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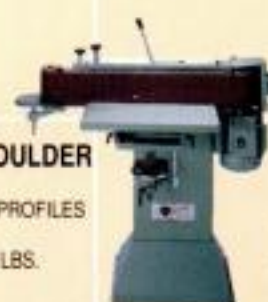
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On the cover: If you can build a basic box, you can build your own kitchen cabinets. See the article on page 36. PHOTO BY PAUL PEARSON



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of putty

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Japanese blades



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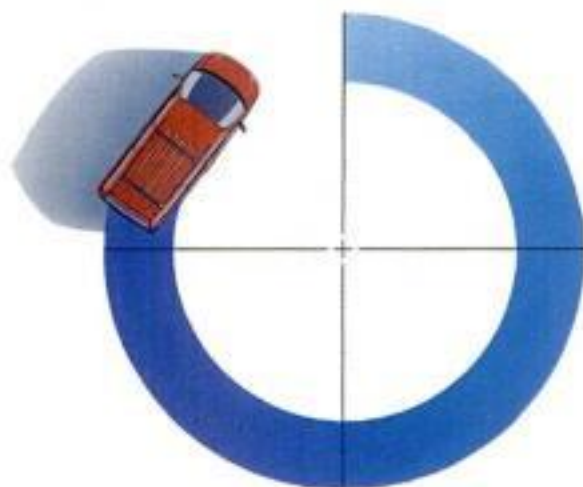


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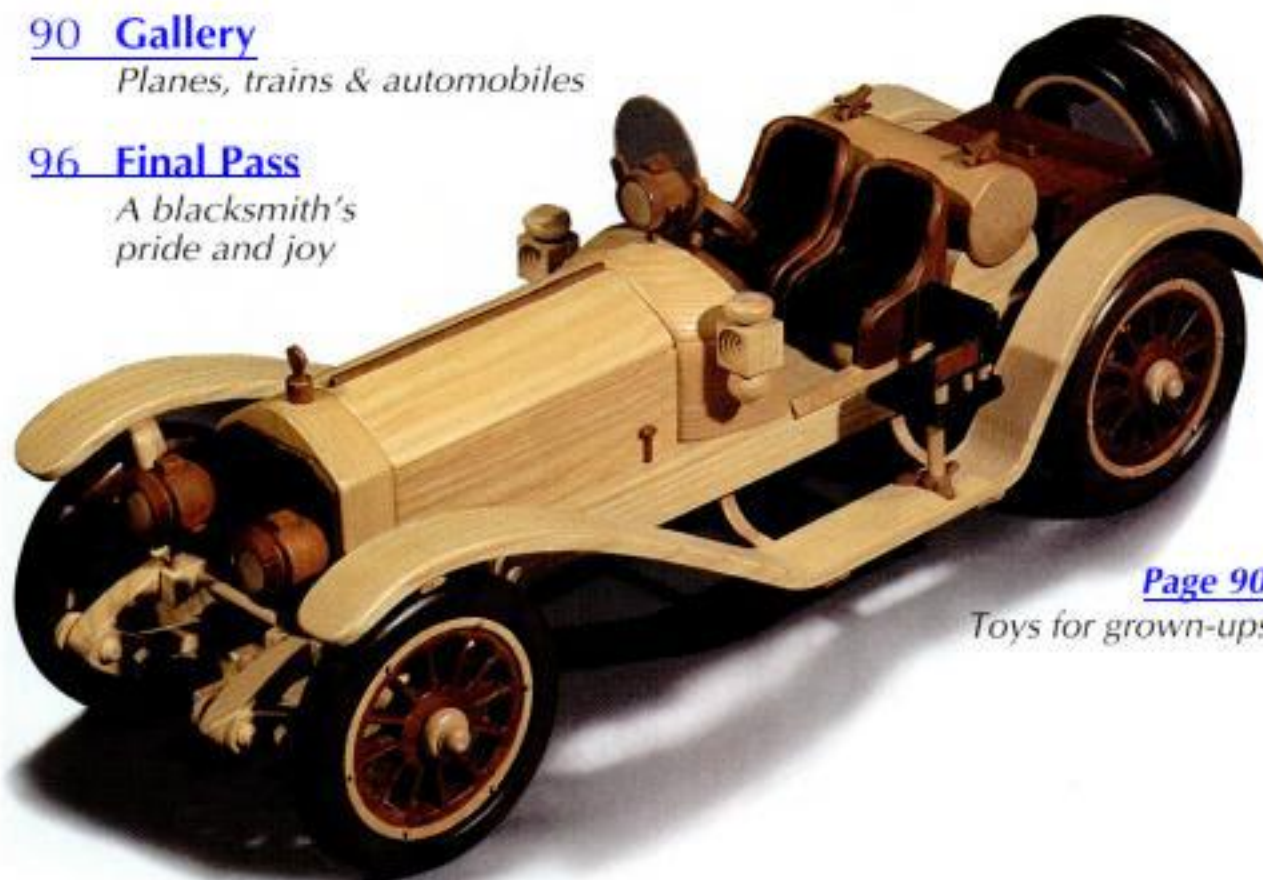
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Building a Woodworking Community

Everyone's invited—and you don't even have to leave the house

A few weeks ago, I made my annual pilgrimage to the Northeastern Woodworkers Association's expo in Saratoga Springs, NY, where I helped judge the craftsmanship competition for the third straight year. As usual, I came away inspired—by the people I met, by the amazing variety of work I saw, and by the collective enthusiasm of thousands of woodworkers gathered under one roof.

These days, though, you don't have to attend a major woodworking event to find people who speak your language. All you have to do is hook up your computer to a telephone line and "log on" to

AMERICAN WOODWORKER Online, on the America Online computer service. It's like having a guild meeting in your living room—every day of the week.

In many ways, AW Online resembles an old-fashioned community. Browse our "Message Center" to read what other woodworkers are saying about topics that interest you. The range of subjects is truly amazing—finishing advice, workshop planning, tools and techniques. And it's easy to participate: Post a question today and check back for an answer tomorrow.

You can also stop by the "Shop Talk" chat room any evening for a lively con-

versation on the subject *du jour*, with experts like Michael Dresdner and Steve Blenk. Shop for AW memorabilia and back issues in our online store, savor the photos in our photo galleries, or launch yourself directly to one of the hundreds of fascinating Internet woodworking sites we've collected for you.

Online interaction may never take the place of quality time in your shop, but it can help you and entertain you in ways you never expected. See page 24 for details on how to join the AW Online community.

Ellis Valentine
Executive editor

PLAY IT SAFE

Woodworking can be dangerous. Safety equipment can greatly reduce your risk of injury; so can common sense and caution. Remember, if a procedure feels dangerous to *you*, don't try it—find a safe alternative. Your safety is your responsibility.

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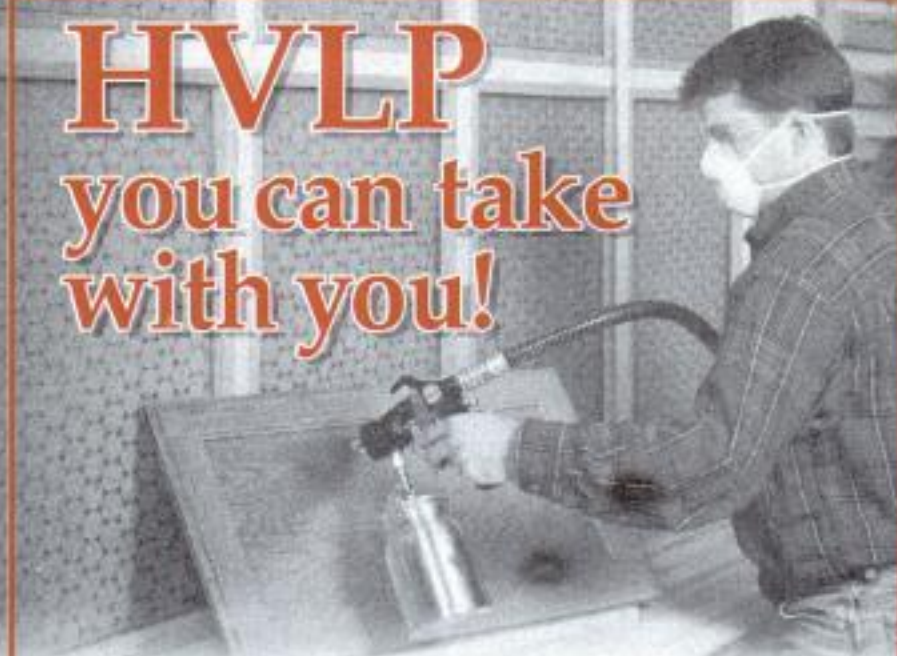


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top is
tify its problems.
he long jointer
7—so the iron is
ross. Waterstones
end and plane
scentrate on the

in the first place (clean, quartersawn wood and tight gluelines) won't move much. Check it as often as you like, and plane it any time you think it can be improved. After you get it flat in the first place, it's not a big job.

Finally, a comment or two about your own workbench: With a size of 8 ft. by

the same way. That is why I was so disappointed with what was referred to as a "Better Workbench" (AW #58).

This bench design misses an opportunity to teach aspiring woodworkers fundamental joinery skills. Most benches use some hardware, mostly bolts, to aid in assembly. But a design that uses 76

twisted or not, and iden

Second, sharpen t
plane—a No. 6 or No.
almost dead straight ac
give the best edge.

Third, start at one
across the grain. Cor

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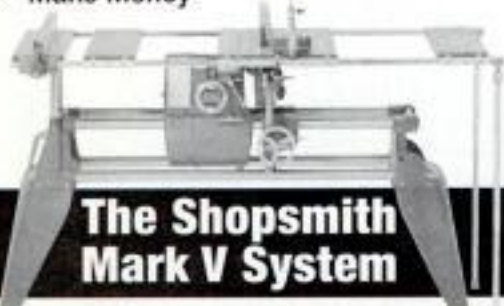
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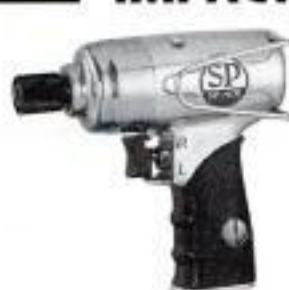
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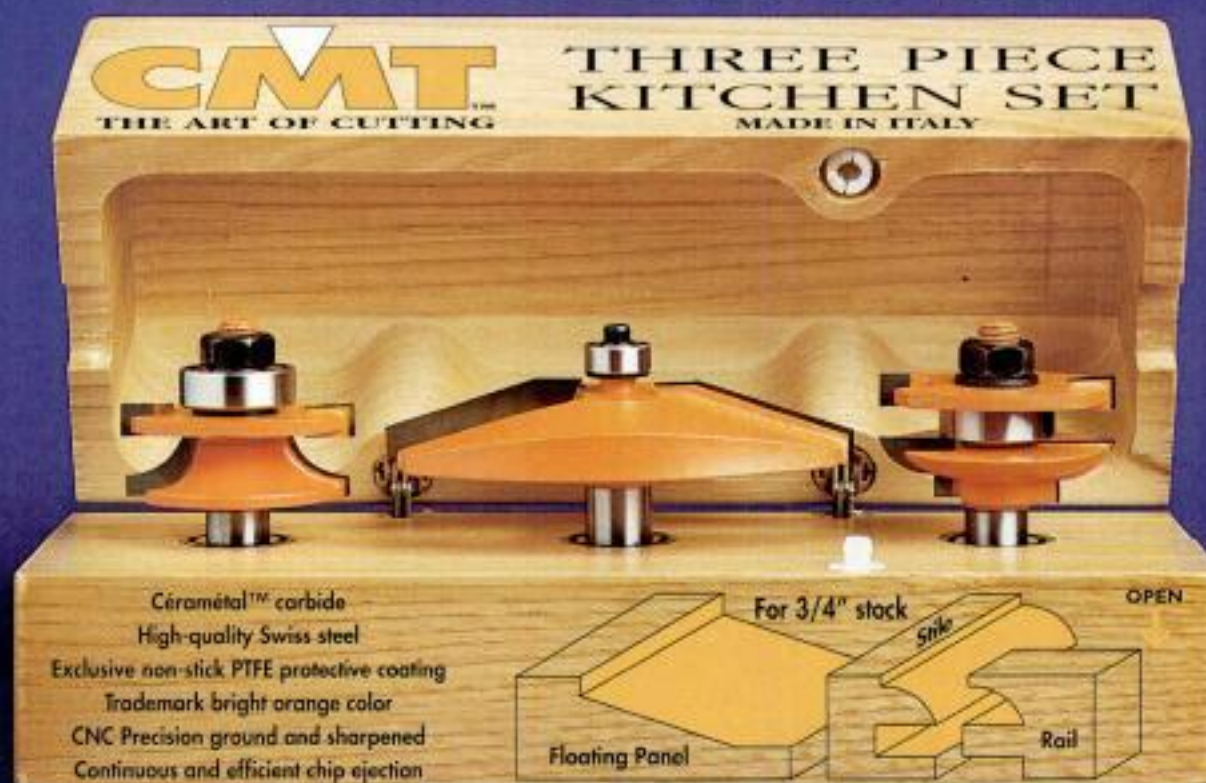
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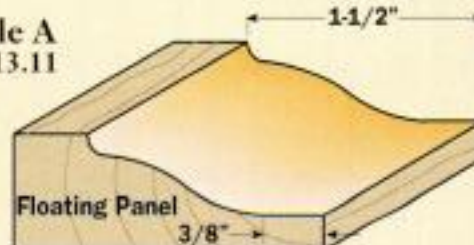
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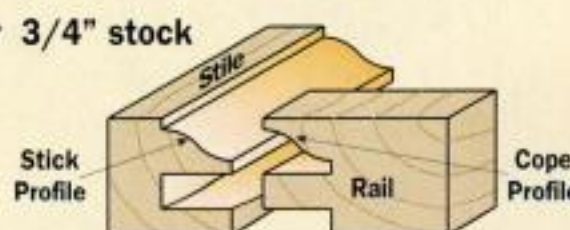
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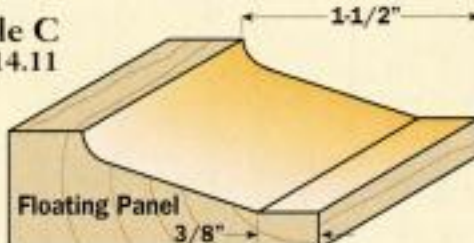


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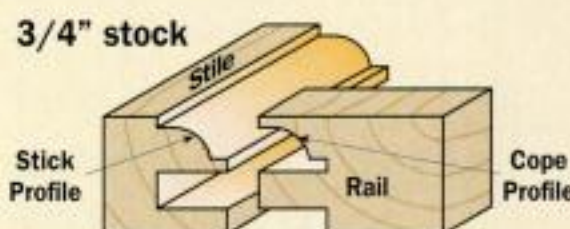


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screws just to hold the basic base components together is, in my opinion, teaching the wrong lesson. The goal of building a better workbench—one of simple but sound design that also provides the opportunity to develop better skills—is not elusive. There is a wonderful example that you published in 1991, issue #18. The top on this bench was purchased to save time, but could easily be shop-built.

William White
Williston, VT

An Easier Way to Turn Napkin Rings

The article on turning napkin rings was well written but the method used is, in my opinion, quite complex.

I have turned quite a few napkin rings and I believe that my technique is easier than the one used by Mr. Howard. I use a longer mandrel—one turned from a piece of soft wood about 8 in. long. The mandrel has a very gradual taper so that the ring-hole diameter is achieved at the

midway point. Drill the ring blank to the desired diameter on the drill press; then push it onto the mandrel. With the blank held at the midway point, both sides and the top can be shaped.

Mr. Howard's method—making a faceplate, gluing the blank to the faceplate, drilling the hole, shaping the ring on one end, forcing the ring off the faceplate with a chisel (with possible breakage of the ring), putting the ring on a jam chuck to shape the other end, and then sanding—has to be a tedious process.

Harold Klock
Athens, OH

Knot to Be Remembered



As soon as I saw "Cornish Knot Puzzle" in AW #56, I decided "that's it" for Christmas gifts. It turned out to be an interesting challenge and resulted in a neat project.

After making the drilling fixture and a prototype puzzle using store-bought maple dowel stock, I decided that the puzzle really had to be made in exotics

as Cauley suggested. I made my own dowel rod from lengths of teak, padauk, cherry, oak, wenge and purpleheart. Then I produced half-a-dozen puzzles. Knowing how difficult it would be to reassemble the puzzle with no clues, I went to the computer and designed a small booklet to accompany each gift. I based my instructions on those given in the article. I'd love to see more projects like this in the magazine.

John Ericson

That's Entertainment



I enjoyed reading Ed Schoen's article on designing and building an entertainment center (See AW #57.) I did, however, find an error that could cause readers to improperly drill the cabinet doors for their hinge cups. Many people assume that the hinge-cup hole diameter for "Euro-type" hinges is 32mm, since frameless, Euro-style cabinetry is also called 32mm cabinetry. But the standard cup-hole diameter is 35mm. This is true for all hinge manufacturers of

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CIRCLE NO. 36 ON PRODUCT INFORMATION FORM

LETTERS

which I'm aware, including the hinges pictured in your article.

The 32mm designation refers to the on-center spacing of holes drilled in frameless cabinets for the installation of shelf supports, drawer slides, and other hardware, including hinge plates. Please tell your readers to buy and use a 35mm-dia. bit, rather than a 32mm-dia. bit.

Skip Lauderbaugh

Thanks for the clarification, Skip. The photo caption on page 51 wrongly instructs readers to drill a 32-mm.-dia. hole. 35mm is the correct diameter. According to author Ed Schoen, a 13/8-in.-dia. Forstner bit can be also used; it's slightly larger in diameter, but this won't adversely affect the fit of the cup on the hinge.—Eds.

From Sawdust to Cyberspace

Now you've done it! I just got my wife calmed down about getting a computer, explaining that computers don't make sawdust or loud noises, which means we

can spend more time together in the house. Tonight she caught me on your America Online site checking out plans for making yet another maple table. She blew her top. Oh well, what's one more night sleeping on the shop floor? Thanks for a great magazine that is worth sleeping on a concrete floor for.

Randall Keith

Carlisle, Ontario, Canada

Corrections

The correct telephone number for M. Horowitz (see "Gilding," AW #58) is (718) 263-6306. The correct model number for Star's 8-in. jointer (a Best Buy winner in our #58 test) is S3107N.

Another Waterproof Joint

Being in the Marines, I don't have much time for woodworking projects. But I did build Frank Klausz's wooden waterstone container. (See AW #57.) Instead of making sliding dovetails to join the sides, as Klausz did, I cut dados in two sides and oversized tenons for the dados in

the remaining two sides. Then I used my vise to compress the tenons to fit in the dados, and assembled the sides using a single finishing nail at each joint. This method has also proven to be watertight.

D.L. Barnhart

Oceanside, CA

Vicmarc Feedback

Vicmarc regrets that customers have been misinformed by the letter in AW #58 regarding the availability of Vicmarc products. We are pleased to inform customers that Craft Supplies USA, (800-551-8876) and Farris Machinery (800-872-5489) both sell the Vicmarc lathe in the United States.

Vic Verrecchia

Vicmarc Machinery

Craft Supplies USA and Farris Machinery informed us they have the Vicmarc VL100 in stock. They reported no problems with the quality, dependability or delivery of Vicmarc lathes, which carry a lifetime warranty from the manufacturer.—Eds.

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1587VS	TOP HANDLE JIG SAW, VAR SP	142
1587VSW	1587VS JIG SAW W/CASE & 10 BLADES	159
1613EVS	2 HP VAR SP PLUNGE ROUTER	198
1613EVSX	1613EVS 2W/1051 DELUXE EDGE GUIDE	208
3310K	12V CORDS W/ HANDLE W/2 BAT, CS & CHRG.	179
3610K	14.4V CORDS DRILL KIT W/2 BATTERIES	197
3725DVS	5" DUSTLESS VS RANDOM ORBIT SANDER	143
3727DVS	6" DUSTLESS VS RANDOM ORBIT SANDER	148
3915	10" SLIDE COMPOUND MITER SAW	578

SKIL

HD1605-82	BISCUIT JOINER KIT	134
HD3400	10" TABLE SAW W/CARBIDE BLADE & STAND	198
HD77	7 1/4" WORM DRIVE CIRCULAR SAW	159

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NS100	NARROW CROWN STAPLER KIT 1/2" - 1"	87
NS150	NARROW CROWN STAPLER KIT 1/2" - 1 1/2"	157
330	SPEED BLOCK FINISHING SANDER	82
332	QUICKSAND 5" RNDM ORB W/STKIT PAD	56
333	QUICKSAND W/HOOK & LOOP, DUSTLS	64
334	QUICKSAND W/STKIT, DUSTLESS	64
340	1/4 SHT FIN SANDER W/DUST P/U	49
347K	7 1/4" FRAMERS SAW, 15 AMP WITH CASE	128
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334	QUICKSAND W/STKIT, DUSTLESS	64
340	1/4 SHT FIN SANDER W/DUST P/U	49
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DB150	DETAIL BISCUIT JOINER	69

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LUR4M10	10" X 56" ATB COMBO BLADE	40
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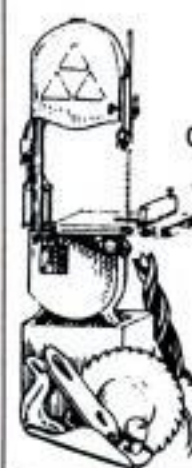
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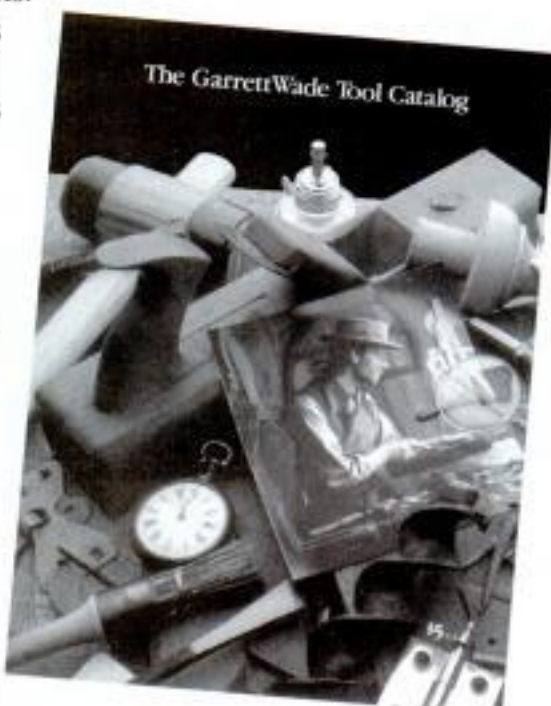
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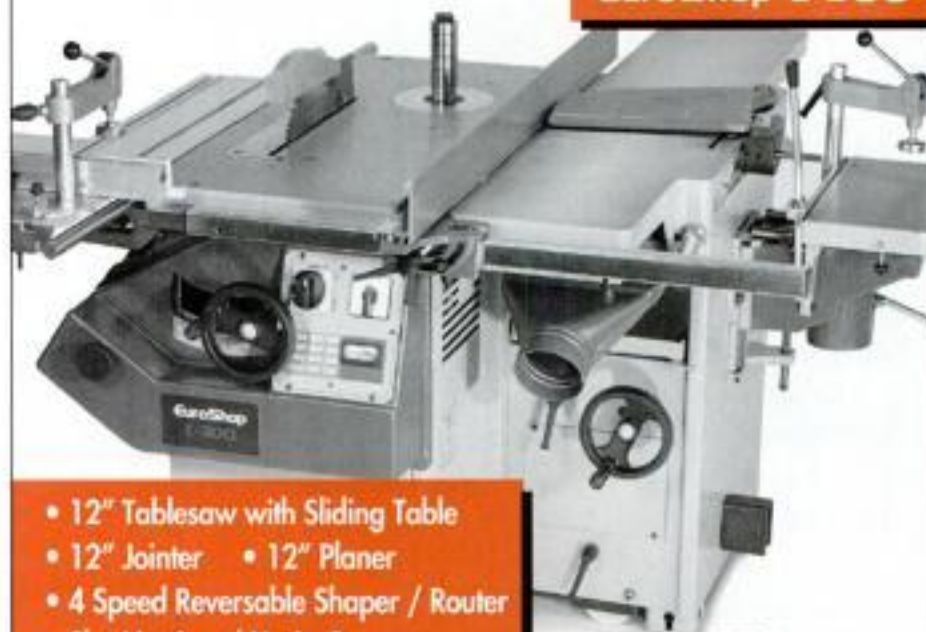
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Q I'm building an 18th-century Pennsylvania German blanket chest with bracket feet. I want the feet to withstand the weight of people sitting on the chest. What's the strongest way to attach the feet?



D. Moyer

A Traditional bracket-foot joinery varied depending on the builder and the locale. However, the secret to a sturdy bracket foot isn't the bracket, but the corner block behind it. (See the drawing at right.)

For a Colonial dovetailed chest, such as the Pennsylvania five-board, screw and glue beefy mitered corner blocks to the bottom of the case. Use 8/4 stock if possible. As shown in the drawing, the corner blocks carry the weight of the chest.

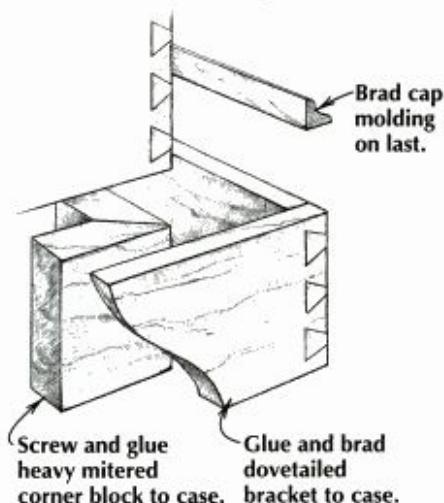
On a frame-and-panel chest like those built in tidewater Virginia, the frame stiles extend to the floor to carry the weight of the chest. Glue corner blocks to the stiles and rails to reinforce the stile-to-case joints.

Your corner blocks should follow the grain direction of the casework. Once the corner blocks are attached, you can

BLANKET CHEST CONSTRUCTION

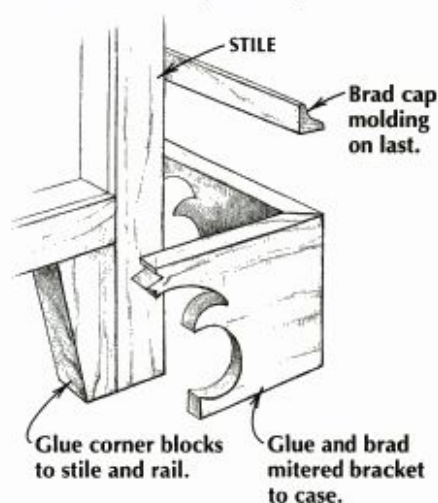
DOVETAILED CHEST & BRACKET

Corner blocks carry the weight.



FRAME & PANEL CHEST, MITERED BRACKET

Extended stiles carry the weight.



glue or brad the bracket to the case, trusting its strength.

To assemble the bracket itself, you can either miter it or dovetail it. Dovetailed brackets are a better choice to survive being kicked apart by shoes. Since the bracket is ornamental, leave it

slightly ($1/16$ in.) above the floor. If the chest will be placed on a wood floor, add felt pads to the bottoms of the corner blocks or stiles.

William Draper
Reproduction furniture maker
Perkasie, PA

Shaker Tilters Exposed

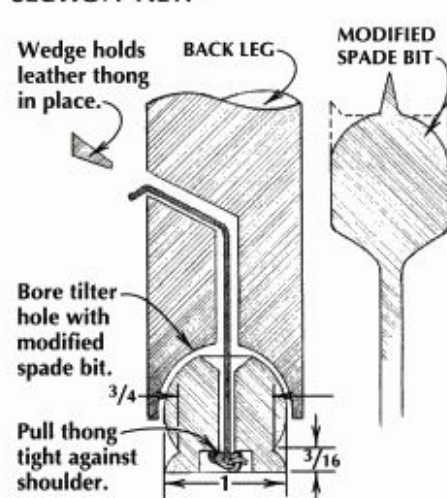
Q I've heard of something called a "tilter" on Shaker chairs. Can you please shed some light on this?

Tracy Nilsson
Tulsa, OK

A "Tilters" or "tilting balls" are an innovation found on early Shaker chairs. (See drawing, right.) They were attached to the back posts to keep them from marring wooden floors. Prior to 1850, tilters were made of wood; later they were most often made of metal. Wooden tilters are not as sturdy as metal ones, but they're especially interesting because you can make them yourself.

To leave room for wooden tilters, Shakers cut the chair's back posts shorter than the front posts. Then they bored a round-bottomed socket in each back post (you can modify a spade bit for this purpose) and turned a wooden ball to fit inside it. I like to turn a "foot" on the ball's base, the same diameter as the ball.

"TILTER" FOOT SECTION VIEW



To attach the tilter, they bored small holes through the ball and the post, and threaded a leather thong through. A counterbored hole in the bottom of the ball made room for a knot in the thong. A wooden wedge, driven through a hole

in the back post, secured the other end of the thong. A little wax rubbed in the ball socket makes for an easier-tilting tilter.

Robert Treanor
Reproduction furniture maker
San Francisco, CA

Avoiding "Fuzz" on Routed Plywood

Q I frequently rout cutouts in $1/4$ -in. oak plywood, and I'm plagued by "fuzzy" splinters of veneer remaining after I rout. I always use well-sharpened straight bits, but I still get fuzz. What's causing it, and how can I stop it from happening again?

Anthony Rotolo
Paramus, NJ

A First consider the bit material. If you're using a tool-steel bit, the first few cuts may be fine, but the glue on the veneer will dull the bit just where it must be the sharpest. Raise or lower the bit about $3/8$ in. to engage a fresh

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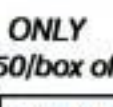
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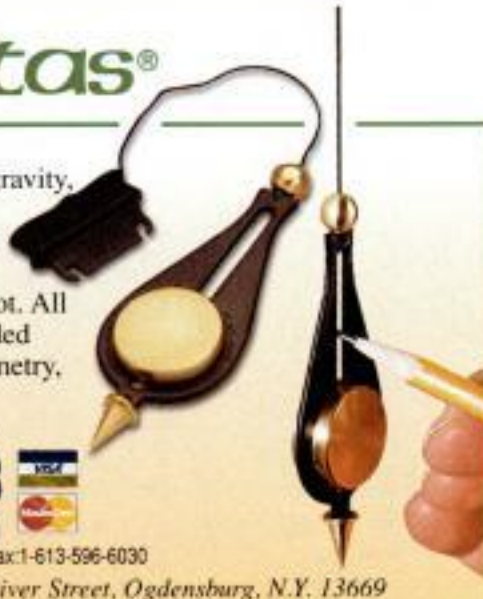
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part of the cutting edge, and take a test cut. If results improve, then you can be sure that sharpness is a factor. Try switching to a carbide bit.

Also consider the bit's clearance angle. If there isn't enough back clearance (known as *relief*) on the bit, the back edge of the tip will hit the wood as it rotates. This can result in fuzz even if you're using a sharp carbide bit.

Finally, try a different type of bit. If you're routing cutouts with a straight

bit, the bit may be wedging the veneer against each side of the cut. This occurs when both cutting edges of the bit are engaged with the wood. To reduce the wedging effect, I'd suggest that you use either a carbide-tipped stagger-tooth bit or a carbide-tipped piloted panel bit. (See drawings at left.) Both of these bits will engage only one side of the opening at a time.

Roger Cliffe

Woodworking author & instructor
DeKalb, IL

The Secret to Solid Edge Joints

Q I'm gluing up a tabletop. How much clamping pressure should I put on the edge joints so that the joints will hold?

Scott Hembree
Richmond, KY

A Very little clamp pressure is needed if the edges are carefully jointed true. In fact, too much pressure may

squeeze out most of the glue and result in a dry, weak joint. When I'm gluing up boards edge-to-edge, I apply just enough clamping pressure to close the joint and bring the members into contact with each other.

Your best guarantee of a good joint, though, is well-prepared surfaces. Joint your edges either dead-true or, if you wish, slightly concave. Some woodworkers argue that slightly concave boards "pull" the ends together, so the joint won't fail. I've never noticed a difference between true or slightly concave edge joints. But never joint your boards convex: The ends will tend to pull apart. *

Before you glue, clamp the joints up dry. If you find that you must "crank down" on the clamps to close the joint, it's very likely that one or both of the boards isn't quite true. Fix it before you proceed with glue-up.

Lonnie Bird

Woodworking instructor &
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Rio Grande, OH

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Safer Ripping on a Radial-Arm Saw

Q I'm building a small home shop, and I recently bought a used radial-arm saw. My friends say not to use it for ripping. Why not? I don't have a table-saw, and right now I have to make do with what I've got.

Gerald Cato
Brooklyn, NY

A The radial-arm saw excels when used in a crosscutting mode for cutting stock to length or milling dados. But ripping, ploughing and molding on a radial-arm saw are all tug-of-war operations with an ongoing threat of kickback.

