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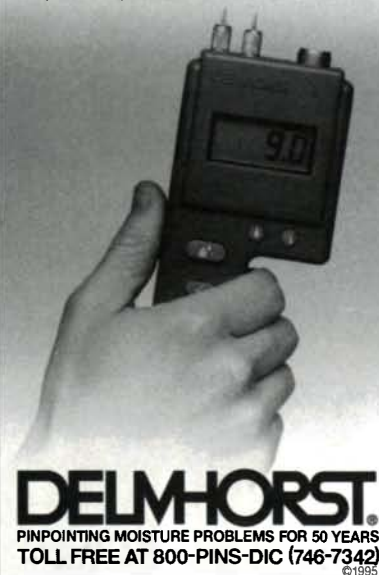
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### **On the Cover:**

*Scott Wynn smooths a chair seat with a buck-horn scraper custom-made for the job. The wooden-bodied scrapers can be fashioned quickly from any close-grained hardwood (p. 51). Photo: Vincent Laurence.*



*Cherry highboy's upper case, p. 34*



*Turning rotted wood, p. 58*



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Benchtop mortising machines, p. 74



**Changes in *Fine Woodworking***—I hope I speak for the many subscribers who find the changes in *Fine Woodworking* a big disappointment. Everywhere you go today, it's smaller, cheaper, cost-effective, Made in Taiwan, whatever. The one standard was *Fine Woodworking*—and someone has changed it.

Yes, paper pulp was high. Now pulp prices are in free-fall. Postage has been relatively stable over the last couple of years. So why the change? In my opinion, a larger bottom line.

I hope you retained that one printer, the guy who was there for you when things were scary, the guy who faithfully produces quality. I hope you didn't reward him by telling him he was not cost-effective. If, in fact, costs are up, send out a questionnaire to us multi-year people and ask us if we would tolerate an increase in our subscription. The answer, in my opinion, will be yes.

—Jim Hudley, Chicago, Ill.

**Ripping on a radial-arm saw**—I agree fully with Peter Korn's preference for the tablesaw over the radial-arm saw (*FWW* #117, p. 24). But I fear that in making his case against the radial-arm saw, he has inadvertently introduced a hazardous piece of misinformation regarding its use.

Korn says the saw's blade rotates in the direction of the cut and warns that "when you rip, the wood wants to self-feed." Actually, safe practice dictates exactly the opposite procedure: When ripping, the work should always be fed *against* the direction of blade rotation. If Korn has ever actually attempted to operate a radial-arm saw in the manner he describes, it is no wonder that he regards it as a dangerous tool.

—Kent K. Fitzgerald, New York, N.Y.

**PETER KORN REPLIES:** I have used radial-arm saws extensively for crosscutting. But heeding advice from many other professional woodworkers over the years, I have never considered ripping with one. This, plus a hopefully temporary bout of stupidity, accounts for the major gaffe in my reply. Wood being ripped on the radial-arm saw should always be fed against the rotation of the blade, not with it.

My answer still stands, however, regarding the relative merits of tablesaws and radial-arm saws. When you feed wood against the rotation of the blade on a radial-arm saw, the blade wants to lift the work off the table as it cuts. If you make the mistake of feeding with the rotation of the blade, it wants to pull the work out of your grasp. Neither situation seems desirable.

**No love for panel products here**—I enjoyed William Duckworth's informative article on sheet goods (*FWW* #117, pp. 38-44), but I was amused by his sidebar on different panel products. He professes wonderment at why some of them, like Classic Core, have been slow to catch on. They're inferior products, that's why, and I'm amazed that anyone buys them.

They cost the same or more than poplar or fir-core plywood. They're heavier, but not stronger, and the use of self-tapping screws can badly bulge the surface. Surface veneers are incredibly thin; if your sawblade is not razor sharp, chipping will occur even on rip cuts. Sawblades dull more rapidly, and these panels are efficient destroyers of router bits.

I would be interested in hearing why people who use the stuff like it. I personally would recommend—very strongly—against using these products.

—W. Geoffrey Seeley, Washington, D.C.

**Sharpening on the job site**—Thank God for your article on job site sharpening (*FWW* #117, pp. 64-65). I've just about had it with articles written by saps and for saps who never seem to realize that their tools are intended to do work. I've heard all I can take about the mysteries of sharpening or honing magic.

I learned how to woodwork and sharpen all my tools without the luxury of a bench grinder or expensive waterstones. I started with sandpaper and my father's hollowed Carborundum

**Writing an article**

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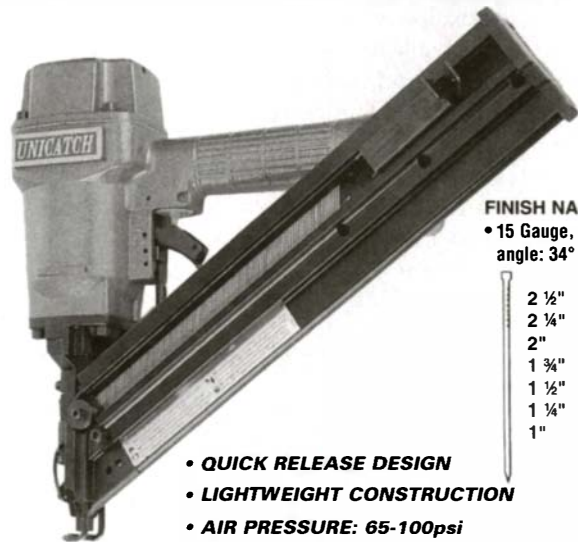
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stones. I still use my belt sander as a grinder because it's fast, and I think it does a better job. Nonetheless, I'll put my tools up against those of any purist who thinks that chisels need more love than friction.

On the job site, time is money, usually out of my pocket, so tools have to be sharpened fast and stay sharp without the hoopla. If I'm in the shop on my own time, I'll take all the time I need to touch up my tools with a diamond stone and strop, but the difference is only marginal. Keep telling it like it is.

—Nick Anastas, Toronto, Ont., Canada

A word of warning regarding the practice of sharpening chisels with a belt sander. Remove the dust bag. Hot metal that leaves the edge of a chisel and blows into fine wood dust converts a dust bag into a great blast furnace very quickly. I burned up a dust bag and nearly burned up a new belt sander.

—Bob Wayne, Pullman, Wash.

**For resawing, try a file first**—There is a way to resaw boards using the bandsaw fence aligned at 90° to the blade. When I was trying to resaw a 4-in.-wide walnut board to about 1/8 in. thick, the sawblade on my 12-in. Sears bandsaw kept wandering off to one side. Wasting a beautiful piece of walnut was the last straw. I have seen the blade wander on a handsaw, circular saw and chainsaw when it was not sharpened properly. So I determined that although new, the blade had the same problem.

I took the 1/2-in., 6-point regular tooth blade off the saw and, holding it between two boards in my bench vise, made one pass with a small triangular file on each

tooth. The blade now cuts perfectly straight slices of 1/8-in. walnut for the little boxes I am making. The half-hour required to sharpen the blade was well worth it. —Bob Curry, Lexington, Ky.

**The fan was backward**—*Fine*

*Woodworking* is a great trade magazine, and I always look forward to receiving every issue. I loved the article on small-shop dust collection (*FWW* #117, pp. 66-70) and plan to build the system that was shown on p. 69. But I question the position of the blower as shown in the artist's rendering. Perhaps the heading should be, "What's wrong with this picture?" or "Turn on with caution" or "First, reverse the motor."

—Ernie Alber, Valley Center, Calif.

**EDITOR REPLIES:** The drawing is indeed incorrect. The air intake of the blower should properly be located in the center of the fan housing.

**Don't overlook dangers of antifreeze**—I just read something in *Fine Woodworking* #117 that should be of major concern to both you and your readers. The writer suggests methods with which to clean teak (p. 8). Though the author may be qualified about chemistry, the letter suggests that any reader may play chemist and mix some everyday household liquids together. This may lead to some personal disaster. For instance, mixing chlorine-based bleach and ammonia-based cleaners can result in a formation of phosgene gas of World War I infamy.

But of most immediate concern is the suggestion of washing down anything with automobile antifreeze to act as an

anti-fungal coating. Those of us who have pets should be aware that even the tiniest drop of this seemingly harmless liquid is highly poisonous to them, specifically the ethylene-glycol-based type. It is apparently sweet-smelling and attractive to pets to take a taste.

—David Harvey, Mercer Island, Wash.

**What to do with scribe marks**—In the article in which Tage Frid and Chris Becksvoort demonstrate their methods of cutting through dovetails (*FWW* #116, p. 86), the final pictures clearly show scribe lines across the base of the tails and pins on the finished joint. Do these two actually make the joint this way and then somehow get rid of the scribe lines, or do they initially only scribe the lines in the waste areas, skipping over parts that will remain?

—Dan Vetter, Regina, Sask., Canada

**CHRIS BECKSVOORT REPLIES:** Scribe lines are made on both sides of both pieces to be dovetailed together. If the lines are made lightly, a single pass with a marking gauge, they can often be removed when fitting the drawer, using a sharp plane or belt sander. But what's wrong with scribe lines? They are marks of handmade dovetails. I often leave them, even on the outside of a case and all the drawers. Decide beforehand whether to leave them or not. Leave all or none. Marking scribe lines only at places to be chopped out is not an option.

**Avoiding an accident on the drill press**—Charlie Morrison's tip about using a router bit in a drill press (*FWW* #116, p. 14) brought to mind my only major injury at work. I'd like to share the

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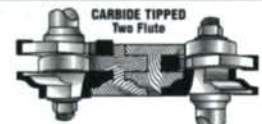
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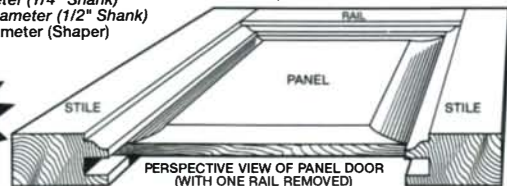
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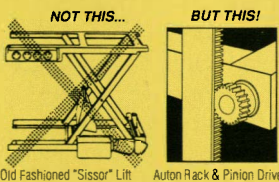
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lesson(s) I learned from that accident.

I learned that side-cutting takes a lot more pressure than simple boring; as a consequence, the workpiece is a lot harder to control. The sharp corners at the ends of the flutes on an end mill are most efficient at grabbing your fingertips and then wrapping your fingers around and around until you manage to stop the machine.

My conclusion: Whenever doing an operation such as flattening the bottom of a bowl, it is wise to secure the piece in a movable vise like machinists use and then move the piece by turning the cranks.

My hope is that the drill press be redesigned as one of your readers suggested a few years back and that larger machinist-type accessories be made for woodworkers.

—John Steinke, Reno, Nev.

**Don't mix oxygen and propane**—I have been enjoying your magazine for many years now and look forward to its arrival. While reading the November/December issue, I came across a tip that smaller air tools could be operated from portable containers such as propane tanks with a \$5 valve kit (*FWW* #115, p. 22). My hair nearly stood on end at this suggestion.

A number of years back, I had the marvelous idea that a small container of oxygen would add considerably to the heating ability of a propane torch. When I approached a local supplier of

compressed gases with my idea and requested a fill up, he changed colors before my eyes. I was told very emphatically that no dealer, under any condition, would put oxygen or anything containing oxygen into a container that had held a combustible gas. It seems that the gas only burns when it's exposed to or mixed with a bit of oxygen. Putting oxygen into the cylinder would create a very volatile, portable bomb.

—Robert Clidero, Mississauga, Ont., Canada

**How glass is really tempered**—I was delighted to see your article on glass (*FWW* #116, p. 53). I was in the glass business all of my working life, and I thought, at last, an article that I can really understand. But a few points beg correction.

After annealing, glass is reheated to approximately 1,400°, as I recall. It is quickly chilled with blasts of air, forced through small jets positioned approximately 6 in. to 8 in. apart on both sides of the glass. It is important that equal cooling occurs on both surfaces to control warp. This rapid surface cooling does set up internal stresses. In essence, the tempered sheet of glass is enclosed in an envelope of surface molecules under compression while the interior glass molecules are under tension. Because of this molecular phenomena, tempered glass is four to five times as strong as annealed glass.

It is true that thin glass is more difficult to temper in a conventional way than  $\frac{3}{16}$  in.,  $\frac{1}{4}$  in. or thicker glass. However, some temperers at sea level, where the ambient air pressure is greater, are tempering single as well as double-strength glass.

—Ben L. Tyson, Salt Lake City, Utah

**Leave building officials out of it**—I enjoyed Andy Charron's article on the advantages of spraying a finish (*FWW* #117, pp. 71-75). I learned a few things, even though I've been spraying for many years. But I almost had a seizure when I read the line, "No matter where you plan to spray, check with your local building officials first."

I'm a very safe woodworker, and I'm very environmentally conscious. But I

draw the line at contacting the officials. You should hear my story about the time I tried to ask the Environmental Protection Agency in Washington for advice.

—Lee Davis, Albuquerque, N.M.

**Full address for Boice-Crane**—In reading "Questions and Answers" in the February issue (*FWW* #116, p. 28), I noticed that you responded to a question on Boice-Crane tablesaw parts but did not include the name of the city. The address of Boice-Crane Parts should have read 2442 Densmore Drive, Toledo, OH 43606.

—Bill Herr, Toledo, Ohio

**What about a smelly finish?** In a recent letter, R.L. Whitney pointed out several advantages of a varnish and oil finish mixed up from spar varnish, boiled linseed oil and turpentine (*FWW* #116, p. 6). There is one important disadvantage: The odor of the turpentine can linger for years.

Several years ago, I finished both the exterior and interior of a solid cherry sideboard with a polyurethane, linseed oil and turpentine mixture (in equal proportions). For the first three years, I picked up the smell of the turpentine whenever I opened one of the doors. A lower proportion of turpentine might have solved the problem, but I prefer the faster build and depth of Sam Maloof's mix (equal proportions of polyurethane, linseed oil and tung oil). However, it is slow drying in humid weather. When this is a problem, one could use spar varnish in place of the polyurethane and add a Japan drier.

—Richard Grimlund, North Liberty, Ia.

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Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't try to perform operations you learn about here (or elsewhere) until you're certain they are safe for you. *If something about an operation doesn't feel right, don't do it.* Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you're in the shop.

—Scott Gibson, editor

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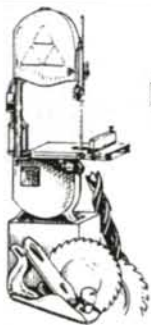
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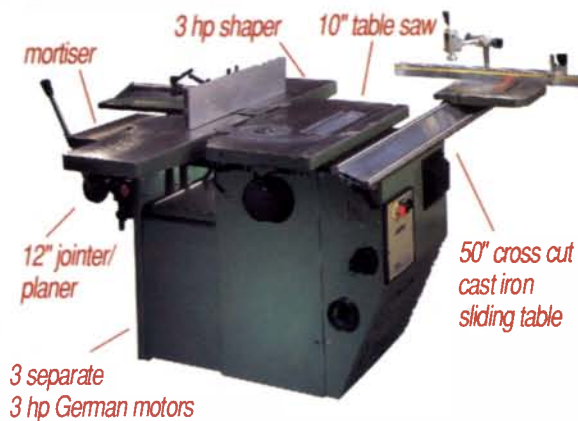
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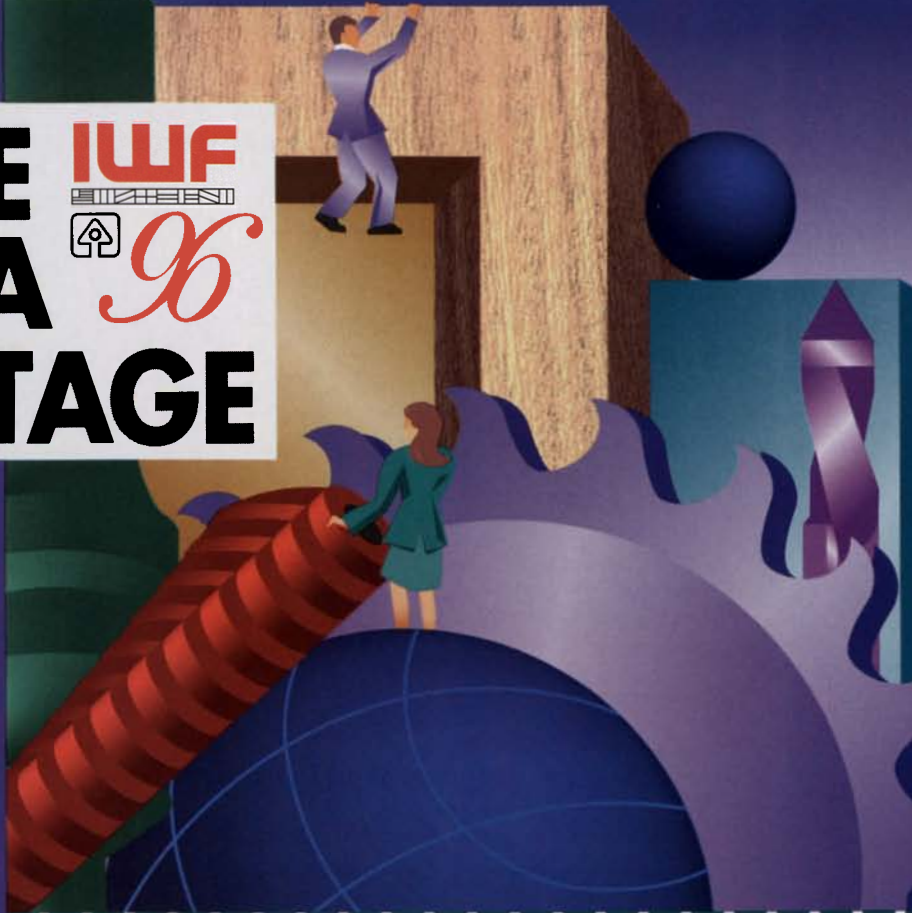
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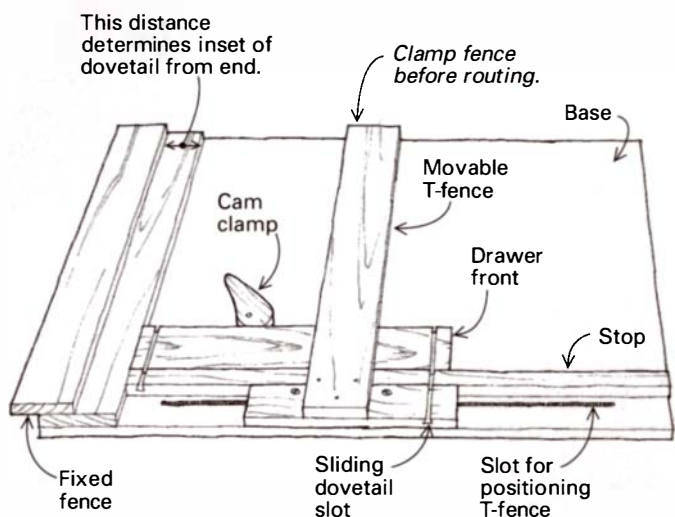
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### Jig for routing sliding dovetails in drawer fronts

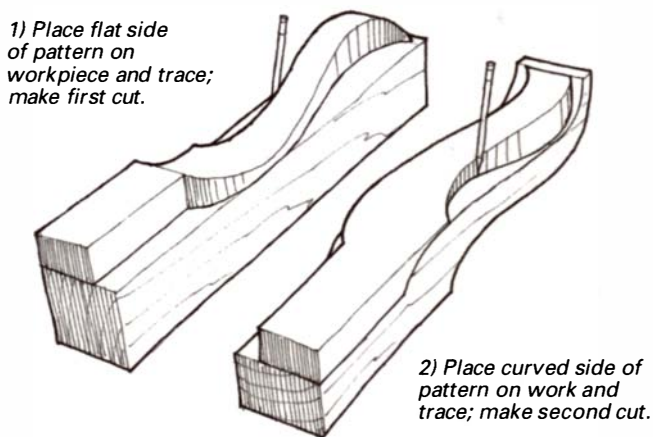


I recently received an order for drawers joined at the front with sliding dovetails. Because the drawers were of many different sizes, I needed to make a router jig that would accommodate drawer fronts of different lengths and widths. The jig I came up with consists of a base with a fixed fence on one edge and a movable T-fence on the other edge. The workpiece is aligned against a stop attached to the base at the front of the jig. The T-fence moves left and right to allow for various widths of drawer fronts, and it locks in place with bolts and wing nuts. I also clamp the T-fence front and back with C-clamps for extra rigidity. A cam clamp holds the work tightly against the stop.

To make through-sliding dovetails, clamp the workpiece in place, and rout both sides with the router. To make stopped-sliding dovetails, either make a stop or draw a stop line on the drawer front about 1/2 in. from the edge.

—Robert S. Kummerow, Elmhurst, Ill.

### Improved cabriole-leg pattern



The way I mark and cut cabriole legs eliminates the need to save and reattach scrap pieces. The secret is to make a pattern that is flat on one side and curved to match the profile on the other. My pat-

tern is made of scrapwood, bandsawn and shaped with hand tools.

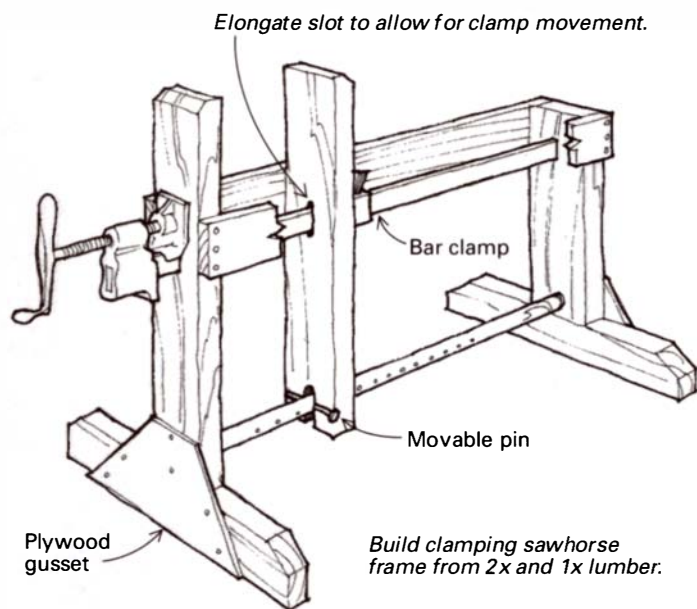
Place the flat side of the pattern down, and trace for the first cut. After sawing out the outline, rotate the stock 90°, and place the curved side of the pattern on the curved surface of the leg. Trace the profile of the leg, and make the second cut.

—Paul K. Murphy, San Jose, Calif.

**Quick tip:** When doing heavy work with a handplane or other hand tools, wear cyclist's gloves. The fingerless gloves allow for full dexterity, but the gel-filled pads protect the palms from blisters and bruising.

—Broadie Newton, Richmond, Va.

### Sawhorse with a vise



I use a wide variety of found wood for the turned objects I make. Collecting the wood is not as difficult as cutting it into suitably sized blanks for the lathe. The main problem is holding large and irregular pieces of wood safely while shaping them with a chainsaw. To solve this problem, I built this sawhorse/vise that uses an ordinary bar clamp to supply the clamping pressure. I have found it to be remarkably versatile and sturdy.

The two end supports have slots that cradle the bar clamp without pinching it. The mobile jaw has an elongated slot that allows the jaw to tilt to different angles as required by the irregular shape of the wood. The capacity of the jaw is adjusted using the pin on the lower bar and is limited only by the length of the bar clamp. I can easily slide the clamp out when I need it elsewhere.

—Neil Hendry, Gwelup, Perth, Western Australia

### Three-bath brush-cleaning system

I used to dread cleaning oil-based stains and finish from my brushes until a professional painter introduced me to his three-bath system. Here's how it works:

Fill three wide-mouthed bottles (48-oz. juice bottles work well) two-thirds full with solvent. Label them 1, 2 and 3. Put the dirty





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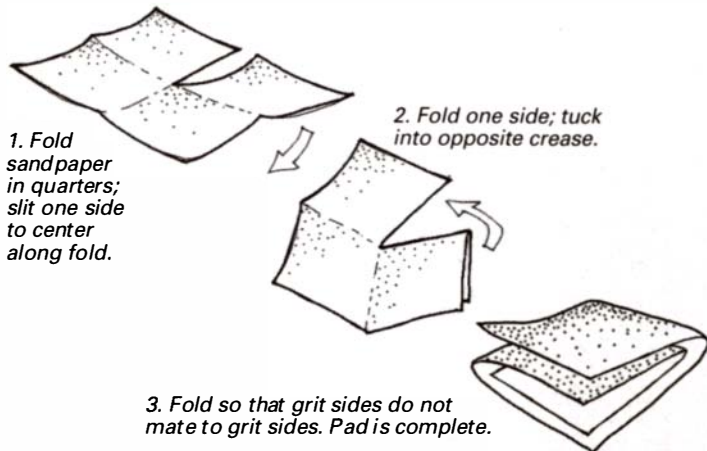


brush in a tin can, and add the solvent from bottle 1. Clean the brush, wipe it with paper towels and pour the dirty solvent back into bottle 1. Repeat the process using the solvent from bottles 2 and 3.

Your brush should be nice and clean now, so reseal and store the solvent containers. Continue using this approach any time you clean a brush. When bottle 1 gets an inch or so of sludge in the bottom, carefully pour the remaining clean solvent into bottle 2, and relabel it 1. Change the label on bottle 3 to 2, and prepare a new bottle 3. This method is environmentally sound because you reuse the solvent.

—James W. Miller, Milan, Ill.

## Folding sandpaper, revisited

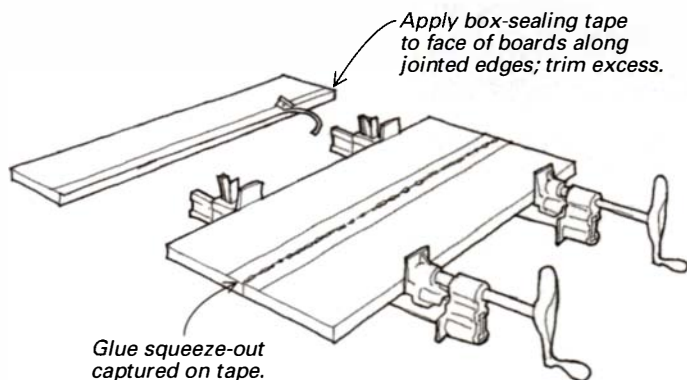


After seeing Peter Moffa's method for folding sandpaper in *FWW* #114 (p. 18), I wanted to share this solution that my father, a carpenter, showed me in 1940.

Take a sheet of sandpaper, fold and crease it in half in both directions as though preparing to cut quarter sheets. Cut along any crease, stopping at the center of the sheet. It does not take a rocket scientist to figure out how to fold the sheet so that you don't mate a grit side to a grit side.

—Rex Headland, Pasadena, Newfoundland

## Catching glue squeeze-out with tape



Here's a technique that keeps squeeze-out off the wood when you're gluing up panels. When the boards have been jointed, just before gluing, apply a strip of box-sealing tape on the face of each

board along the jointed edge. Let the tape overhang the jointed edges by 1/4 in. or so. Press the tape tightly along the corners. Then trim the overhang with a new safety razor, taking care not to nick the jointed edges. Glue as usual. Any glue squeeze-out will go onto the face of the tape and not onto your panel.

After the glue cures, remove the clamps, and pull the two pieces of tape off the joint. There may be a hairline bead of glue at the seam, but this is easily removed. Don't let the tape stay on the work too long because the adhesive may become hard to remove.

Exhaustive tests (not really, I just like the sound of that phrase) have determined that the best tape for this job is 3M's Scotch premium commercial box-sealing tape. Avoid using duct tape, masking tape, cheap packing tape or regular Scotch tape.

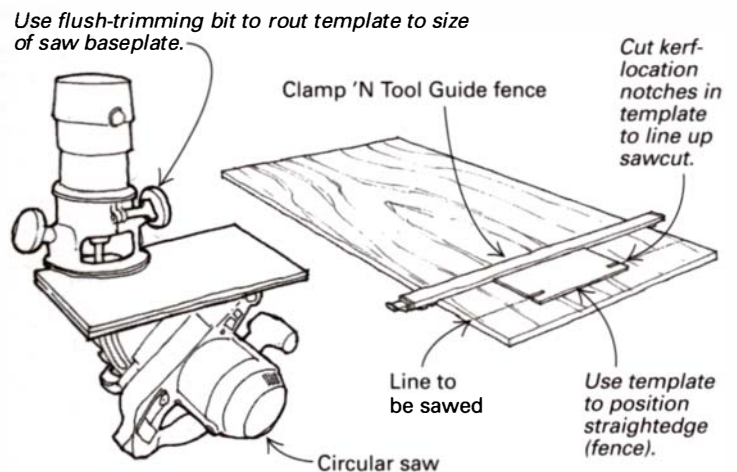
I much prefer spending the time applying tape than scraping glue residue, which can cause finishing problems. Taping also has the advantage of isolating clamp bars from the stock, thus eliminating iron stains.

—Jim Wright, Berkley, Mass.

**Quick tip:** To brighten your shop's work surface without adding one extra watt of light, paint the undersides of the cabinets or shelves that hang over your work areas with a light-reflective color. White or aluminum-silver are best. For even more reflectivity, tape aluminum foil or aluminum-faced insulation under these areas.

—R.B. Himes, Vienna, Ohio

## Circular-saw cutting template



I often cut sheets of plywood with my circular saw, but it can be difficult to place a fence the correct distance from the cut line to guide the saw. To solve this problem, I made the template shown above. It's much easier to position a fence using the template than using the saw base.

To make the template, I clamped a 1/8-in. piece of hardboard to my saw's baseplate. Then I trimmed the hardboard to the exact size of the plate with a router and a flush-trimming bit. Using a saw, I nipped cuts in the front and rear of the template to show the location of the blade.

Now when I want to cut plywood, I just draw a pencil line where I want the cut and then align the fence (I use a Clamp 'N Tool Guide, made by Griset Industries; 800-662-2892). It's quick, and



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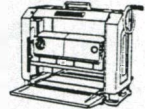
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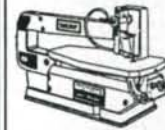
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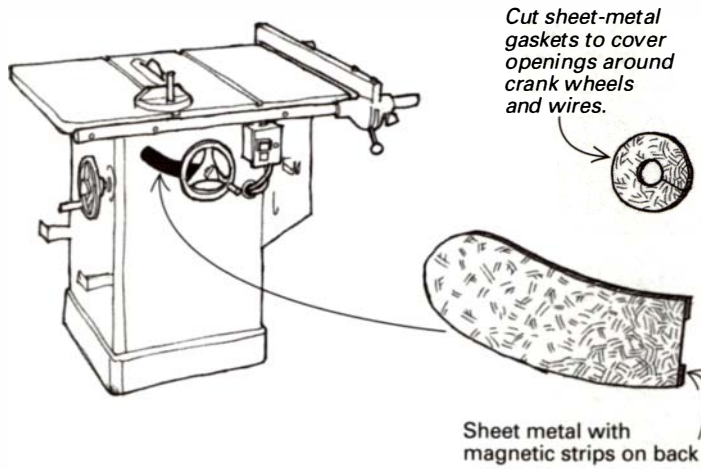
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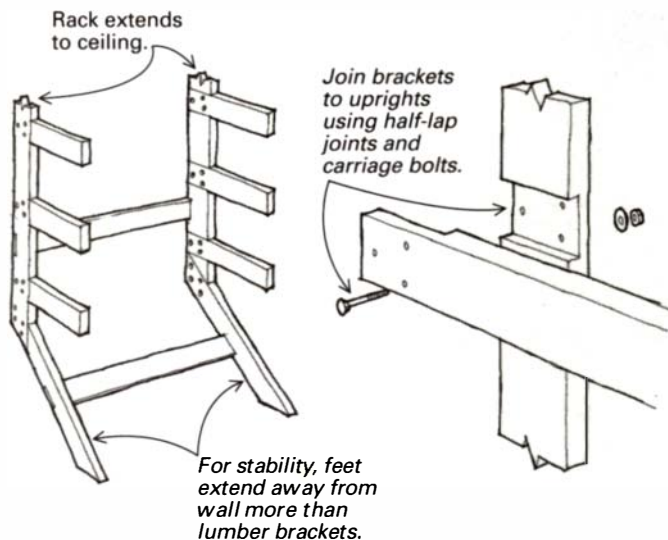
it's easy to place the fence on either side of the cut with the kerf on the waste side of the line. —Rasjad Lints, Vancouver, Wash.

### Improving tablesaw dust collection



I wasn't getting enough suction at the sawblade on my Delta Uni-saw for efficient dust collection because of the large openings around the crank wheels and the switch wire. So I sealed the openings. I cut a scrap of sheet metal the same shape as the slot around the arbor-tilt wheel but 1/2 in. larger than the opening. I added some rubber magnetic strip (available at most craft-supply stores) to the outside edges so that I can remove the cover easily. I added sheet-metal gaskets to block other openings around the blade-height crank wheel and wire ports. —Ted Asousa, Broomall, Pa.

### Lumber rack leans against a wall



If you have to move frequently or you just like to reorganize your shop now and then, a portable lumber rack has merit. This rack is unique in that it leans against a wall and remains stable. The rack's feet are farther away from the wall than the end of the brackets, so

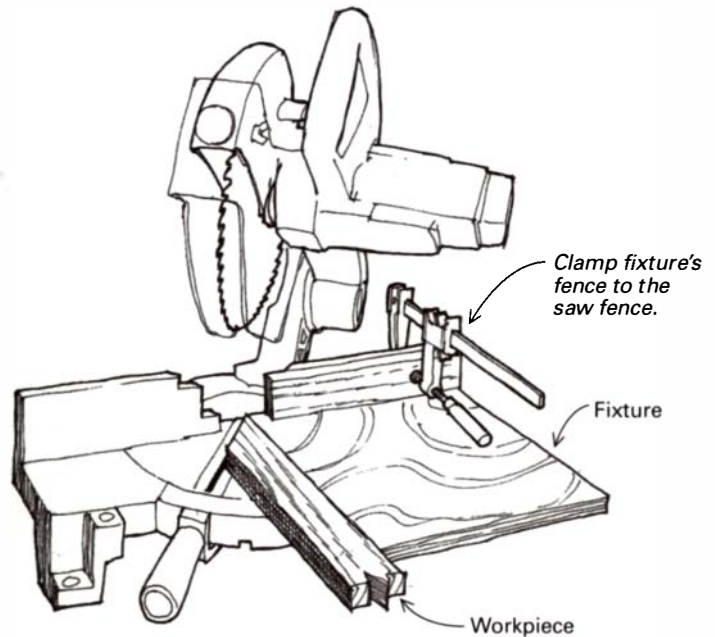
the load is counterbalanced. Even though the rack is fairly strong, don't overload it. It won't support as much weight as a post-and-spar lumber rack.

If you're concerned that the rack might kick out (though I've never had this problem), put non-skid pads on the bottom of the feet or tack them to the floor. If wall space is at a premium, you can make two racks and bolt them together back to back to form a freestanding unit.

I constructed the rack with 1-in.-thick, 3-in.-wide oak boards. Half-lap joints were used throughout, each reinforced with three or four carriage bolts. —Gerald C. Lauchle, State College, Pa.

**Quick tip:** When you are restoring older machines and you find that the nuts you have are smaller than the originals, ask a machine shop or industrial supplier for "heavy" nuts. Their threads fit the bolt, but the outside of the nuts are one size larger, both in width and in thickness. They're much easier to turn for repeated loosening and tightening. —Craig Mooslin, Arcata, Calif.

### Cutting angles greater than 45° on a chop saw



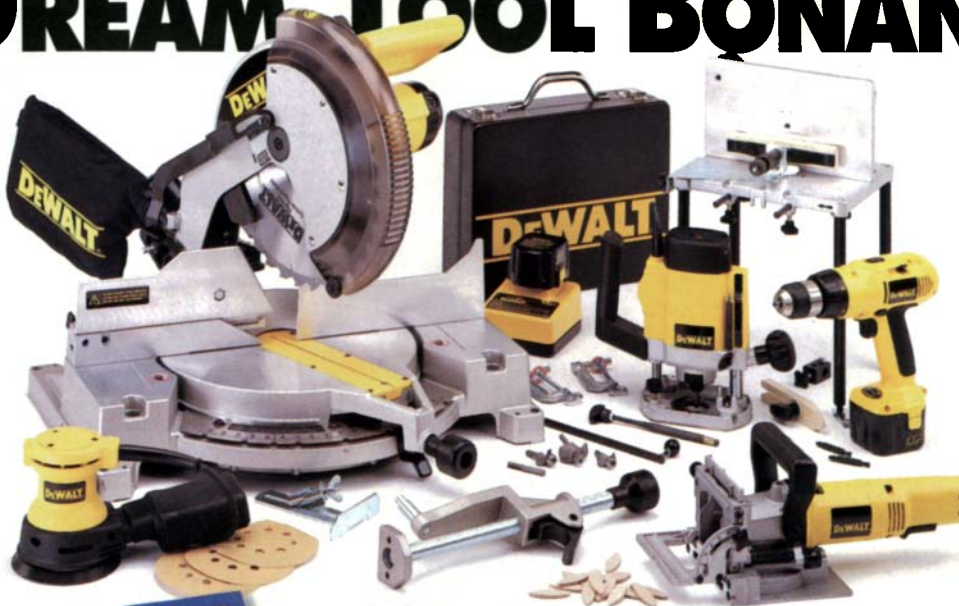
For a recent project, I needed to make 50° miter cuts, but my power miter saw cut only up to 47°. So to remedy that problem, I made a fixture that clamps to the main fence with the working edge 90° to the saw's original fence.

