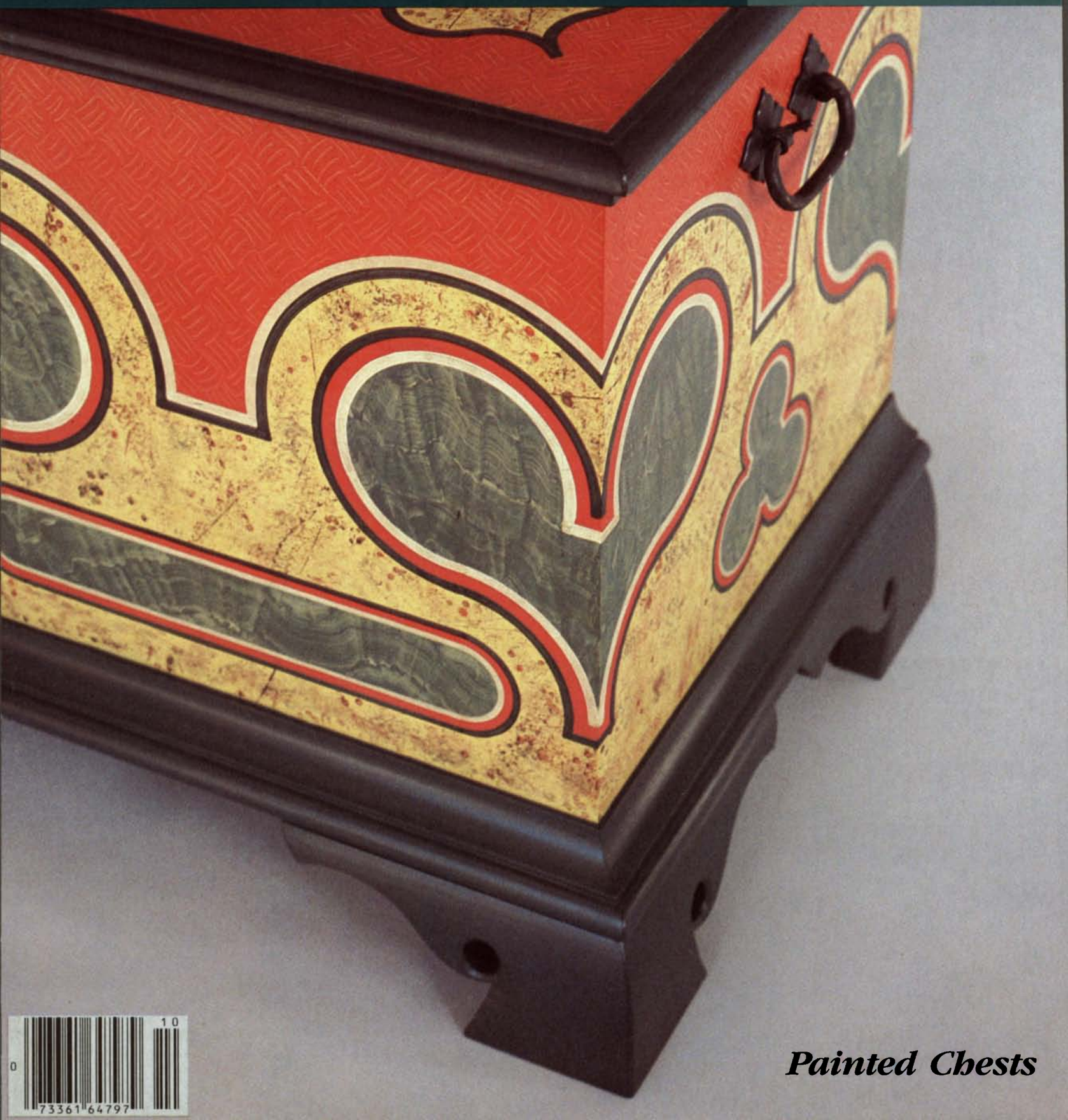
September/October 1984, No. 48, $3.50

Fine WoodWorking

- Berea Woodworkers
- Starting Out: Edge-Joining
- Plans: Hepplewhite Chest Sharpening Wheel
- Turning Music Boxes
- How to Make Tambours



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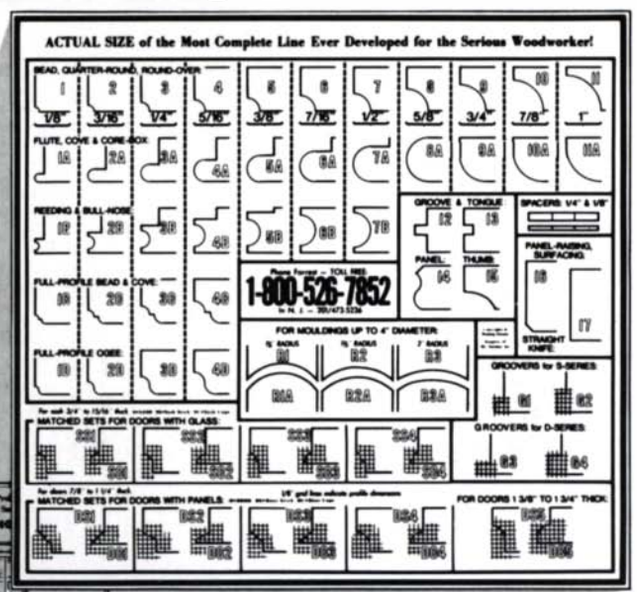

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Fine WoodWorking®

September/October 1984, No. 48

With a base coat of latex paint, a rich palette and a deft touch, Ric Hanisch transformed this plain chest into the beauty shown on the cover. For more, see p. 64.

For the beginner: hand-plane basics for flattening and edge-joining boards. See p. 46.

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Departments

Articles

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This is in response to J. Robison Krup (*FWW* #45) on the **use of fruitwoods.** I have no experience with their use as lumber, but as a dedicated wood sculptor, I've found that lemon, orange and grapefruit are medium-hard woods, are buttery to cut, take a silky finish, and occur in a wide variety of colors and markings. The logs are difficult to season without checking, but then, what isn't? Loquat is pure silk, so is olive. I find avocado too spongy for my taste, but some carvers love it.

I, too, feel a terrible sense of loss when these beautiful woods are wasted. Creating objects from them satisfies a deep need to recycle and preserve a truly precious commodity.

—Lester Kleinberg, Los Angeles, Calif.

Like C.J. Frame (*FWW* #47, p. 14), I've had **rusting problems** on tools and I also have acidic skin, which can cause additional rust. I've found that you can completely resolve these problems by using a solution of natural beeswax and painters' sub-turp (mineral spirits). The best part is that the viscosity is entirely up to you and no measuring is required. Place chunks of wax in a large glass jar and add enough subturp to cover the wax. In three to five days the wax will be in solution and you can add either ingredient to thicken or thin the mixture as needed. This mix is great for wood or metal, and I've been using it on my tools for more than ten years. It can be reapplied as required.

—Don Henschel, Shelton, Conn.

Beeswax is recommended for lots of things. Me, I keep some in a hole in my hammer handle—it's just the thing for lubricating nails and screws. But where do you get beeswax these days? Easy. Pick up a toilet-bowl seal ring at the local plumbing supply house. *—Jeff Crawford, Austin, Tex.*

Ian Kirby's article on **laying veneer** in *FWW* #47 is the finest discourse on the subject I've ever seen and I'd like to add this tip. Some of the lumberyards in this area offer a particleboard that measures 30 in. by 72 in. and is 1⅛ in. thick. In my work, I've used this as the lower caul for veneering. I overlay it with hardboard, which I then cover with a thin plastic film (such as Saran Wrap) to protect the board from glue squeeze-out. I tape the plastic to the hardboard with masking tape, then dispose of it after I've removed the veneered piece from the press. It's an inexpensive expedient to cleaning up dried glue later. *—Frank Biewer, San Diego, Calif.*

We have been in business for many years, and **insuring our shop against fire loss** is a major yearly expense. We can't be the only ones in this position. There must be companies out there who are willing to insure woodworkers at a realistic rate. It would be nice to find them. Also, with the number of subscribers your magazine has, I wonder if it would be possible to form a group to get a good rate on health insurance for us self-employed artists?

—Armin Gollannek, Munising, Mich.

It was with much sadness that I read of the death of **A.W. Marlow** in the May/June issue. I, too, feel as if I have lost a good friend. I first met Marlow through his book, *Fine Furniture for the Amateur Cabinetmaker.* I had never before encountered an authoritative book on cabinetmaking that was so well written and so nicely illustrated. For a number of years I wondered if the author was still alive.

Around 1970 I had an opportunity to visit Marlow in his shop, and I was finally able to thank him for the help and inspiration he had given me through his book. We have lost not only an outstanding cabinetmaker, but an author who was uniquely gifted to write succinctly in a way that is both superbly instructive and inspiring.

—H.A. Kuehnert, Bartlesville, Okla.

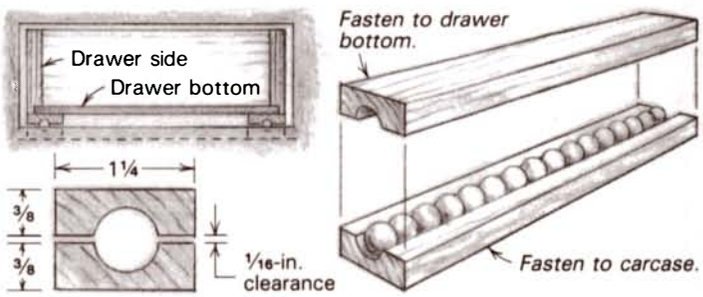
Mr. Schramm, of Los Gatos, Calif., wrote in *FWW* #46, p. 12, about a method for stabilizing wooden candlesticks by **pouring molten lead** into the bottoms. Let me recommend good ventilation and a strong crosswise draft! Molten lead produces lead fumes, and lead fumes in the lungs is a quick route to lead poisoning. One of the shudders of my early years as a chemist for a railroad was to hear about workers who could press pus from under their fingernails—advanced lead poisoning. Their occupation? They ladled a molten lead alloy out of an open pot into brass bearings. They don't do that anymore. *—Elton Schooling, Sacramento, Calif.*

Re **hide-glue preservative** (Q&A, May/June). My maestro, Richard Schneider, brought the following procedure back from his apprenticeship in Mexico: Chop a few cloves of garlic as fine as possible, wrap them in a tightly woven cotton cloth, and tie with a string to make a sachet-like bag. Drop the bag into the hot glue. When the glue foams, skim the foam off. Leave the bag in the pot until the glue has been all used up or discarded. *—Abraham Wechter, Paw Paw, Mich.*

Mr. Irion's assertion (*FWW* #46, p. 8) that the **Inca tablesaw** is unsafe could not be further from the truth. I have personally found the saw to be exceptionally safe. Mr. Irion is correct in his assertion that it is inherently unsafe to run a blade on an Inca tablesaw more than ¼ in. above the stock; however, changing the blade in order to stay safe is one of the minor concessions one makes in owning the Inca saw.

—J. Douglas Armitage, Madison, N.J.

My workbench has several drawers, all with wooden glides. One of the drawers seems to always end up full of junk, and gets rather heavy. One day in my shop I came upon a jar full of marbles that my kids had left lying around. I thought, why not **make a drawer glide out of marbles**? The drawing below shows what turned out to work well, and, much to my



surprise, the system is not as noisy as I'd thought it might be. The marbles are small, about ½ in., as used in Chinese checkers. This makes the grooves easy to machine with either a ½-in. core-box router bit or a molding head on the tablesaw.

—Horace L. Adams, Mount Dora, Fla.

Re Brian DeMarens' comment about the **poor tracking** of a Sears belt sander (*FWW* #47, p. 18). Following four repairs for the same problem within less than two years, I gave up. I packed my sander carefully and sent it to the Sears president in Chicago. I told him I didn't want it and suggested that it be mounted in the lobby of Sears Tower as testimony to poor quality control.

His reply letter admonished me. I was advised that there were no repair facilities at Sears Tower—missed the point, huh? My gesture was attention-getting, however, and the re-

gional manager arranged full credit to my Sears account even though I had asked for nothing. I then went out and bought a Makita. Beautiful! —*Abbott Shilling, Kennett Square, Pa.*

Re **doweling jigs** in *FWW* #45. I have a Dowl-it #2000 jig for which I had a local machinist make a new center drill guide with all four holes drilled and tapped to use the threaded bushings that come with the jig. This lets me have a choice of four spacings when drilling for two dowels without moving the jig. I seldom use 7/16-in. or ½-in. dowels, so I think this is a great improvement over the standard arrangement.

—*James E. Keesling, Lynn, Ind.*

I am certain that Ann Taylor spent a good deal of time preparing her article ("Plywood Basics," *FWW* #46), but it misrepresents **what plywood workshops really do.** It also attempts to give credibility to a pseudo-craft and glosses over the underlying issue of product quality and integrity.

The plywoods construction market is vast and growing, due in part to the rapid proliferation of shopping malls and the need for quick and durable store fixtures. Mall shops go up overnight and speed is everything. As a result, all boxes, square, tall, round, short, birch or mahogany, are built the same way: with a router and a staple gun, not with a dado head on a tablesaw. There are no joints in box furniture, save one: the full ¾-in. rabbet stopped an inch from the front edge of the case. There is little left for the "cabinetmaker" to do but glue, clamp and staple.

Panels are *never* cut oversize. Time does not permit it. Everything is cut to size the first time, usually on a panel saw or hybrid tablesaw, some even computerized. One shop I know of has a man who does nothing but cut panels from prepared lists. The panels are wheeled over to the workbenches, where they are glued, clamped and stapled. Sound exciting? Hardwood edging is also used, but to save time it's applied with contact cement and a hard rubber mallet. Ian Kirby may level his edges with a plane, resting carefully on the veneered surface, but most shop workers simply grab a belt sander and grind away.

At any rate, I can't figure out why this stuff is in your magazine. Some detailed prints of the bureau on p. 79 of that issue would have been much more invigorating. Plywood casework has become a major industry that masquerades as woodworking and stifles woodworkers who get stuck in shops that grind out banal pieces that cheapen us all. As much damage as they have done in the past, there may be a place for unions in these shops where the bosses buy new cars instead of dust-collection systems. *Fine Woodworking* doesn't belong in this league. Your precedents are too strong. I suggest that you take a look at Cleopatra's mirror in #46—that's a lesson in compromise also.

—*H. Ivan Hentschel, Leesburg, Va.*

More on Taiwanese tools

I bought one of those **Taiwanese tablesaws** advertised in your magazine. I called the importers, Andreou Industries, and questioned them about the quality and origins of the saw before I ordered it. They described it very honestly and made it clear that it was not the same thing as the Rockwell contractors' saw, which it resembles.

I have used the saw for four months in my work as a cabinetmaker and trim carpenter, and I'm very pleased with it. It's not quite as heavily constructed as the Rockwell, but it's certainly superior to similarly priced tools and vastly superior to the Sears saw that has been the object of so much discussion.

—*Dan Barton, Austin, Tex.*

I'd like to make **some points overlooked** in the Taiwanese tool article (*FWW* #46, pp. 54-57). When a distributor becomes an importer, that company provides the only recourse for solving customer problems. The customer is not able to pressure a foreign manufacturer to assist with service problems, as he can a domestic manufacturer or a foreign company with U.S. offices. Most important, however, is that if a defective machine causes bodily injury, the importer is the last defendant in a product-liability suit. Most machinery distributors who import are, in my opinion, grossly underinsured and open to potential bankruptcy. As the old saying goes, you get what you pay for. —*Harry S. Bratton, Bratton Machinery and Supply, Tallahassee, Fla.*

Over the past several years **I've owned and sold four planers**—Woodmaster, Belsaw, Parks and Rockwell—and I've had access to many others. Grizzly's ad several issues back caught my eye. I sent for their catalog and also wrote to them for additional information, which they promptly supplied. To further my confidence, I purchased a crossfeed vise for my drill press and found it to be excellent.

After selling my 12-in. Belsaw, I ordered the 15-in., 500-lb. Grizzly planer for $895, delivered. It's not the one shown in your article. On mine the head is stationary and the planing table is movable. Being a very picky person when it comes to machines, I must say that for the money this is a number one machine. At Rockwell's price of $1900-plus, I can buy two Grizzlys and have money left over.

—*Raymond Yobe, Altoona, Pa.*

Your article gives the impression that most Taiwanese motors last a few hours or run erratically, **erroneous information** that strikes fear in the hearts of potential buyers. There are two types of motors: induction-type, which are used on stationary power tools like jointers, planers, larger tablesaws, and bandsaws; and universal-type (also known as carbon motors), which are smaller, router-type motors yielding large horsepower ratings. They are used on cutoff saws and the portable, benchtop tablesaws.

Router-type motors (like the one pictured on p. 56 of that issue) are giving Taiwanese motors a bad name, as they do not stand up under normal use. Taiwanese induction motors have a better record, but they vary in quality. If the original motors on equipment we import from Taiwan aren't up to snuff, we sometimes get motors from an independent manufacturer installed at the factory. Unlike some U.S.-made motors, the majority of Taiwanese motors do not have any overload protection, and will overheat and burn out if the operator does not recognize their limits. For this reason, we put magnetic overload switches on our heavier machines.

We would add these tips for buyers:

—Make sure that the equipment you are considering has an induction-type motor. Motors should have ball bearings, not bushings.

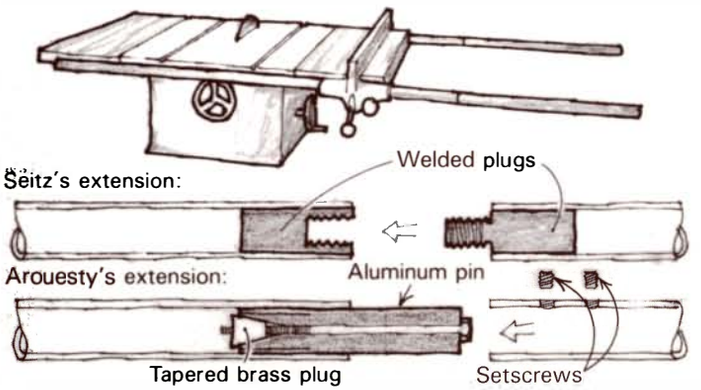
—If you can't actually see the machine, ask for a reference of someone who has bought a similar machine. This will give you first-hand information of how the product is standing up.

—Finally, check the wiring for grounding, loose connections and proper voltage. You may sometimes get a dual-voltage motor that is wired to 220V but has a 110V plug. Taiwan is notorious for this, and a 15-minute check might make the difference between a long or short life for your motor.

—*Shiraz Balolia, Grizzly Imports, Bellingham, Wash.*

edited and drawn by Jim Richey

Rip-fence extensions, two ways



My decision to extend the rip-fence rails on my Rockwell contractors' tablesaw came after a 4x8 sheet of plywood I was cutting "freehand" kicked back on me. I removed the tubular rails, took them to a machinist, and asked him to extend them so I could easily set the fence up to 48 in. The machinist welded a 2-in. steel plug in the end of each rail, drilled a ¾-in. hole through the plug, then tapped the hole with a coarse thread. He made the 24-in. extensions from tubular steel the same size as the rails and fitted each extension with a thread that screws into the plug in the original rails. These extensions have saved me countless hours of production time.

—Stephen Seitz, Oleyo, N.Y.

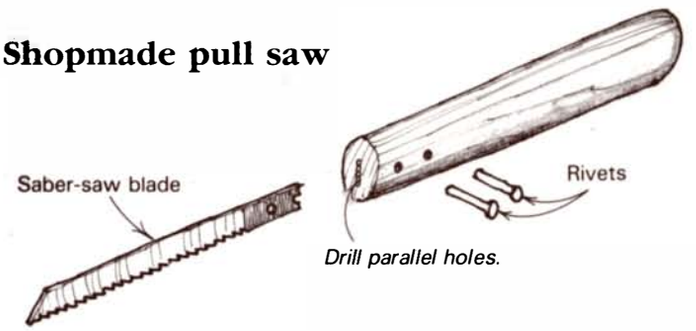
To extend the rails on my Rockwell tablesaw, I purchased a second set of tubular rails and devised expanding aluminum pins to attach them to the original rails. I drilled a bolt hole through the length of each pin and slotted the inner end, as shown in the sketch, so it could expand to lock the pin in the rail. With the pins locked into the original rails, I slip the spare rails on and fasten them in place with setscrews, which are located on the inside so they'll clear the rip fence.

I'm pleased with this system because I can remove the rails when they're not in use and I can use the saw's racking "micro-adjustment" mechanism all the way across.

—Raymond Arouesty, Reseda, Calif.

Quick tip: Sanding-belt cleaners work great, but you don't have to shell out $10 for the commercial version. Just rip the soles from some discarded desert boots or other shoes with crepe-rubber soles. *—Greg Kindig, Harrington, Del.*

Shopmade pull saw



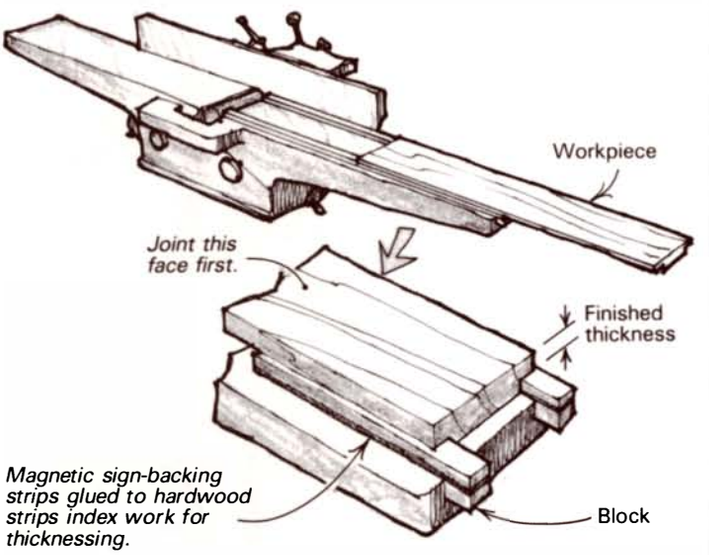
I don't own a saber saw, but I do buy the blades—they make the handiest small saws in my shop.

First, choose a drill bit the same thickness as the sawblade and drill four or five holes side-by-side in the end of the handle blank. Using the blade as a template, mark the location of the rivet holes on the side of the blank. Now clamp the blade upright in a vise and tap the handle over it. Drill holes where marked, rivet the blade securely in place, and shape the handle to suit. *—Stefan During, Texel, Holland*

Thickness-planing on the jointer

Tage Frid, in *FWW* #19, p. 94, describes how to thickness boards on the jointer. Frid's jig is a precision wooden affair that requires removing the jointer's fence to work. Here's a simpler way. From a signmaker obtain two 1-in. strips of flexible magnetic sign backing and glue each to a hardwood strip to produce two ½-in. thick sticks as long as the infeed table. Glue a hardwood block on the end of each strip to keep it from creeping into the cutterhead.

Before using the setup, first joint one face and both edges of the board to be thicknessed. Rabbet the edges, as shown on the workpiece in the sketch.



Now snap the two strips in place on the infeed table so the rabbets ride the strips like rails. Run the workpiece down the rails, across the cutterhead and onto the outfeed table. In this manner, it is the uniform rabbet that indexes the work; the irregular face doesn't touch the infeed table at all. Start with a light cut, then gradually lower the infeed table with each pass until the rabbets are only 1/16 in. deep. On the last pass, just skim off the wood down to the rabbets to produce the final thickness.

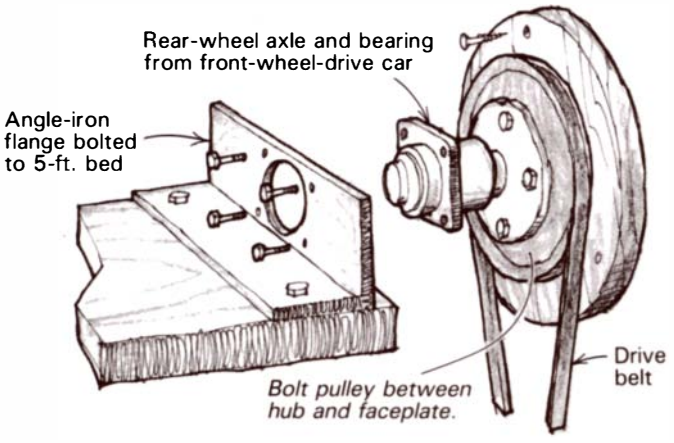
The magnetic strips can be easily adjusted to different-width boards, and there's no need to remove the jointer's fence to use them. When the job is done, it takes all of three seconds to convert your thickness planer back to a jointer.

—Robert Edmondson, Bowmanville, Ont.

Quick tip: I made my router table with a plywood top and a pair of sawhorses as legs. In order to allow easy knockdown, the tops of the sawhorses simply fit into dadoes beneath the plywood. This gives me a little more room in the shop when needed and frees the sawhorses when I want to use them for other things. The table has a spare router base permanently attached—the router can quickly slip out of this, put on its other bottom, and be ready to tackle other jobs. Best of all, I made the table the same height as my tablesaw, so it can double as an outfeed table, which is actually how the whole idea started. *—Ed Devlin, Rothsay, Minn.*

Homebuilt outboard lathe

Turning circular tabletops on my regular lathe was less than satisfactory. The outboard spindle was just not designed for large, unbalanced, rough work. When a friend offered me a rear wheel and axle bearing from a front-wheel-drive car (G.M. No. 1-7466906), my ideas for a special homebuilt outboard lathe came together. I figured that if the hub could



handle a car wheel, it would be ideal for turning a tabletop.

I bolted the wheel assembly's brake flange to a 12-in. long section of ¼-in. thick, 3x3 angle iron as shown, and lag-screwed this to a rigid yellow-pine bed about 5 ft. long.

The lathe faceplate is a 1-in. thick, 11-in. dia. oak disc. I bolted the faceplate directly to the hub with a 9-in. pulley sandwiched between. The headstock/pulley assembly is permanent, and after installation the faceplate should be trued round and faced flat.

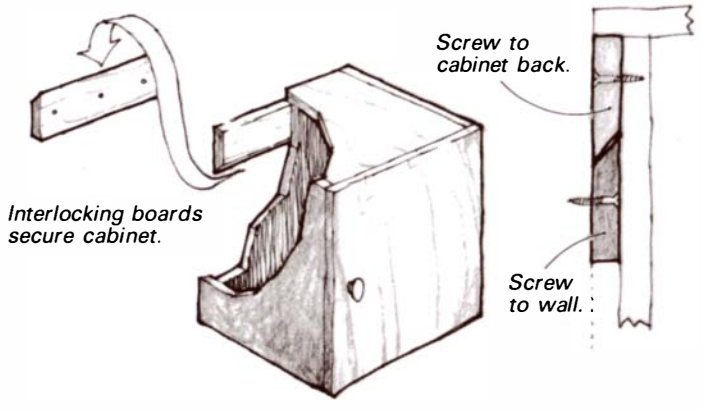
To power the lathe, I mounted a ½-HP, 1725-RPM motor with a 2-in. drive pulley.

The easiest way to fasten the work to the lathe headstock is to drive screws through the rim from the back side. Of course, more elaborate faceplate-fastening techniques can be designed for special projects if needed.

Even on the first project, the lathe exceeded my expectations with its quiet, vibration-free performance.

—Lawrence Wachenheim, Quincy, Ill.

Wall-mounting cabinets

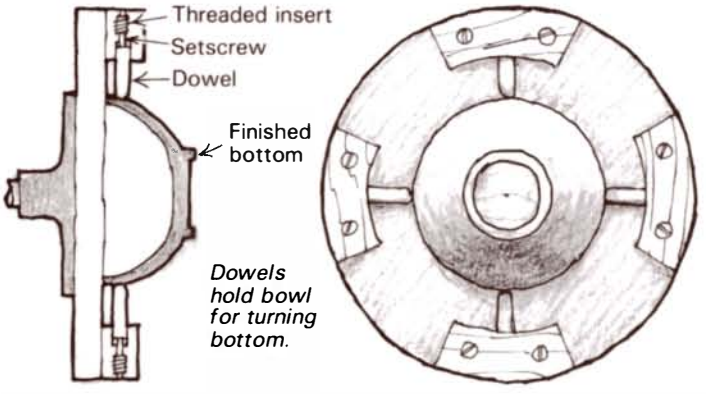


This simple method for hanging wall cabinets is fast, easy and accurate. To make the mount, rip a ¾-in. thick board in two at a 45° angle. Screw one half to the wall to form a perch and screw the other half to the cabinet back, which should be recessed ¾ in., as shown. Then just slip the cabinet over the perch board—a one-man operation. As a bonus, the cabinet can be easily removed whenever needed.

—George C. Muller, Union, N.J.

Bowlturning chuck

I make bowls by turning the top and inside first, then reversing the blank and turning the bottom. This lets me use a standard faceplate for the heavy roughing-out and hollowing operations. For the second step, I switch to a special chuck to finish the bottom. The shopmade chuck described here does a good job—four dowels grip the bowl's rim and provide adjustment for centering. To make the chuck, mount a ¾-in. thick, 12-in. dia. disc to a faceplate, true it and mark the center. Remove the disc and screw four 1-in. thick, 2-in. wide segments to the rim 90° apart. Return the disc to the lathe and true the segments into semicircular arcs 1½ in. wide. Remove the disc again and mark the centerline of each segment radially for installing a threaded insert. Counterbore each segment from the inside (remove if necessary) to accept a ⅜-in. or ½-in. dowel pin. Screw hex-head setscrews in the threaded inserts to tighten the dowels against the bowl rim.



To use the chuck, first mount the bowl on a faceplate, and turn and sand the top and inside. While the bowl is still on the faceplate, mark the center of the bottom with a pointed steel rod through the back of the faceplate.

Remove the bowl from the faceplate and mount it in the special chuck. To center the bowl, bring up the tailstock and use the point on the dead-center as a reference. Tighten the work in the chuck by screwing in the setscrews in the rim, then retract the tailstock. With longer dowel pins, the chuck will hold work as small as 4 in. Of course, the chuck could be scaled down for smaller work.

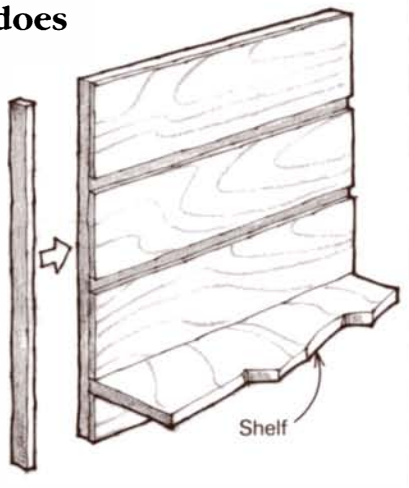
For safety's sake, limit your work to the very bottom of the bowl—keep your fingers away from the exposed dowels.

—F.K. Anan, Tokyo, Japan

Plywood shelf dadoes

Here's a tip from an old pattern maker. For plywood carcases, instead of routing dadoes for the shelves, laminate ½-in. and ¼-in. plywood together, leaving spaces between the ¼-in. sheets for the shelves to be slid into place. A hardwood facing strip on the front edge will conceal this lamination joint.

—Frank L. Gallo, Ancaster, Ont.



Foam faceplate for turning bowl feet

One common method of chucking a bowl blank in a lathe is to use glue and paper to attach a waste piece to the bottom of the blank, then screw the faceplate to the scrap—a time-consuming procedure. If your bowl design calls for a small foot (1½-in. dia. or so), here's a faster, easier procedure.

First screw the bottom of the blank directly to a 3-in. faceplate and turn the inside to finished size. Turn the outside rim to size, but leave the bottom oversize so you won't hit the faceplate screws. Remove the blank from the faceplate and

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I've been in this business a long time — and I've made ALL the mistakes. At this stage of the game, I have one basic purpose for the years I have left: I want the American woodworker to know what a *good* tool is — what the *right* tool is — and how to *use* it in a most professional manner.

I want the American tool *manufacturer* to either produce a top quality product — or go down the drain. I want the American tool *dealer* to get back to demonstrating — proving his points with sawdust instead of hot-air. And I want the American woodworker to get his money's worth — to stop buying gimmicks and gadgets — to choose his tools on the basis of FOREVER!

***Professional* woodworking is not a science.**

The way a lot of fellows do it — it's a craft. But the way I want *you* to do it — it's an art. And, most of the difference is KNOWLEDGE. The basic problem for most woodworkers, is *where* and *how* to get that knowledge. And now. . .

We've got the answer for you:

My sons and I are going to put everything we know on video-tape. If we feel somebody else can do a subject better, we'll get that proper person. Maybe it'll be my friend, Sam Maloof — or Bob Stocksdale on the lathe. But — it's going to be a LIBRARY of totally professional techniques on every phase of woodworking. You'll be able to take these tapes, subject by subject, and SEE the set-up, SEE the operation — STOP it frame-by-frame, STUDY it, play it BACK. Like I said, my friend, this is TOMORROW. This is the *TOMORROW* way to learn!

For us — and for *you* — this is a very important FIRST!

We have assumed the serious responsibility of making these tapes in a thoroughly professional manner. (To do a second-rate job would spoil it for everybody — for a long time.) My first concern was that I would use no machines or tools that were less than the best in each category. And I would accept no sponsor with strings attached. I *personally* CHOSE my sponsors (machine and tool manufacturers) and told them what I wanted in the way of equipment — and what I did *not* want. The result is the dream of every woodworker!

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START *YOUR* LIBRARY OF TAPES. . . *NOW!*

Because I had to write this copy in June, I didn't have all the details at that time. But we do now. So — all we're asking you to do is either PHONE or WRITE to us — and tell us you're interested in our tape library. We'll be back to you by return mail with everything you'll want to know. No obligations!

THAT'S THE STORY. You see, we've been getting letters from all over the U.S. (not to mention England, Canada, Hawaii, Ceylon, etc.) — people wanting to come to our school. It couldn't happen. They are dreaming — and we were wishing we could help them. And now we CAN!

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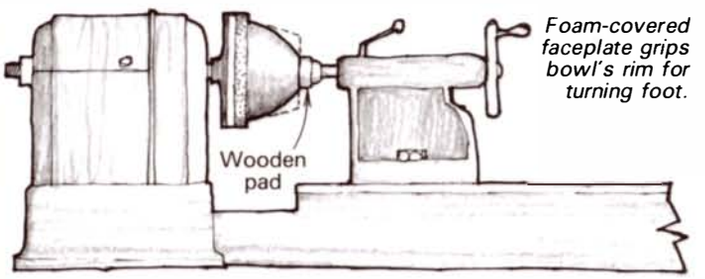
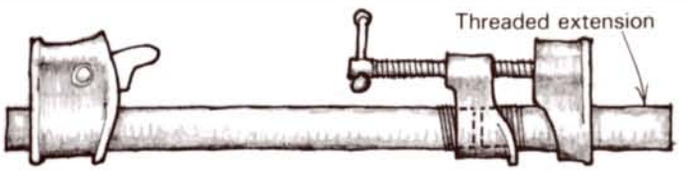


reverse it on the lathe, holding it in place between a foam-covered faceplate and the tailstock. Now finish the foot to final size, cutting away all traces of the screw holes.

To make the foam faceplate, glue 1-in. thick foam to a trued-up 4-in. or 5-in. maple disc screwed to a 3-in. faceplate. I use a ball-bearing tailstock center, fitted with a ⅞-in. flat wooden pad, to press the bowl into the foam disc.

—Max M. Kline, Saluda, N.C.

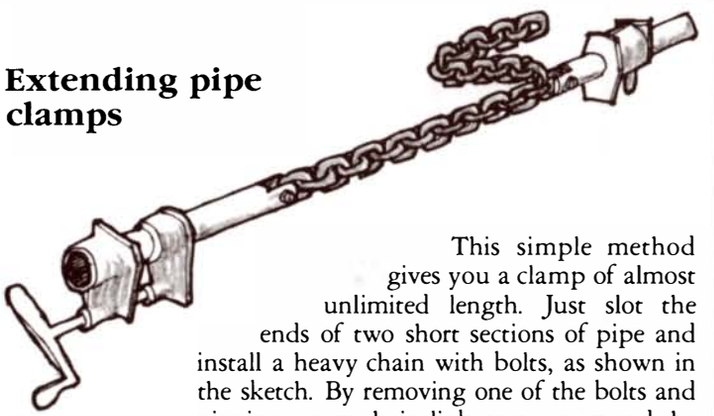
Reversing pipe clamps



It's handy to be able to reverse a pipe clamp so it can be used to push something apart. In fact, special clamp heads are sold for this purpose. As a thrifty alternative, if you add a short section of pipe to the head as shown, you'll be able to reverse any standard pipe clamp at will.

Screw the head on backwards and stop about halfway. Now screw the short 6-in. piece into the clamp head in the normal fashion. Reverse the shoe, and you have an efficient spreading clamp. *—T.D. Culver, Cleveland Heights, Ohio*

Extending pipe clamps

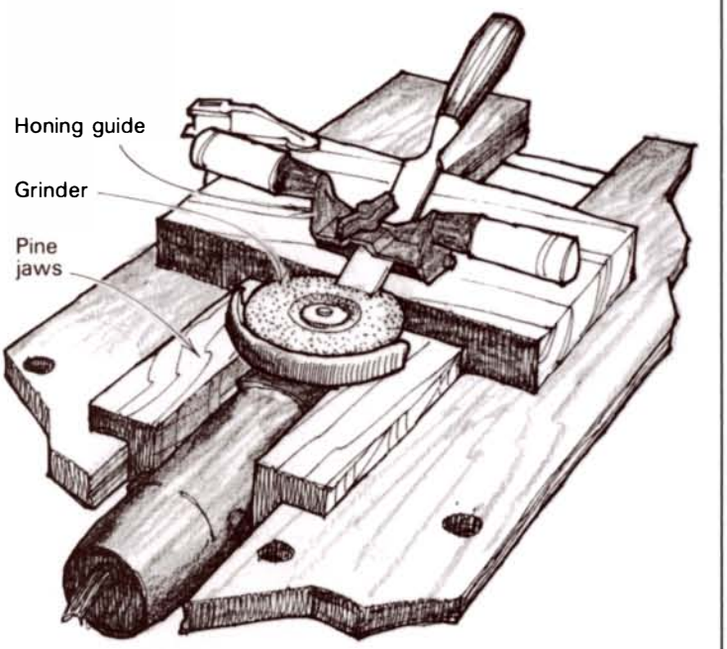


This simple method gives you a clamp of almost unlimited length. Just slot the ends of two short sections of pipe and install a heavy chain with bolts, as shown in the sketch. By removing one of the bolts and pinning a new chain link, you can extend the chain to 30 ft. if needed. Unlike pipe clamps, which must be flat to work, the chain will bridge minor obstacles without loss of pull. An added bonus is that the chain requires little storage space. *—Harold R. Olsen, Fox Island, Wash.*

Quick tip: When I clamp my electric drill in a vise, I use 1-in. thick Styrofoam insulation scraps as a cushion to distribute the pressure evenly. *—Duayne J. Intveld, Hazel Green, Wis.*

Regrinding chisels on a disc grinder

Here's a method that I think is unbeatable for regrinding chisels and plane irons. I clamp my Makita portable disc grinder in a Workmate vise (with a couple of pine jaws) and use a board, shimming it if necessary, to produce a surface flush with the grinding disc. Then I clamp the chisel in a honing guide (I have a Japanese model with handles, as shown, available from Garrett Wade). The roller of the honing guide runs on the board while the blade is ground by the disc. I keep the blade from overheating by frequently dipping it in water. Since the blade remains in the guide, I can return it to the grinding disc at precisely the same angle.



I prefer the Japanese honing guide to others because the spokeshave-like handles allow me to rock the guide slightly from side to side to produce a crowned edge on plane irons. This would be possible with other guides, but the handles on the Japanese guide provide greater control.

With this method, I have reground bevels that are indistinguishable from those ground by the factory. It has changed a frustrating and difficult task into one I can accomplish with precision and ease. *—Robert B. Campenot, Freeville, N.Y.*

Quick tip: My industrial arts students break scores of jigsaw blades, and in these times of tight budgets, we often use broken bandsaw blades as a substitute. I discovered that you can cut a bandsaw blade down to suitable proportions with tin snips, removing most of the metal from behind the teeth. The blade curls when you cut it, but it straightens out again under tension. *—John Batten, Enosburg Falls, Vt.*

Homemade bit for deep holes

To drill holes for long threaded rods, I hammered one end of a 26-in. steel rod flat and sharpened it as shown in the sketch. The bit won't pull chips out of the hole like an expensive ships' auger, so you'll have to retract it more often to clear the chips. Considering the savings, this is a minor inconvenience.

—Ralph Zwiesler, Freesoil, Mich.

Methods of Work buys readers' tips, jigs and tricks. Send details, sketches (we'll redraw them) and photos to Methods, Fine Woodworking, *Box 355, Newtown, Conn. 06470. We can acknowledge contributions only when the final decision has been made. We'll return those that include an SASE.*

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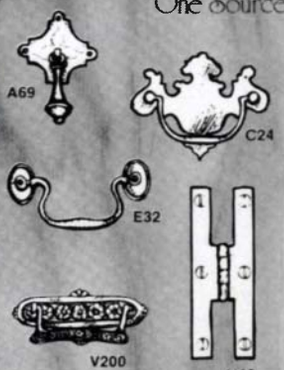

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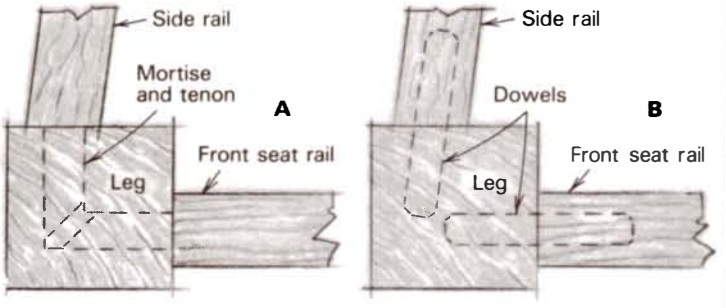
Upholstered-chair joinery

I'm planning to make a fully upholstered wing chair. It would be difficult to make the frame with mortise-and-tenon joints since most of the parts don't meet at right angles. I've considered joining the legs to the rails with butt joints and a few 4-in., #10 wood screws running up through the legs into each rail. The heads of the screws would be countersunk and hidden by the upholstery. Would this joinery be much weaker than mortise-and-tenon joints? —Steve Berg, Dundee, Ohio

Ron Sheetz replies: Wood screws driven up through the legs would penetrate into the end grain of the rails, and since screws don't hold well in end grain, they'd eventually pull out. Glue doesn't hold well on an end-grain butt joint, either.

Because it's one of the strongest joints, I would use a mortise and tenon to join the rails and legs. Cutting these joints isn't as difficult as you think—only the tenons on the side rails have to be sawn at an angle. The mortises in the legs can be cut at right angles as shown in the drawing. The front seat rail will probably be at a right angle to the legs, so the tenons on that rail should pose no problem.



If you find this joint too complicated, you could use dowel pins, but dowel construction is much weaker. First, cut the side-rail ends square, then bore the holes for the dowels (two in each rail end). I recommend using a dowel jig. Insert the dowels (without glue) and cant the side rail at the desired angle to the leg. Use this angle to bore the dowel holes in the leg. Next, remove the dowels from the rail and trim the side-rail ends at the proper angle so they butt against the leg. If it won't interfere with the upholstery, you could glue and screw corner blocks on the inside corners of the seat frame to strengthen it.

[Ron Sheetz is furniture conservator for the National Park Service in Harper's Ferry, W.Va.]

Satin piano finish

We spray lots of ebony piano finishes in our shop. We use a black nitrocellulose lacquer, and have no problems until the final rubout. We wet-sand the lacquer with a pneumatic straight-line sander and 400-grit paper lubricated with mineral spirits. Next, we rub with 0000 steel wool that's been unraveled and stretched across a short, narrow board; the board has a felt pad tacked to it so the steel wool stays flat against the finish. This rubout results in an even-looking satin finish, but instead of deep black, it has a gray look, most noticeable toward the edges of the lids. We suspect that this is caused by the refraction of light in the fine grooves left by the sandpaper.

We've tried all kinds of rubbing compounds and oils, to no avail. Some even highlight the sandpaper scratches. Are we missing some mysterious step in our procedure?

—John Minor, Champaign, Ill.

Donald M. Steinert replies: It may comfort you to know that your problems creating a satin-ebony piano finish are quite common.

Visit a piano dealer to see what kind of finishes the factories are producing on new pianos. Make a point to see satin-ebony grands by Steinway, and by Yamaha or some other Japanese manufacturer. I think you'll see that the "gray look" is common to both. You're correct that this is caused by light bouncing off the minute scratches left by both the abrasive paper and the steel wool.

You'll notice that the scratches on the Yamaha are almost perfectly straight, parallel and uninterrupted. The final rubout on a Yamaha piano is done by machine, with the entire lid passing on a belt under a roller that rubs out the full width in one pass. The Steinway finish probably looks more like yours because it's rubbed out by hand. The exaggeration near the edges happens when you reverse direction as you rub. Obviously, the individual particles on the abrasive paper or the individual strands of steel wool don't stay exactly in the same grooves. Instead, tiny "hooks" are created near the edge of the lid at the point of reversal.

Try rubbing the lacquer with silicon carbide paper only. Mineral spirits will work fine as a sanding lubricant, but a mix of paraffin oil and mineral spirits is even better. This method will remove more lacquer than will steel wool, so apply additional coats before sanding.

Wet-sand with 400-grit until the surface is smooth, flat and uniform. Then wet-sand with 600-grit at right angles to the 400-grit scratches until these are gone—a process called cross-sanding. Next, wet-sand with 1200-grit at right angles to the 600-grit scratches until they disappear (3M "ultra-fine" paper in grits from 1200 to 1500 can be special-ordered by an automotive paint supply house). *Voila!* You should have a superior satin finish.

[Donald Steinert, who lives in Grants Pass, Ore., wrote about piano finishing in *FWW* #44.]

Long jointer tables

For years, craftsmen have been jointing boards with 22-in. to 24-in. long jointer planes. Power jointers can have beds as long as 7 ft. Do you get a flatter, more accurate surface from these machines, or is the extra length needed only to support the moving wood? Is there a break-even point where a longer (or shorter) bed length makes a difference?

—Kevin C. Kelly, Huntington, N.Y.

Rich Preiss replies: A long jointer bed makes it easier to straighten and flatten long boards. A long bed supports more of the stock, so the operator can concentrate on feeding the material instead of trying to hold up the unsupported end of a board. Boards that are severely bowed or twisted along their length are much easier to straighten accurately on a long-bed jointer because of the extra support.

I don't know of a break-even point for bed length. You really just need to consider what lengths of material you consistently machine, and make your decision on bed length accordingly. You can joint long boards on short-bed machines, though good results require greater physical effort to support the board, and stricter attention to where the distortions occur in the board.

