

TAUNTON'S

Fine Woodworking

Hand-tool workout
builds skills, p. 20



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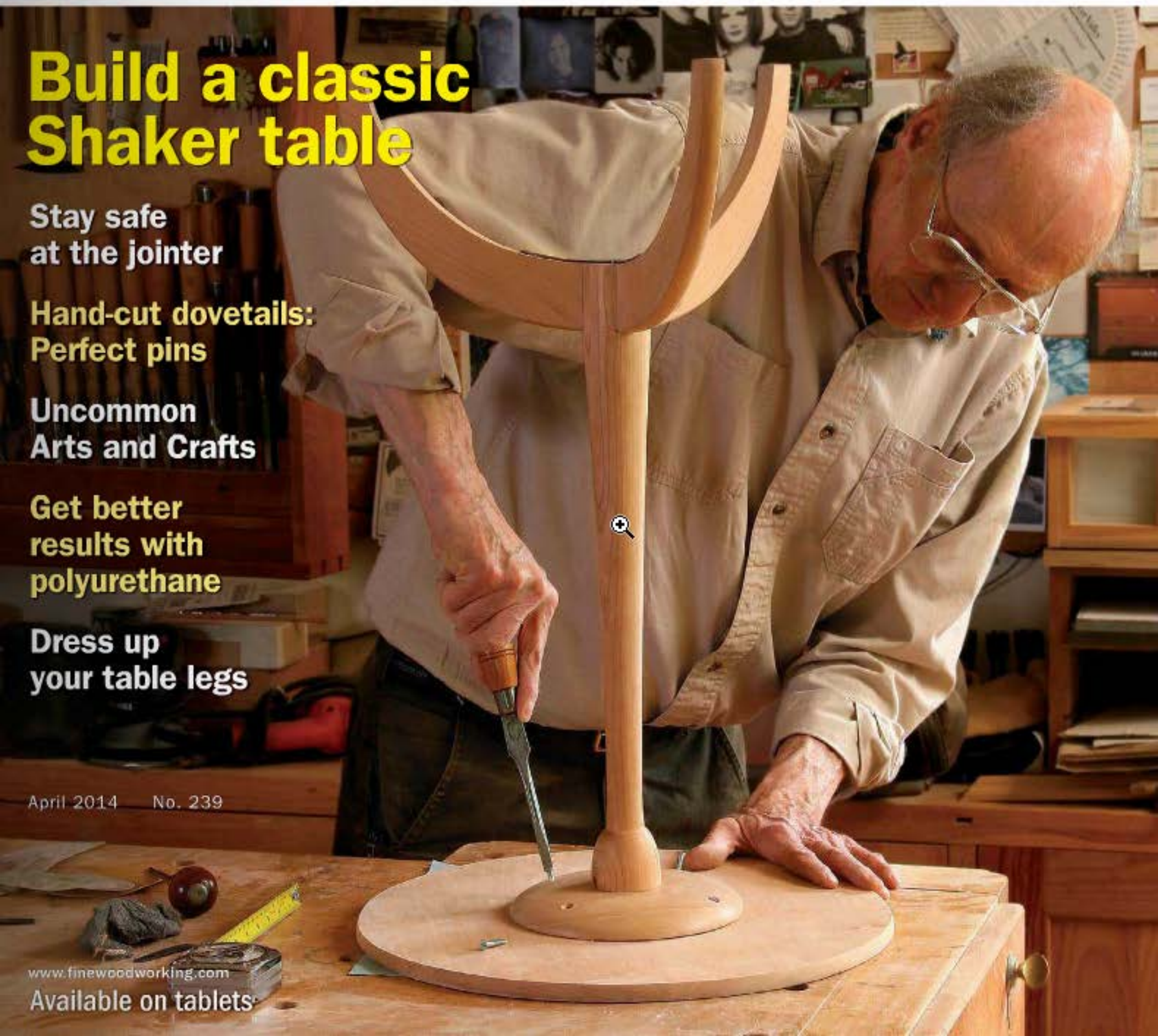
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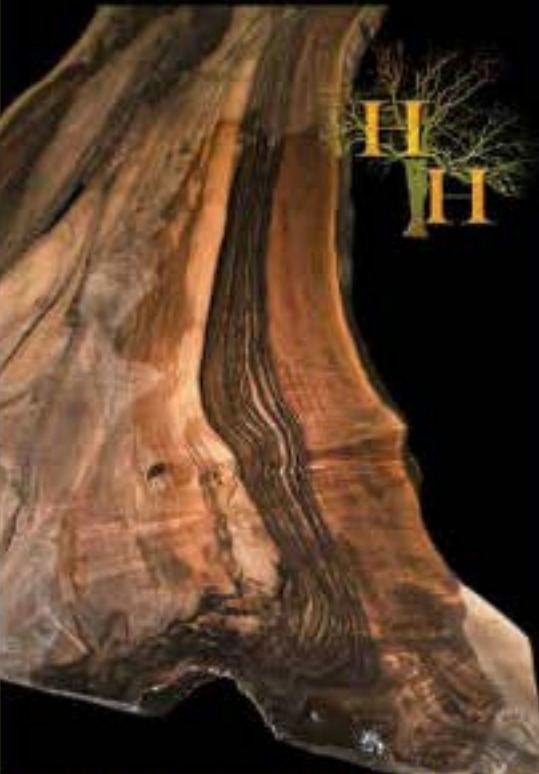
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on the web

THIS MONTH ON **FineWoodworking.com/extras**

Visit our website to access free web extras, available February 5. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.



VIDEO: Mill It by Hand

Sometimes tradition trumps technology. Learn how to mill wood the old-fashioned way (p. 24) and your projects will never be restricted by the size of your milling machines.

SLIDE SHOW: **Unfamiliar Arts and Crafts**

Think the Arts and Crafts furniture movement (p. 50) was strictly an American invention? Think again. Learn how this diverse style first appeared overseas, before blossoming into an international movement.



VIDEO: Joint Like a Pro

Learn how to get the most out of your jointer (p. 42) with our latest series of video tips.

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VIDEO

From Ancient Greece to Colonial America

Period furniture master Steve Latta brings a bit of ancient Greece into the workshop with lessons on how to make period-appropriate dentil moldings. Learn every step of the construction process in our two-part series, including how to:

- Space and lay out two dentil molding styles
- Make sharp, accurate cuts at the tablesaw
- Miter and mount delicate moldings



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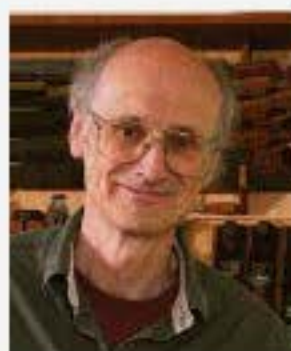
A background in drawing and painting and an early career rebuilding grand pianos started **John Hartman** on the path to FWW. John is one of the talented illustrators who produce the detailed, exploded drawings our readers rely on (for an example of his work, see "Add a Gallery to Any Desk"). Working for a magazine about piano repair sparked his interest in combining the warmth of hand-drawn illustration with the efficiency of computer art. As he developed his illustration style, the piano repair business took a back seat, and he was soon working full time as an illustrator out of his studio in Beacon, N.Y. Working with FWW was an easy fit, he says: "I have always been interested in woodworking (making grand piano soundboards and keyboards is a woodworking challenge) so I am now putting my shop tools to use building furniture and restoring our 19th-century house and studio."



Taimi Barty ("Add a Gallery to Any Desk") earned an engineering degree from Harvard before moving to San Francisco in the mid-1990s to work as an environmental engineer. After months of woodworking in her spare time, she enrolled in the Fine Woodworking Program at College of the Redwoods. She and her husband, Bob Sanderson, now operate Wood Joint Studio in Fort Bragg, Calif., building boats, cabinets, and furniture. **Favorite shop helper?** "I have two. Our 6-year-old son, Frej, has his own workbench, and our poodle mix, Mabel, has a soft chair nearby."

Associate editor **Ben Blackmar** ("Get Better Results with Polyurethane") is an avid woodworker who grew up learning to fix just about anything. He started whittling and making things as soon as he got his first pocket knife, and he worked in furniture and cabinetry shops while attending the University of Georgia and afterward, eventually running his own custom woodworking business. This spring he will graduate from the famed furniture-making program at Boston's North Bennet Street School.

When you're not in the shop? "I'm seeking out a good hiking trail with my wife and dog, or sitting on the porch strumming a guitar."



Christian Becksvoort ("Shaker Side Table" and "Cut and Fit Perfect Pins") has been a professional woodworker for 40 years and a FWW contributing editor for 25. "After all these years," he says, "I still work alone. Each piece is designed, laid out, constructed, glued up, sanded, and finished by me." He builds between 20 and 30 pieces each year, and they range from chairs, tables, and chests of drawers to lamps, clocks, and small sleighs. **Favorite furniture style?** "Shaker, of course." **Favorite rock band?** "The Cowboy Junkies."

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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From the Editor

THE TRADITION CONTINUES

Since I took the reins of *Fine Woodworking* back in October, I haven't had much time to reflect on what the change means to me and, more importantly, to you, our readers. So I put myself into a quiet time to think about it.

Looking back, it seems like I was destined for this job. Since I was a child, I've had a passion for the written word. I devoured every book I saw—even my mom's collection—and loved to write poetry, plays, and short stories. I even liked school book reports! Along with the need to read, I also showed an early interest in making things, from puzzles to plastic models to forts in the yard. I remember taking apart radios and bikes, just so I could figure out how they go back together. (Unfortunately for my dad, it meant that he had to fix what I'd undone or to discard what I'd ruined.) That kind of play led me to take my first woodworking class in 9th grade. My first project was a wall-mounted whale, cut out on the bandsaw and shaped with all manner of files and sandpaper. I was hooked, and I've been woodworking and building ever since.

Being an editor at *FWW* has allowed me to combine these two passions. It really is a dream job. But now that I'm steering the wagon, there's a great responsibility on my shoulders to keep this venerable franchise healthy and to keep it fresh. That's where you readers come in. *FWW* changed how-to publishing by being a reader-written magazine. That means reaching out to experts in the field to have them pen articles from their perspective. It's been a very successful formula, allowing us to spotlight innovative woodworkers all across the country.

There's no reason why everyone, regardless of skill, can't have a seat at this table. You can contribute, too. Send us your ideas (to find out how, go to FineWoodworking.com/submissions). It doesn't have to be a complex project. We're woodworking geeks. We love to see simple tips that have gotten you out of a jam or made your shop life easier. We not only crave creative techniques, but we also savor the taste of basic fundamental woodworking. Often we're just happy to see or hear about what you're building, or about your latest shop adventure.

My goals are simple: to give readers a wide range of topics in each issue, to challenge advanced woodworkers, and to welcome beginners. Most of all, I want the magazine to inspire people to make things, to try different techniques, to get a taste of different styles. I'm honored and humbled by the opportunity to lead *Fine Woodworking*, and I look forward to working with all of you.



—Tom McKenna
tmckenna@taunton.com



Disagrees with drywall screws

I often see drywall screws being recommended for furniture assembly, jigs, and fixtures in *FWW*. I hope you will reconsider this advice.

Regular old drywall screws are inappropriate for woodworking. There are two common diameters, both of which are too weak for many woodworking uses. The common thread shapes are not optimized for hardwoods. Compared to proper hardened-steel cabinet screws, drywall screws are brittle, and break easily while driving, or more rarely, when furniture and jigs are moved or stressed. The bugle head shape does not fit a standard countersink, and it encourages splitting of the wood that it is driven into. The heads are larger in diameter than the same number standard screw, such that a #6 countersink will not fit a #6 drywall screw accurately.

Drywall screws are cheap, but the few pennies saved don't come close to compensating for the number of problems caused by them.

—DEREK ROFF, Santa Fe, N.M.

Editor replies: *You're right—there are many downsides to using drywall screws for furniture making. But they are fine for quick-to-make shop jigs and fixtures. It's hard to beat their price for such use.*

Hand-tool cabinet stirs memories

I very much enjoyed reading Michael Pekovich's article "A Cabinet for Hand Tools" (*FWW* #237). It brought back a flood of (mostly pleasant) memories of my apprenticeship during the mid 1970s with an organ builder in Germany.

As one of the last tasks before receiving the Gesellenbrief (journeyman's certificate), an apprentice is required to build a tool chest very much like the one in the article. It has to house all the hand tools acquired during three or four years of training. Many of the details of tool storage, even the dovetailed corners, are similar, although you'll seldom see swing-out panels on the doors—a great idea that I wish I had used in my chest.

Fine Woodworking

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There's one important difference, however—the sheer size of Pekovich's cabinet, and it's not just because he has more hand tools than anyone else on the planet! You see, the typical Geselle seldom stuck around after finishing the apprenticeship. In the old days, he would strap his tool chest on his back and head out on foot in search of a new job, hence the English term “journeyman.”

—CHRISTOPHER BRODERSEN, Northville, Mich.

Risky tablesaw stance?

I believe that the image of Rob Porcaro at the tablesaw on pp. 53 and 59 in issue #237 (“Make Better Use of Your Space”) is immensely dangerous.

One usually stands to the left of the wood being ripped so that the operator's push forward is toward the fence and blade. Standing to the right will easily present those right-hand fingertips to the nearby sawteeth.

The theory of saw ripping is based on vectors of force, forward and sideward, in effect a diagonal to the upper right. That is how I do and teach it.

—JOHN SHERIDAN, San Francisco, Calif.

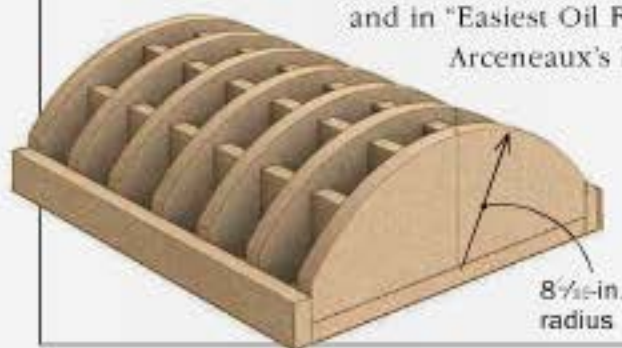


Rob Porcaro replies: *When standing on the right (fence) side of the blade, I am able to pull the workpiece toward the fence while advancing it into the cut. This position does not put my hands any closer to the blade than if I were on the left side of it, and my arms are entirely*

Corrections

In the Readers Gallery spread on the Center for Furniture Craftsmanship's 20th anniversary (FWW #236), we got a name wrong. It's Marc Cutonilli, not Eric.

In “Build a Louisiana Creole Table” (FWW #238), the thickness of the spacer that goes between the two dado blades is incorrectly stated to be the same thickness as the tenon. Because the blades' teeth are wider than the sawplate, the spacer must be thicker than the tenon. In that same article and in “Easiest Oil Finish? Danish Oil,” we misidentified Greg Arceneaux's hometown: He lives in Covington, La.



In “Bowfront Wall Cabinet” (FWW #238), the bending form drawing on p. 34 included an incorrect measurement for the radius of the form's ribs. The correct measurement is 8 1/2 in.

outside of the cutting path. Furthermore, in the unlikely event of a kickback or ejection, less of my body is in the path of rearward-launched wood. This method has been safe for me for many years.

It's a fine measuring tool, not a scraper

I was reading the Q&A section of the *Tools & Shops* issue (FWW #237) when I was appalled to see Michael Fortune suggest using a “steel ruler” as a scraper to remove pitch from the tires of a bandsaw wheel. A quality 6-in. steel machinist's scale is a precision measuring tool. All bets are off if you start using it to scrape dried glue squeeze-out, open paint cans, or as a handy screwdriver.

—DENNIS PERKINS, Hayfork, Calif.

Michael Fortune replies: *I was using an inexpensive and very inaccurate metal ruler that I set aside for jobs just like this. A tool with a sharp edge, like a scraper, might cut or gouge the tire. I also use flexible, inexpensive, inaccurate 1/2-in. stainless-steel rules for cleaning out glue, etc. To be clear, I keep my fine measuring tools in impeccable condition—I have*

made custom holders and date each one when purchased.

Speaking in tongues

In his article “Easiest Finish? Danish Oil,” (FWW #238), Greg Arceneaux explains that the finish is made with either linseed or “tongue” oil. I take it that, if I want a finish that really speaks to me, I should seek out a product that uses the latter.

—BILL HOUGHTON, Sebastopol, Calif.

Editor replies: *We deserve the tongue lashing.*

Sanding disk redux

In “Sanding Disks,” a tool review that appeared in our most recent *Tool Guide*, we failed to include Shopsmith's new product, the G2 line of disks. Also, since we published that original review in FWW #222, the average prices of the disks have changed significantly and those changes nullified our “most economical” statistics shown in the charts. We've updated that original article accordingly online at FineWoodworking.com/sandingdisks and in our archives.

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.



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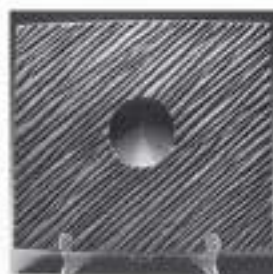
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Best Tip



After being at it for more than 30 years, Rob Porcaro says he is still eagerly absorbing more of the woodworking craft and finding the quiet joy of creating. He designs and builds furniture in Medfield, Mass., and writes a blog that can be found at rpwoodwork.com/blog.