Now, to cut large angles, all I have to do is set the saw at the reciprocal of the angle (90° minus 50° gives a saw setting of 40°). When you cut angles more than 60°, it is a good idea to use a workpiece hold-down to keep your fingers away from the blade.

—Richard A. Menin, Meadowbrook, Pa.

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## Preventing rust in a seasonal shop

*I live in Arizona, but I'm contemplating spending summers in Seattle, Wash. I'd like to set up a basic shop in Seattle. How should I prepare the equipment for the nine months of the year it's not being used, keeping in mind the damp climate of that part of the country?*

—Jack Kirkham, Sun City West, Ariz.

**Jim Tolpin replies:** Rust won't be a problem, even in the damp climate of Seattle, if your shop is well-sealed and receives enough heat from an adjacent building to keep the humidity level below 75%. A wooden floor (or a well-insulated slab), tightly sealed windows and doors, and an insulated ceiling all help. Large burlap (not plastic) bags of salt hung from the ceiling can help absorb moisture from the air. Be sure to replace them each season. Smaller bags of salt in tool chests and cabinets are a good idea, too.

I also suggest liberally coating machine surfaces and metal hand tools with a rust-preventive spray just before you leave. Rub a fresh coat of penetrating oil on wooden planes. Finally, cover the machines with old sheets, and wrap hand tools in leather or in absorbent cotton rags—old diapers are perfect. [Jim Tolpin is a woodworker and writer in Port Townsend, Wash.]

## Preparing plane irons

*Over the past few years, I've been inspired by several articles on handplanes. As a result, I've purchased a smoothing plane, a jack plane and two block planes, one regular and one low angle. By following Mario Rodriguez's sharpening advice (FWW #99, p. 69), I was rewarded with razor-sharp edges. That smooth "swiiiiishh" from my planes is a joy to hear, and the resulting surface feels like glass to the touch.*

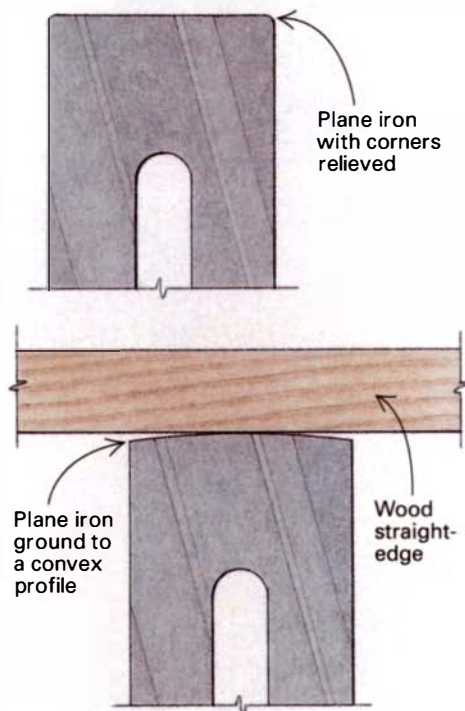
*I have one problem, however, with sharpening. Everything I've read about sharpening and honing plane irons recommends shaping a slight, convex curve on jack-plane irons and slightly rounding off the corners on smoothing-plane irons. How is this done? I'm afraid of gouging my sharpening stones and/or ruining my irons.*

—Arthur Cooper, Cambria Heights, N.Y.

**Garrett Hack replies:** I rarely shape my

irons other than to relieve the corners slightly. I do this on my benchstones by working these edges a little more aggressively. They should be as sharp as the rest of the blade and close to the same bevel angle, or they'll leave dull streaks. I hone the iron to shape on my coarsest stone and work up through the finer ones, while lightly rounding the corners.

## Grinding and honing a plane iron



Grind is exaggerated for clarity. Corners should fall off no more than .005 in.—roughly the thickness of a sheet of paper.

Relieving the corners accomplishes the same thing as grinding a convex profile on a blade—it lets me overlap planing strokes without leaving a distinct edge that would mar the finish. And it keeps nearly the full width of the blade working, letting me work more efficiently than with a blade that's been ground to a convex shape. And because more of the blade is doing the work, I don't have to resharpen as often.

When I do shape a convex profile on an iron (perhaps because a client wants plane marks to show on a piece), I do it on the grinder. I grind a little more heavily on the outer edges, gently pivoting the iron over the grinding wheel

in a slight arc. I can do most of the shaping without the risk of wearing grooves in my benchstones.

After grinding, I hone the profile to a fair curve, using light strokes to avoid gouging the stone. I check the shape by holding the end of the iron against a straight block of wood held up to the light. Only the slightest curvature is necessary, and it need not be a perfect arc. By looking at the shaving as it curls in the plane's throat, I can judge whether I need to alter the blade shape the next time I resharpen.

[Garrett Hack designs and builds furniture in Thetford Center, Vt.]

## Dealing with powder-post beetles

*Recently, a friend sorted some air-dried oak he had cut and stored some 12 to 15 years ago. It was placed green in a barn and well-stickered. Now this wood is riddled with numerous small holes in the sapwood with sawdust-filled tracks. We think powder-post beetles are responsible.*

*We have cut and are air-drying a good deal more oak and other woods. Can you advise us on how to prevent this from happening again?*

—R.S. Johnson, Caledonia, Ont., Canada

**Jon Arno replies:** I suspect your diagnosis is correct. At least the symptoms sound like the work of powder-post beetles, but the larvae of other insects will also attack wood. Powder-post beetles are especially troublesome. They will infest even thoroughly seasoned wood. Once established, the larvae may tunnel their way out of finished furniture literally years later.

There are chemical treatments that work with varying degrees of success. For example, green lumber can be treated by dipping it in a solution of borax salt, which seems to ward off beetles during the drying process. Also, there are commercially available insecticides that can be applied to seasoned lumber, but they work best when mixed with a penetrating solvent like mineral spirits.

Personally, I don't favor chemical approaches because they are potentially toxic, and there is always some risk that they may alter the nature of the wood

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or interfere with finishes.

Virtually all infestations can be halted by exposing the wood to heat: at least 180°F for two to six hours depending on the thickness of the lumber. With large quantities of lumber, this requires the use of a kiln, but at least the process doesn't chemically alter the character of the wood. Unlike chemical approaches, however, heat-sterilized wood provides no residual protection. Wood should be used as soon as possible so it doesn't become reinfested.

Ash seems to be the favorite food of these voracious little creatures. They will also attack other woods and even the sapwood of some species whose heartwood they leave untouched.

It pays to keep a close watch on your inventory of lumber, both while it is drying and after it is seasoned. The discovery of pinholes and adjacent little mounds of powder should prompt a call to the nearest kiln operator. [Jon Arno is a woodworker and wood consultant in Troy, Mich.]

### Identifying and handling stearate-coated sandpaper

*Which types of sandpaper are stearate-coated and, thus, should be avoided for use with waterborne finishes?*

—Edward Leib, Niskayuna, N.Y.

**Chris Minick replies:** Stearate-coated, non-loading sandpaper was invented several decades ago to solve a problem that plagues ordinary sandpaper—it clogs when sanding thermoplastic finishes. To distinguish the two types of sandpaper, you need only feel the front or read the back. Stearate-coated sandpapers usually have a white, powdery coating over the mineral particles and have a slightly soapy feel. The words “Non-Loading,” “No-Load,” “No-Fil” or “Fri-Cut” on the back also indicate a stearate coating.

The self-lubricating and non-clogging nature of stearate-coated sandpaper makes it ideal for sanding woodworking finishes. However, these sandpapers have the potential to cause serious problems. All sandpaper, stearate coated or not, generates both heat and dust when

sanding a finish. The heat buildup can be enough to begin melting the finish dust. This sticky dust then clogs the sandpaper, making it unusable.

Stearate-coating the sandpaper minimizes heat buildup, decreasing the clogging. Still, some clogging occurs. When this happens, the stearate coating sloughs off the sandpaper surface taking the dust clog with it and renewing the sandpaper in the process. Usually this sloughed off stearate just mingles with the rest of the dust and is removed when the surface is wiped down.

Occasionally, a stray bit of stearate coating will stick to the freshly sanded surface. That's when problems start. By design, the stearate coating on sandpaper is a low surface-tension solid, like the Teflon coating on pans. When a stearate-contaminated surface is finished with a waterborne product, surface-tension gradients cause the finish to flow away from the stearate particles. This produces a fisheye crater in the dry finish film.

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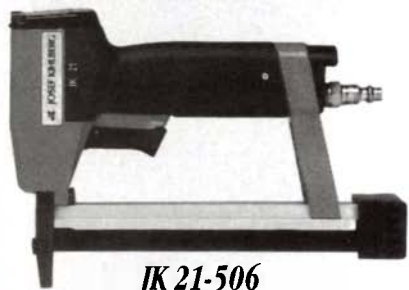
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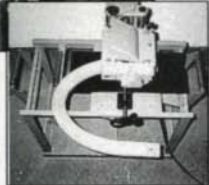
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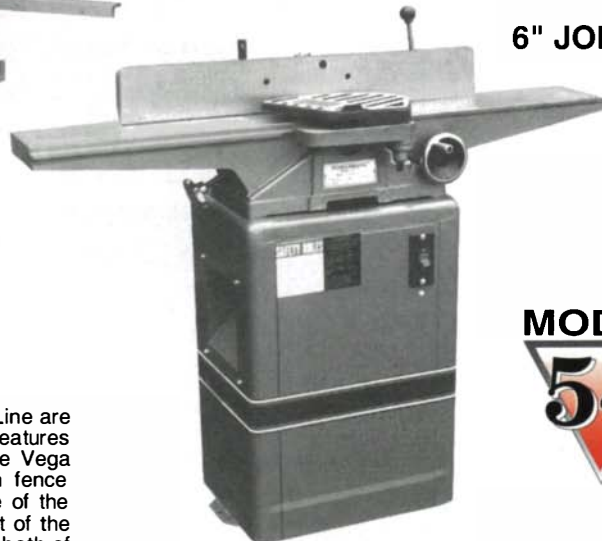
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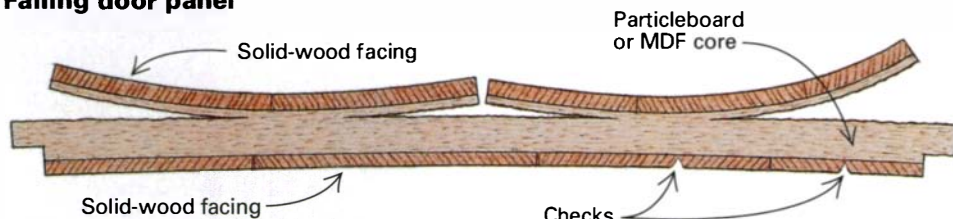
to avoid stearate-coated sandpapers. An easy remedy exists.

After I've vacuumed the bulk of the dust from my freshly sanded finish, I wipe down the whole piece with a rag dampened with mineral spirits. Stearates commonly used on sandpaper are solvent soluble, so this wipe down removes any stearate contamination on the surface. This simple step has eliminated all sandpaper-related defects from my shop. [Chris Minick is a finishing chemist and woodworker in Stillwater, Minn., and a contributing editor to *Fine Woodworking*.]

### Door panels of solid wood and particleboard

I am currently working for a company that manufactures high-end wooden windows and doors. This company has started making raised panels with a core layer of 3/4-in. medium-density fiberboard (MDF) or particleboard sandwiched between two layers of 5/8-in. solid wood. The panels range in size from about 6 in. to nearly 30 in. wide.

### Failing door panel



*It has been my experience that panels made this way do not allow the wood to expand or contract and, therefore, will crack. Isn't it only a matter of time before these panels self-destruct?*

—Geoff Marks, St. Catharines, Ont., Canada

**Bruce Hoadley replies:** I cannot be optimistic about the fate of a paneled door with a particleboard core and solid-wood facings in the range of 5/8 in. thick. Although plywood uses the principle of mutual restraint to attain stability across the panel face, the veneers are usually only about 1/8 in. thick or less. With thick, solid facings restrained on only one side, tremendous stresses develop along the

unrestrained surface as the level of ambient humidity changes. The result can be severe checking. If the internal bond strength of the core is exceeded, the solid facing may pull away from the core or even rip it apart (see the drawing).

Particleboard can be used as a core material but only with thin crossbands and face veneers. The best solution for building a raised panel like you describe is the traditional one, a solid-wood panel that's allowed to expand and contract in its frame.

[Bruce Hoadley is a professor of wood technology at the University of Massachusetts in Amherst and author of the book *Understanding Wood* (The

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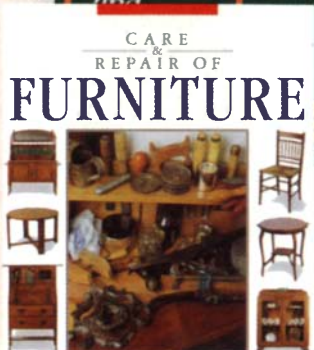
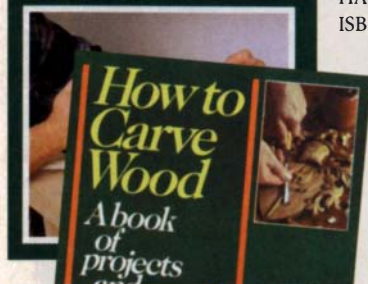
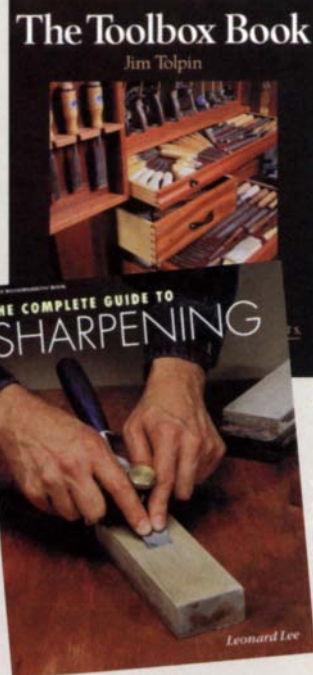
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Taunton Press, 1980). He is a contributing editor to *Fine Woodworking*.]

### Cherry stain compatible with linseed oil finish

*I'm looking for a nontoxic cherry stain that's compatible with linseed oil.*

—Gary Schrodt, Ashland, Ore.

**Chris Minick replies:** Linseed oil is an extremely forgiving finish and is compatible with almost every common wood-stain formulation, except one: waterborne latex stains. Latex stains often contain an acrylic resin or similar binder that effectively forms a barrier over the wood once the stain dries. This layer limits the penetration of the linseed oil, leading to a blotchy, uneven finish.

The binder resin in oil-based stains is often linseed oil or an alkyd-modified oil, both of which are compatible with a linseed-oil finish. Also, aniline-dye stains contain no binder resin, which makes them compatible with all finish types.

Of course, you can guarantee complete compatibility by mixing your own custom

stain from universal tinting colors (available in large paint stores) with the same linseed oil you use for a finish.

### Volts, amps and horsepower

*My old tablesaw bogs down sometimes when cutting hardwood so I'm interested in buying a more powerful tablesaw. Many of the saws are rated in amps and volts rather than horsepower, which I understand.*

*What's the relationship between volts, amps and horsepower? And how can I calculate the horsepower of these saws?*

—Walter M. Miller, Albuquerque, N.M.

**Dennis Preston replies:** Power is the rate at which work is performed. In the English system, the unit for this is horsepower. When describing electric motors, though, it's more accurate to use the electrical definition of power: watts. One watt is equal to 1 volt-amp. To determine the wattage of a motor, multiply the number of amps by the number of volts. To convert watts to

horsepower, divide the number of watts by 746 (746w = 1 hp).

For example, if your line voltage is 120 and the motor is rated at 12 amps, you'd multiply 120 by 12 to get 1,440w. To convert this to horsepower, you'd divide by 746 and get 1.93 hp.

This doesn't take into account minor mechanical and electrical losses, however, which are the result of friction and electrical resistance. These losses typically reduce the actual output power by about 20%. The 12-amp motor in the example above, for instance, would generate closer to 1½ hp.

[Dennis Preston, trained as a mechanical engineer, is an assistant editor of *Fine Woodworking*.]

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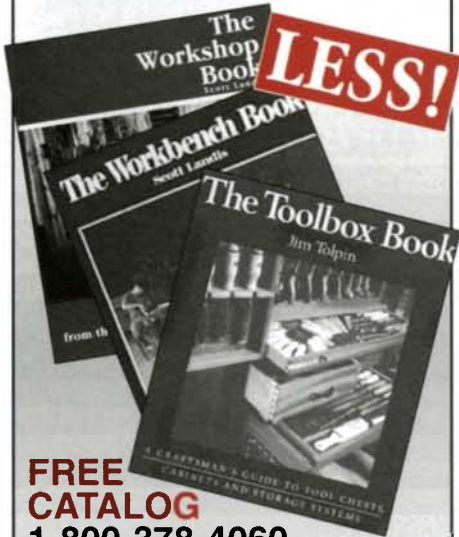
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READER SERVICE NO. 129



used to sell a conversion kit but doesn't any longer. Do you know of any other source for parts to make this conversion?

—Martin E. Zizzi, Montclair, Va.

**Robert Vaughan replies:** Delta offers a table-raising mechanism (part No. 15-009) that fits a 2¾-in. column. It also may be necessary to buy the Delta table (part No. 15-809) to make things work perfectly. At about \$300 and \$325 respectively, though, this is hardly an economical solution.

You may do better to look for a good used industrial-quality drill press that already has one of these mechanisms. If you'd still like to convert your machine, call Delta's parts and service department at (800) 223-7278.

[Robert Vaughan tunes up, repairs and rebuilds woodworking machinery in Roanoke, Va. He's a contributing editor to *Fine Woodworking*.]

### Tablesaw drive belts

*I have exhausted all the areas that I can think of to locate belts for my*

*tablesaw. It is a Wilton, about 30 years old, and uses V-belts that are 3/16 in. wide and 27¾ in. long. The Wilton Co. no longer has anything to do with the company that built the saw.*

*Can you help me locate belts or suggest alternatives?* —Ken Rice, Brighton, Mich.

**Robert Vaughan replies:** Though I'm unfamiliar with your particular machine, I suspect that what you'll have to do is buy two new pulleys and the appropriate size belt for your saw. Belts that are 3/16 in. thick are available (Gates Polyflex 5M series), but I suspect that their "V" may be of a different angle than those you have. Check for these belts or both pulleys and belts at a local power transmission equipment dealer (usually listed in the yellow pages) or industrial hardware store.

### Source of bandsaw noise

*I have a Delta 14-in. bandsaw with a 3/4-hp motor. It works well overall, except it makes a loud "whoomp" just before it comes to a complete stop. What's causing*

*this noise? Should I worry about it?*


—H.W. Anderson, Hendersonville, N.C.

**Robert Vaughan replies:** The "whoomp" sound you describe is the result of the motor generating current as it slows and tries to start itself again. It's called regeneration, and it's typical of some single-phase, capacitor-start motors.




I just live with this quirk in tools I own because eliminating it hasn't been worth the trouble, and it's not hurting the motor. The problem is that the capacitor must remain disconnected until the motor has stopped completely. I've been told that certain resistors across the capacitor will help, but I'm not inclined to pursue such a solution.




Modifying the timing on the centrifugal switch probably would eliminate the problem, too. But that's best left to those who rebuild electric motors every day.


*Do you have a question you'd like us to consider for the column? Send it to Questions & Answers, Fine Woodworking, PO Box 5506, Newtown, CT 06470-5506.*




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 6202DWG9.6V 3/8" Drill Kit w/LED battery ... 390 219  
 6212DWG12V 3/8" Drill Kit w/LED battery ... 412 228  
 6312DWG12V 1/2" Drill Kit w/LED battery ... 432 239  
 6201DWH 9.6V 3/8" Drill Kit w/2 batteries ..... 351 175  
 6210DWH 12V 3/8" Drill Kit w/2 batteries ..... 368 185  
 6311DWH 12V 1/2" Drill Kit w/2 batteries ... 399 205

SUPER CORDLESS SPECIALS		
Model	Description	List Sale
6073DW	7.2V ods Drill Kit. Variable speed & clutch. Complete w/battery, charger, & case. Super Sale	99
6012HDWE	9.6V ods Drill Kit. 2-speed & clutch. Complete w/2 batteries, charger, & case. Super Sale	119
T220DW	9.6 volt Stapler Kit. Complete with battery, charger, & case	99

9900B	3" x 21" Belt Sander with bag	344 179
9924DDB	3" x 24" Belt Sander with bag	329 189
JR3000V	var. speed Recip Saw with case	252 139
9820-2	Blade Sharpener	394 215
N1900B	3-1/4" Planer with case	244 132
BO4552	1/4 sheet Pad Sander with bag	98 55
BO4530	6" Round Sander	117 75
OA3000R	3/8" Angle Drill variable speed	314 185
2708W	8-1/4" Table Saw	585 309
2711	10" Table Saw with brake	1067 599
5005BA	5-1/2" Circular Saw	250 195
6405	3/8" Drill Rev. 0-2100 rpm 2 amp	112 68
6820V	0-4000 rpm Drywall Gun 5.2 amp	171 99
6013BR	1/2" Drill Rev. 6 amp	280 149
5402A	16" Circular Saw 12 amp	374 579
9401	4" x 24" Belt Sander with bag	378 239
4303C	Variable speed Orbital Jig Saw	351 205
LS1030	10" Mitre Saw	428 225
5007NBK	7-1/4" Circular Saw w/case	346 129
LS1011	10" Slide Compound Saw	946 479
GV5000	5" Disc Sander	123 79
N9514B	4" Grinder 4.6 amp	111 65
N9501B	4" Grinder 4.0 amp with case	168 99
9217SPC	7" Sander/polisher var. speed	350 195
2414B	1/4" Cut-off Saw AC/DC	403 225
4320	V/Spd economy Jig Saw 2.9 amp	156 98
6302	1/2" Drill 0-550 rpm 5.2 amp	228 135
BO5001	5" Random Orbit Sander	120 69
LS1211	12" Slide Compound Saw	1550 789
3901	Plate Joiner Kit	372 205

BOSTITCH AIR NAILERS		
Model	Description	List Sale
N80S-1	Stick Nailer	339

RN45 Coil Roof Nailer 3/4 - 1-3/4 ..... 845 369  
 N60FN-2 Finishing Nailer 1-1/4" - 2-1/2" ..... 650 335  
 N60FN-2KN60FN-2 with case, oil, & nails ..... 647 379  
 TS054-1 Decking Sheathing Stapler ..... 619 345  
 MIIFS Flooring Stapler 15 gauge ..... 931 529  
 S325X-1 Finish Stapler 1/2" - 1-3/8" ..... 275 155  
 S325X-1KS325X-2 with case & oil ..... 269 165  
 BT35-2 Brad Tacker 5/8" - 1-3/8" ..... 275 155  
 BT35-2K BT35-2 with case, oil, and brads ..... 299 165  
 BT50-2 Brad Tacker 1-3/16" - 2" ..... 335 185  
 BT50-2K BT50-2 w/case, oil, and brads ..... 395 199  
 PC5000-1 NEW Power Crown Stapler ..... 300 159  
 CW1000 1 HP Pancake Compressor ..... 463 289

PANASONIC CORDLESS		
Model	Description	List Sale
EY6181CRKW	9.6V Drill Kit with 2 batteries, 1 hour charger, & case	305 165
EY6181EQK	9.6 volt Drill with 15 minute charger, case, & ironman battery	315 169
EY6100CRKW	12 volt Drill Kit with 2 batteries, 1 hour charger, & case	358 188
EY6100CQKW	Same as EY6100CRKW but has 15 minute charger	420 198
EY6100EQKW	12 volt Drill kit with 2 ironman batteries, 15 min. charger & case	375 199
EY6101SQK	12V 1/2" Drill with 15 minute charger, diagnostic battery, & case	420 249

PRAZI BEAM CUTTER		
Model	Description	List Sale
PR-7000	12" beam cutter for worm drive saws	149 124

ACCU-MITER  
 18-34 Professional Mitre Gauge ..... 149 145

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Model	Description	Sale
350	12" x 24" x 28" 1/5 HP	245
8-12	20" x 24" x 44" 1/3 HP	469
10-16	20" x 24" x 44" 1/3 HP	659

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VISE GRIP Quick Grip Clamps		
Model	Description	List Sale
00506	6" Quick Grip clamp	22.60 15.50 29.45
00512	12" Quick Grip clamp	27.25 18.65 35.45
00518	18" Quick Grip clamp	29.50 20.85 38.45
00524	24" Quick Grip clamp	31.95 21.75 40.25
00538	36" Quick Grip clamp	36.30 24.95 46.95
590L3	NEW 3/4" Quick Grip Pipe clamp (does not require threaded pipe)	26.95 19.95

PORTA NAILER		
Model	Description	List Sale
401	Porta Nailer complete	265 209
501	Face Nailer complete	265 209

BIESEMEYER FENCES		
Model	Description	List Sale
B-50	50' Commer. Saw Fence	345 329
T-SQUARE 52	52' Homeshop Fence	279 265
T-SQUARE 40	40' Homeshop Fence	259 235
T-SQUARE 28	28' Homeshop Fence	249 225

NEW offer from Tools On Sale™ and Bosch/Skil!

BOSCH		
Model	Description	List Sale
1587VS	Top Handle "CLIC" Jig Saw	292 149
1587DVS	above saw with dust collection	295 178
1584VS	"CLIC" Barrel Grip Jig Saw	285 149
1584DVS	above saw with dust collection	295 178
Bosch Metal Case for above Jig Saws		34 32
Bosch 30 blade assortment for Jig Saws		28.99

Super Special  
 1584VS or 1587VS with steel case and 30 Bosch blades ..... Sale 189

1942	Heat Gun 600° - 900° temp range	125 78
1272D	3" x 24" Belt Sander with bag	375 209
1289D	1/4 sheet Sander	107 68
1194VSR	1/2" variable speed Hammer Drill	282 155
1194VSRK	above Hammer Drill with case	313 169
1195VSR	3/8" variable speed Hammer Drill	229 135
1608XL	5.6 amp Laminate Trimmer w/guide 191	110
1608T	5.6 amp tilt base Trimmer	191 115
1608U	Underwrite Laminate Trimmer	227 139
1609K	Lam Installers Kit w/1609Trimmer	343 189
1609KX	Deluxe Installers kit	405 234
1604A	1-3/4 HP D-handle Router	250 142
1604AK	Same as above w/case & access	318 185
1606A	1-3/4 HP D-handle Router	295 179
3270DVS	3" x 21" v/spd Belt Sander w/bag	270 165
1613EVS	2 HP v/spd Plunge Router	359 199
1615EVS	3 HP v/spd Plunge Router	505 298
1613EVS & 1615EVS come with FREE RA1051 Deluxe Router Guide!		

1614EVS	1-1/4 HP v/spd Plunge Router	283 165
3054VSRK12	12" cordless drill kit	330 185
1370DEVS	6" Random Orbit Sander	427 234
B1650K	Biscuit joiner	156 159
B7000	Corner Detail Sander	122 68
B7001	Corner Detail Sander v/spd	156 89.95
B4050	In Line Jig Saw	199 115
3272AK	3-1/4" Planer with case 4.2 amp	187 119
1347AK	4-1/2" Grinder with case & access	185 105
1348AE	5" Grinder 8.5 amp	225 129
11304	"The Brute" Breaker Hammer	2240 1239
11305	Demolition Hammer 10 amp	1199 739



DELTA BENCH TOP TOOLS		
Model	Description	List Sale
23-700	Wet/Dry Grinder	234 159
23-680	6" Bench Grinder 1/4 HP	86 69
23-880	8" Bench Grinder 1/2 HP	111 115
11-950	8" Drill Press	199 128
28-180	10" Hobby Band Saw	210 145
31-050	1" Belt Sander 2.0 amp	194 78
31-460	4" Belt's Disc Sander	198 120
31-340	1" Belt's Disc Sander	268 200
31-080	1" Belt's Disc Sander	134 89
40-560	12" 2 speed Scroll Saw	266 175
11-900	12" Bench Drill Press	276 184
11-090	32" Radial Bench Drill Press	399 315
43-505	1/2" Bench Router/Shaper	399 305
22-540	12" Bench Top Planer w/extra knives	595 385
36-220	10" Compound Miter Saw	350 219
14-650	Hollow Chisel Mortiser	668 285
33-060	"Slide lock" Miter saw	510 399
14-070	14" Floor Drill Press	450 359
28-190	12" Band Saw w/stand	465 399
20-150	14" Cut-off Saw	375 219
36-090	10" Sidekick Miter Saw	293 235
37-070	6" var. speed Bench Jointer	337 268
36-275	8-1/4" Builders Saw	444 279
36-210	10" Compound Miter Saw	438 285
36-070	10" Miter Saw	284 165
36-630	10" Contractors Saw II	700 579
34-555	Sliding Table	459 289
36-230	12" Compound Miter Saw	480 359

NEW TOOLS BY DELTA		
Model	Description	List Sale
23-710	NEW Sharpening Center	210 169
11-980	NEW 10" Bench Drill Press	186 154
28-185	NEW Bench Band Saw	232 185
37-190	NEW 6" Deluxe Jointer	554 499
36-250	NEW 10" Slide Compound Saw	489
31-695	NEW 6" Belt's Disc Sander	441 359
40-650	NEW Q3 18" Scroll Saw	600 479

DELTA STATIONARY		
Model	Description	List Sale
17-900	16-1/2" Floor Drill Press	462 415
34-080	10" Miter Box	Xtra Special
33-990	10" Radial Arm Saw	818 769
37-280	6" Motorized Jointer	488 399
50-175	3/4" HP 2 stage Dust Collector	483 399
43-355	3/4" Shaper 1/2" H.C.	664 849
46-700	12" Wood Lathe	548 479
33-055	8-1/4" Sawbuck comp with legs	665 665
36-540	10" Table saw	210 175
34-670	10" Motorized Table Saw	511 395
32-100	Stationary Plate Jointer	645 269
36-040	8-1/4" Compound Miter Saw	224 149
36-905	30" Unifence	385 249
36-906	50" Delta Unifence	525 305
36-755	10" Tilt Arbor Saw	1264 1095
33-890	12" Radial Arm Saw	1829 1595
14-040	14" Bench Drill Press	382 345

The following saws have a \$50.00 rebate thru 4/30/96. Price shown is before rebate!

34-444	Table Saw w/1-1/2HP motor & stands	649
34-445	34-444 Saw with 30" unifence	829
28-283	14" Band Saw w/enc stand 3/4 HP	779
28-280V 14"	Band Saw w/enc stand 1 HP	798
28-245	14" Band Saw w/open stand 1/2 HP	598

22-661	13" Planer with stand 2 HP	1513 1239
22-675	NEW DC380 15" Planer	1439 1175
37-154	DJ15 6" Jointer	1451 1299

DEWALT TOOLS		
Model	Description	List Sale
DW945K	3/8" 12V cdss drill kit w/cs & 2 batt.	309 189
DW364	7-1/4" Circ. Saw w/brake, 13 amp	285 158
DW306K	6.0 amp Recip Saw w/case var. spd	291 164
DW610	1-1/2 sheet Palm Sander, 1.7 amp	97
DW704	12" Compound Miter Saw	796 359
DW705	12" Miter Saw	576 325
DW100	3/8" Drill, 4.0 amp, 0-2500 rpm	118 68
DW250	4.5A Drywall Gun, 0-4000 rpm	169 94
DW254	4.5A Drywall Gun, 0-2500 rpm	169 94
DW280K	NEW Screwdriver kit complete	207 124
DW402	4-1/2" Grinder 6 amp	158 92
DW682K	Biscuit Joiner with case	429 219
DW615	1-1/4 HP Elec. Pipe Router	290 172
DW625	3 HP Electronic Pipe Router	511 275

Above router comes with Free DW6966 Fine depth adjustment!

DW675K3	1/8" Planer with case	289 164
DW431	3 x 21 var. speed Belt Sander	331 184
DW420	Palmgrip Random Orb Sander	120 69
DW421	above Sander with dust collector	138 79
DW423	NEW Palm Random Orbit Sndr w/spd170	99
DW930K	12 volt 5-3/8" Trim Saw kit	370 199
DW444	6" Random Orbit Sander - PSA pad	266 139
DW443	DW444 with hook & loop pad	266 139
DW935KNEW	14.4 volt 5-3/8" Trim Saw kit	444 237

NEW DEWALT CORDLESS DRILLS		
Model	Description	List Sale
DW952K	3/8" v/spd incl. two 9.6V batteries	280 139
DW962K-23/8"	v/spd incl. two 9.6V XR batt.	324 179
DW972K-23/8"	v/spd incl. two 12V XR batt.	352 189
DW904	12 volt flashlight	29.95

DW972K-2 drill & DW904 flashlight Sale 205

DW944KQ	1/2" v/spd incl. one 14.4V XR batt	450 235
DW944KQ-2	DW944KQ drill kit w/ 2 batteries	599 259
DW991K	3/8" v/spd incl. one 14.4V XR batt	370 199
DW991K-2	above drill with 2 batteries	225

DW991K-2 DW991K drill, DW935 saw, & case... 339

DREMEL TOOLS		
Model	Description	List Sale
3955	Moto Tool Kit with bits & case	134 79
3956	NEW Super Moto Tool Kit w/acc.	152 95
1672	16" Scroll Saw - 2 speed "Best buy"	302 174
1695	16" var. speed Scroll Saw	408 229
290	Electric Engraver with point	25 16
1731	5" Disc 1" x 30" Belt Sander	189 114

JORGENSEN ADJUSTABLE HANDSCREWS		
Item#	Jaw Length	Opening Capacity
#30	6"	3"
#20	7"	3-1/2"
#1	10"	6"
#2	12"	8-1/2"
#3	14"	10"
#4	16"	12"

STYLE 3400 NEW E-Z HOLD II		
Model	Length	Opening
3410	10"	10.95
3416	16"	17.20
3422	22"	18.40
3428	28"	20.00

JORGENSEN STYLE 37 2-1/2" Throat 1/4"x3/4"		
Item#	Jaw Length	List Sale
3706	6"	10.85 6.20
3712	12"	12.05 6.80
3718	18"	13.25 7.60
3724	24"	14.55 8.15
3730	30"	16.20 9.05
3736	36"	17.70 10.25

JORGENSEN STYLE 45 5" Throat 1-3/8" x 5/16"		
Item	Jaw Length	List Sale
4512	12"	34.50 20.75
4518	18"	36.35 22.30
4524	24"	38.50 23.65

JORGENSEN STEEL "I" BAR CLAMPS		
Model	Size	List Sale
7224	24"	35.75 20.30
7236	36"	38.35 22.35
7248	48"	42.15 24.45
7272	72"	48.50 29.60

PONY CLAMP FIXTURES		
Model	Description	List Sale
50	3/4" Black Pipe Clamps	15.45 8.10
52	1/2" Black Pipe Clamps	12.90 6.95

QUICK DRIVE KITS		
Model	Description	List Sale
SG-2000	Subfloor/drywall, drives screws 1" - 2"	
SG-3000	Complete kit including extension	765 485
SG-4000	Complete kit including extension	936 595

WEDGE SMART LEVELS		
Model	Description	List Sale
ST24	24" Smart tool	198 99
ST48	48" Smart tool	218 109
25536	Smart Dot Laser Level	798 399

BLACK & DECKER		
Model	Description	List Sale
1166	3/8" Drill 0-2500 rpm 4 amp	118 68
2600	3/8" Drill 0-1200 rpm 4.5 amp	167 98
1350K	1/2" Timberwolf Drill 2 speed	551 325
1180	3/8" Drill rev. 0-1200 rpm 5 amp	207 119
2037	Drywall Gun 0-4000 5.0 amp	184 95
2038	Drywall Gun 0-2500 rpm 5 amp	184 95
2054	Tek Gun 0-2500 5.0 amp	287 159
2750	4-1/2" Grinder 10000 rpm 6 amp	156 89
2694	7-1/4" Super Sawcut Circ Saw w/cs#285	158 89
2695	8-1/4" Super Sawcut Circ Saw w/cs#288	179 99
3339	Elu 3 HP v/spd Plunge Router	511 269

Piranha Carbide Tooth Saw Blades by B & D				
Model #	Diameter	# Teeth	List	Sale
73-715	5-1/2"	16	14.39	8.25
73-716	6-1/2"	18	14.39	8.25
73-717	7-1/4"	18	14.60	7.99
73-737	7-1/4"	24	18.06	9.45
73-757	7-1/4"	40	32.87	17.49
73-718	8"	22	20.95	11.25
73-759	8-1/4"	40	46.88	26.95
73-719	8-1/4"	22	20.63	12.45
73-740	10"	32	34.63	18.85
73-770	10"	60	70.37	35.50
73-711	10"	50	68.33	35.50

DURA III- ADJUSTABLE STILTS		
Model	Description	List Sale
D1422	14" 22" extension	270 205
D1830	18" 30" extension	288 222
D2440	24" 40" extension	304 239

SIOUX TOOLS		
Model	Description	List Sale
8030	3/8" variable speed Drill	250 145
8000	3/8" v/spd close quarter Drill 0-1300rpm	201 125
8005	Same as 8000 but is 0-2500 rpm	200 139
690	5" Air Random Orbit Sander	139 132
658	5" Air Random Sander - dual action	261 155

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ALUMINUM LADDER JACKS				
Model	Accepts Stage	Width	Spans to Rung	Attaches
10-14-02	14"	2 rung	2 rungs	83.95
10-20-02	20"	3 rung	2 rungs	92.95
10-20-03	20"	3 rung	3 rungs	101.95

ALUMINUM ARTICULATED LADDERS				
Model	Type IA-300 # RATING	Length	Weight(lbs.)	Sale
M7-14	7'	43#		159.95
M8-16	8'	46#		179.95

FIBERGLASS STEP - TYPE 1- 250# RATING				
Model	Step	Width	Height	Sale
6004	4'	13"		57.95
6005	5'	16"		68.95
6006	6'	18"		72.95

FIBERGLASS STEP - TYPE 1A- 300# RATING				
Model	Step	Width	Height	Sale
6004-S	w/pail shelf	4'	15"	63.95
6005-S	w/pail shelf	5'	18"	73.95
6006-S	w/pail shelf	6'	20"	80.95

ALUMINUM FLAT STEP TYPE 11- 225# RATED EXTENSION				
Model	Size	Working Length	Weight(lbs)	Sale
D1224-2	24"	21'	33#	179.95
D1228-2	28"	25'	42#	209.95
D1232-2	32"	29'	53#	239.95
D1236-2	36"	32'	62#	266.95

ALUMINUM FLAT STEP TYPE 1- 250# RATED EXTENSION				
Model	Size	Working Length	Weight(lbs)	Sale
D1324-2	24"	21'	39#	195.95
D1328-2	28"	25'	50#	225.95
D1332-2	32"	29'	62#	257.95
D1336-2	36"	32'	77#	318.95
D1340-2	40"	35'	85#	359.95

ALUMINUM FLAT STEP TYPE 1A- 300# RATED EXTENSION				
Model	Size	Working Length	Weight(lbs)	Sale
D1520-2	20"	17'	37#	189.95
D1524-2	24"	21'	45#	220.95
D1528-2	28"	25'	56#	246.95
D1532-2	32"	29'	66#	289.95
D1536-2	36"	32'(250# rating)	79#	339.95
D1540-2	40"			



# Curly Cherry Highboy

*Making the upper case, drawers and gooseneck molding*

by Randall O'Donnell





Earlier in my career, I built kitchen cabinets. At that time, dovetailing meant using a jig and router. I dovetailed more than a thousand drawers that way. But when I decided to become a period furniture maker, I knew those days were over—only hand-cut dovetails would do. Abandoning the speed of a jig for tedious handwork seemed crazy at first, but with my first hand-cut joint, I learned it wasn't as hard as I thought.

