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Fine WoodWorking

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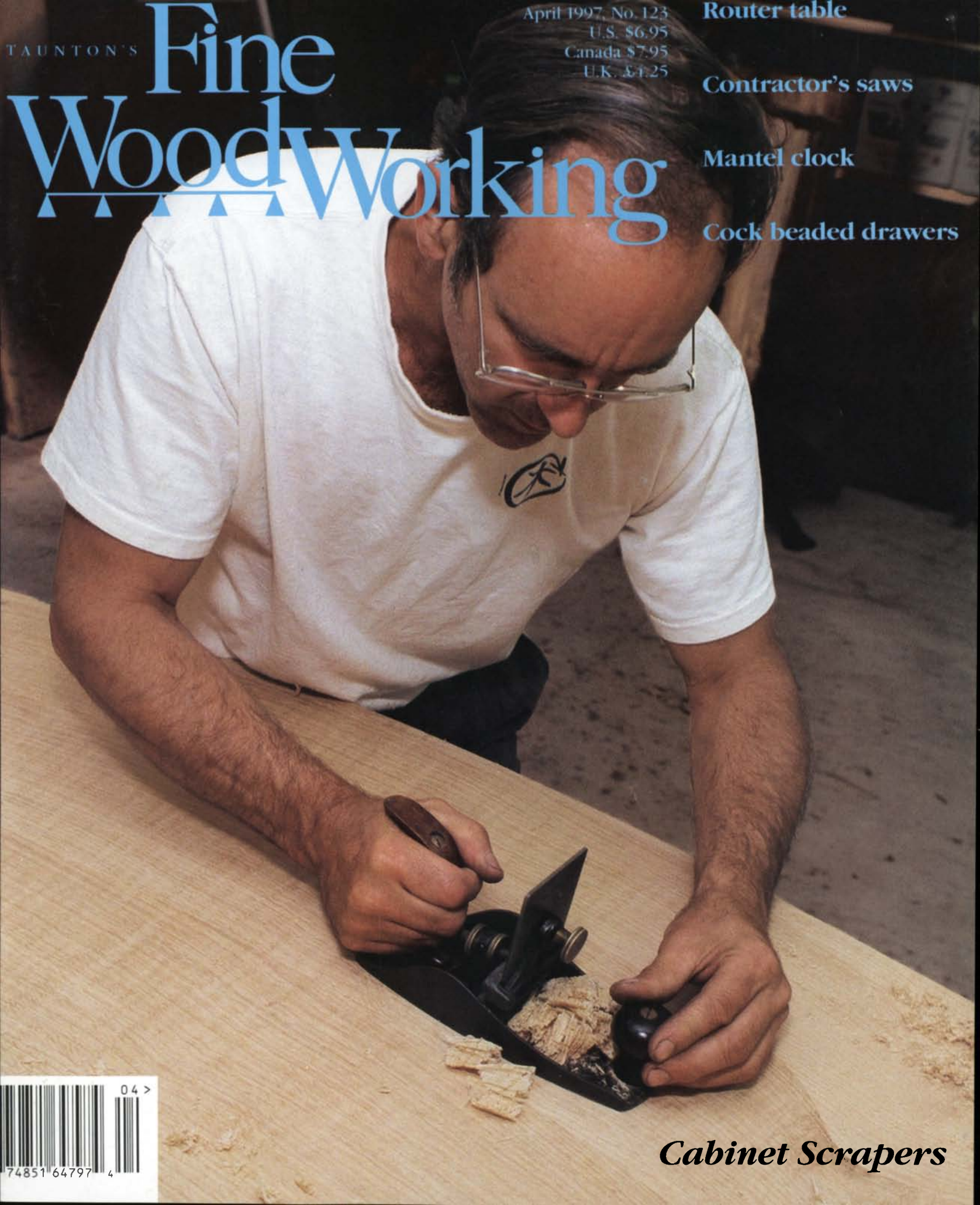

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Monroe Robinson surfaces a tabletop in curly white oak with a cabinet scraper, without fear of tearing or chipping the wood. He explains how to select these tools and prepare them for use, beginning on p. 82. Photo: Vincent Laurence

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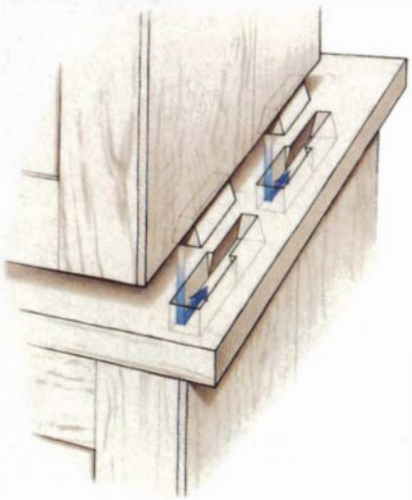

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Tilting-top tablesaw goes way of Edsel—I recently called Garrett Wade for some information and, sadly, was told the Inca 10-in. tilting-top tablesaw was no longer being imported. I purchased one of these saws along with a mortising attachment in the early 1980s. With careful setup, it is accurate to within a few thousandths of an inch—cut after cut. Its small size and light weight allow me to put it on a wheeled stand and push it around my cramped shop.

Is this the finest 10-in. tablesaw available? The tilting top is awkward at best, and the table stand could be a few inches larger all around. I would never expect it to function in a large production shop. In my little shop, however, the merits of this saw encouraged me to continue. Now I have a full-time remodeling business. I'm sure to hundreds of your readers, this saw was their first exposure to such quality and accuracy, and I would just like to say thanks to the little saw that could.

—Steven L. Hunn, Rocky River, Ohio

GARRY CHINN OF GARRETT WADE REPLIES: The all-knowing safety gurus in Europe promulgated regulations that removed all tilting-top tablesaws from the market there. The only decent markets left were Switzerland and the United States. Despite its wonderful attributes (many folks have told me it remains the very best joint-cutting tablesaw ever made), the Inca tilting-top tablesaw will never be a mass-market item here. The combined potential of the Swiss and ourselves did not make it economical to produce the precision pressure die castings that are the heart of the machine. So it has disappeared (sad but true), except in the used equipment market where it is achieving cult status to those in the know.

Going overboard with old violins—The invention of the violin cannot be attributed with any certainty to Andrea Amati or to anyone else (*FWW* #122, pp. 90-93). In roughly its modern form, the instrument appeared rather suddenly around 1550, and its basic design derives not from the ancient and honorable family of viols (violas da gamba), but rather from the three-stringed rebec.

Stradivari probably bought his varnish from his druggist and didn't know what was in it himself. Thanks to modern chemistry, better varnishes are available today from your favorite paint store.

Modern violin makers are producing instruments which some think perform as well or better than the old Italian fiddles. The wildly inflated prices being asked for these antique instruments lead one to suspect that their restoration and sale has less to do with fine woodworking than with myth, romantic notions and (dare we say it?) fraud. The emperor is naked. The old violin trade is mostly a scam.

—Neil Hendricks, Reno, Nev.

Doubling up on carving tools—Ian Agrell, in his article on carving tools, recommends the acquisition of carving chisels in five groups (*FWW* #122, pp. 80-83). The author suggests we buy an 8mm V-parting tool in the first group and then repeats this tool in the fifth group. Can you clarify the repetition?

—W. Bruce Tuckerman, San Diego, Calif.

IAN AGRELL REPLIES: The list of tools in the fifth group should have included a 20mm V-parting tool, not the 8mm V-parting tool. I apologize for the confusion.

A twist drill by any other name—I think *Fine Woodworking* is the best woodworking magazine published today. I look forward with great pleasure to reading each issue. However, one thing that bothers me is when woodworking magazines (you're not alone in doing this) do not call a tool by its correct name. Case in point: twist drills being called bits.

American and metric twist drills are twist drills and nothing else. They are not twist-drill bits. They are not twist bits nor are they drill bits. Brad-point or bullet-point twist drills are still twist drills. Bits are bits, such as Forstner bits, auger bits, spade bits and spoon bits. So please call these tools by their correct names. You'll

Writing an article

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feel better for it. I know I will.

—Norman Newlands, Lexington, Mass.

Wood will never be perfect—I must take exception to Mr. Sellers' letter on winding sticks, twist and warpage in wood, and machine preparation of wood (*FWW* #122, pp. 8, 10).

I've used jointers to face and edge-joint boards and then planed them to size with a machine planer only to have them bow or cup later. I have had panels that were machine-planed and beltsanded flat become unflat with the passage of a little time. I have seen cabinet doors that were prepared by machine twist out of shape after hanging. These situations were infrequent, but to say jointers or planers or any machine can make wood perfect is ill-considered.

Wood is alive, elastic, flexible, and a woodworker must be flexible as well. There is no such thing as perfectly flat, perfectly square or perfectly anything. To a degree, machine functions are absolute, but wood is always in a state of flux. An advantage of hand-cutting joints or preparing stock by hand is that both methods allow a degree of flexibility to achieve results. A similarity of life or art to woodworking is that no one answer will always solve the same problem.

—Anthony Guidice, St. Louis, Mo.

Don't ask biscuits to do too much—It is understandable why Bruce Cohen has had bad luck with using biscuits in bed-frame construction (*FWW* #121, p. 10). The drawing of the beds Mr. Cohen made shows a joint with only two biscuits, one over the other. This type of configuration provides inadequate stiffness, and any racking of the frame exerts tremendous prying force on the joint.

I always use biscuits in side-by-side pairs to join legs and rails. In the illustrated bedpost application, I'd have at least four biscuits (two side-by-side pairs), assuming the headboard is ¾ in. thick. I doubt Mr. Cohen would have any further problems with joint failure if he were to use enough plates to do the job.

I'm not a pro, just a weekend woodworker who likes to build tables and chairs and cabinets. The way I use biscuits to make joints is no secret—I merely follow the how-to instructions that came with my slot cutter.

—Scott Smith, Bethesda, Md.

Glue bottle on the cheap—Deciding I needed a squeeze glue dispenser, I said to myself: Why spend $15 to $20 on a commercial type when I can use the nearly empty 24-oz. plastic keg-shaped container for mustard with its nice twist cap! It worked pretty well. But just between us woodworkers, yellow aliphatic glue will never replace mustard as a condiment for cheeseburgers (trust me). *—Rich Kjarval, Two Rivers, Wis.*

Low-tech improvements for bandsaws—In describing how he sets up his bandsaw for resawing, Ronald Volbrecht says he has to file the ends of the thumbscrew holding his blade-guide bar after severe tightening or it will twist the guide (*FWW* 122, p. 76). I insert a ¼-in. piece of brass or nylon that slides freely in the tapped hole of the thumbscrew to protect the guide bar. These pieces can be hack-sawed from a nylon or brass bolt, the smooth section between head and threads.

—William Kerfoot, Conowingo, Md.

I've found that a plastic featherboard is of considerable help in holding a plank tight to the fence when resawing on the bandsaw. I sawed strips from 4-in.-wide lumber just under ⅛ in. thick. I jointed the plank between cuts to remove half the sawmarks and surfaced the other side in my planer with the bed rollers set very low. Only about one strip in 20 was torn.

—W.K. Saunders, San Francisco, Calif.

As we all know, there are no absolutes in woodworking but many means to a similar end. With that in mind, I would like to pass along some comments on Ronald Volbrecht's article on resawing with a bandsaw (*FWW* #122, pp. 74-79).

I have demonstrated portable bandsaw mills at trade shows, and one trick we routinely used was to cut a ⅛-in. plank off a log to show the high quality of the machine. All bandsaws will accomplish this, even in difficult woods, if you follow a few simple rules.

Proper tension is tantamount. A few years ago, you published an article by Jim Cummins (*FWW* #63, pp. 62-67). He used a Delta 14-in. bandsaw with a riser block (the same as Mr. Volbrecht's) and tensioned the blade to sound, as does Mr. Volbrecht. I also get consistently good results on my saw with a ¼-in. blade tensioned to G/G sharp, or about 15,000 psi. There is one big difference: Mr. Cummins used a ¼-in. blade and Mr. Volbrecht uses a ½-in. blade. The larger blade exerts much more pressure on the wheels and frame than the smaller blade, in turn, causing parts to fail sooner.

Rate of feed, blade speed and tooth configuration also are important. Mr. Volbrecht uses a skip-tooth blade, whereas a bandsaw mill uses a hook-

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tooth blade (that's also my preference). The skip tooth has a larger gullet, which gives slightly more room for sawdust and gives a slightly smoother cut. But the hook tooth is more aggressive, which allows for higher feed rates and will not dull as quickly under normal conditions.

Mr. Volbrecht says it takes him about 6 minutes to resaw an 8-in. by 3-ft. plank. His saw has a ¾-hp motor. I use a 1-hp motor for resawing 6-in. ash, walnut and cherry and achieve consistent results with a much higher rate of feed. *—Bob Houston, Owen Sound, Ont., Canada*

So long, *Fine Woodworking*—After 20 years as a *Fine Woodworking* subscriber, I've decided to call it quits. Quite frankly, I do not find your magazine as interesting as I once did.

As far as I'm concerned, *Fine Woodworking* puts entirely too much emphasis on the first word of its title. The magazine lacks the diversity that marked its early years when it contained articles about wooden bridges, toy making and the like. Perhaps these topics don't meet your current definition of "fine woodworking," but I would enjoy your magazine a lot more if you covered all genres of woodworking and let me decide what I want to read and/or build.

At the same time that you ignore many aspects of woodworking, you beat other topics to death. Just how many times will you have to tell us how to tune up our jointers, for example, before you realize that you have exhausted the topic?

Finally, my tastes in furniture and woodworking projects are simply not the same as yours. I wouldn't allow a Philadelphia highboy, Windsor chair or piecrust table into my house unless you held a gun to my head, and I'm not interested in tackling projects that take months to complete. I prefer modern designs, like those of James Krenov, and simpler projects that I can complete in a weekend or in a few days. In other words, lighten up!

—Michael Bitsko, Santa Cruz, Calif.

Finishing with oily rags—I recently finished a two-drawer chess table with oil-based polyurethane, wiped on with soft, lint-free cotton rags. After applying a coat of finish, I spread out the rag and let it dry thoroughly. When I was done, I had five rags coated with stiff, dried polyurethane.

After the last coat of finish had dried, I could feel some very fine dust on the surface, but I was reluctant to finish-sand the surface. It occurred to me that burnishing the surface with the dried-out application rags would polish the surface. The finish on the rags and the finish on the wood were the same.

The more pressure I applied to the rag, the smoother the surface seemed to get. The rag conformed to any and all curves with equally good results and with no removal of the finish on sharp corners. Furthermore, there was no scratching of the surface. I would appreciate any comments regarding this technique by your wood-finishing consultants.

—Joseph DeFilippo, Monroe, Conn.

CONTRIBUTING EDITOR CHRIS MINICK REPLIES: Well, you have stumbled across another one of those secret professional finishing techniques. Dry burnishing can add a wonderfully smooth, lived-with patina to new furniture. Successful dry burnishing relies more on proper timing than on the rag used as the burnishing tool. I usually use a wad of paper towels in my shop. Best results are obtained when the finish is dry to the touch, but still soft enough to move under the pressure of the burnishing cloth. As a rule, waterborne finishes burnish best about 1 to 1½ hours after they appear dry. Alkyd and polyurethane varnishes have a considerably wider window, anywhere from 3 to 24 hours, and solvent-based lacquers should be burnished almost immediately after drying.

On using routers to cut mortises—Who is Gary Rogowski trying to kid in saying that the best tool for mortising is a plunge router (*FWW* #121, pp. 72-77)? How can it be when it requires a special jig and numerous stops, fences and bushings to guide and control the tool?

The best tool is a chain or hollow-chisel stationary machine. Period. The router is versatile, but it's outmatched every time by a dedicated machine. Articles containing such misleading generalizations deter the serious woodworker from continuing with *Fine Woodworking*.

Also, if there is another article on choosing or fine-tuning a belt sander, plane or cordless drill, I'm gonna scream.

—Richard Fox, Gloucester, England

Gary Rogowski's article on mortising with a router is excellent. But there's one point I'm confused about. In detailing how to make a template by attaching a piece of hardboard to a wooden fence and then slotting the hardboard, he says, "To be sure the slot is parallel with the fence—which ensures that the mortise is square to the stock you're routing—tack the hardboard back a little bit from the edge."

What does he mean by "square to the stock you're routing"? Also, I don't understand how offsetting the hardboard from the edge of the fence ensures squareness. It would seem that making the hardboard flush with the edge of the fence would be more likely to ensure squareness, and it would give more of a bearing surface for the router base.

—David Freedman, Cross Plains, Wis.

GARY ROGOWSKI REPLIES: Mr. Freedman's questions are good ones. I suppose a better way of putting it is: "which ensures that the mortise is parallel to the edge of the stock you're routing."

As to the hardboard's position, the wooden block used for the fence must be milled with parallel sides. This will ensure that any indexing done off its outer face will be parallel to its inner one. Then, to avoid any difficulties or concerns with lining up the hardboard exactly to the edge of the wooden block, it is just nailed back from the edge a little. The difference in the amount of bearing surface for the router is negligible.

About your safety:
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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Straightening bent or kinked handsaws

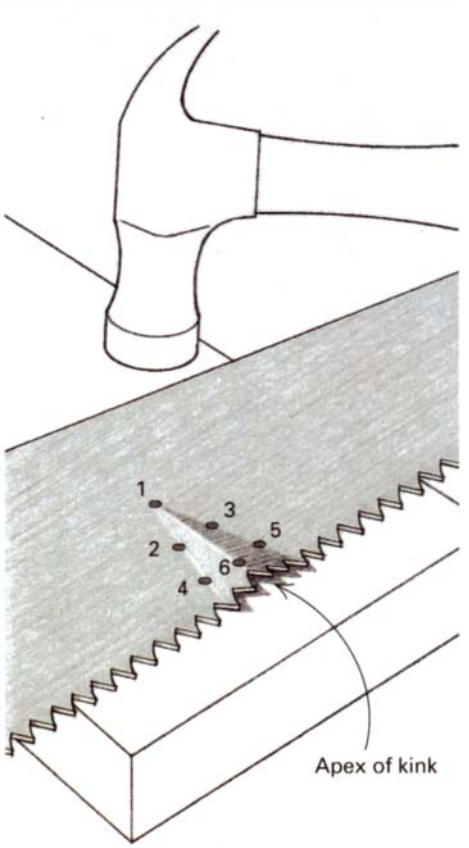
Is there any way to straighten a bent blade on a handsaw, especially those on backsaws? I enjoy using antique hand tools and have passed over some otherwise fine saws because of this defect. —James Leach, Clifton Park, N.Y.

Fred Wilder replies: Crookedness comes in two varieties: bends and kinks. The difference is that bends don't have a definite, visible center point. A kinked saw does. Take heart—both problems can be corrected.

A bent saw can be straightened with hand pressure. I place my hands over the toothed edge, thumbs on the convex side, farther apart for long bends and closer for short ones. I bend the saw just like I would break a stick, and then I check for straightness. I repeat this operation until the saw is straight. Often, this forceful back bend has to be quite severe. Perhaps I've been lucky, but I have never broken a saw this way.

Straightening a kinked handsaw

To straighten a kinked saw, strike light blows around the kink in the order shown. Repeat until the saw is straight.



A kink has an obvious focal point, and must be removed using a different technique. I sight along the saw to determine the apex of the kink and mark it with chalk, also marking out the extent of the kink.

To remove the kink, I place a block of hardwood on a solid support and lay the saw on the block with the marked side of the kink face up. Then, using a light hammer with a convex face, I strike a series of light blows around the kink, as shown in the drawing. Go easy, and repeat until the kink has flattened out.

Straightening a backsaw also is done with a hammer. If the back is bent, lay it on the block and straighten it first—then work on the kink.

Never lay a saw on an anvil and strike it with a steel hammer. It will scratch the saw and adversely affect the tension.

[Fred Wilder trained as a forester and worked as a logger and carpenter before World War II. He's been straightening and sharpening saws since the 1930s.]

Where to learn how to build Shaker furniture

I am an Australian woodworker and have a great passion for Shaker furniture. I would like to learn furnituremaking in the United States because no training of this sort is offered here. I would also like to gain more of an understanding of the place where this style began. Do you know of any programs that focus specifically on the making of Shaker furniture?

—Nick Barratt, Sydney, Australia

Chris Becksvoort replies: I am unaware of any school that specializes in Shaker furniture construction. I'm not sure what background and training you already have, but a good foundation of hand-tool skills and basic machine techniques will stand you in good stead, regardless of the style of furniture you're interested in. To become a medical doctor, you go to medical school. Only then, after you've mastered the basics, do you choose to specialize in a field.

Many woodworkers here in the United States are self-taught. Some have attended formal, multi-year programs such as the one at the North Bennet Street School (North Bennet St., Boston, MA 02113; 617-227-0155). Others have taken short courses, which are offered by a variety of schools, including the Center for Furniture Craftsmanship (25 Mill St., Rockport, ME 04856; 207-594-5611). If you already have some woodworking experience, you might also seek employment with a small shop that specializes in the Shaker style.

Best of luck.

[Chris Becksvoort is a professional furnituremaker in New Gloucester, Maine. He is a contributing editor to *Fine Woodworking* magazine.]

Pumice residue in inlay

Several years ago, I inlaid a 1/8-in. decorative ebony strip around a mahogany drawer front. After gluing the ebony in place, I finished the drawer with varnish and rubbed out the finish with pumice.

Recently, I noticed a fine, whitish line at the junction of the mahogany and ebony. Is this due to misapplied glue (I used white aliphatic resin) or some other factor?

—Lloyd Potter, Hampton Falls, N.H.

Jeff Jewitt replies: You're seeing pumice, not glue. Pumice excels as an abrasive for rubbing out a finish, but it has one drawback: It must be removed completely. Otherwise, the whitish residue you described may appear.

Pumice is volcanic glass with a very high silica content. This gives pumice a low refractive index, which means that in liquid mediums, such as oil, it is transparent. In your case, what happened is that the oil/pumice mixture you used to rub out the varnish got into the small crack in the finish layer where the ebony is set into the mahogany. As long as the oil medium surrounds the pumice particles, the pumice is invisible. Eventually the oil dissipates, usually by being absorbed into the wood. When the oil no longer surrounds the pumice particles, the pumice becomes visible once again as a white powder.

Avoiding the problem is easy. When I'm using pumice, I mix it with water-soluble dyes the color of the wood. As long as you have enough finish on the wood, the dye will not add any color. If you insist on using pumice with rubbing oil, use oil-soluble dyes or pigments mixed with the oil. If this sounds like too much bother,

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use maroon-colored synthetic steel wool instead of pumice. This has the same abrasive cutting action as 4F pumice.

As far as correcting the problem you now have, removing pumice is very difficult, if not impossible. You'll have to cover it up. Wiping on a dark water-soluble dye will cover up the white pumice. An old trick is simply wiping some dark shoe polish on the area. Using a pigmented paste wax such as Antiquax brown paste wax or Liberon Tudor oak also will cover up the problem.
[Jeff Jewitt restores and conserves furniture and sells finishing supplies in Royalton, Ohio.]

What speed for large router bits?

I have some questions about using large router bits. In my router table, I have a Makita 3-hp router that runs at 23,000 rpm. I use large bits (up to 3 in. across) in this router. In other articles, I have noticed that shapers of similar horsepower using similar sized cutters operate at a slower speed. Why is this? Should I do this with my router? And if so, how? ***—Karl Graffte, Aiken, S.C.***

Gary Rogowski replies: If you're using large-diameter bits, you should definitely run your router at a much slower speed. Imagine a ½-in. shank bit with a 3-in. cutting diameter spinning at 25,000 rpm. At the edge of the ½-in. shank, the bit is spinning at approximately 37 mph. But at the very edge, the bit is moving at approximately 223 mph.

Heat build-up at the cutting edge is significant. This can burn the cut and the bit, leading to carbide chipping or worse.

Shapers regularly use wide-diameter bits, but they're run at low speeds, as you've noticed, to keep down the speed at the edge of the bit (the rim speed). This allows for safer and cooler cutting. Shapers also are designed to run continuously at this speed.

A router motor doesn't have the same stamina that a shaper motor has. Running a wide-diameter bit puts a great deal of stress on a router's motor and collet. At high speeds, there's a greater risk of one of these bits vibrating loose and causing damage to the bit, collet, bearings and any and all objects in its flight path.

If your router is a variable-speed model, crank the speed control down to its lowest setting, especially when you start it up. If you don't have a variable-speed router, then you can buy a speed-control unit from many of the woodworking-supply companies.

These units work much like a light-dimming switch. Most bit manufacturers recommend bit speeds for large-diameter bits. With a 3-in. bit in your router, 10,000 to 12,000 rpm is a much safer speed.
[Gary Rogowski is a professional furnituremaker in Portland, Ore. He is a contributing editor to *Fine Woodworking* magazine.]

Is bandsaw rehab project worth it?

I recently acquired a 30-in., model 155, Fay & Egan bandsaw for $495. The previous owner claimed it to be a functioning saw, and it appears to be in good shape.

Is literature available that may show or describe guard configuration, paint color or even any general information on the Fay & Egan Co.? Is there a way to date this machine? Is the machine worth what I paid for it, considering restoration costs?

—Steven Speich, Hayward, Wis.

Robert Vaughan replies: Unfortunately, I am not familiar with your model bandsaw. The Fay & Egan Co. has been out of business for quite some time, and I'm not aware of any company that owns the parts franchise. That doesn't necessarily mean that one doesn't exist.

Without inspecting the machine in person, its difficult to assess its value. The price of old bandsaws varies depending on the local demand at the time of sale. At the upper end of the scale, a new, 30-in. bandsaw of the same quality as some of the Fay & Egans that I've seen could cost as much as $10,000. So, if you were considering buying a new machine, then you're certainly way ahead of the game, even if you end up spending several thousand dollars restoring your old machine.

One major consideration is whether your saw has babbitt or ball bearings. If it has babbitt bearings (which is a poured lead-alloy bearing), then the machine doesn't have much market value except to a hobbyist who would appreciate such technology.
[Robert Vaughan tunes, restores and rebuilds woodworking machinery in Roanoke, Va.]

Locating a tablesaw blade with a ¾-in. arbor hole

I have an old Boice-Crane 10-in. tablesaw. Recently, I decided to replace the blade on it with a carbide-tipped blade. To my surprise, I couldn't find a 10-in. carbide-tipped blade with the ¾-in. arbor hole my saw requires. Can you point me in the right direction?

—Walt Koziol, Elgin, Neb.

Vincent Laurence replies: Good news. Blades are available for your saw. I called three companies whose main business is sawblades, and all three said they'll sell you a 10-in. blade with a ¾-in. arbor hole.

An Amana Tool Corp. (800-445-0077) representative said there's an $18.50 charge for the custom arbor hole. Forrest Manufacturing (800-733-7111) charges $7.50. Ridge Carbide Tool (800-443-0992) charges $14. Other blade manufacturers would most likely oblige as well.
[Vincent Laurence is an associate editor of *Fine Woodworking* magazine.]

Reattaching brass inlay

I have an antique mahogany tall clock that is about 150 years old. The clock is in excellent shape except for some brass inlay on the lower section of the case that has come loose. What is the best way to reattach this brass inlay?

—George Floyd, Wynnewood, Pa.

Garrett Hack replies: I have to assume that the piece of brass inlay was glued in cross-grain and that wood movement over many years has loosened it. Swings in temperature are another possible cause. Brass will expand and contract more quickly than the wood, eventually breaking the glue bond between it and the surrounding wood.

To keep it in place, you'll need to clean the groove thoroughly and use a glue with some flexibility. Probably the best way to do this is to make a small scraping tool by grinding and honing a square point on a scrap of hacksaw blade. The cleaner you can get the groove, the better the glue bond. Just be careful not to alter the groove's size or shape. Sand the back of the inlay with 150-grit (or finer) sandpaper to clean it and roughen it

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slightly for a better glue bond.

I would use a long-setting epoxy (overnight) to glue the inlay in place. Mix the hardener and resin on a clean wood scrap. Then use a toothpick to work a small amount of glue into the groove over its entire length. Press the inlay in place, scrape away any excess with a chisel and, if possible, clamp the inlay in place with a narrow wooden caul. An hour or two later, use a chisel to slice off any semi-hardened glue that's oozed out, and then reclamp with the caul. Don't try to sand the wood or inlay level; it will ruin the patina of both and only make the repair more obvious.

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

Dining chairs that won't hold upholstery tacks

Recently, I upholstered eight 130-year-old oak dining chairs. The gentleman who refinished and repaired them used auto-body filler to fill the holes in the rails left by the many previous tacks and nails. Consequently, the staples which I used to affix the seat webbing are not holding. Have you suggestions for a durable wood filler that will hold the staples? In the past, I've tried a mixture of epoxy and sawdust, but it would not hold the staples either. Can you help?

—Teresa Sinkowski, Waterford, Ont., Canada

Diane Welebit replies: As you have discovered, no filler will really hold up to being tacked or stapled. If used, fillers can serve as a cosmetic aid to rebuild and shape small damaged areas where tacking is not required. The only sure way to remedy the problem is to replace damaged sections with new wood.

To do this, cut back to sound timber, taking care to avoid hidden tacks embedded in the rails (don't use your most precious tools for this job). Replace the cutaway section with the same wood species, building out to the original dimensions. It is often possible to repair damaged rails in this way without cutting into wood that will be seen. In severe cases, entire replacement rails may need to be made. Before resorting to this, take into account the amount of use the piece will receive along with any possible historical importance.

Before reupholstering any piece, always make sure the joints are in good condition and not loose. It may be necessary to dismantle the chair, clean old glue from the joints and reglue using hide glue. This has the advantage of being reversible when carrying out future repairs.

Rails can stand up to many more reupholsterings than one might imagine. Although numerous tack holes may be alarming, it is often unnecessary to do anything before proceeding with the upholstery. Eventually, however, serious repair work may be required. Wood boring insects and brass nails, in particular, take a toll on the wood.

[Diane Welebit owns and operates Barset Furnishings and Upholstery. She trained as an upholsterer at the London College of Furniture.]

Stabilizing a large cross section of a log

I would like to cut a 2-in.-thick slab from a 3-ft.-dia. sugar maple trunk to use as a round tabletop. Can I treat the slab with polyethylene glycol (PEG-1000) to prevent it from splitting? Is there another way?

—Daniel Snipes, Plainfield, Vt.

Bruce Hoadley replies: I don't know of any other way to attempt stabilizing a thick, large-diameter disc of sugar maple. If you decide to try the PEG-1000 route, be sure that you are set up before you cut the slab. The wood should not be allowed to dry out at all and should have as much of its original sap as possible before you soak it.

If you have not worked with PEG-1000 before, I would recommend first reading about the procedure. Patrick Spielman has written an excellent book on the subject, called *Working Green Wood with PEG* (Sterling Publishing Co., 1980). Be aware, too, that the PEG-1000 isn't cheap and that success is not guaranteed. It might be a good idea to try the procedure on some smaller projects first.

With such a large disc, a major problem is getting it leveled and smooth after treating and drying. If you cut the disc from the stump with a chainsaw, I'd recommend setting up a frame to make router passes across it to create a relatively flat surface before you treat it. This will give you more uniform penetration of the PEG-1000 and will reduce the work later. You'll still have plenty of end-grain sanding after the treated disc is dry.

[Bruce Hoadley is a professor of wood technology at the University of Massachusetts at Amherst and author of the book *Understanding Wood* (The Taunton Press, 1980). He is a contributing editor to *Fine Woodworking* magazine.]

Oliver tablesaw has burned-out motor

I recently acquired an Oliver tablesaw model 270-D. It came with a three-phase, 220v motor that was burned-out. The saw appears to have been made in the '40s or '50s and is a really substantial piece of equipment.

I would like to operate the saw on single-phase, 220v power. The machine's motor was 3 hp and operated at 3,500 rpm. Because the motor case is a part of the tilting-arbor assembly, the motor must fit in the existing case.

Are there dealers that sell vintage Oliver parts? Or is my best bet to try to get the existing motor rewound to a single-phase motor. The motor is the main problem.

—Bob Sanders, Long Beach, Calif.

Vincent Laurence replies: The Oliver Machinery Co. (1025 Clancy Ave., N.E., Grand Rapids, MI 49503-1082; 800-253-8108) is still in business, and many parts for older machines are still available.

I spoke with Richard Fink, Oliver's director of manufacturing and technical expert, and his advice is to have the motor rewound by a reputable local motor shop. A new motor is typically about twice as costly as having an old one rewound.

Reader exchange

Does anyone have information on where I can get a parts manual or buy parts for a lathe with the markings "Purlington & Smith Machinery and Tools, Hartford, Conn. U.S.A."?

—Carleton Landers, 31 Plants Dam Road, East Lyme, CT 06333-1428

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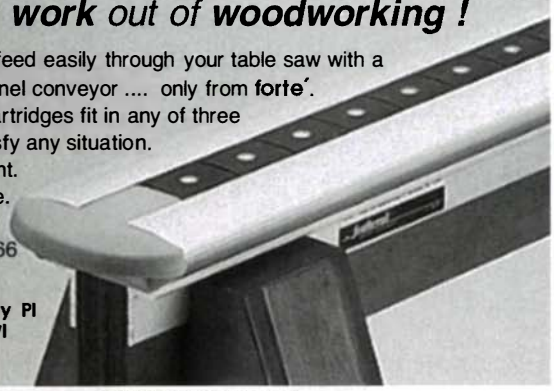

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28-280V	14" Band Saw w/enc stand 1 HP	Sale	798
34-445	10" Table Saw with 30" unifence	Sale	839
22-675	NEW DC380 15" Planer	Sale	1175
43-355	3/4" Shaper 1-1/2 HP	Sale	799

$75.00 rebate

37-154	DJ15 6"Jointer	Sale	1289

DEWALT TOOLS

DW321K	NEW Jigsaw Kit	300	164

DW321K comes with FREE 8 piece blade set !

DW364	7-1/4" Circ. Saw w/brake, 13 amp	294	158
DW306K	8.0 amp Recip Saw w/cs v/spd	291	164
DW610	1-1/2 HP 2 handle Router	266	152
DW411	1/4 sheet Palm Sander, 1.7 amp	88	58
DW705	12" Compound Mitre Saw	734	359
DW705K	DW705 with 80 tooth blade	Sale	395
DW704	12" Mitre Saw	570	325
DW100	3/8" Drill, 4 amp, 0-2500 rpm,rev	118	68
DW280K	NEW Screwdriver kit complete	222	124
DW673K	Laminate Trimmer kit	364	188
DW402	4-1/2" Grinder 6 amp	166	89
DW682K	Biscuit Joiner with case	448	199
DW625	3 HP Electronic Plunge Router	520	275

DW625 router comes with DW6966 fine depth adjuster and 8-piece template guide set !

DW621	NEW 2 HP Plunge Router	400	218

DW621 comes w/ FREE fine height adjuster !

DW675K	3-1/8" Planer with case	292	164
DW431	3 x 21 var. speed Belt Sander	338	184
DW420	Palmgrip Random Orb Sander	124	69
DW421	above Sander with dust collector	144	74
DW423	NEW Palm Random Orbit Sander variable speed	170	94
DW444	6" Random Orbit Sander	266	139
DW443	DW444 with hook & loop pad	266	139
DW935K	14.4V 5-3/8" Trim Saw kit	444	237

DW935K Saw comes with 2 batteries!

DEWALT CORDLESS DRILLS

DW952K	3/8" v/spd w/two 9.6V batteries	284	139
DW972K-2	3/8" v/spd w/two 12V XR batt	362	182
DW904	12 volt flashlight		29.95
	DW972K-2 drill & DW904 flashlight	*Sale*	*205*
DW991K-2	3/8" v/spd w/two 14.4V XR batteries	415	209
DW994KQ	1/2" variable speed w/ one 14.4V XR battery	458	235
DW994KQ-2	DW994KQ drill kit w/ 2 batt.	Sale	259
DW996K	1/2" v/spd Hammer drill w/ one 14.4V XR battery	396	245

Above drill kits come w/charger & steel case !

