# Fine WoodWorking

Sept./Oct. 1985, No. 54, $3.75

Form Laminating

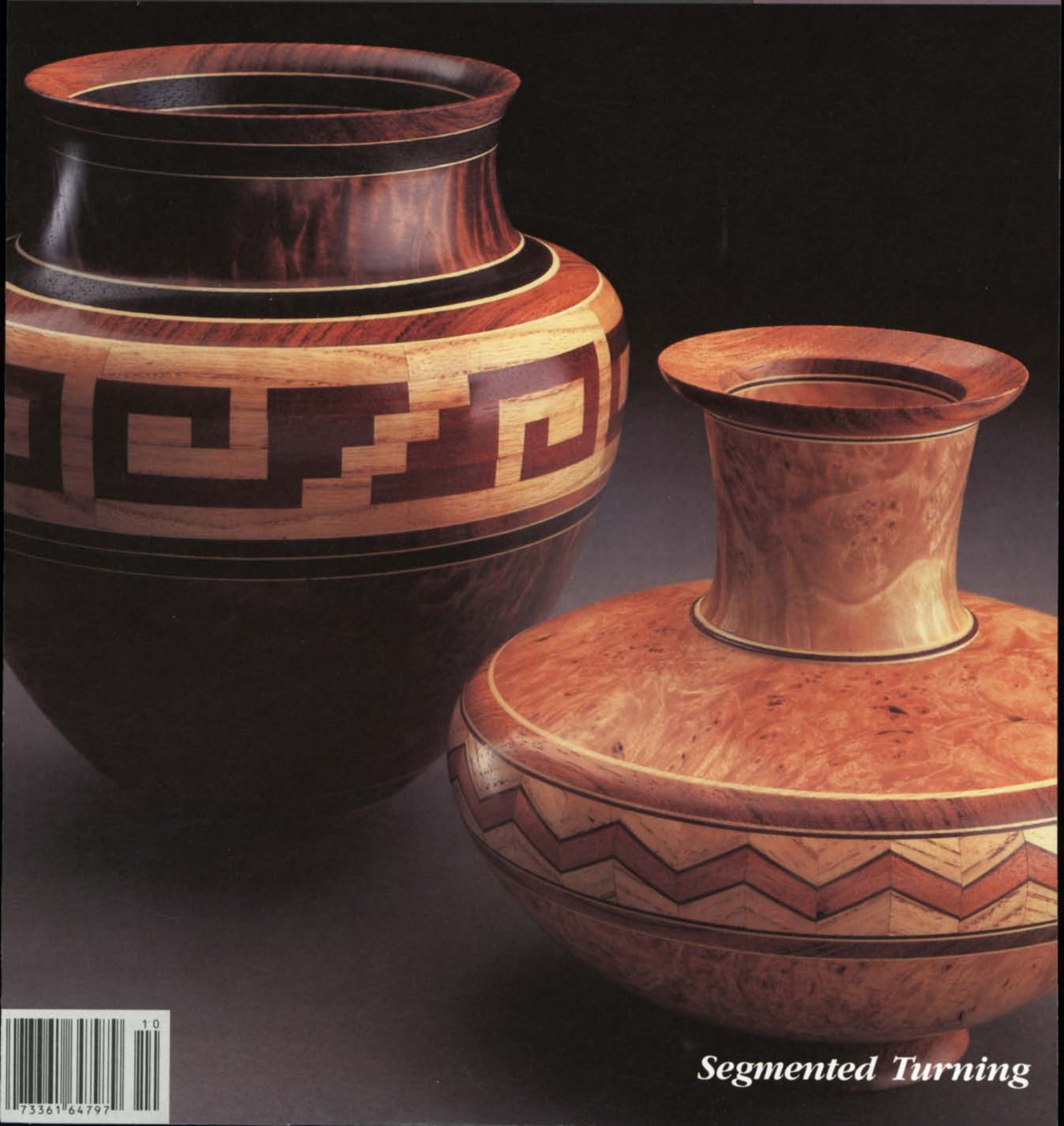
Block Planes

Trestle Bench

Inlaid Tambours

Joynt Stool

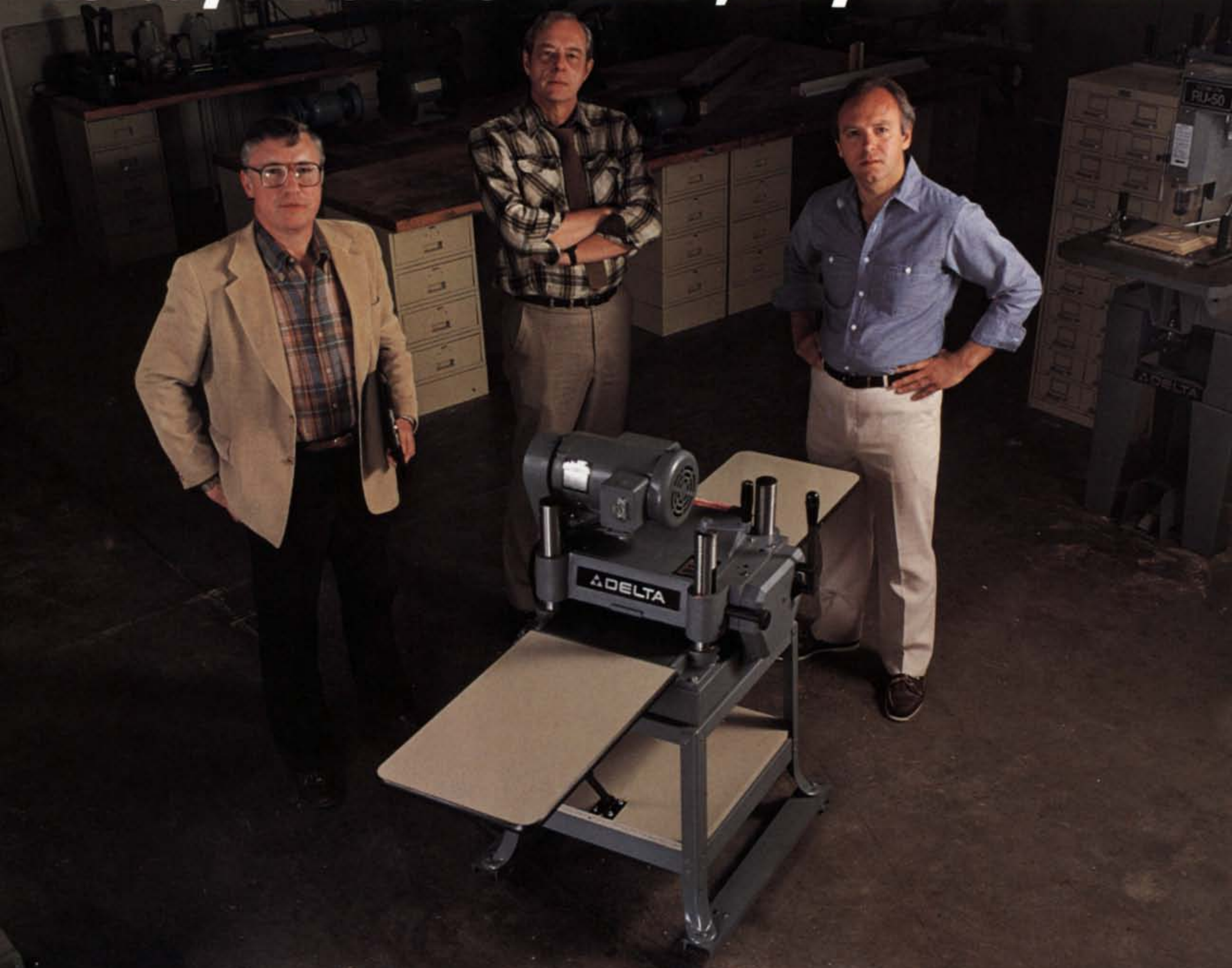
Catalyzed Lacquers



Segmented Turning

73361 64797 10

# If the experts can't convince you to buy a Delta 13" Planer, maybe $150 will.




Maybe it isn't enough that the folks at *Workbench* found our 13" Planer "faultless." And thought it would be "difficult to create a safer machine."

Or that *Fine Woodworking* named it "first choice for an all-around planer."

Or that *Popular Mechanics* found it "a reasonably priced beauty . . . (that) cuts with (the) tenacity of a heavyweight."

And maybe it isn't enough that our planer's made of sturdy cast-iron. That it has a stationary table and adjustable head, big 13" × 5.9" capacity, a constant duty induction motor and 3" diameter cutterhead.

So even though we've already done all we could to make it a great planer . . . we decided to do all we could to make it a *great deal.*

So, from now until December 31, when you buy a Delta 13" Planer*, we'll send you a rebate check for $150.

And if our great features combined with our great deal aren't enough to convince you to buy a Delta 13" Planer . . . well, at least we'll know we gave it our best shot.

Call toll-free for the name of your participating Delta dealer: Delta International Machinery Corp., 800/438-2486 (in PA, 800/438-2487).

RC-33 13" Planer/Model 22-651 shown with accessory stand.
*Offer good on models 22-650, 22-651, and 22-655, only on sales in the continental U.S., Alaska, and Hawaii.

**DELTA**

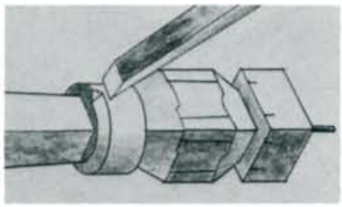
**Behind Our New Name Is Our Old Reputation.**

# Fine WoodWorking

September/October 1985, No. 54




*Cover: Inspired by Southwest Indian pottery, New Mexico woodturners Bud Latven and Addie Draper made these stunning bowls using the segmenting process described on p. 64. Photo: White Light.*



*For making turned table legs, it's nice to have a lathe but Aldren Watson gets by with chisels, a rasp and the turning jig he explains on p. 49.*


*Fine Woodworking* (ISSN 0361-3453) is published bimonthly, January, March, May, July, September and November, by The Taunton Press, Inc., Newtown, CT 06470. Telephone (203) 426-8171. Second-class postage paid at Newtown, CT 06470, and additional mailing offices.



Subscription rates: United States and possessions, $18 for one year, $34 for two years; Canada and other countries, $21 for one year, $40 for two years (in U.S. dollars, please). Single copy, $3.75. Single copies outside U.S. and possessions, $4.25. Send to Subscription Dept., The Taunton Press, PO Box 355, Newtown, CT 06470. Address all correspondence to the appropriate department (Subscription, Editorial, or Advertising), The Taunton Press, 63 South Main Street, PO Box 355, Newtown, CT 06470. U.S. newsstand distribution by Eastern News Distributors, Inc., 1130 Cleveland Road, Sandusky, OH 44870.


***Departments***



***Articles***

I share Michael Podmaniczky's enthusiasm for the spokeshave (*FWW* #52) but think he's a little hard on the Record—the one with the gull wings and screw adjusters. The point of the raised handles is not perversity on the manufacturer's part but so you can work flat or slightly dished surfaces without rapping your knuckles on the wood. I also like the convenient thumb rests on the Record and the ease and delicacy with which the blade can be adjusted—all without searching around for a screwdriver. After each adjustment I always snug the screws down; this keeps the iron in place and prevents rattling. When working an edge 1 in. wide or less, I set the blade fractionally deeper on one side than the other. Then I can vary the depth of cut by sliding the shave sideways. One way to overcome spiteful grain is to skew the spokeshave about 45° to the line of travel. The blade cuts cleaner because it's slicing through the fibers.

Incidentally, with the British pound still gasping for breath all Record tools are a pretty good buy.

*—Simon Watts, LaHave Islands, N.S.*

The adustable-throat spokeshave is a misunderstood orphan, not a "sucker-born-a-minute" tool as author Podmaniczky suggests. You can adjust the thickness of the shaving from microscopic to humongous and back again with the turn of a single screw with no need for lateral adjustment—very handy when doing such jobs as working up the edge of a disc, where you must cut across end grain one minute and long grain the next.

To set up one of these shaves, sharpen the blade with a straight-across edge, no crown. Close the throat down as small as possible and lock the blade in place projecting just enough to take a very thin shaving. Be sure the blade projects equally across its width. That's all there is to it.

The Kunz adjustable-throat spokeshave is a clumsy tool but it's the only one currently in production and can be made to work. You'd be best off watching the flea markets for an old Stanley No. 54, which has straight handles. It's neat to replace the adjustment screw with a knob so you can ride the setting with your thumb as you work.

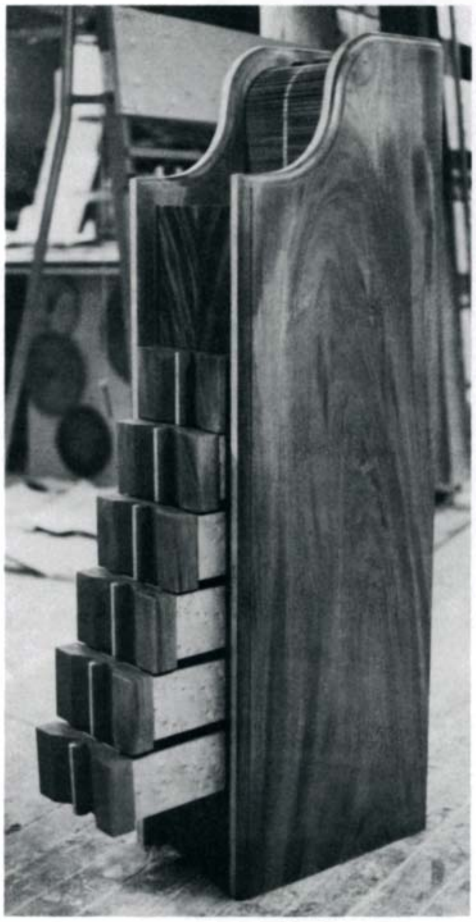
Podmaniczky prefers to push his spokeshave but I prefer to pull for the same reason it is awkward to push a garden rake. But as with all woodworking tools, to each his own.

*—Richard Starr, Thetford Center, Vt.*

Having built a good many acre-feet of bookshelf myself, I concur with Wayne Somers' comments regarding shelf spans and the need for a dust-catching roof (Letters, *FWW* #53). Sometimes, however sagless, a 24-in. span simply does not look or feel right. My solution has been to hang the expense and use 8/4 lumber for both uprights and shelves. It will span five feet of encyclopedia or old magazines without noticeable droop.

I'd also like to add to the discussion in Methods of Work about ways to hang shelving. I don't like metal hangers or round pegs, for with square-edged shelves, they just don't look right. Neither do hidden supports—we're generally more comfortable knowing how things are held up. Thus I choose a straight-grained cutoff about 1½ in. long and split it into half-inch square pegs, six per shelf. I whittle one end round for tapping into half-inch blind holes drilled into the uprights. I chamfer the visible end to match the chamfered edge of my shelves. Since the lumber I spare for shelves is rarely flat, one rear peg rotated in its hole will cancel any wobble. I drill two holes in the underside of each shelf just back of the rear pegs for two more pegs, to remove any risk of it accidentally sliding forward.

*—Larry Green, Bethel, Conn.*



***The lingerie cabinet on the back cover of*** FWW ***#48 caught my eye and it was a real inspiration. My piece has six full extension drawers with bird's-eye maple veneer on the sides. The drawerfronts are Honduras mahogany as are the vertical dowels, which serve as drawer pulls.***

**—Randy Locascio, Greenwich, Conn.**

In your May issue I read the article on small planers and I am familiar with all the machines tested. I am currently using two of them, the Makita and the Williams and Hussey. I agree with some of the criticisims David Sloan pointed out, but any evaluation of a machine is inadequate when tested over a short span by one user. Some objections are easy to correct. The Makita did seem too low, so I built a simple wood base with casters. This makes it easy to move around the shop and I don't have to get on my knees when using it.

I think Sloan would like the Williams and Hussey machine a lot more if he had purchased the power-feed model direct from Williams and Hussey. There is no reason for the machine not to power feed properly when everything is set up correctly.

I admit to not liking either the Makita or the Williams and Hussey machine very much when I first started using them, but given a little time to learn how to use them, I would not want to be without them in my shop.

*—John Leipfert, Binghamton, N.Y.*

The Grizzly comes with one spring on the chip breaker, as David Sloan stated. However, the cast frame is drilled and tapped for two additional springs. I made two springs from an old handsaw and my planer now has three. The motor mount and pulleys will accept a standard NEMA-frame American motor but my Taiwanese motor has been operating for one year with no problems. I have rough planed 8/4 rock maple and have never had to push hard to start the work. Also, no snipes. I'm impressed and pleased with my Grizzly.

*—G. E. Leediker, Baytown, Tex.*

In the summer 1977 issue, Bruce Hoadley referred to adhesive shelf-life and the industry practice of not dating glue containers. I recently had an experience that really brought these aspects of glue-up into sharp and painful focus.

I had completed the glue-up of a dozen panels for a set of cherry office furniture. The adhesive was Franklin Liquid Hide glue. Gluing was done at a temperature in excess of 75°F and clamping pressure was applied for at least eight hours. I had purchased the glue about a year ago and it carried no warning that shelf-life was critical for successful use. The glue seemed fairly runny, but I chalked that up to the heat in the shop. (Turns out that was a clear sign that the glue was bad.) My first

DOMESTIC & FOREIGN

# HARDWOODS

Quality stock for
Cabinet Work

Most all sizes from
1″ up to 4″ in thickness

## HARDWOODS

ASH—BASSWOOD
BIRCH—BUTTERNUT
CHERRY—CHESTNUT
EBONY—MAPLE—OAK
POPLAR—ROSEWOOD
TEAK—WALNUT
Also hardwood plywoods

## SOFTWOODS

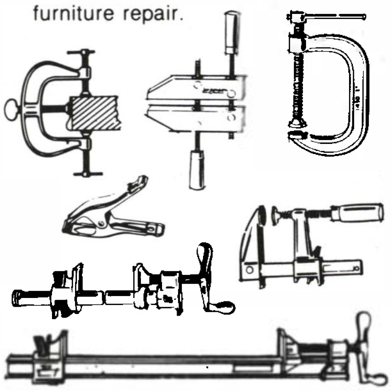
SUGAR PINE—CYPRESS
CEDAR—SPRUCE
DOUGLAS FIR etc.

**MAURICE L. CONDON CO., INC.**
248 Ferris Avenue
White Plains, N.Y. 10603
914-946-4111
Monday through Friday
8 AM to 4:30 PM

---

# "Jorgensen"® AND "Pony"® CLAMPS

Dependable extra hands for all types of clamping and work-holding jobs: woodworking projects, home maintenance, and furniture repair.



Write for FREE LITERATURE.
For big 32-page "how-to-clamp-it" catalog, send 50¢

**ASK YOUR DEALER**

**ADJUSTABLE CLAMP COMPANY**
*THE CLAMP FOLKS*
431 N. Ashland Ave./Chicago, IL 60622

---

# BRIDGE CITY TOOL WORKS HAS SOLVED THE PUZZLE. BUT NOT THE CUBE.

*The try square is perhaps the most important tool in your shop. You layout lines with it, set machines with it, and check joinery with it. You have to trust it. Our exotic rosewood and hardened 360 brass alloy squares are accurate to within ±.002" over the length of the blade, inside and out! There is no puzzle to it. Unconditional 90 day guarantee.*

**PLEASE SEND ME:**

- ☐ *TS-1 5" Jointmaker's Square .... $34.00+2.00 Shipping*
- ☐ *TS-2 8" Master Try Square ..... $47.00+2.50 Shipping*
- ☐ *Buy the set for .............. $81.00 ppd. SAVE $4.50*
- ☐ *1985/1986 catalog ............ $1.00 (free with order)*

NAME ____________________

STREET ____________________

CITY ____________________

STATE ____________ ZIP ________

Mastercard/Visa/AE/Check or Money Order to:
BRIDGE CITY TOOL WORKS
2834 NE 39TH • PORTLAND, OREGON • 97212
PHONE ORDERS – (503) 282-6997

---

# Joint-Matic 4200

The Joint-Matic will help you produce woodworking pieces of elegance, precision and beauty more quickly and expertly than you ever thought possible. Now, in minutes make... Mortise, Tenon, Sliding and Through Dovetail, Box Finger Joint and much much more.

**For Your Brochure Please Send $2.00 to:**

**Strong** TOOL DESIGN
20425 Beatrice
Dept. FW
Livonia, MI. 48152

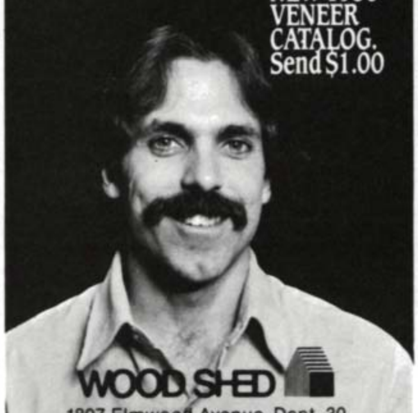
Joint-Matic Machine Is Protected By U.S. Patent 4,163,465

---

# "For Craftsmen, there is only one VENEER Catalog!"

"I'm a professional and I buy my veneer from professionals. The folks at the WOOD SHED personally select my orders from full length, consecutive sheets, ship within 72 hours and guarantee my complete satisfaction."

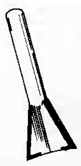
NEW 1986 VENEER CATALOG. Send $1.00



WOOD SHED
1807 Elmwood Avenue, Dept. 30
Buffalo, NY 14207
716-876-4719-20

---

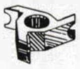
# FREE



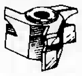
$7.50–½″ CARBIDE-TIPPED DOVETAIL ROUTER BIT WHEN YOU ORDER THIS SET OF SIX TOP-QUALITY ONE-PIECE CARBIDE-TIPPED ROUTER BITS IN THE MOST USEFUL SIZES AND SHAPES.

¼″ SHANK SET **$64.95 PPD.**
½″ SHANK SET **$69.95 PPD.**

AND WHAT'S MORE WE INCLUDE AN EXTRA BEARING SO THE ROUND-OVER MAY BE USED FOR BEADING.

SHAPER CUTTERS
**½″ BORE $20.00**



INDUSTRIAL SHAPER CUTTERS
**¾″ BORE WITH ½″ BUSHING $30.00**

6-PIECE CABINET SETS
**¾″ BORE WITH ½″ BUSHING $149.00**

3 WING PANEL RAISER
**1¼″ BORE WITH 1″ & ¾″ BUSHINGS $48.00**

ORDER BY PHONE WITH VISA/MC OR SEND MO, CHECK, VISA/MC NUMBER, EXP. DATE, PHONE NUMBER. CATALOG $1 — FEATURING OVER 200 CARBIDE TIPPED ROUTER BITS AND SHAPER CUTTERS.

VISA — *Satisfaction Guaranteed or your Money Back. Call 206-236-0272 or write:* — MasterCard

**CASCADE PRECISION TOOL CO. INC.**
**P.O. BOX 848, MERCER ISLAND, WA 98040.**

suspicion that something was wrong came some days later when I noticed that glue drops on the shop floor were not fully hardened. My heart sank as I hand-stressed some cut-offs only to have them break apart at the joint with very little wood fiber failure.

A call to Franklin yielded an instant diagnosis: the glue had passed the one year maximum shelf-life. I found my temperature rising and asked why there was no dating system or even any warning on the bottle. The answer was that cartons are coded but that it was not practical to date individual containers. Coincidentally, they had just begun coding individual bottles within the past couple of weeks. They offered to replace the glue at no charge and suggested I switch to Titebond, but they won't guarantee that past one year either.

*—Doug McCrodden, Sebago, Me.*

EDITOR'S NOTE: Franklin began dating bottles of Liquid Hide Glue and Titebond in June, according to Bob McSween, a spokesman for the company. However, the dates are coded by lot number and to decipher them you'll need to ask the store or phone Franklin at 800-848-0678. McSween says fresh hide glue should dry rock hard overnight if spread on a test scrap; spoiled glue, which is likely to be runny, will remain permanently soft and tacky. Though Franklin limits Titebond's shelf-life to one year, it's likely to last much longer, particularly if protected from freezing. If the glue appears thick and gummy, it's probably spoiled and ought to be discarded.

Re finish repair (Q&A, *FWW* #53). Beau Belajonas gave a somewhat complicated procedure for what would be a first-class repair job on a water-spotted finish. But a very quick approach is often as suitable. Before refinishing an entire surface, try this: Moisten a rag with regular shop-grade solvent alcohol—and moist is *not* dripping wet—then wipe the surface with about three quick but gentle passes. Within the next minute or so the spot will fade before your eyes. Give it time without wiping too much, because too much wiping will soften and mess up a shellac finish. There may be a subtle change in gloss if you spot-wipe, so it is a good idea to wipe the entire surface evenly.

*—Al Root, Newark, Del.*

With reference to William Harrison's article on low cost dust collection (*FWW* #52), be advised that the use of PVC pipe to carry dust and chip particles may be dangerous. PVC is a nonconductor of electricity and the movement of particles through the pipe will cause a static charge to build up. If the charge becomes great enough, it may discharge to any grounded object with explosive force. It happened to me while I was using a piece of 2-in. S-40 PVC pipe and the charge discharged to a water pipe; the pipe disintegrated.

*—Leonard Buck, No. Easton, Mass.*

EDITOR'S NOTE: Bob Wilging, of B.F. Goodrich, explained that under some conditions, static electricity buildup can be dangerous. Reader Buck had been blowing insulation on a cold, dry day. But under normal use the static electricity is more a nuisance than a danger—many central vacuums routinely use plastic pipe, and many shop-vacs do, too. It would not be advisable under industrial conditions, where tons of material would be moved during the workday with no shut-down time, or in any shop with potentially expolsive conditions.

I found William Harrison's dust collection article to be very informative but I do question his comment that it's possible to starve the blower of air and make it work much harder than it needs to. The Dayton Electric Manufacturing Co. (5959 West

Howard St., Chicago, Ill. 60648) in its *Electrical Products Buying Guide* cautions that motor overload will result if a blower is operated at static pressures *below* performance shown. This was news to me but it makes sense that a fan needs less power to churn air around and around in its cage.

I checked my freshly emptied Sears shop vacuum. Running wide open, a clamp-on ammeter showed it drew 10.0 amps. With the input closed it drew 7.5. A number of other squirrel-cage blowers in my shop performed similarly. The higher the static pressure rating the more the blower screams. But, does it whine about a problem of overload or is it screaming for joy?

—*Vernon Raaen, Oak Ridge, Tenn.*

EDITOR'S NOTE: Jerry Vales, a technical consultant at W.W. Grainger, Dayton's distributor, explained that this surprising information is true with regard to centrifugal-type blowers, which do indeed scream for joy when air is restricted. But it's the reverse for fan-type blowers (the sort you'd find in a window fan), which overload if they don't get enough air. Most vacuums use centrifugal-type blowers.

My brother-in-law was looking at the shop side of my garage last week and noticed where I keep my safety goggles and hearing protectors, blocking access to some of my tools. "Hey," he said, "you have to pick up your goggles every time you want to get out your router or Skil saw." Yup.

Also, Clarence Hill of Minburn, Iowa, showed me a tip but was too shy to write about it. It's the simplest foam applicator I've seen for small varnishing jobs. Glue a popsicle stick (or go first class with a tongue depressor) to one side of a spring clothespin. Snap the foam into the clothespin, paint, and throw the foam away when the job is done.

—*Ted Pack, Riverbank, Calif.*

The article by Ric Hanisch about German Chests (*FWW* #48) started my wheels turning. The first thing of course is where to get the flat lumber. My nephew told me about a wind-power generating unit that had been damaged while being removed from a tower. I could have the spruce from the big propeller if I wanted it. I used my chain saw to cut up pieces in order to carry the wood in my pickup truck. I manufactured the flat boards with my radial-arm saw and glued the pieces together. The chest proved to be, as Hanisch says, a straightforward woodworking project. —*Irving F. Lovejoy, Los Angeles, Calif.*

I have some questions about Rick Liftig's moisture meter in *FWW* #53, and fear that some errors may have crept in: In figure 3, the transistor Q1 has no connection shown to the base; the negative and positive signs in figure 1 and figure 3 don't agree; and I do not know how range E will operate if no connections are made to the meter.

—*Martin T. Mueller, Chicago, Ill.*

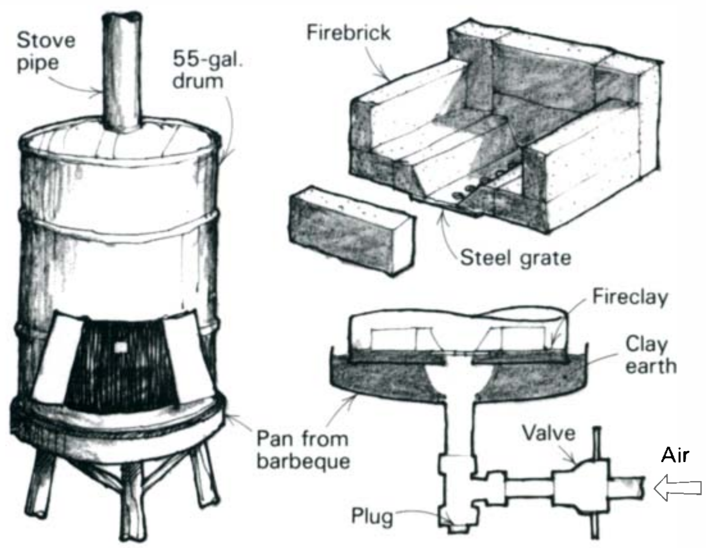
RICK LIFTIG REPLIES: You're right about the + and − signs in figure 3; figure 1 is correct. (Also, the parts numbers for the two switches should be 275-625 and 275-1385.) The other apparent circuitry problems are the result of what could be called "backdoor electronics." Instead of shelling out many dollars for high-power resistors, I used the Q1 transistor as low-cost resistor (not as a transistor at all) and similarly, range E uses the internal resistance of the integrated circuit itself. The meter works fine—if you don't seem to get steady readings, just wiggle the probes in the wood to improve the contact.

**Erratum:** There are two errors in the measurements for the banjo in *FWW* #53. The distance from the nut to the first fret should be 37mm instead of 32mm. The distance from the banjo ring to the peg head should be 20⅛ in. instead of 18$\frac{9}{16}$.

## Improved forge design

When I began making my own tools a few years ago, I decided to build a forge using a barbeque grill and a vacuum-cleaner blower, based on a design in *FWW* #9. I had some problems with that forge, but the one shown here, intended for outside use, eliminates them.

The main components are an old barbeque grill pan, firebricks for the firebox, a 55-gallon drum that acts as a hood, and two lengths of 6-in. stove pipe to ensure a good draft.




Construct the forge as shown in the sketch, connecting the blower with ordinary steel pipe. Install a valve in the blower line (I used a simple sliding wooden plate) to vary or cut off the air, and set a plug at the bottom so you will be able to remove ashes when necessary.

The size of the firepit can be changed, of course, but the configuration illustrated has been the best for my work. Any place that isn't exposed to heat (below the firebrick) can be filled and sealed with hard-packed earth and red clay, of which there is an abundance here in Arkansas. This will save a lot of fireclay, which I used only to seal around the firepit.

After the forge is together, build a roaring fire in the thing until it's good and hot. Check the next day for air leaks by turning on the blower and hanging a loose thread over suspicious cracks. Patch these with clay mud or fireclay.

Although the barrel hood provides enough shade so that I can usually judge forging heat by eye during full daylight, I found it best to save tricky work until evening. The hood also provides good protection from wind.

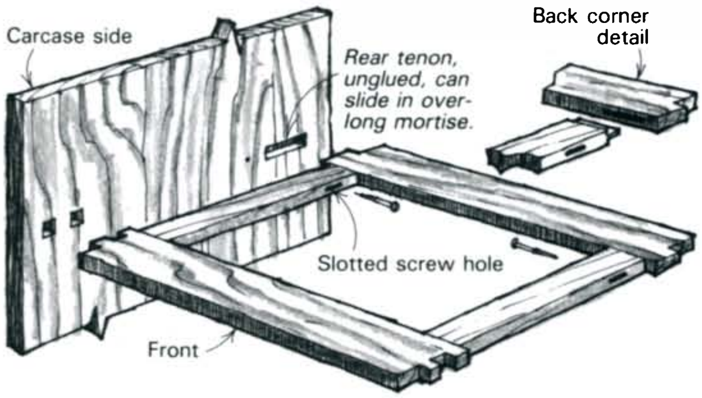
In working the forge with small pieces of steel, you can save coal by damping the back portion of the fire with water. If the work is longer than the depth of the forge, remove the rear firebricks and push the work through the small rear opening cut into the back side of the barrel.

A couple of safety reminders are to use only firebricks in the firepit—ordinary bricks may explode when heated rapidly. Also, bend the corners of the cut-out door in the barrel and smooth any rough edges. In the flurry of forging, it's easy to run into sharp edges. —*Jim Young, Omaha, Ark.*

## Sliding frame-to-carcase joint

I don't claim to have invented this joint. It has surely been used before, but I have never seen it explicitly described. The joint is designed to install parting frames, such as drawer supports, into a solid wood carcase. It provides a sliding action to allow the solid wood carcase sides to expand and contract with changes in relative humidity.

The double tenon at the front of the frame is glued into a

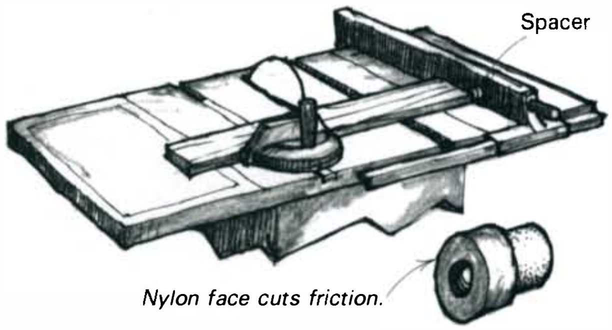



double mortise in the carcase, locking the frame in position (a single tenon would be glued mostly to endgrain in the carcase sides, which doesn't make for a very good glue joint; the double tenon has twice as much side-grain to side-grain gluing area). At the back, a sliding tenon in an extra-long slot and a screw through a slotted hole allow the carcase sides to shrink and expand without damage.

—*Nicholas Cavagnaro, Orofino, Idaho*

***Quick tip:*** Use chalk powder to highlight scribed lines. It not only shows up well even on light-colored woods, but it also tells you when your sawcut is splitting the line—it dusts out ahead of the teeth. —*Dennis Sweeney, Pittsburgh, Pa.*

## Magnetic duplicate cut-off aid




This gadget has saved me a lot of time when cutting duplicate lengths on the table saw. It's a spacer that ensures clearance between the cut-off stock and the rip fence, thereby avoiding the danger of kickback. My spacer is simply a round magnet with a threaded hole through it. These magnets should be standard items at your local hardware store or five-and-dime. Screw a short length of nylon rod or other slippery alternative to the magnet and cut the unit to exacly 1 in. in length. I trimmed mine to length by facing it on the lathe, but other methods would work just as well.

To use, just pop it on the rip fence, set the fence to the desired dimension plus 1 in., butt your stock against it and cut. Best of all, the spacer is always handy—stuck on the back side of the fence. —*Richard Bolmer, Anaheim, Calif.*

***Quick tip:*** You can get good socket chisels at flea markets, but many have lost their handles. Turning a new handle is easy enough, but duplicating the socket taper is tricky. I pour the socket full of molten lead. When it cools I remove the plug and use it as a pattern. —*Ralph Zwiesler, Freesoil, Mich.*

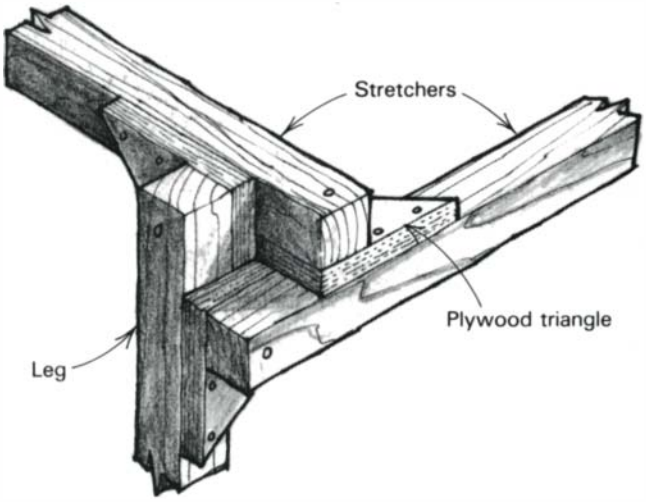
## Laminating sandpaper for flatness

Small items are always difficult to sand. No matter how careful you are they never seem to come out flat. Try using rubber cement to hold the sheet of sandpaper to a scrap piece of laminated countertop from your local cabinetshop. Sink cutouts

seem always to be in plentiful supply. The sandpaper will now be flat and you can use both hands to steady the piece being sanded. When the sandpaper is worn, simply peel it up and remove the rubber cement from the laminate by rubbing it with your finger. *—Robert A. Prive, Essex Junction, Vt.*

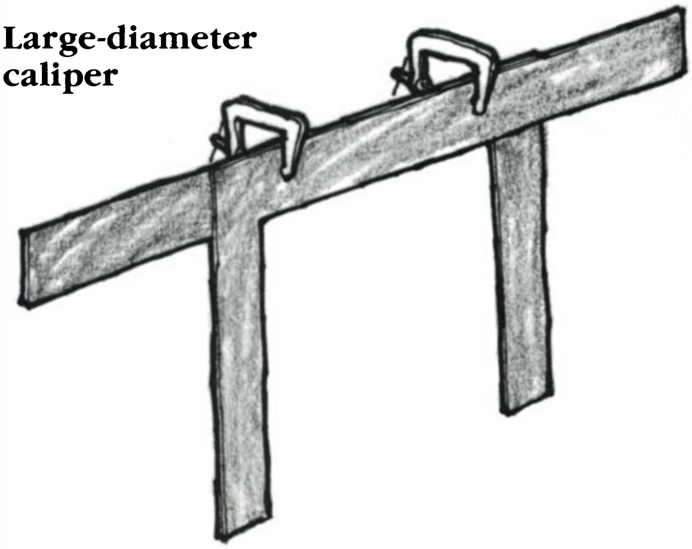
***Quick tip:*** If you can't avoid installing screws in end grain, drill an oversized hole and tap plastic anchors into the end-grain piece. The anchors will expand and ensure a firm grip. *—Christine and David Springett, Rugby, Eng.*

## Frame joint for a job-site table




It's often useful to be able to quickly construct a solid table or bench frame at the job site. I simply cut legs and stretchers to length from scrap, then join with three 45° triangles of ⅜-in. plywood at each corner, glued and nailed. Variations of this joint—with a little mathematical figuring and diamond-section ribs—can be used for quick geodesic domes and other timber structures. *—Chris Yonge, Edinburgh, Scotland*

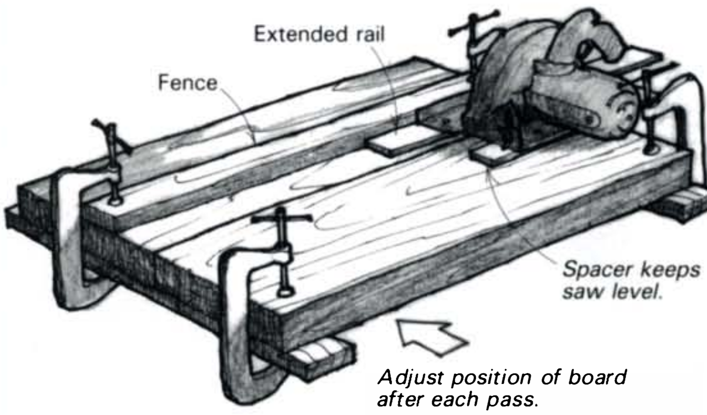
## Large-diameter caliper



Two framing squares can be used for measuring and gauging large diameters on lathe pieces. To use the squares as a fixed-size gauge, clamp them together as shown in the sketch. The framing-square gauge is actually more rigid than a large caliper.

To use the squares for measuring, leave off the clamps and simply slide both squares until they bracket the work. Then you can read the diameter on the inside scale on the back of one of the squares. With a standard 16-in. by 24-in. square you can measure up to 28 in. easily. *—Alan Dorr, Chico, Calif.*

## Jointing with a circular saw




Faced with the problem of jointing two 2x10 lengths of sugar pine for a carved sign, and not having a jointer, I used this method to produce an almost perfect joint.

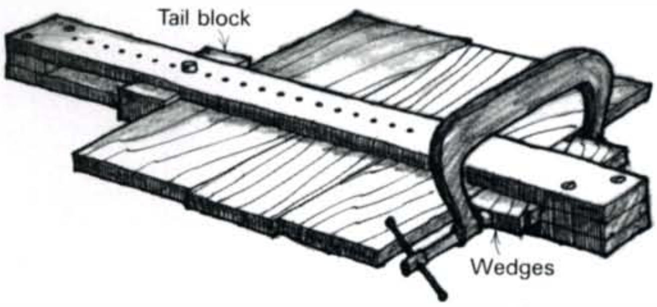
First I bolted an 18-in. oak rail and a spacer of equal thickness to the base of my circular saw, as shown in the sketch. The rail acts as an extension to the base, ensuring the blade will run parallel to a straight fence. I replaced the combination blade with a hollow-ground planer blade.

Next I clamped the two 2x10s edge-to-edge on a level surface and clamped a hardwood fence on top of one of the planks. The fence was set so that the saw would pass right down the meeting line of the planks, removing some material from each plank.

After each pass of the blade I pushed the two planks together, readjusting the fence as necessary, and took another cut. After five or six passes, the joint was ready to be glued. *—Robert P. Cromwell, Royalston, Mass.*

***Quick tip:*** Almost any sort of glue spreader will do the job, but in my mind, serrated plastic knives are superior to all other devices. Just wipe off the mustard and you're ready to spread glue. *—J.A. Breneman, Richmond, Va.*

## Homemade edge-gluing clamps



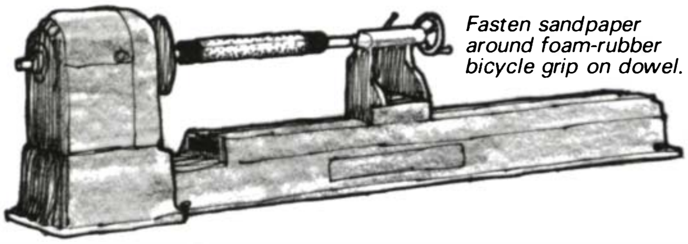

Here's an inexpensive but effective homemade clamp for edge-gluing stock. Unlike a pipe clamp, it won't fall off the workpiece while you're fitting up and it pulls evenly on both sides of the stock, ensuring flat panels. To use, pin the sliding tail block in an appropriate place, then apply pressure by screwing down a C-clamp across the wedges. Scraps of waxed paper will shield the clamp from glue squeeze-out. *—Bert Whitchurch, Rockaway Beach, Mo.*

## Versatile mylar

I recently discovered a drafting "paper" made of transparent mylar, which has proved to have many interesting applications around my woodshop. It is available in rolls or sheets from art supply stores, and comes in various thicknesses from 0.003 in. to 0.008 in.—this makes it handy as shim stock, and the heavier weight makes good template material, too. One side is frosted

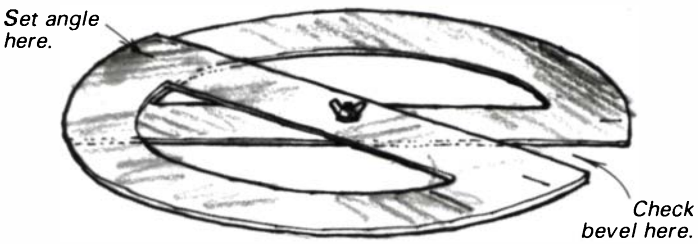
so that it will accept pencil or ink and the other side is glossy. You can buy it clear or with a graph-paper pattern for making drawings. I find that for small projects I can draw the plan on the frosted side, turn the sheet over, and glue up the work on the shiny side—the glue won't stick to it and I can align the pieces perfectly with the drawing. Mylar cuts well with a sharp knife or scissors, is durable and has very good dimensional stability. It is also superior to waxed paper for protecting surfaces from glue squeeze-out because it is stiff, doesn't wrinkle and tends to stay put. —*Norm Capen, Granada Hills, Calif.*

## Flexible drum sander




This inexpensive drum sander can be made by slipping a foam-rubber bicycle grip over a ⅝-in. dowel. The grip will stay nicely in place without adhesive. Notch and center-punch the dowel so it will run between centers on your lathe. Form sandpaper into a cylinder, scrape the abrasive off the bottom edge of the seam and hot-glue the sandpaper around the foam-rubber. The sander has just enough give not to sand flat spots on curved surfaces but is firm enough to make smoothing fast and easy. I use a vacuum and homemade sawdust collector to pick up the dust. —*Gene Austin, Blue Bell, Pa.*

## Adjustable protractor




An accurate adjustable angle gauge can be made quickly and inexpensively from two identical dime-store plastic protractors. With a tiny bolt and wingnut, fasten the two protractors together by enlarging the holes already made at the center. I find the device quite useful when cutting angles and also for checking the bevel angles on chisels and turning tools. —*John Roccanova, Bronx, N.Y.*

## Stripping with sawdust

To remove an old varnish finish quickly and neatly, first apply varnish remover and keep it wet until the finish has softened, then use handfuls of sawdust to remove the sludge. The sawdust acts as an abrasive to effectively clean off the old finish. In addition, it absorbs most of the mess and makes cleanup an easy broom-and-dustpan task. —*Bill McNutt, Guthrie, Okla.*

*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.*

## Replacing motor brushes

***How do I know when to replace the brushes in an electric motor?*** ***—David Grant Willemain, Towson, Md.***

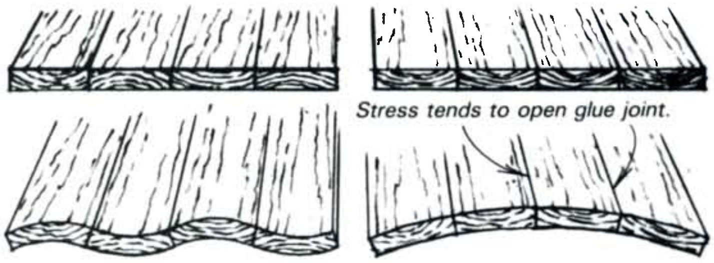
***Edward Cowern replies:*** Brushes should be replaced when they've worn down to approximately half their original length. Some power tools have brushes equipped with a safety mechanism that lifts the worn brushes up from the commutator before any damage can occur. Most tools, however, aren't equipped with this device. Running the brushes too long can result in the brush springs or the copper pigtail lead running against the commutator, which may cause permanent damage.

It's important to use replacement brushes from the original manufacturer. This ensures that the brush material, size, spring tension and the small brass "button" on the end of the spring are correct for the tool. With square brushes, be sure to install them so the contour on the brush exactly matches the contour of the commutator. Failure to do so can mar the commutator and shorten future brush life. It isn't usually necessary or desirable to clean the commutator with any abrasive material.
[Edward Cowern is an electrical engineer in North Haven, Conn.]

## Growth-ring orientation

***I'd like to know which way to orient the growth rings when I glue up a table top. Should the rings all point the same way or should I alternate them? I've seen tables made both ways.*** ***—Ed Stolfa, Roselle, Ill.***

***R. Bruce Hoadley replies:*** There are two schools of thought regarding growth-ring orientation. The drawing shows what type of distortion results from each method. The rings-in-the-




same-direction school holds that alternating the boards makes the cupping more obvious and that the resulting wavy top is hard to fasten down. Orienting the rings in the same direction forces the board into an arch. This method has merit if the top is tightly held down.

On the other hand, alternating the boards has merits too. Alternating the cupping helps maintain an appearance of overall flatness in the finished top and, perhaps even more important, less stress will develop at the glue lines.

More important than growth-ring orientation, make sure that the moisture content is uniform from board to board and that the wood has reached an equilibrium moisture content with its environment before you glue up the top.
[R. Bruce Hoadley is professor of wood science at the University of Massachusetts at Amherst.]

## Shaper cutter safety

***Freud makes horizontal raised-panel cutters to fit ¾-in. and ½-in. spindle shapers. Are these cutters safe for a small ½-in. shaper? Can I safely use one on my ½-in. Delta 43-122 light-duty shaper?*** ***—Charles L. Hart, Jr., Baltimore, Md.***

***Carlo M. Venditto replies:*** Freud's engineers conducted thorough research and testing before introducing this line of cutters. It's generally accepted that if a cutter runs above its maximum RPM rating, the centrifugal force could cause the cutter to explode. Our horizontal raised-panel cutters are rated to run at a maximum of 12,000 RPM. The Delta 43-122 light-duty shaper runs at 9,000 RPM, so there's no chance of exceeding the cutter's maximum rated RPM. We've tried our horizontal cutters on the Delta 43-122 shaper with excellent results.

The following precautions should be used with any shaper: Check that the spindle run-out is within the manufacturer's tolerance; mount the cutter as close as possible to the bottom of the spindle; make sure the cutter clears the fence before turning on the motor; make several passes if the motor strains and always use safety guards and devices where feasible.
[Carlo M. Venditto is executive vice president of Freud USA.]

***Greg Ramsey Replies:*** The Delta 43-122 light-duty spindle shaper wasn't designed for cutters larger than 3½-in. dia. The 3-wing Freud cutters are almost 5 in. in diameter. The Freud cutters may be able to stand up to the shaper's 9,000 RPM but the ½-in. spindle may not be able to stand up to the mass of the big cutter—especially under load. If you want to use horizontal raised-panel shaper cutters, we suggest a spindle diameter of ¾ in. or larger. Delta's horizontal raised panel cutter (43-931) will fit 1-in. and 1¼-in. spindles.
[Greg Ramsey is product analyst with Delta International.]

## Transparent glaze

***I have a large quantity of molding that's been finished with Deft clear lacquer. For a number of reasons, it can't be stripped and refinished. Is there some sort of transparent finish that I can apply over the lacquer to darken the molding to a brown fruitwood color?*** ***—R. Winkleblock, Arroyo Grande, Calif.***

***Beau Belajonas replies:*** One way to solve this problem is to apply a glaze. I believe this technique will enable you to control the amount of color and transparency.

First, you need to mix up a glaze medium from one part varnish, one part mineral spirits or turpentine and one-eighth part boiled linseed oil.

To make a brown fruitwood, I'd use raw sienna and burnt umber which can be bought as universal colored pigments, oil colors or Japan colors (available from Woodfinishing Enterprises, 1729 N. 68th St., Wauwatosa, Wisc. 53213). Add a bit of raw sienna and a touch of burnt umber to your glaze medium, keeping track of proportions. Start with small amounts—you can always add more. Mix up what you think is the color you're looking for and test it on a small section of your Deft-covered molding. Let it stand for five minutes then gently rub with the grain. If the color isn't dark enough, add more pigment.

Once you've reached the right consistency, make up a bigger batch and you're ready for application. The basic technique for applying a glaze is to brush it on, let it stand for five minutes, then gently rub it off. Try to rub in one direction. If the glaze pulls too much or seems to drag, add a little linseed oil. Let the glaze dry overnight.

The next day, after the glaze is dry, I like to give it a coat of satin varnish tinted with a bit of burnt umber. This evens the glaze and gives the finish more depth.
[Beau Belajonas is a professional wood finisher in Camden, Me.]

## Casehardened boards

***When I resawed some 1-in. kiln-dried oak, the resulting ¼-in.-thick boards warped badly as I was sawing. The 1-in. boards weren't warped, but sometimes the resawing would even cause the stock I was cutting from to warp. I tried resawing some 1-in. air-dried ash and the ¼-in. boards came out straight, but after a couple of days they too were warped. What am I doing wrong?*** ***—Michael L. Buza, Alpena, Mich.***

***Gene Wengert replies:*** Your kiln-dried oak has residual drying stresses, a condition known as "casehardening." Casehardening is often to blame whenever lumber warps or crooks immediately while machining, and can occur whenever lumber is

dried in a kiln or dehumidifier. To eliminate the stresses that cause casehardening, kiln operators usually subject lumber to a high-temperature (180°F), high-humidity (80% relative humidity) treatment, called conditioning, for 12 hours at the end of the drying cycle. Casehardening isn't often seen in air-dried or solar-dried wood because there are usually some high humidity days during the drying cycle.

Your air-dried ash (which, in Michigan, probably had a moisture content over 15%—too high for interior use) warped a few days after resawing because the inside of the board probably had a higher moisture content than the outside. So your resawn boards had one moisture content on one face and another moisture content on the other. When the wetter face dried out, the shrinkage caused the boards to cup. To prevent this delayed warp, dry the 1-in. ash to the moisture content that it will have in use, and store it at this same relative humidity. Remember that dried lumber will regain moisture when the humidity increases.
[Gene Wengert is professor of wood technology at Virginia Polytechnic Institute in Blacksburg, Va.]

## Resin bleed-through

***What sealer can I apply to knotty white pine to prevent the resins in the wood from bleeding through acrylic paint?***
***—Deborah McVay, Richmond, Va.***

***Ric Hanisch replies:*** No sealer will be effective on green pine that still exudes resins. Make sure that your wood is dry. I suggest that you experiment with different sealers to see which works best with your particular brand of paint. Shellac works well as a sealer. Apply one coat to raise the grain, sand and recoat. A commercial primer/sealer such as Zinsser BIN Primer/Sealer, which contains shellac and titanium dioxide, seals well and provides a white base for painting. Aluminum paint (a spray can is OK) is also an excellent sealer for knots and could be applied under a coat of BIN.
[Ric Hanisch designs and makes furniture near Quakertown, Pa. He wrote about painted chests in *FWW* #48.]

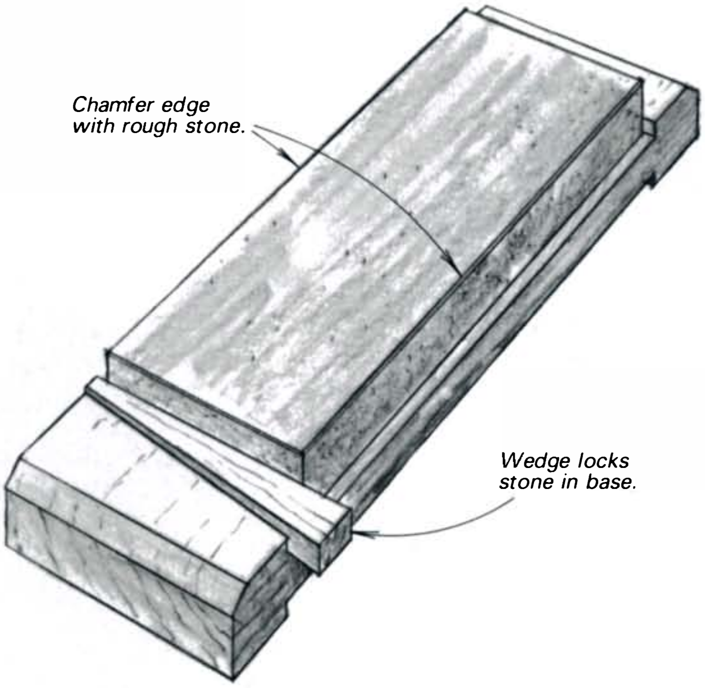
## Care of Japanese sharpening stones

***A few months ago, I replaced my worn out oilstones with man-made Japanese waterstones. What should I do to keep these stones in good condition?***
***— D. Christenson, Solebury, Pa.***

***Toshio Odate replies:*** There are two types of Japanese waterstones, synthetic and natural. Synthetic waterstones may be kept in water all the time, or placed in water to soak for 10 to 20 minutes before use, as I do. Keep natural stones dry except when in use and protect them from freezing. I always make a wooden base for my stones, as shown in the drawing.

Compared to oilstones, Japanese waterstones are quite soft, so they wear more quickly. A flat stone is essential for a sharp blade, so sharpen across the stone from corner to corner as evenly as possible and frequently turn the stone end for end so that it wears evenly. Narrow chisels will wear a hollow in the middle of a stone, so don't sharpen a wide blade on a stone that's been used for narrow blades. I recommend two separate sets of stones: one for narrow blades, and one for wide blades like plane blades. (A good beginning set of man-made stones is 800X, 1200X and 6000X or 8000X.) If you have only one set of stones, use different surfaces for chisels and plane blades.

