AMERICAN WOODWORKER

June 1990, Issue No. 14

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Be Square: Build Our Tablesaw Cutoff Box

Learn the Basics of Box Making

Reproduce a Mission-Oak Armchair

Shaving Horse Plans

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Issue No. 14
May/June, 1990
COVER PHOTO: Mitch Mandel

PROJECTS AND FEATURES


SCOTT LANDIS

BUILDING A BOX **18**

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A WORD FROM THE EDITOR

RESHARPEN YOUR SKILLS

Remember the very first thing you made out of wood? I do. It was a pair of white pine bookends I banged together with tools that felt too big for my 7-year-old hands. My mentor was the guy who ran the woodworking course at the local YM. He'd make the rounds from one busy kid to another, telling us when our cuts were square (not a chance) and encouraging us to sand that edge just a little smoother. You wouldn't know it from looking at those bookends, but he taught me a lot.

From that moment on, I picked up woodworking skills where I could. I was luckier than most, because my father had tools around the house, my uncle was a shop teacher, and my grandfather had once been a carpenter. I don't remember too many formal lessons from these men, but they were always building something. Some of their knowledge was bound to rub off.

For most of us, woodworking education is a get-it-where-you-can proposition. Magazines, books and video tapes are valuable sources of information, but words and pictures can only take you so far. You can read about sharpening till the cows come home, but if nobody's ever showed you what a sharp edge *feels* like, how do you know when you've got one?

So where do you go to get hands-on instruction? What are your options? There are woodworking classes all over the country where you can see, first hand, the techniques you read about in *AW*. Classes can range from an afternoon workshop at a local woodworking store to a 4-year degree program at a college or university. In between, you'll find weekend and week-long workshops at schools such as the Oregon School of Arts and Crafts in Portland; Anderson Ranch Arts Center in Snowmass Village, Colorado; Conover Woodcraft in Parkman, Ohio—the list of schools goes on and on. If you've got the time for more extensive study, you'll find 1-year programs at such schools as the College of the Redwoods in Fort Bragg, California or the North Bennet Street School in Boston. "Woodworker's Calendar" is full of workshop listings.

We're compiling a directory of woodworking schools, which we plan to publish early next year. We need your help to make it complete. If there's a community college, a vo-tech school or a YMCA near you that offers woodworking classes, let us know. We'd also like to hear from readers who have taken weekend or longer courses in woodworking. Tell us what you thought about it and what you learned. We'll publish the best of your first-person reports along with our school directory.

DAVID SLOAN, Editor

LETTERS

For the Birds

Being only an infant in wood turning, I was delighted to see a design that was other than a candlestick or wood bowl (Turned Birdhouses, March/April, 1990 *AW*). I do think that a few design additions would make the houses a little more inhabitable. The addition of drain holes (minimum of 4) drilled in the base, and vent holes drilled at an angle at the top of the body would allow for drainage and cooler conditions.

Also, birdhouses should be cleaned every spring and vents cleaned. To make this easier, the roof or base could be made removable.

ED IANNUCCILLI
Plainview, MN

Shop Wiring: 115V vs. 230V

In the January/February, 1990 *AW* you printed a Q&A debating the advantages of 230 volts versus 115 volts.

There is a very definite advantage to using 230-volt motor connections when you are about to wire your shop—#14 wire is rated at 15 amperes and #10 wire is rated at 30 amperes. The thinner #14 wire is cheaper and easier to handle. The savings in copper for a medium-size shop could be considerable.

STUART R. SHARP, P.E.
Peabody, MA

Project Preferences

The letter from A. Marino of Babylon, NY (Letters, September/October, 1989 *AW*) was correct in the fact that "Your magazine is very good..." Let's keep it that way. If he (or she) and other "woodeaters" want quick and simple projects, there are several magazines that print just their cup of tea.

AW is a magazine for serious craftsmen in that the two issues I have received so far contain projects planned around methods of joinery proven through the decades by the master woodworkers of the past. If I wanted one-day projects, I could find that kind of magazine on any rack. That's why I don't mind waiting two months for the next issue of *AW*. If and when the format changes, so will my subscription.

E. MARTIN
Beaumont, TX

Over the years I have subscribed to many magazines on the subject of woodworking. I have continued to subscribe to only a few of them, and in the long run they seem to offer very little that is new or practical. I feel that *AW* is a different one, and it has certainly become one of my favorites. You have been successful in presenting a wide range of projects that has to appeal to almost every level of skill. I also like your many articles on how to tune up tools and the variety of jigs and devices presented to do better work.

GENE PAYNE
Sioux Falls, SD

EDITOR REPLIES: *Picking projects for AW is the toughest part of our job, because every reader's taste is different. We try to vary the projects we publish so there's a good mix between traditional and contemporary, large and small, easy and challenging, projects to make with machines and things you can build with hand tools.*

Edifying Editorial

Thank you for your February "A Word From the Editor." I normally only browse through your magazine, but this issue was left open on our desk by my husband. Our 3-year marriage has been spent purchasing *expensive* woodworking equipment. Unfortunately, every project we choose cannot be completed until we purchase "another" piece of equipment—paralysis! Maybe now I'll see some of his woodworking dream projects completed. Anything he makes will be a treasure to me.

JO BLANCHETTE
Palos Hills, IL

Honker Harangue

Re: "Humongous Honker" (Final Pass, November/December, 1989 AW). The musical instrument is not an "alpenhorn." It is an alphorn. Secondly, the caption under the picture that says the horn is so large that, "even Gabriel would have trouble blowing it" is very wrong. This instrument is very easy to play. It is easier to play than the standard alphorn and has such a fine range of capability that almost any music can be played on it—classical to jazz to Bavarian. I know that this is true because I'm the person who plays the horn.

VERNON J. HIXON
Boise, ID

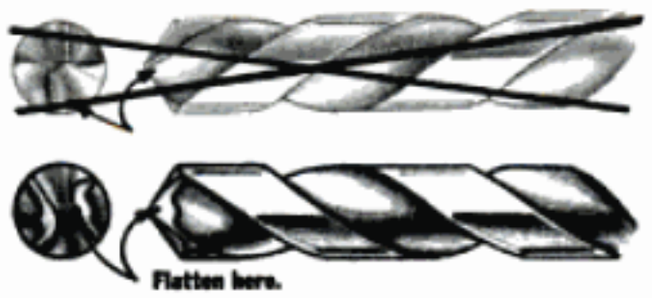
EDITOR REPLIES: *Webster's Ninth New Collegiate Dictionary lists both "alpenhorn" and "alphorn" as appropriate names for this instrument. We went with alpenhorn, because it was the first variation listed.*

Index Idea

I was really pleased to see you publish an index in the last issue. Why don't you run the index as a regular feature, and put it in a place such as the very center of the magazine where it could easily be removed and stored someplace handy for reference?

BILL GAUVREAU
Babb, MT

EDITOR REPLIES: *Great idea. We'll keep it in mind for next year's index.*



A Bit Of An Error

A drawing in the article "Homemade Hardware" shows how to modify a drill bit for drilling brass (January/February, 1990 *AW*, page 44).

The drawing shows the modifications in the wrong place on the drill bit. The drawing here shows the proper places to flatten the bit.

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

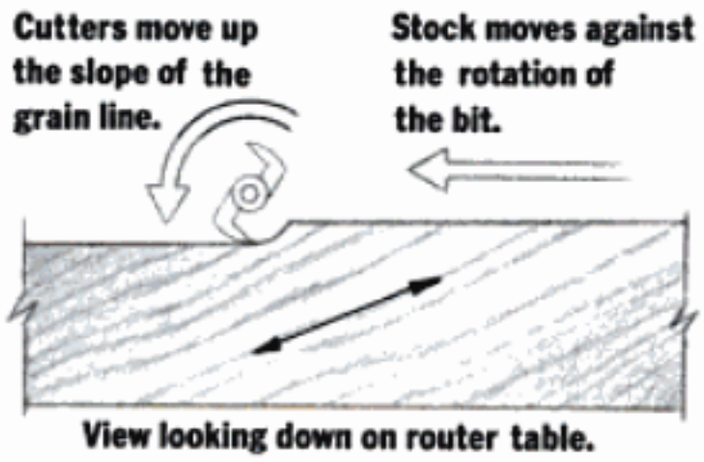
Router-Bit Tear-Out

Q. *I make wooden toys out of pine. I round over edges with a router in a router table, and I use carbide cutters, but I still get an excessive amount of tear-out. How can I prevent this? What can be done to repair tear-out? Presently, I am hand sanding torn-out areas, but it's a long and tedious job.*

R. HAMMOND
Mississauga, Ontario

A. Successful routing without tear-out depends on using the right bit in a healthy router with the correct technique.

First, make sure your bit is sharp and clean. Carbide edges will last a long time, but they do get dull. Keep the cutters free of resin build-up, and don't try to drive a big bit with too small a router. Use the smallest radius round-over that will do the job. The less stock you take off in one pass, the less tendency to tear the wood.



Check your router for any mechanical or electrical problems—worn bearings, brushes, commutator or collet. Be sure your electrical outlets and cords are rated for your router's amperage. Any of these weaknesses can rob power, and power is what's needed for a fast, clean cut.

There are two general rules of router technique: Always rout *with* the grain of the wood (so the cutters move up the slope of the grain line), and always move the work *against* the rotation of the bit. (See drawing.) This applies to using the router freehand or in a router table. As you approach different sides or sections of the work where the grain changes direction, you may have to flip the piece over, end for end, to reposition the grain. In a few situations you may not be able to follow both rules at once. In this case, rout with the grain, and with the rotation of the bit (also called climb cutting). Take very light cuts with multiple passes, and switch to routing against the rotation of the bit again as soon as possible. *Never* do climb cuts on a router table—the bit has a dangerous tendency to kick back the work.

Whatever kind of routing you're doing, try taking one or two partial cuts first. There'll be less load on the motor, and the final pass will be fast and clean, especially on end grain.

BERNIE MAAS
Woodworker and teacher
Cambridge Springs, PA

Polyurethane Over Lacquer?

Q. *I recently bought a new red oak dining room table with decorative inlays. With two small children, I'm looking for a way to protect the table's factory-applied lacquer finish. I don't want to cover the table with plastic or glass. Can I apply a varnish such as polyurethane over the lacquer?*

JOHN KIPILA
Emmaus, PA

A. Your question really has two parts. How can you protect your table? And, is it possible to apply polyurethane over lacquer?

I wouldn't recommend covering the lacquer on your table. Unless you're a professional finisher, your recoat job will probably never look as good as the factory finish.

As for the durability, it's true that lacquer is somewhat vulnerable to scratches and water damage. But some furniture makers are using "catalyzed lacquer," which is really tough. To see what's on your table, rub an inconspicuous spot on the table with a cotton swab dipped in lacquer thinner. Ordinary lacquer will turn sticky, but catalyzed lacquer won't be affected.

If it's ordinary lacquer and you decide to recoat it, polyurethane is not your best choice. While it's famous for durability, polyurethane won't bond to the surface as well as other varnishes. It has a tendency to lose its "grip" and peel off under mechanical abuse (pounding, scraping). Instead of polyurethane, I'd recommend an alkyd varnish, which will protect the table, adhere to the lacquer better, and be easier to repair. An alkyd varnish will rub out and polish easily, giving a more natural appearance that won't yellow.

Whichever varnish you choose, the key to determining the compatibility with lacquer is to look at the solvents used in the finishes. Problems occur when the solvent in the second finish is strong enough to dissolve the cured film of the first finish. The mineral spirits solvent in polyurethane or alkyd varnish will not dissolve lacquer, so you can put a varnish on top of any lacquer. You could *not* put a lacquer over a varnish, however, because the stronger lacquer solvent could dissolve varnish, like a paint stripper lifts paint.

To prepare the surface, wipe it with naphtha to remove all wax, polishes, or oils. It's good to scuff up the lacquer surface with 400-grit sandpaper, then clean off dust with a tack rag. You can apply varnish with a brush or foam-pad applicator. You'll get a better finish by thinning the first one or two coats with mineral spirits—1 part mineral spirits to 10 parts varnish.

NANCY LINDQUIST
Woodworker and finish consultant
Kansas City, MO

Flocking Gun

Q. *Many years ago I used a tool called a flocking gun to spray a velour-like fabric material on the inside of decorated boxes. Where can I buy a flocking gun today?*

DAVID L. SOPE
Meriden, KS

A. "Flocking" is the soft, velvety layer of wool, cotton or other fibers used as a coating on paper, wood or metal surfaces. It's perfect for lining the interior of jewelry boxes and storage containers. A flocking gun is a pump-action tool which mixes the fibers with air for an even application. Flocking guns, colored flock with matching base paints, and undercoat adhesives are available

DRAWING BY SALLY ONCKEN

Q&A

under the "Suede Tex" label from Woodcraft (210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102), or from Constantine's (2050 Eastchester Rd., Bronx, NY 10461).

DAVID DRAVES
Merchandise manager,
Woodcraft Supply
Woburn, MA

Drywall Screws for Woodworking

Q. *How are drywall screws different from regular screws? Is it necessary to drill pilot holes? Is there any good reason not to use drywall screws for woodworking?*

JACK SINGER
Chicago, IL

A. Drywall screws are a subset of a growing variety of fasteners designed for speed and ease of installation. The hardened steel, quicker twist, sharpened thread, and trumpet head slotted for a Phillips drive, all contribute to easy power installation without pilot holes—in softwood, that is. Although you can shoot a drywall screw into maple or oak, you can also split the wood or snap off the screw.

Another difference between drywall screws and regular screws is that, except for the really long ones, drywall screws don't have a smooth shank—the threads go right up to the head. This is not a problem with sheetrock since the screw can spin freely in the crumbly gypsum, but grips the wood stud underneath. In this way it pulls everything together, regardless of the thickness of drywall. In two pieces of wood, without a pilot hole the thread stays engaged in both pieces, so when the head bottoms out, the screw can't pull the assembly together. You could drill pilot and clearance holes, but that defeats the whole purpose of the drywall screw. Might as well just use the old tried and true wood screw. Drill the proper pilot and clearance holes, countersink, and leave the high-tech screws to the sheetrock hangers and high-production boys.

MICHAEL SANDOR PODMANICZKY
Associate Furniture Conservator
Winterthur Museum
Winterthur, DE

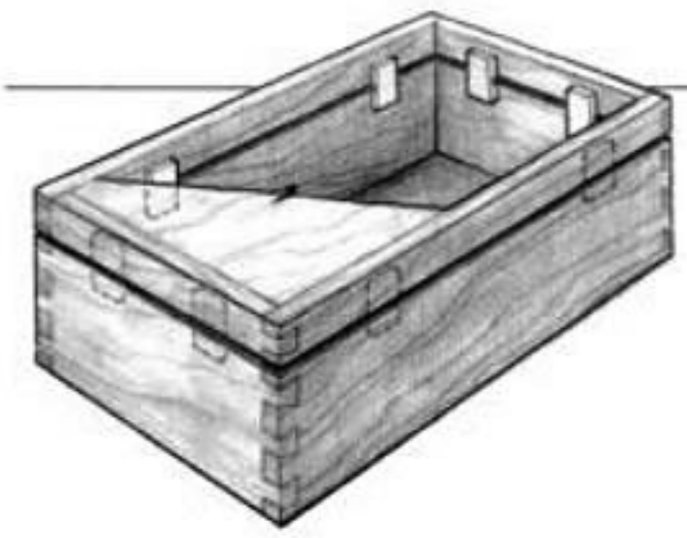
Where To Find It

Several previously out-of-print classic books on stair building, joinery, woodcarving, lathes and turning are available from Linden Publishing Co., 352 W. Bedford #105, Fresno, CA 93711, (800) 345-4447.

Carving tools, patterns, books, paint and other accessories for making decoys are available from Christian J. Hummul Co., Inc., 404 Brooklets Ave., Easton, MD 21601, (301) 820-8760.

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

TECH TIPS



Keep a Lid on It

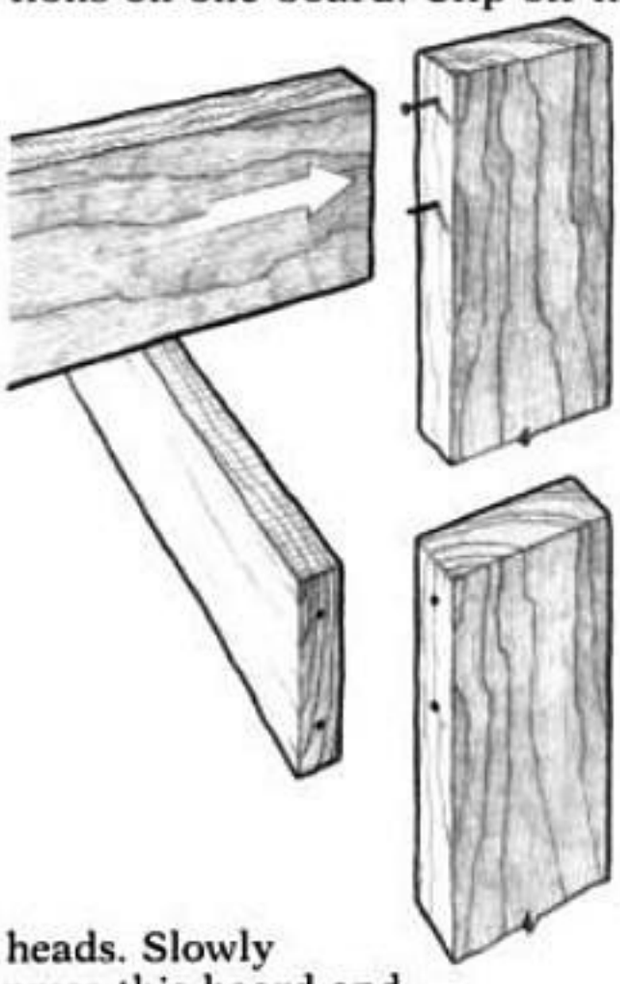
When cutting the lid off a box, I had trouble with the saw blade binding on the last cut. Placing wedges in the saw kerf to keep the lid from binding was troublesome.

An easy solution is to fasten blocks of scrap wood around the inside of the box on the line where you plan to cut. Attach the blocks with a drop of hot glue or a piece of double-faced tape. Set your saw blade to cut about 1/32 in. beyond the thickness of the box side. When you cut through, the scrap blocks will hold the lid in place without binding. Then just knock off the scrap pieces, and you have your lid.

GERALD HUNT
Swartz Creek, MI

Brads as Dowel Centers

Small brads can be used to help align holes for dowel joints. Hammer the brads into the proper locations on one board. Clip off their heads. Slowly press this board and its mate together, and then separate. Pull out the brads. The dowel centers are now marked and ready to be drilled on both boards.



JOHN ROCCANOVA
Ancramdale, NY

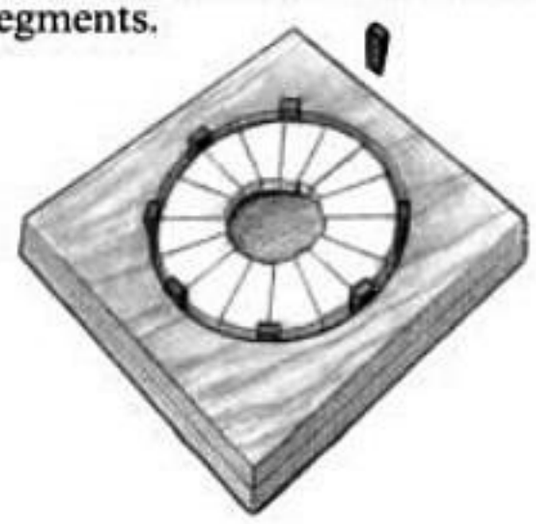
Iron-On Patterns

Transfer patterns—such as carving or bandsaw patterns—onto the wood by copying the pattern on a photocopying machine, placing the copy face down on the wood, and ironing the back of the paper. This transfers the pattern to the wood. Of course, the pattern will be a mirror image of the pattern in the book. Patterns may be enlarged or reduced on the copying machine.

BILL BIGELOW
Surry, NH

Gluing Circular Segments

I cut a circle in a piece of 3/4-in. plywood to make a jig for gluing segments of a circle together for rings or frames. The diameter of the hole should be about 1/8 in. to 3/16 in. larger than the diameter of the circular segments.



Clamp the plywood jig on a piece of 3/4-in. plywood with wax paper in between to keep the segments from sticking to the plywood underneath.

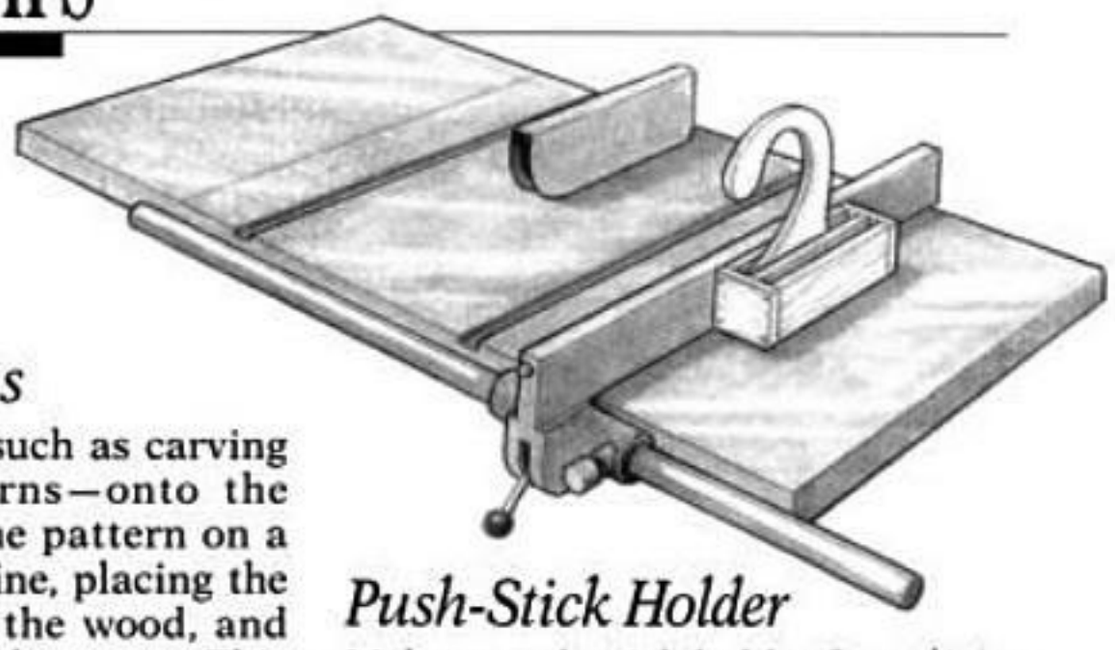
Assemble the segments inside the circle, then push or drive small wooden wedges between the jig and the segments. The wedges push each segment toward the center and close up the gaps between segments.

C.E. RANNEFELD
Decatur, AL

No-Knot Shop Apron

Replace the string on your shop apron with a strip of Velcro. It makes fastening and unfastening much easier than trying to tie a knot behind your back.

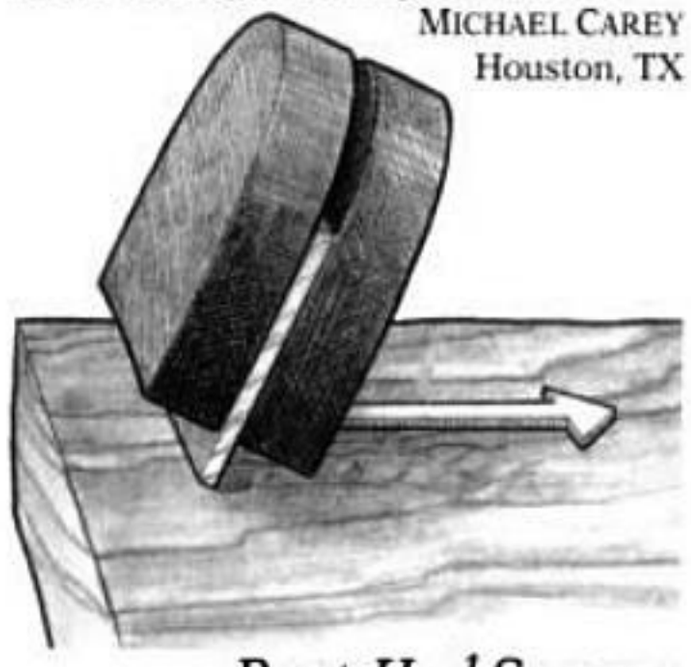
WILLIAM ARCHER
Winfield, KS



Push-Stick Holder

Make a push-stick holder from 1/2-in. plywood, and mount it to your rip fence with contact cement. The push stick is always where you need it.

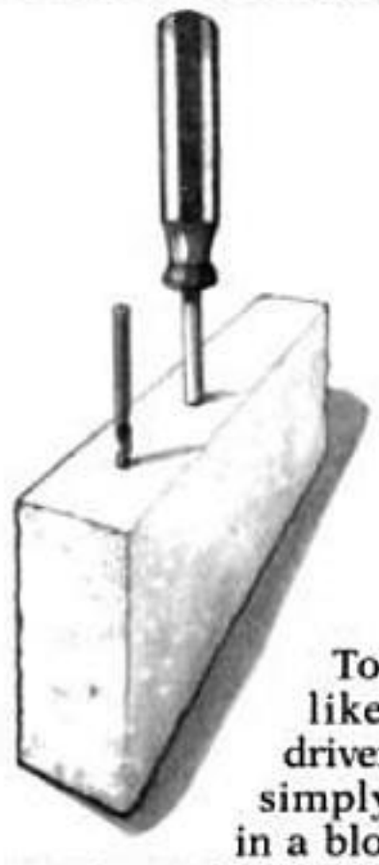
MICHAEL CAREY
Houston, TX



Boot-Heel Scraper

To scrape wood, hold a piece of glass between a pair of rubber heels. The glass stays put, and you have a large surface to hold onto.

J.E. TERZICH
Hibbing, MN



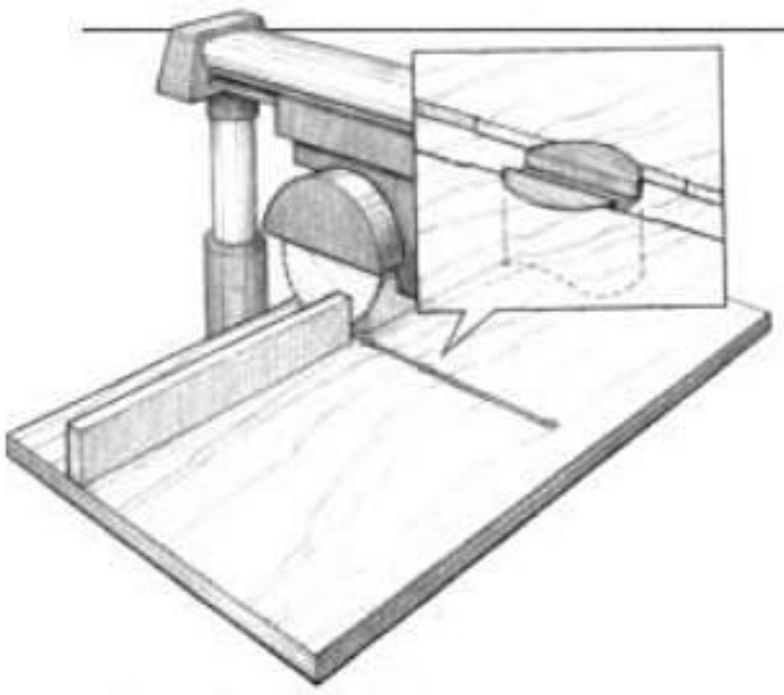
Styrofoam Tool Holder

To organize tools like chisels, screw drivers, drill bits, etc., simply stick the tools in a block of styrofoam. For large-diameter tools, it's helpful to predrill a small hole before you press in the tool.

The foam is rigid enough to stand on its own, it protects the cutting edges of sharp tools, and it's easy to carry the tool holder around the shop.

LEE MAUGHAN
Panaca, NV

TECH TIPS



Dowels Mark the Spot

The table "rut" made by a radial arm saw blade is rarely an accurate indicator for precision trimming. It's also inadequate as a measuring point for cutoff setups. Here's a solution:

About 3/4 in. from the fence, drill a 3/8-in. dia. hole clear through the table. Drill another hole about 1/3 the length of the "rut" and another hole at the end of the saw's travel. Drive in short dowels flush with the tabletop, and run the saw across the ends of the dowels. The kerf shows exactly where the blade is currently cutting. When the dowels get rough, drive new ones down on top of the old ones, and the old ones will fall out the bottom of the table.

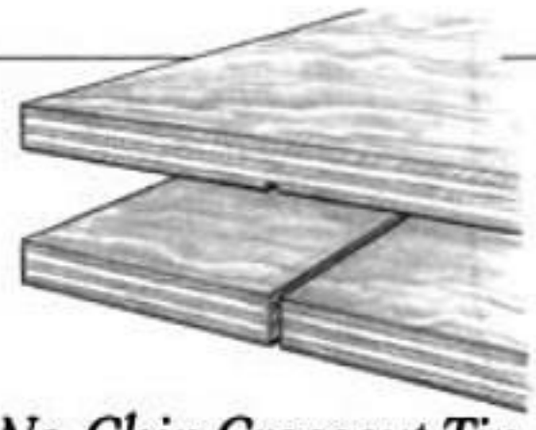
With this setup, you don't have to pull out a still-coasting blade to measure where the blade is cutting. This saves measuring tapes, and probably, other things.

BOB VAUGHAN
Roanoke, VA

Double-Duty Dumpsters

To make handling trash in the shop easier, I've purchased several rubber garbage cans with 5-wheel dollies. Their stability makes them suited for other uses besides handling waste. Recently, they've doubled as turntables in the spray booth while finishing. The 32-in. height makes them ideal for elevating work to be sprayed. I also use them for wheeling furniture pieces from one machine to another. The added ballast of trash makes them even less prone to tip.

LEE MAUGHAN
Panaca, NV



No-Chip Crosscut Tip

If you've ever crosscut plywood on the tablesaw, you know that it usually splinters and leaves a bad edge on the bottom of the cut.

A good way to prevent this is to first make a shallow cut about 1/8 in. deep. Then raise the blade up enough to cut through the plywood, and make a second cut.

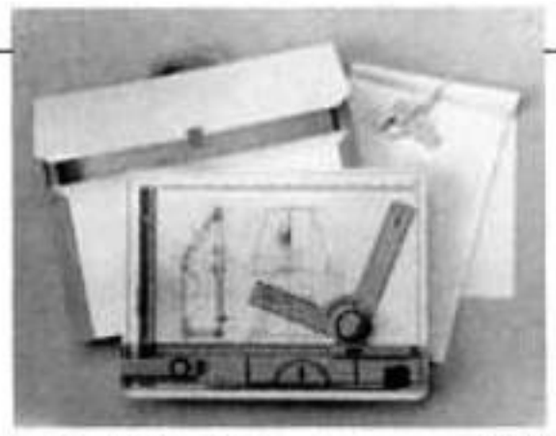
You'll get a substantially cleaner cut, but you still should always keep the best side of the sheet facing up.

PATRICK RUSSO
Pattersonville, NY

Know a better way of doing something? Designed a clever jig? Send your woodworking tips, along with a sketch or a snapshot to: Tech Tips, AMERICAN WOODWORKER, *33 E. Minor St., Emmaus, PA 18098. We'll pay you $25 if we publish your tip.*

DRAWINGS BY HEATHER IRENE LAMBERT

TOOLBOX



Portable Drawing Kit ▲

Small workshops rarely leave room for a drafting table—and the bench, with all its nicks and scars is no place to draw. The Portable Drawing kit solves these problems. This compact kit includes a sturdy, plastic drawing surface equipped with a sliding, graduated straightedge, graduated top and side rules, and a compass scale. The drawing surface has two paper clamps built right in. You can even purchase an optional graduated protractor head that locks onto the straightedge to make perspective drawing a snap. The 12-in. × 17-in. drawing surface comes in a sturdy plastic, briefcase-style carry case, so you can take it anywhere. (Price: drawing kit, $49.95; protractor head, $26.95)

■ *Garrett Wade, Dept. AWT, 161 Ave. of the Americas, New York, NY 10013, (800-221-2942).*

CIRCLE NO. 32 ON READER SERVICE CARD

Timber Tote ▶

Carrying lumber home can be a bit tricky if you don't have a rack on your car. The wood always ends up sticking out one of the windows or

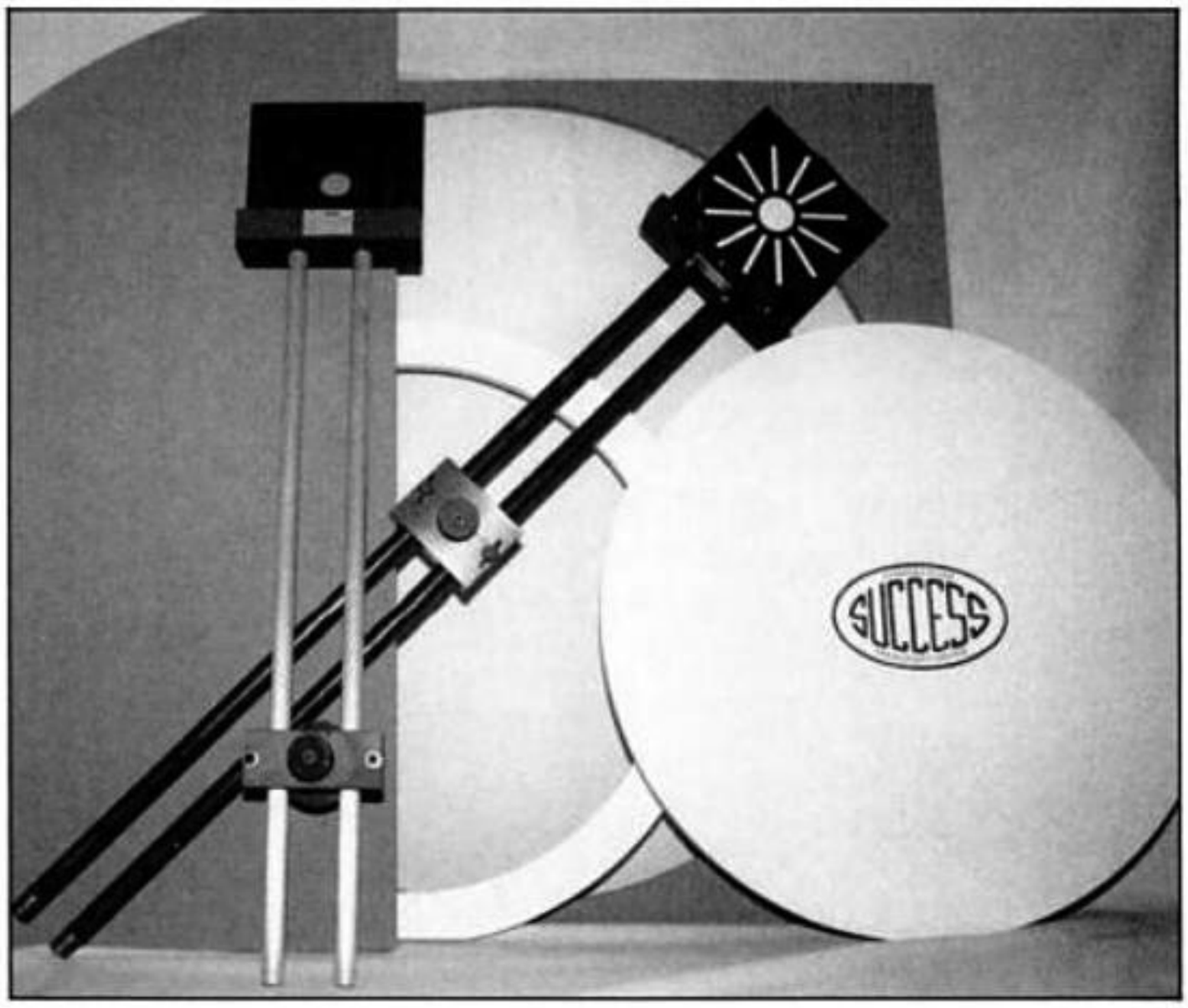
sliding around on top of your car. Either solution is dangerous. The Timber Tote is a set of hangers that you can suspend from the passenger window and trunk of your car. The padded hangers cradle your wood and protect your car from scratches. When not in use, the set of hangers fits together neatly, so you can store them in the trunk of your car. The Timber Tote comes with rope for securing your lumber. (Price: $24.97)

■ *Jupiter Products Inc., Dept. AWT, P.O. Box 4367, Centerline, MI 48015, (313) 354-3339.*

CIRCLE NO. 28 ON READER SERVICE CARD

SHOP TEST

RT-87 Router Radius-Circle Tool



The RT-87 is a simple, but sturdy jig that enables you to cut circles and arcs with your router. It works on the same principle as the string compass—you set the pivot point (hub) down at the center of your circle or arc and the outer point (router) rotates around this pivot.

The RT-87 arrived in my shop just in time to try it out on a large 56-in. dia. tabletop. And I'm glad it did. It proved to be a real time-saver. Normally, I would have cut a tabletop such as this with a saber saw and then sanded it smooth. This would have taken about an hour or so. The RT-87 reduced the job to about 15 minutes, and the smooth cut needed no sanding.

I tested the RT-87 on several different tasks, and I was pleased with the results. The device adjusts easily. The aluminum bars glide through the central hub on linear ball bearings, and the bars have a matte finish, which shows pencil marks well. This is convenient for times when you want to repeat a radius. I used the RT-87 with a fixed router, but a plunge router probably would have worked better and made the work even faster.

Aside from cutting circles, the RT-87 also cuts arcs. I imagine this jig would be ideal for cutting accurate rockers for rocking chairs.