[Rich Preiss runs the woodworking shop at the University of North Carolina in Charlotte.]

Magnolia wood

During a recent excursion into our woodlot, I found a tree that I believe is mountain magnolia. I can't find much information on this wood. What do you know about it?

—Mike Mease, Port Matilda, Pa.

R. Bruce Hoadley replies: *Magnolia acuminata* is most commonly called cucumbertree, or simply cucumber. It's a straight-grained, fairly heavy (0.44 to 0.46 specific gravity), diffuse-porous wood with white sapwood and greenish heartwood. It's a good choice for a secondary furniture wood. Commercially the lumber is often mixed with and sold as

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yellow-poplar (tuliptree), which it closely resembles (see *FWW* #41, pp. 62-64), although cucumber's sapwood is somewhat lighter in color. Another difference: The band of marginal, or terminal, parenchyma (the small cells that appear as a line separating the annual rings) is sometimes more distinct on cucumbertree, giving the tangential surfaces a somewhat more visible growth-ring figure.

[R. Bruce Hoadley is professor of wood technology at the University of Massachusetts in Amherst.]

Gelled tung oil

Can tung oil be used after it has gelled in the container? Is there any way that the gelled oil can be redissolved?

—Marlene Matalon, Houston, Tex.

Otto Heuer replies: Most of the tung oil sold in paint stores has a small amount of metallic drier added to speed drying and form a harder film. If the tung oil is stored in a partially filled container, it won't take long before a film forms on the top of the oil. The oil polymerizes when exposed to air, and eventually the whole container will become a gelatinous mass. I don't know of any way to "redissolve" the oil once this has happened. You can minimize the problem by storing your tung oil in a plastic bottle. Squeeze the bottle to bring the oil level up to the top, driving out air, then hold it while you tighten the cap.

[Otto Heuer is a finishes chemist and consultant who lives in Waukegan, Ill.]

Removing dog stains

What's the best way to remove a dog-urine stain from an oak floor? *—N.A. Benson, Newport News, Va.*

George Frank replies: Start by scraping off the old finish. Next, bleach the spot with a very warm, concentrated solution of oxalic acid in distilled water or rainwater. (Don't mix this in a metal container!) I'd also experiment with full-strength Clorox, and eventually, if the spot is obstinate, alternate the two bleaches, allowing one to dry before applying the other. The combination of the two will raise a mighty stink, so open all the windows and have a fan handy. If the bleach seems to be working, repeat the operation two or three days later. Apply the oxalic acid last, and rinse with water afterward. You'll need to sand after the spot is dry.

In the unlikely event that the spot still remains, I'd utter three lines of Hungarian curse words, then bring out my two big guns: lye and a stainless-steel wire brush. A strong solution of lye and water applied hot and scrubbed with the wire brush will probably dissolve the chemicals that caused the spots. (Lye causes burns—be sure to wear gloves and goggles.) Don't forget to rinse off the lye. Lye will turn oak black, so apply the oxalic-acid solution to restore the natural color, then rinse.

Another idea: In a home I once owned, the oak flooring in front of the fireplace was scorched. I pulled up the boards and reversed them. It worked! Maybe you can do the same.

[George Frank is a retired European master wood finisher.]

Resawing ironwood

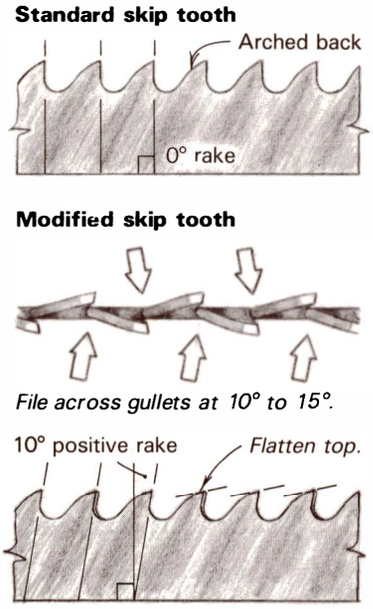
I want to rip ¼-in. slabs from 8-in. dia. desert ironwood logs. I bought an Inca 20-in. bandsaw for the purpose, but I'm having problems. The wood jams between the rip fence and the blade. When I'm cutting freehand, the blade (1 in., 4 TPI) wanders away from the line and makes cuts that are crooked in cross section, not straight up and down. The blade seems to be distorting under the heavy pressure needed to move the blade through the wood. Is a bandsaw the wrong choice for this task? Am I using the wrong blade?

—Peter Sundt, Willcox, Ariz.

Rich Preiss replies: A bandsaw is the right tool for the job, but one designed specifically for resawing, such as the Hitachi B-600 or the Makita 1216, would slice ironwood with greater ease and precision. The blades on these machines are wider and more rigid, and they can also be tensioned more to reduce deflection in mid-cut.

To solve your problem, consult the owners' manual that came with the saw and make sure all the guides are set properly. Check to see that the table is set at 90° to the blade. You may have to cant the fence a degree or two toward the blade to correct for a drifting cut, or make a wooden V-block fence (see *FWW* #5, p. 13).

Sharpening the blade manually is the real key to extending your bandsaw's performance. You need to modify the shape of each tooth so it will slice more cleanly through the dense ironwood. To do this, clamp a section of the blade between two wooden blocks. With a slim triangular file, file across the face of a tooth whose set goes away from you until the tooth has about a 10° positive rake. Do every tooth that's set to that side. Don't file straight across, but angle the file about 10° to 15° in the direction of the set. Take two or three strokes, counting them to be sure each tooth receives the same number. Then carefully take one or two flat passes over the top of each tooth so each one begins to resemble a small chisel. Reverse the blade and repeat the procedure on the teeth with the opposite set. The teeth will have a hook-tooth pattern, which permits faster cutting with reduced feed pressure. If you don't feel like hand-sharpening the blade, the Posi-Tooth blade sold by Diamond Saw Works, Chaffee, N.Y. 14030, has a similar tooth profile.



Once you've completed and double-checked your settings, try out the blade with a piece of softer material before sawing ironwood. You might consider a featherboard to keep the work tight to the fence, and possibly a wider auxiliary fence to keep the stock square to the table.

[Rich Preiss runs the woodworking shop at the University of North Carolina in Charlotte.]

Finish for cedar siding

I put new cedar siding on a house I built in Idaho. I've been told that most, if not all, commercial stains will not hold up under the severe weather conditions—90°F in summer sun, minus 30°F in winter. What would be a good preservative that will last? *—Albert Feers, Newbury Park, Calif.*

William C. Feist replies: Generally speaking, the more pigment a finish has, the longer it will last.

Paint is the best protection. Three coats (one primer and two top coats) are needed for protection that will last six to ten years on smooth wood.

Semi-transparent oil-based stains are the next most durable finish. These contain some pigment. On new, smooth cedar, they'll last two to four years; rough or weathered cedar will be protected for three to six years.

A water-repellent preservative is a relatively simple natural finish. These products are easy to apply and reapply, but will

last only one to two years on new, smooth wood, and two to four years on rough or weathered wood.
[William Feist, a paint chemist at the Forest Products Lab in Madison, Wis., wrote about outdoor finishes in *FWW* #42.]

Oil over wax

I sometimes use a thin coat of beeswax dissolved in turpentine as a final top coat over oil finishes. It gives a nice sheen to the surface and makes it easy to dust and clean, but I've heard that once waxed, an oil finish cannot be re-oiled. Is this true?
—William C. Pellouchoud, Boulder, Colo.

Otto Heuer replies: Oil shouldn't be applied to a wood surface that's been coated with wax. Applying a light coat of the beeswax and turpentine mixture once or twice a year should maintain your finish.

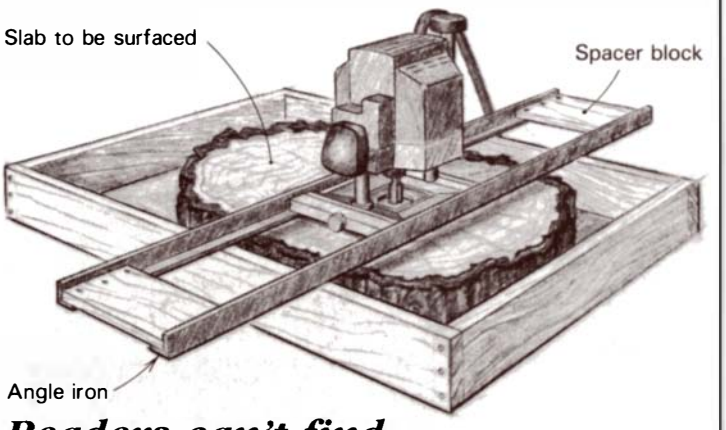
If you want to re-oil, you must first remove the wax by washing and scrubbing with mineral spirits or lacquer thinner. It will take several washes to remove all the wax, particularly if the wood has large pores, as walnut and mahogany do.
[Otto Heuer is a finishes chemist and consultant who lives in Waukegan, Ill.]

Sources of supply:

—Abrasive cords (from 0.012-in. to 0.150-in. dia.) and tapes (from $\frac{2}{32}$-in. to $\frac{8}{32}$-in. width) in an assortment of grits and abrasives are available from E.C. Mitchell Co., PO Box 607, Middleton, Mass. 01949.
—"Micro-Mesh" abrasive sheets in grits from 1500 to 12,000 are available from Micro-Surface Finishing Products, Box 818, Wilton, Iowa 52778.

Follow-up:

Re surfacing end grain on crosscut slabs (*FWW* #44, p. 16). Here's a low-cost, easy slab surfacer.
—Mark Basham, Chula Vista, Calif.



Readers can't find:

. . . a copy of the out-of-print book *The Cooper and His Trade* by Kenneth Kilby. *—John Feichthaler, Langhorne, Pa.*
. . . an owners' manual and parts for a Sears bandsaw, model number 103-0103.*—J. Rosell, Tenafly, N.J.*
. . . an owners' manual and parts for a Craftsman 8-in. tablesaw, model number 101.02141. *—Tom Borusky, Tustin, Calif.*
. . . parts for a Walker-Turner 4-in. by 52-in. belt/10-in. disc sander. *—Bob Chapman, Sunapee, N.H.*

Send queries, comments and sources of supply to Q & A, Fine Woodworking, *Box 355, Newtown, Conn. 06470.*

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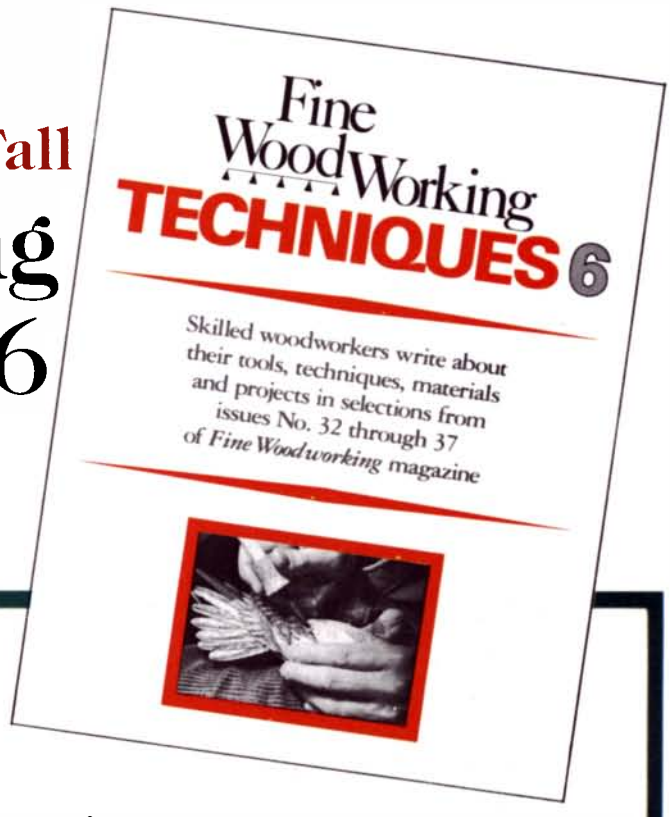

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The Motion-Minded Kitchen by Sam Clark. *Houghton Mifflin Company, 2 Park St., Boston, Mass. 02108, 1983. $9.95, paperback; 146 pp.*

Cabinetmaking by Ken Calhoun. *Prentice-Hall, Englewood Cliffs, N.J. 07632, 1984. $21.95, hardcover; 248 pp.*

I've never been able to resist the lure of the refrigerator. If I get anywhere near one, I have an uncontrollable urge to open the door, even if just to make sure that the light still comes on or to see that the beer and cold cuts are being properly attended. Half the people in the world are afflicted with this obsession; the rest either don't have iceboxes or have disgustingly sensible eating habits. One way or another, though, the kitchen eventually attracts everyone, making it the most popular room and the first to get a face lift when the house is renovated.

A lively trade in do-it-yourself kitchen books has sprung up in the past couple of years, and these two volumes are among the recent additions. Both are suitable for the neophyte or the experienced woodworker, but in *The Motion-Minded Kitchen,* designer-builder Sam Clark clearly aims to lead the beginner through the most frustrating aspect of kitchen-building: designing a layout that works. He succeeds.

Clark devotes his first two chapters to describing the principles of kitchen design, arguing strongly that the actual work that goes on at counters, sinks and stoves should have more to say about how a kitchen looks than do mere aesthetics. Instead of offering the same old eyewash on U-shaped versus L-shaped counter layouts, for instance, he dug up time-and-motion research done in the '30s, '40s and '50s, culled out the designspeak, and came up with a concise, workable way for the amateur to design a kitchen. One method I particularly liked is his way of testing floor plans for trouble spots. He simply tacks scale drawings of proposed plans to a plywood sheet, then inserts pushpins at the work stations. To test the plan, you imagine the moves you'd make in preparing a meal, from pantry to table, and connect the pushpins with yarn. Fat tangles of yarn flag the bad spots.

Clark's chapters on construction are credible, if less inspiring. He advocates the sensible expedient of building cabinets in place instead of constructing them in the shop. This approach is particularly apt for the beginner, who is likely to have neither the considerable space needed for in-shop construction nor the skill to install the completed cabinets. Unfortunately, Clark's you-build instructions suffer for lack of an introductory page or two giving an overview of the detailed information that follows. He seems to start somewhere in the middle, lurching from one drawing to text, eventually petering out in a disappointing chapter on tools.

Calhoun's *Cabinetmaking* is just the opposite. It spends a great deal of space on tools, material and techniques—at the expense of virtually any useful talk on design. I found helpful stuff in this book, such as the chapter on installing cabinets and various tips on machine processes. Calhoun's drawings of cabinet anatomy, though sparse, do the job. I was less impressed by some of the photos, which seem to be more placeholders than purveyors of useful information.

Asked to choose between these two books, I'd pick *The Motion-Minded Kitchen* as a must-have and *Cabinetmaking* as an also-ran. *—Paul Bertorelli*

How to Build 35 Great Clocks by Joseph W. Daniele. *Stackpole Books, Cameron and Kelker Sts., Box 1831, Harrisburg, Pa. 17105, 1984. $29.95, hardcover; 192 pp.*

"The main purpose of this book," it says on page 18, "is to offer plans for clock reproductions that permit free interpretation by the builder. . . . You the builder will make the final statement about how your clock will eventually turn out. The clock case creates the temple of design in which the goddess of time resides. It is the gathering together of wood, glass, metal and finish to form a personal family heirloom."

Well, don't get out your checkbook just yet. Heirlooms they might be to some, but I'd cut these clocks out of my will. Daniele's "reproductions" are in fact "adaptations," and to my eye they miss the boat. He appears to have limited his design choices to what you can make out of lumberyard moldings, standard lumber thicknesses and a router bit or two. I'm not saying that this is a bad idea. *Fine Woodworking* is always on the lookout for good designs that a beginning woodworker can tackle with confidence despite a low-budget workshop. But Daniele's clocks are so low-style that I doubt a reader of this magazine would want to build them or take the trouble to adapt them further. You might want to look the book over in your local library, but I'm not recommending that you make a special trip to do so. *—Jim Cummins*

The Magic Gouge Wood Sculpture by Benoi Deschênes, translated by Louise Fortin Ouellet. *Les Editions Port-Joly enr., PO Box 563, Saint-Jean Port-Joli, Que. G0R 3G0, 1983. $19.95, hardcover; 243 pp.*

Benoi Deschênes, one of Canada's best wood sculptors, says he wrote this book to help anyone who wants to learn the rudiments of woodcarving. And the basics are here, but you'll have to work to get them. The heart of Deschênes' method is a series of exercises, beginning with practice cuts (what he calls "blind sculpting") to learn the nature of wood and tools, then moving on to carving a leaf dish, a caricature plaque and statuettes. Deschênes emphasizes that it takes "plenty of time, energy and patience" to master carving, and it's clear that the magic in the gouge comes from the heart and hand of the carver, not from some extraordinary method or tool. The text is clear and concise, but I would have liked to have spent more time carving with Deschênes, exploring the textures he tantalizingly calls "fantasies of the gouge," and just skipped the preliminary chapters on preparing wood and other perfunctory topics. Also, the photos of his carving exercises and of his "visual outing" showing the possibilities of wood sculpture would be better if larger and crisper. *—Dick Burrows*

Greene & Greene: Furniture and Related Designs by Randall L. Makinson. *Peregrine Smith Books, Box 667, Layton, Utah 84041, 1983. $19.95, paperback; 190 pp.*

California redwood, handcarving, turn-of-the-century power machinery, Tiffany glass and the crafts movement all combined in the designs of Charles and Henry Greene. The result was wooden furniture that freely draws upon Oriental design, Art Nouveau and the creative abilities of two California architects. Evoking a flavor of California, the Greenes' furniture exemplifies what the best of Pasadena looked like in 1910.

Originally published in 1979, the present edition has added color photography, which reveals much more of the furniture's natural beauty. Makinson has carefully researched the origins of the Greene brothers' designs and presents the details meticulously. He provides almost no critical interpretation of the designs, however. But perhaps that is for the best. Each piece is beautiful, and if it cannot be seen in comparison to contemporary furniture of its time, then judgment must rest on its craftsmanship and functional use. *—Todd Royer*

Todd Royer is a furniture designer at Creative Woodworking in Brooklyn, N.Y.

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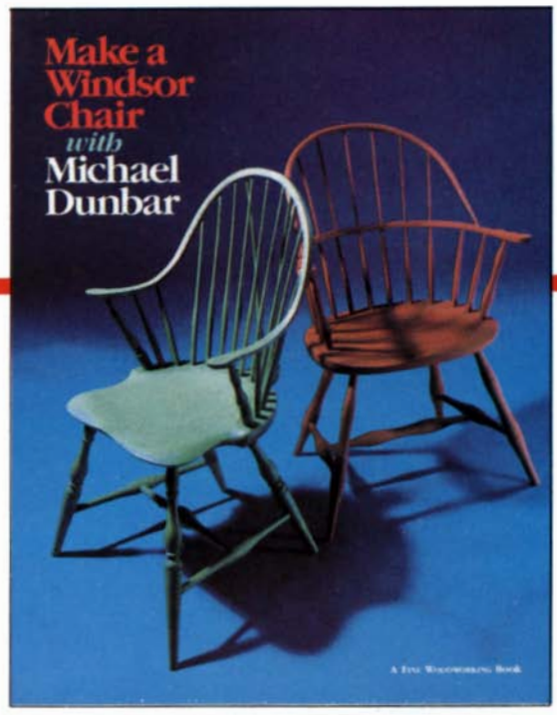
Make a Classic



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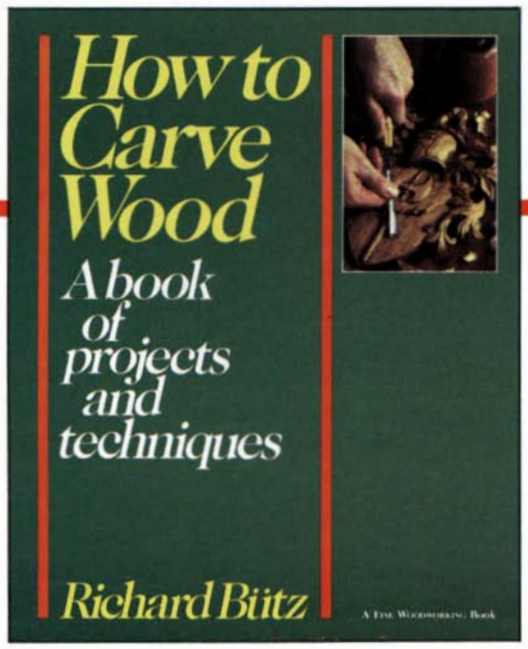

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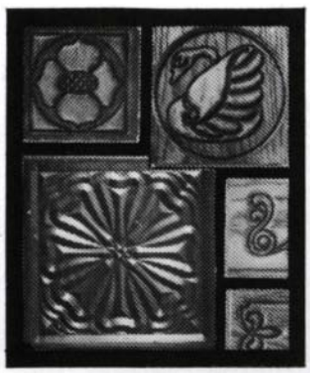

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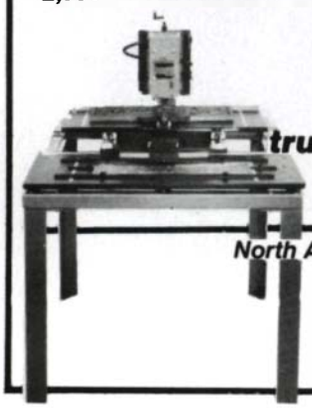

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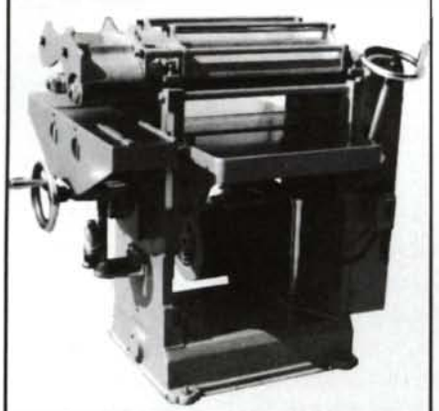

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A Visit to Berea, Kentucky

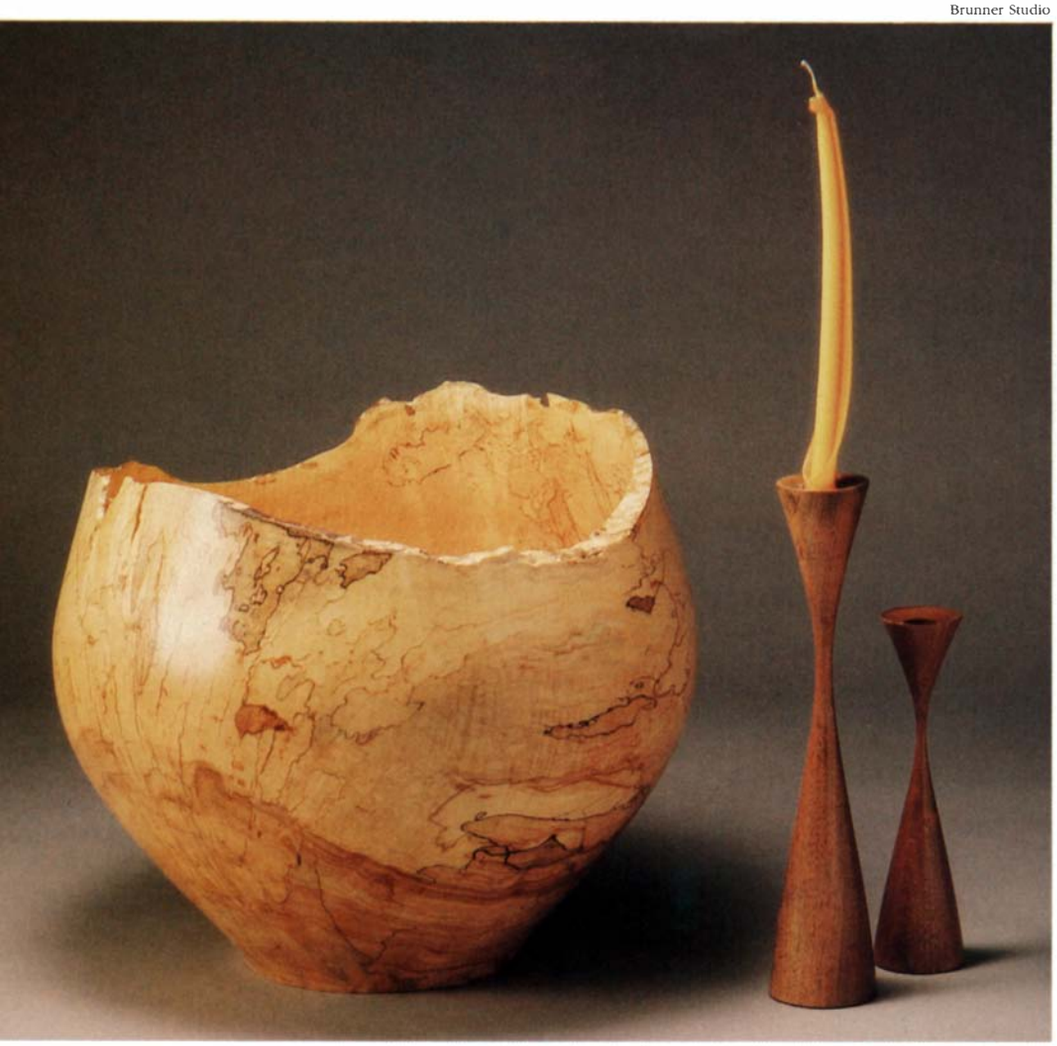
Where woodworkers share a tradition of value

by Jim Cummins

In any discussion of crafts centers or of woodworking schools, somebody is sure to mention Berea. People generally know that Berea College has a crafts program of long standing that includes college-run commercial workshops. And rumors abound that the town harbors a small but growing number of woodworkers who have set up on their own. But in my travels, I'd never met anybody who had actually been to the intriguing place, so when I got the chance to check out woodworking there, I jumped at it. Over the course of two weeks or so, I met a lot of fine people, a few of whom tell their own stories on the following pages.

The town itself is perfectly situated to support a substantial tourist industry. From Berea north as far as Canada, a 10-hour drive, the land rolls flat and level. For tourists driving south on I-75—from Canada, from Cleveland, from Cincinnati—Berea provides the first sight of mountains, the first sign that the freeway is finally getting somewhere. Everybody stops, stretches, and fills their lungs with fresh mountain air. Yet for years the only serious crafts gallery for tourists to browse in was owned by Berea College, and it displayed products from the college's own student-crafts industries.

Brunner Studio



Elegant candlesticks and giant bowls are staples at Rude Osolnik's Benchmark Gallery.

The college is a liberal arts school founded in 1855. Anticipating an impoverished student body, Berea's founders dispensed with tuition, instead requiring every student to enroll in a work program to help defray costs. Students do all the routine jobs that keep the place running. About 250 of them, roughly 15% of the total enrollment, work in the crafts industries—weaving, needlecraft, wrought iron, brooms, ceramics, and, of course, wood. In addition to the usual breadboards, rolling pins and candlesticks, Berea College's Woodcraft Industries is famous for its skittles games—a sort of tabletop bowling—which are shipped all over the world.

Wallace Nutting came across the college late in his career, enthusiastically endorsed its principles, and persuaded it to expand into making furniture. The college now makes a line of high-quality period furniture reproductions, though this enterprise depends mainly on paid workers, with students doing the less critical jobs. Before his death, Nutting bequeathed the college the rights to his own furniture designs (which the school later sold to Drexel Heritage). He also left it his personal collection, and Berea College remains the largest repository of Nutting's own work.

For a while, Woodcraft was managed by Rude Osolnik, head of Berea College's industrial arts department. He began teaching at the school in 1937. About fifteen years ago, Osolnik noticed the growth in the tourist trade, and saw room for an independent crafts gallery, Bench-

Lothar Baumann—"I'd like to make nothing but furniture, but I have to make a living, so I do a lot of turning—rolling pins, bud vases—and I make a lot of small boxes, too. I can average about a hundred bud vases a week, including the finishing.

"I grew up in Virginia, and took industrial arts all through high school. I figured that I'd be a teacher. I went to college here in Berea, and afterward taught for two years, from '76 to '78. My in-laws live over there and they let me build this shop in the fall of '79. I was doing construction work—barns, apartment houses. I worked in my shop on the side and tried to get into a guild. They turned me down the first time. Said my finish was too thin and my edges were too sharp. They didn't like my choice of wood, either. Nobody'd ever heard of walnut frames and spalted hackberry panels, so they knocked me down. I changed my techniques a little, and the next time I got in.

"A lot of people come to Berea College to pick up woodworking skills, but this is the wrong place for that. You have to go on your own, take a lot of independent courses, work over at Woodcraft Industries. You can learn how to apply production techniques there, how to apply jigs and fixtures. I use some, but most of my templates are just boards and sticks nailed together.

"Up behind the barn I've got a pile of walnut logs that I haven't had time to get to the sawmill yet. I have a solar kiln I built, too, but right now all the plastic has blown off. This country gets windy. Right up there by the house, you can see where a tornado came by two years ago. It took the top off that big cedar tree, then it passed about three feet from the shop door—the whole building shook—and went off down the hill along that fence line. It just missed the big old walnut there. That tree has been dying for years. Every fall, I figure that I've seen the last crop of nuts. I've been letting them sprout where they fall, so something can come up to take the old tree's place, but every spring the tree flowers again. It's just not ready to go."

mark, which he built while still teaching at the college. Since then, growth has snowballed. The range of galleries includes a funded organization that promotes mountain crafts, several serious woodworking shops, and—inevitably—a couple of tourist traps geared to low-end crafts and knickknacks.

The new generation of woodworkers I visited have moved in for a variety of reasons. First of all, the college has set a standard of value by the way it prices its own crafts products, thus attracting serious buyers who know what they want. As a bonus, Berea is not only close to populous markets and numerous crafts fairs, it's beautiful as well. But my impression was that there is even more. Berea has an atmosphere conducive to making honest, distinctive furniture, solid contemporary stuff that anybody would be pleased to have in their living room. This certainly isn't front-line woodworking from either coast—the sort of furniture you have to explain to your neighbors—but it isn't stick-in-the-mud, timid work, either. What I saw in Berea was high-style at heart, a constant refining of the best of the "new" woodworking from the past few decades.

My first stop was on the College Square, at Warren and Frankye May's Upstairs Gallery. May's dulcimers were featured in *FWW* #33—using production methods, he makes about four hundred dulcimers a year, and good ones, priced at up to $350.

The Mays had recently expanded their enterprise. In addition to the Upstairs Gallery, they were now renting a corner shop at street level. Behind a large front window was a shallow showroom, a low dividing counter with a stack of dulcimers on it, and a fully equipped woodworking shop that filled the space to the back wall, where there was a lumber pile. May and his helper Danny Lyons were building two small standing cabinets for a show that was two weeks away. They had a lot of pieces scattered around and managed to dry-assemble enough of them so that I could take a snapshot (below). The finished cabinet shown made it to the show on time and then sold within a week. May can sell everything he makes just about as fast as he can make it, and he puts in 12-hour days.

He works in what you could call a country/period style, and he freely adapts designs. He showed me a quilt cabinet whose lines derive from the lap-joined hutches typical of the Kentucky mountains. May's cabinet is not rough-hewn. In addition to dovetail joinery and sound precautions against wood movement, he improved the door design so it couldn't sag and scratch the counter, and he matched the grain throughout. In pieces with more than one drawer in line across the width, May routinely makes all the drawer bottoms from a single board so that the grain matches clear across when the drawers are all open. This can't be seen when the drawers are full, of course, but May likes to do it anyway.

May has been in town seven years, and Lyons has been with him for the last three. May persuaded his helper to learn to play the dulcimer, so he could demonstrate for customers, and the two of them now play a mean duet. They have such rapport that all they need to make a piece

Brunner Studio

Warren May (at right above) and Danny Lyons with two cabinets in progress—one is shown finished at left. May's designs exemplify the best Berea furniture: clean modern lines with a period flavor.

Kelly Mehler—"I started out woodworking by taking a course from some old-time cabinetmakers at the Ohio College of Applied Sciences. They had students spend the entire first quarter making right-angle lap joints with hand tools, joints that were flat, flush and square in every way. That got rid of a lot of students right in the first semester. I stayed there two and a half years.

"I then spent two and a half years at Berea College. I was lucky to get Rude Osolnik for my first woodworking course. He was the best teacher there. I had to take the regular crafts courses, too, so I made a belt real quick, gouged out a bowl, and with the other required stuff out of the way, I started right in on a captains' desk. I was determined to be a cabinetmaker.

"After college, I went to work for myself. I found a barn full of old machinery at the right price—I'm still paying it off—an ancient bandsaw, drill press, overarm router, boring machine and jointer.

"Things were real hard at first, for years. I really hustled—I used to go to every crafts show within four hundred miles. I could sell everything I made, but only if I kept the prices low. I realize now that everybody was having problems, but at the time I thought it was just me. I used to ask myself if there was any other kind of work I could possibly do.

"For me, at the bottom line, this is a profession, like being a doctor. You have to keep learning. I'll make anything people ask me to, pictures from a book, anything. I don't want to perfect one design and then make it over and over. That's too narrow. You can end up not knowing how to make a chair.

"I like woodworking as art, but it's not me. When I put wedges in, I make them from the same kind of wood as the rest of the piece. I'm more a technician than an artist. I try to make perfect joinery, to find the best ways of putting something together, and my aim is not necessarily to make my work stand out from other stuff. It's nice to know that somebody can look at the bottom of a piece and see that it's well made. People say my designs are related to the Shakers', but that style is really just a natural part of me. For the Shakers, the ideals were what counted. They saw furnituremaking as an expression of belief. That's what's important to me, too.

"Things finally seem to be turning around. A year or so ago, a young couple saw my work at a fair, and the wife ran over and fairly jumped into one of my rockers. They bought the chair and ordered some beds and other things. Six months later, they came and got some more. Then one day they called up and asked me if I'd be here [at Treefinery, Mehler's gallery on Chestnut St.]. 'Sure,' I said, figuring that they just wanted a few more things for themselves. But it turned out that they were planning to open a furniture store in Chicago and they wanted me to make all the furniture. They ordered more than fifty pieces just as samples for their showroom. Whatever they sell, I'll have to make all over again. They're even advancing money for expenses. Whatever I ask them for, I get. They're good people, we trust each other."

of furniture is a rough sketch. They switch places casually, cutting and fitting parts. As an example of their streamlined operation, when either of them sees a ding that needs attention, or planer marks, or some glue squeeze-out, he circles it with chalk. The circle rides along with the piece as a flag, and one or the other of them invariably deals with it before the first coat of lacquer goes on.

In his spare time, Lyons makes clocks and quilting frames in his own small shop. The frames are construction lumber, which keeps cost down, and at $60 they show a surprising amount of detail, such as neat ratchets and a wedge system that allows disassembly.

May, my unofficial guide to the town, volunteered to drive me over to visit Osolnik. I'd already learned that until recently the crafts business in town had been confined to three main spheres: the college, the guilds, and Rude Osolnik himself. Most of the woodworkers I eventually talked to had chosen to strike out on their own, thus avoiding the interrelated checks and balances that had built themselves up over the years. The college, for instance, owns a lot of commercial real estate, and frowns on cheap, lurid development—most local businesses are closed on Sunday mornings in deference to the college's firm Christian philosophy. The guilds, if you can get in, provide showplaces: the Kentucky Guild of Artists and Craftsmen, which holds annual open-air shows in Berea, sold $70,000 of its members' work in its Lexington shop last year, and the Southern Highland Handicraft Guild grossed $1,250,000 in its four stores (none of which is in Berea). Osolnik, who was recuperating from open-heart surgery, is the Southern Highland Guild's treasurer.

***Brian Boggs*—"I was studying French and philosophy at Berea College, but I found it inappropriate to be studying how to live when I wasn't living the way I wanted to. So as soon as the weather got warm enough for outdoor work, I quit and took a carpentry job. Then when I got laid off in the fall, just when my wife and I needed the money most, I said to myself, 'That's it. No more working for other people.' That was a year ago, and I feel much better about things these days.**

"I'm underpricing everybody else around here by fifty or seventy-five dollars, and I can do that because I don't have much overhead—and I can make a chair in about a day and a half.

"One thing that's kept me busy is re-seating jobs—that's what brought us out of debt. I've done so many that I've run out of bark for my own chair seats. The only good time to strip bark is in the spring, and I thought I had plenty. These days I try to get people with seating jobs to wait until May. Most people understand. They'll wait."

Rude Osolnik, dean of Berea woodworkers.

When May and I arrived, Osolnik was resting in his darkened living room. Around him, filling every level surface, were exquisitely turned bowls from figured and spalted woods—a couple of months' work about to be shipped off to shows. As we walked out to his rambling workshop, he seemed to move with a little difficulty, but once we were inside he shifted into high gear. Osolnik is famous for his roundnose chisels (*FWW* #47, pp. 70-71), which he grinds from bar stock. In his hands they cut, not scrape. Also, he advocates a very small spur center, about ⅜ in. in diameter, and people say his touch is so deft that the center never tears loose. I asked to see how the roundnose cuts, and Osolnik flipped the lathe switch on, pressed a blank against the turning point, and quickly snugged up the tailstock. As the spur center began to catch, he allowed the corners of the blank to bump his left hand to ensure that it was centered—if it isn't, he'll tap it over a little. He laid the chisel bevel over at an angle, and 4-in. long shavings shot up over his shoulder. "Nope," Osolnik muttered, and gave the edge two licks with a whetstone. Then the shavings were 2 ft. long. In two or three minutes I was looking at one of his $6 candlesticks.

He took the candlestick over to the drill press for his next trick—a reground spade bit that bores the candlehole and shapes the stick's rim at the same time. As the bit turned in his drill press, Osolnik simply freehand-shoved the candlestick up into it, saving the time it would have taken to center the blank and lower the quill. "I don't know why the manufacturers put that hole in the middle of a spade bit," he grumbled. "It takes half the life out of it."

Osolnik seems to have a lathe around every corner, from giant ones on which he

Lance Skidmore

Michael Wilson—"I've found that where I work has a tremendous influence both on me and on my machinery. I tried living in Mendocino for about six months because I'd heard so much about it, but for me that place just wasn't right—I'd pick up a drill bit I'd been using for years, and all of a sudden it wouldn't drill a straight hole anymore.

"It was expensive to live there, too, and I couldn't see that the work was at all as good as it was said to be. So my wife and I took a trip cross-country, looking for some other place to settle. When we got to Berea, we liked the community, the size and the real estate prices, but what clinched it was that we'd never seen such high-quality work so concentrated. Not anywhere.

"I ship my spinning wheels all over, and most sales come from word of mouth. Sometimes I'll go to a specialty textile show and sell some there. I'd say half my customers started off with Australian or New Zealand kit wheels—el cheapo. I ask people to try all the wheels they can.

"I average about a wheel a week, with some time out for a few diversions. But of course you wouldn't make them one at a time. Making wheels is production work. I don't know whether I'd say I'm a fast turner or not, but I'm a uniform turner and I work carefully. When you're turning dozens of things all the same, you weed out false movements.

"I like deep gouges, long and strong, and I grind a steep bevel when I sharpen, like the English turners do. I learned how to turn from reading about it . . . Peter Child, Frank Pain. With tools, I have strong preferences, but I don't think that what suits me has to suit everybody.

"I have some tips, things I've learned. When I'm setting up a turning square, I don't mark diagonals on the ends to find the centers. It's too slow, and it's inaccurate. Instead, I set a marking gauge a little undersize and scribe lines in from all four sides. Then I centerpunch the middle of the little square.

"Here's a trick for making finials. Drill a hole in the end of the blank and drive a three-eighths-inch diameter brass rod into it. Then chuck the rod in a Jacobs chuck in the headstock and bring up the tailstock to steady it. When you turn the finial, it will be exactly centered around the rod, and will line up with the post it's set on. All this precision isn't just for looks, you know—a wheel has to work right or it's not worth making. The wood has to be right, too, and I'll tell you something—you get a lot better wood here than you'll ever see on the West Coast."

can turn a 100-lb. block to one that he designed and built for turning ovals. There's wood everywhere too, maybe five thousand chunks piled up, restricting footspace to a few narrow aisles. I picked up a piece so dusty that there was no visible figure anywhere, and I asked him what it was. "Rhododendron," he said without hesitation. He has every kind of wood I've ever heard of, and then some. He rummaged in a barrel and brought out a coal-black block. "I'll bet you've never seen this before." I admitted it. "It's something I'm working out with a manufacturer—a piece of maple, impregnated with black plastic dye. It turns all right, and it's just about indestructible. You can turn a plate out of this and drop it on the floor. Here, take it with you when you go."

Everywhere I visited in Berea, people gave me little pieces of wood. I'm sure they do this with each other, too. "Here, try this out. See what you think of it." Similarly, every contact seemed to lead to another: "Have you met so-and-so yet? I'll tell you how to get there."

Joe Inabnitt lives and works far back in the hills, in a town called Stab.

Eventually, I ended up far back in the hills, where I met Joe Inabnitt. He's a carver, a wiry man almost 70 years old, who makes miniatures: hay balers, other farm machines, surreys and coaches, log cabins, furniture to fit. He showed me a manure spreader about a foot long, and pulled it along the floor to demonstrate how a full-scale spreader works: the wagon's wheels power a conveyor belt that moves the cargo to the rear, where a series of spoked wheels break it up and force it through another set of faster-turning wheels to scatter it over the field. Inabnitt has five or six manure spreaders ready for sale at $35 each. He has five or six—or five or six dozen—of everything.

Inabnitt does most of his work with a penknife while he sits between the window and the coal stove. His wife, Viney, sews quilts for the miniature beds. As fast as Joe makes something, Viney boxes it up out of the way so he can make something else. Joe laughed, "She's got boxes all over the house. There are boxes in every cupboard and closet, and boxes under the bed."

"We had a man come up one time from Georgia," Viney told me. "So I spread out everything for him to choose from. I couldn't even get everything on the bed, there was so much. I waited for him to make his choices. He picked things up, tried them out, and put each one back down again. Then he just said: 'I'll take them all.' "

The Inabnitts represent a tradition of country crafts that has all but disappeared. Few families sit by their stoves making handicrafts these days. Yet the Inabnitts' mountain pride, independence, and sheer refusal to compromise quality for a quick buck is a code of ethics that's been handed down intact to the new generation. Long days and hard work are the rule in Berea. Craftspeople who don't give fair value, those who might try to substitute hype for competence, are shunned by their peers and eventually move on. The code runs so deep that most of the craftspeople I met live up to it as if there were no other way to live, without question. You know, you could do a lot worse. □

Jim Cummins is an associate editor at Fine Woodworking.

Crafts at the College

Many woodworkers have a misconception about Berea College—that it's a vocational school. It most definitely is not, despite a reputation for crafts that dates back almost a century.

Then, as now, tuition was free, but there was still room and board to be paid for. Some students, skilled in needlework, began trading coverlets and quilts for lodging. College administrator William Goodell Frost had been giving such crafts as gifts to wealthy donors. It was a small step for the college to start making and selling them outright as part of its student work program.

On commencement day in 1896, Frost organized the first Berea craft fair, which drew other traditional crafts down from the surrounding hills. Soon the college was making small wooden objects, brooms, games, wrought iron, and anything else the city folk would buy. During the crafts heyday, students even grew their own flax for weaving.

Some of the essential early work programs, such as the dairy farm and the bakery, have been phased out—it's cheaper now to buy commercial products. But the crafts have continued to grow. At first, the major outlet was the Southern Highland Handicraft Guild's urban stores. When enough people began coming to Berea itself, the college opened the Log House as a salesroom.

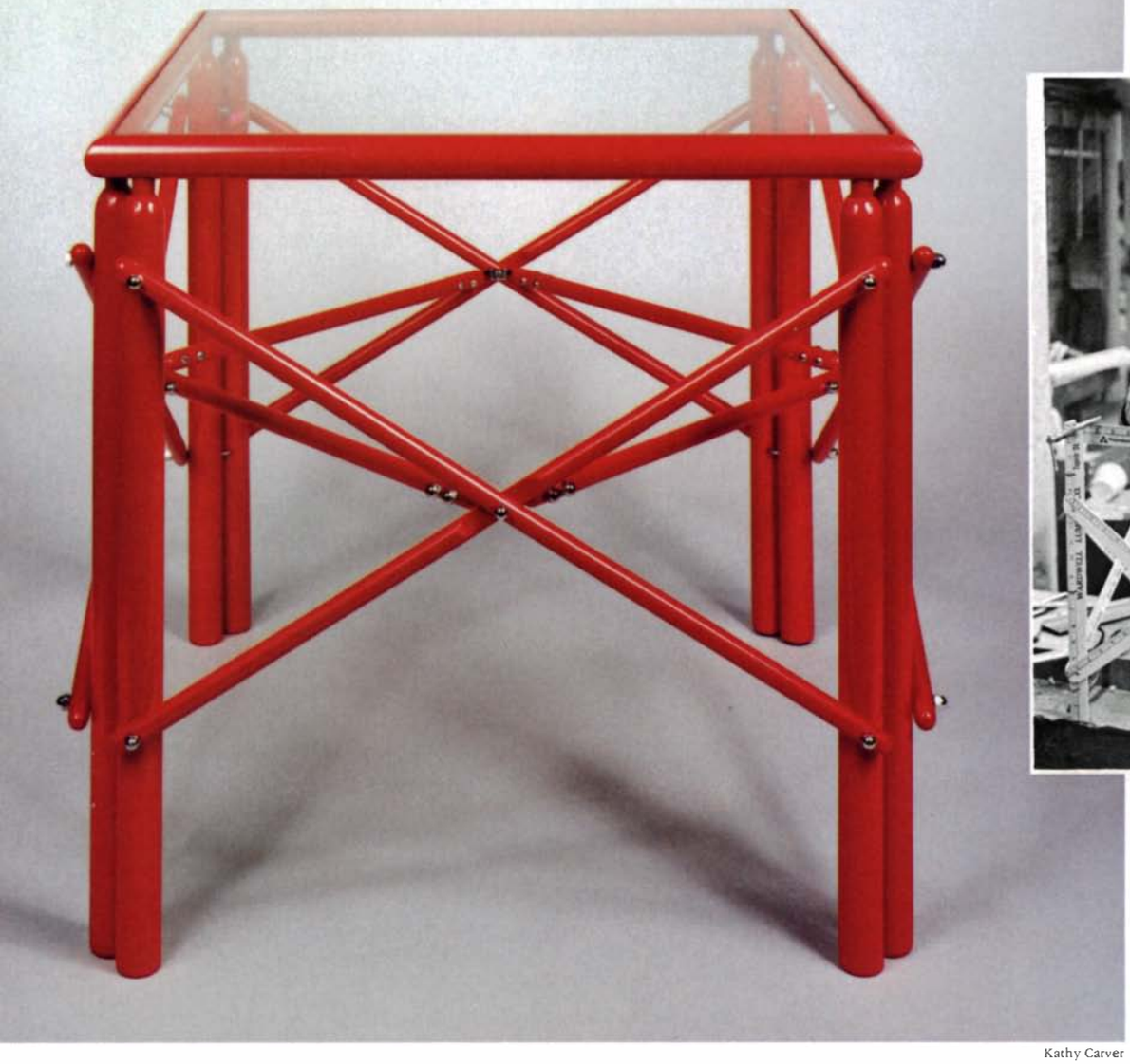
A student coming to Berea College is arbitrarily assigned to a work program for the first year. So some English majors end up in crafts, and some crafty people end up at the telephone switchboard, or waiting tables, or even running computer programs. After the first year, students can change their work program, but Woodcraft director Richard Bellando says he is always surprised at the number of academically inclined students, people planning to go on to masters and PhD degrees, who keep working wood throughout their stay. They just enjoy it.