Waterstones are easy to reflatten. First, get a sheet of glass about 16-in. square and at least ¼-in. thick. Round the corners and chamfer the edges of the glass with silicon-carbide sandpaper. Place a wet sheet of wet/dry silicon-carbide paper on the glass—it will stick by suction. Use 80- or 100-grit paper if your stone is in poor condition, 150- or 180-grit paper for a slightly hollowed stone and 320- to 600-grit for slightly hollowed 6000X or 8000X man-made finishing stones or natural finishing stones. While splashing on water, rub the stone on the sandpaper in a circular motion until the entire surface touches the paper. This is all you need to do for most stones. For a perfect surface on a natural finishing stone or a 6000X or 8000X man-made finishing stone, after flattening, rub two




finishing stones together with plenty of water until the faces fit tightly and are difficult to move. Don't rub a natural stone against a man-made stone. Stones that are badly worn can be rubbed on a concrete surface or a concrete block with plenty of water before going to the paper. After flattening a stone, chamfer all the edges with a rough stone to avoid chipping.
[Toshio Odate is a sculptor and *shoji* maker in Woodbury, Conn. He is the author of *Japanese Woodworking Tools: Their Tradition, Spirit and Use* (1984, Taunton Press).]

## Oxalic acid

***In his stripping process, a woodfinisher I work for uses oxalic acid to remove steel wool from the grain and bleach out stain. Does oxalic acid have any long-term side effects or problems?***
***—Dave Anderson, Greenbrook, Vt.***

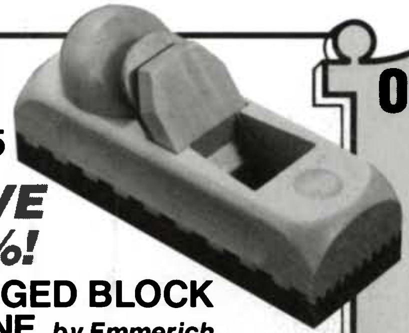
***George Frank replies:*** Oxalic acid will burn the skin and can cause severe respiratory irritation if the fumes are inhaled. Wear gloves and goggles when working with it, and provide plenty of ventilation.

Oxalic acid is a strong bleach and it will harm subsequent finishes unless all traces of it are cleaned off and neutralized. The wood must be rinsed several times with clear water, preferably rainwater. Any dirt, even the slightest amount, or any contact with metal will compromise your cleaning. After rinsing, neutralize the oxalic acid with a final wash of one part Clorox in three parts water. It stinks, but it does the job.
[George Frank is a retired master European wood finisher.]

## *Sources of supply:*

...Footprint Tools, 7 Emery Ave., Randolph, N.J. 07869.
...micro carving tools (1.5mm, 2mm and 3mm) are available from Dockyard Model Co., P.O. Box 8065, Colorado Springs, Colo. 80933.

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



just $9.95

***SAVE 55%!***

## WEDGED BLOCK PLANE *by Emmerich*

Beech, with a lignum vitae sole, and just 6" long – a comfortable fit in your hand. 1½" blade is excellent for general trimming. **109-1588, was $21.95**

**just $9.95** *pair*

***Lightweight, 15¾" Hornbeam***

## WOOD CLAMPS

Spring steel bars with quick-action cam capable of producing 350 lbs. pressure when fully locked. Jaw faces are cork lined to protect your work. **300-1153**

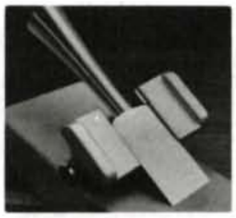
***Our Most Popular Bench Top Accessory!***

*Set of 3*

**just $9.95**

## Flush-Mounting BENCH STOPS

Easy to install – just chisel out a cavity and insert the stop. Easy to use – just turn the screw to raise the jaw, then press your workpiece against the teeth. Extra useful when you have a shoulder vise with built-in "dog". **300-0004, Originally $7.95 each**



***Our Indispensable***

## HONING GUIDE

**just $9.95**

Complete with instructions. It maintains the proper angle for accurate honing of any type chisel or plane blade up to 3" wide. **103-0140**

***SAVE UP TO 80%!***

***25 Assorted 1/2" Shank***

## Recipro Saw Blades

Made by Stanley, for wood, plaster, metal. Some blades not painted, some not printed. All first quality. **117-1960, LIMITED QUANTITY**

# Order any Fine Tool

**on this page for just**

# $9.95

**Order any two for $19.90 and I'll throw in a Pocket Flashlight FREE!**


just $9.95

## *Disston* 12" BACK SAW

Wood handle, Disston's best blade with 12 TPI. **You save over 40%! 117-1949, Disston list $19.00**

**just $9.95**

## BRAD DRIVING PLIERS

They do just one job – and do it superbly! The moveable jaw squeezes a brad into your picture frame while the adjustable cushioned slide protects the frame edge. For moldings up to 3⅝" wide, 1¾" deep. 106-0010

***SAVE $3.00!***

*Set of 3*

**just $9.95**

## World's Toughest SCREWDRIVERS

Smooth, comfortable, hardwood grips, securely riveted to the one piece, forged blade, make these the toughest screwdrivers you can abuse. **102-0040,** set of 3 (6", 8", 10") – the best $9.95 you ever spent!

**just $9.95**

***Our Famous 14 Piece***

## DRILL AND COLLAR SET

Brad point bits, specially designed for accurate wood drilling with no dancing, no skating, no skipping – ever! We include 7 bits (1/8", 3/16", 1/4", 5/16", 3/8", 7/16" and 1/2"), with a stop collar to fit each, so you'll never have to guess at drilling depth again! **200-0060, a $12.90 value**

## *HURRY! SALE ENDS OCTOBER 15, 1985*

the Fine Tool Shops

**The Fine Tool Shops, Inc.** Dept. **FWSF**
Box 1262, 20 Backus Avenue, Danbury, CT 06810

Ship to ____________

Address ____________

City ________ State ________ Zip ________

**CALL TOLL FREE 1-800-243-1037**

In Connecticut, 797-0772

| Qty. | Item | Prod. # | Price ea. | Total |
|---|---|---|---|---|
| | Wedged Block Plane | 109-1588 | $9.95 | |
| | Disston 12" Back Saw | 117-1949 | $9.95 | |
| | Set of 3 Screwdrivers | 102-0040 | $9.95 | |
| | Brad Driving Pliers | 106-0010 | $9.95 | |
| | 15¾" Wood Clamps, Pr. | 300-1253 | $9.95 | |
| | Honing Guide | 103-1040 | $9.95 | |
| | 14 pc. Drill/Collar Set | 200-0060 | $9.95 | |
| | Set of 3 Bench Stops | 300-0004 | $9.95 | |
| | 25 Stanley Recipro Blades | 117-1960 | $9.95 | |
| | Pocket Flashlight – **FREE** when you order any 2 or more! | | | |

| | |
|---|---|
| **Subtotal** | |
| Shipping/Handling 1st item $2.00 Each add'l item, $1.00 | |
| CT 7½% Sales Tax | |
| **TOTAL enclosed** | |

☐ Check Enclosed
☐ Charge my ☐ AmExpress ☐ VISA ☐ MasterCard

Account # ____________

Exp. Date ____________

☐ Send **FREE** Full Color Tool Catalog

**Cabinetmaking: The Professional Approach** by Alan Peters. ***Charles Scribner, Order Dept., Front and Brown Sts., Riverside, N.J. 08075; 1984. $25.45, hardcover; 192 pp.***

I should declare an interest right away. I was a student of Alan Peters' for a couple of years in the early 1970s, an experience from which I emerged with much improved woodworking skills and a great respect for the man who taught them to me. Peters has made one-of-a-kind furniture professionally for 35 years. When he set up his own workshop, in 1962, he could make virtually anything at the workbench, but he could barely rub two pennies together in his pocket. As he tells it, "I had one burning ambition, which was simply to get the business off the ground; to achieve what Gimson and the Barnsleys and many others had not been able to do at that time, which was to run a creative workshop working to my own designs and to my quality, without resorting to teaching or any other source of income." Eight years later, he had succeeded. Today, Peters remains one of the few people in England or America to make a living solely from designing and making one-of-a-kind furniture. He wrote this book to tell how he does it, and for that reason alone it is worth the price to would-be and practicing professionals alike.

Peters apprenticed with Edward Barnsley in the early 1950s, where he acquired the skills and the Arts and Crafts ideals that have sustained him since. His time there coincided with the introduction of machinery into the shop. For his first five years, Peters and everyone else in the shop worked to Barnsley's exacting standards entirely by hand. When, after two years national service, Peters returned to the shop, he was greeted by the hum of electricity and a huge planer spewing chips all over his bench. Likewise, Peters worked through the period of Barnsley's transition from the straightforward, solid-wood Arts and Crafts style pioneered by his father, Sidney Barnsley, and Ernest Gimson, to his later refined, sophisticated style, influenced by 18th- and early 19th-century work. The relationships of hand to machine work and of simplicity to sophistication have occupied Peters ever since, both economically and aesthetically.

Peters begins his book with a short, informative section tracing the history of the modern craft revival from the Cotswold Arts and Crafts workshop of Gimson and the Barnsley brothers through Edward Barnsley to the present. The bulk of the book, however, is a primer on setting up a professional workshop. There is a great deal of useful advice here, but I find the book most interesting when Peters is telling his own story; specific examples from his experience make the advice come alive. Lists of tools, for example, are usually meaningless, but rather than giving a generalized rundown of the tools you might need, Peters tells those that he does need and why, which gives an insight into his work as well as allowing you to compare your needs with his. I only wish the ratio of specific illustration to general advice were higher throughout the book.

In subsequent sections, Peters covers the workshop, equipment, finance, design, commission work, batch production and training. This is not a how-to book. There aren't any sample workshop layouts, you won't learn an accounting system, or a design methodology. Instead, Peters offers sound advice and observations, and some strong opinions. The would-be professional will pick up lots of useful information, but more important, will gain a valuable perspective on woodworking as a career. Though Peters appreciates the romance of wood, he makes it clear that romance fades fast in the absence of money. "Ask yourself why you should succeed where so many other talented people have failed. I have experienced this past ten years a steady flow of students and mature people who have expressed a strong desire to become furniture makers, and my guess is that little more than a tenth ever get started, and even fewer survive the first five years." As one who didn't make it through the first five years, I can vouch for the difficulty of the task.

A section on technique and nine projects complete the book, though I didn't feel they added much to it. (The finishing section, however, provides some valuable help in choosing a finish appropriate to your requirements, as well as a good procedure for oil finishing and a novel use of Vaseline—as a polish.) Far more interesting are the photos and comments on Peters' own work over the years. During the 1960s, as Peters struggled to establish the business, Barnsley remained a considerable influence. During the 1970s he broke away, experimenting with cleaner lines, simpler constructions and combinations of materials. Then, like Barnsley, he became increasingly uneasy with highly wrought surfaces and elaborate designs. It took two trips to the Far East for Peters to rediscover his own roots and find his own voice. "There is a wonderful similarity between the traditional work of Korea and Japan and much of the early Cotswold School. The directness and honesty of construction and approach, with nothing contrived; the general lack of sophistication; the sheer joy and spontaneity that comes through into the finished work itself, which I believe is a direct result of contact with the materials at all stages with hand tools and hand skills. I now know what Edward Barnsley feared [about machinery], and with some justification." His recent work (shown in the book in color) continues and develops the long Arts and Crafts tradition. For my money, it's his best work to date. ***—Roger Holmes***

**The Primary Source: Tropical Forests and Our Future** by Norman Myers. ***W.W. Norton, 500 5th Ave., New York, N.Y.; 1984. $17.95. hardcover; 399 pp.***

Tropical forests generally occur in areas that have a mean annual temperature of at least 75°F and are essentially frost-free. They receive at least 2000mm of rainfall each year and receive twice the solar energy that temperate regions do. This warmth and steady, year-round rainfall offer a consistent climate from which springs an abundance of life forms. Occupying only 7% of earth's land surface, tropical forests contain some 40% of all species, or an estimated 90,000 plant species and some two- to four-million animal species. Perhaps only one in six of these have even been identified, as sparseness is as much a characteristic in tropical forests as is diversity. A large percentage of these species are endemic, that is, they've found only in one particular locale and nowhere else.

According to Norman Myers, in *The Primary Source*, threats to tropical forests have been steadily increasing. Once comprising sixteen-million square kilometers of land, these forests have already diminished to nine-million square kilometers, at most. These threats come from many directions. Fuelwood gathering accounts for loss of some 25,000 sq. km. each year. Conversion of forests to grazing land (or what Myers calls "hamburgerization") to provide cheap beef to the fast-food industries of the United States, Western Europe, and Japan, accounts for yet another 20,000 sq km./yr. Forest farmers, who clear land and raise crops until soils are depleted—usually in just a few growing seasons—and then move on to fresh forest, convert some 160,000 sq. km./yr. And 45,000 sq. km. of forests are logged each year, mostly in Asia and Africa, but with Latin America expected to catch up by the end of the century. In total, then, some 200,000 sq. km. is lost each year, or about 2% of the whole. At this rate, there will be no primary tropical forest left in 50 years.

"We can assume that even if conversion rates do not accel-

erate (as we can prudently expect they will), one-third of the species in Latin America's tropical forests will disappear by the turn of the century, almost one-seventh in Africa's, and well over two-fifths in southern/southeast Asia's...we cannot rule out the prospect of losing one million species."

Much of *The Primary Source* is devoted to looking at just what we have to lose from the disappearance of these flora and fauna. Myers correctly approaches this discussion from a "dollars and cents" point of view, as economic development underlies both problems and solutions. The tropics already provide us with genetic diversity to sustain our vast agricultural output, by aiding in development of disease-resistant crop varieties and varieties that will grow under diverse soil and climate conditions. Many new foods await our discovery in the tropics. Medicines and pharmaceuticals, industrial products, energy sources, all are being developed now, but this development is just the tip of the iceberg. "We have taken a passing look at a mere one species in ten to assess its economic usefulness, and we have cast a longer look at only one species in one hundred." Instead of exploiting tropical forests for short-term gains, third-world countries would do far better to preserve and develop these resources for sustained yield.

Tropical forests provide other major environmental benefits as well, by absorbing huge quantities of water and releasing it slowly, thereby allowing intensive use of irrigation for crops, primarily rice. This same mechanism helps control flooding and prevents siltation of waterways and dams, now a major problem where deforestation has occurred. Tropical forests also have profound effects on rainfall patterns and global temperatures, and help to regulate the amount of carbon dioxide in the atmosphere. We are just beginning to realize the important role tropical forests play in global climate.

In the end, the fate of the world's tropical forests lies largely in the hands of the countries in which they are located. However, because the rest of the world is influenced so greatly by this most important of earth's ecosystems, we must all share in the responsibility to protect it. Through various United Nations agencies and international aid organizations, like the World Bank and U.S. AID, some positive steps are being taken. Environmental organizations, such as the Sierra Club and World Wildlife Fund are also actively involved, but momentum is certainly on the side of the abuse and misuse of what Myers calls "our common natural heritage."

What has all of this to do with us as woodworkers? What part do we play in this deforestation scheme? "More than one-half of all tropical timber felled finds its way into the main market for specialist hardwoods of the tropics, that is, the advanced nations," says Myers. Such demand causes nations to harvest their hardwood timber at rates beyond what the forests can renew. Well might we ask, then: "whose hand is on the chainsaw?"

I suggest that we woodworkers carefully and thoughtfully select the woods we use in cabinets and furniture, not just on the basis of the characteristics of the woods themselves, but on a myriad of other factors. To be able to do so, we must become informed, and *The Primary Source* is an excellent place to start. ***—Rick Walter***

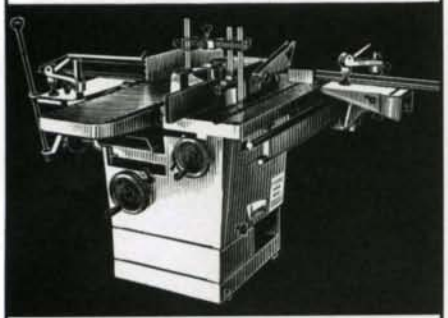
---

*Roger Holmes is an associate editor of* Fine Woodworking *magazine. Rick Walter makes furniture and cabinets in Hermosa, South Dakota.*

# LUREM

## Universal Woodworkers

*"for the woodworker who needs more shop space."*

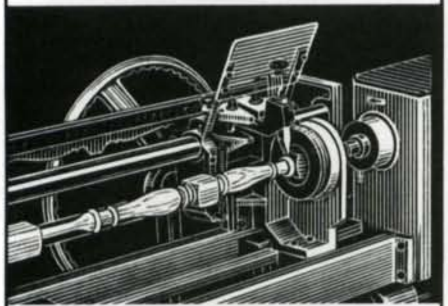


Lurem is the world leader in design and manufacture of Universal Woodworking Machines with over 35 years experience in building this type of equipment. They are built from casting for reliability, and will sustain hard and continuous operation. Standard features include tilting arbor saw, jointer, auto feed thickness planer, shaper, horizontal drill mortiser, and sliding carriage for cross cutting and tenoning. Four models available with jointer/planers from 8" to 16" wide.

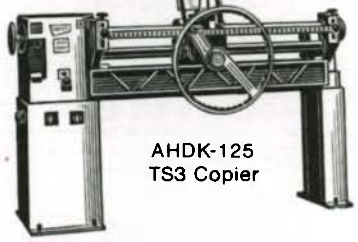
Send $1.00 for Brochure

# HAPFO

## Copying Lathes



Advanced wood copying lathes for custom turning a wide variety of parts, especially long thin parts such as those required in stair and chair production. An adjustable ball bearing back rest guided directly in front of the cutting tool makes this possible by reducing vibration of the workpiece and the part is completed in **one pass**. HAPFO lathes, made in Germany, are available in a variety of sizes, 45 to 78 inches between centers, in both manual and automatic hydraulic operations.



AHDK-125
TS3 Copier

Send $1.00 for Brochure

U.S. Importer 714/549-3446
Int'l. Woodworking Equip. Corp.
11577 A Slater Avenue
Fountain Valley, CA 92708

# The World's Least Expensive Scroll Saw?


That's right. If you've been considering purchasing a scroll saw, you may have thought you couldn't afford a ***HEGNER***. Many of our customers used to think so, too.

But they learned, some of them the hard way, that it costs more to use the wrong tool than to buy one that will do the job right and keep doing it for years and years. In the long run, the best usually costs the least!

That's why more people switch from other makes to ***HEGNER*** than to any other: ***HEGNER*** is proven to be the best!

Use the coupon below for free information today!

*AMI Ltd. is your source for HEGNER Saws, Lathes and Duplicators; FELDER Woodworking Systems; FLOTT Jointer/Planers and Table Saws; and Lachappelle Workbenches.*

Please send me free information on ***HEGNER*** Precision Scroll Saws.

Name ______________________

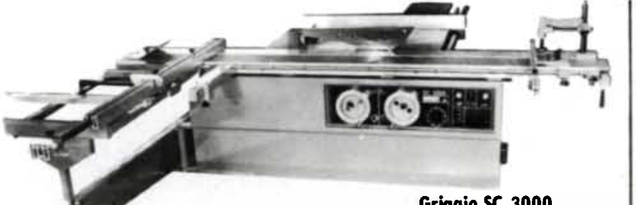
Address ______________________

City, State, Zip ______________________

Phone ______________________

AMI LTD.

**Advanced Machinery Imports**
AMI, Ltd., PO Box 312, Dept. 45
New Castle, DE 19720
**302-322-2226**



**Griggio SC 3000**
5 X 10' maximum panel
Will accept up to
16" blade (with scoring)

# Trouble cutting large panels or components accurately?

We've got the answer at an unbelievably low price.

Woodshop Specialties is a stocking distributor for POWERMATIC, DELTA (formerly Rockwell International) and a full line of other quality stationary woodworking machinery. We also sell parts, deal in reconditioned machinery, and fully service every machine we sell.

*When you want complete satisfaction, write or call and ask for owner Mike Shahan.*

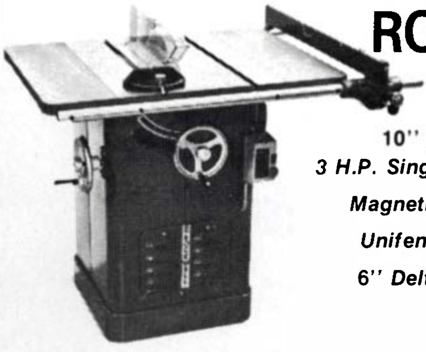
WOODSHOP SPECIALTIES
Cold River Industrial Park • Quality Lane P.O. Box 70
Rutland, Vermont 05701 • 802-773-3240

---

## ASHMAN TECHNICAL LTD.

**Machinery • Tools • Shop Equipment**
351 Nash Road N., Hamilton, Ont., Can. L8H 7P4
(416) 560-2400

# Super Fall Specials



## ROCKWELL DELTA

**10" DELTA UNISAW**
*3 H.P. Single Phase — 230 V Magnetic Starter* **$1275.**
*Unifence Model* **$1395.**
*6" Delta Jointer #37.220* **$ 540.**

## GENERAL

*10" Tilting Arbor Saw—*
3 H.P. **$1295.**
*less Electrics* **$ 995.**
*15" Bandsaw with Stand* **$ 645.**
*12" Wood Lathe* **$ 550.** *with Stand* **$ 720.**
*8" Jointer* **$1020.** *with Stand* **$1120.**

*We also stock* ***PROGRESS, RECORD, MARPLES.***
— Electrics meet Canadian Regulations —
*ALL PRICES U.S. FUNDS. SHIPMENTS FREIGHT COLLECT — NO OTHER CHARGES.*

---

# "TURN" UP WAYS TO SAVE YOU DOLLAR$!

DELTA
Behind Our New Name Is Our Old Reputation.

## 12" VARIABLE SPEED WOOD LATHE

The Delta 12" Variable Speed Wood Lathe—It's turning out exquisite work in professional shops across the country. Now, while we're still celebrating the return of our Delta name, it could turn up in your home shop, for just $1399. (Suggested retail—$2529)

And, as if that weren't enough, we'll even treat you to an accessory package worth $242. That's a total value of $2771 for $1399. Not *quite* half price. But prettydarnclose.

That includes our new Super Chuck for face plate turning, eight turning tools and two "how-to" books to sharpen your skills.

You'll celebrate too when you experience just a few of the features of this professional quality lathe. A big, cast-iron bed for stability and capacity. A smooth variable speed drive that locks in anywhere from 340 to 3600 rpm. A powerful, reliable 3/4 h.p. motor.

Buy it, and you'll turn out your best work.
Buy it *now*, and we'll turn in our best price.

Lathe & Accessory Package
LIST $2771.00

**SPECIAL $1399.00 ea.**

**SEPT. EARLY ORDER SPECIAL**—Write now for details. Delivery: Oct., Nov., Dec.—You tell us!

**STOCK**
We still have a few Delta Special Unisaws with Carbide Tipped Blade
LIST $1647.25
**SPECIAL $1199.00**

**STOCK**
RC33 Delta 13" Planer rebates extended to Dec. 31, 1985
LIST $1729.00
**YOU PAY $1299.00**
**AFTER REBATE $1149.00**

**SAVE MORE**
on your Delta Circular Blade Coupons. Buy at Philipps special discount prices.
**CALL OR WRITE FOR DETAILS**

VISA MASTERCARD CHECK OR MONEY ORDER

**PHILIPPS BROS. SUPPLY, INC.**
*Construction and Industrial Supplies*
Est. 1927
3159 BAILEY AVE. • BUFFALO, NY 14215 • **716/834-8353**

---

# HARDWOOD LUMBER OUTLET

## AT ANDERSON & McQUAID SINCE 1946

**10,000 BD' ON DISPLAY - 100,000 BD' INVENTORY**

- ***HARDWOODS***
- ***SOFTWOODS***
- ***EXOTIC WOODS***

| | | |
|---|---|---|
| ASH | HOLLY | OAK, RED RIFT |
| BASSWOOD | MAHOGANY, SA | OAK, WHITE |
| BEECH | MAPLE, HARD | OAK, WHITE RIFT |
| BIRCH | MAPLE, BIRDSEYE | PINE, EASTERN C&BT |
| BUTTERNUT | MAPLE, CURLY | POPLAR |
| CHERRY | OAK, RED | WALNUT, AMERICAN |
| AFROMOSIA | GONCALO ALVES | PEARWOOD, EUROPEAN |
| AVODIRE | GRANADILLO | ROSEWOOD, EAST INDIAN |
| BOCOTE | LIGNUM VITAE | SHEDUA |
| BUBINGA | MORADO | TEAK |
| COCOBOLO | OAK, ENG. BROWN | WENGE |
| EBONY, INDIAN | OSAGE ORANGE | YEW |
| EBONY, MACASSAR | PADOUK | ZEBRA |
| | | ZIRICOTE |

ALL STOCK FACED/D2S/RIE/SANDED 2 FACES
PRECISION CUT TO SIZE - CUSTOM MILLWORK
MILL DIRECT ORDERS - ROUGH LUMBER
RESTORATION MOULDINGS

***NO ORDER TOO LARGE OR TOO SMALL***

***FREUD SAW BLADES & ROUTER BITS***

# 617-876-3250

HOURS: MON TO FRI 7:30-4, SAT 8:00-12

**170 FAWCETT ST., CAMBRIDGE, MA 02138**
**(OFF CONCORD AV. NEAR FRESH POND ROTARY)**
*CALL OR WRITE FOR PRICE LIST*

# Announcing *Fine Woodworking's*
# Close-Out Back Issue Sale

There are 26 back issues of *Fine Woodworking* still available, each one filled with ideas and information you can use in the shop. And from now until the end of the year, you can purchase any six of these issues for just $13.98 postpaid—that's less than you'd normally pay for four issues. You save over $8 on each set you order.

Just use the accompanying order form or call toll-free, **1-800-243-7252**, and use your credit card. And don't delay. We won't be reprinting back issues, so supplies are limited. (We will continue to offer any issues left in stock after the sale.)

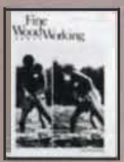
**21** Hans Wegner. Inflatable drumsander. Sanding-disc jointer. Low-tech thickness sander. Ogee bracket feet. Hewing. Dovetailing carcases. Japanese saws. Index.

**22** Kerf-bent boxes. Chair and sofa. Cowhide for chairs. Wood-drying. Sharpening saws. Shop math. Drawing the ellipse. Flexible-veneer marquetry. Oblique miters.

**23** Building blockfronts. Turning thin bowls. Hardwood plywood. French fitting. Abrasive planer. Carbide-tipped circular saws. Disc sander. Post-and-panel chests.

**29** Woodworking in Mendocino. Spindle laminations. Two-board chairs. Stroke sander. Finishing on the lathe. Pin router grinding. How to sharpen. Man-made boards.

**31** Gluing up. McKinley and industrial design. Turning for figure. Designing chairs. Six projects. Mechanism for cribs. Pillar-and-claw table. Bowl lathe. Lacquer finishing.



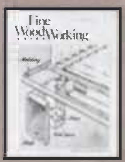
**33** Split and shaved chair. Designing for machine craft. Scribed joints. Air-drying lumber. Trussed log bridge. Shop-built panel saw. Twist turning. Vietnamese planes.

**34** *Shoji*. Using the tablesaw. Ellis desk plans. Blockfront treasure. Bamboo fly rods. Stereo cabinets. Routing wide moldings. Period hardware. Plate joinery. Repairing finishes.

**35** Curved-line joinery. Relying on the router. 18th-century finishes. Framing pictures. Decorative joints. Bermudan dovetailing. Dough bowls. Bench planes. Canoes.

**36** Lapstrake boatbuilding. Taming the skew. Chainsaw lumbermaking. Stools. Wood identification. Workbenches. Gilding. Linenfold carving. Woodworking injuries.

**37** Art Carpenter. Make a molding plane. Dovetail jigs. Lapstrake boatbuilding. Turning tips. Lathe duplicator. Horizontal boring machine. Color finishes.



**38** Building an 18th-century secretaire-bookcase. Turning goblets. Marquetry on furniture. Matched bowls. Walnut-oil finish. Stanley #55. Fixed-knife planers.

**39** Northwest furnituremaking. Wood bending. Souping up planes. Sharpening. Southern huntboard. Un-turned bowls. Radial-arm raised panels. Humidity and wood. Backsaw.

**40** Making buckets. Miniatures by machine. Restoring an old secretary. A spider-leg carriage table. Bandsaw blades. Japanese resaws. Turning tools. Bent bowl gouges.

**41** Turning giant bowls. A wooden tablesaw. The laminated wood ribbon. Respiratory hazards. Kitchen on a stick. Norris plane. Pencil-post bed. Hardware. Color and wood.

**42** Cabriole legs. Small highboy. Trestle tables. Carving running patterns. Router table. Rockers. Wooden locks. Outdoor finishes. Wendell Castle. Veneering. Shop safety.

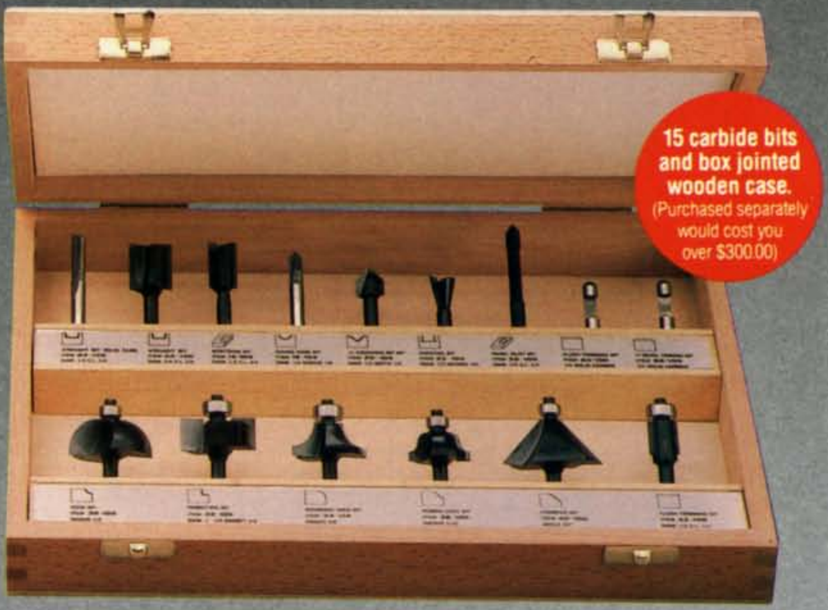
**43** Little boxes. Reading the grain. Which glue? Bandsawn dovetails. Tablesawn dovetails. European-style cabinets. Improving the fretsaw. Spoon bits. Jointer-planers.

**44** Judy Kensley McKie. Making 50 tables. How to market? At the lathe. Glues. Wooden flute. Blanket chests and record cabinets. Piano finish. Auger bits. Modular chairs.

**45** How to make drawers. Rubbed-on varnish finish. Pipe clamps. Knockdown furniture. Laying plastic laminates. Doweling jigs. Boston bombé chest. Carving tips.

# Get a FREE Ryobi Router

## and save $213⁰⁰ when you buy Freud's NEW Industrial Carbide Router Bit Set.




## Router Reg. $162.00, Router Bit Set $300.00 Value, Total Value $462.00

## Yours for only $249.00

**The Router Bit Set**

Freud engineers have designed an industrial quality carbide router bit set at an affordable price. These precision tools are of the finest quality, and manufactured using only carbide or carbide-tipped bits. Carbide will last up to 50 times longer than steel bits before sharpening is required.

These bits exceed all requirements when cutting hard or soft woods, plastics or composition materials. In manufacturing, specific carbide grades are used to insure durable edges, and all bits are ground twice. This provides an extremely sharp mirror edge that cuts like no other on the market.

**The Router**

Ryobi (Model R-151) 1 Horsepower Plunge Router with new trigger switch on handle. Plunges 0 to 2 inches. It's light weight and compactness makes routing easy to handle. The plunge depth is set quickly by thumb action. The stop block can be adjusted for 3 different cutting levels. 24,000 RPM's. Double insulated. ¼" collet capacity. Comes complete with router bit adapter, template guide, straight guide and spanners.

90-100 Set consists of:

| Item | Description | Cutting Length | Cutting Dia | Radius (Bevel) | Depth of Cut | List Price |
|---|---|---|---|---|---|---|
| 04-106 | Solid Carbide Straight 2 Flute | ¾ | ¼ | | | 11.05 |
| 04-140 | Straight 2 Flute | ¾ | ¾ | | | 15.60 |
| 16-100 | Mortising | ¾ | ½ | | | 12.73 |
| 18-104 | Solid Carbide Round Nose | ½ | ¼ | ⅛ | | 17.64 |
| 20-104 | "V" Grooving | | ½ | | ½ | 21.15 |
| 22-104 | Dovetail | | ½ | (14°) | ½ | 16.33 |
| 26-100 | Panel Pilot | ¾ | ¼ | | | 9.43 |
| 30-106 | Cove | | | ½ | ⅜ | 33.64 |
| 32-100 | Rabbet | ½ | | | ⅜ | 27.62 |
| 34-114 | Rounding Over | With Bearing Guide | | ⅜ | | 30.03 |
| 38-100 | Roman Ogee | With Bearing Guide | | 5/32 | | 32.90 |
| 40-106 | Chamfer | 1 | | (45°) | | 26.42 |
| 42-106 | Flush Trim | ½ | ½ | | | 15.62 |
| 64-100 | Solid Carbide Flush Trim | ⅜ | | | | 7.64 |
| 66-100 | Solid Carbide Bevel Trim | ¼ | | (7°) | | 8.30 |

Box jointed wooden case, value $28.00

## Call Us Toll Free!

**FOR THE NAME OF YOUR LOCAL DISTRIBUTOR:**

In California Call Toll Free: 1-800-824-0141

If You Live In This Area: 1-800-824-8045

If Your Live In This Area Call Toll Free (Outside NC) 1-800-334-4107


freud

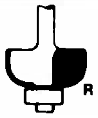
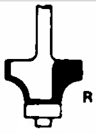
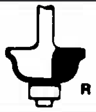
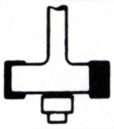
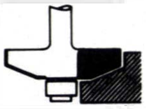
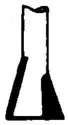
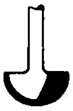
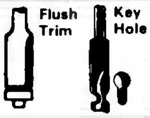
218 Feld Ave., High Point, NC 27264
(919) 434-3171

1570 Corporate Dr., Suite G
Costa Mesa, Cal. 92626
(714) 751-8866

Offer valid only in USA through Dec., 31, 1985

## CARBIDE TIPPED ROUTER BITS
## PROFESSIONAL PRODUCTION QUALITY
## SPECIAL OFFER — SAVE 50% - 75% BELOW COST

**1000's SOLD TO READERS OF FINE WOODWORKING**

| BEST CUT BEST PRICE | ITEM NO. | DESCRIPTION | RADIUS | LARGE DIAM. | CUTTING LENGTH | PRICE |
|---|---|---|---|---|---|---|
|  | | COVE | | | | |
| | #01 | 1/4" R | 1/4" | 1" | 1/2" | $13.00 |
| | #02 | 3/8" R | 3/8" | 1¼" | 9/16" | 14.00 |
| | #03 | 1/2" R | 1/2" | 1½" | 5/8" | 15.00 |
|  | | ROUND OVER | | | | |
| | #04 | 1/4" R | 1/4" | 1" | 1/2" | 15.00 |
| | #05 | 3/8" R | 3/8" | 1¼" | 5/8" | 16.00 |
| | #06 | 1/2" R | 1/2" | 1½" | 3/4" | 19.00 |
|  | | ROMAN OGEE | | | | |
| | #07 | 5/32" R | 5/32" | 1¼" | 15/32" | 18.00 |
| | #08 | 1/4" R | 1/4" | 1½" | 3/4" | 20.00 |
|  | #11 | 3/8" RABBETING | Deep 3/8" | 1¼" | 1/2" | 14.00 |
| | #09 | 1/8" (KERF) SLOT CUTTER | | 1¼" | 1/8" | 14.00 |
| | #10 | 1/4" (KERF) SLOT CUTTER | | 1¼" | 1/4" | 14.00 |
|  | #12 | 45° CHAMFER | 45° Angle | 1½" | 5/8" | 15.00 |
|  | #15 | RAISED PANEL | 20° Angle | 1-5/8" | 1/2" | 25.00 |
|  | | DOVETAIL BITS | | | | |
| | #16 | 3/8" DOVETAIL | 9° | 3/8" | 3/8" | 7.50 |
| | #17 | 1/2" DOVETAIL | 14° | 1/2" | 1/2" | 8.50 |
| | #18 | 3/4" DOVETAIL | 14° | 3/4" | 7/8" | 10.50 |
|  | | CORE BOX (ROUND NOSE) | | | | |
| | #19 | 3/8" CORE BOX | 3/16" | 3/8" | 3/8" | 11.00 |
| | #20 | 1/2" CORE BOX | 1/4" | 1/2" | 11/32" | 14.00 |
| | #21 | 3/4" CORE BOX | 3/8" | 3/4" | 5/8" | 18.00 |
|  | | GROOVE FORMING OGEE | | | | |
| | #22 | 1/2" GROOVING OGEE | | 1/2" | 3/8" | 16.50 |
| | #23 | 3/4" GROOVING OGEE | | 3/4" | 7/16" | 21.00 |
|  | #24 | 1/4" Straight Bit | | 1/4" | 1" | 7.00 |
| | #25 | 5/16" Straight Bit | | 5/16" | 1" | 7.00 |
| | #26 | 3/8" Straight Bit | | 3/8" | 1" | 7.00 |
| | #27 | 1/2" Straight Bit | | 1/2" | 1" | 7.00 |
| | #28 | 3/4" Straight Bit | | 3/4" | 1" | 10.50 |
|  Flush Trim / Key Hole | #13 | 1/2" FLUSH TRIM | | 1/2" | 1" | 8.50 |
| | #14 | 3/8" KEY HOLE (This Bit only HSS) | CUTS 3/8" KEY HOLE FOR FLUSH MOUNTING PICTURE FRAMES, ETC. | | | 8.50 |

**WHEN ORDERING ANY 3 OR MORE, DEDUCT $1.00 EACH**
**ALL PRICES POSTAGE PAID**

- Professional Production Quality • 1/2" Ball Bearing Pilot
- 1/4" Diameter Shanks x 1¼" Long • One Piece Construction
- Two Flute Thick High Quality Tungsten Carbide Tips

**To order by Master Charge or Visa Toll Free**
**7 Day — 24 Hour Order Service Call**
**1-800-523-2445 Ext. 56 (In PA 1-800-346-7511 Ext. 56)**
**or send check to: MLCS, P.O. Box 53F, Rydal, PA 19046**

# WILKE
## MACHINERY CO. INC.

A FULL-LINE FULL-SERVICE MACHINERY COMPANY NOT A POST OFFICE BOX OR AN 800 NUMBER. YOU CAN TRUST WILKE... A FAMILY OWNED COMPANY... WE KNOW MACHINERY - HOW IT WORKS AND HOW TO FIX IT.

120 Derry Court • Exit 11-Interstate 83 • York, PA 17402
Telephone (717) 846-2800

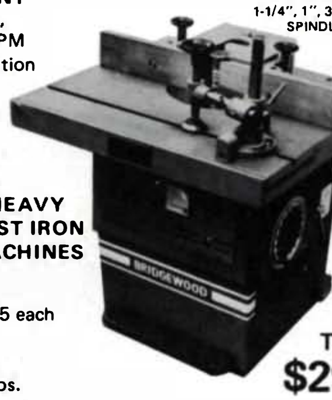
## A SHAPER FOR ALL SHOPS

**BRIDGEWOOD™ MODEL TC-50**
**6.0 HP MOTOR WITH SLIDING TABLE**

**STANDARD EQUIPMENT**
- 4 spindle speeds; 4000, 6000, 8000, 10,000 RPM
- Reversible spindle rotation
- Split adjustable fence
- Roller work holdowns
- Table inserts
- Spindle lock
- Infinite spindle height adjustment
- Ammeter
- Foot brake
- Magnetic controls
- One spindle supplied
- Additional spindles $95 each
- All shapers tested and ready to run
- Shipping weight 1300 lbs.

INTERCHANGEABLE 1-1/4", 1", 3/4", 1/2" SPINDLES

HEAVY CAST IRON MACHINES




TC-50
**$2995**
F.O.B. York

**TWO MODELS AVAILABLE**

**BRIDGEWOOD™ MODEL T-50 WITHOUT SLIDING TABLE ONE SPINDLE SUPPLIED, 5.5 HP** — **$2495** F.O.B. York

MAJOR MACHINES ADJUSTED & TEST RUN BEFORE SHIPMENT. MACHINES & MOTORS GUARANTEED FOR ONE YEAR. PRICES QUOTED F.O.B. YORK, PA & ARE SUBJECT TO CHANGE WITHOUT NOTICE. SEND $1.00 FOR OUR MACHINERY CATALOG.

# INCA

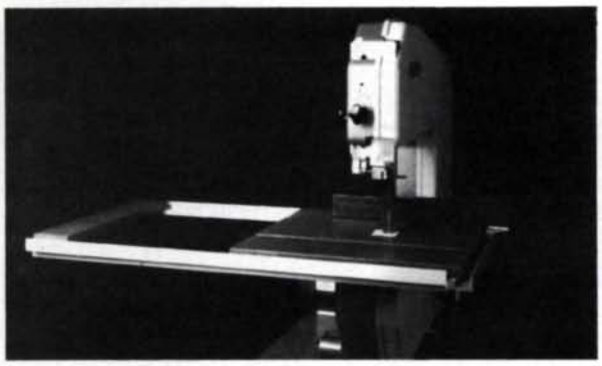
## OUR BIGGER BANDSAW
## INCA MODEL 710 20" BANDSAW

Cuts to the center of a 40" panel and up to 8" thick (10" with optional extension)! 3 speeds, balanced wheels, and ball bearing guides to hold blades, from 1/16" to 1" wide are all standard. Motors up to 1½ hp available.

Part of the complete INCA line featuring **Cast Construction** and our **Five Year Limited Warranty.**

See your **Local INCA Dealer.**

For the name of your INCA Dealer, and a **FREE Brochure,** write to: Injecta Machinery Corp., Dept. 507, 10 Van Dam Street, NY, NY 10013



INCA 51 Years of Quality Woodworking Machinery

# Form Laminating Curved Carcases

*Glued-up layers look like solid wood*

by Anthony Giachetti

I started making curvilinear furniture because I was no longer excited with my straight-line casework. Curved elements now form the basis for almost all of my furniture designs. I like the dynamic springlike energy that curved sides impart to my sideboards, desks and blanket chests. The sides appear to be bent from single, wide pieces of solid wood, but they're actually made up of several narrow sections, each form-laminated to the desired curve, then edge-glued to form a panel. Form laminating is a process of gluing up thin strips of wood by clamping them into or around a curved form. When the laminates are resawn from one board and reassembled in the same order, glue lines are barely visible.

Form laminating may not be for everybody. Resawing and surfacing the laminates is time consuming and wastes a lot of wood. Working up curved side panels can take the better part of a week. But it has its advantages, as I discovered the hard way. For my first attempt at curved sides—a jewelry case—I simply bandsawed the curve from thick rosewood, planning to edge-glue two 6-in.-wide pieces to make a 12-in.-wide panel. It wasn't long after sawing that the pieces began to cup badly, the result of a rapid change in moisture content in the now exposed interior of each board. Weak short grain, another problem with bandsawn curves, is also solved by form laminating because the grain follows the curve.

Form laminating also has several advantages over steam bending. Species that are almost impossible to steam bend, such as teak, rosewood and mahogany, can be bent by laminating. Even a fairly small radius can be achieved by using thin laminates. Springback, the tendency of bent wood to return to its original shape when removed from the mold, is both less severe and more predictable with form laminating than it is with steam-bent solid wood.

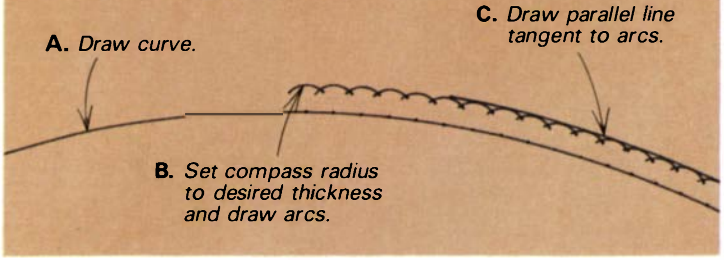
**My designs often start as a sketch** scribbled on the back of an envelope or a scrap of wood. Once the idea is firmly established, I make scale drawings and finally, full-size drawings on heavy tracing paper, working out all the joinery details and the relationships between curved and straight parts (see box, p. 44). Full-size drawings force the designer to confront aesthetic and technical problems that may not be apparent in a sketch. Is the curve graceful or comical? Are good joints possible at the angles that the curved members join the other wood elements? Such problems should be solved on paper.

I start the full-scale drawing with the curved side. I draw uniform-radius curves with trammel points mounted on a long stick, adding the thickness of the lamination to the radius to draw the outside line of the curve. For more complex curves, I draw one line by bending a length of thin, straight-grained wood or a flexible plastic spline. Next, I mark off the parallel line with a compass and the arc method shown in figure 1.

Once the curvature of the cabinet side and its position in a vertical plane have been established, I add the remaining structural elements. If the cabinet is symmetrical I draw only to the center line. Approximate dimensions for the top, side and bottom panels can be taken from this drawing but, because the actual curve of the panel may differ, you'll need to trace the panel on the drawing then redraw the angles and joints based on the new shape.

Almost any wood can be form bent if the laminations are thin enough. I design curves and select wood for the best appearance, then worry about the bending afterward, although the gluing ability of the wood is an important consideration. A beginner would do well to start with straight-grained walnut rather than oily woods, like teak or rosewood, that are often difficult to glue. (Thickness planing or sanding oily wood immediately before gluing helps overcome these problems.)

**Fig. 1: Drawing parallel curves**




In general, light-colored woods more readily show glue lines; highly-figured woods are difficult to resaw accurately and impossible to thickness without an abrasive surfacer. I prefer to reserve showy figure for the tops of my furniture.

To determine the number of laminates you'll need you must consider wood species, the degree of curvature and the amount of springback deemed acceptable. To minimize springback, I don't recommend using fewer than four plies. For a 30-in.-long, ¾-in.-thick panel that deflects 2 in. or 3 in., I'll typically use five plies. Tight curves and hard-to-bend woods require thinner laminates, but overestimating the number of laminates is costly in both wood and time. Test-bending a few assemblies will save time in the long run.

Springback is a direct function of the number of laminates. With two plies, springback will be approximately 33% of the initial radius of the form. With five plies, springback drops to

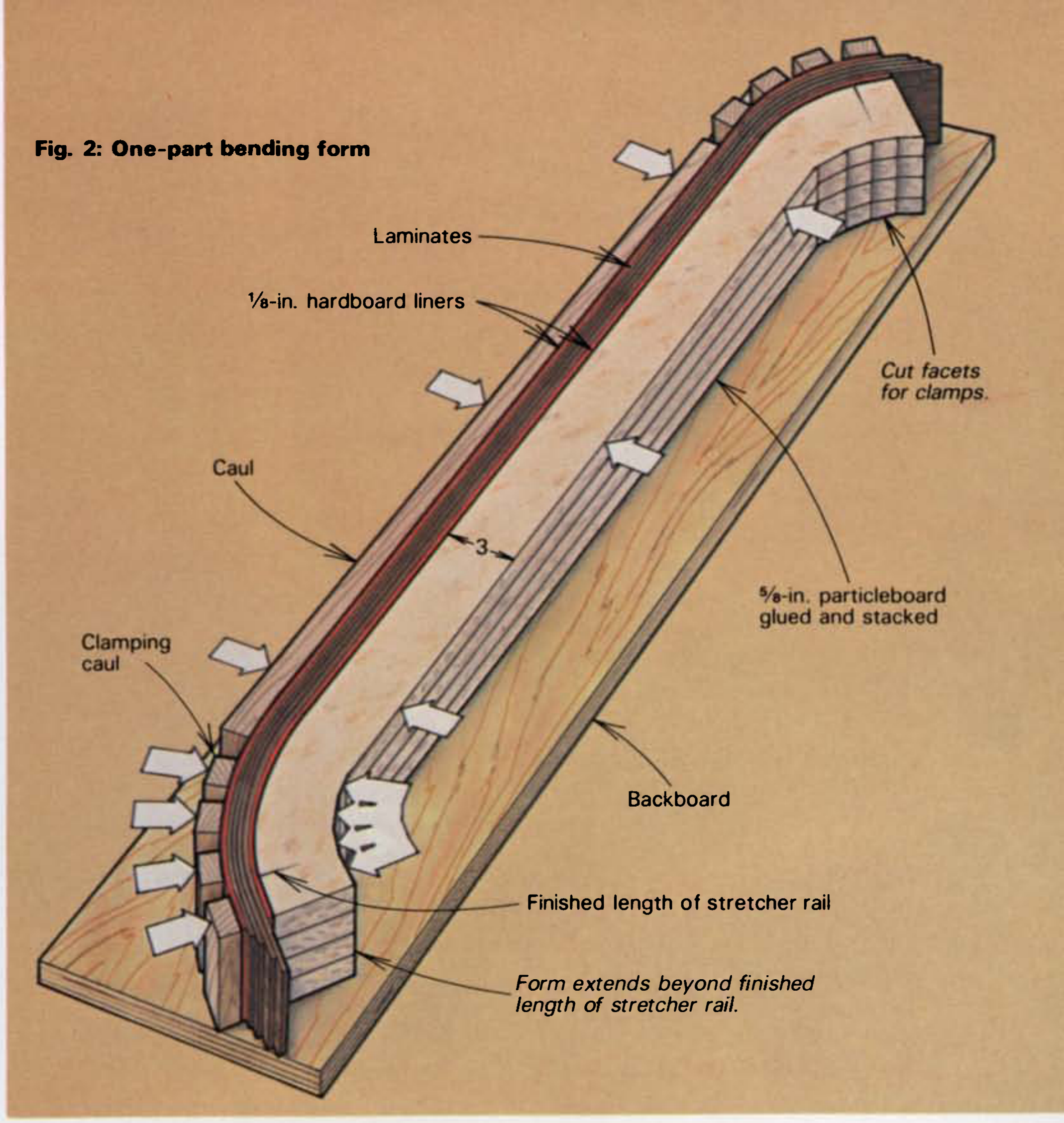



**Fig. 2: One-part bending form**

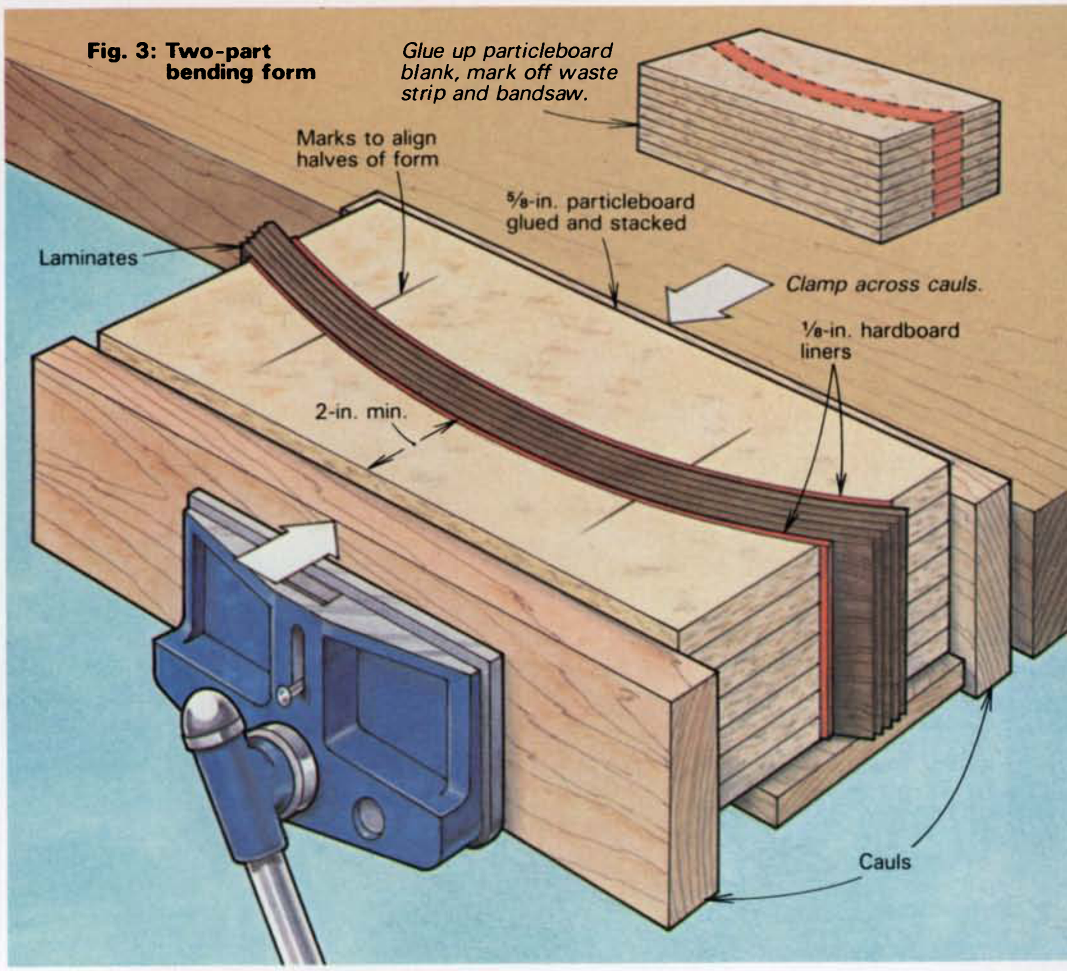



**Fig. 3: Two-part bending form**

4%. The formula for determining springback is $100\ (1/n^2-1)$, where n equals the number of laminates.

I resaw all the laminates in each assembly from one board then reassemble the plies in the same order. This looks good and minimizes cupping and twisting in the glued-up piece. The only exception is when I bookmatch adjacent sections in the glued-up panel, and even then I keep most of the plies in the same sequence.

For a five-ply, ¾-in.-thick assembly, I start with a dressed board at least 1½ in. thick to allow for saw kerfs, thicknessing the laminates, and an extra ply or two as insurance against mistakes. The board should be 3 in. longer than the finished length, measured along the curve, to allow for the planer sniping the ends of the laminates and to ensure a smooth curve through the ends of the piece. To avoid problems with warping, I rarely resaw boards wider than 7 in.

Resawing can be done on any properly tuned bandsaw as long as the blade is sharp and the guides set to close tolerances (see *FWW* #51, pp. 63-65). I use a ½-in., 4 tooth-per-inch skip-tooth blade and a pivot block fence which allows any drift in the blade to be quickly corrected by adjusting the angle of the feed (top photo, facing page). Joint the board before each cut and scribe a guideline along the entire length of the top edge, ⅙ in. over the finished laminate thickness.

When thickness planing pieces ¼ in. or thinner, run the stock through on a piece of ¾-in. hardwood plywood, a little longer and wider than the stock to be planed. To minimize tearout, reduce the planer feed rate, if possible, or angle the workpiece into the cutterhead to obtain a skew cut. Even a superbly tuned planer may completely destroy thin pieces of wavy-grained wood, so you may want to surface them on an abrasive surfacer. Many millwork shops rent time on their abrasive surfacers at reasonable rates. A finished grit of 60 or 80 will be fine for gluing.

**When designing a bending form,** the most important consideration is even distribution of clamping pressure. Pressure should be as nearly perpendicular to the curves as possible. I make both one-part and two-part forms, and each type has certain advantages.

For curved cabinet sides I usually make a two-part form as shown in figure 2, facing page. This type of form distributes pressure evenly across wide laminates, 4 in. or more, that are bent into relatively shallow curves. For narrow laminations or complex bends, I make a simple one-part form, also shown in figure 2, that allows me to get clamps all around a complex curve while maintaining clamping pressure at right angles to the curve. On the other hand, clamping pressure isn't as evenly distributed and it's possible to end up with dents in the finished lamination.

I make my forms of ⅝-in. particleboard and yellow glue. These solid forms work well for laminations up to 7 in. wide. Wider laminations usually require ribbed forms (see pp. 46-48).

For a two-part form, I glue up a particleboard blank then bandsaw it into two pieces. While gluing the blank, keep the layers in line with cauls, then trim the two long clamping edges parallel and square to the faces using either the bandsaw or the tablesaw. Transfer the curve from the full-scale drawing to tracing paper, allowing for the ⅛-in.-thick hardboard liners that flank the laminates. To compensate for springback, modify the curve on the tracing paper by flexing a plastic spline into a tighter curve and tracing around it. Transfer the modified curve directly onto the form blank. Position the curve so that the clamping pressure will be as nearly perpendicular to as much of the curve as possible. To make two or more identical forms, I make a thin, flexible template from ⅛-in. hardboard. By pulling the template into a tighter curve before tracing onto the form, I can compensate for springback.

