sides. Assemble the box temporarily and mark where the panel grooves in the front and back meet the sides. The panel slopes, so you'll need to cut angled grooves in the side pieces to accommodate this slope (see Fig. 1). Disassemble the box and, with the tablesaw blade tilted 8°, cut the grooves on the inside of both side pieces. Be sure to get the angles oriented correctly, as shown in the drawing. It may help to mark the angle on the ends of the side pieces as a visual aid to ensure that you angle the groove in the correct direction.

You can now lay out and bandsaw the curved "leg" on the right side piece. The left side piece is chamfered



PHOTOS BY RAYMOND LEVY

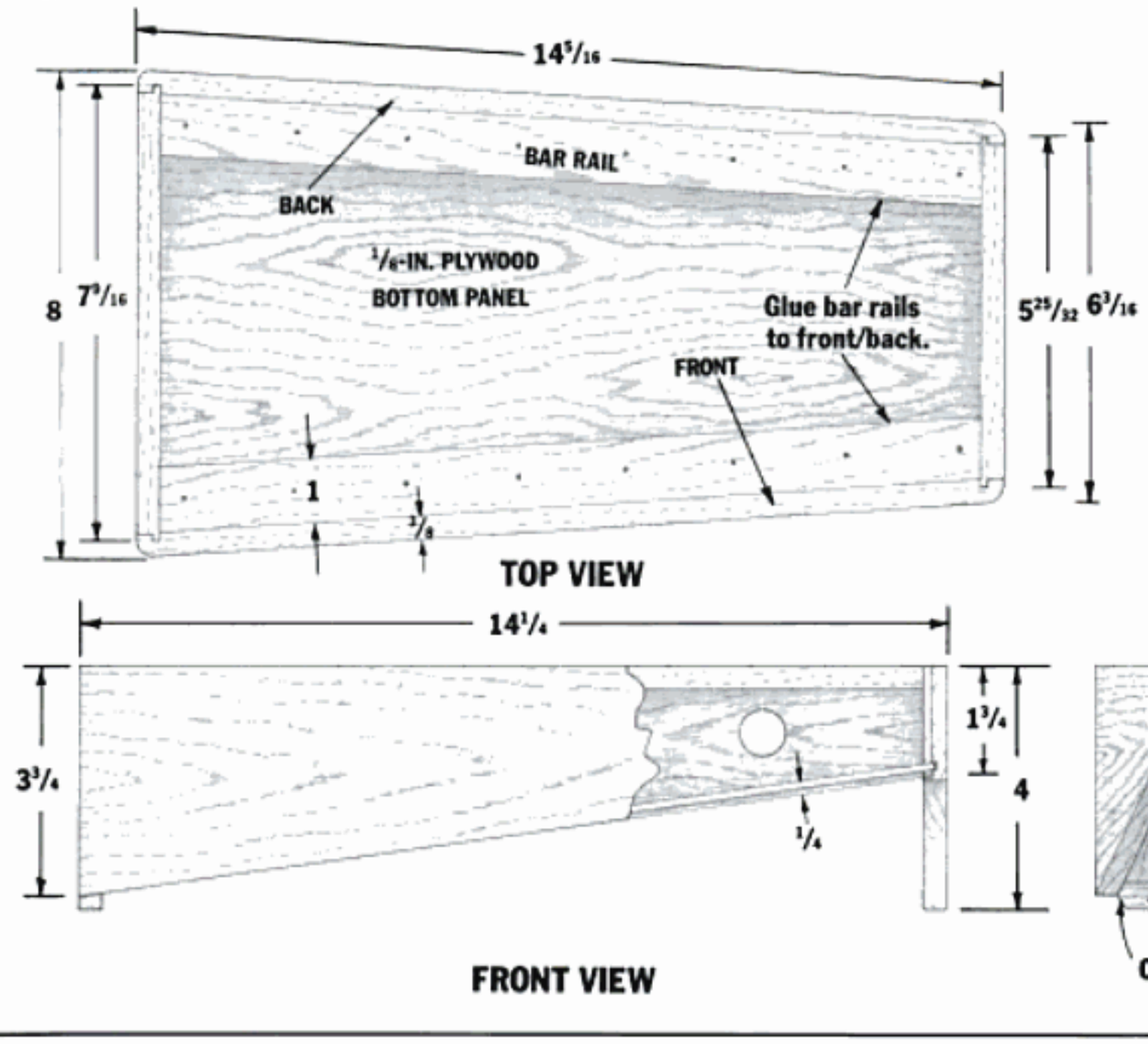
Drilling the screw holes in the bars is easier and faster if you position the bars against a fence so the drill bit automatically comes down on the center line of the bars.

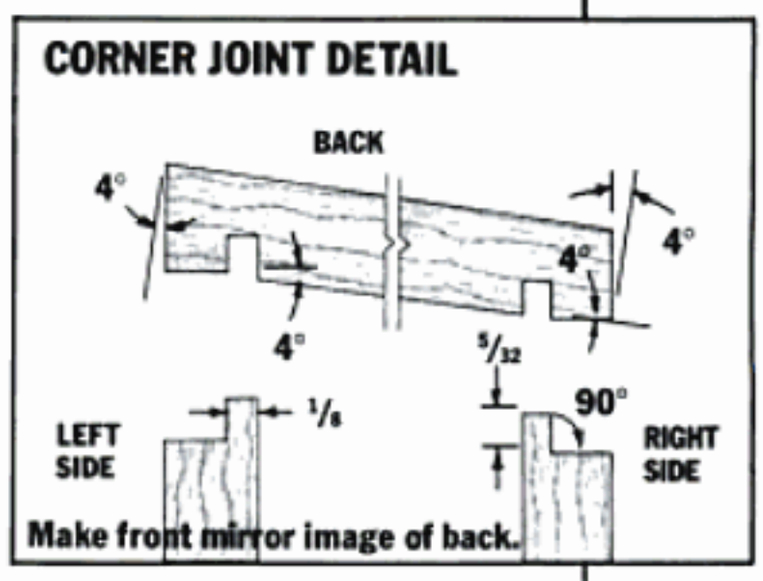


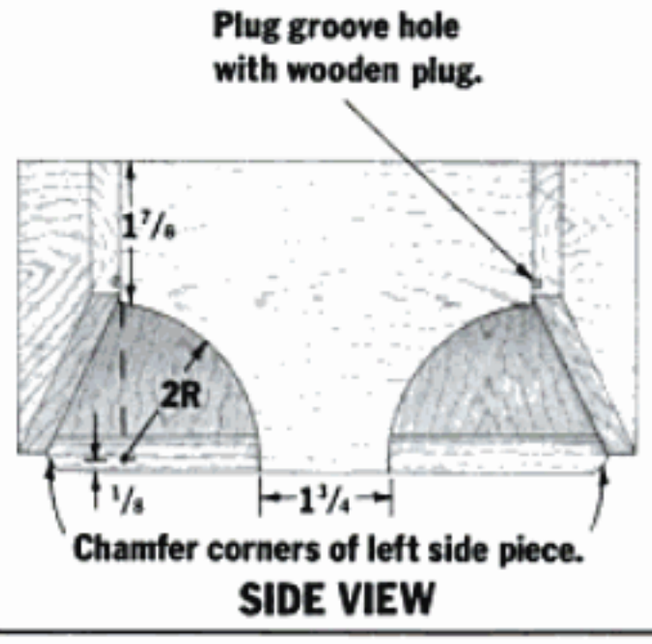
After you've glued up the base assembly, cut the bar rails to size and glue them in.

Cut the vinyl tubing sleeves that line the screw holes by running the tubing through a hole in a 9/16-in. thick strip of wood and slicing the ends off flush.

FIG. 2: XYLOPHONE BASE ASSEMBLY







on the bottom corners, and these are best cut with a fine-toothed hand saw or a chisel.

Finally, drill the sound holes in the back piece (this side faces the audience). These sound holes are optional. My wife Annette finds they improve the xylophone's tone. This completes the front and back.

Measure and cut the bottom panel from 1/8-in. plywood (available from Constantine's, 2050 Eastchester Road, Bronx, NY 10461, 800-223-8087) with a fine-toothed blade. Sand the panel's edges smooth, rounding them slightly. Try the panel in the assembly. It should fit closely, but not so closely that it bottoms out in the groove, interfering with the assembly. Make one more trial assembly with the plywood bottom in place to make certain everything fits properly.

Sand the inside surfaces and glue the base assembly together. If the plywood panel is too loose in the grooves, wipe just a little glue into the grooves before assembly. You'll notice once the box is together that there are little square holes at the ends of the front and back bottom grooves. Plug these holes with little square wooden plugs.

The two bar rails are the last parts to make for the base assembly (see Fig. 2). Size your rails to fit the inside of your assembled box. These rails are angled on the ends to accommodate the angles of the base. Trim them until they fit just right, then glue them to the front and back (see photo). Allow the assembly to dry thoroughly; trim and round the corners of the box, and clean up the outside surfaces.

Drill the holes in the bar rails by centering each bar in its place and marking through the holes in the bars. Clean up the parts and apply your choice of finish. I use a penetrating oil finish which I wipe almost immediately after application. That completes the base assembly.

Assembling the Bars

In order for the bars to ring clearly, they must not be in contact with anything solid. As Fig. 1 shows, this is accomplished by placing strips of wool felt in between the bars and the bar rails. A firm grade of felt at least 3/32-in. thick is best. You can buy this at craft shops. Cut two 5/16-in. wide strips of felt with a straightedge and a utility knife. Trim the ends of the felt strips to fit the bar rails. Don't stretch the felt. Apply a very narrow bead of glue down the middle of the felt and place it in position on the bar rail. The felt should cover all the screw holes. When the glue has set, poke through the felt at each screw hole with a sharp awl.

To prevent the bars from touching the screws, I place sleeves of 1/8-in. I.D. flexible, polyvinyl tubing in the screw holes. You'll find this tubing at most hardware stores. Soft rubber tubing would also do.

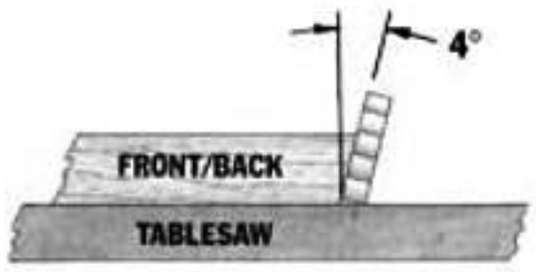
You'll need 16 pieces of tubing, 9/16-in. long. To cut these tube pieces uniformly, plane a strip of wood to a 9/16-in. thickness. Near one edge, drill a hole that just fits the tubing. Wax the hole, insert the tubing, and slice the ends off flush with each end of the wood (see photo).

Making the Mallets

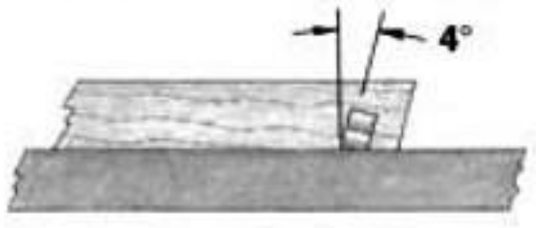
Make the mallets next, because you'll need them to fine tune the bars. (If you don't want to make the mallets, you can buy them at musical instrument shops.) I've tried making mallets out of a number of different materials; the type of mallet I'll describe here works best on the wooden bars that aren't scooped out on their undersides. For those that are, experiment with a softer, rubber-headed mallet.

The wooden mallet consists of a 3/4-in. hardwood

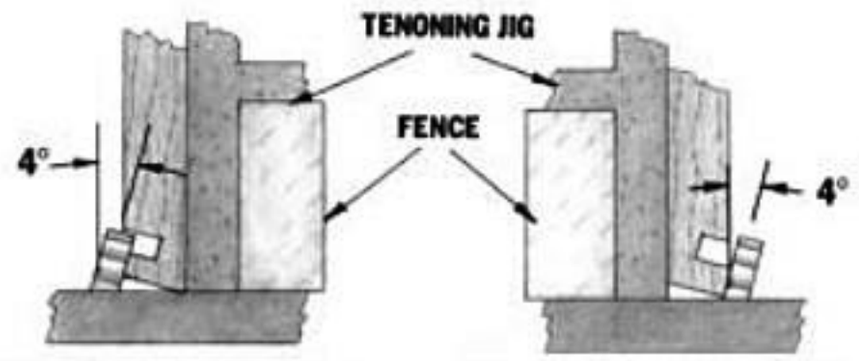
FIG. 3: CUTTING THE CORNER JOINT GROOVES



STEP 1: ***Tilt tablesaw blade and cut pieces to length.***

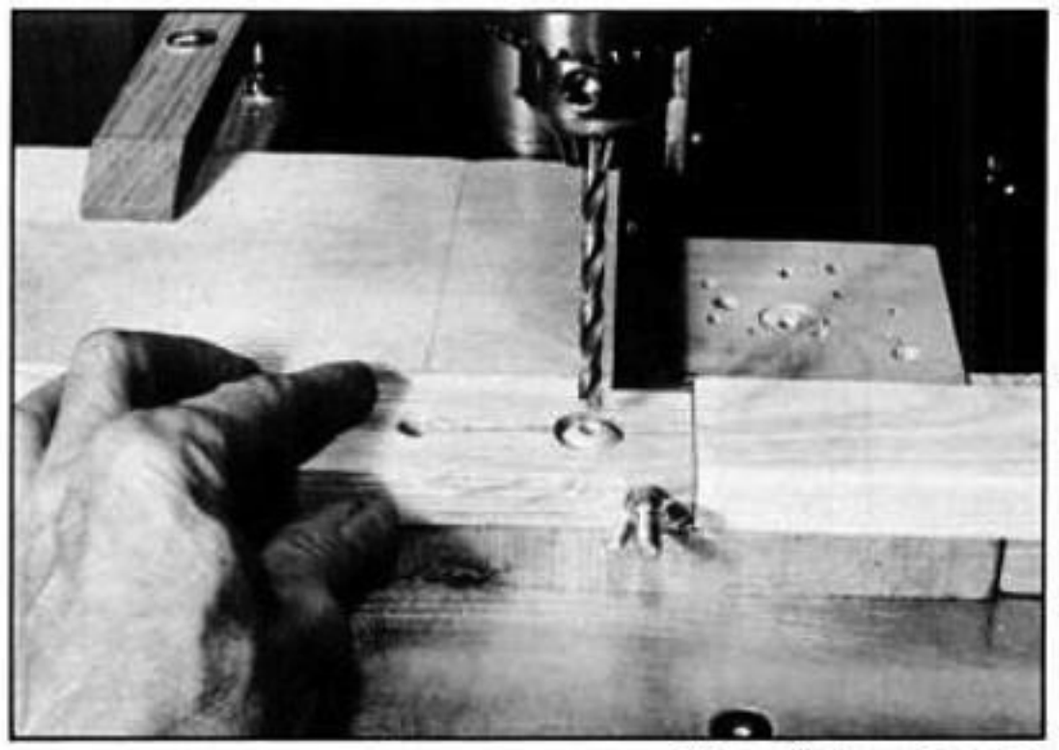


STEP 2: ***Lower blade and cut grooves.***



STEP 3: ***Hold stock vertically and cut outside shoulder.***

STEP 4: ***Move fence to other side of blade and cut other shoulder.***



The mallet consists of a wooden ball on a dowel. Drill a hole in the wooden ball by capturing the ball in a jig, as shown here. Tightening the wing nut keeps the ball secure.

Coat the mallet heads in Plasti Dip by twirling the handle between your fingers and slowly lowering and raising the mallet.

ball mounted on a dowel handle (wooden balls are available at craft shops or Cherry Tree Toys, Inc. P.O. Box 369, Belmont, OH 43718, 614-484-4363). I coat the balls with plastic by dipping the ball in black "Plasti Dip" (available from Trend-Lines, 375 Beacham St., Chelsea, MA 02150, 800-343-3248). I thin this plastic coating down with 10% lacquer thinner to make it easier to work with.

To drill the 1/4-in. hole in the ball for the handle, secure the wooden ball in a vise. I've made a special wooden vise, shown in the photo on p. 35. Wipe a little glue in the hole and drive in the handle. When dry, sand the end of the handle to soften it.

The trick to coating the mallet head in Plasti Dip is to insert it slowly and turn it in the liquid for a couple revolutions, then remove it slowly, rotating it all the while. Doing it this way produces the most uniform coating I've obtained. Once you remove it, turn the mallet upright and set the handle in a hole. Let the mallet cure for at least two days before using it.

Tuning the Bars

If you made all the bars from the same piece of stock, and if you cut them accurately to length, they should be in pretty fair tune relative to each other. But you'll need to fine tune them, especially if you intend to accompany the xylophone with another instrument.

You'll need to fine tune the bars *before* you screw them down, because they need to be unattached for you to alter the tuning. Try out the tuning by setting each bar in its proper location on the felt strips. Strike each note sharply with the mallet. You'll recognize the familiar "do, re, mi" scale—any note that is too high or too low will be obvious. To raise the pitch, sand a little off the ends; to lower the pitch, sand a little off the thickness. If you're lowering the pitch, you don't have to reduce the thickness of the entire length of the bar—removing a bit of wood from the coved portion is sufficient. I use the upper drum on my vertical belt sander to scoop out a little material when I want to lower the pitch of a bar. Go cautiously: a little material removed may have a large effect on the pitch.

If you're gifted with a musical ear, you may be able to set the pitch of each bar so that the bars of the instrument sound just fine together. But most of us need a little help from another instrument (preferably a piano) to get an accurate tuning. Check each bar against its corresponding note on the piano. Make a mark on each bar to indicate whether the pitch needs to be raised or lowered. Adjust each bar until you achieve a well-tuned octave. This may take a bit of leg work, since most of us don't have pianos in our workshops. But after a few trips back and forth from the shop to the piano, you'll either have the bars perfectly tuned, or you'll settle for close enough. Sand the bars lightly and give them a very light coat of tung oil finish or very thin shellac. Allow them time to dry before assembly.

To assemble the bars to the base, put a washer on each screw, slip a vinyl sleeve in each hole and screw the bars down. Don't fasten the screws down tight—drive in each screw so that the bars have about 1/32-in. vertical clearance. Check to make certain the bars can rattle around easily. If so, your xylophone is complete. I hope you like this little instrument. Ours certainly gets a lot of use. ▲

Raymond Levy is a designer of musical instruments and physics apparati in Soquel, California.

FRITZ THE WONDER DOG

This Pooch is a Real Puzzler

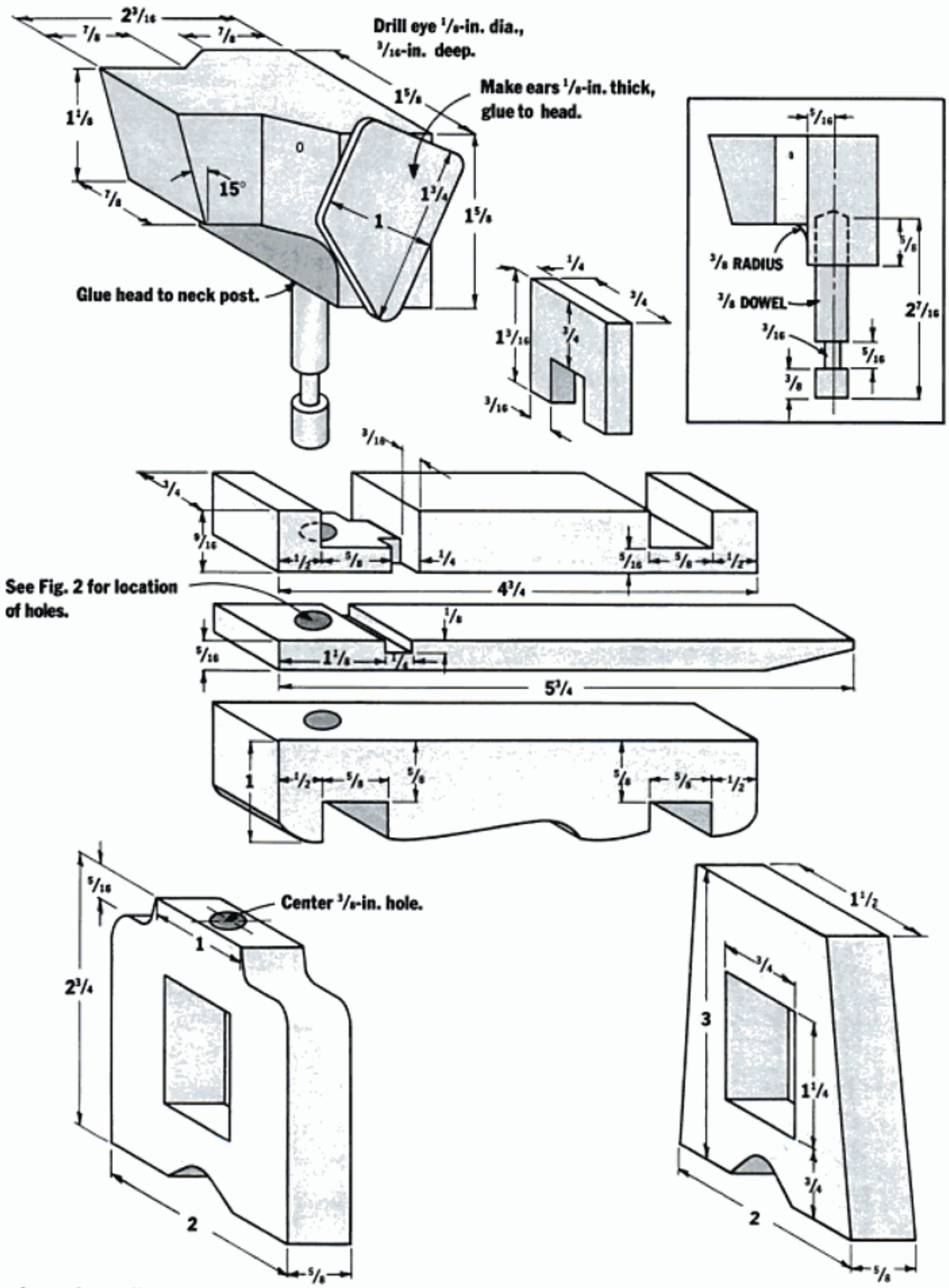
BY ALLAN BOARDMAN

There was a lot of excitement in the puzzle world in 1986. The Craft and Folk Art Museum in Los Angeles was busy preparing for the December opening of the "Puzzles—Old and New" exhibit. The wonderful book *Puzzles—Old and New* by Jerry Slocum and Jack Botermans (available from Woodcraft, Box 1686, Parkersburg, WV 26102) was about to be published. And preparations were underway for the eighth International Puzzle Party to be held in conjunction with the exhibit opening.

In the midst of all this, I agreed to make a "life size" version of a puzzle dog, designed by Botermans, to serve as the exhibit mascot. It proved to be a great woodworking project and, as a mascot, it has been played with and enjoyed by tens of thousands of people, young and old, who have visited the exhibit as it travelled through the United States, Japan, and Canada.

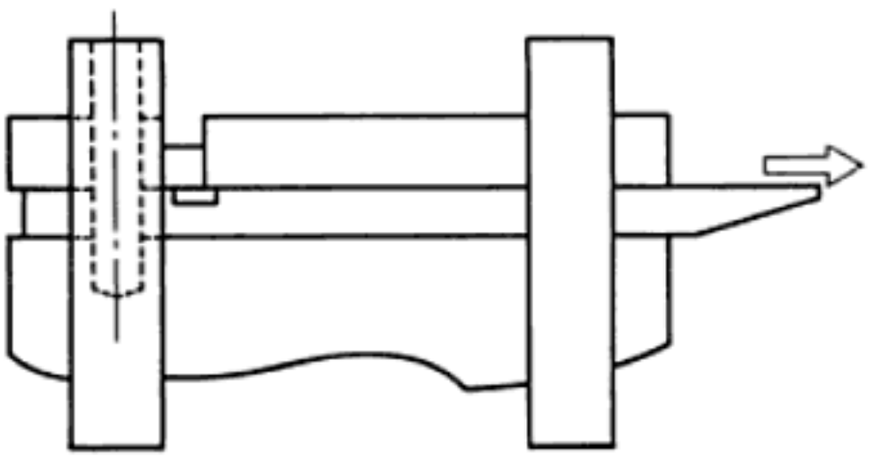
The dimensions shown in the drawings will yield a more conventionally-sized puzzle, about 6½ in. long and relatively simple to make and manipulate. The choice of wood is not critical. Dogwood is obviously preferred but is not commonly available. Hardwoods such as walnut, birch, or maple, although a tad more difficult to work than softwoods, will yield a more du-

FIG. 1: FRITZ'S ANATOMY



Dimensions given allow no clearance for fit. See sidebar.

FIG. 2: DRILLING THE HOLES



STEP 1: ***Assemble body.***

STEP 2: ***Offset body center piece 3/32 in. to rear.***

STEP 3: ***Drill hole 3/8-in. dia., 1 3/4-in. deep, centered in leg piece.***

rable and better-looking puzzle. Because of its thickness, you might make the head from a glued-up block.

The necessity of cutting neat and accurate rectangular holes in the fore and hind leg pieces can be avoided by gluing up these two parts from symmetrical halves. If you don't have a lathe, you can form the notch on the neck post by filing the 3/8-in. dowel while it's chucked in a vise-mounted electric drill or drill press. All other operations can be accomplished with minimal hand tools and shop equipment.

The key to Fritz's assembly or disassembly is to rotate his head so that he is looking straight back; the collar piece can then be raised. The puzzle designer has relied on your being sufficiently uncomfortable about wringing the poor creature's neck that you will be slow to try it.