DW991KS-2	DW991K drill, DW935 saw, &cse		349

NEW DeWalt 18 volt Cordless Tools

DW995K	1/2" Drill Kit	428	229
DW997K	1/2" Drill / Hammer Drill Kit	454	249
DW936K	Saw Kit	458	249

WAP VACUUMS

Model	Description	List	Sale
766RDF	10 gallon turbo vacuum	845	465
766RDF-D	"Drywaller" 10 gal turbo vac	915	549
766RDF-DAS	Same as above w/auto start	950	589

CLAYTON OSCILLATING SPINDLE SANDERS

140	Portable sander w/ 4-1/2" spindle	625	559
146	Portable sander w/ 9" spindle	685	609
100	Floor mount sander w/4-1/2" spnd	785	709
106	Floor mount sander w/ 9" spindle	845	759

DREMEL TOOLS

3955	Moto Tool Kit with bits & case	134	75
3956	Super Moto Tool Kit w/ acc.	152	85
1672	16" Scroll Saw - 2 spd "Best buy"	302	174
1695	16" var. speed Scroll Saw	408	229
290	Electric Engraver with point	25	16
1731	5" Disc1" x 30" Belt Sander	189	114

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Opening Capacity	List	Sale	Box of 6
#3/0	6"	3"	17.05	9.90	56.50
#2/0	7"	3-1/2"	18.30	10.70	60.95
#0	8"	4-1/2"	20.35	12.10	66.95
#1	10"	6"	23.30	12.90	71.95
#2	12"	8-1/2"	26.75	14.90	83.95
#3	14"	10"	33.85	18.55	105.75
#4	16"	12"	44.05	24.65	140.95

JORGENSEN STYLE 37 2-1/2" Throat 1/4"x3/4"

Item#	Jaw Length	List	Sale	Box of 6
3706	6"	10.85	6.20	33.50
3712	12"	12.05	6.80	37.25
3718	18"	13.25	7.60	41.05
3724	24"	14.55	8.15	43.95
3730	30"	16.20	9.05	48.85
3736	36"	17.70	10.20	54.95

JORGENSEN STYLE 45 5" Throat 1-3/8" x 5/16"

Item	Jaw Length	List	Sale	Lots of 6
4512	12"	34.50	20.75	114.95
4518	18"	36.35	22.30	122.95
4524	24"	38.50	23.65	129.95

JORGENSEN STEEL "I" BAR CLAMPS

Model	Size	List	Sale	Lots of 6
7224	24"	35.75	20.30	112.95
7236	36"	38.35	22.35	124.75
7248	48"	42.15	24.45	134.95
7272	72"	48.50	29.60	168.75

PONY CLAMP FIXTURES

Model	Description	List	Sale	Lots of 12
50	3/4" Black Pipe Clamps	15.45	8.10	92.50
52	1/2" Black Pipe Clamps	12.65	6.95	74.95

MKTILE SAWS

Model	Description	List	Sale
MK770	1/2 HP - 7" blade	795	579
MK660	3/4 HP - 7" blade	795	589
MK880	1 HP - 8" blade	986	859

We stock all replacement blades for above saws.

Msxe6362	FEIN Triangle Sander v/spd	Sale	199
Msx625	FEIN NEW Air Triangle Sander	Sale	195
LPN672	PONY Air Palm Nailer w/ glove	Sale	89
LPN672K	LPN672 w/ case & 3 special tips	Sale	109
RTM01	ROTOZIP Drywall cutout unit	Sale	68.95
SCS02	ROTOZIP NEW cordless unit	252	169

BLACK & DECKER

1166	3/8" Drill 0-2500 rpm 4 amp	118	68
2600	3/8" Drill 0-1200 rpm 4.5 amp	173	98
79-034	Workmate 400	191	109
1350K	1/2" Timberwolf Drill 2 speed	573	325
1180	3/8" Drill rev. 0-1200 rpm 5 amp	215	119
2037	Drywall Gun 0-4000 5.0 amp	178	95
2038	Drywall Gun 0-2500 rpm 5 amp	178	95
2054	TekGun 0-2500 5.0 amp	289	159
2750	4-1/2" Grinder 10,000 rpm 6 amp	159	89
2694	7-1/4" Super Sawcat Circ Saw	294	149
2695	8-1/4" Super Sawcat Circ Saw	328	169
3339	Elu 3 HP v/spd Plunge Router	520	269

CRAIN FLOOR COVERING TOOLS

800	Super door jamb saw kit	Sale	275
520	Swivel-lock stretcher	Sale	489
499	Junior power stretcher	Sale	419
507	Stairway stretcher	Sale	135
600	Adjustable deluxe knee kicker	Sale	93
612	Knee kicker 17-1/2" to 21-1/2"	Sale	86
505	Economy adjustable knee kicker	Sale	69
506	Mini knee kicker	Sale	65
785	Toe-kick saw - 110 volt	Sale	188
890	6" S/C pro iron 250° - 375° F	Sale	125
920SC	Deluxe heat bond iron - 800 watt	Sale	83
245	Deluxe carpet trimmer	Sale	49

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

Above models include strap adapter kits

SIOUX TOOLS

8030	3/8" variable speed Drill	263	145
8000	3/8" variable speed close quarter Drill 0-1300rpm	211	125
8005	Same as 8000 but is 0-2500 rpm	221	139
690	5" Air Random Orbit Sander	228	132
790	NEW lightweight 5" Sander	235	135

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ALUMINUM LADDER JACKS

Must be installed on Type 1 or Type 1A ladders only

Model	Accepts Stage Width	Spans	Attaches to Rung	Sale
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 TYPE IA -300 # RATING

Model	Length	Weight(lbs.)	Sale
M7-14	7'	43#	159.95
M8-16	8'	46#	189.95

FIBERGLASS STEP - TYPE 1- 250# RATING

6004	4'	13#	57.95
6005	5'	16#	68.95
6006	6'	18#	72.95

FIBERGLASS STEP - TYPE 1- 250# RATING

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

FIBERGLASS STEP - TYPE 1A- 300# RATING

6204	4'	14#	65.95
6205	5'	18#	76.95
6206	6'	20#	89.95

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

D1324-2	24'	21'	39#	195.95
D1328-2	28'	25'	50#	226.95
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

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'	35'(250# rating)	89#	369.95

FIBERGLASS FLAT STEP TYPE 1A- 300# RATED EXTENSION

D6116-2	16'	13'	34#	199.95
D6120-2	20'	17'	40#	219.95
D6124-2	24'	21'	53#	254.95
D6128-2	28'	25'	60#	298.95
D6132-2	32'	29'	74#	379.95

FIBERGLASS FLAT STEP TYPE 1A- 300# XTRA HEAVY DUTY EXTENSION

D7116-2	16'	13'	37#	249.95
D7120-2	20'	17'	43#	269.95
D7124-2	24'	21'	58#	309.95
D7128-2	28'	25'	66#	344.95
D7132-2	32'	29'	79#	398.95

Buy any 3 ladders (can be asst) deduct additional 5% Prepaid freight and best prices too!

STABILA LEVELS

Model	Description	List	Sale
24740	24" Angle Setter Level	Sale	14.95
24640	24" Level w/ hand holes	62.20	43
24670	48" Level w/ hand holes	79.70	55
24680	72" Level w/ hand holes	145.45	99
27170	48" Level w/o hand holes	71	49
27000	78" Level w/o hand holes	146	105
80LMS	Laser Level System	532	365

RECORD WOODWORKING VISES

Model	Jaw Width	Opening	List	Sale
53E	10-1/2"	15" Quick release	248	99
52D	7"	8" Quick release w/dog	169	85
52-1/2D	9"	13" Quick release w/dog	231	95

KRAUSE MULTIMATIC LADDERS

Model	Description	List	Sale
121482	12' Aluminum Multi Purpose	264	128
121499	16' Aluminum Multi Purpose	286	148

HITACHI TOOLS

Model	Description	List	Sale
C8FB2	8-1/2" Slide Compound Saw	1169	489
998862	8-1/2" Carbide blade - 60 tooth	Sale	44.95
C10FS	10" Slide Compound Saw	1627	739
C7SB	7-1/4" Circular Saw	Sale	89
M12V	3 HP variable speed Router	541	199
TR12	Plunge Router 3 HP	377	189
SB-75	3 x 21 Belt Sander w/ bag 2 spd	315	158
DH24VBK	15/16" SDS Rotary Hammer	298	179
C10FC	10" Mitre Saw	533	199
C15FB	15" Mitre Saw	1346	659
DN10DYK	9.6V Right Angle Drill Kit	370	179
G12SA	4-1/2" Grinder 6.9 amp	177	95
FDS10DVA	9.6V Drill Kit w/ flashlight	Sale	99
DV14V	3/8" Hammer Drill with case	230	115
NR83A	Framing Nailer 2 - 3-1/2 Full Head.	389	
NR83AA	Framing Nailer 2- 3-1/2 Clip Head	375	
NT65A	16 ga. Brad Nailer 1 - 2-1/2	749	325
NV45AB	Coil Roofing Nailer 7/8 - 1-3/4	935	435
N5008AB	7/16" Stapler-16 ga. 1 - 2 lgth.	679	325
EC6B	1 HP Oil Compressor	540	279
EC6C	1 HP Oil-less Compressor	580	295

WAGNER PAINT & SPRAYER PRODUCTS

959	Power Roller	140	109
255	Airless Kit	180	135
375E	Airless System	195	164
404	Airless Painter & Roller	320	265
505	High performance Airless Painter	440	369
HVLP	Fine coat finishing HVLP System	195	159
CS2000	Pro fine finish HVLP System	339	278

DAVID WHITE INSTRUMENTS

Model	Description	List	Sale
LP6-20	Sight Level package - 20x	329	215
LP6-20XL	LP6-20 with 9056 tripod & 7620 rod	409	269
L6-20	Meridian Level - 20x	309	199
LT8-300	Level Transit - 26x	739	489
LT8-300P	above Level with optical plum.	869	565
LT6-900	Level Transit - 20x	419	269
LTP6-900	Above Level with tripod & rod.	615	389
ALT6-900	Automatic Level - Transit - 18x.	666	429
ALTP6-900	above Level with tripod & rod	799	499
ALP6-18HD	Auto. Level-18x with tripod & rod	599	395
AL8-22	Automatic Level - 22x	583	339
AL8-26	Automatic Level - 26x	854	379
ALP8-26	above Level with 9075 tripod and 7620 rod	977	499
ML100I	Laser Level	1099	945
ML100	Laser Level w/detector	1249	1075
ML200	Visible Beam Laser	979	799
ML200I	ML200 w/o detector & bracket.	749	625
LL100	Finish Line Laser Level	199	135

QUAL-CRAFT JACKS

Model	Description	List	Sale
2200	Pump Jack	79	58
2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	21
2204	Work Bench & rail holder combo	53	39
2500	Adjustable Roofing Bracket	9.95	7.95

Buy any 6 (can be assorted) deduct additional 10%

2601	Wall Jack	167	108

Lots of 4 deduct additional 10%

PASLODE IMPULSE GUNS

Model	Description	List	Sale
IM250	Trimpulse Finish Nailer Kit complete drives 3/4" - 2-1/2" brads	1130	548
IM325	Impulse Framing Nailer Kit complete drives 2" - 3-1/4" nails	1130	548
CT325SS	Cordless Framing Nailer Kit complete drives 2" - 3-1/4" nails	1120	495

SENCO AIR NAILERS

Model	Description	List	Sale
SFN1+	Finishing Nailer 1" - 2" w/ case.	448	345
SFN40	Finish Nailer w/case 1-1/4"-2-1/2"	569	389
SN325	Nailer 1-7/8" - 3-1/4"	665	419
SLP20	Pinner w/cse 5/8" - 1-5/8"	422	275
SKS	Stapler 5/8" - 1-1/2"	390	275
M2	Stapler 1-3/8" - 2" length	535	375
SN70	Framing - Clip Hd 2" - 3-1/2"	725	449
SN60	Framing - Full Hd 2" - 3-1/2"	708	449
SN65	15% more power than SN60	709	459

JAMERCO AIR NAILERS

Model	Description	List	Sale
JTBN1832	Brad Nailer - 5/8" -1- 1/4"	96	69
JTSO61825	Narrow Crown Finish Stapler 1/2" - 1"	96	69
JTFN1650	Finish Nailer - 3/4" - 2"	245	139
JTAFN1464	Angle Finish 1-1/4"-2-1/2"	360	225
JTFN1664	Finish Nailer 1" - 2-1/2"	360	225

Above nailers come with case!

AIRY AIR NAILERS

Model	Description	List	Sale
0241SK	Brad Nailer 3/8" - 1-9/16"	180	98
0250SK	Brad Nailer 3/4" - 2"	296	164
0626SK	1/4" Crown Stapler 3/8" - 1"	194	104
0645	1/4" Crown Stapler 3/4"-1-9/16"	310	175
EZ-1	Multi-purpose nailer & stapler	180	98

Above nailers come w/case, fasteners, oil & wrenches

0565T	Angle Finish Nailer 1" - 2-1/2"	386	205
8290	Framing Nailer 2" - 3-1/2"	475	315

Airy nailers use Senco brand fasteners

DUO-FAST AIR NAILERS

Model	Description	List	Sale
LFN-764	Finish Nailer 1" - 2"	611	329
CN-350	Framing Nailer - Full Head	702	399
CN-325	Framing Nailer - Clip Head	682	389

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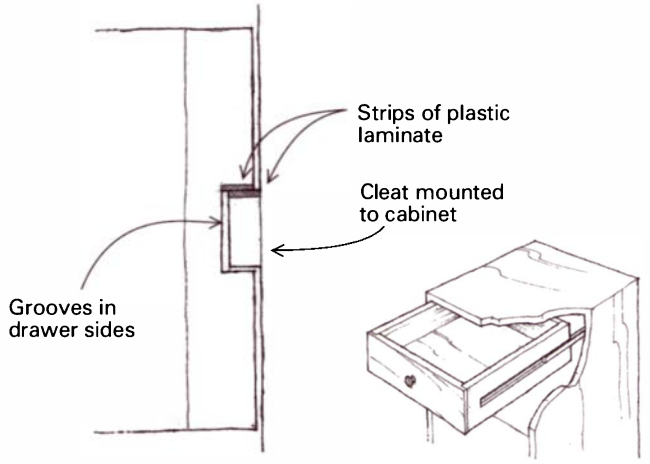
edited and drawn by Jim Richey

Smooth-running drawer guides

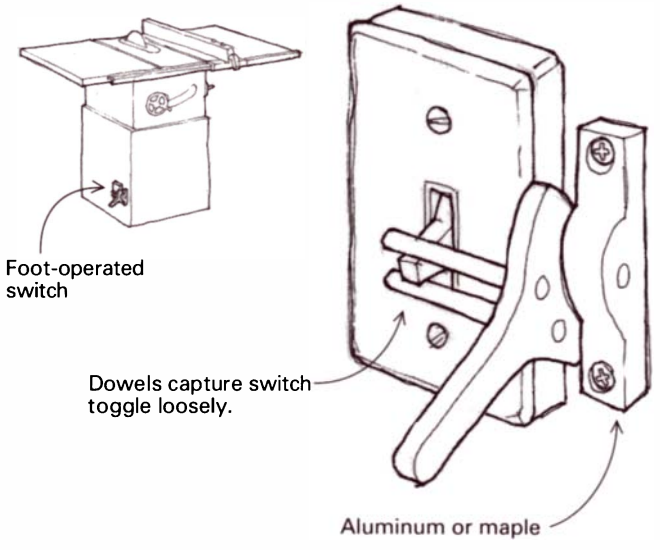


Here's an elegant way to make a smooth-running drawer without using those expensive metal drawer slides that take up too much space. The technique is a twist on the classic cleated-drawer approach—grooves on the sides of the drawer mated to corresponding cleats on the sides of the cabinet case. The twist is to glue a strip of plastic laminate on top of the cleat and on the underside of the top of the groove. The drawer slides smoothly on the surfaces of the laminate. *—Andrew Gibbs, West Palm Beach, Fla.*

Quick tip: To patch the kerf line on a radial-arm saw table that has grown wide over time, mix sawdust and epoxy, and putty-knife it into the slot. After the epoxy sets, scrape and sand the area even with the table, and get back to work.

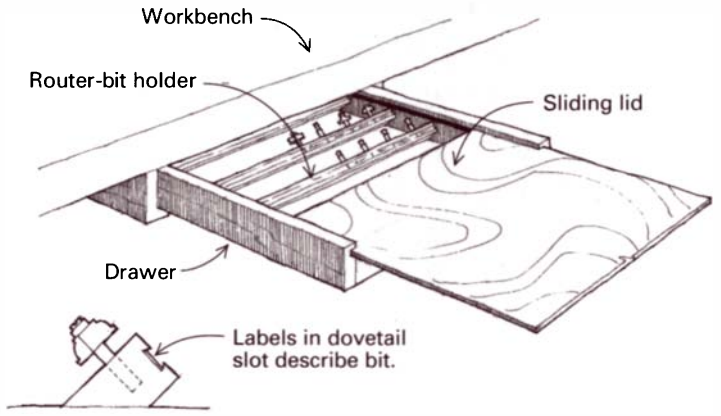
—M. Felix Marti, Ridgway, Colo.

Auxiliary switch for power tools



After experimenting with a dozen or so locations and types of tablesaw power switches, this is the one I find most convenient and safest to use. I mounted a standard 20-amp light switch low to the left side of the saw, as I face the blade. I added an auxiliary, foot-operated lever to the basic switch, so my hands are free to handle the stock. The fingers of the auxiliary-switch lever only loosely trap the actual switch lever in both the on and off position, preventing any damage. I fabricated my latest edition of the switch lever from aluminum, but the original one I made from maple served me long and well. *—Dario Brisighella, Oak Creek, Wis.*

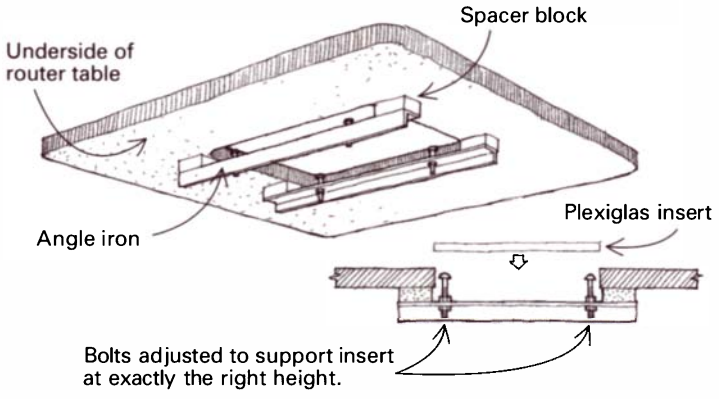
Under-bench router-storage drawer



Space is at a premium in my garage shop. So I built this router-bit storage drawer that fits under my workbench. Make the case from ¾-in. stock with routed slots to accept the bottom and the sliding lid. Cut the bit holder strips at a 45° angle on the bottom edge, and rout the top face of each strip with a ½-in. dovetail bit to hold labels describing each bit. The labels can include bit size and type (½ in. roundover, for example). The case is supported when partially withdrawn, or you can remove it completely for bit selection.

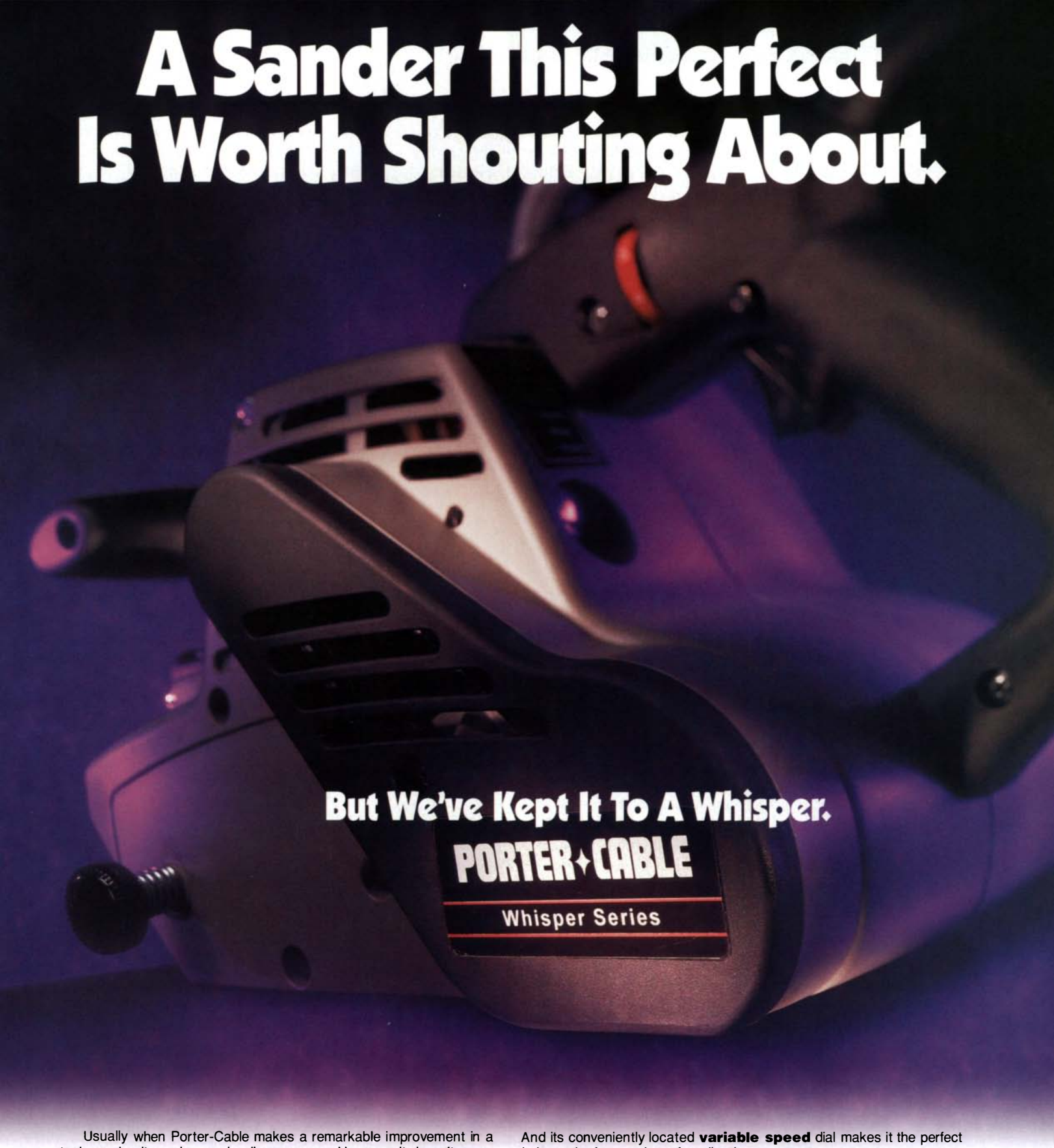
This storage system has been so effective that I added another drawer under the bench to store files. *—Bob Bowles, Oxnard, Calif.*

Adjustable router-table insert



When I installed the insert in my router table, I didn't bother to rabbet the cutout hole to support the insert. Instead, I attached spacer blocks and two lengths of angle iron (mine came from an old bed frame) to the bottom of the router table. The edges of the angle irons protruded into the cutout about an inch. I drilled a pair of

A Sander This Perfect Is Worth Shouting About.



Usually when Porter-Cable makes a remarkable improvement in a tool, we sing its praises as loudly as we can. However, it doesn't seem right for us to shout about a tool that actually makes so little noise.

Yet that's what we're tempted to do with our new **Whisper Series™** of Belt Sanders. After all, we took the best 3"x24" and 4"x24" belt sanders in the business and actually improved them by dramatically **reducing their noise output an amazing 34%**

Plus we did it without sacrificing any power or ability. In fact, the Whisper Series' **12 amp motor** is the most powerful of all belt sanders. The **cast and machined aluminum housing** still properly places the tool's **weight directly over the sanding area.** And its conveniently located **variable speed** dial makes it the perfect belt sander for a variety of applications.

If you'd like to hear for yourself the six sanders that have us whispering at the top of our lungs, visit your local Porter-Cable retailer. Or call 1-800-487-8665 (519-836-2840 in Canada) for the dealer nearest you.

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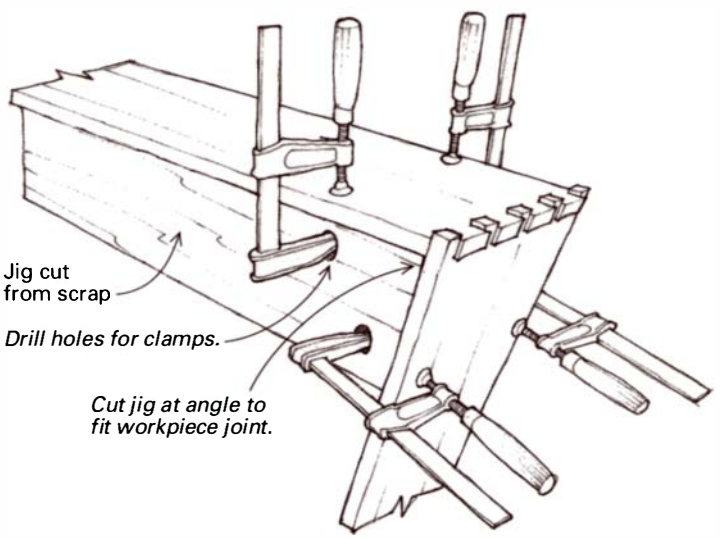
holes in each iron and inserted a carriage bolt in each hole, as shown in the sketch on p. 28. The four round-head bolts stick up into the cutout space to support the plastic router insert at all four corners. The height of the insert can be adjusted perfectly to match the tabletop by adjusting the height of the four carriage bolts.

—Mike Holzhauer, Weare, N.H.

Clamping aid for odd angles



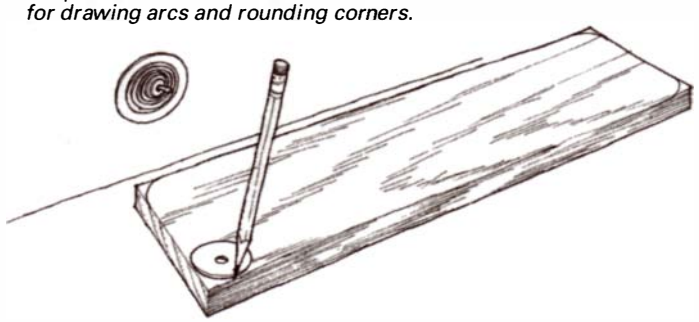
It is frustrating to clamp together two boards precisely at an odd-angled corner. This jig, which can be made quickly from scrap lumber, will help. Cut a generous scrap of hardwood to the appropriate corner angle, and drill holes through the scrap, as shown, to accommodate the head of a clamp.

Use two clamps for each jig piece, one on each of the two boards forming the corner. Make sure the inside corner of the joint is firm against the jig. One jig should suffice for joining narrow boards. Wider pieces will need two jigs, one on each edge, as shown.

—Keith R. Allen, Cedar Grove, N.C.

Using washers for drawing curves

Keep stack of different-sized washers for drawing arcs and rounding corners.



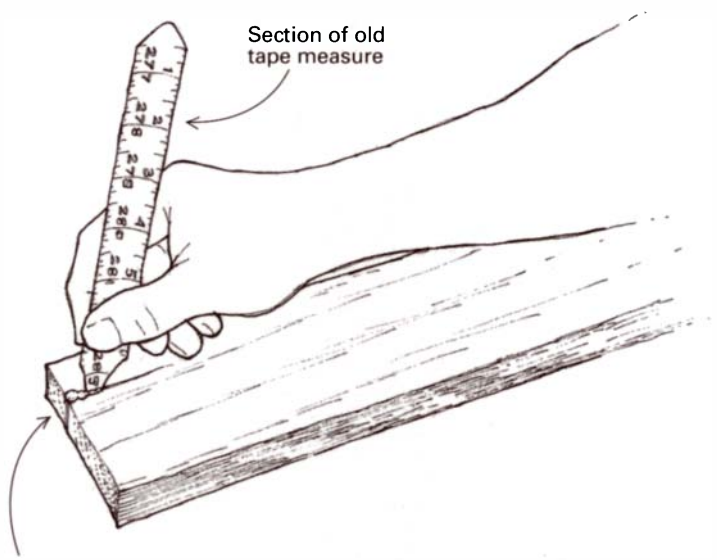
I keep a stock of washers in many sizes to use as templates when drawing rounded corners. Buy one washer of every size from the hardware store, and hang them on a nail in your shop. For larger curves, use jar lids and paint can lids. They're all true circles and less trouble to use than a compass when only part of a circle is needed. *—Percy Blandford, Stratford-upon-Avon, England*

Quick tip: I like to coat screws with beeswax to make them easier to install. To make a handy dispenser, melt the wax in a double boiler, and pour the melted wax into an old stick-deodorant dispenser. After the wax cools, slip a knife between the wax and the side of the dispenser to break the seal.

This handy dispenser keeps the wax clean. It also keeps the wax off your hands as well as your project. Just be sure that it doesn't end up in your medicine cabinet.

—Vincent J. Rucinski Jr., Wilmington, Del.

Tape measure glue-insertion tool



I'm sure most woodworkers have been faced with the problem of trying to force glue into a tight split or crack in the workpiece. My solution for this problem is to cut a 6-in. or so section from an old tape measure. Then I cut a profile on the end of the tape, varying the shape for different applications. The tape section is thin but stiff, and it's ideal for working glue into a crevice.

—Gregory H. Joy, Lincoln, Neb.

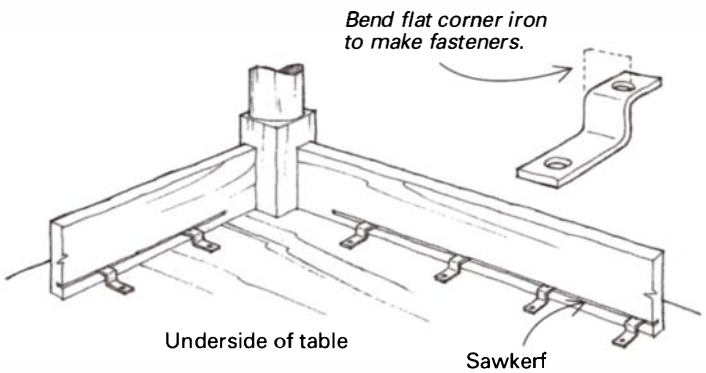
An alternative to winding sticks

The traditional method to determine if a workpiece is twisted is to use two winding sticks, as illustrated on the cover of *FWW* #120. I've found two difficulties with that approach. First, it's not easy to find perfectly straight sticks that won't warp. Second, it is not easy for those of us who wear bifocals, or thick glasses, to focus on both sticks at the same time.

My wife had another idea—use a carpenter's bubble level. Set the workpiece flat on the bench. Place the level on one end of the workpiece, and with a small wedge, level that end of the workpiece. Now, move the level to the far end of the workpiece. Any twist or winding will show up as an out-of-level condition. Using

my level, I'm convinced that I get better results than I would by using winding sticks. —*Winfield Sample, Eureka, Calif.*

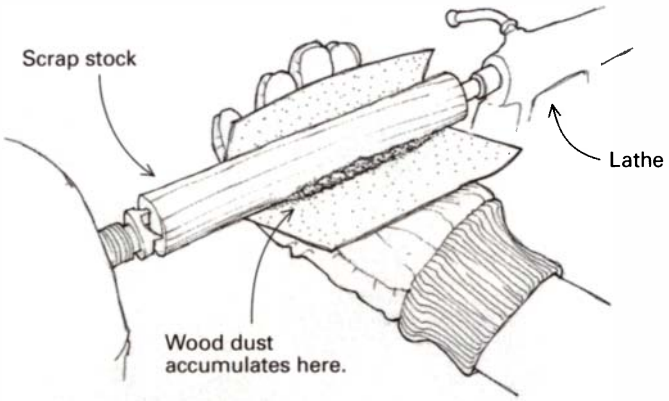
Custom-made fasteners



I make tabletop fasteners from steel corner irons. First I bend one leg of the iron at a right angle, as shown in the sketch. Then I cut a thin kerf in the table apron that this new bend will fit into. I just stick the end of the iron in the kerf and screw the other leg to the underside of the top.

This technique is quick and easy, and it allows plenty of wood movement. —*William D. Murrey, Madison, Tenn.*

Making wood-dust filler



An easy way to generate dust to make wood filler is to turn a piece of wood on a lathe. With a gloved hand, hold a piece of sandpaper against the rotating piece. Sanding dust will quickly pile up on the sandpaper. —*Bill Kadi, Hayward, Calif.*

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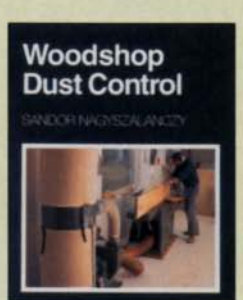

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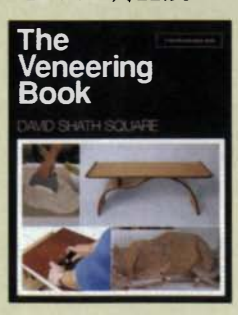

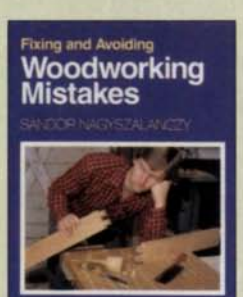

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Cock Beads Dress Up a Drawer

A 17th-century detail stands the test of time

by Garrett Hack

Cock beads frame a drawer and give it a finished look (right). Incised beads, like those on the bathroom vanity (above), can be scratched all around a drawer front or just along the top and bottom edges.

In the late 17th century, English tastes in furniture ran to surfaces veneered in burls and other wild-grained, exotic woods. The thin veneers were vulnerable to chipping unless they were protected by molding. Drawers were especially at risk. Edges were completely exposed when the drawer was open, and simply opening and closing the drawers could damage the veneer on the drawer front. Then some innovative furnituremaker came up with the idea of attaching small, molded strips to the drawer edges. They protected the veneer and gave the drawer a distinctive border. A detail was born.

Rout the rabbet. *Cut to full depth, but set the fence to slightly less than the thickness of the rabbet so that it can be trued up with a plane. To avoid tearout, rout the sides first and then the top and bottom edges.*

Interest in cock beading survived into the Federal period, even on surfaces that were not veneered. Cock beads were used like string inlay—to create a line around a drawer face or along a table apron.

I use cock beads in many of my designs, both around drawers and at the bottom of aprons (see the photos on the facing page). Cock beads and imitation cock beads, called incised beads (see the box on p. 41), add visual interest to a range of furniture styles, from Federal to Shaker-inspired.

Cock beading a drawer is quite easy. There are three steps: cutting the rabbet for the bead around the drawer front; shaping and sizing the bead to fit the rabbet; and mitering and securing the beads in place.