Before cutting out the waste strip, where the laminations will go, I mark the form so that the two sections can be lined up accurately during glue-up. I bandsaw the waste with a sharp blade, just enough to negotiate the curve. This ensures the straightest possible tracking through the thickness of the form. I cut to the waste side of the line, leaving no margin for cleanup—the hardboard liners will even out minor irregularities.

One-part forms are much simpler to make. I just bandsaw the male curve from a particleboard blank, relieve the back side for the clamps, then screw the form to a backboard for support. Faceting the back side of a curve prevents the clamps from sliding around.

Before gluing-up, I lay out all the laminate bundles and arrange them to get the best possible grain match in the finished panel. I mark the outside laminates in each section with "out" and "up" to ensure that the bundle goes into the form in the correct way.

Glue for laminating must be strong enough to withstand the tendency of each lamination to return to it's original shape. White glues (polyvinyl acetate) are flexible when dry and particularly susceptible to cold creep. Yellow glues (aliphatic resin) are somewhat more resistant, but resorcinol and urea formaldehyde (plastic resin) glues are most resistant to creep. These types also set slowly enough to allow time for glue application and clamping. Urac 185, a modified urea formaldehyde (available from Nelson Paints, P.O. Box 907, Iron Mountain, Mich. 49801) has given me good results and has the added advantage of having medium-brown color. Resorcinol's dark color makes it unsuitable for light-colored woods. With either of these adhesives, a shop temperature of 65°F must be maintained during the entire eight- to ten-hour curing period.

During glue-up, it's important to work quickly, but in an orderly way. Clamps and forms should be ready for use. To make glue cleanup easier, wax the forms and the hardboard liners with paste wax. I find it convenient to use my face vise, as shown in the center photo on the facing page, to hold the two-part forms while putting on the clamps.

I apply the glue to all surfaces with a 3-in.-wide hard rubber roller, available from photographic supply houses. Small drops of squeeze-out should be expected. Large rivers of squeeze-out indicate too much glue and result in a nightmarish cleanup job.

Once the glue is applied, I slip the assembled laminates into the form, align them, close the vise, then apply one or two bar clamps to each side of the form near the center point. When applying clamps, always start at the center and work toward the ends. Once the clamps are on I remove the form from the vise and let the glue cure overnight.

After removing the assembly from the form I clean up one edge with a scraper then joint it with the convex curve against the jointer fence. I'm after a straight edge, not necessarily a square edge—I rely on the tablesaw to produce square edges for gluing. I use a 60-tooth carbide rip blade with collars on either side to reduce blade wobble. With the convex side down and the jointed edge against the fence, I trim the glue off the other edge. Then I trim the jointed edge to achieve squareness. The stock must contact the table right next to the saw blade. A slow but constant rate of feed yields best results.

With only one form, it takes four days to glue up four sections

Drawings: David Dann

# Joinery on a curve

Making curved panels takes a long time, so to keep the project economically viable I need an efficient way to join the carcase. Plate joinery is fast, strong and well suited for curved casework. Plate joinery requires a hand-held plunge-cutting machine that cuts a slot in each of the pieces to be joined. An eye-shaped, compressed-beech plate slips into the slots, expands when glue is applied, and locks tight in about 15 minutes. During this time, the joints can be adjusted about ⅛ in. for proper fit (see *FWW* #34, pp. 95-97).

As an alternative, I'd suggest a loose spline joint, but I don't recommend dowels for attaching curved sides. Dowel holes must match up exactly and this kind of accuracy isn't feasible when working with curves. The spline would allow some leeway to adjust parts during assembly.

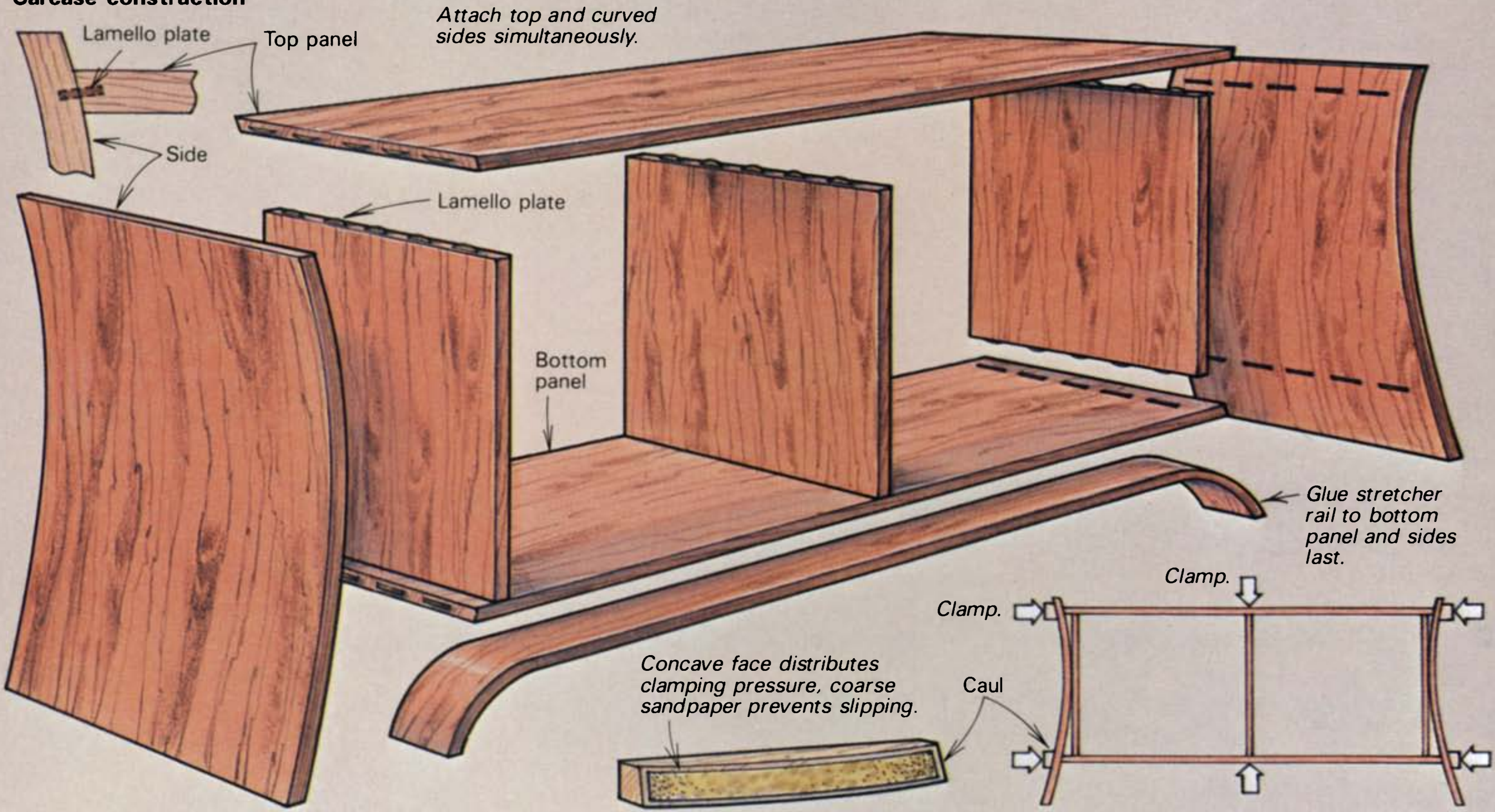
My Lamello machine has an adjustable fence that makes slotting the angled ends of the top and bottom panels easy. To cut the corresponding slots in the case sides, all I need to guide the Lamello is a straightedge clamped against the inside face of the panel. Both sets of slots are cut perpendicular to the line of the joint, not parallel to the top of the case.

I build two basic types of carcases. The first type has structural top and bottom panels joined to the curved sides. The ½-in. to ⅝-in.-thick vertical interior panels are plate jointed to the top and bottom panels. On these verticals, I hang drawers, shelves or whatever the design calls for.

To assemble the case, first I glue the verticals to the bottom panel, with the top panel dry-clamped to the verticals, to ensure squareness. When these joints have dried, I glue the top to the verticals at the same time that I attach the curved sides. Because of the angles involved, the joints between the top, bottom and curved sides won't slip together unless the top can be lifted up slightly.

Attaching the curved sides is a hectic

**Carcase construction**




for one curved panel: I make four forms, reducing laminating time to two days. If I use the forms a second or third time, the investment in form-making is well worth it. An expensive alternative is to use a radio-frequency or dielectric gluing machine (see *FWW* #38, p. 26). This electronic machine cures water-based glues in a few seconds.

The bent sections are now ready to be glued into panels. I set them in order on two sawhorses, convex side down. This arrangement provides room for clamping cauls, critical for proper joint alignment—it's too easy to sand through a laminate trying to correct misaligned surfaces. These waxed cauls run across the width of the panel and help keep the panel from bowing under the pressure of the bar clamps.

I make a dry trial-assembly to check the joints and wax the surfaces adjacent to them. Waxing eliminates the possibility of part of the assembly process that requires planning and an extra pair of hands. I use four cauls to distribute clamping pressure across the width of the side panels. One face of each caul is ripped at an angle and planed slightly convex from end to end so that pressure will be distributed from the center of the panel to the edges. Coarse sandpaper glued to the cauls keeps them from slipping.

Once the cabinet has been assembled, I glue the stretcher rail to the underside of the bottom.

I use a different construction for my blanket chests. The front and back panels are ½-in. Baltic birch plywood veneered on both sides. I bandsaw the panels about ½ in. oversize in length and width, and trim them to final shape with a straight bit in my pin router. A portable router with a straight bit and rub collar would do as well. Guide it against a ¼-in. hardboard template made by tracing the curved sides and stretcher profile on the hardboard then bandsawing to shape. I set the router bit to cut about ⅓ of the panel thickness from each side, which leaves a tongue in the middle. The tongue fits in grooves in the curved sides and stretcher rails.

To assemble, glue the stretcher rails to the front and back panels. Plate join the bottom panel to the front and back and glue the bottom panel to the stretcher rails. Plate join the bottom to the curved sides and glue the front and back panels to the sides. —*A. G.*

**Blanket-chest construction**

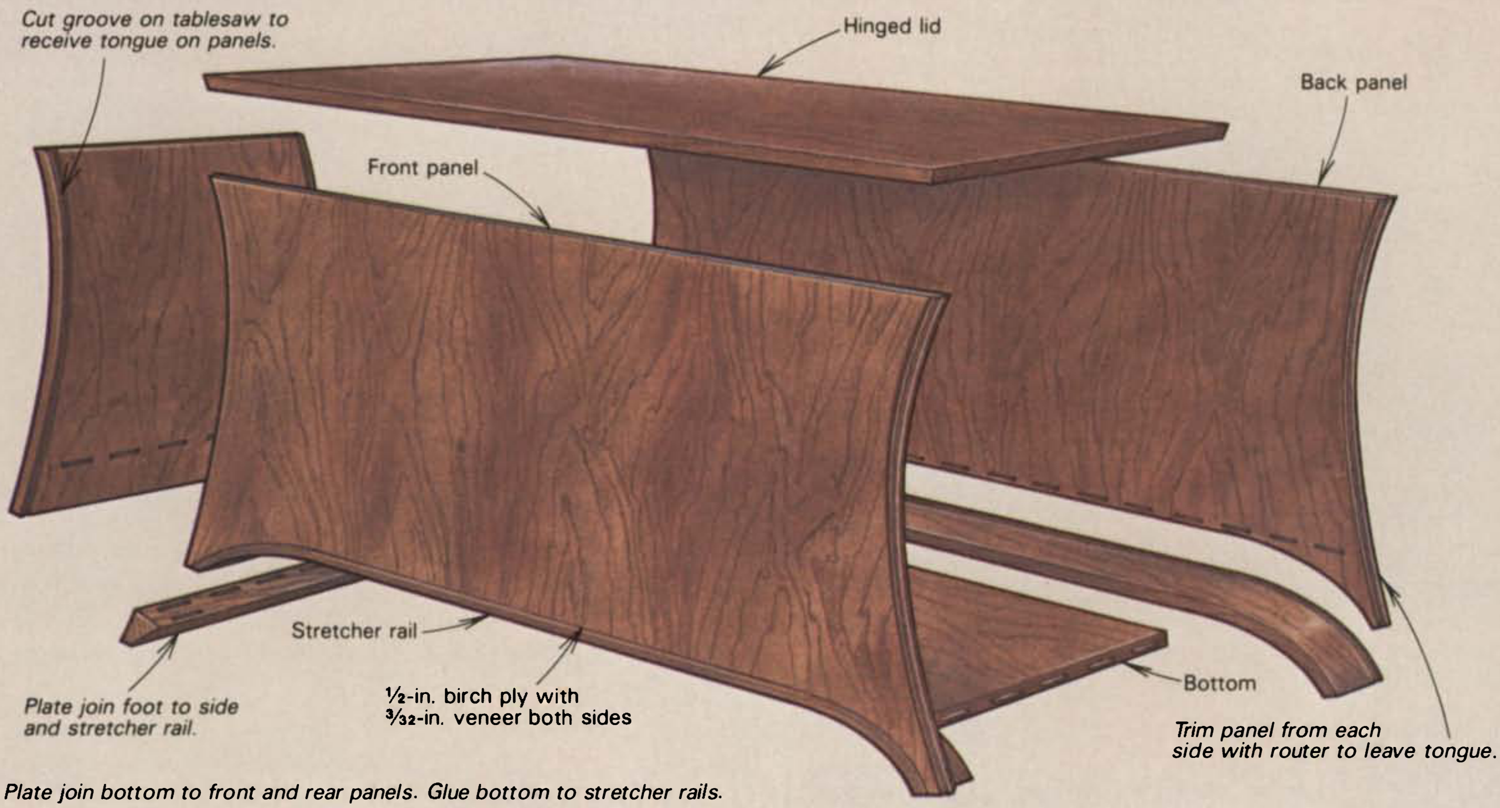



*Plate join bottom to front and rear panels. Glue bottom to stretcher rails.*

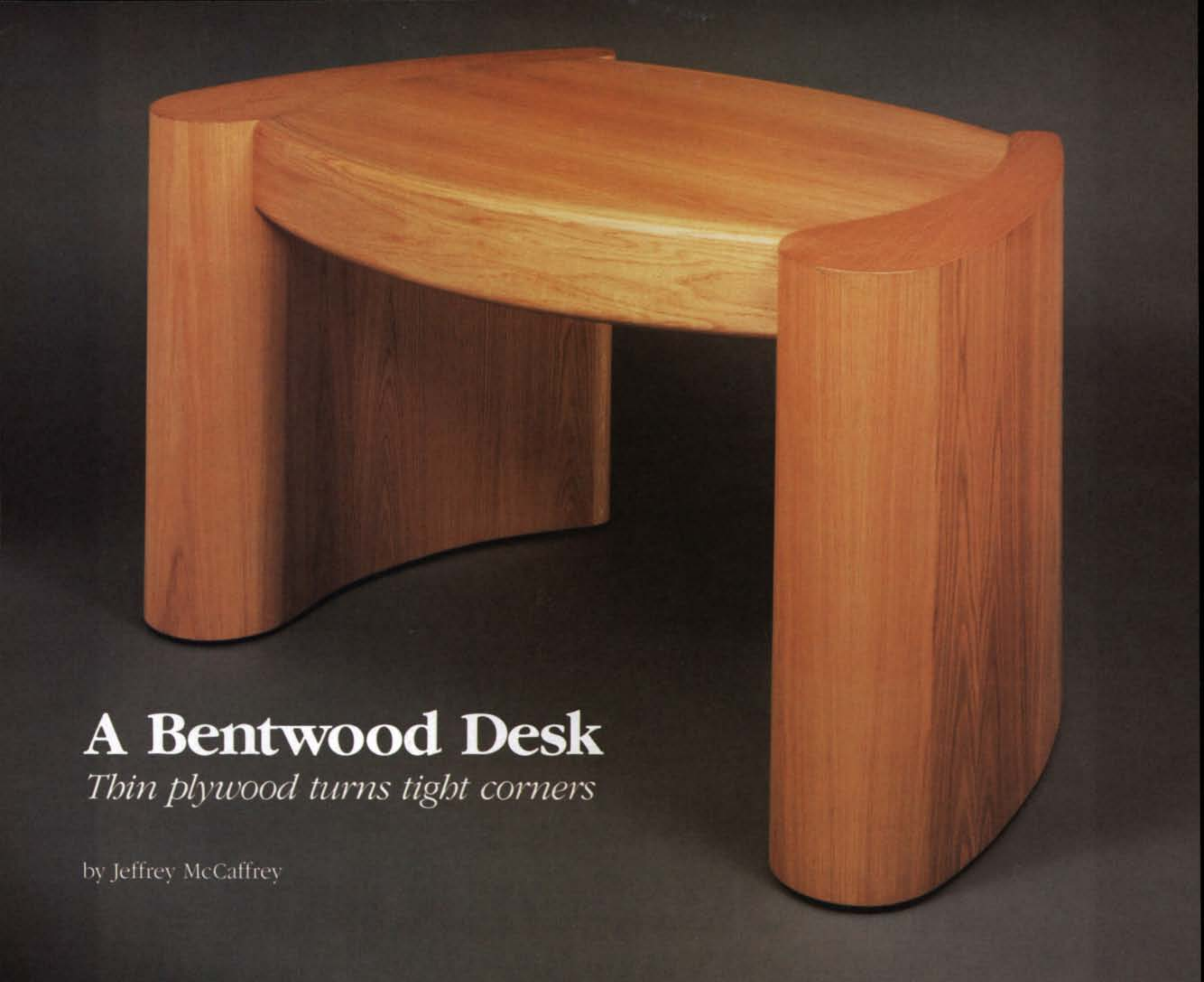
tearing out wood while scraping off glue. Yellow glue would work fine for edge gluing, but I use urea formaldehyde glue here as well, for no better reason than consistency.

When the glue is dry, I trim the joints flush with a compass plane or a scraper. The convex surface must be perfectly straight where the horizontal members join it—I lay a straightedge across the width of the panel to check. Make any corrections with a low-angle block plane by planing across the grain.

I rip the panel to just over finished dimension then compare it to the curve on the full-scale drawing. If, as is often the case, the panel curve differs from the drawing, I redraw the curve to match the panel before going any further.

I've made a sliding cutoff jig for crosscutting curved panels on the tablesaw. It is simply a large piece of veneer-core plywood with two hardwood strips on the bottom that ride in the sawtable's miter-gauge grooves. A wooden fence across the front edge of the plywood keeps the stock square to the blade. I place the panel convex side down on the jig, with one end blocked up so that the end I'm going to crosscut rests on the jig next to the line of cut. To determine the blade angle, I represent the saw table on the full-scale drawing by drawing a tangent line at the cut-off point, another line to represent the cut, then measure the angle between the lines with a protractor. For a smooth cut, a panel hold-down helps. For panels that are wider than the 26-in. capacity of my sliding table, I resort to cross cutting with a Skilsaw guided along a fence clamped to the work. □

*Anthony Giachetti is a furniture designer/maker in East Boothbay, Maine.*



# A Bentwood Desk

*Thin plywood turns tight corners*

by Jeffrey McCaffrey

***Author's writing desk suggests solid wood, but it's actually constructed of lightweight, bentwood panels joined by a framework. Each of the desk's two columns consists of three separately bent panels.***

I've been working with bentwood since I was a student. For me, it presents an opportunity to create unusual furniture while tackling processes not yet learned—a combination of careful planning and blind ignorance that I find both stimulating and humorous. Like most woodworkers, I learned to bend wood by gluing up thin strips of it around a form. Shaped and joined, these glued-up curves became components of larger structures, perhaps a chair or a curvilinear casepiece.

It was a natural progression for me to widen the strips until it was no longer practical to use solid wood. At this point, I began using $\frac{1}{8}$-in.-thick plywoods and my bends became curved planes instead of curved lines. This expanded my design vocabulary to include furniture like the desk shown above. It consists of hollow, monolithic volumes joined together to make a form impossible or impractical to achieve in solid wood. The desk's upright columns are hollow volumes, each made up of several, separately bent panels. They are extraordinarily rigid yet light enough to be easily moved.

In principle, bending plywood panels is a lot like bending solid strips using conventional form lamination. Plywood has some important advantages over solid wood laminae, however. First of all, it's available in sheets at thicknesses suitable for bending so you can skip the tedious, dusty job of resawing thick boards into thin ones. For most applications, plywood will bend to a tighter curve than will an equivalent thickness of solid wood. The columns of my desk, for example, are bent to a radius as small as 4-in. To get away with that in solid wood, the strips would need to be $\frac{1}{16}$ in. thick, which is asking a lot of your resawing technique, not to mention requiring twice as many laminae.

Though they aren't sold in a wide variety of species, $\frac{1}{8}$-in.-thick plywoods are usually available from local lumberyards or plywood suppliers in oak, ash, walnut and cherry. One supplier here in Portland sells a two-ply $\frac{3}{16}$-in.-thick lauan plywood capable of bending around a 3-in. radius. Some suppliers sell three-ply bending plywood which consists of a core of soft, bendable basswood faced with another species. Probably the best bargain in bending plywood is the $\frac{1}{8}$-in. lauan plywood sold by lumberyards as doorskins for hollow-core doors. If you need a thick bent panel, lay up a core of cheap lauan faced with an outer veneer of nicer wood.

So plywood sheets won't warp, manufacturers generally lay up



Photo: Jim Piper

odd numbers of plies. It's probably good practice to follow this rule where possible, but sometimes an odd number of plywood sheets won't add up to the final panel thickness desired, while an even number will. In this case, I go ahead and use an even number. In laminating multiple sheets, two face plies glued to each other with the grain running in the same direction become, in effect, one ply. Thus, for purposes of stability, two three-ply sheets behave as one five-ply.

Forms for bending panels are more demanding to build than those for bending solid strips. Because they are larger, there's more chance of introducing errors that could produce a twisted panel, so it's important to draw and measure carefully. Your project may require more than one simple curve, in which case you'll have to make a series of bends and then join the parts. Segment the curves wherever it seems logical to do so. I try to divide the curves so the forms and panels will be of manageable size, and so I can clamp with downward pressure only. Lateral clamping makes things too complicated. However divided, you will need a form for each separate curve.

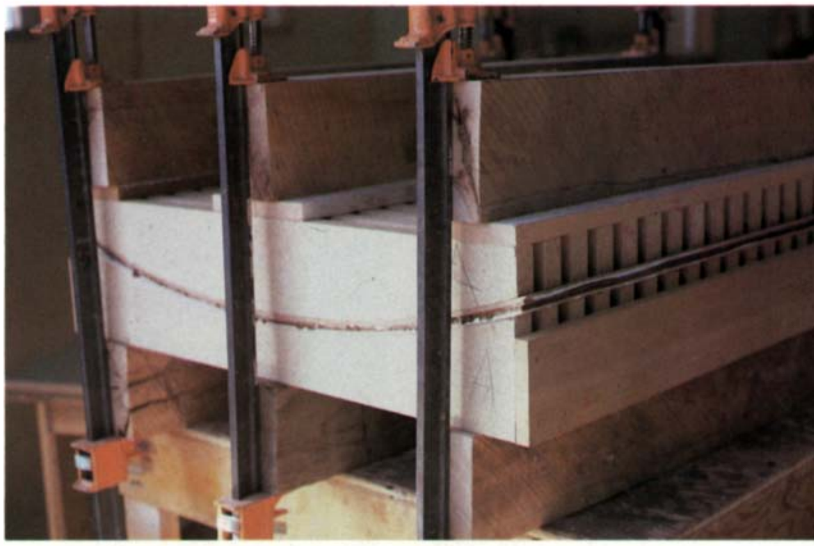
As the photo at right shows, my two-part forms consist of a series of particleboard ribs sawn to the desired curve then mounted on a backing board which keeps them in correct alignment. For accuracy, I make up two templates for each series of ribs—one for one half of the form and the other for the nesting or mating half. I begin with a full-scale drawing of my piece on paper or poster board. I transfer the curves to ¼-in. hardboard, from which I bandsaw out the first template, smoothing lumps or quick turns with a file.

To generate the mating template, set a compass to the desired panel thickness, allowing room for a liner between the form and each side of the bundle of plies. I use a piece of ⅛-in. lauan for a liner. Place the first template on a fresh piece of hardboard and trace the outline for your second template with the compass. Bandsaw, then file the profile fair. For form ribs, I use 1-in. particleboard. It's harder to find than ¾ in., but the extra thickness reduces the number of ribs needed and distributes pressure more evenly. Use the templates to mark out the ribs, then bandsaw close to the line. To finish, screw or tack the template to the rib blank and trim to the line with a flush-trimmer bit in your router or router table.

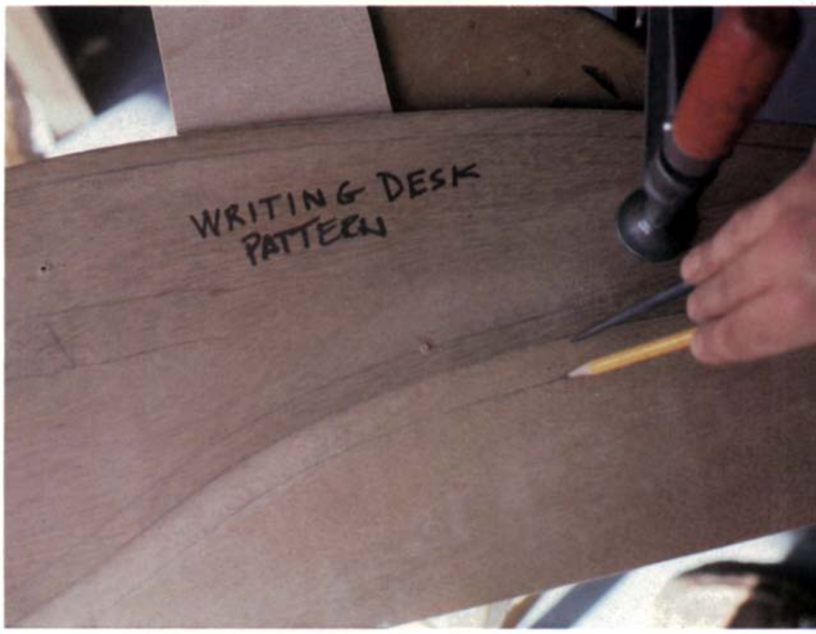
To assemble the form, place the ribs on a flat surface, curved-side up. Slip a ¾-in. scrapwood spacer between each rib, align the ribs and clamp-up the assembly. Flip the whole thing over and screw a squared piece of particleboard or plywood to the rib backs. This will keep the form from shifting into a parallelogram under clamping pressure.

Now comes the fun part: gluing and clamping. After spending several days planning and building forms, it's thrilling to see if it all works. A dry clamp-up is advisable. This will turn up any problems and you'll find out if you have enough clamps and cauls. For a typical 24-in.-wide panel, you'll need six 4x6 battens the length of the form, three on top and three on the bottom.

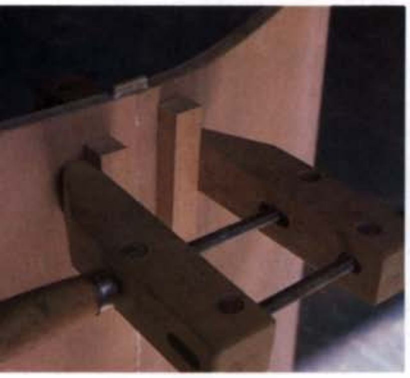
If everything checks out, spread glue on the plies (I use plastic resin glue) with a small paint roller. Before laying up the bundle, put a piece of paper between the liners and the bundle so there's no chance of smeared glue sticking them together. As you build the stack, align the long edge of each ply with the edge of the form. This will give you a straight reference edge for ripping the panel to width later. Also, make sure to put the good ply or veneer on the correct side of the bundle. I have an extra panel in my shop because I glued the good face to the wrong side of the bend. Apply clamping pressure first to the center of



*Each bent panel requires its own form constructed of 1-in. particleboard ribs spaced ¾ in. apart and fastened together with battens and/or backing boards to keep them aligned. Stout cauls and heavy bar clamps distribute pressure evenly at glue up.*




*For fair, twist-free panels, ribs must be of consistent size and shape. McCaffrey marks out a template for the mating half of a form (above middle). Tacked to a particleboard blank, the template guides on the pilot bearing of a flush trimming bit, cutting the blank to final size (bottom).*



*Plywood splines in tablesawn or routed grooves join bent panels together. Blocks temporarily tacked to the panel near the joint with hot-melt glue provide bite for handscrews. Scrap ⅛-in. plywood makes good spline stock. A framework of solid oak joins the desk's two columns, providing support for the top and a hanging surface for a drawer. Bent panels proved too thin for conventional joinery so McCaffrey fitted glue blocks around each frame member—in effect building a mortise around a tenon.*

the form, then work outward. Check for inconsistent glue squeeze out, a tell-tale of uneven pressure.

After the glue has cured for 24 hours, I remove and clean up the panels. If one panel edge was held flush to the form, it should be no problem to scrape the glue and hand plane or joint the edge true. With that done, the opposite edge can be tablesawn parallel. Squaring the other edges is trickier. With a T-square, I mark a line along the rough edge then bandsaw to it, supporting the panel so the edge is as square to the table as I can get it. Hand planing checked with a square finishes the job. Actually, it's not as important that these edges be perfectly square as that they be true enough to join cleanly with another panel.

For joining bent panels together, splines seem to work best. If done carefully, a spline accurately aligns the surfaces of two adjacent panels, and it is more than strong enough for most applications. I have three methods to cut grooves for splines. The simplest is to pass the panel edge over the tablesaw, guided freehand against the fence. This is only practical for shallow bends and/or small panels, however. For larger panels, I clamp scraps to both sides of the edge being grooved. This provides a flat surface wide enough for a router and a fence to run against. If the panel is flat enough near the joint, run the router right on it, using a slotting cutter with a pilot bearing. Whichever method you choose to use, make sure that the groove is perpendicular to the edge being joined. Scrap ⅛-in. plywood makes excellent spline stock.

Clamping curved panels is always a challenge and some improvising will be necessary. If the panel assembly is a closed volume, such as the columns of my desk, band clamps might work perfectly. However, clamping blocks temporarily glued to the panels where the joints come together give more control. Cut scrapwood blocks about 1 in. square and 3 in. long. Attach them to both sides of the panels on either side of the joint with hot-melt glue, as shown in the photo above. Insert the glue-coated spline, then draw the joint together with wooden handscrews, which can pinch close to the surface without the handles getting in the way. Inspect the joint carefully. If you find any gaps, reposition the clamps to close them up.

Be careful when you remove the clamping blocks once the glue has cured. Hot-melt glue is stubborn stuff—if you try to knock off the blocks with a sharp hammer blow, chunks of the panel may come with them. A safer way is to split the block close to the surface with a chisel, then clean up the remainder with a plane and scraper, being careful not to plane through the show veneer, however.

Assembling bent assemblies into finished furniture calls for unorthodox joinery. The columns of my desk, for instance, are joined by a framework that supports the top and provides a place to hang a drawer. The columns are structurally strong but their walls aren't thick enough for proper mortise and tenons. One solution is to build up the wall thickness in the area of the joint, but I found it more practical (and fun) to mortise through one wall and extend the framework to butt against the opposite wall. It was then a simple matter to glue blocks around the framework, in effect building the mortise around the tenon.

Finishing the desk required some adroit router work. I capped the columns with Baltic birch plywood panels, cut with the aid of a template similar to that used for the form ribs. These caps were then veneered with white oak and another piece of oak-veneered birch plywood was fit between them to serve as the desk top. A shallow pencil drawer fitted beneath the top finished the project. □

---

*Jeffery McCaffrey is head of the wood department at the Oregon School of Arts and Crafts in Portland. Photos, except where noted, by the author.*

# Turning Without a Lathe

## *Working in the round with handtools*

by Aldren A. Watson and Theodora A. Poulos

Making turned legs without a lathe isn't complex and you can obtain good results with ordinary handtools. Because these tools require considerable force and both hands are needed to control them effectively, you must hold the work securely and safe from damage while you're shaping it. The lathebox, shown in figure 1, is the most practical answer.

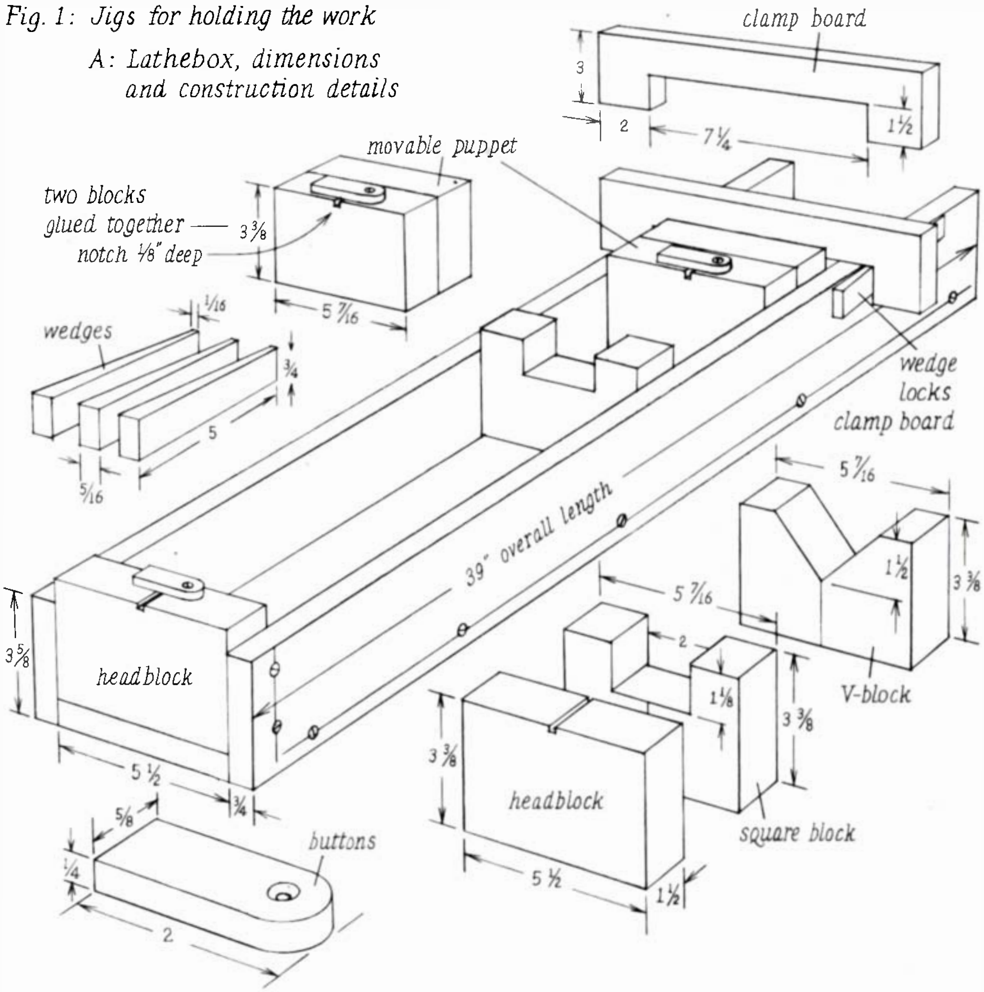
The lathebox can be built from inexpensive lumber, and it will support turning stock up to 3-in. square and 34½-in. long. You can leave the stock free to rotate or lock it in place with wedges and square blocks or V-shaped blocks. The blocks shown in this box fit the 1⅞-in. squares used to make legs for a pine dressing table (see sidebar, p. 52). For long pieces, like canopy bedposts, you can attach separate head and tail blocks to your bench and add free-standing square or V-blocks, as shown in figure 1. The lathebox is handier for smaller pieces because you can move it without disturbing the work when you need the bench for another job.

To make the dressing table legs, or any similar furniture parts, first trace the pattern (see figure 2, p. 50) on all four faces of the stock, then drive a nail into each end of the piece to serve as mounting spindles in the lathebox. Next, with a chisel shape the stock square in section to the outlines of the traced pattern. Then with chisel, drawknife, spokeshave and file, make the square forms octagonal and, finally, round. The key to success is to do one section of the turning at a time. Take light cuts and carefully follow your layout lines.

Begin by cutting the legs, adding 2 in. to the length for waste. The waste sections protect the finished ends, and serve as reference points for checking your work. Before you begin the actual shaping, drill the holes for the drawbore pins (wooden pegs that will hold the joints together)

*Fig. 1: Jigs for holding the work*

*A: Lathebox, dimensions and construction details*




*B: Separate head and tail blocks for long work*

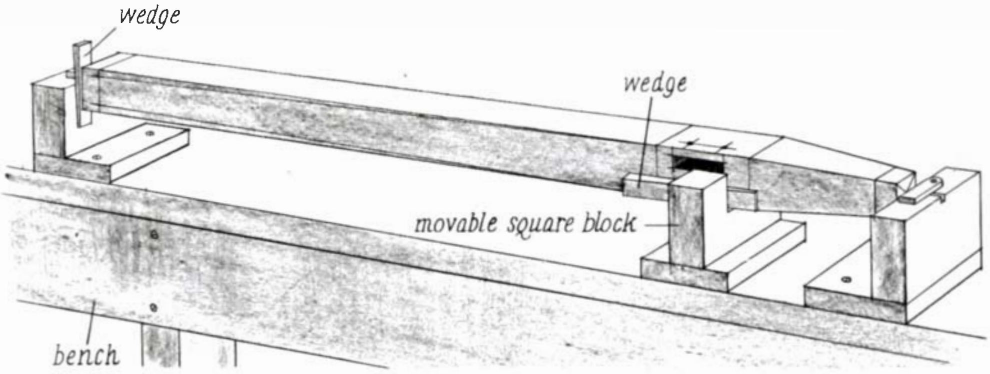


Fig. 2: Laying out leg pattern

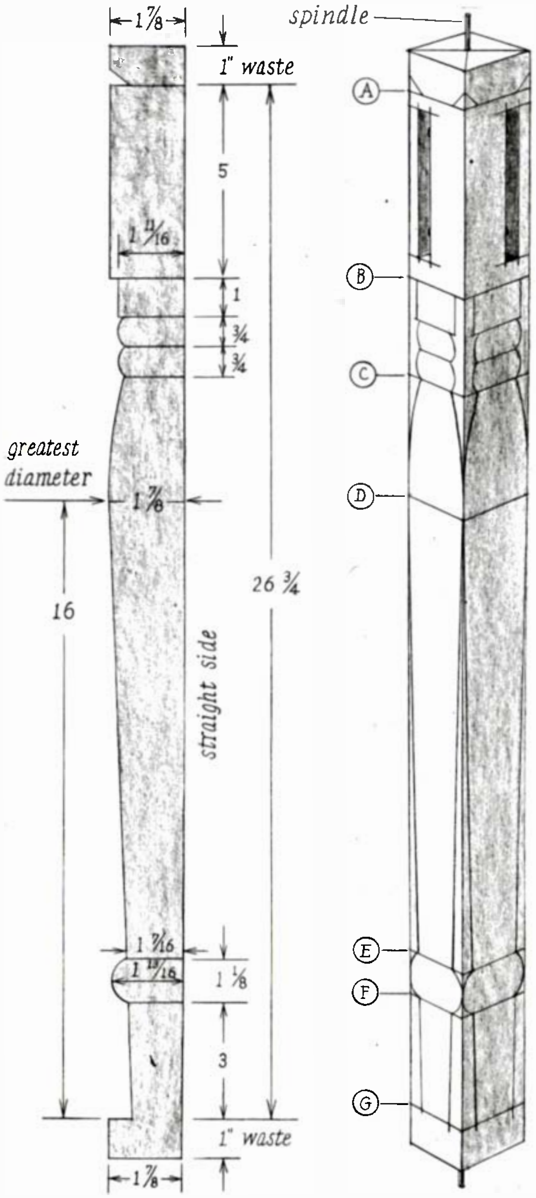
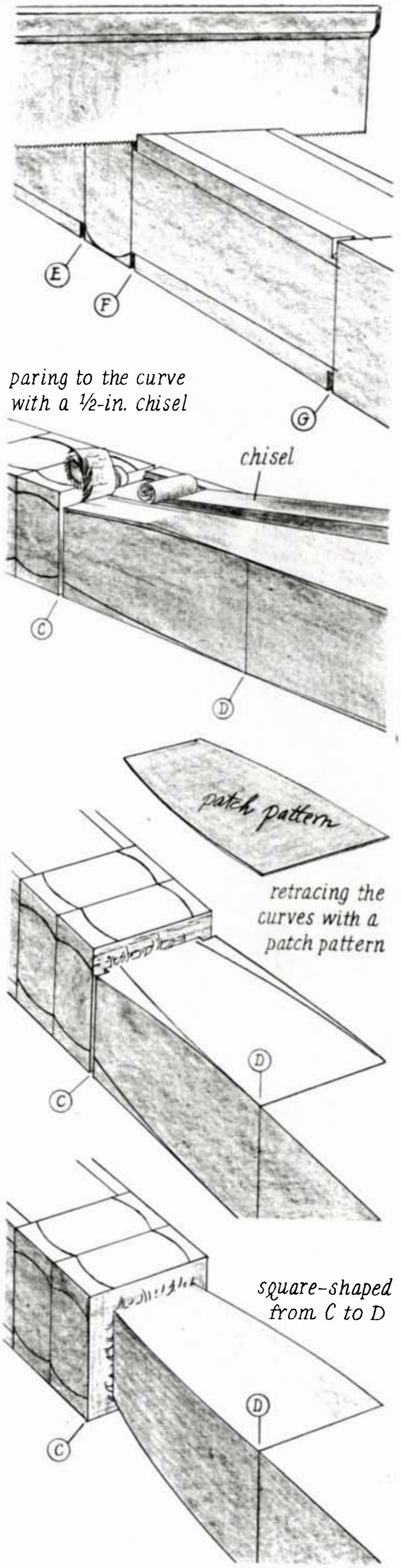



Fig. 3: Roughing out making backsaw cuts




and chop the mortises shown in the plan. This is more easily done while the work is flat and square, and it avoids damaging the finished turning.

After cutting the mortises, draw diagonal lines on both ends of each leg to locate the centers, then drive an 8d finish nail about ¾ in. into each center. Cut off the heads with heavy wirecutters or a hacksaw to form ¾-in. spindles. Now mark off the 1-in. waste sections and tape the leg pattern to the work, aligning the straight side of the pattern with one edge of the stock. Use a sharp, soft pencil to trace the pattern from top to bottom. Remove the pattern, flop it over, and tape it down aligned with the other edge of same face. Trace the pattern onto all four sides, then use a try square to draw the reference lines A, B, C, D, E, F, and G, again on all four sides.

Put the work in the lathebox, twist the buttons over the spindles and drive wedges into the clampboard to secure the movable puppet or tailstock. After securing the box in your vise, outline the leg sections by making light backsaw cuts 1/16-in. deep on all four sides at B, C, E, F and G. To prevent tearout, saw across the corners first, then level the saw to complete the cuts (figure 3). While sawing, secure the leg with blocks and a wedge between the stock and the headblock.

Begin the actual shaping between C and D. With a ½-in. chisel held bevel-up, pare off wood following the curved lines, using hand pressure alone (no mallet). Take thin, narrow slices, which are easier to control than great wide cuts. Pare close to the lines, but leave them showing. It is especially important not to lose the reference lines at D, which mark the greatest diameter of the leg.

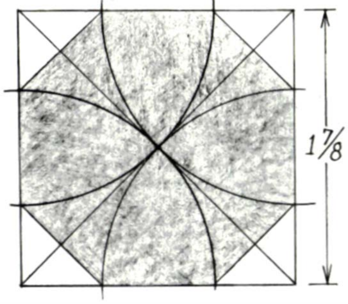
After shaping the first side, make a small patch pattern as shown, and retrace the pencil lines you removed with the wood, so that you can shape the second side. The small patch pattern is easier to align than the whole pattern. Rotate the work in the lathebox and shape the opposing side in the same way. Repeat for the remaining two sides.

Next, deepen the saw cuts on all four sides at E and F (both sides of the bulb). Then use a ½-in. chisel to cut pockets on all four sides of the leg above E, below F, and at G. These pockets establish square sections that serve as reference points as you continue shaping the leg.

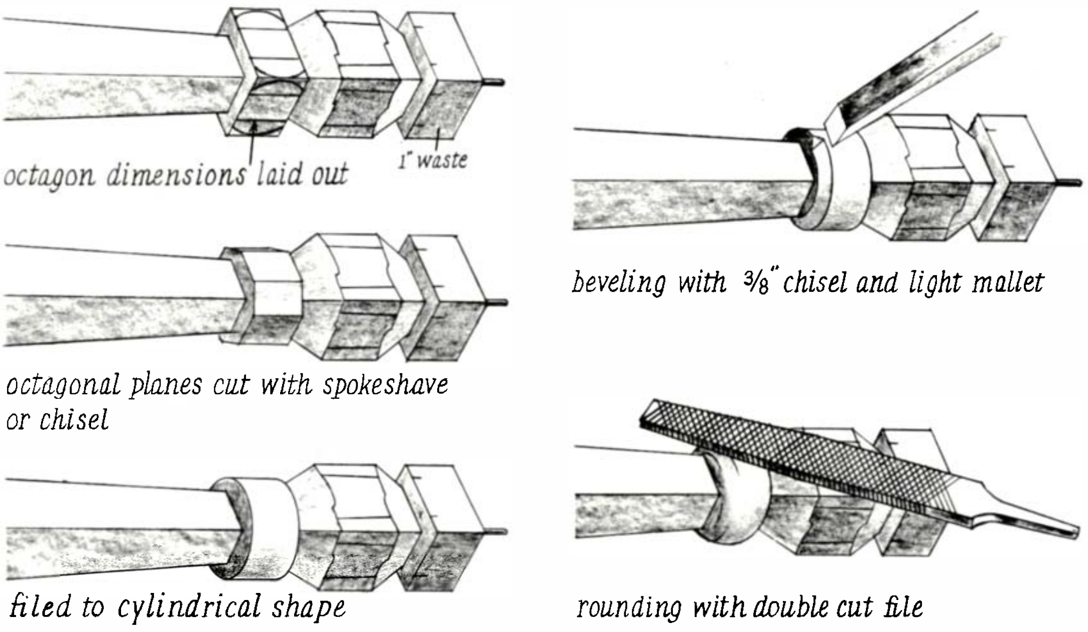
A drawknife efficiently roughs out the long taper between D and E. For best control, hold the knife bevel-down and slice at an angle to the length of the leg. Shave thin slices rather than heavy splinters and frequently check the layout lines. As the work progresses, snug up wedges securing the square block and V-block as needed. You can smooth the surfaces with a spokeshave. A small bullnose plane will get into the tight spots just above E, or you can pare carefully with a 1-in. chisel held bevel-up. Try to keep the sides of the taper as nearly square as possible, or it will be difficult to make the leg octagonal in the next step. Check for squareness by measuring in from the untouched faces at E and by sliding a try square along each of the four sides. Also, set a straightedge along the length of each side to check for humps or hollows. Pencil-mark any high spots, then shave off the marks with a spokeshave or block plane.

Next, rough-shape the bulb. Lay out

Fig. 4: Shaping the bulb, octagon dimension for bulb




***To layout an octagon, first draw a square. Set a compass to the distance from one corner of the square to the center. Draw arcs from each corner. Their intersections with the sides of the square mark the eight angles of an octagon.***




lines on all four sides $\frac{9}{16}$ in. from the edge, as shown in figure 4. Then reduce the bulb to an octagon and round it as shown. To shape the long section between C and E, measure in from both edges on all four sides, $\frac{3}{8}$ in. at C, $\frac{9}{16}$ in. at D, and $\frac{9}{32}$ in. at E, and tick off pencil marks. Then use a wooden batten to connect these marks into continuous lines from D to E (figure 5). The octagon lines C to D are drawn freehand. Before cutting these bevels down to the guidelines, make short, beveled chisel cuts at C to outline the octagon shape and prevent tear out.

How well you round the leg from one end to the other depends primarily on how accurately you cut the bevels. And this, in turn, depends on taking off only a little wood at a time. If you have a really light touch, you can use a drawknife, but the finer-cutting spokeshave is safer. True up and smooth all surfaces with a 10-in. double cut, flat bastard file, being careful not to nick the shoulders at C and the bulb at E.

Next, work the foot end of the leg (F to G) to size, making it square in section. Then lay out the octagon lines with the same measurement as for E, and cut the bevels as above. Follow the same general procedure to round the leg at G, below the bulb.

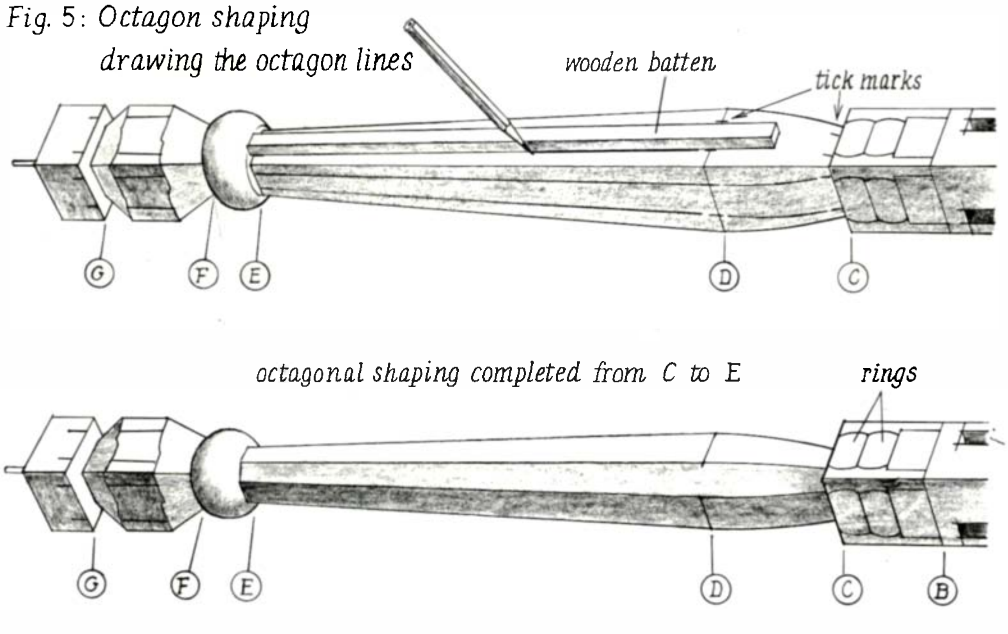
The next stage in rounding the leg is to chamfer the eight sides to make 16. You do this strictly by eye with a 10-in. file, again working away from the high point at D. File one or two edges, then work the others to match. Make a cardboard contour template from the original pattern to guide you. Hold it on one edge of the lathebox, rotate the leg, and pencil mark any imperfections to be filed off.

Shape the top of the leg, B to C, in the same way. Lay out octagon lines $\frac{7}{16}$ in. from the edges. Chamfer the eight edges, as before, to make 16. Continue filing to make the leg cylindrical.

Pick up the dimensions for the two rings from the pattern and lay them out by holding a pencil on the mark while you slowly rotate the leg in the lathebox. Next, saw $\frac{1}{16}$ in. deep on these lines. Put one corner of the 10-in. file in the kerf (figure 6) and rotate the leg to make a V-shaped trough. Do the other ring the same way, then file both rings to shape, as you did with the bulb.

When all the roughing out is completed, spin the leg round smartly several times in the lathebox to watch it in mo-

Fig. 5: Octagon shaping



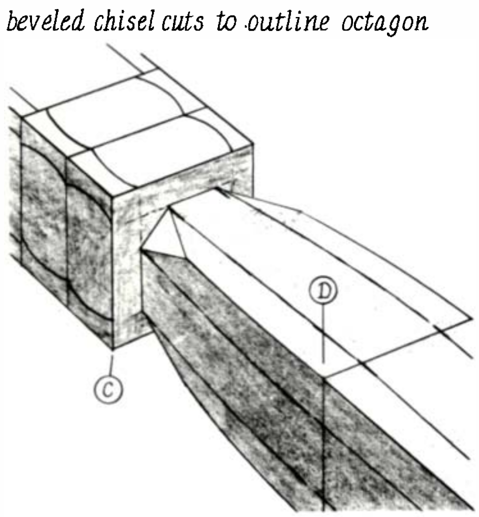
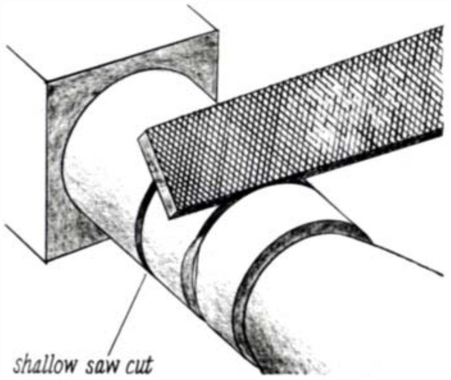



*Fig. 6: Filing round and round in the saw cuts*




tion. Mark any glaring bulges and flat places with a soft pencil, then file away the marks and a bit of wood. Continue the process over the length of the leg from B to E, filing with patience and restraint—as the work is close to the point where no spare wood remains. To assist in this refinement, make a template to check diameters at three or four fixed points along the leg.

When everything looks shipshape, switch from the file to 220-grit sandpaper. Wrap the paper around a thin, flat stick and sand lightly with one hand down and across the leg at a slight angle as you slowly rotate the leg with the other. Now go back over the leg and use the flat and the thin edges of a fine, half-round file to sharpen the tight areas that the coarser tools can't reach—the shoulder at B, the groove between the rings, the junction at C and the sections above and below the bulb. For a more polished surface, shoeshine up and down the leg with a 1-in. strip of 220- or 320-grit sandpaper backed with masking tape. Cut off the 1-in. waste from the top and bottom of the leg in a miter box.

No matter how carefully you work from the square to octagonal to round, there will probably be a swelling here or an out-of-round section there. Yet, if each step has been measured, marked out and cut accurately and slowly, your turning will be remarkably uniform, and will have the stamp of your own personality. □

*Adapted from* Furniture Making Plain and Simple, *by Aldren A. Watson and Theodora A. Poulos. ©1984 by Aldren A. Watson and Theodora A. Poulos. Reprinted with permission of the publisher, W. W. Norton & Co., New York. Watson is an illustrator and long-time woodworker living in North Hartland, Vt. Theodora Poulos, is a former editor for a New York publishing firm.*

# Pine dressing table

Your handturned legs will transform this simple pine dressing table into an elegant piece of furniture. Referring to the plan, cut all the parts to size. Drill holes for the drawbore pins, then chop the leg mortises. Cut and fit the rail tenons and drill their drawbores.

Before assembling the legs and rails, cut the halved joints on the underside of the drawer rail, one at each end, as shown on the facing page. The front ends of the drawer runners will fit into these joints. As a decorative touch, plane a ¾-in.-wide chamfer along the outside corners of the front legs.

