2013

Fine WoodWorking

Build a curvy lounge , p. 36

7 flawless joinery CIRCULATING es

Weatherproof woods for outdoor furniture

Work safely at the tablesaw

One-of-a-kind cutting boards

Master Class: Curved-front drawers

Complete guide to Japanese chisels

June 2013 No. 233

$7.99 $8.99 Canada

0 94115 56525 7 06 >

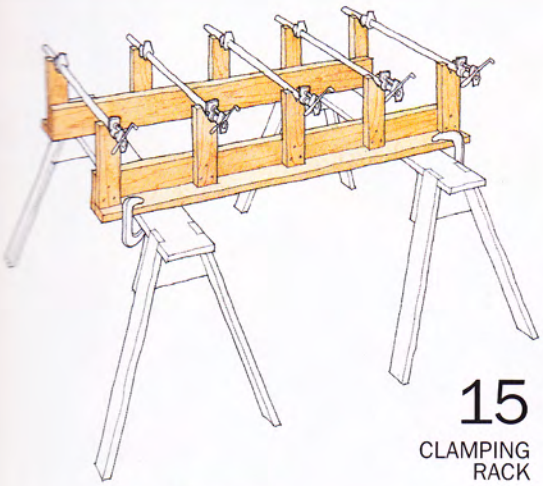
www.finewoodworking.com

Now available on tablets

Fine WoodWorking

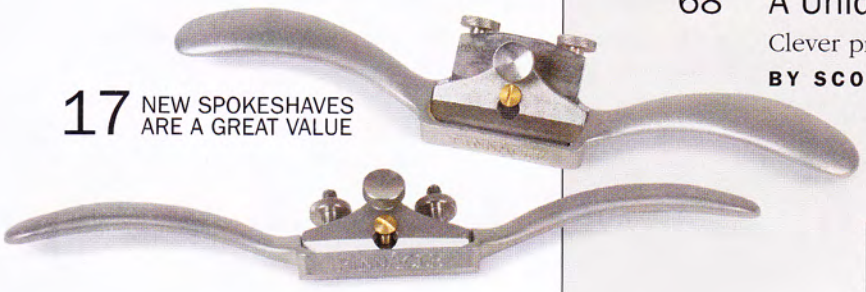
MAY/JUNE 2013 ■ ISSUE 233

contents



15 CLAMPING RACK

up front

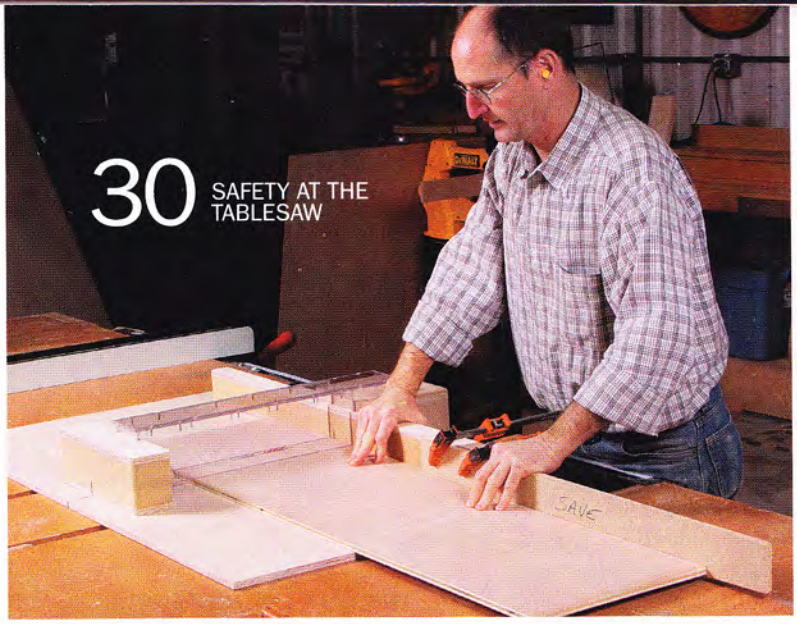


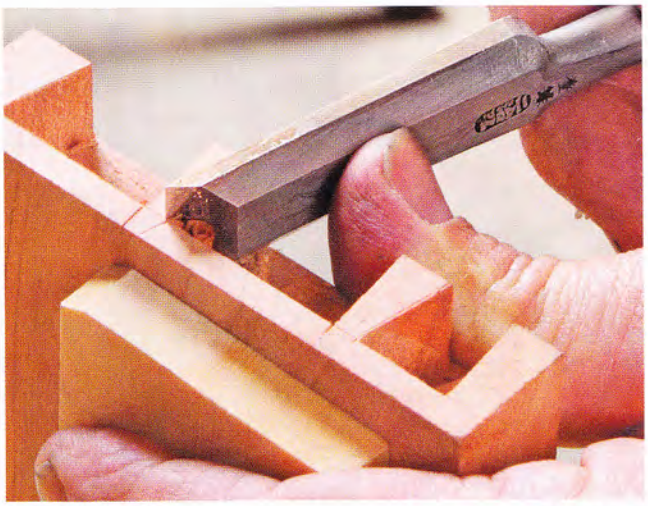
17 NEW SPOKESHAVES ARE A GREAT VALUE

features

The Taunton Press
Inspiration for hands-on living®

Cover photo: Michael Pekovich





in the back

THIS MONTH ON FineWoodworking.com/extras

Visit our website to access free web tie-ins, available April 4. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.

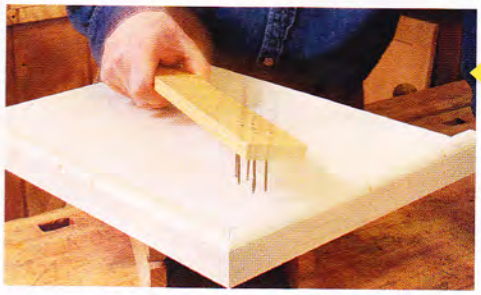
VIDEO:

Better Bandsawing at Your Fingertips

When changing a bandsaw blade (p. 20), a little tension goes a long way. Learn how your fingertip holds the key to better blade changes.

Free eLetter

Get free plans, videos, and articles by signing up for our FREE eLetter at FineWoodworking.com/newsletter.



VIDEO:

Beat Up Your Built-Ins

Cabinetmaker Gregory Paolini shares his techniques for adding a quick distressed finish to built-in furniture projects.

VIDEO:

A Cut Above the Rest

Why relegate curves to cabinets and desks? Watch how Scott Lewis incorporates stunning lines into top-notch cutting boards (p. 68).

Become an online member

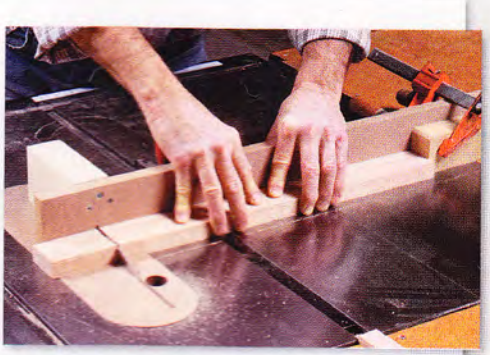
Access more than 1,000 exclusive project and technique videos by subscribing to FineWoodworking.com. You'll also get more than 35 years of magazine archives at your fingertips, including 1,400-plus articles and project plans.

VIDEO WORKSHOP

Sharpen Your Tablesaw Skills

Unlock your tablesaw's full potential with furniture maker and teacher Marc Adams. In our latest series, Adams walks you through a variety of essential techniques, including how to:

- Build your own splitters and zero-clearance throat plates
- Construct a custom crosscut sled
- Cut precise joinery



Fine WoodWorking

Editor	Asa Christiana
Art Director	Michael Pekovich
Managing Editor	Thomas McKenna
Senior Editors	Matthew Kenney Jonathan Binzen
Associate Editors	Steve Scott Henry P. Belanger
Senior Copy/ Production Editor	Elizabeth Healy
Associate Art Directors	Kelly J. Dunton John Tetreault
Administrative Assistant	Betsy Engel
Shop Manager	William Peck
Contributing Editors	Christian Becksvoort Garrett Hack Roland Johnson Steve Latta Michael Fortune
Methods of Work	Jim Richey

FineWoodworking.com

Executive Web Producer	Mather Dolph
Senior Web Producer	Ed Pirnik
Web Producer	Lisa Morgan

Fine Woodworking: (ISSN: 0361-3453) is published bimonthly, with a special seventh issue in the winter, by The Taunton Press, Inc., Newtown, CT 06470-5506. Telephone 203-426-8171. Periodicals postage paid at Newtown, CT 06470 and at additional mailing offices. GST paid registration #123210981.

Subscription Rates: U.S., $34.95 for one year, $59.95 for two years, $83.95 for three years. Canada, $36.95 for one year, $63.95 for two years, $89.95 for three years (GST included, payable in U.S. funds). Outside the U.S./Canada: $41.95 for one year, $73.95 for two years, $104.95 for three years (payable in U.S. funds). Single copy U.S., $7.99. Single copy Canada, $8.99.

Postmaster: Send address changes to *Fine Woodworking*, The Taunton Press, Inc., 63 S. Main St., PO Box 5506, Newtown, CT 06470-5506.

Canada Post: Return undeliverable Canadian addresses to *Fine Woodworking*, c/o Worldwide Mailers, Inc., 2835 Kew Drive, Windsor, ON N8T 3B7, or email to mnfa@taunton.com.

Printed in the USA

contributors

Marc Adams (*"Staying Safe on the Tablesaw"*) opened his woodworking school 20 years ago in an Indiana cornfield, and has grown it into a multi-building facility (MarcAdams .com) that sees more students each year than any other woodworking school we know of. With so many skill levels passing through, Adams is serious about safety. But you can also trace his success to his appreciation for all things Disney, specifically the customer-centered philosophy of the theme parks. His latest project, five years in the making, is a replica of Belle's bed from *Beauty and the Beast*, and is going to his daughter.

After working in a number of shops and undergoing nonstop training, **Greg Brown** (*"Expanding Table Looks Great Open or Closed"*) hung up his own sign in Deerfield, N.H., in 2010. Along with running his own business and training apprentices, he assists in workshops at North Bennet Street School. "Being surrounded by talented people has always been the cornerstone to my success and skill," he says. When not in the shop, he can be found casting flies at a local fishing spot.
Favorite tool? "My Buck Bros. 1-in. chisel."

John Reed Fox (*"Choosing and Using Japanese Chisels,"* Handwork) bought his first set of Japanese chisels on a trip to Japan in 1980. Three decades later he still uses them daily—along with quite a few others he's acquired—to build solid-wood furniture in his one-man shop north of Boston. His quietly powerful designs combine influences from Japanese aesthetics and from James Krenov, whose first book turned Fox toward furniture making.
Where to find him when he puts down his chisels each day ... "On the seat of a custom-made road bicycle."

Scott Lewis (*"A Unique Cutting Board"*), of Ennismore, Ontario, has packed quite a bit of woodworking into his first 25 years. He built a motorboat with his father at age 11 and made furniture throughout high school. Right after graduation, he entered a three-year apprenticeship building cases for electronic church organs. Next, he signed on with contributing editor Michael Fortune, and has worked with him since.
Where he sees himself in the future ... "Teaching high school wood shop."

For more information on our contributors, go to FineWoodworking.com/authors.

We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

Fine WoodWorking

Group Publisher	Anatole Burkin aburkin@taunton.com
VP, Advertising Sales	Rick Straface rstraface@taunton.com
Advertising Director	Peter Badeau 203-304-3572 pbadeau@taunton.com
Custom Solutions Manager	Brenden Delaney 203-304-3590 bdelaney@taunton.com
Senior National Account Manager	Linda Abbett 203-304-3538 labbett@taunton.com
Advertising Sales Assistant	Diana Mackey
Senior Advertising Marketing and Operations Manager	Karen Lutjen
Assistant Advertising Marketing Manager	Kandace Doyle
Member Audit Bureau of Circulation	The Audit Bureau
Digital Marketing Director	Sara Ezrin Larsen
Senior Consumer Marketing Manager	Melissa Robinson
Director, eCommerce	Michael Stoltz

The Taunton Press
Inspiration for hands-on living®
Independent publishers since 1975
Founders, Paul & Jan Roman

President	Timothy Rahr
CFO	Richard Browning
Group Publisher	Anatole Burkin
Group Publisher	Maria Taylor
SVP, Creative & Editorial	Susan Edelman
SVP, Operations	Thomas Luxeder
VP, Single Copy Sales	Jay Annis
VP, Consumer Marketing	Nancy Hallberg
VP, Advertising Sales	Rick Straface
VP & Controller	Wayne Reynolds
VP, Finance	Kathy Worth
VP, Human Resources	Carol Marotti
VP, Fulfillment	Patricia Williamson

Publishers of magazines, books, videos, and online
Fine Woodworking · Fine Homebuilding
Threads · Fine Gardening · Fine Cooking
www.taunton.com

letters

From the Editor

GET READY FOR FWW LIVE 2013

Last summer's first-ever Fine Woodworking Live event was such a success that we're doing it all over again. In case you missed it, FWW Live is a happy gathering of readers, authors, and staff members where we all celebrate the fun of woodworking. This year's event is all set for August 8–11 at Southern Connecticut State University in New Haven, Conn. SCSU is close to both Boston and New York, and is less than an hour from the Hartford/Springfield airport, with a wide range of lodging nearby.

You can meet your favorite authors, raise your woodworking game with live demos, meet old friends, and make new ones. But we've made some improvements. Based on attendee feedback, there are even more classes to choose from this year, and all are electives, meaning you are in charge. Power-packed seminars include Chris Becksvoort on hand-cutting dovetails and working in the Shaker style, Phil Lowe on fitting drawers and shaping a cabriole leg, Steve Latta on classic and contemporary inlay, Michael Fortune on bent lamination and brainstorming original designs, Mike Pekovich on mastering the smoothing plane and the Arts and Crafts style, and Peter Gedrys on fixing finishing mistakes and coloring wood. You'll also have a chance to visit our vendor booths to stock up on tools and accessories.

Last year's action. *The first FWW Live was chock-full of demonstrations, such as Michael Fortune on steam-bending (top), plus lots of vendors (bottom).*

There is an optional furniture tour at the Yale Art Gallery, and many other surprises are planned.

Go to FineWoodworkingLive.com to learn more, register for the conference, and pick your electives. Space is limited and early-bird pricing is in effect. Don't miss out on the fun.

—Asa Christiana

Time to clean?

I recently threw a dowel over to where the dowels belong in my shop. The toss became necessary as the traditional land route was blocked. Is this an indication that it's time to clean my shop?

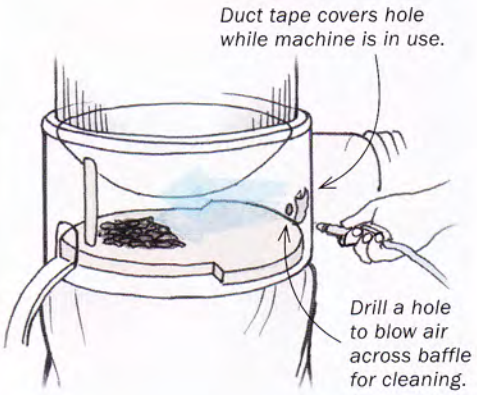
—MIKE NOLIN, West Greenwich, R.I.

Editor replies: *Or build a bigger one.*

Blow off the baffle

In Soup Up Your Dust Collector" (*FWW* #232), you point out that dust settles on top of the shopmade baffle when the filter is cleaned, only to be sucked back into the filter when the collector is turned on again. So you recommend removing the filter after cleaning it, in order to brush off the baffle. A better approach is to drill a small hole (or two) in the side of the collector just above the baffle to allow a quick blast of air that will remove the dust. A small piece of duct tape seals the holes with no effect on airflow.

—DICK WYNN, Wynn Environmental, Warwick, Pa.



Fear of heights

In "Doors that Stay Flat" (*FWW* #232), Steve Latta showed how he drops wood on the floor to release internal stresses (see photo, right). How does he keep from cracking the wood when he does this?

—RICK HERMANN, Wilmington, Del.

Steve Latta replies: *Wood should not be breaking under this type of stress. If it does, it must have been cracked or seriously flawed in the first place. Also, when this step occurs the stock is a good bit oversized. So dings and dents aren't an issue either.*

Clarifications

Some readers were confused by the recommended pairing of a Wynn C-1425C filter and an Oneida Super Dust Deputy separator in "Soup Up Your Dust Collector" (*FWW* #232). Those items must be purchased separately from the two manufacturers. Also, while the filters from Wynn Environmental are described at WynnEnv.com, they must be purchased over the phone at 215–442–9443. Oneida Air Systems products can be purchased at Oneida-Air.com.

Correction

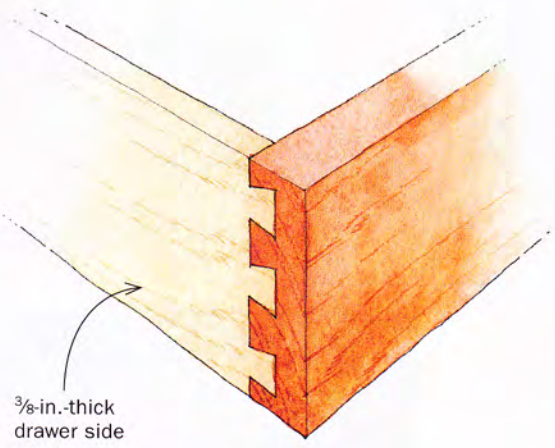
In a recent Handwork department (*FWW* #232), when identifying the final grit of sandpaper Chris Gochnour uses to polish the back of his chisels and plane irons, we mistakenly put a "P" in front of the number, citing the FEPA grading system. The actual sandpaper Gochnour uses is 3M 2,000-grit Imperial Wet/Dry, which is graded with the ANSI system (no prefix), and would indeed be comparable to the 8,000-grit waterstones that Gochnour also advocates for final polishing. ANSI- and FEPA-graded abrasives diverge in the higher grits, with ANSI being finer.

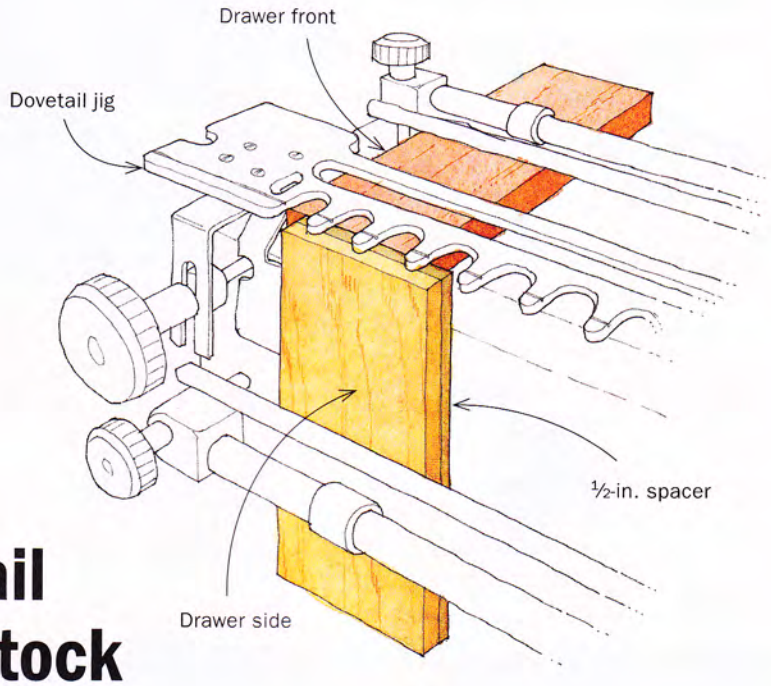
About your safety

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't perform operations you learn about here (or elsewhere) until you're certain they are safe for you. If something about an operation doesn't feel right, find another way. We want you to enjoy the craft, so please keep safety foremost in your mind.

methods of work

EDITED AND DRAWN BY JIM RICHEY





Best Tip

Adapt a dovetail jig to thinner stock

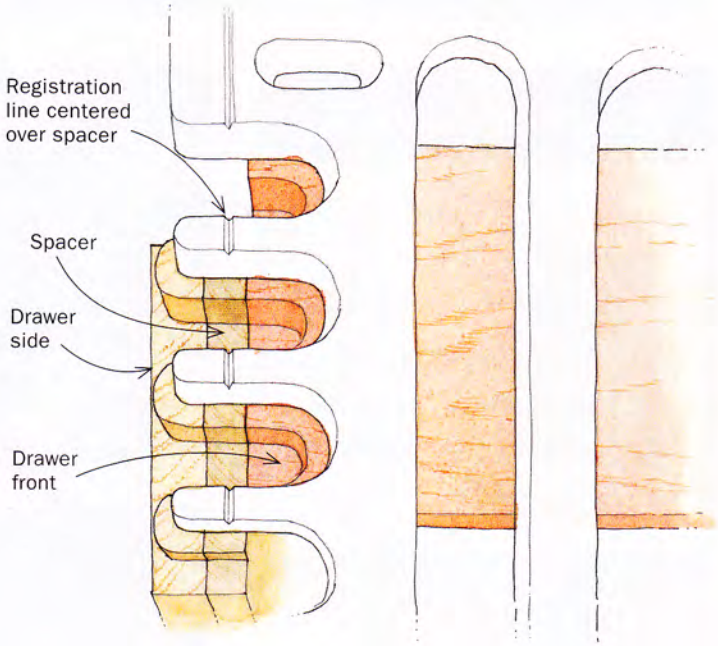
Len Meyer recently retired from a 40-year career in aircraft engine design. He now spends a lot of time in his expanded garage woodshop, working primarily on furniture projects for his home and his children. Len's favorite style is Arts and Crafts in both Prairie and Greene and Greene types using cherry, mahogany, or walnut.

With some router dovetail jigs, like the Porter-Cable 4212, you can't cut half-blind dovetails in stock less than ½ in. thick. This is because the template controls your router bit on a fixed-length path that will cut the pin slots in the drawer front too deep for the thin tails in the drawer sides. This is a serious limitation when you are making small drawers or boxes and want the sides to be thinner than ½ in.

I found an approach that allowed me to use ⅜-in.-thick drawer sides with a thicker ¾-in. drawer front and produce neat and tight half-blind dovetails. The secret is to place a sacrificial spacer board (in this case, ½ in. thick) between the ⅜-in.-thick drawer sides and the jig face. Also, you will need to reposition the template guide to center the registration line over the spacer.

The sketch shows the setup. By using an appropriate spacer and repositioning the template, you can make drawer sides as thin as ¼ in.

—LEN MEYER, Mesa, Ariz.



A Reward for the Best Tip

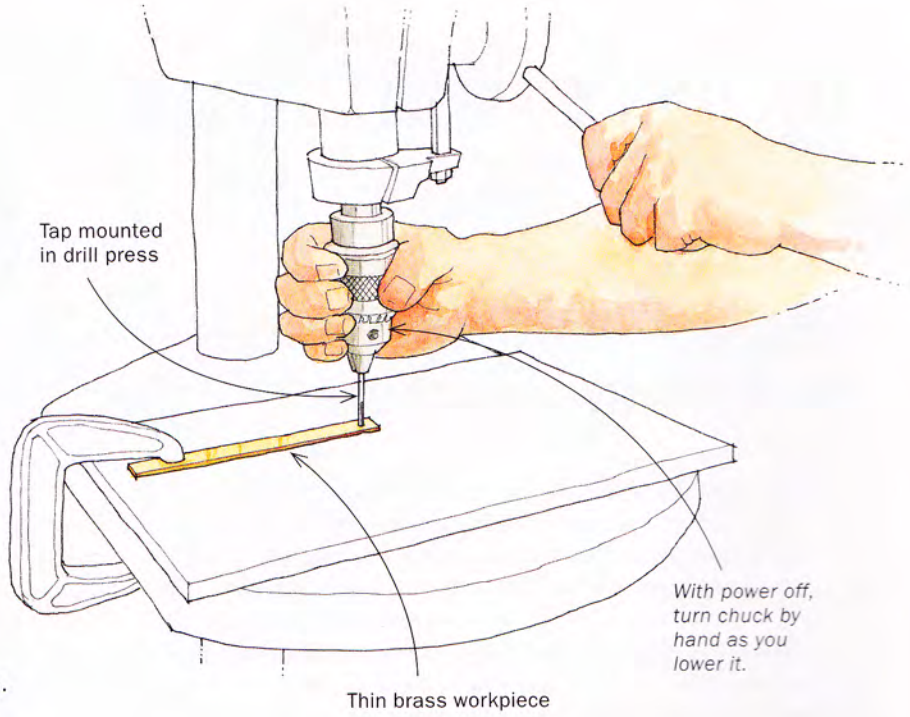
Send your original tips to fwmow@taunton.com or to Methods of Work, *Fine Woodworking*, PO Box 5506, Newtown, CT 06470. We pay $100 for a published tip with illustration; $50 for one without. The prize for this issue's best tip is a DeWalt router kit.

Guide a tap for precise threads

My latest woodworking project required several small brass parts that were drilled and tapped for threaded fasteners. I tried to cut nice straight threads in ⅛-in.-thick material, but I just couldn't keep the tap square to the brass material by hand.

I was about to give up when I came up with a solution that worked perfectly. I put the tap into my drill-press chuck, which held it securely at 90° to the brass workpiece on the table. Then I manually rotated the chuck to cut the threads as I gently lowered the tap through the workpiece. The result was nice straight, square threads. This technique works well in materials of all thicknesses.

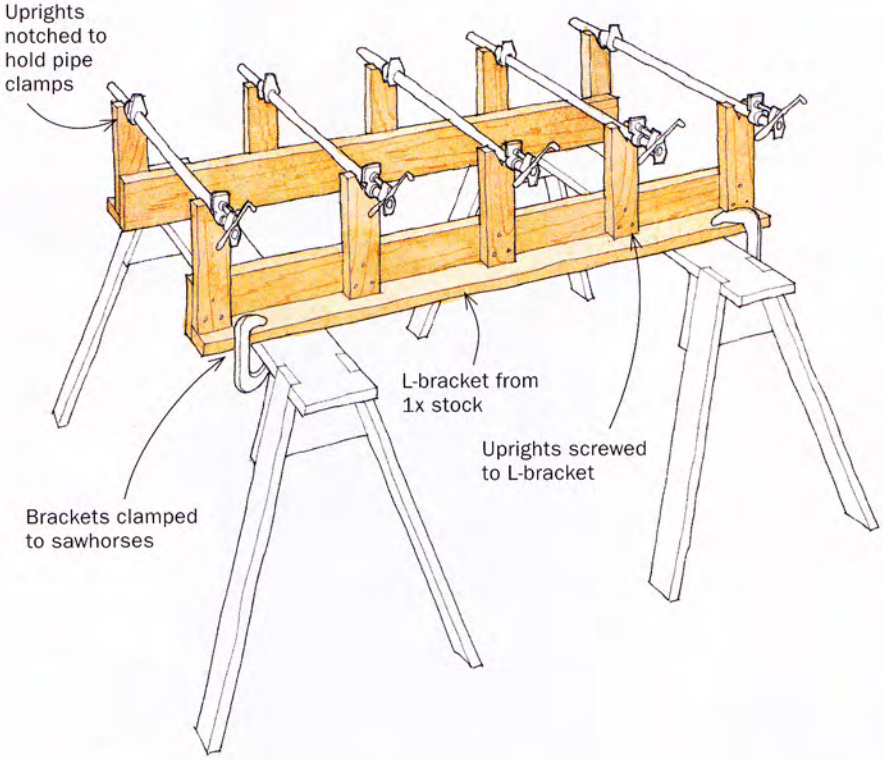
—BILL WELLS, Olympia, Wash.



Knock-down rack makes panel glue-ups a breeze

I glue up a lot of reclaimed wood into countertops and wide panels. To keep my pipe clamps lined up and evenly spaced and to keep them from rolling, I built a clamping rack that I clamp to a pair of sawhorses. The uprights that cradle the clamps provide plenty of room beneath the panel to insert clamping cauls. When I'm done, the racks store easily out of the way.

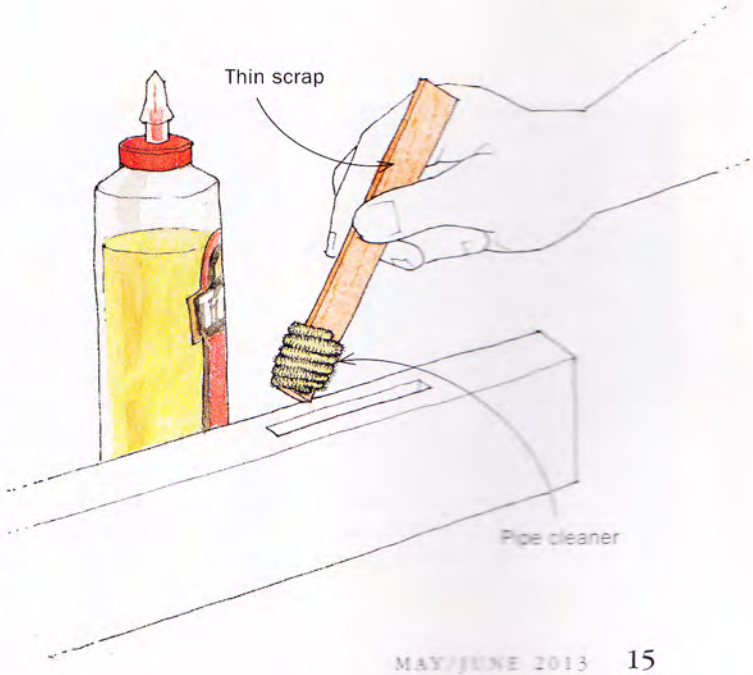
—DARRIN GREEN, Montrose, Colo.



Glue applicator for mortises

I recently completed a project with a large number of mortise-and-tenon joints, all of which had to be glued more or less simultaneously. I made a simple glue applicator from a slim piece of hardwood and a 12-in. pipe stem cleaner (available at craft stores). Drill a small hole at the lower end of the stick, push a bit of the cleaner through it, and clinch. Wind the cleaner around the stick. Now drill another hole, push the tail end of the cleaner through it, and clinch. Just dip the applicator in the glue and spread it around. It works a lot faster than a brush, and the size can be customized to fit your mortises.

—CHARLIE MORRISON, Powell River, B.C., Canada



■ MACHINES

Big bandsaw features in a 14-in. machine

THE BANDSAW IS THE MOST VERSATILE MACHINE in a shop because it can rip, resaw, and cut curves. A 14-in. saw is the most popular size because it offers a fair amount of usefulness at an affordable price. Rikon recently unveiled its next-generation 14-in. saw, the 10–350 Pro, with the power and capacity of a much larger model.

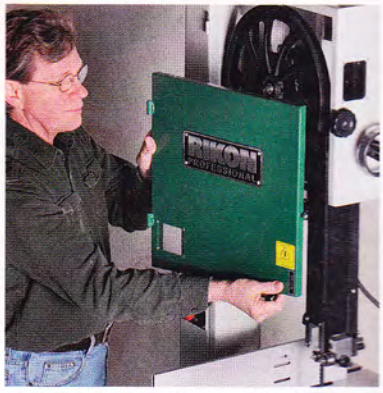
First off, the cast-iron table is about 19 in. by 21 in.—the biggest I've seen in its class. Even more impressive is a resaw capacity of 14 in., with a 2½-hp motor that effortlessly sliced through an assortment of tall hardwoods. The motor moves the 124-in. blade at a prodigious 4,100 feet per minute—about 1,000 fpm more than a typical saw this size—which makes for smoother, easier cutting.

Cast-iron wheels, a rigid frame, and a stout upper guide-post mount all help the saw handle big jobs. Its roller guides are easy to set up and they hold their settings. However, the upper guides on the saw I tested suffered from some early manufacturing miscues and had to be replaced. The replacements worked perfectly.

Two 4-in. dust ports provide superior dust collection. The aluminum fence can be set in two positions, one low (7/16 in.) for sawing thin material and one tall (4⅜ in.) for resawing. The saw features removable doors and a foot brake. For safety, the saw can't be started if the blade isn't tensioned or if the doors are open.

Simply put, Rikon thought of everything on this bandsaw.

—Roland Johnson, contributing editor, is an avid bandsaw collector.



Easy access. *Removable doors give you better access to the wheel compartments for cleaning or blade changes.*

Quick stop. *The foot brake is a welcome addition, and an uncommon feature on a 14-in. saw. It turns off the motor, too.*

Ready for hard work. *The Rikon has the biggest table in its class and a 14-in. resaw capacity that rivals 18-in. bandsaws. Its 2½-hp motor makes resaw cuts a breeze.*

Rikon 10-350 14-in. Professional Bandsaw
$1,400
woodcraft.com

Photos, this page: Roland Johnson

■ HAND TOOLS

Great spokeshaves for $100

Spokeshaves by Pinnacle
$100
woodcraft.com

WOODCRAFT HAS INTRODUCED TWO NEW SPOKESHAVES under its Pinnacle brand: a flat-sole model (No. 151) and a curved-sole cousin (No. 151½). When I received the shaves for testing, I was beginning work on a mantel that featured 8-in.-wide cyma posts, an ideal prop to put the 151 through its paces, as a flat-bottomed shave can handle all but the tightest convex and concave curves. I used it to clean up bandsaw marks on the posts and to refine their shape, and it worked flawlessly.

Out of the box, the Pinnacle shave was impressive, with precise machining on the bed, lever cap, and sole that essentially eliminates any blade deflection or chatter. Vertical and lateral blade adjustments, made using twin-knurled screws, are smooth and precise.

Each shave is cast from durable stainless steel that gives the tool an attractive matte finish while resisting rust or oxidation. The blade is another bright spot. Manufactured in Canada by IBC, it is made from ⅛-in.-thick A2 steel that is cryogenically treated and precision ground. It took only 5 minutes to lap and hone before it was ready to go, and it held its sharp edge for a long time.

The handles on the Pinnacle shaves have an upswept, gull-wing design that keeps your fingertips up and out of the way when working a broad surface. This additional clearance is welcome. The only area of disappointment was the lack of comfortable thumb depressions, or holds, on the handles. But to be fair, other prominent hand-tool makers have omitted the holds on their shaves, too.

After using the 151 for a while, I wouldn't hesitate to recommend it to anyone looking for a high-quality shave.

—Chris Gochnour is a hand-tool expert near Salt Lake City.

■ ACCESSORIES

Go-anywhere tool hangers

SOME FOLKS LIKE TO MAKE CABINETS for their hand tools, but I'm more interested in getting to them quickly than storing them in splendor, so I hang my favorites on the wall near my workbench. I like being able to see what I need, grab it quickly, and put it away just as fast.

Ordinarily, I make a custom holder for each tool, so I was excited to try Lee Valley's new Magnetic Studs. Hiding a rare-earth magnet behind a protective rubber disk, these round steel studs thread into the wall wherever you need them. The ½-in. magnet is strong enough to hold a heavy tool like a block plane, yet not so strong that it grips my small bevel gauge too tightly.

The screw section is sized for standard pegboard with ¼-in.-dia. holes. A ¼-in. hole will work in drywall too, but for harder materials you'll need to drill slightly larger ones. I have plywood on my shop walls (better than drywall for hanging things), and a 9/32-in. hole and a Vise-Grip wrench worked great.

With no need to make special holders anymore, I find myself hanging up lots of handy tools that used to hide in a drawer. These magnetic studs work great for power-tool accessories, too, like drill-press chuck keys, which have a way of hiding.

—Asa Christiana is editor of FWW.

Magnetic studs
$13 for a set of four
leevalley.com

Photos, except where noted: staff

Carbide mini turning tool set by Rockler
$190
rockler.com

■ TURNING

New carbide tools ease the turning curve

ONE OF THE CHALLENGES OF LEARNING to turn wood is learning to sharpen the tools. Traditional turning tools require complicated bevel angles and finely ground cutting edges, and sharpening them requires either specialized jigs or hours of practice. Rockler's new carbide turning tools come ready to cut and stay sharp for hours. And when one side of the cutter gets dull, you just rotate it to expose a fresh edge. When it's worn out, you simply buy a replacement.

Using the tools is more straightforward, too. You operate them as you would a scraper, plunging straight in. The difference is these tools have a sharper edge than a scraper and leave a cleaner surface. But they are shorter than standard turning tools, which limits the distance they can be extended off the tool rest. (The rule of thumb for scraping is you need seven to nine times more tool on your side of the rest than the amount on the lathe side.)

The Rockler set comes with three cutters. The square one is made for bulk removal, handy for making tenons of all kinds. A ½-in.-radius cutter is useful for making coves on spindles and planing cuts. The V-cutter is good for detail work. The tips are easy to remove and replace (they cost $18 to $21). The handles are very comfortable, with a soft rubberlike material that absorbs vibration well.

You'll want to add to your arsenal later, but these tools are a great way to get into turning. Have fun!

—Mike Mahoney is a professional bowl turner (bowlmakerinc.com).

How to change a bandsaw blade

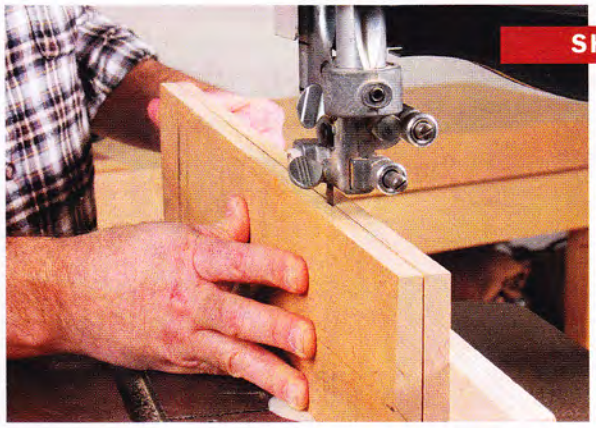
DON'T PROCRASTINATE, AND THE RESULTS WILL AMAZE YOU

BY ASA CHRISTIANA

Most bandsaw problems are blade-related. Choose the right kind, tension it properly, replace it when it gets dull, and issues like blade drift and bumpy or "barrel" cuts will be problems that happen to other folks.

