TAUNTON'S

Fine WoodWorking

3 great outdoor chairs, p. 52

Sander vs. handplane

Which is faster?

Key to a fine finish is the right brush

Bench-vise basics: 11 ways to use it

Build an elegant hall table

Why every turner needs a 4-jaw chuck

June 2010 No. 212

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Fine Woodworking

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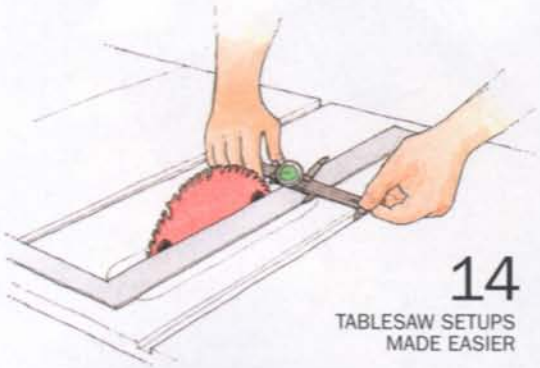

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The Taunton Press
Inspiration for hands-on living®

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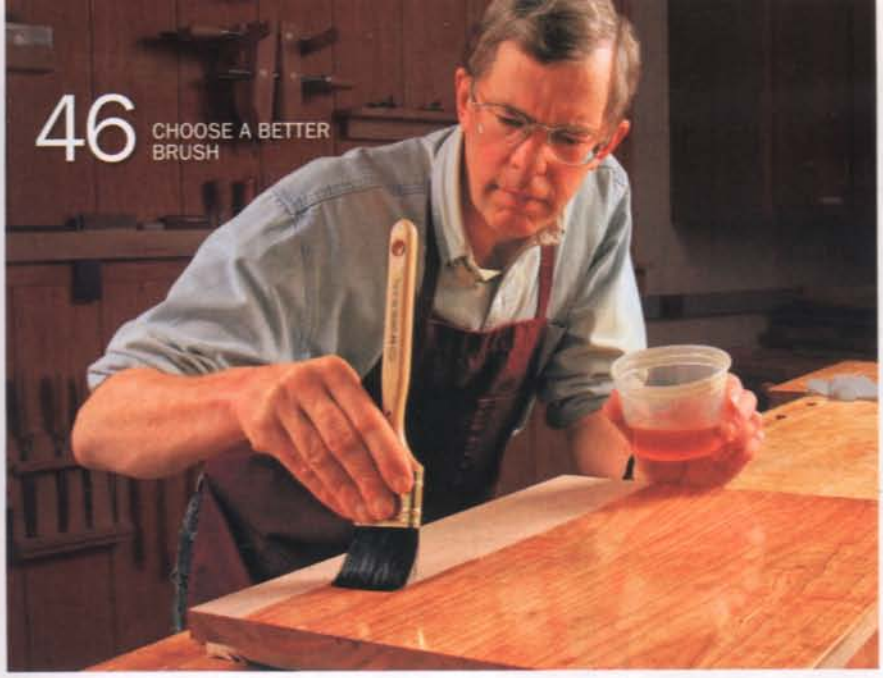
Cover photo: Michael Pekovich



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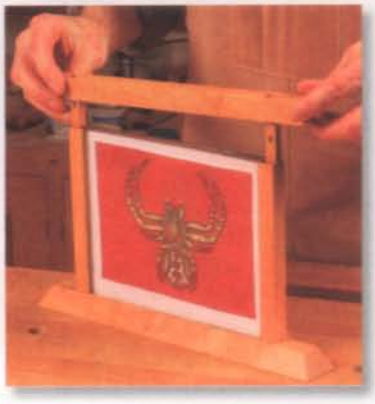

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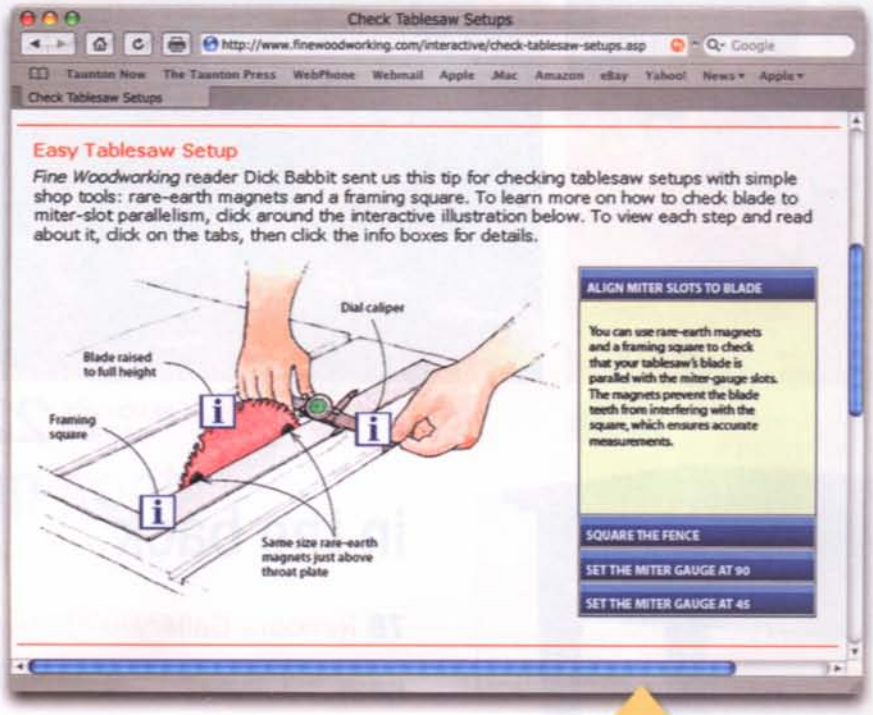
on the web

THIS MONTH ON FineWoodworking.com/extras

Visit our Web site to access free Web tie-ins, available April 8. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.



ANIMATION: Easy Tablesaw Setup

Four simple steps to assure square and accurate cuts

VIDEO: The Surface-Prep Battle

Watch a replay of our hand- vs. power-tool duel.

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Post photos of your projects in our online gallery, like Kevin Mack of Boston, who built this Federal klismos chair.

PHOTO: LANCE PATTERSON

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VIDEO WORKSHOP

3 Ways to Build a Box

Boxes can be deceptively difficult. Matt Kenney guarantees gorgeous results with three clever techniques:

- A router method for flawless miters
- A unique spin on the dovetail joint
- A safer way to work with small parts

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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 and Canada, $34.95 for one year, $59.95 for two years, $83.95 for three years (in U.S. dollars, please). Canadian GST included. Outside U.S and Canada, $41.95 for one year, $73.95 for two years, $104.95 for three years (in U.S. dollars, please). Single copy, $7.99. Single copies outside the U.S. and possessions, $8.99.

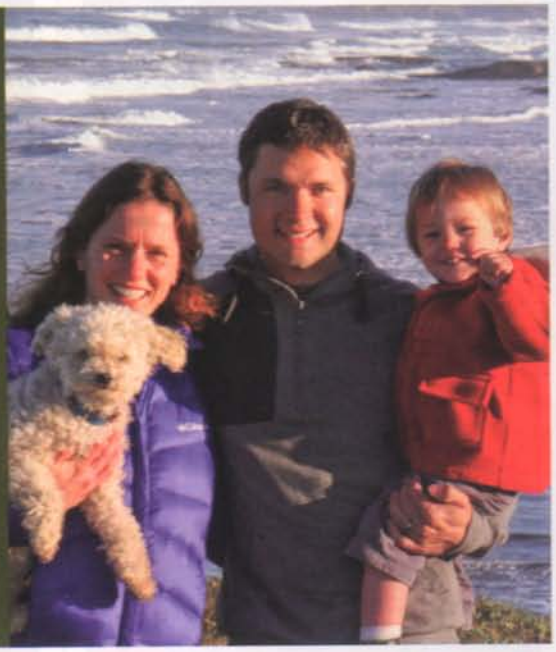
Postmaster: Send address changes to *Fine Woodworking*, The Taunton Press, Inc., 63 S. Main St., PO Box 5506, Newtown, CT 06470-5506.

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

Bob Sanderson (*"Make Your Own Hardware"*) started his woodworking and metalworking journey when he built model rockets and remote-control cars as a child. He studied wood technology in college and then worked as an assistant in a canoe-building class. In 1999, Sanderson moved to Fort Bragg, Calif., to study under James Krenov. Unable to find the right hardware for a tansu project, he started working with metal. A lot of experimentation, some machine-tool classes, and a demand for his product led to his business, Sanderson Hardware. He still lives in Fort Bragg with his wife, Taimi, son, Frej, and dog, Mable.



Craig Thibodeau (*Master Class: "Veneering Tight Curves"*) began his career as a mechanical engineer. When his children were born (that's his son, Darren, left), Thibodeau jumped at the chance to turn a longtime woodworking hobby into a stay-at-home profession. Veneered pieces are his mainstay, and among his many awards was Best of Show in San Diego's prestigious Design in Wood exhibition.

Ralph Tursini (*"The Lathe Accessory Everyone Needs"*) lives in the Green Mountains of Vermont with his wife, Andrea, and enjoys growing cold-hardy foods and making hard cider. He has just about finished a basement root cellar. Tursini teaches Forest Conservation and Wood Turning at the University of Vermont and offers private turning classes at his studio (VermontWoodturning.com).

The work of **Kevin Kauffunger** (*"A Graceful Hall Table"*) bears the hallmarks of his time at the College of the Redwoods—clean lines, elegant details, beautiful woods, and handmade hardware. After a year at the school, he returned east to Pittsburgh. These days, Kauffunger works for the cutting tool manufacturer Freud, traveling the Northeast as a product specialist.

Even though he teaches furniture making full time at Thaddeus Stevens College in Lancaster, Pa., **Steve Latta** (*Fundamentals: "Bench-Vise Secrets"*) always has a private commission or two on the burners. In addition, he lectures and teaches workshops across the country, is an active member of The Society of American Period Furniture Makers, and enjoys motorcycles, hiking, and exercise.

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.

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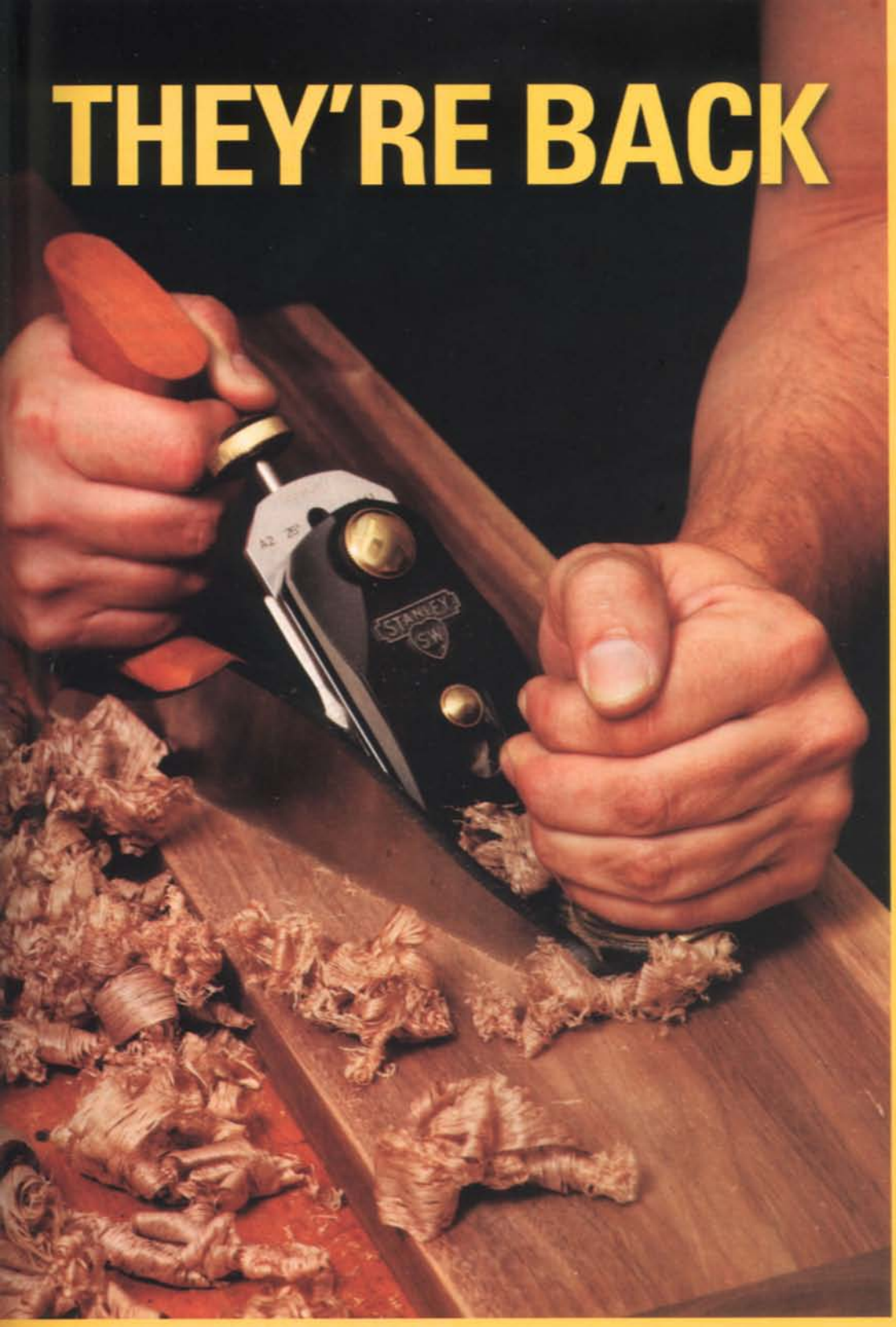

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letters

Spotlight


10 Tips for Mail-Order Lumber

8 Be wary of online photos and inventories

ISSUE NO. 211
March/April 2010
p. 66

LUMBER ARTICLE WAS WARPED

In the recent article "10 Tips for Mail-Order Lumber," an image of our Web site (cookwoods.com) was placed in a section of the article titled, "Be wary of online photos and inventories." *Fine Woodworking* Editor Asa Christiana has assured me that the author and the magazine staff did not intend to portray Cook Woods as a supplier or Web site to be wary of. The layout artists simply needed a generic example of a site with online photos of lumber, and they chose ours because it looked nice in the layout. Nevertheless, I believe some readers will be misled.

—CATHERINE COOK, Cook Woods, Klamath Falls, Ore.

Editor replies: You are exactly right about our intentions, and we deeply regret any negative implication we created about Cook Woods (or Pine Creek Wood Company, also pictured there). I would point readers to the bottom of the same page, where there is a short write-up about the positive experience one of our editors had when buying from Cook Woods.

I noticed a recurring theme in the article, something to the tune of, "Expect wood suppliers to be dishonest." It's a shame the author came away with that notion. The only way to stay in business, especially as long as we have (since 1978), is with happy customers, period.

—MARK STEPHENS, Woodworkers Source, Phoenix, Ariz.

Walking in Krenov's footsteps. *Second-year student Barbara Shelton works on a cabinet made of castello boxwood and European sycamore. The marquetry is the leaves and seeds of those two species.*

Krenov school was overlooked

Editor's note: *Our recent coverage of James Krenov's death neglected to recognize the Inside Passage School of Fine Woodworking, which he helped to set up along the coast of British Columbia in the last years of his life, and treated to weekly lectures by phone. The following letter is from craftsmen in residence at the school, which is run by Robert Van Norman.*

Thanks, Jim. Thanks for *A Cabinetmaker's Notebook* (1976). It helped us take the first steps toward a sensitive approach to craft.

Thanks for your work. Students, beginning to find their own voice, get a helpful start by studying the catalog of your work given to our school.

Thanks for sharing your vision. Through it, we have a better relationship with the wood and our tools.

Thanks for the stories. You played them off as "the Old Man's ramblings," but to us they were the details of James Krenov only discovered as we got closer.

Thanks for the inspiration. Your students have become our teachers.

Thanks for not compromising. It is just one of the many attributes shared by you and Robert. He vows to continue his school, true to your teachings and process.

Thanks for helping us find answers. We know that from year to year many questions sounded the same, yet you always made us feel that we had touched on a novel concept.

Thanks for the honesty. Few can follow the path you tread, yet we will always strive for perfection ... and have a flexible definition of that.

A dream that you and Robert shared is now in its fifth year of existence. You shared with us your final thoughts on the craft. You shared with us your secrets to a handmade life.

Every time a hand discovers an edge "cut rounded" or a door coopered to a "live curve," your legacy lives on.

Thank you.

—JASON DINGESS, on behalf of the Resident Craftsman Program, Inside Passage School of Fine Woodworking, Roberts Creek, B.C., Canada

In defense of high contrast

Perfect timing. I brought my padauk and maple blanket chest in from the shop the same day I got my new *Fine Woodworking*. Just when I thought I got it right, your article ("The Right Way to Use Contrast," *FWW* #211) shot my work down in flames.

After reading it, I headed back out to the shop to apply a finish to a lamp and a 12-sided container made with the same woods.

This is my new favorite pairing of wood. I really do think the figured maple matches great with the richness of the quartersawn padauk. Guess I love to

Photo: Bruce Hobson

Fine WoodWorking

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"shout" (as the article said). That's OK, I'll still renew my subscription.

—ROB NIELSEN, Kelso, Wash.

Unsafe tablesawing

On p. 72 of "How to Add Quarter Columns to Your Furniture" (*FWW* #211), I count three unsafe work practices in the photos. Only two of the mistakes are serious, but still I expect more from the magazine.

—JONATHAN WELTER, New York, N.Y.

Editor replies: *You are correct. Highly skilled woodworkers like Jeff Headley have their own ways of doing things, but as a rule we insist that all authors (and readers) wear safety glasses when using the tablesaw and use a push stick to keep fingers safely away from the blade. We slipped up when shooting these photos.*

Not-so-perfect hinges

The recent article "Perfect Hinges Every Time" (*FWW* #211) states that the depth of the hinge mortise should be "just shy of the depth of the thickest part of the *hinge leaf*." This is true for swaged hinges and the thick Brusso-style hinges shown in the photographs, because the inner surfaces of the leaves touch when the hinge is closed. But that isn't true for all hinges.

On thin-leaved, non-swaged hinges like the one shown in the drawing on p. 45 of the article, the inner surfaces do not touch. Cutting the mortise to the depth of these thin leaves will result in a significant gap between the door and the carcase. If you set the depth to just shy of half the overall thickness of the *hinge* (measured between the outside surfaces of the leaves with the hinge closed) the gap will be just right.

—GREG WEASE, Carlsbad, Calif.

Corrections

In last summer's review of compact 18-volt cordless drills (*FWW* #207), we mistakenly wrote that Skil's model 2895LI-02 has a ⅜-in. chuck. Like the other models in the test, the drill has a ½-in. chuck.

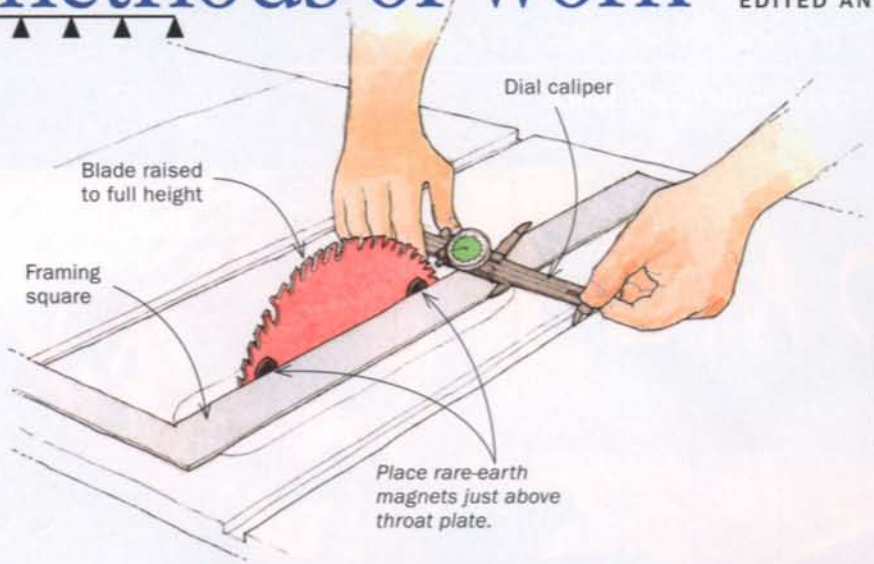
In "Make Your Own Marking Gauge" (*FWW* #211), the bar should have been labeled as ⅞ in. wide, not 1 in. This means that the mortise in the fence also should be ⅞ in. wide. On the wedge detail drawing, the dimensions might not match your finished wedge. To fit the wedge, follow the steps in the text.

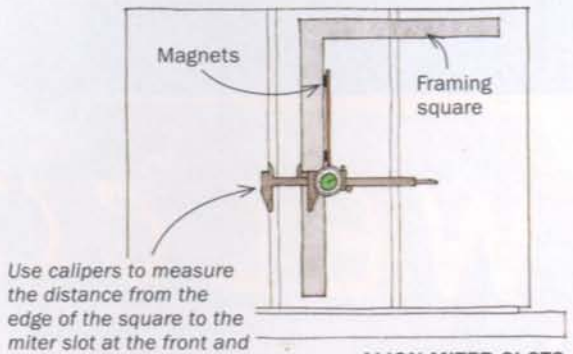
About your safety

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.

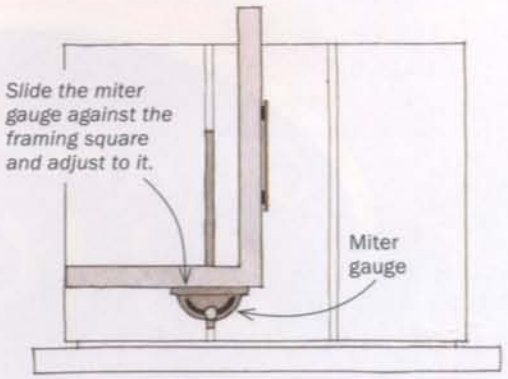
methods of work

EDITED AND DRAWN BY JIM RICHEY

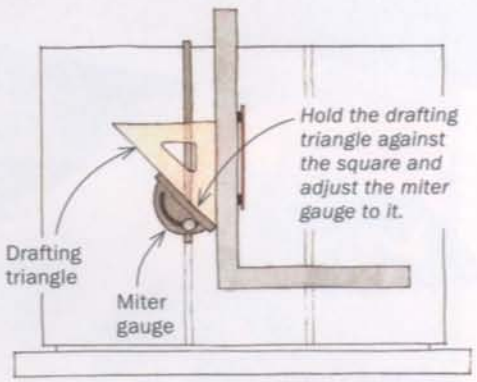




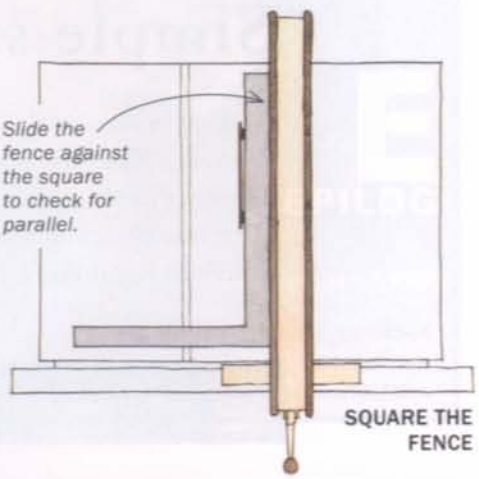
ALIGN MITER SLOTS TO BLADE



SET THE MITER GAUGE AT 90°



SET THE MITER GAUGE AT 45°



SQUARE THE FENCE

Best Tip

Check tablesaw setups with magnets and a framing square

Dick Babbitt loves to develop woodworking tips, and this is his second winning tip in the last couple of years. He says it gives him a "warm, fuzzy feeling" to share his ideas with other woodworkers.

Rare-earth magnets and a framing square offer a wonderful way to set up your entire tablesaw, from the table to the rip fence and the miter gauge. The magnets prevent the blade teeth from interfering with the square, which ensures accurate measurements.

To align the tablesaw's miter-gauge slots (table) parallel with the blade, first disconnect the power. Raise the blade to its full height and place two identical rare-earth magnets on the left side of the blade just inside the teeth—one in front and one in the rear. Both magnets should be low, about level with the throat plate.

Now place an accurate framing square flat on the saw's top and move the square to the magnets as shown. With a dial caliper, measure the distance from the miter-gauge slot to the framing square at both the front and rear of the blade. Both measurements should be equal. If not, rotate the top left or right until the readings are the same.

Once you have the table adjusted so the miter slots are parallel to the blade, you can also use the magnets and framing square to quickly adjust your miter gauge and fence as shown.

—RICHARD BABBITT, Friday Harbor, Wash.

Online Extra

For an animated version of this tip, go to **FineWoodworking.com/extras.**

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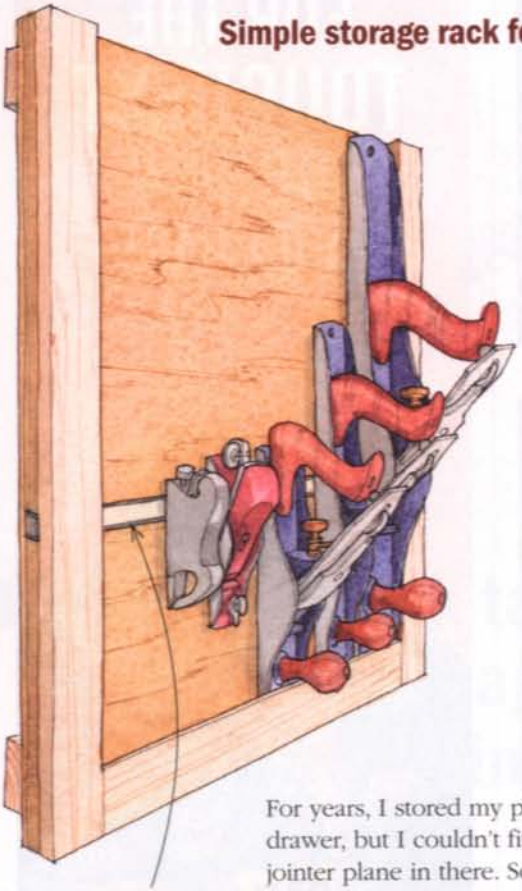
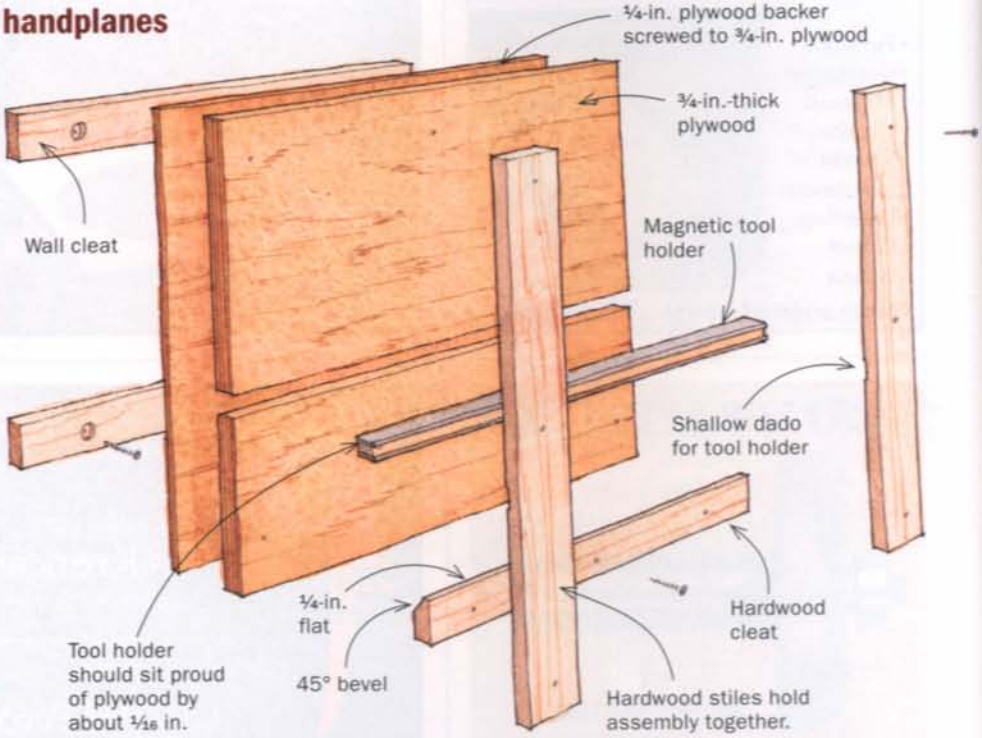
Simple storage rack for handplanes





For years, I stored my planes on their sides in a drawer, but I couldn't fit my 22-in.-long Stanley jointer plane in there. So I came up with this idea to hang all of them on a rack. The rack is basically a 24-in.-square piece of ¾-in.-thick birch plywood with a cleat at the bottom and a 24-in. magnetic tool holder located above the cleat.

The maple cleat supports the longer, heavier planes at their toes. I positioned the magnet 9 in. from the bottom so that no plane blade would hit it, including the big jointer plane. I place block planes and spokeshaves, tail up, directly on the magnet.

When constructing the rack, make sure the magnet stands about 1/16 in. proud of the plywood. This gap will help ensure that the plane blades will miss or barely touch the wood. It also means that the magnet will be squeezed between the stiles and the backer board to hold it firmly in place.

I hang the rack on a couple of 1x2 cleats screwed to the wall. The magnetic tool holder, which was my only out-of-pocket expense for the rack, can be purchased through woodworker.com and other suppliers for about $18.

—RANDALL BAKER, Sacramento, Calif.

Quick Tip

To make sure I know how many screws, nails, and bolts I have, I transfer the fasteners to a clear plastic jar. Then I cut the label off the fastener package and tape it to the jar with clear packing tape. Plastic peanut butter jars are my favorite, but I also use tennis-ball containers to hold longer or taller items.

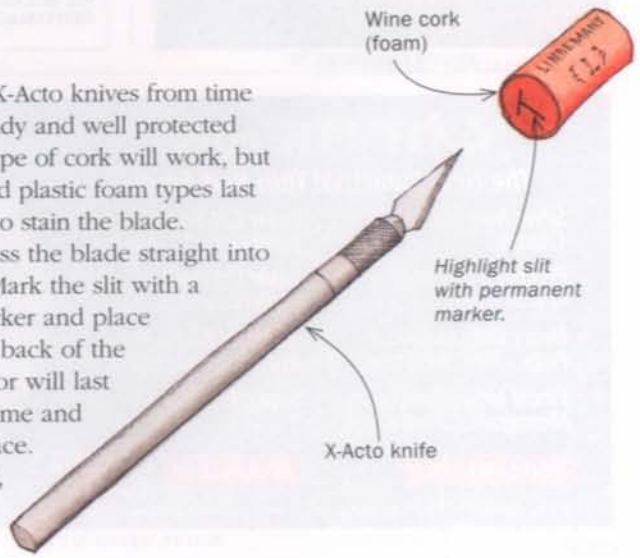
—MICHAEL J. BELLOTTI, Southbury, Conn.

Knife protector

Many of us use various X-Acto knives from time to time. I keep mine handy and well protected with a wine cork. Any type of cork will work, but I find the newer extruded plastic foam types last longer and do not tend to stain the blade.

Carefully and fully press the blade straight into the center of the cork. Mark the slit with a fine-line permanent marker and place a cross mark where the back of the blade goes. The protector will last for a surprisingly long time and is certainly easy to replace.

—DONALD R. LEWIS, Whitney, Texas



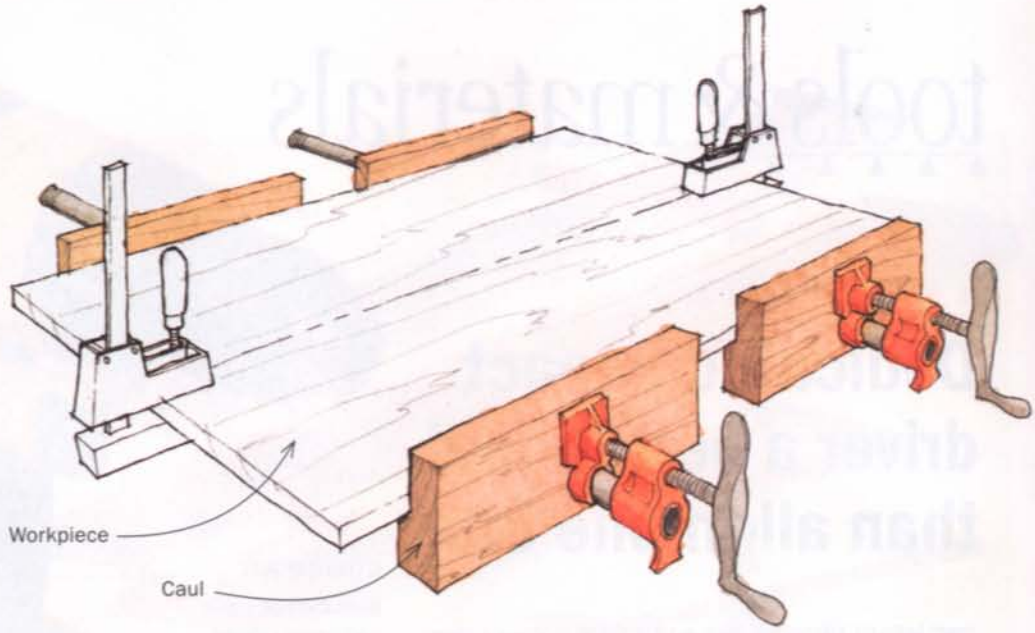
Pipe-clamp cauls put pressure where you need it

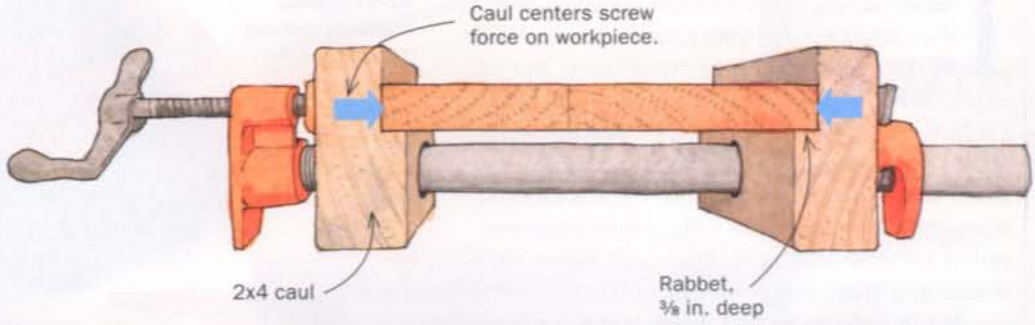
These clamp cauls not only position edge-glued stock at the center of pressure on the pipe clamps, but they also help spread the clamping pressure along the length of the workpiece and protect the edges from bruising. They make the clamping process much faster and easier.