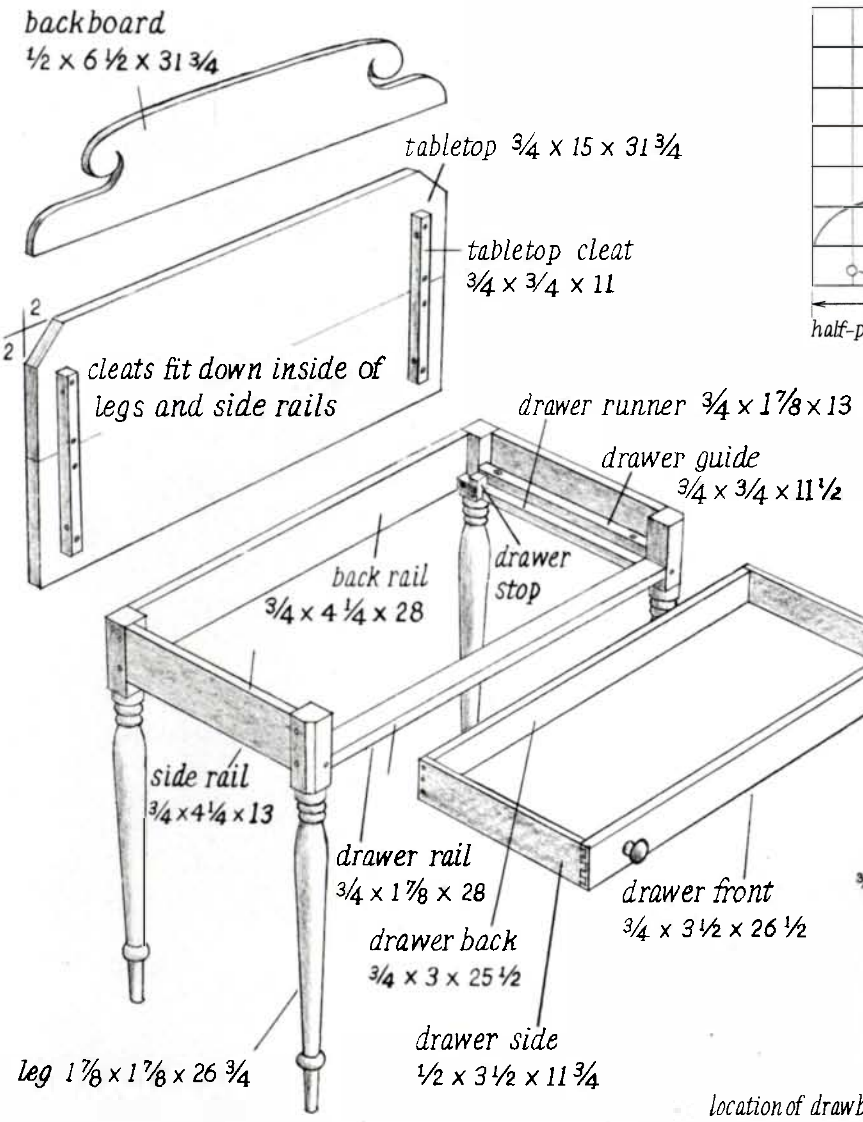
Assembly begins with the sides. Lay a back leg on a piece of carpet or a towel to protect the turning. Insert a side rail into the leg mortise, then push firmly in place to close the joint. Lay a front leg on top of the upended rail, start the mortise-and-tenon joint together and tap the leg down with your fist. After clamping the joints, start the drawbore pins into one leg and drive them home with a hammer, tapping one, then the other to draw the joint up evenly. Pin the other leg, then assemble the second side. Join the back rail and drawer rail to the side units in the same way.

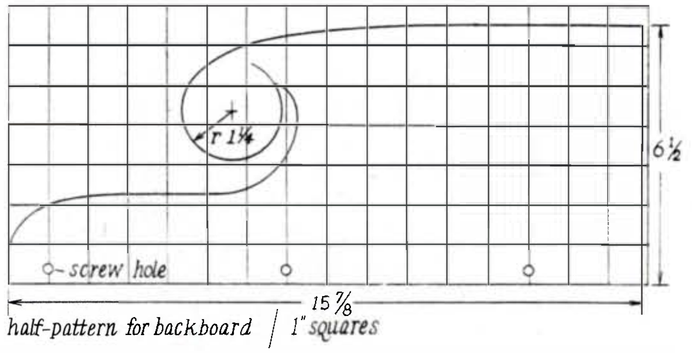
Turn the table upside down and attach the drawer runners with countersunk screws. Stand the table upright and clamp the drawer guides on top of the runners, aligning their inside edges flush with the inside faces of the front legs. Fasten them with countersunk screws.

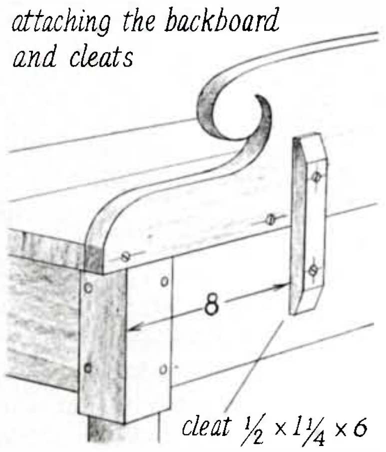
The drawer is joined with dovetails at the front and dowel pins at the back. Cut ¼-in. rabbets in the sides and front to house the plywood bottom. Slide the plywood into the rabbets and nail it to the edge of the drawer back. After attaching the drawer pulls, put the drawer in place with its front flush with the front edge of the drawer rail. Without moving the drawer, mark the back of the drawer on the runners and attach the stops there.

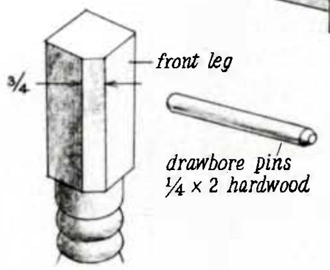
Next, edge-glue two boards to make the top and cut the front corners at a 45° angle as shown. Then lay the top face down on the bench. Set the table frame bottom-side up on it and adjust until there's an even overhang at the front and both ends, and a ½-in. gap at the back for the backboard. Position the cleats by drawing a line on the tabletop around the inside of the frame. Remove the frame and screw the cleats inside the marks. Set the frame down over the cleats and screw each cleat to the side rails.

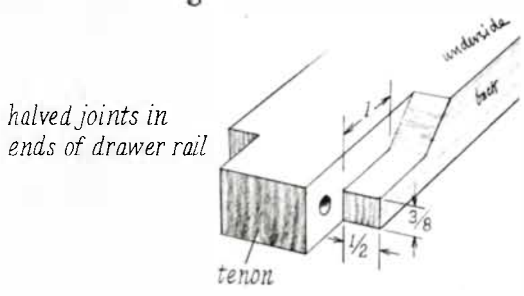
Cut the scrolls on the backboard with a coping or scroll saw, smoothing the curves with a file, spokeshave, and sandpaper. Screw the backboard to the rear edge of the tabletop and attach two cleats to the back for support. Now you're ready to finish the table, as you like. —*A. A. W.*

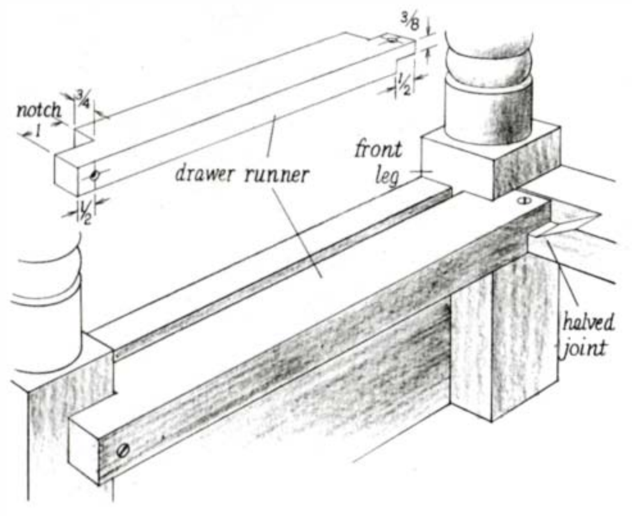

backboard
½ x 6½ x 31¾
tabletop ¾ x 15 x 31¾
tabletop cleat
¾ x ¾ x 11
2
2
cleats fit down inside of legs and side rails
drawer runner ¾ x 1⅞ x 13
drawer guide
¾ x ¾ x 11½
back rail
¾ x 4¼ x 28
drawer stop
side rail
¾ x 4¼ x 13
drawer rail
¾ x 1⅞ x 28
drawer front
¾ x 3½ x 26½
drawer back
¾ x 3 x 25½
drawer side
½ x 3½ x 11¾
leg 1⅞ x 1⅞ x 26¾

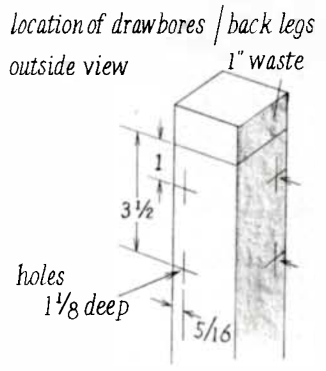

r 1¼
6½
screw hole
15⅞
half-pattern for backboard | 1" squares

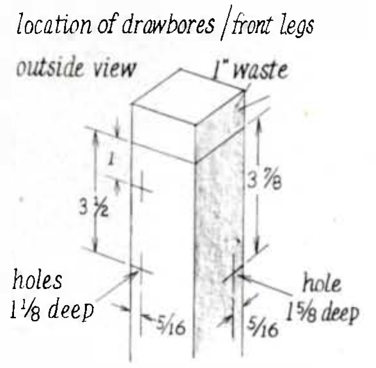

attaching the backboard and cleats
8
cleat ½ x 1¼ x 6

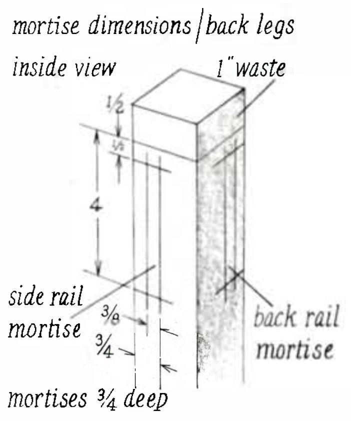

¾
front leg
drawbore pins
¼ x 2 hardwood

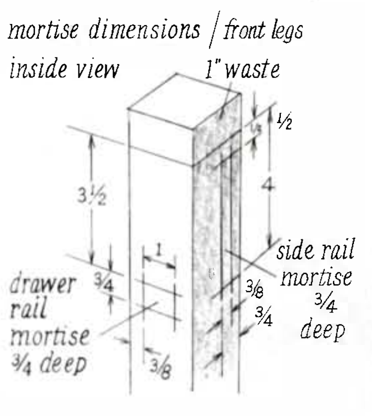

halved joints in ends of drawer rail
underside
back
1
⅜
½
tenon


notch
¾
1
⅜
½
drawer runner
front leg
½
halved joint


location of drawbores | back legs
outside view
1" waste
1
3½
holes
1⅛ deep
5/16

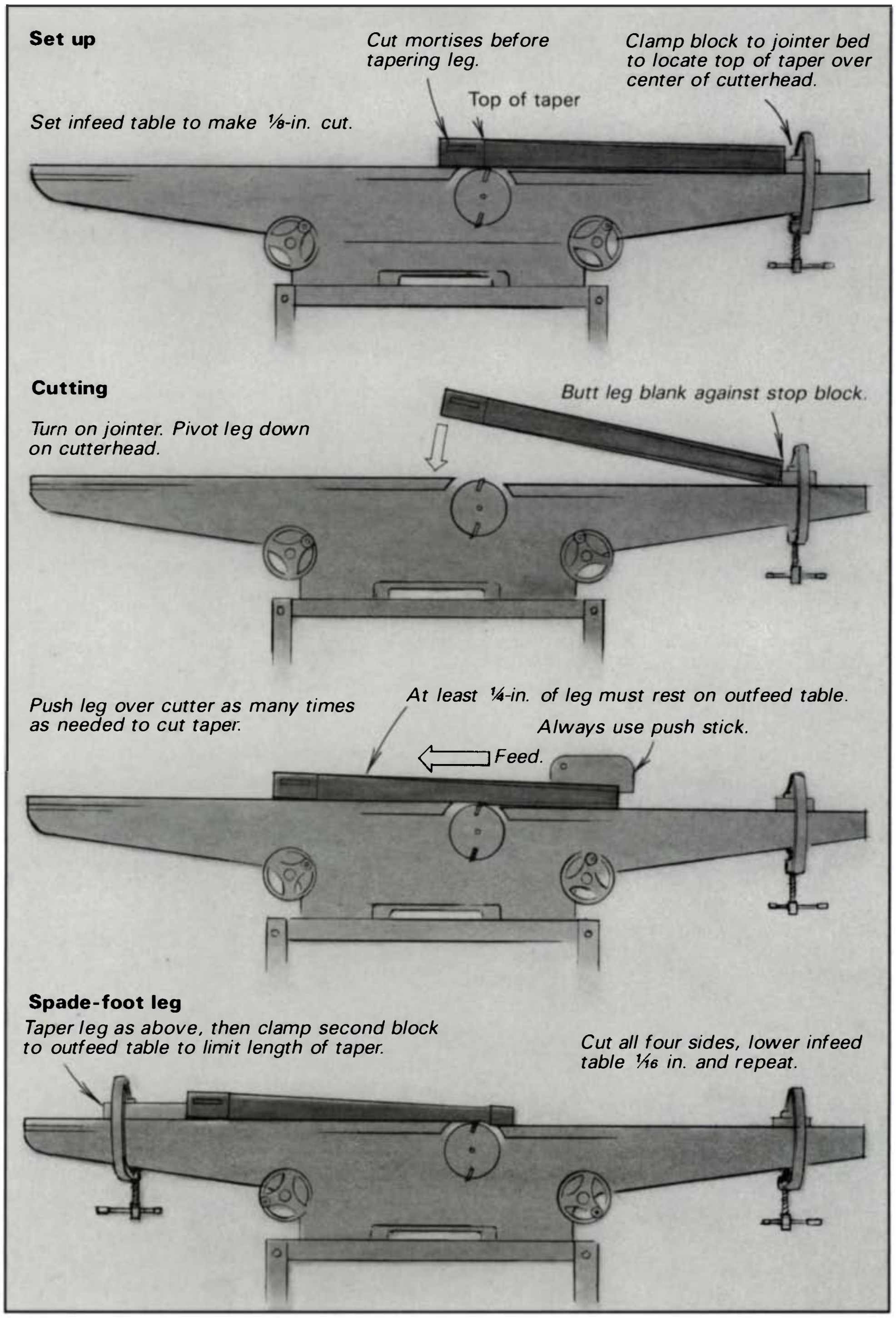

location of drawbores | front legs
outside view
1" waste
1
3½
3⅞
holes
1⅛ deep
5/16
5/16
hole
1⅝ deep


mortise dimensions | back legs
inside view
1" waste
½
½
4
side rail mortise
⅜
¾
back rail mortise
mortises ¾ deep


mortise dimensions | front legs
inside view
1" waste
½
½
3½
4
1
¾
drawer rail mortise
¾ deep
⅜
side rail mortise
¾ deep
⅜
¾

# Tapered Legs on a Jointer

by Eric Schramm




If the turned legs on the pine table shown on p. 52 don't suit your fancy, you might want to build the piece with elegant tapered legs. I cut them with several passes on my jointer, which I fit with stop blocks to set the length of the taper and regulate the slope of cut. This method is fast, accurate and produces smooth surfaces. You could also taper the legs with a bandsaw or tablesaw, then finish with a smoothing plane, which is what I do with very short tapers rather than trying to pull small pieces over the cutterhead.

For a table like this I begin with 1¾-in. stock and taper it on all four sides to ⅞ in. Before you begin cutting, draw the taper on all four faces of the leg and carry the guidelines onto the bottom end of the leg so they remain visible after you start cutting. It's also easier to cut the leg mortises above the taper in the square stock before you begin shaping.

If you're tapering stock that's shorter than the length of the infeed table, set up the jointer as shown *before* starting the machine. Lower the infeed table to make a ⅛-in. cut. Place the stock on top of the infeed table and against the fence with its top section resting on the edge of the outfeed table. Butt a stop block against the end of the leg and clamp the block to the infeed table.

Now, remove the leg and start the jointer. Place the bottom end of the leg against the stop block, carefully open the blade guard wide enough for the leg to slide by and lower the leg until the top end rests on the outfeed table. Setting the top of the leg on the outfeed table like this will hold the end high, so that the cut will be tapered toward the other end of the stock as you push the leg through the jointer with the push stick. *Be very careful.* Don't use the jointer without a push stick. Mine is a 6-in. by 4-in. block of wood notched on one long edge to fit over the leg. Continue cutting each side in turn, until the end is tapered to the guidelines you've laid out. Then plane or sand to smooth the transition from the square stock to the taper.

If the leg is to be tapered from end to end, you must leave extra length at the top of the leg and adjust the stop block to prevent the leg from missing the edge of the outfeed table. At least ¼ in. of the leg must be on the outfeed table to prevent the leg from dropping onto the cutterhead and kicking back. If the stock is longer than the infeed table, you can use the same procedure outlined above, if you attach a movable extension that can be moved along with the infeed table.

If you want to make a spade-foot leg or another form requiring a stopped taper, taper leg as above, then attach a second stop block to the outfeed table. Repeat the procedure using the second block to stop the cut. After tapering each side, lower the infeed table about $\frac{1}{16}$ in. and cut each side again. Repeat until the foot is formed. □

---

*Eric Schramm designs and builds custom furniture in Los Gatos, Calif.*

# Klompen

## *Shoes from trees*

by Anne Siegel

***Bob Siegel makes wooden shoes from green Aspen chunks with tools like this spoon auger used to hollow out each shoe. The shoes are wedged in a notch cut into his walnut-log workbench. The flat end of the bench is a cutting board for rough shaping the shoes with an ax. When not in use, the rest of his tools hang from pegs in the front of the bench.***

About 15 years ago my father, obligingly following my mother into another Wisconsin antiques store, spotted something interesting and emerged with an armful of oddly shaped tools. A full-time insurance agent and weekend woodworker, he never dreamed that he was carrying the remnants of the dying European craft of wooden shoe making.

In 1912 there were about 4,000 carvers in the Netherlands who each year produced about six million pairs of inexpensive, durable shoes for the farmers, fishermen and other workers. Each carver made about five pairs per day—splitting each one out of a log with a froe, then shaping the exterior with an ax and long knife and hollowing the inside with a spoon-shaped auger. The Netherlands now produces about three million pairs per year, most of them for tourists, but today they're turned out by duplicating lathes and boring machines following models handcarved by the few remaining craftsmen.

The Dutch call their wooden shoes ***klompen*** after the "klomp, klomp" sound they make on cobblestone streets. In France they're called *sabots*. Workers protesting the 19th-century mechanical wonders that were putting them out of work, threw their *sabots* into the whirring machines at several factories. They didn't derail the Industrial Age but they created the word sabotage.

As his collection of old tools grew, my father, Bob Siegel Jr., (everyone calls him Sieg) became interested in the history and carving of these shoes. Sieg decided to learn how to use the tools so he could demonstrate the craft. He began in the early 70s by observing a master ***klompenmaker*** in Orange City, Iowa, and another in Holland, Mich. Later he spent three weeks in the Netherlands, where he studied with 12 ***klompenmakers***.

Each man had his own methods of carving, and sometimes different tools, but the result was always the same—a shoe that fit the foot. The skill of the craft is not so much in using the tools or in the unique shape of the finished product, but in having the shape of the foot in mind and carving it by eye quickly and efficiently. The carvers found that the only way to master the art of carving a foot shape inside a block of wood was to carve a lot of shoes.

Aspen is the best shoe wood, although willow and beech can also be used. The wood should be lightweight, split and carve easily, resist checking and not discolor with age. Since the wood is always worked green, carvers would often move right out to the forest, cut down a tree and turn the whole thing into piles of shoes—a mature aspen yields about 75 pairs. Dry wood is harder to cut and tends to split when the shoe is hollowed out. The carved wet wood doesn't usually check when it dries, perhaps because the carving, from start to finish, takes less than two hours and the thin sides dry simultaneously inside and out.

Sieg works on a walnut-log workbench, trimmed underneath until it weighs about 70 pounds—light enough to carry, but still heavy enough to be stable. Instead of a vise, he's cut a deep, wide notch into one end of the bench top where he can wedge a pair of shoes while hollowing them. The top stands on three splayed legs secured from underneath with wedges. Removable pegs in the front and sides of the bench hold his tools—a mallet for securing wedges, a metric ruler, a rasp for enlarging the instep and a wooden bit brace to bore tiny holes in the sides to string the shoes together.

***Klompen*** are carved in pairs, so the carver can concentrate on making the shoes the same size and give them the proper left-foot, right-foot contours. The carver needs three measurements—

the length of the person's foot; the length of the log section to be crosscut (20% longer than the foot gives you enough wood for a strong toe and heel) and the inside length of the shoe, which is generally a little greater than the footlength.

To carve a pair for a one-year-old child, for example, you need a 6-in. blank. Cross cut the log to length, then split it into quarters with a froe and maul. Sieg then uses a side ax, a one-hand version of the hewing ax, to smooth two adjacent surfaces at right angles to each other. These flat sides will be the side and the sole of the shoe. Then he chops the remaining sides until he has roughed out the shoe exterior to within a 1/4-in. of its final contours. It takes about 10 minutes to chop out a pair.

Next, he refines the exterior shape with a block knife, a long blade with a handle at one end and a little curlicue at the other. The curlicue end fits loosely into a screw eye at one end of the bench, so the knife can be used like a paper cutter for straight cuts and rotated slightly in the screw eye to do a curved cut (photo 3, facing page). The long blade gives the knife powerful leverage and enough control to shave a pair of ***klompen*** to a nearly finished stage in about 20 minutes. It's important to accurately shape the exterior so that when the ***klompen*** are hollowed out to fit the foot, the top and side walls will be only about 3/8 in. thick.

The rough shoe is now wedged into the bench notch. With a spoon auger, Sieg bores a hole near the heel by pressing down hard on the shaft, while simultaneously twirling the handle. If you hold the auger handle with your right hand, you'd twist it clockwise; lefthanders go counterclockwise. You control the cut by holding the lower shaft with your other hand. The first wood section removed will look like a button. On large ***klompen***, Sieg bores a second hole, just in front of the shoe's high crown (roughly equivalent to the top of the tongue on a leather shoe), then breaks out the wood between the holes. He spoons out the rest of the heel area, just as you would scoop ice cream from a bucket.

Working with his spoon auger, Sieg bores a hole from the heel to the toe, slightly longer than the person's foot, then enlarges the opening, scooping circular curls of wood from the lower half of the ***klompen*** until the walls are the right thickness and the arch is properly contoured. He can hollow out a pair of ***klompen*** in about 30 minutes.

Sieg releases the nearly completed shoes from the bench and trims them with the block knife. Finally, the inside front half of each shoe is smoothed with a long chisel that's hooked at the end and the outside is scraped smoooth with a metal scraper or a piece of glass. Sometimes the shoes are left unfinished, sometimes they are painted. In some European areas where the low-cost wooden shoes are considered poor people's fare, a Sunday pair might be painted black and outfitted with glued on laces and eyelets until they looked like real leather shoes. Sieg decorates many of his with carved tulips, hearts and windmills.

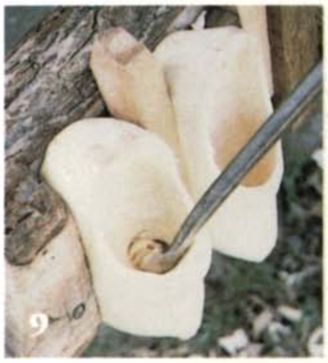
Sieg now demonstrates *klompen*-carving at trade shows, festivals and other events around the country and sells full-sized shoes for adults, who buy them for the same reasons that European workers do—*klompen* worn with thick socks are warm in winter; with thin socks they are cool in summer. They're good safety shoes and easy to slip on and off. They also keep your feet dry when working in the garden or another damp area, and, if you get tired of wearing them, they make unique mantle pieces. □

*Anne Siegel is editor of* Oregon Magazine *in Portland Ore. Bob Siegel lives in Mequon, Wisc.*

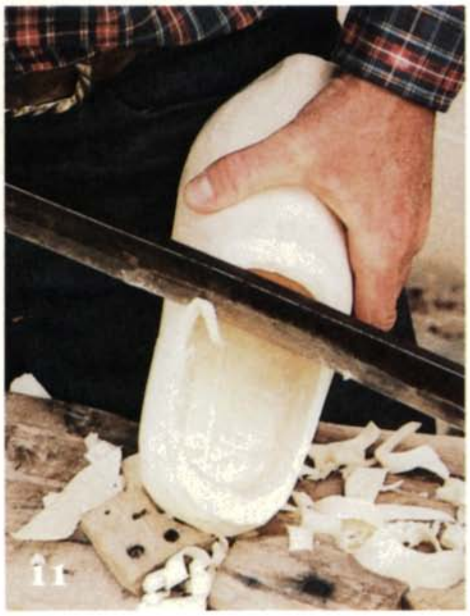
*A froe and mallet split the shoe blank out of the green log (1). A 10-in. diameter log yields four blanks. Sieg uses a side ax to square the sole and one side, then begins shaping the shoe (2). The ax is beveled only on the side away from the cut, making it an efficient planing and carving tool. After bracing the shoe with his bench and thigh (3), he refines the shoe shape with the lever-like block knife that pivots in a screw eye attached to the bench. The leverage of the long block knife makes it good for heavy crossgrain paring (4).*

*Sieg wedges the shoes to the bench, which he braces with his legs (5), then bores a hole in the heel with a T-handled spoon auger. After boring two holes, he uses the auger like a pry bar to break out large chunks of waste from between the two holes (6). After clearing the heel, Sieg uses the spoon auger like an ice cream scoop to enlarge the opening and shape it to fit the foot (7). Large curls of wood are removed from the top (8), until the wall reaches proper thickness and from the bottom until the arch is properly contoured for support and comfort.*










*To hollow toe, Sieg turns the auger with his right hand while guiding the shaft with his left (9 and 10). The block knife creates a ready-to-wear finish (11).*


*Don Strong, left, cuts a sliding dovetail on the Joint-Matic, a router joinery machine he invented and manufactures in his garage machine shop. He subcontracts foundry work, then does final assembly himself. A similar small-scale manufacturing setup turns out the Wirth Machine, a sophisticated joinery tool developed by former aerospace engineer John Wirth, right.*

# Two New Joinery Machines

## *And a look at their backyard beginnings*

by Paul Bertorelli

"Look here," says Don Strong, reaching into a plastic milk crate heaped high with small, gray iron castings, "this is the kind of problem you run into building your own machines." Pointing with a pencil, Strong shows me how sloppy pattern work mislocated a dimple needed to center a machinists' bit. At Delta or Powermatic, they'd probably toss the lot back into the furnace, then dispatch a stiff memo to the pattern foreman. Not Strong. He's devised a positioning jig for his drill press so the hole can be bored true, correcting the mistake.

Remedial engineering is all in a day's work for Strong, who in his garage workshop manufactures a machine called the Joint-Matic, a router-based joinery tool he invented nine years ago. The casting we are inspecting, a bracket for the Joint-Matic's cutter guard, is one of six that go into each machine. Recasting them would be costly and might delay shipment of the new machines, neither of which Strong's budding business can afford. So, to keep things rolling, Strong improvises.

He's ideally positioned to do so. As chief designer, manufacturing supervisor, quality control inspector and customer relations rep of Strong Tool Design, he's a one-man show, with a little help from his wife Bonnie, who handles the books. Strong is part of a tiny network of cottage-industry manufacturers sprung up during the past 10 years to service—and in part create—a demand for woodworking tools that the bigger companies don't make. He and John Wirth, another small-fry tool manufacturer I visited for this report, are true inventor-entrepreneurs, inveterate machine tinkerers who've channeled their compulsive thingmaking into the manufacture of genuinely new tools. Wirth's machine, which bears its inventor's name, cuts many of same joints that the Joint-Matic will, but operates differently enough to provide an interest-

***The Joint-Matic makes quick work of the sliding dovetails used in this leg-and-apron table joint with corner bracket. A compound miter gauge available as an option positions the bracket to cut the angled pins.***

ing look at how a tool design can be approached in distinct ways.

Strong's Joint-Matic represents the direct approach. It was born out of the peculiar ingenuity of a woodworker accustomed to modifying machines to do what some workers might accomplish by handtools. "I had been building a little set of shelves...nothing really fancy, but it seemed a shame just to dado the corners," recalls Strong. He had in mind a sliding dovetail, an excellent carcase joint but a nuisance to cut by hand or machine. His Shopsmith and a new router offered a solution. If he could cobble up a bracket to hold the router, he could feed the work on the Shopsmith's horizontal table past the bit, cutting first the dovetail's socket, then the pin. After much trial and error, Strong got the arrangement down well enough to suggest commercial potential and two more weeks of night-time work refined it enough to produce the Joint-Matic prototype. The production machine looks a bit crude at first glance, but a shrewd design rationale lurks beneath its coarse exterior.

Essentially, Strong took the idea of a router table—an upright cutter past which the wood is fed via fence or miter gauge—and flipped it 90°. The Joint-Matic has two metal tables, one horizontal and one vertical. The vertical table, which holds the router, rides on two steel ways, allowing it to travel up and down, thus positioning the router bit relative to the work instead of the other way around, as with a router table. Wood is fed free-hand past the bit on the horizontal table or gripped in a tablesaw miter gauge that rides in a groove milled in the table surface. Borrowing a trick from metal-working machinery, Strong added a pair of steel lead screws synchronized by a bicycle chain and sprocket to crank the vertical table up and down.

**Strong's design has notable advantages** over a router table. For one, the lead screws have 16 threads per inch so they move the table (and bit) up or down 1/16 in. per turn, where it stays put. Fine adjustments are made by cranking the screws through a portion of a turn. This is far better than fumbling with an imprecise shop-made fence and it gives the Joint-Matic remarkable accuracy, expanding its repertoire of joints. Using the miter gauge or an optional compound gauge for angled parts, you can grip the wood positively and feed it without slipping or skewing. The Joint-Matic solves one other router table shortcoming, as well: the router is mounted horizontally to one side of the cutting face instead of vertically beneath the cut so it doesn't suck sawdust into its guts, ruining the bearings and armature.

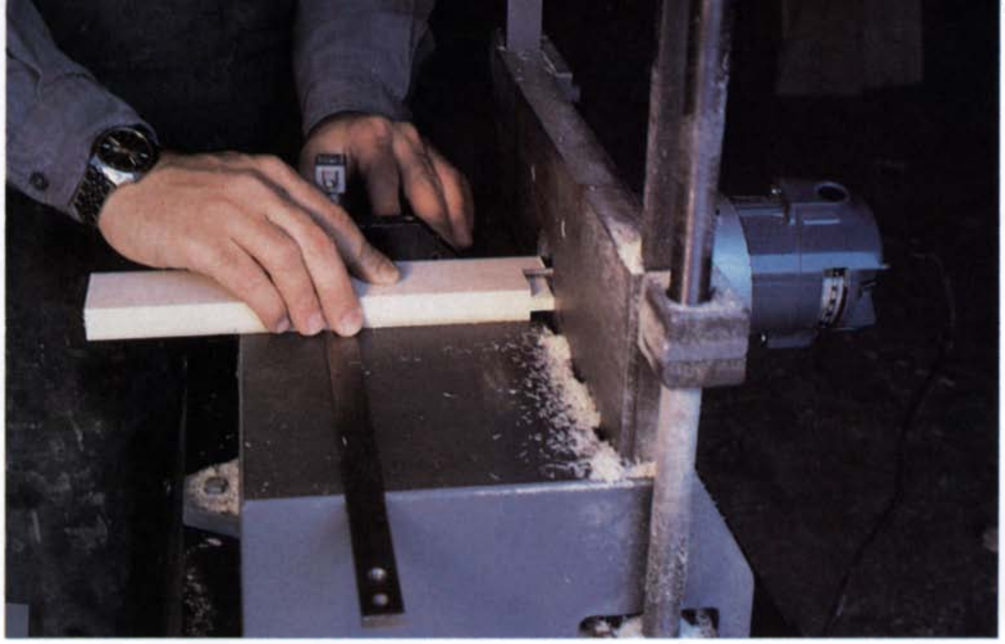
Originally, Strong had no intention of building the Joint-Matic himself. "I knew I had a great idea and that a lot of them could sell," says Strong, "but I thought I could make more money at it if I sold it to someone else." Strong offered his invention to Sears, Black and Decker, and Porter-Cable, all of whom turned it down as having too little sales potential. Rather than see the project wither, Strong began producing the Joint-Matic on his own, financing its development with income from his job as a millwright at an auto plant. "Every time I'd get $1,000 ahead, the money would go to pay for something...one week it might be patterns for castings, the next week it was the patent lawyer." By the time the Joint-Matic was ready for demonstration, Strong had spent more than $100,000.

To keep costs down, Strong used as many off-the-shelf parts as he could. The lead screws and table tracks, for instance, are standard industrial-hardware items. The sprocket and bicycle chain come from a Belsaw planer's depth-setting mechanism. Strong has castings poured at three foundries and subcontracts most of the machining and assembly work. Final inspection, testing, and shipping is done in his garage machine shop. The Joint-Matic retails for $778, which includes a Bosch 1¾-HP router. Two options, a stamped-steel base and a compound miter gauge, cost $79 and $119.95, respectively. Strong sells a universal mounting plate so another router will work, so long as it has at least 1¾ HP and a ⅜-in. or ½-in. collet.

I experimented with the Joint-Matic for a couple of days, and I found that it's easy to set up and that it generally performs as advertised, without much fuss. It will cut basic carcase and frame joints like the mortise-and-tenon, box joints, several kinds of dovetails plus grooving and dadoing operations that yield various drawer corner joints. I think it's best at sliding dovetails, though. I usually don't bother with this joint for the same reasons that led Strong to invent the Joint-Matic. But his machine makes fast and nearly foolproof work of it. To make the socket, you chuck a dovetail bit in the router, set it to the desired depth, then position the bit by cranking the lead screws. The wood—say the side of a small carcase—is held upright on the horizontal table, fed into the bit and backed out once the socket is long enough. To cut the pin, you feed the wood held flat on the horizontal table, assisted by the miter gauge if the board is narrow.

**Now the lead screws do their stuff.** By referencing the initial bit setting from the same surface, usually the top face of the stock, you can accurately keep track of the bit's position by counting turns. If, for example, the wide end of the pin is to measure ½ in. and be centered in ¾-in.-thick stock, you simply crank the cutter down two turns (⅛ in.) and make one pass. Flipping the board edge for edge for the second pass automatically centers the pin. I got pins to fit perfectly by cutting them a little fat first, then trimming with partial turns of the crank. Increments as small as 1/16 of a turn are practical, and move the bit about 0.003 in. At those tolerances, and because the Joint-Matic references off two surfaces, good results come only with accurately milled and square stock.

Mortising on the Joint-Matic is like mortising on a router table. You set the router to the desired mortise depth, center the bit in the stock thickness by counting turns, then plunge the wood onto the spinning bit, feeding it against the rotation as you go. Using spiral end mills (regular flute cutters don't seem to plunge as well), I got controlled, clean mortises on the Joint-Matic. The Bosch router has power enough to cut ⅜-in. wide mortises to about 1¼-in. deep in one or two passes. Anything wider or deeper gets a bit hairy. A ½-in. bit I tried grabbed and chattered unless I nibbled away at the mortise by tedious step cutting, which seemed more trouble than it's worth. Tenoning is done with the same bit set at the same depth. Using the miter gauge, the end of the stock is fed into the bit, cutting one cheek and one shoulder simultaneously. Flipping the board does the other half, centering



***Wood to be mortised on the Joint-Matic is plunged onto the bit then advanced against rotation. Mortises up to 1¼-in. deep and ⅝-in. wide are practical. Tenoning is done by feeding stock with the aid of a miter gauge, cutting cheek and shoulder simultaneously. Flipping the stock edge for edge automatically centers the tenon in stock thickness.***

the tenon. Again, I found it easiest to make a test tenon overlarge then trim to a perfect fit by tweaking the lead screw crank.

Through dovetailing is not the Joint-Matic's strong suit. If I hadn't actually done it, I wouldn't think it possible to cut both pins and tails, but Strong has devised a method that involves chasing one dovetail cut with another made at 90° to the first. At the end of all this, you're left to clean up the pins with a chisel, making me wonder why I hadn't started with a chisel in the first place. Half-blind dovetailing is more rewarding, the results looking like the round-bottomed jobs a Sears router-dovetailer produces. You can vary the pin-tail spacing, if you remember the correct number of cranks for each drawer front or side. On a carcase full of drawers, I'd prefer to use the Joint-Matic in the box-joint mode, at which it beats any of the tablesaw or router jigs I've used before.

Overall, I liked the Joint-Matic. Its forthright design reminds me of a mid-'60s station wagon: homely, but no hidden vices and rugged enough to last into the next century. The Joint-Matic's capacities and price are well-suited to an amateur woodworker's needs and, by dint of a first-rate owner's manual, anyone comfortable with a router should get good work out of it.

**John Wirth's joinery machine**, on the other hand, is an edge-of-technology counterpoint to the Joint-Matic's dowdiness. Where Strong's machine has a crank and bicycle chain, Wirth's has a complement of templates, gizmos and adjusters that make it a machine junkie's dream come true. In a way, the Wirth Machine's complexity reflects the background of its inventor. During the 1960s, Wirth worked as an engineer for McDonnell Aircraft, developing and testing airplane electronics systems in New Mexico. The climate appealed to Wirth so he settled there, founding Woodworker's Supply of New Mexico in 1972. His joinery machine is as much a result of his habitual need to engineer, as it is new product for Woodworker's Supply.

Wirth's experience parallels Strong's. He tried to interest Delta in a prototype at a time when that company's former parent, Rockwell, was selling its stationary power tool division and wasn't in a new-product mood. Powermatic nibbled too, but later declined to buy the design. Wirth ultimately invested some $70,000 of his own to put his machine into production. Like Strong, Wirth farms out the all-aluminum castings and major machine work. In a well-equipped machine shop in a corner of his retail store and warehouse in Albuquerque, Wirth makes the machine's accessories and does the painting, assembly and fine tuning. The day I visited, six machines in various stages of completion sat on long work tables while he experimented with jigs to produce variable-spaced dovetails. In its current evolution, the Wirth Machine sells for $2,095, which includes a 1½-HP induction motor stepped up by belt and pulley to spin the bit at 20,000 RPM. A less expensive model, using a router instead of the induction motor, is being developed and is expected to sell for about $800.

**Wirth's invention is an intriguing hybrid** of a woodworking slot mortiser and a metalworking horizontal mill. It consists of an aluminum sliding table mounted to a base via bearings and a pair of steel tracks. The tracks and bearings allow the table to move along two axes, one perpendicular to the bit (y) and the other toward or away from it (x). Sounds like a slot mortiser so far, but Wirth added a twist. He mounted the cutter on a pivoting-arm arrangement which permits it to move up and down in the z-axis, then connected a template follower on top of the arm. By fastening a template where the follower can get at it, the machine functions as a part-reproducing pantograph.

In principle, the Wirth Machine is fathomable enough, but it requires undivided attention to set up, especially for operations involving the templates. All the basic joints are possible: the mortise-and-tenon, dovetails (except half blind), box joints, plus horizontal boring for doweling and neat, angled mortises for fixed-louver shutters. It'll also reproduce in wood any part capable of being traced by the template follower. If the base is bolted to a stout bench, the Wirth Machine can grasp and joint long stock, providing it's supported with roller stands.

I found the Wirth Machine to be a splendid mortiser, the operation for which it seems best suited. As with a slot mortiser, you first clamp the wood to the table with a fast-action clamp, then center the cut in the stock thickness, which, on the Wirth Machine, is done by locking the bit in its z-axis. Grasping a handle bolted to the table, you plunge the work onto the spinning bit by sliding the table in the x-axis. Moving the table back and forth in the y-axis completes the cut. Adjustable stops limit table travel, controlling the mortise depth and length. The Wirth Machine's cutting action is evener and quieter than you'd expect from a router, and mostly chatter free, chiefly because the induction motor doesn't bog down under load as does a router. By step cutting in three or four passes, I milled ½-in. mortises up to 2-in. deep and probably could have gone deeper with a longer bit. Mortising on this machine feels very safe because manipulating the table keeps your hands well clear of the cutter.

Every mortise deserves a tenon and at that, the Wirth gets involved. Tenoning is done by using the machine's one-to-one pantograph capabilities. Wirth provides Delrin tenon-shaped templates, each corresponding to a specific tenon size. One size, 3/8 in. by 2 in., comes with each machine, others are sold as accessories for $21.50 each. You screw the template onto an aluminum plate mounted on the machine's frame, then adjust the follower—a steel rod with a bearing threaded into one end—to contact the template. To cut the tenon, trace the template's profile with the follower by grasping one handle, which moves the bit up and down, and the other, which moves the table in both axes. This requires coordination not unlike rubbing your head and patting your belly at the same time, but it's not hard to get the hang of it and, while you concentrate on template tracing, the bit chews away all the wood that isn't tenon.

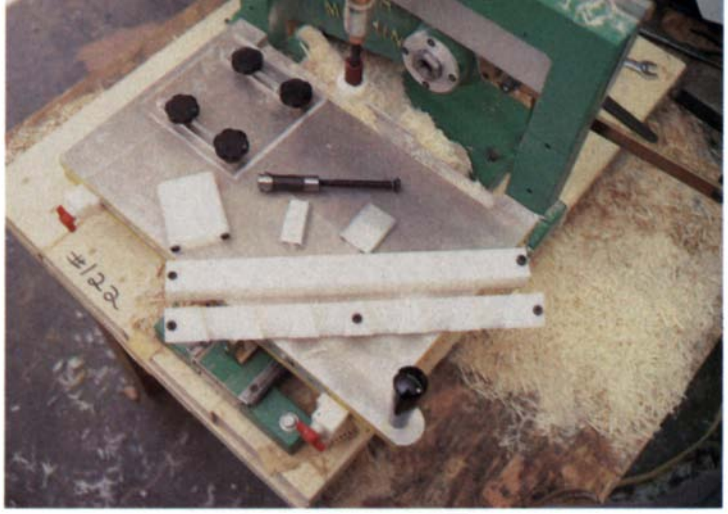
**I got acceptable tenons easily enough** but had trouble putting them where I wanted them. An index indicates how the template's position relates to what the bit will actually cut, but I found it time-consuming to adjust everything so that the tenon was accurately centered in both the thickness and width of the stock. Trial and error finally got the job done, but test tenons sliced off the end of my ever-shrinking scrap littered the floor under the radial-arm saw. The templates are made slightly undersize to compensate for a bit whose diameter has shrunk after sharpening. To fatten the tenon to a snug fit, you wrap a turn or two of tape around the follower. If it seems ludicrous to trim a $2,000 machine with a 29-cent roll of tape, the method does work and I can't think of a better way to do it. One nice thing about the tenons is that their radiused edges match the mortise, thus solving the nagging dilemma of whether to round the tenon or square the mortise.

Two other templates I tried, for dovetails and for angled shutter-louver mortises, were faster to set up. Both are 12 in. long, but the stock can be repositioned to allow for wide boards or long shutter stiles. The shutter template works particularly well, simplifying what would be a daunting task on a slot mortiser or a router table. Using this template, I was able to produce a 12-in.-long shutter start-to-finish in about 20 minutes.

The Wirth Machine's facility at shuttermaking suggests that its real potential is as a specialized joinery and shaping tool rather than as a general, jack-of-all-joints shop machine. If you want an odd-shaped tenon or one that's angled relative to the board's thickness, the Wirth Machine can accommodate. My joinery tastes are more straightforward, so except for mortising, I wouldn't have the patience to fuss with it unless I needed a dozen or so of one particular joint—which isn't always the case in the amateur's shop. But the sliding table is readily jigged and the template holder can accept all kinds of shop-built templates, making the Wirth Machine ideal for reproducing small or odd-shaped wooden parts, say in a pattern or model shop. An attachment Wirth sells for $325 converts the machine into a duplicator, which can reproduce long three-dimensional objects up to about 8-in. in diameter, a capability that ought to interest gunstock makers.

Wirth believes that's market enough to justify his investment and I for one would like to see him succeed. The major manufacturers introduce new products cautiously and then only if sales in the thousands are predicted. Wirth (and Strong) represent an innovative, less hidebound alternative source of new tools and there ought to be room for them in an expanding market. □

*Paul Bertorelli is editor of* Fine Woodworking. *For more information, write Woodworker's Supply of New Mexico, 5604 Alameda N.E., Albuquerque, N.M. 87113 or Strong Tool Design, 20425 Beatrice, Livonia, Mich. 48152. We welcome comments from owners of machines described in this report.*




***About two dozen templates are available, including those for various sized tenons and for dovetails. The templates are made of a tough plastic called Delrin. The Wirth Machine's collet, top of photo, is drawn into a hollow tapered spindle by a long bolt.***

***The Wirth Machine set up for tenoning. The template follower, top, traces the template, guiding the bit to reproduce its profile on the end of the stock. As the bit cuts, the wood is held firmly against a plastic plate, setting the shoulder depth.***

# Fox Wedging

## *A sly joint for a 17th-century stool*

by Alasdair G.B. Wallace

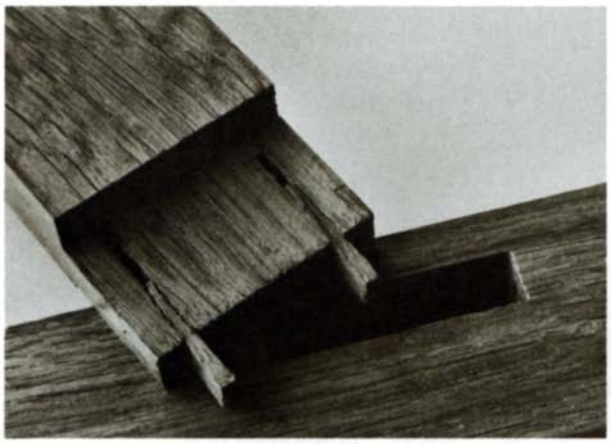
A request to copy a pair of 17th-century joynt stools in brown oak offered a welcome change and challenge for me. My customer had admired a pair of 19th-century reproduction stools in an antique shop, but found the price beyond her means and equally beyond the realm of reason. Though English brown oak costs three to four times as much as domestic red oak, a quick calculation suggested that I could produce two stools for less than the price of a single 100-year-old reproduction.

Joynt stools date from the late 16th century and the advent of the technique of framing and the pegged mortise-and-tenon joint. (The term joynt comes from joined.) In addition to plain, totally unadorned joynt stools, some exhibited simple moldings and carving, while others for churches and manor houses were elaborately carved and molded. I was asked to copy the most basic stool, the product of the country carpenter.

Construction of the stool is straightforward. When preparing the stock, make the leg blanks 1 in. longer than the finished dimension to allow for trimming. You can mortise the legs before or after turning them. I prefer to turn them first so that I can fine-tune the location of the mortises relative to the turnings.

The mortises and tenons should be laid out so that the outer faces of the apron rails and stretchers will finish flush with the outer faces of the legs. For maximum strength, the tenons should be offset as shown in the drawing on the facing page, and mortises for adjacent rails or stretchers shouldn't intersect in the leg. The legs are splayed 5° from perpendicular when the stool is viewed from the ends, so those mortises and tenons must be laid out accordingly. The Jacobeans didn't glue the mortise and tenons, relying instead on pegs and the shrinkage of slightly green legs around the tenons for strength. My brown oak was bone dry, so I chose to fox-wedge the tenons to help secure the joints.

Though little-used today, the fox-wedged tenon provides an exceptionally strong joint where a through-wedged tenon would be inappropriate or impossible. A fox-wedged tenon expands the tenon within its mortise, as does a through-wedged tenon, and both require tapered mortises to accommodate the tenon's expansion. The difference between the joints is that the fox-wedged mortise is blind and the wedges must be driven into the tenon by the bottom of the mortise. A great many things can go wrong if the joint isn't laid out and cut carefully. If, for example, the tenon or wedges are too long or the mortise insufficiently tapered, the joint won't pull tight; if the mortise is too wide or the wedges too slim, the joint will be loose. Regardless of whether you glue the joints (I preferred not to), they can be further secured by pegging.



*Wallace's brown oak copy of a 17th-century joynt stool, left, is held together by fox-wedged tenons. The top is attached to the apron rails with square wooden pegs. A fox-wedged tenon and mortise, above, is ready for assembly. Since the faces of the pieces are to be flush, the tenon is offset for greater strength. The mortise, right, has been too heavily undercut, causing the tenon to fracture at the end of the top kerf. The wedges and kerfs, however, are perfect.*

Lay out and cut the joint as you would a standard blind mortise-and-tenon. Then taper the mortise, kerf the tenons and make the wedges following these basic guidelines:

The depth of the mortise should be about 1/16 in. to 1/8 in. greater than the length of the tenon.

The taper of the mortise should equal the difference between the width of the sawkerfs and the thickness of the wedges.

Begin the mortise taper at a distance of about one-fifth the depth of the mortise beneath the shoulder. (Start tapering a 1¼-in.-deep mortise about ¼ in. beneath the shoulder.) This ensures that the wedges will be driven into the tenon equally and that the tenon will be centered in the mortise.

Position the kerfs about one-fifth the tenon's width in from each of its edges (about ¼ in. on a 1¼-in. wide tenon), and cut them to a depth of about four-fifths the tenon length.

Make hardwood wedges as long as or a bit less than the length of the kerf. At its thickest, a wedge should be about twice the width of the kerf, thinner if the wood is likely to split.

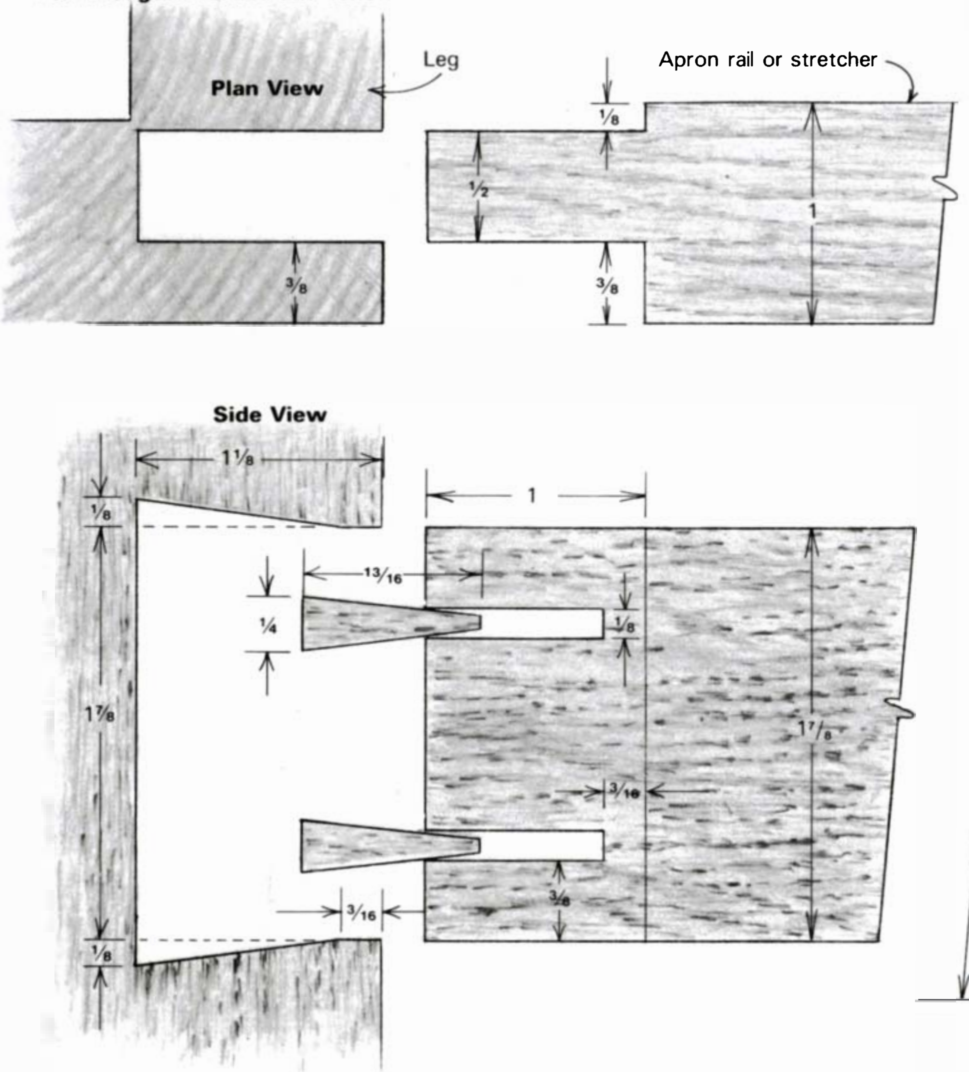
I assemble the sides of the stool first, then add the end rails and stretchers. When you assemble the fox-wedged joints, make sure that the wedges are firmly in place in the kerfs, and take care not to dislodge the wedges as you insert each tenon into its mortise. To avoid jarring the wedges loose, draw the joints together with a clamp rather than driving them together with a mallet. The original stool's joints were pegged. I drove square pegs into slightly smaller round holes, then flushed them off with a chisel. To attach the top, I used the Jacobean method of driving square pegs through it into the apron rails. Nails, pocket screws or buttons can do the job, too.

Everyone in the business of reproduction has his or her own secret recipe for stain. These range from unlikely concoctions of manure, ashes and soot to commercial stains. Don't be afraid to experiment. I used a manure/ash/soot combination, painting it on liberally, filling cracks and hollows and leaving it for three or four months. Brushing the mixture off revealed a deep brown surface. Thorough wiping in areas of high wear and some judicious sanding achieved the antique effect my client desired. A beeswax, turpentine and lampblack mixture completes the finish. Apply it over five wiped-on coats of 1-1 white shellac/methylhydrate which seals the wood and gives it life and depth.

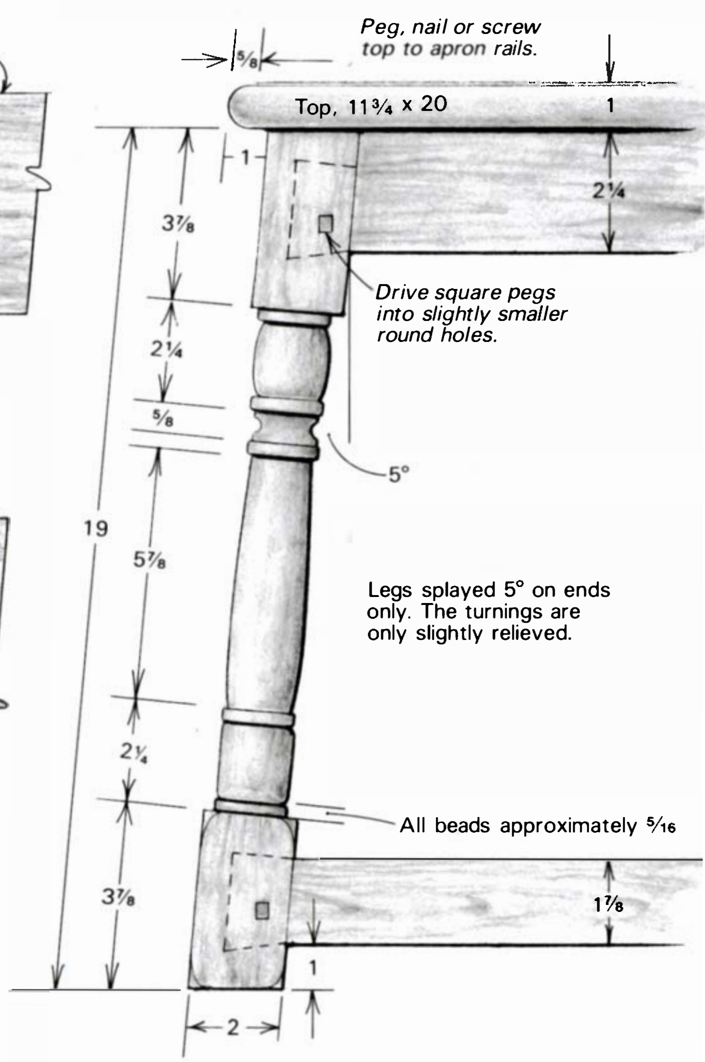
My customer's wish that the stool look old presented me with an ethical dilemma. Judging by the wealth of "authentic" joynt stools I saw on a recent trip to England, the Jacobean carpenter was much more prolific than we realize or current high prices have tempted their modern counterparts to augment the Jacobean output. I was able to satisfy the customer's desire for a piece that looked authentic by staining and distressing. By carving my name and the date on the back face of an apron rail I ensured that no one would ever be duped by my deception. □

*Alasdair G.B. Wallace makes furniture in Lakefield, Ontario.*

**Fox-wedged mortise and tenon**




**Jacobean joynt stool**



*Subtle or showy, the colors and textures of wood, burl and veneer interplay in authors' geometric designs. Glued up from bands of wedge-shaped segments, the lathe-turned bowls shown play on Indian-pottery forms and patterns from the American Southwest. Turnings shown range in height from 4 in. to 9 in. with an average wall thickness of ⅛ in.*

# Segmented Turning

## *Redefining an old technique*

by Addie Draper and Bud Latven

While exploring the art of woodturning we rediscovered and refined an old turning technique known as segmentation. This process involves gluing various shapes and colors of wood together then turning them to create lively, infinitely-variable designs. The method is time consuming and often complicated but worth it for the richness and diversity of designs it makes possible.

We've always savored the beauty of burl and we find that the regulated crispness of segmented designs contrasts nicely with the unpredictable burl figure. Once a year we go on burl-hunting trips to the West Coast. Some of our favorite species include walnut-root burl from the Sacramento valley, lilac burl from southern California and maple-root burl from western Oregon. The challenge is to devise patterns that complement each burl's unique character.