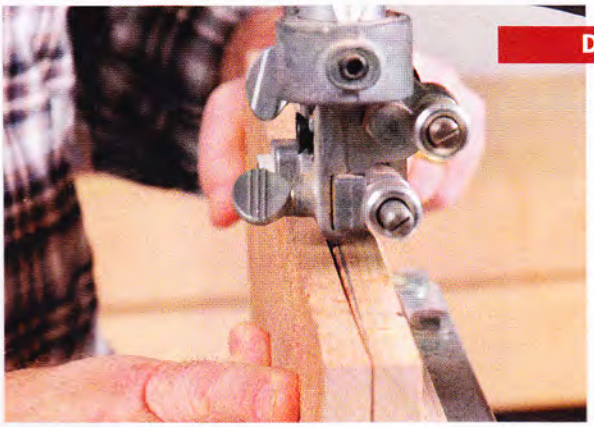
Like many of you, I used to put off changing my bandsaw blade, choosing to soldier on with subpar results rather than order a new one, wait for it to arrive, and then struggle through the changeover process. But the job doesn't have to be stressful.

My method is quick and painless. And when you make your first clean, effortless cut with a new blade, it will be clear that the time was well-spent.



SHARP BLADE

Straight, clean cuts. *If you've been fighting to follow a straight line when resawing, you'll be amazed at how easy it is to make clean cuts with a fresh blade that's properly installed. Basic blades work fine (see box at left), so buy a few at a time.*

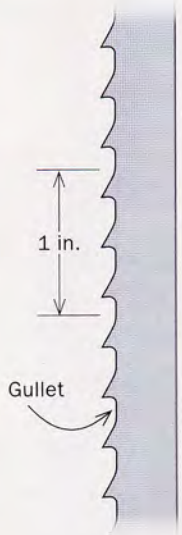


DULL BLADE

Say hello to drift. *Pick the wrong blade, or go too long with a dull one, and the blade will soon begin to drift sideways, making it very difficult to get smooth cuts. The answer to drift is a sharp blade.*

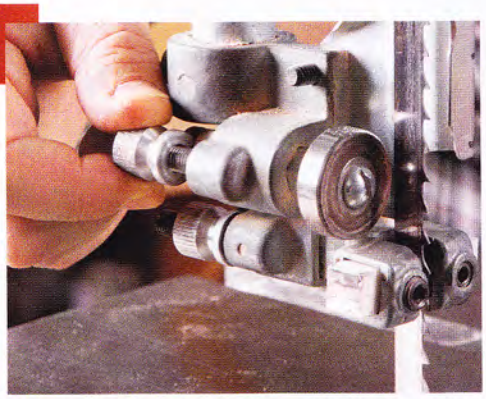
A chance to choose the right blade

Woodworkers often assume that more teeth or a more expensive blade means cleaner cuts. This might be true of circular sawblades, but for bandsaws, a basic 3-tpi (teeth per inch), skip-tooth blade will produce superior results to models with 4 tpi or more, no matter the task. Here's why: The small gullets on finer blades pack with chips, causing the blade to resist the cut, twist, and "drift."

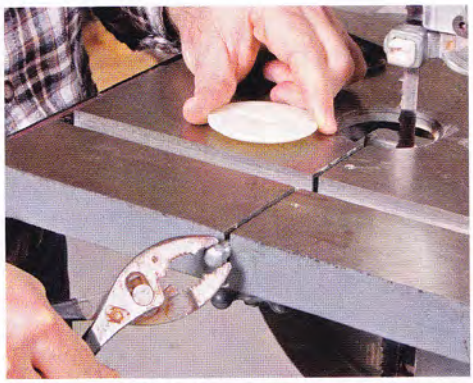


Photos: Henry P. Belanger; drawings: Kelly J. Dunton

Removing the old blade



Back off the guides. *You won't be able to track or tension the new blade correctly with the guides in the way. Back off the rollers or guide blocks (left), and the thrust bearing (right). Do the same to the lower guides, located below the table.*



Pull the pin. *With the guides retracted, remove the throat plate and the little pin that keeps the two halves of the table aligned.*

Release the tension. *The tension crank lowers the top wheel, creating enough slack to get the old blade off and the new blade on.*

Out with the old. *Take the blade off the top wheel first, and then pull it clear of all the guides. You'll need to pivot it to the left to get it through the slot in the table (above).*

Online Extra

To watch Christiana go through this process in a free video, go to **FineWoodworking.com/extras.**

Change the blade before drift sets in

As blades dull, they start to resist the cut, twisting to one side or the other. This causes them to dull more on one side, which leads to even more twisting and makes it all but impossible to make straight cuts. It's called blade drift. Many woodworkers try to overcome it by angling the fence or cranking up the tension—which only causes more problems. If your blade was installed properly and the saw was working fine, drift is a sure sign that your blade is dull and it's time to install a new one. With some experience, you'll start to notice your blade getting dull before drift sets in, because you'll need to push harder than usual, which also causes the blade to twist.

Remove the dull blade

After unplugging the saw, retract all the blade guides, both above and below the table. Remove the throat plate and that little plug in the side of the table that keeps the two halves aligned. Remove any blade guards if your saw has them.

Now you can remove the dull blade. Open the doors and turn the tension crank until the blade is loose. Take the blade off the wheels, turn it sideways, and thread it out the slot in the table.

Install and tension the new blade

With the blade off, it's a good time to clean the bandsaw tires. Built-up sap and sawdust on tires can interfere with how the blade tracks. To remove it, I use the edge of a steel ruler, holding it perpendicular to the tire as I spin the wheel with my other hand. I find this method preferable to using mineral spirits (which might degrade the tire material) or water-based cleaners (which can promote rust).

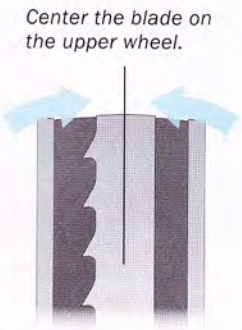
Now you can pop open your new blade and thread it through the slot and onto the wheels. Dial up the tension as

Install the new blade

High tension is just another one of those bad fixes for blade drift, and it can chew up your bandsaw tires. With the right blade, you need only medium tension.

Clean the tires. *This is a great time to scrape off any sawdust or sap that could interfere with blade tracking. Use the edge of a metal ruler while turning the wheel by hand.*

Install the blade. *After threading the new blade into position, increase the tension as you turn the upper wheel by hand. You might need to adjust the tracking knob (below) as you go.*



Dial in the tracking. *Another key to eliminating drift is tracking the blade at the center of the upper wheel, at the top of the crown.*

Finger test for final tension. *If you can make the blade deflect ¼ in. before your fingertip starts to hurt, you're good. If you can't, release the tension until you can.*

you turn the upper wheel by hand. You want the blade running dead center on the upper wheel. If necessary, adjust the crank that tilts the upper wheel until the blade is centered on the crown of the tire and tracking perfectly.

With the right blade, medium tension is all you need. If your bandsaw has a tension gauge for various blade sizes, start at the setting just below your blade size (e.g., the ⅜-in. setting for a ½-in. blade). Try pushing on the side of the blade with your fingertip (on the left side of the saw, or on the right, with the guides as far up and out of the way as they go). You should be able to move the blade ¼ in. comfortably with one finger. If you have to put some weight behind it to get it to move ¼ in., it's too tight.

Set the blade guides

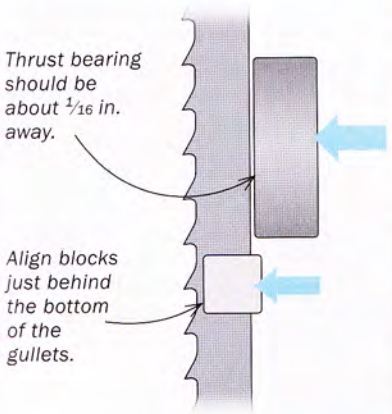
The next step is to move the side guides into place. There are two equally important sets, above and below the table. Some bandsaws have roller guides and some have blocks, but the way you set them is practically the same.

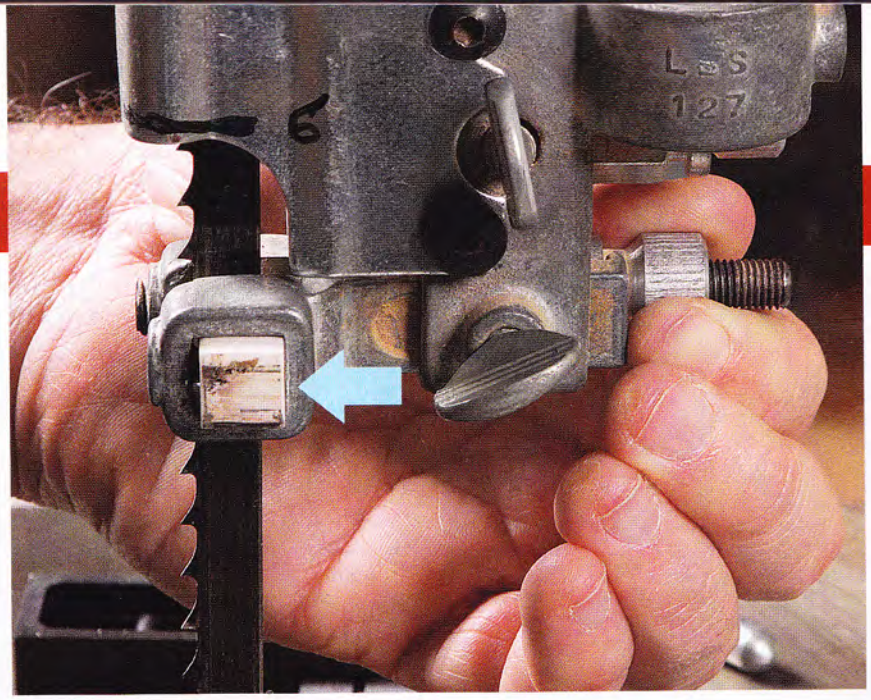
You want the side guides as close to the blade as possible—to keep the blade straight and the cuts smooth—without causing too much friction or catching the weld (there's a small welded spot on every blade, and it's not always ground perfectly flush). Some people set a very precise gap between the blade and guides, using cigarette paper or a feeler gauge, but I go by sight and feel.

Start by moving one of the guide blocks (or rollers) so it's just barely kissing the blade. If you see the blade move, the guide is too close. Hold the guide in that position as you tighten down the set screw. Then repeat on the other side. I take my finger away as I tighten the second guide, so I'm not pushing it against the blade as I tighten it. You should see almost no light around the guides, but when you spin the wheel by hand, you shouldn't feel any friction, nor a bump as the weld catches. Repeat these steps for the lower guides.

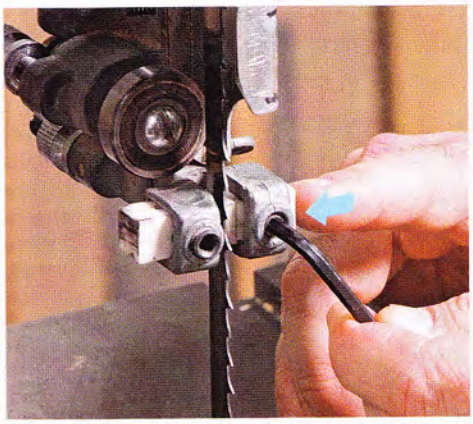
Finally, set the thrust bearings, which sit behind the blade to stop it from flexing too far back as you push stock

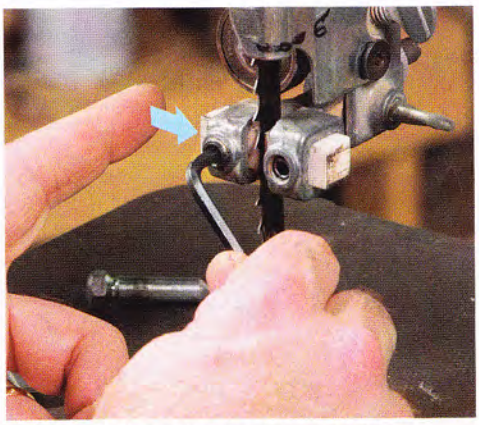
Adjust the guides



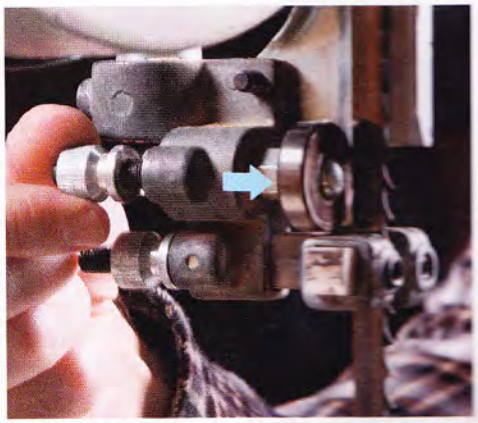


Line up the guides front to back. *With the blade tracked properly, adjust the guide assembly so the blocks are just behind the gullets of the teeth.*





Set the blocks (or rollers). *Move the first guide block over (left) until it just kisses the blade without deflecting it. Hold the block lightly as you tighten down the set screw. Do the same with the other block, but this time let go before tightening the set screw (right). The goal is just a sliver of light around the blade. As a final check, turn the wheel to make sure the welded area of the blade passes through the guides smoothly. Do the same to the lower guides.*

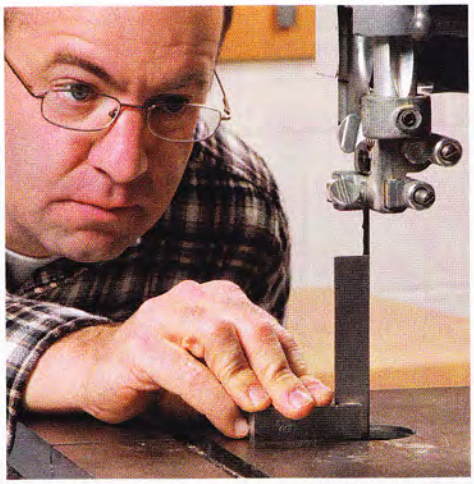


Set the thrust bearing. *Experts recommend a 1/16-in. gap between the back of the blade and the bearing.*

through. Bring the top one to within roughly 1/16 in. of the blade. Again, turn the wheel by hand to confirm that the gap remains constant as the blade passes through. Do the same for the bottom thrust bearing.

Put the throat plate back in place and replace that little plug in the side of the table. Now adjust the table so it's perfectly square to the blade and adjust your rip fence so it is aligned with the miter slot. Your blade won't drift again until it gets dull, and you'll never have to angle the fence. If you have one of those single-point attachments for resawing, you can get rid of it. And get ready for the straightest, smoothest cuts your bandsaw has ever made. □

Asa Christiana is the editor of Fine Woodworking.



Square the table and fence. *With the blade tracked and the guides set, recheck that the table is square. Now you can align the rip fence with the miter slot, and the blade should stay perfectly straight during the tallest resaw cuts. Just don't push too hard; let the blade cut.*

Setting up your new Japanese chisel

PREP WORK AND SHARPENING ARE DIFFERENT WITH LAMINATED STEEL

BY JOHN REED FOX

Japanese chisels come in what Westerners might think of as rather unfinished condition. Setting the hoop, creating the appropriate bevel angle, and flattening the back of the blade are left to the craftsman. I also strip the finish from the handles and blades of new chisels and replace it with a coat of oil. (For the rest of the story on these unmatched tools, see "Choosing and Using Japanese Chisels," p. 60.)

Flatten the back

I begin setup by flattening the back of the blade. Unlike Western chisels, Japanese chisels have laminated blades: A thin layer of tough, high-carbon steel that can take a very sharp edge is fused to a thick layer of more malleable,

Four steps to a tuned-up tool

With its laminated blade and hooped handle, a Japanese chisel is built differently than its Western counterpart. And by tradition, a new Japanese chisel arrives with a fair amount of setup left to the individual craftsman.

4 **Reset the hoop.** Remove the hoop, file it smooth inside, then replace it and mushroom the top of the handle.

2 **Adjust and hone the bevel.** Use sharpening stones to flatten and polish the entire bevel.

3 **Remove—and improve—the finish.** Strip the lacquer from the handle and the blade and recoat the chisel with oil.

1 **Flatten and polish the back.** The first flattening is critical, but won't need to be repeated until many sharpenings later.

1. Flatten and polish the back

First flattening. *Holding the chisel perpendicular to the long axis of a 2,000-grit stone, apply medium pressure on the area just behind the bevel.*

It's essential that your sharpening stones are flat. For years I used King waterstones and flattened them with coarse sandpaper on granite. But 10 years ago I switched to Shapton stones, which are harder, cut faster, and stay flat longer. I use Shapton's diamond plate to flatten them.

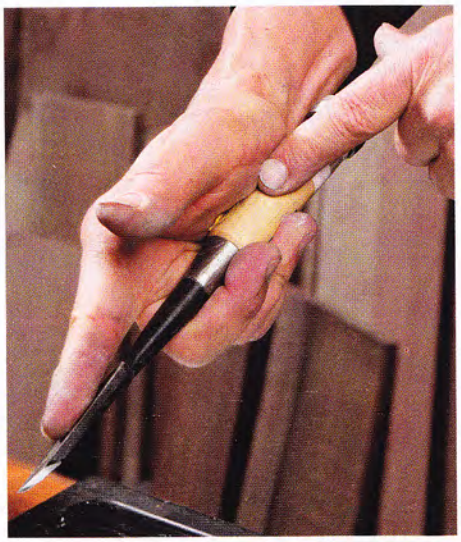
Make it flat around the hollow. *The back of the blade is hollowed to make flattening easier. It's critical to flatten the front edge and most of the way up the sides, but not necessarily all the way up the back.*

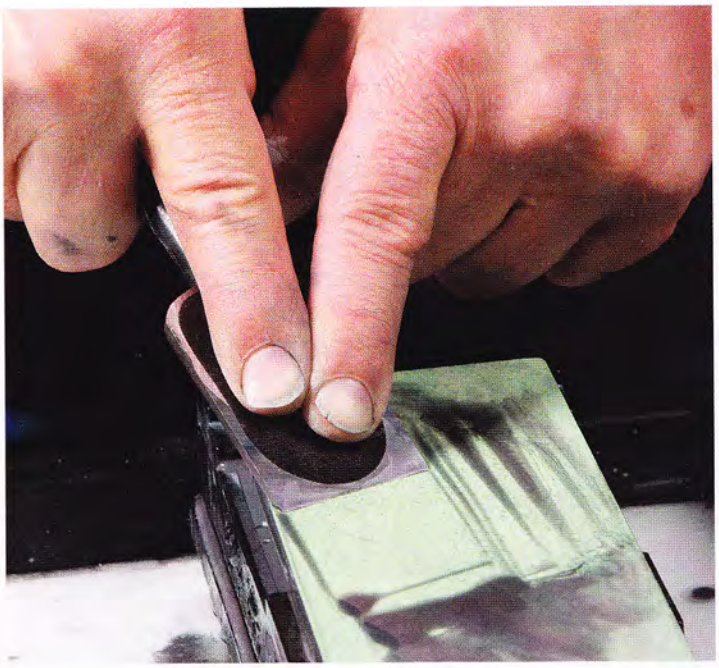
Photos: Michael Pekovich

2. Work on the bevel

LOCK IN THE ANGLE

The bevel comes roughly prepared. *But it needs help. Use sharpening stones—freehand (below), or with a honing guide—to adjust the bevel angle and flatten the bevel. To maintain a consistent stroke when freehand sharpening, be sure the chisel's handle is seated against your upper palm (right).*

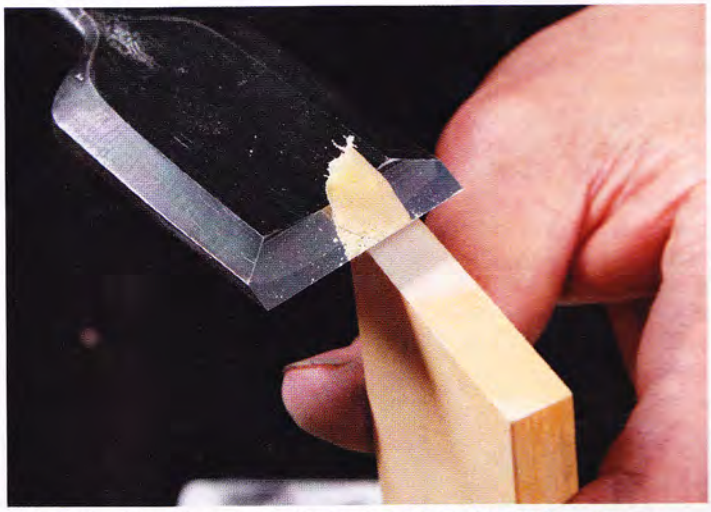




Check the new angle. *Because the blade is mostly soft iron, altering the bevel angle on sharpening stones is fairly quick. Fox uses angle blocks to check that his new bevel is accurate.*

HONE THE ENTIRE BEVEL

No microbevel on this blade. *As you work through the finer grits, continue smoothing the whole bevel (left). A microbevel or hollow grind is not recommended on a laminated blade, as they reduce support for the brittle cutting edge. Hone the back with each grit (right) to remove the burr.*



A good test for sharpness. *You have a sharp chisel when you can make clean paring cuts in the end grain of softwood.*

DON'T WORRY!

You may find that a Japanese chisel's edge chips easily at first. This is because it is difficult to fully harden the very tip. After several sharpenings, you'll be into fully hardened steel.

Prevent rust. *Coat the blade immediately after sharpening with a rust preventer like camellia oil.*

Knock off the hoop. *Use a flat-sided hammer to remove the hoop. If you are working on more than one chisel, keep track of which hoop belongs to which chisel. Then use lacquer thinner to strip the finish from the handle and blade. Use a scraper if needed to finish the job, then apply a coat of oil.*

Fine-tuning the hoop. *File away any burrs inside the hoop that might cut the handle's wood fibers. Then ease the inside edges at both ends of the hoop. The top edge should be a distinct chamfer, which will allow for a smooth mushrooming of the handle.*

shock-absorbing iron, which comprises most of the blade. The thin layer of steel on the back of the blade is the critical part of the tool, and it is hollowed out to facilitate flattening.

When flattening the back, the goal is to get the edges surrounding the hollow flat and highly polished. While the area along the front edge must be completely flat, it is not necessary to have 100% of the area up the sides perfect. Just flatten enough area so that the back will lie flat on your stones and will serve as a flat reference surface when you are using the chisel. I start on a 2,000-grit stone and proceed through the finer grits.

Once the back is flat, you will not have to repeat the flattening process until you have sharpened the bevel so many times that it threatens to intersect the hollow. At that point, using a coarse stone will effectively move the hollow up the blade. For day-to-day resharpening, you'll just hone the back with your finer stones. If you work the back regularly on coarse stones, you will eventually wear through the layer of high-carbon steel.

Create the bevel

With the back flat, it's on to the bevel, which comes roughly shaped. Because of their laminated construction, Japanese chisels should be sharpened to a flat bevel, never hollow ground. The thin layer of hard, brittle steel depends on the backing provided by the iron body of the chisel for support. Hollow grinding, especially on a small wheel, removes supporting material where it is most needed and may cause the edge to break.

Because most of the blade is made of relatively soft iron, the bevel can be adjusted or honed quickly using sharpening stones only. I start with a 1,000-grit stone and make my way up through 5,000, 8,000, and 10,000. I find that for working domestic hardwoods, and even harder exotics like bubinga and rosewood, a bevel angle of 30° works well. If I am working soft woods like Alaskan cedar or Douglas fir, I might sharpen the bevel to 25° or 27°. The

4. Set the hoop

Set it with a socket. *Use a socket (or a piece of pipe) just larger than the chisel's handle to direct your hammer blows to the hoop. After the hoop is hammered down, about 1/16 in. of the handle should be showing above it.*

TIP GETTING A GOOD FIT

Hammer, don't file. *If the fit is tight, try hammering lightly with the handle against a hard surface.*

In case it's overlong. *If the hoop seats down too far on the handle, you can saw off the end of the handle, leaving 1/16 in. showing.*

Make a mushroom. *Use light hammer taps with a pulling motion while gradually turning the chisel to create an even mushroom shape that will hold the hoop securely in place.*

brittle cutting edge needs full support, so microbevels are not recommended either.

Set the hoop

The metal hoop encircling the end of a Japanese chisel acts as a retaining ring, enabling you to strike the chisel with a metal hammer without splitting the handle. Setting the hoop—adjusting its fit and mushrooming the wood to lock it in place—is another task left to the craftsman.

Start by removing the hoop. If it's tight, tap it off with a flat-sided hammer or a punch. If you want to remove the lacquer finish, this is the time to do it. I strip the handle and blade with lacquer thinner and wipe on a coat of camellia oil.

After smoothing the inside of the hoop with a round file and easing the chamfers on either end, test the fit to the handle. The inside of the hoop is slightly tapered to mate with the handle, so it will fit better one way than the other. It should be a very tight press-fit most of the way on but require a hammer to get it fully seated. In the end, you'll want 1/16 in. of the handle showing above the hoop. Drive it on by striking the hoop but not the handle (difficult), or by using a socket just larger than the handle to direct the blow (easy). Then, with the hoop seated, lightly hammer around the end of the handle to bend the wood fibers and lock the hoop in place. Using light strokes and a pulling motion, form a nicely mushroomed top and you're ready to put your new chisel to work. □

John Reed Fox makes furniture in Acton, Mass.

Staying Safe on the Tablesaw

Part 1: Ripping and crosscutting

BY MARC ADAMS

Most woodworkers, including me, will answer yes to the following two questions, while looking sheepishly at their penny loafers. Did you ignore the "Using Your Saw" section in the owner's manual when you got your first tablesaw? Have you experienced kickback?

I have had workpieces kick back a few times in my life. Fortunately, I wasn't hurt. For others, though, that instant on the tablesaw has been tragic and life-altering.

With hundreds of students passing through my school each year, I've developed firm guidelines for safe tablesaw use, regardless of skill level. My first rule is to keep all 13 saws properly set up and maintained. But

THREE CORE PRINCIPLES

Staying safe begins with these three core concepts. No. 2 is specific to the tablesaw, but the others are critical on any piece of machinery.

1. MAINTAIN CONTROL

Never cut stock freehand. The stock must be controlled at all times, using either a fence or a jig. For this to work, miter slots and fences must be aligned properly. Also, a workpiece must be straight and flat on its control surfaces: at least one face and one edge. Be sure to push it all the way past the blade.

2. USE A SPLITTER

Kickback is the primary danger on a tablesaw, and a splitter is the cure. Also called a spreader or riving knife, this thin tab of metal or wood sits right behind the blade. The slot (kerf) made by the blade slides onto the splitter, preventing the board from pivoting onto the teeth at the back of the blade. Without having to steer the board to prevent kickback, you can focus on keeping your hands out of harm's way.

3. LIMIT YOUR EXPOSURE TO THE BLADE

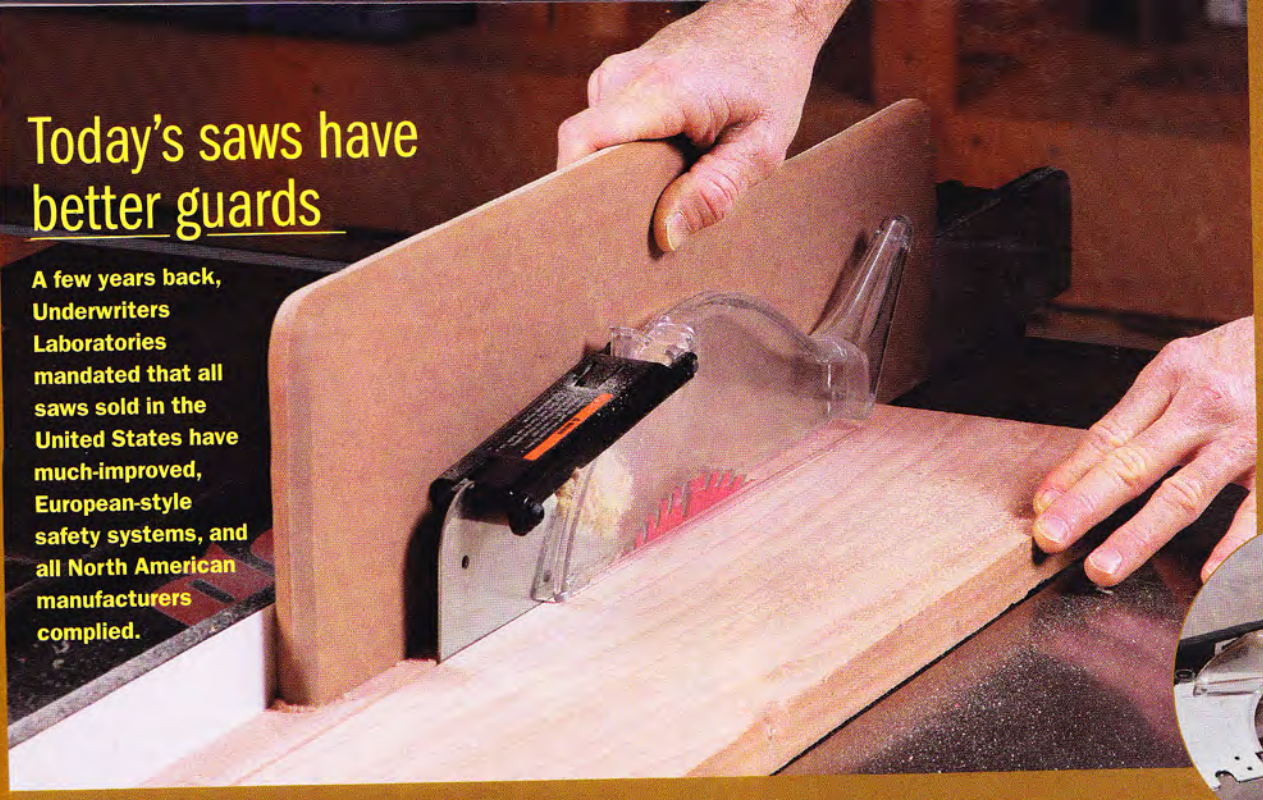
Keep the blade only about ¼ in. higher than the workpiece. Whenever possible, keep the cover attached to the splitter, acting as a physical barrier. Keep your fingers 3 in. away from the cover, or 6 in. away from the exposed blade. For many cuts, this means using push sticks or push pads.

VIDEO WORKSHOP

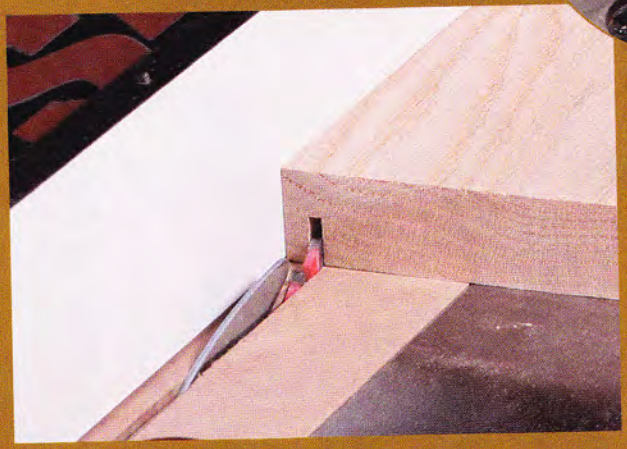
Watch Adams demonstrate these techniques, plus cut a number of common joints on the tablesaw, in a members-only video at FineWoodworking.com/extras.

Today's saws have better guards

A few years back, Underwriters Laboratories mandated that all saws sold in the United States have much-improved, European-style safety systems, and all North American manufacturers complied.



Better blade covers and splitters. *Today's blade covers are narrower, allowing a push stick to pass by more easily. And the riving knife, an improved version of the splitter, moves up and down with the blade, hugging it closely to prevent kickback.*



Low-profile option. *For very thin rips (far left) and non-through-cuts (near left), the blade cover comes off easily, and you can either adjust the riving knife downward or replace it quickly with a low-profile version (above).*

Older saw? You have options

Older splitter systems are inconvenient, and often discarded. But no worries—there are two good ways to replace them.

Buy a better splitter. *Available online as an "Anti-Kickback Snap-In Spreader" for about $150, the Biesemeyer aftermarket splitter was designed for Delta saws but works in many others. You install its holder in the throat of your saw, and then the splitter pops in and out quickly.*

Or make a stub splitter. *This little tab of wood goes into the saw slot (above left) on a shopmade throat plate (see p. 34 for how to make one), and can be cut short so it works for non-through-cuts too (below left). You'll need to lengthen the saw slot to accommodate it. If it binds in the sawkerf, just sand or plane the sides a bit. Be sure the grain runs vertically for strength.*

Ripcut basics

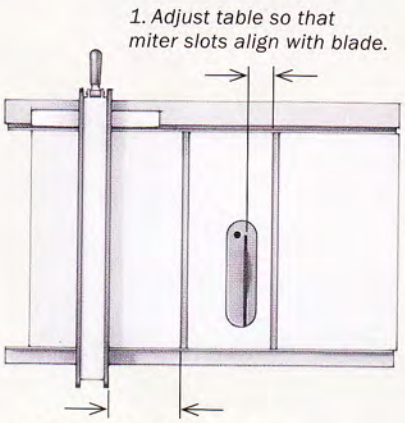
Safe ripping is a 3-step process

Set up for safety

When ripping boards, you need the fence to be parallel to the blade, and you need a few shopmade push sticks on hand.

ALIGN THE SAW IN TWO STEPS

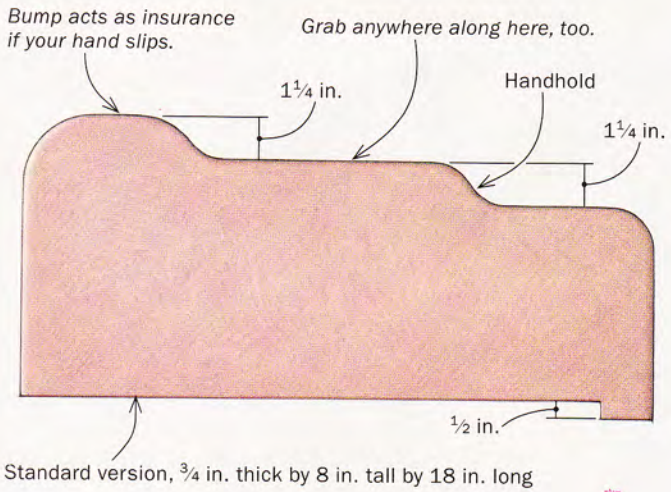
How you adjust the table is different on different saws, but you need the miter slots to be parallel to the blade for safe crosscutting. Then you adjust the rip fence parallel with the slots and you're set for ripping, too.

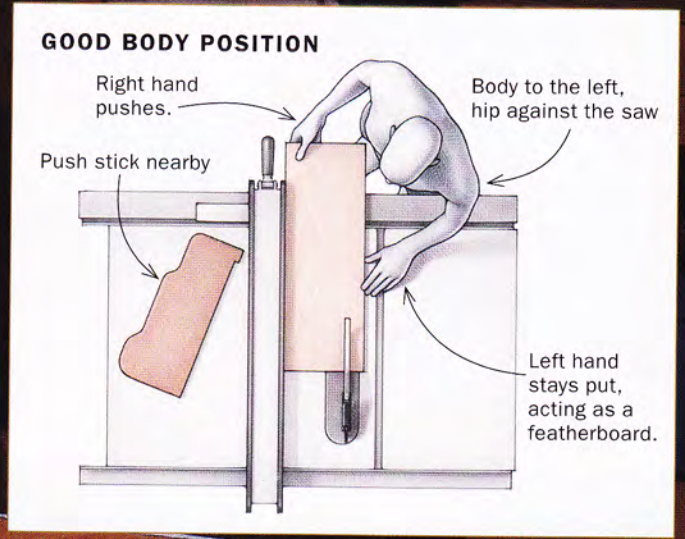


Rip fence is easy to correct. *Use the adjustment screws to align the fence with a miter slot, and it should stay parallel in any position.*

SMART PUSH STICK DESIGN

Adams's push sticks hook over the back of a board, of course, but also extend over the top of it for full control. He makes them in MDF in a number of sizes and thicknesses.





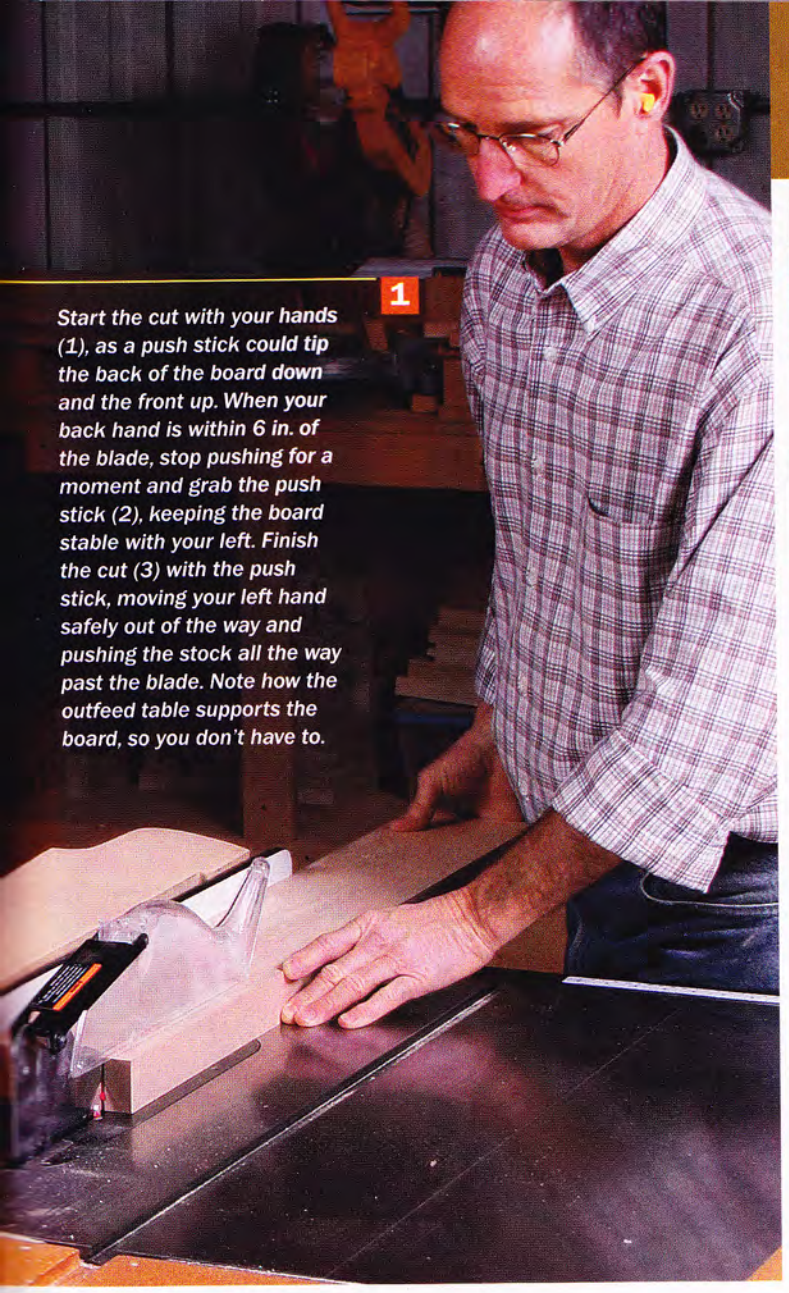
this article focuses on the second part of the equation: a knowledgeable operator. If you understand how the saw works and know the best practices for its use, the chance for a bad accident can be virtually eliminated. Machines don't think, but you can.

