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OCTOBER 1998 #68

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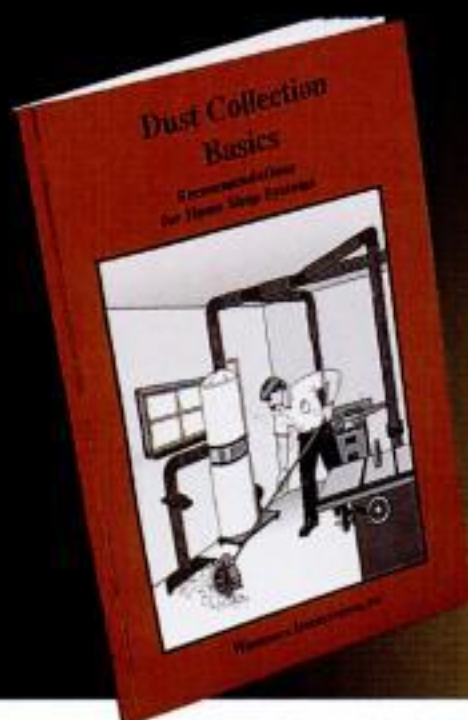
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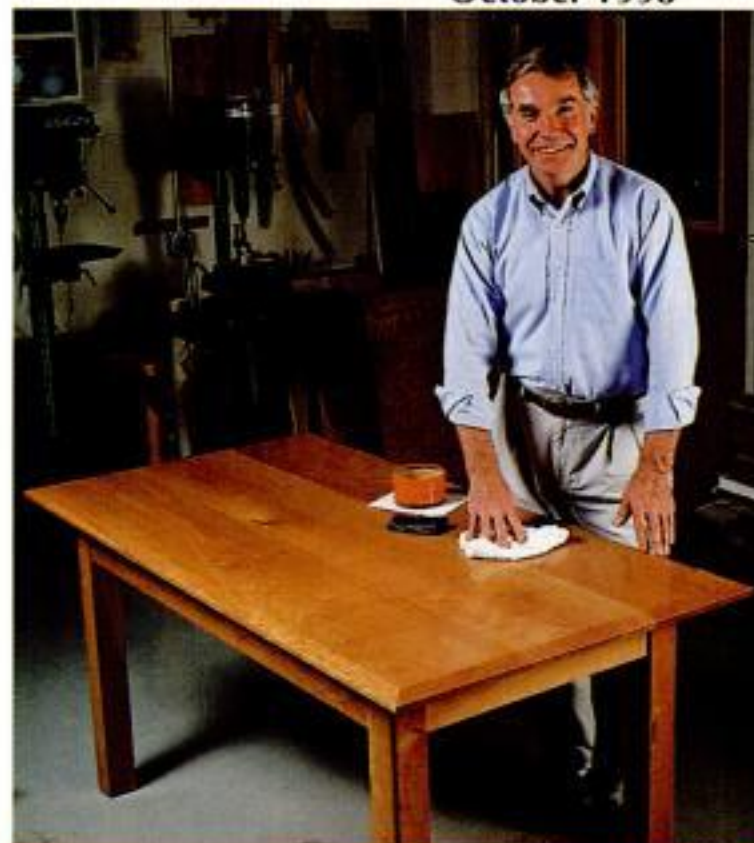
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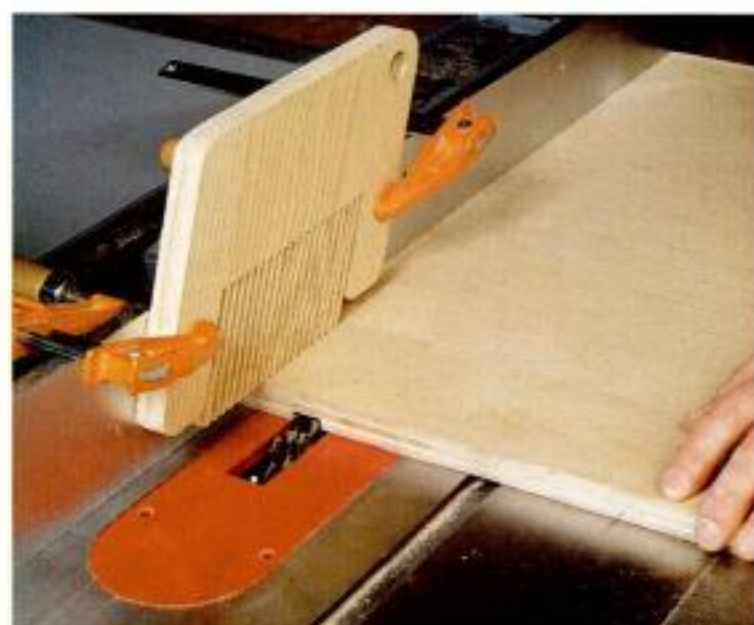
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Turn a bowl today!



AMERICAN WOODWORKER

On the cover: Contributing his tablemaking techniques.

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This One



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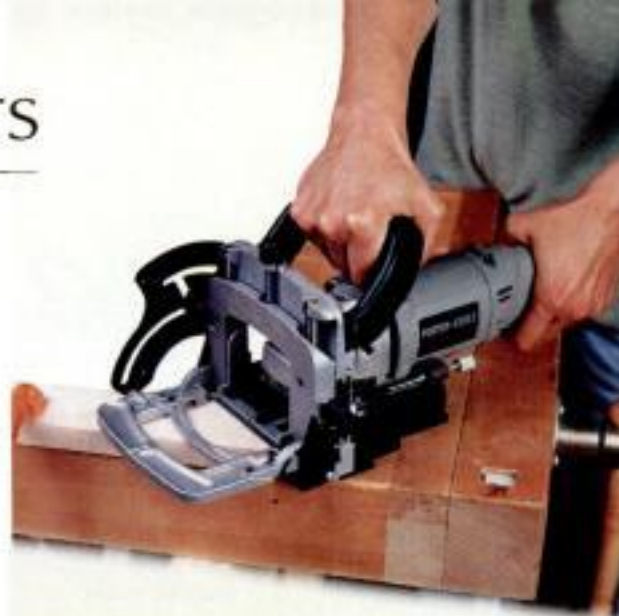
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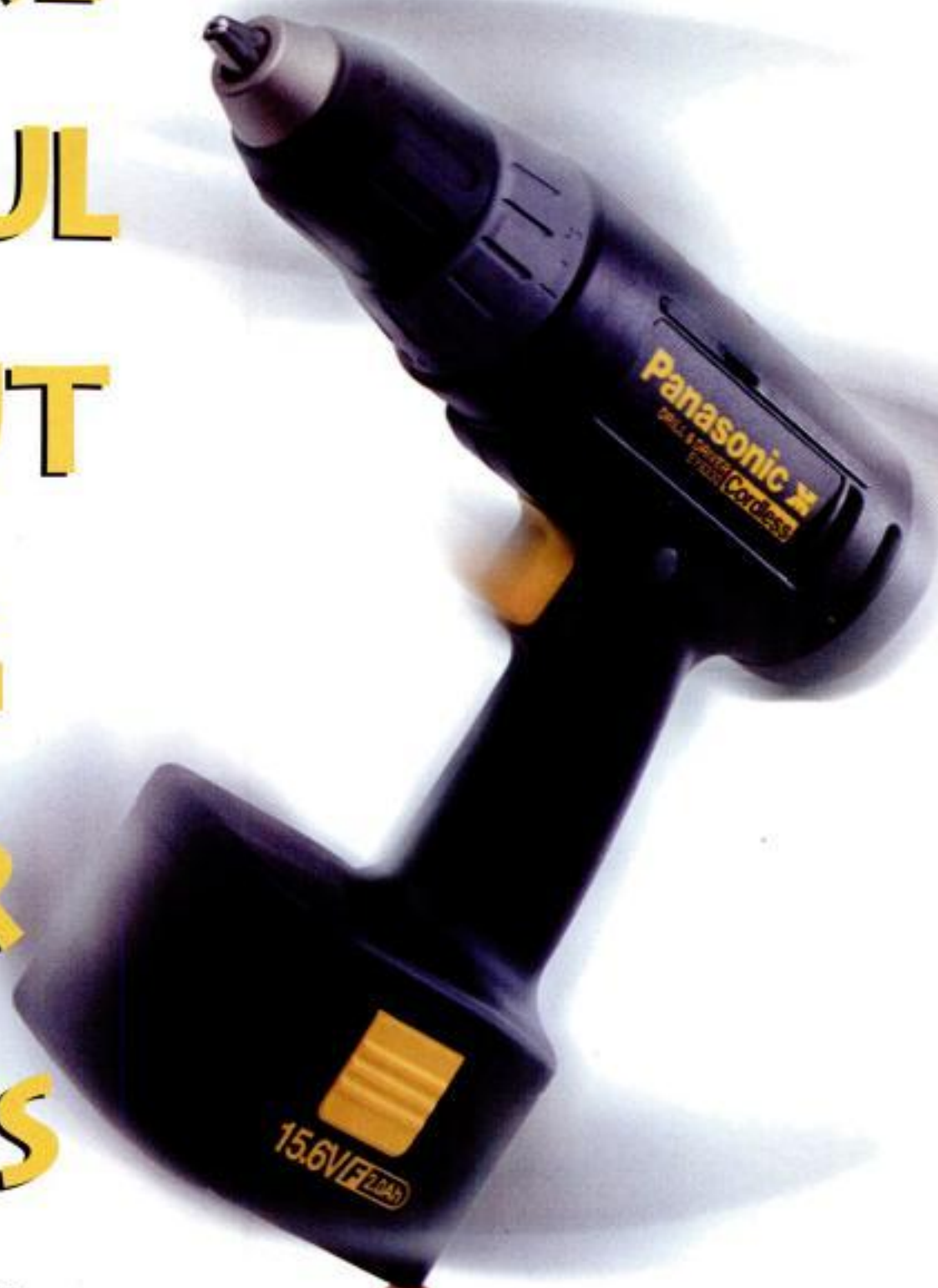
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The Celebration Begins Here

AMERICAN WOODWORKER's tenth-anniversary issue

Please join us while we pop a few corks in celebration. With this issue, AMERICAN WOODWORKER marks its tenth year of publication. It's hard to believe, but we've produced 68 issues since our first one in 1988.

Back then, AW was an oversize, black and white magazine with only 20,000 readers. Some of you may remember those early issues. AW's come a long way since then, but before I leap into the present, let me tell you the little-known tale about how the magazine got its start.

Before 1988, AW was an obscure quarterly published by Jim and Mary Jennings—a husband and wife team working out of the back room of their trophy shop in a suburban Nashville mini-mall. Jim worked as editor and Mary sold ads when the trophy business got slow. Woodworkers wrote the articles, a moonlighting English teacher did the copy editing. The design work and layouts were handled by a woman down at the local type shop. Seat-of-the-pants magazine making—Southern style.

Then Rodale Press bought AW in 1988 and hired me as the editor. After putting out the first issue with a full-time staff of one (and swearing I'd never do a solo act again), I started building the tremendous team of talent that makes AMERICAN WOODWORKER the great magazine it is today.

We've now expanded beyond the magazine to make AMERICAN WOODWORKER a multimedia publisher of woodworking information. The magazine is the flagship, of course—the number-one magazine for serious woodworking enthusiasts like you.

But print is only part of the plan. AMERICAN WOODWORKER has always been the leader in exploring new opportunities. AW was the first woodworking magazine to set up a woodworking site in cyberspace—we launched AMERICAN

WOODWORKER Online on AOL in December 1994. We still maintain this site, but this year we've added a Web site at <http://www.americanwoodworker.com> so we can serve even

more woodworkers with fast, interactive woodworking info online. If you haven't checked out online woodworking yet, you don't know what you're missing! Computers can do some cool things that magazines can't.

And AMERICAN WOODWORKER was the first U.S.

magazine to introduce its own woodworking show. The first AMERICAN WOODWORKER Show™—the exposition that brings the pages of the magazine to life—took place in Fort Washington, PA (suburban Philadelphia) back in 1995. We were so bowled over by the positive feedback from that show, we now put on three shows a year: one in California, one in Pennsylvania, and another in Michigan (see page 103 for 1998-99 dates and locations). The AMERICAN WOODWORKER Show™ is a great opportunity for woodworkers to get together, pick up some good deals, learn a few things, and have one heck of a good time.

Who knows what the next ten years will bring. Interactive AMERICAN WOODWORKER TV? Nuclear-powered robot laser saws that can be programmed from a computer? Who knows what woodworking will be like in 2008. Technology is changing so quickly that it's difficult to keep pace. There's one thing you can always count on, though. As new technologies create new possibilities, AMERICAN WOODWORKER will be there first—trying out new and better ways of bringing you great woodworking information that will help you to become a better craftsman.

David Sloan
Editor & publisher



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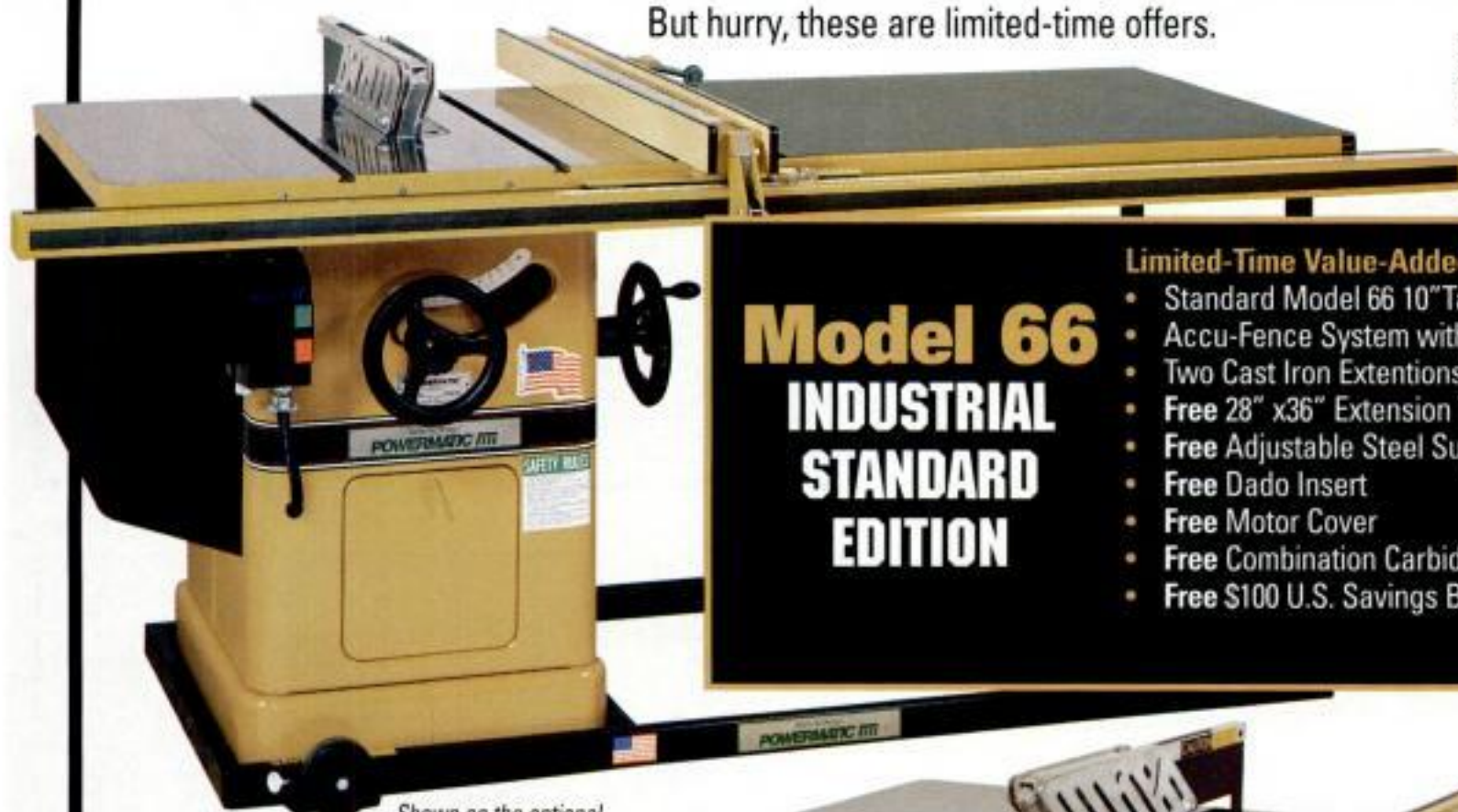
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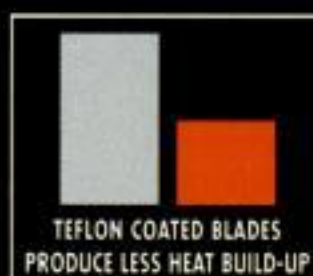
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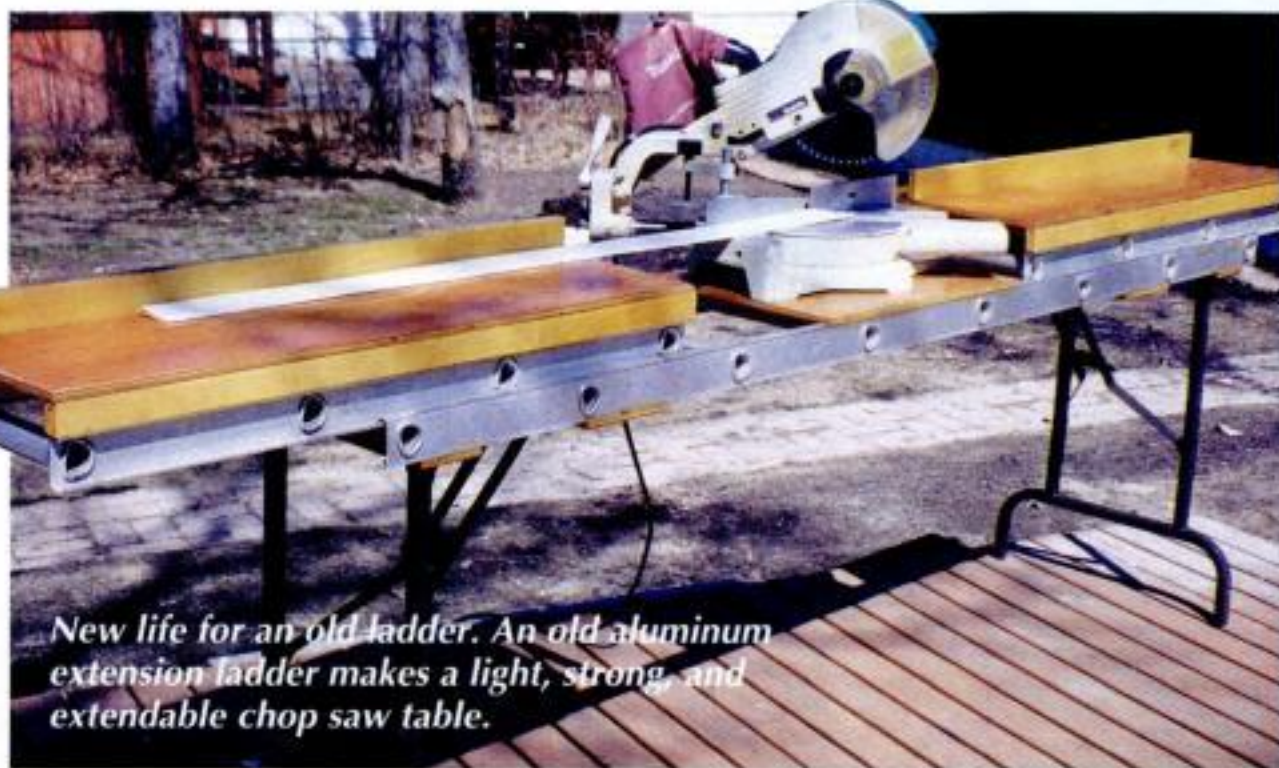
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Another Chop Saw Stand

The portable miter saw stand I saw in AW #66 prompted me to send in some photos of my own version. It's made from an old aluminum extension ladder, standard metal folding legs, 1/2-in. plywood, and pine. The stand folds up easily to 8-ft. length so it can fit in the back of my truck. But the two extension tables, built onto sliding ladder sections, can provide a work surface as long as 12 ft. The aluminum ladder is light but strong—just what you want in a portable stand. If you don't count the cost of the old ladder, the bill of materials for the stand comes to less than \$40.

Paul Clark
Dauphin, Manitoba



New life for an old ladder. An old aluminum extension ladder makes a light, strong, and extendable chop saw table.

Sharpening with Sandpaper

Thanks to AW and Mike Dunbar. After I read the sharpening article (for the fifth time) I went to my shop and started working on some old plane blades and chisels. What a difference in appearance and sharpness! I then took a closer look at some newer chisels and was surprised by the grinding marks I found on the backs. Dunbar's technique removed them quickly. Mike's tips are the kind that help a new woodworker like me to keep coming back.

Phil Tuttle
Carthage, IL

Quite a few readers have requested a source for the sandpaper Dunbar uses for sharpening edge tools. Adhesive-backed sandpaper (from 80 to 400 grit) is available from The Sanding Catalog, (800) 228-0000. Silicon-carbide sandpaper (non-adhesive-backed) is available in a variety of grits at most hardware stores. For super-fine grits (1,200 and 2,000), visit your local auto supply store.—Eds.



Thanks. You saved me \$350 on a sharpening system. I tried Mike Dunbar's method, and it worked like a charm. I've been sharpening tools for almost 50 years and I've never seen anything like it. I used 1/2-in.-thick plate glass as a platen for various grits of sandpaper. In an hour and a half, I sharpened four plane blades and five chisels. I tested the results on a block of knotty white oak. Very impressive.

Richard Baumgardner

My sincere, undying gratitude to Mike Dunbar for his article "Scary Sharp" (AW #66). Truly sharp edges had been painfully absent on my tools until I read his piece. I will never again have anything dull in my shop (unless it's my neighbor).

Gil Forbes
Orlando, FL

Shop-Made Throat Plates Revisited

Let me add to Paul Anthony's advice on making zero-clearance throat plates for the tablesaw (AW #66). I use the stan-

dard metal throat plate as a template to cut out matching wooden ones. Attach a rough-cut blank to the top of the metal plate with double-stick tape, and pattern-route the wooden plate to match the outline of the metal one. Then place the metal plate in your saw (with the wooden plate still attached above), turn on the saw, and raise the blade through the wooden plate. If your metal plate has tapped holes for adjusting setscrews, use these holes as a guide for drilling adjustment holes in your new wooden plate.

Jay Drew
Valparaiso, IN

Inch vs. Metric: An English Opinion

I have been interested in the recent discussion about measuring systems. Here in England, we had the metric system foisted on us in the interests of "harmonizing with Europe."

As a retired engineer trained to work in thousandths of an inch, I found (on coming to woodworking) that the metric system was easier to use. It's

STAY IN TOUCH! If you have comments, corrections or news to share, we want to hear from you.

- ❖ To write us, address letters to: **Editor, AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098.**
- ❖ You can fax us at **(610) 967-7692.**
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CIRCLE NO. 66 ON PRODUCT INFORMATION FORM

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much simpler to measure off, say, 441 mm than $17\frac{5}{16}$ in. But it's too bad that the metric system has no equivalent to the foot. Having been 6 ft., 2 in. tall for all of my adult life, I find it disconcerting that I am now officially 1.89 m tall.

It's important to note that we still have pockets of resistance to metric measure. Though a man's height is now given in meters, we still measure his weight in stones and pounds. We measure road distance and auto speed in miles, but we buy our petrol in liters. The barman in a pub will draw a pint of beer, but we buy a bottle of wine or spirits by centiliter measure.

Michael J. Pearce
Essex, England

Swing History

When I saw the porch swing in your June issue, it looked very familiar. I suppose it was because in 1955 I made one exactly like it. I took the dimensions and design from an old swing that

was manufactured by the Defrehn chair factory in Johnstown, PA.

The people who bought my last house in 1994 liked that swing so much, they made it one of the conditions for purchasing the house. I'm sure that Mr. McArthur had just as much fun making his swing as I did making mine.

Don Wallace
Valrico, FL

Online Index Saves Time



I just visited your new Web site for the first time. It's wonderful. I especially like the AW Index and Shop Test pages. I've been a subscriber for several years and keep past issues for reference. But I often end up wasting time thumbing through previous issues for specific articles. Your index will make referencing much easier. It will also help with new tool purchases because I'll have quick access to your Shop Test features.

Kevin M. Mosier, M.D.

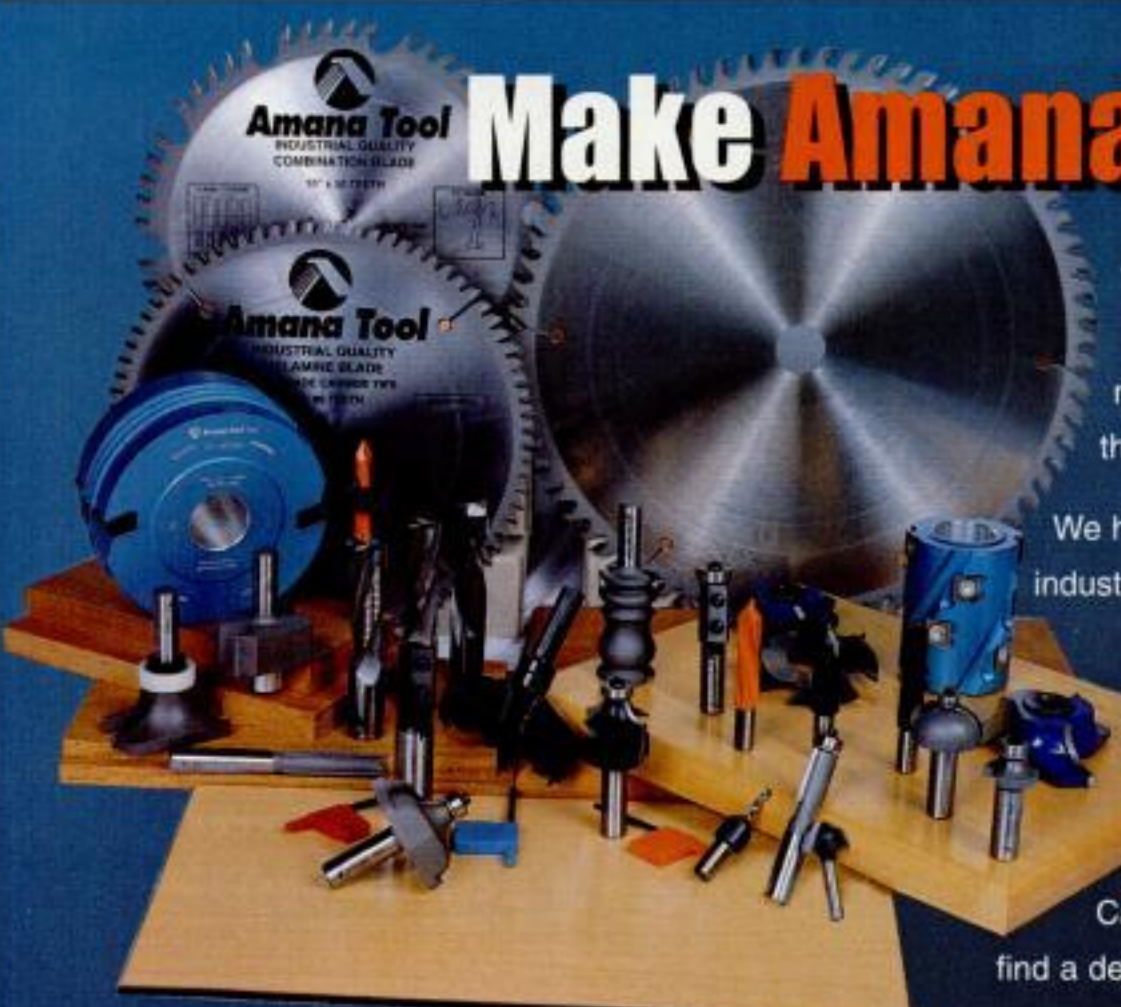
The print version of AMERICAN WOODWORKER's latest index (for issues #1 through #63) is available by mail. Send a check or money order for \$4.95 to: AMERICAN WOODWORKER Index, Box 7591, Red Oak, IA 51591, or call toll-free (800) 666-3111.—Eds.

Keepsake Cabinet Omission

I'm preparing to build Andy Rae's Keepsake Cabinet (AW #66) and I noticed there are no dimensions for the length and thickness of the bottom of the case. Should I mill the bottom to the same size as the top?

Max Mattia
Greensboro, NC

Andy Rae replies: The length of the bottom should stay the same, but it's $\frac{1}{4}$ in. thicker than the top to allow for the thicker bullnose molding that wraps around the cabinet's base. If you use a thinner bottom, you'll be left with an unsightly gap between the



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bottom and the door. The correct size for the bottom of the case is 1 in. by $4\frac{5}{16}$ in. by $10\frac{5}{8}$ in.

Secrets to Woodworking Success

I have been a woodworker and a builder for a long time now, with moderate success at both endeavors. Recently I noticed that some of the greatest woodworkers (Kirby, Kelsey, and Krenov, to name a few) have a few physical traits in common. They're all bald, or close to it, and they all have grey beards!

Flash! If I shaved my head and grew a silver goatee, could my dovetails and mortise-and-tenon joints be raised to the paradigm to which I have so long aspired?

I did it. I shaved my already-thinning hair and grew a beard, which luckily came in an erudite silver/gray. Then I went out to my shop. The results have been amazing: My mortises and tenons are perfect, my dovetails no

longer require veneer slips, and I can complete curved laminations of Maloofian quality. People are flocking to my shop!

I'm planning to open up the Marble Road School of Bald and Bearded Woodworkers. (MRSBBW, Inc.) I'm also seriously considering a pair of those half-glasses that fall off the tip of your nose.

Charles Reiman
Oneonta, NY

Helpful Headgear

On page 39 of issue 65, Robert Whitley is shown wearing a headband-type magnifier. Could you please find out for me who makes this and where I can get one like it?

John Wildermuth
Midlothian, VA

AW associate editor Paul Anthony responds: Robert Whitley has had his "Peer Binocular Magnifiers" for so long that he can't remember where he got

them. But for 30 years, the $2\frac{1}{2}x$ -power magnifiers have helped him see fine cut-lines for sawing and given him a much better view of small carvings and other details on work in process.

For some years now, I've been using a similar magnifier called "The Optivisor." You can order one from Rio Grande Tools and Equipment, (800) 545-6566.

Seven lenses are available, ranging in power from $1\frac{1}{2}x$ to $3\frac{1}{2}x$. I use the $2\frac{1}{2}x$ -power lenses. A visor and one set of lenses cost about \$30.

Corrections

Jet's new mini lathe, featured in last issue's "Toolbox" department, comes with a $\frac{1}{2}$ -HP motor. The $\frac{1}{4}$ -HP listing was incorrect.

The Micro Fence edge guide recommended in last issue's router test was incorrectly priced. Micro Fence packages start at \$125. For more information, call (800) 480-6427.

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(Models 22-675Y/6Y)

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- 3-#2 Phillips Bits

A.

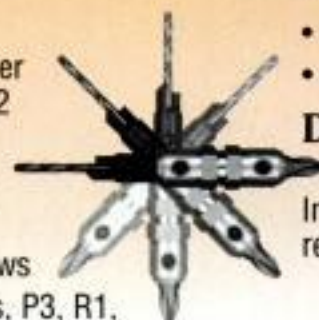


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- 8 Insert Bits (P1, 2-P2's, P3, R1, R2, 4/5 slotted, 6/8 slotted)

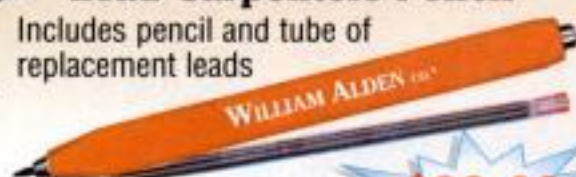


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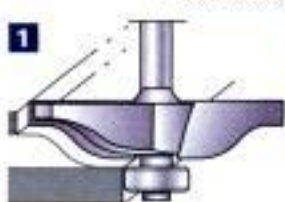


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A Screw Loose over Loose Screws

Q I'm having a problem with screws backing out of the slats on my cedar swings and garden benches. Even when I counterbore and cover the screw with a dowel plug and yellow glue, it still loosens and eventually pops out the plug. I can't figure out what I'm doing wrong, and it's driving me crazy. Any advice?

Pete Hoffman
Columbus, OH

A Screws aren't the best choice for seating furniture, or for outdoor furniture. You're much better off with wood-to-wood joints such as dowels or mortises and tenons. Why? It's a wood movement problem.

There are two wood movement factors at work on your outdoor swings and benches. First of all, seating takes more abuse than almost any other form of furniture. When you sit, the wood flexes and moves under your weight, tugging on the joints and encouraging the screw threads to crush the surrounding wood fibers. The more use the seating gets, the more the screw threads crush the wood, leading to a looser and looser joint. (See drawing.)

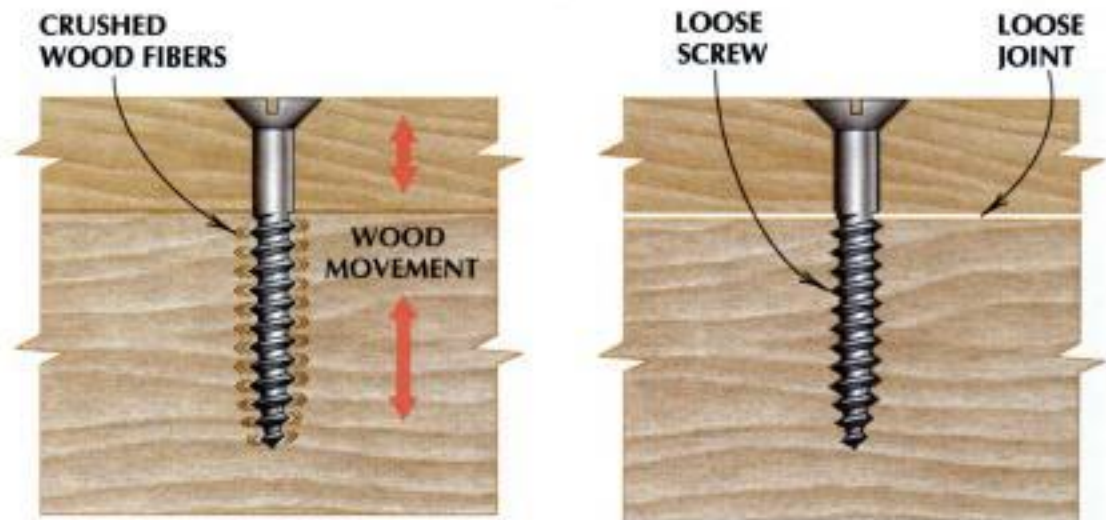
Second, outdoor furniture is especially susceptible to wood movement from humidity changes. The wood expands and contracts, but the metal screw does not. As the wood expands, its fibers swell around the screw, with the same crushing effect. When the wood contracts, you're left with gaps again. Retightening the screw only makes the problem worse, since it crushes even more fibers.

Sand at an Angle to the Grain

Q When I sand coarse-grain wood such as walnut or mahogany, I have trouble telling whether the grit I'm using has erased the scratches made by the previous, coarser-grit sandpaper. I always sand with the grain. I probably sand way more than I need to, because I'm never sure when it's enough. How can I be sure when to stop sanding with each grit? I usually start with 100- or 120-grit.

Bette Dusavel
Milwaukee, WI

WHY A SCREW LOOSENS OVER TIME



As the joint flexes, or as the wood expands or contracts due to wood movement, the screw threads crush the wood fibers surrounding them.

While the wood continues to move, the fibers remain crushed, resulting in gaps around the threads. The screw becomes loose and weakens the joint.

There are two options for overcoming the problem. The first and best option is to cut snugly fitting wooden joints and select the proper adhesive for your application. In your case, epoxy is a good choice, since the furniture is outdoors. I've had good luck with West System Brand Epoxy (available from Gougeon Brothers, 517-684-7286).

The second approach is to use larger screws. Larger screws with more and bigger threads provide the bearing surface you need to overcome wood movement. Coated deck screws are a good choice, as are confirmat screws (available from The Woodworkers' Store, 800-279-4441). Confirmat screws are designed for use in particle-

board, but their thin, deep threads can hold their ground anywhere there's a lot of force. But even these screws can't beat a good wood-to-wood joint.

I reserve screws for the low-stress parts of my outdoor chairs and benches, such as seat slats or back slats. I countersink each screw and brush a little marine epoxy over its threads before I drive it home. After I've driven in the screw, I brush more epoxy into the countersunk hole, to help keep moisture from leaking into the joint. Then I tap in a tapered plug, which fits tighter than a straight plug. (Tapered plug cutters are available from Lee Valley Tools, 800-871-8158.)

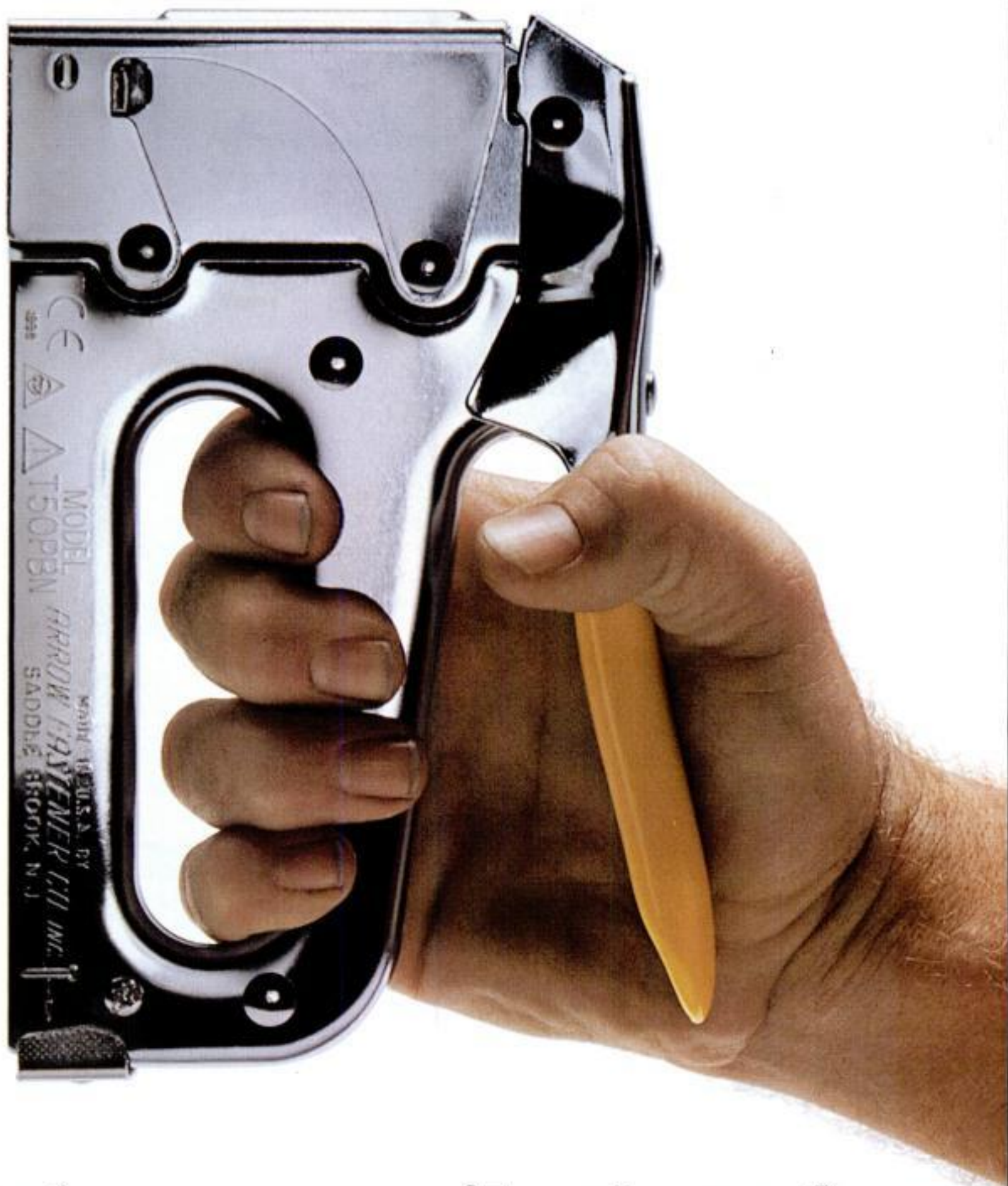
Andy Rae
AW senior editor

A When you begin sanding wood with your coarsest grit—let's say 100 grit—angle your sanding strokes at 30° to 45° relative to the grain direction. If you look at the wood under a bright light, you'll be able to clearly see the 100-grit scratch pattern. On your next pass, say with 120-grit paper, sand 30° to 45° in the opposite direction. Any 100-grit scratches left by the previous pass should be clearly visible under the new 120-grit scratches. Keep on sanding with 120-grit paper until you've eliminated the coarser

scratches, and replaced them with a finer scratch pattern.