Many of the dimensions shown are not critical for the puzzle to work. In fact, you may wish to change some to accommodate available material or to alter Fritz's personality. For example, adding an inch to the body length might be appropriate for a dachshund lover.

But other dimensions matter a great deal. Note that the drilled hole in the center body piece is not lined up with the holes in the other two body pieces. It is this intentional misalignment that serves to lock the puzzle parts together. Before beginning construction, study the drawings to understand how the puzzle works, where accuracy counts, and where you have some dimensional freedom. (Also, see the sidebar on tolerances.)

When cutting out the parts, leave just a bit of material for a final cleanup with a well-tuned plane, sharp chisel, and sandpaper, as appropriate. Leave edges crisp until you are satisfied that the puzzle assembles properly and you have achieved an easy sliding fit of all parts. Then ease the corners and edges a little so they feel comfortable in the hand.

Finishing is a matter of personal taste. Whether to stain or not depends on what kind of wood you choose and what color you think is proper for Fritz. Avoid multiple coats of varnish; they aren't really necessary and could cause sufficient build-up to spoil the fit of the parts. Painting the puzzle with full dog features

DIMENSIONS, TOLERANCES, FIT

What does it really mean when a dimension on a project is given as, say, 2 1/4 in.? Does it mean that 2 3/16 in. or 2 3/8 in. won't do? How about 2.255 in.—that is, 2 1/4 in. plus the thickness of a piece of paper—will that work? The answer, of course, depends on many factors: the nature and use of the project, esthetics, the properties of the selected species of wood, atmospheric conditions, finishing techniques, and how that particular piece relates to the rest of the pieces in the project.

In commercial engineering practice, every dimension on all drawings is given a tolerance to set the limits within which a nominal dimension may vary and still be acceptable. Our 2 1/4 in. might be written as 2 1/4 in. +/– 1/32 in., indicating that if the part were produced as small as 2 7/32 in. or as large as 2 9/32 in., it would still work.

But dimensions on woodworking project plans are seldom presented this way. By tradition, it is expected that through experience, trial and error, the woodworker will come to understand and work within the appropriate limits for the job. If a drawer is to be fitted into a carcase opening, the cabinetmaker might build it snug to start and then, perhaps as part of the joint cleanup operation, plane it so that it fits just right, without ever defining in thousandths or sixty-fourths of an inch what "just right" is. Few would think to measure the finished drawer to check it against the dimensions on the plans—in the end it is the fit that counts, not the dimensions. How smoothly does the drawer slide in and out and how neat and uniform is the gap when the drawer is closed?

In another kind of project—or even elsewhere on the same project (such as the joinery)—a friction fit may be desired. Perhaps the aim is to achieve that fit after the piece is moved from the damp workshop to the lower-humidity house. Possibly the thickness of a few coats of varnish must be accommodated. Although most woodworkers do not think in terms of thousandths of an inch, the most skillfully-crafted objects usually reflect the application of precise standards. These standards are more often achieved by

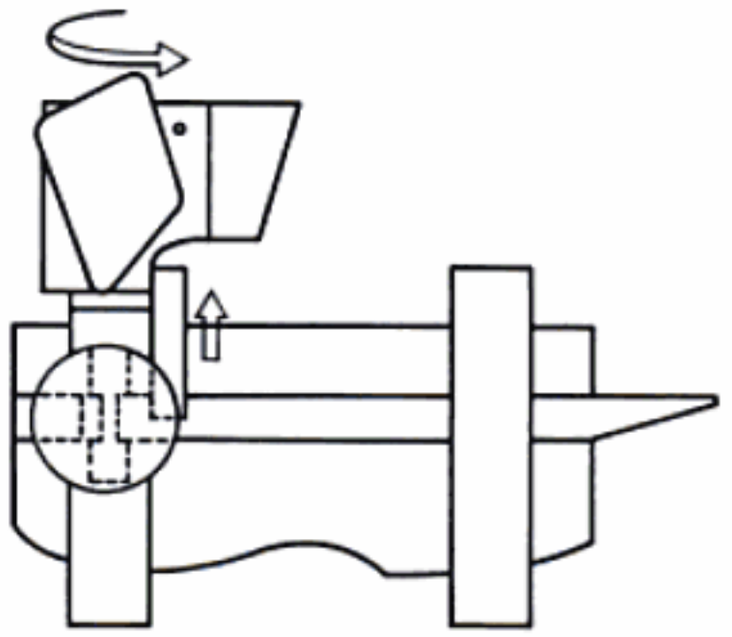
is a possibility but, again, remember to account for the thickness of the paint layers. My preference for wooden puzzles is an application of a penetrating oil—just enough of a finish to bring out the best of the wood's natural appearance and protect it from discoloration due to handling.

Of course, all the dimensions in the drawings can be scaled up or down as desired. My life-size mascot was made five times larger than Fritz—about 32 in. from muzzle to tail tip. Had I chosen a hardwood, the finished puzzle would have weighed nearly 60 lbs, far too heavy for a youngster to handle. With a lot of additional work, I could have stuck with hardwood and made all the parts hollow. Instead, I selected jelutong, an inexpensive low-density species readily available in the required large dimensions. As you might expect, some of the tools and techniques required for the larger pieces were different than those I used for the small puzzle. Using jelutong, the resulting weight was acceptable, but in the exhibit it didn't stand up very well to continuous disassembly and assembly—after three years, the pathetic pooch looked like an accident victim. I expect to get him back soon for extensive cosmetic surgery.

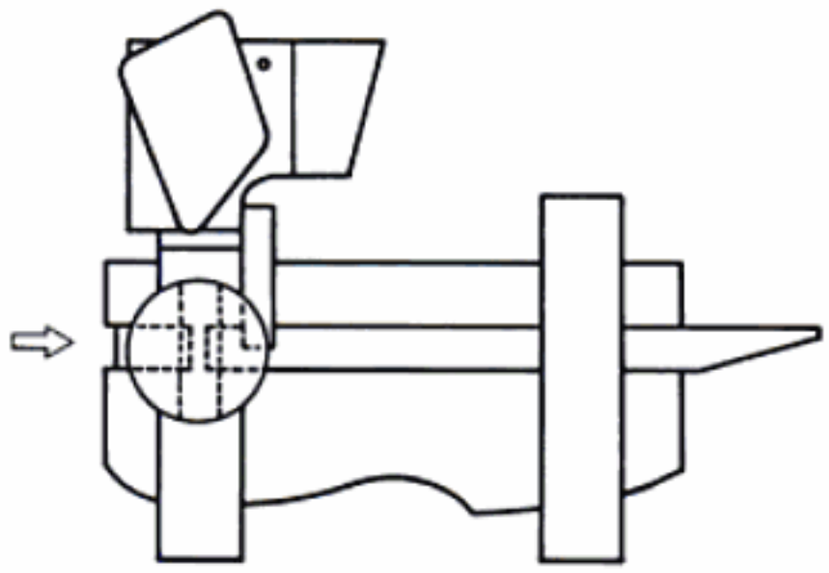
Large or small, Fritz is a well-tested puzzle pet and is sure to charm and challenge all who meet him. ▲

When he isn't working with wood or playing with puzzles, Allan Boardman serves as a corporate officer of a Los Angeles aerospace firm.

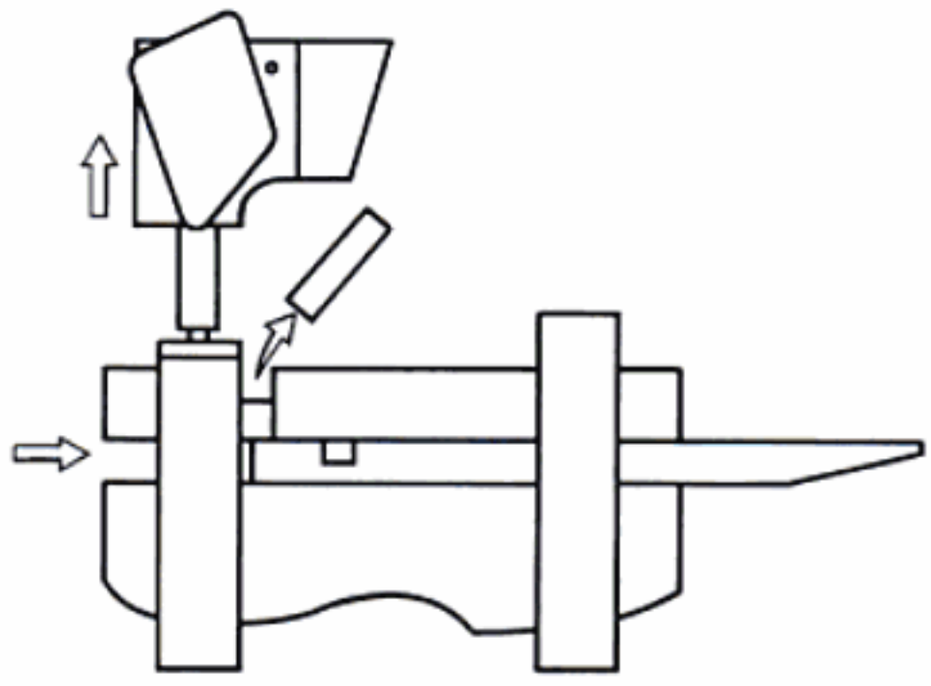
FIG. 3: FRITZ'S SECRET



STEP 1: ***Turn head to face rear; lift collar.***



STEP 2: ***Move body center piece slightly to rear.***



STEP 3: ***Lift off head and collar, remove center piece.***

AND FEEL

the experienced eye and by attention to fit, feel and appearance than by the use of micrometers and gauges.

Wooden puzzles are wonderful projects to sort out these issues and develop the intuitive feel needed to guide the worker when tolerances are neither explicit nor obvious. Some puzzles demand highly precise light-friction fits—anything looser and the key-piece would fall out inadvertantly, spoiling the disassembly challenge; anything tighter and assembly would be physically difficult or impossible. Fritz is not such a puzzle because interlocking parts hold him together. The parts want to be pleasantly loose but not sloppy; snug fitting would be detrimental to the enjoyment of the puzzle.

After initial sizing to the indicated dimensions, the parts should be very carefully trimmed (by planing or sanding, for instance) so that when the puzzle is fully assembled the accumulated gaps are neat and uniform—perhaps, uh, let's see, say $^1/_{64}$ in. or so, maybe $^1/_{16}$ in. if you make the larger version. —*A.J.B.*

WOODEN LIGHTS

BY CHARLES LINN

When you think of lamps and light fixtures, wood probably isn't the first material that comes to mind. Yet wood is a natural choice for the job. It's strong and plastic enough to be worked into almost any shape. What's more, wood has a character all its own. A light source plays up the form, color and texture of wood in subtle and wonderful ways. A wooden light fixture can add a tremendous amount of cozy warmth to a room.

As versatile as it is, wood isn't suited to every type of lighting fixture design. There's no reason to make wood imitate what metal can do better. I wouldn't bother making a swing-arm desk lamp out of wood, for example. It would require large sticks of wood to equal the strength possible with thin metal tubing. When you design, I suggest you capitalize on the qualities of wood, using light to dramatize its color and textural patterns.

In this article, I'll cover the basics of designing and building wooden lights. I'll give you some guidelines for making them safe, and I'll outline the basics on lamp hardware and wiring. There isn't room here to give you a crash course on electrical wiring. If you aren't familiar with basic wiring practices, study up on the subject before you attempt any wiring. An improperly wired lamp can be dangerous.

Designing with Light

One of the first things you'll want to think about when designing a lamp is what you want the lamp to light. Light can create different moods depending on the way it's used. Consider whether the light fixture you design should distribute the light over a wide area or focus it in one place (see Fig. 1).

Task Lighting—Task lighting fixtures are used to direct light onto an activity that requires a high degree of visual acuity. The more visually demanding the task, the more light is required. The swing-arm desk lamp I mentioned above is a good example of a task light. Task lighting requires that the light be concentrated onto a small area, so a reflector is usually used to control the light. A room that uses only task lights for illumination may appear like a cave with a few candles burning in it.

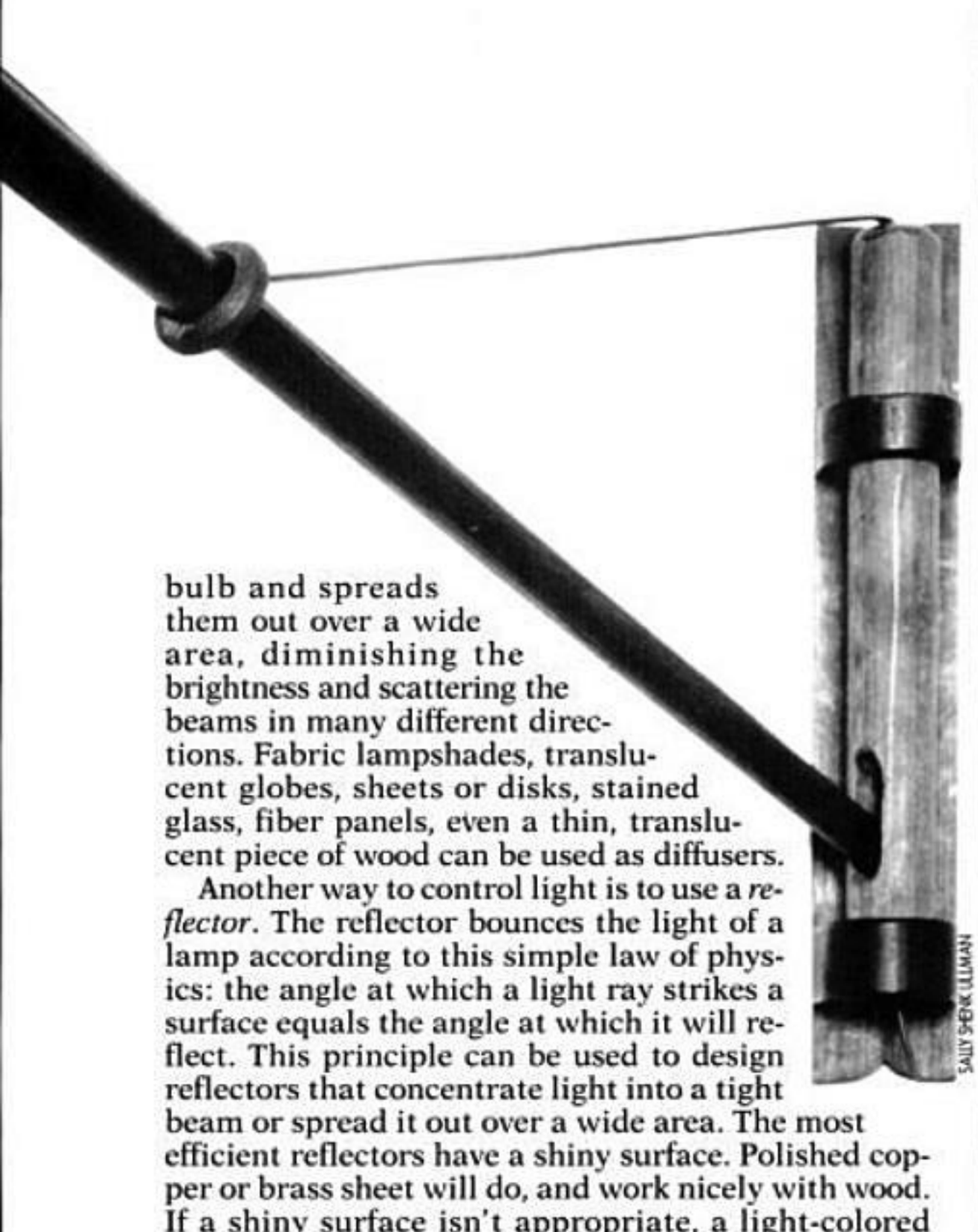
Ambient Lighting—Ambient light fixtures are intended to spread a minimum level of light more or less uniformly throughout a room. This light is used to balance the bright, concentrated light provided by task lighting. Ambient lighting is often provided by downlights, table and floor lamps, and other fixtures that use diffusers to spread light out over a wide area.

Glare—Failure to balance brightnesses in a room can cause a condition known as glare. Glare occurs when there is a source of light within the field of view that is much brighter than the rest of the light within view. Our eyes are unable to reconcile these great differences in brightness. The momentary blindness a driver experiences from the bright headlights of an oncoming car is an extreme example of this phenomenon. A bare lightbulb in a room can be a source of glare.

Glare is sometimes an indication of wasted light, and wasted light means wasted energy. Sometimes the same amount of energy used to power one bright spotlight, which dumps most of its light in one place, could light an entire room, if all the light coming out of that lamp were distributed evenly across the room.

Controlling Light—There are several ways to control light (see Fig 2). One is to provide a *diffuser*. A diffuser intercepts the light rays emanating from a light-

An Expert Sheds Light on Design and Construction

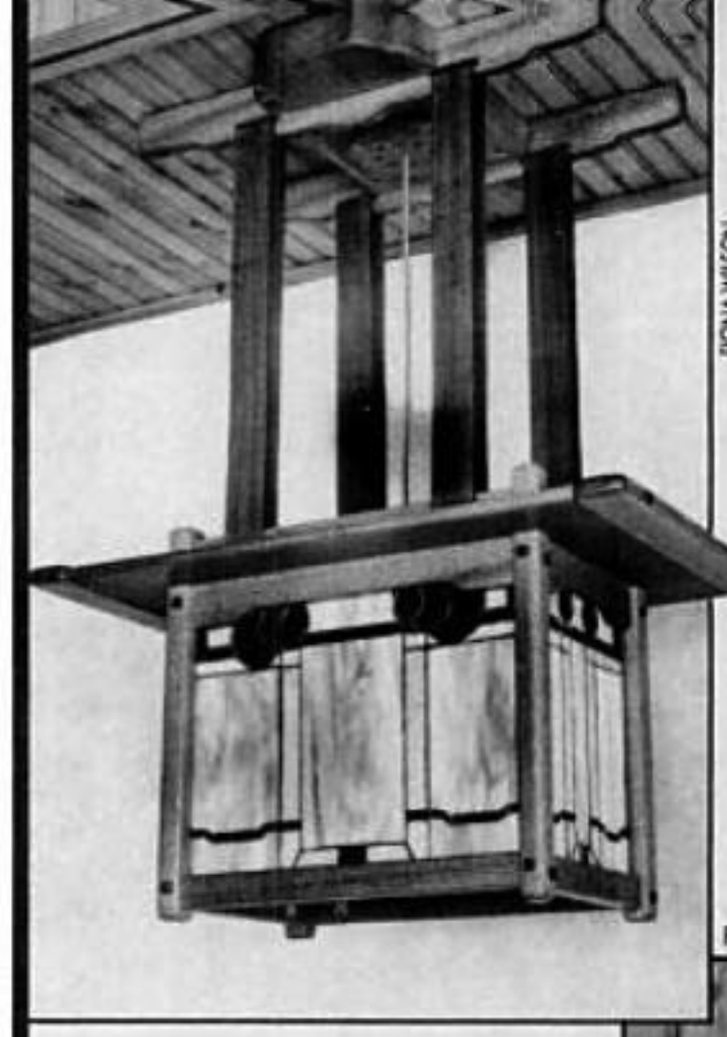


bulb and spreads them out over a wide area, diminishing the brightness and scattering the beams in many different directions. Fabric lampshades, translucent globes, sheets or disks, stained glass, fiber panels, even a thin, translucent piece of wood can be used as diffusers.

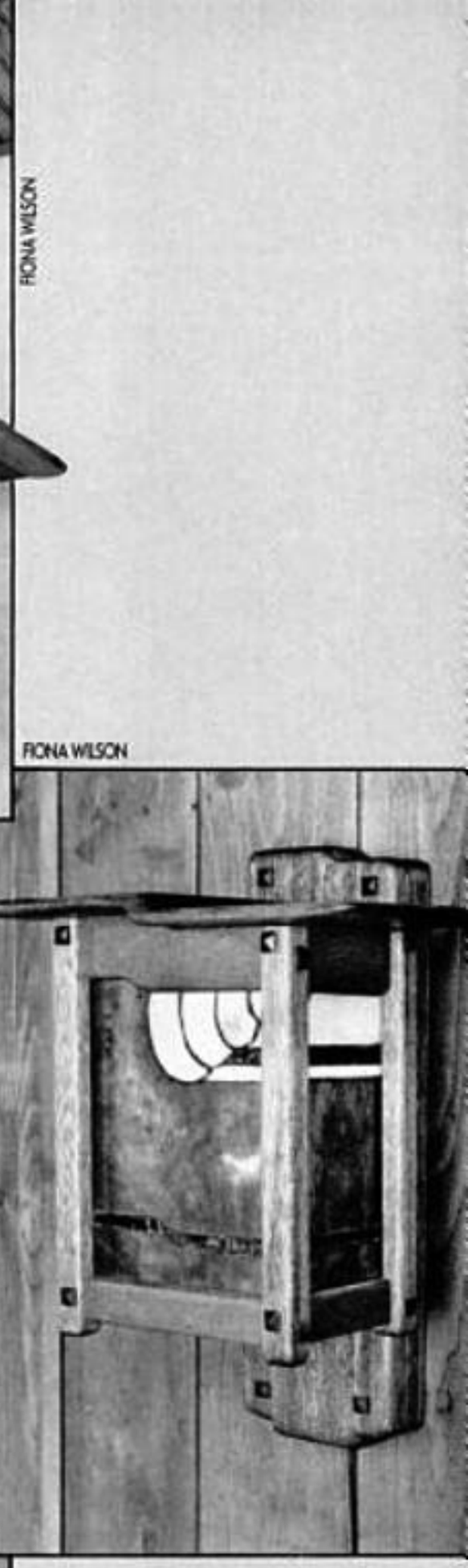
Another way to control light is to use a *reflector*. The reflector bounces the light of a lamp according to this simple law of physics: the angle at which a light ray strikes a surface equals the angle at which it will reflect. This principle can be used to design reflectors that concentrate light into a tight beam or spread it out over a wide area. The most efficient reflectors have a shiny surface. Polished copper or brass sheet will do, and work nicely with wood. If a shiny surface isn't appropriate, a light-colored surface will work, although a light-colored surface used as a reflector also causes some diffusion.

Some lightbulbs have built-in reflectors. PAR lamps, and their lighter-weight cousins R lamps, have built-in parabolic-shaped silvered surfaces that concentrate the light into a beam. Light from bulbs with built-in reflectors is concentrated, and tends to be harsher and cast more distinct shadows than light which is diffused either by penetrating a diffuser or bouncing off a light-colored surface.

Another method of controlling light is through the use of *prisms*. These transparent, triangular shapes reflect light at some angles and refract it at others. Many light fixtures use prismatic sheet (clear plastic formed into hundreds of rows of tiny pyramids) to dis-



FIONA WILSON



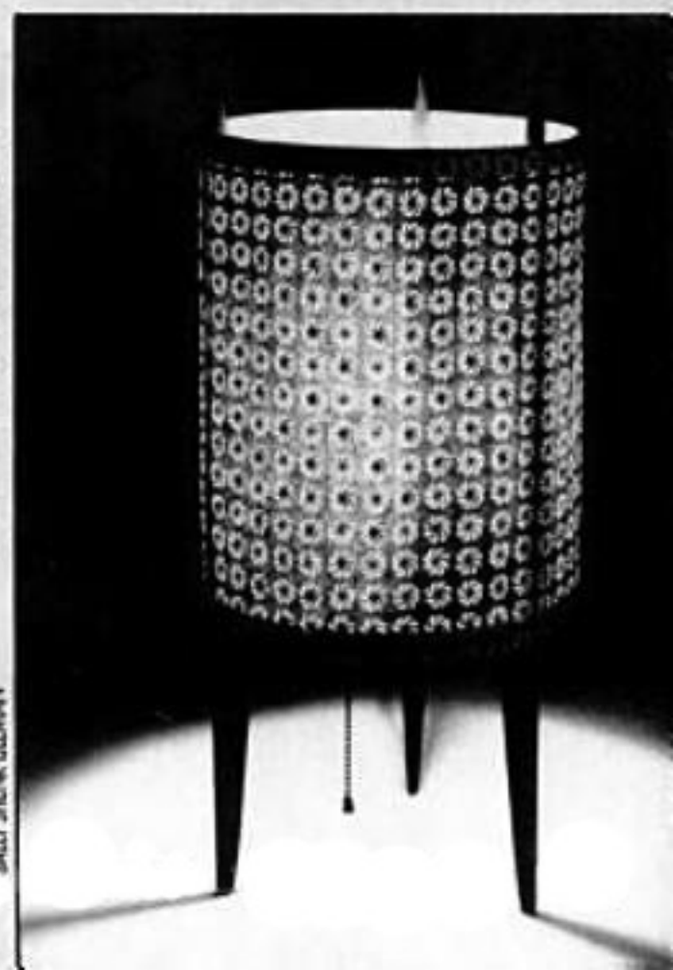
FIONA WILSON

Hanging lamp (top) on leather straps and wall lantern (right) are reproductions of turn-of-the-century lamps by California architects Greene & Greene. Stained glass has iridized coating for a pearlescent look when lamps are off. *Dennis Finn, Arboles, CO.*

SALLY SHENK ULLMAN

Hanging lamp (left) in ash. Three hollow forms, turned from green wood, are thin enough to be translucent. Light shining through the wood highlights tool textures and variations in the grain. *David Ellsworth, Quakertown, PA.*

Swing-arm wall lamp (far left) in walnut with paper and wood shade. Arm pivots on dowel in two brackets. Moveable ring that grips cord on arm slides to raise and lower arm. Table lamp (right) has scarf-joined mahogany hoops around walnut legs with paper shade. *John Fisher, Solebury, PA.*



SALLY SHENK ULLMAN

tribute light over a large area. Some glass globes have triangular-shaped ribs that focus light into beams while creating an attractive luminous pattern on the glass reflector itself. Holophane Lighting Company (214 Oakwood Ave., Newark, OH 43055) manufactures prismatic glass shades and globes in hundreds of different styles.