When you rip on the tablesaw, the cutting action of the blade pulls the stock down against the table. But when you rip with the radial-arm saw, the blade enters the workpiece from beneath, lifting it and forcing it backwards. If the workpiece vibrates and rises slightly off the table, then instead of tracking into

the kerf of the previous tooth, the teeth slam into solid stock and WHAM! This effect is worse when ploughing or molding, since the load is heavier.

If you must rip on the radial-arm saw, try to improve your odds. Don't feed stock under 2 ft. long—longer stock gives you more leverage to outmuscle the machine. Never stand directly behind the stock you are feeding. Hold the stock down tight to the table, so it doesn't vibrate. Keep the kickback guard in place, and get a friend to help you on the outfeed end. You could probably rig up hold-downs, too. But my overall advice? Get a tablesaw!

Bernie Maas
Professor of art

Edinboro University of Pennsylvania

Sticky Spanish Cedar

Q I made a cigar humidor using the plans in your August issue (AW #53). I finished the exterior with Minwax Helmsman varnish, and on the interior, I only finished the exposed

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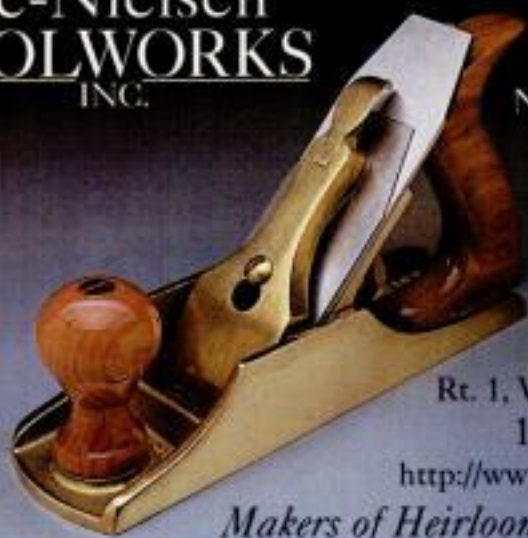
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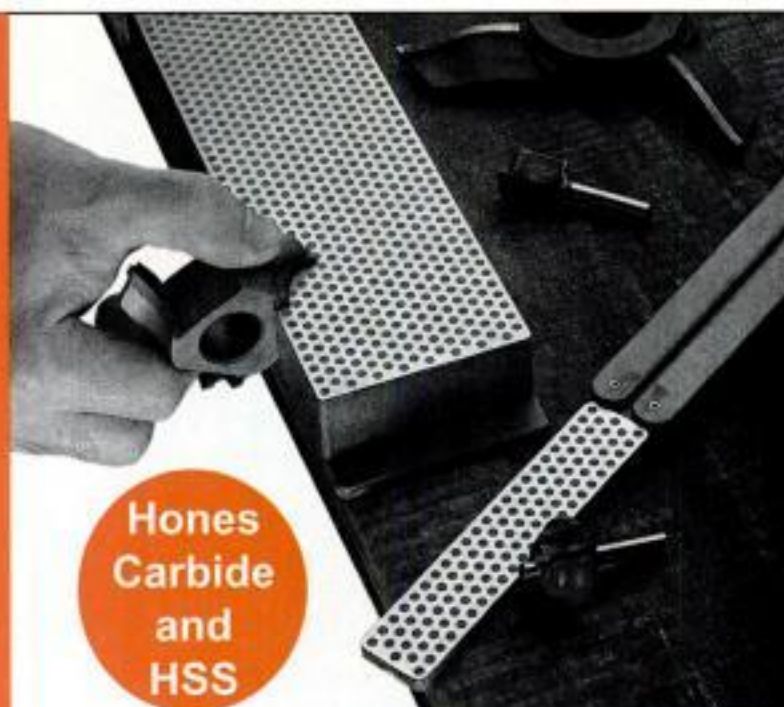
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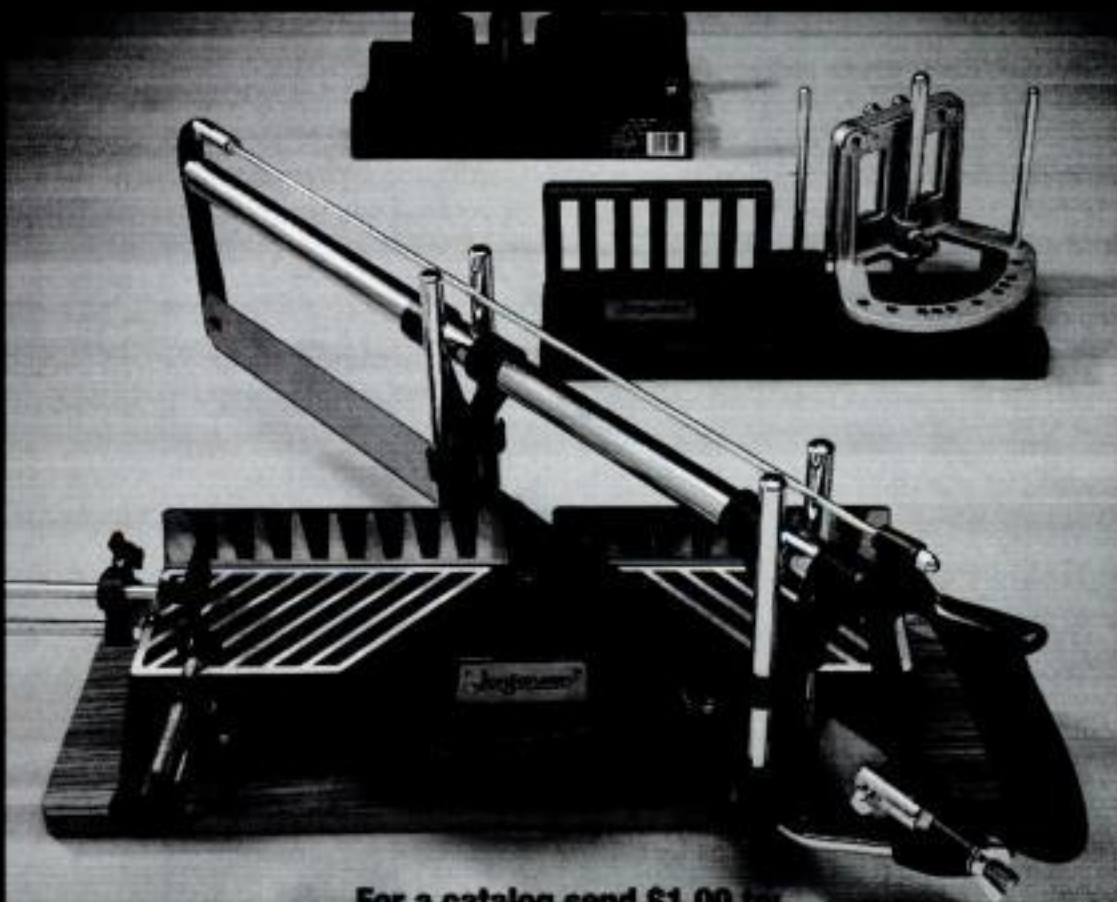


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edges of the case, leaving the Spanish cedar lining "raw." Several days later, I found the cedar covered with dark, sticky blotches, and the varnish on the inside was tacky. What happened? And how can I avoid it happening again?



Stan Davies

A Spanish cedar tends to "bleed" sap after it is cut—even long after it is dried. This is quite normal and will settle down in time. This has happened to my own humidors, but it doesn't seem to damage my cigars, so I don't worry about it. It can wreak havoc on an uncured finish, though, so for the future I'd advise you to finish the exterior and let it dry for a few days before installing the lining.

To reduce the risk of your Spanish cedar bleeding in the first place, select your stock carefully. You can see streaks on the surface of cedar that has bled. Select streak-free boards, and buy some extra just in case. Once you get home,

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plane the surfaces of your stock and observe them over a couple of weeks. Then use the boards that have bled the least over that time.

Michael Dresdner
Finishing consultant &
AW contributing editor
Puyallup, WA

Cpm and Rpm: Which One Matters?

Q After reading your review of jointers (AW #58), I'm still a bit confused about rpm vs. cpm (cuts per minute). What's more important for determining the cutting smoothness, a high rpm or a high cpm?

Thom Baxter
Vancouver, BC

A Your question and its answer apply not only to jointers, but to thickness planers as well.

Multiply the cutterhead rpm by the number of knives in the cutterhead, and you get cpm. In theory, the jointer (or thickness planer) with the highest cpm should plane the smoothest. But no matter how many knives your cutterhead has, chances are that one knife is slightly higher than the rest. Although all the knives are cutting the wood, the finished surface is produced *only* by the highest knife—even when this knife is set just 0.0005 in. above the others.

This fact means that a high rpm is your best insurance of smooth cuts on a jointer or thickness planer. However, I'd still hedge my bets—make sure that the knives are all sharp and set correctly. (See the article, "Tuning a Jointer," in AW #58.)

Bill McCarthy
Cabinetmaker
Springtown, PA

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Plain tools... A Javanese craftsman uses crude handmade tools to create ornate relief carvings in solid teak.

PHOTOS BY FRANCIS J. TAN

Power tools are scarce in the small town of Jepara on the island of Java, northwest of Australia. But exceptional woodworking abounds. Using crude chisels made from recycled truck springs or other scrap steel, craftsmen create ornate carvings in teak and Philippine mahogany.

And in Java, these traditional carvings are everywhere—on furniture, statues and even buildings. A well-established

apprenticeship program ensures a steady supply of gifted carvers.

To carve an ornamental panel, an apprentice draws a freehand outline of his design on a piece of planed teak, using pictures as a guide. He patiently chisels and files the scene to completion. A less experienced apprentice then builds a teak frame to fit. The boys are mostly Muslims, but they often



...fancy carvings. This jungle-scene sculpture started as a solid log 3 ft. long and 10 in. in dia.

carve scenes from Hindu legend, since consumers favor this older and more distant mythology. Pastoral scenes are also common.

Although by our standards these woodworkers are poorly compensated—earning less than \$1 an hour—they have achieved relative prosperity in Indonesian terms. And their woodworking culture remains rich in detail and tradition.

—Francis J. Tan

FINE FURNITURE

Looking for inspiration? Check out the third annual Philadelphia Furniture Show, on May 2-4 at the Pennsylvania Convention Center. Craftspeople from all over the country will be there with innovative new furniture and decorative woodwork, plus some beautiful traditional stuff. For more information, call: (215) 440-0718.



Turned urns. There's more than furniture at the Philly Furniture Show, held May 2-4. These matching pieces are by Barry T. Macdonald of Michigan.

PHOTO COURTESY
OF PHILADELPHIA FURNITURE SHOW

The Limited Edition *Delta* Unisaw as seen on "The New Yankee Workshop"



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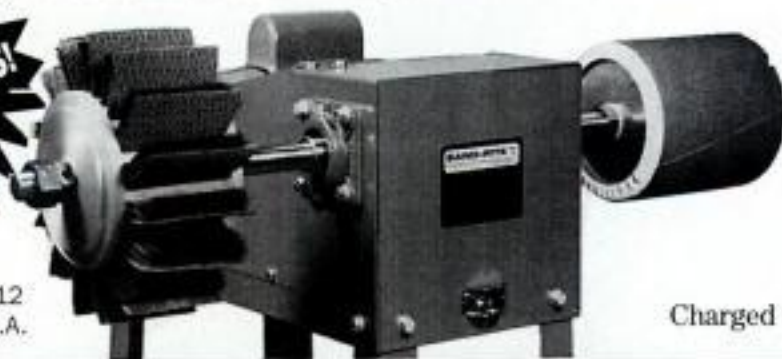
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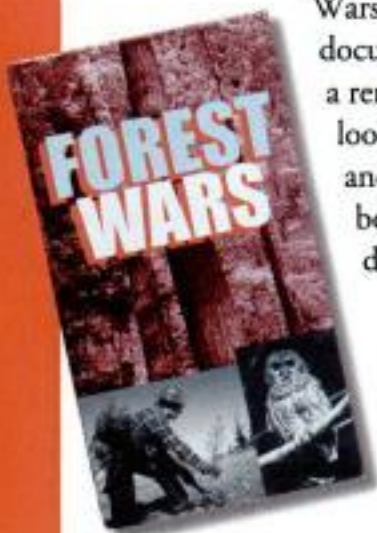
THE VIDEO FILE: "FOREST WARS"

Loggers or environmentalists: Which side are you on? Timber harvesting on federal lands continues to be a political hot button. "Forest Wars," a video documentary, takes a remarkably fair look at the people and issues on both sides of the debate.

This 72-minute video takes you to the Pacific Northwest, Montana,

Georgia and Louisiana. Meet the infamous Northern spotted owl, plus foresters, activists, sawyers, loggers and their families.

I went into this video with one opinion and came out with another. "Forest Wars" would be great fodder for a guild discussion. It's available for \$29.95 plus \$3 shipping from Summit Films, Inc., Box 420, Gypsum, CO 81637.—*Susannah Hogendorn*



MY FIRST FINISHING JOB

One chilly Saturday in 1939, I was hanging around my dad's small-town Iowa drugstore when he invited me to tackle my first real finishing project: varnishing the wooden toilet seat in the restroom out back. I was thrilled, and approached the job with great gusto. A couple hours later I eyed the gleaming toilet seat with a satisfied smile, and left it to dry.

The following Monday I stopped by the store on my way home from school. My father glanced up from his work. "Did you varnish the toilet seat?" he asked.

"Yes," I answered.

"Go back and look at it."

As I opened the restroom door, my look of pride soon turned to horror. My toilet seat needed a haircut! It seems a salesman had asked to use the restroom... with rather painful results.

The moral? Never varnish a toilet seat in an unheated restroom in the dead of winter!—*John D. Reinhold*

LUMBER ON THE RUN

The U.S. exported about 1 billion board feet of hardwood lumber to other countries in 1995. Laid end to end, that's enough finished 2x4s to circle the earth more than 41 times! And that's from a total of 12.4 billion board feet harvested.

Source: *Weekly Hardwood Review*, Thursday, December 19, 1996.



50 BUCKS For Bookends!

Don't beat up your books! Build them some decent bookends. Then send us your plans... we just might send you \$50. The winning bookends should be strong enough to support *Moby Dick* and handsome enough for Moll Flanders. Send slides of completed bookends to: Bookends, "Offcuts," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098.

WIN \$\$ FOR YOUR TOYS!

The Wharton Esherick Museum is seeking entries for its fourth annual Woodworking Competition and Exhibition. This year's theme is innovative toys.

All woodworkers are eligible; you may submit up to three 35mm color slides of each completed piece. The museum will exhibit selected pieces from September 7 to December 31, 1997. Three entries will receive awards of \$500, \$300 or \$200. A Member's Choice Award winner (\$200) will be chosen at the opening reception.

Entries must arrive by July 1, 1997. For more information about the contest, write to: Wharton Esherick Museum, Box 595, Paoli, PA 19301.



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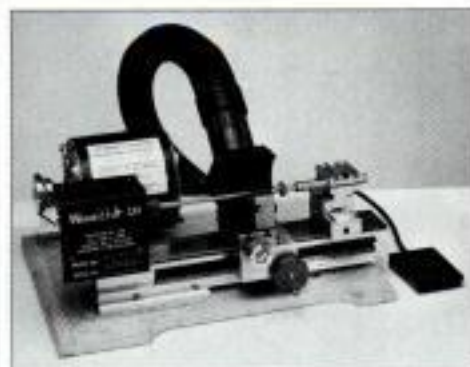
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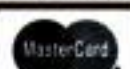
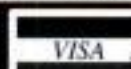
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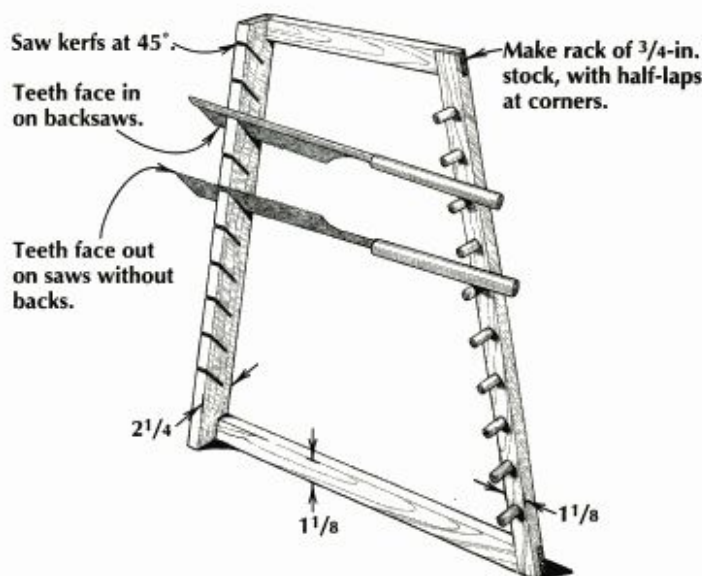
Japanese Saw Rack

Best tip of the issue

If you have several Japanese saws, you'll find it worth your while to make this convenient rack. You can hang it on the wall, or take it to a jobsite.

I made my rack trapezoidal to accommodate shorter saws above with longer ones below. I also found it convenient to cut each slot with the actual saw it will hold. You can use the saws themselves to cut all the joinery.

Paul Alt
Yorktown Heights, NY

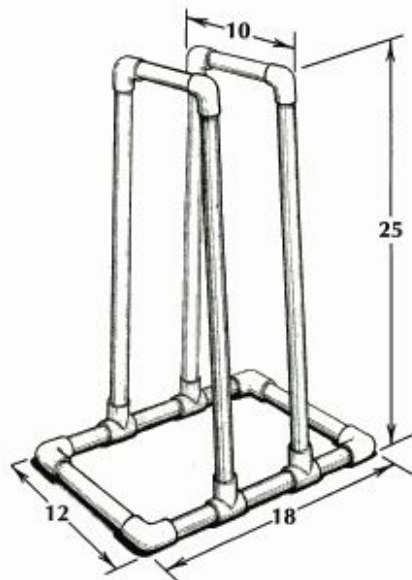


Best tip wins \$200. Know a better way of doing something? Designed a clever jig? Send your original woodworking tips, along with a sketch or a snapshot to: "Tech Tips," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. We'll pay \$50 for each tip we publish and \$200 for the best tip of the issue.

Storage For Offcuts

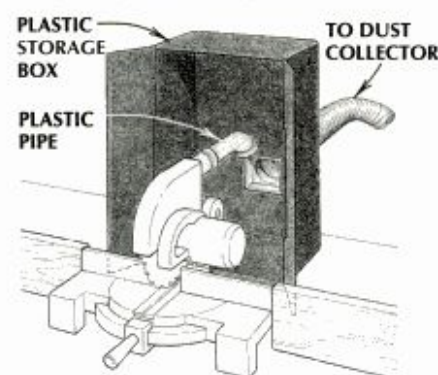
I got tired of leaning small plywood scraps and other sheet materials up against a wall, so I made a pair of these simple racks. You need about 15 ft. of 1-in. PVC pipe, plus eight elbows and four tees for each rack. Approximate sizes are shown in the sketch. I recommend dry assembling each rack to check the fit before you apply any cement.

Steve Condon
Golden, CO



Miter-Saw Dust Collector

Here is an inexpensive, effective way to collect dust from your miter saw. I bought a plastic storage box with hinged



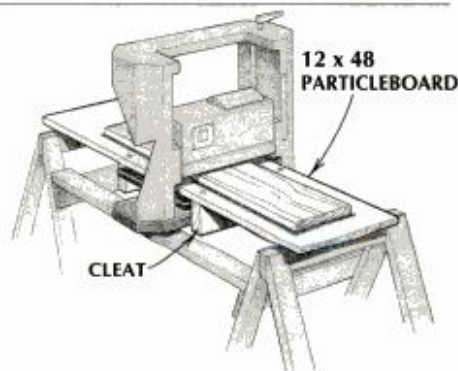
lids and set it up behind the saw as shown. After cutting a hole in the back I attached a flange fitting with sheet-metal screws to fit my vacuum hose.

If your saw has a bag, remove it and substitute a short piece of plastic pipe to direct the dust toward the rear of the box. From here it is easily sucked out by the vacuum.

Dick Pilling
Simi Valley, CA

Auxiliary Planer Bed

Replacing the factory bed of a portable planer with an extra-long one makes it easier to plane boards when working



alone. It also reduces end snipe and allows you to plane very thin stock. I used a piece of 3/4-in. particleboard faced on both sides with plastic laminate for the new bed. Two cleats screwed to the underside of the board saddle the planer and prevent any movement.

Paul Stotler
Leonardtown, MD

Leaf Blower/Vacuum

Having tried a number of dust-collection systems, I finally opted for an electric-powered leaf blower/vacuum. The portable unit is designed to suck up leaves and dirt but does a great job with sawdust and wood chips. It's quieter than most shop vacuums and comes with a convenient carrying strap. I hang the unit on a nail and hook it up to whatever machine I'm using with a length of duct.



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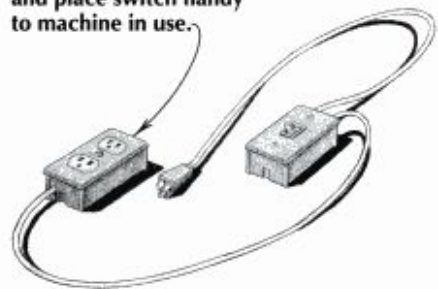
Incidentally, I've discovered that the wire-reinforced duct sold for clothes dryers is cheap and adequate for the low pressures involved.

Kris Lewellen
San Antonio, TX

Remote Controller

For less than \$5 I made this remote control switch that I can use with a dust collector, fan or other appliance. I made the wire long enough so I can place the

Plug in dust collector and place switch handy to machine in use.



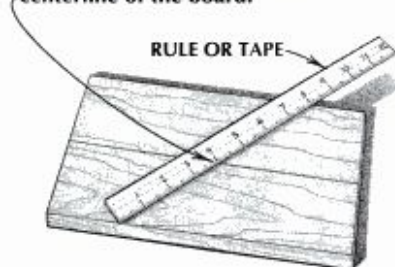
switch on my tablesaw, drill press or other machine. Be sure to connect the ground wire from the grounded plug throughout the remote extension.

Herbert Akers
Rockville, MD

Finding the Center

The "Rule for Centers" ("Tech Tips," AW #54) will work but I think my way is a lot simpler: Swing a rule (or tape)

Angle ruler so it measures an exact number of inches. Half that number marks the centerline of the board.

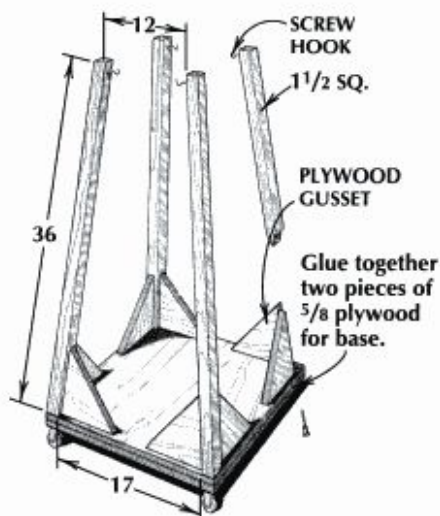


across the board and angle it until it reads an even number. Divide that number in two and that's your center.

Paul Alowgi
Hermitage, PA

Scrap Bag Dolly

Wood scraps often fall to the floor near the machine that produced them—a major safety hazard. Since we have a steady supply of free burlap bags, we

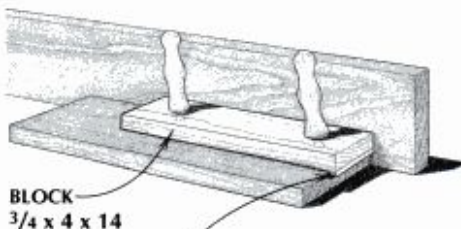


made a special dolly on casters to hold a bag open at a convenient height. The posts slope inward for stability and for easier removal of the bag when it's full. The dolly was made from scrap and the four swivel casters cost a total of \$14.

Arques School for
Traditional Wooden Boatbuilding
Sausalito, CA

Two-Handled Push Stick

When you're facing relatively short lumber on the jointer, a heavy cut could cause the work to kick back. So



for maximum safety, I use a two-handled push stick. This gives me firm, positive control over the stock I'm machining. I turned the handles on the lathe and set them leaning forward at a slight angle.

Michael Burton
Glorieta, NM

Frost Fighter

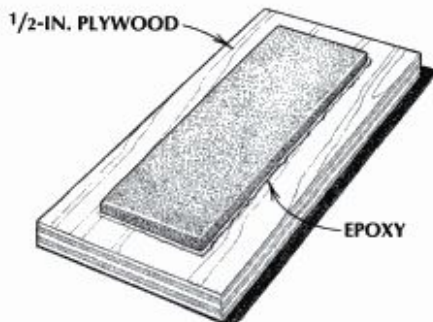
When my shop is too cold for glue to cure I improvise a heat box and put the glued-up assembly inside. I use 4x8 sheets of foil-faced, rigid foam insulation board. By scoring one side of the board I can fold it to make the walls of a box,

with an extra piece for a lid. Place a portable electric heater (or light bulbs) inside for heat, but don't leave the shop unattended without turning it off. When you're done, the boards easily fold back flat for storage.

Paul Anthony
Associate editor of AW

Extending Waterstone Life

Many American woodworkers now use Japanese or American-made waterstones. With constant use these wear quickly and are apt to break as they get thinner.

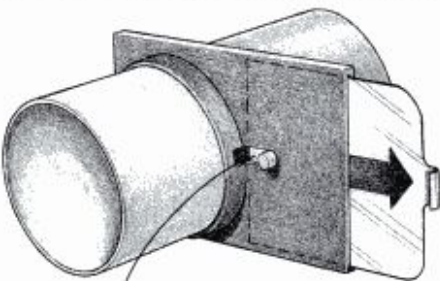


When I find a stone reduced to a thickness of about 3/8 in. or less, I let it dry out and then epoxy it to a piece of exterior plywood. A scrap piece of solid-surface material such as Du Pont Corian® would also work.

Ping Sing Li
Redwood City, CA

Improved Blast Gates

Commercially available blast gates only open partway, so they partially obstruct the flow of air. By drilling and filing a



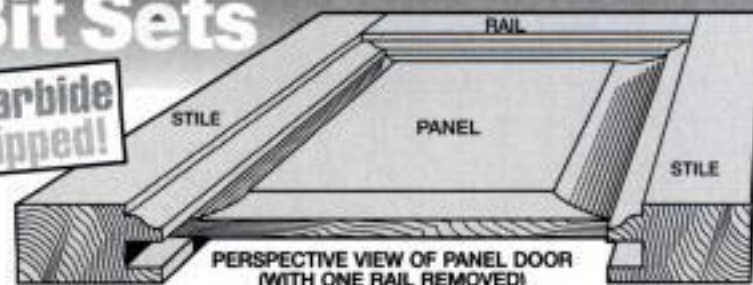
Lengthen pin slot with drill bits and files so gate will open fully.

larger slot for the stop pin, you can make them open fully. It only takes a few minutes to modify each one and the difference is noticeable.

James Rucker
Houston, TX

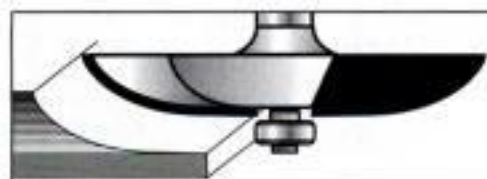
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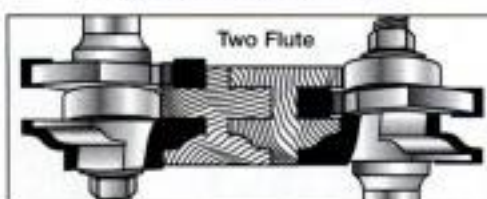


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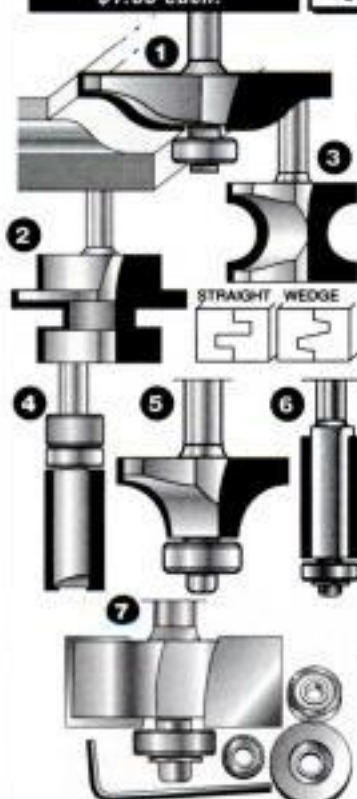
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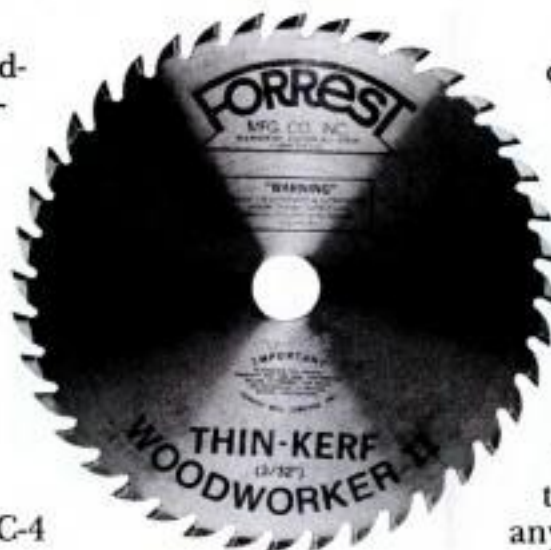
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Building Kitchen Cabinets

Filling a room with cabinets begins with the basic box

by Paul Anthony

This is the first of many articles on cabinetmaking. In future issues, we'll cover cabinet doors, drawer-making, countertops, cabinet installation and other topics of interest to woodworkers who want to build professional-quality cabinets.

Visit any home center or building supply outlet and you'll see cabinets by the kitchenful, displayed in an impressive array of styles and configurations. But if you were to remove the doors and drawers and lift off the countertop, you'd simply see a collection of connected boxes.

Building a kitchen all begins with the basic box. And if you have a tablesaw and a router, you have the wherewithal to fill any room with cabinets—whether it's a kitchen, bathroom, laundry room or workshop.

There are two basic styles of plywood case cabinetry. *Face-frame* cabinets are boxes with a solid wood "face frame" attached to the front for strength and easy fastening of door hinges. *Frameless*, or "European," cabinets are built without face frames. The doors are attached using special "Euro" hinges. (See AW #46.) Frameless cabinets are becoming more common in the U.S., but face-frame cabinets still dominate.

In this article, we'll cover face-frame cabinet design and construction, starting with key dimensions and construction details. Then we'll discuss designing and making the face frames. Finally, we'll show you how to combine base and wall cabinets in a well-planned kitchen. ►

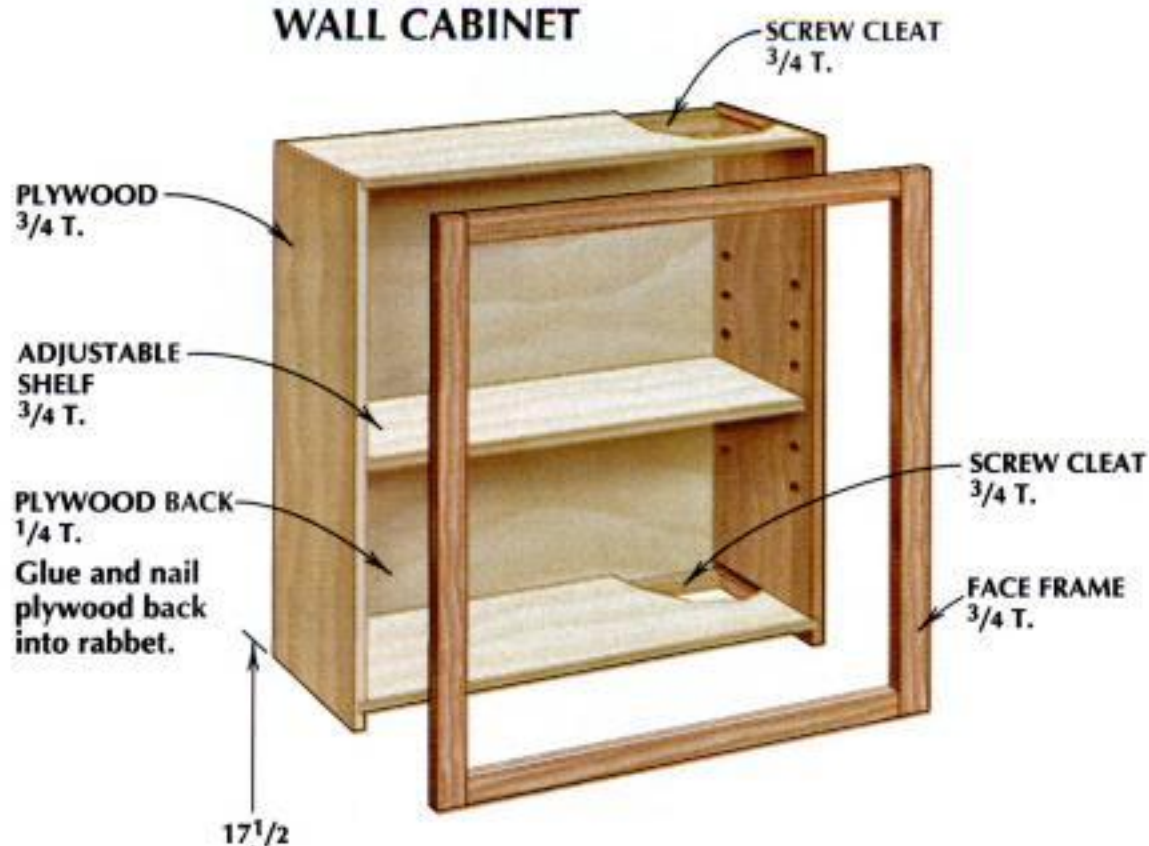
PAUL ANTHONY is an associate editor of AMERICAN WOODWORKER.