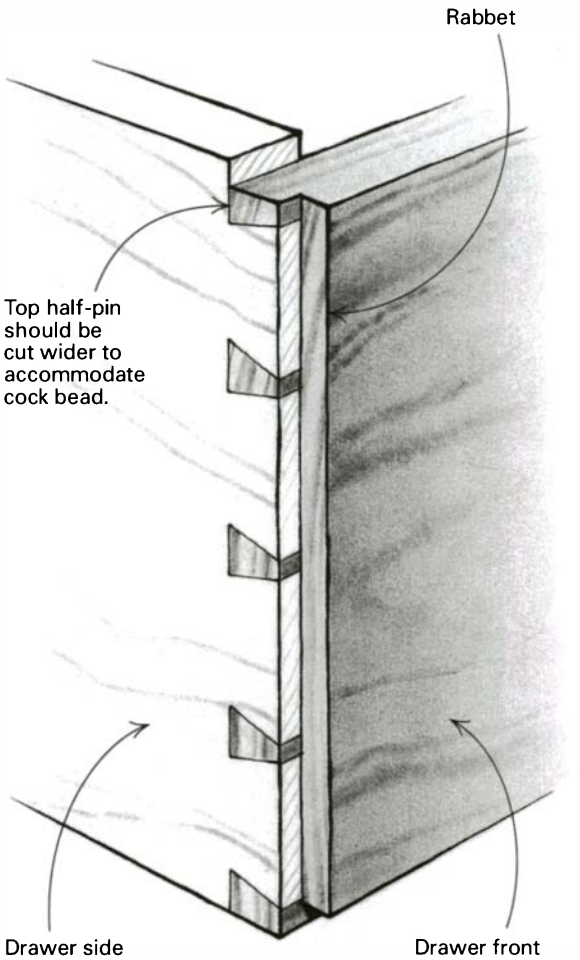
Rabbets are routed and then cleaned with a plane

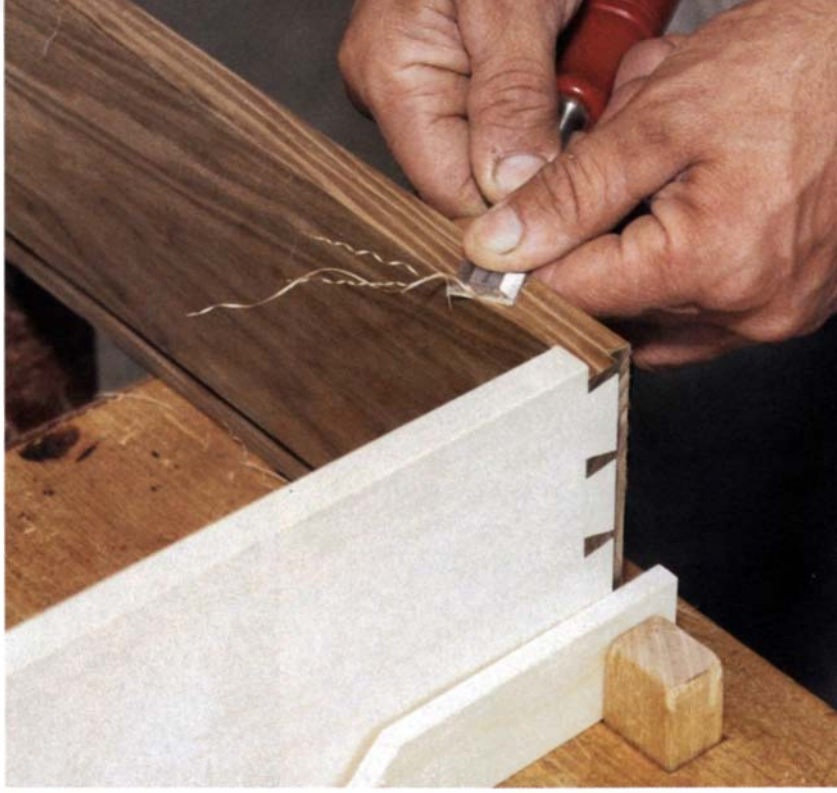
I finish building and fitting a drawer to its opening before cutting the rabbets to house the cock beads. Anything more than the smallest amount of fitting done after the bead is glued in place will be noticeable. If you take a few shavings off the sides of a drawer that's too tight, all of a sudden, the cock beads on the drawer's sides may look thinner than the top and bottom beads.

In earlier days when dovetails were just

Rabbeting a drawer for a cock bead

The top edge of the drawer front is rabbeted all the way to the drawer side when a contrasting wood is used for the bead. This way, only one kind of wood is visible along the top edge when the drawer is open.





Clean up the back edge of the top rabbet. *A knife or a chisel works well. Leaving this paper-thin buffer in place while routing prevents damage to the front edge of the drawer sides.*

Bottom and side rabbets are cleaned up with a rabbet plane. *The inside corners can be cleaned out with a chisel, if necessary.*

construction joints rather than aesthetic focal points on a piece of furniture, cabinetmakers did not mind covering their dovetails with cock beads. Today, however, furnituremakers generally want their dovetails to be seen. So when I cock bead a drawer, I use half-blind dovetails and rabbet the sides of the drawer to the base of the dovetail pins—usually about 5/16 in. (see the drawing above). A typical cock bead is about 1/8 in. thick and extends beyond the drawer face about 1/16 in.

On the bottom edge of the drawer front, the rabbet is the same depth as it is on the sides. But on the top edge, I rabbet the full thickness of the drawer front when I'm using a contrasting wood. When the drawer is open, you see only the cock bead, not the wood used for the drawer front. Be sure to make the top half-pin wide enough for the bead (see the drawing above).

If you intend to use the same wood for the cock bead and the drawer front, you can just cut the same size rabbet all around the drawer front. By saving an offcut from the drawer face, you will get the best possible color and grain match, and the joint will be nearly invisible.

The rabbet can be cut with a tablesaw, router or hand tools. Because the rabbet's exact dimensions depend on the size of the bead, I either make up a sample piece of bead or use a piece saved from a previous project to make sure that the size of the rabbet will be right.

I think a router is the easiest tool to use for

Photos: Vincent Laurence; drawings: Michael Gellatly

large drawers. I clamp the drawer to my bench and use a hand-held router with a wooden fence to get a rabbet of consistent width. The rabbet's depth is set by adjusting the bit's depth of cut. Marking the outside edge of the rabbet with a knife, especially where the router will exit the cut, will prevent any splintering. Routing across the grain first (the sides of the drawer) and then with the grain also will eliminate tearout at the end of the cut. I cut the rabbets slightly undersize, so I can true and size them with a chisel and a small rabbet plane.

For small drawers, you can cut the rabbets on a router table (see the photo on p. 39). Set the bit height for the depth of the rabbet, and set the fence for the thickness of the bead. Cut the sides first, then the bottom and then the top. The bit height will need to be reset for the top rabbet. For the rabbet on the top edge of the drawer, set the bit so it cuts just shy of the drawer sides. Clean up the paper-thin strip that's left with a knife or a chisel (see the top photo on the facing page). Holding the router bit slightly away from the drawer sides eliminates the possibility of chipping or tearout.

A few passes over the edges of the drawer with a finely set rabbet plane will give you a straight and true edge and produce a nearly invisible glueline (see the bottom photo on the facing page). I check frequently along the length of each side of the drawer with a small square to be sure the rabbets are square to the face.

Beads can be shaped with a number of tools

I've cut beads with a router, beading planes, a Stanley No. 66 beading tool and homemade scratch beaders. A router is the most consistent and easiest tool for making lots of beading, even though it's hard to find bits that will cut small beads.

Beading planes can be found in antique-tool shops, some as small as ⅛ in. Also, many antique-tool dealers have the Stanley No. 66 (a reproduction of the Stanley is made by Lie-Nielsen Toolworks). Quite often, I use a homemade scratch beader. With the Stanley No. 66 and the scratch beader, there are no restrictions on the size of bead I can make because I can grind my own cutters. Because of the time involved, these hand-tool methods are better for cutting beading for just a few drawers. Although the resulting bead is slightly inconsistent, it has a wonderful, handmade feel.

I cut strips of beading from a board a few inches longer than the drawer width and

the cock bead's country cousin

***Shape a bead by hand—A** homemade scratch beader is the author's preferred tool. A scratch beader can be both pushed and pulled.*

Beads cut into and flush with the face of the drawer are known as incised beads. They're just scratched into the surface of the drawer front, but when they run all around the drawer, they look as though they were mitered. Sometimes they're just cut into the top and bottom edges of a drawer front. They're found more often on country furniture and were meant to imitate high-style applied cock beads. Incised beads don't create the same shadow lines, but they are an interesting detail on an otherwise plain drawer face. The bead isn't very deep: Just the faintest suggestion is all that's necessary. If you cut it too deep or make the bead too narrow, the short-grain beads at the sides of the face will be vulnerable to chipping.

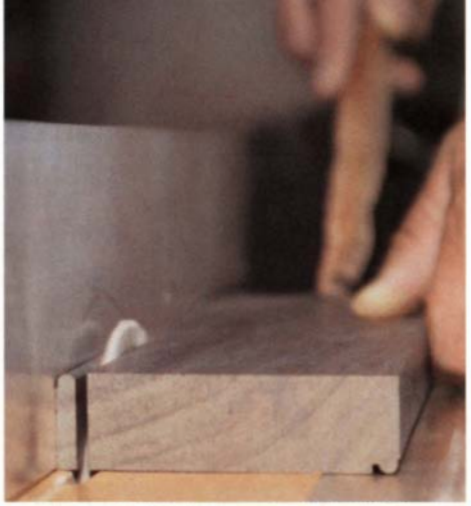
Incised beads can be cut in nearly as many ways as cock beading. I like to use a homemade scratch beader (see the photo above) along with a chisel, a marking knife and a block plane. To make my scratch beader, I ground a profile on a piece of heavy-duty hacksaw blade with a thin grinding wheel mounted in a drill. The grinding wheel is the kind you find in a hardware store, with an arbor already on it. I find it easier to bring the steel to the grinding wheel, so I pinch the drill in my bench vise. Then I hone both sides of my cutter on benchstones and use a slip stone to hone the profile. The cutter is driven into a sawkerf in a hardwood block and is held in place with a finishing nail. The profile is adjusted by extending or retracting the blade from the side of the block, which acts as a fence.

The trick to a good incised bead is to take your time and work carefully—especially around the corners. It's very easy to overshoot a corner and cut through the adjoining bead. I creep up on a corner from both directions using light cuts. The scratch beader can be both pushed and pulled. And it shapes wood across the grain nearly as well as it does with the grain.

After I've done all I can with the scratch beader, I use a chisel and marking knife to clean up the inside corners and a block plane to refine the shape of the outside edge of the bead all around.—*G.H.*

***Complete the corners.** Use a chisel and knife to clean up the corners. The corners should be sharp and appear to be mitered.*

Router cuts beads quickly and consistently. *When he has a lot of beading to cut, the author chooses the router. The only drawback is the limited availability of router bits with small profiles.*



Beads are sawn off both sides. *The author leaves a little extra material next to the bead and then planes the bead to a precise thickness. A push stick is used to move the bead past the blade.*

Plane strips of beading to thickness. *A fixture consisting of three pieces of softwood glued and tacked to a piece of plywood holds the bead in place.*

somewhat thicker than the width of the widest finished bead. I start by planing the two long edges of the board smooth, flat and square. I work from both edges of a board at the same time, shaping two beads on a router table (see the far left photo). It saves time.

After cutting the beads, I rip the strips off the board on the tablesaw, keeping them slightly thicker than the depth of the rabbets (see the near left photo). Then I plane them to thickness, using a caliper to check my progress as I go. When planing, I place the strips of beading jointed side down to remove sawmarks.

To hold the beads in place when I'm planing, I put them in a very simple fixture, a thickness gauge of sorts (see the bottom photo at left). The strips of wood holding the bead in place are approximately the desired thickness of the bead and are glued and tacked to a piece of plywood. Make sure the brads are set well below the surface so that you don't nick a plane iron.

Jointing new edges on the board, cutting two beads, ripping them off and planing them to thickness eventually yields enough strips for what I need and some extras, just in case. Depending on how many drawers I'm cock beading, I'll make between 20% and 50% extra—the fewer the drawers, the higher the percentage.

The final step is to rip each strip to the width of the rabbet plus the amount the bead projects from the surface. I find this more accurate than cutting the strips from a board that's only as thick as the final beaded strips are wide. It's easier to keep the wider strips a consistent thickness across their width as I'm planing them. Also, I can cut the wider top beads with the same setup. I measure for the top bead by setting one of the thinner beads in place at the side of the drawer and using a caliper to measure from the front of the bead to the back of the drawer front. This ensures that the top bead will project beyond the drawer front the same amount as the cock beading around the sides and bottom.

Work your way around the drawer

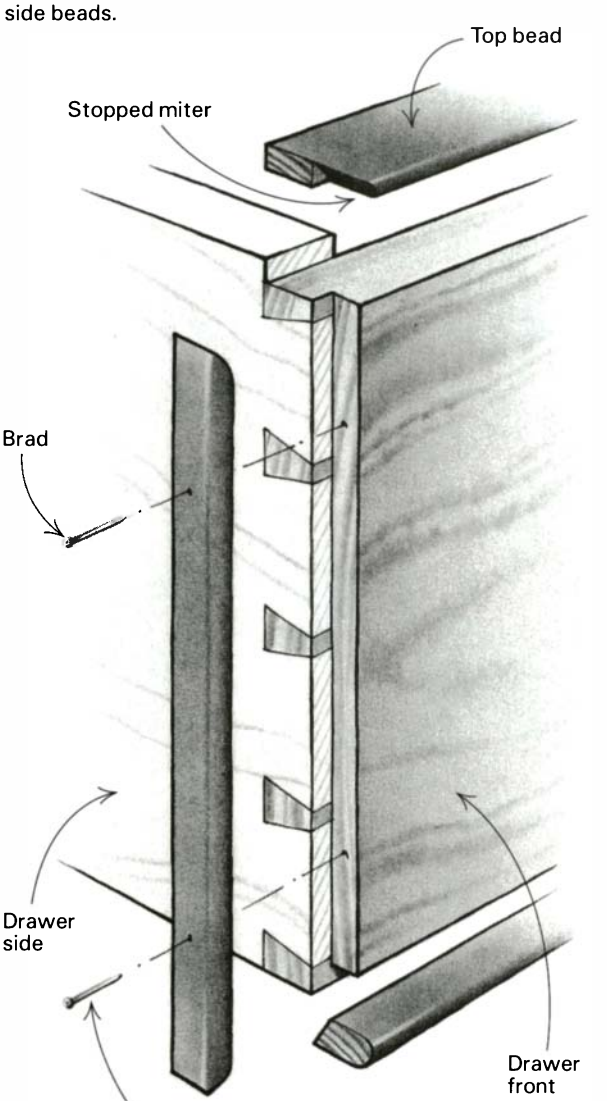
The beads are mitered on all four corners. If you are setting the top bead in a rabbet the same depth as the other three, rather than the full depth of the face, then the mitering is straightforward. If the top edge bead is full width, then it's mitered only to where the side beads meet it. This stopped

Clamp the bottom and sides in two directions. *A rabbeted caul allows you to clamp the cock bead firmly into the drawer face in both planes, producing the least visible gluelines. A flat caul protects the top bead.*

Attaching a cock bead to a drawer

After the door has been rabbeted, strips of beading are glued into place. Each corner is mitered.

When the top bead is the full width of the drawer front, it is stop-mitered at the corners where it meets the side beads.



On drawers wider than 5 in., the side beads are pinned with a few brads in addition to being glued.

miter is not terribly difficult to cut; however, it is the part of this process that requires the most attention.

I start with the bead along the top edge. I mark and cut it to length and mark out the depth of the stopped miters at either end. Holding the strip against a simple miter block, I saw the miter close with a dovetail saw, and then I pare it so that it fits perfectly. Before attaching the beads, I smooth-plane the face of the drawer front one last time. Then I glue and clamp the top bead in place, using softwood cauls to protect the bead and the rabbet at the drawer bottom.

I work my way around the drawer face. There are two minor differences in dealing with the three remaining sides. The side and bottom beads need to be clamped in two directions, tight against both faces of the rabbet, so you don't end up with a visible glueline. I use a rabbeted caul to exert pressure both down and in (see the photo above). Because of cross-grain movement, the side beads on drawers wider than about 5 in. are best secured with a few small brads in addition to glue. Drawers wider than 8 in. or so should not be cock beaded. By setting the brads and filling the holes with a wax pencil of the same color as the cock bead, the holes are nearly invisible. □

Garrett Hack trained as an architect before turning to furnituremaking in 1975. He designs and builds furniture and farms about a dozen acres in Thetford Center, Vt.

No-Frills Router Table

Build it in an afternoon for about the cost of a good bit

by Gary Rogowski

Remember the commercial about the knife that sliced, diced and performed a myriad of other tasks, even gliding through a tomato after cutting a metal pipe? Well, that's what a router table is like. You can cut stopped and through grooves, dadoes, rabbets and dovetailed slots. You can raise panels, cut sliding dovetails, tenons and mortises. It's no wonder that many woodworkers can't imagine working wood without one.

But router tables can be expensive. In one woodworking catalog, I saw a number of packages selling for between $250 and $300. I'd rather spend my money on wood. That same money would buy some really spectacular fiddleback Oregon walnut.

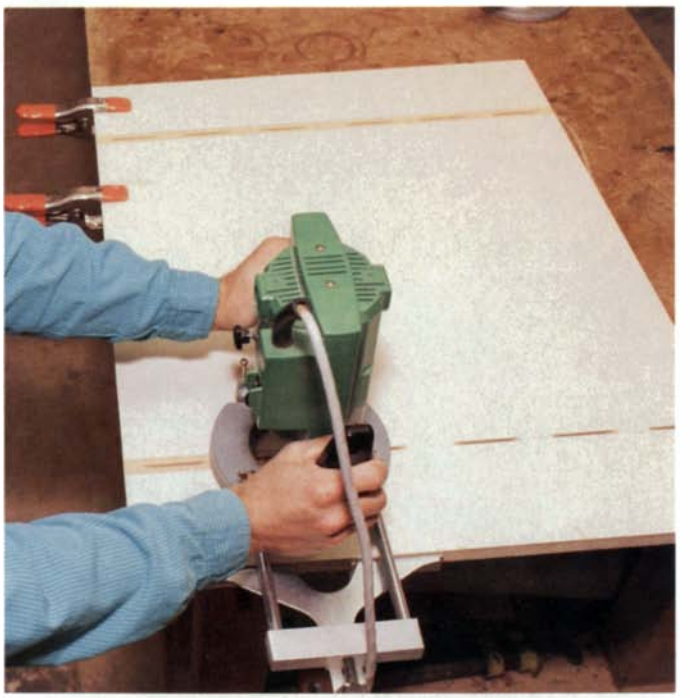
I've been building furniture for years, and my bare-bones router table has given me excellent, accurate results. The router table in the photo above is a variation that is inexpensive, simple to construct and extremely versatile. It's a simple, three-sided box made from a half-sheet of ¾-in.-thick melamine with the front left open for easy access to the router. I made mine with a top that's 24 in. deep by 32 in. wide, which keeps it light enough to move around yet big enough to handle about anything I'd use a router table for. It's 16 in. high, which is a good height for placing it on boards on sawhorses or on a low assembly bench.

Biscuits and dadoes join parts

When you buy the melamine, make sure the sheet is flat. And buy it in a color other than blinding white—it's tough on the eyes.

The melamine I used had a particleboard core. Biscuits are stronger than screws in

Photos: Vincent Laurence



Shallow dado increases glue surface. *To strengthen the joints between the sides and top, the author routs a dado 1/16 in. deep in the underside of the top directly over biscuit slots.*

Fiberboard back prevents racking. *Although it's only 1/4 in. thick, the fiberboard back greatly strengthens the table. The fiberboard is glued and screwed into a rabbet all around the back of the table.*

particleboard, so I joined the two sides to the top with #20 biscuits. To make the cuts in the underside of the top, I took a spacer block 5 in. wide, aligned it with the end of the top and set my plate joiner against it for the cuts. The width of the block determined the overhang of the top. Marks on the spacer block gave me my centers.

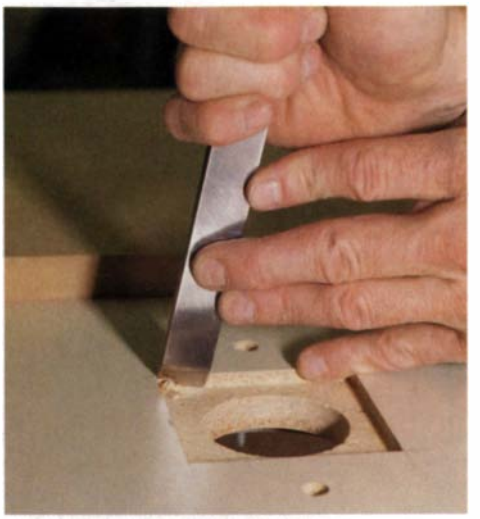
The biscuit joints probably would have been plenty strong by themselves, but I wanted to add a little extra strength to the joint. So I decided to dado the underside of the top for the sides. I couldn't dado very deeply, though, or the biscuits would have bottomed out. I settled on a 1/16-in.-deep pass centered over the biscuit slots (see the top photo). Before cutting the dado, however, I dry-fitted the sides and top with biscuits in place to check alignment. Then I scored heavily around the edges of the side pieces with a marking knife and routed the shallow dadoes.

Before gluing the sides to the top, I rabbeted the back edge of the two sides for a 1/4-in. panel to strengthen the table and prevent it from racking. Then I glued the sides to the top one at a time, using battens to distribute the clamping pressure. I made sure each side was square to the top and waited for the glue to set up.

I used a router and rabbeting bit to cut a stopped rabbet in the back edge of the top. Then I glued and screwed down the 1/4-in. medium-density fiberboard (MDF) back panel (see the bottom photo). Hardboard or plywood would have worked as well.

I use a fixed-base router in my router table because it's lighter than most plunge routers and won't cause the table to sag

Cut the hole with a router bit. *With the router base screwed to the underside of the top, the author advances his largest bit through the table. Go slowly.*



A recess for interchangeable inserts— *A plunge router and chisel make short work of a recess in the tabletop that accepts inserts for different-sized bits.*

over time. Also, it's much easier to change bits. I just drop the router motor out of the base, change bits, reinstall the router and I'm back to work.

I attached the router base to the underside of the tabletop with machine screws that go down through the top into the tapped holes in the router base. To mark the location of the screw holes, I removed the router subbase and made pencil marks on the top. Then I drilled and countersunk holes into the tabletop.

With the base attached to the table, I marked out where the bit hole should go and drilled a ¾-in. hole into the table. I put a 2⅛-in.-dia. chamfer bit in my router—the largest bit I have. I started the tool and gradually moved the bit up and through the tabletop (see the photo above left).

To prevent workpieces from diving into this hole when using small bits, I made a set of inserts that fit in a shallow recess around the bit hole. Holes in the inserts accommodate bits of different sizes with minimal clearance. I routed out the rabbeted recesses for the inserts first, using a plunge router guided by a straightedge. I squared the corners with a chisel.

I made the inserts of ¼-in. tempered hardboard. Their square shape keeps them from spinning during use and makes them easy to fit. I cut a bunch of them on the tablesaw and then sanded each to a perfect fit on a belt sander.

L-shaped fence provides dust collection

The fence I've always used might be called low tech, but there's really no tech to it at all. It's simply a straight, wide, flat piece of wood jointed so that one edge is square to a face. I clamp it to the router table wherever I need it. The fence doesn't have to be parallel to a table edge to work. When a bit needs to be partially hidden for a cut, I use another board with a recess cut into its face.

The only thing my primitive fence lacks is dust collection. Hooking up a vacuum or a dust collector just won't work in some situations, such as when I plow a groove. But with other operations—raising a panel, rabbeting a drawer or box bottom, or cutting an edge profile—having a fence with a dust port can really help clear the air.

The fence I built for this router table is made of two pieces of ¾-in.-thick MDF about 4½ in. wide and 49 in. long rabbeted together to form an L-shape (see the photo at left on the facing page). I cut a semicircular hole at the center of each for dust collection. This allows for better pickup. I also routed slots in the vertical part of the fence so I could attach auxiliary fences for specific operations, such as raising panels or rabbeting. Once these slots are routed, the two pieces of the fence can be glued together. Make sure the fence clamps up square because virtually everything you use the table for depends on it.

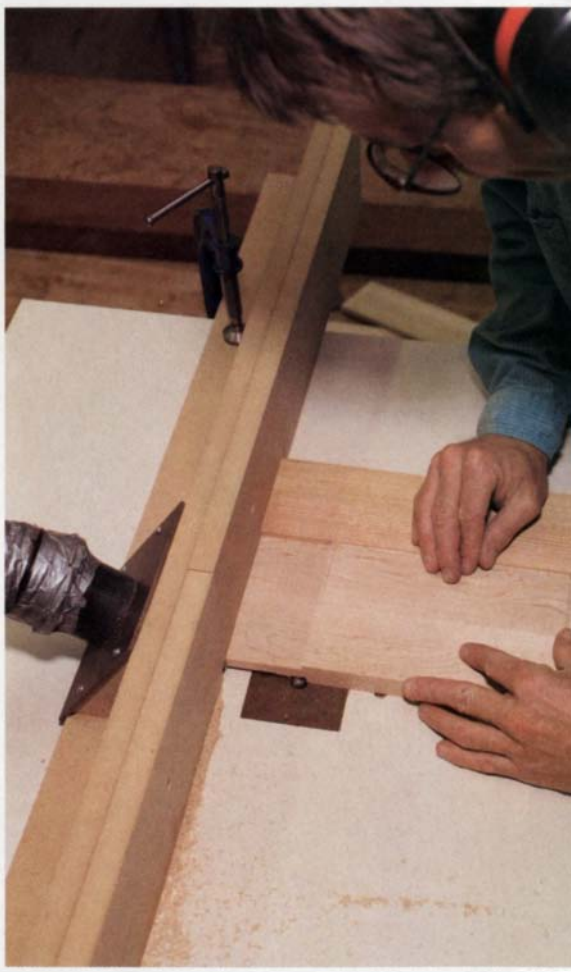
To create sidewalls for the dust-collection hook-up, I added two triangular-shaped pieces of ¾-in.-thick MDF to frame the dust-collection port (see the top right photo on the facing page). I glued these triangles in place on either side of the dust holes, just rubbing them in place and letting them set up without clamping. After the glue had cured, I filed the triangles flush with the fence, top and bottom.

To complete the dust-collection hook-up, I measured the diameter of the nozzle on my shop vacuum and cut a hole to accommodate it in a piece of ¼-in. hardboard. I left the hardboard oversized, clamped it to the drill-press table and used a circle cutter on my drill press. Then I cut the hardboard to size and glued and screwed it to the two triangular walls.

Auxiliary fences solve specific problems—A two-piece auxiliary fence can be used to close up the area around the bit when routing profiles, rabbeting or performing similar operations. This way, there's no chance of a small piece diving into the gap between bit and fence. And with a smaller opening around the bit, the dust collector or vacuum will work more efficiently. When the fence is situated back from the bit, such as when mortising, another set of auxiliary pieces can be used, so there's no gap between the two halves (see the bottom photo on the facing page).

Clamp the fence square. *Adjust the clamps (left) to get the two pieces square over the entire length of the fence.*

Screw dust-collection port to fence *(above). Smear a bead of glue along the two triangular sidewalls. Drill holes and screw the hardboard back to them.*



Using a closed auxiliary fence— *Routing away from the fence calls for auxiliary pieces butted tightly together to form a smooth, continuous surface.*

I made the auxiliary fence from two more pieces of MDF. The auxiliary fence is drilled and countersunk for machine screws that ride in slots cut in the main fence. I use nuts and washers to tighten the two pieces in position.

When using the auxiliary fence, I close the two halves around the moving bit to provide a custom fence. When I'm done with it, I can set the fence aside for future use or just cut it off square and use it again. Closing the fence into a bit with a diameter that's less than the thickness of the fence will not open up the back of the fence to the dust-collection port. In this situation, I pivot the fence through the spinning bit before setting the fence for depth of cut.

Make sure that the outfeed side of the fence doesn't stick out any farther than the infeed side. If it does, it will prevent you from feeding your work smoothly past the bit. If your work catches on the outfeed side of the fence, easing its leading edge with a file or a chisel may help. If it doesn't, you can always shim the infeed side with slips of paper.

Another router table problem I've found is what to do with large upright pieces, such as panels cut with a vertical panel-raising bit. The solution is to screw a taller auxiliary fence to the main fence. The fence can be pivoted right into the bit, so there's no gap on either the infeed or outfeed side of the bit, yet there's dust collection behind the bit. □

Gary Rogowski has been building furniture in Portland, Ore., since 1974 and teaching woodworking since 1980. He is a contributing editor to Fine Woodworking.

Pear Mantel Clock

Clean lines and few details make this clock handsome and easy to build

by Mario Rodriguez

My daughter Isabel's seventh birthday was fast approaching, and I wanted to build her something special. She had recently learned to tell time, so a clock seemed like the perfect way to mark the occasion. I designed the clock in the Arts-and-Crafts style; it looks somewhat contemporary but still has a traditional feel (see the photo at left). The joinery is simple, just stub tenons and dadoes, most of which can be cut quickly on a router table and tablesaw.

The clock consists of eight parts: the top, bottom and two sides, the middle shelf assembly, veneered panels for the face and back of the clock, and a door below the middle shelf. The clock is just a bit taller than 16 in. As a result, not a lot of wood is required to build it, and the planing, sanding and finishing don't take very long.

This clock is made of pear, which has a very mild grain that lets the clock's design dominate. A coarsely grained or heavily figured wood could overpower a clock of this size.

Use router table and tablesaw for joinery

The two sides of the clock are dadoed into the top, and the lower and middle shelves are dadoed to the sides. I routed these stopped dadoes as well as the grooves for the back panel and face panel on the router table. The dadoes are all ¼ in. deep by ¼ in. wide. I moved the router-table fence over a hair for the grooves, which are just slightly wider to accommodate the face and back panels. I made these from ¼-in. birch plywood, veneering one side with quartersawn pear veneer. To ensure accurate, square cuts on the router table, I used a right-angle jig and cut no more than ⅛ in. deep per pass. With the tablesaw, I cut the corresponding stub tenons at the top of the case sides and on the ends of the lower and middle shelves. They were cut just a little wide and then fitted by hand.

I tapered the outside faces of the clock sides using a jack plane, taking the sides from ¾ in. at the bottom to just under ½ in. at the top. This gives the clock a lighter feel and is a detail found on many Arts-and-Crafts clocks made earlier this century. A ½-in. cove routed around the underside of the clock's top gives it a visual lift.

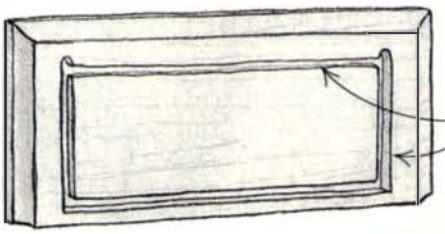
With the top, bottom and sides made and fitted, I planed and scraped the pieces. They were sprayed inside and out with two very thin coats of aerosol nitrocellulose sanding sealer followed by one coat of semigloss lacquer. To keep the joints free of lacquer, I taped the stub tenons and temporarily fit ¼-in. strips into all the dadoes. I scuff-sanded with 320-grit sandpaper between coats. Spraying before assembly allowed easy access into corners, eliminated drips and reduced overspray.

Middle shelf—The middle shelf requires a 1¼-in.-dia. hole for

Photo this page: Scott Phillips

Pear mantel clock

Simple joinery makes this small clock a quick build. Dadoes are ¼ in. wide and ¼ in. deep. Grooves for face panel and back panel are slightly wider to accept ¼-in. plywood panels that have been veneered on one side.



Grooves and dadoes on the underside of the clock top accept tenons from the sides and the face and back panels.

Top, ¾ in. x 4¼ in. x 9½ in.

Cove, ½ in. radius

Veneered face panel, 7¼ in. sq.

Tenon, ¼ x ¼

Veneered back panel, 7¼ x 15¾

Groove for back panel

Groove for face panel

Hole for clock stem, 5/16 in. dia.

Setback, ¼ in.

Dado for middle shelf assembly

1¼ in.

Door hinge hole

7⅝ in.

7/16 in.

1¼ in.

Dado for lower shelf

Door, 6 11/16 in. x 6⅝ in.

Hole for chime rods, 1¼ in. dia.

Spline, ⅛ in. thick

6¾ in.

Door stop, ¼ in. thick

3¼ in.

16⅛ in.

Cutout for pendulum, 3 in. x 1¼ in.

Lower shelf, 2¾ in. deep

Middle shelf

Front rail

Inlay strip, 1/16 in. thick

Side tapers from ¾ in. at bottom to about ½ in. at top.

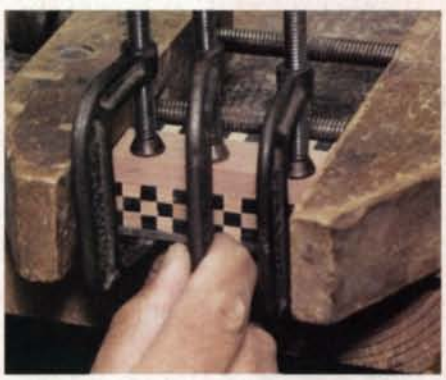
Drawings: Bob La Pointe

Making the checkered inlay

The checkerboard band across the middle of the clock is an eye-catching detail, and it really makes the clock. You'll find that it invites close inspection. For best results, use clean, straight material, and don't use any sapwood or wood with other defects. You'd only have to discard several strips of inlay later. *—M.R.*

1. *Prepare two "sandwiches" of material—one with a lighter wood in between two dark pieces, and the other just the opposite. Width and length aren't critical, but each layer of the laminations must be exactly ¼ in. thick.*

2. *Plane the edges of each lamination square to the faces, and make sure the edges are free of glue. Crosscut laminations into segments exactly ¼ in. wide.*



3. *Arrange segments from alternating sandwiches. Glue and clamp them together. Apply pressure down, as well, onto a steel plate or something similar, to ensure even registration all the way across.*

4. *When the glue has cured, clean up and square the completed checkerboard blank. Bandsaw into 1/16-in.-thick strips. Using a knife to pull the thin strips along on the outfeed side of the blade helps. Select the best pieces for the clock inlay.*

MAKING THE MIDDLE SHELF

Plane the front rail flush. *Using a sharp block plane is a quick way to bring the top and bottom edges of the front rail down to the level of the inlay.*

Kerf front rail and middle shelf for a spline. *One pass with each piece over a standard-width blade is plenty. Then just plane the spline to fit.*

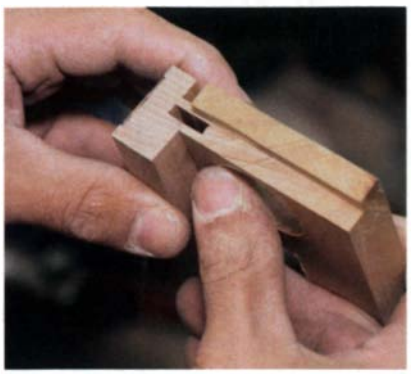
chime rods and a 3-in. by 1¼-in. cutout for the pendulum. I made the hole on the drill press with a Forstner bit and cut out the cavity for the pendulum on the tablesaw and bandsaw.

A band of checkerboard inlay is let into a front rail, which is splined to the middle shelf. I used the tablesaw to cut the slot for the ⅛-in. spline and to cut the rabbet in the top of the front rail for the veneered face panel. To create the recess for the checkerboard inlay, I plowed a 1/16-in.-deep groove across the center of the front rail on the tablesaw and planed it smooth and flat. Then I glued and clamped down the checkerboard inlay, which I made of ebony and pear (see the photos at left for a complete description of making the inlay). After the glue had cured, I planed the front rail flush with the inlay (see the top photo), cut the front rail to length and clamped up the middle shelf assembly (see the photo at right on the facing page). I taped the stub tenons and sprayed the assembly before moving on to the plywood panels for the clock face and back.