Dovetail joinery is a large part of what goes into constructing the upper case of this highboy. With its bonnet top and graceful moldings, this chest of drawers appears to be a formidable project. But stripped of embellishment, it's simply a large dovetailed box containing smaller dovetailed boxes.

Finding high-quality, wide stock was my biggest challenge. I was fortunate to find outstanding curly cherry. I used poplar for all the secondary wood except the drawer bottoms, where I used aromatic cedar. Using cedar is more work because it involves joining narrow stock, but the wonderful smell that escapes as you open a drawer makes the effort worthwhile.

I described my approach for building the base unit in *FWW* #117, pp. 80-85. Now I'll detail construction of the upper case (see the photo at left). That involves making the carcass, framing the bonnet top, making the drawers and carving the curved crown, or gooseneck, molding.

### Building the basic box

It's virtually impossible to find a single board of figured wood wide enough for the sides. But two well-matched boards glued together look fine. The first step is to glue up stock for the case top, bottom and sides. A piece of furniture like this needs stock that's slightly thicker than what's usu-

**An American classic**—The dovetailed upper case of this bonnet-top highboy is capped by a sweeping gooseneck molding, which is made with hand and power tools. Construction of the lower case, including its cabriole legs, was covered in the previous issue of *Fine Woodworking*.

ally used on case pieces. I use 7/8-in.-thick stock for the entire case, internal framing and drawer fronts.

I start by flattening one face and jointing one edge of each board. Then I thickness plane the boards to within 1/16 in. of their final thickness. Next, on the tablesaw, I rip the boards to width. I usually don't bother to joint the boards after ripping because I've found that with a good blade and a true-running saw arbor, it's not necessary.

Now I glue up the boards. Once the glue has dried, I sand the pieces to thickness on a wide belt sander. Later, after all the joinery has been cut, I'll surface all the sides, inside and out, with a handplane and cabinet scraper. This gives a handworked texture.

The case is joined at the corners with through dovetails (see the photo at right). The top corners are hidden by the moldings and bonnet, and the bottom corners are covered by the base and the waist molding. This doesn't mean you should be less careful in the joinery, but it does relieve some of the pressure. Flat and square boards make dovetailing easier (for more on dovetailing, see *FWW* #116, pp. 81-86).

After cutting the dovetails on all four corners, I lay the sides on the bench so I can mark the location of the dados that will house the drawer runners (see the drawing on p. 36). Using a router, I cut 7/8-in.-wide by 1/8-in.-deep dados across the width of the sides.

A rabbet runs around the back inside edge of the case to house the back boards. Using a router, I rabbet the top and bottom pieces across their entire length. The rabbet on each side piece, though, is stopped so that it doesn't break through the outside of the case. Rounded corners can be squared up with a chisel.

The last thing to do on the case is prepare it for the scroll board, the decorated piece that slides into place. With a router, cut the slots in the top front inside faces of the sides to house the scroll-board tenons. The front edge of the top must be ripped to its finished width to allow the scroll board to slide into place.

### Installing runners and rails

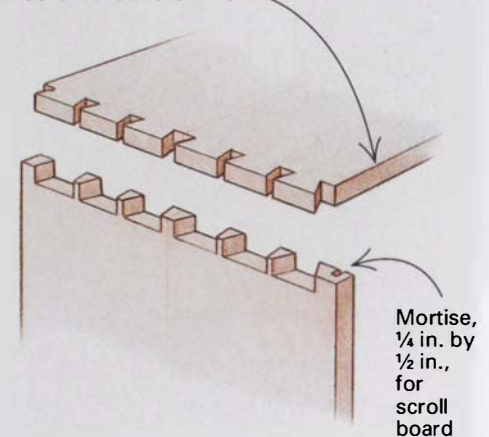
With the bulk of the joinery on the case sides completed, it's time to make the inte-

## THE BASIC BOX

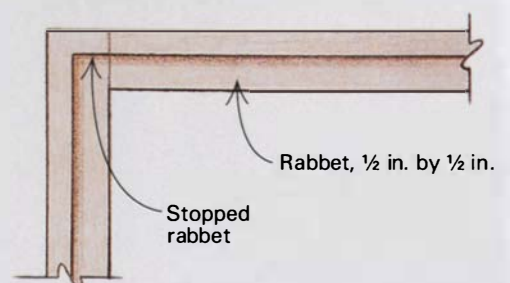


**It's really not complicated.** The upper case of the highboy starts as a large dovetailed box. Molding covers the joinery at top and bottom.

The top is 7/8 in. narrower than the sides to clear the scroll board at the front of the case.



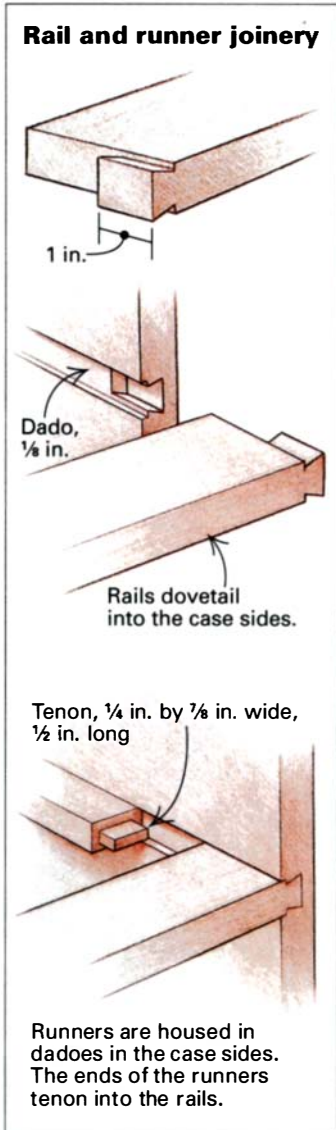
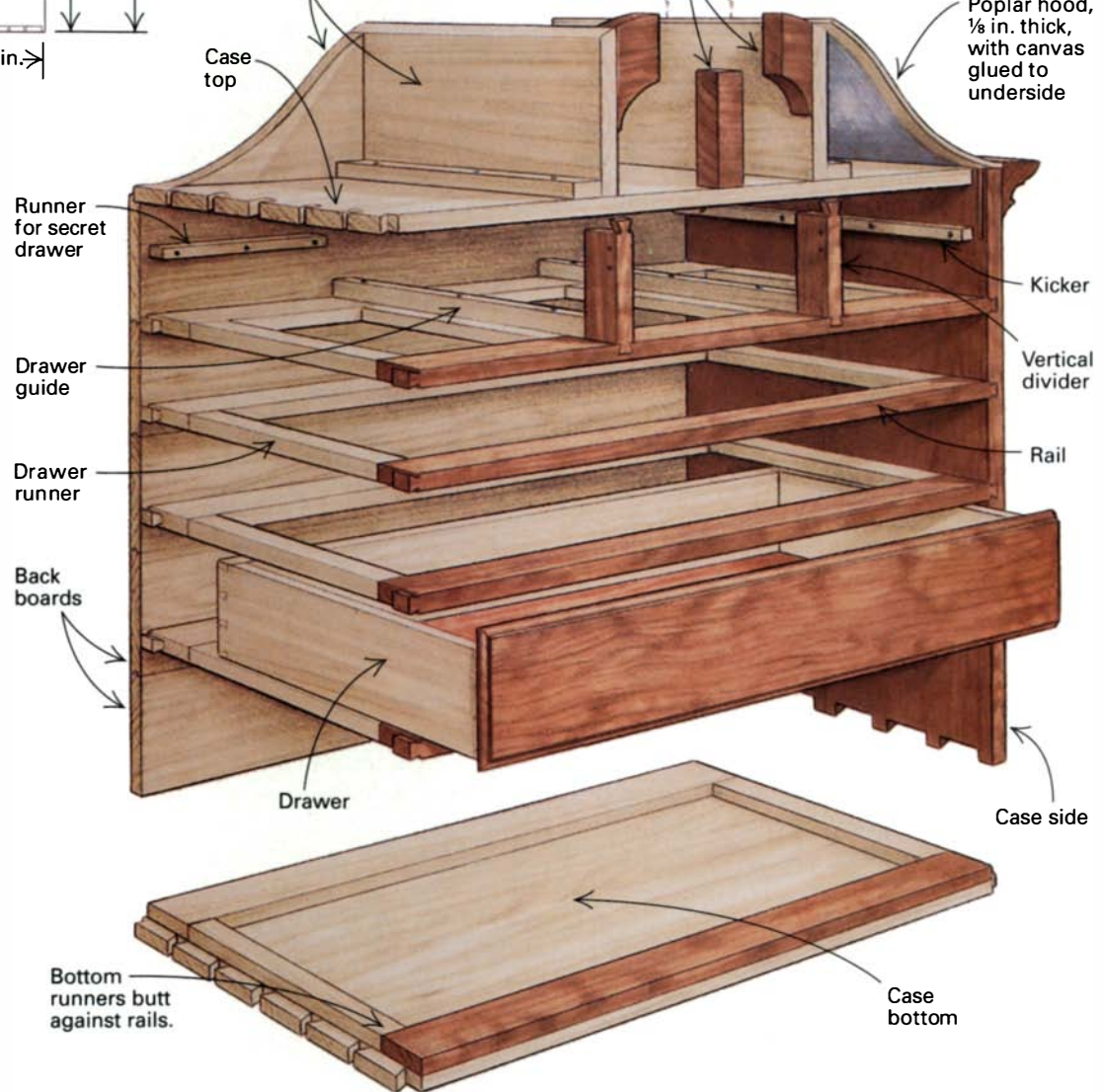
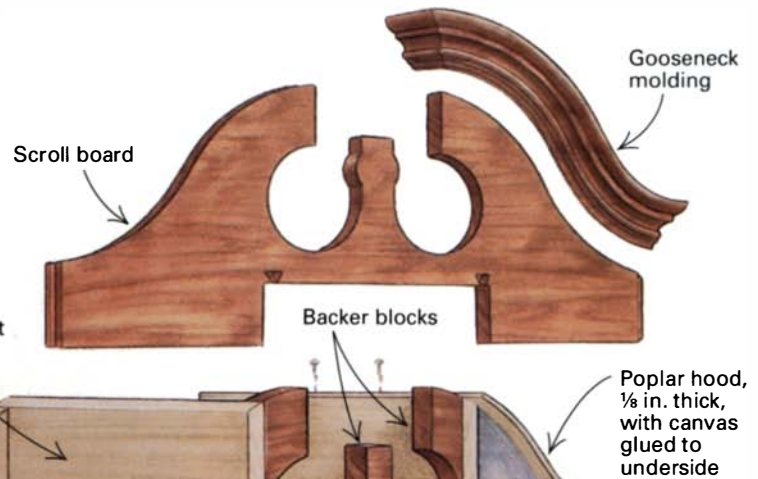
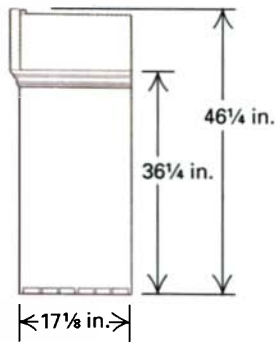
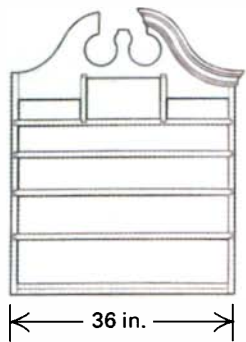
Case back is rabbeted for the back boards.





## Joinery details

The highboy uses simple dovetail and mortise-and-tenon joinery. This exploded view identifies all the parts used in this part of the highboy.



rior framework. Five rails run horizontally across the case at the front and back. These pieces, which help hold the case sides together, are the horizontal dividers between the drawers.

It would be easier to cut the front rails out of 7/8-in.-thick flatsawn cherry, but this would put the edge grain on the front of the chest between the drawers. I prefer the look of face grain on the front rails because

it complements the grain on the drawer fronts. To get face grain on the front rails, I cut the rails from quartersawn stock. An alternative method is to cut the rails out of 12/4 flatsawn stock, but quartersawn stock is more economical.

I start by ripping the rails to 2 3/4 in. wide and then cutting them to length. I group the rails into front-and-back pairs and lay out the 1/4-in.-wide, 7/8-in.-long mortises



## FITTING THE SCROLL BOARD



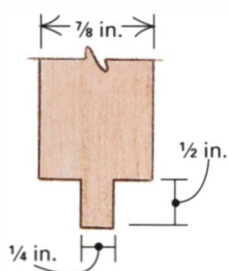
**Slide scroll board into place (above).** Make sure that the bottom edge is parallel with the rail below.

**Lay out vertical dividers.** Scribe the dovetails in the ends of the dividers into the scroll board and rail (right).



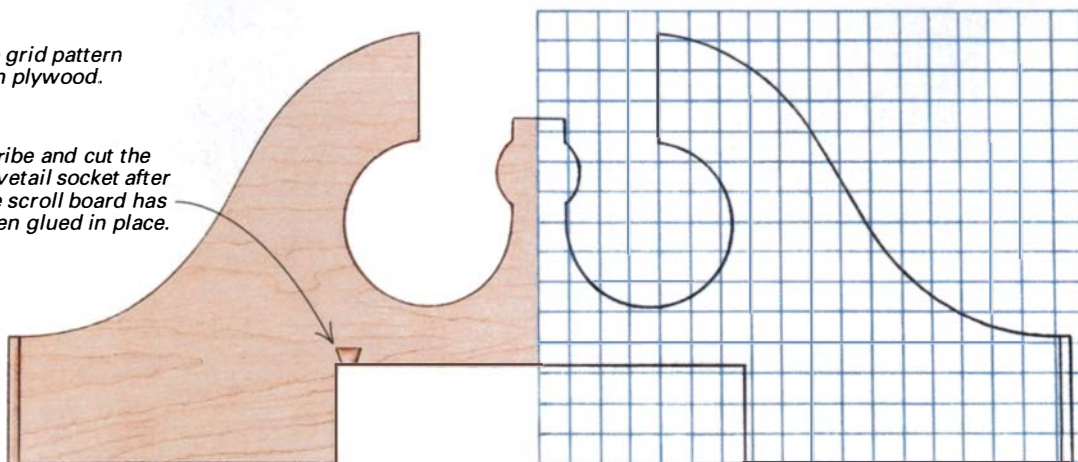
### Scroll-board pattern

To lay out the scroll board, use the grid pattern to make a full-size template on thin plywood.



**Scroll-board tenon**

Scribe and cut the dovetail socket after the scroll board has been glued in place.



1 sq. = 1 sq. in.

that will accept the tenons on the ends of the runners. I use a plunge router with a spiral, up-cut bit to cut the mortises 1/2 in. deep, and then I square up the corners with a chisel.

In the ends of the upper four rail pairs, I make 1-in.-deep dovetails. They'll slide into dovetail sockets that I'll cut after the case is assembled. The bottom rail doesn't need to be held in place by joinery. The

rail is simply glued to the case bottom.

The runners, which complete the interior framing, are tenoned into the rails. I group all these parts together and cut the tenons in one setup (for more on this, see *FWW* #117, pp. 80-85).

### Dry-fit the case before gluing

Before applying glue, it's best to dry-fit the case members. Any problems should be

corrected now. When the pieces fit correctly, I glue up the box, and then I make sure that the case is square (for more on clamping and squaring cases, see *FWW* #113, pp. 68-71).

After the clamps have been removed, I slide the rails into their respective locations and scribe the dovetails into the case sides. With the case on its back, I chop the dovetail sockets for each front rail. Then I place



## MAKING THE BONNET



*Trace the curve of the scroll board onto stock for the rear framing member.*



*Hold the bonnet frame square, and drill pilot holes for screws. Once the glue has dried, screws are replaced with forged nails.*



*Scribe the curve on the center wall using the scroll-board template.*

the case face down and chop the rear dovetail sockets. I can now glue the front rails in place and allow the glue to set. Next I lay the case face down, glue the drawer runners into the front rails and apply glue to just the front 2 in. of the runner in the dado in the case sides. I don't glue the runners to the back rails, so the case sides can expand and contract freely with humidity changes. Now I glue the back rails in place. And, finally, I glue the bottom drawer rail to the case bottom.

The drawer kickers behind the scroll board prevent the top outside drawers

from tipping when they are pulled out. Because these kickers do not carry much weight, they are glued and nailed to the interior case sides with cut nails, as was done on many Early American pieces. Because of the cross-grain construction, I apply glue only along the front half of the kicker.

### **Scroll board completes the case work**

The scroll board is cut from stock that is 14¼ in. wide. Although a single, full-width board is nice, you can join two narrower boards. For the best appearance, though,



*Fair the center walls to the scroll curve. Using a handplane, the author works from front to rear to prevent chipping the scroll board.*



## SHAPING THE GOOSENECK MOLDING

one of the boards should be at least 11 $\frac{3}{4}$  in. wide so that the glue joint is hidden by the gooseneck molding. Before cutting the stock, I make a full-size pattern of the scroll board from thin plywood.

It's easier to cut the tenons on the ends of the scroll board and make the center drawer opening while the board is rectangular. I cut the tenons with a router and a spiral bit and edge guide. Then I bandsaw the rough opening for the center drawer.

I use a router fitted with a flush-trimming bit and a template to make the finish opening, and I clean out the two corners with a chisel. I bandsaw the profile at the top of the scroll board and then smooth it on my belt sander.

With the scroll cut, I lay out and carve the circular fan in the plinth (carving for this highboy will be explained in *FWW* #119). Once the glue is applied to the tenons, the scroll board can be slid into place (see the photo at left on p. 37).

The next step is to fit the vertical dividers for the top center drawer opening. I cut the dividers to size and dovetail the ends first. Although the divider is 2 $\frac{3}{4}$  in. deep, the dovetail is only  $\frac{1}{2}$  in. deep. I scribe the dovetails to the rail and scroll board (see the photo at right on p. 37), cut the dovetails with a fine backsaw and chisels, and glue the dividers into place.

Riven oak pins anchor the inner edge of the scroll board to the dividers. I drill two  $\frac{1}{4}$ -in. holes through each divider and into the edge of the scroll board. I put a little glue on the edge of the pins and drive the pins into the holes, cutting any bit of protruding pin flush with the surface. The upper carcass is now ready for the bonnet framework and thin bonnet top and the gooseneck molding.

### Framing the bonnet

The scroll board establishes the curve of the bonnet, but additional framing is needed to enclose this area and support the hood. The first step is to copy the curve from the front scroll board (see the top left photo on the facing page) and to cut the two poplar pieces to shape. Next I cut the stock for the center walls and the cleats that will attach the frame to the case top, and then I glue these pieces together.

I use screws to clamp the parts together temporarily (see the center left photo on the facing page). I replace the screws later with forged nails. The bonnet's frame, like many other traditionally made pieces, does have some cross-grain construction. The



**Removing waste quickly**—A router does the heavy work quickly. The author will hand-carve the details in this traditional deep molding.



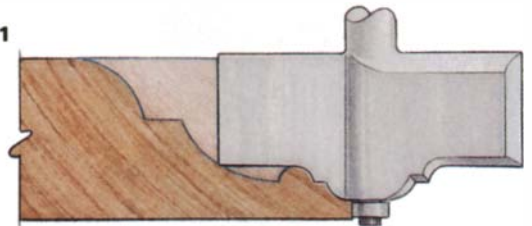
**Custom-made router bits** establish the overall profile of the gooseneck molding.



**Use a gouge that matches the cove radius.** The router-cut blank leaves guide marks for the width and depth of the cove.

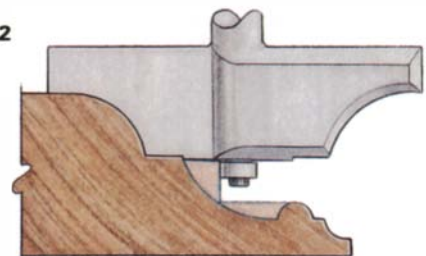
### Molding in three steps

Step 1



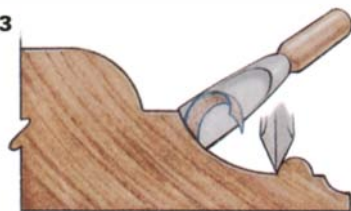
Stock removed by first bit.

Step 2



Stock removed by second bit.

Step 3



Shape with gouges.



## FITTING THE GOOSENECK MOLDING



**Clamp the molding in place, and scribe the miter locations (above).**

**Screws hold the molding to the fence so that the molding can be accurately and safely mitered (right).**



**Locate the molding  $\frac{1}{4}$  in. above scroll board (above).**

**Test-bend the hood over the frame. To control cracking, glue canvas to the inside of the hood before it's nailed to the bonnet frame (right).**



nails accommodate the wood's seasonal movement without sacrificing strength.

After the glue has dried, I use my hand-plane to fair the center walls with the curve of the scroll board (see the photo at right on p. 38).

### **Gooseneck molding is routed and then carved**

This traditional molding profile has an astragal bead that stands proud of a large cove, creating a dramatic shadow line. I've made a variety of architectural moldings on my shaper, but this profile, with its S-curve shape, is best worked by a combination of router and carving tools.

I start with a full-size pattern to lay out the S-curve on a wide piece of  $1\frac{1}{2}$ -in.-thick stock. Then I bandsaw and smooth the inside curve to the layout line. I had a pair of router bits made to remove the bulk of the waste quickly (see the center photo on p. 39). The pilot bearing of the first bit follows the inside curve of the blank (see the top photo on p. 39) and creates part of the profile (see the drawing on p. 39). The pilot bearing of the second bit follows the shoulder cut made by the first bit and removes more material.

The remaining material is removed with carving tools, and the entire molding profile is lightly sanded. Finally, I bandsaw the outside curve to separate the molding from the blank and sand the curve to the layout line. The straight moldings for the case sides are made in the same manner.

### **Mount the molding, and install the hood**

The top edge of the molding extends about  $\frac{1}{4}$  in. above the scroll board curve to form a rabbet for the front edge of the hood. To locate the miters, I clamp the molding stock in place and scribe the inner edge of the miter.

Mitering the curved molding can be tricky. To hold it in place securely, I screw the molding to the wooden fence on my miter saw. The straight molding is cut by placing the stock upside down with the back edge against the fence. Once the molding is cut, I drill holes and nail it into place with forged finish nails. The plinth and the upper arch of each scroll have fragile short-grain sections that need reinforcement, so I glue backer blocks behind each of them.

The hood is an  $18\frac{1}{2}$ -in.-wide poplar board that I plane to  $\frac{1}{8}$  in. thick. It is bent over the frame and nailed in place (see the photo at left). Most antique hoods have





**Make the drawers after the case work is completed. Batch like parts to speed up the work and produce more consistent results.**



**Secret drawers add a little mystery. The drawers slide toward the center and can be withdrawn from the case.**

cracks in this thin piece of wood, and a few minor splits are unavoidable. But to prevent major cracks, I glue canvas to the underside of the hood with contact cement. This makes a ply construction, and so far, none of my bonnets have any serious cracks. Minor cracks seem to be confined to the ends.

### **On the home stretch with drawers, backboards**

Once the top and bottom cases have been assembled, I make the drawers. After I select the most highly figured boards for the drawer fronts, I make sure that the growth rings on the stock of all the drawers have the same orientation (the faces closest to the bark are all in or all out). Don't mix them up because I've found that the sapwood side will never darken quite as much as the heart, even when the wood comes from the same log.

I cut all the drawer fronts to size, run a bead around the entire drawer front and

rabbet the top and sides for a lip—there's no lip on the bottom edge. I check the fit of each drawer and make adjustments. Prior to cutting the dovetails, I carve the fans on the two middle drawer fronts.

Batch all the drawer parts, and lay out and cut the dovetails (for more on drawers, see *FWW* #104, p. 65). The cedar bottoms are fitted after drawers have been glued up. During glue-up, I use a temporary plywood bottom with corners cut off to help square the drawer and to make it easier to clean glue out of the corners.

Even though each drawer front has been fitted to its openings, I work each drawer lightly with a handplane after assembly. A little fussing is usually all that is needed to make each drawer fit perfectly.

Secret compartments add an air of mystery, and this highboy has several. I added two secret drawers inside the case above the two small drawers at the top; they're hidden behind the scroll board. Though not deep, the drawers are plenty big enough

for jewelry or documents (see the photo above right). I also made false bottoms in two other drawers. These have a 1/2-in. space between two drawer bottoms. The upper bottom is completely housed in a groove. The lower bottom slides in from the back. It's held with a loose-fitting nail that can be pulled out with your fingers.

Five individual boards are used to close the back of the case. The 1/2-in.-thick boards are handplaned inside and out and have tongue-and-groove edges. I fit the boards horizontally across the case and nail them at the ends. □

*Randall O'Donnell is a period furniture-maker who lives in the countryside near Bloomington, Ind.*



**Next issue: the fans and finials**

In the next issue, Randall O'Donnell describes the carved fans and flame finials that complete this highboy. An article in the previous issue detailed the lower case.



# Low Assembly Bench

*Versatile platform puts your work at the right height*

by Bill Nyberg



My father learned woodworking in Sweden, and when he came to this country, he got a job building reproduction Early American furniture. The shop had been in operation since the late 1700s, and like those who worked before him, my father was assigned a huge bench with many drawers. He stored his tools and ate his lunch at the bench, but much of his actual work took place nearby on a low table he called “the platform.”

When I inherited his big bench, I also found myself doing most of my work at a low platform improvised from sawhorses and planks. I have bad shoulders and the occasional sore back, so using a full-height bench is difficult and unproductive.

I needed a bench that suited the way I really work, so I built a low platform that incorporates some features of a traditional full-sized bench.

## A clamping machine

My low platform bench is made for clamping (see the photos on the facing page). The edges overhang enough for clamps to get a good grip anywhere along the length of the bench. A 4-in.-wide space down the middle increases the clamping options.

This platform bench has four tail vises made from Pony No. 53 double-pipe clamps, which can be used by themselves or in combination with a row of dogs on the centerline between the screws, as the drawing shows. Unlike most bench arrangements, with a single row of dogs along one edge, this one doesn't twist or buckle the piece. I can use each vise singly or with the others because the pipes are pinned into the benchtops at each end with ¼-in. by 2-in. roll pins. Without the pins, the pipes would slide through the bench when tightening one end.

Rather than using traditional square bench dogs, I bored ¾-in. holes for a variety of manufactured dog fixtures or shopmade dowel dogs (see the drawing).

## Building the benchtops

The bench is made from eight straight, clear 8-ft. 2x4s that I had kept in the shop for a few months to dry. I jointed the edges and then ran each of the boards through the planer until the radiused corners were square.

Building the legs and base according to the dimensions on the drawing is straightforward. The only point to note is the dovetail connecting the beams to the legs. Because of the orientation of the beams and legs, the dovetail is only 1½ in. at its widest point, but it's 3½ in. from top to bottom. I tilted the tablesaw blade to cut the tails on the beam and cut the pins on the legs in the bandsaw. Almost any method would work to join the beam to the leg; my first version of the bench used a bolted slip joint.

**The pipes run through the tops**—The tops are made in two sections and glued up with the pipes and vises in place. The upper sections are made of three boards and the lower section from two. I edge-glued them with alternating growth rings to eliminate cupping. I cut 7/8-in. grooves

lengthwise in the top face of the bottom section to accommodate the pipes.

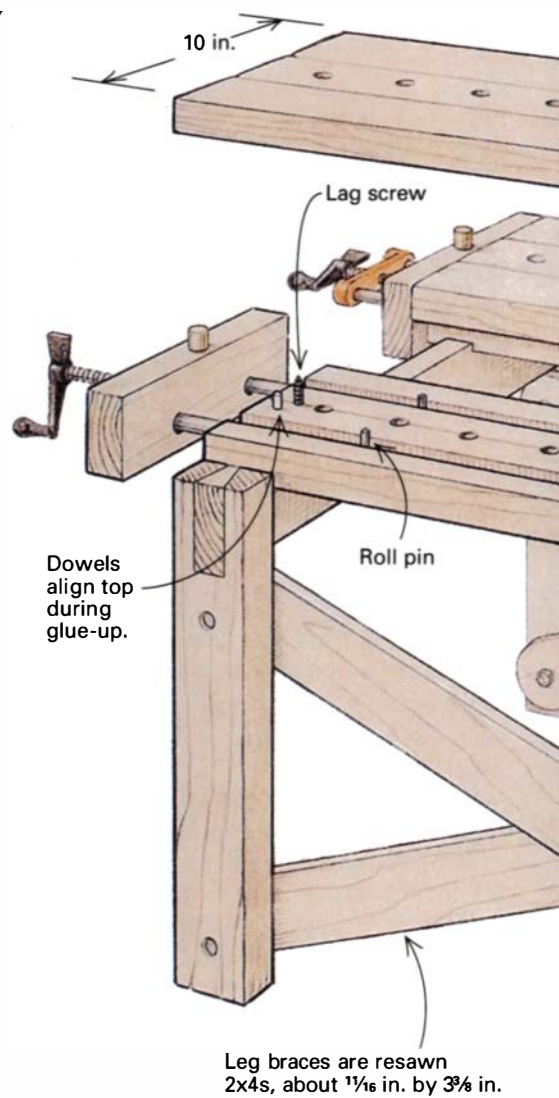
The tops are held to each beam with a single lag screw, which allows seasonal movement. To lock the tops into the base, I cut dadoes on the lower faces of the bottom sections to fit over the beams.

## Assembling the double-pipe clamps—

The double-pipe clamps are sold with a

## A low bench made for clamping

This bench is 24 in. high, a convenient height for working on many projects. The benchtops are 42½ in. long, which gives more than 4 ft. between the jaws. At about 70 lbs., the bench is light enough to move around yet heavy enough for stability.





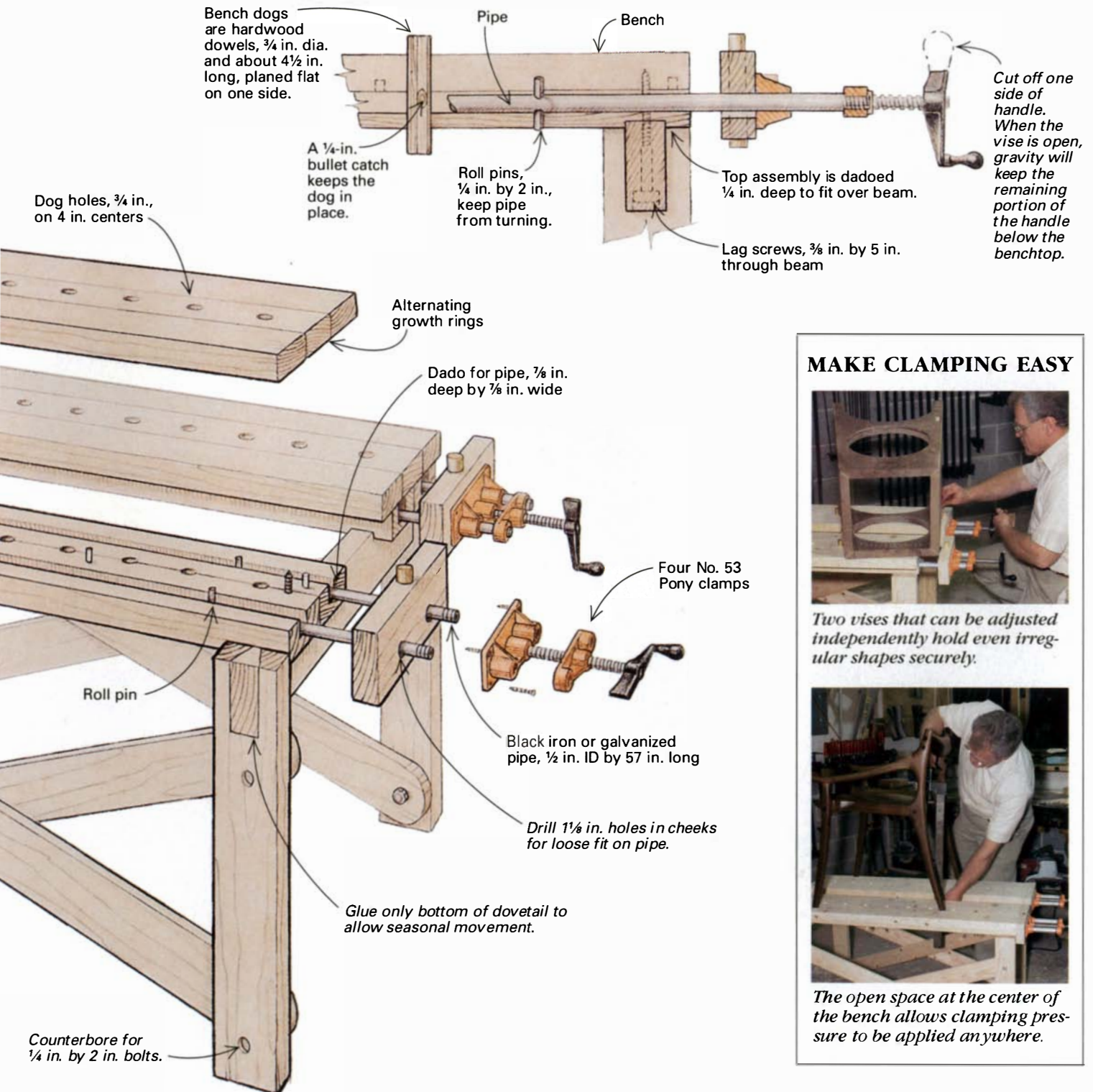
tail stop and a screw head. I set aside the tail-stop ends and used only the screw heads. Threading on the vise at one end of the pipe will unscrew the vise at the other end. So I had a plumber cut the threads twice as long on one end of each of the four pipes. I threaded the first vise all the way onto the end with double-long threads so that it was twice as far on the pipe as it needed to go. By the time the

second vise was in place, the first one had unscrewed itself to the correct location.

**Keep ends flush when gluing**—Before the pipes are installed in the grooves, I cut all the bench pieces to length. Once the tops are glued up, the pipes and vises are in the way, so it's hard to trim up ends that aren't flush. For flush ends, I aligned the pieces with dowel pins between top and

bottom. I applied the glue and clamped the top and bottom sections together with the dowels in place. After the glue was dry, I drilled for the roll pins from the bottom so they wouldn't show. □

*Bill Nyberg is director of ophthalmic photography at the University of Pennsylvania in Philadelphia. He works wood in his spare time.*



### MAKE CLAMPING EASY

*Two vises that can be adjusted independently hold even irregular shapes securely.*

*The open space at the center of the bench allows clamping pressure to be applied anywhere.*

# Choosing Shaper Cutters

*Toolmakers are improving safety and quality*

by Lon Schleining





A shaper is an indispensable tool in my custom stairbuilding shop. But I had used one for 12 years before I could bring myself to try anything other than standard wing cutters. I'd heard too many stories about knives that had been thrown from old-style cutterheads to feel comfortable with them on my own shaper. Eventually, I was convinced to try modern cutters with replaceable knives—what the industry calls insert tooling. To my surprise, I found a lot had changed in cutter design.

Even with new products on the market,

*Wing cutters can be stacked and the tips staggered so only half are cutting at a time. These custom cutters are made with a shear angle to give a smoother cut.*

Photo: Alec Waters

there are still only two basic kinds of cutters: those with permanently attached cutting edges, like the wing cutters I was used to, and those with interchangeable knives. Developments in design and manufacture have produced safer, better-performing tools of both varieties. European safety standards have led to a new family of wing cutters, and insert tooling is now offered in several styles that are a big improvement over the old-fashioned cutters, which I refuse to use.

Many manufacturers make shaper cutters, and each offers a variety of profiles. Panel-raising, flush-cutting, detailing and molding (contouring) cutters are just a few of the common styles. There are also matched sets, like cope-and-stick cutters, for making rails and stiles in doors and paneling. Generally, the bigger and more powerful the shaper, the bigger the cutter you can use and the larger the cut you can take in one pass.