Kickback is the main danger

Kickback accounts for the majority of tablesaw accidents. Unfortunately, I encounter many woodworkers who don't understand the cause of kickback, or the cure.

Here's how it happens. The teeth at the front of the blade do the cutting, and they move downward, helping to keep the board safely on the table. But the teeth at the back of the blade are not your friend; they spin in your direction at over 100 mph. During a safe cut, the slot made by the blade brushes past the back teeth without incident. But if the back of the board pivots as you push it, or one of the halves is pinched into the blade somehow, only one of those back teeth needs to grab the workpiece to set kickback in motion. And it happens in milliseconds, as the lifting action converts almost instantly to horizontal force aimed right at you. The

Photos: Asa Christiana; drawings: Christopher Mills



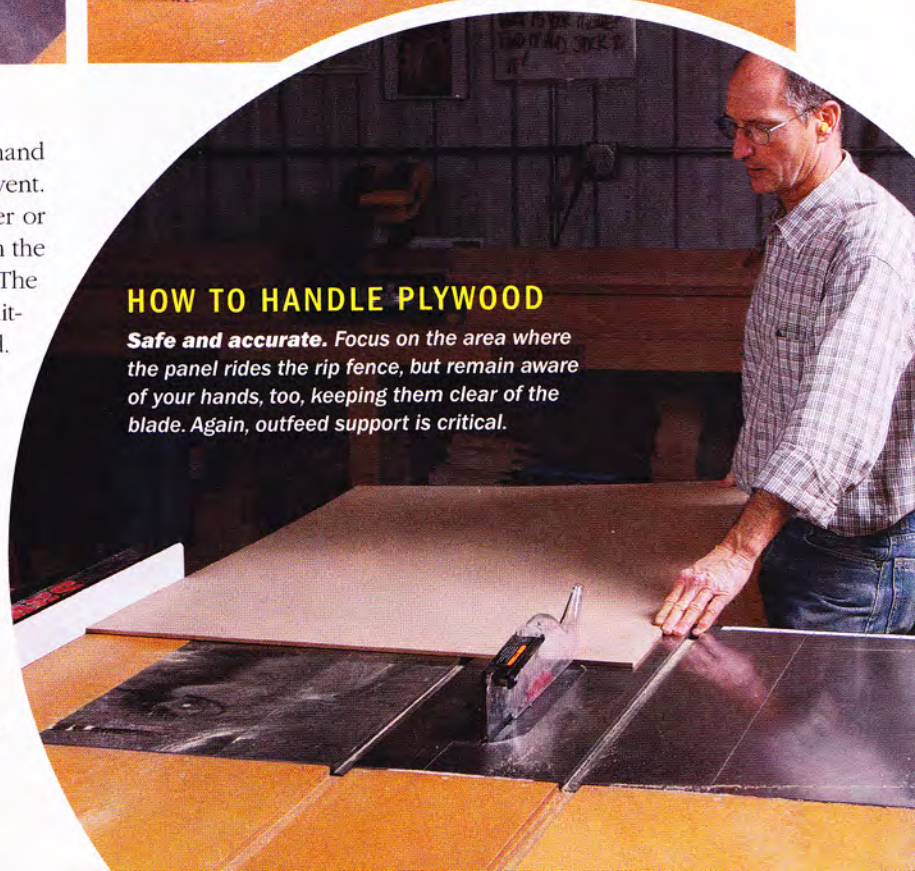
Start the cut with your hands (1), as a push stick could tip the back of the board down and the front up. When your back hand is within 6 in. of the blade, stop pushing for a moment and grab the push stick (2), keeping the board stable with your left. Finish the cut (3) with the push stick, moving your left hand safely out of the way and pushing the stock all the way past the blade. Note how the outfeed table supports the board, so you don't have to.

projectile can hurt you, obviously, but it can also pull your hand into the blade. The good news is that kickback is easy to prevent.

Use a splitter whenever possible—Also called a spreader or riving knife, a splitter keeps a board from making contact with the teeth at the back of the blade. Problem solved? Not exactly. The splitter has to be there to do its job, and until recently, most splitters were downright inconvenient and were therefore discarded. North American saws that are more than a few years old will have a crude splitter that extends high above the blade and too far behind it. The main problem is that these splitters have to come off the saw for all non-through-cuts, such as grooves. The big blade covers are just as inconvenient.

This outdated safety equipment is difficult to detach and reinstall, so most of these splitter/blade cover assemblies find a permanent home in a shop cabinet. If you have one of these saws, you still owe it to yourself to use a splitter (see "Older saw? You have options," p. 31).

A riving knife is a blessing—Fortunately, a few years ago Underwriters Laboratories (UL) proposed that all new

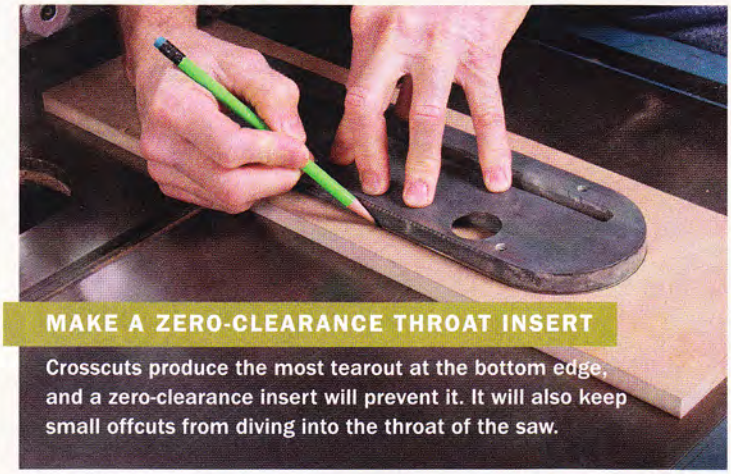


HOW TO HANDLE PLYWOOD

Safe and accurate. *Focus on the area where the panel rides the rip fence, but remain aware of your hands, too, keeping them clear of the blade. Again, outfeed support is critical.*

Crosscut basics

Set up for safety



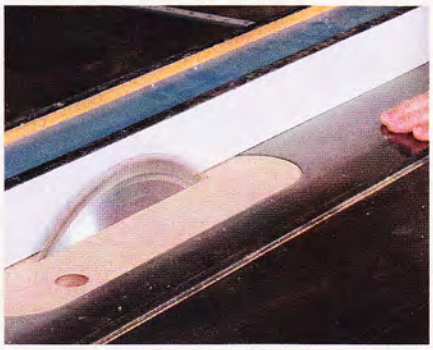
MAKE A ZERO-CLEARANCE THROAT INSERT

Crosscuts produce the most tearout at the bottom edge, and a zero-clearance insert will prevent it. It will also keep small offcuts from diving into the throat of the saw.

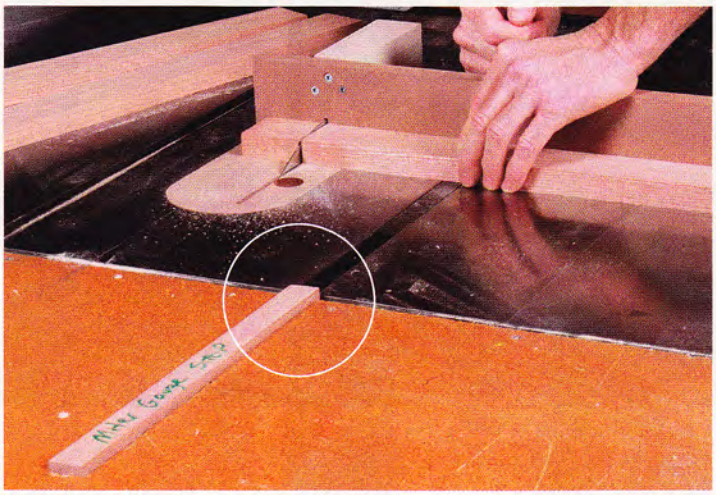
MAKE A MITER-GAUGE FENCE

A standard miter gauge needs some help. A long fence will improve control and accuracy, tame tearout on the back edge, and push the offcut safely past the blade.

Simple job. *Trace your stock insert plate onto a piece of MDF (above) of the right thickness to fit your saw, and then bandsaw it close, using a sander to work up to the line. On most saws, a 10-in.-dia. blade won't go low enough to let you insert the blank plate, so make a ripcut along the bottom to create clearance (above right). Then install the blank insert, place the rip fence on top of it, and bring the spinning blade up through it (right). Last, extend the slot with a jigsaw (below) or scrollsaw to accommodate your splitter or riving knife. You might also need to use tape or screws underneath to shim the plate level with the table.*



Smart, safe design. *Screw a long piece of MDF to your miter gauge, cut a slot through it, and then attach a wood block (as shown) on the back edge where the blade emerges.*

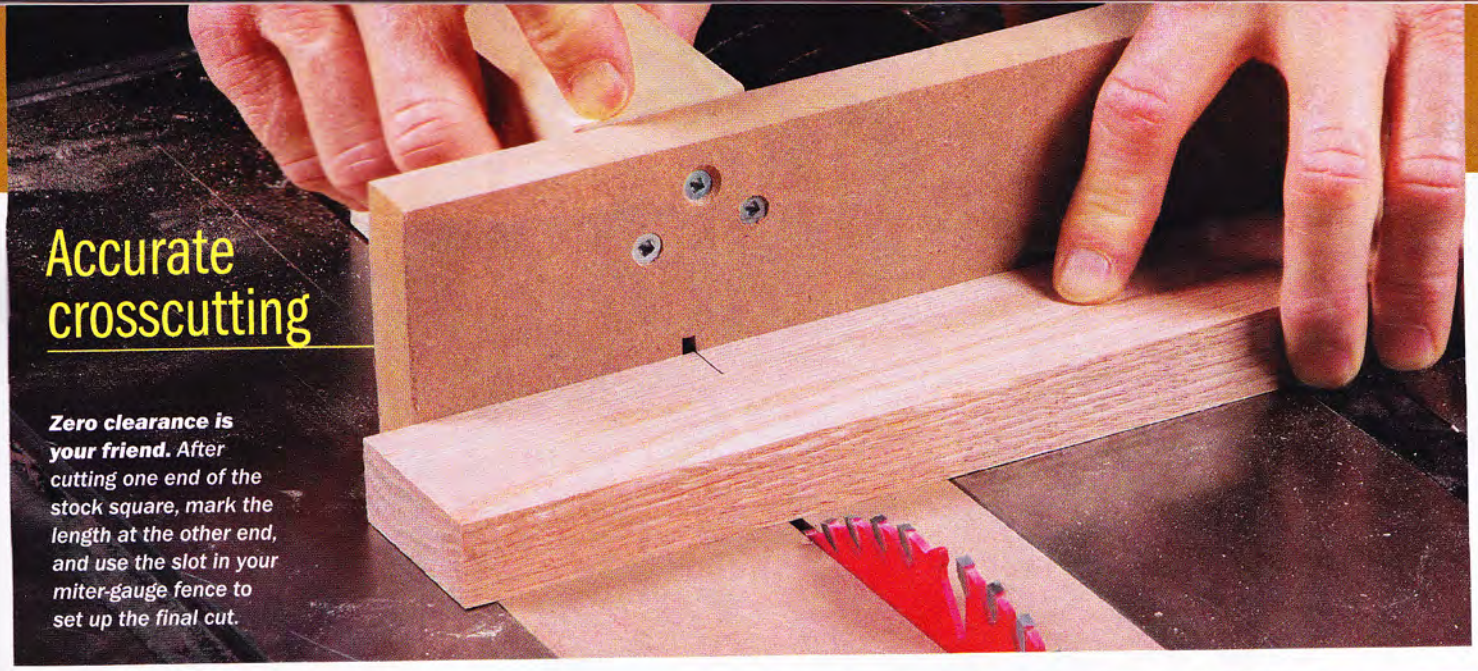


Stick trick. *The slots in your outfeed table, designed to accommodate miter gauges and sled runners, are the perfect spot for a simple stick that limits their travel, making sure the blade doesn't pass through the safety block (or box) at the back of the fence.*

tablesaws have a riving knife, a more versatile type of splitter borrowed from European tablesaws, and all of the North American tablesaw manufacturers complied.

If you can afford to buy a new saw, you'll find safety much more convenient. The riving knife can stay on for almost every type of cut, and the new blade covers are narrower and come off the saw more easily when they get in the way. Unfortunately, today's riving knives still include "anti-kickback fingers," which are basically useless and often in the way, so I remove them.

One gray area is getting your riving knife or splitter to fit through a shopmade throat plate. On my saw, I just extend the blade slot (using my scrollsaw) to allow the low-profile riving knife to



Accurate crosscutting

Zero clearance is your friend. *After cutting one end of the stock square, mark the length at the other end, and use the slot in your miter-gauge fence to set up the final cut.*

fit through. But the taller knife won't work because it is longer, and I'd have to make the slot so long it would weaken the insert plate. So I use my zero-clearance throat plate for crosscutting only, where tearout is the biggest problem and where I need to use my low-profile knife anyway to fit through the fence on my miter gauge and crosscut sled. For ripping, I use the standard throat plate. That lets me use the full-height riving knife and blade cover.

A few more tips

Even if a board is already jointed straight and flat, it might not stay that way as internal tensions are released during a cut. If a board jams during the cut, use one hand to turn off the saw, wait for the blade to stop, and finish the cut on the bandsaw. Also, be aware that a short board is more likely to pivot onto the back of the blade. If you are not sure about a workpiece, rip it on the bandsaw. And on some smaller, portable saws, the rip fence won't stay parallel to the blade when you move it, which can cause binding, so you'll need to check it each time.

One no-no when crosscutting is using the rip fence as a stop. This traps the offcut, and the friction against the fence can cause it to pivot and bind, causing kickback. For the rest of my safety rules, see the photos and illustrations throughout this article.

Follow these basic safety guidelines and you'll turn the most dangerous machine in the shop into a trusted friend. In Part 2, I'll show you how to get even more value from this versatile tool, demonstrating a variety of fast, accurate joinery cuts. □

Marc Adams runs one of the largest woodworking schools in North America. Go to MarcAdams.com for more information.

Set the stop. *The long MDF auxiliary fence lets you set up a stop at the far end for cutting a series of workpieces to the same length.*

CROSSCUT SLED IS BEST

For the most accurate crosscuts of all, even on large panels, nothing beats a crosscut sled. To learn how to build one, check out FineWoodworking.com/extras for a free plan.

Perfect support. *With a big, stable bed, and two runners in the miter slots, a crosscut sled cuts big workpieces with unmatched accuracy. Again, you can clamp stops to the fence. For longer workpieces, clamp a hook-type stop above the workpiece (see above).*

Build an Outdoor Lounge

Steam-bent curves make it sleek and comfortable

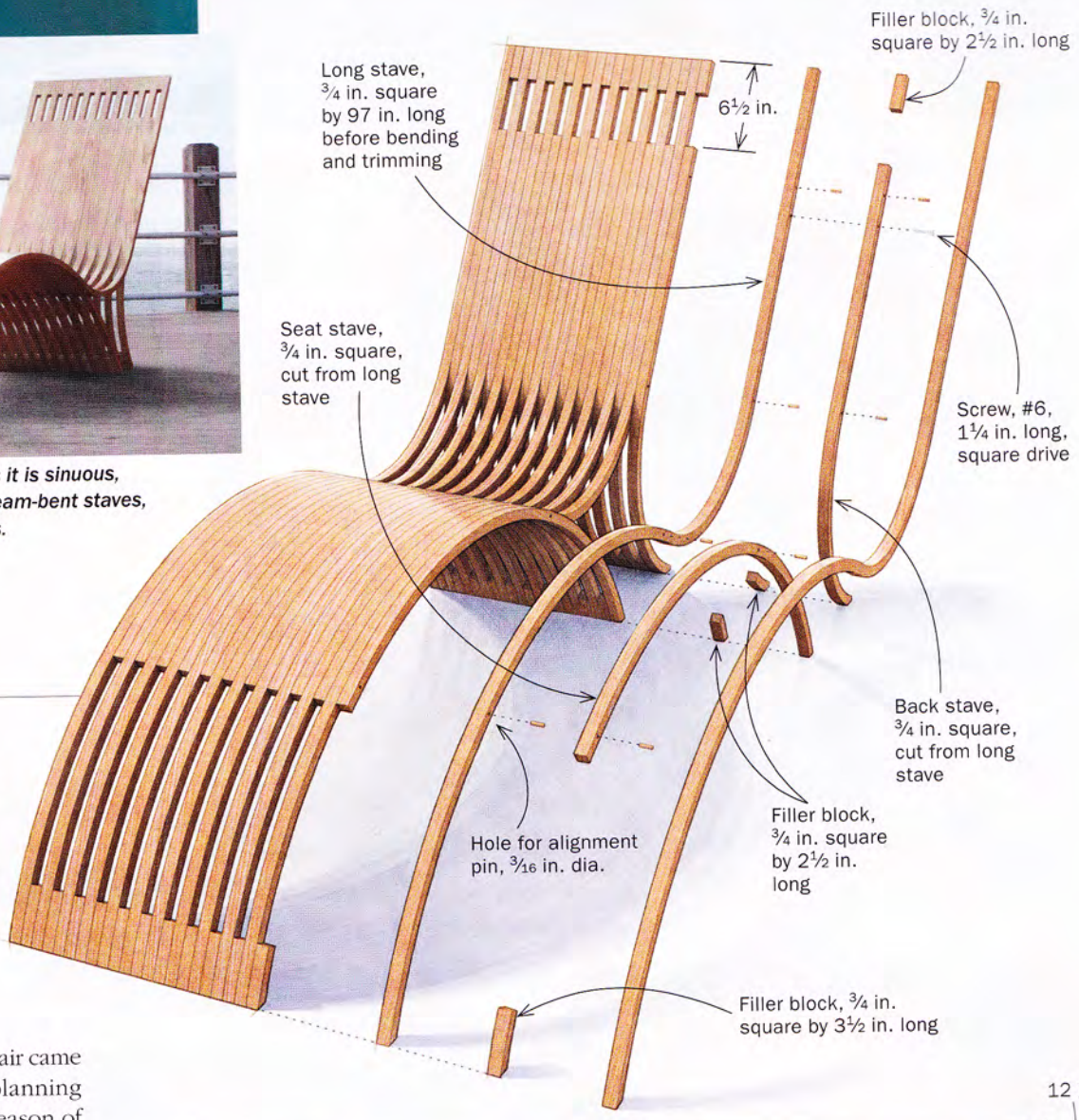
BY TOMMY MACDONALD

Photos: Michael Pekovich; drawings: John Hartman

Curve appeal. *As comfortable as it is sinuous, this lounge chair is made from steam-bent staves, with eye-catching negative spaces.*

ELEGANT ARRAY MADE SIMPLE

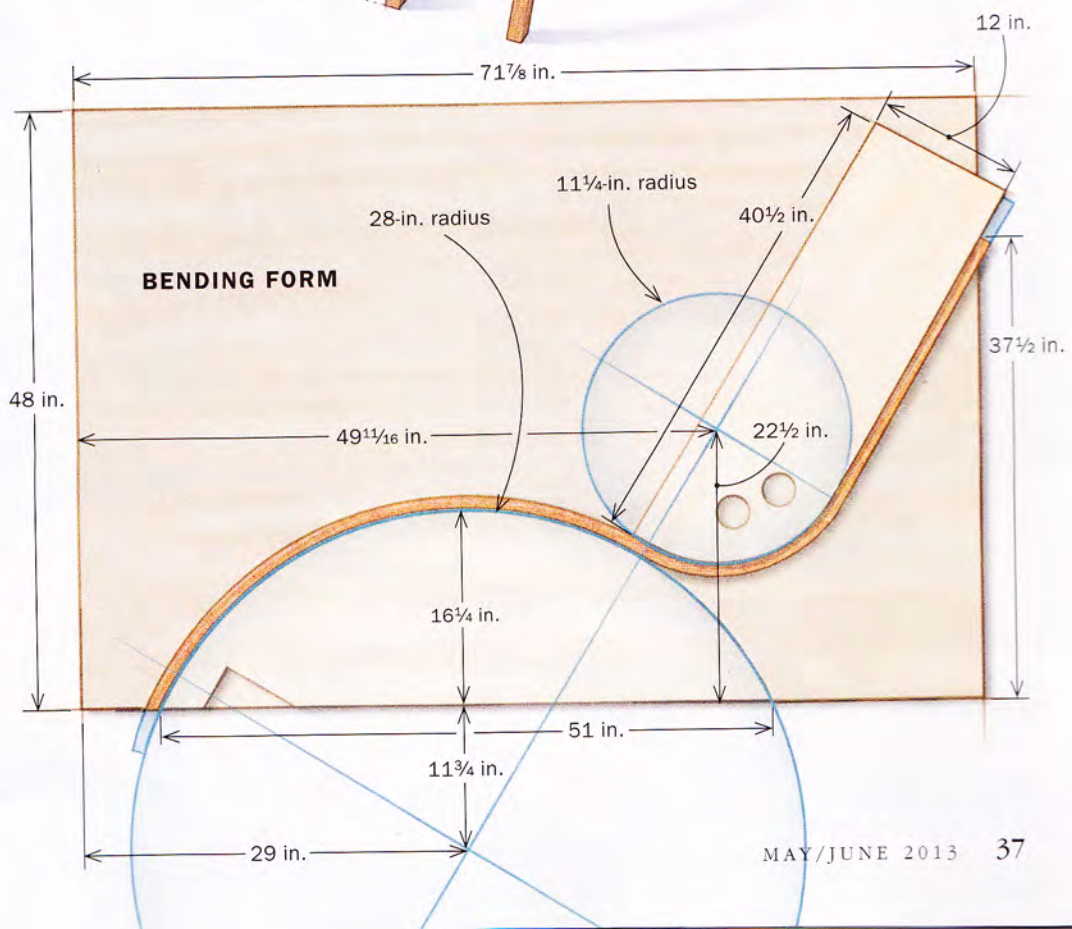
Bent staves are pinned and glued together to create a comfortable chair with modern lines and shapely curves. The beauty of the design is that all of the parts come from the same long stave.



The basic idea for this chair came to me while I was planning projects for the third season of my TV show, *Rough Cut—Woodworking with Tommy Mac*. But I was a bit unsure of how to make it. Then, in a moment of inspiration, I realized that I could steam-bend staves and edge-glue them together to create the chair.

I took my ideas to Eli Cleveland, a great woodworker who is also the show's technical adviser, and Steve Brown, an instructor at North Bennet Street School who is the show's editorial consultant. We worked through a series of sketches, scale models, and prototypes before we had everything sorted out. The final design is strong and comfortable, and looks great. The stave method of construction allowed us to create negative spaces at the top and bottom, the perfect design detail on a chaise-type chair like this one.

There are three different stave shapes and sizes in the chair, but Eli had the brilliant insight that we

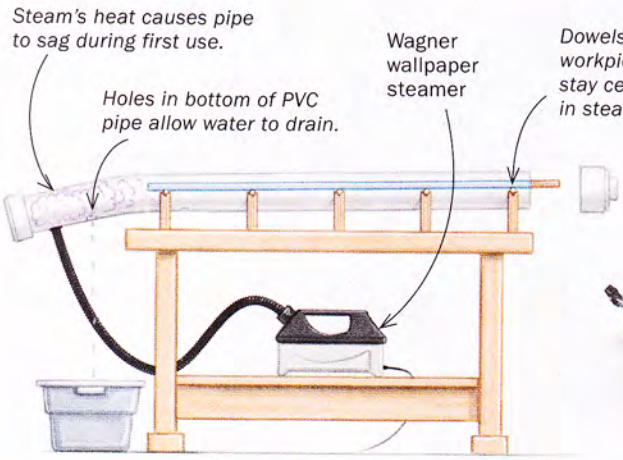


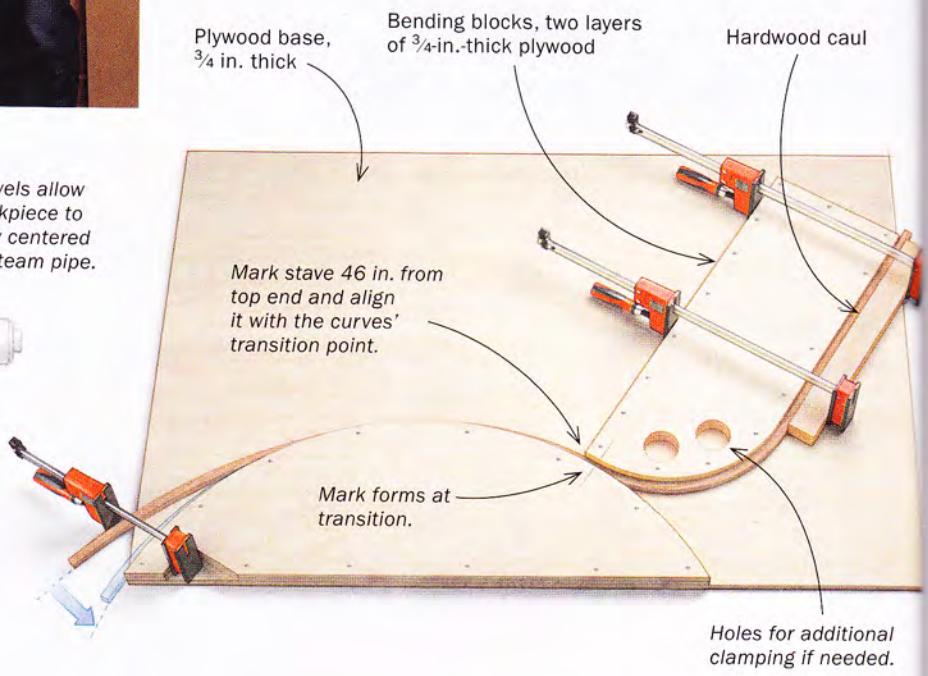
Make 30 staves

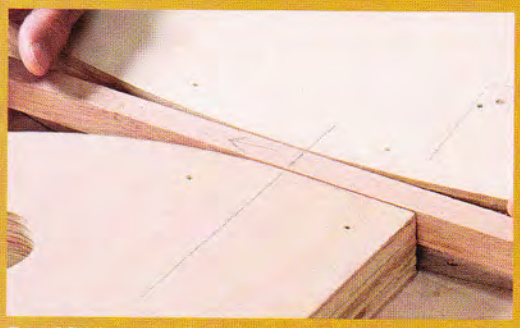
1. BEND THEM ON A FORM

It takes 25 staves to make the chair, but you'll need a few extra for breakages. You'll use 13 at full length, and cut the other 12 in two.

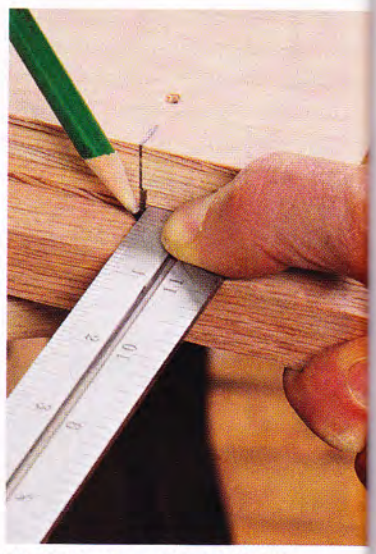
Steam it. *After two hours in the steambox, pull out the stave. It will be very hot, so use a towel or glove to protect your hand.*







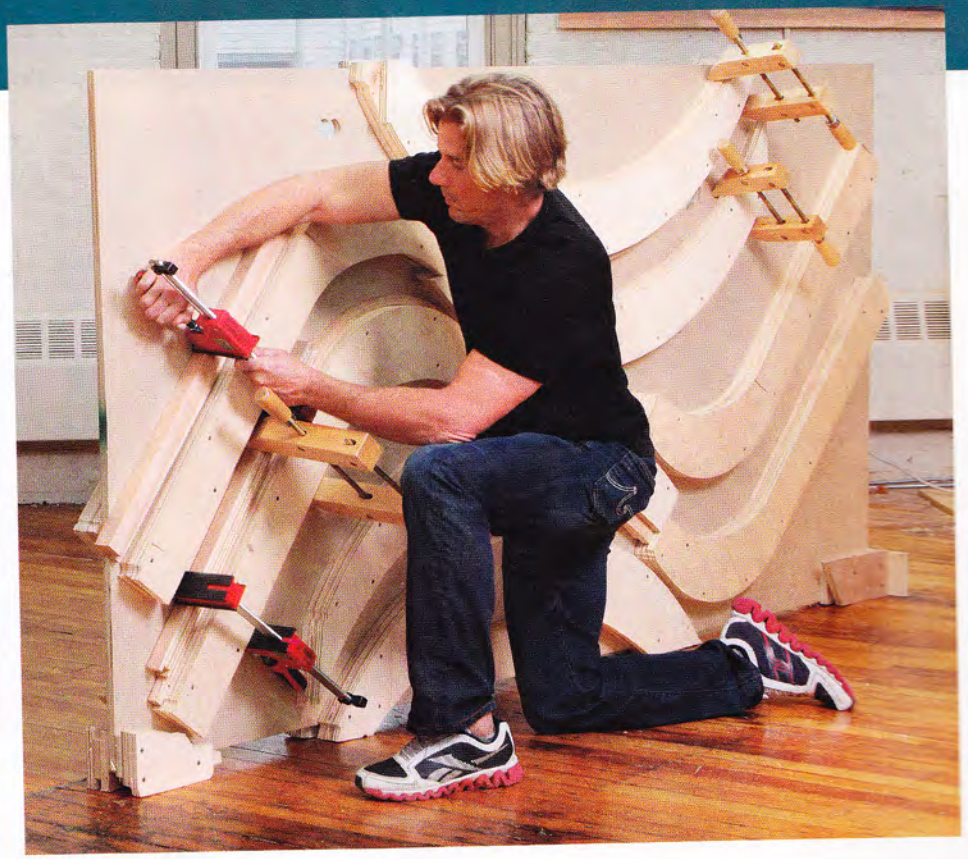
Bend it. *A mark 46 in. down from the top end of the stave aligns with the middle of the curve that transitions from the seat to the back (above). Because the stave loses flexibility fast, bend the tighter back curve first. Clamp the back between a caul and the form, and then bend the rest of the stave around the seat's more gentle curve (right).*



Mark the top edge while it's in the form. *The line, marked where the bending form intersects the plywood base, not only indicates the long stave's final length, but also gives you a way to reposition the back staves on the form later for drilling (see p. 40) after they've been cut from the long staves.*

2. LET THEM DRY

A two-sided drying rack frees up the bending form for the next stave. MacDonald made it big enough to hold almost every stave.



could use one form to make all three. The form bends all of the staves into the same long S-curve. Then the smaller staves are cut from larger ones. I'll show you how to make all of the staves and how to tame the glue-up with alignment pins and screws to minimize the work needed to smooth the back and seat.

This curvaceous lounge is perfect for a deck or patio. But I think it is actually elegant and comfortable enough to be used indoors, too.

Simple setup for steaming

All of the staves are steam-bent, but don't let that freak you out. It isn't hard. I used a Wagner wallpaper steamer to make the steam, and PVC pipe for the box (see drawing, opposite).

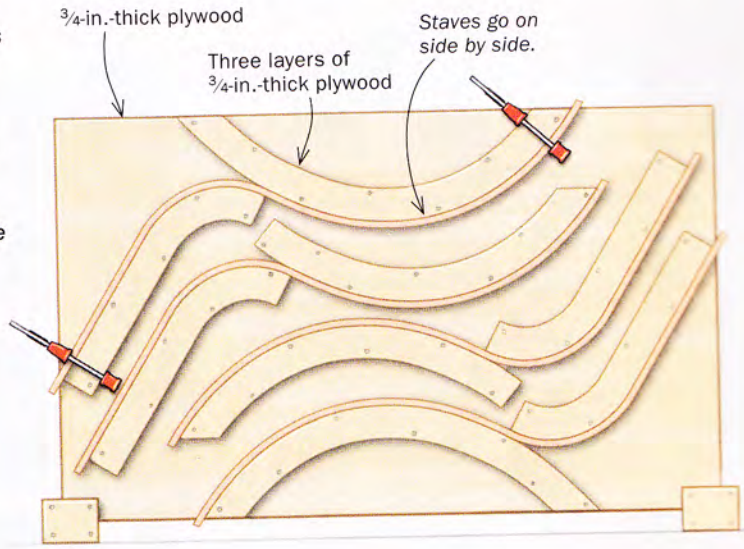
As for lumber, I used air-dried red oak. White oak would be even more weatherproof. Many local sawmills have air-dried wood, or you can ask your lumberyard to get it for you—that's what I did. Air-dried stock bends more easily, but you could also use kiln-dried lumber.

No matter how the lumber was dried, prepare for some staves to break during the bending process. We made five extra ones. Add a few more if you're using kiln-dried lumber.

To make the bending forms, lay out plywood pieces as shown on p. 37 and get them as fair and smooth as you can. You only need to attach a single layer of each part on the form. Then you can rough-cut the second layer, attach it, and flush-rout it to the lower layer. To begin the bending, warm up the steambox, then put in some staves. After two hours, pull out a stave and put it onto the bending form. Use a caul to clamp the straight section for the back to the form and then bend the seat's gentle curve, clamping it at the foot. Add clamps on the rest of the curve. After two hours, transfer the stave to a drying rack. Leave the staves in the rack for at least a week.

To make the drying rack forms, just screw pieces of rough-cut plywood to the bending form so you can rout them flush as you did before. Now here's the trick: Screw a narrow piece of plywood to the two newly routed pieces and unscrew the two pieces from the form. The plywood "bridge" holds the two pieces together so you can maintain the correct orientation between them as you move them to the drying rack base. After screwing them to the drying rack, remove the "bridge," and flush-rout rough pieces on top of them to make the forms thicker. Be sure you have relieved the back edge of these forms for clamping on the staves.

When you take the staves out of the rack, you might notice some springback, but don't worry. It will be similar on all of them. Small inconsistencies are OK, as all surfaces are smoothed after glue-up. After all of the staves have dried, cut the shorter ones to length on the bandsaw.



On the rack. *Move each stave to the rack after two hours in the bending form. Let them dry there for one week. MacDonald built his to allow three staves to be stacked side by side in each position.*

Alignment pins level staves for glue-up

Keeping all these thin, curved parts aligned during glue-up could be a nightmare. To ease assembly, use wood pins to keep the staves in alignment and reduce the amount

Assemble the chair

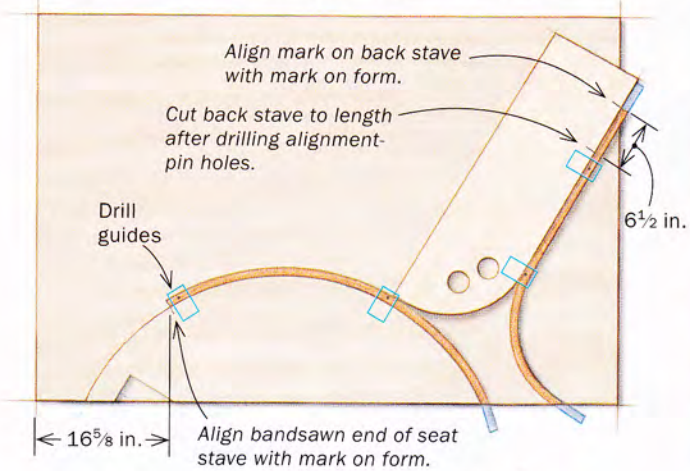
CHOP SOME OF THE STAVES

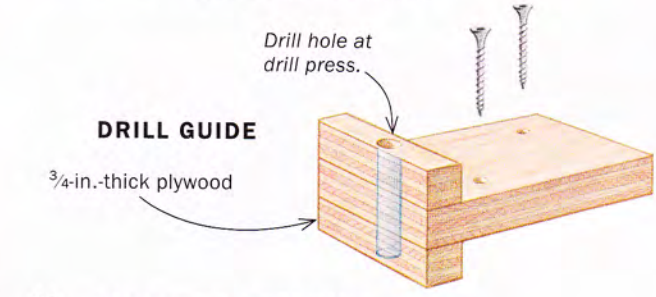
Cut at the same mark used to align the stave on the bending form. You need to cut 12 staves in half to create the seat and back staves that alternate in rows with the long staves.

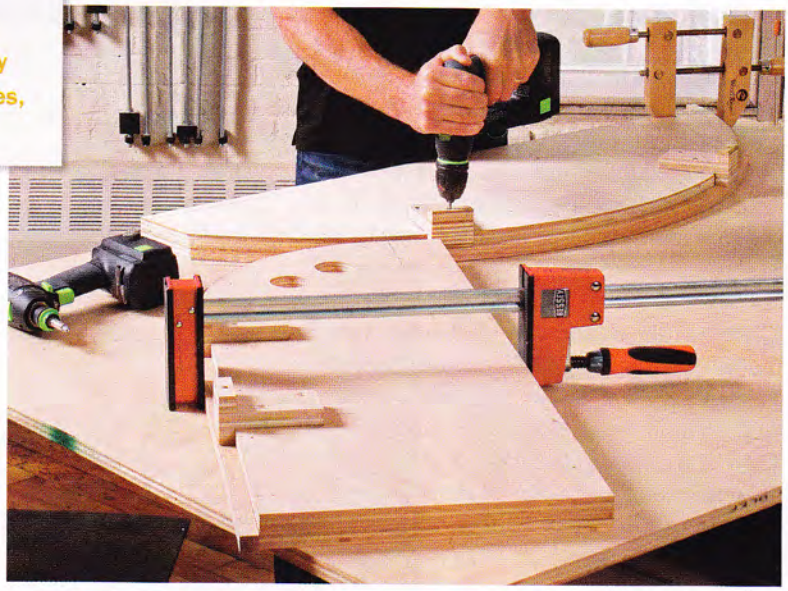
DRILL FOR THE ALIGNMENT PINS

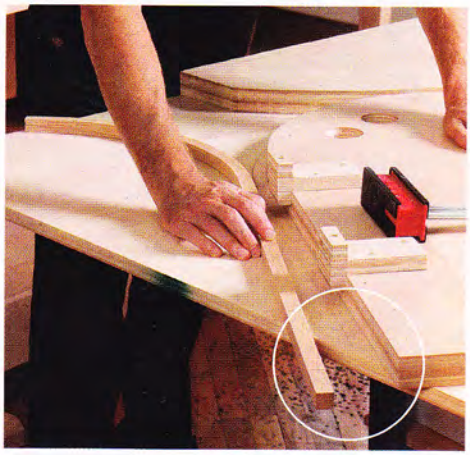
The pins bring the top and bottom surfaces into alignment. They also guarantee that the interior ends of the seat and back staves, which start the negative spaces, line up across the chair.