Working Up a Design

In its simplest form, a light fixture is nothing more than furniture for holding up a light socket, lamp, and either a diffuser or reflector. It's almost an entirely separate system from the wiring and electrical parts.

FIG. 1: DESIGNING WITH LIGHT

ILLUSTRATIONS BY BRUCE VAN PATTER

TASK LIGHTING

Task lighting fixtures direct light onto an activity of some sort.

AMBIENT LIGHTING

Ambient lighting fixtures spread low light throughout a room.

GLARE

Glare occurs when a light source within the field of view is much brighter than the rest of the light within view. Everything else looks dark. Diffusers or low-wattage bulbs would correct the problem.

Just about all you've got to do to design a light is decide how to connect the socket, diffusers or shades to the wooden unit, and how you'll wire it safely.

When I design a light, I start off thinking about what I want my fixture to do. If I want it to provide ambient light in the room, I need to diffuse a light source, so I might design an uplight—a tall floor lamp, with a glass, prismatic reflector which would be aimed toward the ceiling. Ambient light could also be provided by a lampshade or diffusing globe. If I wanted to put task light on a desk, I might use some sort of shade to cover a small-wattage R lamp. There are an endless number of possibilities. Many ideas will suggest themselves to you when you begin to peruse the endless variety of lighting hardware available at your local lighting store (see sidebar).

For a beginner, the way a reflector or diffuser affects light may be the most difficult part of visualizing a light fixture design. I suggest that you try holding different types of reflectors or diffusers over different types of bare lightbulbs, just to see what happens, before deciding on a particular combination of the two.

A nice glass diffuser or reflector can make an excellent starting point for a wooden light fixture design. Many different types of diffusers and glass reflectors can be found at lighting stores or home improvement centers. I like to look for unusual glass shades at architectural salvage shops. Some can be had for next to nothing, some are quite pricey.

I like to start designing with rough pencil sketches. Sketching allows me to get a lot of design ideas on paper in a hurry. I've found that when I draft with a T-square, triangle, and a ruler, the hard precision of the lines—and the time required—somehow signal a kind of finality to what I've drawn. They make me less liable to experiment with the forms. With sketching, I feel free to play around and try lots of different ideas. And I always draw front, top and side elevations at the same time, so there are no suprises when I start building the fixture.

I sketch with a soft lead pencil on tracing vellum, a translucent paper used by architects, which has a light blue $^1/_8$-in. grid printed on it. The translucent nature of the paper allows me to overlay my drawings with fresh sheets, so that I can trace certain parts of a drawing over and over again as I work toward an ideal design solution. Tracing also allows me to try different ideas without erasing part of a drawing I might want to refer back to later.

After I've gotten an idea of what the overall shape of my fixture will be, I begin sketching its key parts at full size. These details help me establish how I'll secure the reflector or diffuser to the fixture, how the wire and tubing will get through the wood parts, and tell me which joinery details I'll have to pay particular attention to.

Designing for Safety

Electric lights are so much a part of our lives that it's easy to forget they can be dangerous. An improperly wired fixture could cause shock or a fire. A combustible material like wood presents additional safety problems which make the use of some non-combustible materials like metal, glass or ceramic inevitable in most wooden lighting fixture designs.

Underwriters Laboratories (UL) defines the safety standards for portable lamps and light fixtures. This independent, non-profit organization also tests light-

ing products to be sure they conform to these standards. Products that meet the standards receive the familiar UL label. It isn't necessary to have fixtures that you build for use in your home tested by UL; however, if you intend to produce and sell your light designs, consider submitting them to UL for testing.

The UL "Standards For Safety" that apply to shop-built lighting fixtures are contained in publications UL 153, "Portable Electric Lamps," which applies to floor and table lamps, and UL 1571, "Incandescent Lighting Fixtures," which applies to fixtures that are permanently affixed to a wall, ceiling or other surface. These publications cost $36 each and are available from UL (Underwriters Laboratories Inc., Publication

FIG. 2: CONTROLLING LIGHT

DIFFUSERS

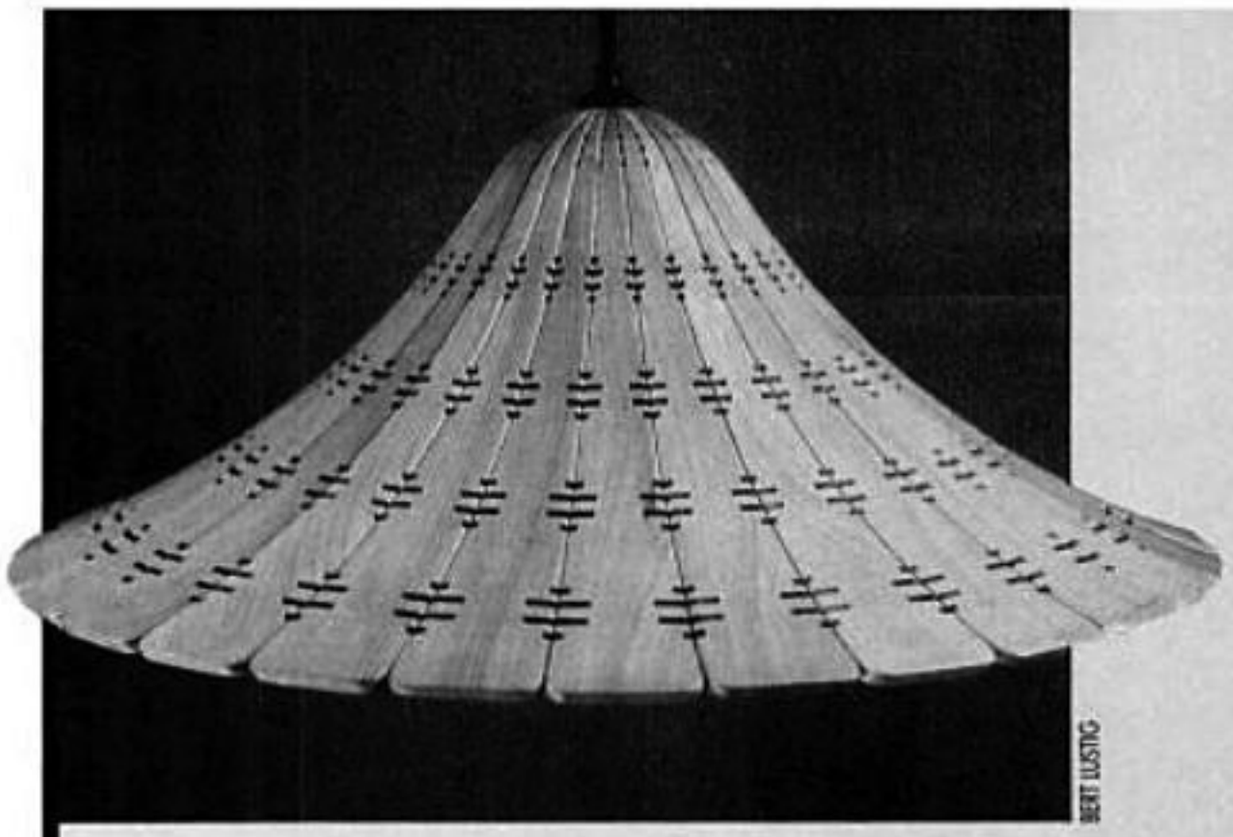
A diffuser intercepts light rays and spreads light out, diminishing brightness and scattering the beams. Fabric lampshades, fiber panels, stained glass—all serve as diffusers.

REFLECTORS

A reflector bounces light off a polished or light-colored surface. Light is reflected at the same angle at which it strikes the surface. PAR lamps and R lamps have built-in reflectors.

PRISMS

Prisms reflect light at some angles and refract it at others. Some glass globes have built-in prisms.



BERT LUSTIG

Cherry hanging lamp (top) of thirty resawn S-curved segments joined with wire. Cherry table lamp (right) of bandsawn segments, reassembled for turning, then sculpted. *Bert Lustig, Berkeley, W.V.*

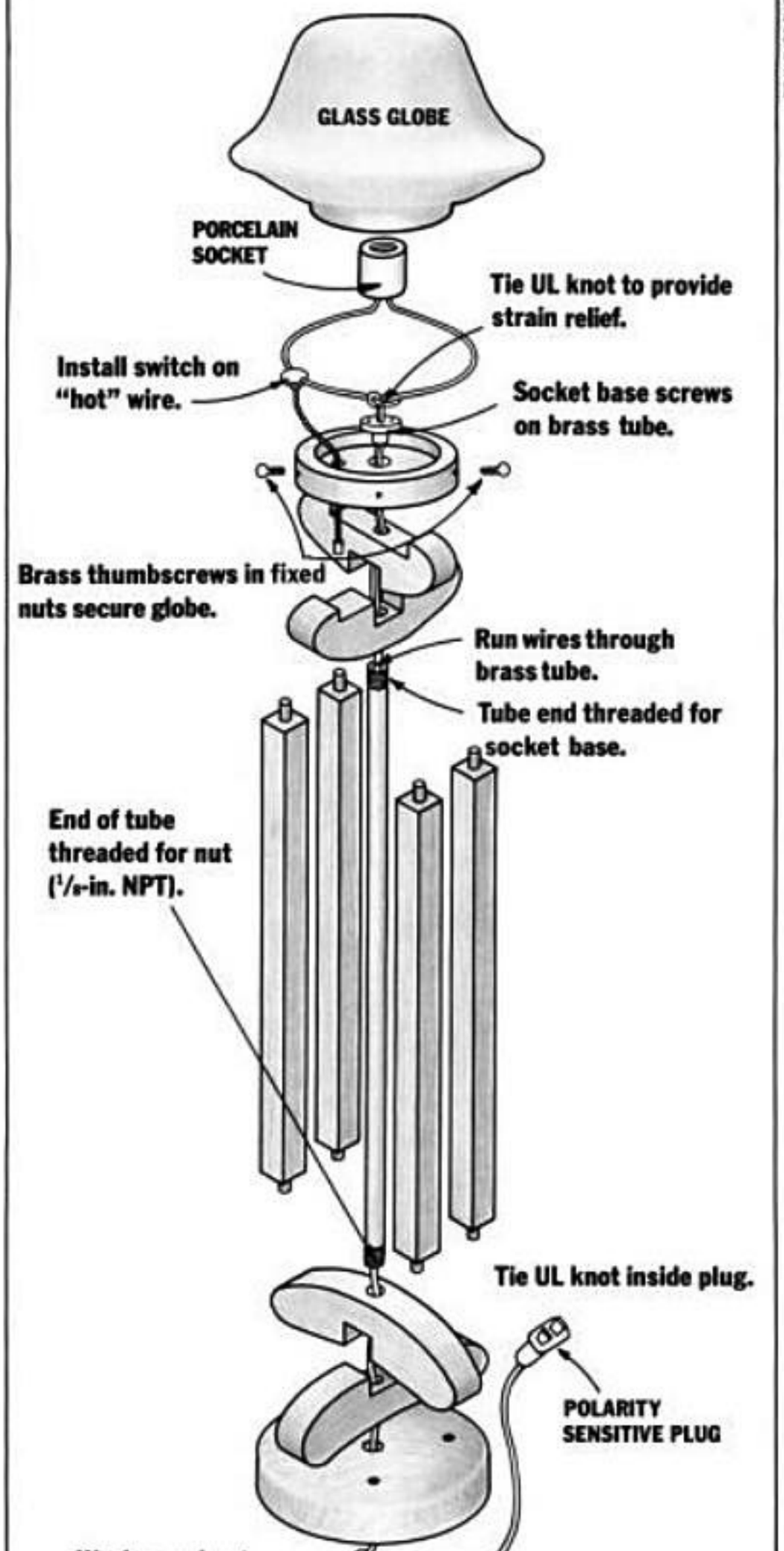
JEAN PIERRE HSU

PHILLIPUS S. SOLLMAN

PHILLIPUS S. SOLLMAN

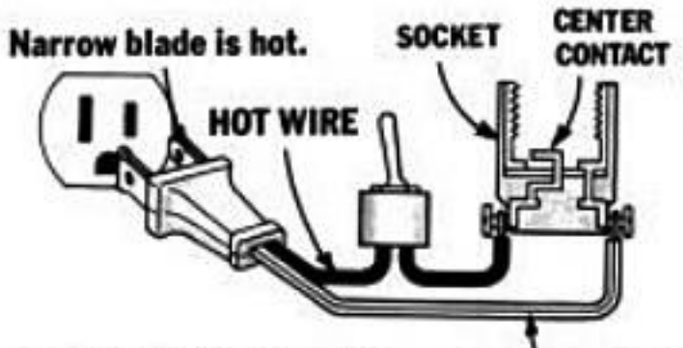
Lamp (above) of bent laminated cherry. Each strip has two laminates, pre-bent individually over a hot pipe then glued together and clamped on a curved form. Cherry wall lamp (left) has solid top and sides with bent-laminated front and back panels. *Phillipus S. Sollman, Bellefonte, PA.*

FIG. 3: WIRING A FIXTURE



DRAWINGS BY FRANK ROHRBACH

POLARITY IN WIRING



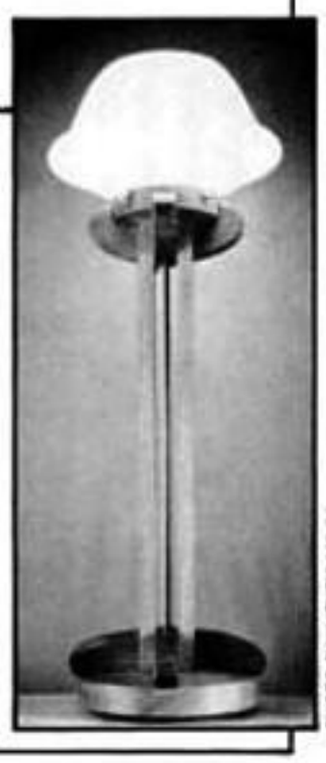


PHOTO BY KATHRYN LINN

Stock, 333 Pfingsten Road, Northbrook, IL 60062).

The UL "Standards for Safety" contain a lot of useful guidelines for building *safe* fixtures. I suggest that you read them. I've condensed some of the most important points as they apply to portable light fixtures below, as well as some tips of my own. These guidelines apply to lamps for interior use only. If you intend to make a fixture for exterior use, check the UL Standards for exterior fixtures and applicable sections of the National Electrical Code concerning safe outdoor wiring practices.

• **All wiring must run through some sort of metal wireway.** That means, if you're planning to run wires through wood, you must line the hole with metal tubing. If the insulation on the wiring were damaged, the heat caused by the bare wires touching could very well cause the wood to ignite. The metal is intended to protect the wood. One-eighth in. IPT pipe with a 1/8-27 NPT thread is the industry standard for this purpose, and sockets and other hardware are threaded to fit

LIGHT-FIXTURE HARDWARE

Safe light fixtures start with safe electrical hardware. Use Underwriters Laboratories (UL) approved plugs, cord, switches, and sockets to make your wooden light fixtures. Look for components that carry a UL label.

Plugs—Let's start with the plug. For wooden lamps that will be used indoors, use a two-pronged, polarity-sensitive plug, the kind with one blade slightly narrower than the other. AC current has polarity, like DC current, and the narrow blade plugs into the hot side of the electrical outlet. The wider blade plugs into the neutral side of the outlet.

Cords—There are many types of electrical cord that will do the job. For most lamps, I recommend using type SP or SPT cord—also known as lamp cord or "zip cord." The insulation covering one of the two wires has a groove or a ridge and the insulation covering the other wire is smooth. This makes it easy to keep track of polarity. You connect the wire with the smooth covering to the narrow blade on the plug. This will be the hot wire.

Choose cord with wires large enough to carry all of the current your bulb or bulbs will require. Trying to force too much current down a wire that's too small will overheat the wire—hot enough perhaps to melt the insulation on the cord. For fixtures that will require a lamp that is 100 watts or less, 18-gauge wire will be sufficient. Higher wattage lamps will require heavier wire. But don't get confused: in wiring terminol-

KEYLESS PORCELAIN SOCKET

KEYLESS TWO-PART PHENOLIC SOCKET

KEYED BRASS SOCKET

this pipe. The outside diameter of this tubing is 3/8 in. When you cut the tubing, deburr the edges or install an insulating bushing where the wiring exits the metal wireway. The purpose of the insulating bushing is to keep the sharp edge of the metal wireway from damaging the cord's insulation as the lamp is moved about, and to keep the metal parts from becoming electrified if the insulation becomes damaged.

• **All wiring splices, taps, transformers, ballasts, and so on must be inside an accessible metal, glass, ceramic, or porcelain enclosure.** This means that if you intend to use multiple sockets in your fixture, you'll have to design some kind of junction box to fit inside the fixture. If you're going to build a fixture that will attach to a structure permanently, you must use a UL-recognized junction box cover, not a piece of wood.

• **The electrical cord must be provided with strain relief.** Generally, wiring is secured to the socket and plug by screw terminals. Strain relief simply means that you should put an overhand, or "UL knot," in the wires before wrapping the wires clockwise around the screws and tightening them down (see Fig. 3). Without such a knot, a sharp tug on the cord could cause an instant short circuit if the wires came off the screw terminals and accidentally touched.

According to UL standards, there should be at least five feet of cord between the point where the cord exits the fixture and the plug.

• **Provide adequate clearance between the lightbulb and shade.** UL safety standards are very specific when it comes to minimum clearance dimensions, and they vary with the wattage of the lamp chosen and the type of shade. I strongly recommend that you review UL Publication 153 if your design requires a wooden lampshade or a shade made of some other combustible material.

• **Provide sufficient openings at the top and bottom of the fixture for ventilation.** If you are enclosing a bulb within a globe, and ventilation cannot be provided, stick to a bulb that is rated at 60 watts or less,

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ogy, the smaller the number, the larger the wire. SP-1 cord is made only in No. 18 wire; SP-2 comes in both Nos. 18 and 16 and has heavier insulation than SP-1.

If you want to suspend a hanging light from its cord, you need a heavier cord than SP-1. UL rates the load-carrying capacity of types SP-2 and SPT-2 cord at 2 1/2 lbs. maximum. Lights that weigh between 2 1/2 lbs. and 10 lbs. may be suspended from heavier type SJ or SJT cord.

Sockets—Use UL-approved sockets, and don't modify them. Do not use sockets with exposed terminals. Sockets with a built-in switch are known as "keyed," and those without switches are "keyless."

I personally dislike metal sockets, simply because the only thing that's separating the current from you is a thin strip of cardboard which, under intense heat conditions, can dry out and turn to dust within a few hundred hours. Better-quality light fixtures are built with porcelain sockets, lined with nickel-plated brass conductors. I prefer porcelain sockets when the socket will be enclosed inside a globe. For ventilated fixtures, I prefer sockets made of phenolic, a hard plastic material. Both socket types are keyless, so some provision for a switch must be made.

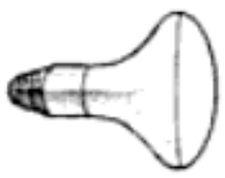
Sockets vary in the way they're mounted to the fixture. Many sockets are threaded to accept a 1/8-in. NPT threaded wireway. Others attach with mounting screws.

Switches—If you use a keyless socket, you'll need a switch. Line switches are easy to install on the cord's hot wire, within 12 inches of the point where the cord exits the fixture. Convenient in-line dimmers are also available. The wiring for other types of switches must be enclosed in some sort of junction box.

Lightbulbs—There are some light sources I recommend and others that I would avoid for safety reasons. Incandescent "A" lamps are the pear-shaped lightbulbs that most people use all over the house. I have no trouble recommending

A-TYPE

T (TUBULAR)



R (REFLECTOR)

PAR (PARABOLIC ALUMINIZED REFLECTOR)

CANDELABRA

G (GLOBE)

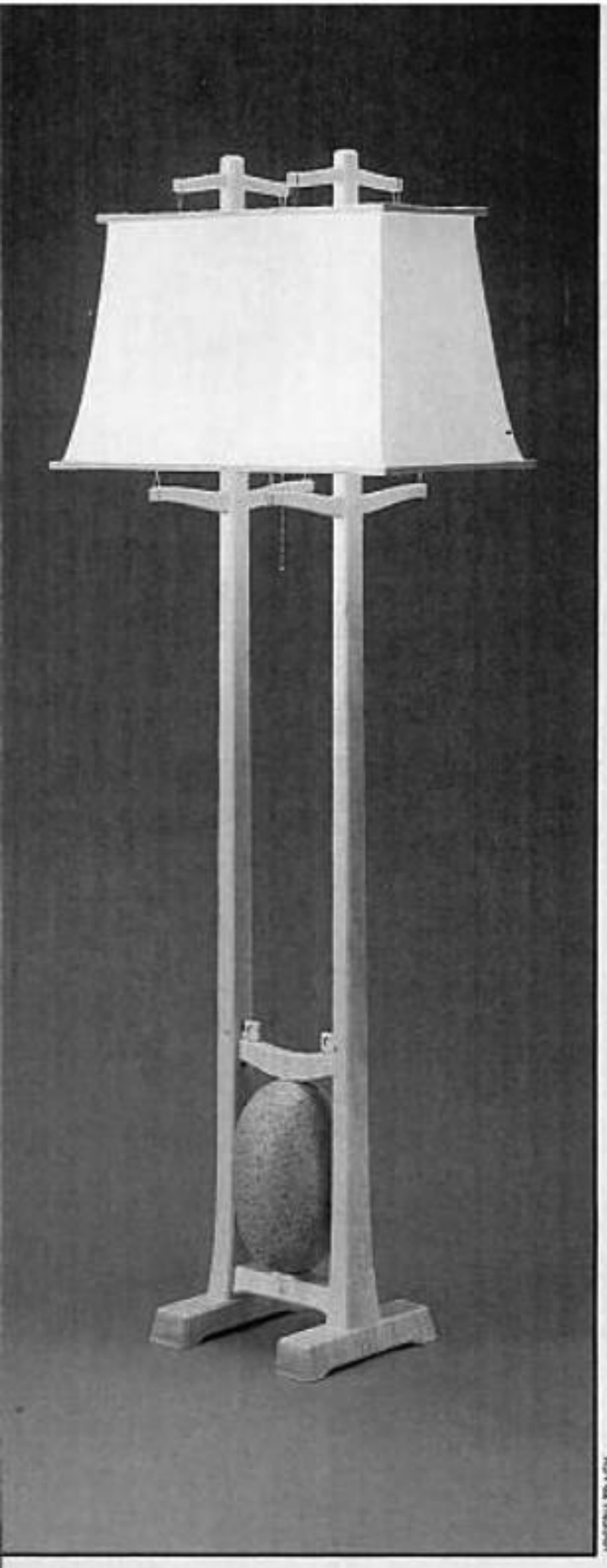
these for use in wooden light fixtures at sizes of 60 watts and under for unventilated lamps and 75 watts and up for designs that are ventilated. Likewise for PAR lamps and R lamps. The new screw-in compact fluorescent lamps with built-in ballasts put out lots of light and consume very little energy. They offer some exciting possibilities, and I recommend them highly.

Don't try building your own fluorescent fixtures from scratch. Although you can buy fluorescent ballasts and sockets in stores, these are intended to be used for replacement and repair of existing fixtures. To be used properly, they must be mounted to a grounded metal base, and the many wires involved must be enclosed inside a 20metal wireway. They are not meant to be mounted to wood. It is possible, however, to mount a premanufactured fluorescent strip inside wooden casework, although these types of installations should comply with the standards of the National Electrical Code.

It is tempting to try scavenging lamps, transformers and sockets from low-voltage quartz halogen desk lamps or the $10 exterior quartz halogen floodlights sold at home centers. The intense heat of quartz halogen sources—the temperature of the bulb wall can exceed 500° Centigrade—and the tendency of these lamps to shatter with explosive force while in use makes them unsuitable for use in shop-built wooden light fixtures. These lamps and sockets are originally supplied with fixtures that have wiring designed to withstand high temperatures, special glass covering the lamps to protect users should a violent lamp failure occur, and insulation to protect users from being burned when adjusting the lamp's position. Their engineering complexities make building your own a dangerous proposition.

Fixtures which use high-intensity discharge lamps and ballasts, like high-pressure sodium or metal halide, are also unsuitable for being home-engineered into wooden light fixtures because of their high operating temperatures.—*C.L.*

DRAWINGS BY SALLY ONORA



JOSEPH TRACY

Floor lamp with granite beach stone and double silk shade. *Joseph Tracy, Mount Desert, ME.*

RICK MASTELLI

Bedside reading light in pine mounts under a small hanging bookshelf. Carved louvers swivel to adjust the direction of light. *Wille Sundqvist, Hogland, Sweden.*

just to be on the safe side. Some of the heat from the bulb will be radiated through the globe into the room, but some will be conducted through the socket, down the copper wiring. UL would require a manufacturer to place a warning label near the socket cautioning the lamp user not to substitute a higher wattage lightbulb. Applying such a label to your lamp isn't a bad idea.

The orientation of the bulb has a great deal to do with heat buildup in fixtures. When the base of the bulb is up, the socket and wiring get much hotter than when the base is down. For base-up designs, it is especially important to use a porcelain socket and a fixture wire that is rated for high temperatures (types CF, AF or SF). For the exact wattages and wiring temperature ratings for different bulb orientations, see UL Publication 153.