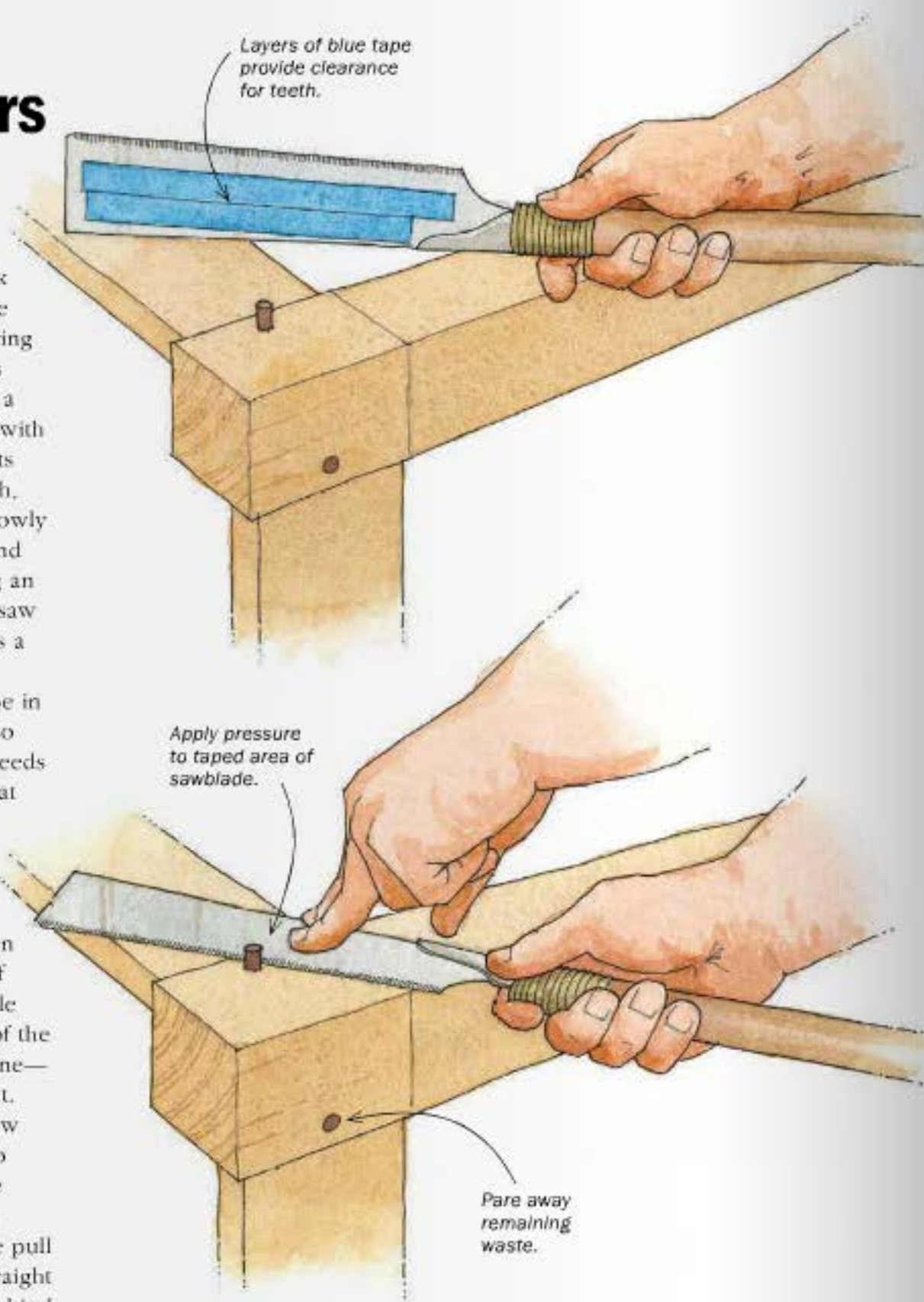
Flush cuts without scars

Finishing off through-tenons and joint pegs often involves crosscutting to trim them flush with the surface. The trick lies in removing as much of the waste as possible without marring the surrounding wood. For this task, some woodworkers favor a specialized "flush-cutting" saw with a flexible blade and no set to its teeth. In my experience, though, this type of saw tends to cut slowly and bind in the work. So I found a way to get great results using an ordinary flexible Japanese pullsaw with a normal set. All it takes is a little blue tape.

Simply apply strips of the tape in layers on one side of the saw so that their thickness slightly exceeds the set of the saw's teeth on that side. The tape supports the saw parallel to the surface while lifting the blade just enough to keep the teeth from scratching the work. When applying tape, cover enough of the saw plate to create a reliable shim, but keep the tape clear of the teeth— $\frac{1}{4}$ in. away should be fine—to avoid interfering with the cut.

To make the cut, press the saw against the work, taking care to apply light downward pressure with your fingers on the taped portion only. Saw with a gentle pull stroke. The result is a clean, straight cut with very little waste left behind for paring.

—ROB PORCARO,
Medfield, Mass.



A Reward for the Best Tip

Send your original tips to fwmow@taunton.com or to Methods of Work, Fine Woodworking, P. O. Box 5506, Newtown, CT 06470. We pay \$100 for a published tip with illustration; \$50 for one without. The prize for this issue's best tip was a Veritas block plane.



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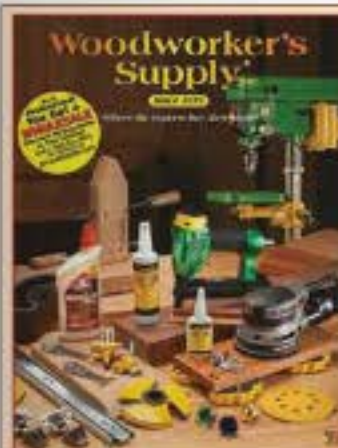
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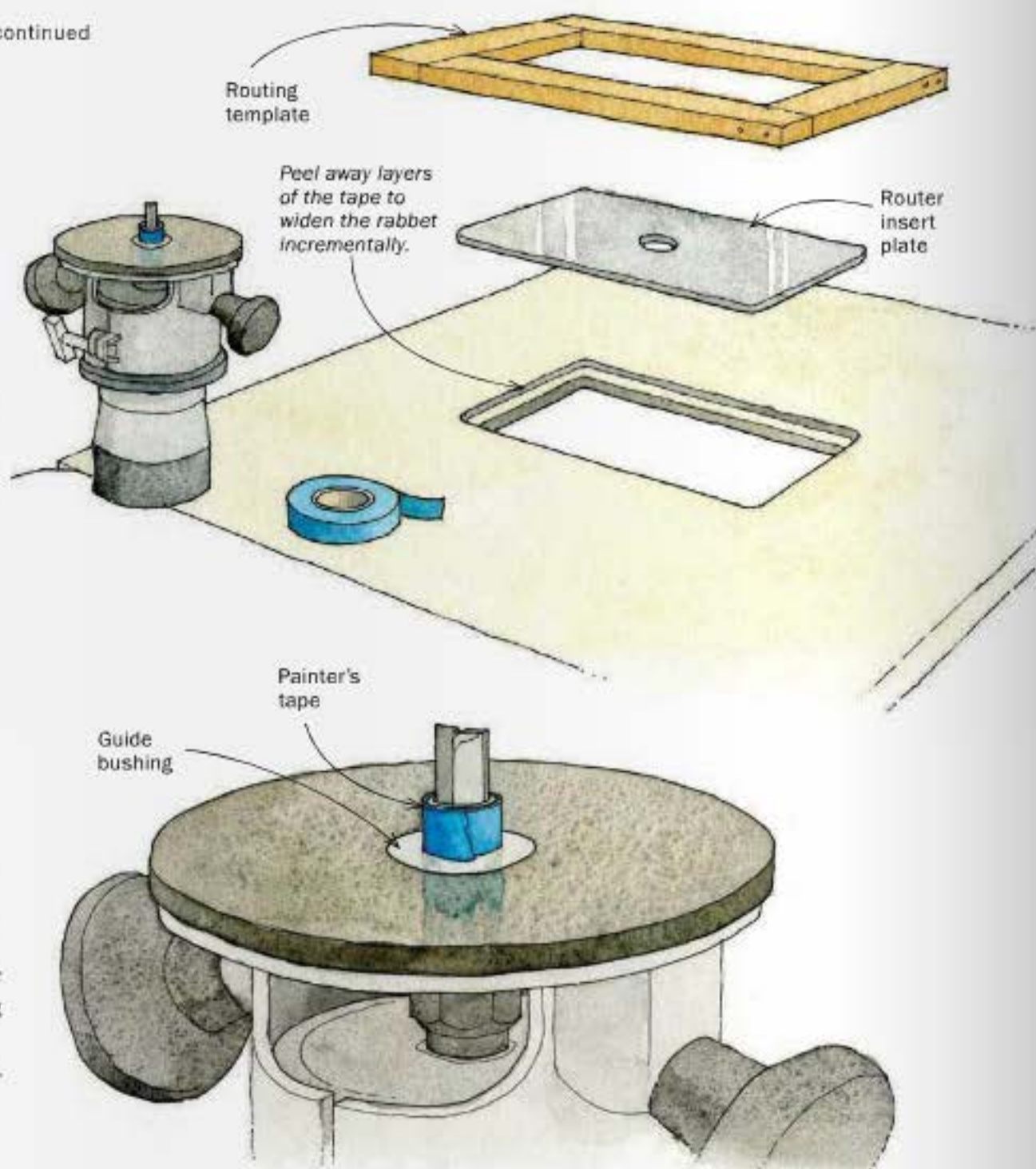
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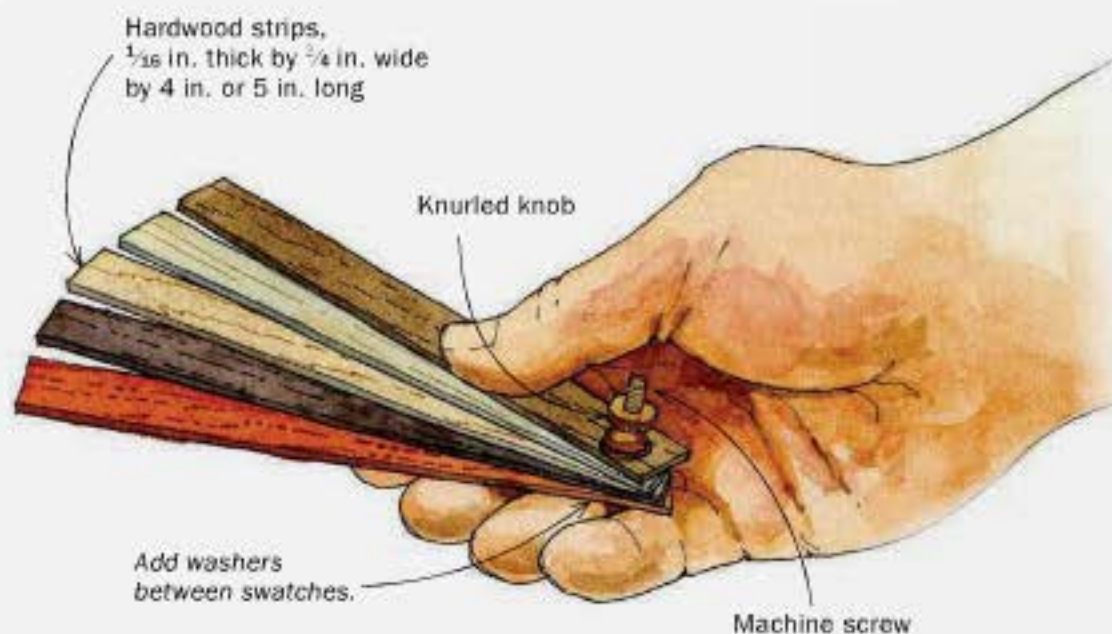
Wrap a guide bushing with tape to sneak up on a perfect fit

I recently added a router table to my tablesaw's extension table using a piece of Corian for the top, and needed to make an opening for a commercial aluminum router-table insert. After rough-cutting the opening using a jigsaw, I had to rout a rabbet sized precisely for the insert. To do that, I made a rectangular routing template by joining four pieces of $\frac{3}{4}$ -in. material. The opening in the frame was sized larger than the aluminum insert by the distance between the router bit and the outside edge of the bushing. I made the template as precisely as I could and theoretically, I could have routed the opening and achieved a perfect fit on the first try. But as a precaution, I decided to sneak up on the size of the opening by wrapping blue painter's masking tape around the bushing. I wrapped three layers of tape and trimmed any excess sticking off the end of the bushing. After the first round of routing, I checked for fit and, as expected, found that it was a bit tight. I removed a little tape and routed again to enlarge the opening by a fraction. The result was a perfect fit.

—JOHN BURKE, Northfield, N.J.



Hardwood swatch fan



I got the idea for this collection of wood samples from those fan-like color swatches you see at paint stores. I use my wood-swatch fan at the lumber store and at home for selecting complementary woods. It also comes in handy at the computer, when I'm adding wood color to my Sketchup project drawings.

To make the fan, I cut several $\frac{1}{16}$ -in.-thick strips of the hardwoods I use most often, making them $\frac{3}{4}$ in. wide. I left one side unfinished and varnished the other side. I drilled a $\frac{1}{4}$ -in.-dia. hole in one end of each strip, then used a machine screw and knurled knob to hold the strips together. With washers on both sides, the thin pieces are less likely to split. With the knob fairly tight, the strips stay put until I'm ready to pick out one or two for comparison.

—BART BRINKMAN, Post Falls, Idaho

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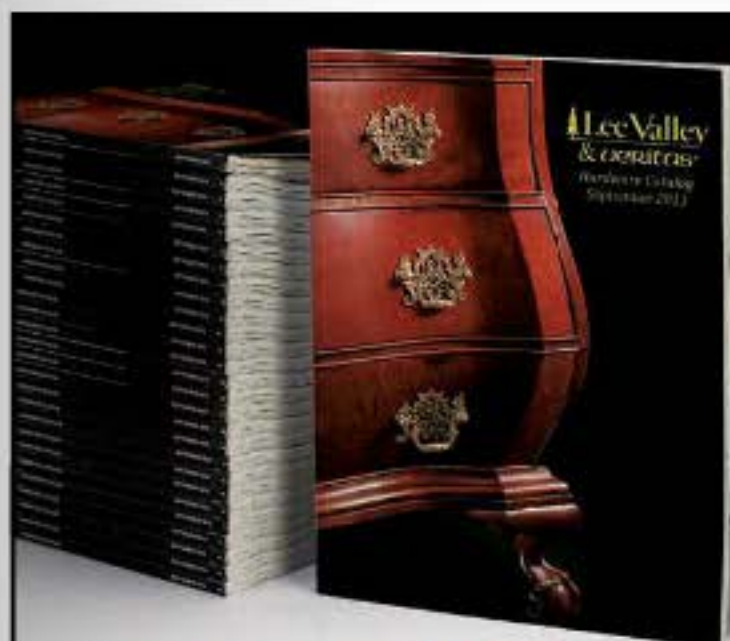
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HAND TOOLS

Sash saw makes fast, clean cuts

ALL OF THE LARGE TENON SAWS I've used are heavy and cut with a wide kerf. But the Gramercy Tools 14-in. sash saw has qualities not found in other big saws. It is light (for a big saw), cuts with a thin kerf, and is very well balanced. It excels at cutting tenons and large joinery.

What really makes this saw stand out from other tenon saws are its teeth, which are a hybrid of rip- and crosscuts. The hand-filed and hammer-set teeth cut quickly when ripping, but

still cut smoothly and cleanly when crosscutting. The saw has 13 tpi, which is aggressive enough to get through tenons in short order but still start easily.

I also like that the saw's plate tapers in height from the heel of the saw to the toe. This design reduces weight, enhances balance, and enables the saw to cut more aggressively because each tooth is slightly lower than the preceding one. The walnut handle is elegant and comfortable.

—Chris Gochnour, a professional furniture maker, regularly cuts joints by hand.



Handy feature. The K5's clamp is adjustable without tools. Just press down on the ratchet release and slide the clamp against the board (above). Pull the handle down to lock the clamp, then drill (left).

Pocket-hole jig by Kreg

Model: K5

\$140

kregtool.com

ACCESSORIES

Easier pocket-hole joinery

AS A PROFESSIONAL CABINETRY AND FURNITURE MAKER, I have used the Kreg Jig extensively to create pocket-hole joints. Kreg's latest jig, the K5, is a big improvement over the original.

First, instead of a toggle clamp to secure parts for drilling, the K5 has a ratcheting clamp that can be adjusted without tools to accommodate different stock thicknesses (the toggle clamp on the original Kreg Jig requires a wrench). Adjusting the height of the drill guide is fast and easy, too, thanks to a spring-loaded locking pin. That's a good thing, because the height must be adjusted to suit the thickness of the part being drilled. The clamp handle also is larger than the handle on the original Kreg Jig and fits nicely in the palm of your hand.

The K5 includes two base extensions that double as small tool trays to hold accessories, and the base is 1½ in. tall, which means you can easily extend the base farther with 2x lumber to support longer stock.

My only complaint is that the jig body no longer has a built-in means for setting the drill bit's stop. Instead, the K5 comes with a small stepped block, which I'm sure I would occasionally forget to take with me to the job site, or simply lose altogether.

—Mark Edmundson is a professional cabinet and furniture maker.



14-in. bandsaw by Jet

Model: JWBS-14SF

\$1,900

jettools.com

No tools needed. You can adjust the guide bearings with just your fingers, and once you have them set, they stay in place.



MACHINES

Bandsaw is big on resawing

WITH ITS MASSIVE RESAW CAPACITY and well-designed fence, Jet's new 14-in. bandsaw is impressive. The bandsaw can resaw boards up to 13½ in. wide, the largest capacity of any 14-in. bandsaw on the market. The saw's fence is just as impressive. It has a micro-adjust feature that allows very accurate placement with the twist of a knob, and the fence rail has a deeply etched scale that's accurate and easy to read. The fence's aluminum face can be quickly switched between two different configurations: The high position provides support for resawing, while the low position allows the guides to drop to within ¼ in. of the table surface for sawing thin material.

Its 1¼-hp motor (wired for 115 volts, but can be rewired for 230 volts) will handle the majority of sawing that you'd ask it to do, but if you plan to resaw at its capacity, you'll need to slow down the feed rate.

The 21½-in. by 16-in. cast-iron table has one of the largest round throats I've seen, making it easy to install and remove wide blades. The anodized aluminum throat plate has three set screws to level it with the surrounding tabletop.

The guide post is very stiff, with a rack-and-pinion system for height adjustments. Adjusting the roller-blade guides is a tool-free breeze and the guides hold their settings accurately. A quick-release lever for blade tension speeds up blade changes and a window in the upper

wheel house makes it easy to track the blade. There are two 4-in. dust ports.

The one below the lower guides pulls most of the fine dust, and the one at the bottom of the saw helps catch the rest.

A crank-operated, rack-and-pinion system adjusts table tilt. When set to 90°, the table didn't move. But when angled for bevel cuts, it shifted slightly under pressure.

Fortunately, bevel cuts aren't common on a bandsaw, so the problem isn't necessarily a deal-breaker. But if Jet corrected this problem, they'd have a great bandsaw.

—Roland Johnson is the author of *Taunton's Complete Illustrated Guide to Bandsaws* (2010, The Taunton Press).



ACCESSORIES

Throat plate with replaceable inserts

INFINITY TOOLS IS NOW

SELLING a zero-clearance throat plate for SawStop tablesaws (\$110, infinitytools.com, No. 100-335). The aluminum plate has replaceable melamine-covered MDF inserts where the blade cuts. The inserts are inexpensive (4 for \$14, No. 100-337), allowing you to have custom zero-clearance inserts for several blades, blade angles, and dado-set widths.

I tried the throat plate in *FWW's* shop and found that it fit the saw extremely well. Height adjustment is done using the saw's screws at the rear and built-in screws at the front. Likewise, the replaceable inserts fit perfectly and slide in easily, making them quick to change. There are inserts available for both the standard riving knife and the blade guard/dust collection riving knife.