Attach guides to the bending form. The guides locate the holes and keep the drill bit perpendicular to the stave's face. When drilling, each stave is placed on the form in the exact orientation it will have in the assembled chair so the negative spaces will align.









Drill the long stave. *Align the centerline on the stave with the mark on the form. This puts the stave back in the same position it was in for bending.*

Drill the seat and back staves, too. *Align the mark at the top end of the back stave with the mark on the bending form (left). Reverse the seat stave to align its cut end with the mark on the bending form.*

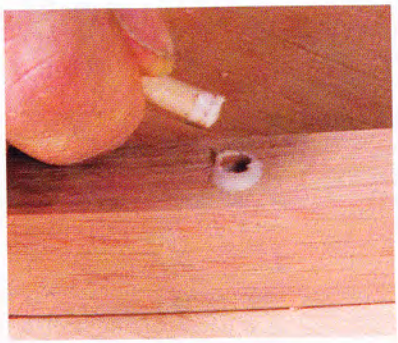
of leveling and smoothing you'll need to do later. To drill holes for the pins, put each part on the bending form in the location it will occupy in the completed chair, and drill holes for the pins in the edges. To keep the holes straight and square, use a plywood drill guide.

After the holes are drilled, start the assembly. Glue in the pins for the first stave and spread glue on the inside edge. Use a waterproof glue like Titebond III. Add the short staves for the back and seat. Screw them to the first stave. It's important to drill a pilot hole and countersink for the screws so the staves don't split. I used coated decking screws, spacing them every 6 in. to 8 in. Glue pins into these two short staves and spread glue on their edges, but only where the next long stave touches them. Add the long stave and then repeat the process.

The screws create enough clamping pressure to bring the rows of staves together, but if you find gaps between the rows, stop and clamp up the assembly. Leave the clamps on for an hour and then continue. Clamp the entire

STACK AND GLUE

There's no need to stress about this glue-up. The alignment pins keep you on track, and screws take the place of clamps, so you move along at a comfortable pace.



Pin, screw, clamp. *Start by gluing the alignment pins into a long stave (left). Place a seat and back stave, drill and countersink for screws, and drive them in (right). You can glue up large sections this way if you use a slow-setting glue like Titebond III. Clamp up the entire assembly about halfway through (below). This gives you a chance to check for gaps and pull them closed. Leave the clamps on for at least another hour.*

FILLER BLOCKS PERFORM TWO JOBS

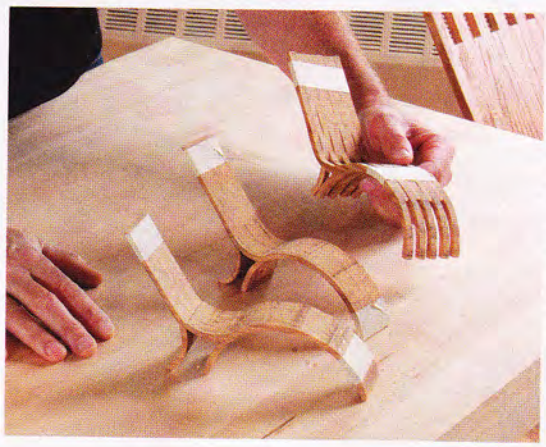
There are gaps between the staves at the top of the back, and everywhere the chair touches the floor. Use offcuts from the staves to fill them and to create the decorative negative spaces.

Glue in the spacers. *Use cauls on both sides to hold them in place. Slide in the blocks so that they line up straight across the chair, using pencil marks on the long staves to aid with the alignment (left). Then add a clamp on both sides of the cauls and leave them until the glue is dry (right).*

Before and after. *MacDonald reclines on a full-size mockup of the chair. Initially, the arc of the seat was too tight, and he tended to slide off. So, he altered the mock-up to extend the foot of the chair forward. With the problems ironed out, he was able to make the actual chair (background) without fear.*

Prototypes eliminate bad design

This lounge chair didn't leap fully formed from MacDonald's shop. It took a lot of work to get to the final product. After he and his shopmate, Eli Cleveland, kicked around several ideas, they made small-scale and full-size models to check for stability and comfort, and to get a sense of how hard it would be to make a stave chair.



Start small. *Before making the full-size prototype, MacDonald and Cleveland made several small-scale models, which allowed them to get a sense of how different designs would look and whether or not they would be stable on the floor.*

assembly after the last stave is in place and let the glue dry overnight. The next day, glue in the small blocks that create the decorative negative spaces. After the glue dries, cut the top of the back straight across with a jigsaw. Do the same with the legs and the foot of the seat. Check to see if the chair sits level. If it doesn't, plane the high spots.

The alignment pins should have kept everything in order, so use a scraper to get rid of squeeze-out and start the smoothing. Then use a random-orbit sander (80- and 100-grit) and finish up sanding by hand (150-grit). If your staves aren't level, plane across the grain to level them first. For a finish, use either a spar varnish (reapply yearly) or no finish at all. □

Tommy MacDonald is a furniture maker and the host of Rough Cut: Woodworking with Tommy Mac, *on public television (check local listings).*

TRIM AND SMOOTH

Trim the three points of contact so that the chair sits flat on the floor, and level the staves for a comfortable seat. Also, use a file to smooth the internal ends of the staves.

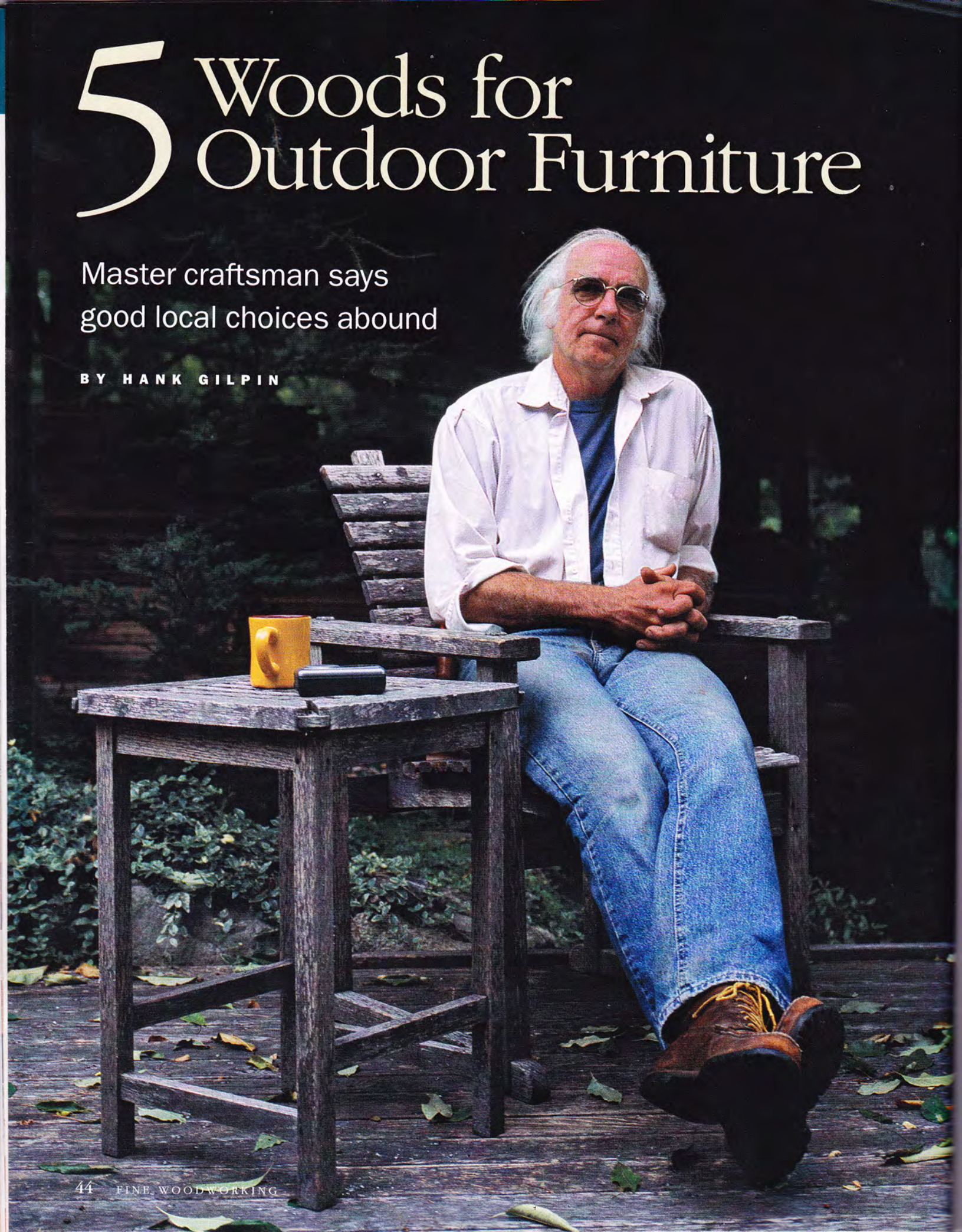
Flat feet. *Angle the jigsaw to create feet that sit flat on the floor. Cut to a line drawn across all of the staves along both ends of the filler blocks. To stabilize the chair for the cut, clamp it to a spacer and then clamp the spacer to the workbench. Notches on the bottom edge of the spacer provide a surface for the clamp holding the chair to the spacer.*

Fair the curves. *A scraper follows the curves well, and a pair of notched boards makes it possible to clamp the chair to the bench at the front and back.*

5 Woods for Outdoor Furniture

Master craftsman says good local choices abound

BY HANK GILPIN



After a long day in the shop, I like to head out to the backyard, sit back in a chair, and have a cold drink. It's relaxing, but I'm only there for a few hours at most. The wood chair beneath me is out in the weather all day, every day. And every minute, the elements are working to tear it down. Outdoor furniture won't last forever, but you can greatly extend its life by using the right wood (and the right joinery).

What makes a wood right for the outdoors? Its ability to resist decay. I've been making outdoor furniture for several decades, and I've used a wide variety of woods to do it. Teak is far and away the best. It resists decay, is very stable, and naturally fades to a beautiful silver-gray. But it also is very expensive, so I don't use it. In fact, I don't use any exotics. There are plenty of domestic species that do great outside and I'll tell you about the five that top my list: white oak, black locust, bald cypress, eastern red cedar, and northern white cedar. Some of these are more difficult to find than others, but you should be able to find at least one of them where you live (and the others you can get from online lumber dealers).

Regardless of which wood you use, here is one bit of advice that applies to them all. Use only the heartwood for outdoor furniture (and anything else you make for the outdoors). Sapwood is too rich in sugars and other tasty treats to survive very long in the wet, wild, and often warm wilderness out the back door. Fungi, the critters most responsible for decay, tear through sapwood, but have a much harder time with heartwood. Wind, rain, and sun also cause decay, but you can mitigate their impact with smart design, like making sure surfaces that face up are sloped and that exposed end grain has plenty of room to breathe and dry.

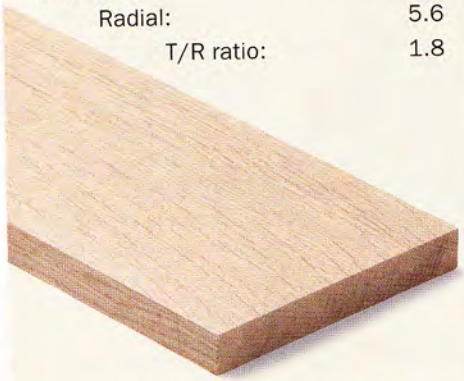
Also, applying a finish is a Sisyphean task, *and it won't preserve the wood* forever. The elements catch up with everything. So, skip the finish, let the wood weather to its natural gray, and relax.

Hank Gilpin is a professional furniture maker in Rhode Island.

White oak

White oak is widely available, much less expensive than teak and other exotics, and withstands the elements for years. The one knock against white oak is that it can be tough to work. Also, be aware that different parts of the growth rings weather differently. The light-colored early wood (the part of the ring that grows first) is more porous and softer than the darker late wood, so the surface becomes uneven. To minimize that effect, look for lumber with tight annual rings (check the end grain).

Latin name: *Quercus alba*	
Average price (bd. ft.):	$4–$5
Availability:	throughout U.S.
Specific gravity:	0.68
Percent shrinkage:	
Tangential:	10.5
Radial:	5.6
T/R ratio:	1.8



BEHIND THE NUMBERS

A wood's **specific gravity** speaks to how hard, dense, and heavy it is. The higher a wood's specific gravity, the tougher and stronger it is.

The **percent shrinkage** indicates a wood's stability. There are three numbers to consider: tangential and radial shrinkage and the ratio of the two. As the ratio of tangential to radial shrinkage gets higher, wood is more prone to warping.

Outdoor design, perfected. *With surfaces designed to shed water, simple but strong joints, and stainless-steel screws, Gilpin's white-oak chair is sure to stand up to the elements for years.*

Avoid sapwood at all costs

Sapwood, the outer rings of the tree where cells were still alive when it was cut, is a tasty treat for fungi. This fence post illustrates why you shouldn't use it in outdoor furniture. After just a few years of contact with soil, it has been eaten away. But the *heartwood, the durable inner rings where the cells* were no longer alive, remains as strong as ever. It's the same story with furniture. Sapwood will rot quickly, leaving you with a weakened or unusable piece of furniture.

Photos, except where noted: staff

Black locust

Of all the domestic woods I know—and I know a lot—black locust resists the ravages of fungi and moisture the best. More durable than white oak, it is the best choice for furniture parts that are in direct contact with the soil. As it never has more than three years' worth of sapwood, there is very little waste. Like white oak, it is tough to work. Although it grows just about everywhere, black locust can be hard to find because it is only just appearing on the fringes of the commercial radar. However, with a bit of leg work (try an online search) you should be able to find it in your area.

Latin name:
Robinia pseudoacacia

Average price (bd. ft.): $3–$4

Specific gravity: 0.69

Percent shrinkage:

Tangential:	7.2
Radial:	4.6
T/R ratio:	1.6

Legs built to last. *Because the end grain of its slab legs is in direct contact with the soil, Jennifer Wickham made this bench from black locust. No other domestic wood is better at handling the stress of constant exposure to dirt, moisture, and fungi.*

How to build furniture that survives outside

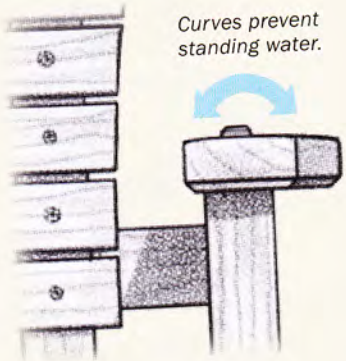
Building durable outdoor furniture isn't only about picking the right wood. It's just as important to build smart. That's because the parts expand and contract far more than they would indoors.

Start by creating surfaces that naturally shed water, such as angled seats. Keep parts narrow and give them enough space to expand. On a seat, for example, six narrow slats are better than four wider ones. And keep end grain exposed where possible. That allows the wood to dry more easily, making it more difficult for mold and fungi to start growing.

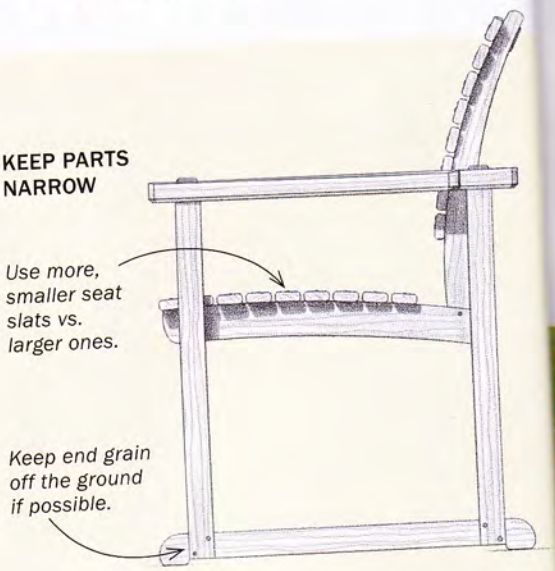
When it comes to joinery, simpler is better. Mortise-and-tenon joints, bridle joints, and lap joints are all good choices. Use a waterproof glue, like Titebond III, to hold the joints together, and reinforce them with a peg or two. Or you can forgo traditional joinery altogether, and use mechanical fasteners such as bolts and screws. Just make sure that you use stainless-steel or brass fasteners. Ceramic decking screws are a good choice, too.

—Matt Kenney is a senior editor.

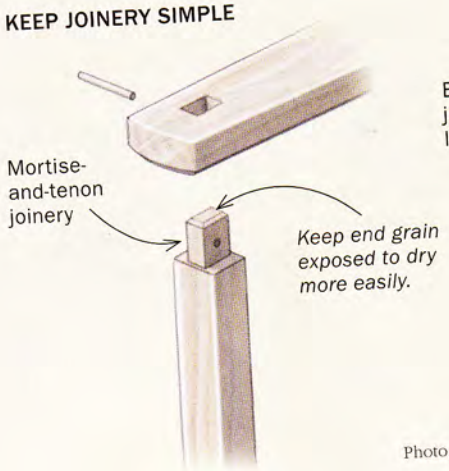
SHED WATER NATURALLY

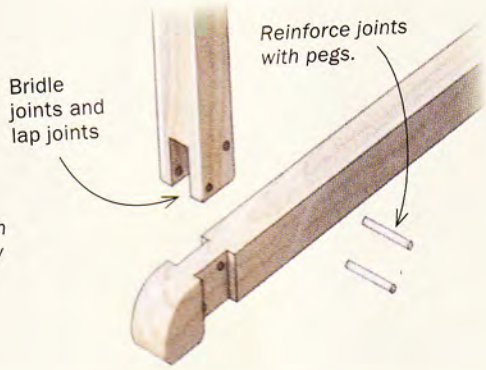


KEEP PARTS NARROW



KEEP JOINERY SIMPLE





Photo, this page (top right): Jessica Wickham; drawings: John Hartman

Bald cypress

A light but durable wood, bald cypress is great for furniture that you need to move around often. It works very well with hand tools, and doesn't clog sandpaper as fast as northern white cedar. However, it can be oily, which makes glue-ups tough. Furniture maker Brian Boggs has tested many glues on it and recommends using Oak & Teak Epoxy Glue (glueoakandteak.com), which is specially formulated for oily woods. Bald cypress grows in a fairly large part of the country and isn't difficult to find.

Latin name: *Taxodium distichum*

Average price (bd. ft.):	$4–$5
Specific gravity:	0.46
Percent shrinkage:	
Tangential:	6.2
Radial:	3.8
T/R ratio:	1.6

Bald is beautiful. *Although its parts are beefy, Brian Boggs's chair isn't heavy, because it's made from bald cypress. It's no problem to move it from spot to spot, so you're always sitting in the sun (or shade, if you prefer).*

Two cedars

Red cedar challenges black locust in terms of durability, and is another great choice for any part that is in direct contact with soil. It's not difficult to work, but is often very knotty. However, if you design with foresight you can locate joinery to miss the knots, or use it only for those parts that touch the ground or are buried in it, and use another wood for everything else (it all turns gray in the end). It grows just about everywhere, but to find it in sizes suitable for anything other than fence posts and wood chips for hamster cages, try local sawmills.

Northern white cedar isn't as resistant to decay as red cedar, but still holds it off for many years. It's light and fibrous, but resists splitting very well. It's another perfect wood for furniture that is moved around a lot. Galvanized fasteners will cause staining, so use stainless-steel, brass, or ceramic-coated decking screws instead.

Lightweight Adirondack. *There's a lot of wood in an Adirondack chair, which can make them very heavy. That's why Tom Begnal made this one from light but strong white cedar.*

Latin name:
Juniperus virginiana (Eastern red)

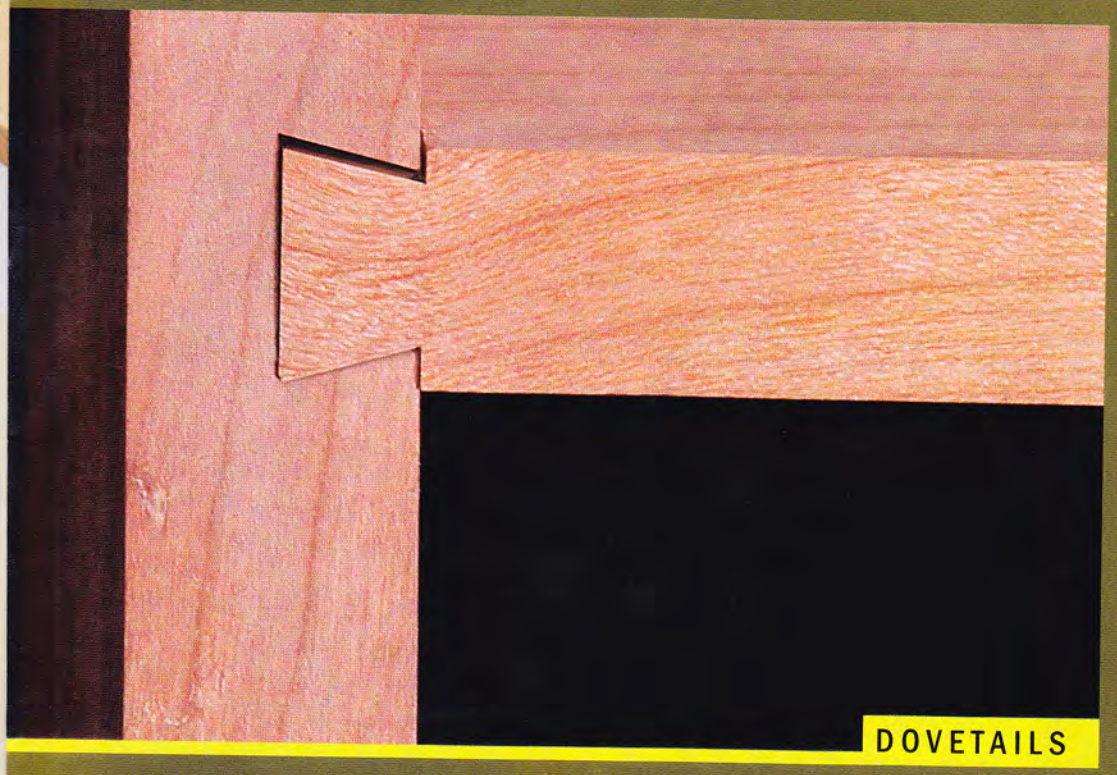
Average price (bd. ft.):	$5–$6
Specific gravity:	0.47
Percent shrinkage:	
Tangential:	4.7
Radial:	3.1
T/R ratio:	1.5

Latin name:
Thuja occidentalus (Northern white)

Average price (bd. ft.):	$5–$6
Specific gravity:	0.31
Percent shrinkage:	
Tangential:	4.9
Radial:	2.2
T/R ratio:	2.2

Fast Fixes for Joinery Mistakes

5 pros share their favorite saves

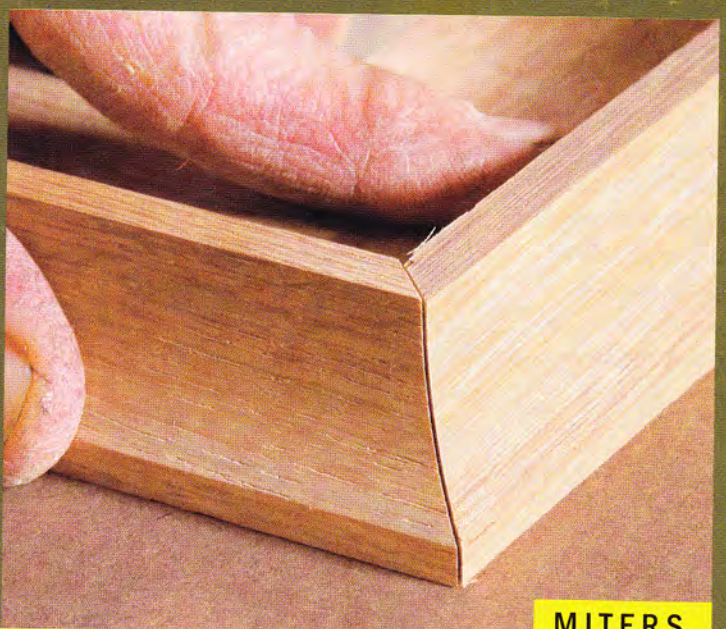


DOVETAILS

In the article "How to Fix Flaws and Mistakes" (*FWW* #228), we asked the magazine's most frequent contributors for their favorite methods for concealing flaws in the wood, whether self-inflicted mistakes or courtesy of Mother Nature. Their clever tricks for getting out of a problem without having to go back and start over struck a chord with our readers.

That article focused on cosmetic fixes for surface flaws, but we saved a whole other family of invaluable remedies, for mistakes made while cutting joinery. While these mistakes may or may not affect the look of a piece, they most certainly have an impact on its strength, and can force you to scrap a valuable workpiece. Once again, the pros have a bunch of tricks up their sleeves.

Compiled by FWW staff.



MITERS

TENONS

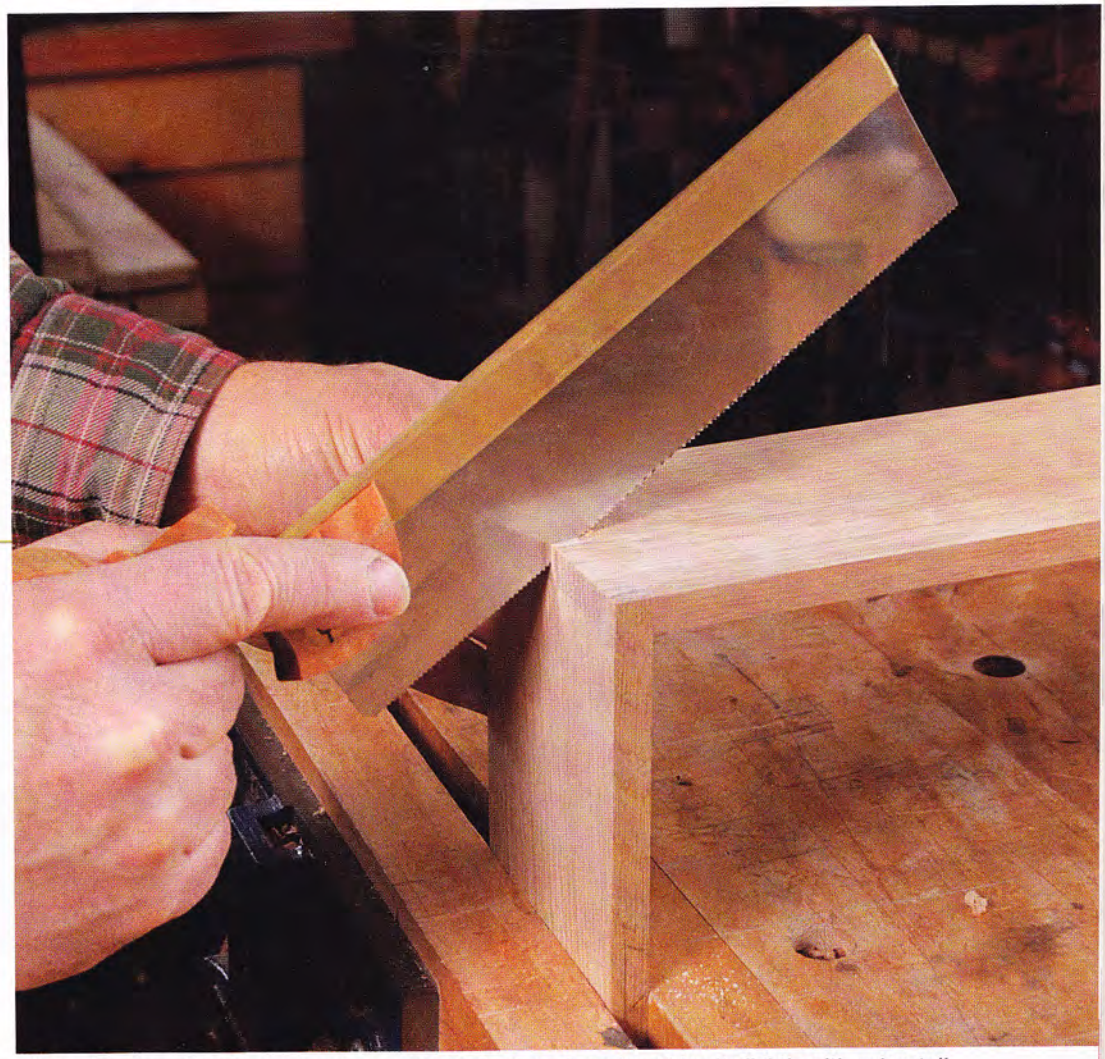
Solutions for gappy dovetails

Obvious mistake. *Even a small dovetail gap can be a big eyesore on a cabinet case.*

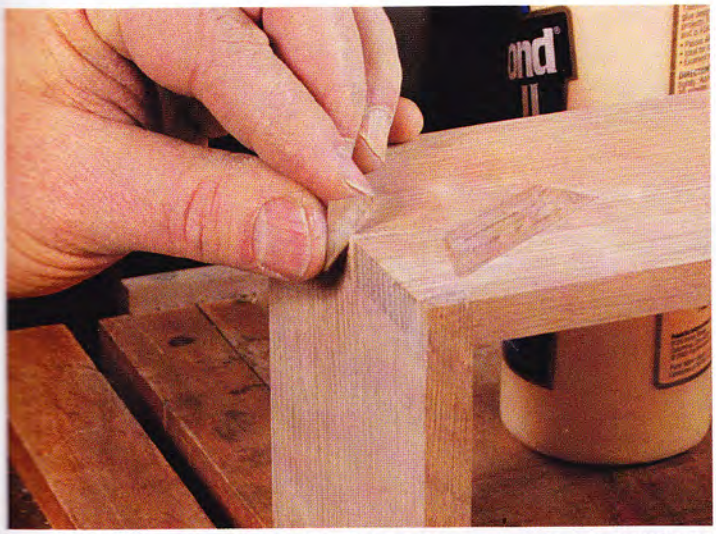
ANGLED SHIM FOR THROUGH-DOVETAILS

A common mistake when hand-cutting through-dovetails is to cut on the wrong side of the scribe line, which leaves a small but noticeable gap between the pin and tail when the piece is glued up. A surefire solution is to fill the gap with a thin shim that's the same wood species as the project. Widen the gap first, glue in the shim, then trim it flush.

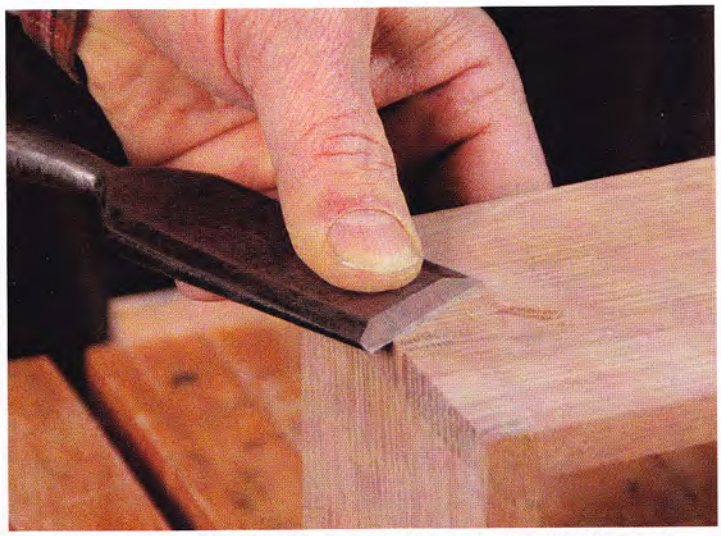
—Michael Pekovich is FWW*'s art director, and a prolific furniture maker.*



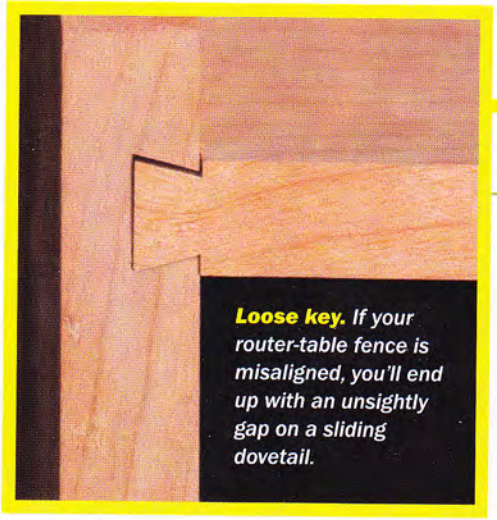
Widen the gap. *A slight gap can be hard to fill. To make it easier, widen it slightly with a dovetail saw, angling the saw and cutting to the baselines of both the pins and tails.*



Insert the shim. *Chop the bottom of the strip at an angle so it will fit the widened gap, then glue it in place. Be sure to orient the end grain of the strip in line with that of the tail board.*



Trim it flush. *After the glue dries, use a wide chisel to slice the shim flush.*



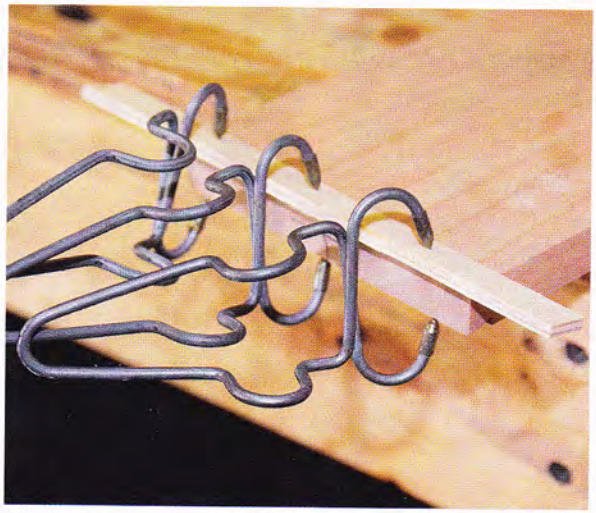
Loose key. *If your router-table fence is misaligned, you'll end up with an unsightly gap on a sliding dovetail.*

Dovetails continued

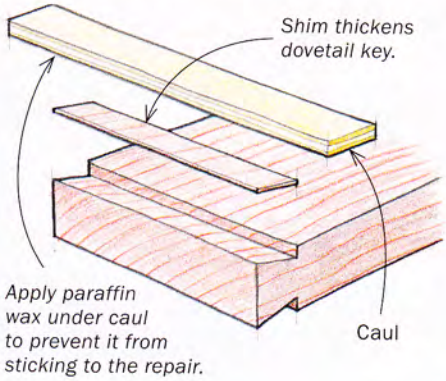
WIDE SHIM FOR A LOOSE SLIDING DOVETAIL

This fix came to me while I was working on a wall shelf made with sliding dovetails. As always, I'd set up the router-table cuts using test pieces and verified the fit. But after I finished routing the dovetail keys, I discovered that I was off by a little more than 1/16 in. Yikes! Turns out that I'd not tightened down my fence sufficiently, and it shifted slightly as I made the cuts. Fortunately, I came up with a fix that was pretty quick and easy. I filled the gap with a piece of thick veneer, glued along the face of the key. Be sure to run the grain in the same direction. Then I re-routed the joint to get a tight fit.

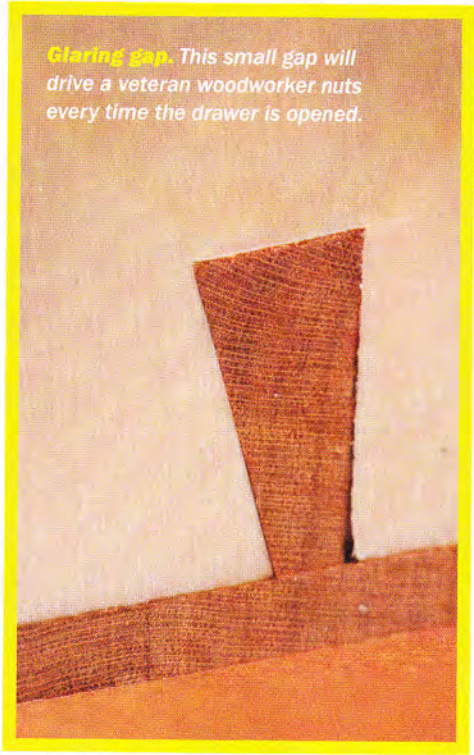
—Greg Brown is a furniture maker in New Hampshire.



Spring into action. *Glue a piece of veneer or a thicker shim to the face of the dovetail key. Brown uses spring clamps and a thin caul to ensure a good glue bond across the width.*



Tight joint. *After re-routing the shimmed key, it fits perfectly.*



Glaring gap. *This small gap will drive a veteran woodworker nuts every time the drawer is opened.*

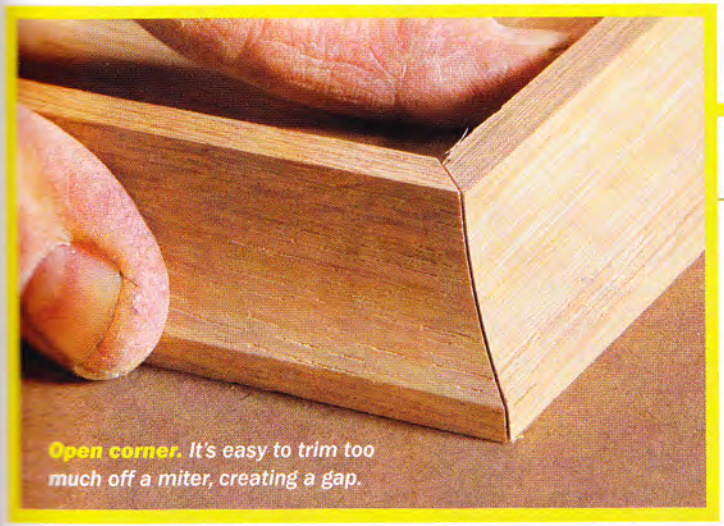
TAPERED SHIM FOR HALF-BLINDS

Here's a simple way to fix a gap in a half-blind dovetail. Use end-grain shims that closely match the color and grain pattern of the pin. This fix is slightly different from the through-dovetail fix on p. 49, which uses a triangular, flat shim. Because there's no way to widen the gap cleanly, and it's trapped by the edge of the drawer front, I taper the shim to create a wedge that is easier to put in. I tap it into the gap with a hammer, then trim it flush.