For those of you who have to cut circles and arcs only occasionally, there is a less expensive, lighter-duty model—the RCT-101. The RT-87 can cut diameters from 9½ in. to 9 ft. (and any radius in between). The RCT-101 can cut a diameter from 11 in. to an unlimited upper diameter. (You can extend the bars with threaded gas pipe.) For circles with the smaller diameters, you can also use the jig to cut out accurate templates. (Price: RT-87, $295.00; RCT-101, $135.95)

■ *Success Engineering and Manufacturing, Dept. AWT, P.O. Box 25648, 9418 Dorothy Ave., Cleveland, OH 44125, (216-883-1200).*

FRED MATLACK

CIRCLE NO. 29 ON READER SERVICE CARD

MAKE YOUR OWN TABLESAW CUTOFF BOX

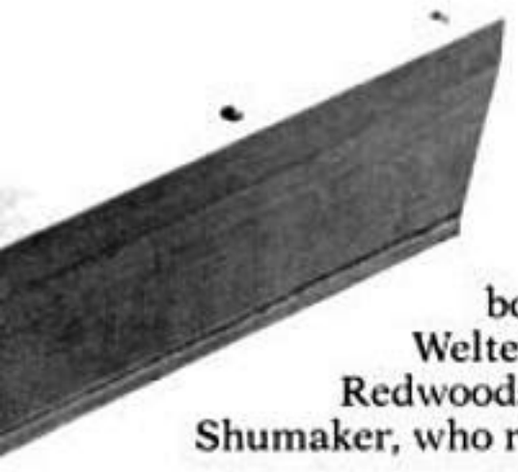
Perfect Square Cuts— No Problem With This Sliding Crosscut Table

BY DAVE SELLERS

A tablesaw is a versatile tool. But when ultimate accuracy is a necessity, even a well-tuned tablesaw may be a hair off. This is especially noticeable when crosscutting wide boards or squaring up the ends of large panels or cabinet doors. The size of the workpiece dwarfs the saw's miter gauge, making crosscutting an awkward and unsafe operation, at best.

A cutoff box is the answer to these problems. A cutoff box (sometimes called a sliding crosscut table) is basically a broad, flat, table-like jig that slides back and forth on the top of the tablesaw. The cutoff box has two runners on the bottom that ride in the tablesaw's miter-gauge slots, so it always moves parallel to the blade. The fence on the cutoff box is built so it is *exactly* perpendicular to the blade, making every cut perfectly square.

You can make a cutoff box any size you want. A big one can accurately square up cabinet sides and doors better than any other method, while a down-sized box can crosscut smaller pieces with ease. Keep in mind that bigger means heavier, and a large box is more cumbersome to lift onto the saw and more troublesome to store when it's not in use.



The staff at *AMERICAN WOODWORKER* designed the cutoff box shown here with input from David Welter, shop foreman at the College of the Redwoods in Fort Bragg, California, and Karl Shumaker, who runs a shop in Petaluma, California.

Designing the Box

There's nothing fancy about a cutoff box—in fact it can be stone simple—yet it must be made with care. It's important to make the box with rigid, stable materials that give the required precision, but it should also be as light as possible.

The base must be dead flat, and of even thickness. We chose ½-in. Baltic birch plywood for the base because of its dimensional stability. Be sure to inspect the plywood you buy for any warping, delamination or uneven thickness. We glued plastic laminate to the top of the plywood for a nice appearance and smooth working surface. We also laminated the bottom of the plywood so that the plywood wouldn't warp from uneven moisture absorption.

Nothing beats a cutoff box for dead square crosscuts on any size stock—wide or narrow. The cutoff box slides on a pair of runners that ride in the miter-gauge slots.

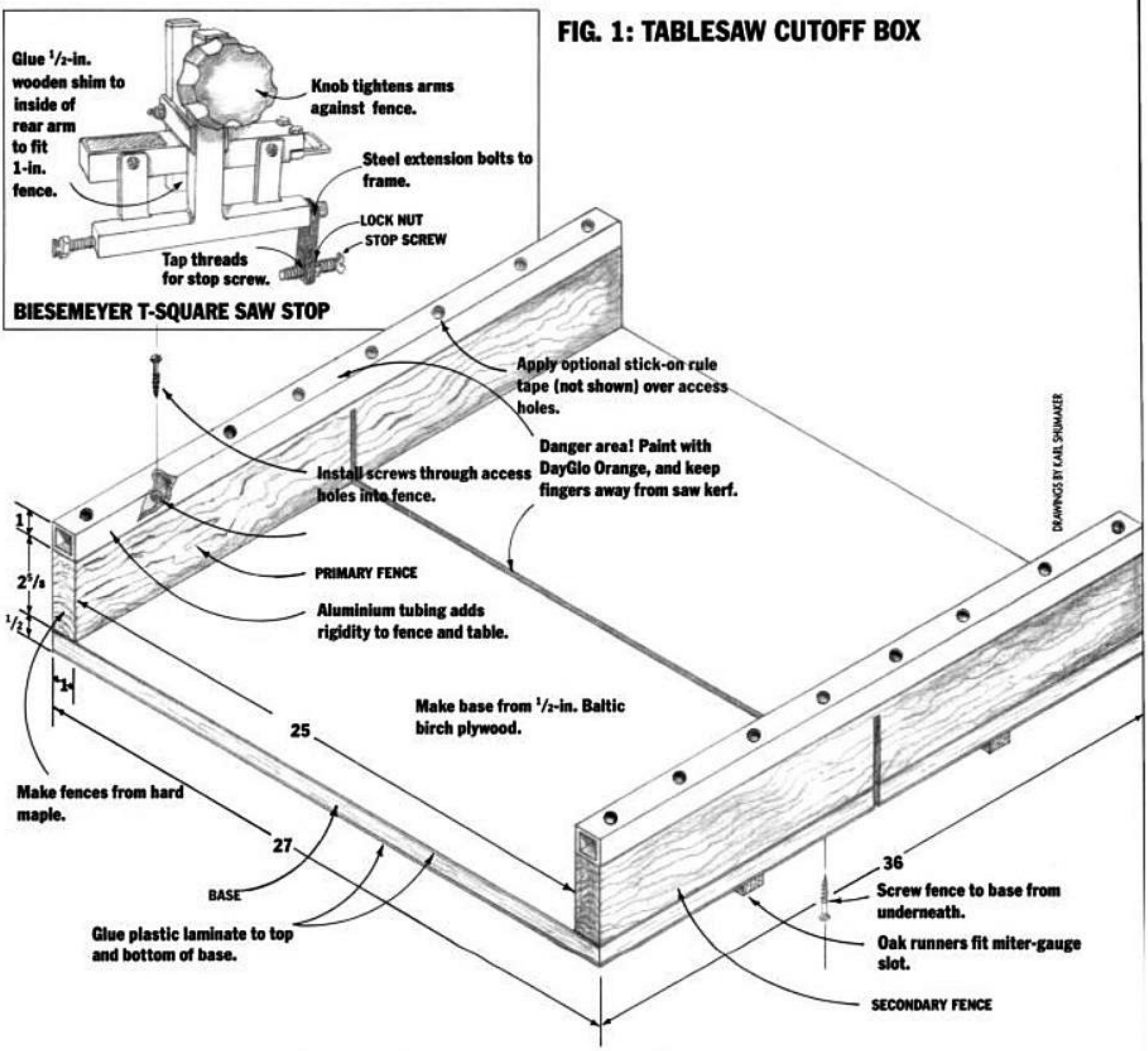
The cutoff box has a primary fence on the side nearest the operator which positions the piece being cut, and a secondary fence on the far end which helps to stiffen the base. In use, the saw's blade will cut the base and most of each fence into two halves. It's essential to design a strong connection, or bridge, over each fence so that the two halves of the base stay exactly flat in the same plane, with no bending or buckling.

We solved this problem by making our fence of hard maple with a length of 1-in. sq., hollow aluminum tubing screwed along the top. The fence is high enough

PHOTOS BY MITCH MANDEL

We modified a Biesemeyer T-Square Saw Stop to fit our fence by bolting on a metal stop-screw extension. The Biesemeyer Stop positions the work accurately with a hairline indicator over adhesive-backed tape. New models have the locking knob on the operator's side of the fence.

FIG. 1: TABLESAW CUTOFF BOX



that the blade, at maximum height, won't touch the aluminum. The tubing should have a wall thickness of 1/8 in. to be rigid enough to hold the box together. This aluminum tubing is available at some hardware stores and home centers, but you can also order it by mail (available from Bethlehem Aluminum, 270 E. Hamilton St., Bethlehem, PA 18105,215-432-4541). Prices will vary from one source to another, but 6 ft. of tubing cost us a little more than $20.

A stop block is handy for repetitive cuts. A wooden block clamped to the fence works just fine, but an adjustable stop block is a real handy feature. Karl Shumaker swears by his Biesemeyer T-Square Cut-Off Saw Stop—a commercially made saw stop that locks in place with a turn of a knob. We liked the way the Biesemeyer Saw Stop worked, so we designed our cut-off box to accept it as an option (available for $62 plus shipping from Biesemeyer, 216 S. Alma School Rd., Suite 3, Mesa, AZ 852020, 800-782-1831). It has an easy-to-adjust clamping knob, a self-stick tape mea-

To fasten the runners to the base, slide the base out a few inches, and screw the runners on from below.

sure for the top of the fence, and a hairline indicator to set the distance from the blade. Of course, you don't need to buy the Biesemeyer Saw Stop to build the cutoff box.

Making the Cutoff Box

First, cut the plywood base to size. For the box shown here, we made the base 27 in. × 36 in., so a full 24-in. wide panel will fit between the fences with a bit of room to spare. The 36-in. width just covers the top of a Delta Unisaw. Glue the plastic laminate to the top and bottom of the plywood with contact cement. Trim the edges of the laminate with a laminate-trimmer bit in a router.

Cut two 3-ft. lengths of hard maple for the fences. (See Fig. 1.) You may want to make the operator's fence longer than the base to provide more support for long boards. Joint the stock so it's straight and square. The operator's fence must be perfectly straight, or your cutoff box won't be accurate.

Cut the two pieces of square aluminum tubing 36 in. long, and clamp a piece to the top edge of a maple fence. Drill small pilot holes clear through both sides of the tubing and into the maple. Remove the tubing, and enlarge the holes for the mounting screws that attach the fence. The holes on the top edge of the tubing must be big enough for the screw heads to pass completely through—the other holes (inside the tubing) are smaller in diameter. (See Fig. 1.) Repeat the procedure to make the second fence, and attach the aluminum tubing to the maple with 1¾-in., #8 flat head wood screws.

Mount the runners—First, cut out two hardwood runners to fit your saw's miter-gauge slots. Shape the runners so they fit snugly in the slot but can slide freely back and forth without binding. Now put the runners in the slots, and lay the plywood base on the saw table with the blade retracted. Slide the base a few inches out over the forward edge of the saw table (toward the operator). Square the plywood with the edge of the saw table, and clamp it in position. (See photo, page 16.) Slide each runner out to meet the edge of the base, and drill and screw the runner to the bottom of the base.

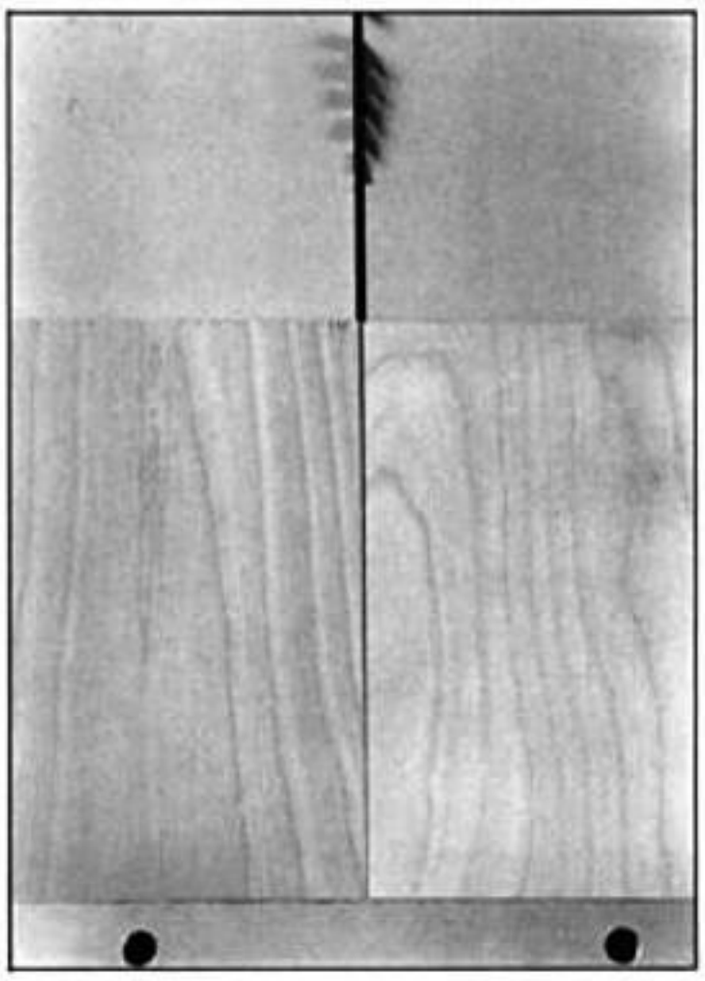
Next, slide the table and runners out over the edge of the saw table in the *opposite* direction. Then square, clamp, drill and screw as before. Take the base off the saw table, flip it over and run three more screws through each runner into the base.

Mount the fences—The secondary fence on the far end of the box is simply screwed to the top edge of the base from underneath. Line up this fence flush with the edge, clamp it, drill and run in some 2-in., #8 wood screws about 4 in. apart.

The primary fence, nearest the operator, gets special treatment. The whole idea of a cutoff box as a precision crosscutter rests on the accurate alignment of this fence square to the blade. Here's the procedure for getting it just right.

Line up the primary fence flush with the edge of the base, and mount *two* screws through the base into the fence, one near each end. Now place the cutoff box on the edge of the tablesaw, raise the blade an inch or so, and slowly push the box across the blade, cutting a kerf in both fences and the base.

You'll need to make some test cuts to square up the fence. Joint one edge of a wide board, and rip the other edge so that both edges are perfectly parallel. Place



To calibrate the fence for square, cut a board with parallel sides in two, and flip one of the two pieces over. The test cut will show a gap that's twice as wide as the fence is out of square.

the board against the cutoff box fence, and cut the board in two.

To check the cut for square, take one of the two halves of the test piece, flip it over front to back, and lay it down beside the other piece so the freshly cut edges are together (both pieces still against the cutoff box fence).

Now if the edges match perfectly, it means the cut was exactly 90°—a perfect square cut—and you're home free. More than likely, there'll be a small gap between the pieces. (See photo above.) The angle of the gap will be twice the amount that the fence is out of square.

For reference, mark the position of the fence on the laminate surface with a pencil. Remove *one* of the fence mounting screws, and shift the fence position in the direction that will reduce the error. Try to move it about half the angle of the gap across the test pieces. Drill and install another screw near the first screw hole. Try the test again. Repeat this procedure until the test pieces come out gap free. When you've got it, install more fence mounting screws about 4 in. apart.

The Biesemeyer Saw Stop is designed to fit a wider, lower fence than the one on our cutoff box, so we had to make some minor modifications to fit the stop to our fence. (See detail, Fig. 1.) We made an extension for the stop screw from a small piece of mild steel—¼ × ¾ × 2¼ in. This involved drilling a hole ¼ in. in from each end. The top hole was 5/16 in., and the bottom hole was ¼ in. We tapped screw threads in the bottom hole with a 5/16-in. × 18 tap for the stop screw and lock nut that came with the Biesemeyer Saw Stop. The extension just bolts to the frame of the Biesemeyer Stop.

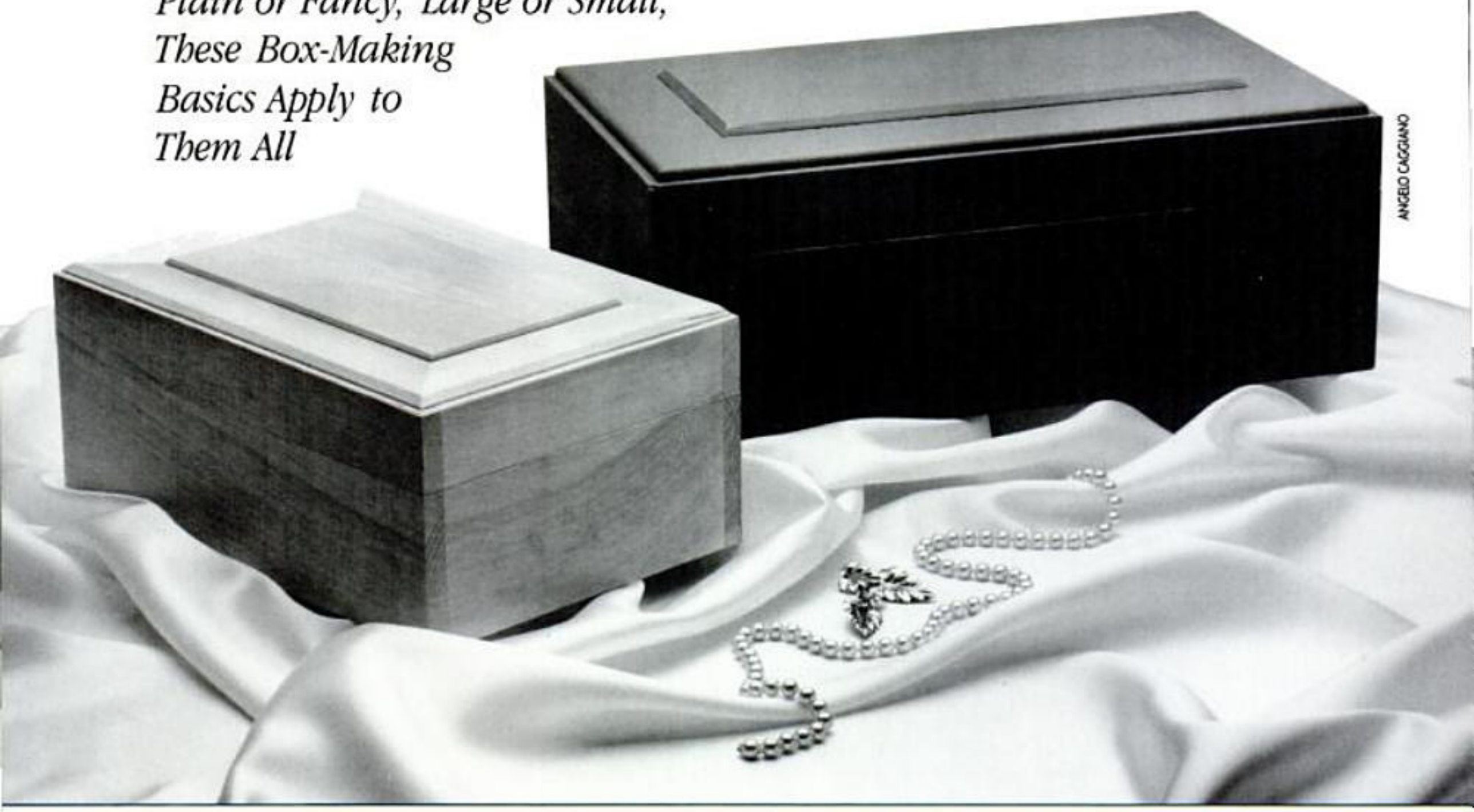
The Biesemeyer Stop is designed to fit on a 1½-in. wide fence, so we epoxied a ½-in. thick wooden shim to the inside of the outboard arm, as shown in the drawing.

One last thing. When you use the box, it's easy to forget that the blade will pass *all the way through* the fence. Paint a red warning stripe around the kerf in the fence on the operator's side, as a reminder to keep your fingers away. ▲

Dave Sellers is assistant editor of AMERICAN WOODWORKER.

BUILDING A BOX

Plain or Fancy, Large or Small, These Box-Making Basics Apply to Them All



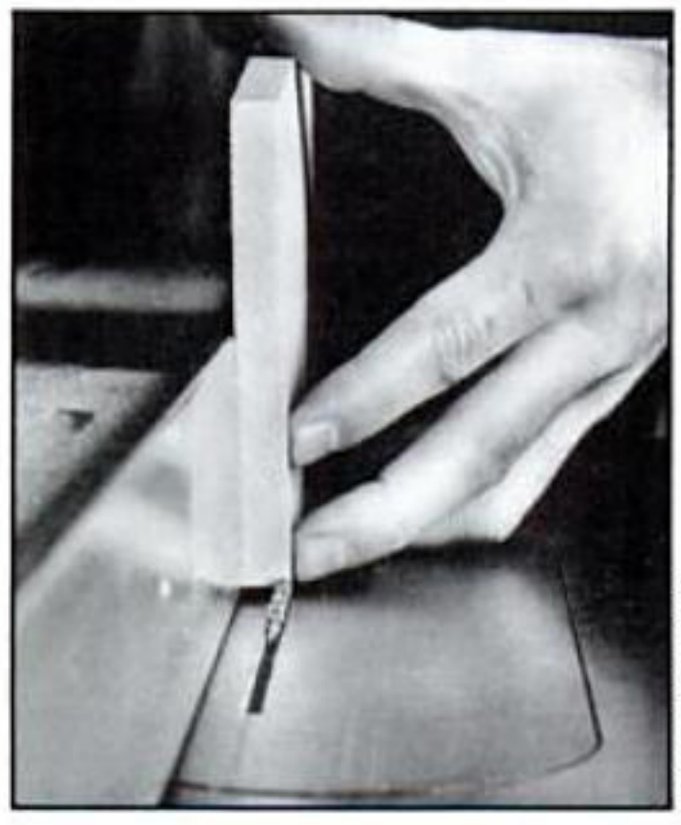
ANGELO CAGGIANO

For papers and pencils or platinum and pearls, wooden boxes make wonderful gifts. All the joinery on these simple boxes can be done on the tablesaw.

BY ROGER HOLMES

One of the first things I made when I started woodworking about 20 years ago was a little jewelry box. I wince today when I think of how poorly it was made, but I couldn't have been happier with it at the time. Best of all, the friend I gave it to was thrilled. Over the years, I've had a lot of fun making a variety of small wooden boxes. They make wonderful presents—in a weekend you can take care of a half-dozen people on your Christmas list. More complicated boxes, with dovetail joints, interior lining and compartments, carving or inlay, take more time but can be very satisfying tests of your woodworking skills.

One of my favorite box designs is shown here. Its construction is simple—I usually cut all the joints on the tablesaw, though a router table or hand tools work just as well. I got the design idea from looking at En-



Use a box side as a thickness gauge to set the fence for the first cut of the corner-joint groove.

PHOTOS BY SCOTT LANDIS

glish writing boxes, many of which employ the same, simple joinery and lid construction. Most writing boxes I've seen are veneered, but I prefer to make my boxes of an interesting hardwood or of pine, which I paint and sometimes chip carve. You can make them virtually any size—the same construction even works nicely for blanket chests.

Making this box of solid wood poses only one real construction problem. The top and bottom panels must be able to move with changes in humidity. If not, they'll split as they shrink or push the box apart as they expand. The easiest solution is to house both top and bottom panels, unglued, in grooves plowed in the box sides. This works fine for the bottom, but I think the proportions of the narrow sides to the wide panel look awkward on the top. The frame-and-panel top shown in the drawings is a bit more work to make, but to my eye it looks a lot better.

In the Workshop

The steps in making the box are as straightforward as the box design. I mill all the pieces to size, cut all the joints, assemble the sides and bottom, make the frame and panel, rabbet the box for the frame and glue it in place. Then I cut through the sides of the box to separate the box and its lid. If you're making more than one box, complete each step for all the boxes before moving on to the next.

Mill the pieces to size—It's important that the pieces of a box be flat and square. Just one warped or out-of-square side can make assembly difficult, if not impossible. First, cut out all the pieces to rough length and width. For convenience and safety at the jointer and thickness planer, I combine a long and a short piece of the same dimension (two sides or two top-frame members, for example) laid out end to end on a single long board. If the boards I'm working with are thick enough (1¼-in. or more), I'll often resaw them on the bandsaw and pair the matched pieces. (See September/October, 1988 *AW*.) Mill several extra pieces now for use when setting up to cut the joints later.

Plane one face of all the pieces flat on the jointer or by hand, then thickness them all to ½ in. If you don't have a jointer or planer, it's worth seeking the help of a friend who does or having this work done at a local mill. The extra trouble or expense to make the pieces flat will save a lot of grief later.

Once you get the knack of basic box making, you can keep busy for a long time going your last box one better.

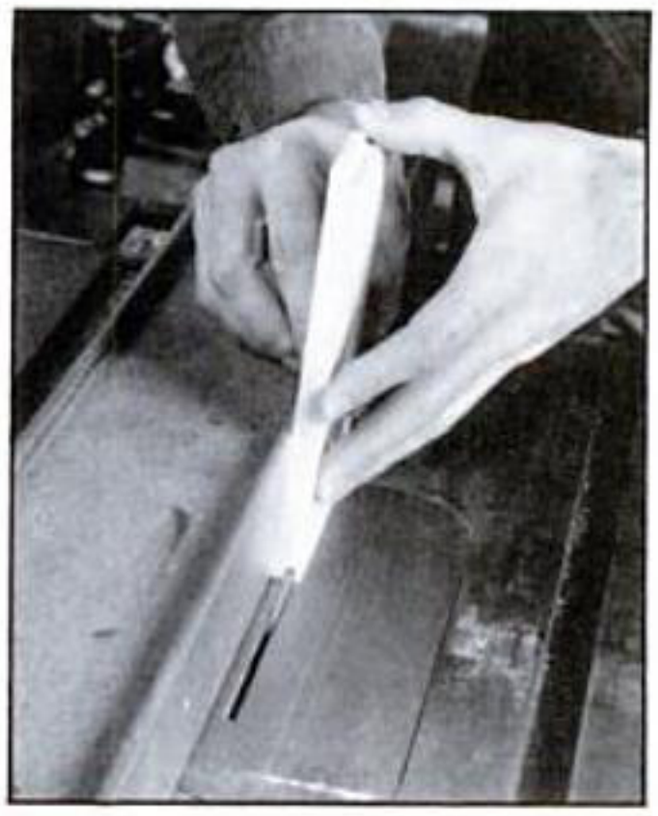
Laying parts for the top and bottom aside, I cut the sides to exact size. After jointing one edge of each board, I rip them to width, then crosscut to length, being careful to place the newly jointed edge against the rip and miter fences. By setting a stop on the wooden miter-gauge fence (I use a block of wood and a C clamp), you can ensure that pairs of sides will be exactly the same length. I check with a square to make sure that the ends of each piece are square to the jointed edge and correct any problem with a sharp hand plane. I mark the outside face and top edge (the jointed edge) of each piece for reference when cutting the joints.

Cutting the joints—This kind of box is often made with a simple rabbeted joint at the corners, as shown in Corner-Joint Detail, Fig. 1. But unless it is reinforced with nails or screws, the rabbetted joint relies entirely on end-grain-to-side-grain gluing, which is inherently weak. I prefer a tongue-and-groove joint which adds a fair amount of mechanical strength to the glue joint. It's not much more trouble to cut on the tablesaw and a little easier to assemble.

If the sides are ½-in. thick or less, I make the tongues about ⅓ to ½ the thickness of the sides; ¼-in. thick tongues are fine for thicker sides. The same rule applies to depth. I always cut the groove in the long sides, so the end grain won't show on the front.

I think it's best to cut the grooves first, then cut the tongues to fit. Set the tablesaw rip fence using a box side as a gauge to set the distance between the far side of the blade and the fence, as shown in the photo on page 18. Lay the side flat on the saw table and against the blade, so you can set the blade height. Make a test cut to be sure you have the depth-of-cut right, then cut all four grooves. If the sides are 5 in. wide or more, I push them through freehand with the end of the stock against the fence. If they're narrower, I push them

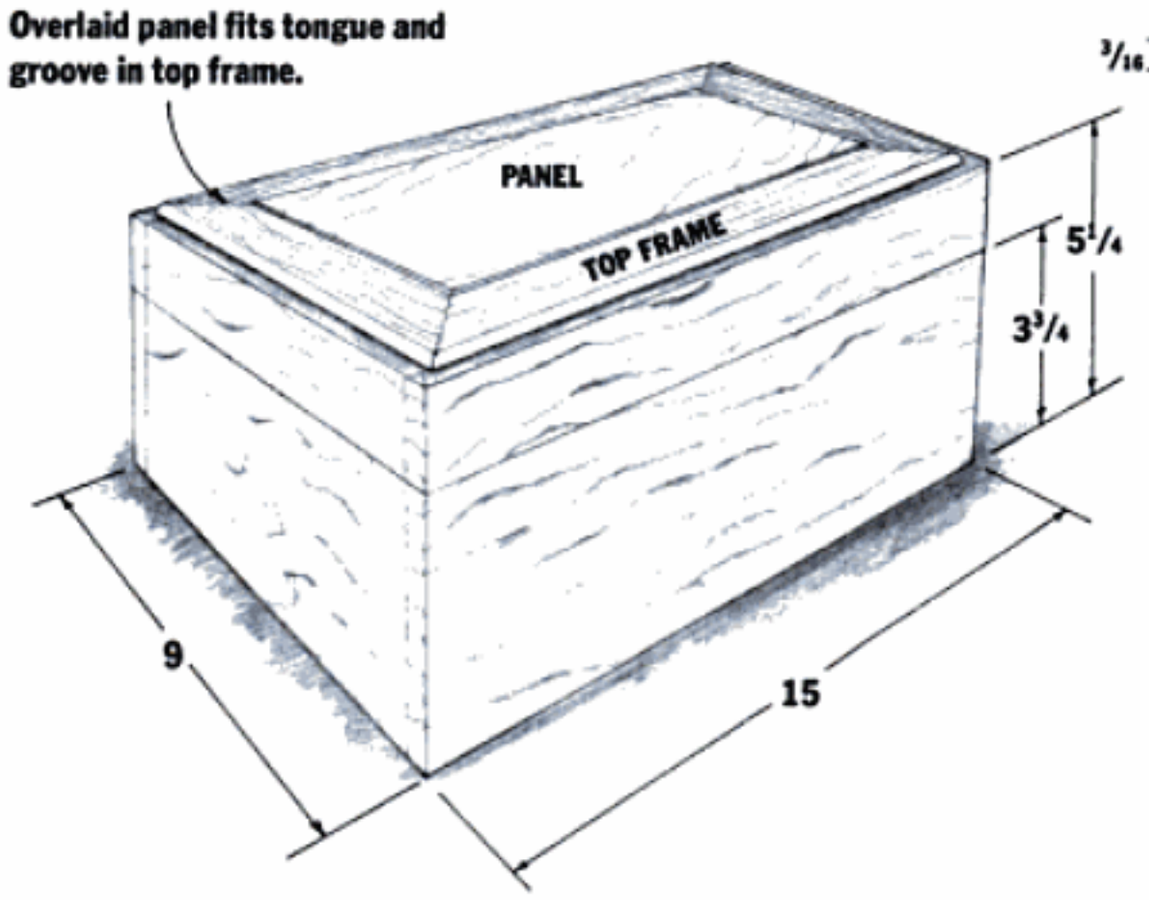
Cut the corner-joint groove, keeping the end of the stock against the rip fence to locate the groove shoulder. Use the miter gauge on sides narrower than 5 in.



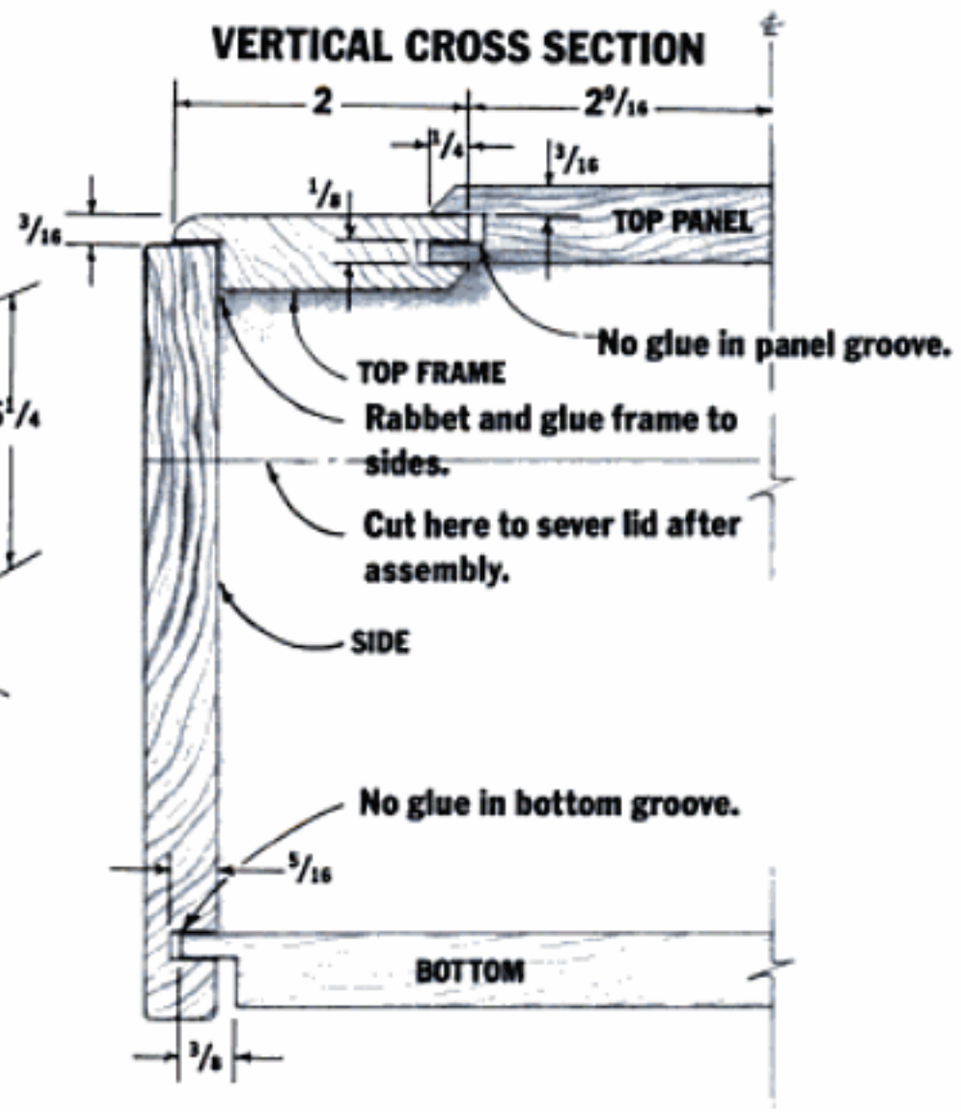
If the box sides vary slightly in thickness, cut the corner-joint tongues by setting the rip fence to the thickness of the tongue and holding the box side vertically.

FIG. 1: A SIMPLE BOX

OVERALL VIEW



VERTICAL CROSS SECTION

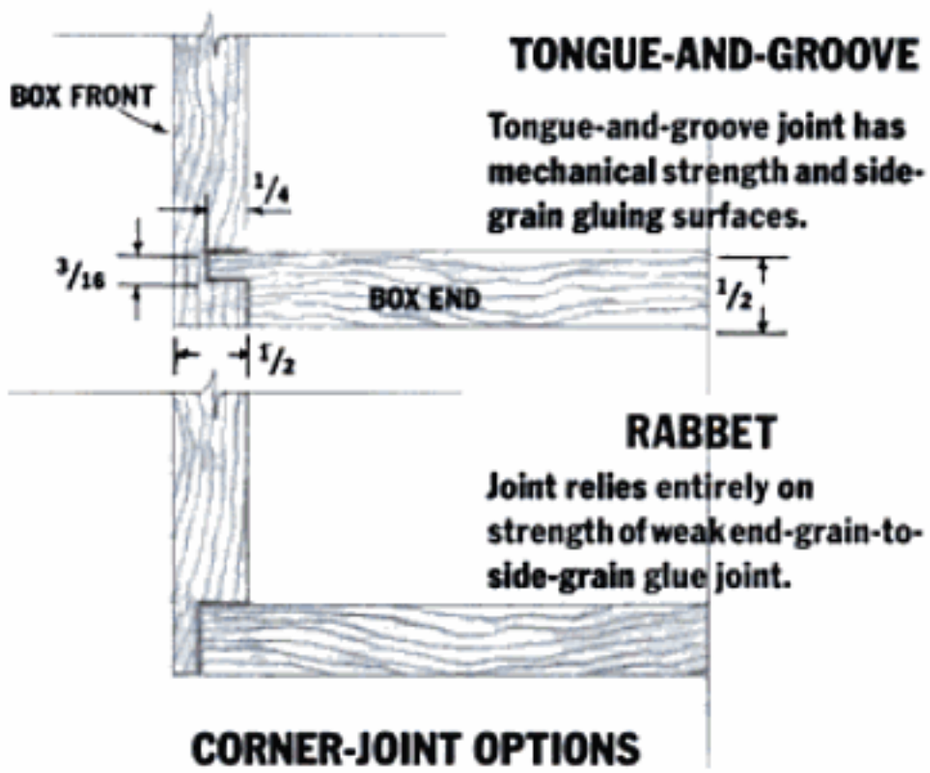


TONGUE-AND-GROOVE

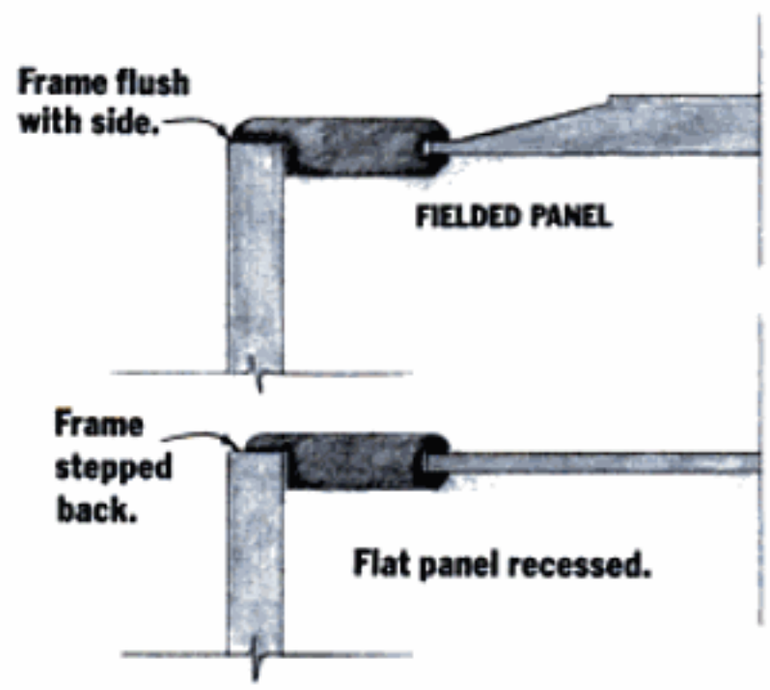
Tongue-and-groove joint has mechanical strength and side-grain gluing surfaces.