PHOTO COURTESY OF RSI

KITCHEN CABINET CONSTRUCTION

Here is one widely accepted method of constructing plywood cabinets with dado and rabbet joints. You can use biscuit joinery if you prefer, but maintain the standard cabinet depths and base cabinet height as shown here.

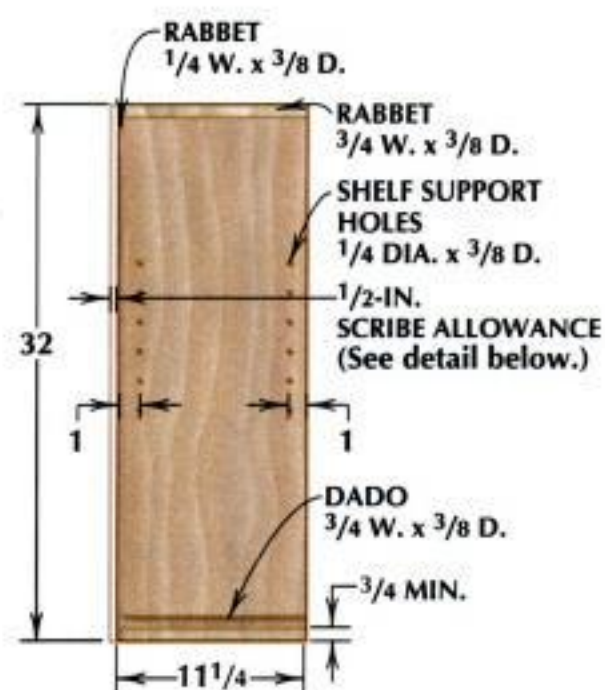
WALL CABINET



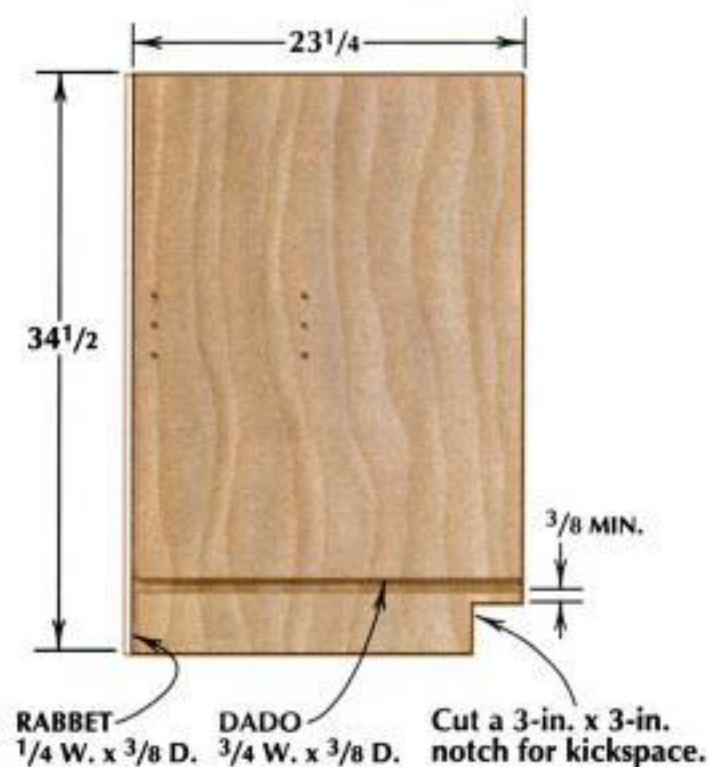
BASE CABINET



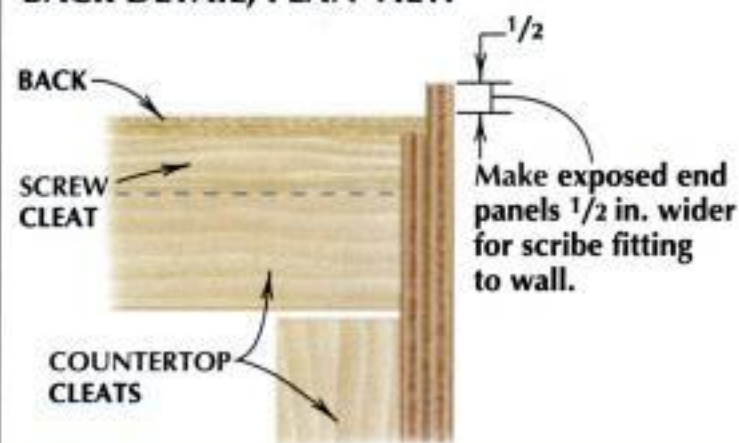
WALL CABINET SIDE



BASE CABINET SIDE



BASE CABINET BACK DETAIL, PLAN VIEW



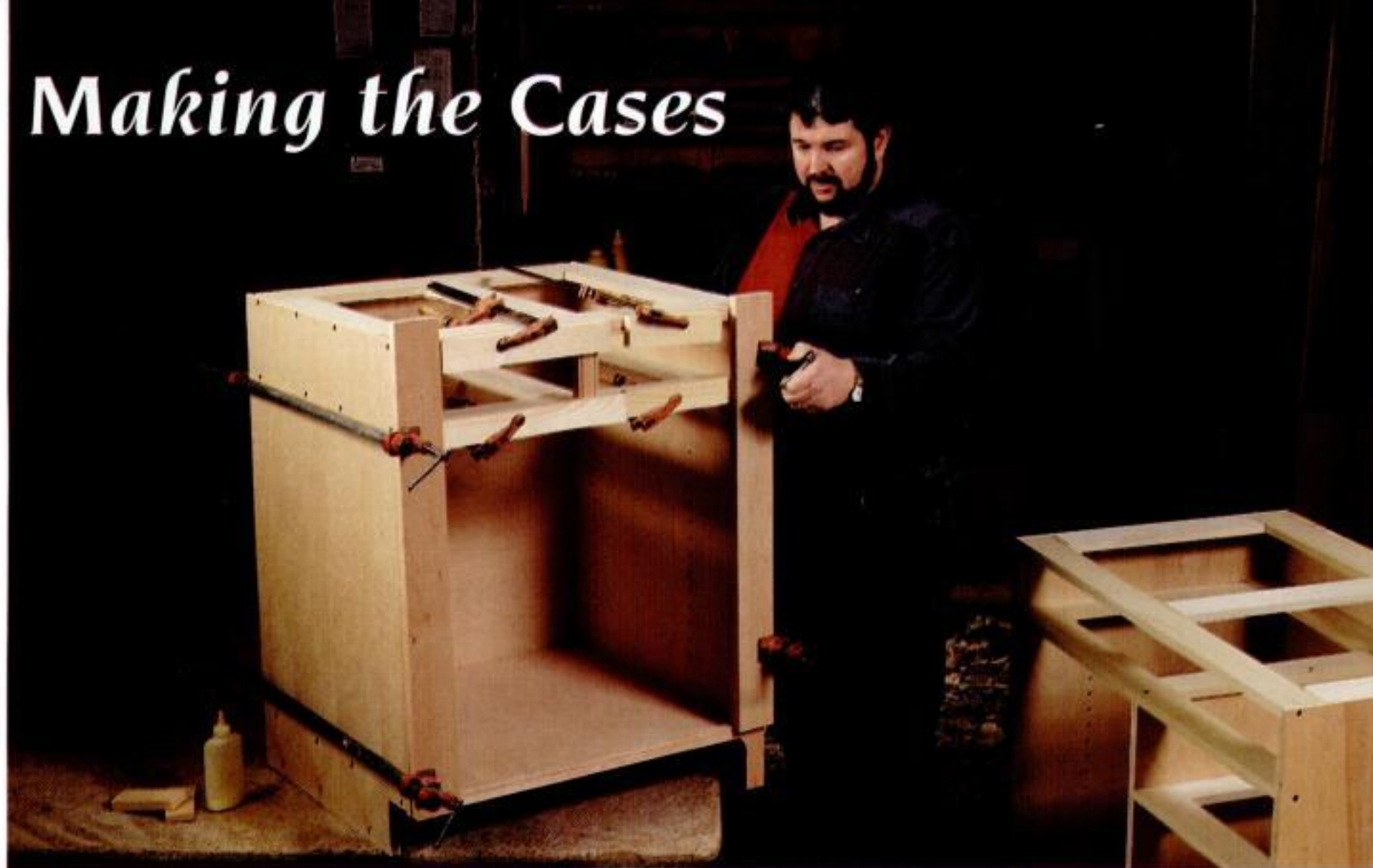
FOR MORE INFORMATION

See the following books for more on designing and building basic cabinets:

Cabinets and Built-Ins by Paul Levine (1994, Rodale Press, 33 E. Minor St., Emmaus, PA 18098)

Professional Kitchen Design by Murray Shaw (1995, Craftsman Book Co., Box 6500, Carlsbad, CA 92018)

Making the Cases



Humble beginnings. Beautiful cabinets begin with simple boxes, usually assembled with glue and biscuits or drywall screws. Glued-on face frames add rigidity and a finished appearance.

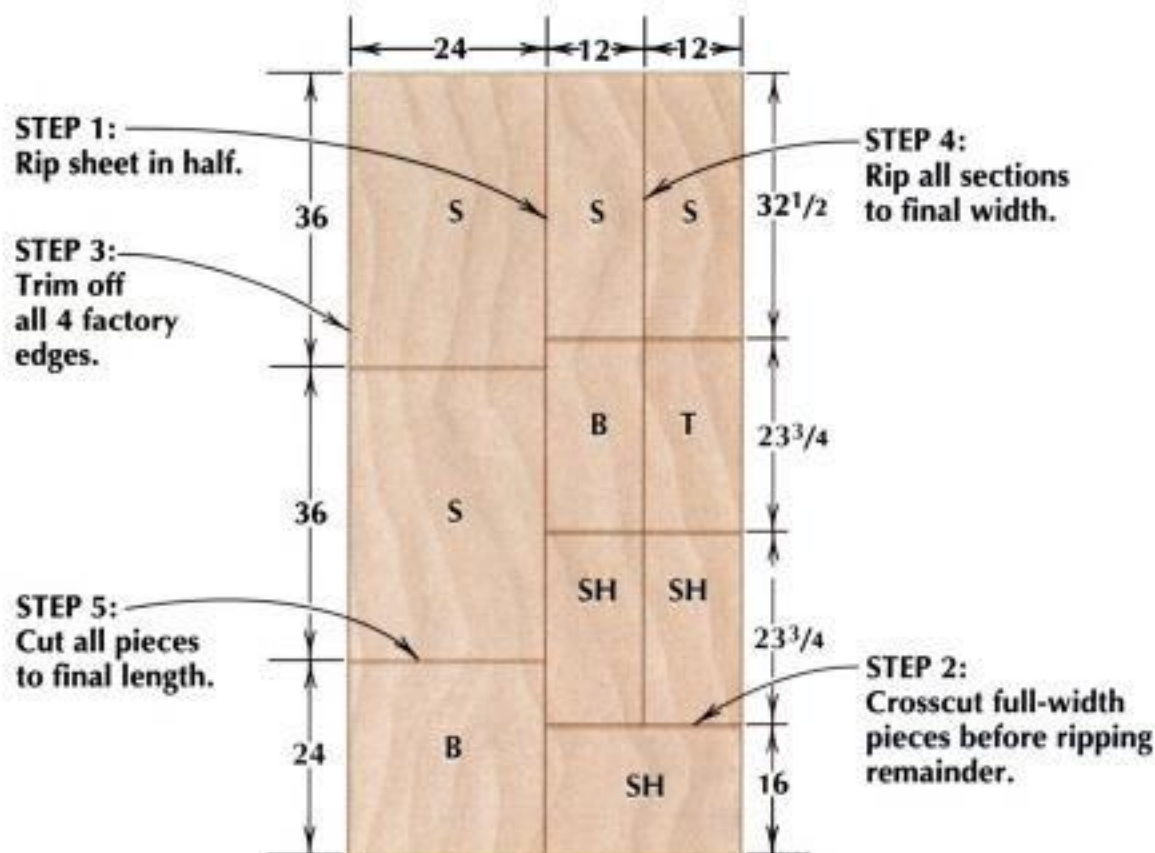
Kitchen cabinet construction varies from maker to maker, but the basic design principles remain the same: Cases are made of plywood or particleboard and usually include $\frac{3}{4}$ -in.-thick strips, or *cleats*, at the back for screwing the cabinets to the wall. Base cabinets also include top cleats for attaching a countertop. Base cabinets have a “kickplate” or “toekick” at the bottom, and wall cabinets include a recessed area underneath for undercabinet lighting.

The drawing on page 37 shows one widely accepted method of construction. Investigate various construction methods by visiting friends’ kitchens or home supply stores that sell cabinets. You can join cases together any way you like—from nailing or screwing into dadoes to splining or using biscuits. Many professionals simply dado, then glue and nail the boxes together.

Don’t casually change the standard cabinet depths or heights shown on page 37. These standard sizes were not only developed to suit the average person; they also make best use of 4x8 sheet goods. (See drawing, right.) And radically altering the dimensions, particularly of kitchen cabinets, can affect the resale value of your home.

GETTING THE MOST FROM YOUR PLYWOOD

Whether you use a computer program or a sheet of graph paper, it makes sense to optimize your panels when building cabinets. As shown here, a single 4x8 sheet can yield all the case parts for a 24-in.-wide base cabinet and a 24-in.-wide wall cabinet. Dimensions shown are for initial rough cuts.



Key: B = bottom; S = side; SH = shelf; T = Top

Choosing Your Material

Quality cabinets are generally made from hardwood plywood. Parts of a case that won't be visible when a cabinet is installed can be made of less expensive grades. Or you can use a good-quality particleboard if you want to save a few bucks, although the stuff is heavy. (See "Man-Made Boards," AW #43.) For exposed panels on end cabinets, use premium-grade hardwood plywood.

Laying Out and Cutting the Parts

Lay out the cabinet parts for the best use of your sheet goods. An example layout is shown on the opposite page. Label the parts as you lay them out on the panels.

When you're cutting out the parts, it's wise to cut away the factory edge on plywood to help ensure clean, strong joints. A good cutting sequence is shown opposite. When crosscutting sheet goods, a tablesaw "cutoff box" can be a great help. (See AW #40.)

When cutting the parts to finished size, remember to allow an extra $\frac{1}{2}$ in. of width on exposed panels for scribing to walls during installation. (See Base Cabinet Back Detail, page 37.)

CUTTING CASE JOINTS

Here's a simple procedure for cutting case rabbets and dados on the table-saw. You'll save time because only one cutter adjustment is required. First, adjust your dado cutter to match the thickness of your panel stock. Raise the cutter $\frac{3}{8}$ in. into a wooden auxiliary fence, with $\frac{1}{4}$ in. of the cutter's width exposed. Then follow the sequence in the drawings below.

Laying Out and Cutting the Joints

Next, lay out the rabbets and dados as shown on page 37. Also lay out dados in case tops and bottoms for any vertical partitions. (See drawing, page 42.)

Although you can rout the dados and rabbets, cutting them with a dado head on the tablesaw is quicker. See the sidebar below.

Making the Cleats and Kickplate

Use solid wood to make the cleats for fastening cabinets to the wall. (See drawing, page 37.) A cleat should be fastened between the cabinet sides with screws, or with 6d finish nails if you're fastening into exposed cabinet sides. Notch any interior cabinet partitions to fit around the cleat, and screw and glue the cleat to the partition.

Make the kickplate to finished thickness and width but a bit longer than it

needs to be to cover one straight run of base cabinets. It's best to attach the kickplate after installing the cabinets. That way, you can scribe it first to fit humps in the floor.

Assembling the Cases

A flat surface is crucial for case assembly. And a pneumatic nail gun can speed the process considerably. Using glue and 6d finish nails or drywall screws, join the top and bottom of a case to the interior partition if there is one. Then attach the sides. Lay the case on its front edges, get it square and hold it there by installing the back with glue and 1-in. brads or staples.

Drilling the Shelf-Pin Holes

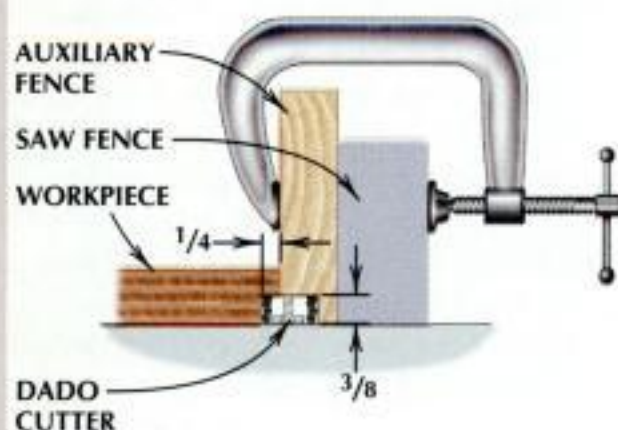
You can drill the shelf-pin holes before or after assembling the cabinets. To make quick work of the job, use a boring guide made from a length of $\frac{3}{4}$ -in.-thick plywood.



Tablesaw technique. Making dados and rabbets is simply a matter of changing the fence position. Use the cutting sequence shown below.

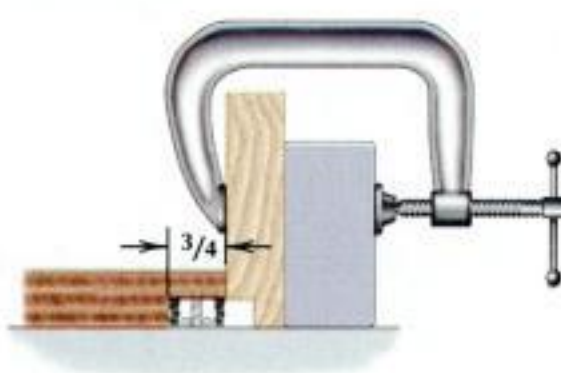
Step 1

Rabbet for back panels.



Step 2

Rabbet for the top panels of wall cabinets.



Step 3

Dado for all interior partitions.



Making Face Frames

FACE FRAMES FOR BASE CABINETS

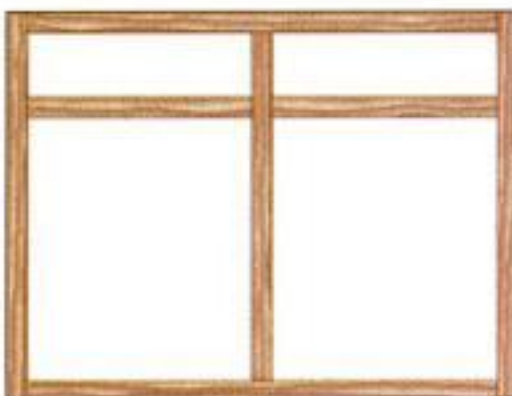
Face frames divide the cabinet opening for doors and/or drawers. Here are some basic design guidelines:

- ▼ Stiles and rails are typically 1½ in. to 2 in. wide.
- ▼ Top drawer openings are usually 5 in. high.
- ▼ Stiles on base cabinets should line up with stiles on wall cabinets.
- ▼ Stay within maximum widths for door and drawer openings as shown below.

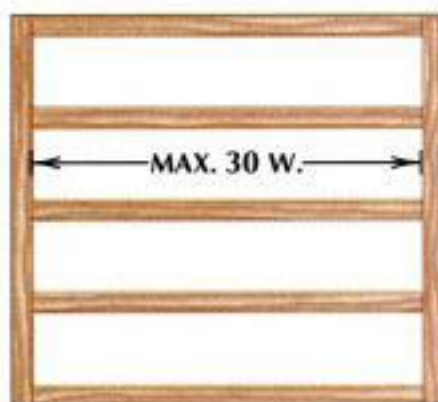
SINGLE DOOR WITH DRAWER



DOUBLE DOOR WITH DRAWERS



FOUR-DRAWER



Face frames help stiffen cabinets, hide plywood case edges, and provide mounting for hinges. Rails and stiles are usually the same width—typically 1½ in. to 2 in. wide—but you can vary them to achieve visual balance. For instance, if you plan to install molding on upper cabinets, you can widen the top rail so that the part exposed below the molding will equal the width of the bottom rail.

On adjacent cabinets, the outer stiles will be screwed together, so they should overhang the cabinet sides ⅛ in. to ¼ in. (See drawing, opposite.) But don't widen the face frame to create the overhang; make the cabinet slightly narrower instead. When a stile will butt to a wall, allow ¼ in. to ½ in. of overhang. This way, when you're installing the cabinets, you can scribe the stile to fit neatly against any irregularities in the wall.

On an end cabinet with an exposed panel, you have several options for aligning the stile to the panel. (See drawing, opposite.) A face frame that's trimmed flush to the case side gives the nicest finished appearance, but it involves planing, scraping, or sanding away any overlap. A proud face-frame edge saves you the work of trimming but doesn't look quite as nice. As a tradeoff, you can slightly chamfer the mating edges of the face frame and the panel, creating a shallow reveal.

For cabinets that will have side-hung drawers, you'll need to shim out the inside of the cabinet flush with the inside of the face frame. (See main drawing, opposite page.) To simplify the shim installation, overlap the inside of the stile by the thickness of commonly available plywood. This saves you the trouble of milling stock to an odd thickness for shim material.

You can attach the face frames with nails and glue, putting the holes afterward. Or you can just glue and clamp them, which takes more time but gives a neater look.

5 WAYS TO JOIN FACE FRAMES

HALF-LAPS



These joints are strong and easy to make on the tablesaw. Lap-joined face frames will have some exposed end grain which will influence appearance.

How to do it: You can use a tenoning jig to cut the joint, as shown above, or you can cut away the waste with a dado set. To cut laps in the middle of rails or stiles, use a dado set or take multiple passes over your saw blade.

MORTISES & TENONS

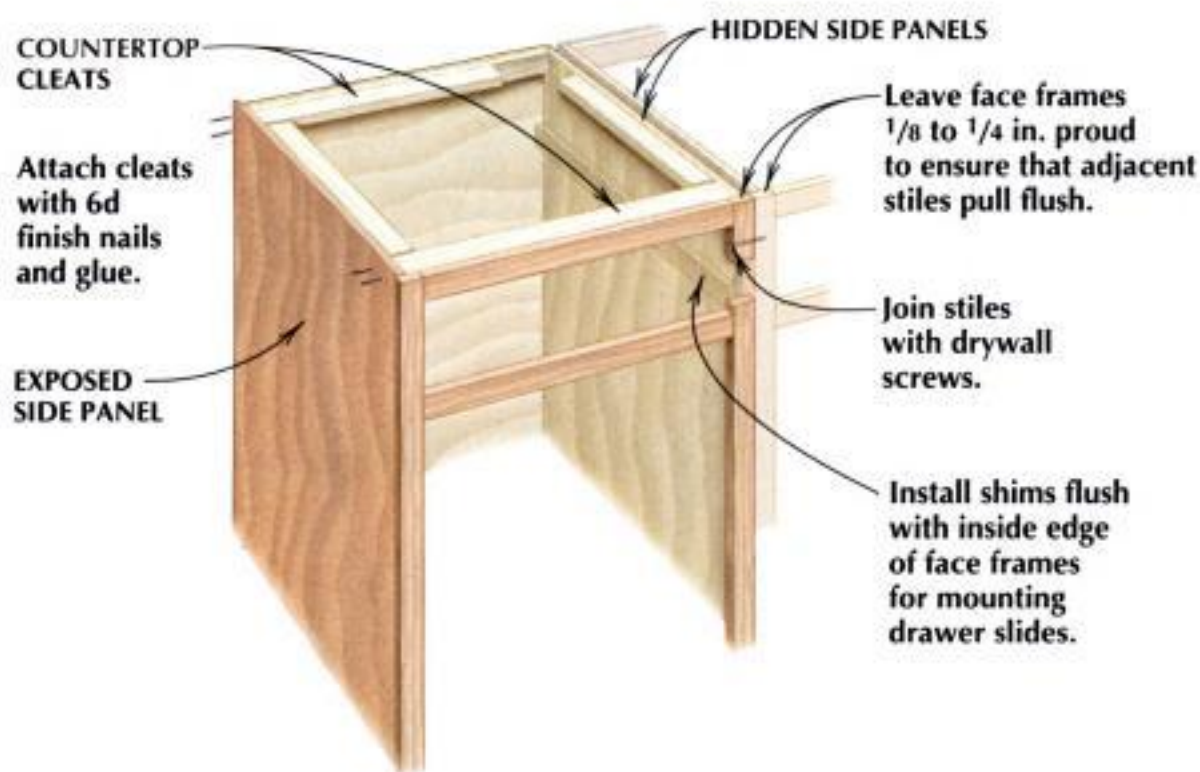


Although mortise-and-tenon joints are more time-consuming to make than other face-frame joints, they're super-strong and represent top-end quality.

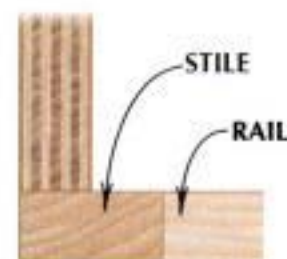
How to do it: Cut mortises with a fence-guided plunge router, as shown above, or with a hollow-chisel mortising bit on a drill press or mortising machine. Cut tenons on the tablesaw using a tenoning jig or dado set.

ALIGNING THE FACE FRAME

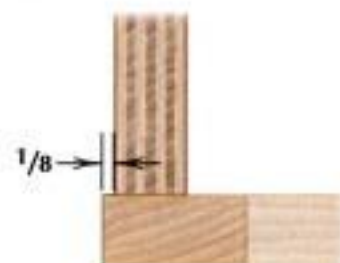
There are three common ways to align a face frame with the side of a cabinet. All three are acceptable for exposed ends. But where cabinets meet, it's best to align the face frames slightly proud. This ensures that you'll be able to pull the adjacent stiles tight with drywall screws.



FLUSH
(Looks the best.)



PROUD
(Easiest.)



CHAMFERED
(A good compromise.)



BISCUITS



You can't beat biscuit joinery for speed. And biscuits allow some lateral movement for alignment during assembly.

How to do it: Ryobi's mini-biscuit joiner (above) cuts slots small enough to remain hidden on most face frames. But you can get similar results with a router and slot-cutting bit. When using very small biscuits, cut two slots at each joint. Make sure frame members are aligned flush during glue-up and clamping.

DOWELS



Dowels are almost as quick as biscuits if you have a self-centering doweling jig (above) or one made precisely on the drill press.

How to do it: Precise drilling is critical; dowels leave no room for adjustment. Bore for two dowels at each joint. Set hole depth to between $\frac{3}{4}$ in. and 1 in. Cut your dowels $\frac{1}{8}$ in. shorter than the combined hole depth, and use fluted or grooved dowels for good adhesion.

POCKET SCREWS



Widely used in the cabinet industry, pocket screws allow you to remove your clamps as soon as the joint is screwed fast.

How to do it: Drilling pocket holes requires a special jig and bit. The Kreg jig (shown above) is one of several available from common mail-order suppliers. Drill into the back of frame members; then use glue and two screws at each joint.

Laying Out a Kitchen

by Ed Brader

The kitchen is the heart of the home: People just seem to gravitate there. And a well-designed kitchen can improve your house's value. So whether you're building a new kitchen or remodeling an old one, it's crucial to factor convenience and appearance into your overall design.

Certain design rules-of-thumb apply to most kitchens, as shown below and opposite. Many kitchens involve special designs to fit particular needs. But here's a general overview of the process:

Step 1: Carefully measure the room and draw a floor plan to scale. Note the exact distances between door and window casings, as well as any electrical or plumbing fixtures that you plan to keep.

Step 2: Choose your sink, dishwasher, stove, refrigerator and any other built-in

appliances. Get their dimensions from the manufacturer so you can determine cabinet sizes.

Step 3: Determine which kitchen configuration best suits your space and your routine. Four common examples are shown on the opposite page.

Step 4: Locate the appliances on your floor plan and in elevation drawings. Some guidelines and examples are shown below and opposite.

Step 5: Subtract the appliance dimensions from the overall dimensions of the room, then divide the remaining space up into the sizes and types of cabinets that you want to fill the space. The suggestions in the drawings below and on the opposite page will help you. Make plan views and elevation drawings of the cabinets to scale.

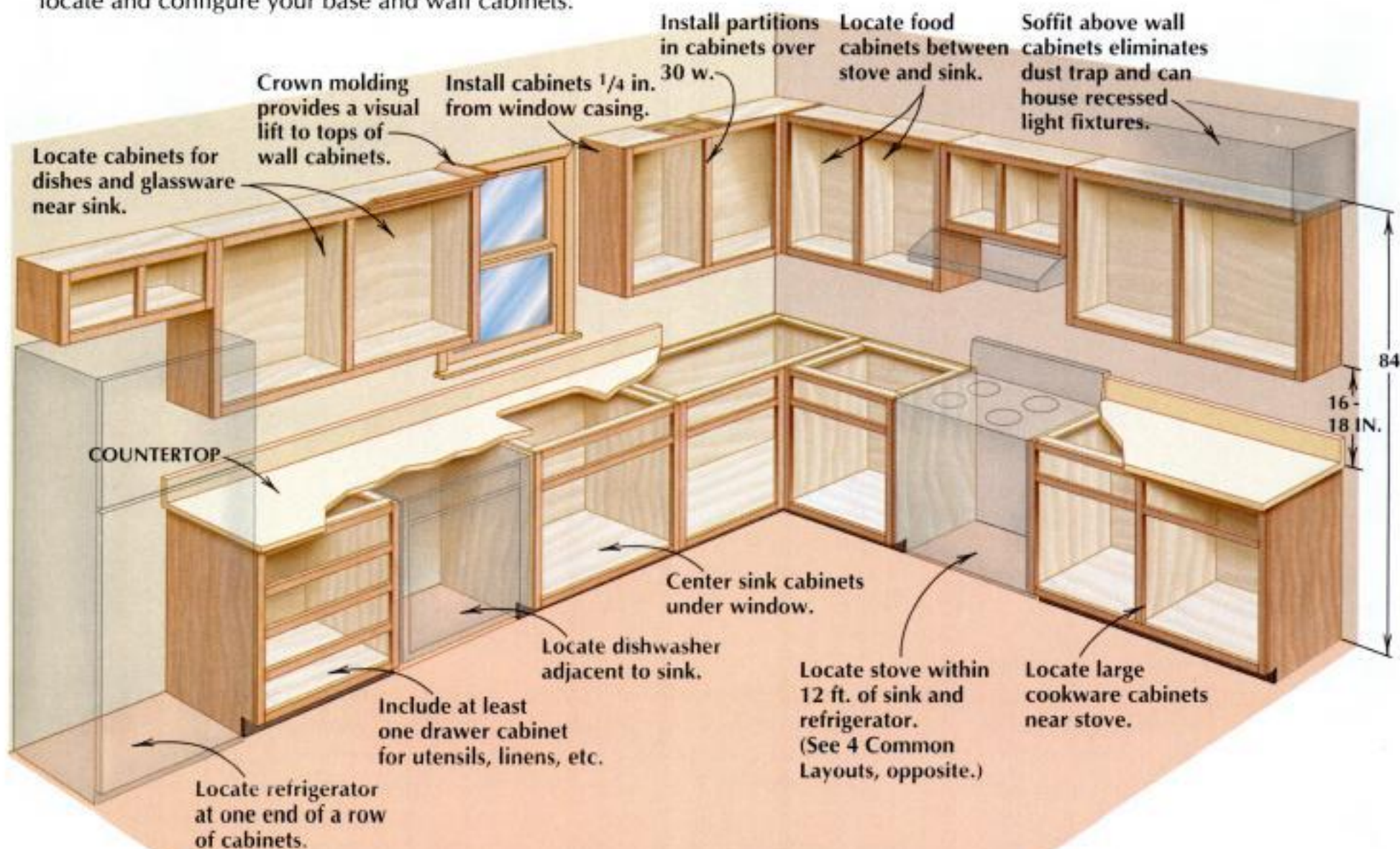
In your drawings, remember that the face frame represents the full width of a cabinet (e.g., a 24-in.-wide cabinet has a 24-in.-wide face frame). If a cabinet will be installed adjacent to another, make the cabinet box narrower to create the necessary overlap, as shown in the drawing on page 41. When you're done making the drawings, use them to create a cutting list for building the cabinets.