Alternate sanding directions each time you change to a finer grit. In each case, eliminate all coarser scratches before you progress to a finer grit. When you're ready to sand with the finest-grit paper, it's time to sand the wood with the grain. Any fine scratches that are left will be obscured by the wood grain.

Sandor Nagyszalanczy
AW West Coast editor
Santa Cruz, CA



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Teak Cleaner

Q What do I use to clean teak wood in a sailboat?

Linda Flanagan
Kent, NY

A Go to any marine supply store and ask for a two-part teak cleaner. It comes with instructions, but I recommend applying it with bronze (not steel) wool.

Simon Watts
Boatbuilding instructor
and AW West Coast editor
San Francisco, CA

Heat-Resistant Finishes

Q I am finishing a red oak fireplace mantel that I built. What finishes will stand up to the heat of a fireplace?

Adam Kaplan
Chicago, IL

A Oil-based polyurethane varnish is one of the most heat-resistant brushable finishes, but water-based

poly or a hand-applied oil finish would have fairly high heat resistance too. The ones to avoid are the thermoplastic finishes such as shellac, lacquer, and wax.

Michael Dresdner
Industrial finishing consultant
and AW contributing editor
Puyallup, WA

Planer Feed Speed

Q Why is the standard feed speed for most thickness planers around 26 ft. per minute (fpm)? I changed a sprocket on my Delta planer and slowed the feed speed from 26.2 to 19.5 fpm. This has increased the cuts per inch from 51 to 68, resulting in a smoother planed surface with less tearout on hard-to-plane materials. Are there any drawbacks to a slower feed speed?

A You're right, reducing a planer's feed rate will give you more cuts per inch, resulting in a smoother finish. But according to experts in Delta's engineering department, more cuts per

inch wear out the knives faster, because the knives get hotter. It can also cause burning of some woods. The common 26 fpm speed is a happy compromise: It's slow enough to give you a fairly smooth finish, but fast enough to ensure a reasonably long blade life and prevent burning. Therefore, Delta does not recommend reducing the speed of its planers.

Dave Freedman
AW associate editor

Ripping Thick Hardwood on a Tablesaw

Q I'm having trouble ripping 8/4 cherry on my 1 1/2-in. contractor's saw. I have to push hard to feed the stock, and there is burning on the

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edges of the wood. I'm using what I consider a quality alternate top bevel and raker (ATB&R) combination blade, and it's clean and sharp. The saw is fine-tuned (blade parallel to miter slot) with little vibration. I have no trouble using the same setup for 4/4 hardwood. Am I asking too much from the saw, or is the combo blade not appropriate for thick stock?

Ken Bowling
Louisville, KY

A It's good that you've checked to see that the blade is parallel to the miter slot. Have you checked the fence for parallel also? If not, that could be part of the problem.

I've got two tablesaws, a 1½-HP contractor's saw and a 3-HP cabinet saw. I can see quite a difference in their ability to rip thick hardwood stock: The cabinet saw handles such wood easily, but the contractor's saw often bogs down. Unfortunately, your 1½-HP saw probably just can't muster

all the power that you would like it to.

I often use my bandsaw to rip thick stock. The thin kerf of the bandsaw blade cuts through thick stock easily, and it's safer than the tablesaw. If you don't have a bandsaw, here are some tips for ripping thick stock on a contractor's saw:

- Try a thin-kerf ripping blade. Thin-kerf blades require less HP because they encounter less resistance. And ripping blades cut with the grain a bit faster than combination blades because they have fewer teeth, bigger gullets to remove waste, and a tooth geometry designed specifically for cutting with the grain.

- Raise the blade slightly higher than the stock, so that you're burying no more than three teeth in the wood at a time during the cut. A lower blade results in more teeth in the kerf, which causes the blade to heat up and burn the wood. The higher you raise the blade, the fewer teeth are in the wood at once—but be cautious and use your tablesaw blade guard.

• Expect some burning. Cherry and oak are notorious for burning, even when the blade is clean and sharp. I use my jointer or hand plane to remove the burn marks.

Lonnie Bird
Woodworking instructor
and AW contributing editor
Rio Grande, OH

WHERE TO FIND IT

Parts for Shopsmith combination machines, including all models in existence except Mark II, are available from Battel's Hardware, 13238 Whittier Blvd., Whittier, CA 90607, (562) 698-3714.

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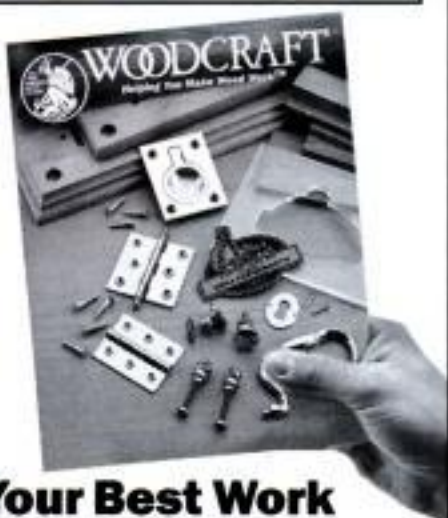
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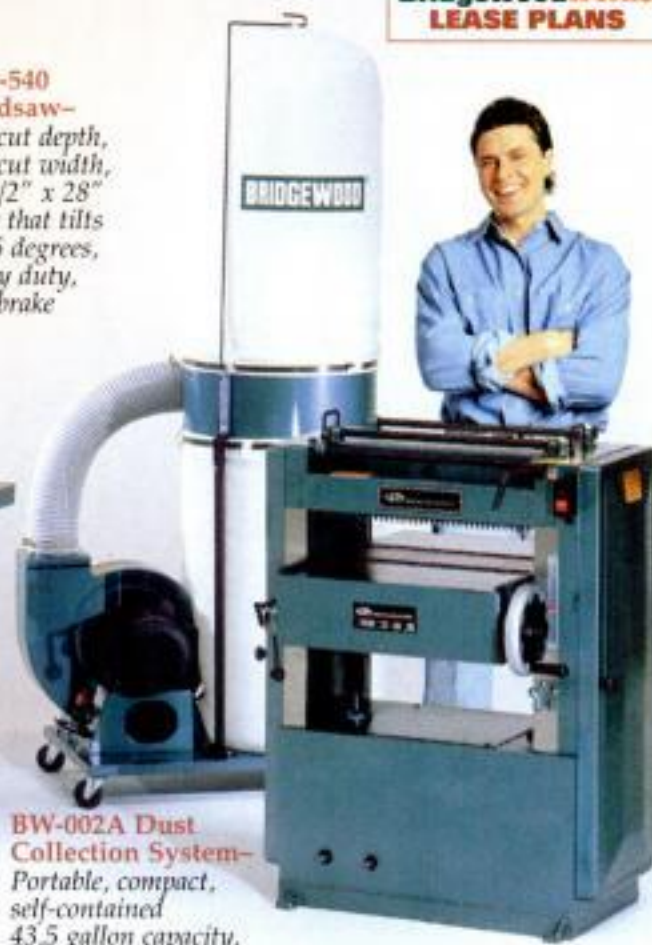
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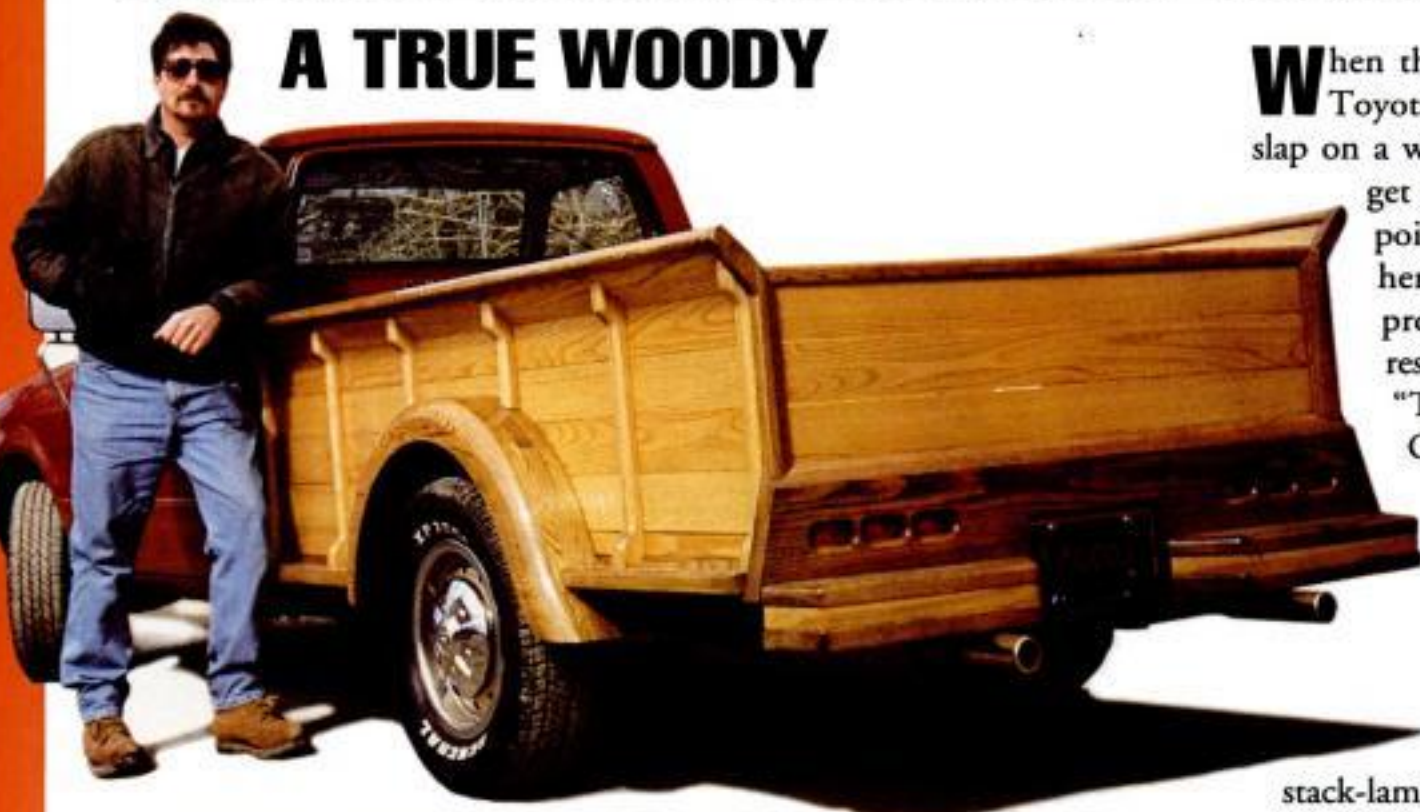
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offcuts

Bits and pieces of woodworking news

A TRUE WOODY



Truck-bed rebirth. Eric Gangluff's oak and ash truck bed draws applause wherever he goes.

When the bed rusted out on Eric Gangluff's '81 Toyota truck about a year ago, he figured he'd slap on a wood flatbed and a couple of sideboards to get a little more life out of it. "After all," he points out, "she only had 180,000 miles on her." But he admits that somewhere in the process, he got a bit carried away. The end result was the oak and ash bed you see here. "The first time I drove it through town," Gangluff says, "I realized I'd done something a little different. People were staring and honking with thumbs up. Even now, when I stop for gas, all the guys still walk around for a quick gander."

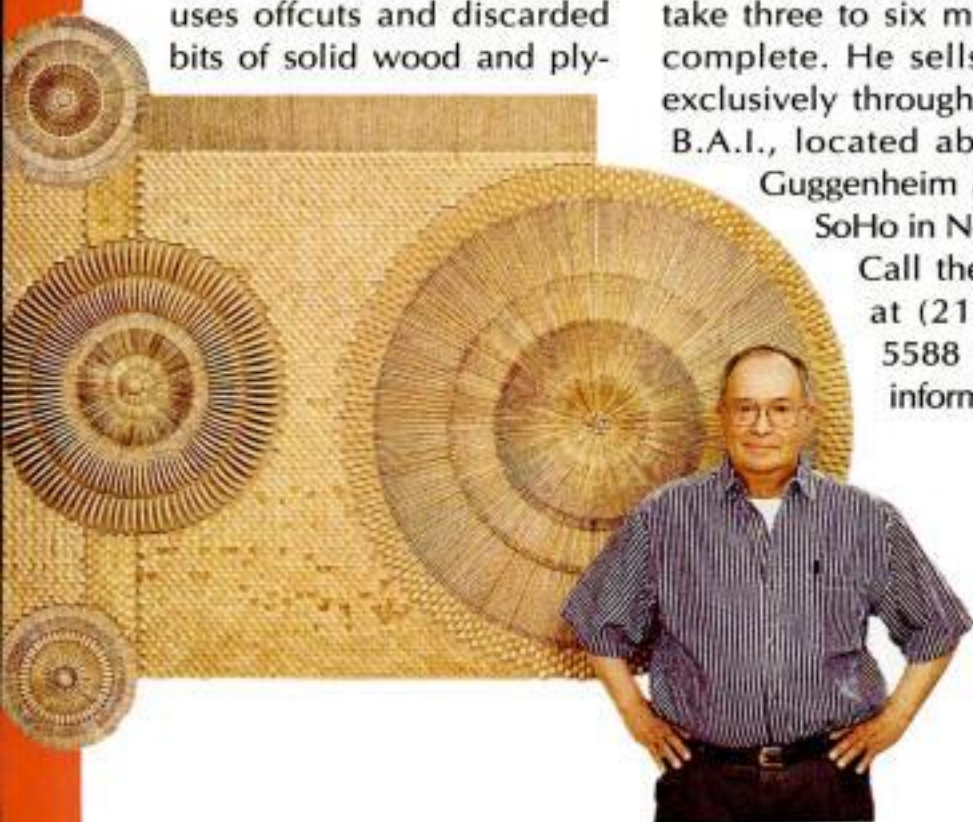
It took Gangluff, of Attica, OH, about 100 hours to design and construct the 6-ft., 10-in.-long bed. He stack-laminated the fenders using Titebond II glue, but the rest of the bed is simply screwed together with stainless steel screws.

WOOD SCRAPS TURN TO GOLD

Charles Chirico is no alchemist, but he does transform lumberyard scraps into creative works of art. He uses offcuts and discarded bits of solid wood and ply-

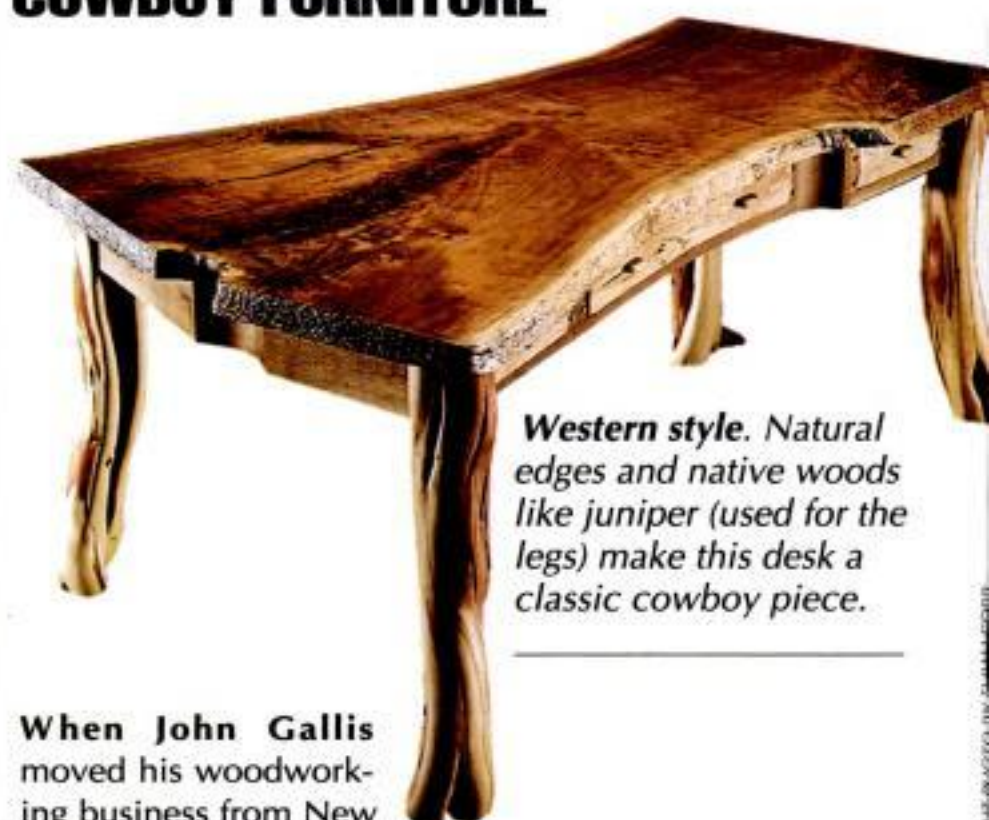
wood to make wall hangings that he sells for \$3,000 to \$9,000 each.

Chirico's works typically take three to six months to complete. He sells his art exclusively through Gallery B.A.I., located above the Guggenheim Museum SoHo in New York. Call the gallery at (212) 941-5588 for more information.



Fine art from found wood. Chirico's untitled wall hanging is made mostly from scraps he found in lumberyards. It measures 5 x 78 x 100 in.

COWBOY FURNITURE



Western style. Natural edges and native woods like juniper (used for the legs) make this desk a classic cowboy piece.

When John Gallis moved his woodworking business from New York to Wyoming, he had a hard time selling Shaker and Stickley furniture. So he studied Western design and adapted.

The strategy worked. Gallis's walnut and juniper desk (shown above) won the Exhibitors' Choice Award at last year's Western Design Conference in Cody, WY.

This year's Western Design Conference will take place September 24-26 in Cody. For more information, call the WDC at (888) 685-0574.

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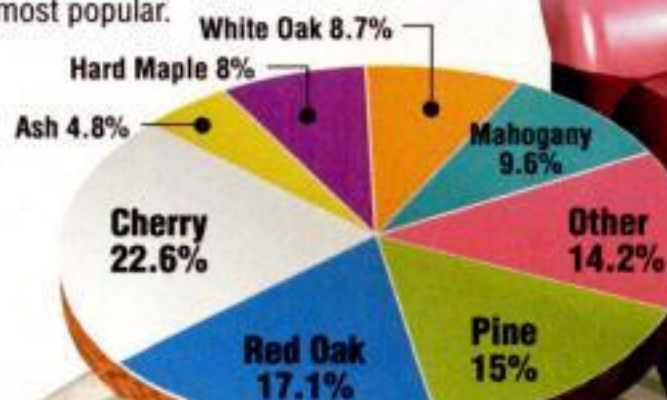


offcuts

FACTOID

Popular Furniture Woods

Seven wood species accounted for 85% of all factory-built furniture manufactured in the U.S. in 1997. Of these, cherry and oak were the most popular.



Source: Wood Unlimited News

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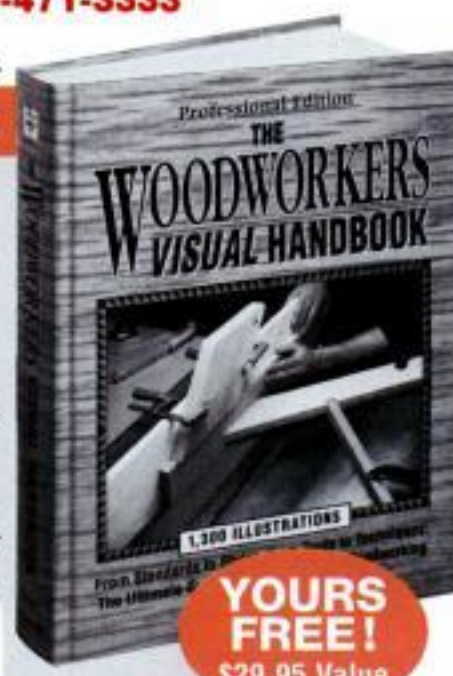
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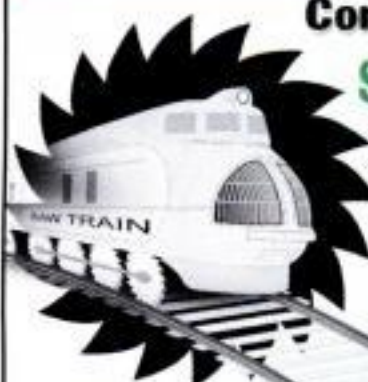
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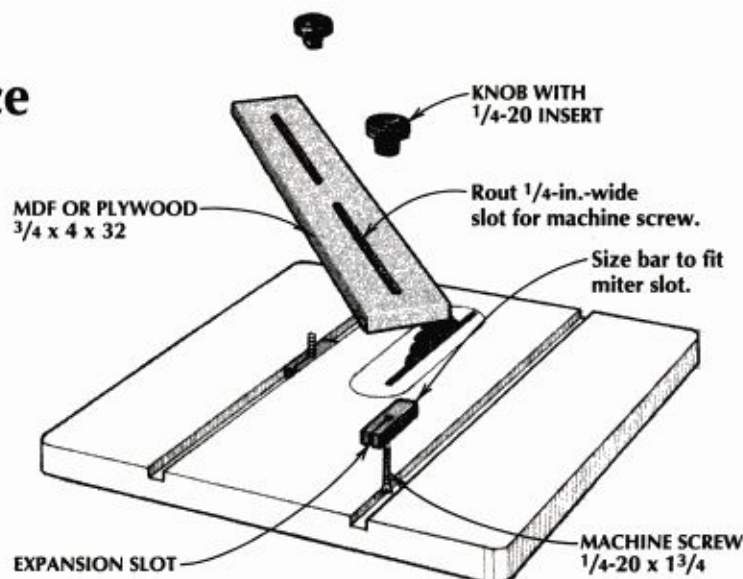
CIRCLE NO. 44 ON PRODUCT INFORMATION FORM

Quick-Clamp Coving Fence

Best tip of the issue

Cutting coves on the tablesaw with an angled fence is handy (see AW #64, pg. 47), but clamping the fence to the saw's tabletop can be a problem. To hold the fence at the desired angle, I rely on my saw's miter slots and a pair of hardwood bars, as shown in the sketch. Tightening the two knobs expands the bars so they grip the miter slots and the fence. Use medium-density fiberboard (MDF) or plywood for the fence, and smooth and wax the working edge to reduce friction on the workpiece.

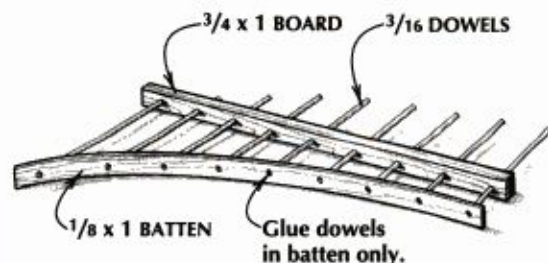
Paul Saporito
Orange, NJ



Best tip wins \$200. Know a better way of doing something? Designed a clever jig? Send your original woodworking tips, along with a sketch or a snapshot to: "Tech Tips," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. We'll pay \$50 for each tip we publish and \$200 for the best tip of the issue.

Drawing Curves

Trying to draw curves with a sprung batten (which takes two hands) frequently means holding the pencil with your teeth. This versatile jig is simple



to make and adjust, and will always produce a fair curve. The sharper the radius of curvature, the thinner the batten should be. You need only glue the dowels into the batten because friction prevents any slippage in the 3/4-in. board.

Yeung Chan
Millbrae, CA

Router Spindle Sander

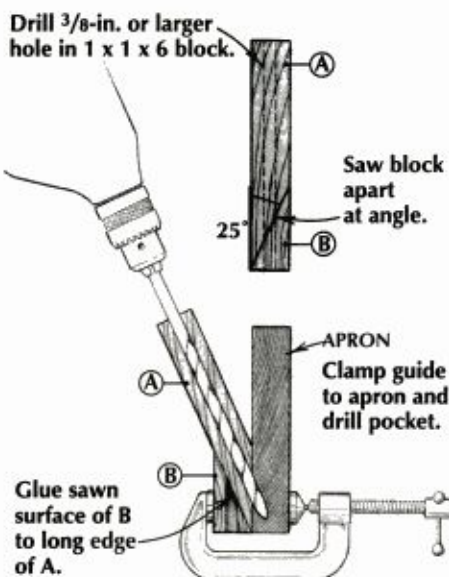
I recently discovered that my variable-speed router makes a very effective spindle sander. The router is mounted in a table so I can raise or lower it to get the full use of the sanding drum. I buy 1-in.-dia. sanding drums, 3 in. long with a 1/4-in. shank for about \$10. Smaller sizes are also available.

James Bell
Earlsboro, OK

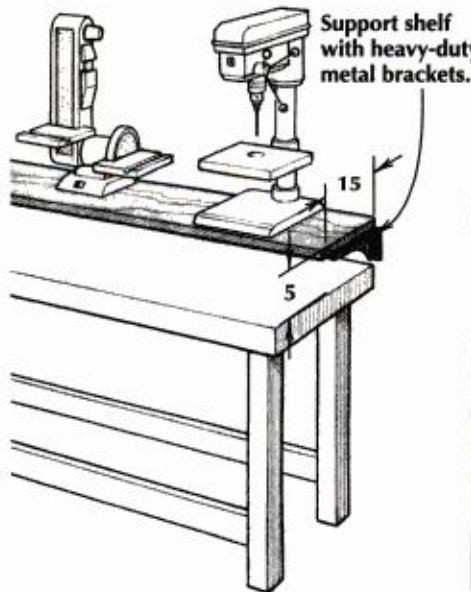
Pocket-Hole Drill Guide

This jig can be made in a few minutes and greatly simplifies drilling pocket holes in aprons, etc. Drill a hole down through the middle of a piece of scrap. Saw the block apart at an angle, then glue the two pieces together as shown. Now clamp the guide to the apron and drill the pocket hole.

Kelly Mehler
Berea, KY



shelf I store my benchtop machines, such as the drill press, bandsaw, grinder, and various accessories. When necessary, I can easily shift a machine from the shelf to



the bench and back again. The bench space under the shelf remains fully usable and is less likely to become cluttered.

Peter Rees
Ellesworth, ME

Veneer Hangers

I used to store my veneers in a drawer or on a shelf but find hanging them more convenient, with less chance of damage and warping. Also, I can easily see exactly what veneers I have in stock.

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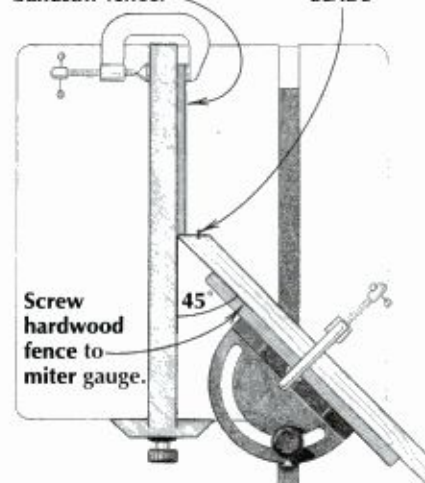
Tape the ends of the veneer to prevent splitting. The wooden hangers used for pants and slacks work well.

R.B. Himes
Vienna, OH

Miniature Spline Mitters

A spline miter is a quick and unobtrusive way to reinforce the corners of boxes and picture frames. Most circular saw blades cut too wide a kerf, so I devised this jig for my bandsaw. I use a 1/4-in. by 14-tpi standard-tooth blade, which produces a 1/16-in.-wide kerf. Cut the miters 1/8 in. deep to accept a 1/4-in. spline. Be sure that the table is exactly

Clamp stop to bandsaw fence.

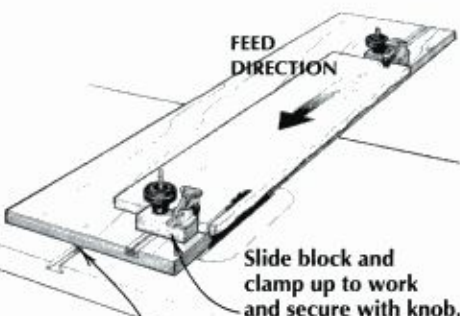


square to the blade and have the grain of the splines running across the miter—not up and down.

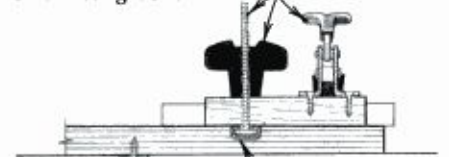
Richard Shackelford
Linden, CA

Ripping/Taper Jig

With my table saw jig, you can straighten irregular edges on rough stock or saw tapers for table legs and the like. Unlike most ripping jigs, mine is guided by the T-slot in the saw table, not the fence. I used a piece of 3/4-in. plywood, 1 ft. by 8 ft. long, and installed a track as shown. The lever clamps are screwed to blocks that can be positioned anywhere along the track and secured with threaded



Size wood or metal runner to fit miter groove.



Run screw through washer and runner and into plywood.

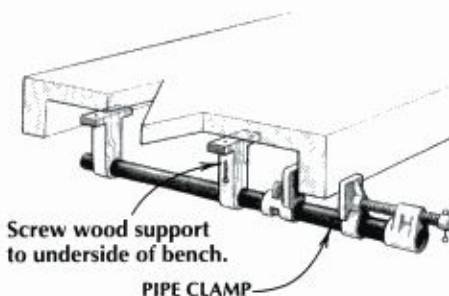
TABLESAW'S T-SLOT MITER GROOVE

knobs. I got the track and the hold-down kit from the Woodworkers' Store, (800) 279-4441.

David Gast
Gaylord, MI

Auxiliary Bench Vise

With only one vise I had difficulty supporting long boards when planing the edges. Rather than invest in a second vise I installed a pipe clamp as shown.

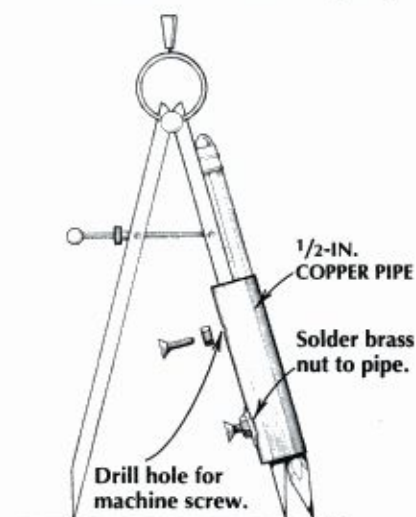


When I don't need it, I unthread the handle and slide the pipe back under the bench. This idea is readily adapted to fit a solid-top bench.

David Ellithorpe
Fountain Hills, AZ

Pencil Adaptor

I made this pencil adaptor for my spring dividers with a 2-in. length of copper tube and a couple of screws. Drill holes in the pipe as shown, place brass nuts with stainless steel screws in place, and

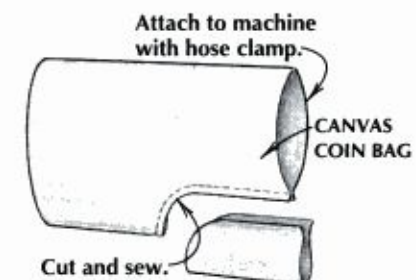


solder. (Solder won't stick to stainless steel). Then flatten the tube in a vice to form an oval of a size to accommodate both the pencil and a divider leg.

Michael Burton
Ogden, UT

Replacing Dust Bags

Finding replacement dust bags for an older machine can be a costly nuisance.



My solution is to buy bank change bags (used for coins) and modify them as shown in the sketch. I then attach the bag to the machine with wire ties or a hose clamp.

Allen Weiss
Fresh Meadows, NY

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CIRCLE NO. 43 ON PRODUCT INFORMATION FORM

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Enjoying your work. Build a beautiful table and you'll have a project that provides many years of pleasure. The table in Frank and Edith's kitchen is like an old friend.

Frank's Table

A master shows you how to use your most beautiful boards

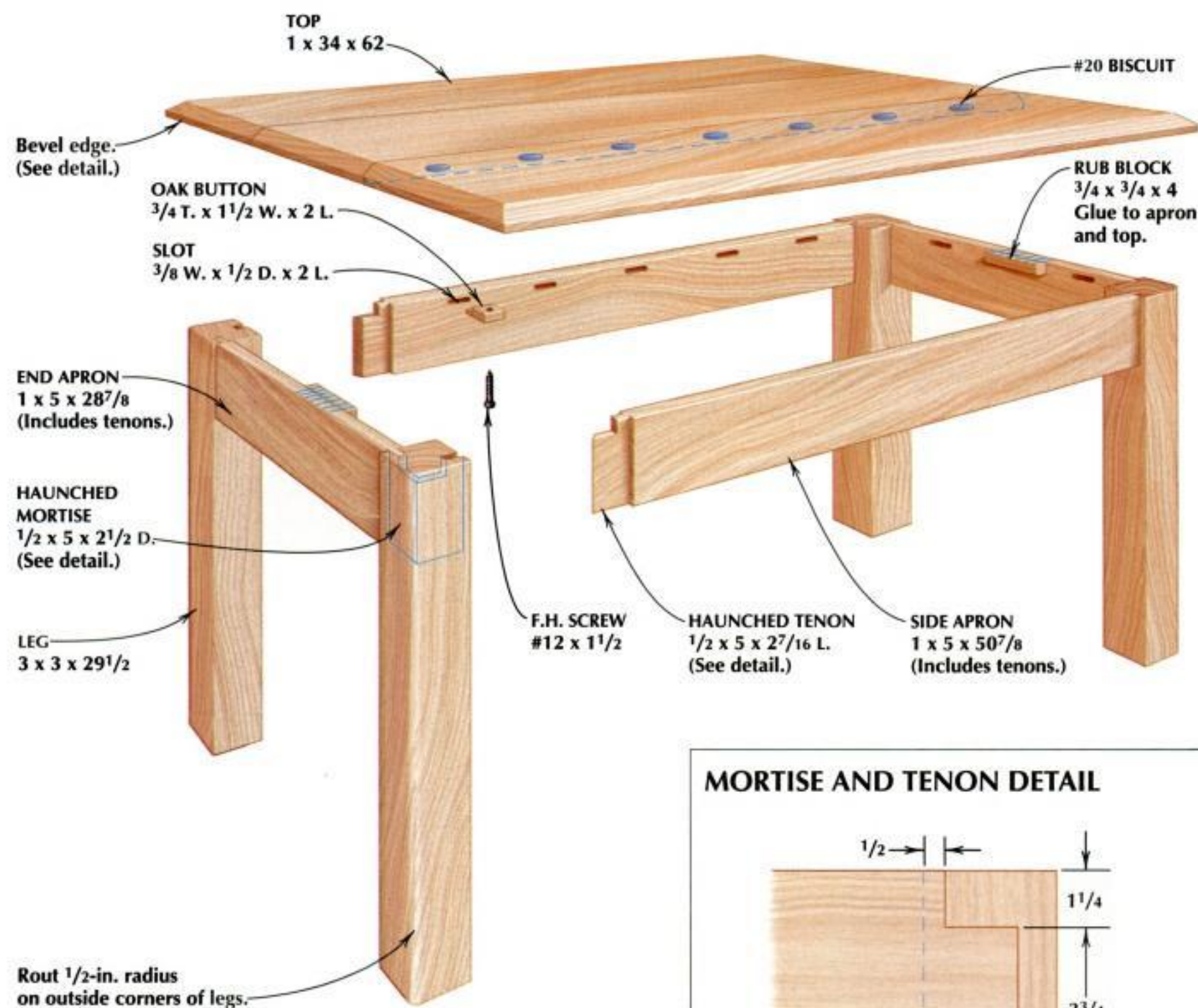
by Frank Klausz

While sitting at my kitchen table last summer, AW's Tim Snyder remarked on how comfortable it was. "The secret is in the table's proportions," I explained, "plus the long, sloping bevel along the top's edge. The beveled top lets you rest your arms on the edge at just the right angle."

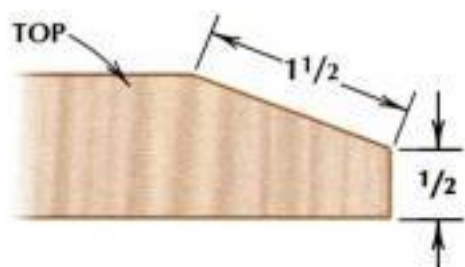
The table that Edith and I use is a mixture of cherry and ash to complement our chairs, but any favorite hardwood will do. Save your best boards for the top: This is the surface you'll use and see the most, so it's worth selecting premium stock.

FIG. 1: KITCHEN TABLE

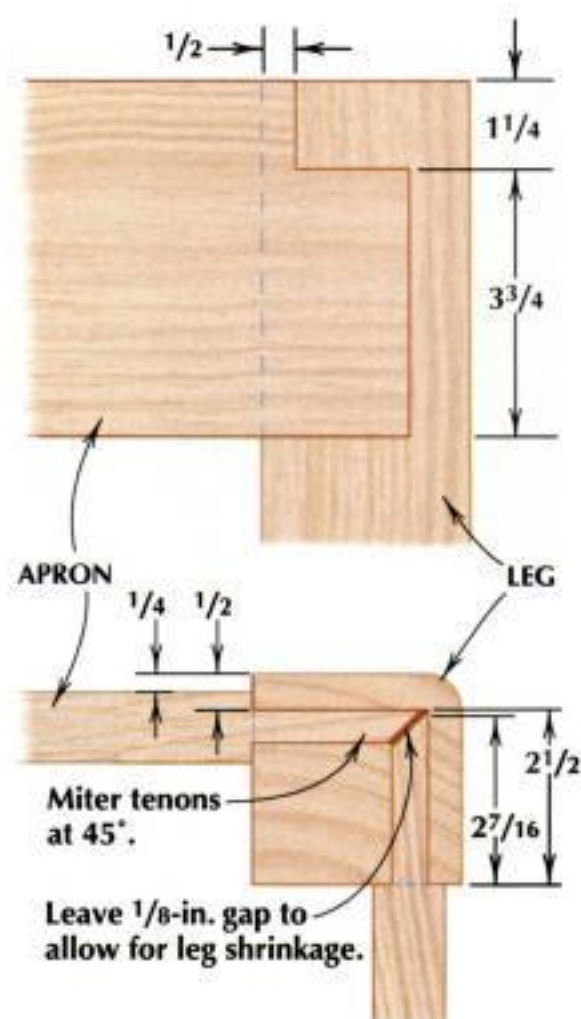
Frank's table is sized to seat six comfortably. The aprons join the legs with haunched mortise-and-tenon joints. Wooden rub blocks and buttons secure the top to the aprons. The top overhangs each side apron by 2 in. and has a 5-in. overhang at each end.



BEVEL DETAIL



MORTISE AND TENON DETAIL





▲ **Match the grain.** Arrange the boards for the best possible grain pattern across the joints. Then mark a "V" across the joints for correct orientation during glue-up. Save the offcuts for the aprons.

◀ **Glue the top flat.** Heavy cauls clamped at the ends keep the boards flat and aligned with each other. Three bar clamps are sufficient to draw the joints closed.