To make them, first bore a hole (sized to slip over the pipe) about 1 in. from the edge of a 2x4. Then cut a ⅜-in.-deep rabbet in the 2x4 wide enough that the clamp head is centered on the edge of the material you're gluing up. This width will vary with stock thickness. This puts the clamping pressure right where you need it.

The cauls I use most of the time are 10 in. long, and I keep them on my pipe clamps. But I have longer and shorter cauls for different-size jobs.

–MARK FALTER, Rancho Palos Verdes, Calif.





POWER TOOLS

Dedicated impact driver a better deal than all-in-one tool

COMBO KIT

Both DeWalt's drill and impact driver have compact housings and use 18-volt lithium-ion batteries. You can also buy the impact driver on its own.

IMPACT DRIVERS ARE A HOT ITEM because they make driving screws almost effortless and their amazing run time means you can work all day without running out of juice. But an impact driver won't replace your conventional cordless drill. The hex-shanked bit holders don't accept traditional drill bits without an accessory chuck and the impacting action—which kicks in when the tool encounters sufficient resistance—makes for slow drilling in hardwood. Given these limitations, many power tool manufacturers offer kits that include an impact driver and a cordless drill. Recently, however, engineers have been able to pack driving and drilling modes into a single tool.

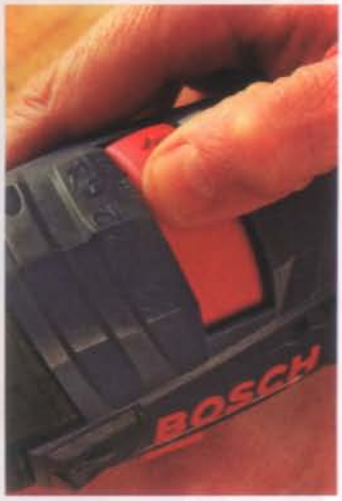
To see if these new do-it-all platforms work as well as advertised, I tried the all-in-one Bosch 26618 and compared it to a two-tool kit from DeWalt (DCK265L). Both manufacturers use 18-volt lithium-ion batteries for less weight and longer run times, but the similarity ends there. At 3 lb., the DeWalt impact driver is lighter than most 18-volt drills and its compact housing can fit almost anywhere. Conversely, the 4.3-lb. Bosch is about the same size and weight as a large 18-volt cordless drill.

Even though the Bosch performed well in all of our tests, I think furniture makers would be better served by the DeWalt kit. For starters, you'll have two tools, so you can use one for pre-drilling and one for driving. You'll also be able to use your existing collection of bits in the DeWalt drill's standard chuck. And at $280, the DeWalt kit is $110 less than the single Bosch tool. All that said, the Bosch performs well and its do-it-all convenience would likely make it a great tool for home remodeling and repair. For more information, go to dewalt.com or boschtools.com.

—Bob Nash is the FWW *shop manager.*

ALL IN ONE

A switch on the top of the Bosch housing allows you to select between one impact mode and two drilling modes.



Photos: staff

STORAGE

Ready-made rack simplifies storage

Easy and strong. *Each pair of Lumber Store racks can handle up to 660 lb.*

BUILDING A LUMBER RACK is one of those projects that I just never seem to get to, so when General International introduced its Lumber Store lumber rack (No. 99-300) I jumped at the chance to try it out. Assembling the painted steel rack takes about 15 minutes with a cordless drill.

Sold in pairs, the racks are made from square steel tubing and have six levels. Each level is rated at 110 lb. (55 lb. per bracket). The manufacturer suggests spacing the supports between 4 ft. and 6 ft. apart. I kept them about 4 ft. apart to prevent my lumber from sagging and to line up with the wall studs. At that spacing, you'll need another pair if you anticipate storing material longer than about 8 ft.

The rack, which sells for $56, is nothing fancy, but it works well and makes a great solution for woodworkers short of space and time. For information, go online to general.ca.

—Patrick McCombe is an associate editor.

ACCESSORIES

Short shop-vacuum hose provides long reach

I HAVEN'T PLAYED WITH A SLINKY in a long time, but I was reminded of the toy when using Rockler's Dust Right Expandable Vacuum Hose. The 2-ft. hose is sold in 2½-in. and 4-in. diameters and can stretch up to 12 ft. The design provides extra reach when you need it, but without a tangle of hose underfoot. The only drawback is the hose offers a little more resistance than a conventional vacuum hose when it's fully extended, but anything that makes it easier to keep my shop clean is a good thing, so this hose is a keeper. It sells for about $36, hose clamps not included (rockler.com).

—Tom Begnal is a former associate editor.

■ HAND TOOLS

Bargain-priced planes are a gamble

Economical ebony. *Woodline's affordable handplanes include (from left): a rabbet plane, an 8-in. Asian-style plane, and a European smoothing plane.*

I'M SURE THAT I'm not the only woodworker who finds the cost of good handplane a bit of a stretch, so I thought these bargain-priced ebony planes from Woodline (woodline.com) deserved a look.

Curved handle, low-profile rabbet plane— Measuring 6 in. long, this handy little plane ($45; product No. ERP55) has a 1-in.-wide cutter held in place with a wooden wedge. Unfortunately, the cutter sticks out above the plane body, making for an uncomfortable grip. And only one side of the plane was square to the sole—a problem when planing rabbets.

No pushing. *The 8-in. ebony plane from Woodline works best when pulled rather than pushed.*

Asian-style plane— I was tickled to find this 8-in. plane ($46; No. EP9), which is meant to be pulled rather than pushed, works as both a standard- and high-angle model. Putting the blade in upside down produces a 70° cutting angle, allowing me to plane a piece of deeply figured walnut with virtually no tearout. The standard bevel-down blade position provides a more typical 45° cutting angle. Unfortunately, after a month in my shop during the very dry Midwest winter, a fine shrinkage crack developed along the side, which would be a problem had it occurred on the sole or the blade bed.

European-style plane— This 10-in. smoothing plane ($50; No. EP3) did a fine job on hardwood right out of the box, but its shape makes it uncomfortable to use.

Reminiscent of earlier plane technology, the cutting edge of the 2-in. blade is ground on a piece of heavy tool steel that's brazed to a larger piece of mild steel, a nice touch.

Bottom line— All of these planes have good blades that perform pretty well right out of the box. They sharpen easily and hold an edge for a surprisingly long time. But each one had its problems. Also, generally speaking, I find adjusting wedged blades with a small hammer a bit of a hassle. Since the blade on the Asian-style plane can be turned bevel up or bevel down, I think it's worth taking a chance on. I'd steer clear of the others, unless I was on an extremely tight budget.

—Roland Johnson is a contributing editor.

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Bench-vise secrets

YOU'RE PROBABLY NOT GETTING THE MOST FROM THIS WORKSHOP WORKHORSE

BY STEVE LATTA

The bench vise is one of woodworking's most necessary and fundamental tools, vital for holding work while you saw, chop, pare, plane, scrape, and perform any number of other tasks on your projects.

Despite the vise being used so often, it is commonly misused. In my class or at workshops, I routinely see beginning students clamping stock the wrong way in the vise, sawing or paring in the wrong direction, and risking injury when the work slips and the tool jumps.

Work in the right direction

Brace the work from behind. *Applying force in line with the jaws can make the workpiece slip (right). Instead, orient the stock so that you're sawing perpendicular to the jaws (below).*

Even wide stock can slip. *It's natural to place the broadest faces against the jaws (left), but clamping on the edges still provides enough pressure to hold the work securely (below). Now the piece is braced against the force of the cut and won't slip.*

Photos, except where noted: Steve Scott; this page (top left): John Tetreault

Work at the right height

Too tall. *It's tempting to place the stock high in the vise so you can work without stooping. But this lets the workpiece flex (right), making the task more difficult and the results less accurate. For the best support, keep the stock low in the vise (below left) or brace it with a backing block of thick scrap stock (below right).*

This is dangerous. *With no support underneath, the workpiece and chisel can slip under downward pressure (left). Place a support block in the vise underneath the work (below).*

A safe setup. *Resting on the vise's bars, Latta's support block is about ⅝ in. lower than the vise jaws. With the block in place, the workpiece doesn't slip.*

You can avoid mishaps like that by adopting a few basic techniques to hold your work securely and prevent it from slipping. And with a few simple shopmade fixtures, you can use your vise to tackle an even wider variety of tasks safely.

Many ways to use the vise alone

I typically use my bench vise in one of three ways: by itself, with benchdogs, or with other clamping fixtures. Let's look at all three.

On its own, the vise is great for holding smaller workpieces during sawing, chisel work, edge-planing, or other tasks. But for best results—and safety—it's important to orient the work properly in the vise.

For vertical work, consider your task and orient the workpiece so that you'll be working across the jaws and not in line with them. You want the back jaw to brace against the thrust of the saw or chisel. Also, to reduce the likelihood of slipping

Tips for flat surfaces

Secure longer stock for surface planing. *Butt the workpiece against a thin batten laid across the benchtop. Hold the batten in the vise with an attached cleat, and brace it with a benchdog. This simple setup gives all the support you need, and lets you change out boards quickly.*

How a drawer fits in a vise. *Clamp the drawer front lightly in the vise to avoid racking, and use a short piece of stock as a bridge between the benchtop and the top of the vise. This bridge braces the drawer side against downward pressure.*

and racking the vise, position the stock between the vise screw and a guide bar, as low in the jaw as possible. The farther up from the jaws the operation gets, the greater the potential for losing control.

For horizontal work, you may need support under the workpiece if the task calls mainly for downward force. So I keep a piece of ¾-in. stock handy that is as long as my vise and comes to about ⅝ in. below the top of the jaws when resting on the guide bars. Resting a workpiece on top of this board provides additional support and enhances safety.

For edge-planing short pieces, simply clamp them in the vise. For longer pieces, I add a support block with a piece of sandpaper glued to both faces. The sandpaper bites into both jaw and workpiece, keeping it from slipping when I get to the ends of the board.

A vise and dogs hold work on the bench

For surface planing and some other tasks, the workpiece needs to be held flat on the benchtop. You can do this using the sliding stop on top of the vise and a row of dogholes bored into the bench surface.

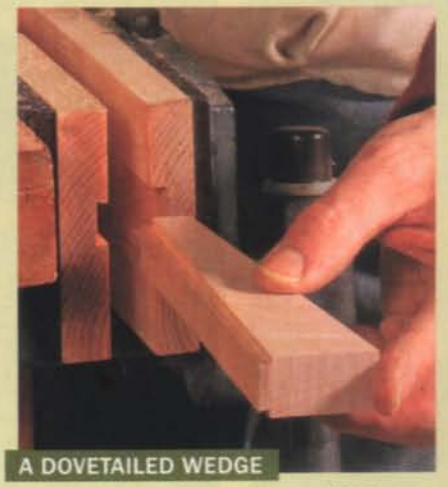
Many vises come with a metal stop that slides up out of the front jaw. If yours doesn't have one, you can create one by boring a hole in the front auxiliary jaw to fit a commercially available or shopmade dog. For best support underneath the work, don't open the vise wide to

Two cures for racking

When a workpiece is placed near the end of the jaws, all front jaws rack (deflect) to some degree, compromising the grip. Here are two great solutions.

USE AN OFFCUT

Match its thickness to your workpiece to prevent the front jaw from pivoting. A spring clamp keeps the scrap from falling before the vise is closed.



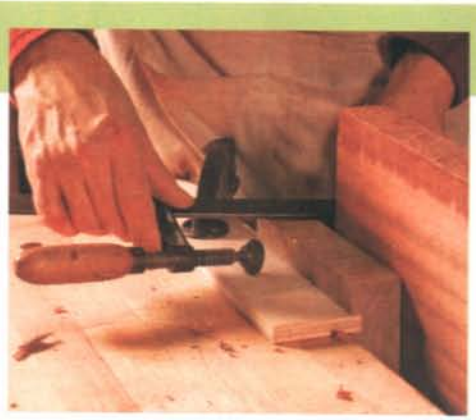
A DOVETAILED WEDGE

Latta's anti-racking wedge won't fall out because it slides on a dovetailed key routed into the inner jaw. Slide the wedge farther in to accommodate thicker stock.

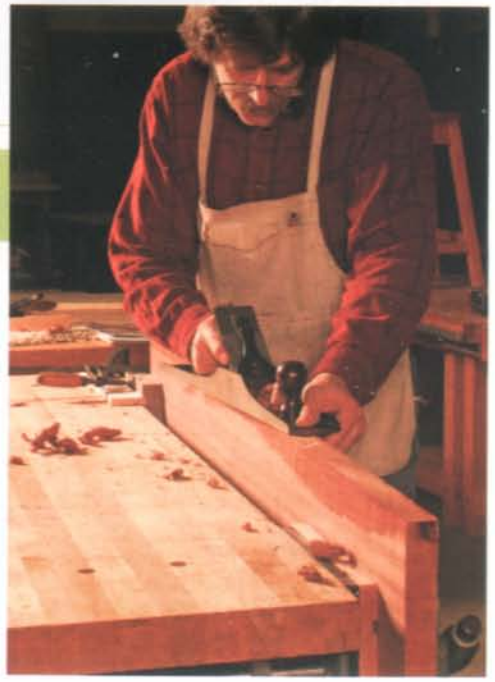
Use clamping blocks for long and tall stock

LONG

Fixture helps hold wide or long boards. *The block is as thick as the vise's rear jaw. Leave the crosspiece long to accommodate a clamp.*



Just add clamps. *To hold the free end of a long board for edge-planing, secure the crosspiece to the bench and the workpiece to the block. The setup also works for wide boards.*



TALL

A fixture for legs. *Latta uses a panel with an L-shaped bracket to support long work vertically (above). The fixture's top provides a bearing surface for the router when cutting dovetail mortises in the top of a table leg (right). The bottom of the L provides an index for clamping into the vise.*

accommodate the workpiece. Instead, use the most distant doghole you can, and keep the vise opening narrow. This puts the bulk of the stock over the bench surface, making planing easier and more stable.

Also, make sure the dog is below the board's surface. Nicking a steel or brass dog can damage a plane iron.

Add a few simple helpers

There are several accessories and attachments that work well with a vise. The simplest is just a cutoff scrap that matches the thickness of the workpiece. Inserting this scrap in the opposite end of the vise helps prevent the vise from racking (pivoting and losing its grip) when work is clamped on the other side of the vise. Taking this further to prevent racking with any thickness of stock, I made an angled block that slides in a dovetail key cut along the length of the vise (see photos, p. 24). Also in the very simple category, just about any bench hook or shooting board that typically braces against the edge of the bench can be made more stable by clamping it into the vise—a practice I recommend.

Other accessories help with larger stock or specialized tasks. For instance, when edge-planing longer stock or working the end grain of wider boards, you need a way to hold the free end of the workpiece. I do this with a clamping block made from two pieces of scrap joined at a right angle. This block gives me a surface against which I can clamp the work, and a plate that lets me secure the block to the workbench. A different fixture helps when dovetailing the top of a table leg. To hold the work and support the router, I use an L-shaped block (see photos, left) that clamps securely in the vise. The fixture anchors the leg, letting me remove much of the socket with a router and do final cleanup with a chisel. □

Contributing editor Steve Latta teaches woodworking in Lancaster, Pa.

Barnsley is in the details

The pencil roll adds a stylish touch to the back of the tabletop and prevents objects from sliding off.

Stringing emphasizes the shapes of the tabletop and drawer fronts, and leads the eye to handmade **drop pulls** (covered on pp. 66-71).

A gun-stock joint, a type of haunched miter reinforced with slip tenons, allows the bottom rails to flow into the leg.

A Graceful

Barnsley style combines Arts and Crafts

BY KEVIN KAUFFUNGER

I was introduced to the work of Edward Barnsley while studying furniture making at the College of the Redwoods. Among the more dog-eared books in the school's library was an out-of-print catalog from a retrospective exhibit of his work that took place in the early 1980s. I was immediately inspired.

Barnsley was a direct descendant of the English Arts and Crafts movement (his architect father and uncle were major proponents). His early pieces were typical of the style: solid wood, thick, with exposed joinery that communicated a visual and literal strength. After World War II, his work transitioned into something more refined. It still maintained the technical honesty of Arts and Crafts, but it began to reflect the spare elegance seen in the Hepplewhite or Federal styles.

This sideboard is not a direct copy of any Barnsley piece, but rather it incorporates many of his design elements. The construction process is relatively straightforward, so I'll focus on the Barnsley elements.

Flowing joinery

Where the legs meet the bottom rails, the lower edge of the joint flows in a continuous curve. Just joining the two members at right angles would leave weak short grain on the tip of the rail. To minimize this problem, craftsmen use a type of haunched miter called a gun-stock joint, combined with slip tenons.

Lay out the legs on a template of ⅛-in.-thick plywood or MDF, transcribe the pattern onto

Photos: Mark Schofield; drawings: Bob La Pointe

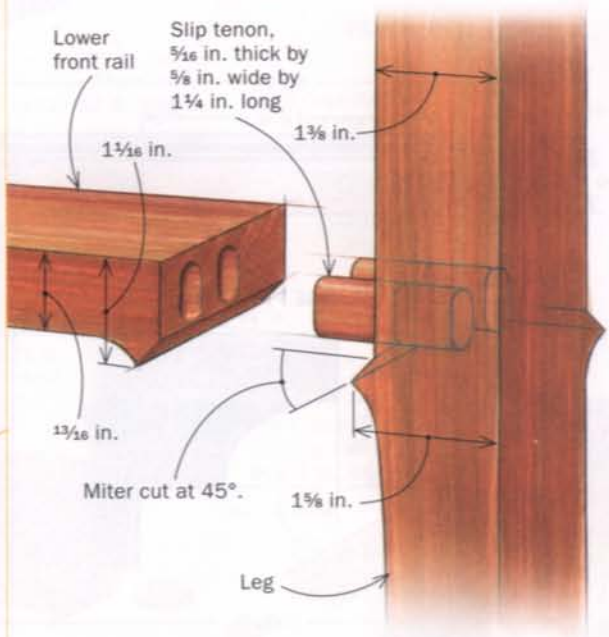
Hall Table

simplicity with Federal elegance

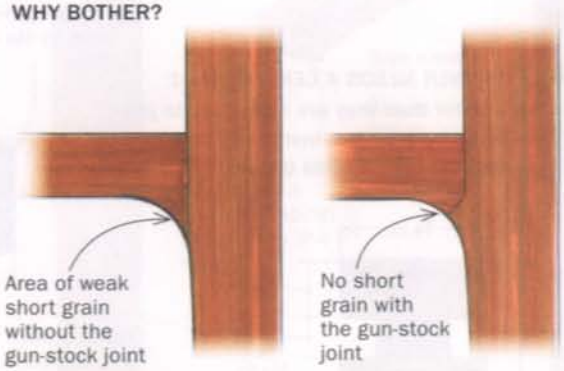
the leg blanks, and mark out the mortises. Next, mark the 45° angle at the bisection of each curve, and with your tablesaw blade at 45°, use a crosscut sled to cut the miter ¼ in. deep into the legs, a total of eight cuts.

Cut the mortises in your preferred way; I use an upcutting spiral bit in a plunge router equipped with an edge guide. Mortising before shaping gives you easier surfaces to reference the router against. On the adjoining lower rails, cut matching mortises and then cut the miter

INSIDE THE GUN-STOCK JOINT

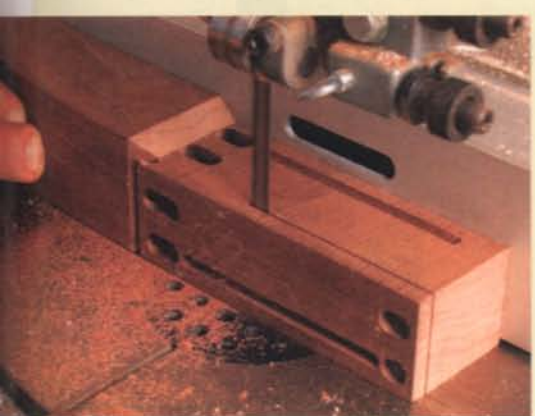


WHY BOTHER?

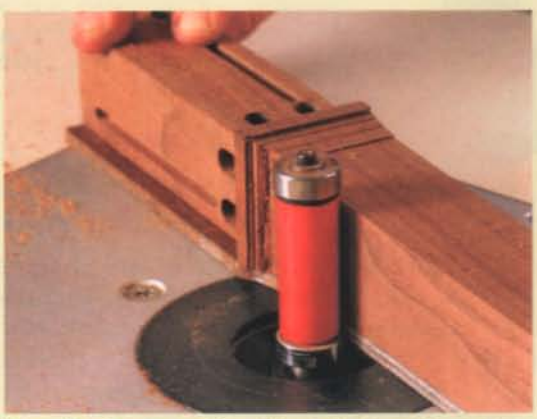


How to form the joint

Cut the miters on both parts of the joint first, but don't try to create a seamless curve until after the joint is glued together.



Start at the top of the legs. *First lay out the entire leg, and then create the mitered part of the gun-stock joint on the inside faces. After cutting the mortises for the rails and the panels, bandsaw down from the top of the leg to the peak of the miter. Use a fence to guide the cut.*

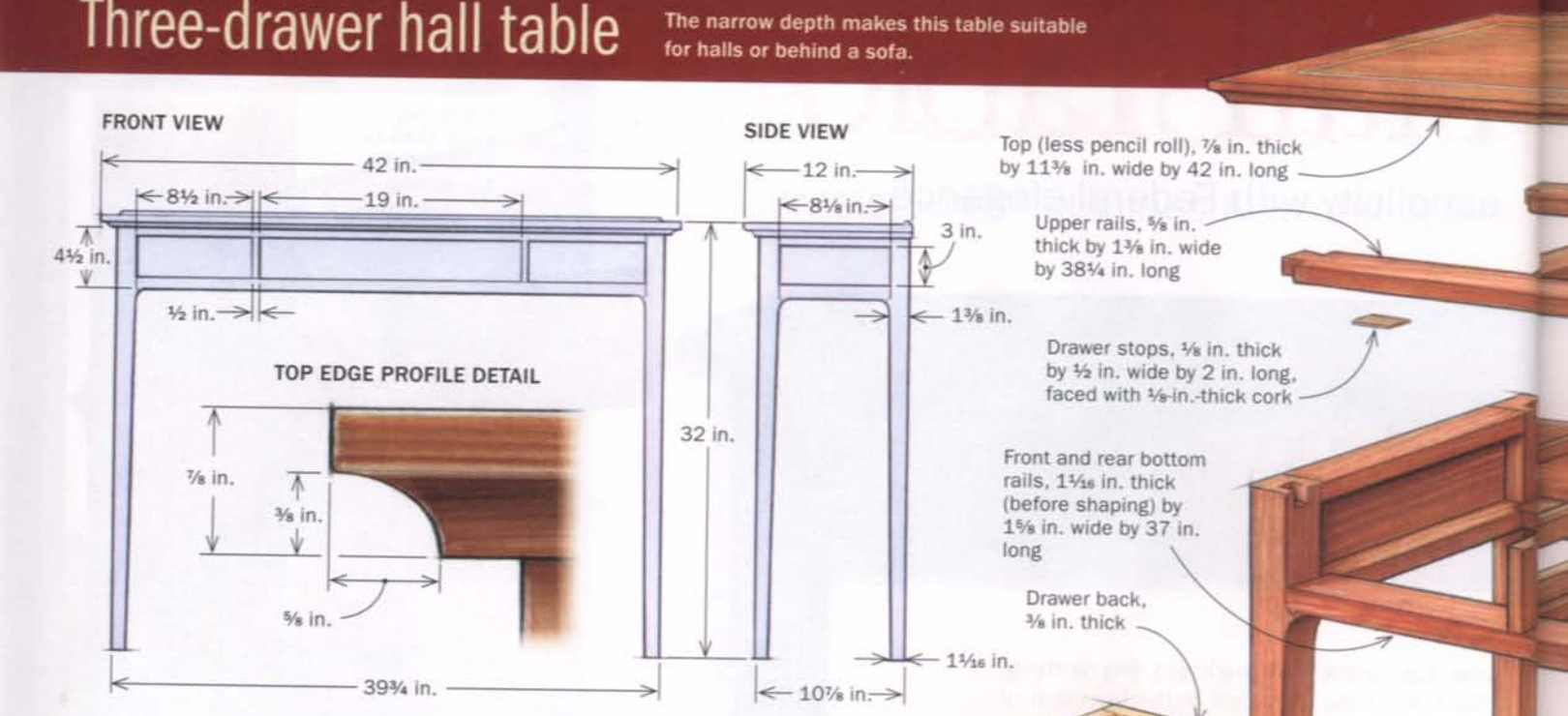


Taper the lower section. *Attach the template to the leg with double-stick tape and use a bearing-guided straight bit to clean up the tapered sections. Stop ½ in. short of the gun-stock joint; this area will be completed after the base is assembled.*

Shape the rails. *After mitering the ends of the lower rails, bandsaw the concave profile between the miters. Then clean up the surface using a template and bearing-guided bit. Again, stop just short of the gun-stock joint.*

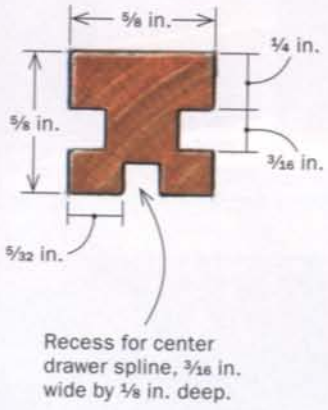
Three-drawer hall table

The narrow depth makes this table suitable for halls or behind a sofa.



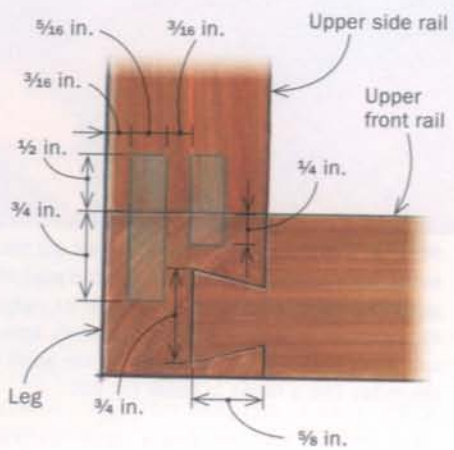
WIDE DRAWER NEEDS A CENTER GUIDE

Drawers wider than they are deep tend to jam. To ensure smooth action, install a drawer guide in the bottom of the middle drawer.



To learn how to make these drop pulls and other handmade hardware, turn to pp. 66-71.

UPPER RAIL JOINT DETAIL

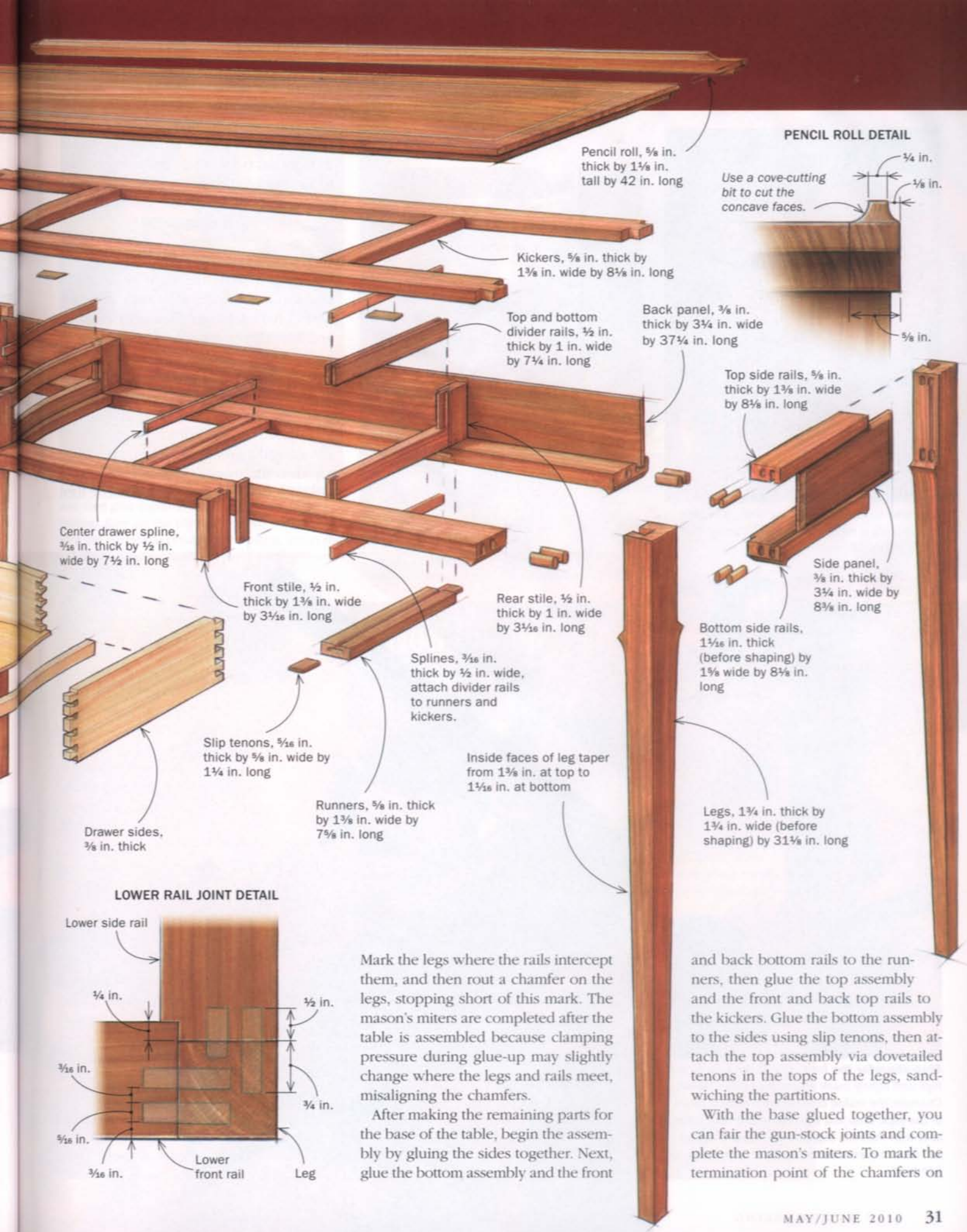


using the same crosscut sled setup that you used on the legs.

Use a bandsaw to rip from the top of the leg down to the peak of the miter, reducing this portion of the leg to 1⅜ in. square. Clean up the bandsaw marks with a block plane. You're now ready to taper and curve the leg on the bandsaw. You can use the template to guide a router bit first or do all the cleanup with hand tools, but whatever method you choose, make sure not to fully shape the curve around the joint. You'll want to leave extra material here so that you can finish shaping the joint after glue-up.

Decorative chamfers and miters

Subtle chamfers surround the drawer openings and side panels, but instead of the legs and rails meeting in a normal miter, which would involve insetting the rails into the legs, they meet in a false, or mason's, miter. Begin by routing the chamfer on the inside edge of all the rails.



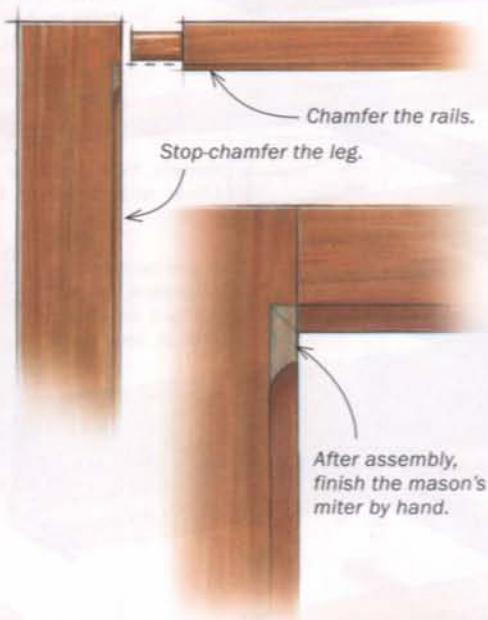
Mark the legs where the rails intercept them, and then rout a chamfer on the legs, stopping short of this mark. The mason's miters are completed after the table is assembled because clamping pressure during glue-up may slightly change where the legs and rails meet, misaligning the chamfers.