The throat plate doesn't have the locking feature found on the SawStop throat plate, but with the precise fit and the machined-in hold-down at the rear of the plate, I don't think it is necessary.

—Bill Peck is Fine Woodworking's shop manager.



Before I made furniture for a living, I made music. As a player in orchestras and brass ensembles, I stayed sharp in the way that most performers do, with hours and hours of practice.

So when I came into the woodshop, it seemed natural to practice my new skills with the same sort of discipline. Imagine my surprise when I found that practice is shunned by most woodworkers as much as it is embraced by musicians. But it's just as important.

Practice turns the tool into an extension of yourself. It builds and reinforces your muscle memory, letting you perform the physical tasks routinely and making them second nature. And that's key, because there's always more than just the physical task. You don't just saw or chisel—you need to do that to a line. Practicing lets you build

Skill-building hand-tool exercises

PRACTICE, AND YOU'LL GAIN BETTER CONTROL OVER YOUR TOOLS

BY JEFF MILLER

up mastery of the underlying skills by isolating them—reducing them to basic elements of technique.

The exercises shown here will help. Work on them for 15 minutes a couple of times a week and your mastery and confidence will grow. Will it make you perfect? Nope. But it certainly will make you a better craftsman.

Jeff Miller builds custom furniture and teaches woodworking in Chicago.

SAWS



With proper technique, using any handsaw—western or Japanese—is a joy. The saw cuts easily, without binding, and follows a line without being steered. These exercises will help. Start with the right stance, with your forearm perfectly aligned with the back of the saw. To do this, stand slightly off to the side, with your hips at about 45° to the work. Your feet should be at least shoulder-width apart.

SAW WITHOUT SEEING

Clamp a $\frac{1}{4}$ -in.- to $\frac{3}{4}$ -in.-thick board upright in a vise, with 5 in. or so above the jaws. Practice sawing into the end grain with your eyes closed. This lets you concentrate on your mechanics, instead of watching the kerf. Make your grip light, as if you're holding a baby bird, and point your index finger forward along the blade. Try to generate all of the saw's movement from your shoulder.

With the cut underway, close your eyes and notice how the saw's action feels. How much pressure is needed in each direction for a smooth cut? Also listen to the sound of the saw as you cut. Strive for a very even sound throughout the stroke. A little of this practice goes a long way.



Eyes wide shut. Practicing with your eyes closed helps you focus on the sound and physical sensation of a smooth cut (right). Curl your fingertips under and let the saw brush the back of your index finger to help monitor the straightness of each stroke (left).

SAW TO A LINE

This exercise helps develop your ability to cut accurately right next to a layout line.



Set a practice piece in the vise. Use a knife to make several clean lines about $\frac{3}{4}$ in. down the board and across the top. Now trace over these lines with a slightly dull pencil to create two pencil lines; one on each side of the incised line (left). The goal is to cut away one of the lines without disturbing the other one. Miller suggests beginning the cut with almost no pressure on the back of the saw. It may feel like you're actually lifting the saw off the work (center). A neatly sawn line leaves its twin undisturbed (right).

HANDPLANES

These exercises will help you practice the right stance and teach you how to control and balance downward pressure on the plane. For tips on sharpening and setting up a plane, see "Get Sharp Fast," *FWW* #213, and "Handplaning 101," *FWW* #204.



SLOW DOWN

Pick a $\frac{3}{4}$ -in.-thick board, at least 4 in. wide and 3 or 4 ft. long, and set it up to plane on edge. With a smoother or jack plane, start at one end and move the plane extremely slowly (right). This makes it harder to plane incorrectly. Feel the push originating with your feet (far right). Align your pushing arm in the direction of the cut and keep your wrist straight.



START, STOP, START, STOP

Plane the entire edge again, but stop and start every 6 in. or so. Remember to maintain pressure with your hands (right) as you push all the way from your feet. With proper downward pressure, the cut will begin as soon as you restart. The goal is a continuous, unbroken shaving (far right).



PLANING A CONVEX CURVE

You should always plane "downhill" on a curve to follow the grain. But just for the exercise, try planing uphill, too. As you move the plane over the curve, balance downward pressure on the front and back to keep the iron in the cut.





CHISELS

These exercises are aimed at developing greater control over the chisel and understanding how the chisel interacts with wood grain.

PARE TO A LINE

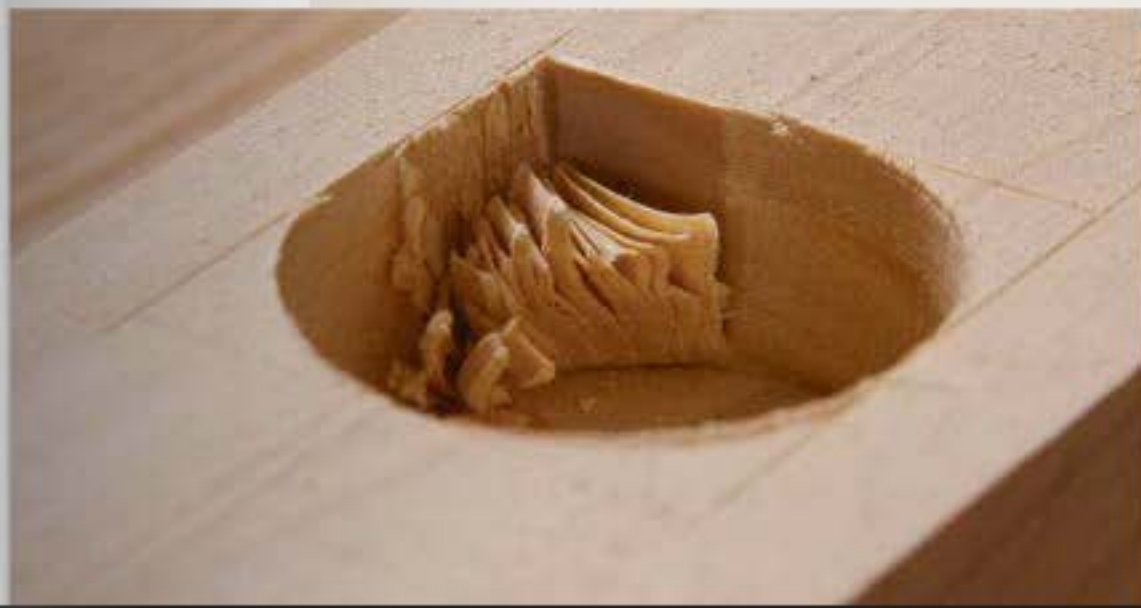
Cut a rabbet on the end of a board. Then, with a marking gauge (or knife), scribe a line about $\frac{1}{16}$ in. away from the rabbet. Use a $\frac{1}{2}$ -in. or $\frac{3}{4}$ -in. chisel to pare to the scribed line. The goal is to leave the scribed line perfectly straight without going over it (right). This will teach you chisel control, and how much you can pare away in a single cut without forcing the chisel backward.



Chase the line across. Once you're within $\frac{1}{16}$ in. or so of the line (closer is better for harder woods), start at one end with the chisel in the scribed line and pare down. Then move the chisel along the line, holding it so that about 80% is tight to the just-pared surface, with the rest in the line a little farther along. Pare and repeat all along the line.

SQUARE UP A HOLE

Start with a scrap board at least $1\frac{1}{4}$ in. thick. Use a Forstner or spade bit to drill a hole about $\frac{3}{4}$ in. deep and 1 in. to $1\frac{1}{2}$ in. dia. Now scribe a square tangent to the circle. The task is to pare the hole square. This will help you feel how the chisel interacts with wood grain. For control, hold the end of the tool like a pencil, with your hand resting on the work. Power the work with your weight and shoulder muscles.



SLICE OFF A DOWEL

Drill a $\frac{3}{8}$ -in. hole in a board. Next, pound in a dowel and trim it so that it sticks up about $\frac{1}{8}$ in. above the surface. Now use your chisel to pare the dowel flush. A slicing motion will help with this, and is a useful technique to master. Push the chisel's edge sideways across the dowel with your guiding hand, while you push forward with the other hand on the handle.



Two directions at once. Move the cutting edge sideways as you push the chisel forward. This helps to trim the dowel flush without cutting into the board's surface.

Prep rough lumber with hand tools

WITH THIS BEDROCK SKILL, YOU CAN FLATTEN ANY SIZE BOARD, FREEING YOU FROM THE LIMITATIONS OF YOUR MACHINES

BY ANDREW HUNTER



Online Extra

To watch a video showing how to mill lumber by hand, go to FineWoodworking.com/extras.

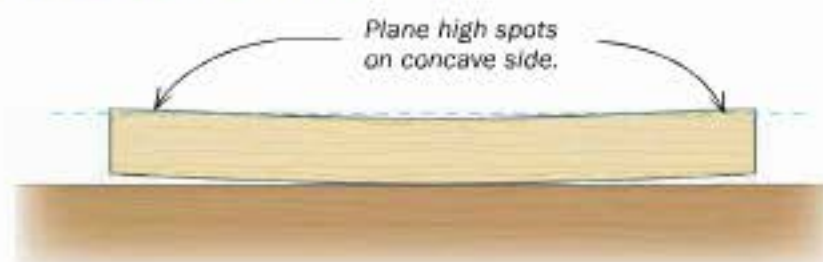


Start with the saw. Cut the parts $\frac{1}{4}$ in. oversize in length and width. You'll trim them to final size after the flattening is complete.

Flattening and dimensioning boards by hand is the bedrock of hand-tool woodworking. Nothing can teach you more about wood than taking it from rough to ready with a handplane. You'll improve your skill at reading the grain and sharpen your eye for a true surface. Through repetition, you'll develop a sense of controlled strength that will benefit every aspect of your work. And once you've developed the ability to mill by hand, your projects will no longer be limited by the size of your jointer and planer.

If possible, be kind to yourself with the species of wood you choose for hand milling. Softer woods free of knots and irregular grain are best. Most of the time, I mill a board in two separate stages: rough and finish. In the rough-milling stage, I first cut the board to rough length and width. Then I flatten the board, bringing it to within $\frac{1}{16}$ in. of final thickness. I remove the bulk of material from both sides without worrying about making perfectly smooth surfaces. I do this because a board needs to be somewhat flat before it can be made perfectly flat—if it bends under the pressure of planing, the

Prepare the board



Mark the highs and lows. Using a flat bench or table as a reference surface, find the high and low spots on both sides of the board and mark them with a pencil.



Take out the wobble. Working with a jack plane on the concave side of the board, plane flats along the two long edges until the board, when flipped, lies firmly without rocking.

TIP

DEALING WITH KNOTS

Knot-free wood is best for hand-milling, but sometimes knots are unavoidable. To figure out which direction to plane over a knot, put a finger at the center of the knot on each side of the board. The offset between your fingers will indicate the angle of the knot. Plane with the angle. It also helps to soak a knot with water to soften it beforehand. The swollen cells will be less likely to tear out.



Flatten one face

Plane flats along edges to prevent rocking.

Then flatten the convex side.



Start across the grain. Rough flattening starts with a short-bodied plane set to take a coarse shaving. Take strokes directly across the grain, skewing the plane slightly for a slicing cut.

CHANGE DIRECTION AS YOU GO

In the rough-milling stage, plane in the sequence shown below with the roughing, jointer, and smoothing planes. For the finish-milling stage, skip the roughing plane and omit angles 1 and 2.



springback will leave the board out of true. The two-stage process also allows me to let the rough-milled stock rest for a day or so—and move, if it's going to—before I plane it to finished thickness and smoothness.

To begin rough milling, shave the edges of the concave side of the board until, when flipped, it will lie flat. Don't worry if it doesn't contact in the middle; your aim is just to get it stable. Now start the rough milling with the convex side of the board.

Whether you use Japanese handplanes like me, or western ones, I recommend using three planes to do all the flattening: a scrub or jack plane (with its blade set for an aggressive cut), a jointer plane (long body for best jointing), and a smoother (short, wide body for a smooth final surface). The sequence of cuts with all the planes in the rough milling stage follows a similar pattern. Begin with strokes directly across the board—90° to the direction of the grain—and follow with strokes 60° to the grain, then 45°, and finally along the grain. Take side-by-

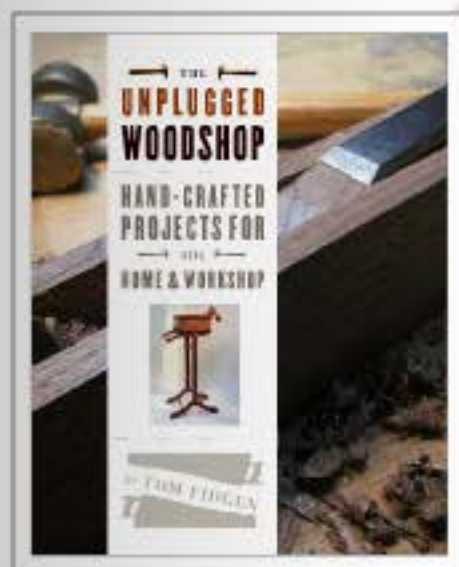


Check progress with a straightedge. Using a pencil, Hunter marks high spots with X's and squiggly lines, low spots with O's. Sighting across a pair of winding sticks (right) will tell you if there's any twist in your planed surface.



Along the grain with a longer plane. After working through the angles with the roughing plane, follow up with a jointer plane. Use the same planing sequence of angled strokes, ending with passes along the grain. Then finish up with a smoothing plane, following the same sequence of strokes.

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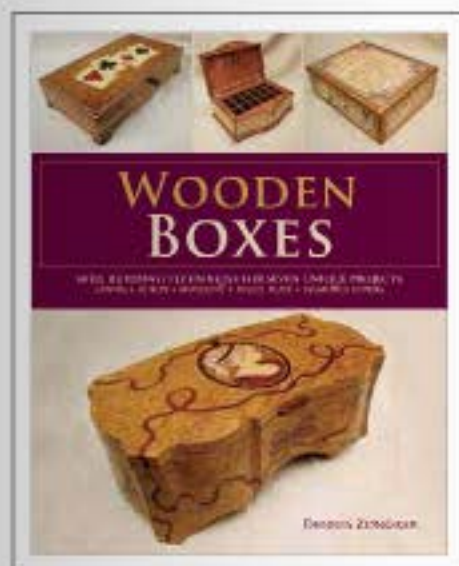
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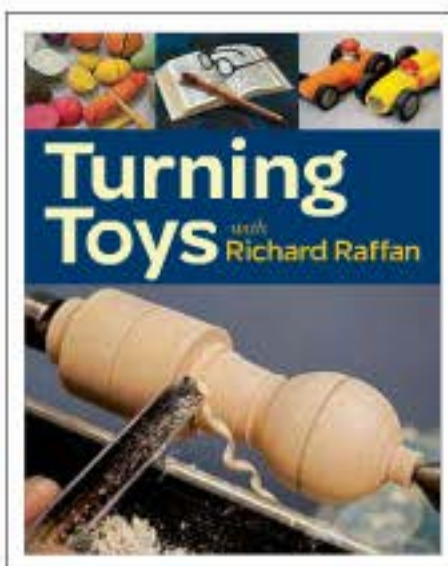


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Bring the board to thickness



Leave it a little thick. Set a marking gauge to $\frac{3}{16}$ in. over the board's final thickness. Working off the newly flattened surface, scribe a line around the workpiece.

side strokes, overlapping them slightly. After you have rough-flattened the first face, set a marking gauge to $\frac{1}{8}$ in. thicker than your intended final thickness and scribe a line around the board. Repeat the rough-milling process on the second side, working down to the scribe line. When you've finished, let the rough-milled board sit overnight (at least) with plenty of air circulation before final flattening.

Begin the finish milling with the show face. You can skip the roughing plane and start with your jointer plane. Also skip the 90° and 60° strokes. With the blade set for a fine shaving, take a series of strokes at 45° to the grain across the full width of the board,



Second side gets flattened. Repeat the same sequence of planes and planing angles to flatten the second side and bring the board to the marking gauge lines.

and follow this with a sequence of strokes along the grain. Check with the straightedge and winding sticks, and if things look good, you're ready to clean up the surface with a freshly sharpened smoothing plane set very fine. Again, take strokes at 45° and then along the grain. Then use the marking gauge to scribe a line around the board to the final thickness, and finish-mill the second side, using the same sequence of strokes as on the show face and working right to the scribe line. Once the surfaces are flat, you can trim the board to final length and width. □

Andrew Hunter designs and builds custom furniture in Accord, N.Y.



SHOOT EDGES ON THE BENCH

Plane on side
Scrap elevates workpiece.

Trim and square the edges



Shave it to size. By elevating the workpiece and using your plane on its side, you can use your bench like a shooting board and plane the board to final width (left). After using a knife to lay out the finished length of the board and sawing just shy of the lines, use a jointer plane to trim to the scribe lines (above). To avoid blowing out the grain, take half passes with the plane, shaving from the outside toward the middle.

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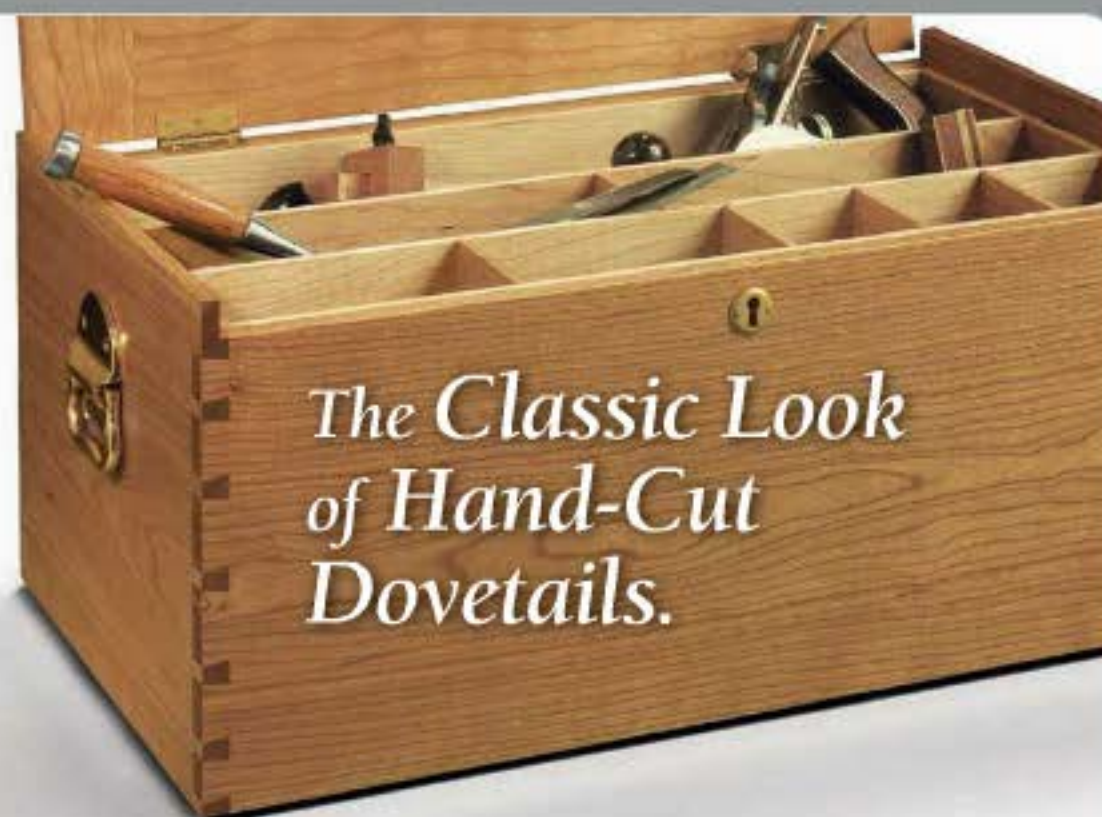


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Shaker Side Table

Build a delicate version of this iconic round stand

BY CHRISTIAN BECKSVOORT

The first time I saw a photo of this small table, I was thrilled, but also taken aback. It looked to me like something designed in Denmark in 1960, not in a Shaker village in the early 1800s. The Shakers designed a variety of beautiful round stands, and I've written about other versions—and built more than 100 of them—but this one in my opinion is the ultimate. With its slightly concave tapering post, thin top, and light, half-crescent legs, the piece sums up the power and simplicity of Shaker design.