▶ **Bevel the edge.** A tall fence and a featherboard keep the top stable as Klausz pushes it past the angled saw blade.

▼ **Smooth the bevel.** Klausz uses a No. 4 plane to smooth the sawn bevel. Use a razor-sharp blade and set the plane for a light cut.



Start with the Top

I begin constructing the top by pulling several boards from my stack and laying them edge to edge to study the grain. When choosing my show face—in this case, the top surface for the table—I always try to display the "inside" of the board. This is the face that was oriented toward the center of the tree. The inside face has a richer-looking texture and a deeper reflection. Align the boards with each other so the grain is harmonious.

Next, I cut the boards to rough length—about 1 in. longer than the top's finished length of 62 in. Then I joint one edge straight on each board, rip the opposite edge on the tablesaw, and joint that edge, too. Check that there are no gaps along the joints. Hold the boards together with hand pressure alone, and look for light between the joints. If you find gaps, re-joint and check again. To help align the boards during glue-up and to strengthen the joints, I cut a series of biscuit slots along the edges of the boards. (See Fig. 1.)

Choose a flat surface for gluing up the top. I use bar clamps to pull the joints together, and I also clamp heavy beams across the ends of the top to keep the panel flat and the boards aligned with each other. (See center photo, left.)

The procedure for clamping is as follows: First, apply light pressure across the joints with the bar clamps. Then clamp the beams to the ends and go back and fully tighten the bar clamps.

Once the glue has dried for a minimum of three hours, cut the top to finished size. I rip the top to width on the tablesaw using the rip fence, then I crosscut it on a vertical panel saw. You can cut the top to finished length by guiding a circular saw against a straight-edge clamped to the top. Use a square when clamping the straightedge to ensure it's square to the sides of the top.

Now you're ready to saw the beveled edge on the top. I do this on the table-saw by standing the tabletop on edge and running it past the angled saw blade. (See bottom photo, far left.) Use a 40-tooth, alternate top bevel (ATB) rip blade to keep burning minimal. For a similar setup when raising panels, see Paul Saporito's article on page 70. Alternatively, you can use a hand plane instead to shape the gentle slope.

Finish the bevel by hand-planing the surface smooth, planing evenly all the way around the top. (See bottom photo, near left.)

MAKING THE LEGS



▲ **Bandsaw the legs.** Klausz uses the bandsaw for roughing out the 3-in.-thick leg stock, sawing the legs $\frac{1}{4}$ in. oversize.

► **Mortise two-step.** Establish each end of the mortise first, then chisel the middle in a series of overlapping cuts.

Making the Base

Begin construction on the base by making the legs. The legs are a full 3 in. thick. I make the legs from solid stock, using $12\frac{1}{4}$, or slightly over 3-in.-thick, stock. If thick stock is hard to come by, you can laminate the legs from thinner stock. (See Fig. 2.)

I rough-cut the legs on the bandsaw, which is the best tool for ripping heavy stock. I saw the stock about $\frac{1}{4}$ in. over thickness, then I joint and thickness-plane the legs to final dimension and crosscut the legs to finished length.

Now stand the legs upright on the bench and study the grain patterns. Pick the best two adjacent faces for the outside of each leg. Mark the end grain at the top of the leg to identify your outside faces and to indicate where the two apron mortises go.

Now you're ready to cut the mortise-and-tenon joints. Start by cutting the mortises in the legs. You can rout them if you prefer, but I rely on my hollow-



chisel attachment on the drill press for accurate, square-ended mortises.

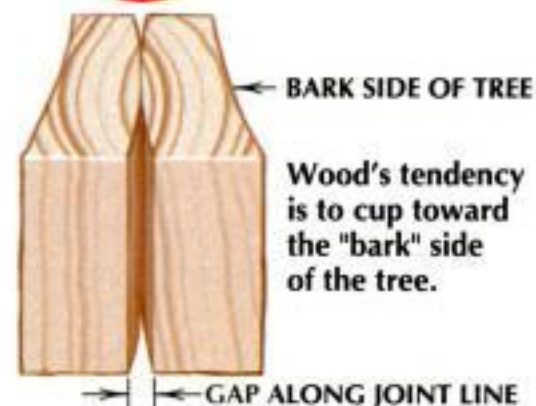
I use haunched joints in this table. (See Fig. 1.) They prevent the aprons from twisting, and the haunched area at the top of each leg allows for more gluing area without weakening the short end grain at the top of the leg.

Lay out and square the mortise lines on adjacent sides of the stock for the full-length tenon. (See photo, above.) Now clamp a fence to the drill press table to guide the work. Be sure to allow for a $\frac{1}{4}$ -in. reveal where the aprons meet the legs. Set the depth of the chisel so the adjacent mortises will meet at right angles.

Start mortising at one end of your lay-out lines, making a full-depth cut. Then move to the opposite end and make a similar full-depth cut. Next, make a series

FIG. 2: MAKING THICK LEGS FROM THIN STOCK

You can make 3-in.-thick legs by gluing together two thinner pieces of stock. Orient the grain as shown to keep the joints tight over time.



of overlapping cuts in the middle of the mortise. (See photo, above.) Cut all the mortises this way, then finish up by resetting the mortise depth and cutting the haunched areas at the ends of the legs.

The reason for cutting the mortises first becomes apparent as you set up for cutting the tenons: You use a finished mortise to check the fit of your tenons. I cut the tenons on the table-saw, using a tenoning jig for accuracy. (See sidebar, page 45.)

After sawing the tenons on the table-saw, I miter their ends at roughly 45° . The angle isn't critical, but you must leave about $\frac{1}{8}$ in. of clearance where the two tenons meet in each leg. (See Fig. 1.) I bandsaw this miter cut by eye.

Once the joinery work on the aprons is complete, I rout a series of shallow slots



▲ **Glue up the end.** The author brings the assembly into square by adjusting the pipe clamp at an angle to the rail.

► **Assemble the base.** Once the joints are clamped, Klausz checks for square by comparing diagonal measurements.



on the insides of the aprons for the wooden buttons that secure the top. (See Fig. 1.) A plunge router equipped with an edge guide and a $\frac{3}{8}$ -in.-dia. straight bit makes a quick and accurate job of routing these slots.

Finish up the base by smoothing all the show surfaces. I use a hand plane and 220-grit sandpaper to smooth and clean up the outsides of the aprons and the inside faces of the legs. I'll finish smoothing the outside of the legs after assembly.

Gluing Up the Base

For a table this large, it makes sense to tackle the glue-up in two stages. First, I assemble each end assembly, which consists of two legs and an end apron.

Spread an even, thin coat of glue on all the tenon cheeks and on the walls of the mortises. Use a pipe clamp to draw the joints closed, then check the assembly for square. (See top left photo.)

Allow both end assemblies to dry, then assemble the entire base by adding the side aprons. Again, check the legs for square to the aprons, and also check that the apron frame is square by measuring the diagonals. (See top right photo.)

Finish and Attach the Top

Before attaching the top to the base, I like to finish the entire table. This way, I can work with smaller subassemblies during the finishing process.

You need a durable finish for a kitchen table, one that can withstand heat, alcohol, and the many spills it must endure. My finish is four coats of catalyzed varnish, which I spray on and then rub out with paste wax for a satin, silky feel. You can get the same protection with less trouble by brushing on several coats of urethane, sanding with 220-grit paper between coats. Apply the same number of coats on both sides of the top to prevent it from cupping or distorting.

Once the finish work is complete, lay the top upside down on the bench and position the base over it. Use a tape measure to ensure that the top overhangs the base evenly on all sides. Mark the top at the corners of each leg, and mark the center of the end aprons where they contact the underside of the top.

Next, remove the base and sand or scrape the top where you marked for the end aprons. Spread a 4-in.-long line of glue along the scraped area, and reposition the base onto the top, then clamp the aprons to the top. To strengthen the apron-to-top joints, spread some glue on two small blocks and rub them against the end aprons and against the top. (See bottom right photo.) The blocks and the 4-in.-long glue lines keep the center of the top securely fastened to the base.

To secure the outer edges of the top and allow the top to expand and contract due to wood movement, install the 14 wooden buttons into their respective slots



▲ **Attach the top.** Glue and clamp 4 in. of the end apron, and rub a glued block next to the joint. Wooden buttons hold the top's perimeter without restricting wood movement.

in the aprons. Make sure to leave an $\frac{1}{8}$ -in. gap between the shoulders of the buttons and the long aprons so the top can shrink across its width if it needs to. ▲



FRANK KLAUSZ is a master cabinetmaker and a contributing editor to *AW*.

CUTTING TENONS ON THE TABLESAW

I like the tablesaw for cutting tenons. With a 40-tooth alternate top bevel (ATB) blade and a properly tuned saw, I can make accurate tenons quickly. There's no fussy setup to slow me down, especially when I use my tenoning jig for sawing the cheeks.

With my jig placed over the table-saw's rip fence, I simply set the fence for the tenon's thickness, and I adjust the blade height for the tenon's length.

Position the jig's cam clamp to accommodate the correct stock thickness and the length of the tenon you wish to make. (See drawing.) Rip all the cheeks first, then reset the fence and the blade height and rip the haunched part of the cheeks by turning the stock 90°.

Now lift off the tenoning jig and use the miter gauge to crosscut the shoulders. Clamp a gauge block to the rip fence, making sure it's well forward of the blade. (See inset photo.) Set the fence the correct distance from the blade, then use the block to gauge the length of the tenons by butting the stock against the block. As you cut the shoulders, keep any offcuts well clear of the blade to avoid debris flying back at you.

—F.K.



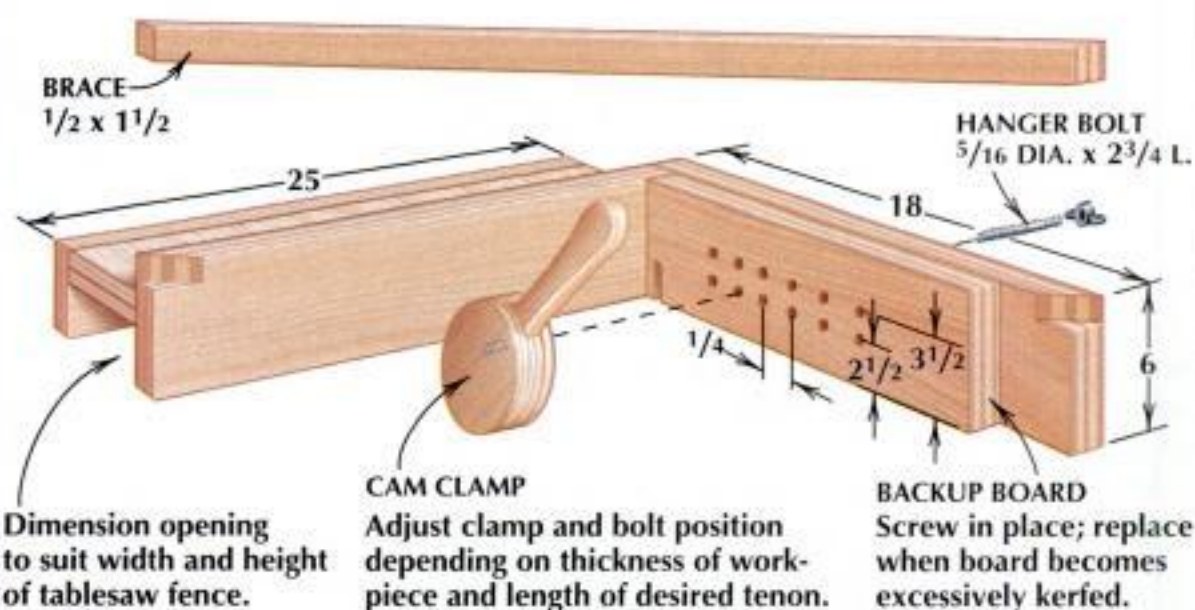
Saw the cheeks. Klausz's jig rides over the table-saw's fence for accurate cheek cuts. A cam-operated clamp makes setup fast and secure.



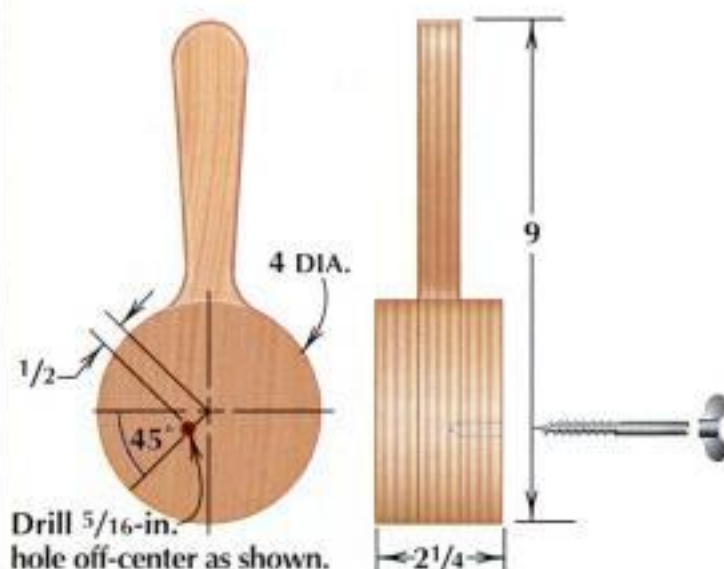
Cut the shoulders. Use the miter gauge and a stop block clamped to the rip fence to saw the shoulders.

TABLESAW TENONING JIG

Build all the parts of this jig from 3/4 hardwood plywood, except for the 1/2-in.-thick brace. Glue and nail the joints, except where noted.



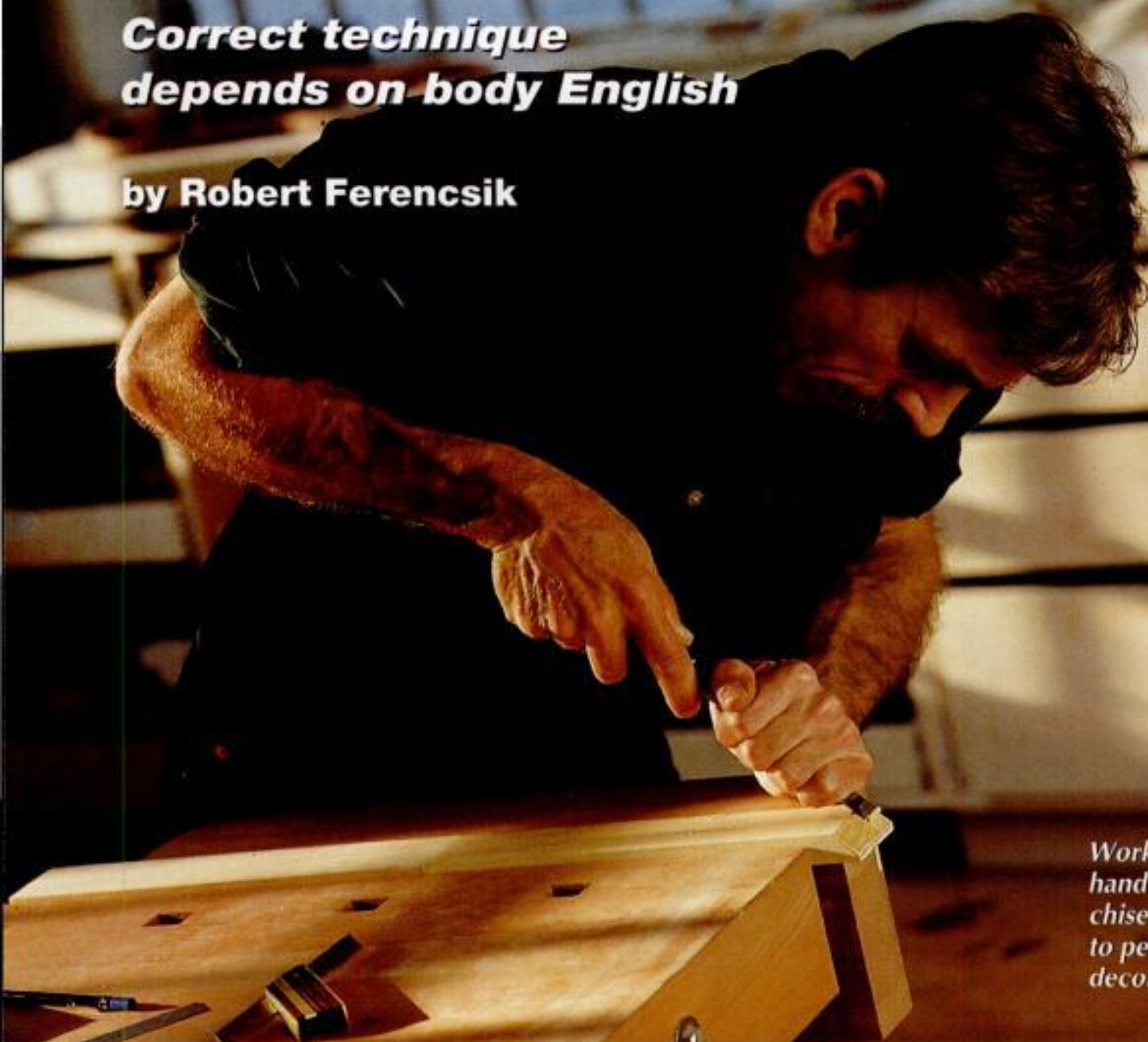
CAM CLAMP DETAIL



Using a Chisel

**Correct technique
depends on body English**

by Robert Ferencsik



Workbench workout. With the right hand and body position and a sharp chisel, you can pare your way to perfect-fitting joints, elegant decorative edges, and more.

The chisel is one of the most basic woodworking tools, and paring is one of the most basic chiseling techniques. By taking small shavings with a chisel, but without a hammer or mallet, you can fine-tune your joints for a perfect fit. And you can pare simple decorative edge treatments in less time than it takes to say “power tool.” In this article I’ll show you how to get control over the chisel, for perfect cuts every time. We’ll review some basic rules that apply to all paring operations, then I’ll demonstrate the best hand and body positions for horizontal, vertical, and angled paring.

General Paring Guidelines

Hand and body positions are necessary for good paring, but they’re not sufficient. Before we discuss the proper posture, here are four general guidelines for more precise paring:

Lay out first. You need reference lines to pare accurately. For rabbets, mortises and tenons, and other square shapes, lay out with a knife. By tapping lightly along the knife line, you can form a little shelf to support the chisel and keep it from jumping out of the cut. (See top photos, opposite.) For curves or bevels, lay out with a pencil, not a knife—the cutlines will show in the finished surface.

Face the chisel in the right direction. It’s usually best to face the bevel up away from the work. In this position, the bevel helps force the back of the chisel against the wood as you cut. (See bottom left photo, opposite.) Occasionally, when you pare in a tight spot such as a mortise, the back of the chisel can’t reach the work surface. In this case, face the bevel down. (See bottom right photo, opposite.)

Pare across the grain when you can. When you pare along the grain, you have

to fight the interlocked wood fibers. You also risk tearout. Cross-grain paring decreases the risk of tearout. Paring cross-grain is easy if you remember this rule:

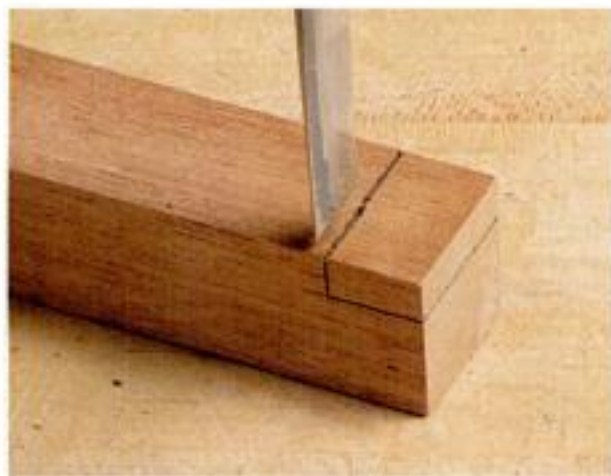
Take light cuts. This is one of the most overlooked—and important—rules of chisel work. Light cuts give the smoothest results with the most precision. The heavier the cut, the harder the bevel will push against the back of the chisel, encouraging it to dive into the wood. If the chisel tends to slip on light cuts, you can press down on its face with your thumb or fingers.

Poised for Success

When you pare wood, the cutting force comes from the motion of your body, and it’s channeled through your hands. Your ideal hand and body position depends on whether you’re paring horizontally, vertically, or at an angle. The

A "SHELF" TO GUIDE YOUR CHISEL

When paring straight, square cuts such as rabbets or tenons, you can widen your layout line into a "shelf" that guides and supports the chisel.



Step 1: Lay out your lines with a sharp knife or gauge. Chisel into the line at exactly 90° to the work surface, tapping lightly with a mallet.



Step 2: Pare at 45° to form a V-shaped shelf across the top of the workpiece. This shelf will guide your chisel neatly along the shoulder.



Step 3: Pare down to the tenon cheek. An identical V-shaped cut along the side of the work will help guide your final paring cuts.

drawings on the next two pages show each hand and body position in detail. But here are a few posture guidelines for all paring situations:

Always hold the chisel with both hands. You won't believe the difference two hands make. The action of one hand opposes and limits the action of the other—giving you much more control over the cut. Use your rear hand to transmit power and steer the chisel, and use your front hand to apply pressure to the cutting edge, so it moves through the wood in a controlled manner.

Keep your hands behind the cutting edge at all times. You might be inclined to wrap your fingers around the workpiece to get leverage and support. But one slip of the chisel, and your finger can

get stabbed. It's better to clamp the workpiece in a vise or between bench dogs.

Push with your body, not your arms. Think of your body as a motor that powers the chisel; think of your arms and hands as micro-adjustable fixtures that hold the chisel in place. This gives you the ultimate combination of power and precision. Lock your elbows—this helps transmit power from your legs, hips, and torso to your hands. You can swing your arms from the shoulder if you need to.

Put your best foot forward. If your left hand is forward on the chisel, your left foot should be forward too—and vice versa. You provide the power and range of motion for each cut by shifting your weight onto your forward foot and driving the chisel from your hips.

Use your eyes. Look at your workpiece, but watch adjacent flat surfaces to gauge squareness. For vertical paring, keep your chisel square to the bench. Set a try square on your bench for reference. For horizontal paring, as on a tenon cheek, keep your chisel square to a vertical surface such as an adjacent shoulder.

Practice Makes Perfect

Now that you've learned basic paring techniques, all you need is practice. Following these rules and paying attention to hand and body position will lead you to paring proficiency. ►

ROBERT FERENCsik is a graduate of the North Bennet St. School. He works wood in Massachusetts.

CONTROLLING THE CUT

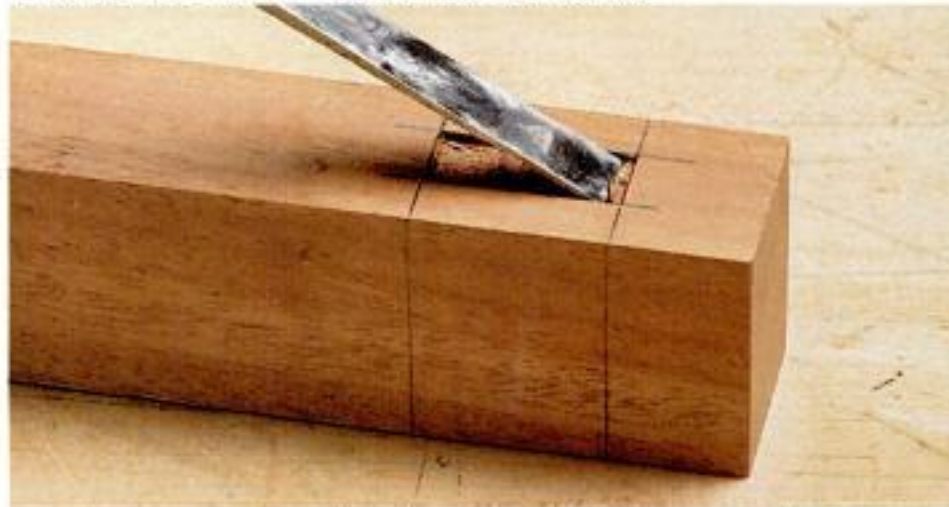
You can orient the chisel two different ways for different paring circumstances.

BEVEL AWAY FROM WORK



This orientation is best for most paring situations; it yields the smoothest surface. Keep the back of the chisel pressed flat against the workpiece.

BEVEL DOWN TOWARD WORK



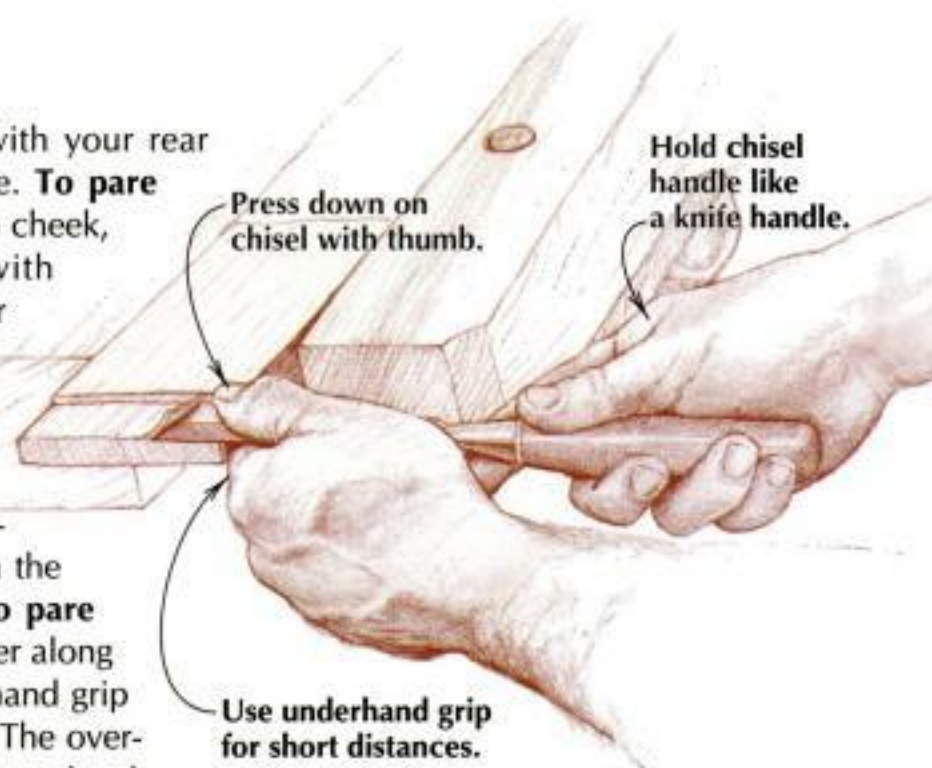
This orientation is good for paring tight spots that the back of the chisel can't reach, such as mortises. But it yields a choppier surface.

HORIZONTAL PARING

Horizontal paring is the most commonly used paring technique. Trimming tenons and making rabbets are only two of numerous applications.

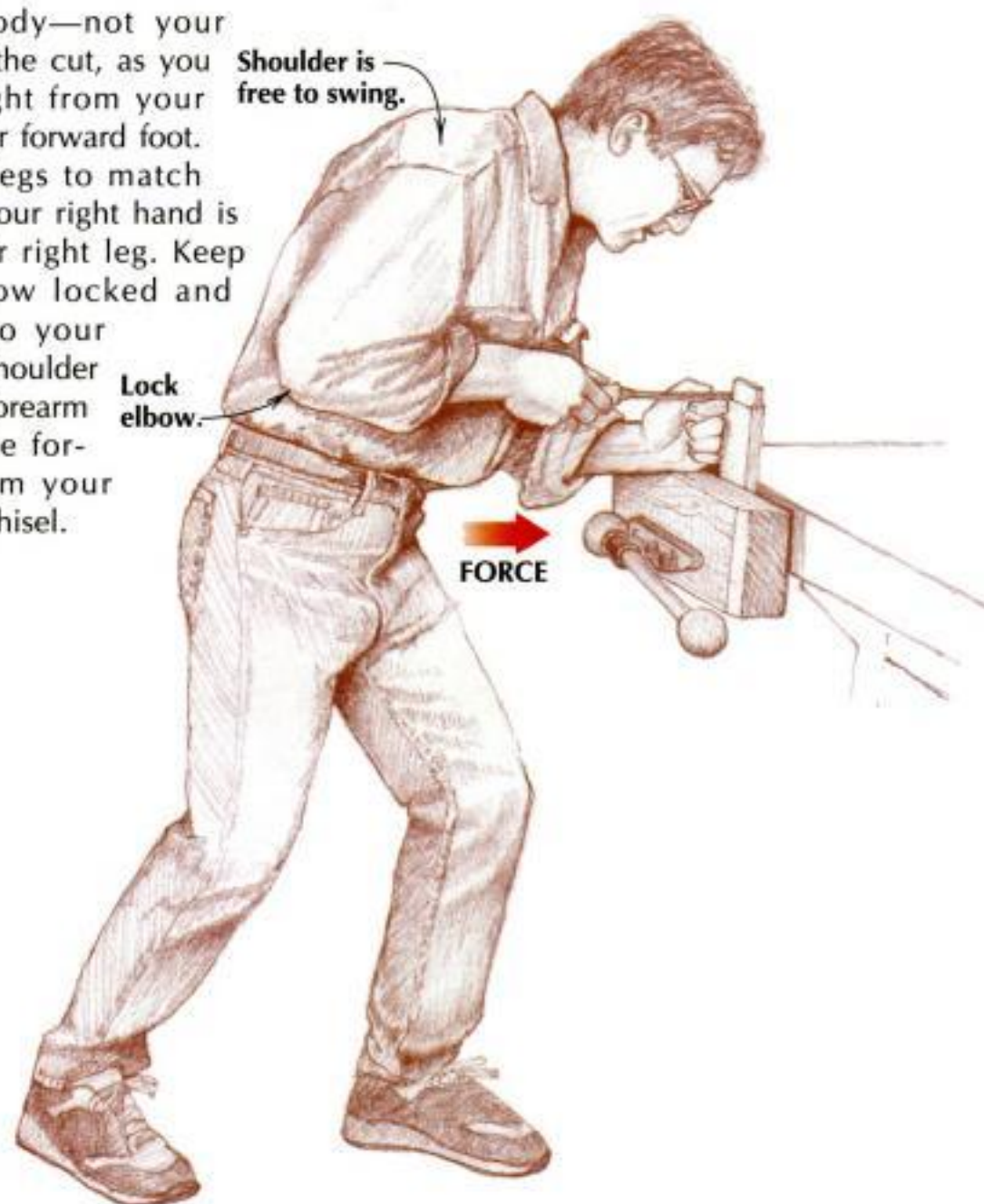
HAND POSITION

Grasp the chisel handle with your rear hand as you would a knife. **To pare short distances** like a tenon cheek, use an underhand grip with your forward hand. Anchor your knuckle against the workpiece if you can. Support the blade from underneath with your index finger. To help control the cut, press down on the blade with your thumb. **To pare long distances** like a chamfer along a long board, use the overhand grip shown with angled paring. The overhand grip is also good for paring in the middle of a board.



BODY POSITION

Your upper body—not your hands—powers the cut, as you shift your weight from your back foot to your forward foot. Position your legs to match your hands: If your right hand is back, so is your right leg. Keep your back elbow locked and tucked close to your body. Let your shoulder swing, so your forearm can transmit the forward force from your torso out to the chisel.



VERTICAL PARING

Good vertical paring technique helps you make smooth tenon shoulders and mortise walls.

HAND POSITION

Place your lower hand in an underhand grip. Plant the thumb of your uppermost hand on the butt of the handle, with the fingers wrapped over the handle. Pull the chisel against the work with your lower hand. Use the thumb and index finger of your lower hand to help control the cut.

BODY POSITION

Nearly the same as for horizontal paring, but you use your upper torso to drive the chisel down, not forward, into the wood. Tuck your uppermost hand into your shoulder, and lean onto the butt of the chisel. Bend at your hips, and rotate your weight onto your forward leg to power the cut through the wood.

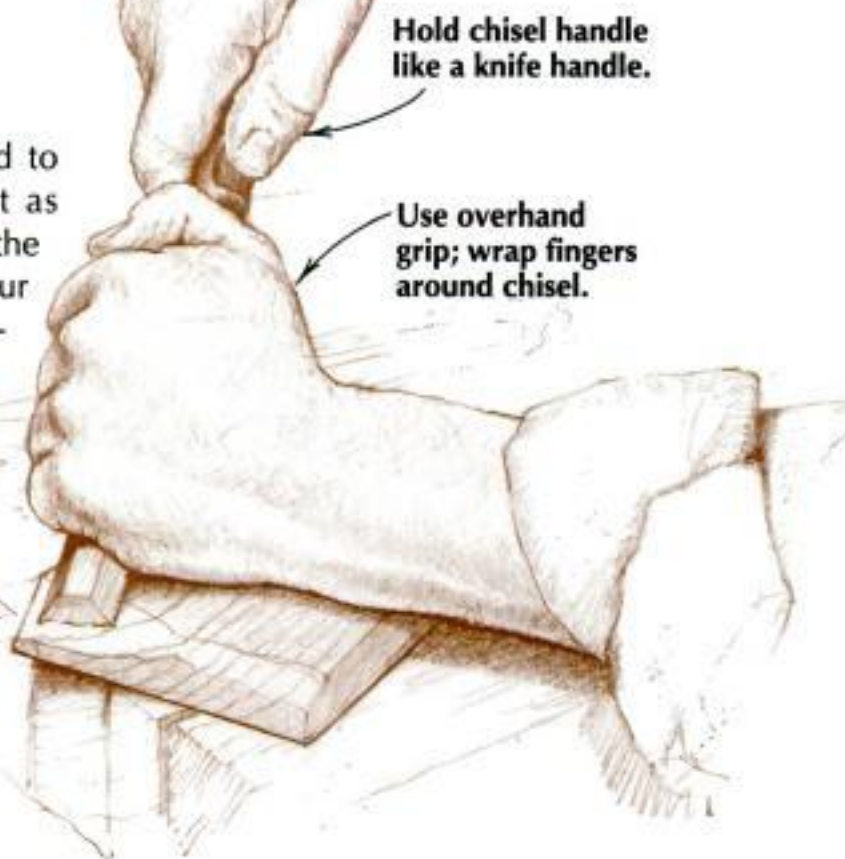
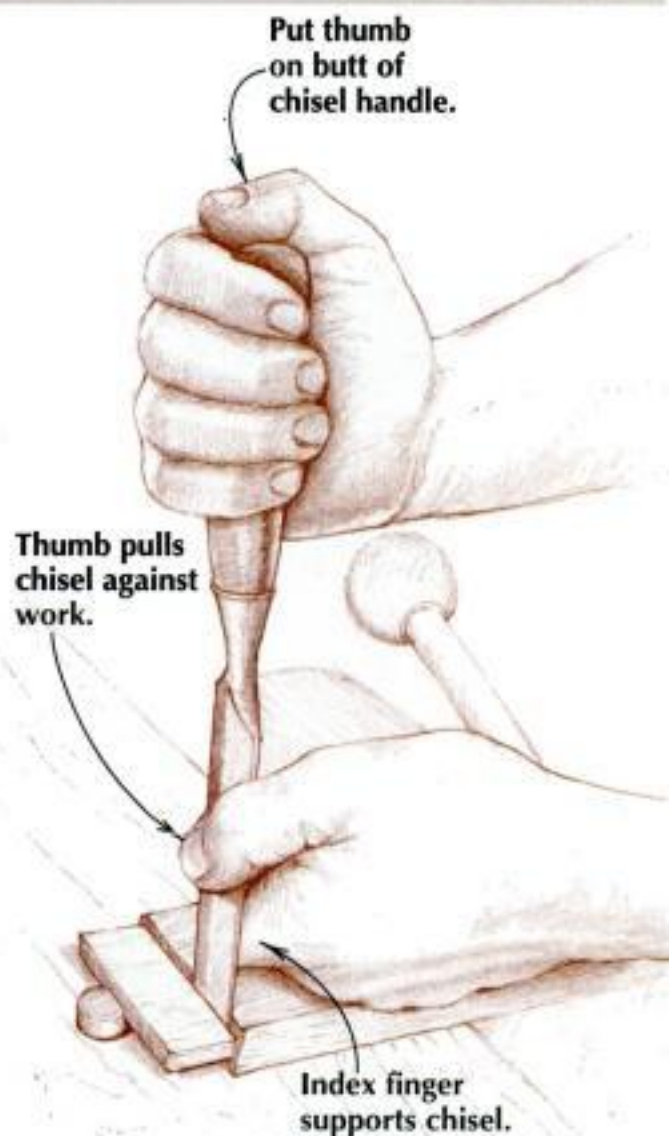


ANGLED PARING

This powerful paring technique is ideal for making miters and bevels on end grain.