RABBET

Joint relies entirely on strength of weak end-grain-to-side-grain glue joint.

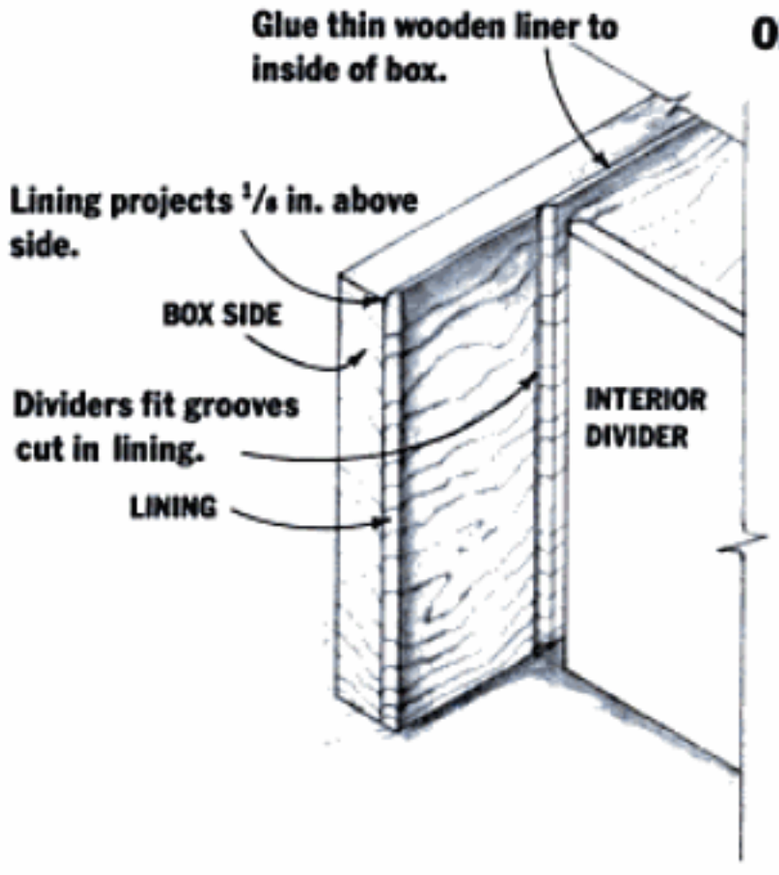


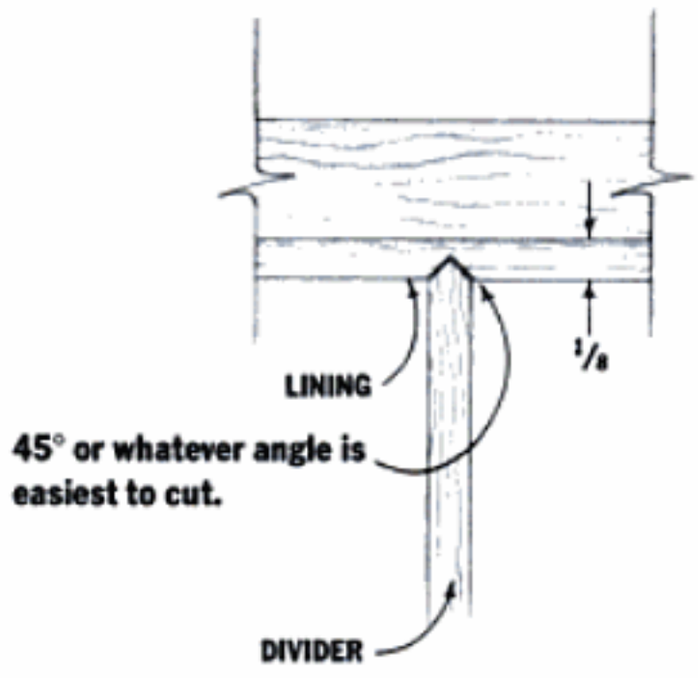
CORNER-JOINT OPTIONS



ALTERNATE FRAME-AND-PANEL TREATMENTS

OPTIONAL WOOD LINING





DRAWINGS BY KARL SHUMAKER

with a miter gauge, still keeping the end against the rip fence. For grooves wider than a saw kerf, you'll need to reset the fence closer to the blade and make a second pass.

You can cut the rabbet that forms the tongue in much the same way. Testing with a piece of scrap, adjust the height of the blade and the position of the rip fence until you cut a tongue that fits the groove snugly and stops just shy of the groove's bottom. The first cut, which establishes the shoulder and the tongue's length, can be made against the rip fence. I push the second cut, which clears the waste, through with the miter gauge.

This method works fine as long as the sides are *exactly* the same thickness. But if the sides vary, the thickness of the tongues will vary, too. To avoid this, an alternate method is to set the rip fence to the exact thickness of the tongue, and run the sides through vertically. (A featherboard helps keep wider sides pushed tightly against the fence.) After you've made this cut on all the pieces, reset the rip fence and blade height, and cut the shoulders with the stock face down on the saw table. I use a miter gauge and make successive cuts in from the end. The end of the stock butts against the fence to locate the last cut. If you make this shoulder cut first, you trap the waste between the blade and fence, where it will kick back at you.

Fit the bottom—I find it's faster if I rabbet the bottom panel to form a tongue to fit the grooves in the sides, than it is to make a traditional fielded panel. I cut the grooves and tongues on the tablesaw as I've described above, except I stop the grooves before the ends in the long sides, so they won't show at the joint. To start and stop the cut where I want it, I clamp two blocks of wood to the rip fence, as shown in the photo.

To start the cut, push the piece firmly against the rear block and the rip fence, and lower the far end slowly onto the spinning blade, as shown in the photo, and make the cut. When the far end touches the other block at the end of the cut, pivot the stock up off the blade from the near end, keeping the far end against the block. You'll need to clear the waste at each end of the groove with a narrow chisel.

This cut is perhaps more dangerous than the others, though I've done it safely hundreds of times. Still, I'm a little nervous each time. This is just as well, I suppose, as it concentrates the mind on making the cut safely. If you'd rather not try it, you can cut the grooves with a plunge router, or set a stop on the tablesaw blade-raising mechanism, and bring the spinning saw blade up into the wood. A quieter alternative is to cut the grooves with a plow plane.

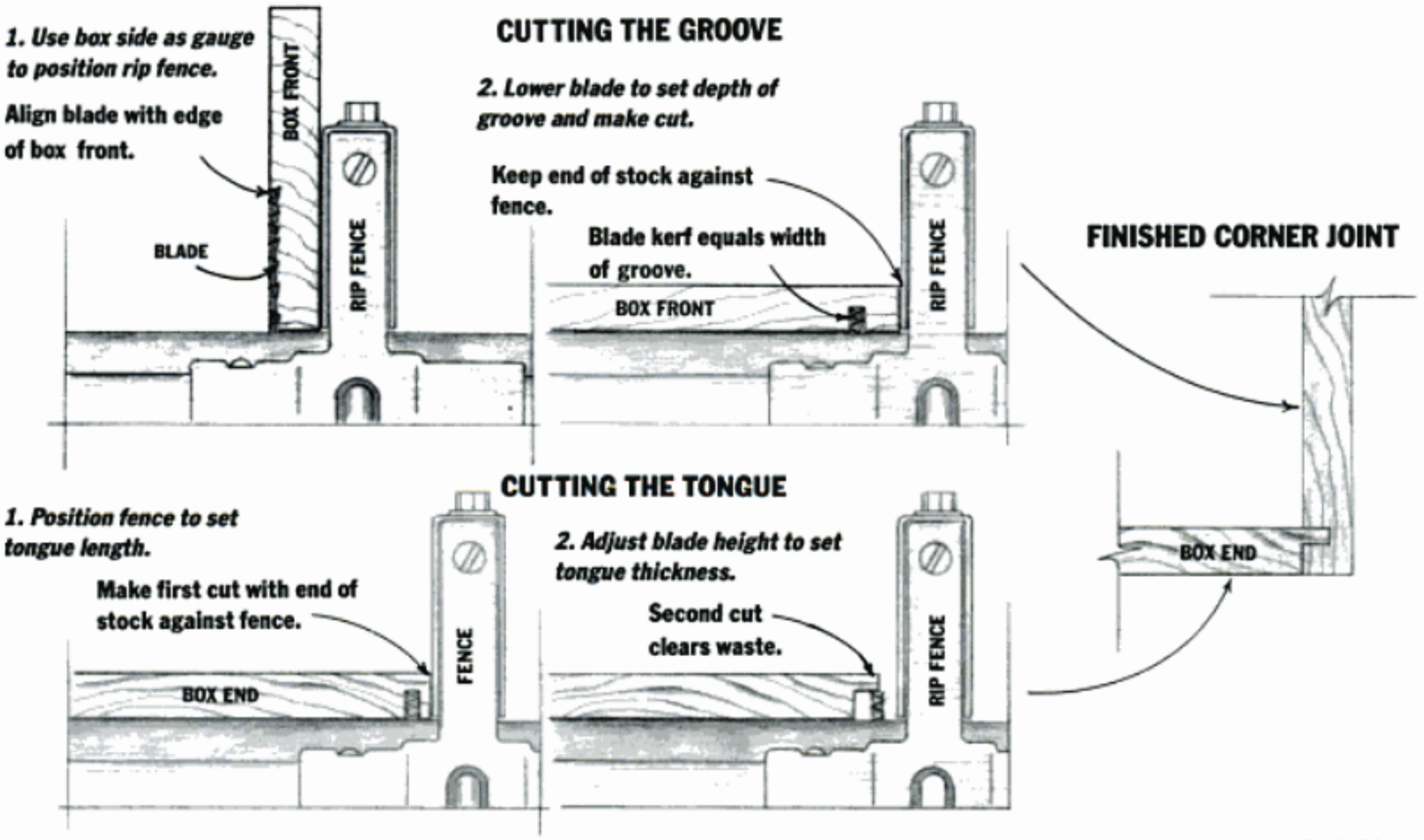
Assemble the box—I push the sides and bottom together dry to make sure everything fits. If I'm not lining the box with a thin, wooden liner (more on this later), I finish the inside surfaces by taking off a fine shaving with a very sharp plane. Next, I apply wax or finish, taking care to keep gluing surfaces clean.

Glue up the box on a flat surface—remember to keep the glue away from the bottom grooves so the panel will float. For small boxes, I use two pipe clamp or quick-action clamps across each end, bearing on clamping blocks that extend the length of the joints. To check for squareness, I measure across the diagonals of the top opening, altering the position of the clamps until the measurements are equal.

Make the top frame—The top panel floats in a mitered frame. You can vary the proportions of frame to panel, as well as the type of panel. I like the overlaid panel shown in the photo, but fielded or flat panels (shown in the drawing) look nice too, and are a little easier to make.

After selecting and marking the face of each frame member, I joint and mark what will be the inside edge, then rip the frame pieces slightly oversize to allow for final planing later. This is particularly important if I want the edges of the frame to finish flush with the sides of the box, rather than be stepped back.

FIG. 2: CUTTING TONGUE-AND-GROOVE CORNER JOINTS

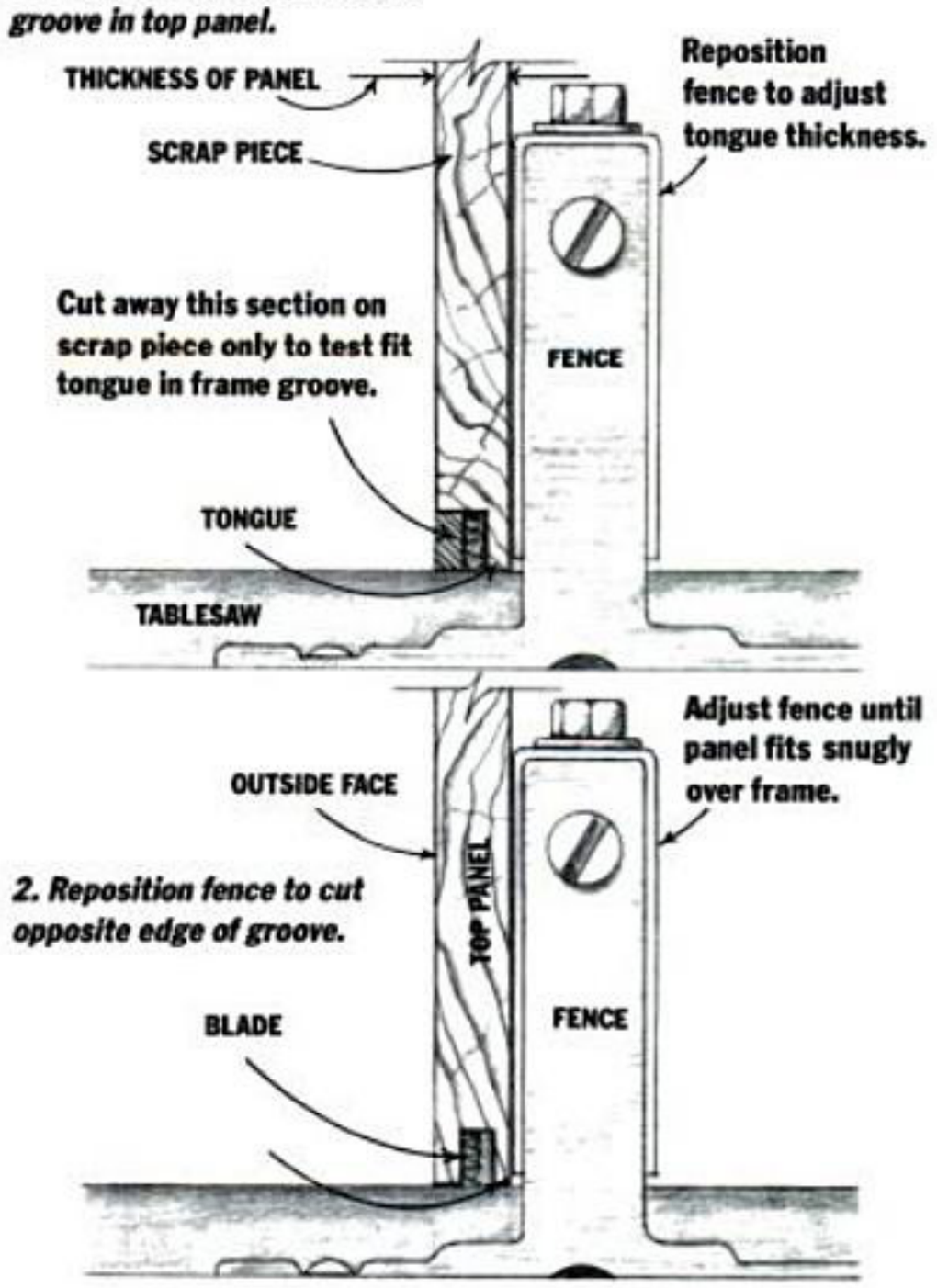


To cut a stopped groove for the box bottom, clamp stop blocks to the rip fence to start and stop the cut. To start the cut, push the stock firmly against the near block and fence, and lower the stock down onto the blade, pivoting the end against the near block. At the end of the cut, pivot the stock against the far block to raise the stock off the blade. CAUTION: Use this method only for sides long and wide enough to allow you to keep your hands well away from the blade. A simple jig (right) makes it easy to cut the top-frame spline slots.

Both of these treatments are shown in Fig. 1. I cut the miters on a tablesaw or by hand in a miter box, then lay the pieces on a flat surface to check that they go together square and without gaps, making any necessary adjustments with a sharp plane and the 45° stop on my homemade shooting board.

Cutting the grooves for panel and splines in the frame pieces is straightforward. Be sure to place the marked face of each piece against the rip fence for *all* the cuts. If you flop a piece when cutting spline grooves, the top surfaces of the frame won't be flush, and the overlaid panel won't fit.

FIG. 3: GROOVING THE TOP PANEL



The location of the grooves is determined by how far you want the panel to extend above the frame and how far you want the frame to extend above the box sides. If you don't want the spline to show at the outside corners of the frame, you must locate the spline groove so the end of the spline will be cut away with the rabbet. In some instances, the spline grooves and panel grooves may line up, so you can cut them at the same time. If so, you can make splines from scrap wood at the same setting you used to cut the tongues on the panel. If the frame pieces are narrow or short, you may want to make the simple jig shown in the photo to support them and cut the spline grooves safely. Of course, if you've got one, a plate-joiner will make short work of splines.

After the frame grooves are cut, but before cutting the groove in the panel, I take a shaving off the top surfaces of the frame pieces and the inside surface of the panel. It's easier to clean them up before assembly.

Groove the top panel—The trickiest part of making an overlaid panel is fitting the panel snugly into the groove in the frame *and* snugly against the top surface of the frame. A series of test cuts in pieces of scrap, that are the exact thickness of the panel, make the job easier.

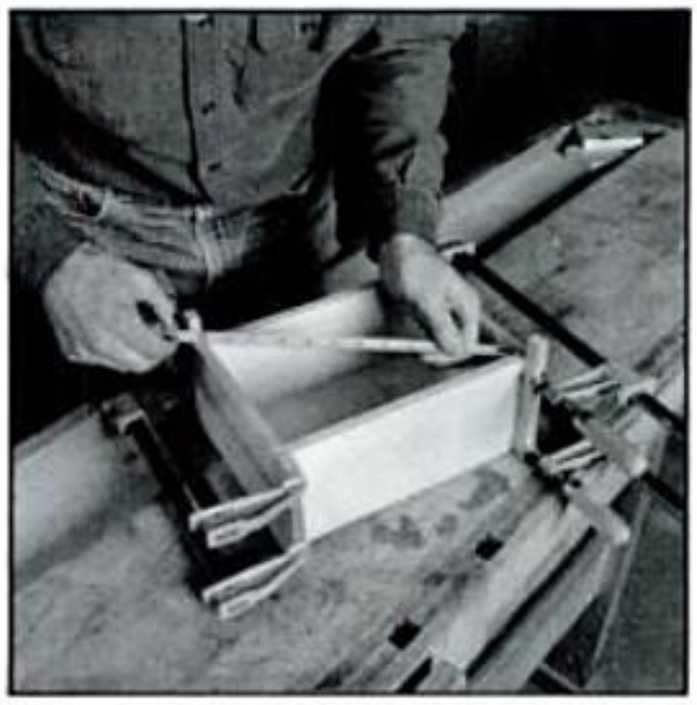
Set the tablesaw rip fence to cut the tongue on the bottom of the panel. Make the cut in one of the scrap pieces, then cut away the waste, as shown in Fig. 3, and test the tongue in the frame groove. When the setting is right, cut the panel. Hold the panel vertically using a featherboard, if necessary, to keep it tight and flat against the fence. Then make the same cut in the edges and ends of several pieces of scrap, so you'll have plenty of edges for making test cuts.

Reposition the fence for the second cut (see Fig. 3), and make test cuts in the grooved scrap until you get a setting that produces a snug fit to the frame pieces. When you get the right setting, make the cut around the panel.

Before gluing up, I round or chamfer the top arrises (the edges) of the panel and the inner arrises of the frame. I think gluing mitered frames is a nuisance, but if the splines are tight, there shouldn't be too much slipping around. I use quick-action or pipe clamps, but a band clamp might be easier. Again, be careful to keep the glue out of the panel groove.

Gluing on the top—When the glue has set, plane the bottom of the frame flat, and cut the rabbet that fits it to the box. I think the best method is to make the first cut with the frame held vertically against the rip fence, then clear the waste with the frame lying flat

Glue up the box with clamps across each end, bearing on clamping blocks that extend the length of the joints.



Cut off the lid after assembly. Saw through both ends, then drop the blade 1/32 in. less than the side thickness. Cut the two long sides, then saw through the thin strip that remains with a handsaw.

After cutting the miters on the tablesaw, trim them with a plane on a 45° shooting board.

on the saw table. Although gaps between the rabbet shoulders and the inside of the box don't affect the joint's strength much, I don't like to see them. To solve this, I cut the shoulders slightly full and trim them with a shoulder plane, until the top just slips onto the box. Then I plane the top edges of the box flat and clean up the rabbet with a shoulder plane to eliminate gaps that would show on the outside of the box.

A few quick-action clamps on wooden clamping blocks attach the top to the box. To keep glue squeeze-out to a minimum (it's a nuisance to clean up inside, or against the edge of a stepped-back frame), I run a bead of glue down the corner of the rabbet and spread it out only about half-way onto the rabbet surfaces.

Cut off the lid—Before cutting off the lid, I plane the bottom of the box flat and clean up all the exterior surfaces with a sharp plane and cabinet scrapers.

To sever the lid, set the tablesaw blade just slightly higher than the thickness of the sides, and run the box bottom against the rip fence to cut through the two ends of the box. Next, drop the blade down so it's about 1/32 in. *less* than the thickness of the sides, and cut the two long sides. Saw through these thin sections with a handsaw to free the lid.

Sometimes my rip fence isn't exactly parallel to the saw blade, and I get a nick at the end of each cut. Small nicks are easy to plane off; larger ones indicate that your saw needs tuning up. Whether nicked or not, I plane the saw marks off the edges of the newly cut box and lid and make a light pencil mark on one face across both lid and box, so I can easily orient them while fitting a pair of brass butt hinges.

Wooden linings—I like to make thin, wooden linings for the insides of boxes. The linings on the sides of the box extend 1/8 in. or so above the top edge of the box to make a friction fit with the lid, so the box opens and closes with a satisfying click. (Smallish boxes made this way don't even need hinges.) You can also fit internal divisions into the linings, which is much easier than trying to joint them into the box carcase itself. (The *V*-groove joint shown in Box-Lining Detail, Fig. 1, is easy to cut on the tablesaw by tilting the blade.) You can make linings of the same wood as the box or of a contrasting wood. The grain must run the same direction as the box sides. Except for very small boxes, I make linings about 1/8 in. thick, and miter them at the corners. A line of glue just below the top edges of the sides and a few dabs elsewhere hold the linings in place. The top edges must be rounded to allow the box to open and close—it looks nicer, too.

I think boxes of just about any size work fine without handles. But they work fine with them, too, and handles can be fun to make. If you want to get fancy, you can fit a nice brass half-mortise lock, or make your own lock. In fact, once you get the knack of basic box making, you can keep busy for a long time going your last box one better. ▲

Roger Holmes writes and woodworks in Woodbury, Connecticut.

MISSION-OAK ARMCHAIR

Reproduce a Turn-of-the-Century Arts-and-Crafts Classic

BY DAVID SLOAN

This oak armchair is typical of the sturdy, functional furniture popularly known as "Mission Oak." The name Mission derives from the notion that the style was inspired by furniture from the Spanish missions of early California. It wasn't. Mission is a misnomer. The style has its roots in the English Arts-and-Crafts Movement of the late 1800s and is more properly referred to as Arts-and-Crafts furniture. In America, the Arts-and-Crafts style peaked in popularity just after 1900. By 1916 it was considered passé.

This chair is similar to armchairs built during that period by Gustav Stickley, Roycroft Workshops, and several other American firms. There are no marks or labels on the original chair in my home, so it's impossible to say who made it. With it's raked-back posts, it's jauntier and more graceful than most Arts-and-Crafts armchairs, and it's comfortable enough that I decided I needed two of them. In this article, I'll explain how to make a reproduction.

It's a relatively easy chair to build because there isn't any bending or curved joinery involved. Everything goes together with mortise-and-tenon joints. Things get interesting where the side rails and stretchers join the curved back post, but it's a simple task to get these joints to fit. If you're put off by the idea, just forget about the curve, and make the back post straight from the top edge of the seat rail to the floor.

Most American Arts-and-Crafts furniture was made of white oak, and this armchair is no exception. Red oak would work just as well, if you can't find a local source for white oak. You'll need some 8/4 stock for the front and back posts, the crest rail, the back rail and the seat blocks, but everything else can be made from 4/4 stock. If you don't have a jointer and a planer, pay the guy at the lumberyard to surface the boards for you and plane everything to final thickness. (See Bill of Materials.)

Building the Chair

Start by cutting the front posts to size. Each front post has a 1/2-in. long stub tenon on the end that fits into a blind mortise in the underside of the arms. This treatment is somewhat unusual for chairs of this style. Most Arts-and-Crafts armchairs have through tenons that protrude about 3/16 in. or so above the arm surface. These through tenons are usually finished off with decorative chamfers cut with a chisel. Structurally, the through tenons don't add much, but they look real nice, and the protruding tenons give your fingers something to fiddle with when you're sitting in the chair. You might want to try them on this chair.

After you've done the front posts, lay out the curved back posts on a piece of squared-up stock that's 1 1/2 in. thick. Refer to the gridded area in Fig. 1 to reproduce the curve. Bandsaw the back posts to shape, and you're ready to lay out and cut the mortises for the rails, stretchers, back rail and crest rail.

When you lay out the seat rail mortises on the front and back posts, note that the seat rails are not centered on the leg posts. (See Side and Back views, Fig. 1.) But the side stretchers are centered on the posts.

The side seat rails and stretchers join the leg posts at an angle, so the mortises for the side rails and stretchers must be cut at an 86° angle. (See Tenon Detail, Fig. 1.) This is no problem if you're chopping the mortises by hand with a chisel. A power tool approach, however, will require you to angle the stock with respect to the cutter. I don't own a slot mortiser or a hollow-chisel mortising attachment for my drill press, so I cut the mortises with a plunge router and a 3/8-in. spiral or straight bit (available from MLCS, P.O. Box 4053 C2, Rydal, PA 19046, 800-553-9298). To guide the router at the proper angle, I made the simple trough-type jig shown in Fig. 2.

Cut the mortises for the seat rails, stretchers, back rail and crest rail. Next, cut the tenons on the rails and

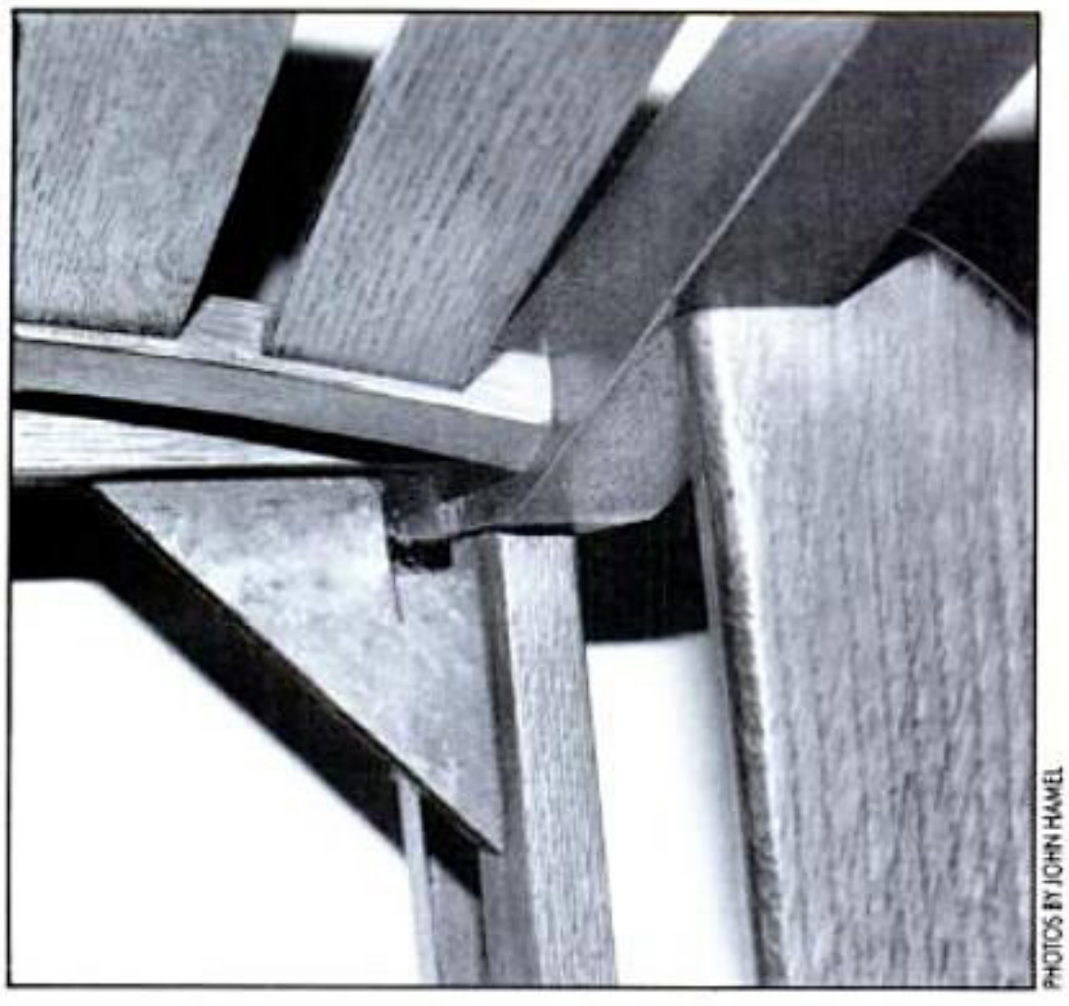
JOHN HAMEL

Mission is hot. Turn-of-the-century Arts-and-Crafts furniture, such as this white oak armchair, is in big demand among furniture collectors.

With the cushion removed, you can see the details of the chair's construction.

stretchers. All the tenons are 3/8 in. thick by 3/4 in. long. The shoulders of the tenons on the side seat rails and stretchers must be cut at an 86° angle, as shown in the Tenon Detail, Fig. 1. The tenons themselves are straight —it's just the shoulders that are angled. Tilt the blade on your tablesaw to cut the shoulders, and clean up the corners with a chisel.

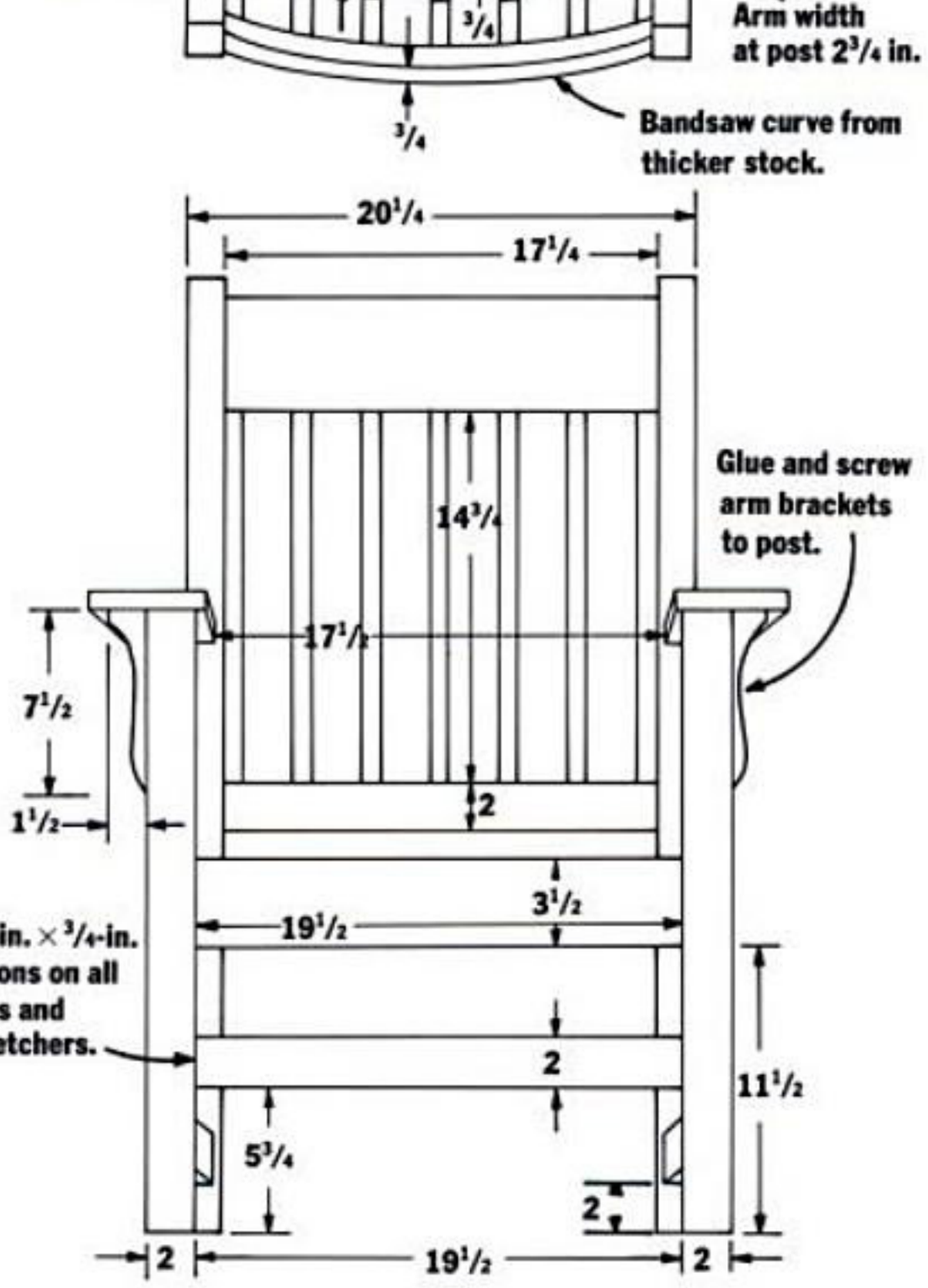
After you've cut all the tenons, you'll need to trim the shoulders of the side seat rails and stretchers to fit the curve of the back leg. Here's how I did it: Working



PHOTOS BY JOHN HAMEL

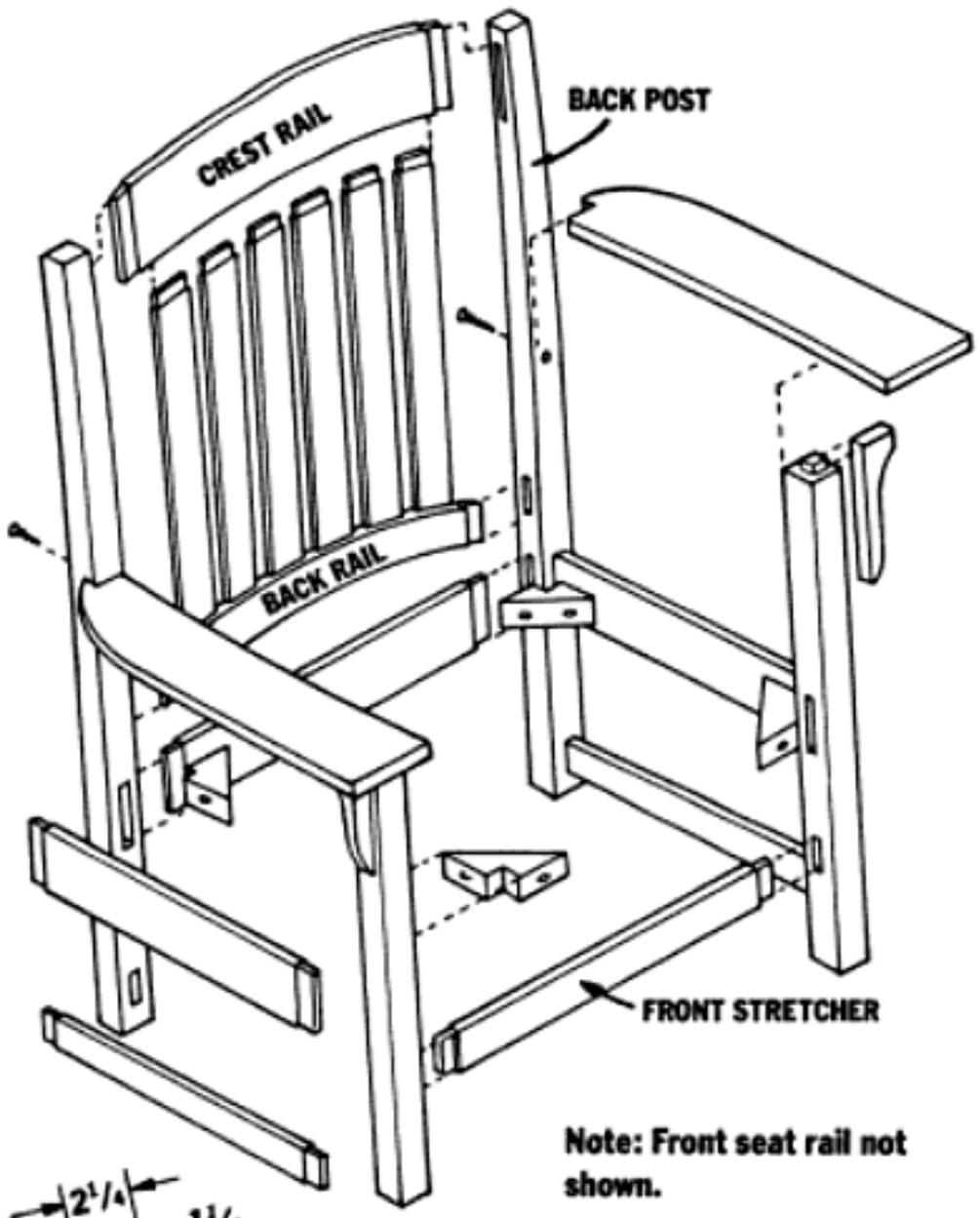
The back post begins its backward lean just above the point where the seat side rails join the post at an angle.