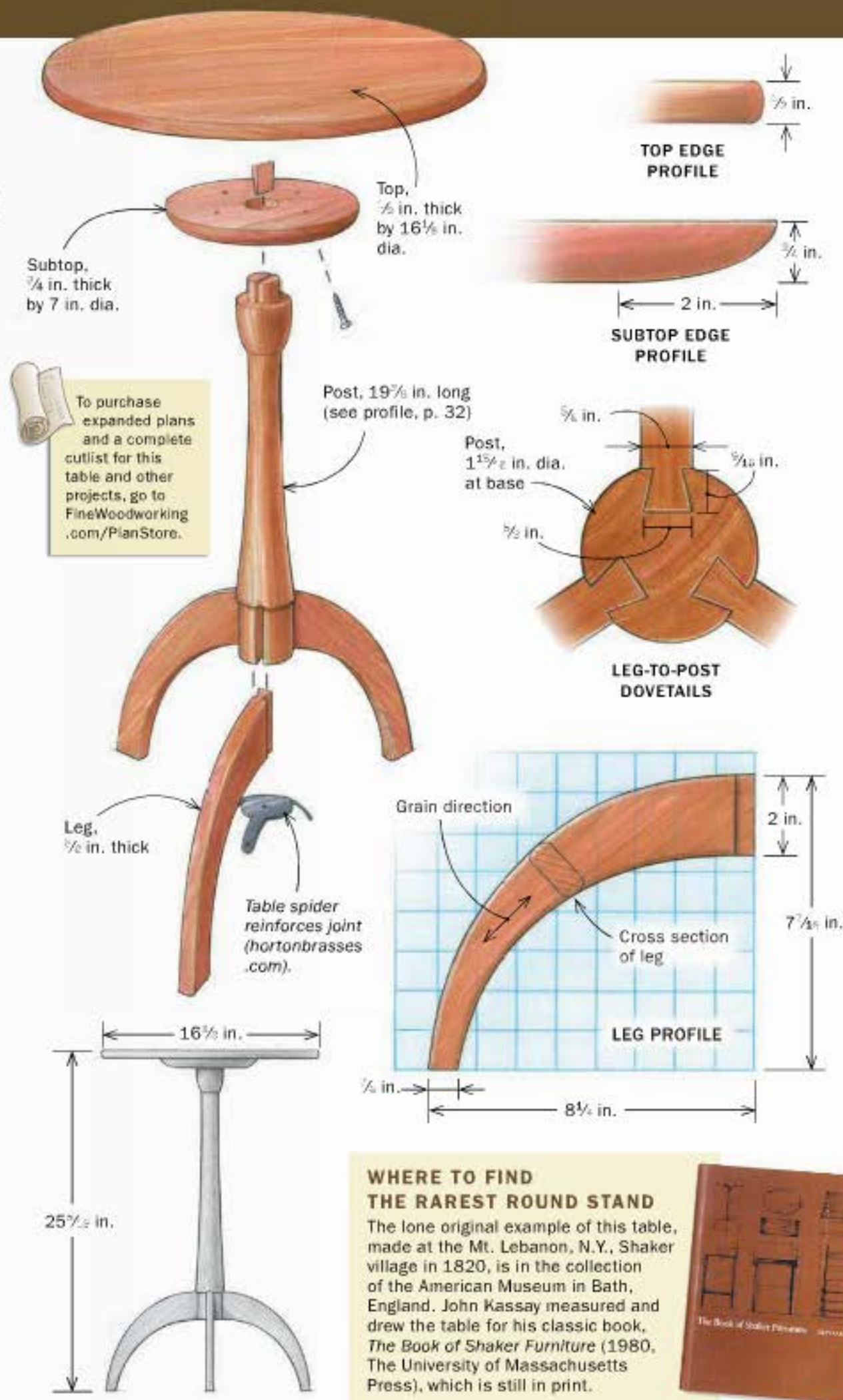
It also happens to be the rarest of round stands; only one original in this form is known to exist. I've since built several reproductions, in a variety of woods, and refined the parts until they are as near to the original as possible.

Start with the top

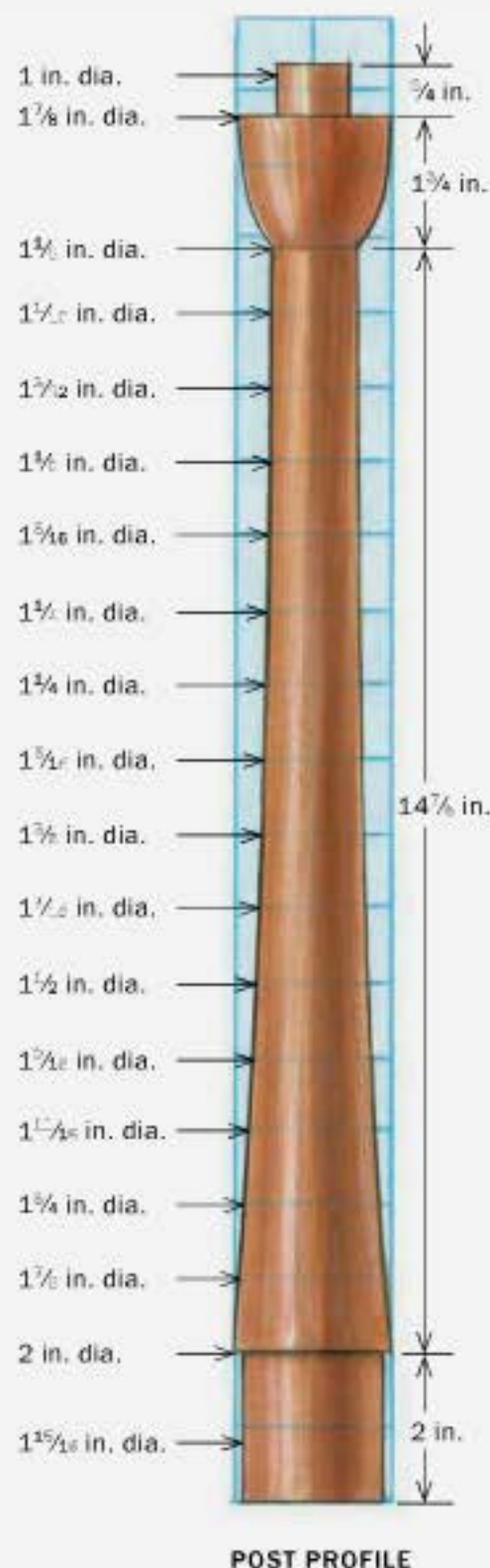
My first move when I make this stand is to glue up a blank for the 16½-in.-dia. cherry top and put it aside. A single-board top (like the original) is ideal, but because that kind of plank is rarely available, I usually cut two pieces from a 9-in. or 10-in. board and edge-glue them. I look for a flatsawn or riftsawn board and disguise the glue line by putting two rift-to-quartersawn edges together.

Turn the post

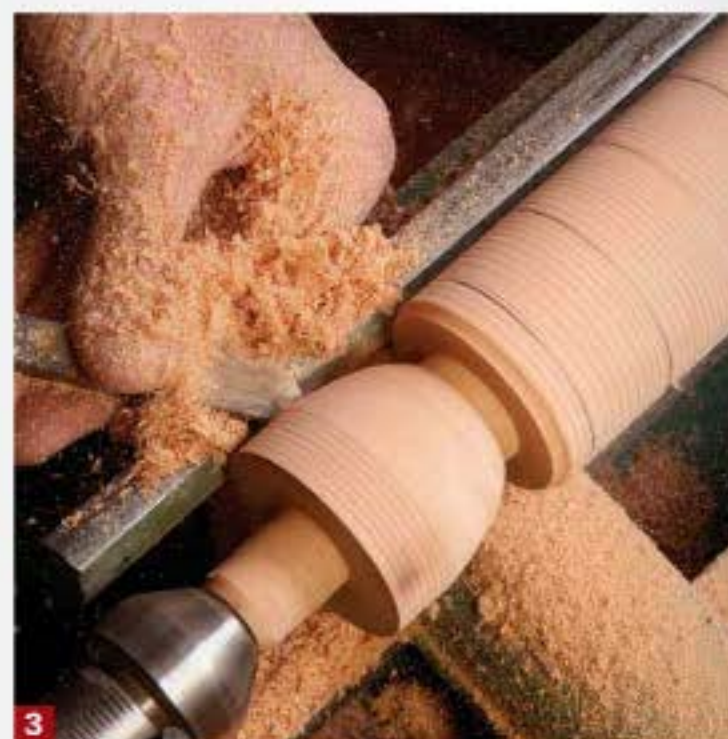
Start the post by selecting stock with grain as straight as possible, and turn



Turn a slender post



Marked and measured. After turning the cylinder, use a pencil to transfer diameter marks from a story stick (1). Then turn the tenon (2) and the bulb at the top of the post (3).



a 2-in. cylinder. Using a story stick, make pencil marks on it at each of the dimensions. On the top end, turn a tenon 1 in. dia. by 3/4 in. long. Just below the tenon is a flared bulb. Its curve is not an arc, but rather a section of a parabola. Turn the diameter below the bulb first, using a parting tool. Then use a small gouge and a spear-point scraper to turn the bulb itself.

The long part of the post is not a straight taper, but a concave flared curve, and reproducing that subtle shape requires precise turning. I use a parting tool fitted with a gate jig to make a series of cuts that will control the shape of the curve. If you prefer, you can use calipers instead of the gate jig. The last section of the post—where the legs will dovetail in—must be perfectly cylindrical, and the small shoulder should be crisp. Make a series of depth cuts with a parting tool, clean them up with a spear-point scraper, and follow with sandpaper on a block.

With the bottom cylinder complete, move on to the main section of the post, cleaning out the waste between the parting-tool cuts with a sharp gouge and then fairing the curve with a thumbnail gouge. When the turning is finished, leave the lathe running and sand the whole post to at least 400 grit, followed by a rubdown with 0000 steel wool.

Shape and dovetail the legs

Make a pattern for the legs and trace it three times onto 3/2-in.-thick stock, orienting the pattern so the wood's grain runs more or less straight between the two farthest points of the leg. Cut out the legs on the bandsaw and sand the curves fair. Then, at the router table, use a roundover bit to cut a shallow arced profile into the curved edges of the legs. Next, create the dovetail keys on the legs at the router table, using a 14° dovetail



Dial in the diameters. Use a gate jig (1) or a pair of calipers to control the depth of cut. Establish the critical diameters of the post with a parting tool (2). Then remove the waste between the grooves with a heavy, shallow gouge (3), before fine-tuning the surface with a fingernail gouge.



Sandpaper cleanup. Smooth the taper and the bulb with sandpaper, going through the grits from 150 to 400, and finishing with steel wool. For the cylinder at the base, back up the paper with a sanding block to be sure the surface stays flat.

TURN THE SUBTOP WHILE YOU'RE AT THE LATHE



Shaping the subtop. After bandsawing out a disk, turn it perfectly round. Then shape the curved profile on the bottom edge with a round-nosed scraper.

Shape the legs



Leg layout. Trace the shape using a cardboard template, orienting the grain so it runs straight from tip to tip (see leg profile, p. 31).



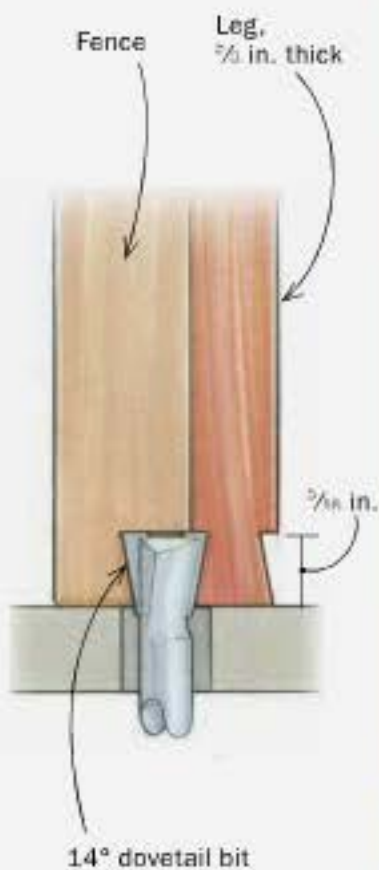
Strapped in for sanding. After cutting the legs, tape them in a stack and smooth the ends and the outside curve at the disk sander (left). Sand right through the tape. Re-tape the stack, then fair the inside curve (right) with a drum sander.



DOVETAIL THE LEGS TO THE POST

Standing dovetail.

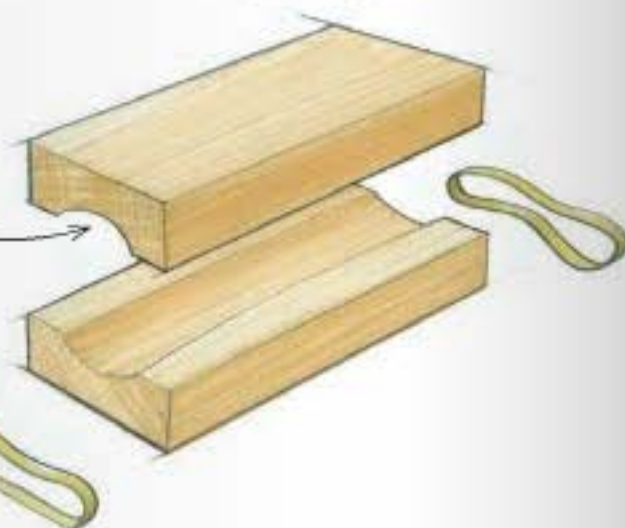
Cut the sliding dovetail keys at the router table, using a dovetail bit and a tall fence.



Socket layout. With the post inverted in the vise, scribe around the dovetail key. Pine cushion blocks hold the post steady.

Shape the hollows in the cushion blocks with a gouge. Taper them to match the taper of the post.

Rubber bands hold blocks on round post.



bit. Then finish-sand the legs to 400 grit and rub them with 0000 steel wool.

Mark and cut the dovetail sockets

To properly locate the dovetail sockets, clamp the post upside down in the vise and divide the bottom into three 120° sections. You can do this with a protractor or a compass, but I do it with paper. Wrap a strip of paper around the end of the post, marking and cutting it to the exact circumference. Flatten the paper on the bench and divide its length into exact thirds. Then wrap the paper around the post again and transfer the marks to the end grain.

Now position one of the leg dovetails on the post's end grain so that it sits flat and the tips of the shoulders just touch the rim of the post. Put it just to one side of one of the third marks. Then scribe around the dovetail with a knife. Repeat the process for all three legs, and be sure to number the legs and their mating sockets. If the knife marks are faint, I highlight them with a chisel. Use a small square and a pencil to bring the lines down the face of the post to the shoulder.

To cut the sockets, position the leg in the vise at about a 30° angle. Using a rip dovetail saw, cut on the inside of the pencil lines, following the knife marks. Since you have to stop shy of the shoulder, this angled cut will create a bit less than half of the cheek of each dovetail. The rest of the work is done with a chisel, using the sawn plane as a guide.

Carefully define the end of the socket by chopping downward right at the shoulder line, then begin chiseling out the bulk of the waste between the sawcuts. Once most of the waste is removed, place the chisel into the knife cuts and pare down the slot. If the grain runs perfectly straight, this works fine. Unfortunately, it often runs to the left or right, in which case one side pares very well, while the other side tears into the post. When that happens, instead of paring along the grain from the end of the socket, pare across the grain from the outside of the post.

Fit and glue up the dovetails

Once the socket is well-defined, begin fitting. Mark the three leading edges of the dovetail key with a pencil, and push the leg in as far as it will go with moderate hand pressure. The graphite



Extend the layout lines. Use a small square and a pencil to carry the scribed lines down to the shoulder.



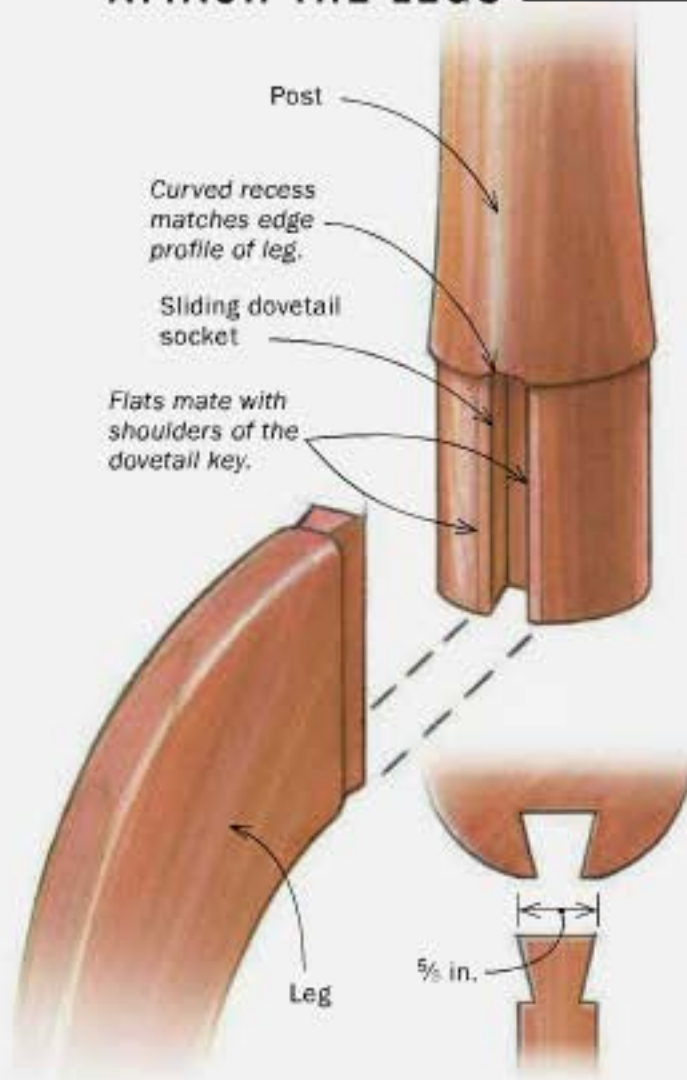
Saw the socket. With a rip dovetail saw, cut a kerf just inside the pencil lines and as deep as you can without hitting the shoulder.