—Garrett Hack is a contributing editor.

Make a wedge. *Cut a shim slightly wider and thicker than the gap. Then taper the sides and ends using a chisel and block plane.*

Photos: staff; drawings: John Tetreault



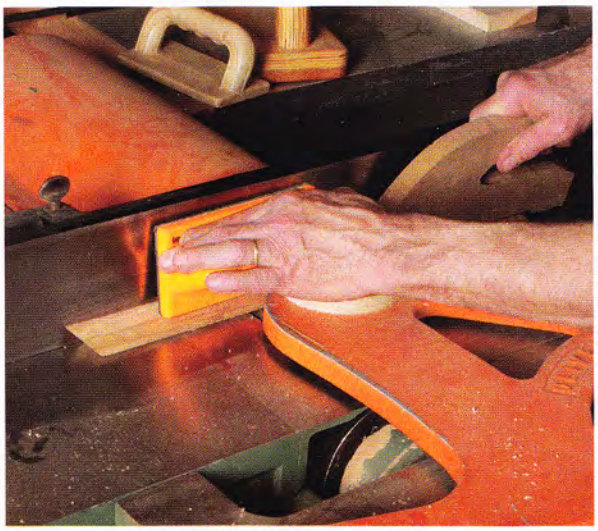
Open corner. *It's easy to trim too much off a miter, creating a gap.*

When miters don't meet

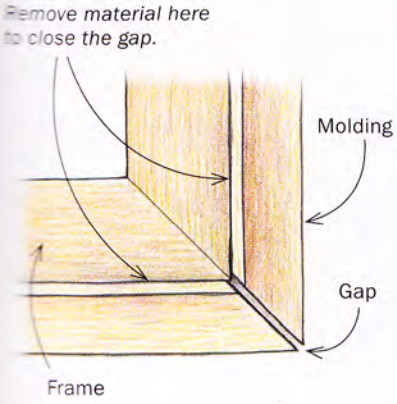
RELIEVE THE BACK, NOT THE CORNERS

When trimming the miters on moldings, it's easy to take off too much from one end, leaving a small gap. Instead of cutting a new piece of molding, you can fix the pieces you have. Simply take a very light jointer pass off the back face of the molding (a handplane will work too). This has the effect of lengthening the distance between the miters, giving you one more chance to close the gap.

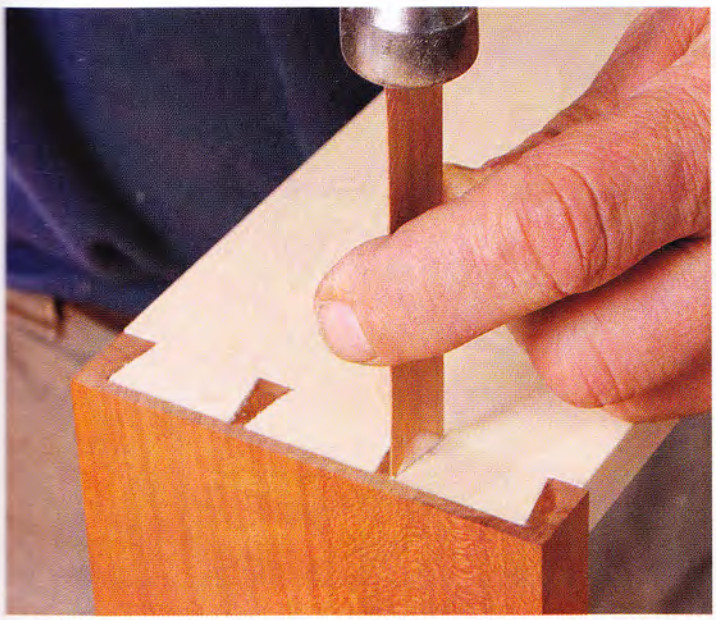
—Will Neptune is a furniture maker in Massachusetts.



Joint the back. *Run the back of the molding over the jointer, taking a shallow cut. Be sure to use push blocks. If the molding is too small for a safe jointer pass, use a handplane.*



Tight miter. *Taking material off the back brings the miter together.*



Drive it home. *Put glue on the tip of the shim and tap it in place (above). Saw off the excess and trim the patch flush (right).*

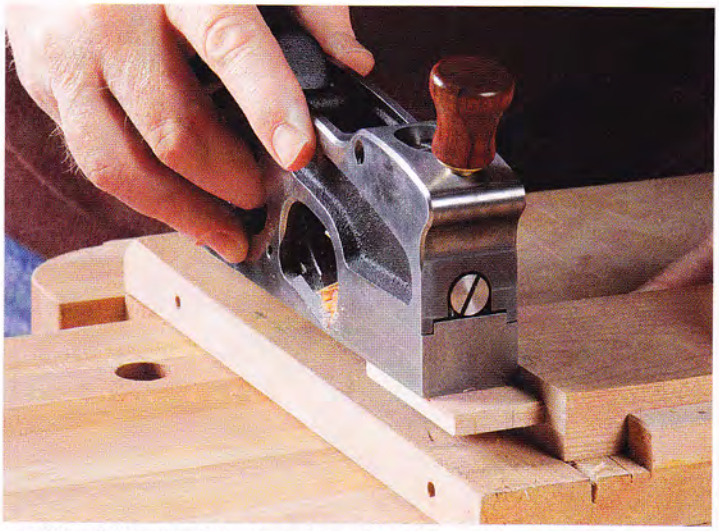
Shim splint. *Add a strip of veneer to thicken a loose tenon. Cut the veneer so that it overhangs the tenon just a hair on each side.*

Rx for tenon troubles

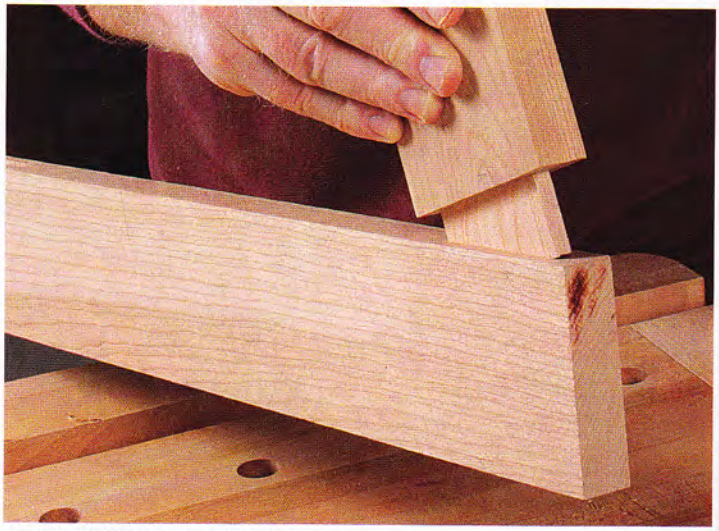
FATTEN UP A THIN TENON

It's easy to trim too much from a tenon, creating a loose fit in its mortise. There is an easy fix, which I learned from Phil Lowe. You just glue veneer to the tenon cheek and try again. First partially assemble the joint and look for a gap to see which face of the tenon is undercut (shimming the wrong face can mess up the alignment of the parts). Now resaw a strip of veneer just a bit thicker than the gap. Glue it on, using a small caul to get even pressure and a tight glueline, and then trim the tenon again to creep up on a perfect fit.

—Tom McKenna is managing editor, and Phil Lowe runs the Furniture Institute of Massachusetts.



A little off the top. *Trim the edges of the veneer flush, and then plane the fattened tenon until it fits.*



Hanging tight. *A perfect fit is one where the joint stays together when you hold it in mid-air.*

CAP A BAD THROUGH-TENON

A through-tenon is an attractive detail, but it's easy to end up with a gap or chipped corner while you're fitting the extralong tenon. A simple fix is to cut back the bad tenon and then cap it. The cap can either be flush or protruding, depending on the style. Start by cutting a slip tenon for a snug fit in the mortise. Then trim the damaged tenon back so that it's about ¼ in. shy of the outside end, and insert it fully into the mortise. Cut the cap long enough to bottom out against the internal tenon, especially if it is designed to protrude evenly. Now you can glue in the real tenon and add the cap on the outside. If it is a chamfered cap, be sure to do that beforehand.

—Michael Pekovich

Bad corner. *When fitting a long through-tenon, it's easy to chip out a corner or just over-trim it, ruining the look.*

Make a cap. *Mill a slip tenon for a snug fit in the outside of the mortise. Then cut off a piece long enough to meet the end of the real tenon.*

Top it off. *Glue in the cap over the tenon for a seamless repair.*

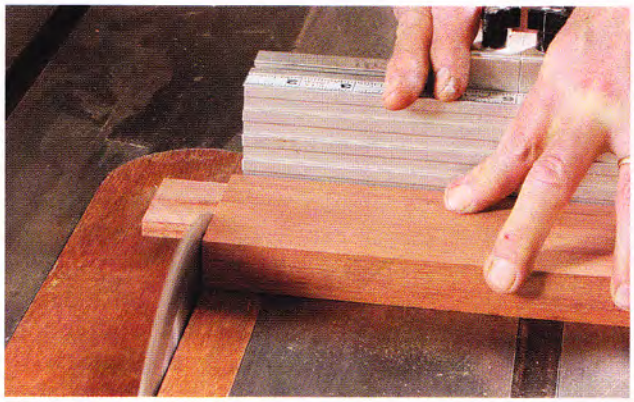
Bad shoulder. *Get an offset tenon wrong and the problem is obvious. But even this can be fixed without starting from scratch.*

REPLACE A TENON COMPLETELY

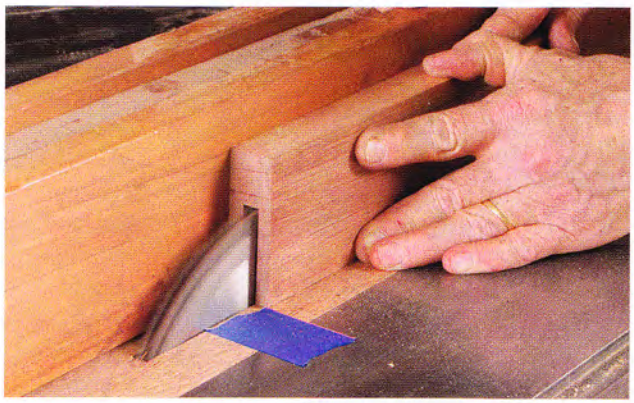
It's all too common to orient an offset tenon backwards on a rail, creating a big step on the finished frame. But it's not a fatal error. You can simply slice off the miscut tenon, cut a big stopped groove in the rail, and slide in a slip tenon. This fix works for bad tenons of all kinds. Here's how to do it.

Install a dado set on the tablesaw equal to the tenon thickness. Set the height for the width of the tenon and use the rip fence to locate the dado set in the rail thickness. Be sure you have the location right this time! Feed the rail in far enough to cut a reasonable-size pocket—stop the cut just after you reach the apex of the blade. Turn off the saw and wait for the blade to stop. Use the same species of wood to make a slip tenon that fits snug in the curved pocket. Cut the tenon to length and glue it into the rail. When the glue dries, clean up the bottom edge and fit the new tenon to its mortise.

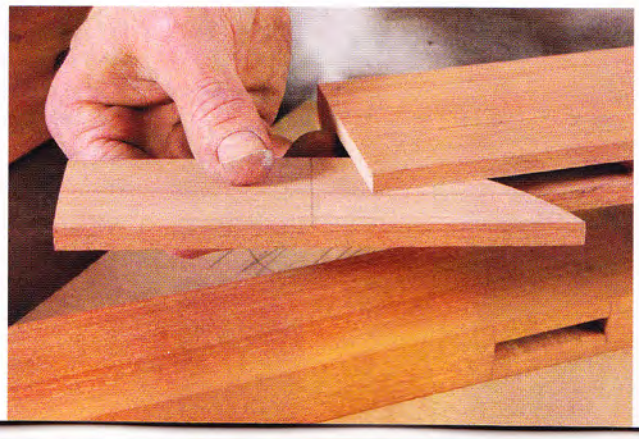
—Will Neptune



Remove the tenon altogether. *Cut off the tenon at the shoulder.*



Clear a path for a new one. *Use a dado set to plow a groove where the tenon should have been. Stop the cut when the blade is at the apex of the curve, turn off the saw, and hold the piece until the blade stops.*



Curved piece fits right in. *Mill a slip tenon for a snug fit in the groove, with one end curved to match the arc of the blade. You can use the blade to trace the arc.*

Slippery glue-up. *When gluing in the tenon, you need to clamp it in three directions: One clamp pushes the tenon in, one keeps it from pivoting out, and one goes across the face to ensure a good bond with the cheeks.*

Turning Furniture Parts

Part 2: For smooth surfaces and intricate elements, a little practice makes perfect

BY PETER GALBERT

A step-by-step tutorial

After learning to make perfect cylinders and tapers, Galbert's students learn more intricate cuts by running through a series of short exercises on scrap or firewood. By cutting the key shapes over and over, they develop confidence and muscle memory. It also is easier to see and fix errors in technique when you make the same mistake a few times in a row.

One thing furniture makers don't realize when they approach turning is that the smooth surfaces, sharp notches, and lovely beads and coves they covet all take a bit of practice. The great thing about a practice session is that you don't have to fret over making something precious.

The basic drills in this article will teach you the subtleties involved in planing a surface smooth, plus cutting the precise notches, beads, and coves seen in traditional furniture parts. Master these cuts in practice and real furniture spindles will be a breeze.

Like I did in Part 1 (*FWW* #231), I'll demonstrate some techniques that the usual sources neglect to explain, such as how to adjust your footwork and grip to put the tools and your body in the most comfortable position.

You won't need as many tools as you think. Furniture work requires only four tools, a roughing gouge and parting tool, plus an oval skew chisel and spindle gouge that have been specially reground and honed (see Fundamentals, also in *FWW* #231). For the skill-building exercises in this article, you'll need blanks 12 in. to 18 in. long that have been roughed down to 2¼-in.-dia. cylinders, as you learned to do efficiently in Part 1.

Planing with the skew chisel

Although planing all of the flat surfaces with an oval skew chisel is typically the last step I take in turning a spindle, it's one of the first skills I teach novices because it's simple to learn and develops a feel for the tool. The key is learning to balance the bevel of the tool on the spinning workpiece and rotate/angle the edge as needed to take whisper-thin, even shavings and leave behind a glass-smooth surface. Turners try to minimize sanding, which blunts sharp details.

You'll need to learn to plane in both directions, but there is a more natural direction for lefties (going left to right) and righties (vice versa) to start with when getting a feel for the technique.

Hold the oval skew chisel like a roughing gouge, with one hand bracing the bottom of the handle against your hip. Press the barrel of the chisel against the tool rest with the thumb of your other hand. Keep the edge of the tool at about 45° to the axis of the workpiece with the toe pointed up. That position keeps the bevel bearing on the workpiece, stabilizing the cut.

Engage the blade either by rotating the tool down a bit so the

Photos, this page: John Tetreault

Balancing act. *Galbert braces the handle against his hip and uses thumb-pressure on the barrel to keep the tool in a consistent position (above left). The trick with a planing cut is to ride the bevel of the tool while keeping the cutting action at the center of the edge (left). Avoid cutting with the toe or heel, which can cause catches. The other key is to always be moving forward.*

curved edge begins to shave, or by swinging the handle up in an arc. In either case, the point of contact with the spindle should stay in the middle of the edge, as high on the workpiece as is comfortable. Staying high on the round limits the depth of cut. With a little practice, you'll find that the skew will cut from any number of positions once you find the right balance between the angle of presentation and the rotation of the tool. Use the same side-to-side movement with your hips and legs that you use with a roughing gouge. This ensures that the edge will move along the spindle in a relatively constant position, making it much easier to cut straight.

To avoid catches, always keep the skew moving forward in a constant, fluid motion, and don't try to cut too deep. Most problems with the skew come from moving backward to get a missed spot. Be content to

Exercise 1

Learn to smooth a cylinder

The goal is to plane a roughed-down cylinder until it's glass-smooth and even. Practice moving in both directions, and smooth a number of spindles.

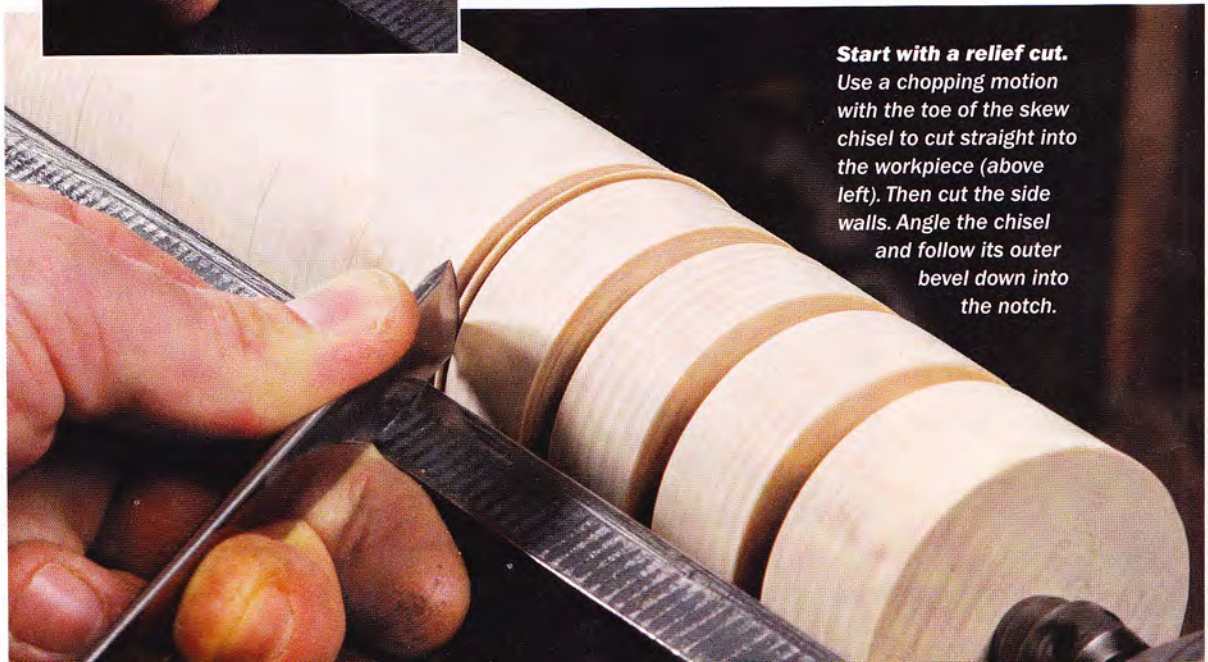
THE OVAL SKEW CHISEL HANDLES BOTH TASKS

The oval-shaped barrel is especially important for planing cuts, making it easier to pivot subtly on the tool rest and find that perfect angle of attack.

Exercise 2

Cut a row of V-notches

The V-notch is the easiest shape to learn, but the trick is to cut one consistently and confidently in three clean strokes.

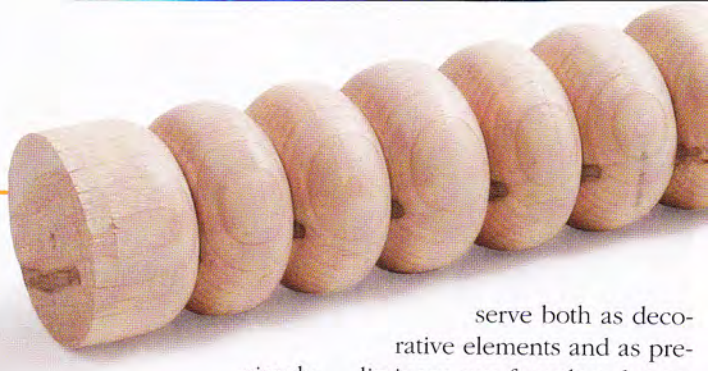


Start with a relief cut. *Use a chopping motion with the toe of the skew chisel to cut straight into the workpiece (above left). Then cut the side walls. Angle the chisel and follow its outer bevel down into the notch.*

Exercise 3

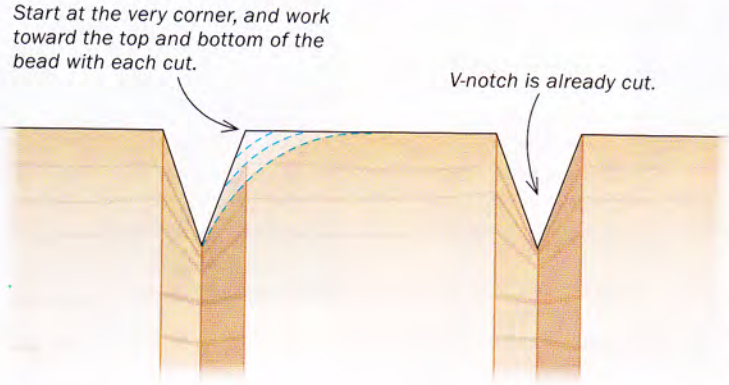
Learn two ways to cut beads

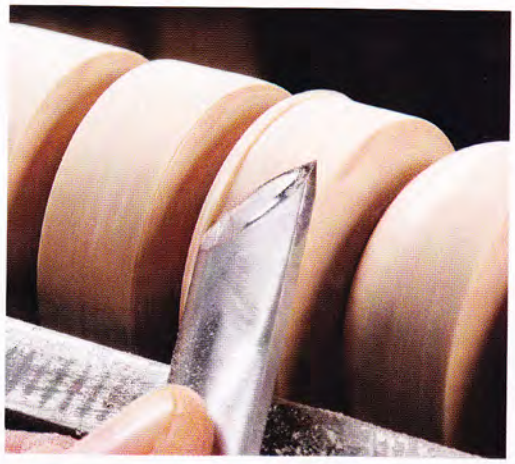
Beads are a fundamental shape in spindle turning. There are two ways to cut them, and each has its advantages. For both drills, start with one of the notched spindles you just made.



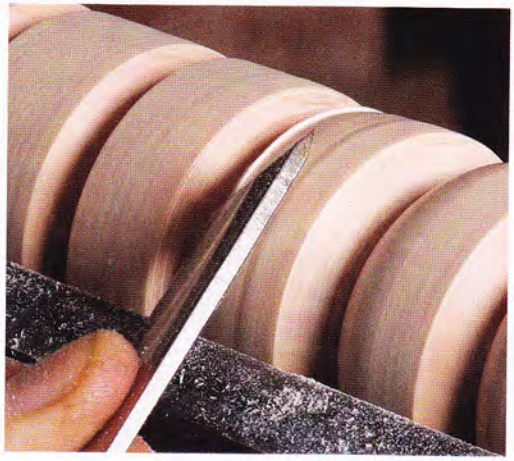
SKEW CHISEL IS EASIER

Once you have a handle on planing and cutting V-notches with the oval skew chisel, it's relatively simple to learn to cut a bead with it.





Lead with the heel. *Begin by taking a small cut on the corner of the V-notch, rotating the heel of the chisel to peel a thin shaving all the way down to the bottom. Remove a bit of wood with each pass.*



Pivot from the thumb. *Use the tool rest as a fulcrum when slicing through the wood. The motion looks and feels like a planing cut in which you ride the bevel. You'll need to move the handle away from the center of the bead to do so.*

simply shave away high spots at first. Subsequent passes will even out the surface. The shavings will become more uniform and continuous once the spindle is straight and smooth. To finish a skew cut, rotate or push the edge back up again so that the edge no longer contacts the round. Don't pull the tool away from the blank or lower the cutting edge; that will deepen the cut and could catch the edge.

Now try it in the other direction, this time planing away from your body. First use the rouging gouge to rough up your nice surface, and then switch to the skew for planing. It's a little trickier this way for new turners, who often block the handle as they position themselves. Rotate your body close to the lathe. This will let you angle the edge properly, and give you plenty of room to enter and exit cuts cleanly.

V-notches open the door to other shapes

For new turners, V-notches are a gateway because they serve both as decorative elements and as preliminary cuts for other shapes. Also, the V-notch is the easiest shape to learn—it takes just three short cuts with the toe of a skew chisel. To practice that, make a series of notches about 1 in. apart along one of your practice cylinders. Make a notch and move quickly to the next without recutting or cleaning up the last. The goal is to repeat the gestures until you develop a feel for them, moving seamlessly from one side of the V to the other. After a few blanks, you'll be able to do this handily.

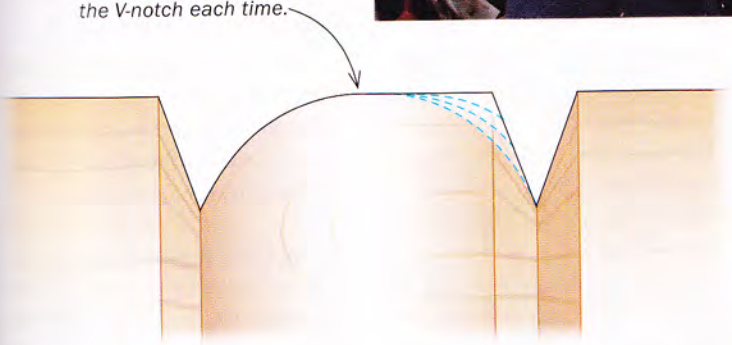
After making the relief cut in the center, rotate the chisel slightly to cut each sidewall. The outer bevel is the one that matters. Line it up with the cut you want to make, and then raise the handle of the tool to slice off a nice, clean ring of wood. If the chisel skitters one way or the other, rotate it in the other direction a bit more and try again. Just as with a planing cut, the skew must constantly travel forward to cut a V-notch without catching. You'll need to sidestep a little and get your torso out of the

Vertical limit. *With each pass, you'll start closer to the center of the bead, and finish with the tool more and more vertical until it's close to 90°.*

Photos, except where noted: Ken St. Onge; drawings: John Tetreault

SPINDLE GOUGE IS FASTER

You also can cut beads with a spindle gouge, a tool that hogs out material faster than an oval skew chisel but can leave just as smooth a surface.



way before making the cut that is closest to your body.

Skew can cut beads, too

To cut beads, start with your series of V-notches and use the same tool you've been getting comfortable with, the skew chisel. To develop consistency, practice cutting a row of half-beads along a cylinder that has a V-notch about every inch, and then come back and cut the other half-bead.

To enter the cut, lower the skew until the edge is about to contact the workpiece, then roll the heel of the skew toward the V-notch and lift the handle. Stay in contact as you roll around the bead by moving the handle sideways.

Here's a secret seldom told to new turners: The technique is much easier if you hold the tool so it's most comfortable at the end of the cut. In this case, it's important to keep the skew cutting high on the round, which is easier if you start with your hands in a slightly unnatural position. Hold the chisel with its toe pointing straight up. Then rotate it back to the starting position without changing your grip. Now you'll always be moving toward a more comfortable grip as you rotate the tool, and your motion will be much smoother.

By the way, I leave a nearly imperceptible flat on the center of my beads, so I have a good starting point for both sides of the cut. I finish it off afterward.

Cutting beads with a gouge

When cutting a bead with a spindle gouge, new turners often find the cutting motion tough to master, because it involves rotating the tool while simultaneously lifting the handle and swinging it sideways along the tool rest. Again, if you do the drill, you'll build the skill.

Start by cutting the left side of each bead, working down the entire row. The handle will swing away from you, which is easier. The process is the same

Righties, start on the left. *Start by cutting the left side of each bead (right side of the notch). That motion will be easier for you. Do a whole row.*

Now the right. *To cut a bead with a spindle gouge, enter the cut near the center and simultaneously roll the tool and ride the bevel down the side of the bead.*

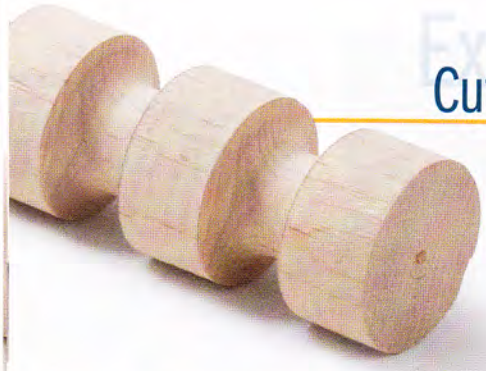
Tricky motion. *To keep the cutting edge engaged, you'll need to roll the tool sideways while both lifting the handle and moving it sideways.*

Finish on the side. *The gouge will end up tipped all the way onto its side on your final pass.*

Individual photos of tools and spindles: John Tetreault

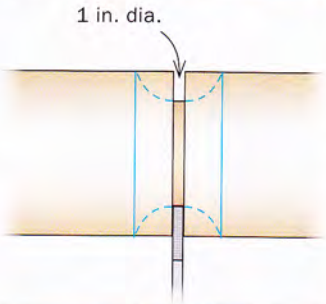
Exercise 4

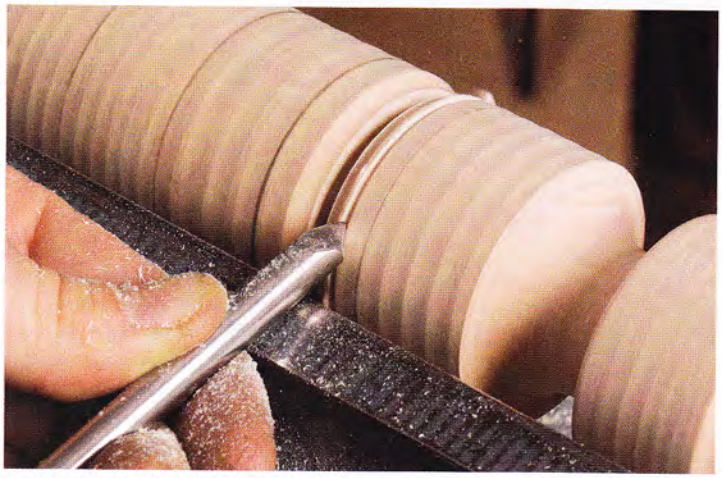
Cut a row of coves



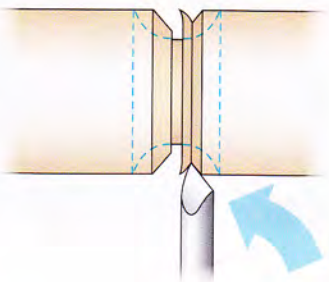
Unlike beads, you can practice coves on a straight cylinder and it's best to cut them one at a time.

Start with a pencil and a parting tool. *Mark pencil lines every 1 in. and make notches between them to roughly 1 in. dia. To use the parting tool, start by riding the bevel and then raise the handle to lower the tip.*





A few small cuts in the middle. *Holding the gouge on its side, take shallow cuts on each side of the parting-tool cut. Enter the cut by rolling the gouge back toward level while pushing it forward in a scooping motion. Keep the bevel of the gouge bearing on the wood as you roll and push.*



for cutting right-side beads, but it requires you to step a little farther to the left to get your body out of the way as you swing the handle of the tool toward you.

Back to that turner's secret again, where you start off a little awkward and move toward comfortable. For a right-side bead, this means you should grip the gouge so the flute faces all the way to the right before putting it in position to start the cut.

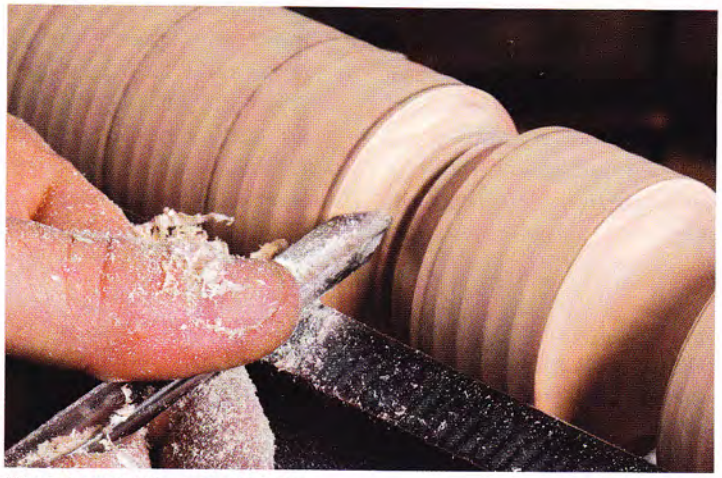
Cutting coves with a gouge

To cut coves, the concave shapes found in all types of spindles, you'll use the spindle gouge in a maneuver that looks similar to cutting a bead in reverse. As with beads, the choreography is tough to get used to at first. You'll practice cutting two sides from the same position, and the entire spindle will be less likely to vibrate and chatter if it's thinned out in only one place at a time. Lay out the ends of the coves by penciling a line every inch and then get the cove started by using a parting tool to size the diameter between the marks down to 1 in.

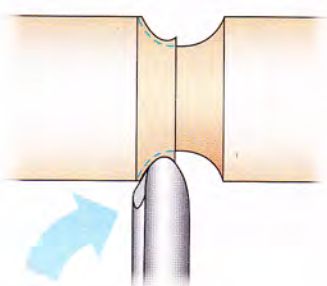
Making a cove cut is like scooping wood out of the spindle, working toward the middle in ever-widening scoops until you reach the pencil line. Finish each cut before you encounter any end grain that's exposed on the other side of the cove, which will cause a catch. Work back and forth, making passes on the right and left until the cove is done before moving on to the next one. As before, it helps to grip the gouge so that your hands are in a comfortable position at the end of the cut. Your body needs to be out of the way, too.

Bring it all together

After practicing the basic shapes, you're ready for a more complicated shape. I have students bring them together into a series of alternating beads and coves, each shape beginning and ending at a crisp shoulder line. Here, the goal is to create consistent shapes and move fluidly from one to the other without



Work toward the pencil lines. *Scoop out the sides of the cove, working from side to side to widen and deepen the shape. Continue feeding the cutter forward to raise it out of the cut.*



Exercise 5

Put it all together

Use another one of your practice cylinders. The goal is crisp transitions between each element.

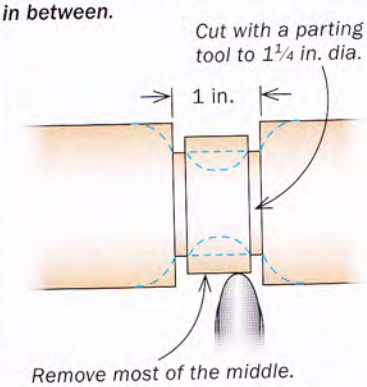
cutting into the shoulder. For a workpiece, rough down one of the practice pieces from earlier. I tell students to aim for about a 2-in.-dia. cylinder, but being exact doesn't matter, as long the diameter is consistent and thick enough to leave the bottom cove at least ¾ in. thick. Any thinner and the spindle could flex, causing chatter as you cut.

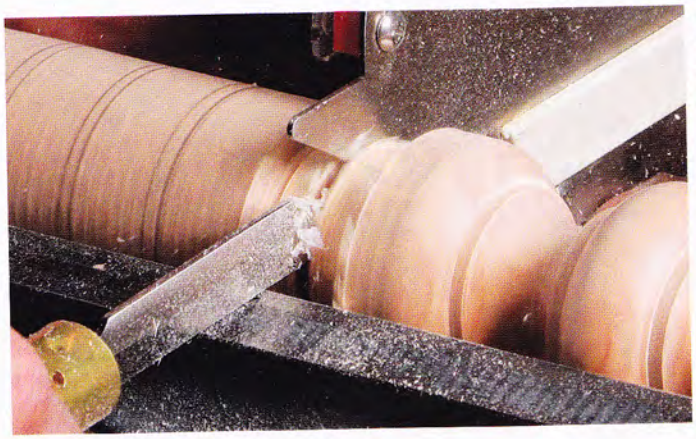
Locate the shoulder lines by making a pencil line every inch, down the entire workpiece. But once again, you will work one section at a time to avoid excessive vibration. That section will consist of a half-bead, then a shoulder cut, a full cove, a shoulder cut, and then a half-bead.

Start each section by cutting a pair of shoulder lines down to 1¼ in. dia. Then remove most of the waste between them with the spindle gouge, stopping just before you reach the depth of the shoulders. The slightly proud surface gives a reference point to begin the cove cuts. Cut the beads last, smoothing them with the skew chisel if needed. If your gouge is sharp, they probably won't need it. And remember, it's just practice. □

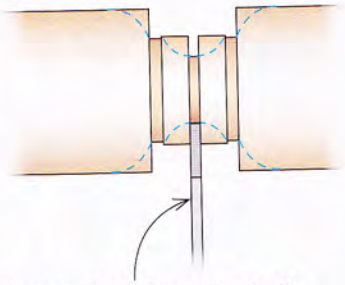
Peter Galbert is a chairmaker in Sterling, Mass.