Most cutters have either a 3/4-in. or 1 1/4-in. bore, which are the two most widely used spindle diameters, and two to four cutting edges made of high-speed steel or tungsten carbide. High-speed-steel cutters are less expensive and can be ground to a sharper edge than carbide. But I use carbide because it holds an edge much longer. This is important because every sharpening reduces a cutter's diameter. For matched cutters, all the knives in the set must be carefully sharpened to maintain the mating profiles.

Not surprisingly, the best shaper cutters are the most expensive. But I consider cost last. The expense is only for the short-term. Over the long haul, I've found that high-quality cutters are a better investment.

### **Wing cutters are easy to set up**

Three-wing carbide-tipped cutters (see the top photo on p. 47) are just about my standard tooling choice. Solid cutters run true and require no special expertise to set up

because there are no loose parts. They are available in hundreds of stock contours, and you can stack different cutters on the spindle to produce complex profiles. In addition, cutters can be made in almost any custom profile (see the box on p. 47).

Wing cutters usually have two or three wings, but four-wing cutters are not uncommon. Two wings are best for clearing chips quickly and for removing a lot of stock in one pass, but manufacturers prefer cutters with three wings because they are easier to balance. More wings mean more cuts per minute and, therefore, a smoother cut. The cost of a cutter is directly related to the number of cutting tips.

Wing cutters often incorporate a shear angle to improve the cut quality. This is where the cutting face is angled rather than parallel with the spindle. The shearing action slices rather than chops the wood.

### **Safety cutters help reduce kickback**

The most recent development in wing cutters is a new antikickback design (see the bottom photos on p. 47), also called safety or chip-limiting cutters. Developed in Europe, safety cutters limit how far cutting edges protrude from the body of the cutter. Viewed from above, these cutters look more like a disc than a propeller. Because the body of a safety cutter is only slightly smaller than its cutting diameter and because there is no open passage behind the cutting face, these cutters require a slower feed rate. In use, safety cutters and conventional cutters are impossible to tell apart. Kickback is minor. The biggest drawbacks to the new safety cutters are high cost and limited availability. Also, local saw shops may not be able to sharpen them.

### **Insert tooling is versatile**

Replacing just the knives rather than the entire cutterhead makes insert tooling attractive to both production shops and one-

*Even with new products on the market, there are still only two basic kinds of cutters: those with permanently attached cutting edges and those with interchangeable knives.*

off operations (see the bottom left photo below). In a production run, knives that get dull or damaged are easily replaced, and having a spare set reduces down time. In addition, replacing dull knives with new ones maintains a consistent profile.

For short runs in a variety of profiles, insert tooling is economical, especially when you are using high-speed-steel knives. These steel knife blanks can be ground to virtually any profile.

As a group, though, interchangeable cutters require more care in set up and use. Every fastener must be carefully tightened. Knives must be in good condition so that

they will seat properly. And they must be sharpened as a set to remain balanced. Finally, the assembly must be checked to be sure that the knives protrude equally from the cutterhead.

A slip-knife cutterhead is an early example of insert tooling. The slip knives are clamped on edge between two collars, and friction caused by compression of the spindle nut is all that holds the knives.

The disadvantage, and major safety concern, with slip knives is that they can fly out of the cutterhead if the spindle nut is not sufficiently torqued down. You have to be especially careful when you install and use

these cutters. Setup is time-consuming and requires a higher level of expertise than any other type of tooling.

### **Latest insert tooling adds safety to versatility**

A safer alternative to older style slip knives are lock-edged knives (see the top right photo below), which have milled teeth in one edge of each knife. These teeth engage an adjusting screw in the collar. This forms a mechanical connection between the cutterhead and the knives and allows the knives to be set so they all have a consistent cutting diameter. Some toolmaking

## *Interchangeable knives*



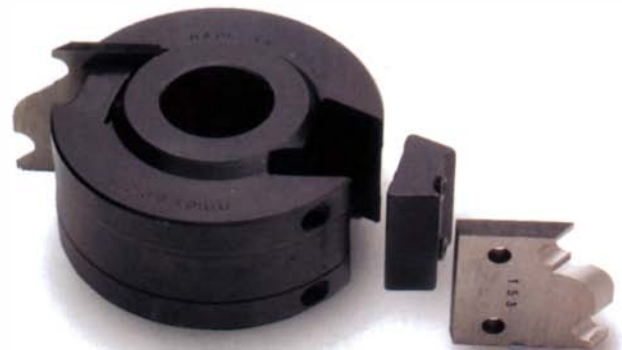
**Chip-limiting insert tooling provides increased safety.** A plate in front of the knife exposes only a small portion of the blade to prevent overfeeding.



**Lock-edged cutterheads have interchangeable knives.** Teeth in the edge of the knife engage a screw in the cutterhead.



**Wing cutters use insert tooling.** Replaceable tips mean little down time when a cutter becomes dull or damaged.



**Wedge-shaped gibs hold the knives in place.** A pair of pins holds each knife to the cutterhead if the gib ever loosens.



shops can mill teeth in the edges of older slip knives so that they can be used in a lock-edged cutterhead.

Another type of insert cutterhead holds a pair of high-speed-steel knives in place with wedge-shaped gibs, which is somewhat similar to the setup for some jointer knives. A pair of pins registers each knife in the cutterhead and forms a mechanical safety lock (see the bottom right photo on the facing page).

A similar design also uses a wedge-and-gib screw but adds serrations across the back of the knives. These grooves interlock with matching grooves in the cutter-

head to form a mechanical connection. The serrations also provide a reference to help set the distance the knife projects from the cutterhead.

Insert tooling can be purchased with a full set of knife profiles. Or you can purchase just the cutterhead and the knives you need. A number of manufacturers offer pre-ground knives and blanks made of high-speed steel. In addition, some manufacturers sell solid-carbide knives. □

*Lon Schleining builds custom staircases in Long Beach, Calif., and teaches woodworking at Cerritos College in Norwalk, Calif.*

## Ordering custom cutters



*Custom-made, carbide-tipped wing cutters save time. Two cutters mold this large banister profile with the fewest setups.*

Despite the availability of many stock profiles, you may need a custom shape. Some toolmakers can produce a custom profile from a drawing and have it ready the next morning.

To locate a good toolmaker, call the supplier where you get stock cutters or ask at the blade-grinding shop that you use. A knowledgeable sales person can save you time and money.

It helps to remember that a toolmaker is first a metal worker. He may know a lot about tooling for woodworking, but woodworking may not be his area of expertise.

The more information you can supply, the better. Specify the basics: cutterhead type, knife-blank size, spindle diameter and machine horsepower. It also helps to know the material being worked and whether it will be hand- or power-fed.

A careful drawing is a good start. If you are trying to match a pattern exactly, send a sample of the molding itself. If you are cutting a curve, specify the radius of the curve and how you intend to run the stock through the shaper. When in doubt, ask for a return drawing with your quote so that you can see if the cutter the toolmaker has in mind is actually the tool you need. And if he has made something similar for another client, a call to that person may be a good idea. —L.S.

## Fixed knives

*Wing cutters have become the standard tooling choice. They are available in a variety of profiles.*



*Safety cutters minimize potential for kickback. The reduced gullet opening limits the stock feed rate.*



# Padding Lacquer

*A quick, easy alternative to French polishing*

by Mario Rodriguez

For me, French polishing is the finish of choice for the very finest furniture. When done well, a French polish has a soft but brilliant glow that brings out all the depth and color of the wood without the heavy buildup generally associated with a high-gloss finish. No other finish even comes close.

I've taught French polishing for years, and for beginners, it can be a nerve-racking juggling act. The ingredients of a French polish—shellac, oil and pumice—must be applied at the right time and in the proper amounts. The addition of each can improve the finish dramatically—or destroy it. Padding lacquer is an amazing one-step mixture of dissolved shellac, lubricants and nitrocellulose resins. It produces a surface virtually identical to that of a traditional French polish, without the risks. It still requires a lot of elbow grease, but because it's a premixed formula, you can concentrate on applying it and not worry about maintaining a delicate balance of ingredients. There are several brands of padding lacquers from which to choose (see the sources box on p. 50). I haven't found significant differences among them.

In addition to being convenient and easy to apply, padding lacquer dries quickly, so you don't need a special finishing room. It can even be applied on-site, eliminating the need to bring a piece of furniture back to the shop for finish repairs. And because shellac is the primary ingredient in a padding lacquer, it can be applied over other finishes. Finally, padding lacquer has a variable sheen. The more or less sanding you do will increase or decrease its gloss.

## Surface preparation

For more formal furniture pieces, which generally look best with a high-gloss finish like a French polish, I scrape the wood until I have a fairly flat, uniform surface (see the photo at left below). Then I sand with 220-grit and 320-grit sandpaper (see the photo at right below).

After wiping the surface with a dry rag, I wash it down with denatured alcohol. This raises the grain slightly and allows me to see sanding scratches and any other flaws (see the top photo on the facing page). If I want to fill the pores slightly for a smoother finish, I wet-sand with worn 320-grit wet-or-dry sandpaper and denatured alcohol. If I want a glass-smooth, nonporous finish, I use a filler (for more, see the box on p. 50). For a moderately porous, more natural-looking finish, just dry-sand with 320- and 400-grit sandpapers once the denatured alcohol has dried.

## Applying padding lacquer

When using padding lacquer, all you need is a 6-in. square of lint-free cotton. Old T-shirt scraps work great. Just make sure that there aren't any creases or seams in the center of the pad because they can mar your finish.

I pour a small amount of padding lacquer into the center of my cloth and let it soak in a few seconds. Then with a small, circular motion, I begin to rub the polish vigorously into the surface (see the center left photo on the facing page). Initially, the surface will

## SURFACE PREPARATION

**1. Scrape the surface until it's flat and even in appearance.**

**2. Sand with the grain using 220- and then 320-grit sandpaper.**





## APPLYING PADDING LACQUER

**3. Check for sanding scratches and other flaws by flooding the surface with denatured alcohol. This also raises the grain slightly, so follow up by sanding with 320- and then 400-grit sandpaper.**

**4. Quick, circular motions bring up a shine. Move the pad in tight circles in a small area, applying a good deal of pressure. The surface will be hazy at first, but after just a minute or so, a shine will start to come up. Apply less pressure as the shine increases.**

**5. Work just a few square inches at a time, blending adjacent areas. Apply more pressure on unfinished areas.**

**6. Polish the whole surface lightly. Take a clean rag, apply just a little padding lacquer and rub very lightly. The rag should just skate across the surface. Do this until the whole surface has a uniform sheen.**





## Pore filler gives a glass-smooth surface



**Pour it on, smear it around.** You don't have to be fussy when applying wood filler—just fill all the pores. Move the rag around; then use a scraper.



**Filled pores, satin sheen—**Paste wood filler dries to a satin sheen even before padding lacquer is applied. The filler dries rock-hard, so wipe the surface clean.



**Like a mirror—**With its pores filled, this crotch mahogany panel takes on a finish that's a dead-ringer for French polish—a warm but brilliant sheen.

In traditional French polishing, pumice helps fill the pores in the surface. Padding lacquer has no pumice, so the pores don't get filled appreciably, except by the padding lacquer itself. The result, depending on how much sanding you've done, is a relatively open-pored surface.

To get a glassy-looking, nonporous surface with padding lacquer, I use Behlen's pore-filling compound called Pore-O-Pac paste wood filler (see the sources of supply below). Pore-O-Pac is available in six shades.

Applying the filler couldn't be easier. I pour some on the surface I'm going to polish and wipe it all around with a rag (see the top photo). Then I use a scraper like a squeegee, moving the filler across the wood in all directions. This works the filler into the pores.

I let the filler remain on the surface between 30 minutes and one hour before wiping it off. This filler dries rock-hard, so it's important to clean the scraper and the surface you're filling. Otherwise, it will take a belt sander to remove it. I use a clean rag and keep wiping until the rag comes off the surface without any residue.

I wait 24 hours for the surface to dry, and then I fine-sand with 320- and 400-grit sandpaper. After sanding, I wipe down the surface with a rag soaked in denatured alcohol.

I let the surface dry and start applying the padding lacquer. A brilliant gloss will start to come up almost immediately (see the photo at left). —M.R.

haze and the cloth will drag a little, but with firm, steady pressure, an attractive shine will quickly start to appear. As I move from one small area to another, I carefully overlap my applications for uniform coverage (see the center right photo on p. 49).

A second coat can be applied almost immediately. As you build up the polish, though, you should extend the time between coats for the best results. When I get to my fourth and fifth coats, I usually wait between 12 and 24 hours.

### Feathering out the finish

Even with very careful application, some areas will have more of a sheen than others, and the overall surface may look splotchy. You'll want to go over duller areas and make the surface as uniform as possible.

Then put a small amount of padding lacquer on a clean rag, and apply it over the entire surface, using a broad, circular motion. Bring the cloth just barely into contact with the work surface—almost glancing over it. This will eliminate any small streaks or blotches and leave a consistently brilliant, thin film (see the bottom photo on p. 49).

### Repairing mistakes

As easy as padding lacquer is to use, I do run into small problems from time to time. These problems usually appear as rough crater-like patches. If they're not too severe, I simply pad over them. The application of new material usually will soften the area and vigorous rubbing will level it out. If this doesn't do the trick, I'll let the panel dry overnight, scrape or sand the damaged area flush the next day and then repolish. After a coat or two, blemishes will disappear completely.

### Finishing on the lathe

I often use padding lacquer on lathe-turned objects, including table pedestals, spindles, cabinet knobs and tool handles. Here the application is even easier. Sand to 320-grit with the object spinning on the lathe. Then raise the grain with alcohol, and sand again with 320- and then 400-grit paper. You can apply the padding lacquer a little more heavily on the lathe, but don't use so much that it's spraying off the workpiece. Use gentle pressure on the rotating workpiece, and watch an incredible gloss develop. □

*Mario Rodriguez teaches woodworking at the Fashion Institute of Technology in New York City and at Warwick Workshops in Warwick, N.Y. He is a contributing editor to Fine Woodworking.*

## Sources of supply

The following companies sell padding lacquers and/or fillers.

*Behlen's Qualasole, a padding lacquer, and Pore-O-Pac, a paste wood filler, are distributed through:*

**Garrett Wade**, 161 Avenue of the Americas, New York, NY 10013; (800) 221-2942

**Woodworker's Supply**, 1108 N. Glenn Road, Casper, WY 82601; (800) 645-9292

*Behlen's Qualasole and Constantine's own Pad-Lac, another padding lacquer, are available from:*

**Constantine**, 2050 Eastchester Road, Bronx, NY 10461; (800) 223-8087

*#77 Lubricite, a padding lacquer, is available from:*

**Industrial Finishing Products**, 465 Logan St., Brooklyn, NY 11208; (718) 277-3333





**Wooden-bodied buckhorn scrapers** take only a few hours to make and can be shaped to fit the curves of any project.

# The Buckhorn Scraper

*Smooth any contour with wooden-bodied scrapers made for the job at hand*

by Scott Wynn

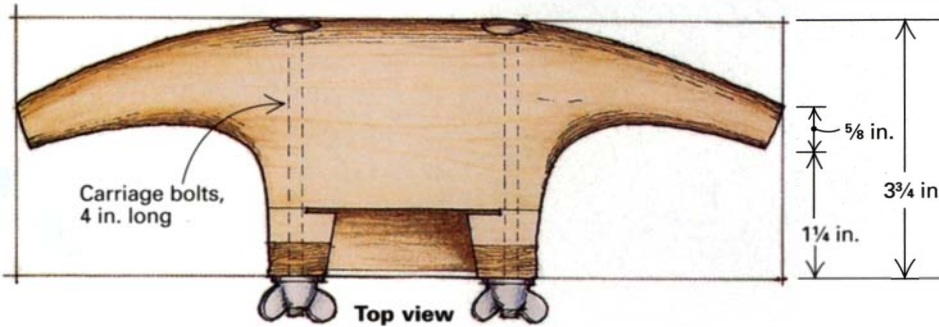
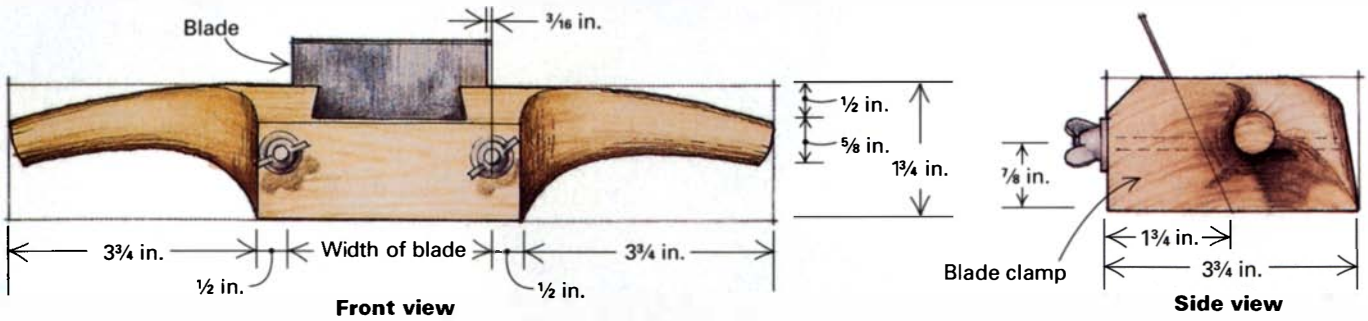
**A**n odd-looking scraper caught my eye at a tool swap several years ago. It had a round wooden body with handles flared out like horns, and the sole was curved along both its length and width. The old-timers called it a buckhorn scraper. I could see it would be comfortable to use, and that the handles would increase leverage and control. Thinking it a mere curiosity, I put the scraper down and went on to something else.

A year or so later, I built a set of eight cherry chairs with backs coopered in two directions. I needed a way to smooth the insides and outsides of the backs, preserve their shape and prevent grain

tearout. I thought of several methods, but nothing seemed right until I remembered the buckhorn scraper. I realized that if I had a few such scrapers with the right sole configurations, I could scrape all the surfaces of the chairs smooth while maintaining the compound curves (see the photo on p. 54).

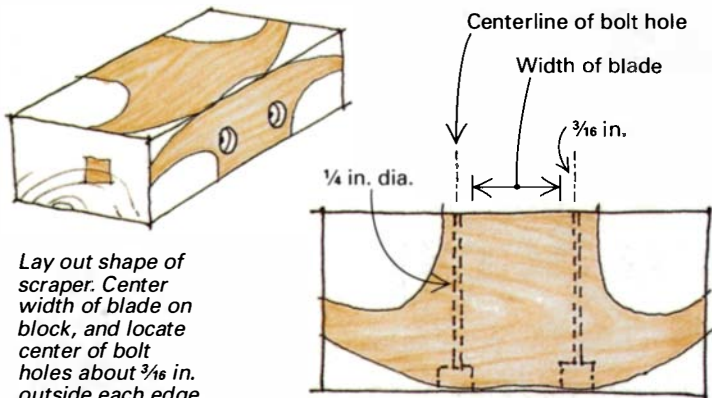
As the drawings on the next two pages show, I started with a block of 8/4 maple and began by shaping the flared handles. To create a blade clamp, I cut away the front of the block at an angle and bolted it in place. A little work with a handsaw and a chisel opened the throat for chip clearance. I shaped the sole to match

# MAKING THE BUCKHORN SCRAPER



Make scraper from an 8/4 block of dense, close-grained wood such as maple or beech. Size it to width of blade.

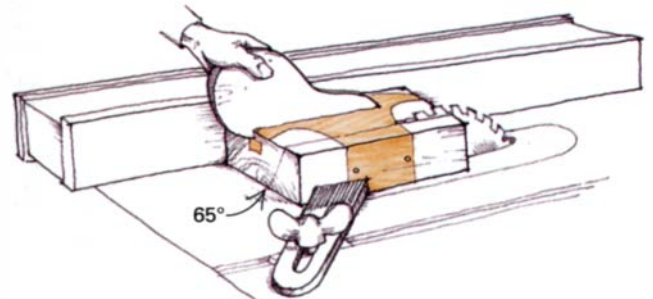
## 1. Shape the body, and cut the blade clamp



Lay out shape of scraper. Center width of blade on block, and locate center of bolt holes about  $\frac{3}{16}$  in. outside each edge of blade.

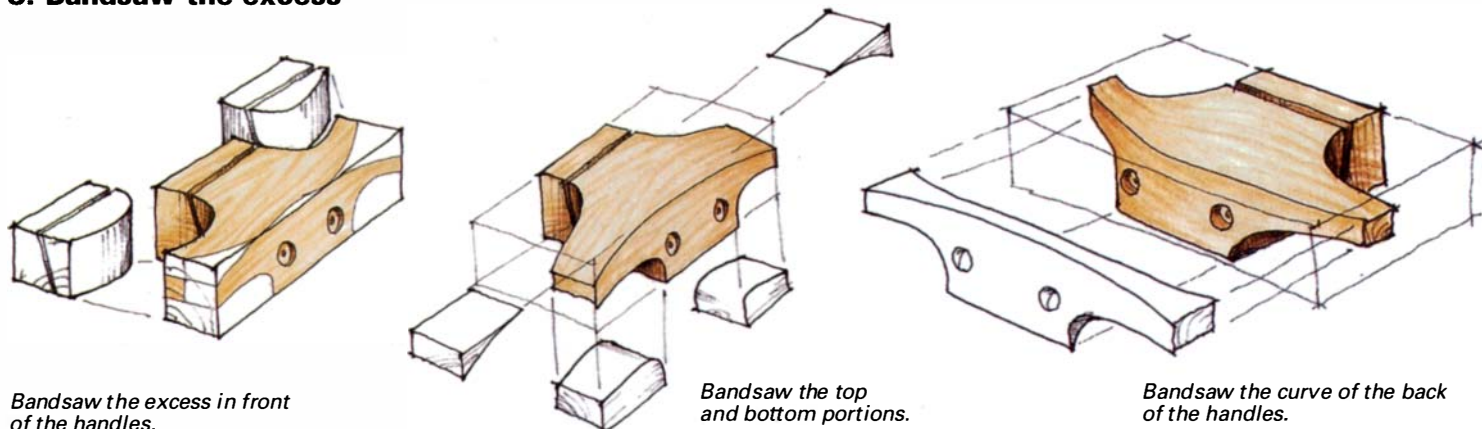
Countersink for carriage bolts,  $\frac{5}{8}$  in. holes drilled  $\frac{3}{8}$  in. deep

## 2. Saw the blade clamp



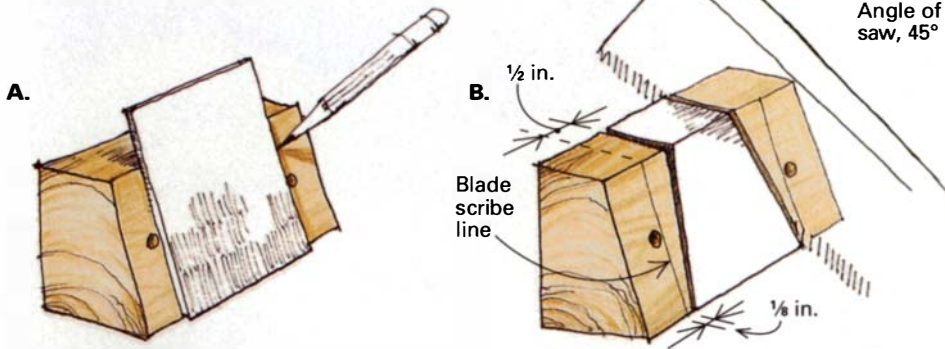
Cut blade-clamp portion free at a 65° angle. Bolt, hot-melt glue or tape pieces back together for bandsawing shape of body.

## 3. Bandsaw the excess



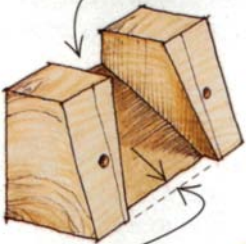


#### 4. Cut the blade seat



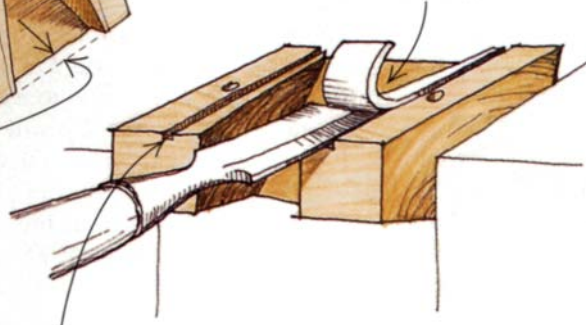
Open throat for chip clearance by cutting as shown.

**C.** Clean up throat with chisel.



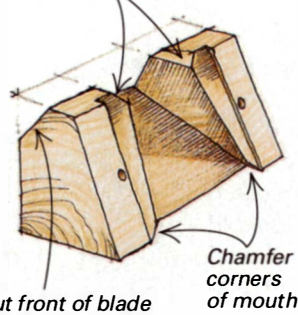
Cut back the mouth about 1/4 in.

**D.** Depth slightly less than thickness of blade



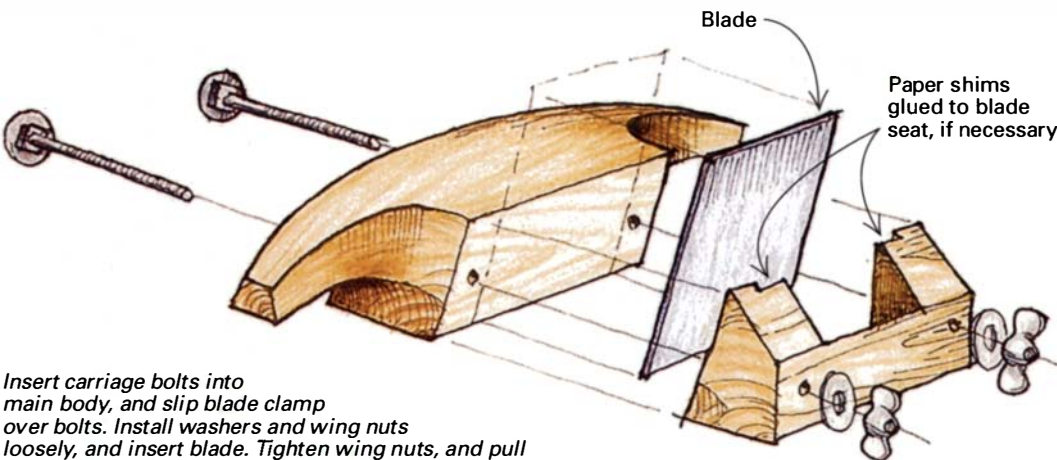
On scribe lines marking outside of blade, make a saw cut to a depth slightly less than thickness of blade. Pare blade seat down to that depth.

**E.** Chamfer here.



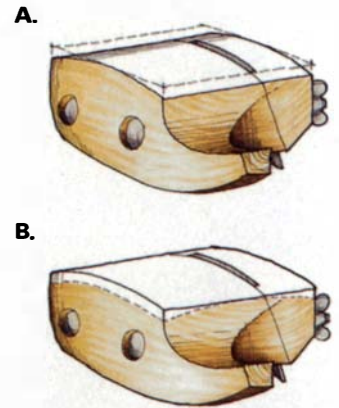
Chamfer corners of mouth.  
Cut front of blade clamp at an angle to bolt holes. Leave room for washers (see drawing 5 below).

#### 5. Fit the blade seat

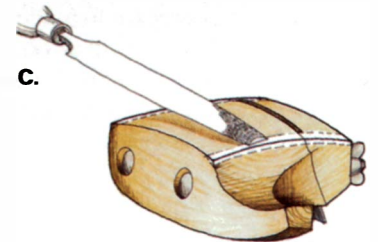


Insert carriage bolts into main body, and slip blade clamp over bolts. Install washers and wing nuts loosely, and insert blade. Tighten wing nuts, and pull on blade to see if it's secure. If the blade moves, tighten the fit by gluing paper shims to the blade seat. When the blade fits, round off and smooth the body with a rasp, scraper and sandpaper.

#### 6. Shape the sole



Mark curves on all sides of scraper to fit workpiece. Cut or rasp curve across length of sole, as shown in drawing A. Fair curve to line. Then cut across width, as shown in drawing B. Curves in each direction should be constant. If workpiece has been roughed out fairly evenly, use it to finish shaping sole of scraper. Lay 80-grit sandpaper on work with grit side up, and rub scraper over abrasive in direction you'll be scraping. Repeat with 100- and 120-grit paper.



Even when the sole is correctly shaped, the wood on either side of the blade may hit a high spot that lifts the scraper enough to prevent the blade from contacting the work. To avoid this, cut the sole on either side of the blade at a slightly more severe curve for the whole length of the scraper, as shown in drawing C.



**A scraper for any job**—Over the years, the author has made a number of wooden-bodied buckhorn scrapers for concave surfaces, convex surfaces and compound curves. Some of the scrapers can share blades.

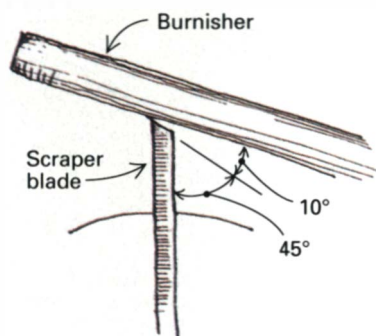
the work and shaped the blade to the sole. In a short time, I had a comfortable finishing tool.

**Shaping the blade**—I get my scraper blades from a variety of sources. I've used blades from my cabinet scrapers, bought new or used blades at tool swaps and made blades from old handsaws. A blade will often work in several other scrapers depending on the configuration of the sole. If the scrapers are curved only along their length, a straight-edged blade will work in all of them. Scrapers with the same radius curve across their width also can share blades. Because scraper blades have two useable sides, one blade can have two different profiles, further reducing the number of blades I need.

To give a blade the correct curve, I simply install it in the completed scraper so it's just barely exposed through the mouth. I mark the curve and remove the blade. When sharpened, the blade will be honed at a bevel, but when I'm shaping the blade, I grind the edge square down to the line. I check my progress frequently by reinserting the blade and sighting down the sole.

Once the blade is shaped, I grind a 45° bevel while maintaining the curve. Then I hone the back and the beveled edge of the scraper just as I do a plane blade. I turn the burr as shown in the drawing above.

These angles are a starting point. Harder woods often scrape best with a lesser burr angle and sometimes with no burr at all. I've also varied the bevel down to approximately 30° with good results. The hardness of the steel, the depth of the cut, the type of wood being scraped and the curve of the sole along its length all affect the amount and the angle of the burr. Determining the optimum angles for your scrapers will take experience.



### Turning a burr on a beveled scraper blade

*Using moderate pressure, stroke the burnisher along the bevel a few times at 45°. Then tilt up the handle of the burnisher, and take three or four strokes, tilting up the handle a little more each time. The last stroke is at about 10° to the bevel.*

**Using the scraper**—These scrapers are not tools for hogging off wood; I get the surface fairly even before using the scraper. If the surface isn't well-prepared, the scraper will skip, making it difficult to tell if the scraper is set properly. Initially, I set the blade in the scraper for a light cut by sighting along the sole and adjusting the blade until it protrudes evenly, just as I do on a plane. Then I make a few trial cuts.

I almost always push the scraper over the work. The difficulty in using this tool lies in keeping the blade in contact with the wood on work curved the length of the scraper. To do that, you must slightly rock the body of the scraper back and forth as you push it. Sometimes I put two fingers on the clamp portion of the scraper to get better control (see the photo on p. 51). Even so, there are strokes where the blade makes no contact.

I adjust the blade with a well-placed mallet tap and strike only the main body of the scraper, not the blade clamp. Lightly tapping the block behind the blade will back it out a little, and tapping behind the blade at one corner will angle the blade. Tapping the blade itself sets it deeper (not an option when the top of the blade also has an edge). Another way to advance the blade is by tapping the sole with a mallet.

Once I've scraped the entire surface, I sharpen the blade, hack it off to a lighter cut and scrape again. I follow this with a small flexible scraper to remove any ridges. Then I sand with 120-grit paper on a shaped block and do the finish-sanding with 220- or 320-grit paper on a flexible rubber block. □

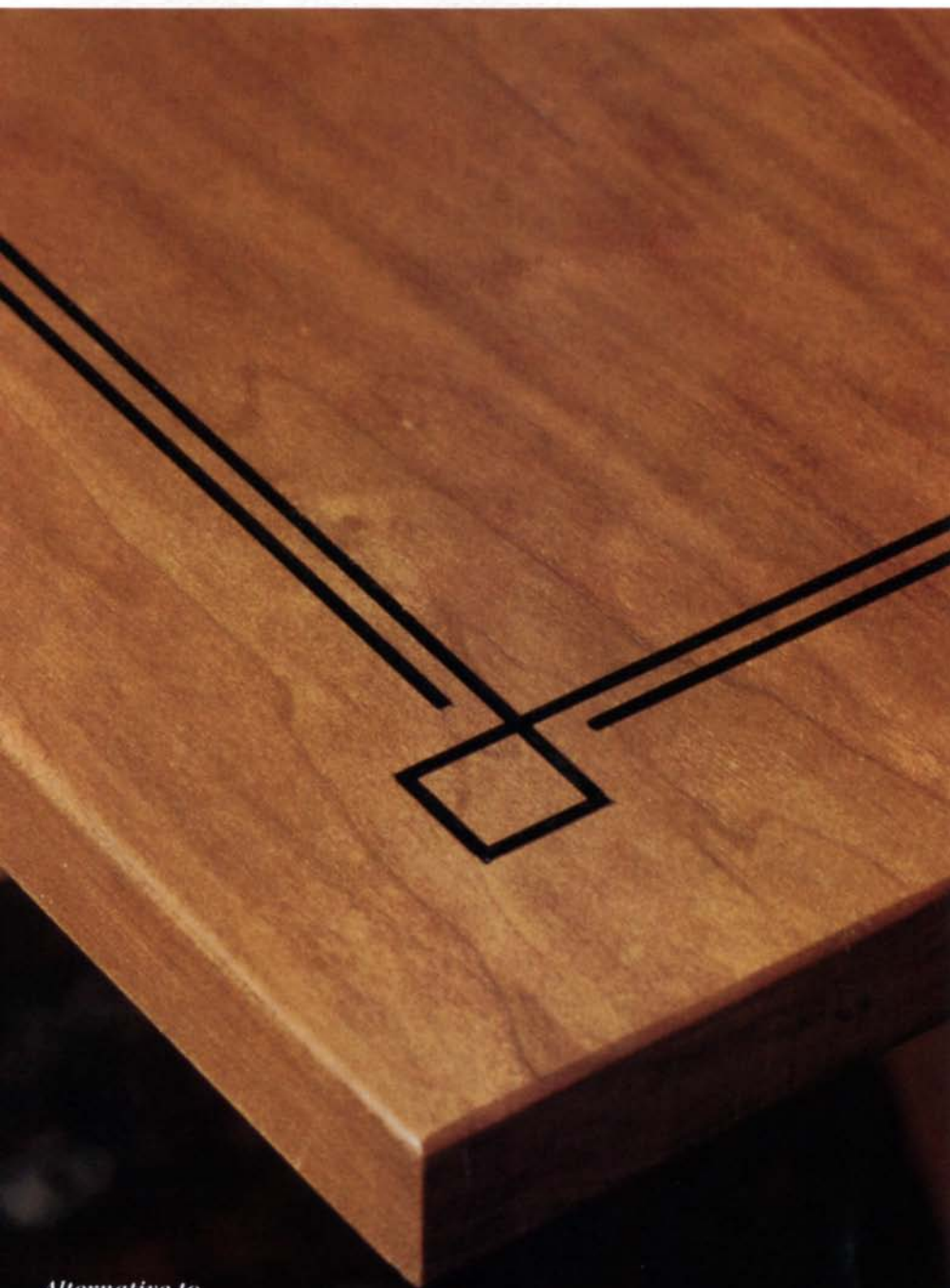
*Scott Wynn is an architect, designer and builder of furniture in San Francisco, Calif.*



# Epoxy Inlay

*Tough, fast-drying resins can replace traditional wood accents*

by Jeff Miller



*Alternative to wood inlay: Epoxy resin mixed with a colorant like graphite produces nearly the same effect as wood inlay.*

I've been designing furniture with decorative inlays for years. At first, I used wood strips for the inlay material, just as you'd expect. That was until I began a series of cherry pieces with intricate ebony inlay. Suddenly, I was yearning for an easier approach. So I began experimenting with other materials, and the best results came from epoxy.

Using epoxy means there is no careful sizing of wood strips to groove width, something of a problem when the strips are  $\frac{1}{16}$  in. to  $\frac{1}{8}$  in. wide and the grain isn't perfectly straight. Splicing, cutting to length and mitering are all eliminated.

Epoxy is an attractive alternative, but it isn't foolproof. There can be bubbles and voids, and the color occasionally bleeds into end grain. With practice, you can cope with these problems.

Epoxy resins are highly allergenic, and they are strong irritants. Wear gloves when handling epoxy, and use a good respirator. The resins give off fumes when mixed and when curing. Dust from epoxy is also an irritant. So take precautions when sanding.

## **Performance varies with the epoxy**

Epoxy is well-suited for use as inlay. It doesn't shrink as it hardens, it adheres well without requiring pressure, and there's enough elasticity to cope with cross-grain movement. Many pigments and materials can be mixed in to create a variety of colors and effects.

I've tried a range of commercial products, from hardware-store brands (both quick and slow set) to more specialized formulations. Most give adequate results. I've had the best luck with Star E150 epoxy filler (Liberon/Star Supplies, P.O. Box 86, Mendocino, CA 95460; 800-245-5611). It has a rather thick consistency (a little thicker than peanut butter), but it spreads easily, doesn't show many bubbles and tends not to bleed into end grain.