Veneer the face and back panel

Because I didn't want to worry about wood movement across

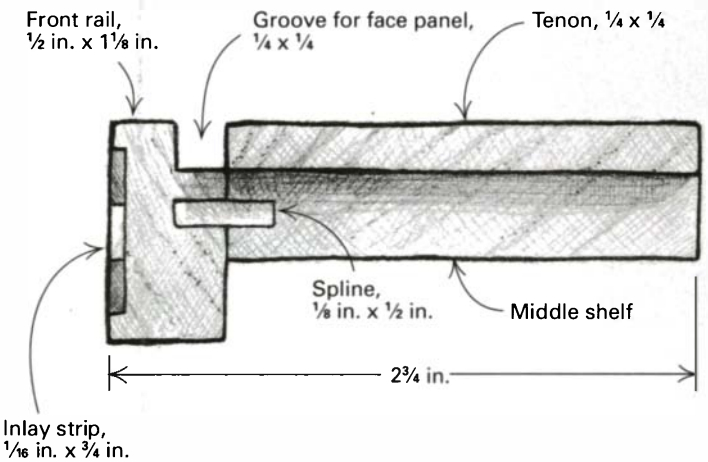
Photos except where noted: Vincent Laurence



***Check the alignment** (left). The top of the middle shelf and the top of the front rail should be flush. The ¼-in. groove accepts the bottom edge of the face panel.*

Middle shelf assembly

The middle shelf assembly is 2¾ in. deep overall.



***Middle shelf and front rail are joined with a spline.** Hand screws provide plenty of clamping pressure, but be sure the front rail stays square to the shelf as pressure is applied.*

the width of the clock, I used ¼-in.-thick birch plywood for the face and the back panels. I veneered the plywood with clear, quartersawn pear. This way, the grain all but disappears. After shooting and taping the veneer seams, I glued the veneer to the plywood using yellow glue and a warm iron (for more on this technique, see *FWW* #108, pp. 48-51). Ordinarily, both sides of the substrate should be veneered so the piece won't cup later. But because both panels are captured, I didn't think it was necessary to veneer their inside faces.

After the glue had dried, I scraped the veneer tape off and cut the panels to size. To mark the center of the face for the clock movement, I struck diagonals from corner to corner and used an awl to make an impression where the lines crossed. Then I scraped and sanded the pear veneer. I finished the face with sanding sealer and semi-gloss lacquer. By finishing the face before drilling for the clock stem, I didn't have to avoid the hole when I sanded or rubbed with steel wool.

I bored the hole for the clock movement on my drill press and screwed it to the back of the face panel (for part numbers, price and other information on the movement, see the sources box on p. 53). I set the back panel aside until the whole clock was glued up.

Glazed door swings up on dowel hinges

The little door that swings up to provide access to the pendulum is of standard mortise-and-tenon construction. Both top and bottom rails are 1½ in. wide, slightly wider than the stiles. The top rail takes a mild curve, and the bottom accepts a small knob and visually anchors the design. I roughed out the curve in the top rail on the bandsaw, and then I cleaned it up using a template and the template guide on my router table (see the photo at left on p. 52).

After the door frame was glued up, I routed a ¼-in. rabbet all around the inside to accept a pane of glass. I squared the corners of the rabbet and chopped small open-sided mortises in the back side of the door for the muntin assembly (see the photo at right on p. 52).

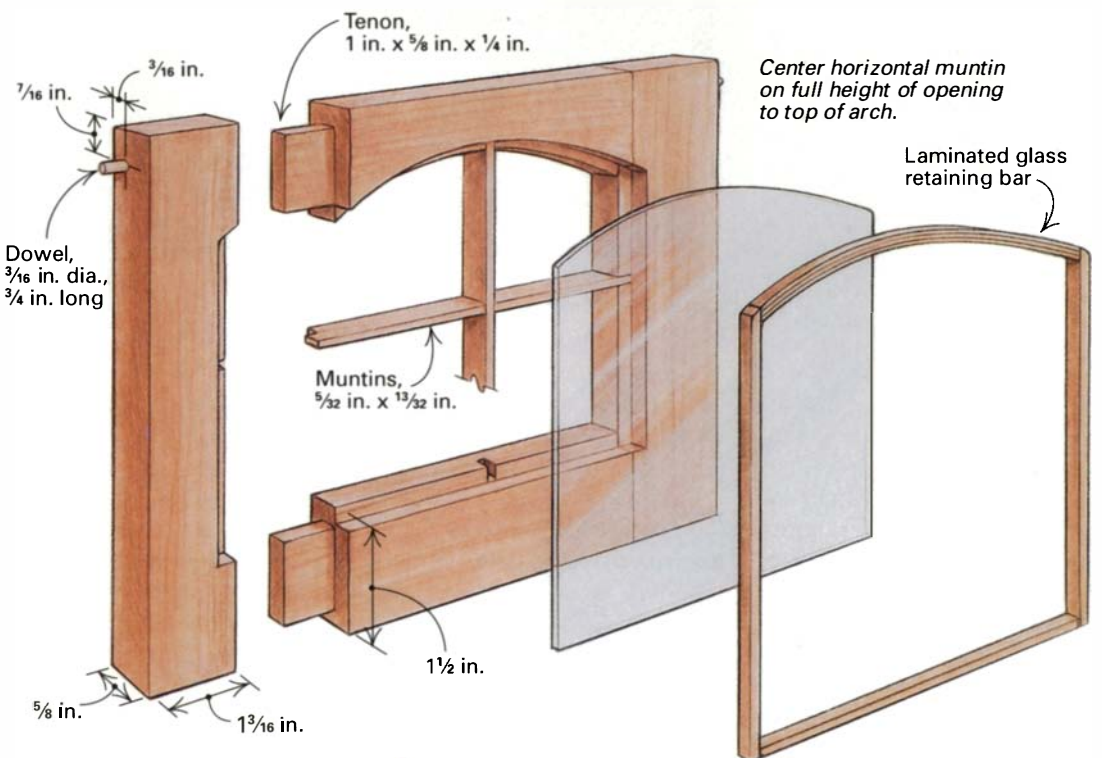
I ripped the muntin stock on the tablesaw and planed and scraped it to its final 5/32 in. thickness. I cut the tenons on the ends of the muntins with a small dovetail saw and fitted them to the mortises in the back of the door with a file. The half-lap joint where the two muntins cross was done on the

MAKING THE DOOR

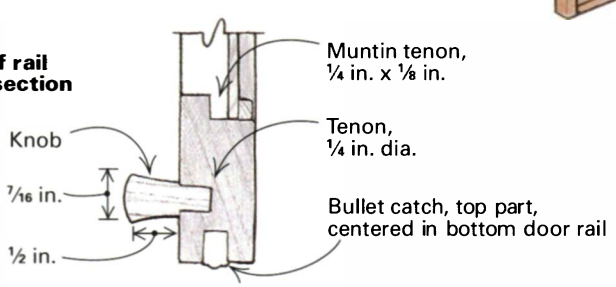
A template and guide shape the top door rail. *After bandsawing the curve in the rail to rough shape, the author routs it to finished shape.*

Muntins are tenoned into open mortises in frame. *Tap the tenons home with a small hammer and a wooden block.*

Back view of door



Cross section of rail at muntin intersection



tablesaw. After gluing in the muntin assembly and letting it dry, I planed it flush with the front of the door frame.

I cut the glass for the door, but the edges were still a bit ragged, so I cleaned them up on a belt sander clamped into my bench vise. A 100-grit belt eased the edges quickly but safely.

To hold the glass in the rabbet in the back of the door frame, I spot-glued a laminated, curved bar across the top and straight strips against the two sides and the bottom. I made the curved bar from three thin strips, using the top rail as a form and planing them flush after the glue had dried. Because these retaining bars are just glued to the frame in a few spots each, they can be pried out and the glass replaced, if necessary. When the glue had dried, I scraped, sanded and finished the door.

Location of dowel hinge holes is critical—I wanted the door on this clock to swing up rather than out, and I didn't want to mar the clock's appearance with metal hardware. My solution was to pivot the door on two short sections of 3/16-in.-dia. dowel set into holes in the door's edge and on the inside of the clock case. The exact placement of the holes is critical, but it's not difficult. Before drilling the holes in the sides of the door, I did a test with a piece of scrap the same size as my door. I wanted to be sure the door wouldn't bind on the bottom edge of the front rail when opened and that it would set back 1/4 in. into the clock case.

To drill the hinge holes in the door, I used a doweling jig and a hand-held drill. I drilled the holes in the case sides on the drill press, shimming the underside of the thinner end to get the sides level.

The dowel I used was a little too fat to fit in the holes I had drilled, so I shaved it with a block plane before cutting it to length—about 3/4 in. to start.

I dry-fitted the door in the clock case and fine-tuned the length of the dowels with a file until I had an even reveal on both sides of the case, without much play.

Door knob is turned from a blank shaped to a Morse taper—The small pull is made of the same wood as the clock case. I first shaped a 1-in.-sq., 3-in.-long piece of pear into a rough Morse taper, leaving about ¾ in. at the end for the knob. I cut off the end the drive spurs had bitten into, replaced the drive center with the tapered plug and tapped it securely in place. With the end free, but secure, I turned a small knob. Then I sanded, burnished and finished it right on the lathe before cutting it free from the tapered plug with a small tenon saw.

I marked the location of the knob mortise at the center of the bottom door rail and drilled it on the drill press. After some final fitting of the knob tenon with a file and sandpaper, I glued and clamped the knob to the door using a hand screw.

To hold the door in place when it's closed, I used a ¼-in. bullet catch made by Brusso and sold through many woodworking-supply catalogs. The Brusso catch is the cleanest, smallest and least intrusive one I've seen.

I dry-assembled the clock, with the door in place. The door is positioned correctly when it is set back from the front edge of the case by ¼ in. evenly top to bottom. I marked straight down from the front edge of the door at its center. Then I located the center of the bottom part of the bullet catch 5/16 in. back from that mark. I centered the top part of the catch on the ⅝-in.-thick door. The hole in the door can be bored freehand. But I drilled the hole in the bottom shelf on a drill press. Both pieces of the bullet catch can be pushed in place. No glue is needed.

Assemble case on its side

I laid one side of the case on the workbench and glued in the bottom and middle shelves. Next I slid in the veneered face panel with the works attached. I set in the completed door and then carefully lowered the other case side, lining up all the mating parts. After standing the clock upright, I glued the top on and clamped up the whole assembly, side to side and top to bottom. I adjusted the clamps until the case was square (see the photo at right). The back of the clock, which slides home in a groove, goes on last.

After the glue had dried, I cut, planed and finished one side of a ¼-in.-thick door stop. I glued the door stop onto the bottom shelf, using spring clamps to hold it in place until the glue had set. The bullet catch provides a positive stop for the door, but the door stop will prevent the door from being inadvertently jammed past the catch, possibly breaking the hinge dowels or the case itself.

Snap pendulum rod to size, and attach hands

The pendulum hanger extends down into the lower compartment through the cutout in the middle shelf. The hanger supports the adjustable pendulum shaft. The pendulum shaft is manufactured with scored lines across its back so that it can be broken to length. I broke off the shaft so the center of the pendulum bob would swing past the cross hairs formed by the muntins of the door.

I positioned the one-piece dial and bezel over the clock stem extending through the veneered face panel (the dial is the face of the clock; the bezel is the brass-bound glass disc). Then I fastened the dial with a thin brass nut. I press-fitted the hands over the stem and screwed on the top nut. Each hand has a slot or hole that corresponds with a portion of the dial stem. Next I tacked the dial in place with the eight tiny brads that came with it. Once the dial was tacked down, I put in a D battery and turned on the clock.

Finally, I turned the clock upside down (after temporarily removing the pendulum shaft and bob) and slid the back of the case in from the bottom. I secured it with two ¾-in. #8 brass screws driven into the back edge of the bottom shelf. The removable back makes it easy to change the battery or turn off the clock. □

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

Assemble the clock on its side, *turn it upright and then place the top on the clock. Adjust the clamps as necessary to make the case square.*

Sources of supply

The quartz Bim-Bam movement and the dial-bezel combination are from Merritt's Antiques (P.O. Box 277, Douglassville, PA 19518-0277; 800-345-4101). The movement is part #P-647W/P and costs $41. The dial-bezel combination is part #P-222 and costs $19.

The hands are from S. LaRose (3223 Yanceyville St., P.O. Box 21208, Greensboro, NC 27420; 910-621-1936). The hands are part #816012 and cost 75¢.

Contractor's Tablesaws

Our editors survey six saws and find differences in detailing and cost

Meet your new saw. *Associate editor William Duckworth assembles one of six new contractor's saws in the* Fine Woodworking *shop, the first step in comparing tablesaws by Bridgewood, Delta, Grizzly, Jet, Powermatic and Ryobi.*

Delta International Machinery Corporation would rather not tell you how many tablesaws it sells every year, but the company will say this much: Its contractor's saws outsell its flagship Unisaw line by roughly three to one. That shouldn't be a surprise. A 10-in. tablesaw with a 3-hp motor and an enclosed base, like the Unisaw, easily costs more than $1,500. Contractor's saws, though lighter and less powerful, are designed to do essentially the same job for half the cost or less, and companies like Delta sell them by the truckload.

Fine Woodworking editors recently compared contractor's tablesaws from Bridgewood, Delta, Grizzly, Jet and Powermatic. We also looked at the Ryobi BT3000 saw, something of a hybrid design. The Delta and Ryobi models are made in the United States, the others in Taiwan. When we approached manufacturers to participate in this review, the criteria were simple: We wanted a saw with at least a 1½-hp motor that would take a 10-in. blade and that cost less than $1,000. When manufacturers offered more than one model in this category, we left it to them to choose which one to send. Once the saws arrived, they were unpacked and assembled in our shop, checked thoroughly, and then put to work. Details about each saw appear in the summary boxes on the following pages.

It's fair to say that the tablesaws look very much alike; some of them are nearly identical. All of the saws rest on stands made of sheet steel of about the same gauge. Tables are of about the same size. With the exception of the Ryobi, motors are mounted on a pivoting frame at the back of the saw cabinet and deliver power to the saw arbor by a single belt. Motors (except for the Ryobi) were listed at 1½ hp.

So where are the differences between these saws? Mostly in the details, not in the overall design or construction. Features like blade and belt guards, miter gauges, and rip fences varied slightly from saw to saw. Coming up with an overall assessment of these tablesaws really amounted to adding up a long list of small things.

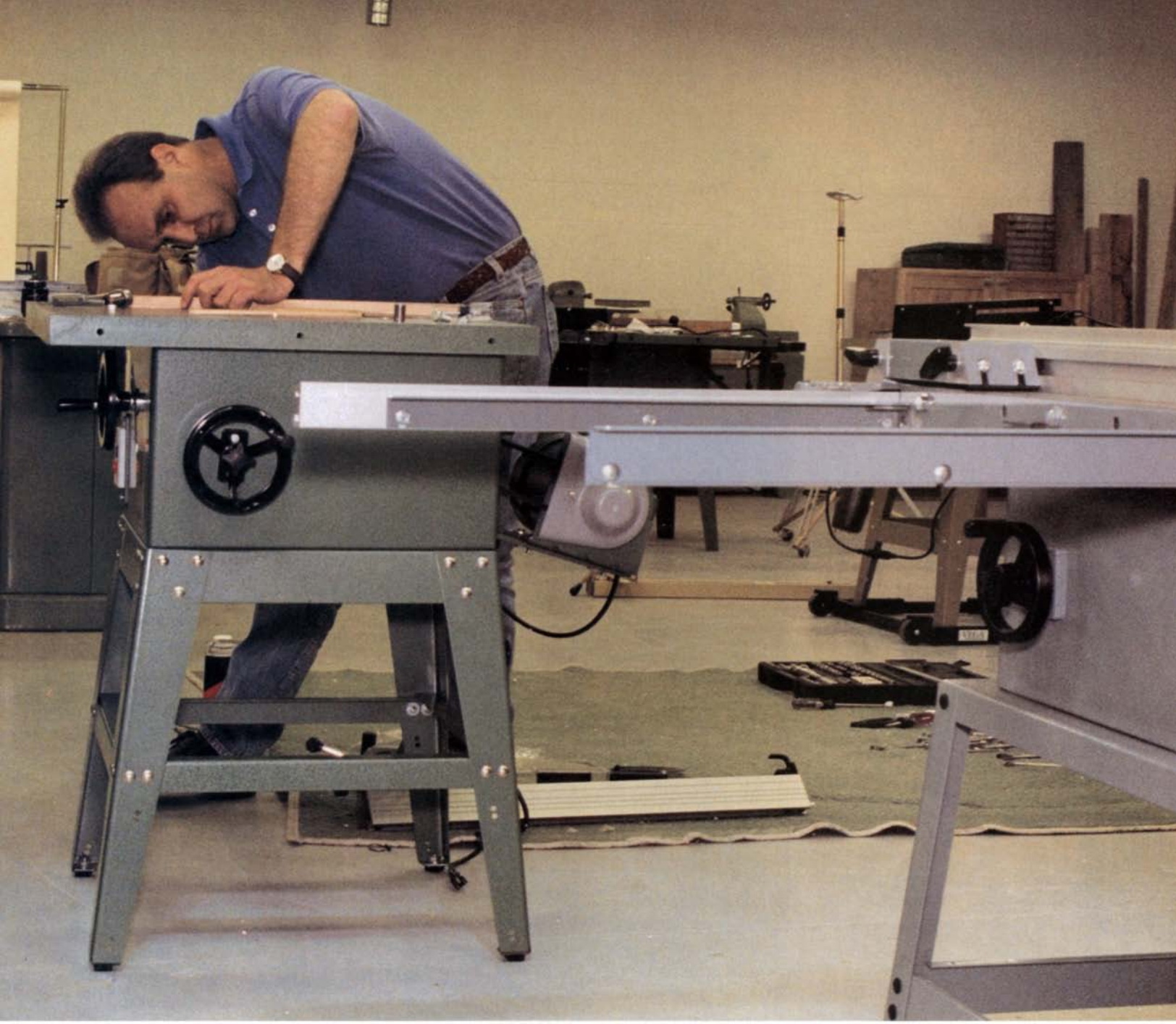
Assembly instructions: Read them carefully

The saws may look a lot alike, but as associate editor William Duckworth discovered when he assembled the saws, differences became apparent as soon as the shipping cartons were opened (see the photo at right). Assembly instructions ranged from very good to annoyingly obtuse. Some manuals were well-illustrated; others used photos and drawings that did not match the text, making it difficult to understand exactly what the manufacturers had in mind. In one instance, printed wiring instructions didn't correspond to the diagram stamped right on the motor.

Most manufacturers appeared careful to pack all the parts and hardware needed for assembly. A few did not. Judging from the saw we received from Powermatic, for instance, you might have to make a trip to the hardware store for bolts and screws the company neglected to include.

These issues may not bear directly on how well a tablesaw runs once it's been set up, but they are the buyer's first introduction to a new tablesaw. When we encountered saws that had been poorly packed or were accompanied by foggy instruction manuals, we wondered how far this inattention to detail extended. When a new tool was carefully packed and accompanied by all the required nuts and bolts, we felt the manufacturer had made an effort to get the buyer off on the right foot.

Once you've purchased a saw, we would suggest going through the packing and assembly lists carefully and writing down everything that may be missing. That may seem like a pain in the neck, but our experience suggests it's worthwhile. You won't need anything special to assemble the saws: a set of wrenches (metric sizes may be required for some of them), screwdrivers and a combination square. A ratchet will speed things considerably. The Jet manual advises getting assistance for some



steps in the assembly, which is good advice that would apply to all these saws.

Table extension wings: stamped or cast

Table sizes are about the same (the Ryobi excepted), but extension wings come in two varieties: stamped sheet steel or a sort of cast-iron grid. Stamped steel extensions are sturdy enough, but they aren't nearly as stiff as the cast versions. One editor wondered whether small offcuts could get jammed in the cast grid. That didn't happen with the limited use we gave these saws.

When measured with a straightedge and a set of feeler gauges, the tables of these saws showed varying degrees of flatness. The most variation we found over 24 in. was .040 in. on the Ryobi and the least was .010 on the Grizzly. But all of the tables seemed flat enough for general woodworking. Although the finish on some cast tables was better than on others, this appears to be more of a cosmetic consideration than a functional one.

At least one of the manufacturers, Jet, offers cast extension wings as an option. If you have a definite preference for either a stamped or cast extension, the differences may help you choose from one of the many models available. But in practice, it isn't much of a factor in performance.

Blade guards and miter gauges

Company lawyers may feel better if tablesaws come equipped with combination blade guards and splitters, but we didn't. Though the intent is admirable, guards can be a weak point in an otherwise good design. Most are flimsy affairs, and some (like those on the Delta and Powermatic) get in the way during a blade change; they don't swing up and out of the way. The guards generally obscure a good view of the work.

The splitter/guards (except for Ryobi's)

Photos: Scott Gibson

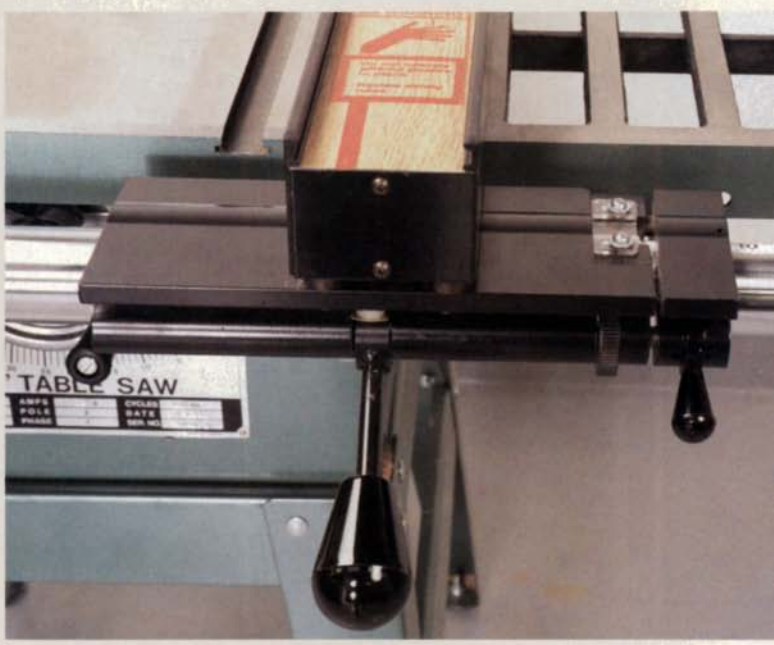
Bridgewood #TSC-10C

Average price	$490 (without fence)
Warranty	1 year
Fence tested	Vega U26
Other compatible fences	Biesemeyer (home shop, commercial), Delta Unifence, Excalibur, Vega (utility, professional, commercial)
Motor hp / amps	1½ hp / 14.2 amps
Maximum depth of cut	3 in. @ 0° 2 3/16 in. @45°
Maximum rip with fence provided	26¼ in.
Table height	34¾ in.
Runout at arbor flange	.0005 in.
Runout at miter gauge to sawblade	.017 in.
Dust-collection panel	Yes
Decibel level at ear height	84 dB
Switch	Magnetic

■ The owner's manual included drawings and photos of a saw that did not match the one we received. There were some problems getting the saw up and running. This saw comes with a 14.2-amp Marathon, fan-cooled, thermally protected motor that we had to wire to the magnetic switch. The motor is packaged well in a box, along with a printed wiring diagram different from the one on the motor's label. We followed the label on the motor first, and the blade ran backward. The printed diagram makes no mention of what to do with the white wire on the cord, but we took a guess and rewired it; the motor ran correctly. It also ran quietly, 84 dB, and smoothly.

The rough casting on the table insert had to be ground down before the insert would fit into the throat opening. The runout of the arbor flange was very good (.0005 in.), but the runout from the miter-gauge slot to the blade was .017 in. Raising and lowering the blade and changing angle settings were smooth, easy operations.

The Vega fence comes with installation instructions that are confusing and hard to follow. We had to buy new hardware to install it. Setting the fence square to the blade took some time. The fence has one annoying tendency: It lifts up at the far end as the lever is tightened at the front rail. Otherwise, this is a really nice fence. It sits dead square to the table.



***Precision adjustments**—By using the unique micro-adjust feature on the Vega fence that comes with the Bridgewood saw, it was easy to move the fence precisely in very small increments.*

are attached at two points, behind and inside the saw cabinet. They can be adjusted (with difficulty in some cases) so they are in line with the blade, but plan to do some tinkering. All but one of the saws, the Powermatic, had a see-through plastic guard with attached anti-kickback pawls. The Powermatic design uses slotted metal guards that retract out of the way as work is pushed through the saw (the wings on each side of the blade move independently). Although safety equipment like tablesaw guards are important in preventing potentially crippling injuries, awkward or cumbersome guards are quickly ushered into a corner of the shop where they gather dust. Blade guards that are better designed would encourage wider use.

Miter gauges all came with a small washer on one end of the bar that locks the gauge into a T-shaped groove in the table. This helps to keep the gauge in place when crosscutting wide stock. The gauges were similar. There were differences, however, in how well they were machined and how they fit in the slots, giving clues to overall attention to detail and quality of construction. Delta and Jet miter gauges, for instance, were carefully machined and fit snugly. Miter gauges for the Powermatic and Grizzly saws showed more side-to-side slop, although this could easily be corrected with a center punch and hammer.

Delta #36-440

Average price	$835
Warranty	2 years
Fence tested	Delta Precision Saw Guide
Other compatible fences	Biesemeyer (home shop, commercial), Jet-Lock, Unifence
Motor hp / amps	1½ hp / 12.8 amps
Maximum depth of cut	3¼ in. @ 0° 2¼ in. @45°
Maximum rip with fence provided	29 in.
Table height	34½ in.
Runout at arbor flange	.001 in.
Runout at miter gauge to sawblade	.003 in.
Dust-collection panel	No
Decibel level at ear height	80 dB
Switch	Toggle

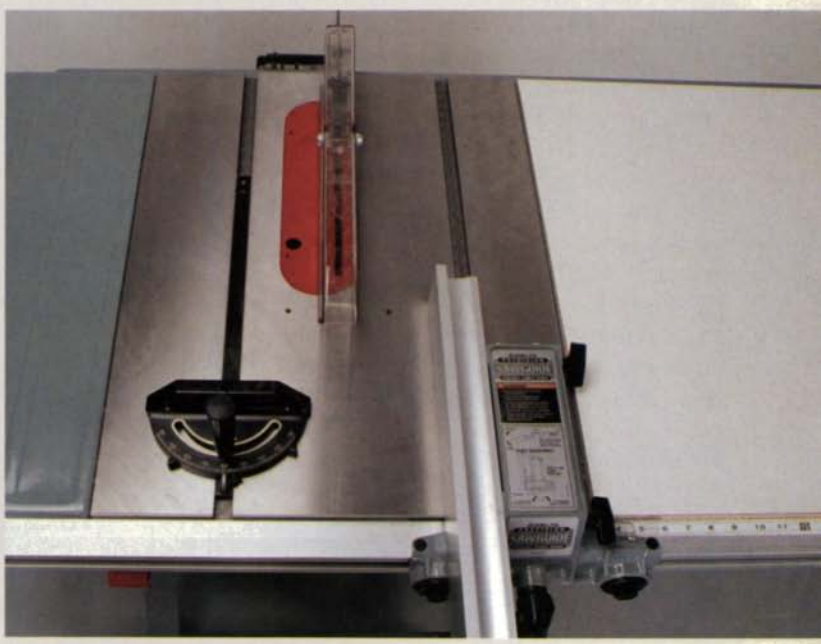
■ With the exception of the splitter and blade guard, assembling the Delta machine was easier than it was for many of the others. Parts list for the saw and fence is complete, and the instruction manual is full of good quality photos that illustrate the text. (One exception here are the photos showing the standard Jet-Lock rip fence, not the Precision Saw Guide that came with the machine.)

The mechanisms to raise and lower the blade and to change the angle setting worked smoothly. Adjusting the 45° and 0° blade stops are a cinch with the Allen screws on the top of the table.

You get two wrenches to install a blade on the arbor, which minimize the risk of cut fingers. But changing a blade was very difficult because the blade guard does not fold out of the way. Threads on the arbor nut were enough out of whack that the nut did not sit flat to the flange that clenches the blade.

The large switch mounted at the front of the saw is a big plus—easily accessible and safer because of its size and location. At 80 dB, this was the quietest saw of the lot. The 1½-hp motor rated at 12.8 amps cut 2-in. oak more easily than some of us expected.

The Precision Saw Guide fence was easy to install. It can be used on either side of the blade by moving the extruded aluminum fence from one side of the fence body to another. Also, by moving the aluminum fence back on the body, it works well as a stop block for crosscut pieces.



Versatile fence design—*The fence can be shifted toward the front of the table and used to index repetitive crosscuts of small pieces, a welcome feature.*

Check factory settings carefully

Just how well a tablesaw performs depends in part on how accurately the machine has been set up—either at the factory or by the owner.

We checked a number of settings after the saws had been assembled, including whether there was wobble (or runout) in the arbor flange where the blade is tightened; whether the miter-gauge slots and fence were parallel to the blade; whether the face of the fence was square to the table; and whether the bevel angle stops of 0° and 45° (sawblade to table) had been set accurately at the factory. With one important exception, adjustments for these settings should be easy to make.

We measured runout on the arbor flanges with a dial caliper fixed to the table. There was little runout on any of them, meaning that blades should run true. This is important because even small problems at the arbor flange get translated into much bigger problems at the rim of the blade. More important, runout is built into the machine. It can't be fixed in your own shop.

Adjusting the 0° and 45° stops for the blade is basically the same among the machines. A bolt with a locknut threaded into the saw's trunnion stops travel at the right spot. The arrangement works. However, access to make adjustments isn't easy. The only notable difference is the Delta table-

Grizzly #G1022Z

Average price	$425
Warranty	1 year
Fence tested	Grizzly
Other compatible fences	Shop Fox
Motor hp / amps	1½ hp / 16 amps
Maximum depth of cut	3⅝ in. @ 0° 2⅝ in. @45°
Maximum rip with fence provided	25 in.
Table height	36¾ in.
Runout at arbor flange	.0005 in.
Runout at miter gauge to sawblade	.003 in.
Dust-collection panel	No
Decibel level at ear height	90 dB
Switch	Push button

■ The people at Grizzly get high marks for putting together an instruction manual that is clearly written, easy to follow and illustrated with good photos that show you what you need to see. The motor had to be wired to the switch with simple connections that are clearly spelled out.

The machine ran loudly, 90 dB, and vibrated heavily, which may have been caused in part by a faulty belt. When one of the editors switched belts from another machine, it seemed to run with less vibration.

Some of the edges on the cast tabletop were very sharp. The blade setting from the factory was dead square. The runout at the arbor flange was very good. The 3¾-in. opening for the table insert, like the Delta's, is a bit wider than those on the other saws, making it a little easier to change the blade. The mechanism to raise and lower the blade was stiff, but changing the angle setting was fairly easy.

None of us like the fence design, based on Delta's old Jet-Lock fence. It will cut on both sides of the blade, but it doesn't sit square to the table. And it easily goes out of square to the blade. The table on the Grizzly was the flattest of all the saws.

This saw had no trouble cutting 1-in. poplar, but we blew a circuit breaker twice while cutting the 2-in. red oak.

Specify a more up-to-date fence. *The Grizzly saw comes with an old-style fence apparently modeled on Delta's Jet-Lock design. It's not nearly as versatile as other options.*

saw. Allen-head screws set in the tabletop provide fast, painless adjustments.

Rip fences are vital to tablesaw performance

Using a tablesaw with a poorly designed fence is something like driving a car with a flat tire: It can be done, but you'll sure wish you didn't have to. A good fence is easy to move from side to side, comes up parallel to the blade each time it's reset, and deflects very little when a piece of lumber is pushed against it. The fences that came with these saws were generally able to do all of these things. Most of these rip fences represent big improvements over what used to be available, and most of the manufacturers offer quite a choice in fences and rail lengths. For this survey, we evaluated the fences that were provided with the saws, but more than likely, you'll have a choice when you buy one.

Some of the fences were not square to the table when we finished assembling them, but they could be brought into adjustment with some tinkering. That should be a one-time fix. All of them moved easily along the table, snugged down nicely and didn't deflect too much under a load.

The most innovative fence in the lot seemed to be on the Delta saw, and the most dated design on the Grizzly. Fences on the other saws were somewhere in between. The Vega Utility fence that came on the Bridgewood saw had an annoying tendency to rear up when the lock handle

Jet #JWTS-10JF

Average price	$529 (without fence)
Warranty	2 years
Fence tested	Xacta Homeshop
Other compatible fences	Jetfence
Motor hp / amps	1½ hp / 18 amps
Maximum depth of cut	3¼ in. @ 0° 2⅜ in. @45°
Maximum rip with fence provided	52 in.
Table height	34⅛ in.
Runout at arbor flange	.001 in.
Runout at miter gauge to sawblade	.001 in.
Dust-collection panel	Yes
Decibel level at ear height	84 dB
Switch	Push button

■ Like Delta and Ryobi, Jet offers a two-year warranty on this equipment. The machine comes packed with a runout inspection record from the factory. Our own measurements confirmed a well-tuned machine—only .001 in. runout for both the arbor flange and the miter gauge to the blade. The blade setting from the factory was also dead square to the table.

Raising and lowering the blade and changing the angle setting on this saw was perhaps the smoothest of the bunch. Changing the blade is a pain because the cast tabs that support the throat plate are close to the arbor and protrude into the space where your hand needs to be to get at the arbor nut. The arbor nut was thicker than any of the others and well-machined.

The motor, rated at 18 amps, cut 2-in. oak as well as or better than all of these saws. This saw ran smoothly and relatively quietly, 84 dB, compared to the others in this review. A large switch, mounted up near the front rail, is easy to get at and safer in an emergency (see the photo above). Some of us would prefer the cast-iron table wings to the stamped sheet steel ones that come with this model. Jet offers them in one of five variations of this saw. The Xacta Homeshop fence—what looks like a knockoff of a Biesemeyer—is easy to install and can be used on either side of the blade.

Slippery fence reduces friction. *The polyethylene faces on the Xacta fence may be replaced when worn.*

was pushed down, but the fence also has a clever micro-adjust feature. Powermatic and Jet fences are virtually identical (Biesemeyer and Biesemeyer clone respectively). They are solid fences that lock on only one rail and pop right off the saw when you don't need them. They are, however, more difficult to adjust in very small increments than some of the others. The Jet fence has slippery plastic faces on each side, which reduce friction. See the summary boxes for more details.

Performance: Well, it can be slow

To get an idea of how these saws performed, we jointed and planed 2-in.-thick red oak and 1-in. poplar and then ran both through each saw. We used the same blade on each saw, a brand new Ridge combination blade. None of the saws had any trouble with the poplar, as you'd expect. And all of them cut the oak—as long as the feed rate was slow. Our conclusion was that any of these saws will handle 8/4 material, but none would be the right choice if you plan to cut thicker stock regularly. There just isn't enough power in any of them for this kind of service.

All the motors except the Ryobi are rated at 1½ hp. We ran all the saws at 115v, although some of them could be rewired to 230v. According to the manufacturers, motors draw varying amounts of current, from a low of 12.8 amps for the Delta to a high of 18 amps for both the Powermatic and the Jet. Without introducing some subjectivity, it's impossible to say which cut the best,

Powermatic #64 Artisan

Average price	$749
Warranty	1 year
Fence tested	Biesemeyer Home Shop
Other compatible fences	Accu-fence, Vega
Motor hp / amps	1½ hp / 18 amps
Maximum depth of cut	3¼ in. @ 0° 2¼ in. @45°
Maximum rip with fence provided	29 in.
Table height	34¾ in.
Runout at arbor flange	.0005 in.
Runout at miter gauge to sawblade	.005 in.
Dust-collection panel	Yes
Decibel level at ear height	88 dB
Switch	Toggle

■ This is not a left-tilting sawblade like the well-known Powermatic #66 machine, and it is a far cry from the level of quality we've come to expect in Powermatic's more industrial-level equipment. Problems became evident during assembly. Drawings in the instruction manual showed insufficient detail or simply didn't match the actual parts of the machine we received. Allen screws that secure the motor mount to the trunnion assembly were missing. The Biesemeyer fence did not come with any instructions, the hardware for mounting the front rail was the wrong size, and the holes drilled in the back rail did not line up with those drilled in the tabletop.