It's hard to say why we combine certain woods or why a particular pattern complements a particular shape. What works aesthetically and what doesn't is largely subjective but color, figure and density are the main things to consider in planning this kind of turning. If a burl's figure is subdued, a segment band of brightly contrasting wood—rich, red paduak on a field of ash—will liven up the piece. For accent, we might work contrasting or complementary-colored veneers into the pattern. As a rule, we avoid highly-figured woods in the segment band because too much figure is distracting. Woods of similar density turn and sand more easily. If you juxtapose a soft wood next to a hard, dense one, the finished surface may have an uneven feel. This isn't necessarily a liability—the contrast can produce some interesting tactile qualities—but it's something to consider when choosing woods.

The shapes we turn have evolved from many sources. Living in the Southwest, we've been influenced by the indigenous Indian pottery. Though these shapes were developed in clay, they have a directness and simplicity of line that translates nicely to woodturning. Other cultures have provided rich inspiration as well. The jar-like bowl in the top left photo, for example, owes much to the Greek hydria.

Whatever the shape, we usually begin a bowl by drawing it full-size on graph paper. We start with an elevation view including the segment pattern, then make a full-size plan view of each segment band, as shown in the drawing on p. 66. This is a critical step because it allows us to refine the shape and plan the segment pattern in minute detail. We can then measure the various angles and sizes of each segment right off the drawing instead of puzzling it out mathematically. We've found that it's a lot simpler to measure in millimeters and centimeters when working at this scale.

The basic building block for our designs is a segment with a truncated-wedge shape. A few of our bowls are turned entirely of segmented sections, but most consist of a burl blank onto which we glue one or more segment bands that make up the desired pattern. The segment patterns can become quite complex. It's impossible to describe in this article how we make every one, but by experimenting with the basics explained here, you'll be

able to figure out the more complex patterns and invent new ones. We've developed different types of segments and several techniques for combining the segments into patterns. Solid-block segments, and slant-line segments, both shown on p. 66 are the two basic segment types. Solid-block segments are cut from solid wood. Slant-line segments are sliced from a glued-up sandwich of multi-colored woods and veneers so that the laminates form a diagonal stripe across the segment face, as shown in the drawing. The apparently curved lines of holly veneer in the bowl, facing page, center, are simply a variety of straight slant-line segments. The lines appear curved because they traverse the bowl's radiused edge.

Solid-block and slant-line segments can be combined in many different ways, but there are two basic ways that we glue up the segments—single-angle and multi-angle patterns. A single-angle pattern, like a pie cut into equal slices, is made up of segments with the same angle, say 18 segments at 20°. A multi-angle pattern alternates segments with different angles, say 12 segments at 20°, and 12 segments at 10° spaced wide, narrow, wide, etc. Photo #11 (p. 67) shows a simple multi-angle pattern. Whether single-angle or multi-angle, the segment angles always add up to 360°.

By stacking bands of segments we create a multiple-row pattern. The complex Aztec design shown in the photo (facing page, right) is an example of a solid-block, multi-angle, multiple-row pattern.

Once you have drawn the design full-size, you are ready to make the segments. The diameter of the segment band should be 1cm larger than the finished diameter to allow for turning. You can measure the angle and width of each segment at it's heel and toe right on the drawing, or, if you are mathematically inclined, you can calculate the circumference with the formula $C = \pi d$ and divide this by the number of segments if all the segments are the same angle. This will give you the approximate segment width at the circumference. It won't be entirely accurate because it will be the arc of the end of the segment, so the segment itself will be slightly smaller. But since the segments are cut slightly oversize anyway, the measurement you get with this formula will be close enough.

We usually plan to cut the segments so that we don't have to turn end grain. The grain direction should run around the circumference of the turning. We cut the segments 2mm oversize on either side, then sand them to size on the disc sander with an 80-grit disc. Solid-block segments are crosscut from a board on the tablesaw. The sawing process for slant-line segments is two-step, as shown at the bottom of p. 66. Remember that slant-line segments are sliced from a glued-up sandwich of contrasting woods. First, on the tablesaw, we crosscut parallelogram sections from the sandwich. Then we square off the corners of the parallelograms on the bandsaw. For sanding the segments to size, we've tacked a wooden fence to our disc-sander table at 90° to the disc. A wooden push stick (one for each angle) with the end cut to the segment angle feeds the segment into the disc. To ensure consistency, use one segment, sanded to the proper size, as a pattern for the others.

Before gluing the segments to the burl blank, we level the turning blank with a custom-made sanding disc, as shown in photo #4 on p. 67. This 12-in.-diameter disc was machined from ½-in.-thick aluminum by a local machinist. It has a steel spindle with a morse taper that matches the drill press quill. After the segments have been trued up on the disc sander, they're ready to be glued to the burl. With a circular protractor, duplicate the radial "grid" from the full-size drawing directly on the burl blank. Accuracy is very important. Lay the segments on the grid and bring them in tight to check for a proper fit. If there is a total of more than 1mm of slop all the way around, the segments need to be touched up on the sander.

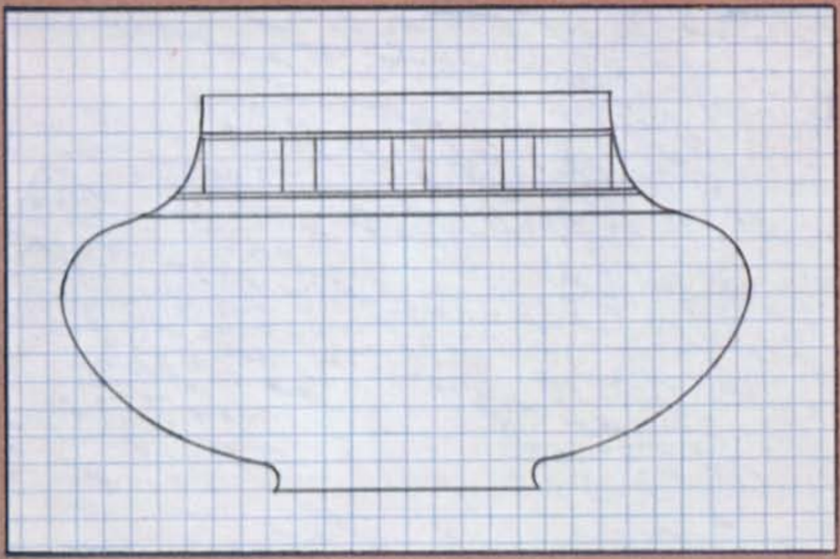
When the fit is right, apply glue to the bottom of a segment and rub it onto the blank moving it back and forth and applying downward pressure. We use Titebond glue for all our laminations. Line up one segment side along a radius line and lay a straightedge along the side of the segment. The straightedge should still follow a radius line on the opposite side of center. Allow the glue to set for five minutes. Glue the next segment and rub it into position against the first, but don't bump the already-glued segment out of position. Continue this process, gluing each segment in place around the circumference of the blank, taking care to align each segment on the "grid" lines. Continuous attention to accuracy avoids compounding problems. This is especially important in multiple-row and slant-line patterns where minute joinery errors add up to become major ones in the finished work. The photos on p. 67 show how we lay up a solid-block multi-angle pattern. When you've laid up ¼ circle, check it with a square. When you've laid up ½ circle, check with a straightedge. Make a third check with a square when you've laid up ¾ circle. We usually need to touch up the last three segments slightly on the disc sander for a tight fit. Once all the segments are glued up, let the work dry overnight. We find that it's not necessary to clamp when laying up the segments, but we do clamp the layers of veneer or other hardwood laminates that may be part of the piece. We have never had a piece fly apart on the lathe.

We usually glue a piece of hardwood to the bottom of the burl. This will be turned down later to become a very thin foot at the

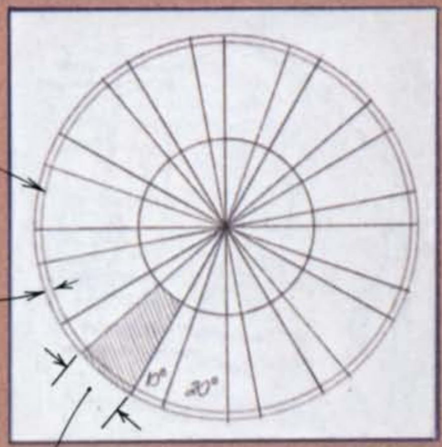
Photos of finished bowls: Ken Reid

## Making a segmented bowl step-by-step

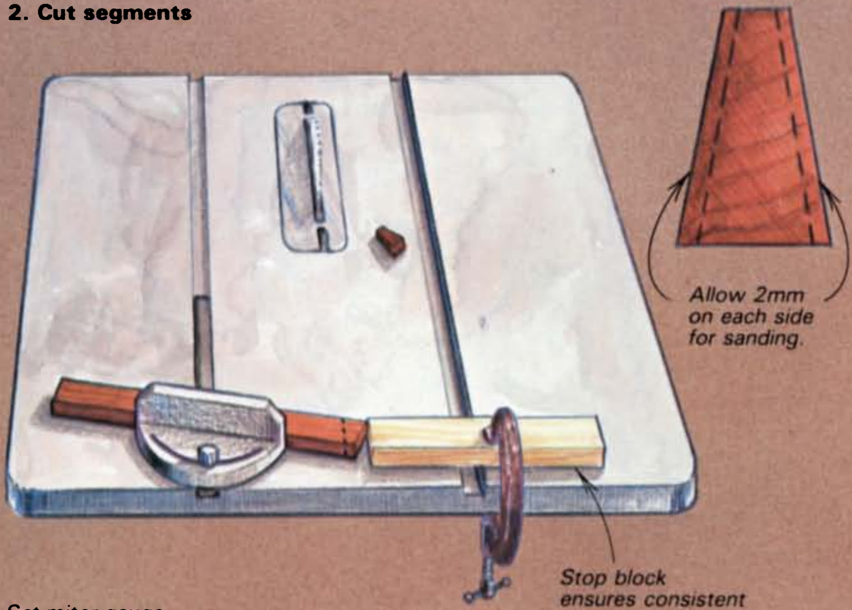
### 1. Draw desired shape full size on graph paper



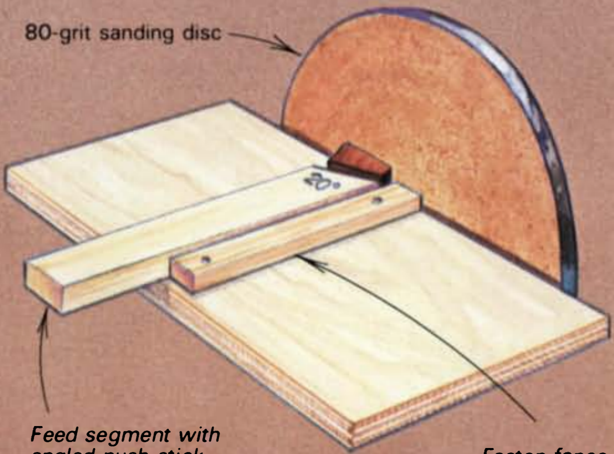
*Draw plan view of each segment band:*



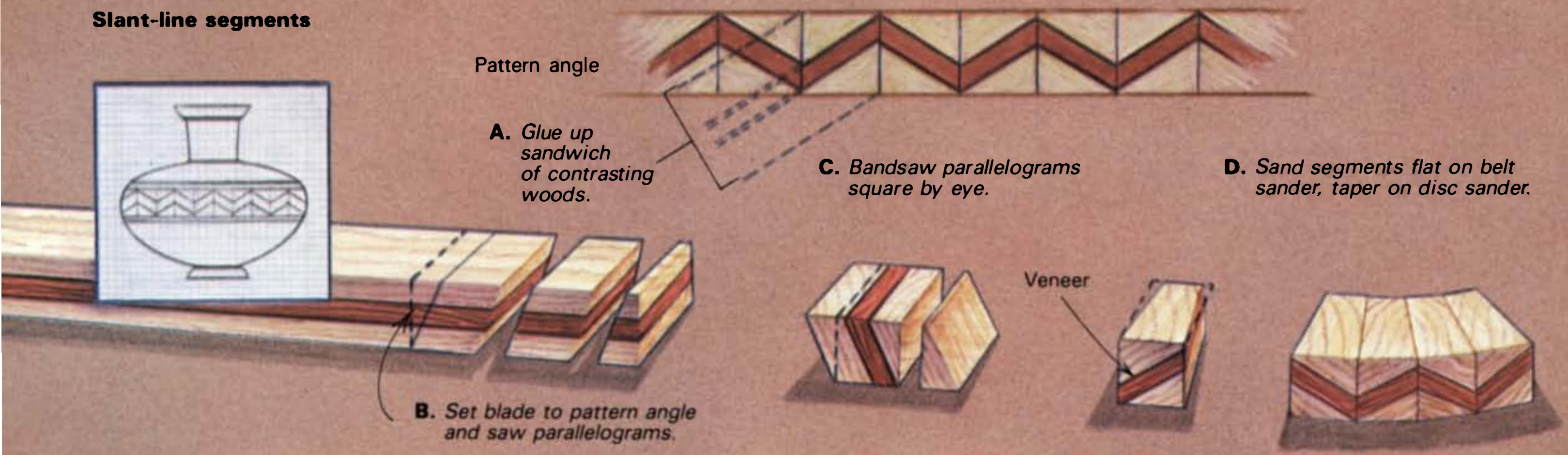

### 2. Cut segments

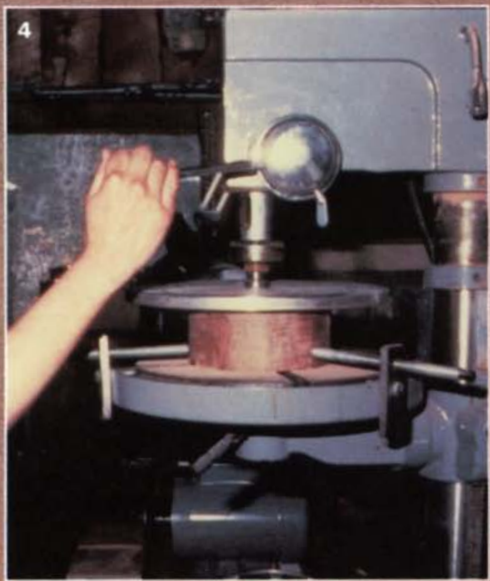


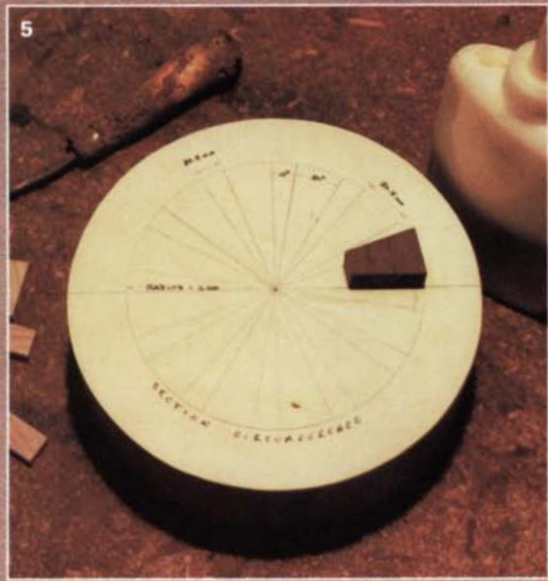

### 3. Sand segments to size

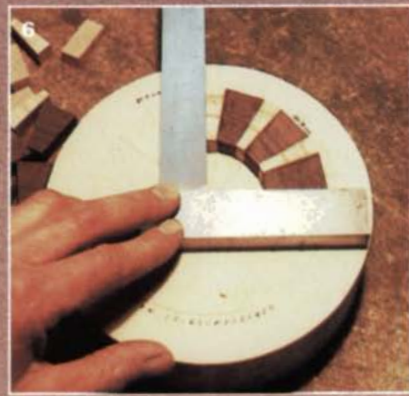



### Slant-line segments









*Gluing up begins with a burl-blank bandsawed round then sanded flat with a custom-made sanding disk (4). After gluing on a layer of veneer, the pre-planned segment "grid" is drawn on the blank (5) and the segments glued in place one-at-a-time. Checks for square at 90° (6), 180° and 270° reveal cumulative errors in segment size and allow corrections. The completed solid-block, multi-angle segment band (7) is set aside to dry.*

***After gluing on a hardwood rim and foot, the blank is screwed to a faceplate. The center is drilled to depth with a ¾-in. multispur bit, then the tailstock is brought up for support (8). First the outside is turned to shape with scrapers (9), then the inside is scraped, leaving the tailstock in place (10) for as long as possible to support the work. After sanding, the bowl is parted off the lathe and the bottom sanded flat before finishing with Waterlox (11).***

bottom of the piece. We glue a piece of maple to the hardwood which is, in turn, screwed to a faceplate.

The blank can be quite heavy, so do as much of the turning as possible between centers. We do most of our rough turning at 1000 RPM to 1500 RPM and finish turn at 2200 RPM. First, we turn the outside with scrapers. For complex pieces we stop occasionally to check the drawing against the turning. If an interesting effect starts to happen during the turning process we don't hesitate to deviate from the drawing.

We sand the outside, first with 60-grit, then with 80-grit sandpaper before starting the inside. With a chuck in the tailstock, we bore to within ⅛ in. of the bottom of the burl using a ¾-in. multispur bit, then turn the inside with scrapers, striving for a wall thickness of ⅛ in.

We finish-sand down to 400-grit, and part the bowl off through the layer of hardwood, leaving only about ⅛ in. still attached to the burl. We sand this flat on a piece of 120-grit sandpaper fastened to the benchtop, working through the grits down to 400-grit. Six or more coats of Waterlox finish the bowl.

The segmentation process can be as simple or as complex as you choose to make it. Since the actual lathe work is often only a small part of the entire process, it's a good idea to develop turning techniques before plunging into segmentation work. You'll find, as you experiment with our techniques, that you'll discover new effects at the lathe that you just can't predict on paper. □

*Bud Latven and Addie Draper are professional woodturners in Tajique, N.M.*

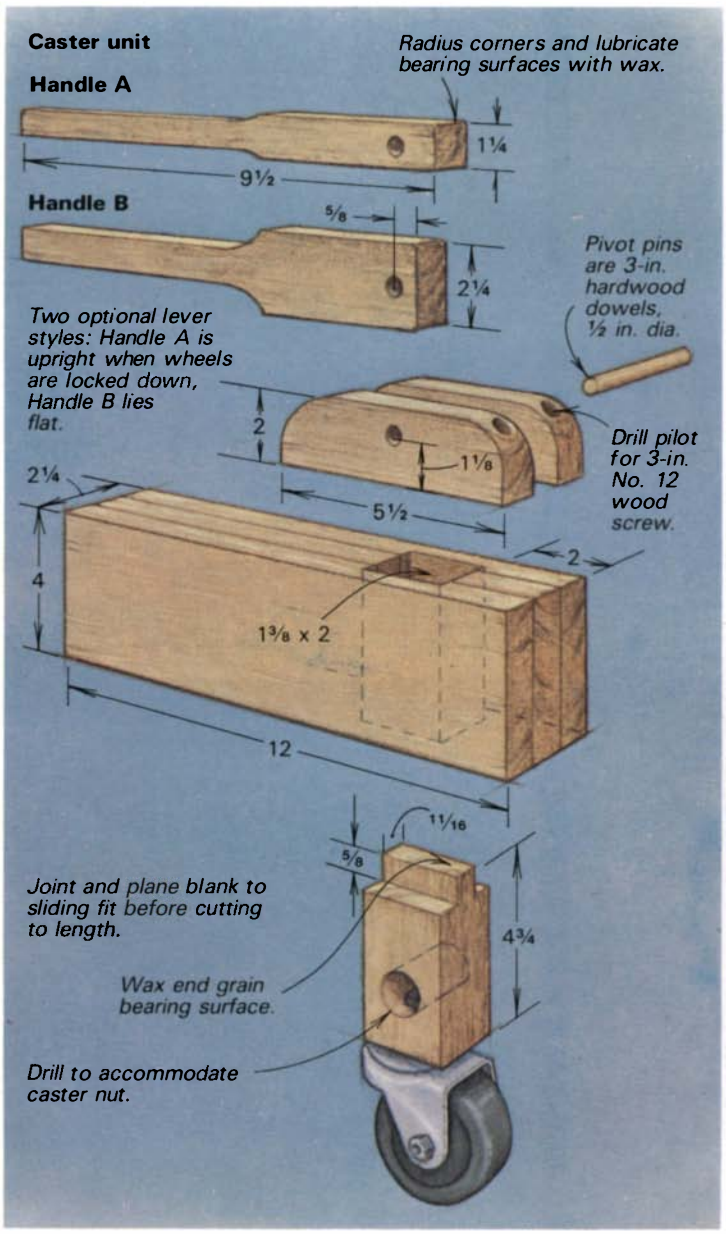
Drawings: Mark Kara

# Tight Quarters

*Here's a sample of some ways readers cope with what seems to be a universal problem—not enough room. Robert Henderson, a woodworking teacher in the Detroit public schools for 21 years, tells how he rolls tools out of the way in his garage shop; Mike Drummond, a woodworker and writer from Grass Valley, Calif., tells how a nearby craftsman adapted to the cramped space in a tractor trailer; Vic Mumford, a retired executive who turned his garage into The Whittle Shop in Ventura, Calif., has come up with the fastest tablesaw/router-table conversion yet; and Michael K. Brouillette, a database designer in Fairfax Station, Va., writes about an ingenious workbench/lathe combination. What they all have in common could be summed up by the old magician: Now you see it...Now you don't....*

## *Wheel away your troubles*

by Robert Henderson




I've moved three times in the past 20 years, and each time my workshop got a little bigger and better planned. With every move, I anticipated that the new shop would be big enough to spell an end to my space problems. Not so—I've come to believe that a big-enough workshop truly is the "impossible dream."

A few years back I installed a commercially made caster set on the base cabinet of my radial-arm saw in hopes that it would help. But I found the adjustable casters cumbersome to use, and the wheels were too small to work well. What I needed was big wheels that lowered and retracted without a lot of fuss.

The system I finally came up with has solved most of my problems. The hardwood base adapts to various machines with a little ingenuity, and the casters can be selected to bear whatever weight is required. As equipped here, with medium-duty casters from the hardware store, the setup will carry a 500-lb. machine very well and when the wheels are retracted the machine sits firmly on its own weight.

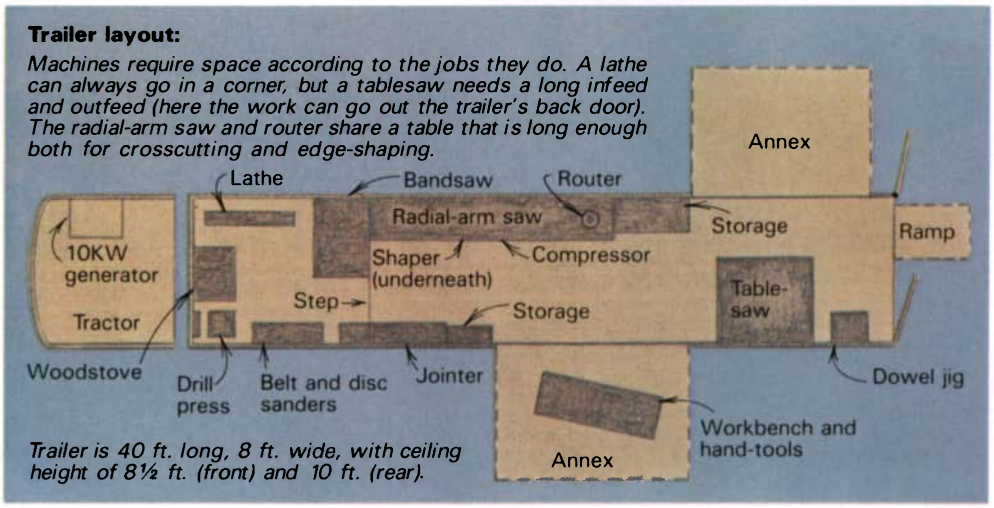
The levers shown in the drawing provide ½ in. of lift, which should be enough to traverse the most uneven floor. If necessary, the amount of lift can be easily changed by slightly altering the design. In addition, I've shown two lever styles: one positions the handle up when the wheels are extended, as shown in the photo; in the other style, the levers lie flat.

So far I have fitted casters on three of my heavier machines with excellent results. In fact, they work so well that at least three more of their relatives will soon have wheels of their own.

Author

*One version of Henderson's retractable casters bolts directly to the sides of his tablesaw; another version, not shown, has a four-sided wooden frame that supports his Hitachi planer.*


*For additional space and light, Clay cut and hinged two sections of the trailer's sides so they would fold out as decks supported by adjustable metal legs. In bad weather they can be shielded with corrugated fiberglass and plywood panels.*




# Mobile Wood Works

by Mike Drummond

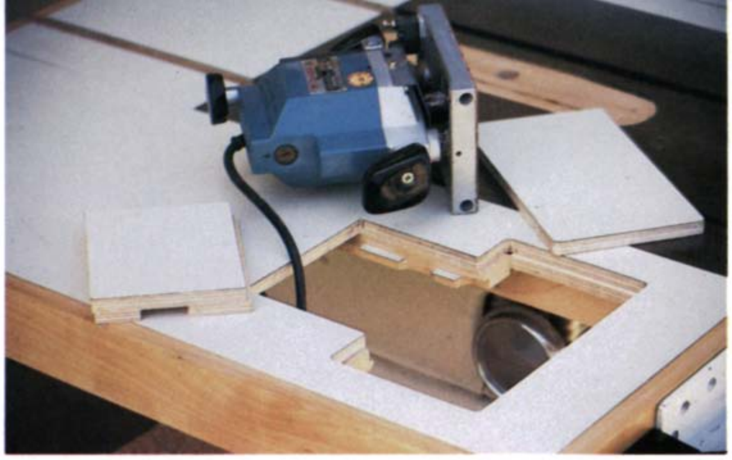
Gary Clay took delivery of a 40-ft. truck trailer a year ago intending to use it as storage. But he soon saw it in a different light, as a complete wood shop on wheels.

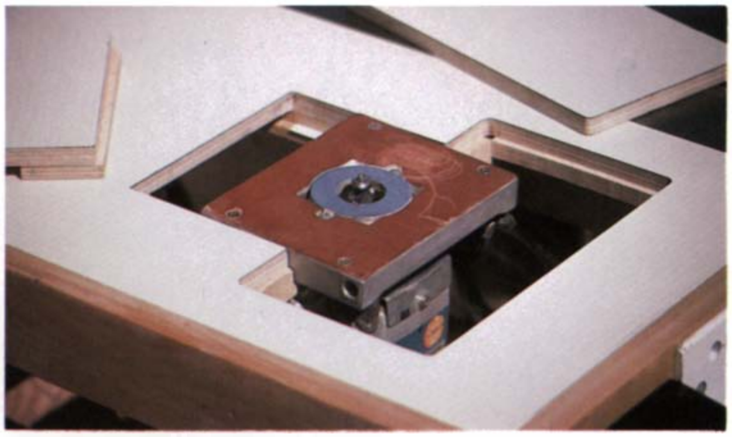
The wheeled workshop is only 8 ft. wide, which would have made a discouragingly narrow and dark work space, so Clay modified the trailer as shown in the floor plan and photos above. The trailer can tap into a power source on the job site, or run off its own 10KW generator, which Clay mounted in place of one of the truck's 80-gal. fuel tanks.

The machines are situated according to the jobs they have to do, and the heights of the tables are also taken into account—the tablesaw feeds under the dowel jig; the bandsaw feeds over the radial-arm saw and the lathe. The jointer is angled just enough that long work can bypass the sanders. In places where much vertical clearance won't be needed, such as above the radial-arm saw and the jointer, 10-in.-deep shelves provide storage, and pegboard above the router table keeps much-used handtools central and handy.

Clay is after jobs where he can set up on site for several days or weeks at a time. He is an all-around woodworker: In the past he has done circular windows, arches, custom bars, cabinetry, stairways and office furniture. One early job was building a 7½-ton sailboat; a recent one was customizing a recording studio for a member of the rock group SuperTramp.

Clay, who recently drove his shop from Nevada City, Calif., to a new home in Telluride, Colo., has been partial to Sears Craftsman machines for many years, and now appreciates a feature he never thought much about before—the tools have excellent warranties, parts and service—nationwide.





Mumford's Makita router plugs into a switched outlet, then is inserted through a hole large enough to admit the handles. Gravity and the access-hole cover plate hold it in place.

# Drop-in router table

by Vic Mumford

In my 400-sq.-ft. shop there wasn't room for a regular router table, so I decided to mount my Makita 3600B in one of the plywood extension wings on my tablesaw. Past experience with space-saving ideas taught me that unless a conversion is foolproof and dead easy, the changeover simply isn't used very much. So I wanted a mounting system that required no screws, no clamps and no fasteners, one that would allow instant setup and takedown, with no-hassle bit changes. The photos at right show the simple drop-in design I came up with. The router is inserted down through an access hole that is large enough to admit the handles, then it slides into a tight-fitting mounting bracket and is locked in place by the access hole's cover plate.

I cut the holes with the router, a straightedge and some handtools, then glued and screwed wooden strips beneath to form rabbets that support the router and the cover plates. Where the wooden strips met, I left spaces at the corners to make sawdust removal easier. You could mount a round-base router in a similar way, by cutting half the mounting hole in the table surface, and the other half in the access hole's cover plate.

*Workbench top swings up on hinges, as shown in center photo. Lathe is then raised into position. A length of angle iron on a hinged wooden strip at the front of the bench holds the lathe base up, as shown in the photo at right.*

# Lathe/workbench duo

by Michael K. Brouillette

Despite my workshop's size—a double garage measuring 20 ft. by 22 ft.—I never seem to have enough room. To make matters worse, I recently decided I needed a second workbench, so I could work on more than one project at the same time. My quandary was that regardless of where I placed it, the bench would occupy 18 sq. ft. of precious floor space.

I spent weeks puzzling out the situation until my wife, Jane, gave me the solution. Why not remount the lathe on a hinged board under the workbench top, like a sewing machine?

The photos above show the general idea. The important design considerations are the length of the lathe and the height of the headstock, for which you have to allow clearance. I made my base from heavy construction lumber, and mounted the lathe on butcher-block. The workbench top is an old solid-core door.

I counterweighted the lathe with a spring-and-cable setup at both ends, running over pulleys mounted inside the base frame. My local hardware store carried the necessary hinges and the other hardware: 2-in. pulleys, heavy-duty springs about 1 ft. long, ¼-in. vinyl-coated steel cable and 2½-in. eye screws. Depending on the weight of your lathe, you might want heavier or lighter springs (or maybe none at all), but considerable leeway is possible by adjusting the mounting positions.

The workbench is mounted on casters, like most of my other heavy machines, and it does its double-duty with aplomb. I may not have any more room than I had before, but at least for the time being, I don't have any less. Now where, if I had the chance, would I put a nice little planer...? □

# Inlaid Tambours

## *Floral patterns on a flexible door*

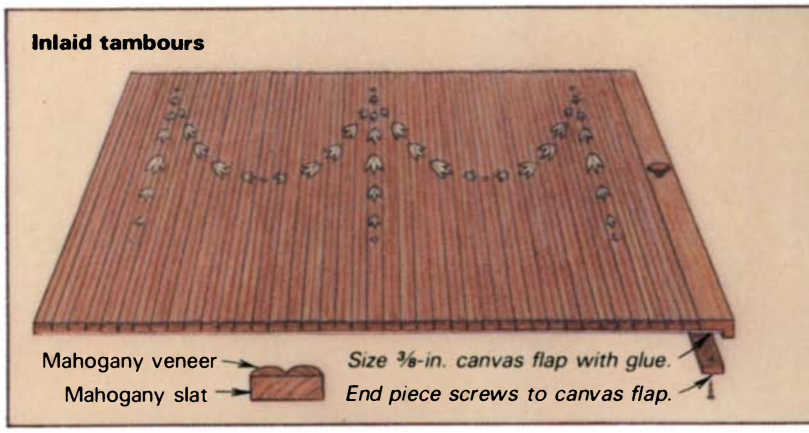
by David Convissor

John Seymour and his son Thomas were among the finest of the Boston cabinetmakers at the turn of the 19th century. Although they produced an amazing variety of furniture, they are best known for their Federal tambour desks and secretaries. The tambour doors on some of their fancier pieces were decorated with a delicate, draped cornflower design inlaid into the tambour slats. I reproduced this design on the doors of my Seymour-style desk shown at right. Inlaid tambours certainly look impressive, but they aren't nearly as difficult as they appear.

Inlaid tambour doors are basically the same as conventional tambours: thin wooden slats glued to a flexible canvas backing. The inlays appear to have been worked into each slat individually, but this isn't the case. The flowers are inlaid into a sheet of veneer. Wood strips are then clamped edge-to-edge and glued to the back of this marquetry sheet. The veneer is then cut apart along the strip lines with a knife. This technique can be used to add parquetry patterns, marquetry designs or just some beautiful grain pattern to contemporary-style tambours. I molded each slat on my desk doors but, if you leave the slats flat, the surface will look solid when the tambours are closed.

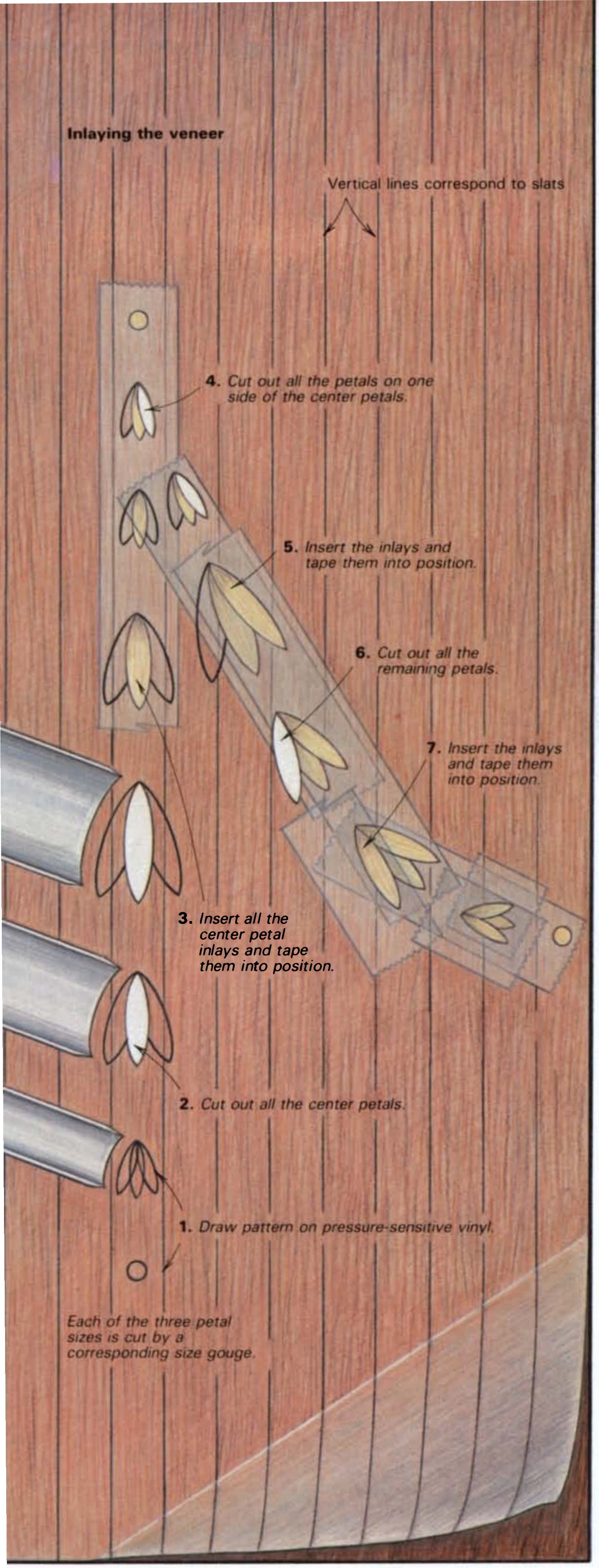
The tambours on my desk are mahogany inlaid with holly. Both woods cut easily and are available in nice, straight grain. Instead of being sawn out with a scroll saw, the inlays and the corresponding holes in the veneer are punched out with gouges. Since the desk-door slats will be molded, to allow enough thickness, start with veneer that is at least $\frac{1}{16}$ in. thick. Most veneer suppliers sell $\frac{1}{16}$-in. mahogany. However, you might have to plane down the holly from a thicker piece or resort to gluing together two pieces of $\frac{1}{28}$-in.-thick veneer.

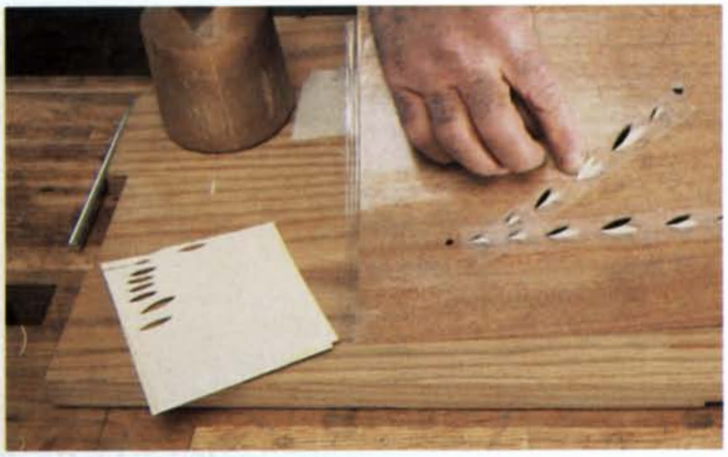
Start by drawing the pattern full size on paper. As you can see from the photo of the desk, the flower pattern repeats and reverses itself four times across each door. You need to draw only one section, not the entire pattern. The pattern has only two shapes, a football-shaped flower petal and a round dot. To draw the flower petals accurately you'll need a template and to make the template you'll need three gouges—one for each size flower. I made the design shown with three #6 sweep straight gouges: 1 in., $\frac{3}{4}$ in. and $\frac{1}{2}$ in. Make the template from 3- to 5-mil drafting film (available from any large art-supply store) by cutting out one petal shape with each chisel. Two chisel cuts punch out one petal, as shown in the drawing. Trace around the inside of the template cutouts to draw the flower petals on your full-scale drawing. Draw parallel lines $\frac{3}{8}$ in. apart to represent the slats. Transfer the finished drawing to tracing paper and fasten the tracing with rubber cement to your mahogany veneer. Art stores also sell transparent pressure-sensitive vinyl which is more con-




*Inlaid tambour doors decorate author's version of a Federal-style desk. Not a reproduction of any particular piece, it combines features of desks built by early Boston cabinetmakers John and Thomas Seymour.*

Photo this page: Susan DeLong



***With full-size drawing on clear vinyl stuck to the veneer, Convissor punches out the center inlay recess with a #6 sweep straight gouge (top). The same gouge cuts the holly inlays. The hole for the side inlay cuts into center inlay piece to create a three-dimensional effect (bottom). The third side inlay hole cuts through the first two inlays. Cellophane tape holds inlays in place.***

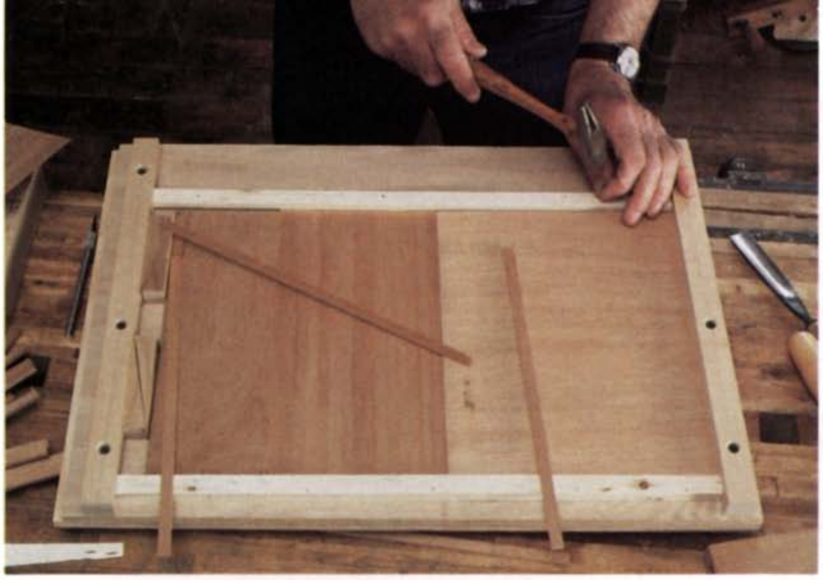
venient than tracing paper because it sticks without cement.

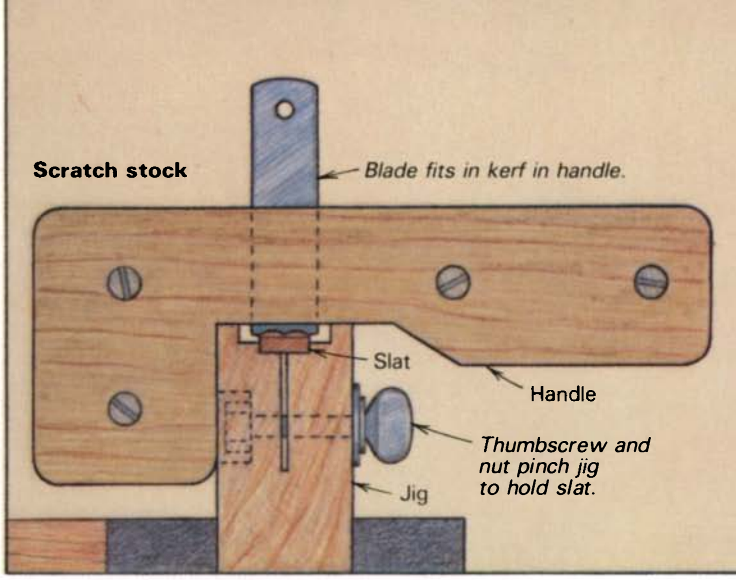
I suggest that you do the entire marquetry and veneering process with one section at a time. After you've finished four sections and cut apart the slats, you can glue canvas across the back of all four sections to complete one door. With the same gouges you used to make your template, cut out the center petal of each flower. Don't worry if the two cuts overlap at the ends of the opening because the overcuts won't show after the slats are molded. Cut the matching center petal inlays from the holly veneer with the same gouges. After working for a few minutes your eyes will become accustomed to the sizes and shapes and you'll be surprised how neatly the holly petals fit into the mahogany.

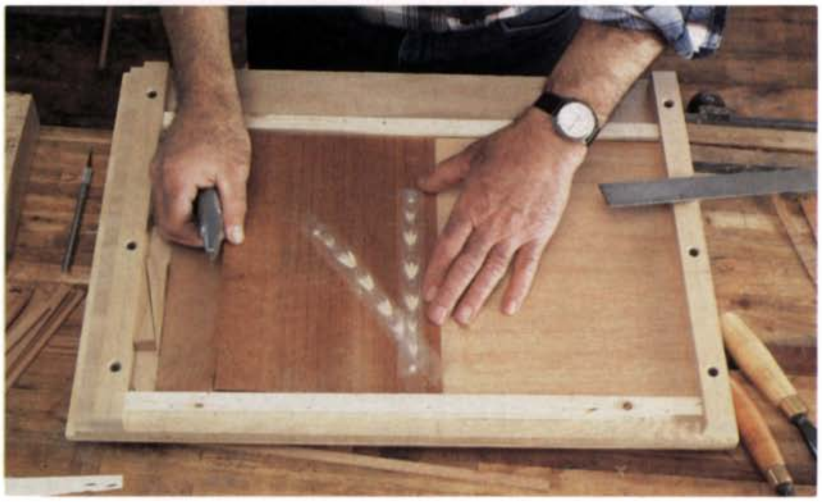
I shaded the inlays by charring one end slightly in hot sand. This shading adds depth to the flower design. Fill a cast-iron skillet with about 1-in. of fine builders' sand. Hold one end of each inlay in the hot sand for a few seconds so that the tip is shaded. Experiment to find the proper amount of time. Too long and you'll char the wood. With my electric hot plate on high, I find a 5-second count just right. After shading, insert the inlay into the veneer and hold it there with cellophane tape.

When all the center petals are installed, cut out all the petals on one side. To give the flower a three-dimensional appearance, cut right into the center petal so that the side petal appears to overlap it. Shade just the tip of the side petal in the sand and tape it in place. Now make the cuts for the third petal through both the center and side petals. Cut the dots at the end of the strings with a punch or a #9 gouge slowly twisted in a circle. Don't shade the inlays for the third petal or the dots.

When all the pieces are taped in place, turn the veneer over and brush a mixture of watered-down yellow glue and mahogany sawdust into the cracks. I force the mixture into the gaps with a





*For veneering, the slats are locked up in a rigid frame. A wood strip tacked across the slat ends prevents movement when clamps are applied (top left). Edges of marquetry sheet must be trimmed so the lines on the drawing line up with the cracks between the slats underneath (left). The frame is large enough to hold the entire door for canvassing, but when working on one section of the pattern, plywood spacers take up the remaining space. After cutting the veneered slats apart, Convissor molds the slats with a scratch stock (right). A wooden fixture secures the strip.*

flat scrap of metal. When the glue has dried, level the back side with a cabinet scraper.

To make the slats, I cut mahogany strips 3/16 in. thick and 3/8 in. wide and ½ in. longer than the finished door height. When the marquetry sheet is finished, it's ready to be glued to these slats. To keep the slats from moving around I've built a rectangular frame much like a printers' chase—the iron frame that holds hand-set metal type in place. Lock up the correct number of slats for one section of the pattern, as shown in the photo above. Tack a strip of wood over the bottom ends of the slats to secure them, and place the veneer face up over the clamped-up slats. Trim the ends and sides of the veneer so that the slat lines drawn on the tracing line up with the cracks between the strips underneath. Remember, the other sections of the pattern will later butt up against this one, so the end of the section must line up with a crack.

I cover the veneer with a heavy layer of newspaper or a piece of 1/16-in. sheet foam to take up any unevenness while clamping. A piece of ¾-in. plywood distributes pressure over the surface. When the alignment is right, clamp up a dry run to make sure that everything is ready and that no one has taken your clamps. Remove the veneer and brush a coat of white glue on the slats. Position the veneer and drive a few veneer pins or brads in the corners to keep the veneer from shifting when you apply the clamps. Cut the pins off 1/16 in. above the surface. Cover the veneer with the newspaper or foam, lay on the plywood and clamp it in place. A veneer press is nice if you have one.

Let the glue set for no more than 15 minutes. Remove the panel and flex it to be sure no glue has seeped between the slats. I flex the panel over a piece of half-round stock and run a razor knife blade between any slats that feel tacky. Now number the slats and draw some diagonal registration lines across the back so that you can line up the slats and later reassemble them in the correct order. The slats are now ready to be cut apart. With a straightedge, score the veneer face along the slat lines with a sharp razor knife to prevent the cuts from following the grain, then turn the panel over. Rest it on a curved surface to spread the slats. Cut through the veneer with the razor knife using the edge of the slat as a guide.

When all the slats are cut apart they can be molded. I've made a simple fixture that holds one slat in place while I cut the molding with a scratch stock. A scratch stock, shown in the drawing above, is a simple, shop-made tool for making moldings, beadings and grooves for string inlays. A broken hacksaw blade makes a good cutter and you can grind or file any profile you want. To use the tool, set the blade to the depth you want to cut and pull the tool back and forth along the stock until the handle stops the cutting action. No, the inlays won't pop out. Sand the molded slats with 120-grit sandpaper, followed by 150-grit.

When you've completed the above process four times you'll have all the slats for one door and you'll be ready to glue on the canvas. Lock the slats for the entire door face down in the chase. Make sure that you have them in the correct order and that the diagonal lines are lined up. Apply white or yellow glue to the canvas and clamp it in place under a plywood batten for no more than 15 minutes. Remove the clamps and flex the tambour. Remove any glue from between the slats with a razor knife. I trim the door to width on the tablesaw with a hollow-ground planer blade after first scoring the back of the canvas with a knife. □

---

*David Convissor is a professional furnituremaker in Littleton, Mass. For more on tambour doors and their installation see* Fine Woodworking *#48, pp. 54-58.*

Drawings: Lee Hov

Robert Novak

# Quilted Mahogany

## *The tale of a magnificent mutant*

by Mark Berry

One of the pleasures of woodworking is often the story behind the wood itself. Some wood, specially selected for its striking grain or some other unusual characteristic, will raise eyebrows and interest in its origins. But on rare occasions a wood turns up that practically pops the eyes out of your head. Recently our woodworking firm, Hoddick, Berry and Malakoff, had the good fortune to work with the extraordinary mahogany you see pictured here. The wood was so amazing that I decided to track down its story. Here's what I found.

In 1965 in Honduras' Chicibul jungle, a party of loggers discovered a large mahogany tree—over 100 ft. high, 10 ft. in diameter at the base, 50 ft. to the first branches. The spiraled bark indicated that the wood might be highly figured. Felling and transportation to the mill almost 200 miles away was a daunting prospect, but loggers take pride in being able to fell these monsters, so down it came. Unfortunately it didn't fall where they intended, toppling backward into a large ravine instead. Even after the log was cut in half a D7 Caterpillar tractor couldn't pull it out, so there the tree rested for the next 18 years.

In 1971 Robert Novak, who was running a sawmill in the Chicibul jungle, first heard rumors of a giant figured mahogany tree stuck in a ravine. After Novak left to form his own lumber company, a mill approached him about purchasing the log and after some haggling, a crew was sent into the jungle after it. They quartered the two halves with chainsaws, then dragged and trucked the eight pieces 100 miles through the jungle to the river. The quartered logs were then sawn in half again, pushed into the river and floated 70 miles down river to a steam-powered sawmill—a vestige of early British logging operations.

When finally opened at the mill, the log was revealed to be the rarest of the figured mahoganies, technically known as "blistered" or "quilted." The exact cause of this grain pattern is not known, though it is believed to be due to a genetic defect. A 20-year-old desk made of mahogany with an identical figure sat in the mill office, and none of the millhands had seen anything like it in the interim. News of the rare log drew other buyers, and soon a bidding war ensued between Novak, who wanted to mill it as lumber, and two firms, one German, one

Robert Novak

*One-sixteenth of the original quilted mahogany log emerges (left) after a 70-mile float to a Honduran sawmill. Above, the freshly bandsawn boards, some almost 4 ft. wide, are sorted before being stacked for air drying. Berry and his partners resawed and laminated the mahogany to plywood for the carcase of the dresser (right and far right). The ebony border helps keep the wood's extraordinary figure from overpowering the piece. The end grain of the solid drawer fronts displays the same figure as the face.*

Fritz Hoddick

Fritz Hoddick

American, who wanted it for veneer. Novak won.

The huge pieces were pushed through the mill's 40-in.-throat bandsaw under Novak's close supervision, each log carefully positioned for the best possible cut. The entire milling operation took 12 days. The yield was nearly 12,000 bd. ft., of which about a third had true blistered or quilted figure, another third had more of a wavy, ribbon figure, and the balance was a combination of these two and about three other grain patterns.

When air-dried to 35%, the wood was shipped to Miami, and drying completed in an evaporator kiln. Mahogany usually takes approximately 11 days to kiln dry. This mahogany took 30 days because of its greater density and the special care and gradual drying required by the wavy grain. Half the wood remained in Miami, while the other half was shipped to Handloggers Hardwood Lumber, run by Tim Mahoney in Sausalito, California. Novak sold the rest directly to woodworkers around the country to whom he had sent a mailing.

A brochure printed by Novak preceded the shipment to Handloggers, stirring up interest in the woodworking community. My partners, Peter Malakoff and Fritz Hoddick, and I were among the first to see it. The lumber was incredible. Straight, flat, fully figured and without defect, the boards were over 1-in. thick, 10-ft. to 14-ft. long and 6-in. to 36-in. wide. The price: $10 to $30 a board foot, depending on width. As we went through the stack we were joined by a man who had heard about the wood and wanted to buy some and have furniture made from it. Peter Malakoff cleared his throat and mentioned that we happened to be woodworkers. A relationship quickly developed, and we soon found 250 bd. ft. of figured mahogany (the pick of the shipment) stacked in our shop.

Having got the wood and the client, we had to figure out how best to use it. Design is particularly crucial when using a highly-figured wood, as the wood can easily be overpowering. Eli Sutton, a free-lance designer with whom we often work, came up with a modern rendering of the classic Japanese *tansu*, a traditional chest with doors and drawers. The ebony frames the wood like a picture; a simple and elegant solution. The client liked it enough to commission two, one for himself and one for a friend.

Because of the rarity and expense of the figured mahogany, we had the 1-in. thick boards resawn. The risk of the blade wandering in the 18-in. to 24-in. wide boards forced us to settle for splitting the boards in half. After resawing and thickness sanding (planing was out of the question), we were left with veneers slightly over ¼ in. thick.

We glued the ¼-in. veneers onto ½-in. Finnish birch plywood and then fit the ¾-in. panels in the frames. We couldn't bring ourselves to put ordinary backs on these pieces, so we installed figured-mahogany panels there, too. As I began working the wood, I noticed another amazing feature: the figure on the edge grain *and* end grain was almost identical to that of the face grain. The wood was also exceptionally dense and quite stable.

The solid quilted-mahogany drawer fronts form a pattern taken from a hexagram in the *I Ching* that has special significance for the client. The drawers, which slide on Accuride glides, are fitted with Tutch latches, so that no hardware mars the lines of the hexagram. Finished with four coats of Tungseal and a coat of Trewax, the quilted mahogany has matured with the passage of time to a deep, rich brown with a striking iridescence.

Having whetted your appetite for this extraordinary wood, I have to say that only about 1,000 bd. ft. remains at Handloggers (PO Box 1625, Sausalito, Calif. 94966), and Novak (PO Box 1365, Sausalito, Calif. 94966) also has some. But don't give up hope. When I last spoke with Robert Novak he was making plans to have the 12-ft. long butt of the log (about 3,000 bd. ft.) pulled out of the jungle. He also told me the following story. After his wood had been milled he took a sample to a friend at another Honduran mill. His friend called over his tree hunters and said, "I'll give anyone $1,000 who finds a tree like this." So with a cash incentive and a little luck maybe we won't have to wait another 20 years. □

---

*Mark Berry works wood with his partners in San Rafael, Calif.*

# Block Planes

## *What are they really for?*

by Maurice Fraser

The familiar little block plane is something of an enigma. Its origins, function—even the meaning of its name—are a little obscure. The typical block plane has a cast-iron body 6 in. to 7 in. long with an adjustable blade bedded at 20° or, on a low-angle block plane, 12°. Unlike bench planes, the blade cuts bevel up and has no cap iron to add rigidity and serve as a chip-breaker. Some models sport an adjustable mouth that can be set to an ultra-fine opening to reduce tearout. The bulbous lever cap, which gives the plane it's characteristic domed top, clamps down the blade and fits into the palm, making the plane comfortable to use in one hand. The nose of the plane has a dished-out knob or machined dimple as a rest for the index finger.

Small, one-handed planes have been around since medieval times, but the block plane, in the configuration we know, seems to be an American phenomenon a little more than a century old. It wasn't until 1873 that Stanley produced the small Model 9½ block plane, much like the one still being made today. Earlier "block" planes were larger, two-handed affairs.

**The block plane is an odd jumble** of assets and liabilities. Small size and light weight are its greatest assets. It's comfortable to use in one hand, especially on small pieces that would get lost under a large plane. A block plane can be useful for hundreds of small jobs: softening sharp edges, trimming small miters, fitting drawers, trimming excess plywood edging tape or projecting veneer, trimming finger joints or dovetails on small boxes and any time you need to hold work with one hand and plane with the other.

Over the years, Stanley has offered some fifty-odd models of block planes. Today, Stanley and Record, the major manufacturers, make only a handful of models (they differ mostly in the number of possible adjustments) in two basic types: standard (20°) and low-angle (12°). Footprint also makes a few models. Two small German-made wooden planes on the market are in the block plane size category but their blades are bedded at 50° and mounted bevel down like a bench plane.