After making the remaining parts for the base of the table, begin the assembly by gluing the sides together. Next, glue the bottom assembly and the front and back bottom rails to the runners, then glue the top assembly and the front and back top rails to the kickers. Glue the bottom assembly to the sides using slip tenons, then attach the top assembly via dovetailed tenons in the tops of the legs, sandwiching the partitions.

With the base glued together, you can fair the gun-stock joints and complete the mason's miters. To mark the termination point of the chamfers on

Another nice detail: mason's miters

Chamfer the rails. *The front, back, and side rails receive a decorative chamfer along their inside edges.*



Stop-chamfer the legs. *Dry-fit the rails to the legs and lightly mark where they meet (above). Chamfer the inside corners on the show faces of the legs. Stop just short of where they intersect with the rails (right). The mason's miters will be completed after the table base is assembled.*

the legs, register a plane iron, bevel up, against the chamfer on the rail and slice crossgrain into the leg, making sure to maintain the angle. Now register the back of the iron against the chamfer on the leg to meet the cut you just made. If you have to go against the grain, take your time, skew the iron, and make sure it is super sharp to avoid tearout.

How to inlay across solid wood

Stringing defines the field of both the tabletop and the drawer fronts, adding a typical Barnsley combination of elegance and formality to the overall piece. I chose holly, not just because of its visual merits but also because it works beautifully with hand tools, and you don't have to worry about the walnut dust getting in the pores and muddying the white color.

Routing the groove is easier on the tabletop than the more fiddly drawers, so begin with that. Mark out the corners, then

Assemble the base

Do it in stages. *Pre-finish the panels completely and then glue together each side of the table (above). Glue up the top and bottom assemblies, glue the bottom assembly to the sides, insert the pre-finished back panel and the drawer dividers, and then glue in the top assembly (right).*

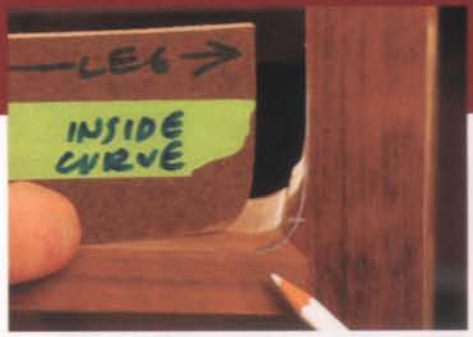
use either a plunge or a fixed-base router equipped with an edge guide to make the 1/16-in.-square grooves, taking care not to rout past the end points. I always use a carbide down-spiral or down-shear bit (Freud No. 04-096; www.woodcraft.com and other online sites) as the downward pressure minimizes fuzz on the top edge of the groove. As an extra precaution, I rout the groove through a strip of masking tape.

To be sure the holly stringing fits the groove, I make it myself. Starting with a 1x1 stick, I bandsaw 3/16-in.-thick strips. To plane them down to 1/16 in., I use double-stick tape to attach them to MDF. Last, I bandsaw them 1/8 in. wide, with a zero-clearance insert in the throat.

The top is solid walnut and will expand and contract across the grain with seasonal changes in humidity. Running long grain stringing across the grain could cause the stringing to pop out. To avoid this, you want the stringing also to be crossgrain.

Using a block of holly about 1 in. square, saw slices off the end as thick as the width of the groove in the tabletop. Use a plane iron and a mallet to chop these slices into five or six sections. Don't worry about

Now fair the joints

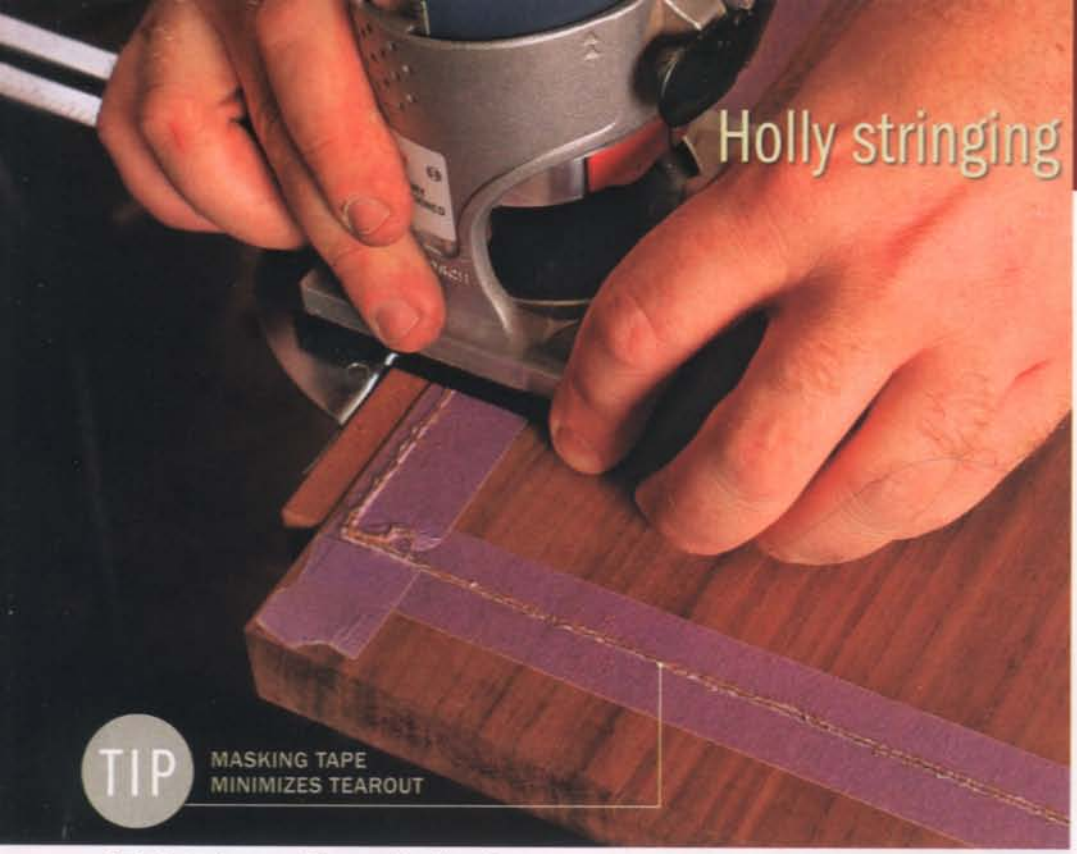


Lay out the gun-stock curve. *Use a template to draw the finished curve.*

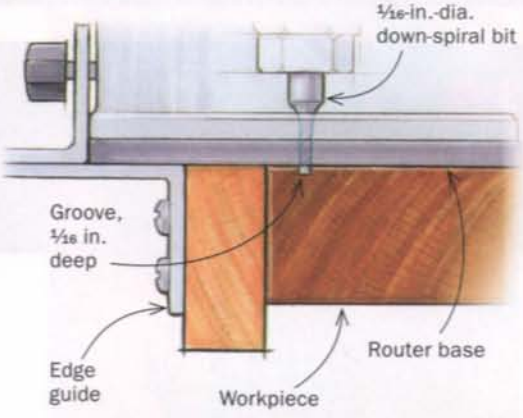
Shape and smooth it. *A coarse Microplane removes the waste wood quickly.*

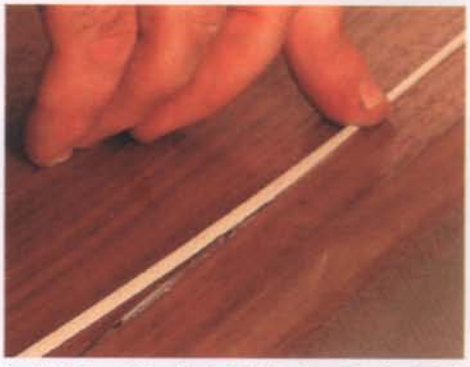
Finish the mason's miters. *Create a stop cut where the rail's chamfer meets the leg; then use a plane iron to complete the chamfer on the leg.*

Holly stringing outlines the tabletop

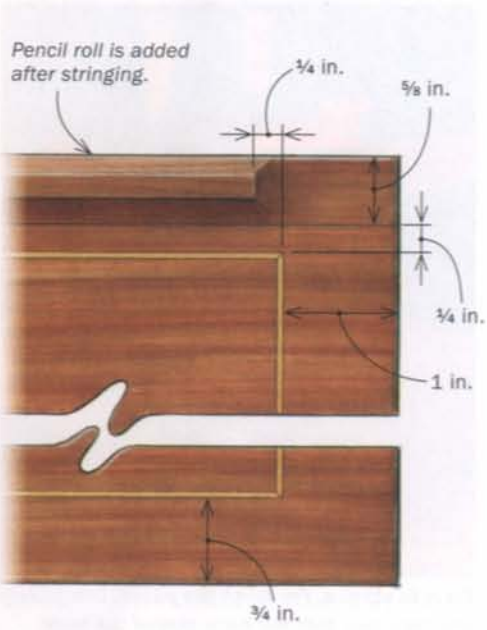


Cut clean grooves. *The combination of a down-spiral bit and masking tape minimizes tearout when cutting grooves for the stringing.*





Install the stringing. *Mill the long-grain stringing to 1/16 in. thick. Use a glue syringe to inject the glue into the groove.*



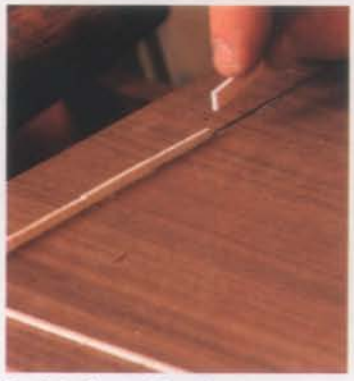
getting the sizes exactly the same, because they'll be planed flushed once installed in the table. Glue these pieces edge to edge into the groove. At the corners, butt the pieces together rather than trying to miter the fragile cross-grain stringing.

For the drawer fronts, you can use a plunge router with an edge guide, except for the curved portions near the drawer pulls. Here, use the plunge router with a template bushing and follow a Masonite template to get the curved shape. I made a short template and moved it to each curved section, but the extra time spent

CROSS-GRAIN STRINGING MOVES WITH THE SEASONS

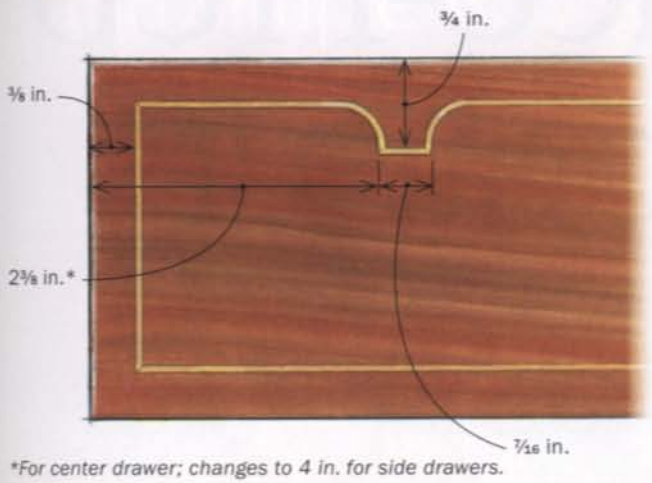
Like slicing salami. *Double-stick tape on the stop block ensures you don't lose thin sections when slicing end-grain holly.*

Chop the slices. *Use a sharp plane iron to cut each slice of holly into five or six sections.*

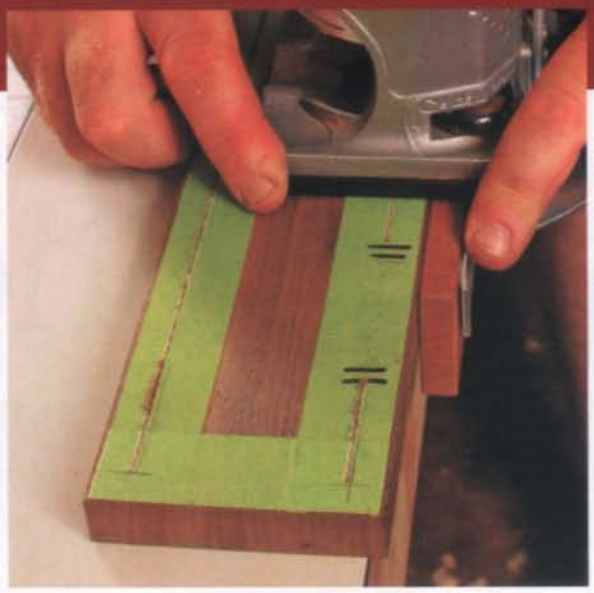


End grain up. *The short sections of end-grain holly will move seasonally with the solid-wood tabletop.*

Trim it flush. *Use a scraper to bring the stringing flush with the tabletop. Near the corners, use a plane iron to avoid tearout.*

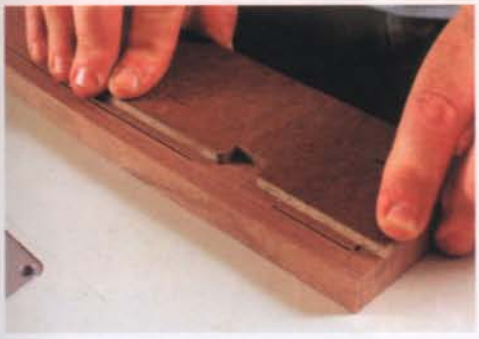


*For center drawer; changes to 4 in. for side drawers.

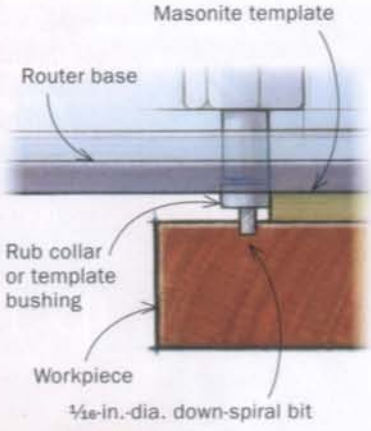


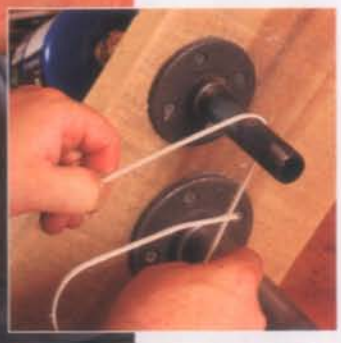
Straight grooves first. *Use a router equipped with an edge guide to cut the grooves for the straight sections of stringing.*

TAME THE CURVES WITH PATTERN ROUTING



Make a template. *A piece of Masonite attached with double-stick tape guides a bushing on the router when cutting the curved grooves adjacent to the drawer pulls. Spend some time aligning the template so that the curved groove transitions perfectly into the straight sections.*





Round the bend and miter the joints. *For the curved stringing, soften and bend the holly on a piece of pipe heated with a propane torch (above left). Dry-fit each section of stringing, mark the ends (below left), then remove the stringing and miter the ends with a plane iron.*

lining up the template to make sure that the curve flows smoothly would have been better spent making one long template.

The curve is too tight to hand-bend the stringing without breaking it, so instead use a hot pipe to soften the wood and allow it to bend (see Master Class: "The magic of hot-pipe bending," *FWW* #205).

Though some of the stringing on the drawer fronts goes cross-grain, the span is too short to need cross-grain stringing. Let the inlay dry, and then plane and scrape the holly flush. Finally, attach the tabletop. □

Kevin Kauffunger is a furniture maker in Pittsburgh, Pa.

Surface-Prep Shootout

A contest in the *FWW* shop reveals two great paths to a perfect finish

One of the happiest moments in any woodworking project comes when you begin applying a finish. It's then that you see the wood's final appearance deepening in color and character before your eyes. But the results won't be satisfying if you haven't prepared the wood's surfaces for the finish, which tends to highlight flaws instead of disguising them. The surfaces must be smooth, flat, and free of milling marks, scratches, tearout, and other imperfections that can detract from the beauty of your work.

Preparing the surfaces usually means using one of two time-honored cutting technologies: sandpaper or handplanes. Which is best? To explore the question, we recently set up a friendly competition in our shop. Each contestant was given the parts for a Shaker table with tapered legs. Milled to final dimension and with the joinery already fitted, the parts were ready to be sanded or planed in preparation for a finish. We broadcast the event live on FineWoodworking.com, and invited local woodworkers to our shop to watch and judge the results.

Art director Michael Pekovich demonstrated handplanes and scrapers. Editor Asa Christiana used a random-orbit sander and hand-sanding. Afterward, each contestant applied a coat of Waterlox, a wiping varnish, as a way to check the results.

We put each contestant on the clock to see who crossed the finish line first. But we were even more interested in knowing whose finish looked best at the end.

As it happened, Mike and his handplanes appeared to prevail on both counts. He finished his prep with a half-hour to spare, and the audience judged his finish to be superior. In truth, if you follow either method carefully and thoroughly, you'll get great results.

Online Extra

To see the contest as it happened, go to **FineWoodworking.com/extras**.

Photos: Kelly J. Dunton

'No sharpening required: Sanding is a sure and simple way to get flawless surfaces'

BY ASA CHRISTIANA

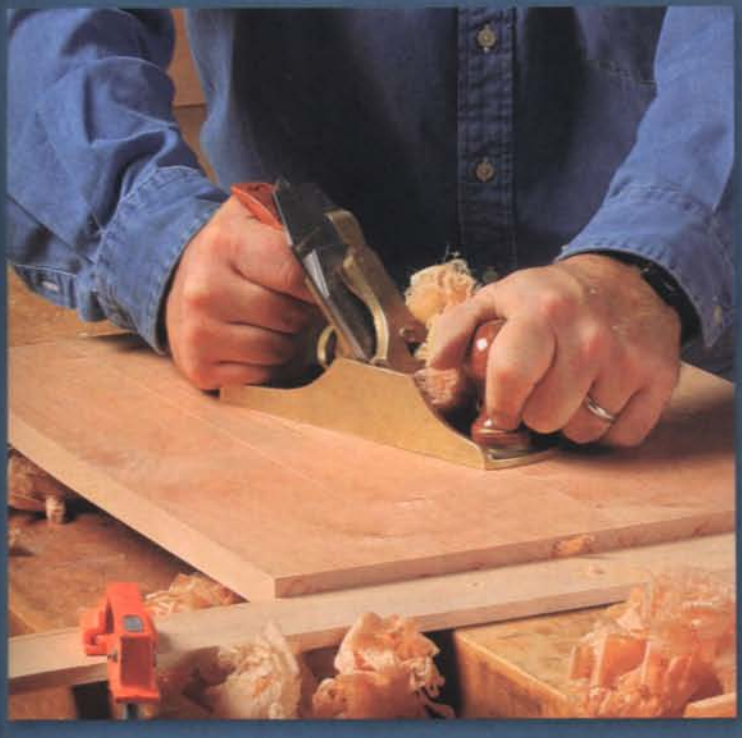
When I started out as a woodworker, I didn't know much about sharpening and therefore couldn't get my hand tools to work well. So I used sandpaper to prepare surfaces for finishing. Sandpaper has a short learning curve, and I picked up most of the tips I needed from a great Taunton Press video on finishing by Frank Klausz.

Truth be told, I've since switched to handplanes for a lot of my surface prep. A few passes with my sharp No. 4, and I usually have a dead-flat surface ready for finish. But the handplane doesn't work with every type of wood and figure, so I still break out my random-orbit sander and trusty sanding blocks quite often.

I don't mean to say that sandpaper works better than handplanes and scrapers. But sandpaper is a great equalizer: It works on every wood and in nearly every situation, while handplanes must be perfectly tuned and razor sharp to work at all. With sandpaper and a few tips, anyone can create flawless surfaces.

My sense is that sanding is slower than planing and scraping, even when you factor in sharpening time for the hand tools. This shootout will test that assumption. Maybe sanding is easier *and* faster.

'Handplanes flatten and smooth quickly, with no dust'



BY MICHAEL PEKOVICH

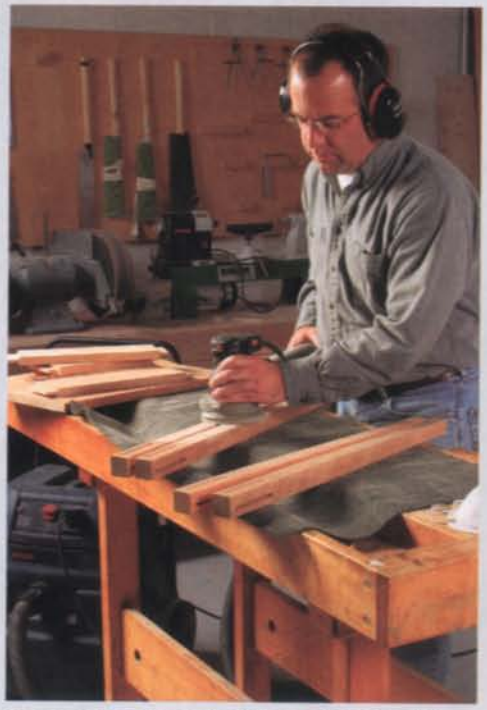
I did a lot of sanding in the 15 years between my first run-in with a dull, rusty handplane and my eye-opening test drive with a truly sharp one. Unfortunately, that's not an uncommon experience. A sharp handplane can work wonders, going from machine marks to a glass-smooth surface in minutes. A dull plane can do a lot of damage, both to your lumber and your psyche.

The good news is that it's easier than ever to start working with your first handplane. Years ago, your choices were to buy an inferior new plane that needed a lot of tune-up work or an old high-quality plane that also needed a lot of tune-up work. Today the market offers many excellent new planes that require little more than a five-minute sharpening before the shavings start to fly.

I still keep a scraper and fine sandpaper on hand to fix the occasional tearout, but my smoothing plane has eliminated the dusty hours of sanding that used to accompany every project. In addition to saving time and leaving a smooth surface, the handplane excels at creating dead-flat surfaces and crisp chamfers, hallmarks of fine woodworking that are impossible to achieve with sandpaper alone.

POWER SANDING: DEAL WITH DUST AND DON'T SKIP A GRIT

Better than a dust mask. *Connect a shop vacuum to the sander's dust port to keep dust out of the air and avoid clogged sanding pads. Better vacuums switch on with the sander when the tool is plugged into an onboard power outlet.*



Gang up parts. *Start with a coarse grit, P80 or P100, to remove burns and mill marks. Avoid rounded edges on narrow stock by ganging two narrow pieces together. Note, this only works if the surfaces are level.*

Change disks frequently. *Don't be shy about using more than one disk of the same grit before moving to a finer abrasive. A worn or clogged disk will slow down the work.*

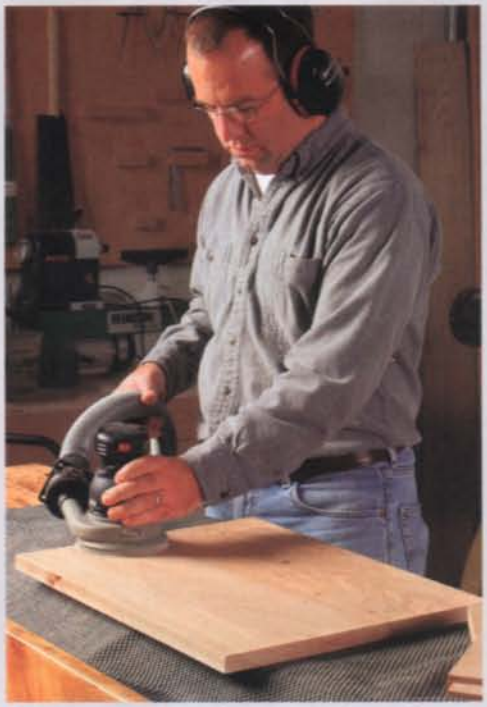
HANDPLANING: START SHARP AND USE SIMPLE STOPS

Get sharp first. *Using waterstones and a honing guide, Pekovich polishes a narrow band at the blade's beveled tip (top). He removes the burr with his finest stone (bottom). For more, see "A Visit to the Sharpening Doctor,"* FWW #206.

Easier than benchdogs. *A simple planing stop clamped across the benchtop is all you need to secure the work, and it lets you quickly flip the piece or change to another.*

Don't bother with hidden surfaces. *To save time and wear on the blade, plane only the outside face and bottom edge of each apron. Afterward, chamfer the bottom edges with a block plane.*

Scrape away the glue first. *Christiana starts work on the tabletop by using a sharp paint scraper to remove the glueline in the middle of the panel.*



Sand evenly. *It is critical to work the surface evenly and systematically to guarantee it will end up flat. It's easy to linger in one area and create a hollow, which you may not notice until finish is applied.*

Work in stages. *Use each successive grit to remove the scratches left by the last one, until the abrasive is so fine (P220 or more) that the human eye can't see the scratches under a finish.*

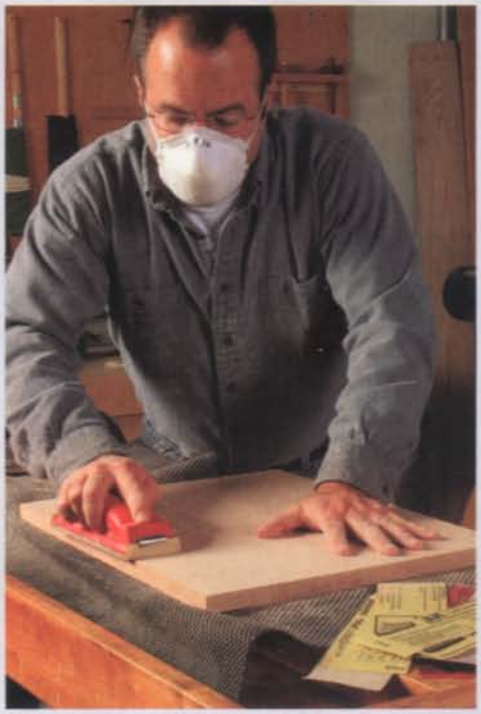
Holding narrow work. *A simple L-shaped jig mounts in the vise and holds the leg securely during planing.*

Mark the top end of the taper. *Planing too much on the tapered area can cause the intersection with the flat area to move. To avoid this, draw a few pencil lines just below the intersection as a guide.*

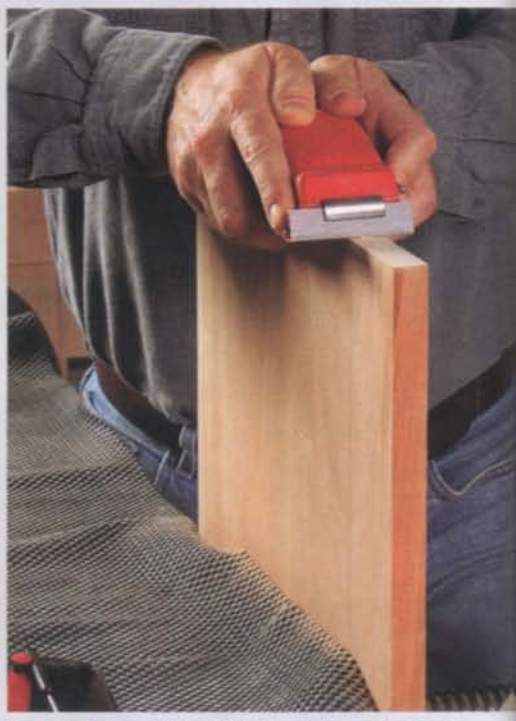
A piece of scrap keeps the workpiece level. *To plane the outside faces, insert the taper's matching cutoff underneath to support the leg along its length.*

FINISH BY HAND-SANDING

Shopmade paper cutter. *Christiana's cutting jig uses an old hacksaw blade to trim sandpaper sheets squarely to fit on padded sanding blocks. The blocks hold the paper flat, ensuring that it will leave a flat surface.*

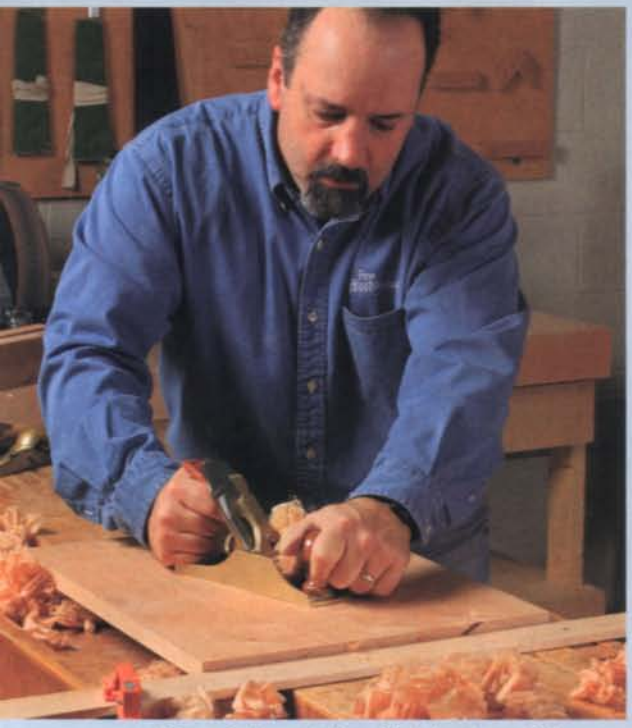


Finish by hand. *Begin hand-sanding with the last grit you used on the random-orbit sander, usually P220. Work the sanding block in the direction of the grain to remove the last swirl marks from the sander.*



How to keep edges flat. *Hold the workpiece in a vise, with the narrow edge horizontal. Use the sanding pad like a block plane, running your fingertips along the workpiece to keep the block flat and the edge square.*

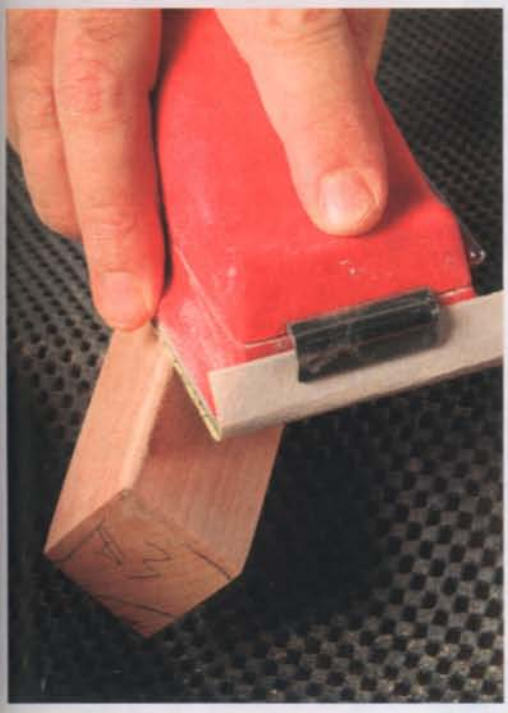
THE TOP GETS EXTRA CARE



Plane in two stages. *First, level any high spots until the top is flat on both sides. After resharpening the iron, set the plane for a light cut and take a series of smoothing passes over the entire surface of the show side only.*

Treatment for tearout. *Pekovich typically uses a card scraper to remove any tearout.*

Sandpaper? *Because the scraped areas have a different scratch pattern than the planed areas, it's good to blend them by following any scraping with P320- through P600-grit sandpaper over the entire top.*



Sanding block breaks edges, too. *Easing the sharp edges makes them friendlier to fingers and more resistant to damage. Turn the block 45° for a few passes with P150-grit paper to create a light bevel.*

When to stop. *The final grit depends on the type of finish: P220 for shellac or polyurethane, or as high as P600 for an oil finish, especially on blotch-prone woods like cherry.*

What they learned

ASA: SANDING IS STILL A SAFE FALLBACK

Mike beat me comfortably, but not by as much as I expected. He ran into some tearout, and that took some fussing to overcome. I had no such problem. Sandpaper handles the toughest grain without a hitch. But now I'm sure that it takes longer. A few online comments suggested using a belt sander for speed, but the random-orbit sander is easier to control.

Under a coat of oil, my tabletop had a tiny bit more blotching, but that might be due to the different boards we started with. And I'd say my legs and aprons were better, as his still had some tearout left.

On future projects, I'll stick to my usual approach: When the wood allows, I'll use handplanes. But trusty sandpaper is always my backup plan. Also, I think sanding is easier for beginners. Just work the surface evenly, move patiently through the grits, and use a block for hand-sanding.