Different products have widely different cure times, mixing instructions and viscosi-

ties. A more liquid epoxy is easier to apply, but it tends to bleed more into end grain. The thicker stuff won't bleed as much and won't run out of an open groove as easily, but it's a little harder to apply.

### Carefully cut and trim the grooves

I rout grooves with a sharp  $\frac{1}{8}$ -in. or  $\frac{1}{16}$ -in. straight cutter, using either a fence to guide the router along the edges or a pattern and a bearing-guided bit (see the near right photo). Depths of  $\frac{1}{16}$  in. to  $\frac{3}{32}$  in. seem to work best. That's deep enough for a good bond, and there's enough material to allow for aggressive sanding if necessary. Corners may be cut square with a sharp chisel (see the bottom left photo).

No matter how the grooves are cut, the surface probably will need sanding. It's also a good idea to run some 320-grit paper lightly in the groove to eliminate any remaining fuzz on the walls of the groove.

The biggest drawback with epoxy is that the unhardened resin will creep into any inconsistencies in the groove. Chips or wavering lines that look inconsequential when they are cut can turn into glaring problems when filled with a dark resin. That's why it pays to look over and repair the piece carefully before going too far. You may even need to patch imperfections with solid wood.

Colored resin can bleed into end grain, exactly what you'll find along the length of a cross-grain groove. This problem isn't serious with a clean cut in a fairly closed-pore wood like maple, but it is serious with open-pore woods like oak (so much so that you should choose a different species of wood when using this technique).

Try a test piece. End grain can be sealed with a clear coat of epoxy applied with a cloth in the groove. Be sure to wipe off the excess. I allow the epoxy to cure until it's set, but I don't wait until it becomes completely hard because the inlay won't adhere as well.

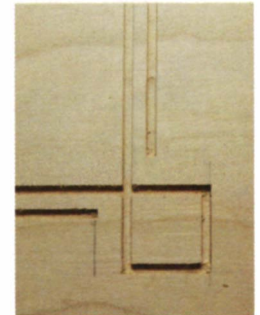
### Mix epoxy, and then add color

After the grooves are prepared, the next step is to mix the proper ratio of resin and hardener to make the epoxy (see the top left photo on the facing page). Check the directions carefully because the ratio varies widely from product to product. Once thoroughly mixed, any number of additives may be blended in. I've found that graphite powder makes a good black colorant. Both artist's acrylics and universal

## CUTTING AND PREPARING THE GROOVES



*A router cuts the grooves. A  $\frac{1}{16}$ -in. straight bit and an edge guide on the router help make grooves of uniform depth. They still must be cleaned up.*



*Clean grooves carefully before trying epoxy. The end of a small file ground to form a narrow chisel squares up corners. Fuzzy edges and the bottoms of the grooves should be cleaned up with 320-grit sandpaper.*

tinging colors are effective and result in smooth colors. Any basically non-reactive powder will work.

Color consistency can be a problem, so if you mix up a color, make a recipe. One batch usually is enough, but you may need to do some touch-up work the next day. And if the piece is large, the epoxy may start to set before you can finish. A number of batches may be needed.

### Apply epoxy mix with a stick, and watch for bubbles

After mixing the Star epoxy and colorant, I use the same stick to spread the resin. I

press the resin firmly into the grooves, leaving some extra on the surface to allow for settling (see the bottom left photo on the facing page). For epoxy that's not as thick, I've used a plastic-tipped syringe or an empty squeeze bottle. For really big jobs, empty caulk tubes can be used.

The biggest potential problem is trapped air bubbles in the resin. Mainly, these are from air whipped in during mixing. Waving a lighted propane torch over the epoxy after it has been applied almost magically releases the bubbles, but do this carefully. Keep the torch 6 in. away from the surface, and keep it moving fairly rapidly. Try not to



## FILLING AND SANDING THE EPOXY



**Mix epoxy and colorant thoroughly.** Proportions of resin and hardener vary with the type and brand of epoxy, so read directions carefully.



**Press resin firmly into grooves.** Use the same stick to mix the resin and push the epoxy into the grooves.



**Sand off the excess and inlay emerges.** Although hardened resin can be sanded by hand or scraped, the author prefers his stroke sander. Before sanding, allow the epoxy to harden thoroughly, so it won't be pulled from the grooves.



**Now's the time to repair minor flaws.** Air bubbles can leave tiny craters in the finished resin. After the surface is sanded, examine the inlay, and patch any faults with a new mix of epoxy. When it's hardened, carefully sand the surface flush.



**Careful preparation pays off.** If grooves have been cut and cleaned properly, the result is clean and crisp.

heat up either the wood or the epoxy. You should see lots of tiny bubbles exploding. Go over all of the inlay lines a few times, but don't get carried away. I don't have to do this with the Star epoxy.

### **After the resin has cured, clean off the surface**

Let the epoxy set overnight, or long enough so that you can work it without having it gum up or pull out of the grooves. Planing, scraping and sanding all can be used to clean off the excess (see the center photo above). I don't plane too close to the surface for fear of cutting into it. Scraping

works well, but it can leave little ripples as the scraper follows bumps in the epoxy. Sanding is effective, but it has two problems: The colored epoxy dust gets into the pores of the wood, and the dust is dangerous to breathe. Dust can be blown off with either compressed air or light scraping. A good dust mask is essential.

As you clear off the mess you've made, you will see the full effects of your inlay, as well as any voids, imperfections and air bubbles. Repair is simply a matter of going around carefully with a new batch of colored epoxy (see the top right photo). For adhesion, I use a pin to scratch the areas

that need touch-ups. A toothpick or shop-made equivalent is perfect for applying the epoxy. If the defect is very small, the pin should work fine. After another round of sanding—scraping is likely to pull out your touched-up spots—you should be ready to apply finish.

Oil finishes work well over epoxy inlays. Lacquer may form pits around the smallest bubbles. Check carefully for these after the sealer coat, and fill them in as needed. □

*Jeff Miller designs, builds furniture and teaches at his studio, J. Miller Handcrafted Furniture, in Chicago.*



# Turning Rotted Wood

*The dregs of your woodpile can yield some beautiful results*

by Robert J. Lentz

Some people cringe at the thought of using rotted wood for anything, especially for turning. Not me. I like it because I can get some really interesting figure and color, and I'm making use of wood that would otherwise be wasted.

I use the word *rotted*, but many woodworkers prefer *spalted* to describe lumber showing signs of decay. It's, really, just a difference of degree. The kinds of fungi that cause spalting (incipient decay) will eventually lead to rotting (advanced decay) if left unchecked. Much of the wood I use falls somewhere in between.

Wood has loomed largely in my life from very early on. As a youngster growing up in Pennsylvania (even the name of that state contains the Latin root of the word *sylva*, meaning woods), I used to go on rounds with my grandfather, a sawmill foreman. He'd choose the trees to be cut and hauled to the sawmill where he worked. Later on, I worked part-time with my father in my uncle's furniture store, where I saw how wood grain and color were blended to enhance the beauty of finished furniture. In college,



**Spreading the disease**—To promote fungal growth, cover the top of a log with shavings, and stack an already spalted piece of wood on top. Dampen the log with a hose. Signs of good fungal growth should appear within a few months.



I earned a forestry degree, and until I retired last year, I worked for the U.S. Forest Service on projects throughout this country and in the tropics.

Wood in any stage of decay responds differently to tools than lumber untouched by fungal agents. It takes some practice and some getting used to, but I think the results make it worthwhile. One note of caution: Turning decayed wood releases microscopic fungal spores into the air that can produce severe allergic reactions in some people. So you should wear a good-quality dust mask and ventilate your shop well. I've been lucky. So far, I haven't noticed any unpleasant symptoms.

### Find it, or make your own

I look for wood to turn anywhere I can find it. I've been known to ask road crews trimming trees on the highway for some of the waste pieces. A neighbor up the road from us, on the eastern shore of Chesapeake Bay, owns an old plantation set among acres of woodlands. He lets me glean pieces of wood lying on the forest floor, which is a great source for decaying wood.

Not the least of my supplies is in my backyard, where I have a good woodpile of hackberry, holly, maple, oak, persimmon and sweet gum. Some other species that work well are box elder, dogwood, yellow poplar and sycamore. Sometimes, I will promote the growth of fungi by standing a log on one end, covering it with wood shavings, wetting it down with the hose and placing an already spalted piece of wood on top of it (see the bottom photo on the facing page). The fungi seem to spread faster this way. During the summer, it helps to keep the wood in the shade. In a drought, I'll hose down the log occasionally to keep it moist.

The wood is ready to harvest when some of the bark peels off easily and signs of beetles or other borers are obvious. Mushrooms growing on the log are a good sign, too. The sapwood can be spongy enough to drive an awl into it with little effort, but you want the heartwood firm and with little rot. It's important that enough of the wood remains so that you can screw it firmly to a faceplate on the lathe. At this point, I nip 6 in. or so off either end of the log with a chainsaw and start to work on it right away.

### Turn the exterior slowly

I turn almost all my pieces mounted to the lathe on the end grain because the heartwood is usually the only part still intact enough to secure to the faceplate. Occasionally, I cut the log in half lengthwise and screw it to the faceplate. Either way, I flatten the spot for the lathe faceplate with a hand-held power planer and use a dozen or more 1½-in.- to 2½-in.-long hex-head lag screws (see the top photo), depending on the size of the blank I'm turning.

I always start out with the wood held between the head and tailstock centers of the lathe (see the center photo). The longer you can leave the wood between centers, the safer you are. Turning a piece with a large, open top will allow you to use the tailstock for support longer. If you're new at turning decayed wood, it's best to keep to this approach. Another precaution when turning: Never stand directly in front of the piece. Large chunks can break free and go flying.

With a rough blank, I set the tool rest a little below the center of the mounted piece—it seems to cut better in that position. I also readjust the tool rest as I remove the waste, keeping it as close to the surface as possible. I start turning at 100 rpm, using a ½-in.-deep fluted bowl gouge mounted to a shovel handle for extra leverage and control. The gouge is ground back to a steep angle



**No such thing as overkill**—When mounting a decayed piece on the lathe, the author drives a dozen or more 1½-in.-long lag screws through the faceplate into a small log of sweet gum.



**Start the lathe at a slow speed** when roughing out the shape with a gouge. Soft, spongy wood cuts differently from sound lumber: It chips or breaks more than it cuts.



**Grinding as an intermediate step**—After rough-shaping with the gouge and before sanding to a final smooth shape, the author sometimes uses a grinder with 60-grit paper to remove deep pits and to refine the shape of a vessel.



**Keep the piece between centers as long as possible. The author hollows out the interior, and then removes the tailstock. The waste in the center breaks off easily.**

on both sides. Decayed wood is more likely to vibrate because of the varying densities in the piece, so you have to go slowly.

After the piece is rounded over to a fairly uniform shape, I crank up the lathe to 250 or 300 rpm. I shape the base first, starting at the midrib, or center, of the piece and working toward the bottom end at the faceplate. I prefer to leave a large waste block here to support the piece when I work the inside.

After roughing out the base, I work toward the rim, or open end, starting at the midrib. For the final rough shape, I turn the gouge on its side to reduce the angle of cut. This gives me smoother results on the outside of the piece. I clean up the remaining rough, pitted surfaces on the exterior with a skew or a hand grinder loaded with a 60- or 80-grit disc (see the bottom photo on p. 59).

### Define the rim, and then turn the interior

I square off the top using a bowl gouge, and then I use a ½-in. roundnosed scraper ground along the left side to shape the rim. I set the thickness of the bowl at this time, using the same tool, by cutting the inside of the piece toward the rim. Because the walls of bowls made from decayed wood are weak, they must be a minimum of ¼ in. to ⅜ in. thick. And when sanding, more material will need to be removed to get rid of pits that result from turning.

I switch to the ½-in. bowl gouge to begin removing waste from the interior, keeping the piece held between centers as long as possible (see the top photo). Use calipers to check for uniform thickness. When there's not much left of the center waste, I turn off the machine and pull the tailstock out of the way. The waste breaks off easily. I position the tool rest inside the bowl, reduce the speed to 150 or 200 rpm and continue to gouge out the rest of the inside until I reach the bottom. I switch to a ½-in. scraper to clean up the inside upper surface of the bowl. I clean the inside bottom surface with a 1-in. roundnosed scraper, sharpened about 1¼ in. along the left side. I leave the waste block intact, so the piece can be remounted on the faceplate for final sanding.

### Drying, fast or slow

If the bowl is small enough, I dry it in a microwave oven. My wife isn't too thrilled because decayed wood at this stage sometimes releases a really foul odor, and it can still contain live insects—but not for long. I set the microwave at full power, bake for two minutes and follow that with four to eight minutes at defrost, or 50% power. I follow this procedure several times, letting it cool between cycles.

You can also air-dry the piece. Start by putting it in a fairly damp area, like the basement, and moving it periodically toward a drier place, like the attic. This process takes several months. Use a moisture meter, if you have one, to determine when you've reached an acceptable moisture level for your area, anywhere from 6% to 11%. Decayed wood seems to undergo less stress in the drying process than sound lumber. But you should inspect the piece periodically for checking. I use cyanoacrylate glue for minor repairs.

### Back to the lathe for final sanding

After the bowl has dried, I remount it to the faceplate and sand it to final shape, smoothing out the pits. I start on the outside and finish



**A flexible shaft will reach inside. This homemade tool (a drill chuck holding a sanding drum on the end of a flexible shaft) makes shaping and cleaning out the inside surfaces easier.**



**Cyanoacrylate for fixing repairs—The author prefers fast-setting Hot Stuff adhesive for its strength. He mixes mineral oil with sawdust or shavings from the turned piece to maintain a good color match and then applies the glue over that.**





with the inside. I've rigged up a flexible shaft that's driven by an old washing machine motor hung from the ceiling. A sanding drum fits in a chuck at the end of the shaft for cleaning up the inside of turned pieces (see the bottom left photo on the facing page).

Decayed wood remains very delicate—especially at the rim—so repairs may sometimes be required. I mix mineral oil with some of the shavings, as shown in the bottom right photo on the facing page. I use that mixture as a kind of filler that will make a good color match when the piece is finished. After that, I cover the repaired area with cyanoacrylate glue. I like this glue because it's strong, dries quickly and seems to hold up well over time.

After sanding the inside, I cut the bowl from the waste block with a handsaw (see the photo at left below). Then I remount the bowl on the lathe by pinching it between the tailstock and a ½-in. steel rod chucked into the headstock. I installed an old pulley onto the end of the steel rod and glued some foam to it as a protective pad.

I complete final sanding of the exterior by machine and by hand. I have another padded foam disc that I attach to the flexible shaft (see the center photo below), sanding with 80- through 220-grit paper to finish the exterior. At this point, the lathe serves only as a vise. I turn the bowl around by hand to complete the sanding.

### **Finish with a polish**

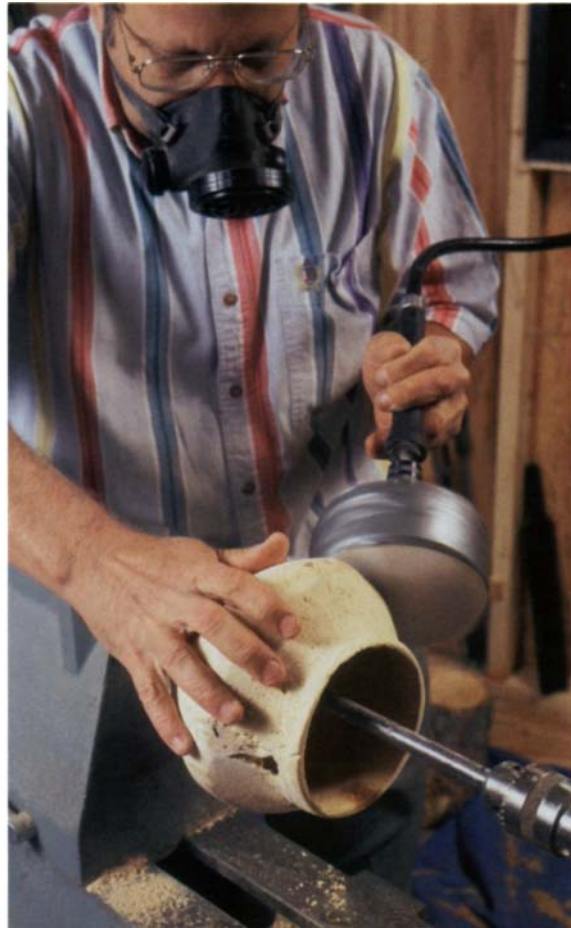
I start the finishing with a few coats of mineral oil, rubbed in with 220-grit wet-or-dry sandpaper. I follow that with several coats of Deft semigloss clear wood finish, allow that to dry overnight and buff with 0000 steel wool. I repeat that process over a period of several days until I get a deep, lustrous finish. After the last coat has dried for several days, I buff the finish, using cotton pads soaked in mineral oil and rubbed with tripoli polish. □

*Robert J. Lentz owns Chesapeake Woodart, in Pungoteague, Va., where he makes and markets one-of-a-kind turned vessels.*



**A handsaw is safer than a parting tool when separating the bowl from the waste mounted to the faceplate. The author cleans up the cut on a disc sander so that the bowl will sit flat.**

**The lathe serves as a vise for the final sanding stage. The bowl is held securely by a steel rod (with a padded blunt end) mounted into a chuck on the headstock. Rotate the bowl by hand.**



**Polishing to a final luster—***After several coats of mineral oil and hand-rubbed brushing lacquer applications, the author buffs each piece with tripoli polish applied to a set of heavily oiled cotton pads. He recommends an occasional coat of mineral oil to refresh an aging finish.*

# Choosing Tropical Hardwoods

*Rain forest preservation finds an unlikely ally in small-scale cooperatives that harvest wood*

by Jason Grant

Concern for the environment is a passion these days, and woodworkers have practical as well as philosophical reasons to care. Alarming stories of widespread timber overharvesting and tropical forest decline appear frequently in newspapers and on television. Already, some premier furniture-making woods have been lost. Cuban mahogany (*Swietenia mahagoni*) lapsed into commercial extinction near the turn of the century, and Brazilian rosewood (*Dalbergia nigra*) has become so scarce that it is now banned from international trade. Others are threatened. Burmese teak (*Tectona grandis*) and Honduras mahogany (*Swietenia macrophylla*) are not as plentiful as they once were, and lumber quality has diminished. Even though both species are available at relatively reasonable prices, highly figured boards and dense, old-growth lumber are harder to come by. Unless more conservation steps are taken (see the photo at right), these popular exotics and others could suffer a fate similar to rosewood's.

Woodworkers who want to do the right thing for rain forests can do two things to help: learn more about the forest management practices for the exotic woods they currently use (see the photo on the facing page), and start using lesser-known species that are abundant and come from sustainably managed sources.

## What's on the horizon for mahogany, other exotics?

In November 1994, delegates to the Convention on International Trade in Endangered Species narrowly defeated a proposal to add Honduras mahogany to a list of species that are potentially threatened by overharvesting. The outcome may be different next time.

Though it's true that uncontrolled logging contributes to tropical deforestation, other factors are at work, such as agriculture, cattle grazing, fuel-wood gathering, oil drilling, mining and dam building.



**Logging a sustainable forest**—The Yanasha cooperative, a community-run forestry operation in the Palcazu valley of central Peru, seeks long-term sustainability.

One promising development is the recent proliferation of community-oriented forestry programs. They are making replacements for mahogany, teak and other exotic woods available, while they attempt to harvest commercial species more sustainably.

In southeastern Mexico, for example, community groups, backed by development agencies and the Mexican government, are attempting to bring more than a million acres under sustainable management. Honduras mahogany in that region grows among about 100 other tree species (most lacking commercial value at present).

Mahogany requires plenty of sunlight to regenerate naturally. When mahogany trees are cut selectively, the resulting holes in the forest canopy don't let in enough light for the mahogany seedlings to grow. Providing enough light involves felling the surrounding trees, many of which are lesser-known species. It costs more to manage forests this way, and the costs cannot be recouped unless markets are developed for the unfamiliar timbers.

As it turns out, many of them are desirable for woodworking.

A number of community-based forestry projects, like the one in Mexico, are scattered across the tropics. At these locations, meeting economic needs and preserving forest ecosystems are seen as mutual goals. As craftsmen become more comfortable with lesser-known woods and the market for them grows, there will be more incentives for rain forest inhabitants to manage their forests for timber production rather than to cut them down. Using lesser-known species can also give troubled woods a chance to recover.

## Certification can eliminate guilt

Given the multiple factors contributing to tropical deforestation, boycotting tropical woods alone probably won't save the rain forests. But insisting that woods be grown and logged in a re-





**Sawn mahogany, stacked to dry**—Mahogany air-dries in tepee-like stacks at a sawmill at the Plan Forestal Estatal, a community-managed forest, on Mexico's Yucatan peninsula. Like teak, mahogany is considered a tropical mainstay for woodworkers.

sponsible manner can make a difference.

How can you be sure that the wood you're buying comes from a well-managed source? One way is to make sure that the lumber is certified as well-managed by a qualified third party. To be certified, a forestry operation must undergo a review by a team of professional foresters and meet a detailed set of social, forest-management and ecological criteria.

After the initial assessment, forests are audited periodically to ensure that sound forest management continues. Most certified operations in the tropics selectively harvest a sustainable yield of lesser-known and more commonly traded species, like mahogany, from the natural forest. In other cases, the focus of the operation is plantation-grown species, like teak.

In the United States, there are two major certifiers of forestry practices: the Rainforest Alliance (65 Bleecker St., New York, NY 10012-2420), which administers the Smart Wood program, and Scientific Certification Systems (The Ordway Building, Kaiser Plaza, Suite 901, Oakland, Calif. 94612), which runs the Forest Conservation program.

To find out which lumber dealers carry certified tropical lumber, contact the Good Wood Alliance, GWA (formerly Woodworkers Alliance for Rainforest Protection, WARP) at 289 College St., Burlington, VT 05401. Ask for a copy of the Good Wood list, which also includes sources of recycled wood.

### **Bringing unknown woods to the light of day**

Of the 20,000-odd tree species found in tropical forests, only a fraction are currently valued for timber. It's possible to find 250 species growing in a single hectare (2.5 acres) of tropical forest, and in most instances, the commercial species grow widely dispersed among lesser-known woods. Because of this, many tropical forestry programs struggle to derive adequate income from their forests to cover management costs. That's why the success of tropical forest management hinges, in part, on woodworkers' willingness to put lesser-known species to good use.

As things stand, lesser known doesn't necessarily mean unknown. Some species have been thoroughly analyzed by forest products laboratories. Others, which are lesser-known in the United States, have a long track record in other countries. GWA has begun a shop-testing program where woodworkers devote their time and skills to discovering how these woods perform and finish. And as lesser-known woods trickle their way into lumberyards around the country, woodworkers are deciding for themselves what the newcomers are like. A few of these pioneering craftsmen present their findings in Scott Landis' article, which begins on the following page. □

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*Jason Grant is a director of GWA and a co-founder of EcoTimber, a supplier of lesser-known tropical woods, in San Francisco, Calif.*





*Lesser-known lumber*—A sawmill worker at the Plan Forestal Estatal, a community-managed forest in Mexico, with stacks of tropical hardwoods not widely known in the United States. Many of the species are good replacements for mahogany and teak.

# Using Unfamiliar Tropical Woods

*Taking the “lesser” out of lesser-known species*

by Scott Landis





## Replacements for teak and mahogany

Burmese teak and Honduras mahogany (below) are prized tropical hardwoods that share an uncertain future. Woodworkers are finding suitable replacements in six lesser-known species, whose characteristics are described on the following three pages.



### Burmese teak (*Tectona grandis*)

Shrinkage: radial 2.5%;  
tangential 5.8%  
Specific gravity: .55



### Honduras mahogany (*Swietenia macrophylla*)

Shrinkage: radial 3.0%;  
tangential 4.1%  
Specific gravity: .54

According to an 1850 study, published in Liverpool, mahogany was first imported into England in 1724. The first few planks were reportedly sent by a ship's captain to his brother, a doctor in London. When the doctor, who was building a house, gave the strange new lumber to his workmen, they complained that it was too hard. He then asked his

cabinetmaker to use the wood to make a candle box. Despite the craftsman's complaints, when the box was finished, it surpassed all the furniture in the house. The doctor commissioned a mahogany bureau, and the Duchess of Buckingham ordered another.

Every imported wood is, at some point, "lesser known," even one as familiar as mahogany. Its eventual accep-

tance or rejection has as much to do with demand as with supply. And demand is based not merely on aesthetic quality but on the performance of the wood. Put simply, how does the wood work?

### Experience talks

Recently, I posed that question to various woodworkers who have had hands-on experience with six lesser-known tropical

hardwoods. I interviewed more than a dozen furniture builders, cabinetmakers and turners to see how they liked working with kwila, narra, chakté kok, chechen, kiaat and umbaua. The six woods (two each from Mexico, Papua New Guinea and Mozambique) were chosen for their availability from well-managed sources and their reputed woodworking potential com-



## Kwila (KWEE-lah) *Intsia bijuga*

**Origin:** Papua New Guinea

**Other names:** Merbau, afzelia, ipil, Borneo teak, ironwood

**Color:** Bright yellow when freshly cut, turns brown or dark brown. Light-yellow sapwood is clearly distinguishable from heartwood. Yellow deposits are common.

**Physical properties:** Hard, heavy. Straight to interlocked grain, medium to coarse texture.

**Shrinkage:** radial 2.7%; tangential 4.6%

**Specific gravity:** .68

**Price:** About \$7 per board foot



**Greg Smith, Oakland, Calif.**—Side cabinet has a maple interior and kwila exterior.

### Comments:

**Greg Smith:** Kwila is one of my favorite imported woods. It has a rich, brown color with tiny dark-green spots spread randomly throughout. I like the spots, although I have been accused of antiquing my projects with paint splatter. Kwila is open-grained and coarse-textured, and there is a nice contrast between the dark heartwood and the creamy-white

sapwood. It is a very stable wood. I've bandsawed  $\frac{3}{32}$ -in.-thick veneer up to 11 in. wide with no distortion. Because the grain is often roey, Kwila can tear out badly if handplaned. But I get satisfying shavings from my scrapers. Oil finishes tend to muddy the color of the wood, so I recommend finishing with shellac or lacquer with a topcoat of wax.

Photo: Sean Sprague

## Narra (NAR-rah) *Pterocarpus indicus*

**Origin:** Papua New Guinea, Solomon Islands

**Other names:** PNG rosewood, amboyna, Solomons padauk

**Color:** Heartwood is light yellow, yellowish brown to blood red. Whitish sapwood.

**Physical properties:** Moderately hard and heavy. Moderately coarse to fine texture. Wavy or crossed grain, with mottled, fiddleback or curly figure.



**Bob Erickson, Nevada City, Calif.**—Narra desk and office chair, titled Liz Lutz Desk.

### Comments:

**Bob Erickson and Mike Killigrew:** Narra offers customers an alternative to woods like bubinga. The grain is open, sometimes interlocking. The wood is smooth and not stringy. It is soft, light and not very dense. But it's very brittle. It's the most stable wood we've worked; there's no binding on the tablesaw. The reddish narra is difficult to dry. It machines and planes beautifully. Figured narra is amazing. It holds detail and doesn't crush.

Tearout is nearly nonexistent; you can machine and plane against the grain. We hand-rub tung oil for a finish. It's brilliant, but the initial crispness is lost in about six months. We got itchy throats the first time we used it, but we have no problems when we wear air helmets. Customer response has been strong. (Mike Killigrew and Bob Erickson run separate woodworking businesses, but they share ideas on projects.)

Photo: Steve Solinski

pared to more common woods. Of the six woods, narra and umbau (often called African mahogany) are probably more widely known than the other four.

### Ordering and handling

In my conversations with the woodworkers, five general themes surfaced.

First, anticipate some color variation between heartwood and sapwood, between shipments and even between boards. The appearance and working characteristics can vary depending on the soils and conditions under which the trees were grown. Also, many lesser-known woods are susceptible to color shifts when exposed to light. For the best results, run some test samples using different finishes and ultraviolet inhibitors.

Second, expect some fluctuations in moisture content between species and batches of boards. Many woodworkers who have dabbled with these tropical woods have horror stories to tell about wet wood. This is especially true of heavy stock ( $\frac{8}{4}$  and up). Suppliers and distributors of lesser-known species are often small and their kilns and drying schedules are not always up to snuff. Whenever possible, rough-mill your stock well in advance, and let it acclimate to your shop.

Third, watch your tools. Because many of the species are hard and dense and may have silica and other minerals embedded in them, your tools will dull quickly. Use carbide teeth and knives where you can, and keep them sharp.

Fourth, use a dust mask and run your dust collector. This is a sensible precaution when working any type of wood, but it's especially important with unfamiliar exotic woods. Nobody I talked with had a serious allergic reaction, but everyone has a different toler-



ance to dust. Allergies are notoriously unpredictable.

Fifth, plan to spend more money. Because re-supply is usually more difficult with lesser-known species than it is with ordinary domestic and imported woods, order enough to allow for design changes and waste. Be aware, too, that freight costs typically run higher than estimated, and small volumes cost more.

### Lesser-known tropical woods are visually exciting

I saved the toughest question for last. "How important are aesthetics, workability, price and environmental concerns when choosing lesser-known tropical woods?"

Aesthetics is at or near the top of everyone's list. "Number one is the look," California furnituremaker Bob Erickson said. David Fay, a furniture-maker in San Francisco, likes to bring his customers along when he shops for wood. He said that they're often amazed at the woods.

The environmental issue is a high priority for most of the woodworkers I interviewed. Fay feels "morally good" about using lesser-known species, but he confesses that the certification process, designed to assure consumers that the wood comes from well-managed forests, isn't perfect. Steve Kearns, a former logging truck driver and skidder operator, supports sound forest management. But he, too, is skeptical about timber industry claims.

Workability is usually taken for granted. A few woodworkers, like Fay, were intimidated at first by the crazy grain of some species. Most adjusted the price in anticipation of problems. Paul Carpenter, a cabinetmaker in northern California, seemed to relish tackling unknown or pariah materials. "I'll work with the toughest ones, the stinkiest

## Chakté kok (chock-TAY-COKE) *Sickingia salvadorensis*

**Origin:** Mexico

**Other names:** Guayatil colorado, Brasileite, Palo rosado

**Color:** Heartwood ranges from pinkish-orange to bright red or reddish orange; sapwood is cream-colored.

**Physical properties:** Moderately hard and heavy. Fine-texture, generally close grain.

**Shrinkage:** radial 2.8%; tangential 8.2%

**Specific gravity:** .52

**Price:** About \$6.65 per board foot



Paul Carpenter, Eureka, Calif.—Chakté kok kitchen cabinets and island.

### Comments:

**Paul Carpenter:** Chakté kok looks like it's from Mars. When cut, it smells slightly bitter, but not unpleasantly so. The wood is close-grained, similar to cherry, so you need sharp hand and power tools. It won't chip out as badly as maple or pecan, but it burns with a router if you slow down. I joined pieces with

yellow glue and biscuits without de-oiling the surfaces, and I had no problems. Once the wood is varnished, it turns golden-yellow or orange. But it fades to a light brown more quickly than any wood I've used. A customer says it's his favorite wood. It's a bit too bold for me, though I might use it for accents.

Photo: Dean Carrier

## Chechen (chey-CHEN) *Metopium brownei*

**Origin:** Mexico

**Other names:** None known

**Color:** Variegated chocolate-brown to reddish-brown, with dark streaks.

**Physical properties:** Hard and heavy. Fine texture, with long, open, shallow pores. Straight to wavy and roey grain.

**Shrinkage:** radial 3.8%; tangential 6.3%

**Specific gravity:** .79

**Price:** About \$6.10 per board foot



Ray Jones, Asheville, N.C.—Chechen jewelry box, 9 in. by 15 in.

### Comments:

**Ray Jones:** Chechen is similar in color to dark koa and occasionally has curly figure, but it lacks koa's depth. The wood is very dense and the texture is fairly smooth. It's gummier than koa and loads sandpaper quickly. The wood power-planes well, but there's some grain tearout on flatsawn surfaces. I had repeated problems with case-hardening on thick stock, and I got serious cupping after I resawed boards. I use regular yellow glue and Titebond II. Chechen takes oil finish very well, and it polishes nicely.

**Michael Elkan:** Chechen has a nice color—great for smaller projects. The wood has tight figure, but it doesn't get lost. A more flamboyant wood can give you a comic-strip effect. The wood is fairly stable. Even with wet boards, I didn't run into much checking. The wood routs nicely. But it's hard, so you may have to make an extra pass or two. It is hard to drill, and it wears out bits. Chechen takes a great shine when oiled and waxed. (Michael Elkan builds boxes, mirrors, furniture and accessories in Silverton, Ore.)

Photo: Ray Jones



## Kiaat (KEY-ah) *Pterocarpus angolensis*

**Origin:** Mozambique

**Specific gravity:** .59

**Other names:** Muninga, umbila, mukwa, bloodwood

**Price:** About \$6.80 per board foot

**Color:** Golden to reddish-brown heartwood. Pale cream sapwood is distinct from heartwood.

**Physical properties:** Medium density. Decorative wavy figure, with fine heartwood.

**Shrinkage:** radial 1.9%; tangential 2.9%



*Steve Kearns, Somerville, Mass.—Custom window has 2¾-in.-thick kiaat frame.*

### Comments:

**Steve Kearns:** The grain of kiaat is wavy, and it's fairly figured. It has tight grain clusters similar to swirls in walnut. The wood is waxy; it looks and feels like teak. You can see the silica in the wood. I just switched to carbide planer knives because kiaat was kicking the butt out of the steel blades. The wood is stable, but you'll get an occasional board that becomes an airplane propeller the day after you mill it. The

wood tends to oxidize and darken like mahogany. For a finish, I use both Watco oil and water-based paint. As with mahogany, you can see the pores through paint. In my business, mahogany and white oak are the woods to use for high-end windows. Kiaat is good, but it's not a perfect replacement. The people who have bought kiaat window frames are impressed that the wood is sustainably grown.

## Umbaua (Oom-BAH-wah) *Khaya nyassica*

**Origin:** Mozambique

**Specific gravity:** .60

**Other names:** African mahogany, red mahogany

**Price:** About \$5.80 per board foot

**Color:** Pinkish-red when cut, but oxidizes to red or reddish-brown.

**Physical properties:** Medium density. Fine texture, even grain.

**Shrinkage:** radial 3.0%; tangential 3.8%



*John Proulx/Niall Johnson, Somerville, Mass.—Umbaua credenza is 33 in. high.*

### Comments:

**Niall Johnson:** Umbaua is an attractive wood. It's a uniform reddish-brown with ribbon-striping. The grain is moderately open. The wood is dense but not super hard; it's easy to work in any direction. Even end grain works well. The wood is dusty—the dust hangs in the air. Of all the mahoganies I've worked, umbaua is the best in terms of tearout and cross-grain planing. I like it better than American or Philippine mahogany. The umbaua I ordered arrived dead dry and has been fairly stable. There was some cupping, but nothing major. When

fastening with brads, the fibers seem to draw down around the holes, making the heads look larger. Joining the wood with yellow or white glue has been a real problem. After wiping off the glue, a residue remains in the pores, which shows up when you stain. I've had good luck using polyurethane glue. I finish with a reddish-brown stain followed by a water-based lacquer or urethane. Left unfinished, the wood fades quickly. Customers are really into the wood's ecologically responsible aspect.

Photo: Alec Waters

woods," he said. "If you keep your tools sharp, you can work with just about anything."

Price is a low priority. Everyone I spoke with pays more for certified lesser-known species, but no one seemed fazed by the higher prices. Erickson put it this way: "As long as it's less than \$20 per board foot, I don't care." Rather than having the customer give up the wood he wants, Fay suggests a simpler design.

Every craftsman I spoke with was curious and excited about exploring "new" woods, which gets at the heart of what working wood is all about. □

*Scott Landis is a writer and photographer in York Harbor, Maine. He is the founder of the Good Wood Alliance (formerly WARP) and edits its quarterly journal, Understory.*

## Sources of supply

A&M Wood Specialty Inc.  
(800) 265-2759

Almquist Lumber  
(707) 668-5652

Berea Hardwoods  
(216) 234-7949

Crosscut Hardwoods  
(503) 224-9663

Cut & Dried Hardwoods  
(619) 481-0442

EcoTimber International  
(510) 549-3000

Edensaw Woods Ltd.  
(800) 950-3336

Endura Hardwoods  
(503) 383-5003

EnviResource  
(206) 682-7332

Pittsford Lumber  
(716) 586-1877

Rio Rivuma  
(617) 451-2549

Tropical Exotic Hardwoods  
(619) 434-3030

Wild Woods Co.  
(707) 822-9541

Woodworkers Source  
(800) 423-2450



# Flattening Wide Panels by Hand

*A flat, blemish-free surface doesn't have to take all day*

by William Tandy Young

Sooner or later, most woodworkers will have to flatten and thickness a plank of solid wood wider than their jointers or planers can handle. When I have a lot of wide panels to flatten, I take them to a local millwork shop. The big jointer and planer can do the job in minutes, and the wide-belt sander can thickness heavily figured wood without tearout. Typically, I can have all the major parts for a large, solid case-work piece sanded to 120-grit on both sides in about 30 minutes. Sanding usually costs about \$30—money well-spent.

When I have only a few panels to flatten, however, I stay in my shop and do the job with hand tools. The work is satisfying, and it goes quickly. It took less than an hour to flatten one side of a 16-in.-wide cherry board. With a jointed straightedge and just a few commonly available hand tools (a No. 7 jointer plane and a No. 80 cabinet scraper), I can flatten just about any panel, even one many times wider than my planer.