The mechanism to change the angle was fairly smooth, but the action to raise and lower the blade was very stiff. Also, roll pins that are designed to keep a lowered blade from going too far were missing from the trunnion assembly—a condition that would allow a moving blade on this saw to strike the cast-iron trunnion if it were retracted all the way. The heavy-duty, all-metal blade guard does not fold out of the way, making it very difficult to change the blade. This saw vibrated heavily when we turned it on. The noise level rating, 88 dB, was in the mid-range of all the machines we tested. Powermatic offers a choice of three fences—all for the same price.

Blade guard is in the way. *The Powermatic blade guard design, like those on some of the other saws, makes blade changes frustrating: The guard simply won't move out of the way.*

but motors with the higher amp ratings didn't necessarily make cutting easier.

Ryobi is the only saw in the lot with a universal motor, the same type of motor you'll find on your router. The other tablesaws come with induction motors, a much more typical choice for a tool like a tablesaw. Although Ryobi's motor is rated at 15 amps, higher than some of the induction motors, we thought that it struggled more than the other saws. Ryobi does not list a horsepower rating on the motor.

Some saws were quieter than others, and some seemed to vibrate less while they were running. Delta's saw was the quietest of the bunch; the Ryobi made more noise than any of them. Although there's no precise way of measuring vibration, the Delta, Bridgewood and Jet tablesaws seemed to be the smoothest.

Price is a factor

As you might expect, opinion among the *Fine Woodworking* editors who used these saws wasn't unanimous. Some of the differences between the saws were very small, and personal preference would certainly play a part in choosing one brand over another. It's also worth mentioning that we looked at a single saw from each manufacturer, and we had the saws in the shop for a matter of weeks, not months, so our impressions are based on limited exposure. Still, we agreed on a few points.

First, the Ryobi. We found the design innovative and flexible. The sliding table is a

Ryobi #BT3000

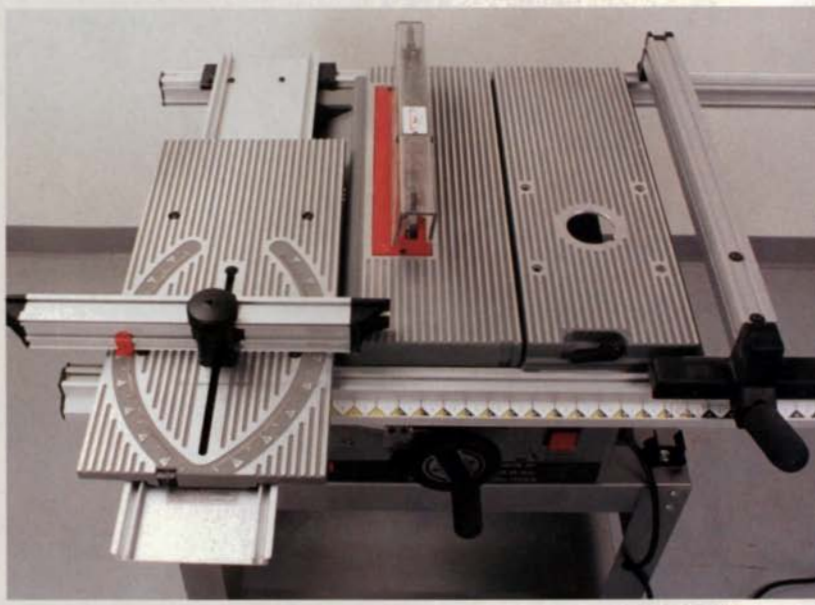
Average price	$498
Warranty	2 years
Fence tested	Ryobi
Other compatible fences	None
Motor hp / amps	Not rated / 15 amps
Maximum depth of cut	3⅝ in. @ 0° 2⅝ in. @45°
Maximum rip with fence provided	29½ in.
Table height	37¼ in.
Runout at arbor flange	.001 in.
Runout at miter gauge to sawblade	.020 in.
Dust-collection panel	Yes
Decibel level at ear height	93 dB
Switch	Push button

■ This sturdy little saw has everything but power. The universal motor, rated at 15 amps, drives the blade at 4,800 rpm—not the usual 3,450—which could account for the loud whine. Our sound meter read this one at 93 dB.

This saw is like a better mouse trap: A great deal of thought went into its design. Standard features include a sliding miter table with an adjustable fence and a built-in angle scale, an accessory table for mounting a router, a small but rugged rip fence, a built-in electrical plug for a router and the best splitter and blade guard of all the saws we looked at. You can also get all kinds of accessories: a dust bag, a quick-fold table for outfeed support, a table extension to increase the usable work surface, a miter clamp and an air flotation/vacuum clamp system for working with large panels.

A full 3⅝ in. of the blade is available for the depth of cut at 0°. You can move the sliding table or the accessory table from one side of the blade to the other, but you'll have to tweak the alignment to the blade every time you do. Rubber pads and levelers hold this saw firmly on the floor.

The throat plate opening is only 2⅞ in. wide, and the plate is screwed into the table with three screws, so changing the sawblade is difficult.



Ryobi's design is different. *A sliding table and router-table insert make this saw versatile, although its many adjustments will need frequent checking for accuracy.*

strong point, and the saw looks like it would be an excellent job-site or light-duty hobbyist tool. But there are lots of adjustments to get out of whack, and the relatively small motor is a concern.

The Powermatic and Delta tablesaws are the most expensive of the group. For that money, we think Powermatic needs to pay more attention to details. The Delta seems like a well-made machine; it ran quietly and smoothly. Its fence was the most versatile one that we surveyed.

The Grizzly has the lowest price. Its standard fence is not a strong point, though. The saw was both noisy and somewhat prone to vibration, something that probably would be improved with a better belt. Both the Jet and Bridgewood saws ran quietly and smoothly. The Jet is somewhat more expensive than the Bridgewood, but we liked its fence better. Jet also offers a two-year guarantee. We thought it was the best value in the group.

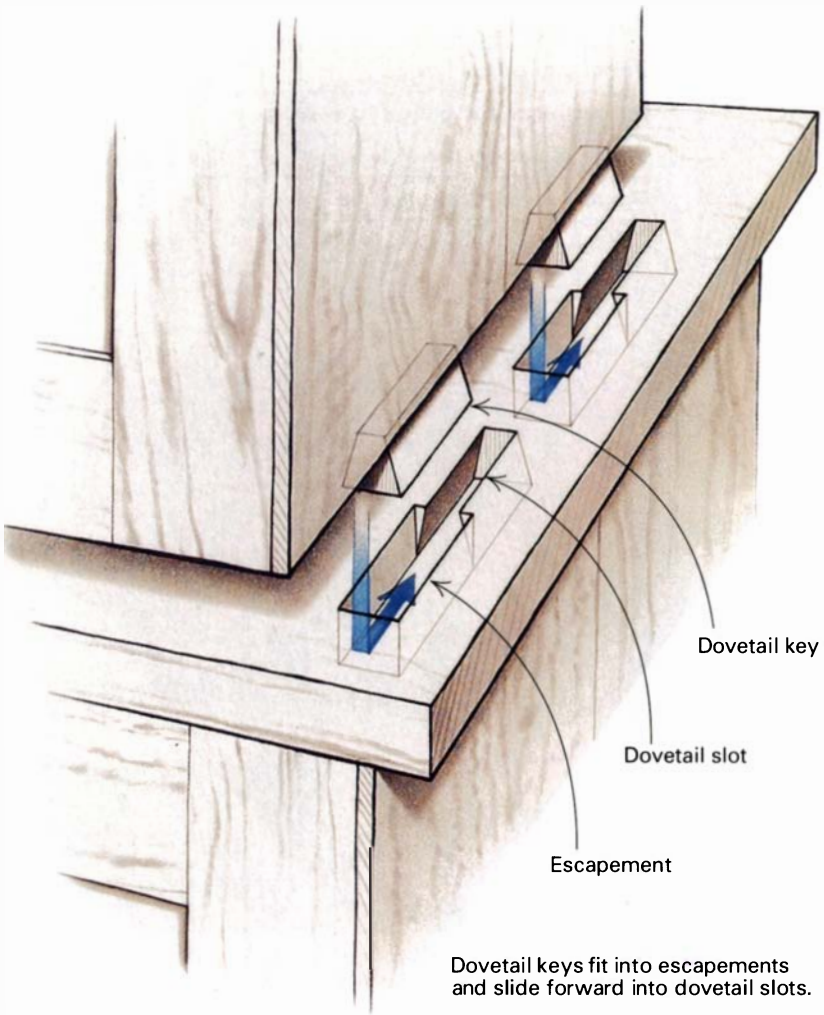
Of course, there's no substitute for trying the saws yourself. And more than one editor pointed out that the same money you'd spend on one of the more expensive saws in this group might pay for a used saw with a bigger motor and heavier cabinet. That may not be an attractive option for everyone (no factory warranty, for instance), but it may be an idea worth considering. □

This article was researched by the editors of Fine Woodworking *and written by William Duckworth and Scott Gibson.*

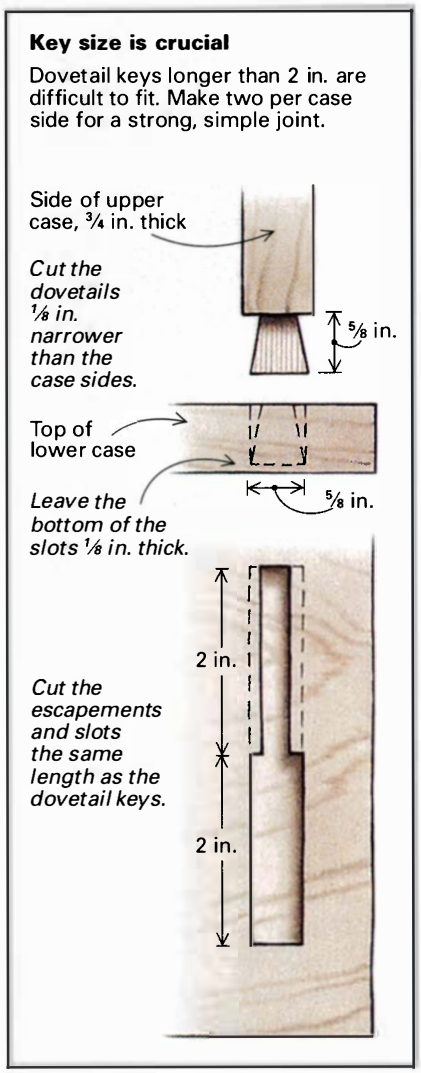
Housed Sliding Dovetails

A strong, hidden joint that's ideal for large cabinets

by Tony Konovaloff



Dovetail keys fit into escapements and slide forward into dovetail slots.



My shop is quite small. There is just enough room for a bench, a tool box and a place to stand and work. I like it that way. My tools are always within easy reach and are hard to misplace. And the shop doesn't require much heat in the winter. But there's one problem: Large cabinets don't leave much room to work. Even desks take up all the available floor space. And to work on large china cabinets, I have to take down the ceiling lights.

Having a small shop doesn't keep me from making large cabinets. However, I do make a lot of knockdown joints to keep big pieces of furniture manageable.

There are endless ways to connect large case pieces, but most knockdown designs I've seen are lacking in one way or another. Some are weak; others require clunky or expensive hardware. Sliding dovetails are an option, but they show at the back of the case, and they tend to bind.

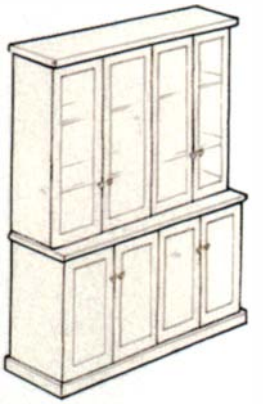
To solve some of these problems, I devised a strong connection using housed sliding dovetails (see the drawing above). I cut small dovetail keys on the bottom of the sides of the upper case and dovetail slots with escapements on the top of the lower case. The keys fit down into the escapements and then slide forward into the slots, locking the cases together and eliminating the need for hardware. And nothing shows in the front or back when the cases are assembled.

The joint holds upper and lower cases tightly together but knocks down smoothly and easily without binding. It doesn't require special tools to make or very much time. But to make sure that you understand

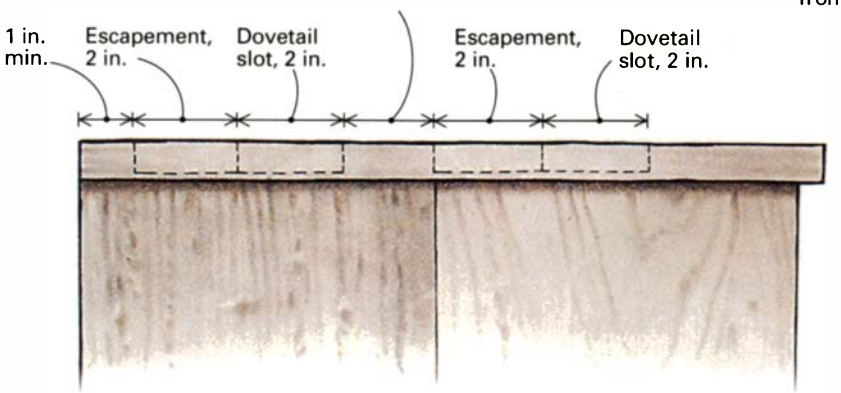
Drawings: Michael Gellatly

Large cases joined securely

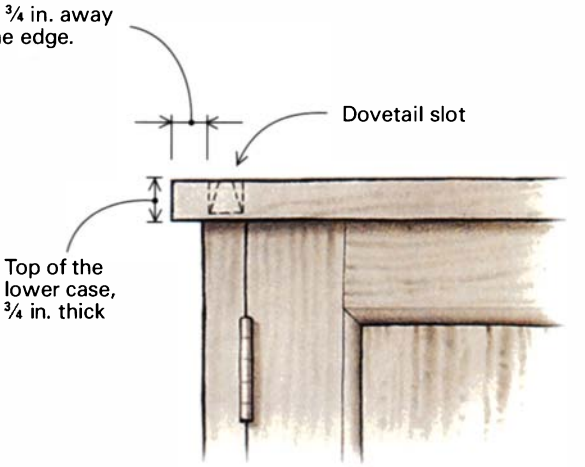
Housed sliding dovetails will keep upper and lower cases of the largest cabinets snugly together.



Space the slots and escapements far enough apart to leave room for an inch or more of solid wood.



Make upper case at least 1½ in. narrower than lower case top so that dovetail slots are at least ¾ in. away from the edge.



***After cutting a dovetail** the full width of the upper case side, cope out the dovetail keys (left), and then clean up the shoulder with a chisel (right). Pare carefully: The line of the finished joint depends on the flatness of the shoulder.*

what's going on with the joinery, it's a good idea to work up a practice piece.

Cut the dovetails first

Before gluing up the top half of the case, I cut the dovetails on the bottoms of the case sides. There are many ways to do this. I use a dovetail plane, but a router and jig would work as well.

Next I cut out sections of the dovetails to leave two keys, each about 2 in. long (see the photos above). The proportions of the keys depend on the thickness of the stock you use. Generally, I cut them ⅛ in. narrower than the case sides and ⅛ in. shorter than the thickness of the top of the bottom case (see the drawing detail on p. 62). Their placement is important. They must be far enough apart so they don't interfere with each other. If the dovetails are 2 in. long, the escapements and slots must each be 2 in. long. To maintain strength, each slot and escapement pair should be at least an inch apart. This means that 2-in. dovetails must be spaced at least 3 in. apart, and the front of the rear dovetail must be 3 in. from the back of the upper case.

After I cut the keys to length, I complete the upper case. It's important to remember that the shoulders of the dovetail keys rest on the top of the lower case. Only the keys should extend below the line of the shoulders; otherwise, the upper case will not sit evenly on the lower case, and the joint will not function properly.

***Mark the dovetail slots first.** The locations for dovetail slots in the top of the lower cabinet are marked directly from the dovetailed keys.*

***Layout the escapements** using the dovetail slots as a guide. When you cut the joints, remember that the escapements are at the back of the cabinet.*

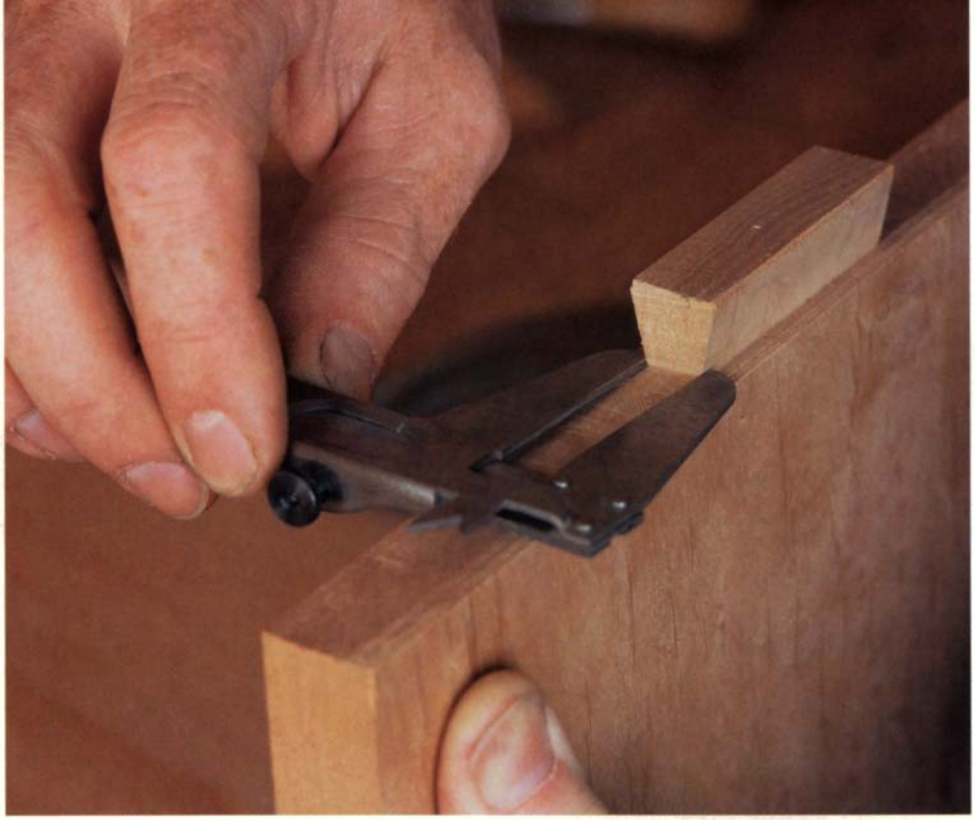
Lay out the dovetail slots and escapements

Once the upper case has been glued and assembled, I can lay out the escapements and dovetail slots on the top of the lower case. I start by placing the upper case onto the lower case and marking the front, back and sides of each slot and escapement. To determine the width of the top of the dovetail slots, I transfer the measurement from the dovetails themselves with vernier calipers (see the top photos on the facing page). It is important that the upper case be assembled: It's the only way to be absolutely sure the slots will be in the right place. However, this isn't necessary when making a practice piece.

Cut the escapements before the dovetail slots

I remove the bulk of the waste from the escapements with a brace and bit and pare to the lines with a chisel. I cut them just slightly deeper than the dovetails are tall. You don't need to leave as much stock in the bottom of the escapements as you would for a sliding dovetail, just enough to keep them solid. I leave about ⅛ in. of material

Photos: Vincent Laurence



Don't measure, transfer. *The tops of the dovetails and slots should be the same width. Find the width with a vernier caliper (left), and then mark it in the middle of the slot (above).*

Carefully pare the slot walls *(right). Cut a little at a time, and test the fit frequently. Pay attention to the angle. It's easy to wander from it.*

Just pull back, and lift out *(below). The housed sliding dovetail requires no contortions to take apart, even though it is very solid when assembled.*

at the bottom of each. I test-fit the dovetails in the escapements before I cut the dovetail slots. The dovetails should just slip into the escapements with no extra room front or back. The shoulders of the dovetails, not the bottoms of the escapements, hold the weight of the upper case.

Fit the slots to the dovetails

I cut the slots slightly undersized and then pare them to fit the dovetails bit by bit. I work slowly, keeping an eye on the angle and the marked lines. The hard part is that you can't really see what you are trying to fit. Don't try to get it all at once (see the center right photo).

Fitting the first ¼ in. or so of each dovetail makes a good reference for cutting the rest of the slots. The finished joint should feel snug, neither binding nor loose. Putting it together and taking it apart shouldn't take a mallet or Herculean strength.

After you've finished the joint, apply a good coat of paste wax to all parts of the dovetails and slots. The wax helps the joint work smoothly. You now have a hidden, stable and graceful knockdown connection for a two-piece cabinet. □

Tony Konovaloff is a professional furnituremaker in Oak Harbor, Wash., and a yacht carpenter in a local boatyard.

My Kitchen Table

A knockdown design for a man on the move

by Tim Gilchrist

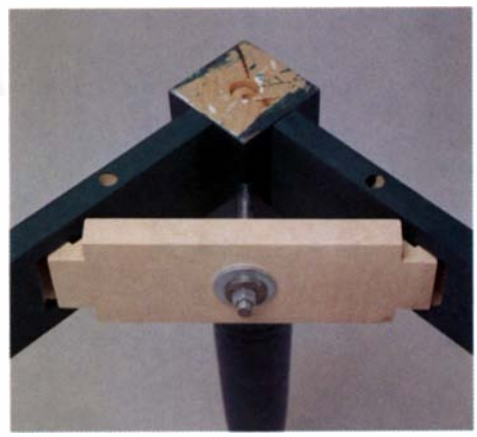
I built my first kitchen table a number of years ago when I was still in college. My intent was to create a stylish yet indestructible platform capable of withstanding all potential abuse. I also wanted a piece of furniture that I could take apart and move at the end of the school year. That solid red oak structure bears its battle scars well. The table could support seven full kegs of beer at once, withstand the deeds of careless roommates and then be taken apart and moved with ease.

Now that I have a real job, a house and drink beer out of bottles, I decided to build a new table. I wanted something more stylish but with the same stalwart presence and convenient mobility of my trusty red oak table. I spent some time in furniture stores looking at tables for design inspiration before I found a style I was happy with.

Let your lumber supplier do some of the work

I work in a really small basement space. The dominant feature of the workspace is a large cast-iron oil burner, so I don't have room for a lot of equipment. I do all my work on a Shopsmith combination tablesaw, bandsaw, lathe and drill press. Because I don't own a jointer or a planer, I buy most of my lumber already surfaced. It

Photos: William Duckworth



This table was made to be taken apart. *The author wanted sturdy and easily transportable furniture. A solid maple top and a knockdown design answered those needs.*

costs a little more, but I don't have any other choice, short of dressing it all by hand.

For this table, I chose 5/4 maple for the top and the apron, dressed to a full 1 in. thickness. For the turned legs, I got a good deal on some 8/4 Eastern white pine, clear as a winter's day. So I had it dressed to a finished 1¼ in. thickness and laminated each leg from three thicknesses for a full 3¾ in. dimension. I'd never turned pine before. With this job, I learned that you have to keep your turning tools extra sharp to cut the pine cleanly.

Knockdown joints

My job may require me to relocate from one coast to the other, so I wanted to be able to take this table apart easily for the move. I've seen the stamped metal corner braces held in with wing nuts on hanger bolts on a lot of mass-produced furniture, but they looked too flimsy for my taste. So I designed a wooden corner gusset that would do the same thing. The ends of all four gussets and all four apron pieces were cut into tenons. The gussets fit into mortises cut into the inside of the apron pieces. The apron tenons slip into regular blind mortises cut into the legs (see the drawing on p. 68).

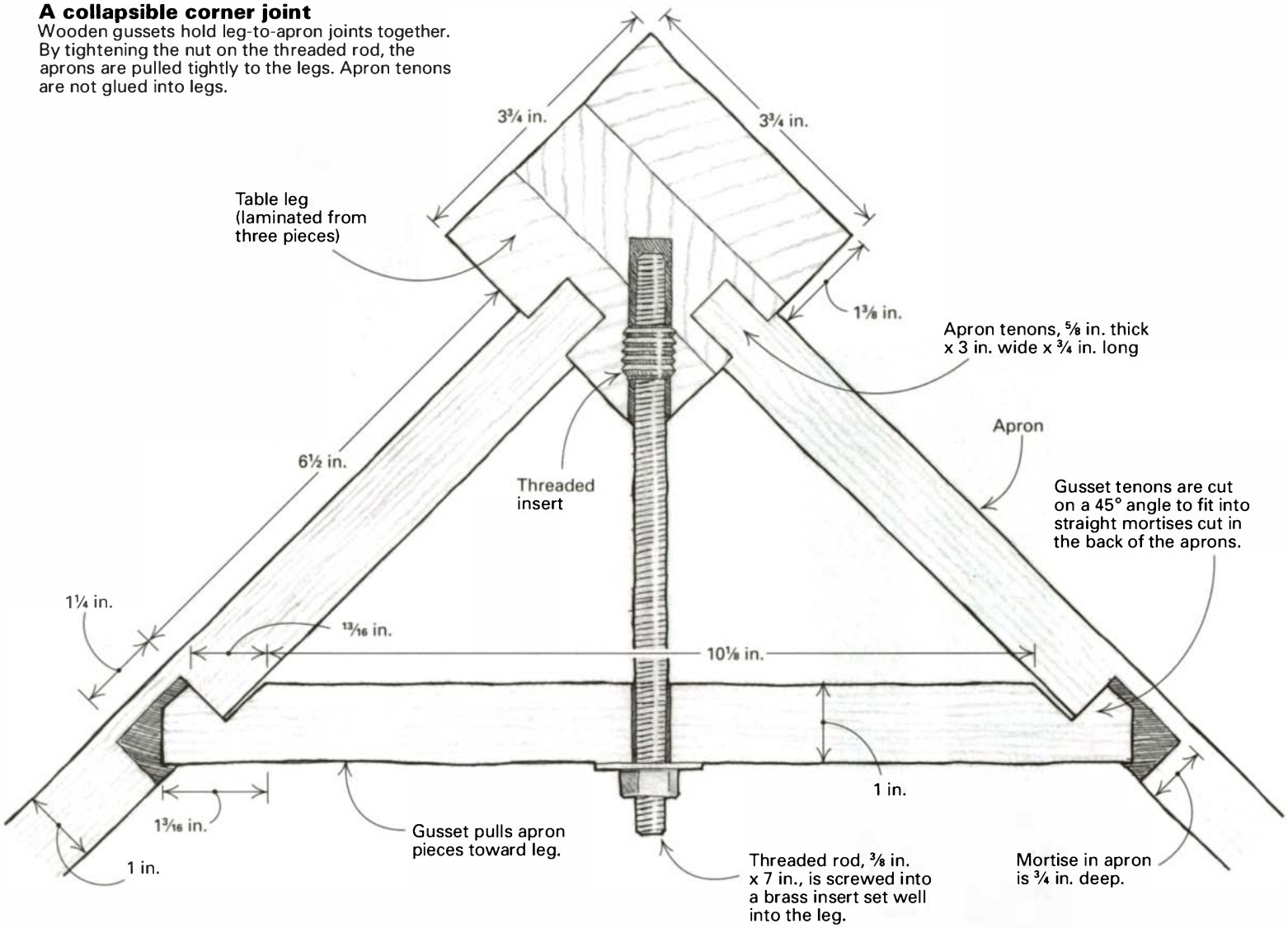
I cut all my mortises the same way, using the drill press. First I drilled a series of holes with a flat-bottomed bit, and then I cleaned them out by hand with a chisel (see the photo at right on p. 68).

I cut the tenons for the ends of the apron pieces with my miter gauge on the tablesaw, making all the necessary adjustments first on a scrap of the same thickness. I don't own a dado blade, so I just made a lot of repetitive cuts with a regular sawblade and cleaned up the tenons with a chisel.

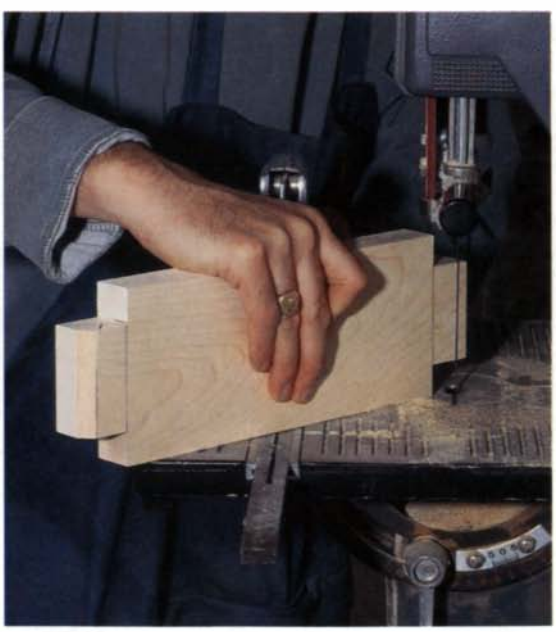
Tenons for the gussets were a little more complicated because the corners had to be cut on an angle. That way, the gussets draw the apron pieces tightly into the corner joint with the leg. I made all the cuts for the gusset tenons with the bandsaw. I started by marking all the corners with a pencil, using a combination square, and then cutting the tenons to shape with the gussets held flat on the saw table (see the photo at left on p. 68). After that, I turned each piece on edge and made the angled cuts for the tenons (see the center photo on p. 68).

In place of the hanger bolt on the stamped

A collapsible corner joint
Wooden gussets hold leg-to-apron joints together. By tightening the nut on the threaded rod, the aprons are pulled tightly to the legs. Apron tenons are not glued into legs.



Tenons for the gussets, *cut to size and shape with the bandsaw, pull the apron pieces tightly to the legs.*



Angles in the tenons*, marked in pencil, are cut freehand to the right profile. The gussets are held on edge to make the cuts.*

Gusset mortises*—After boring holes on the drill press, the author cleans out the mortises by hand.*

Drawing: Michael Pekovich

metal corner braces, I used a length of ⅜-in. threaded rod screwed into a brass threaded insert driven deep into the corner of each leg. I used the drill press to make the pilot hole for the threaded insert. Once I'd marked and drilled a hole for the threaded rod in the first gusset, I used that one as a master. I made a mark for the holes in the other gussets by placing them underneath the first one and twisting a brad-point bit through the existing hole.

Turned legs—copy the first one

The legs were turned from laminated blanks, 3¾ in. sq., cut to length at 28 in. Even in pine, this size was asking a lot of my little lathe, so I ripped some waste off the corners with the bandsaw before doing any turning. I made a jig to cradle the stock as I trimmed it on the bandsaw. The jig consists of several plywood scraps cut in a V-shape in the tops and held together with two lengths of ⅜-in. dowels.

Because of the length of these cuts, I clamped a scrap of wood over the bandsaw tabletop to serve as a temporary extension. That way, the jig could move in one even and continuous run. To indicate where to stop the cuts, I marked the tops of the legs with a pencil.

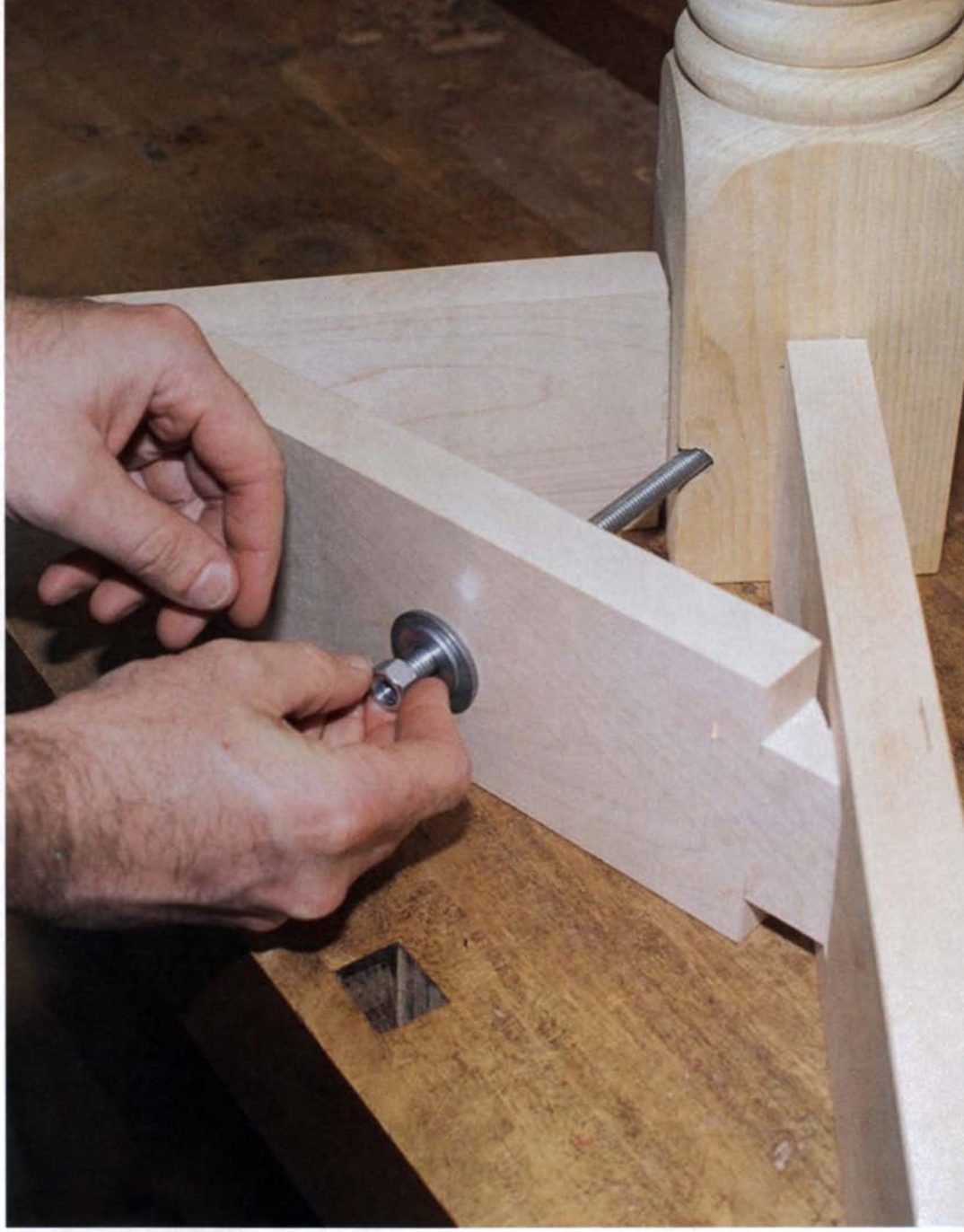
To give me a good idea of the profile, I laid out the turned shape in pencil on one edge of the first leg. Then I scribed pencil lines for all the reference points that defined the shape—grooves, beads and so forth. When I was happy with the way the leg looked once it was turned, it became the master for the others.

A solid top built to take abuse

Because of my limited shop space, I had to use the floor to lay out and mark all the pieces for the top. I used six boards ripped to three different widths to arrive at a finished width of 32 in. for the tabletop.

I usually work alone, and I don't own a biscuit machine. So when I have to join a lot of boards, I glue up one joint at a time—it's easier to maintain control over the results. Even then, with this top, there were several joints in which one board sat 1/32 in. or so proud of another. That didn't bother me. I planed those areas out by hand and sanded the surface to clean them up a little. A little gouge or a mark from a handplane can give character to a country-style design like this one.

To join the top to the apron, I drilled and countersunk pilot holes through the bottom edges of the apron pieces. After fitting the top in place, I marked for threaded inserts in the underside. The holes through the apron were drilled out larger than the screws that would hold the table in place, to make some room for the top to move.