Nevertheless, students at the college are firmly steered toward books, not encouraged to haunt the woodshop. Any student who graduates with a BS in industrial arts must also earn a BA in liberal arts. The college offers only one or two woodworking courses each semester, and a student who wants more experience has to put in extra time in the work program, where production techniques are the rule. Rude Osolnik, who taught at the college for forty years and also ran Woodcraft Industries for some time, recalls a mere handful of woodworkers in all that time who really prospered. Berea College draws its students from the top 10% of Appalachia's high schools. It aims to produce state governors, not carpenters. The crafts, essential as they are, are just a means to an end—a sideline. —*J.C.*

Triangular Sensibility

Intuitive geometry makes strong designs

by John Marcoux



Polished stainless steel fasteners glisten like jewels amid the glass and streaks of color in the 'Tritut' table (honoring King Tut and the Egyptians who used triangles in their furniture), left. In workshops, Marcoux is more whimsical, using yardsticks to show how 'weak materials' make strong furniture.

Kathy Carver

I've been designing and building furniture for many years, and I sometimes found myself locked into arbitrary rules that dictate looks. Things like: Dark wood should be used for serious furniture, light wood for informal furniture; forms should be predominantly rectangular. All that was too inhibiting for me as a designer. I struggled for years to sort out a point of view that would free me up to be a more decisive, adventurous furnituremaker, one who was still able to make furniture that people would want.

Eventually I found that I liked what happened when I heeded a fundamental design rule: Form follows function. I start with common materials—dowels, nuts and bolts, rattan—and put them together so that they rely on structure as an expression of design; purpose-in-use becomes a reason for being. The small table shown above is typical of my personal solution. There's no highly figured wood added for effect, just distinctive linear patterns and geometric shapes. The table base is triangulated to make maximum use of the structural potential of its parts—thus conserving material or enabling me to build with materials I couldn't otherwise use—and to keep costs down. As I'm a natural conserver and a cost-conscious craftsman, this appeals to me.

My fascination with the triangle as a structural unit is an important part of the development of this furniture. For centuries, ancient Egyptian craftsmen used triangles in their furniture. What puzzles me is that sometime between 1500 and 1000 BC the triangle disappeared as a visible aesthetic and structural element in formal furniture (although it was still seen in rustic and wicker pieces), and rectangular forms became dominant. When I began exploring the design possibilities of triangles, I felt like a prospector who had stumbled across a rich vein in an abandoned mine.

Because triangles distribute weight in several directions, effectively neutralizing

George Schlettinger

Maple dowels are the main structural components in this weavers' bench. The triangular compartments on each side of the 31-in. high seat are for yarn and tools.

much of the force upon them, small-diameter dowels and other relatively weak materials can be used to create interlocking triangles capable of supporting a lot of weight. The triangle has another special quality: when fastened securely at its three corners, it will not change its shape as long as its joints and components remain intact. Without diagonals to brace them, rectangular constructions put under stress tend to distort into parallelograms. Any triangle, regardless of its included angles, will remain strong and rigid, so I've found that I have a lot of design freedom in creating interlocking triangles.

In any triangulated piece, the parts can be assembled in almost infinite combinations, bringing alive an aesthetic idea in which structure is also decoration. In my tables, I try to create linear and angular patterns that fascinate and delight the eye. Tops, especially those that are transparent or have ports revealing the base, must become an integral part of the table design, not just a platform set on a base. Adding mirrors and glass can create an ethereal dimension that changes with the light and with the viewer's position. When the design is right, I hope the viewer senses one of my favorite ideas: "It does what it's supposed to do with joy."

Bolted construction is a powerful asset in these tables. The legs and struts are fastened with machine bolts ⅛ in. in diameter, so I'm not making holes large enough to weaken any component. To make this humdrum hardware appear gemlike and decorative, I polish faceted stainless steel cap nuts (available from Jamestown Distributors, 28 Narragansett Ave., PO Box 348, Jamestown, R.I. 02835).

In the workshops I teach, I like to introduce design ideas and the possibilities that "weak materials" offer by having people build a small table from yardsticks, like the one shown on p. 37. It's a good exercise, and you don't even need any woodworking tools. Tin snips to cut the yardsticks, a drill or a leather punch to make the holes, some wire and a pair of pliers, a screwdriver, some nuts and bolts, and a pocket knife for adding the finishing touches complete the kit. You don't need a tape measure, either—just use the markings on the yardsticks. Start with a couple of dozen yardsticks, and a few hours later you'll have a strong little table and a sense of how triangulated materials work together.

One of my simplest dowel tables, the Tri-table shown in figure 1, can support considerable weight, even though its base weighs only 14 oz. I assembled the table with 1¼-in., #4-40 stainless steel round-head machine bolts with cap nuts. I usually don't worry too much about the initial length of these bolts. After drilling through the two components to be joined, I insert a long bolt and add a hex nut. Then I cut the bolt close to the nut with electricians' diagonal cutters, unscrew the nut (this helps fix any threads damaged by the cutters) and put on the cap nut. This way, I'm sure that the bolt won't bottom out in the cap nut before the nut can be tightened down. The Tri-table could also be lashed together with cane or rattan. I used rattan only on the top and bottom of the center-column dowels. The top is solid maple, but you could use cane or thin strips of wood in a dowel frame instead.

In constructing the table, I made two simple jigs: one to position three dowels so that I could bore and bolt them together into a triangular unit (figure 2), and one to support the base while I lashed together the center dowels of the triangular units to form a column (figure 3). To make the first jig, I drew a line representing the floor near one edge of a plywood sheet. After deciding the height and size of the tabletop, I drew its side view on the plywood. I angled a dowel between the floor line and the tabletop line until it looked right, then marked the intersections. Next I added blocks and braces to hold the other two dowels needed to build a triangle around the diagonal. I determined the length of the dowels and cut them exactly, although they could be cut after they are drilled.

The dowels should extend about ½ in. beyond the bolt holes. I center-pricked the dowels at the three points where they cross and, using a portable power drill, just eyeballed holes through the center marks. Then I sanded the dowels in a large drum sander (see pp. 40-41), and painted them three bright colors which accent the triangles of the base and create a lively pattern as the parts thread through intersections and linear crossings.

To form the base, I lashed the three triangular units together with strips cut from an inner tube. On a plywood base, I made the second jig: I drew a circle large enough to intersect the tops of the legs, divided the circumference into three equal parts, and built traps for the legs at these points. With the three legs set in the traps, I wound the center column with rattan before removing the rubber strips. To secure the rattan, I drilled a hole in one of the dowels, glued in one end of the rattan, wrapped the column, and then worked the other end back into the lashing.

While the base was still in the jig, I added ⅜-in. dowel stabiles, or braces, to keep each leg in the 120° position. Using

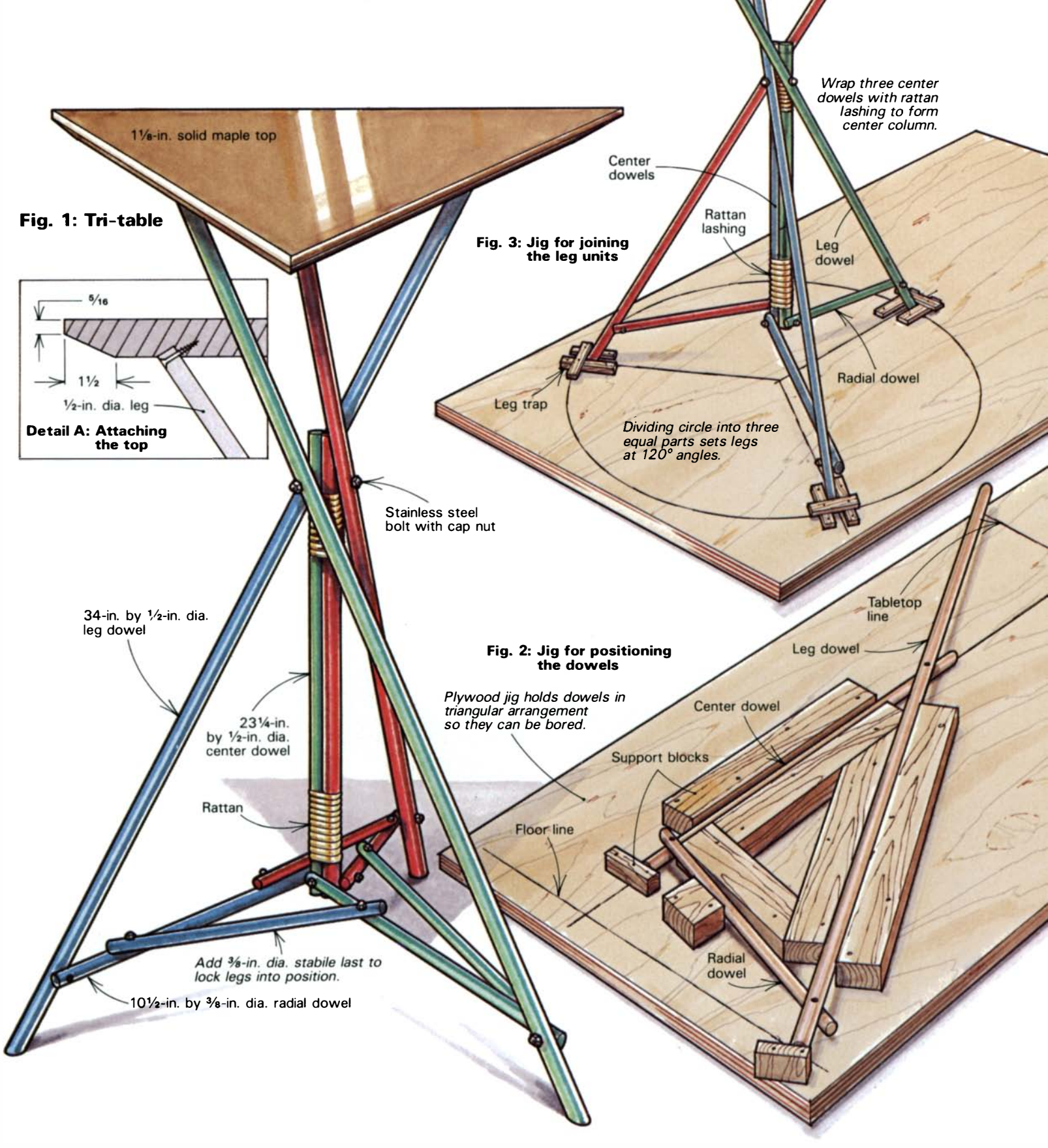


Fig. 1: Tri-table

Fig. 3: Jig for joining the leg units

Fig. 2: Jig for positioning the dowels

rubber strips to attach the stabile to the radial dowel temporarily, I positioned it to form an attractive angle. Then I bored and bolted the stabiles and radials together, and removed the rubber strips.

Tightening the bolts and buffing the metal parts completed the base. Holes for the top are bored, as in detail A in figure 1. I left the legs square on their bottoms until after I'd assembled the table. Then I set the table on a level surface, and cut and sanded the legs until the top was level. Alternatively, you could cut the legs at the floor line while they're still in the jig.

I liked the Tri-table so much that I've expanded the idea to make much more elaborate constructions such as chairs and dining tables. I've also developed a whole series of dual-leg tables with triangular, square or pentagonal tops.

All these tables support my long-held and stubborn conviction that people will buy furniture that's strong, well designed and reasonably priced. Regardless of the materials used, if you combine a designer's eye with a willingness to experiment and depart from traditional woodworking themes, you can create a variety of distinctive visual effects. *(continued on next page)*

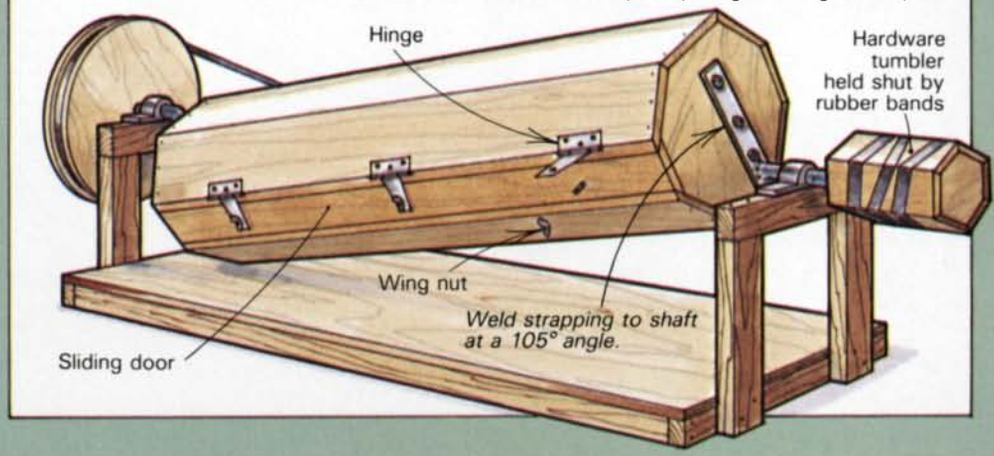
John Marcoux designs furniture in Providence, R.I.

Drawings: David Dann

Working with dowels

Fig. 4: Dowel sander

Two faces of octagonal drum form a dovetail-shaped slide for door. Door is secured by strap hinges acting as hasps.

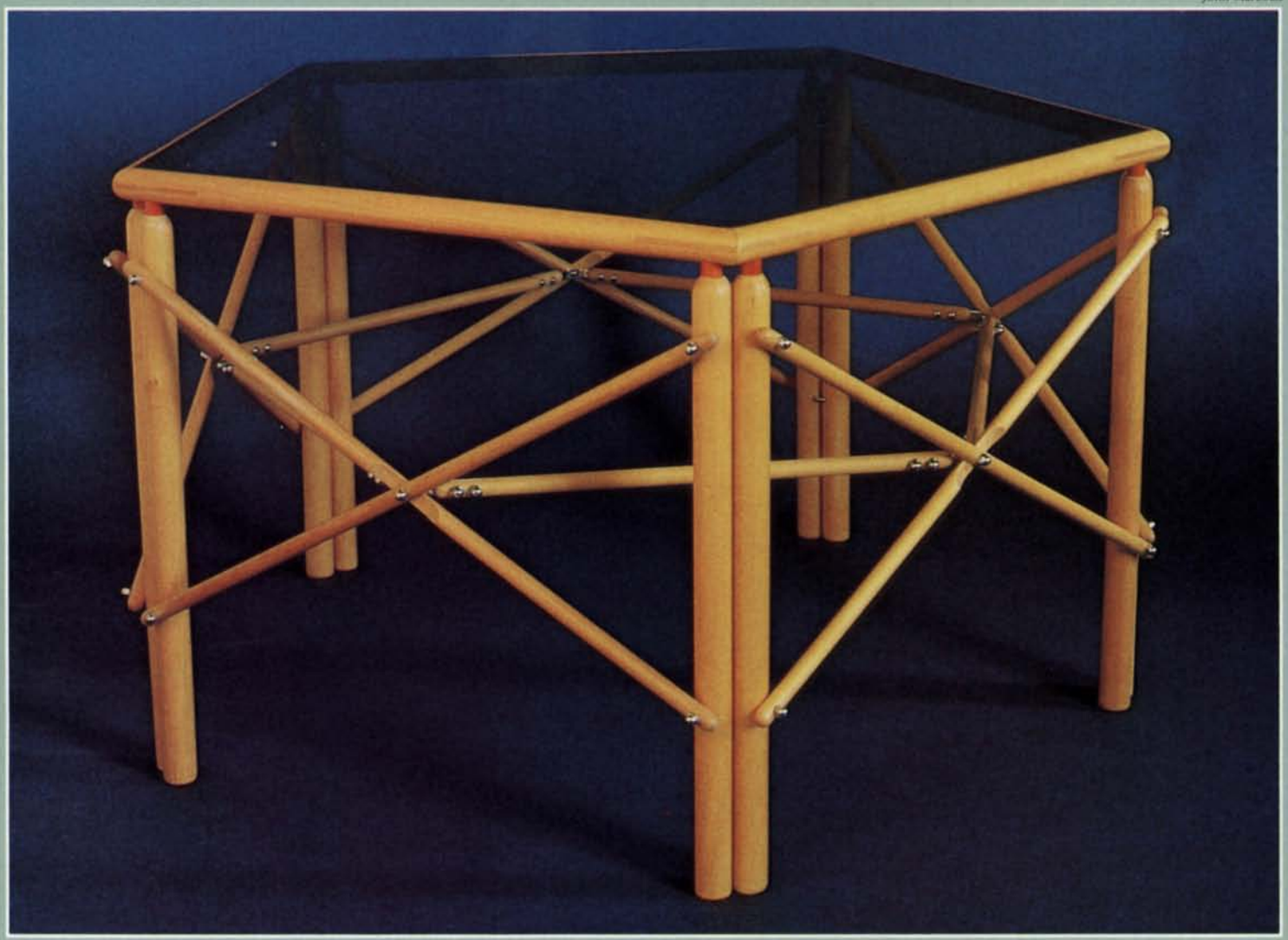


I find dowels to be an efficient and economical building material that gives me a lot of freedom in developing my designs. I prefer maple dowels, if I can find them. Generally, dowels purchased from any reputable lumberyard are maple or birch. Avoid cheap imports—they're spongy and porous and they don't hold up well.

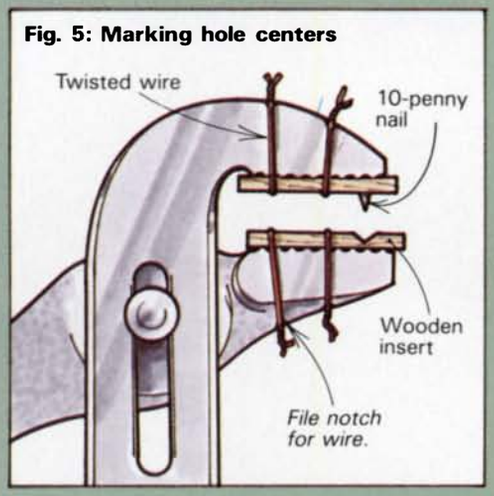
Regardless of where you buy the dowels, they'll probably be pretty rough and covered with mill marks. To avoid tedious sanding, I built an octagonal drum, 47½ in. long and 14½ in. in diameter (figure 4), that tumble-sands 30 to 50 dowels at once. I lined the drum with carpeting to cushion the dowels and to keep the noise down, but the thing still creaks like an old wooden boat. The brackets that connect the drum to its support and drive shafts are offset, enabling the drum to move up and down along its length as it rotates. For abrasives, I cut sandpaper sheets into thin strips with tin snips. I also attached self-adhering sandpaper to each end of the drum to sand the ends of the dowels hitting the end walls.

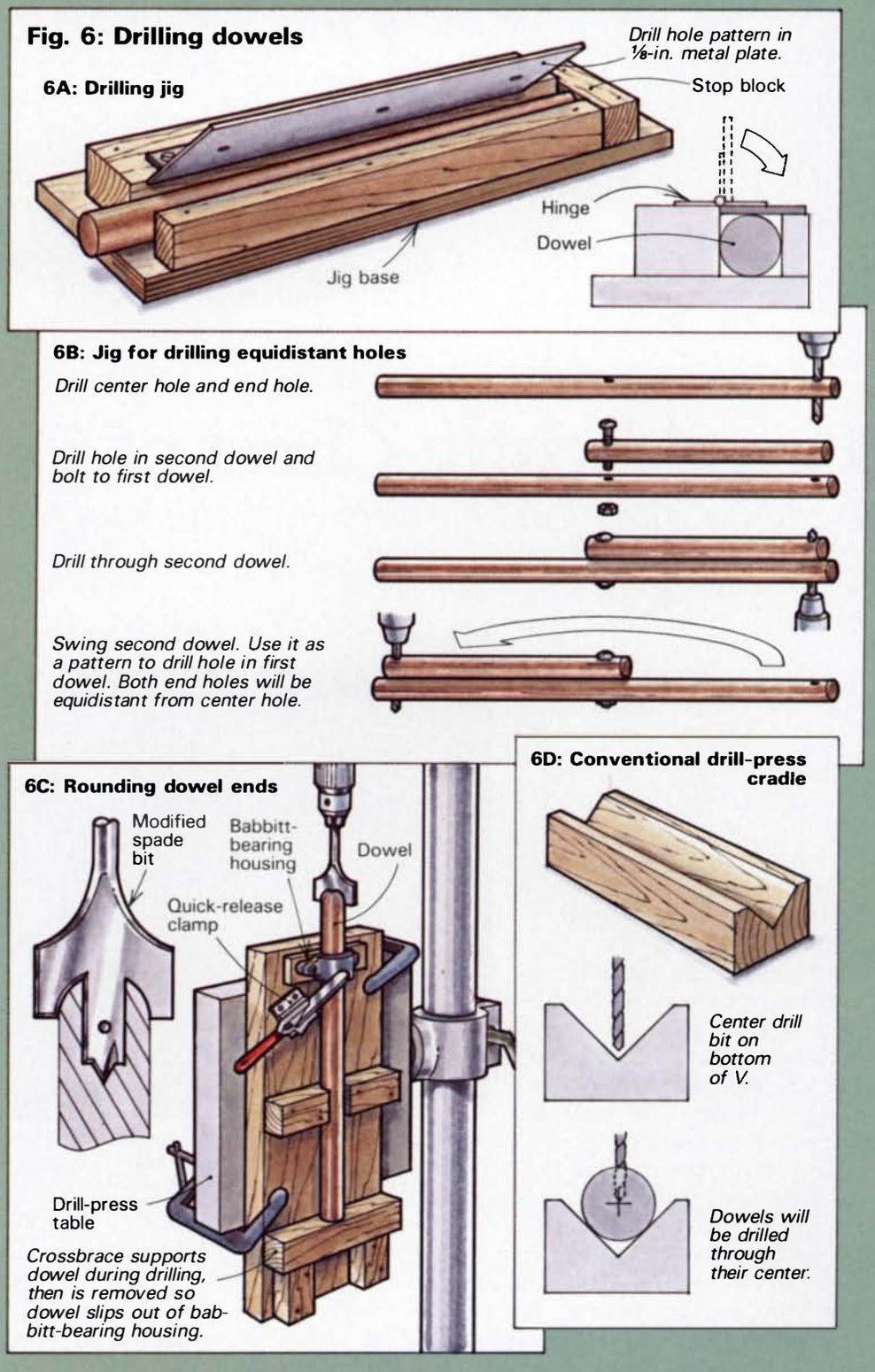
To use the sander, I throw in several handfuls of sandpaper strips with the dowels, turn on the motor, and work on something else for a while. Sanding time depends on how badly the dowels are marked. The drum has to turn slowly, about 25 RPM, otherwise the dowels will be tossed about too roughly and will fall

John Marcoux



Marcoux dubbed this 18½-in. high table 'Birdfoot' because of its spindly legs. The top is bronze-colored glass.





from wall to wall. I also added a smaller 5½-in. dia. drum on the support-shaft end for polishing nuts and bolts and other hardware. Tumbling the metal parts with lapidary compound brings them to a bright finish. If I want to clean hardware before it's painted, I tumble the pieces for two hours with medium or fine emery-cloth strips.

When I have to drill dowels, I often use a center punch to make a starting mark and I gauge the angle of the drill by eye. You can make another good tool for marking holes from a pair of Channel Lock pliers (figure 5). In a piece of hard wood, cut a V large enough to hold a dowel and fasten the block to one jaw with wire. Drive a 10-penny common nail though another block, clip off the nail and sharpen the protruding point. Then attach that piece to the other jaw so that the nail will hit the dowel in the V-block. This tool is easy to control, and it makes a hole deep enough for you to accurately start the drill bit.

I also use a variety of blocks and jigs as drill guides. To make an accurate drilling jig for boring identical components, I simply glue two lengths of soft wood, usually about ¾ in. wide, to a base (figure 6A). The first block should be thicker than the dowels to be drilled. The second block should be ⅛ in. thinner to accommodate the thickness of the metal plate used in the jig. Drill guide holes in the metal plate at the locations you want them in the dowels. Next hinge the plate to the first block, so that the plate can be lowered over the dowel. When lowered, the plate should rest on the thinner block and lie flat over the dowel channel between the blocks. Glue the first block to the base, place the correct-size dowel next to it, push the second block lightly against the dowel, and attach the second block to the base. A stop block tacked in the dowel channel positions the dowel.

Another way to guide the bit is to fasten a predrilled dowel to a second dowel with rubber bands and drill through the first hole to make the second. I use a similar technique (figure 6B) to drill holes that are equidistant from a center hole, as for a cross stretcher on a table.

A drill press can also be used for drilling dowels. I bolted the top half of an old babbitt-bearing housing to a wooden base so that it can be clamped down onto a dowel. The size of the housing determines the size of dowels that can be drilled; the one I use fits 1-in. dowels. After turning the drill-press table vertically (figure 6C), I use a modified spade bit to drill and round over the end of a dowel. To shape the tops of the 1-in. legs for the Tritut table (p. 37), I ground down a 1½-in. spade bit so that it rounds over the ends of the dowel as it bores a ½-in. center hole. The center drill bit also stabilizes the outer cutters to prevent chattering which could mar the wood.

Figure 6D shows a conventional V-block cradle for steadying dowels on a drill-press table. The point of the V also helps you line up the drill bit. —*J.M.*

Hepplewhite Chest of Drawers

Delicate inlay fans life into a traditional piece

by Carlyle Lynch

An aura of mystery cloaks this beautiful chest: where was it made and by whom? Adding to its charm is the delicate string inlay and fan, shown full-size at top of page.

At an antiques show, a small mahogany Hepplewhite chest with a delicate fan inlay beckoned me. The owners let me measure and draw it, but we haven't been able to learn much more about this beautiful unsigned piece, except that it came from an old home in Fauquier County, the heart of Virginia's horse country.

The owners presume that the chest was made nearby in the old port city of Alexandria. Overland transport of heavy lumber was so difficult two hundred years ago that most mahogany furniture was built in coastal areas. The chest's secondary wood is white pine, but that's no clue to its origin, since cabinetmakers in both New England and Virginia used white pine extensively as a secondary wood, and northerners shipped a great deal of mahogany furniture to wealthy southern farmers. If the secondary wood were yellow pine, you could reliably classify the piece as a southern antique.

The construction techniques shown on p. 44 are typical of those used by 18th-century cabinetmakers. On the original chest, ⅛-in. thick mahogany strips hide the rail housings in the solid-mahogany sides, and similar strips face the white-pine drawer rails. The apron and the edge of the solid-pine base also are veneered. A white string inlay highlights the solid-wood top and the drawer fronts. A narrow diamond-pattern inlay band runs around the front and sides just below the level of the chest base. To reproduce the piece, you could use solid wood throughout, except for the apron, where veneer and a marquetry fan are more appropriate.

The original top, a single piece of ⅜-in. mahogany, is so thin that I wonder if the maker resawed a board to get the same beautiful grain for a second chest. The top appears to be glued all around. Because any seasonal wood movement in the thin top is in the same direction as in the sides, the top is still tight and without cracks, nearly two hundred years after it was made.

The fan inlay is a most appealing feature of this chest. Today you can buy a pre-cut veneer fan, patch it into a mahogany veneer sheet and apply the sheet to the apron, as if you were gluing down a marquetry picture. Readers wishing to reproduce the original authentically, however, will probably prefer to make their own ⅛-in. thick veneer, and their own fan, as discussed below. In this method, the apron blank is first veneered with mahogany, then a recess is carved in it to accept the lighter-colored pieces of the fan. Before you start on the inlay, cut the veneered apron to size, but don't scroll-saw it to shape yet. Wait until the inlay has been done. That way you can saw the apron to match the bottom curve of the inlay.

If you cut your own fan, make an exact copy of the inlay from thin cardboard before making one from wood. Start with a piece of cardboard slightly larger than the fan. That way, as you cut out the individual leaves, you'll be making the fan-shaped cutout you'll need later for a fitting template. If you want to make an elliptical fan like the original, you can trace the photo

Photos: top, Richard Aufenger; bottom, author

on the facing page and transfer it to the cardboard. Here I'll make a slightly different, circular inlay. Either way, after you make the template, cut out the eight leaves with a sharp knife.

Next, using a sharp pencil, trace each leaf pattern onto ⅛-in. thick maple. As much as possible, avoid short cross-grain near the narrow ends of the leaves. Saw the leaves out with a jewelers' saw, fine scroll saw or coping saw. Cut on the waste side of the pencil lines, then plane and file the edges down to the lines and fit the pieces into the cardboard template.

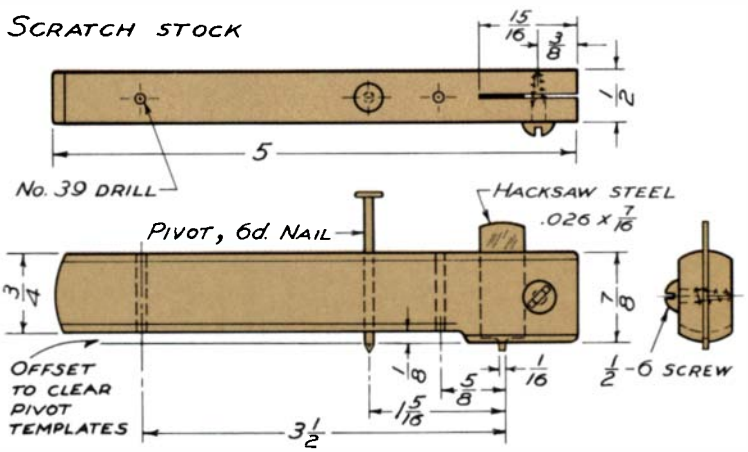
Once the leaves fit snugly in the template, they must be individually shaded by scorching in hot sand. When making the fan inlay for this article, I used only about three tablespoons of fine white sand in a small metal plate, but you might find it easier to control the temperature with about an inch of sand in a pan. Put the container on a hot plate set on medium until the sand is hot. Before risking the real leaves, experiment on scrap pieces to determine how long each must be heated. Grip each one with tweezers and dip its edge in the sand. For a start, try about five seconds; you may have to adjust the temperature. On the original, the tone gradually lightens across the leaf, giving the fan a real three-dimensional look. Don't overdo it, or you'll char the pieces.

While the shaded pieces are cooling, use the template to trace the fan shape on a 2-in. wide piece of brown-paper packing tape. The tape should be cut the same size as or slightly smaller than the template; any overhang will just get in your way. Now fit the maple back into the template and tape the leaves together. Lift the inlay out as a unit, sandwich it between two pieces of wood that can be clamped in a vise, and file the fan's back edge to a slight bevel to ensure a tight fit.

Clamp the beveled fan in position on the apron and carefully pencil a line around it. Remove the fan and use a ⅜-in. gouge to carve a recess about 3/32 in. deep within the outline, then flatten the bottom with a hand router plane. Cut the recess shallow enough to leave the fan about 1/32 in. proud of the apron surface. Dry-fit the inlay and pare the recess outline for a snug fit. Next spread yellow glue over the recess bottom, drop the entire inlay as a unit into the indentation, put a smooth piece of wood between the inlay and a clamp, and press the fan into place. Immediately remove the clamp and block, and wipe off excess glue with a damp rag. The inlay should be stuck firmly enough to stay put while you sand off the tape. A little more sanding will create enough dust to fill any small spaces between the leaves. To ensure that the fan is down, cover the inlay with waxed paper, replace the wood block, and reclamp the assembly until dry.

Rabbet the top edge of the apron with a router, saw or shaper to take the 3/16-in. wide diamond inlay band. The apron now requires a narrow, curved groove for the maple stringing, and similar grooves are needed on the top and the drawer fronts. I prefer to cut straight grooves by hand with a homemade scratch stock similar to the one discussed below, but for cutting curved grooves, a small router, such as a Dremel hand tool with its router attachment, is faster.

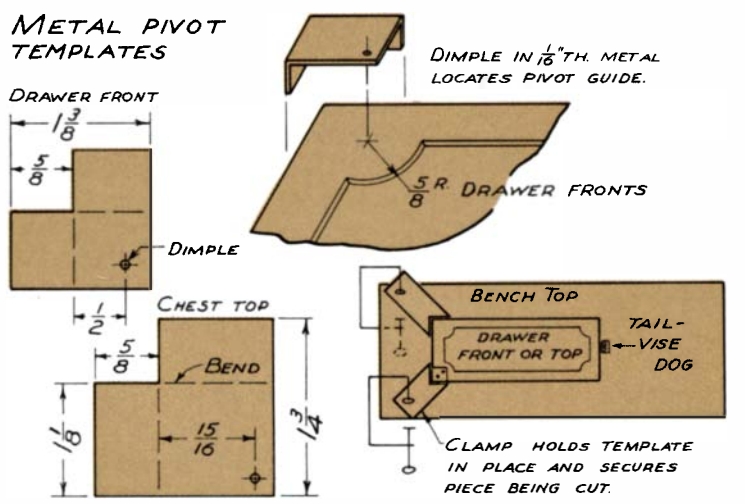
If you don't want to use a router—and I didn't until recently when I was given a Dremel tool and discovered how handy it can be—all the inlaying can be done with a small homemade scratch stock, as shown at right above. I used it with a pivot for cutting the circular-arc inlay, and clamped a wooden fence to the beam for cutting straight grooves. To make the cutter, use a 100-grit aluminum oxide wheel to grind a piece of hand hacksaw blade. No bevel is needed; the sides should be ground square with the face. To use the tool, hold it firmly near the blade and lean it a little toward the direction you are moving



it. Use a light scraping pressure, working first in one direction and then in the other.

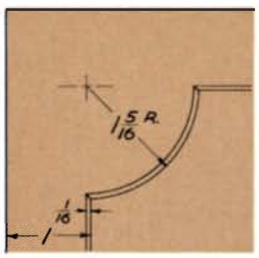
To cut a 1/16-in. circular inlay groove under the fan, clamp a piece of wood to the apron edge, mark on it the center for the 3½-in. radius arc and punch a small hole there. The hole will anchor the scratch-stock pivot or the Dremel pivot guide. After the groove is cut, soften the string inlay in boiling water so it can be bent around the curve. I recommend that you use commercially available 1/16-in. by 1/16-in. sawn maple inlay—it's easier to bend than the 1/28-in. by 1/16-in. types, which are cut from veneer and tend to flip over on edge when bent. I used maple stringing because it's more readily available than the holly used on the original chest. If you don't want to buy inlay, you could saw your own with a fine-tooth plywood blade. Once the inlay is soft enough to bend, apply a thin coat of yellow glue to the bottom and sides of the groove, and press the inlay in with the face of a hammer. When the glue has dried, sand all the inlay flush with the apron surface.

Next cut the inlay grooves for the top and the drawer fronts. Whether you use a scratch stock or a Dremel tool, cut the straight grooves first. Then by starting the cutter in the groove, you can work around the curves without chipping any corners. To do the curves, I recommend clamping the piece to the workbench and using homemade metal templates, shown below, to protect the wood and to anchor the guide pivot of the Dremel or scratch stock. Set the pivot in the indentation punched in the metal template and place the cutter bit in the end of a straight groove to start. Then pivot the cutter to the end of the next straight groove. When inlaying the top and drawers, apply glue to the groove and press in long, straight pieces wherever possi-

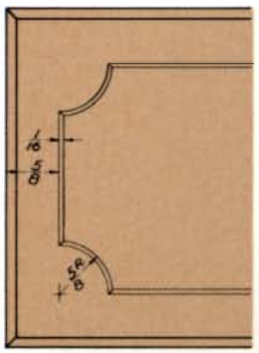


Hepplewhite CHEST OF DRAWERS Mahogany About 1780

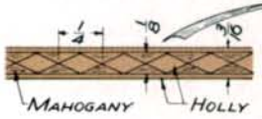
Courtesy Mr. & Mrs. Henry A. Shook
Virginia Beach, Virginia



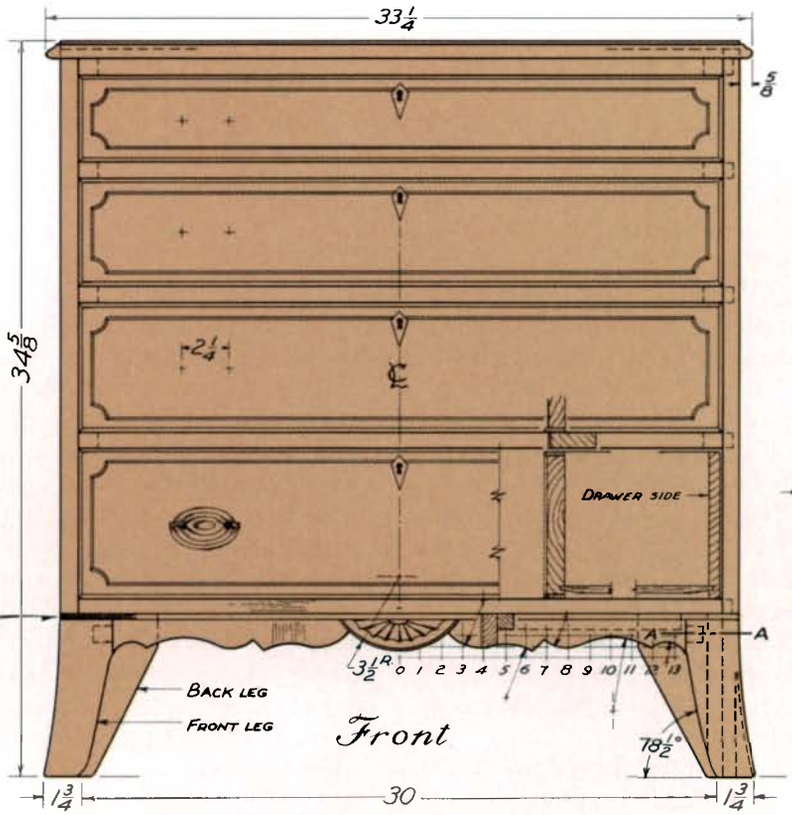
TOP INLAY



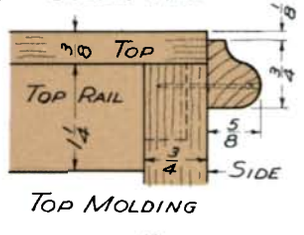
DRAWER INLAY



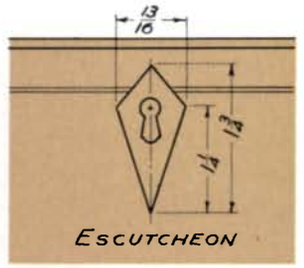
INLAY FRONT & SIDES
(SHOWN ENLARGED)



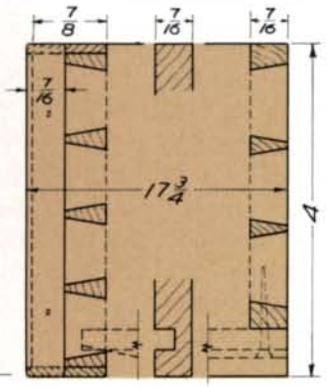
Front



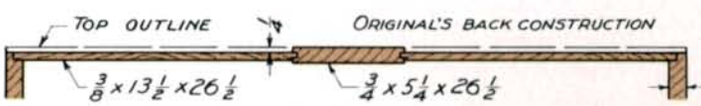
TOP MOLDING

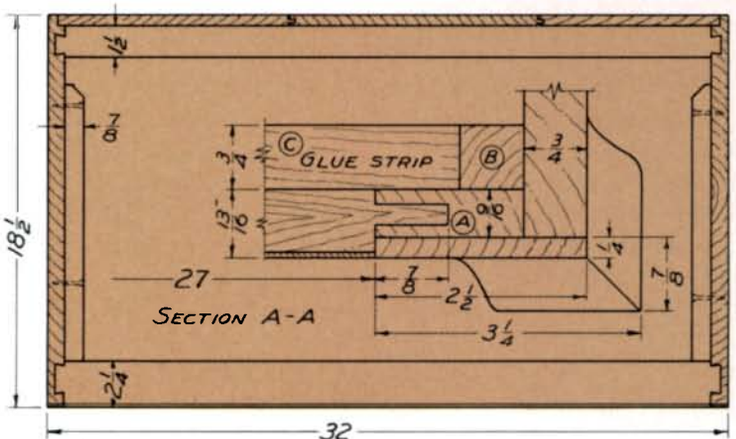


ESCUTCHEON

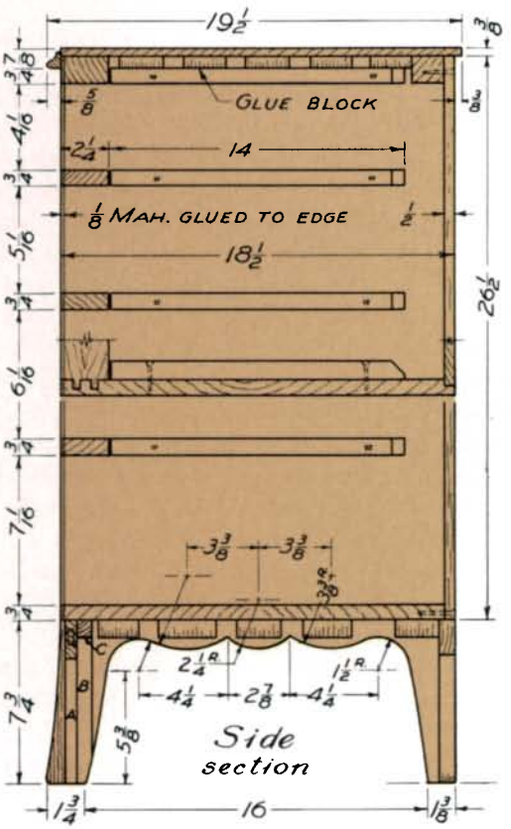


DRAWER DETAIL

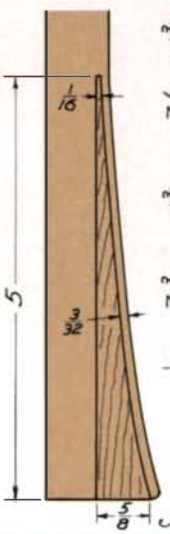


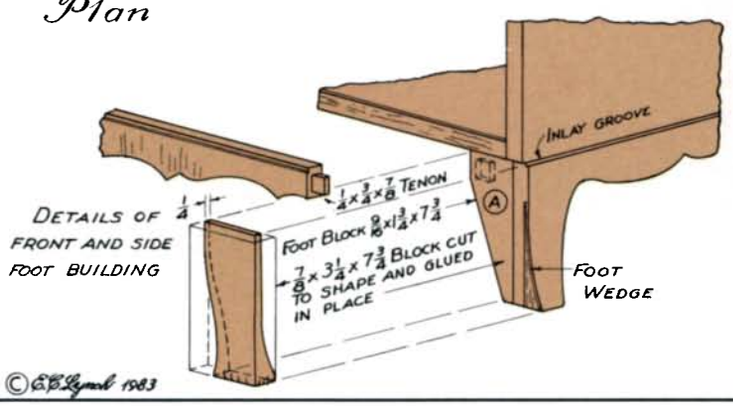


Plan

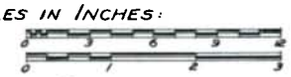


Side section





SCALES IN INCHES:



Measured & Drawn by Carlyle Lynch

ble. To join pieces at the corners, put a piece of tape across the groove where the joint will be and cross the inlay strips over it, so they're held out of the glued groove. Cut a miter through both strips with a sharp knife and remove the tape. The joint will be tight when the pieces are forced into the groove.

Regardless of whether you buy pre-cut inlay or make your own, be careful when applying finishes. Much of the beauty of the original chest is due to the clear, unstained dark mahogany, which is enhanced by the white inlay and brightly polished hardware. The types of mahogany available today, however, usually need to be stained as well as filled in the finishing process, and there's a danger of staining the inlay out of existence. Although it may sound tedious, an easy way to protect the white areas is to take a tiny watercolor brush and apply enough white shellac to seal the inlay before you stain the chest.

If you reproduce the piece from my drawing, note that the top rails are dovetailed into the sides, while blind mortises with twin tenons are used on the lower rails. If you prefer, you can dovetail all the drawer rails. Also, cut a housed dovetail joint so that you can slide the bottom in from the back. Notch the bottom's front corners to hide the joints.

The feet can be made in two ways. Foot pieces with a concave taper can be glued into recesses cut into the sides, then the front of the foot assembly covered with a shaped piece. On the sides, if you want to shape the legs without interrupting the grain pattern, glue flaired wedges into kerfs sawn in the side feet. Since a 10-in. tablesaw can cut only 3-in. deep kerfs, cut the space for the wedges in two steps, beginning with a tablesaw and finishing up with a handsaw. To be safe, make the tablesaw cuts clear across the sides while they're square. Bandsaw the sides to the scroll pattern to make it easier to handsaw the remaining 2 in. of the 5-in. deep kerf. I find that two handsaws clamped together will make a kerf as wide as that of a 10-in. combination blade. Drive in the glue-coated wedges after soaking the area with hot wet towels for 10 minutes, and clamp.

The drawer fronts listed in the bill of materials are 5/16 in. narrower, top to bottom, than the opening, allowing 1/4 in. for the cock beading and 1/16-in. vertical play. Mahogany is stable in humid conditions, but 3/32-in. to 1/8-in. vertical play may be needed in some regions. It's better to be generous in allowing for vertical play, rather than trying to shave down a cock-beaded drawer. Drawer runners are strips fastened to the sides with two nails each. Don't secure them more firmly than that, or the sides may eventually split from wood movement.