- **All lamps must be switched.** In-line switches which attach to the lamp cord are fine for table lamps, but aren't very convenient for floor lamps. They get stepped on, pick up dirt, and you have to bend over every time you want to turn the lamp on or off. It's much better to use either a keyed socket or a toggle or pull switch. But remember: if you use a switch that is not built into the socket, and it's not an in-line switch, the wiring for these devices must be enclosed in some sort of junction box as described above.
- **As far as children are concerned, if it looks like a toy, it's a toy.** A wooden lamp in the shape of an animal or a car could be a wonderful gift for a child, but is too dangerous to play with. On commercial products, UL requires a label that reminds adults that children should not be allowed to play with lamps, and that they should not be placed where a child can reach them. This advice is worth remembering.
- **Don't assume that you've wired the lamp correctly just because it turns on and off when you flip the switch.** It's possible to create a shock hazard if you forget to consider electrical polarity when you wire your fixture (see Fig. 3) or use wire that is too small to carry the current required by your lightbulbs.

CAUTION: Be sure to install switches on the cord's "hot" wire. A switch placed on either the hot or the neutral wire can turn the lamp on or off by interrupting the flow of the current. If the switch is placed on the neutral wire, one of the socket terminals will remain hot, even though the bulb is off. This could result in electrical shock to a person changing a lightbulb, if he happened to touch the terminal under the right conditions.

The hot wire always wraps around the brass-colored screw on the socket (or the center contact of a keyed brass socket), and the neutral wire wraps around the silver-colored screw.

When you set out to design and build your own light fixtures, you're on your own. The range of lamp and light fixture designs that are possible in wood is limited only by your imagination, and by what can be accomplished safely. Go wild, but don't take any chances. Don't hurt yourself or others by cutting corners on components or safe wiring practices. ▲

Charles Linn is a registered architect who resides in Eugene, Oregon. He is a woodworker and former editor of Architectural Lighting, *a trade magazine for architects and designers.*

NOAH'S ARK

Oh, the Animals Marched Two by Two Hurrah, Hurrah!

BY NICK ENGLER & MARY JANE FAVORITE

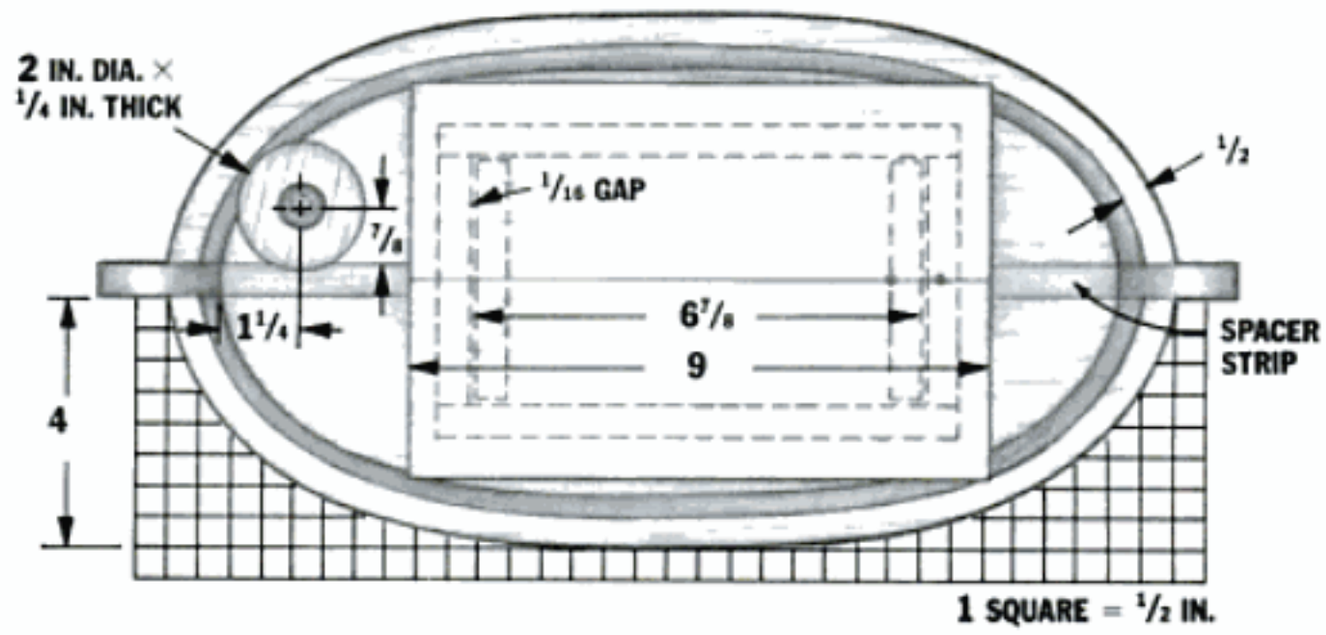
"Remember the Sabbath day," begins the Third Commandment (Exodus 20:8-11), "To keep it holy ... thou shalt not do any work; thou, nor thy son, nor thy daughter ..." In the eighteenth and nineteenth centuries, Americans took these words to heart. Sunday was a day of rest, not just for adults, but for the entire family. To help their children make it through the day in good spiritual standing, parents gave them special "Sunday toys." These playthings were designed to discourage boisterous play and keep the youngsters peacefully occupied.

Among the most popular Sunday toys were miniature "Noah's Arks" filled with animals. Not only did

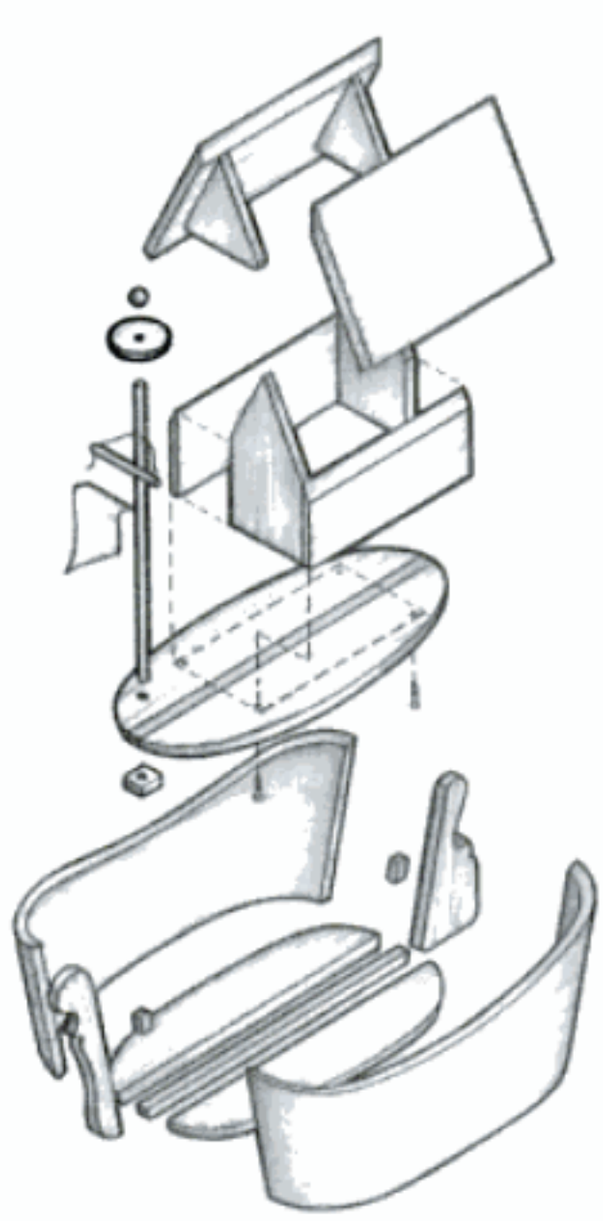
KAREN CALLAHAN

FIG. 1: THE ARK

TOP VIEW

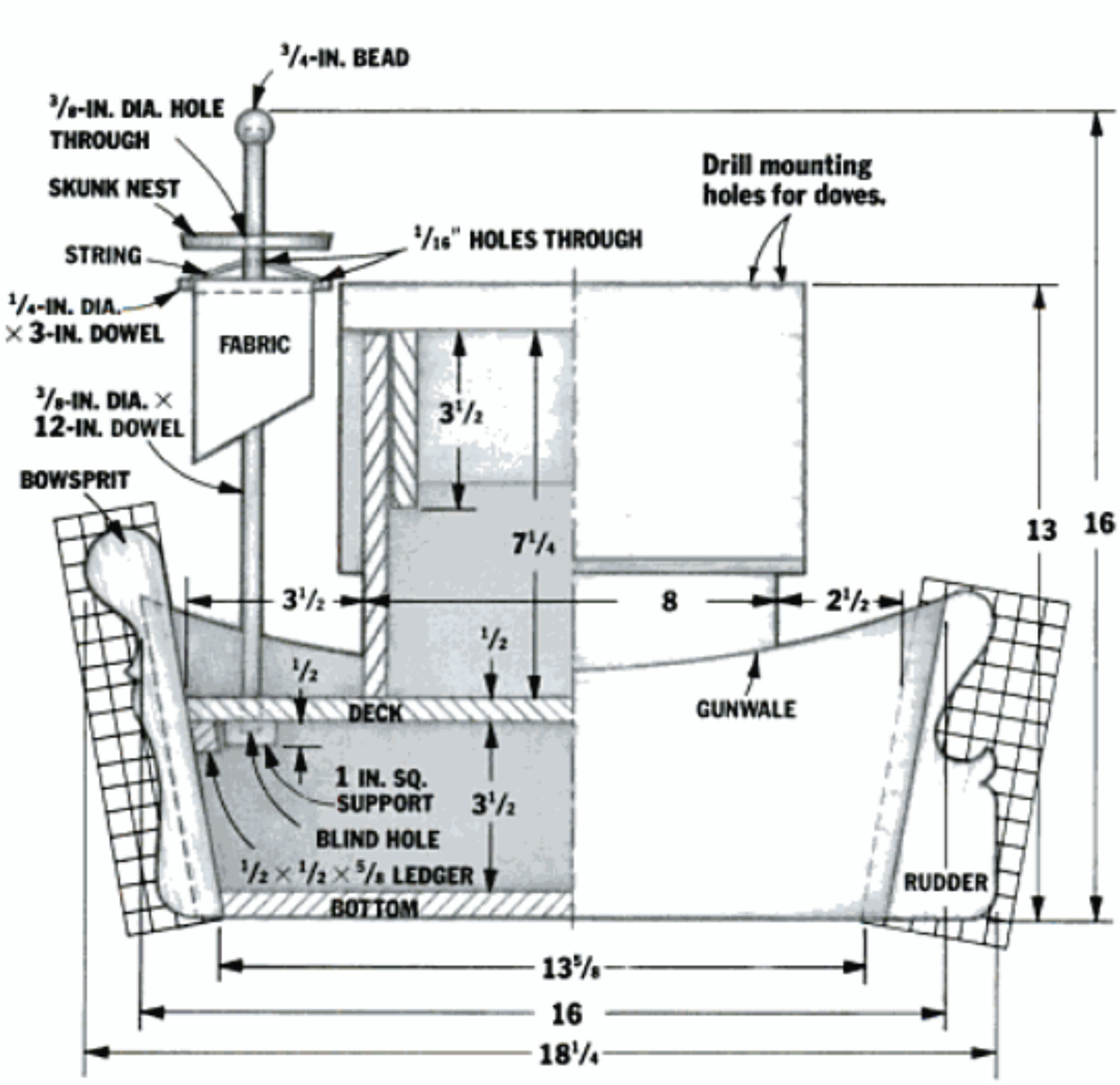


ARK EXPLODED VIEW

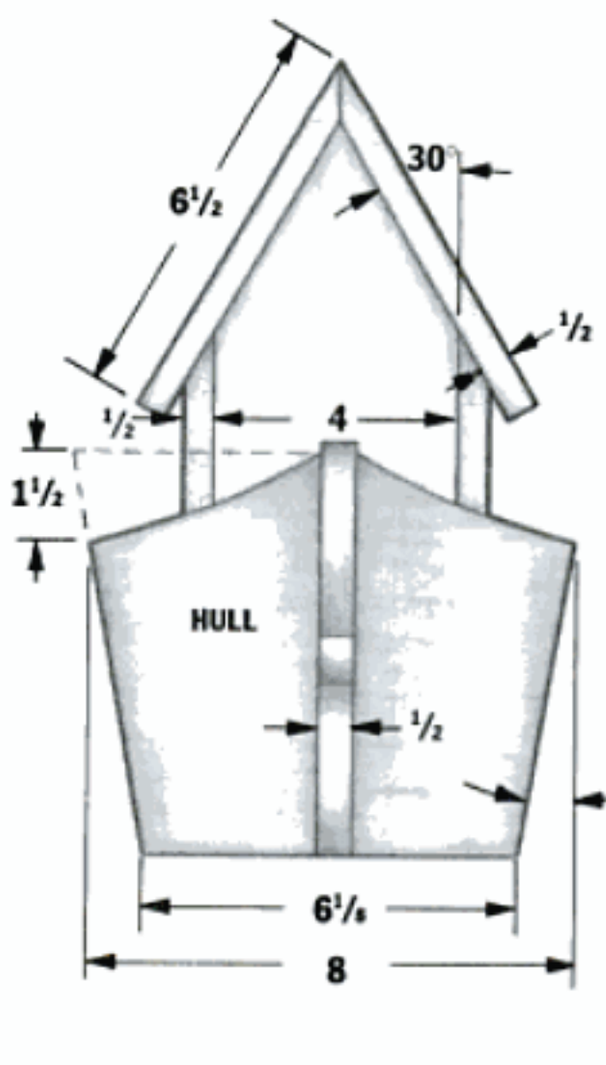


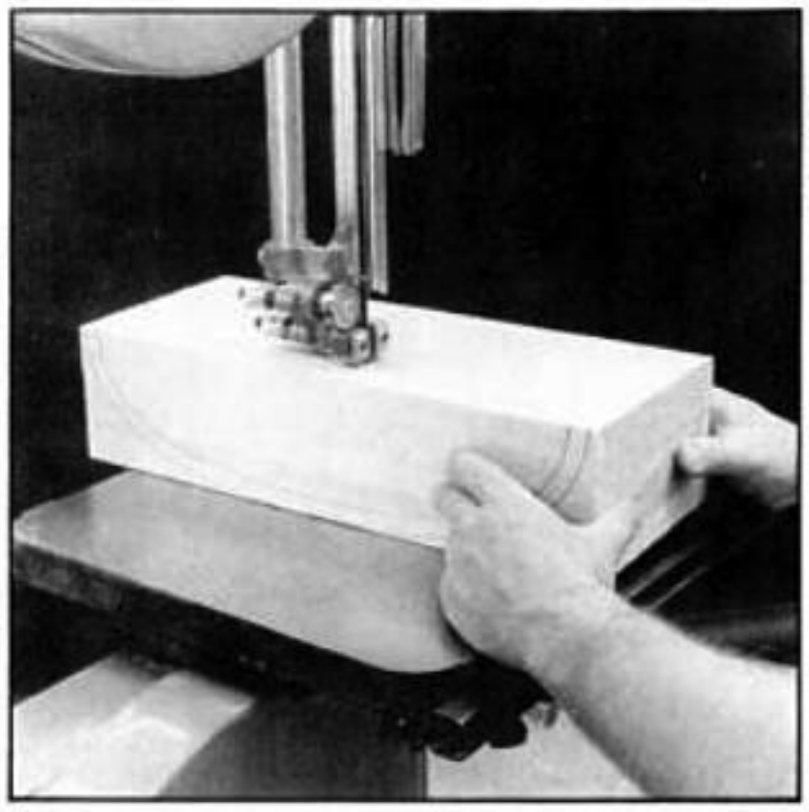
DRAWINGS BY MARY JANE FAVORITE

SIDE VIEW



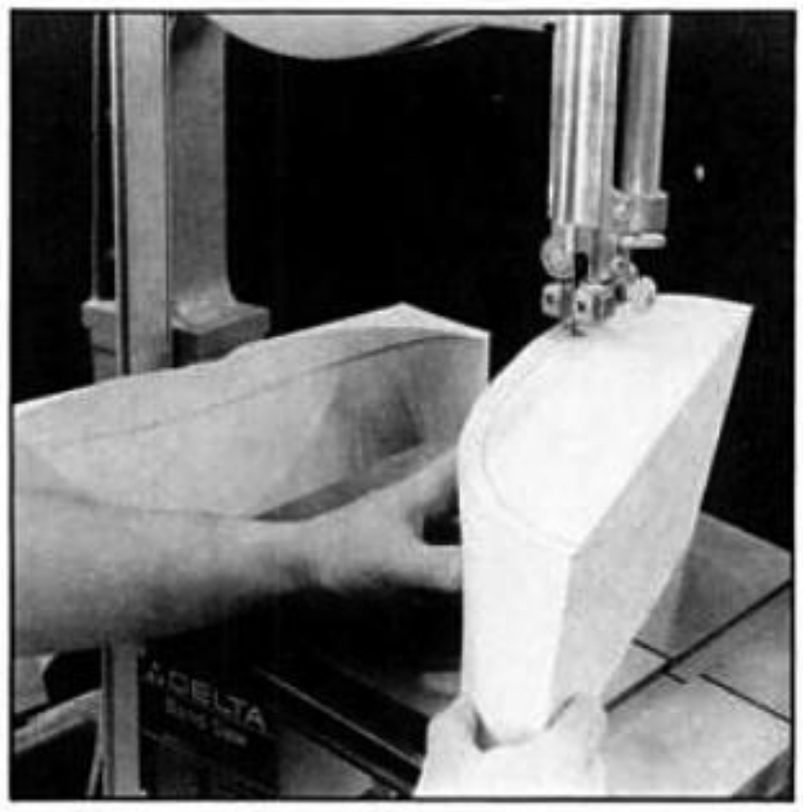
END VIEW



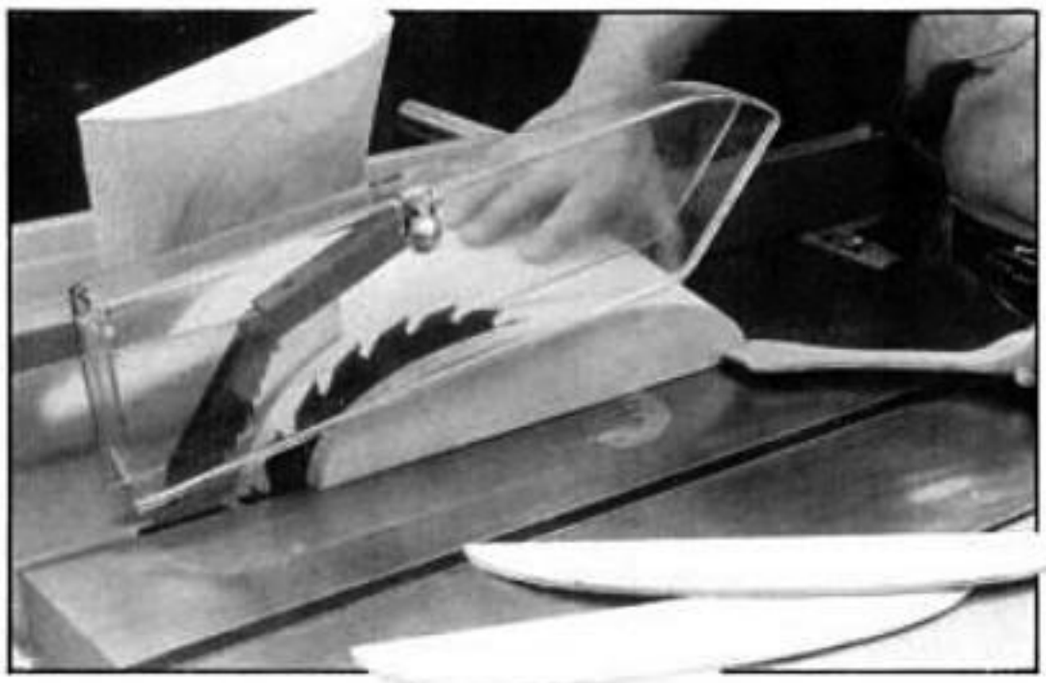


PHOTOS BY KAREN CALLAHAN

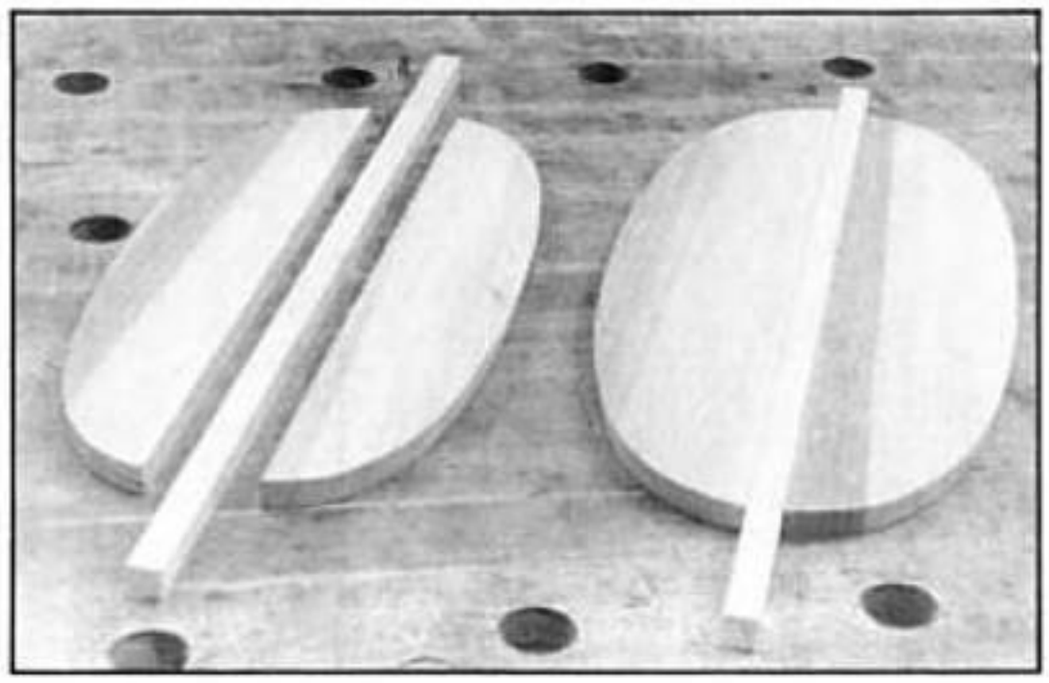
To make each hull half, trace the top and side views onto each block. Begin by cutting the gunwale (top edge) curve. Save the waste; you'll need to tape it back on the block to cut the curve of the hull.



Tape the waste from the gunwale curve back on and, tilting the bandsaw 10°, cut the outside curve of the hull first; then cut the inside curve. Save the inside waste.



Rip 1/4 in. from the bottom of the inside waste from each hull half, as shown in Fig. 3. Then cut 1/2-in. thick pieces to make the bottom and deck halves.



Cut and glue two 1/2-in. thick spacer strips between the bottom and deck halves. Trim the ends of these strips to match the 10° bevels of the bottom and deck.

these promote quiet play, they were also educational and had a biblical theme. Most arks and animal sets were imported from Europe, but many were made by loving parents and grandparents. Store-bought or handmade, they all shared a similar design—the arks were small toy chests in which to store the animal figures, along with Mr. and Mrs. Noah.

This Noah's Ark is a contemporary version of the old Sunday toy. True to tradition, the ark holds all the animals and people shown. There's even room for the detachable mast. It opens like a cookie jar—the roof lifts off the cabin and the deck lifts off the hull, allowing you to reach inside. The design also includes a non-traditional feature: the mast supports a "skunk nest," to separate the aromatic mammals from the rest of the crew. Please keep in mind that there are some small parts in this set, and the toy is best suited for children ages six and older.

Making the Ark

The ark construction is straightforward—cut the parts, sand them and assemble them with brads and glue. There are, however, a few special techniques you must use to make some of the pieces.

Hull—Make the hull from two matching blocks of wood 4 in. × 6 1/2 in. × 16 in., one for the left side of the hull and one for the right. The ark in the photo is made of poplar, but you could use any light-colored wood. Fig. 3 shows how to cut one half—hull, bottom and deck—all out of the same block. Make two as shown, then glue these two halves together.

Note: if your bandsaw has a 6-in. maximum depth-of-cut, make the block 4 in. × 6 in. × 16 in. and reduce the space between the bottom and the deck from 3 1/2 in. to 3 in.

Cabin—To cut the 30° bevel at the edges of the cabin sides and roof halves, you'll need to clamp the stock to a jig that rides along the rip fence.