It's chisel work from here. Establish the shoulder of the socket with several mallet hits (far left), then remove long chips of waste, working from the end with the chisel horizontal. Extend the cheeks beyond the sawkerfs with vertical (left) and horizontal chops.

Put it all together

ATTACH THE LEGS



Flat tops. Cut flats on each side of the socket (left) to seat the shoulders of the dovetail keys. Use a shallow gouge (right) to cut a crescent-shaped recess to accept the rounded edge of the leg.



Mark and fit. To fit the joint, rub the leading edge of the dovetail key with a pencil, insert the key, and pare darkened wood from the socket. When all the joints fit, apply glue and pull them home with hand pressure (right).



BRACE THE BOTTOM AND ADD THE TOP



Joint cleanup. After the glue cures, smooth the bottom of the post with a drum sander.

transfers to the edges of the socket and shows where the dovetail is binding. Pare this away from the socket, and repeat the process five, 10, even 15 times until the leg slides all the way to the end. It should seat with no wobble. Too loose a fit means a weak joint. But you shouldn't have to pound a leg in, either; if it's too tight it could split the leg. When all three legs are fitted, glue them in. If they fit right, there's no need to clamp them.

Subtop and true top

Bandsaw out the subtop, mount it on a faceplate, and shape its edge profile on the lathe. After turning, drill a 1-in. hole in the center of the subtop to mate with the tenon at the top of the post. The original table has a small metal plate, or spider, at the bottom of the post to reinforce the joints.

You can cut your own spider out of 1/2-in. sheet metal, or order one from Horton Brasses.

Finally, bandsaw the top to a 16-in.-dia. circle and fair it on the disk sander. Then create the edge profile with a balloon sander. Alternatively, it could be done with a rasp, file, spokeshave, or router. Finish-sand the top to 400 grit and attach it with four wood screws up through the subtop.

I use a straight linseed-oil finish of three or four coats. Since it has no UV filters, linseed oil allows the cherry to darken faster than any other finish. □

Christian Becksvoort is a contributing editor.



Bottom needs support. Screwing in a metal brace, or spider, reinforces the sliding dovetails. Becksvoort bought his spider and modified it, cutting several inches off each of its legs.



Crosswise wedge. To avoid splitting the subtop, orient the wedge perpendicular to the grain. After the glue cures, saw off the wedge and chisel the tenon flush. Then attach the top with screws through the subtop.

Get Better Results with Polyurethane

Combine brushing
with wiped-on coats
for an easy, durable sheen

BY BEN BLACKMAR

I've tried all kinds of finishes in my woodworking career, from beautiful but tedious hand-rubbed oils to quick but expensive sprayed-on lacquers. Nowadays, the finish that I use most often is one of the simplest and most widely available commercial products out there—polyurethane. The finish has significant advantages. First, poly is oil-based, which makes it extremely durable and resistant to water stains. Because of this, it is ideal for tabletops and cabinetry. Poly also cures hard much more quickly than oil, which means you'll be finished in days rather than weeks, and with fewer coats.



Two products, one finish. Blackmar starts with a sealer coat of thin, wipe-on polyurethane, then builds up a durable film with two coats of brush-on poly. He follows it with more wipe-on poly.

Wipe on the first coat

A thin application of wipe-on poly seals the wood in preparation for the thicker, brushed-on coats.

CAREFUL PREP IS CRITICAL



Sand surfaces smooth. Sand to P150-grit with a random-orbit sander followed by a sanding block to P220-grit, working in the direction of the grain.



Break the edges. Blackmar uses folded P220-grit sandpaper to ease the corners on the top, the legs, and the undersides of the aprons.



Seal inside with shellac. To avoid persistent odors from the polyurethane, Blackmar seals the inside of drawer compartments with shellac.

Wipe on the poly. Soak a cloth with wipe-on poly (inset) and apply to the entire piece (right). Nitrile gloves keep the finish off your skin.



My approach calls for two different satin-gloss polyurethane products—a fast-drying version of the standard brush-on product, and the thin, wiping variety. I start with a thin coat of wipe-on to seal the surface, followed by several brushed-on coats to build a durable protective film. Then, instead of applying wax, I complete the process with another thin coat or two of wipe-on to perfect the satiny, medium sheen. Here's how I do it.

First coat seals the surface

To prepare the surface, I first remove all machine marks by sanding up to P150-grit with a random-orbit sander. I follow this by hand-sanding with a block, using P220-grit, until the surface is uniformly flat and smooth, with no visible scratches.

Last, I use the P220-grit to break the edges. A softened corner is easier to finish, nicer to the touch, and more resistant to denting and wear. Afterward, gently remove the dust with an air compressor or wipe down the piece with a dry, lint-free cotton cloth.

I begin applying the finish with a thin coat of wipe-on poly to penetrate and seal the surface. Use a lint-



Brushing adds protection

The heavier brush-on product quickly builds a clear protective film. Apply two coats, then sand to flatten.



Don't overload the brush. It should hold enough finish to keep a wet edge while applying a relatively light coat. Lightly brush away any drips on the top's edge. Apply two coats.

free cotton cloth. Saturate the cloth with finish and wipe it on liberally. Then use a clean, dry cloth to remove any excess. Let the finish dry for several hours.

Be sure to dispose of your used rags properly to avoid the possibility of starting a fire. Before tossing them, dry the rags by spreading them out individually on a flat surface or draping them over the rim of a trash barrel.

Thicker coats build a protective film

The next two coats get brushed on so you can easily build an even, durable layer. In a warm shop, the "fast-drying" finish lets you lay down these two coats in one day—if you start early enough.

To ensure a smooth coat that is relatively free of brush marks, use a good quality, natural-bristle brush. I've gotten great results with a brush designed for oil paint available at home centers. Brush on a thin but wet coat, quickly smoothing out any runs or drips as you go.

To test whether the first coat is dry enough to continue, brush the surface with the back of a finger in an inconspicuous place. If you leave no marks, it is safe to continue. Apply the second coat, let it dry, then lightly hand-sand the surfaces with P220-grit paper on a block to remove brush marks and other inconsistencies. Work with the grain. Afterward, wipe away the dust and lightly rub down the entire piece with #0000 steel wool. Work with the grain to flatten and create a straight rub pattern on each surface, then wipe away the dust again.

TIP



THIN WHEN NEEDED

If the brush-on poly isn't flowing out evenly, thin it with mineral spirits to help the brush marks level out as the finish cures. Pour the finish and thinner into a measured container. Start with a 1:6 ratio of spirits to poly, testing and adjusting as needed until the finish flows out easily from the brush.

Remove the brush marks. After applying two coats, sand the surface with a block and P220-grit paper to flatten brush marks and other inconsistencies. Blackmar softens the block with a layer of cloth and uses steamed paper designed not to clog.



Rubdown before the topcoat. Rub down the surface with steel wool to level any remaining imperfections.

The top coats go on with a rag

For the top coats, I use wipe-on poly to create an even, thin layer. These coats dry quickly, so work systematically, smoothing out the most recently applied finish before moving on. Avoid wiping areas you've already covered, even if they appear dry.

Four to six hours after the first coat, when it is dry to the touch, apply another coat the same way. After two or three thin coats, any scratches or marks left from the steel wool should be gone.

Wait a day or two before making a final judgment on the sheen's uniformity. As the last layer cures and hardens, the apparent sheen across the piece will equalize. If you're not satisfied, repeat the steel-wool step and wipe on more poly. □

Ben Blackmar is an associate editor.

Wipe on the final coat

Use a rag to apply the top layer of finish, one thin coat at a time. Let these coats (two or three) dry thoroughly before judging the sheen, which should cure to a uniform satin appearance with no need for waxing.

TIP

BURNISH WITH PAPER



A folded sheet of white paper is just abrasive enough to remove any dust nibs without scratching the finished surface.



Master the Jointer

Veteran instructor shows how to get better results and stay safe

BY MARC ADAMS

Buying roughsawn wood is one of the best ways to save money as a woodworker. It is also the gateway to fine work. Instead of relying on the lumberyard to surface and thickness your material, you control every dimension and ensure that every board you use ends up flat, square, and straight. Properly milled wood is a joy to work with, making machining, joining, assembly, and finishing much easier. And you can't mill wood accurately without a jointer.

Unfortunately, the jointer is one of the least understood tools, and one of the most dangerous, intimidating woodworkers new and old. I'll explain how it works, how to get much better cuts on it, and how to stay safe at all times.

The milling process: jointer vs. planer

The first step is understanding what a jointer does, and how its job differs from that of a planer. With its tables aligned with the cutterhead, the jointer straightens and flattens one surface with no regard for the opposite face.

In contrast, the planer's cutterhead is elevated above its reference surface (the bed), guaranteeing uniform thickness but not flatness. If a board goes in bowed or twisted, it will come out that way. This is why the jointer is critical, and comes first in the milling process.

SOUP UP YOUR PUSH PAD

To get a better grip, Adams attaches self-adhesive, 100-grit sanding disks to the bottom of his push pads.

TIP



Set up for success

For a jointer to work properly, it needs sharp knives, and an outfeed table that is set exactly level with the top of the knives' arc. Once it is set, you can leave it alone. The same goes for squaring the fence. Depth of cut is the only thing that changes.

The milling process starts with rough-cutting your workpieces close to their final size. You don't want to joint an overly long or wide board—you'll have to take away too much material to get the whole thing flat. In other words, a lot of twist, bow, and cup are removed by simply cutting a board up into shorter and narrower workpieces.

After cutting your pieces to rough length and width, you flatten one face on the jointer, and then run that face against the jointer's fence to mill one edge square to it. At that point the planer takes over. The straight, flat face goes down against the bed, and you can dial in the thickness, knowing the top face will come out just as straight as the bottom one. The tablesaw usually comes next, with the jointed edge going against the rip fence as you trim the board to final width.

There is another critical difference between the planer and jointer. The planer is automatic. You simply put the wood in one side and it comes out the other. On the jointer, you control the board, and there is a learning curve. That curve starts with understanding how the machine really works.

Jointer magic

The magic of this machine is in the relationship between the tables and cutterhead. For a start, all three need to be parallel to each other, and the knives need to be sharp and adjusted properly. (For a complete guide to jointer

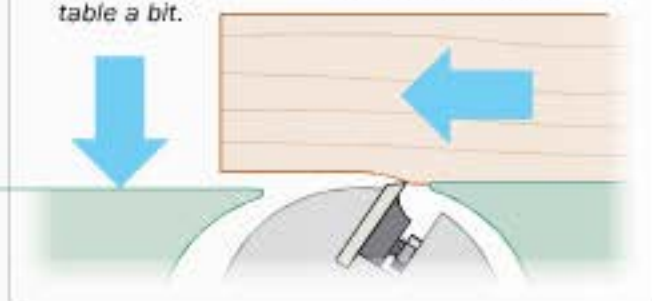
LEVEL THE OUTFEED TABLE



Simplest way to set the table. Start by lowering the outfeed table a little and jointing one end of a board.

First lower the outfeed table a bit.

Joint the first few inches of the board.



Close the gap. Turn off the jointer and raise the table just until the gap closes and no farther.

When the gap is gone, the table is level with the knives.

Raise the outfeed table.



SQUARE THE FENCE AND SET THE DEPTH OF CUT



Where to check the fence. Use an accurate square and check on the outfeed table, just past the cutterhead.



Change the cut as needed. The infeed table has a scale to indicate depth of cut. On a very warped board, you can take as much as $\frac{3}{8}$ in. on the first pass, but lighten up the cut to $\frac{1}{8}$ in. or less afterward to avoid removing too much material.

Better results when face-jointing

The first step when milling rough lumber is flattening one face. A few important tips will help you work safely, with less tearout and minimal waste.

BREAK DOWN BOARDS FIRST

Smaller pieces mean better yield. Before milling, chop your parts to rough length and rip them on the bandsaw to rough width. Parts will be easier to handle, and you'll have less warp to remove.

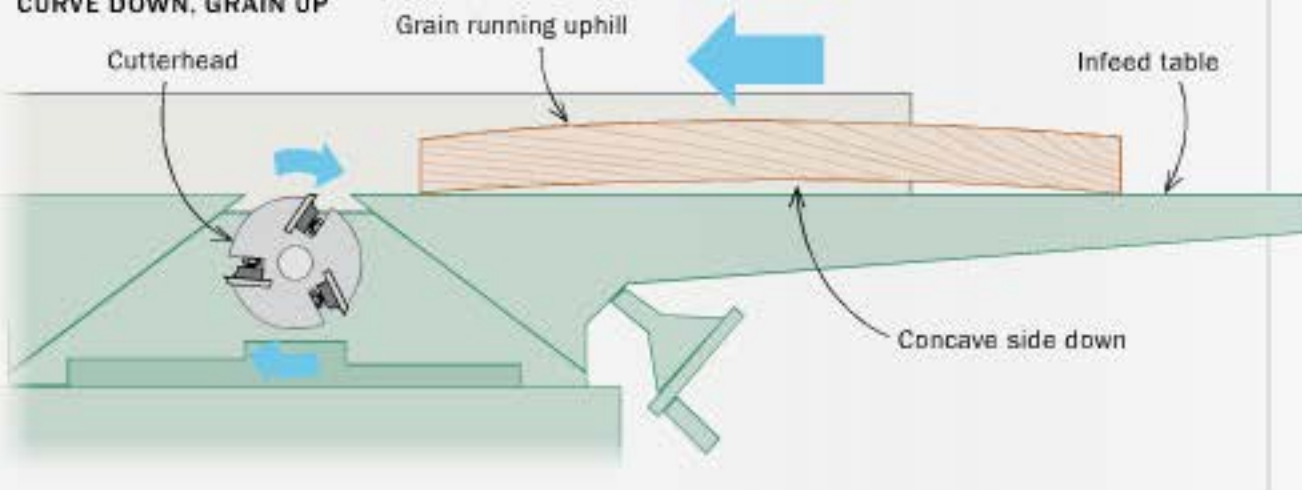


GET ORIENTED

Right face and right direction. To avoid rocking and removing too much material, put the cupped or warped side down. For the smoothest surface, you want the grain running uphill toward the cutterhead as much as possible.



CURVE DOWN, GRAIN UP



setup, including replacing dull knives, see "Tune Up Any Jointer," *FWW* #230).

The two tables do different jobs. The infeed table is adjusted up and down to determine the depth of cut. The outfeed table, which is the reference surface, must be set at exactly the same height as the arc of the knives at their highest point. The jointed surface should pass onto the outfeed table with perfect contact, so you can press down on it and ensure that the rest of the cut stays straight. If the outfeed table is set too high, the stock will bump into it. If it is too low, you will get a tapered cut or an overcut area ("snipe") at the end of the board.

The fence also guides the stock, but it serves different purposes during face-jointing and edge-jointing. When the board is lying facedown, the fence is nothing more than a side guide that provides some additional control. But when a board is on edge, the fence is critical, ensuring that the jointed edge comes out square to the face.

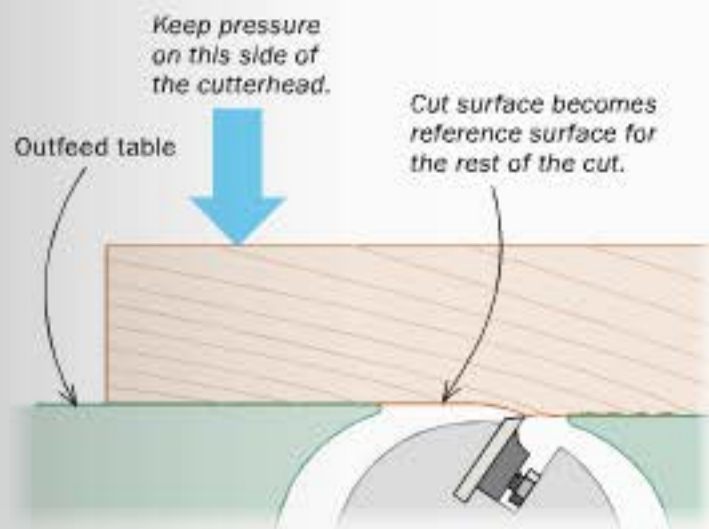
There are two ways to adjust the fence: One is its angle to the table and the other is its distance from the front edge of the tables. I keep the angle locked at 90°. You can tilt the fence to make beveled cuts, but other tools are better at that job, so why throw off the setting? I do use the second adjustment sometimes, moving the fence back and forth to distribute wear evenly across the knives.

Older jointers have a rabbeting ledge on the outfeed table, but that operation requires removing the guard, and there are better tools for rabbeting. Again, leave the jointer set up

BASIC TECHNIQUE

FOCUS PRESSURE ON THE OUTFEED TABLE

The idea is to get pressure to the outfeed table as early as possible, and then keep it there. Keeping the freshly jointed surface pressed down ensures that the rest of the board will come out just as straight.



for what it does best: milling wood straight and square.

The Zen of push and pull

I define jointing technique using the motions "push" and "pull." Boards start on the infeed or "push" side of the jointer. This is the most dangerous part of the process, as your hands are pushing toward the cutterhead. If they slip, you could be in serious trouble. That is just one reason I teach students to get their hands to the outfeed side of the machine as soon as possible, and learn how to "pull" the board through.

The outfeed side of a jointer is not only the safer side but is by far the most critical to the accuracy of the cut. As soon as part of the board passes onto the outfeed table, focusing your pressure there will ensure that the rest of the cut is perfectly smooth and straight. I think of that as a pulling action, though your hand and body angles don't really change.