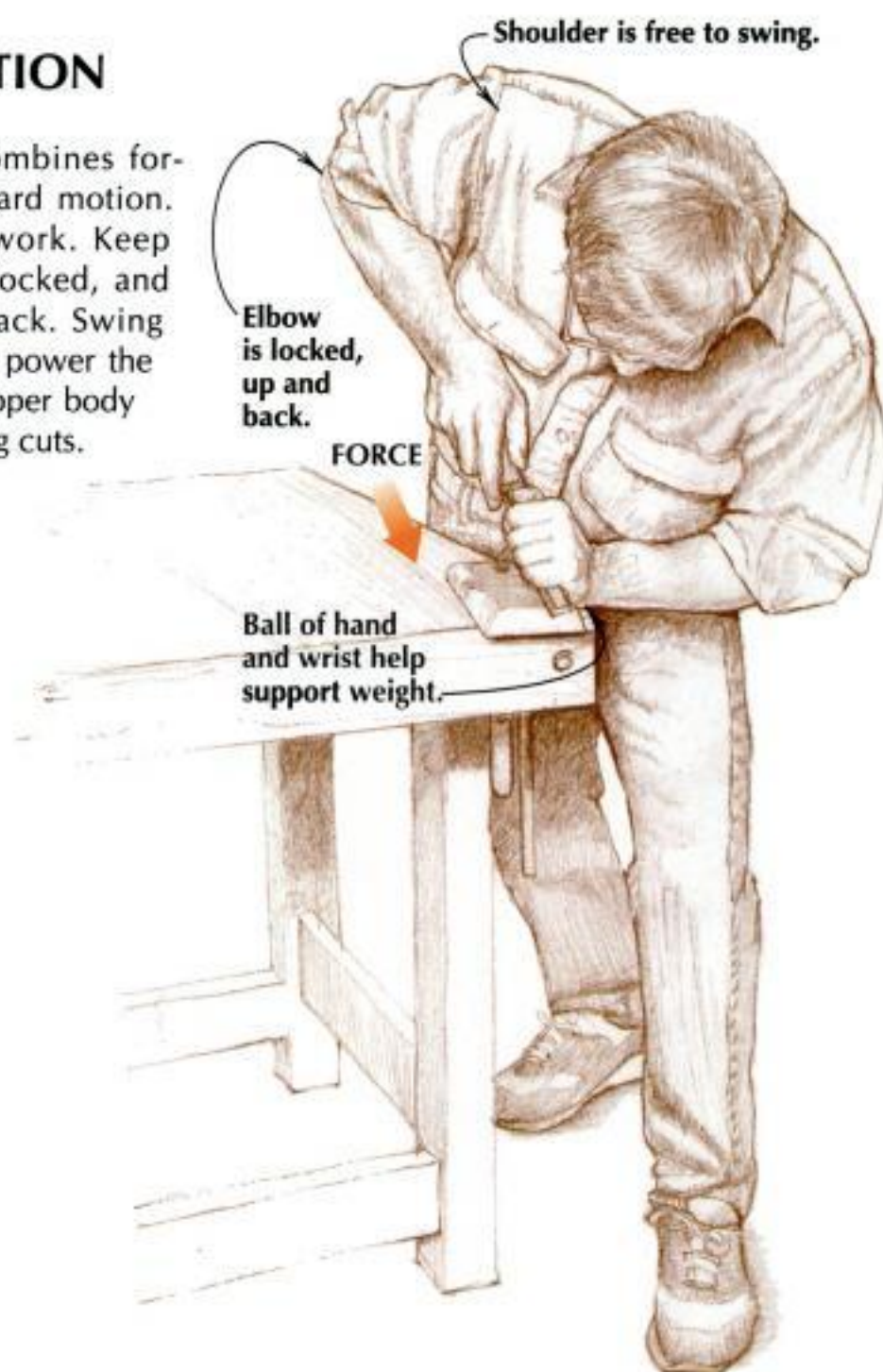
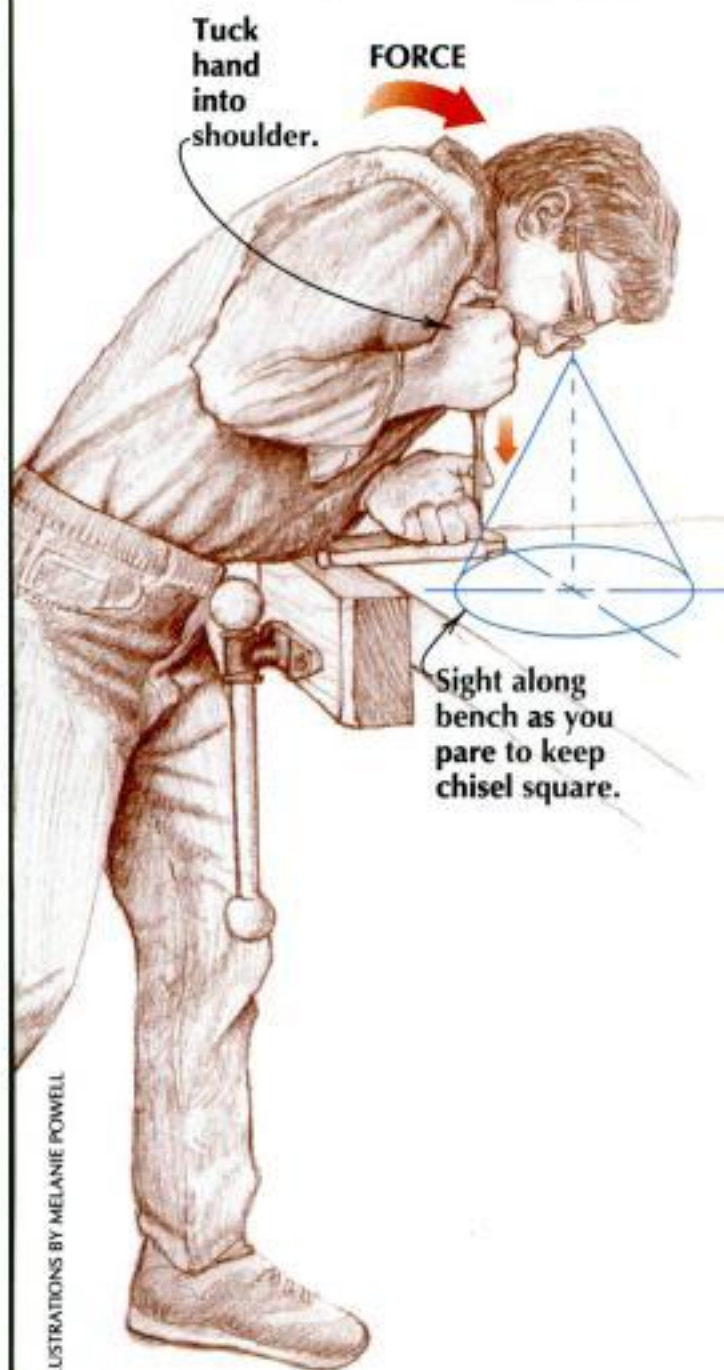
HAND POSITION

For angled paring, you'll need to change your grip for comfort as you move to different parts of the workpiece. Initially, position your rear hand as you would for horizontal paring. Put your forward hand in an overhand grip. To control the cut, press down on the chisel with your forward hand. The ball, wrist, or elbow of your forward hand supports your weight and controls the chisel's motion. Increase your leverage by keeping your rear hand and forearm close to your side.



BODY POSITION

Angled paring combines forward and downward motion. Bend over your work. Keep your rear elbow locked, and slightly up and back. Swing your shoulder and power the chisel with your upper body to take short, slicing cuts.



New life for a Garage-Sale



\$20 buys a basket case. This “before” photo reveals a homely appearance but not the failing joints, bowed sides, and other structural problems the authors encountered in their rescue effort.



It's smart to take it apart. Piecemeal repairs often perform poorly. By disassembling the case, you create an inventory of parts that can be evaluated accurately. Some can be reused, while others will need to be repaired or replaced.

*Save the best;
fix or replace the rest*

**by Ian J. Kirby and
John Kelsey**

Poking around a garage sale, we stumbled into a four-drawer bureau, dark and rickety, tarted up with garish curlicues and ripple molding. None of the trim details went together, the case sides looked cupped, and the top looked suspiciously unoriginal.

Clearly, this ruin was not a period piece worthy of meticulous restoration. But then we teased open a drawer. Aha! Hand-cut tails and pins, wooden-threaded drawer pulls, and through the grime, the glimmer of mahogany veneer, perhaps Cuban. The tag said \$20—what a deal. (See photo, left.)

When you've got a sad case like this one, complete renovation is more than a one-evening project. You have to take the piece completely apart, save what you can, and replace the rest—then put it all back together again. It's still a lot less work than building a new bureau from scratch. It's also a lot of fun, because you get a close look at the work of a long-gone cabinetmaker.

It's Just a Kit of Parts

Start by taking a few “before” photos. They'll record noteworthy details and also serve as proof of a dramatic rescue job once you're finished.

Now remove everything. Take the back off, take the top off, pull all the screws, push all the loose joints apart. Try not to break anything, but don't fret if you do—it can always be reglued. Mark the pieces with a felt pen so you're sure you can get them back in order. The objective is to end up with a pile of clearly labeled parts. (See photo, left.)

At this stage, you can begin to devise a strategy that is partly technical and partly aesthetic. The technical part of your plan should enable you to rebuild this kit of parts into a sturdy and functional cabinet. Your aesthetic concerns will make it look really nice. This two-part strategy needs to evolve as you get into the work. At every stage, the key is to be bold and thorough.

Bureau

The Cuban Connection

The case sides were so badly cupped they seemed beyond saving, but after some exploratory sanding, we hit paydirt: mahogany veneer, probably Cuban, tight and thick. The priceless mahogany was hide-glued to a softwood ground, and although there were some cracks and broken edges to repair, there were no bubbles or voids. Instead of chemical stripping, we sanded off the old finish to reveal the rich red wood. They don't make veneer like this any more.

The drawer fronts were another matter. The bookmatched veneer looked hopeful, but sanding off the old finish and grime revealed bald spots, filled voids, and odd patches. We decided initially to paint them, but later came up with an even faster finish. (See page 54.)

Structural Repairs

Our bureau was built like a lot of old solid-wood furniture. The sides are connected by five front rails that define the drawer openings and two back rails that also serve as nailers for back boards. The case sides rest on the floor. Before the glue failed, the case took a lot of its stiffness from a pair of pilasters that were glue-blocked to the sides.

Once the sides were apart, we could see how worn the drawer support and guide system was. New drawer supports could solve both of these problems.

To make each side flexible enough for flattening, we cut a series of deep saw kerfs running top to bottom on each side's inner face. We made the kerfs two-thirds the thickness of the wood and spaced them 2 in. apart. We also sawed the banged-up case feet off the sides, leaving the wood square.

Reassembling the case meant gluing and clamping the original rails to the sides. The reglued case felt strong when we took the clamps off but still needed the new drawer supports to hold the sides flat. Each support is made by screwing



A successful rescue. Kirby stands by his work. In giving the bureau a new identity, he exchanged drabness for drama. The case sides, drawers, knobs, and top are all original. New mahogany trim replaces damaged older parts and ties the bureau together visually. Kirby planned to paint the repaired drawer fronts and top, but instead opted for leather, a faster finish with a wonderful feel. (See "Veneering with Leather," page 54.)

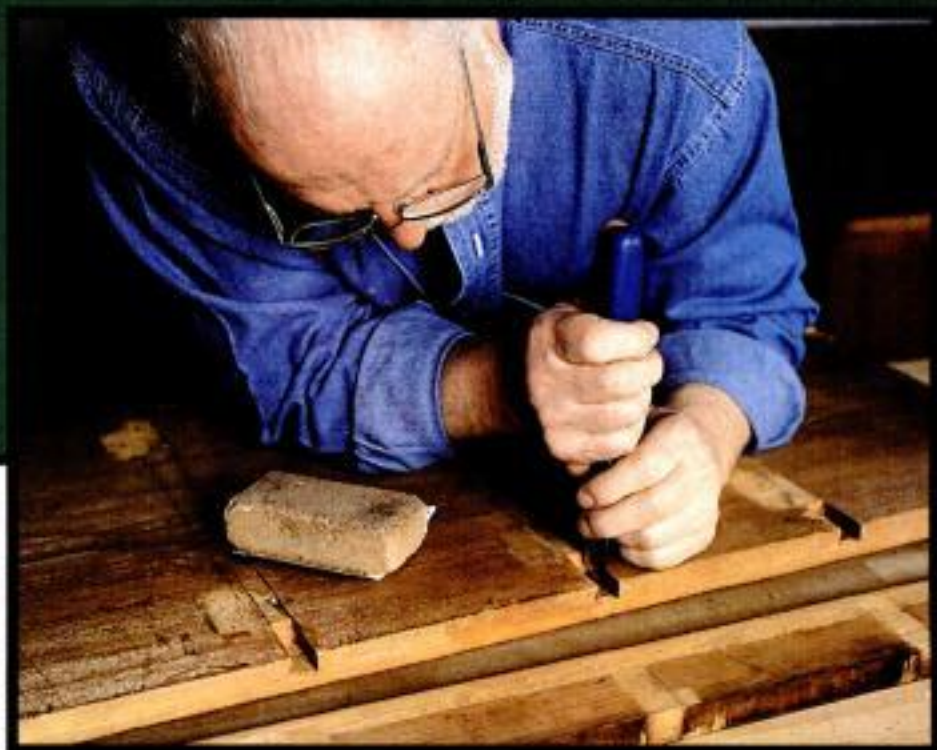
two pieces of hardwood together to form a T-shaped cross-section. The "T" provides a pair of flanges for screwing the support to the sides, and a runner that supports the drawer. Cross-grain movement between the sides and the supports isn't a problem—the saw kerfs take all the fight out of the old wood.

For smooth drawer operation, the runner on each support must have its

top edge flush with the top edge of its front rail. The runner must also be square with the front of the case and parallel to neighboring runners. To position each support in exactly the right place, we marked the top surfaces of the front rails on a measuring rod, then transferred these marks to the back of the side. (See top right photo, page 53.)



Gentle persuasion. Cushioning the blow with a block of wood, Kirby taps a rail free of a side. Though the joints were well made, the hide glue had failed.



Removing old glue. A sharp chisel is essential for removing hardened hide glue. Take special care with areas that will be reglued, like this half-dovetail joint.

Re-doing the Drawers

Our drawers were falling apart, so disassembly was no problem. Earlier repair work had already added drawer slips to the worn bottom edges of the drawer sides, so we didn't have to re-do that.

After cleaning the old glue out of the drawer dovetails and gluing them back together, we fit the old drawers the same way you'd fit a new drawer. We screwed new side-guides to the supports to create smooth side clearance. To fit the drawer fronts neatly in their openings, we had to plane some down, while others required the addition of a glued-on slip.

In any case repair involving drawers, it's best to leave the back off until

you're satisfied with the way all the drawers fit. The open back made it easy to attach side guides to the drawer runners and test each drawer for smooth closing action.

Recovering the Top

At first we thought the bureau top might also be mahogany veneer, but it turned out to be a bland white wood—birch or maple—on a pine ground. It was a replacement added during the case's previous bout of repair, stained blotchy brown and not worth saving.

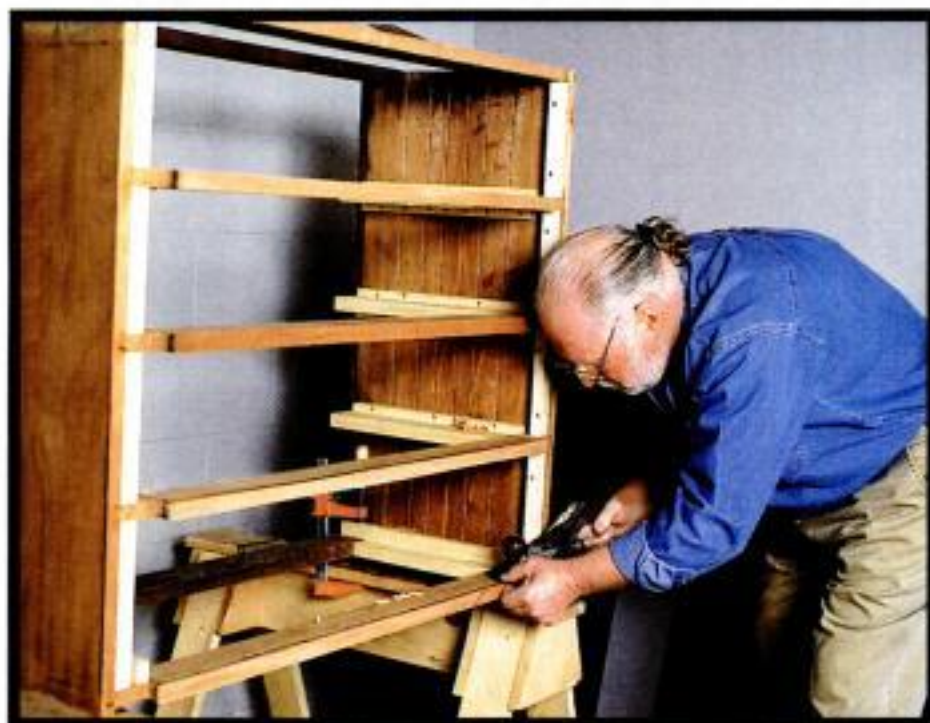
Time for a decision. We could have replaced the top with solid wood, veneered wood, plastic laminate, Corian, or even a slab of marble. Instead, we

decided to flatten and smooth the existing top and cover it with leather.

Of all possible solutions, leather is the quickest route to achieving a rich finished surface. You can find skins at leather shops and at upholstery fabric stores, and if you shop, you can buy it for less than \$5 a square foot. Once we had decided to cover the top of the chest with leather, it was natural to forget about paint and cover the drawer fronts too. There's more detail about gluing leather onto wood in the sidebar on page 54.

New Trim

In a project like this the goal is a good-looking result that doesn't grow into absurd amounts of work. Though we



Adding cleats and edging. Kirby planes new mahogany edging flush with the rail it covers. Vertical cleats stiffen the case and provide backing behind new corner posts.



Corner posts and base trim. New, larger corner posts, simple base trim, and matching rail edging give the remade piece a more contemporary appearance.



Regluing sides and rails. Kerfs cut on the inside face of each side provide enough flexibility for Kirby to flatten these parts during reassembly.



New drawer supports. Installing the T-shaped supports pulls the sides flat. The supports are aligned with front rails and with layout marks on a measuring rod.

didn't want to reuse the original trim, the visual composition of the chest seemed to need the bands of light and shadow it had cast. Three of the drawer rails were covered with dark slips of Cuban mahogany, and one was covered with a lighter wood. Evidently the maker intended to make the mismatch disappear under stain.

For us, deciding to glue leather onto the top and drawer fronts made the trim decision an easy one: We needed visible wood to tie the new posts and the old mahogany sides together. Putting the new trim where the old moldings had been preserved the original proportions of the bureau, minus the curlicues.

Making the two front posts larger than the original ones cast a shadow reveal on both sides and front. This work-saving detail also allows the smaller trim pieces to simply die into the posts without complex joinery. Bringing the posts through the top avoided having to wrap the leather around an outside corner.

With the drawer fronts and top covered with leather, finishing work was minimal. A coat of shellac followed by buffed wax restored the Cuban mahogany sides to their original glory. The new corner posts and front rail trim form a well-proportioned frame for the drawer fronts and top. Who could guess that this fancy bureau began as a \$20 basket case?



IAN J. KIRBY
is a furniture designer
and woodworking
teacher with studios
in Connecticut.

JOHN KELSEY
is a writer
and occasional
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in Connecticut.



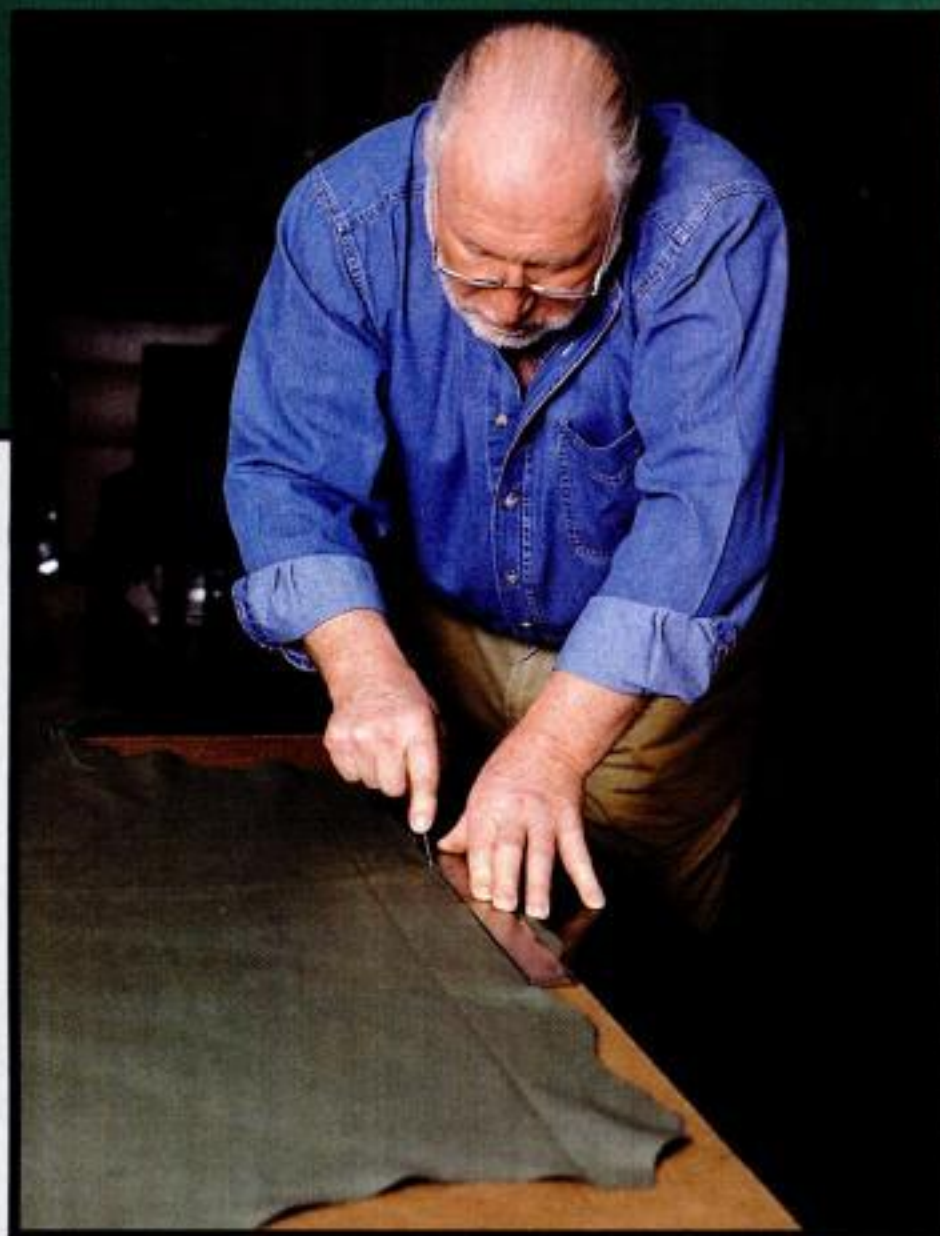
Next page, "Veneering with Leather." ▶



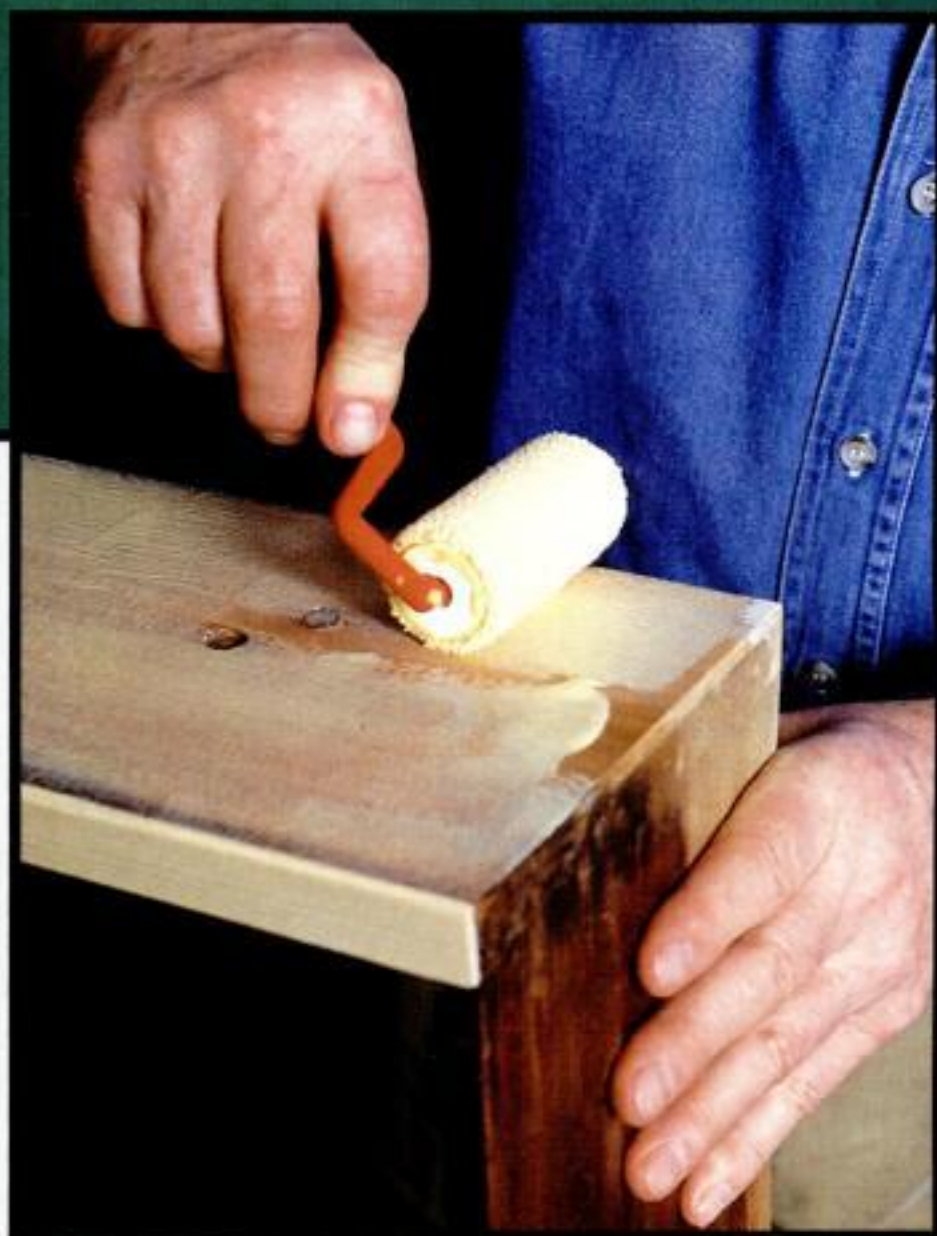
Old joint, new fastener. After regluing one of the dovetailed drawers, Kirby uses a pneumatic nailer to pin a joint fast.



The back goes on last. Leaving the back off makes it easier to install and adjust the drawer guides for a smooth, precise fit with each drawer.



1 Face edge. Trim the irregular edge off the leather with a sharp pocket knife, guided by a steel straightedge.



2 Roll it out. A disposable trim roller makes short work of spreading yellow glue on this drawer front.

Veneering with

by Ian J. Kirby

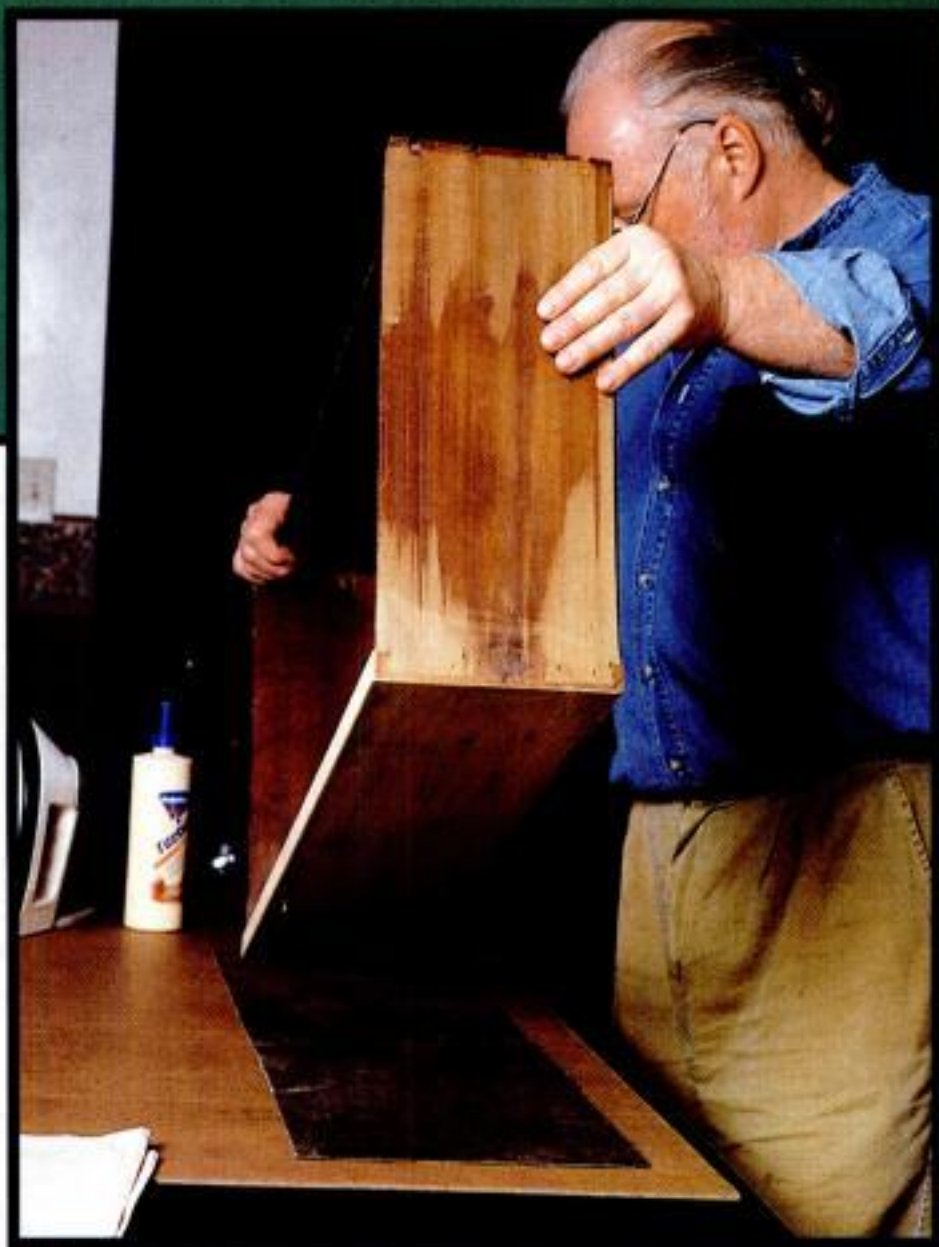
Leather is the quickest finish for raw wood, plywood, or MDF. The lush hide looks rich in every way. It's a great finish for projects of any size, from bureaus like the one shown here to small jewelry boxes. It also hides a multitude of sins. You'll find leather in fabric stores and leather shops. (Look under "Leather" in the Yellow Pages of your phone book.)

Finishing with leather doesn't demand an extensive tool kit. You'll need a super-sharp knife for cutting; a steel straightedge; tempered hardboard to use as a cutting board; yellow glue and a small paint roller for spreading it; an ordinary household iron; and some hard-surfaced drawing paper.

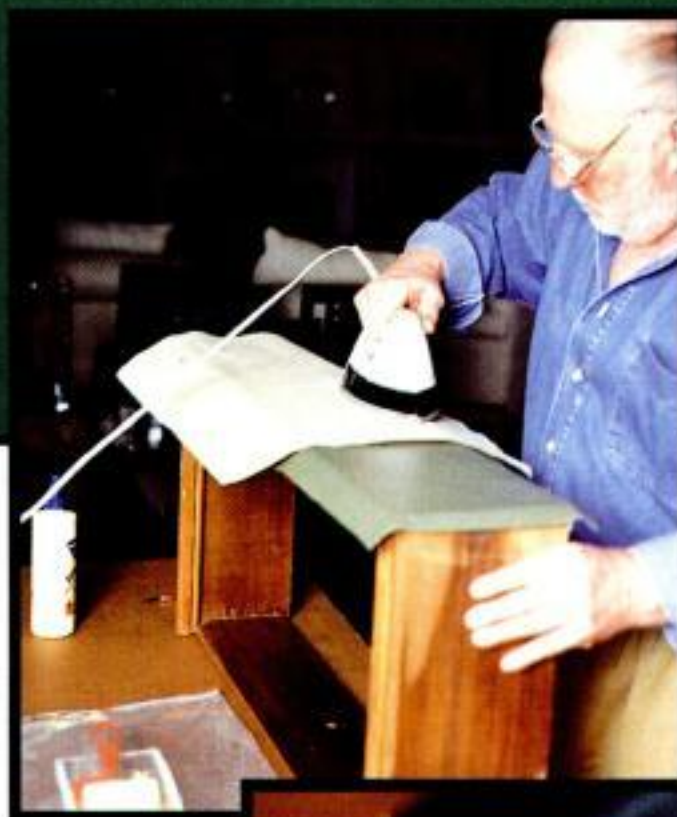
Sawdust is leather's enemy. Stray crud embeds itself in the suede side, making a lump. You can vacuum the shop like never before or move to the dining room table.

Establish a face edge by making a straight cut to trim the waney edge off the hide. **1** Lay out the pieces by measuring from this edge. Cut the leather an inch oversize, so it will overhang a half-inch all around after glue-up.

Glue the leather with ordinary yellow glue. Work on only one surface at a time; don't try to glue around a corner in a single step. Spread glue on the wood with a small paint roller, but don't put any glue on the leather. **2** Spread the leather on the hardboard panel, plant the glue-coated wood on it, then flip the whole thing over. **3** Smooth the leather with the palm of your hand. Remove any trapped bubbles of air by lifting the leather and smoothing it out again, but be careful not to stretch it. Then cover it with clean, hard-surfaced paper, and iron it at medium heat



3 *Cover the drawer.* Carefully lower the glue-covered drawer front onto the leather.



4 *The iron cures it.* Start the glue-curing process by ironing the leather through a layer of clean, hard paper.



5 *The knife trims it.* Slice the excess leather along the edge of the wood.

Leather

with light pressure. The iron will help to smooth the leather and cure the glue. **4** But if you press too hard, you'll end up ironing the texture off the leather surface. Keep the iron moving, and work across the entire surface two or three times.

You don't have to wait to fold the leather over the front edge of the drawers and glue it there. Squeeze a little bead of glue along the edge, then spread it evenly with your roller. Smooth the leather over the edge with a rolling motion, and iron it through paper. Roll your hand, and the iron, over the corner to make sure it's tight and smooth. Try not to dig your fingers into the leather. Since the glue is still somewhat plastic, you'll make a dimple, which you'll have to iron out again.



Allow the glue to cure for at least an hour, and preferably overnight, before you pare the leather square and tight to the wood. Put some tension on the waste leather as you steer the knife along the wood. **5**

That's it. You don't have to apply a finish, and there's nothing to clean up. The piece looks great, and you're all done already. ▲

NOB'S NEVEREN

Complex solutions from a simple shape

by Allan Boardman

Puzzlemaking is an old tradition in Japan, probably dating back to the origins of oriental joinery. This tradition is still thriving today, with modern designers creating many challenging new puzzles each year. Nobujuki Yashingahara, known as "Nob" to his many friends, is the best known of today's puzzle inventors. In the mid-'80s, Nob developed a new puzzle made from eight different puzzle pieces. It was originally envisioned as a straightforward "packing puzzle" (dump all the pieces out of a box, then pack them back in), but Nob realized that the same pieces could be assembled into a number of interesting shapes. The award-winning puzzle was dubbed "neverending" because at first, Nob didn't know how many solutions were possible. But expert puzzle solvers now agree that there are only eleven really good solutions, not counting rotations and mirror images. (See page 59.)

The pieces all look similar but are slightly different. Each is an assembly of two compound-angled blocks. To make the pieces, 16 compound-angled blocks are cut and glued together in eight different ways. (See photo, opposite page.)

Making the Puzzle

All the puzzle pieces can be cut from a single 1-in.-square stick about 24 in. long. The 1-in. dimension is not essential, but it's critical for the cross-section to be exactly square and uniform for its full length. Make the stick smooth, but keep the edges crisp.

I cut the stick up into 16 compound-angled blocks using the radial-arm saw and a special jig. (See page 58.) A similar version of my jig will work on the chop saw instead of on the radial-arm saw.

The workpiece is held in a V-shaped cradle glued to the base of the jig at a 10° angle. This enables me to alternate between compound-angled cuts and square cuts without adjusting the saw from its regular setting. Glued to the cradle, an adjustable end stop makes it easy to get precise alignment. A hold-down arm prevents each block from being flung once it's been cut free of the workpiece. It also keeps your fingers clear of the blade.

Whether you're cutting parts on a radial-arm saw or on a chop saw, make sure you're using a premium-quality cutoff blade.



A geometric challenge. The building block in this intriguing puzzle is a single shape, glued together in pairs to form eight parts. Many puzzle solutions are possible.

DING PUZZLE

This will give you smooth cuts and reduce the need for sanding, which can destroy dimensional accuracy. Set blade depth to just cut into the top surface of the jig base.

Set up your jig by cutting some test blocks to see if a pair of blocks can be stacked up to form a cube. You want equal measurements on all sides. Follow my directions for using the jig, adjusting the screw in the stop block until you get two blocks that attain cube status. For safety and accuracy, tighten the screw on the hold-down to lock the workpiece in position.

After cutting the 16 puzzle pieces, touch up their crosscut surfaces by lightly sanding them, rubbing each against a piece of fine sandpaper placed on a flat surface. Glue the pieces into the eight assemblies shown here, taking care to neatly align the pairs before clamping.

After the glue sets, clean off any squeeze-out and very lightly chamfer or round all exposed edges. The little tray shown in the top right photo makes a handy container for the puzzle and facilitates solving it on your lap. The 1-in. center cube is optional.

Finishing the puzzle pieces with a penetrating oil will bring out the color and grain of the wood, and provide a little moisture and stain protection.

Once your puzzle is complete, see how many solutions you can get without referring to the drawings on page 59. Who knows—maybe you'll discover a few new ones that have evaded the experts! ▲



ALLAN BOARDMAN
is a retired aerospace executive who can finally spend enough time with wood-working and puzzles.

MORE INFO ONLINE

<http://www.johnrausch.com/PuzzleWorld>

Ready for action.

The author built a base and a center cube to house his puzzle in one configuration. For other solutions, see page 59.

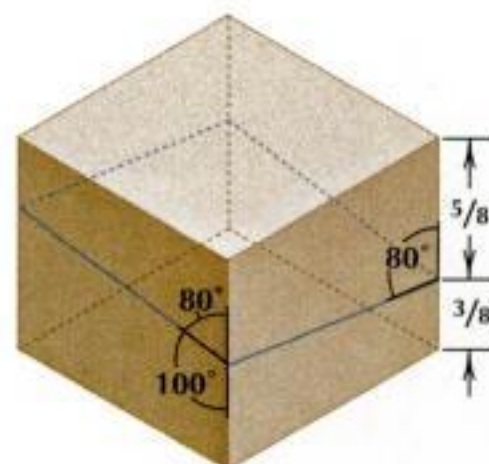


THE PUZZLE PARTS

The completed puzzle consists of eight distinct parts (A-H, below). Each puzzle part is made by gluing together two identical compound-angled blocks in different ways.

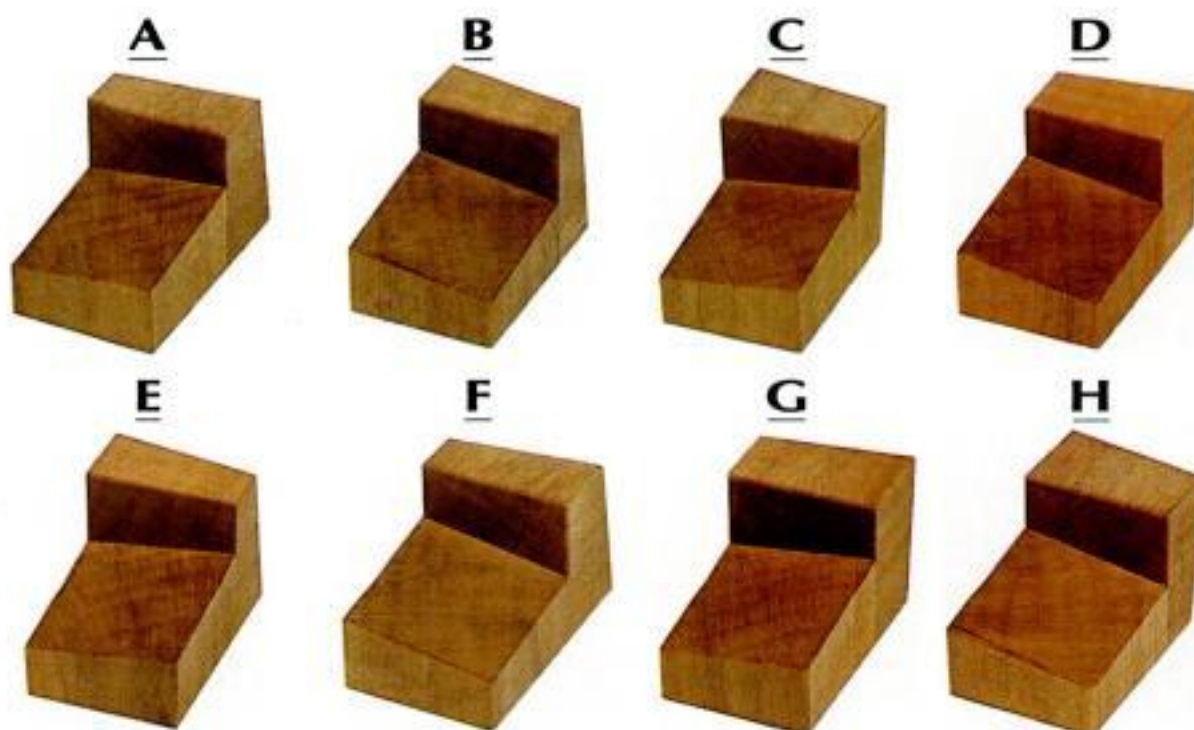
STEP 1

Cut at least 16 identical compound-angled blocks. Two blocks stacked together should form a 1-in. cube, as shown at right. It's easy to make the blocks using a jig like the one shown on the next page.



STEP 2

Glue pairs of blocks together to make parts A-H.



STEP 3

Let the fun begin! You can try some of the solutions shown on page 59, or come up with new ones of your own.

MAKING AND USING THE BLOCKMAKING JIG

The author's jig is designed to work on a radial-arm saw, but could easily be adapted to work on a motorized miter saw.

THE JIG IS EASY TO USE...

The workpiece rests in a V-shaped cradle. An adjustable end stop ensures exact positioning of the workpiece. A hold-down arm prevents the blade from throwing the block after it's cut.