The back shown here is made of tongue-and-grooved vertical boards. The original chest's back has two thin boards that fit into grooves cut in the edges of a thicker, center support. Nails hold the thin boards in rabbets in the chest sides, to the top rail, and to the edge of the bottom. □

Carlyle Lynch, a designer, cabinetmaker and retired teacher, lives in Broadway, Va. Drawings by the author. Lynch's plans for a Queen Anne highboy appeared in FWW *#42, and others of his drawings are available from Garrett Wade, Lee Valley Tools Ltd., and Woodcraft Supply. Constantine's (2050 Eastchester Rd., Bronx, N.Y. 10461) stocks fans, escutcheons and inlay borders suitable for the chest shown here. Manhattan Supply Corp. (151 Sunnyside Blvd., Plainview, N.Y. 11803) has 1/16-in. end-mill router bits with 1/8-in. shanks. For more on inlay, see* FWW *#27, pp. 44-55.*

BILL OF MATERIALS

Amt.	Description	Wood	Dimensions T x W x L
Case:			
1	Top	mahogany	3/8 x 18 7/8 x 32
1	Top molding	mahogany	5/8 x 3/4 x 34
2	Top moldings	mahogany	5/8 x 3/4 x 20
2	Sides	mahogany	3/4 x 18 1/2 x 34 1/4
1	Bottom	pine	3/4 x 18 x 30 1/2 s/s
3	Drawer rails	pine	3/4 x 2 1/4* x 30 1/2 s/s
1	Top rail	pine	1 1/4 x 2 1/4* x 30 1/2 s/s
1	Top back rail	pine	1 1/4 x 1 1/2 x 30 1/2 s/s
6	Drawer runners	pine	3/4 x 7/8 x 14
2	Kickers	pine	3/4 x 7/8 x 14
1	Back (tongue-and-grooved boards)	pine	1/2 x 31 1/4 x 26 1/2
1	Apron	pine	3/4* x 1 7/8 x 27
2	Front feet	mahogany	7/8 x 3 1/4 x 7 3/4
2	Front foot blocks	pine	9/16 x 1 3/4 x 7 3/4
2	Apron and foot glue blocks (makes two pairs)	pine	3/4 x 3/4 x 29
4	End foot wedges	mahogany	5/8 x 2 x 5
2	Back feet	pine	3/4 x 4 3/8 x 7 3/4

Hardware: Eight brass pulls, 2 1/4-in. bore, similar to D-3 or D-5 from Ball and Ball, 463 West Lincoln Hwy., Exton, Pa. 19341; four drawer locks with barrel keys, 7/8-in. selvage to key pin.

Amt.	Description	Wood	Dimensions T x W x L
***Drawers**:**			
1	Front	mahogany	7/8 x 3 3/4 x 30 7/16
1	Back	pine	7/16 x 3 7/16 x 30 7/16
2	Sides	pine	7/16 x 4 x 17 5/16
1	Front	mahogany	7/8 x 4 3/4 x 30 7/16
1	Back	pine	7/16 x 4 7/16 x 30 7/16
2	Sides	pine	7/16 x 5 x 17 5/16
1	Front	mahogany	7/8 x 5 3/4 x 30 7/16
1	Back	pine	7/16 x 5 7/16 x 30 7/16
2	Sides	pine	7/16 x 6 x 17 5/16
1	Front	mahogany	7/8 x 6 3/4 x 30 7/16
1	Back	pine	7/16 x 6 7/16 x 30 7/16
2	Sides	pine	7/16 x 7 x 17 5/16
4	Bottoms (1/4-in. plywood can also be used)	pine	3/8 x 17 1/4 x 29 3/4
8	Cock beading	mahogany	1/8 x 1 x 30 7/16
2	Cock beading	mahogany	1/8 x 1/2 x 24
Inlay:			
12	String inlay	maple	1/16 x 1/16 x 36
1	Fan inlay (makes eight leaves)	maple	1/8 x 1 1/2 x 5 1/2
4	Escutcheons	maple	1/8 x 13/16 x 1 3/4
3	Base diamond inlay band		3/16 x 1/24 x 36

s/s = shoulder-to-shoulder. Allow 1/2 in. to 1 in. extra length for each tenon or dovetail.

* Veneered

** Dimensions include 1/16-in. vertical allowance for humidity changes.

Starting Out

Edge-joining for the beginner

by Roger Holmes

While practicing basic woodworking skills, you can make this simple dining table and bookcase, or variations to suit your fancy.

A friend of mine took a beginners' woodworking course not too long ago. She was surprised, and a little disappointed, to discover that the first two sessions were devoted not to the construction of a coffee table or a dovetailed box but to the making of a simple, ordinary board—two flat, parallel faces, and square to them, two straight edges.

Board-making is not exactly the stuff of woodworking romance. But without boards it's tough to make tables and cabinets. In this article I'll tackle board-making; in subsequent articles, I'll cover other basics—cutting bridle joints, rabbets, and so on. My methods aren't definitive, but I hope they'll get you going.

Making sample joints isn't much fun, so if you don't have your own projects to practice on, you can cobble up the table and bookcase shown above as you go along. (Make the 48-in. dia. tabletop now, the table base with the next article, the bookcase with the third and fourth.) I built these pieces after my wife and I moved our meager possessions into a seven-room apartment and needed to fill up the empty spaces. The results are hardly masterpieces of design or construction, but you can generate a lot of simple furniture from them. Chests of drawers, after all, are just little boxes housed in a big box; tables, merely slabs of wood perched at various heights above the floor.

Wood—I decided to build the table and bookcase of solid wood, even though using plywood would have eliminated gluing up wide boards. I enjoy working solid wood. Curling a long shaving out of my plane gives me a great deal of satisfaction—planing plywood produces grit and dust.

There is solid wood and solid wood, however. Some woods, such as rosewood and walnut, seem to demand elegant designs. But what I wanted was utility, economy, and something easy and pleasing to work. Pine filled the bill on all counts, and I discovered a small lumberyard up the road selling it for $.30 to $1.00 a board foot.

I strongly recommend that beginners work with pine or a similarly soft, evenly grained wood such as basswood or certain varieties of fir. Mistakes are inevitable and instructive, so you might as well make them cheaply. In lumberman's lingo, you'll need 4/4 (1-in.) boards for the boxes and 8/4 (2-in.) boards for the table.

If you can, buy roughsawn (unplaned) boards. If not, buy the planed, or surfaced, boards sold at most lumberyards. The most common variety of surfaced board is designated S4S, which stands for "surfaced four sides," meaning that the boards have been surfaced on both faces and both edges. No. 2 Common pine boards are fine. They're relatively cheap, and the knots in them will add character to your furniture (that's as good a rationalization as any for penny-pinching.) Because the boards have been surfaced, they will not be the full nominal thickness. For example, if you want boards between ¾ in. and 1 in. thick after you've flattened them, start with 5/4 S4S stock.

Flattening boards—The tabletop and the box that forms the bookcase base require large, flat expanses of wood. Roughsawn boards from the sawmill or surfaced boards from the lumberyard are seldom flat enough or wide enough. Their faces usually will be cupped across the grain, bowed, or twisted diagonally along the grain, or a combination of all these. Making wide boards by edge-joining requires flat boards, so your first task is to make them that way.

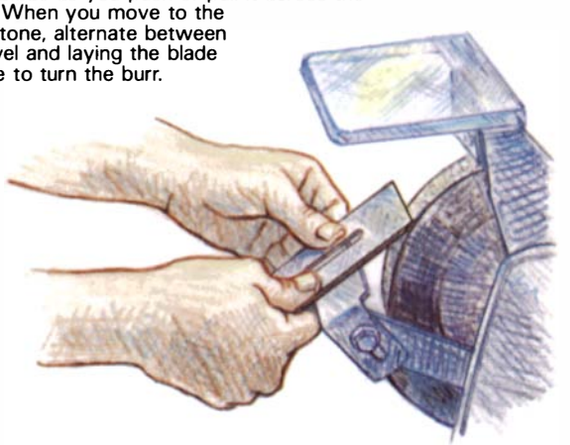
Cabinetmaking, like mathematics, proceeds logically from start to finish. Each step builds on the last, and if you miss something at the beginning, you'll likely suffer for it at the end—or sooner. If the first face isn't reasonably flat, everything that follows will be affected. The sequence is simple: After flattening one face, flatten the other while removing enough wood to bring the board to the right thickness. Then plane the edges square to the faces, and you're ready to glue up.

I think that the hand plane is the most effective tool for flattening. Its mechanical cousin, the jointer, is quicker, but the width of the jointer bed limits the width of board that can be flattened. A thickness planer can make a board uniformly thick, but it can flatten only the thickest boards. Whenever possible, I use a combination of hand and machine techniques. But even if you're blessed with a wide jointer and a planer, it helps to know how to flatten, thickness and joint the edges of boards by hand. In the process, you'll also

For a close shave

Sharpening on stone

Sharpening involves a series of simple operations, but success requires patience and persistence. Grind a 25° bevel on the blade (below), then refine the edge with increasingly fine benchstones and a leather strop. Try not to rock the blade as you push or pull it across the stones (above). When you move to the soft Arkansas stone, alternate between stroking the bevel and laying the blade *flat* on the stone to turn the burr.



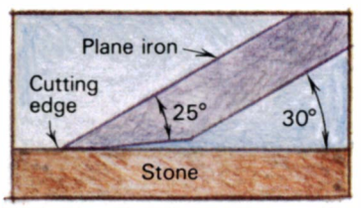
Planing with a dull tool is a thankless task. I spent much of my first woodworking year struggling with a dull plane blade, and when I finally managed a keen edge, it was a revelation. It's inevitable that, for a while, you'll be keener than your tools.

In sharpening, the end totally justifies the means, and there are dozens of equally effective routes to a sharp edge. The cutting edge of a plane blade is at the intersection of the bevel and the back of the blade. The ideal edge, like the ideal line in geometry, would have length but no thickness. All sharpening methods try to refine the bevel/back intersection to the ideal by removing steel with finer and finer abrasives.

My sharpening tools are simple: a bench grinder with a medium-grit, 6-in. carborundum wheel; an 8-in. long combination India benchstone, one side coarse, one side fine; a 6-in. long soft Arkansas benchstone; and a leather strop, a piece of belt leather impregnated with a fine abrasive such as rottenstone. (The leather alone, or even the palm of your hand, will do for a strop).

The bevel of a new plane iron is ground to about 25° and I maintain this angle, trying not to facet the bevel when grinding. Most grinders have tool rests that can be fixed, or adapted, to support the blade at the bevel angle. You can grind the cutting edge slightly convex in its length or dub off the corners to prevent making ridges in the wood when you're rough-planing. I use one plane for everything, so I grind straight across, and plane the ridges out with a few strokes of a sharp, finely set blade.

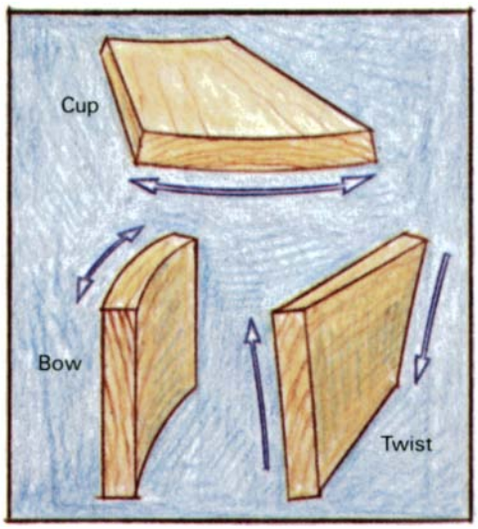
After grinding, rub a little light machine oil on the fine face of the India stone and rest the bevel on it. I hold the blade with one hand, tilt it slightly forward (about 5°) and draw it toward me. The motion can be slow or fast, but hold the blade steady—don't rock it from front to back or side to side. Tilting the blade forms a second bevel, which makes the cutting edge a little more durable.



Take six to eight strokes, then feel for a burr of steel rolling over the back of the cutting edge. When the burr appears, move to the soft Arkansas stone and make about as many strokes at the same angle. Then turn the blade over, lay it *flat* on the stone, and rub it back and forth to turn the burr. Alternate on the Arkansas between the bevel and the back until the burr disappears. Then stroke the bevel and back on the leather strop, just as on the stones.

At the end of this little ritual, try to shave the hair off the back of your hand—a clean shave equals a sharp edge. If you tire of being asked about your bald hand, rest the flat side of the blade on your thumbnail, raise it slightly and push the cutting edge toward the cuticle. The lower the angle at which the edge catches on the nail, the sharper it is. If the edge isn't sharp enough, strop again; if that doesn't work, go back to the stones.

That's how I do it. Others hold the blade with both hands, move it in a circle or a figure eight on the stone, strop the edge on their pant leg, and so on. No matter how long it takes, don't get discouraged. Once you get used to it, you can sharpen a plane iron in less time than takes to read about how to do it. —*R.H.*



Planing technique

Most boards are afflicted with at least one of the problems shown at left, but can be cured with a hand plane. Hold the plane comfortably; make your whole body work for you. Extend your right index finger along the edge of the blade for added control. Begin with pressure on the plane's toe, and end with pressure on the heel.

acquire dexterity with the plane, which is handy for all sorts of work.

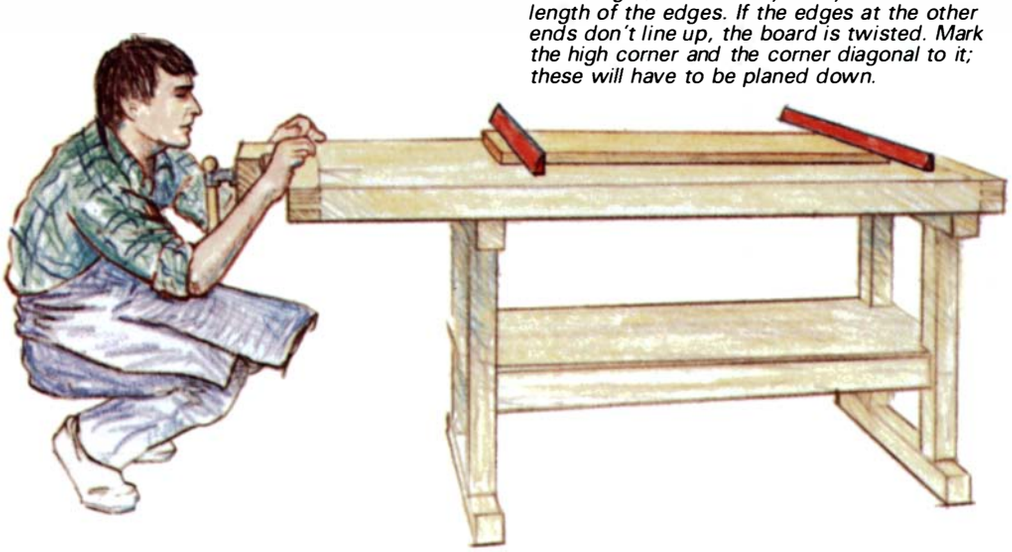
Selecting a plane—Locked up in a London warehouse is my collection of bench planes—eight or nine different sizes, all in working order. When I acquired them, I was teaching myself to woodwork from books and it didn't seem possible to get by with fewer than a half-dozen bench planes. I did my best with them, but the results were mixed. When I went to England to work with master craftsman Alan Peters, I packed them all, eagerly expecting Alan to reveal their secrets. The secret, he told me, was to leave them in the box and use a jointer plane.

I use a 22-in. long, 7½-lb. Stanley-Bailey #07 jointer for everything, from flattening rough lumber to slicing a few thousandths of an inch off the end grain of a 2-in. wide drawer side. The plane is at least 30 years old and cost me $35 used.

I like the jointer's size, weight and balance. Its length and width make it ideal for flattening boards and jointing long edges. It rides over low spots while slicing off the high until everything is flat. And it's heavy enough to maintain solid contact with the wood so most of the pushing can be in the direction of the stroke.

Using winding sticks

You can check for twist by sighting across two identical pieces of wood called winding sticks. Get the edges at one end of each stick in your line of sight, then move your eye down the length of the edges. If the edges at the other ends don't line up, the board is twisted. Mark the high corner and the corner diagonal to it; these will have to be planed down.



Most important for me is the jointer's balance. Held only by its handle, a jointer remains nearly horizontal—there's about as much weight behind the handle as in front. Balance makes the plane easier to control and less tiring to use.

Every woodworker has a favorite plane. The right bench plane for a job is the one you're most comfortable with—don't be afraid to go against the book and try a plane outside its prescribed territory.

Planing—First determine where the board isn't flat. This can be done by eye, alone or aided by a straightedge, or by feel on a large, flat surface, such as a benchtop, the top of a tablesaw, or the kitchen floor (unless your kitchen floor is like mine and

Checking for cup

The edge of a plane works fine for checking cupped boards.

requires sea legs to navigate). Sight across the width of the board to check for cupping and along its length to check for bowing. If you've got a flat surface, check for twist by placing the face of the board on it, then tap each corner in turn. A twisted board will rock, supported on diagonal corners. If you haven't got a flat surface, you can use winding sticks to determine twist, as shown on the facing page.

When you've found and marked the high spots, plane them off. The first problem here is holding the board while you plane. A bench with a tail vise and benchdogs is ideal: pinched between the vise and a stop, most if not all of the board is supported by the benchtop. Lacking a built-in, wooden tail vise, you can mount a regular bench vise on the end of a bench, and bore holes in the benchtop for homemade wooden dogs—¾-in. dia. dowels with scrapwood heads work fine. An easier solution is to drive three or four nails into the benchtop in an L-shaped configuration and shove the board against them. As long as you plane toward the nails, the board won't move.

I set the plane blade to remove as much wood as possible, while still allowing for a comfortable stroke. Position the chip breaker about 1/16 in. back from the cutting edge and make sure that the edge is parallel to the sole of the plane. (Keep the sole and cutting edge parallel for all planing.) I lower the cutting edge as I make the first few strokes. The amount varies with the character of the board, how keen the cutting edge is, and how keen I am to shove away. If you're a hearty soul and the wood is cooperative, you can peel off a goodly shaving (maybe 1/32 in. thick) with each pass. Less blade, less brawn and more strokes will get the job done just as well. If you keep lowering the blade and still slice off only a wisp of wood, or none at all, chances are the blade is dull—take the time to sharpen it.

I hold and push the plane as shown on the facing page. Planing is repetitive work and is most accurately and efficiently done rhythmically, each stroke the same, or nearly the same, as the last. I like to power the stroke with my back and shoulders as well as my arms, shifting weight from front to rear foot as the stroke progresses. Using your whole body allows you to control the plane with your hands and wrists.

I plane the concave side of a cupped or bowed board first. The plane can too easily follow the contour of the convex side, and you'd just keep planing the same curve rather than flattening it. Regardless of whether the board is cupped, bowed or twisted, it's best to plane diagonally across the board's width, because the plane is less likely to follow and maintain the contour of a long curve or to tear the grain severely. Concentrate on removing the high spots. Check your progress every now and then with a straightedge, flat surface or winding sticks. If the plane is long enough, you can use it as a straightedge, as shown above. A torn and rough surface indicates that you're planing against the grain—try planing the other way. After the face is planed, draw an arrow on it to mark the best direction for planing—the arrow will help you lay out the boards when you're ready to joint the edges.

If the planed board is wide enough to use without gluing up (a bookcase side, for example), smooth any torn grain with a sharp plane, stroking parallel to the grain direction. Often I make these last strokes after assembling the piece. I don't sand the surfaces, because I like the look and feel of a planed surface—and sanding is no fun at all.

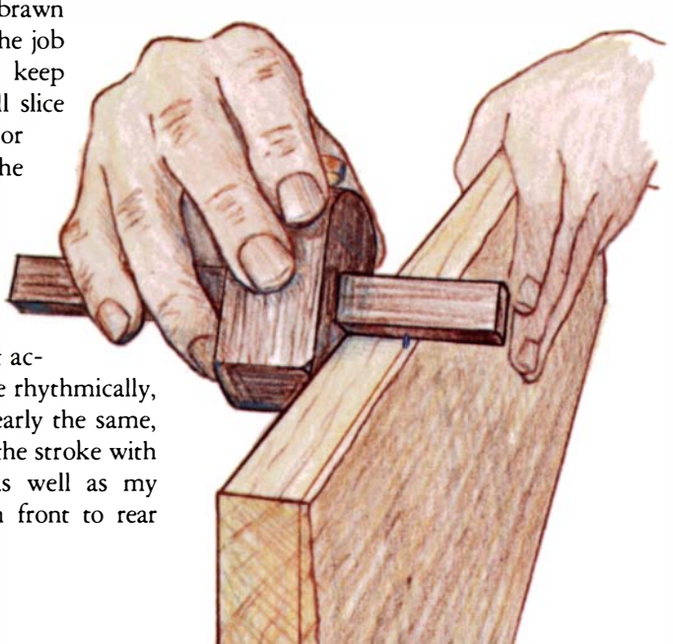
Flattening boards is a good way to get a feel for planing. In the old days, apprentices spent months at it, paying their dues, building up their skill and their biceps. You make lots of strokes, but there isn't a lot of risk involved. About the worst you can do is end up with thinner boards than you wanted. And if you really screw one up, try another—after all, it's just pine.

Thicknessing—When you're satisfied with the first face, you can gauge from it to flatten the second face and thickness the board. Set a marking gauge to the thickness you want (or the thickness you can get—the thinnest spot on the edges or ends), then run it around the edges and ends of the board. Now plane down to the scribe, just as for flattening.

If you don't want to thickness boards by hand, a local millwork shop might do it for you by machine. If you haven't flattened one side, make sure they do, otherwise you'll just end up with uniformly thick boards that are still cupped, bowed or twisted. Also let them know beforehand if the boards are pine—some shops won't machine resinous woods.

Scribing the thickness

After flattening one face, scribe a line indicating the board's thickness around the edges and ends with a marking gauge. Push the gauge's fence flush to the flat face and its scribe point into the wood. Push or pull the gauge, whichever suits you.



Edge-jointing—When you've got a stack of flat boards, a pile of fragrant shavings and a pair of sore arms, you're ready to plane the edges for gluing up. This is less strenuous than flattening or thicknessing, but more exacting. I've come to appreciate bookcases that can be made without edge-joined boards. Tabletops and deeper boxes, unfortunately, can seldom be made without gluing up boards. Once I'm resigned to necessity, I usually enjoy the technical challenge of making good edge joints.

The ideal edge joint consists of two edges, planed straight, flat and square to their adjacent faces, cemented together with a microscopic layer of glue. In practice, the edges needn't be square or flat as

Controlling the plane

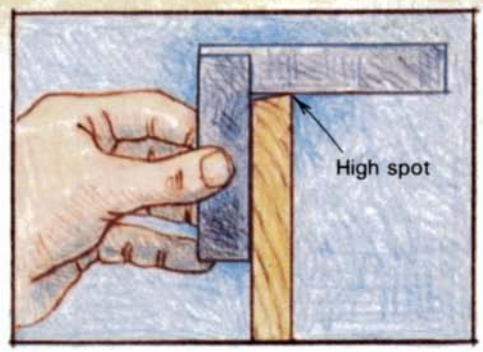
The fingers of your left hand can help keep the sole of the plane square to the edge of the board. Strive to keep the sole of the plane at right angles to the board's faces for every stroke, regardless of the defect you're correcting.

long as they are complementary, and if the edges are slightly concave in their length, the joints will be less prone to open at the ends. That said, I still *try* to plane edges flat and square.

Lay out the boards for the tabletop or box side on a flat surface. Arrange them so the grain pattern and colors please you. If you have a slightly bowed board, place it between straight ones—it can be pulled into alignment when you clamp up. Run all the grain-direction arrows you made earlier in the same direction, so you'll be less likely to tear the surface when planing it flat after glue-up. Finally, mark the relative positions of the boards by drawing a large V across their faces—reconstituting the V will restore the order.

Sharpen the plane blade before edge-jointing, and set the chip breaker within $\frac{1}{32}$ in. or less of the cutting edge. Make sure the cutting edge is parallel to the sole, then adjust the iron during the first few strokes to take a heavy shaving for roughing out the edge, or a fine one for finishing.

Put the first board edge-up in a bench vise. (Long boards narrower than 2 in. to 3 in. should be planed edge-up on the benchtop between dogs or against a nail, so they won't bend under the pressure of planing.) Sight down the length of the edge to determine if it's convex or con-

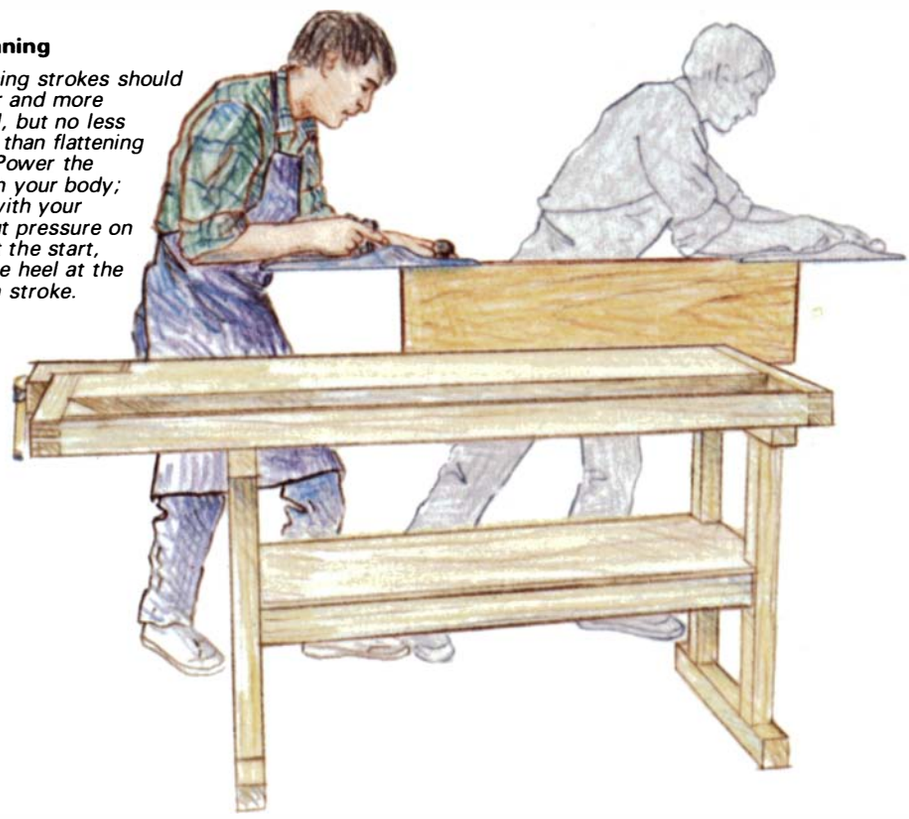


Checking the edges

Check the squareness of an edge with a try square. Sight into a light source as you slide the square along the edge. Light between the edge and the blade indicates a high spot. If high spots at each end are on diagonally opposed corners, the edge is twisted. Check mating edges with a straightedge, as shown below. If the surface isn't fairly flat, adjust the angle of one or both edges to the faces.

Edge-planing

Edge-planing strokes should be slower and more controlled, but no less rhythmic, than flattening strokes. Power the plane with your body; orient it with your hands. Put pressure on the toe at the start, and on the heel at the finish of a stroke.



cave. Check the edge for squareness to the faces with a try square. You can sight down the edge as you slide the square along it, marking high spots as you go.

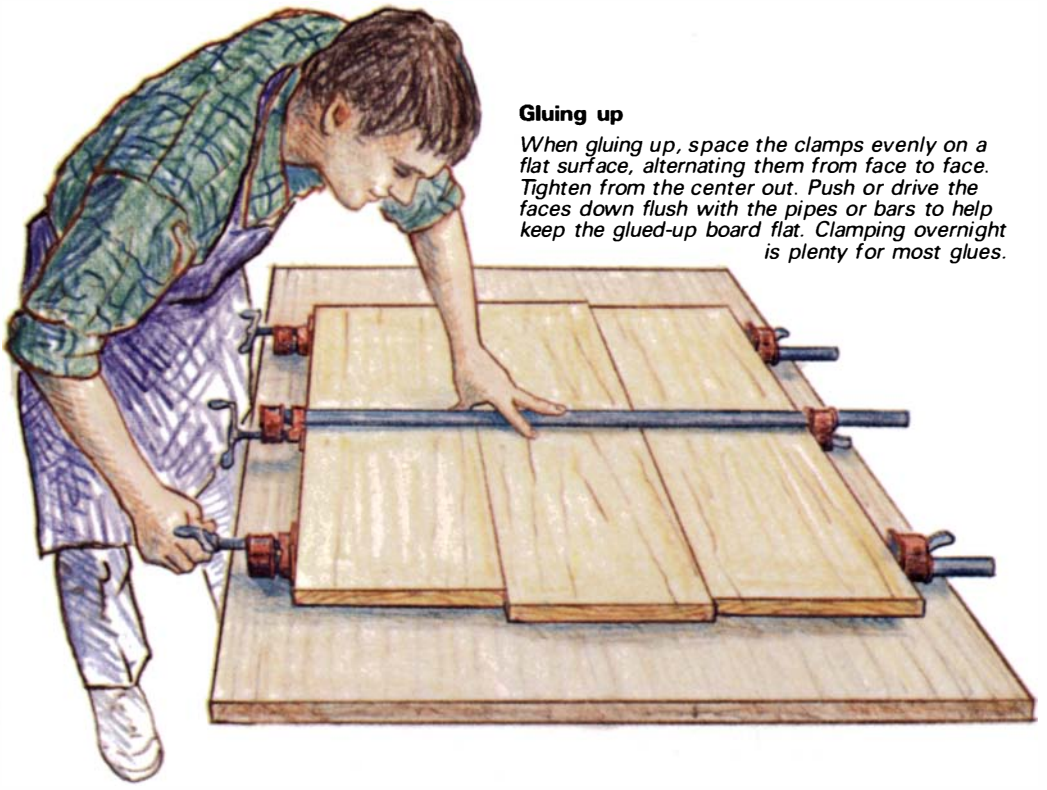
The secret to edge-planing is to always hold the plane with its sole perpendicular to the faces of the board. I extend three fingers of my left hand over the edge of the plane, where they rub against the wood, forming a fence and giving a surprisingly accurate sense of the angle of plane to face. Use your whole body to power the plane; control it with your hands. Get the edge roughly in shape with rapid strokes, but finish evenly and deliberately. (When there's a machine jointer handy, I rough out the edges on it and finish them with the hand plane to remove the tiny ridges created by the machine.)

Because planing edges is so exacting, its success depends upon all sorts of factors—chiefly, practice. So don't fuss too much with the first edge; when you feel it's straight, flat and square to the faces, plane the mating edge on the next board. Then, while the second board is still in the vise, place the first edge on the second to check the fit. The top board should rest steadily on the bottom one. If it rocks, one or both of the edges is convex and/or twisted.

A concave or convex edge is easy to see; a twisted edge is not so easy. Press down on one end of the top board and look closely at the joint at the other end. If an edge is twisted, the surfaces will touch only at one corner; if they don't touch at all, the edge is convex. (Edges may, of course, be convex and twisted at the same time—I try to correct the convexity first.) You can also check for twist with a try square. If there are diagonally opposed high spots at the ends, the edge is twisted.

It doesn't hurt if the edges are slightly concave—but not more than $\frac{1}{32}$ in. over 3 ft. To fix an excessively concave edge, take a few strokes off each end and one the full length, then recheck. To flatten a convex edge, work out from the center, taking three or four progressively longer strokes, finishing with a full-length stroke.

A twisted edge requires a more delicate fix. As when flattening a twisted face, you want to plane from corner to corner to remove the diagonally opposed high spots. If the sole of the plane is perpendicular to the board's faces, you should be able to take a shaving from just the high spot at the near end, reach a full-width shaving in the center of the edge, and nip off the other high spot at the opposite end. When you think the twist is gone, take a full-width shaving from end to end, and check against the mating edge. If the boards still rock, the mating edge may need work. This can go on for some time. Don't lose heart—think of all the skill you're accumulating.



Gluing up

When gluing up, space the clamps evenly on a flat surface, alternating them from face to face. Tighten from the center out. Push or drive the faces down flush with the pipes or bars to help keep the glued-up board flat. Clamping overnight is plenty for most glues.

Twisted edges need to be fixed, but it doesn't matter if mating edges are at slightly other than right angles to their adjacent faces—as long as the angles are complementary, the boards will form a flat surface. To check the surface, stack the boards edge-to-edge and place a straightedge against their faces. If the surface isn't flat, adjust the angle of one edge to its face and check them again. After edge-planing all the boards to be glued together, stack them up and make a final check for flatness.

Hand-planing mating edges is a difficult skill to master. Over and over again you'll introduce one fault while trying to correct another. When the edges are close to mating perfectly, force yourself to try one more time to correct that last niggling fault. If it still isn't right, then say the hell with it, and move on to the next pair. Among the virtues of modern glues is their ability to join edges that are far from perfectly matched. There may be gaps, the joined boards may not be perfectly flat, but they will stick together. The simple table and bookcase are nice projects because you get a lot of practice while making something useful. It's up to you how much practice you can stand before you need to see the completed piece before you.

Gluing up—When all the pairs of mating edges have been planed, I glue up with $\frac{3}{4}$-in. pipe clamps and Elmer's Glue-All (a white glue), first making a dry run to determine the position and number of clamps. Place clamps 12 in. to 15 in. apart, starting and ending about 3 in. from the ends of the boards. Alternate the clamps top and bottom to equalize their pull and avoid cupping the glued-up boards.

Lay the bottom clamps on a flat surface and spread glue on all the edges to be joined. Better too much glue than too little—the excess will get squeezed out of a tight joint anyway. Place the boards on the clamps and rub the mating edges together until glue squeezes out. Draw the joints together with the center clamp, then work out toward each end. I align the faces of the boards with a 16-oz. hammer and a hardwood block, driving them down on the clamps, which helps keep the boards from cupping or twisting as a unit.

It's important that the surface of the glued-up boards lie in a single plane while the glue cures. Whether the boards lie flat or lean against a wall, you can sight over the clamps just like over winding sticks, and shim up low corners to align them.

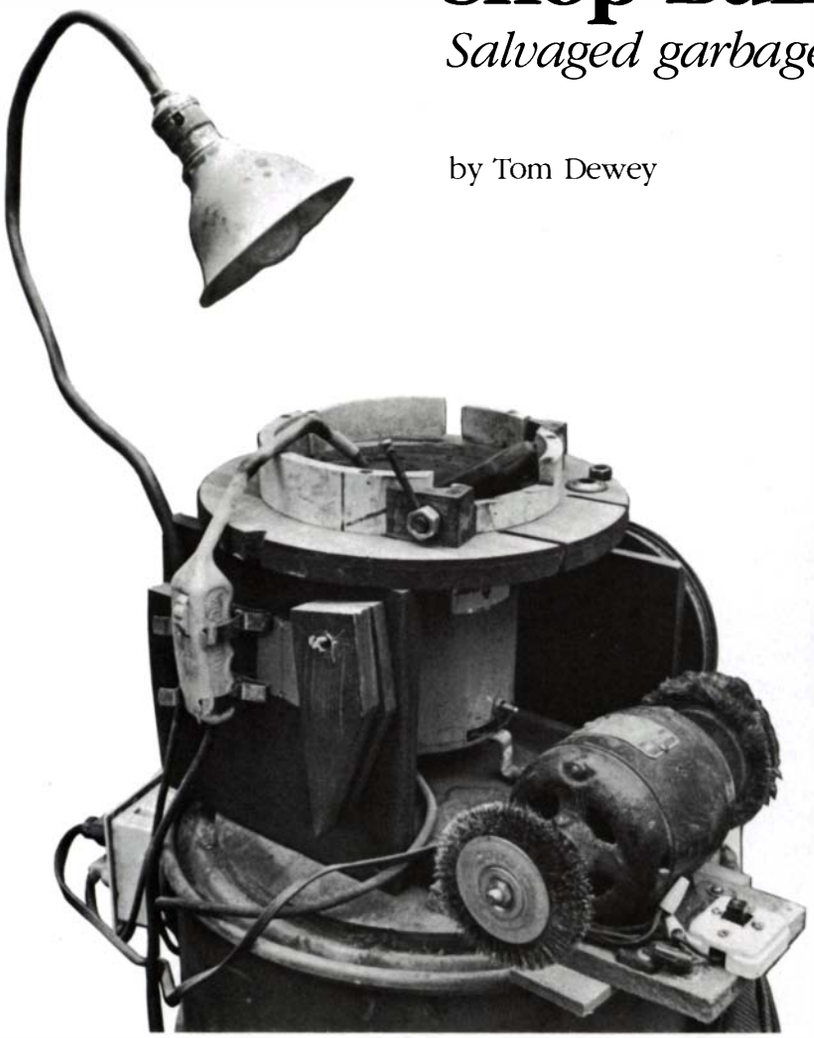
The glued-up boards can be treated like a single board now, and cleaned off with a sharp plane. Chances are the surface will be slightly cupped, but I don't worry too much about that. The understructure of a table or the corner joints of a box can pull it fairly flat. At this point, the whole question of flatness boils down to what irritates you more: a gently rolling tabletop with wobbling plates and teacups, or seemingly endless tabletop planing. □

Roger Holmes is an associate editor at Fine Woodworking.

Shop-Built Sharpener

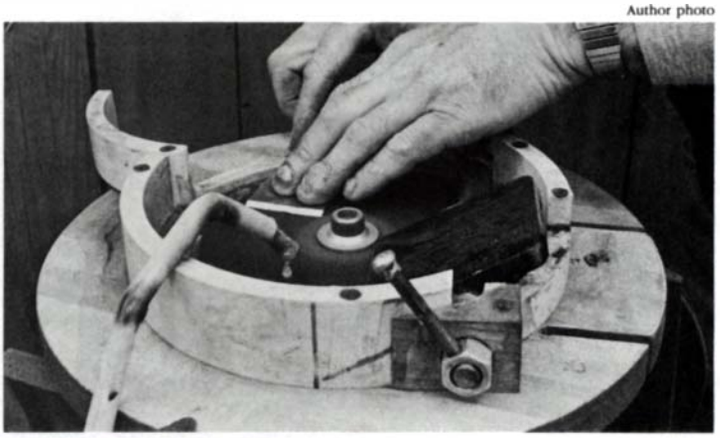
Salvaged garbage disposal grinds a keen edge

by Tom Dewey



Jeffrey C. Carts

Author photo



Salvaged parts keep the cost of this water-cooled sharpener below that of similar store-bought machines. Above, after honing the bevel on a plane blade, Dewey opens the machine's hinged port and removes the burr from the back of the blade. A steady stream of water keeps the edge from overheating. The nut in the foreground locks the tool rest at the desired angle.

Nearly everyone agrees that the best cutting edge comes from hand-sharpening on water or oil stones, but it takes time and practice to get a perfect edge. I'm not very fast at hand-sharpening, and in my production shop, where time equals food on the table, I can't justify the luxury of hand-honing. Instead, I wanted to build an inexpensive machine that would speed both jobs—something with a water-cooled horizontal wheel, a wide selection of abrasive grits, and a solid, adjustable tool rest. My first two versions had problems, but the one shown here works fine.

The grinder took me a little more than a day to build, using a salvaged garbage-disposal unit, a few parts and some scrapwood. I use a 60-grit stone and/or 7-in. abrasive discs, either store-bought or homemade, ranging from 36-grit to 600-grit. The grinder can sharpen blades as wide as 2½ in.

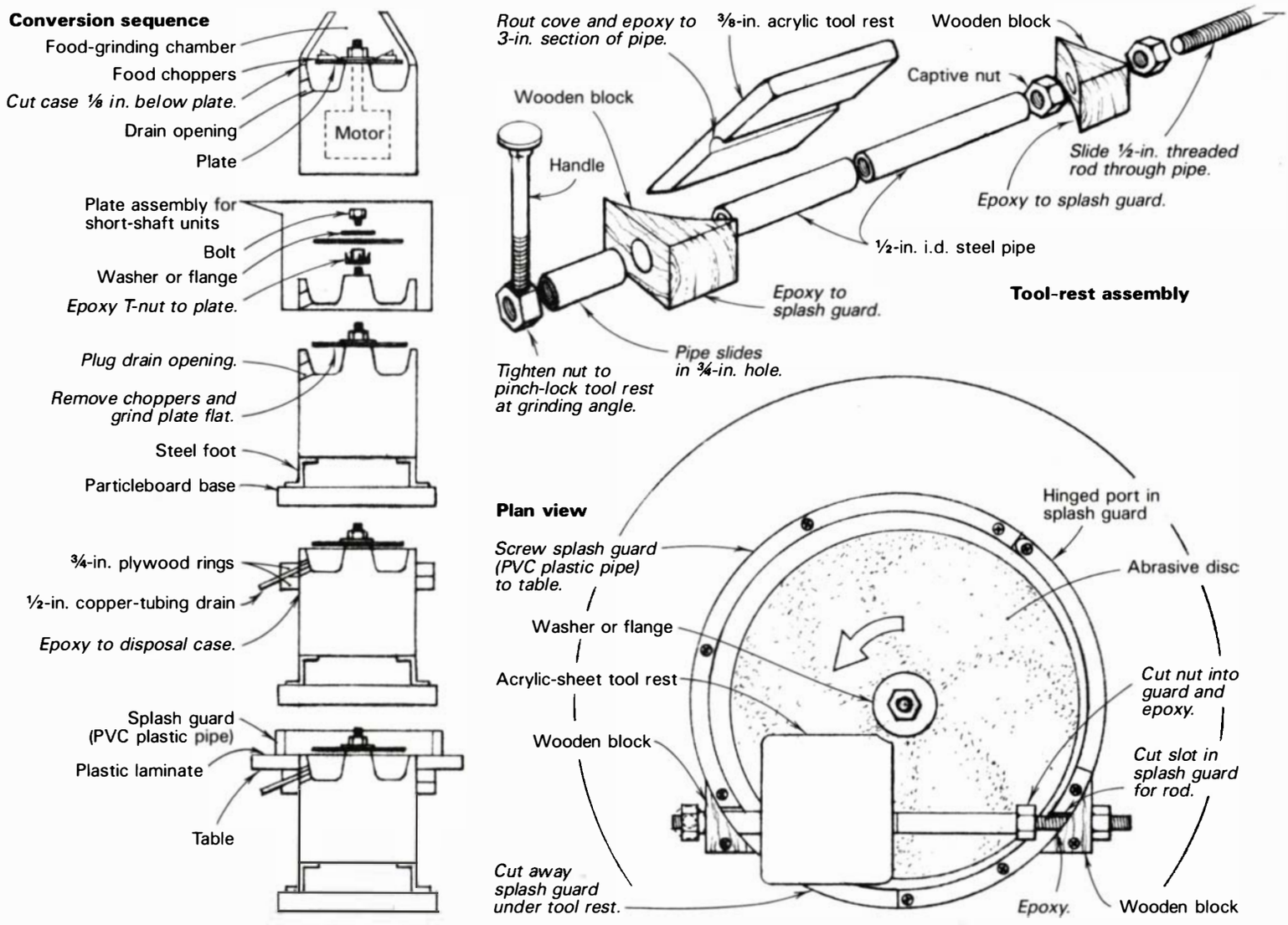
A garbage-disposal motor (usually ⅓ HP or ½ HP, and 1725 RPM) is ideal for a water-cooled grinder because it is designed to run in a vertical position, has a waterproof seal on the shaft to keep the motor dry and has built-in overload protection. When a disposal stops working properly, usually it's because the food choppers have worn out—often the motor is still in good shape. Few people bother to have broken disposals repaired, opting for replacement instead. Check with a local plumber and you probably won't have much trouble finding a unit with a good motor. (New disposals from Sears are as cheap as $50.) You can use almost any brand, but try to avoid models labeled "automatic self-reversing" or "auto-grind," because they'll require some rewiring. You'll have to make some mechanical modifications to any unit.

The food-grinding chamber must be cut away to expose the chopper plate on the end of the motor shaft, as shown in the drawing. If your unit has a stainless-steel liner in the grinding chamber, pry it out before cutting the case. Anything goes in this removal operation—sawing, chiseling with a cold chisel—but be careful not to crack the casting. It may take plenty of penetrating oil before you can loosen the retaining nut and unscrew the plate from the shaft. If the plate has a recessed nut, the shaft won't be long enough to mount the stone and discs. You'll have to make another plate from ¼-in. thick acrylic, a worn-out circular-saw blade with the teeth ground off, or exterior plywood.

Most of the other modifications should be clear from the drawing, and I'd suggest that you do them in this order: Plug the drain opening in the side of the disposal case with a piece of wood and file the wood flush with the outside of the housing. Epoxy the laminated-plywood ring that supports the table to the case, and drill a hole through both the ring and the wooden plug for a new copper-tubing drainpipe.

The table can be any convenient shape and size. Mine is round because I happened to have a small sink cutout handy. Glue and screw the table to the plywood ring, level with the top of the case, then cement plastic laminate on the table, overlapping the edge of the disposal unit.

Add the splash guard (mine is a section of heavy PVC plastic



pipe that I picked up from a construction site—wooden rings epoxied together would work as well). Seal the joint with silicone caulk. Note that the splash guard is positioned slightly to the left of center to make room for wide blades on the tool-rest side. For deburring the backs of plane blades, I cut a hinged port in the side of the splash guard.

Next cut two slots in the splash guard for the tool-rest pivot rod. Mark off a 25° line on the side of the guard as shown in the photo on the facing page. I cut two shallow slots, then gradually deepened them until the top of the tool rest lined up with the 25° line. When fitting this assembly, make sure that the rod is high enough off the plate for abrasive discs to slip underneath. I cut away a section of the splash guard under the rear of the tool rest so the rest can be tipped up for changing discs.

To provide a continuous flow of water to the disc, I use a plant-watering gadget called Water Whiz (available from Edmund Scientific, 101 E. Gloucester Pike, Barrington, N.J. 08007). It comes with a 50-ft. hose which attaches to a faucet and provides any flow from a spray to a stream. I heated the plastic wand of the Whiz and bent it into shape. The Whiz is fastened to the grinder with two metal broom-hanging clips from the hardware store. To get rid of waste water, run a length of garden hose from the copper drain tube to a sink or a catch bucket.

I added a light, then mounted my grinder/honer on a 30-gal. drum filled with about 100 lb. of sand for stability. Casters on the bottom allow the setup to be rolled about the shop.

The workhorse of the grinder is a 6-in. dia., $\frac{3}{16}$-in. thick, 60-grit resin-bond stone (available from Foley-Belsaw Co., 90472 Field Bldg., Kansas City, Mo. 64111). This stone gives a very good edge and cuts quickly. You'll need to make a plastic or aluminum bushing to reduce the center hole of the stone to fit the garbage-disposal shaft.

For occasional coarser work, I use 36- to 80-grit, cloth-backed auto-body grinding discs fastened with contact cement to ⅛-in. thick acrylic discs (Brodhead-Garrett Co., 4560 E. 71st St., Cleveland, Ohio 44105, sells ⅛-in. acrylic sheet). For honing, I cut my own discs from silicon carbide paper and cement them to acrylic discs. The finer grits—400 and 600—produce a beautiful sheen. Abrasives can be mounted on both sides of the acrylic discs—coarse on one side, fine on the other—to cut down on storage and handling. You can sharpen blades by sliding them back and forth on the tool rest, or by holding them in one place—it doesn't seem to make much difference. By rolling gouges on the rest, several different profiles are possible and the bevels will be consistent from corner to corner.

I normally grind with the stone, then hone with 180-grit or 320-grit, or both, for a really fine edge. A buffing wheel whisks off the wire edge. It's hard to resist "going all the way" with the polishing grades. It's easy to get hooked on seeing such nicely polished edges come off a shop-built machine. □

Tom Dewey is a cabinetmaker in Coudersport, Pa.