A safety checklist

When used improperly, the jointer can be one of the most dangerous machines in the shop. Accidents occur for a few primary reasons. The first is jointing wood that is simply too thin or short for the machine to cut safely. This can cause the workpiece to dive into the cutterhead, pulling your hands with it. My rule is nothing smaller than $\frac{1}{2}$ in. thick or 8 in. long, and no cuts deeper than $\frac{1}{8}$ in. at a time. Also, while it is possible to joint end-grain surfaces, it is tricky and I don't recommend it.

Another cause of catastrophe is loose clothing getting caught in the jointer, so always make sure your shirt is tucked in or tight to your body, your sleeves are rolled up, and no apron straps or strings are dangling. Of course, protect your eyes and ears, too.

Always have the guard adjusted so that it swings fully against the fence. If it is a



Push and walk. Adams generally starts with a push stick in his back hand for a good grip on the end of the board, and a push pad in the other for good downward pressure (1). On most boards you can keep your hands as they are, and just walk forward (2), finishing with the push stick alone (3).



Face-jointing continued

SHUFFLE HANDS ON LONG BOARDS



You'll have to reposition your hands on long stock, but keep the pressure focused on the outfeed side.

1 Starting position. Start with the push pads near the front of the board, but keep a long push stick within reach.



2 Walk and regrab. Walk forward to the outfeed side, and when you need to reposition the pads, don't move them back past the cutterhead.

stationary European-style guard, keep it as close to the board and fence as possible.

I enforce a 3-in. rule on every machine in the shop. In this case, I use two safety devices to keep my hands safely clear of the cutterhead at all times: push pads and a long push stick. I

use the garden-variety push pads with foam on the bottom, but I stick self-adhesive sandpaper onto the foam, which makes them even grippier. My long push stick is the tablesaw type. It hooks securely onto the end of a board, yet gives plenty of downward pressure.

Never hook a finger or thumb on the back end of a board. You'll have no idea how close it is coming to the cutterhead.

If your stock is too long for your jointer tables to support on their own, add a support stand at both ends of the jointer. Better yet, ask an ex-

perienced friend to give you a hand. Otherwise you will have to press down too hard to control the stock, and your hands or push pads could slip dangerously.

Better face-jointing

Jointing one face of a board is the first step in the milling process. When done properly, it will remove cup, warp, and twist, leaving a smooth, straight, tearout-free surface. Magic.

But before you joint any board, there are a couple of critical decisions: Which side goes down, and which end goes first? When choosing sides, the goal is control. There are always exceptions, but in general put the cupped or bowed side down. You'll get less rocking that way. A twisted board is a little more complicated. You'll have to make a judgment call about which side will give you less rocking and better yield.

Be careful you are not flexing a curved board downward

SHORT BOARDS ARE THE EASIEST

A long push stick offers all the control you need for shorter workpieces.





3 **Grab the push stick.** When the end of the board draws closer, reach for the push stick while keeping the stock moving.



4 **Finish the cut.** A long push stick will maintain a good grip and good downward pressure as you finish the pass.

as you press on it. It will only spring back afterward.

Vary your initial depth of cut according to the amount of warp. It helps to remove as much of the problem as possible in the first pass, but I typically don't go deeper than $\frac{1}{8}$ in. to start. Once the high points are mostly removed, I reduce the cut to $\frac{1}{16}$ in. or less. By the way, you do not have to joint every inch of a face to get a good reference surface for edge-jointing and planing.

As for direction, the edges of the board usually tell me which way the grain is running (see drawing, p. 44). You can also run your hand along the surface to see which way feels the smoothest and easiest, like petting a cat. If you still get a lot of tearout, just run the board the other way the next time. Move slower on your last pass; you'll get more cuts per inch, and a smoother surface.

One push pad and one push stick—To keep your hands out of the 3-in. zone, all face-jointing must be

Stuck? Don't panic



When boards go bump. Sometimes a bowed board will bump into the outfeed table and stall.



Just pull it back. Don't worry; you can pull the board backward safely.



The flip trick. Now rotate the board end for end, set it halfway across the cutterhead, and lower it as shown. Push it forward to joint away the problem area. Now you should be able to turn the board right-way-round again and joint the entire face with no problems.

Edge-jointing is next

After jointing one face of a board, that surface goes against the fence as you straighten and square one edge. The trick here is to maintain pressure on both the fence and table while keeping the motion steady and your fingers safe.

KEEPING HANDS OUT OF HARM'S WAY

Starting position.

Begin with your top hand midway down the board. That way, you won't have to pause to regrab. Adams positions his other hand palm up and parallel to the table so if it slips, it won't move downward.



The rest of the way. Once your left hand passes over the cutterhead, drop it onto the outfeed table and keep it there as a featherboard, maintaining good pressure against the fence. Your push hand can stay put, maintaining a steady feed rate.



Online Extra

For a series of video tips on getting the most from your jointer, go to FineWoodworking.com/extras.



done with push pads and/or a push stick. I generally use a push pad in my front (left) hand and a long push stick in my right hand, hooked onto the end of the board so I get the best grip possible. Face-jointing uses a lot of the cutterhead, so there is a fair amount of resistance.

For the best possible surface, you want to keep the motion as continuous as possible. Too fast, and the cut will be bumpy. Pause and you'll get burn marks. Turn your feet forward, parallel to the jointer, so you are ready to walk forward as needed. If you must reposition your hands, or trade a push

pad for a stick, keep the board moving with the other hand.

Edge-jointing is different

You have to combine three different actions to edge-joint a board successfully. Like face-jointing, edge-jointing requires that the board be held down on the table and pushed forward with that steady, continuous motion. At the same time, however, it must be held tight against the fence.

Three actions, two hands—the math doesn't work. The way to solve that problem is to dedicate hands. The right hand does the holding down and pushing forward, while the left

hand pushes against the fence. Check the photos for how to do this safely on all types of boards. Again, for the steadiest feed rate, get your feet ready to walk forward and start with your hands in the best position. If the board is tall enough to clear the fence, try placing your right (push) hand farther forward. The goal is to avoid repositioning it.

I believe that you have more control using your hands to support the board. But if the board is under 3 in. wide (tall), I use a push stick with my right hand, on top of the board. To keep my left hand safe, I proceed as usual but pull my

left hand away briefly when it nears the cutterhead, raising it up and over to reposition it as a featherboard on the far side. I keep pushing with the stick the whole time to maintain that continuous motion.

The jointer is one of the best time-savers ever invented, replacing the long session of handplaning it used to take to level and square each piece of lumber. Now you know how to use it safely. □

Marc Adams runs Marc Adams School of Woodworking in Franklin, Ind. For a course list and more information, go to MarcAdams.com.



1

TRICKS FOR LONG BOARDS

Start like normal. Grab the board a couple of feet back from the front end and proceed as usual.



2

Left hand becomes push hand. When you need to regrab with your right hand, turn your featherboard hand into a push hand as shown, keeping the board moving forward.



3

Regrab and finish the cut. Just as when face-jointing, don't move your push hand back onto the infeed side. Keep the pressure on the outfeed table.

TIPS FOR NARROW BOARDS

On boards that aren't as tall, use a long push stick and change your technique to keep your fingers at least 3 in. away from the cutterhead.



1



2



3

Mind your front hand. Keep your front hand as high as possible on the board (1). As that hand approaches the cutterhead, pull it away completely (2), moving it past the cutterhead and guard to set it up as a featherboard on the outfeed side (3).

Uncommon Arts

Going beyond
Stickley
to uncover
the riches of
a many-faceted
movement

BY JONATHAN
BINZEN

Stickley, Craftsman, Mission style: These names and the solid, rectilinear pieces they describe represent the vast majority of Arts and Crafts furniture made in America during that movement's heyday from 1895 to 1915. Hundreds of thousands of such pieces were cranked out in factories across the East and Midwest. But during the same period in a range of small shops in America and Europe, makers drew on the same Arts and Crafts philosophy to produce furniture that was far different—still solid and functional, but much more personal, adventuresome, and stylistically distinctive. Linking these diverse designs was a root system that started in England and spread around the globe. It began with the writings of the critic John Ruskin—who argued for honest designs and the importance of handwork—and with the embodiment of those ideas in the buildings,



Arts and Crafts by Architects

M.H. Baillie Scott was one of a circle of young English architects deeply influenced by William Morris. Like Morris, Baillie Scott designed houses and often every scrap of furnishing inside them. For his 1901 Blackwell House (above), now a museum, he designed custom furniture, hardware, and paneling for every room.

Many faces of the Morris chair



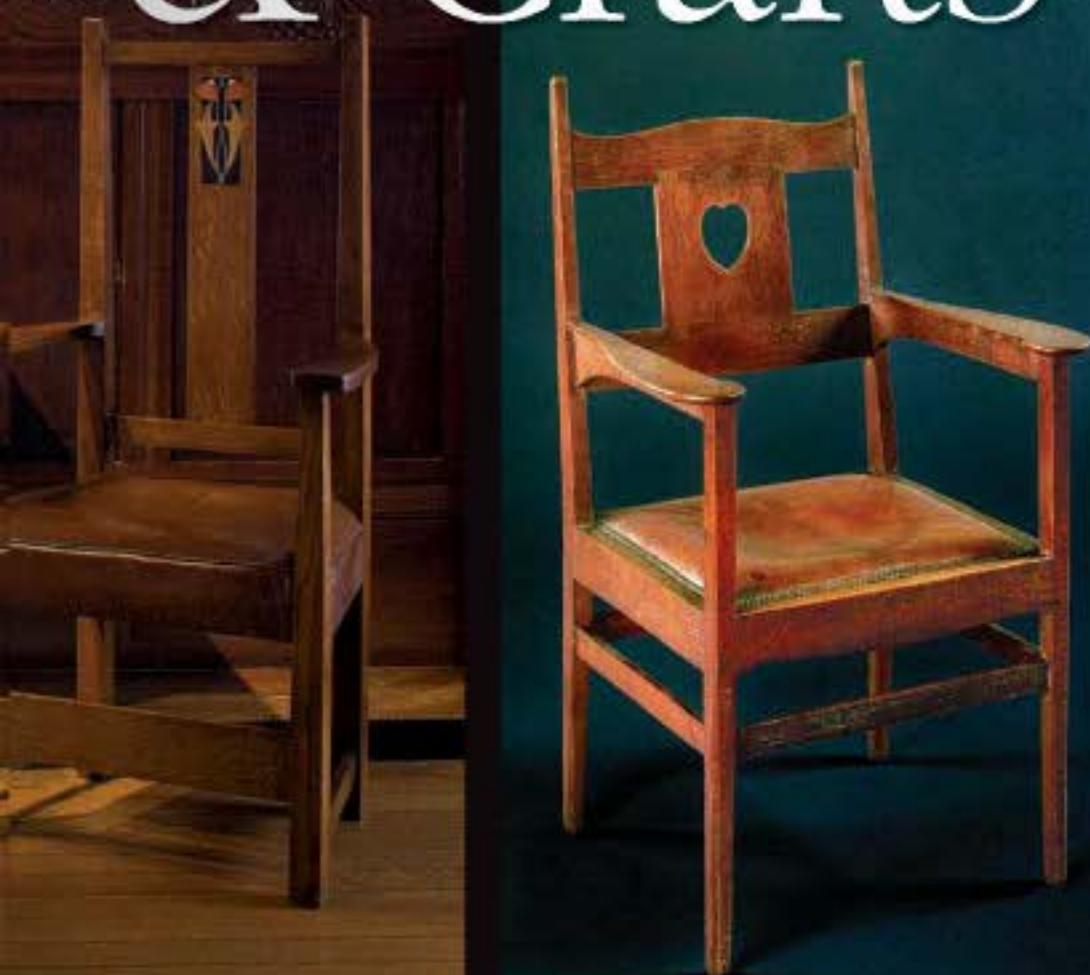
The original Morris chair, adapted by Philip Webb from a traditional English design, was introduced by Morris & Co. in 1865 and kept in production for 75 years.

William Morris was an icon to members of the Arts and Crafts movement—not necessarily for the style of his furnishings, but for the ideas they represented. Arts and Crafts spanned many countries and many styles, but furniture makers across the spectrum drew inspiration from the English designer, and many paid tribute by interpreting the original “Morris” chair.



Gustav Stickley's Morris chair from 1905, with its exposed joinery, clear finish, and solid, four-square construction, embodies the Craftsman aesthetic.

& Crafts



C.F.A. Voysey was another London-trained architect inspired by Morris who went on to design houses and many of the furnishings and fittings inside. In his furniture, Voysey made prominent use of flat planes and straight lines, but blended them with carefully selected curves and rounded elements. His oak cabinet (above

right), with its slender legs and thin shelves, shows the refinement typical of Voysey's work. As with many of his pieces, its hardware is also of his own design. The dining chair (above left) shares the lightness of Voysey's designs and sports his trademark double-curve on the crest rail.



New York City manufacturer Joseph P. McHugh produced this Morris chair, whose branching elements enliven a rectilinear design.



Made by the Charles P. Limbert Co., in their Holland, Mich., factory, this Morris chair blends elements of Mission style with curves and plank construction.



Philadelphian William Price embraced the Gothic style in much of his furniture, harkening to the days of the medieval craft guilds praised by John Ruskin.



Viennese designer Josef Hoffmann's 1908 version of the Morris chair showcases his preference for pure geometry while paying homage to Morris.

furnishings, crafts, and writing of the English designer William Morris.

I've brought together a sampling of furniture by makers in America and Europe whose work illustrates the great breadth and high quality of Arts and Crafts designs created outside the mainstream. For reasons of space, I've chosen not to include a number of superb and groundbreaking Arts and Crafts designers—like the brothers Charles and Henry Greene in California, Frank Lloyd Wright in the Midwest, and Charles Rennie Mackintosh in Scotland—in favor of makers whose work might be less familiar.

Jonathan Binzen is the co-author, with Kevin P. Rodel, of Arts & Crafts Furniture (2005, The Taunton Press), from which this article is adapted.

English Country Arts and Crafts

One man's hands. Sidney Barnsley designed and built this library table, an undecorated piece that derives its power from the purity of its form.

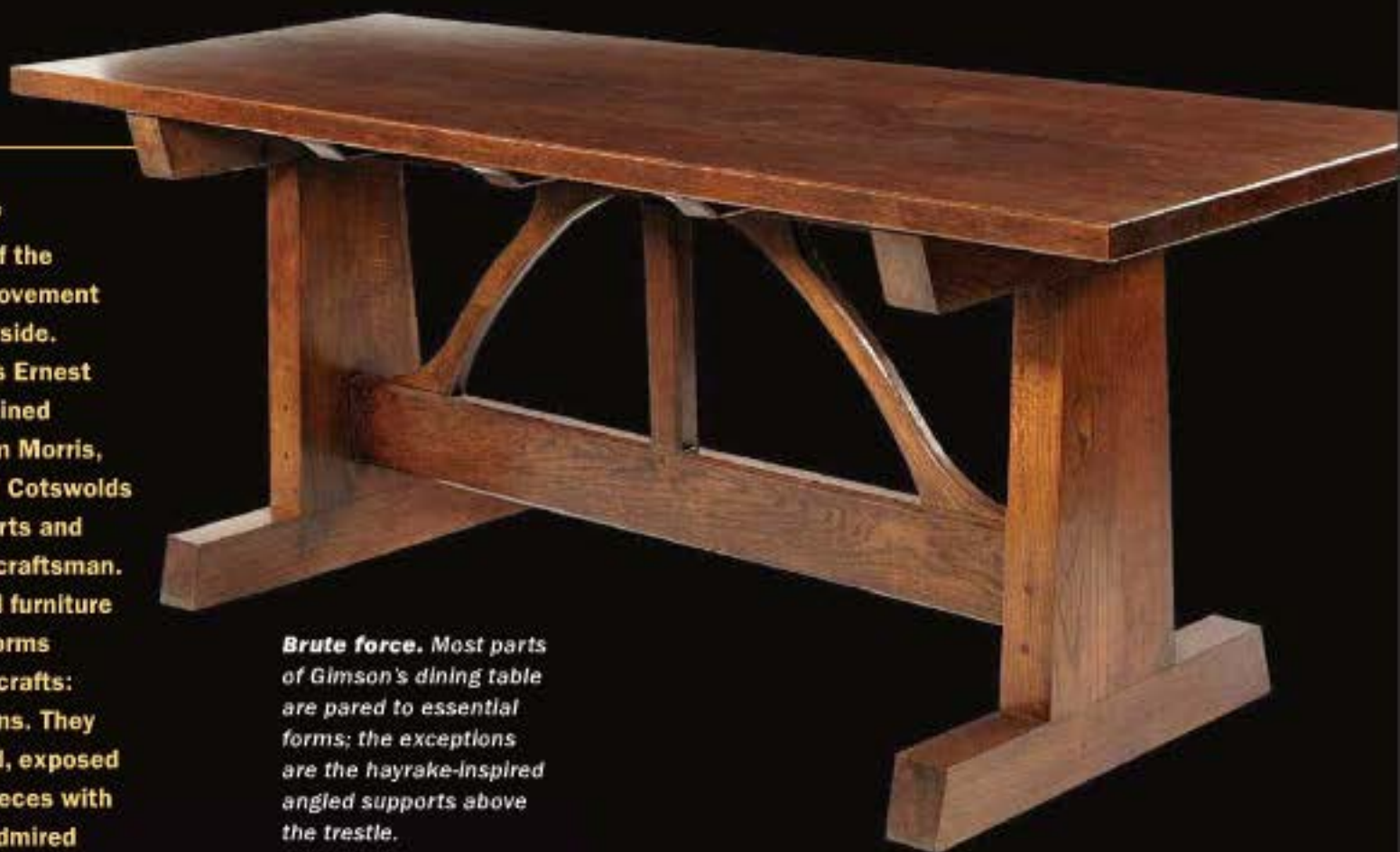


An essay in exposed joinery. Through-tenons and proud dovetails anchor Sidney Barnsley's blanket chest. The deep chamfering on the corners is a detail borrowed from farm implements.



High and low. Combining the proportions and rich materials of a formal sideboard with the heavy chamfers and arched framing of a farm wagon, Ernest Gimson's walnut sideboard is a prime example of his ability to blend the elegant with the utilitarian.

London was the birthplace of Arts and Crafts, but some of the most interesting work of the movement emerged in the English countryside. Ernest Gimson and the brothers Ernest and Sidney Barnsley, all city-trained architects influenced by William Morris, moved from London to the rural Cotswolds in the early 1890s to live the Arts and Crafts ideal of the designer as craftsman. Together they developed a vivid furniture style rooted in the traditional forms and techniques of the region's crafts: wagons, hay rakes, barrels, barns. They used heavy timbers and pegged, exposed joints, often decorating their pieces with the extreme chamfering they admired



Brute force. Most parts of Gimson's dining table are pared to essential forms; the exceptions are the hayrake-inspired angled supports above the trestle.



on farm implements. Sidney Barnsley abandoned architecture and devoted himself purely to furniture. And he built every piece he designed, working alone and using only hand tools. Ernest Gimson learned to make traditional post-and-rung chairs, but he left casework to the two or three cabinetmakers working in his shop. Some of his furniture has the raw, country flavor of Sidney Barnsley's work, but other pieces combine elements of the rural vernacular with elevated forms and rich decoration. This play of the formal and the informal, the rough and the elegant—along with an unerring eye for proportion—gives Gimson's pieces a unique spirit.