Many woodworkers I know own 12-in. or 15-in. planers, but few have jointers with a capacity of more than 8 in. And there's the rub. By learning how to flatten one side of a wide board with hand tools, you can still take advantage of your planer for thicknessing. You won't have to rip boards down to size, joint them and then glue them back together. You'll save time and have fewer gluelines.

Using hand tools to flatten a panel that's too large for your jointer or planer is also more efficient and less annoying than other low-tech methods. I've surfaced solid panels with a belt sander, but I sure don't relish all the noise, dust and vibration. I've also seen panel-surfacing jigs that consist of a router in a large plywood base riding on top of wooden rails at either side of a workpiece. My reaction has always been, "All that jig-building and routing just to end up with a surface that still needs a lot of cleanup? No thanks, I'll stick with my jointer plane and cabinet scraper."

**Plane across, and then scrape with the grain**—The beauty of this technique is that I can flatten a board quickly while avoiding tearout altogether. I plane straight across the grain, eliminating the



**Plane across the grain.** Start at one end of the board, and work to the other, planing straight across. Skewing the plane at 45° or so may help it cut better. The jointer plane's length makes it a good reference surface, and its wide iron (2<sup>5</sup>/<sub>8</sub> in.) allows you to make fewer passes. If the board starts to rock, tap wedges under the high corners.



# Well-tuned hand tools make the work fast and fun

**Set the chip-breaker  $\frac{1}{16}$  in. or less from the end of the plane iron. This will help keep the throat clear of chips. Grind off the corners of the iron on a bench grinder so that they won't gouge the wood.**



**Wax the plane's sole to keep it gliding smoothly. Either beeswax or paraffin is a good choice.**



Planes or scrapers that clog, leave chatter marks or produce only dust take the pleasure out of working wood. Experiences like these may send you scurrying for your belt sander. But it's not all that difficult to get these old-fashioned "cordless" tools to sing. Before you put a 60-grit belt on your sander, try tuning up your hand tools.

**Tuning a jointer plane for flattening:** Besides the basics of plane tune-up (a flat sole and a well-honed iron with a flat back), there are other steps that will improve the performance of a jointer plane used for flattening.

The first thing I do is ease the corners of the plane iron on the grinder. As long as you adjust the iron so it projects through the mouth evenly across the opening, it won't gouge the wood. Sometimes I switch to an extra iron I keep on hand that's been ground to a slightly convex profile. I wouldn't use this iron to joint the edge of a board, but it's perfect for flattening.

I also set the chipbreaker close to the end of the iron (see the top photo at left).

This will help keep the throat clear of chips. And sometimes I'll open up the mouth by moving the frog back slightly.

Finally, I keep the sole well-waxed. As soon as I feel the plane start to drag, I rub on a little more wax. It won't affect the finish because I'll smooth the surface later. A well-waxed sole makes a world of difference in how easily the work goes.

**Tuning a cabinet scraper:** The first thing I did to my cabinet scraper when I got it was flatten its sole with some fine-grit sandpaper on a flat surface (I used a glass plate). I ground a 45° bevel on the blade, honed it and flattened the back, and then turned a slight burr with a burnisher. This worked well enough, but sometimes I would get chatter when I scraped.

I determined that the blade wasn't seating well, so I trued the scraper body with a mill file to improve the bedding of the blade and the fit of the blade retainer bar. I also bent the retainer bar inward so that it contacts the center of the blade first as the thumbscrews are tightened. The result is a cut that's almost always chatter-free (see the far left photo). But you'll need to set the blade for the right depth of cut. I use a piece of paper to set the amount the blade protrudes through the sole (see the photo at left).

Once I have the proper depth of cut, I tighten the front thumbscrew just until it's snug against the blade. You shouldn't have to crank down on the thumbscrew. The more you do, the rougher the scraped surface you'll leave and the sooner you'll have to re-hone and burnish the burr. —W.T.Y.



**File the scraper body. Make sure the blade bed is filed flat, and file the scraper body so the retainer bar seats properly when tightened. This will help eliminate chatter and produce a better curl.**



**Use a piece of paper to set blade height. With a slip of paper under either the front or rear edge of the scraper sole, lower the blade until it rests on the bench. Then tighten the thumbscrews to exert pressure on the blade.**





**Use a jointed straightedge to determine flatness. Check the board once the sawmarks are eliminated and the board is close to flat from edge to edge. Position the straightedge diagonally across the board to make sure it's not twisted.**



**Plane off any high spots, continuing to plane across the grain.**

possibility of the plane blade catching the grain and lifting and breaking wood fibers. After using the jointer plane, I scrape with the grain. Because of the angle at which the cabinet scraper holds the blade, there's no chance of tearout. This lets me arrange boards for glued-up panels so they look their best, regardless of which way the grain goes. It also allows me to flatten even heavily figured wood.

After one side is flattened, you can feed the panel through your planer to take it to thickness. If the panel is too large for the planer (a tabletop, for example), take a marking gauge and scribe a line around the tabletop's edge, holding the fence of the gauge against the flat side of the tabletop. Then repeat the procedure. The gauged line tells you when to stop planing and scraping.

Once your panel is the right thickness, smooth the surface. If you're confident in your planing skills, smooth the surface with a finely tuned smoothing plane; otherwise, scrape and sand.

You should use flattened panels as soon as you can because they can warp or cup with changes in temperature or humidity. Then you'd have to flatten them all over again. If you can't use them right away, either stand the panels upright so they get plenty of air circulation on both sides or sticker them on your workbench and weight down the top. □

*William Tandy Young is a furnituremaker and conservator in Stow, Mass.*

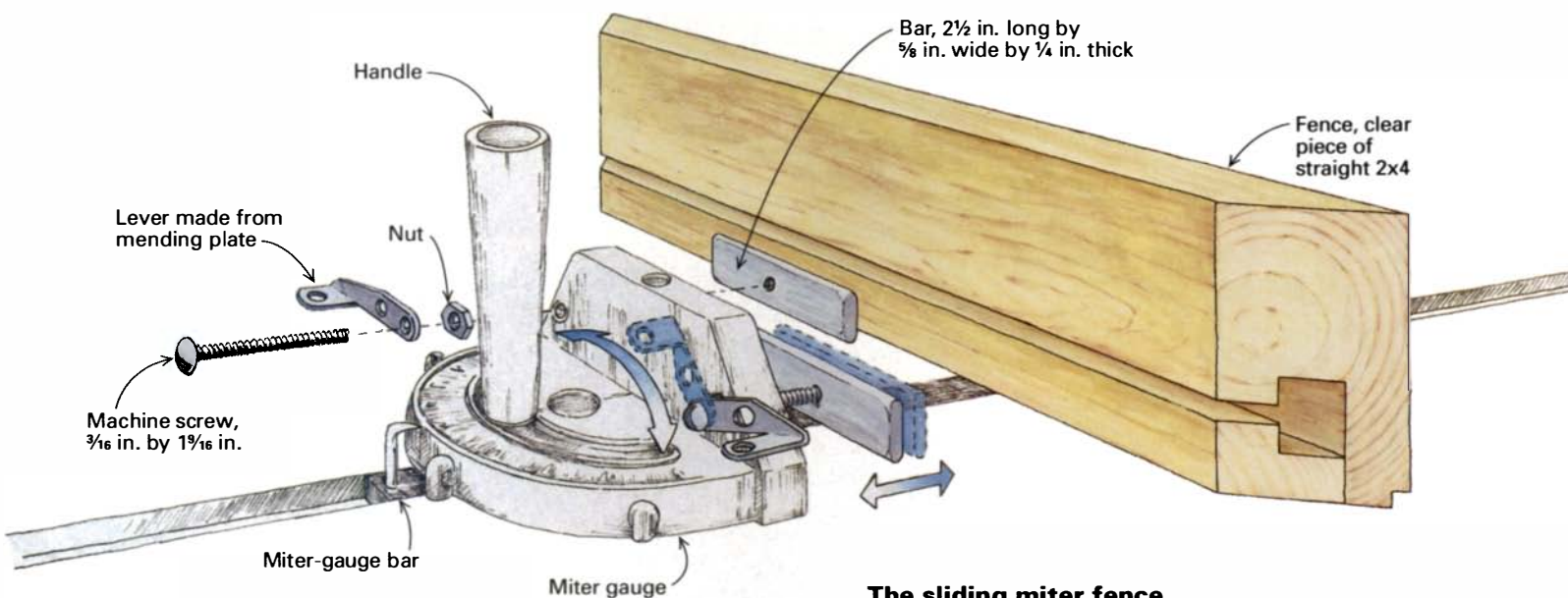


**Scrape with the grain across the width of the panel from either end until you've eliminated all cross-grain planing marks.**

# Sliding Fence for a Miter Gauge

*Shop-built fence adjusts quickly for accurate cuts*

by Tim Hanson

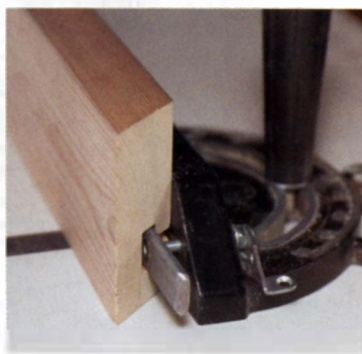


## The sliding miter fence

Made from scrap lumber and easy-to-find hardware, this adjustable fence supports the work right up to the blade, no matter what the angle. It makes cross- and miter-cutting safer and more efficient.

The piece of scrap I kept bolted to my tablesaw miter gauge was a great improvement over the gauge alone, especially when making crosscuts. This extra fence made the gauge easier to grip, and it supported the workpiece right up to the blade. The problem came when making angled cuts. Each new angle made a new divot in the fence, and pretty soon, it looked like an old comb with missing teeth. I would try to save time by using one of the gaps as a point of reference when cutting, but sooner or later, I'd use the wrong one. Then I'd get ticked off and have to stop work to make a new fence, and the whole cycle would start again.

I finally took the time to make a fence that could be moved right or left and locked in place by simply flipping two little levers (see the photo at right). Now I can make minute adjustments in the position of a workpiece by releasing the levers and sliding the fence rather than unclamping and re-clamping. The fence makes using the tablesaw faster, safer and more accurate.



**The lever-action adjustment on this shop-built fence lets you position the fence quickly.**

## How it works

The wooden fence is held to the miter gauge by a pair of machine screws. The screws go through the miter gauge and are tapped into 2½-in.-long metal bars that ride in T-slots in the back of the fence. When the machine screws are loosened, the fence can be adjusted right or left—exactly where you want it. Flip the levers up, and the fence slides right up to the blade (see the photo on the facing page). Flip them down, and the fence is locked in place.

The fence is made from a clear, straight piece of 2x4 construction lumber. I made it 20 in. long thinking I'd shorten it later, but I found the length useful when crosscutting long pieces.

I used a tablesaw to make the T-slot, but there are other ways to do it. The important thing is to make the slot larger than the bar stock by about 1/16 in. all around for easy sliding.

**Fine-tuning the levers**—I fashioned the levers from right-angle mending plates, which I purchased at the hardware store. The





**This sliding fence is easy to grip with hands or clamps, and it supports the work right up to the blade.**

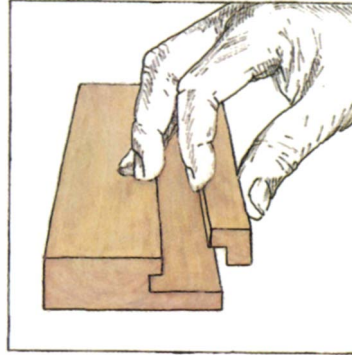
drawings at right show the parts and how they go together, but the system does need some fine-tuning. Secure the levers under the heads of the machine screws with a wrench-tight nut. Slide the machine-screw assemblies through the miter gauge, and turn the bars onto the screws so the ends of the screws are flush with the bars.

Now turn one lever all the way to the left (at the 9 o'clock position), and slide the bar into the T-slot. Flip the lever to the right. The fence should tighten up against the miter gauge at about the 2 o'clock position without much effort. If it rotates past that point and the fence still isn't tight, the lever has to be repositioned. Disassemble the fence, and remove the machine screw. Clamp the machine screw between two blocks of wood in the vise, and loosen the nut just enough to rotate the lever counterclockwise about one-quarter turn. Tighten the nut and reassemble. It may take a few tries to get the levers to grip and release in the correct position. Use the same procedures to adjust the second bar.

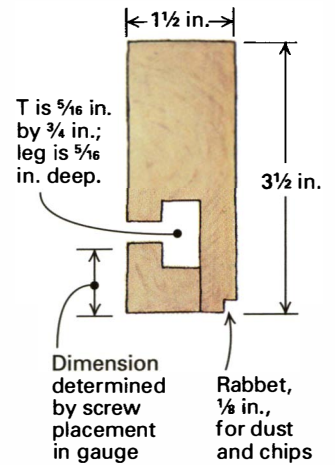
Precise cuts come from an accurate fence. My miter gauge's face wasn't perpendicular to the table, so I had to handplane the wood-sliding fence to make it square. □

*Tim Hanson builds furniture and toys in Indianapolis, Ind.*

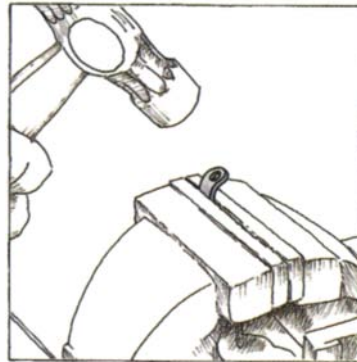
## SLIDING FENCE



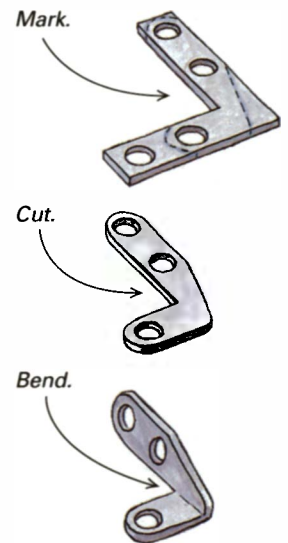
**Make a T-shaped slot in the fence.** Cut the pieces to the dimensions shown at right, and glue together. Make sure the bar stock moves freely in the slot. Miter the ends of the fence at 45°.



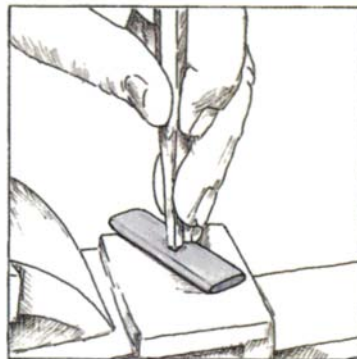
## LEVERS



**Make two levers** from 2-in. by 2-in. mending plates. Cut one leg about 1/2 in. long, and round all the corners. Make the left lever by bending the short leg toward the back of the vise, as shown. For the right lever, bend the short leg toward the front.



## BARS



Drill a 1/32 in. hole through bar.

Counterbore a 1/32-in. hole two-thirds of the way through.

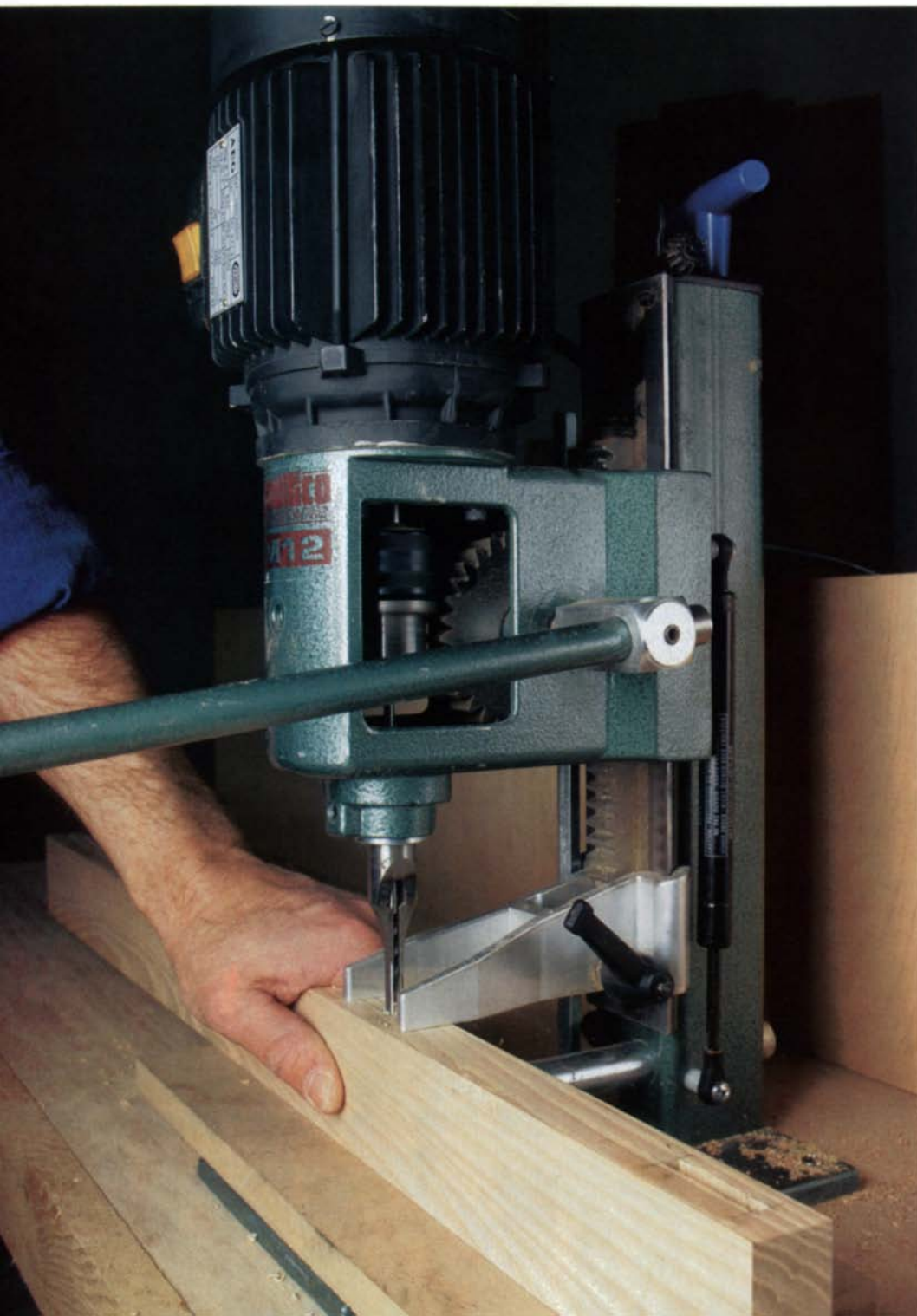
Press nut with vise; lock in place by dimpling bar with punch.

**Attaching screw to bar—**A machine screw threads into the bar to lock the fence in position. If you don't have metal taps to make this connection, you can use a standard lock nut, as shown at right.

# Benchtop Machines Make Mortising Affordable

*A look at six models currently on the market*

by Bernie Maas



Until Lewis Parks, the founder of Parks Woodworking Machinery, put a mechanical mortiser on the market in the 1880s, the only way to cut a mortise was to chop it out by hand. Parks Woodworking Machinery has passed into oblivion, but the company's original technology evolved over the years into some sophisticated and very expensive industrial equipment designed solely to cut mortises.

If you're not familiar with a mortiser, you might be stymied by the idea of drilling a square hole. But the concept is simple. A mortising bit and chisel cut a circle inscribed in a square. The chisel is hollow, housing a drill bit that protrudes from the chisel by a few millimeters (see *FWW* #116, p. 71). The drill bit hogs out most of the waste while the chisel shaves or shears out the corners. The big machines that do this quickly and efficiently are gems—but you need a wad of cash to buy one. Your other options, until recently, have been to buy one of those drill-press mounted attachments, set up a plunge router to do the job or chop the mortise by hand. Now, thanks to British ingenuity, small, affordable mortisers are generally available.

## **Multico started it all**

About four years ago, the original benchtop machine, the British-made Multico PM12, hit the popular woodworking market in the United States. Since then, a half-dozen or so knockoffs have jockeyed for a competitive edge. These include the models shown on the facing page. All of them sell for less than \$400.

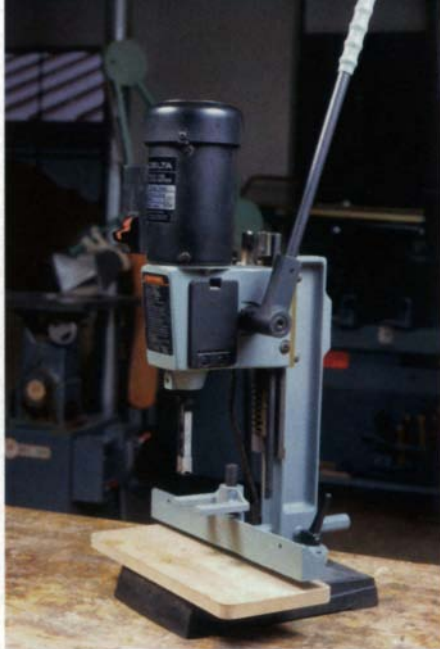
With help from some of my students in the college shop where I teach, I evaluated all six machines. We had a few months to

***These benchtop machines cut square holes and make mortising easier and more affordable for the small shop.***





**AMT** 5131



**Delta** 14-650



**Grizzly** G3183

### Six mortisers compared

All of these machines are powered by ½-hp motors. The Multico is made in England, and the others are made in Taiwan.

Brand name	Suppliers		List price	Amps/rpms	Depth control	Head return	Chuck capacity
<b>AMT</b>	Am. Machine & Tool	(800) 435-8665	\$249.00	6.0A/3,450	Stop rod	Gas cylinder	¾ in.
<b>Delta</b>	Delta Machinery	(800) 438-2486	\$380.00	4.8A/3,400	Stop rod	Gas cylinder	¾ in.
<b>Grizzly</b>	Grizzly Imports	(800) 541-5537	\$225.00	6.0A/3,450	Stop rod	Gas cylinder	¾ in.
<b>Multico</b>	Garrett Wade	(800) 221-2942	\$389.00	5.2A/3,460	Stop rod	Gas cylinder	½ in.
<b>Reliant</b>	Trend-lines	(800) 767-9999	\$199.95	8.0A/3,400	Split ring	Springs	½ in.
<b>Woodtek</b>	Woodworker's Supply	(800) 645-9292	\$239.95	6.0A/3,450	Stop rod	Gas cylinder	¾ in.



**Multico** PM12

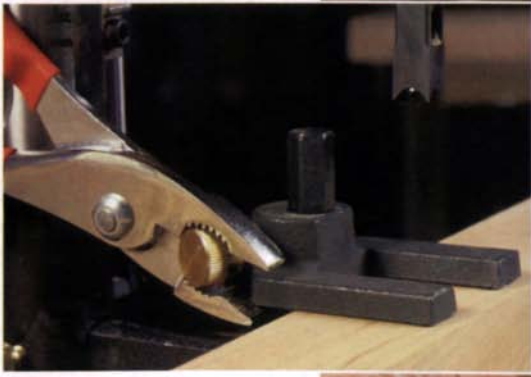


**Reliant** DD136

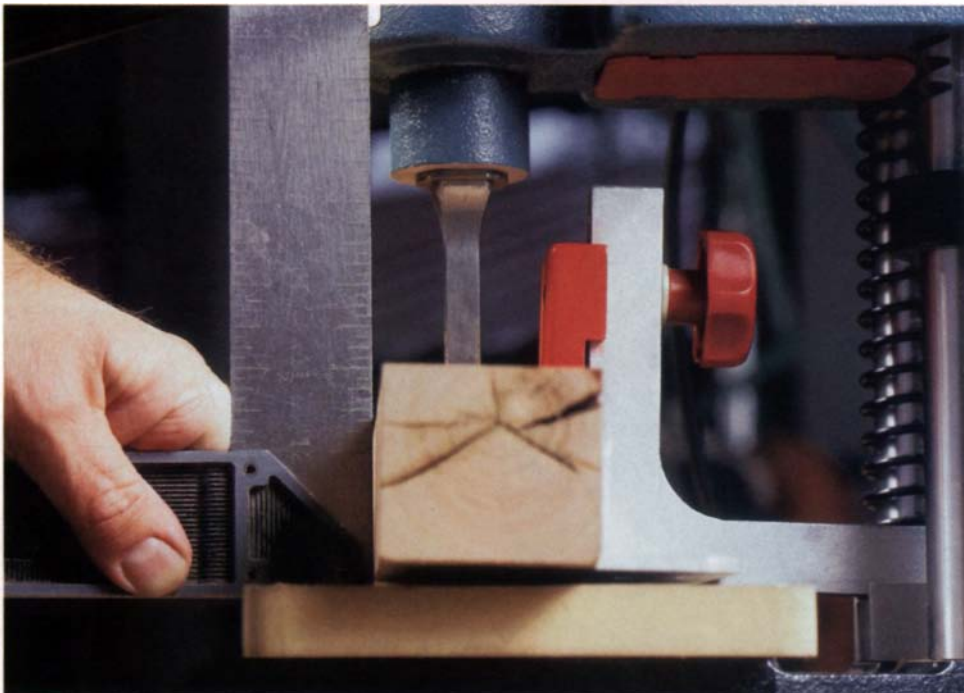


**Woodtek** 876-775





**Faulty hold-down design.** The AMT mortiser uses brass thumbscrews for making adjustments. But to secure them, the author had to use pliers (above). The author suggests using a ratcheting hand lever (right) to improve performance.



**Reliant was the worst** when it came to securing stock. Here, the hold-down assembly has been torqued as tightly as it will go. The chisel tilts the workpiece and jams the machine as the author lifts the chisel out of the cut.

play around with them, so we got a good feel for how well they work. At the outset, I should mention that the Grizzly, the Woodtek and the AMT machines look identical except for the paint jobs and that the AMT sports a few brass setscrews in place of Allen heads. In general, all the machines we looked at are well-crafted and nicely appointed—the only differences between them are in the minor details. But some of the minor details can make a big difference in the way they work.

### Unpacking revealed a few problems

Out of the box, the Multico was the only machine ready to go. The rest had problems, albeit minor ones. AMT's hydraulic cylinder was shot. Grizzly's base was warped. Reliant's depth control didn't match the one pictured in the manual and was awkward to use. Woodtek's ratcheting fence-clamp handle was faulty. Delta's hinged chuck cover wouldn't lock. Although all five suppliers were very gracious about sending replace-



ment parts, these were five phone calls and five repairs I should not have had to make.

### How the machines work

Using one of these mortising machines is simple enough. It's relatively safe, as machines go, and fairly easy to use. The hollow-mortising chisel and its corresponding drill bit are often sold as a set, and they come in a variety of sizes. A 1/2-in. chisel is the nominal capacity for tabletop machines. After scribing start-and-stop lines to delineate the length of the cut, the operator registers the stock against an adjustable fence, which locates the mortise within the thickness of the piece to be cut. A stop rod or lock collar on the machine determines the depth of the mortise.

The bit is forced into the stock using a hand lever attached to a rack-and-pinion gear drive. Often, this procedure will exact considerable force. As the chisel enters the stock, heat from friction causes the metal chisel to expand. Extracting the chisel is like yanking a spike out of a railroad tie. It takes muscle. As a consequence, extreme strain comes to bear against the machine's hold-down assembly. How well the machine is able to accommodate this strain is one key determinant in the overall value of the unit—one of eight categories we looked at to rate these mortisers.

**The hold-down is essential**—For rectangular mortises, the stock must slide back and forth under the hold-down. A happy medium must be struck between moving the stock horizontally and making it immobile vertically. If there's any up-and-down give, the stock will lock the chisel as you try to draw it out. The harder you yank, the tighter the grab, like one of those straw Chinese finger puzzles.

The Delta, Grizzly and Woodtek hold-downs are part of the fence assemblies. Their hold-downs weren't perfect, but they did the job. The AMT fence and hold-down arrangement is identical to Woodtek's and Grizzly's, but AMT substituted a knurled-brass thumbscrew for an Allen-head socket screw to lock the hold-down in place (see the top photos on the facing page). Although brass is pretty to look at, a finger-tightened thumbscrew can't deliver the same sock-it-home torque that an Allen key can. Consequently, the hold-down lifted up every time.

Fabricated of a heavy-weight aluminum extrusion and fixed directly onto the post with a ratcheting hand lever, Multico's

hold-down was the best performer (see the photo below). On the other end of the scale, because of an inordinate amount of flex in the hold-down/fence assembly, we found the Reliant to be virtually unusable (see the bottom photo on the facing page). Once I locked the fence to the table with a pair of clamps, the Reliant was in business. But dedicating two of my prized Wetzlers to any machine in the shop isn't in my game plan.

### Motor power depends on amperage—

All the mortisers are equipped with 1/2-hp motors and posted speeds in the 3,400 rpm range, but the key factor is amperage. The Reliant is rated highest at 8 amps and the Delta the lowest at 4.8 amps. The Multico,

with a 5.2-amp rating, boasts the added advantage of both a fin- and fan-cooled AEG motor, which gives it an efficiency boost. We've been using a Delta mortiser in our shop for several years. Time and again, it would jam whenever we cut heavily fibered woods such as red or white oak. The Delta simply did not have the moxie to eject those tailings out through the exhaust slot on the chisel. Rated at 6.0 amps, the AMT, Grizzly and Woodtek machines have plenty of power to cut mortises well.

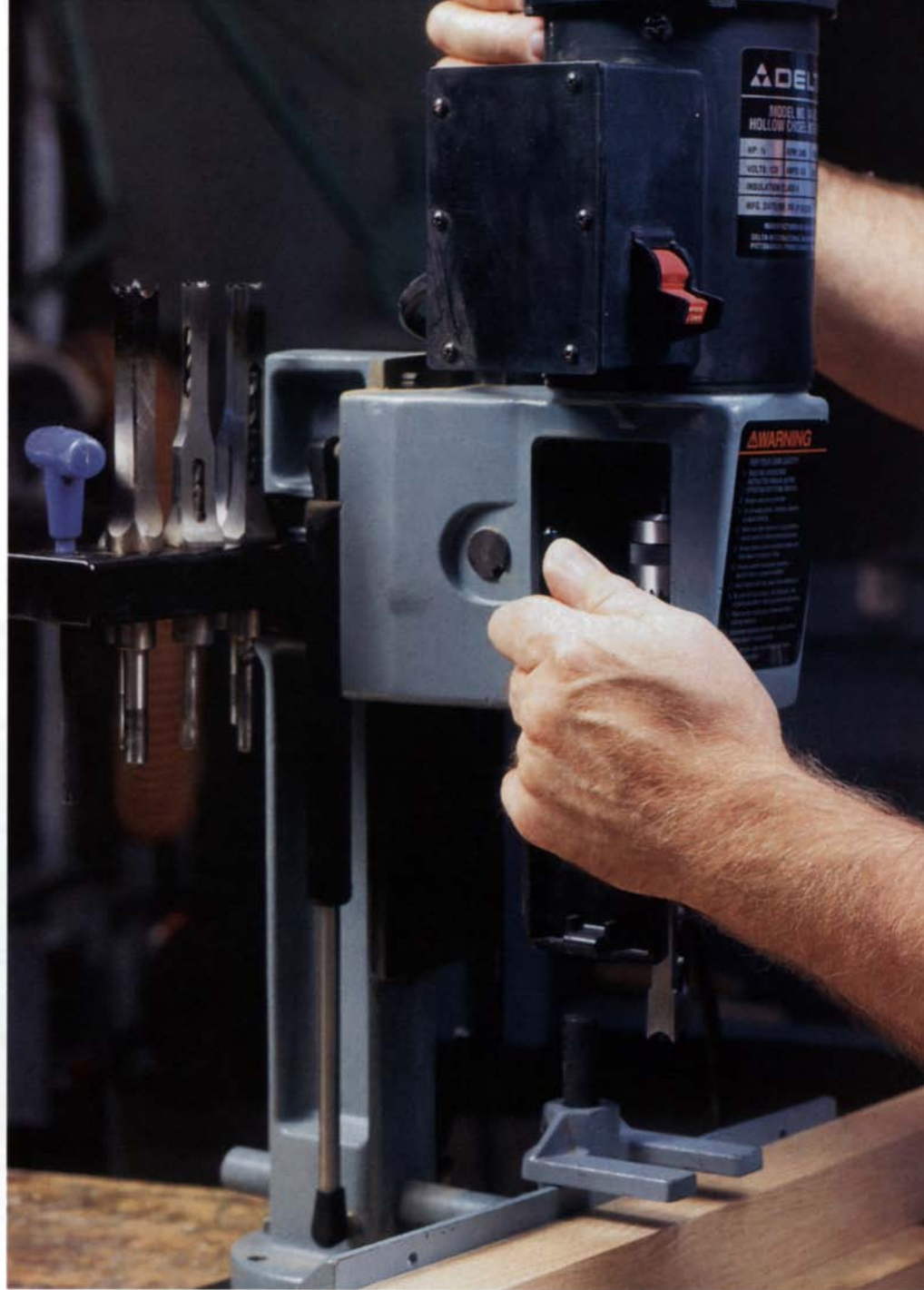
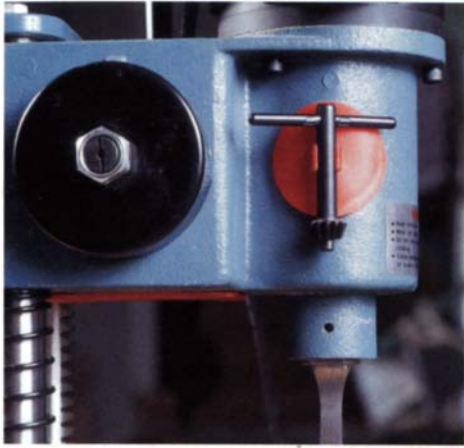
### Accessing the drill chuck wasn't always easy—

Except for the Multico, all the machines have some sort of cover plate to keep errant fingers of careless operators from being mashed by the rack and pinion

**Multico held the stock better than all the others. This hold-down is firmer and stronger because it incorporates a hand lever and is secured directly to the rack-and-pinion post of the machine.**



**Three chuck-cover designs**—The Delta cover (right) is the most convenient—a hinged flap that simply drops out of the way. The plastic plugs on the Reliant (top left) provide a clip for the chuck-key, a convenience not found on all the other machines. The Grizzly (bottom left) has the same cover design as the Woodtek and AMT machines; it's better for right-handed people.



in the chuck housing. The Multico does well without it, and securing the bits in the chuck is easier and more efficient than with any of the other machines.

The best cover belongs to the Delta (see the photo at right above), which employs a hinged, drop-down door. Poorest is the Reliant, with its got-to-eventually-wear-out-and-fall-out plastic plugs (see the top left photo).

The other three machines have cover plates bolted to the right corner of the housing, as you face the machine, which makes them a pain to use if you're left-

handed, like I am (see the bottom left photo). The Multico, Delta and Reliant covers can be reached from either side, so they're non-handed for changing bits.

Access to all the drill chucks involves some uncomfortable gymnastics, which could easily be solved by revamping off-the-shelf chuck-keys with longer shanks.

**Solid handle bars are stronger**—All the machines have solid-steel bars except the Reliant, which has a hollow tube. An earlier version of the Delta mortiser we use in our shop also sported one of these tubes.

After a semester and a half, metal fatigue near the pinion shaft sent the tube to an early grave. I expect the same will happen with the handle on the Reliant.

**Good counterbalance makes setups easier**—The heads of all of the mortisers, except the Reliant, are counterbalanced with gas cylinders. These cylinders, which look a lot like miniature shock absorbers, are calibrated to keep the heads poised at any vertical position.

The heads neither slide down nor shimmy back up, but they can be moved up and



down effortlessly. This makes it easier to set the depth of the mortise. The head of the Reliant, which is subject to the forces of a set of powerful return springs, slams back to its uppermost position as soon as the handle is released. Unlike a drill press, it has no travel lock.

**Setting the depth of cut is quick and easy**—All of the mortisers, again except the Reliant, have an adjustable rod as a depth stop, like that found on some plunge routers (see the photo at right). It's easy to use. After bringing the chisel to the desired depth, the rod is then locked in place with a setscrew. When mortising, the rod limits the depth of cut.

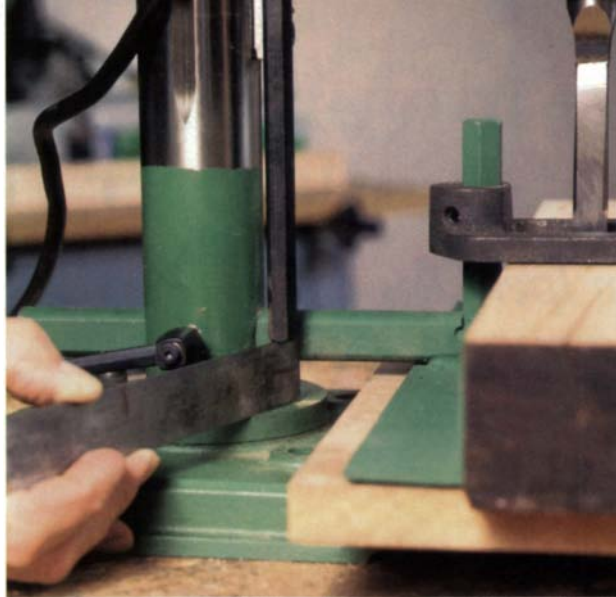
The Reliant has an enigmatic split-ring depth control, the operation of which the manual patently fails to explain. It's just plain inconvenient for one person—without a third or even a fourth hand—to work this oddly contrived device (see the bottom photo at right).

**Chisel bushings and spindle extensions, scarce extras**—Only AMT, Grizzly and Woodtek provide additional chisel bushings and spindle extensions. These extras allow the machines to accommodate chisels other than 1/2 in. and bits with shorter shanks. These bushings and extensions make those machines more versatile if you want to buy additional tooling.