Drawing: Karen Pease

Fabric-Backed Tambours

It's not that difficult to roll your own

by Tim Daulton

There is something almost magical about a tambour, a seemingly solid row of slats that slides out of sight at the touch of a finger. Actually, a tambour is little more than a flexible sliding door, and not much harder to construct.

Like any sliding door, a tambour needs a pair of parallel tracks or grooves to guide its movement. It also needs some type of compartment, usually behind a false partition, into which the door can disappear. Both the sliding door and the tambour door open without swinging out in front of the cabinet. The tambour, however, can slip around corners to be stored out of the way, while a rigid sliding door must remain in the plane of the opening and can therefore limit the size of the compartment's opening. With tambours, you can transform curved surfaces or corners into doors, opening up numerous design possibilities.

Tambours can be designed to open either vertically or horizontally, and this versatility sometimes causes confusion when people describe tambours. A tambour that moves vertically, up and down, has horizontal slats; one that opens horizontally has vertical slats. In this article I'll describe a vertical-opening door, which has a natural counterbalance that makes it operate more smoothly than a horizontal one. In a horizontal-opening tambour, all the weight rests on the lower track, whereas the weight of a vertical-opening door is spread over two tracks. As the top slats move into the compartment, they help balance the weight of the lower slats.

The individual tambour slats can be connected with interlocked wood joints, with wires or cords (see pp. 57-58), or with a flexible backing of leather or fabric. Fabric backing is the simplest and most common method, and the one I'll use here to make a desk-top organizer (figure 1). I prefer plain cotton canvas backing—it's durable and available in a variety of weights for different-size doors. For this small door, I used 8-oz. artists' canvas. The natural color of canvas blends with light woods, and it can easily be dyed to match darker woods. For attaching the slats to the backing, I like contact cement, since it remains flexible and any squeeze-through can readily be cleaned off the slats. Hide glue or white glue also can be used.

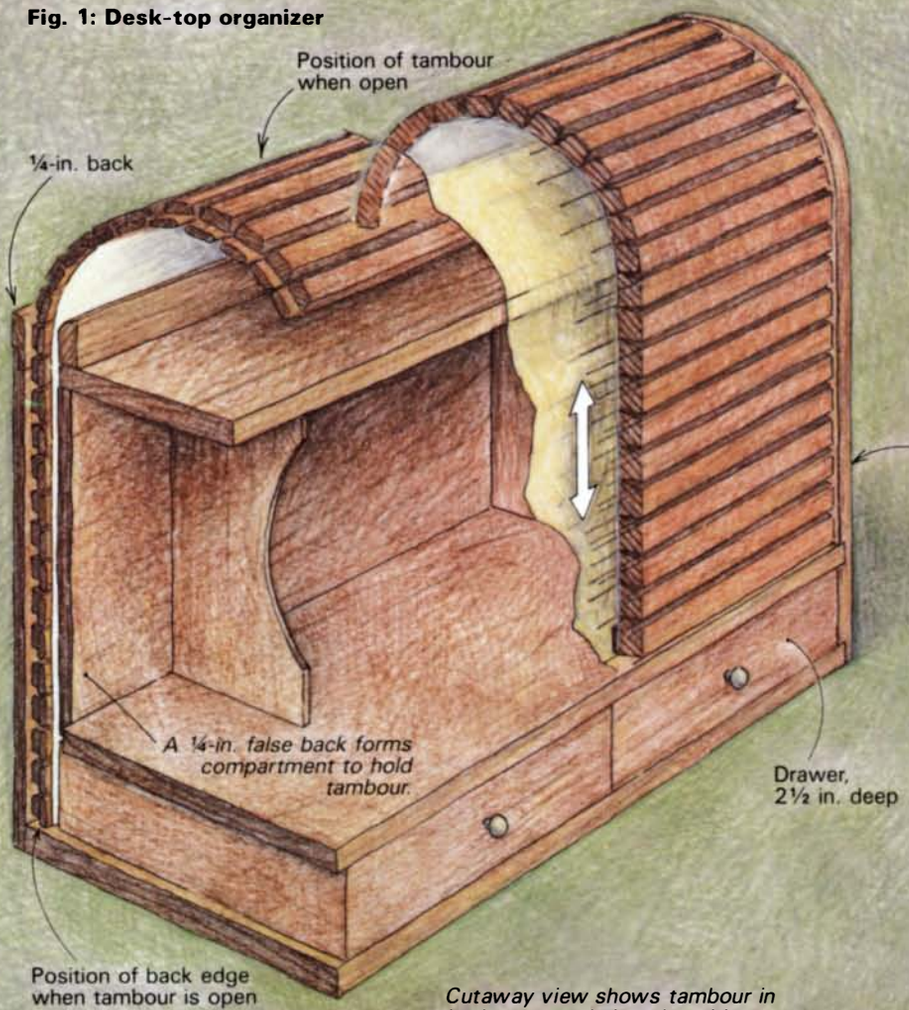
Any carcase or cabinet can have a tambour door, but there are some practical limitations to consider. Before you assemble the carcase, remember that you must provide a way to install the completed tambour. There are two ways to do this. One is to trap the tambour between the carcase sides as the piece is assembled. Since this method precludes removal of the door for adjustments, it's suitable for only the simplest pieces. The second method, the one I recommend, is to leave one end of the track open, usually at the back or bottom, so that the tambour can be slid in place after assembly and then closed in. This allows more careful fitting, and the door can be removed for finishing or adjustment. When designing the track, it's a good idea to consider how you're going to insert the completed tambour. In the piece shown here, the back and bottom fit into rabbets cut in the carcase sides, so it was easy to leave them both off until I had installed the tambour (figure 2, p. 56).

You must construct the carcase carefully to ensure square, parallel sides, otherwise the tambour will neither fit well nor slide smoothly. Since a tambour often occupies one or more corners of a piece, thus replacing some structural framing, you may need to include interior partitions or shelves to help hold the case together. Measure carefully to ensure that the door will clear all interior elements, as well as the back and outside panels. Also make sure that no glue gets into inaccessible sections of the track during assembly.

Before you can begin to prepare slats for the tambour, you must consider the width of the opening, which affects slat thickness, and establish the curvature of the guide track, which determines the width of the slat. Slats should be $\frac{3}{8}$ in. to $\frac{3}{4}$ in. thick, just substantial enough to keep from flexing too much between the sides. Thin slats make the door light enough to operate easily without slamming when opened or shut. I recommend laying out the proposed track on scrap material and test-fitting slats to determine optimum slat shape and track curvature for your design, but you could simply draw the track out carefully on paper instead. Just be sure that there's enough room for the tambour to open and close completely, without coming out of its pocket. Generally, the track extends into a pocket behind a false back or interior partition so that the door's workings aren't exposed and the contents of the case don't interfere with its operation. I suggest that you build the tambour with a couple of extra slats to ensure that the door won't be too short—the excess pieces can be trimmed off before assembly if they aren't needed.

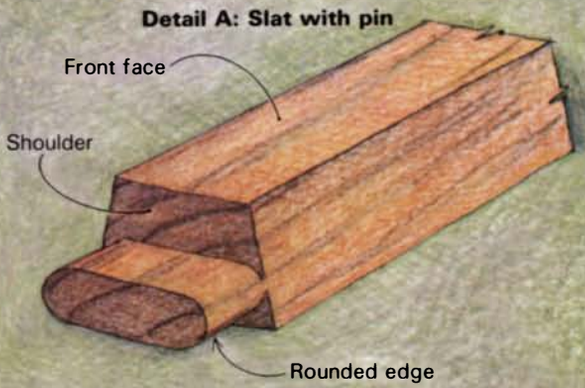
The track can be really any shape that suits your piece, although I try to avoid extremely tight circles and to keep curves as gentle as possible to reduce friction. Tighter curves demand narrower slats; the larger the track's radius, the wider the slats can be. The front edges of the slats are often beveled, chamfered or rounded so that the joints appear uniform, even around corners, and so that they won't pinch fingers and things when closing. With reverse-curve or S-shaped tracks, which bend tambours in more than one direction, slats must be beveled enough to allow the bend. The back edges of canvas-backed slats

Fig. 1: Desk-top organizer



Cutaway view shows tambour in both open and closed positions.

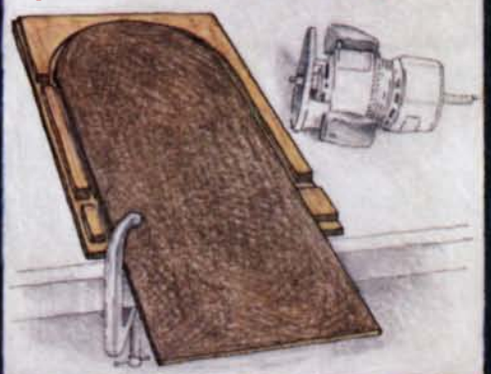
Detail A: Slat with pin



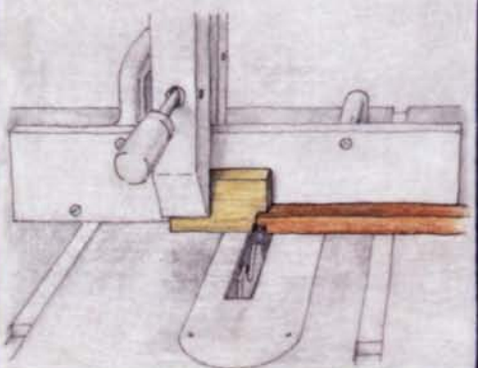
Pin should be slightly longer than depth of guide track to prevent shoulder from rubbing carcase.

A flip of the wrist opens the tambour to reveal shelves and a small work area. The upper shelf and backs provide structural support to the upper section of the case. Making a tambour is not all that difficult, but, as this sequence of drawings shows, you must cut the guide tracks and the slats accurately, and align the pieces carefully before gluing the unit together.

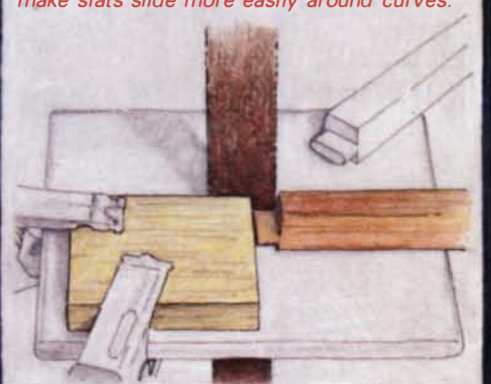
1. A template of ¼-in. Masonite guides bushing on router as it cuts tambour track.



2. To rabbet ends of slats, use a combination end-stop/hold-down on tablesaw.

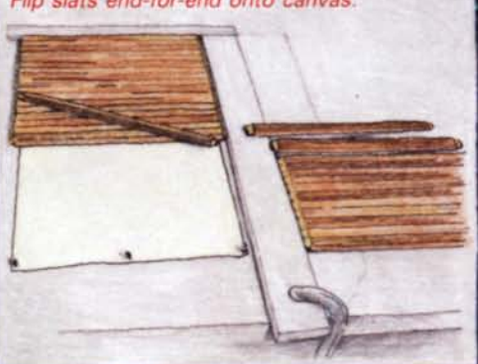


3. Round pins with a small belt sander to make slats slide more easily around curves.



4. On jig, lay slats out in order, face down. Apply contact cement to slats and canvas. Masking tape keeps cement off pins.

5. Reposition canvas a pin's length from jig, with one end under jig and other end pinned. Flip slats end-for-end onto canvas.



6. To hide end of canvas backing, attach a wooden strip to back of first slat, holding it in place with spring clamps while glue cures.

Drawings: Christopher Clapp

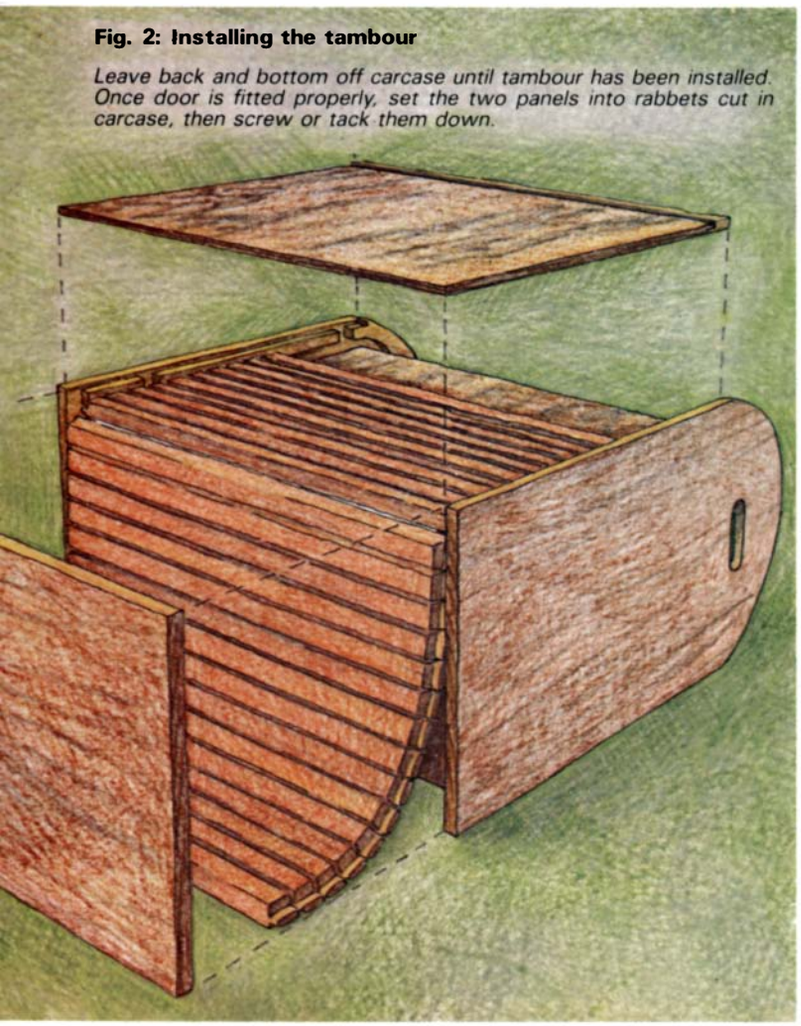
shouldn't be chamfered, as they must fit together closely at the fabric.

I cut the guide tracks using a router guided by a bushing against a shaped template (figure 1, step 1)—identical tracks can easily be cut by reversing the template on opposite sides of the carcase. To make the correct-size template, subtract the difference between the bit's radius and the bushing's outside radius from the full-size track layout. The track groove itself should be about half the thickness of the slats, usually $\frac{3}{16}$ in. to $\frac{3}{8}$ in., to accommodate the slat pins. Pick the closest size for which you own a router bit. A good template can be made from $\frac{1}{4}$-in. Masonite, which is smooth and dense and wears well. Cut it out carefully, and make it longer than the track will be to guide the router's entrance and exit. With a new template, I like to practice the cut a couple of times on scrap material to check the template's accuracy and to get a feel for moving the router around it smoothly. When you're satisfied with the template, attach it firmly to the top, side or bottom piece in the correct position. Tacks or screws in an inconspicuous place are more convenient than clamps. Check the alignment, and cut the first groove. Then flip the template over onto the mating piece, making sure the alignment is identical, and cut the matching track. Sand the grooves smooth with a small sanding block or folded sandpaper, and widen them slightly around any particularly tight curves to prevent binding.

Once I'm satisfied with the guide tracks, I cut the slat stock to length (I usually make extra slats to allow for defects), rip the pieces to size, and then rabbet the ends of each piece to form pins, as in figure 1, detail A. The pins should be just slightly thinner than the track groove. Rabbeting pins allows the groove to be narrower than the slat thickness and remain hidden behind a neat joint at the front face. Rabbeting the front face of the slat, so the pin is on the back half of the slat, allows you to fit the tambour flush with the face of the piece. I cut the pins on each slat on a tablesaw, using a crosscutting guide and end stop (step 2), then round their corners with a rasp or a sander so that they'll slide smoothly around corners (step 3). The pins should be slightly longer than the track is deep so that they'll bottom out, preventing the slat shoulders from rubbing against the case. The slats themselves should have a little end clearance between tracks to allow for wood movement and inconsistencies in construction. Round or bevel the long edges of the slats with a sander, router or tablesaw.

Fig. 2: Installing the tambour

Leave back and bottom off carcase until tambour has been installed. Once door is fitted properly, set the two panels into rabbets cut in carcase, then screw or tack them down.



After all the tambour slats have been prepared, sand them smooth and lay them out in order, matching grain and tossing out any pieces that are seriously warped. Fasten a couple of straight boards to your work surface at right angles to form a gluing jig (step 4). Cut a length of canvas slightly narrower than the shoulder-to-shoulder width of the slats and spread contact cement over it. Lay the slats out in order, face down, next to the gluing jig and spread cement on them. Let the glue set properly, and apply a second coat if necessary. Carefully align the canvas in the jig—I clamp one end under the jig itself and tack the free end down. Now flip each slat end-for-end and press it onto the canvas, making sure it's flush and square in the jig and tight to the next slat before the glue-covered surfaces make contact (step 5). Once all the slats are stuck down, flip the completed tambour over and press the canvas down firmly onto the slats. Rub off any excess glue, trim the canvas, and you're ready to roll. I like to face the back of the first slat with a thin strip of wood to finish off the canvas edge and to reinforce the bond there (step 6). Handles or knobs can be attached now if they won't interfere with the installation of the tambour, or they can be added after the tambour is assembled.

Regardless of whether the tambour is installed as the carcase is assembled or slid into place afterward, it will probably fit tightly at first. Slide it back and forth to locate the rough spots, and carefully sand the tracks or pins until the door runs without catching anywhere. Do as much sanding and finishing as possible with the tambour out of the case, where it's easier to get at, and be careful not to saturate the fabric with finish which may stiffen or weaken it. A bit of paraffin or paste wax rubbed into the tracks after final finishing will make the door operate more smoothly, but a little friction in heavier doors is desirable since it will keep them from rolling too rapidly at the end of the track and slamming when opened or closed.

After installing the tambour and making a final check for smooth operation, add stop blocks, if necessary, to keep the tambour from sliding down too far into the hidden compartment. Close up the end of the track, and the piece is ready for final finishing.

Building a tambour may be a little trickier than fitting a hinged door or cutting straight grooves for a sliding door, but it's not really all that difficult. And the results, in space efficiency, visual appeal and design variation, can be well worth the effort. □

Tim Daulton builds furniture in the woodcraft program at Arizona State University in Tempe. He recently returned from Osaka, Japan, where he studied old Japanese wood sculpture.

Wired Tambours

Support you can't see

by Dale Tucker

Wired tambours have one significant advantage over cloth-backed doors. Since the devices for holding the slats together are hidden, wired tambours are more attractive in carcases and containers where both sides of the door can be seen as the tambour is opened.

I began experimenting with wired tambours while designing a cabinet with a half-cylinder-shaped tambour top (figure 1, p. 58). I didn't want to glue the slats to a canvas backing, since it would be visible when the door reached the top of the curve. Then I remembered a restoration job I'd done on an old desk with a roll-top that had been wired together. The wire had broken, but it was easy to repair and worked well.

While a wired tambour would allow the back of the slats to be exposed, I knew that fabric backing stabilizes a tambour and controls warpage. To improve the stability of my tambour and to help hide the wires, I decided to try an S-shaped slat (figure 2). Slats must be thick enough so that they won't bend or sag in the door, and narrow enough to slide around the curve in the case. The tighter the curve, the narrower the slats. For the piece illustrated here, I decided on ½-in. thick, ¾-in. wide slats.

Start by selecting straight-grained boards for the slats. My cabinet is walnut, but cherry, oak or some other hardwood could be used. Be very selective in choosing the lumber, since both sides of the slats will be visible in the finished piece.

The best procedure is to make 10% to 20% more slats than you need, set them aside for a couple of weeks, then pick the straightest ones that look perfect on both sides. I used a tablesaw to cut all the slats. From ¾-in. stock, I ripped the boards to width, then planed them to the proper thickness so that they were rectangular and suitable for the S-shape to be cut. Then I made two passes on the saw to cut each rabbet on the slat. For safety, I used a series of featherboards to hold the slats against the fence and down on the table as I guided them through the saw with a push stick. For cutting the second rabbet on each slat, I used an outfeed catch board, which fit into the first rabbet and stabilized the slat. Since the cuts aren't more than ¼-in. deep, cutting the rabbets isn't difficult. To chamfer the slats, set the blade at 45°, run all the pieces through again on each of the four corners, then scrape each chamfer slightly. Cut the slats to length after shaping—I usually cut them just a hair shorter than

Tambour lines and rhymes

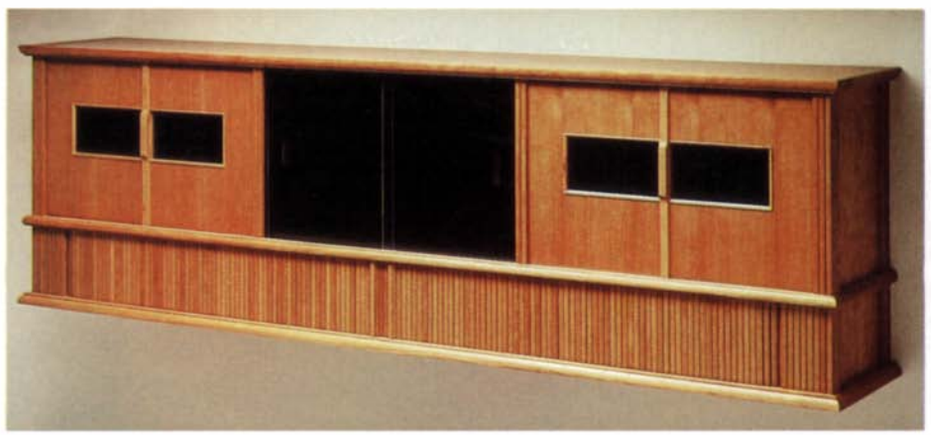
by Dick Burrows

In addition to making nifty doors, tambours are a kind of visual punctuation that can link and unify the major components of a cabinet. Using this characteristic to her advantage, Boston furnituremaker Penny Gebhard formed tambour shapes into handles, moldings and walls as well as doors to create a wall-hung cabinet with an architectural feeling.

"I was after a linear quality—the striped grain of the quartersawn cherry veneer and the etched lines in the glass inserts pick up on the tambour theme," says Gebhard, a recent graduate of Boston University's Program in Artisanry. Her use of tambour-like elements around the doors makes the workings of the piece seem mysterious. At first glance it appears that the entire front is tambour with no place to go. Just a sliver of a line betrays where the real tambour (at the bottom) slides into the case.

Gebhard says the piece was designed to be a liquor cabinet: bottles go in the two center areas, glasses in the two large side compartments, and utensils and other drinking accoutrements in the four compartments behind the tambours.

The carcase, 6 ft. wide, 2½ ft. high and 1 ft. deep, is made of tongue-and-grooved plywood panels, covered with black plastic laminate on the interior and veneered with cherry on the outside. The black laminate is impervious to liquids, and forms a striking contrast to the glass and the oil-finished cherry. It also provides a durable surface for the tambours to ride. The tambours themselves are tiny, about 7/16 in. square. A tongue rabbeted on the ends fits into a ¼-in. groove routed in the case. When opened, the tambour disappears into a compartment between a false wall and the sides and back of the case.



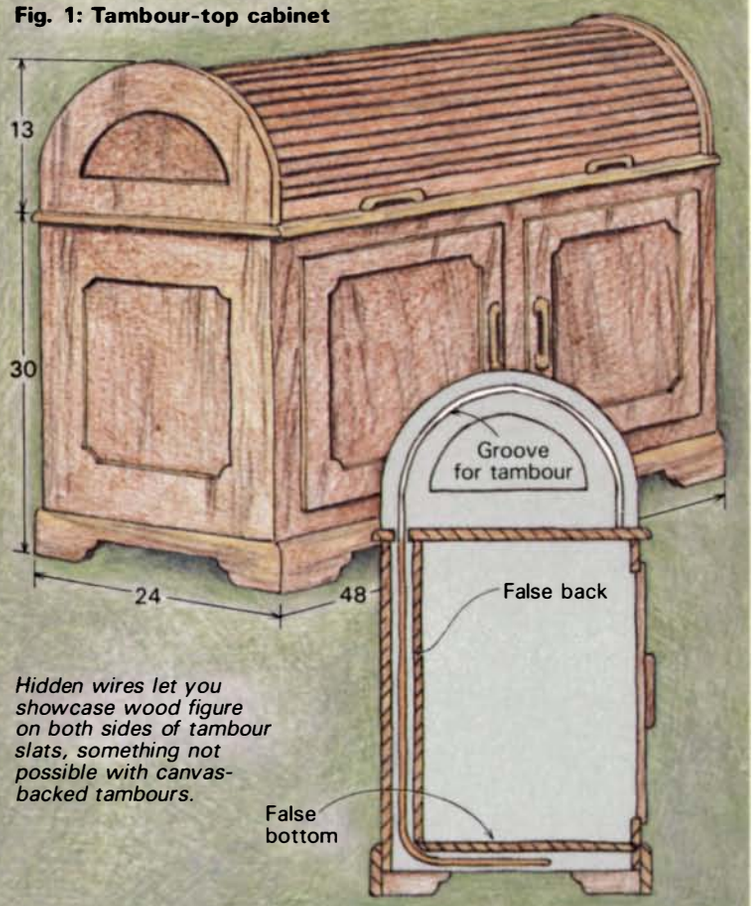
Perfectly matched slats hide where illusion ends and the door begins.

Each of the hand-shaped, 5½-in. tall slats has a subtle round on the front, then angles back like a dovetail, forming a V-shaped space between pairs of slats. With slats so small, the tambour is light, flexible and easy to use.

Gebhard's liquor cabinet, priced at $2,450, was displayed at Pritam and Eames Gallery in East Hampton, N.Y. □

Dick Burrows is an assistant editor at FWW. Photo by Dean Powell.

Fig. 1: Tambour-top cabinet



Hidden wires let you showcase wood figure on both sides of tambour slats, something not possible with canvas-backed tambours.

Fig. 2: S-shaped slats

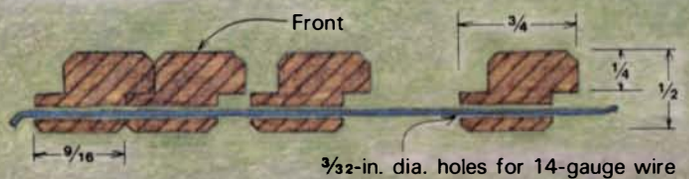


Fig. 3: Drilling jig

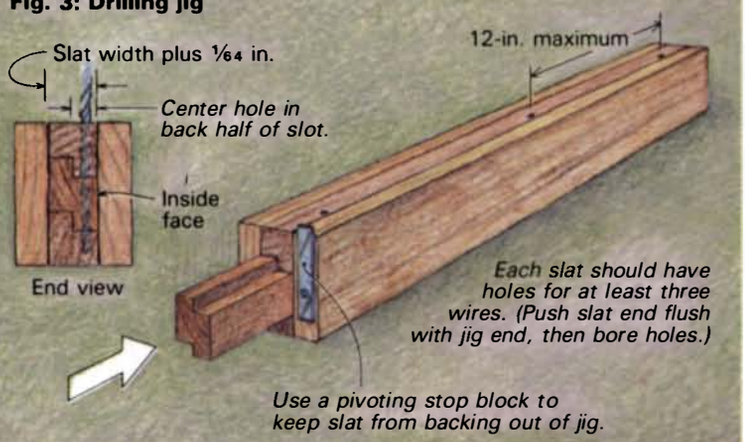
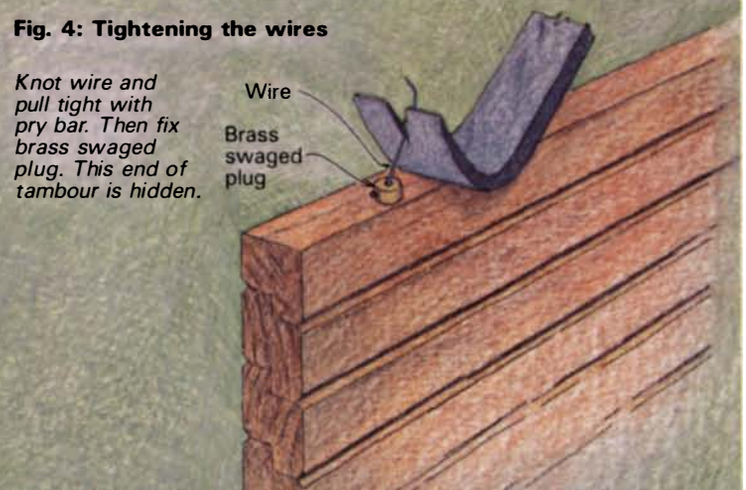


Fig. 4: Tightening the wires



the distance between the bottoms of the guide tracks.

Once the slats have been cut and shaped, decide how many wires will be needed to hold the door together. As a rule, the wires should be set no more than 12 in. apart. But even on narrow doors, use at least three wires to keep the door square. The 3/32-in. dia. steel stranded wire sold for hanging picture frames is good for joining the slats. It has the strength and flexibility needed to withstand the bending caused by opening and closing the door. I've also found that 7x19 stainless steel cable with vinyl coating (available from Sava Industries Inc., 70 Riverdale Rd., PO Box 30, Riverdale, N.J. 07454) works well.

For locating the holes for the wires, I used two extra slats to make a drilling jig (figure 3). A jig is important here because the holes must be accurate for the door to operate smoothly. Sandwich the slats between two straight, flat boards, using paper or tape to make the pocket about 1/64 in. wider than the slat so that each piece can be inserted and removed easily. To keep the slats from moving in the jig, I nailed an immovable stop over the opening at one end of the jig; at the other end I screwed on a wooden block that could be swung out of the way to insert a slat, then moved down to trap it during drilling. Note that the holes are centered in the back half of the slats, so the wire is never visible. Since the door is on a curve, with the inside surface having a 1/2-in. smaller radius than the outside, the spacing between the slats is always closed on the inside. The lap of each slat keeps the wire covered on the outside. Use a drill press to drill guide holes where you want wires located on the finished door. Insert a slat in the jig and drill through the guide holes with a drill press or a hand-held drill.

After the holes are drilled, sand the pieces and test-assemble. The ends of the slats essentially ride against the bottom of the guide tracks, and it isn't really necessary to create a shoulder on the slats. I belt-sanded the ends on the inside of the door slightly so that the slats would slide smoothly in the 1/2-in. tracks. Clamp a board to the assembled tambour to guide the sander so that it removes wood from only the end sections. I finish the slats before final assembly, to ensure complete coverage. My favorite finish is Minwax natural stain, satin spray lacquer, then paste wax.

For the door to work properly, the wire must be pulled as tight as possible during final assembly. Drill 3/8-in. dia. holes in the back of the first slat to intersect with the 3/32-in. dia. wire holes, but don't go through the front face. Then insert a wire in each 3/32-in. dia. hole, pull the end of the wire out through the 3/8-in. dia. hole, tie it in a knot, and push the knot back into the hole. Fill the holes with wood putty. Once the wires are fastened in the first slat, feed the wires through the required number of slats and attach a brass wire connector (a hollow plug with a setscrew to hold the wire fast) to the end of each wire. Then tie a knot in the cable. Using a small pry bar or some other type of lever, pull the wire taut and tighten the plug (figure 4).

The cabinet is a conventional frame-and-panel construction. Before assembling the case, I cut the guide track for the tambour with a router and template. I used a 1/2-in. straight bit, the same size as the slats. As you can see in figure 1, the groove in each side for the tambour door extends down the back and under the bottom behind a false wall. This allows the door to open completely out of the way, exposing the entire work surface. The cabinet top is removable, so I just slid the tambour into the top, then dropped the excess down into the false compartment as I lowered the top onto the base. □

Dale Tucker is a full-time woodworker in Clarksville, Md.

Sharpening Screwdrivers

by Michael Podmaniczky

In 1964 I was blessed with a Latin teacher who was as happy to avoid the drudgery of classical studies as his charges were. His nonacademic interests were wide and varied, and he was easily sidetracked by his resourceful students. On one such rambling day, while discoursing on the development of the internal combustion engine by BMW, he observed that in order to make some vital adjustment, a properly sharpened screwdriver was necessary. This brought a back-row dozer to sudden, albeit sleepy, attention:

"Sharpen a screwdriver, sir?"

"Indeed, scholar Westcott. . . sharpen a screwdriver."

I don't remember just what tangent we managed to steer the screwdriver tale toward, but the vignette came back to me the other day when I was asked about the same thing.

The first requirement for a screwdriver is that its blade positively engage the slot of a (wood) screw well enough to remain in place while you turn and tighten the fastener. The second is that this must be accomplished without mangling the surrounding wood, or, if the screw is to be countersunk and plugged (as is usually the case in boatbuilding), without deforming the bung hole. Screwdrivers straight from the hardware store don't perform either task very well, but with a little "sharpening" they will.

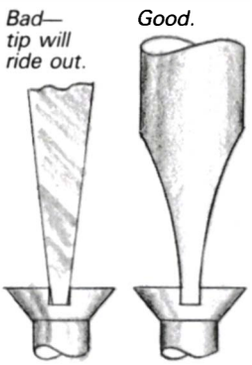
Since the screw manufacturer kindly provides a slot across the whole width of the screw head, you might as well take advantage of it. You therefore want a screwdriver tip that's exactly as wide as the screw head and that fits tightly in the slot, so as to bear along its entire width. Thus you really need a *set* of drivers, individually matched to each and every screw size you use.

A screwdriver tip that's too wide will overhang the ends of the slot. When driving a countersunk screw, it will ream out the bung hole, resulting in a poorly fitting and unsightly bung. If you're trying to tighten down a screw flush with the surface, that last turn will score the wood around the head, or raise nasty burrs on brass hardware and fittings.

Most manufacturers make screwdrivers with spade-shaped tips, which means that the blade will make the hole even bigger as it goes deeper into the wood. You can prevent this by grinding the tip to a constant width.

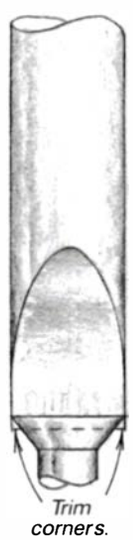
A screwdriver tip that's too thin will bear only at its corners, defacing the screw slot and increasing the likelihood that the tip will jump out of the channel and gouge the woodwork. This problem, bad enough with flat-head screws, is even worse with round-heads because the slot is so shallow at the extremes. Ask yourself why you push so hard when tightening a fastening with a stock tool. The answer is that you're trying to keep the tip from parting company with the slot.

Because the threads of a screw do all the work, pulling it tightly into the wood, you should have only to apply torque; forward pressure should be unnecessary. But the faces of a stock screwdriver taper slightly, preventing the blade from squarely contacting the slot's sides, and the tip therefore tends to ride up and out when torque is applied. The harder you twist, the greater the tendency of the tip to pop out, and the greater the force required to keep it jammed in place. If the tip does jump out, all the force you're exerting will be directed at the surrounding wood—too bad! Yankee-style screwdrivers can apply only as much "push" as the spring is strong, and they invariably pop out if not dressed properly. The result is a less-than-decorative "Yankee doodle" across your pride and joy.



The solution is to dress the tip of the screwdriver so that its faces are parallel to the sides of the slot. Bits designed to be power-driven with an electric drill are invariably ground this way by the manufacturer—they would be lethal otherwise. You can grind a screwdriver to the correct shape as easily as you would hollow-grind the bevel on a chisel. The tip will wear in use, and now and then you'll have to go to the grinder to square up rounded edges. Such touch-ups will gradually shorten the blade, but you should be able to drive a few thousand screws before you have to hollow-grind the blade again.

For major-league screw installation, such as in boat planking, maximum torque is supplied by a brace and screwdriver bit. Once in a great while, this may even break a screw, but a properly sharpened screwdriver bit will engage the slot so well that even a screw that's been broken above the threads can be coaxed out of the bung hole by turning it counterclockwise with the brace and gently pulling it. Try that with a stock.bit.



The ultimate touch, the *pièce de résistance* of the craftsman's ego, is to ever so slightly grind away the corners of the sharpened tool to make the tip conform perfectly to the beveled edges of the screw slot.

There you have it. The screwdriver with the right stuff is actually one of a set, each driver ground to match a particular screw size. You can take virtually any old screwdriver and true it up to do its job, but I prefer to begin with what are variably called "cabinet" or "cabinetmakers' deluxe" screwdrivers. These have a constant-dimension round shank for literally generations of sharpening. With one of these, you're halfway to having a well-dressed screwdriver already. □

Michael Podmaniczky is a boatbuilder and Windsor chair maker. He lives in Thomaston, Maine.

Chicago Furniture

Then and now

by Roger Holmes

A lot of furniture has been built in Chicago since 1833, when James Reed was sole cabinetmaker to the 350 citizens living in shacks lining the Chicago River and Lake Michigan. Two recent exhibitions celebrated the city's furnituremaking between then and now. The Chicago Historical Society's show, *Chicago Furniture: Art, Craft, & Industry, 1833-1983,* took a sweeping look, while the Evanston Art Center narrowed its focus to current work by 19 Chicagoans. The contrast between

In 1888, the Tobey Furniture Company opened a Chicago factory where thirty or so craftsmen produced expensive, high-style pieces. Tobey carvers worked entirely by hand, unlike those in competing firms, who were finishing off work roughed out by newly patented carving machines. This virtuoso piece, carved in the 1890s by the factory's chief carver, Otto Anderson, was a birthday present from one of the firm's partners to his wife.

Photos this page: W. Krutz, courtesy of Chicago Historical Society

the two shows was stark. The Historical Society's exhibit was stuffed with commercial furniture designed for service and sale. At Evanston, the furniture was artier; the designs seemed more about, well, design. Wood was hard to miss at the Society; it was hard to find at Evanston, covered as most of it was by layers of paint or colored lacquer. Comparisons are intriguing, but it shouldn't be forgotten that the Society presented an epic, Evanston a snapshot.

Chicago furniture has a long, vigorous history. Nineteenth-century Chicago was blessed with ready access to raw materials, expanding markets, and a large pool of skilled, mostly immigrant craftsmen and semiskilled workers. Entrepreneurs (many of whom were craftsmen themselves) mixed these ingredients with new technology that increasingly engineered time and skill out of production, and came up with success on a grand scale. By 1895, Chicago's factories produced more furniture and employed more artisans (28,000 in some 250 factories) than those of any other American city. The industry remained strong until after World War II, when a different mix of the same ingredients lured furniture manufacturers south.

The Historical Society show made it abundantly clear that Chicago's 19th-century furniture industry was driven by commerce, not design. The stripped-down, pioneer integrity of the early pieces quickly gave way to an explosion of styles and ornament made possible by large shops, skilled workers and new manufacturing techniques—anyone who has ever browsed a midwestern auction or garage sale will recognize the results. Thousands of solidly built, haphazardly ornamented oak and walnut suites poured out of Chicago on the waterways and railroads. Businessmen in the midwestern hinterland bought respectability—and the acquiescence of reluctant spouses to otherwise harsh conditions—by filling their houses with Chicago furniture.

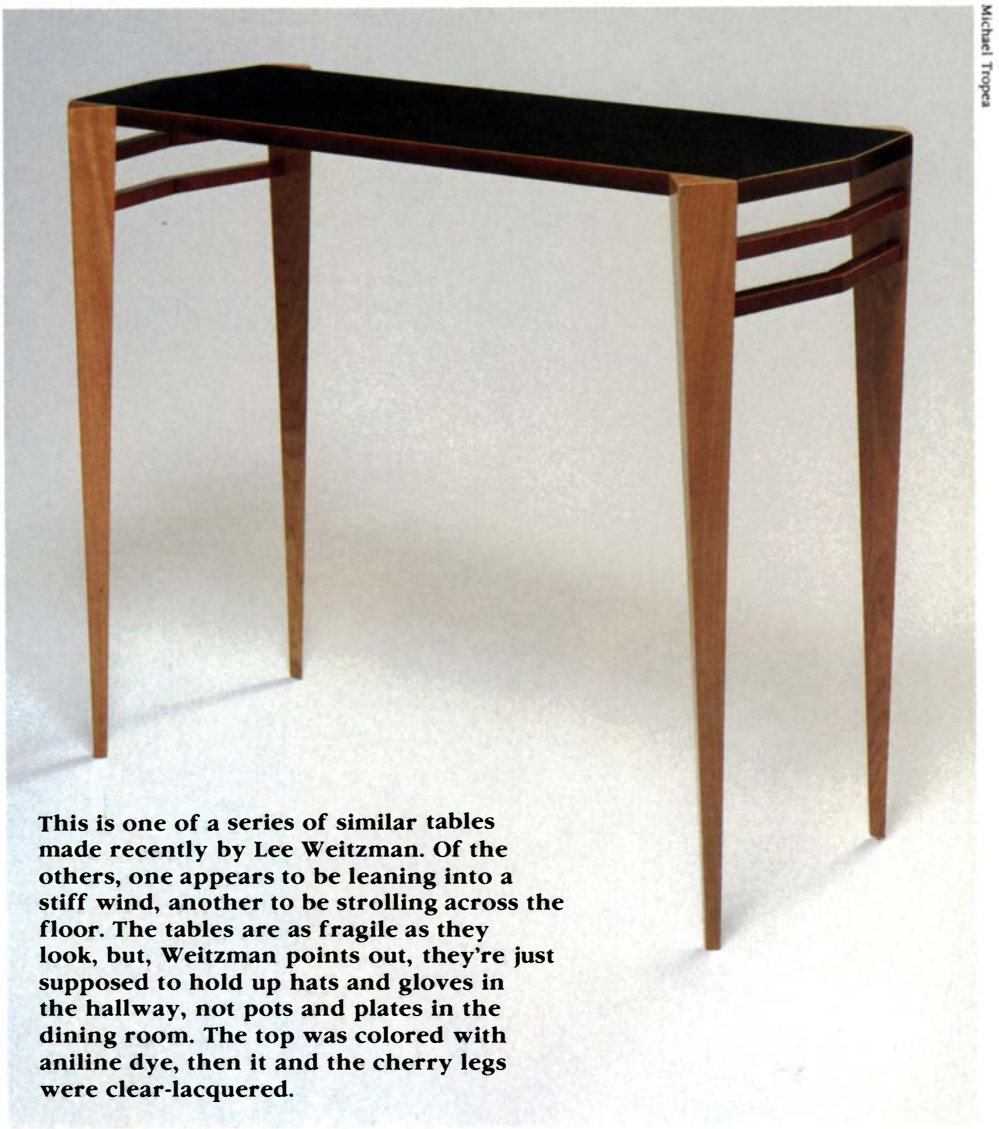
In addition to furnishings in quantity for the rising middle class, Chicago shops also produced one-offs for the rich. The Pullmans, Fields, Armours and McCormicks who had turned a frontier town into the nation's second city wanted to make sure that no one forgot it. Their appetite for opulence was slaked by workshops operated by the city's most prestigious retailers and a slew of small carving shops. (As many as 5,000 carvers, many of them trained in Europe, may have worked in Chicago in 1900.) This loot was stuffed into gargantuan homes designed in every conceivable style. The furniture marched in step with these architectural piracies, much of it running to garish rococo displays of technical virtuosity and precious materials.

Around the turn of the century, Louis Sullivan, Frank Lloyd Wright and other Chicago architects and designers helped to lay the foundations of the Modern movement in architecture and design. In the process, they remade the taste of Chicago's well-heeled: henceforth, brick and mortar monuments to wealth and power would be tastefully designed and furnished. Chicago's pioneering movers and shakers had become patrons of an art and architecture they could call their own.

Today, the Chicago of high rises and architectural history stretches several miles along the lake front. Back about half a mile from the shore, however, the skyline dips and industrial Chicago spreads out into mile after mile of factories and warehouses, many abandoned. A few of these industrial shells have been colonized by contemporary designer/craftsmen and artists, who now supply Chicago's affluent, design-conscious folks with fashionable furnishings. Interest in the work of these artisans runs high—about 700 people showed up opening night in Evanston.

These furnituremakers are an eclectic bunch. The Evanston show sported two painters, a sculptor, a painter/sculptor, an illustrator, a designer, a graphic designer and three architects as exhibitors, along with nine designer/makers. Regardless of label, almost all employed wood as a means to a constructional end, not for its figure, texture or color. In fact, over half the pieces were made principally with man-made board of one sort or another and covered completely by paint or colored lacquer. Most of the rest combined solid wood with man-made board, clear with colored finishes.

With a few exceptions, the Evanston pieces seemed to me to be way-station work, in transit to something else. Given



Michael Tropea

This is one of a series of similar tables made recently by Lee Weitzman. Of the others, one appears to be leaning into a stiff wind, another to be strolling across the floor. The tables are as fragile as they look, but, Weitzman points out, they're just supposed to hold up hats and gloves in the hallway, not pots and plates in the dining room. The top was colored with aniline dye, then it and the cherry legs were clear-lacquered.

The Chicago Historical Society made a succinct statement by displaying these two vanities back to back under the show's logo. Made by the W.W. Strong Furniture Co. in about 1870, the massive walnut vanity at right combines straightforward construction with applied ornament to give the illusion of being a finer piece of furniture than it really is. The Society commissioned Cal Spitzer's vanity (below), which needs no such sleight of hand to pass as fine furniture. Spitzer, whose background includes minimal sculpture and clothing design, set up as a furniture designer/maker in 1980. Two years later he stopped doing contract work for other designers and now works only on commission. The vanity, made of medium-density fiberboard with accurate but simple joinery, is lacquered inside as well as out.

Michael Tropea

Howard Kavinsky's 12-year woodworking odyssey includes banjo making, stack laminating, and building cabinets à la Krenov, as well as making displays for Chicago's Merchandise Mart. Proficient at and bored with technique, Kavinsky turned his attention to design. He combines basic shapes with basic joinery, then concentrates on detail and color to enhance the relationships between the parts. The chair shown below is one of a series, each finished differently. Kavinsky worked out the crackle-lacquer finish (popular in the 1920s and 1930s) with The Refinery, a finishing shop that did much of the lacquerwork in the Evanston show.

Photo at left: Gregory Murphey; above: Ken Thompson

the chaos in the world of design, where the stylistic smorgasbord of Post Modernism currently holds sway, perhaps this isn't surprising. One destination is indicated by Glenn Gordon, an exponent and skilled practitioner of woodworking committed to exploring the connections between form, function and emotion. While the exhibitors I talked with all admired Gordon's work, they seemed inclined in another direction--commerce.