Making the Animals

You can make the animals in one of three styles, depending on your tastes and skills (see photo):

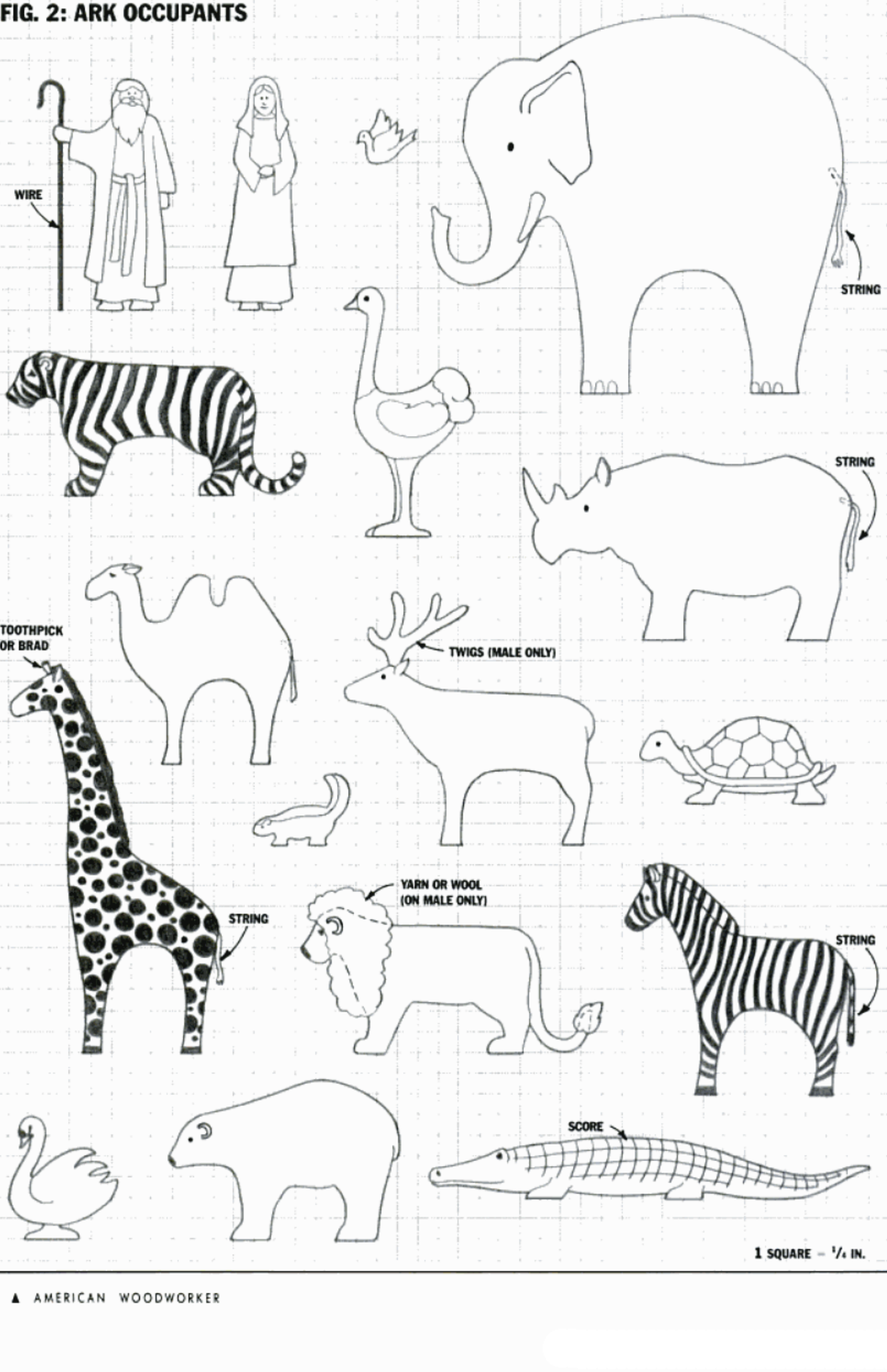
1) Silhouettes on bases—cut animal shapes from 1/4-in. thick stock and mount them on 1/4-in. thick × 3/4-in. wide bases.

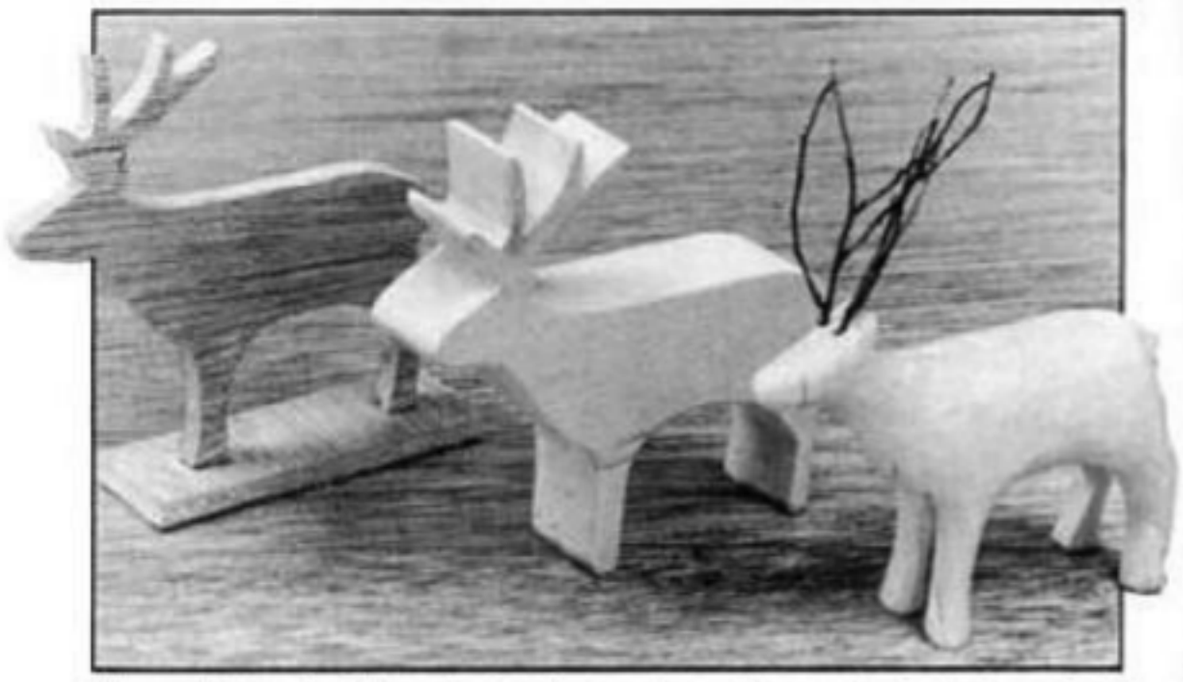
2) Block figures—cut animal shapes from 1/2-in. to 1-in. thick stock; no base is needed.

3) Carved figures—cut animal shapes from 1/2-in. to 2 1/2-in. thick stock (depending on animal), shape with knife or chisel.

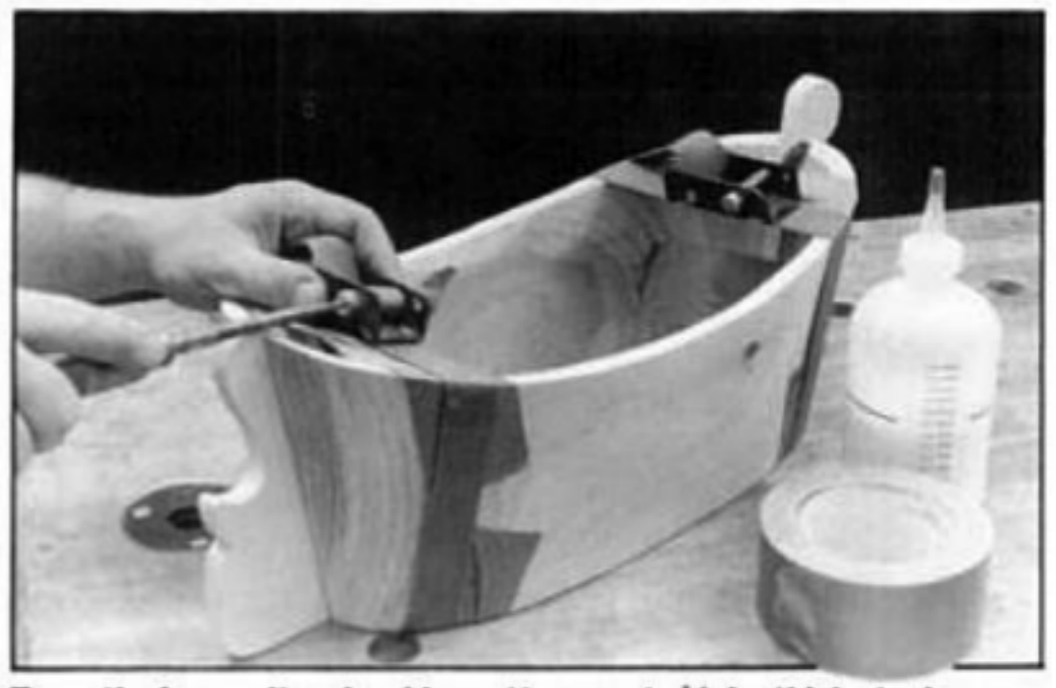
If you choose to make the thin silhouette figures, make the animals from *laminated* stock. If you make them from solid wood, no matter how you orient the grain, many of the thin shapes will be weak. Legs, heads, tails, and antlers will break off easily. To pre-

FIG. 2: ARK OCCUPANTS





Three different styles of animals are shown here prior to being painted: 1) thin silhouettes on bases; 2) block figures; 3) carved creatures.



Trace the bowsprit and rudder patterns onto ½-in. thick stock, cut these parts, and sand them. Then glue the hull halves to them, wrapping band clamps around the assembly while the glue dries.

vent this, glue up ¼-in. thick plywood from veneer stock. Alternate the grain direction so each layer is perpendicular to the one above or below it.

You can make some of the details on the thicker style figures from materials other than lumber. On the animal set shown, the tails and manes are made from yarn, and the antlers from twigs. Noah's crook is a short length of #14 copper wire.

While most of the animal and people figures are designed to stand on a flat surface, the doves rest on the slanted roof of the cabin. Glue dowels in the bottom of each dove, then drill holes in the roof. Insert the dowels in these holes.

Painting the Ark and Animals

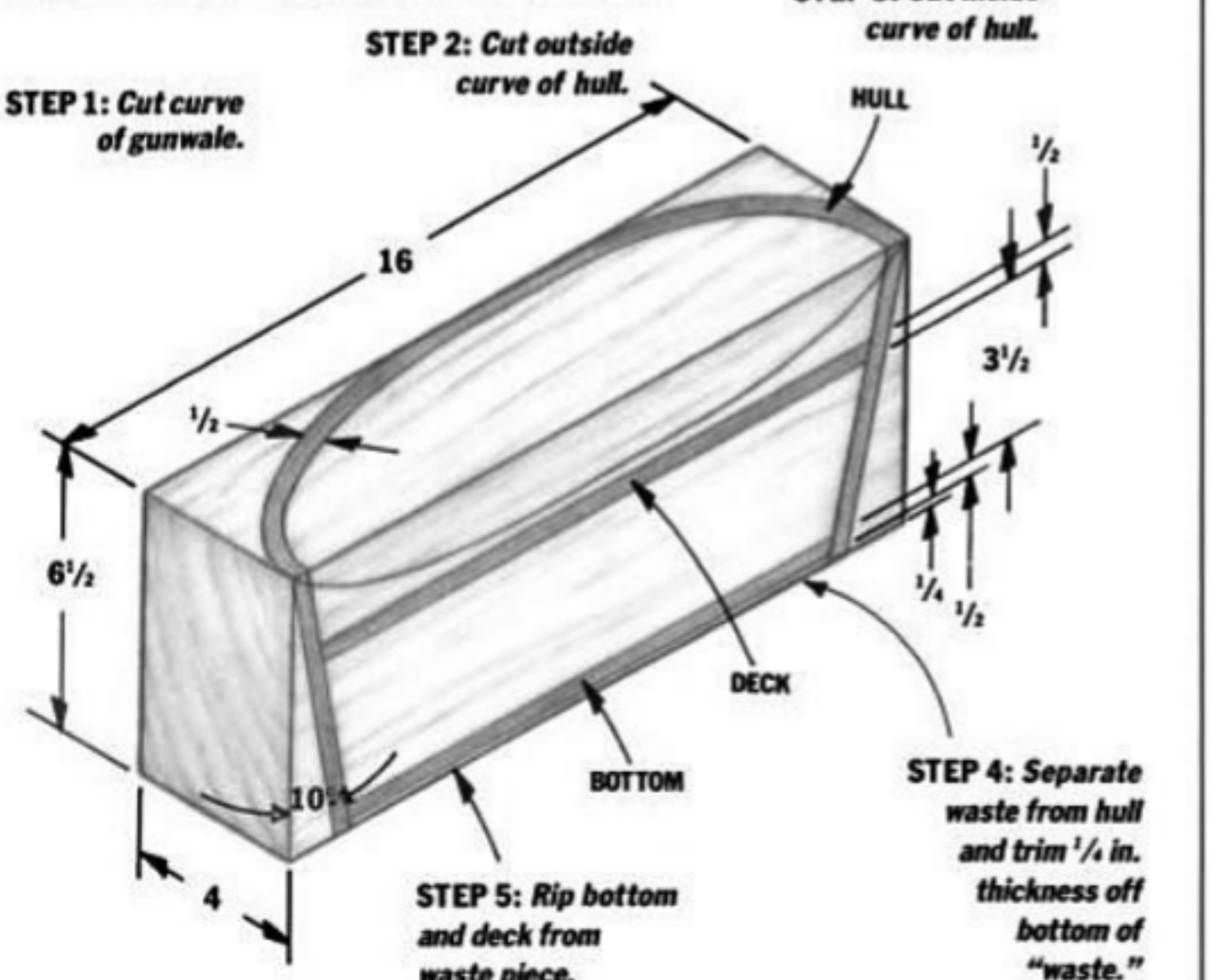
While you can use almost any type of paint to finish this project, artist's acrylics offer several advantages. They come in small quantities (one to two ounces), so you don't have to buy more than you need. They also come in a wide range of colors and can be easily mixed to create an infinite variety of hues. They are easy to apply and they dry quickly.

To prepare the surface for painting, finish sand with 150# sandpaper. Wipe the wood with a wet rag, allow it to dry overnight, then sand it again. This keeps the water-based acrylic paint from raising the wood grain when you apply it.

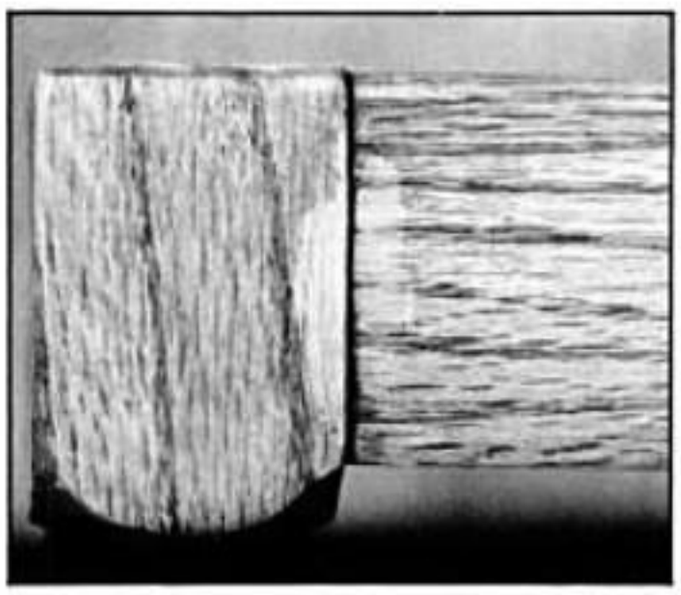
Brush the paint over the raw wood—do *not* prime it. When applied to a bare surface, acrylic soaks into the wood and bonds to it. If you apply them over a primer, the color chips easily. To protect the color from dirt, apply paste wax, tung oil, or varnish over the acrylic. Do *not* apply shellac or an alcohol-based finish. Alcohol dissolves acrylic.

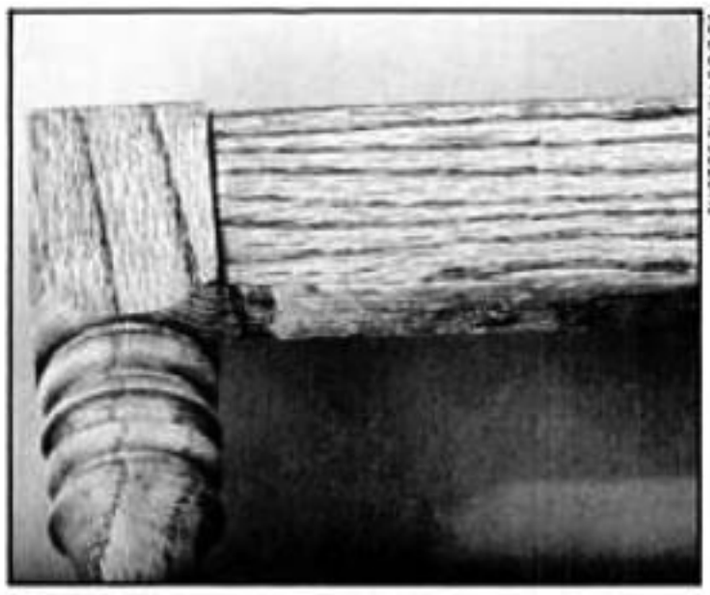
If you want to "antique" the project, sand away some of the color from those areas that would have seen the most wear—edges and corners. Apply a dark glaze to the entire surface with a rag or brush. You can make your own glaze by mixing two ounces of burnt sienna or burnt umber artists' oil paints with 8 ounces of turpentine, 3 ounces of boiled linseed oil, and ¼ ounce of japan drier (available from Wood Finishing Supply Co., Inc., 100 Throop Street, Palmyra, NY 14522, 315-597-3743.) Let the glaze soak in for a few minutes, then wipe it off as much as possible with a clean rag. Some will remain (particularly in the crevices), making the surface look old and well-used. ▲

FIG. 3: CUTTING OUT THE HULL



Mary Jane Favorite is a folk artist, woodworking designer, illustrator, and she has co-authored four woodworking books. Nick Engler is a Contributing Editor of AW. He's also an





PHOTOS BY JIM BOGGS

Traces of glue can cause splotches when you stain (left). To repair the damage, scrape off the spot with a sharp hand scraper (center) then sand the spot, avoiding the stained area around the spot. Restain, wipe off the excess, and the splotch will be history (right).

in the scratches and darken the wood.

The coarseness of the sandpaper you use for finish sanding has a significant effect on the way a surface accepts stain. Coarse-grit scratches make more room for pigment. Fine scratches make less room. But if the scratches are too coarse, they'll show up in the finished piece. Opinions vary, but I think 180- to 220-grit sandpaper gives the most pleasing results. Sand the entire surface to the same grit and remove tool scratches and pad-sander swirls, or they'll be highlighted by the stain. Always sand in the direction of the grain, if possible.

Performance Depends on the Binder and Solvent

When you think of the pigment as dust-sized colored particles, it's easy to see that something is needed to adhere these particles to the wood or they'll simply blow away. The "glue" used to hold the pigment color to the wood is called the binder, and there are several different kinds. It's important to understand what these different kinds of binders are, because it's the binders and their corresponding solvents that determine the characteristics of the stain.

Most binders can be classified as one of four types—or some combination thereof. The four most common types of binder used to stick pigment to the wood are oil, alkyd or polyurethane varnish, nitrocellulose lacquer, and waterborne acrylic resin.

Oil-based stains—Oil stains are the oldest, probably the most common, and definitely the easiest to use. Since these stains are most commonly wiped on and wiped off the wood, they are often called "wiping" stains. They are usually based on boiled linseed oil, which cures very slowly, giving you plenty of working time. Oil-based stains are thinned with mineral spirits or naptha.

There's no trick to applying oil-based stains. You simply cover all of the wood (or, if you're working on a particularly large surface, a section of the wood) with the stain, and, while it's still wet, wipe off all of the excess. Pigment will remain everywhere there's a pore or scratch large enough to accept it. The oil will cure, binding the pigment to the wood. It makes no difference how you apply the stain. You can wipe, brush, or spray it on the wood, or you can dip the wood into the stain. I usually wipe it on with a soaked cloth or sponge.

Oil-based stains are not meant to be left thick on the wood. Linseed oil never hardens thoroughly, and, if left on in any thickness, will wrinkle when it cures. With oil-based stains, it's always best to wipe off all the excess.

Varnish stains—Many stains currently on the market are made with alkyd- or polyurethane-resin varnish. These stains are usually sold as "varnish stains," or as stains that "stain-and-seal" or "stain-seal-and-finish" in one step. Like oil stains, they're thinned with mineral spirits or naptha.

These stains are, quite literally, thinned paint. If you apply a heavy coat of varnish stain without wiping off the excess, you can totally obscure the wood and the film will dry hard—just like paint.

Because varnish stains cover, or partially cover, the wood, they're especially useful for blending sapwood with heartwood or blending boards of different shades. Additional coats of varnish stain, left thick on the wood, will darken the color but will also obscure the wood.

While they may be referred to as varnish stains, very few stains are made from straight varnish. Most contain a mixture of oil and varnish. The higher the percentage of oil, the easier the stain is to use. The higher the percentage of varnish, the more the stain will perform like paint and be difficult to wipe off.

There are three other stains that are based on oil or varnish—or a mixture of the two—that you're likely to see in stores: semi-transparent, penetrating, and gel.

Semi-transparent stains are stains which contain some dye along with the pigment. They have less tendency to obscure the wood than straight pigment stains, and they will do a better job of coloring dense summer wood growth, because the dye penetrates everywhere the solvent does (see sidebar).

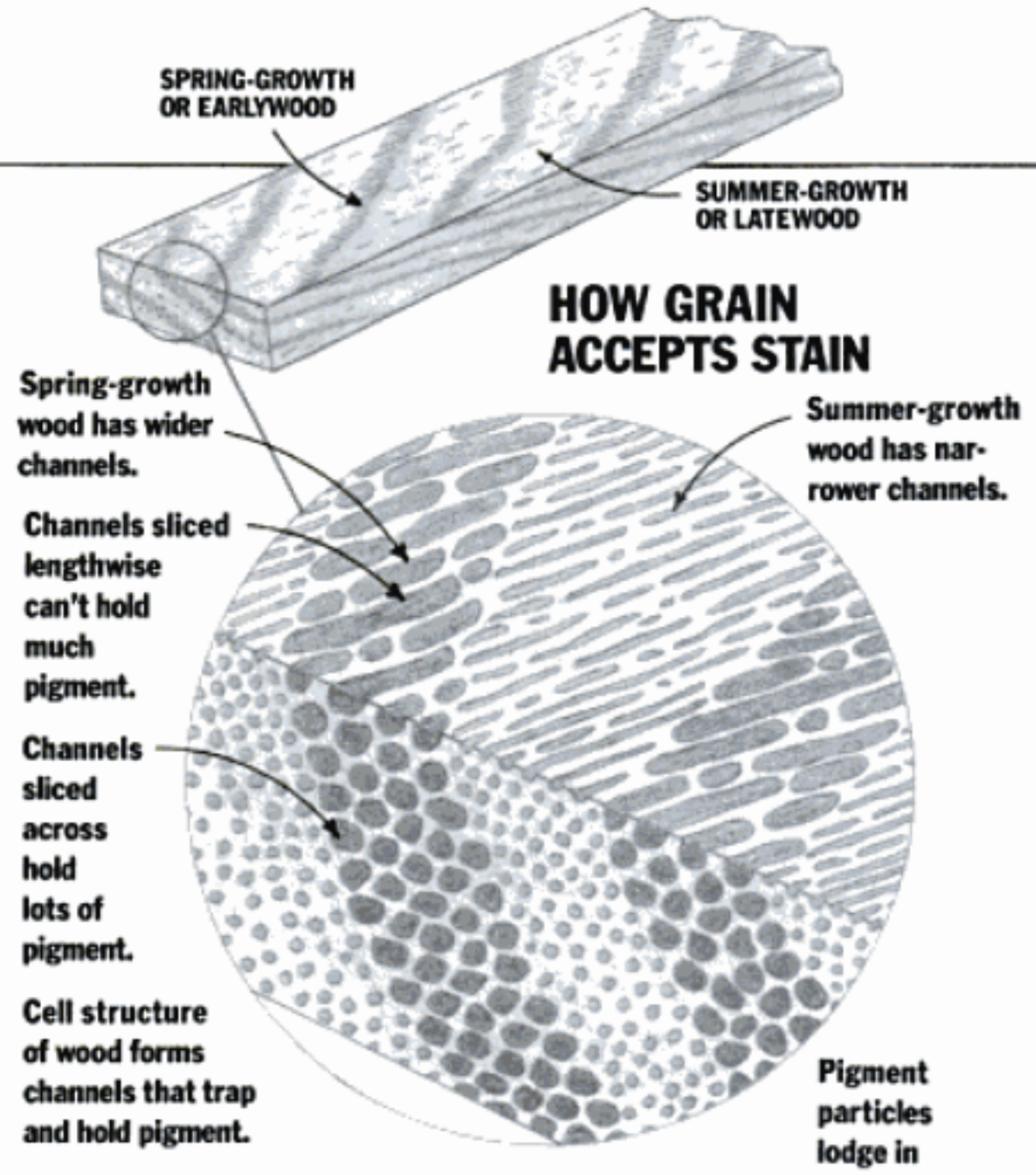
Penetrating stain has traditionally meant an oil-based dye stain containing no pigment at all. But I've come across some pigment stains called "penetrating" where the word is used to mean that the binder for the pigment is composed primarily of oil rather than varnish. Using the term in this way is confusing. If you find a stain which contains pigment, that stain can't legitimately be called a penetrating stain.

Gel stains can contain pigment, dye, oil, varnish or any combination thereof. "Gel" simply means that there are thickeners added to keep the stain from dripping or running.

If you choose to use a gel stain you should pay attention to what type of coloring material (pigment or dye) and what type of binder (oil or varnish) is used. These ingredients determine the degree of color penetration and the clarity or cover you will get. The gel only affects the working qualities.

Lacquer-based stains—Nitrocellulose lacquer-based stains are very popular in industry and with

THE STAIN STAYS MAINLY IN THE GRAIN



If you've worked much with pigment stains, you've surely noticed that some woods take stain better than others. Some take stain unevenly. The difference in stain penetration is directly related to the density of the wood and the angle of the grain.

Wood is composed of countless, individual, straw-like cells and vessels, which I will refer to as "channels." These channels carried water and nutrients when the tree was alive. But the lumber-drying process leaves these channels largely empty. It's these empty channels, sliced through at some angle when the board is sawn, that accept and hold the colored pigment particles in the stain.