FIG. 1: MISSION-OAK ARMCHAIR



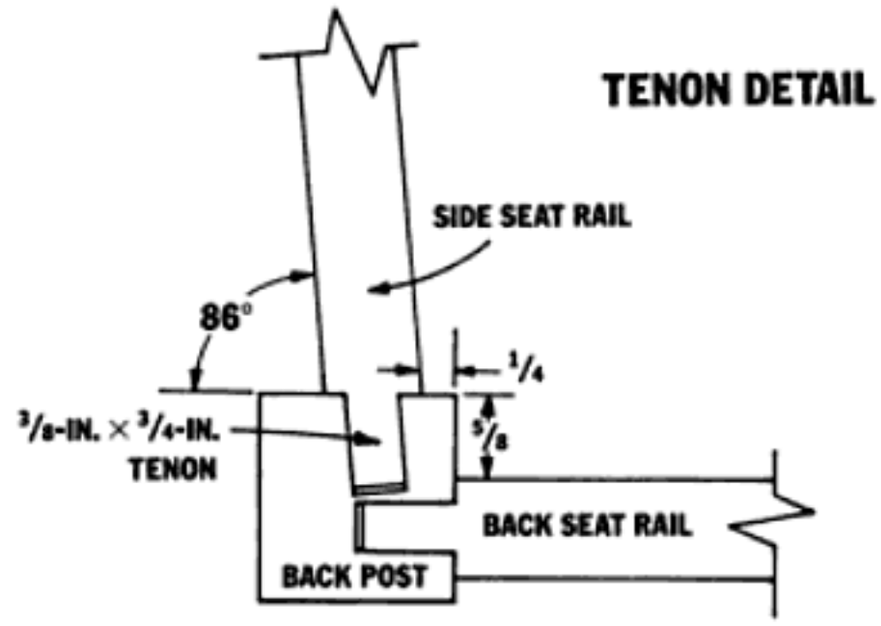
with one side of the chair at a time, assemble the front post, back post, side seat rail and side stretcher. Close up the joints with a minimal amount of clamping pressure. Run the side of a pencil along the curve of the leg to transfer the curve to the side rails and stretchers. Be sure to mark both sides. Then trim to the line with a sharp knife or chisel.

Now you should be able to dry assemble the two sides of the chair individually. After you've assembled the sides, put the front and back seat rails in their mortises, along with the front stretcher, and hold the chair together with a couple of clamps.

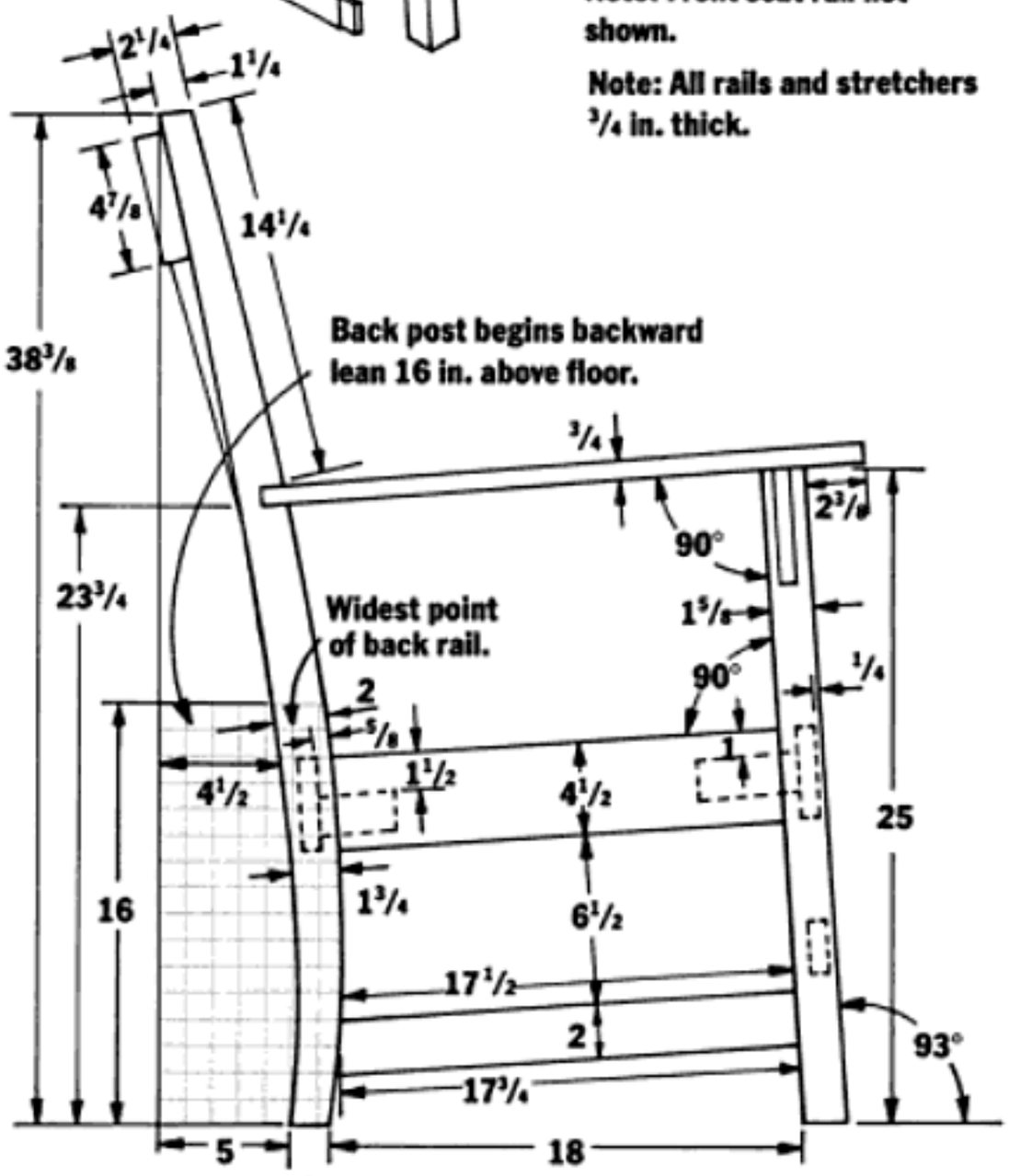


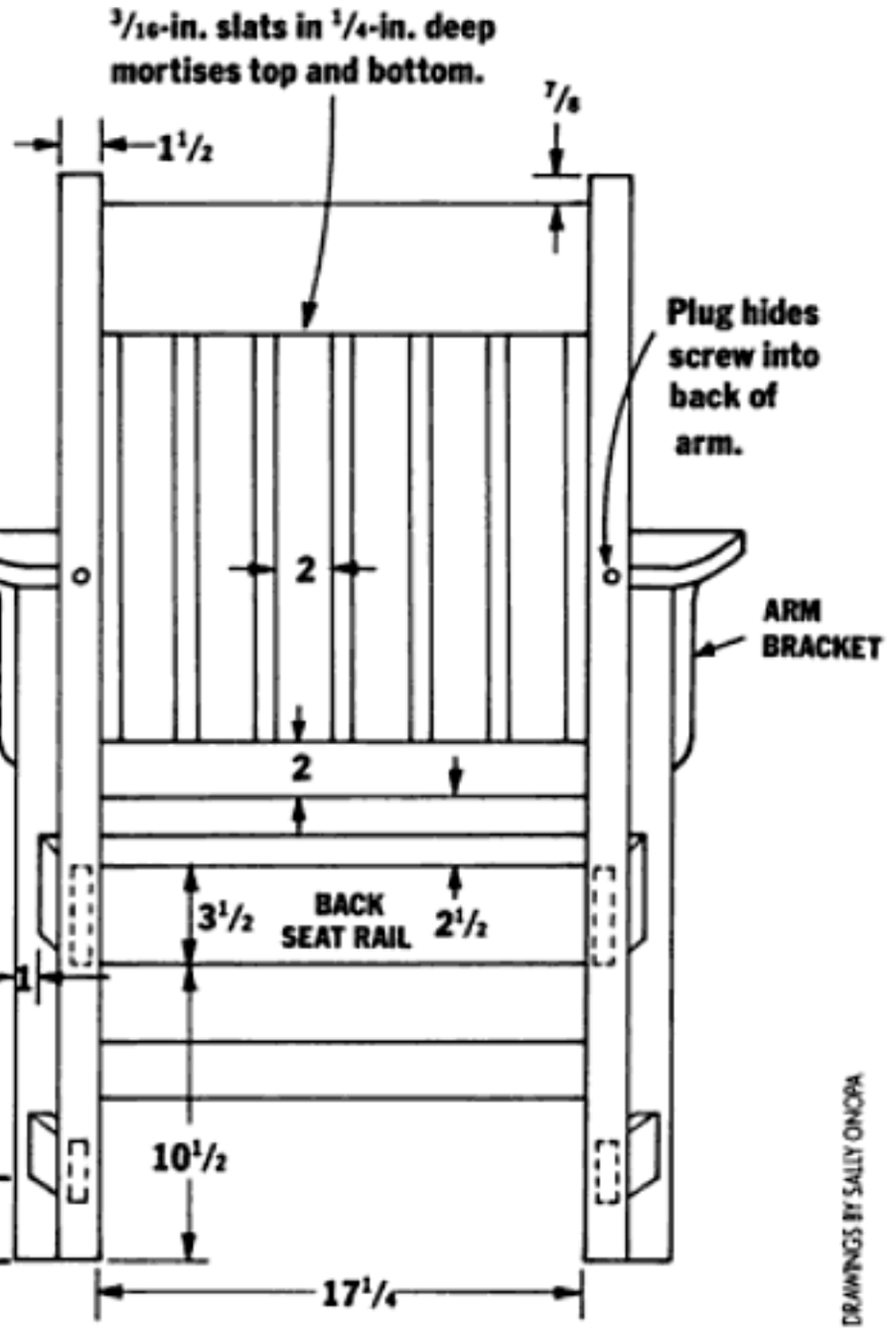
Note: Front seat rail not shown.

Note: All rails and stretchers 3/4 in. thick.



Section through back post and seat rails.





DRAWINGS BY SALLY ONOPA

1 1/2

The crest rail and back rail are curved to make the chair more comfortable. Both pieces are bandsawn from 8/4 stock. I found it easiest to cut the mortises on these two curved pieces, while the stock was still square and full thickness. Once the joinery was complete, I bandsawed the curve. This left a lot of rough ridges that I trued up with a scraper and a belt sander.

After cutting these two curved rails, the next step is to cut the mortises for the slats. Each slat fits into it's own pair of mortises. After all that work removing the bandsaw marks, I didn't want to run the risk of a runaway router ruining the curved rails. To avoid that, I hogged out most of the waste on the drill press and cleaned up the slat mortises with a mortising chisel.

Bandsaw the arms to shape next. The back ends of the arms fit into notches cut in the back posts. A screw through the back of each post holds the arms in place. The screw heads are concealed with oak plugs, which fit into counterbored pilot holes.

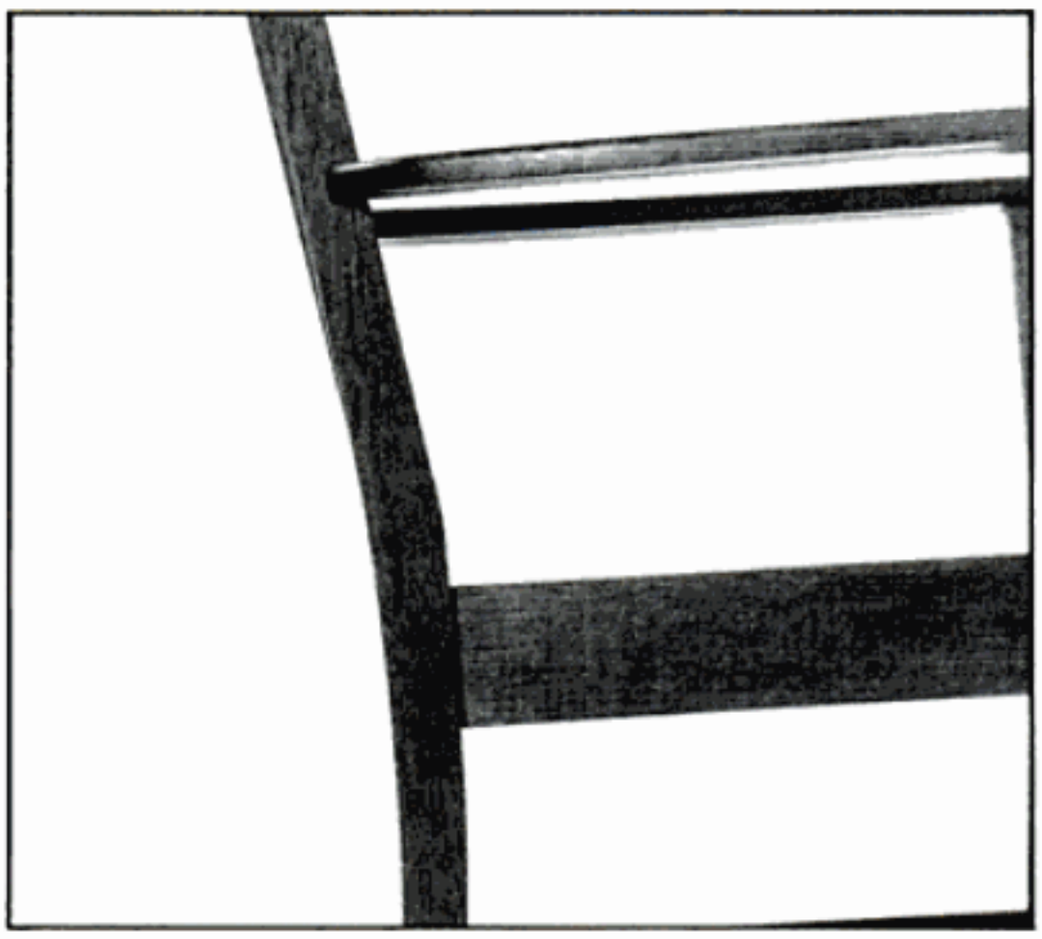
Locate and cut the notches in the back posts with a backsaw and chisel. Fit the arms into place. Next, mark and cut the mortises for the front post tenons in the underside of the arms. Finally, drill and counterbore for the screw that holds each arm to the back post.

Remove the arms, and round over their top edges with a round-over bit. All other corners on the original chair are left square—just softened slightly with sandpaper. Instead of sanding the edges, I prefer to chamfer them very slightly with a block plane. I always count the number of plane strokes, so that each edge has the same chamfer.

I suggest sanding everything down to 220-grit and dampening the wood with water to raise the grain. When the wood is dry, whisk off the fuzzy, raised grain with fresh 220-grit paper. I usually raise the grain twice—three times if I intend to color the wood with a water-soluble aniline dye, as I planned to do here.

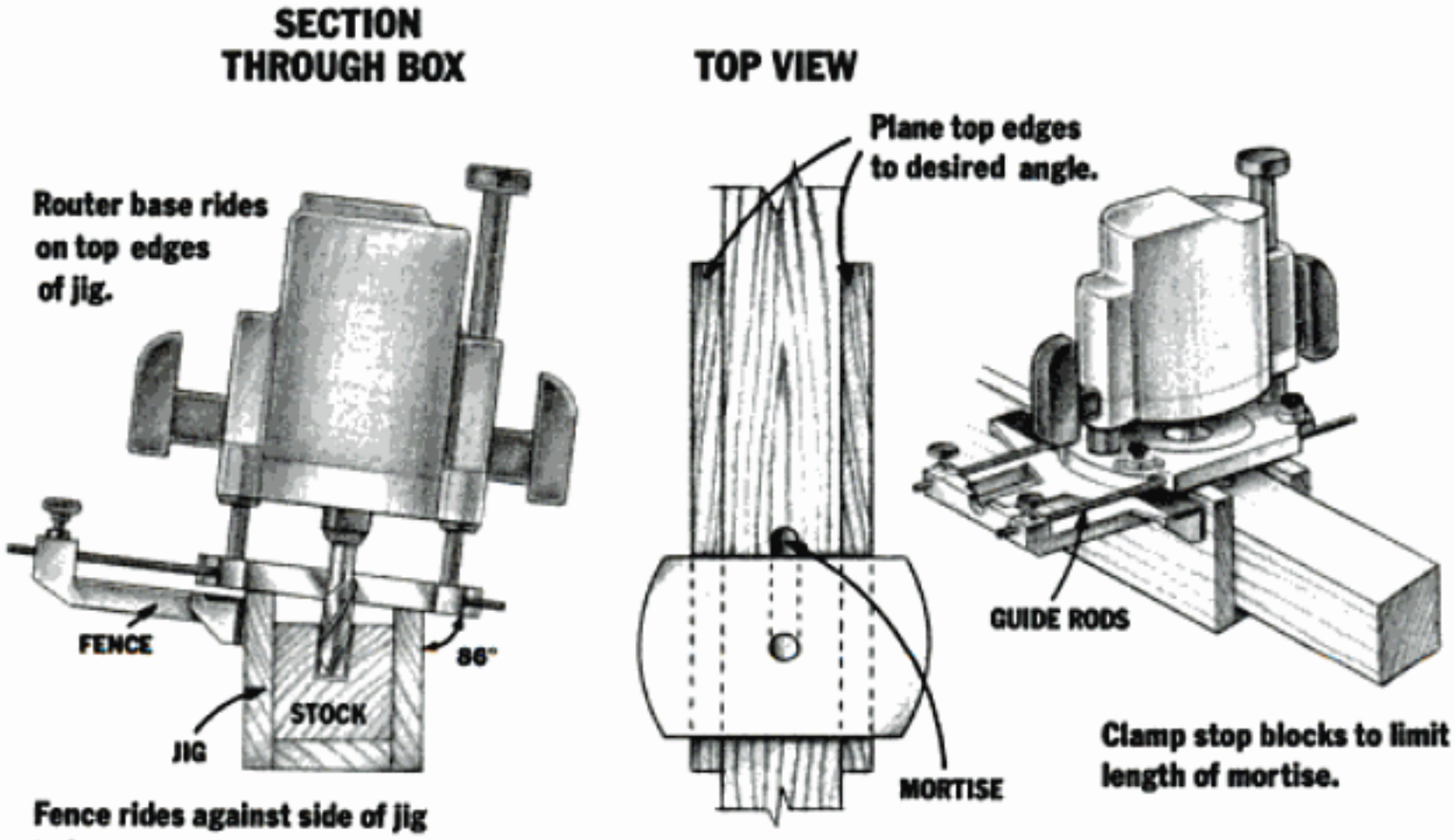
When you're sure that everything fits, you're ready to glue up the chair. I strongly suggest that you have a helper or two on hand to assist you. Assemble the crest rail, slat and back-rail assembly first, and set it aside. You don't need to glue the slats in their mortises unless you were sloppy and they wobble a lot.

Next, assemble the two halves of the chair, consisting of the posts, side rails and side stretchers. When these assemblies have dried, you can put the two halves together with the remaining rails, stretchers and back assembly. Finally, put the arms in place on the front posts and screw them to the back posts.



The rear leg starts to lean backward from a point 16 in. off the floor.

FIG. 2: ROUTING ANGLED MORTISES



Fence rides against side of jig to locate mortise.

The next day, when you take off the clamps, glue and screw the four seat blocks to the insides of the seat rails. As shown in Fig. 1, the two rear blocks sit lower in the rails than the front blocks. Drill through the backs of the leg posts into the crest rail tenons, and pin the tenons with small hardwood pins. Don't forget to plug the screw holes at the back of the arms.

The original chair is dark, most likely the result of a "fuming" process that caused the oak to darken from concentrated ammonia. (See January/February, 1990 *AW*, page 54.) You can get the same effect with a dark stain or dye. For a final finish, I recommend a couple of coats of an oil finish such as Watco or Minwax Antique Oil Finish.

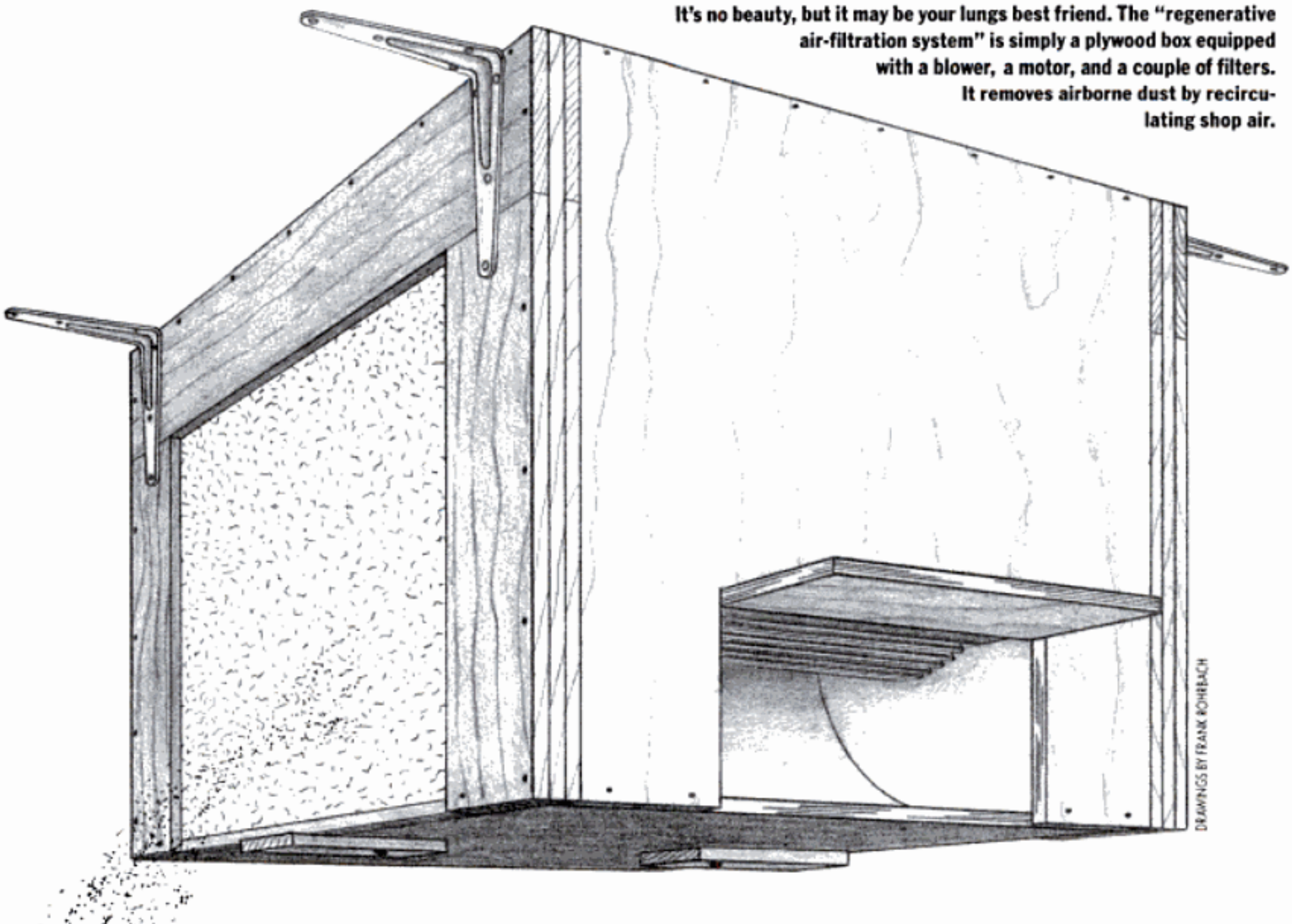
If you want to try your hand at upholstery, be my guest. Upholstery is a skill I've never been able to master. There are lots of good books and articles on the subject. The original chair had a leather seat over a foundation of springs and webbing. For the reproduction, I cut a 3/4-in. plywood seat board to fit loosely inside the rails (about 1/4-in. gap all around). I took the seat board to an upholstery shop, picked out a fabric I liked, and for $70, I got a much nicer seat than I could ever have done myself. Leather will cost you more. The cushion on my seat lofts about 4 1/2 in., including the thickness of the board. ▲

David Sloan is editor of AMERICAN WOODWORKER.

BILL OF MATERIALS

(Note: Lengths given include lengths of tenons where appropriate.)

PART	QUANTITY	DIMENSIONS
Back Posts	2	1 1/2 × 3 1/2 × 40
Front Posts	2	1 5/8 × 2 × 25 1/2
Arms	2	3/4 × 4 3/8 × 23 1/4
Seat Rails, Side	2	3/4 × 4 1/2 × 18 1/2
Seat Rail, Front	1	3/4 × 3 1/2 × 21
Seat Rail, Back	1	3/4 × 3 1/2 × 18 3/4
Front Stretcher	1	3/4 × 2 × 21
Side Stretchers	2	3/4 × 2 × 19 1/4
Crest Rail	1	8/4 × 4 7/8 × 18 3/4
Back Rail	1	3/4 × 2 × 18 3/4
Back Slats	6	3/16 × 2 × 15 1/4
Seat Blocks	4	1 3/4 × 2 1/2 × 5
Arm Brackets	2	3/4 × 1 1/2 × 7 1/2
Seat Board	1	3/4 × 18 × 20 plywood



It's no beauty, but it may be your lungs best friend. The "regenerative air-filtration system" is simply a plywood box equipped with a blower, a motor, and a couple of filters. It removes airborne dust by recirculating shop air.

DRAWINGS BY FRANK ROHRBACH

SHOP-BUILT DUST COLLECTOR

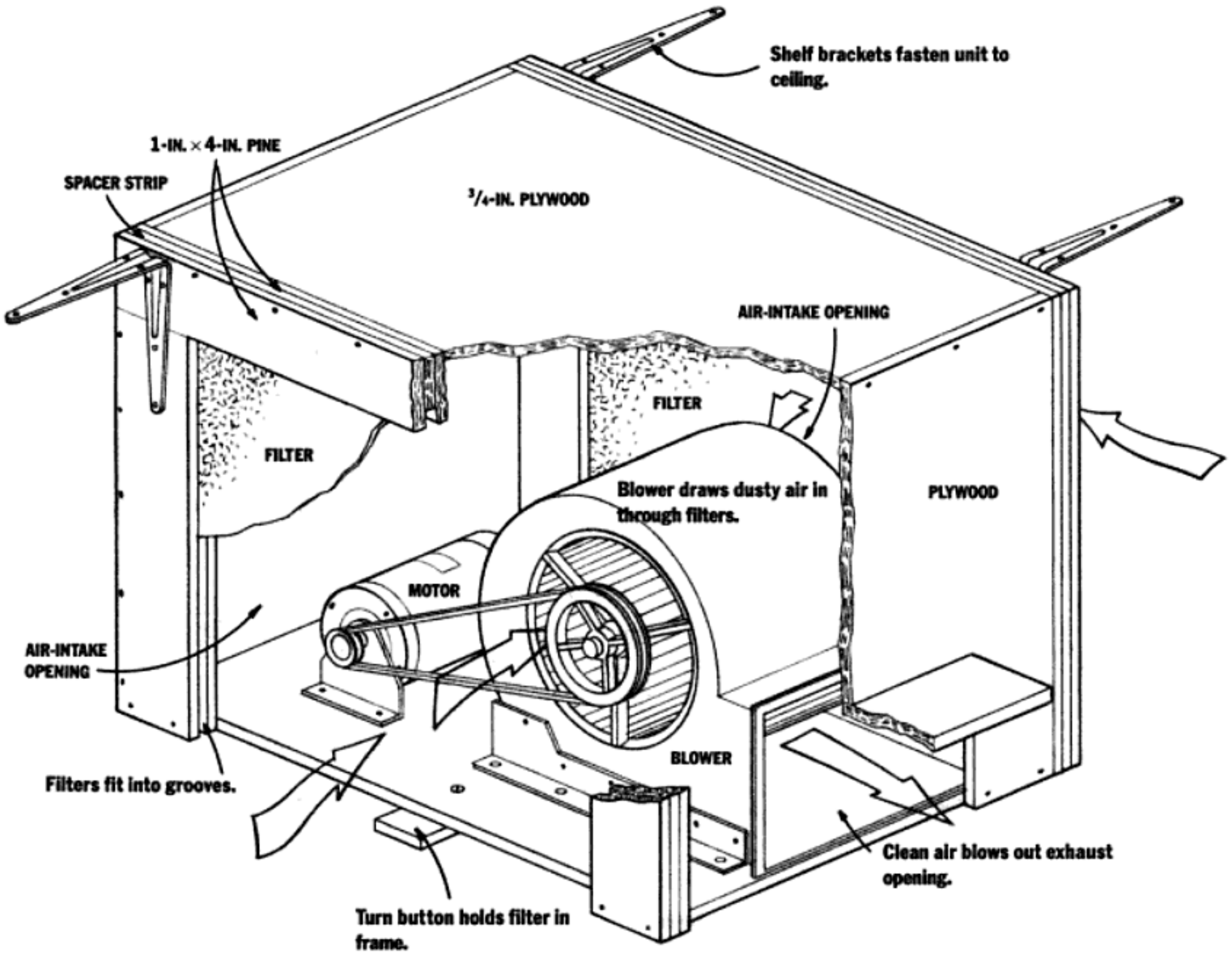
Airborne Dust Is Bad to Breathe—Clean Up Your Act With This Low-Tech Air Filter

BY JERRY BUSSE

I never knew how hazardous shop air could be, until one day I was innocently drilling a piece of wood laminate when BOOM, the air—that's right, the *air*—smack in front of my face exploded. Drilling this bit of wood had seemed a harmless enough task, so I had left my face mask off—a decision I deeply regretted as I crawled outside to flush my eyes with snow.

Fortunately, fate spared my eyesight, but the confidence I had in drilling wood laminates had been severely affected. I later learned that the heat generated while drilling wood impregnated with phenolic resin could ignite the airborne resin dust, if the dust wasn't cleared. I began to wonder, if such a small amount of dust could explode so violently, what continent would

FIG. 1: SHOP-BUILT AIR-FILTRATION SYSTEM



I land on if my whole shop went up. Dust had always been a problem in my shop, but I had figured it would kill me slowly. I figured I'd have plenty of time to worry about it later. But my brush with dust had opened my eyes, and I became a clean shop-air convert.

Now the question, "Should I get a dust collector?" had changed to, "What kind of dust collector should I get?" I wasn't about to settle for any, old dust collector. I wanted to get an effective collector that met my needs. Being a knifemaker, I'm exposed to a variety of lung hazards in my shop, including metal dust, wood dust, phenolic-resin dust (the stuff that caused the explosion) and assorted particles and fumes. The dust-removal system I was looking for had quite a job to do.

Basically, there are two kinds of dust-collection systems: 1) the kind that vacuums up wood chips at the machine source, trapping the larger particles but leaving smaller particles in the air. 2) the kind that vacuums the airborne dust but ignores the larger chips on the ground. I started with the first of these, adorning my shop walls with miles of aluminum tubes and vents that loudly shuttled loads of dust from the inside of my shop to the outside. Along with the dust, went all the warmth on winter days and all the cool on summer days. After suffering the uncomfortable drawbacks of this system for a few years, it struck me that although my shop floor no longer had a carpet of debris, the air I was breathing was none the cleaner.

I decided I needed a "regenerative air-filtration system," which works on the principle of cycling shop air through filters by means of a blower and motor. The dust gets trapped in these filters, and the cleaned air passes through. The filters can then be cleaned and reused or replaced. After comparing manufacturers' costs, I figured if I were to buy a commercially made unit large enough to serve a 400-sq. ft. shop, I could expect to pay at least $300.00. Since that's more than I wanted to spend, I decided to design and build my own unit. It proved to be simple, and cost me less than $75.00. I'll outline the general parameters for building the air-filtration system—specifics, such as dimensions, will depend on the size of the blower/motor assembly you use.

Building the Unit

The unit is fairly straightforward. (See Fig. 1.) The blower and motor are housed in a plywood box that you mount on the ceiling (near the center of the shop,

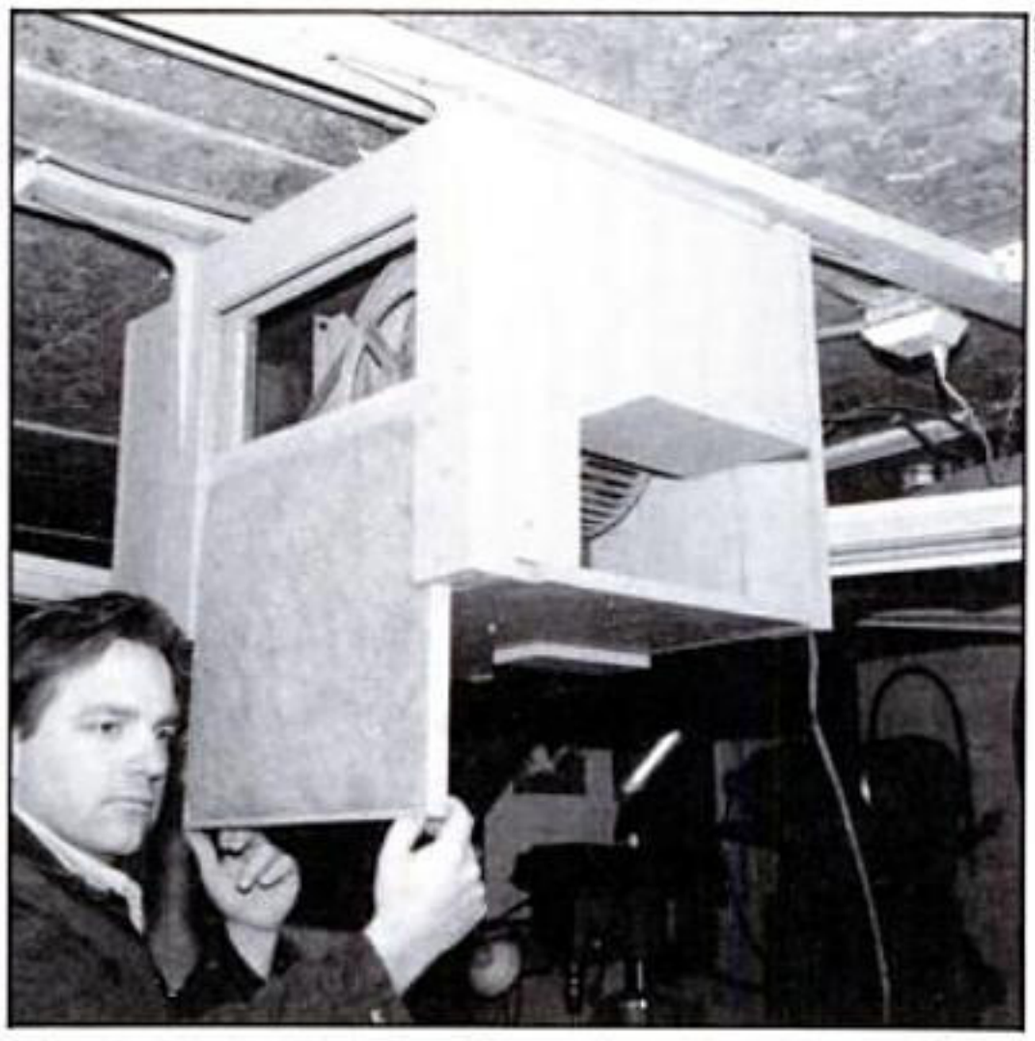
if possible). The box has filters on two sides and an exhaust opening on a third side. Dust-filled air is sucked in through the filters where the dust is trapped, while the cleaned air passes back out into the shop through the exhaust opening.

The materials you will need to build the system are as follows:

A Blower/Motor Unit—You could spend months researching exactly which blower/motor unit is correct for your size shop—I didn't feel the need to get scientific about it. I figured an old furnace blower would do the trick. Since these are designed to move large amounts of air throughout the rooms of a house, it seemed like a good choice. You can find used blowers in heating and plumbing shops, or you can buy them new, complete with the proper motor. I chose to use a belt-drive, "squirrel cage" blower with a blower-wheel diameter of 8 in. and a width of $10^{5}/_{8}$ in., (available from W.W. Grainger, model #2C973, see Sources). The operating speed of my specific blower is 625 rpm, but speeds vary, so be sure to look on the blower you buy for the specific rpm—it's usually printed on a metal tag mounted on the side of the blower. I powered the blower with a $^{1}/_{3}$-HP, 1725-rpm motor. You'll need to know the respective blower and motor speeds to determine the correct pulley combination to use between the blower and the motor. By choosing a diameter for the motor pulley, you can then calculate what diameter the blower pulley needs to be by multiplying the speed (rpm) of your motor by the diameter (in inches) of the motor pulley. Divide this by the specified blower speed (rpm), and you will get the diameter of the blower pulley (in inches) you need to use. The formula looks like this:

$$\frac{\text{(Motor-Pulley Diameter} \times \text{Motor Speed)}}{\text{Specified Blower Speed}} = \text{Blower Pulley Diameter}$$

The proper pulley combination ensures that the motor and blower are matched so that they run at their maximum efficiency. Generally, the blower pulley will be larger in diameter than the motor pulley.



ROBERT WINTERS

This simple dust collector has filters on two sides which you slide in from the bottom and lock in place with a turn button on the bottom.

Filters—You can either get disposable furnace filters or reusable polyester filters (often used as spray-paint filters). I prefer the latter, and when they get filled with dust I just blow them out with a vacuum (available from furnace shops and W.W. Graingers).

Wood—You may have all the wood you need for the box in your scrap wood pile. You will need approximately one, 4-ft. × 8-ft. sheet of $^{3}/_{4}$-in. plywood, about 24 ft. of 1 × 4 pine board, and about 12 ft. of 1 × 2 pine strips. Your exact wood needs will be dictated by the size box you build and the size filters you use.

Hardware—$1^{5}/_{8}$-in. drywall screws, metal shelving brackets.

Construction Tips

Making the box is as simple as can be. Just take the measurements of your blower/motor assembly and the filters you've chosen, then make a plywood box that takes these measurements into account. Fig. 1 shows the way I went about doing this, but this can be modified to suit your needs. Let me offer a few general tips.

The two sides that have filters are built so that the filters slide in and out of their frames from the bottom. Once in position, each filter is held in place by a turn button (a small scrap of wood that rotates into place.) Build the filter frames so that the intake openings are 3 in. smaller than the filters you've chosen. (See Fig. 1.) Filters vary in size. Make sure you buy your filters before you build the box. My system uses 20-in. sq. filters, and the intake openings are 17-in. sq.