By the way, remember that if you need to add or relocate any electrical boxes, light fixtures, plumbing or gas lines, you'll have to install them before the cabinets go in. ▲

ED BRADER is the owner of Brader's Woodcraft, in Pennsylvania. He has been designing and building kitchens for more than 20 years.

KITCHEN DESIGN GUIDELINES

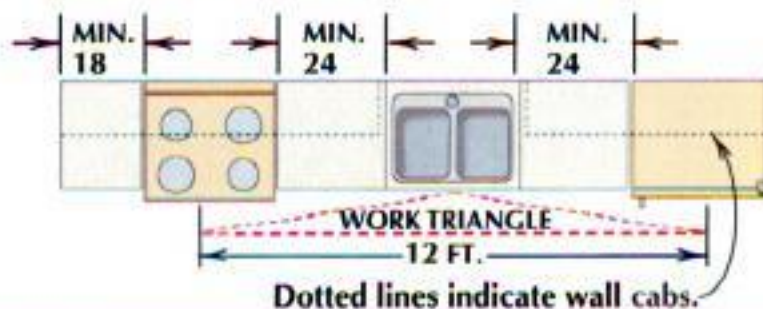
Once you've selected your appliances and determined how much storage space you need, follow these rules of thumb to locate and configure your base and wall cabinets.



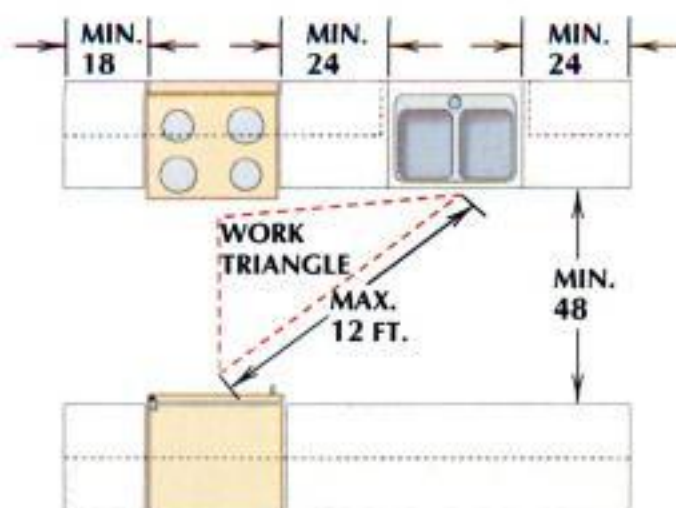
4 COMMON KITCHEN LAYOUTS

An efficient kitchen is organized around a step-saving "work triangle" comprised of the sink, stove and refrigerator. No leg of the triangle should exceed 12 ft.

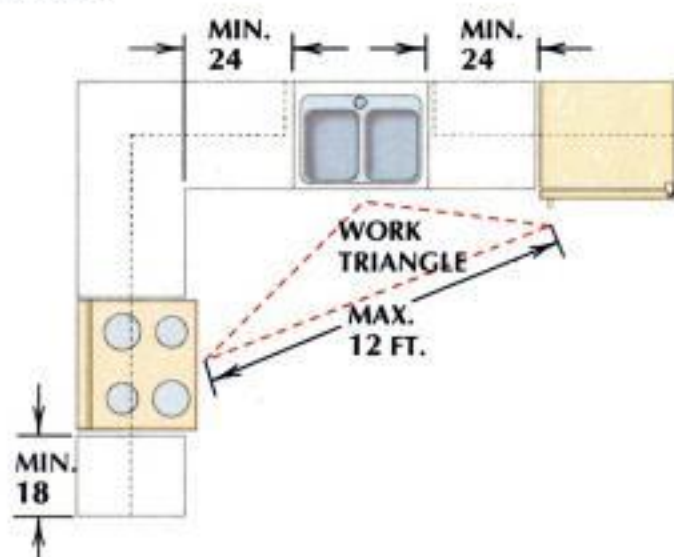
SINGLE-WALL



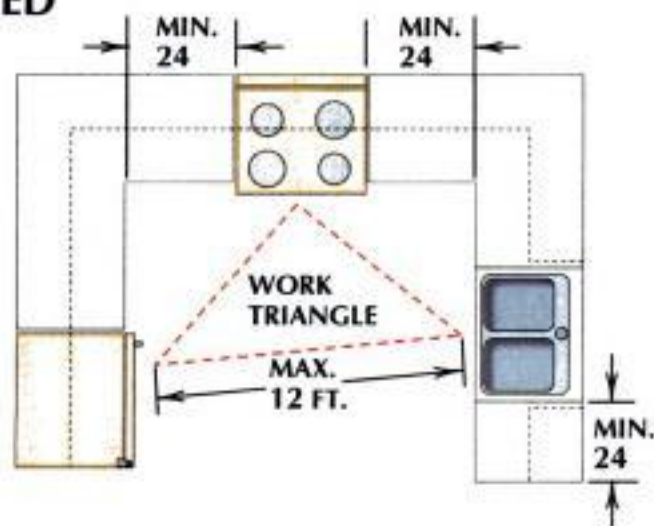
CORRIDOR



L-SHAPED



U-SHAPED



SPECIALTY CABINETS

In addition to standard base and wall cabinets, you can incorporate a number of specially designed cabinets. Three of the most common are shown here.

CORNER CABINET

Fitted with a "lazy Susan," this cabinet utilizes space better than a blind corner cabinet.



ISLAND

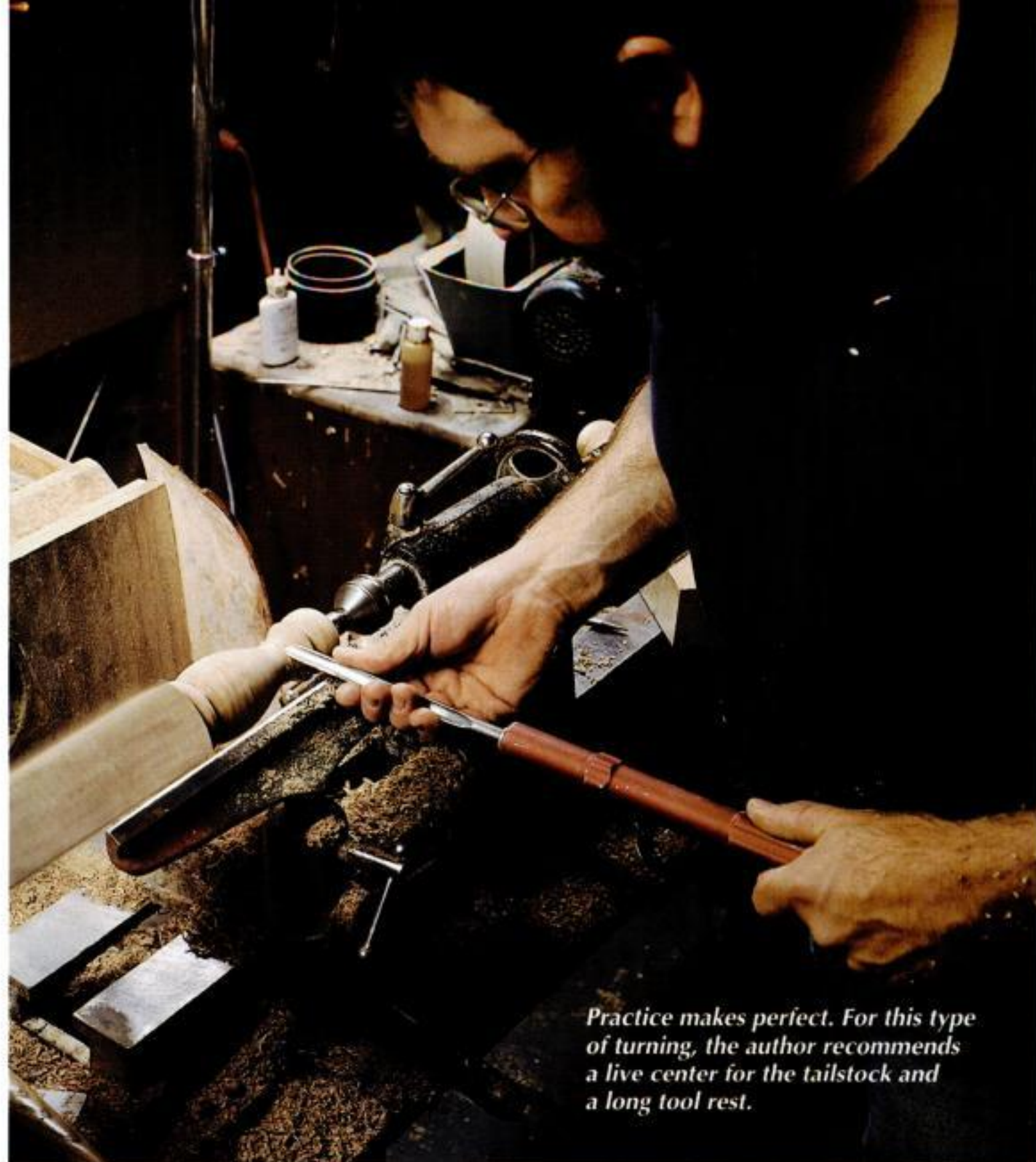
A great way to gain extra workspace for food preparation or serving.



PENINSULA

Creates additional storage. It can also serve as a room divider and breakfast bar.





Practice makes perfect. For this type of turning, the author recommends a live center for the tailstock and a long tool rest.

Turning Table Legs

Practice your skills on a prototype,
then turn four of a kind

by Steve Blenk

You don't need expensive duplicating equipment or fancy tools to turn out a set of table legs. You can do a fine job with a minimum of equipment and setup work. Whether you're a furniture maker who occasionally needs turned table legs, or a turner who likes to dabble in furniture, this spindle-turning exercise is well worth learning.

Here I'll show you how to design a leg profile and then turn a prototype you can use as a template for a set of four legs. If you'd like, you can use these legs to build the TV table on page 52.

Tools and Timber

The length of your legs will be limited by the maximum distance between your lathe's centers. I prefer a live center for the tailstock, since dead centers tend to "drill" your stock. A variable-speed drive system is helpful, but not as important here as it is for bowl turning. For most legs, I run my lathes at about 1,500 to 2,000 rpm. A long tool rest enables you to do more work without having to reposition the rest. And if you plan to turn legs of dining-table length (or longer) it may be helpful to use a steadyrest, so the workpiece has some support

PHOTOS BY TIM SNYDER

between centers. For instructions on making your own steadyrest, see AW #40, page 56.

For leg turning, I like to use several types of gouges as well as a skew, a beading chisel and a parting tool. To transfer diameters, it's essential to have at least one set of calipers.

For this exercise you'll need clear, dry, straight-grained stock. Each blank must be square in section and cut to the finished length of the leg. Prepare at least five blanks instead of four. The extra one is your prototype, and that's the piece to turn first. On all leg blanks, it's crucial to mark the centerpoint on each end precisely. Locate the point by crossing diagonals, and mark it with a sharp awl.

Start with Graph Paper

I like to design leg profiles at full scale, sketching on 1/4-in. graph paper. If you use this approach, be sure to check the graph paper you're using: Sometimes the grid isn't exactly 1/4 in. square.

Mark out the finished length of your leg, draw a centerline, and start to experiment with different profiles. As shown in the drawing at right, most legs have a square top section where rails or apron pieces join. The turned profile is made up of different shapes, or elements.

By folding your paper along the profile centerline and cutting out the proposed profile, you can create a full-scale "silhouette" of your leg. This gives you something to hold up, examine and fine-tune. When you're satisfied, make a template

BASIC LEG ANATOMY

Whether long or short, most turned leg profiles consist of at least several basic shapes or elements. To design a leg profile, size the individual elements, then combine them to create a profile that's both functional and attractive. Here's a brief description of basic leg profile elements. See page 53 for the dimensions of this particular leg.

SQUARE SECTION

The unturned part of the leg that contains the joinery for aprons or rails.

CHAMFER

A good way to go from square to round, or from a broad diameter to a narrower one. Cove cuts are also good for this.

BEAD

Can be used singly or in multiples. It's an excellent transitional element, especially when used to separate two broader elements.

BELLY & HOLLOW

Combining these two elements creates a gentle ogee profile. The hollow is usually the narrowest part of the leg.

V-GROOVE

Created with two chamfer cuts, the groove forms a horizontal line that effectively divides the vertical form of the profile.

BALL

A visually pleasing way for any leg to meet the floor.



FROM SQUARE TO ROUND



Break the corners. With the blank stationary, use a skew chisel to make an angled cut toward the foot of the leg. This will help prevent chipout.



Cut the transition. Introduce the tip of a sharp-pointed gouge to the blank very gradually. Work both sides alternately.



Turn to round. A large gouge makes quick work of roughing out the cylindrical form. Make the diameter as large as possible.

SHEARING, NOT SCRAPING

Spindle turning uses both shearing and scraping techniques. A shearing cut, shown at right, produces smoother surfaces and lets you remove material more quickly. To make a shearing cut with a skew chisel or gouge (a gouge is shown in the photo) hold the tool at approximately a right angle to the workpiece. Turn the handle to put the bevel in contact with the workpiece, and carefully introduce the cutting edge. A shaving signals correct technique. Advance the edge into the work and along the tool rest as necessary to cut your profile.

—S.B.



Shearing makes a shaving. Keep the tool's bevel in contact with the workpiece, and carefully introduce the cutting edge.



Transfer the details. Working from your template, mark the transition lines between details and all high points and low points.



Cut the bead. Use a beading tool (shown) or skew chisel to form the bead, cutting "downhill" from the large diameter.



Calipers are important. Hold the calipers lightly in the groove while parting to transfer diameters from your template to the workpiece.

by gluing the negative side of the profile to any stiff material—hardboard, foam-core board and thin plywood "doorskin" all work well. Cut out the shape on the bandsaw or with a jigsaw, rasp and sand as necessary, and you're ready to go. (See center photo, left.)

Turn a Prototype First

No matter how much I like my "paper" leg, I almost always turn a prototype to make sure I've got the proportions and feel I'm after. You can also refine your choices of tools and techniques as you turn the prototype.

Mount your prototype blank between centers, then use a pencil and square to mark the shoulder on the leg where the turned part will begin. With the lathe off, use a skew to lightly break each corner at the mark, slanting toward the end that will be round. (See left photo, page 45.) This nick helps prevent the corner from chipping off when you begin turning.

Now start the lathe, and carefully begin your chamfer cut to round at your transition marks. I make this cut with a thin, long-pointed spindle gouge. (See center photo, page 45.) Work as you would for a V-cut, removing material from each side alternately. Be careful with the side that will remain square: The cut should be made by shearing rather than by scraping. (See sidebar, above left.)

Once you have completed this shoulder, proceed to rough off the rest of the spindle to round, leaving the maximum possible round diameter. (See right photo, page 45.) I use a large roughing gouge for this, and I am not particular about results as none of it will be the final surface. Now, with your template or story stick, mark the main detail points on the cylinder with a pencil. (See center photo, left.) For the leg shown here, these points are (from left to right) the edges and center of the bead, the thickest part of the belly, the narrowest point of the hollow, the high and low points of the V-cut, and the largest diameter of the ball.

I jumped the gun in turning the bead next. But it's fine to turn the bead at this stage, if you've marked its edges and large diameter in the previous step. When turning round shapes like the bead and ball, I work "downhill," from the larger diameter to the smaller. I use an old-style beading tool, which looks like an oversize parting tool. Once again, hold the tool's bevel against the workpiece to make shearing cuts.

Now it's time to transfer your template diameters to the workpiece. The object here is to establish important diameters at the key detail points mentioned earlier. The calipers, set to the desired diameters, rub lightly on the parting cut as you advance the parting tool into the work. You're there when the calipers slip across the workpiece. (See bottom right photo, opposite.) To give yourself room to fine-tune the shape, set your calipers about 1/8 in. larger than the desired final diameter.

On a short spindle like the one shown here, I like to work the ends first. The ball is cut the same way as the bead, using the corners of the beading tool to cut "downhill" from the high point of the ball's profile. (See photo, top right.)

Once the bead and ball are done, I work the V-cut above the ball, cutting from alternate sides, using the long point of the skew or spindle-gouge point. Keep your cuts light to avoid catching your tool and chipping the workpiece. (For more ways to avoid catching, see AW #47.)

Then work the belly and the hollow. (See photo, near right.) The skew and a spindle gouge both work well here for initial cuts. Cut from high to low, approaching your parted diameters gradually. To finish up the long taper, I switch to a skew, working with the long point down. As you approach the final profile, trust your eye; it's a very reliable tool for assessing overall appearance.

Sanding comes last. I use 220-grit paper, taking care not to round over any crisp profiles that I've worked to make. A good way to sand the transitional chamfer at the top of the profile is to fold some sandpaper around a flexible plastic ruler, as shown in the far right center photo.

Now pat yourself on the back. Your prototype is complete, paving the way for the set of legs you're about to turn. (See sidebar, right.) With every set of legs you turn, your skill will increase, and you'll be able to work with confidence in the final result. The satisfaction of seeing your own turnings in a piece of furniture is worth the effort. ▲



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is a professional
woodturner and
contributing editor
to AW. He lives in
Washington state.



Form the ball. Cut this detail like a large bead, using a beading tool or skew chisel. Work from large diameter to small.



Taper the middle. Remove waste with the gouge, cutting to your parting diameters to form the belly and hollow.



Sanding trick. Fold sandpaper around a flexible plastic ruler to smooth the chamfer.

MAKING MULTIPLES

Once completed, the prototype can replace your template or story stick. It's easy to pencil in the detail points as shown in the photo. And you can use the prototype to set your calipers for making parting cuts at detail points. It's not a good idea to use successive legs as patterns, since this can result in "clone disease," with each piece varying a little more from the original. Stick with your prototype for marking out and setting your calipers.

Follow the turning sequence that you used to make your prototype and you'll get a set of legs that will look identical in your finished project. Perfect duplication isn't necessary, since the legs will be separated, and your eye will be more interested in the overall profile than in the dimensions of the specific profile parts.



The prototype is the template. To turn a set of four "identical" legs, use your prototype or a single leg as your template.

—S.B.

Working With Natural Edges

Make the most of wood's natural beauty

by Stephen M. Metz

Like many woodworkers of my generation, I was fascinated by James Krenov's wonderful books on cabinetmaking in the early 1970s. Krenov's reverence for the grain, color and figure of wood really made sense to me, and it has influenced my work ever since.

My interest in the natural variations of wood has led me to specialize in furniture and woodwork made with "wane-edged" lumber—boards cut with the natural edges of the tree intact—and other natural-edged forms. Natural-edged wood has an infinite variety of natural shapes and edge textures, offering design possibilities you won't find anywhere else.

In this article, I'll show you some of the ways I use wane-edged wood in my work and the techniques I use to clean up the edges themselves. In the sidebar on page 51, I'll tell you how to find natural-edged wood, and how to dry and store it for best results.

Designing with Natural Edges

The notion of using natural edges is foreign to many woodworkers. Our materials, machines and methods are based on straight lines and square edges.

Working this way is easy and predictable, but it overlooks an important fact—that nature herself is the greatest designer of all. No woodworker could ever dream up or duplicate the variety and complexity of shapes and textures that natural-edged wood offers. Yet commercial lumbermaking processes are oriented to machining away this unique character.

Learning to design with natural-edged wood requires us to challenge our assumptions. For one thing, you can't assume you'll always have exactly the material you need for a particular project. You're limited by the shapes and sizes of the boards in your collection. That means you'll have to

Open sesame. The polished faces of these maple-burl pulls are like secrets revealed when you open a door.



Bound for glory. Curly, gnarly and bug-eaten tree surfaces like these can lend a distinctive character to furniture and architectural details.

invest some time and effort collecting interesting wood. (See sidebar.)

Then you have to visualize how to use your available boards in functional ways while retaining as much of the natural character of the log as possible: A natural-edged board with just the right shape can fill an awkward space in a room or create an appealing transition between two spaces; a shelf with an interesting natural edge can provide a visual oasis in an otherwise ordinary room; natural-edged handles and other details can completely change the character of rectilinear cases, drawers and doors. The possibilities are endless.

Here are some of the things I think about when designing with wane edges:

Keep it playful. Let the shapes and details of your boards suggest unconventional uses. A board with a severe crook in it may be perfect for wrapping around an obstacle; bent sticks often make great drawer handles.

Exploit differences in width within a board. Boards that vary in width can be used to emphasize the flow of a space. For example, a tapering board used as a shelf can visually widen or narrow a corridor.

Use sequential boards. Boards sawn from the same tree work well when used in series, as in stair stringers and treads (see photo, right), shelves, and cabinet sides. Repetitive shapes can add unity to a project.

Leave as much of the natural edge as possible. Remember, you want the boards to speak for themselves. Avoid excessive edge-sculpting or cutting to fit.

Play off the surroundings. Natural-edged boards can complement or contrast with other materials such as stonework (see bottom photo, right) and painted or polished surfaces.

Learn to love the defects. Bark incursions, pitch pockets—even the occasional punky spot—are part of nature's signature and can add character to a piece.



STEVE METZ builds custom architectural interiors in Pennsylvania.

Continued on next page ►



Railings and balusters. Different types of natural wood edges blend nicely in this balcony railing composition.



A matched set. These graduated maple pulls were bandsawn from a single piece of firewood.



Going down. Sapwood edges reinforce the rhythm of these cherry stair treads cut in sequence from the same tree.



Rough companions. The bold shape and bug-eaten edge of this walnut post blend well with the rough texture of stone.

Working Natural Edges

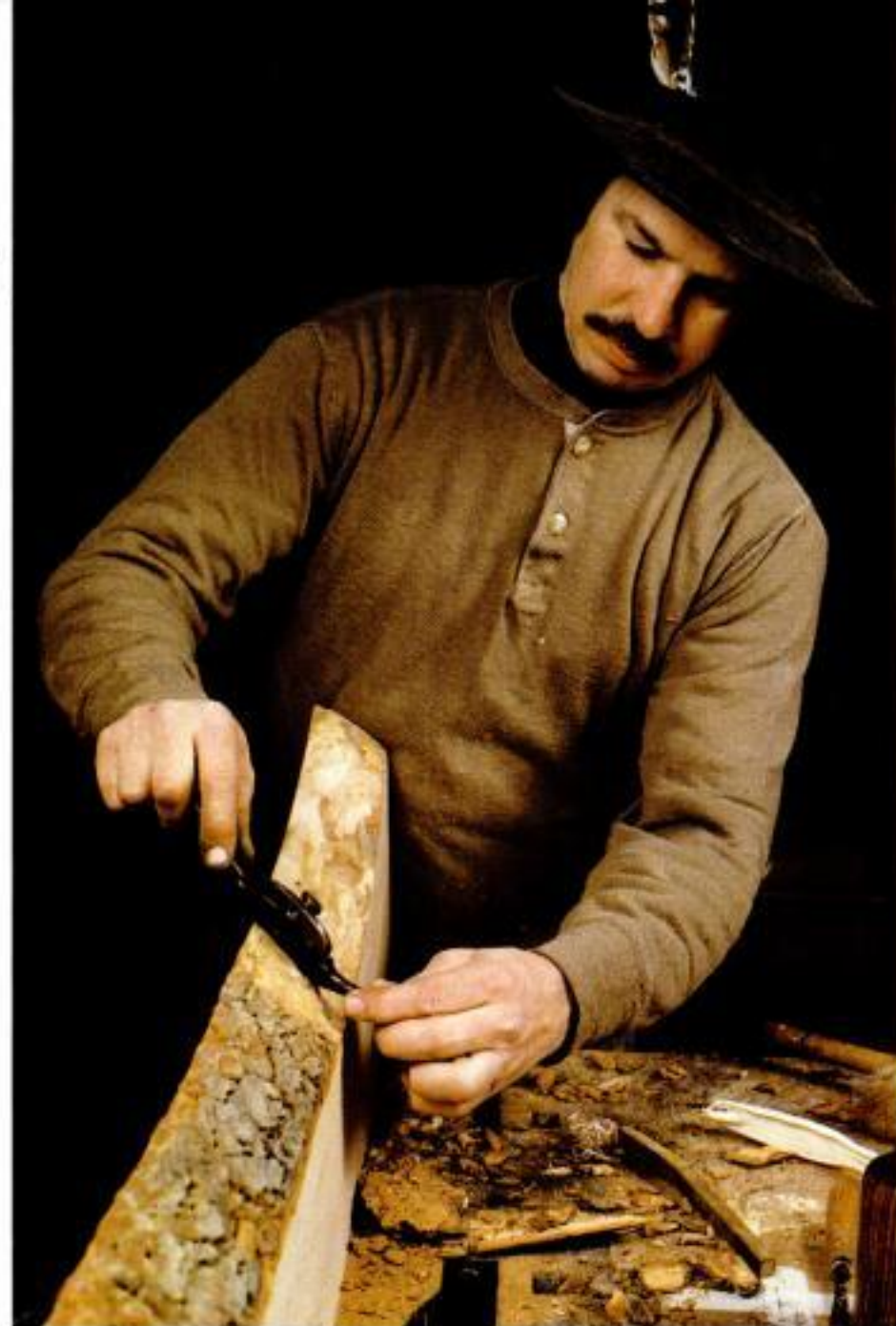
Working with wane-edged boards is no more difficult than working with square-edged stock. You still have to surface the sawn faces of your material and, depending on the design, you may have to figure out how to join the pieces together. But the main difference is in the techniques you use to clean up and prepare the edges. (See photos, this page.)

Here are some tips you may find helpful when preparing natural-edged wood for prime time.

Surface with the bark on. It's good to leave the bark on until you've planed and sanded the faces of a board. Intact bark helps prevent tearout when planing and it helps keep your sanding equipment from rounding over the edges.

Experiment with joinery. Most of the time, I try to use splines and loose tenons for joining parts, but creative use of fasteners—screws, magic wires (see AW #57) and so on—often comes into play. Be willing to concoct unconventional joinery methods.

Choose appropriate edges. Natural edges may be smooth, curly, knobby, prickly, bug-eaten or rotted. My rule of thumb is to preserve the natural edge texture wherever possible. Shelves, cabinet parts and pulls can usually keep their crisp edges without hurting anyone. But a tabletop or a bench shouldn't have sharp or prickly edges, because people will be constantly in contact with them. Here, use a board with a smooth edge texture, and spokeshave or sand the sharp edges where the natural edge meets the faces of the board. ▲



Level the high spots. A spokeshave smooths unwanted nibs and punky spots.



Pop the bark. Pry the bark off natural edges with a dull old bench chisel.



Open wide. Dental tools are great for removing bark from tight spots.



Brush it off. Remove loose debris with a brass brush to avoid harming the surface.

Stocking Up On Natural-Edged Wood

You can find natural-edged wood wherever there are trees, but you won't find it at your local lumberyard or home center; traditional lumber suppliers can't be bothered with the stuff. The good news is that you can zero in on a supply of wane-edged lumber with a few well-placed phone calls to local sawmills and cabinet shops. And your next natural-edged door handle or jewelry box lid may be as close as your firewood pile.

Firewood can be a gold mine for small, interesting pieces of wood. Not only is firewood inexpensive and available, but it's usually split radially—"on the quarter"—so quartersawn stock is just a couple bandsaw cuts away. Quartersawn wood often displays the finest "fleck" (medullary ray patterns) and curl, plus the natural edge is usually at right angles to the face of the board.

Where To Find It

You're most likely to find wane-edged lumber at a local bandsaw mill. (See photo, near right.) Band mills can easily cut wood "through-and-through," even unusually curved or crooked logs.

Your sawyer may not carry a stock of wane-edged boards, but he will usually be willing to custom-mill logs for you. Cultivate a good relationship with him and he'll keep your needs in mind when he comes across unusual timber.

There are thousands of bandsaw mills scattered across the country, so you're likely to find one nearby. Look in the Yellow Pages™ under "Sawmills" or "Lumber—Wholesale."

Drying and Storing Your Wood

There are two options for drying your wood: kiln drying, which is faster but more expensive, and air drying, which takes longer and requires more work.

Kiln drying is fine if you need to use your wood in a hurry, but it sometimes makes the bark difficult to remove. And it keeps bugs from eating away at the cambium, so the natural edges will be clean and sound. Some sawyers have dehumidification kilns on premises, or they can steer you to someone who does.



Stack it right. A well-constructed lumber pile keeps water out and allows unrestricted airflow around the boards.



Through and through. Bandsaw mills are your best bet for custom sawing of irregularly shaped logs.



Bug work. When wood is air dried, insect larvae munch tiny tunnels through the cambium layer, creating unpredictable patterns and textures.

Air drying is my usual choice. It's less expensive than kiln drying, and it encourages insect activity under the bark. I like the unexpected textures these bugs create.

It's important to keep boards flat and to keep water from getting on them as they dry. Build your drying pile on a level foundation, and sticker the wood with dry, uniform sticks lined up vertically about 2 ft. apart. (See top photo.) I drape my pile with polyethylene fabric (available from Shade-Dri, 800-541-3511) that allows air to circulate but keeps rain from getting in. Top your drying pile with roofing material weighted down with rocks or logs.

Air drying takes about a year per inch of thickness. The final equilibrium moisture content (EMC) will vary depending on where you live. If you'll use the lumber for exacting furniture construction, sticker it in a warm, dry place—an attic works fine—until the moisture content stabilizes. A moisture meter will save a lot of guesswork. On a given project, I try to use wood of the same moisture content to avoid wood movement problems.

Once your wood has dried to its EMC, it's safe to restack it in a tight pile in a dry place until you're ready to use it. Stack it neatly, so the boards aren't subject to uneven loads that could cause them to warp or twist in storage. ▲

TV Table

Build the simplest entertainment center of all



Where's the remote? Here's a project you can build in a few days and enjoy for years. A VCR fits neatly on a shelf underneath the TV.

Large, complicated entertainment units are all the rage in this era of electronic gadgets and associated clutter. (See AW #57.) They're great if you have a lot of audio and video gear that you want to house in a centralized location. But suppose you just need a place to park a TV set and VCR?

Consider building a TV table. It occupies very little space, and it does a fine job of hiding the tangle of wires, cables and cords that inevitably trails from your

equipment. The table shown here was designed to make use of the spindle-turned legs Steve Blenk made for the article that begins on page 44. It's made of curly bigleaf maple, but any hardwood or softwood species will do.

Our table will accommodate a typical 27-in. TV and front-loading VCR. For larger or smaller sets—or if you need a wider shelf opening for additional equipment, such as a cable box—you can adjust the dimensions accordingly.

Construction Notes

Joinery—For strength, we decided to build the leg-and-rail assembly with standard mortise-and-tenon joints. (See drawing, opposite.) If you need more information on routing mortises with a plunge router, see AW #57. We cut our tenons with a simple tenoning jig on the tablesaw. (See AW #54.)

When joining parts of equal thickness, you would normally make the tenons just over one-third the thickness of the parts, to balance the strength in the mortise and the tenon. In this case, since the rails are set in $\frac{1}{4}$ in. from the faces of the legs, we opted for $\frac{3}{8}$ -in.-thick tenons.

Sizing the shelf—The surest way to size the shelf accurately is to measure the opening dimensions after you've dry assembled the legs and rails. Add $\frac{3}{16}$ in. all around for the tongues. (See drawing.) Also, measure for the square notches in the corners of the shelf.

Before finishing and assembly, saw or rout an opening in the back of the shelf for your TV cables and wires.