***Sturdy knockdown connection**—A length of threaded rod is screwed into a threaded insert in the leg to provide a post for the gusset. When a nut is tightened against the outside face of the gusset, the table aprons are cinched tightly against the leg.*

Finishing up

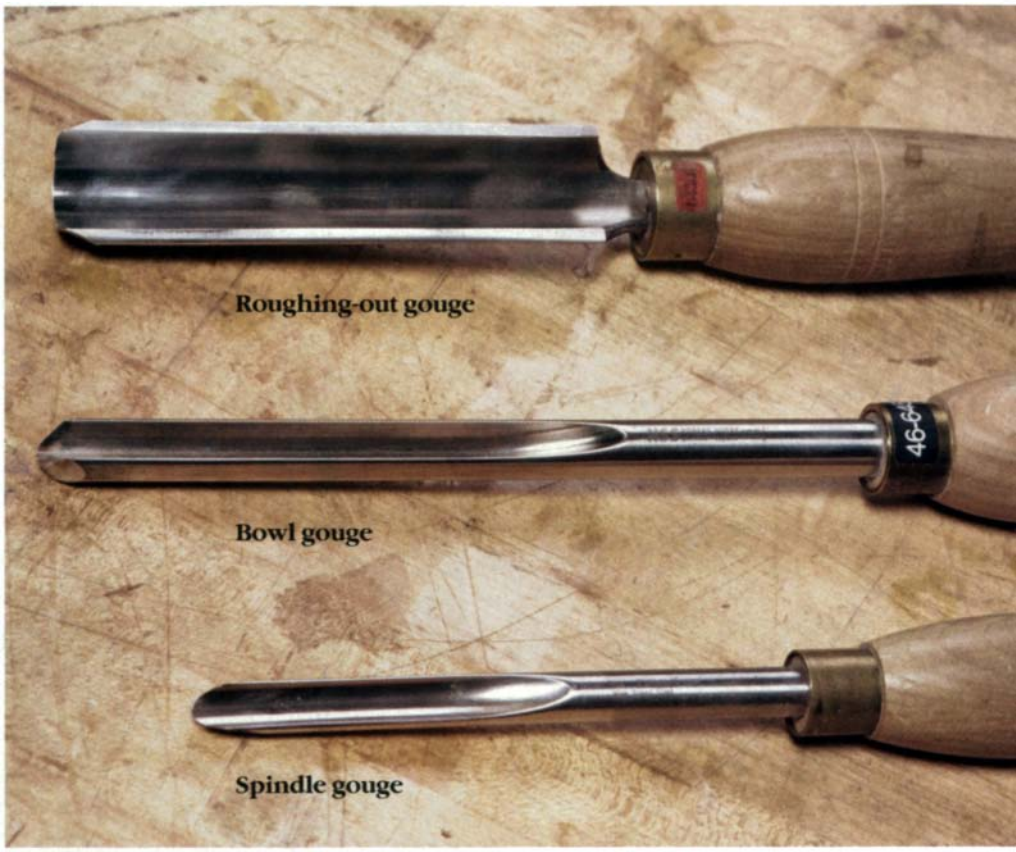
I chose to prime and paint the legs and the apron pieces with a good quality oil-based paint because I knew that it would stand up well to the rigors of daily use. I picked the hunter green color because it seemed to go so well with the clear maple top. For the top, I used several coats of Homer Formby's tung oil mixture. After about a week of drying time, I waxed the top for additional protection.

I was happy with the results—a rugged table I can take with me if I'm forced to make a career move—a table I can use to pay bills, fix odds and ends around the house, even prepare and eat food. As my college buddy from Memphis would say, "That dog can hunt." □

Tim Gilchrist works as a marketing consultant and builds furniture for fun in Simsbury, Conn.

Gouges for the Lathe

Selecting and sharpening spindle, bowl and roughing-out gouges



by Ernie Conover

I'll never forget King Heiple, the orthopedic surgeon who signed up for one of my turning classes a few years ago. When I called the class to gather 'round as I demonstrated a new technique, he was the student who was right by my side, carefully studying my every move. Then he would go over to his lathe and do what I did, except he did it better. Not many of us are blessed with the ability to master a new skill so quickly. But I have noticed that anyone who learns how to handle a gouge with aplomb will be far along the road to mastering turning itself.

Gouges can be divided into three categories: roughing-out, bowl and spindle (see the photo above). When viewed in cross section, all are U-shaped, but their similarities end there.

Roughing-out gouges are the biggest of the bunch. They're used to make square stock round (see the top photo on the facing page). Spindle gouges have the shallowest flutes. They're used for finely shaping the details on legs or posts (see the top photo on p. 72). Bowl gouges have the deepest flutes and are employed when shaping vessels in faceplate turning (see the top photo on p. 73).

Knowing a little about how gouges are made and what they're used for can help in deciding which types you need to add to your turning arsenal.

You'll need some tools and jigs to reshape and sharpen the gouges. Even premium tools leave the factory with a grind that's only a caricature of the proper shape. That problem has plagued turners for more than a century. J. Lukin wrote of spindle gouges in his book, *The Lathe & Its Uses,* published in 1868: "When purchased, they require grinding, the bevel being too short. It is essential that this tool have a long bevel. It is impossible to do good work with the standard form of the tool which is, nevertheless, of frequent occurrence in the workshops of amateurs."

The best gouges are made of high-speed steel

Gouges were first manufactured by forging and many are still made that way. High carbon steel is heated and hammered to the correct shape while hot. Premium gouges, made of high-speed steel, are machined into the proper shapes.

High carbon-steel tools—Only carbon is needed to make a good tool steel. But since the late 19th century, steelmakers have been adding other alloying ingredients, such as manganese, phosphorus, silicon, vanadium and nickel, to their steels to make them tougher and more abrasion-resistant.

The heat-treating process is just as important as the basic steel. Soft steel is hardened and then tempered. When it arrives from the mill, steel is about Rc31 (Rockwell hardness scale). Most cutting tools need to be much harder if they are to hold an edge.

Heat-treating begins with hardening. The freshly forged tool is brought to cherry red and then quenched in water or oil. This leaves the steel at full hardness, about Rc64 for high-carbon tool steels. The steel is then tempered in a process called drawing.

High-speed-steel tools—In 1868, steelmakers came up with high-speed steel (HSS) by alloying tungsten (and later large amounts of molybdenum) into their steels. Because HSS does not forge well, these gouges are usually machined from round bar stock.

High-speed steel does hold an edge longer than high-carbon steel, but its real virtue is that the turner no longer has to worry about overheating the tool during grinding. Temperatures above 430°F begin to draw the temper of high-carbon tools,

Photos: Anatole Burkin

Preparing spindle stock—*A roughing-out gouge makes quick work of rounding a square billet.*

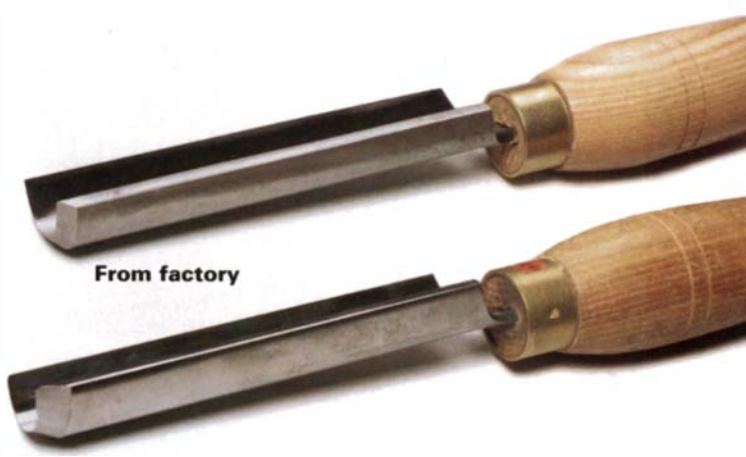
Grinding a roughing-out gouge—*The heel of a roughing-out gouge's handle rides in a Oneway pocket jig's rest set for a 30° bevel. The author spins the tool between his fingers and applies even pressure against the grindstone.*

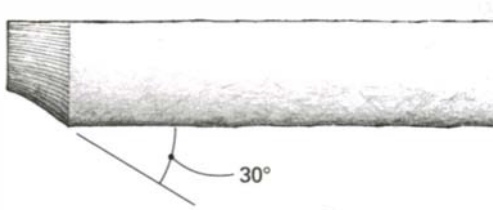
ROUGHING-OUT GOUGE

A roughing-out gouge can remove large amounts of material quickly. It's used for rounding billets and cutting cylinders and tapers. One roughing-out gouge will serve most needs; I recommend getting one that's between ¾ in. and 1¼ in. wide. Most high-speed-steel (HSS) roughing-out gouges come from the factory with square faces and medium bevels, about 45°. The tool works much better with a longer bevel of about 30° (see the drawing below).

To begin grinding, set up your jig. The Oneway pocket jig, which I favor, has a V-shaped pocket welded to a square bar that slides into a mating piece attached below the grinder. The distance from the pocket to the wheel determines the bevel angle. As the pocket moves toward the grinder, the bevel length increases and the angle decreases.

Set the roughing-out gouge's handle in the pocket, lower the cutting edge against the grindstone and roll the tool between your fingers for an even bevel (see the photo below). If you plan to use the roughing-out gouge to cut large coves, ease the edges of the corner bevels against the grindstone so that you won't catch the sharp edges against the workpiece.





A 30° bevel will yield better results.

but HSS tools can be turned red hot, up to about 1,800°, without loss of temper. That means you can use grinding wheels without a water bath. The cost of an HSS tool can be two to three times that of carbon steel, but it's well worth it.

Round is better—Most turners prefer a gouge made of round bar stock: The point of contact with the tool rest can be kept directly under the edge doing the cutting. Flatter tools have an oval-shaped bottom, and the contact point can be off to one side or the other, a less stable condition.

Combination gouges—Long, HSS gouges whose flutes are deeper than those on spindle gouges but shallower than those on bowl gouges have recently been introduced. The bevels on these gouges can be ground between 35° and 45° and will perform both faceplate or spindle work. However, these gouges do neither job as well as a dedicated gouge. Combination gouges cannot be ground to the really long bevel necessary for spindle work. Grinding a 30° side bevel creates a ragged burr on both

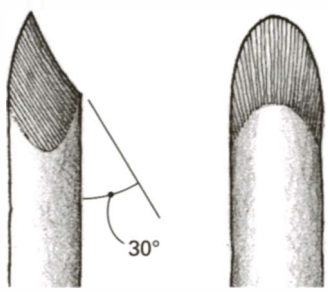
Drawings: Jim Richey

SPINDLE GOUGE

The best spindle gouges are made of high-speed-steel (HSS) round bar stock. They come from the factory with a very short bevel and a rather squarish profile at the tip, which makes it hard to get the point into tight quarters. I prefer to grind the sides into a fingernail profile with a rather long bevel. For spindle turning, the tool needs a long bevel of 25° to 30°. I also like a highly tapered profile, what I call a high-society fingernail shape, because the narrow point gets into tight places (see the drawing below). I know a good many turners, however, who do just fine with a rather blunt or workingman's fingernail. You may want to experiment to see what profile works best for the kind of work you do.

If you're just starting out, I recommend you buy two spindle gouges: ¼ in. and ½ in. dia. For furnituremaking purposes, these will usually suffice.

Spindle gouges are sharpened using a pocket jig and a gooseneck clamp. Adjust the jig for a 30° bevel angle, and swing the gouge from side to side across the grinding wheel. A jig allows you to get a consistent grind that would be difficult to do freehand without a lot of practice.



Side view

Bottom view

Grind the bevel to about 30°, and grind a long fingernail that rakes back the side bevels. The shape of the fingernail is a matter of personal preference.

Cutting coves and beads—*Much of what's needed for furnituremaking can be performed with a spindle gouge.*

Jigs simplify the task of sharpening. *Using a Oneway pocket jig and a gooseneck clamping fixture to hold the tool, the author swings a spindle gouge from side to side across the grinding wheel. Bevel angles are controlled by adjusting both the pocket jig's distance from the grinder and the angle on the gooseneck clamp.*

sides of the fingernail where the metal has been ground too thin. If ground to a bowl-gouge contour, combination gouges lack sufficient flute depth to do a really good job. I find that they're best used for final cleanup on faceplate work.

Economy gouges—About 50 years ago, some large retailers began offering inexpensive lines of turning tools for hobbyists. These gouges have shorter and thinner blanks of steel and shorter handles. Such tools are still around. Their cross section is very flat—so flat that they don't do a good job of rolling beads or cutting deep coves. It's best to avoid them.

Tools for sharpening

Although I learned how to sharpen gouges by eye using a simple tool rest mounted on a bench grinder, I now prefer jigs for more accurate and consistent results.

Good jigs hold the tool at the proper angle when sharpening. Because lathe tools are round or oval-shaped, you need to rotate or swing them to shape the bevel correctly. Doing this freehand takes more skill than turning itself. I can recommend two brands of jigs: Oneway and Glaser. Both will help guide the tool around the grindstone with a greater sense of control than is possible with only a simple tool rest.

Not all grinding wheels are alike—I use an ordinary bench grinder with aluminum oxide wheels for most of my grind-

BOWL GOUGE

Traditional bowl gouges were forged with a deep U-shaped bevel, which was ground all the way around to 45°. The cutting edge (what is called the face) of this tool is square to the shank.

Modern bowl gouges, machined from high-speed-steel (HSS) round bar stock, generally have parabolic-shaped flutes. Factory grindings of this tool vary greatly among manufacturers, but many come with a 45° bevel ground all the way around. Most turners find the tool's performance can be improved by modifying this shape (see the photos below right). I recommend doing this to the two primary bowl gouges you'll want to have in your tool kit: ½ in. and ¼ in. sizes.

Modified grind: I favor an asymmetrical grind where the sides of the flute are raked back 15° to 30° and the nose bevel is reground to 60° to 80°. This allows you to cut cleanly across the axis of rotation without catching the corners of the tool or digging in too aggressively.

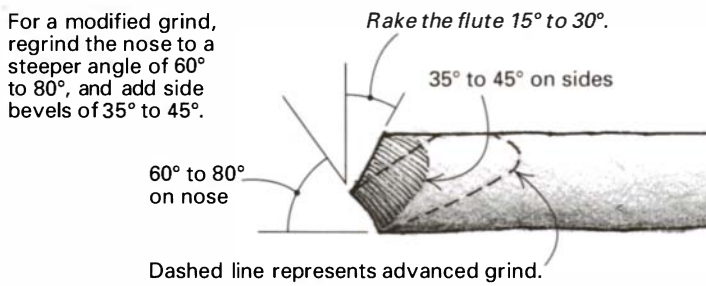
This grind works well when turning the inside of deep bowls because the nose bevel does not lose contact with the wood when it makes the sharp transition from the side wall to the bottom of the workpiece.

I use the Oneway sliding pocket jig in tandem with a matching gooseneck clamping fixture to sharpen bowl gouges. I slide the clamp 1¾ in. beyond the tip of the gouge, tighten the lock screw and set the angle on the jig's arm. Different jigs have slightly different ways of adjusting bevel angles, so you'll need to refer to your instruction manual. On the Oneway jig, the gouge is held in such a way that the gooseneck's arm pivots inside the pocket jig. You grind the gouge by swinging it from side to side, maintaining even pressure against the grindstone.

Advanced grind: Many bowl turners grind the side bevels back even more and increase the length of the lower bevel, too. If you want a longer bevel, bring the pocket in closer to the grinder. If you want more rake on the sides, adjust the gooseneck accordingly.

In skilled hands, a gouge with this grind will cut through reverse grain with nary any tearout, but it negates much of the forgiving nature of a modified-grind bowl gouge. Instead of rolling out of trouble, it tends to dig in deeper. I urge you to become technically proficient with one of the other grinds before progressing to this one.

***Faceplate work**—A bowl gouge allows the author to cut across the grain and create hollows and curves.*



ing. New bench grinders usually come equipped with silicon carbide wheels, which are very hard and better suited for shaping garden tools.

When I do roughing work, I grind gouges on a 46-grit wheel. For finer cuts, I sharpen them on an 80-grit wheel. It's important to keep your grinding wheels trued and flat. For that, I use a diamond wheel dresser. If you will be grinding high-carbon steel tools, you'll need to keep the tool cool during sharpening by regularly dipping it into a water bath to avoid drawing the temper. Bluing on high-speed steel won't affect the temper.

Finish by honing the edge

I always hone my spindle-turning tools after sharpening, but my bowl gouges usually get honed only when I'm ready to make final passes across a workpiece and want a really smooth surface.

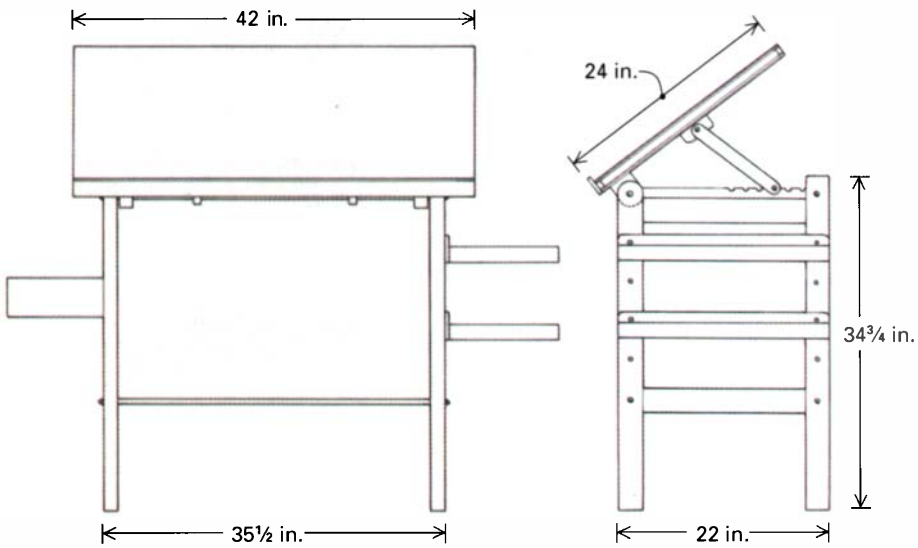
For honing, I use a cushion-sewn buffing wheel impregnated with Dico SRC stainless buffing compound, which is available at most hardware stores. To buff a gouge, hold it downhill against the wheel, and touch up both the bevel and the back. Make sure the gouge is held tangentially to the wheel so that you don't round off the sharp cutting edge. □

Ernie Conover directs and teaches woodworking at Conover Workshops in Parkman, Ohio. He is also the co-designer of the Conover Lathe.

A Drafting Table for Shop or Home

Torsion-box top and simple joinery make a light and sturdy table

by Cameron Russell



Front view **Side view**

The drafting room at the college where I teach furnituremaking had long been a sore spot with me. The tables we used were industrial-type library tables, not designed for drawing. The students who used them were far from comfortable. For hours at a time, they hunched over a flat surface that was at the wrong height. It made drafting a pain.

To solve that problem, I designed and built the prototype shown in the top photo on the facing page. After working out the bugs in the design, I realized that this would be a good beginner's project for the woodworking class. By the time the projects were finished, we had refitted the drafting room at the school, and the students were a lot more comfortable.

The construction process is simple, and the hardware we used is readily available from hardware stores or mail-order supply houses. The knockdown design makes it easy to disassemble the table for storage or moving. The torsion-box top is rigid and dead flat, yet light and portable.

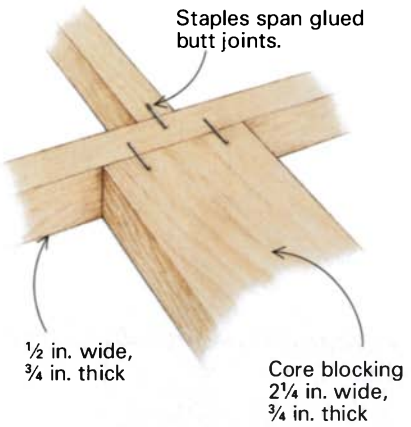
The key hardware components holding the table together are four threaded rods that fit within metal pipes. The nuts and washers on the ends of the threaded rods pull the leg assemblies firmly together while the rigid lengths of pipe keep the two sides apart. This combination of tension and resistance to compressive forces stiffens the structure. The smooth cylindri-

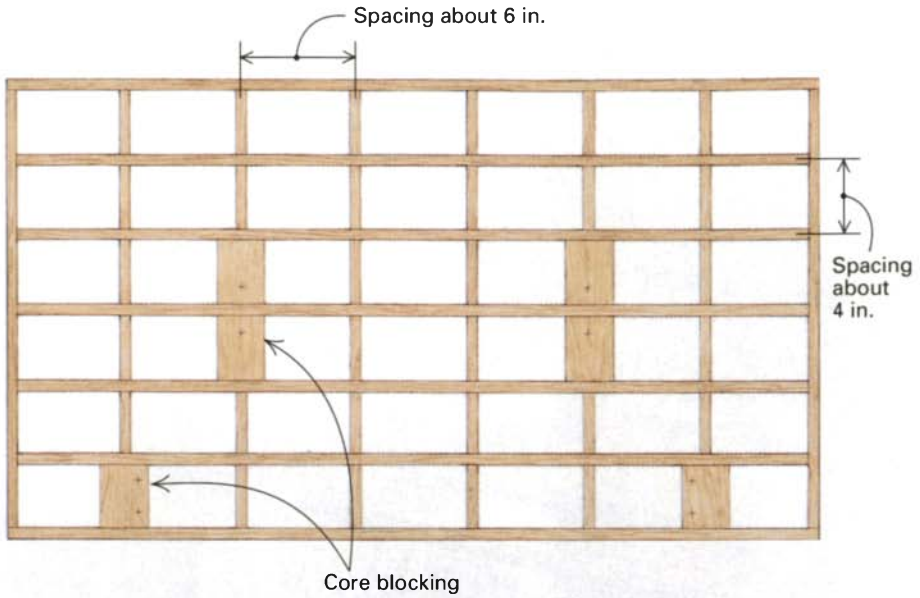
A knockdown drafting table

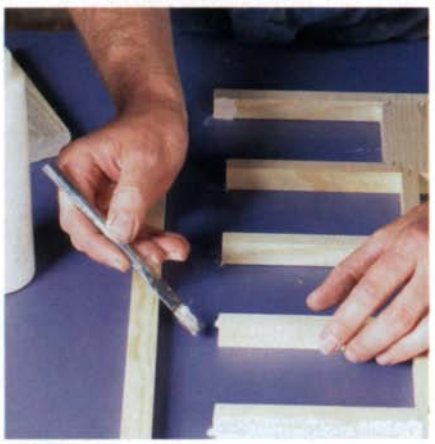
Built with common materials and knock-down hardware, this table is inexpensive and easy to make. Movable hinged supports make it possible to adjust the top to different angles. Accessory trays mounted on the sides provide plenty of storage space for drafting materials.

Building the torsion box

Core framework of pine is lightweight and rigid. The six frame pieces that are wider receive threaded inserts to hold the top to the hinged support pieces.







Butt joints are plenty strong. *Glue and staples hold the core framework together. The torsion-box top assumes full strength once the plywood skins are glued to this frame.*

cal surface of the metal pipe also provides an ideal pivot pin for the tilting top.

Torsion-box: light but strong

The design for the top guarantees that it will be lightweight, dead flat and strong. The outside skins of ¼-in. plywood are glued to the narrow surfaces of an internal wood frame, and the considerable overall surface area makes a healthy bond. As with any face-to-face gluing of wood, this construction process offers a lot of resistance to twisting forces, making the panel very rigid for its size and weight.

I built this tabletop 24 in. wide by 42 in. long, but the lower structure could easily handle a top up to 30 in. wide by 60 in. long. If you plan to fit a drafting-arm machine or a parallel straightedge to your table, take that size into account when you determine the length of your top.

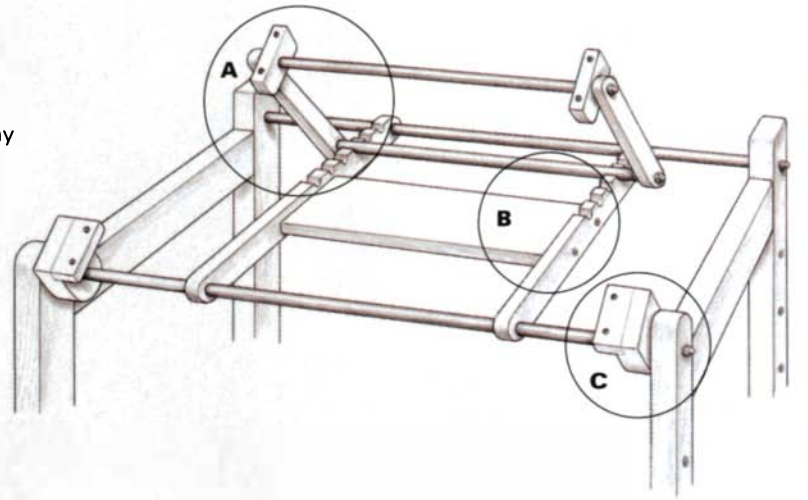
The internal framework of the top's core consists of ribs of lumber ½ in. wide by ¾ in. thick, as shown in the drawings and photos above. It's a good idea to add a few wider blocks to receive the fasteners that secure the pivoting top to the lower frame. The extra size gives you a little more leeway for mounting the hardware.

Mill all the lumber for the ribs at the same time to ensure they're all the same size. Also, accurately marking the locations of intersections where ribs are joined together

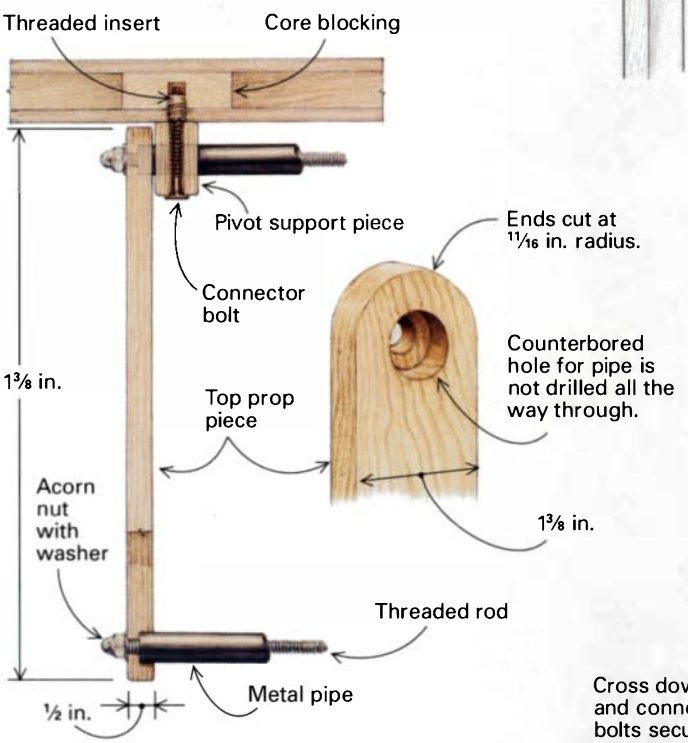
Drawings: Gary Williamson

Construction details

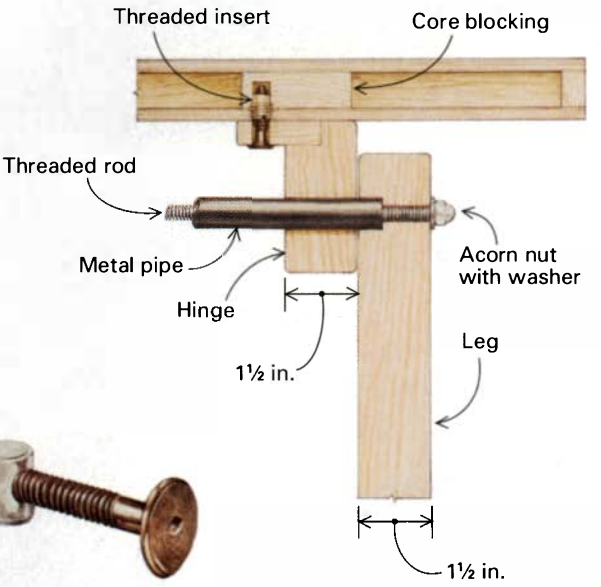
These drawings show the important details of parts that connect the top to the lower frame. For rigidity, the holes for the metal pipe should have flat bottoms and furnish a snug fit. If you use a spade bit (left), you may have to grind it down.



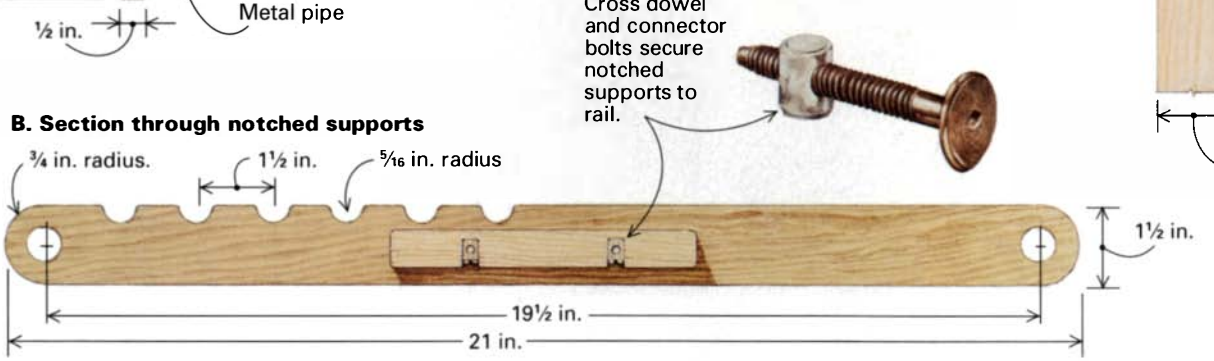
A. Section through top prop



C. Section through top hinge mount



B. Section through notched supports



is important. Apply a small spot of glue to each joint, and drive a staple to span the seam, as shown in the photos on the facing page. Use a small-gauge staple and gun. Once one side of the frame is complete, flip it and staple the other side.

Gluing the plywood skins to the core frame requires a lot of pressure. A large veneer press is ideal, but if you don't have one, you might ask someone at a local cabinet shop to glue up the skin for you. You can do it yourself by sandwiching the top between sheets of plywood weighted down with bags of cement or boxes of nails. In any case, mark the hinged edge before adding the outside skins—you'll avoid trouble later when you want to install threaded inserts for the wood-hinge mounts.

Legs and notched support rails

Each side of the table is made with a front and rear leg joined by two rails, as shown in the drawings on pp. 74-75. We used mortise-and-tenon joints to connect legs and rails, but either dowels or biscuits also could be used.

The size of the table calls for standard lengths of 36-in. threaded rod. The pipe can be either thin-walled, ½-in. EMT (electrical metallic tubing) or ½-in. copper plumbing pipe. The copper is much more expensive, but it can be polished and clear coated for a visually pleasing finish. If you

Photos: William Duckworth

***Accessory trays are adjustable.** They are fastened with connector bolts to threaded inserts mounted in the legs. The author's design calls for two shallow trays and one deep one.*

use the EMT, you might want to dress it up a bit with primer and paint.

When drilling holes for the pipes in the legs (and in the prop pieces for the underside of the top), drill the counterbored pipe holes first. You can use the center point left by that hole to line up the bit for the smaller hole that the threaded rod passes through. Depending on the type of pipe you choose, the diameter of the hole may or may not be a standard size. It's critical for the overall sturdiness of the table that the pipes fit snugly within the counterbored holes with no slop.

A ⅝-in.-dia. hole should be right for the ½-in. copper plumbing pipe. The outside diameter of ½-in. EMT is between 11/16 in. and ¾ in. The best method I know for getting a snug fit for the EMT is to file or grind down a ¾-in. spade bit until it makes a hole into which the pipe fits just right. Don't forget to mark the bit, so you don't get it mixed up with your standard-sized bits.

The other wood parts are easy to cut, drill and shape. Half-round holes in the notched supports (see the drawing on p. 77) can be drilled by clamping two pieces together, edge to edge, and using the joint line as the centerline. With any part that must revolve around the metal pipe, like the hinge blocks mounted to the underside of the top, be sure to drill the hole large enough to allow free movement. Sand and finish all the wood parts before assembly.

Assembling all the parts

Once you've fabricated and finished all the pieces, putting them all together is a cinch. Start with the legs and notched support-rail assembly. It's important to remember to slip the hinge-block pieces over the pipe as you do this, so the hinge blocks are in place when you want to secure the top later. The only tools you'll need to set up this table (or take it apart) are a box wrench, a ratchet, for the threaded rods with acorn nuts, and an Allen wrench, for the connector bolts.

The small blocks of wood that allow the top to pivot and to be supported at different angles are bolted through into threaded inserts set into the underside of the top. For applications like this, where I thought parts would have to be taken apart and put back together many times, I used threaded inserts and bolts.

If you plan to assemble the table and leave it set up, you could certainly substitute regular wood screws for some of this hardware. Keep in mind, though, that ready-to-assemble hardware makes adjustments easy when aligning the moving parts of the tilting and supporting pieces.

I also installed threaded inserts on the outsides of the legs for rearranging or adding accessory trays for drafting equipment (see the photo above). You could customize your own table to handle other specific accessories, such as a paper-roll holder or a T-square rack. □

Cameron Russell teaches furnituremaking at Camosun College in Victoria, B.C., Canada. He also spends some of his free time restoring a 1963 MG roadster.

Dry-Brushing Wood Stains

Widen your range of color possibilities using stains and tints

by Roland Johnson

***Changing the color of oak**—Red oak panels in a white oak frame (left) don't match. So the author stained the piece and dry brushed the red oak to achieve a uniform color (right).*

I pride myself on being able to restore all types of furniture. So when a customer called on me to look at two grungy, broken-down filing cabinets and asked whether I could bring them up to snuff, I couldn't say no.

The filing cabinets were made of white oak. One was missing a side; the other needed two new sides. The client liked the character of the old pieces but realized they were not valuable antiques. She wanted the repairs done for less than the cost of new cabinets. We discussed options and agreed the new frames would be made of solid white oak, the panels of plywood.

I couldn't get the white oak plywood locally. With the customer's consent, I used red oak panels. I now had two finishing challenges: matching new white oak to the aged patina of the original case and making red oak look like aged white oak.

To help make these kinds of repairs appear seamless, I have developed a staining technique I call dry brushing. I've blended the light sapwood of walnut to match the dark brown heartwood. I've used it to even out hard-to-stain woods such as maple and cherry. And I can make new wood look like it's 100 years old.

Dry brushing is a two-step process that begins with traditional staining: The wood is sanded and a stain is applied and then wiped off. When that's dry, a second, heavy coat of stain is applied. This coat is delicately brushed with a soft, dry, natural-bristle brush to remove and blend any excess stain. This method leaves pigment on the surface of the wood as well as in the pores.

A good set of brushes and quality stains and tints

The brush must be pliable and have dense, soft bristles. I prefer natural bristles, but you could use a different kind of brush as long as it's recommended for varnish or enamel. Don't buy cheap brushes; an inexpensive brush may seem soft and supple, but it will be prone to losing bristles. It's not easy to remove bristles from a dry-brushed finish.

I keep a range of brush sizes on hand to suit different jobs. A 2-in. brush works well for small areas such as face frames and chair parts. A 2½-in. brush is good for small panels and other medium-sized surfaces. For large areas, such as tabletops, I use a 4-in. brush. This brush can really move stain around in a hurry.

My favorite stains are oil-based pigment stains produced by Benjamin Moore and Pratt & Lambert. These stains have finely ground pigments and good solvents. Fine pigments help to eliminate brush marks, and good solvents evaporate quickly and evenly. Cheaper stains use solvents that don't seem to have even-drying

Mix and match stains. *Benjamin Moore's golden oak and colonial maple stains are mixed to create a tint matching new millwork to an old white oak filing cabinet under repair.*

Apply a base coat. *The rebuilt side of the case is covered with a first coat of stain and then wiped off.*

Red oak panels get second coat. *Apply the blue-tinted stain to the panels; when the stain develops a dull sheen, begin dry brushing. Let the brush just skim the surface.*

Tinting and toning colors

Color-matching stains can be a real guessing game. A little knowledge about color theory will help make sense of mixing your own stains.