Inlay in the outlands. Not all of Gimson's work reflected his rural surroundings. In pieces like this small chest, he used marquetry to create an elegant geometric composition. He designed the silver hardware and had it made in his shop.

Subtle slats. Having learned to make ladder-backs in the traditional fashion with turned posts and rungs and flat slats, Gimson adapted the cyma-curved slat profile to this more formal chair.



Influence of the Orient

John Scott Bradstreet, an interior designer and retailer in Minneapolis, designed furniture in a wide range of styles, but made his lasting mark with pieces that drew on his many buying trips to Japan. Inspired by William Morris's Kelmscott workshops, where a range of crafts were plied, Bradstreet created his own Crafhhouse, which was both a retail space and a workshop where he employed some 80 craftsmen, most from Scandinavia and Japan. Bradstreet developed a version of the Japanese "jin-di-sugi" surface treatment for wood, scorching and wire-brushing cypress to give it an aged and eroded appearance, as seen in his tulip table (below). The 1905 cabinet with sliding panels (left) was in Bradstreet's own office.



The Organic Element

Following in the footsteps of William Morris, who often used organic imagery in his textiles and furnishings, many Arts and Crafts makers incorporated plant forms in their designs. William Templeton Johnson, an architect in San Diego, designed this redwood blanket chest (below) around a panel of carved eucalyptus leaves. The plain box makes a deferential frame for the powerful carving.



Power of the Prairie

The Minneapolis architects William Gray Purcell and George Grant Elmslie gave the Arts and Crafts an injection of Prairie style. In pieces like these 1910 dining chairs with their pierced back splats, Purcell and Elmslie created a striking geometric version of organic ornament. Working in the style pioneered by their colleague Frank Lloyd Wright, they designed flat-roofed, open-plan houses and filled them with custom-designed furnishings.



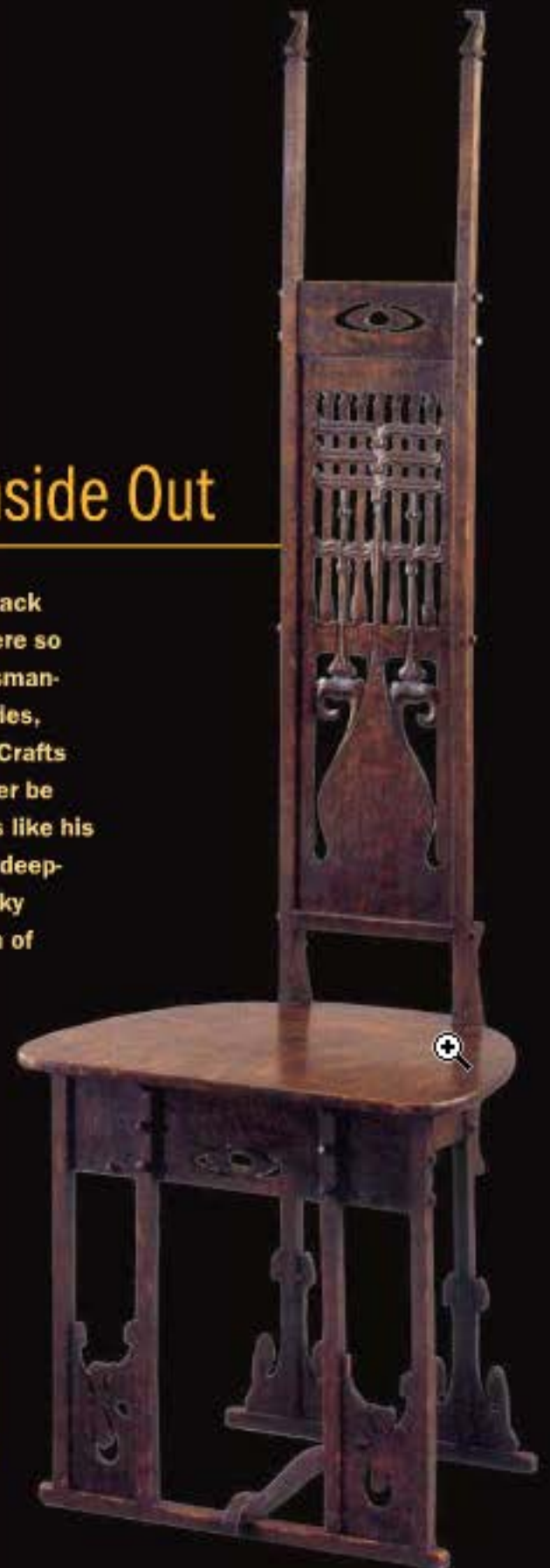
Turning Mission Inside Out

In his four-man workshop in Buffalo, smack in the stratum of upstate New York where so much Stickley and other copycat Craftsman-style furniture was made in large factories, Charles Rohlf adopted many Arts and Crafts ideals but built furniture that could never be mistaken for anyone else's. With pieces like his writing desk (left) he used pierced and deep-relief carving to transform a stout, plunky design into an extraordinary expression of individuality. After a first career as a Shakespearean actor, Rohlf decided to become a full-time furniture maker at age 44 in 1897.

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Online Extra

For a slide show on the origins of the Arts and Crafts movement, go to FineWoodworking.com/extras.



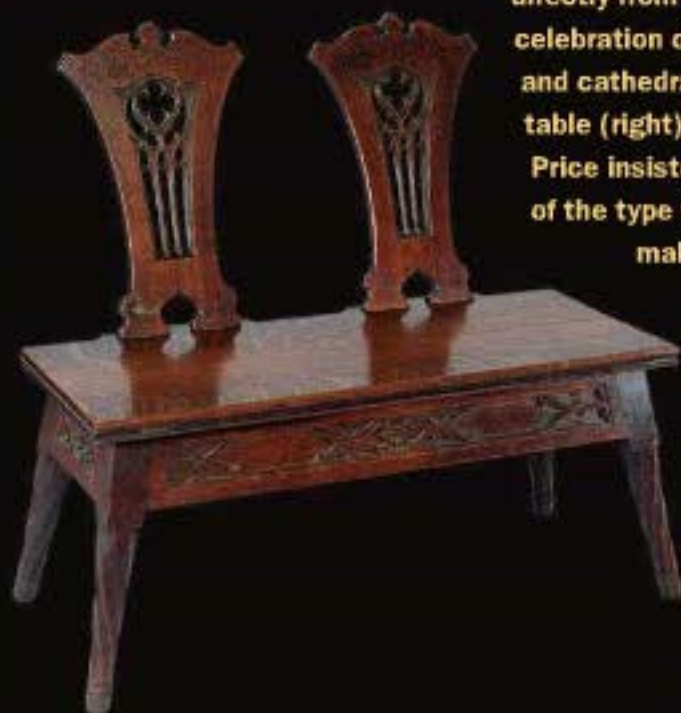
Utopian Arts and Crafts

PENNSYLVANIA GOTHIC

Philadelphia architect William Price was such a devotee of William Morris that in 1901 he set up a utopian community—Rose Valley—along the lines suggested by Morris in his writings. Price designed furniture in a neo-Gothic style, which was far out of step stylistically with most other Arts and Crafts furniture, but stemmed

directly from John Ruskin's celebration of medieval craftsmen and cathedrals. As he did in this table (right), with its tusk tenons, Price insisted on exposed joinery of the type favored by medieval makers. His twin-

backed bench (left) combines complex pierced carving typical of his work with unusual spiral-fluted legs.



CATSKILLS COLONY

Some of the finest pieces of Arts and Crafts furniture were produced at Byrdcliffe, an experimental artistic community founded in 1901 by Ralph Radcliffe Whitehead, a wealthy English protégé of John Ruskin. Built near Woodstock, N.Y., Byrdcliffe failed as a community but produced exceptional furniture during the two years its woodshop was in operation. Drawing on the talents of fine art painters in residence, the furniture pairs relatively plain, rectilinear cabinets with panels that are either painted or carved. This oak linen press (left) has poplar panels carved in a design of stylized sassafras leaves.



CONTINENTAL ARTS AND CRAFTS

The most powerful designs of the continental branch of Arts and Crafts came from the Austrian designer Josef Hoffmann. The style he developed at his Wiener Werkstatte (Vienna Workshop) had the honesty and impeccable craftsmanship championed by the Arts and Crafts movement but utilized boldly abstract and graphic forms that still look modern a century later. Like his English counterparts, Hoffmann was opposed to using machines to imitate handwork. But he had no aversion to using machines to do what they do best: make identical parts with great precision. In Hoffmann's furniture, standardized, machine-produced parts double as decorative elements.

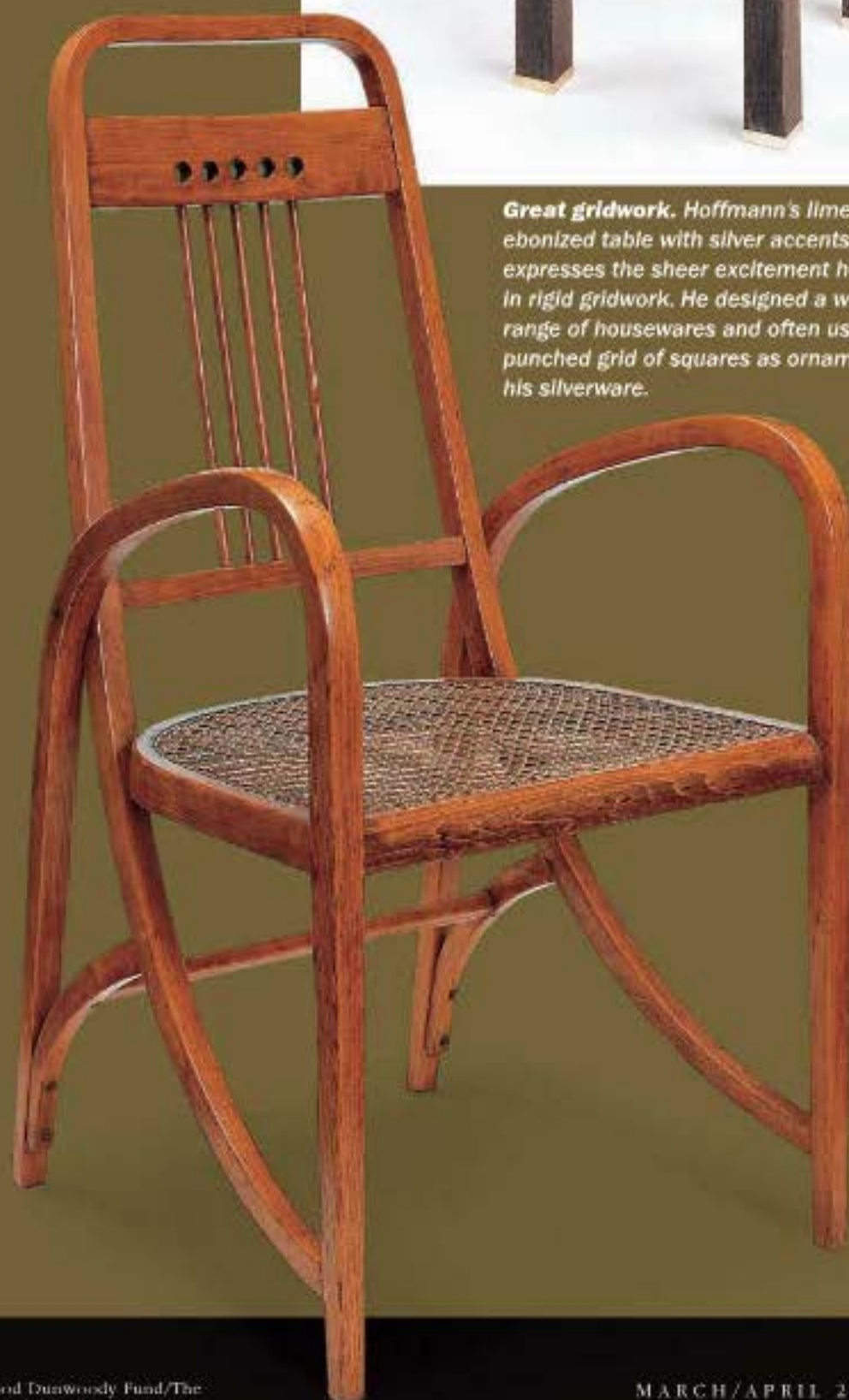


Masking the material. Like Charles Rennie Mackintosh—but unlike most Arts and Crafts makers, who preferred the honesty of wood surfaces left natural—Hoffmann often ebonized his pieces to increase the visual impact of their lines, grids, and planes.

How many do you want? Hoffmann did custom pieces for the wealthy, but he also frequently designed lower-cost furniture to be made in production. This Hoffmann chair was produced by Thonet, the behemoth of bentwood chair manufacturing.



Great gridwork. Hoffmann's limed and ebonized table with silver accents (above) expresses the sheer excitement he found in rigid gridwork. He designed a wide range of housewares and often used a punched grid of squares as ornament in his silverware.



Add a Gallery to Any

An easy way to increase storage and add charm

BY TAIMI BARTY

It all started with a guy. He liked to fly-fish and to tie his own flies, but he left feathers and thread and hooks strewn everywhere. I inadvertently got hooked too many times. My solution was to build a space for him to work and to store all those loose parts: a fly-tying bench with lots of small compartments within arm's reach.

As so often happens, though, the guy realized there were other fish in the sea. With him out of the picture, and having just started milling the European beech for his bench, I reworked my vision into a desk for myself, with a gallery for my stuff.

We all recognize a gallery—that piece of light casework that sits



Desk

atop a desk, housing a combination of drawers, shelves, doors, and possibly a secret compartment or two. A gallery provides room for stationery, pens, small electronics, and plenty of other stuff. It can also do something much more profound—turn an ordinary flat desk into a partially enclosed, personal space that is great for reading, writing, and quiet reflection. I'll show you the basics for building any gallery. The one I built for this article is designed to fit a specific desk, but the construction can be adapted to any desk or table (for design inspiration, see drawings at right).

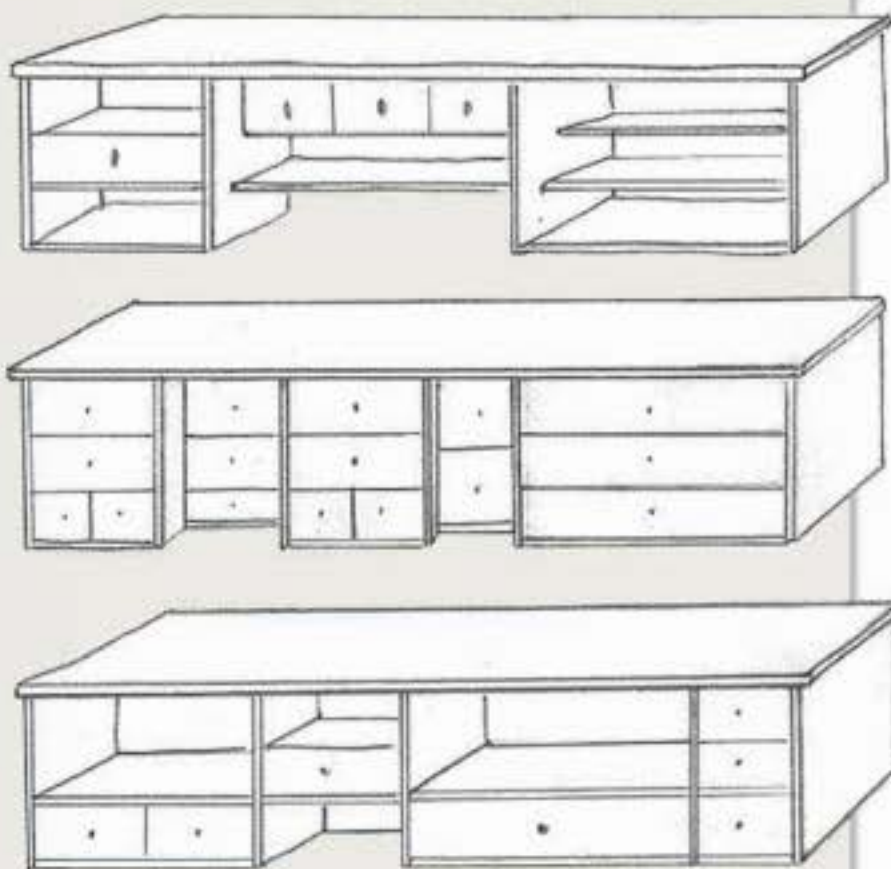
Design considerations

A gallery should look intentional and integrated with the desk, not just stacked on top of it. For this reason, I designed mine with the outer sides landing on top of



DESIGNED TO WORK

As Barty's sketches show, there are many creative ways to build storage into a desktop. With any design, function comes first. Consider what types of items you will store in it, and how much clear space you will need on the desktop.



and in line with the end aprons of the desk. The gallery's height is critical. The taller it is, the more stuff it can hold, but if you make it too high it can start to feel like it's looming, rather than embracing the user. Likewise, the depth needs to accommodate envelopes, paper, and other items without taking up too much space. The thickness of the gallery parts should be proportionate to those of the desk. In my case, I discovered that the partitions and dividers can be especially thin and yet remain strong. This lends a visual lightness to the piece and provides more storage space. I also built in a well of open space beneath the bridge of drawers. This lets me push a laptop underneath when I'm not using it or use the open area as an additional work area.

Tips for happy doweling

The gallery goes together using several different joinery techniques—dowels join the top and uprights, while stopped rabbets, dadoes, and splines secure the bottom shelves and other dividers (see drawing, p. 60). The gallery is secured to the desktop with screws driven from the underside of the top.

Dowels offer the best approach for sturdy joinery in the thin stock of the top, sides, and uprights. They provide plenty of glue surface and are easy to lay out and drill using a shopmade jig (see drawing, p. 62).

Holding wide pieces together with dowels involves drilling lines of multiple dowel holes in the mating pieces. Each must align perfectly with its mate so that the parts come together the way

they are supposed to. The jig goes a long way toward making this happen, but it isn't perfect—a guide hole that is even slightly off-center will yield an imperfect row of dowel holes. So, when you drill the mating holes, you have to make sure the imperfections line up, too. The solution is easy—just flip the jig over when drilling the mating line of holes. This ensures that each stray hole is off center in the same direction as its mate.