FOLLOW THREE RULES WHEN USING THE JIG

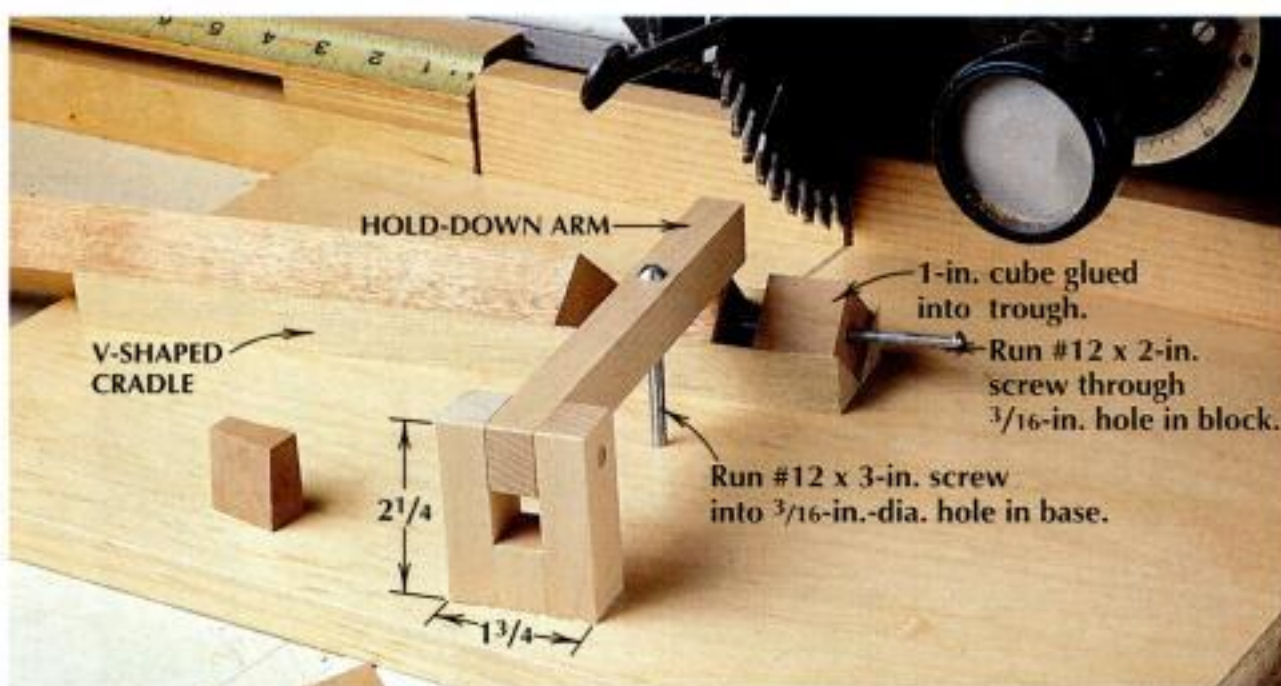
1 Cut your blocks from a length of clear, stable hardwood that measures 1 in. square in section. Start with a workpiece at least 24 in. long.

2 Always position a square-cut end of the workpiece against the end stop.

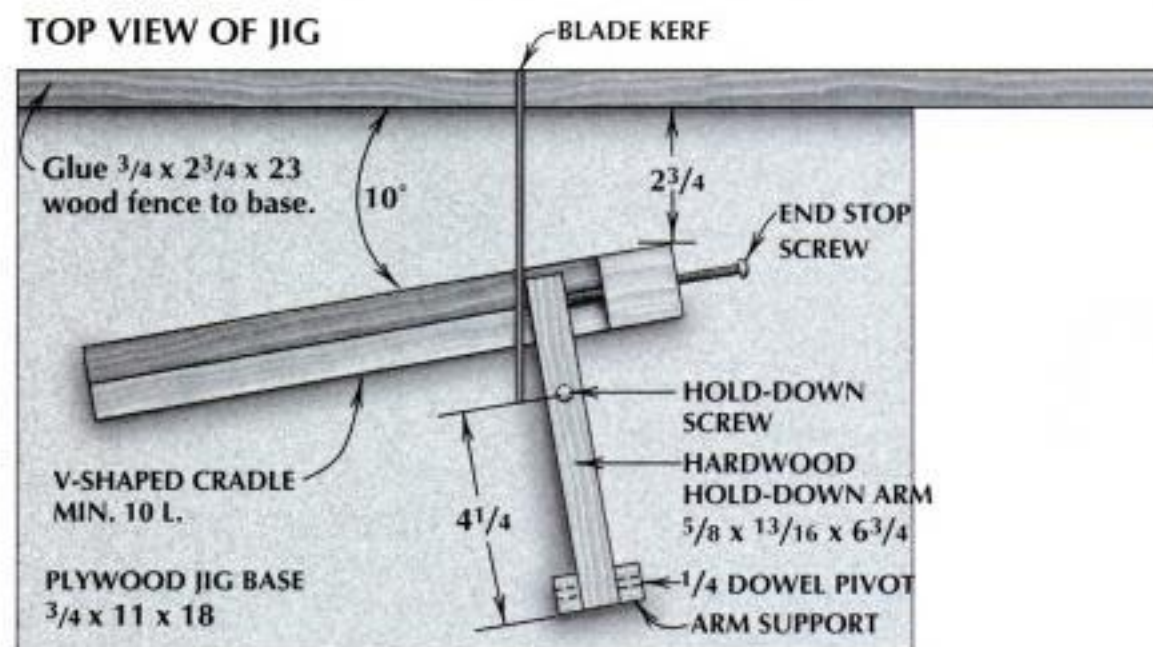
3 When placed together, pairs of compound-angled blocks should form a cube, as shown in the drawing on page 57. Cut test blocks and adjust the end-stop screw until you can form a cube with two blocks. Then cut all 16 blocks.

...AND EASY TO MAKE

Use the photo and drawing as guides when making your block-cutting jig. A similar design will work if you're using a chop saw. The V-shaped cradle should form a 90° trough for holding the workpiece, and be positioned at a 10° angle to the fence.

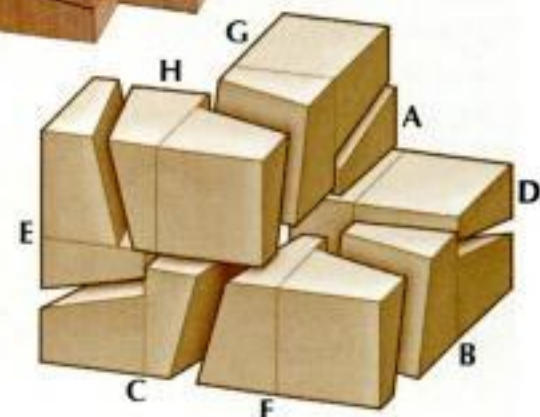
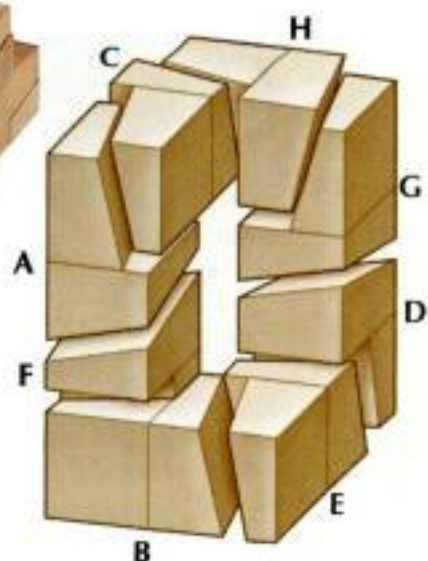
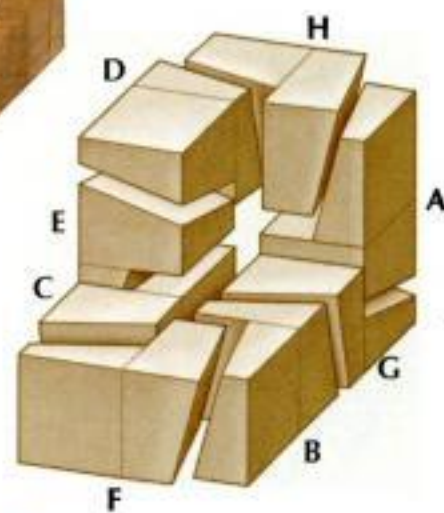
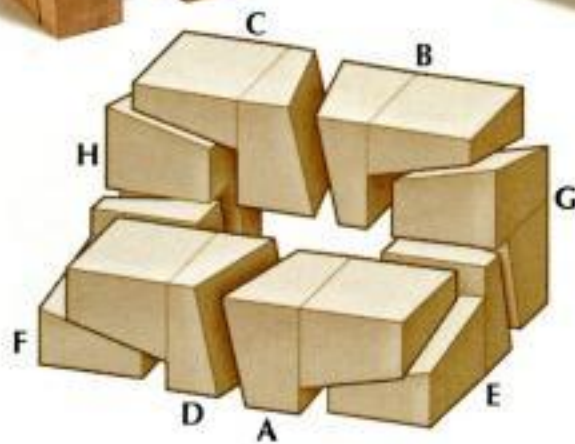
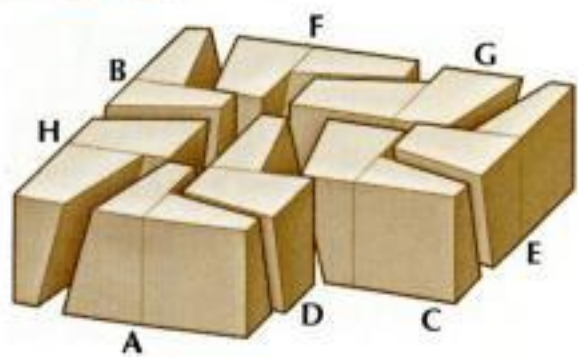
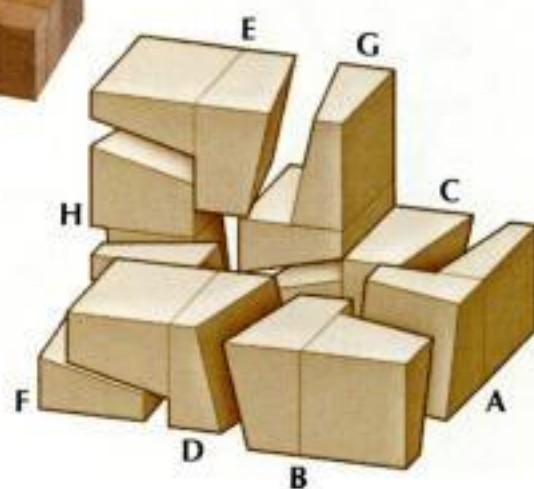
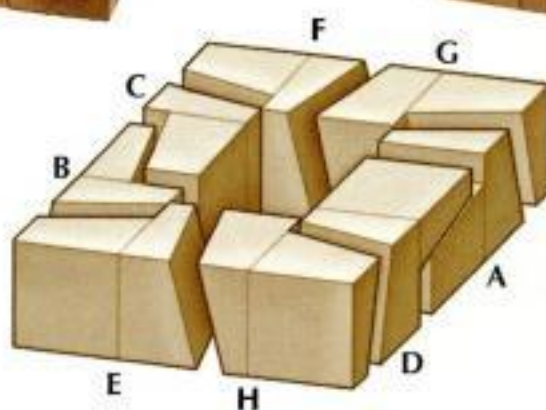
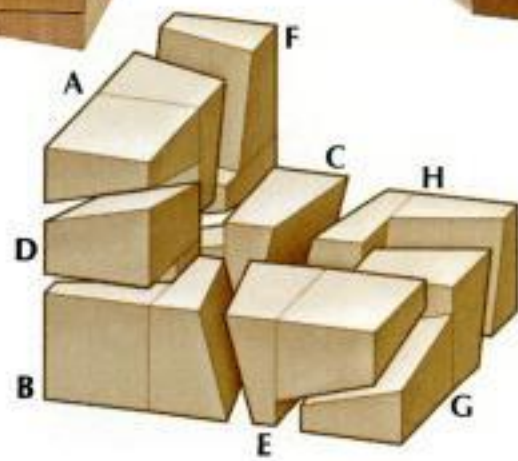
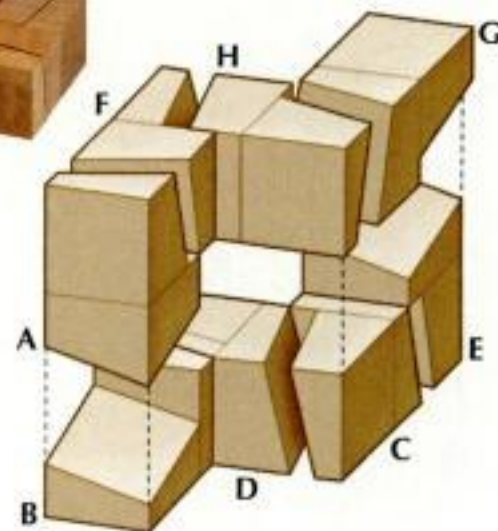
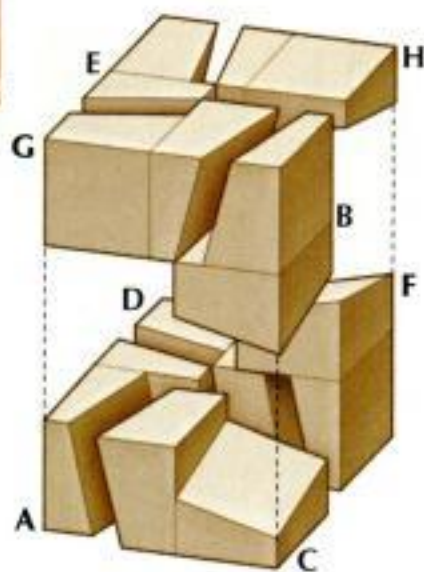


TOP VIEW OF JIG



PUZZLE SOLUTIONS

The 11 puzzle configurations shown here are the most common solutions. The letters correspond to the lettered puzzle parts shown on page 57.





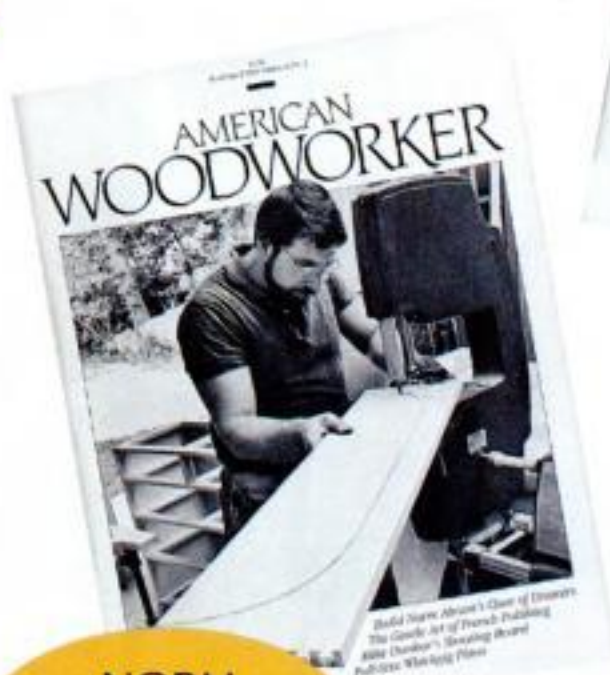
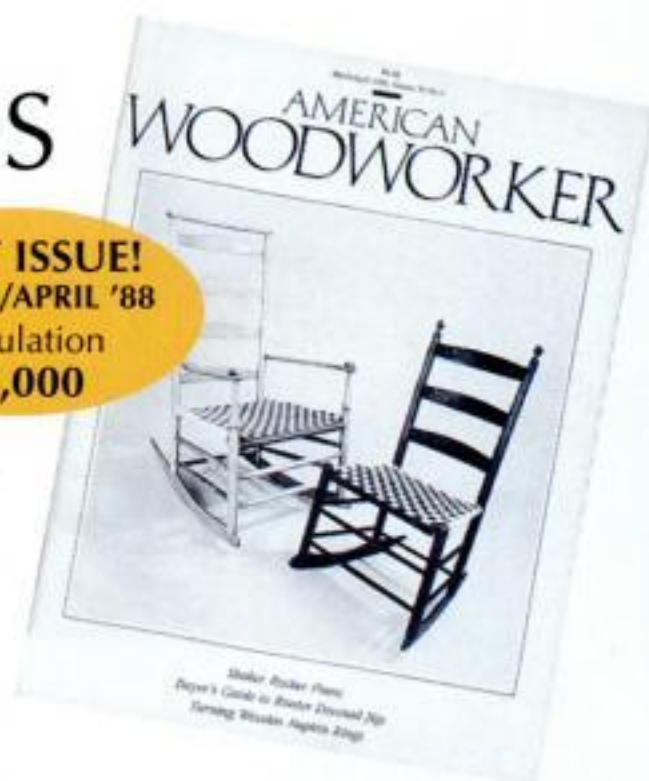
the Best of 10

*Celebrating a dynamic decade
at AMERICAN WOODWORKER*

Welcome to the party! It's been ten years since a small quarterly magazine vaulted into the big time by gaining a major publisher, a full-time staff, and a significant jump in circulation (See "Milestones," right.) Today, with more than 380,000 readers, the adventure of building better and better magazines has become more exciting and more challenging than ever. So let the festivities begin! We hope you'll enjoy the lighthearted "Best of 10" lists we've assembled.

MAGAZINE MILESTONES

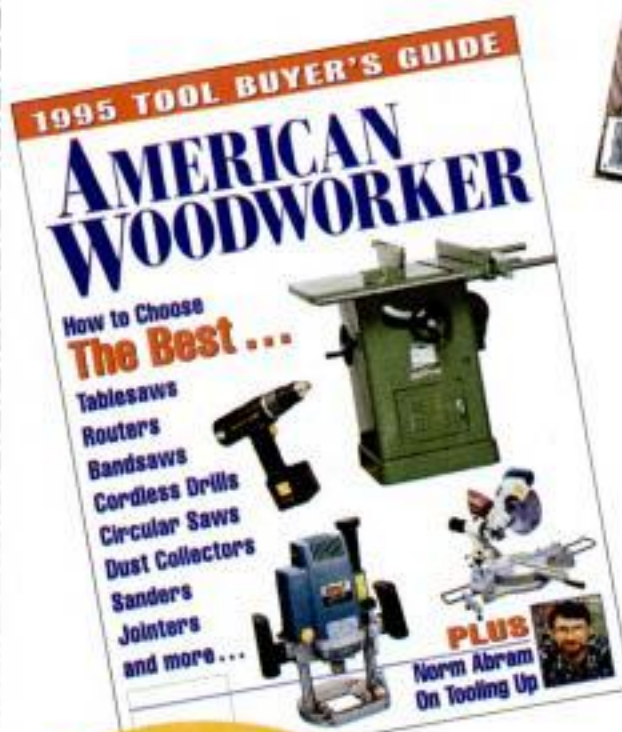
FIRST ISSUE!
MARCH/APRIL '88
Circulation
20,000



**NORM
ARRIVES**
MARCH/APRIL '89



**FIRST ISSUE
FULL COLOR**
APRIL '92



**FIRST BUYER'S
GUIDE ISSUE**
NOVEMBER '94



JUNE '98
Circulation
380,000

10 INNOVATIONS

we'd like to see in the future

- Genetically engineered figured wood.
- X-ray safety glasses that let you see embedded nails before you cut a board.
- A standard tablesaw blade guard that's worth keeping on your saw.
- A self-vacuuming workshop stereo system.



- Affordable, renewable, plantation-grown exotic woods—available at Home Depot.
- A cough-activated dust collector.
- Flannel shirts that repel sawdust.
- A bandsaw that tracks automatically when you put on a new blade.
- A way for professional woodworkers to make money like lawyers and stockbrokers.

10 signs that you may be spending too much time in your workshop

Your garage is absolutely off limits to cars.

Family members must wear name tags.

Your friends stop using your real name; instead they call you "Norm."

Sawdust deposits have turned your entire backyard into a compost pile.

Instead of removing splinters, you simply let them wear away with the calluses.

Your dog growls when you enter the house.

Your finishing room is about to become a Superfund site.

The pile of pizza boxes outside your shop is taller than you are.

You've filled every room in the house with furniture and are actually considering yard ornaments as future projects.

You have no idea who Seinfeld is.



10 THINGS A WOODWORKER SHOULD NEVER TELL HIS OR HER SPOUSE

I quit my regular job. I'm going to be a professional woodworker.

I'm taking my Visa card to The AMERICAN WOODWORKER Show™.

What do you mean, when will I finish it? It *is* finished.

This plunge router is for your birthday, but I'll just keep it out in the shop where we can both use it.

Think of sawdust as a food supplement.

I'm done buying tools. I've got everything I need.

Of course you can lend my good chisels to your brother.

Happy anniversary, hon. This grinder will last a lot longer than flowers.

I'm going to the hardware store. I'll be back in just a few minutes.

\$1,200 for THAT? I could build it in a weekend.

WEIRDEST 10 NAMES FOR WOOD



Woollybutt

Tasmanian oak (*Eucalyptus delegatensis*)

Dead-rat tree

Baobab (*Adansonia digitata*)

Farkleberry

Bilberry (*Vaccinium arboreum*)



Monkey puzzle

Chile pine (*Araucaria araucana*)

Pain-in-back

White bay cedar (*Trema micrantha*)



Devilwood

Wild olive
(*Osmanthus americanus*)

Shaving-brush tree

Pink bombax
(*Pseudobombax ellipticum*)



Stinkwood

Black tupelo (*Nyssa sylvatica*)

Woman's tongue

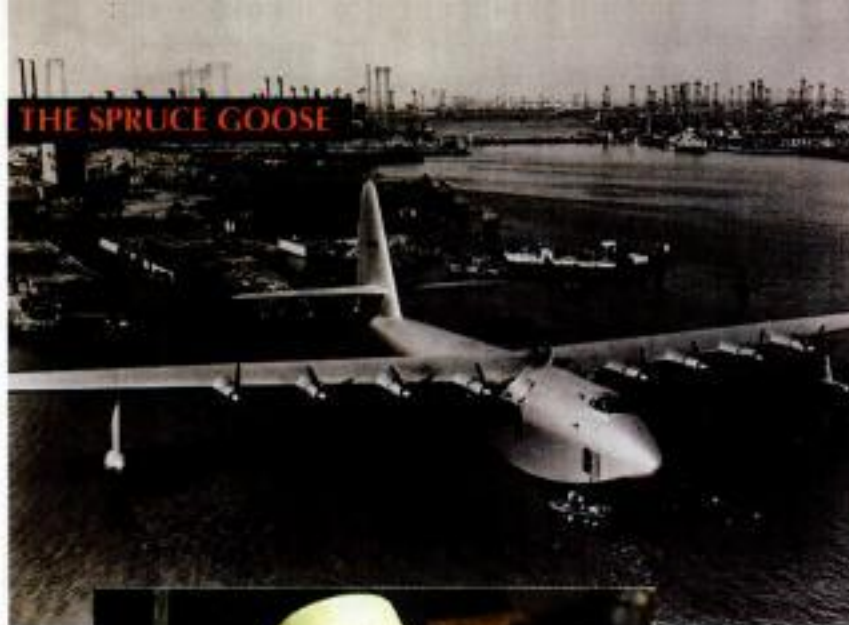
East Indian walnut (*Albizia lebbek*)

Ape's earring

Texas ebony
(*Pithecellobium flexicaule*)



ILLUSTRATIONS BY TIM LEE



**JOHANNES MICHELSEN'S
COWBOY HAT**



**PETER PORTUGAL'S
SPORTS CAR**

10 of the wackiest things made from wood

DENTURES (George Washington wore them) ▲ **CLOCK MOVEMENTS** ▲ **WATER MAINS** ▲ **NECKTIES** ▲ **EYEGLASS FRAMES** ▲ **SHOES** ▲ **THE FLOOR PAN OF THE NEW CORVETTE C5** (a sandwich of balsa wood and carbon fiber)

SEPARATED AT BIRTH **TEN** WOODWORKERS



JAMES KRENOV



**MICHAEL
DRESDNER**



**SANDOR
NAGYSZALANCZY**



**DAVID
ELLSWORTH**



STEVE BLENK



OBI-WAN KENOBI



FIDEL CASTRO



**LEONARDO
DICAPRIO**

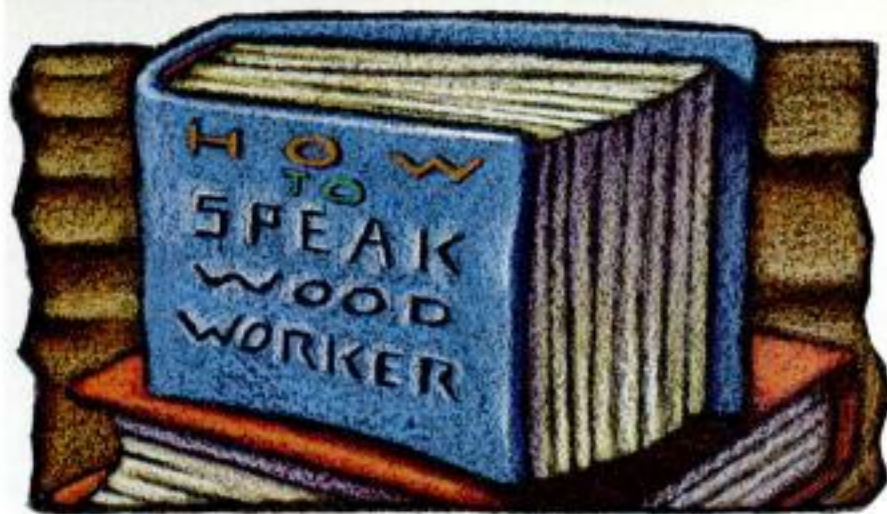


MOSES



GRIZZLY ADAMS

BOTTOM ROW PHOTOS (LEFT TO RIGHT): MPTV ©1979. ©HARRIS & EWING/GLOBE PHOTOS, INC. 19. ©1996 SYLVIA NORRIS/GLOBE PHOTOS, INC. 19. COURTESY OF PHOTOFEET. ©BOB NOBLE/GLOBE PHOTOS, INC. 19



10 TRANSLATIONS EVERY NON-WOODWORKER MUST KNOW

WHAT A WOODWORKER SAYS

I'll just be a few minutes.
This is really the last major tool I need...
I made a slight mistake.
Has anyone seen my tool catalog?
Honey, I'd like to buy you some new Tupperware.
I'm ordering some things for the kitchen.
I designed it that way.
I know exactly how to do it.
My chisels are always razor-sharp...
I think I could make good money selling my stuff at craft shows.

WHAT IT REALLY MEANS

Don't expect me in for dinner.
...for the next week or so.
We've got some more firewood.
I need to use the john.
Your best containers are now holding my waterstones.
I need to get my order up to \$500 for free shipping.
That's how it turned out.
I have no intention of asking for help.
...as long as you warn me before you visit the shop.
I need you to keep your day job.

AND THEIR CELEBRITY COUNTERPARTS



MARK DUGINSKE



DAVID SLOAN



IAN KIRBY



SAM MALOOF



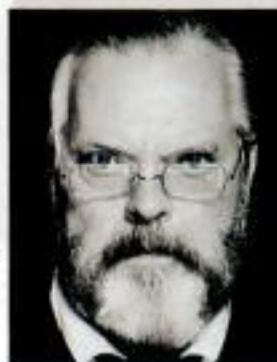
ELLIS VALENTINE



RASPUTIN



ELLIOTT GOULD



ORSON WELLES



PABLO PICASSO



GROUCHO MARX

10 SIGNS THAT OSHA* HAS TAKEN CONTROL OF YOUR SHOP

Shop-made plywood armor
(a less-expensive alternative
to commercially available
Kevlar vest)

7,000-cfm dust extraction
and air purification system.

Machine tether cord
to prevent woodworker from
being sucked into primary
dust-collection port.

"Use with adequate
ventilation" stickers on all
shop materials and supplies,
including hardware packs.

85% to 90%
of all shop surfaces are
painted safety orange.

Insurance waiver required
to enter your own garage.

All the wood you buy comes
with "Splinter Hazard"
warning stickers.

"Break-away" drive belts
on all power tools.

Push-back guards
on hand planes and chisels.

Safety glasses
for the shop dog.

*Occupational Safety and
Health Administration

BOTTOM ROW PHOTOS (LEFT TO RIGHT): COURTESY OF PHOTOFEST. ©1996 LISA ROSE/GLOBE PHOTOS, INC. 19. GARI RONA/MPTV ©1970. GLOBE PHOTOS, INC. 19.

Premium Jigsaws

We rate **17**
top-of-the-line
models

Jack-of-all-trades. Today's jigsaws are loaded with features that make them versatile, fast, and comfortable.

The jigsaw—also called a saber saw—is a versatile performer in the shop and on the jobsite. It cuts curves and irregular shapes in solid wood and sheet goods. It can make cutouts in the middle of a board and scribe cabinet sides to make them conform to wall contours. Fitted with different blades, it'll also cut metal, plastic, and other materials.

For this shop test, we picked out 17 top-of-the-line models from 11 different manufacturers. Priced between \$100 and \$500, these saws offer levels of control, power, precision, comfort, convenience, and durability that you won't find in low-end versions.

Top Handle or Barrel Grip?

Manufacturers make jigsaws in two different grip styles: top handle and barrel grip. Of the jigsaws we tested, the Craftsman and Freud models come with top handles only; the Fein, Festo, and Metabo come with barrel grip only. The six other brands offer a choice between the two for the same price. Which style is better? Among experienced woodworkers, you'll find passionate advocates on both sides of the handle vs. barrel debate. In the U.S., top-handle jigsaws outsell barrel grips by a very wide margin, but in Europe it's the other way around.

Most of our testers prefer the top handle for two reasons. First, when you grip the top handle, your index finger and thumb are almost directly over the blade. We found that this gives you better control on curved cuts. Second, during long periods of cutting curves, the barrel grip tired out the wrist and forearm more quickly.

Tests and Ratings

We tested and rated each model in five categories: power, blade-changing convenience, cutline visibility, baseplate quality, and ergonomics. Using high-quality Lenox jigsaw blades, we made straight, curved, and beveled cuts in solid wood, plywood, and particleboard. You'll find our ratings, with other important test results, in the chart on pages 66-67.

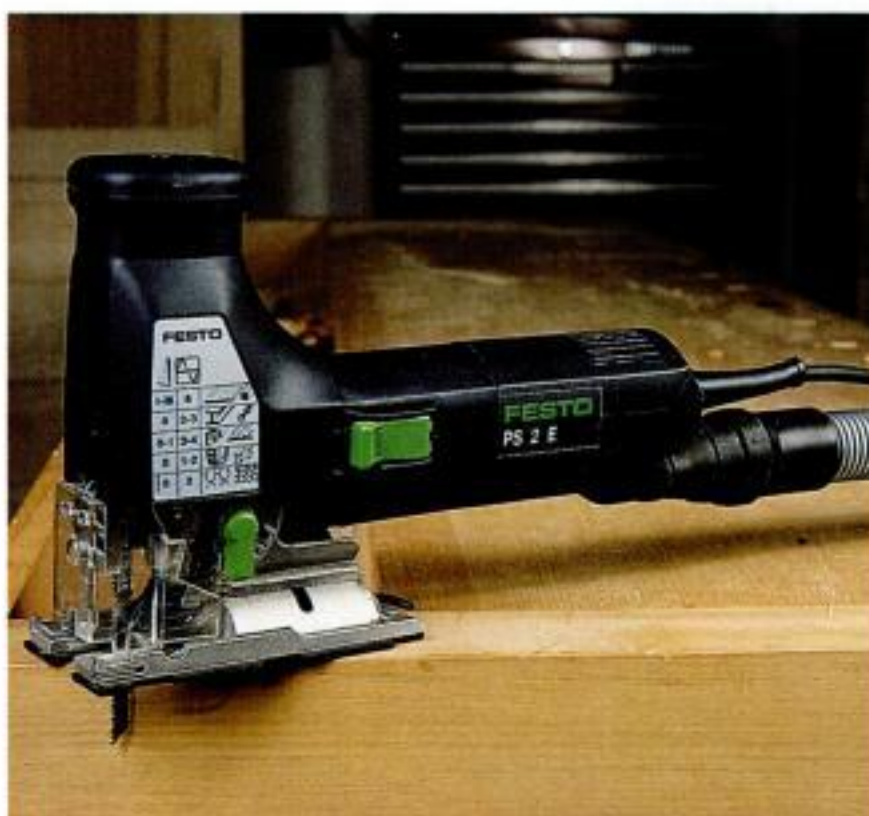
Power. All the models in our test had plenty of power to cut through all kinds of wood, including 5/4 hard maple. The Fein has the lowest amperage rating (and lowest maximum speed) in our test group, and it cut a bit slower than the other models, but we still found its

Text continued on page 68.

Features to Consider



Toolless blade change. Metabo's quick-release lever makes blade changes effortless (right). DeWalt requires a few turns of a pull-out knob (left).



Vacuum connection. Dust collection on most saws works well only if you attach a clear plastic blade shield. Festo's shield allows good visibility. Some shields cloud up with dust and obscure the cutline.



Lefties beware. On some saws, left-handers can inadvertently press the lock-on button, creating potential danger—you think you're turning the saw off, but it keeps going.

Bosch

Model 1587AVS
Top handle - street price \$160
Model 1584AVS
Barrel grip - street price \$160
(800) 815-8665 Circle #610



PROS: Toolless blade change.

CONS: Lock-on button potentially dangerous for lefties (top handle only).

Craftsman

Model 27251
Street price \$138
See your local Sears store. Circle #611



PROS: Flat base.

CONS: Lock-on switch difficult to operate; resetting base to 90° is fussy; no dust-collection port.

DeWalt

Model DW321K
Top handle - street price \$165
Model DW323K
Barrel grip - street price \$165
(800) 433-9258 Circle #612



PROS: Toolless blade change and base adjustment; soft-start motor (barrel grip only).

CONS: On/off switch uncomfortable on barrel-grip model; lock-on button difficult to use on top-handle model; 90° base detent imprecise; no dust-collection port.

Performance Ratings

	Blade Changing 1 2 3 4 5					Cutline Visibility 1 2 3 4 5					Baseplate 1 2 3 4 5					Ergonomics 1 2 3 4 5				
Bosch																				
Model 1587AVS Top handle																				
Model 1584AVS Barrel grip																				
Craftsman																				
Model 27251 Top handle																				
DeWalt																				
Model DW321K Top handle																				
Model DW323K Barrel grip																				
Fein																				
Model ASte638 Barrel grip																				
Festo																				
Model PS2E-Plus Barrel grip																				
Freud																				
Model FJ85 Top handle																				
Hitachi																				
Model CJ65V2K Top handle																				
Model CJ65VA2K Barrel grip																				
Makita																				
Model 4304 Top handle																				
Model 4305 Barrel grip																				
Metabo																				
Model StEP70 Barrel grip																				
Milwaukee																				
Model 6266-6 Top handle																				
Model 6276-6 Barrel grip																				
Porter-Cable																				
Model 7549 Top handle																				
Model 7649 Barrel grip																				

KEY TO THE RATINGS: 5 = excellent, 4 = very good, 3 = good, 2 = fair, 1 = poor.
'T' = T-shank, 'U' = universal shank, 'H' = hook shank.

Materiale protetto da copyright

Specifications

Overall Rating	Blade Type ¹	Amps	Speed Range (rpm)	Dust-Collection Port	Weight (lb.)
1 2 3 4 5					
★★★★	T	5	500-3,100	Optional	6.2
					5.8
★★★★	U	4.5	0-3,100	No	6.2
★★★★	T/U	5.8	500-3,100	No	6.4
					6.3
★★★★	U	4.3	1,050-2,600	Yes	5.8
★★★★	T	Not Available	1,200-3,100	Yes	5.9
★★★★	T/U	4.8	0-3,000	Yes	5.6
★★★★	T	5.2	700-3,200	No	5.9
					5.9
★★★★	T/U	5.2	500-3,000	No	5.9
					5.7
★★★★	T	6	1,000-3,000	Yes	6.4
★★★★	T	5.7	450-3,100	Yes	6
					5.6
★★★★	U/H	4.8	500-3,200	No	6.4
					6.1

Fein

Model ASte638
Barrel grip - street price \$500
(800) 441-9878 Circle #613



PROS: Flat base; very low vibration; soft-start motor; comfortable small-diameter barrel; best dust collection; allen wrench stores on saw.

CONS: Base doesn't tilt; no orbital action (but blade cants forward 4°, so it backs away from cut on down-stroke); slower top speed means less aggressive cuts in hardwood.

Festo

Model PS2E-Plus
Barrel grip - street price \$285
(800) 337-8600 Circle #614



PROS: Longest power cord (16 ft.); comfortable small-diameter barrel.

CONS: On/off switch sometimes gets shut off inadvertently in use.

Freud

Model FJ85
Top handle - street price \$100
(800) 334-4107 Circle #615



PROS: Allen wrench stores on saw.

CONS: 90° base detent imprecise; lock-on button potentially dangerous for lefties.

Hitachi

Model CJ65V2K
Top handle - street price \$180
Model CJ65VA2K
Barrel grip - street price \$180
(800) 829-4752 Circle #616



PROS: Top handle has low center of gravity; allen wrench stores on saw.

CONS: 90° base detent imprecise; lock-on button potentially dangerous for lefties (top handle only); no dust-collection port.

Makita

Model 4304
Top handle - street price \$160
Model 4305
Barrel grip - street price \$160
(800) 462-5482 Circle #617



PROS: Allen wrench stores on saw.

CONS: No dust-collection port.

Metabo

Model SIEP70
Barrel grip - street price \$219
(800) 638-2264 Circle #618



PROS: Toolless blade change; soft-start motor; very good dust collection; comfortable small-diameter barrel.

CONS: None.

power acceptable. The reason that Fein's top blade speed is lower than the others' in this test is that it's designed primarily for metalwork, according to the manufacturer. Nevertheless, Fein recommends the ASte638 for wood-working too.

Cutting power is increased by adjustable orbital action, a feature you'll find on all our test saws except the Fein ASte638. An orbital blade stroke causes the blade to back away from the wood on the down stroke, clearing sawdust from the teeth, reducing friction, and allowing for more aggressive cutting action.

For more precise cutting, you can switch from orbital to straight blade stroke and slow down the cutting speed. All our test saws have electronic variable speed control.

Blade changing. Four of the brands allow toolless blade changes: Bosch, DeWalt, Metabo, and Milwaukee. The quickest and easiest blade change of all is the Metabo, which uses a quick-release lever. (See top photo, page 65.) The Milwaukee blade-change mechanism is similar to the Metabo, but you have to be careful to push the blade firmly into its slot, or it'll twist out of alignment when you release the lever. The Bosch and DeWalt toolless blade changes require a few turns of a knob directly over the blade—a little less convenient than the Metabo and Milwaukee.

The other jigsaws require either an allen wrench or a slot-tip screwdriver to change the blade. Blade changes on these models are still fairly quick and easy, as long as you keep the tool handy, but we liked toolless blade changing better.

There are three different types of blade shanks: universal, T, and hook. Different saws accept different types. (See specifications in chart, pages 66-67.) We did not notice a difference in performance between the three types, but universals are the most widely available—you can buy them at hardware stores, home centers, woodworking stores, and catalogs. T-shank blades are available from woodworking stores and catalogs, and hook-shank blades are available primarily where Porter-Cable jigsaws are sold.

Cutline visibility. On all the saws, air from the motor's cooling fan is directed toward the blade, to blow chips away from the cutline for good visibility. The Metabo blower was the best performer, giving you a perfectly clear view of the

cutline. Some saws (Bosch, DeWalt, Fein, and Porter-Cable) let you reduce the air flow or redirect the blower away from the blade when you don't want as much airborne dust or when you're cutting metal with cutting oil.