How to tackle end grain. *Start by lightly lubricating the plane's sole with paste wax. To avoid chipout at the far edge, take a few short passes from that end first. Then rotate the piece and work normally, stopping short of the far edge.*

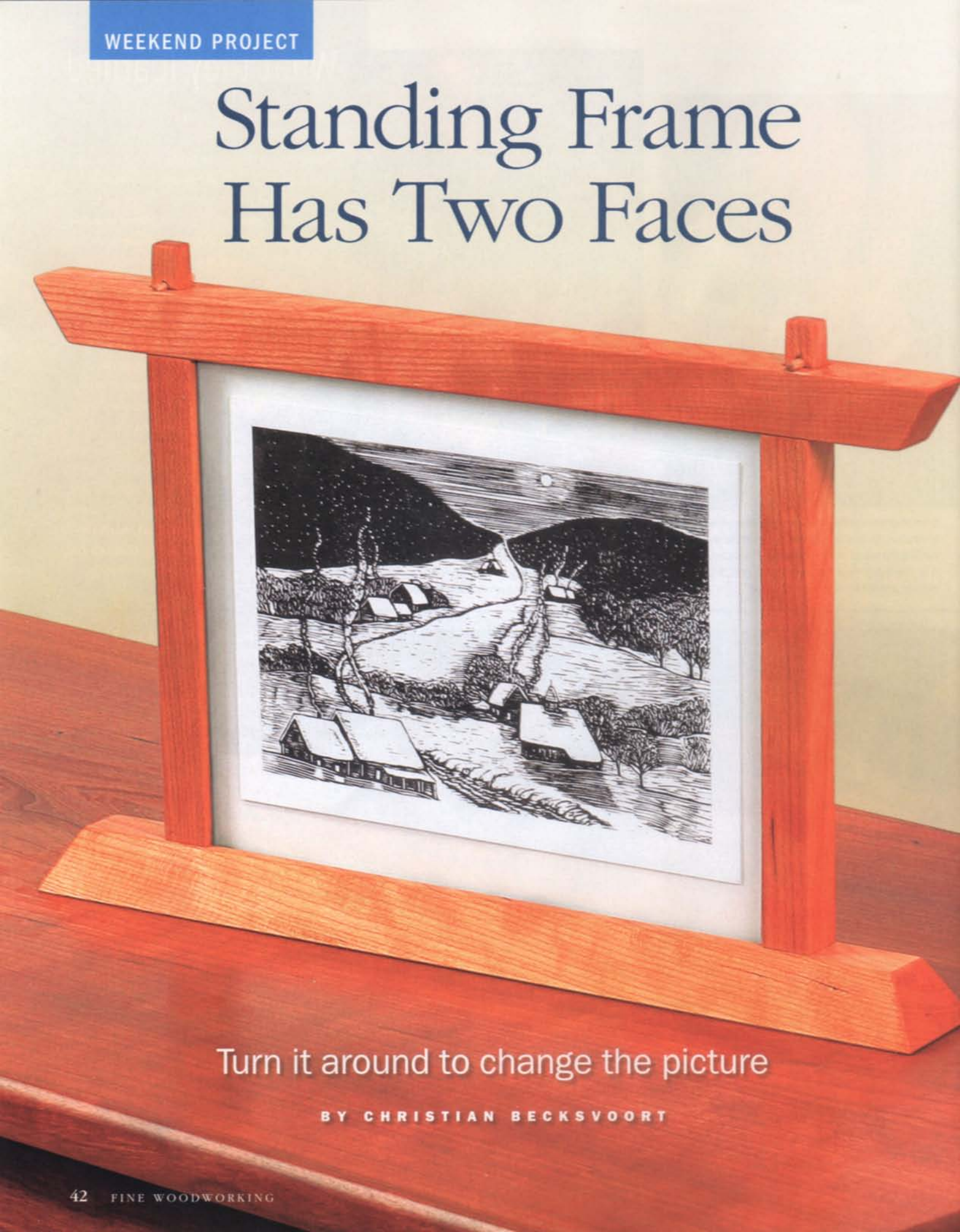
Dead flat and smooth. *Careful surface preparation pays off, especially on your project's broadest, most visible surfaces.*

MIKE: YES, PLANES ARE FASTER, BUT DON'T RUSH

I've always contended that handplaning was faster than sanding, so it's nice to know that I haven't been laboring under a false assumption. That said, I planned on half an hour to prepare these parts and it took twice as long. As always, the devil was in the details. With perfectly straight-grained lumber, planing is a breeze, but in the real world, that's rarely the case. The quartersawn grain on the legs was especially tricky and prone to tearout. I spent extra time scraping those parts, and would have done even more if I hadn't been keeping an eye on the game clock.

During the contest, I used just one bench plane and a block plane to show that you don't need to buy a lot of handplanes to get started. But I wound up doing a lot of adjusting for heavy and light cuts. Normally, I'd have set up a No. 5 jack plane for flattening parts quickly and a No. 4 for final smoothing. That would have saved some time and effort.

Standing Frame Has Two Faces

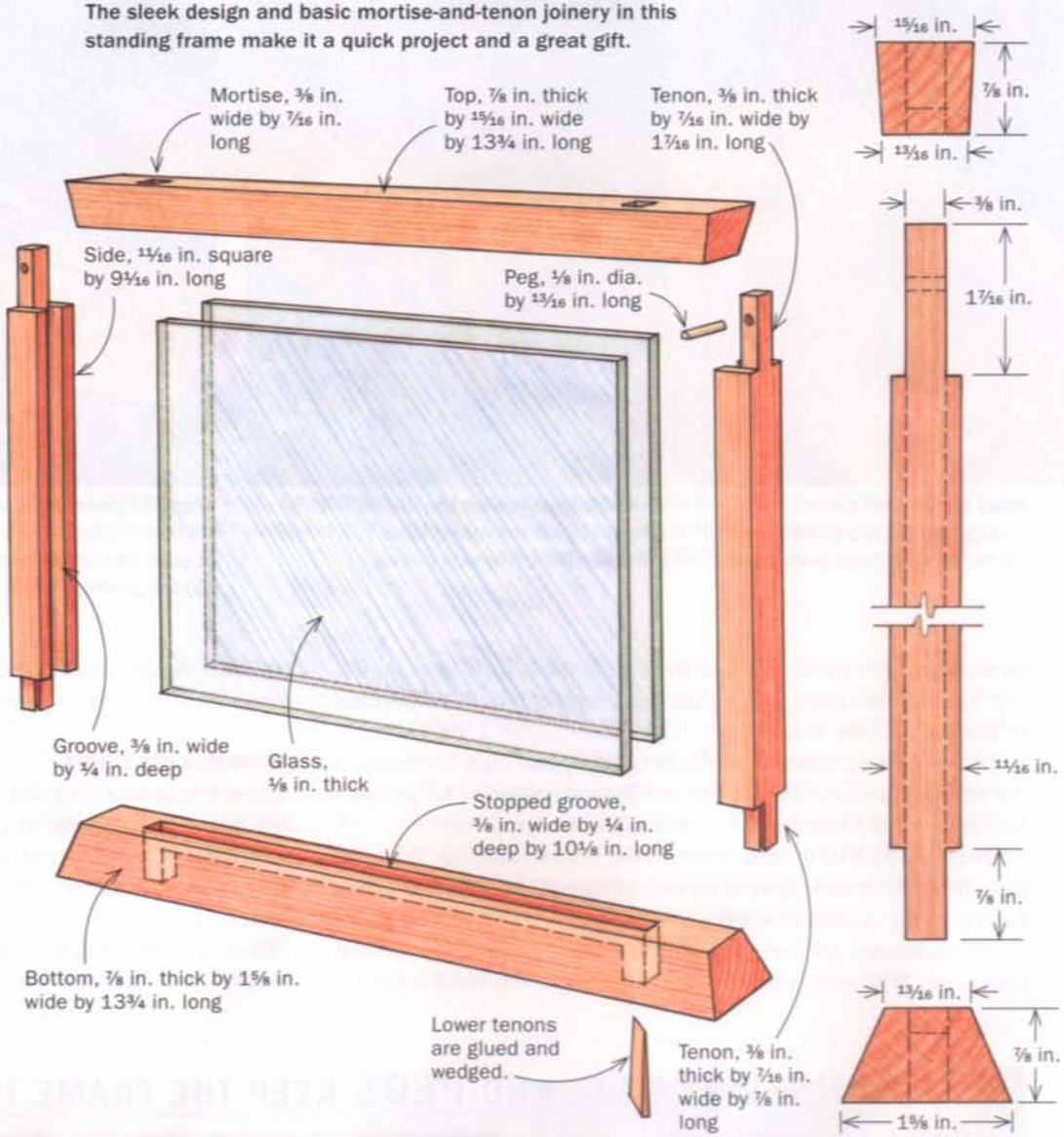


Turn it around to change the picture

BY CHRISTIAN BECKSVOORT

SIMPLE ANATOMY

The sleek design and basic mortise-and-tenon joinery in this standing frame make it a quick project and a great gift.



I have a black-and-white woodcut print and a piece of needlepoint that are dear to me. Since wall space is limited in my house, I decided to make a free-standing frame to display them. Both pieces of art fit in the same frame, one on each side facing out, and the frame can be placed on a tabletop, shelf, desk, dresser, anywhere you have free, flat space—at home or in the office. The frame also makes a great gift.

Because both sides are visible, I knew this frame would be a bit trickier to design than a typical, wall-hung picture frame. I also needed a way to take apart the frame, should the artwork ever need to be replaced.

The frame required a relatively wide base to stand on. Playing around with several designs, I settled on a wide base, a narrower top, and through-tenons on the uprights to allow for disassembly. Although the frame dimensions will vary depending on what it is to hold, the building process can be adapted to any size.

Cut the joints

Once you've measured both pieces of art, added a proportional border/mat, and come up with an overall

SHOW OFF TWO PIECES OF ART IN ONE FRAME

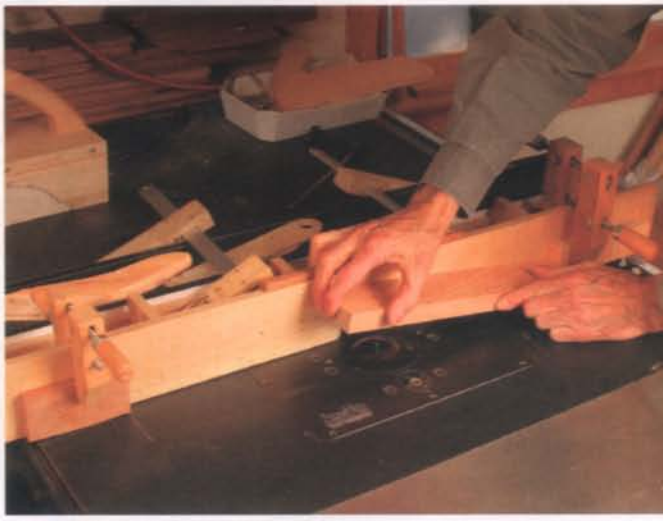
Installing artwork is a breeze. *Just sandwich the art between two glass pieces and slide the package into grooves in the bottom and sides (left). The mortised and grooved top fits onto the sides (above left), and dowels lock it all in place (above right).*

Needlepoint by Margo Timmons; woodcut by Mary Azarian

GROOVES, BEVELS, AND MORTISES ARE SIMPLE TO MAKE

Start on the drill press. *Drill through the top and bottom, centering the mortise holes in the stock.*

Through-grooves on the sides. *With a straight bit on the router table, run through-grooves on the two side pieces.*



Stopped grooves in the top and bottom. *With two stop blocks clamped to the fence so that the bit lines up in the mortise holes at each end, pivot down into the first hole with the router running, run the groove, and lift the workpiece out of the second hole.*

dimension, you can rough out the frame parts for the base, the top, and the two sides. Use a drill press to rough out the mortises in the top and the base.

Cut the through-grooves in the two sides, and then move on to the stopped grooves in the top and bottom pieces. The grooves line up with the mortise holes and run between them.

Square up all four mortise holes in the bottom and top. Both the top and bottom now have a groove centered on the wide faces, ending at the square mortises.

Cutting tenons on the sides of the frame is the last structural operation. With only one height setting, I cut the tenons on the tablesaw using a wide dado blade. Small bevels on the tops of the tenons make the frame easier to assemble.

Assemble the frame

When I was working out the original design and the artwork and glass panes were in place, everything fit well but looked too clunky. So, to give it a lighter appearance, I ripped a bevel down the sides of the top and bottom and crosscut an angle on each end.

Once you've completed the joinery and beveling, sand all the parts to P220-grit and glue the sides to the bottom, wedging the

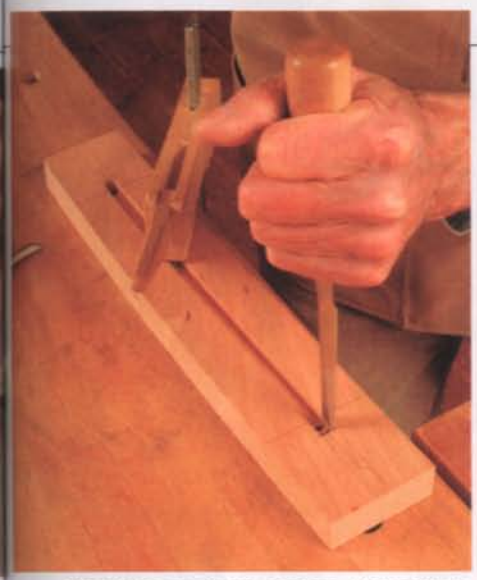
TENONS, WEDGES, AND PEGS KEEP THE FRAME TOGETHER

Quick and easy tenons. *Using a dado set, miter gauge, and the rip fence as a stop, form the tenons on the side pieces.*

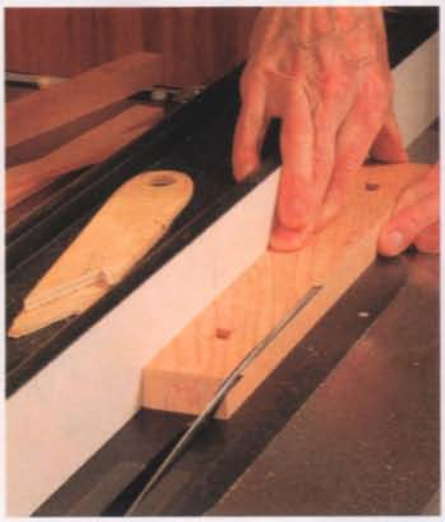
Lower tenons are wedged. *Saw a diagonal kerf in the bottom tenons. When the wedges are tapped in, the tenons will spread in all directions.*

Tap in wedges. *Glue the sides into the bottom, set the top in place for clamping, glue the wedges, and tap them into place. Saw the tenons and wedges flush, and then smooth the bottom with a block plane.*

Photos: Anissa Kapsales; drawings: Vince Babak



Chisel the mortises square. *Now square up the mortise holes all the way through the top and bottom pieces.*



Bevels lighten the look. *Becksvoort rips a bevel down the length of the top and bottom, refining the look.*

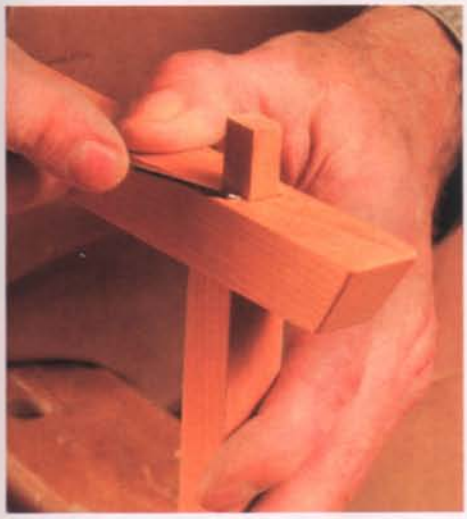
Angle the ends, too. *With the tablesaw blade still tilted from the bevel, use a miter sled and cut angles on the ends of the top and bottom.*

tenons diagonally on the underside. Plane and sand the bottom flush. With the frame fully assembled, but without the artwork or glass, take a knife and mark the spot where each tenon protrudes through the top. Then remove the top and drill holes through the tenons, using shims so the tenons lie flat and are supported on the drill-press table. I make sure the hole overlaps the knife marks by about 1/32 in. By offsetting the holes like this, the dowels with a flat sanded on one side are then forced into the space, pulling everything tight.

Using a dowel plate, make two dowels out of any very hard, tight-grained wood such as apple, rock maple, dogwood, or hornbeam. Begin with square stock and use a knife to cut a series of bevels around the end. Rounding the ends helps start the stock in the dowel plate. Then simply hammer the stock through the dowel plate. Fit the dowels (see photos, below) and cut them to length. The dowels are removable with hand pressure, although if you insert them in January and then want to open the frame in August, it helps to have a small block to push the dowels out.

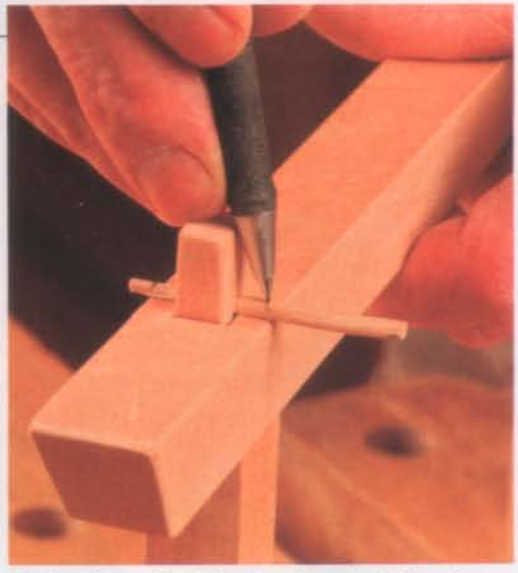
Finally, I applied two coats of Tried & True Danish Oil, polishing the first coat with 0000 steel wool after it dried. □

Christian Becksvoort is a contributing editor.



Dowels secure the top. *Dry-fit the frame to mark for the dowels. Mark the point where the tenon protrudes. Drill a hole at that point, overlapping the knife mark by about 1/32 in.*

Flatten the dowels to create a perfect fit. *Sand a flat into each dowel and then insert it, flat side against the top of the frame, until hand tight.*

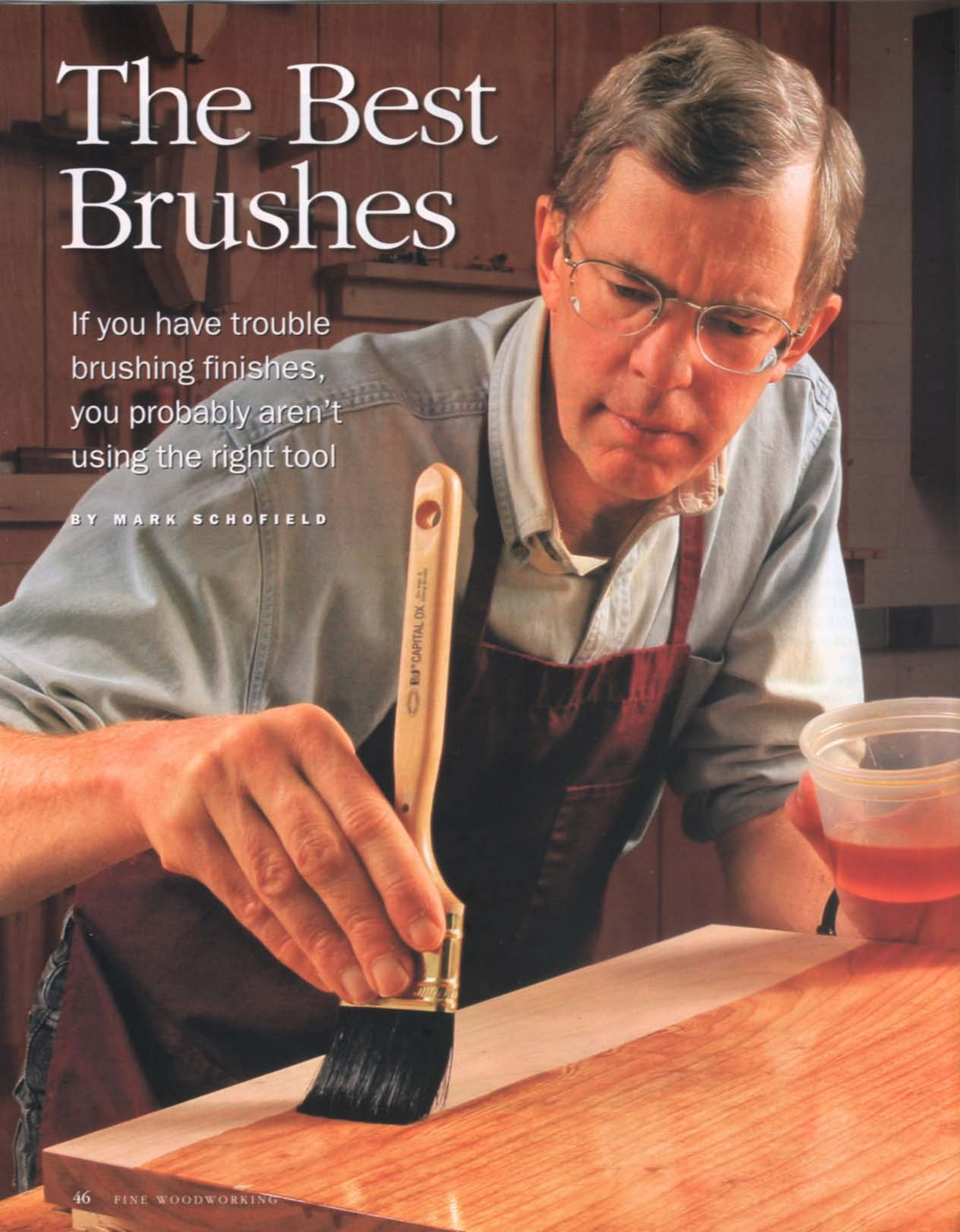


The final cut. *Mark the dowels and cut them to length, flush with the sides of the frame.*

The Best Brushes

If you have trouble brushing finishes, you probably aren't using the right tool

BY MARK SCHOFIELD



Many woodworkers use only one finishing tool—a cloth. That is a shame, because applying a finish with a brush has many advantages: You build up a protective finish much faster; you can use waterborne finishes, which are very hard to wipe; and you waste far less finish than with a spray gun and don't need a special spray booth.

One obstacle to getting started, though, are the hundreds of brushes for sale in hardware stores, home centers, and online. They come in all sizes and shapes, at every point on the price scale, and with different types of bristles (some with no bristles at all). You want to apply a perfect finish to your just-completed project, but should you spend $50 on a brush or will a $10 one work just as well?

A brush is simply a tool for spreading finish on a surface. But like all tools, there are specialist versions for different products and situations, and to a great extent price does determine quality. I'll explain what to look for in a quality brush, why you will get better results using one, and how to keep your brushes working well for many years. I'll also tell you what brushes work best with different types of finish, and suggest a selection that won't break the budget. You'll be surprised at how easy brushing can be when you have the right brush.

Mark Schofield is the managing editor.

Your first brush

Start with a 2-in. brush. This is small enough to learn on but large enough to finish most surfaces up to small tabletops. Because most brushes are designed to apply paint, they are stiffer than is ideal for applying most clear finishes. Look for a brush that feels relatively flexible and has filaments around ½ in. longer than the brush is wide. Shorter filaments don't have enough flexibility. Buy a natural-bristle brush for solvent-based finish, or a synthetic-filament brush for water-based finish.

A GOOD PLACE TO START

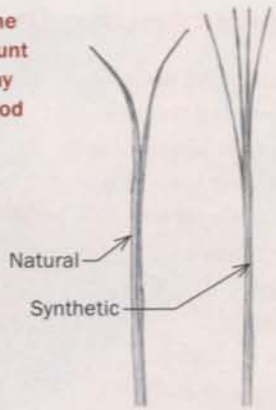
A 2-in.-wide flat brush with a square end will let you develop your brushing skills.

TWO OTHER SHAPES TO CONSIDER

An angled-sash brush is designed to handle areas of different widths as well as corners and tight spots. Get a size between 1½ in. and 2½ in. Once you're comfortable brushing and you're ready to tackle a large surface, buy a round or oval brush. Their extra capacity means fewer trips to reload the brush.

Buy quality, not quantity

A starter pack of brushes is usually a false economy. The quality will be so-so and you'll probably use only one size regularly. Spend the same amount on one quality brush from a company that specializes in making them. Good choices include Elder & Jenks, Purdy, and Wooster.

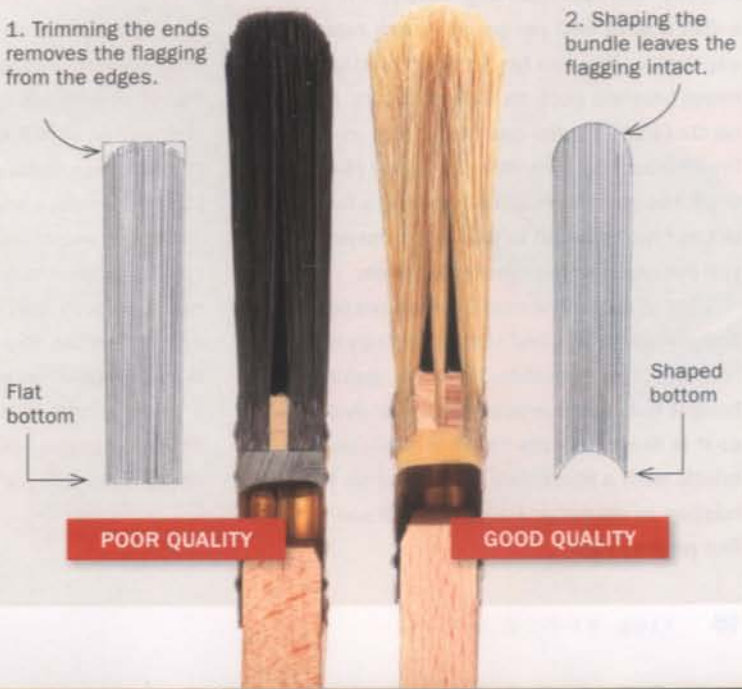


SPLIT ENDS ARE GOOD

Brush-makers split, or flag, the tips of both natural and manmade filaments to combine stiffness with the ability to leave a smooth finish.

TWO WAYS TO CREATE A CHISEL PROFILE

Brushes work better with a pointed end, but there is a good way and a bad way to form it.



Match the brush to the finish

NATURAL HAIR OR BRISTLES FOR SOLVENT-BASED FINISHES

Despite some manufacturer's claims, brushes with synthetic filaments can't match a natural-filament brush when applying a solvent-based finish. Most woodworkers refer to a brush's bristles rather than its filaments, but that is rather like calling all cheese cheddar. Bristle refers only to hog bristle, also known as China bristle because that is where nearly all of it comes from. Sold to brush-makers for $8 to $12 per pound, bristle is the workhorse among natural-filament brushes.

The other natural filament you're likely to find in brushes is European ox hair, which comes from these animals' ears. Slightly less stiff than hog bristle, it is also softer and at $80 per pound, much more expensive. You can buy ox hair/bristle blend brushes such as Elder & Jenks' Capital Ox ($20), or you can buy a pure ox-hair brush from Tools for Working Wood ($40). Once you get the feel for brushing a finish, either type of brush is well worth buying if you are using solvent-based varnish.

Your grandfather may have sworn by his badger-hair brush and some catalogs offer "badger-style" brushes. However, genuine badger hair costs around $400 per pound, so it is likely that the brush is really hog bristle with a black streak painted on the bristles to resemble badger hair. Read the fine print closely.

A GOOD START

Your first brush should be made from hog (China) bristle. The black or beige color of the bristle makes no difference, and you can get a fine 2-in. brush for under $15.

TOP OF THE LINE

The Cadillac of solvent brushes is made from pure ox hair. Very fine and soft, it will lay down a coat of varnish with almost no brush marks, but costs at least $40 for a 2-in. brush.

NICE COMPROMISE

An ox hair/bristle blend works very well. It can't quite match the surface left by pure ox hair, but this won't matter if you are rubbing out the finish. Expect to pay $20 to $25 for a 2-in. brush.

Taklon is the exception to the rule

One synthetic filament, Taklon, works for both solvent- and water-based finishes. The filaments are extremely fine and leave virtually no brush marks, but their flexibility makes them suitable only for thinned finishes and they can't deliver as much finish per stroke. A good way to get a really smooth final coat for fast-drying finishes like lacquer or shellac is to thin them by at least 50% and use a Taklon brush to lay down a coat almost devoid of brush marks. You can expect to pay around $30 for a Taklon brush.

PERFECTLY SMOOTH FINAL COAT

Taklon does an incredible job laying down a thin, smooth coat of solvent-based finish.

SYNTHETIC FILAMENTS FOR WATER-BASED FINISHES

When hair and bristle hit water, they swell and go limp. This makes them unsuitable for water-based finishes.

When latex paints were introduced, brush manufacturers had to create suitable brushes, and now the majority of brushes in stores are designed for latex paint. They have synthetic filaments: nylon, polyester, or a blend of the two. Brand names include Chinex and Tynex, both nylon, and Orel, made from polyester. Polyester is the stiffer of the two filaments and is probably better just for paint, but even most nylon brushes are too coarse to be able to lay down an even coat of clear finish. Instead, focus on the thinness of the filaments.

LOOK FOR FINE FILAMENTS

Two good choices are Purdy's Syntox brushes and Wooster's Alpha line.

ALL-PURPOSE? NOT REALLY

Most synthetic-filament brushes are designed to apply latex paint and are too stiff and coarse to be ideal for clear finishes.

PURDEY SYNTOX

WOOSTER ALPHA

Brushing the last coat. *Taklon brushes are ideal for the last, thinned coat of finish. But there is a specially made Taklon brush (right) for water-based finishes that can't be thinned as much.*

Water-based finishes also dry fast but can't be thinned as much as shellac and lacquer. To get around this problem, you can buy slightly stiffer Taklon brushes made especially for these finishes. Homestead Finishing sells one for $25. Some Taklon brushes have a glue size applied that keeps the bristles stiff for packaging and transport. Before first use, submerge them in warm water or alcohol to remove the size.

THICKER VERSION FOR WATER-BASED FINISHES

The double row of filaments can handle thicker water-based finishes.

Photos and drawings: Kelly J. Dunton

Protect your investment

A 75¢ foam brush is disposable, a $40 ox-hair brush is not. Take time to clean a good brush thoroughly each time you are done with it and you'll be rewarded with many years of flawless service.

CLEANING STARTS BEFORE YOU BEGIN

Wet the brush first. *Before dipping the brush in finish, wet the filaments in a solvent compatible with the finish. This will coat the filaments in solvent and make cleaning the brush easier after you've finished with it.*

So you're anxious to see how your new brush works. Before you dip it in the finish, though, there are a couple of steps to take. First, even the best brush may have one or two loose filaments (cheap brushes will have many), so rather than pick hairs out of a wet finish, bend the filaments back and forth with your hand a few times, pulling gently on them. Hold the tip up to the light and remove any filaments protruding above the rest. Now dip the brush into a solvent that matches the finish you'll be using and then squeeze out the solvent onto a paper towel. This coats the filaments with solvent and makes cleaning the brush much easier when you've finished using it.

In use, don't overload the brush with finish. If you are brushing vertical surfaces, periodically squeeze out as much finish as possible back into the can. These steps will prevent finish pooling around the base of the filaments and flowing all over the ferrule or running down the handle.

Dip a toe in. *Only submerge about a third of the filaments in finish. If you go deeper, it is harder to apply an even coat. Also, finish will tend to pool in the bottom of the brush and then run down the ferrule when brushing vertical surfaces.*

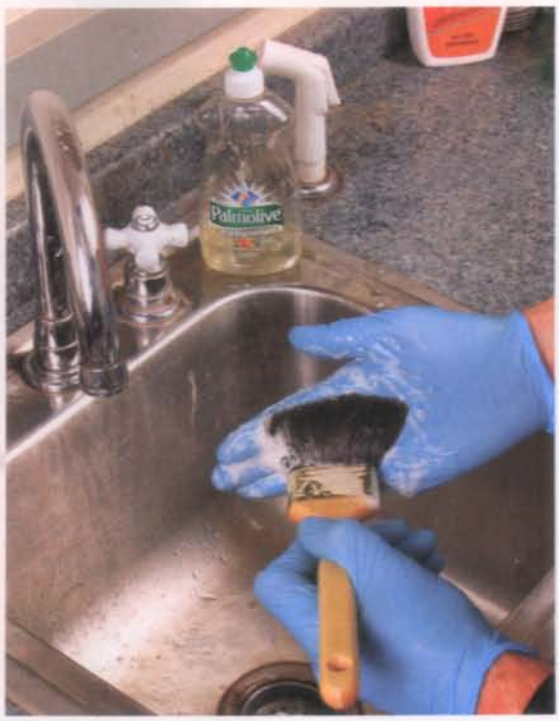
SHELLAC, LACQUER, AND WATER-BASED FINISHES CLEAN UP EASILY

SHELLAC AND LACQUER: LET IT DRY

Brushes used for lacquer and shellac don't need to be cleaned thoroughly. Give it a swish in lacquer thinner or denatured alcohol, shake it out, and let it dry hard. When you need it again, just stand it in solvent. It will be soft and ready to use within 30 minutes.

USE SOAP AND WATER FOR WATER-SOLUBLE FINISHES

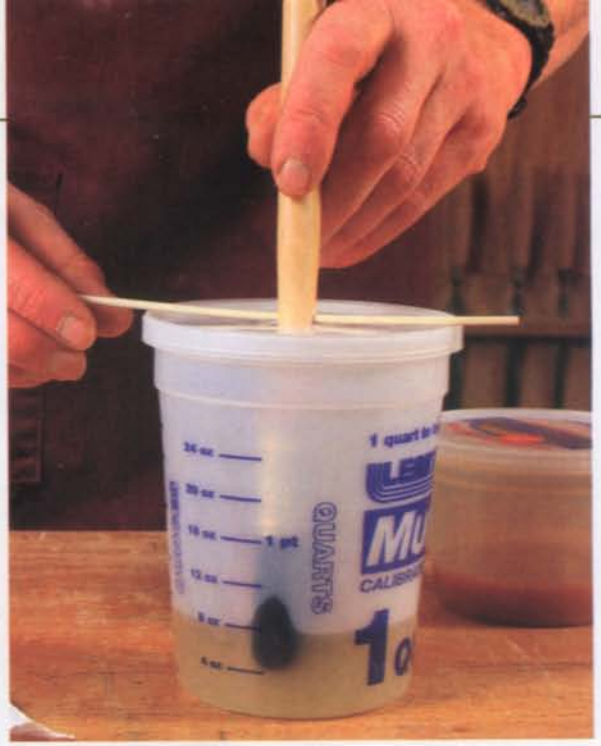
Use hot water and dish soap to remove water-based finishes from brushes. Lather, rinse, and repeat two or three times.