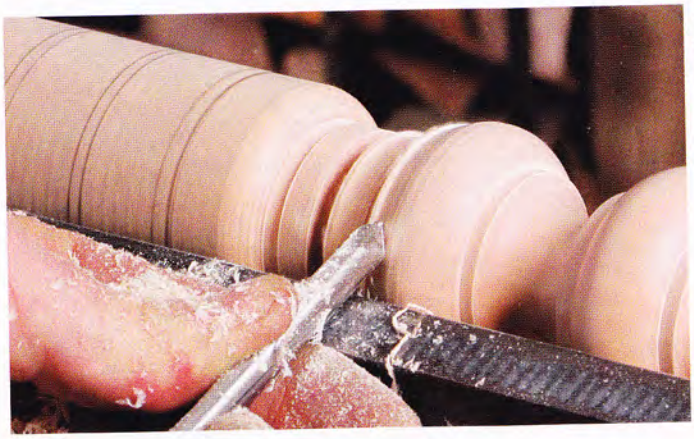
Map out the spindle and excavate. *Use two parting-tool cuts to define the shoulders, and the spindle gouge to remove most of the waste in between.*



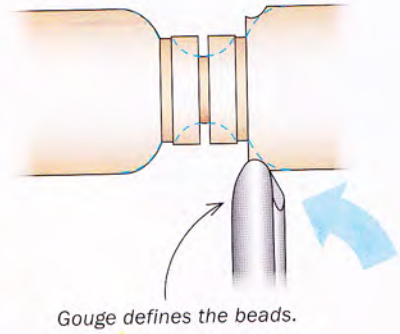


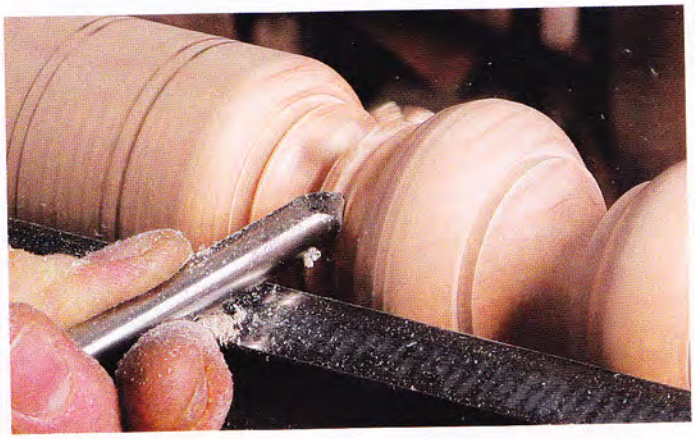
Define the center. *Use a parting-tool cut to define the depth of the cove at roughly ¾ in. dia.*



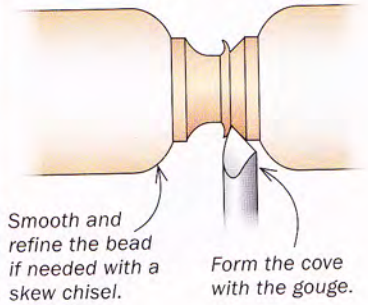


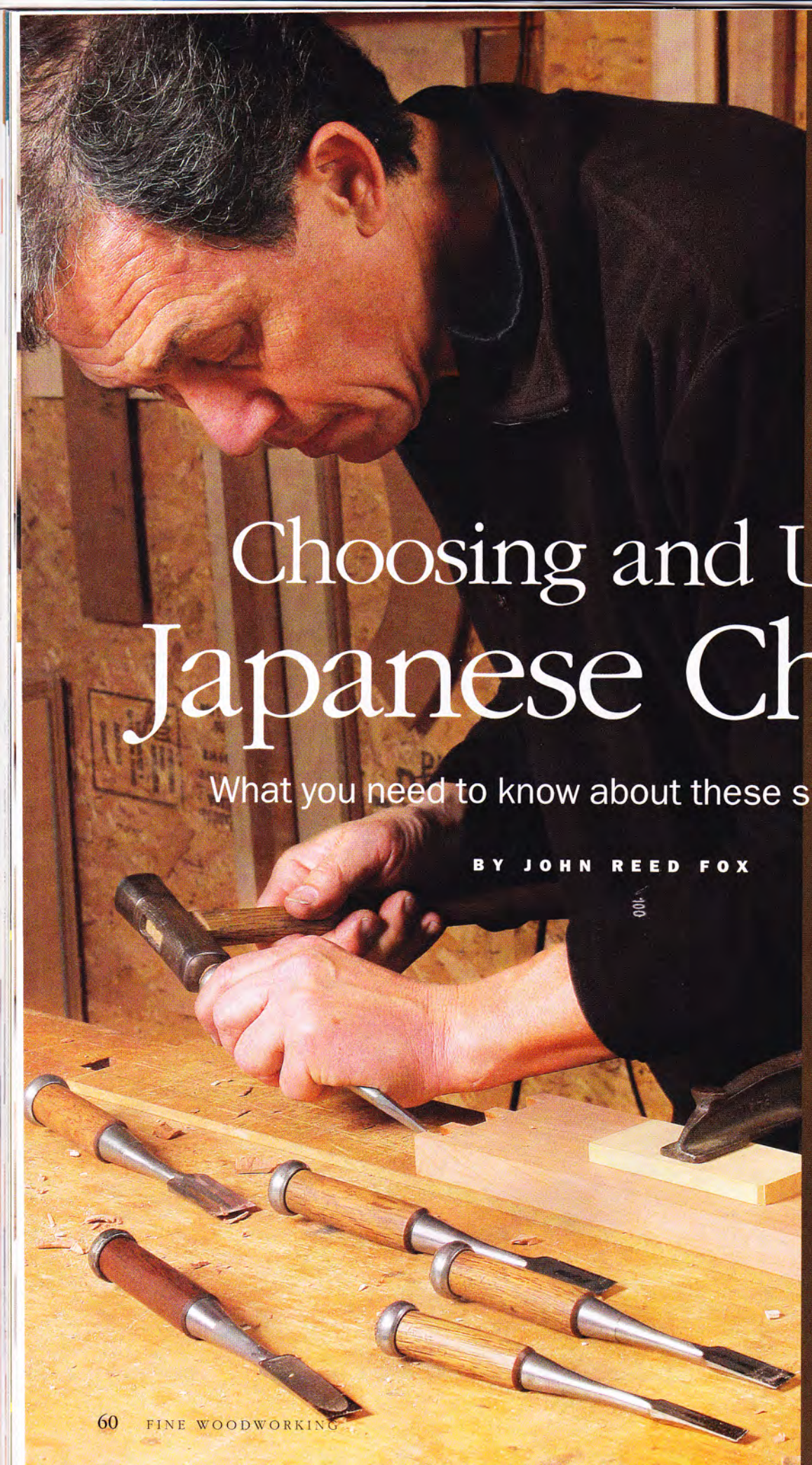
Beads first. *Stick with the gouge, shooting for a clean, sharp transition to the flat shoulder.*





Now the cove. *To avoid excessive vibration, hollow out this section last. If the beads are rough, plane them a bit with the skew chisel.*





Choosing and Using Japanese Chisels

What you need to know about these superior tools

BY JOHN REED FOX

The machine area of my shop is stocked with Western woodworking machines. But over at my workbench, all the hand tools are Japanese. Just as it's hard to beat hefty Western machines, I think Japanese hand tools clearly outperform their Western counterparts. When it comes to chisels, the Japanese variety takes a sharper, more durable edge than Western chisels; these tools simply work better and for a longer period of time.

What makes them so good?

Japanese chisels, like other Japanese edge tools, are laminated, and this is the key. A thin layer of very hard and finely tuned high-carbon steel—the cutting edge—is forge-welded to a thicker piece of iron or low-carbon steel that forms the body of the blade. The thick layer of softer metal provides mass and shock dampening and prevents the hard, brittle steel from fracturing.

When you buy a new Japanese chisel, there's some setup to do before you can put it to work—flattening the back, creating the cutting bevel, and setting the hoop (for an explanation of that process, see p. 24). Here I'll explain the anatomy of Japanese bench chisels, walk you through the various types, and give you guidelines and specific suggestions for which chisels to buy. Good-quality Japanese chisels are still made one at a time by individual blacksmiths in small shops, and I like the idea that while buying the best tool I can find I'm also helping keep an age-old craft alive.

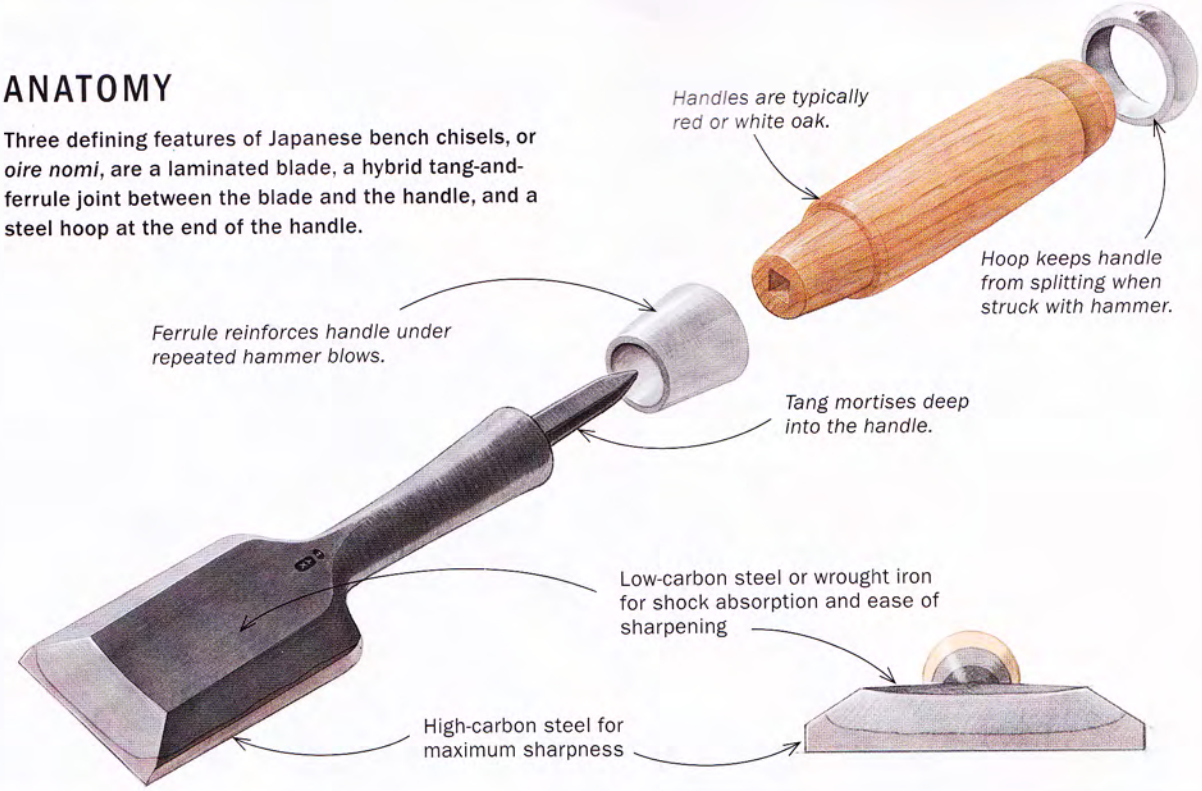
Photos: Michael Pekovich

Basic features

Nearly all Japanese-style chisels share a common anatomy, give or take the hoop, which is not found on dedicated paring chisels. But there are interesting variations in the blades, some significant and some not.

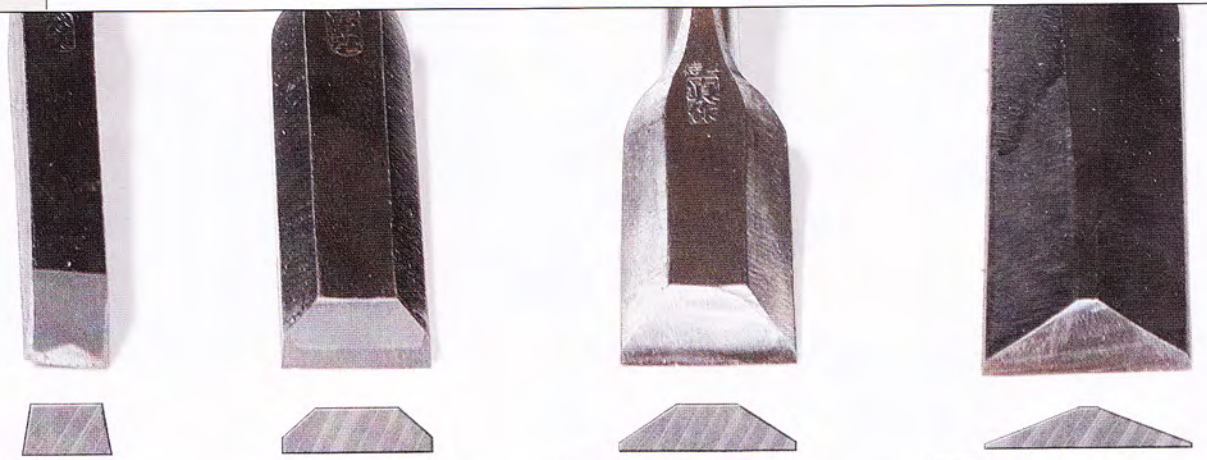
ANATOMY

Three defining features of Japanese bench chisels, or *oire nomi*, are a laminated blade, a hybrid tang-and-ferrule joint between the blade and the handle, and a steel hoop at the end of the handle.



PROFILES

The Japanese bench chisel comes in a variety of blade profiles. These are four of the most common and useful.



KAKA UCHI

An old style with only slightly raked sides, this profile delivers maximum power for chopping but is less versatile when paring.

MENTORI

The most common blade profile, it combines heft for chopping and striking with side bevels for paring access.

KINARI

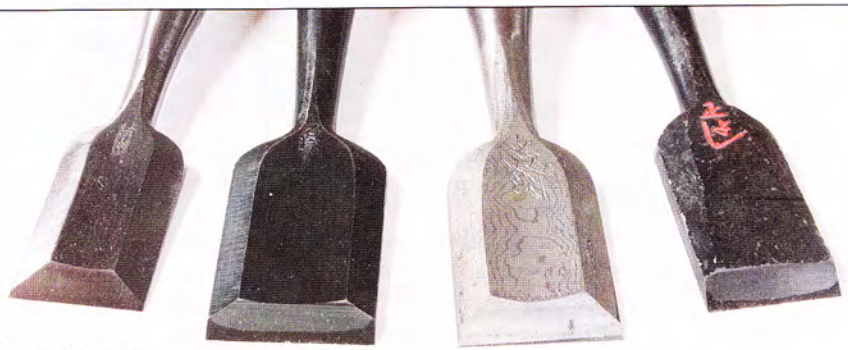
With longer bevels than the *mentori*, this more delicate profile is excellent for paring dovetails but still retains enough mass for effective chopping.

SHINOGI

The low, wide-beveled blade profile affords excellent access when paring in tight spaces. It is used only on push chisels—unhooped chisels not meant for striking.

BACKS

You'll find one or more hollows on the back of a Japanese chisel. They make flattening and honing the hard, high-carbon steel back easier.



FINISHES

Depending on the maker, the body of a Japanese chisel may be finished in a variety of ways. The finishes are decorative and don't affect functionality. From left: polished, or file-finish; black; *mokume*, or wood-grained; and hammered.

Drawings: John Hartman

SPECIALTY CHISELS ABOUND

Japanese chisel-makers still produce a wide array of specialty chisels for Japanese craftsmen plying traditional trades. Here are a few that are useful on the Western workbench. From left: a long *shinogi* push chisel for paring; a *hiramachi* chisel for access to tight spaces; a crankneck chisel for cleaning the bottoms of dadoes and sliding dovetails; a heavy mortise chisel for chopping mortises; and a very wide chisel for paring or chopping.

Fishtail chisel is worth reeling in. *With its flared blade, the* bachi nomi *is superb for getting at otherwise inaccessible corners while paring.*

Using a Japanese chisel

Using Japanese chisels doesn't present anything like the radical shift users experience when going from Western to Japanese planes and saws. Japanese bench chisels are generally shorter than Western chisels and have a different feel and balance, but you'll work with them in the same ways.

One slight difference in use is due to the hollows on the back of the blade. When you are paring with a Japanese chisel and the back is registered against a flat surface, you have to adapt to the fact that you don't have the full width to ride on as you would with a Western chisel. Also note that Japanese chisels should never be used with a prying motion, as this action risks breaking the edge.

Sharpening the laminated blade may actually be easier than what you're used to. Because the thin steel cutting edge needs to be fully supported, the bevel of a Japanese chisel shouldn't be hollow-ground or given a microbevel—the whole bevel stays flat and the whole thing is honed at each sharpening. But since the backing iron is soft, sharpening the bevel on stones is quick. And dispensing with the grinder simplifies the sharpening process.

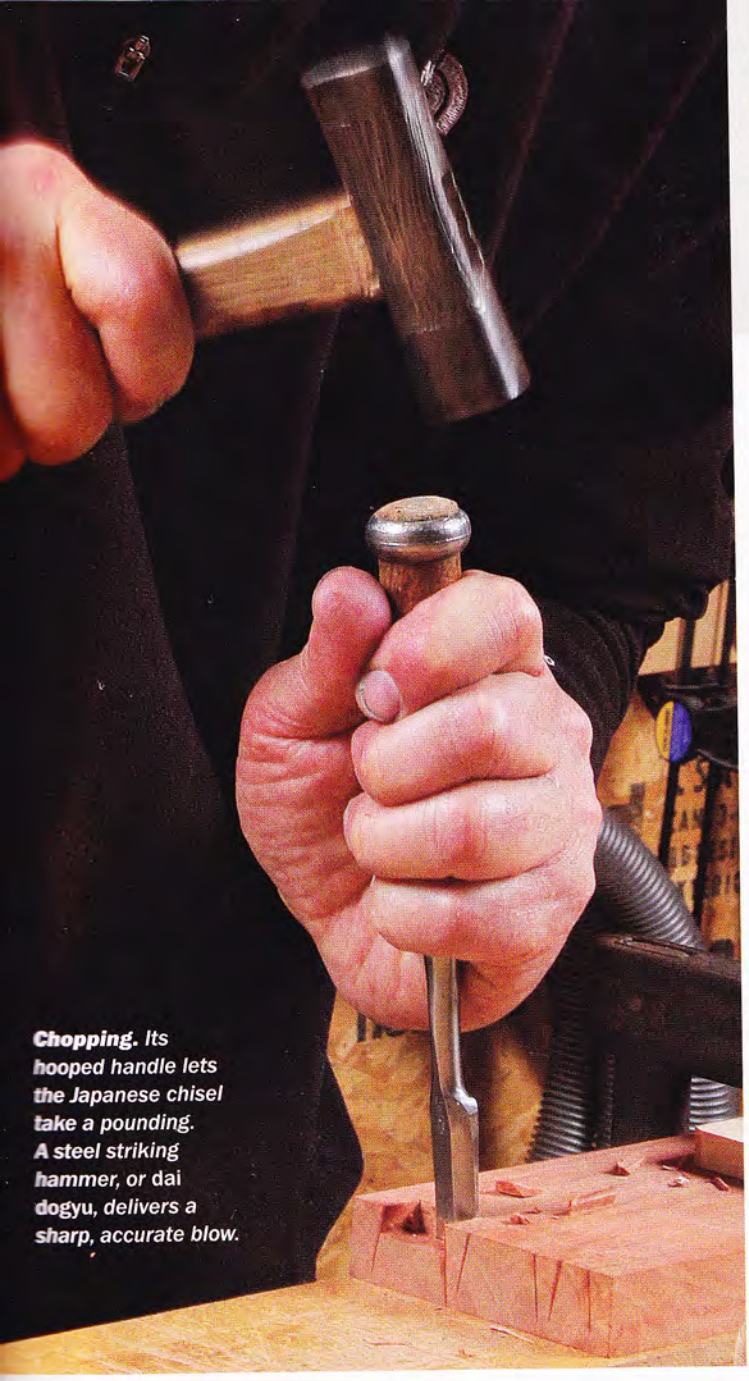
If you use a mallet with your chisels, you might consider getting a Japanese hammer to use with these chisels. The hoop at the end of a Japanese bench chisel keeps the wood from splitting when it's struck with a metal chisel hammer. These hammers are lighter, smaller, and easier to control than large wooden mallets, and deliver a more accurate blow.

Choosing a chisel

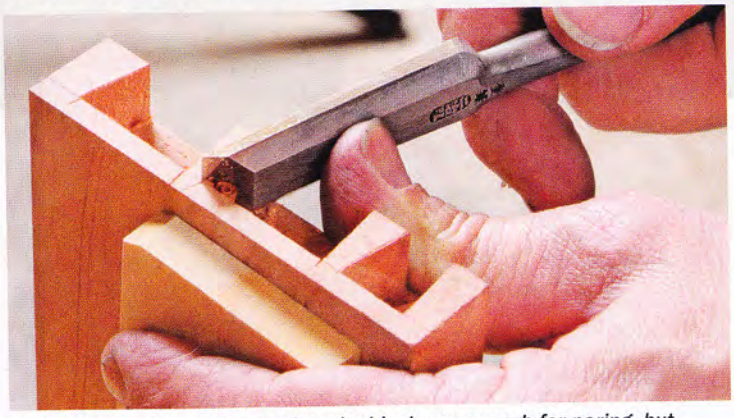
Although there's no real learning curve in using a Japanese chisel, it will have a subtly different heft and feel in use than a Western

Using Japanese chisels

With their super-sharp blades and hooped handles, Japanese chisels perform both chopping and paring tasks with ease and accuracy.



Chopping. *Its hooped handle lets the Japanese chisel take a pounding. A steel striking hammer, or* dai dogyu, *delivers a sharp, accurate blow.*



Precision paring. *Japanese bench chisels are superb for paring, but shouldn't be used with a prying action, which could chip the very hard cutting edge.*

Specialty tools in action. *The* shinogi *push chisel (above) excels at paring wide recesses like hinge mortises; the ultra heavy duty* tataki *(right) excels at hand-chopping large mortises.*

one. If you are new to these chisels, consider buying one in a size that you use often and working with it for a while to see how you like it. If you prefer it, I still wouldn't advise buying a full set unless cost is no object. You get almost no discount for buying a set of 10 and you pay a hefty premium for the larger sizes. Instead, I'd buy five or so in the sizes you use most. For me, that would be: 3mm (⅛ in.), 6mm (¼ in.), 9mm (⅜ in.), 12mm (½ in.), and something wide like 24mm (1 in.) or 36mm (1½ in.). Japanese chisels are usually sized metrically, and are slightly narrower than their imperial equivalents. The smaller widths—⅛ in. to ½ in.—are good for the relatively small dovetails I use on drawers. The ¼-in. and ½-in. chisels are also good for squaring mortises cut by machine. And having one or two wider chisels is nice for larger dovetails and larger mortises. All these chisels would work well for the various paring tasks that come up while making furniture.

Depending on need, you could fill out the set over time. Or use the money not spent on a complete set of bench chisels to buy some specialty chisels. Because hand-tool use is still a living part of the woodworking culture in Japan and because much of the woodworking there is highly specialized, there is a wide variety of chisel types.

You could get a wide *shinogi*-style push chisel, which is great for general-purpose paring (and not meant to be struck); a crank-neck chisel with a short foot for cleaning the bottoms of dadoes; a heavy mortising chisel for hand-chopping large mortises; or a fishtail-shaped chisel, or *bachi nomi*, for working in tight spaces like the hard-to-clean rear corners of half-blind dovetails.

Steels and handles

The cutting edge of Japanese chisels is usually made from either "white steel," which is a very pure high-carbon steel, or "blue steel," which is white steel to which tungsten and chromium have been added to make the steel tougher. The names white and blue steel have nothing to do with the color of the metals—they refer to

Buying guide

Japanese chisels fall into three general categories according to cost.

LOW END ($20–$40)

In this range, the maker's name will not be known—possibly because the tools are mass-produced. The handle may be dyed to mask inferior wood, and poorly fitted to the ferrule. Blades may be stamped from sheet material and painted. Cutting steel may be soft and abrade away quickly. Hollows may be ill-formed. Blades won't get as sharp as better brands and will lose their edge more quickly.

MID RANGE ($60–$300)

Although made one at a time in small shops and typically attributed to a particular blacksmith, these chisels offer the best value to furniture makers. Made with high-quality white or blue steel tempered to Rockwell c65 or higher, they should take a razor-sharp edge and hold it. Care in the making will be evident in the even shape of the hollow, a clean lamination line, a graceful transition from the neck to the body, and the fit of the handle to the ferrule.

HIGH END ($500 AND UP)

Some Japanese tools are treated as art, and with collectors in the picture, prices can get stratospheric. The provenance of a chisel—whether the blacksmith is a national figure—and features like folded-steel blades, exotic handles, and rustic, hammered surface treatments can increase the value of a chisel, but they don't improve its performance.

A few great models to start with

For workmanlike chisels of excellent quality, I suggest the Fujihiro brand (far left in photo), made by Chutaro Imai. "Workmanlike" is a compliment; these chisels are similar in quality to the ones I've been using for over 30 years. Made with white steel, they sharpen easily to a very durable edge. Well-crafted and finished, they come in the *mentori* profile and have red-oak handles and nice hoops. They are available with single or multiple hollows. A ½-in. (12mm) chisel is $71 from Hida Tool (hidatool.com) in Berkeley, Calif.

The next level of chisel, in my experience, takes an even sharper edge and holds it longer. An example is the Sekiryu brand (a 36mm Sekiryu is at center in the photo). These chisels are branded for Hiraide Tools (a large Japanese distributor), so the blacksmith's name is unknown. They are nicely made with an exceptionally clean back face, white-oak handles, and black finished metal with a *kinari*-style profile. They have wide side bevels for good access to tight spaces but are still robust enough for striking hard. Easily honed to a sharp and durable edge, a ½-in. (12mm) Sekiryu is $92 from Harrelson Stanley at japanesetools.com (or call 877–692–3624).

If price was no object, I'd buy all my chisels from father-and-son blacksmiths Akoi and Michio Tasai. At the very top of their craft, they make chisels in an array of finishes and styles (their *shinogi* paring chisel is at right in the photo). The standard Michio Tasai cabinetmaker's chisel, or *oire nomi*, with a *mentori* profile is beautifully made from yasuki, a type of blue steel, and has a black finish and red-oak handles. It will take an incredibly durable edge. This is about the highest level of chisel that I would actually use. A ½-in. (12mm) Tasai costs $162 at Tomohito Iida (japantool-iida.com), a wonderful Osaka dealer that carries many other fine tools.

the paper that the steel comes wrapped in from the mill. There are different grades of both white and blue steel. White is said to take a sharper edge, blue to hold it longer in use. In my experience, either kind can make an outstanding chisel. One of my favorite chisels is made with #1 white steel. It's easy to sharpen, holds a great edge, and is fairly durable. But I also have chisels made with blue steel that perform similarly. To me, the skill of the blacksmith is more important than the choice of steel.

Japanese chisel handles are often made from red or white oak, but boxwood, gumi, ebony, and rosewood handles are also fairly common. All except the ebony and rosewood are strong, tough, and resilient enough to make excellent handles. I find rosewood and ebony too brittle for chisels that will receive hammer blows, but they are fine for push chisels, which are meant only for paring.

A word about prices

Good Japanese chisels are not cheap. They start at about $70 apiece. But these tools are hand-forged by blacksmiths drawing on years and usually generations of experience who are at the top of their craft. They are using materials that are difficult to work and expensive. And they are creating arguably the finest tools of their kind. I'm constantly surprised that they don't cost more.

That said, in Japan there is definitely a level of "tools as art," and there are collectors around the world who buy them. It is not necessary—and it may be counterproductive—to go to that level to find a wonderful tool. For me, the most beautiful tools are those that perform their jobs the best. □

John Reed Fox is a woodworker in Acton, Mass.

Side table. *When the table is in the closed position, the rear leaf lies on top of the front one.*

Expanding Table
Looks Great Open or Closed

Hinged side rails are the secret

BY GREG BROWN

The problem with most expanding card tables is that they either look good when open or when closed, but rarely both, and sometimes neither. If the legs are symmetrical in one position, they usually aren't in the other, and in either position they may get in the way of the user or not provide optimum support.

I recently made a card table designed by Thomas Chippendale whose base expands and contracts with no compromise in appearance, strength, or utility. What's more, the mechanics can be used on almost any small table design. Whether you are looking for a traditional card table or a contemporary table for a small kitchen, you can adapt it to multiple uses, with no compromise of form or function.

Greg Brown is a professional woodworker in Deerfield, N.H. His website is gbwoodworks.com.

Pull back the legs. *To expand the table, lift the rear apron slightly and pull it backward. The hinged side aprons unfold smoothly.*

Slide the shelf and unfold the leaf. *To lock the side aprons open, you pull an internal panel forward. Then swing open the top leaf.*

Table for four. *The table now seats four comfortably, and the aprons look seamless.*

Photos: Mark Schofield

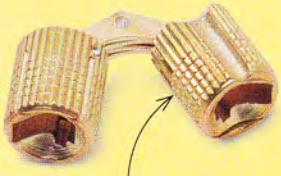
Anatomy is simpler on standard tables

This ingenious accordian mechanism gets even simpler when you don't have to contend with fancy legs like those on Brown's Chippendale-style table. For a standard table base, the folding sections can be hinged directly into the legs, offering a more seamless look. In either case, the overall length of the expandable table sides shouldn't be much more than 36 in., or you risk overloading the hinges. The fixed sides can be as long as you like.

TOP FOLDS ON CARD-TABLE HINGES

Traditional card-table hinges are mortised into the two halves of the tabletop.

BARREL HINGES ARE A HIDDEN OPTION



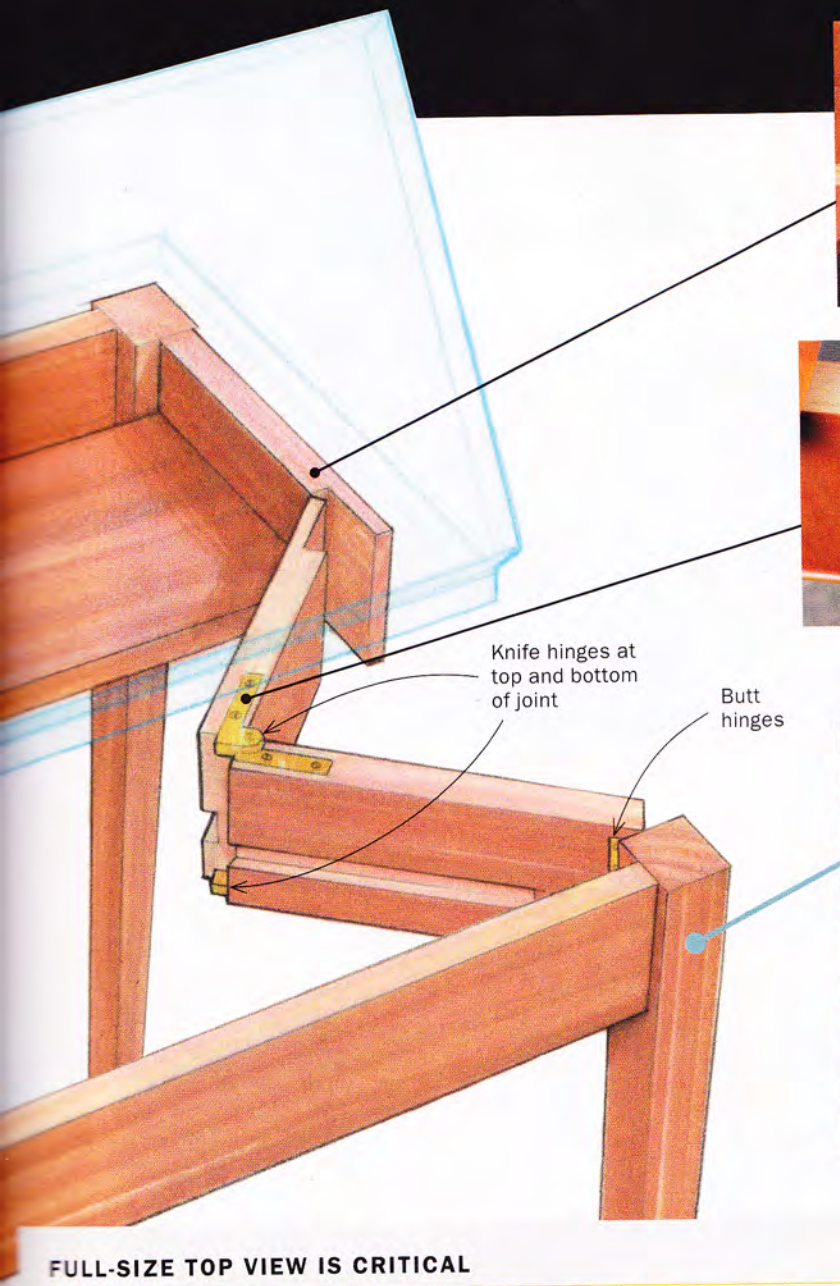
Soss barrel hinges

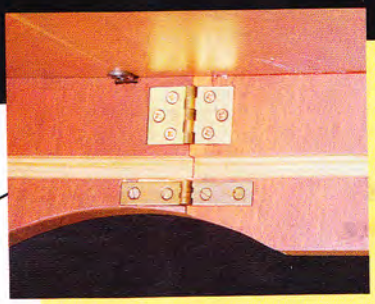
For a cleaner, more contemporary look, *FWW* contributing editor Michael Fortune suggests a series of 16mm Soss barrel hinges from Lee Valley, spaced 4 to 5 in. apart.

SLIDING PANEL LOCKS THE SIDES

An internal panel slides forward in grooves to lock the side aprons open when they are unfolded.

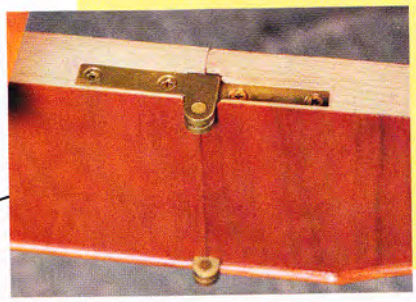
Drawings: Bob La Pointe





SIDES PIVOT ON BUTT HINGES...

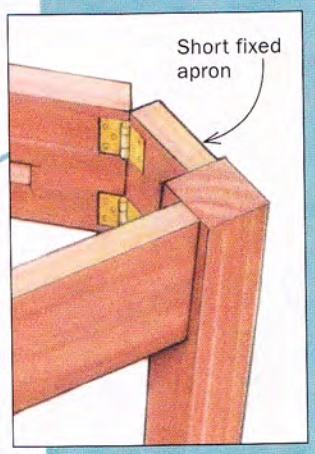
Brown attaches butt hinges in their open positon as shown, but mortises them into the surface to place less stress on the hinge screws.



...AND MODIFIED KNIFE HINGES

Brown reverses one leaf in these knife hinges so they can pivot toward each other. This also points both sets of countersinks in the right direction.

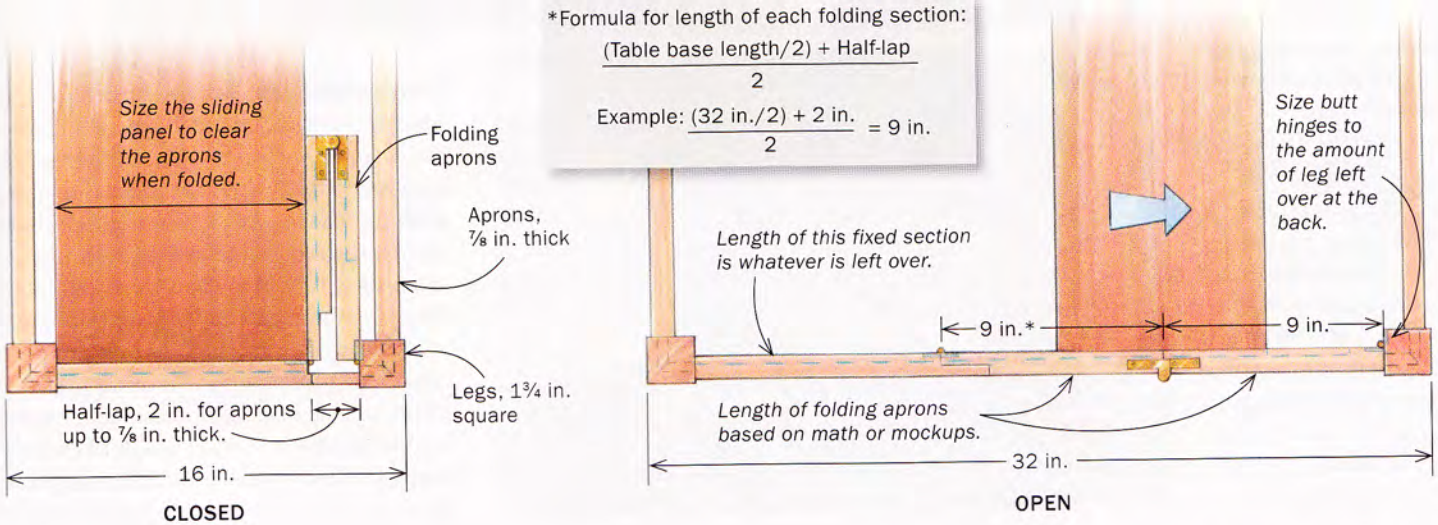
Tweak the design for cabriole legs



On his Chippendale table, Brown added a short fixed apron before the folding ones, to allow for the curved transition to the cabriole leg. The rest of the anatomy is the same.

FULL-SIZE TOP VIEW IS CRITICAL

The dimensions below are for a typical square table, close to the author's in size. If you need a different size or shape, be sure to make full-size drawings. Do the math to determine the length of the folding sections, or create mockups using the hinges. The key is that the overall length of the base, including the legs, is exactly half when it is in the closed postion. That will keep your tabletop overhang consistent.



A Unique Cutting Board

When I was asked to make a cutting board as a special gift, I wanted to do something new and eye-catching. Tired of squares and straight lines, I envisioned curving accents—not shallow inlay, but strips extending through the full thickness of the board so they would be visible on the top, bottom, and both ends. I drew some flowing S-curved lines, and one soon overlapped another. I liked the way they looked, but I thought, how am I going to make all the curved pieces nest together perfectly?

When I broke the process down, it was actually quite simple. I make the through-inlays as bent-laminations: Each accent line is made of thin, flexible strips sandwiched together to look like a solid piece of wood. The critical step is getting the solid parts of the cutting board to fit together. After routing a shallow groove in the blank using a curved template, I bandsaw most of the waste from the groove and use a flush-trimming bit to remove the rest from each half. When I add the inlay strips, the curves match exactly.

Although the three lines of through-inlay in my cutting board differ in thickness and appear to have different shapes, I use a single template to do all the routing required to establish their paths. I trim the inlays flush once they are glued in. So far, I've only used the technique on cutting boards, but I can also imagine using it on chair backs, box lids, or cabinet doors.

Online Extra

For a free, fun video of Lewis making one of these cutting boards, go to **FineWoodworking.com/extras.**

One template guides the routing

I create the through-inlays one at a time—gluing in the first one, then trimming it to length and flushing it off before beginning work on the second. I use different diameter router bits for each inlay, but just the one router template. By flipping the template and moving it laterally, I get different results for each line of inlay.