There are three primary colors: red, yellow and blue. Tints are combinations of these primaries. I define tone as the shade (light or dark) of a color. Tint is the actual color.

Let's use red as an example. Red is the tint. By adding black or white, you change the tone. By adding a different color, such as blue or yellow, you change the tint. Pink is a lighter tone of red made by adding white. Purple is a new tint made by combining blue with the red. Equal amounts of all three colors produce brown.

To get specific shades of brown to match wood colors, use more or less of the primary colors. To lighten the tone of your stain, either brush more characteristics. I have not had success with water-based stains because they raise the grain too much.

To create the tints I need, I combine different stains and add tinting colors (see the story above). But you don't need to buy dozens of different stains. I recommend you get a quart each of Benjamin Moore's walnut and golden oak stains. For tinting, purchase 2-oz. bottles of universal tinting colors (UTCs) in red, yellow and blue. These are the basic tints used in paints and are available from most paint dealers. With this kit, you can accomplish a lot.

Because I need to match colors of many different woods in my work, I also use maple stains for their yellow cast, cherry stains for their red cast and a teak stain for its gray-green cast.

On occasion, a good match using premixed colors eludes me, and I resort to mixing my own stain from scratch. I use a clear stain base (I get mine from a local paint dealer) and color it with artist's oils or UTCs. Artist's oils can be used for tinting small batches of stain, but they are expensive.

Just the topcoat of stain gets dry brushed

To match the white oak frame to the red oak panels on this job, I applied a base-coat stain to the entire piece, wiped it down in the traditional manner and let it dry. Then a second coat of stain, tinted slightly differently, was applied to the panels. These were dry brushed to match the white oak.

I begin by mixing a base-coat stain and testing it on a piece of scrap from the project. Large differences in grain porosity or wood color—even in the same species of lumber—will affect the results. For the base coat on the filing cabinet, I mixed Benjamin Moore's golden oak and colonial maple stains.

Once I have a good color match, I stain the workpiece (see the center photo at left). When I stained the new parts of the filing cabinet, I was fortunate that the new white oak millwork blended nicely with the old. But the red oak panels were still too warm.

To adjust a stain's color, I add different tints. To cool down the red oak, I added a little blue tint to the base stain and tested it on a sample. This new batch of stain resulted in a perfect color match between the red oak and the white oak, but the tone was still too light. This is where a dry brushing technique comes to the rescue. I brushed the new color stain over the panels. I let the stain set up until it took on a dull sheen. The time will vary

Photos: Aimé Fraser

of it out or thin it with mineral spirits before applying.

Matching dissimilar woods: Every species of wood leans toward certain parts of the color spectrum. In the accompanying article, I matched red oak to white oak. I first blended a stain to match the new white oak to the old, but the stain proved to be too red, or warm, for the red oak panels. To remedy this, I added just a few drops of a blue universal tinting color (UTC) to cool the color and make a good match.

If you have a stain that is a bit on the blue, or cool, side but you want more of a mahogany color, simply add some red tint.

It only takes a tiny amount of colorant in some cases to make large changes in tint. I can usually remedy a bit too much colorant by adding a little bit of the other primary colors to balance my mistake. But the more times I have to add a bit of colorant, the harder it will be to duplicate my efforts.

Keep a variety of tints on hand: My color kit consists of a number of artist's oils for small batches of stains, such as for touch-ups, and less-expensive UTCs for large batches.

The artist's oils I have are burnt sienna, raw sienna, burnt umber, raw umber, yellow ochre, permanent blue, alizarin crimson, white and black.

In UTCs, I keep burnt sienna, raw sienna, burnt umber, raw umber, thalo blue, bulletin red, light yellow, lamp black and white. Using umbers and siennas is a quick way to get basic browns without the need to mix the primary colors together. Umbers and siennas have a tint built in. With a little experience, you will know which to use as a base.

To get a feel for color matching without mixing a batch of stain, practice mixing colorants on a piece of white tag board. I use toothpicks to get a small amount of tint colorant out of the container, and with a small artist's brush, I mix the colors in varying densities to see what changes occur. Make sure you use a new toothpick for each colorant. Just a little contamination can ruin your mix. *—R.J.*

from five to 15 minutes, depending on the temperature.

I brushed the stain back and forth with the grain (see the bottom photo on the facing page), using just the tips of the bristles of a clean, dry, soft brush. The weight of the brush does the work. If you press down too hard (see the photo at left below), the stain tends to move around and the brush gets wet. If you use the sides of the bristles or drag the brush at too flat an angle, the stain will smear and leave obvious brush marks.

It's important to keep the brush dry. I use paper towels to wipe the stain off the tips of the bristles after a few passes. If the brush becomes wet with stain, it will only smear the stain, not dry it. Continue to wipe the stain with the brush until the surface is dry. You know you're done when the workpiece has a uniform sheen and the brush no longer picks up stain. The stain should not show brush marks or any other obvious signs of a thick topcoat. If the results are not to your liking, erase the surface with a rag moistened with mineral spirits.

Overlapping fresh stain over dry-brushed stain can be a problem. The fresh stain's solvent will dissolve the built-up pigment of the dry-brushed stain quickly, resulting in a poor blend line. Always try to find natural breaks to stop and start the brushing, and try to work small areas at a time. The only exception is a tabletop. Here I do the entire surface at once. I work fast, but I never hurry. On a piece that is fairly complex, such as a chair, I tend to do one or two parts at a time. Sometimes I'll mask off completed areas to avoid getting fresh stain on an already brushed surface.

Spray on a protective finish

A dry-brushed surface needs a protective coating. Any solvent-based finish will work, but you must apply it by spraying. A dry-brushed surface is very delicate because pigment is floating on top of the wood. If you try to brush on a finish coat, solvents will dissolve some of the dry-brushing, and you'll have a real mess. Handle the piece carefully before final finishing.

I spray my work with an acrylic lacquer. I start with one coat of sanding sealer, lightly sand with 220-grit and then apply two coats of finish, sanding between them with 220- or 320-grit. If you don't have spray equipment, you can use aerosol cans of spray sealer and finish. □

Roland Johnson restores antiques and builds reproduction furniture and architectural millwork in his one-man shop in St. Cloud, Minn.

***Too much pressure**—This will only sweep the stain around.*

***Just the right touch**—Gently sweep bristles across workpiece.*

***Keep the brush clean.** Wipe bristles every few strokes.*

Cabinet Scrapers

You'll get a smooth and flat surface, even on hard wood and curly grain

by Monroe Robinson

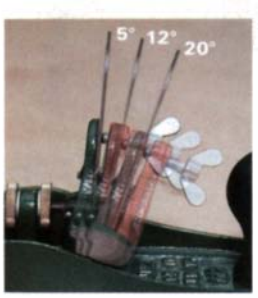
Stanley No. 80 fixed-angle cabinet scraper

The dining table, 13½ ft. long and 5 ft. wide, could seat 18 people. After working on it for three months, the last thing I wanted was a flaw in the top. To smooth it—all 60-odd sq. ft. of Macassar ebony that I had painstakingly resawn—I started with a handplane.

When the ebony, still rough from the bandsaw, showed signs of tearing, I turned to a cabinet scraper. It took 16 hours, but when I was done, the top was completely flat and smooth with no chipping, gouging or tearout. And no sandpaper.

A cabinet scraper is the ideal tool for smoothing and flattening any dense hardwood, especially if the grain is difficult and prone to tearout. Figured oak, ash or maple and most tropical hardwoods are all good candidates for surfacing with a cabinet scraper. A belt sander may remove wood as quickly as a cabinet scraper, but a scraper is much less likely to chew through veneer into the substrate or create ugly dips in the surface. A cabinet scraper not only smooths the wood's surface but flattens it as well.

Kunz No. 112 variable-angle cabinet scraper



Change angle as scraper dulls. *The author sets a fresh blade at about 5° off vertical. When it stops cutting, he adjusts it a few degrees forward. The blade can be adjusted until it reaches 20° before it needs reburnishing.*

Cabinet scrapers are simply tools for holding blades at a fixed angle and depth of cut. They are pushed like Western planes, and some cabinet scrapers, like the one in the photo below, look like handplanes. Others, like the one in the photo above, look more like large spokeshaves. All hold a blade at an acute angle to the work, so a burr on the blade cuts the wood just like a hand-held scraper. But the cabinet scraper has several advantages over a hand-held scraper. Because the cabinet scraper has a sole like a plane, the amount of blade in contact with the work is limited. As a result, the cabinet scraper takes down just the high spots and skims over any low areas.

Only a few models are still being made

Decades ago, there were many makers and models of cabinet scrapers. These days, I know of only four cabinet scrapers still being made—Stanley's No. 80 (widely available), the Kunz No. 12 (available from MacBeath Hardwoods; 510-843-4390), the Kunz No. 112 (sold by Woodcraft; 800-225-4482) and the Lie-Nielsen No. 212 (available through a number of woodworking catalogs as well as directly from Lie-Nielsen Toolworks; 800-327-2520).

Prices for new cabinet scrapers range from about $30 for a No. 80 to $120 for the Lie-Nielsen No. 212. An antique Stanley No. 112 can cost considerably more.

New or old, there are just two types of cabinet scrapers—those that hold the blade at a fixed angle and those that permit the blade angle to be set by the user. The Stanley No. 80 is a fixed-angle cabinet scraper. Both Kunz scrapers and the Lie-Nielsen No. 212 permit blade-angle adjustments. Both of these variable-angle cabinet scrapers are also called scraper planes because of their shape.

Bevel angle isn't critical—a well-prepared blade is

A properly prepared blade is essential to getting a cabinet scraper to work well. All of these cabinet scrapers can be used with the blade sharpened at any angle between 90° and 45°. When filed and honed at 90° (just like a hand-held scraper), you get two cutting edges at one end of the scraper blade. A blade with a 45° angle is a more aggressive cutting tool. It will scrape for a longer period before dullness reduces it to creating dust rather than shavings. The angle is a matter of personal preference. I use a 90° angle on the

FIXED-ANGLE SCRAPERS

The No. 80, the most common fixed-angle scraper and the only one still being made, is the most aggressive. Its relatively short sole makes it better suited for cleaning up glue joints (below) and fairing out areas of tearout than for surfacing large tabletops. Like all other Western cabinet scrapers, the No. 80 is designed to be pushed.

Setting and flexing the blade

Secure the blade. Tighten the two nuts on the front of the cabinet scraper while holding the scraper body and blade down with the other hand. The blade is now flush with the sole.

Flex the cutting edge of the blade. Tightening the thumbscrew on the back of the scraper body causes the blade to extend below the sole, allowing it to cut. The more the thumbscrew is tightened, the greater the blade projection.

blades in my No. 80s, although I know others who swear by a 45° bevel. On my variable-angle cabinet scrapers, I prefer a bevel angle somewhere between 45° and 60°. Anything more acute than 45° would be too fragile to last very long. Whatever the angle, the bevel faces the rear of the scraper.

After filing the edge to the angle I've chosen, I hone the edge to 6,000-grit on my Japanese waterstones and burnish the edge with a light touch. (For more on this, see *FWW* #114, pp. 53-55.)

Preparing and using a No. 80

The No. 80 is the most aggressive wood remover of the four cabinet scrapers still generally available. Because its sole is comparatively short, it's not the best tool for flattening a large surface. If not used in a consistent pattern, it can create shallow dips that would be evident when viewing the surface from a low angle, such as when sitting down at a dining table. The No. 80 is a good choice, however, for eliminating small rough spots or leveling the surface along glue joints. Or if you've already largely flattened a surface with a plane or a cabinet scraper with a longer sole but you still have some minor tearout here and there, reach for the No. 80. Just be careful not to linger in one area of the surface, or you're likely to create a depression.

To ready this type of scraper for use, start by setting the tool on a smooth, flat surface. Loosen the center thumbscrew on the back of the scraper, and slip the blade between the body of the scraper and the pressure bar until the blade bottoms out. Then, while holding down both the blade and cabinet scraper with one hand, tighten the two nuts on the front of the cabinet scraper with the other hand

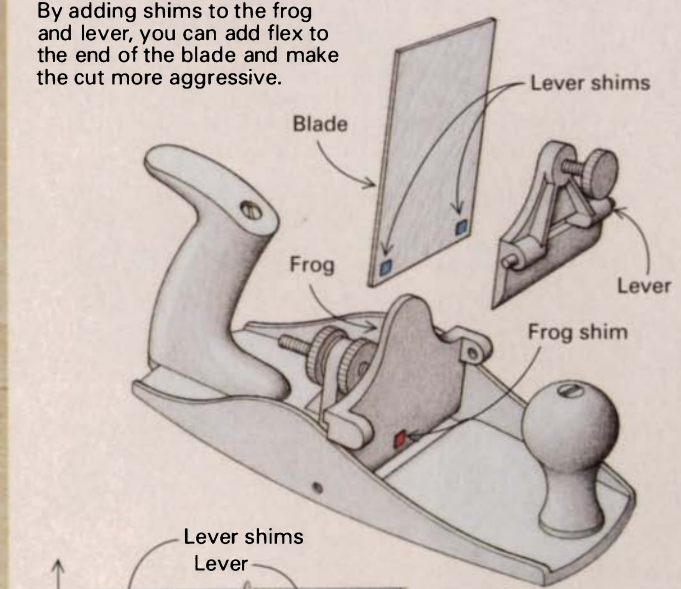
Photos: Vincent Laurence

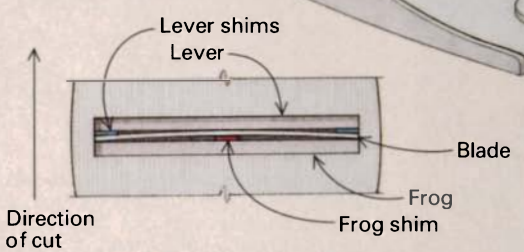
VARIABLE-ANGLE SCRAPERS

Variable-angle scrapers can be set again and again before the blade needs to be reburnished. The long sole on the No. 112 (below) is ideal for flattening and smoothing large surfaces, such as tabletops, especially if the wood is figured or very dense.

Adding flex to a variable-angle cabinet scraper

By adding shims to the frog and lever, you can add flex to the end of the blade and make the cut more aggressive.





Bottom view of scraper

(see the top right photo on p. 83). This secures the blade to the scraper body and positions the blade precisely flush with the sole. Now tighten the center thumbscrew so it just barely flexes the blade (see the bottom right photo on p. 83). This pushes the center area of the blade slightly below the sole. As the blade gets dull, adding more flex with the thumbscrew will get the blade to bite again. And after reburnishing a new edge, it's often necessary to add a little more flex to get the blade to make shavings again.

Working with variable-angle cabinet scrapers

The first step in setting up a cabinet scraper with an adjustable blade angle is to position the frog mechanism to about 5° forward of straight up (see the bottom photo on p. 82). This angle works well for a newly sharpened blade. You may want to set the angle with a protractor and bevel gauge the first time, so you know what you're shooting for. After that, setting the angle by eye is close enough. Another way is to use the cabinet scraper blade like a hand-held scraper for just a few strokes. It may feel a little awkward at first, but once the scraper's making shavings, you'll know the proper setting.

Then, just as with the No. 80, set the scraper on a smooth, flat surface, and slip the blade into the frog mechanism until it touches bottom. Tighten the blade hold-down screw with one hand while holding down the blade and cabinet scraper with the other. The blade is now flush with the sole. Adjust the blade angle forward ½° or so with the blade-angle adjustment nuts at the rear of the scraper. This pushes the cutting edge of the blade back slightly so it protrudes just below the sole. The scraper is ready for use.

Drawings: Vince Babak

With use, the blade will dull. To get it to cut again, you can burnish a new cutting edge on the dull blade, adjust the angle forward or do both. The farther forward you adjust the blade, to as much as 25° or so, the more aggressive the cut. Each time I shift the blade angle forward, I reset the blade flush with the bottom. Then I shift the blade forward another ½° or so, so it's just slightly below the sole. This two-step repositioning of the blade alters the angle of the blade without causing it to protrude excessively through the bottom of the sole.

Problem-solving for variable-angle cabinet scrapers

Much of what you've read about tuning up handplanes is just as applicable to cabinet scrapers: A flat sole and flat seating for the blade will go a long way toward improving performance. But particular makes and models of cabinet scrapers seem to have some specific problems.

Every one of the dozen or so Kunz scrapers I've seen has had significant play in the pin or screws attaching the frog assembly to the scraper body, making it difficult to set the scraper iron accurately. None of the many old Stanleys I've seen have had this problem. I was able to correct the problem on a Kunz No. 112 in less than 10 minutes by flaring the ends of the screws securing the frog assembly on each side with a hammer and center punch.

Something else I noticed while experimenting with cabinet scrapers early on was that because the variable-angle cabinet scrapers don't have any provision for flexing the blade, they don't cut as aggressively as I'd like. What they needed, I figured, was a slight flex at the end of the blade, just as you would get with a hand scraper or with the No. 80. I cut three ¼-in.-sq. pieces of brass shim stock (between .020 in. and .030 in. thick is about right) and glued one on each outside corner at the bottom of the lever and one at the bottom center of the frog (see the drawing on the facing page). Wood veneer between 1/30 in. and 1/50 in. thick would work as well. Contact cement works perfectly to adhere either material to the scraper body. With these shims installed, the more you tighten the blade into the cabinet scraper, the more the blade will be flexed.

Scraping a large surface

Cabinet scrapers can be used to surface furniture parts of any size and, in fact, the Lie-Nielsen No. 212 works particularly well on smaller pieces. But where most cabinet scrapers really shine is on large, flat panels like tabletops.

In general, my process for flattening and smoothing a large tabletop is first to handplane it and then scrape it with a Stanley No. 112 or No. 12½ (same as the No. 12 but with screw holes in the sole) with an extended body (see the box at right). I finish up with some finer hand scraping. If the wood doesn't respond well to the handplane, I go straight to the cabinet scraper. Either way, when I do get to the cabinet scraper, I scrape the top in all directions—across the grain, diagonally in every direction and with the grain—so I don't favor or neglect any portion of it. The order is not important, but scraping in repeated sequence from each direction is, until an overall flatness is achieved.

Once the surface has been flattened, you can use a No. 80 to remove more wood, working on small imperfections or tearouts. Or you can just continue using the No. 12 (or No. 12½) or No. 112 to do this. Although it will take longer, the top will be flatter.

The last thing I do with the cabinet scraper is hone a blade so it's very sharp, put it in my extended No. 12½ or No. 112, set it for a very delicate bite and scrape straight with the grain. I do not hold the cabinet scraper nose forward in line with the direction of the stroke. Rather, I skew the scraper first to one side and then the other. This prevents the cabinet scraper from creating a miniature washboard effect on the wood surface.

Finally, I go over the surface one last time, taking just a delicate scraping with a freshly honed hand-held scraper. The surface is now ready for a finish. And no sandpaper is needed. □

Monroe Robinson is a sawyer in Little River, Calif., specializing in the custom sawing of salvaged, old-growth redwood and Douglas fir. He was a professional furnituremaker for 22 years and trained with James Krenov at the College of the Redwoods. He has worked as a woodcarver, log-bridge builder and custom homebuilder.

Extended body gives scraper more sole

While attending woodworking school, I built a large, rosewood-veneered table. When I surfaced the top, I wanted to take every precaution to prevent planing or scraping through the veneer. I had an antique Stanley No. 12½, a relatively short-soled cabinet scraper, but not a No. 112, which is considerably longer. To get the longer sole I wanted, I built and attached an extended body to the old No. 12½, tripling the length of its sole and all but eliminating the chance of scraping through the veneer (see the photos above). The construction of the extended body is straightforward, all screws and glue. It works so well that it's the cabinet scraper I reach for to this day.

If you want to make your own extended-body cabinet scraper, buy a No. 12½. The No. 12½, unlike the No. 12, has four holes in the sole to fasten the extended sole to the cabinet scraper. With the No. 12, you'll have to drill and tap screw holes yourself or pay a machinist to do the work. Don't make the extended sole any thicker than 5/16 in. or so. If you do, the blade won't be supported very well where it scrapes and could chatter or cut poorly. —*M.R.*

In the Land of Klompen

Where they still make and wear these wooden shoes

by William Duckworth

God made heaven and earth, but the Dutch made Holland, as the saying goes. The Dutch also made *klompen*—wooden shoes, or clogs—to navigate in the mud that remained after they reclaimed land from the ocean. Often worn with leather slippers, called *klompensokken*, wooden shoes keep feet dry and warm. Farmers used to stuff them with straw as insulation.

My wife's father is Dutch. He brought her a pair of klompen on his return from a trip to Holland several years ago. I took one look at them and laughed, not imagining that anybody actually wore these silly looking shoes. Turns out, I was a little hasty in my judgment.

The klompen industry pales in comparison to other sectors of the Dutch economy—electronics (Philips), chemicals (Shell), and agriculture (flowers and food)—but it is alive and well. More than three million pairs of clogs are made and sold each year by some 60 or so businesses that belong to a professional klompen-makers trade organization. Two-thirds of those are exported and one-third go for domestic use within the Netherlands. An average pair costs about $20.

I tracked down a number of the people who make and sell wooden shoes and decided early on to get a pair for myself. But this turned out to be somewhat of a problem.

All the wooden shoes in Holland are made from either willow or what they call Canadian poplar. Poplar is lighter in weight and color, and it's cheaper. An average tree takes only 25 years to mature for harvesting, and it will yield enough wood for roughly 150 adult-sized shoes. Willow is harder to find and much more expensive, but the farmers prefer it because the wood is more water-resistant.

Klompen makers work the wood wet, at about 40% moisture content (see the photo at left). Freshly carved shoes are either

***An irreplaceable national icon**—Wooden shoes, or* klompen, *continue to be made by the millions in Holland. Although most of the shoes are exported, they remain in wide use in Holland, as evidenced by the young food vendor, at left, in a park near Lisse. Poplar or willow, carved while it is still wet, can support fungal growth as the shoes dry (far left).*

Automated machines shape and carve the klompen. *Harry Laarhoven (above) operates a roughing machine—the first step toward shaping the outsides of the shoes. The boring machine in the Nijhuis family plant in Beltrum (right) carves out the insides of a pair of shoes by copying the master blank at center.*

kiln-dried (in more sophisticated production facilities) or hung in nets outside in the shade to dry over a period of several months.

Gone are the days of handwork

It used to be a common practice for a husband to present his bride with an intricately carved pair of shoes on their wedding day—sometimes spending up to 50 hours making them. Blame the death of that cultural observance on the advent of the machine age. Many of the klompen makers I met know how to carve a pair by hand (see *FWW* #54, pp. 55-57), but other than performing demonstrations for tourists, they simply don't do it anymore. Instead, they employ a sort of duplicating lathe to shape the outsides (see the photo at left) and a boring machine with spoon-shaped bits to carve out the insides (see the bottom photo). Curiously, every shop and factory I visited still finishes the shoes by hand with lacquer applied by brush, not spray equipment (see the photo on the facing page).

In search of some shoes that fit

My first visit was to meet Abner Verschuur. He's a resident klompen maker at the Kooijman wooden shoe workshop and museum at a restored 17th- and 18th-century village in Zaandam called the Zaanse Schans—a setup not unlike Williamsburg, Va. He learned the trade in an apprenticeship under a man named Harry van Aarle.

The museum, like many others I visited, has an extensive collection of wooden shoes; one pair is more than 300 years old. There are fancy painted versions worn only on Sundays to church; klompen with metal spikes in the undersides to be worn on ice; klompen with pointed toes worn by fisherman and used to grab the nets with their feet; klompen with leather shin guards tacked to the top for reed cutters; trip klompen with a leather strap across the top, designed for dancing; klompen with large, flat bottoms for extra buoyancy for people who collected peat in spongy earth. They even had klompen for the horses that carried the peat back home from the bog.

Abner Verschuur was wearing a pair of clogs when I met him. When I asked him whether they were comfortable, he replied that Dutch people have been wearing them for 550 years, so either they're comfortable or there's something wrong with the Dutch. I tried on a number of shoes in his shop, but none of them felt right.

Down the road a bit, I found Kees van El at his shop in Broek in Waterland, where he's been in business for 35 years. He had an impressive pile of very large willow trees lying on the ground in front of his shop—one was 75cm (close to 30 in.) in diameter. He prefers willow to poplar for its working characteristics and durability. The klompen he was wearing were about a year old. He spends his days walking on wooden floors. On concrete, the shoes will last about six months; on wet concrete, three months. When I started to try on a pair of clogs, he took a look at my foot and said right away that none of his shoes would fit. My instep is too high, meaning that the bone on the top of my foot is too pronounced.

A warm-hearted and engaging man, van El credits American soldiers for reviving a dying industry. They bought wooden shoes as souvenirs to take home after World War II. The light bulb of tourist dollars clicked on and burns brightly still.

The next day, I headed south where I met up with Harry Laarhoven (see the top photo). He and his brother, Willem, run a

Photos: author

'Dutch people have been wearing klompen for 550 years, so either they're comfortable or there's something wrong with the Dutch.'

Finishing is still handwork. *Some shoes are sold raw, but those that get a finish are painted with a brushing lacquer, one by one, by hand.*

business called De Platijn in the town of Best, which boasts more klompen makers than any other town in Holland. The Laarhoven brothers have been making klompen for 42 years, after inheriting the business from their father. At De Platijn, the factory produces 45,000 pairs of clogs a year and sells them to tourists, farmers and gardeners. Nothing goes to waste. The sawdust is sold to chicken farmers; scraps of slab wood are used to smoke fish.

The Laarhovens also run a klompen museum next to the working shop. They have a collection of old machinery, as well as the typical array of wooden shoes. My favorite was a pair made by a butter smuggler during World War II. The bottoms of the shoes were carved with the heel and toe reversed to confuse anyone trying to track his footprints in the snow.

In the nearby town of Liempde, I met Jan van der Wiel, a *blokkenleverancier*. He supplies the rough-cut logs split into wedges, or billets, to klompen makers all over Holland, using some very heavy-duty and state-of-the-art equipment. Felled trees are mounted on a railroad trolley and fed into a giant laser-guided cutoff saw. The length of the cut is calibrated for different sized shoes. From there, the cut pieces, or bolts, head up a conveyor belt to a de-barking machine before being split into billets and shipped to klompen makers.

While heading back to Amsterdam, I stopped in Culemborg and spent some time with Jan van Zuilekom. Kees van El had spoken highly of the quality of van Zuilekom's shoes. Every year, a group of pensioned klompen makers get together to judge samples of shoes taken randomly during unannounced visits from factories all over Holland. Van Zuilekom has won the award the last four years in a row.

This family business, 90 years in the making, has five employees. The factory makes 50,000 pairs of shoes each year and markets 65% of those to children. Jan van Zuilekom wears a pair around the plant. He leaves them outside his office door, so he doesn't track the sawdust and grime into the office space. He has another pair at home for gardening and camping. And no, he was sorry to say, he didn't make klompen for feet like mine.

Only a few miles from the German border, in the small town of Beltrum, I toured what the owner says is the largest wooden shoe factory in the world—Nijhuis B.V. Klompenfabriek. Paul Nijhuis's father started the business in 1938, making four pairs of shoes a day. Last year, the factory made 1.5 million pairs. Granted, 1.1 million of those were souvenirs and gifts—everything from miniature key chains to Heineken beer bottle openers. But that still leaves 400,000 pairs of wooden shoes for farming and gardening. Nijhuis exports a lot of those to Japan, Taiwan, Indonesia and Brazil.

Paul Nijhuis has run the business since 1975. He employs 30 people full time and another 60 for part-time help. The manufacturing facilities are impressive, clean and modern. Here, too, all the waste products are used elsewhere: sawdust to cow farmers, slab wood to a German particleboard manufacturer and smaller scraps for wood stoves.

Nijhuis does have a master mold for people with high insteps, so I finally found a pair of shoes that fit. He showed me how to check for a proper fit—an index finger should slip in easily above the instep and behind the heel. And to walk in them, you drag your feet along in a kind of shuffle. They take some getting used to, but so do new leather shoes. □

William Duckworth is an associate editor of Fine Woodworking. *He wears his klompen while gardening.*

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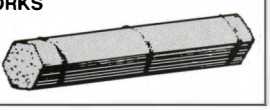

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READER SERVICE NO. 199

Jet 13-in. Planer/Molder

I own an Arts-and-Crafts-era home that had suffered from a frenzy of remodeling in the 1950s. The previous owners had torn out much of the handsome oak cornice trim above the interior door and window casings. When I decided to restore the house, replacing that molding was a priority. Because it was no longer available, I had two options: Pay someone a lot of money to make custom molding or buy a tool to do it myself.

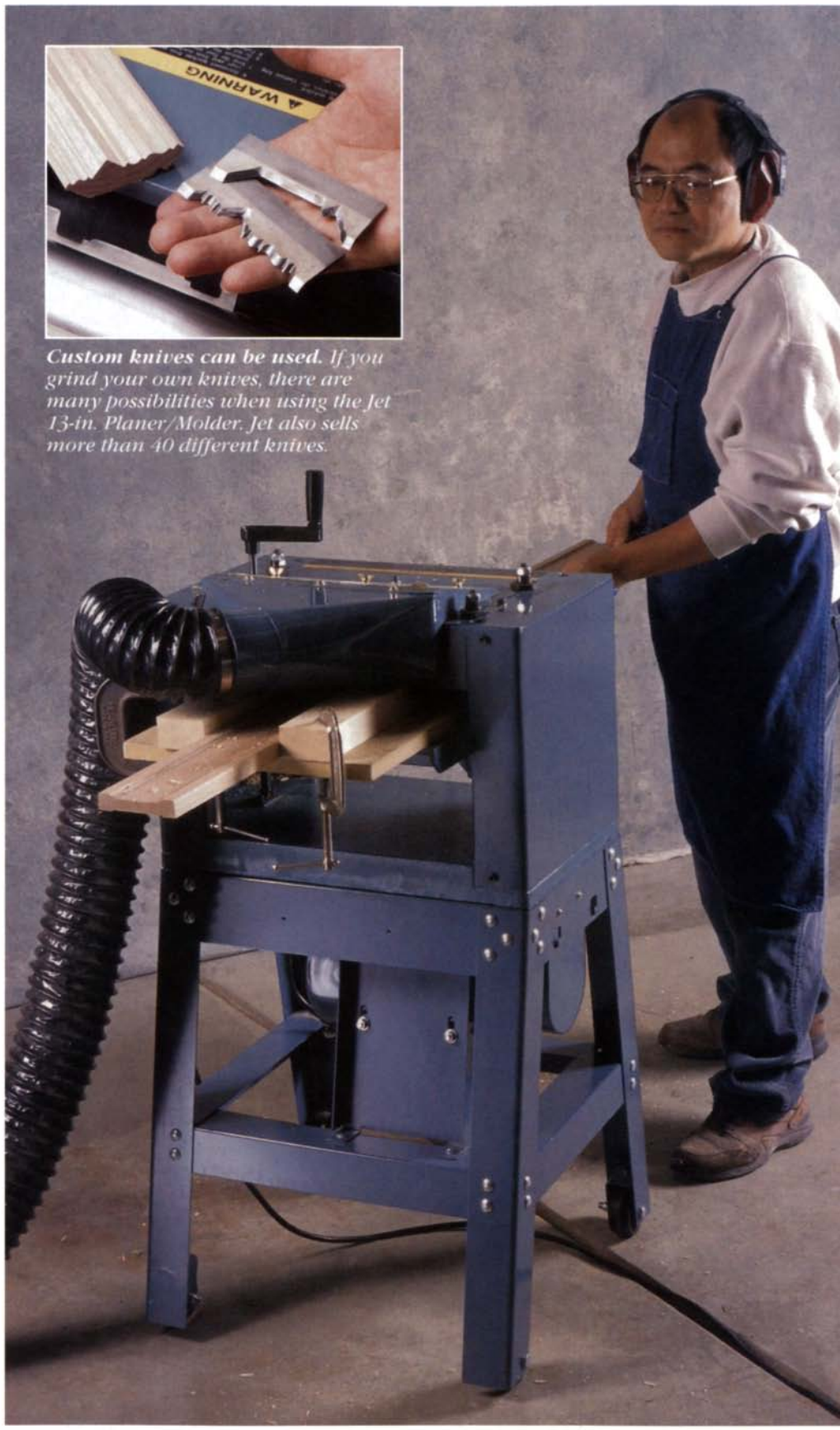
I decided to buy a machine, the Jet 13-in. Planer/Molder (see the photo at right). At $800, it turned out to be a cost-effective way to make 700 lineal feet of red oak crown molding for myself and neighbors, who were also restoring their homes.

This Taiwan-made machine is a recent entry into the market. Instructions on assembly and use of the machine are provided by an excellent illustrated manual and a videocassette. The machine's main components are a cast-aluminum top section, cast-iron bed and base, and formed steel sides. The cutterhead has three slots for mounting planer or molding knives. A set of 13-in. high-speed-steel planer knives are furnished, secured with gibs.

When planing, stock travels on a bed that is guided by four vertical rods and supported by two screws, one on each side, attached to a crank. Depth of cut is adjusted by this crank. Infeed and outfeed roller pressure can be adjusted for planing and molding. Greater pressure is used for running molding. If you want a dust chute, it costs extra. I consider it a necessity. Cutting molding creates a lot of sawdust.

A 110v, single-phase, 1½-hp induction motor, mounted below, drives the unit with double V-belts. The feed rate has two speeds: 10 ft. per minute (fpm) for molding and 20 fpm for planing. I planed some 10-in.-wide oak boards and found the quality of cut acceptable. There was just a hint of a snipe at the ends. For fine work, plan to do some finish-sanding.

Setting the planer knives is tricky and time-consuming, but I was able to accomplish it myself. One nice feature about this machine is that molding knives, which are less than 2 in. wide, can be mounted in the center of the cutterhead without



Custom knives can be used. *If you grind your own knives, there are many possibilities when using the Jet 13-in. Planer/Molder. Jet also sells more than 40 different knives.*

Custom crown molding—*The author used a Jet 13-in. Planer/Molder to make 700 ft. of oak molding while restoring his home.*

Photos this page: James Polaski

removing the planer knives.

I ground my own knives from high-speed-steel planer stock to match the original crown molding in my house (see the inset photo on p. 100). My run of 2½-in.-wide red oak crown molding required cutting a back profile and then an intricate front profile.

There was some minor tearout in a few pieces due to wild grain and knots; otherwise, the machine performed well, and I'm satisfied with the results. *—Edward Koizumi*

Particleboard made of wheat straw

Particleboard and medium-density fiberboard (MDF) are industry-accepted mainstays for cabinet construction, but I don't like them because they are heavy and when worked, emit fumes and dust that I find noxious. Some of these drawbacks appear to have been eliminated from WheatBoard (see the photo below).

WheatBoard, an industrial-grade particleboard, is 5% to 10% lighter than its wood-pulp counterpart and is made from wheat straw. The adhesive, an isocyanate glue, used to bind the fiber is nontoxic and emission-free once cured.

Although machining WheatBoard raises a lot of typically super-fine particleboard dust, there were no eye-watering, nose-searing formaldehyde fumes. In fact, after several cuts, my shop started to smell a bit like my uncle's hayloft.

WheatBoard is currently available in the upper Midwest. The company plans to expand distribution nationally. For more information, call or write United Board Group, 2111 N. 3M Drive, Wahpeton, ND 58075; (701) 642-9700. *—Roland Johnson*

Smells like hay—Wheatboard, a particleboard substitute, is made of wheat.

Delta's Boss sander has plenty of power

Delta's oscillating spindle sander—The Boss sander and optional kit of different-sized spindles and throat-plate inserts.

I was pleased when I first turned on the Delta Boss (Bench Oscillating Spindle Sander). Motor noise was minimal and vibration was almost nonexistent. Delta introduced the Boss in March of 1996, several years after other manufacturers had already unveiled similar machines.