To use the spindle extensions, you first have to remove the drill chuck. I must confess that we didn't bother with this because the tooling we had on hand fit all the machines just fine. With some chisel sets, however, the bit is too long, so it has to be ground down to fit snugly into the hollow of the chisel.

**Key and storage caddies keep tools in order**—Because bits and other paraphernalia seem to grow legs and creep all over the shop, a tool caddy is a handy gizmo. Only Delta has one that stores the drill chuck and Allen key and several mortising chisels as well. Nice touch. The Multico has a spot for both keys, and the Reliant has a plastic clip for its chuck-key.

The Multico and the Delta offer another nicety: comfortable T-shaped handles for the Allen keys, which are easy to use and hard to lose. With the other mortisers, you're on your own when it comes to tracking your bits and keys, which is not always an easy job in my classroom and probably not any easier in a busy shop.



**Depth stops are fairly simple.** The author sets the Woodtek stop (left) for a 1-in.-deep cut by using a 1-in.-wide steel rule as a feeler gauge between the adjustable rod and the base of the machine. The Reliant (below) originally came from the factory with a split collar and an Allen screw, which did not match the catalog rendition. When the author called the supplier, it sent the knurled, red-plastic replacement knob shown here.



### Multico is the best overall

At last, the bottom line: how did they rate? My students and I liked the Multico best—overall, the surest performer. It's the most expensive of the lot, and I guess you get what you pay for. The Delta is identical to the one we've used for several years, which still works fine except for the limited amperage, so I probably won't be buying another machine anytime soon.

The Grizzly and the Woodtek cut mortises equally well and both are probably good buys. Although virtually the same as the Grizzly and Woodtek machines, the AMT

rated poorly because its dandified brass thumbscrews couldn't provide enough grab for the hold-down assembly. Retrofitted with a ratcheting hand lever that can be tightened with a lot more torque, the AMT would do as well as the other two.

Last and least, the Reliant gets a rousing thumbs down and ends up at the bottom of our list. It would seem that the machine's designer never attempted to use it. □

*Bernie Maas is a professor in the art department of Edinboro University in Edinboro, Pa.*

# Woodworking Revival at the Blacker House

*Jim Ipekjian's exquisite craftsmanship is replacing lost Greene and Greene treasures*

by Alec Waters

If you're an aficionado of American architecture and furniture, chances are good you've heard of The Gamble House. The national historic landmark in Pasadena, Calif., is famous for its Arts-and-Crafts furnishings as well as its architecture, and it may be the high-water mark of the Bungalow style in the United States. Designed by the Greene brothers, Charles Sumner and Henry Mather, for the Gamble family in 1908, the house has more than a dozen rooms graced by exquisite furniture.

You probably know all that. Maybe you didn't know that a year before the Gambles' house was built, the Greene brothers designed a home not far away that is even bigger and whose woodworking is every bit as impressive. Meet the Robert J. Blacker house, which sits majestically on a hill. At 12,000 sq. ft., it is about 20% larger than The Gamble House. Considering that the woodworking is on such a grand scale, it's amazing the Blacker house has received any less acclaim than its far more famous neighbor. One reason is that the Blacker house has not been open for public tours; another is a brush with disaster in the 1980s that skilled craftsmen are still trying to set right.

One of those craftsmen is Jim Ipekjian, who knows the woodworking in the Blacker house as well as anyone. He is helping to restore the home to its original glory. In an inconspicuous shop a few blocks down the road, Ipekjian is faithfully building a treasure trove of Greene and Greene reproductions (see the top photos on p. 82). As he described his work to me, it became clear that the Blacker home and its furnishings, in all their woodworking splendor, have a compelling story to tell.

## A house in need of attention

Like many homes that are pushing 90 years of age, the Blacker house is suffering from the effects of weather and neglect. The ends of the roof rafters, for example, have rotted from exposure, and the decay has spread into the roof itself.

Perhaps more disturbing than the disrepair of the structure is the remodeling and the disappearance of furnishings that have taken place under various owners. After the Blackers sold the house, the three subsequent owners made minor changes to the home. The last one sold some of the furniture and subdivided the property in

the late 1940s. Max and Marjory Hill occupied the house until about 1985. To that point, alterations had not been substantial. Then a pair of out-of-state owners had big ideas. The *Los Angeles Times* recounted the story in October 1985.

Barton English, an investor, and a partner, the late Michael Carey, an Arts-and-Crafts dealer from New York, bought the Blacker home for 1.2 million dollars. But they never moved in. Instead, they had all the light fixtures and several art-glass windows removed and shipped to Texas and New York City. Some pieces were sold. A few of the glass works were replaced with reproductions. A

neighbor, who noticed the front door being taken off its hinges, alerted the local historical commission, which tried unsuccessfully to halt the dismantling of antiques. The partners sold the house to the Poole family around 1987 but not before the damage was done.

## A perfect customer

The Blacker house changed hands once more. The present owners have lived in Pasadena most of their lives. They've been interested in living in a Greene brothers' house for a while. "Luckily for all of us," says Ipekjian, "they decided to purchase and restore the Blacker home."

Ipekjian sees the revitalization of the Blacker house as significant in both an historical and an architectural sense. "The clients are taking the care and spending the money to do the job right," Ipekjian says.

Repair work, which began in January 1995, has been extensive, including a complete seismic retrofit. The house is getting new rafter tails and an insulated roof, and its electrical, plumbing, heating and cooling systems also are being

replaced or overhauled. For the most part, the alterations will be unseen or done in a way that will preserve the house's authenticity.

Only a tiny portion of the woodworking being done is not considered exact replication. For an upstairs dressing room, Ipekjian is building new cabinets adapted from other furniture in the house. The kitchen is getting reproduction cabinets, with modifications, by another contractor. Despite the number of trades involved, all the work is being done in the spirit of the original house. To make sure this happens, the owners put together a three-party team.

The planners of the Blacker restoration are Randell Makinson,



For the most part,  
the alterations will be  
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that will preserve the  
house's authenticity.





*Comprehensive restoration—Jim Ipekjian reproduces teak lanterns for the Blacker house (left). Exterior work includes 250 new rafter tails and a new roof. A refurbished Arts-and-Crafts fireplace surround glows in afternoon sunlight (below).*







**Greene furniture is exquisitely reproduced. More than 180 pieces of inlay go into a Greene brothers' reproduction sideboard by Jim Ipekjian (above). A mahogany side chair (far right) matches the sideboard. The flower in the chair's top rail (right) has rosewood roots, white oak twigs and leaves, padauk buds and stem, and petals of New Zealand abalone.**



**Visible joinery is everywhere. The Blacker house entry (left) is graced by scarf joints and pegged mortise-and-tenon joints. Ipekjian fired new glass to create iridescent transoms. He leaded the glass to match original Tiffany glazing. An exaggerated box joint (above) makes a handsome cornice.**



the architect, Julia Lyman and Bill Searle, the owner's representatives, and Ipekjian, who is responsible for the woodworking, the wood finishing and the reproduction light fixtures. Ipekjian is hopeful that some furniture commissions will come his way, too.

Ipekjian and Makinson have worked together on various projects for almost eight years. Makinson is the author of *Greene and Greene, Architecture as a Fine Art* (Gibbs M. Smith, Box 667, Layton, UT 84041) and the former curator of The Gamble House. Makinson is a big plus for this job because he is able to share more than 25 years worth of knowledge about the Greenses.

Most of the Blacker house blueprints are still available. But the original drawings show little or no detail of the furniture. Ipekjian has never found any of the shop drawings. So to answer questions, he occasionally visits nearby Huntington Library to see its collection of archival photographs and drawings (see the photo on p. 80).

To better understand the importance of the Blacker house restoration, it's helpful to know about the men who built it.

### Brotherly involvement at the Blacker residence

Pasadena was a small resort community when Robert Blacker decided to build a home there in 1907. Blacker was a turn-of-the-century lumberman, which may explain his appreciation of skillful woodworking. He hired architects Myron Hunt and Elmer Grey to design a home for his property in the prestigious Oak Knoll subdivision. After seeing their initial design, Blacker was concerned the house might not withstand an earthquake. (The 1906 San Francisco quake had just occurred.)

Blacker was aware of the Greene brothers' reputation as sound structural designers, and he liked the homes they had designed in the area. So he decided to hire them as new architects for the project. At the time, the Greenses were coming into their own as architects, trying new details and including crafted wooden elements in their work. Influenced by the Arts-and-Crafts movement, particularly the furniture of Gustav Stickley, the Greenses raised the level of craftsmanship by adding Oriental motifs and subtly textured surfaces to their designs. (For more about the Greene and Greene style, see *FWW* #106, pp. 67-70.)

The Greenses stuck with the basic Hunt and Grey floor plan, but the Greenses totally changed the character of the house. A large overhanging roof, framed with heavy Douglas fir timbers, added shade to the surrounding porches and gardens, making the home more informal and in keeping with the hot, arid climate. Exhibiting qualities of Japanese, Swiss and Spanish Mission architecture, the exposed timbers in the Blacker house would become a hallmark of the Greenses' designs—in particular, what Makinson calls the Ultimate Bungalows, all built between 1907 and 1909.

The Greene brothers weren't the only siblings who worked on the Blacker house. If it weren't for John and Peter Hall, and the accomplished craftsmen they employed, the Greenses' visionary designs may never have left the drawing board. Whatever the Greenses designed, the Halls' workshop managed to build. In the furniture pieces, for example, the Halls hand-tooled all surfaces.

Corners and edges were rounded, and inlays were carved and shaped to give a soft, tactile feel to the wood (see the top center photo on the facing page). Charles Greene, I'm told, was particularly fond of the Halls' craftsmen. He stopped by their shop and the job site regularly to learn about their techniques and to check the progress of the work.

Ipekjian believes many of the same craftsmen employed by the Hall brothers worked on both the Blacker house and The Gamble House. "Because similar methods were used at each residence, it's logical the same craftsmen's hands performed the work. What's astonishing is the Gamble work was completed in just two years."

### Ipekjian's path follows the Greenses and the Halls

Like the Greene brothers who designed the Blacker house and the Hall brothers who built it, architect Makinson and woodworker

Ipekjian are working closely together to restore the house. They continue to be inspired by the craftsmen who worked at the Halls' workshop. "Every time I'm doing work at the Blacker house," says Ipekjian, "I notice some design or construction detail that I hadn't seen before." When I asked him what he finds most challenging about mimicking those details, he says simply, "the subtleties."

Ipekjian has worked in his present shop for almost eight years. The 5,500 sq. ft. of space includes a combined office and drawing area and a small showroom that's usually jammed with his own work as well as originals from which he takes measurements and studies details. His lumber sheds add another 2,400 sq. ft. of space, which sounds luxurious. But having a large selection of premium and figured stock—mahogany, white oak and teak—is essential for the kind of work he's doing.

The shop is equipped with vintage machinery, which he has acquired, restored or modified over the years. Like the Halls, Ipekjian uses large, basic stationary tools in the shop and mostly hand tools on the job site. But of all the tools at his disposal, he prefers his own two hands. A self-taught woodworker, Ipekjian explains that the most effective way to learn about building in the Greene and Greene style is through hands-on experience. "I am fortunate in being able to examine and touch many original pieces," says Ipekjian.

Ipekjian builds one reproduction at a time. He works between 55 and 60 hours per week, assisted by his wife, Kate. Judging from the number of pieces I saw in his shop, he gets a lot done. He doesn't consider himself fast, though he attributes production to having good tools. "It's great to be able to do all the work—except the sanding," he said.

When I asked which aspect of his work is most difficult, his collected response resonated with Greene and Greene ethics: "Nothing is hard. Some things just take longer than others." He estimates that he has between six months and a year's more work to go. I'll bet he'll be savoring every minute of it. □

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Alec Waters is an associate editor of *Fine Woodworking*. Special thanks to Skip Lauderbaugh, Lon Schleining and Edward R. Bosley.



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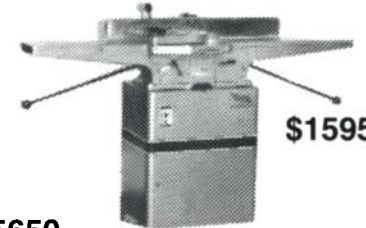
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SHOP TEST, Woodworker's Journal  
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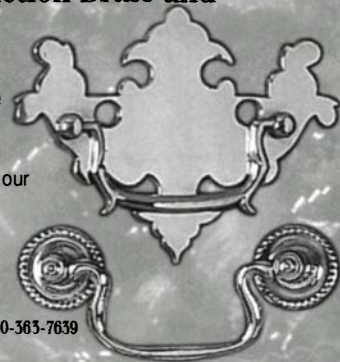
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- 1 year warranty
- Dust hood
- Anti-kickback
- Stand included

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- 14" Radial Arm Saw
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- 37" List: \$13,300
- SALE: \$9100, 20 hp
- 43" SALE: \$13,000, 25 hp
- Phase converter avail.



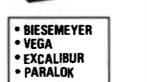
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- 8" x 6" bed
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### RAISED PANEL DOOR MACHINES



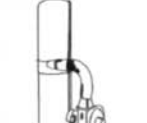
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- 43" SALE: \$13,000, 25 hp
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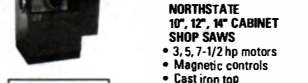
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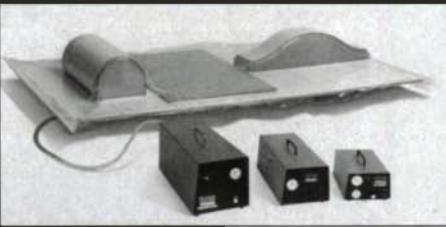
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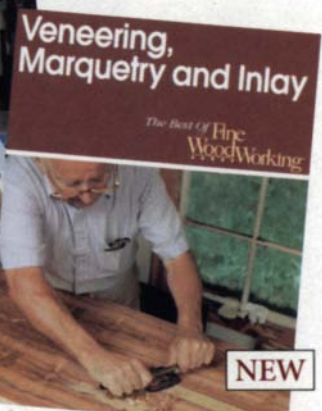


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## DeVilbiss OMX gravity-fed spray gun

The DeVilbiss OMX didn't look like any spray gun I had ever used (see the photo at right). An unusual number of additional parts and a videotape made me think this gun was going to be too complicated to use. My skepticism turned to delight once I began spraying with it.

The handle is comfortable and the whole unit is well-balanced and easy to control. The fluid cup is located on top of the gun, not below it. This position allows the finish to feed into the gun by gravity rather than by suction, which reduces both air-cap pressure and overspray.

The entire spray gun is made of high-impact plastic composites, so it is incredibly lightweight. Because it's only two-thirds the weight of my other guns, the first few times I used it, I kept expecting the gun to run out of paint.

What makes the OMX spray gun different is a second trigger that's mounted above the handle. Rather than having to twist my wrist when spraying horizontal surfaces, I can rotate the gun 90° and use the second trigger. This is more comfortable, and it results in a better spray pattern. It did take me a few minutes to get used to the motion of flipping the gun from vertical to horizontal and back, but before long, it became second nature.

With my old equipment, I would coat horizontal surfaces in two passes, one against the grain and one with it. With this gun, I can get the same finish with one pass along the grain.

The fluid tip and needle are built right into the gun. A knob on the front of the gun allows the fluid-tip diameter to be adjusted from a closed position to about .070 in. Adjustments can be made while spraying, giving greater control over how much material is flowing through the tip of the gun. This is helpful when moving from small areas, requiring a delicate spray, to larger sections on the same workpiece.

A disposable plastic liner with a leak-proof bushing keeps the inside of the fluid cup clean, greatly reducing the amount of solvent needed at the end of the job. Cleaning the gun is simply a matter of removing the liner and running 2 or 3oz. of thinner through the gun. At first, I found the liners



Photo: ITW DeVilbiss

*DeVilbiss OMX spray gun has a gravity-fed fluid cup and two triggers. The trigger on top of the gun is used when spraying horizontal surfaces.*

difficult to fill. After using the gun a few times, however, filling it became quite easy.

You will need at least a 3-hp air compressor to power this spray gun, but a 5-hp unit with a 60- to 80-gal. tank is better. The gun retails for \$495 and comes with a videotape, several plastic liners and bushings, cleaning brushes, a stand to hold the gun during refilling, an in-line air filter and a mini-regulator.

I have three other spray guns in my shop, including both compressed-air and turbine-driven high-volume, low-pressure units. I have not used any of them since I unpacked the OMX.

The OMX is manufactured by ITW DeVilbiss Industrial Spray Equipment, 1724 Indian Wood Circle, Maumee, OH 43537; (800) 445-3988.

—Andy Charron

## California Import/Export pen-turning tools

Turning pen barrels requires some specialized tooling. Small stock must be held on the lathe precisely so the parts will line up correctly after they are turned. As a production turner who makes a lot of wooden-barreled pens, I was eager to try this new tooling set (see the top photo on p. 90).

A combination mandrel and spur drive is the heart of the set, and it may be reason enough to buy the system. The drive is finely machined with a spur diameter of about 3/16 in. I have often considered having a drive like this custom-made for turning stick pens, chess pieces or the occasional



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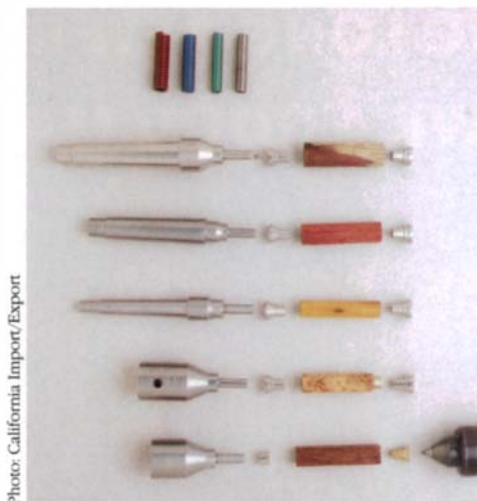
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lace bobbin. The kit also includes a bushing set so blanks for different pen types can be mounted on the same mandrel.

I usually turn both the top and bottom of a pen barrel in one setup. So my enthusiasm with this tooling began to wane when I found that I could only turn one-half of the barrel with each setup. Even though this tooling is more versatile, it results in a lower volume output. This set is probably best suited to the turner who wants to make a variety of pen styles and is willing to settle for a lower volume output.

The tooling set costs \$34.85, and the spur drive can be purchased separately for \$24.95. Contact California Import/Export, 621 W. Porter, Fullerton, CA 92632; (714) 992-5725. —Angelo lafrate



**California Import/Export offers a kit for turning a variety of wooden pens.**

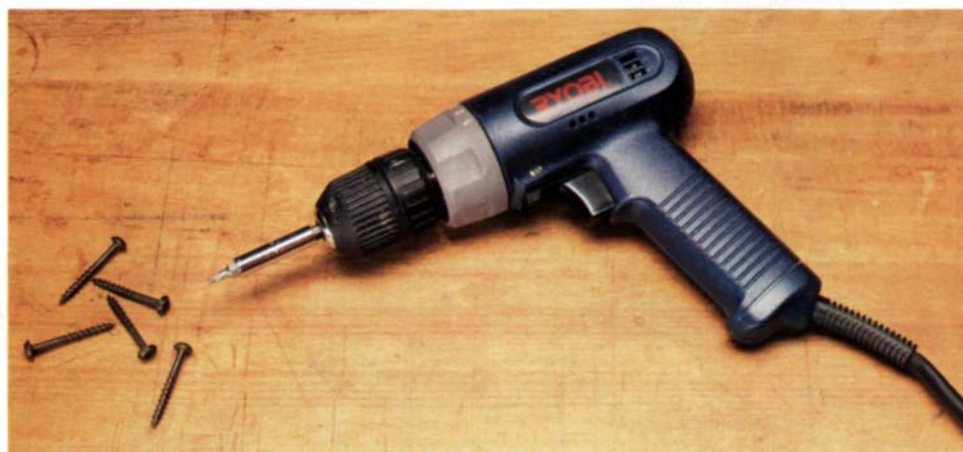
## Ryobi drill/driver

I have used a cordless drill in my shop for a long time, but I could just as easily use a drill that plugs into a shop wall outlet. Ryobi America Corporation must have realized that people liked some of the features on cordless drills (such as an adjustable clutch and low weight) but were never far from an outlet.

Ryobi's answer is this 3/8-in. drill/driver. It has a keyless chuck, six torque settings and a price tag of about \$40 (see the photo below). This tool has the look of a cordless drill, but instead of a battery pack at the end of the handle, there's a 10-ft. power cord. Eliminating the battery pack saves considerable cost and weight.

The 10-ft. cord provides enough slack so I don't have to reach for an extension cord at every use. The 82-watt motor has ample power for driving the usual assortment of furniture-size screws, and the six torque settings are sufficient for consistent seating of screws and nuts. Users with small hands will find the lightweight, compact housing a welcome improvement.

The motor has only one speed—540 rpm. That's a possible drawback. I prefer having variable speeds for maximum control, and 540 rpm is a bit slow for drilling small-diameter holes. Nevertheless, for all but the most fussy screw-driving operations, one speed isn't a problem. —Dennis Preston

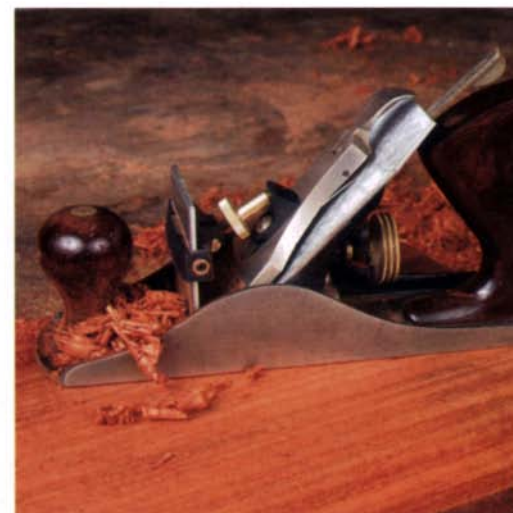


**Lightweight and low cost—This single-speed Ryobi drill/driver has some of the advantages of a cordless drill for those who don't need the portability.**

## Veritas scraping-plane insert

A scraping plane has some advantages over a simple cabinet scraper. The blade can be set to take a consistent cut without burning the user's thumbs. And the long sole helps achieve a flat surface. For the novice, the plane is easier to use. This attachment from Veritas (see the photo below) offers these advantages at a fraction of the cost of a dedicated scraping plane.

This scraping-plane insert is designed to replace the plane's original blade. The thin blade is prepared with a 45° bevel edge and burnished to produce a cutting burr. The blade is then placed onto a V-shaped



**A scraping-plane insert from Veritas converts a bench plane into an easy-to-use scraping plane.**

carriage that engages the pivoting prongs of the blade-advancement mechanism. The scraper blade can be precisely advanced and adjusted laterally, just like a plane blade. In addition, there is a fine-tuning nut that flexes the scraper blade, providing even greater control.

Clear instructions made setup a snap, and I was able to convert the plane in about five minutes (the second time, it took about two minutes).

The scraping-plane insert definitely takes the sting out of scraping large surfaces because the bench-plane body supports the scraper blade. When finishing large, flat panels, this is a major plus.

One complaint: The scraper blade is too



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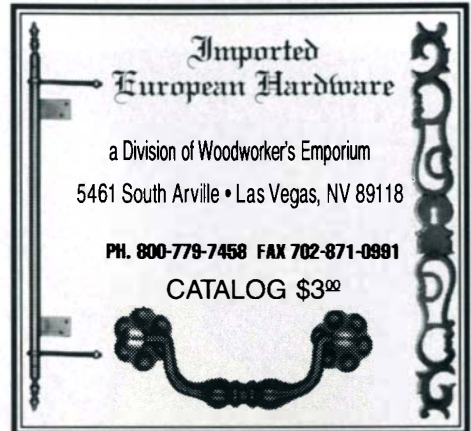
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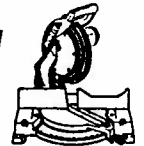
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thin. With vigorous use, it vibrated and chattered, and at times, it seemed to hum. This minor shortcoming had no serious effect on performance. But most of the scraped surface was covered with very faint chatter marks that required fine sanding.

I still prefer a flat cabinet scraper because it gives me the capability of adjusting the cutting angle to suit the grain and the wood

surface. However, I would recommend this tool as an effective intermediate finishing tool or to beginning woodworkers who would otherwise shy away from cabinet scrapers completely.

The scraping-plane insert costs \$25.95 and is sold by Veritas Tools, 12 East River St., Ogdensburg, NY 13669; (800) 667-2986.

—Mario Rodriguez

## The Shop Fox



*The Shop Fox holds stock for either horizontal or vertical cutting and milling.*

At first glance, the Shop Fox looks suspiciously like another semi-useful wood-working gizmo. Actually it's a serious tool.

This jig is designed to hold stock either vertically or horizontally on a tablesaw, a shaper or any machine with a standard 3/4-in. by 3/8-in. miter-gauge slot (see the photo above).

A number of holes drilled through the vertical face make mounting toggle clamps or other hold-down devices easy. A built-in clamp on the back side of the face holds stock in the horizontal position.

The Shop Fox is heavy. In fact, the device weighs 15 lbs. The parts are, for the most part, 1/2-in.-thick aluminum plate. The milling and finish are first-rate.

The rectangular guide bar attached to the base allows the jig to slide along the miter-gauge slot. Anti-friction tape on the underside of the base helps it slide smoothly. The upper carriage can be moved closer to or farther from the cutting tool by loosening two knobs that anchor the upper carriage to the base.

This jig is useful for cutting tenons on the tablesaw and coping cuts on the shaper. Both of these operations can be very tricky to set up with shop-built jigs. This jig has the ability to do both quickly and safely.

The Shop Fox lists for \$169.95 and is available from Grizzly Imports, Inc., P.O. Box 2069, Bellingham, WA 98227; (800) 541-5537.

—Lon Schleining

## Briefly noted

### Free wood-finishing booklet

M.L. Campbell, a Pratt & Lambert company, is offering a free booklet to finishers on solving common wood-finishing problems. For additional information about this booklet, contact Roger Drollinger, M.L. Campbell, P.O. Box 22, Buffalo, NY 14240; (716) 873-6000.

### Hollowood

I can't help but feel that there are a lot of things that can be made with the wooden tubes shown in the photo below. Table legs, architectural details, round storage boxes, who knows?

Hollowood is made of several plies of hardwood veneer and waterproof glue. The standard wall thickness is 1/8 in. The tubes are available in 8-ft. lengths and in outside diameters from 1 1/2 in. to 4 in., go-



ing up in 1/4-in. increments. Hollowood is produced in white and red oak, cherry, basswood, mahogany, walnut, poplar and maple. The tubes cost about \$3 to \$7 per ft. Tubes made of other wood species can be special ordered.

For more information and the closest dealer, contact Hollowood, P.O. Box 1149, Clinton Township, MI 48036-1149; (810) 465-2767.

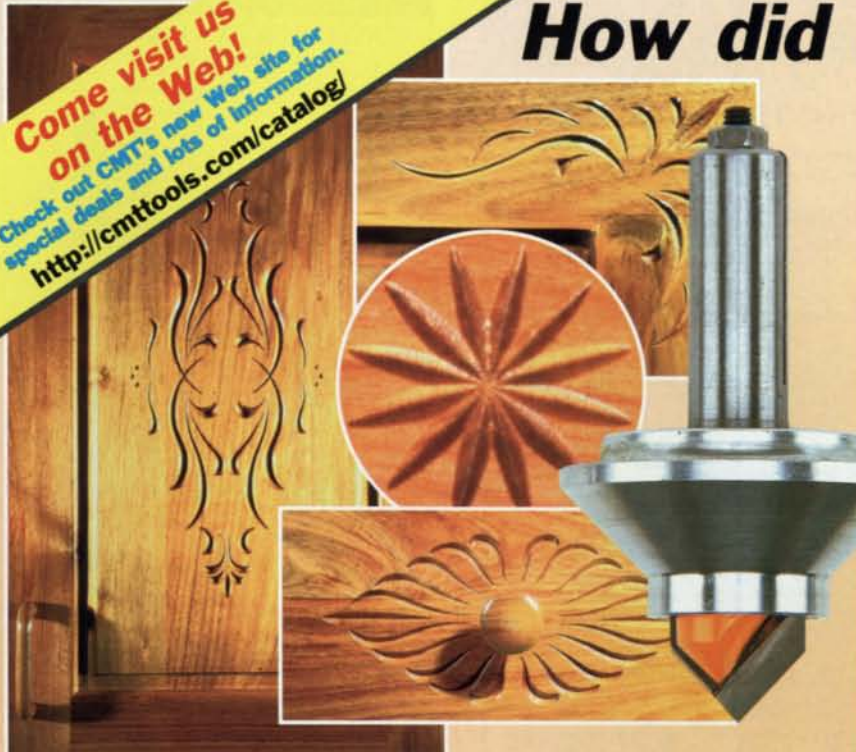
—D.P.

*Andy Charron is a cabinetmaker in Long Branch, N.J. Angelo Iafrate is a woodturner in New Caanan, Conn. Dennis Preston is an assistant editor of Fine Woodworking. Mario Rodriguez is a contributing editor to Fine Woodworking. Lon Schleining is a stairbuilder and woodworking instructor in Long Beach, Calif.*



# How did I carve these?

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I love the look of hand carved wood, with its warmth, beauty and unique personality. But hand carved cabinets, doors and furniture have always been beyond my budget and quite frankly, intricate carving has always been beyond my skills.

In fact, architectural carving is almost a lost art in this age of automation and mass-production woodworking. So when we found this three dimensional router carving system in Tasmania (an island off the southern coast of Australia) we had to have it.

The beauty of this system is that it carves in three dimensions. Router sign-carving systems only have two-dimensional patterns, but our system incorporates a unique angled template guide and special templates to produce true three-dimensional cuts.

Besides the expense and time required, traditional hand-carving has another limitation: it's very difficult to exactly duplicate a carving. The 3D Carving system allows you to produce any design once, twice or a hundred times! With the 3D System, cabinet shops and door makers can add a new dimension to their work. Furniture makers can add rosettes, corner designs and "hand carving" to their pieces.

Best of all, the 3D Carving System is very affordable, providing professional woodworkers with an excellent opportunity to add value and distinctive touches to their work. I'm convinced that the 3D Carver will prove to be the most revolutionary tool to enter the woodworking market in decades.

Sincerely,  
Carlo Venditto, C.E.O.

P.S. If your router carvings look "too perfect", just add a few chisel marks for a more primitive look.

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1) **The 3D Carver Bit:** A 1/2" shank, carbide tipped V-Groove Bit is enclosed in a 45° guide bushing. A threaded shaft within the bit's shank allows precise depth adjustment of the tip of the V-Groove bit.

**Bit Specifications:** Shank: 1/2" Cut diameter: 3/4" Cut Angle: 45° Cut depth: 5/8" Guide bushing diam.: 1-7/8"

2) **Template Holding Frames:** Clamped or tacked to your workpiece, these frames hold the 3D Templates securely in place.

3) **Carver Templates:** A total of 46 templates (with more in the works) produce a host of designs for cabinet doors, panel doors, door rails and comers, drawer fronts and many other applications.

### How does the system work?

Using the 3D Carver is easy. The bit is installed in the router (1/2" collet only) with the plunge mechanism unlocked so that the router can move up and down as you route. The 45° bushing follows the slots in the template. As the slot gets wider, the router moves downward, so the v-groove gets wider. As the slot narrows, the router moves up and the groove gets narrower. That's it!

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The 3D Carver System™ & Templates are protected by U.S. patent #5,146,965 & international patents. The color orange on router bits is a registered trademark of CMT Tools™

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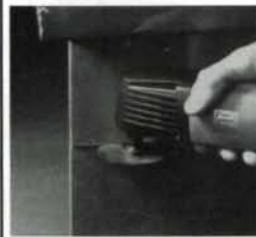
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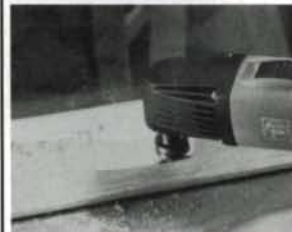
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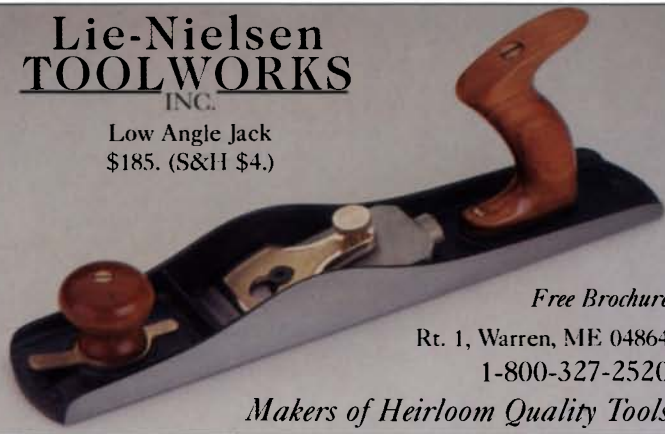
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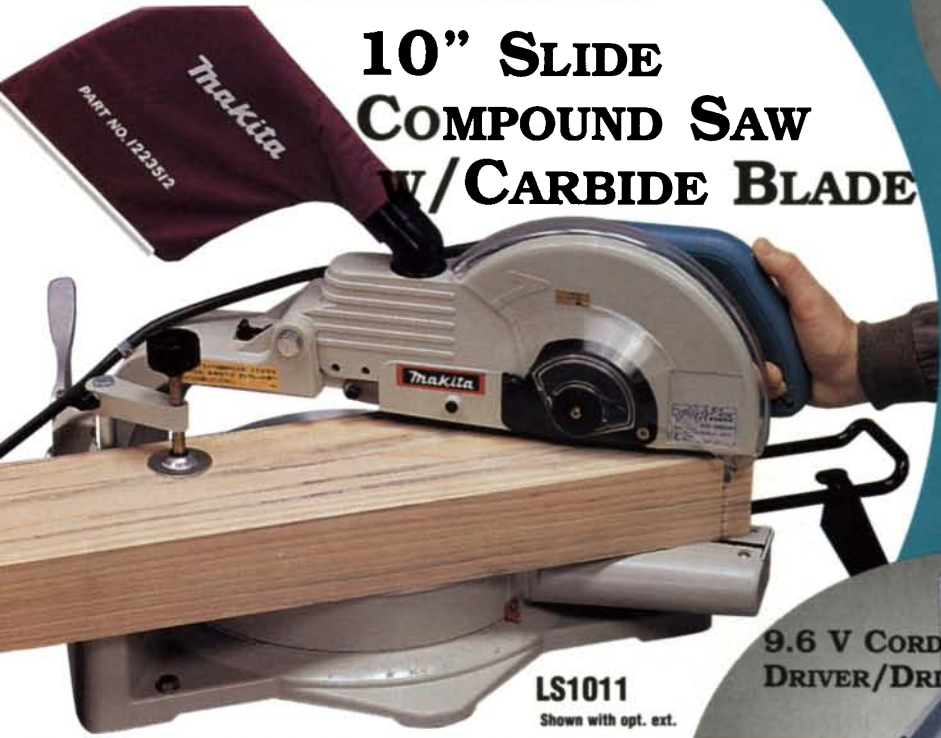


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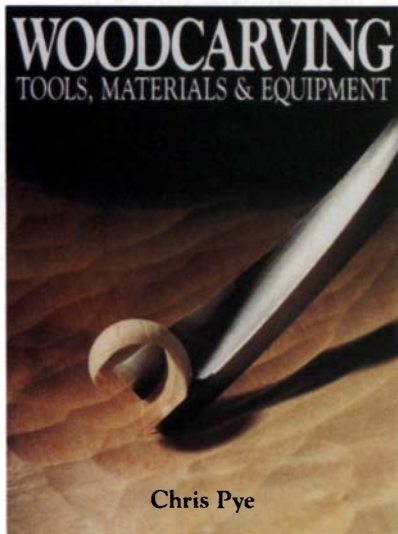
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May/June 1996 99



**Woodcarving: Tools, Materials & Equipment** by Chris Pye. *Guild of Master Craftsman Publications, Ltd., England. Distributed in the United States by Sterling Publishing Co., 387 Park Ave. S., New York, NY 10016-8810 (800-848-1186); 1994. \$24.95, paperback; 362 pp.*



Chris Pye is a professional woodcarver and woodturner with more than 20 years experience. His book, *Woodcarving: Tools Materials & Equipment*, covers tools, sharpening, holding devices, the work place, wood and finishing. More than half of the book is devoted to a meticulous study of gouges and chisels and how to sharpen them. This section includes some highly technical information on steel, cutting angles, the correct form of tangs, handles and ferrules. And there's a 90-page, in-depth section on sharpening.

The section on holding devices covers the workbench and a variety of ways to clamp the work securely for carving. A short chapter about the actual workshop (position of bench, floor, lighting, storage) is followed by a thorough chapter on wood, its qualities and defects, where to get it and how to glue it together for different types of joints.

The chapter on finishing discusses sealers, polishes and stains. A reference section at the end of the book covers subjects such as research, drawing, photography, safety and suppliers.

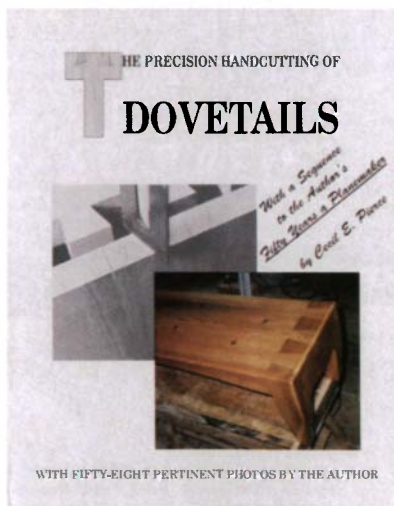
The contents and the index are quite

good, and the quality of the graphics and photos is excellent. The whole book reflects a thorough understanding and a love of traditional woodcarving techniques and tools.