The No. 9½ made by Stanley, Record and Footprint, is the stan-

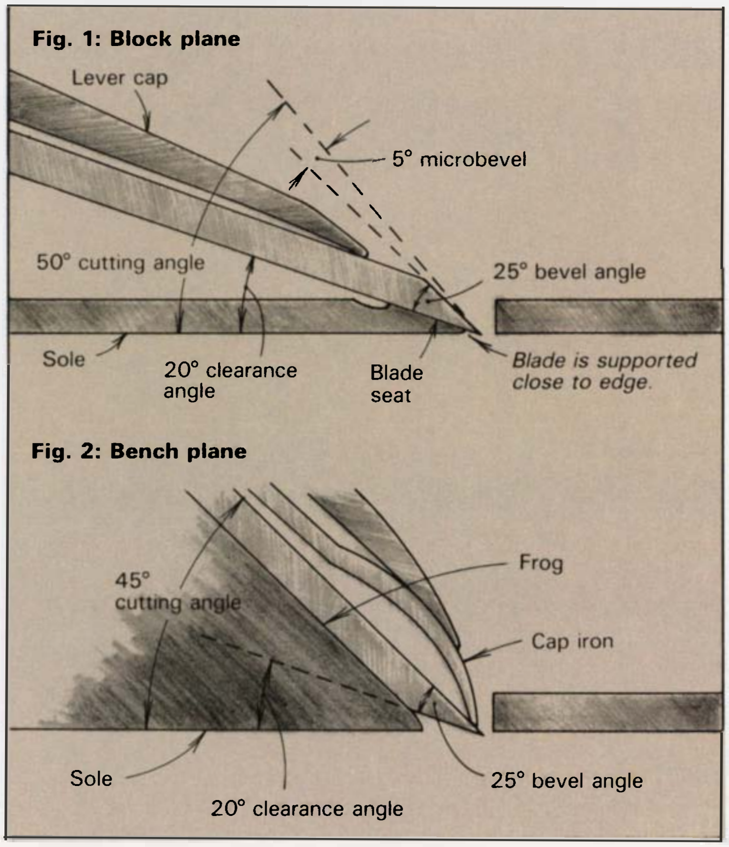
***Small and light, the block plane is the choice for one-handed planing jobs. Unlike a bench plane, block plane blades cut bevel up. Top of the line models, like these Stanleys, have adjustable blades and mouths. Blade angle on the No. 9½ (right) is 20°. The low-angle No. 60½ has a 12° blade angle.***

dard 20° block plane with all the adjustments. I haven't tried the Footprint, but either the Record or Stanley No. 9½ is a good, honest, no messing-around tool for general one-hand planing.

The other conventional block is the low-angle (12°) No. 60½ made by both Record and Stanley. I prefer the Record 60½ to the Stanley because it has a wider blade (1⅝ in. to Stanley's 1⅜ in.) and it's heavier. And, at the time I wrote this, the Record plane cost a bit less than the Stanley. The quality of machining, however, is inconsistent. Sometimes the Record plane seems better made, sometimes the Stanley. Anyway, never buy a tool sight unseen unless you can return it if it's not right.

**The textbook myth is that a block plane's** low blade angle makes it the best plane for working end grain. Best? Well, they're OK. It isn't that a well-made block plane, perfectly tuned, can't make a decent end-grain cut, it can, if you set the plane for a very light cut, have the blade extra sharp, tighten the hold-down screw (not so tight that the blade can't be adjusted) and use a narrow mouth setting. But more often, my students get chatter on end grain that they wouldn't get with a sharp smooth plane. The low-angle blade doesn't hurt anything, but a low blade angle does not guarantee a low cutting angle. A look at cutting geometry shows that things aren't always what they seem.

As figure 1 shows, with the plane-blade bevel facing up, the 25° bevel angle contributes to the cutting angle. It's common to hone a 5° microbevel which increases the bevel angle to 30°. The standard block plane bed tilts the blade up another 20° for an actual cutting angle of 50° Compare this to the bench plane shown in figure 2. Since the bevel faces down, bevel angle doesn't affect the cutting angle. Standard pitch bench plane blades are seated at 45°, and the cutting angle remains 45° regardless of the bevel angle. So, a 20° block plane really cuts at 50° while a smooth plane cuts at only 45°. The 12° low-angle block plane with a 25° grind and a 5° microbevel has a cutting




*Entrepreneur Tom Lie-Nielson has brought two vintage Stanley specialty block planes back to life in flashy, manganese-bronze incarnations. Shown here with the cast-iron Stanley originals are (left) the No. 95 edge-trimming block plane and (right) the No. 140 skew-rabbet block plane.*

## *Specialty block planes reincarnated*

**Flipping through old tool catalogs can make a plane buff long for the good old days when specialty planes abounded. Stanley and Record seem to discontinue another hand plane each year. There's still a market for these tools and, though it may not be large enough to keep the big guys interested, small entrepreneurs may be able to fill the gap by reproducing the plane classics.**

**Tom Lie-Nielson has been doing just that in West Rockport, Me. He's making reproductions of the pre-World War II Stanley No. 140 low-angle, skew-rabbet block plane and the Stanley No. 95 edge-trimming block plane. Unlike the cast-iron originals, the Lie-Nielson repros are cast in manganese bronze because it's easier to machine and not likely to break if dropped.**

**The Lie-Nielson No. 140 skew-rabbet block plane is wondrous to behold. Like the originals, one side is removable, allowing the skewed blade to trim a rabbet. The bronze body and lever cap are quite heavy, providing useful damping against chatter. The blade bed offers rather solid support by block-plane standards. In ordinary use it planes well; the optional fence (unique to the Lie-Nielsen re-creation) is a fine idea, but not for making rabbets from scratch. For that you would want the cross-grain spurs and depth gauge of a regular rabbet plane. The fence and the skewed blade are useful for smoothing fielded panels that were begun on a tablesaw. The skewed blade cuts nicely across the grain. With the fence, the plane costs nearly $140—no casual purchase (available from Garrett Wade, 161 Avenue of the Americas, N.Y., N.Y. 10013).**

**The Lie-Nielson version of the Stanley No. 95 edge-trimming block plane holds up well to the original. It is a skewed low-angle block plane with an integral 90° fence. It will trim a straightened edge up to ⅞-in. thick and square it to the face while doing so. But its 6 in. length is inadequate to establish edge-joinable straightness on anything much larger than a bread box. Surely the name implies no such ability. The danger lies in the beholder's eyes: it looks as though it could do anything. It would serve well as a veneer or edging trimmer. At about $125 I would rather receive than give one (available from Garrett Wade and Lee Valley Tools, 2680 Queensview Dr., Ottawa, Ont., K2A 1T4, Canada).** ***—M.F.***

*The Achilles heel of block-plane design is the skimpy blade support. A small nub on the depth adjuster supports the rear of the blade and a machined flat at the mouth supports the cutting edge. Between these points the blade is unsupported, and likely to chatter.*

angle of 42°, only 3° lower than most bench planes but a full 8° lower than the standard block plane.

Any advantage the lower cutting angle may offer on end grain is nullified by a weakness in the block plane's design. The block plane can chatter because it lacks the rigidly-supported blade and substantial body mass of the bench plane. Compare a block plane blade with a smooth plane blade. The frog/bed on the smooth plane supports the blade for several inches underneath, plus a cap iron and a thick lever cap atop the blade. The block plane blade is supported underneath only by a raised nub or two in back and a milled ridge at the mouth, under the blade edge. The bevel-up blade is supported very close to the cutting edge, which could be an advantage if the blade had more support further back, but this skimpy arrangement leaves most of the blade unsupported. This is the Achilles heel in block-plane design and the most significant structural cause of chatter. Other defects—thin blades, improper bevel angles, warped soles—can be corrected by the owner, or manufacturer quality control, but the atrophied blade seat seems inherent in the tool's design as it's now being made. Superior machining in pre-war block planes mitigated this defect somewhat but even they rarely exhibit the rock-solid feel of a good bench plane with it's cap iron and continuous blade bed.

The blade seat problem is exacerbated by feeble lever-cap toggle clamps, a perennial block-plane problem. This design supplies inadequate and uneven clamping pressure on the blade. Much better blade-locking methods—especially the hinged knuckle-joint cap—can be found on some old block planes.

**To properly set up the block plane,** mount the blade bevel up and advance the adjusting knob until the blade edge can barely be felt along the plane mouth. Clamp on the lever cap handle; if the blade can easily be pressed sideways, tighten the clamping screw by very tiny increments until the blade can only be moved with difficulty. If the blade isn't perfectly parallel to the mouth opening, tilt the blade by means of the lateral adjustment lever. For planes without an adjustment lever, grasp the lever cap and the blade and wrest them left or right a trifle as needed.

If the plane has an adjustable mouth, loosen the finger-rest knob to unlock the mouth adjusting lever. Turn the plane upside down and observe the opening while you slowly shift the lever sideways: a mouth opening of about 1/32 in. is good for most hardwoods and a scant 3/64 in. for mild woods. Avoid zapping the blade's edge with the front portion of the mouth piece when narrowing the mouth. □

*Maurice Fraser teaches woodworking at the Craft Students' League in the 53rd St. Y.W.C.A. in New York City. He was woodworking consultant for the book* Crafts & Hobbies *(1979, Reader's Digest Press).*

*For most cuts, a block plane cuts best when it's skewed to the work. With a low-angle block plane skewed to the work (top photo) Fraser trims tablesaw marks from a miter. Scrap clamped to the board's edge prevents split out of end grain. Author relieves a sharp edge with a low-angle block plane (photo above).*

# Adventure in Chair Design

*In which a student discovers some limits*

by David Veleta

Straight, flat and square had been the staple diet of my first year as a student of furniture design and construction, so I was anxious to try curves when I began my second year with my first chair design. I started out wanting an upright chair suitable for reading and conversation. I had in mind an upholstered tall-back and curves and tapers that would give the chair a light and elegant look.

These initial ideas reined-in my imagination somewhat, but the constraint was helpful. It seems that the more indefinite the design parameters, the more difficult it is to focus the design process; the diversity of possibilities becomes a distraction. Within these still roomy boundaries, my design evolved in a "see-saw" manner. The "see" mostly involved looking at classic chairs, but it also meant taking a fresh, close look at the lines and shapes of anything else that caught my attention. The "saw" was sketching side and front elevations: drawing by drawing upon what I had seen.

Eventually I came up with a freehand perspective drawing (which, as it turned out, proved to be pretty close to the final form). I attribute its curved rear legs and parallel arms to an adjustable armchair adapted by Phillip Webb from a traditional design for Morris and Co. (c. 1865). The extra-tall back and the piercing crest rail were inspired by a Charles Rennie Mackintosh chair. In general, I feel that the design reflects my attraction to Japanese forms, but the association here is more vague. In fact, although you can attribute certain aspects of a design to historical precedents, original designs invariably incorporate some unpredictable and unidentifiable leap of imagination on the part of the designer.

To bring this idea for a chair down to earth, I had to make a working drawing. In addition to satisfying structural integrity, I wanted to make sure that the chair would be comfortable. Trying to figure this out on paper before anything was constructed proved to be baffling. I consulted the textbooks, but found a vast tangle of heights, depths and angles. These floating figures brought home the fact that because of the endlessly varied shapes, sizes and proportions of people, no non-adjustable chair can be really comfortable for everyone. So, using myself as a model and with tape measure in hand, I sat in a lot of chairs and discovered what I liked about how they felt and then measured them. These clues were enough to make a full-scale side-elevation working drawing, though the only way to confirm or reject my guesses was to build a mock-up.

Working from my drawings, I quickly bandsawed the parts in poplar, then half-lapped and screwed them together. Quarter-inch Masonite screwed to the seat and back and topped by an

***Veleta's first chair taught him that designing doesn't end on the drawing board. The finished chair is walnut with velvet upholstered over foam and webbing on maple frames.***

Photo: John Marcy

inch of foam completed the mock-up. I sat down. Naturally, something was not right. I cut some scrap strips of plywood into a slightly different back curve, screwed these pieces directly to the existing frame, and reattached the Masonite. This felt better. Next, I adjusted the tilt of the back by blocking up the front legs. Finally, I was satisfied.

Unfortunately, the motley looking mock-up I now had was not true to my working drawings. The abundance of curves in my three-dimensional design provided no ready reference point, so the dilemma was how to transfer the changes I had made on the mock-up to a final side-elevation working drawing. The solution, provided by a teacher, was to drop a plumb line from various points on the chair (upright and laid on its back) to a grid drawn on the floor. When connected, the points on the grid defined the curves and their relationships. Measurements up from the floor helped too, filling in any missing details.

After completing the working drawing, I began construction by form-laminating the rear legs. If excessive springback occured it would be possible to alter the other parts to fit. I tapered the laminates for strength and appearance following Jere Osgood's method (*FWW* #14, pp. 48-51). Twin mortise and tenons (side by side) connect front and rear legs, and I found the full-scale drawing indispensable for laying out the shoulder lines accurately. By laying the rear leg on the drawing I could tick-off two points of the shoulder and then scribe around at the appropriate angle. I cut the shoulders shy of the line, then trimmed them to fit with a Record 073 shoulder plane.

The inside taper of the front legs begins just below the front rail so joining the rail and legs was straightforward. Joining the rear stretcher to the rear legs, however, was an entirely different matter. First, I made a simple jig for mortising the rear legs. I laid a leg on a scrap of 8/4 poplar, aligning the long layout lines of the mortises parallel with the jointed edge of the poplar. I then traced the inside curve of the leg on the poplar. Bandsawn to the line and clamped to the leg, as shown in the drawing, the jointed edge of the poplar provided a true guide for the fence on a plunge router.

So far so good. Looking at my drawing, I assumed that the shoulder angles of the rear stretcher were the same as those for the rear legs, so I proceeded to cut them with confidence. When I dry-assembled the lower frame, however, everything fit closely except the rear-stretcher shoulders. After a little head scratching, I realized that because the stretcher is canted to be flush with the curve of the leg, its shoulder angles are different than the drawing led me to believe. The only solution was to take the correct angles directly off the clamped-up frame and make a new piece. Orthographic drawings are immensely helpful, but they can sometimes obscure what is really happening in three dimensions. No matter how long and hard you look for trouble spots in a complex drawing, making the piece is the only way to work everything out. Only then can you truly finish the rest of the plans.

Now that the base frame was together I could start building up. This work was straightforward enough, until I came to the arms. These were a three-strip, straight lamination, and I used the male inner half of the rear-leg laminating form to repeat the curve. A single finger joint attaches the arm to the front leg; the full thickness of the arm is mortised into the side of the back stile and screwed from inside. Laying out these joints was a Catch-22 situation. In order to know where the final lines would be, the joints had to be home, but the joints would have to be cut already in order get them home. Caution, trial and error, and one veneer shim yielded success. It had been so easy to draw!

Now I made the upholstery frame. I chose maple for strength and joined the pieces with bridle joints. Using the existing seat and back curves as templates I bandsawed the frame pieces so that they would sit ½ in. back from the front edge of the chair frame, as shown in the drawings. I also left a gap of ⅛ in. between the chair frame and the upholstery frames to allow for webbing and fabric. (It is better to be a little generous here since it is less trouble to pack the upholstery than to remove more wood from the frames). With the frames glued up, I beveled their faces toward the middle with a spokeshave so that someone sitting in the chair would not "bottom-out" and feel the frame through the upholstery. The seat frames are screwed in place, as shown on the drawing. Finally, since no structural cross-member supports the back of the seat frame, I mortised and screwed metal L-brackets into the rear legs beneath the frame.

Many of the techniques, procedures and pitfalls that I encountered building this chair were new to me, but they were all still woodworking, so at least somewhat familiar. However, when it came to upholstery I felt completely naive. Exploring fabric samples was overwhelming. The choice of color, texture, material and pattern was vast. I finally chose conservatively, picking a traditional burgundy velvet. Before upholstering, it was necessary to finish the chair completely to eliminate the risk of getting finishing materials on the fabric. I chose a rubbed oil-varnish mix. It was a lot of work, but the results were worth the effort.

Now it was finally time to go to the upholsterer. Not being fond of over-stuffed furniture, I had designed the chair for a minimum of padding, just enough to be comfortable. I explained this to the upholsterer and he agreed to do as I bid. But I was shocked by the completed job, which was overly stuffed compared with my expectation. My disappointment wounded the upholster's professional pride. He explained that he had tried less stuffing but the fabric did not "lay right;" it looked "flat," so he adjusted things as he saw fit. In retrospect, I believe he was probably correct, and I am pleased with the firm feel of the upholstery. Viewed from the side, however, the thin back uprights look imbalanced next to the generous stuffing. Fortunately, this imbalance is not noticeable from any other view. The main point is this, before going to an upholsterer be sure that you know what you want and can explain it clearly, and be sure that you are consulted if the upholsterer decides that what you want won't work.

Now that I have some distance from this project, I feel capable of criticizing it. As far as comfort and fidelity to my design are concerned, I feel the chair is a success. However, the design process itself had some drawbacks. Working with side-elevation drawings is useful, but you can end up with a "cookie-cutter" design: two side-elevation outlines held together with rails. Using parts that are rectilinear in section reinforces this feeling, and side elevations alone don't suggest how various members might be otherwise shaped.

The other thing that I learned is the importance of simplifying construction. The amount of time it takes to hand-fit joints through trial and error adds up quickly. This can also be seen as a fault in the design. On the other hand, most pieces of fine furniture require some careful hand work, and I am happy for that. I hope my next chair can be made a little more efficiently, now that I have plowed through the first one. □

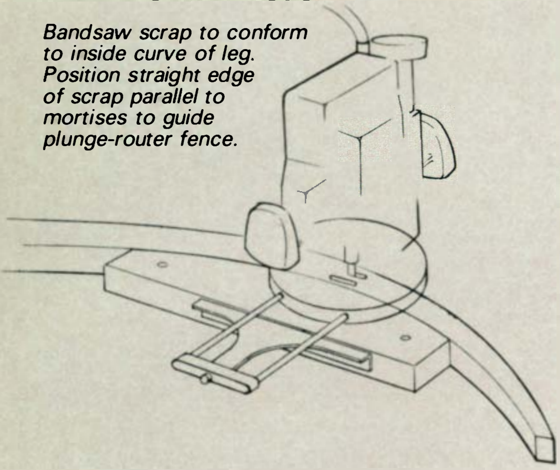
---

*David Veleta, a graduate of Leeds Design Workshop, makes furniture in Northampton, Mass.*

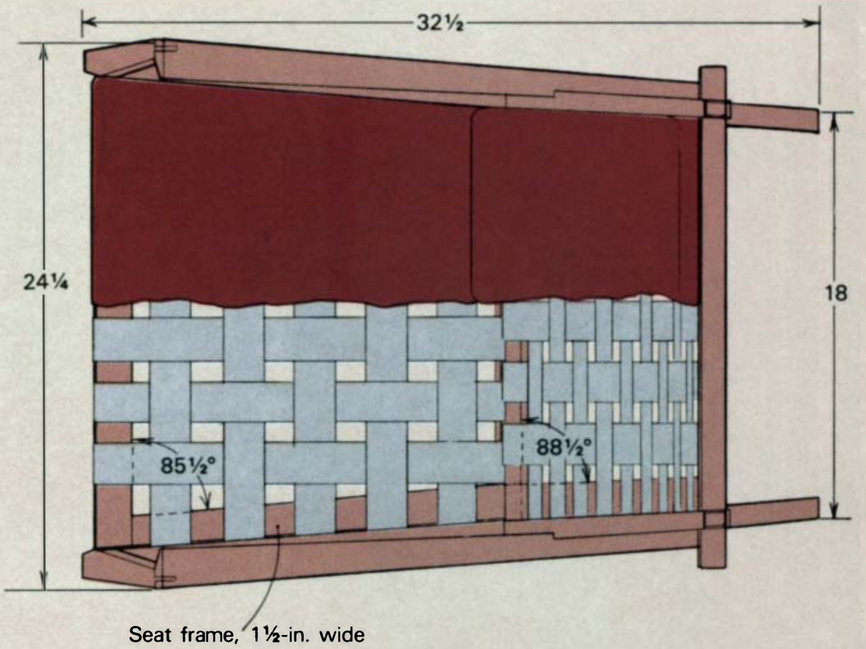
## Armchair

### Detail: Leg-mortising jig

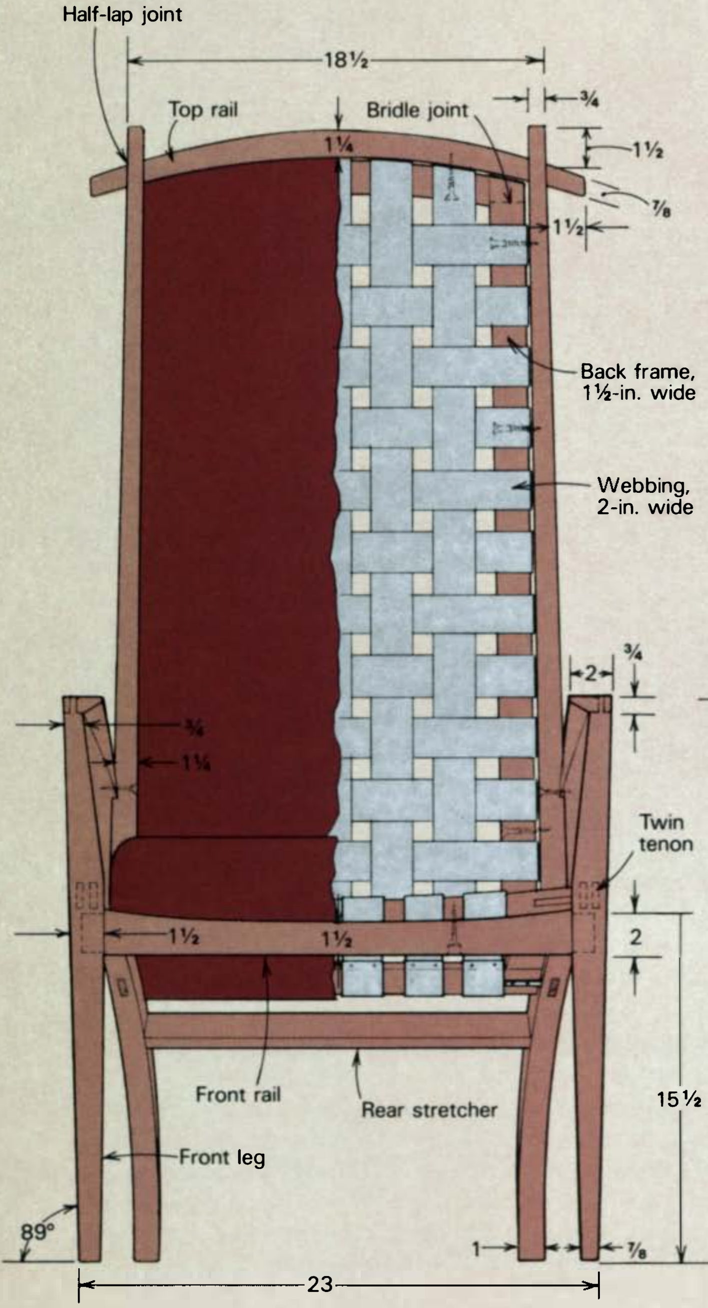
*Bandsaw scrap to conform to inside curve of leg. Position straight edge of scrap parallel to mortises to guide plunge-router fence.*



### Plan view

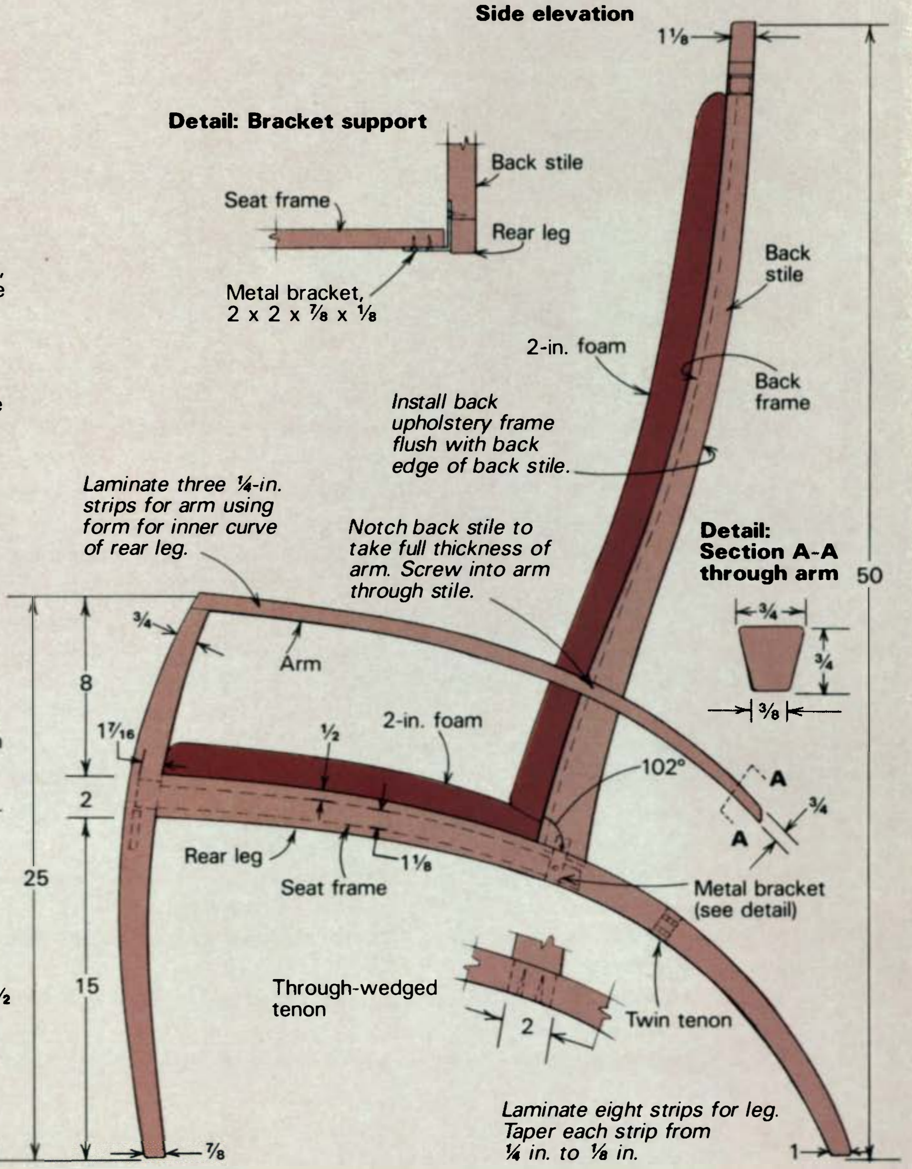



### Front elevation




*Screw upholstered back and seat frames to chair frame. Handsew fabric to back frame after frame is installed.*

### Side elevation

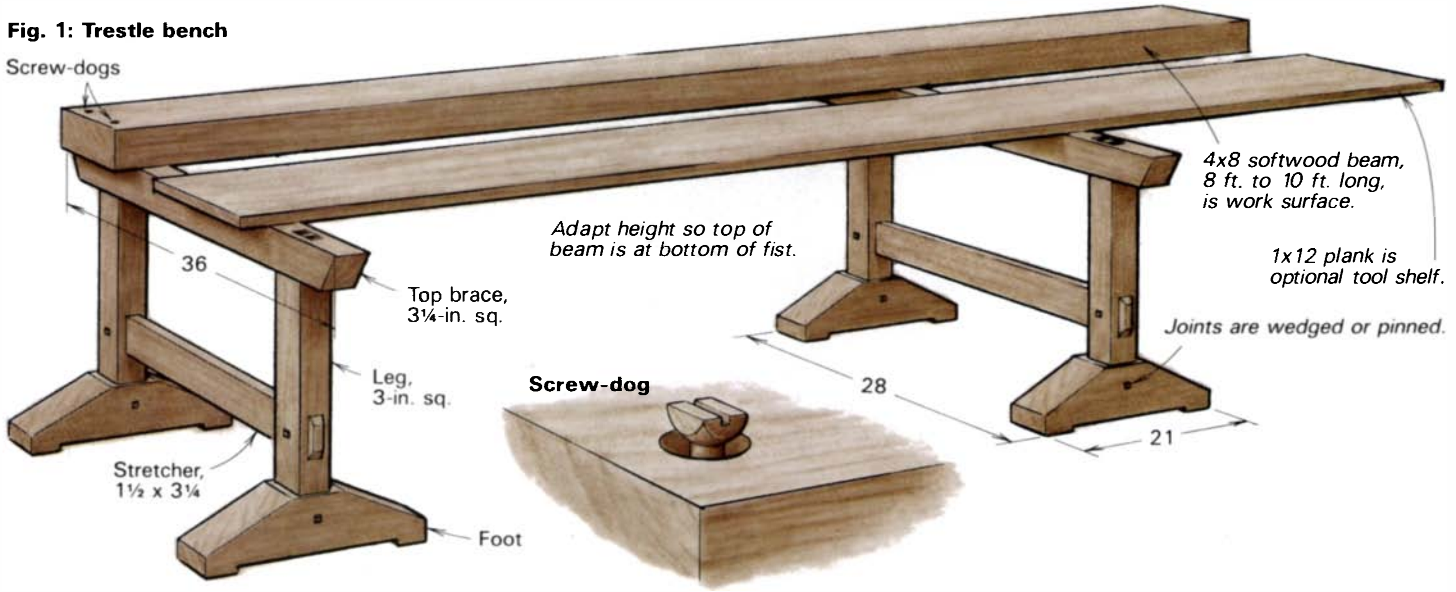


# Body Mechanics and the Trestle Workbench

*Some appealing virtues, with nary a vise*

by Drew Langsner

**Fig. 1: Trestle bench**




For the past two summers Carl Swensson has been teaching a five-day course in Japanese woodworking at Country Workshops, the series of hands-on seminars I offer at my home in the North Carolina mountains. Up to that time, Country Workshops had specialized in my own main interests—traditional American crafts and the European roots they sprang from.

For several years I had also been attracted to Japanese woodworking but was reluctant to get involved. It seemed an exclusive realm for specialists, craftsmen who dedicated years to perfecting their skills. Western-style woodworking, to me, had been providing enough challenges, and I wasn't sure I was ready for further complications. But I also had a strong intuition that Japanese woodworking had much to offer. The opportunity for a hands-on introduction came when I learned about a Baltimore-area woodworker named Carl Swensson. After working for several years in a conventional cabinet shop, Swensson began to look for a more challenging and personal way of working wood. His initiation in Japanese woodworking began with eight months of work with Kieth Mesirow. Swensson then came under the tutelage of master tea house builder Makoto Imai, for one-and-a-half years. Makoto's students learn by observation and personal trial—the master discourages questions. As a result, Swensson had to translate traditional ideas and methods into western concepts that he could identify with.

Although many Japanese woodworkers work on the floor at very low horses (5 in. to 8 in. high), Makoto uses a trestle bench almost as high as a western workbench. It consists of two horses crossed by a heavy bench beam (the work surface) and an optional plank (the tool shelf), both about 8 ft. to 10 ft. long.

One prominent aspect of traditional Japanese woodworking is the absence of bench vises and dogs. During this century, Japanese craftsmen have adopted lightweight bar clamps, mostly for marking out or sawing multiple units of stock, such as *shoji* rails. But in general, Japanese woodworkers regularly accomplish very complicated tasks using only the body, the force of gravity and a pair of simple trestles to support the work. With practice, Japanese holding methods can be a lot faster than using vises and clamps. At a western workbench, you waste a lot of time loosening and tightening vises and repositioning dogs. At the trestle, you simply flip a board over or change your body position.

The trestles, shown in figure 1, are of straightforward construction. Joints are through mortise-and-tenon, and are wedged or pinned as appropriate. The beam is typically a surfaced 4x8, but can be smaller. It's usually fir or another softwood, which doesn't become as slick as the hardwood top of a typical western bench. This aids the craftsman in holding the material with his body because the material is less liable to slip. A trestle bench is usually sized so that the beam is at the height of the standing woodworker's fist. Swensson's beam is 30 in. above the floor.

Woodworkers who work flat materials with hand tools will probably benefit from the trestle bench, especially when using Japanese tools. If you're tempted, you can make up a quick version using a pair of cut-down sawhorses. The beam's weight and mass are important. If a 4-in.-thick beam isn't available, laminate one to the approximate thickness.

During his workshop, Swensson demonstrated the use of the trestle bench for chiseling, planing and sawing. The first thing that struck me was the variety of body positions he employed. He doesn't maintain any working stance long enough for it to become tiring. What I didn't fully realize at the time was that all the movement had two more important and interrelated purposes—first, to direct the tool so that it would cut most effectively; second, to combine the tool's cutting action with the most efficient way to hold the work.

Japanese craftsmen use gravity as a work aid. The Japanese believe that one's center of gravity is just below the belly button. As you extend arms or tools away from this center, control becomes more difficult. One reason for pulling a saw or plane to your body is that each stroke becomes more controlled as you finish it. Also, any body (or structure) loses stability with increased height. This is partially why Japanese craftsmen often sit on the floor, and why many Japanese tools tend to be low or short.

Many tools, western as well as Japanese, are easier to use if you keep in mind some of the following rules of gravity and balance. When you can, situate your body with a wide, low base, such as by kneeling on the floor or sitting on the bench with legs forward and spread well apart. When you need control and accuracy, position the tools and the wood close to your body.

Learn to limit movements to the required joints and muscles. Large, more stable lower-body muscles are suited for comparatively slow and powerful movements, such as hogging wood with a plane. Small muscles of the upper body, arms and hands are best suited for detail work, which requires accuracy and subtle adjustments, or speed with less power (i.e. fast sawing).

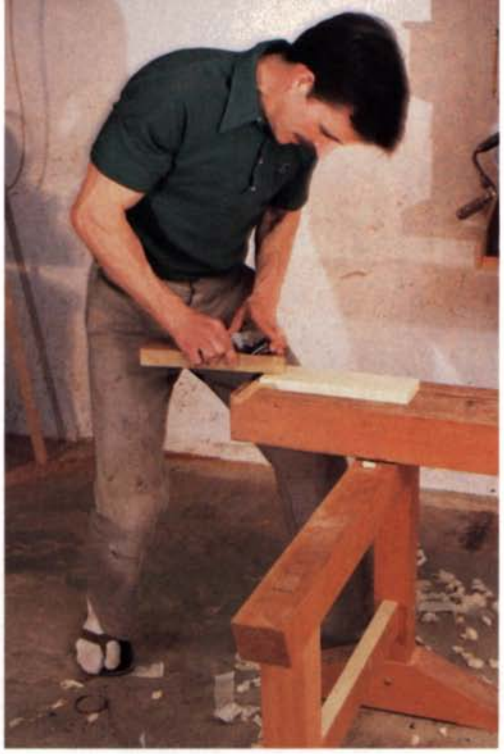
Whichever set of muscles and joints you use, the other parts of your body should be immobile, but relaxed. Your work stance does not have to be tense if your center of gravity is well within a stable base. Extraneous tension is tiring and a waste of energy. Facial grimacing is a good example of this. Hanging over a workbench with a bent back is tiring and can lead to injuries. If you need to get over your work, extend one leg forward to support the shift in the center of gravity. When bending from the waist, support the weight of your upper body with an arm, thus taking strain off your back and also widening your support.

**Chiseling**—The cross-trestle leg should be directly under the chiseling area of the work beam, so that chiseling force goes directly to the floor instead of being wasted in bending or vibration. To immobilize the stock, Swensson usually sits on the piece, generally side-saddle, with at least one foot well based on the floor. The idea is to maintain at least a three-point base. You can vary the amount of weight taken by any one of these points. A simple shift in weight will dramatically increase "clamping pressure" on the work. Shorter boards are sometimes secured by folding a leg across the bench, with the piece under one's shin. Problems with very short pieces can often be avoided by chiseling before sawing a board to final size.

I was surprised to learn that Japanese woodworkers use steel hammers instead of wooden mallets. After trying this, I became a convert. A mallet absorbs striking shock that could be transferred to the chisel. The compact hammer head allows better visibility. There's also a greater range of balance adjustments since the

*Swensson clamps the work with his thigh and shin (top photo) as he begins to tap out the waste from a dovetail. Heavy paring cuts can be driven by chin pressure (photo above), using the strong muscles of the upper body. This provides good control.*

Drawings: Lee Hov



***Fast, flattening or hogging work is done with the large muscles of the legs and back, while the rest of the body remains relaxed. Balance is ensured by keeping the body's center of gravity inside the broad stance of the feet.***

**Fig. 2: Planing**

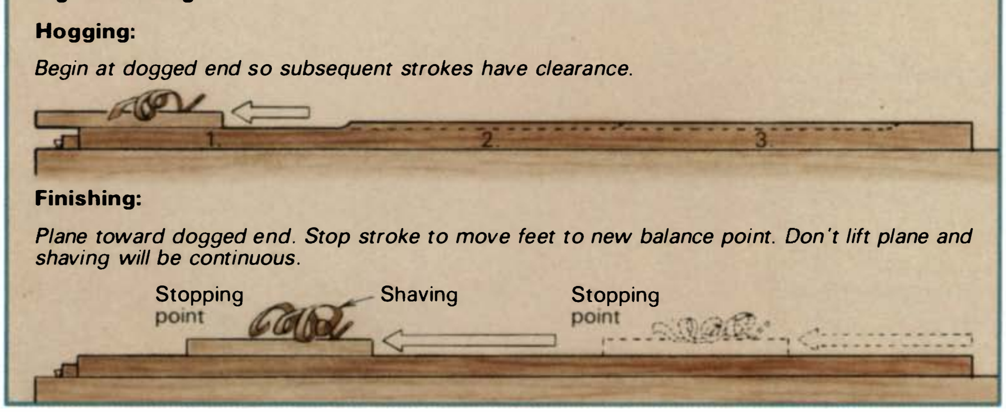
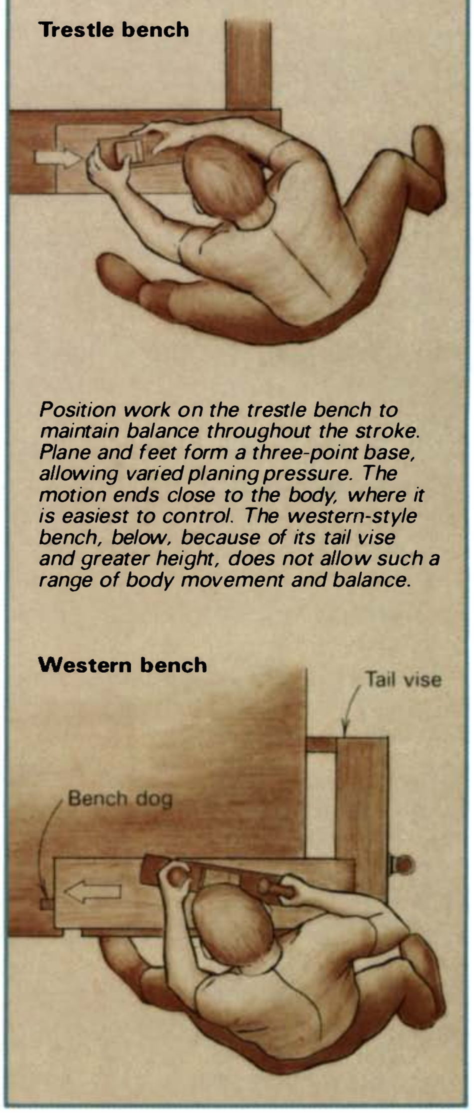



**Fig. 3: Planing positions**




*Position work on the trestle bench to maintain balance throughout the stroke. Plane and feet form a three-point base, allowing varied planing pressure. The motion ends close to the body, where it is easiest to control. The western-style bench, below, because of its tail vise and greater height, does not allow such a range of body movement and balance.*

weight ratio of the head to the handle is much greater than with a wooden mallet. Learn to grasp chisels lightly. A tight grip absorbs the hammer blow and wastes energy. If a chisel is sharp, it will go where it is pointed without your having to choke it.

**Planing**—Most planing is done with the work pulled toward two adjustable bench stops. Swensson's bench stops are a pair of ordinary countersunk wood screws, located about 6 in. apart, about 1 in. from an end of the bench beam. He has filed their heads square to provide more bearing surface against the work. Height adjustment is by screwdriver. A small cleat of scrap wood is often set between the bench stops and the work to prevent marring.

During the workshop, Carl likened planing to playing a violin. There are countless methods and nuances dictated by grain and shape of the board. There is no *best way* to plane, but there are general methods that can be used as starters. I'll describe the motions for pulling a Japanese plane. In general, the same ideas work in reverse for pushing a western one.

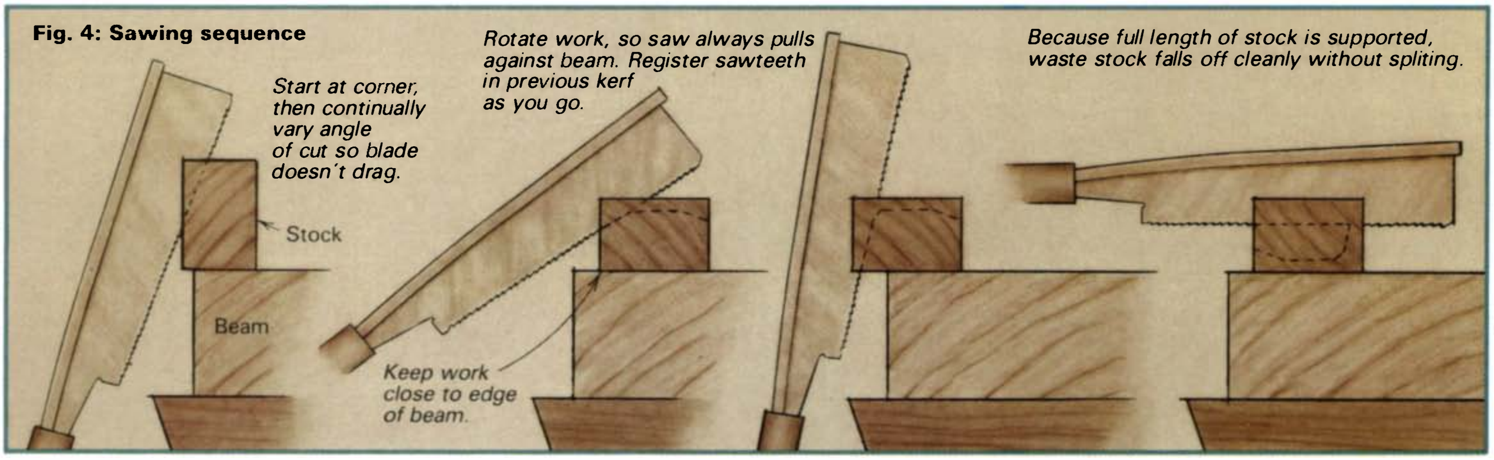
Fast, flattening or hogging work is generally done with strong leg movements and a locked torso and arm position. Each stroke begins with the forward (left) leg bent and the rear leg extended. The stroke ends with the forward leg extended and the rear leg bent. Long boards are flattened with a series of leg and lower body passes as shown in figure 3, working forward from the dogged end of the board so the plane has clearance.

For finish planing, the legs and body are held steady. The plane is pulled by the arms. To finish plane long boards, you can walk the plane with distinct, controlled steps. Unlike hogging, start at the far end of the board and work backward. Each planing stroke is taken with both legs well based. At the end of the stroke, the plane is held flat on the board, hands and lower arms frozen in place. From this position, take a "two-step" backward, so that arms re-extend for the next plane pass. Because the plane is not lifted from the board, it will take a continuous shaving.

Very thin boards that can't be dogged at the bench stops require a different planing technique. The near end of the board is held flat with downward pressure from the left hand, while the right hand begins the planing stroke. At mid-stroke the plane is frozen, not lifted. The left hand is then repositioned at the far end of the board so that the right hand can finish.

For edge work use a narrower plane, which is easier to steady on a narrow surface. Set the board on the other edge, with the near end pushed against a cleat and the bench stops. To guide and steady the plane, wrap your fingers far enough around the plane block so they can touch the sides of the board being planed. Boards to be edge-jointed can often be positioned side-by-side, so that common edges are planed simultaneously. This will cancel variations in angle; straightness requires care and practice.

*When crosscutting, as in the photo at left and the drawing below, rotate the work so the saw's pull is down against the beam, helping to clamp the work. As shown above, rip cuts are best started by resting the work at an angle against the trestle. The left hand, gripping the work, is part of the basic three-point stance. With the body in balance, the arm is free to saw with easy, rapid strokes.*




**Sawing**—Most sawing is done from a kneeling position, as shown in the photos above, with the left hand used as a body support and to hold the work. Locate your body in a position where you won't need to move your head or shoulders during the cut. Your eyesight should align with the saw and the layout lines on the edge and face of the board simultaneously, creating a single, flat plane. This method works well with western-style saws as long as they are sharp and the cut is straight. There will be no need for a tightly clenched hand or the use of force. With a light grasp you'll feel telling vibrations and, therefore, develop subtle control. A light grasp also minimizes physical fatigue. Rapid, light cuts are preferable to slower, heavier sawing. Swensson changes the angle of attack every few strokes, as shown in figure 4, so that he is constantly cutting at a "corner" inside the kerf, not dragging the sawteeth along a flat, full-length cut.

For long timber rips, rest one end of the board across the bench or trestle, and the opposite end on the floor. The prop angle can range from 30° to 90°. If the timber is light, steady it with one foot. Swensson works barefoot or in socks, as shoes may force grit into the wood. Long power rips are usually made holding the saw with two hands. In my experience, kneeling with straight back posture is much less stressful than standing in a bent-over position. You can finish up a rip cut by standing the board on one of the trestles.

**Summing up**—In my opinion, the Japanese trestle bench is not a substitute for, or necessarily superior to, a western workbench. Both are tools available to the contemporary woodworker. The trestle bench has become my choice for hand work such as mortise-and-tenon joinery and planing. It's fine for sawing, especially with a Japanese saw, if the stock isn't too short. I definitely prefer it for most architectural scale work.

For me, the trestle bench does have its shortcomings. It's too low for doing layout work without bending over at an awkward angle, unless you want to kneel or sit on a stool. Also, the 8-in.-wide beam is too narrow for some assembly work, but you can easily add other pieces up to the full width of 36 in. When I'm building a Windsor chair, or working on very small stock, I prefer the western bench with its extra height and built-in vises.

Working at a trestle bench can become an excellent introduction to the principles of how body mechanics and tool design affect each other. Swensson is quick to point out that there are innumerable sound ways to apply the ideas. Some techniques come quickly, but learning to get the most from the trestle bench is like peeling an onion—many layers and some tears. □

---

*Drew Langsner's Country Workshops take place in Marshall, N.C. Carl Swensson will be teaching Japanese woodworking again September 23 through 27. For information call (704) 656-2280.*

# Catalyzed Lacquers

## *Creating a rich finish that's tough as nails*

by David E. Shaw

If you want a clear wood finish that you can tap dance or iron a shirt on, try catalyzed lacquer—it's as tough and strong as baked enamel, more resilient than polyurethane, and doesn't look like plastic. Rather, it has that lovely sheen that only lacquer can produce, and it can be rubbed to a myriad of looks, from a rich gloss, to a mellow satin, or even dead flat.

Catalyzed lacquers also penetrate well and resist everything from intense cold to paint stripper. I prefer them for kitchen and bathroom cabinets, anything for a kid's room, and for tables, floors and other surfaces that are subjected to excessive moisture, temperature variations and plain old physical abuse.

Chemically, catalyzed lacquer is a nitrocellulose base blended with alkyd resins and urea formaldehyde. Hardening is induced by a phosphate ester catalyst, which reacts with the ingredients to form tough, chemical bonds. The amount of catalyst needed is critical and varies from brand to brand, so make sure that you get precise instructions. You should also heed safety warnings—any lacquer will give off fumes, but catalyzed lacquer gives off urea formaldehyde as well. I don't feel this is any more dangerous, but it does smell worse and will quickly give you a headache that can linger for days. If you do not have a good double-cone, organic-vapor respirator and can't provide fans or some other type of forced ventilation, don't use catalyzed lacquers.

There are two distinct types of catalyzed lacquers. The one I prefer produces the toughest finish because the catalyst is added to each coat, from the sealer on. Both Maclac Chemlac (available from distributors of Maclac Lacquer Co., 198 Utah St., San Francisco, Calif. 94103) and Sherwin Williams' Sherwood Super Kemvar HS (Sherwin Williams Co., 101 Prospect Ave., Cleveland, Ohio 44115, and its local distributors) fall into this category. The other lacquer is Synlac, a "bleed through" type, in which only the top coat of lacquer is catalyzed and the catalyst bleeds into the sealer and base coats (available from Industrial Finishing Products, 465 Logan St., Brooklyn, N.Y., 11208). This lacquer goes over Synlac's special barrier-coat sealer, and you can apply it over any finish that the barrier coat will adhere to, which is just about anything. If you want to refinish a lacquered or varnished table without stripping it, for example, you could reseal it with the barrier-coat, then apply bleed-through lacquer.

**To use catalyzed lacquers,** you must first mix the right amount of catalyst into the lacquer. Since most brands recommend two to four ounces of catalyst to every gallon of lacquer, an ordinary shot glass is an accurate measure for quart-size spray guns. Too much catalyst leaves a greasy finish that may take days to dry and gives off a disagreeable odor for five or six months. Too little catalyst produces a relatively weak finish.

Once mixed, catalyzed lacquers spray on and dry just like ordinary lacquer, or they can be mixed with thinner and lacquer retarder—an additive which slows drying—and brushed on. Most manufacturers recommend high-grade thinner, which dries slower than inexpensive types, giving the lacquer more time to flow out smoothly and resist the whitish-blue hazing that develops in humid areas. In a pinch, you can hype-up regular thinner by making a mixture of 90% to 95% thinner (by volume) to 5% to 10% retarder. For brushing the lacquer, you can add up to 25% retarder in the thinner mixture, then spread the lacquer with a soft brush, just as you would brush on shellac. Too much retarder gives a greasy finish that can be dried only with a good deal of steel-wool buffing and lots of elbow grease.

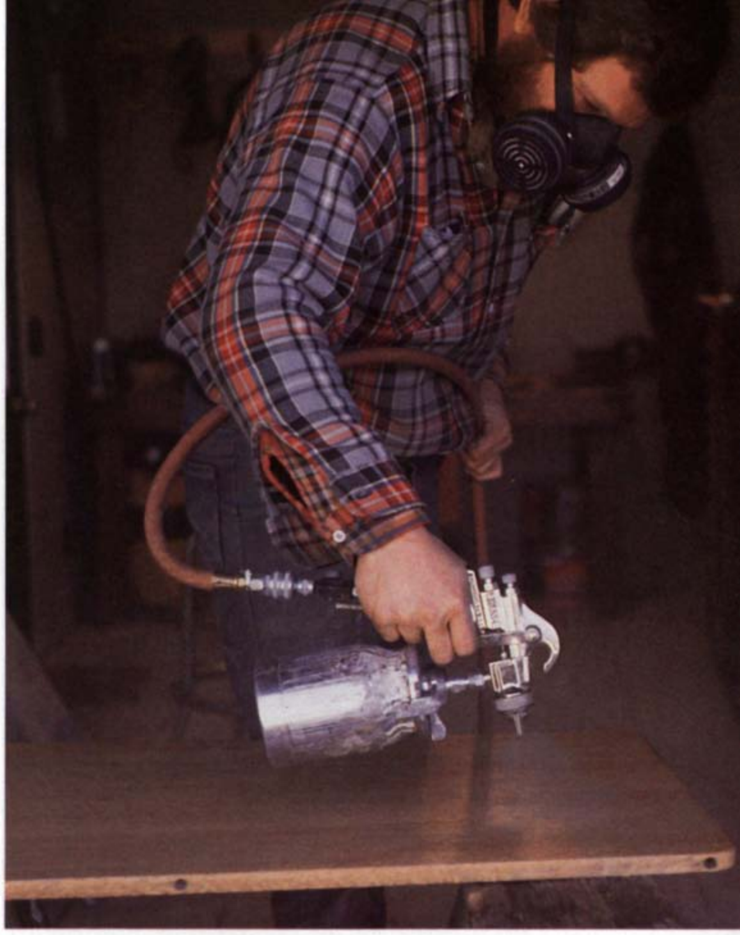
Whether you are spraying or brushing, you first must apply at least one coat of a catalyzed sealer, let it dry, then sand lightly with 320-grit wet/dry paper. For open-pore woods, you may have to sand down two or three consecutive coats of sealer until the grain is filled, since catalyzed lacquer cannot be used over wood filler or any oil-based stain. Next apply three or four coats of lacquer, sanding between each coat with 600-grit paper. While manufacturers recommend that you wait four or five hours between coats, I have sprayed three coats in less than three hours.

Once applied, catalyzed lacquer must cure seven to 10 days to develop its full strength. The finish gives off a slight odor as it cures, but if you mixed it right, the odor will go away within a day or so. The disappearance of odor doesn't mean the finish is fully cured. Wait the full 10 days. If you rub out the cured finish with rottenstone, you can create as high a gloss as you'll get with any finish. If you rub with 00 steel wool you can kill the gloss entirely. Use 0000 steel wool for a more satiny effect.

Occasionally, when I'm in the final stages of finishing, I must alter the color of a finish to produce what my customer ordered. You can do this by adding a colored glaze between the lacquer coats or by tinting the lacquer itself. In either case, use oil-based or oil-compatible color (I use so-called Universal colors, either UTC brand, Byzantine brand or Japan colors by Ronan, available by mail order from Industrial Finishing products).

For glazing, I mix color with mineral spirits to form a very thin, weakly-colored stain that I apply with a lint-free rag, wiping with the grain and feathering the glaze at the end of each stroke until I evenly color the entire piece. Let the glaze dry about an hour until it's evenly dull before applying more lacquer. To tint the lacquer itself, add color to thinned lacquer and test until you get the shade you want. There are no tricks here, except your

To ensure that the lacquer is free of all dust and impurities, filter each batch through a cone filter as you fill the spray gun cup.



*Shaw sprays catalyzed lacquer just like regular lacquer, with long, even, overlapping strokes, above. A double-cone, organic vapor respirator and fans or other forced ventilation are mandatory. Finishing the finish is the most time-consuming part of the job. To ensure a rich, smooth finish, each coat must be rubbed out with fine wet/dry paper. To check his work, right, Shaw examines the finish closely from a low angle where light reveals any defects.*

gun control must be perfect—an uneven coat looks horrible.

Catalyzed lacquers have many of the same problems as conventional lacquers, and the remedies are often the same. Fisheye, for example, is caused by contaminants, usually silicon, on the wood. Catalyzed lacquers will fisheye when applied over almost any contaminant, so I always assume that any refinished surface is contaminated and mix a fisheye remover into the lacquer. With new pieces, I test the sealer on some inconspicuous corner. If there is any trace of cratering, I use fisheye remover.

As with conventional lacquer, you can prevent hazing on catalyzed lacquer by adding enough retarder to slow the hardening process, giving the lacquer time to bleed off moisture before drying. The retarder also helps the lacquer flow out smoothly. To minimize air bubbles in the wet film, spray the catalyzed lacquer when the temperature is 75°F to 85°F, a much narrow range than for ordinary lacquer. If you must spray at higher or lower temperatures, add about 5% more retarder.

If something goes wrong, you can remove a catalyzed finish, but do it quickly before the lacquer cures or you're in for one miserable job. Paint stripper will remove partially-cured lacquer, but it takes an awful lot of stripper and even more elbow grease. If the finish has fully cured, straight lye (a can of Draino in a quart of water) applied over and over works eventually, but it does not do the wood any good. After using the lye, you must rinse the wood with water and vinegar and usually have to bleach it with oxalic acid before refinishing. Make sure you wear your respirator and chemical-resistant gloves, and mix the lye in a plastic bucket—the solution can react with aluminum containers to produce harmful fumes.

Clean your brushes and spray gun immediately with lacquer thinner or acetone, or you will ruin them. Manufacturers claim the lacquer mixture will be usable for about three months, but I've found it must be used within a week if you want the strongest possible coat. Old lacquer won't turn into gelatinous ooze as long as it's kept in a sealed container. You can use it, but don't expect it to be any stronger than regular lacquer. In the last four years I have applied catalyzed lacquer to hundreds of pieces of furniture and numerous kitchen and bathroom cabinets, and have yet to hear a customer complain. So, for a finish that is as tough as nails, lovely to see and simple to apply, catalyzed lacquers are the only way to fly. □

---

*David Shaw is a writer, furniture finisher and restorer in Kelly Corners, N.Y.*

Photos: Elizabeth Jean Shaw

# Subtractive Woodworking

*Furniture from logs and limbs*

by David Holzapfel

Working in a vacuum is a way of life for many of us. We do what we do in the cloisters of our heads and shops. For many this isolation is important to develop skills and experiment. The vacuum is safe, no noise but our own. At some point, however, someone will ask, "And what do you do?" And answering from the vacuum you say, "I make furniture." "Oh really, what kind?" The vacuum gets a bit denser, smaller, tighter. "Tables, benches, and chairs mostly." "Are they, uh, like Windsor chairs or Shaker style?" Denser and smaller still, "No I uh...well, I take uh...whole logs and burls and uh sometimes root systems and I uh...carve...." By this point you've lost them. The face before you is blank. They have no mental picture of what you're talking about, no handle on it. "Oh, that sounds interesting." You hear these last words as if spoken through a drain pipe. Exchange dumb smiles and talk about the weather.