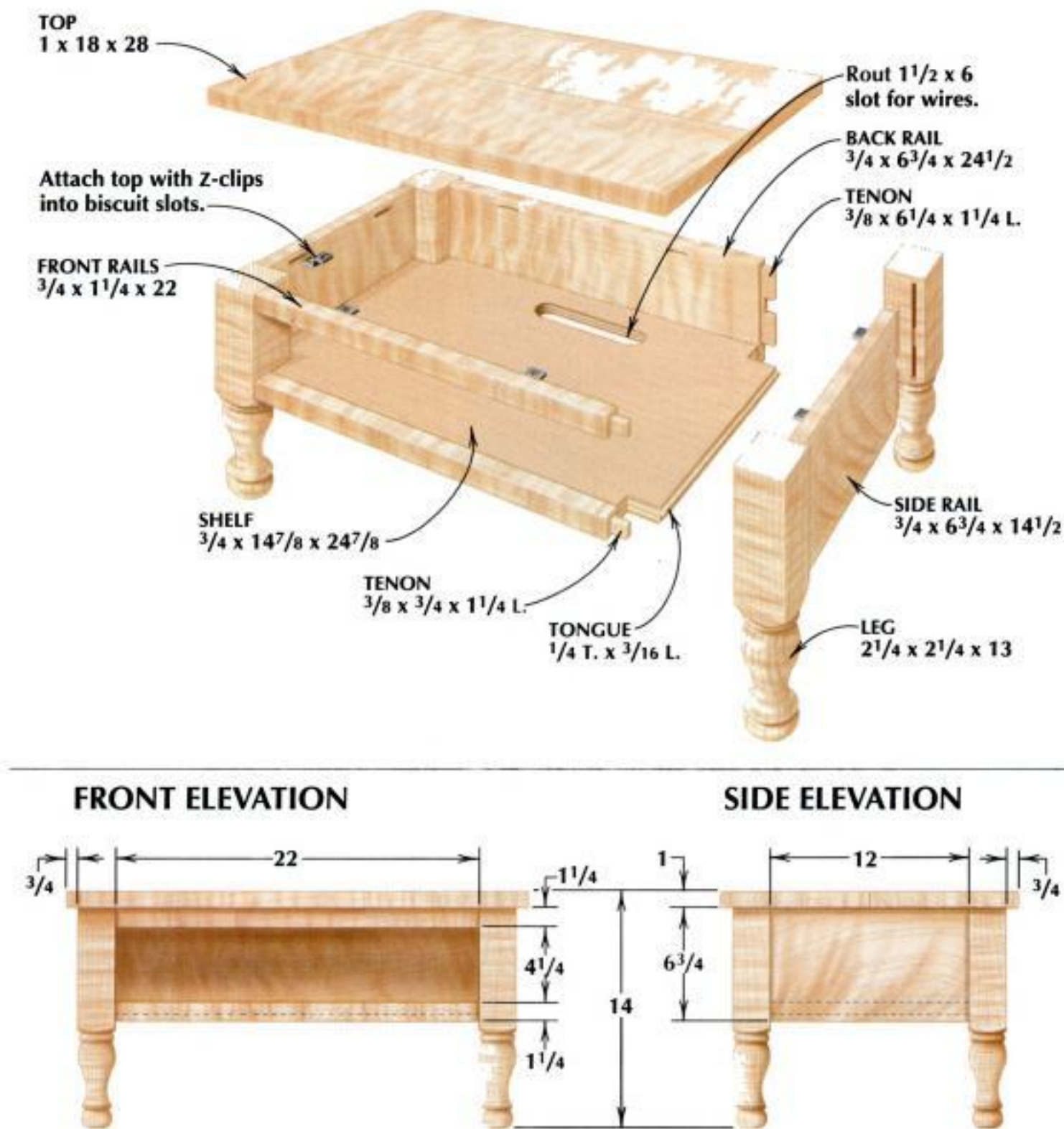
Prefinishing—Since the interior of the VCR compartment will be somewhat difficult to reach after glue-up, there's a strong case for prefinishing the individual parts before assembly—especially if you're spraying or brushing your finish. If you're wiping your finish on with a rag, you can wait until after glue-up. Avoid getting finish in the mortises and grooves.

Attaching the top—We attached our tabletop to the leg-and-rail assembly with metal Z-clips (available from The Woodworkers' Store, 800-279-4441) set into biscuit slots in the tops of the rails. Wooden "button blocks" (see the drawings for "Connecticut Tea Table," AW #49) would also work. You'll have to use a stubby screwdriver to install the clips or blocks.

You could also screw the top directly to the rails if you can conscience the appearance of wood plugs. (After all, the top will most likely be hidden by a television.) Taper or counterbore the screw holes from the underside of the top, so the screws can pivot slightly as the top expands or contracts. ▲

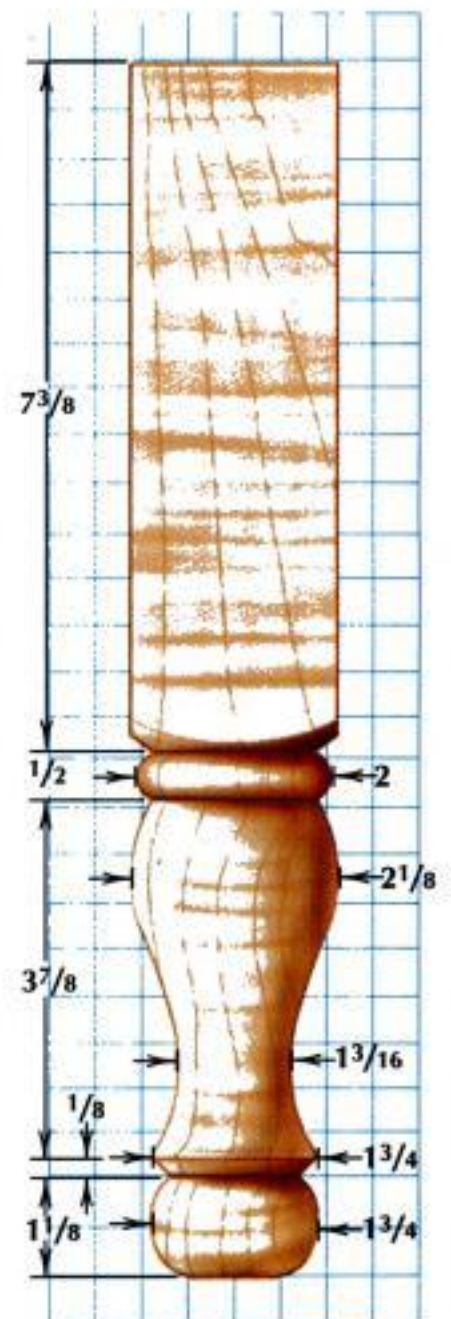
TV TABLE

The rails of this sturdy table are joined to the turned legs (see page 44) with mortises and tenons. To size the plywood VCR shelf accurately, preassemble the legs and rails and measure the opening directly.

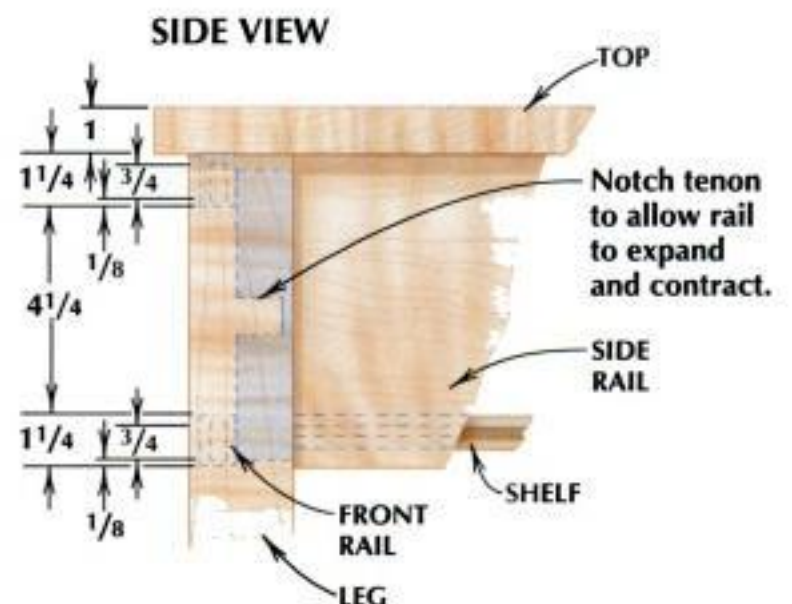
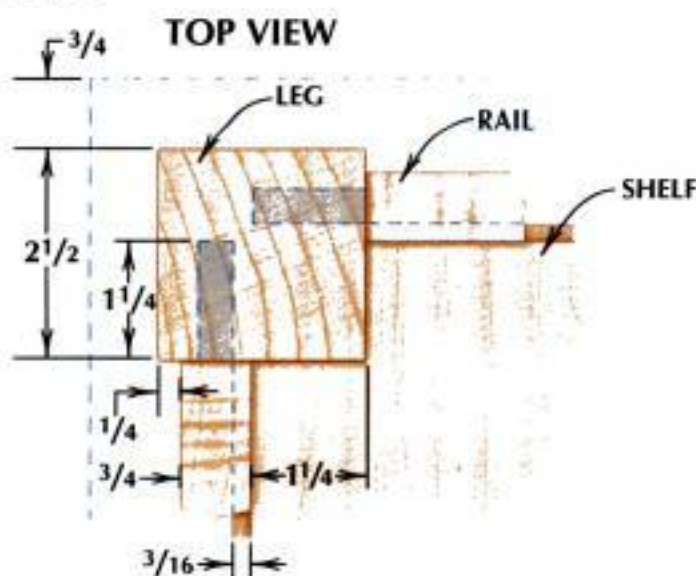


LEG DETAILS

1 SQUARE = 1/2 IN.



JOINT DETAILS



BUYER'S GUIDE TO **Wood Putty**

How to choose
and use the goop

Hardware stores, home centers and mail-order catalogs are crammed with cans and tubes of the stuff: Wood Rebuilder™, Ezy-Fill™, Plastic Wood™, Rock Hard™, Miracle Wood™. The product names are persuasive, and the promise is clear: This artificial wood can fool the eye and cover a multitude of sins, from dents made by an errant hammer to the accidental dings and depressions that eventually mar all manner of furniture, trim and other woodwork.

But if you've spent any time with this goop, you know that the camouflaging claims on the can are often overstated. It's difficult to make a wood-putty patch that truly disappears into the surrounding wood. The texture of the patch can differ from that of the surrounding wood. And when you apply a clear finish or stain, the patch can emerge with

eye-popping clarity. Even when a patch is painted, shrinkage can sometimes cause the repair to telegraph its location through the paint.

Despite these problems, wood putty plays an important role in all kinds of woodworking. Wood putty remains the preferred way to fill the holes that result from countersinking finishing nails. And it's much quicker to repair a small hole or dent with a putty patch than with a solid wood patch, or "dutchman." As you'll see on the pages ahead, it is possible to make a nearly invisible patch if you choose the right product and use grain-painting techniques. In this article, we'll help you pick the right putty and maximize its defect-hiding potential.

For this test, we rounded up 29 products and tested their performance when

*Plenty of products.
To test 29 wood putties
we filled hundreds of holes,
sanded the patches flush
and then coated them
with clear finish and stains.*



treated with different finishes: paint, clear lacquer, dye stain and pigment stain. All of the putties in our test group have a doughy consistency when fresh. This distinguishes them from paste and semipaste wood fillers, which sometimes get used as pore fillers when finishing open-pored woods such as oak and mahogany.

There are four basic types of wood putty. *Solvent-based* putties come ready to apply, and they usually contain wood in the form of fine sawdust. These preparations can be thinned (and sometimes rejuvenated) with lacquer thinner or acetone. *Premixed water-based* putties contain acrylic or latex compounds, while *powdered* putties get their doughy feel from either powdered wood or plasterlike compounds. *Two-part* wood putties are similar to the fillers used at auto-body shops to repair dinged fenders. They consist of two separate compounds that must be mixed together just prior to application. When you blend the compounds, a chemical reaction causes the putty to harden and adhere to the patch area.

What's Important?

Shrinkage and adhesion—Most wood putties shrink slightly as they dry. You can usually compensate for this by overfilling a shallow hole, or by filling a deep hole with several shallow applications. But our tests revealed that some putties shrink excessively, even in shallow holes. This excessive shrinkage caused adhesion problems and cracking in the poorest performers. (See top photo, right.)

Texture—After curing and sanding, most wood putties show a smooth, uniform surface ready for finishing. But we found that some putties dried with a texture that was too coarse, creating enough surface variation to show beneath a coat of paint. Not surprisingly, finishing these coarse-textured putties with clear lacquer and stain only caused the patches to stand out more. (See center photo, right.)

Stainability—If you plan a stained or clear finish, it's important to know how your putty will respond to these finish treatments. Most solvent-based putties and some water-based products are available in wood-tone colors as well as in a "natural" or "neutral" tone. Another approach is to pre-stain the putty yourself by mixing it with a compatible stain or with tinting colors prior to application.

But even if you get an excellent match when the putty has been sanded flush with the bare wood, a coat of stain or clear finish can cause your patch to re-emerge dramatically. This is because wood absorbs finish differently and less uniformly than dried putty does.

To get an idea of how different putties respond to clear finish, dye stain and pigment stain, see the photos on page 56. You'll notice that some putties "take" stain better than others—well enough, in fact, that a small patch can be difficult to detect. To make a truly invisible patch, you'll need to test your putty and finish treatment on some scrapwood and try your hand at grain painting. (See [Making a Patch Disappear](#), page 57.)

Workability and working time—A fast-drying putty can be a help or a hindrance, depending on how many holes you have to fill and how quickly you're able to work. The workability of the putty is also an important consideration. Good workability means that the putty is easy to pick up, pack and level. (See bottom photo, right.) As you'll see on page 56, each type of putty has certain workability and working time characteristics.

Shelf life—Some wood putties can last indefinitely in the can, while others are prone to hardening in a matter of days if you don't reseal the container tightly. Check out the shelf-life information given with each of the four types on page 56. It will help you decide which putty to buy and how much.

HOW WE TESTED

We tested 29 wood putties, evaluating four important performance factors: shrinkage and adhesion; stainability; texture; and workability. We drilled a series of 1/8-in.-deep, 3/8-in.-dia. holes in red oak and packed the holes carefully with neutral-color putty. We overfilled each hole slightly, so we could sand patches flush with 80-grit, 120-grit and 180-grit sandpaper. We left one patch of each brand unfinished. The remaining patches we finished with clear lacquer, water-based dye stain and pigment stain. The results are shown on page 56.

PUTTY Problems

Shrinkage



Excessive shrinkage led to adhesion problems with this powdered putty.

Texture



Sawdust in this solvent-based putty resulted in a coarse-textured patch that looked bad and absorbed too much finish.

Workability



The thicker consistency of some solvent-based putties makes packing and leveling difficult.

Putty Performance

Solvent-based putties

Pros: Fast drying—puttied nail holes can be sanded in about 15 minutes. Minimal shrinkage and good adhesion are typical of most brands.

Cons: Strong solvent odor. Solvents are flammable, so good ventilation is required. Requires solvent cleanup. Not as easy to work with as water-based putties. Working time is short—typically several minutes or less—so you have to fill the hole fast and shape the patch quickly. Prone to hardening in the can; shelf life is limited.

Recommendations: The best performers in this group are great when you want to fill holes, sand them flush and then apply finish in the same day. This rapid drying can occur in the container, too, so it's smart to buy solvent-based putty in small quantities.

Sanded without finish Clear lacquer Dye stain Pigment stain



Best: Elmer's Pro-Bond Wood Filler (shown), Famowood Professional Wood Filler, Plastic Wood.



Worst: Mend All (shown), Red Devil Instant Wood Filler. The main problems with these putties were slight shrinkage and more porous texture, which led to excessive stain absorption.

Water-based premixed putties

Pros: No solvent odor, non-flammable. Good workability; longer working time than solvent-based putties. Can be thinned easily and used as pore fillers.

Cons: Slower drying than solvent types—at least 45 minutes. Typically more shrinkage than solvent types. Unused putty must be protected from freezing temperatures.

Recommendations: Water-based putties come ready to apply and are the easiest putties to work with. This is the type of putty to use if you need extra time to "tool" or shape patches over curved or contoured areas. And you can buy in larger quantities, because water-based putties aren't as prone to drying out as solvent-based putties.



Best: Fix Wood Patch (shown), Famowood Professional Wood Filler, Franklin Mendwood, Dap Latex Wood Dough, Zar Wood Patch.



Worst: Wunderfil (shown), J.E. Moser's Fill 'N' Stain, Miracle Wood-2, Behlen Wood-Fil, 3M Just Like Wood. Poor performers dried with more shrinkage and took stain unevenly.

Water-based powdered putties

Pros: No solvent odor, non-flammable. Good workability; longer working time than solvent-based putties. Easy to thin with water. Can be thinned and used as pore filler. Unlimited shelf life when powder is protected from dampness.

Cons: Slower drying than solvent types—at least 45 minutes. Mixing and measuring required, and unused mixed putty must be discarded.

Recommendations: Powdered putties offer most of the benefits of water-based premixed putties, plus unlimited shelf life. Even if you normally use another type of putty, it's smart to have some powdered putty on hand in case your other putty hardens in the can or simply runs out.



Best: Durham's Rock Hard Water Putty (shown), Bix Stain Putty.



Worst: Hydrocote Ezy-Fill (shown). Shrinkage and poor adhesion caused our test patches to fall out of a 3/8-in.-dia. hole after we sanded the dried putty. Stainability was also poor.

Two-part putties

Pros: Strongest type of putty; can be used for structural repairs. Minimal shrinkage. Long shelf life.

Cons: Most expensive type of putty. Careful mixing required; limited working time. Once mixed, unused putty must be discarded. Dried putty is more difficult to sand than other types.

Recommendations: Here's the putty to reach for when your patch is deep or along an edge, where structural strength will be important. Mix only as much as you need; Once you mix it up, it's a use-or-lose proposition.



Best: J.E. Moser's Epoxy Paste (shown), Lake One Wood Rebuilder, Minwax High Performance Wood Filler. There were no bad performers in this group; all the putties dried with minimal shrinkage and took stain evenly.

At left, a structural repair. Edge repairs like this one are no problem for two-part putties.

SECRETS OF SUCCESS

How to get great results with wood putty

- **Use fresh putty.** Don't use putty that has partially hardened. Remove the spoiled part from the container, and just work with the fresh stuff, if any remains. If you only make infrequent, small repairs, it's best to buy putty in small containers.
- **Test it first.** If grain and color matching is important, test your putty on a piece of scrapwood the same species and grain characteristics as the workpiece, or on a hidden section of the workpiece. Experiment until you get a good match.
- **Apply it with an artist's palette knife.** A palette knife has a thin, flexible blade that's ideal for applying putty. These tools are commonly sold at art supply stores. (See bottom photo, page 55.)
- **Clear the sawdust.** Before you apply the putty, blow sawdust out of the area to be filled. This improves adhesion.
- **Don't go too deep.** Two-part putties can be used to fill deep holes. But our tests show that other types of wood putty can crack or shrink excessively when applied to holes deeper than 1/8 in. and wider than 3/8 in. A test application will tell you if this is a risk. The solution is to apply in two or more layers, letting each one cure before applying the next.
- **Overfill the hole.** Pack the putty into the hole firmly, making sure there are no voids. Form the putty into a small mound over the hole to account for shrinkage as the patch dries.
- **Use a sanding block.** When you're sanding a patch flush, back up your sandpaper with something firm—you'll find it much easier to achieve a flat surface. (See AW #56.)

MAKING A PATCH DISAPPEAR

How to grain-paint a wood-putty patch

Coloring putty before applying it is an easy way to approximate wood, but you can get better results by coloring the patch after it is dry and has been sanded smooth, as shown in the photo. Coloring putty after application allows you to imitate the colors in the surrounding wood more exactly. For



Adding camouflage. To match the surrounding wood, use an artist's brush to paint in grain details.

colors you want to imitate. This also creates a nonporous surface for painting.

Step 2: Paint in the grain and figure using an artist's brush. If you're trying to approximate a deep-porous wood, such as oak or mahogany, you can also scratch "pores" into the patch with the point of a knife.

Step 3: Once you have a close approximation of the grain, let the patch dry and protect it with a thin coat of finish.

the coloring medium, you can use glaze or thinned varnish with some japan or oil color added. Or you can use shellac or padding lacquer and add powdered pigment colors or universal colors. The advantage of glaze and thinned varnish is that if you don't like the result, you can remove the finish by wiping with paint thinner. Here's how to grain-paint a putty patch:

Step 1: Apply your first coat of finish (the sealer coat) to the entire surface, putty and all, in order to see the correct

have a close approximation of the grain, let the patch dry and protect it with a thin coat of finish.

Step 4: Then apply the background color (the lightest color visible in the surrounding wood). If you paint the background first, you'll probably get the patch too dark when painting the grain. —Excerpted from *Applying Finishes: Techniques, Tips and Problem-Solving Tricks* by Bob Flexner (1997, Rodale Press, 33 E. Minor St., Emmaus, PA 18098).

WHERE TO BUY Wood Putty

Wood putties are available at retail outlets and by mail order. Brands of putty are keyed to the sources below.

Sources

- 1 Hardware stores and home centers
- 2 Amity Coatings (800) 733-1776
- 3 Constantine's (800) 223-8087
- 4 Garrett Wade (800) 221-2942
- 5 Highland Hardware (800) 241-6748
- 6 Hydrocote Co., Inc. (800) 229-4937
- 7 Lee Valley Tools Ltd. (800) 267-8767
- 8 Leichtung Workshops (800) 321-6840
- 9 The Woodworkers' Store (800) 279-4441
- 10 Woodworker's Supply (800) 645-9292

WHAT & WHERE

Brand Source

SOLVENT-BASED PUTTIES

Dap Wood Dough	1
Elmer's Pro-Bond	1
Famowood Professional	10
Fix Wood Patch	1
Mend All	3
Miracle Wood Filler	8
Plastic Wood	1
Red Devil Instant Wood Filler	1
Wood Tex	10

WATER-BASED PUTTIES

3M Just Like Wood	1
Amity Wood Putty	2
Behlen Wood-Fil	3, 7
Behlen Master Wood Filler	4
Dap Latex Wood Dough	1
Famowood Professional	5, 10
Fix Wood Patch	1
Franklin Mendwood	1
LV Wood Filler	7
Miracle Wood-2	8
J.E. Moser's Fill 'N' Stain	10
Latex Plastic Wood	1
Wunderfil	9
Zar Wood Patch	1

POWDERED WOOD PUTTIES

Bix Stain Putty	1
Durham's Rock Hard Water Putty	1
Hydrocote Ezy-Fill	6

TWO-PART PUTTIES

Lake One Wood Rebuilder	4
Minwax High Performance Wood Filler	1
J.E. Moser's Epoxy Paste	10

Pencil Box

*Make this clever container
with a plunge router and an ingenious jig*

by Steve Blenk

These days, I've noticed that many woodworkers are making fancy writing implements of one sort or another. The time is right for a nice pencil box.

The box shown here is my interpretation of a design that reportedly dates back to the days of Marco Polo, who brought similar boxes back from China. My box has three compartments. Two are revealed when you slide open the dovetailed lid. The large top compartment swings out of the way to grant access to a bottom compartment. But the "pencil box"

label doesn't really do this project justice. It's nice for jewelry and all kinds of tiny treasures.

Making this box is fun and easy if you use a jig like mine. Designed for any round-base plunge router, the jig relies on wooden borders and inserts to control the movement of the router. You can rout the openings in the box parts very precisely, and small production runs are no problem. (See photos, opposite.) This is a good thing, because once you show off your first pencil box, you're sure to get requests for more.

Tools and Materials

I recommend using a router that will take 1/2-in.-shank bits, to minimize vibration and deflection when making the deep plunge cuts to excavate the openings. You will need a 5/8-in.-dia. dovetail bit and

a 1/2-in.-dia. straight bit with at least 1 in. of cutting depth. I use carbide bits with double flutes for durability and smooth cuts. You will also need your tablesaw, both to make the router jig and to trim the box sections. I use a chop saw to separate the top section of the box into its two component parts, but this can also be done on the tablesaw.

The box shown here is made of claro walnut; I have also made boxes from mahogany, maple, oak, ash and cherry. Lighter woods tend to show occasional burns from the router, so more sanding is required. Whatever hardwood you choose, make sure to use clear, dry stock. To make a single pen box, you'll need a blank 1 in. thick, 2 in. wide and about 22 in. long, and a thin, narrow piece of wood for the lid. (See Fig. 1.) But I'd suggest preparing enough stock for several boxes.

Make the Jig First

The routing jig is the key to this project. (See photos, opposite page.) The router runs inside a rectangular "pen" created by edging strips that are attached to a base of 1/4-in. hardboard. The workpiece is clamped beneath the base, positioned between a pair of locator strips. Three different inserts fit inside the rectangle to control the router's movement. This enables you to rout the dovetailed slot for the lid and also the different-sized openings in the box parts. (See Fig. 2.)

The dimensions of your jig depend on the diameter of your router base. If you follow the sizing directions in Fig. 2, the routed opening in the jig's base will always be the same, regardless of router base size.

Cutting and Assembly

The jig and router work is finished; now it's time to cut and assemble the box parts. I cut the pieces of the box apart with the chop saw. With the saw set up for a 30° cut, separate each top section blank into small and large pieces. Then make a 90° cut to trim the pivoting or "screw" end of the large top section, just past the curved part of the dovetail slot, so the lid can slide in and out. At this stage, it's fine to leave extra waste at both ends of the box pieces.

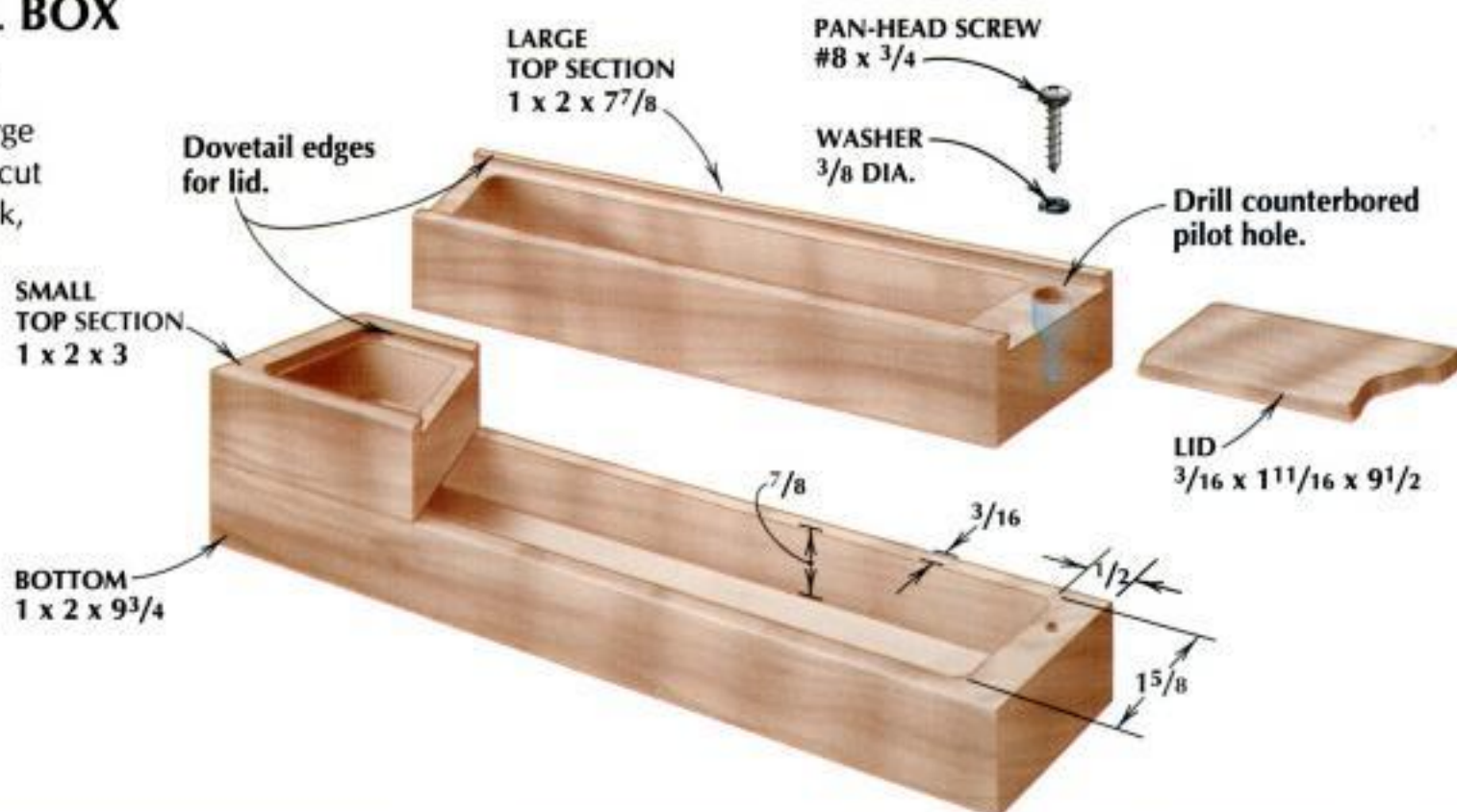
Next, glue the small top section to the bottom. To get the correct position here, I hold the large top section in place where it will be screwed to the



The lid locks the top.
Sliding off the dovetailed lid reveals the two top compartments. It also allows the top of the box to pivot, exposing the bottom compartment.

FIG. 1: PENCIL BOX

The bottom, the small top section and the large top section can all be cut from a blank 1 in. thick, 2 in. wide, and about 22 in. long.



ROUTING THE BOX PARTS

Let's start with the two top sections of the box. Though separate in the finished box, these sections are routed from a single blank at least 10¹/₄ in. long. Make sure that the ends of the blank extend at least 3/4 in. beyond the ends of the base opening. Clamp the blank firmly against the bottom of the base.

Cut #1: Rout the dovetail slot. Chuck the dovetail bit in the router and set the plunge depth so that the bit will cut 3/16 in. into the blank. No inserts are needed for this first cut. Starting near the center of the base opening, make a slanting plunge cut to the 3/16-in. depth and move the router back and forth inside the edging until all the waste is removed. (See left photo, below.) Raise the bit when you're done, but make sure to move the bit away from the sides first. If you're making more than one box at a time, repeat this dovetail cut on your remaining top section blanks.

Cut #2: Rout the large opening in the top section. Chuck the 1/2-in. straight bit in the router, position the narrow insert and the small angled insert in the base, and set maximum cutting depth to 7/8 in. Rout this 7/8-in.-deep opening using progressively deeper depth settings. (See center photo, below.)

Cut #3: Rout the small opening in the top section. Keep the narrow insert in place, remove the small angled insert and install the large angled one. Plunge rout the 7/8-in.-deep opening as in the previous step, running the router base against the insert and edge strips. (See right photo, below.) Now you can unclamp the top section blank and give any remaining top section blanks the same treatment.

Cut #4: Rout the bottom section. Start with a blank at least 10 in. long and use the same bit and depth setting as for cuts #2 and #3. This time, only install the narrow insert. Clamp the bottom blank in the jig, and remove the waste as before.

THE JIG MAKES IT EASY



Rout the dovetail slot for the lid. Start and stop the router in the middle of this excavation. No inserts are used in the jig for this first cut.



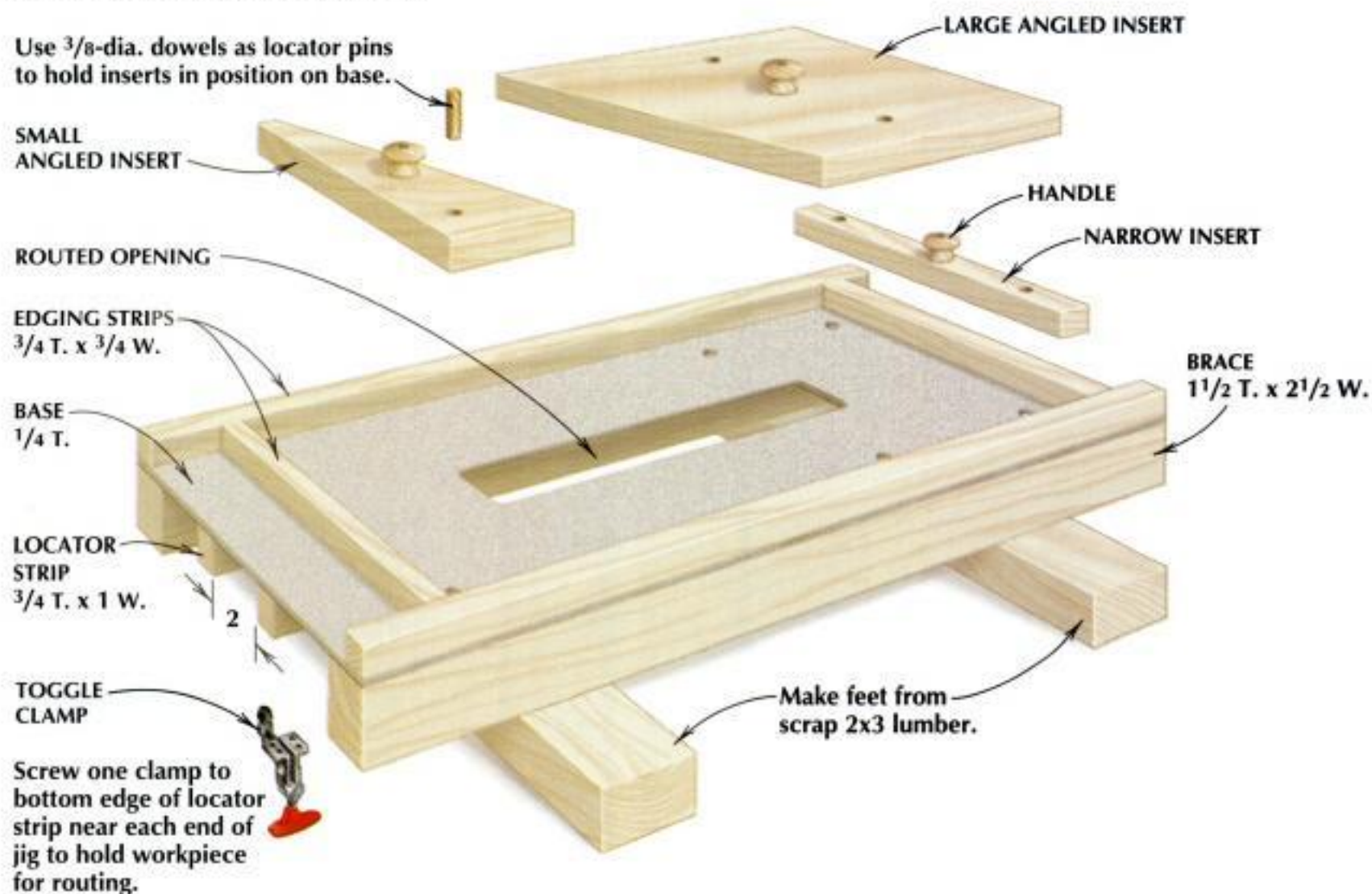
Rout the large compartment. Use the narrow insert and the small angled insert to define the opening size. Plunge cut with a straight bit.