Designer/makers Lee Weitzman, Howard Kavinsky, Cal Spitzer and Mark Levin all expressed interest in bridging the gap between one-off and mass production. Kavinsky and Levin, for example, have worked their way through fascination with the craft of woodworking to fascination with design and the business of woodworking. Sound familiar? Perhaps like somebody dusting off the entrepreneurial tradition of Chicago furnituremaking? □

Roger Holmes is an associate editor at FWW. *Sharon Darling's book,* Chicago Furniture: Art, Craft, & Industry, 1833-1983 *(*$27.50 *ppd. from the Chicago Historical Society, Clark St. at North Ave., Chicago, Ill. 60614), is a fine history.*

Orlando Cabanban

Architect Paul Florian's 42-in. dia. round table was made on commission. The design, Florian says, can be seen as a series of volumes altered by either addition or subtraction, depending on how you want to look at it. He finds designing both architecture and furniture stimulating; one being the formation of space, the other the formation of something in space. The table, which was made by Wooden Horse cabinetworks and lacquered by The Refinery, has a medium-density fiberboard top and legs connected by beech stretchers.

Michael Tropea

Glenn Gordon, like many of the Evanston exhibitors, is a self-taught woodworker. His oak-and-glass low table was one of the few forthrightly wooden pieces in the show, and perhaps the only one to rely on joinery for part of its appeal. The two uprights at each end are connected by a thick tongue, which is glued and further secured by ebony dowels, whose exposed ends sit like bolt heads on the inner faces. An ebony square in each double-wedged tenon covers cross-grain dowels, insurance against an over-enthusiastic wedge driver (Gordon also provided a small wooden mallet). Clearly, all this is more than sufficient to hold up a piece of glass. Gordon, who called the table 'The weight of the sky, borne by oaks,' used the base and its details as much for what they suggest as for what they do. The result is a functioning piece of furniture that invites and repays a closer, more meditative look.

Author Hanisch renders a contemporary version of the colorful heart motif, a favorite of traditional Pennsylvania-German chestmakers.

Pennsy Painted Chests

Vivid colors brighten the basic box

by Ric Hanisch

I must confess that I don't have a ready answer when people ask me why I started making painted chests. Inspired by the colorful vitality of the old Pennsylvania chests I'd seen, I wanted to explore their potential as a contemporary mode of expression. The simple joinery, the easily worked woods and the fluency of the decoration led me to think that these chests might become an economic cornerstone of my business. I've since found the chests to be a special kind of challenge to my skills as a designer-craftsman.

The painted chests that were popular in the early 19th century in regions of Pennsylvania settled by German immigrants have directly influenced my work. The decorated-chest tradition itself dates to Renaissance Germany and Switzerland, where chests were among the earliest forms of furniture, both for sitting on and for storing household goods such as clothing and linens. In 17th-century Germany, a wealthy merchant could have afforded to commission an elaborate chest, perhaps decorated with bold carving or rich intarsia (a technique in which pictorial designs are made by inlaying bits of colored wood). While European chests were made by professional cabinetmakers, most Pennsylvania work was probably a sideline for a farmer with diverse skills. Most likely the painting was done by the maker, a member of his family, or some competent member of the community.

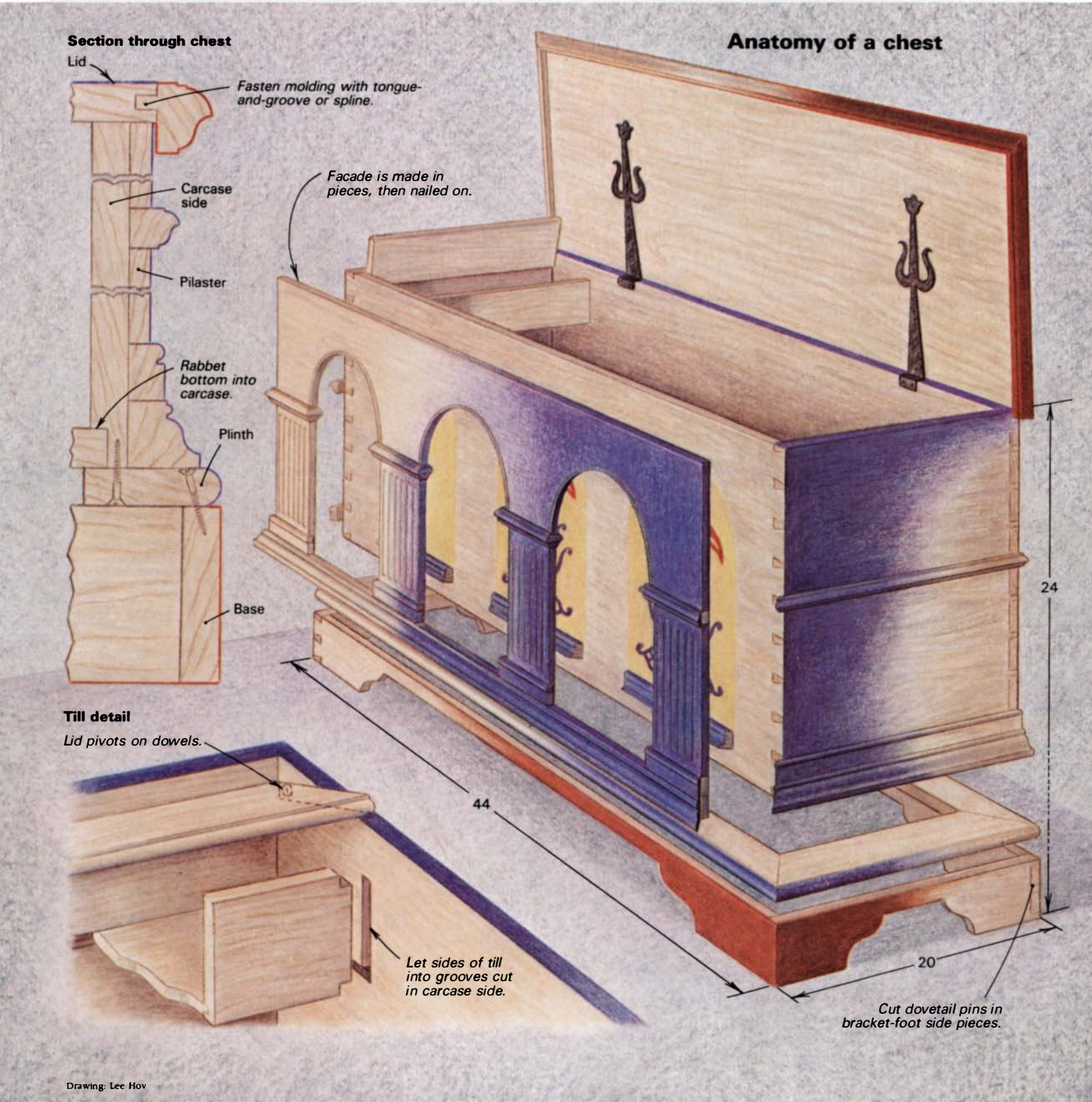
The six-board chest (four sides, a bottom and a lid) was a common construction when wide lumber was readily available. The piece was dressed up with trestle, turned or bracket feet and usually a plinth or series of moldings that smoothed the transition from carcase to base. Old chests show a delightful variety of form, from crude, unadorned boxes to refined pieces sporting sophisticated architectural facades. Sizes range from 50-in. long, 24-in. high chests to diminutive boxes less than a foot long. Tulip poplar and white pine were the favored woods because they were easy to get and their mild grain, when hand-planed, provided an excellent surface for painting. Occasionally you'll see chests made of walnut, but

Photos: Ric and Mary Hanisch

these usually were treated with a clear finish, not paint.

As the drawing below shows, constructing a chest is pretty much straight-ahead woodworking. The carcase is dovetailed together and the bottom fitted into a rabbet. The architectural facade, if used, is made up in separate elements and nailed or glued onto the front. Before I assemble a carcase, I plane the inside, which will be left unfinished. I fit the hinges (fabricated to my specifications by a local blacksmith) and fasten them permanently with clinched-over wrought nails. Inside, a small lidded box called a till fits into grooves during carcase assembly. The till is handy for holding valuables and has another practical function: when it's open, it props the main lid at a convenient angle so you can root through the chest's contents.

I like to think of the woodworking portion of making a chest as preparing a three-dimensional canvas. On this blank surface, paint brings an idea to life. The interplay between the chest's form and the paint is an important element in developing a design, so I experiment with proportion and details such as the plinth and feet. For me, this is serious business. I want each successive chest to show greater fluency in paintwork, which comes only with practice. Doors, stools, old chairs, short runs of mirror frames, small boxes, and spoon racks provide places for



Drawing: Lee Hov

me to test painting technique, study color relationships and evaluate materials, thereby broadening the limits of what's possible in a piece.

The painting on traditional chests displays a rich variety of subjects, many dealing with the symbolism and mythology of medieval Europe. Blooming flowers, fanciful birds called *distelfinks,* rearing unicorns, and bold geometric motifs—some reminiscent of the hex signs painted on Pennsylvania-German barns—are quite common. I aim for a more contemporary aesthetic, usually by choosing a strong idea and then organizing the rest of the work to buttress this central theme. Controlling the many variables to achieve a balanced whole takes deliberate effort. As the work proceeds, I carefully review the results. How does it read at fifty feet, at ten feet and at one foot? How does it feel to the touch? Some old chests have remarkable tactile qualities, which the maker produced by manipulating thick coats of wet paint.

Creating a cohesive painted design requires discipline. I like to develop full-size drawings, exploring ideas before taking up the brush. I find that ideas come rather easily; the problem is keeping track of them before they fade from memory. I've taken to

If color is a painted chest's rhythm, texture is its harmony. A paper dauber stabbed into the wet paint stippled the orange background on the chest above. Below, an architectural facade, made separately and nailed on, dresses up a boxy chest front.

filing all my sketches. This rich mine of information provides a practical tool for future projects. And a quick leaf-through also tells me how much time I've spent on the design for a particular project—a figure I need if I expect the price of the work to reflect the effort that went into it. Design time on just the paint for the heart chest (cover and p. 64), for example, totaled about 35 hours, including development of technique and paint tests.

Once I've designed the major elements, I scribe them onto the chest with dividers and a knife so outlines can be seen through the accumulating layers of paint. Then I'm ready to begin painting. The first step is to seal the raw wood with a wash coat of shellac. I make the wash coat from what I call my stock solution—a pound of shellac flakes dissolved in about a quart of alcohol. I filter the stock solution and dilute it by adding one part stock to four parts alcohol.

I apply undercoating next. This coat, which is the background color on which the other designs will be painted, can be a flat oil- or water-based house paint, or a tinted artists' gesso. Since I choose the color to match subsequent opaque coats, or to provide background color for transparent or textured layers, I may have to apply several undercoats on different parts of the same chest. Before working on the actual piece, I prepare sample panels so I can check the color and workability of the paints and brushstrokes I'll be using. After smoothing the undercoats with a Scotch-Brite pad, I seal the surface with shellac to ensure that subsequent coats will be absorbed evenly and to allow mistakes to be wiped off without permanently staining the surface.

For the top layers of paint, I prefer oil-based finishes, either manufactured enamels combined with a tung-oil paint base called Waterlox, or Waterlox mixed with dry pigments or artists' oil paints. Waterlox, available at most paint stores or through Waterlox Chemical and Coating Co., 9808 Meech Ave., Cleveland, Ohio 44105, is a versatile additive. It makes the paint flow more easily and dry more quickly, and the final film is a good deal tougher than that of straight enamel—an important consideration because a chest that's to be used will be subjected to a lot of wear. Another method—which probably is excellent for the beginner—is to mix pigments with shellac, thinned to the appropriate viscosity. Shellac paints are quite thin and flow easily but dry quickly, so they're unsuitable for texturing. They're "one stroke" paints. Using two strokes doubles the paint thickness and intensifies the color.

I've experimented with two kinds of dry pigments: artists' colors and bulk pigments sold as colorants for concrete. The masonry pigments, though cheaper, aren't as finely ground and they come in fewer colors. You sometimes can buy them at local hardware stores for $1.50 to $2.50 per pound. Artists' colors vary widely in cost. Earth colors and titanium dioxide (white) are at the lower end of the scale; vermilion, cadmium yellows and reds, and some blues and greens are at the upper end, costing $36 or more per pound. Pigments also vary in coloring power, ease of mixing, transparency, permanence and toxicity. Some act as catalysts to accelerate drying; some mix up to unusual consistencies (ultramarine gets stringy) or are difficult to disperse in oil. Using a muller or a mortar and pestle helps disperse the pigment in the oil medium. Ralph Mayer's *The Artist's Handbook of Materials and Techniques* (Viking Press, 1981) is a good general reference on this subject.

To mix a color, first add a little oil paint or Waterlox to a small amount of pigment, thoroughly wetting it. Once you've got a homogeneous paste, add more oil until you have the desired color and consistency. A little turpentine will thin the mixture and slow drying, buying you additional time for texturing the surface. Whiting (calcium carbonate) provides bulk without changing the color value appreciably.

To make brushing easier, wipe large areas to be filled with color with a turps-dampened cloth. Brushes vary widely in kind and quality, and choosing the right one is important. When I'm aiming for a particular effect, I may try several brushes, or even modify one by trimming it. Once I've found one that performs a particular function well, I keep it in good condition with careful cleaning. Good natural-bristle brushes are made from the best materials, and even the novice will notice the difference in performance. Also, a good brush will outlast a cheaper one.

In painting a chest design, I start with the broader background colors, then progress to the finer detail. At this point, I might begin adding some texture to the still-wet paint by manipulating it with a brush, dabbing it with a sponge or my finger, or dragging a feather, corncob or perhaps a rolled-up wad of paper through the film. The possibilities are endless. On the heart chest, I textured the green heart with a feather and marbleized the yellow background by dabbing dry color into the wet paint with crumpled paper and Q-tips. Testing paints on a scrap panel is particularly important, however, since each color mixture can be textured only during a critical time period, which varies with daily conditions. If you start too soon, you may find that the paint is too wet to be worked; wait too long and the paint will be too stiff. With a fast-drying paint, I sometimes have a helper do the painting so I can concentrate on texturing.

The safest painting procedure is to allow one color area to dry, then seal it with a shellac wash coat before doing an adjacent color. Flowers, figures, borders and moldings are then painted in to connect the various details. At this point, the reflective qualities of the paints will vary from color to color, depending on the amount of whiting and turps used—both substances tend to flatten the paint surface. To even out surface sheen, richen the colors and give a protective surface film, I rub on a glaze of Waterlox mixed with a tiny bit of whatever pigment brings out the colors best.

I realize that all this will seem rather complicated to someone about to try decorative painting for the first time. In fact, if it had been explained to me this way before I felt the urge to paint, I might not have made the attempt. Confidence, born of ignorance and tempered by experience, kept alive my desire. This is a skill you can teach yourself without enduring years of frustration. Remember, the rural chest decorator of 1750 worked with no formal training and a limited palette, yet was able to achieve results that remain powerful statements of the spirit.

I grew up in a rural New Jersey house built as a church in 1880. There are still traces of the original painted adornments—stenciled fleurs-de-lis on wainscoting and cherubs holding an open Bible. During the 40 years my folks have lived there, most of the flat surfaces carpentered by my father have been enhanced with decorations painted by my mother . . . fish and anemones in the bathroom, mountain scenes down the hall, giraffes and skeletons in the closets, oriental landscapes in the stairwell. Furniture, trays, lamps—nothing was safe. It's strange but true that until a year ago I didn't make the connection that, in fact, I do come from a tradition of decorative painting. And in that way, I am indebted to the past and responsible to my own future. □

Ric Hanisch, a member of Guild X in Bucks County, Pa., has a masters degree in architecture and has worked as a builder. He designs and makes furniture in Haycock Township, Pa.

Japanese Measuring and Marking Tools

More than simple utility

墨付道具

by Toshio Odate

While I was returning home from a seminar in Atlanta recently, the word *shokunin* came to mind. This Japanese word is defined by both Japanese and Japanese-English dictionaries as "craftsman" or "artisan," but such a literal description does not fully express the deeper meaning. The Japanese apprentice is taught that *shokunin* not only means having technical skill, but also implies an attitude and social consciousness. These qualities are encompassed in the word *shokunin,* but they are seldom written down.

The relationship of a *shokunin* to his tools is very close, for it is through the tools that the work of the *shokunin* is created. When I was being trained as a *tategu-shi* (sliding-door maker), we celebrated the tools every New Year's Day. We cleaned them and our toolboxes and put them in the *tokonoma* (a special, decorated corner of the house or sometimes the shop). We put a small piece of rice paper on each box, and on top of that two rice cakes and a tangerine. This simple gesture is the traditional way of thanking the tools for their hard work and for the crucial part they play in the *shokunin*'s life.

In the past ten years, some of these tools have enjoyed popularity among Western woodworkers, but problems exist in knowing how to get the best performance from them. Though Japanese tools often look simple when compared to Western tools, they are really very complicated to use, performing best through the *shokunin*'s preparation, ability and experience. Though the knowledge is usually acquired through long apprenticeship in Japan, in America, especially, knowledge of new things is often gained through experimentation. In some countries, this freedom to experiment is unknown, but, in America, I realize that it is a natural outgrowth of interest in and respect for personal opinion, not recklessness or carelessness.

In my book *Japanese Woodworking Tools: Their Tradition, Spirit and Use,* from which this article is adapted, I had the opportunity to write about the *shokunin*'s tools. Here I will talk about some of the marking tools used by both the *tategu-shi* and the carpenter as well as other woodworkers. I will be very happy if you understand not only the tools, but a little bit about the spiritual relationship a *shokunin* has with them.

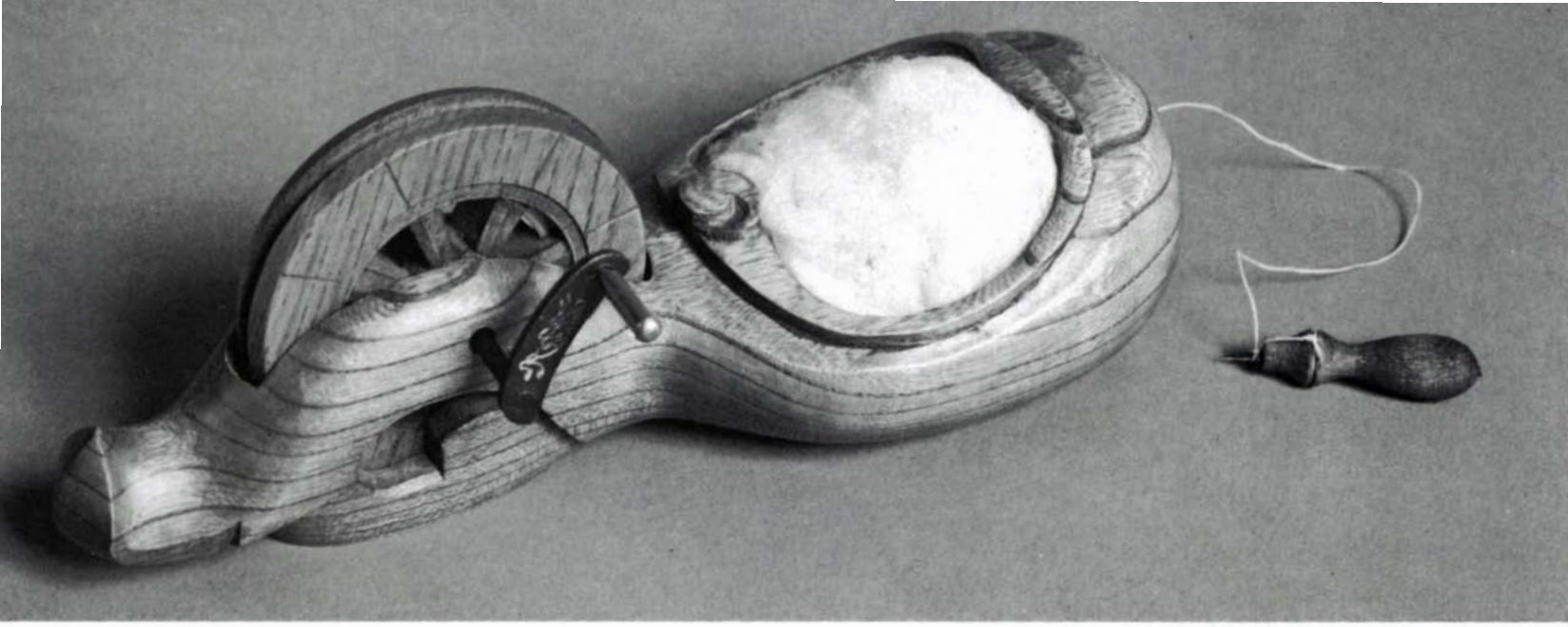
Sumitsubo—The carpenter usually begins his work by outlining on the ground with string the shape of the house to be built. Then he chooses the wooden columns and beams from the timber on the site and marks directly on them with the *sumitsubo* (ink pot) and *sashigane* (square). The same tools are used by *tategu-shi* to mark out the rails and stiles of sliding doors. The line made with the *sumitsubo* is similar to that made with a Western chalk line (a chalk-covered string unwound from a reel, stretched between two points and snapped to mark a straight line). But instead of coarse string and chalk, the *sumitsubo* uses fine silk line and ink, which comes in both liquid form and as small solid chips.

The *sumitsubo* is an important tool, symbolic of the carpenter's spirit. When I was an apprentice, it was customary for the master carpenter to come to the site at the beginning of construction and, with the *sumitsubo,* to snap one line on a major timber. After this, his work for the day was considered done, and he was paid for the full day. An ancient custom at the end of construction of a shrine or a temple was to leave the *sumitsubo, sashigane* and *chona* (adze) in the building as treasures.

Because the *sumitsubo* is such an important spiritual symbol, it has maintained its ornate, formal style even though other woodworking tools have been simplified. Today you can buy *sumitsubo* in every Japanese tool store. They are available in three sizes: large, about 30 cm (11⅝ in.) long; medium, about 24 cm (9⅜ in.) long; and small, about 18 cm (7⅛ in.) long. The medium-size *sumitsubo* is the most commonly used.

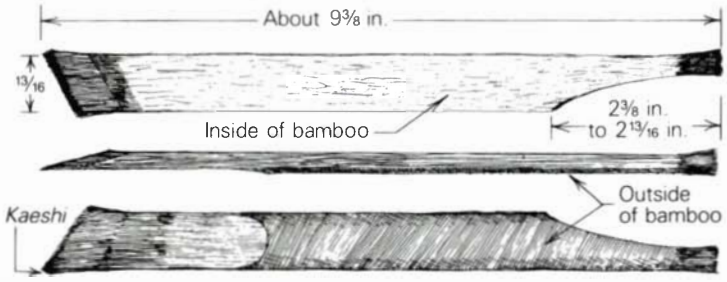
The *sumitsubo* is used with a piece of bamboo called a *sumisashi.* One end functions as a pen for fine work such as marking joints, and the other end as a brush for writing characters, numbers and signs, as shown in figure 1. The carpenter presses the *sumisashi* across ink-soaked cotton in the well of the *sumitsubo* as the ink line is being drawn out. To make a *sumisashi,* cut the shape with a chisel or knife; use a razor blade to split the pen end into approximately 40 pieces about 1¼ in. to 1½ in. deep to separate the fibers so that they will hold ink. Then relieve the sharp corner. This relief is called the *kaeshi,* which means "return." The *sumisashi* is used by pulling it toward you. When you are making a long line and the last part of the line is getting lighter because the brush is running out of ink, you can reverse the *sumisashi* to use the ink stored on the *kaeshi,* then go back over the line.

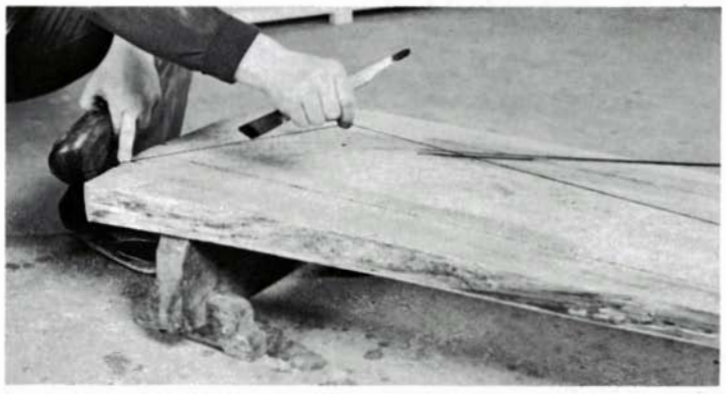
To prepare the *sumitsubo* for use, soak the cotton in water, then wring it out and pull it evenly into a shape about twice the size of the ink pot. Place half the cotton in the pot, letting the other half hang over the side. Next, pull the end of the line through the mouth of the *sumitsubo* from the outside, and pass it over the cotton and then through the hole between the pot and the wheel. Tie the line to the groove in the wheel the way you would tie a fishing line to a reel, then insert the wheel. Thread the handle into the wheel and start reeling in the line. Stop reeling about 2 ft. from the end of the line. Tie the free end of the line to the *karuko,* a small piece of wood with which



The sumitsubo, *or ink pot, is symbolic of the Japanese carpenter's spirit. Used like the Western chalk line, you snap a mark by plucking the silk line straight up, then releasing.*

Fig. 1: *Sumisashi* (bamboo pen)





to pull out the line, shaped so that it can be easily grasped. The *karuko* (which means "porter") has a steel pin at one end with which to hook the line after it is tied.

Put enough liquid ink into the pot to soak the half of the cotton pad that is there. Spread chips of ink evenly on the cotton in the pot and fold over the other half of the cotton so that the line is in the middle. Now pour just enough ink onto the cotton to soak the top layer. The chips will slowly dissolve into the cotton. The next time you wish to use the *sumitsubo* and the cotton is dry, you do not have to add ink—plain water will do. Now, to ink the line, anchor the *karuko* in a piece of wood and pull the line out about 10 ft. to 15 ft. While walking back, press the cotton with the *sumisashi* so that the line will be well saturated with ink. Then reel in the line. Do this two or three times and the *sumitsubo* will be ready for use.

Snapping the line—A *sumitsubo* has many advantages. Not only can it make a long, straight line in very little time on flat surfaces, it can also mark straight lines on curved or twisted surfaces such as logs. Skilled carpenters also use it to make beautiful, light, curved lines, such as for marking out the boards at the gable ends of Japanese roofs. They do this by snapping the line at an angle to the wood instead of straight up and down.

To snap a straight line, plant the *karuko* on the wood you wish to mark. Walk the *sumitsubo* back while pressing on the cotton with the *sumisashi*. When enough line is out, put your left thumb between the pot and the wheel to stop the wheel from turning. Using your left index or middle finger to tighten the line, press down the line where you want it. Now stretch your arm as far out as possible and, with your right fingers, lift up the line and snap it. (If you pick up the line close to its end, you won't have the necessary spring in the line.)

Sashigane—The word *kane* (or *gane*) means "steel," but in woodworking it means "square." So the woodworker saying "see the *kane*" means "check the square." A *sashigane* is used very much like a Western carpenter's framing square, but the markings, material, shape and size are quite different. The *sashigane* has a long history. I have read in *Daiku Dogu No Rekishi,* by Teijiro Muramatsu, that its predecessors came from China, where a square is known to have existed in the second century. In Japan, *shokunin* may have been using squares as early as the eighth century, but these had no measurements on them.

Today there are two types of *sashigane* used. Traditional *sashigane* use the traditional Japanese measurement system, and have different markings on the front and back. This is the square I used when I was a *shokunin,* and the one I still prefer. Modern *sashigane* have the same metric gradations front and back. Figure 2 on p. 70 shows the markings on my traditional *sashigane*. In the Japanese measurement system, there are *mo, rin* (10 *mo*), *bu* (10 *rin*), *sun* (10 *bu*), *shaku* (10 *sun*), *ken* (6 *shaku*), and *jo* (10 *shaku*). The unit *ken* (about 6 ft.) is an essential measure. The Japanese *tatami* (grass mat) measures 6 *shaku* (1 *ken*) by 3 *shaku* (½ *ken*). Japanese rooms are often proportioned according to the number of *tatami* that will be used to cover the floor.

The front face of the *sashigane* is calibrated in *sun*. The markings on both the tongue (short arm) and the body start at the outside corner of the square. These markings are only on the outside edge. On the back face, the outside edge of the body, which is based on *sun* multiplied by the square root of 2 (*sun* x 1.4142), is called *ura-me*. The uses of the *ura-me* are far-ranging. Carpenters use this edge to determine the maximum-size square timber that can be cut from a log by laying the *sashigane* across the smallest diameter of the log. This works

Photos: Brian Gulick

Fig. 2: *Sashigane* (square)

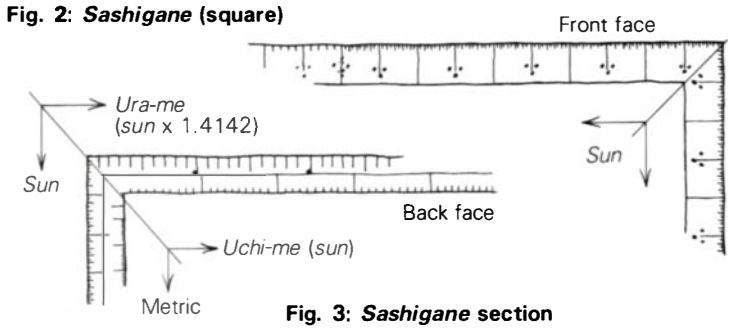


Fig. 3: *Sashigane* section

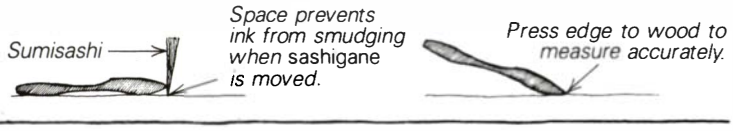


Fig. 4: Judging the squareness of a *sashigane*

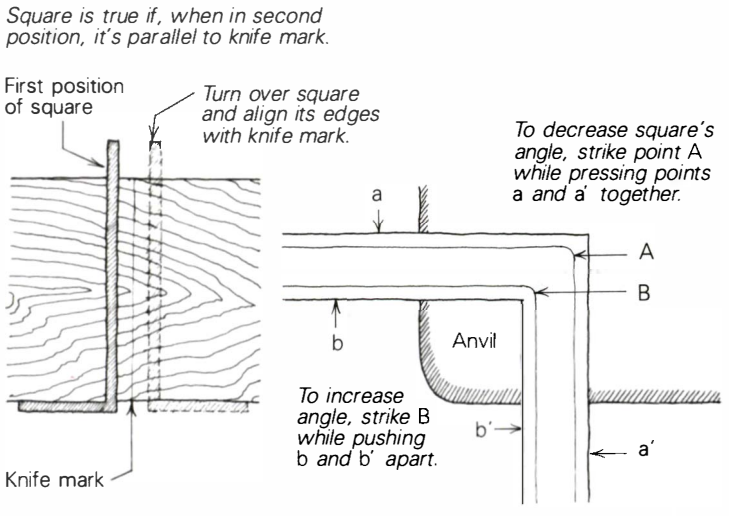


Fig. 5: Types of marking gauges

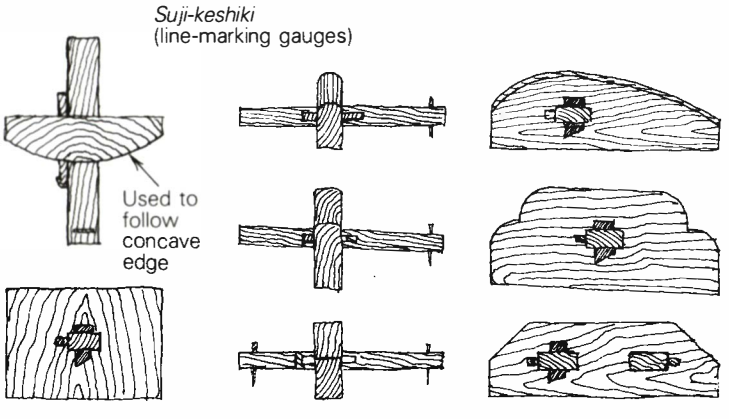
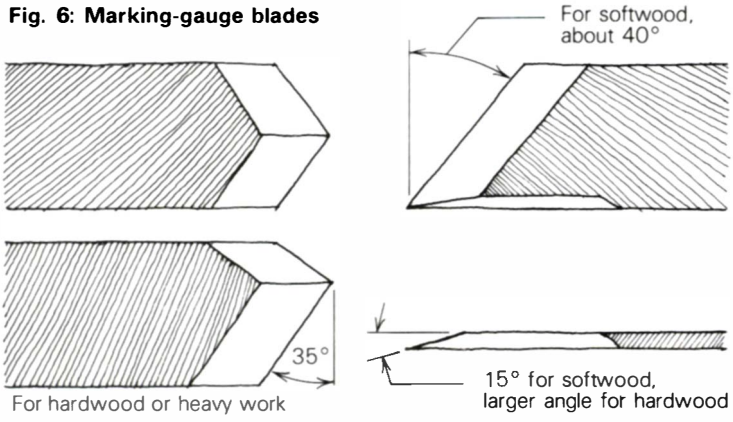


Fig. 6: Marking-gauge blades



mathematically because each side of a square inscribed in a circle is equal to the diameter of the circle divided by the square root of 2.

Until about 55 years ago, *sashigane,* like other tools, were forged by blacksmiths from iron. Today, I do not know of any blacksmiths making *sashigane* by the old method. Instead, *sashigane* are made from copper, brass, German silver (an alloy of copper, zinc and nickel), steel or stainless steel. Steel *sashigane* rust easily, and it is difficult to see the lines, so many *shokunin* do not like them, even though they are stronger than the others. At the time of my youth, many *shokunin* did not like stainless-steel *sashigane* because the color was too bright and its shine was cold and harsh. My master said, "It never gives me calmness." Stainless steel does not have this effect on me, and this is the type of *sashigane* I use today.

Shape and squareness—The *sashigane* is much smaller and narrower than the Western framing square, and also much more flexible. It is sensitively designed—for example, the blade is contoured so that when used with the *sumisashi,* as shown in figure 3, the space between the edge of the square and the surface to be marked allows the square to be moved without smudging the ink. Yet by holding the edge of the square flat against the surface, very accurate measurements can be taken.

The *sashigane* is the basis for all marking. If it is not square, then the entire building will not be true, so you must check that the angle is correct from time to time. I will explain how to check for squareness, as shown in figure 4.

Begin by preparing a board about 1 in. thick by 12 in. wide by 30 in. to 36 in. long. Dress its face as flat as possible and plane one edge straight and square to the face. Then put the square on the board and draw a line with a marking knife along the square's edge. Reverse the square and hold its edge to the knife mark. If the edge is parallel to the mark, that is good, and the *sashigane* is square. But if they are not parallel, follow these steps. If the angle is too large, strike point A gently with a hammer while pressing the tongue and body together on an anvil, either alone or with the help of an assistant. Don't strike too hard, as you might stretch the steel badly. If the angle is too small, strike point B while pushing apart at the points indicated. Continue this procedure and test again until the square is true.

Keshiki—Marking gauges, or *keshiki,* are used mainly by *tategushi* and other woodworkers who use small materials. Many *shokunin* make their own, but *keshiki* are also available in tool shops that carry Japanese tools. There are different sizes, shapes and types for different work (figure 5). I will talk here about the most common, the *suji-keshiki,* or line-marking gauge. This tool is used to scribe a single line parallel to the edge of the piece of wood. Most *suji-keshiki* have a simple flat fence and a single beam to hold the blade. The fence, which must be square to the beam, is usually held in place with a wedge, but sometimes with a nut and bolt. The blade, either made from an old bandsaw blade or purchased, is a forced fit in the beam.

In general, Japanese marking gauges are similar to their Western counterparts. With the exception of the mortise gauge, however, all Japanese gauges use blades instead of pins, for marking both across the grain and along it. A blade, which cuts, leaves a finer mark than a pin, which scratches. Like other Japanese tools, marking gauges are used on the pull stroke. Most are adjusted in the same manner by tapping the beam with a hammer, as shown in the photos on the facing page.

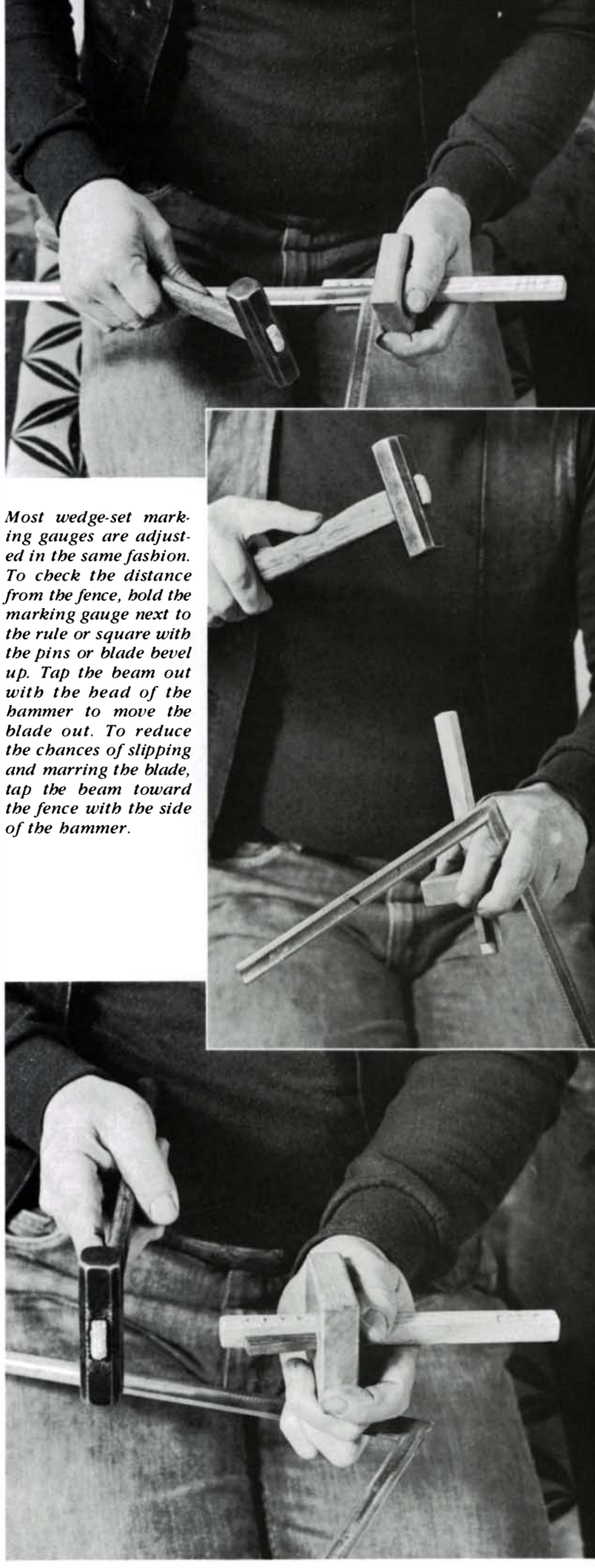
Suji-keshiki are traditionally made of white or red oak, which has the hardness and tenacity the tool needs. Today, however, *suji-keshiki* are also made from rosewood and ebony. Rosewood and ebony *keshiki* should be used with a wedge of a softer, more resilient wood, such as oak or maple. Wedges made of these woods will compress when tapped to allow fine adjustment and will hold the fence tightly in position. Here are some points to consider if you are making your own *suji-keshiki*. Fences may be made in a variety of shapes and sizes. Common beam lengths are 3½ in. to 7 in. and common thicknesses are ⅜ in. to ⅝ in., but size the beam to fit your hand and work. The width of the beam may vary, and depends on the size of the blade; naturally, a wide blade in a too-narrow beam could split the beam.

The beam should slide easily in the fence, but not be loose. The wedge hole in the fence should be tapered, with the larger opening on the outside of the fence. The angle of the wedge and wedge slot have to match perfectly, otherwise the wedge may press on just one point of the beam, which could change the angle of the beam to the fence. In addition, a wedge that does not fit correctly will not hold the beam tight.

The blade of the *suji-keshiki* is beveled on one side to form the cutting edge, and that side usually faces the fence; as the blade cuts, the bevel keeps pulling the fence into the edge of the wood. Blades can be made in a number of different shapes, as shown in figure 6. I make my blades from a piece of broken bandsaw blade or any other hardened steel, but they can also be purchased. To set the blade in the beam, first insert the beam into the fence and tighten it. Then draw a line on the beam showing the location of the knife, usually about ½ in. to 1 in. from the end. This line should be exactly parallel to the fence. Now draw another line starting at the same position at the front, but skew it out one pencil-mark width at the back. (Skewed away from the fence, the blade will push away from the fence slightly in use, helping to pull the fence into the wood and allowing greater accuracy.)

Start the slot for the blade by making a small hole on the end of the line at the front of the gauge. I usually use a spade-tipped gimlet for this, or a drill. Saw down the skewed line with a coping-saw blade. If necessary, widen the top of the slot with a chisel. The thickness, but not the width, of the blade must be tight, otherwise the beam might split. (In case the blade is loose in the slot, you can add a wedge to tighten it.)

Suji-keshiki can also be made with two beams on one fence, so that you can mark two lines, as for mortising. For this, the bevels on the blades should be opposite each other, facing toward the inside of the mortise. This will leave a clear guide for the mortise chisel. *Suji-keshiki* can be adapted to do many different jobs. For example, if you have a gauge with one beam and you need to make many sets of parallel lines a certain distance apart, as when marking mortises, cut a piece of wood the width of that distance for a spacer and notch it to take the beam. Mark once with the piece in place against the fence and once without the piece. □



Most wedge-set marking gauges are adjusted in the same fashion. To check the distance from the fence, hold the marking gauge next to the rule or square with the pins or blade bevel up. Tap the beam out with the head of the hammer to move the blade out. To reduce the chances of slipping and marring the blade, tap the beam toward the fence with the side of the hammer.

Toshio Odate's new book, Japanese Woodworking Tools: Their Tradition, Spirit and Use, *is available for $23.00 from The Taunton Press. In addition to the chapter on marking tools, the 192-page volume covers saws, chisels, planes, sharpening stones and some specialized tools with no Western counterparts. Odate, who lives in Woodbury, Conn., conducts frequent workshops on Japanese tools and teaches sculpture at New York's Pratt Institute. Drawings by the author.*

English Oak Table

Reproducing an Arts and Crafts classic

by Victor J. Taylor

The lines of this sturdy table's rustic hayrake stretcher are reminiscent of the English farm tools and wagons that inspired its design.

An influential figure in the English Arts and Crafts movement around the turn of the century, Sidney Barnsley designed and made this massive oak table in 1924. Trained in London as an architect, Barnsley, along with his brother Ernest and their friend Ernest Gimson, was disenchanted with the impersonal, mass-produced furniture churned out by the machinery of the industrial age. So the three left urban life behind and retreated to the idyllic English countryside. In this peaceful setting they planned to make furniture that emphasized craftsmanship and integrity of design.

Sidney Barnsley was the loner of the trio. When differences arose among the three partners, he went his own way, hand-crafting all the pieces that came out of his workshop. His only machine was a large hand- and foot-powered circular saw.

Barnsley relied on his surroundings for many of his design ideas. Farm wagons and agricultural implements were common sights in the rural Cotswold hills of Gloucestershire where Barnsley set up his workshop. Their influence can be seen in this table's rustic "hayrake" stretcher—so called because its shape resembles a type of wooden rake used in the fields. Barnsley used this design on many pieces and it became a sort of trademark. He also had a keen interest in Byzantine architecture, which is reflected in the chipcarving that decorates the top and legs of the table.

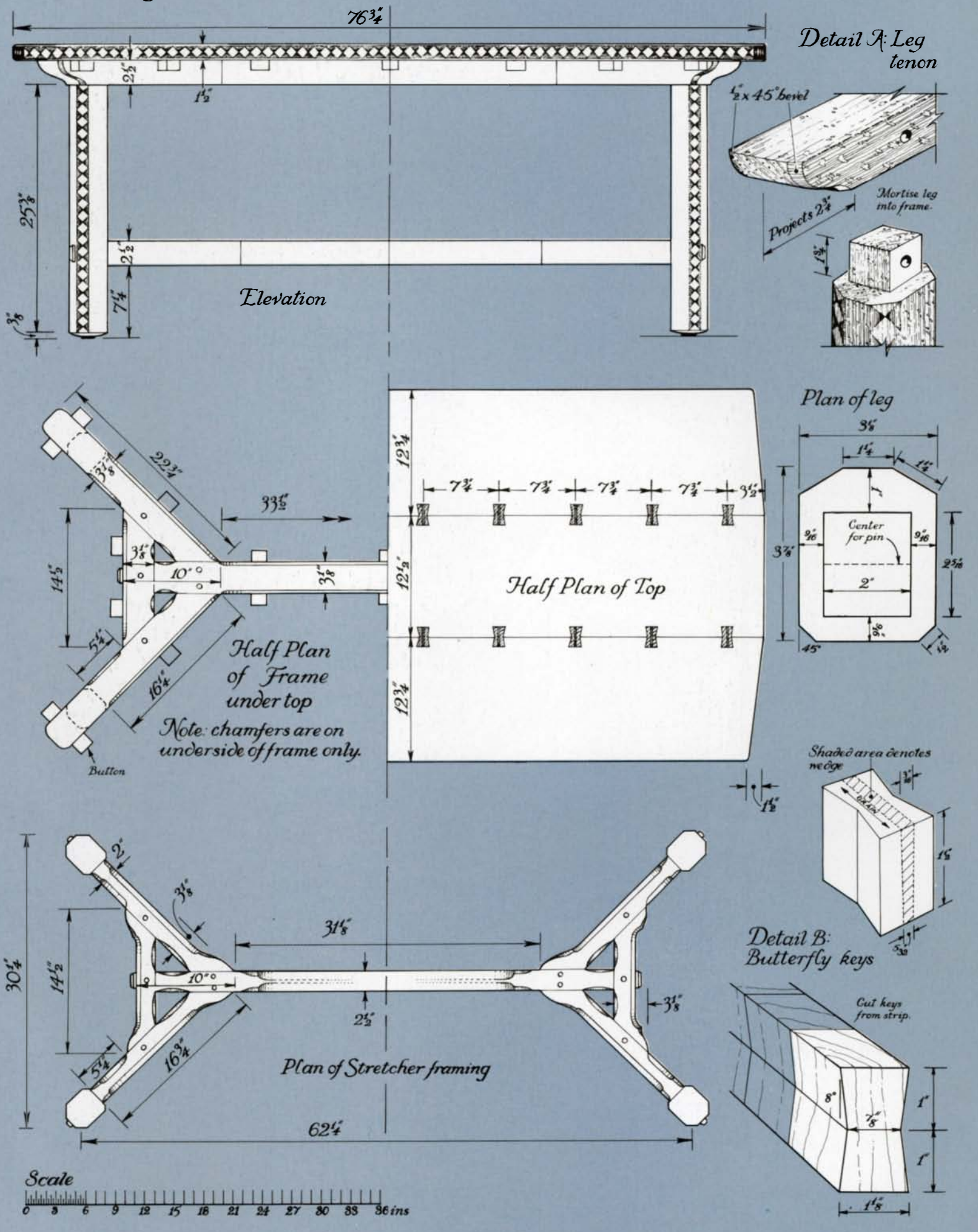
When reproducing this table, it's best to keep machining to a minimum. The parts may be cut out and surfaced by machine, but the beveling on the arrises of the top and legs and the chamfering on the stretcher and frame should be done by hand to keep the feel of the original.