The grooves for the filters need to be a tad larger in thickness than the filters. That way, they slide in and out without jamming. The filters I chose are 1-in. thick, so I needed 1-in. spacers in the groove. (See Fig. 1.) To get this, I beefed up the $^{3}/_{4}$-in. thickness of the 1-in. × 2-in. pine stock with $^{1}/_{4}$-in. strips of plywood.

Don't forget to cut a small hole in the box for the motor's cord to exit. This cord can be plugged in directly, or you could run it to a motor switch.

When the system is turned on, it becomes a vacuum box and will quietly filter the air in your work area in a matter of minutes. The system is also handy when cleaning your shop. Just put your shop-vac on reverse, and you can blow the loose dust off of your shelving, lights, motors and so on. The air cleaner will remove the airborne dust, and the rest can be swept up with a broom. Use your air-filtration system along with a good dust mask, and you'll breathe clean air, and substantially reduce the health risks associated with inhaling harmful dust. ▲

SOURCES

Motors and blowers available from:
W.W. GRAINGER, INC. (wholesale only),
5959 W. Howard St., Chicago, IL 60648.
(312-647-8900).
SURPLUS CENTER, 1015 W. "O" St., P.O. Box 82209, Lincoln, NE 68501. (1-800-228-3407).

Jerry Busse is a drama professor at the University of Toledo, Ohio. He is also a professional knifemaker and a vocal artist for national radio. He lives in Waseon, Ohio.

SOMETHING OLD,

Furniture Makers Recast Antique Forms at Boston's Museum of Fine Arts

Kristina Madsen's side chair shows a direct influence from its inspirational model, a painted side chair from early 19th-century Pennsylvania.

PHOTOS COURTESY OF MUSEUM OF FINE ARTS, BOSTON

To the untutored eye, Rick Wrigley's sideboard could pass for a well-restored antique. It bears close resemblance to the sideboard that inspired it, an early 19th-century piece by William Hook.

The Boston Museum of Fine Arts is emerging as one of the strongest forces encouraging the development of handcrafted furniture in the United States. In 1975, the museum began purchasing seating made by practicing woodworkers to be used by the public in the halls of the museum as a part of its "Please Be Seated" program. This was followed by its 1977 show "Contemporary Works by Master Craftsmen." Now the museum has given us "New American Furniture: The Second Generation of Studio Furniture Makers."

For this show, the museum asked 26 furniture makers to make pieces, each using as an inspiration for their design, an historic piece of furniture from the museum's collection. Despite the fact that the new designs were based on antique forms, the exhibition tells us a great deal about *present* trends in studio furniture making.

Given the premise of the show, it is not surprising that a significant number of the works might be described as modern paraphrases of past styles. Among those whose work most literally emulated the past were Rick Wrigley, Wendy Stayman, Richard Newman, Kristina Madsen, and Timothy Philbrick. An observer unfamiliar with the history of furniture design might very well take the works of these artists to be outright copies of, or well-preserved examples of, historic pieces. But a careful look is rewarded by subtle signs of a modern hand at work using present day techniques.

Kristina Madsen's chair shows an elegance and lack of superfluous ornament, which much of the best Federal-period furniture suggested but never achieved. The seat rails of her chair are enhanced by a band of delicate V-cut vertical ridges held between borders of smooth wood. (See photo.) Rick Wrigley's sideboard most literally resembles the museum piece after which it was modeled. (See photo.) But he uses the advantages of 20th-century hindsight,not to simplify,but to add materials and motifs not present in the original. He has successfully integrated granite, patinated copper, and brass, as well as marquetry designs from Renaissance Italy,to enliven the piece.

Wendy Stayman decorates the doors of her Hayden-

SOMETHING NEW

BY JOSHUA MARKEL

Bands of maple veneer over a pearwood substrate ornament Wendy Stayman's Haydenville chest. It's based on an early 18th-century chest with two drawers from Connecticut.

Judy Kensley McKie is the primary pioneer of the neo-primitive style. Her painted leopard chest is inspired by—but no duplicate of—Charles Pendergast's chest built in 1927.

ville chest in a manner which opens doors for many other possible applications. (See photo.) She veneered over the doors with a contrasting wood, and then cut through the veneer to create a delicate design based on Egyptian motifs. Her particular version of this technique involved routing away many thin, vertical stripes and creating her figures with areas of veneer left uncut by stripes. Her piece also has the feeling of an historical paraphrase.

Another tendency clearly represented at the Boston show is primitivism. In the current generation of woodworkers, no one has done more to bring this tendency to the attention of the public than Judy Kensley McKie. (See photo.) The surfaces—sometimes even the overall shapes—of her work are inhabited by the magically charged animal forms of a pre-scientific culture. Her leopard chest for this show achieves its magic, not only by the impact of her animal ornamentation, but through the use of a finishing technique which suggests that the object was somehow born hundreds of years old. She achieves this effect by rubbing through a deliberately dull surface color to reveal other subsurface colors. This gives the impression of a patina created through years of use. Others in the show whose work is in a neo-primativist style include Rosanne Somerson and Wendy Maruyama, both of whose work have a distinctly tribal cast.

Peter Dean and Hank Gilpin present works which refer to forms, not of the tribal past, but rather those of the pre-Renaissance. The forms of Dean's trestle table clearly relate to the joinery used in timber-frame construction, but the stretcher is bent laminated to achieve its curvature—a technique from the modern age of reliable adhesives. (See photo.) Gilpin's wardrobe is a well designed piece which rewards close consideration with pleasingly subtle paradoxes. (See photo.) The starting point for the work is the frame and panel, clearly a rectangular design element. And yet, the full-height legs and bottom frame members are gently curved with the effect of softening and enhancing the rectilinear forms. Similarly, while he uses highly figured wood, he has deliberately not used a finish, which would serve to highlight the wood figure at the expense of the serenity of the design. The con-

Edward Zucca's "Mystery Robots Rip Off the Rain Forest" is meant to be an ironic commentary on the woodworker's guilt about using exotic woods. This table is based on Benjamin Clark's trestle table (below left).

Peter Dean's "Canyon Table" is closely inspired by the late 17th-century trestle table attributed to Benjamin Clark. The title of Dean's table comes from the canyon-like split down the table's center.

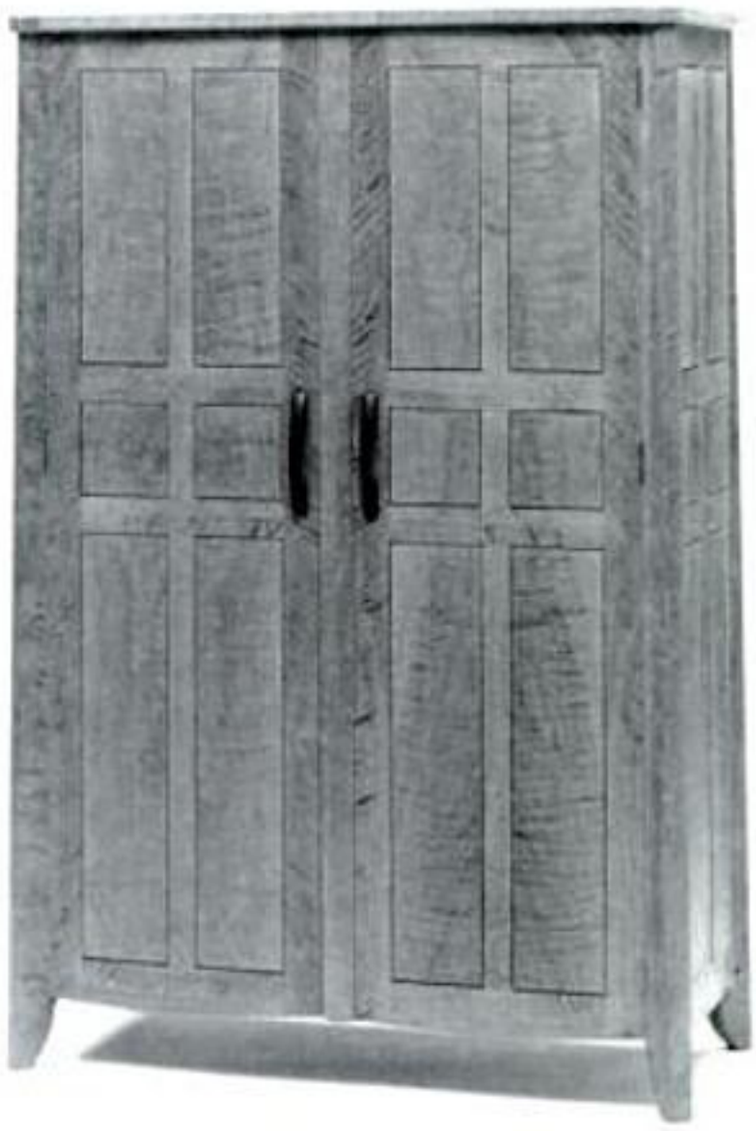
trast of the gently curved wenge handles finishes out this consistent and harmonious work; a work in which the very constraints of its severity serve to emphasize its sensual aspects.

The third major stylistic group represented uses its historical models as a takeoff point for parody. That is to say, historical forms are reused in an unexpected and often humorous manner.

Paul Sasso and Edward Zucca have used parody to make a statement. Sasso's piece, a sewing table, is meant as an attack on patriarchy, while Zucca'a trestle table takes on the issue of tropical deforestation. The vertical members of Zucca's table are sculptures of evil, but humorous-looking, robots. (See photo.) The title of his piece is "Mystery Robots Rip Off The Rain Forest," but the biggest mystery is how we would know the meaning of this piece without its title. By appearance alone, one might take its subject to be the contrast between the coldness of the mechanical world and the warmth of wood and the woodworking craft. It's also a little strange that Zucca uses an exotic wood for the top and stretcher—Honduran Mahogany—the very kind of wood the table itself argues against using.

Garry Knox Bennett has contributed a kneehole desk, which while rather conservative in its formal structure, is extremely innovative in its use of materials. (See photo.) To begin with, he uses more ingredients than a Christmas fruitcake. And he likes to offer up surprising combinations. His desk contains Honduran rosewood, maple, aluminum, brick, Fountainhead (a faux granite), ColorCore, antiqued bronze, and watercolor paint. In a sense, this resembles the French furniture makers at the time of the monarchy, who sought to dazzle the viewer by incorporating rare species of veneer, ivory, marble, and both applied and inlayed metals, all in the same work. The difference is that Bennett incorporates materials from realms usually not associated with luxury. He also dazzles the viewer with his ability to handle so many different materials so skillfully. For example, the curves of his custom-fabricated antique bronze pulls mimic perfectly the ripple in the rosewood drawer fronts. His flamboyant textural contrasts are emphasized by a surprisingly narrow color scheme.

Bennett was one of the few craftspeople presented



The rectangular lines of Hank Gilpin's wardrobe are gently accented by the subtle curves at the bottom of the doors and feet. This piece is based on a paneled door from the late 18th century.

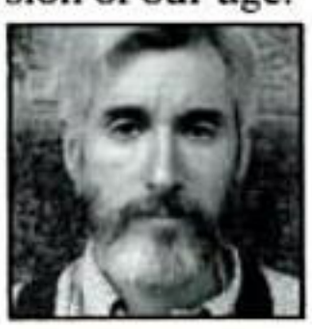
The "Boston Kneehole," as Garry Knox Bennett calls his desk, is a multi-media piece including such diverse materials as aluminum, brick, rosewood, maple, Fountainhead, and paint. This is inspired by a kneehole bureau table from the late 18th century.

who does not come from New England. Which raises the question, does this show accurately represent furniture trends in the country as a whole?

A deeper question concerns the relationship of the artist and the patron. The show uses, as its starting premise, pieces of furniture which were made, in their time, for a mass audience. Even if they were not within the financial reach of the masses, they were likely to be coveted by them. Much of the furniture in this show seems more suited for view in the gallery than use in the home. The people who can afford present-day craft furniture are often distanced from it by confusion, amusement, or awe. What are the sources of this distance?

There is a problem with the three P's I've mentioned —paraphrase, primitivism, and parody. There is a fourth P missing. That P is the present. All of the three P's are some form of *reaction* to the past. It would be easy to say that this is understandable given that the starting points for the show are the historic pieces of furniture. But two points argue against this. First, all of the artists chose to work in styles representative of their recent work as a whole. Second, some of the furniture makers strayed so far from their models, that any connection is unrecognizable.

Modernism, the style which produced chrome and glass furniture and the sleek glass boxes, which fill our city skylines, had many faults. It is justly criticized in the present day as being cold and inhuman. But it had as its starting point the use of materials and techniques derived from the state of the then present-day production technology and the mythology of industrial progress. Perhaps today's furniture makers have inherited these modern materials and techniques but have lost faith in industrial progress. The result is a failure of nerve—a lack of faith in anything our own age has to offer. This is not a fault of our artists, but rather an unflattering reflection of the general confusion of our age. ▲



Joshua Markel is a professional woodworker in Philadelphia, Pennsylvania. He also works in an architectural partnership which designs and builds new housing in the Philadelphia area.

BODGER'S

Its Foot-Powered Clamp Holds the Wood While You Shape It

BY DON WEBER

Of the vises and devices used to hold wood while it's being worked, the shaving horse, or "mule," is among the most basic you can find. As a young fellow, I remember knocking about under my father's feet while he practiced the varied skills of the village carpenter and neighborhood repairman. Chair mending was a regular part-time occupation for him, so he used his shaving horse quite regularly. My use of his horse was a bit more imaginative. Between "creative building" sessions with nails and bits of scrap, I would ride that three-legged horse for many a happy hour, across the imagined hills and valleys of my native Wales.

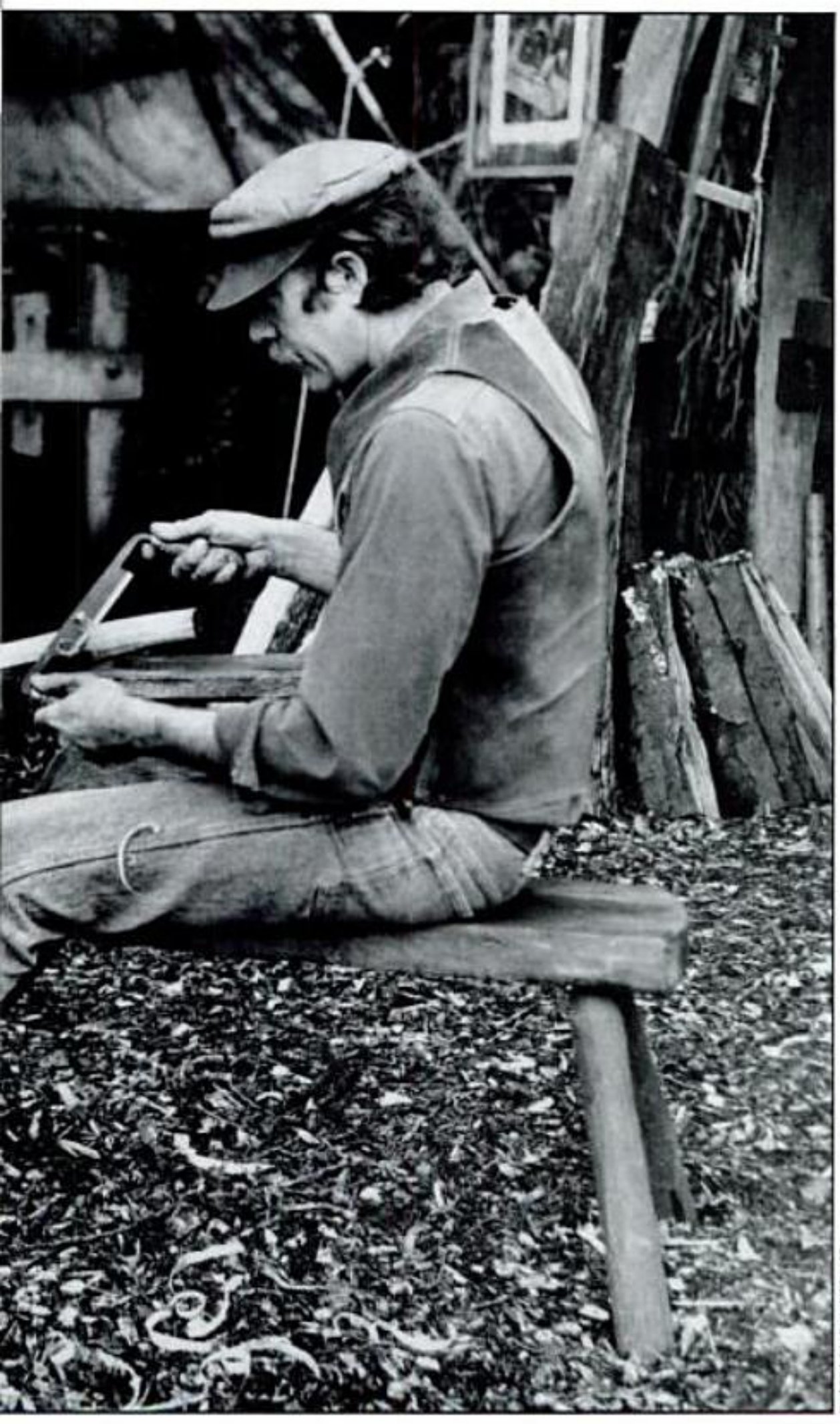
Old though the device is, the shaving horse has a place in the modern shop along side the workbench. With the quick-release action of this foot-powered vise and the great deal of clamping pressure exerted with little effort, it's perfect for fitting tool handles, shaping tenons, or working odd-shaped pieces, such as rustic chair legs. It certainly makes working with drawknives and spokeshaves more convenient.

Shaving horses have taken different shapes and forms over the ages. Each trade had its variation on the shaving horse, modified for its own use. The craftsmen of rural England and Wales used a variety of clamping devices to hold stock during the roughing-out stages of such items as chair legs, thatching spars and barrel staves. The hoop and spar makers used a brake or clamping beam to hold long, riven hazel rods. With one knee exerting pressure on the work, they sheared the rods thin and flat for barrel hoops. The bodgers (spring-pole turners, see May/June, 1989 *AW)* and handle makers used a bench with an inclined table and two pivot arms to clamp the work down while shaping it in preparation for the lathe. (See Fig. 1.)

In this article, I will be focusing on the last of these holding devices—the bodger's shaving horse. This is the type of horse I use most frequently for roughing out riven pieces before they go to the bodger's spring-pole lathe for shaping into chair and stool legs.

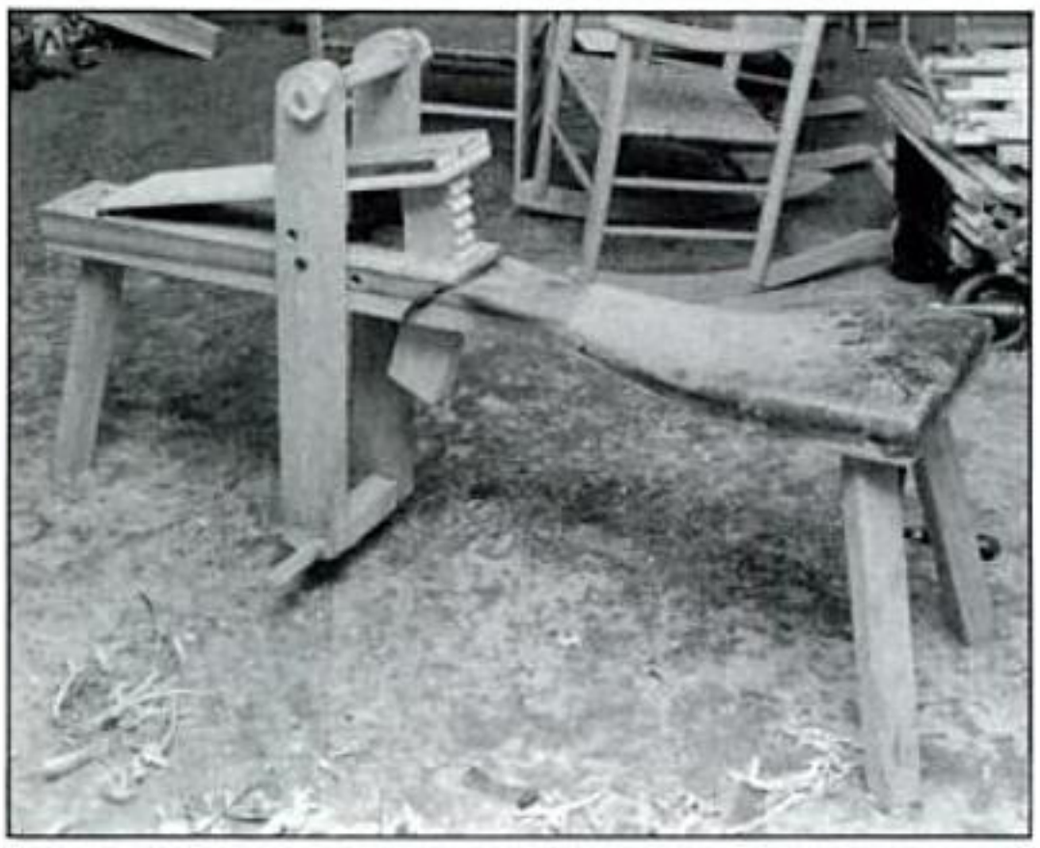
But you may find a different kind of shaving horse is more useful in your shop. My horse is in the British style, with two pivot arms. German shave horses usually have only one arm that pivots through a slot in the bench. Feel free to make your own modifications, as you see fit. A Kentucky chair-maker friend of mine, Brian Boggs, has his own ideas of how a shaving horse should be built. His "modern" innovations aid him in the more exacting work of shaping and finishing chair parts with a spokeshave. For this work, he has developed a ratcheted riser to allow easy changing of the incline angle, and a clamp head that pivots to provide more contact with the work. He also uses a grooved holding block that is screwed to the incline board to hold his work more securely.

SHAVING HORSE



PHOTOS BY JOHN BIRCHARD

This German-style "dumbhead" shaving horse has a single pivot arm. It's used with longer stock, such as oars or rake handles.



This shaving horse, made by Berea, Kentucky chair maker Brian Boggs, has a ratcheting riser block, to make adjustments more convenient.

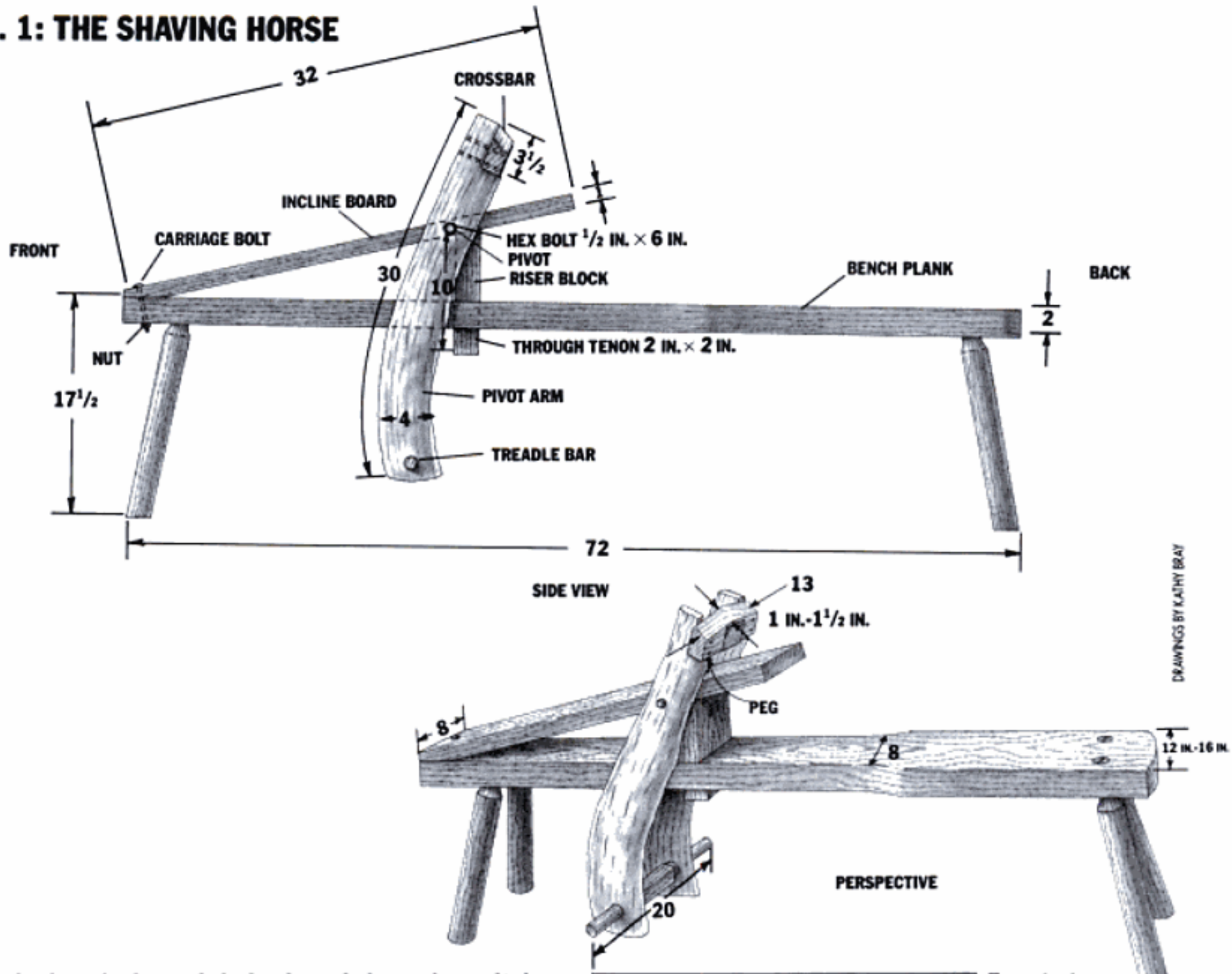
The shaving horse is a sit-down workbench for holding stock while it's worked with a drawknife.

Building the Shaving Horse

The shaving horse is a simple device with a few parts. (See Fig. 1.) These include: a *bench plank* so you can sit while you work, an *incline board* upon which your work rests, a *riser block* which props the incline board up, and a set of *pivoting arms* held together by a *crossbar* at the top and a *treadle bar* at the bottom. By moving the treadle bar back and forth with your feet, you engage and disengage the clamping action of the crossbar against the incline board.

Start with the bench. I've found that a heavier bench walks around less when I'm working hard at it. I begin by making the front end of the bench plank narrower to match the width of the incline board. I do this with a hewing hatchet. After this is done, you're ready to put legs on the horse. The four legs (or three, if you prefer) are riven out of green oak, or another splitable hardwood, then rough-shaped with an ax and fitted

FIG. 1: THE SHAVING HORSE



into the bench through holes bored through at slight angles (so the legs splay a bit). Cut saw kerfs in the ends of the leg tenons, so you can drive wedges in from above to lock the legs tightly in place. (Leave off driving the wedges in for a few weeks so the legs have time to dry out first.) The longer the legs on your horse, the further you will be able to extend the lower section of the pivot arms (and still clear the ground) for greater clamping power. If you plan to do a lot of rough, heavy work a higher bench is best.

Next, cut and bevel the front end of the incline board, the one that you'll be bolting to the bench. Do this with a hewing hatchet and/or plane. (See Fig. 1 and the photo below.) The angle of this bevel is determined by the height at which you are most comfortable work-

To protect your work from being indented by the pressure of the crossbar, chisel out a slight notch, and set a piece of leather in it.

Prop up the incline board to a height that's comfortable for working, then cut a bevel on the front end of the incline board to accommodate that height.

The pivot hole should be drilled slightly ahead of the vertical centerline of the riser-block thickness.

ing. To determine this height, block up the end of the incline board nearest the seat with scrap until the height is a comfortable one to work at with your drawknife. Somewhere around elbow height is right for most people.

I cut a 2-in. × 2-in. tenon on the hardwood riser block, and I cut a mortise through the bench for this tenon. Make the riser block from a piece that is long enough to extend through the bench, with 1 or 2 inches sticking out below. Chop the mortise in the bench and cut the tenon on the riser block. Place the riser block with one tenon shoulder on the bench beside the in-

PHOTOS BY SALLY SHENK ULLMAN

THE DRAWKNIFE AND SPOKESHAVE

No article about a shaving horse would be complete without a few words about the tools you'd use while working on such a contraption: drawknives and spokeshaves. Though similar in their function—both tools are used for shaping wood with a shaving stroke—these two tools have their respective niches in the world of woodworking.

The drawknife consists of a long blade (usually 8 in. to 12 in. long) with a handle at each end. (See photo.) Drawknives are handy tools to use for roughing out such things as chair legs and seats, tool handles, table legs and so on. I use a drawknife when rough-shaping a billet that will then go to the pole lathe for turning.

There is some dispute as to whether to use the drawknife with the bevel up or down. The bevel up gives more of a shearing cut, while the bevel down has more of a scooping action. The proponents of the bevel-down technique contend that the bevel down makes it easier to control the depth-of-cut, since the blade has less of a tendency to slice into the wood.

I find that cutting with the bevel up and the blade held askew, I can shave a long, flat plane. The flat of the blade acts as a plane body would, spanning the hollows and irregularities in the work. With practice and a keen edge on your drawknife, I think you'll find cutting with the bevel up gives the best results.

To get a good cut, it's best to work with straight-grained woods that have been split, rather than sawn, apart. The fibers in split wood will run the full length of the piece. But with sawn wood, the saw cuts the wood without regard for the way the fibers run, so you end up with "runout," meaning the fibers are severed along the length of the piece. Runout makes drawknife work more difficult. Also, as a general rule, it's easier to cut green wood than it is to cut dried wood.

To use the drawknife, I start by clamping a split, green billet into the shaving horse with at least $^2/_3$ of the billet extending out from the clamp. I then pull the drawknife toward me with a series of strokes that shave the billet down from the center to the end. I do all the shaping I can before releasing my grip and turning the billet over. When I'm finished with one end, I turn the billet around and do the other end until I'm left with a uniform, tapered cylinder.

Spokeshaves differ from drawknives in that their blades are supported in metal or wood bodies. (See photo.) One of the major differences between the spokeshave and the drawknife is that with the spokeshave you can control the depth-of-cut mechanically, but with the drawknife you must rely on your skill. While you can hog away a lot more wood with a drawknife, you can achieve a smoother surface with a spokeshave.

The spokeshave is an ideal tool to polish up the work you've done with a drawknife, especially for detail work, as in chamfering. By clamping the billet back in the shaving horse and adjusting your spokeshave to take a light cut, you simply work in the same manner you did with the drawknife. Pull toward you with the spokeshave held at a slight diagonal. You'll be amazed at the fine results you can get.

In the olden days, you could buy a wooden, factory-made spokeshave at the hardware store. Now they are harder to find. You can hunt them down in old tool shops and flea markets, or buy a new one (available from Conover Woodcraft, 18125 Madison Rd., Parkman, OH 44080, 216-548-3481 and Highland Hardware, 1045 N. Highland Ave. N.E., Atlanta, GA 30306, 404-872-4466).

Metal spokeshaves are still commonly sold in hardware stores, but you often need to spend a good deal of time tuning them up so they work properly. Drawknives are available by mail order from most woodworking tool distributors and often found in old tool shops.—*D.W.*

PHOTO BY RON GOODEARL

Bodger Owen Dean enjoys a smoke as he shapes this chair leg with a drawknife. Great Hampden, Buckinghamshire, 1949.

cline board, and mark the angle to which you will trim the top of the riser block. Saw the block, square across the width on this mark, then remove the incline board, and set the riser block in the bench. I don't wedge the tenon. I leave it loose in the mortise, allowing me to adjust the height (and angle) of the incline board with wedges set in under the shoulders of the riser block, on either side of the tenon. Peg or screw the incline board to the top of the riser block where they meet. At the base of the incline board, where it meets the bench, I use a carriage bolt to hold them together. I used to peg the incline board down, but I've found that a carriage bolt makes it easier to adjust the angle. Like the wedges I use under the riser block, I will also wedge the base of the incline board when I want to decrease the angle for working with longer pieces.

The pivot arms, one on either side of the bench, are made out of a curved limb about 4 in. in diameter, split down the center. Before splitting the limb, notch the top end to fit the crossbar, and bore a hole for the treadle bar near the bottom end of the limb. Then split or saw the arm in half.

Next, prepare the crossbar. To keep the crossbar from marring your work while it's clamping down on it, chisel out a slightly concave notch in the center, and line this notch with leather. (See photo.) This leather patch will also give you a better grip. My billets go to the spring-pole lathe for finish turning, so shallow marks from the clamping head do not matter. To avoid this compression, Brian Boggs' shaving horse has a pivoting head covered with leather, and he also covered the top of the incline board with leather.

Now you're ready to assemble the arm mechanism. Insert the treadle bar through the holes, and peg the crossbar in place at the top of the arms. The ends of the treadle bar should extend out several inches past the outside of the pivot arms on either side—enough to get a comfortable grip with the balls of your feet.

To attach the arms to the incline board, you'll need to designate a pivot point. Usually the pivot point is located on the incline board just ahead of a vertical centerline drawn through the thickness of the riser block. (See photo.) On the pivot arms themselves, the rule is the more length you have below the pivot than above, the more clamping power, but of course you are limited by the fact that the swing of the treadle must clear the ground. In general, a ratio of 4 or 5 units below the pivot to 1 unit above is about right.

To mark out the best pivitol point, lay the bench on its side, and slip the pivot arms over the whole thing. Hold the arms as they would be in their fully-clamped position, leaving approximately a 4-in. to 6-in. incline board in front of the crossbar. Confirm that this is a comfortable angle for your legs. When you find the right pivot point, with a long-shanked auger, bore completely through both pivot arms and the incline board. You may want to bore more than one set of holes through the pivot arms so you can reposition the pivot arm to accommodate very thick work. Attach the arms to the incline board using two hex bolts ½ in. × 6 in. I made the holes in the arms and the incline board ½ in. dia. so that the bolts are a friction fit. I slide these bolts in and out when I need to make adjustments, more like pins than bolts. Now, stand 'er up and you're ready to go to work.

Using the Shaving Horse

The handy thing about the shaving horse is that you can work almost entirely around the piece you are shaving without having to move or reposition it. When you do reposition it, it can be done with barely a pause between strokes.

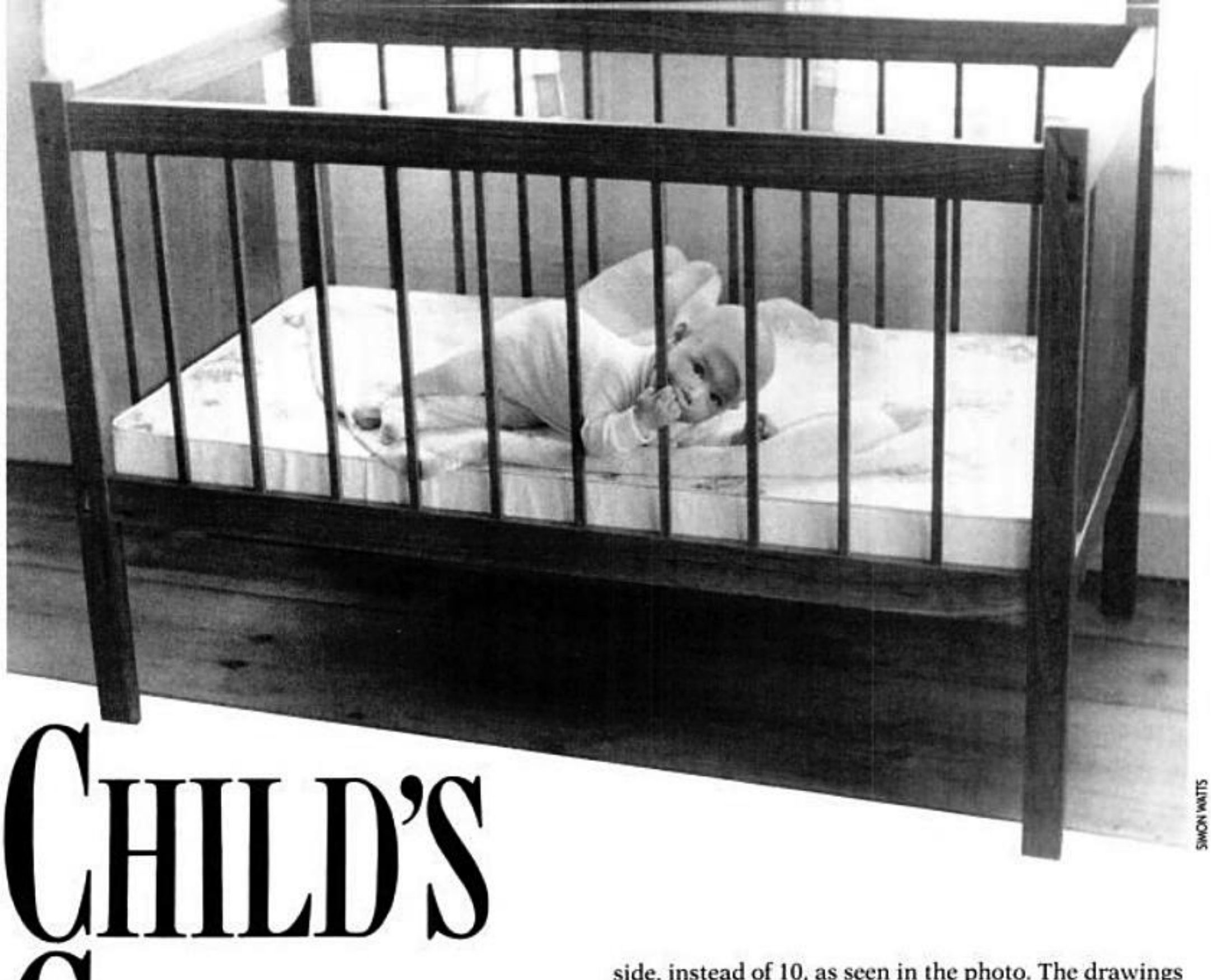
As a chair maker, I've discovered an added bonus to my shaving horse. The angle of the incline board on my horse tilts upward approximately 17° to 18° from the horizontal. This happens to be the same angle I use for splay on the legs of my Windsor chairs. I find it easy to drill the rung holes in chair legs by simply clamping the leg to the incline board and holding the drill bit plumb. The tilt of the incline board holds the leg at the proper angle, so I don't have to waste time measuring angles. As you see, the shaving horse is a very versatile workbench indeed! ▲

Don Weber is a Windsor chair maker and spring-pole lathe turner and has been invited to join a gathering this fall of the Spring Pole Turner's Guild in High Wycombe, England where Windsor chairs originated.