Baseplate. We considered a few factors when rating baseplates (also called shoes). First, all the baseplates except Fein and Porter-Cable tilt 45° in both directions for bevel cuts. However, setting them back to exactly 90° can be painstaking on the DeWalt, Freud, and Hitachi. This is because the 90° detent is imprecise on the models we tested—you need to use a square to get them precise. The Craftsman model doesn't have a 90° detent, and it's the most difficult base to set square because tightening the setscrew cocks the base slightly away from your setting.

We asked Fein and Porter-Cable why the bases on their jigsaws don't tilt. The reason, according to the manufacturers, is that a significant number of woodworkers prefer a base set permanently to a perfect 90° to ensure accuracy.

The DeWalt baseplate is the only one that permits adjustments without a tool—we like the convenient built-in lever that loosens the base for tilting.

Most of the test models have bases with channels down the middle underneath, to add rigidity and allow splinters and dust to escape during the cut. We didn't notice any difference in performance between saws with channels and those with flat bases.

But channels can be a problem for a site carpenter or cabinet installer backbeveling a cut to scribe-fit a cabinet against a wall. When the entire jigsaw, rather than just the base, is tilted a few

In the Pipeline:

As this issue went to press, we got our hands on three brand-new jigsaws. We didn't rate these saws because they're prototypes. But we did try them out, and we noticed some upgrades that make them worth considering. Here's the scoop:

The **Bosch 1589EVS** has a new streamlined housing that looks better than it feels. The upgraded toolless blade changing mechanism is the best we've tried. Both top-handle and barrel-grip

degrees, the shoulders of the channels can hang up on the edge of the work. For this kind of back-beveling, a flat base without a channel works best. The Craftsman, Fein, Milwaukee, and Porter-Cable all have flat bases.

Ergonomics. This rating gives a good idea of how comfortable the tool will be during extended use. We looked for comfortable handles, convenient on/off switches, modest vibration, and a low center of gravity. The Hitachi and Porter-Cable top-handle models earned "excellent" ergonomics ratings.

Our testers thought slanted top handles felt more comfortable than horizontal ones. And smaller-diameter barrel grips felt better than fatter ones.

A warning for left-handers: Some of the top-handle models (Bosch, Freud, Hitachi, Milwaukee, and Porter-Cable) have a lock-on button or switch located on the left side of the handle. (See bottom photo, page 65.) With these saws a lefty can inadvertently activate the button or switch and lock the saw on—a potentially dangerous situation. Among top-handle saws, the Craftsman, DeWalt, and Makita saws had the best lock-on mechanisms for lefties.

Dust collection. Five of the eleven brands have dust-collection ports behind the blade; the Bosch's dust-collection attachment is optional. (See chart.)

On the Bosch, Festo, Freud, Metabo, and Milwaukee saws, dust collection works well only if you snap a clear plastic shield (supplied) in front of the blade. (See middle photo, page 65.) But on the Bosch and Freud saws, the shield gets dusty—even with the vac turned on—and obscures the cutline. Fein's dust collection works great without the shield.

Our conversations with jigsaw users revealed that not many considered dust collection one of the most important features on jigsaws, because these tools don't generate the volume of airborne dust you get with sanders and routers. But if dust collection is important in your shop, consider the Fein and Metabo saws—top performers in our dust-collection tests.

Recommendations

We gave our Editors' Choice award (best performance regardless of price) to two top-handle models and two barrel-grip models.

In the top-handle category, we found the best performers to be the Bosch 1587AVS and DeWalt DW321K. They both received very good to nearly excellent ratings in all categories. The Bosch offers optional dust collection, while the DeWalt doesn't. Unfortunately, we can't recommend Bosch's top-handle model for left-handers, because we found that it's easy for lefties to unintentionally press the lock-on button. The DeWalt top-handle saw is safe for lefties.

In the barrel-grip category, Editors' Choice honors go to the Metabo StEP70 and Bosch 1584AVS. Metabo gave an outstanding performance in every category. Metabo's dust collection is standard, while Bosch's is optional.

Our Best Buy award (best performance for the price) goes to the Freud FJ85. It holds its own in this elite class of professional-quality jigsaws, yet its street price is a rock-bottom \$100. And it does have dust collection. We don't recommend it for left-handers, though, because the lock-on button is easy for lefties to press unintentionally. ▲

Milwaukee

Model 6266-6
Top handle
street price \$155
Model 6276-6
Barrel grip
street price \$155
(800) 414-6572
Circle #619



PROS: Flat base; toolless blade change; cordless model available (not rated in this test).

CONS: Top handle not slanted so less comfortable; lock-on button potentially dangerous for lefties (top handle only).

Porter-Cable

Model 7549
Top handle
street price \$145
Model 7649
Barrel grip
street price \$145
(800) 487-8665
Circle #620



PROS: Flat base; comfortable top handle has low center of gravity.

CONS: Base doesn't tilt; lock-on button potentially dangerous for lefties (top handle only); no dust-collection port.

New Models from Bosch, Makita, and Porter-Cable

versions will be offered. Available: December. Street price: around \$170.

The **Makita 4304T** is a lot like the 4304 that we tested, but it has toolless blade changing and base-tilt adjustment. Available: August. Street price: around \$200.

The **Porter-Cable 9543** is the company's first adjustable-base jigsaw, and the toolless base adjustment is the best we've tried. It also features toolless blade changing. Available: September. Street price: around \$180.



BOSCH 1589EVS



MAKITA 4304T



PORTER-CABLE 9543

Veneered RAISED PANELS

*Combine the beauty of veneer
with the stability of MDF*

by Paul Saporito

Nicely figured raised-panel doors give any cabinet a sense of depth, an air of distinction, and a feel of superior craftsmanship. For years I made raised (also called fielded) panels for frame-and-panel doors the conventional way, from solid wood. That often means gluing up two or more boards and matching their grain patterns as best you can. It's often difficult to achieve a continuous grain pattern across a large panel, especially with figured wood.

Then I came up with an easier way to make large raised panels with continuous grain, using veneered MDF (medium-density fiberboard) and solid wood edging. This method offers two important added benefits. The first is the stability of MDF—even the largest veneered panels are largely immune to the movement and warping that can afflict solid wood panels. Secondly, my technique gives you vastly greater design opportunities, since veneer is available in a wider variety of grain patterns and species than solid wood. For example, you can achieve multiple book-matches by using consecutive veneers over several panels. As shown in the drawing opposite, solid wood edging lets you cut a bevel and raise the field without exposing any of the MDF.



Beauty and stability.
*On the outside the
veneered panel looks and
feels like solid wood.
Inside it's mostly MDF,
with a solid-wood edging.*

I'm not trying to fool anyone into thinking these panels are made of solid wood. The beveled edging won't match the field perfectly—especially on the rails, where the grain runs perpendicular to the panel. So you shouldn't use this technique in reproduction work where you're striving for authenticity. Otherwise it's a great way to make your panels quite stunning.

Raising veneered panels doesn't require any advanced woodworking techniques or fancy equipment. If you don't have a shaper you can do it on the tablesaw, using a fairly simple panel-raising jig. (See sidebar.)

The order of work is important to getting good results. For example, you should make and dry-assemble the door frame to fit the cabinet before you calculate the panel's dimensions. Also, veneer the panel, front and back, after you glue the solid wood edging to the MDF, but before you cut the bevels to raise the field—that way you can hide the joints between the MDF and the edging. (See drawing, below.)

Make the Door Frame First

The trick to building durable, warp-free doors is in the stock preparation. Use quartersawn wood wherever possible. Don't thickness-plane and rip the stock all at once, but sticker the wood for a few days to give it a chance to move (release the tension) between milling operations.

I always make full-size drawings of the doors so there's little chance for mistakes. I make each door frame using 2 1/4-in.-wide stock, which is wider than what you're accustomed to seeing. I think the extra width distinguishes my cabinets from the run-of-the-mill. If the door is



Solid wood edges. Glue and clamp mitered edging to the MDF, using biscuits for good alignment. The author glues up two opposite edging pieces first, lets them dry, then glues up the other two.

to fit flush in the cabinet opening, I cut the frame's pieces to the exact size of the opening, then trim it to fit later.

I proceed to build the frames. For cabinet doors that will be subject to a lot of use, use mortise-and-tenon joinery for strength. Or you can reinforce cope-and-stick joinery with loose tenons. Simple cope-and-stick joints will do for light-duty or fixed panels.

Calculate Panel Dimensions

Dry-assemble the frames to measure the opening for the panels. The panels' overall size should be 1/2 in. larger in both length and width than the inside

opening of the frame. This will allow 1/4 in. of the tongue to sit in the groove. Subtract 4 in. from this length and width, and you have the final size of the MDF panel (not including the edging).

I've used MDF in thicknesses of 1/2, 5/8, and 3/4 in. for door panels. Thicker panels will have a raised field that's proud of the frames, for a look of greater depth. Thinner panels, on the other hand, will be recessed, making it easier to sand the frame joints flush and smooth. Cut the MDF to its final length and width now.

Make and Glue Up the Edging

For a traditional or understated look, use solid wood edging that's the same species as the front veneer. If your design sense is contemporary or bold, you can use a contrasting species for the edging.

I prepare the edging stock as carefully as the door frame—it needs to be flat, straight, and the same thickness as the MDF. I rip it to 2 1/4 in. now (I'll trim it later to its final width of 2 in.).

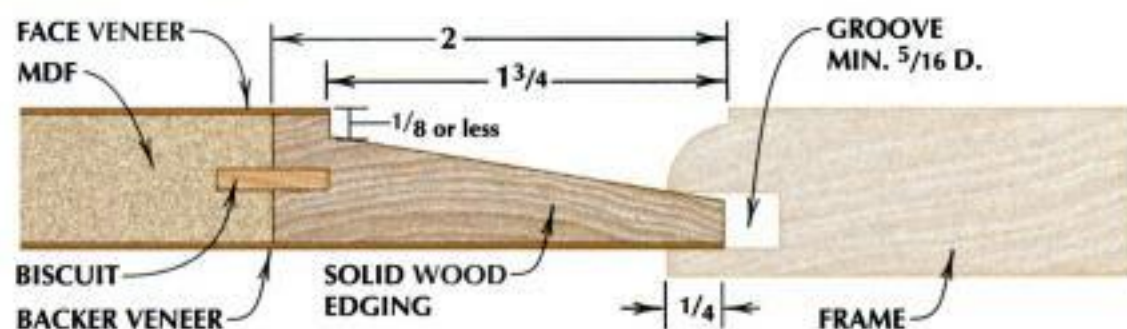
I glue the edging to the MDF panel with biscuits for alignment purposes. They're not really needed for strength, so space them fairly far apart—every 6 in. or so is fine.

I miter the ends of the edging pieces so the corners meet at 45°. Use a power miter saw for accuracy. Cutting these pieces to the right length takes care. To do it, miter one end of each edging piece.

VENEERED RAISED PANEL

Raised panels made from veneered MDF (medium-density fiberboard) and solid wood edging are more stable than solid wood—and when you use veneer, your design possibilities are vast. The MDF thickness can be 1/2, 5/8, or 3/4 in., but the dimensions shown here are always the same. Glue the edging to the MDF first, then veneer both faces. Finally, bevel the edging on the tablesaw to raise the panel.

SECTION VIEW





Saw the bevel. The author's jig helps hold the panel vertical while he pushes it through the angled blade. Featherboards contribute stability and safety.

RAISING PANELS ON THE TABLESAW

A simple jig makes it quick, accurate, and safe

A good panel-raising jig makes it easy to raise panels accurately and safely on the tablesaw. My jig is easy to build. You can use it to raise panels made of veneered MDF or solid wood.

It's important to use featherboards to keep the panel tight to the auxiliary fence as you move the panel through the blade. (See drawing, opposite page.) The featherboards shown here are available for \$10 each from Woodworker's Supply, (800) 853-9663. Or see page 78 for tips on making your own out of wood.

Plastic laminate glued (with contact cement) to both sides of the auxiliary fence helps the panel slide smoothly and prevents the fence from warping.

Even the best tablesaw blade leaves a beveled surface that needs some scraping and sanding. The key to accurate results is cutting the bevels very slightly oversize in thickness, so that sanding gets you down to the final dimensions.

You can raise panels of different thicknesses using the same jig, but you'll have to set the fence and blade angle anew, and raise the blade through the jig again, for each new panel thickness. —P.S.

Use a mitered scrap to line up the mitered end of one edging piece at one corner of the MDF. Mark the miter's location at the other end. Cut the second miter a hair long and sneak up on the final length with successive cuts.

Glue two opposite edging pieces to the MDF panel with biscuits. Dry-fit the remaining two edgings, and if they're a tad long, shoot the miters with a plane or trim them on a saw. (For more information on cutting and trimming miters, see AW #66, page 44.) Then glue on the last two edging pieces. Use pipe clamps as shown in the photo on page 71, and make sure the clamps don't pull the edging out of level with the panel. I use a long straightedge to check this. I place clamps about an inch from the miter joints, and every 6 or 8 in. apart.

Veneer the Panel

I select a very fine veneer for the outside face of the panel. If I'm making high-end cabinets for an insistent client, I'll use matching veneer on the inside. Most of the time, though, I use a less expensive "backer" veneer on the inside face. In any case, it's important for the front and back veneers to be the same thickness.



Press the veneer. A vacuum bag and pump system clamps the veneer to the panel. Saporito uses 1/8-in. hardboard cauls over and under the panel to keep the veneer flat on the MDF.

You might find veneer leaves large enough to cover the entire panel, or you can match two or more consecutive leaves to cover it. When you're matching, the rule is: For an even number of leaves, flip every other one so that each seam is bookmatched; for odd numbers, lay them out in the order they come off the flitch so that the seams are slipmatched.

I cut the front veneer about 1/2 in.

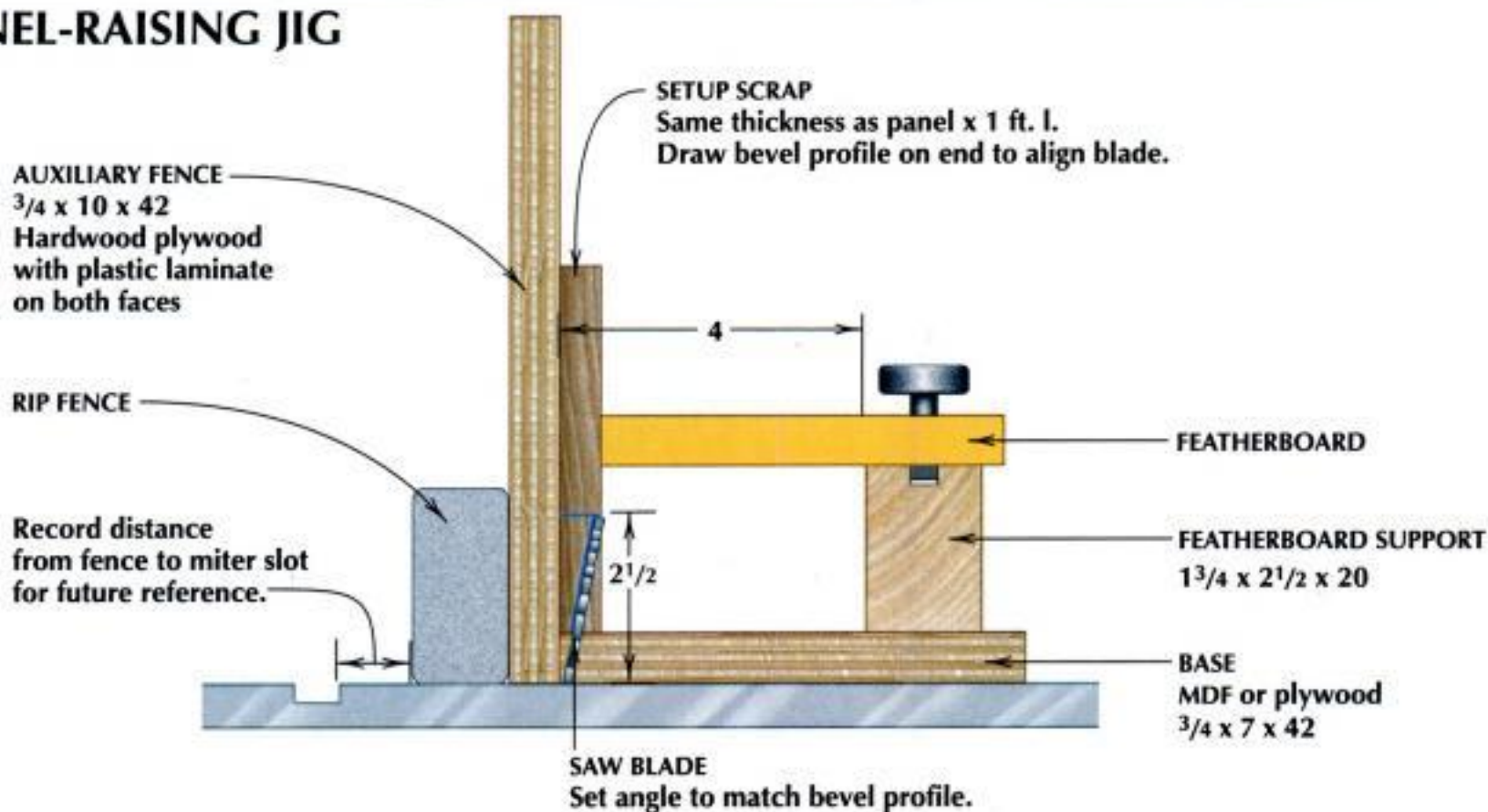
smaller in each dimension than the assembled panel. I cut the backer veneer about 1/2 in. bigger in each dimension than the whole panel—you'll trim the overhanging edges flush later.

Next, glue the veneer to the panel. It's important to do a dry run to be sure you have everything you need. I use Unibond 800, a two-part liquid urea resin glue (available from Vacuum Pressing

USING A RAISED-PANEL JIG ON THE TABLESAW

The author's jig consists of an auxiliary fence and base, joined at a 90° angle, plus a grooved support for two featherboards. (See photo, opposite page.) To set up the jig on the tablesaw, first lay out the bevel profile on the end of a setup scrap. Place the scrap on the jig and position the jig on the outfeed side of the blade. Sighting along the blade, adjust the blade angle to match the bevel angle. Adjust the fence until the left edge of the blade almost touches the bevel layout line. Lower the blade under the table and screw the jig to the fence, centering it over the blade. Then turn on the saw and slowly raise the blade through the jig, to a height of 2 1/2 in. Test the setup by cutting into the scrap, and fine-tune the settings if necessary. When you get them right, record them for future reference.

PANEL-RAISING JIG



Trim to final size.

The MDF edge of the assembled panel rides along a wood strip attached to an auxiliary fence. Trim the overhanging veneer and panel to final dimensions.

tablesaw using a panel-raising jig like the one shown above. The jig helps hold the panel in an upright position and keeps it stable during the bevel cut. (See top photo, opposite page.)

After you've cut the bevel, the final step is to clean up the beveled surface with a scraper and sandpaper. Use a sanding block, taking care not to gouge or round over the sharp edges of the raised field. I can usually go straight from the scraper to 150-grit sandpaper. As you sand, check the fit of the bevel in its respective stile or rail. You're done when you get the fit shown in the drawing on page 71. The panel should fit into the grooved frame without any wobble or slop, so there's no need to glue it in place. For extra strength, after gluing up the frame drive a brad or small dowel pin through the top and bottom rails in the back. ▲

Systems, 207-725-0935). It gives me a long, 15-minute open time; and it's rigid, so the seams won't creep open as they sometimes do with the more flexible yellow and white PVA glues. I don't recommend contact cement for veneering.

I use a vacuum press, which is fast and reliable. (See photo, opposite page.) You can also use a conventional veneer press, or make your own press with bar clamps, hardwood cauls, and melamine-coated particleboard platens. (See AW #40, page 37.)

Once the glue cures, it's time to trim the panel to its final dimensions. Because

the backer veneer overhangs the panel, it's difficult to trim without using a jig like the one in the photo above. It's just a plywood auxiliary fence with a strip of wood attached about 1/2 in. from the bottom, so that the panel's edge rides against the strip and the overhanging veneer slips under the strip. Using this jig, rip 1/4 in. off each edge to trim the backer veneer flush with the panel's edges.

Raise the Panel

The easiest way to raise a panel is to use a shaper with panel-raising cutters. If you don't have a shaper, raise the panel on the



PAUL SAPORITO

is a professional furniture maker who operates a cabinet shop in northern New Jersey.

Turn a Bowl! T O D A Y !

From block to bowl in one afternoon

by Steve Blenk

The myth that salad tastes better when served in a bowl you've turned yourself is entirely true. No matter how much intricate work I do on the lathe, I never get tired of turning bowls. Transforming a block of wood into a beautiful bowl is just as magical as ever. In this article, I'll show you how to work this magic on your own lathe. It's a wonderfully rewarding way to spend a couple of hours.

You don't need fancy equipment to produce great bowls. But it's important to look after your safety. As you can see in the photos, I use a dust helmet that incorporates a full face shield. A dust mask and safety glasses will also work. Make sure you're protected before you start turning.



If you plan to turn bowls on a regular basis, consider buying a self-centering chuck. These chucks can expand or contract concentrically, making it easy to mount and remount the workpiece. (For a review of lathe chucks, see AW #43.) If you don't have access to one of these chucks, don't worry. It's not difficult

to do your mounting work with inexpensive screw chucks and/or faceplates.

Choose Your Wood

To complete a bowl in a single session, it's best to begin with seasoned wood. A bowl turned from green wood is likely to warp or crack without proper care. Highly figured wood can also be unstable, and it's usually very difficult to get a smooth surface.

Tip: If it's hard to plane, it will be difficult to turn. My favorite bowl woods are maple, walnut, and cherry. The bowl shown here came from a 4-in.-thick slab of western maple (*Acer macrophylla*). ▲

STEVE BLENK is a professional woodturner and a notorious salad eater in Washington state.



1 Prepare the blank

The bandsaw enables you to cut away plenty of waste wood quickly and easily.

Draw a usable circle on your blank, marking the center clearly. Then bandsaw the blank as round as possible. The better job you do here, the less vibration you will have once the blank is mounted on the lathe.



2 Mount the blank

I use a Glaser screw chuck to mount the blank on the lathe. This chuck simply screws into a hole drilled in the center of the blank face that will contain the bowl's top edge. If you don't have a screw chuck, use a faceplate.



3 Shape the outside Mount the screw chuck or faceplate (with blank attached) onto the lathe shaft. Bring the tailstock up with a live center to help hold the piece, and make sure your tool rest is positioned so that the workpiece can spin without hitting it.

Set your lathe at low speed! For the bowl shown here, I started out at around 600 rpm. Now stand clear and flip the "on" switch. If you get enough vibration to shake the lathe, it probably means the blank isn't centered well, so you'll have to reposition it.

The first shaping you do will rough the bowl blank into balance and reduce the outside diameter to the size you want for your bowl. I use a $\frac{5}{8}$ -in. deep-flute bowl gouge for this work. Keep the tool's bevel in contact with the work. (See inset photo, above.)

Once the bowl blank is balanced and the major stock removal is done, I back the tailstock away and work with only the screw chuck holding the blank. To make the form, first make several different intersecting tangent cuts. Then gradually bring them together into the desired curve. I try for

a single clean line with no shifts or bevel points.

You can work with a template, or simply use your eye as I do. Positioning some colored matte board or any contrasting background behind the blank will give you a better view of the profile as you develop it. The bowl shown here has a shallow curve. The base diameter is about $\frac{1}{3}$ the total diameter—a proportion that looks nice.

As you approach your final exterior shape, make your cuts progressively lighter to produce a cleaner final surface. A good turner can run a cut from the

base to the lip in a single light pass of uniform depth. Starting and stopping cuts will produce tooling lines that you will have to remove later, either by further cutting or tedious sanding.

I finished up this part of the project by cutting a shallow recess (about $\frac{1}{4}$ in. deep) in the bowl's base. The recess serves two important purposes. First, it gives the finished bowl a better chance of sitting flat on the table over time. Second, the recess provides purchase for the jaws of my Oneway chuck when I remount the blank, which comes next.

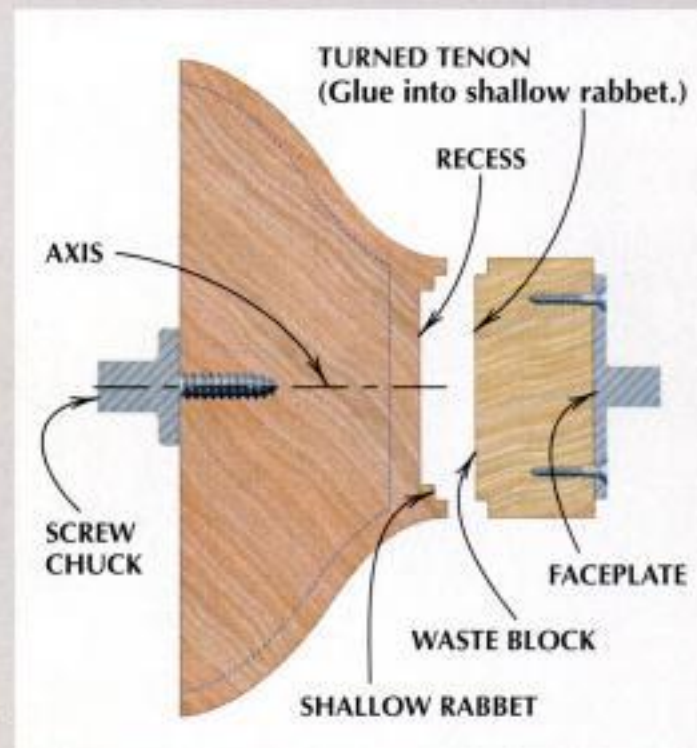
Mounting and Remounting Options

Before you begin a bowl-turning adventure, it's important to know how you'll be mounting and remounting the workpiece. Here's what to consider:

Mounting. To work on the outside of the bowl, fasten a screw chuck or faceplate to the face of the workpiece that will contain the bowl's top edge. Make sure the faceplate or screw chuck is centered on the workpiece axis.

If you have a self-centering chuck to use when remounting the bowl, turn a shallow (about 1/4-in.) recess on the bottom. This allows the expanding chuck to grab and hold the workpiece when you remount. If you don't have a self-centering chuck, make room at the base of the bowl for both a recess and a rabbet, as shown in the drawing.

Remounting. To get at the bowl's interior, you must remount the blank with the bowl's top edge facing the tailstock. To remount without a self-centering chuck, screw a waste block to a faceplate and turn a tenon that will fit snugly in the rabbeted bottom. Glue the tenon to the bottom so you can finish turning the bowl when the glue has set. **Important:** Be sure to go back to your slowest speed when you first start a remounted blank. When you're done turning the bowl and have applied the finish, part off the waste block. This should leave the recess in the bottom.



4 Remount and remove the inside

To get at the inside of your bowl, you'll need to flip and remount it. If you don't have a self-centering chuck to expand against the recess in the base, don't worry. A couple of low-tech, low-cost remounting options are explained above.

Rotate the blank by hand first to check for serious off-axis problems. If they appear, rework your mounting job before running the lathe.

Tip: Exercise caution here. You changed all the rules on this piece when you changed the mounting.

When you are satisfied that the piece is safely running true, begin hollowing out your bowl with your bowl gouge. Cutting action should always be toward the center. Your first cut can start about an inch from the center and produce a shallow depression. Now gradually move outward to begin your cut.

Tip: Keep your cuts reasonably light, and keep the bevel of your bowl gouge rubbing the wood. (See inset photo, below.)

Another way to start hollowing the bowl is to make a depth bore

using a drill bit in a tailstock-mounted chuck. This will remove the slow-moving center of the blank and give you an approximation of your final depth. Mark your drill bit or use a stop to prevent drilling through the bottom.

Tip: If you plan to do a lot of bowl turning, consider buying a coring system that allows you to remove the center of your blank for turning into smaller bowls. (Two coring systems will be reviewed in AW #70.)

As you approach the wall of the bowl, try to approximate the same curve inside as you have on the outside. Thickness calipers can be a big help here. I switch to a gouge with a shorter handle at this point so I can keep the bevel in contact while clearing the lathe bed. You may wish to experiment with different bevel grinds here to see what is easiest for you to use. I like a modified side-ground bevel for interior work.

As with the bowl's outside shape, make your cuts lighter when you approach the final surface. As the bowl comes to full depth, you should be able to run your light cuts across the entire wall and bottom of the bowl. This should yield a good surface, with little torn grain.



5 Scrape if you like
The only time I use a scraper is to clean up the tooling marks in the bowl's bottom. To do this, take very light cuts, and be sure the scraper has a razor-sharp, burnished edge, or you will tear the grain. Keep the scraper at a slight down angle to prevent

"digging in" by accident. Determining your bowl's final wall thickness is a matter of personal preference. Many turners think thinner is better, but I disagree. If your bowl is to be used rather than displayed, leave $\frac{3}{16}$ in. or even $\frac{1}{4}$ in. of wall thickness for strength and durability.



6 Sand as little as possible
The best thing about using cutting technique to make a bowl is the sanding you eliminate. With the bowl spinning at about 1,200 rpm, I gave this piece a hit with 120 grit to smooth out a rough section of interior end grain. Then I spent a couple of minutes each with 220 and 400 grit.

Tip: Placing a vacuum pick-up near the workpiece, as shown in the photo above, really cuts down on the mess

that sanding can create. The bowl can be sanded while running on the lathe, or while stationary. I keep the bowl stationary if there's a stubborn spot of torn grain that needs extra sanding.

If you can reverse your lathe, do so with each successive grit of abrasive to remove the fibers that "lie down." Remember to lock the chuck or faceplate tightly on the spindle before reversing the lathe, or it may unscrew itself!



7 Finish up and chow down If you plan to eat out of your new bowl, it will need a food-safe finish. I've had good results with Behlen's Salad Bowl Finish (available from Woodcraft, 800-225-1153). Mineral oil is another traditional food-safe finish. Applying a beeswax coat with the oil will impart a gentle sheen as well as enhance the oil's protective qualities. Apply your finish with the bowl spinning at a slow speed (800 rpm), using a piece of foam rubber as a sponge. Be generous when working on the bowl's interior; centrifugal force will drive the finish deep into the wood.

Once you are finished in the shop, take your new creation to the kitchen. You're bound to get a round of applause from chefs and chow hounds alike.



FEATHERBOARDS

*Promote safety and precision
with hold-downs made from scrap*

BY FRED MATLACK



Safe, clean cutting. Featherboards protect your fingers and help produce clean, smooth cuts by maintaining consistent pressure against a fence or table.

Featherboards are simple jigs that enhance both safety and accuracy. Also called fingerboards, they'll hold narrow or thin stock securely against a tool fence or table without jeopardizing your own fingers. If made and used properly, they prevent kickback and help produce smooth, consistent saw and router cuts. In fact, any setup where stock is guided by a fence can be considered featherboard country.

You can make featherboards in a variety of shapes and sizes. I'll show you how to make and use three different types that I find particularly useful. But first, a few words about featherboards in general.

Making and Using Featherboards

In use, a featherboard presses a workpiece firmly against a fence or tool table as the workpiece passes the cutter. The featherboard's angled fingertips allow the workpiece to move only in the cutting-feed direction, preventing kickback toward the operator. Longer, thinner fingers are more flexible and allow easier stock feeding. Shorter, thicker fingers are stiffer and exert greater pressure on the workpiece,

A SAW-TABLE FEATHERBOARD

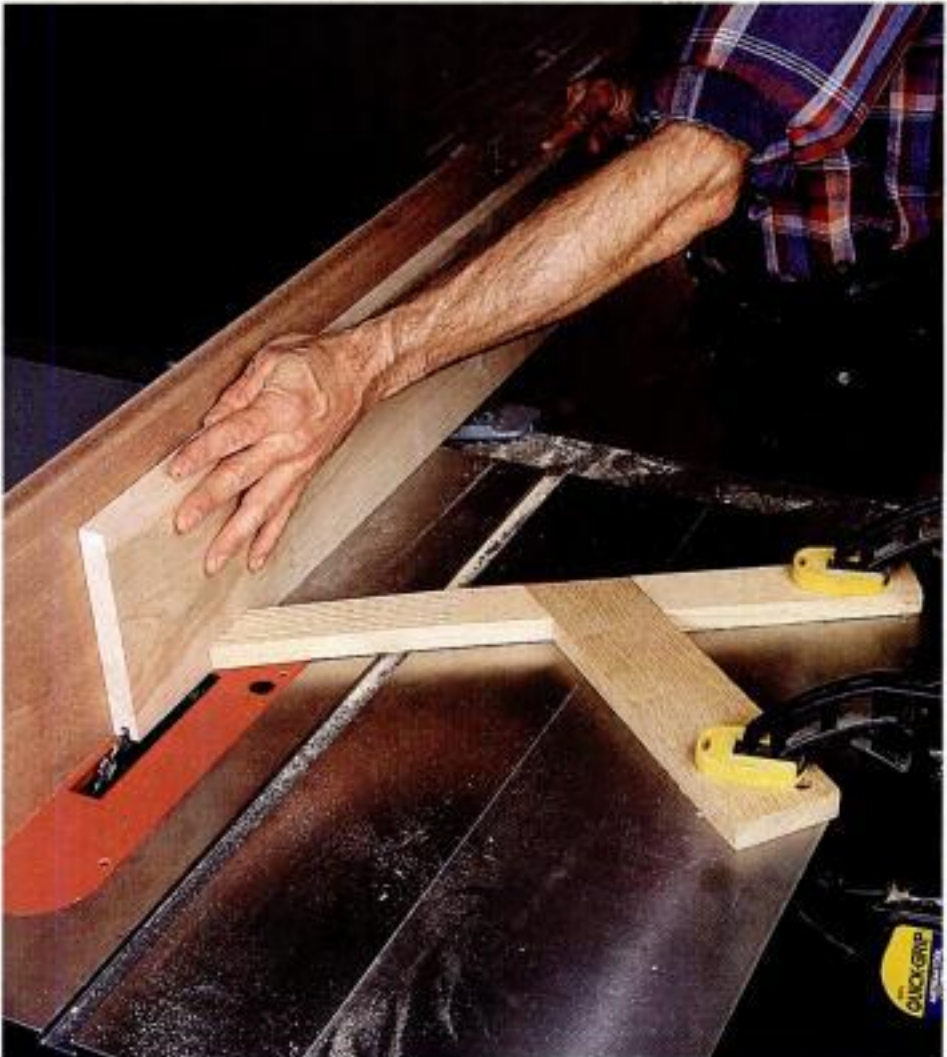
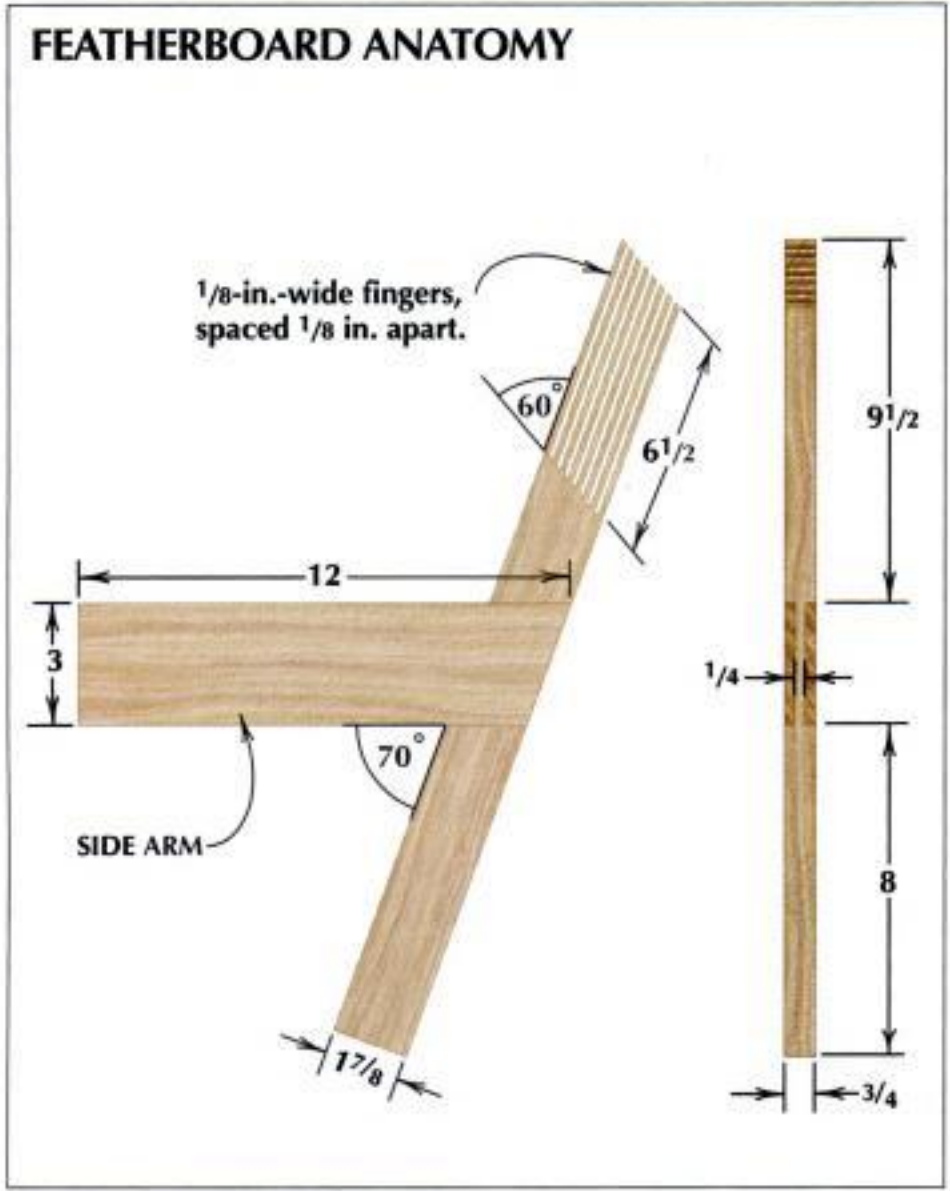
This featherboard clamps to a saw table to press stock against the rip fence. It helps accuracy when you're ripping oversize stock to final width or cutting grooves, rabbets, or other details in narrow stock or on the edges of wider boards. (See photo.) The featherboard's long arms extend to the edges of a typical saw table and provide solid, two-point clamping.

To make the featherboard, begin by cutting two pieces of wood to the dimensions shown in the drawing. Then join the side arm to the main body. I made a bridled joint, but a glued half-lap joint will work as well. When the glue is dry, miter

the 60° angle at the business end of the featherboard and mark a parallel 60° baseline about 6½ in. up from it.

To cut the fingers, begin by setting the saw fence to cut a ⅛-in.-wide finger on the left side of the fingerboard. Then rip to the baseline and turn the saw off to prevent kickback, as described in the main text. For each subsequent cut, reset the fence ¼ in. closer to the blade.

To set up the featherboard, place its fingertips against the workpiece on the infeed side of the blade as shown in the photo below. Avoid pressing the fingers against the workpiece directly opposite the blade.



Firm to the fence. The table featherboard holds workpieces firmly against the fence for operations such as grooving the edge of a board for splining.

which can help to straighten warped stock when you're cutting it.

I generally cut featherboard fingers ⅛ in. wide, spaced ⅛ in. apart, and at an angle between 70° and 45°. I find this ensures good pressure and prevents kickback. In general, the steeper the finger angle, the more firmly the featherboard holds the workpiece.

When making featherboards, I prefer tough, springy woods such as oak, ash, or hickory. I avoid soft or brittle woods like poplar and maple. No matter what type of wood you use, make sure to cut the fingers parallel to the wood grain for strength. I most often use ¾-in.-



Ripping fingers. Cut the fingers from left to right, with the featherboard's acute angle against the fence and the blade raised to full height. The featherboard in this photo is shown on page 81.