To design the curves, I sketch freehand right on the cutting-board blank, keeping in mind that I will have to bend the strips to that shape, so the curves can't get too crazy. And to avoid problems with

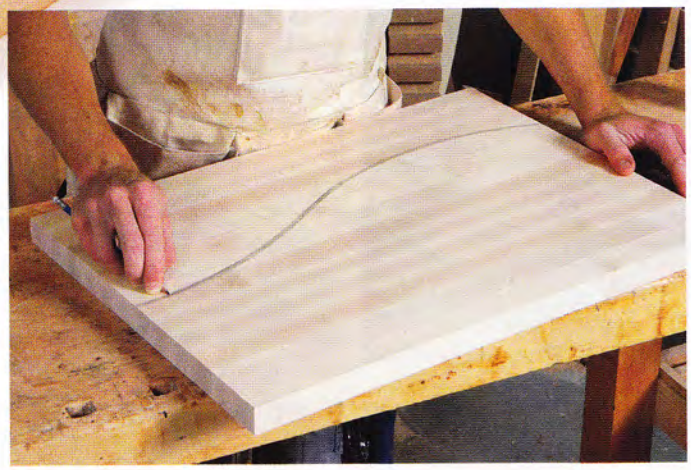
Photo, this page: Kelly J. Dunton

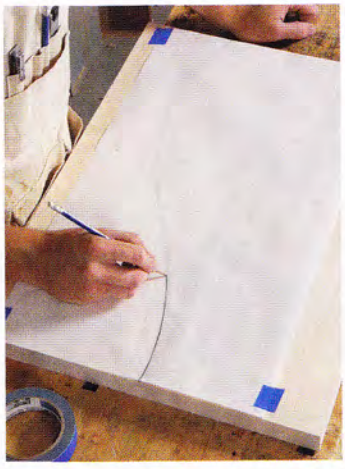
Clever process creates innovative inlay

BY SCOTT LEWIS

Thin strips make sweet curves. *Lewis uses sandwiches of ⅛-in.-thick strips to create the S-curved stripes that pass through the entire board.*

ONE TEMPLATE HANDLES ALL THE CURVES



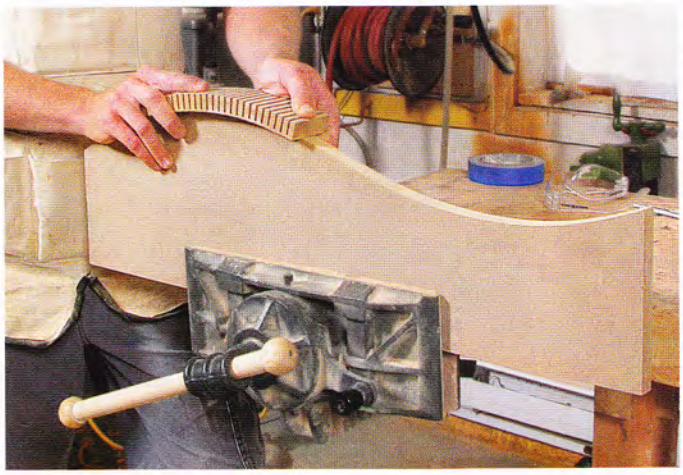


Sketch a pleasing curve. *Lewis begins by sketching an S-curve freehand on the cutting-board blank (far left), keeping it roughly parallel with the grain. He transfers the curve to tracing paper (left), which he tapes to ¾-in. MDF and bandsaws out to make a template.*

wood movement, I keep the inlay curve roughly parallel with the grain of the cutting board.

When I have a curve I like, I transfer it to a piece of tracing paper cut to the size of the cutting-board blank. Then I tape the paper to a piece of ¾-in. MDF and bandsaw along the line. So that the router will be supported at the beginning and end of the cut, I make this template several inches longer than the cutting board.

For tight gluelines, the curves of the template must be free of bumps and dips, so I bandsaw carefully and sand with a flexible

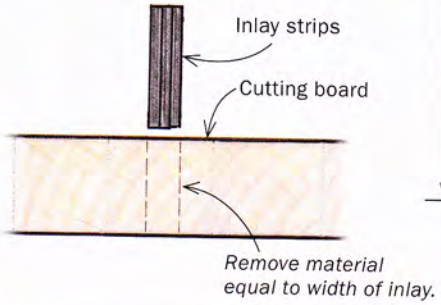


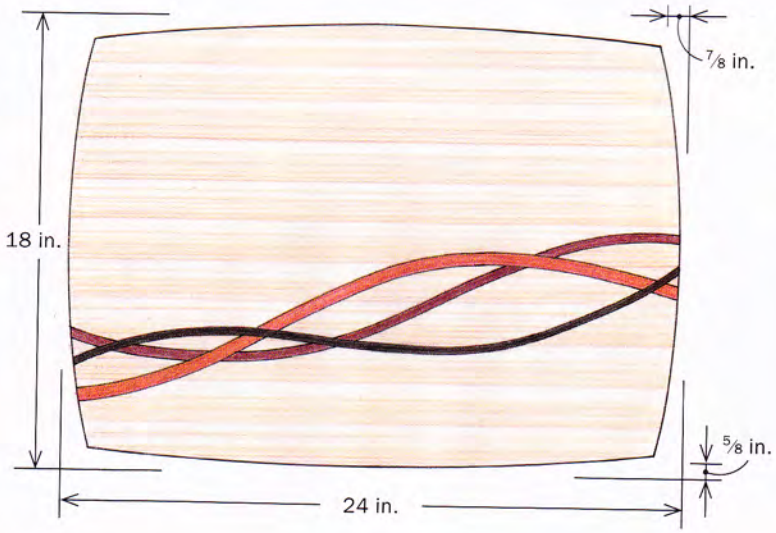
Make it smooth. *Fairing the template's curves is vital, since any bumps could be visible in the inlay gluelines. Lewis used the tablesaw to cut slots in a piece of MDF, creating a pliable sanding block that conforms to convex and concave curves.*

CUT THE BOARD APART

MAKE ROOM FOR THE INLAY

By routing away the same amount of material he is adding, Lewis ensures perfectly mating curves and tight gluelines. It's vital to start with a blank that's dead flat so that everything goes back together properly.

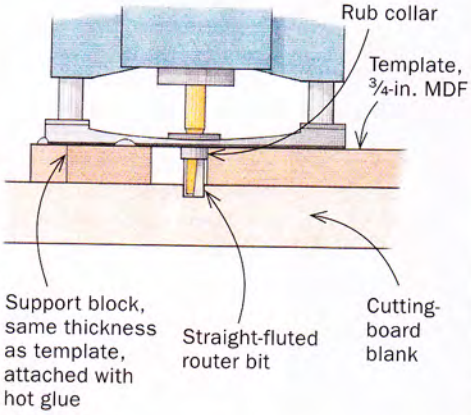


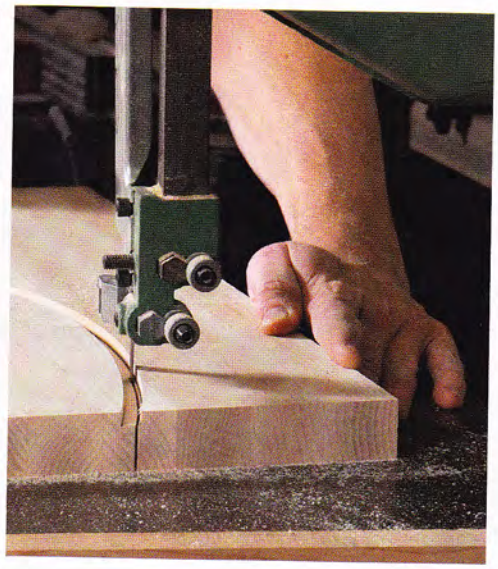


Varying the inlay thicknesses yields a more interesting pattern. You need a different router bit for each thickness you want to include.

1. ROUT A GROOVE

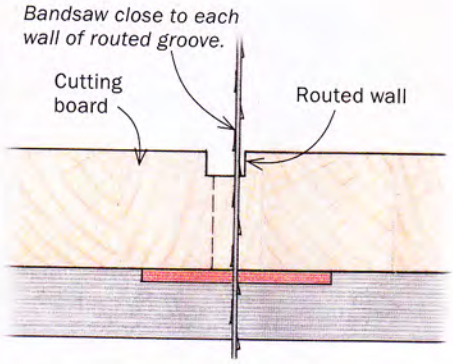
Template-routing a 1/4-in.-deep groove creates smooth, accurate reference edges for the next steps. Get to final depth in multiple passes.

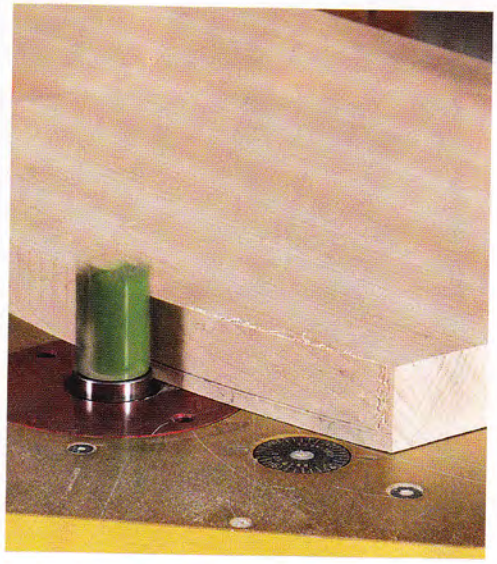




2. SAW OUT THE CENTER

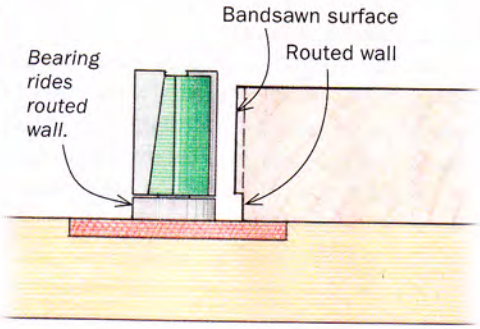
Before sawing, Lewis darkens the corners of the groove with a pencil for visibility. Then he carefully bandsaws the waste, staying 1/16 in. away from each wall of the routed groove.





3. FINISH WITH A FLUSH CUT

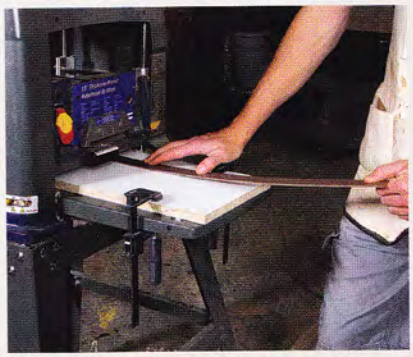
Placing the workpiece groove-side down on his router table, Lewis flush-trims the bandsawn surface with a 1-in.-dia. straight bit, guided by a bottom bearing.



Photos, except where noted: Jonathan Binzen; drawings: Vince Babak

GLUE IT BACK TOGETHER

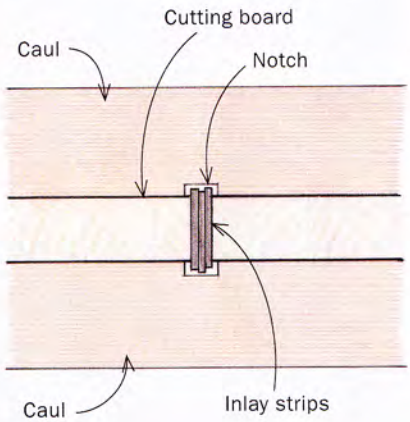
FIT THE STRIPS

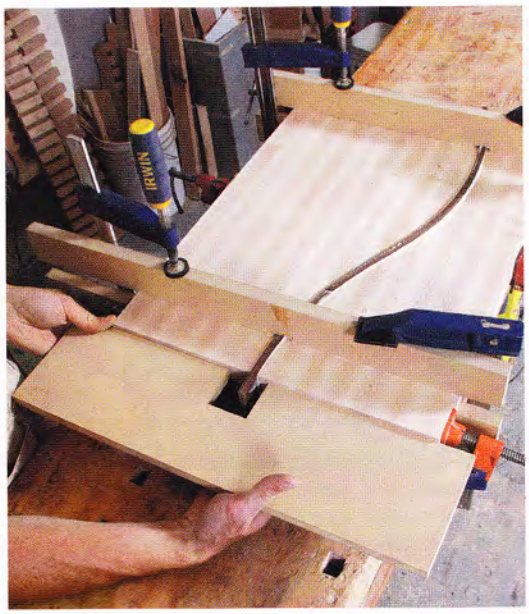


Dial in the thickness. *Lewis uses melamine-coated MDF as an auxiliary bed (above) to keep the thin strips from getting chewed up in the planer, bending the strips to create downward pressure at the point of the cut. A straight groove cut in a piece of scrap (right) tests the pack of strips for a perfect fit.*

This glue-up takes some guile. *A quick-grip clamp, with its pump action and long travel, is ideal for making the flat strips conform to the S-curve (above).*

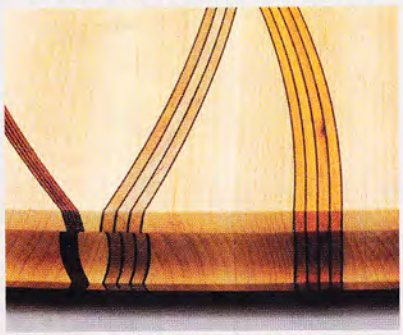
Hold it flat. *Cauls with shallow notches center the inlay strips. Lewis uses a deep-reach clamp (left) to adjust end-to-end alignment of the cutting board's halves.*





Verify the alignment. *Before putting on the final pipe clamps, Lewis uses a notched piece of MDF (left) to make sure the halves are lined up perfectly.*

ADD VARIETY WITH PIN STRIPES



For a jazzy alternative, try adding thin commercial veneers between each of the thicker strips.

sanding block. If you mess up a template, you can try again with the offcut.

To prevent the router from tipping while using the template, I hot-glue a ¾-in.-thick piece of scrap to the router base. I rout the paths for the through-inlays in a number of shallow passes. When the groove is about ¼ in. deep, I bandsaw first along one wall of the groove and then the other, leaving just a bit of waste to clean up on the router table.

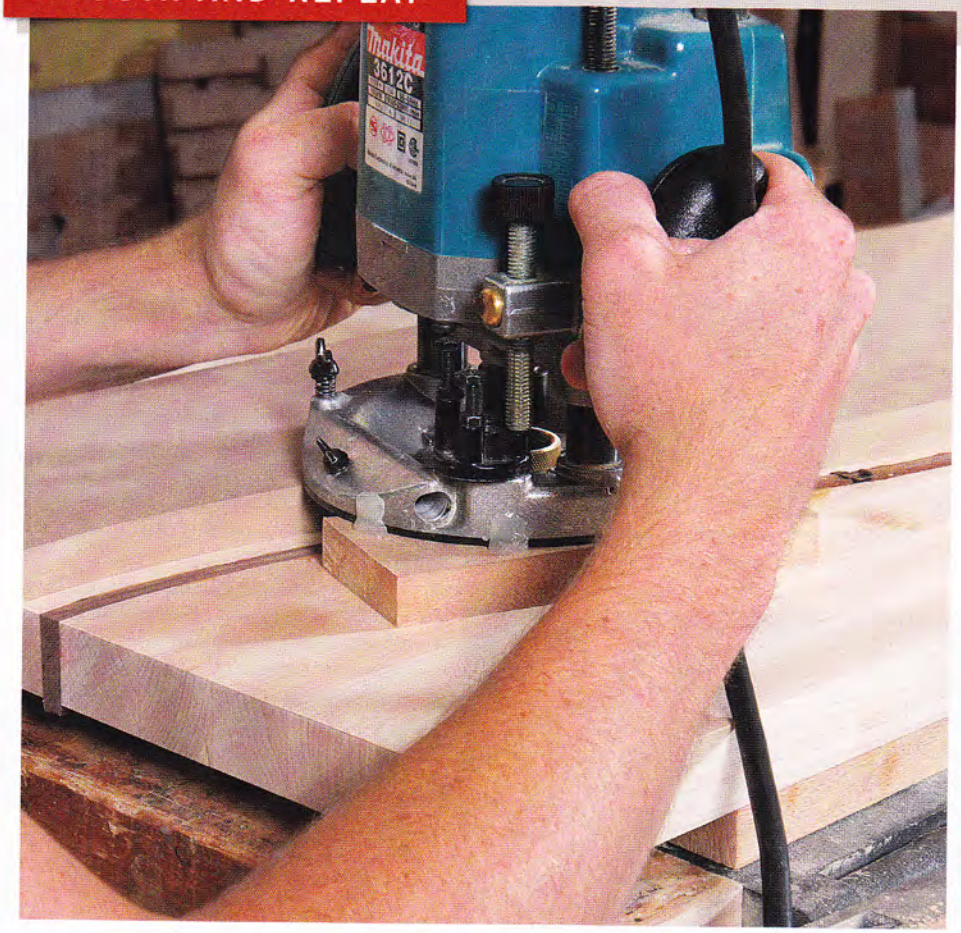
If you push the halves of the cutting board together now, the curves won't match. Add the through-inlay—which is exactly as thick as the routed groove—for a perfect match. I make the individual inlay strips ⅛ in. thick, and they flex easily around the curves. I cut them about ¼ in. wider than the thickness of the cutting board so that during glue-up they extend slightly above and below the board. I also cut the strips over length by about 6 in. This allows me to cut off any planer snipe. Even minimal snipe is noticeable when a number of strips are stacked together.

Interesting assembly

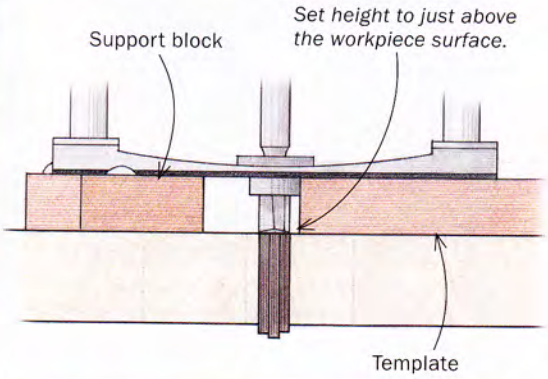
Having sliced your cutting board apart, you may look at the two halves and think,

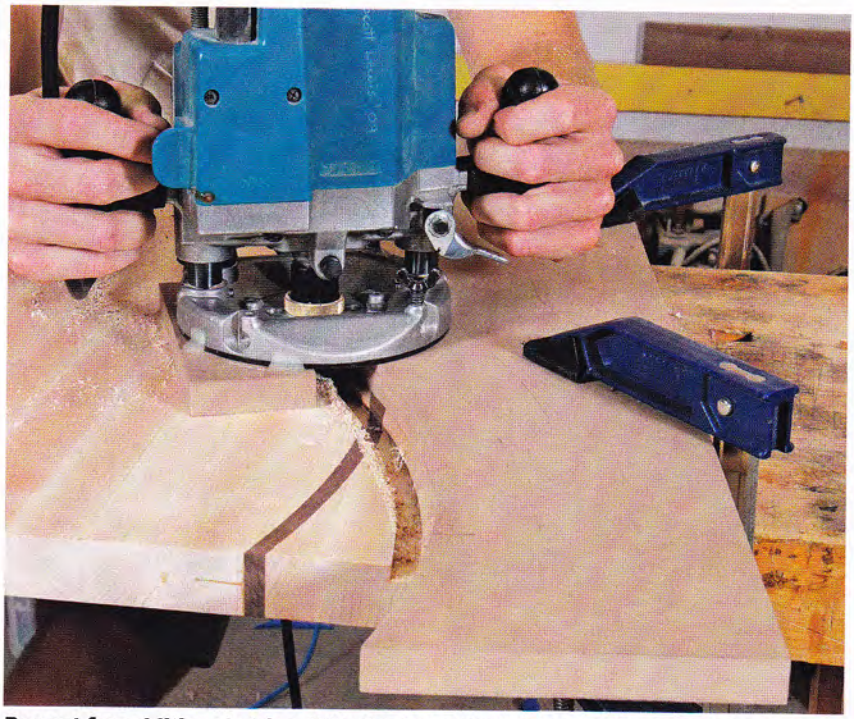
Photo, bottom right: Scott Lewis

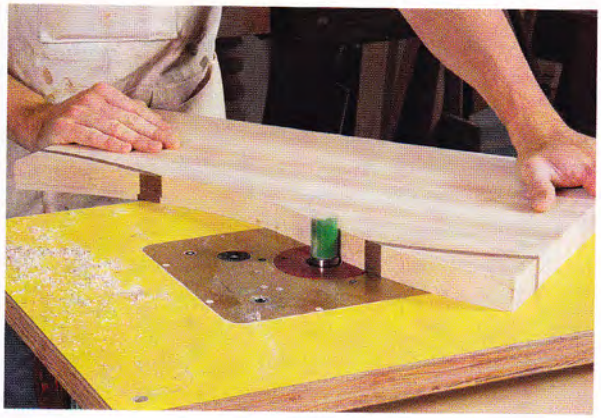
SMOOTH AND REPEAT

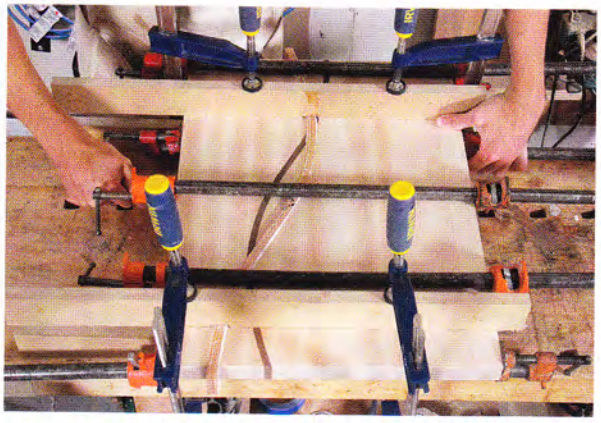


A few steps to smooth strips. *After cutting the end of the inlay flush with a handsaw, Lewis uses a router (left) to get it close to flush with the surface. Then he uses a card scraper (photo below) for final smoothing.*



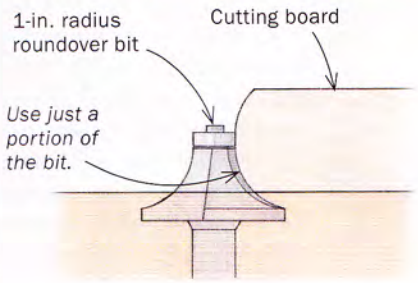






Repeat for additional strips. *With the first strip glued in and flushed off, Lewis starts the process for the second strip. After repositioning the template on the cutting board, he routs a new groove (above), bandsaws away the waste, and flush-trims it on the router table (above right). He clamps the new curve (below right), and when that is all glued up and scraped flush, he repeats the process for the third strip.*

SHAPE THE PROFILE



Soft edges. *After bandsawing and smoothing the cutting board's curved perimeter, Lewis gives the edges a shallow radiused profile (far right). He uses the top section of a 1-in. roundover bit, taking light passes.*

"What have I done?" Not to worry; with the right clamps and clamping cauls, the whole thing will come back together. The glue-up is a bit of challenge, though, since you have to clamp in three directions.

I glue up the cutting board on a flat bench and use shopmade cauls that have notches to accommodate the inlay. I use a quick-grip-style clamp to bring the halves most of the way together, squeezing the stack of inlay strips to the curved shape. I then add pipe clamps with light pressure to close the joint. Next, I tighten clamps on the notched cauls that hold everything flat and push the inlay strips into place. As I tighten the pipe clamps, I check that the ends of the halves line up.

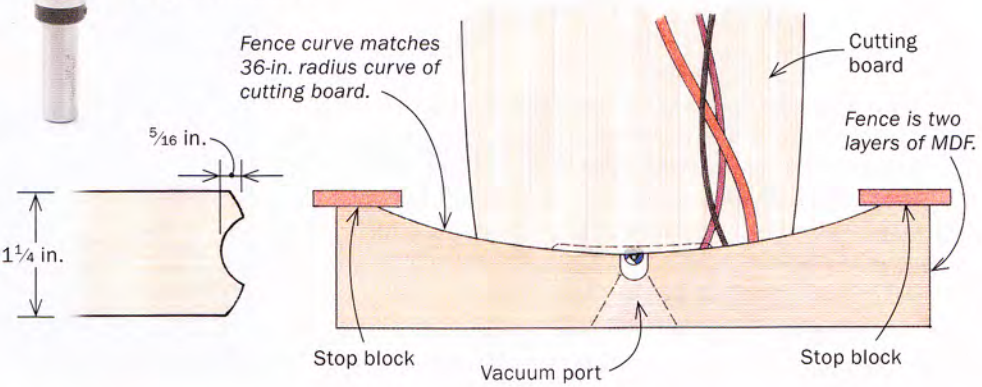
After glue-up, I use a handsaw to cut the inlay to length, then rout it and scrape it flush. Then I start the process over to add the subsequent inlay strips.

When I've finished the inlays, I bandsaw the sides of the cutting board to gentle curves and sand them smooth. Then I give the edge a radiused profile and cut finger grips into the ends.

I sand all surfaces with P150 grit, and sand the end grain to P220. Before wrapping this gift and mailing it off, I coat it with my favorite food-safe finish—mineral oil, which never goes rancid and is easy for the owner to maintain. □

Scott Lewis works wood in Ennismore, Ont., Canada.

Finger grips in a curved surface. *To rout the finger grips on the curved ends of a cutting board, Lewis makes a curved fence for the router table. He uses a fluting bit and takes multiple shallow passes. He controls the length of the finger grip by adding end stops to the fence.*



Photo, bottom right: Asa Christiana

readers gallery

CHARLES DRAKE
Winchester, Va.

Drake completed this Philadelphia high chest of drawers (24 in. deep by 44 in. wide by 94 in. tall) as part of a class taught by George Slack, a woodworker and teacher in Virginia. The class met one weekend a month for 18 months, with the students working on their projects in between. This is the fifth project Drake has completed with Slack's help. The mahogany chest, with secondary wood of white pine, is based on one at the U.S. Department of State that Slack had access to for photos and detailed measurements. Drake finished it with gel stain and varnish.

STEVEN TRAVIS
Shrewsbury, Mass.

This bentwood table and chairs was designed as a game table that could also function as a cocktail table (40¼ in. dia. by 17 in. tall). To form the round frames on both the tabletop and chairs, Travis bent-laminated thin strips of oak. The top is an octagonal bookmatched design that creates a star pattern and is made from ¼-in.-thick pieces of oak. All construction is mortise-and-tenon and bridle joints. The finish is precatalyzed lacquer. PHOTO: BRIAN HUCKINS

SMALL-TOWN SHOWCASE

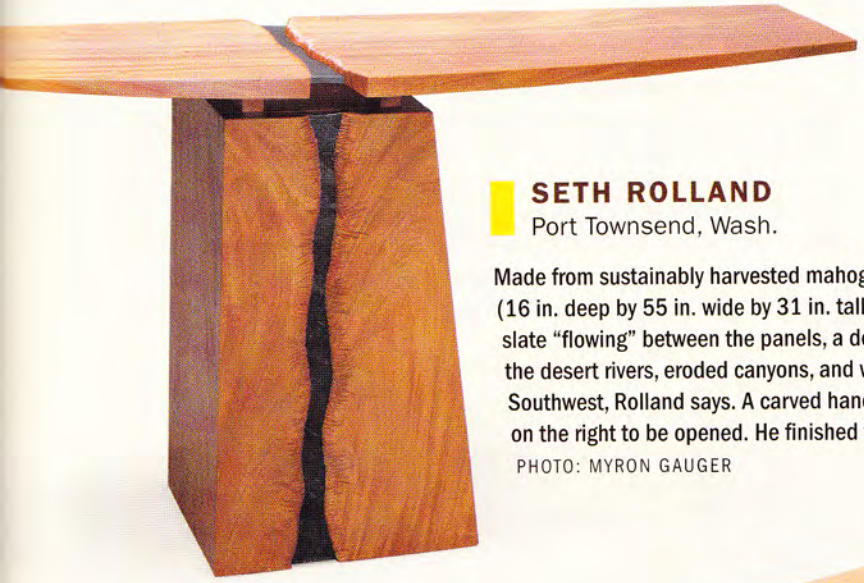
Port Townsend is a little town in Washington with a big concentration of woodworkers. Each November, The Splinter Group, a local woodworking club, hosts an impressive show. Last year's Seventh Annual Port Townsend Woodworker's Show was no different. Here are some of our favorite pieces.

GARY JONLAND
Port Townsend, Wash.

When thinking about what to make for the show, Jonland was looking for something minimal yet elegant. He came up with these nesting tables (17 in. deep by 20 in. wide by 18 in. tall), made of walnut and bamboo plywood. He liked the color match of the laminated bamboo with the walnut. Constructed with slip tenons and bridle joints, the top is light yet strong. Jonland finished the tables with varnish.

MICHAEL HAMILTON
Port Hadlock, Wash.

This stool is based on an original 1940s New England stool—a favorite family piece of a client. Hamilton sculpted the sides of the seat to make the design his own. This stool (20 in. deep by 20 in. wide by 26½ in. tall) is made of Oregon walnut and is finished with varnish.



SETH ROLLAND
Port Townsend, Wash.

Made from sustainably harvested mahogany, this buffet (16 in. deep by 55 in. wide by 31 in. tall) incorporates slate "flowing" between the panels, a design inspired by the desert rivers, eroded canyons, and waterfalls of the Southwest, Rolland says. A carved handhold allows a door on the right to be opened. He finished the piece with oil.
PHOTO: MYRON GAUGER

BRYAN WENTZEL
Port Townsend, Wash.

Wentzel built this madrone bench without glue or fasteners. Sliding dovetail cleats made of purpleheart join the two-part top to the tenoned legs. The top is a single slab that was ripped and flipped to put the natural edges in the center. The bench (10¾ in. wide by 78 in. long by 15 in. tall) is finished with tung oil and beeswax. PHOTO: MYRON GAUGER

MONICA RAYMOND
Rockland, Maine

Gothic cathedrals inspired this arched desk, which Raymond made during the Nine-Month Comprehensive Program at the Center for Furniture Craftsmanship in Maine. She says the Gothic arches are the most obvious connection, but the aprons also suggest the flying buttresses common to the cathedrals. The arches and stretchers are bent-laminations and the top is veneered and inlaid with holly. The desk (23 in. deep by 33 in. wide by 37 in. tall) is made of maple, walnut, and holly. The finish is lacquer. PHOTO: JIM DUGAN

JIM TUTTLE
Marietta, Ga.

The beauty of the canarywood played a big role in the design of this wall clock (7 in. deep by 18 in. wide by 34 in. tall)—Tuttle's first. He wanted the wood to be the focal point and designed the clock with asymmetrical doors to add to the visual impact. The left door is a canarywood slab and the right door uses a cherry frame with a canarywood book-matched raised panel. The cabinet is dovetailed. Tuttle made the pulls and clock hour markers of ebony. The finish is dewaxed shellac and varnish.

MARCUS COLLIER
Gainesville, Fla.

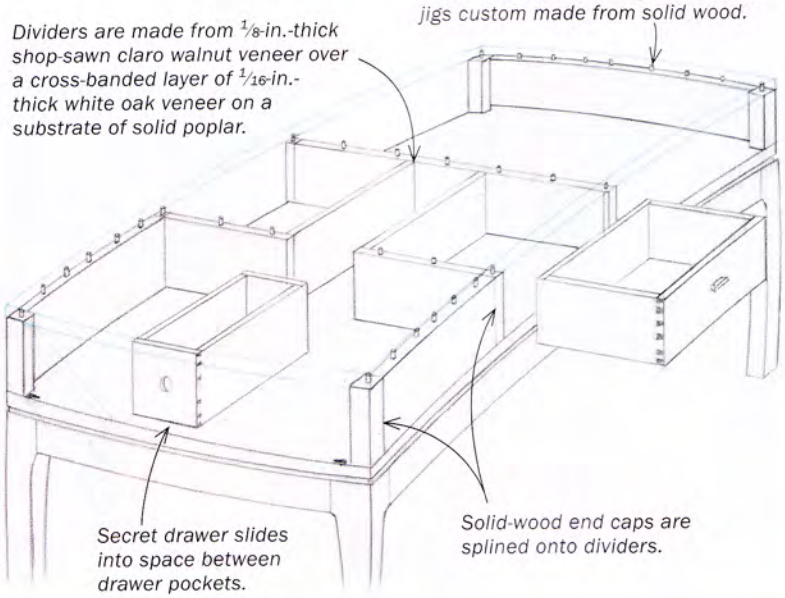
This sideboard (27 in. deep by 71 in. wide by 28 in. tall) was commissioned as a fifth wedding anniversary present—the traditional gift being wood. The clients wanted the piece built of walnut and liked the work of George Nakashima, so Collier took inspiration from his book, *The Soul of a Tree*, building the piece with a natural-edged top and butterfly keys. Other materials include poplar, Gabon ebony, and hand-forged iron pulls made in Japan. The finish is polyurethane. PHOTO: ALLEN CHEUVRONT

DESIGN SPOTLIGHT

KYLLE SEBREE
San Diego, Calif.

Sebree doesn't work from detailed drawings. He began building this coffee table on the strength of a napkin sketch. When it came time to divide the storage spaces below the top, he simply moved around some rough-cut dividers until he had an asymmetrical arrangement he found pleasing. Function was on his mind, too, so he made the open-sided storage space wide enough to fit two stacks of magazines side by side. At the opposite end he designed an ample space enclosed by a pair of doors—just the place to hide things when visitors are due. Sebree envisioned the table in front of a couch, so he gave it back-to-back drawers, one accessible from each side. And in a final functional twist, he made the drawers shallow enough to leave space between them for a secret drawer. Sebree made the table from a slab of claro walnut. He sawed some of it into veneers, which he applied over a poplar substrate to make the top unit. He built the base with solid wood from the same plank. Adding to the elegance of the piece—and making the project quite a bit more challenging—Sebree gave the table curves along its sides and on both ends, requiring curved doors, drawer fronts, and drawer dovetails. He finished the table (16½ in. deep by 48 in. wide by 16 in. tall) with oil and wax.

BEAUTIFUL USE OF SPACE



WILLIAM BUNDSCHUH
Two Harbors, Minn.

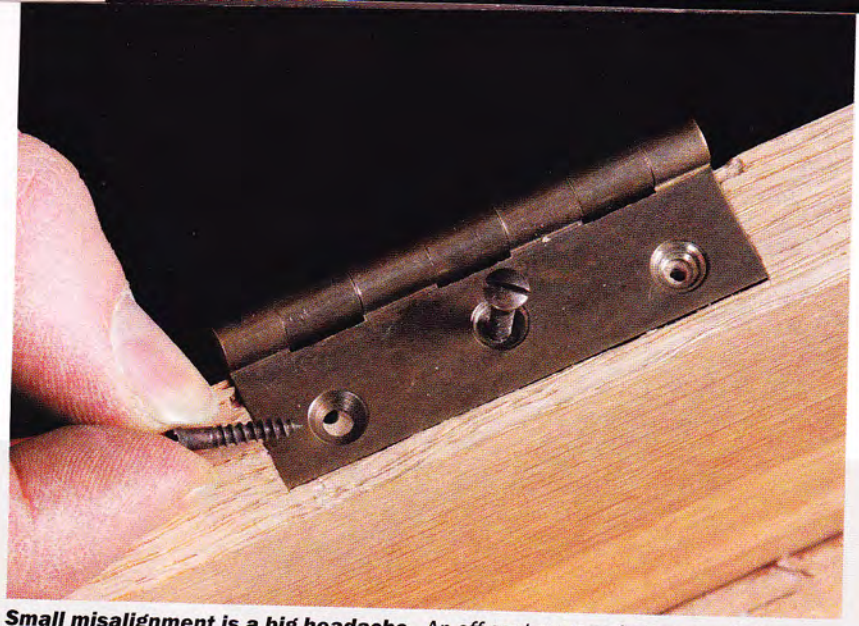
Inspired by the work of author and cabinetmaker Norman Vandal, Bundschuh studied Queen Anne design and combined different features to produce this cherry Queen Anne lowboy (20 in. deep by 34 in. wide by 30 in. tall), the second piece in a series he made for his wife. Bundschuh carved the shell rays with a cyma curve to complement the other curves in the piece. He also enclosed the shell in a circle and carved a dished area at the end of each ray. The piece is finished with a hand-rubbed satin urethane and a topcoat of micro-crystalline wax.

Q&A

Fix an off-center hinge screw hole

Q: I've occasionally misdrilled the hole for a hinge screw so that it's just a bit out of alignment. What's the best way to fix the mistake?

—QUINN LARSON, Greenfield, Mass.



Small misalignment is a big headache. *An off-center screw hole can pull the hinge, and thus the whole door, out of alignment. It will also keep the screw from seating properly, which can cause the door to bind.*

A: A MISALIGNED HOLE won't let the screw set properly in the hinge. It's a common problem, but it's easy to fix by plugging the hole and trying again. This works great for hinge screw holes with stripped threads, too. The first step is to make the plug. You don't want to use a length of dowel. That would result in an end-grain plug, which doesn't offer a lot of holding power for screws. Instead, use a ¼-in. plug cutter on the drill press to make a long-grain plug as long as the screw hole is deep. While you're at it, make a bunch—this probably won't be the last time you'll need one (I've made the repair more than once).

Next, enlarge the existing screw hole using a ¼-in.-dia. twist bit. The bit's pointed tip helps center it in the hole. Now glue in the plug and drill the hole in the right spot. Use a self-centering drill bit, commonly called a Vix bit. These bits have a spring-loaded sleeve with a tapered end that fits into the countersunk screw hole in the hinge, allowing you to drill a perfectly centered hole.

—Michael Pekovich is FWW's art director.

Two-tool fix. *A plug-cutter (left) makes a filler for the wayward hole and a Vix bit (right) centers the new one in the hinge.*

Make a bigger hole. *After making a ¼-in.-dia. plug, use a matching twist bit to drill out the existing hole. Use a piece of tape as a depth indicator (left), so that the hole's depth matches the plug's length. Next, fill the new hole with a plug (right). It should be flush with the bottom of the hinge mortise.*

Finally, redrill the screw hole. *Let the glue dry overnight, then make your life easier and use a Vix bit to get the new hole perfectly centered in the hinge hole.*

Photos: Kelly J. Dunton

Check for debris when rotating cutters

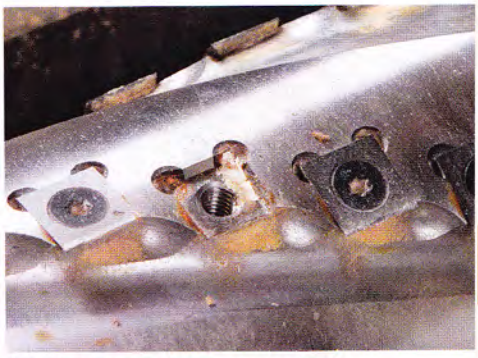
Q: I recently rotated some of the cutters on my jointer's segmented cutterhead. Now one of the rotated cutters is cutting slightly deeper than all of the others. What happened and how can I fix it?

—ANDY GREEN, Fleming Island, Fla.