FOR MORE INFORMATION

For more information, see the following books:

- *Country Woodcraft*, by Drew Langsner (1978, Rodale Press, 33 E. Minor St., Emmaus, PA 18098).
- *The Woodwrights' Shop*, by Roy Underhill (1981, University of North Carolina Press, P.O Box 2288, Chapel Hill, NC 27515).
- *Green Woodwork*, by Mike Abbott (1989, Guild of Master Craftsmen Pub. Ltd., 166 High St., Lewes, East Sussex, U.K. BN7 1YE).
- *Restoring, Tuning and Using Classic Woodworking Tools*, by Michael Dunbar (1989, Sterling Publishing Co., 387 Park Ave. S., New York, NY 10016).
- *The Workbench Book*, by Scott Landis (1987, Taunton Press, 63 S. Main St., Box 355, Newtown, CT 06470).



SIMON WATTS

CHILD'S CRIB

A Place for Little Ones to Rest Their Head After the Cradle But Before the Bed

BY SIMON WATTS

As a young woodworker and parent, I naturally made quite a few pieces of furniture for my own children. I started with a cradle and ended with a four-poster bed. This crib was a stop along that road.

All the commercially made cribs I've seen are made to be dismantled for moving and storage. But this tends to make them a bit shaky, especially with an active child. I decided to make this crib with through, wedged tenons for a very solid construction.

Actually, I made the crib pictured here a long time ago. (My daughter Rebecca, the model in the photo, is now 23 years old.) Though this crib has served our family well, a recent federal law now requires that the space between the crib slats be no more than $2^3/_8$ in. wide to prevent a child's head from getting wedged between them. I modified the design to comply with this standard by making the slats wider and spacing them closer together. There are now 14 slats on each side, instead of 10, as seen in the photo. The drawings are updated to reflect the changes.

You can use any reasonably strong hardwood for the crib. The amount of material is modest, so you might consider a fancy wood like teak, walnut or cherry. Choose stock that's dry and straight grained. Try to avoid wild variations in color and figure in the wood, because they are not appropriate for such a simple, slender design. If you have to use air-dried or partially green stock, I'd suggest roughing out all the parts for the crib and setting them aside for a couple of months to adjust to the prevailing humidity.

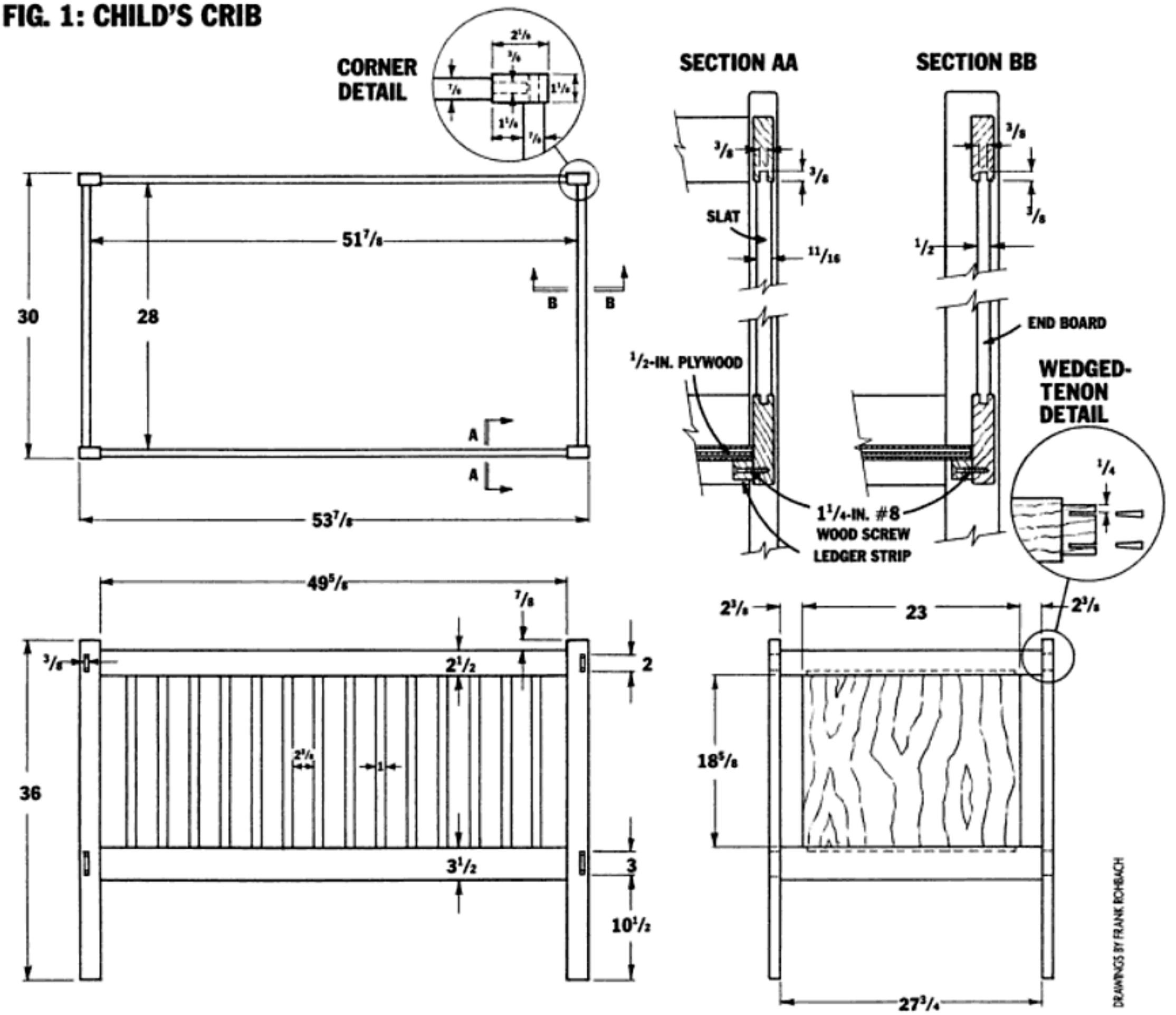
Making the Crib

Make the posts first. It's wise to make an extra post—five instead of four. With each operation make a trial cut on the spare post, and check it carefully before starting on the other four. Keep the piece as a pattern when the crib is finished (or a reminder of what can go wrong).

Starting with 6/4 stock (that's shorthand for $1^1/_2$-in.) rip five post blanks 37 in. long and $2^1/_4$ in. wide. Flatten one of the wide sides on a jointer (or with a jointing plane), then plane them down to their finished thickness of $1^1/_8$ in. Now joint or plane one of the narrow edges on each post, and rip to a shade more than $2^1/_8$ in. (Remember to place the planed surface against the saw's fence.) Clean up the sawn edge with a hand plane.

Take a good look at each post and pick the best two adjacent faces—one wide, one narrow—and arrange them so they face out, because they'll be the most visible faces on the finished crib. Next, lay all five posts on the bench, narrow inside faces up, and clamp them together. Mark out the top, bottom and side dimen-

FIG. 1: CHILD'S CRIB



sions of the mortises for the side rails in each post. Loosen the clamps, turn each post 90° so the wide inside faces are up, and reclamp together. Mark out the top and bottom of the posts and the ends of the mortises in each post. These mortises on the wide faces are through mortises and must be marked on both sides of the posts. Use a knife or a cutting gauge—not a pencil—to get a cleaner cut. (See Corner Detail, Fig. 1, for locations and dimensions of the mortises.) Now set a marking gauge (the kind with two pins), and mark the width of the mortises.

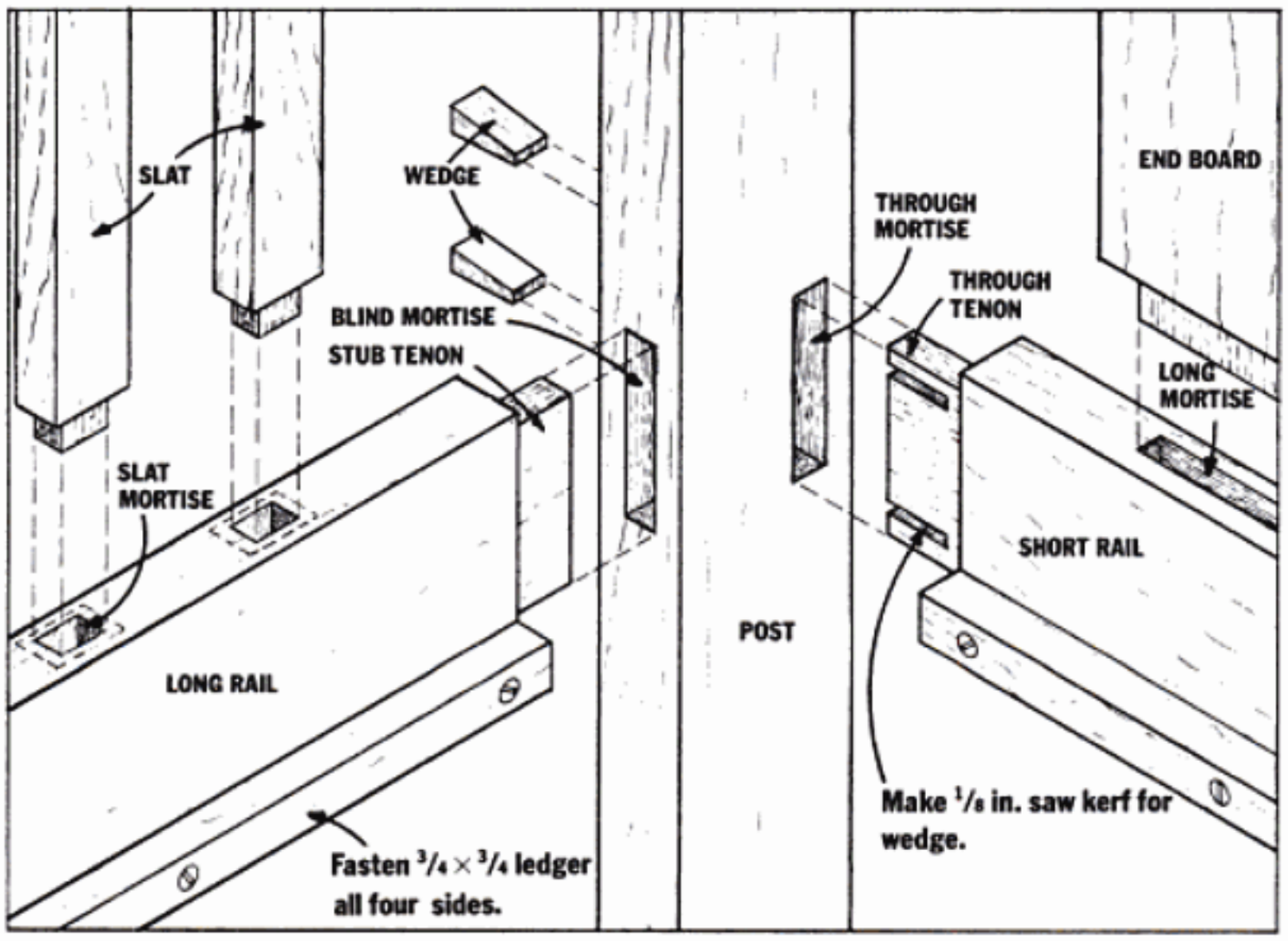
It's easiest to make the mortises with a mortising machine or a hollow-chisel mortising attachment on a drill press. You can also drill a series of $^{5}/_{16}$-in. holes, and chop the mortises out by hand, to their $^{3}/_{8}$-in. width, with a mortising chisel. I'd use a drill press for this with an improvised fence, but if you don't own one, a brace and bit is almost as quick. Count the number of turns of the brace after the cutting spurs first begin to bite the wood, and you'll find you can bore holes of the same depth consistently. Be sure to cut the mortise in the narrow face of the post first and the through mortise second. This avoids breaking through the slim $^{1}/_{8}$-in. or so of wood separating the mortises. Now cut the posts to their finished 36-in. length.

To make the frame of the crib, cut the four long rails and four short rails to length. Clamp each set together for marking, just as you did with the posts. All the mortises in the long rails (for the slats) are easily cut with a $^{3}/_{8}$-in. hollow-chisel mortising attachment for a drill press, or drill and chop them out as before. The long mortises in the short rails (for the end boards) are cut the same way—or you can use a router.

Now you need to cut the tenons in the rails and fit them to the posts. (See Post-and-Rail Connection Detail, Fig. 2.) You can use a tenoning jig to hold the rails vertical for cutting on a tablesaw. (See May/June 1989, *AW*.) You can also lay the rails flat on the tablesaw using the miter gauge, and take multiple cuts. (A dado blade speeds the work.) In either case, I prefer to saw a little oversize, and then fit the tenons individually to the mortises in the posts, by trimming with a sharp rabbet plane or paring chisel.

Unless you're a real wizard, the tenons will seldom be interchangeable. It's good to key the tenons to their respective mortises by marking them with letters or numbers. Also make two saw cuts in each of the through tenons in the short rails. These saw cuts will

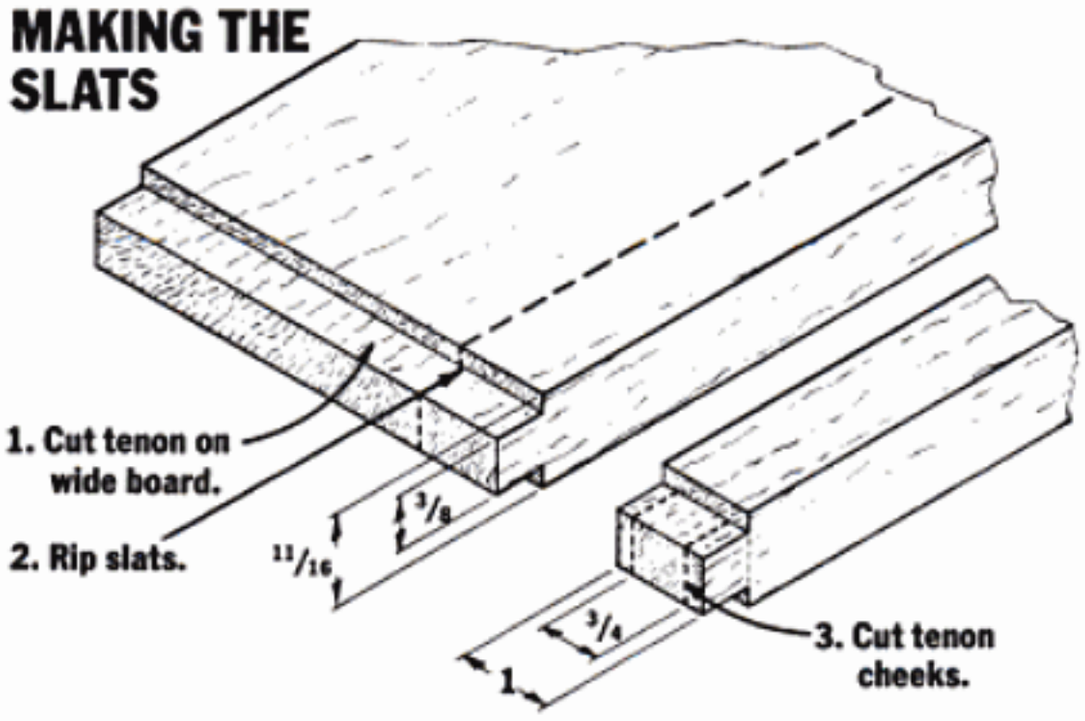
FIG. 2: JOINERY DETAIL AT POST



accept the wedges as shown in the detail in Fig. 1. Also, make the small wedges that lock the tenons. I like to use a contrasting wood for the wedges.

The slats and end boards are the last parts to make. These are mortised into the rails, top and bottom, as shown in Fig. 1. Since it's awkward dealing with a lot of small pieces, I like to do as much machining as possible on a wide board before ripping the slats out individually. Choose some straight-grained stock, and cut it an inch longer than the finished length of the slats. Flatten one side on a jointer, and plane to 11/16 in. thick. (See Fig. 3.) Now cut the piece to the finished slat length of 19 3/8 in. and machine a 3/8-in. thick tenon on each end by making two cuts with a tablesaw. Depending on the accuracy of your saw and the quality of the blade, allow more or less for subsequent fitting. Rip the board into individual slats a fraction wider than 1 in., and clean up the sawn edges with a jointer or hand plane, bringing them to 1 in. thickness. Finally, cut the last two cheeks of each tenon with a chisel, and fit them to the mortises in the rails with a shoulder plane as before.

FIG. 3: MAKING THE SLATS



To make the 23-in. wide end boards, you'll have to join up three or four pieces. I made thin splines to join the edges so individual boards wouldn't spring in or out along their length if pushed on. There is no need to glue them together, because they are held securely in the long mortises. To make sure they stay in place, I pinned each board top and bottom through the rails with escutcheon pins (small brass nails with a rounded head), so they can shrink or swell about their centerlines in response to seasonal moisture changes. I also lightly chamfered the edges of the boards as a design detail. That way, if slight cracks open up they won't look like a flaw. You can glue the boards together if you wish, but cleaning up a wide, thin, glued-up panel such as this is a chore without a power planer of sufficient capacity.

Cut out the four 3/4-in. square ledger strips that support the plywood and mattress. Make them an inch or so shorter than the shoulder-to-shoulder distance of each bottom rail. Fasten the ledger strips to the bottom rails with glue and #8 × 1 1/4-in. wood screws.

With everything marked and ready, glue up the head and foot assemblies one at a time. I use plastic resin glue to avoid rushing. Pull the posts together with padded clamps, and then drive the wedges. Tap the two wedges in each tenon alternately—top, bottom—otherwise you'll force the tenon to one end of the mortise. When the glue has set, cut the wedges off flush, and clean up the end of the tenons with a block plane.

Finally, assemble the two sides. Insert all the slats into their mortises, and glue the long rails into the posts. There's no need to glue the slats into the rails—it's messy, and they're quite secure if you've done a good job of fitting. Make sure the frame is square by measuring the diagonals from post to post. They should be the same within about 1/8 in.

Cut a piece of 1/2-in. plywood to fit between the bottom rails, and drop it onto the ledger strips as shown. Cut at least one handhold in the plywood, so it's easy to remove from above.

I often use marine varnish, a quality spar varnish, for finishing a piece like this. It's durable, non-toxic when dry and easy to apply. I put on three coats, sanding lightly between coats with #220 grit sandpaper. ▲

Simon Watts lives in San Francisco and teaches wooden boat building around the country and in Canada. He is the author of Building a Houseful of Furniture *(1983, Tanton Press, 63 S. Main St., Newtown, CT 06470).*

WOODEN MOULDING PLANES

BY MICHAEL DUNBAR

Part 2: How to Select, Collect and Correct Them

This is Part 2 of a two-part series on Wooden Moulding Planes from the book, Restoring Tuning and Using Classic Woodworking Tools, *by Michael Dunbar. Reprinted by permission of Sterling Publishing Co., Inc., 387 Park Ave. South, New York, NY 10016.*

If you want to use moulding planes in your woodworking, you will quickly find purposes for them. The more planes you acquire, the more versatile you will become. It is still possible to quickly and inexpensively assemble a graduation of hollows and rounds and bead planes. You will have more difficulty with ogee, ovolo, cove, and thumbnail planes, but these are by no means rare.

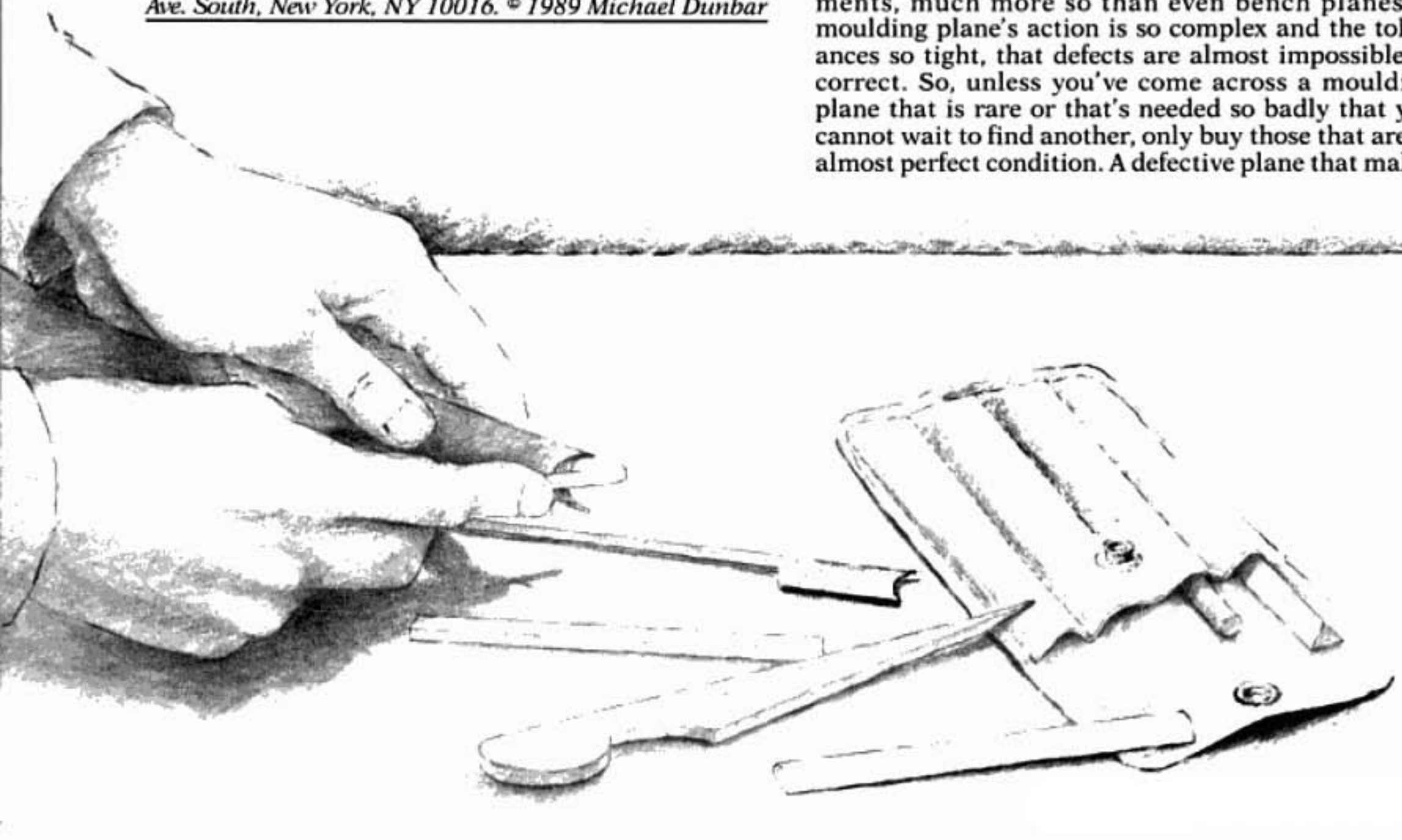
Gathering a working collection of complex planes that has any reasonable continuity is even more work. (See photo, page 45.) Fewer of these planes were made than were the simple planes, and some profiles and sizes are scarce. However, unless you are doing restoration work where it is necessary to make exact duplicates of missing moulding, you do not need continuity in your collection. Several complex shapes of different widths will be ample for most woodworkers.

Although the secondhand tool market is becoming more sophisticated and efficient, pricing is still inconsistent. Specialized dealers know what is scarce and desirable to collectors, but much of the time, moulding planes are priced "by the inch." This is a facetious way of saying that a bigger plane is more expensive than a smaller plane, regardless of what profile the tool makes, its condition, and rarity.

Like all secondhand planes, moulding planes can be found in unexpected places and at unusual prices. Many planes offered for sale on the secondhand market as moulding planes are not. Be aware of these planes. Most are special-purpose planes whose bodies look like that of a moulding plane.

As with all other secondhand tools, moulding planes were inherited by people who did not appreciate them. As a result, most that have survived are in bad condition. These planes are precision instruments, much more so than even bench planes. A moulding plane's action is so complex and the tolerances so tight, that defects are almost impossible to correct. So, unless you've come across a moulding plane that is rare or that's needed so badly that you cannot wait to find another, only buy those that are in almost perfect condition. A defective plane that makes

DRAWING BY KATHY BRAY



Two groups of planes with the same profile, but in graduated sizes. The three planes on the left make a cove and astragal. Those on the right make a shape called OG and astragal. Both the OG and astragal were commonly used as back bands in Federal-period architecture. The plane on the far right is only missing about an inch of boxing, and so it still tracks very well.

a common profile is just not worth reconditioning.

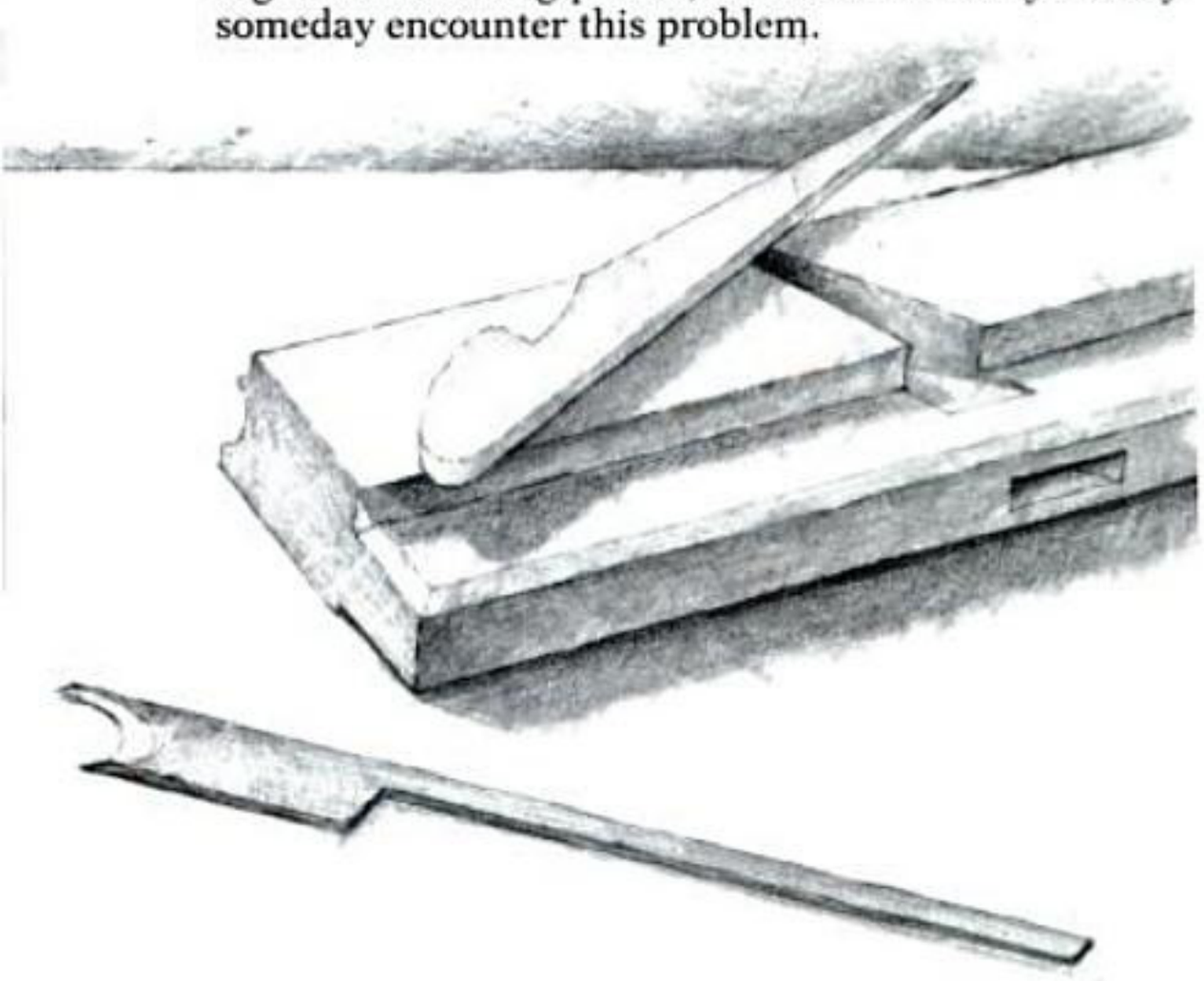
Make sure that the stock is sound. Minor check cracks are not a problem. Reject the plane if it has dry rot, extensive bug damage, or severe cracks.

The stocks of some moulding planes look worse than they really are. Although still sound, they are just badly dried out. I have done wonders for such planes by standing them on end in a can that's filled about 1/3 of the way with boiled linseed oil. The dried wooden stock absorbs a surprising amount of the oil.

Reverse the stock periodically (up to half a day) so that the other end is submerged. The stock will look much better, and you'll notice that some check cracks have even closed. Wipe the plane dry, and set it aside in a warm area. Small amounts of oil may bleed back out. Always dispose of rags soaked with linseed oil in an approved fireproof container, or take them outdoors. They can ignite spontaneously and start a fire.

If a bench plane is missing its iron, you can give it a replacement with only a minimal amount of work. A moulding plane without its cutter, however, is a serious problem. It is not that the work is that difficult. Rather, the problem for the inexperienced is in conceptualizing how the cutter and its bezel work. And, when you do understand these concepts, grinding a new cutter is time consuming.

Unless the profile made by the plane is rare, or you need it immediately, it is seldom worthwhile to cut a moulding-plane iron. Still, if you find you enjoy working with moulding planes, chances are that you may someday encounter this problem.



I pick up stray irons whenever I find them, but there are problems with moulding-plane irons that do not occur with bench-plane irons. The web (the wide part) of a moulding-plane cutter is ground to the same profile as the sole. If the profile is deep, the contour will reach well back into the steel. (Like bench-plane irons, these blades often have a forge-welded layer of steel.) There simply may not be enough space remaining to grind a new, or very different shape.

In that case, find a blacksmith who will make a new cutter out of tool steel, or make one yourself. Later, I will describe how new cutters are ground.

Before purchasing a tool, check to see if the plane's stock is warped or wracked. Hold the plane up to your eyes and sight down the fence from toe to heel. Make sure that it is straight enough to track on the edge of a board. If the plane body is no longer straight, do not bother to buy the plane. It will never work correctly again without being almost totally remade.

Before buying a plane, take a moment to check the sole. Unlike bench planes, moulding planes cannot be resoled with much success. If this surface is worn or battered, it is not worth reconditioning. Only minor corrections can be made to a sole, and you must know how to do them before determining whether or not they are worth doing.

All the details (especially the fence) should still be crisp. Otherwise, as the plane makes each successive cut, it will have difficulty tracking. If the plane rides off its cut, it will probably damage the moulding.

Do not buy a moulding plane with an altered throat.

PHOTOS BY ANDY EDGAR

Check as to whether the fence or stop have been tampered with by a previous owner. If the plane has been recently reworked, the old, darker surface has been disturbed, exposing wood that is lighter in color. However, if the alteration was done long ago, by now the freshly exposed wood has had time to age.

You will also find planes that have been given a new profile. If the tool was damaged, a former owner may have changed the sole. If it's a shape you want and still works well, buy it. But you can't determine whether or not it will work until you have first become familiar with moulding planes. Until you are, only buy those that are in good (and original) condition.

Make sure that the wedge on the plane is the original one. If a tool is missing its wedge, a dealer will often fit it with a spare. If this replacement wedge does not fit properly, it will not hold the iron tightly. Although you can make a proper wedge, it will be time consuming. If the plane does not have its original wedge, you have a good reason for asking the dealer to lower the price.

The passage and ejection of the chip is a very complicated process, and if it is not accomplished precisely, the plane will choke. While the wedge is in

FIG. 1:

1. When you sight down the sole of a moulding plane with a properly sharpened and adjusted cutter, you will see a halo of steel rising above the sole. 2. Over time, friction wears down the edge's high points, and they become too low to engage the wood. The plane takes a few shavings, and then stops cutting. 3. The temptation is to advance the cutter to raise the worn spots. When you do, the low spots take such a heavy cut that they choke the plane. The only solution is to reshape the edge.

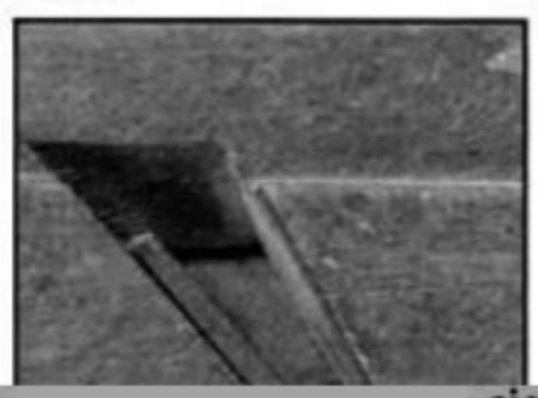
place, check its lower end by looking in the throat. The end should be pointed and not blunt. The wedge must also fit perfectly against the wear (the front surface of the throat). If it is not tight and a gap has formed between the pointed end and the wear, the shaving might jam into this opening. Every time you use the plane, it will choke. So if the wedge does not fit perfectly, you will have to make a new one.

The plane will also choke if it has an iron with a badly worn profile. The high points on the cutter cut the lowest points on the moulding. They cut almost all the time the plane is in operation. The low points on the cutter cut the high points on the moulding. They only cut during the final passes.

The high spots on the iron receive the most wear. Eventually, friction takes its toll. To make these worn areas engage the wood, you have to set the iron so deeply that the unworn, low areas make too heavy a cut. This chokes the plane. (See Fig. 1.)

Beware of alterations to the throat before buying the plane. It was common for later owners, who did not understand the tool, to think that choking occurred because of a problem in the plane's throat, when in reality it was the iron. They often tried to correct the choking by opening the throat, so that the chip could clear more easily. (See photo, page 45.) This created more difficulties, as the altered throat could no longer eject the chip.

The pointed end on a moulding-plane wedge guides the chip up and out of the throat. Most wedges have darkened to three different shades of color. The darker upper end is exposed above the stock. The light area in the middle is where the wedge fits into the stock. The slightly darker lower end is exposed in the throat.



The lower end of the wedge is visible when you look into the throat. Notice the beveled point, as well as the bevel, cut into top of the throat. These features help guide the chip

of the open one.

hat the web's top edge does not press the top of the throat. There has to be here for the cutter to be adjusted longi- e about a ¼ in. of space for adjustment. so that it is slightly narrower than the too tight, it will be difficult to fit it up and there will not be any room for lat-

The boxwood used to box the soles of best-grade 19th-century planes was harder than the native hardwood used for the stock, so it usually took longer to wear out. Unfortunately, boxwood is more brittle and can be easily damaged if it is bumped or dropped.

The boxing was often set into simple grooves, and if damaged, it can be removed with a chisel, and a new strip can be laid. This procedure is much more difficult if the boxing is held with the complicated keyed slot (called a dovetail). If dovetail-keyed boxing is damaged, do not purchase the plane.

Once you have used moulding planes and become familiar with them, you can do some work that may be necessary. In Part I, I cautioned you not to strip an old finish. Should you be forced to do so, make sure that as little stripper as possible flows into the throat. Carefully clean any stripper out of this passage by twisting a soft, dry rag and pulling it through the wedge slot. Give the stock and wedge a light coat of linseed oil that's cut 5-1 with turpentine. Allow plenty of time for drying before reassembling the plane.

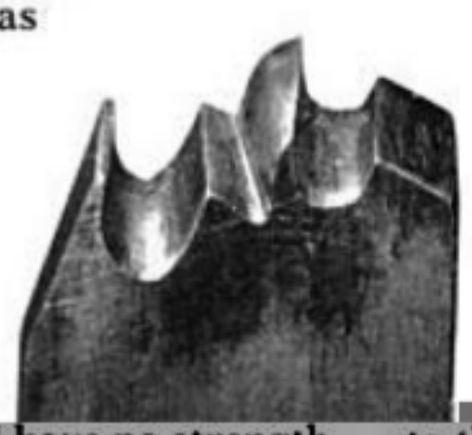
A missing or damaged wedge will diminish the plane's value to collectors, but it's only a minor annoyance for a woodworker. When making a replacement wedge, use the same species of wood as the stock. First, measure the wedge slot (or what remains of the original), and plane a piece of hardwood to that thickness. It is critical that the wedge taper at the same angle as the bed and wear, or it will not work. If the wedge's taper is greater, it will only make contact at the top. (See Fig. 2.) If the taper is less, the wedge will only bind at the bottom. (See Fig. 3.) At best, a wedge without the correct taper will not hold. At worst, it could damage the stock.

If part of the old wedge remains with the plane, copy the angle from this. You will have to do some final fitting and some fine trimming to make sure that the wedge fits properly and locks along its entire length. I use a block plane for this type of trimming.

Once the wedge fits snugly in its slot, you have to bevel the end on the throat side. (See photo, page 46.) This bevel creates a point similar to that on a sharpened pencil (but only on one side). The pointed end prevents the chip from getting caught in the throat and choking it. The bevel also helps direct the chip out of the open throat.

The bevel on the end of the wedge should be a continuation of the incline cut into the stock at the top of the throat. (See photo, page 46.) Once the wedge has been fitted, reach into the throat with a scribe and scratch a mark on the side of the wedge where it disappears into the stock. Bevel from the mark down to the end.

When the wedge's taper and point are completed, finish by shaping the top. There was no sense in doing this first, as had you not fitted the taper correctly, it would have been wasted work.



cient clearance that the edge would have no strength.