The Boss (see the photo above) has an 18-in.-dia. cast-iron table and a direct-drive ¼-hp motor with a ½-in. shaft. Spindle speed is 1,725 rpm with 60 strokes of ⅞ in. per minute. There is an effective sanding height of 4¼ in., the length of the sandpaper sleeves. Oscillation is achieved using a shaft-mounted gear set (steel and plastic) to drive a dual, cam-link arm assembly. The vertical motion is guided by two steel shafts, one full-length with bronze bushings and a shorter one with adjusting screws to eliminate slop. Every pivot point runs in a bronze bushing.

I could not bog down the sander with heavy pressure, even when I was sanding 3½-in.-thick teak. Spindle changing is quick and easy. All you do is remove the bolt on the top of the spindle shaft and slide the sanding sleeve on and off.

I frequently cut out curved parts for furniture that require sanding to scribed lines. The oscillating sander is more aggressive, less likely to burn and has more capacity than the drill-press sanding drum I was using. Once I got used to the vertical travel, I found it easy to sand up to the line.

I also thickness-sand pieces for repair parts and splines. Because there's good access all around the table, it is easy to clamp down a tall fence and hand-feed stock through the sander. The first pass leaves ridges from the oscillation, but a second pass eliminates most of them.

The accessory kit, which includes additional spindles, throat-plate inserts and holders, sells for about $50 to $60, discounted. I think it's a bit pricey, but it's a kit that I wouldn't do without. The Boss can be purchased for about $200.

—Charles Ramberg

Edward Koizumi is a model maker in Oak Park, Ill. Roland Johnson restores and builds furniture in St. Cloud, Minn. Charles Ramberg builds custom furniture in Charleston, S.C.

Top photo: Charles Ramberg; bottom photo: Anatole Burkin

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Ryobi–Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	$229	$139
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10"X40TX1/8" or 3/32"	$156	$119	$107	$ 95
30T 1/8" or 3/32"	$135	$ 99	$ 89	$ 79
9"X40T	$146	$109	$ 98	$ 87
30T	$125	$ 99	$ 89	$ 79
*8-1/4"X40TX 3/32"	$136	$ 99	$ 89	$ 79
8"X40T 3/32"	$136	$ 99	$ 89	$ 79
30T	$115	$ 89	$ 80	$ 71
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Fine Woodworking Magazine test Oct 96 page 43

After installing your blade and 5 in. stiffener the vibration in my saw went down another 20%. I ran several pieces of hardwood through the saw, both crosscut and ripping, and was amazed at the smoothness. It was like cutting butter, maybe smoother. I have never had a saw blade that cut this smooth.

Rick Price

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9"x80Tx1/8" & 3/32" K	$207	$179	14"x100Tx1"	$266	$226
10"x80Tx1/8" & 3/32" K	$207	$159	16"x80Tx1"	$262	$223
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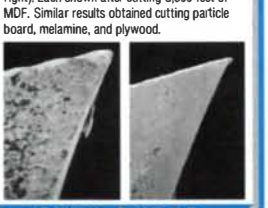

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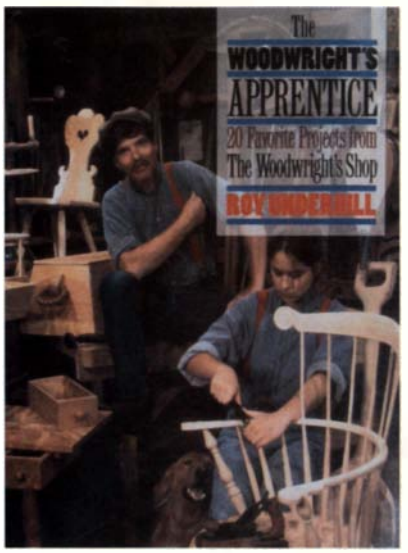
The Woodwright's Apprentice by Roy Underhill. *University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27515 (800-848-6224); 1996. $29.95, hardback; 208 pp.*



I wouldn't be surprised if Roy Underhill drives a BMW, has central heating in his house and wrote this book on a word processor. But he is so good at personifying an age past, it's hard to see him in any other way.

Underhill is a model of self-reliance. He needs only a few traditional hand tools and a log from his backyard to make almost any useful household item quickly and easily. His latest book is a collection of 20 furniture projects. They range in usefulness and interest and include the simple dovetailed stacking bookcases that Thomas Jefferson used, a revolving Windsor chair, a bellows and even a gunpowder shovel.

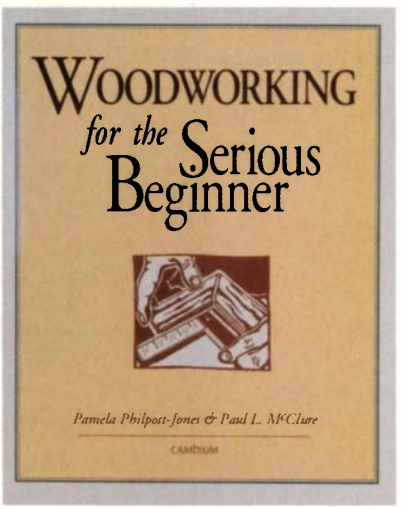
The many tool marks and tearouts on Underhill's work are evidence of his casual, but frantic style. And he doesn't explore the construction process in any great detail, assuming familiarity with techniques covered on his television show or in earlier books.

Underhill's style is an alternative to fast and furious power tool woodworking. He invites us to find pleasure in drilling peg holes with a brace and bit and to learn a little about the historical background of each piece. It's an uncommon attitude toward woodworking, but it has tremendous appeal.

All in all, this is an interesting book even if you're not a die-hard Underhill fan.

—Mario Rodriguez

Woodworking for the Serious Beginner by Pamela Philpott-Jones and Paul L. McClure. *Cambium Press/Lyons & Burford, 31 W. 21st St., New York, NY 10010 (212-620-9580); 1995. $19.95, paperback; 176 pp.*



Woodworking for the Serious Beginner has a clever premise. It's written by a novice and her teacher, each writing in his or her own voice, and giving two perspectives on each subject. The book covers the elementary questions that a beginning woodworker would have, ones that might not occur to the expert were he writing the book on his own.

They cover how to set up a shop, what to buy and what to make, and a few first projects that require joinery no harder than dadoes and rabbets. Throughout the book, the authors give frank opinions and definite, no-nonsense advice. Their discussion of tablesaw guards is the most honest I've seen anywhere.

Occasionally, though, I found them to be too didactic: Philpott-Jones insists that "the steel blade that comes with any new tablesaw is worthless. Remove it at once." However, I have found that my steel blade has an easier time ripping through thick, wet softwoods than my carbide rip blade does.

But if I have any real complaint about the book, it's that it ends too soon. They get you all set up and ready to go; then suddenly, you're looking at the index. The format works so well that it would be good to hear more from these two. Perhaps this slim volume could become the first of a series.

—David Mukamal Camp

Tools of the Trade by Jeff Taylor. *Chronicle Books, 275 Fifth St., San Francisco, CA 94103 (800-722-6657); 1996. $25, hardback; 176 pp.*

Tools of the Trade is a superbly entertaining book about the uncommon satisfactions that come with a life of making useful things by hand. Jeff Taylor captures and puts to words the reasons why really bright and talented people go into the building trades, and not into law school.

Taylor is a deft storyteller. Every chapter in this book is a brilliantly funny anecdote about a tool he has collected, the carpenters he has known and the events that connect them. For example, from the number of accidents with ladders Taylor has witnessed, we gather that they are dangerous tools demanding respect.

However, his caution and sympathy have their limits: "One would think that no sane being would ever stand on the folding paint-tray shelf found on some stepladders; but yes, they do. This is evolution at work. We should not interfere with these people and their destiny." I have been tempted by the paint tray on occasion. Next time I am, I will probably laugh aloud. Such gems of wit and wisdom are rare in books about the building trades. There are many of them, and they put Taylor at the doorstep of truly memorable writing.

At times, Taylor abandons his sharp wit for mush, searching to express the ineffable. His sentiments about "the *meaning* of tools, the aura of them" describe little and fail to inspire me. But these minor blemishes should not keep anyone from picking up the book or from thoroughly enjoying it.

—Strother Purdy

Mario Rodriguez teaches woodworking in Warwick, N.Y., and is a contributing editor to FWW. *David Mukamal Camp is a custom furnituremaker in La Cienega, N.M. Strother Purdy is an assistant editor of* FWW.

Listings of gallery shows, major woodworking fairs, lectures, workshops and exhibitions are free but are restricted to happenings of direct interest to woodworkers. Only workshops sponsored by not-for-profit groups are listed. 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.

ALABAMA: **Meetings**-The Alabama Woodworkers Guild meets the second Thursday of each month at 7:00 p.m. at Acton Moulding & Supply Co., Helena. For info, contact Steve Onisick at (205) 942-8075.

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.; Central Arkansas Woodcarvers meets the second Tuesday at 7:00 p.m. and the fourth Tuesday at 6:30 p.m. J.T. Shannon Lumber Co., Woodworkers Center, 6200 Sears Drive, Little Rock, 72209. (501) 565-1510.
Meetings-Ozark Woodturners meets the third Saturday of each month in Mountain Home. For more information, call Michael Kornblum at (501) 424-5893.

CALIFORNIA: **Lectures**-"New Discoveries in Shaker Paints and Varnishes" by Susan L. Buck, March 11; "Leon Marcotte: New York Cabinetmaker and Interior Decorator" by Nina C. Gray, April 8. American Decorative Arts Forum, M.H. de Young Museum, Golden Gate Park, San Francisco. For more information, contact Carol Fox at (415) 387-0905 or Pat Newman at (415) 499-0701.
Exhibition-Artistry in Wood '97, March 21-April 20. Sonoma County Museum, 425 7th St., Santa Rosa. For more information, call (707) 579-1500.
Show-Contemporary Crafts Market, March 14-16. Herbst and Festival Pavilions, Fort Mason Center Marina District, San Francisco. For more information, call (415) 995-4925.

CONNECTICUT: **Workshops**-Woodworking workshops held year round, Brookfield Craft Center, P.O. Box 122, Route 25, Brookfield, 06804. (203) 775-4526.

DISTRICT OF COLUMBIA: **Show**-15th annual Smithsonian craft show, April 24-27. For more information, call (202) 357-4000.
Exhibition-Washington Wood '97, May 1-26. Works by Washington Woodworkers Guild members. Rock Creek Gallery, 2401 Tilden St. N.W. (202) 244-3510.

FLORIDA: **Meetings**-South Florida Woodworking Guild meets every second Monday at 7 p.m. Constantine, 1040 E. Oakland Park Blvd., Ft. Lauderdale. For further information, contact Woody McLane at (954) 561-1716.
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. For further information, 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. For more info, contact Don Montgomery at (813) 898-0569.
Call for entries-Soft, Hard, Rough, Smooth: artwork for the senses. Deadline: April 3. For application, send SASE to Artists Unlimited Inc., Soft Hard, Rough, Smooth Exhibition, 223 N. 12th St., Tampa, 33602. (813) 229-5958.

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.

IDAHO: **Exhibition**-Idaho Woodcarvers Guild competition and exhibition, March 1-2. Boise Centre on the Grove, 850 W. Front St., Boise. For more information, contact Doug Rose (208) 336-4312.

ILLINOIS: **Classes**-Ongoing woodworking classes, all levels. Elston Woodworking School, 2228 N. Elston Ave., Chicago, 60614. (312) 342-9811.
Meetings-Fox Valley Woodworkers Club meets at 7:30 p.m. on the first Tuesday of every month in Batavia. For more information, call (708) 469-9517.

KENTUCKY: **Meetings**-Kyana Woodcrafters meets the first Thursday of each month. Bethel United Church of Christ, 4004 Shelbyville Road, Louisville, 40207. (502) 426-2991.

MAINE: **Meetings**-Guild of Maine Woodworkers meets the first Wednesday of every month. Call (800) 805-5100.

MARYLAND: **Show**-Columbia art and craft show, June 27-29. Columbia Art Center, 6100 Foreland Garth, Long Reach Village, Columbia. For more info, contact Rebecca Bafford at (410) 730-0075.
Show-Second annual woodworking show presented by the Galleries at Savage Mill and Historic Savage Mill Foundation, April 8-May 10. Deadline: March 15. For prospectus, send SASE to Joan Bevelqua, Mill Box 2007, Savage Mill, Savage, 20763. (301) 490-0187.

MASSACHUSETTS: **Classes**-Woodworking classes, most of the year. Contact Boston Center for Adult Education, 5 Commonwealth Ave., Boston, 02116. (617) 267-4430.
Workshops-Joinery, cabinetmaking, more. Hancock Shaker Village, Box 927, Route 20, Pittsfield, 01202. (413) 447-9357.
Classes-Year-round intensives in woodworking and wood carving. Horizons New England Craft Program, 108 N. Main St., Sunderland, 01375. (413) 665-0300.
Workshops-Woodworking with Bob Trotman, April 12-13. Worcester Center for Crafts, 25 Sagamore Road, Worcester. (508) 753-8183.
Workshops-Classes in woodworking held year-round. North Bennet Street School, 39 North Bennet St., Boston, 02113. (617) 227-0155.

MICHIGAN: **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: **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.

MISSOURI: **Meetings**-The Kansas City Woodworkers' Guild meets the third Wednesday of each month. For more information, contact Eugene Caples at (816) 452-6379.
Call for entries-St. Louis Art Fair, Sept. 5-7. Nationally juried fine arts exhibition. Deadline: April 1. For prospectus, send name and address to Saint Louis Art Fair, 2 Mark Twain Circle, St. Louis, 63105. (314) 863-0278.

NEBRASKA: **Meetings**-Omaha Woodworkers Guild meets at 7 p.m. the third Tuesday of every month. Westside Community Center, Omaha. For more information, contact John Cahill at (402) 334-5550.

NEW HAMPSHIRE: **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.

NEW JERSEY: **Auction**-C.R.A.F.T.S. annual spring tool auction, May 10. Flemington Elks Lodge, Route 31. For more information, contact Joseph Hauck (908) 221-7648.

NEW YORK: **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 Deckter 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.
Show-Woodworkers Expo '97, sixth annual woodworking show, April 5-6. Northeastern Woodworkers Association, Rexford. For more information, call (518) 371-9145.
Show-The Western New York woodworking show, March 14-16. Erie County Fairgrounds, International Agri-Center, 5820 S. Park Ave., Hamburg, 14075. For info, contact The Woodworking Shows, 1516 S. Pontius Ave., Los Angeles, CA 90025. (310) 477-8521.

NORTH CAROLINA: **Meetings**-North Carolina Woodturners meets the second Saturday of each month. For more information, contact the North Carolina Woodturners, P.O. Box 1833, Hickory, 28603. (704) 324-5960.
Exhibition-Gallery Americas Southern furniture exhibition, May 1-June 16. Contact George Melone, Gallery Americas, Historic Carr Mill, Carrboro, 27510. (919) 929-1002.
Call for entries-The Chair Show II. Deadline: June 4. Judges include Sam Maloof and Wendy Maruyama. Contact Katherine Duncan, Chair Show, Southern Highland Craft Guild, P.O. Box 9545, Asheville, 28815. (704) 298-7928.
Show-The Charlotte woodworking show, March 7-9. Merchandise Mart, Freedom Hall, 2500 E. Independence Blvd., Charlotte, 28205. Contact The Woodworking Shows, 1516 S. Pontius Ave., Los Angeles, CA 90025. (310) 477-8521.

OHIO: **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 more info, contact the club at 10125 Montgomery, Cincinnati, 45242.
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.

OREGON: **Meetings**-Cascade Woodturner's Association meets every third Thursday. For more information, contact Cascade Woodturners, 11575 S.W. Pacific Highway, #104, Tigard, 97223. (360) 834-6325.
Meetings-The Guild of Oregon Woodworkers meets the third Wednesday of each month (except December) at 7 p.m. For further information, contact the guild at P.O. Box 1866, Portland, 97207-1866. (503) 492-1515.
Show-With the Grain III: Works in Wood, April 26-May 27. Cook Gallery, 705 Oregon St., Port Orford, 97465. For info, call (541) 332-0045.

PENNSYLVANIA: **Show**-Fourth annual Wharton Esherick Museum woodworking competition and exhibition. Deadline: July 1. For info and application, send SASE to Wharton Esherick Museum, P.O. Box 595, Paoli, 19301-0595.

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. (423) 436-5860.
Classes-Lumber selection and more. For more information, contact Tennessee Valley Authority, 17 Ridgeway Road, Box 920, Norris 37828-0920. (615) 632-1656.

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.
Meetings-North Texas Woodworker's Association meets the third Tuesday of each month. For info, contact Bruce May, P.O. Box 831567, Richardson, 75083. (214) 271-0125.

UTAH: **Symposium**-1997 Utah Woodturning Symposium, June 5-7. Brigham Young University, Provo. For more information, call (801) 378-2021.

WASHINGTON: **Juried show**-The Kitsap County Woodcarvers 11th annual show, March 15-16. Westside Improvement Club, Bremerton. For more info, call (360) 373-6173.

WEST VIRGINIA: **Workshops**-Progressive Windsor chairmaking, March 9-14. Crafts Center, Cedar Lakes, Ripley, 25271. (304) 372-7873.

WYOMING: **Show**-Art and Healing, art created or influenced by the healing or dying process. Oct. 4-Nov. 11. Deadline: July 10. Send a SASE to Mary-Alice Huemoeller, Coordinator, P.O. Box 256, Wilson, 83014. (307) 733-4462.

CANADA: **Association**-Canadian Woodturners Association, Markham, Ont. For more information and to receive newsletter, call (905) 479-0755.
Meetings-West Island Woodturners Club (Montreal) meets every Tuesday, thru May. For more information, 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.

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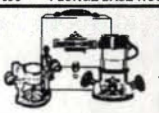

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READER SERVICE NO. 181

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Alluring business

I love to fish and so does a woodworking buddy of mine. For his bachelor party, he decided to go deep-sea fishing, so I made up a few giant lures to take along for a gag. When we got back to shore, a gallery owner noticed the big lures and offered to buy them. Soon she called for more. As word spread, I began getting calls from people wanting lures to hang in their homes and offices. I soon found myself in the business of making decorative lures.

In the last two years, I've made more than 300 lures reminiscent of the classic wooden plugs I used when I was a kid fishing for bass in the bayous of Louisiana (see the photo at right). I have 10 different lures in my Big Time Bait line, but I'll occasionally make a special order for a client who sends me a lure to reproduce. My lures range from 16 in. to 30 in. in length and are 2 in. to 6 in. thick.

The lures are made of cypress, which I get from my hometown of Ponchatoula, La. The round, plug types of lures are turned on the lathe from 6-in.-thick, glued-up blocks. The flatter types of lures are bandsawn and routed from 2-in. stock and shaped on an inflatable sander. The paint job is especially important. A realistic scale pattern may need as many as nine coats of paint, followed by a thick coat of spar varnish, which gives it an old-timey look.

I still haven't given up traditional woodworking and continue to make sidechairs, music stands and other items, but the popularity of my Big Time Bait really has me hooked. *—Ken Picou, Austin, Texas*

Photo: Matt Lankes

***Big fish tale**—Ken Picou's first big wooden lures started out as a gag for a buddy, but once a gallery owner noticed them, a demand was created and a new business born.*

Woodworking in a closet

I practice woodworking under what might be considered impossible conditions. For one, I live in an apartment in Belo Horizonte, one of Brazil's largest cities, and must do with a workshop that is just a closet off the kitchen. I've chosen to work with an endangered species of wood—rosewood—which is practically not available except for old scraps. And I'm married to a woman who pursues cleanliness with the same passion that I bring to woodworking.

Woodworking for me involves using many of the same tools 18th-century craftsmen used. But I'm sure they didn't have to cope with neighbors who can't tolerate the sound of a pounding mallet and household rules that require me to wash the walls and floors of the kitchen lest a speck of sawdust remain after working on a project.

I own but one power tool: a ½-in. portable drill with a few attachments, including a small saw. I've amassed a respectable collection of hand tools, and with them, I have created classic Brazilian furniture at the rate of about one piece a year (see the photo at right and the bottom photo on p. 120).

Although I make my living in the world

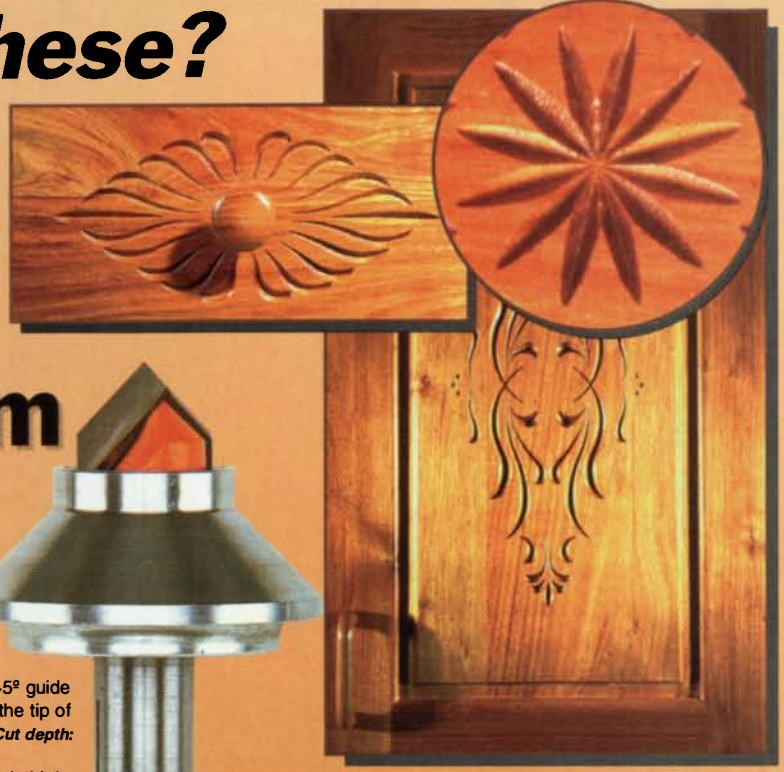
***Going for Baroque**—Using rare, salvaged rosewood, Dilo Marcio Fernandino built this 18½-in.-tall Baroque-style shrine.*

Bottom photo: Dilo Marcio Fernandino

Can you carve these?

Sure you can, with CMT TOOLS' exclusive

3D Router Carver™ System



What is the 3D Router Carver™ System?

The 3D Router Carver System is a unique patented method of producing intricate carvings quickly, economically and with complete repeatability. With the Carver Bit, Carver Templates and your 1/2" collet plunge router you can carve any flat wooden surface with designs that rival the work of a professional carver. In fact, the 3D Carver System's speed, accuracy and economy make it equally attractive to the professional or the serious amateur. Besides your router, the system requires three key elements:

1) The 3D Carver Bit: A 1/2" shank, carbide tipped V-Groove Bit is enclosed in a 45º 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: 45º 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 produce a host of designs for cabinet doors, panel doors, door rails and corners, drawer fronts and many other applications.

How does the system work?

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 45º 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!

Where can I learn more?

Order our new 3D Carver Pattern set (at right), which includes full-size drawings of all 46 designs packed in a 3-ring binder. Or order the 3D Carver video (below), a step-by-step demonstration of all of the system's capabilities.

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3D Carver Video
List: $13.00 SALE: $10.00

NEW! **Complete 3D Carver™ Pattern Set**

Includes 42 pages of accurate, full-size drawings packed in a sturdy 3-ring binder

3DC-900
Pattern Set, List: $20.00
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What's the best way to get started? With our 3D Carver Starter Kit

You'll get our Classical Kitchen Door and Drawer templates, two holding frames, a 3D Carver Bit and our 3D Carver Video. That's everything you need to carve the beautiful Classical-style door and drawer front shown at right.

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*The color orange on router bits is a registered trademark of CMT Tools™

READER SERVICE NO. 191

of finance, I've always had a fondness for the craft of woodworking. I'm especially drawn toward a Baroque style of carving unique to Brazil, which was influenced by the Portuguese who colonized the region.

Because rosewood is an endangered species and illegal to cut, I have to spend a lot of time hunting down scraps. I've managed to find old hollow logs or irregular pieces rejected by rural cabinetmakers. Many of these pieces were cut 100 years ago, and as a result, are very hard.

There's a wide variety of figure and color in the lumber I get. When I build a piece, I have to spend much time making sure I get a good match. I also have to size my furniture based on the sometimes odd dimensions of the available lumber.

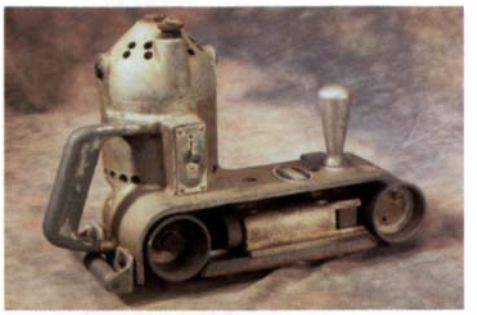
Concerns about noise restrict my use of the drill and any heavy mallet work to weekend days. Occasionally, I take stock to a cabinet shop to have a large piece cut or turned. I hand joint, plane, groove, mold and carve all of my furniture. I never apply carving details, but rather chop them out from solid stock.

Sometimes, I wish I didn't have so many obstacles standing in the way of my hobby. But maybe, because of those challenges, when I put a final coat of wax on a piece of furniture, I'm overcome with an indescribable feeling of triumph.

—Dilo Marcio Fernandino, Belo Horizonte, Minas Gerais, Brazil

Undeterred by lack of workshop space—*Working out of a closet-sized room, Fernandino takes up to a year to build pieces like this rosewood silverware cabinet.*

Porter-Cable tools added to Smithsonian



Porter-Cable's B-5 Take-About sander, the world's first portable belt sander.

The world's first portable belt sander, the B-5 Take-About, is now part of the permanent collection at the Smithsonian Institution's National Museum of American History. The sander (see the photo above) was introduced in 1926 by the Porter-Cable Corporation; it sold for $110. The sander was among a number of early portable power tools the company gave to the museum last fall. There also was the K-88 Speedmatic, an early circular saw, and the 104 Sterling sander, the world's first orbital finishing sander. *—Scott Gibson, editor*

Peter Joseph Gallery closing in New York

A landmark gallery for art furniture in New York City closed in January. The Peter Joseph Gallery opened in 1991 on Fifth Avenue and had been a showcase for work by a number of well-known woodworkers, including Wendell Castle, Rosanne Somerson and Wendy Maruyama.

Founder and owner Peter T. Joseph plans to resume collecting. The gallery's president, Michael W. Monroe, joined the American Craft Council late last year. *—S.G.*

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 06470-5506.***

Top photo: courtesy Porter-Cable; bottom photo: Dilo Marcio Fernandino

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Building a guitar

I don't recall exactly why or when I decided to build my own guitar. I guess it had something to do with the notion that a person who can't play a guitar can at least do the next best thing, which is to make one. It may be like the carpenter who builds houses he could never hope to buy.

As a kid, I never had much desire to build anything, not even the model cars and airplanes that every other kid in the neighborhood was building. The urge to actually work with wood did not enter my head until much later when I married and needed furniture. Then I started looking at woodworking magazines. I began lusting after tools and hanging out in shady hardware stores. In no time at all, I had graduated to slick, professional journals that cost about as much per issue as a small piece of furniture. I read issue after issue. In my mind, I was building masterpieces.

But to begin, I needed tools, lots of tools. That was the first thing I learned. So I went out and bought a tablesaw. Then a router, a drill press, a bandsaw, a sanding machine, two back saws, a coping saw, a scroll saw, some files and some planes—a block plane, a jack plane and a smoothing plane. For the money I spent on tools, I could have outfitted my house with Stickley furniture. Instead, I filled it with projects that were built from the inspiration of magazine blueprints: bookcases, desks, a couch with a frame made entirely from scrap plywood, a coffee table and a big entertainment center.

When one day my wife deemed my projects "hippie furniture," it didn't faze me a bit. I simply pushed those neoprene ear plugs in a bit deeper and plunged on, with the router screaming, the tablesaw whining and the electric bill soaring through the roof. What did *she* know about woodworking?

Eventually, I was bitten by the build-your-own-guitar bug. I suspect the idea originated in the pages of one of my many woodworking magazines, maybe from an article describing how easy it is to build a guitar, or from an advertisement hawking guitarmaking supplies.

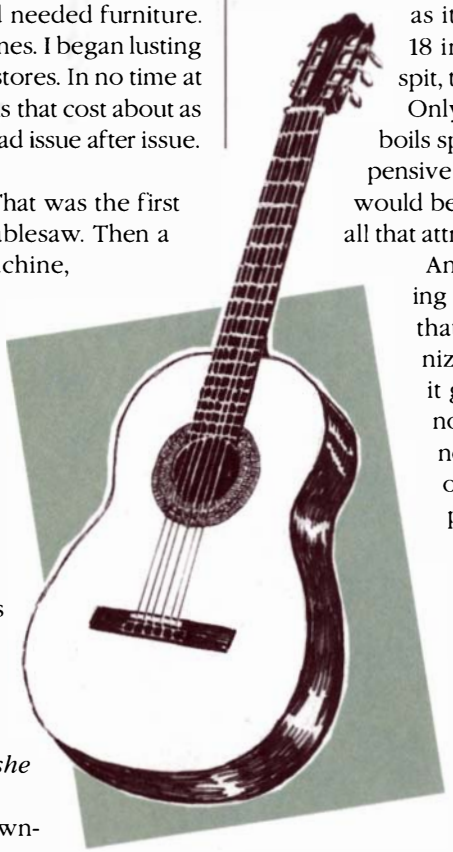
I found a company in California that sells everything a person could need to build a stringed instrument. Everything, that is, except the skill. And for that—at a reasonable price—they will supply you with videotapes that detail, step-by-step, the process of building a guitar.

I got to know the company well. I learned that to build a guitar, the first things needed are clamps, enough to fill a good-sized dump truck: spring clamps, clothespin clamps, C-clamps, deep-throated C-clamps, pipe clamps and cam clamps. Building a guitar is essentially a process of acquiring and clamping clamps.

To build a guitar, you follow a pattern, kind of like sewing a dress. You cut and then you smooth the wood to match the pattern. It's really pretty easy—time-consuming, maybe, but easy. Do not, however, try to cut the wood on a bandsaw while dreaming of how famous you will become by building guitars that are just as good as a Martin. In doing so, I nearly lost an index finger.

The truly mysterious part of guitarmaking is bending the thin sides of the guitar into shape. First you soak the wood for the sides in warm water (a bathtub is perfect) for 15 or 20 minutes, and then you take it to the torch—a simple torch, just propane, the kind you get for a few bucks at the hardware store.

Direct the torch's flame inside a metal pipe that you have clamped to a board. The pipe can be any old piece of pipe as long as it has a diameter of about 3 in. and is 12 in. to 18 in. long. When the pipe is hot enough to boil spit, then you're all set to start bending the sides.



Only don't do it if the pipe is *that* hot. A pipe that boils spit is also hot enough to scorch wood. Thin, expensive guitar wood scorches more easily than you would believe possible, and black scorch marks are not all that attractive on a finished guitar.

And here is another piece of advice: If your bending pipe is just any old piece of pipe, make sure that it is not zinc-coated. My first one was galvanized, and I still have a little cough from the fumes it gave off. Also, during the bending, make sure not to set fire to the sides. Flaming the wood will not improve its appearance. "Flamed" maple is often used to build guitars, but it's from a completely different kind of flame.

After bending the sides and clamping them in a mold, you're all set to glue on the top (called the soundboard) and the back (called the back). You'll already have put in the braces, so it's just a matter of truing, gluing and clamping and the soundbox is ready.

All that's left to do is cut slots for frets in the fretboard, attach the fretboard to the neck, cut slots for the tuning pegs at the end of the neck, install the frets, install the tuning pegs, attach the neck to the body, slap on a coat of finish, buff it out and, voilà, you've just built a guitar. Now install the strings, tune up and attach a price tag.

See how easy it is? Building a guitar is just a matter of practice. And it's the ultimate in woodworking. Build a guitar, and the world will be impressed.

I know. I've been at it for two years now. And as soon as I master the art of side bending, I will be able to finish that first guitar. It's sure to become a collector's treasure. Then I will be able to call myself a luthier, a guitarmaker, a master of my mysterious craft. An artist. I can see light at the end of my bending pipe, and this time, it's not just the curtains catching fire again. □

Mike Sheffield is a dairy farmer, writer and amateur woodworker in Blossvale, N.Y., who is currently making a guitar.

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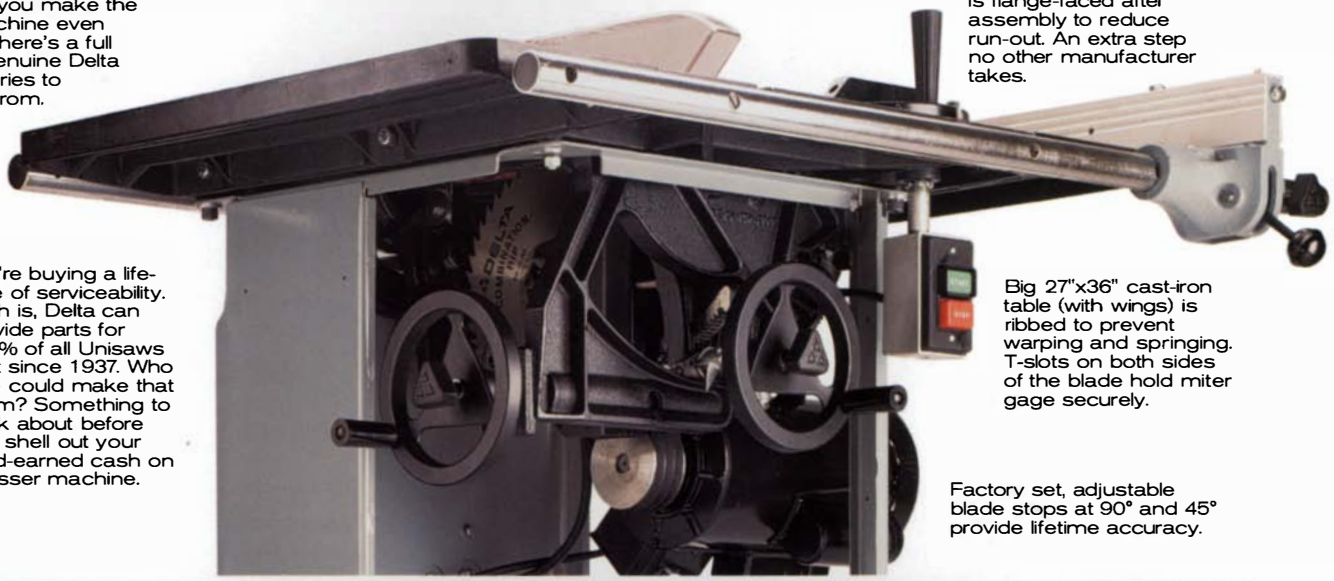

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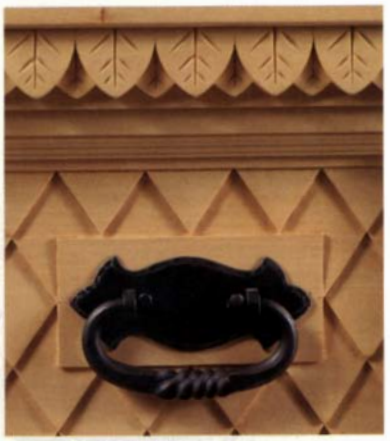
By a father, for his daughter



When John K. Muse retired and had some free time on his hands, he built hope chests for his daughters. He was inspired by *bauernmöbel*, or country furniture, that he had seen on trips to Austria, Germany and Switzerland. He built and carved the chest shown above for Elisabeth, whose name appears in the base below the front panel. The flat relief carving on the front panel is in contrast to the more three-dimensional shapes on the corner frames and the base. Muse spent two years designing, building and carving this chest, inspired by his daughter's love of nature. Alpine originals were often made of linden wood; Muse chose American basswood as a close substitute. It, too, has agreeable carving properties.

Photos: William Duckworth