The size of these channels, which varies with species of wood, determines the amount of pigment the wood will accept. The channels in some woods, like maple, birch, and cherry, are very small and can't accept much pigment. But these channels are also quite uniform, which means that, when the grain is straight, the acceptance of pigment will be uniform, resulting in an evenly-stained board.

The channels in other woods, like pine and oak, vary significantly in size between the fast growing, porous, spring growth (earlywood) and the tight, dense, summer growth (latewood). The relatively large channels of the spring-growth wood hold lots of pigment, but very little pigment gets into the tiny summer-growth channels.

When the channels are sliced lengthwise (picture a straw, split down the middle), they'll fill

DRAWINGS BY FRANK RICHBACK

professional finishers because they cure fast, which means the finisher can move quickly to the next finishing step. But lacquer-based stains often cause problems in the hands of amateurs because the working characteristics differ so much from oil- and varnish-based stains.

First, lacquer-based stains, which contain lacquer-thinner solvent, dry so rapidly that it's difficult to wipe off the excess stain if you aren't very fast. (It's important to plan your steps before you begin.) Second, because these stains are based on the evaporative finish nitrocellulose lacquer rather than reactive finishes like oil or varnish, overlapping, dripping, or reapplication of the stain will cause spotting or splotching. (For more on evaporative and reactive finishes see my article, "A Tale of Two Finishes," Nov./Dec. 1989 *AW*.)

With lacquer-based stains, if you don't get the stain on the wood the way you want it the first time, you'll have to recoat the entire surface. Recoating will dissolve all the existing lacquer binder, putting first and second coats into one solution, and make it possible for you to achieve an even color when you again wipe off the excess. Alternatively, you can wipe the entire surface with lacquer thinner, which will remove most of the pigment, and then recoat with stain.

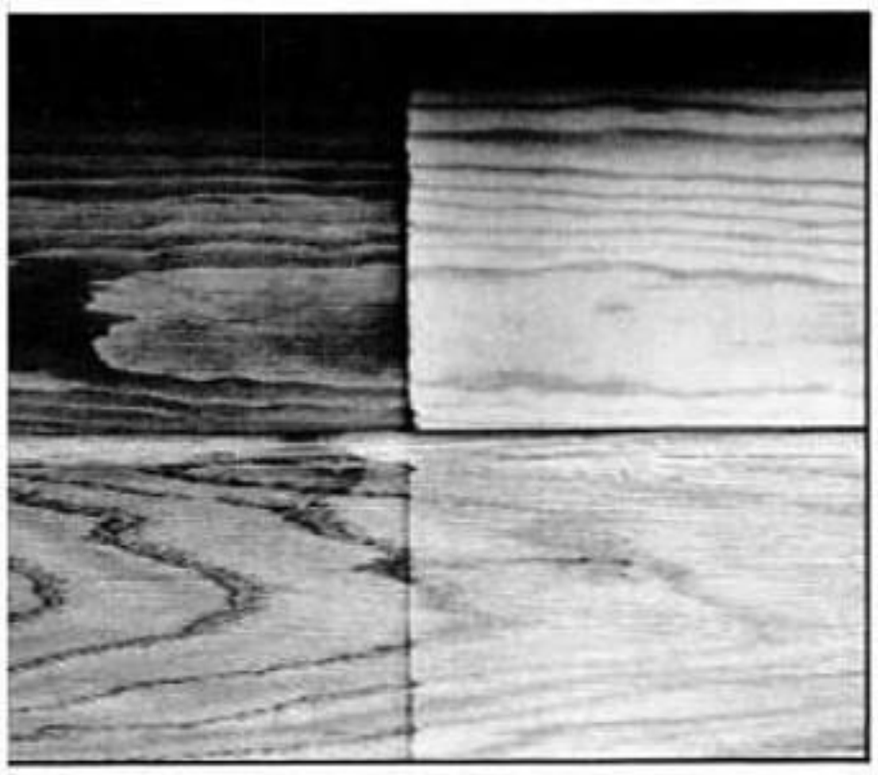
Water-Based Stains

All of the stains mentioned above contain some type of organic-chemical solvent—mineral spirits, naptha, or lacquer thinner. Stains thinned with water instead of chemical solvents are relatively new to the market. They are becoming more common because of anti-pollution laws limiting the use of volatile organic compounds (VOCs) in finishes.

Most water-based stains use acrylic resins as the binder, but some use linseed oil or alkyd resin. In each case the binder is emulsified so it can be suspended in water. Emulsification is achieved by adding an emulsifying agent (which is also a solvent), such as a glycol ether, which has an affinity for both the binder and the water. This emulsifier acts as a bridge—much like soap does when it binds grease and oil to water when you wash your hands so it can be rinsed away.

Water-based stains use essentially the same pigment as the solvent-based stains do, but water-based stains are more difficult to use. The first problem is that water raises the grain of the wood. Softer woods are affected more. You can minimize this fuzzing problem if you raise the grain of the wood and then smooth it before applying the stain. To do this, wipe water over the entire surface with a sponge or cloth, let the wood dry overnight, and then sand off the lifted fibers with 280- or 320-grit sandpaper. Then the stain won't lift the wood fibers much during application.

If the wood doesn't fuzz too badly after staining, you can go ahead and put on your first coat of finish right over the raised grain. This will lock the raised fibers in place. Then, after the finish has cured, carefully sand the surface smooth with fine sandpaper, taking care not to sand through the stain. Remove the



Some woods take stains unevenly. Large spring-growth pores of red oak (top) stain darker because they hold more pigment than the smaller summer-growth pores. Spring-growth wood of white pine is lighter in color than summer growth but stains darker because larger pores absorb more pigment (bottom).

up with pigment all along the exposed length. But, except for the large, spring-growth channels on Douglas fir, oak and ash, these channels aren't wide enough to hold much pigment.

When the channels are sliced *across* their length, they'll hold quite a lot of pigment. The pigment penetrates the open end of the channel and stops only when the air in the channel prevents further penetration, or when the opening of the channel is sealed over.

This explains why stained end grain appears so much darker than side grain: more pigment has penetrated into the open end-grain pores. And this is why you get splotchiness on boards that have a swirly grain pattern. The more the channels swirl to the perpendicular, showing up on the surface as pores, the more pigment they accept. —*B.F.*

dust and apply the next coat.

The second problem with water-based stains is that the pigment doesn't penetrate into the pores and scratches as fast as solvent stains do. Solvent takes the pigment into the wood almost instantly, so you can wipe almost instantly (in spite of what some instructions tell you). With water you need to wait a minute or two before wiping off the excess or the result will be an uneven, splotchy stain penetration.

The third problem is that water, and the acrylic resins, dry relatively fast, so you have to work quickly to cover the entire surface and get the stain wiped off before it dries. Otherwise you'll have streaking.

Water-based stains are a relatively new technology, but they're becoming more and more common. Chemists are busy improving the working qualities, so look for continuous improvement in the performance characteristics of these stains.

Cures for Common Staining Problems

The most common staining problems are streaking and splotchiness.

Streaking—Streaking occurs when excess stain dries unevenly on the surface of the wood. Streaks won't occur if you wipe off all the excess stain, but they're difficult to avoid in situations where you want to build up a coat of stain on the surface to obscure the wood. When this is your goal, spraying is the best application method for avoiding streaks. Spray on just the right amount of stain so you don't have to wipe anything off. If spraying isn't an option and you have to use a brush, sponge or cloth to apply a heavy coat, minimize streaking by gently smoothing out the excess stain in the direction of the grain.

Splotchiness—Splotchiness can be caused by uneven grain or by unevenly-sealed wood. Uneven grain is common and natural, and I usually accept the wood for what it is rather than try to change it. But if you can't live with the effect of stain on uneven grain, you can usually even out the pigment penetration by applying a highly-thinned coat of finish, called a "wash coat," *before* you apply the stain. The wash coat partially fills the pores of the offending grain but, due to the high percentage of evaporating solvents, not enough finish gets into the pores to stop them up completely. It only reduces the room for pigment penetration. Since a wash coat reduces the space for pigment everywhere, there is less darkening of the wood.

Traditionally, shellac thinned with five to ten parts denatured alcohol was used for a wash coat. Now there are ready-made "wood conditioners" and "prestains," such as Minwax Wood Conditioner, designed for this purpose. These conditioners are usually highly-thinned linseed oil or varnish.

Uneven sealing can be caused by glue that has seeped out of the joints or been deposited on the surface by your fingers, or by traces of old finish you missed when you stripped an old piece of furniture.

Once you've applied the stain, it's difficult to repair these splotchy spots. The best way to handle splotches is to be conscious of them from the beginning: try to avoid creating them. Practice cleanliness in gluing up, and check for shiny spots on a stripped piece (which would indicate that all the finish is not off).

If you have to repair a splotchy spot, the best way I've found to remove spots of glue or unstripped finish is to scrape the spot off with a sharp hand scraper. Then I carefully sand the clean wood with same grit sandpaper I used for the initial finish sanding, being careful to avoid sanding the stained area as much as possible. Then I reapply the stain to the sanded area and wipe off all the excess.

Sometimes you can blend repaired spots into the surrounding area by sanding the spot and the wood all around the spot while it is wet with stain. That may get the color match close enough.

If you can't seem to get the glue-splotched areas to blend in, you might be able to remove enough of the pigment with the appropriate solvent—mineral spirits, lacquer thinner, or water—if you can catch the problem before the binder has fully cured and then restain. If not, you'll have to strip the entire piece with paint-and-varnish remover and start over.

Staining wood is usually quite simple, and the rewards considerable. Most of the problems that occur are caused by a lack of understanding of how various stains work and how they differ from each other. Rather than just buying the first stain you come across, give a little thought to choosing the type of stain that will give you the working qualities and results you want. ▲

Bob Flexner restores furniture at The Workbench in Norman, Oklahoma. He wrote about shellac and varnish in the Nov./Dec. 1989 AW *and about aniline dyes in the Nov./Dec. 1988* AW.

JEWELRY BOX

A Gem of a Gift

BY PATRICK STAFFORD

Give your jewels a beautiful setting with this dovetailed jewelry box.

I enjoy making jewelry boxes. They're ideal for putting small but precious bits of wood to good use, and they make great gifts. They also provide the perfect opportunity for honing your woodworking skills with a minimum of risk in materials.

When making a jewelry box, you need to take into account the types of jewelry that the box will hold. Most of the people I've made boxes for have wanted a place to store necklaces, brooches, and earrings. On rare occasions, I've been asked to add a special provision for rings, but I've found most people don't change rings like they do other pieces of jewelry.

I've made jewelry boxes of all kinds, but the one you see here is my most popular version. It includes a lower section, with compartments for necklaces and brooches, and an upper sliding tray with smaller compartments for earrings and rings. The box sides are dovetailed and the lid is a partially recessed frame-and-panel.

In this article, I'll describe how to make this box, with some tips on how you can modify my design to suit your needs. (For more on boxmaking, see May/June 1990 *AW*.) The methods and design I'll describe are a mixture of my own and those I learned from James Krenov and the staff at the College of the Redwoods in Fort Bragg, California.

Building the Box

When choosing the wood for the box, I try to find an exciting piece for the top panel—a piece with a lot of figure, spalting, or colors—and then surround it with a box and frame of a complementary, straight-grained wood, quieter in nature. In this way the panel in the box is like a gem in a setting, in keeping with the precious objects inside the box. I've found some of my best panels hiding in a piece of firewood or in wood I've picked up on the beach.

Start by dimensioning the four sides of the box. For a box of this size, 5/16 in. is the minimum thickness for the sides. This thickness is sturdy without being bulky; it permits well proportioned dovetails, while still allowing enough thickness for the hinges and the bottom panel grooves (see photo below).

To get a harmonious grain pattern around the box sides, I recommend you resaw the sides from a single board. Resawing allows you to construct a box so the grain pattern is continuous, wrapping around all four sides. If you're scratching your head, take a look at Fig. 4 to see how it's done.

I recommend resawing the box parts 1/16-in. thicker than the finished thickness to allow room for reflattening the parts if they twist a bit while releasing their internal stresses. Leave the wood alone for half a day to let it reckon with these stresses. It's a good idea to resaw the other parts of the box and a few extra pieces (for use as joinery test pieces) at this time.

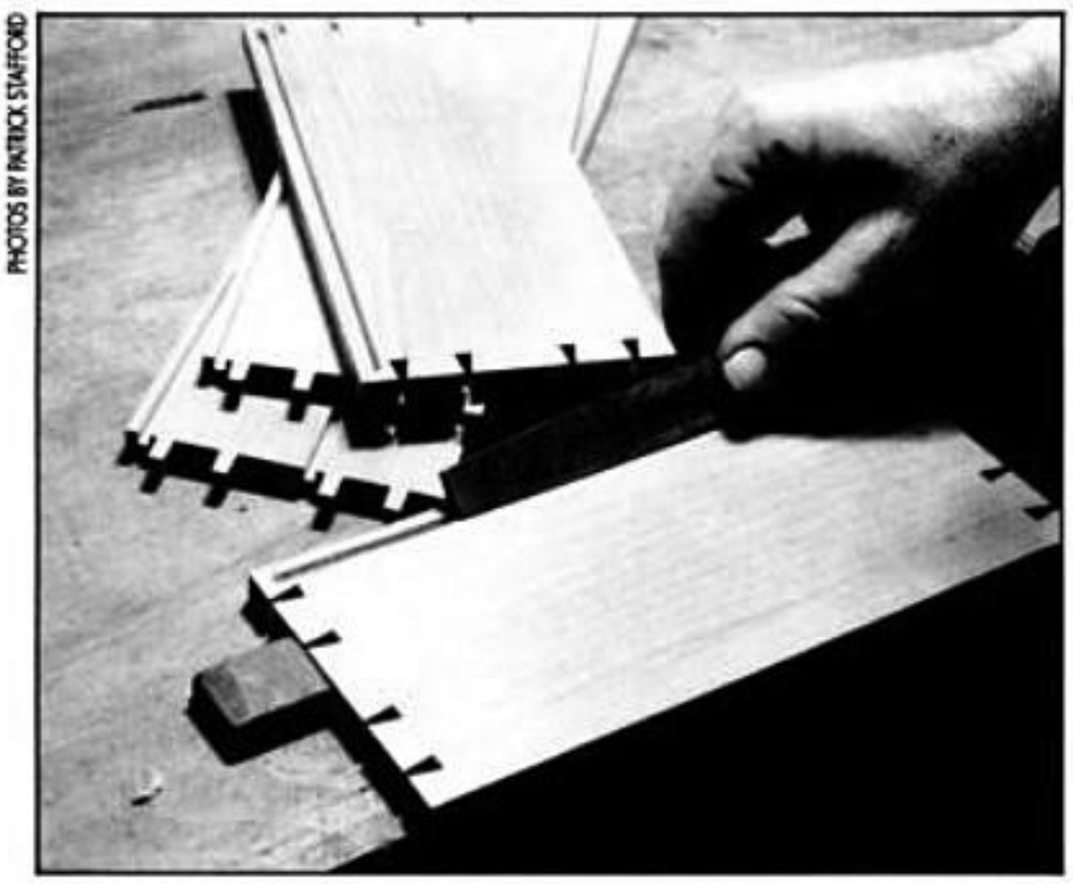
Once the resawn box sides have had time to mellow out, flatten them on the jointer, then thickness them to a fat 1/32-in. more than the final thickness. *Evenly* handplane or scrape the inside surfaces of the box to remove the machine marks (leave surfacing the outside of the box until later).

Rip the box sides down to their 3 1/2-in. width and true up the ends of the pieces. Cut them 1/32 in. longer than their finished lengths for front, back, and sides. Be very certain here that the ends are square, or the box will be twisted. A shooting board works well for this.

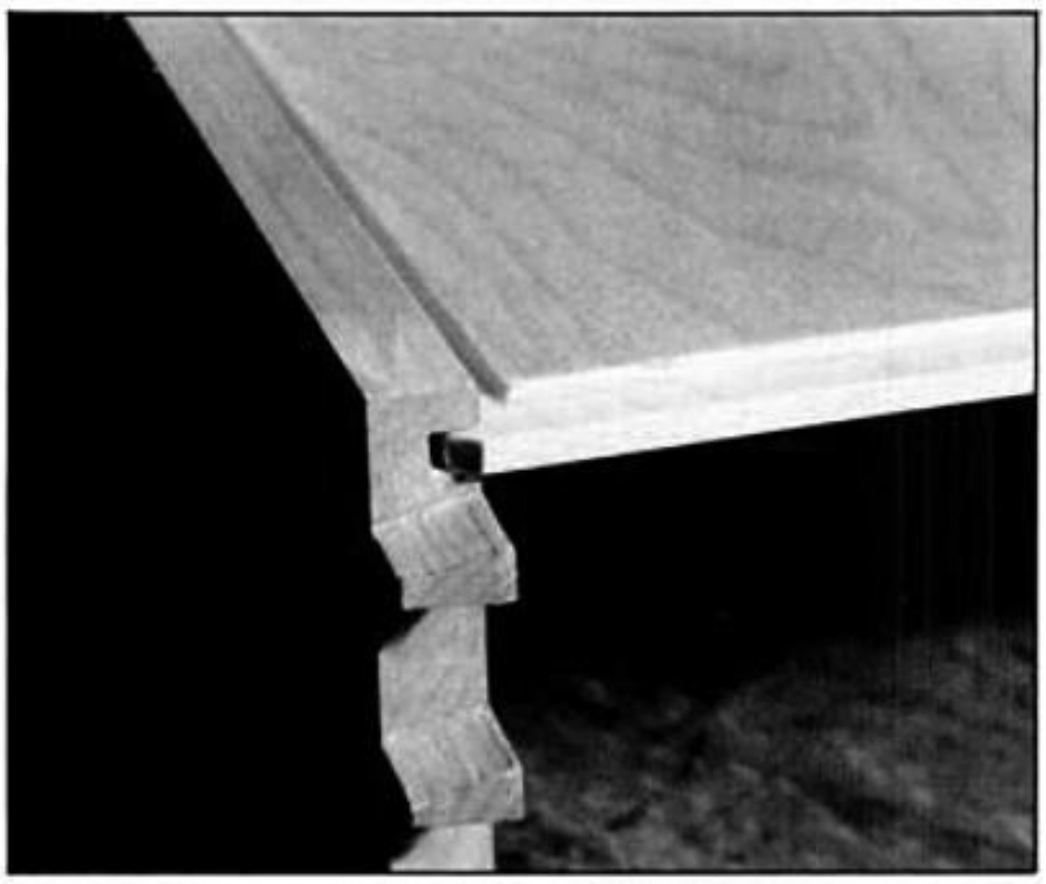
The dovetails add a nice touch to this box. I won't explain how to cut dovetails, but if you're going at it for the first time and you need a bit of guidance, I recommend James Krenov's book *The Fine Art of Cabinetmaking* (1977, Van Nostrand Reinhold Company, 135 W. 50th St., New York, NY 10020) which has an excellent description of how to go about making beautiful, handcut dovetails.

Krenov taught me to lay out dovetails so that the outer tails are smaller than the central tails. This

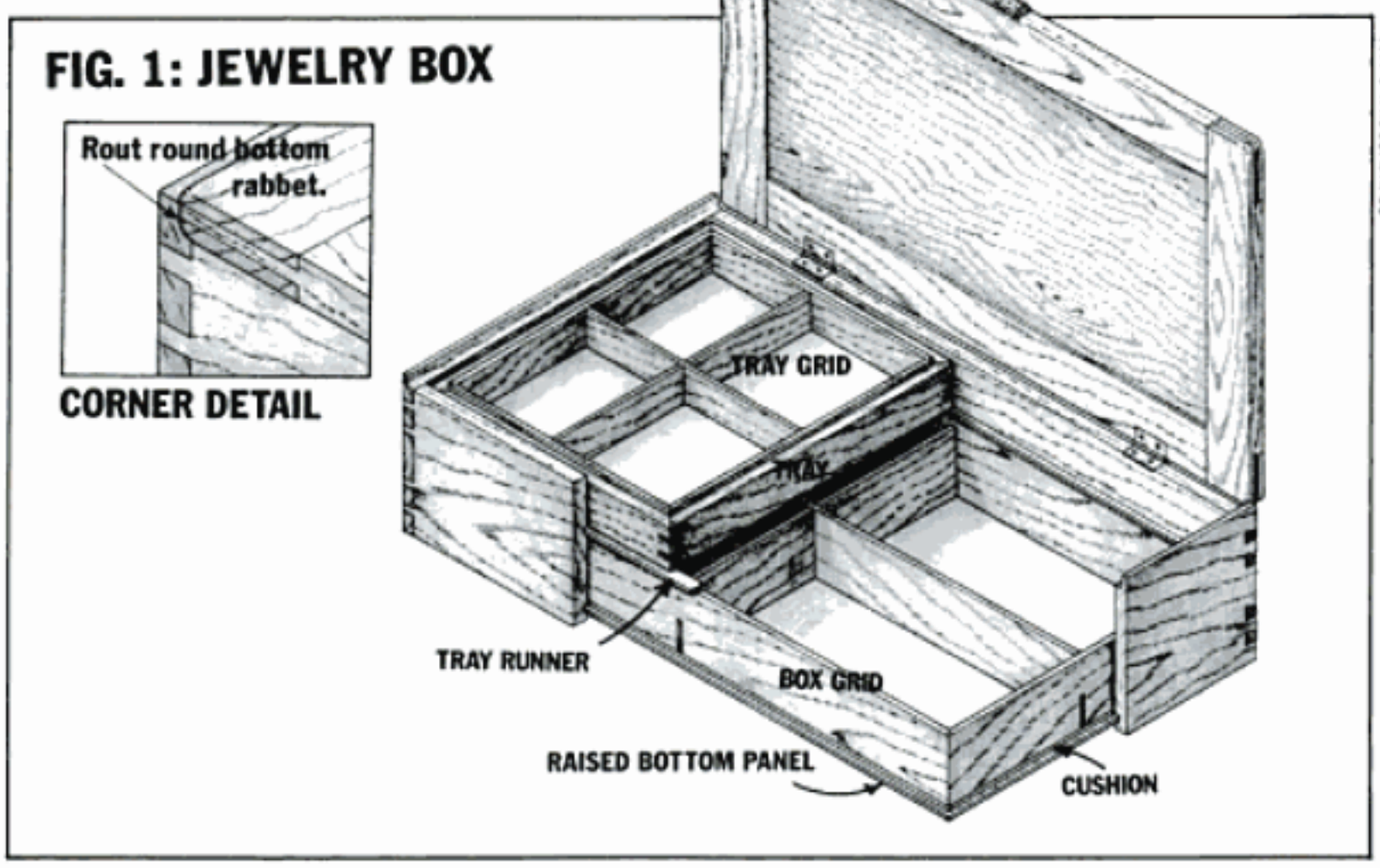
PHOTOS BY PATRICK STAFFORD



Once you've routed the grooves for the bottom panel, file off the "fuzz" from the edges of the groove. Note that the groove on the tail pieces stops short of the end.



Raise the bottom panel of the box to beef up the thickness of the panel and make the underside of the box look as fine as the top.



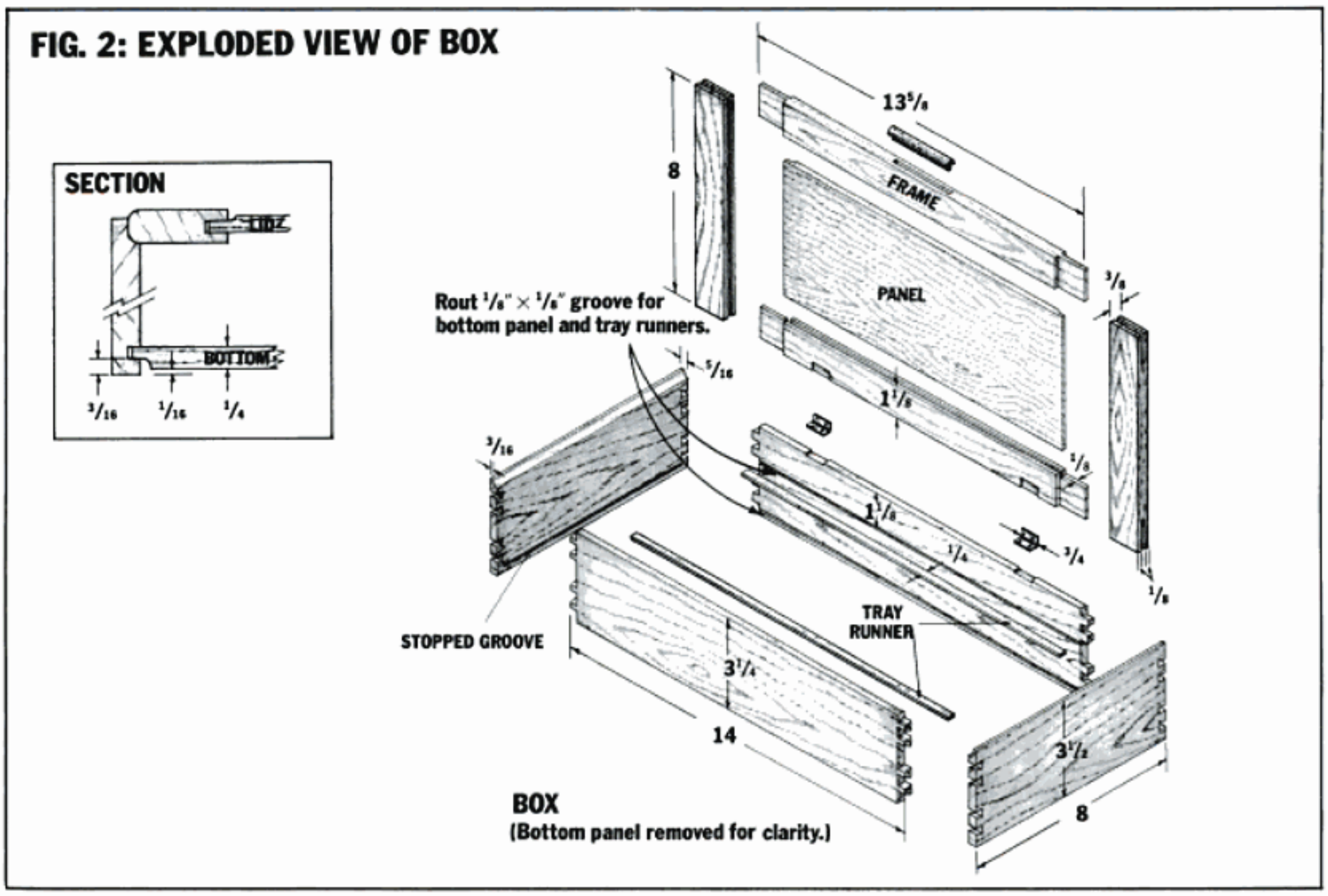
gives added strength at the outside corners where it's needed and also shows that the dovetails were cut by hand rather than machine. As you can see on my box, I like to contrast smaller pins with larger tails.