OIL-BASED FINISHES ARE HARDEST TO CLEAN

Let's start with the good news: You don't need to clean the brush if you plan to use it again within 24 hours. Instead, suspend the brush in mineral spirits that have previously been used for cleaning a brush. Keep the tips of the filaments off the bottom of the container so they don't get bent or contaminated with residue.

When you're done with the brush, rinse it a couple of times in used mineral spirits, then pure mineral spirits, removing the bulk of the solvent on newspaper each time. Now rinse the brush in hot soapy water several times before giving it a final cleaning using either citrus cleaner or household ammonia. If you can't smell any mineral spirits on the filaments, the brush is clean and can be wrapped in paper and put away.



LET IT SOAK BETWEEN COATS

If they are going to be reused within 24 hours, brushes containing an oil-based finish can be suspended in mineral spirits. Use a kebab skewer through the handle to avoid bending the bristles.

Solvent, then soap. *Rinse the brush two or three times in mineral spirits, then remove the solvent on newspaper before cleaning the brush with hot water and soap.*

Final cleaning. *To remove any last traces of mineral spirits, rinse the brush in either a citrus cleaner or household ammonia.*

Ready for next time. *To let any moisture escape and at the same time keep out dust, wrap the brush in brown paper or the original cardboard wrapper.*

TIP

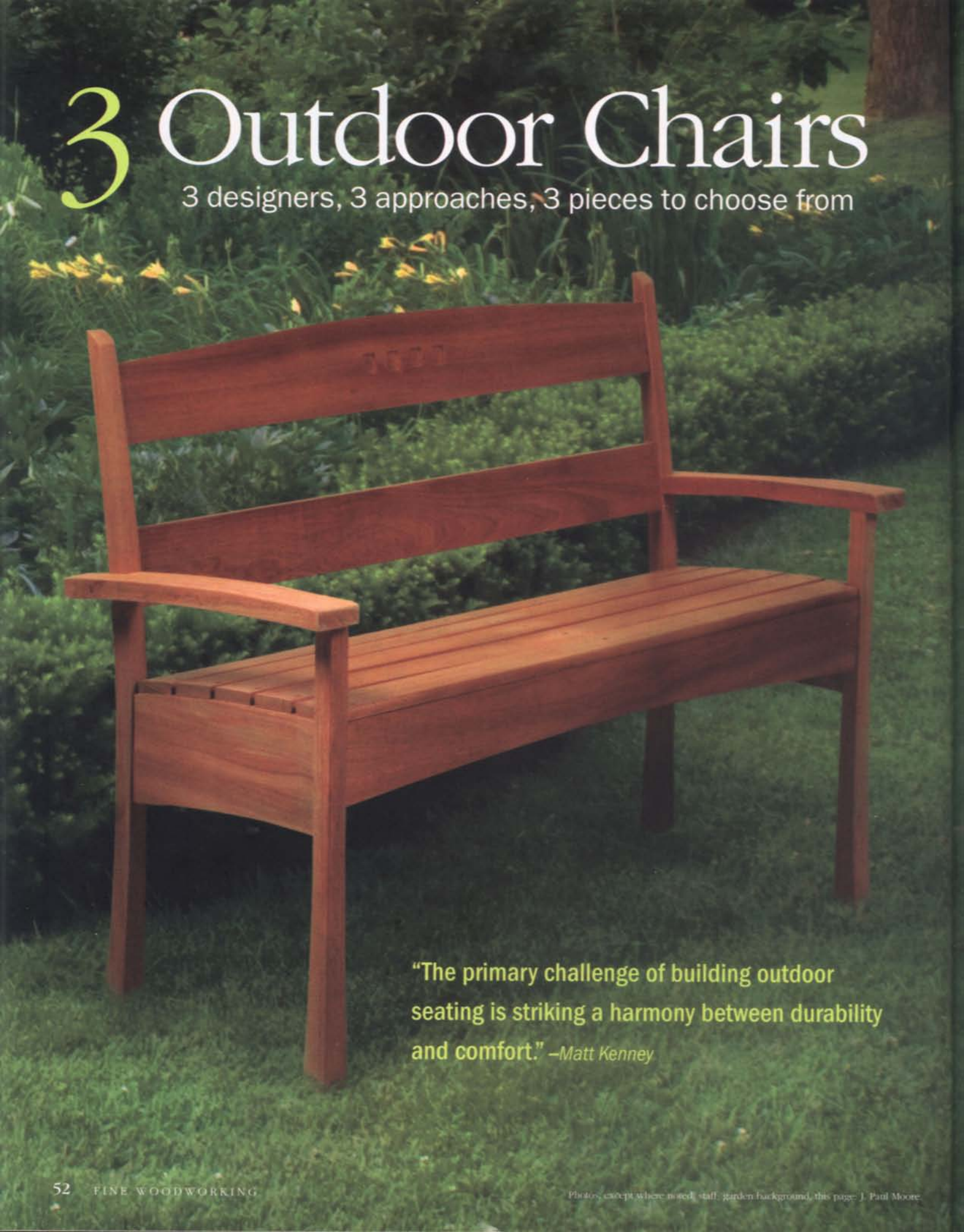
Reuse your mineral spirits

Don't toss it. *After you have cleaned a brush, pour the contaminated mineral spirits into a sealable container.*

Clearly better. *After a few weeks, the residue will sink to the bottom of the container and you can pour off clean mineral spirits for reuse.*

3 Outdoor Chairs

3 designers, 3 approaches, 3 pieces to choose from



"The primary challenge of building outdoor seating is striking a harmony between durability and comfort." –*Matt Kenney*

Photos, except where noted, staff; garden background, this page: J. Paul Moore

As furniture makers, we aspire to build things that will look beautiful for a lifetime. We spend a lot of time on the design and choose the best-looking lumber for the project. We work hard to cut strong, long-lasting joinery and add in tolerances that allow for expansion and contraction of the wood so that doors and drawers don't bind and tabletops don't split. Last, we apply our favorite finish to illuminate the wood and protect it over time.

When you build for the outdoors, though, many of those efforts are in vain. Think about all that an outdoor piece must endure throughout the seasons. It gets soaked with rain and scorched dry by the sun. It freezes in winter, gets scratched up by squirrels, cats, and other critters, and even endures the indignation of being used as a Porta-Potty for the birds. Not exactly a prime environment for a period piece with a French polish.

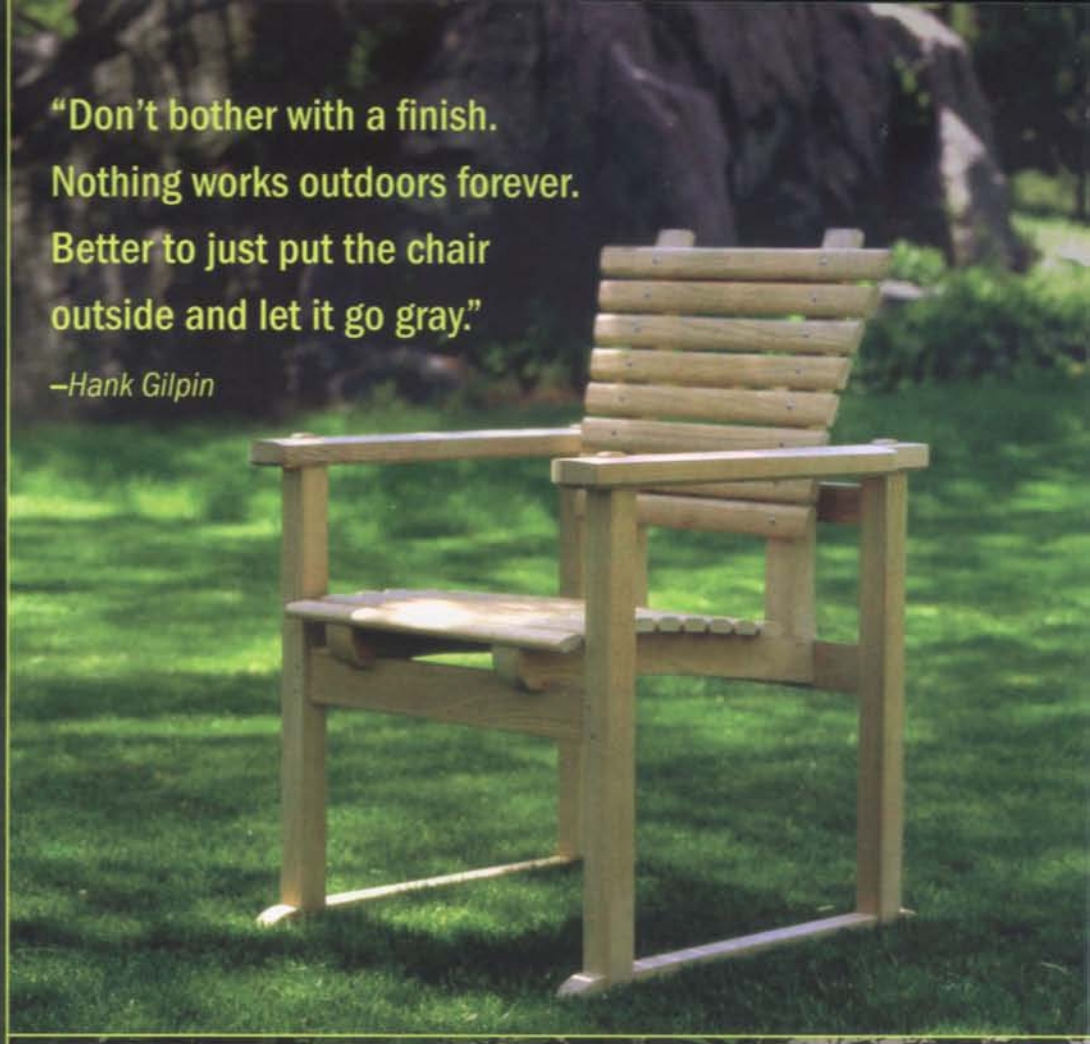
We're not recommending that you head to a discount store and buy resin chairs and tables. Far from it. You can still make elegant furniture for your garden, deck, or patio. You just have to figure out the best approach to building for a brutal, decay-prone environment, and accept the fact that nature always wins.

As Hank Gilpin says, "Enjoy the pleasure of making it, but remember that all things go away."

In this article, you'll learn about designing for the outdoors from three furniture makers. Gilpin and Michael Fortune have been building outdoor furniture for many years. Matt Kenney, a *FWW* associate editor, had never built a piece for the outdoors until this year. So he took tips from Gilpin on how to make a piece last.

Each of these makers offers an outdoor chair (Kenney's is a bench) that is both attractive and comfortable, using materials and joinery that will push back against nature's onslaught. If you want to go beyond these designs, you'll also get some great tips on building for the outdoors in general, such as choosing the right wood, glue, and hardware, and whether to apply a finish (some do, some don't bother).

Tom McKenna is senior editor.



Photos, this page: Jonathan Binzen (top); Michael Fortune (bottom)

Adirondack with a twist

BY MICHAEL FORTUNE

The most important criterion for an outdoor chair is that it be comfortable for relaxing, reading, and conversing in a garden setting. The Adirondack chair is a traditional outdoor design, and the form has been widely copied. I'm not big on copying, and I wanted to introduce some playful curves while increasing the comfort. So I made some changes.

Most traditional Adirondack seats are around 14 in. high and sit rather low at the back. To make my version easier to get in and out of, I made the seat 16 in. high at the front. I also made the back of the seat a bit taller. By the way, the part of the seat that protrudes past the arms is the perfect place to set a summer drink.

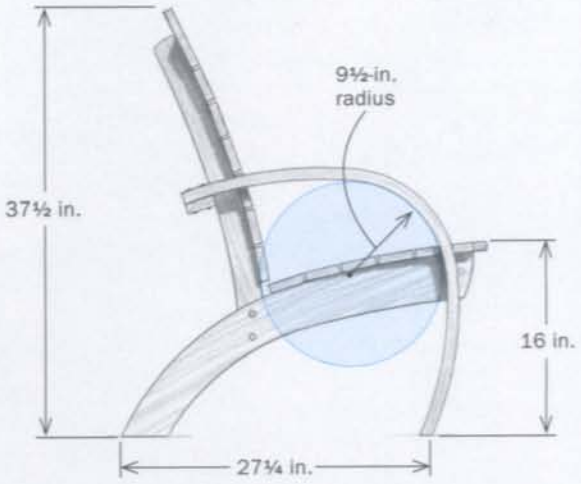
The wide curved arms make strong visual statements, reflecting the natural shapes found in gardens, and they provide structural integrity. Each arm is made from eight, ⅛-in.-thick laminations, assembled on a bending form (see drawing) using Titebond III, which is highly water resistant. You'll need to draw a full-size side view to work out the arm curve.

The legs appear to angle inward toward the back, but the side assembly is an easy-to-make flat plane. The illusion makes the chair more interesting from all angles.

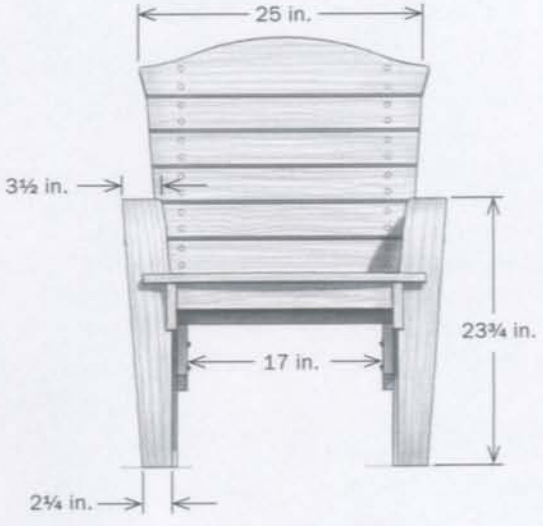
All of the joints are assembled using stainless-steel bolts and decking screws. To notch the arms for the legs, I used a couple of quick jigs to guide the router: one for the right assembly and one for the left.

I've made these chairs in a variety of woods suitable for outdoor use, such as cedar, larch, and mahogany. With these woods, I often apply a clear penetrating finish, like Watco exterior. You also could allow them to weather and develop a silvery color—I like that transformation on this particular chair. I've even painted some of these chairs my favorite color, periwinkle blue.

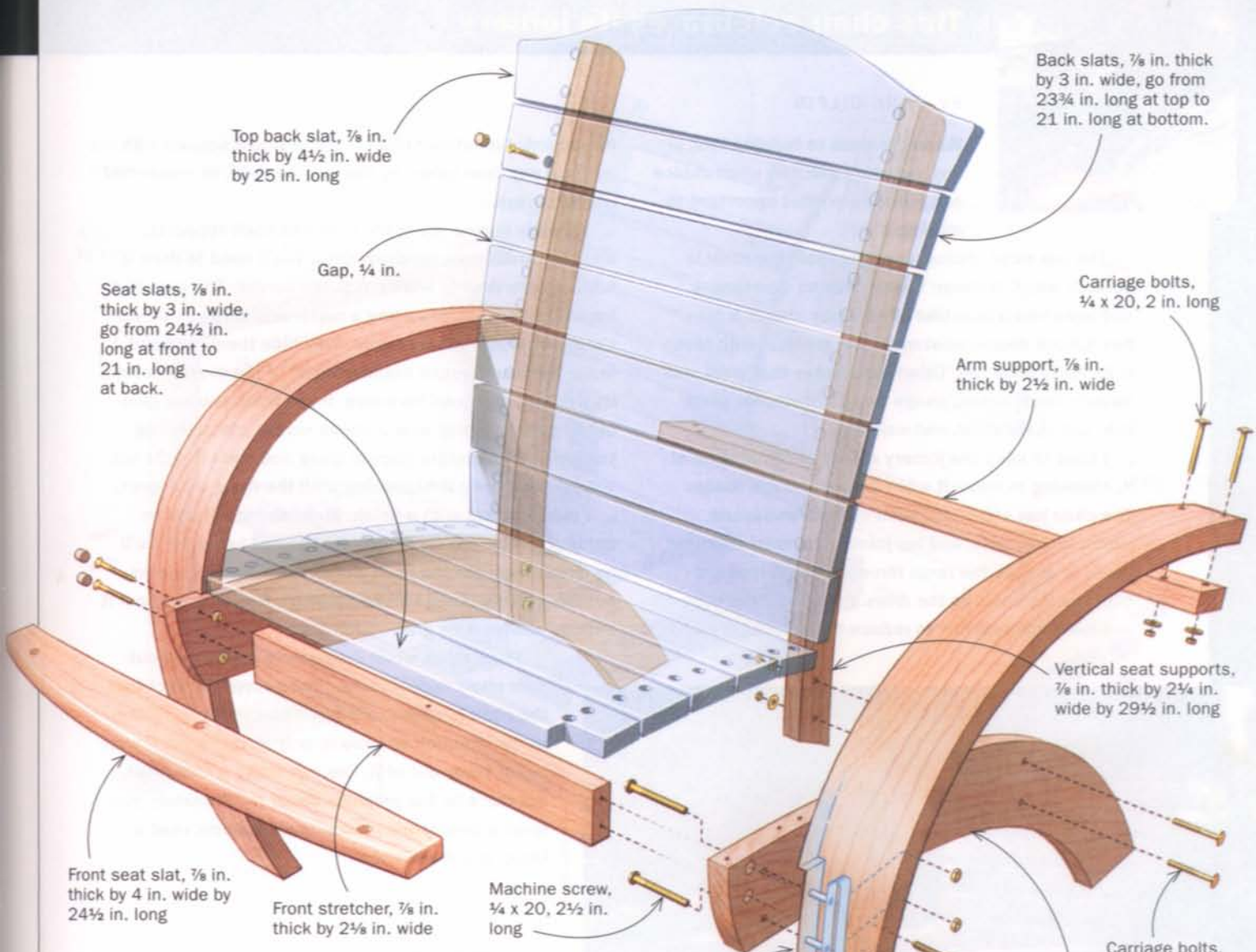
SIDE VIEW



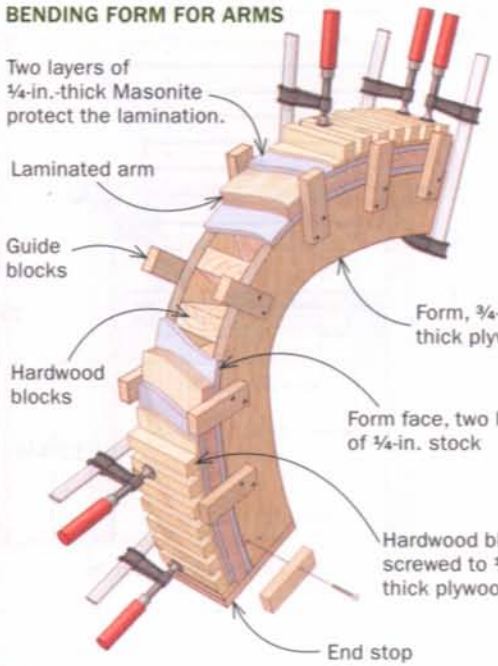
FRONT VIEW



Photo, this page (bottom): Michael Fortune; drawings: John Hartman



BENDING FORM FOR ARMS



This chair celebrates its joinery

BY HANK GILPIN

When it comes to building this, or any, outdoor chair, the wood choice and joinery are most important to making it last.

The top wood choice would be teak, the miracle outdoor wood. It doesn't move, has no coarseness, and ages into a beautiful silvery-gray sheen. It also has natural decay-resistance. The problem with teak is its hefty price tag. Other candidates that work well include black locust, osage orange, mulberry, white oak, cedar, redwood, and walnut.

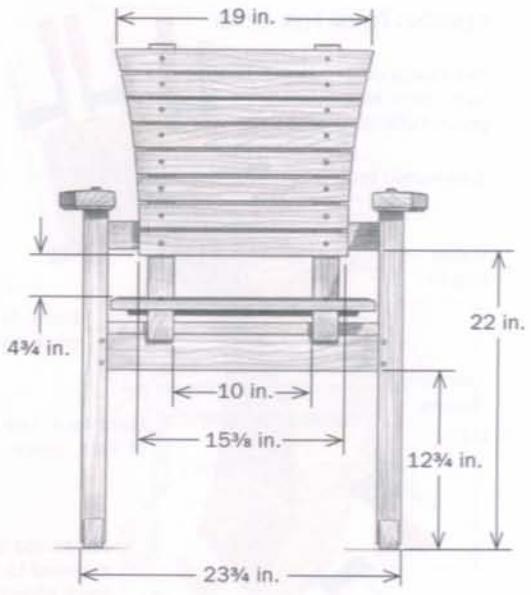
I tried to keep the joinery simple and I hid none of it, choosing to make it a key element of the design. The chair has straightforward mortise-and-tenon joints, bridle joints, and lap joints. The most exacting joints to cut are the large through-tenons that connect the leg posts to the arms. I also kept the seat and back slats narrow to reduce the amount of wood movement. An outdoor chair is going to get soaked with rain one day then baked by the sun the next, so movement will be severe.

The only curves are in the seat and back supports, and they are simple bandsaw cuts. You'll need to draw a full-size side view to work out these curves. The seat and back slats are profiled using a router and screwed on with visible, stainless-steel screws. Why hide them? Instead, I make the countersunk hardware part of the overall design. By the way, use good hardware. If you think you are gaining by putting a plug over a cheap screw, you're fooling yourself. The moisture goes in there and rusts it right out. You just don't see it happening until the thing falls apart.

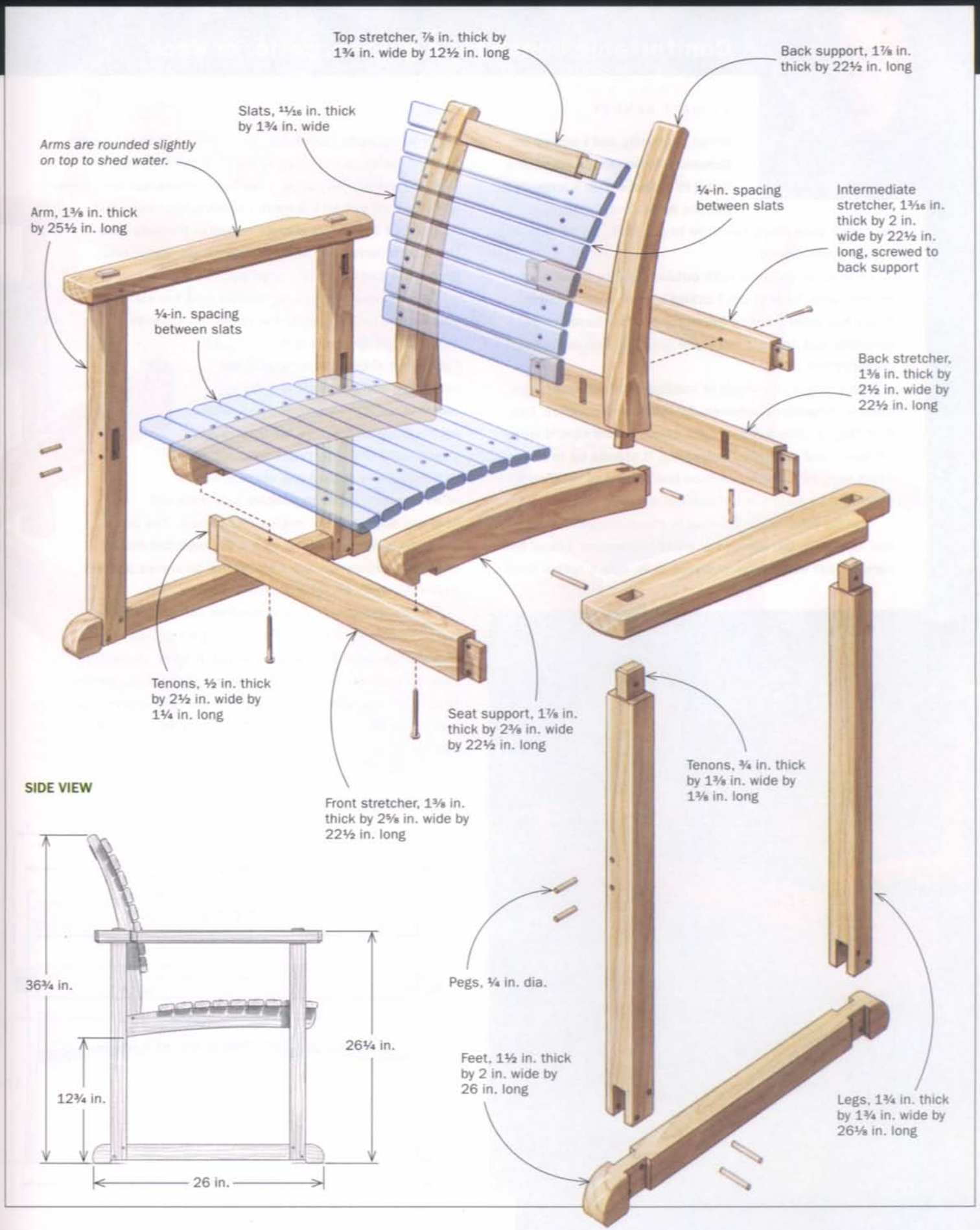
I didn't bother with a finish. Maintaining a finish on outdoor furniture is an assignment to hell because you'll be refinishing your furniture all the time. Nothing works outdoors forever (and I mean nothing). Better to just put it outside and let it go gray.

Remember, when it comes to building an outdoor chair, don't obsess. Just accept the fact that the chair is essentially being placed into a decay-prone situation and you're only going to get X number of years out of it. You can make a nice chair, but don't be too precious about it. Ultimately, you want a comfortable place to sit outside, read a book, and drink a beer.

FRONT VIEW



Photo, this page (bottom): Jonathan Binzen


Top stretcher, ⅞ in. thick by 1¾ in. wide by 12½ in. long
Back support, 1⅞ in. thick by 22½ in. long
Slats, 11/16 in. thick by 1¾ in. wide
Arms are rounded slightly on top to shed water.
Arm, 1⅜ in. thick by 25½ in. long
¼-in. spacing between slats
Intermediate stretcher, 1⅜ in. thick by 2 in. wide by 22½ in. long, screwed to back support
¼-in. spacing between slats
Back stretcher, 1⅜ in. thick by 2½ in. wide by 22½ in. long
Tenons, ½ in. thick by 2½ in. wide by 1¼ in. long
Seat support, 1⅞ in. thick by 2⅜ in. wide by 22½ in. long
Front stretcher, 1⅜ in. thick by 2⅝ in. wide by 22½ in. long
Tenons, ¾ in. thick by 1⅜ in. wide by 1⅜ in. long
SIDE VIEW
36¾ in.
12¾ in.
26¼ in.
26 in.
Pegs, ¼ in. dia.
Feet, 1½ in. thick by 2 in. wide by 26 in. long
Legs, 1¾ in. thick by 1¾ in. wide by 26⅛ in. long

Comfortable bench for a garden, patio, or deck

BY MATT KENNEY

When my family and I moved to Connecticut, we found ourselves living in a house with a large deck out the back door. Unfortunately, we didn't have much furniture to put on it. So I decided to build a garden bench.

I had no experience with outdoor furniture, but while visiting with Hank Gilpin I asked him for some advice. Gilpin has been building beautiful outdoor furniture for decades, and he gave me some great tips on design and construction.

The primary challenge of building outdoor seating is striking a harmony between durability and comfort. The first step is choosing the right wood. I used sipo, a tropical wood and cousin to mahogany. It stands up to the outdoors very well and its surface has remained comfortable to the touch after several months outside.

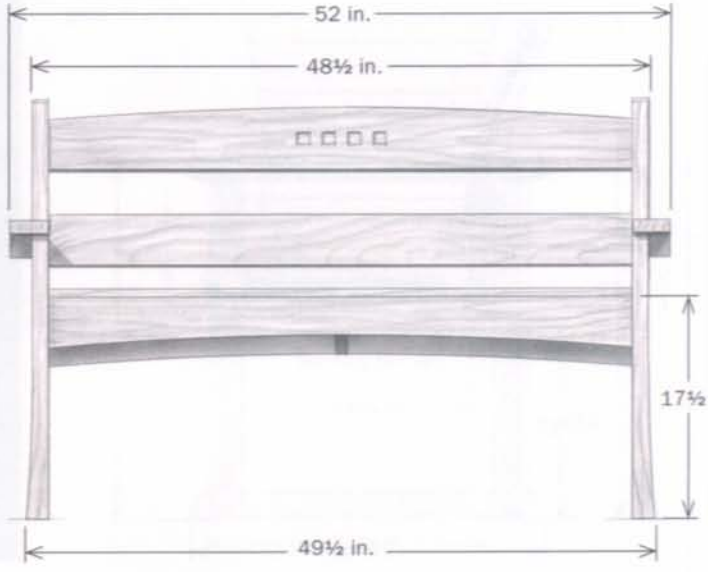
One tip Gilpin gave me was to make the seat slats narrow to reduce the amount of wood movement. I used five narrow seat slats, spaced about ½ in. apart, rather than fewer wider slats. Gilpin also recommended that I design to shed water wherever possible. Toward that end, the seat curves downward from the front, which not only helps water roll off but also is more comfortable than a flat seat. And I set the seat slats on top of the side rails (instead of between them) to expose the slats' end grain so it can dry easily after each rainstorm.

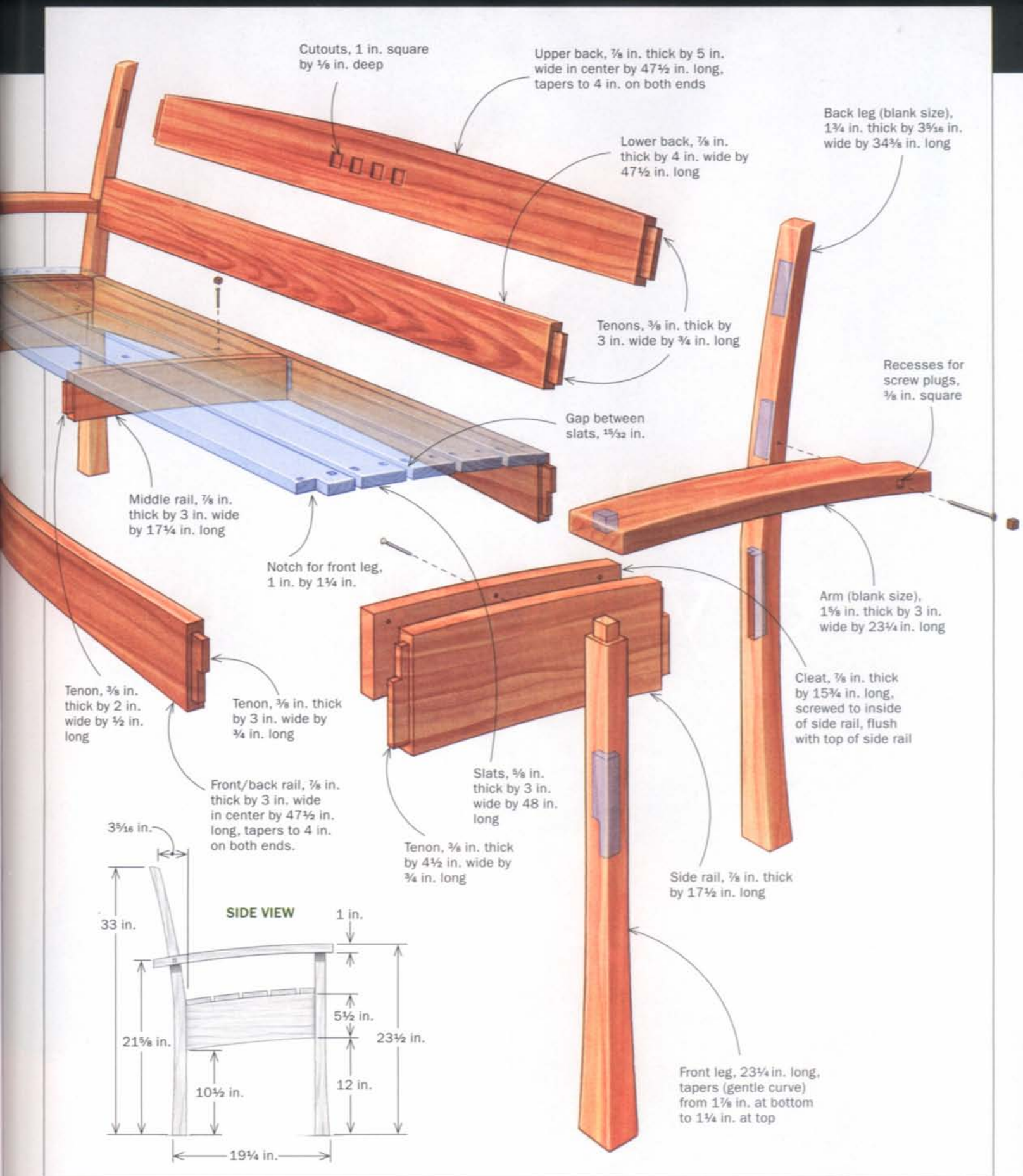
Ceramic-coated decking screws hold the slats to the rails, and I plugged the counterbores with face-grain plugs made from cocobolo. Face grain sheds water better than end grain, and cocobolo is a dense, weather-resistant tropical wood. Gilpin avoids plugs and leaves his screws exposed, but I think my plugs will hold up.