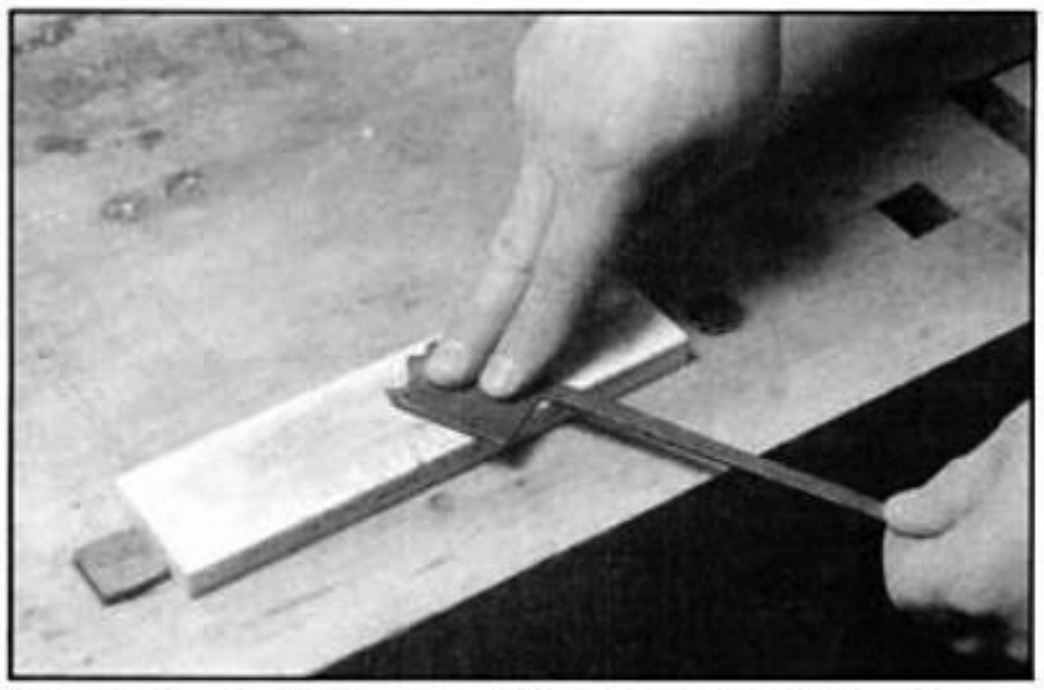
When you have to make a new blade for a moulding plane, consider each individual segment of the cutting edge (whether curved or straight) as a separate cutter, complete with its own bezel. Remember each fillet (the short, straight sections between separate shapes) has to have its own clearance as well. (See photo, page 46.)

If you have to make a new iron for a moulding plane, begin by finding a space cutter that will fit.

to the outside

Make sure tightly agains enough room tudinally. Lea

Cut the tan wedge. If it is the wedge slo eral adjustme



Before honing the bezel of a moulding-plane cutter, flatten it on a lapping table, and polish it on a honing stone.

Adjust a moulding plane by sighting down the sole. To advance the iron longitudinally, tap the end of the tang. Retract the iron by tapping the heel of the stock. To laterally adjust the iron, tap the sides of the tang.

wedge. Put some pressure on the wedge to lightly secure it. Adjust the blank so that it is bedded in the same position as when used. Trace the sole's outline in the layout fluid with a sharp point (I use a scratch awl with a long shank) held as parallel to the sole as possible. (See photo, page 47.)

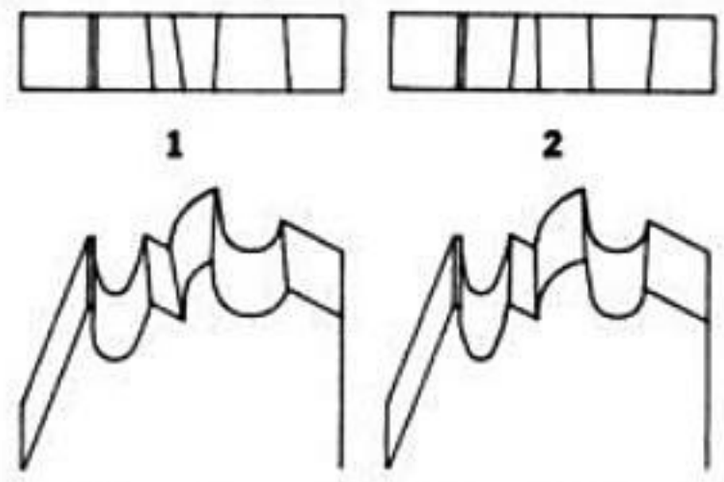
Remove the iron and grind to that shape. You may not be able to make the entire profile on a grindstone; if not, do the rest of the work with files. Chainsaw files, which are available in several smaller diameters, are handy for this work. Triangular files, used for sharpening handsaws, are also useful. You can also cut the profile in the web with a jeweler's saw (which looks like a fine coping saw) and clean up with files.

Place the iron back in the stock, and check the profile against the sole. As you sight down the sole, you should see a perfect "halo" of metal that uniformly follows the sole's profile. Take the time to place the iron back in the stock correctly. Otherwise, all your work will be wasted.

Remove the iron, and spray the back surface of the cutter with layout fluid. Return the iron to the stock, and secure it with the wedge. Drive the tang until the forward edge is projecting about 1/8 in. This setting would be too heavy for use, but is necessary to lay out the bezel.

With the scratch awl, trace the moulding profile in the rear surface of the cutter, back 1/4 in. from the edge. This new line will outline your bezel and relief. It is

FIG. 4:



The bezel of a moulding plane has to have proper relief. 1 Is a drawing of a very elaborate Federal period back band. It has six different cutting surfaces. Above it is an end view, showing how the bezel would appear if you held the cutter up to your eyes and sighted along its length. It shows the angles at which the individual features are relieved. 2 Shows how the same cutter would appear if the various details were not given any relief. The plane would take several passes, but would soon "stall" as the unrelieved areas began to drag on the wood.

not perfect, but it is enough to be used as a guide.

Now, grind and file the bezel. Make sure that each individual shape has its own separate relief so that it has the proper clearance.

When you are done, put the iron back in the plane, and adjust it so that the cutting edge just barely projects above the sole. Adjust it as you would for use. Now look down the sole from the toe towards the mouth. You should see a perfect "halo" above the sole. (See photo, page 47.)

Turn the plane around; you should also see a halo as you look from the heel toward the mouth. If you have insufficient relief anywhere along the bezel, you will be able to spot it from this direction. Look for any area on the bezel that might project below the cutting edge and make contact with the surface of the moulding.

If you are making your replacement cutter from an old iron, follow essentially the same process. Begin by annealing the iron to make the steel soft and easier to work. Do not file the tempered blade even if you can, because you risk working back into softer areas of the steel when you make the new profile. These spots will not hold an edge and will wear faster than the other areas. The extra effort needed to heat-treat is worthwhile, if it avoids this problem.

Once again, spray the front edge with layout fluid, and seal the wedge so that none of the old profile intersects with the new one. Then, trace the profile and make the new shape. After that, the process is the same as described above.

Whether you made your own cutter or reshaped an old one, you next have to harden and temper it.

By now, you should understand why I suggest not buying moulding planes with common profiles, if they are missing their irons. Making a new one can take several hours, and the value of your time usually exceeds the value of the plane.

A missing iron is not the only problem you may discover. Even if the iron is the original one, it may be worn and will still require considerable work before the tool operates properly. Remember, as a moulding plane is used, the high points of the cutting edge receive more wear than the low points.

If the high points are considerably more worn than the low ones, you will have to rework the profile. Remove the cutter from the stock and anneal it. Once again, spray the forward surface with layout fluid.

Before starting the first pass, make sure that the spring lines are aligned with the edge and surface of the board. Note the marking-gauge line. It has been darkened with a pencil so that it would show.

After you have made several passes with the plane, the molding will begin to develop. Note the shavings, which also get wider with each pass.

The moulding is complete when the stop rides on the board.

Once this coat of fluid is dry, return the iron and wedge to the stock. Adjust the iron so that the worn spots are level with the sole of the plane, with the unworn areas projecting. Run the point of the awl along the contour of the sole in front of the mouth. The scribe will trace a line in the colored fluid that describes the restored profile.

Remove the iron from the plane and clamp it, bezel-up in a vise. When you restore the original profile, you reduce the width of the bezel and lose some clearance. You will have to re-establish the old bezel. If you don't, there is a risk of insufficient relief. After doing this, follow the process as described for making a new cutter.

If the dealer has several planes of a particular profile that you want to use, check the irons. All other considerations being equal, buy the plane with the least-worn iron. Before making the purchase, set the iron as you would when using the plane, and sight down from the toe. If you see that the halo of metal projecting above the sole is not equidistant everywhere, some areas perhaps not showing at all, you will have to work on that cutter.

Whether you have made a new iron, reworked an old one, or just restored the original profile, you now have to harden and temper the cutter.

Finally, hone the cutter. Begin by polishing the surface opposite the bezel. (See photo, page 48.) This usually requires a trip to the lapping table. Be sure to flatten just the web. Like bench planes, moulding-plane irons are often signed by their maker. This mark adds to the plane's value, especially if it is a good, clean impression. You reduce the resale price of the tool if you scratch or obliterate the mark on the lapping table.

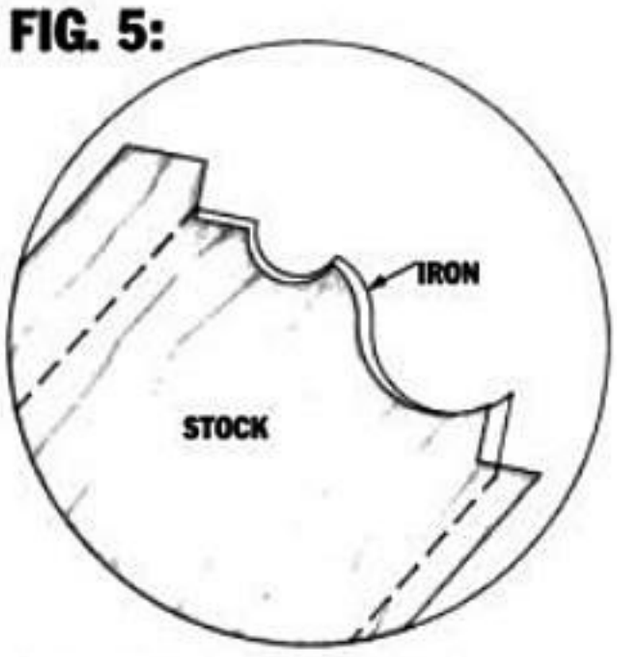
You will need a variety of slip stones to sharpen the bezel. I use ceramic files that are made of the same material as my sharpening stones. Use them dry; it is less messy this way, and there is no oil to obscure your view when you look to see how the edge is developing. The set of files include a round, triangle, square, and teardrop files. The triangle and square files are good for corners and fillets, as well as convex edges. The round and teardrop files work on concave areas.

Slip stones are sometimes sold on the secondhand market, often in the same places where you find old tools. They are seldom recognized or appreciated by dealers and are often priced well below the cost of a new one. Otherwise, you can buy slip stones from any new tool dealer or through a tool catalog.

You may have to strop the cutter to get rid of any wire edges. I use a soft buffing wheel impregnated with buffing compound. A stiff pad will not reach down into the contours of a moulding-plane iron unless you exert a lot of pressure. This pressure can wear away the high points before the low points are sufficiently stropped. Do as little stropping as possible. When you have to, do it as quickly and lightly as you can to avoid wearing the high spots.

There are many planes now available on the secondhand market that were made and used in England for many years by English woodworkers. In the last 20 years, they have been swept up in large numbers by American tool dealers and shipped to the United States. England is more humid than my native New England. As a result, the wooden bodies of planes that have been shipped here will experience some dimensional change as the stock balances its moisture content with the new relative humidity. Usually, the stock

FIG. 5:



If a wooden moulding plane is transported from a humid climate to a much drier one, the stock will shrink. As a result, the cutter's features will no longer be aligned with the same features in the sole. The sole will appear to have shifted to the left. As you sight down the sole, it will look as shown here. The dotted lines indicate the edges of the cutter's web.

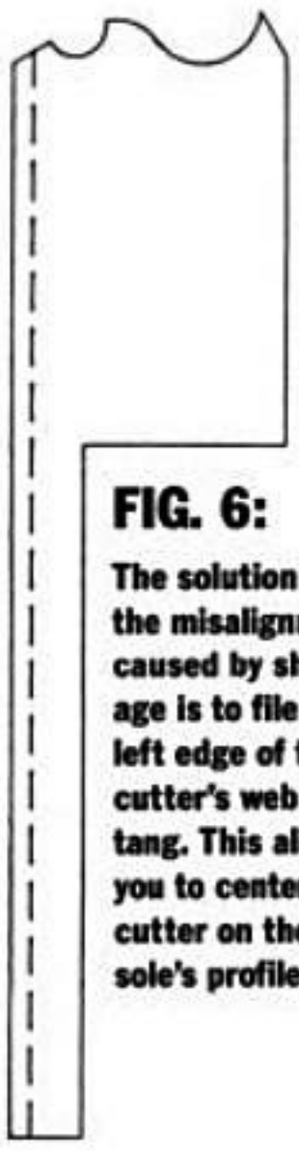


FIG. 6:

The solution to the misalignment caused by shrinkage is to file the left edge of the cutter's web and tang. This allows you to center the cutter on the sole's profile.

A thumbnail moulding plane does not have a fence.

When making a thumbnail profile, start in the middle of the curved profile. You will gradually round the corner of the board. Eventually the drop will form, and the stop will make contact with the board's surface.

becomes slightly narrower.

Because the plane's cutter is made of metal, it retains its original size. The shrinkage causes the features of the sole to move slightly out of alignment with the same features on the cutting edge. If you try to use the plane, it will act very much the same as it would were the cutter's profile badly worn. It will begin to form the moulding, but the cutting will soon stop when the sole reaches the first point of misalignment.

Because their stocks are thicker and experience a greater amount of shrinkage, this problem is more acute on wider moulding planes than narrow ones. I recently purchased a plane that had this problem. The stock was 2 1/4 in. thick. The total misalignment amounts to approximately 3/64 in., enough to prevent the plane from working.

The stock's dimensional change is most noticeable on planes with a complex profile, especially one that has deep features such as a quirk. A wide, round plane, for example, would experience a similar amount of shrinkage but probably not enough misalignment to make the tool unworkable.

You can easily spot this misalignment when you know what you are looking for. (See Fig. 5.) Sight down the sole, from the toe toward the heel; you will see that the features appear to shift right to left in relation to those on the iron. This is not really a right-to-left movement: it only appears that way. Actually, the whole stock has shrunk uniformly. Because the iron (which retains its original width) is butted tightly up against the closed cheek, it cannot be centered with the features in the sole's profile.

I have only experienced the problem of dimensional change on English planes that have been recently imported. I assume that the problem also occurred with planes that were imported a century or more ago, but was corrected by the original owners. The same dimensional change could probably occur with American planes transported from the American East coast (or Midwest) to arid regions like the American Southwest. The amount of dimensional change in English planes imported to the American Southwest must be even greater than in the planes I have come across.

Happily, the solution is simple. Draw-file the left edge of the iron, the edge that butts against the closed cheek. (See Fig. 6.) Concentrate on the web and the lower length of the tang. Remove about the same amount of metal as the displacement caused by the shrinkage.

Now the iron can be centered on the sole. The effects of the shrinkage are distributed evenly over the whole profile and often become so slight as to no longer effect the tools performance. If not, you will have followed the procedure already described for restoring the profile.

After sharpening the cutter return it to the plane, invert the stock, and holding the iron so that the bezel faces the toe, insert the tang up the throat and through the wedge slot. Turn the plane upside right with the sole down, and keep the iron from falling out by covering the mouth with your index finger.

Insert the wedge, and push it in place snugly enough to hold the iron. Once again, sight along the sole from the toe to the mouth. Lightly tap the tang end of the cutter with a hammer until you see the cutting edge rise slightly above the sole. If necessary, adjust the iron laterally by tapping either side of the tang. (See photo, page 48.)

When you are done, the cutting edge should produce a halo above the profile of the sole. It should be equidistant everywhere. If you have set the iron too deeply and have to retract it, tap the heel. Once you have reached the desired setting, tighten the wedge with the hammer. Remember, someday you will again have to loosen the wedge, so don't be too aggressive.

Using a Plane

Your moulding plane should now be ready to use. Select a board. Most moulding planes were not meant to be used on very hard or heavily figured woods. The exceptions are those with a high pitch—for example those with a half or middle pitch. The board should be made of pine or some other soft, even-textured wood with a straight grain. Plane the upper surface with a smooth plane, and joint the left edge.

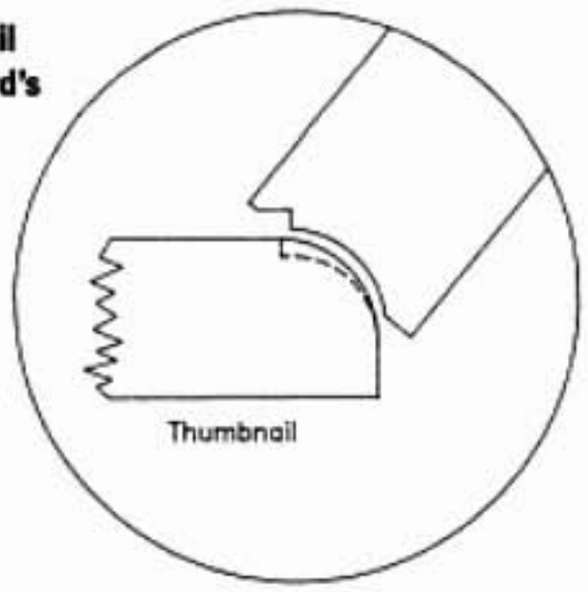
Clamp the board to the workbench with the left edge projecting slightly over the front side. Set a marking gauge to the width of the finished moulding, and use it to scribe a line parallel to the edge of the board. Set the plane's fence against the board. The mouth should be just off the right-hand corner, so that your first pass cuts a shaving from the entire length of the edge. (See photo, page 49.)

If the plane is sprung, bring the stock to the correct angle relative to the vertical and horizontal. Remember, you do this by looking at the scribe lines on the toe.

Grip the plane by the toe with your left hand and by the heel with your right. Your right palm, pushing against the upper corner of the heel, will provide most of the force. Make sure your hands are not covering the mouth or otherwise interfering with the chip. The chip does not exit through the top of the stock as on a

FIG. 7:

Start a cut with a thumbnail moulding plane on the board's arris; each pass will round the corner more and more. Eventually, the drop (indicated by the dotted line) will form. Shortly after that, the stop will come into contact with the board's surface.



bench plane. The throat is open on the right-hand side, and the chip is ejected onto the workbench.

As you walk alongside the board, push the plane forward while simultaneously pushing down on it to prevent it from jumping off the edge. Do not stop the forward motion, as this will create a bump in the moulding's surface. However, if the tool does stall, no great damage has been done and this bump will be removed in the next pass.

Repeat this process, and with each pass of the plane you will see the moulding begin to develop. (See photo, page 49.) As the plane works down deeper into the profile, the chips will become wider, and the plane will become harder and harder to move. You will have to lower your torso to lean into the work.

The amount of force required to move a moulding plane depends on the width of the moulding. This can be deceptive, since the real width of the cut is the width of the moulding's surface—in other words, its length if all its curves and fillets were straightened out. A narrow, but deep moulding will cut a wide chip and require a lot of force to move it forward.

When the profile is complete, the stop will ride on the right side of the moulding and lightly burnish the board where it rubs. It is very important that the plane not stall during the last pass. (See photo, page 49.)

A thumbnail moulding plane is a special case, because some of these tools have no fence and instead have two stops, one on either side of the sole. (See photo, page 50.) To begin cutting with a thumbnail plane, hold the middle of its concave sole on the arris of a jointed board. These planes are usually sprung, so the plane is also at an angle.

Rather than establishing a track that the plane can follow, each pass of the thumbnail rounds the arris to the plane's elliptical profile. (See Fig. 7.) The curved edge grows wider until near the very end, when the fillet is cut into the board's surface. When the fillet is fully formed, the right-hand stop rides on the board's upper surface. The left-hand stop is the area of the sole below the edge of the cutter. When this runs on the edge of the board below the curve, it stops the plane from advancing laterally, to the right. (See photo, page 50.)

Once you have finished the moulding, cut it from the board using a ripsaw or a tablesaw. Remember to follow the line made by the marking gauge. Joint the outside edge to remove the saw marks. To plane the sawn edge of a large moulding, clamp it in the side vise of a workbench, and run a plane over it. Short lengths of moulding can be jointed to a shooting board. Very small mouldings can be jointed if you invert a jointed plane and hold it in the vise. Pull or push the moulding over the mouth of the plane.

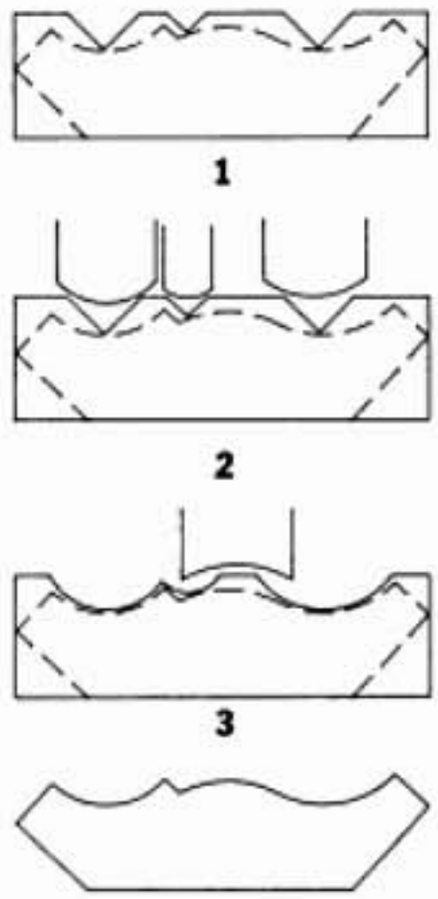


FIG. 8:

Mouldings can also be made with hollows and rounds. Shown here is a cyma reversa and cove cornice. As in 1, first lay out the placement of the various details and their depths with a V plow. I use a Stanley #45 for this purpose. As shown in 2, use various widths of rounds to excavate the concave details. 3 Use hollows of various widths to shape the convex details. The fillet between the cove and the cyma recta can be trimmed with a shoulder rabbet and the corners with a bench plane.

It is not likely that you will ever have to make mouldings with hollows and rounds. (Remember this is not all these planes are used for.) If you do, you will find it helpful to have another plane called a V plow. This tool is a special-purpose plane and is similar to a grooving-plow plane.

The V-plow plane has a movable fence and depth stop, so it is adjustable for both width (distance from the edge) and depth. It is used to establish the deepest points on the moulding profile you are making. (See Fig. 8.) When you are done with this tool, the rough form of the moulding will exist as one or more V grooves of different depths that are spaced across the edge of the board. Hollows and rounds are used to shape the remaining profile. Rounds hollow out the concave areas, and hollows shape the convex.

V-plow planes are rare, and your chances of finding one are not good. However, if you own a combination plane such as the Stanley #45, you can use it for this purpose. You will have to make a V cutter, which is a simple process.

Making a moulding with hollows and rounds is more time consuming than using a moulding plane and works best if you are making a limited amount of moulding. However, at times, I have had to make a large quantity of moulding, and found it more economical to make a moulding plane of that profile. To do this, first purchase a single, round plane that has become separated from its hollow plane. Give the round plane a new sole, and grind its iron to the new profile as described above. The result is a moulding plane with the profile that you need. I only recommend doing this in an emergency, as the process takes time. Also, to do it properly requires a complete understanding of how moulding planes work. This can only be learned through experience. ▲

Contributing Editor Michael Dunbar is a furniture maker and author of books on Windsor chairs, Federal furniture and antique tools.

APPLE WITH

The Hidden Compartment Will Keep 'Em Guessing

PHOTOS BY JOHN HAMEL

A SECRET

BY JAMES A. JACOBSON

Don't take any wooden apples . . . unless there's something special inside. These turned wooden apples have a secret compartment.

This apple is a nice, little turning project that makes a great gift. Turn the apple over, and you'll see what really makes it unique—a hidden compartment inside. The secret is a small cylindrical container that fits into the bottom of the apple and locks in place with a friction fit. You can store keys, coins, valuables or other small items in the compartment. Probably the most fun (especially for kids) is just knowing it's there.

Making the apple is easy—it's a good project for the novice turner. To make it, you'll need a screw chuck (see sidebar) and some stock at least 2 in. thick. You can glue up that thickness from thinner stock, if that's all you have. I've turned apples from Osage orange, black walnut, wild cherry, oak, padauk or anything else I could find in my scrap box. You might glue two pieces of stock together with a piece of veneer between them for a different effect. Use your imagination and surprise yourself.

After turning the apple shape on the lathe, I contour the apple on a belt sander to give it the form of a delicious apple. To make the apple look more realistic, I carve a stem from red-colored padauk and a leaf from a green piece of poplar. I shape the stem and leaf using a Dremel, or flexible shaft tool, and a sanding sleeve.

Turning the Apple

First, prepare a rough block for turning. Trace out a 2¾-in. dia. circle on 2-in. thick stock. Mark the center point, and cut out the block with a bandsaw. You can use thicker stock to make the apple a bit taller, if you like. The exact dimension isn't important, but 2 in. is a minimum. If you're like me, you can't make just one of anything, so you might want to bandsaw enough blocks to turn several apples.

Drill a ⅛-in. hole in the block at the center point to act as a pilot hole for the screw chuck's thread. Mount the screw chuck on your lathe, and thread the apple block on the screw chuck's screw until the wood is snug against the face surface of the chuck. Bring the tail stock cone center up to support the end of the block.

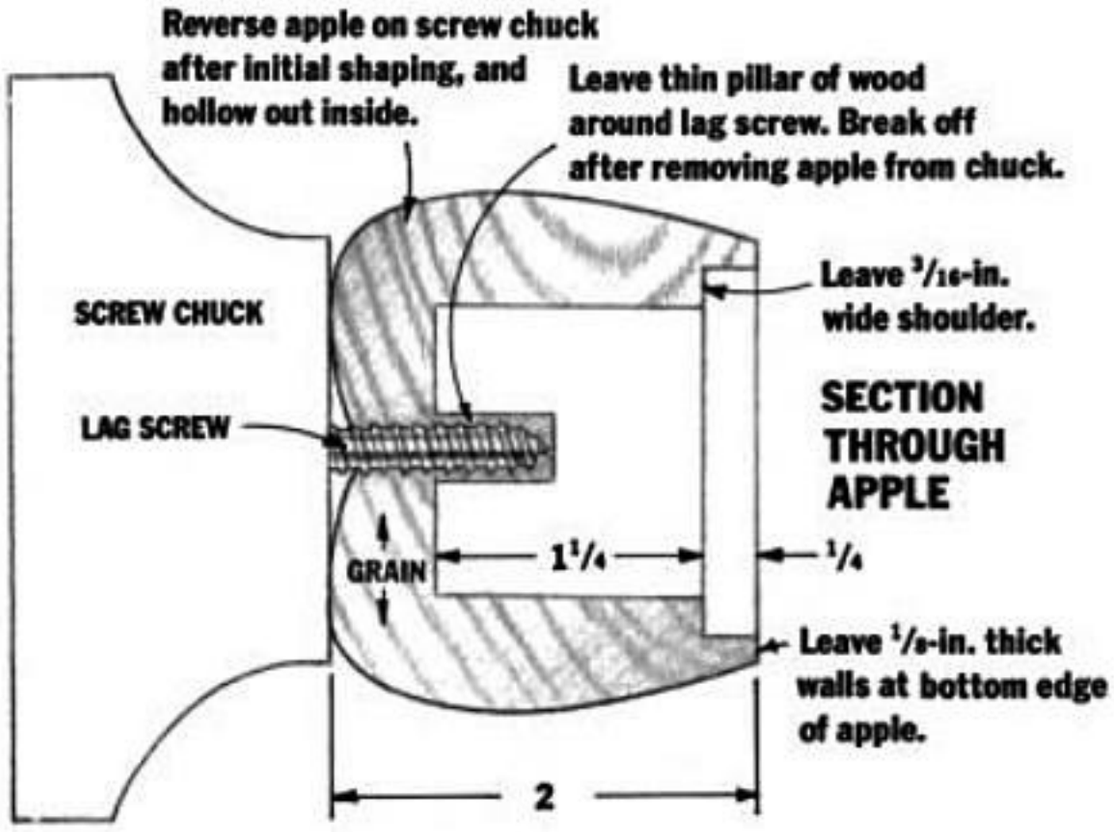
Turn the apple to shape, as shown in the photo. I use a ¾-in. roughing-out gouge to rough out the form, and a ½-in. gouge to bring it to final shape. You can also use a ½-in. round-nose scraper, if you prefer. There are no exact outside dimensions for the apple—just shape it until it looks right to you. Remove the tail stock to do the final concave shaping at the top of the apple where the stem will go. I sand the apple while it's still on the lathe, then use a belt sander to give the apple a few extra contours on it's outside for realism. I finish up with 240-grit sandpaper.

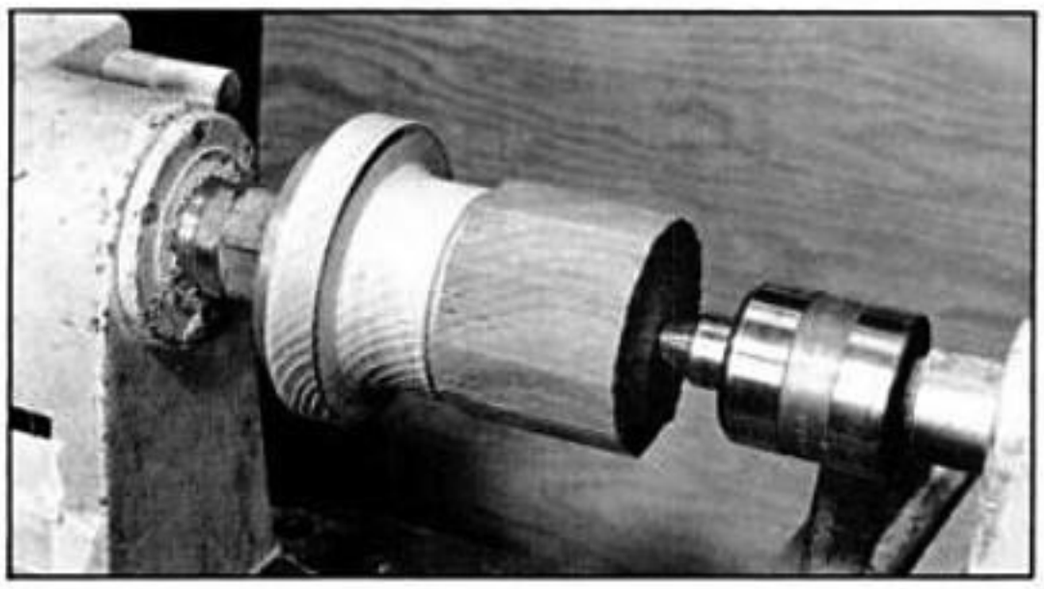
The next step is to hollow out the apple for the secret storage compartment. Drill a ⅛-in. dia. pilot hole in the top of the apple for the screw chuck. If you have a Jacobs chuck for your tail stock, you can do this right on the lathe. Turn the apple around, and thread the top end on the screw chuck.

Hollow out the inside of the apple with a ½-in. square-nose scraper, as shown in the photo and Fig. 1. A light touch with the tool is best, as too much force might loosen the apple from the screw chuck.

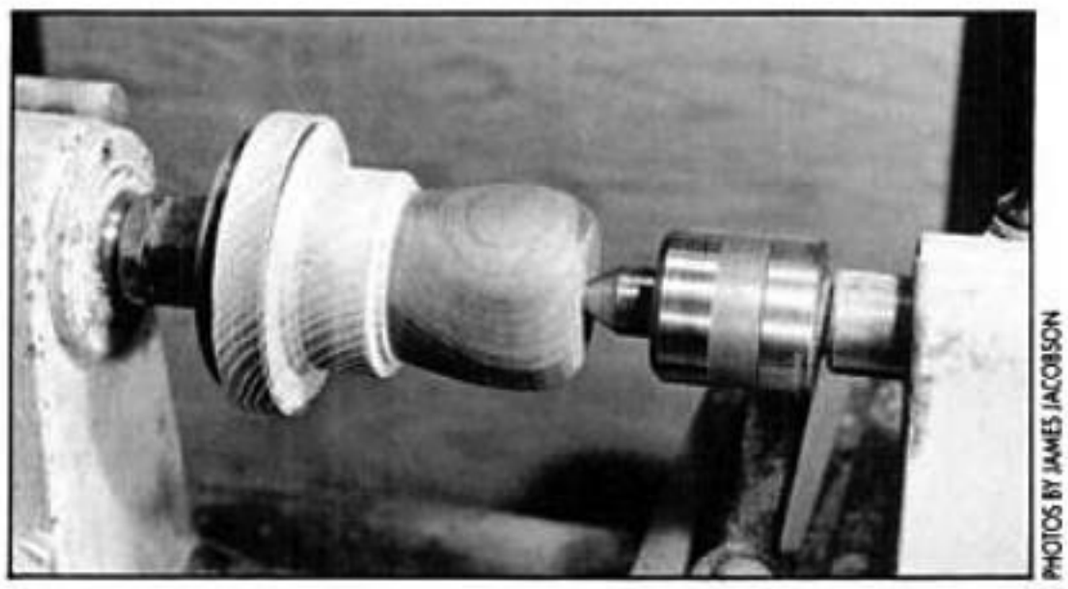
Start by turning the rabbet for the flange on the storage compartment, leaving an outer wall thickness of at least ⅛ in. Cut the rabbet at least ¼ in. deep and 3/16 in. wide. Continue to remove wood from the inside, making it at least 1¼ in. deep, but be careful not to hit the lag screw with the tool. Allow a thin pillar of wood to remain around the screw. When the hollowed-out space is finished, remove the apple from the chuck, break out the wooden pillar, and clean up any leftover stump with a chisel.

FIG. 1: TURNING THE APPLE





Thread the rough apple block on the screw chuck.



Use a live center in the tail stock to support the apple when turning to shape.

PHOTOS BY JAMES JACOBSON

Turning the Secret Compartment

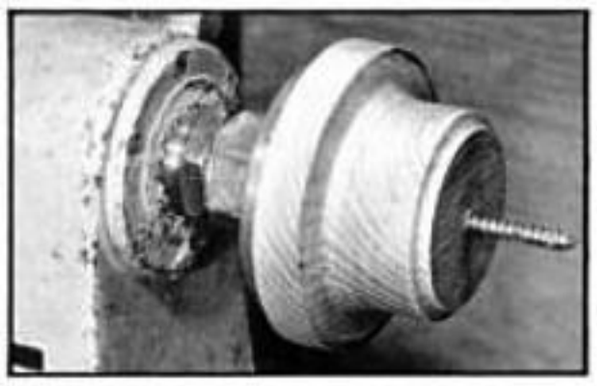
Bandsaw a 1¾-in. dia. block from a piece of 1¼-in. thick stock. Drill a ⅛-in. hole in the center of the block, and mount it on the screw chuck. Put a ⅛-in. thick, ¾-in. dia. shim between the chuck and the block—it'll keep the compartment from becoming jammed on the screw chuck. Turn the outside of the storage compartment, as shown in Fig. 2.

The idea is to make the storage compartment fit inside the hollowed-out apple, with a little clearance to spare. To do this, measure the inside diameter of the apple with a pair of calipers, then use that measurement as a guide. As you turn the storage compartment, keep checking the outside diameter until it's about ⅛ in. smaller than the inside diameter of the apple. Be sure to leave a flange on the end of the storage compartment, which will fit into the wider-

MAKING A SCREW CHUCK

You'll need a small screw chuck to turn the apple. A screw chuck mounts to the lathe's faceplate and has a pointed screw at its center. The apple blank screws onto the chuck for turning. If you don't have a screw chuck, the first thing to do is make one on your lathe. Bandsaw a 4-in. dia. circle out of 6/4 oak or hard maple, and screw it to a 3-in. lathe faceplate.

To make the turning safer and easier, support the block with the tail-stock center. The point of the center will mark the spot where you'll eventually drill a hole. Now turn the block into the shape of the screw chuck shown in the drawing. I use round-nose scrapers, but you can use whatever seems most comfortable. Remove the tail



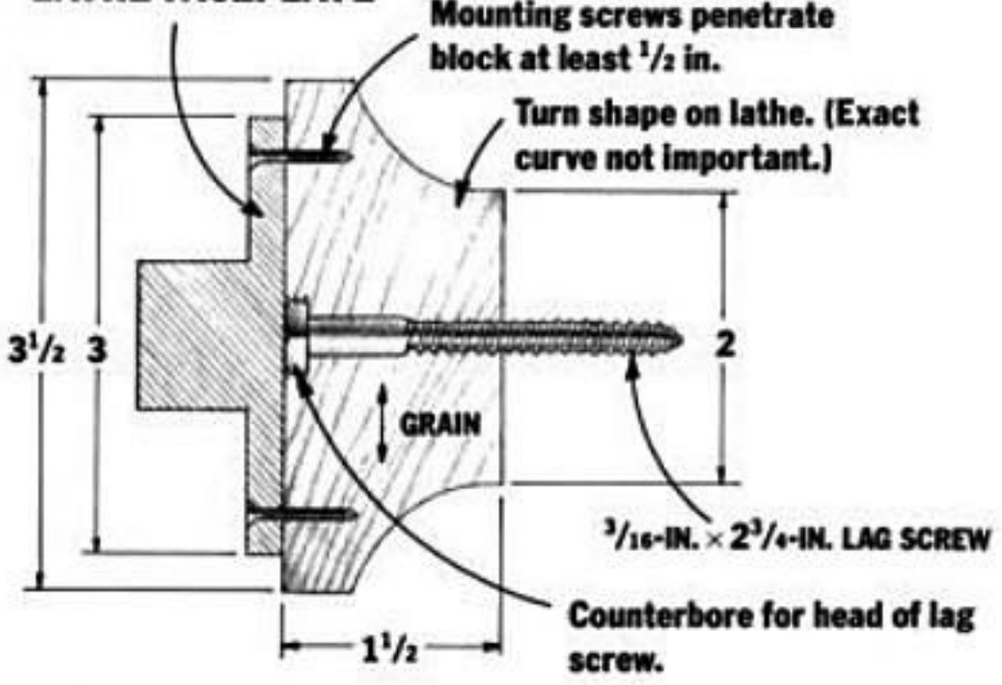
This shop-built screw chuck is easy to make—it's nothing more than a lag screw threaded into a piece of wood.

stock to flatten the face of the chuck. Make an alignment mark on the edge of the faceplate and chuck for later reassembly, and remove the turned chuck.