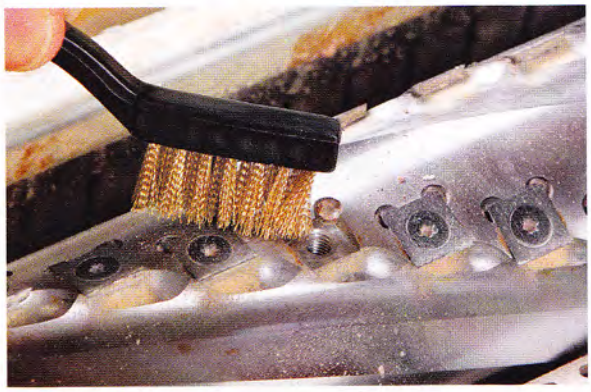
A: MOST LIKELY, SAWDUST or other debris got caught under one of the cutters while you were rotating it. Even a tiny amount of debris can cause one cutter to project farther than the others and take a deeper cut. To identify the cutter, place a jointed board on edge on the outfeed table so that it overhangs the cutterhead. Rotate the cutterhead by hand (unplug the machine first). The guilty cutter will lift up the board. Remove the cutter, clean it and its pocket, and then reattach it.

—Roland Johnson is a contributing editor.

Sign of raised cutter. *Marks along the length of a planed board could mean that one cutter is biting too deep.*



Remove the problem cutter. *Unscrew the cutter (left) and pull it completely off the cutterhead. Check the socket for debris and sawdust, which can get trapped beneath the cutter when you're rotating it to a new cutting edge.*



Clean out the socket. *A soft brass-bristle brush is stiff enough to get rid of dust and chips, but won't scratch the cutterhead.*

Safer glues for veneer and bent laminations

Q: I know that Unibond 800 (urea formaldehyde) glue is good for bent laminations and veneering, but I've also heard that it's pretty toxic stuff and requires the use of a respirator. Are there any less-toxic alternatives that work as well?

—BRUCE COLTON, Flagstaff, Ariz.

A: I USE PRO-GLUE VENEER BOND DRY RESIN, which is a low-formaldehyde version of urea formaldehyde glue. It comes as a powder that gets mixed with water. I use it both for curved veneering and bent laminations. I've found that Pro-Glue (woodcraft.com) creates a rigid glueline with minimal creep. Plus, it costs less than Unibond 800 and has a much longer shelf life. But because there's still formaldehyde in it, you should consider using a respirator.

If the respirator is a deal-breaker, then I'd use liquid hide glue, such as Patrick Edwards's Old Brown Glue (oldbrownglue.com), or Titebond. Because of its rigid glueline, I find that the hide glue is better suited for bent laminations and curved veneering. For flat veneering, I prefer Titebond, because it's inexpensive, easy to use, and readily available. It also can be quicker to use because parts glued with Titebond can be taken out of the vacuum press in an hour or so, whereas Pro-Glue needs upwards of eight to 10 hours.

—Craig Thibodeau is a San Diego-based furniture maker.

The options to replace Unibond 800 glue. *Pro-Glue works for veneering and bent laminations, but it still contains some formaldehyde. Both liquid hide glue and Titebond are free from formaldehyde.*

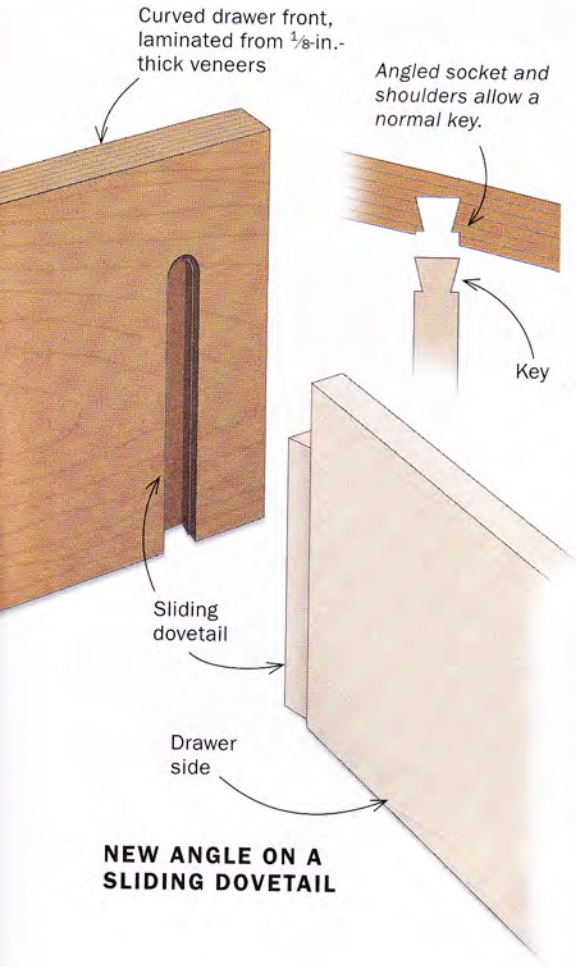
master class

Easier joinery for curved drawer fronts

CLEVER JIGS CONTROL THE CURVES

BY ALAN TURNER

Puff out your chest. *Gently bowed overlay drawer fronts give the chest a clean, elegant appearance. The overlay also allows the sliding dovetails this article relies on.*



NEW ANGLE ON A SLIDING DOVETAIL

My colleague at the Philadelphia Furniture Workshop, Mario Rodriguez, recently designed this three-drawer bowfront dresser and handed it off to me, the resident jigmeister, to figure out an efficient way to build it. The key questions I faced were how to produce the curved drawer fronts and how to join them to the drawer sides.

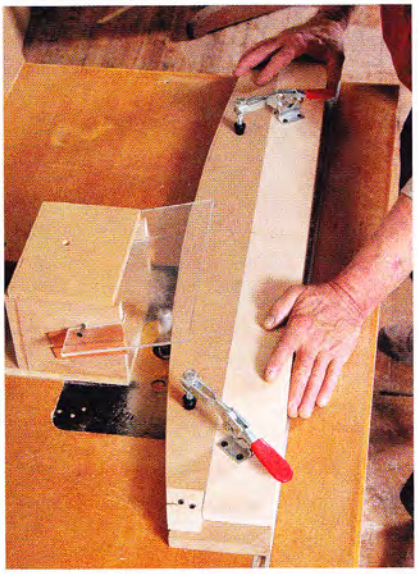
I considered steam-bending the drawer fronts, but I thought I wouldn't get consistent enough curves. I could have bandsawn the fronts out of solid wood, but that would have wasted material and created an unappealing grain pattern. I decided on bent lamination, which conserves wood, has minimal springback, and affords complete control of the grain. I decided to join the drawer sides to the fronts with sliding dovetails, the strongest method of attaching overlay drawer fronts.

To produce predictable curves and accurate joinery, I built a series of jigs to speed up and simplify the building process. I made a two-part bending form, a cradle for crosscutting the curved drawer fronts, a jig for routing the stopped dovetail sockets, and a

Photos, this page: Mario Rodriguez

Trammel cuts the master curve. *Turner uses a router on an adjustable trammel to produce male and female curved templates. He routs a curved groove ½ in. deep, then bandsaws through the waste and trims it flush with a router.*

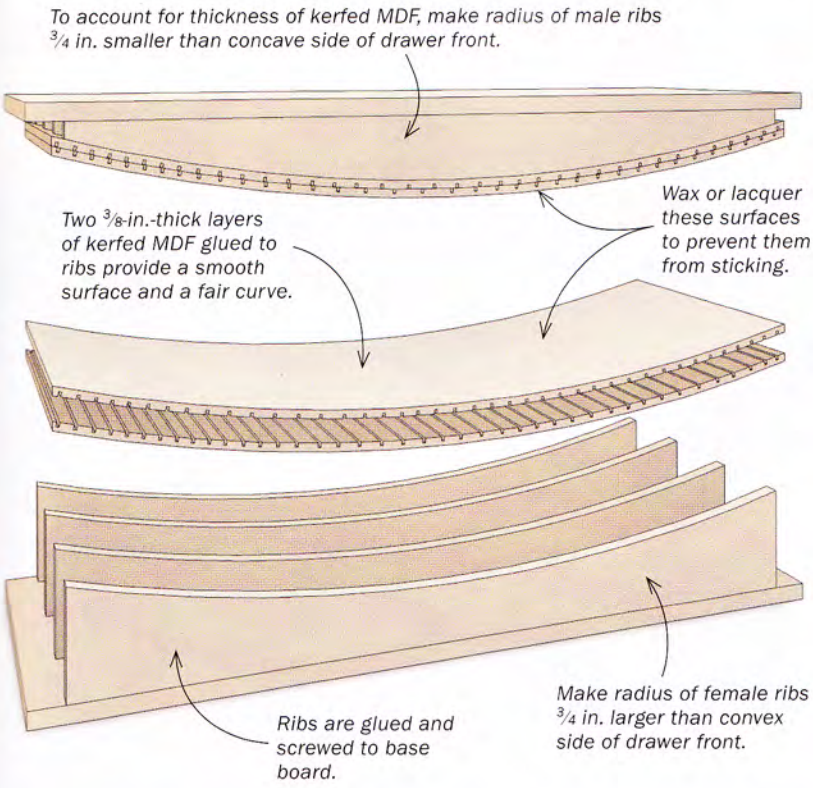
Make the drawer fronts

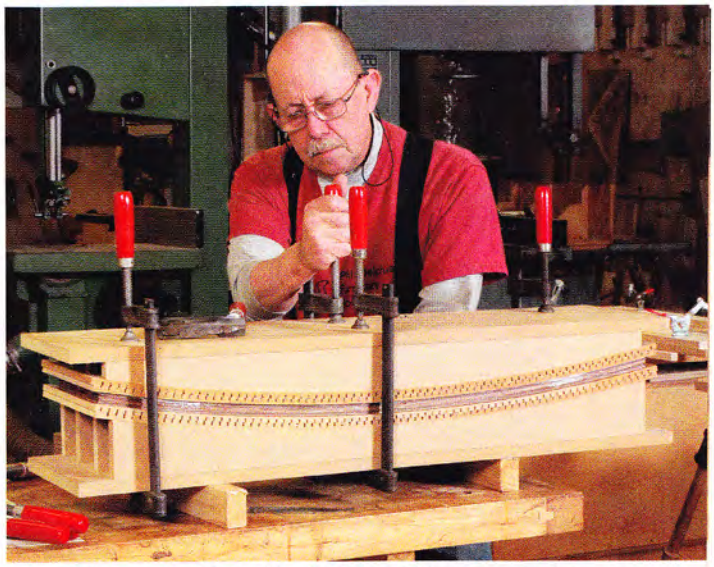


Make ribs at the router table. *After bandsawing the ribs to rough shape, use the trammel-cut master templates to pattern-rout male and female ribs for the various cauls, jigs, and fences.*

TWO BENDING FORMS

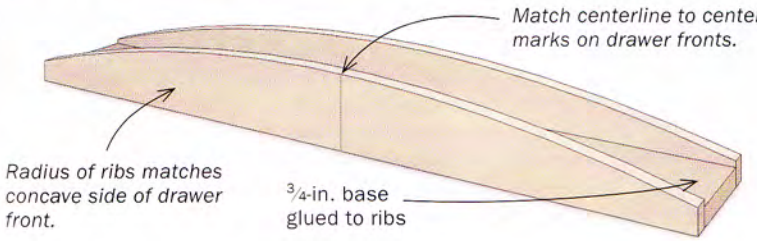
Mating male and female forms create the bent-laminated drawer fronts. Make them several inches longer than the drawer fronts. If you have a vacuum press, you need only the male form. All parts are MDF.





Create the curve. *After rolling Unibond 800 urea resin glue onto the stack of ⅛-in.-thick laminates, Turner binds the ends in stretch-wrap to keep them registered. Then he clamps the stack between forms and lets the glue cure overnight.*

CROSSCUT CRADLE



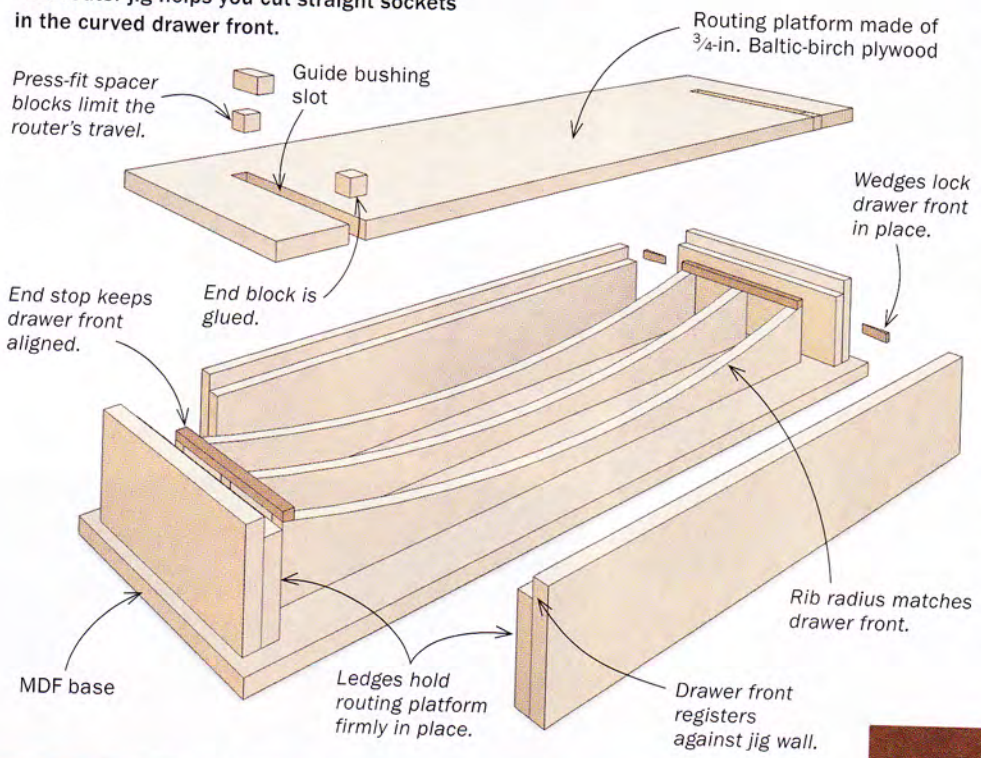
Cut it to length. *Mark the centerline on the drawer front and align it with the center mark on the cradle.*

Photos except where noted: Jonathan Binzen; drawings: Kelly J. Dunton

Rout the dovetail sockets

JIG LEVELS THE CURVE

This router jig helps you cut straight sockets in the curved drawer front.

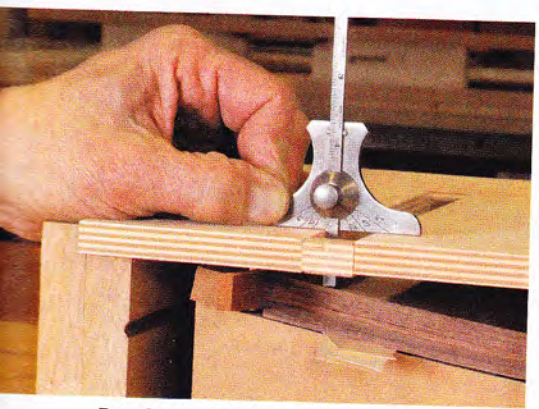


curved fence for the router table that enabled me to cut the slot for the drawer bottom on the concave inner face of the drawer fronts.

Master patterns are the starting point

I built all these jigs using convex and concave ribs. The MDF ribs are easy to produce on the router table using male and female pattern-routing jigs.

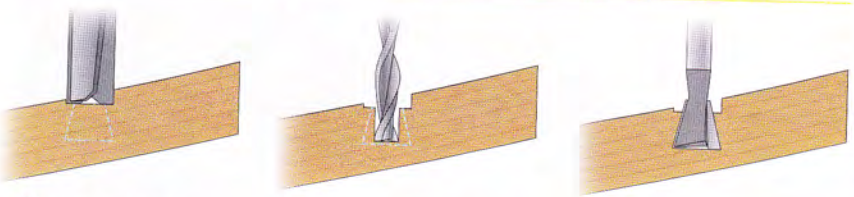
These master routing patterns are the key to the whole chest. I generated the curves with an adjustable trammel arm and a router. I drilled right into our wooden floor to set the trammel pin, and then I screwed a fence into the floor perpendicular to the trammel arm. To ensure that it was exactly 90° to the arm, I measured carefully to make the two ends of the fence equidistant from the trammel pin. After routing a ½-in.-deep groove with a ⅜-in.-dia. bit, I bandsawed through the waste and then cleaned up with a router and a flush-trimming bit.



Precise height is key. *Due to springback, no two bent-laminated drawer fronts are exactly the same. Use paper or card-stock shims to level the drawer fronts.*

Spacers control the length. *Graduated drawers require different-length sockets. Use press-fit spacers to control the router's travel.*

ROUT IN THREE STEPS



1 *12mm straight bit establishes the shoulder.*

2 *¼-in. upcutting spiral bit roughs out dovetail in a single pass.*

3 *10°, ½-in.-dia. Whiteside dovetail bit finishes the joint.*

Multiple passes. *To cut the joints from start to finish without disturbing the drawer front, Turner sets up three routers with different bits. If you don't have extra routers, change bits between cuts and use test cuts in a sample board to reliably reset the depth of cut.*

I used one pair of patterns to generate all the ribs for the various jigs and I had no problems as a result. If I were making the chest again, however, I think I would take the mathematically precise route and make a separate set of patterns to produce the ribs for the bending jig, so that I could account for the thickness of the layers of kerfed MDF in that jig.

Bent-lam basics

To make the bent-laminated drawer fronts, resaw a plank into slices slightly more than ⅛ in. thick and then use a planer or thickness sander to bring them down to ⅛ in. Each drawer front is a sandwich of six slices. When you glue up the bent lamination, you can add a sheet of commercial veneer as the show surface. Slip-match the show veneers so that the grain pattern is consistent from drawer to drawer. After gluing them up and letting them cure overnight, joint one edge, rip the pieces to width, and then crosscut them to length.

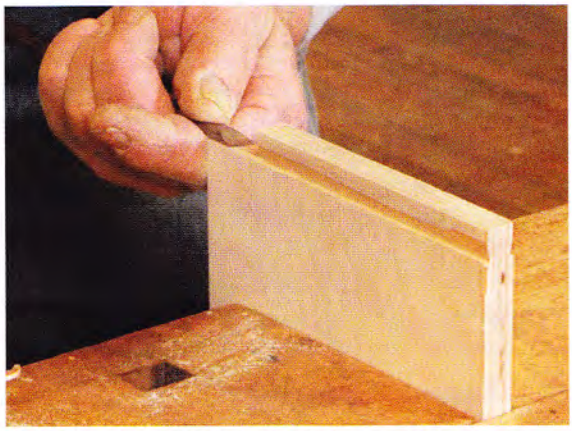
Perfect joint for curved drawer

Perhaps the trickiest part of this project was cutting the sliding-dovetail sockets in the drawer fronts. The router jig I built, however, let me cut the dovetail sockets and shoulders as if the drawer front were flat. And that allowed me to cut the dovetail keys on the drawer sides just as you would if they were joining flat stock. The router jig takes most of the guesswork out of the process, but because there is some minor springback even with bent-lamination, the drawer fronts may not be perfectly consistent curves. Once the drawer front is in the routing jig, it's important to ensure that the four corners of the drawer front are equidistant from the routing surface. I used a Starrett depth gauge to check this and paper or card stock shims to adjust for any disparities. □

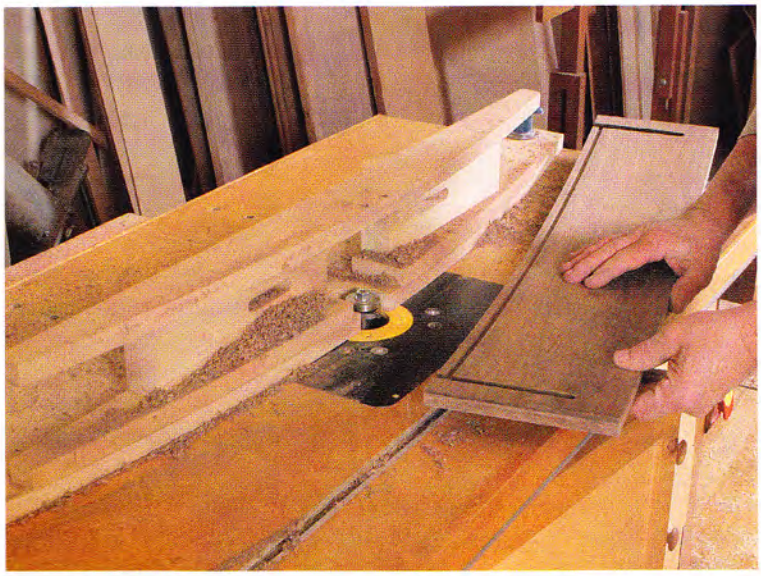
Alan Turner teaches at the Philadelphia Furniture Workshop, which he founded in 2006.

Fit the sides to the front

Scribe the angled shoulder. *After cutting normal dovetail keys on the drawer sides using a router table, insert the key into the socket and transfer the drawer-front angle onto the drawer side. Turner uses a flat-sided marking knife for an accurate transfer.*



Notch the top end. *Use a backsaw and then a chisel (above) to cut away ¾ in. or so at the top end of the dovetail, creating an angled surface that mates with the slightly curved inside face of the drawer front (right).*



Curved fence for a curved groove. *To rout the stopped groove in the drawer front that will accept the drawer bottom, use a slot-cutter in the router table. To support the piece, make a fence from male ribs cut to the same radius as the concave side of the drawer front.*

Texture wood to highlight the grain

MODERN TOOLS MAKE IT EASY TO MIMIC AN ANCIENT JAPANESE FINISH

BY GEOFF GUZYNSKI

I've always liked the textured look of weathered cypress. It reminds me of old playground equipment where the wood's texture has been polished by thousands of small hands. It turns out that traditional Japanese craftsmen loved this look too. They called it jin-di-sugi and created it by burying the wood in the ground and allowing it to decay for several years. I wasn't about to invest that much time, but I was determined to incorporate the look in my furniture. After some experimenting, I came up with a fast and simple technique using an angle grinder fitted with a wire brush.

The process works best on boards with a dramatic difference in density between the early and latewood growth rings. You should be able to run your thumbnail across the grain and leave marks in the earlywood but not in the latewood. I've seen pine, cedar, and fir boards that pass this test, but I've had the best results with cypress. Be sure to test each board individually, however.

Light or dark? *Guzynski's texturing method looks great with a clear finish, but if you really want the pattern to pop, try an ebonized treatment (see p. 86).*

The rough and the smooth. *The hard, smooth, light-colored beech on Guzynski's credenza complements the soft, dark, cypress panels textured to resemble a classic Japanese finish.*

Texture the wood in three steps

Dimension the wood in the normal way. It's not necessary to start with a board that's thicker than the intended final thickness, because only the softer early wood is removed. The dense latewood remains unchanged.

Begin removing softwood, keeping the brush's rotation in line with the grain and moving the grinder parallel with the grain. For a less aggressive cut, and to avoid snagging the panel edges, let the brush pull the grinder along the surface.

If you're going to color the wood, the stain mostly penetrates the soft early wood, so you need to adapt your grinding technique to the grain pattern. In areas where the grain is more flatsawn, use a very light touch with the brush or you will get rid of all or almost all of the early wood, and the surface won't absorb stain later. A panel with a flatsawn area adjacent to a more quartersawn section would then end up with uneven color. After the grinder, hand-brush the surface with a sparse, stiff-bristled wire brush. The final step is to smooth the panel with a nylon flap brush chucked in a drill.

You can stop here and apply the clear finish of your choice. Be careful to keep any film finish thin because a thick finish that fills the grooves looks really bad.

Dye and stain highlight the texture

Using separate dye and pigment stains allows me to manipulate the color balance between the latewood and early wood. I start with a very light dye stain in an acetone and water base. The acetone gives the dye a bit more bite on the densest parts of the latewood. I combine brown, red, and yellow dye concentrates from Sherwin-Williams until the mix is a little

Photos: Mark Schofield

Reveal the grain

You need a 4-in.-dia. crimped wire wheel (Milwaukee, part No. 48-52-5070; amazon.com) and a nylon flap brush (Weiler Vortec, model 36447; drillspot.com).

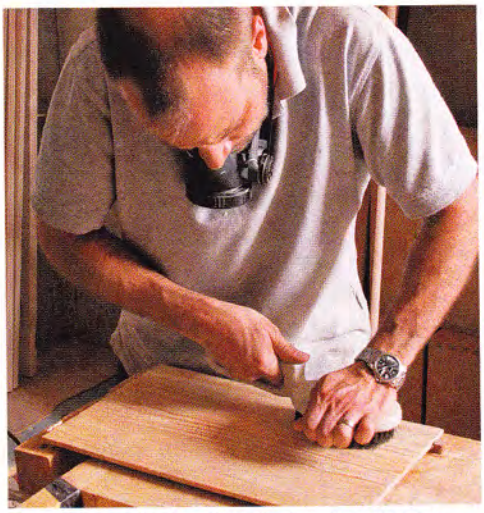
Go lightly. *Hold the angle grinder so that the wire wheel is parallel to the grain and just touching the surface. The goal is to remove the soft, early wood while leaving the harder, later wood intact.*

brighter than if it was the only color being used. If you are using TransTints, Homestead No. 6006 dark mission brown, No. 6010 red mahogany, and sometimes No. 6020 lemon yellow give good results, too.

Once the dye has dried, flood the panel with a black pigment stain, like Minwax ebony diluted with five parts of mineral spirits. Wipe off the excess stain almost immediately. The deep grooves really hold onto the pigment.

Since I spray-finish my work, I don't topcoat the panel before assembling it into the frame. If you are applying finish with a brush, I would definitely recommend a seal coat of shellac before brushing on a topcoat, because there is a lot of color you could pick up and drag to the frame. □

Geoff Guzynski is a professional furniture maker near Chicago (village-woodworking.com).

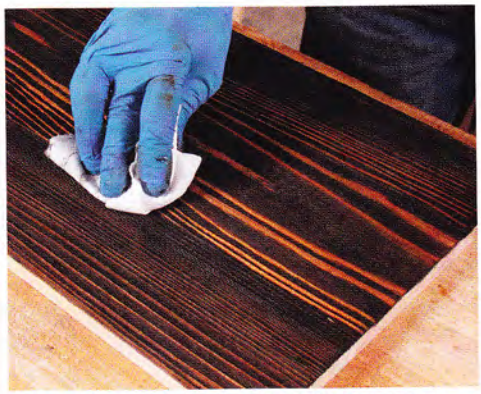


Brush hard. *Pull a stiff wire brush across the surface to define the grooves in the early wood. Use heavy pressure.*

Remove the fuzz. *A nylon brush attached to a drill removes loose wood fibers and leaves the surface ready for finishing.*

Kick up the contrast with color

First dye the surface. *Guzynski applies a dye with a slightly brighter color than the intended final look.*



Then add a pigment stain. *A diluted black pigment stain mutes the dye and also darkens the denser late wood.*

A thin coat, please. *The textured surface looks best under a minimal clear finish.*

WOODWORKERS MART

WOODWORKERS MART

CLASSIFIED

The Classified rate is $9.50 per word, 15 word min. Orders must be accompanied by payment, ads are non-commissionable. The WOOD & TOOL EXCHANGE is for private use by individuals only; the rate is $15/line, minimum 3 lines. Send to: *Fine Woodworking* Classified Ad Dept., PO Box 5506, Newtown, CT 06470-5506. FAX 203-426-3434, Ph. (866) 505-4687. For more information on advertising go to www.finewoodworking.com. The Ad deadline for the July/August issue is April 19, 2013.

Hand Tools

HIGHLANDWOODWORKING.COM, the world's largest selection of hand planes, plus thousands more fine hand tools.

PETE NIEDERBERGER- Used and Antique tools and parts. Special on vintage tuned Stanley planes. (415) 924-8403 or pniederber@aol.com Always buying!

DIEFENBACHER TOOLS- Fine imported and domestic hand tools for woodworkers. www.diefenbacher.com Free catalog 1-800-326-5316.

Instruction

PENLAND SCHOOL OF CRAFTS, in the spectacular North Carolina mountains, offers one-, two-, and eight-week workshops in woodworking and other media. (828) 765-2359; www.penland.org

WM PERRY STUDIO, TORONTO. Fine woodworking private instruction in working shop. (416) 429-2323; www.wmperry.ca

PRIVATE CLASSES with woodworking author in the Great Smoky Mountains. All skill levels. www.GregoryPaolini.com (828) 627-3948.

Miscellaneous / Accessories

WOODSLICER.COM, re-sawing blade rated best-performing 1/2-in. bandsaw blade by *Fine Woodworking.* 800-241-6748.

Plans & Kits

FULL SIZE FURNITURE LAYOUTS Drawn by: Philip C. Lowe. Catalog $3. (978) 922-0615. 116 Water Street, Beverly, MA 01915. www.furnituremakingclasses.com

Wood

EISENBRAND EXOTIC Hardwoods. Over 100 species. Highest quality. Volume discounts. Brochure. 800-258-2587. eisenbrandhardwoods.com

SAWMILL DIRECT 100 species of exotics, turning, lumber, logs, slabs, musical instruments TROPICAL EXOTIC HARDWOODS OF LATIN AMERICA, LLC: Toll Free (888) 434-3031. www.anexotichardwood.com

QUALITY NORTHERN APPALACHIAN hardwood. Custom milling. Free delivery. Bundled, surfaced. Satisfaction guarantee. Niagara Lumber. 800-274-0397. www.niagaralumber.com

FIGURED CLARO WALNUT for architectural as well as musical instrument projects. (530) 268-0203 www.woodnut.com

BIRD'S-EYE AND CURLY MAPLE, 4/4 to 12/4 lumber, flitches, turning squares and blocks. Black walnut, cherry/quartersawn, and curly oak lumber. Dunlap Woodcrafts, Chantilly, VA. (703) 631-5147.

LONGLEAF HEART PINE (antique). Flooring-lumber-millwork. Red cedar lumber & paneling. Lee Yelton: (706) 541-1039.

LARGE CLARO WALNUT book-matched slabs, turning stock, raw and paper-backed veneer of burl and crotches. www.walnutwoods.net online store. Newton Woods. (559) 277-8456. Fresno, CA.

NORTH/CENTRAL VIRGINIA: Complete line of premium, kiln-dried hardwoods. Culpeper/Warrenton area. (540) 825-1006. cpjohnsonlumber.com

RARE WOODS. Ebony, boxwood, rosewood, satinwood, ivory wood, tulipwood + 120 others. (207) 364-1073. www.rarewoodsusa.com

WOOD AND TOOL EXCHANGE

Limited to use by individuals only.

For Sale

AMERICAN CHESTNUT lumber from fallen tree; 8-in. to 21-in. boards; 4/4 and 8/4, 1500 bd. ft. Located in southern NJ. (215) 923-3714.

FINE WOODWORKING issues: 1 – 231, excellent condition. No. 24 complete but damaged. $380. plus shipping. So. California. (909) 273-9936.

5 – OLD GROWTH REDWOOD sinker logs for sale, you haul and mill or I can arrange milling. bbrazill@mcn.org

70 YR OLD WALNUT. Harvested in Delware, c. WWII. Stickered and stored inside. 4-5 pick-up loads. Up to 22-in. by 5/4; to 8-ft., 5X5 and 6X6's. rdodd01@verizon.net (302) 856-9175. DE

FELDER BF6-31 Multi-function woodworking machine. Lazy Susan turn table base. Planer, joiner, sliding table, 12-in. saw, shaper, extra spindle for router bit, tenon attachment and power feed. 220 SINGLE ph motors. Low hrs. Ontario, Canada. kendal@nexicom.net

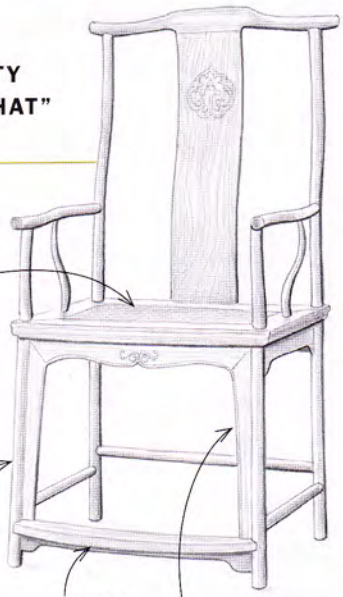
Chair fuses best of East and West

CHINESE AESTHETICS MEET CONTEMPORARY COMFORT

BY JONATHAN BINZEN

John Cameron's new chair (see the back cover) blends the distinctive styling of a Chinese Ming Dynasty chair with the comfort and structure of a contemporary Western one. Cameron found a superb example of the "official's hat" armchair in his well-thumbed copy of Wang Shixiang's landmark book *Classic Chinese Furniture* (shown above). He closely followed the upper part of that chair in his own design. But for reasons of comfort and strength, he designed the lower half more in line with a contemporary Western chair. He replaced the mitered seat frame, round legs, and glueless joinery of the Ming chair with a robust system of seat rails double-tenoned into legs and reinforced with hidden corner blocks under an upholstered seat.

MING DYNASTY "OFFICIAL'S HAT" ARMCHAIR



Crest rail is lower than in the original, placed behind the sitter's shoulders for increased comfort.

Back posts gradually transition from round at the top to rectangular at seat rails, then back to round at the floor.

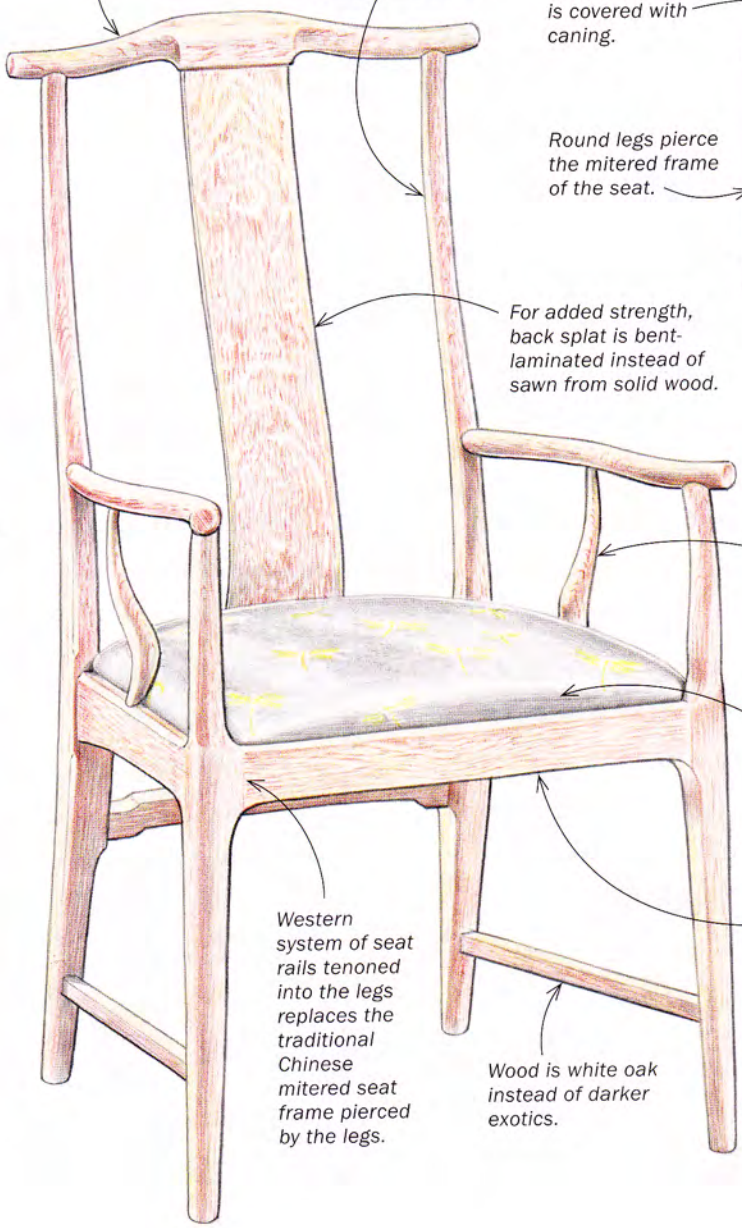
Solid-wood panel is covered with caning.

Round legs pierce the mitered frame of the seat.

For added strength, back splat is bent-laminated instead of sawn from solid wood.

Foot rest

Spandrels let into the legs and seat frame are both decorative and structural.



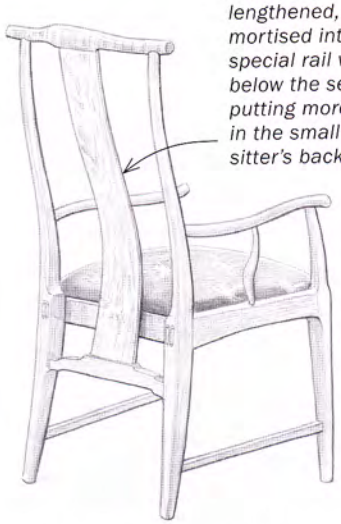
The arm support, locked in place by a metal pin and a set screw from below, can be taken out to remove the slip seat.

Upholstered slip seat replaces flat wooden seat in Ming chairs.

Seat is lower and narrower than the Chinese original, which was designed for use with a foot rest.

Western system of seat rails tenoned into the legs replaces the traditional Chinese mitered seat frame pierced by the legs.

Wood is white oak instead of darker exotics.



Back splat is lengthened, and mortised into a special rail well below the seat, putting more flex in the small of the sitter's back.

Drawings: John Tetreault

Massachusetts Ming

John Cameron was channeling 500-year-old Ming Dynasty furniture when he designed this chair. He also was shadowing one of his favorite modern chairmakers, the Danish designer Hans Wegner, who produced some of the most iconic chairs of the 20th century by translating classic Chinese chairs into the language of Scandinavian Modern. When Cameron, of Gloucester, Mass., realized that Wegner had never interpreted the Chinese "official's hat" armchair—one of his own favorites, with its beautiful crest rail and squiggled arm support—he knew he had discovered fresh ground to explore. Above the seat, Cameron's chair mirrors the aesthetics of the Eastern original; but from the seat down it is distinctly Western in style and structure. Blending these two traditions into a chair that speaks in one voice is no easy trick. Here's a tip of the official's hat to Mr. Cameron.

—Jonathan Binzen

Photo: Bill Tru

How They Did It Turn to p. 90 for details on how Cameron blended Eastern and Western styles in this chair.

Pro Portfolio To learn more about this chair and other pieces by John Cameron, go to FineWoodworking.com/extras.