Barnsley used English oak, but American red or white oak will work nicely. Three boards are edge-glued to make the top. The gluelines are reinforced with wedged butterfly keys (figure 1, detail B), also made from oak. Ideally, the boards for the top should be quartersawn for stability (for an article on quartersawing lumber, see pp. 76-77), but quartersawn oak is expensive and 1½-in. thick stock may be hard to find.

Make the butterfly keys before sawing out the sockets. Tilt the tablesaw blade 8°, and with four passes cut a 2-in. wide

Photo: Central Photographers, courtesy of Cheltenham Museum and Art Gallery

Fig. 1: Hayrake~stretcher table



Drawings by the author

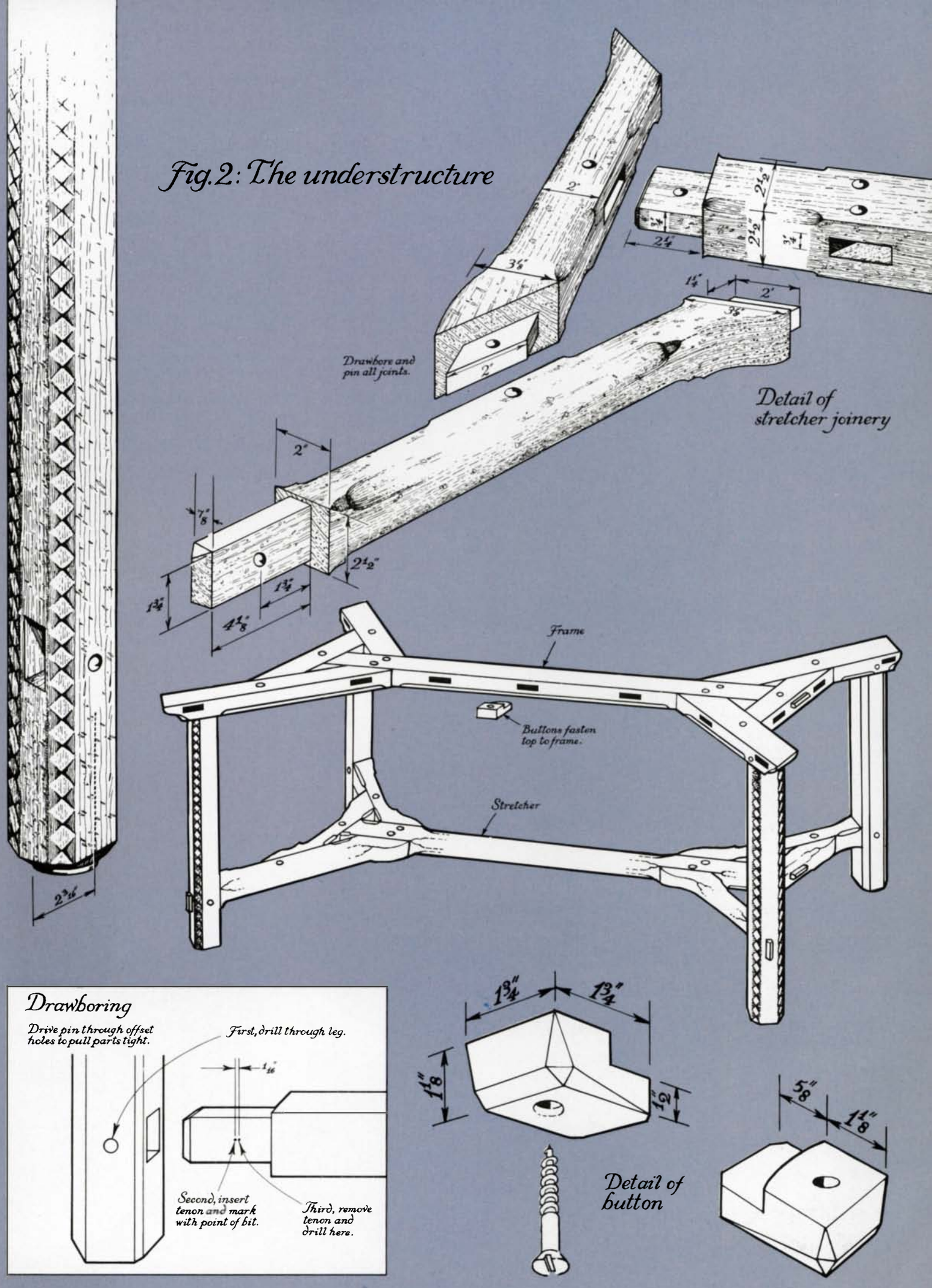


Fig. 2: The understructure

Drawboring

Drive pin through offset holes to pull parts tight.

First, drill through leg.

Second, insert tenon and mark with point of bit.

Third, remove tenon and drill here.

Detail of button

crosscut section from a wide board to the butterfly shape, then cut individual keys off the strip (see *FWW* #25, pp. 72-73). Instead of making a blind slot for the wedges, Barnsley sawed each key in half, then tapered the halves to match the wedge taper. Dry-assemble the tabletop and use each key as a template to mark out its socket. Unclamp the top and cut the sockets with a tenon saw, chiseling out the waste. The sockets go clear through the top.

Glue up the top and clamp lightly. Then glue the keys in their sockets. Insert the wedges end-grain-up and drive them home with a light tap from a mallet. When the wedges are all in place, tighten up the clamps.

Barnsley planed his tabletops by hand, and you might like to follow his example if you have energy to spare. Then angle off the ends of the top as shown in figure 1. Round off the corners with a block plane.

The dimensions and details for the hayrake stretcher are shown in figures 1 and 2. Cut the joints before shaping and rounding the parts. Barnsley used a timber-framing technique called drawboring to peg the joints. Holes for the $\frac{3}{8}$-in. oak dowels are bored slightly out of line with each other. The distance between the hole centers need not be more than $\frac{1}{16}$ in. When the pin is driven through, it draws the parts tightly together. This technique works best if the dowel is cut from green wood.

Shape the stretcher with a spokeshave and a drawknife. Use the spokeshave to start the chamfers at the corner, then continue with the drawknife. Push the spokeshave forward to create a gentle, curved lead-in to the main chamfering. The actual rounding off consists of a series of three separate chamfers. Although the stretcher appears round in cross section at its center, don't try to make a perfect circle. On the original table, the chamfered faces can still be felt by hand.

The top frame is similar to the stretcher, and the joinery is the same. There is no shaping or heavy chamfering on this assembly, but single chamfers are worked on the underside only. Chop mortises for the buttons that hold down the top. The legs are mortised into the underside of the top frame.

The chipcarving on the legs and edges of the top consists of shallow chisel cuts, as described in the box at right. Leave the work with a tool finish for a crisp, vigorous appearance.

It was impossible for me to discover what the original finish on the table was because the museum has been applying its own wax polish. The finish Barnsley used was probably a wax applied to the unfilled, unstained oak. I prefer a good-quality commercial wax polish, but you can make your own by shredding bleached beeswax and a smaller amount of carnauba wax into warm turpentine. Heat the mixture in a pan of hot water or on a radiator. Avoid open flames because the mixture is highly flammable. You've added enough wax when the mixture has a creamy consistency.

Before applying the wax, coat the wood with thinned shellac to seal the grain and prevent dirt and grime from getting into the pores. When the shellac is dry, apply the wax polish with a stiff-bristled brush. Brush in a generous amount, allow 24 hours for the turpentine to evaporate, then buff with a soft, lint-free cloth. The more you rub, the better the results will be. Apply several coats of wax at weekly intervals. □

Victor J. Taylor, an author and editor, lives in Bath, England. For more about Gimson and the Barnsleys, see FWW *#26, pp. 48-55, and* Gimson and the Barnsleys *by Mary Comino (Van Nostrand Reinhold, 1982).*

Chipping away at decoration

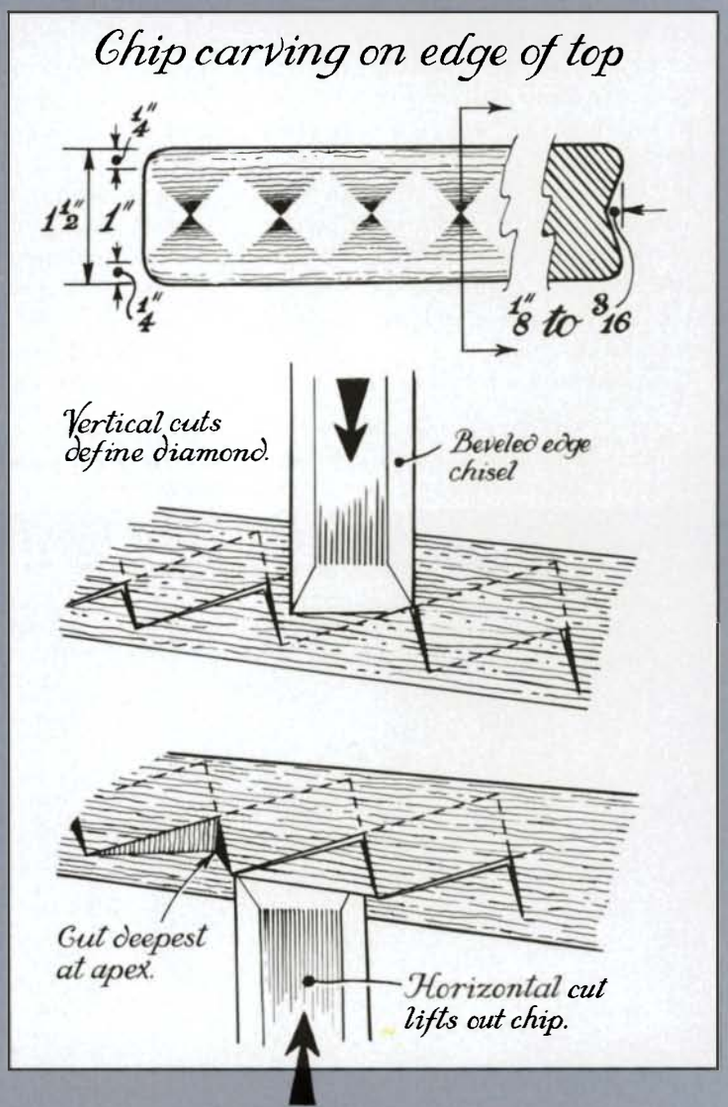
The diamond chipcarving that ornaments Sidney Barnsley's hayrake table is one of the oldest forms of carving—and one of the easiest to master. The basic component of this and most other chipcarving is a triangular depression made by three cuts.

Make the first two cuts perpendicular to the work, deepest at the apex of the triangle and sloping to nothing where they join the third side. Hold the knife blade or chisel at a shallow angle to the work for the third cut, slicing from the base of the triangle down to the apex to pop up the chip. Repeat this sequence on the opposite side, and you have a diamond. That's all there is to it (well, almost).

Accurate layout is essential. Slight variations in the size of the squares won't be too noticeable, but errors can accumulate as the pattern repeats, and soon you won't have diamonds at all, just trapezoids. Draw the patterns directly on the wood with a sharp pencil, using a compass or a steel engineers' ruler to divide the surface into equal spaces.

For crisp detail, you should make each triangle by freeing one chip with only three cuts. But for large triangles, you may need to make the third cut in several steps, each removing a small chip until you've reached full depth. Too many cuts, however, and it will look like you nibbled the wood away.

Chipcarving is a pleasant way to whittle away idle hours and have something to show for it. ***—V.J.T.***



Quartersawn Lumber

The quality's in the cutting

by Sam Talarico

A quartersawn board is special. Dimensionally stabler than a board sawn any other way, it won't cup as it dries, and as the seasons change, it won't move very much in width. This stability makes quartersawn boards ideal for drawer sides, tabletops, frame rails and stiles—wherever cross-grain movement or cupping could be a problem. Because their surfaces wear more evenly than those of plainsawn, or flatsawn, boards, quartersawn boards are often used for flooring. When quartersawn some hardwood species, such as the oaks, also reveal spectacular, shimmering flake figure scattered across the grain.

If quartersawn lumber is so attractive and well behaved, why saw any other way? Economics. Quartersawing yields fewer clear, knot-free boards than does plainsawing, and it isn't practical for small-diameter logs. For these reasons, most commercial sawmills don't do it. It's also a time-consuming and fairly wasteful way to cut up a log.

Quartersawn lumber owes both its dimensional stability and its subdued figure to the orientation of the annual rings. Figure 1 shows the difference between a plainsawn board and a quartersawn board. A plainsawn board is a tangential slice from a log. The board's face is more or less tangent to the annual rings, which form ellipses or parabolas on the surface. Theoretically, the ideal quartersawn board is a radial slice. The annual rings are perpendicular to the face, and their edges form parallel lines on the surface. (In commercial practice, any board with rings 60° to 90° to the surface is considered quartersawn.) Because wood moves roughly twice as much tangentially to the rings as it does radially (this ratio varies with the species), the plainsawn board moves more in width, the quartersawn more in thickness.

A tree's rays radiate from the heart like the spokes of a wheel. In quartersawing, the sawblade cuts roughly parallel to the rays. Severed rays show on the board's surface as the flake I described earlier, which is also called "ray fleck." In species where the rays are small, this may hardly be noticeable. Hardwood species with very large rays produce the best flake. Mahogany is good, but in Pennsylvania, where I live, white oak is the best, with red oak and sycamore close behind.

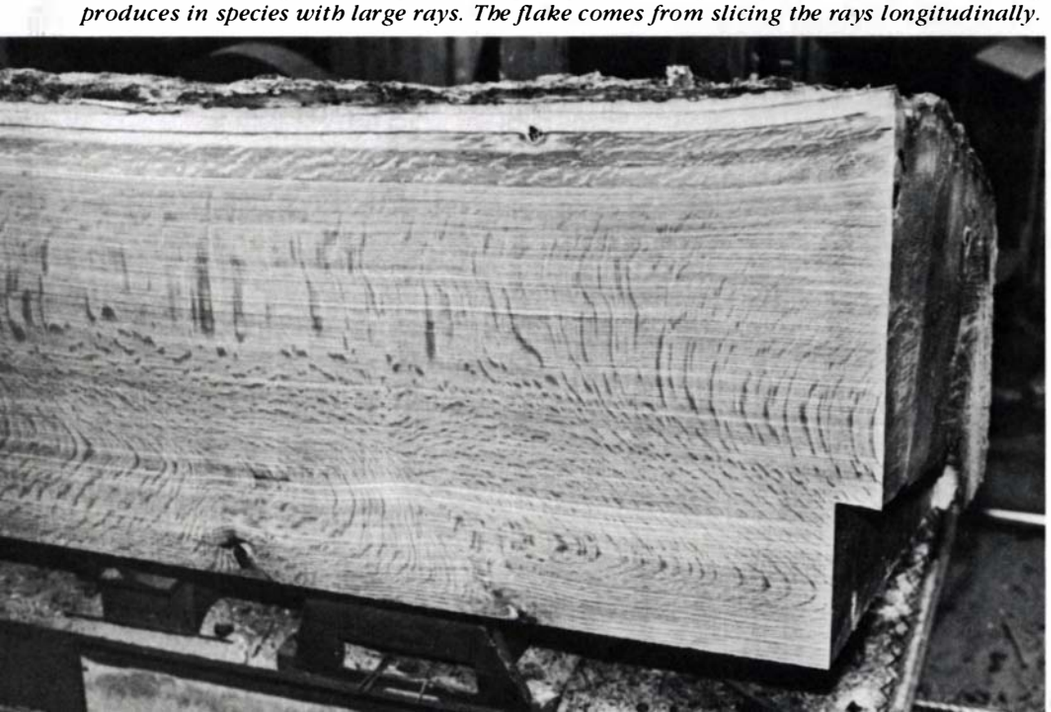
Alternative methods of quartersawing are shown in figure 2, along with the conventional method shown in figure 3. The log is first quartered, then the boards are sawn from the quarter. This method is a compromise. For each board to be the ideal—a true radial slice—the log quarter would have to be repositioned after each cut, which would be a slow and costly procedure. Boards quartersawn the conventional way are close to being true radial slices, and there's no need to turn the log after each cut. This system produces narrow boards with tapered edges, but the widest boards are the most perfectly quartered—the rings are closest to 90° to the surface.

Sawing "through and through," or flitchsawing, produces a few boards near the center of the log that contain the pith. On either side of the pith, the rings are almost 90° to the board's surface. If you rip one of these boards through the pith, you'll have two quartersawn boards. Even though they weren't sawn from a quartered log, these boards are radial slices and therefore quartersawn.

When the growth rings are cut at an angle too far off the radial, the boards are referred to as riftsawn. The rings are less than 60° but greater than 30° to the board's surface. The figure is still straight, but since the cut isn't parallel to the rays, the flake is less pronounced. Riftsawn flake is sometimes called "comb figure."

When you shop for quartersawn hardwood, don't expect to find a wide choice of species. Mostly you'll find red and white oak from about 4/4 to 8/4 in thickness. Widths of 4 in. to 6 in. are

This white-oak log shows a fine example of the cross-grain flake that quartersawing produces in species with large rays. The flake comes from slicing the rays longitudinally.



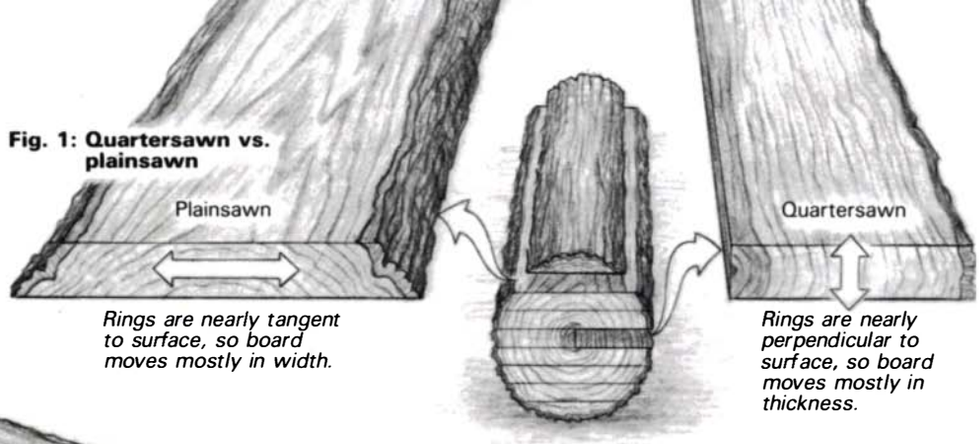


Fig. 1: Quartersawn vs. plainsawn

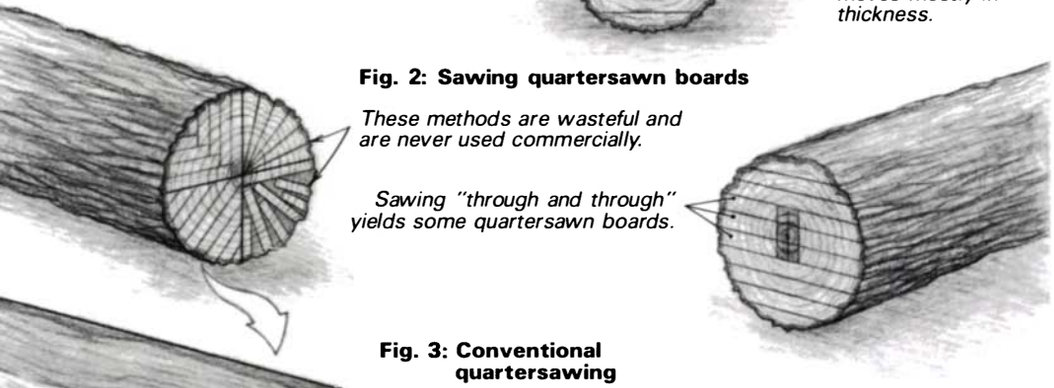


Fig. 2: Sawing quartersawn boards

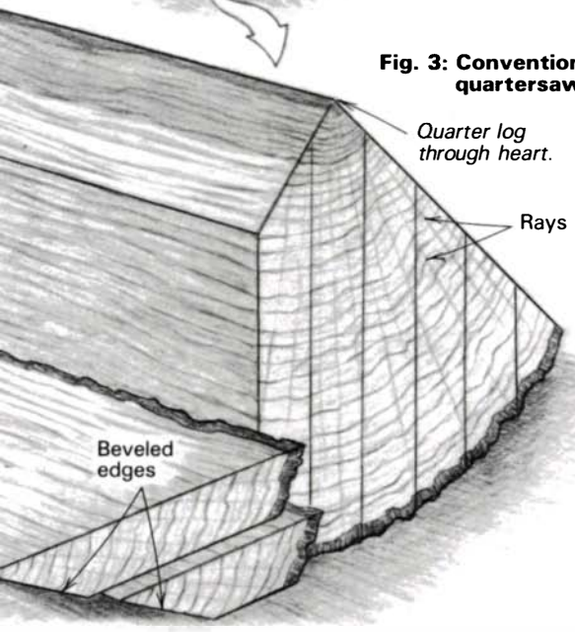


Fig. 3: Conventional quartersawing

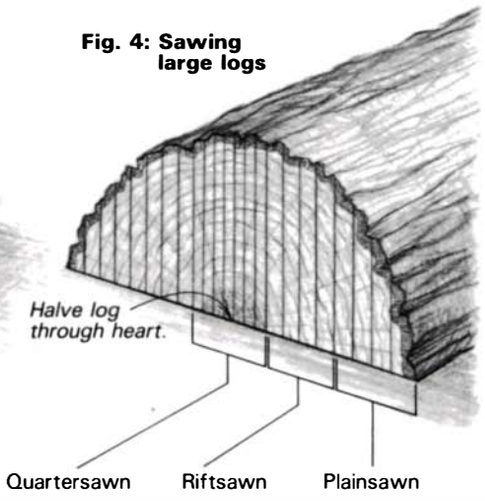
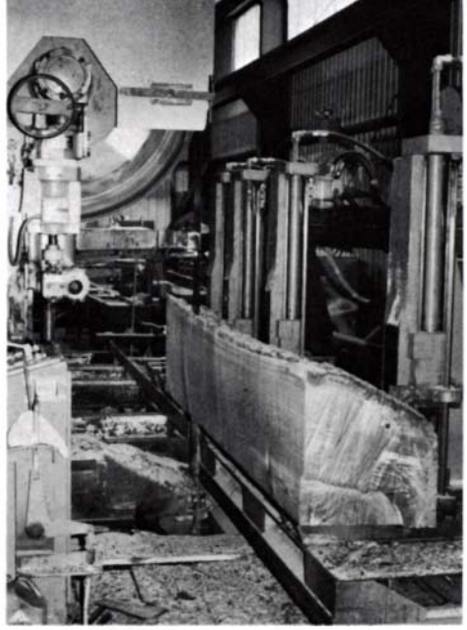


Fig. 4: Sawing large logs



A large bandmill can handle bigger logs than can a circular sawmill. Even so, the buttress of this 46-in. dia. log had to be trimmed with a chainsaw to fit.

average. You'll also find that dealers' policies vary greatly. Many hardwood dealers sell quartersawn boards for 20% to 75% more than plainsawn boards of the same species. Sometimes the highly flaked boards are sorted out and sold at a premium. On the other hand, some sellers don't even offer quartersawn as a separate grade, and won't charge extra for the quartersawn boards mixed in with the plainsawn boards. (There usually are some in any pile. Look on the end of the board for rings at 60° to 90° to the faces.) Some dealers will let you pick out the boards you want, some won't; but don't expect anyone to move a ton of lumber so you can pick out one board. In my experience, some lumberyards' quartersawn grade is a mixture of about two-thirds riftsawn boards and one-third quartersawn. Quartersawn softwoods are more standardized. Most places you can ask for "vertical-grain" or "edge-grain" Douglas fir or southern yellow pine. Expect to pay a lot more for this grade.

A few lumber businesses, like mine, specialize in quartersawn hardwood. I find that the biggest demand is for boards with lots of flake, so I saw primarily to get the best figure. I saw my best logs on the bandmill at C.F. Martin & Co. in Nazareth, Pa., shown in the photo above. The blade makes a narrow kerf, which allows me to cut thin boards without much waste. On the bandmill, I rarely quartersaw oak or sycamore thicker than 5/4—the more boards I get out of a log, the more surfaces there are to showcase the flake. When I'm using a circular mill, however, the ¼-in. to ⅜-in. kerf of the blade turns a lot of potential boards into sawdust. So instead of wasting all that wood sawing thin boards, I saw thick boards and resaw them later on a bandsaw to expose the flake.

If you want to have your own logs quartersawn at a local sawmill, there are a few things to consider before you talk to the sawyer. Sawyers at small mills may not be familiar with quartersawing, so be prepared to explain what you want. Quartersawing small logs produces very narrow boards, so I recommend cutting only butt logs (from the bottom of the tree) with a minimum small-end diameter of 20 in. Butt logs contain the highest-quality boards and yield the best flake. Very large logs are unwieldy, though, and most sawmills aren't able to cut them. If I have a log that's too large for the mill, I rip it into manageable halves with a chainsaw, then saw it as in figure 4. Technically, this is not quartersawing, but like the "through and through" sawing method in figure 2, it produces quite a few quartersawn boards in addition to riftsawn and plainsawn boards. It saves the time (and expense) involved in quartering a very large log. When halving or quartering a log, always locate the heart on both ends, snap a line, then rip through the center of the heart.

Quartersawn lumber takes longer to dry than does plainsawn. Because of the orientation of the rings, moisture is released from the edges rather than from the face of the board. Before drying, I number the boards in the order in which they came off the log. This enables me to bookmatch boards to make a wider panel.

Because quartersawn lumber is more expensive, some people might consider it a luxury. True, you wouldn't buy it for building sawhorses. But, like a good wine, it's well worth the price for a special occasion. □

Sam Talarico is a lumber dealer, woodworker and winemaker in Mohnton, Pa. Photos by the author.

Drawing: Lee Hov

Turning Music Boxes

Try a different movement on your lathe

by James A. Jacobson

One of the dilemmas of the turner's craft is the persistent question: What is it for? Over the years, I'd turned innumerable round things, including dozens of boxes and containers, but most of these objects just stood around doing nothing, with no real purpose or function. The question began to nag at me. Then one day I turned a little box and fitted a music movement inside. When the tune began to play, that was answer enough for me.

I've since worked out a variety of shapes and sizes for turned musical boxes. These experiments proved so satisfying that they led me to write a book: *Woodturning Music Boxes.* In this article I'll show you the basics, including how a music movement works (see p. 80), and I'll give a list of suppliers. I'll tell you about my favorite woods, skim over the tools I like, and share some of the turning tips I've picked up. I'll also discuss a shop-made chuck that I find invaluable. Other turners, no doubt, will see ways to apply their own tricks.

Wood—It is my good fortune to live in an area of the Midwest that is endowed not only with hardwood forests, but also with numerous small sawmills, where some of the best wood for turning is almost free for the asking—those pieces that others would consider worthless. I like chaotic and unpredictable grain—sawmill cutoffs from logs, burls and spalted wood.

Some woods transmit musical vibrations better than others, amplifying the sound. Yet in my experience, any wood will make a decent music box. Oak and mahogany, for instance, are said to be poor choices, but when they are turned thin enough, I've found that they work fine. I highly recommend walnut, cherry, hard maple and Osage-orange, but other woods are worth experimenting with, too. Try whatever is in your woodpile—the turned pieces I enjoy the most are from wood that I found, lugged home, and nursed to readiness myself.

In addition to native woods, I've turned music boxes from bocote, padauk and bubinga, though mostly I use these as accent woods for designs on lids, and for decorative plugs: if I have a nice turning block that's flawed, I drill out the flaw and insert a contrasting plug before I turn the piece. Another ornamental, wood-saving trick for a block with one or two major checks is to bandsaw along the check line and glue the block back together with a contrasting piece of veneer between the two pieces.

When working out a new design, I often turn a few prototypes from glued-up construction-grade 2x4s or #3 lumber.

Tools—I prefer scraping tools because they allow me to make very light and precise cuts. This is especially important when turning the soundboard of a music box, the part to which the music movement is attached. The soundboard should be both thin and flat. That way, it not only transmits the music to the air, but also transmits the vibrations to the sides of the turning, for more volume. Musical vibrations will also travel down the sides of a box to the surface beneath. A wooden tabletop, for instance, will amplify the sound.

For rough-turning, especially on larger blocks, I use a 1-in. roundnose scraper, pointed slightly downward. I sharpen it on a 6-in. by 48-in. belt sander with a 100- or 120-grit belt. You don't need a razor edge on a scraping tool. In fact, the edge will cut better if it has a slight burr. To prevent ruining the entire belt, which is used for other things, too, I restrict the sharpening area to a narrow strip along one edge. On smaller jobs, and for lids and insides, I usually begin with a ½-in. roundnose.

I sharpen square and skewed scrapers, which make the finishing cuts, on a regular shop grinder. For the outsides of music boxes, an extra-heavy skewed or squarenose scraper, ⅜ in. thick and 1½ in. wide, is a good tool. I like a long, heavy handle, and often make my own either from hickory or from hackberry. Hackberry, because of its interlocking grain pattern and surface texture, is a non-slip wood and very secure in the hand.

Once in a while I cut rather than scrape, using a long-and-strong ⅜-in. deep gouge. But on the kind of wood I prefer, scraping tools have advantages. A scraper is less likely to tear out unruly grain, and is ideal for truing the walls and soundboard. In addition, a scraper can very cleanly square up the narrow shoulders necessary for lids and for glass inserts.

The glass insert is a clear cover that allows you to watch the movement working yet keeps it clean. I cut my own glass inserts with a circle glass cutter, then smooth the sharp edges on the belt sander. If you'd like an insert but don't want to go to the trouble of cutting your own, you can probably find a replacement flashlight lens near enough to size to do the job. Good hardware stores usually carry them, although these days they're likely to be plastic instead of glass. No matter.

The chuck—When turning a large box, it's best to screw the blank securely to a faceplate, the way you would begin turning any heavy piece of wood. If you want to avoid screw holes in the bottom of the box, use the familiar method of gluing a piece of paper between the block and a wooden faceplate, so that the

Tunesome containers can be made of everything from Osage-orange firewood to choice padauk. The tallest music box in the photo on the facing page is 10½ in. high. The small ones, with single-tune movements, readily sell at crafts fairs for about $25.

How a music movement works

Cylinder music movements were developed by Swiss horologists (watch/clock makers) early in the 19th century. Though designers have evolved some exceedingly complex—and expensive—mechanisms, the basic principles of a music movement are easily understood (figure 1).

Each tooth on a metal comb, when plucked, vibrates and produces a musical note. The teeth are plucked by metal pins on a revolving cylinder, and the arrangement of the pins and tuning of the comb determine the tune. The cylinder is powered by a wound spring, and its speed is regulated by the air resistance of a rapidly whirling, lightweight governor called a butterfly.

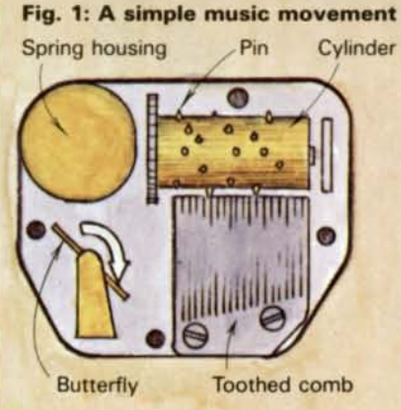
In some movements, the on/off switch is merely a wire, called a stopper, that pivots into the path of the butterfly (figure 2A). This makes it simple to adapt most movements to various switches. Wires can be linked to run up through the side of the box to the lid, so the box plays when it is opened and stops when it is closed. Similarly, the stopper can run through the bottom, so the box begins to play when it is picked up. Instead of a wire, I sometimes run a small dowel through the side of the box. My usual stopper consists of a sliding cylindrical weight on a horizontal rod (figure 2B). When you tilt the box to the side, the weight slides free of the butterfly. Tilting the box the other way stops the butterfly.

Some simple movements are made without stoppers—they play until they run down—and some are cranked by hand. A slightly more complicated type of movement plays more than one tune, and usually has a built-in index stop that turns the movement off when each tune is finished (figure 3). These movements are actuated by a sliding switch, and have one clear advantage—the music begins at the start of the tune, not somewhere in the middle. Otherwise, the basic principles remain the same.

Sources: I primarily use Reuge Swiss movements, and these are readily available by mail order. Reuge catalogs its movements according to the number of teeth (the number of notes in the comb) and the number of tunes the movement will play. Reuge's 1.18 movement has 18 teeth and plays one tune. Their 2.36 has 36 teeth—allowing greater range from treble to bass—and plays two tunes. The 1.18 movement will play nearly 3½ minutes on a single winding.

Each movement type is available in a variety of melodies, and many familiar woodworking catalogs (Woodcraft and Constantine's, among others) contain a page of musical movements. In addition to the basic movements that most places sell, you can buy battery-powered movements, miniature movements, and movements with interchangeable cylinders. For the out-of-the-ordinary, try Craft Products Music Boxes, Dept. 95, 2200 Dean St., St. Charles, Ill. 60174; Klockit, Box 629, Lake Geneva, Wis. 53147; Mason & Sullivan, 586 Higgins Crowell Rd., West Yarmouth, Mass. 02673; and World of Music Boxes, 412 Main St., Avon, N.J. 07717. This last source will even make custom movements to play the tune of your choice. There's an organization for aficionados, too: The Musical Box Society International, Box 205, Rt. 3, Morgantown, Ind. 46160. —*J.A.J.*

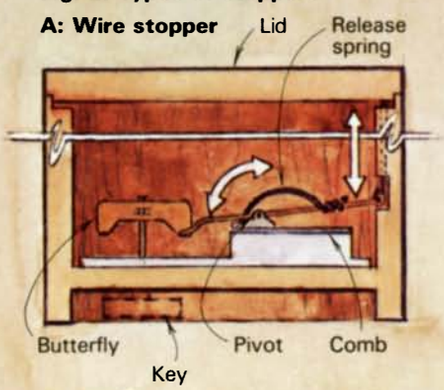
Fig. 1: A simple music movement



The schematic music movement above shows the general principles: A spring turns the large gear on the cylinder, whose pins pluck the teeth on the comb to produce the tune. Speed is regulated by a whirling governor (called a butterfly) powered off the main gear by a gear train (omitted for clarity).

Fig. 2: Types of stoppers

A: Wire stopper



B: Sliding-weight stopper

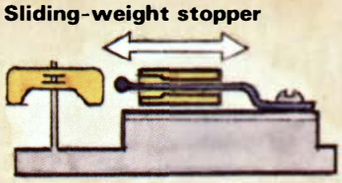
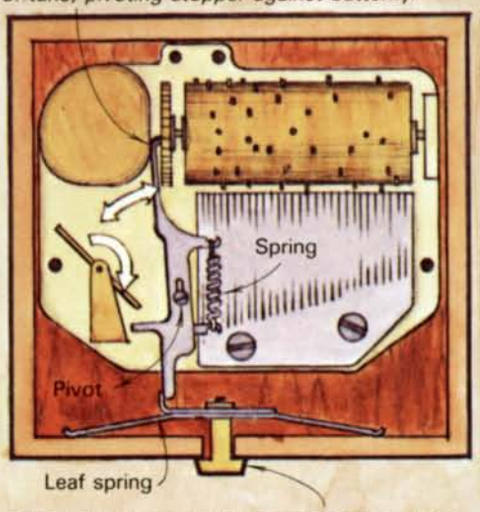


Fig. 3: Automatic shutoff

Cam drops into hole in face of gear at end of tune, pivoting stopper against butterfly.



Switch slides in groove to disengage stopper.

Drawings: Ben Thompson

block can be split off later. I bandsaw all blocks round before mounting them. When you have finished as much as you can with the blank on the faceplate, you'll have to reverse the blank so that you can turn a recess in the bottom for the music movement's winding key (and to thin out the soundboard). I've developed a screw-center chuck, shown in the drawing, that holds the box in this position. When trying the chuck, you may find that the center screw doesn't run quite true. It will seem to wobble as the lathe turns. A few gentle taps with a hammer or a wooden block, with the lathe turning, will usually put it right.

Dimensions—The dimensions of a turned music box depend on the size of the music movement. The simple box in the drawing shows the important size considerations, the turning process and some finishing touches. Other ideas can be seen in the photograph on p. 79 and are mostly self-explanatory. All you need to ensure accuracy while turning are some simple measuring tools. Inside and outside calipers and a child's compass are enough, but I like a vernier caliper as well—I usually work in millimeters, because the music movements I use are metric. In addition, I have a gauge for estimating the rounded size of a rough, irregular blank. The gauge is merely a sheet of stiff plastic with concentric circles scribed around a center hole. I position the gauge against the end of the wood, center the largest circle I can, then mark the center through the hole.

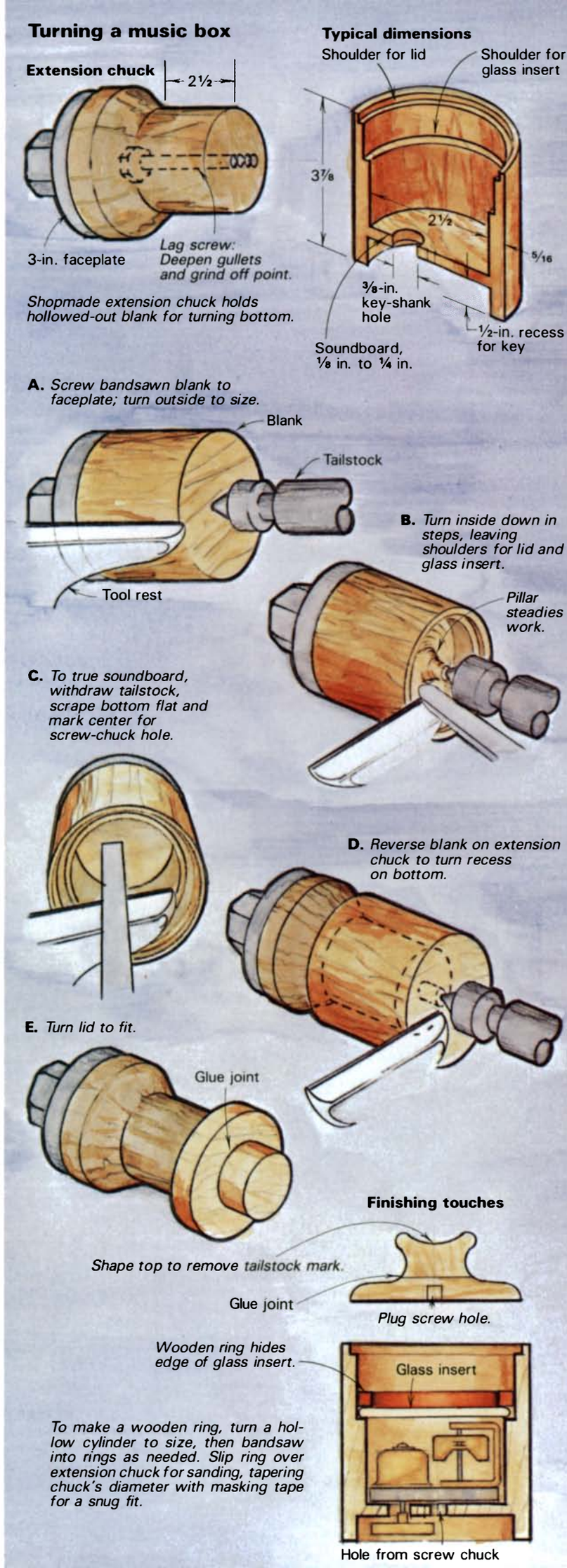
Sanding and finishing—For protection, I wear a suede glove on my left hand most of the time when I'm turning, and both gloves when sanding. I back up the sandpaper with pieces of ¼-in. foam carpet padding. These are flexible enough to follow contours smoothly, and they absorb most of the friction heat that would otherwise burn the wood. I begin with 100-grit garnet paper, except on very rough wood, where I use 60-grit. If the paper won't cut the wood fibers with the lathe turning in the usual direction, I reverse the lathe motor for a while, taking care that the faceplate doesn't start to unscrew. Next I sand with 150-grit, followed by 220- or 240-grit. It usually isn't necessary to sand the recess where the movement will be.

For a high polish, I dry-sand with 280- or 320-grit wet-or-dry paper (silicon carbide), followed by 600-grit and a final polish with 0000 steel wool.

I've done my share of shellac-polishing on the lathe, but I have a few reasons for not doing music boxes that way. First, you can't finish the entire piece at one time, because the faceplate or chuck gets in the way. Second, lathe-finishing ties up faceplates and chucks, and on occasion the lathe itself. Third, you sometimes must finish a piece as soon as you've turned it (when remounting it might cause it to go out of balance). I'd rather finish a few pieces at a time, off the lathe, at leisure.

First I apply Watco oil, sanding lightly with the grain with 600-grit wet-or-dry paper to remove the last whiskers of wood. The oil brings out the natural beauty of the wood—I never use stain. When this first coat is dry, I go on in one of two ways: I either apply two or more additional coats of Watco, or brush on a few coats of Deft lacquer, steel-wooling between coats to an even luster. In either case, a coat of paste wax, buffed or rubbed, is a good way to maintain the finish. □

James A. Jacobson, who turns wood in Collinsville, Ill., is currently working on a second book, Crafting Music Boxes. Woodturning Music Boxes *is available from Sterling Publishing Co., Two Park Ave., New York, N.Y. 10016.*



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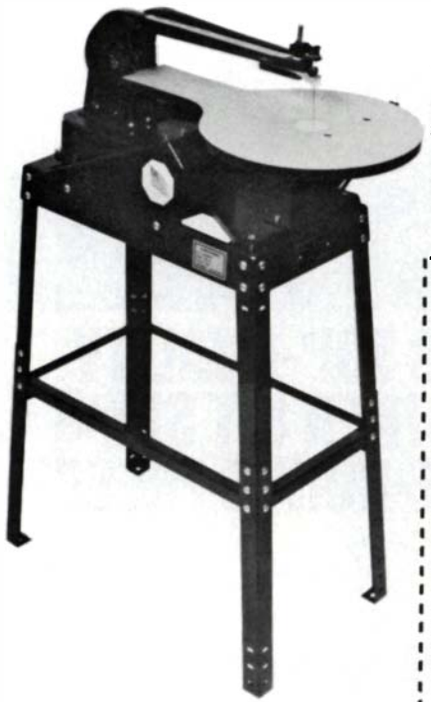

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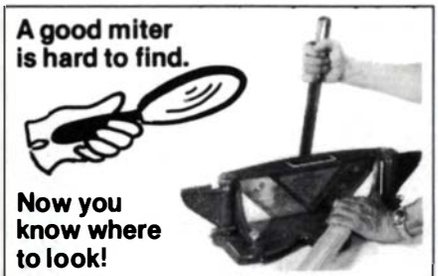

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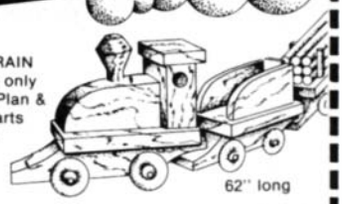

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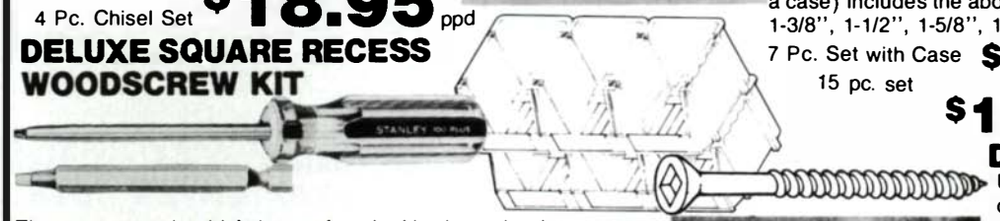

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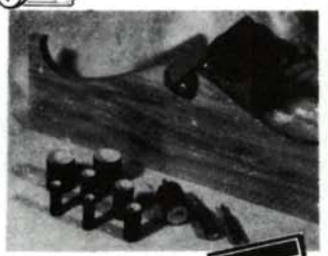

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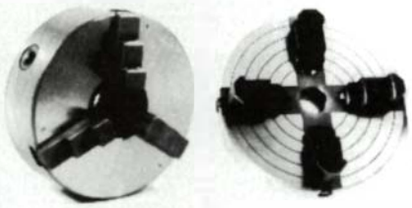

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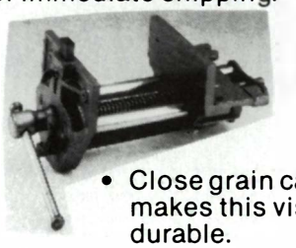

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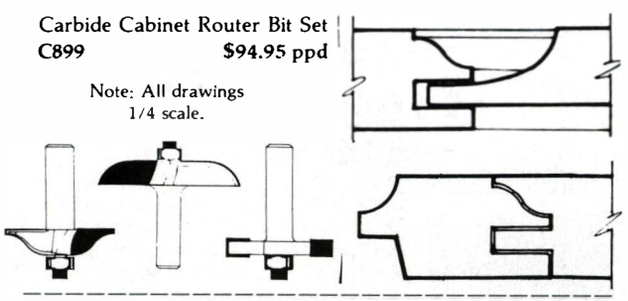

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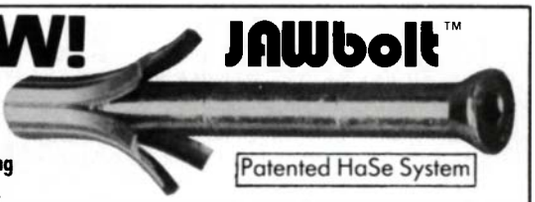

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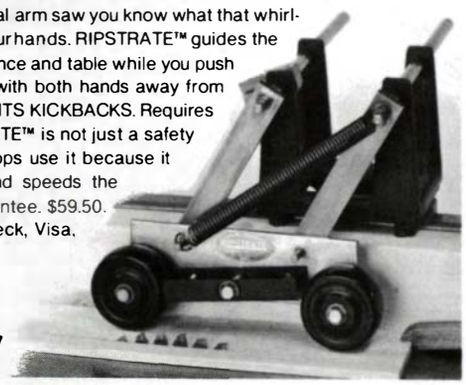

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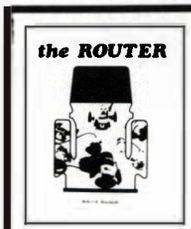

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B7200A	4x24 Belt Sander	167.90
D1010	3/8" Var. Sp. Drill	89.50
D1015A	3/8" Screwdriver/ Drill	111.95
D1310	½" Drill	89.95
D1320R	2 Sp. ½" Rev. Drill	99.95
E3700A	Drywall Screwdriver	77.95
JS-60	Jig Saw	99.95
JSE-60	Electronic Jigsaw	125.90
L-120U	3-5/8" Planer	81.25
L-1323 ALS	3¼" Planer	129.95
LS-35	Finishing Sander	46.95
L-580	6-1/8" Planer	189.00
R-150	1 H.P. Plunge Router	88.00
R-330	2 H.P. Router	139.70
R-500	3 H.P. Plunge Router	165.00
RA-2500	10" Radial Saw	449.95
S500A	3x5½ Finishing Sander	43.95
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TR-30	Laminate Trimmer	78.95
TS-251U	10" Miter Saw	189.95
TS-251U	w/accessories	199.95
W630	7¼" circular Saw	99.50
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0375-1	3/8" Rev. Angle Drill	139.75
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5397	Hammer Drill Kit	177.50
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5680	2 HP Router	224.95
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6145	4½" Angle Grinder	107.50
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6749-1	Magnum Screwdriver	123.50
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LU82M12	12"	72	Cut-Off	85.95
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DS306	6"		Dado	98.95
DS308	8"		Dado	119.50

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		50	1.07 ea	.94 ea
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		80	1.22 ea	.97 ea
		60	1.26 ea	1.12 ea
		50	1.31 ea	1.15 ea
		40	1.34 ea	1.18 ea
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		80	1.73 ea	1.51 ea
		60	1.78 ea	1.64 ea
		50	1.85 ea	1.70 ea
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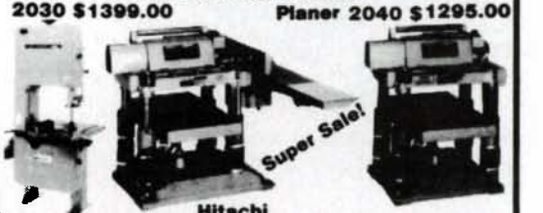

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3030 7¼" Circ.	155.00	119.95	10.00	109.95
3051 7¼" Wormdrive	232.00	158.25	20.00	138.25
3103 Cut Saw	163.00	99.95	10.00	89.95
3105 Cut Saw	170.00	109.50	10.00	99.50
3107 Cut Saw	183.00	119.50	10.00	109.50
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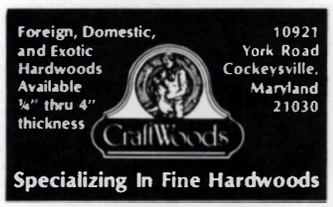

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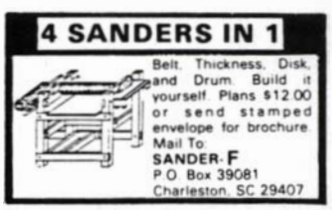
ZUCKERMANN HARPSICHORD/CLAVICHORD kits. Uncompromisingly fine instruments from $445. Brochure, $1. 2305 Miller Ct., Lakewood, CO 80215.