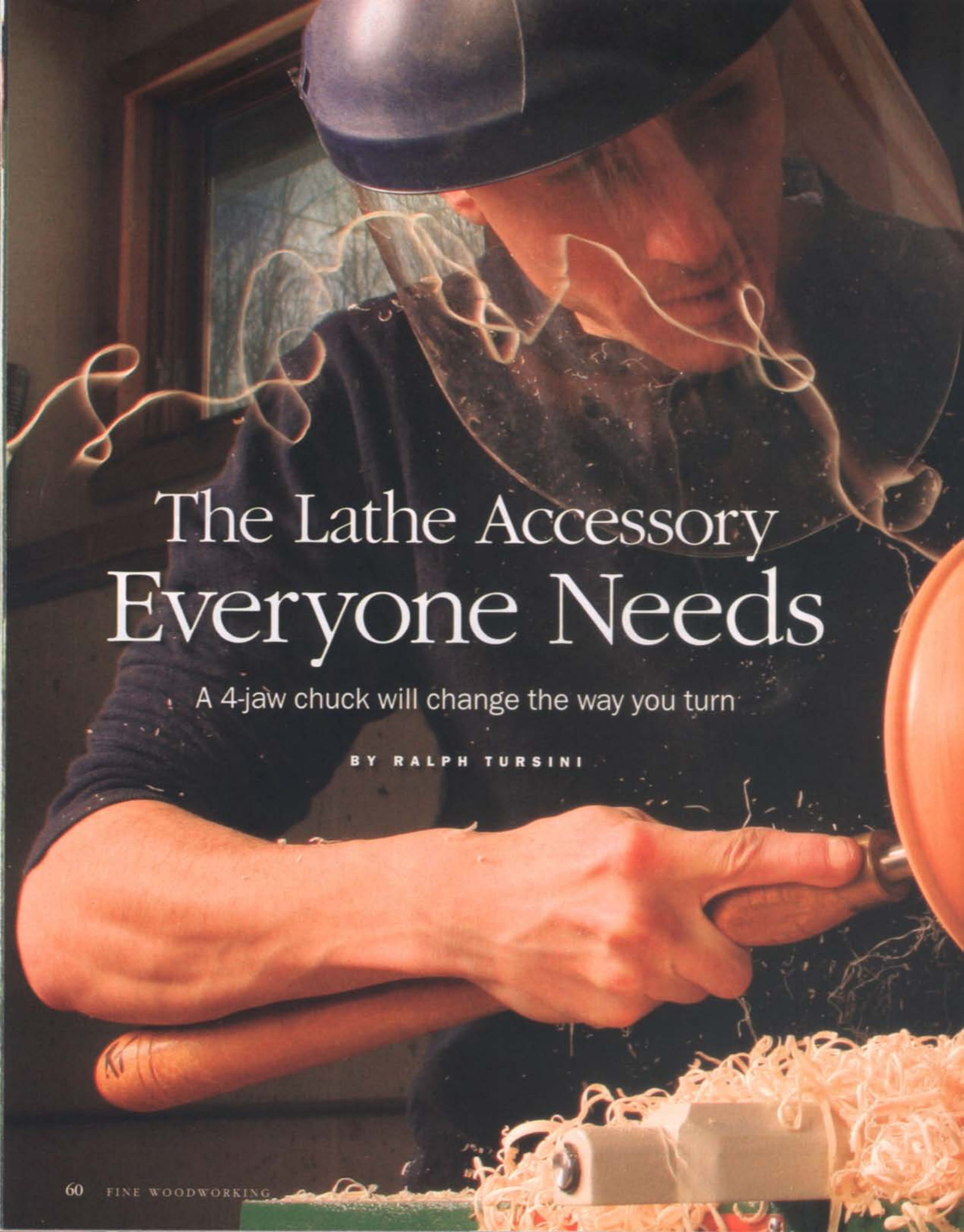
The back is sloped and curved, which adds comfort. Again, a full-size side view will help you work out the angles and curves. The arms are wide enough to serve as a drink rest, but not so wide that expansion and contraction becomes a worry. And water rolls off their downward curve.

Finally, like Gilpin, I used mortise-and-tenon joints, held together by Titebond III, to bring all the parts together (except for the seat slats). It's very important that the joint fits well and that there are no gaps around the shoulders, where water might sneak in and eventually tear apart the joint. And, like my mentor, I chose not to apply a finish.

FRONT VIEW




Cutouts, 1 in. square by ⅜ in. deep
Upper back, ⅞ in. thick by 5 in. wide in center by 47½ in. long, tapers to 4 in. on both ends
Back leg (blank size), 1¾ in. thick by 3⁵⁄₁₆ in. wide by 34⅜ in. long
Lower back, ⅞ in. thick by 4 in. wide by 47½ in. long
Tenons, ⅜ in. thick by 3 in. wide by ¾ in. long
Recesses for screw plugs, ⅜ in. square
Gap between slats, 15⁄32 in.
Middle rail, ⅞ in. thick by 3 in. wide by 17¼ in. long
Notch for front leg, 1 in. by 1¼ in.
Arm (blank size), 1⅝ in. thick by 3 in. wide by 23¼ in. long
Tenon, ⅜ in. thick by 2 in. wide by ½ in. long
Tenon, ⅜ in. thick by 3 in. wide by ¾ in. long
Cleat, ⅞ in. thick by 15¾ in. long, screwed to inside of side rail, flush with top of side rail
Front/back rail, ⅞ in. thick by 3 in. wide in center by 47½ in. long, tapers to 4 in. on both ends.
Slats, ⅝ in. thick by 3 in. wide by 48 in. long
Tenon, ⅜ in. thick by 4½ in. wide by ¾ in. long
Side rail, ⅞ in. thick by 17½ in. long
3⁵⁄₁₆ in.
33 in.
SIDE VIEW
1 in.
5½ in.
21⅝ in.
23½ in.
10½ in.
12 in.
19¼ in.
Front leg, 23¼ in. long, tapers (gentle curve) from 1⅞ in. at bottom to 1¼ in. at top



The Lathe Accessory Everyone Needs

A 4-jaw chuck will change the way you turn

BY RALPH TURSINI

Since their introduction to woodworkers in the mid-1980s, four-jaw chucks have been steadily replacing faceplates as the preferred way to turn hollow forms, because they make the process faster and easier, especially for beginning turners.

But four-jaw chucks aren't just for bowls and vases. A chuck allows you to use a number of useful shopmade accessories for sanding, polishing, and turning small items.

In fact, a four-jaw chuck is such a valuable tool that I advise my students to make it their next big purchase once they have a decent set of turning tools and some experience at the lathe.

Match the chuck to the lathe

While there are exceptions, chucks come in two basic body sizes (4½ in. and 3½ in.) that correspond to the two basic classes of lathe (see "Choosing a chuck," p. 62). You can put the smaller chuck on larger lathes with an adapter, but these can be difficult to remove and tend to amplify vibration, so I avoid them.

Since there are so many lathe models, chucks have a threaded insert that's specific to the lathe spindle, so you'll need to know the spindle diameter and thread pitch before you buy. If you have a modern lathe, knowing the manufacturer and model number will likely be enough, as most chuck

Installs easily

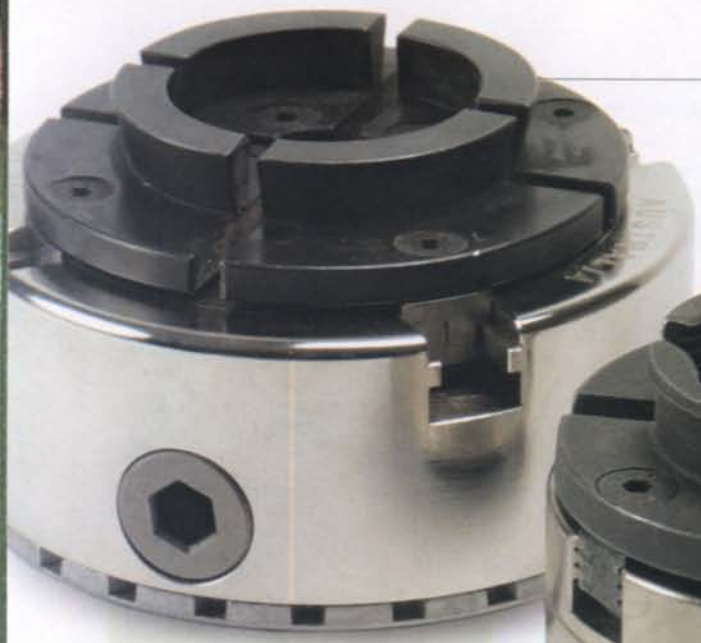
Grabs bowls tightly

Handles small parts

Sands and polishes

Choosing a chuck

When buying a chuck, it's important to consider not only the size of your lathe but also the size of the work you do.



A BIG CHUCK FOR BIG LATHES

Larger lathes (16-in. to 24-in. swing) are best matched to chucks with 4½-in. bodies. One downside: The bigger body gets in the way with small turnings, but a set of spigot jaws (below right) solves the problem.

TWO OPTIONS FOR SMALLER LATHES

Mid-size and smaller lathes work best with 3½-in. chucks (left). Another option for these lathes is a mini-chuck (above). Its 2½-in. body provides additional access near the chuck face.

ONE WRENCH IS EASIER THAN TWO

Chucks tightened with a pair of tommy bars (top) cost less than chucks operated with a single wrench, but holding and tightening a workpiece can be a challenge. Chucks with a single wrench (bottom) allow you to hold the workpiece with one hand and tighten the jaws with the other.

Accessory jaws worth having

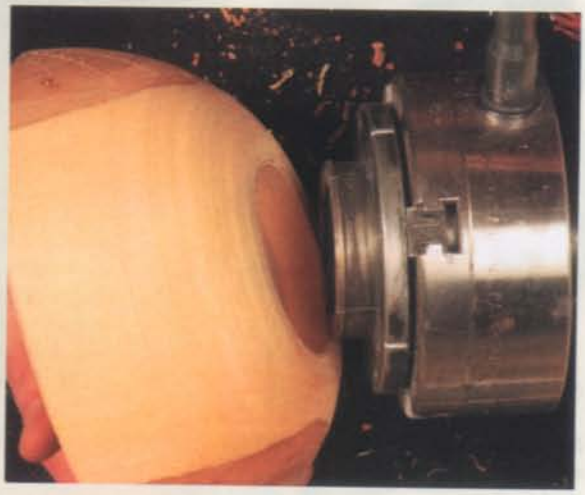
You can easily swap the standard jaws with accessory jaws. Spigot jaws are great for turning small projects like pulls and ornaments. Adding deep jaws gives the chuck a firm grip on larger vases and boxes.

Spigot jaws offer a tight radius for small work. The long jaws also provide clearance from the chuck for turning and sanding small parts.

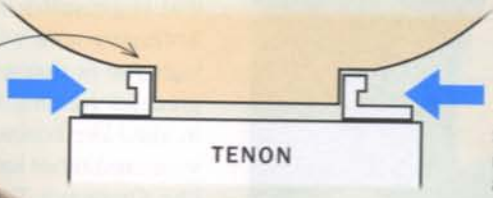
Deep jaws provide a better grip for large and long vessels.

BETTER TO GRIP THAN EXPAND

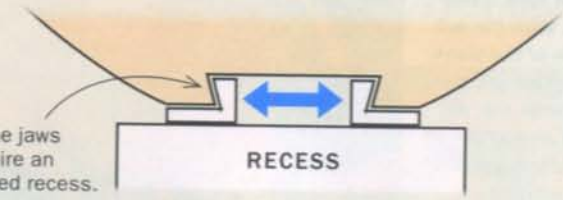
Chuck jaws can either grip a tenon (right) or expand into a recess (far right), but it's best to grip a tenon whenever possible because wood has more compressive strength than tensile strength. The owner's manual is the best place to look for information on shaping a tenon or recess that matches an individual chuck's jaw profile. Accessory jaws will have different requirements than standard jaws.



Tenons need a square or slightly undercut shoulder for solid seating.



Some jaws require an angled recess.



MATCH THE TENON TO THE JAWS

Even though most chucks can grip through a 2-in.-dia. range, there is a sweet spot where they make full contact with the workpiece (top). Outside the sweet spot, the grip is compromised (bottom).

manufacturers have an application chart to help you get the right insert.

Securing your work

You can use the chuck's jaws to grip a tenon or you can expand them into a recess, but it's best to grip the work because wood has greater compressive strength than tensile strength, especially perpendicular to the grain. This makes using a recess a delicate balance: Expand the jaws too much and your work will split; expand them too little and the workpiece could loosen. Rather than using a recess, it often makes sense to turn the work with a tenon (for gripping) that can be removed later (see "Turning a bowl," pp. 64-65).

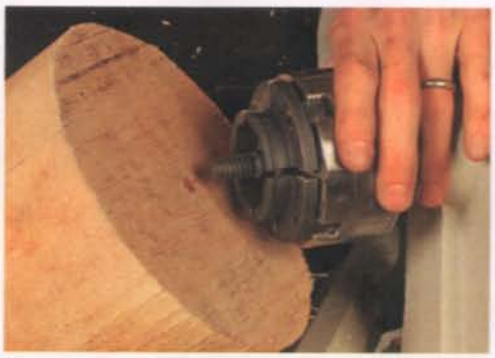
The jaws that come with chucks have either a smooth, serrated, or dovetailed profile. I prefer the serrated profile, as it provides the best grip with the least amount of pressure. Dovetail jaws also hold well, especially inside a recess, but matching a tenon to their exact shape can be tedious.

Jaw sizes and profiles

The most versatile jaws grip tenons that are roughly one-half to three-quarters of the chuck's body diameter. Not surprisingly, this is the set

Turning a bowl is easier with a 4-jaw chuck

1 SHAPE THE OUTSIDE



Flat blanks. *Relatively uniform blanks with a flat side can be rough-profiled with a screw center. The blank should make even contact with the chuck jaws to minimize vibration. Screw centers usually come with the chuck.*

Irregular blanks. *Burls and other irregular-shaped blanks require a chuck spur center (top) and the tailstock for initial profiling. A ⅜-in.-deep hole the same diameter as the spur prevents the blank from sliding as it's secured to the lathe.*

Shape the outside of the bowl and turn a tenon. *With the outside of the blank roughed out, turn a tenon that fits the chuck. The finished tenon should have straight sides and a square shoulder for the best grip.*

that is generally included with the chuck body. Accessory jaws will vary with the kinds of turnings you're doing. For instance, spigot jaws are great for holding small parts (down to about ⅜ in. dia.) like knobs and pulls. If you want to make vases and other longer hollow forms, deeper jaws like Oneway's Tower Jaws will get a very firm grip on a long tenon (see "Accessory jaws worth having," p. 62).

Must-have accessories

You'll find both a screw center and a chuck spur center invaluable for initial shaping of the blank

2 HOLLOW THE INSIDE

Flip and hollow. *Clamp the bowl's tenon in the chuck making sure it is fully seated (above). With the bowl secured, hollow the interior (right). Keeping the sides and bottom a uniform thickness makes cracks less likely.*

Photos, except where noted: Patrick McCombe; product photos and drawings: Michael Pekovich

3 TURN THE FOOT

Reverse it. *To finish the foot, you have to flip the bowl one last time. Tursini slips it over a chucked mandrel (above), protecting the bowl with a piece of "fun foam." Then he moves the tailstock into place (right).*

and preparing a tenon that can be clamped inside the chuck jaws (see photos, this spread). Most chucks come with a screw center, which is the fastest way to mount a blank for initial profiling and for shaping the tenon. Screw centers hold better in face grain than in end grain, and they are not all equal. I've found that the screw centers made by Oneway and Vicmarc hold the best.

Unlike a screw center, which requires a flat face on the blank, spur centers can be used with burls and other irregular-shaped blanks. Chuck-mounted versions save time and handling because you don't have to remove the chuck to use them. Despite their utility, chuck spurs aren't included with most chucks. You'll have to buy one. My favorite is from Oneway and sells for about $35.

In my experience, when it comes to purchasing, chucks are definitely one of those items where you get what you pay for. High-quality chucks have precise machining for smooth operation and a good grip. Conversely, I've had blanks loosen on low-priced chucks even when I thought I had really cranked them down. □

Ralph Tursini is a professional turner and turning instructor in Cambridge, Vt.

Finish the foot. *Using a gouge, turn away most of the tenon and form the bowl's foot.*

Break off the nub. *The goal is to leave only a small button of stock.*

Trim with a chisel. *Use a chisel to pare any remaining stock flush with the bowl's bottom.*

Faceplates are the traditional way to turn hollow forms and they're still a viable method—especially for extremely heavy blanks. But they have a few drawbacks.

Why a chuck beats a faceplate

Working around the plate is cumbersome. *Even the smallest faceplate will hamper access to the stock surrounding it.*

Faceplates leave deep screw holes. *Overzealous hollowing can expose the screws that mount the blank to the faceplate, ruining the turning.*

Make Your Own Hardware

These two custom pulls are easier than you think

BY ROBERT SANDERSON

Years ago, I needed angled hinges for a cabinet and decided to make them myself. That experience got me hooked on metalwork and blossomed into a side business, Sanderson Hardware. Now, hardware making is a part of my work as a furniture maker, a place where I can further express myself as a craftsman.

Designing and making pulls gives you the freedom to do exactly what the piece calls for, and it is exciting to know that your piece of furniture is custom built from start to finish. Brass, an alloy of copper and zinc, is a good metal to use for pulls because it is relatively inexpensive, can be cut with woodworking machines, and is easy to bend. It also is readily available in many forms: bar, rod, and sheet stock. Commercial hinges are often made of brass as well, so the overall look of the piece will be consistent.

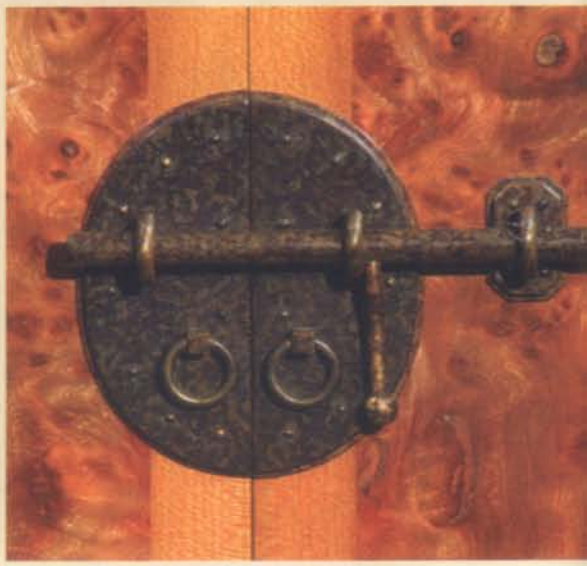
You don't need exotic, expensive tools or machines to make your own brass pulls. Most woodworking shops already have the necessary equipment. To work the relatively small pieces of brass safely, you will have to make a few simple jigs to hold the workpieces. You can make them from scraps of MDF (medium-density fiberboard) or plywood, and once you have them you're set for the future.

Here, I'll show you how to make a ring pull and a drop pull. Once you've learned to build and install them, you'll have a launching point for future work.

Robert Sanderson owns Sanderson Hardware in Fort Bragg, Calif.

Take your furniture to another level

The tips and techniques in this article will get you started on the basics of metalworking. From there, you can mix and match the methods and apply them to an endless variety of designs. Here are a few different takes on the ring pull and drop pull.



Photos, this page: Jay Odee (bottom right)

Stick with brass

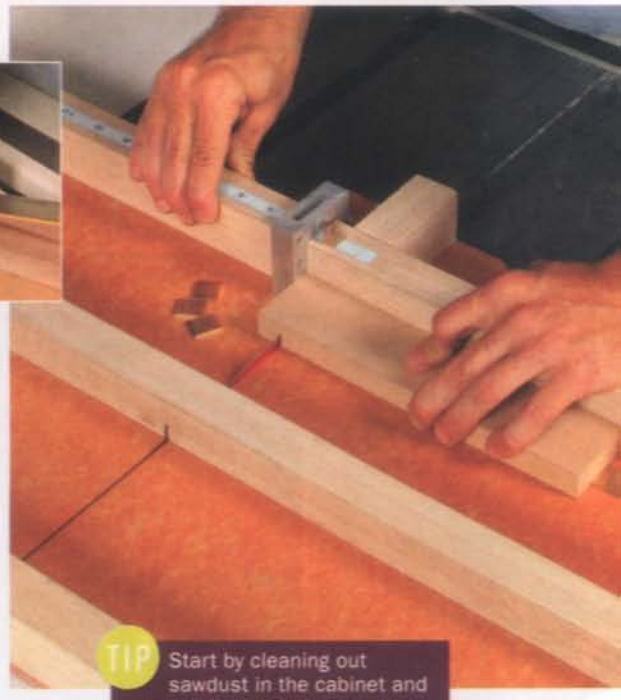
Most of the tools and techniques used for cutting wood can be applied to brass. A standard woodworking blade will work fine on the bandsaw, but you'll want a metal-cutting blade for your tablesaw. Also, brass is widely available in a variety of sizes, and it can be treated to give it different textures and colors.

BANDSAW

A sled for small stock. *For safety, there should always be two teeth in a cut, so use a sled to add to the thickness. The sled also guides the stock safely. Leave enough length to square up the ends with a file or disk sander. A benefit of the bandsaw is that it can cut curves. A hassle is that brass shavings get embedded in the rubber tires and need to be cleaned.*

TABLESAW

Rip to width. *Work with about 12 in. of bar stock, ripping equal amounts from each side. If you take the full amount off one side, the natural tension in the bar might cause it to bend. Use a good zero-clearance throat plate, push sticks, and a featherboard.*



Cut to length. *Use a cutoff box and hold-down block for consistent, accurate parts. A dado in the hold-down block holds the brass (above). Butt the hold-down block against a stop block. The blade should be high enough to cut through the brass, not the whole block (right).*

TIP Start by cleaning out sawdust in the cabinet and turn off dust collection. It's rare, but metal shavings can be hot and could start a fire.

Brass-work survival kit

The projects in this article require only a small investment in new tools and materials.

TOOLS

Freud New Diablo Steel Demon

Cone-shaped ⅛-in. shank rotary file, MSC Industrial Supply (mscdirect.com), No. 00439117

Pillar file, #4, MSC No. 60210143

Drill-press vise, MSC No. 00267161

6/32 standard tap, MSC No. 04436325

6/32 bottoming tap, MSC No. 04436333

Reamers:
Loose fit, MSC No. 02318525
Press fit, MSC No. 72006208

T-handle tap wrench, MSC No. 00208348

#53 screw machine drill bit MSC No. 01378538 (12-pack)*

#65 Jobber drill, MSC No. 01188655 (12-pack)*

Center drill and countersink #2, MSC No. 01031020

Layout fluid, MSC No. 00264176

MATERIALS FOR RING PULL

1/16-in. by ¾-in. rectangular bar stock, MSC No. 32001786

⅛-in. rod stock, MSC No. 78203981

Standard brass cotter pin, available at most hardware stores

Brass escutcheon pins:
⅝ in., #16 gauge for attachment
½ in., #20 gauge for the divider, Atco products (atcoproducts.com) by the pound*

MATERIALS FOR DROP PULL

5/16-in.-square bar stock, MSC No. 32001661

½-in. by 3/16-in. rectangular bar stock, MSC No. 32001901

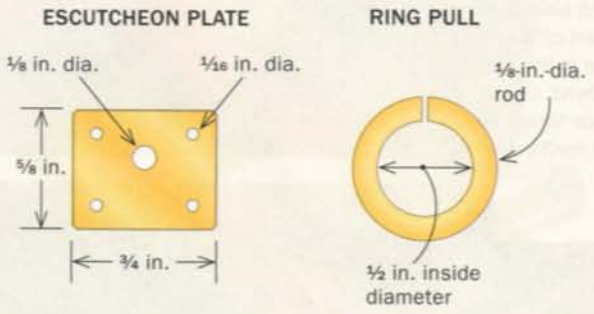
1/16-in. by 5/16-in. alloy steel dowel pin stock, MSC No. 0602 0028 in bulk*

*Smaller quantities available at Sanderson Hardware (sandersonhardware.com)

Photos, except where noted: Anissa Kapsales (action); Kelly J. Dunton (products)

Make a ring pull

Ring pulls are a great beginner project. They require little machining, and they can be made in any size to accommodate your piece.



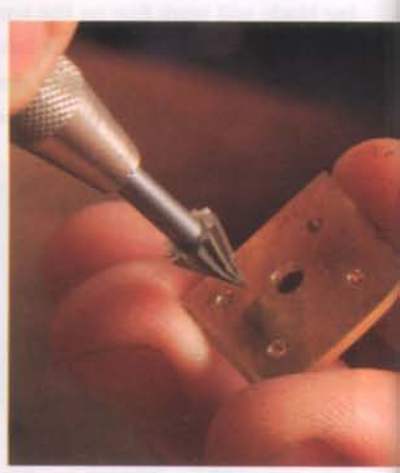
BRASS STOCK

1/16-in. by ¾-in. rectangular bar stock for the escutcheon plate

⅛-in. rod stock for the ring

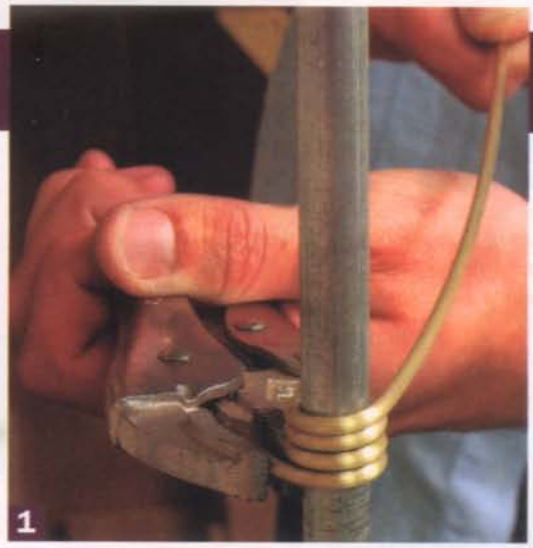
1 START WITH THE PLATE

Beyond just being decorative, the escutcheon plate locks the cotter pin in place and lifts the ring off the surface of the wood.

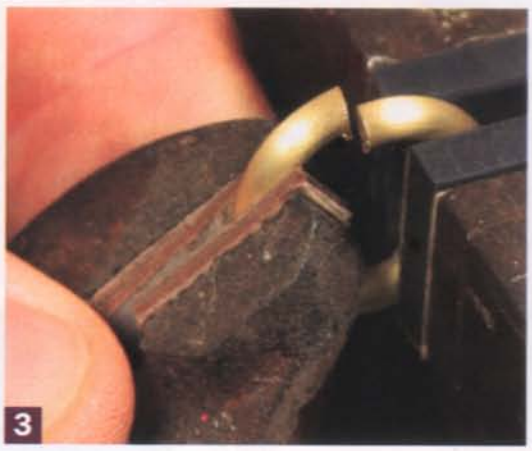


Locate and drill holes. *Mark for the cotter-pin post as well as the holes for the attachment pins, and start them with a center punch. To provide space for the drill bit, place the escutcheon plate in a vise, raised up on parallel bars taped inside the jaws (left). With a cone-shaped ⅛-in.-shank rotary file held in a pin vise, break the edges of the holes (right) to remove any burrs and to provide clearance under the head of the pin. Sand the plate with P400-grit paper to create a consistent finish. Last, slightly chamfer the edges with a Pillar file for a more interesting look.*

2 RING MAGIC



Make a coil and cut rings apart. *First, sand the rod to P400-grit to clean it and give it a consistent finish. Bend it around any ½-in. cylinder, holding one end with a vise grip to create a coil (left). Bring each layer tight to the next. Then cut through the whole coil with a handsaw (above).*



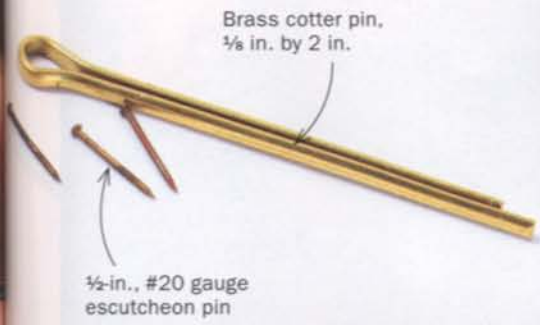
Flatten them. *Hold one side of the ring in a vise and twist the other with a pair of channel locks. To prevent scratching, line the vise jaws and channel locks with dense cardboard. Because the brass ring will spring back, overbend it.*

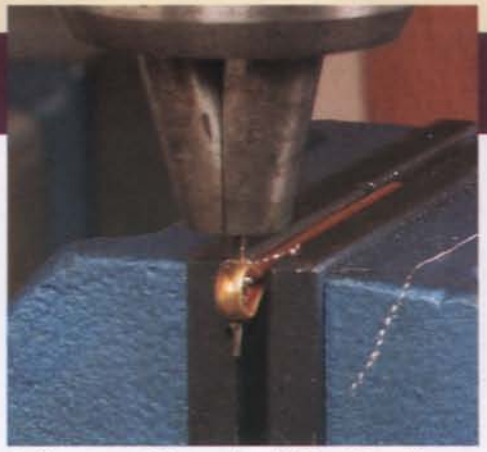
Cleanup trick. *Run a single-cut bastard mill file (3/32 in. thick) through the ends to make them vertical and parallel to each other. This will affect the way the ring hangs on the cotter pin.*

Drawings: Kelly J. Dunton

3 COTTER PIN HOLDS IT TOGETHER

The tiny escutcheon pin will keep the ring centered so that the split will not be visible.





Add an escutcheon pin divider. *Place the cotter pin horizontally in the vise, and mark the "eye" with a center drill. Switch to a No. 65 drill bit and drill all the way through both halves of the eye.*

Push the pin through and peen the divider. *Cut off the extra length with a pair of dykes, leaving a small amount sticking out. A small hammer flares out the end of the divider and locks it in place. Sand with P400-grit paper.*

Open the ring. *Place one half of the ring in the vise so that the split is outside the vise jaw. Place a tool handle through the ring to lever it open just enough to load the cotter pin onto it.*

Heat sets it. *Pinch the ring in the vise, using only enough pressure to bring the ends of the ring in contact with the divider pin. Then heat the ring with a small propane torch to allow the brass to relax. Now it will stay closed.*

FINISHING BRASS

Plain brass is beautiful and oxidizes naturally. There also are antiquing solutions available. For texture or colors, the brass can be packed in sawdust dampened with any of these chemical solutions. *The Coloring, Bronzing and Patination of Metals* by Richard Hughes and Michael Rove (1991, Watson-Guptill Publications) is an excellent source for recipes.

4 INSTALL IT

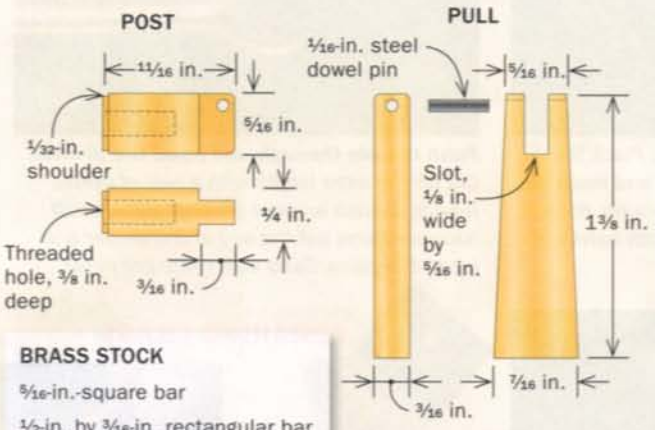
Install the plate. *Use double-sided tape to hold it in place while drilling pilot holes. Hammer in the pins, preferably using a hammer with a plastic head to prevent damage to the pins.*

Add the ring pull. *Drill for the cotter pin, wiggling the drill in the back of the hole to accommodate the wedging action to come. Now push the pin through and mark its length, plus 1/16 in. Holding the pin in a vise, cut it to length with a saw and clean up the ends with a file.*

Insert the wedge. *To lock the pull on the escutcheon plate and drawer or door, hammer a wood wedge between the ends of the cotter pin. Spread the ends with a screwdriver to get started, and trim the wedge with a saw and chisel.*

Drop pull

Drop pulls have a refined look and feel wonderful to the touch. The mechanics are similar to a butt hinge, except the knuckle has only one section.