After not too many encounters of this kind the big questions emerge—what is it that I'm doing, how can I explain it succinctly? At the Wood '79 conference, Jon Brooks, one of the guest lecturers, was introduced as the maker of "Flintstone furniture." The humor intended was shared by all, but at the same time it was evident that although Jon speaks lucidly about his own work, there was no vocabulary in general furniture parlance for the style of work Brooks does.

In order to explore some of these questions, I spent the spring of 1984 visiting six others who work wood as I do, beginning with a whole log or tree section and carving wood away to generate the form, part of which may be used as furniture. I call this subtractive woodworking. Furniture design is usually a process whereby the designer-maker creates a form in his or her mind or on paper, then gets the boards necessary to execute the idea. Subtractivists work a giant step closer to the raw material. The material, be it whole log section, branch, burl, or natural-edged plank, may be the springboard of inspiration from which the form of a piece leaps. The artisan may also have a form in mind before carving begins, but unlike dimensioned boards, a log or branch will inform her or him whether or not the design is feasible.

J.B. Blunk, Jon Brooks, Erik Gronborg, Heather Hilton, David Van Nostrand and Howard Werner are by no means the only subtractive woodworkers around, but each has been at it for at least 10 years, and each has become nationally known. Their backgrounds are as diverse as the work they produce. Gronborg abandoned a career in electronics in his native Copenhagen to obtain a masters degree in ceramic and wood sculpture. Blunk apprenticed as a ceramist with one of Japan's National Living Treasures; Van Nostrand was seduced away from the family business by subtractive woodworking. Hilton, Brooks and Werner also have college art degrees and all three have taught.

Regardless of background, however, all deal primarily with the subtractive sculptor's language of mass and volume, form and space, and only secondarily with the traditional determinants of design: function, economy and efficiency. Visual success is a vital function of a piece and often a more important factor than its ability to support a stack of magazines or how easy it is to dust. All the makers are dealing with the object as subject—an everyday object such as a table or chair is chosen as a subject for sculptural investigation much as a painter chooses a landscape or portrait as the subject of a painting.

The nuts and bolts of subtractive woodworking are simple: get rid of everything you don't want however you can. Throughout time, a wide range of subtractive methods has been used. Breaking off the unwanted wood, charring and scraping it with stones or shells, and soaking the wood in urine then scraping are but a few of the techniques known to have been practiced for eons.

With the advent of metallurgy came saws, chisels and gouges, which revolutionized the working of wood. Subtractive processes were ushered out of the mainstream and replaced by additive ones. Entire logs could now be sawn into boards then joined together in never-ending combinations. As technology evolved, furniture in the industrialized world came to be made almost entirely of dimensioned lumber. Only sculptors, rustics and "primitive" societies continued to work subtractively with whole logs and branches. Midway through our own century came the chainsaw, another revolution, perhaps. At any rate, here's where the story begins for today's subtractivist sculptors and furniture makers.

Subtractive woodworkers don't trot off to the local lumberyard for their material—most of what they use never gets to the sawmill. They get their logs and branches wherever they can, often through contacts with loggers, farmers, tree surgeons and friends. The tree dump down the street from David Van Nostrand's Rochester home, for example, provided the material for his first pieces. Now in Atlanta, he still relies on throw-away wood. Fortunately for Van Nostrand and fellow Atlantan Heather Hilton, Atlanta is a boom town, and the old growth trees that fall before the bulldozers are an excellent resource.

J.B. Blunk had the most spectacular wood collection of anyone I visited. A stockpile of redwood logs and burls greeted me at his studio in Marin County, outside San Francisco. This is but a fraction of his major stock, some 40 tons stored in northern California. Periodic trips north keep him in touch with his stash and logger contacts. For a hick Easterner who had only seen pictures of the venerable redwoods, their size alone struck me dumb. To conceive of actually carving one of his burls, which literally dwarfs

## *Howard Werner*

"In Africa and Oceania it's been ongoing. But there's been a gap of several hundred years when Western culture left the direct carving of furniture forms and took to constructed furniture." Howard Werner was explaining his work to me in the spacious workshop he shares with furniture-maker Ben Mack in New York's Catskill mountains.

Since his 1974 graduation from Rochester Institute of Technology, he has been working to close that gap. At RIT, Werner was influenced by his teachers, Jon Brooks and Wendell Castle. An interest in the sculptor Constantin Brancusi led Werner to the Rockefeller collection of primitive art in the New York City Metropolitan Museum of Art. This collection, much of it carved wood, is enough to cause the subtractive woodworker either to quit because everything has already been done, or to work ceaselessly, fueled by the inspiration. Werner chose the latter course.

Werner works on several pieces at a time, some furniture forms, some purely sculptural. He makes no distinction technically between the two. "I've determined what it's going to be way in advance of actually doing it," he told me. "So I don't wonder about what object I'm making while I'm working. I don't design them [furniture and sculpture] differently, think about them differently, or carve them differently. They both deal with the same sculptural issues of mass, volume, and space."

Ideally, Werner would spend the quiet winter months designing, spring and early summer rough carving outside, and the hot summer months and the fall finishing up whatever is ready. At the outset, the material plays little part in Werner's design process. From his sketchbooks he selects ten or so forms to develop further into wood models. Knowing in advance what form he is going to carve and, therefore, how he will cut into the log, ensures the best possible use of the material. Werner admits to occasionally getting logs which definitely inform him what they're going to be, but he feels most comfortable leaving as little as possible to chance by having his design 100% conceived before he approaches the material.

There are no secrets to Werner's methods which, like all chainsaw techniques, are inherently dangerous. His "Curly-Que" elm coffee table (shown in two views at right), which he made in 1983, is a good example of his mastery of the chainsaw. The piece, carved from a single log, required innumerable controlled plunge cuts into the log's end grain. Truing everything up and texturing the inner surfaces consumed the ensuing endless hours.

*Howard Werner made numerous controlled plunge cuts with a chainsaw to rough out the form of the "Curly-Que" coffee table (top, bottom right) from a single log. Werner is shown at bottom left with two recent, geometrically-derived coffee tables.*

The piece represents a shift to geometrically-derived forms, classic in nature, from the fluid forms he carved up through 1982. A recent set of coffee tables (above left) employs carved spalted-maple spheres and triangular forms, certainly influenced by the current neo-classic revival of Post-Modernism. Werner makes no effort to direct his work to keep abreast of trends. "I'm part of a contemporary society and I keep aware of what's going on. But really my current work is way behind the times. I'm just now moving into Modernism. I've been looking particularly at Modernist architecture, and I think that's where my current interest in geometric forms is coming from."

Color photos: Woody Packard; black and white photo: Michelle Stuhl human-scale, and the amount of mental and physical effort it would take, left me weak in the knees. One of Blunk's pieces, a table for Green's restaurant in San Francisco, was carved from a redwood burl 4 ft. high and 17 ft. in diameter. Blunk pointed out that it's merely a question of scale, of what one is accustomed to.

Fifteen years ago Blunk's wood was basically free, but now he may pay up to $4,000 for the more monumental redwood burls, not to mention the cost of hauling them to his work site. Before he fires up the chainsaw, he's made a large investment, leaving no room for mistakes, least of all in estimating a commission. Nine times out of ten he hits it on the nose. But not always. For a huge public sculpture he estimated and was paid $40,000. Sounds like a haul, except that his expenses were $37,000. "Not a great return," he told me with a head shake, "but when another mall contacted me about a piece they wanted, I told them $50,000, so I guess I learned something from it."

The lack of steady income is a constant concern in this kind of work, and several of the people I visited teach part-time. Erik Gronborg teaches sculpture, woodworking and ceramics full-time at Mira Costa Community College. Not being dependent upon production and sales for his livelihood gives him the freedom to explore and make what he likes at whatever pace it requires, and he wouldn't have it any other way.

These makers work primarily on one-of-a-kind pieces, some speculative, some public or private commissions. Sales are through galleries or directly to the customer. Brooks, for example, has learned to negotiate the rocky ground between his clients' wishes and the object he wants to make, but he prefers to leave selling to the galleries. "For me, the business side is like washing dishes. I prefer eating." Everyone I spoke with prices intuitively and subjectively rather than by applying a materials and labor formula. Charging by the hour is out, no one could afford it. As J.B. Blunk put it, "This ain't piecework." □

---

*David Holzapfel wields chainsaw and gouges in Marlboro, Vt. An exhibition featuring the work of the makers profiled here will run from October 13 to November 24 at the Snyderman Gallery, 319 South St., Philadelphia, Pa. 19147.*

Photos: Jon Brooks

*In the 1970s, Jon Brooks became well known for chairs carved from a single log. "Peace Chair," above, is oak.*

Photos: J.B. Blunk

## J.B. Blunk

Wood wasn't the material J.B. Blunk chose to work; instead, it chose him. Blunk had been a ceramist for 10 years when he happened upon a downed cypress and its attendant muses that inspired him to begin carving wood. Though he apprenticed in the early 1950s with two of Japan's foremost ceramists and considers sculptor Isamu Noguchi an important mentor, Blunk is not a formally trained artist. He values his "amateur" status. "Innocence," he explained to me, "is in an endangered position in our culture now. Innocence in problem solving and design, and innocence in the experience of art are endangered by our reliance upon 'experts'."

Wood itself doesn't figure directly into J.B. Blunk's design process, though it does have a lot to say about the final form. Working from a theme or concept, Blunk

## *Jon Brooks*

"I make furniture on the themes of sculpture and sculpture on the themes of furniture," Jon Brooks explained to me in his New Hampshire studio. "Making objects for ritual and daily use has always been important to me and a vital aspect of my work." Brooks wants the viewer/owner to be able to use and handle his work as well as look at it, so furniture was a natural.

Brooks feels it's important to keep himself open to all influences, inner and outer. After graduation in 1967 from the Rochester Institute of Technology, where he studied with Wendell Castle, Brooks went to California. There the then-burgeoning ecology movement, the local landscape and the work of J.B. Blunk influenced him, and he began making the chairs carved from whole trees for which he is well known today.

Photo: Uffe Shultz

Photo: Uffe Shultz

*Brooks used the waterfall imagery and title of the table above left, which he calls "Gordon Below Franklin, Dam vs. No Dam," to express his concern with a controversial Tasmanian dam project. His current passion is music stands he calls the Flashstick series, above right. For some pieces, Brooks "inlays" paint, carving a pattern on the plain wood then applying paint to the recessed surfaces.*

Brooks has no particular set pattern for designing and executing either furniture or sculpture. Sometimes he has in mind what he wants to make, then draws models or mocks it up before he selects the wood. Other times a specific tree section will reveal to him what it is to be, so he just starts carving. He regards technique as merely a means toward presenting his ideas. "The preoccupation that many woodworkers have with technique is a diversion from the reason why they work wood, which is to create pleasing objects, I would hope. If you want to make something, really want to make something, you'll figure out how to do it."

Brooks may work variations of a particular theme in a series of related pieces, but generally each piece presents specific ideas which, once communicated, are left behind. The table above left, for example, expresses his concern for a political/ecological issue—the damming of a large river in Tasmania. The visual imagery of the piece is straightforward, as is the message—the walls of a canyon, water flowing unrestricted over the rocks of the riverbed.

Last year, as guest artist at the Hobart School of Art, Hobart, Tasmania, Brooks was provided with tools, a studio and a stipend in exchange for approximately 12 hours per week of actual instruction. Away from the familiar, a new set of influences worked on Brooks. Moved by Tasmania's jagged, mountainous landscape, he has introduced geometric forms and sharp, straight lines as well as paint to his work. The romantic, organic sense of "tree" apparent in his curvilinear pieces hasn't been dropped, however. To focus on his new design elements, Brooks carefully plays the irrational, organic elements against the rational, classical geometry of the straight line. This interplay may be seen in his Flashstick series of music stands (above right).

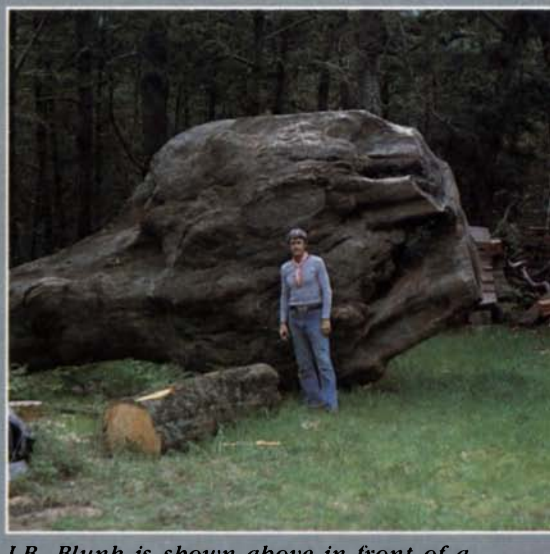
Those familiar with Brooks' work may pass out when they learn that he has begun to paint wood. But that, too, is a question of getting with the times. Besides, he does it well.

---

may make a series of sketches then go right to the material and begin carving. If the piece is a commissioned one, he likes to make models, usually of wood though sometimes clay, to help the client understand what he's going to do. At other times he'll forego models and sketches and start carving, developing the form intuitively as he goes. There is nothing haphazard in this approach. Intuitive response to the material is essential whether or not sketches and models have been made. "If you don't have a sense of the material," Blunk explained to me, "no idea however grand can be successfully communicated."

In much of Blunk's work archetypical and/or primeval messages come through. The venerable redwoods that he carves are appropriate to the feeling he wants to communicate, be it furniture or a purely sculptural form. "Magic, that's what it's all about," he told me. "Magic as the mystery and process of life." Or, as he explained at a 1978 Los Angeles exhibition, "...what is intended is an evocation of a sense of the unknowable."

Because we can recognize his smaller functional pieces as furniture and therefore mundane, the sense of mystery may not be felt as readily from them as from his larger scale work. One such large piece is "Planet," installed in the entrance to the Oakland Museum (shown on the facing page). Carved from a single 12-ft.-diameter burled redwood bole, "Planet" functions as a meeting place. Adults sit on it and rest while children climb and explore. Blunk left portions of the bole natural in contrast to carefully carved and textured flat planes. These carved planes and textures in the otherwise natural chaos of the form make the magic and power of the bole palpable—without the sculptor's skill and vision, the free form alone would not transmit that magic.



*J.B. Blunk is shown above in front of a huge redwood burl. His sculpture, "Planet" (bottom, facing page), was carved in 1969 from a 12-ft. diameter burl bole for the Oakland museum.*

## *Heather Hilton*

Although Heather Hilton carved her first functional piece in wood some 10 years ago, "pure" sculpture in stone occupied most of her time until 1983. Then, during a sabbatical from teaching sculpture at Spelman College in Atlanta, Ga., she turned to wood to explore forms that also function. "We're bound by what is expected behavior," she told me. "So sculptors make sculpture and craftspeople make functional crafts." She has exhibited sculpture throughout the U.S., but feels a broader range of people can appreciate her seating pieces, because the appeal is more than simply visual.

Hilton prefers to work directly with the wood—no sketches, no models. Though she may have an idea for a seating piece, she tries not to impose that too strenuously on the log. Hilton works by a process similar to automatic drawing, whereby you place lines by whim or intuition until you sense that the sketch is complete. The piece develops slowly, carefully. Decisions about where the piece is going are made with each cut. If the potential for a seating piece emerges, she will go with it; if not, the piece develops as it will.

Hilton's methods are decidedly not haphazard. They demand undisturbed concentration and years of training and experience. By working directly, intuitively she feels she puts no intellectual distance between herself, the process and the object being created. The finished piece is not so much the result of a plan executed but a series of discoveries.

One result of Hilton's working method is that the finished piece may appear ambiguous: is it a chair or a sculpture? Of course it's both. Hilton likes the idea of her work "not having a set top or bottom, no beginning, no end. Where does this process begin, where does it stop?" She feels that as long as the piece succeeds visually, the ambiguity enables others to relate to it in many ways. For this reason she doesn't like to direct the viewer by the titles, not even "Untitled."

Hilton's recent interest in the movement of waves was evident in much of the work I saw in her studio. As one sits in the trough of the gently undulating piece shown at right, for example, the crests rise up on either side. "A calmness, a continuity, an undisturbed flow are intrinsic to the feeling that I want to communicate."

Photo: Fred S. Gerlich

Photo: Charley Akers

## *David Van Nostrand*

David Van Nostrand describes his early carved pieces, drawn from the tree dump in Rochester, N.Y., as "exploitative...the form was there, all I really did was make it into something which functioned." Deprived of the treasures of the dump by his 1978 move to Atlanta, Ga., Van Nostrand was obliged to carve a whole tree trunk for his first commission. This began a new and lasting direction—responsive to the natural form of the raw material but not, as in his previous pieces, dependent upon it for the creation of the finished piece.

Individual objects have influenced Van Nostrand more than whole bodies of work by a particular artist. He acknowledges the strong influence of Jon Brooks, with whom he studied, and the recent influence of metal sculptor Carl Andre, as well as the "inescapable" influences of Henry Moore and Constantin Brancusi. Nevertheless, he feels his work evolves largely in his subconscious.

Much of Van Nostrand's work takes on zoomorphic and biomorphic forms, and recently he has been experimenting with combinations of wood and metal. Sometimes both the steel and wood flow and curve, as in the red oak and iron chair at bottom left. On another chair though, a straight, hard-lined steel rectangular base constrasts with the carved wood, making the wood's curves even more sensuous. Rarely does he set about carving with human anatomy in mind, but "if certain curves reminiscent of curves we all know develop as I work, I let it happen."

*It took David Van Nostrand only a few hours to chainsaw the basic form of the "Left-Handed Beer-Drinkers Chair" (top), then hours and hours to refine and sand the piece. He has been combining wood and metal for the last several years, as in the red oak and forged iron chair (bottom), which matches a desk of similar design.*

Van Nostrand prefers to forego drawings and deal directly with the log. After studying the mass, he decides upon the function, which he defines further by making initial chainsaw cuts to establish the top and bottom of a chair or table. Then he studies the remaining mass for its sculptural potential. "It's more important to me to create the aesthetic around the function rather than incorporate and sometimes have to force the function into the aesthetic." Van Nostrand is well aware that people who buy his work aren't responding to function but to sculptural form. That his chairs, for example, are comfortable is a delightful, functional plus.

To develop the form further, Van Nostrand draws right on the remaining wood with chalk or crayon. The lines also keep him from removing more material than his plans call for. His experience tells him where and how much wood may be removed without jeopardizing the structural integrity of the piece. At the outset, work proceeds quickly. Typically, a piece such as his "Left-Handed Beer Drinker's Chair" (top left), will be 90% carved within the first three or four hours of chainsaw work. Once the essential form is carved, he leaves the piece for a day or more. Coming back to it with fresh eyes and a rested body, the painstaking process of defining the lines and bringing the proportions into clear focus go on until they're right "...for a long time, and let's not even talk about the sanding."

Photo: Heather Hilton

*This oak seat, sculpted without reference to drawings or models, reflects Heather Hilton's recent exploration of wave forms.*

## *Erik Gronborg*

Erik Gronborg was an internationally-known ceramist when he took up woodworking in the mid-1970s. He had done a fair amount of wood sculpture while studying for his master's degree, so he was familiar with the material. He regards European Romanesque art and architecture of the 11th and 12th centuries as his major stylistic influence. "Not a lot of frilly details," he explained to me, "but rather a stark, simple, robust quality. Romanesque architecture employs big stone blocks which overall give a sense of mass with very straightforward construction."

Gronborg begins a piece as a series of quick sketches, changing elements until he gets the general form he wants. The spontaneity of drawing pleases him and he works the wood with the same sense of spontaneity. He works trunks and branches gathered in the avocado groves near his home on the California coast north of San Diego. A "gigantic" avocado trunk may be 12-in. to 14-in. in diameter. The wood is reddish-brown to beige, it works cleanly and smells good.

The bandsaw, the fastest, safest stock removal machine around, is essential to his work style. Working from the ground up, Gronborg bandsaws each element to relate to the overall form as it develops. This form will relate both to the natural shape of the tree and to the proportional shape the object demands. He draws the shape onto a curved avocado log of about the right size, bandsaws it out and sticks it in place. If it's too big here, or not quite the right line there, it's back to the bandsaw and in a moment all is right. Very little time is spent with the rasp or the body grinder bringing that line into shape. From a whole log, a finished major element of a piece may take him minutes rather than hours. Sadly though, Gronborg's bandsaw doesn't eliminate the tedium of sanding and there the hours build up.

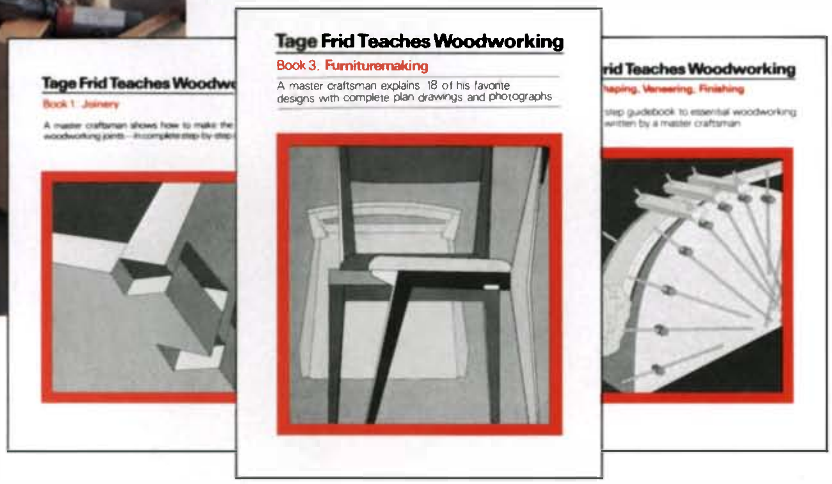
Gronborg's use of the natural form of the log is reminiscent of the ancient boatbuilder's craft (his Nordic blood perhaps). The construction of his pieces is right out in front. The elements are exaggerated, oversized in what Gronborg calls "explicit" joinery, reflecting again his interest in the massive quality of Romanesque architecture. I found particularly delightful the wooden latches and slides he makes for his writing desks and cabinets, like the one shown below. They're not concealed or slick the way commercial hardware can be. And because they're oversized, you can see their purely simple mechanical functioning.

Photos: Erik Gronborg

*Erik Gronborg's "Big Chair" (above) is assembled using simple, exposed joinery. He bandsaws avocado logs, often mimicking the log's natural shape in the finished form. "Treasure Chest" (right) sports ceramic panels in an avocado frame. The interior is lined with velvet.*

*Now Available*

Photo: Dick Swift




# Announcing Tage Frid's new book on furnituremaking

In his first two books, *Joinery* and *Shaping, Veneering, Finishing,* master craftsman Tage Frid covers virtually all the techniques you need to know to make fine furniture. Now, in the long-awaited conclusion to his three-volume woodworking series, Frid shows you how to use these techniques to make some marvelous furniture of his own design.

Frid's new book, *Furnituremaking,* offers photos, instructions and complete working drawings for 18 individual pieces, including eight different tables, Frid's well-known workbench, his distinctive three-legged stool, a rocking chair and more. All the designs reflect Frid's Scandinavian heritage and his belief that even the finest furniture is meant to be used. In each case, Frid outlines the steps involved in making the piece—frequently referring you to the appropriate sections in his other books—and describes in detail those steps that are most difficult or interesting. There's also valuable information about designing a room full of furniture.

All in all, this new book is the perfect conclusion to Frid's three-book series and a fitting culmination to the 35 years he has spent teaching his craft to others. *Hardcover, 240 pages, $18.95 postpaid*

## *Special Three Book Price*

You can now order all three of Frid's books for only ***$44.95 postpaid.*** That's a savings of almost $12. Just check the appropriate box on the insert or call our toll-free number: ***1-800-243-7252.*** (As always, we guarantee your satisfaction.)

**To order: Use the insert after page 94 or write The Taunton Press, Box 355, Newtown, CT 06470**

# Woodworking technique as you've never seen it before

Our new *Fine Woodworking* videotapes let you look over the shoulders of some of today's best woodworkers as they demonstrate their skills and techniques. You see how they use their tools and refine their designs. And you pick up a wealth of practical shop tips and tricks that will save you time and effort.

There's nothing else like these tapes available. They capture so much practical information, you'll want to come back to them again and again—to brush up on your techniques, study overlooked details and refine your procedures. So order now, and start building your library of *Fine Woodworking* home video workshops.

## Videotape Workshops

***Dovetail a Drawer with Frank Klausz.*** Cabinetmaker Frank Klausz demonstrates and explains each step in making a clean, easy-to-use drawer, from preparing the stock to gluing-up and fitting the drawer. *Approx. 60 minutes,* ***$49.95 postpaid***

***Bowl-Turning with Del Stubbs.*** Learn bowl turning from one of today's leading woodturners. Stubbs demonstrates and explains all the basic equipment, tools and techniques you need to turn a chunk of wood into a handsome bowl. *Approx. 120 minutes,* ***$59.95 postpaid***

***Carve a Ball-and-Claw Foot with Phil Lowe.*** A specialist in period woodworking, Lowe shows you everything you need to know to design and make that hallmark of 18th-century furniture, the cabriole leg with a ball-and-claw foot. *Approx. 115 minutes,* ***$59.95 postpaid***

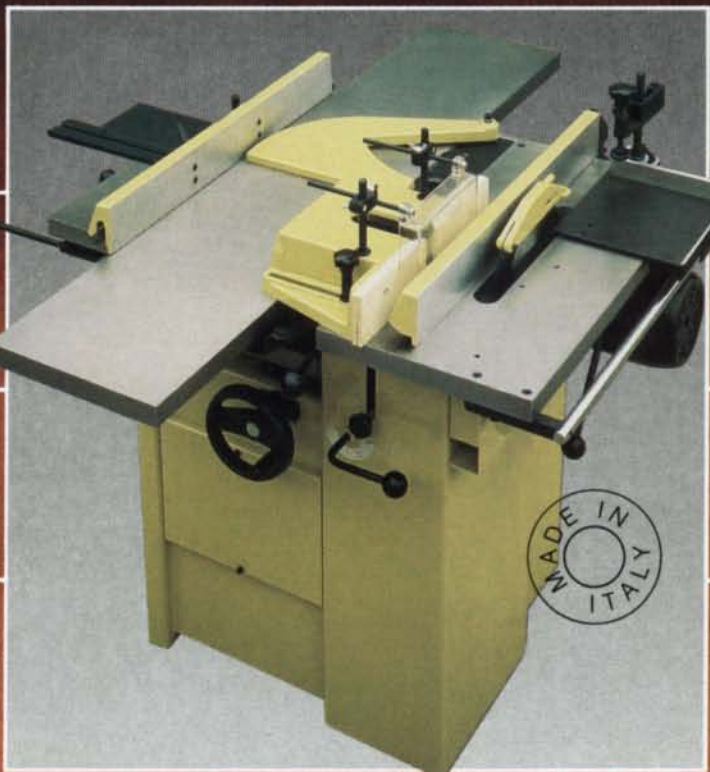
***Radial-Arm-Saw Joinery with Curtis Erpelding.*** The craftsman who's brought fine joinery to the radial-arm saw demonstrates the jigs and techniques he uses to make impeccable joints time after time. *Approx. 110 minutes,* ***$59.95 postpaid***

***Wood Finishing with Frank Klausz.*** Calling on 20 years of finishing experience, Klausz shows you how to stain, oil, varnish, lacquer and French polish your work, and how to refinish older pieces. *Approx. 110 minutes,* ***$59.95 postpaid***

**You can also order by phone. Call toll-free, 1-800-243-7252, and use your credit card.**

# We can cut it
## ...turn it, sand it, plane it, etc.

**C-30 Combination Woodworking Machine**
**Saw:** 8" x 5/8" bore, 2½" depth of cut
**Planer/Jointer:** 11¾" wide 3 knife head, 4" thick planer capacity 23 ft/min. power feed
**Shaper:** 1¼" arbor 6000 RPM
**Mortiser:** 5" x 4" x 3½" travel, 16" x 7" table




Two Year Warranty

$2,995.00

*Mini Max*

**S45 Band Saw $995.00**

**T100 Lathe $650.00**
shown with duplicator

**MC90 10" Saw/Shaper $2,395.00**

**FSB35 13½" Planer/Jointer/ Mortiser - $2,395.00**

The C30 gives you all the stationary machines needed for cabinet making without wiping out your budget or floor space.

Call for the name of the dealer nearest you. There you can see how the C30 converts in seconds to each of its functions, all designed to equal their single purpose counterparts.

But look closely, added together you get even more: The sliding table can be used for the saw or shaper, the jointer is the same width as the planer and here's the mortiser you've always improvised.

If you can find a better cabinet shop for under $3000 buy it.

**Dealer inquiries welcomed.**

Call for additional information on these and other exciting Mini Max machines.

**MINI MAX USA. INC.**
3642 NW 37 Avenue
Miami, FL 33142
Telex: 153506 "MINI MAX"

Call Toll Free Outside Florida
**1-800-327-4022**
In Florida Call
**1-800-432-2454**

## SUNHILL

## CABINET SHOP SPECIALS FOR THE SERIOUS WOODWORKER

* Step up to superior quality with Sunhill's Sept./Oct. specials. All prices include freight to nearest terminal of our house carrier. Prices effective through Nov. 15.

**SP-101 Cabinet Shop Shaper**
- Single phase 2 HP motor
- Precision 1" spindle
- 3" spindle travel
- 2 reversible speeds
- Options include 3 HP motor ½", ¾" and 1¼" spindles; Collets for router bits

List - $1600 **SALE - $1195**

**UFO Dust Collectors**
- UFO-101 2HP 2 Bag
  List - $450
  **SALE - $395**
- UFO-102B 3HP 4 Bag
  List - $595
  **SALE - $545**
- UFO-104 5HP 8 Bag
  List - $1650
  **SALE - $1450**

**MP-210 Tilting Spindle Shaper**
- 3 phase 3 HP motor
- 3 speed reversible rotation
- 3" travel, tilts to 45°
- Wt - 880 lbs

List - $3170 **SALE - $2850**

**PET-14 14" Three Sided Moulder**
- 14" × 3" Three sided capacity
- 14" × 8" one sided capacity
- 2HP & 3HP standard motors
- Optional 3HP & 5HP motors

List - $6950 **SALE - $5,750**

**MP-230 Heavy Duty Tilting Spindle Shaper**
- 3 phase 5 HP motor
- 4 speed reversible rotation
- 3" travel, spindle tilts to 45°
- 38" × 40" table area
- Wt: 1200 lbs.

List - $3895 **SALE - $3550**

**CT-200 8" Cabinet Shop Jointer**
- Single Phase 2 HP motor
- 9" × 67" table
- 6000 RPM
  3 blade cutterhead
- Wt: 500 lbs.
- Dual Tilt fence

List - $1350
**SALE . . . $895**

**PS-20 20" Planer**
- 5HP motor
- 20" × 8" capacity
- 35' per min. feed rate
- Wt: 730 lbs.

List - $3,500
**SALE - $2,450**

**CT-38B 15" Planer**
- Powerful 3 HP motor
- 2 speed feed rate
- 3 blade cutterhead
- Stand included
- Wt: 480 lbs.

List - $1650
**SALE - $1175**

**PS-20S 20" Planer/Moulder**
List - $3,600 **SALE - $2,850**

**TAS-12HS 12" Table Saw with Sliding Table**
- 3 phase 5 HP motor
- 1" square thread arbor
- 30" × 40" table with sliding extension
- Wt: 530 lbs.

List - $3,090 **SALE - $2,450**

**SDM-25 24" Cabinet Shop Sander**
- Single platen head
- 25" × 60" belt
- 10 HP main motor
- ½ HP feed motor
- Heavy cast iron and steel plate construction

List - $7950
**SALE - $5850**

**TAS-14S 14" Table Saw with Sliding Table**
List - $4,010 **SALE - $2,950**

**SDM-37 36" Cabinet Shop Wide Belt Sander**
- Single platen head
- 37" × 60" belt
- 15 HP main motor
- 1 HP feed motor

List - $12,000 **SALE - $8,950**

**SRS-300 Rip Saw**
- 1 HP & 5 HP motors
- 4500 RPM spindle speed
- 3 feed rates
- Auto plunger pump lubrication

List - $13,450 . . . . . **SALE - $9,350**

**Write or call for a catalog of our complete line of woodworking machinery. Or, contact the dealer in your area:**

**Sunhill Enterprises**
414 Olive Way, Suite 210
Times Square Building
Seattle, WA 98101
(206) 622-5775

PA (717) 632-3443
NY (518) 872-0369
NJ (201) 828-3246
OR (503) 389-1521
OH (216) 878-7076
KY (502) 898-3740
CA (619) 729-2973
IA (515) 738-6063
WI (715) 384-9998
OK (918) 250-1400
KS (316) 942-8475
IA (319) 391-2386
AR (501) 524-4890
CA (415) 499-0408
WA (206) 775-6304
IN (219) 353-7551
IL (312) 223-8080
CA (408) 248-3535
IL (815) 758-6009
WA (206) 423-4242
CO (303) 469-8013
FL (813) 665-3458
LA (504) 738-6063
OR (503) 267-3511
MD (301) 340-7377
NC (704) 376-7421
CA (707) 937-4280
UT (801) 262-2020
MS (601) 982-6369
OH (513) 372-8376
OR (503) 252-4335
TX (214) 826-1752
CA (916) 343-5937
MO (816) 694-3493
IN (317) 477-7592
CT (203) 522-8174
MA (518) 872-0369

## TOOL CITY BEATS ANY AD PRICE THIS ISSUE FREIGHT PREPAID (USA)

### SENCO NAILING GUNS

| MDL# | DESP. | PRICE |
|---|---|---|
| LSII | pin nailer ⅝-1" | $259 |
| SNI | finish nailer 1-1½" | 259 |
| SFNII | finish nailer 1½-2½" | 399 |
| K | finish stapler 1-1½" | 259 |
| J | uphol. stapler 5/32-⅝" | 129 |

*Call for fastner prices*

### BIESEMEYER RIP FENCES

| | | |
|---|---|---|
| 40" | Home Shop | $199 |
| 50" | Commercial | $289 |

*Call for other Biesemeyer products*

### FREUD

| No. | Size | Teeth | USE | PRICE |
|---|---|---|---|---|
| LU72m10 | 10" | 40 | Gen. | $34.50 |
| LU73m10 | 10" | 60 | Cut-off | 35.00 |
| LU72m10 | 10" | 24 | Ripping | 36.95 |
| LU82m10 | 10" | 60 | Cut-off | 44.95 |
| LU85m10 | 10" | 80 | Super c/o | 63.00 |
| LU82m12 | 12" | 72 | Cut-off | 85.95 |
| PS303 | 7¼" | 40 | Gen. | 24.00 |

ALL FREUD ROUTER BITS AND SHAPER CUTTERS ON SALE. PHONE FOR SALE PRICES.
**15 Piece FREUD Router Bit Set $139.00**

### FORSTNER BITS

4 Piece Set ½/⅝/¾/1" **$32.95**

### MAKITA

ALL MAKITA TOOLS 30-45% OFF. PHONE FOR PRICE!

### HITACHI

ALL HITACHI TOOLS 30-40% OFF. PHONE FOR PRICE!

### MILWAUKEE

ALL MILWAUKEE POWER TOOLS 25-40% OFF. PHONE FOR PRICE!

### BOSCH

ALL BOSCH POWER TOOLS 25-45% OFF. PHONE FOR PRICE!

### PORTER CABLE

ALL PORTER CABLE POWER TOOLS 25-45% OFF. PHONE FOR PRICE!

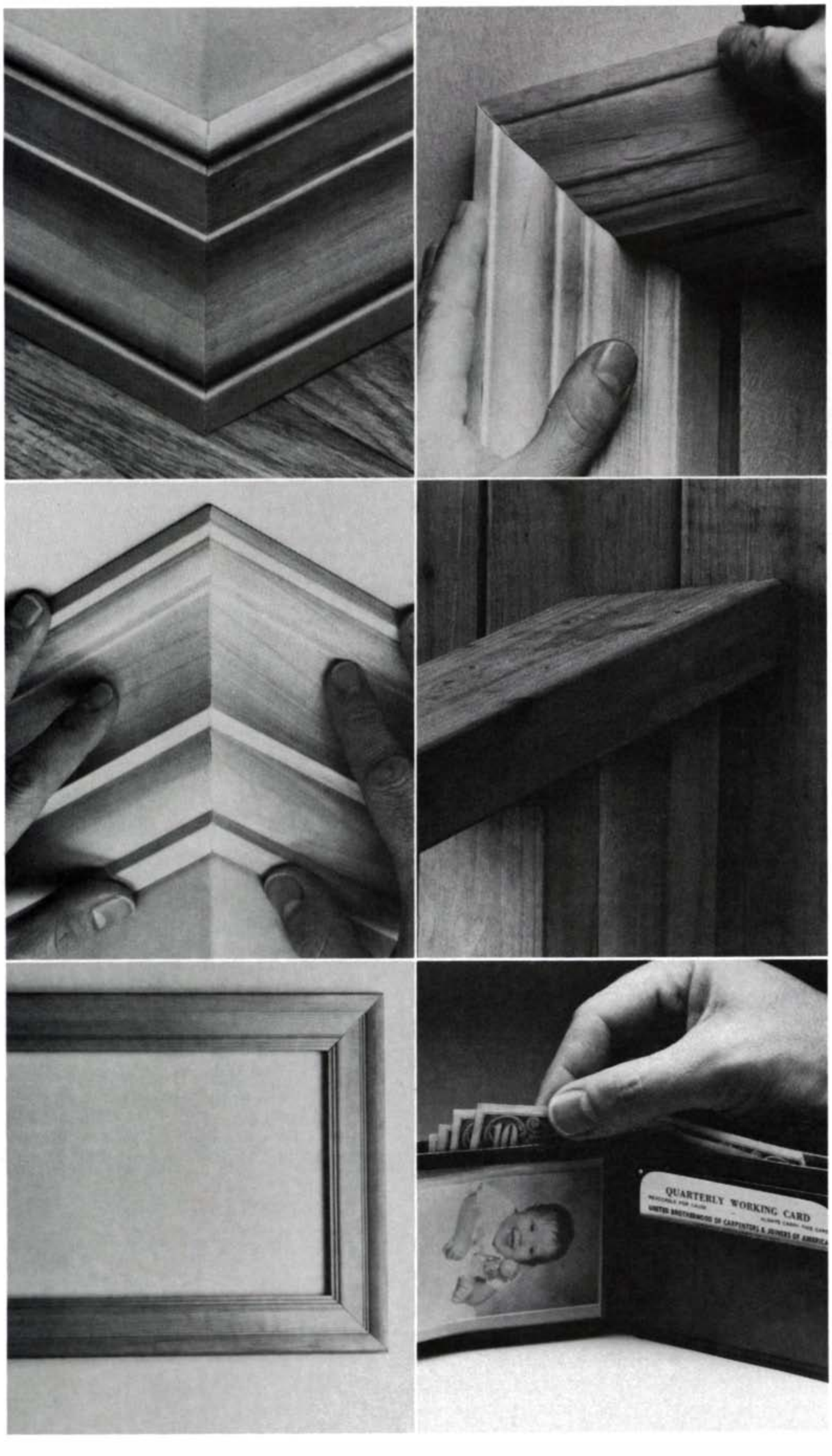
**FREE WITH ANY ORDER**
**#1) PREPAID FREIGHT**
**#2) 2 YEAR SUBSCRIPTION TO TOOL CITY CATALOG**
**#3) 7 PC. NUTDRIVER SET**
***RETAIL VALUE $19.00***

OUTSIDE CA. ***1-800-423-7899***
INSIDE CA. ***(213) 802-1236***
VISA, MASTERCARD OR PERSONAL CHECK

*Open Mon.-Sat. 8:00 am-5:30 pm*
***WE SHIP IT FAST!***

***TOOL CITY***
***14136 E. Firestone Blvd.***
***Sante Fe Springs, CA***
***90670***

# OUR NEW COMPOUND MITER SAW MAKES ALL KINDS OF PERFECT FITS.




If you're a professional trim carpenter you know all the cuts a power miter saw can make for you. But you also know how it can cut into your budget.

Well, Black & Decker is about to change all that. Our new compound miter saw is compact, lightweight, but incredibly durable.

It's also less expensive.

But that doesn't mean it's less versatile. Our new saw makes compound miters up to 45 degrees. Something some more expensive saws can't even do.

Since it's portable, you can take it anywhere on the job.

And its 1¼ H.P.* motor lets you slice right through widths up to 5¼ inches. So it can handle just about any trim job. From tricky crown molding to door and window frames.

Black & Decker's new 8¼ in. compound miter saw. It fits your budget as well as it fits a corner.

**BLACK & DECKER™**
**Ideas at work.**

DON'T MISS OUT!

The GENERAL 10" Tilting Arbor Table Saw

To Order Call Toll-Free 1-800-387-9789

10" TILTING ARBOR TABLE SAW c/w 3 HP Motor, Magnetic Control, Guard, Guide Rails and Fence. 425 lbs. Ready to use.

Crafted to exacting standards to assure you of years of unexcelled performance. A state-of-the-art table saw with a 40-year tradition of quality woodworking machinery production.

10" Tilting Arbor Table Saw Specifications

| | |
|---|---|
| Maximum depth of cut | 3⅛" |
| Diameter of arbor ... ⅝" Diameter of saw blade | 10" |
| Saw tilts to right | 45° |
| Maximum depth of cut at 45° | 2⅛" |
| Maximum cut to right of saw | 25" |
| Maximum width of cut-off (1" stock) | 14¼" |
| Maximum cut to left of blade | 15½" |
| Maximum width of dado | 1" |
| Distance in front of blade maximum cut | 12¾" |
| Maximum length of cut with extra long guide bars | 50" |
| Table height ....... 34" Table size | 28" × 36" |
| Overall dimensions with guide bars and rip fence: | |
| Width ............ 45½" Length | 40" |
| T-slot mitre gauge groove | ⅜" × ¾" |
| Rip fence | Locks both ends |
| Speed of saw blade | 4000 Rpm |
| Motor TEFC, 3600 Rpm | 3 HP |
| Shipping weight | 385lbs |

We've sold hundreds of this rugged heavy-weight. For the dedicated woodworker, this saw's got it all!

GENERAL 10" Tilting Arbor Table Saw

c/w 3 HP TEFC 3600 RPM Motor

$1295.

Shipped freight collect • No other charges

VISA — SEND FOR OUR CATALOG OF OTHER FINE WOODWORKING MACHINES — MasterCard

J. Philip Humfrey Ltd.

3241 Kennedy Road, Unit 7
Department FW 9/10
Scarborough, Ontario M1V 2J9 (416) 293-8624

☐ I enclose $1.00 (refundable against purchase). Please rush my catalog.

Name ____________

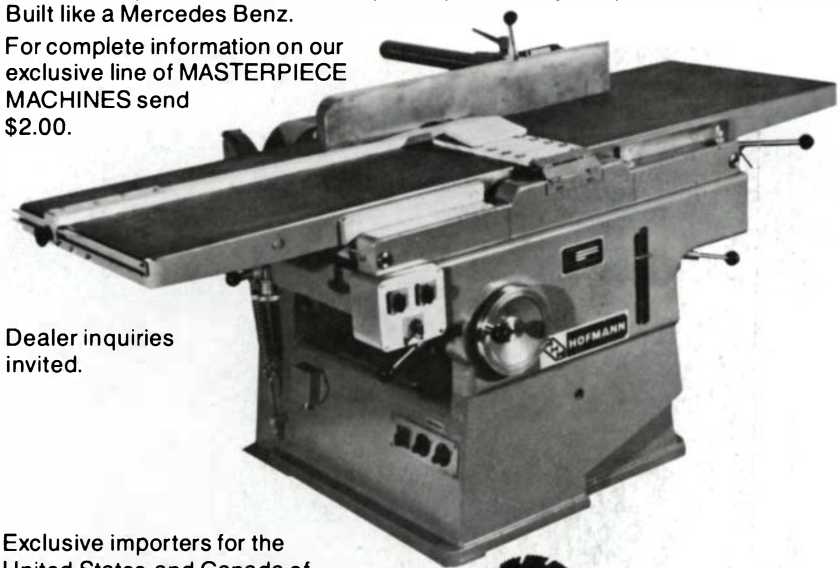
Address ____________

City ________ State ________ Zip ________

# World's Finest Planer/Jointer

Made in a small town in West Germany, our HOFMANN Combi Planer/Jointers are German battleship-strong. Carefully hand finished by master machinists, built entirely with cast iron and steel. Planing and jointing widths are identical, in three large sizes: 16", 20", and 24"! Four rapid-set knives turn at router-speed of 22,000 cuts per minute! Two feed speeds powered by a separate feed motor. Built like a Mercedes Benz.

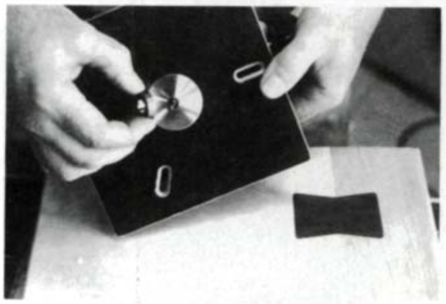
For complete information on our exclusive line of MASTERPIECE MACHINES send $2.00.



Dealer inquiries invited.

Exclusive importers for the United States and Canada of ULMIA Table Saws, HOFMANN Planer/Jointers, HEERMANN Bandsaws, and KILLINGER Duplicating Lathes.

MAHOGANY MASTERPIECES
SUNCOOK, NH 03275 USA
(603) 736-8227

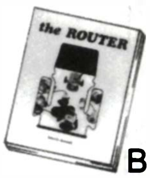


## ROUTER INLAY KIT

Make inlays, marquetry, or patch inserts by using your router with this unique kit.

Kit includes: 1 Universal Phenolic Base Plate
1 Brass Template Guide (7/16")
1 Brass Ring Nut
1 Brass Inlay Bushing (7/16") & Wrench
1 Instruction Sheet

#IK1027-3 fits router with 3 fastening bolts
#IK1027-4 fits router with 4 fastening bolts
State router make with order. Kit Price $33.95 U.S. pp



## THE ROUTER BOOK BY BOB ROSENDAHL

Beginning and experienced woodworkers alike will glean how-to information from this comprehensive book about the router. Difficult inlays, box joints, and pattern cutting made easy. Information about projects, cutters, setups, jigs, safety, maintenance, and much more.

The Router Book price $10.95 U.S. pp

Available from: Dept. X
OAK PARK ENTERPRISES LTD.
Box 13, Station A
Winnipeg, Manitoba
R3K 1Z9

# Professional quality Tools and Materials

Send for new woodworkers CATALOG

116 Pages
Over 2,000 Products


SEE page after page of hard-to-find products to build, restore, refinish anything of wood! Everything you need can be ordered by mail. Choose from 14 finest hardwoods. 109 veneers, 76 inlays. Cab. & furn. hardware. Pro finishes. Chair & table legs. 33 picture moldings. Uphol. supplies. Cane. Carving tools. Specialty tools & shop equipment. 100's plans, how-to books. Constantine is a name to trust. Est. 1812

DISCOUNTS to professional shops.

★ Send $1 now for new 116-page Woodworker Catalog. Get $2 BACK

Double Your Money Back!
$2 Refunded on 1st Catalog Order

CONSTANTINE
2065 Eastchester Rd., Bronx, N.Y. 10461

# CLASSIFIED

**The CLASSIFIED rate is $5.00 per word, minimum ad 15 words. All payments must accompany orders; all are non-commissionable. The WOOD & TOOL EXCHANGE and SITUATIONS WANTED are for private use by individuals only; the rate is $7 per line. Allow 30 letters or spaces per line, including name and address. DISPLAY CLASSIFIED rates on request. Send to: *Fine Woodworking,* Advertising Dept., Box 355, Newtown, CT 06470. Deadline for the November/December issue is August 25th.**

## Busn. Opportunities

ESTABLISHED CUSTOM FURNITURE SHOP for sale. Located in beautiful sunny San Diego. Retail front and shop, high-end style, with designers. $33,000. Write or call Roy, 1015 University Ave., San Diego, CA 92103. (619) 295-4719.

EARN $$! Build the Sharpeze saw sharpening machine from our easy-to-follow plans. Free information, Box 6004, San Bernardino, CA 92412.

EXPERT CABINETMAKER for partnership in 5,000 sq. ft. shop in North Jersey. Serious-minded man about 30. S. Weinberger, 81 Park Pl., Passaic, NJ 07055.

**DEALER INQUIRIES INVITED**

**We are a direct importer stocking all quality hand tools needed for a woodworking tool store or specialty department. Resale only—no enduser sales.**

**Robert Larson Company, Inc.**
**82 Dorman Avenue**
**San Francisco, CA 94124 (415) 821-1021**

## Help Wanted

WANTED: EXPERIENCED WOODCARVER to carve set of Hepplewhite chairbacks. Samuel J. Adams, 40 Francis La., Greenwich, CT 06830. (203) 531-6025.

SMALL SHOP needs meticulous, experienced person (M/F) for eventual forepersonship. Friendly custom/production/specialty environment. Box 70, Manchester, MA 01944. (617) 526-1480.

EXPERIENCED CABINETMAKER, custom furniture. Salary negotiable. Five minutes to ocean, South Jersey. Handmade Furniture Co., Rt. 9 Box 11-A, West Creek, NJ 08092. (609) 597-2708.

SKILLED WOODWORKERS for small, growing contemporary fine furniture, cabinetry, and millwork shop. Jobs are project-oriented, limited production and one-of-a-kind. Cooperative congenial environment stimulates creative problem solving and personal skill development. EOE. Union Woodworks, 7 Belknap St., Northfield, VT 05663. (802) 485-6261.

SELF-MOTIVATED CRAFTSMAN for small custom cabinet shop in Yonkers, NY. (914) 963-9292.

FOREMAN M/F. Contemporary fine furniture/cabinetry manufacturer seeking people-oriented leader with experience and excellent skills all phases of woodworking. Responsible for creative setups on standard woodworking tools, coordination of work flow, scheduling job teams, quality control, personnel supervision, estimates. Wage/benefits negotiable. EOE. Union Woodworks, 7 Belknap St., Northfield, VT 05663.

INVESTOR—WORKING PARTNER—Salaried journeyman. Name your own terms of involvement in growing Architectural Millwork Firm. Reply to: A.R.T., 455 Fountain St., New Haven, CT 06515.

## Situations Wanted

Responsible young man, 23, seeks apprenticeship position with a furniture/cabinetmaker. Interested in learning custom work. Will relocate. Craig Weisrock, RR #4, Box 146, Davenport, IA 52804. (319) 381-3486 eves.

Hello-Sonoma County, Calif. Woodworker, 30, seeks position with craft/fine wood furniture maker. 10 yrs. experience. Resume and portfolio. Contact John Shipstad, 4718 White Oak Ave., Encino, CA 91316. (818) 789-3722.

## Instruction

APPRENTICESHIP in prominent studio/workshop/showroom. Individual supervision designing and building a full range of furniture from solid walnut/rosewoods using intricate wood joints and pegs—the very finest hand work. Tuition. Jeffry Greene Design Studio, New Hope, PA. (215) 862-5530. Call, don't write, Mon.-Fri., 9:30 to 4:00.

APPRENTICE WITH A MASTER CRAFTSMAN. A unique in-shop experience. Woodworking, furniture design, textiles, ceramics, jewelry, glass, printmaking. Flexible, individual, equitable fee structure. Baulines Craftsman's Guild, Schoonmaker Point, Sausalito, CA 94965. (415) 331-8520.

LEARN WOODEN BOAT BUILDING AND DESIGN. Two full-time residential programs that offer intensive training in a creative but disciplined environment. Equal opportunity enrollment. V.A. approved. The Landing School, Box 1490F, Kennebunkport, ME 04046. (207) 985-7976.

BOSTON UNIVERSITY'S PROGRAM IN ARTISANRY "PIA" now transferred to Swain School of Design. Wood, ceramics, fiber, metals. Relocation means lower tuition, individual studio space, BA/MFA from respected art school in historic seaside city. Write: Admissions, Swain School of Design, 388 County St., New Bedford, MA 02740.

DESIGN AND CONSTRUCT your own acoustic guitar in a workshop course. For information write Timeless Instruments, Box 51, Tugaske, Sask., Canada S0H 4B0.

LEARN TO TURN. Two-day concentrated course in all aspects of lathe. Workshop located in converted 18th-century spring house. Individualized instruction. Reading and Lancaster nearby. Send for free brochure. James L. Cox Woodworking School, R.D. 2, Box 126, Honey Brook, PA 19344. (215) 273-3840. We use and sell the Myford English lathe.

**RUSS ZIMMERMAN**
**TURNERS' WORKSHOPS**
**Turn Better With Personal Instruction.**
MYFORD LATHES, SORBY TOOLS, ETC. Send 44¢ in stamps for full details or sent free with $9 subscription to Zimmerman Turning Letter.


RFD 3, BOX 242, PUTNEY, VT 05346

**Woodturning**
VISION & CONCEPT
**NATIONAL CONFERENCE**
**October 9-12, 1985**
Demonstrations - Ellsworth, Hogbin, Osolnik, Stirt, Stubbs
Seminars, Slides/Films, Trade Show, Exhibition
**ARROWMONT**
Box 567, Gatlinburg, TN 37738
(615) 436-5860

## Clock Parts & Kits

QUARTZ CLOCK MOVEMENTS and supplies at lowest prices. Lifetime warranty. Catalog, $1, refundable. Creative Clock, Box 565, Hanson, MA 02341. (617) 293-2855.

## Demos & Shows

WOODWORKERS: Put your work to work in the National Craft Showroom, New York's juried wholesale showroom representing over 300 craftsmen. We sell department and gift stores across the U.S. For information and application send $1 to: National Craft Showroom, 11 East 26th St., New York, NY 10010.

## Publications

**NOW AVAILABLE**
**A TREATISE ON STAIRBUILDING AND HANDRAILING**
**by W. & A. Mowat**
Republication of the 1900 edition. Essential for the architect, joiner, and designer. 424 pages. Profusely illustrated. $19.95 ppd. Paper. At your bookstore or order direct from Linden Publishing, 3845 N. Blackstone, Fresno, CA 93726. Calif. residents add 6% sales tax.

## Tools

SAVE 40%. Assemble your own bandsaw blades. Plans for simple accurate jig and instructions, $5. Marshall Machine Works, Box 792, Marshall, CA 94940.

MAKITA/JET TOOLS. We'll not be undersold. Price quotes, call (800) 331-TOOL (8665). Calif. (800) 336-TOOL (8665). (707) 964-6661. Write AES, Box 1790, Ft. Bragg, CA 95437. Prices include delivery.

LATHES/INDUSTRIAL. Automatic, semiautomatic, variety, faceplate, asymmetric, large pattern lathes. The Miller Company (415) 488-4333.

SILVO Hardware, 188-page Hand & Power Tool Catalog, $1. Dept FW-5-10, 5301 Tacony St., Philadelphia, PA 19137.

FREE WOODWORKERS CATALOG. Your best source for quality woodworking tools. Everything from bit braces to wood borers, from saws to sharpening stones. Full color, 32 pages, $3 discount coupon. Satisfaction Guaranteed. Woodcraft Supply, Dept. FW03, Box 4000, Woburn, MA 01888.

DIRECT IMPORTERS FROM EUROPE. Complete 64-page catalog of Fine European Imported Tools & Hardware. Send $3 to M.F.S. Tools, Box 67, Port Huron, MI 48061-0067.

WOODCARVERS' FREE CATALOG. Over 1,000 professional-style imported and domestic carving tools. Supplies, accessories, books. The Walnut St. Handtool Co., 214 Walnut, Ft. Collins, CO 80524.

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

CARPENTERS MACHINERY CO., INC. is the exclusive stocking dealer for General woodworking machines. Complete quality line of woodworking machines at more reasonable prices. Wood lathes, 11-in. and 12-in.; tablesaws, 8-in., 10-in., and 14-in.; joiners, 8-in.; bandsaws, 15-in.; drill press, 15-in.; mortising machine, etc. Call or write for further info. 212 No. 11th St., Philadelphia, PA 19107. (215) 922-7034. Also at 365 W. Cottage Pl., York, PA 17403. (717) 843-2101.