Plans & Kits

PLANLIST classifies hundreds of woodworking plans from many sources. $1. Meade, 4201F West Diana, Phoenix, AZ 85021.

BUILD QUALITY CASKETS: adult/infant. Step-by-step plans. Send $18.95 to Kit Masters, Box 698, Wendell, ID 83355.

ROLLTOP ROLL KITS: oak kits complete, pre-drilled, ready for assembly. Tambour thickness: 7/16 in. Lengths, 47¼ in. w by 27½ in. h, $95; 53¼ in. w by 29 in. h, $100; 59¼ in. w by 29 in. h, $105. Shipped promptly UPS, COD, F.O.B. Free sample. Bob Clair, Box 1008, Folly Beach, SC 29439. (803) 588-9261, 588-9605.



Toy Plans/Kits

MAKE WOODEN TOYS—projects. 100's of plans, kits, hardwood parts (toy, craft, furniture). Catalog, $1. Cherry Tree Toys, Belmont, OH 43718.

Catalog of unique WOODEN TOY PATTERNS. $1, refundable. Playrite, Rt. 8, Box 343F, Moultrie, GA 31768.

Tools

SILVO Hardware, 188-page Hand & Power Tool Catalog, $1. Dept FW-4-10, 2205 Richmond St., Philadelphia, PA 19125.

CHICAGO—INCA tools sold and demonstrated in full-time woodworker's own shop. Northside Chicago. Omega Workshops. 472-4333.

MARYLAND'S AUTHORIZED INCA/HEGNER DEALER. All tools in stock and displayed. Demonstrations available at all times. We inventory 8,000 sq. ft. of fine hardwoods and woodworking tools and supplies. Call today: Craftwoods, 10921 York Rd., Cockeysville, MD 21030. (301) 667-9663.

CARBIDE SAWBLADES. Tsumura Custom Track are the thinnest, easiest-cutting carbide blades available in the U.S. 7¼ in. to 16 in. $14.50 to $88.00. Call or write The Beall Tool Co. for catalog. 541 Swans Rd. N.E., Newark, OH 43055.

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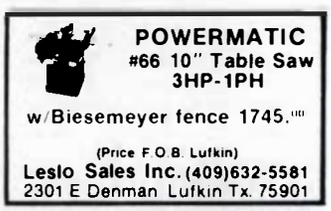
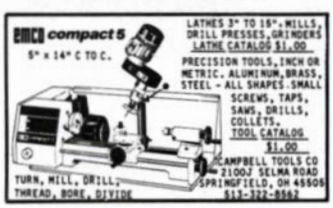
SHOPSMITH owners: ¼-in. router bit holder designed especially for you. BWT, 2413 Driftwood Dr., Wilmington, DE 19810.

Quality and best price. STETON-GRIGGIO-MABO-MARBA-others. Brochure, $2. Henry Wiegand Corporation, Clarmont, NH 03743.





TOOLS—ANTIQUE & USED. Stanley. Send SASE and 25¢ for current list. Bob Kaune, 511 W. 11th, Port Angeles, WA 98362. (206) 452-2292.

RESTORED MACHINERY—Finest woodworking machines ever made. Oliver, Yates, Northfield. Bandsaws, tablesaws, wood lathes, etc. Puget Sound Machinery. (206) 627-0802.

Progress Machine Co. has the finest BELT SANDERS in North America. PMC-150 edge sander, 3PH, $1,250; 1PH, $1,450. PMC-158-5-4' stroke sander, 3PH or 1PH, $1,875. P-12-60 disc and belt sander, 3PH or 1PH, $1,275. For information on ordering and free literature, phone or write PROGRESS MACHINE CO., 729 Finley Ave., Ajax, Ont. L1S 3T1. (416) 686-3305.

SAMCO, Model T1 12-in. wood lathe with 40-in. centers. 1HP, 1PH, 5-speed, with floor stand, $1,200. Carpenters Machinery has one of the largest inventories of new and used industrial woodworking machinery in the country. Over 100,000 sq. ft. inventory. Carpenters Machinery Co., Inc., 212 N. 11th St., Philadelphia, PA 19107. (215) 922-7034. 365 W. Cottage Pl., York, PA 17403. (717) 843-2101.

QUALITY WOOD LATHES (45 in. to 96 in. between centers). Duplicators, Rockwell drill presses. Harold Barker, 8108 Klingler Rd., Ada, OH 45810. (419) 634-7328.

USED AND ANTIQUE TOOLS, English tools. Current list dollar bill, Bristol Design, 14 Perry Rd., Bristol, England. Tel. (0272) 291740.

KEO SAW WORKS, INC. Your Iowa source for quality machinery, blades, tools and accessories. See us for your Powermatic machinery needs. Ask for our sale flyer. 1731 E. Guthrie, Des Moines, IA 50316. (515) 265-5269.

JAPANESE WOODWORKING TOOLS SINCE 1888. Free catalog. Tashiro's (3rd & Yesler), 119 Prefontaine Pl., Seattle, WA 98104. (206) 622-8452.

BANDSAW BLADES, any size. Save 20-30%. European wood and metal working machinery. Free information. Suffolk Machinery, Suite 14, 16 Shore Rd., Patchoque, NY 11772.

PRECISION WOODWORKING MACHINES. Authorized dealer for Inca, Hegner, Nobex, Lignomat, Virutex, Sand-Rite. Call, write or stop in for information or demonstrations. Rt. 7A, PO Box 603, Manchester Village, VT 05254. (802) 362-1985.

GENERAL, EXCALIBUR woodworking machinery. Catalog, $3, refundable. John Gorrell Woodworking, 7188 Whitfield Dr., Riverdale, GA 30296.

Wood

HARDWOOD PLYWOODS. Ash, Baltic birch, red, white or natural birch, cherry, mahogany, maple, knotty pine, red oak, white oak, walnut, teak. All items ¼ in. and ¾ in. thickness. Sheet sizes 4x8, 2x8, 4x4, 2x4 or precision cut (1/16 in. tolerance) to any size, paying for what you order. Edging for all species in hardwood veneer strips or hardwood molding ⅜ in. by ¾ in. Sheets of hardwood veneer with polyester backing. Wholesale quantity discounts. Call (617) 666-1340 for quotations. Shipping in USA via UPS or a common carrier. Boulter Plywood, 24 Broadway, Somerville, MA 02145.

EXOTICS. Lumber and logs. Blackwood, bocote, lignum, kingwood, tulipwood, Brazilian rosewood, pink ivory, C. ebony, M. ebony, cocobolo, ironwood, quilted maple, lilac burls, other odd species. SASE for list. SJW, 650 St. John, Pasadena, CA 91105. (213) 441-1067.

HONDURAS ROSEWOOD shorts, rosewood, granadillo, Ziricote squares, bird's-eye maple shorts. Send $1 for list. Black Mountain Wood Co., PO Box 3525, Portland, ME 04104. (207) 772-3332.

COCOBOLO, bocote from $6.50/rbm. Lignum vitae from $2.50 lb. A & C Hutt Enterprises Ltd., 15861 32nd Ave., Surrey, B.C. V4B 4Z5.

IRONWOOD/MESQUITE—Turning blocks, mesquite veneer. Treeline Hardwoods, 807 S. 3rd Ave., Tucson, AZ 85701. (602) 624-6828.

Rare wood buying COOPERATIVE. A practical approach to buying quality exotic woods in small quantities at discount prices. For the craftsman/hobbyist/cabinetmaker/instrument maker. SASE. Jim Heusinger, 125 Jacqueline Dr., Berea, OH 44017.

BRIARWOOD, MOUTHPIECES. Special tools, finishing materials. Book: *Pipe Crafting.* PIMO W94, Box 482, Skokie, IL 60077.

COCOBOLO LUMBER, blocks and squares. Lignum and bocote. AD, all defect-free. Wholesale/retail. Tropical Timber Corp., 3125 VanWater, Portland, OR 97222. (503) 654-5349.

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MAPLE WHEELS. 1-in., $4.25; 1½-in., $6.50; 2-in., $14.25; 2½-in., $23.50, all per 100. Oak gallery spindles, 2-in., $9 per 50. Add $3.75 S&H. K&K Woodcrafters, RD 4 Box 270AFW, Scotia, NY 12302.

WOOD & TOOL EXCHANGE

Limited to use by individuals only

For Sale

KD walnut $2.50, cherry $2.25, oak $2.25, cedar $1.75. S. Isenhour, 3830 Overview, Clemmons, NC 27012. (919) 766-9032. After 6 pm.

American Saw Co. tilt arbor tablesaw, 5HP, 3PH, direct motor drive, 1-in. arbor, sliding table 47 in. by 60 in. Restored. $1,995 or best offer. C. Bierlein, Box 81, Spring Mills, PA 16875. (814) 422-8844.

Burls, spalted wood, lg. F.F. slabs, walnut, cherry, myrtle, H. locust, R. olive, Osage-or, etc. Sidney Ward, 3904 N. Mozart, Chicago, IL 60618. (312) 463-4763.

Sliding table attachment for Rockwell 12/14 saw, $450. Powermatic 6-in. deluxe jointer with stand, $650. 4207 Menlo Dr., Baltimore, MD 21215. (401) 358-1961.

Minilo Top Jnr. Was $500, now $395. Biesemeyer 50-in. T-Sq. tablesaw fence. Was $300, now $225. All new in boxes. Mike, (312) 991-0790 days; 991-1375, eves.

Stanley 55s: Good cond., all cutters and parts, $375. Near mint, $475. Call (812) 867-6219 eves., weekends.

7-ft. swing faceplate lathe, 33-in. by 12-ft. patternmaker's lather, Oliver 30-in. jointer, Crescent 36-in. tilting ship's bandsaw. Thom, (207) 946-7276 eves. Maine.

Upright mortiser, 4-ft. steam box, steam bender. Niel Wright, 28 Liberty St., Camden, NY 13316. (315) 245-1434.

A quantity of Santo Domingo mahogany. Samuel J. Adams, 40 Francis Lane, Greenwich, CT 06830. (203) 531-6025.

Hand cabinetmaking tools. Molding planes, Stanley's, chisels, etc. Quality list, $8/yr. 8219 Old Petersburg Rd., Evansville, IN 47711.

Carnauba wax #1 prime yellow. Flakes, $6.75/lb.; 1-lb. cakes, $8.25/lb. Add $1.75 for postage. Write: Walter Ambrosch, PO Box 3204, Ridgewood, NY 11386.

Wanted to Buy

Quartersawn radial cut cherry KD. Must be flat, straight, clear. No defects; select, premium in all respects. For details, Phillips, Box 1281, Midland, MI 48640.

Wanted for Baxter Whitney tablesaw: rack-and-pinion tabletop production fence, 18 in. between pins. C. Bierlein, Box 81, Spring Mills, PA 16875. (814) 422-8844.

Old 2, 3, 4-sided molder. C. Bair, 221 W. Franklin, Troy, OH 45373. (513) 335-2904.

Heavy woodbending equipment. Steamer and forms for wheelrims. (416) 643-2575 eves.

10-in. tablesaw, i.e. Rockwell Unisaw or Inca. Good condition, fair price. (619) 437-8311.

DeCristoforo's *Complete Book of Power Tools*. Liberal price paid. Dain, Box 454, Amagansett, NY 11930.

Listings are free, but restricted to happenings of direct interest to woodworkers. Our Nov./Dec. issue will list events between Oct. 15 and Jan. 15; deadline Sept. 15. Our Jan./Feb. issue will list events between Dec. 15 and Mar. 15; deadline Nov. 15.

ARIZONA: **Fair**—1984 State Fair, Oct. 19–Nov. 4, handicraft competition (16 and under). Contact Sherry Pew, Arizona State Fair, Box 6715, 1826 W. McDowell Rd., Phoenix, 85005. (602) 252-6771.

CALIFORNIA: **Exhibit**—Woodworker West, Aug. 17–19. Civic Ctr., Santa Monica. Contact Craft Market America, (914) 469-2249.
Exhibition/competition—California State Fair, Aug. 17–Sept. 3, Sacramento. Contact (916) 924-2015.
Contest—Carving, whittling, Sept. 9. Carnegie Park, 4th St., Livermore. Contact (415) 447-3186.
Show—4th Annual Western States Invit., Aug. 18–Sept. 30. Gallery Fair, Mendocino, 95460. (707) 937-5121.
Workshops—Circular and band saws, Sept. 10–14. Contact (415) 231-9404. Lumber drying, Sept. 24–28. Contact (415) 231-9582. U. of Cal. Forest Products Lab, 47th & Hoffman, Richmond, 94804.
Demonstrations/workshops/seminars—Various. The Cutting Edge, 7626 Miramar Rd., San Diego, 92126, (619) 695-3990; and 3871 Grand View Blvd., Los Angeles, 90066, (213) 390-9723.
Workshop/seminar—Tools and tech., Aug. 6–Sept. 1; James Krenov, Sept. 7–8. College of the Redwoods, 440 Alger St., Ft. Bragg, 95437. (707) 964-7056.
Show—Woodworking, Sept. 28–30. Orange County Fairgrounds, Bldg. #10, Costa Mesa. Contact Patricia Dillon, (213) 477-8521.
Fair—Furniture, housewares, toys. Wholesale, Sept. 19–20; retail, Sept. 21–23. Showplace Sq./Trade Show Ctr., 7th & Brannan, San Francisco. Contact (914) 255-0039.
Show—1985 ACC Craftfair, May 15–19, San Francisco. Application and slide deadline Oct. 15, 1984. SASE to A.C.E., Box 10, New Paltz, N.Y. 12561. (914) 255-0039.
Workshops—Various, Sept.–Oct. Hands On Wood, 2621 Sutter St., San Francisco, 94115. (415) 567-2205.

COLORADO: **Juried exhibition**—Colorado Artist-Craftsmen, Nov. 30–Dec. 23, Arvada (Colo. residents only). Slide deadline Sept. 15. Contact Box 4382, Denver, 80204.

Juried show—National crafts, Aug. 24–26. Denver Art Museum, 100 W. 14th Ave. Parkway, Denver, 80204. (303) 575-2793.
Workshops—Slimen Maloof, Aug. 13–24; Sam Maloof, Aug. 18–19; David Ellsworth, Aug. 20–24. Anderson Ranch, Aspen. Contact (303) 923-3181.

CONNECTICUT: **Shows**—Berlin Crafts Expo, Aug. 24–26; Hartford Christmas Crafts Expo I and II, Dec. 7–9, 14–16. Contact American Crafts Expo's, Box 368, Canton, 06019. (203) 693-6311.
Exhibit—16th Annual Celebration of American Crafts, Nov. 8–Dec. 23. Creative Arts Workshop, 80 Audubon St., New Haven, 06511. (203) 562-4927.
Workshops—Boatbuilding, Aug. 13–18, 20–25; turning, Sept. 15–16; wood techniques, Sept. 25–Nov. 6; canoe restoration, Oct. 6–7; carving, Oct. 13–14; green-wood chairmaking, Nov. 17–18. Brookfield Craft Ctr., Box 122, Brookfield, 06804. (203) 775-4526.
Seminars—Marketing crafts, Sept. 29 at Quinnipiac College, Hamden; Oct. 27 at Middlesex Community College, Middletown. Send SASE to Anita Malone, 670 Wintergreen Ave., Hamden, 06514. (203) 789-7865.
Juried show—"The Great Salt Box," Oct. 7–28. Saltbox Gallery, 37 Buena Vista Rd., W. Hartford. Deadline Sept. 24. Open to New England residents only. Contact Vikki Chenette, 120 Beacon St., Hartford, 06105.
Juried exhibition—New England Crafts Showcase, Sept. 29–30. Charles Ives Ctr., Univ. Blvd. off Lake Ave., Danbury. Contact (203) 797-4002.

WASHINGTON, D.C.: **Exhibition**—Crafts about "American Politics and the Presidency," Sept. 7–Nov. 4, Renwick Gallery, Smithsonian Institution.
Juried show—1985 Washington Craft Show, Apr. 26–28. Deadline Oct. 10, 1984. Contact Smithsonian Assoc. Women's Committee, A&I-3101, Smithsonian Institution, 20560. (202) 357-4000.

GEORGIA: **Fair**—Internat'l Woodworking Machinery & Furniture Supply Fair, Aug. 25–28. Georgia World Congress Ctr., Atlanta. Contact (301) 948-5730.

ILLINOIS: **Show**—Woodworking World, Oct. 12–14. O'Hare Expo Ctr., Rosemont. Contact (603) 536-3876.
Demonstrations—Inca, Sept. 15, Nov. 3, Dec. 1, O'Hare Expo Ctr., Rosemont; power tools, open house, Sept. 29. Hardwood Connection, 420 Oak St., DeKalb, 60115. (815) 758-6009.

INDIANA: **Course**—Hardwood lumber grading, Oct. 8–12, New Albany. Contact Jack Seifert, (812) 458-6977, or Daniel Cassens, (317) 494-3644.
Juried show—15th Chautauqua of the Arts, Sept. 29–30. Vine St., Madison. Contact (812) 265-5080.

IOWA: **Festival**—Pioneer Exposition of arts and crafts, Aug. 31–Sept. 1. Pottawattamie County Fairgrounds, Avoca. Contact (712) 366-1136.

LOUISIANA: **Show**—Craftworks Gift Show, Mar. 16–17, 1985, Baton Rouge. Application deadline Oct. 15, 1984. Contact J. Martin, Craftworks, Rt. 4, Box 688, Gonzales, 70737. (504) 673-4002.

MAINE: **Summer courses**—Jon Brooks. Haystack Mt. School of Crafts, Deer Isle, 04627. (207) 348-6946.
Craft show—9th Annual Maine Professional Craftspeople, Aug. 17–19. Mt. Desert Island High School, Bar Harbor. Contact (207) 288-5688.
Summer courses—Various. WoodenBoat School, Box 78, Brooklin, 04616. (207) 359-4651.
Design competition—Products for sheltered workshops. Deadline Nov. 1. Contact Sheltercraft, Inc., 58 Exchange St., Portland, 04106.

MARYLAND: **Juried fairs**—Fall Craft Fair, Sept. 12–14, deadline Aug. 31; Holiday Craft Fair, Dec. 4–6, deadline Nov. 15. Both Fairs held at U. of Md., College Park. Contact Mary Shaffer, (301) 454-4754.
Show—1985 ACC Craftfair, Feb. 12–17, Baltimore. Application and slide deadline Oct. 1, 1984. SASE to A.C.E., Box 10, New Paltz, N.Y. 12561. (914) 255-0039.

MASSACHUSETTS: **Workshop**—Cabinetmaking, Sept. 17–21. Heartwood, Johnson Rd., Washington, 01235. (413) 623-6677.
Seminars—Various. The Woodworkers' Store, 2154 Mass. Ave., Cambridge, 02140. (617) 497-1136.
Show—Student work, June 14–Sept. 8. Worcester Craft Ctr., 25 Sagamore Rd., Sagamore. (617) 753-8183.
Show—1985 ACC Craftfair, July 8–14, W. Springfield. Application and slide deadline Oct. 15, 1984. SASE to A.C.E., Box 10, New Paltz, N.Y. 12561. (914) 255-0039.
Show—"Wood," Aug. 1–Sept. 15. Signature Gallery, Dock Sq., North St., Boston. Contact (617) 227-4885.

MICHIGAN: **Show**—Mich. Woodworkers Guild, Oct. 24–27. Somerset Mall, Troy. Contact (313) 996-9183.

MINNESOTA: **Festival**—14th Annual Renaissance Festival, Aug.–Sept., weekends only. Highway 169, Shakopee. Contact (612) 445-7361.

MISSOURI: **Workshops/classes**—Various, Aug.–Nov. Contact Dan Smith, Finishing School, 1629 N. 2nd, St. Charles, 63301.

MONTANA: **Show**—6th Woodworking, Oct. 12–Nov. 7. Artifacts Gallery, Bozeman. (406) 586-3755.

NEVADA: **Show**—Craftworks Mkt., Oct. 27–28. 5151 Boulder Hwy., Las Vegas, 89122. (702) 456-6695.

NEW HAMPSHIRE: **Workshop**—Violin building, Aug. 20–29. Univ. of N.H., Durham. (603) 862-1088.
Exhibit—Handcrafted Furniture, Oct. 29–Jan. 18. League of N.H. Craftsmen, 205 N. Main St., Concord. (603) 224-3375.
Exhibit—Award-winning furniture of New England craftsmen, Aug. 1–Sept. 26. Woodworkers' Gallery, Rt. 101A, Milford. (603) 673-7977.

NEW JERSEY: **Show**—Craft Mkt., Oct. 26–28. N.J. State Armory, Westfield. Contact (914) 469-2249.
Workshops—Tage Frid, Aug. 17–19; Emil Milan, Aug. 20–24; James Hutchinson, Aug. 25–26. Peters Valley Craftsmen, Layton, 07851. (201) 948-5200.
Demonstrations/exhibits/seminars—Woodworking tools, Sept. 28–30. Westfield Armory, Westfield. Contact Garrett Wade Co., (212) 807-1155.
Workshop—Japanese tools and techniques, Toshio Odate, Oct. 20. Brookdale Community College, Newman Springs Rd., Lincroft, 07738. Contact Gabriel Longo, (201) 842-1900.

NEW MEXICO: **Demonstrations**—Chinese joinery, Sept. 22, 1129 Goff SW, Albuquerque; Japanese tools and joinery, Oct. 27, 615 Mission NE, Albuquerque. Contact William Pike, (505) 265-4077.

NEW YORK: **Exhibit**—Tage Frid, Sept. 13–Oct. 28. Gallery at Workbench, 470 Park Ave. So. at 32nd St., N.Y.C., 10016. (212) 481-5454.
Workshop—Japanese tools, Aug. 20–24, Sept. 22–23, Oct. 20–21, Nov. 17–18. The Luthierie, 2449 W. Saugerties Rd., Saugerties, 12477. (914) 246-5207.
Fairs—Arts & Crafts, Aug. 31–Sept. 3. Ulster County Fairgrounds, New Paltz. Contact (914) 679-8087.
Fair—7th N.Y. Renaissance, July 28–Sept. 9, weekends. Sterling Forest, Tuxedo. Contact (516) 288-5225.
Craft fair—10th Croton, Sept. 15–16. Croton Point Park, Croton-on-Hudson. Contact (914) 271-5302.
Exhibit—1984 Annual Marquetry Society of America, Nov. 3–Dec. 1. Deadline Oct. 13, limit two entries/member. Contact William J. Rondholz, 51 Carlton Ave., Jersey City, N.J. 07306.
Demonstration/course—Dovetailing, Sept. 13; woodworking, Sept. 19–Jan. 9. Craft Student League, YWCA, 610 Lexington (53rd), N.Y.C. (212) 755-2700.
Workshop—Restoration carpentry, Aug. 22–24. Eastfield Village, E. Nassau. Contact (518) 766-2422.

NORTH CAROLINA: **Juried shows**—High Country Crafters. Fairfield-Sapphire: Aug. 17–19; Cashiers: Aug. 31–Sept. 2; Scaly Mountain: Oct. 12–14; Asheville: Nov. 23–25. Contact Elizabeth Kdan, (704) 254-0070.
Courses—Various, Oct.–Dec. John C. Campbell Folk School, Rt. 1, Brasstown, 28902. (704) 837-2775.
Workshops—Chairmaking, Aug. 20–24, John Alexander; toolmaking, Oct. 1–5, Darry Wood. Country Workshops, Rt. 3, Box 262, Marshall, 28753. (704) 656-2280.
Show—Southern Furniture Market, Oct. 18–26. Contact Southern Furniture Market Ctr., Box 828, Highpoint, 27261. (919) 889-6144.

OHIO: **Show**—Nat'l Furniture Invit., Sept. 21–Oct. 28. Sylvia Ullman Gallery, 13010 Larchmere-Woodland, Cleveland. (216) 231-2008.
Symposium—Woodworking and joinery, Rude Osolnik and Dr. James Hall, Oct. 12-13 (limit 24 people). Coventry High School, 3257 Cormany Rd., Akron. Contact Dave Hout, (216) 644-2248 or 644-2232.

OREGON: Various events. Western Forestry Ctr., 4033 SW Canyon Rd., Portland, 97221. (503) 228-1367.

PENNSYLVANIA: **Fair**—15th Crafts, Sept. 7–9. Mellon Park, Pittsburgh. Contact (412) 363-0569.
Exhibition—2nd Woodworker, Sept. 21–23. Phila. Armory (Drexel Campus). Contact (914) 469-2249.
Exhibition—Wildlife Art, Oct. 20–21. Armory, 33rd and Market Sts., Phila. Contact (215) 299-1044.

SOUTH CAROLINA: **Show**—Furniture, Sam Maloof, Sept. 25–Nov. 4. Greenville County Museum of Art. Contact Bob Ripley, (803) 271-6871.

TENNESSEE: **Workshop/exhibition**—Turning, Aug. 13–17; woodworking related to the garden, Oct. 12–Dec. 8. Scholarships available. Arrowmont School, Box 567, Gatlinburg, 37738. (615) 436-5860.

TEXAS: **Seminar**—Marquetry and inlay with Silas Kopf, Sept. 14–16. Wood & Tool Store, 1936 Record Crossing, Dallas, 75235. (214) 631-5478.
Show—1985 ACC Craftfair, Mar. 27–31, Dallas. Application and slide deadline Oct. 1, 1984. SASE to A.C.E., Box 10, New Paltz, N.Y. 12561. (914) 255-0039.
Exhibit—Local Treasures, Dec. 4–Jan. 13, San Antonio. Deadline Oct. 17. Contact Austin Woodworkers, Rt. 1, Box 112, Manchaca, 78652. (512) 282-0493.
Show—Woodworking, Sept. 13–15. NorthPark Center, Dallas. (214) 363-3317.

VERMONT: **Workshop**—Wood and canvas canoe building, Sept. 2–10. Sterling College, Craftsbury Common, 05827. (802) 586-2561.
Festival—Kennedy Bros. 2nd Ann. Crafts, Oct. 5–8, Vergennes. Contact Kennedy Bros., (802) 877-2975.
Exhibit—Rare tools and machines. At the American Precision Museum, Windsor, Vt., publishers of the *Tools & Technology* quarterly. (802) 674-5781.

VIRGINIA: **Show**—Internat'l Creative Marquetry, Oct. 2–28. Library, Virginia Wesleyan College, Norfolk.
Show—J.L. Heatwole, David Ray Pine, John Weissenberger, Sept. 9–30. Staunton Fine Arts Ctr., 1 Gypsy Hill Park, Staunton, 24401. (703) 885-2028.
Fair—Lynchburg Fine Arts Ctr. Fall Craft, Nov. 2–4, Radisson Hotel, Lynchburg. Contact (804) 846-8451.
Show—11th N. Va. Carvers, Nov. 24–25, Arlington. Deadline Oct. 31. Contact C. Schafer, (703) 256-2779.

WASHINGTON: **Show**—Furniture, Jonathan Cohen, Sept. 13–Oct. 7. Northwest Gallery of Woodworking, 202 1st Ave. South, Seattle. (206) 625-0542.
Exhibit—Sculpture, furniture, constructions, July 21–Oct. 27. WhatCom Museum, 121 Prospect St., Bellingham, 98225. (206) 676-6981.
Workshops/seminars—Various. Northwest School of Wooden Boatbuilding, 251 Otto St., Port Townsend, 98368. (206) 385-4948.

WEST VIRGINIA: **Exhibit**—Woodworking 1984, June 24–Aug. 25. Stifel Fine Arts Center, 1330 National Rd., Wheeling, 26003. (304) 242-7700.

Wearing down the barriers in Colorado

On both coasts, woodworkers who pass a jury's scrutiny can display work in any of a dozen or so major craft fairs, with a good chance of selling something. Besides fairs, a number of crafts-only galleries have popped up, and more fine-arts galleries seem willing to show furniture now and again. A recent trip to the Denver area convinced me that craft marketing—or at least public response to it—isn't as far along in the mountain states.

The Colorado Woodworker's Guild, a four-year-old association with about 85 members, ran smack up against that market resistance last spring when it set about organizing a show of members' work. The guild had sponsored two shows in Denver malls, but wanted something more upscale the third time out. "Malls just aren't classy enough," says Phil Clark, CWG's president. "You get lumped in with the car shows." When the guild approached the Denver Center for Performing Arts and a local gallery, it was turned down. Denver's Century Bank offered a way out, agreeing to donate a fairly spacious corner of its downtown office for a three-week wood show last June.

I was pleased—and not really surprised—to discover that the work is as good as what you see on either coast. There were 34 pieces in the Century Bank show, including lots of casework and tables, and a couple of sculptures to round out the display. Conspicuously absent was the glossy lacquer and bright paintwork that occasionally dominates shows where trendier tastes are being served. Frankly, I found the plain wood an invigorating change of pace.

Curious about how their work was being perceived, the guild passed out ballots asking the opening-night crowd to pick their favorite pieces. Among the top five vote-getters were a walnut buffet by Derek Davis, an oak lecturn by Tony Brazzale and a cherry standing cabinet by Dave Boykin. Boykin's was an elegant solution to the everyday problem of where to stash the stereo gear and the china. He accommodated the stereo's snarl of wires by leaving the back off the carcase, a technique which also vents heat generated by the equipment. The piece was among a handful that shared a stylistic imprint, a sort of amalgam of James Krenov's finessed details and the chunky, angular look of Arts and Crafts furniture. Among these was my favorite: a post-and-panel sideboard (shown above) made of mahogany and cordia by Paul Gordon.

Paul Gordon's sideboard was shown at the Colorado Woodworker's exhibition in June.

The Century Bank show was by far the best attended of the CWG's three exhibitions, but it wasn't really a commercial success, at least not in the short term. The bank wouldn't allow a display of work-for-sale, and as of late June, only a couple of commissions had been generated, a discouraging outcome that's left some guild members asking if such shows are worth the effort. In the long term I think they are. Big-name fairs on the coasts are fine, but suppose you don't fancy trucking your stuff from one end of the country to the other? Well-organized and promoted local shows—whether in galleries, the local art center or what have you—are one alternative, particularly if they're held regularly so that a buyer whose interest is piqued one year can come back and part with some cash the next. *—Paul Bertorelli*

A flash of hindsight and a Murphy knife created John Willey's rolling billboard.

Signing on

It's hard for a woodworker to get into the public eye, and even harder to stay there. Your latest piece of perfection is usually tucked away in a house or office, visible only to its owner and the owner's friends. Exhibitions make a momentary splash, but even the most favorable newspaper or magazine reviews generally help the ego more than the pocketbook. And each of us knows at least one first-rate craftsperson who's long on talent and skill but short on cash for advertising.

Advertising is about the most loudly

discussed subject at winter meetings of the Kennebec Valley Woodworkers Association in central Maine, and the cost of an ad is apt to produce brisker adjectives than the weather. The KVWA is a group of professionals and amateurs devoted to excellence in all phases of woodworking. We try to share and critique jobs whenever possible, but the Maine climate keeps each of us denned up and solitary for much of the winter, so we appreciate a monthly chance to unclench our teeth and talk wood with a set of friendly faces. One of us defrosts the Fritos, and the rest quickly thaw out with discussions of beams, boats, balusters, boxwork and the ever-worrisome miter joint, along with our host's work-in-progress.

At a meeting last winter, advertising once again put a damper on our discussions. Driving home afterward, I had a flash of hindsight. (God gives me a great many of these, possibly to take up the slack in my foresight department.) Why not, I said to myself, make my truck a mobile billboard? All I needed was nerve enough to carve low-relief signs on the sideboards I'd recently installed on the truck.

I say "nerve" because my wife is the real carver in the family. She possesses neatness and patience, along with many other qualities that have amazed me for more than twenty years, so I didn't want to hang a carving on the truck that would embarrass her. Also, I was enduring a drought of Tollhouse cookies at the time.

Nonetheless, there is more bravery than clean carving in the signs. You can probably do better. After days of going at the "Family Woods" plaques with gouges and chisels, I remembered Paul McCarthy's Murphy-knife sign-carving techniques (*FWW* #30, pp. 64-66). Slicing away with a Murphy, I cut the smaller plaques in a little more than a day—slow for Paul maybe, but remember, he does it all day, every day.

As for business results, I'm still stunned. In short order, my rolling ads brought in a kitchen, a sign, chances to bid on another kitchen and another sign, and a far more cheerful reception at the bank. And the summer folks hadn't come yet. Bill-the-Truck (in honor of my dad, who gave it to us) makes friends wherever we go, and even slows down semis on the Interstate.

If you want your own movable ads, here are a few hints. Bill is small, but still needed three sheets of $\frac{3}{8}$-in. exterior plywood to make the bedliner and toolcases. Keep weight and windage down, or watch your gas mileage drop. A truck body survives because it flexes—follow suit with your woodwork. Take pains when fitting the stakes to the sockets, especially if you carry weight high up. For signs, bigger is better. Lettering about 4 in. high on a standard half-ton truck should be handsome. Try not to tangle logo and lettering—clarity is the key. As to finish, think like a boatbuilder. It works.

One more hindsight: A good companion while thinking about sideboards and signs is Jay Hanna's *Marine Carving Handbook* from International Marine Pub. Co., 21 Elm St., Camden, Maine 04843. Jay has foresight, and talks sense.

There you are, employed again.

—J.H. Willey, Mt. Vernon, Maine

True grit: Santa Cruz sanders poised for a belt-to-belt runoff.

Sanders in drag

The latest mean machine to roar out of California dusted off all comers at the Santa Cruz Woodworkers Association's "Belt Sander Drag" races.

The dragsters were just ordinary belt sanders, souped up with racing bric-a-brac—one sported a fully aerodynamic body shell. The overall winner, a big 4x24 Rockwell, clocked 2.4 seconds for the 28-ft. run. Scaled up to auto size, this would be a ground-pounding 200 MPH!

The day went smoothly, and the knottiest controversy, about whether the track got faster with use, was settled by a wry fellow who pointed out that, ultimately, it only gets thinner.

—Sandor Nagyszalanczy, Santa Cruz, Calif.

Rent a shop and a little help, too

If your woodworking dreams regularly outstrip your beleaguered tool budget or your closet-size workshop, Gordon Williamson of Clearwater, Florida, has come up with an idea that could be the answer to your prayers.

Williamson runs a rent-a-shop service, much like the self-help auto repair garages that have sprung up around the country recently. He started The Workbench, Inc. four years ago, to help satisfy his own interest in woodworking while filling a need shared by many woodworkers in his area who live in trailers and small apartments.

For $10 an hour, $15 a half-day, $25 a day or $300 a year, customers have the run of a 1700-sq.-ft. shop that is equipped with most of the major stationary power tools and a good selection of hand tools. The Workbench also sells lumber, plywood and other supplies at competitive prices.

Some basic instruction is provided, but customers themselves, some of whom are retired woodworkers with decades of practical experience, are the most important resource in the shop. "There's a kind of tutoring that you just can't buy," says Williamson. "Everyone helps everyone else with their projects. Everyone has their own specialty and they're so willing to share their secrets."

Williamson, who does custom picture framing and some furniture work, says

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that more than 2400 customers have used the shop so far—from a 15-year-old boy cutting plywood for a hydroplane to a couple of octogenarians looking for a hobby. Nine out of ten users are amateur woodworkers, but professionals are also welcome—a woodcarver, for example, can rough out a month's worth of work in a morning's bandsawing.

Although it was a little tough competing with beaches and golf courses at first, Williamson says he's starting to inch into black ink. "With the economy in the state it seems to be in, I think that more and more people will find that they can save money by doing things themselves. And the nice thing is that so far it's been a matter of one hundred percent satisfaction. I've yet to have anyone bail out on a project." *—Dick Burrows*

Stops and starts in the Bay Area

The closing this past spring of Berkeley's popular tool store, The Cutting Edge, came as a blow to Bay Area woodworkers. But the store's manager, Jon Lopez, moved quickly to fill the void, organizing a non-profit group that will offer classes in the Fort Mason area of San Francisco beginning Sept. 12.

The Berkeley store was one of four Cutting Edge tool stores in California and Arizona. In recent years, the Los Angeles based parent company has shifted from corporate-owned branch stores to owner-managed affiliates. An expiring lease, coupled with inadequate display/workshop space and parking at the Berkeley store, prompted the negotiations between Lopez and the company, which broke down at the last minute.

While The Cutting Edge looks for an owner-manager and a new Bay Area site, Lopez and his group, called Hands on Wood, have scheduled 28 classes, many taught by former Cutting Edge instructors, for September and October. Hands on Wood is presently affiliated with The Center for Wood Arts. Donations of money, machinery and tools have already begun to outfit three large workrooms at Fort Mason. Contributions (tax-deductible and earmarked for Hands on Wood) can be sent to The Center for Wood Arts, PO Box 714, Sausalito, Calif. 94965. For information on class offerings, contact Jon Lopez, 2621 Sutter St., San Francisco, Calif. 94115, (415) 567-2205.

—Simon Watts

New shapes, old styles

For several years, Bob Kopf has been creating light, airy, yet elegant furniture by combining turned shapes and traditional furniture forms. The table shown at right has laminated mahogany legs and stretchers and curly maple spheres. Tenons on top of the legs fit into holes in a mahogany frame that supports the hand-planed 36-in. by 36-in. maple top. Kopf, a full-time furnituremaker in Walnut Cove, N.C., is sold on turned forms: "They really make nice structures—with very thin and light elements. And, the finished object is much stronger than the sum of its parts. It's an efficient way of making things." Shown recently at The Works Gallery in Philadelphia, the table costs $1850; the chairs, $1500 apiece.

—Dick Burrows

Smith/Weiler Photography

Letter from the Editor

Just a note to let you know that along with its new, colorful look, *Fine Woodworking* is getting a new editor.

He is Paul Bertorelli, 34, a one-time newspaper reporter who had abandoned that career for his own small cabinet shop in West Virginia. Bertorelli then saw at The Taunton Press an opportunity to combine his principal talents. And after three years on our editorial staff, he's shown the ability and the judgment he'll need for success in what to me has been the world's most interesting job.

Our work is so fascinating because *Fine Woodworking* is a reader-written magazine, and our staff editors are all woodworkers. We visit craftspeople, see what they do and how they do it, then help them write about it. We actually get paid to learn about woodworking, and to make friends with other woodworkers. I've often thought that if I weren't doing this for a living, I would have made it my hobby.

Back in 1976, before I became editor, I too had firmly left journalism for woodworking. Since I had always wanted to read a magazine like *Fine Woodworking,* however, I couldn't resist the opportunity to help create it. I felt then that in a few years I would return full-time to my own shop. I may still do that, but sometime later on. You see, editing *Fine Woodworking* has changed me, too. For one thing, our style of magazine journalism has most of the attractions and hardly any of what I found awful about editing newspapers. For another, I've finally read enough about woodworking to last my lifetime, while my own shop interests have turned toward sculpture—personally satisfying, but commercially worthless.

I'm moving down the hall at The Taunton Press, to work on new editorial projects: new books, new magazines, and new media besides print. I'm glad for the change and enthusiastic about my new job, about which you'll be hearing more as our plans develop. Meanwhile, I know Bertorelli will find his new challenge fascinating and rewarding.

All best wishes,
John Kelsey

Notes and Comment

Got an idea you'd like to get off your chest? Know about any woodworking shows, events or craftsmen of note? Just finished a great project? If so, we'd like to hear about them. How about writing to us? And, if possible, send photos (preferably with negatives) to Notes and Comment, Fine Woodworking, ***Box 355, Newtown, CT 06470.***

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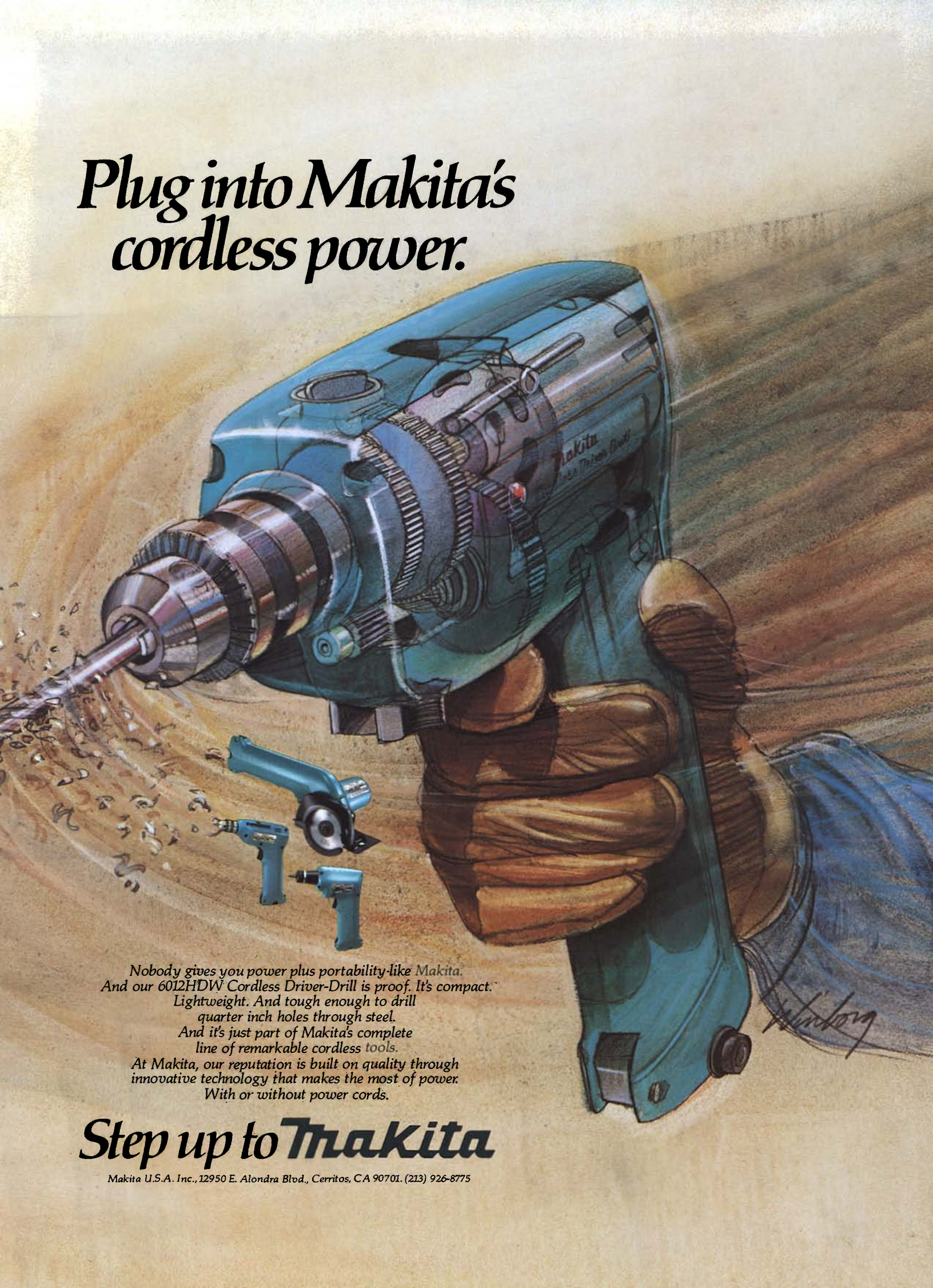

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TRIO IN SOHO

New York City's artsy Soho district, long the haunt of painters and sculptors and the home of toney galleries that show their work, got a good look at high-style woodworking this past spring. Three different shows ran concurrently.

One of them, at Gallery Henoch, was a group show of works by David Ebner, John Dunnigan and Richard Newman. The designs were accomplished, the craftsmanship superb.

A trip to Egypt inspired Dunnigan's "Pavilion Bench," above, in ebonized mahogany and curly maple. The lines are Pharaonic, the plastic rings recall street vendors hawking bracelets.

In France, lingerie is kept in a seven-drawer dresser—one drawer for each day. Ebner's "Seminée," right, carries on the tradition. Built from Honduras mahogany, the chest stands 45 in. tall.

Newman's "Writing Desk," below, is his most recent piece. Made of curly cherry and ebony, its spiral-fluted legs were machined on a shaper using an elaborate jig.