A ROUTER-TABLE FEATHERBOARD

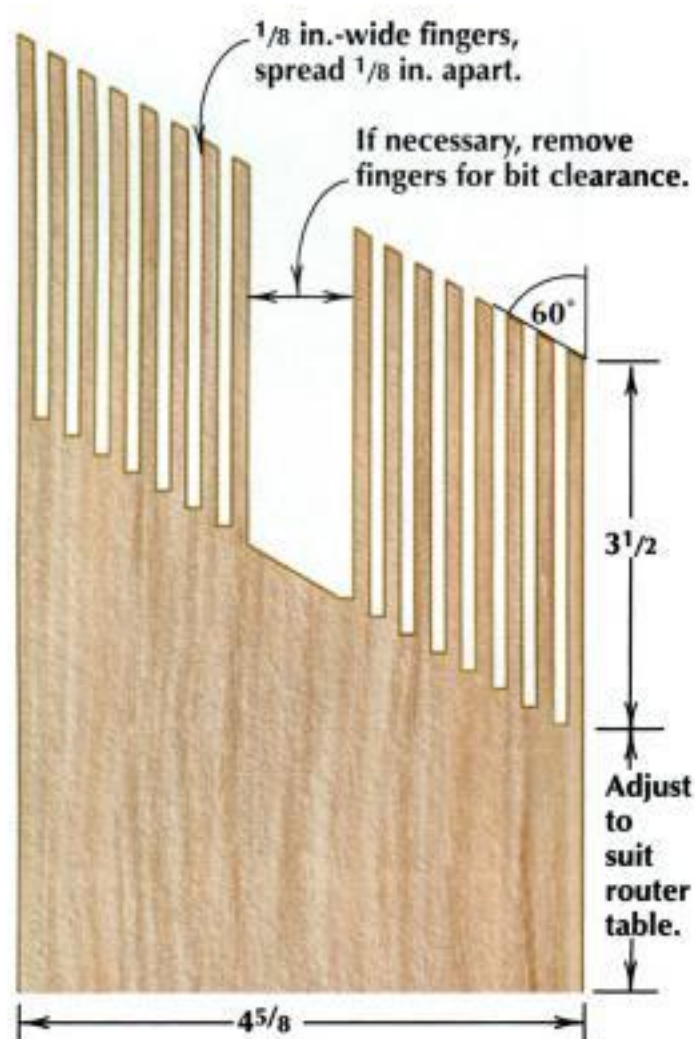
Here's a good featherboard for the router table. It's wide enough to give you solid, two-point clamping to a table overhang, and provides positive pressure against a router-table fence.

To make the featherboard, cut a straight-grain piece of hardwood to $4\frac{5}{8}$ in. wide by about 18 in. long. You'll cut the workpiece to final length after ripping the fingers. The extra workpiece length will keep your hands a safe distance from the blade. Cut a 60° angle at one end, then draw a parallel baseline 3 to 4 in. up from it. (See drawing.) Cut the fingers in the same manner described for making the saw-table featherboard. When you're done ripping the fingers, crosscut

the featherboard to a length that will reach from the edge of your router table to the bit, as shown in the photo.

To set up the featherboard, place its fingers firmly against the workpiece right at the cutter. When routing thin or narrow stock, there are two important considerations: First of all, check that the featherboard doesn't push the workpiece into the fence opening, causing it to catch on the leading edge of the outfeed fence. If this happens, just back the featherboard off a bit. Secondly, in some rare operations the fingers can spring in and contact the bit at the end of the cut. To prevent this, simply cut out a few of the center fingers to provide the necessary clearance.

FEATHERBOARD ANATOMY



Router-table helper. This short featherboard, wide enough for two-point clamping to a table overhang, presses stock against a router-table fence.

thick material for my featherboards, which provides good finger strength.

You can slice the fingers with a bandsaw, but I prefer to cut them on the tablesaw. Although cutting fingers on a bandsaw is a safer operation, fingers cut on the tablesaw tend to be straighter, and the wider kerf allows more finger flex in use. When cutting fingers on the tablesaw, I begin with featherboard stock that is at least 18 in. long, to keep my hands a safe distance from the saw

blade. I raise the blade to its full height to minimize the undercut on the exit side of the kerf. (*Caution:* This much exposed blade can be dangerous, so use a blade guard.)

I rip the fingers from left to right, with the featherboard's acute angle against the fence, as shown in the bottom photo on page 79. I make the first cut, then reset the fence $\frac{1}{4}$ in. closer to the blade for every subsequent cut. This creates $\frac{1}{8}$ -in.-wide fingers

with $\frac{1}{8}$ -in.-wide spaces between them. (*Caution:* Backing a workpiece away from a spinning blade invites kickback. It's much safer to turn the saw off when you reach the end of a stopped cut like this, keeping a firm grip on the workpiece. Then wait until the blade stops completely to back the workpiece away.)

You can mount a featherboard to a machine table or a fence, as shown in the boxes on these pages. Featherboards

A FENCE FEATHERBOARD

Here's a handy saw- or router-table featherboard that you can clamp to a fence to apply downward pressure on a workpiece. The wide areas (I call them "thumbs") flanking the fingers allow clamping to low fences. (Note: If your tablesaw rip fence doesn't lock at the rear of the saw, clamp it down to prevent fence lift when using this featherboard.)

This fence featherboard will hold down stock for general ripping operations or for dadoing or rabbeting wide boards as shown in the photo. It can also be used in tandem with one of the table featherboards.

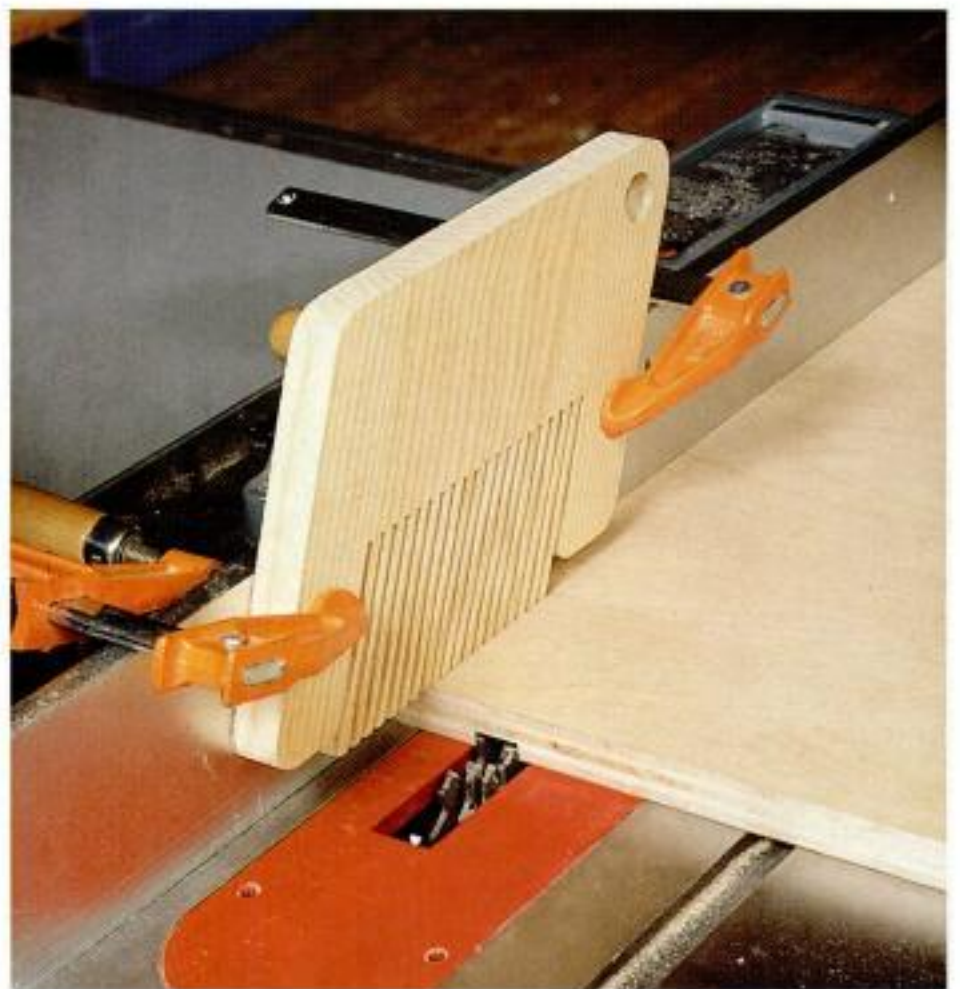
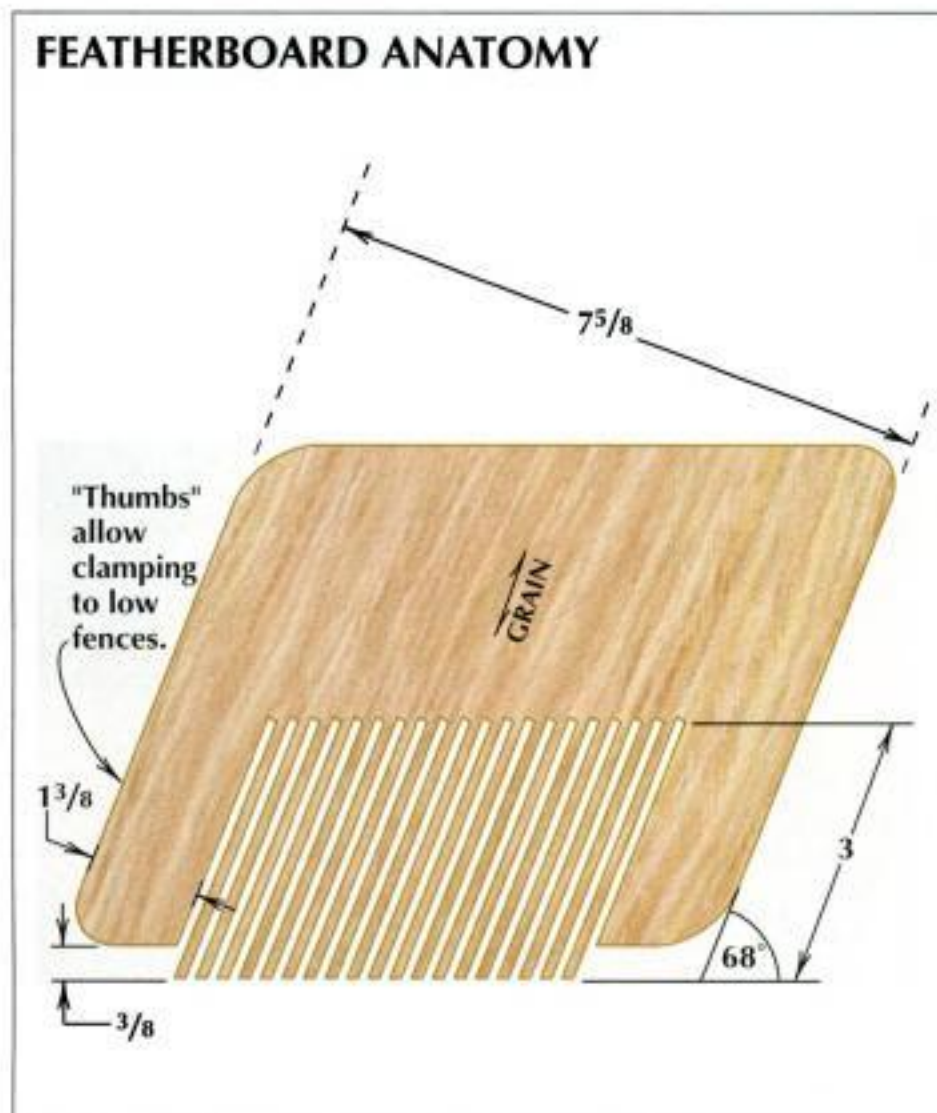
To make the featherboard, begin by cutting a piece of straight-grain stock to $7\frac{5}{8}$ in. wide by about 18 in. long. You'll cut it to final length after ripping the fingers. Crosscut one end to a 68° angle, mark a parallel 68° baseline about 3 in. up from there, and mark the width of the thumbs. To rip the fingers, place the featherboard's acute angle against the fence, as shown in the bottom photo on page 79.

Set your rip fence to cut the first finger $1\frac{3}{8}$ in. from the left side of the workpiece. Then cut the rest of the fingers, moving the fence $\frac{1}{4}$ in. closer to the blade for each subsequent cut. Stop ripping when you reach the thumb on the right-hand side. When ripping the fingers, stop at the cut's baseline and turn off the saw to prevent kickback, as mentioned in the main text. The extra length on the workpiece will stabilize it against the fence and allow you to keep your hands safely away from the blade.

Last, cut the featherboard to final length, and trim the "thumbs" about $\frac{3}{8}$ in. shorter than the fingers as shown in the drawing. This is easily done with a bandsaw or jigsaw.

To set up the featherboard, clamp it to the fence adjacent to the cutter whenever possible, as shown in the photo. However, if you're ripping thin stock, you can clamp the featherboard just in front of the saw blade to prevent cutting the featherboard itself.

FEATHERBOARD ANATOMY



Holding it down. The fence featherboard holds work firmly against the table. It is useful for sawing dados and rabbets of consistent depth or for general ripping.

can also be used in tandem, as shown in the lead photo.

To set up a featherboard, begin by adjusting the machine's fence to its desired position. Then, with the cutter lowered below the table, place a piece of the stock against the fence. Press the featherboard fingers against the stock just hard enough to begin to bend the fingers, and clamp the featherboard to the table or fence with two opposing clamps, as shown in the various photos.

Next, with the cutter still lowered, try feeding stock through the setup. Each finger should bend slightly as the stock contacts it and the workpiece should be difficult to pull backward.

I'll finish up with a few words about push sticks: A table-mounted featherboard allows normal use of most push sticks. But a fence-mounted featherboard often impedes a push stick, particularly when you're cutting thin, narrow stock. In those cases, you're better off to run

only workpieces that are long enough to reach clear through the featherboard and be pulled out the back. ▲



FRED MATLACK is a woodworker and AW's Design Shop chief.



Champion chessboard. A few square feet of veneer, a piece of MDF, and a few hours in the shop make for a great game.

CHECKMATE!

Build a chessboard in less time than it takes to play a game

by Frank Pollaro

For a gift project, it's hard to beat a veneered chessboard. Spend a few hours in the shop, and you can give someone the pleasure of whiling away hours jousting on a classy-looking board. And it's cheap to make one; all you need are a few square feet of veneer and a piece of medium-density fiberboard (MDF). You can make the board any size you

like, and put any style of border on it. I've chosen a 45° crossbanded border for this board, but you can make a simpler border if you like.

Choosing Materials

For chessboards, I suggest woods with strong contrast, such as the macassar ebony and curly maple on this one. I use 3/4-in.-thick MDF for my veneer

substrate, gluing a secondary veneer to its back for stability. MDF also makes a good straightedge for sawing the veneer pieces.

Making the Field

Begin by making the board's field—the area with the checkered pattern. The squares on this board measure 2 in. by 2 in. You'll need five strips of one color

and four of the other. Each strip should be at least 2 in. longer than the desired finished width of the field plus the width of one square. Cut the strips using a sharp veneer saw. (See top right photo and the sidebar on page 84.)

To mate well, veneer edges must be straight and square. But because my veneer saw's teeth are beveled on one side, only the stock under the straightedge will be cut square. To cut a strip that's square on both edges, first trim one edge of the veneer stock square using the straightedge. Mark the width of the strip, then turn the stock around so the finished piece is under your straightedge. Before you cut the strip free, prop the "free" end of the straightedge on another piece of veneer, as shown in the top photo. Repeat this for every strip, marking widths with a sharp pencil or knife.

Stack the cut strips in sequence to maintain grain continuity on the finished board. Then join alternating color strips with moistened veneer tape. Always apply the tape to the "show" side of the veneer. It will be sanded off later. Beginning at one end of two adjacent strips, pull them together. Tape across the seam every few inches, and press it down with a roller. Then tape the entire seam as shown in the middle photo, again pressing the tape with the roller.

Make checkered strips of alternating colors by crosscutting the striped field. (See bottom left photo.) Mark your first cut by laying one leg of a framing square on a taped seam and tracing along the opposite leg. This will ensure that all your subsequent strips are cut square.

Now create the checkered field pattern by taping the checkered strips together. Offset every other strip by one square, as shown in the bottom right photo. When all of the strips are taped together, carefully trim off the excess squares using your straightedge.

Making the Border

This border is pieced together from 45° diagonal slices cut from veneer stock that you've trimmed to a consistent width. Leave the stock as wide as possible to yield slices long enough to span half the width of the finished chessboard. If your stock isn't very wide, you can always tape the diagonal slices together to make longer pieces.

Now cut the stock diagonally into sections. To mark my first cut, I place the veneer stock on top of my MDF

Cut the solid-color strips.

Guide a sharp veneer saw against a 3/4-in.-thick MDF straightedge to cut the strips.



Join alternating strips. Lay the veneer strips show side up and join the edges using moistened veneer tape.



Crosscut alternating strips.
To make strips of alternating squares, crosscut the striped pattern.



Tape offset strips together.
Offset every other strip by one square to create the checkered pattern.



Cut the border pieces. Saw the 45° crossband border pieces from veneer stock trimmed to consistent width.



Add the banding. Attach banding to the joined border pieces with short lengths of tape.



Fit the border. Miter the four border pieces where they meet at the corners of the boards.

straightedge, aligning one edge of the veneer with the edge of the straightedge, as shown in the top left photo. I mark the first 45° angle using a combination square, then I saw the cut using my straightedge. Next, I carefully measure over for the next cut (2½ in. for this board) and repeat for subsequent cuts.

There's no need to saw the opposite edge of each piece square as you did before, because it will be trimmed on the table-saw later. Keep the pieces in sequence as they come off the stock to keep track of the square-sawn edges.

Next, lay out the border pieces with their square-sawn edges adjacent to the

perimeter of the field. Flip pieces end for end as necessary to create the mirrored diagonal pattern shown in the lead photo. If you need to lengthen the halves to create one half of a border, tape end to end as many pieces as needed. Allow excess length that can be trimmed to fit later.

SHARPENING A VENEER SAW

A veneer saw will cut veneer without splitting the grain as a knife will. But the saw teeth need to be sharp, beveled on the face of the blade, and honed flat on the back.



STEP 1: File the teeth. Hold a triangular mill file square to the face of the blade, but cocked clockwise a few degrees to maintain tooth rake. Push forward with the same number of firm, even strokes in each tooth gullet.



STEP 2: File the bevel. Extend the teeth over the edge of a bench. Sweep a mill file diagonally at a low angle across the saw's edge to create a bevel.

STEP 3: Hone the back of the blade. Remove filing burrs by honing the back of the blade on a sharpening stone. I use an 800-grit waterstone.

VENEER SAWING TIPS

- Hardwood plywood makes a good cutting surface. Saw blade veneer cross-grain to the plywood.
- A thick straightedge, such as ¾-in. MDF, helps keep the saw blade vertical. Press down hard on the straightedge when sawing. I clamp it down for long cuts.
- Saw on the pull stroke, pulling the saw the full length of the cut.
- Start with the far end of the curved blade contacting the work, then slowly rock the saw backward as the cut progresses, ending with the rear teeth contacting the work.
- Begin each cut with two light scoring strokes to prevent splitting of the veneer. Increase pressure on subsequent strokes. A total of four or five passes should cut through most veneers. —F.P.



Clamp the veneer to the substrate. Clamp the glued-up assembly between MDF platens and wooden cauls, using waxed paper as a glue resist.



Clamp the edging veneer. Glue on the edge veneer, using tape to position it, and clamp two opposing edges at a time.

Now fit and join the first set of halves to each other like this: Saw the innermost end of one half to a 90° angle using your straightedge, then overlay it onto its mating piece, sliding it left or right to create a good grain match at the joint. Trace the cutline onto the mating piece, saw it, and tape the two pieces together. Repeat to make the three remaining borders.

Attach the 1/16-in.-wide holly banding on the inner edge of the border. I order the precut banding veneer rather than cut the tiny stuff myself. (See Sources.) To attach it, pull it against the border, and apply short lengths of tape every few inches (see top middle photo, opposite page). Trim off the overhanging tape with a sharp knife. You should now have four borders ready for attachment.

Carefully center one of the borders against one edge of the field. Mark and saw a miter on each end of the border so it aligns with the field's corner, and tape the border to the field. Center the next border on an adjacent edge, tuck it under the first border piece, and mark the miter cut. (See top right photo, opposite page.) Mark the other end at the corner of the field as before. Saw the miters, attach the border, then fit and attach the remaining border pieces.

Assembling the Board

It's time to glue the chessboard veneer to one face of your MDF substrate. I apply a secondary, less expensive veneer

like mahogany or maple to the back of the substrate to prevent warpage.

Cut three 3/4-in.-thick MDF panels about an inch larger than your chessboard veneer. You'll use one panel as the veneer substrate and the other two as clamping platens. Gather up the necessary clamps, some waxed paper, and a few long, thick pieces of wood to use as cauls for applying even pressure across the platens. (See left photo, above.) Make your secondary veneer to the full size of the substrate, taping smaller pieces of veneer together if necessary.

Spread glue on one side of the substrate and lay it onto your secondary veneer. I use white glue for its long open time. Then glue the chessboard veneer on the opposite face of the substrate, with its grain oriented in the same direction as the secondary veneer. Press the veneers firmly into the glue using a roller. Then place the chessboard between the MDF platens with waxed paper between the board and the platens. Place your cauls and clamp everything tightly.

When the glue is dry, you're ready to saw or rout the board to its final size. I sand the tape off near the board's corners to expose the holly banding. Then I mark the finished width of the border, measuring outward from the banding. I'll retrim if necessary to make the border meet neatly at the mitered corners.

Saw the veneer edging strips 1/4 in. wider and 1 in. longer than the edge of the chessboard. Then glue and clamp

them to the board. (See right photo, above.) Glue the first two opposing edges and trim them flush to the board with a laminate trimmer or veneer saw. Then apply the last two edges and trim them flush.

Finish up by sanding the board and filling the inevitable gaps or voids in the veneer. I sand with 120- and 220-grit paper on a random-orbit sander to remove the tape and smooth the veneer. Keep the sander flat on the work; tipping it can create depressions or sand through the veneer.

I make my own filler by mixing fine sanding dust with lacquer. After filling and sanding, I finish up with several coats of lacquer. ▲

FRANK POLLARO is a professional woodworker in New Jersey. For a closer look at his shop and work, see "Gallery," (page 114) and "Shop Visit," (page 90).

SOURCES

Veneers, banding, and veneering supplies are available from:

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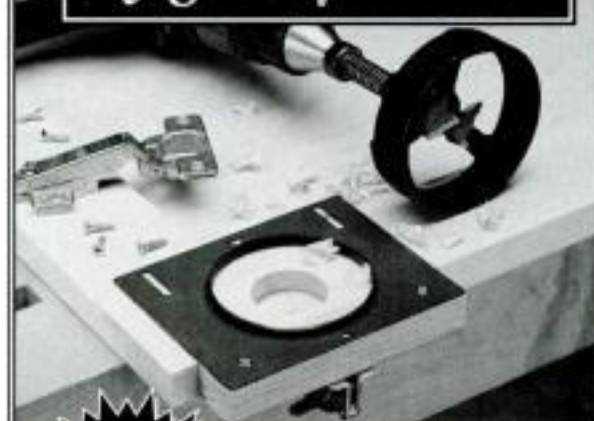
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When asked how he has come so far so fast, Pollaro credits three woodworking teachers: John Mangelli, Bill "Chief" Welch, and AW contributing editor Frank Klausz. "The encouragement I received from these guys was really valuable," Pollaro acknowledges.

"I fell in love with veneer because of all the possibilities it offers," Pollaro explains. "You can get wood species from all over the world, in a variety that would be nearly impossible to attain with solid wood. I also love the way veneer can be matched and patterned."

The appetite for awesome veneer prompted Pollaro to start Flamingo Specialty Veneer in 1996. Today, this sideline has grown into a retail business that supplies Pollaro's shop and woodworkers around the country. "It gives the average woodworker access to the same high-quality veneer we use," says Pollaro. "When a customer calls with a question about veneering, we've got a dozen guys here who can help out with answers."

The energy level in Pollaro's shop is always high. "We have a unique environment because the craftsmen who work here come from varied backgrounds," Pollaro offers. His employees have included self-taught woodworkers, students, graduates from woodworking programs, even skilled craftsmen from traditional European apprenticeships. With such a mix of talent, Pollaro stresses that the team's goal is single-minded: "to make the finest furniture possible." ▲

For a look at Pollaro's furniture, see page 114.

Room to grow. There are always many projects under way in Pollaro's gigantic, state-of-the-art shop.



SHOP SHOT

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Age: 31

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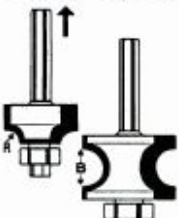
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Roundover Bits with Bearing

1/4" Shank Radius		
WL-1040 1/16"	\$9.	
WL-1041 1/8"	\$9.	
WL-1042 3/16"	\$9.	
WL-1043 1/4"	\$9.	
WL-1044 5/16"	\$10.	
WL-1045 3/8"	\$11.	
WL-1046 1/2"	\$13.	
1/2" Shank		
WL-1049 1/8"	\$9.	
WL-1042-5 3/16"	\$9.	
WL-1050 1/4"	\$9.	
WL-1044-5 5/16"	\$10.	
WL-1051 3/8"	\$12.	
WL-1052 1/2"	\$13.	
WL-1053 5/8"	\$16.	
WL-1054 3/4"	\$18.	
WL-1055 7/8"	\$25.	
WL-1056 1"	\$27.	
WL-1057 1-1/8"	\$30.	
WL-1058 1-1/4"	\$30.	



Bullnose Bits with Bearing

1/4" Shank • Bead		
Opening		
WL-1100 1/4"	\$12.	
WL-1101 3/8"	\$14.	
WL-1102 1/2"	\$16.	
WL-1103 5/8"	\$18.	
WL-1104 3/4"	\$19.	
1/2" Shank		
WL-1110 1/4"	\$12.	
WL-1111 3/8"	\$14.	
WL-1112 1/2"	\$16.	
WL-1113 5/8"	\$18.	
WL-1114 3/4"	\$19.	
WL-1115 1"	\$22.	
WL-1116 1-1/8"	\$25.	
WL-1117 1-1/4"	\$28.	
WL-1118 1-1/2"	\$32.	



Cove Bits

1/4" Shank • Radius		
WL-1159 1/8"	\$10.	
WL-1160 3/16"	\$10.	
WL-1161 1/4"	\$11.	
WL-1162 3/8"	\$13.	
WL-1163 1/2"	\$14.	



Cove Bits (continued)

1/2" Shank		
WL-1169 1/8"	\$10.	
WL-1170 1/4"	\$11.	
WL-1171 3/8"	\$13.	
WL-1172 1/2"	\$14.	
WL-1173 5/8"	\$18.	
WL-1174 3/4"	\$20.	

Chamfer Bits

1/4" Shank • Degree		
WL-1180 15°	\$10.	
WL-1181 25°	\$10.	
WL-1182 45°	\$12.	
WL-1183 45°	\$14.	
(for up to 3/4" material)		
1/2" Shank		
WL-1184 45°	\$10.	
WL-1185 11-1/2°	\$12.	
WL-1186 15°	\$12.	
WL-1187 22-1/2°	\$12.	
WL-1188 30°	\$14.	
WL-1189 45°	\$15.	
WL-1190 45°	\$22.	
(for up to 1-1/4" material)		

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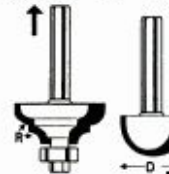
(for up to 1-1/4" material)

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(for up to 1-1/4" material)

Classical Ogee Bits

1/4" Shank • Radius		
WL-1250 5/32"	\$18.	
WL-1251 1/4"	\$20.	
1/2" Shank		
WL-1252 5/32"	\$18.	
WL-1253 1/4"	\$20.	



Core Box Bits

1/4" Shank • Diameter		
WL-1370 1/8"	\$10.	
WL-1371 1/4"	\$8.	
WL-1371-1 3/8"	\$9.	
WL-1372 1/2"	\$10.	
WL-1373 3/4"	\$12.	

Roundnose/Core Box

1/2" Shank • Diameter		
WL-1375 1/4"	\$8.	
WL-1375-1 3/8"	\$11.	
WL-1376 1/2"	\$12.	
WL-1377 3/4"	\$14.	
WL-1378 1"	\$16.	

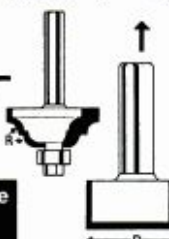


Bowl & Tray Cutter

1/4" Shank • Diameter		
WL-1380 7/16"	\$13.	
WL-1381 3/4"	\$15.	
1/2" Shank		
WL-1385 3/4"	\$15.	
WL-1386 1-1/4"	\$18.	

Dado & Planer Bit

1/4" Shank • Diameter		
WL-1390 3/4"	\$12.	
1/2" Shank		
WL-1391 3/4"	\$12.	
WL-1392 1"	\$14.	
WL-1393 1-1/4"	\$15.	
WL-1394 1-1/2"	\$16.	
WL-1395 2"	\$28.	



Pattern Cutting Bit

1/4" Shank • Diameter		
WL-1400 1/2"	\$12.	
WL-1401 5/8"	\$12.	
WL-1402 3/4"	\$12.	
1/2" Shank		
WL-1405 3/4"	\$15.	
WL-1406 1-1/8"	\$16.	



Straight Bits

1/4" Shank • Diameter		
WL-1001 1/8"	\$10.	
WL-1002 3/16"	\$5.	
WL-1002-5.5 5.5mm	\$5.	
(for undersized 1/4" plywood)		
WL-1003 1/4"	\$5.	
WL-1004 5/16"	\$5.	
WL-1005 3/8"	\$5.	
WL-1006 15/32"	\$5.	
(for undersized 1/2" plywood)		
WL-1007 1/2"	\$6.	
WL-1008 9/16"	\$6.	
WL-1009 5/8"	\$7.	
WL-1010 23/32"	\$8.	
(for undersized 3/4" plywood)		
WL-1011 3/4"	\$9.	
WL-1012 1"	\$10.	
1/2" Shank		
WL-1020 15/64"	\$5.	
(for undersized 1/4" plywood)		
WL-1021 1/4"	\$5.	
WL-1019 5/16"	\$5.	
WL-1022 3/8"	\$5.	
WL-1023 7/16"	\$5.	
WL-1024 15/32"	\$5.	
(for undersized 1/2" plywood)		
WL-1025 1/2"	\$6.	
WL-1027 5/8"	\$8.	
WL-1028 23/32"	\$8.	
(for undersized 3/4" plywood)		
WL-1029 3/4"	\$9.	

(for undersized 1/4" plywood)

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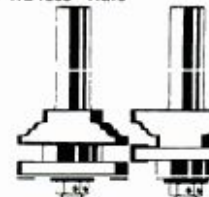
(for undersized 1/2" plywood)

(for undersized 1/4" plywood)



Horizontal Panel Raiser with Undercutter • 1/2" Shank

WL-1346 Ogee	\$49.
WL-1347 Traditional	\$49.
WL-1348 Convex (Cove)	\$49.
WL-1359 12" Facecut with Quarter Round	\$49.
WL-1363 Wave	\$49.



2-piece Rail & Stile Cutter Sets

1/2" Shank	Set	
WL-1360 Ogee Profile		\$59.
WL-1361 Roundover		\$59.
WL-1362 Cove & Bead		\$59.

1-piece Rail & Stile Cutter Sets

Just raise the cutter to make the matching cut. No changing or reversing.		
1/2" Shank		
WL-1365 Ogee Profile	\$49.	
WL-1366 Roundover	\$49.	
WL-1367 Cove & Bead	\$49.	
WL-1368 Wedge	\$49.	
WL-1374 Dbl Roundover	\$49.	

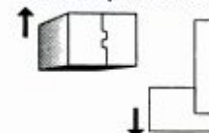


Finger Joiner

Router Bit WL-1429	\$39.
For the Shaper WL-1580	\$89.

Reversible Glue Joint

WL-1430 1-3/4" Diam	\$35.
For the Shaper WL-1706	\$35.



Drawer Corner Lock

Makes drawer side separation virtually impossible	
1/2" Shank	
WL-1435 For 1/2" material	\$30.

For the Shaper

Lock Mitre WL-1581	\$40.
--------------------	-------

SHAPER CUTTERS 3/4" BORE

1-piece Rail & Stile

Just raise the cutter to make the matching cut. No changing or reversing.

WL-1500 Roman Ogee	\$89.
WL-1501 Roundover	\$89.
WL-1502 Cove & Bead	\$89.
WL-1503 Dbl Roundover	\$89.

Panel Raisers (Shaper Cutter)

3/4" B



SPECIES AND COMMON NAMES: *Sassafras albidum*—Sassafras, cinnamon wood, red sassafras

GROWING REGION: From southern Ontario south to Florida and west to Texas. Largest specimens in Missouri and Arkansas

SPECIFIC GRAVITY: 0.45 to 0.53

DENSITY: 28 to 33 lb. per cu. ft.

WOOD MOVEMENT¹: Tangential (flatsawn): small (less than $\frac{1}{4}$ in. per ft.)
Radial (quartersawn): very small (less than $\frac{1}{8}$ in. per ft.)

DURABILITY: Heartwood resistant to decay. Sapwood susceptible to decay and insect attack

SUSTAINABILITY: Sustainable at current harvest levels

AVAILABILITY: Hardwood lumber dealers

SIZE: Thicknesses: $\frac{4}{4}$ through $\frac{16}{4}$. Widths: 4 to 10 in. Lengths: 6 to 12 ft.

COST: Lumber: \$2.50 to \$5 per bd. ft. Veneer not available

¹Indicates wood movement across the grain from 6% to 12% moisture content.

Sassafras

by Paul L. McClure



Long before the first Scandinavian strode onto North American shores, the American Indians were using the "sasauaka-pamuch" tree to make medicinal cures for conditions ranging from fever to rheumatism. They also used it as a blood purifier and as a poultice for wounds, sores, and skin diseases.

American colonists renamed this curative tree "sassafras." It became a major colonial export, second only to tobacco, and was promoted in Europe as a blood thinner and purifier. It was also deemed a cure-all for everything from intestinal gas to malaria. An excellent-tasting tea made from the root bark became all the rage until it developed an unjustified reputation as a cure for syphilis, casting suspicion on its users.

For years, sassafras oil was used as a dental antiseptic and as flavoring for toothpastes, root beer, and chewing gum. But the U.S. Food and Drug Administration determined in the early 1960s that the oil is a potential carcinogen, so it's no longer sold commercially.

Appearance

With its straight grain, large pores, and coarse texture, sassafras strongly resembles ash and chestnut, but it has more natural luster than either. The heartwood is pale brown, deepening to an orangish brown upon exposure to sunlight and air. The yellowish-white sapwood isn't sharply demarcated from the heartwood.

Workability

Sassafras is light in weight, brittle, and fairly soft. And it gives off a pleasant, distinct fragrance when worked. The wood cuts well with both hand and power tools, but cutting edges should be kept very sharp. It sands and glues easily and accepts all types of fasteners. Prebore for screws that are close to edges to avoid splitting. Sassafras steam-bends, turns, and carves well and is very stable. It readily accepts all types of stains and finishes. However, because of its large, open



This flatsawn board shows sassafras' resemblance to ash and chestnut.

pores, you should use pore filler before applying built-up finishes such as lacquer or polyurethane.

Uses

Sassafras is often used and sold in combination with ash because of its similar appearance. It is also used as a substitute for chestnut when restoring antique furniture made of that rare wood. Sassafras is used to make furniture, moldings, architectural trimwork, boxes, crates, and non-food containers. (It will impart taste to food). Because of its resistance to decay, it's also used for fenceposts and split rails. ▲

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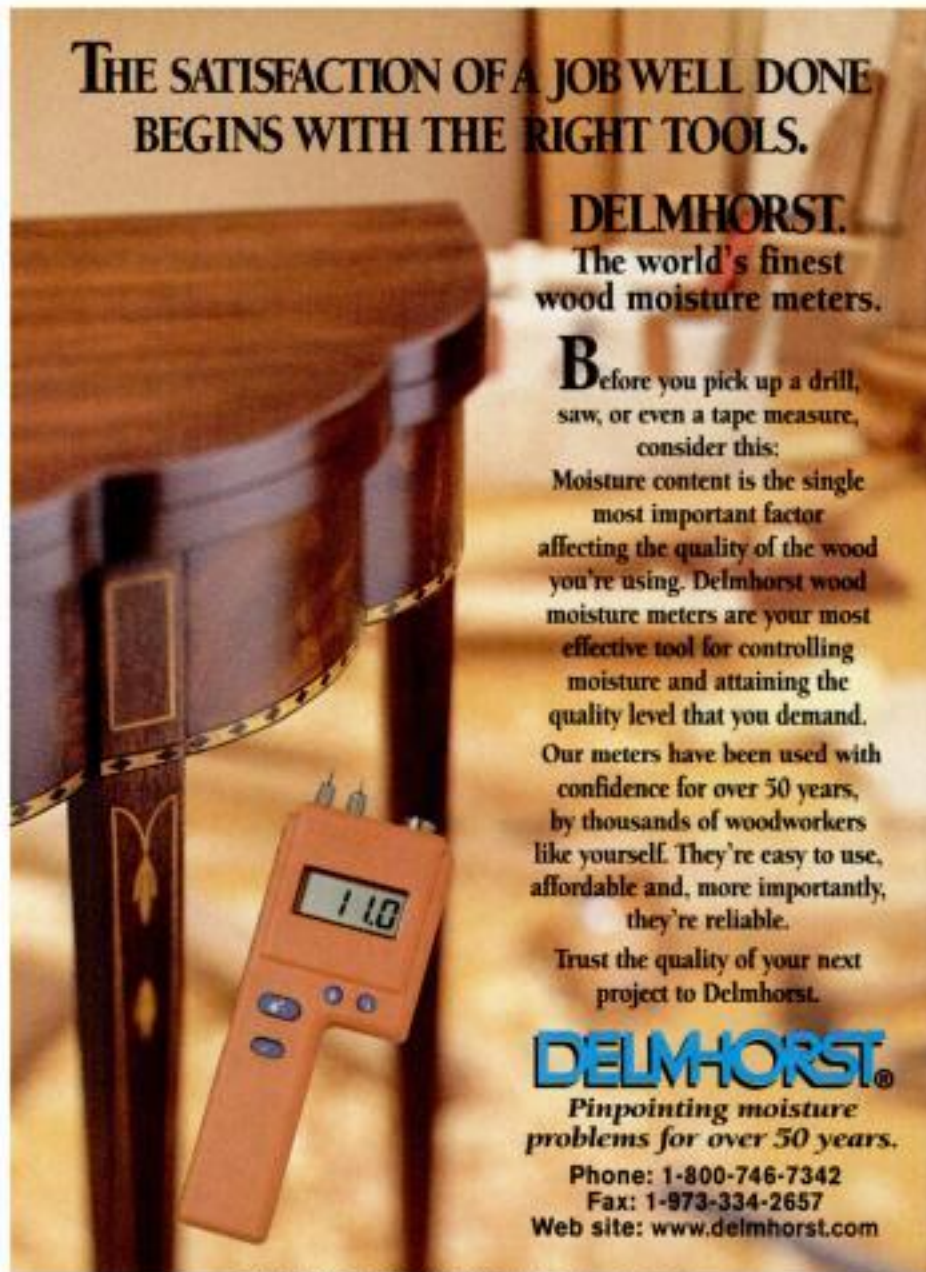
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Sealers

The ideal solution for many finishing problems

by Michael Dresdner



Hungry end grain.

Three coats of varnish on the end grain still has an unfinished look (left). Applied over glue size (right), varnish looks satiny.



Fisheye. If the wood surface is contaminated, you'll get "fisheye" spots showing through a waterborne finish. Seal with shellac first.



Bleeding dye. Water-based dyes can "bleed" into the finish—and onto your brush or rag. Seal in the stain with shellac.

The first coat of finish that you apply to wood forms a thin barrier known as the sealer coat. That barrier isolates all subsequent coats of finish from the wood. Those subsequent coats are called top coats. Any finish that forms a film over wood acts as a sealer, whether you apply it over raw, stained, or filled wood.