Rout the small compartment. Fit the narrow insert and the large angled insert inside the jig's borders to rout this small opening.

FIG. 2: BOX-ROUTING JIG

Locator strips and a pair of toggle clamps secure the workpiece beneath the base. Edging strips and three different inserts control router movement to make the different plunge cuts in the box parts. The size of your jig depends on the diameter of your router base. (See How to Make Your Jig, below.) Use hardboard for the jig's base, and 2x3 stock for braces and feet. You can make the inserts from hardwood, plywood or MDF.

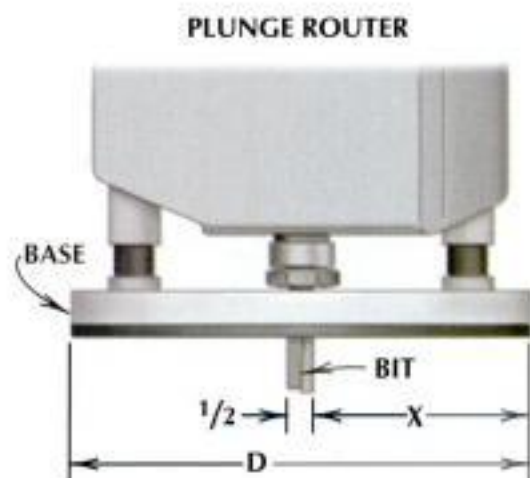


HOW TO MAKE YOUR JIG

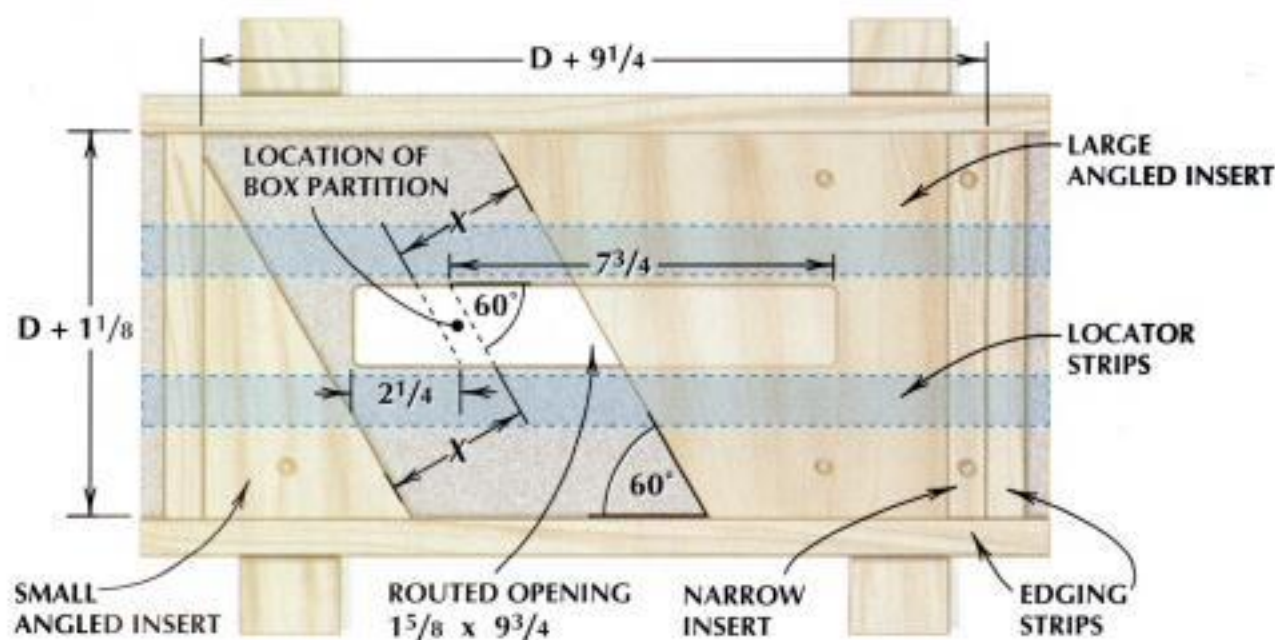
1. Find the diameter (D) and offset (X) of your router. (See detail, below.)
2. Cut your hardboard base to size, at least $D + 2\frac{5}{8}$ in. wide by $D + 10\frac{3}{4}$ in. long.
3. Calculate the interior dimensions for your base as shown in the drawing.
4. Install the four edging strips to create the opening. Then install the braces and feet.
5. Plunge rout the opening, using a 1/2-in.-dia. bit. Install the locator strips to center the workpiece beneath the opening.
6. Use a 60° triangle to mark the location of the partition.
7. Measure X from the partition lines to get the dimensions of the small and large angled inserts. Cut all three inserts to size, then install dowel locator pins and handles.
8. Install toggle clamps on the locator strips to hold the workpiece against the underside of the base.

DETAIL OF ROUTER

Diameter (D) and offset (X)



PLAN VIEW



bottom, and then I place the small top section against it. Use a rubber band to clamp the pieces. (See top photo, right.) Some overhang at the end of the box is fine; you'll trim it flush later.

After the glue dries, drill the counter-bored pilot hole through the large top section and into the bottom. I clamp these parts to keep them aligned and bore the hole on my drill press for the pan-head screw and washer. Make sure your bit is sharp—a dull bit can cause the end grain in the top piece to split. With the hole bored, you can screw the top section to the bottom. The screw should allow movement with minimal play.

Now for the sliding lid. Start with a blank $\frac{3}{16}$ in. thick, $1\frac{3}{4}$ in. wide and at least 10 in. long. Angle your tablesaw blade to match the angle of the dovetail slot, and rip one side of each lid to this angle. (It's a good idea to use a push stick for this cut.) Then carefully set your fence to cut the opposite side. Work with one piece until you achieve a fit that's snug but smooth-sliding, then cut the rest of your lids for future boxes.

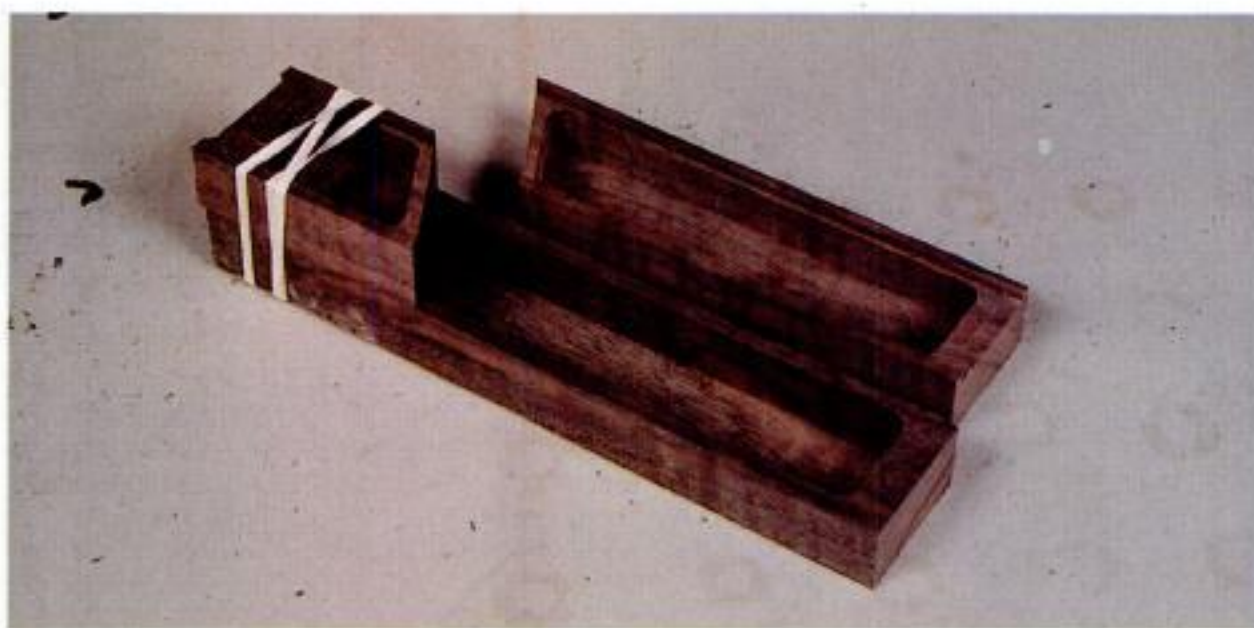
Your lids won't slide all the way closed at this point—you have to radius the corners to fit the round corners at the end of the small top section. To do this, tilt your belt- or disc-sander table to match the dovetail angle, then carefully round the ends of one lid for a good fit. (See center photo, right.) Use this lid as a template to mark out the rest for sanding.

With the box closed and lidded, go back to your tablesaw and carefully trim away any overhangs on each end. (See bottom photo, right.) Then use a sharp gouge and a chisel to carve the thumb-nail catch in the lid, for easy opening.

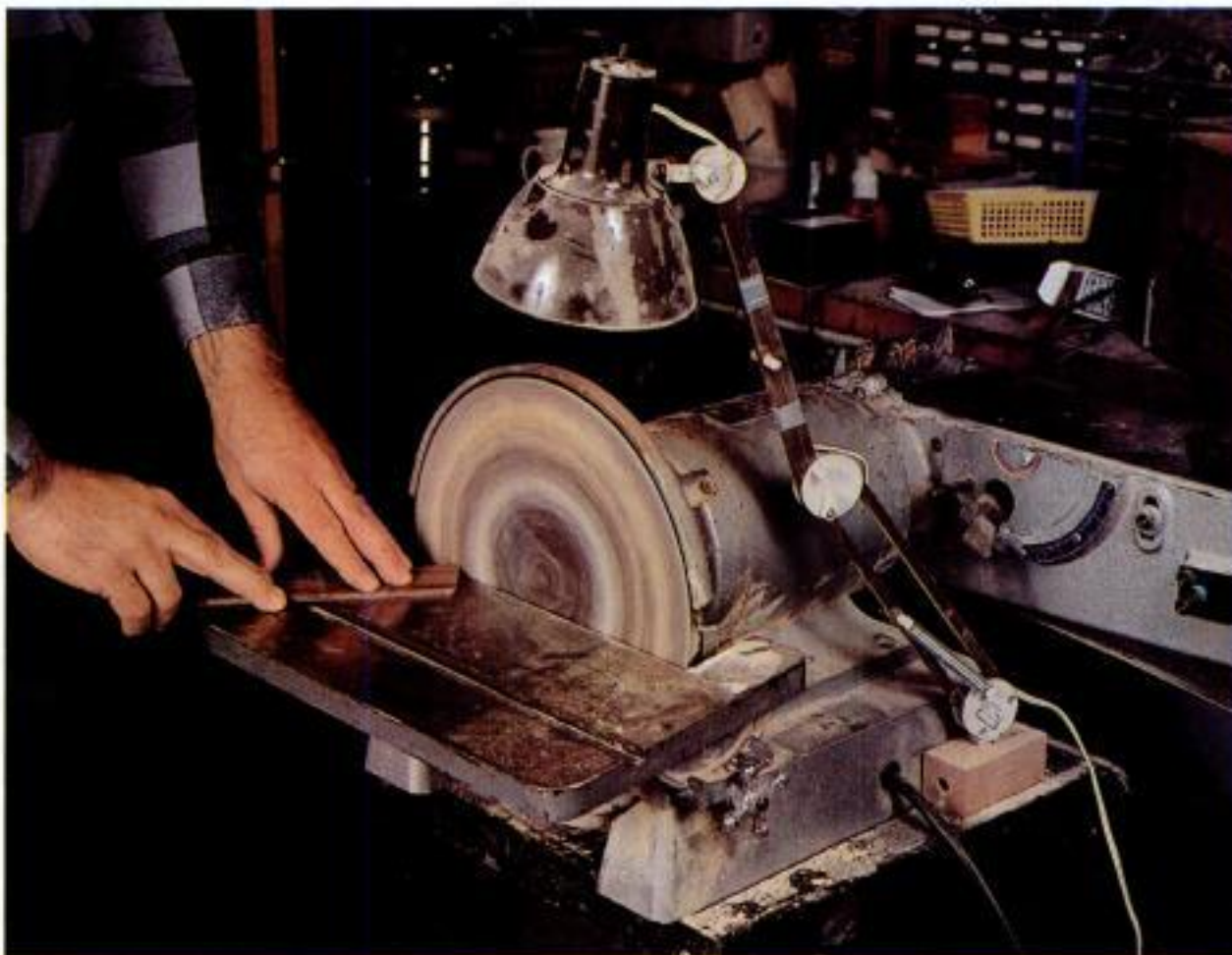
The best finish for a project like this is penetrating oil, followed by wax, to keep the moving parts working easily. Make sure to coat inside and outside surfaces equally. If the lid fits too tightly after the finish dries, wait a few days more before you sand it narrower. It's normal for the wood fibers to swell slightly after finishing, but they usually shrink back to size. ▲



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He lives on the
Olympic peninsula
in Washington state.



Gluing up. A rubber band provides enough clamping pressure for gluing the small top section to the bottom.



Beveling the lid. Tilt the disc sander's table to match the lid's dovetail angle, then round the ends of the lid to fit in the top.



Trimming the ends. Make two cuts on the tablesaw to trim the ends and lid. To complete the box, carve a fingerpull in the lid, then sand and finish.



the story of a Japanese Blade

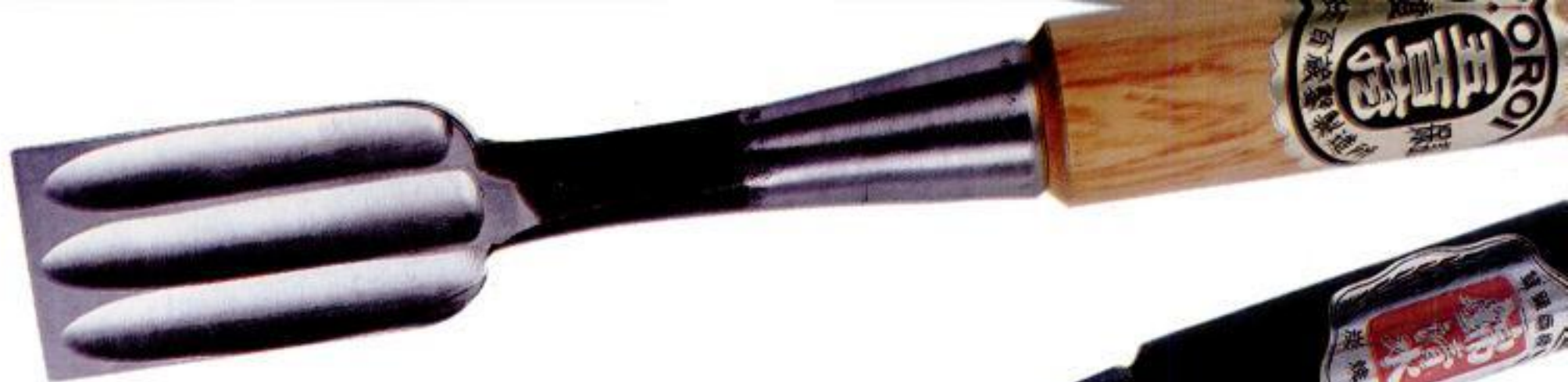
Master blacksmiths work magic with fire and steel

by Toshio Odate

During his lifetime, master blacksmith Shodai Tsunesaburo forged remarkable plane blades by hand in his traditional workshop (above). Today, his son continues the tradition.

Traditional Japanese woodworking tools were first introduced to American woodworkers more than 30 years ago. Waterstones were the first tools to arrive, in the mid 1960s, followed by saws: *dozuki* saws, *ryoba* saws, and *aze-biki* saws. Then in the late '60s through the early '80s, chisels, planes and other Japanese woodworking tools gained popularity with both professionals and amateurs. It became very fashionable for western woodworkers to own Japanese tools.

For me, a craftsman who had come to the United States from Japan, this was a surprising phenomenon. In Japan, these traditional woodworking tools were disappearing. Scholars and other intellectuals were writing books and articles like the "Life of Hand Tools" and "The Dying-Out of Great Woodworking Tools" about the disappearance of these traditional tools.



But in America this was not the case. Instead of disappearing, the most unique and most difficult-to-use hand tools were gaining popularity. I remember asking myself how someone untrained in their use would know how to take care of a laminated blade's hard brittle cutting edge, or recreate a plane blade's hollow back, or understand the configuration and soul of the wooden plane block. Of course woodworking magazines produced articles on these topics and a few books came out to "help" the consumer but in my opinion it takes at least five to ten years of constant training to master these tools and to understand them.

Today, the fashion fever for Japanese tools has begun to cool off. Once all major tool stores carried all kinds of Japanese tools, but today very few stores carry Japanese planes because they are the most difficult of all Japanese woodworking tools to set up and use to their full potential. Certainly American woodworkers found this out. Yet there are still many western woodworkers buying and using Japanese chisels, saws and planes. Any woodworker who is willing to spend the time and effort required to understand the nature of these tools will come to appreciate their fine quality.

While many articles and books have been written about the care and use of traditional Japanese woodworking tools, very little is known in the West about how these tools are made. Even less has been written about the remarkable craftsmen who still make the very best blades by hand.

I have made several trips to Miki City—Japan's famous tool-making center—to visit blacksmiths who make saws, chisels and plane blades in the traditional way. I spent time with plane-blade makers Chiyo-zuru Sadahide and Tsunesaburo. I also visited chisel makers Iyoro and Nishiki, as well as



saw maker Hirota. These blacksmiths range in age from late 50s to late 80s and have been working since childhood. Throughout their lives they have had only one wish, to make blades which will be loved and appreciated. On the following pages I would like to take this opportunity to write about some of these blacksmiths' workshop scenes and explain a little about how traditional tools are made today. My special thanks to Shiro Tanaka, President of Harima Enterprises Corporation, for his assistance in researching this article.

TOSHIO ODATE is a sculptor and shoji maker. He wrote the book, *Japanese Woodworking Tools: Their Tradition, Spirit and Use* (1984, Taunton Press, Newtown, CT). He currently teaches at Pratt Institute in Brooklyn, New York.

Continued on next page ▶

SOURCES

Traditional Japanese woodworking tools are available from the following mail-order companies.

Garrett Wade

161 Ave. of the Americas
New York, NY 10013
(800) 221-2942 Circle #608

Hida Tool & Hardware Co.

1333 San Pablo Ave.
Berkeley, CA 94702
(800) 443-5512 Circle #609

The Japan Woodworker

1731 Clement Ave.
Alameda, CA 94501
(800) 537-7820 Circle #610

Lee Valley Tools, Ltd.

12 E. River St.
Ogdensburg, NY 13669
(800) 871-8158 Circle #611

Tashiro's

2939 4th Ave. South
Seattle, WA 98134
(206) 621-0199 Circle #612

Sadahide



Like all Japanese plane blades, Sadahide's exquisite "Evening Calm of Awaji Island" is made by forge-welding a hard steel cutting edge to shock-absorbing mild steel. This permits a harder, sharper edge.

Chiyozuru Sadahide's house and workshop are located off a narrow alleyway in Miki City just wide enough for a bicycle to fit through. A sign on the center column reads, "Plane Blade Maker—Chiyozuru Sadahide." In front of the house are several bonsai and, next to them, a rusty old ship anchor with bean plants climbing around it. Now Miki City is surrounded by mountains, so a ship anchor standing in front of a house has a very strange feeling. But old anchors and anchor chains are very important materials for making most Japanese blades the traditional way (see sidebar, page 66), so it is not so uncommon to find them in front of blacksmiths' workshops.

Chiyozuru's workshop has a dirt floor about fifteen feet square. There's a large old-fashioned air hammer whose square anvil is worn slightly concave from years of constant use. Chiyozuru—now in his late eighties—controls the air hammer with his feet, like a sewing machine's foot pedal, some-

times striking hard and sometimes soft, as the forging process requires. Next to the hammer is the *ro*, the traditional Japanese forge or hearth made of brick. The *ro* and the air hammer are at ground level, with a pit dug between them for the blacksmith to stand in. A hole in the center of the floor contains a wooden box filled with water and some rough sharpening stones. Near a wall, on the ground, is a smaller oven and a smaller anvil for hand hammering.

Among the several traditional blacksmiths I visited, Chiyozuru Sadahide's workshop is the most modest. He has so little equipment yet he is one of the most accomplished and famous plane blade makers still working today. At his advanced age, it is now very difficult for him to do the hard rough hammering required in the early stages of forging a blade. His son, also a plane blade maker, now does the beginning work so Chiyozuru can reserve his strength and his skill for the most critical stages of the blade-making process.



Tsunesaburo

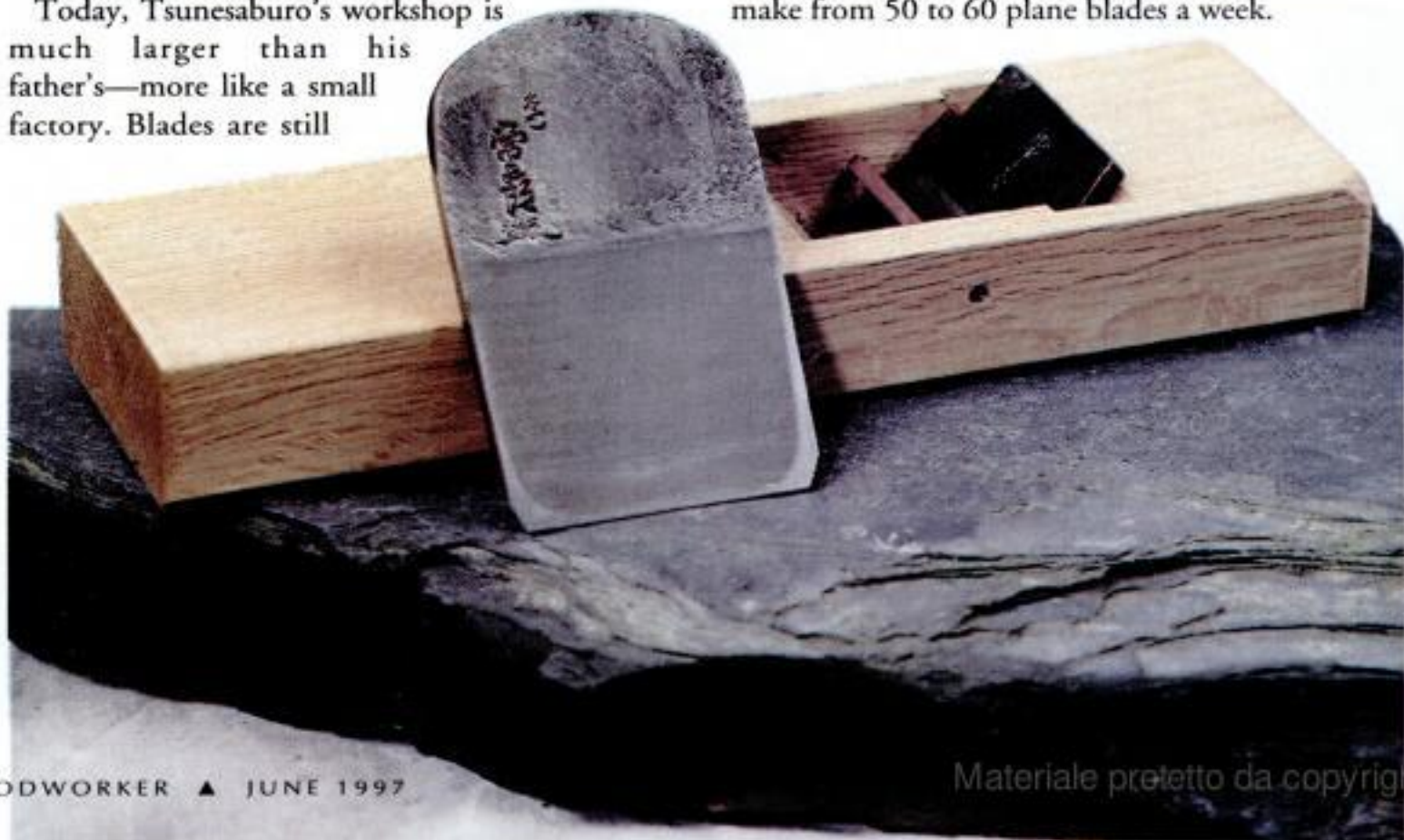


Tsunesaburo learned the blacksmith's art from his father, Shodai Tsunesaburo. He combines the best old traditions with new time-saving machinery to make premium-quality plane blades.

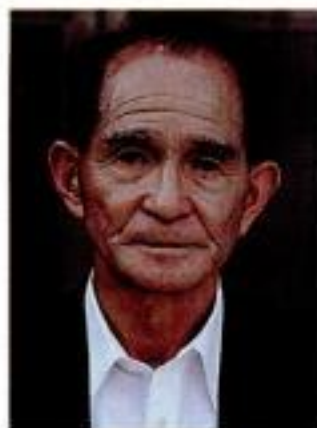
Plane blade maker Tsunesaburo is actually the second generation craftsman to use the name. His father, called Shodai Tsunesaburo, was also a well-known plane-blade maker. When I visited, Tsunesaburo had preserved his father's workshop the way it was when he was alive and working. It is much like Sadahide's small room and dirt floor.

Today, Tsunesaburo's workshop is much larger than his father's—more like a small factory. Blades are still

made with the traditional process but much faster. There is a large forging hammer and many electric machines and brick ovens but the work style is still piece by piece, each plane blade being handled independently by the craftsman. With the help of power tools and two or three assistants who do the basic rough work, Tsunesaburo's workshop can make from 50 to 60 plane blades a week.



chisel maker Iyoro



Iyoro makes chisels in several styles for different uses. Iyoro's calligraphy graces the wooden boxes in which his best chisels are boxed. The blade backs are hollowed for faster sharpening and to maintain flatness.



Iyoro's chisel-making workshop is a factory, much like Tsunesaburo's, with many kinds of electric machines and electrically controlled ovens. Iyoro employs three or four people in production, and two or three people doing the packing and shipping. Yet, like Tsunesaburo's plane blades, Iyoro's chisels are crafted individually one by one, each through the craftsman's hand.

Some of Iyoro's machines are at a suitable height for standing, but most machines, like grinders, cutoff machines and anvils, are sitting on the ground. On the day that I visited Iyoro's workshop, one person was hammering the soft steel and heating it up in the *ro* and then putting high-carbon steel on it. After hammering the hard and soft steel together he threw it to the ground near the next person. Then this next person would do his process and give it to the next person in line like an assembly line. Each chisel goes through many processes while Iyoro himself checks each stage very carefully.



chisel maker Nishiki



*Beauty is more than skin deep. Meant to be used as well as admired, Nishiki's best *oire-nomi* butt chisels are acid-etched to create a woodgrain-like pattern.*

Nishiki's work space has a dirt floor like Sadahide's and not very many machines. An old-style air hammer stands in a corner of the room. In front of the machine is a pit dug in the ground so that Nishiki can work in a standing position. To the left of the air hammer is a small open *ro*. In the opposite corner of the room is another *ro* and anvil, and a large grinder sitting on the ground.

I was fortunate to see Nishiki working on a blade from the very beginning. He was using cokes that gave off a very high heat for pounding. Even the softest steel should be pounded many times. The more it is pounded, the better it will be.

When he tempers the blade, Nishiki removes the top portion of the red-hot cokes and replaces them with crushed one-inch cubes of pine charcoal. This good pine charcoal is getting very expensive. Next to the *ro* is a bucket of charcoal powder. He heats the chisel blade until it is red-hot, and then puts it into the charcoal powder to cool. Nishiki works alone, but when he needs another hand his wife holds the hammer while he guides where it strikes.



the making of a Japanese Blade

Materials and methods

Traditional Japanese plane blades and chisels are made by forge-welding a hard steel cutting edge to a larger piece of softer mild steel or wrought iron. The soft steel, called *jitetsu*, supports the brittle hard-steel edge, called *hagane*. (Edge tools were also made this way in America and Europe before the introduction of inexpensive "cast steel" in the mid-1800s.—Eds.) Blacksmiths select materials that complement their techniques, experience, and intuition.

Soft steel (*jitetsu*)—According to plane blade maker Tsunesaburo, a good soft steel, or *jitetsu*, has very hard black spots—like sesame seeds—that appear when the bevel is sharpened. These spots are impurities in the metal and can readily be seen in wrought iron and

steel made before 1900. These black impurity spots are very hard and when sharpening the bevel, they dress the stone surface. Good *jitetsu* can be found in old anchors and anchor chains, as well as old iron bridges and ship boilers. This old wrought iron is the preferred material for *jitetsu* in the best-quality plane blades and chisels.

Hard steel (*hagane*)—The cutting edge of the blade is made from high-carbon tool steel. Tool steel made by Hitachi—Japan's largest steelmaker—comes wrapped in colored paper to distinguish different grades. Blacksmiths talk about steel by the color of paper it's wrapped in, referring to "white paper," "blue paper," "yellow paper," etc. Each blacksmith has his own preference about which steel he likes best. Chisel maker Nishiki says that White Paper #2 is the best material for his chisels. Other

blacksmiths may prefer White Paper #1 or #2 or Blue Paper #1. These steels differ in their carbon content and the presence of alloying elements such as silicon, manganese, chromium and tungsten, each of which imparts certain characteristics to the steel.

Blacksmiths generally make blades in different quality levels—A, B, and C quality (from high to common). Certain steps in the process are shortened or eliminated for the C quality blades. For example, A and B quality blades have *hizukuri* (see step 4, opposite). When the material is cooled to 500° C it is then heated to 800° C to 900° C and this is repeated. This process is repeated about three times on A quality plane blades, and one to two times on B quality blades. There is no *hizukuri* for C quality blades. Some hired hands (craftsmen) in the master's shop will make all three levels of blade quality; however, the last tempering has to be done by the master. The very best blades are A+ quality and these blades the master will work from beginning to the end by himself.



Old wrought-iron anchor-chain links and anchors are prized by traditional blacksmiths for the soft *jitetsu* that forms the back of the blade.

MAKING A PLANE BLADE STEP-BY-STEP

The following steps outline the process of making a traditional Japanese plane blade in the workshop of Tsunesaburo. Numbers on photos refer to numbered steps in the text below.



1. Tansetsu—Joining the soft steel and hard steel together. Joining compound is placed between the two pieces of metal. It is heated to between 1000° C and 1050° C and hammered to join the two metals.

2. Tanzo—Alternate heating of the joined material between 900° C to 950° C and pounding with an air hammer. This work needs great experience and intuition and will influence the end quality of the blade. This is such an important step in the entire process that a minimum of eight to 10 years of blacksmithing experience is needed before being taught *tansetsu* and *tanzo*.





3. Setsudan—Cutting the rough forging to the size of the blade.

4. Hizukuri—After cutting, the steel is heated from 800° C to 900° C and pounded while shaping. The more *hizukuri*, the more the blade gains tenacity and durability. Higher-quality plane blades have more *hizukuri*. This step is eliminated on common-grade blades.

5. Katanuki—Pressing out the blade shape in a press machine.

6. Shouton—The steel is heated from 750° C to 770° C and is kept between those temperatures for several hours; it is then cooled off slowly. The entire *shouton* process takes about eight to 10 hours.

7. Arakenma—Rough straightening and polishing of the blade's back with a grinder.

8. Shiagekenma—Finishing the blade with buffing.

9. Joumen ishozukuri—Decorating the upper part of the back.

10. Seikei—Creating of the concavity of the back by hammering 60 to 70 times.

11. Atama to waki no seikei—Grinding and polishing the sides and head for the prescribed size and shape.

12. Hizumitori—Taking out the warp and twist which were created during processes 1 through 11.

13. Kouno seikei—Tapering the thickness of the blade from the head to the cutting edge forming a concavity of the front surface. This concavity is important when setting the blade into the block.

14. Kouno shiage—Buffing to finish.

15. Kokuinuchi—Striking the craftsman's seal.

16. Uramen kenma—Flattening the back before tempering.

17. Yakiire—Tempering the steel. Before heating, powder is painted on the soft steel and clay is painted on the hard steel (this work is each individual craftsman's secret).

18. Hizumitori—Correcting the warp and the twist which is created by tempering.

19. Yakimodoshi—The blade is immersed in oil and heated



to 170° C and kept in the oil bath for a long time. This process settles down the blade's structure, which is disordered by tempering. This work gives the blade more tenacity without losing the hardness of the steel.