BRASS STOCK

5/16-in.-square bar

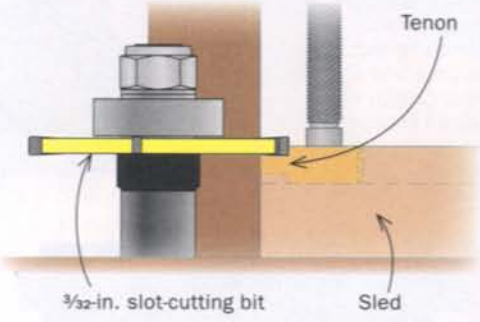
1/2-in. by 3/16-in. rectangular bar

1 DRILL AND TAP THE POST

One thread at a time. *Mark the center of the post with a center punch and place the post in the vise. Use a #36 bit to drill a hole. Now use a #6/32 standard hand tap in a tap wrench, chucked in a drill press. Turn the tap gently by hand, cutting one thread at a time and then backing it out a half-turn to break off the chip. After the standard tap, which has a tapered end to start the cut, come back with a bottoming tap to finish cutting the threads to the bottom of the hole.*

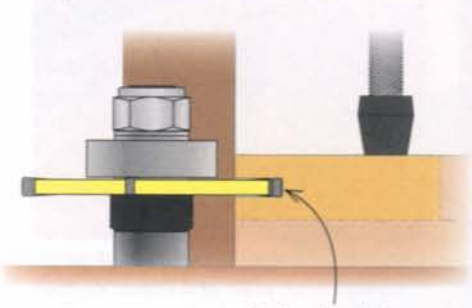
2 CUT THE KNUCKLE JOINT

ONE SLED FOR THE POST

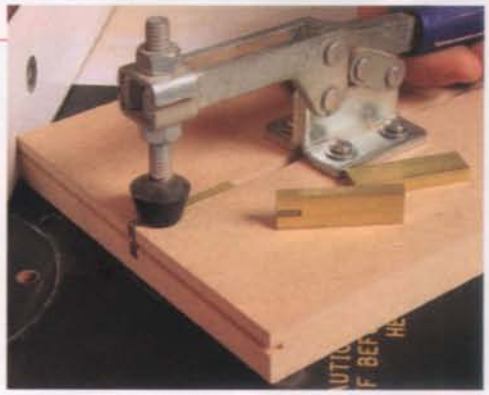


Post gets shoulders. *On the router table, cut the first shoulder, flip the part in the sled 180°, and cut the opposite shoulder. The shallow tenon on the opposite end is cut the same way, using a pair of similar sleds.*

ANOTHER FOR THE PULL

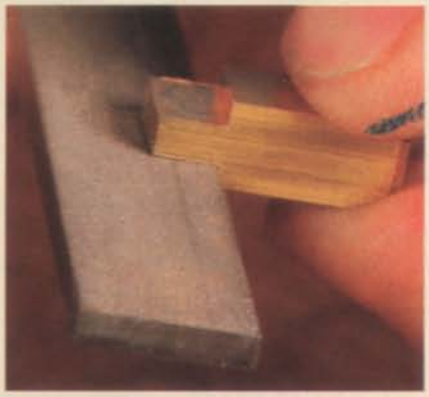


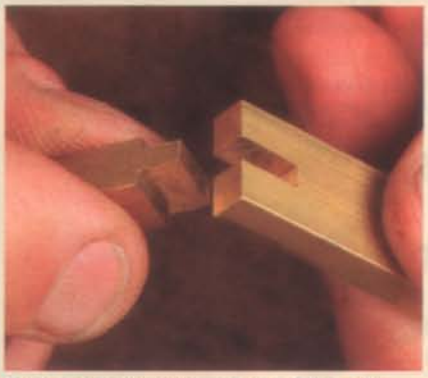
Center the slot on the pull.



Pull needs a slot. *While still on the router table, cut the slot in the pull that will accept the tenon on the post.*

FILE TO FINALIZE THE FIT

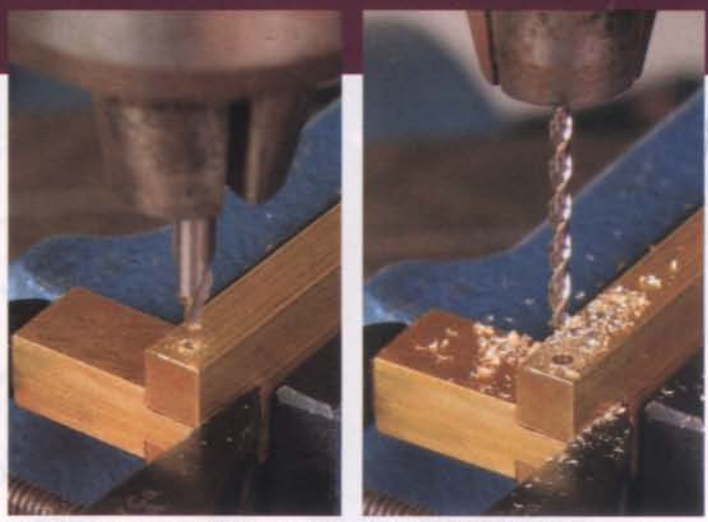




To fit the post to the pull, use a Pillar file on the post with the safe edge against the shoulder and make light cuts, testing the fit until the post goes all the way home in the pull and does not stick.

3 DRILL FOR THE DOWEL PIN

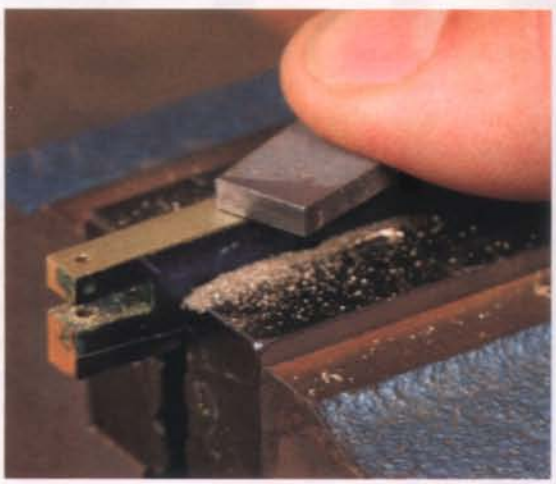
L-shaped stop holds work. *The stop, made with two stopped cuts on the tablesaw, enables the pinhole to be drilled from both sides, reducing error from wander if you were to drill through from one side.*

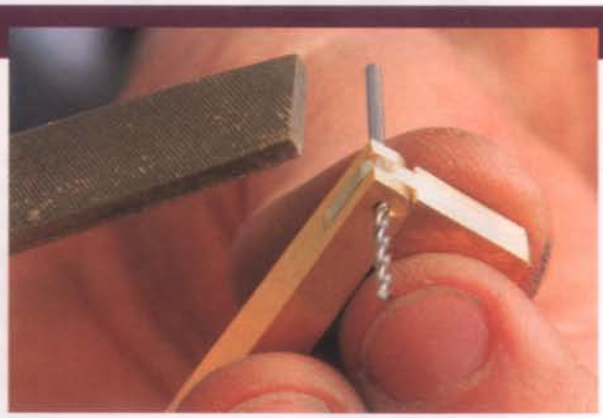


Drill halfway and flip. *Clamp the pull to the post (the face of the pull must be slightly proud of the post for clamping pressure to hold them together) and lay out the pinhole location at the center. Start the hole with a center drill (left) and switch to a #53 bit to drill about halfway through the assembly (right). Flip the pull and complete the hole.*

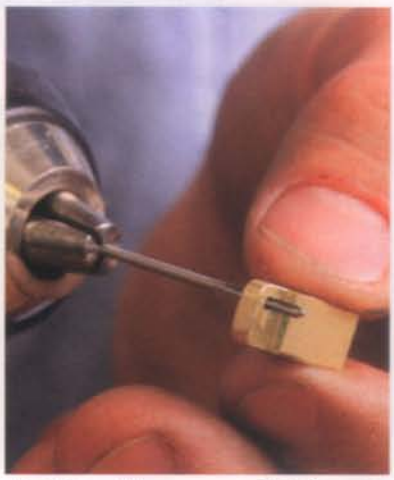
4 SHAPE THE PULL AND ADD THE PIN

Create a taper. *Apply layout fluid, scribe a 2° taper on each side, and file to the final shape. Then sand the front and back of the pull to thin it out and bring the front of the pull in line with the front end of the post. Using P180-grit sandpaper stuck to a flat surface, move the pull back and forth with your fingers, trying to keep the pressure even and the surfaces flat.*





Round off the knuckle. *File to create clearance for the pull to swing. With a drill bit aligning the parts, file the front end of the post and the corner of the pull. Flip the pull and round off the other corner in the same way. Round over the bottom front end of the post with the pull removed.*



Create a press fit. *Ream out the assembly so that the pull has a press fit (left) and the post a loose one (right). Using a drill, hold the parts in your hand while you ream them out. Be careful not to run a reamer in reverse; it will change the reamer's size.*

Press the pin in place. *File or sand the pin to size, deburring and rounding it with a file. Start the pin in the pull with a small hammer, then hold the post in place and press the pin in gently with a vise.*

The Contemporary Cabriole

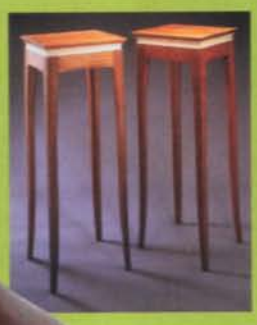
Today's furniture makers breathe new life into an old leg

BY JONATHAN BINZEN

The cabriole leg was like a flourished signature on furniture of the 18th century. From Queen Anne through Chippendale, the S-curved cabriole, with its outcurved knee and incurved ankle, was produced by European and American furniture makers in thousands of variations, on pieces from dining tables and side chairs to highboys and footstools. But use of the cabriole—which takes its name from the Italian word for a leaping goat—neither started nor stopped in the 18th century. Versions of it have been around since ancient Egypt, Greece, and China. And now many furniture makers are giving it a contemporary twist of their own.

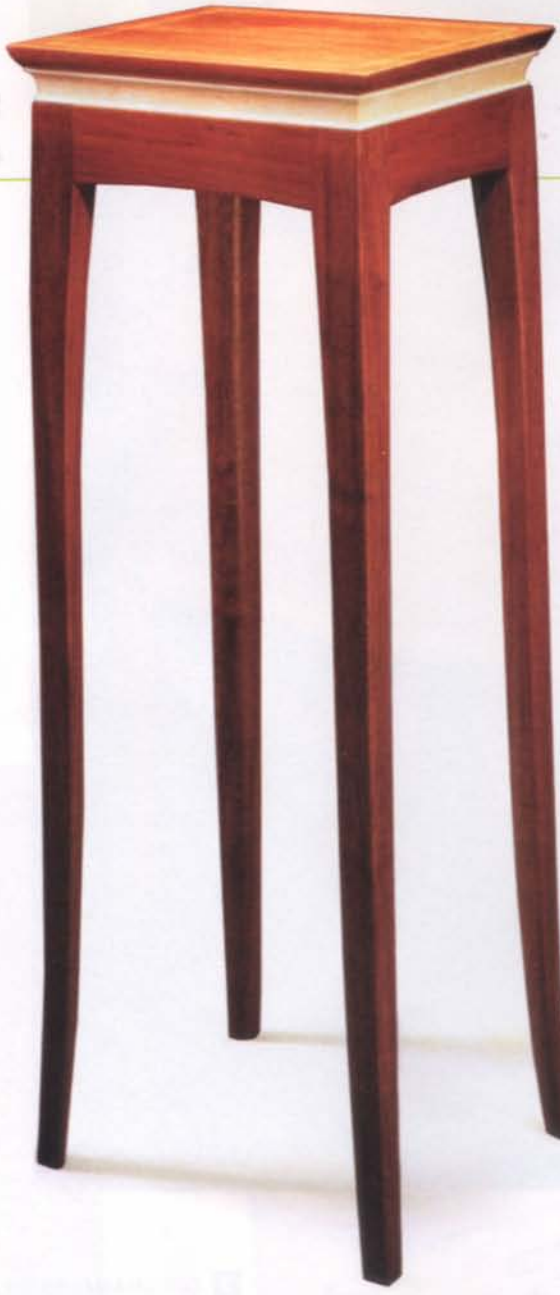
The reversing curves of the cabriole can provide a powerful visual impact whether the legs are long or short and whether the curves are sharp or shallow. The challenge for the furniture maker is to create a handsome cabriole that also suits the overall design of the piece. Here is a handful of examples that show how the ancient cabriole is being deftly put to use by some of today's top makers.

Jonathan Binzen is a consulting editor.



Photos, this page (top left): Michael Pekovich; for bottom photos, see following pages

SMOOTHED OUT AND STRETCHED



"I think subtle can be powerful," says Ted Blachly, and the slightly sinuous legs of his table prove the point. The legs are notable not only for their restraint but also for combining a fairly hard line down the outside corner with softly rounded inside faces.

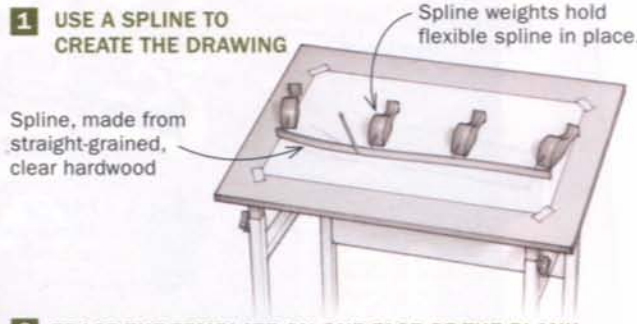
Blachly's design started with a small freehand sketch and proceeded to a full-scale drawing. To generate the lines of the legs' curves full size, he used a spline and spline weights. This simple technique, an essential in a boat-designer's kit, involves placing a thin, flexible strip of solid wood (the spline) right on the drawing paper and bending it to the desired curves. A few weights placed strategically along the spline hold it still while you trace the curve with a pencil. The longer the curve, the thicker the spline should be, Blachly says. For these legs, he used a cherry spline about 3/16 in. thick and 7/8 in. wide. To ensure that the spline takes an even curve when bent, it should be made from straight-grained stock. Specially made spline weights can be purchased (woodenboatstore.com; no. 835-073S), but Blachly improvises with blocks of soapstone.

To make the legs, Blachly started with squared-up blanks milled from a 12/4 mahogany plank. He transferred the curves from his drawing to the leg blanks with a flexible template he made from 1/4-in.-thick lauan plywood.

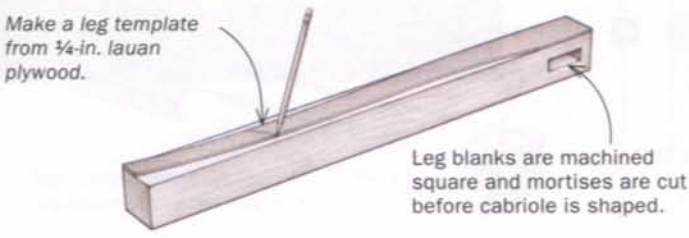
After tracing the template on one face of each leg, he bandsawed those curves. Then, to provide a flat bearing surface for cutting the second face, Blachly taped the bottom offcut back in place. He positioned the template on the now-curved upper face, traced it, and cut the second set of curves. He smoothed the curves with spokeshaves and bench planes, including a flexible-soled compass plane.

HOW TO MAKE THE LEG

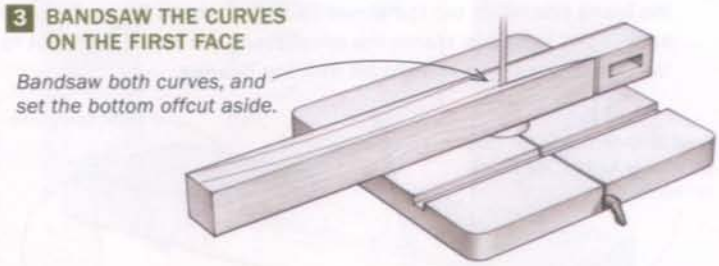
1 USE A SPLINE TO CREATE THE DRAWING



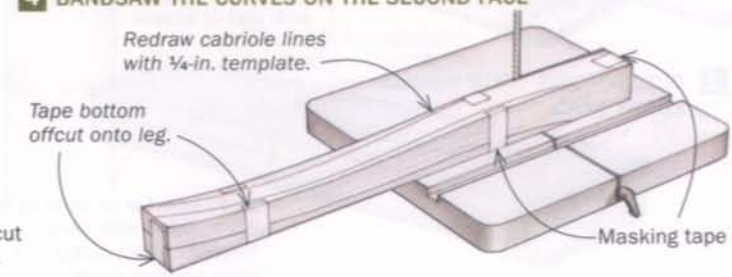
2 TRACE THE TEMPLATE ON ONE FACE OF THE BLANK



3 BANDSAW THE CURVES ON THE FIRST FACE



4 BANDSAW THE CURVES ON THE SECOND FACE



Photo, this page: Dean Powell; drawings: Christopher Mills

SHAPED TOP AND BOTTOM

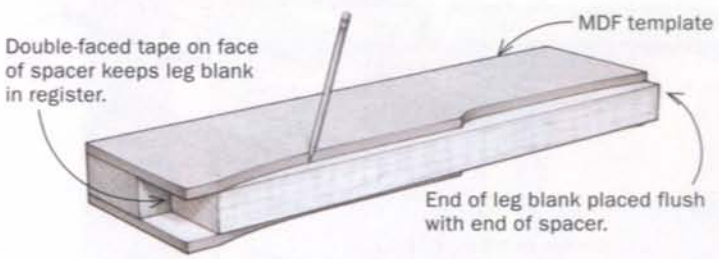
Peter Shepard tapped a long-standing furniture tradition when he carried the legs of his bureau through to the top of the case and had them serve as corner posts for the frame-and-panel carcase. But where in many such case pieces the upper portion of the post is left square, Shepard shaped it with a pair of incurving bevels accented with an ebony bead. This makes the whole leg read as one piece, rather than as a post with a leg below it, and helps deliver the sprightly feeling he was seeking.

After cutting the joinery, Shepard roughed out the legs on the bandsaw and used an MDF template to refine them on the router table. With the curves cut, he used a handheld router with a bearing wheel and a chamfer bit to create the bevels on the upper half of the leg. After the bead was glued in, Shepard worked with rasps and files to extend the bottom of the bevels and create a crisp transition to the lower half of the leg.

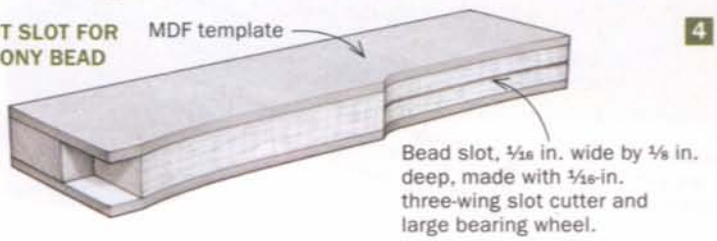
HOW TO MAKE THE LEG

1 BUILD A TEMPLATE SANDWICH

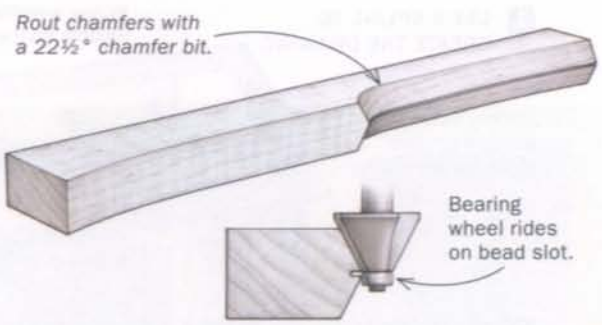
Place the blank in the template and trace it with a pencil. Remove the blank and rough out the shape on the bandsaw. Place the blank back in the template, clamp the template to the bench, and rout to the template using a straight bit with top bearing.



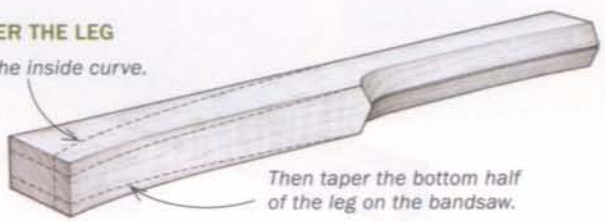
2 CUT SLOT FOR EBONY BEAD



3 CUT CHAMFERS ON THE TOP SECTION



4 TAPER THE LEG



Photos, this page and facing page: Dean Powell

UPSIDE DOWN AND TWINNED

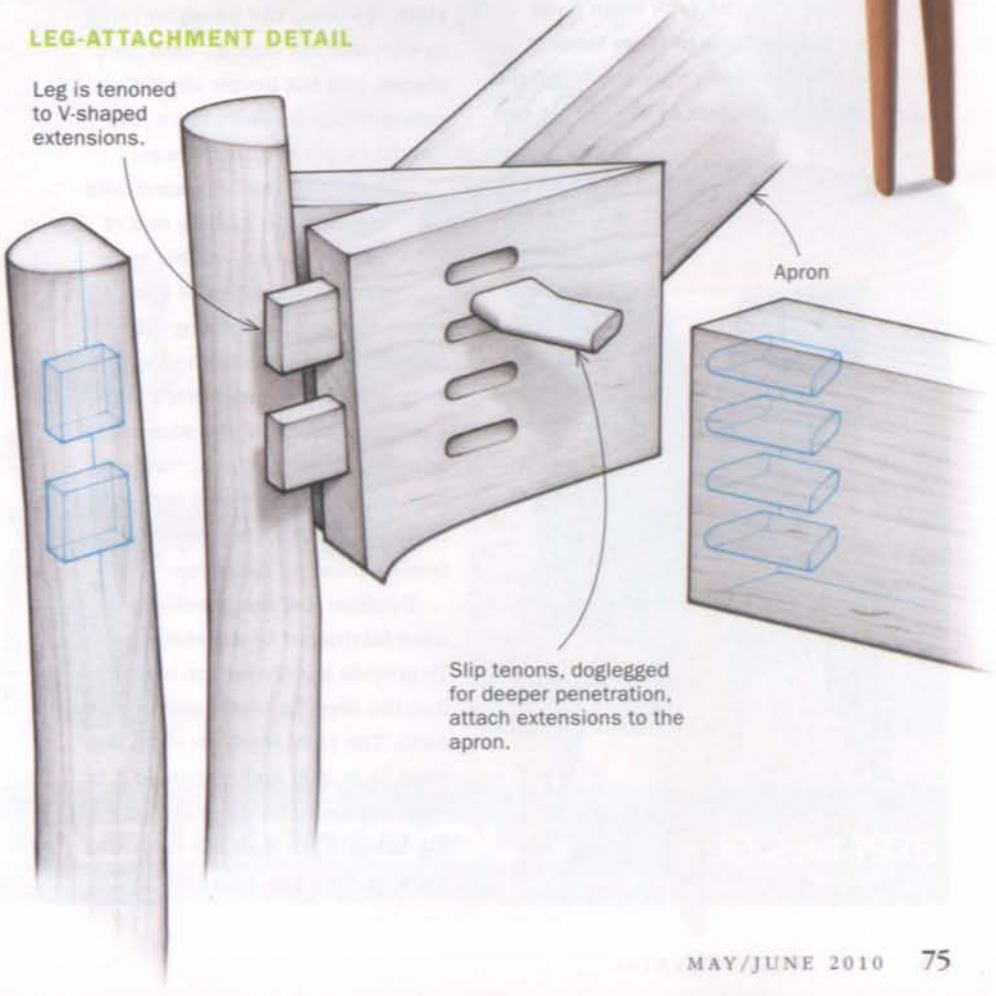
For 50 years, Jere Osgood has been making furniture that exhibits a sculptor's flair for invented forms and an engineer's eye for the creative technical solution.

The legs of this square dining table are an inverted cabriole. Osgood originally designed the shape not for this table but for the back legs of his wishbone chair. When he decided to use a similar leg for the table, he knew it would have to be beefier than on the chair both for visual and structural reasons. Rather than scaling up the leg, however, he paired it up.

This unconventional decision instantly added strength and visual panache, but it also posed a daunting technical challenge—how to attach the legs firmly to the aprons, especially without joining the legs to each other, which he did not want to do. Osgood's equally unconventional solution was to create a V-shaped extension at the junction of the aprons. The forked extension offers a true tenon to each leg and is fixed to the rails with a series of slip tenons oriented to maximize long-grain glue surface.

Osgood made the legs on a shaper using two templates for each leg. The leg comes off the shaper with its cabriole curves established but its corners still square. From there it's all hand-shaping with spokeshaves, rasps, and files. To guide the handwork, Osgood uses templates made from illustration board or cardboard that help him check the cross-section of the leg at critical points.

LEG-ATTACHMENT DETAIL



WITH A SENSE OF FUN

James Schriber set out to design a little table that could also serve as a magazine or book rack and include a drawer. He decided to make the case and box out of sheet aluminum and the legs out of solid wood. This let him balance the flat, cool, hard-edged aluminum with lively, S-curved legs, softly pillowed, rounded at the edges, and coated with a milk-paint finish. "I liked the purposefulness of the box," Schriber says, "against the playfulness of the legs."

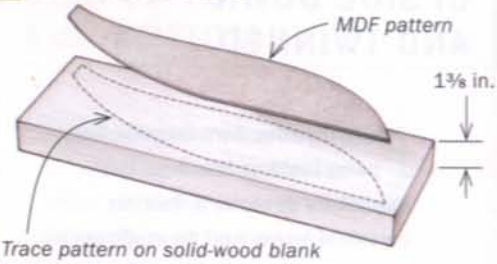
The legs may have a lighthearted air, but they required some serious shaping. Schriber roughed out the curves on a bandsaw and then pattern-shaped them with a router. Then he took them back to the bandsaw to taper them in thickness. Seen from the edge, the legs are thickest at the middle and thinner at the top and bottom. He turned the leg on its edge to make the cuts.

To begin shaping the pillowed sides, he tilted the bandsaw table to 45°, laid the legs on their face planes, and cut bevels along the cabriole curves. From there, the majority of the shaping was done with the legs hand-held against the spindle end of his edge sander. This technique left a series of facets that required smoothing with a balloon sander. He finished with a random-orbit sander fitted with a soft pad. Much of the shaping, Schriber says, is by eye, "and calipers wouldn't find these legs identical. That's fine, though—and it's true of 'most all cabrioles."

Schriber had the aluminum case fabricated by a metal shop. To provide joinery for the legs, he had the shop fix metal pins to the case. The pins, three for each leg, were ¼ in. dia. and protruded 1 in. from the case. Schriber drilled mating holes in the legs and fastened them to the case with epoxy.

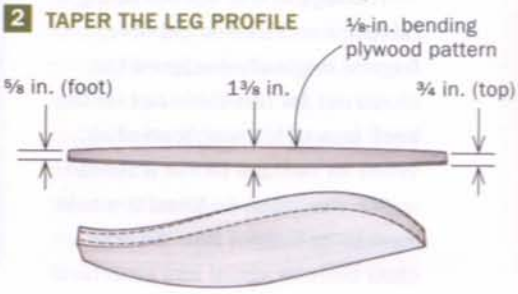
HOW TO MAKE THE LEG

1 BANDSAW AND ROUT

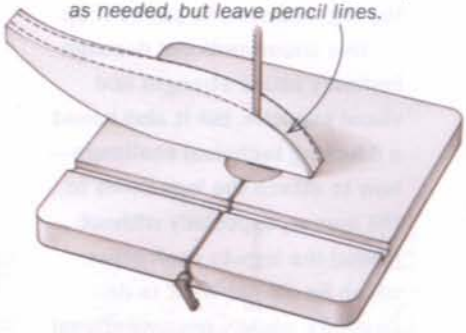


Trace pattern on solid-wood blank and bandsaw to rough shape. Then use template to rout final outline.

2 TAPER THE LEG PROFILE

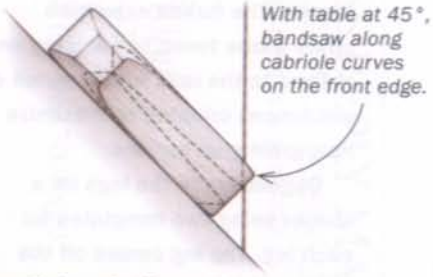


Cut taper on bandsaw, rocking workpiece as needed, but leave pencil lines.

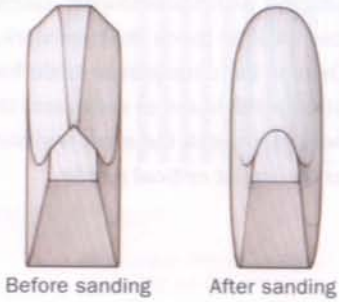


3 SHAPE THE FRONT EDGE

VIEW FROM BOTTOM



Smooth the edge first against a spindle sander, move to a balloon sander inflated soft, and then a random-orbit sander. Final sanding is done by hand.



Before sanding | After sanding

Photos, this page: John Kane

readers gallery

BREK JACOBSON
Kent, Ohio

When commissioned to build a jewelry cabinet, Jacobson designed this veneered and solid-wood oval cabinet on a stand. He wanted a soft form to accentuate the feminine function of the piece. The chestnut, Sitka spruce, and curly-maple piece (18 in. deep by 28 in. wide by 36 in. tall) is finished with shellac. PHOTO: SETH JANOFSKY

JAMES PLATTETER
Middletown Springs, Vt.

Three factors motivated Platteter to build this Pennsylvania spice box: the beauty of the original in *The Pennsylvania Spice Box* by Lee Ellen Griffith (Chester County, 1986), the technical challenge it would provide, and the allure of adding a secret drawer, a feature of many spice boxes. This box (10½ in. deep by 16½ in. wide by 23½ in. tall) is made with figured cherry, curly mahogany, poplar, white pine, and white oak. The inlay woods are yellowheart, walnut, maple, padauk, ebony, and curly bubinga, and the finish is tung oil. PHOTO: MARK SCHOFIELD

DANIEL C. FAIA
East Wakefield, N.H.

Commissioned to build a block-front chest-on-chest, Faia worked with his client to find the right piece to reproduce. They settled on this one for its unique design and dimensions. The original was made in the late 1700s for the sea merchant John Brown. Finished with blond and garnet shellac and paste wax, the mahogany and pine chest stands 21¾ in. deep by 41½ in. wide by 86¾ in. tall. PHOTO: MICAH GUMMEL

PAT MEGOWAN
Corvallis, Ore.

For Megowan, the dovetails were the most challenging part of this jewelry box because of the gently curving profile. The madrone and bird's-eye maple box, finished with shellac, is 9 in. deep by 14 in. wide by 4 in. tall. PHOTO: DAVID WELTER

WILLIAM WELLS
Ypsilanti, Mich.

For Wells, who interned with Michael Fortune, this table (12 in. deep by 54 in. wide by 32 in. tall) was a lesson in grain direction and curves. Wells chose Macassar ebony veneer because its distinctive grain would stand out as it wrapped from the top down the front and back. The ebonized cherry stretcher was steam-bent and joined to the legs with mortise-and-tenon joints and to the top with dowels. The finish is lacquer.

readers gallery continued

JAMES ROMICK
Cresskill, N.J.

Romick made this maple, walnut, wenge, and cherry vessel, the "Phantom Urn," as a gift for Howard McGillin for his record-setting 2,544th (and final) performance as the Phantom in Broadway's "The Phantom of the Opera." Romick, an actor in that musical for nearly 20 years and McGillin's understudy, used 2,544 pieces to build the urn, 12 in. dia. by 18½ in. tall. The finish is lacquer and wax.

ROBERT STECKLER
Dallas, Texas

Steckler designed this chair, 22 in. deep by 24 in. wide by 46 in. tall, to be used at a desk. He chose curly maple for the framework and slats and maple burl for the seat and headrest, leaving a natural edge on the latter. The finish is Watco oil and wax. PHOTO: ROBIN SACHS

NATHAN SCHOENING
Tukwila, Wash.

Inspired by Carlyle Lynch's article in *FWW* #48, Schoening built this Hepplewhite chest of drawers (22 in. deep by 33¼ in. wide by 36 in. tall), taking a few liberties with the design. His drawers are built with sliding dovetails and Tandem Blumotion slides. He also left off the escutcheons and locks because, he said, the piece "was meant to store clothing, and who would want to steal my clothes?" The African mahogany and maple chest is finished with liquid dye concentrates, linseed oil, and shellac.

MAINE WOOD 2010

In an effort to promote the artistic and economic development of Maine's woodworkers, the Center for Furniture Craftsmanship, in Rockport, holds a biennial juried exhibit. Here are just a few pieces from Maine Wood 2010.