Drill a ⅛-in. hole through the screw chuck at the center of the front surface. (You can do this before you remove the wooden chuck from the lathe if you have a Jacobs chuck to fit the tail stock). Make a shallow counterbore around the hole on the faceplate side. Using a socket wrench, thread a 3/16-in. × 2¾-in. long lag screw through the hole. A little soap on the threads will make it thread in easier. The head of the screw rests in the counterbore, so it won't interfere with the faceplate. Grind or file off the sharp point of the screw.

Reassemble the screw chuck to the faceplate using the alignment marks. With the chuck and faceplate on the lathe, deepen the gullets of the extended screw with a small file to give it greater holding power. Now turn on the lathe, and watch the screw to see if it's running true. If it wobbles, shut off the lathe, rotate the chuck by hand, and tap the screw with a block of wood until it runs true.

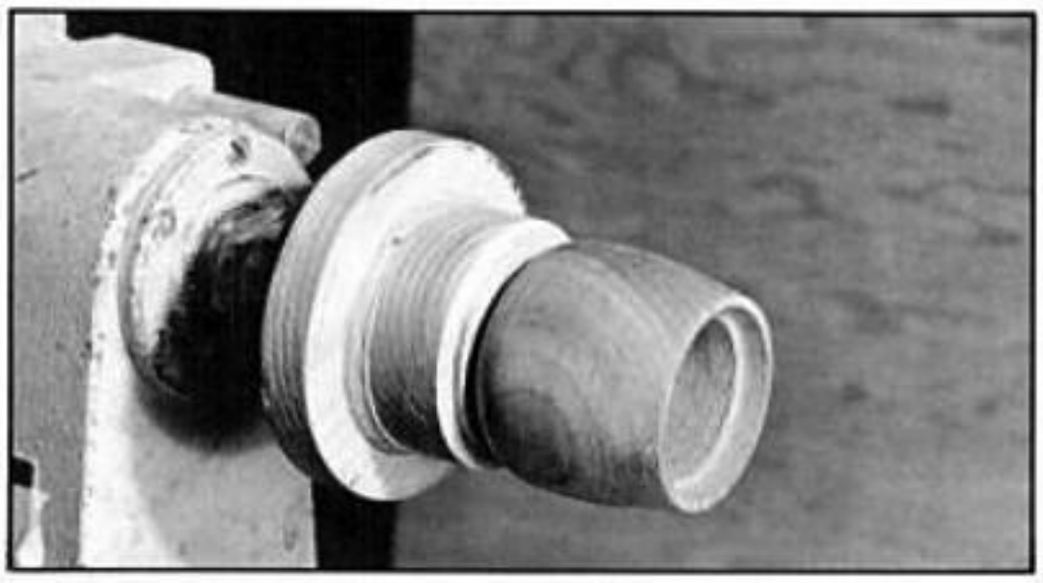
LATHE FACEPLATE



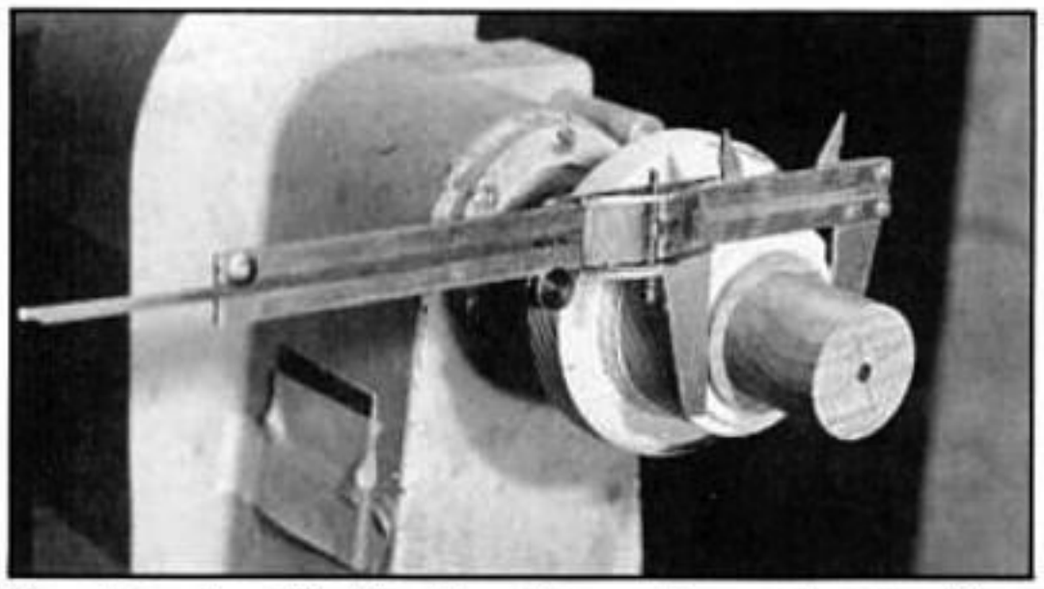
SECTION THROUGH SCREW CHUCK

DRAWINGS BY SALLY ONORA

Remove the tail stock, and finish shaping the top of the apple.



Remove the apple, turn it around on the screw chuck, and hollow out the inside.



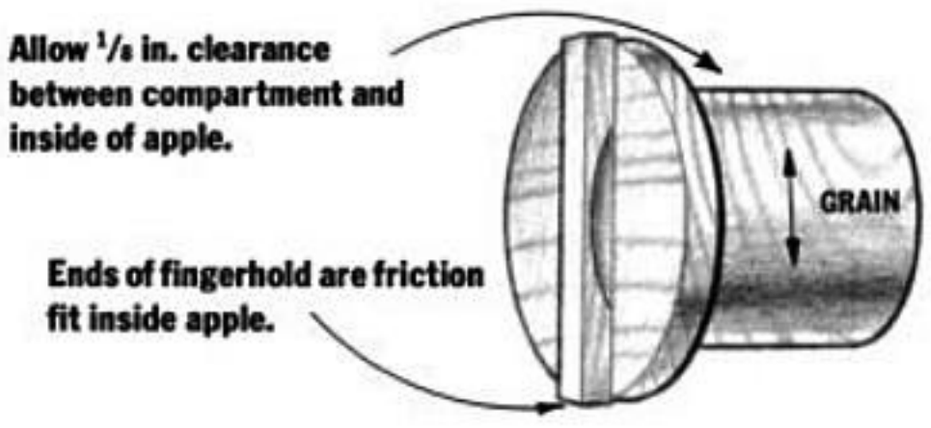
Use calipers to get the diameter of the secret compartment and its flange just right.

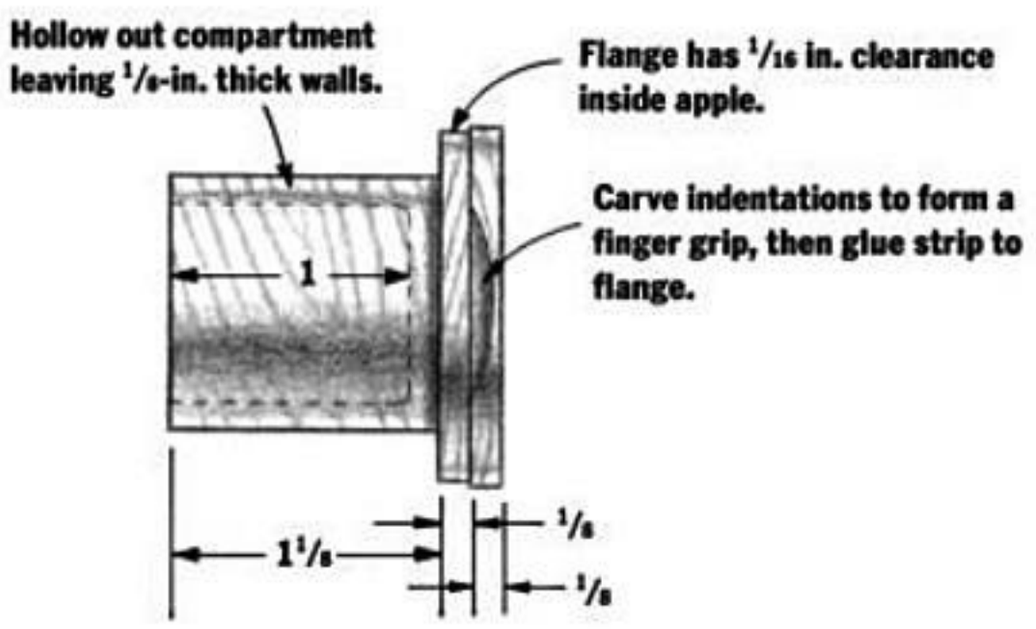
diameter shoulder in the bottom of the apple. This flange should be about 1/8 in. thick and fit inside the apple with about 1/16 in. clearance on the diameter. Use the hollow apple, itself, to check the final fit over the storage compartment.

I used a 1/4-in. square-nose scraper to hollow out the inside of the storage compartment. Again, you'll have to leave a pillar of wood around the chuck screw. Remove the storage compartment from the chuck, break out the wood pillar, and clean up the inside bottom surface of the compartment.

Next, make a small fingerhold for the storage compartment. Measure the diameter just inside the bottom opening of the apple. Cut a strip of wood 1/16 in. longer than this measurement, 1/8 in. thick and 1/4 in. wide. Carve a finger indentation into each side of the strip, as shown in Fig. 2. Glue the strip onto the bottom of the storage compartment so it extends slightly

FIG. 2: SECRET COMPARTMENT





beyond the edge of the flange on each side.

The storage compartment is held inside the apple by a friction fit between the ends of the fingerhold strip and the inside wall of the apple. To get it to fit just right, first round the ends of the strip with sandpaper. Then keep sanding away the wood,and continually test the fit of the strip (and the storage compartment) in the apple. You're looking for a friction fit. With two fingers on the strip, you should be able to insert the storage compartment with a twisting motion, and its snug fit will hold it in place. If you get a loose fit from removing too much wood, sand off the strip on a belt sander. Make a new one until you get it right.

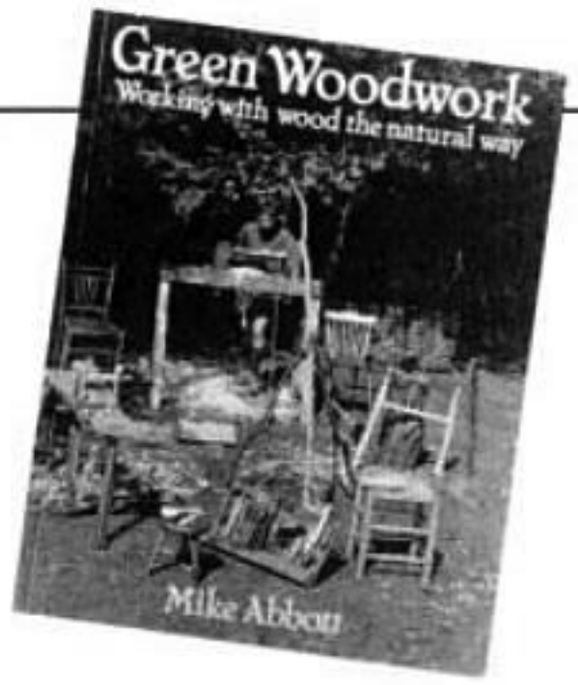
Make a stem and leaf for the apple from bits of scrap wood. The red color of padauk makes a nice stem, and you can usually find a green spot in a piece of poplar for the leaf. I shape the stem and leaf using a Dremel flex-shaft tool with a sanding sleeve, though a carving knife will work, too. I make the rough stem about 1/4 in. in diameter and 1 1/2 in. long. The leaf is about 3/4 in. long and 3/16 in. thick. Secure the leaf to the stem with a small piece of wire glued into tiny holes drilled in both the leaf and the stem. Taper the bottom portion of the stem, so it will fit snugly in the hole in the apple, then glue it in place.

I finish my apples with a couple of coats of Deft brushing lacquer, but you could use any clear finish you like. ▲

James Jacobson is a retired university professor and author of several woodworking books. He's currently interested in making round containers and music boxes on the lathe.

BOOKS & VIDEOS

BOOK



Green Woodwork

by Mike Abbott
(1989, Guild of Master Craftsman Publications, 166 High St., Lewes, East Sussex BN7 1XU, England, U.K.) 208 pp; paperback, $27.00.

Green woodwork is the craft of making wooden objects from green wood —that is wood that comes straight from the tree and is not seasoned or sawn into boards. This allows the craftsman the excitement of gathering his own material locally at little or no cost, and turning it into functional and beautiful objects, using low-tech, low-energy, low-risk hand tools and body-powered machines. For some, this could be the ultimate pastime—working out in the woodlands, combining skill and tradition with fresh air and the satisfaction of creative endeavor.

These are the thoughts of Mike Abbott in his first book, *Green Woodwork*. Abbott takes his inspiration, and much of his craft, from the chair bodgers of rural Great Britian. These craftsmen flourished during the last century, riving out and turning parts for Windsor chairs in crude, temporary camps set up in the woodlots where their materials grew and were felled.

There are only a few full-time bodgers left in the world, and Abbott is one of them. For 10 years he has worked at reviving this nearly lost craft, teaching and demonstrating at the Green Wood Trust in Coalbrookdale, Telford, England, during the summers. This organization promotes the educational, social and commercial value of small woodlands. In the winter he continues making Windsor chairs using traditional methods.

In his book, he shares a spirit for the old ways, as well as a sense of concern for the environment. The simple projects he presents in the book are well illustrated, allowing even a beginner (indeed much of his teaching is often with children) the opportunity to experience the joy of working green wood.

The projects outlined in this book cover many of the old woodsman's skills based on a good eye, a steady hand and a strong arm. Projects range in difficulty, from carving a spoon to building your own spring-pole lathe, which requires steam bending, turning and other skills used in chair making. As a bodger myself, I picked up quite a few tricks.

The photographs of lovely, long ribbons coming off his spring-pole lathe are an inspiration, even to an experienced turner. The book is generously illustrated with clearly understandable photos and line drawings. Abbott's style and humor make this an altogether pleasant and informative book.

DON WEBER

VIDEOS

Wood Lathe & Accessories

One in a five-part series (1987, Meridian Education Corp., 205 E. Locust St., Bloomington, IL 61701) VHS; 20 min; $89.00.

I must say that being asked to review a video was quite a psychological crossroads for me, because we don't have a TV in our home. It's not that we are religious zealots. It's just that my wife and I feel that the tube would bring more harm into our home than good.

I watched *Wood Lathe & Accessories* at my father's house with our two youngest children, ages 9 and 12. Everyone in our household can hold his or her own on a wood lathe, so it was fun to watch the reactions to the tape. Amid exasperated exclamations of "That's not the way its done," and so on, I took notes.

The video epitomizes my feelings about the U.S. industrial arts educational system. Industrial arts today is a case of two realities: woodworking the way it's really done and woodworking as prescribed by a committee of product-liability lawyers. At some point just after WW II, industrial arts educators decided to scrap the European apprentice system, where one was thoroughly steeped in hand-tool basics and theory before he or she ever touched machines. One can still wander into most any high school shop and find nice, old hand tools, neglected and rusting. Today, machines are the order of the day. But wait a minute, machines are dangerous so we have to think safety! This is a problem because both student and teacher often have little understanding of the subject.

Enter, stage right, the safety engineers who are driven by product-liability lawyers. The result is *Wood Lathe & Accessories*. The only good I could see in this tape was some very basic safety procedures, such as roll up your sleeves, restrain long hair and remove jewelry. I could have lived with the tape had it shown some good basic scraping. A correctly applied scraper is sharpened to a burr and used down hill. *Wood Lathe & Accessories* featured scraping with a skew. At times, the skew was even turned at an odd angle.

Even an absolute neophyte's turning career would be much better served by not watching *Wood Lathe & Accessories*. Why teach bad habits that will only have to be overcome, when, for the same amount of trouble, we could teach correct methods from the start? The 20 minutes it takes to watch the tape would be better used by asking the class to whittle on a block of soft pine with a pen knife. Then charge them to think of the turning chisel as a pen knife, and apply it to the work accordingly.

ERNIE CONOVER

GALLERY

Animals have reared their beastly heads (and feet) on furniture throughout the ages. In ancient times, Egyptians carved lion paws, bull hooves and duck heads on the feet of their chairs. More recently, we find the claw-and-ball foot from the Chippendale period, or ornate birds and sinuous serpents from the Empire period. Once again, animal motifs are back with a renewed vigor and a fresh look. While, in the past furniture mainly included animal parts—heads and/or feet—today's furniture has evolved to show the whole animal.

JON ALLEY

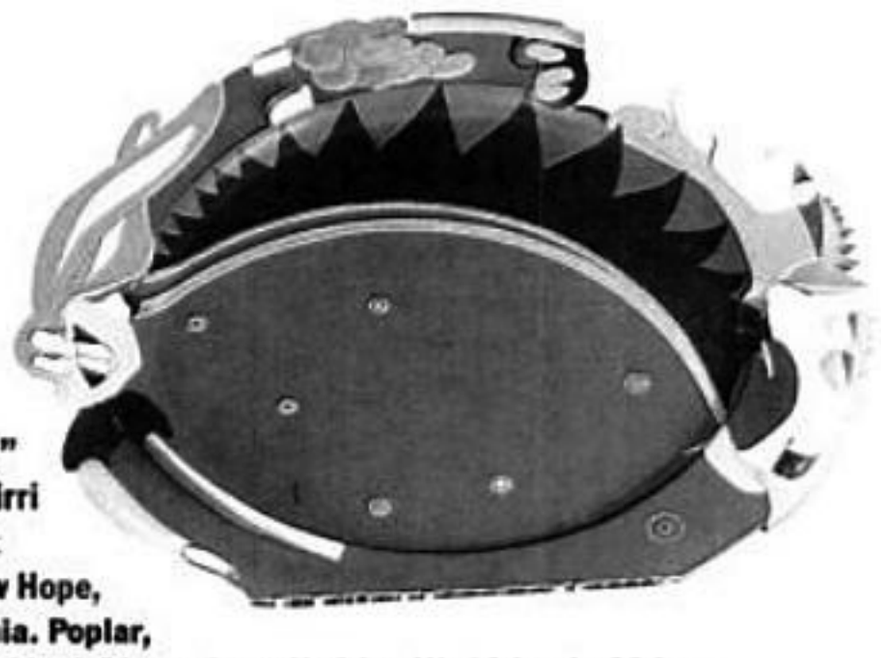
"Pheasant Bowl," by Jon Alley, Churchville, Pennsylvania. Red cherry, gold leaf. Dimensions: H: 6 in., D: 6 in.

DEAN POWELL

"Cow Chair," by Donald Krawczyk, New Bedford, Massachusetts. Ash, milk paint, woven fabric seat. Dimensions: H: 24 in., W: 12 in., D: 11 in.

DAVID CABAS COURTESY OF GALLERY NAGA

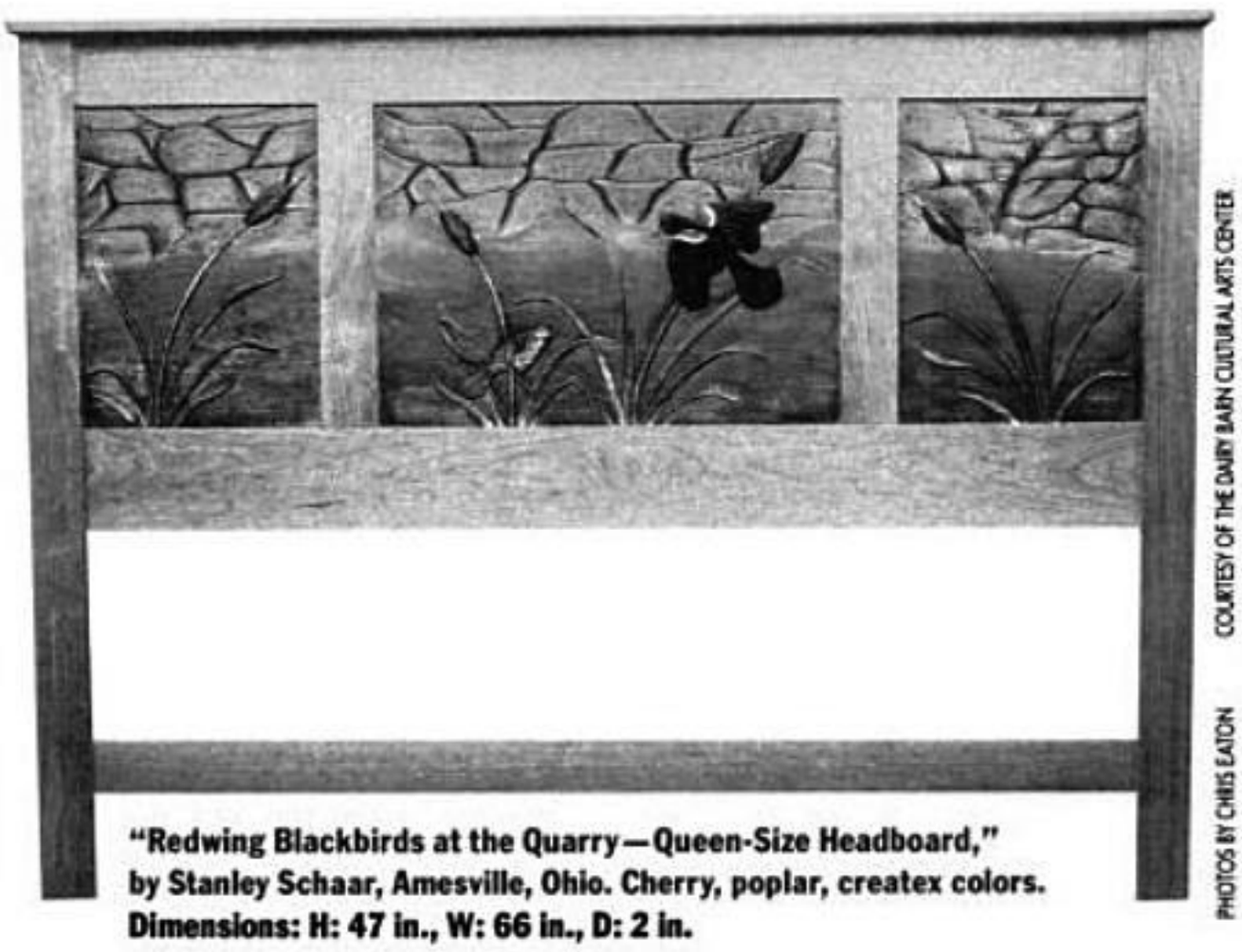
"Panther Table," by Judy Kensley McKie, Cambridge, Massachusetts. Cast Bronze, glass. H: 17 in., W: 50 in., D: 40 in.



MARK SFIRRI

"Bugs and Thugs," by Mark Sfirri and Robert Dodge, New Hope, Pennsylvania. Poplar, acrylic, gold leaf. Dimensions: H: 6 in., W: 19 in., L: 23 in.

"Redwing Blackbirds at the Quarry—Queen-Size Headboard" (Center-Panel Detail)



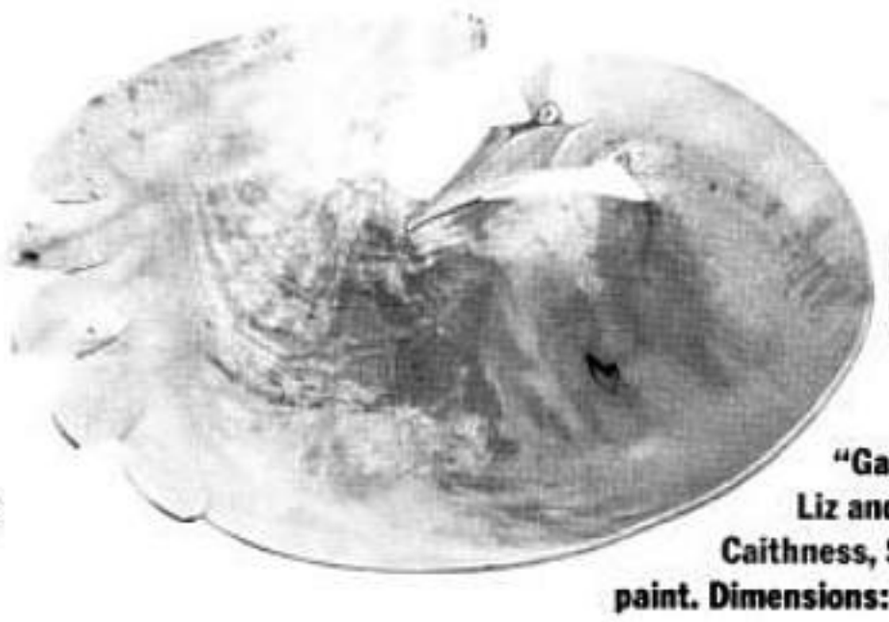
PHOTOS BY CHRIS EATON COURTESY OF THE DAIRY BARN CULTURAL ARTS CENTER

"Redwing Blackbirds at the Quarry—Queen-Size Headboard," by Stanley Schaar, Amesville, Ohio. Cherry, poplar, createx colors. Dimensions: H: 47 in., W: 66 in., D: 2 in.

GALLERY

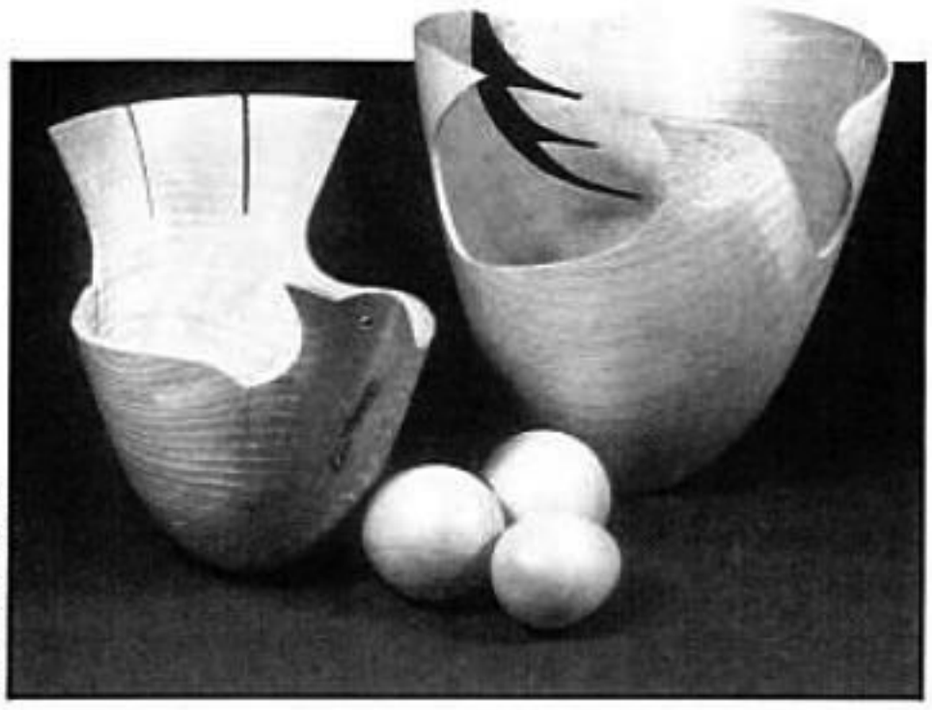
CHARLES MARK-WALKER COURTESY OF THE SOCIETY OF ARTS AND CRAFTS

"Wolf Cabinet," by Charles Mark-Walker, Cambridge, Massachusetts. Maple, painted wood, avenite. Dimensions: H: 64 in., W: 18 in., D: 11 in.



NICK COOK

"Gannet, Bird Bowl," by Liz and Michael O'Donnell, Caithness, Scotland. Sycamore, paint. Dimensions: H: 4 in., D: 17½ in.

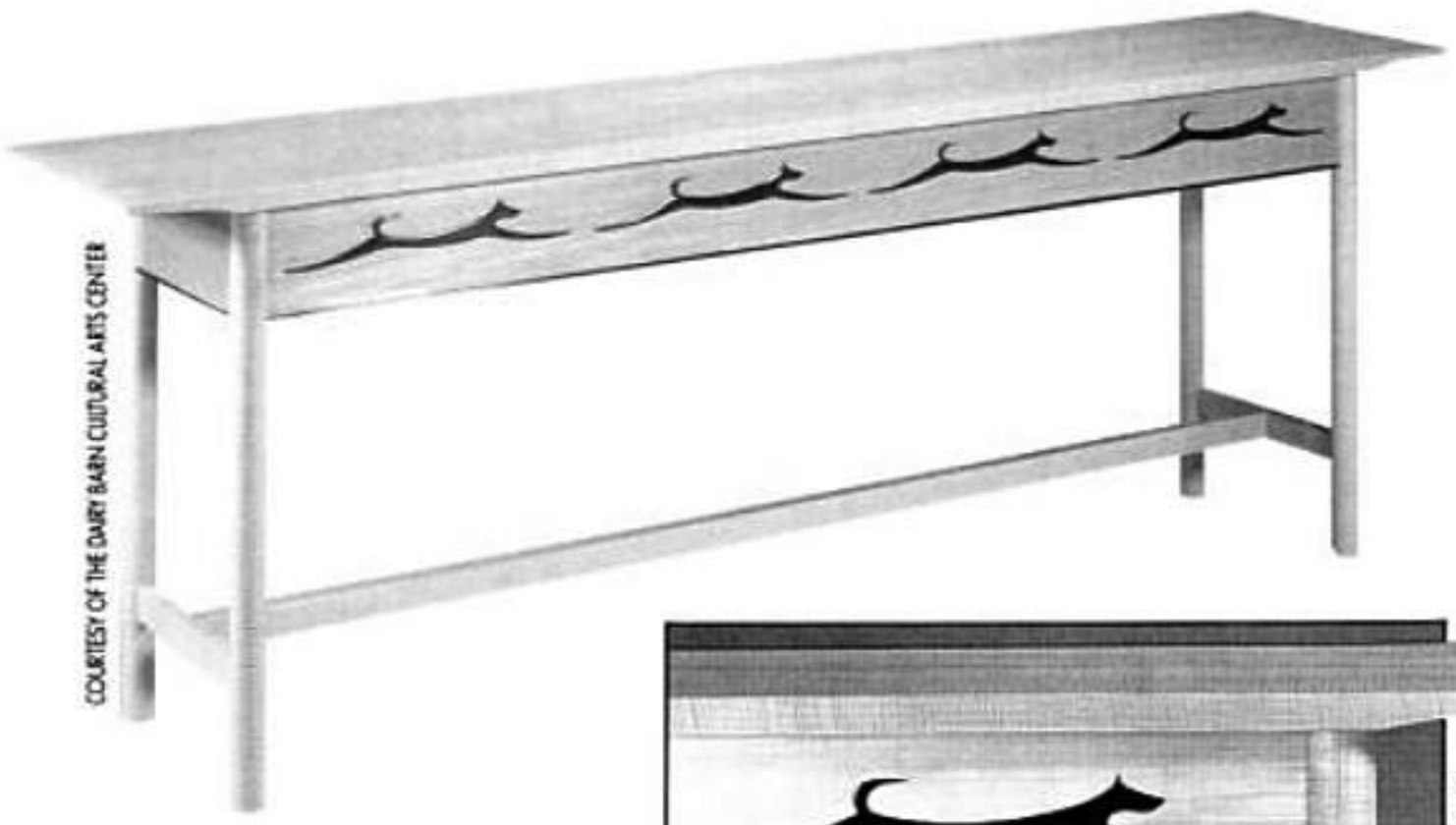


JOANNE B. O'DONNELL

"Bowled Over," by Liz and Michael O'Donnell, Caithness, Scotland. Sycamore, painted rims. Dimensions: H: 8 in., 10 in., D: 4 in., 5 in.

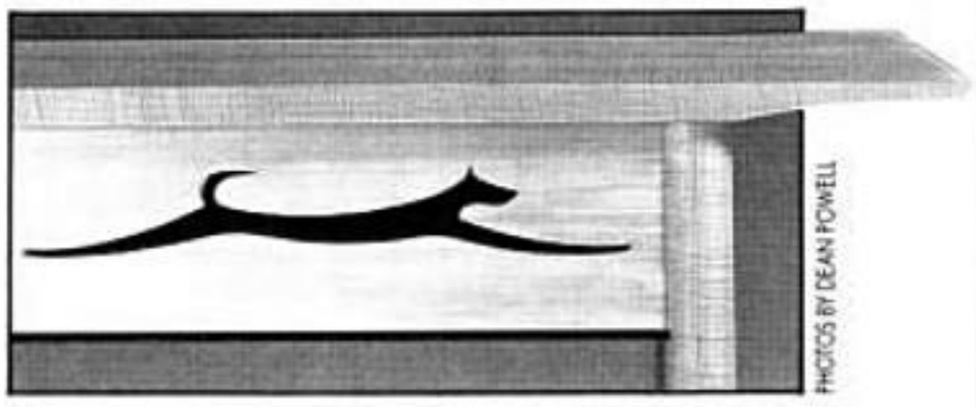
JON ALLEY

"Honey Plate," by Jon Alley, Churchville, Pennsylvania. Bubinga, gold leaf. Dimensions: D: 10 in.



COURTESY OF THE DAIRY BARN CULTURAL ARTS CENTER

"Running Dog Table," by Jamie Robertson, Cambridge, Massachusetts. Curly sycamore dyed grey, blue dyed veneer, ebony inlay, lacquer. Dimensions: H: 30 in., W: 84 in., D: 18 in.



PHOTOS BY DEAN POWELL

"Running Dog Table" (Dog Detail)

Want to see your *work in Gallery? Send photographs and a description of the piece to:* AMERICAN WOODWORKER, *33 E. Minor St., Emmaus, PA 18098. Only black-and-white prints (4 in. × 5 in. or larger) or color slides will be accepted. Please do not send color prints or snapshots. Enclose a self-addressed envelope for return of photos.*

Old Pros at The New Yankee Workshop

DAVID SLOAN

Time out on the "New Yankee Workshop" set. Host Norm Abram (left) and producer Russell Morash work out details for the upcoming scene as cameraman Dick Holden (right) moves into position for the best shot.

Team.work\'tēm-werk/*n*\: work done by several associates with each doing a part but all subordinating personal prominence to the efficiency of the whole.

Watching Norm Abram at work on Public TV's "New Yankee Workshop" is a lot like looking at an iceberg. What you see is impressive, but it's only the tip. There's an even *bigger* part that you can't see, hidden beneath the surface.

Norm's backed up by a talented team of behind-the-scenes people working hard to produce, what I think, is the best how-to TV in the business. I had a chance recently to spend the day on the "New Yankee Workshop" set and watch these pros at work.

Russell Morash, the show's producer, functions as director on the set. Norm's the guy who's designed and built the piece of furniture being featured, and he knows, better than anybody, the ins, outs, and idiosyncrasies of its construction. The challenge: how to shoehorn hours—in some cases days—worth of woodworking into the program's 30-minute format and still convey a meaningful amount of technical information to the viewer.

The process works like this. Before shooting a scene, Abram and Morash take a few minutes to go over the fine points of a construction detail. Then as cameraman Dick Holden follows him around the shop, Norm ad libs to the camera, explaining how he does a thing and walking through the steps in the process. Meanwhile, Morash watches on a monitor, listening to Norm and making mental notes about Holden's camera work.

Morash—a woodworker himself—has an uncanny ability to home right in on the essence of a procedure, the one or two key steps that will make the whole thing clear to the viewer. As Norm walks through the scene, Morash "edits" the procedure, suggesting words and shots that will clarify and streamline the process Norm has just explained. When Morash calls out, "Roll tape," the revised scene goes down on video tape, and they're on to the next scene. The entire process seems as smooth and effortless as an Astaire/Rogers dance routine.

This kind of teamwork doesn't develop overnight. These people have been working together since 1978, the first season for "This Old House."

Next time you kick back to watch Norm Abram at work, give a thought to the behind-the-scenes team that lends him a hand.

DAVID SLOAN

When You're Hot, You're Hot

An article published in the February issue of New York Woman Magazine made public a well-kept secret we woodworkers have known all along. When the magazine polled women in New York City to see which male occupations they found most attractive, carpenters and cabinetmakers came out on top.

In the magazine's Loose Lips section, columnist Helen Rogan writes, "The ultimate fantasy object of the New York woman is the carpenter, or cabinetmaker, his back muscles rippling as he lovingly hones your bookshelves. Carpenters make strong women weak. 'Gentle with a flannel shirt,' sighs one. 'Capable, rugged, sensitive.' 'Mmm hmmm, just think of all those lovely tools!' You get the gist."

Lawyers and investment bankers were tops on the list of losers. Sorry guys, there are some things money just can't buy.

BRUCE H. GOTTSHALL

Amos Borneman's wooden family tree depicts the growth of his family in America.

A Tree of Life

After all that tracking and digging, why put your family tree on paper. Instead, create a living testament of your family's lineage by constructing a family "tree" out of wood.

That's just what Amos Borneman of Boyertown, Pennsylvania, decided to do back in 1877 to record his family's growth in America. The trunk was to represent the ancestor who braved the New World, the limbs for his offspring, the branches his grandchildren and the twigs descendants for the next eight generations.

A thicket of 2,925 branches and twigs sprout from the 4-ft. high trunk. Dark pieces of walnut illustrate the family's male descendants, and lighter pine, the female members. The bulk of the work was completed in about 18 months. Ironically, two months after this undertaking, Amos Borneman died of pneumonia, leaving behind a tangible account of one family's history. This heirloom is in the Schwenkfelder Museum, Pennsburg, Pennsylvania.

NANCY WALLACE HUMES