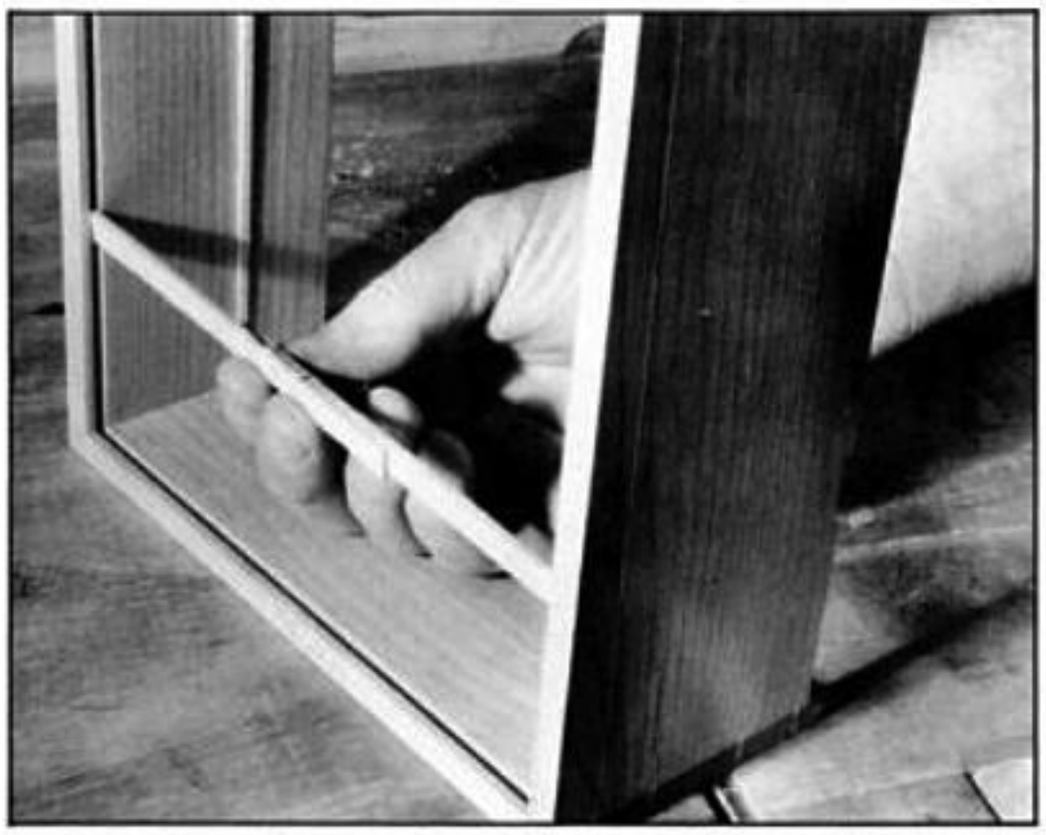
When laying out dovetails, plan ahead to determine the location of the grooves for the bottom panel and tray runners. I laid out the dovetails on this box to minimize the number of stopped grooves I'd have to rout. The photo on page 57 will show you what I mean.

Cut the dovetails, then dry fit the box together and plane the top and bottom edges to make them all flush so that the box sits flat. Next, rout the grooves for the bottom panel and the tray runners. I've located the groove for the bottom panel so that there is $^1/_{16}$-in. clearance between the panel and whatever surface the box sits on. Rout the grooves on a router table, using a $^1/_8$-in. straight bit (remember, the grooves in the end pieces are stop cut, those in the front and back are continuous, placed where the ends of the groove won't show once the box is glued up). I put a slight chamfer the edges of the grooves with a file.

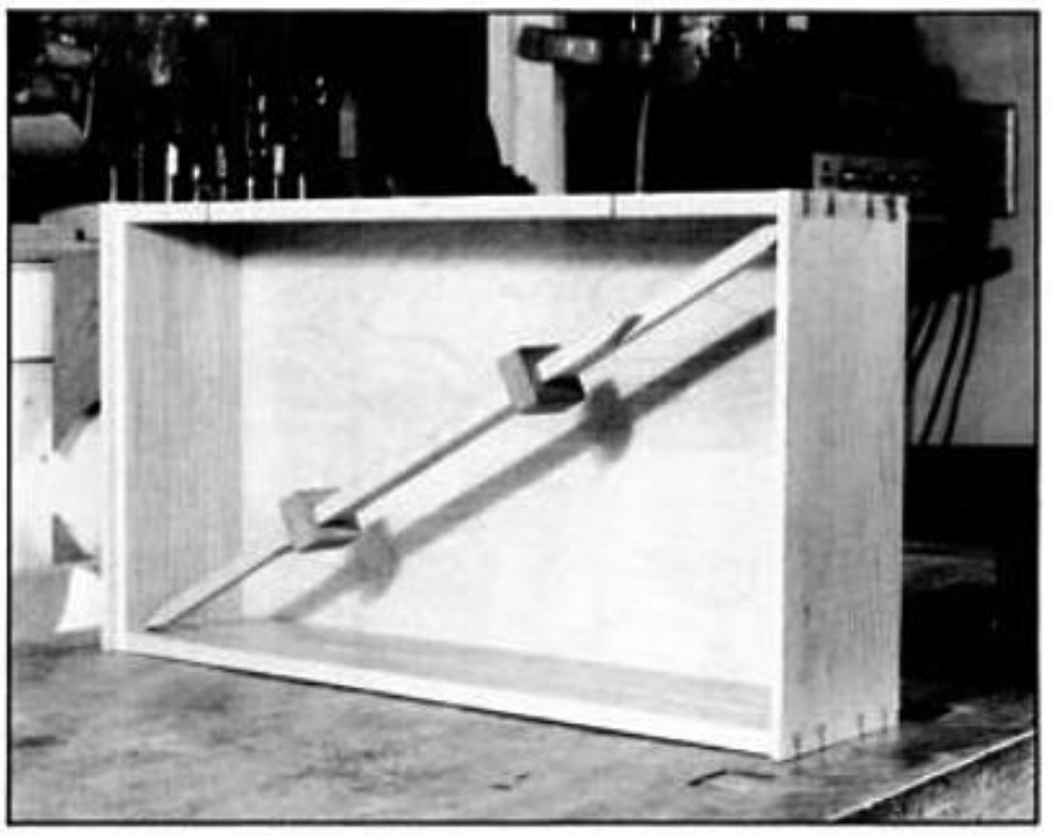
The lid of the box fits into a rounded rabbet in the sides of the box (see Fig. 1). You don't *have* to round out the bottom of the rabbet, but it's a nice touch. To make this cut, I rounded the cutters on a $^1/_2$-in. high-speed steel straight router bit. Even though only the two side pieces have this rounded rabbet, I rout it on all four pieces to start. I then rip and plane the top edges of the front and back pieces down to the bottom of the rabbet, making these edges flush with the bottom of the rabbet on the side pieces. Afterwards, I dry fit the box together again and soften the inside edges slightly with a file.

Now, on to dimensioning the bottom panel. As the picture on page 57 shows, the bottom panel is raised





To get accurate dimensions for the bottom and top panels, measure between opposite grooves with a pair of flat sticks. Mark across them, and transfer that measurement to the panel.



Compare diagonal dimensions to ensure your box is square. Both diagonals should measure the same. Diagonal sticks like these allow you to compare the distance without fumbling with a measuring tape.

and mounted in the box with the raised portion down. This makes for a sturdier panel, and it looks nicer too; people always like to look at the undersides of boxes. It's a mark of quality when hidden parts are as beautiful as the rest of the piece. The panel should fit snugly in the long dimension, but it should have a bit of play ($^1/_{16}$ in. overall) from side to side to allow for the panel to expand and contract across the grain. To minimize this movement, use quartersawn wood for the bottom panel.

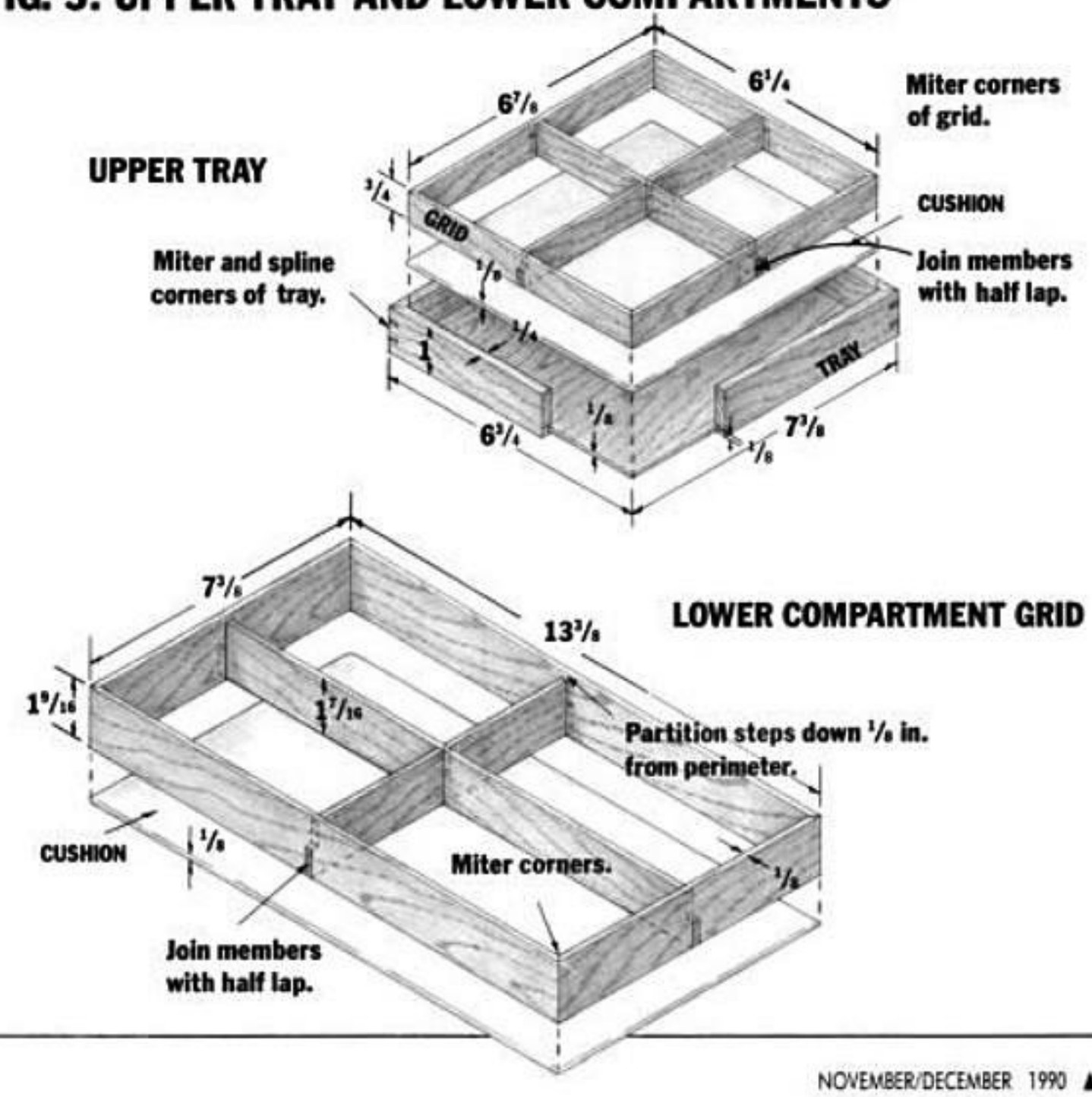
For an accurate fit, measure the length and width of the panel grooves with the box assembled. I do this, as the photo shows, by sliding two small sticks into opposite ends of the groove, holding them together and making a mark across both sticks. Then I'm able to transfer this measurement onto my panel so I know where to cut it. First I cut the panel to fit snugly all the way around, then I raise it, and finally, to allow for expansion, I narrow the long grain edges down $^1/_{32}$ in. I chamfer the corners of the panel so I don't have to bother squaring up the ends of the stopped panel grooves (see photo on p.57).

Next, cut the hinge mortises. I used jewelry box stop hinges (hinge JB-101, available from Larry and Faye Brusso Co., 3812 Cass-Elizabeth, Waterford, MI 48328, 313-682-4320). These hinges hold the lid up just past vertical without the need for a cord, chain, or lid support. This type of hinge tends to put a lot of stress on the screws, so use it only on light-duty projects like this box. (For more on installing hinges, see July/Aug. 1990 *AW*, p. 45.)

Before gluing the box together, apply a finish to the inside surfaces—it's easier to get the finish into the box's inside corners *before* it's assembled. The finish also makes it easy to pop the dried glue right off the inside corners with a chisel after glue-up. I finish my boxes with several coats of thinned shellac (10 parts alcohol to one part shellac flakes) and then wax, but you can use whatever finish you prefer. Make sure you don't get the finish on areas that will be glued.

Finally, it's glue-up time. Directly after you've applied the glue and fastened the clamps, measure di-

FIG. 3: UPPER TRAY AND LOWER COMPARTMENTS



agonally across the corners of the box. Both diagonals should be equal. If they aren't, adjust the angles of the clamps until both diagonals measure the same. I use a pair of diagonal sticks to make this measurement quickly and accurately. These are simply two sliding sticks of wood with pointed ends, attached together by means of two friction-fit wooden or plastic collars (see photo).

The Lid

The lid is a frame and panel with slip joints at the corners. True up the lid members—panel and frame pieces—surfacing the stock to just slightly over finished thickness. Do a few extra pieces to use as test pieces for the frame joinery. You might want to make a "story stick" like the one shown in the photo so you can transfer the dimensions without having to fumble with a tape measure. Cut one end of the stick at an angle to ensure that you won't measure from the wrong end.

Rip the frame members down to 1/16-in. wider than their finished width. This extra width ensures that when you clamp up the frame, the joint will go home without the clamps being interrupted by the end-shoulders of the mortise. Cut the lengths to slightly longer than finished length (1/32 in. overall). This extra measure leaves you a bit of room to clean up the edges after glue-up. Cut the mortises first and then cut the tenons to match.

Rout the grooves in the frame for the panel. You'll need to do a stop cut on the two tenoned pieces to keep the end of the groove from showing on the ends of the tenon. On the two mortised pieces, if the groove is centered, you can run it on through without danger of the groove showing on the end. Dry clamp the frame together and gently soften the inner edges of the frame with a file. (If you try this with the frame apart, you risk ruining the beautiful slip joints.)

With the frame still dry clamped together, measure for the top panel using the same method you used for the bottom. The upper surface of the panel should be just below the upper surface of the frame to make cleaning up the frame after gluing a little easier. Cut and shape this top panel as you did the bottom panel. Apply finish to the panel and inside edge of the frame (don't get any finish on the glue surfaces).

Glue the frame together. When the glue has dried, chamfer all four corners of the frame to prevent breakout when you plane. Plane and scrape the frame, checking its fit on the box. Always plane uphill to grain around corners (see Fig. 5). Finally, mortise the lid for the hinges.

As for the handle, I carved the one you see on this box out of a contrasting wood and mortised it into the lid. But you could also dowel or screw a handle on. You may even choose to forego a handle altogether, and rout a little cove for a finger hold.

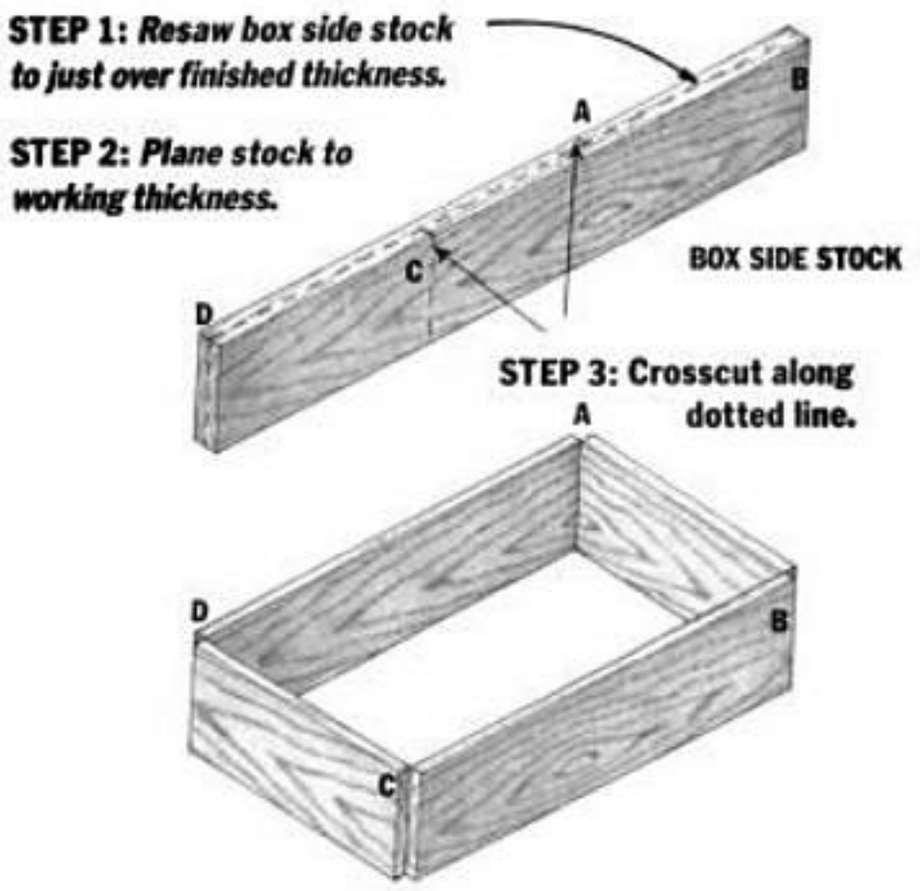
Clean up the joinery on the box with a plane. Make sure you've clamped the box in a manner that will prevent racking while you plane it. Then chamfer all the corners to minimize breakout while you plane the full length of the box sides. Apply finish to the outside of box as you did on the inside.

Making the Tray and Grids

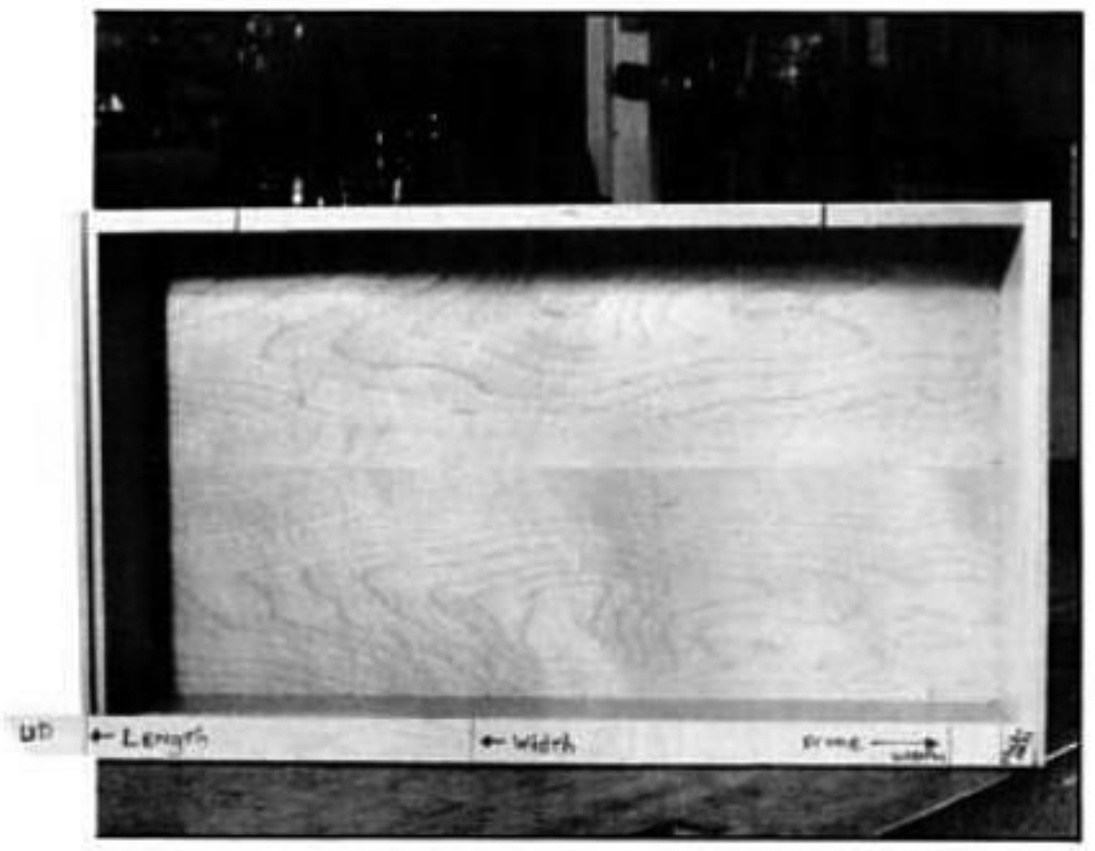
Now it's time to make the compartments that hold the jewelry. As Fig. 3 shows, there are two levels. The entire lower portion of the box is divided into four compartments by a wooden grid. The upper level consists of a removable tray which has an inner wooden grid dividing the space into four parts. This tray is half the length of the box; it sits on runners so you can slide it from side to side to gain access to the lower compartments. Both upper and lower compartments are padded on the bottom to protect the jewelry.

Start by making the tray frame with its raised bottom panel. The tray sides need to be at least 1/4-in. thick to enable you to rout the panel groove without weakening them. Dimension the thickness of the tray sides so that they're slightly oversized (1/64 in.). After glue-up, you'll fit the tray so that it glides in the box smoothly.