DAVID BOYLE
Bath, Maine
Juror's Best in Show: Outstanding Craftsmanship

Setting out to make something colorful and playful, Boyle built this chest of drawers, 29 in. deep by 56 in. wide by 35 in. tall. He started with hornbeam logs and resawed them to create the framework, and added a live-edge walnut slab for the top. The poplar drawer case sits on a nest of lilac branches, and Boyle cut an antique mason jar to create the pulls. The finish is milk paint, varnish, and wipe-on polyurethane. PHOTO: DENNIS GRIGGS

LIBBY SCHRUM
Camden, Maine
People's Choice

Inspired by Frank Lloyd Wright's cantilevered work, Schrum built this cherry and cherry burl jewelry box (6 in. deep by 17 in. wide by 7 in. tall). She finished the box with an oil/varnish mix and the sleeves with shellac. PHOTO: CHRIS PINCHBECK

MATTHEW LINDSAY
North Yarmouth, Maine

With design guidance from instructors Tim Rousseau and Adrian Ferrazzutti, Lindsay built this "Strummer's Stool" (17 in. deep by 14 in. wide by 35 in. tall) during the Twelve-Week Intensive course at the Center for Furniture Craftsmanship. The maple and oak veneers of the curving seat and solid-walnut frame are finished with shellac.
PHOTO: STRETCH STUDIO

GREGG LIPTON
Cumberland, Maine
Best Use of Veneer, Best in Furniture

Lipton originally designed this Macassar ebony and glass coffee table to go in a home furnished with Biedermeier pieces. The design works in contemporary and traditional settings, and he has subsequently adapted it to dining and demilune tables. This table, 30 in. deep by 60 in. wide by 17 in. tall, is finished with hand-rubbed varnish oil. PHOTO: DENNIS GRIGGS

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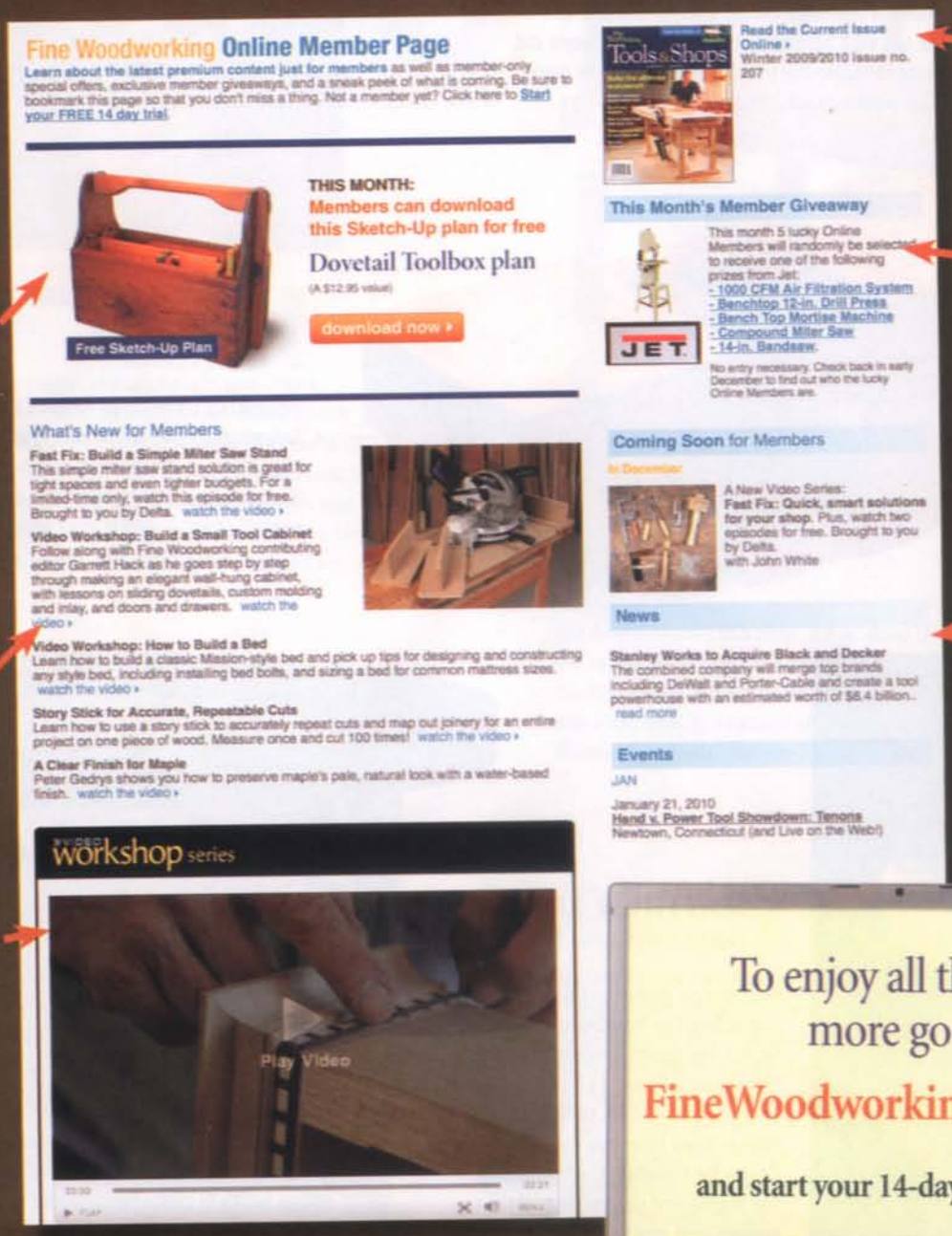

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The Taunton Press

Q&A

On the bandsaw, stick with skip-tooth blades

Q: What's the difference between hook-tooth and skip-tooth bandsaw blades?

—HARRISON FORTSON, San Pedro, Calif.

A: THE DIFFERENCE IS THE SHAPE OF THE TEETH, which has a noticeable impact on how each type of blade performs.

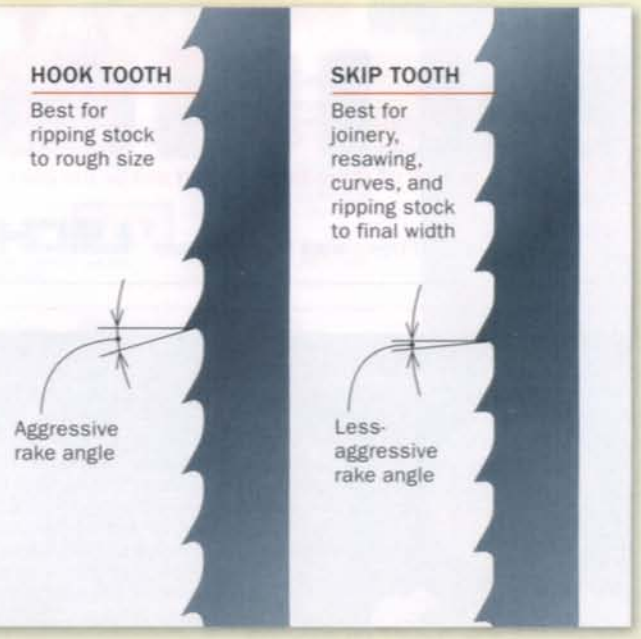
As the name suggests, the teeth on hook-tooth blades resemble hooks, raked aggressively forward. They cut quickly, but the sides of the kerf are rougher and there is noticeable tearout along the bottom of the workpiece, where the teeth exit the wood. They are best used just for ripping boards to rough size.

Skip-tooth blades have a less-aggressive rake angle and so make cuts more slowly, but the cuts are much smoother and cleaner. They are a better choice for general use. I outfit all six of the bandsaws in my shop with skip-tooth blades. I use ½-in.-wide, 3-tpi (teeth per inch) blades for ripping stock, resawing, and cutting joinery. For cutting curves, I use ¼-in.-wide and ⅛-in.-wide blades, both with 4 tpi.

—Michael Fortune is a furniture designer and maker near Lakefield, Ont., Canada.

TOOTH SHAPE AFFECTS HOW A BLADE CUTS

Hook-tooth blades are fine for rough work, but a skip-tooth blade is better for all other tasks because it cuts a smoother kerf wall and minimizes tearout along the bottom of the cut.



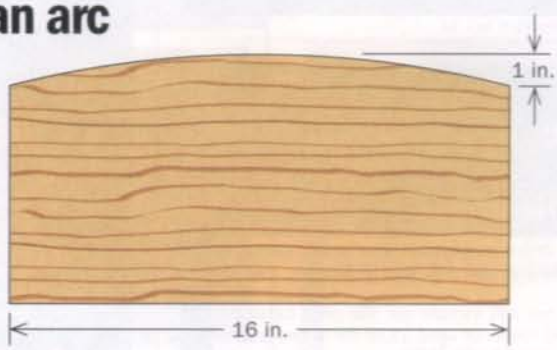
Simple math finds radius of an arc

Q: I'm building a bow-front cabinet and need to find the radius of the bow so that I can make some templates, using a router on a trammel. How can I find it?

—THOMAS MULLINS, Fort Worth, Texas

A: FROM YOUR PLANS, you can find the width and height of the arc. Then you can use a simple mathematical formula (see drawing) to determine the arc's radius.

—Matt Kenney is an associate editor at FWW.



$$\text{Radius} = \frac{H}{2} + \frac{W^2}{8 \times H}$$

$$R = \frac{1}{2} + \frac{16^2}{8 \times 1}$$

$$R = \frac{1}{2} + \frac{256}{8}$$

$$R = \frac{1}{2} + 32$$

$$R = 32\tfrac{1}{2} \text{ in.}$$

H = Height W = Width

FUN WITH ALGEBRA

The width and height of an arc can be used to determine its radius. Here, the width is 16 in., the height is 1 in., and the radius is 32½ in.

Photos: Matt Kenney; drawings, this page: Kelly J. Dunton

Modern glues are strong enough for future antiques

Q: Your readers create furniture that they hope will last for generations. Have any studies been done on the life span of modern glues?

—KEN WILCOX,
Sydney, NSW, Australia

A: MODERN GLUES MIGHT LACK THE HISTORY of hide glues, but they are almost certainly more durable. Dale Zimmerman of Franklin International said the company introduced the first aliphatic resin (polyvinyl acetate, or PVA) interior glue in 1951. The company has been monitoring its performance ever since and has yet to see any general failure. Polyurethane glues such as Gorilla Glue and Type I waterproof PVA glues such as Titebond III are thermosetting and cross-linked, which means they are even stronger, forming irreversible bonds when cured. Similarly, when a urea formaldehyde glue like Unibond is mixed together, it starts a chemical reaction that cannot be reversed. Hide glues, by contrast, can be readily re-liquified with warm water.

—Mark Schofield is FWW's managing editor.

Modern glues are a very safe bet. *We all want our furniture to last, but you don't need to use hide glue like our ancestors did. A modern glue will last for generations.*

Use bed bolts for a knock-down table

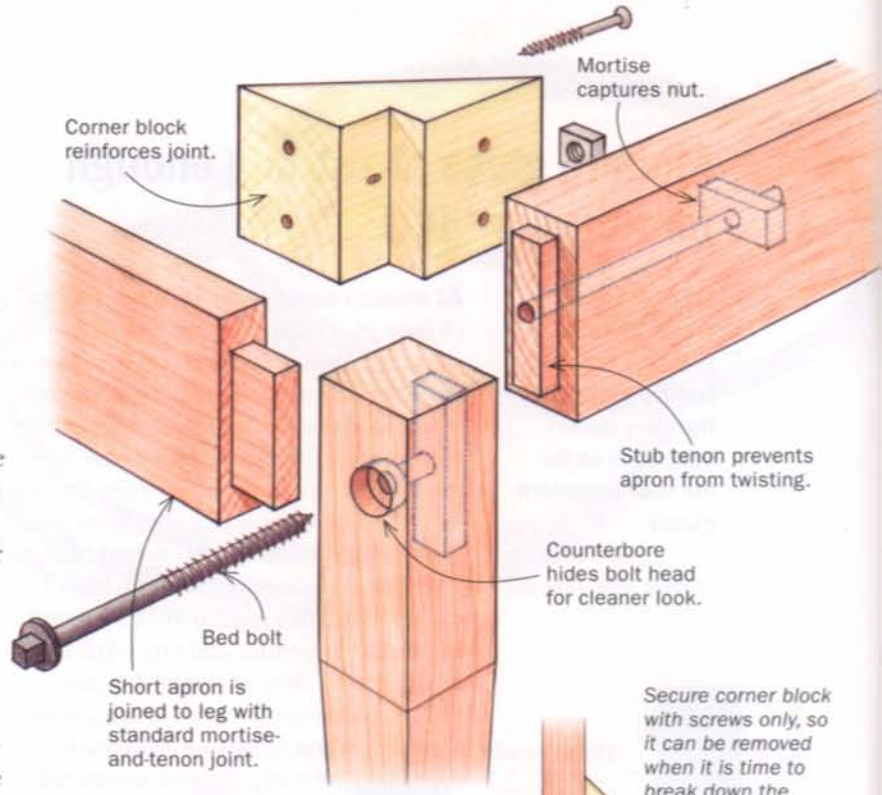
Q: I've been asked to make a 9-ft.-long harvest table that can be disassembled for easy moving. What is the best way to join the aprons to the legs so that the joints are both strong and easily knocked down?

—STEVE MORRIS, Riverhead, N.Y.

A: JOIN THE SHORT APRONS TO THE LEGS with standard mortise-and-tenon joinery. Then make a stub tenon on the apron and a matching mortise on the leg to align the apron and leg, and prevent twisting. Secure the joint with a bed bolt and reinforce it with a corner block, driving two screws into each apron and one into the leg.

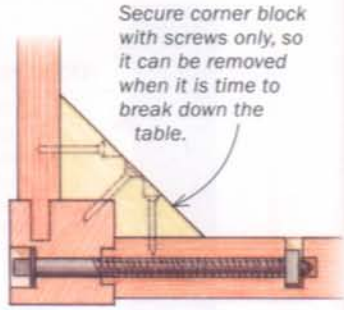
Bed bolts are not appropriate for a refined period piece, but they look fine on a rustic harvest table, especially if you drill a counterbore in the leg to hide the bolt head. One last note: To accommodate the nut, the apron will need to be at least 1¼ in. thick.

—Christian Becksvoort is a contributing editor.



A STURDY KNOCK-DOWN JOINT

A stub mortise-and-tenon prevents twisting; the shoulders and the bed bolt make a strong joint that resists racking. The counterbore removes material from the nearby tenon, but not enough to compromise its strength.



Best finish for spalted woods

Q: I'm making a cabinet with spalted-maple drawer fronts. I can't get an even finish on the fronts. What's causing the uneven finish and how can I fix it?

—TIM MADISON, Hickory, N.C.

A: THE UNEVEN FINISH IS CAUSED by the wood absorbing finish unevenly. This is because it varies in density, a common problem with spalted wood. The solution is to spot-harden the spalted areas first, using a thin, penetrating cyanoacrylate (or "super") glue. Use a medium-thickness glue for small gaps and a thick one for big gaps.

After the glue has dried, sand the wood. Spalted wood is more easily scratched by sandpaper, so sand up to P600 grit. Finally, if you want a clear, non-yellowing topcoat, use a water-based finish like Minwax Polycrylic, wet-sanding with CAMI 800-grit paper between coats.

—Sara Robinson is the owner of Northern Spalting (northernspalting.com).

Cyanoacrylate glue hardens spalted wood. *The spalted areas then absorb less finish, allowing for a more even topcoat.*

Spread glue over punky areas. *Let it soak in and dry, then sand the entire surface before applying the topcoat of your choice.*

Drawings, this page: Vince Babak

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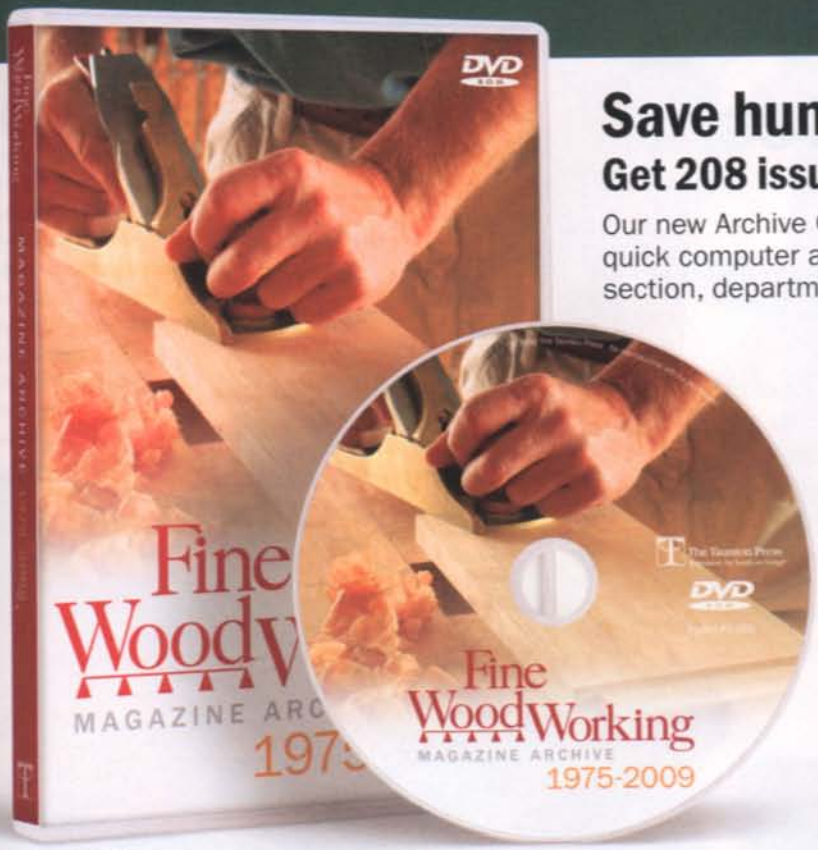

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Veneering tight curves

BY CRAIG THIBODEAU

HALF-ROUNDS

Thibodeau veneered this modern bench in myrtle burl, including a half-round molding around the seat.

QUARTER-ROUNDS

The feet end in a sleek quarter-round profile.

My clients prefer figured or exotic woods that aren't readily available as lumber, so I do a lot of veneering. Luckily, I enjoy the creative freedom this gives, allowing me to run the grain in eye-catching directions—around curves, for example.

When I started out, I found any number of articles on how to veneer flat or gently curved panels for doors and tabletops, but not much on the tighter curves I saw in my mind's eye. So I forged ahead, mixing and matching techniques I found in various places. In this article I'll show how I veneer coves, half-rounds, and quarter-rounds.

The tools and methods are well within the reach of an ambitious amateur. You'll need a vacuum bag, veneer (the thin, commercial kind), white Styrofoam insulation (available at home centers), plastic sheeting, and neoprene rubber (mcmaster.com; No. 9455K46). I use the foam both as a clamping caul and to make flexible sanding blocks for smoothing substrates and the veneered surface. I use Titebond I

LARGE COVES

Dramatic coves, veneered in Macassar ebony, frame the chessboard on Thibodeau's Art Deco game table.

How to handle any cove

Start with a dry run. *Rehearse the clamp-up without glue to make sure the veneer and all the parts of the sandwich are sized right and working correctly. This assembly includes the MDF substrate, glue, veneer, a plastic sheet, ¼-in.-thick neoprene rubber, white foamboard, and a narrow plywood caul.*

Mix and spread glue. *Use urea-formaldehyde glue for coves. Spread it evenly on the substrate using a roller designed for adhesives. Wait a few minutes for some to be absorbed, and then apply a thin second coat.*

Flip check. *Clamp the assembly firmly and uniformly along its length. Turn over the glue-up and check the squeeze-out to be sure all of the edges are clamped. The white foam will continue to compress, so come back in 10 minutes to retighten the clamps.*

Remove the tape. *Thibodeau uses thin, wide gum tape to join sections and reinforce curves. It comes off easily when dampened and allowed to soften.*

Two ways to trim. *If the veneer is sticking straight out, a flush-trimming bit works great (left). But if the veneer bag has flattened the edge, use a machinist's "float" to file the corner (right) until the excess drops away, then sand it flush with a hard block and P100-grit paper.*

Photos, except where noted: Asa Christiana; facing page, Craig Carlson

Half-rounds with no worries

Measure for the veneer. *Make the workpiece extra wide at this point, and use a flexible ruler or a strip of paper to see how much veneer is needed. Cut the veneer about ½ in. short to allow it to expand when it hits the yellow glue.*

Tape outside curves. *The wet gum tape prevents splintering and keeps the veneer flexible. Burnish the tape with a brass-bristle brush to improve its bond. Cover the veneer temporarily with a piece of MDF to keep it flat and moist.*

Lock it down. *After applying glue, tape down the veneer (left) to keep it from sliding around. Then tape down the layer of plastic sheeting and neoprene (right).*

Press and wrap. *Thibodeau adds a layer of white breather cloth to help the airflow. He smooths the wrinkles and wraps the bag tightly around the bottom corners as the air escapes.*

for outside curves; it cures within hours. But it allows too much creep for coves. For those I use Unibond 800, a two-part urea-formaldehyde-based glue (available from Vacuum Pressing Systems; vacupress.com). It allows more open time, creates a very rigid glueline, and cures within 24 hours. Wear a proper respirator, not a dust mask, to protect yourself from the formaldehyde fumes. I use MDF for the substrate because it is stable in all directions and it creates a dead-flat surface.

My veneer tape of choice is thin, 2-in.-wide "water gum" tape (dilegnosupply.com). It comes off easily when dampened and allowed to soften for a minute or so. I use it to assemble joints and to reinforce veneer on outside curves, where it keeps the veneer flexible and prevents splintering. I also used it on the cove veneers in this article, which have vertical grain and had to be assembled from multiple pieces. Quick tip: After applying the tape, burnish it with a brass-bristle brush to improve its bond.

Veneered coves can be used facing upward, as on my Art

TIP

BUBBLE TROUBLE?

If you find bubbles, pockets, or small wrinkles, slice them open with a scalpel, work glue into the recess, and reclamp the assembly in the vacuum bag.

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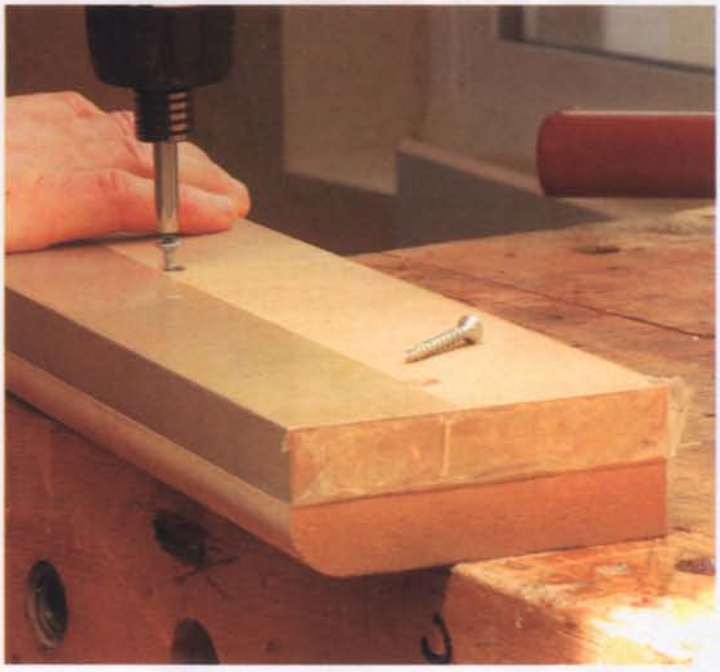
Quarter-rounds aren't much different



Flat landing strip. *To keep the veneer tight against the entire curve, Thibodeau screws on an extra tape-wrapped block flush with the lower edge.*

Lock it down. *As before, tape down the edges of the veneer, and then the layers above it.*

Press and tuck. *As the pressure increases, smooth out the wrinkles on top and be sure the bag wraps under the curved edge.*

Another way to trim. *A sharp veneer saw leaves a perfect edge under the curve.*

Deco chess table, or downward as in crown molding. I laminate a stack of MDF for the substrate. I use the method described in *FWW* #168 ("Cutting Coves on the Tablesaw") to lay out and cut the coves. They usually need some sanding afterward to smooth the tablesaw cut. I don't use a vacuum bag to press large coves; I find it easier to clamp them manually. Before veneering the cove in this case, I veneered the flat edges adjoining it. Those are also easy to veneer with clamps and cauls.

Use a vacuum bag for convex edges

Half-round pieces can be used as a frame (as on my bench) or to create half-round columns to be applied to furniture.

My techniques for outside curves work well all the way down to a ⅜-in. radius. Since the bag does most of the work, the sandwich is simpler. But instead of sitting the glue-up on a flat platen inside the bag as some would do, I use breather cloth (called EvacuNet by Vacuum Pressing Systems) to carry the air from around the workpiece to the hose, and then a layer around the glue-up to help the airflow.

On half-rounds, I make the substrate extra wide for two reasons: It gives me extra support on the router table when forming the round edges, and it leaves room for the veneer to expand a bit when glue and pressure are applied; you don't want it to hit the bag and break or wrinkle. You can just trim away the excess substrate later on the tablesaw.

The other type of outside curve is a quarter-round. I use these for table edges, door edges, and feet. □

Craig Thibodeau, a woodworker in San Diego, specializes in veneered work.

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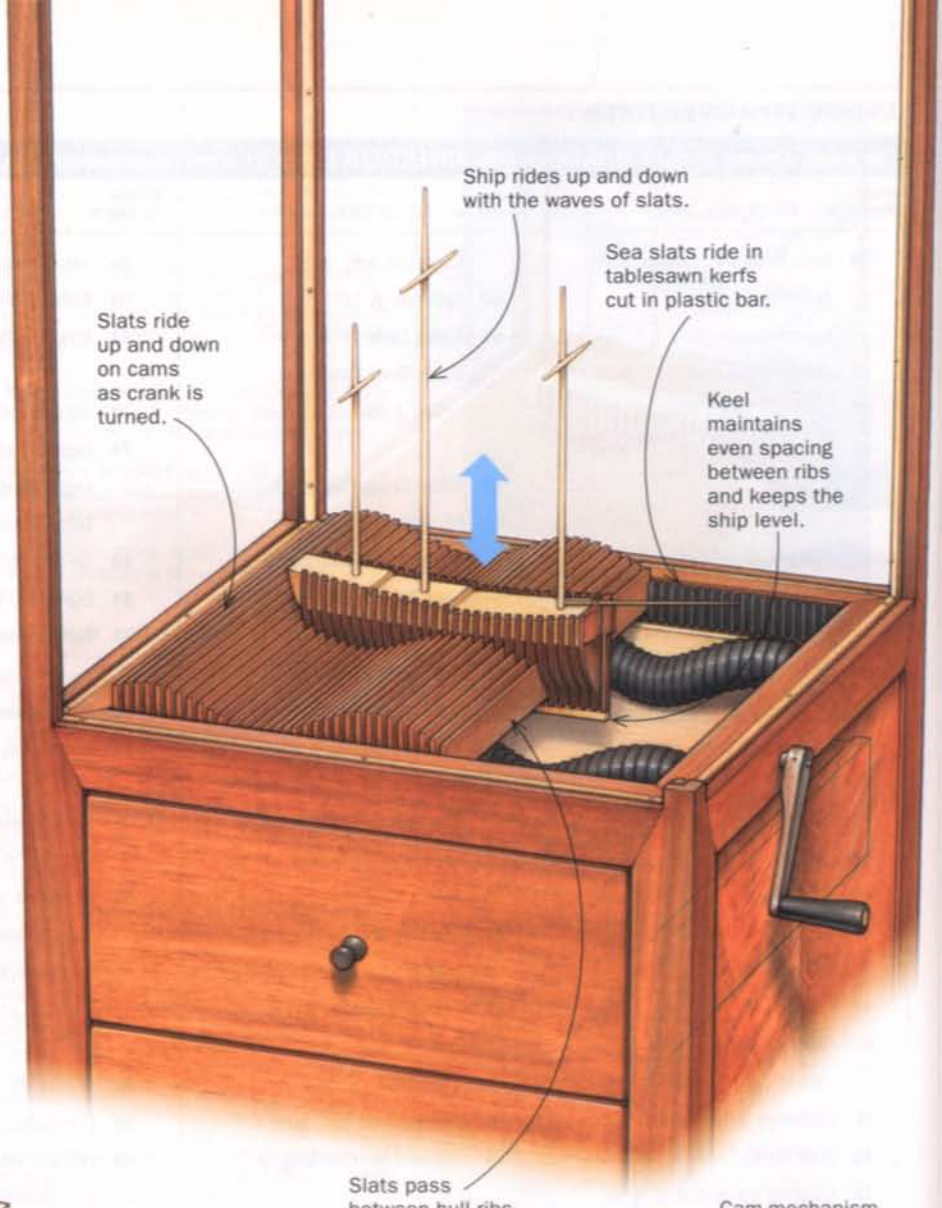
Making waves

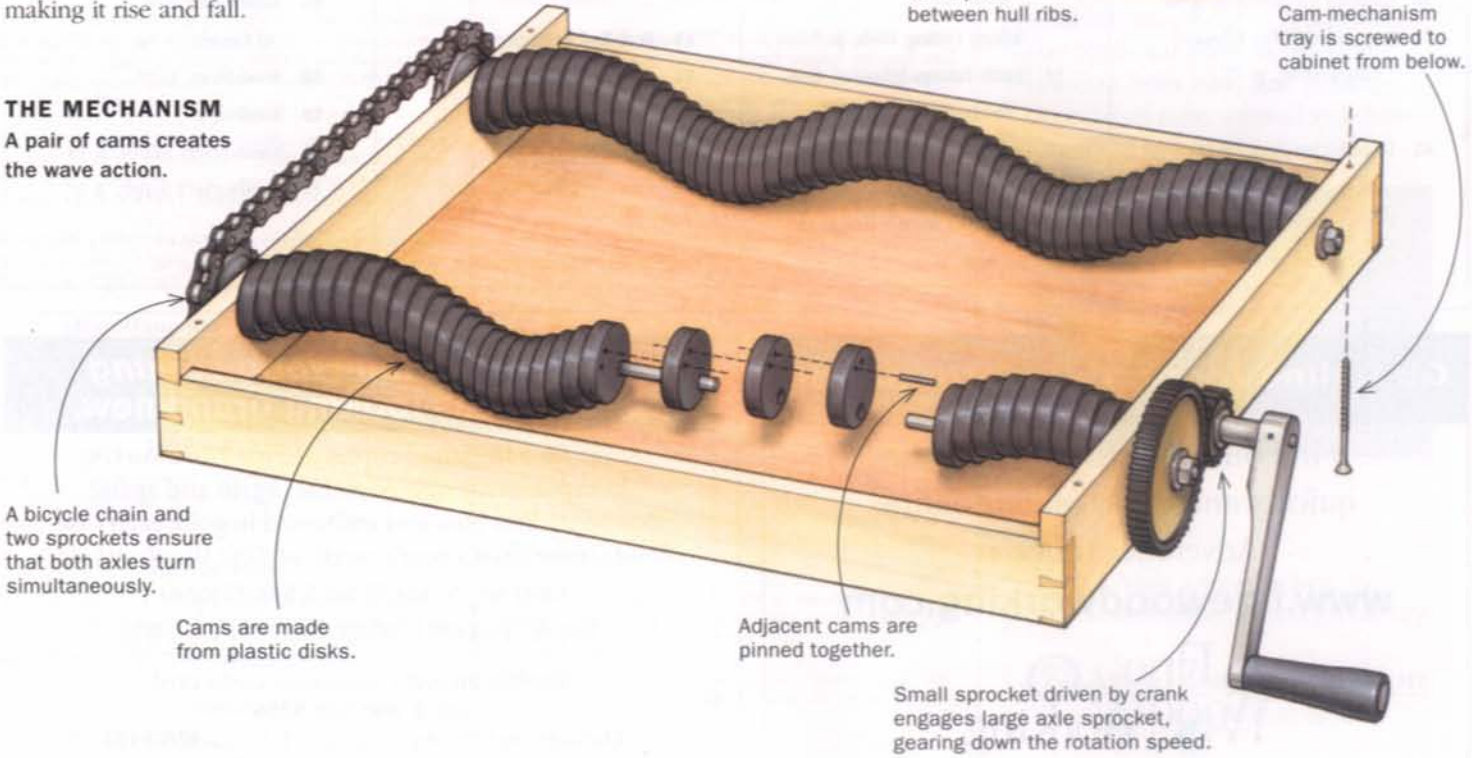
BY JONATHAN BINZEN

Adrian Potter is 15 years into a career as a furniture maker, but he hasn't entirely left behind his training as a mechanical engineer or his early stint designing for an automotive factory. When he wanted to create a sea of slats with simulated waves for his tiny version of Captain James Cook's ship Endeavour (see the back cover), Potter made a cam mechanism like the ones found in a car's drive train. To convert the rotation of his two axles into the up-and-down movement of the waves, Potter threaded the axles with plastic disks. All the disks were drilled identically, with off-center holes for the axle and a pair of small holes for pins. Each disk, or cam, is rotated a few degrees relative to its neighbors and pinned in place, creating a snaking shape that the slats sit on. When the disks move, the wave slats push up on the bottom of the boat, making it rise and fall.



THE MECHANISM

A pair of cams creates the wave action.



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Playing With History

Photos: Grant Hancock

Every school child in Australia learns that in 1770 Captain James Cook discovered the island continent and claimed it for Britain. To commemorate that event, Australian furniture maker Adrian Potter built this collector's cabinet, with a little three-masted ship modeled on Cook's Endeavour. Turn the ebony-handled crank, and the ship rides up and down on a rolling sea of wooden slats. The clever effect depends on the slats moving freely between the ribs of the hull. The style of the cabinet itself, with its 18th-century English Regency flavor, recalls Australia's ties to the mother country. The primary wood Potter used, Australian red cedar, which he describes as "stable, durable, beautiful, and easily worked—up there with mahogany," was quickly discovered by settlers and used nearly to extinction in the colonial period. Cook's voyage sparked a long era of migration by ship to Australia—one fraught with forced voyages, sinkings, and mutinies—and Potter's skeletal ship also reflects this darker side of Australia's maritime history. It is named "SIEV-X" for an Indonesian fishing boat packed with Iraqi refugees that sank in 2001 on its way to Australia, killing more than 300 people.

—Jonathan Binzen

How They Did It Turn to p. 98 to see how Potter created the mechanism that tosses the sea and rocks the boat.

Pro Portfolio For a slide show featuring more of Potter's work and a video clip of his ship in action, go to FineWoodworking.com/extras.