20. Uramen shiage—Buffing the back and using a wooden block with water to finish.

21. Arauradashi—Hammering the bevel and roughly creating the *ura* or flat edge on the back of the blade.

22. Arahatori—Rough sharpening.

23. Araurahatori—Hammering the bevel to create a very thin and even flat edge on the back.

24. Chuhatogi—Additional sharpening of the cutting edge.

25. Shiage urahatori—Finishing the *ura*, the thin flat edge, with a honing stone, and completing the *ura* with the *kanaban* steel plate.

26. Shiage hatogi—Final sharpening with three to five waterstones.



Plantation Shutters

Basic jigs simplify a complex project

by Robert Kempinski



Well-crafted window treatment. With their adjustable louvers, plantation shutters provide privacy and insulation or ventilation and light filtration.

Along the hot and steamy Gulf Coast, plantation shutters are a common sight flanking the windows of antebellum mansions. In the days before air conditioning, the wide slats, or *louvers*, on plantation shutters let in cool breezes while offering protection from the hot sun.

Today, plantation shutters are popular interior window treatments across the U.S. Their sleek lines go well with just about any decor. And adjusting the louvers lets you filter light without sacrificing privacy.

My wife had her heart set on shutters for every window in our house. Since the cost of buying them was prohibitive, she challenged me to make them instead. So I devised a few elementary jigs in my small home shop to make the job simple and precise.

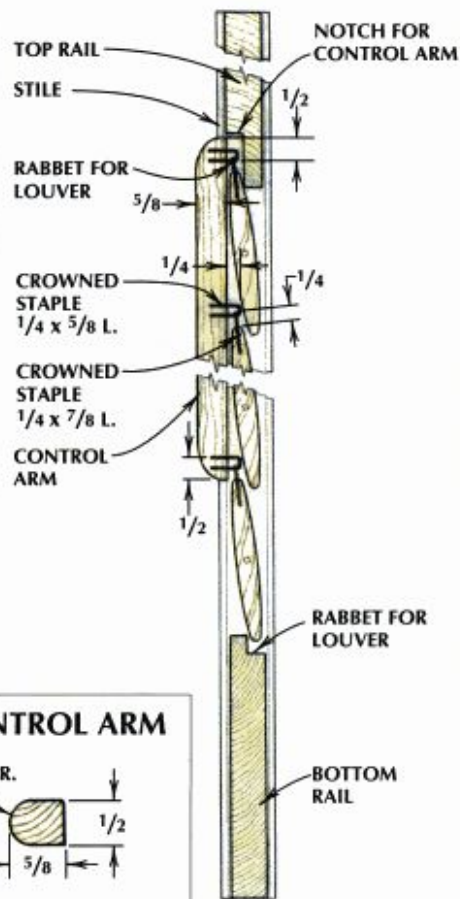
Shutter Design

The shutters shown above consist of a simple frame joined by traditional pegged mortises and tenons. Plastic shutter pins (available from Woodworker's Supply, 800-645-9292) hold a series of louvers to the stiles of the frame. A control arm connects the individual louvers to each other, allowing you to close or open the louvers in unison by pulling the arm up or down. (See Fig. 1.)

Wide louvers are characteristic of authentic plantation shutters. I make my louvers 3½ in. wide, but widths can range from 2½ in. to 4½ in. You can make your louvers from any stable and straight-grained wood, and you can make them oval, diamond-shaped or rectangular in cross section. (See Fig. 2.) I use basswood for the louvers because it's lightweight and

PHOTOS BY ANDY RAE

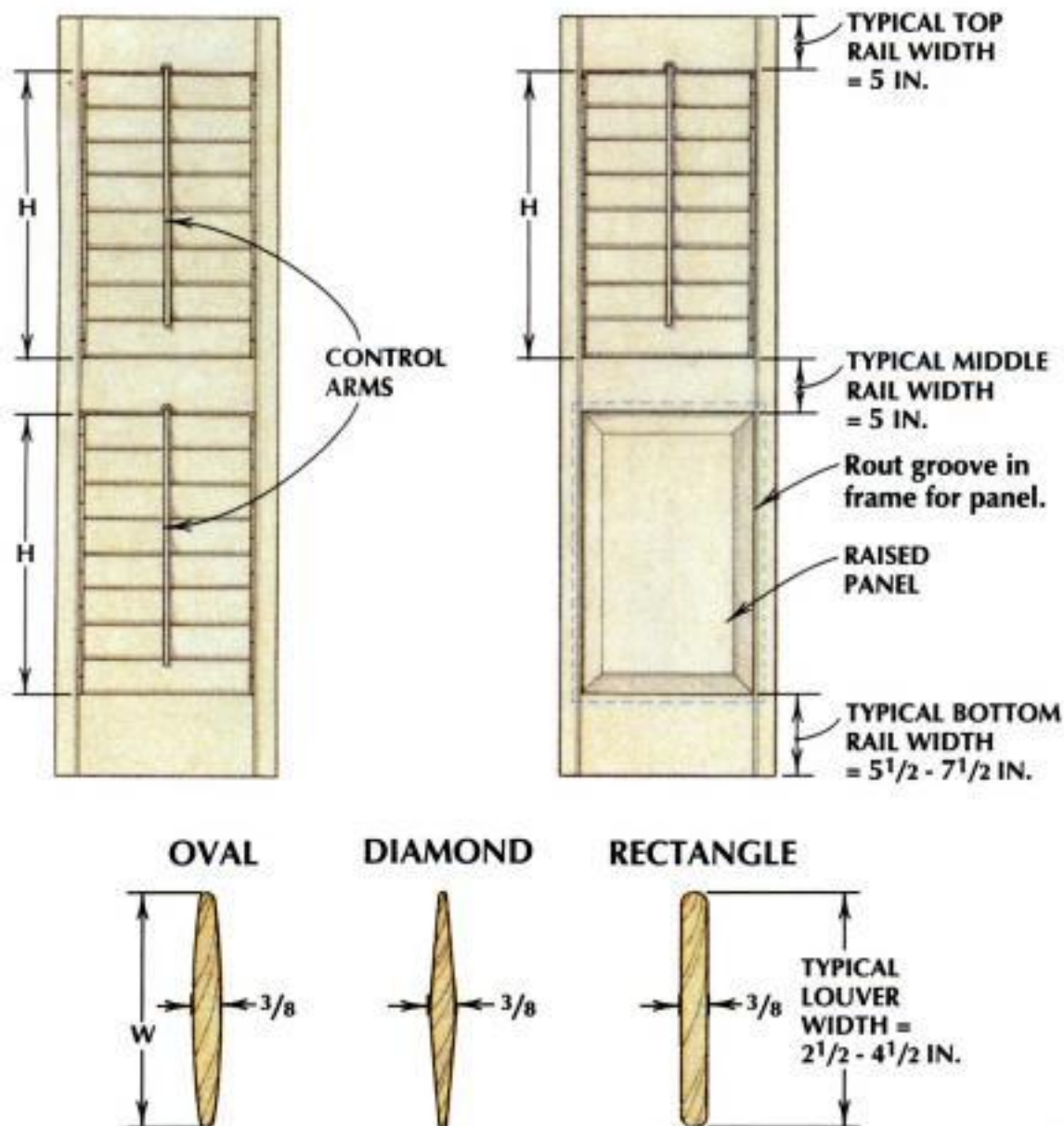
Mortise-and-tenon joinery holds the frame together. The louvers pivot on shutter pins inserted into the stiles. A control arm allows you to move the louvers up or down in unison. The lengths and widths of the rails, and the lengths of the stiles and control arm, depend on the size of your windows.



Making the louvers—If you'd rather not make your own louvers, you can buy louver stock with an oval cross section by mail from American Hardwood (310-527-9066). But I make my own, as shown on page 70.

FIG. 2: SHUTTER DESIGN

Use the formula at right to calculate the width and number of louvers. Shutters more than 60 in. high should have middle rails. You can have two sets of louvers, or combine louvers with a fixed panel.



HOW MANY LOUVERS?

To calculate the number of louvers that will fit in a shutter, first determine:

- H**—the planned height of the frame opening minus $\frac{1}{8}$ in. for clearance, and
W—the planned width of one louver minus the planned louver overlap, usually $\frac{1}{4}$ in.

STEP 1

Find $H \div W$. If this calculation yields a whole number, you're done; that's how many louvers will fit exactly in your shutter. If you get a number plus a fraction, go to Step 2.

STEP 2

Adjust H and/or W. By slightly altering the width of your shutter's rails, you can get a whole number when dividing H by W. Or you can adjust the planned width of your louvers to eliminate the fraction in $H \div W$.

Example:

H = 38 in. (The planned height of the opening is $38\frac{1}{8}$ in.)

W = $3\frac{1}{4}$ in. (Planned louver width is $3\frac{1}{2}$ in.)

Step 1: $H \div W = 11.69$

Step 2: Adjust rail width to increase opening size so that **H** = 39.

Now $H \div W = 12$.

Your shutter can hold 12 louvers.

SHAPING THE LOUVERS



Saw safely. Rip two 5° bevels on one side of the louver stock, guiding the work against an auxiliary fence and hold-down. Then attach veneer strips to the fence and rip the opposite side.



Plane the oval. A few passes with a block plane refines the louver's shape into an oval. Looking at the end-grain cross section helps you check your progress.

I start with $\frac{3}{8}$ -in.-thick by $3\frac{1}{2}$ -in.-wide basswood and rip it into a truncated diamond cross-section on the tablesaw. To do this safely, attach an auxiliary fence with a hold-down to your tablesaw fence, and use featherboards.

Rip both edges of one side of the stock with the blade angled 5° from vertical. Then attach shims of veneer to the auxiliary fence with double-sided tape to support the angled side, and rip the opposite side. (See photo, far left.)

Once all the louver stock is ripped, I take it to my bench and use a block plane to refine the shape into an oval, as shown in the photo at near left. Then I round over the edges with an antique rounding plane, but you can easily substitute a block plane instead.

Next, crosscut the louvers to length. For the shutters to work well and look good, leave a $\frac{1}{32}$ -in. gap between the louvers and the stiles on each side—the thickness of the shutter pin's shoulder. When operating the louvers, the shoulder of the plastic pin bears against the stile and the louver, preventing binding.

HOW TO ROUT A MORTISE AND TENON

With these jigs and a plunge router, you can make production runs of tenons and mortises for shutter frames, cabinet doors, or other applications.

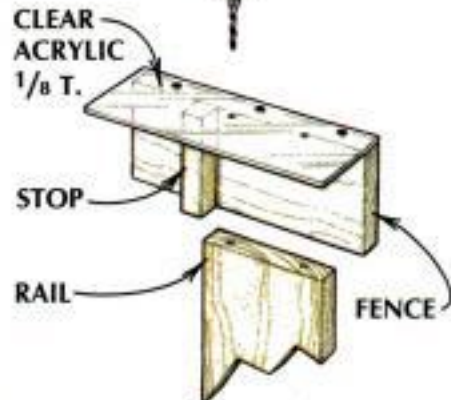
ROUTING A TENON

STEP 1

Make a hardwood tenon template of the desired length, as shown in Step 3. Use it to make a drilling jig. (See Step 2.)

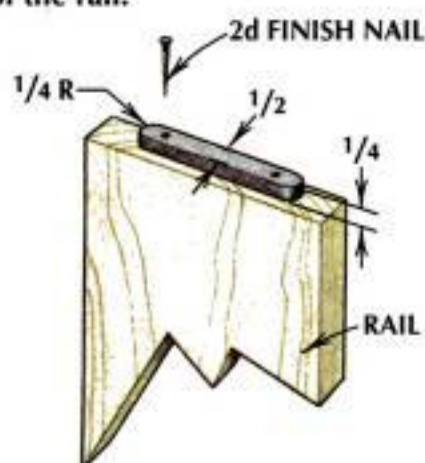
STEP 2

Use the drilling jig to drill a pair of 1/16-in. locator holes in the end of the rail.



STEP 3

Tack the tenon template to the end of the rail.

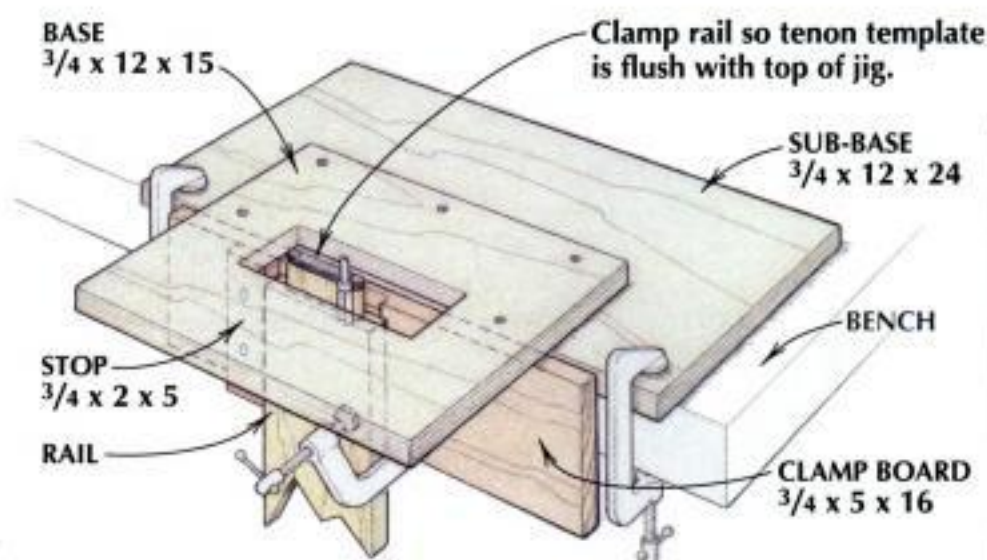


Jigged for tenons.

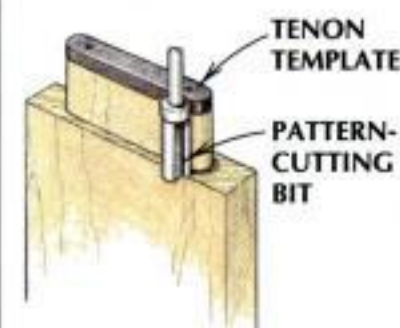
With a tenon template nailed to the end of the rail, rout the tenon by following the template with a pattern bit.

STEP 4

Clamp the rail in a simple three-board jig, and rout the tenon by following the tenon template with a pattern-cutting bit.

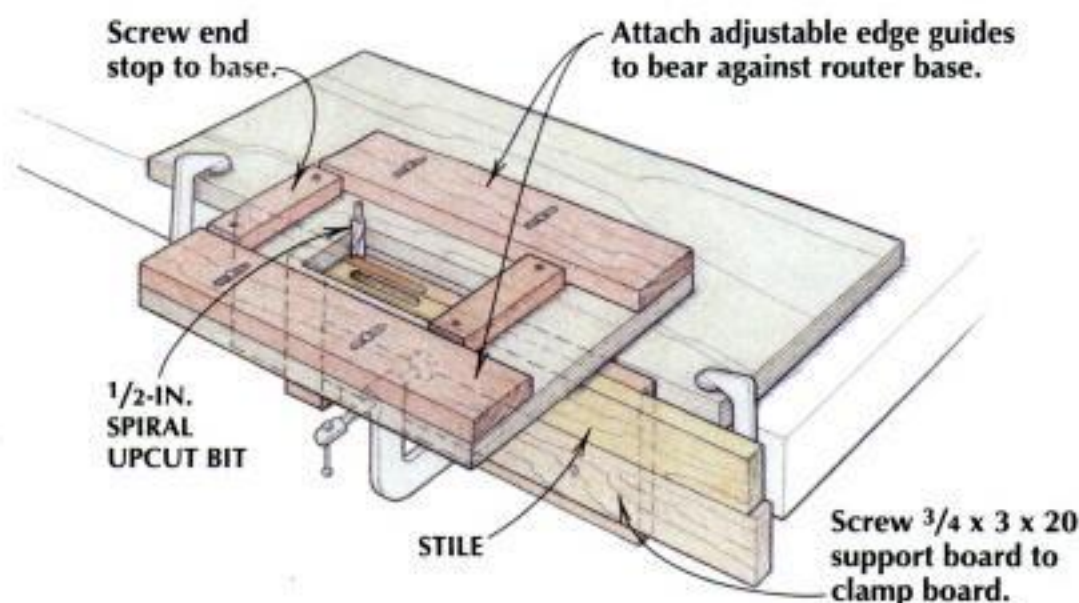


TENON-CUTTING DETAIL

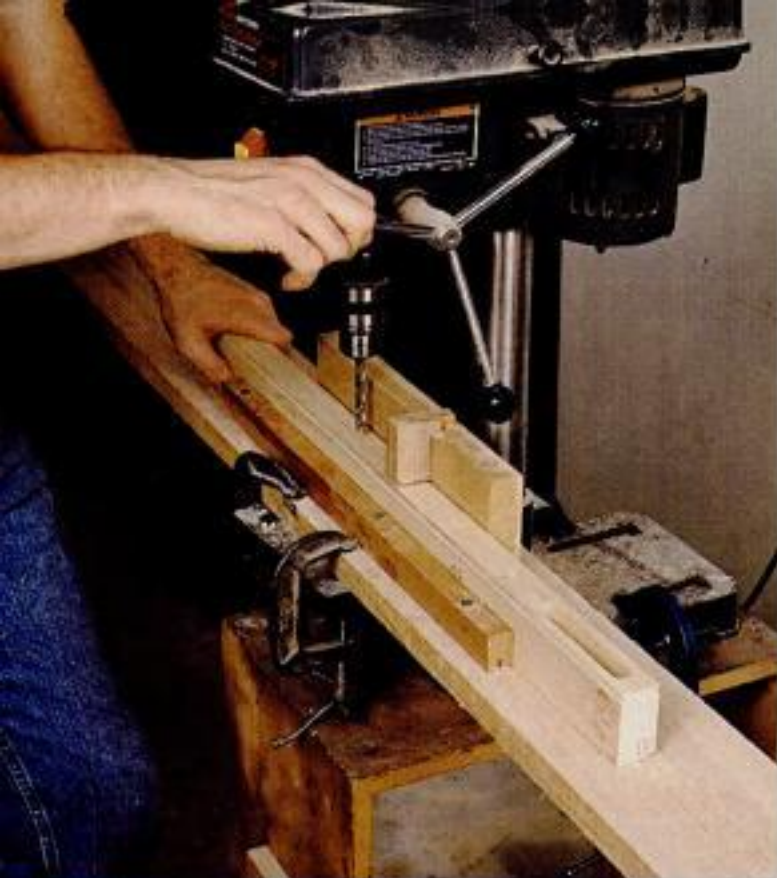


ROUTING A MORTISE

Using the same jig, attach a support board, end stops and edge guides. Use a straight bit and rout the mortise by moving the router base between the guides.



Fenced for mortises. Add a pair of edge guides and end stops to the same jig, and plunge rout the mortise.



Drilling accurate shutter-pin holes—It's important to drill evenly spaced holes in the stiles and the louvers for the shutter pins. I use two drill-press jigs to do this. The stile-hole jig references the previously drilled hole, ensuring consistent spacing. (See photo at top left, and "Tech Tips," AW #58, for a similar jig.)

The louver-drilling jig holds each louver as shown in the photo at left center. Flip each louver to drill the second hole, so the same edge rests on the same side of the fence. This will place any minor misalignment on the same side and keep the louvers straight in the frame.

Detailing the frames—Cut the rabbets in the top and bottom rails on the table-saw, to act as stops for the louvers. (See Fig. 1.) Be sure to rabbet the interior side of the top rail and the exterior side of the bottom rail.

Next, rout the notch in the center of the top rail for the control arm. I bandsaw a template to the shape of the notch, and use a guide bushing and straight bit. (See photo, above right.)

Then I use the same bushing and bit and a separate template to rout shallow mortises for the butt hinges on the edges of the stiles. (See Fig. 1.)

Finally, I chuck a 1/8-in. core-box bit in the router table to make a 1/8-in. cove along the inside edges of the stiles.

Sealing before assembly—With all the parts cut, sand everything with 150-grit sand-

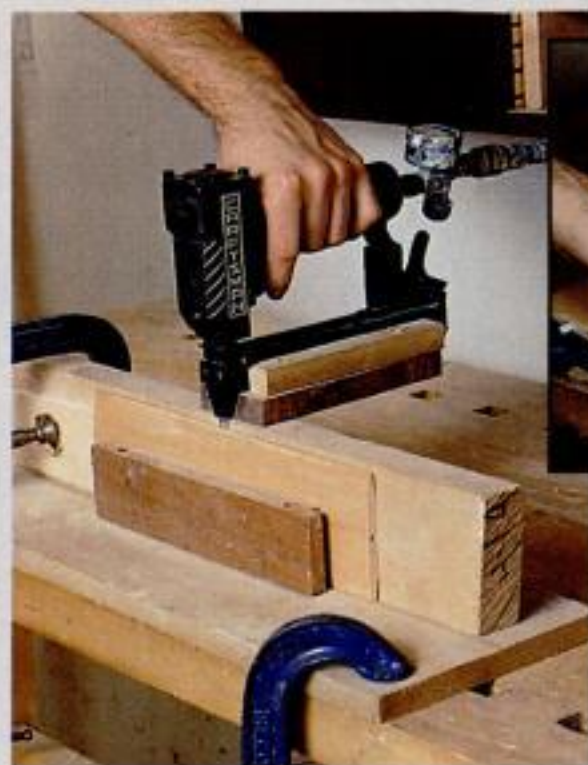


Notch with a template. Clamp a template to the rail, and use a guide bushing and a straight bit to rout the notch for the control arm.

Drill for shutter pins. Above, drill the holes in the stiles by aligning the stock in a jig on the drill press. A sliding dovetailed block holds a shutter pin to engage the workpiece. At right, use a separate jig to hold the louvers vertically for drilling.



ATTACHING THE CONTROL ROD



Stapling setup. At left, with a staple gun secured 3/8 in. above the work, the author shoots a staple into the edge of a louver, leaving the staple 1/4 in. proud. Above, he uses a separate jig to shoot a staple through the louver's staple into the control arm.

paper. Then apply an alkyd sanding sealer. Keep the sealer off the tenons and out of the mortises as you brush it on. Before assembly, pre-paint the inside edges of the stiles and rails; it's hard to spray an even coat of paint on these surfaces.

Assembling the shutters—The first step here is the trickiest: driving all the crowned staples to attach the control arm to the louvers. Once again, a simple jig takes the guesswork out of this operation. This one holds the nose of my air-powered stapler just far enough (about 3/8 in.) away from the edge of the louver to drive the 7/8-in.-long staples into the louvers, so they stand 1/4 in. proud of the surface. (See photo, bottom far left.)

Once I've attached a staple to each louver, I use a separate jig to interlock the louvers to the control arm with 5/8-in.-long staples. (See photo, bottom left.)

Now it's time to assemble the frame. With the shutter pins pressed into the louvers, coat the tenons and mortises with glue. Then fit the louvers one by one into the frame, working from one end of the frame to the other and applying pressure with a bar clamp as each pin finds its hole. When the clamps come off, peg each tenon with two hardwood dowels.

Finishing up—I apply a gloss, oil-based enamel. I definitely recommend spray equipment (see AW #53), even if you have to borrow or rent it. Once the paint has been dry for several days, you can hang the shutters. ▲



ROBERT KEMPINSKI is an amateur woodworker and a rocket scientist at the Houston Space Center.

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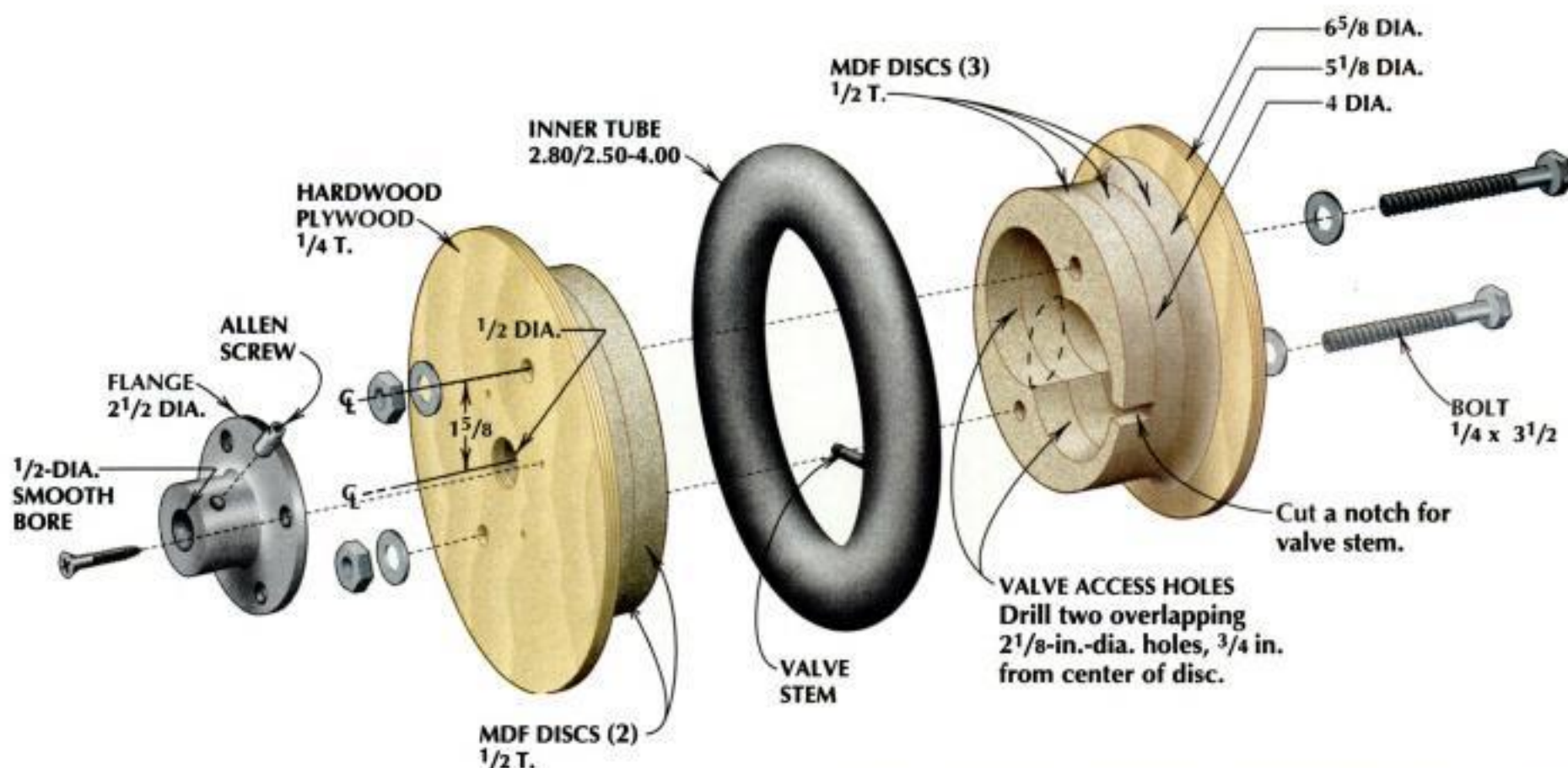
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CIRCLE NO. 25 ON PRODUCT INFORMATION FORM

Pneumatic Drum Sander

Contour sanding on the cheap

by Frank Gregg



A pneumatic drum sander does a great job of smoothing and shaping all kinds of curved work. My shop-made sander works just like expensive commercial models, but requires only a few dollars' worth of materials. Designed to use commonly available 3-in. by 21-in. sanding belts, it's made from 1/4-in.-thick hardwood plywood, 1/2-in.-thick medium-density fiberboard (MDF) scraps, and a motor flange that you can get at most hardware stores. I bought the 4-in.-i.d. inner tube at a lawnmower repair shop.

I use the sander on a belt-driven grinder powered by a 1,750-rpm motor. I geared the grinder to run at about 870 rpm by using a motor pulley half the size of the grinder pulley. You could also mount the sander on a lathe by using a faceplate instead of a motor flange.

Make the sander in the following sequence: Lay out two 6 5/8-in.-dia. plywood discs, two 5 1/8-in.-dia. MDF discs and three 4-in.-dia. MDF discs, as shown in the drawing. Locate the hole spacings accurately.

Bandsaw each disc 1/8 in. oversize and drill a 1/2-in.-dia. hole through the center of each one.

Glue the discs together to make the two sander halves, as shown in the drawing. Slip a 1/2-in.-dia. bolt through the center for glue-up alignment. With the halves bolted together, drill the two 1/4-in.-dia. bolt holes, then install two 1/4-in. by 3 1/2-in. bolts securely in the holes.

Attach the flange, centering it with a 1/2-in.-dia. bolt, then mount the sander on your grinder and turn it to its finished diameter. This ensures that it will

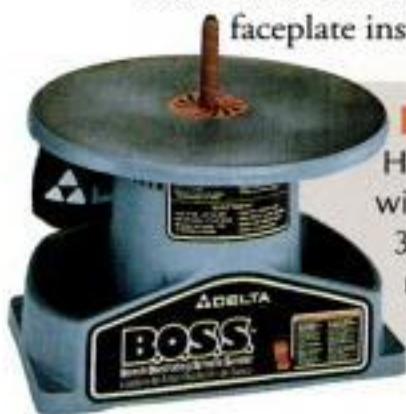
run true. (I used a simple shop-made turning tool rest.)

Finally, disassemble the halves, drill the two overlapping valve access holes, and cut the valve stem notch. ▲

FRANK GREGG works wood in Texas.



Sanding for a song. This inexpensive, shop-made pneumatic drum sander uses a standard 3-in. by 21-in. sanding belt. You can make it from plywood and MDF scraps and a 4-in.-i.d. inner tube.



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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 a Delta "B.O.S.S." Benchtop Oscillating Spindle Sander—list price, \$261. See the review on page 86.

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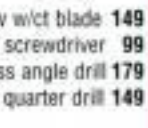
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CIRCLE NO. 66 ON PRODUCT INFORMATION FORM

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Beech

by Paul L. McClure



Beech trees have long been valued for their fruit and medicinal properties as well as their wood. Raw beechnuts are sweet and delicious; dried and roasted, they were once a popular substitute for coffee beans. Leaf shoots served as a cooking herb and beechnut oil as a cooking oil. In fact, the genus name for beech—*Fagus*—comes from the Greek for “to eat.”

Numerous folk medicines have also been derived from the tree, including lotions to treat poison ivy and ointments to heal burns, sores and ulcers. Beech sap was one ingredient of a compound used to treat tuberculosis, and a derivative of the root or leaves was believed to cure fevers, dysentery and diabetes.

There are eight species of beech worldwide. Only *Fagus grandifolia*, or American beech, is commonly available in the United States. European beech (*F. sylvatica*), sometimes available on special order, is very similar to *grandifolia* in

appearance and density. Beech trees can live as long as 150 years, growing 100 ft. tall and reaching diameters of 5 ft.

Appearance

Beech's reddish-brown heartwood often flows gradually into the pinkish-white sapwood. The wood has a fine texture and tiny pores. The grain is tight and straight and often interlocked or wavy.

One of the most distinguishing characteristics of beech is its pattern of small, dark flecks evenly spaced throughout the wood. On quartersawn surfaces, these rays can display a pattern resembling lacewood. Beech retains its color even after long exposure to light and air, although it may turn a little darker. The wood has no odor or taste.

Workability

Beech lumber is very hard. It is difficult to work with both power tools and hand tools. It can bind saw blades and it tends

to scorch when being sawn or drilled. It tends to blunt plane irons and can tear out due to alternating grain. On the plus side, it sands easily to a very smooth surface, glues well, and has excellent steam-bending properties. It holds fasteners well, but you need to prebore for screws and nails to prevent splitting. Beech stains easily and accepts all finishes. Because the lumber has a tendency to warp, I avoid using it for large panels.

Uses

Beech lumber is widely used for furniture, bentwood chairs, cabinets, flooring, tool handles, plane bodies, turnings and toys. It's especially well suited to kitchenware because it imparts no taste or odor. For the same reason, it's widely used to make barrels for “beechwood-aged” whiskey. Some vintage cars were made with beech, so it's used for their restoration. Beech veneers, often highly figured, are used in furniture. ▲

BEECH



SPECIES AND COMMON NAMES

Fagus grandifolia—American beech, red beech, ridge beech, white beech, winter beech

GROWING RANGE

Nova Scotia west to Ontario, and south to Florida and eastern Texas

SPECIFIC GRAVITY

0.65 to 0.90

DENSITY

40 to 56 lbs. per cubic ft.

WOOD MOVEMENT¹

Tangential (flatsawn): medium (less than 3/8 in. per ft.)

Radial (quartersawn): small (less than 1/4 in. per ft.)

DURABILITY

Susceptible to decay and insect attack

SUSTAINABILITY

Sustainable at current harvest levels

AVAILABILITY

Hardwood lumber dealers; not commonly available in the western U.S.

SIZE

Thicknesses: 3/4 through 8/4. Widths: 6 to 12 in. Lengths: 8 to 16 ft.

COST

Lumber: \$2.90 to \$3.50 per bd. ft.

Veneer: \$1.35 per sq. ft.

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

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Ebonizing

Black is beautiful

by Michael Dresdner



Ebonizing, or blackening, wood can be used to great effect in a variety of projects. Black accents—often created to simulate expensive ebony wood—create points of visual interest as your eye travels across a piece of furniture. Entirely ebonized furniture is rare, but fully treated smaller pieces, such as turnings, are fairly common.