As a rule, your objective in finishing is to seal the wood against moisture and dirt with the first coat, and then build protection and beauty with subsequent coats. In some cases, such as when you use Danish oil, you may need two coats to completely seal the wood, and the third coat starts building the film.

In most cases, there's no need to use a special sealer other than the finish itself. There are certain situations, though, when applying a special sealer under your finish can help you avoid finishing disasters and achieve the best results. These

special sealers include sanding sealer, dewaxed shellac, glue size (watered-down glue), and vinyl sealer.

In this column, I'll identify five common finishing problems and the special sealer used to solve each of them.

Problem #1: End grain keeps absorbing finish. After two or three coats, the face and edges of a board look nice and satiny, but the ends still look "hungry" and dry.

Sealer solution: Glue size. You can buy it, or mix your own by thinning hide glue, yellow glue, or white glue 50/50 with water.

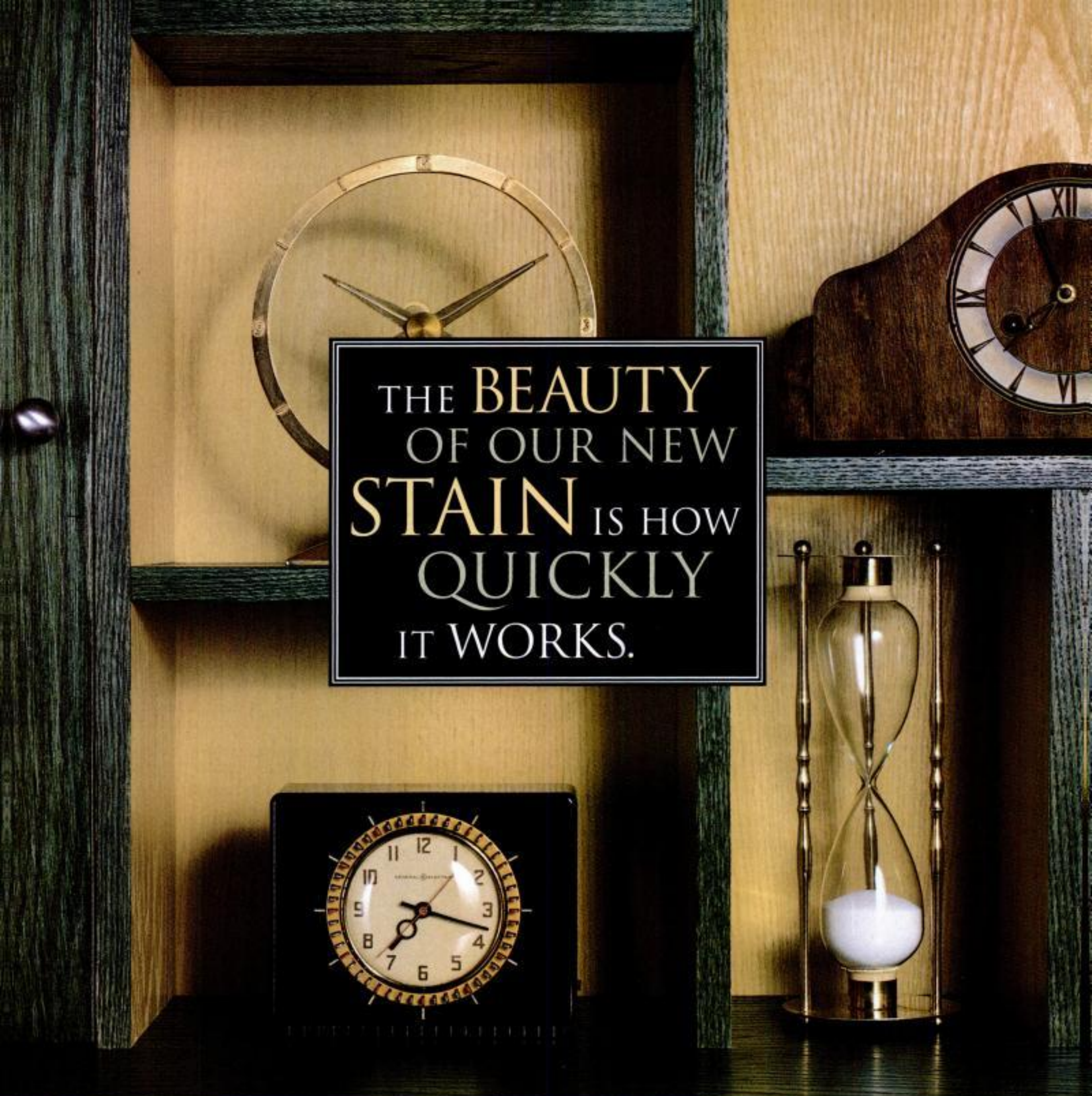
Brush a coat of glue size onto the exposed end grain, let it dry, and sand it smooth with 220-grit paper before applying your first coat of finish. Avoid getting the glue size on the faces and edges of the board.

Problem #2: Stain and clear top coats won't cooperate with each other. The stain bleeds into the finish, or the finish doesn't stick to the stain.

Sealer solution: Separate stain and clear top coats with an application of



Easier sanding. Lacquer sanding sealer is much easier to sand than pure lacquer. It generates soapy white dust.

A wooden cabinet with several shelves. On the top shelf, there is a round clock with a brass frame and a wooden clock with a white face and Roman numerals. In the center, a black sign with a white border contains the text. Below the sign, on a lower shelf, is a square clock with a white face and a brass frame. To the right of the square clock is a tall, ornate hourglass with a white candle inside. The cabinet's wood is stained in a dark, rich color.

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dewaxed shellac, available from Mohawk Finishing Supplies, (800) 545-0047.

Water-based dye stains often "bleed" into waterborne coatings, and some non-grain-raising dye stains bleed into lacquer top coats, distorting their color. Some waterborne coatings will not adhere well over oil-based stains. A thin coat of 2-lb.-cut, dewaxed shellac will seal in the stain and provide a base that both solvent-based and waterborne coatings will stick to.

Most liquid shellac sold in cans contains wax, and top-coat finishes do not stick well to wax. To be safe, buy dewaxed shellac flakes and mix your own by adding the flakes to denatured alcohol. (For more on mixing and using shellac, see "Just Finishing," AW #60.)

Problem #3: Disastrous finishing results with rosewood, gonalco alves, and other oily woods.

Sealer solution: Vinyl sealer, available from paint dealers. Rosewood is notorious for preventing varnish from curing, and its color often bleeds into lacquer,

discoloring adjacent light woods. Some oily woods let finishes cure, only to have the film peel off after it is dry.

Vinyl sealer adheres well to oily woods. If your top coat is lacquer, spray on a coat of vinyl sealer and follow with the first coat of lacquer no more than 45 minutes later—before the vinyl is completely dry. Lacquer adheres poorly to fully cured vinyl.

If varnish is the top coat, let the vinyl dry overnight, but scuff it with an abrasive pad before you apply the varnish.

Problem #4: Lacquer is hard to sand. It takes a lot of effort to level out the first couple of coats.

Sealer solution: Lacquer sanding sealer, available at paint dealers. Lacquer is meant to resist scratches, and that goes for sandpaper scratches too. To make easier work of smoothing the first couple of coats, try lacquer sanding sealer. It is simply lacquer with soft, easy-to-sand zinc stearate mixed in. But while the stearate makes sanding easier, too much of it will cloud the finish. Use only one or two

coats of sanding sealer, sand the wood smooth, then switch to gloss lacquer. (Varnish sanding sealer is available to use under oil-based varnish.)

Problem #5: Waterborne finishes raise the wood grain and sometimes allow "fisheyes" to show.

Sealer solution: Dewaxed shellac. Waterborne coatings tend to raise the grain. They can also form "fisheyes"—spots caused by oil, wax, grease, or other contamination on the wood. Seal the wood with a coat of dewaxed shellac to limit grain raising, lock in contaminants, and make the waterborne top coat behave as it should. ▲



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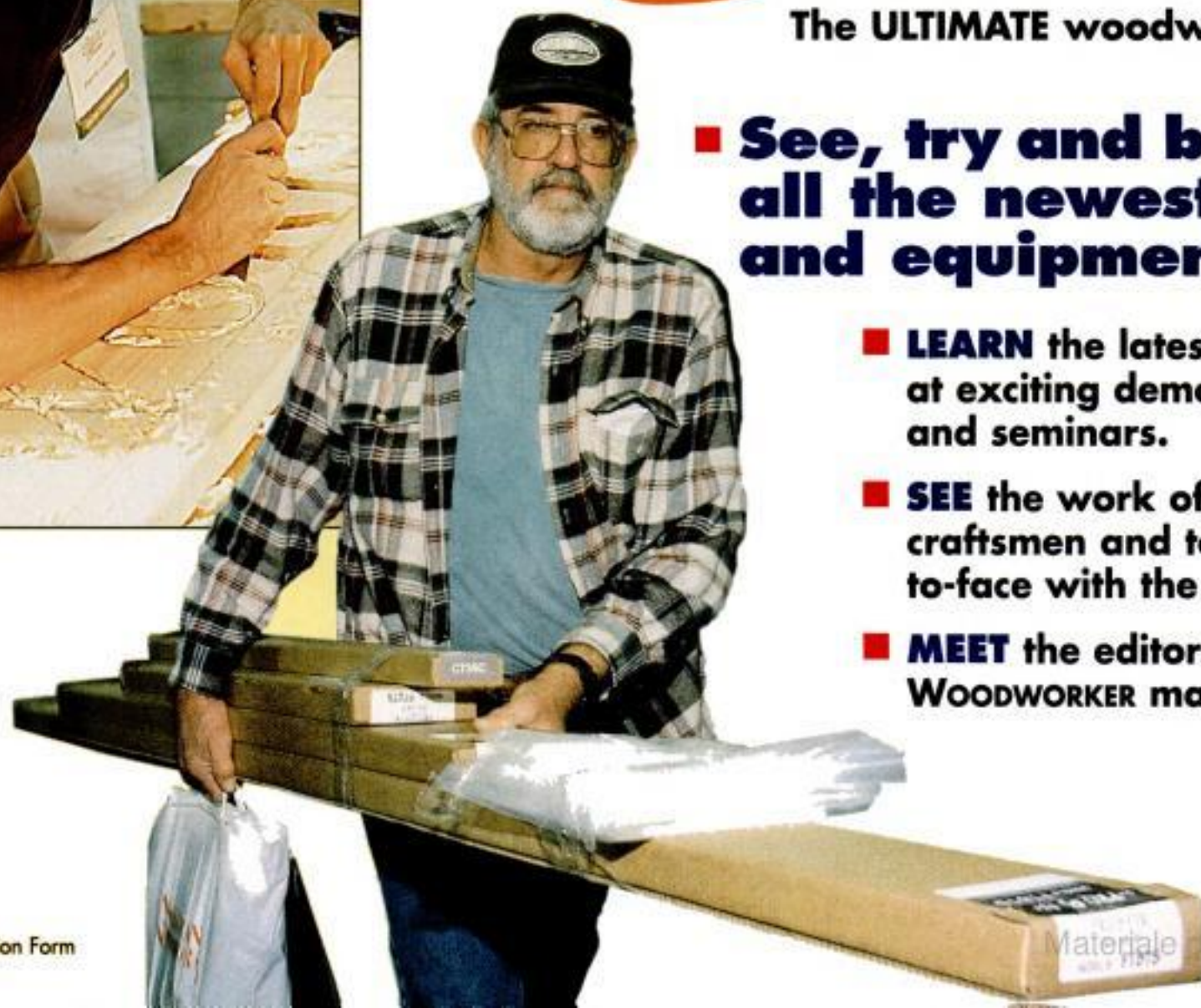
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Who should attend: Beginning to intermediate woodworkers.

About the presenter: Bill Hylton is a long-time woodworker and woodworking writer. He is the author of *Woodworking with the Router* and *Router Magic*, as well as the recently published *Rodale's Illustrated Cabinetmaking*.

ADVANCED ROUTER WORK

Friday 4:00-6:00 pm
Saturday 1:00-3:00 pm

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Make complex moldings • Choose and equip a router table • Joint and surface difficult woods with the router • Cut advanced router joints—cope-and-stick, lock-miters, and finger joints • Make professional-quality router jigs and fixtures • Perform template-guided router operations

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Who should attend: All woodworkers.

About the presenter: Trained in England as a furniture maker, designer and wood technologist, Ian Kirby has taught and written extensively on woodworking in the United States and England for over 30 years. He is a frequent contributor to *AMERICAN WOODWORKER* magazine.

DESIGN AND BUILD A WORKBENCH

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Understand what makes a good bench • Design the bench that's best for you • Choose the right materials and construction methods • Select and install vises and work-holding features

Who should attend: All woodworkers.

About the presenter: Frank Klausz is a professional cabinetmaker who learned his craft in his native Hungary. He lectures and gives seminars throughout the U.S. and Canada and is a contributing editor to *AMERICAN WOODWORKER* magazine.

FINISHING SECRETS

Friday 1:00-3:00 pm
Saturday 8:30-10:30 am

MICHAEL DRESDNER

In this seminar, you'll learn how to:

Select the best finish for the job • Understand wood stains and use them correctly • Apply finishes for the best results • Get a professional-looking finish on your project—from surface preparation to final polish

Who should attend: All woodworkers.

About the presenter: Michael Dresdner is a contributing editor to *AMERICAN WOODWORKER* magazine and the host of our finishing "chat room," Sunday nights on the America Online computer service. Michael writes our "Just Finishing" column and is the author of *The Woodfinishing Book* (Taunton Press, 1993).

WOODWORKING FUNDAMENTALS

Friday 8:30-10:30 am
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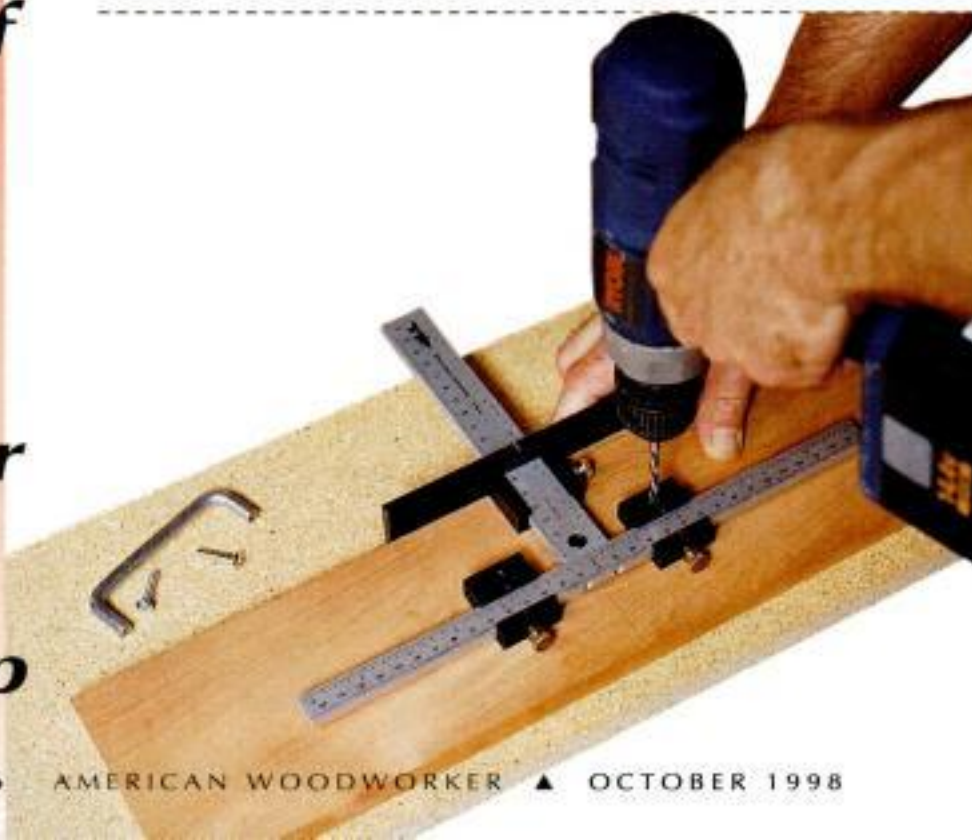
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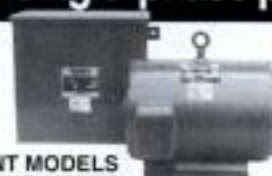
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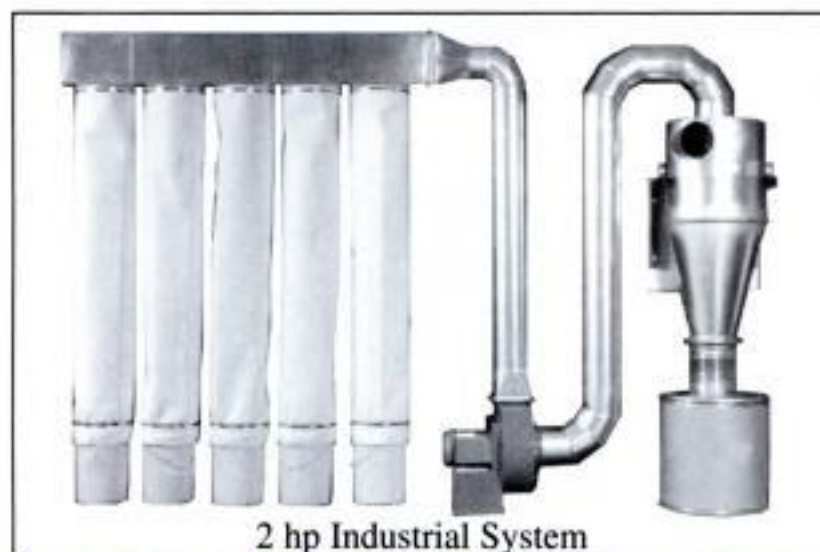
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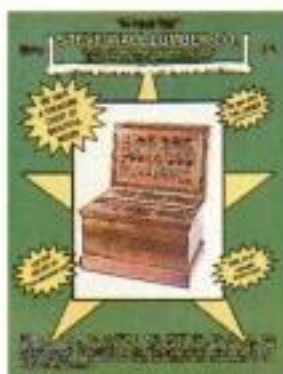
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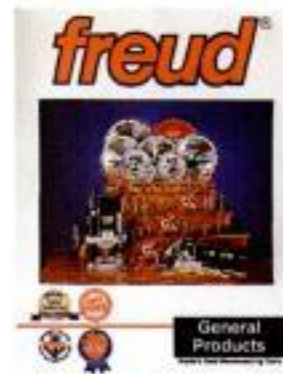
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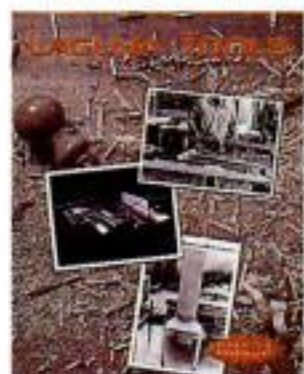
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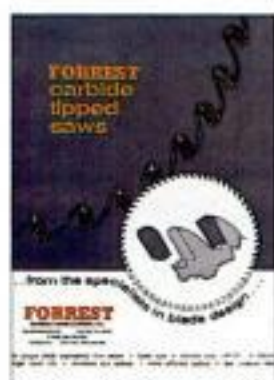
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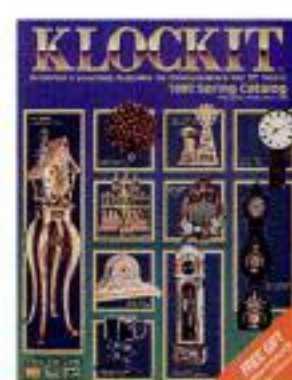
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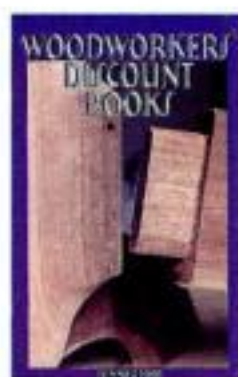
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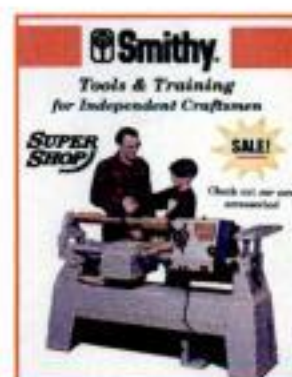
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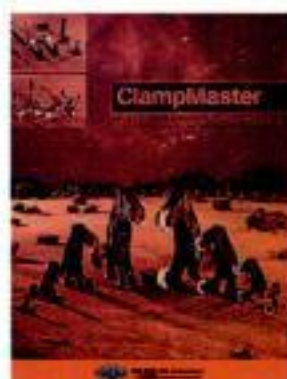
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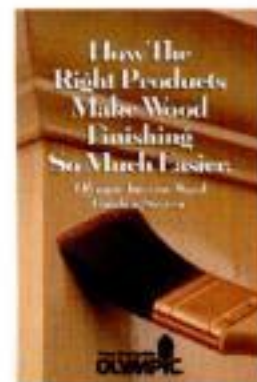
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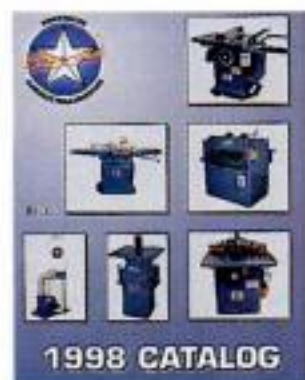
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A Love Affair with Veneer

Frank Pollaro discovered the veneered furniture of Jacques-Emile Ruhlmann as a high-school senior in Orange, NJ. Ruhlmann's well-proportioned curves and intricate inlay details are just as awe-inspiring today as they were when the French designer made his mark as an Art Deco master in the 1920s. "It was seven years before I had the nerve and the skill to build my first Ruhlmann piece," says Pollaro.

Today Pollaro's excitement for veneer is stronger than ever. His company, Pollaro Custom Furniture, has built a reputation for combining exotic veneers with precious metals and fabrics, including shagreen, the polished skin of a shark or a ray. His most recent adventure is the "Art Case" grand piano shown at right, which he veneered for the famous Steinway & Sons company. The one-of-a-kind model took more than 700 hours to complete and is covered in ebony and rare amboyna burl. Other work includes a reception desk for the headquarters of Jim Henson Productions (See photos, above and opposite.) To portray the familiar Sesame Street gang, Pollaro and partner Dan Gordon inlaid more than 100 species of veneer onto three panels, selecting natural wood tones to suggest color, shading, and depth. ▲

(For more on Pollaro, see page 90.)



◀ Art Deco "Art Case" Steinway piano

Macassar ebony and amboyna burl veneers, hard maple, Sitka spruce, ivory, and leather
L: 84 in. W: 59 in. H: 37 in.

PHOTO BY TONY WANG

◀ Detail from "Muppetry Marquetry Desk"

▼ "Muppetry Marquetry Desk"

Black walnut; black granite; MDF; ivory; mother-of-pearl; 23K gold leaf; and over 100 species of veneer, including Ceylon satinwood, Tamo ash, amboyna burl, kingwood, and cocobolo
L: 84 in. D: 45 in. H: 44 in.

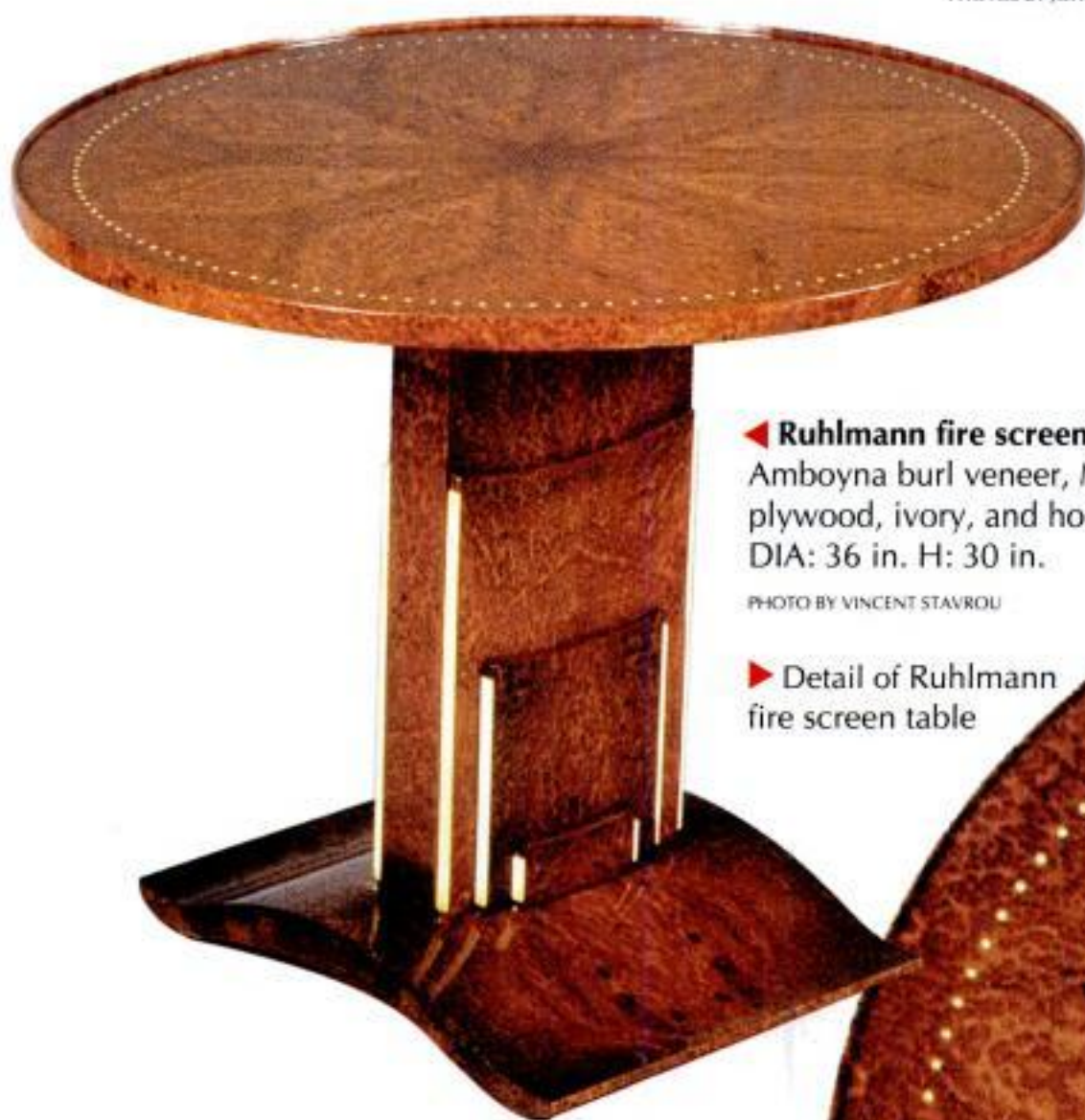
PHOTOS BY JOHN E. BARRETT, © JIM HENSON CO.



▲ Art Deco humidor

Amboyna burl veneer, Spanish cedar, mahogany, and veneer
W: 15 in. D: 10 in. H: 6 in.

PHOTOS BY JOHN HAMEL/RODALE IMAGES

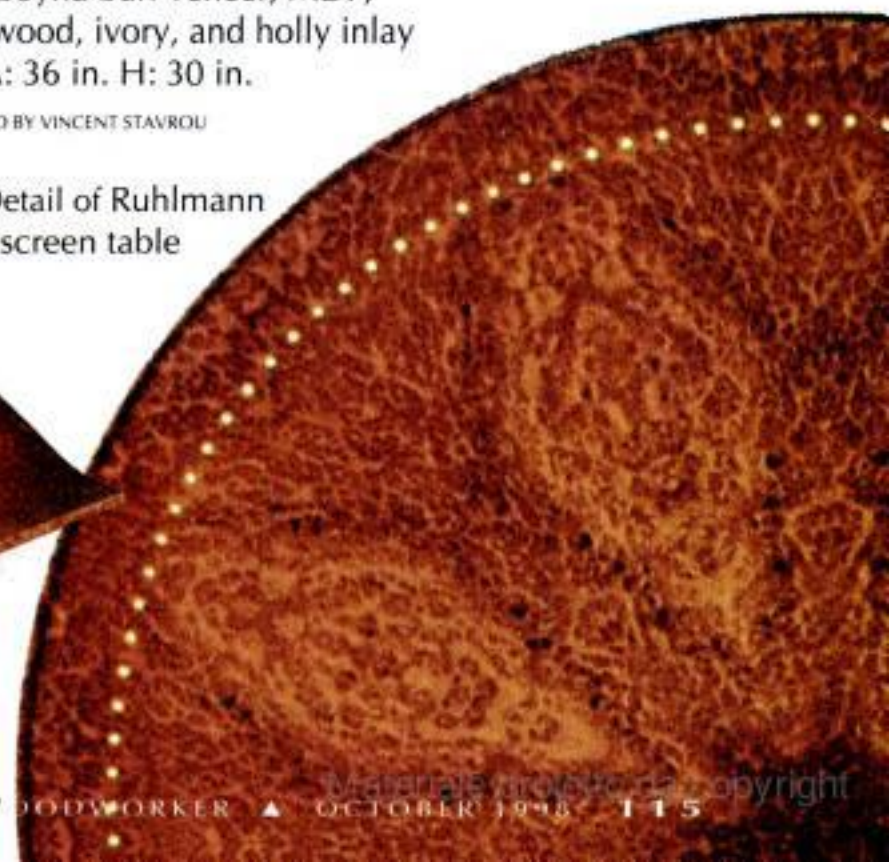


◀ Ruhlmann fire screen table

Amboyna burl veneer, MDF, plywood, ivory, and holly inlay
DIA: 36 in. H: 30 in.

PHOTO BY VINCENT STAVROU

▶ Detail of Ruhlmann fire screen table



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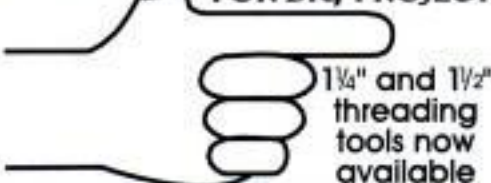
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Simple Steady Rest

An inexpensive cure for whiplash

by Mike Callihan

I've always found it challenging to turn long, thin chair rungs on the lathe because they tend to flex and chatter. I used to support them with my gloved left hand while holding the turning tool in my right, but the results were mediocre at best.

My solution was to build this simple steady rest. It supports long rungs beautifully, yet it takes only a couple of hours to make—and the parts cost less than \$20.

Unlike most other steady rests, this one supports the work at only two points instead of three, relying on the force of the cutting tool to keep the workpiece in contact with the support bearings. The two-point design is much quicker to set up, and the wing nuts make it easy to remove.

Make the steady rest so the center of the opening is in line with your lathe centers. The key attached to the base maintains the alignment.

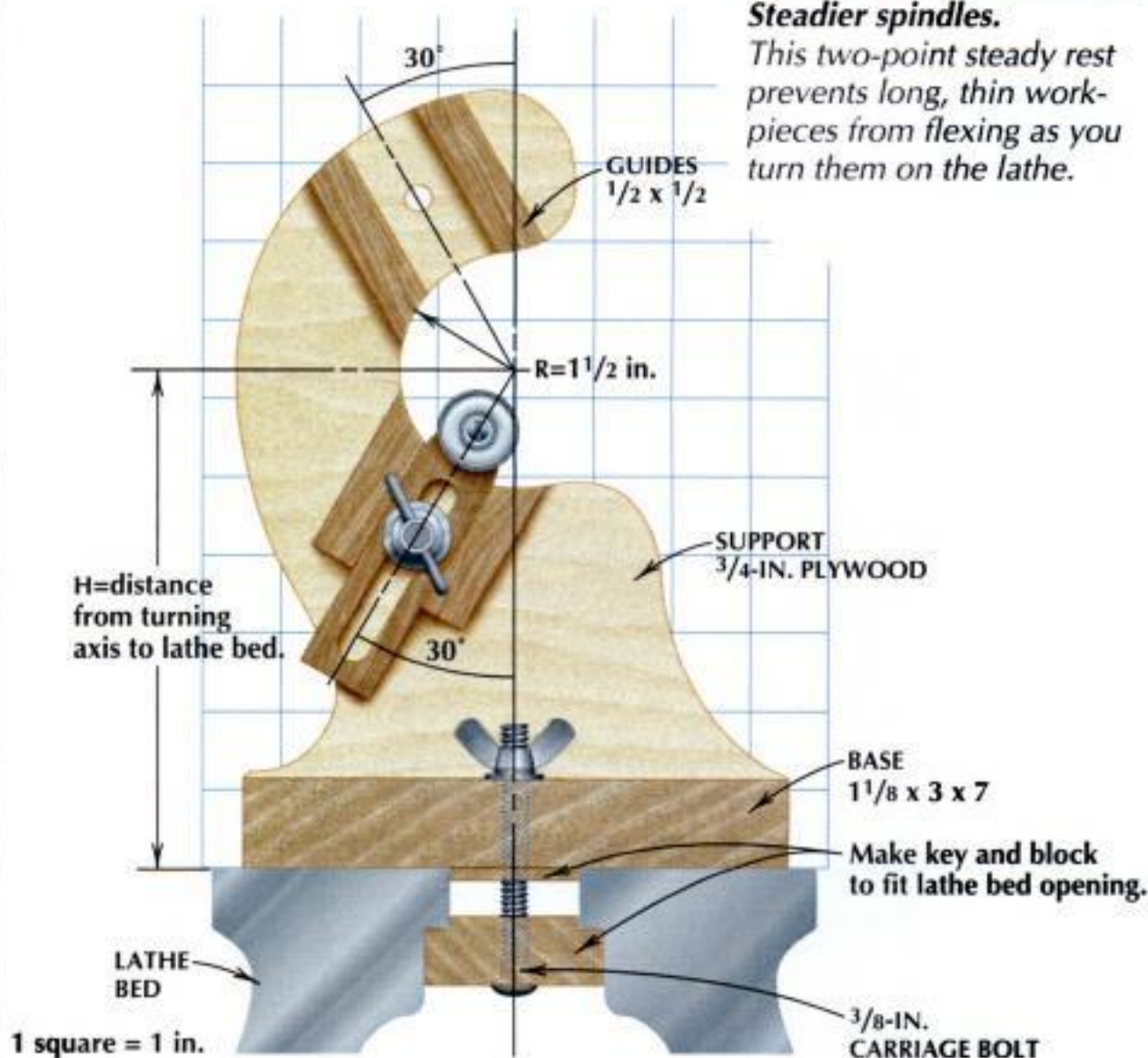
I used inexpensive, 1-in.-dia. sealed bearings (available at bearing-supply houses). You can use any size bearings, but keep in mind that smaller bearings will support thinner workpieces.

To use the steady rest, rough your workpiece to a cylinder, then turn the middle of the blank to finished size. (Tip: I use an open-end wrench as a convenient caliper.) With the rest in position and the lathe running, slide the bearings until they touch this center section with just enough force to make the bearings spin.

After turning one end of your workpiece, remove the steady rest, reposition the tool rest, and turn the other end. ▲

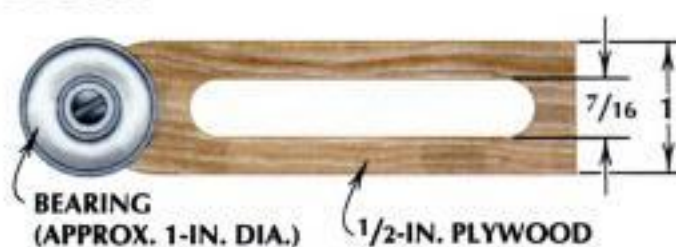
MIKE CALLIHAN is a mechanical engineer and woodworker who makes and restores hand tools in Wisconsin.

ELEVATION



BEARING BLOCK

TOP VIEW



SIDE VIEW



Steadier spindles.

This two-point steady rest prevents long, thin workpieces from flexing as you turn them on the lathe.

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Have a shop jig or fixture you'd like to share? Send a photo or sketch with an explanation to "Shop Solutions," AMERICAN WOODWORKER, 33 E. Minor Street, Emmaus, PA 18098. Next issue's contributor will receive Hitachi's DS14DV 14-volt cordless drill. (Street price: \$225)





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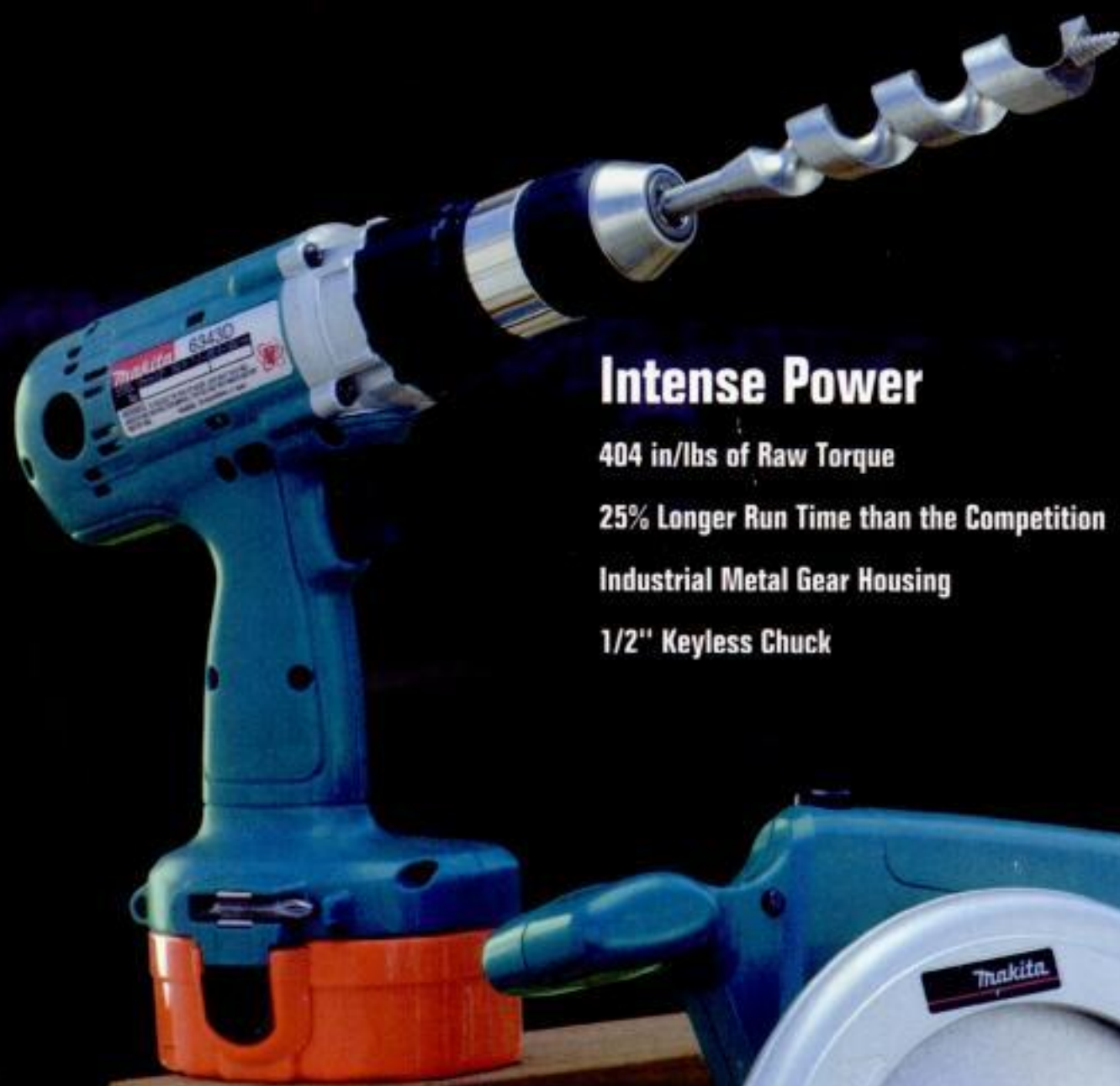
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