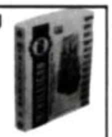
$REWARD$. Wanted—woodworkers looking for tremendous savings on finest quality tools and supplies. Send $1 for catalog and Reward details. Dusty Splinters Enterprises, PO Box 3204, FWW 54, Flushing, NY 11386.

TOOLS—ANTIQUE AND USED—STANLEY. Current illustrated list, $1. Subscription, $4/yr., 5 lists. Bob Kaune, 511 W. 11th, Port Angeles, WA 98362. (206) 452-2292.

ULMIA TABLESAWS, beautifully crafted and engineered. A precision machine! In Vermont send $2 for information. Dale Helms, Ryegate, VT 05042. (802) 584-3169. Also INCA in northern Vermont.

FALL SPECIAL ONLY WHILE THEY LAST! Powermatic 6-in. jointer, model #50 w/enclosed stand ¾HP, 1PH motor and P/B switch. Sale: $899. Powermatic 14-in. woodcutting bandsaw, model #141 w/enclosed stand ¾HP, 1PH motor and P/B switch. Sale: $999. Delta #34-010 9-in. miter box, 10.5 amp, 115 volt motor. Sale: $159. Delta #49-255 28-gal. vacuum, 7.5 amp, 115 volt motor. Sale $129. Dewalt #7716 10-in. miter box, 10.5 amp, 120 volt motor. Sale: $175. All machines shipped freight collect. Carpenters Machinery Co., Inc., 212 N. 11th St., Philadelphia, PA 19107.

**Woodworkers Super Catalog**
Three pounds, 704 pages of tools, materials & machines, 60,000 items, valuable reference, **Name Brands Discounted,** call for our price before buying any machine Ph.607-729-6511



Send $5 or credit card to get your catalog
**McKILLIGAN SUPPLY**
FWC 985, Johnson City, N.Y. 13790

**Over 300 Router Bits**
Over 300 Different Carbide Router Bits and 150 Carbide Tipped Saw Blades, From 7" to 16", designed and manufactured for the professional woodworking trade. Our quality and prices are unbeatable. Send $2.00 for illustrated catalog.
**Nimrod Tools**
P.O. Box 54
Cedarhurst, N.Y. 11516

**SEATTLE**
You'll find a large selection of the best woodworking tools at:
**The Wooden Boat Shop**
1007 NE Boat St., Seattle, WA 98105
(206) 634-3600
9 AM–5:30 PM weekdays
9 AM–5:00 PM Saturday

**Whittling and Carving Tools and Supplies**
New catalog—60¢. American and foreign made quality tools.
**WARREN TOOL CO., INC.**
**Rt. 1, Box 14-AF, Rhinebeck, NY 12572 (914) 876-7817**

**BANDSAW BLADES**
Industrial grade black carbon blades, 4 tooth hook with 10° positive rake. Welded and designed to cut thick stock.
Standard sizes:
80"—$8.50 93½"—$8.75 105"—$9.50
*Prices include welding and delivery.*
We weld custom sizes too!
Ask for your *free* copy of our decoy and wood carver's tools and supplies catalog.
P.C. English Enterprises, Inc.
P.O. Box 7937 Dept. FW2
Fredericksburg, VA 22404 (703)371-1306

**GENERAL**
**MODEL 350 10" TABLE SAW**
*3 H.P. motor mag. control*
**$1395.00** Delivered*
**Sisco Supply Inc.**
4050 Williston Road
So. Burlington, VT 05401
**(802) 863-9036**
**excluding Alaska & Hawaii*

**NEW PRICE GUIDE TO OLD TOOLS**
**5,000 items priced & illus. (1840-1940). Adzes, axes, braces, bitstocks, chisels, coopers tools, compasses, hammers, levels, planes, plumb bobs, routers, rules, saws, spokeshaves, trammels, and wrenches. 9x12 vol., 230 pgs. Rush $12.95 plus 1.05 post.**
**Windmill Publishing Company**
**Dept. FW, 2147 Windmill View Rd.**
**El Cajon, CA 92020**

VIRUTEX 0-81, $295 ppd. Precision Woodworking Machines, PO Box 603, Rte. 7A, Manchester Village, VT 05254. (802) 362-1985. Authorized dealer for INCA, Lignomat, Virutex, Freud, Winchester, Konig, Sand-Rite. See them all in use daily in our furniture shop.

FREE CATALOG, quality woodworking supplies for the craftsman. Odd Ball Supply, Box 133, No. Attleboro, MA 02761.

ABSOLUTELY BEST BUYS. Steton quality woodworking machinery. References. Brochure, $2. Henry Wiegand Corp., Claremont, NH 03743.

**ANDREOU INDUSTRIES**

**10-IN. HEAVY-DUTY TABLESAW**
2½ HP with double pulley system, "solid" cast iron extensions, heavy-duty fence system, etc., $399.95. Biesemeyer 50-in. commercial T-Square system, $275, plus other extra heavy-duty woodworking machinery, i.e. bandsaws, shapers, planers, 10-in., 12-in., 14-in.; tablesaws, jointers, etc., at low prices. All equipment carries a full one-year warranty.

**ANDREOU INDUSTRIES**
22-69 23rd St.
Astoria, NY 11105
(718) 278-9528
24 hrs./7 days. Mastercard/Visa accepted.

## Accessories

WOOD MOLDING KNIVES made for Belsaw-type molders. Wanager Custom Knives, 536 East B Ave., Kingman, KS 67068. (316) 532-5391.

ANTIQUE LATHE-CUT WOOD SCREWS. List $2. The Old Woodworks, Box 8054, Station F, Edmonton, Canada T6J 3Y7.

THE GOLD LEAF PEOPLE™, genuine, imitation sheets, rolls, supplies, and texts. In USA: Three Cross St., Suffern, NY 10901-4601. Canada: 454 Lawrence West, Toronto, Ont. M5M 1C4.

MUSIC BOX MOVEMENTS, Reuge and Sankyo. Quantity discounts, catalog, $1 (refundable). Unicorn Studios, Box 370DF, Seymour, TN 37865.

**PEPPER & COFFEE MILL WORKS**
European quality for America's awakening taste
For illustrated price list write:
**Don Snyder Imports**
P.O. Box 207, Comptche, CA 95427
(707) 937-0300

**The Beall Tool Co**

Introducing the **Beall Wood-threader**, a new and better way to cut threads in ANY kind of wood. This patented device attached to your router allows you to make perfect ½", ¾" and 1" threads.
For more information write:
**541 Swans Road, N.E., Newark, Ohio 43055**
**614-345-5045**

**CONCEALED HINGES FOR WOOD & GLASS DOORS**
STEREO AND KITCHEN CABINET HARDWARE
SLIDES ★ CATCHES ★ SPECIALTY ITEMS
MAIL ORDER ONLY — CATALOG $1.00
*ALLEN SPECIALTY HARDWARE*
P.O. BOX 10833 PITTSBURGH, PA 15236

WEST SYSTEM® Epoxy Products, well-known for their quality and durability, have been developed to meet the requirements of today's high strength structures. Our experienced technical staff is available to assist you with your questions.
GOUGEON
**Gougeon Brothers, Inc.**
**706F Martin Street**
**Bay City, MI 48706**
**517/684-7286**
• Trademark of Gougeon Brothers, Inc., U.S.A.

## Miscellaneous

FILTER BAGS FOR DUST COLLECTION SYSTEMS, $40 ppd.; fabric (80 in.), $10/yard ppd; custom bag quotes. Barter Enterprises, Box 102B, Prospect Harbor, ME 04669.

CHAIR CANING SUPPLIES—Cane webbing, rush, splint, ash, rawhide, cord. Catalog $1 (refundable). The Caning Shop (FWM), 926 Gilman, Berkeley, CA 94710.

ANTIQUE SQUARE HEAD WOODEN SCREWS, different dimensions, wrought, hot galvanized, blue zincked, steely blue. Raymond VanSchoonbeek, Handelskaai 15, B-3500 Hasselt, Belgium.

BRANDING IRONS. Fast delivery. Free literature. Call/write (800) 237-8400 ext. 720. BrandMark, Dept. F, 462 Carthage, Beavercreek, OH 45385. (513) 426-6843.


## Musical Supplies

LUTHIERS' SUPPLIES: Imported tonewood, tools, varnishes, books, plans, parts, accessories, strings, cases, for violins, violas, cellos, basses and guitars. Assemble-yourself violin and guitar kits. Catalog, $.50, includes 10% discount certificate. International Violin Company, Ltd., Dept. WB, 4026 W. Belvedere Ave., Baltimore, MD 21215.

VIOLIN, GUITAR, banjo, mandolin-making materials, accessories, books. Catalog, $1. International Luthiers Supply, Box 580397, Tulsa, OK 74158.

TRAVEL CELLO fits under airplane seat. Plans, $25. Information: Travielo, Box 34464, Bethesda, MD 20817. (See *FWW* May/June, p. 104.)

## Plans & Kits

WATERBEDS AND BEDROOM FURNITURE CATALOG of plans. $2.75. Over 50 beautiful selections! Kraemer Furniture Designs, PO Box 33, 1350 Main St., Plain, WI 53577.

CATALOG. Full-size Furniture Plans—$2, refunded with first order. Traditional, early American, over 180! Furniture Designs, 1425 Sherman, Dept. CK-95, Evanston, IL 60201.

## Finishes

**Swedish Wood Dyes**, *Beautiful, brilliant colors. Inexpensive, non-toxic. $5 for 3 samples. Professionally used. T.H.&.A., P.O. Box 6004, Dept. FW, Rockford, IL 61125*

## Toy Plans/Kits

MAKE WOODEN TOYS—PROJECTS—100's of plans, kits, hardwood parts (toy, craft, furniture), tools, wood, supplies. Color catalog, $1. (614) 484-4363. Cherry Tree Toys, Belmont, OH 43718-0369.

**Make Peanut Butter Toys**
Plans, Hardwood Parts, Catalog $1.
Peanut Butter Toys,
Granite Road, Ossipee NH 03864

WOODEN TOY PLANS. Original and unique. Catalog, $1, refundable. Phillips, Drawer 518B, Mt. Pleasant, NC 28124.

CATALOG ONLY $1
**MAKE TOYS**
PLANS & PARTS

JULIA WOODEN TOYS DEPT. 1901
1283 AVERY CT. ST LOUIS MO. 63122
FULL SIZE QUALITY PLANS

**TURNINGS**
TOYMAKERS SUPPLIES
WALNUT AND OAK DOWELS
Furniture Plugs, Pins, Buttons
Cabinet Spindles and Knobs
Shaker Pegs and Candle Cups
**WOODWORKS**
P.O. Box 14507-F9 Ft. Worth, TX 76117
817-281-4447
Catalog $1 First Class FREE 3rd Class


## Wood

CHESTNUT SPECIALISTS. Custom milled. Woods of Heavenly Valley, Plymouth, CT 06782. (203) 283-4209 after 8 p.m.

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. (818) 441-1067.

EXOTIC AND DOMESTIC WOODS, huge supplies. Veneers, basswood to 4 in. thick. Marine plywood, hardwood plywood ⅛ to ¾ in. Northwest Lumber Co., 5035 Lafayette Rd., Indianapolis, IN 46254. (317) 293-1100.

COUNTRY WOODCRAFT, local lumber. Oak, maple, cherry and more. Jack Bowman, 3439 Rt. 167E, Jefferson, OH 44047. (216) 858-2972.

WOODWORKER'S SUPPLIES CATALOG! Hundreds veneers, toymaking, turning squares, carving blocks, hardwoods, patterns, books, cane, dowels, pegs, spindles, more! Bargain offers included. Send $1. Morgan, FO4M08-D, 1123 Bardstown, Louisville, KY 40204.

COCOBOLO, BOCOTE, LIGNUM VITAE, western yew, western maple. A & C Hutt Enterprises, Ltd., 15861 32nd Ave., Surrey, B.C. V4B 4Z5 Canada.

ATTENTION:
**FLORIDA WOODWORKERS**
We have Florida's largest selection of exotic and native hard and soft woods, table slabs, veneers, etc. for the professional and novice. Send SSAE for list.

**HENEGAN'S WOOD SHED**
7760 Southern Blvd(FW), West Palm Beach, FL 33411
Call (305) 793-1557

WIDE WALNUT LUMBER $3/bd. ft. up. Quantity discounts apply. Call Gerry Grant, Gettysburg, PA. (717) 528-4496.

THE HARDWOOD CONNECTION, 420 Oak St., DeKalb, IL 60115. (815) 758-6009. A complete woodworking store, staffed by woodworkers. Native and imported hardwoods, plywood, power tools, hand tools, books and supplies.

BORDERS—INLAYS—OVERLAYS. SASE for information. Loeffler-Valac Industries, 2557-F Forbestown Rd., Oroville, CA 95966.

HARDWOODS FROM HONDURAS: Rosewood, mahogany, cedar, rosita (additional species available). 4/4 and 8/4 surfaced and rough sawn. Large widths and lengths available. Exquisite hand-carved interior and exterior doors. Hardwood flooring and molding available. Rancho Bonita Hardwoods, 6200 San Miguel Rd., Bonita, CA 92002. (619) 267-7975.

CLARO WALNUT BURL VENEER, $2 sq. ft. Claro walnut fiddleback veneer with occasional burl figure, $1.25 sq. ft. These veneers are available in 16 and 20 consecutive sheet books. Book sizes vary from one sq. ft. per sheet to eight sq. ft. sheets. Domestic Burls, 15061 Meadow Dr., Grass Valley, CA. (916) 272-7581.

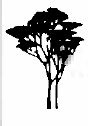
DOMESTIC AND EXOTIC HARDWOODS, 70 species in stock. Macassar ebony, $15/bd. ft. Rosewoods—Brazilian, Honduran, Amazon, Bolivian, East Indian. Cocobolo, bocote, ziricote, kingwood, tulipwood. Bubinga, padauk, wenge, zebra, purple, ash, oaks, walnut, cherry, quartersawn oaks, holly. Also snakewood, Italian olive, black ebony, pernambuco, verawood sold by the pound. Many others. Price list: International Hardwoods, 14514 Main St., Upper Marlboro, MD 20772. (301) 627-4040.

WOOD STOCK. 2"x2"x10". Perfectly aged, 50 years. Dried cherry, oak, maple. Excellent for turning. 6-Pack, $5.95 shipped UPS collect. Parrish Sales, 2 Corporate Pl., West Des Moines, IA 50265. (515) 225-8818.

The finest in BOWLS, CARVING WOOD, SPINDLE TURNINGS. Brochure, 44¢ stamps. Johnson Wood Prod., Strawberry Point, IA 52076. (319) 933-4930.

**EBONY, ROSEWOOD, AFRICAN BLACKWOOD & CURLY MAPLE**
FOR MUSICAL INSTRUMENTS, POOL CUES, KNIFE HANDLES AND INLAYING.

For Price List
**EXOTIC WOODS CO.**
Box 32, Dept. F, Haddon Hts., NJ 08035
Phone: (609) 546-2903



**GILMER WOOD CO.**
503 • 292-4182
**Rare & Exotic Woods**
• in logs, planks & squares
• over 50 species in stock
• also cutlery, turning & musical instrument woods
10426 NW Laidlaw Rd., Portland, OR 97229

**Quarter Sawn White Oak**
Precision Band Sawn. Extra Wide Stock.
EXOTIC AND DOMESTIC LUMBER
Personalized Service — (215) 775-0400
RD#3, Box 303, Mohnton, PA 19540
**TALARICO HARDWOODS**

**CONSTANTINE'S**
**Wood Center of Florida**
**Exotic woods in veneers, lumber. Hard-to-find woodworking tools, hdwe. specialties, wood finishes. Catalog at store. Come on in.**
**1040 E. Oakland Pk. Blvd. 305-**
**Ft. Lauderdale, FL. 33334 561-1716**

## Wood Parts

CUSTOM RAISED PANEL DOORS and face frame stock in red oak, white oak, ash, maple, cherry and walnut. Catalog, $1. Paul Lumber Company, Rt. 2 Box 353, Seymour, MO 65746. (417) 683-5290.







## WOOD & TOOL EXCHANGE

Limited to use by individuals only

### For Sale

FAS, AD 6 yrs, (most clear stock) 500/bd. ft. 4/4 each; oak, $1.50; cherry, $1.75; walnut, $2.90; all or part. Jim Shrewsbury, 505 S. Jefferson St., Princeton, KY 42445. (502) 365-6119.

Zinken ZC-21 Combo machine. 8-in. jointer, planer, tablesaw, hor. borer, shaper. All tooling. Pd. $3,100 Nov. '84. $2,050 FOB Mass. (617) 386-7137 eves.

Rockwell #23-294 chisel and iron grinding attachment, $35, plus $2.75 shipping. #46-221 12-in. gap-bed lathe complete, 1 hr. use, $1,200. SASE misc. machine tools. J. Bergamo, RD 2, Bethel, VT 05032. (802) 234-9673.

Hitachi FA 700 Super Surfacer. Good condition. $1,200. Cost new, $2,500. Surfacer was reviewed in *FWW* #38. Hitachi knife grinder also available. (404) 351-0095.

INCA 10-in. tablesaw, 1½HP motor with all accessories, $1,000. INCA dust collector, $350. Worcester, MA. (617) 756-9720 evenings.

Illness forces sale of home shop power tools as 10-in. Delta Unisaw, Dewalt radial saw, Rockwell PowerMiter w/stand and wing extensions. Much more. Allyn Joyce, 24 Wakefield St., Rochester, NH 03867. (603) 332-2855.

Super Shop model 105L capable of industrial-grade performance. Never used, cost $2,350; will sell for $1,800 plus shipping. W.H. Yost, R.R. 5, Pocahontas, AR 72455.

15-in. planer and 11 other woodworking machines. Much kiln-dried lumber —oak, walnut, cherry, maple, etc. Much misc. Send SASE for list to E. J. Whitty, 9316 So. 69th Ct., Oak Lawn, IL 60453. (312) 598-3305.

One set *Fine Woodworking* back issues, #1 thru #50, $110. 1008 Long Ct., Sparta, WI 54656. (608) 269-6604.

Northfield 20-in. bandsaw. Belt drive, 1HP, 1PH motor. Excellent condition, $2,000. (804) 266-4069.

Torit cyclone dust collector, 10HP; Hammond var.-speed double-spindle buffer/sander, 3HP; Faye & Egan 30-in. bandsaw, 2HP, 1PH; $2,000 ea. John Donkus, 1299 Asper Dr., Boiling Springs, PA 17007. (717) 258-3102.

Bandsaw mill. 2-in.-wide band cuts 30 in. by 20 ft. 17HP, full hydraulics. Portable. $5,500. (313) 482-2354.

Texas mesquite and native hardwoods for turners and carvers. No minimum. SASE. RWL, 4302 Timberhill, San Antonio, TX 78238.

Large duplicating carving machine, approximately 7 ft. by 4 ft. table; with router, for one to one reproduction carving. (203) 264-6449.

Red oak, rift, quarter, face. White ash, AD KD. Tim Whiffen, Box 202, Chatham, NY 12037. (518) 392-5271.

### Wanted To Buy

Shopsmith Mark V and accessories. Steve Shockley, Box 9, Pleasant Hill, MO 64080. (816) 987-3576.

*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. 1. Our Jan./Feb. issue will list events between Dec. 15 and Mar. 15; deadline Nov. 1.*

***CALIFORNIA:*** **Workshops/classes**—Numerous subjects. Hands on Wood, Building F, Fort Mason Center, San Francisco. (415) 567-2205.
**Show**—First Annual Wooden Boat, Sept. 21. On Main St., Mendocino. Contact Chamber of Commerce, PO Box 1141, Ft. Bragg, 95437.
**Competition**—Tri-Valley Woodcarving Circus, Sept. 8. Carnegie Park, 4th St. (between J and K Sts.), Livermore. Contact Liz Finigan, (415) 447-3186.
**Workshops/classes**—Beginner and experienced woodworkers. Rosewood Tool Supply, 1836 Fourth St., Berkeley, Calif., 94710. (415) 540-6247.
**Show**—Woodworking/homebuilding, Oct. 4–6. Santa Clara Fairgrounds, 344 Tully Rd., San Jose. Contact Patricia Dillon, (213) 477-8521.
**Workshop**—Design/operation, circular and band saws, Sept. 9–13. Univ. of Calif. F. P. L., 47th and Hoffman Blvd., Richmond, 94804. J. Harrison, (415) 231-9452.

***CONNECTICUT:*** **Exhibition**—17th American Crafts, Nov. 11–Dec. 23. Creative Arts Workshop, 80 Audubon St., New Haven, 06511. (203) 562-4927.

***DELAWARE:*** **Demonstration**—Craft techniques for furniture conservator, Sept. 19–21. Contact Gregory Landrey, Rt. 52, Winterthur Museum, Winterthur, 19735.

***GEORGIA:*** **Exhibit**—Woodworking machinery, furniture, Sept. 6–9. Hall "A" of Georgia World Congress Center, Atlanta. Contact Cherif Moujabber, (203) 964-0000.

***IDAHO:*** **Exhibition**—Contemporary furniture, through Sept. 15. Boise Gallery of Art, 670 South Julia Davis Dr., Boise, 83702. Contact David Willard, (208) 345-8330.

***ILLINOIS:*** **Show**—15th Annual Midwestern Wood Carvers, Nov. 2–3. Exposition Hall, 200 South Belt East, Belleville. Don Lougeay, (618) 233-5970.
**Classes**—Swiss method of chip carving, through Oct. 7. Alpine School of Woodcarving, 225 Vine Ave., Park Ridge, 60068. Contact Wayne Barton, (312) 692-2822.

***INDIANA:*** **Juried show**—Lafayesta 1985, arts and crafts, Aug. 31–Sept. 1. Greater Lafayette Museum of Art, 101 South Ninth St., Lafayette, 47901.

***IOWA:*** **Show**—10th Annual Craft, Aug. 30-Sept. 2. Avoca Fairgrounds, Exit 40 off I-80. (712) 366-1136.

***MAINE:*** **Juried exhibition**—Maine Woodwork '85, Oct. 18–Dec. 21. Thomas Moser Cabinetmakers showroom, 415 Cumberland Ave., Portland. Contact Jon Clowes, Clowes Woodworking, RFD*3, Waldoboro, 04572. (207) 832-5191.
**Shows**—Maple Hill Gallery, 367 Fore St., Portland, 04101. Contact Lou Kimball, (207) 775-3822.

***MASSACHUSETTS:*** **Workshops/fair**—Extensive schedule. Calendar from Old Sturbridge Village, Sturbridge, 01566. 6th Annual, traditional crafts, Nov. 2–3. Contact Frank G. White, (617) 347-3362, Ext. 236.
**Workshops/seminars**—Numerous events. Contact The Woodworkers' Store, 2154 Massachusetts Ave., Cambridge. (617) 497-1136.
**Exhibition**—Wooden puzzles, Stewart T. Coffin, Oct. 1–31. Worcester Library, Salem Square, Worcester. Contact Penny Johnson, (617) 799-1660 or Joseph Lemire, (617) 757-2124 for schedule.
**Show/demonstrations**—Small Expressions: Two Centuries of Little Furniture, through Jan. 1986; students of North Bennett Street School, through Aug. 31. Essex Institute, 132 Essex St., Salem. Contact Sally Miller NBSS, (617) 227-0155.
**Exhibition**—Saluting The Program In Artisanry, through Sept. 1. Society of Arts and Crafts, 175 Newbury St., Boston. (617) 266-1810.
**Exhibition**—Scent Bottle Invitational, through Aug. 31. Signature galleries in Boston and Hyannis. Contact Signature, Dock Square, North Street, Boston, 02109. (617) 227-4885.

***MICHIGAN:*** **Juried show**—Michigan Woodworkers Guild 5th Annual, Oct. 24–27. Somerset Mall, Troy. Contact Gregg Cornell, (517) 546-3688.
**Show**—Woodworking/homebuilding, Sept. 13–15. Southfield Civic Center, 2600 Evergreen Rd., Southfield. Contact Patricia Dillon, (213) 477-8521.

***MINNESOTA:*** **Workshops/seminars**—Numerous events. The Woodworkers' Store, 3025 Lyndale Ave. S., Minneapolis. (612) 822-3338.
**Class**—8th Annual Kiln Drying Short Course, Sept. 16–20. University of Minnesota, St. Paul Campus. Contact Harlan Petersen, 202 Kaufert Laboratory, University of Minnesota, 2004 Folwell Ave., St. Paul, 55108. (612) 373-2393.

***MISSOURI:*** **Show**—3rd Annual Excellence in Woodworking, Nov. 2. Sponsored by Midwest Woodworkers Association. Ramada Inn, 170 and 63N, Columbia. Contact Gerald Jones, 311 Cumberland Rd., Columbia, 65203.

***MONTANA:*** **Juried exhibition**—Northwest Woods, functional and nonfunctional construction, sculpture and carving, through Sept. 20. Hockaday Center, 2nd Ave. East at 3rd St., Kalispell, 59901. (406) 755-5268.

***NEVADA:*** **Juried show**—KNPR Craftworks, Oct. 26–27. Reed Whipple Center, 821 N. Las Vegas Blvd.

***NEW HAMPSHIRE:*** **Juried Exhibition**—Rocking chairs, functional and decorative, Nov. 3–Dec. 1. Deadline Oct. 10. North River Designs, PO Box 274, Northwood, 03261. (603) 942-8184.

***NEW JERSEY:*** **Exhibition**—Furniture Designers, 85, Sept. 18–Dec. 15. Richard Kagan, Peter Korn, Jack Larimour, Josh Markel, George Nakashima, Robert Whitley and others. Noyes Museum, Lily Lake Road, Oceanville, N.J. 08231. (609) 652-8848.
**Seminar**—Technology of wood, Bruce Hoadley, Oct. 26. Brookdale Community College, Newman Springs Road, Lincroft. For information, contact Dr. Gabriel L. Longo, (201) 842-1900.

***NEW MEXICO:*** **Workshop**—Japanese joinery, John Burt, Oct. 5–6. Sunrise Springs retreat center, La Cienaga Valley (15 miles south of Santa Fe). Sponsored by Albuquerque Woodworkers Assn., PO Box 40407, Albuquerque, 87196.
**Exhibition**—Taos Style Primitives, James Rannefeld, through Oct. 6. Palisander Gallery, One Bent St., Taos.

***NEW YORK:*** **Juried exhibition**—2nd Annual Autumn Crafts Festival, Aug. 31, Sept. 1–2, Sept. 6–8. Lincoln Center, New York City.
**Juried exhibition**—Crafts: National, Oct. 6–Nov. 15. Upton Hall Gallery, State University College at Buffalo. Contact Chairperson, Design Department, S.U.C.B., 1300 Elmwood Ave., Buffalo, 14222. (716) 878-6032.

**Demonstration**—Working with exotic woods, Joshua Hoffman, Sept. 9. Joshua's Trees, 113 North Seventh, Brooklyn, 11211. (718) 387-9016

**Classes**—Woodworking, all levels, Maurice Fraser, beginning Sept. 18. Cutting dovetails, Sept. 12 and 17. Craft Students' League at Y.M.C.A., 610 Lexington Ave. (53rd St.), New York. (212) 755-4500.

**Workshops**—Robert Meadow, handtool techniques, Oct. 5–6; Making shoji screens, Oct. 19–20. The Luthierie, 2449 West Saugerties Rd., Saugerties, 12477. (914) 246-5207.

***NORTH CAROLINA:*** **Classes**—Woodworking, Roy Underhill, Oct. 11–13; woodcarving, Helen Gibson, woodworking, Dana Hatheway, Oct. 13–19 John C. Campbell Folk School, Route 1, Brasstown, 28902. (704) 837-2775.

**Class**—Timber framing course, Oct. 20–26. Location Greensboro. Contact Riverbend Timber Framing, Inc., PO Box 26, Blissfield, Mich., 49228. (517) 486-4566.

***OHIO:*** **Juried show**—American Contemporary Works in Wood, Sept. 21–Oct. 20. Contact American Contemporary Works in Wood, PO Box 747, Athens. Dick Mulligan or Linda Comeaux, (614) 592-4981.

**Exhibition**—National Furniture Invitational, Oct. 4–Nov. 10. Sylvia Ullman American Crafts, 13010 Larchmere-Woodland, Cleveland, 44120. (216) 231-2008.

**Demonstration/lectures**—Including marquetry, adhesives, wooden clocks, violin construction, bowmaking, hand tool sharpening, woodturning, Sept. 14–Oct. 19. Renaissance Wood Tool Co., 1313 Old River Rd., Cleveland. (216) 621-9663

**Class**—Timber framing course, Sept. 15–21. Location Medina. Contact Riverbend Timber Framing, Inc., PO Box 26, Blissfield, Mich., 49228. (517) 486-4566

**Juried exhibition/workshops**—American Contemporary Works in Wood '85, Sept. 21–Oct. 20. Sponsored by Dairy Barn Southeastern Ohio Cultural Arts Center. Contact Ann Donohoe, exhibition coordinator, (614) 592-4981. Woodturning, hollow vessel forms, David Ellsworth, Sept. 28–29; woodcarving, Robert Butler, Oct. 5–6; furniture design and construction, Tage Frid, Oct. 11–12. Contact American Contemporary Works in Wood, PO Box 747, Athens, 45701. (614) 592-4981.

***OREGON:*** **Class**—Timber framing course, Aug. 18–24. Location Bend. Contact Riverbend Timber Framing, Inc., PO Box 26, Blissfield, Mich., 49228. (517) 486-4566.

***PENNSYLVANIA:*** **Juried exhibition**—Luckenbach Mill Gallery, 459 Old York Rd., Bethlehem, Sept. 14–Oct. 27. Contact Janet Goloub, Historic Bethlehem, Inc., 501 Main St., Bethlehem, 18018. (215) 691-5300.

**Exhibition**—The Woodworker, Sept. 20–22. Philadelphia Armory (Drexel Campus). For information contact Craft Market America, Box 30, Sugarloaf, N.Y., 10981. (914) 469-2158.

**Festival**—Hay Creek Valley, crafts, antiques, Sept. 6–8. Historic Joanna Furnace Plantation, southern Berks County (9 miles south of Reading, 3 miles north of Penn. Tnpk. Morgantown interchange #22 on Rte. 10). Contact Hay Creek Valley Fall Festival, Box 36, Geigertown, Penn., 19523. (215) 286-0388.

**Show**—Super Craft Weekend, Sept. 20–22. Valley Forge Convention Center, King of Prussia. Contact Creative Faires, Ltd., PO Box 1688, Westhampton Beach, N.Y. 11978. (516) 325-1331.

**Juried show**—Pennsylvania Festival of Fine Arts & Crafts, Sept. 13–15. Bucks County Fairgrounds. Contact United Craft Enterprises, Ltd., Box 326, Masonville, N.Y., 13804. (607) 265-3230.

**Show**—16th Annual Fair in the Park, Sept. 6–8. Sponsored by Craftman's Guild of Pittsburgh. Mellon Park, Pittsburgh. Contact Craftmen's Guild of Pittsburgh, PO Box 10128, Pittsburgh, 15232.

**Seminar/class**—Carlyle Lynch, finding and measuring period antiques, Sept. 14; Woodturning, Hugh Davis, Sept. 28. Classes on joinery techniques in October. Olde Mill Cabinet Shoppe, RD 3, Box 547A, York, 17402. (717) 755-8884.

**Exhibition**—Crafts Fair Day, Sept. 1. Brandywine River Museum, U.S. Route 1, PO Box 141, Chadds Ford, 19317. (215) 388-7601.

***TENNESSEE:*** **Juried show**—Third Mississippi River Folkfest Crafts Fair, Aug. 31–Sept. 2. Contact Kate Pouncey, Mud Island, 125 N. Mid-America Mall, Memphis, 38103. (901) 528-3685.

***TEXAS:*** **Classes**—Cabinet construction and advanced cabinet making, Aug. 26. Registration deadline Aug. 21. San Jacinto College North, 5800 Uvalde, Houston, 77049. Contact Dr. George J. Hobart, (713) 458-4050.

***VERMONT:*** **Exhibition**—Rare tools and machines, ongoing exhibit. The American Precision Museum, Windsor. (802) 674-5781.

**Exhibition**—12th Annual Woodcarvers, Aug. 17. American Legion Hall, Main St., Morrisville. Contact C.A. Brown, Box 268, Waterville, 05492. (802) 644-5039.

**Show**—"Along Different Lines", traditional and contemporary furniture, Sept. 14. Vermont State Craft Center at Frog Hollow, Middlebury. (802) 388-3177.

***VIRGINIA:*** **Show**—11th Annual Woodcarving, "Artistry in Wood," Nov. 30–Dec. 1. Marymount College, Glebe Rd. & Old Dominion Dr., Arlington. Contact Charles Schafer, 7014 Murray Lane, Annandale, 22003. (703) 256-2779.

**Fair**—10th Annual Richmond Craft, Nov. 8-10. Richmond Arena, Richmond. Contact Ann Vazquez, Hand Workshop, 1001 East Clay St., Richmond, 23219. (804) 649-0674.

**Juried show**—1985 Handcrafts, Oct. 25–27. Radisson Hotel, 601 Main St., Lynchburg. (804) 846-8451.

**Show**—2nd Annual International Creative Marquetry, Oct. 1–27. Virginia Wesleyan College, Norfolk. Contact ICMS, 1501 Mill Dam Rd., Virginia Beach, 23454. (804) 481-4567.

**Seminars**—Hands-on instructions carving decorative decoy, Sept. 13–15, Oct. 25–27, Nov. 15–17; cork working decoy, Sept. 6–8. P. C. English Enterprises, Inc., 906 Lafayette Blvd., PO Box 7937, Fredericksburg, 22404. (703) 371-1306.

***WASHINGTON:*** **Workshop**—Japanese joinery, second in series, Yoshikuni Shimoi, Oct. 20. For location contact Charlie Mastro, 4268 10th Ave. South, Seattle, 98108. (206) 767-9185.

**Demonstration/lectures/workshop**—Sharpening workshop, Sept. 10; Inca/Hegner demonstration, Sept. 12–Oct. 12; dovetail cutting contest, Sept. 21; antique hand tools, Bob Kaune, Sept. 28; planning boat building project, Oct. 5. The Wooden Boat Shop, 1007 NE Boat St., Seattle, 98105. (206) 634-3600.

***ONTARIO:*** **Show**—Christmas Craft, one of a kind, Nov. 1985. Automotive Building, Exhibition Place, Toronto. Contact The Canadian Craft Show, 2 St. Clair Ave. East, Suite 202, Toronto, M4T 2T5. (416) 960-3680.

**Seminar**—Woodturning with Michael O'Donnell, Sept. 14. Chalet Woodcraft, RR 4, Waterford, Ontario N0E 1Y0. Contact Jeff Parsons at Chalet, (516)-443-7121.

**Exhibit**—Branching Out, furniture by students and faculty of Sheridan School of Craft and Design, Nov. 7–Dec. 1. Public Library and Art Gallery, 65 Queen St. E., Brampton. Contact Shirley Morriss, 453-2444.

*Matt Holtby's desk and chair of cherry, ebony and bronze, above, is a modest contemporary design that's elegant and fairly light. Joseph Hafenour's walnut side table with maple inlay, left, was constructed entirely with hand tools. Patrick Howe used traditional techniques to build his mahogany and ebony bombé chest, but gave the piece a modern look by mounting it on a light frame and joining the carcase with exposed dovetails.*

## Big show from Big Sky country

Montana is even more beautiful than the travel brochures claim, but nobody ever said it was the easiest place to make a living as a craftsman. Money is tight and the state's population is relatively small and spread over a wide area. Of course, it can be tough to find customers anywhere, but here it's even hard to find a good piece of native hardwood—the trees don't like the altitude.

Yet, tucked away in the rolling foothills west of the Continental Divide, in a renovated factory in downtown Missoula is a small school devoted to furniture design and construction—handcut joints, meticulously applied finishes, custom-made hardware—the kind of place you'd expect to find in Boston or New York.

The 16 students I visited at the Primrose Center, which was founded in 1979 by Steve Voorheis, come to the school from all over the country, although a slight majority is from west of the Mississippi (the state contributing the most stu-



Photos this page: Joseph Felzman

dents is Alaska). The students I talked to at the opening of the school's end-of-year exhibit don't seem to think they're missing anything by shunning the schools on either coast. They genuinely like the area and feel that Voorheis and the school's two other instructors are training them well. As one student put it, "They let you go off in the direction you want to take. They encourage you and give you solid advice and help."

This approach seems to be working, and if the student show is any indication, the students are going in all sorts of directions—traditional to Art-Deco, and everything in between—and doing it consistently well. For example, Theodore Troutman displayed a small English brown oak showcase reminiscent of the work of Frank Lloyd Wright and Greene and Greene, Michael Dolney updated the massive radio cabinets of the 1930s into a modern stereo cabinet, and instructor West Lowe combined automotive lacquers and Chinese legends of the Dragon and Pearl to come up with a small lacquered stool with a claw grasping an iridescent-silver-lacquered pearl.

The students are obviously proud of their own work and that of their classmates. When it looked as though one student wouldn't complete his tamboured desk in time for the student exhibition, several other students pitched in to help him finish it.

While admitting that working in Montana is sometimes like being in a vacuum, Voorheis said the isolation isn't necessarily bad because it allows each person to pursue his or her own feelings, without trying to keep up with the latest fad, and that's not a bad thing for a would-be-designer to learn.

If you're going to make it in Montana, you also have to learn right off how to promote yourself. "It's a tough market. There's not a lot of money and there is sort of a western mentality about furniture. If you're into design and not interested in reproducing period stuff, you could be in real trouble. People come here because it's beautiful, but they go back to Los Angeles, or New York, or wherever they're from to buy furniture. They don't know there are craftsmen right here."

Aside from providing his students with strong technical skills while they absorb a sense of quality and design, Voorheis says his main motivation as a designer and woodworker during the past 17 years has been to create furniture that lets people react, "the kind of reaction you get when you see something that you think is really neat, that you like to look at." Judging from the 70 or so people attending the show opening, he and his students are pretty close to the mark. *—Dick Burrows*

## Capitol woodworking

The Oregon State Capitol building in Salem recently featured an encyclopedic array of furniture, sculpture, carving, turning, marquetry and architectural models of historic buildings in the state. Sponsored by the Oregon Guild of Woodworkers, the show last spring was a tribute to the technical expertise of members of a trade considered little more than an alternative lifestyle a decade ago.

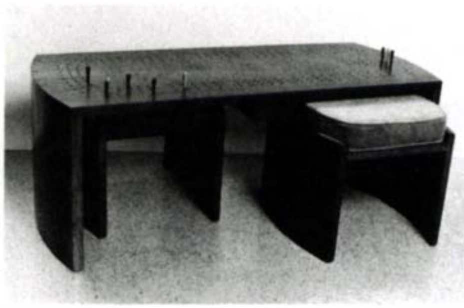
Rather than seeing similarities in technique or style among the exhibits, I sensed the common denominator of the show to be the spirit of the Arts and Crafts Movement, which encouraged the handcrafting of functional, common household items.

Among my favorite pieces was Steve Foley's 20th-century Windsor chair. Nine continuous slats fastened to a base of four turned, split and bent legs, create the back and seat of the chair. The slats form a concave curve at shoulder level, a convex curve at the small of the back and a bowl-shaped curve at the seat. The slight flexing motion you feel as you lean back enhances the comfort of the piece.

Comfort was also an important aspect of woodworker Nancy Horne's "Macintosh Computer Desk," which provides a custom-fit environment for both Apple microcomputer and the backache-prone operator sometimes forced to hit a keyboard placed atop conventional desks. Horne designed a recess in the center drawer to position the keyboard correctly, and eliminated the drawerfront, replacing it with a slightly inclined wedge to support the forearm and wrist. I also liked the coffee-table-size cribbage board by Michael Jesse. Two upholstered stools slide under the table, flanking a small drawer that holds cherry, mahogany and maple pegs.

*—Ellen Francis, Veneta, Ore.*

Photos: David Stein



***The curved Oregon white oak slats on Steve Foley's Windsor flex slightly to support the sitter's back. The chair was priced at $700. Michael Jesse fused a coffee table and a game board to come up with a cribbage player's delight.***

## Ice-cold Buddhas

In the mid-forties, near the end of the war, no elegant woman would walk on the streets of New York unless her head was adorned by a hat created by "Monsieur Pierre." Despite the impressive moniker, our protagonist was born in 1913 in Brooklyn, and Brooklynese "of Toid Ave." was his mother-tongue. But in the mid-1920s he went to Paris with his father, a chauffeur with the U.S. diplomatic corps, and embraced both the melodious French language and some of the continent's more flamboyant mannerisms.

When the handsome young man returned to the United States as a hat designer, he had no trouble charming the ladies. Impeccably dressed from head-to-toe in silver-gray (to match his eyes and his hair), he usually was escorted by two silvery Afghans. He spoke in frenchified American, forever in superlatives. A new creation, crowning the innocent would-be buyer's head was either repulsive or nauseating, or it was resplendent and heavenly. Punctuating every sentence were elegant gestures as he used his thumb, his index finger and his pinky to point at everything. When angry, he threw an arched eyebrow at the offender.

At home in his Park Avenue duplex, Monsieur Pierre took off his mask and became a simple successful businessman, investing most of his great wealth in Oriental Art, mainly exquisite statuettes. Many of these, made of metals, ceramics or wood, lacked the proper base or stand to be ex-

hibited in his numerous showcases.

Somehow he discovered me, and the fact that I could understand his French, and we developed a friendly business relation. We generally had no trouble deciding on the shape and finish of the pedestals to be made and rarely was he displeased with my handiwork. He rewarded me with pleasing words, and some sherry. He showed me his museum-like collections, exhibited in seven or eight rooms.

In June 1945, Pierre purchased five Buddha heads, carved of wood, and painted. We agreed on pedestals for the heads, which averaged 20 in. in height, and I was ready to take the heads to my shop when I remembered an unpaid bill. "Monsieur Pierre, my last bill is overdue. Can I get a check?" Pierre replied, "We will send you one today," and I left with the Buddha heads. In the shop, I put the heads on a clean shelf—if he was in no hurry to pay, why should I rush to work? Then, three or four days later I noticed some fine sawdust underneath these Chinese antiques.

A week later Pierre's chauffeur-driven Cadillac stopped in front of my shop and the great hat-maker entered inquiring: "Where are my Buddhas?" With a teasing smile I signaled "follow me", and we entered my living quarters adjacent to my shop. With a theatrical gesture I opened my refrigerator, exposing four Buddhas, stored in there, freezing. (There was no room for the fifth.)

Pierre's reaction, as always, was utterly exaggerated. He yelled, "Are you trying to make a fool of me? What does this mean?" Without waiting for an answer he grabbed one of the heads and ran out. Minutes after, the chauffeur came in: "My master told me to pick up three freezing Buddhas." I pointed to the refrigerator, he plucked up the heads and walked out. This was the last time I ever saw Monsieur Pierre. I sent him many letters seeking the overdue payment of $485, but to no avail. He never called me and I did not press the issue, since I still had the fifth Buddha head, (in the refrigerator for a whole week).

Monsieur Pierre: We both know this is not your real name, and we also know that you did not pay my bill dated January 19, 1945, amounting to $485. Pay me this amount, plus the accumulated interest and you may have the fifth Buddha head that graces, presently, my daughter's apartment.

P.S. Had you asked why I froze these heads, I would have explained that all five were infested with worms, and that cold kills these worms dead. In memory of our friendly relation, while it lasted, I am not charging you for the disinfecting.

*—George Frank*

## Turning symposium at Arrowmont

Ten years ago, brothers Albert and Alan LeCoff from Philadelphia thought it might be fun to gather 50 woodturners together in one place and call it a turning symposium. The event proved so popular with turners from all over the country that the LeCoffs organized ten more until, in 1981, they finally ran out of steam.

Arrowmont School of Arts and Crafts in Gatlinburg, Tenn., has stepped in to fill the gap. October 9 through October 12, Arrowmont will be the site of a major woodturning symposium titled "Woodturning: Vision and Concept" in conjunction with an exhibition of over 100 turnings to be displayed at the school from October through December.

Symposium highlights will include demonstrations by turning luminaries David Ellsworth, Stephen Hogbin, Rude Osolnik, Alan Stirt and Del Stubbs and a panel discussion on the future of woodturning as an art form. Most of the big names in American woodturning, and a few from England, Ireland and Scotland, will be there, showing slides and talking about design, technique and the state-of-the-craft. A small "trade show" will offer a good chance to see new lathes and tools.

If you're a woodturner, you should find something to interest you. You can request a conference-registration prospectus by writing to Woodturning Exhibition, Arrowmont School of Arts & Crafts, P.O. Box 567, Gatlinburg, Tenn. 37738.

## Product review

**Morten**, *Peterson Specialty Products Co., 764 Grant Ave., Loveland, Colo. 80537, $49.95*

I sometimes wonder if router manufacturers have any idea of how woodworkers use their products. Some major companies are peddling high-tech models with electronically-controlled motors and LED gauges, but apparently don't know that what you really need to do good work with a router is well-designed jigging. And for that, you're usually on your own.

As is often the case, however, individual entrepreneurs have come up with several gizmos to fill the gap. One of these jigs (and as far as I know, it's the only one) capitalizes on the router's considerable potential to be a cheap mortise-and-tenon machine. Appropriately called "Morten," it's the invention of Dean Martin, a retired photographer and amateur woodworker in Loveland, Colo. At a weekend seminar, Martin had watched Tage Frid mortise through a stack of lumber by hand and decided there ought to be an easier way for mere mortals to do it with a machine.

Martin's easier way is as dirt-simple a jig as you can imagine. It consists of an aluminum template with two slots, one for the mortise and another for the tenon. The template is fastened, via screws and three alignment pins, to a piece of 2½-in. aluminum angle which is, in turn, screwed to a block of wood that lets you clamp Morten to the workpiece. To use it, all you need is a 7/16-in. guide bushing for your router and a ¼-in. straight bit.

This tool will cut any practical form of the mortise and tenon, plus one or two which aren't so practical. It will cut joints in curved and/or cylindrical parts, as well. In the course of a couple of hours experimentation with Morten, I found that it works a lot like router dovetail jigs do,

***Combined with a router, Dean Martin's jig will cut both mortises and tenons. Closed slot at right guides bit for mortising and the tongue, left, is for tenoning.***

which isn't too surprising since both operate on the same principle. For mortising, you clamp Morten to the work with the mortising slot located where you want the mortise. Plunging the router into the wood, with the guide bushing bearing against the template, routs the mortise. When Martin demonstrated mortising for me in his basement shop, he used a plunge router and had a vacuum handy to clear the sawdust. You don't have to have a plunge router, but the vacuum is a must—you can't cut accurate mortises unless you remove the sawdust that accumulates between the bushing and the template.

For tenoning, you position the jig's tenoning slot—really a tongue that the guide bushing follows—over the end grain of the piece to be tenoned. One-half of the tenon is routed (cheek and shoulder at once), then the template is flipped end for end to do the other half. If the test tenon is too loose, you can

## Fine WoodWorking Reader Service

To make use of any of the services listed here, write your name and current address below.

Name ____________
Address ____________
City ____________
State ________ Zip ________

**MOVING?** So you won't miss an issue, please give us your new address at least six weeks before the next issue.

Name ____________
New Address ____________
City ____________
State ________ Zip ________

**SUBSCRIBER LIST.** We're now renting our subscriber list to carefully selected companies—only those we believe you'll want to hear from. If you don't want your name on the lists we rent, check the box below and we will remove it at the first opportunity.

☐ Please do not rent my name.

**PROBLEMS.** If you've run into a subscription-related problem, write to our Subscription Department. We will do our best to help.

The Taunton Press Box 355, Newtown, CT 06470



## INDEX TO ADVERTISERS

tighten the next one by sticking a strip of stainless steel tape (provided) to the jig's tongue. The template is sized to produce a $\frac{3}{8}$-in.-thick tenon that is $1\frac{3}{16}$ in. wide, just right for most furniture and cabinet applications.

I've seen shop-built wooden or plastic versions of Morten but these are more cumbersome than Martin's device. Truth be told, for ten bucks worth of aluminum and an afternoon spent filing, you could make your own version of this jig in any size you want. But for $49.95, Morten is cheap as woodworking tools go and probably worth it for the versatility it affords an ordinary router. —*Paul Bertorelli*

## Maloof named MacArthur Fellow

Sam Maloof, the dean of California woodworkers, was one of 25 recipients of MacArthur Fellowships announced June 18. The award, from the John D. and Catherine T. MacArthur Foundation of Chicago, will provide Maloof with $300,000, tax-free, over the next five years to use any way he wishes.

As the program's first craftsman Fellow, Maloof joins 166 other honorees, predominantly scientists and academicians, named since 1981. The awards are intended to allow recipients the financial elbow room to make further scientific, artistic or social contributions to society. The Foundation stresses that selection is "not intended to be a reward but rather to foster new accomplishments." The selection process is carried out by 100 nominators and a 15-member final selection panel, all of whom are anonymous. Awards range from $128,000 to $300,000 according to the recipient's age.

Like many a newly minted lottery winner, Maloof claims the cash won't change him or his work. "I've never worried about the material aspect of my work, or I wouldn't have gone into it," he told us over the phone. "I've never given a thought to changing direction. I like the way I work." But some things will change. "For the first time in 40 years," he said, "I won't have to worry about cash flow."

**Notes and Comment**

***What's new in woodworking in your area? Notes and Comment buys brief articles about interesting events, shows and people and welcomes all manner of commentary. Send manuscript, if possible with color slides or black-and-white photos (preferably with negatives), to Notes and Comment,*** Fine Woodworking, ***Box 355, Newtown, Conn. 06470.***

## Mainlining art

Two glistening maple and stainless steel benches by Bill Keyser are among the newest attractions of Boston's transit system. They're part of a program to bring contemporary art into subway settings.

The 4-ft.-high benches create what Keyser calls "wooden landscapes for sitting" in the Alewife station at the Cambridge end of the line. One bench is about 15 ft. wide and 19 ft. long; the other is 7 ft. wide and 30 ft. long. Keyser, who teaches design and woodworking at Rochester Institute of Technology and has his own studio in Honeoye Falls, N.Y., laminated the maple together with the WEST System (Wood Epoxy Saturation Technique, developed by Gougeon Brothers, a boatbuilding company at 706G Martin St., Bay City, Mich. 48706). He shaped the forms with grinders and abrasives, then finished them with three coats of WEST epoxy and two coats of spar varnish.

Other pieces in the Bay State Arts on the Line program dedicated last May include a neon work composed of 1,000 hanging red tubes by Alejandro and Moira Sina, several life-size cast masonry statues and a series of bronzed gloves by Mags Harries.

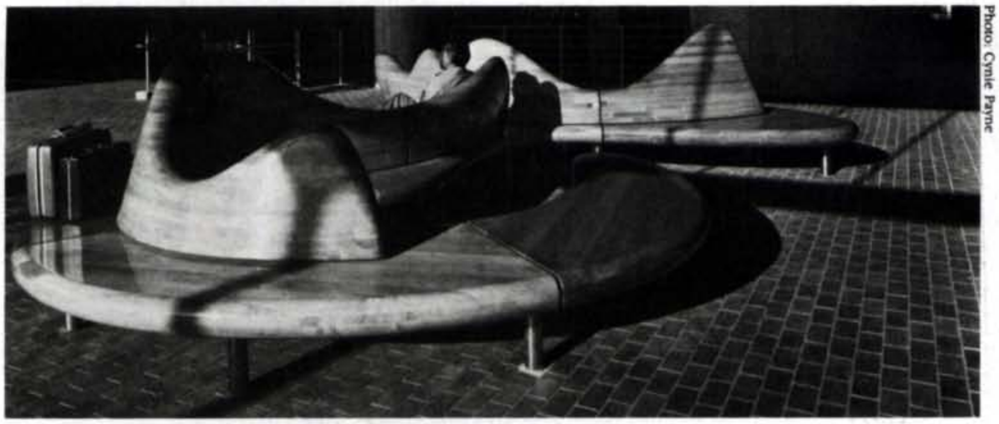


Photo: Cynie Payne

***Bill Keyser's laminated benches have been cossetting Boston commuters since May.***

## More Pye

EDITOR'S NOTE: We have received many questions about David Pye's fluting engine (*FWW* #50, pp. 40-43). Here's Pye's own explanation, adapted from the broadsheet, *David Pye*, (available from the Crafts Council, 12 Waterloo Place, London SW1Y 4AU, England).

The fluted interior of many of my bowls and dishes is carved with a contrivance that I invented in 1949 or 1950, which so far as I know has not been used by anybody else. The principle on which it works is very simple, as shown in this sketch:


A bowl blank (A) is fixed to a rather stiff turntable (B). CD is a flat steel lever that swings in a vertical plane about a fixed pivot at E (the pivot is not shown in the sketch). The lower end of the lever at D is formed into a hook, its forward edge sharpened so that it cuts like a gouge.

Now, if the lever is grasped at C and pulled toward you, the hook will move along the path shown by the dotted line and will scoop out a flute. Rotate the turntable a degree or so and swing the cutter again to cut another flute overlapping the first; continue until you come back to your starting point. You then raise the whole turntable (but not the pivot) about $\frac{1}{8}$ in. by means of a screw jack under it, and repeat the whole process to deepen the hollow.

That illustrates the principle. The actual practice is considerably more complicated. By varying the relative position of the fixed pivot and the turntable center, altering the cutter's radius, tilting the plane in which the cutter swings, and so forth, you can cut many variations.

It's not surprising that no one else has eagerly adopted the fluting technique. Although it is a good way of making bowls, it's a poor way of making money, being far slower than turning, and it's hard work in the bargain.

I have made two developments of the technique in the last 10 years. One is the cutting of spiral flutes done (in principle!) by swinging the cutter in a plane diagonal to the turntable. The other is the cutting of elliptical vessels by adapting the ancient oval-turner's chuck so that it works instead of a turntable. On old lathes, the chuck had to be fairly small or it would shake the workshop to pieces. But with my technique there's no speed and the chuck can be relatively large. Some of the resulting geometry is interesting particularly when the oval cutting is done with spiral flutes.

I have never put a dividing plate on the turntable so that all the flutes could be indexed to an equal width. I prefer the element of freedom introduced by spacing the flutes inside the bowl by eye and hand. □

# BLACK & DECKER THINKS FUN SHOULDN'T BE TOO MUCH WORK.


Big, bulky, hard-to-handle tools can take the fun out of almost any hobby.

That's why we made our Precision Power Tool so easy to use. (Its thin neck slips into your hand as easily as a pencil; yet its durable ball-bearing design can supply you with up to 20,000 RPM.)

It takes the grind out of etching glass.

It shines at polishing.

It has a keyless chuck that makes changing bits a snap, a variable speed power adaptor for precise power control and our exclusive 2-Year Home Use Warranty.

The deluxe kit comes with all the accessories you need to grind, deburr, etch, carve, drill, cut, shape, polish, buff, and even sharpen.

And with over 100 available attachments you can add, we're sure you can think of some uses of your own.

The Black & Decker Precision Power Tools.

Designing them took a lot of work. But using them doesn't.

**BLACK & DECKER™**
IDEAS AT WORK.™

**SPECIAL OFFER**
Now, for a limited time, receive a free Precision Power Tool Jigsaw (#9817) or Orbital Sander (#9819) with the purchase of our Precision Power Tool kits (#9803, 9804, 9805). Offer good from August 25 through December 31, 1985.

For more information on the complete line of Black & Decker Precision Power Tools, write: P.O. Box 40903J, Raleigh, NC 27629.

# SOMETHING OLD, SOMETHING NEW

*SPNEA preserves period furniture, such as this 1750's chair by an unknown cabinetmaker.*

The Queen Anne furniture style swept the American Colonies in the beginning of the 18th century and evolved into its most refined form by about 1750. And, despite the changes in fashion since that time, Queen Anne has never really gone out of style—many consider it to be the perfect blend of function and beauty. The chair above was in constant use for almost 200 years before being acquired by the Society for the Preservation of New England Antiquities in Boston. The one at right was made just last year at the North Bennett Street School, whose students specialize in period reproductions. Both were on display recently in two related shows in the Boston area, the old work at the DeCordova and Dana Museum in Lincoln, the new at SPNEA's Harrison Gray Otis House.

*Ron Morin built this Queen Anne reproduction at the North Bennet Street School, where students can learn the essentials of the old styles and acquire the old skills.*

Photos: J. David Bohl/SPNEA