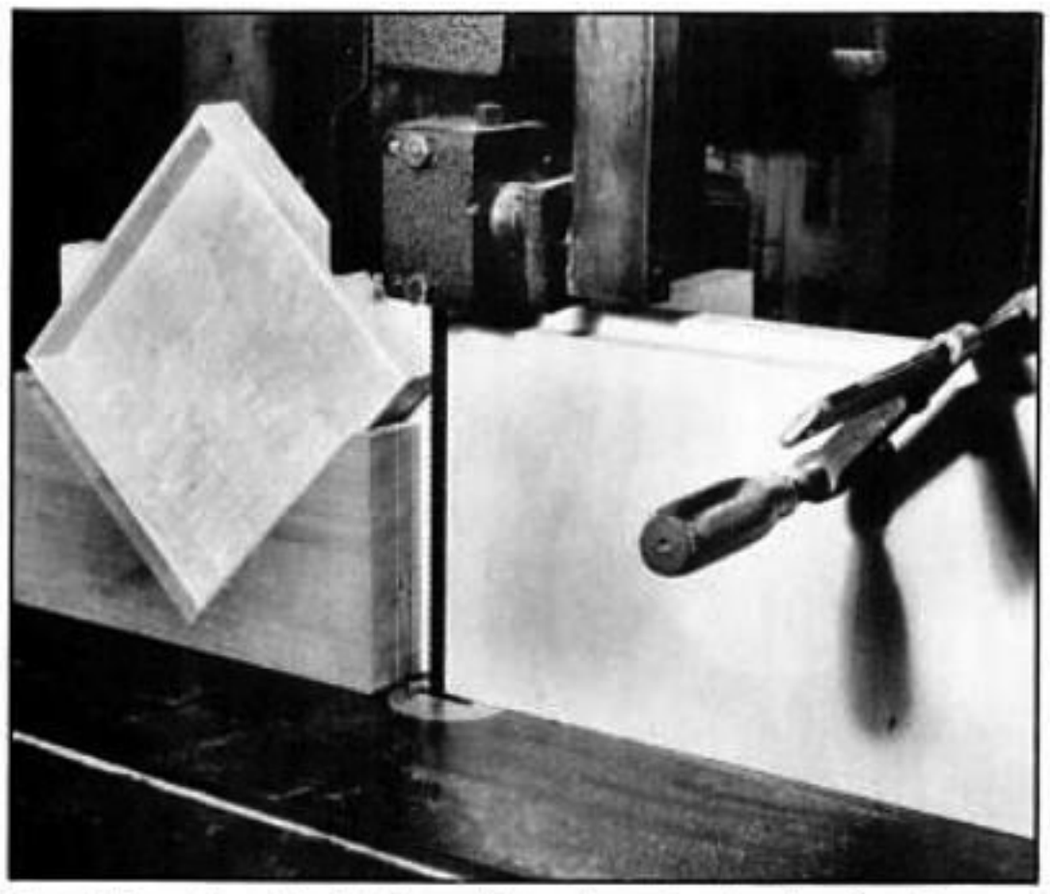
FIG. 4: CUTTING THE BOX SIDES FOR CONTINUOUS GRAIN



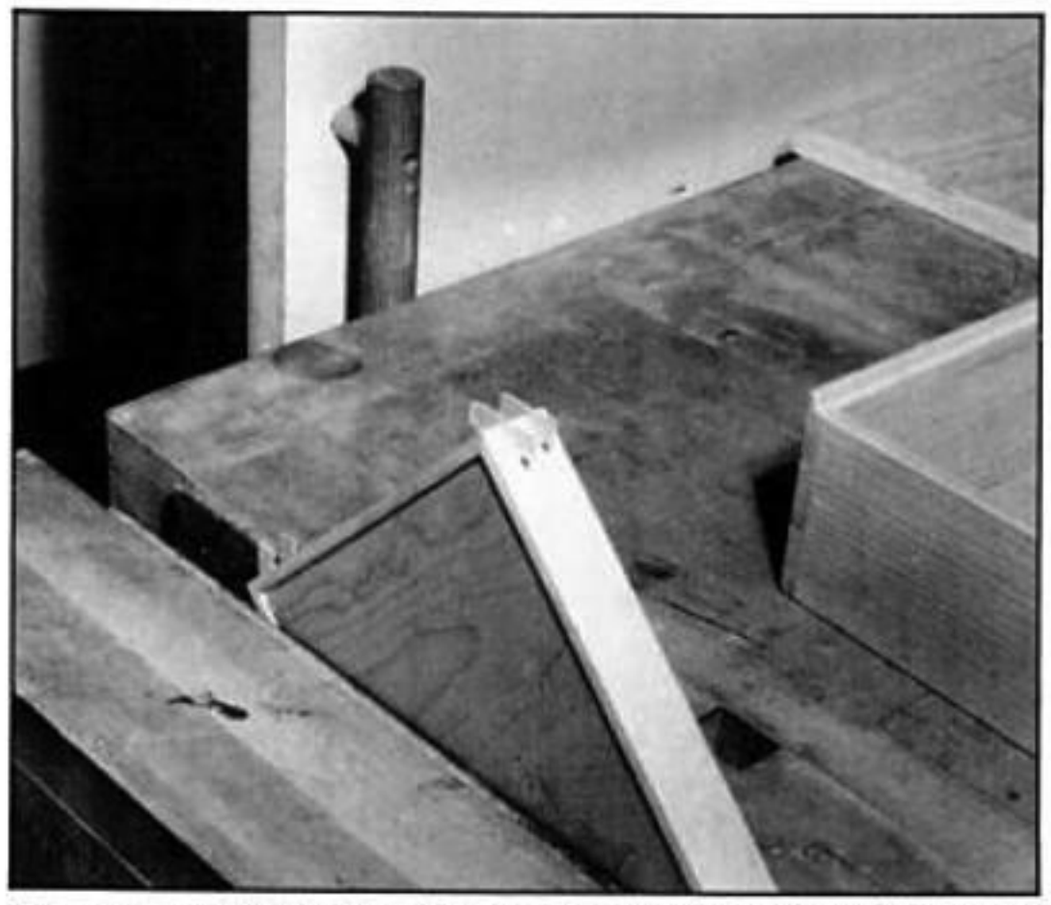
STEP 4: *Open box sides out to reveal continuous grain pattern around all four sides.*



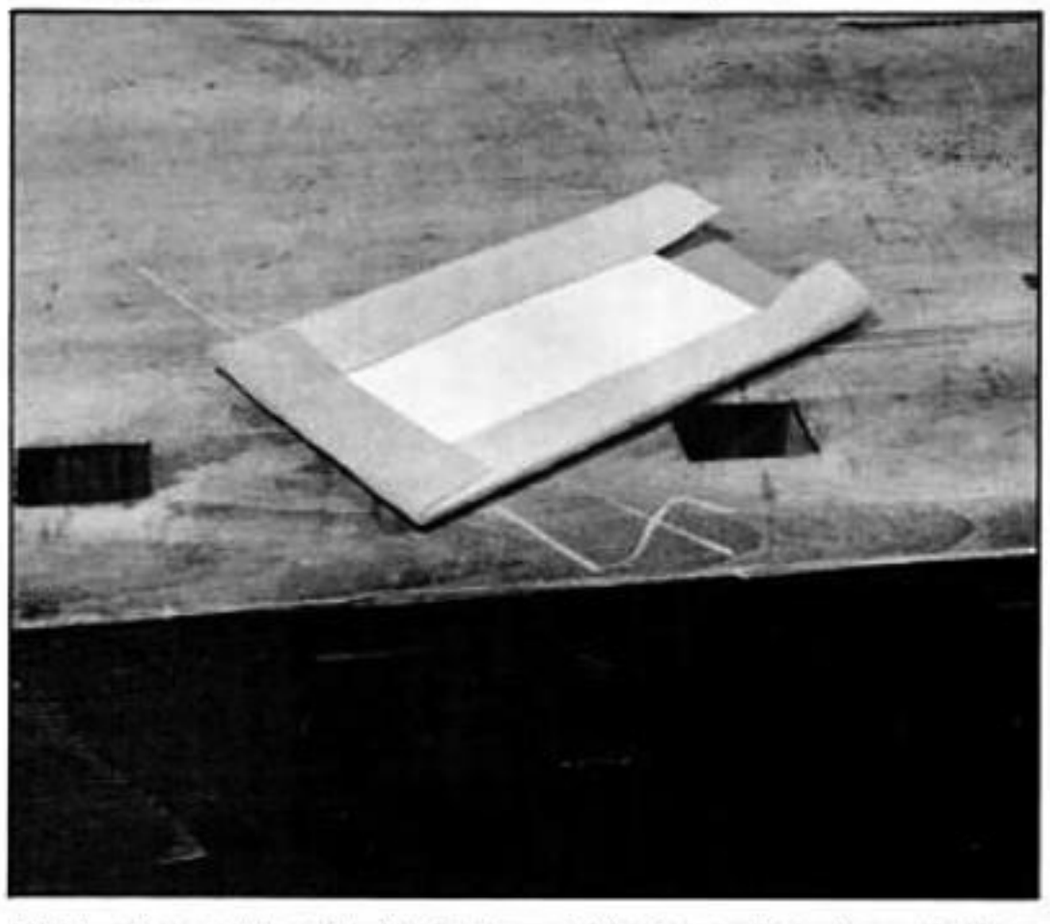
Dimensioning the stock for the lid frame is a lot easier if you make a "story stick," marking and labeling all the dimensions for the lid parts. Cut one end at an angle so you don't measure from the wrong end.



To cut the splines for the tray miters, place the glued-up tray in a simple "V" jig and cut the spline kerfs on the bandsaw.

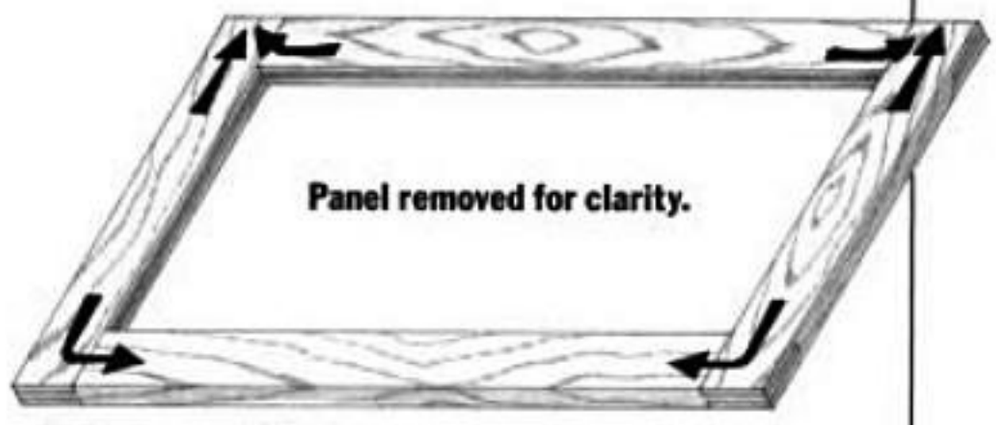


After you've cut the kerfs for the corner splines, glue the splines in. Let them dry before you trim them flush with the tray side.



Making the cushions for the bottom of the box and tray by wrapping fabric around a matte-board core padded with cotton batting—wrap it tightly, like a present.

FIG. 5: PLANING THE LID FRAME



When planing around the top and bottom corners of the frame, always plane with the grain running upwards and away from the blade.

In contrast to the dovetailed joinery on the box, the corners of the tray are mitered with spline reinforcements. You'll get the tightest miters if you shoot them on a miter shooting board (see Sept./Oct. 1990 *AW*). After you've mitered the corners, apply finish to the inner sides, install the panel, and glue the tray using strips of masking tape to clamp the sides together.

After the glue has dried, I spline the corners by cutting two kerfs in each corner and gluing in splines (see photos). This strengthens the tray. After the glue has set, saw the excess off the splines so they're flush with the tray sides, and plane the tray to fit in the box.

Next, make the wooden grids for the box and tray. You can organize the partitions however you choose, just don't make the compartments so small that you can't get your fingers in to retrieve the jewelry. The outer corners of the grids are joined with miters, while the partitions inside are joined with simple lap joints cut on the tablesaw. Clamp each grid with masking tape while the glue dries. Once it's dry, size it to fit snugly into the box or tray.

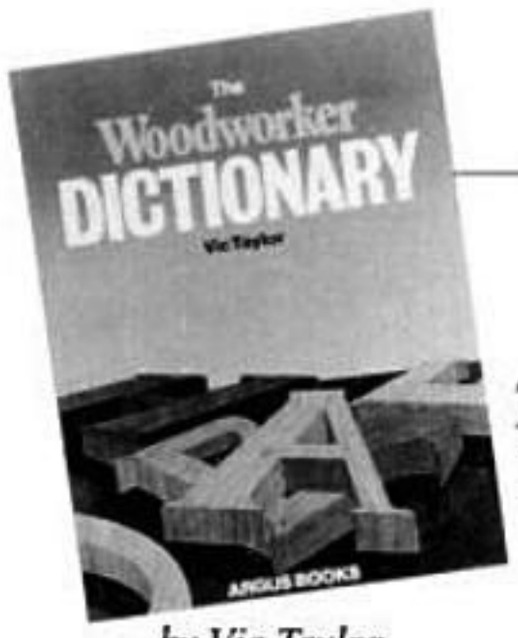
The cushions are simply artist's matte-board padded with a thin layer of cotton/polyester batting and covered with a nice piece of fabric (see photo at left). I've used suede, silk, and Ultrasuede. Both batting and fabric are available in fabric stores. Make two cushions to fit snugly inside the box and tray.

Place these cushions in the box and tray and put the grids in their respective places. I recommend gluing the tray grid in place with just a few dabs of glue.

You don't need to glue the lower grid in; it's held in place by the tray runners. Now's the time to measure and cut these runners. Finish them, and placing the lower cushion in the box with the grid on top of it, press fit the tray runners in place. These runners exert a bit of pressure on the lower grid, which causes the cushion beneath it to bulge up nicely in little pillows. Close the box, and pat yourself on the back. ▲

Patrick Stafford is a professional woodworker in Santa Cruz, California. He studied and has taught with James Krenov in the Fine Furniture Program at the College of the Redwoods in Fort Bragg, California.

BOOKS & VIDEOS



The Woodworker Dictionary

by Vic Taylor
(1987, Argus Books Ltd., 1 Golden Square, London, England WIR 3AB)
260 pp; paperback, $12.95

If you're the type of woodworker who likes detail, who looks beyond the "how" of a project to the "why," you'll like this book.

The Woodworker Dictionary covers woodworking from A to Z in an encyclopedia format. There are hundreds of entries covering wood species, materials, tools, techniques, finishes, hardware and joinery. A separate historic section lists British and American designers and craftsmen, and British and American period furniture styles.

The book's strength is its comprehensive coverage—there are few items you could think of that aren't mentioned. It's especially good as a catalog of little known or long-forgotten woodworking arcana.

If you need to know what a "farthingale" or "caquetoire" chair is, or the Latin name for quebracho wood, or just have a thirsty curiosity about woodworking in general, you'll enjoy *The Woodworker Dictionary*.

DAVE SELLERS

Country Furniture: 114 Traditional Projects

by Percy Blandford
(1988, Tab Books Inc., Blue Ridge Summit, PA 17294) 250 pp; paperback, $15.95

This book presents plans for a wide range of common household furniture and artifacts made and used by early American settlers. With an emphasis on simple, functional items with a minimum of ornamentation, it includes projects that range in difficulty from simple, nailed-together boxes and shelves to dovetailed chests and drawers.

The projects include tables, chests and small boxes, benches, shelves, chairs, cupboards, cradles and beds. It's like a do-it-yourself book for an early American pioneer. Simple line drawings accompany each project, but many of them require that you provide your own dimensions.

The book includes a discussion of authenticity in materials and techniques, and then provides general guidelines that allow a lot of opportunity for individual creativity. If you favor the simple, rugged, Early American style, you may like this book. But if you need a book with complete details and a step-by-step presentation, you'll have to look elsewhere.

DAVE SELLERS

GALLERY

With the amount of paper that passes through our lives these days, it's hard to stay organized. The design of a desk can make all the difference between clutter and clarity. A poorly-designed desk leaves you constantly at odds with your work—nothing is ever where it should be. But on a well-designed desk the paperwork often appears to take care of itself. Here are ten personalized desks; try them on for size.

Desk by Michael Gidron, Fort Bragg, California. Honduras rosewood, steamed pear. Dimensions: H: 43 in., D: 19 in., L: 36 in.

PHOTOS BY SEAN SPRAGUE

Desk (open).

PHOTO BY SEAN SPRAGUE

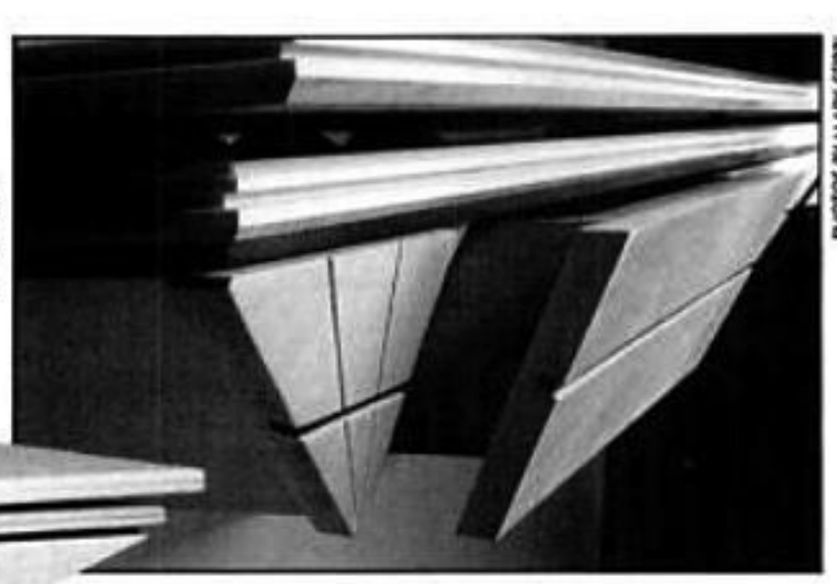
Writing Desk by Patrick Stafford, Santa Cruz, California. American cherry, Monterey cypress. Dimensions: H: 30 in., D: 24 in., L: 43 in.

Office Desk by Ted Lombard, Ventura, California. Douglas fir, madrone. Dimensions: H: 28¾ in., D: 26 in., L: 54 in.

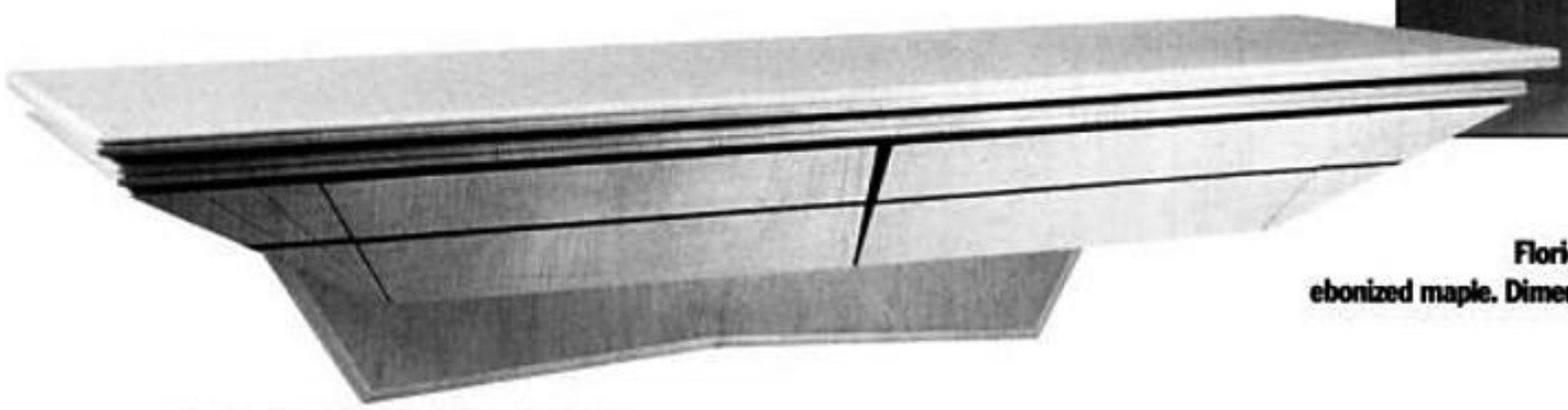
PHOTO BY TED LOMBARD

PHOTO BY SEAN SPRAGUE

Desk by Karl Shumaker, Petaluma, California. Rosewood. Dimensions: H: 29 in., D: 24 in., L: 66 in.



Wall-Hung Writing Desk (Detail).



Wall-Hung Writing Desk by Michael Whiffen, Gainesville, Florida. Maple, curly maple, hard maple, ebonized maple. Dimensions: H: 18 in., D: 18 in., L: 52 in.

PHOTO BY DAVID PAGE

Lourdes' Desk by David Page, Swarthmore, Pennsylvania. Bubinga, ebony. Dimensions: H: 29½ in. D: 28 in., L: 42 in.,

Desk by Joseph Natress, Mill Valley, California. Cherry, bird's eye maple. Dimensions: H: 30 in., D: 24 in., L: 40 in.

PHOTO BY SEAN SPRAGUE

Writing Desk by Denis Buet, Dayton, Washington. White oak, ash. Dimensions: H: 29 in., D: 24 in., L: 36 in.

PHOTO BY SEAN SPRAGUE

Writing Desk and Chair by Michael Burns, Fort Bragg, California. Maple. Dimensions: H: 29 in., D: 22 in., L: 34 in.

PHOTO BY JEFF SHELEY

PHOTO BY ANNA ARMSTRONG

Shaker Desk by George Rogers, Jr., Harrodsburg, Kentucky. Cherry, pine. Dimensions: H: 31 in., D: 18 in., L: 27 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. × 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.

Woodworkers Organize to Protect Rainforests

Many of us who are concerned about worldwide deforestation feel helpless and frustrated by our inability, as individuals, to halt the destruction. Woodworkers have an additional point to ponder. Do we contribute to the problem when we buy tropical woods? Some advocate a boycott of tropical woods. Others say that the trees will be cut whether we buy the wood or not. Nobody seems to know for sure.

The Woodworkers Alliance for Rainforest Protection (WARP), a new organization for woodworkers concerned about the destruction of the Earth's forests, has formed to study the problem and come up with a plan for action.

As users of wood, WARP members want to take steps toward conserving Earth's valuable rainforests. WARP's goal is to explore alternative methods of wood harvesting throughout the world to ensure a renewable supply of wood without destroying the forest ecosystem.

Members of WARP's organizing committee include, to name a few: Gary Hartshorn of the World Wildlife Fund, Ivan Ussach of the Rainforest Alliance, forest biologist Richard Jagels, Dick Boak from Martin Guitars, John Curtis of Luthiers' Mercantile, Leonard Lee of Lee Valley Tools, woodturner David Ellsworth, Ken Kupsche of Woodcraft Supply, writer Scott Landis and *AW* associate editor Fiona Wilson.

WARP's first official gathering takes place November 16th to 18th at the University of Massachusetts at Amherst. The three-day conference will include speakers—from environmentalists to lumber industry representatives—who will address questions about the rainforest and related issues. A trip is planned to the Boston Museum of Science to view the Smithsonian's traveling exhibition "Tropical Rainforests: A Disappearing Treasure."

WARP welcomes all interested woodworkers as members. For information write to: John Shipstad, WARP Secretary/Treasurer, P.O. Box 133, Coos Bay, OR 97420 or call (503) 269-6907. The November conference requires pre-registration.

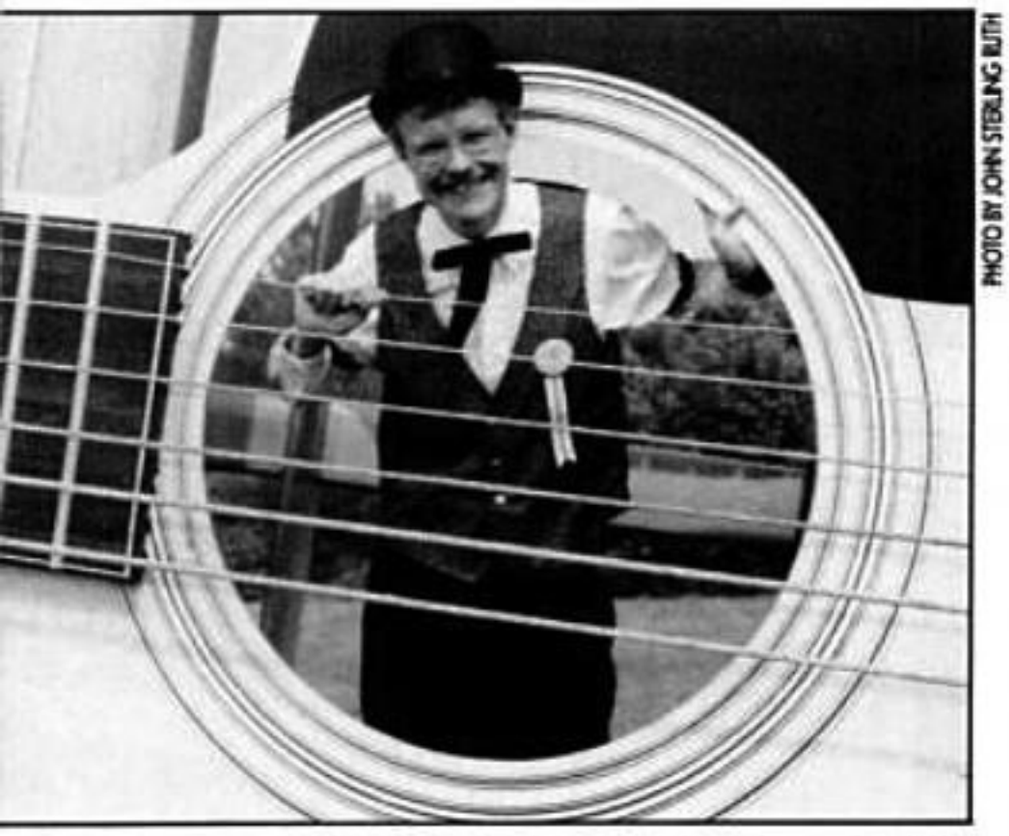


PHOTO BY JOHN STERLING RUTH

Chris Martin is into guitars in a big way. Martin, president of the Martin Guitar Company, is captured here with his head through the soundhole of a 32 ft. long replica of Martin's legendary D-45 guitar. This musical monstrosity, which took 4,500 hours to build, was made to celebrate Nazareth, Pennsylvania's 250th anniversary.

Elu Router Winner

The winner of the FYI Catalog Showcase drawing for the March/April 1990 issue is William King, of Springfield, Oregon. Mr. King is now the proud owner of a 2¼-H.P. Elu plunge router.

Minwax on a Mission

Craftsman Farms, the Parsippany, New Jersey estate of Arts and Crafts furnituremaker Gustav Stickley, has received a new lease on life. Thanks to the efforts of concerned citizens and assistance from the Minwax Company, the Stickley homestead was saved from the bulldozers and has been restored to its original condition. It is now open to the public as a museum.

Stickley, leader of the American Arts and Crafts movement, built the house in 1904 with the dream of turning Craftsman Farms into a commune for artisans and craftsmen. Stickley's plans were shattered a dozen years later when his business ventures began to fail and he was forced to sell the estate.

The farmhouse was converted into apartments and finally abandoned. The house has been vacant for the last decade. When the estate was slated for the wrecking ball to make way for a housing development, a neighborhood citizens group recognized its historic value and came to the rescue.

Enter Minwax. Hearing about these grassroots efforts and the need for a corporate sponsor to get the project off the ground, Minwax decided to lend a hand. The company hired an Arts and Crafts restoration specialist and donated its resources and expertise for stripping and refinishing the interior of the house as well as several original pieces of furniture.

In addition to preserving the homestead, Minwax purchased and restored two original Stickley cabinets from the farmhouse kitchen. These cabinets—over six feet tall, made of solid chestnut—are on permanent display at the Stickley museum.

For information about museum hours and tours, call Craftsman Farms at 201-682-2859.

PHOTO BY KAY STUBBLEBINE

The 80-year-old home of Arts and Crafts designer Gustav Stickley is now a museum to showcase fine wood furnishings and decorative arts from the Arts and Crafts Movement of the early 20th century.