To some, ebonizing might include painting the wood black, but to me the object is to maintain some of the grain and character of the wood. You can accomplish this using various dyes, stains and chemicals. In this column, I'll cover some of the more popular ebonizing methods and share my own favorite technique. Although none of these treatments are hazardous, you should wear gloves to prevent blackening your hands.

Vinegar Homebrew

Let's start with a traditional homemade formula concocted from vinegar and rust. The mixture works best on oak, walnut, mahogany and other woods high in tannin; low-tannin woods will not get as dark. If you have ever seen the blue-black stains that form around iron nails in old oak, that's the color you'll get.

To make the brew, pour some vinegar into a glass jar and drop in a handful of rusted iron parts—nails, hinges, whatever. No rusty metal around your shop? No problem; throw some water on a couple of steel-wool pads; you'll have plenty of rust within a day.

Put the jar lid on loosely so that gas can escape but the vinegar doesn't evaporate. Let the jar sit in a warm part of the shop for a week or more. Then remove the metal and strain the black liquid through cheesecloth or a coarse filter cone. Sponge it liberally onto the wood and let it dry overnight. Reapply once or twice if you want to darken the color. When the wood is dry, scrub it with a stiff bristle brush to remove any renegade steel-wool fibers. Then wipe



Fade to black. Ebonizing treatments have different effects on different woods. Woods from top to bottom are soft maple, oak and cherry. Treatments from left to right are vinegar and rust, black dye, black pigment stain and India ink.

it off with a slightly damp cloth and, after it dries, seal it with your favorite sealer. I use fresh shellac.

Dye Stains

Dye stains are solutions made by mixing a powder into a specific liquid: water, alcohol or oil. (See AW #57.) You can buy premixed solutions, but it's cheaper to buy the powder and mix your own. (Dye stains are available from many mail-order woodworking suppliers.) I generally avoid oil-based dyes because they don't get as dark, they go on unevenly at times, and they fade more quickly. They can also bleed into solvent-based top coats.

Black dye works even on low-tannin woods such as holly. However, very close-pored and dense woods, such as hard maple, will resist absorbing the dye. This resistance forces the "black"

dye to show its true colors: either blue/black or green/black.

Mix either water- or alcohol-soluble dye powder as strong as the directions permit. Sponge the mixture liberally onto the wood, allow it to soak in for a minute or two, and then wipe off the excess solution.

Resist the temptation to let a heavy coat of dye dry to a black crust instead of wiping it off. The crystal residue sitting atop the wood is likely to cause your finish to peel. Instead, if you want the piece blacker than the dye will allow, let it dry, then apply a black pigmented stain on the unsealed dyed wood. ([See Pigment Stains, page 80.](#))

When the dye is dry, you can seal and finish the wood with a clear top coat of your choice. I generally avoid water-based top coats over water-soluble dyes because the dye tends to bleed.

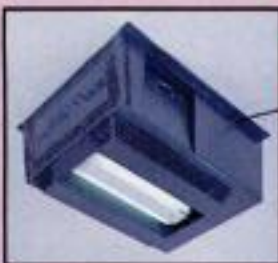
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ASK WOOD-KOTE

Fixing Sticky Cabinets

Q: *The finish on my kitchen cabinets has become sticky. Dirt is accumulating around the door pulls. I have tried everything to clean it. Nothing seems to work. Is there anything I can apply to the surface that will remedy the situation? Please help.*

J. Maxey, Boise, ID

A: Unfortunately, we are not aware of anything that you can simply apply to your cabinets to reverse the stickiness. Your kitchen cabinets are, no doubt, finished with lacquer which is the choice of many cabinet manufacturers because lacquer dries quickly and can easily be recoated to touch up scratches or blemishes. Lacquer, however, does not hold up well in a kitchen envi-

ronment. Compounds contained in cooking vapors tend to collect on the cabinets and soften the lacquer, creating a "sticky" surface that accumulates dirt. The problem is compounded when strong household spray cleaners are used to clean the cabinets as they will further soften the lacquer. Regrettably, softened lacquer must be removed from the cabinets using a scraper or chemical stripper. After the cabinet surfaces are stripped, sanded (and restained if necessary), we recom-



mend applying three coats of a high grade polyurethane, such as Wood Kote's **Ultra Poly Kote™**. Polyurethane takes longer to dry and is more difficult to touch up, but it creates a durable finish that is resistant to harsh food substances and will hold up to repeated washing.

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CIRCLE NO. 72 ON PRODUCT INFORMATION FORM

Pigment Stains

Pigment stains (available at most paint and hardware stores) are made by adding finely ground, inert powder to a liquid medium. Pigment stains work by depositing the pigment particles in crevices in the wood. Because of this, dense, closed-pore woods like maple often resist the pigment. Dense, open-pore woods like oak will darken much more in the pores than on the surrounding wood. (See photo, page 78.)

To apply the stain, flood the surface, let the stain soak in for a few minutes, then wipe off the excess. (You don't have to wipe off pigment stains as completely as you do dye stains.) After each coat dries, you can restrain to further darken the wood. The type of wood you use, the amount of stain you wipe off or leave on, and the size of the pigment particles will all affect the final color.

If you're using an oil-based stain, use a solvent-based top coat. Water-based finishes and oil-based stains are often incompatible.

India Ink

To get the blackest color with the least amount of buildup, my favorite stain is good old India ink. Surprisingly, India ink (available at art supply stores) is not a dye, but a very finely ground pigment. You can buy it in either a water-based or a solvent-based formulation. Both work well, but I find that the water-based ink penetrates better.

Walnut treated with India ink will simulate the color and grain of ebony very convincingly. Applied over a black dye, India ink will get you as close to a deep black as you can go without losing the wood's character. And you can seal it with shellac, lacquer sealer, varnish, oil, or whatever finish you prefer.

"Deep Dish" Black

I'll wrap this up with a finishing schedule for a lovely, deep ebony-colored lacquer finish that I've used on pianos.

Stain the raw wood with India ink and seal it with fresh shellac. For open-pore woods like mahogany and walnut, follow

up with black pore filler. Sand the filler carefully to avoid cutting through the stain. (See AW #27.) Build up several coats of clear lacquer, sanding between coats until the surface is flat and pore-free.

Dissolve an ounce of oil-soluble black dye powder in a quart of lacquer thinner. Add an ounce of this solution to each quart of top-coat lacquer that you spray. Build up several coats and buff them to a gloss when they're dry. The small amount of black dye "floating" in the lacquer above the wood adds incredible depth to a very black finish, especially when viewed under strong, direct light. ▲



Join Michael Dresdner live

on America Online Sunday nights from 9:30 pm to 10:30 pm eastern time for answers to your finishing questions. Keyword "wood" takes you to AMERICAN WOODWORKER Magazine Online. Click the "Shop Talk" icon to enter the chat room.

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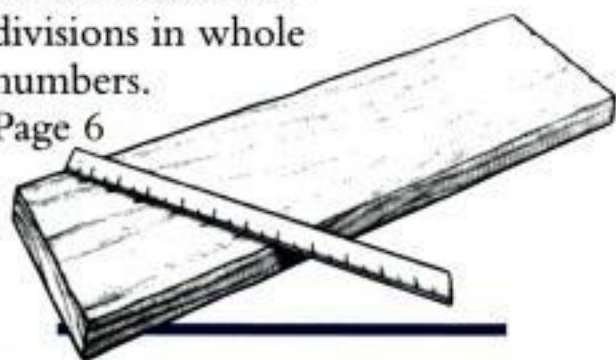
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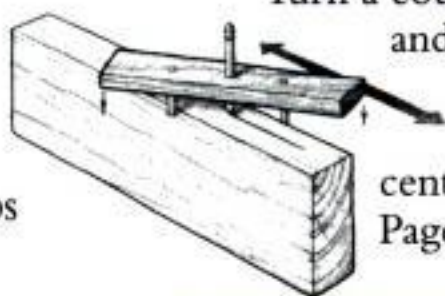
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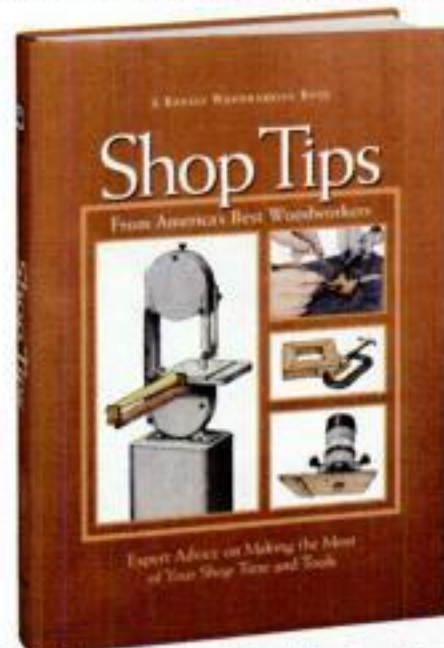
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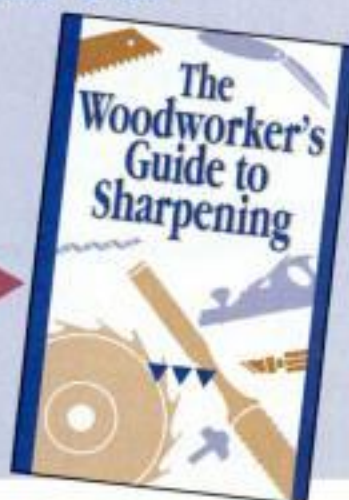


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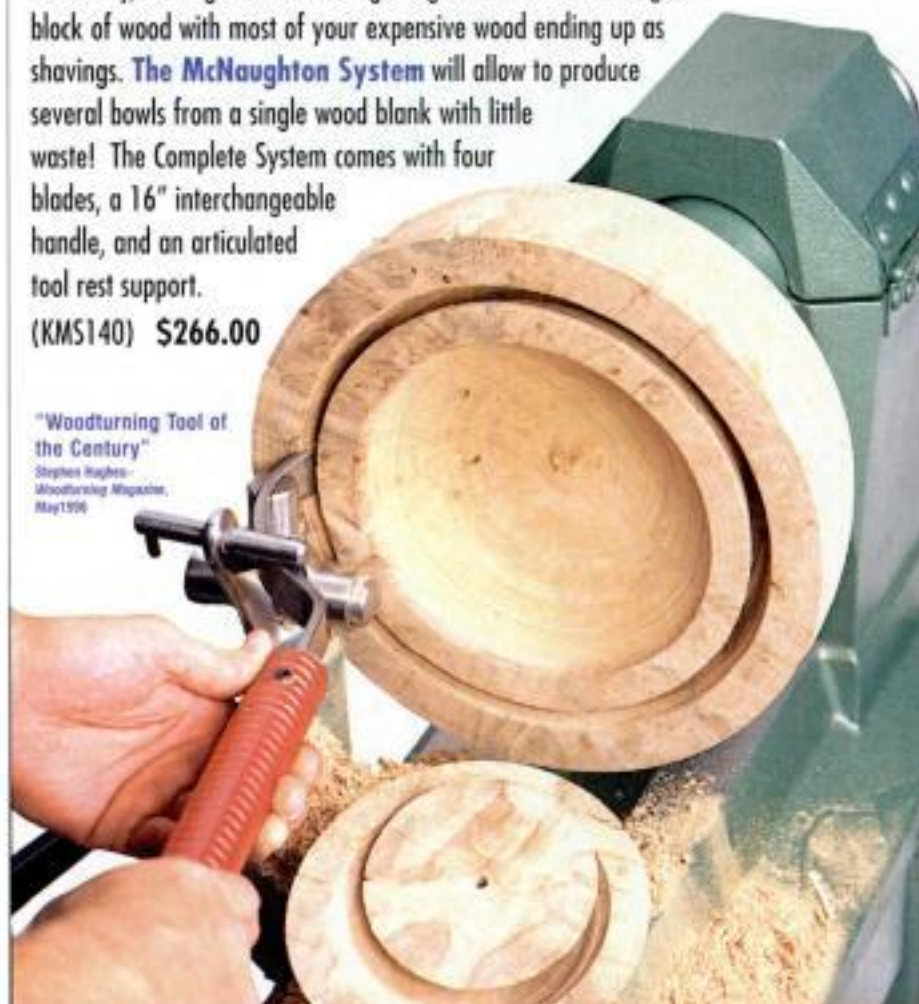
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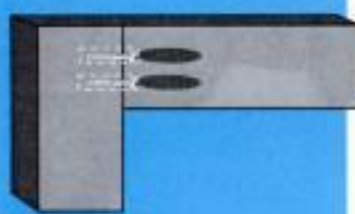




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CIRCLE NO. 38 ON PRODUCT INFORMATION FORM

Machines on the Move

Is your shop cramped for space? Delta's new 50-345 Universal Mobile Base converts stationary machines into easily movable ones. The base costs less than other bases and can be assembled to fit different size machines. To custom-fit the base, you cut your own hardwood rails to fit in the four corner brackets.

Three wheels give a smooth ride on irregular surfaces, and a foot pedal locks the base firmly in place. (Street price: about \$50) *Delta International Machinery Corp., Dept. AWT, 246 Alpha Dr., Pittsburgh, PA 15238, (800) 438-2486. Circle #604*



Cut Anything—Quick!

Think of the new SpiraCut SCS as a versatile alternative to a jigsaw or scrollsaw for quick, freehand cuts in almost any material—wood and sheet goods, laminates, drywall, ceramic tile and Du Pont Corian®. The spiral bit leaves a much cleaner edge than a saw, and you don't need a pilot hole—just plunge directly into the material

and then cut in any direction. (Price: about \$90 for corded version; about \$219 cordless with batteries, charger and three bits.) *RotoZip Tool Corp., Dept. AWT, 1861 Ludden Dr., Cross Plains, WI 53528, (800) 521-1817. Circle #605*

Stay Cool in the Shop

Cool your shop this summer with Power Plus, a multi-function portable fan that blasts a cooling breeze up to 30 ft. This 300-cubic-ft.-per-minute blower can be positioned to blow in any direction. Use it to dry paint or rid areas of odors, fumes or dust. Or attach a duct hose to pump air into or out of an enclosed space. (Price: about \$140 at hardware stores and home centers) *Coppus Portable Ventilation Div., Dept. AWT, Box 8000, Millbury, MA 01527, (800) 556-8057. Circle #606*



SHOP TEST



Delta B.O.S.S. Oscillating Spindle Sander

You can't beat an oscillating spindle sander for sanding curves. Its spinning, up-and-down action (see AW #40) removes material faster than a fixed sanding drum and doesn't leave scratches.

Delta's new model 31-780 sander—dubbed “the B.O.S.S.,” for “bench oscillating spindle sander”—sports some features found on more expensive machines, including an induction motor and a cast-iron table. But at \$195, the Delta sander is only slightly more expensive than lighter-duty models. We feel that its performance more than justifies the extra cost.

The B.O.S.S.'s spindle revolves at 1,725 rpm and oscillates 60 times a minute over a 7/8-in. stroke. Its 1/4-HP, direct-drive induction motor runs quieter than the universal motors found on other sanders. And the massive cast-iron table gives it a solid feel and very little vibration, though at 41 lbs., it's still easy to pick up and move.

The 18-in.-dia. table offers plenty of support for large workpieces. It's a snap to change the rubber sanding drums—they all mount on the same 1/2-in.-dia. spindle. If you're just changing sleeves, you can leave the drum in place. Drum diameters range from 1/2 in. to 3 in.

In operation, the B.O.S.S. has power to spare. You can hog wood from thick stock without stalling the motor. And the built-in dust-collection fan and on-board collection bag pick up about 95% of the dust through the innovative spiral slots in the table inserts. You can hook up your shop vacuum to collect the rest.

If you sand a lot of curved work, we recommend the Delta B.O.S.S. without reservation. It's available from mail-order catalogs, woodworking stores and home centers for around \$195. This includes 1/2-in. and 3/4-in. abrasive sleeves, sanding drums, and matching table inserts. An accessory set (\$65) includes 1-in., 1 1/2-in., 2-in. and 3-in. sleeves, drums, and inserts. *Delta International Machinery Corp., Dept. AWT, 246 Alpha Dr., Pittsburgh, PA 15238, (800) 438-2486. Circle #607*

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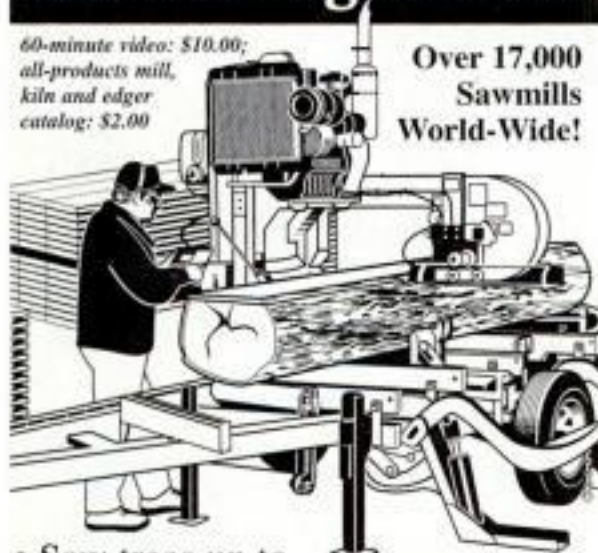
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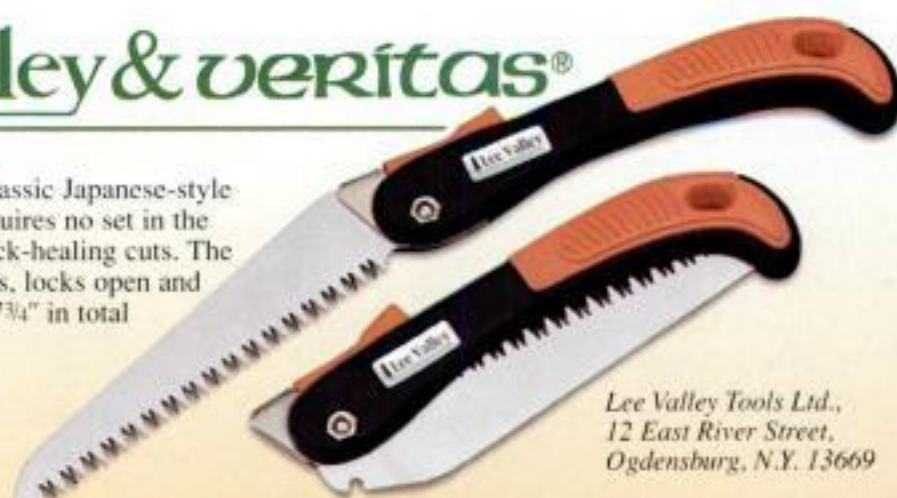
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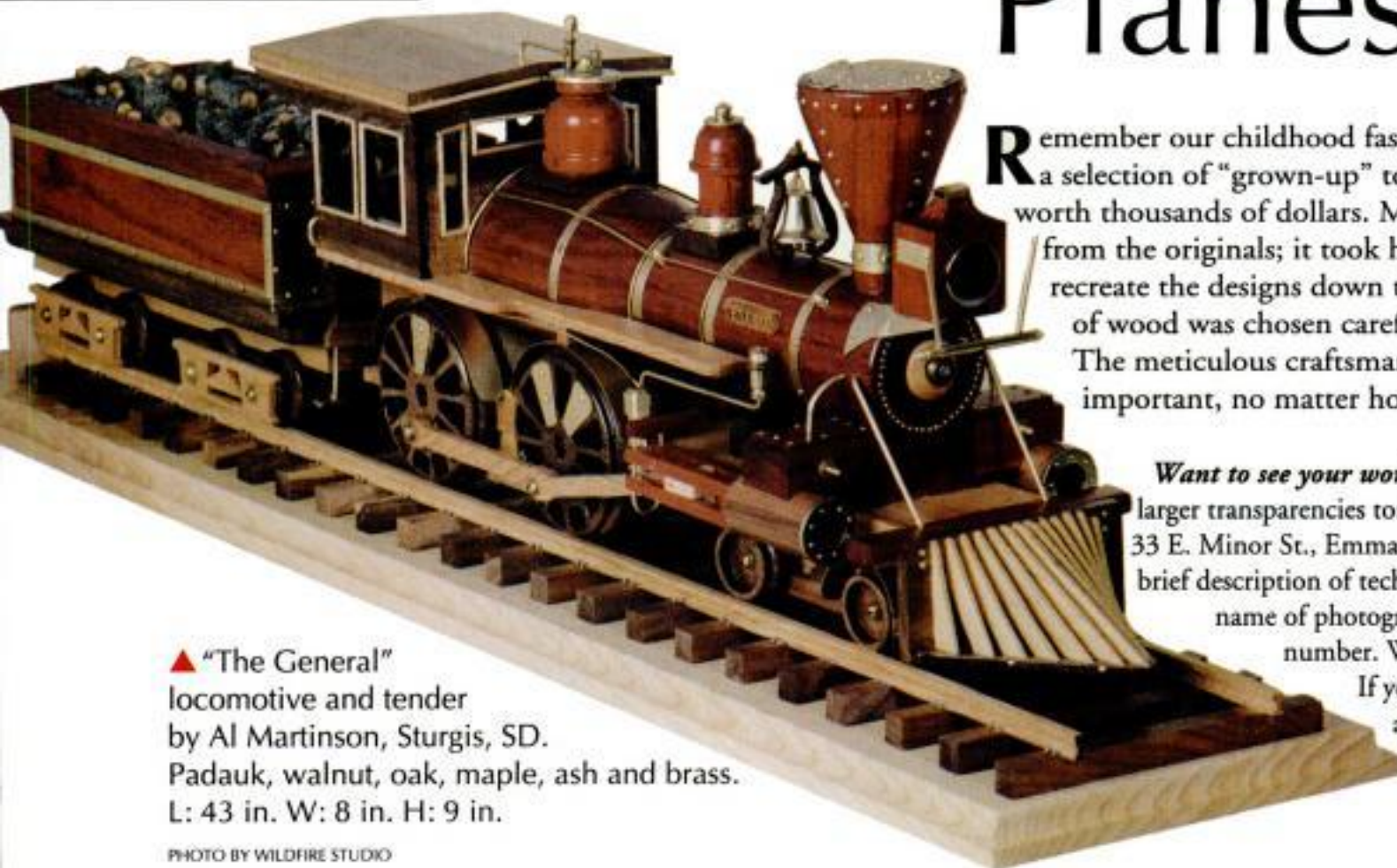
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Planes, trains



▲ "The General" locomotive and tender by Al Martinson, Sturgis, SD. Padauk, walnut, oak, maple, ash and brass. L: 43 in. W: 8 in. H: 9 in.

PHOTO BY WILDFIRE STUDIO

Remember our childhood fascination with scale models? Here's a selection of "grown-up" toys, some of them collectors' items worth thousands of dollars. Most of these pieces were scaled from the originals; it took hours of painstaking research to recreate the designs down to the smallest detail. Each species of wood was chosen carefully to convey the right color. The meticulous craftsmanship proves that toys are important, no matter how old you are.

Want to see your work in "Gallery"? Send color slides or larger transparencies to: "Gallery," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. Please include a title, a brief description of techniques used, materials, dimensions, name of photographer, your name, address, and phone number. We'll pay you \$35 per entry published. If you want your photos returned, enclose a self-addressed stamped envelope.



◀ 1923 freight locomotive by Doug Kenney, Key West, FL. White ash, walnut, jarrah, mahogany, Brazilian rosewood, bird's-eye maple, birch, pau amarillo, brass, transfer decals and coal. L: 27 in. W: 4 1/2 in. H: 5 in.

PHOTO BY DOUG KENNEY



▶ Scale model of Challenger aircraft by Colin Butler, Putney, VT. Thai rosewood and cast bronze. L: 14 in. W: 14 in. H: 8 in.

PHOTO BY MITCH MANDEL

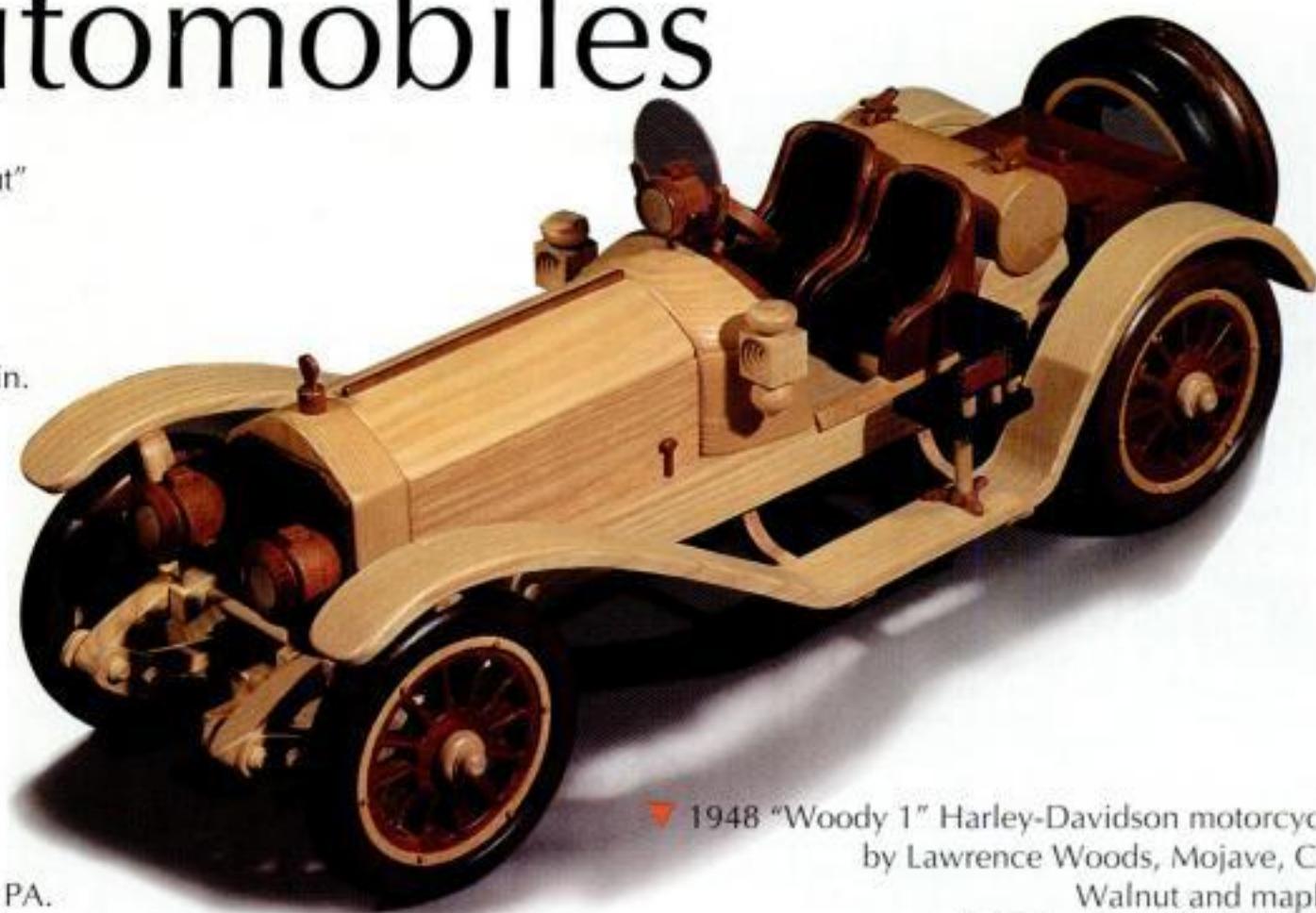
and automobiles

► 1913 Mercer "Raceabout"
by Rodger C. Tanner,
Charlottesville, VA.

Ash, walnut, mahogany
and basswood.

L: 20 in. W: 7 1/4 in. H: 6 in.

PHOTO BY CRAIG TANNER



▼ Peterbilt cattle truck
by Sam Martin, Lancaster, PA.
Red oak and walnut.

L: 25 in. W: 6 in. H: 9 1/2 in.

PHOTO BY OWEN HARTZ



▼ 1948 "Woody 1" Harley-Davidson motorcycle
by Lawrence Woods, Mojave, CA.

Walnut and maple.

L: 36 in. W: 11 in. H: 18 in.

PHOTO BY ROSEMARY WOODS



▲ Napoleon-style coach

by George Fath, Granite City, IL.

White pine, satin, cotton, leather, copper,
colored lacquer and enamel paint.

L: 18 in. W: 9 in. H: 10 in.

PHOTO BY GEORGE FATH



▲ Backhoe by Sam Martin, Lancaster, PA.

Red oak and walnut. L: 26 in. W: 7 in. H: 11 in.

PHOTO BY OWEN HARTZ

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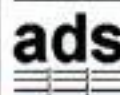
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A Blacksmith's Pride and Joy

by Toshio Odate

On recent trips to Japan I visited several master craftsmen who make traditional Japanese plane blades, chisels and saws. (See page 62.) These men started their profession in childhood, and most of them are now in their 70s and 80s. Throughout their lives they have had only one wish: to make a blade that will be loved and appreciated. It has been a lifetime of pride and joy, with a constant stream of sweat and hardship beneath. They told me many stories which illustrate this pride and joy. Here is a story told to me by Mr. Hirota, a third-generation saw maker.

One day Hirota met a carpenter who showed him a *ryoba* saw Hirota's father had made many years earlier. Now, a *ryoba* saw has rip teeth on one side and crosscut on the other. But the handle of a *ryoba* saw is not in the center of the body; it is closer to the rip teeth. This leaves more room for sharpening and wear on the crosscut teeth, which Japanese carpenters use most frequently.

Anyhow, the old carpenter had been using this same *ryoba* saw for 50 years. Over that time, the saw's crosscut teeth had been used and resharpened until they were way past the handle and went into the saw's rip side!

Hirota said, "I was very excited to see my father's work still honored after so many years. I thought to myself, 'This saw has been loved for a long time, and it has been used so well for so many different jobs, that it must be a great blessing for my dear father.' So I asked the carpenter to exchange it for my new saw, and I took the old one home. Now it hangs on the wall in my workshop."

Another time, a carpenter who lived in a distant place sent a photograph of a beautiful new house to Hirota. Included was a note which said, "I thank you very much, for I built this beautiful house with a saw that you made."

Today, Mr. Hirota still treasures the old saw and the photograph, the symbols of a job well done. And by doing so, he shows the blacksmith's pride and joy, like a parent who loves and appreciates his child. ▲

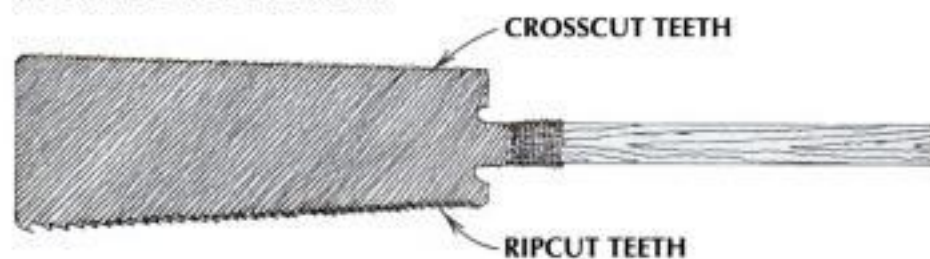
TOSHIO ODATE is a sculptor and *shoji* maker. He wrote the book, *Japanese Woodworking Tools: Their Tradition, Spirit and Use* (1984, Taunton Press, Box 355, Newtown, CT 06470). He currently teaches at Pratt Institute.



A lifetime of pride and joy. Mr. Hirota is now an elderly man. He has been making Japanese saws all his life. Here, he flattens a saw blade.

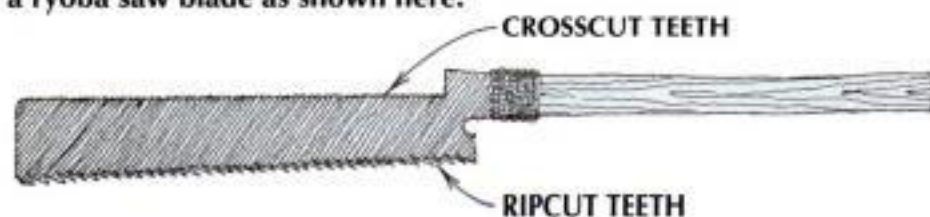
FIFTY YEARS OF SAWING

NORMAL RYوبا SAW



HIROTA'S FATHER'S SAW

Repeated sharpenings eventually narrow a *ryoba* saw blade as shown here.





This Delta exclusive gives you a lock on snipe control. Patent-pending cutterhead snipe control lock stabilizes the cutterhead during operation, for complete rigidity.



Those who've had a sneak preview have nice things to say about it. Priced in the middle of the pack—we're betting it'll end up at the head of its class.



Quick-change 2-knife system includes two high-speed steel, double-edged, reversible knives, a wrench and installation tool for quick and accurate knife changes.

Plane your own stock up to 12 1/2" wide and 6" thick. All the way down to 1/8" thick.



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