There are, however, some shortcomings. Thousands of amateur carvers in Britain and in the United States use small, mushroom-handled palm gouges, also called block cutters, but they simply are not mentioned. Japanese carving chisels, highly regarded by many carvers, are likewise ignored. Pye pays scant attention to electric carving tools or to sharpening chisels with electric tools. His belief that many carvers enjoy sharpening by hand is a fact that has escaped my notice. The sections on knives and sandpaper are extremely limited in scope.

There aren't many omissions in this book, but they are serious. All in all, this book has more to do with the history of woodcarving tools than with the craft as it is practiced today. —Ian Norbury

**The Precision Handcutting of Dovetails** by Cecil E. Pierce. *The Monmouth Press, 383 Norris Hill Road, Monmouth, ME 04259 (207-933-4922); 1995. \$18.00, hardback; 56 pp.*



At 90 years old, Cecil Pierce was still working wood and writing books. When he died in January, he was working on a book on sharpening. He didn't just recycle the same old techniques. He was always experimenting, turning out fresh ideas and trying new things. That is what

is most attractive about his last book, *The Precision Handcutting of Dovetails*.

This book seems squarely aimed at the beginner. Pierce details the sequence for laying out and cutting dovetails with plainly written text and close-up photos. The writing is personal and comfortable. He shares his own tricks—like his novel technique of using a hack saw to cut dovetails. But he doesn't boast; he's just trying to improve the reader's skills.

The first 36 pages are devoted to cutting dovetails; the remaining 20 serve as a follow-up to his first book, *Fifty Years a Planemaker and User* (he needed the extra pages to qualify for a copyright). Pierce offers new information on adjusting plane irons and adapting bench planes to cut moldings, with the hope that the reader will find it interesting.

This book is more than interesting. It is proof of one old dog's passion for woodworking, his respect and admiration for his predecessors and his boundless curiosity. —Mario Rodriguez

**The Woodworker's Marketing Guide** by Martin Edic. *The Taunton Press, 63 S. Main St., Box 5506, Newtown, CT 06470-5506 (800-888-8286); 1995. \$17.95, paperback; 160 pp.*

In this book, Martin Edic explores a sometimes neglected and mysterious aspect of business for professional woodworkers, many of whom are not known for their keen insight into business affairs.

Edic walks the reader through the process of developing a good marketing strategy, from setting goals to making sales calls to potential customers. I found this book helpful when I recently moved my business 1,800 miles and had to set up in a relatively short time on a reasonable budget. —David Tuttle

*Ian Norbury is a British woodcarver and the author of several books on carving. Some of his work appeared on the back cover of FWW #108. Mario Rodriguez teaches planemaking at his workshop in Warwick, N.Y., and is a contributing editor to FWW. David Tuttle operates The King's Woodwright, a custom furniture and cabinetmaking shop in Brantford, Ont., Canada.*



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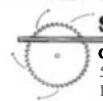
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*Listings of gallery shows, major craft fairs, lectures, workshops and exhibitions are free, but restricted to happenings of direct interest to woodworkers. We list events (including entry deadlines for future juried shows) that are current with the time period indicated on the cover of the magazine, with overlap when space permits. We go to press three months before the issue date of the magazine and must be notified well in advance. For example, the deadline for events to be held in March or April is January 1; for July and August, it's May 1, and so on.*

**ALASKA: Meetings**-Alaska Creative Woodworkers Association meets at 7:00 p.m. on the fourth Monday of each month at the Anchorage Museum. (907) 345-3077.

**ARKANSAS: Meetings**-Woodworker's Association of Arkansas meets the first Monday of each month at 7:00 p.m. at J.T. Shannon Lumber Co., Woodworkers Center, 6200 Sears Drive, Little Rock, 72209.

**Meetings**-Ozark Woodturners meets the third Saturday of each month in Mountain Home. For more information, call Michael Kornblum at (501) 424-5893.

**Workshops**-Woodcarving, bamboo fly rod, wood-strip canoe. White River Artisans School, P.O. Box 308, 202 South Ave., Cotter, 72626. (501) 435-2600.

**CALIFORNIA: Workshops**-Woodworking for women. Furnituremaking with hand tools using traditional joinery, weekends. San Francisco. For more info, contact Debey Zito (415) 648-6861.

**Classes**-Wood finishing and more for furniture and cabinets. For schedule, contact Studio 1829, 1829 Stanford St., Santa Monica, 90404. (310) 453-0230.

**Workshops**-Shaker bench, sofa table, Adirondack chair, more. Saturdays and Sundays. For more info, contact the Woodworkers Place at (818) 952-3177.

**Workshops**-Various workshops including Japanese woodworking, joinery and sharpening. Contact Hida Tool Co., 1333 San Pablo, Berkeley, 94702. (510) 524-3700.

**Lecture**-Making and marketing furniture in 18th-century Newport, May 14. M.H. de Young Museum, Golden Gate Park, San Francisco. For information, call (415) 499-0701.

**Workshops**-Week-long, one-on-one sessions in building classic furniture in Ventura shop. Contact Greg Radley, Radley Fine Furniture, 2745 Sherwin Ave., #12, Ventura, 93003. (805) 658-0327.

**COLORADO: Classes**-Woodworking and related classes, year-round. For info, write Red Rocks Community College, 13300 W. 6th Ave., Lakewood, 80401. (303) 988-6160.

**Classes**-Traditional hand woodworking, year-round. Contact Tom Larkin, Shadow Mountain School of Woodcarving, 32037 Stenzel Drive, Conifer, 80433. (303) 674-8560.

**Classes**-Hand-cut dovetails, finishing. The Woodworkers' Store, 1550 South Colorado Blvd., Denver. (303) 782-0588.

**CONNECTICUT: Classes**-Hands-on woodworking, finishing and lathe classes. Harris Enterprise, 80 Colonial Road, Manchester, 06040. (203) 649-4663.

**FLORIDA: Meetings**-South Florida Woodworking Guild meets every second Monday at 7 p.m. Constantine, 1040 East Oakland Park Blvd., Ft. Lauderdale. For further information, contact Woody McLane at (305) 565-2729.

**Meetings**-Central Florida Woodworkers Guild meets the second Thursday of each month. Woodcraft Supply, 246 E. Semoran Blvd., Casselberry. For more information, contact Bob Elliott (407) 695-8960.

**Meetings**-Tallahassee Woodcrafters Society meets the second Tuesday of each month. Contact Walt Behrle at (904) 668-6653 or Austin Tatum at (904) 386-6876.

**Meetings**-St. Petersburg Woodcrafters Guild meets the fourth Thursday of every month at 7 p.m. Montgomery Electric and A/C, 1200 19th St. N., St. Petersburg, 33713. Contact Don Montgomery at (813) 898-0569.

**GEORGIA: Meetings**-Woodworkers Guild of Georgia meets the second Monday of every month. Southern College of Technology, 1100 S. Marietta Parkway, Marietta. For more information, call (404) 299-3972.

**Workshops**-Japanese woodworking by Toshihiro Sahara. One Saturday each month. For more info, contact Sahara Japanese Architectural Woodworks at (404) 355-1976.

**ILLINOIS: Classes**-Finishing, tablesaw, cabinetmaking and more. The Woodworkers' Store, 286 West Rand Road, Arlington Heights. (708) 253-8875.

**Workshops**-Chairmaking, bed making with Jeff Miller. J. Miller Handcrafted Furniture, 1774 W. Lunt Ave., Chicago, 60626. (312) 761-3311.

**INDIANA: Classes**-Hands-on woodworking classes with Michael Van Pelt. Superior Woodworking Supply, Inc., 922 Ft. Wayne Ave., Indianapolis, 46202. (317) 635-5747.

**Classes**-Marc A. Adams School of Woodworking, Route #2, Box 121A, Franklin, 46131. (317) 535-4013.

**Workshops**-Molding planes, hand-cut dovetails and more. Mississinewa Valley Workshop, 4110 W. Michael Drive, Marion, 46952. (317)664-3325.

**IOWA: Show**-International woodcarvers 30th anniversary congress, June 20-23. Putnam Museum, Davenport. For info, contact Larry Yudis, Affiliated Wood Carvers, Ltd., P.O. Box 10408, Bettendorf, 52772-8408. (319) 359-9684.

**KENTUCKY: Workshops**-Woodturning and joinery instruction. For further information, contact Jim Hall, Adventures in Wood, 415 Center St., Berea, 40403. (606) 986-8083.

**Meetings**-Kyana Woodcrafters Inc. meets the first Thursday of each month. Bethel United Church of Christ, 4004 Shelbyville Road, Louisville, 40207. (502) 426-2991.

**Workshops**-Traditional Windsor chairmaking. One-week courses. Contact David Wright at (606) 986-7962.

**Workshops**-Bowl turning with Abe Harper, Berea. All levels. For more information, call (606) 256-5443.

**MAINE: Workshops**-Two-week basic and intermediate furnituremaking courses, 12-week intensives. Center for Furniture Craftsmanship, 125 W. Meadow Road, Rockland, 04841. (207) 594-5611.

**Meetings**-Guild of Maine Woodworkers meets the first Wednesday of every month. For info, call (800) 805-5100.

**MASSACHUSETTS: Classes**-Woodworking classes, most of the year. Contact Boston Center for Adult Education, 5 Commonwealth Ave., Boston, 02116. (617) 267-4430.

**Workshops**-Box construction, hand tools, joinery, cabinetmaking and more. Hancock Shaker Village, Box 927, Route 20, Pittsfield, 01202. (413) 447-9357.

**Instruction**-Full-time program in fine furniture construction. Complete facilities. For info, contact Wm. B. Sayre, Inc., One Cottage St., Easthampton, 01027. (413) 527-0202.

**Classes**-Turning, carving, finishing. One Cottage Street School of Fine Woodworking, One Cottage St., Easthampton, 01027. (413) 527-8480.

**Workshops**-Toolmaking for woodworkers. First three weekends of each month. Contact Ray Larsen, Genuine Forgery, 1126 Broadway, Hanover, 02339. (617) 826-8931.

**Workshops**-One-week woodworking and related workshops, year-round. Contact The Heartwood School, Johnson Hill Road, Washington, 01235. (413) 623-6677.

**Classes**-Ongoing woodworking classes. For information, call Michael Coffey at (413) 527-8480.

**Workshops**-Carving, dovetail jig, finishing, furniture repair and restoration, more. Woodcraft Supply, 313 Montvale Ave., Woburn, 01801. (617) 935-6414.

**Classes**-Year-round in a do-it-yourself woodworking club. For more info, contact Yankee Artisans, 201 Westfield St., W. Springfield. (413) 732-0404.

**Classes**-Trellises, gazebos, fences, building a canoe or kayak, thru May. Horizons, The New England Craft Program, Williamsburg. For more info, call (413) 665-0300.

**Workshops**-Woodcarving, sharpening, layouts, carving techniques, tool forging and design study. Calvo Studio, 17 Mill Lane, Arlington, 02174. (617) 648-5589.

**Show**-Central New England woodturners exhibition and sale, May 4-June 7. Surroundings Gallery, 377 Main St., Gardner. (508) 630-2340.

**MICHIGAN: Workshops**-Woodworking basics, furniture-making basics with Joseph Hoover, year-round. For more information, contact Woodcraft Supply, 42102 Ford Road, Canton, 48187. (313) 981-6808.

**Meetings**-Metro Carvers of Michigan meets second Tuesday of each month (except July and August) at 7:30 p.m. Helen Keller High School, 1505 N. Campbell Road, Royal Oak. (810) 771-1040.

**MINNESOTA: Classes**-Woodcarving classes, year-round. For information, contact Wood Carving School, 3056 Excelsior Blvd., Minneapolis, 55416. (612) 927-7491.

**Meetings**-Minnesota Woodworkers Guild meets the third Tuesday of each month at 7:15 p.m. Demonstrations presented each month. Contact Richard Gotz at (612) 544-7278.

**Classes**-Ongoing classes at a Minneapolis/St. Paul facility. For more information, contact Wild Earth Woodworking,

401 Hunter Hill Road, #3, Hudson, WI 54016. (715) 386-3186. **Classes**-Routers, refinishing, finishing, avoiding and repairing mistakes and more. The Woodworkers' Store, 3025 Lyndale Ave., South, Minneapolis. (612) 822-3338.

**MISSISSIPPI: Classes**-Various woodworking classes. For more information, contact Allison Wells School of Arts & Crafts, Inc., Canton. (800) 489-2787.

**MISSOURI: Show**-Treasures in Wood, May 11-27. Crown Center Exhibit Hall, Crown Center Shopping Center, 2450 Grand Ave., Kansas City. Contact John Freeland of the Kansas City Woodworker's Guild at (816) 478-8332.

**NEBRASKA: Meetings**-Omaha Woodworkers Guild meets at 7 p.m. the third Tuesday of every month. Westside Community Center, Omaha. For more info, contact John Cahill at (402) 334-5550.

**NEW HAMPSHIRE: Workshops**-Week-long Shaker-style furniture and chairmaking workshops, year-round. For info, contact Mary Sweet, Dana Robes, Wood Craftsman, Lower Shaker Village, Enfield, 03748. (603) 632-5385.

**Classes**-Fine arts and studio arts. For more info, contact Manchester Institute of Arts and Sciences, 114 Concord St., Manchester, 03104. (603) 669-2731.

**Classes**-Various woodworking classes. The Hand & I, P.O. Box 264, Route 25, Moultonboro, 03254. (603) 476-5121.

**Auctions**-Antique and craftsman's tool auctions, year-round. Contact Richard A. Crane, Your Country Auctioneer, 63 Poor Farm Road, Hillsboro, 03244. (603) 478-5723.

**Classes**-Make a Windsor chair with Michael Dunbar. For more information, contact Michael Dunbar, P.O. Box 805, Portsmouth, 03802. (603) 431-4676.

**NEW MEXICO: Classes**-Woodworking classes. For information, contact North New Mexico Community College, El Rito, 87520. (505) 581-4501.

**Classes**-Woodworking classes. For info, contact Santa Fe Community College, Santa Fe, 87502. (505) 438-1361.

**NEW YORK: Classes**-Traditional 18th-century woodworking techniques with Mario Rodriguez. For info, contact Warwick Country Workshops, P.O. Box 665, Warwick, 10990. (914) 986-6636.

**Meetings and classes**-New York Woodturners Association meets bi-monthly. YWCA, 610 Lexington Ave. (53rd St.), New York City. Contact Howard Alalouf (914) 337-0226.

**Classes**-Traditional and contemporary woodworking with Maurice Fraser, Bill Gundling, Jack Van Decker and Susan Perry. The Craft Students League at the YWCA, 610 Lexington Ave., New York City. (212) 735-9731.

**Meetings**-Long Island Woodworker's Club meets the first Wednesday of every month, September thru June. Brush Barn, 211 Jericho Turnpike, Smithtown. (516) 360-1216.

**Classes**-Intermediate woodworking & furniture design, thru May 14. Purchase College, Purchase. Contact Olene Duncan at (914) 251-6503.

**NORTH CAROLINA: Meetings**-North Carolina Woodturners meets the second Saturday of each month. Contact North Carolina Woodturners, P.O. Box 1833, Hickory, 28603. (704) 324-5960.

**Symposium**-The American Association of Woodturners 10th annual national symposium, June 22-24. Koury Convention Center, Greensboro. For more information, contact Mary Redig, 3200 Lexington Ave., Shoreview, MN 55126. (612) 484-1724.

**Workshops**-Windsor chairmaking and more. Contact Country Workshops, 90 Mill Creek Road, Marshall, 28753. (704) 656-2280.

**Classes**-Woodcarving, whittling and more, thru December. For more information, contact Southern Highland Craft Guild, The Folk Art Center, P.O. Box 9545, Asheville, 28815. (704) 298-7928.

**OHIO: Workshops**-Windsor chairs, taught by Joe Graham. For more information, contact Lenox Workshops, 1192 Webster Road, Jefferson, 44047. (216) 576-0311.

**Workshops**-Various workshops, year-round. Conover Workshops, 18125 Madison Road, P.O. Box 679, Parkman, 44080. (216) 548-3491.

**Classes**-Bandsaw techniques, veneering, furniture design and more. The Woodworkers' Store, 2500 East Main St., Columbus. (614) 231-0061.

**Meetings**-Cincinnati Woodworking Club meets from 9:00 to noon on the second Saturday of January, March, May, September and November. Reading High School, 801 E. Columbia Ave., Reading. For info, contact Cincinnati Wood-



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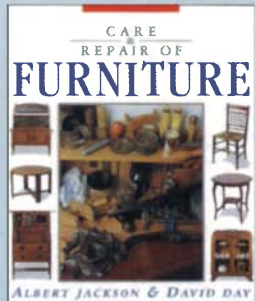
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working Club, 5974 Gaines Road, Cincinnati, 45247.

**Meetings**-Woodworkers of Central Ohio meets on the second Saturday of November, February, April and June. For more information, call Chuck at (614) 457-3704.

**Workshops**-Build a Queen Anne tea table, June 10-14; professional results with the shaper, June 15. Rio Grande. For more information, call Lonnie Bird at (614) 245-7325.

**OREGON: Exhibition**-With the Grain II: Works in Wood, thru May 28. Cook Gallery, 705 Oregon St., Port Orford, 97465. (503) 332-0045.

**Meetings**-Cascade Woodturner's Association meets every third Thursday. Contact Cascade Woodturners, 11575 S.W. Pacific Highway, #104, Tigard, 97223. (360) 887-3903.

**Classes**-Oregon School of Arts and Crafts, 8245 S.W. Barnes Road, Portland, 97225. (503) 297-5544.

**PENNSYLVANIA: Classes**-Windsor chairmaking, weekly and weekends. For more information, contact Jim Rendi, Philadelphia Windsor Chair Shop, P.O. Box 67, Earlville, 19519. (610) 689-4717.

**Classes**-Bowl turning with David Ellsworth. Three-day weekend classes in private studio. For info, contact David Ellsworth, Fox Creek, 1378 Cobbler Road, Quakertown, 18951. (215) 536-5298.

**Call for entries**-Third annual Wharton Esherick Museum woodworking competition/exhibition. The theme is jewelry boxes. Deadline: July 1. Send SASE to Wharton Esherick Museum, P.O. Box 595, Paoli, 10301-00595.

**Workshops**-Woodcarving instruction, June thru October. Contact Sawmill Center for the Arts, P.O. Box 180, Cooksburg, 16217. (814) 677-3707.

**Show**-Philadelphia Furniture Show, May-10-12. Pennsylvania Convention Center, Hall B, 12th and Arch Streets, Philadelphia. For more information, contact Hilary Jay at (215) 235-2809.

**RHODE ISLAND: Show**-Annual outdoor chair and furniture fair, June 1-2. Contact South Country Center for the Arts, Box 109, West Kingston, 02892. (401) 782-1018.

**TENNESSEE: Workshops**-Turning, carving and more, year-round. For more information, contact Arrowmont School of Arts and Crafts, P.O. Box 567, 556 Parkway, Gatlinburg, 37738-0567. (615) 436-4101.

**Classes**-Lumber selection and more. For information, contact Tennessee Valley Authority, 17 Ridgeway Road, Box 920, Norris 37828-0920. (615) 632-1656.

**Workshops**-Spring workshops include turning and carving. Tennessee Technological University, Appalachian Center for Crafts, 1560 Craft Center Drive, Smithville, 37166. (615) 372-3051.

**TEXAS: Meetings**-Woodturners of North Texas meets the last Thursday of every month, 7:30-10:00 p.m. Paxton Beautiful Woods Store, 1601 W. Berry St., Fort Worth, 76110. (817) 927-0611.

**Classes**-Carving classes with Don Schol, every Thursday, 6:00-9:00 p.m. Paxton Beautiful Woods Store, 1105 Sixth St., Carrollton, 75006. (214) 245-1192.

**Meetings**-North Texas Woodworker's Association meets the third Tuesday of each month. Contact Bruce May, P.O. Box 831567, Richardson, 75083. (214) 271-0125.

**UTAH: Symposium**-Woodturning Symposium, June 6-8. Brigham Young University, Provo. For more information, contact Utah Woodturning Symposium, P.O. Box 50196, Provo, 84606. (801) 378-2021.

**VERMONT: Courses**-Yesterday Design and Building School, Route 1, Box 97-5, Warren, 05674. (802) 496-5545.

**VIRGINIA: Classes**-Woodworking, router techniques, bowl turning and more. For more information, contact The Woodworkers Club, 216 Dominion Road, N.E., Vienna, 22180. (703) 255-1044.

**WASHINGTON: Workshops**-Small boat construction, handplane repair and construction, paddle carving, woodturning. For more info, contact Northwest School of Wooden Boat Building, 251 Otto St., Port Townsend, 98368.

**Classes**-Woodcarving, lathe, router, tablesaw, furniture and cabinetmaking. Individual and small groups. For more information, contact Common Sense Woodwork, 8231 S.E. 67th St., Mercer Island. (206) 232-1714.

**Classes**-Hand tools, dovetails, router basics, boatbuilding. The Wooden Boat Shop, 1007 N.E. Boat St., Seattle, 98107. (800) 933-3600.

**Exposition**-Washington woodworking and hobby exposition, June 1-2. For info, contact Evergreen State Fairgrounds, Monroe. (800) 484-5890, ext. 3067.

**WISCONSIN: Workshops**-Birchbark canoe building, June 29-July 14. Port Wing. Contact David Gidmark, Box 26 Maniwaki, Que. J9E 3B3.

**CANADA: Workshops**-Traditional Windsor chairmaking. Weekly courses. Contact David Goodwin, Village Chairmaker, Sparta, Ont., N0L 2H0. (519) 775-2751.

**Association**-Canadian Woodturners Association, Markham, Ont. For newsletter, call (905) 479-0755.

**Meetings**-West Island Woodturners Club (Montreal) meets every Tuesday, thru May. Contact Dennis Brown, 8817 Cure Legault, Lasalle, Que., H8R 2V9. (514) 366-6071.

**Association**-Superior Woodworking Association meets 7:00 p.m. the last Monday of each month. Confederation College, Ont. Contact Vic Germaniuk at (807) 767-5964.

**Show**-The Ancaster wood show, June 14-16. Ancaster Fairgrounds, 625 Highway 53 E. For more info or entry forms, contact John Downes, Oak Leaf Productions, 35 Ingrid Court, Hanilton, Ont., L8W 2V4. (905) 575-0450.

**ENGLAND: Workshops**-Restoration, hand finishing, cabinetmaking for beginners, marquetry, furniture design, year-round. Bruce Luckhurst, Little Surrenden Workshops, Bethersden, Kent TN26 3BG. 0233-820-589.

**SCOTLAND: Workshops**-Ongoing workshops. For more information, contact the Myreside International School of Antique Furniture Restoration, Myreside Grange, Gifford, East Lothian, EH41 4JA. (062 081) 0680.

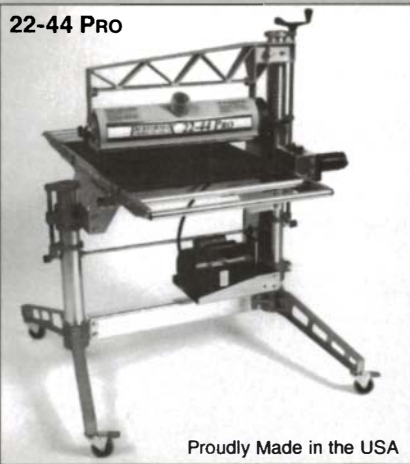
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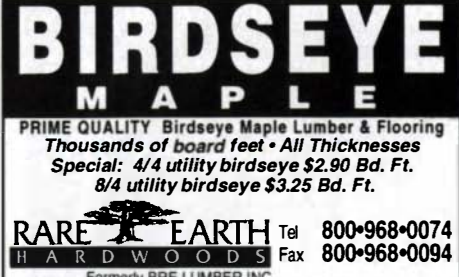
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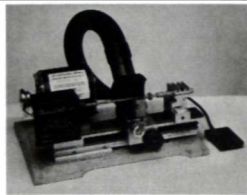
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## Are more biscuits better?

My pal, Chuck Ring, saw an item in the paper about the “technology transfer mission” at Sandia National Laboratories, a nearby federal facility dealing in various aspects of nuclear energy and weaponry. In the name of good public relations, the scientists at the lab wanted to help local businesses test manufacturing processes and products.

Chuck had some questions about the strength of the biscuit joints he uses in doors and how they compared with loose-tenon joints, so he gave the scientists a call. After deciding he wasn't a security risk, a scientist invited Chuck to make up some sample joints that could be crushed in the lab's 20,000-lb. computer-controlled press.

Chuck and I built 14 ponderosa pine L-shaped pieces, 18 in. on a side. We joined some with ½-in.-wide by 3-in.-high by 4-in.-long loose tenons. We put the majority together with two or three biscuits, using both #2 and the much larger #S-6 biscuits. We glued up the joints with urethane glue.

Some days later, we signed in at the laboratory gate and carried our samples past various plutonium planning places, Strategic Defense Initiative war room facilities, Top Secret Q-level sanctums and, finally, through heavy double-locked doors into the testing lab (see the photo above left).

After we'd destroyed our samples, the video plots of the tests gave me the most interesting information I've seen on a screen in years. While naked-eye results all looked the same (see the photo above right), the overlapping plots on the monitor showed that more and larger biscuits seem to make stronger joints. But as the graph at right shows, even the strongest biscuit joint didn't quite equal the loose tenon. (For more on the relative strength of biscuit joinery, see *FWW* #111, pp. 58-61.)

After looking at the results, we wondered what would happen if we had a more realistic sample—a four-sided frame with joints in each corner. We also wondered if moistening the biscuits with water before gluing them with a urethane adhesive would increase the strength of the joint.

We made up several frames with 3 #S-6 biscuits and then went back to the lab. Once more, the tenon joints were stronger than the biscuits. Interestingly, the tenon



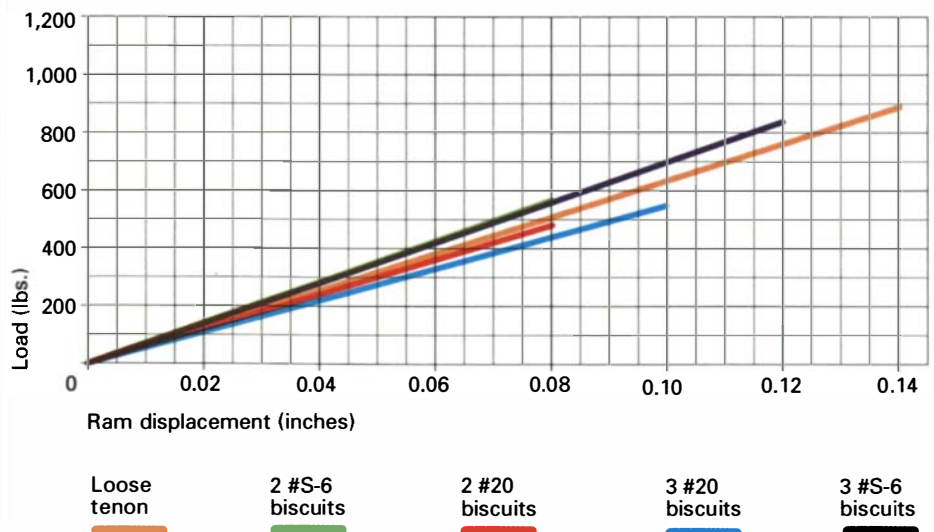
*A 20,000-lb. computer-controlled press, owned by the Department of Energy, was used to test the strength of biscuit and loose-tenon joints in ponderosa pine.*

*Every joint failure began at the end grain of the rail and split through the joint. In failure, all the biscuit joints looked similar.*



### Are biscuit joints as strong as loose tenons?

The evaluation used a computer-controlled press to bend L-shaped pieces of ponderosa pine joined with biscuits or loose tenons until the joints failed. The graph shows averages of a relatively small number of samples.





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joint could support a considerable load after initial failure, but the biscuit joints failed suddenly and completely (see the graph at right).

Perhaps the most interesting thing we learned was that moistening a biscuit with water made an appreciable improvement in load-bearing capacity.

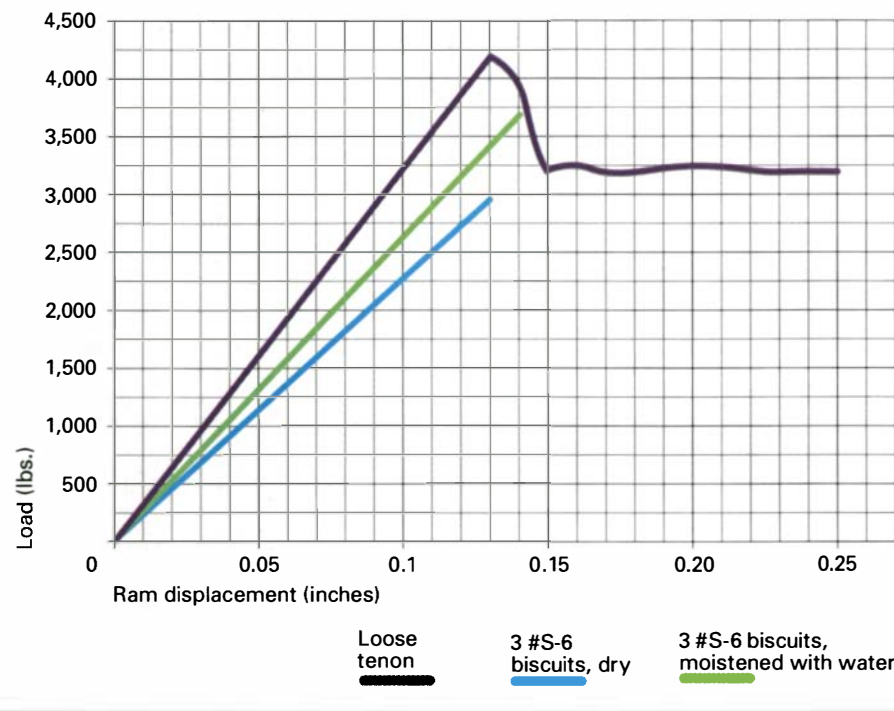
We evaluated relatively few samples, and our results won't bear up to rigorous scientific scrutiny. But we found them useful and have changed the way we work in the shop as a result. Now we use as many biscuits as possible and use the largest size that fits. We always use urethane glue even when water resistance isn't necessary, and we wet all surfaces with a spritz of water before applying the glue.

Our scientist/woodworker research consortium (SwoRC) plans further research in the shop and lab. We'll increase the samples to generate enough data to allow statistical inference. We want to look at ways to make bigger biscuits and slots and evaluate how biscuit joints hold up to stresses like slamming, bending and twisting.

—Sven Hanson, Albuquerque, N.M.

**Moisture makes polyurethane glue stronger**

When the joint was spritzed with water before assembly, the bond was stronger. The loose-tenon joint is still the strongest and supported a considerable load after failure. Here, joints were in four-sided frames. Results are averages of a relatively small number of samples.



**Guerrilla forestry**

Each year I use between 1,000 and 1,500 bd. ft. of wood; that's between two and 15 mature trees, depending on the species. I make a point to plant more trees than I use, even though I won't be around to harvest them. It's easy to do, and you don't even need to own a woodlot.

I sometimes take seedlings to my clients when I deliver furniture, and I often give small trees as gifts for birthdays, housewarmings or anniversaries. Mostly, though, I practice guerrilla forestry.

I head out with a can of seedlings and a garden trowel and start planting. There are plenty of empty lots, nonproductive fields and roadsides that could use some shade. Almost any empty space will do; all the tree needs is about 12 sq. ft. of land with decent

soil and plenty of sun and water. I use common sense and plant only in places where the trees have a chance to reach maturity.

A professional can plant 1,000 seedlings a day; I spend more time with each tree and plant only 25 to 50 seedlings at a time. I plant native trees because they thrive without a lot of care and attention. I make a hole about 1 ft. deep and about 1 ft. in diameter and backfill it with compost and topsoil. A gallon of water settles the roots. A heavy spread of leaves or wood chips keeps down the weeds and slows evaporation.

There are a lot of places to get seedlings. Some state forestry departments operate nurseries and sell seedlings to residents. Commercial nurseries include: Musser Forests, Inc., P.O. Box 340, Indiana, PA 15701; (800) 643-8319 and TEC, P.O. Box 539, Osseo, MN 55369; (612) 425-7577.

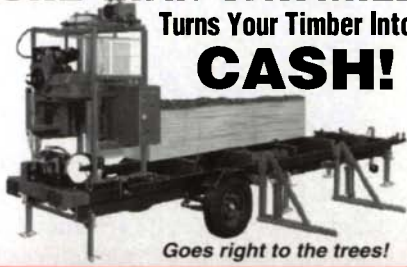
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—Chris Becksvoort, contributing editor

## Thorsen house, a Greene and Greene gem opens to public

If you're an enthusiast of the Craftsman style, you can get a rare glimpse of one of the Greene brothers' masterpiece houses this summer. The William R. Thorsen house in Berkeley, Calif., is open to the public for the first time. Designed in 1909, the house features one-of-a-kind architectural details, wooden crafts and informal gardens. It's been refurbished with original and reproduction furniture, lighting fixtures, rugs and decorative arts. Called "Last of the Ultimate Bungalows," the exhibit runs from June 14 through Aug. 18. For ticket information, call (213) 740-8687.

Not far away, a collection of original Greene and Greene drawings and photographs is on display at the University Art Museum. They are normally housed at the University of California's Berkeley College of Environmental Design.

If this doesn't satisfy your Craftsman appetite, there are several other places in California that display Greene and Greene work. In Pasadena, The Gamble House (818-793-3334) is a fully restored 1908 bungalow open for daily tours.

In San Marino, the Huntington Library (818-405-2100) has a collection of Greene and Greene archival photographs and documents and a recreated dining room based on the Greenes' Robinson house. The Los Angeles County Museum of Art (213-857-6000) in Los Angeles has an exhibit of Craftsman furniture, including Stickley pieces, a Greene and Greene chandelier, and a side chair from the Blacker house (for more on the Blacker house, see pp. 80-83 in this issue).

—Alec Waters, associate editor

## Remembering Cecil Pierce

Cecil Pierce, author of *Fifty Years a Planemaker and User* and a new book called *The Precision Handcutting of Dovetails* (see the review on p. 100), died unexpectedly at his home in early January. He was 90 years old and had spent his life pursuing a variety of passions and careers. He was a machinist, an elected official in his hometown of Southport, Maine, a lobsterman, planemaker, author, boatbuilder, maker of fine fly-fishing rods, fire chief and master woodworker.



**At home with tools—Woodworker and author Cecil Pierce in his Maine shop. He died in January.**

I first met Cecil 10 years ago at the Kennebec Wood Workers Association. Even then he was our most senior member. He rarely missed our monthly meetings, although he sometimes drove 2½ hours to get there. He always had a special contribution—an anecdote of the old days or expert technical advice. Our meetings will never be the same without him.

A little more than a year ago, my colleague, Michael Polumbo, and I had the good fortune to spend a Saturday with Cecil. He lived alone in a house that could be described as a series of wood and metal workshops. He took us into the only room that was not a shop, and we spent the morning in conversation among the many books, pictures and historic items that lined the walls.

Michael has built a few fly rods and was eager to learn some of Cecil's techniques for building hollow carbon-reinforced lam-

inated bamboo rods. He showed us the special tools he'd developed, and my friend was delighted when Cecil presented him with one. After that, our conversation shifted to his fly fishing trips to Alaska and Northern Siberia and then to his books.

We'd heard he was writing a new book he planned to call *Diamond Sharpening for the Fine Woodworker*, and Michael and I had brought some chisels and plane blades for him to use in a demonstration.

Cecil approached sharpening with his typical energy, proving that good ideas and inventiveness don't have to decline with age. He used bench-mounted belt sanders to shape the bevel and then turned to a diamond stone and diamond paste to finish up. The result was a remarkably smooth and polished edge.

The three of us went for a drive and had lunch, and afterward, my friend and I thought Cecil might have had enough company. We suggested he might need some rest but were firmly told there was much more he had to show and tell us. "No time to rest," he said, and then he took us to his woodworking shop.

Michael and I took turns helping Cecil run a 5-ft.-long by 4-in.-wide two-man wooden jointer plane. We planed across the grain of a 30-in.-wide mahogany board destined for a tabletop. Though half Cecil's age, we had to take turns to keep up with him.

As an orthopedic surgeon, I had a special admiration for Cecil and often used him as an example to encourage my patients. Forty years ago, he lost all the fingers of his left hand in a woodworking accident, and afterward, he did finer work than many people with both hands.

—Robert Hottentot, D.O., Waterville, Maine

### Notes and Comment

We welcome news stories, anecdotes about the triumphs and pitfalls of woodworking, tales of government regulators, photos of unusual work—anything you think other woodworkers would like to know about. We pay for material we use. Send submissions to Notes and Comment, Fine Woodworking, P.O. Box 5506, Newtown, CT 06740-5506.



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## Baltimore High Style

Some years back, Robert Frey became fascinated with Baltimore furniture, a style made unique by its painted Verre Eglomisé panels. Trouble was, according to experts and historians in Maryland, the last known craftsman of the Verre Eglomisé technique had died 60 years earlier. Undeterred, Frey taught himself. He completed this mahogany and satinwood lady's desk while a student at the North Bennet Street School in Boston.

Verre Eglomisé is often confused with reverse painting on glass, but the two are completely different. In Verre Eglomisé, the glass is first painted with the field color. Then the subject is etched out, the details are panned in and gold is laid on top. Baltimore furniture hit its peak between 1790 and 1810. Frey continues to specialize in the style at his shop in Baltimore.