To help with this, I label one side of the jig "A" and make sure that the "A" side is always facing me, right side up when doweling the sides and upside down when doweling the top.

It's also important to make sure the line of holes starts and stops in the same place on each piece so that when the pieces are joined, everything lines up. This calls for consistency in choosing a reference face or edge for the jig. I used the back edge, but it could just as easily have been the front. The important thing is to use the same reference face each time.

Join the sides and top

I bore dowel holes with a handheld drill, relying on the jig, a depth stop, and a careful eye to keep the holes perpendicular to the surface. Start with the sides and uprights. With the workpiece held in a vise, hook the jig on the back edge, making sure that it is oriented in the correct direction, and secure it with strips of double-sided tape and clamps.

The depth of the dowel holes into the sides and uprights should be about 1 in. An unintentional shallow hole will hold up the entire top during glue-up. So, to ensure consistency, make a stop block that fits over your drill bit to control the depth of each hole.

Now lay out the holes in the top. If there's no overhang, align the jig flush with the top's edge. If there is an overhang, first determine the top's overhang relative to the sides. I bumped my sides in about $\frac{1}{8}$ in. To locate the dowel holes, I taped a brass spacer to the "A" side of the doweling jig and aligned it flush with the edge of the top. These dowel holes have to be shallower since the top is only $\frac{1}{8}$ in. thick, so adjust the bit in the chuck so that only $\frac{3}{8}$ in. protrudes beneath the depth stop.

Dry-fit the sides to the top with a couple of dowels in place. Then use MDF spacers that butt against the sides to help align the dowel holes for the uprights.

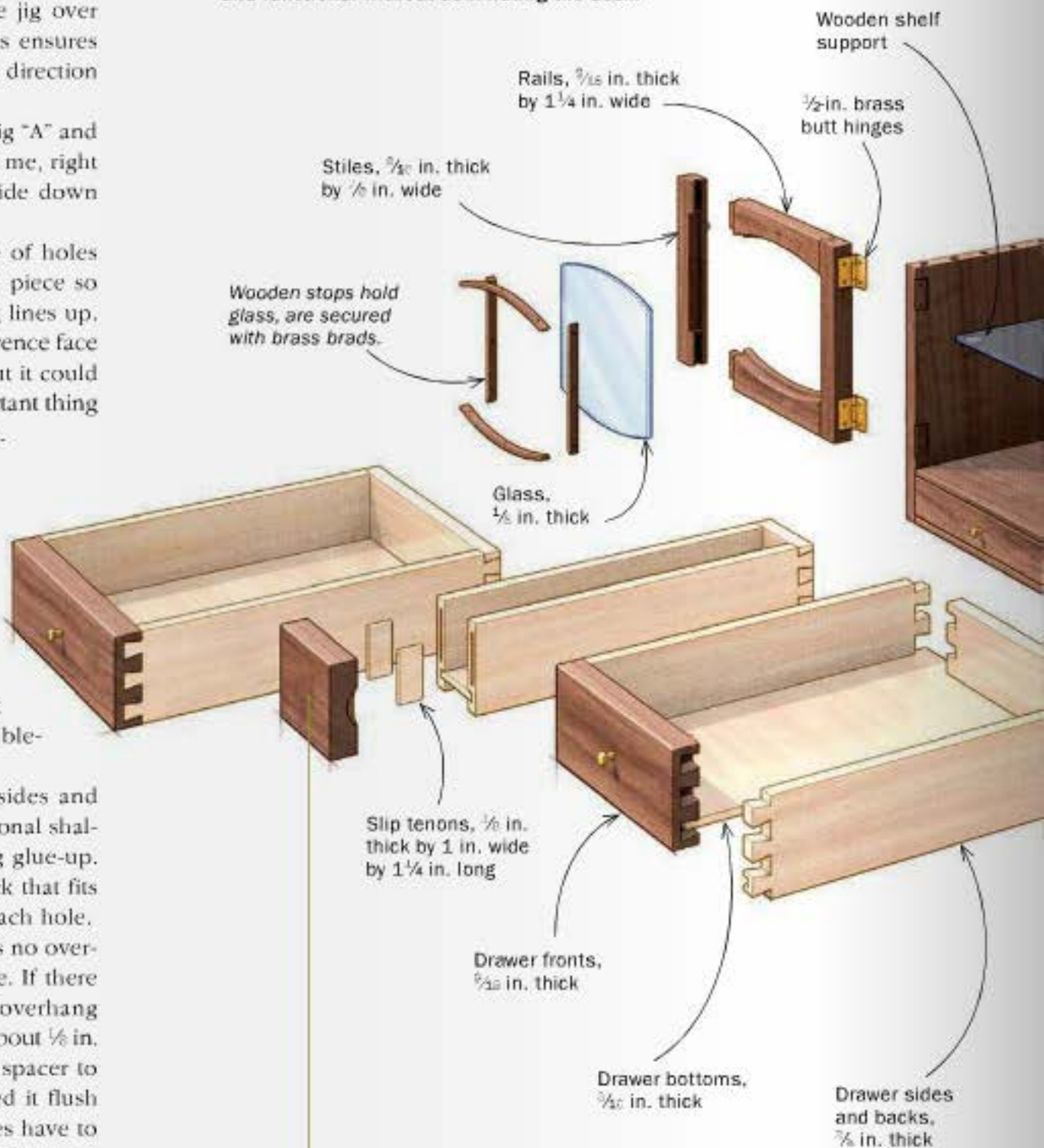
I like to use shadowlines to create visual interest along the front of the gallery, so after I finished doweling, I ripped the sides $\frac{1}{16}$ in. narrower than the top to create a step.

No room for dowels? Use rabbets

The bottoms of the gallery are just $\frac{1}{4}$ in. thick, which is too thin for dowels, so I let them into the sides and uprights in rabbets stopped $\frac{1}{4}$ in. from the front edge.

Build a desktop icon

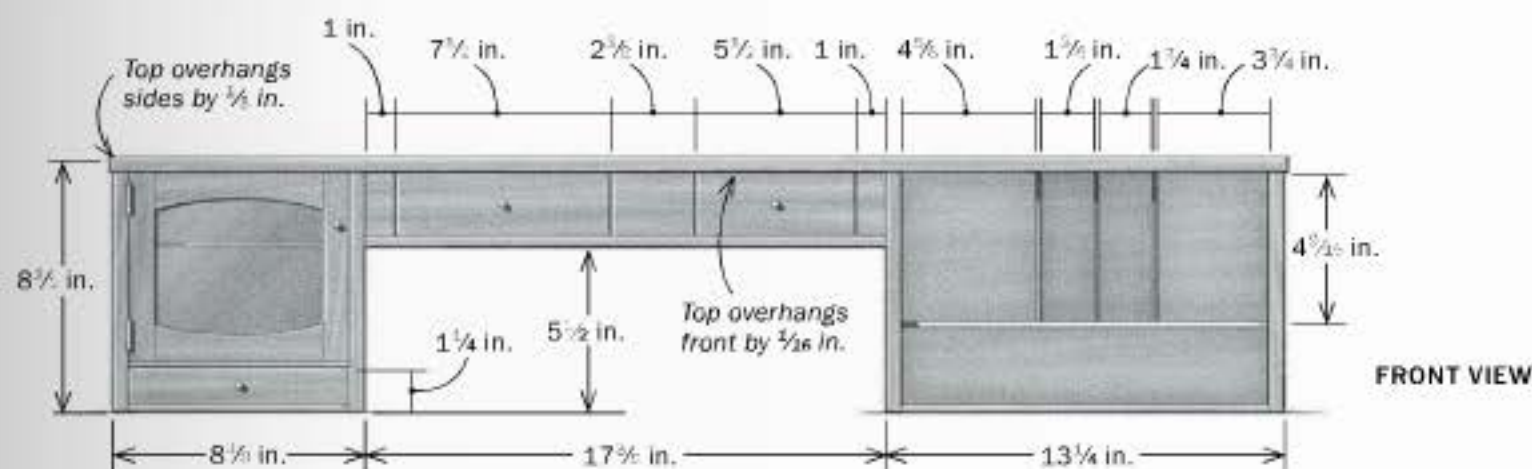
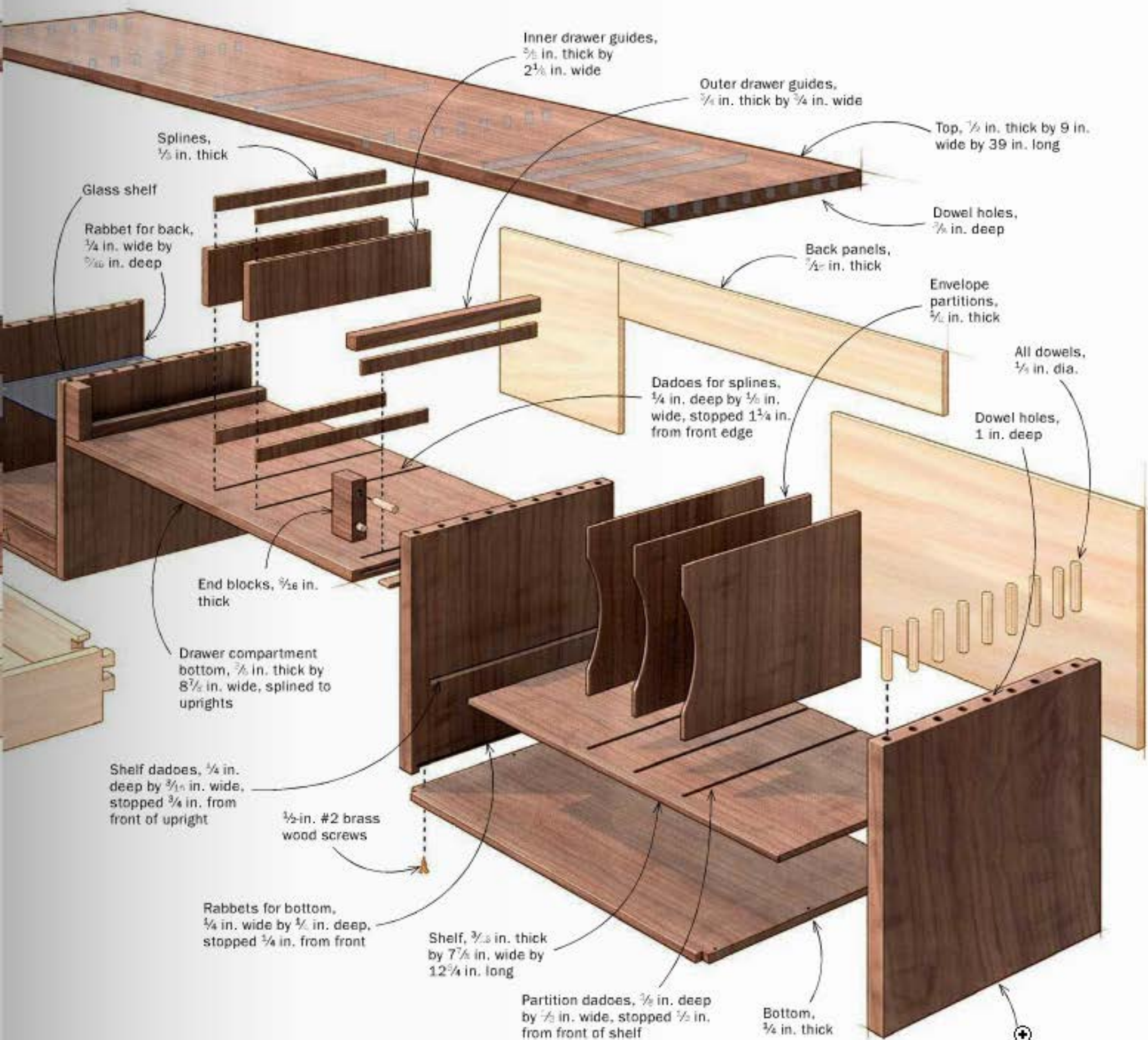
The gallery's proportions and light-but-sturdy construction combine for a case that's strong and functional without dominating the desk.



SECRET DRAWER

When removing either side drawer, a hidden center drawer is revealed. Barty carves a fingerhold in the back of the drawer front to allow the secret drawer to be pulled out.



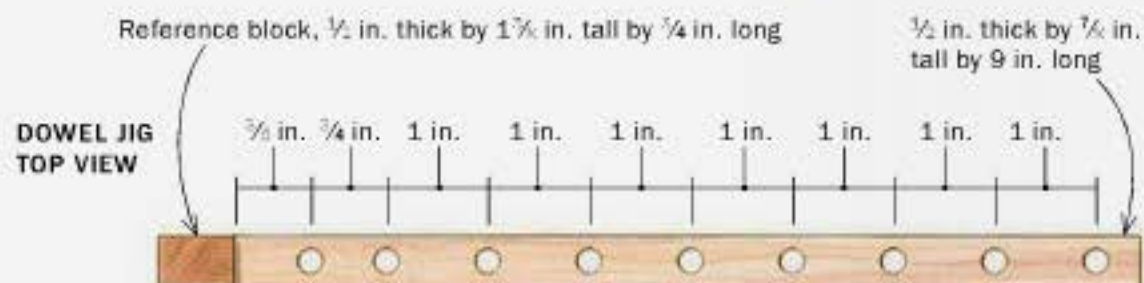


Case joinery

The top is attached with dowels. But the compartment bottoms are too thin for that joinery option, so Barty opted for rabbets and screws.

DOWELS

Dowels secure the sides to the top and are spaced closely together for maximum glue surface.



Attach the jig. Mill the jig to the thickness of the workpiece and clamp across its width to ensure perfect alignment. Double-sided tape helps keep the jig from slipping.



A simple depth stop. A drilled block of wood slips over the bit to ensure dowel holes of consistent depth. Adjust the bit in the chuck so that the desired amount comes through the block.



The bottoms are notched so that everything is flush in the front, left wide, and later planed flush in the back. The rabbet is cut on the router table, using a rabbeting bit and a pair of stop blocks. I used a piece of scrap to set the bit height and depth of cut, then marked the fence for the location of the stop blocks. I laid the sides flat on the router table to make the cuts. For the two sides where the stopped cut is at the beginning of the cut, be sure to back up your part so that you don't blow out the back edge as the bit exits the wood. Afterward, square up the ends of the stopped cuts with a chisel. To establish the length of the bottoms, dry-fit the top and uprights, bracing between the uprights with the MDF spacers you used during layout. Measure between the rabbets for the length of each bottom and cut them on the tablesaw. Then



Invert the jig for mating holes in the gallery top. This ensures that the holes on each piece line up precisely. A spacer of hardwood or other material (Barty uses a piece of brass bar stock) aligns the jig to create the 3/8-in. overhang (left). Reset the stop block for drilling the shallower holes in the top (right).



Full-size spacers aid layout. To position the jig for the interior rows of dowels, Barty uses spacers cut from MDF to match the size of the compartment openings.



STOPPED RABBETS

The bottoms of the main compartments sit in stopped rabbets and are screwed to the sides and uprights.

place the bottoms in the rabbets to lay out the front notches. I cut the notches with a handsaw and cleaned them up with a chisel. The bottoms will be glued and screwed into the sides.

Stopped dados for shelves and partitions

The compartment on each side has a fixed shelf that's notched to fit into stopped dados. In the left compartment, the shelf is notched so that it's flush with the side and upright. The shelf on the right stops $\frac{3}{4}$ in. shy of the front of the case (it is not notched).

I used a $\frac{3}{16}$ -in. down-spiral bit in the router table to cut the dados in the sides and uprights. Cutting stopped dados in opposing pieces requires you to start the cut in the middle of one workpiece and stop the cut in the middle of the other. To simplify these steps, I attached a stop block to the fence with double-sided tape to limit the travel in the proper direction for each cut.

I dropped into the cut by firmly holding the workpiece against the fence, tilted at an angle, and lowering it onto the bit. Keep in mind where that spinning bit will exit the work and keep your hands away from it.

After cutting the dados, plane the shelf stock to fit into them. Dry-fit the assembly, measure between the bottoms of the dados, and cut the shelves to length. Notch the left shelf and round over the leading edge of the right shelf using a handplane and a file to match the rounded groove. Rip the shelves to final width.

The envelope compartments call for routing a series of stopped dados in the underside of the top and a perfectly matching set on the top of the shelf. To locate the dados accurately, I used the MDF template shown in the photos on p. 64. Of course you can modify the dimensions to suit your own storage needs or sense of symmetry. I cut them with a handheld trim router equipped with a $\frac{1}{8}$ -in. down-spiral bit and a $\frac{3}{16}$ -in. template guide.



Rout the rabbets.

Attach a block to the router table's fence to create the stopped rabbets. Position the block at the front for the right-hand pieces (top) and at the rear for the left-hand case sides (left).



Square the ends.

Use a chisel to carefully square up the rounded end of each stopped rabbet. The bottoms will be notched to fit around the end of the rabbet.



Measure for the bottom.

Use the MDF spacer to brace the case sides. Measure between the rabbets for the bottom panel's length.

Shelves and partitions

Barty cuts multiple stopped dados to accommodate the shelves, drawer guides, and partitions.



STOPPED DADOES

The partitions and shelves sit in stopped dados.

Routing at the table. Position the fence and bit to cut matching stopped dados for the spline joinery that secures the central drawer support.



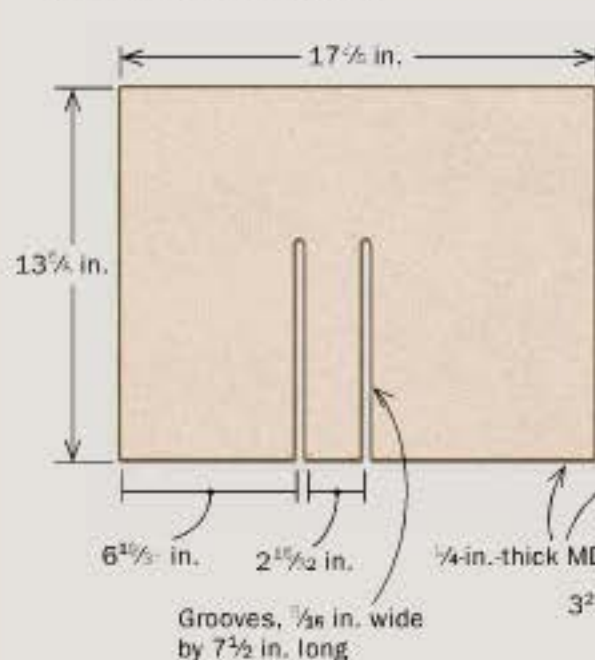
Routing by template. Barty uses templates to rout stopped dados in the shelves and the underside of the top for the drawer guides and the envelope partitions. She positions the template on the shelves by aligning a registration mark with its mate on the workpiece.



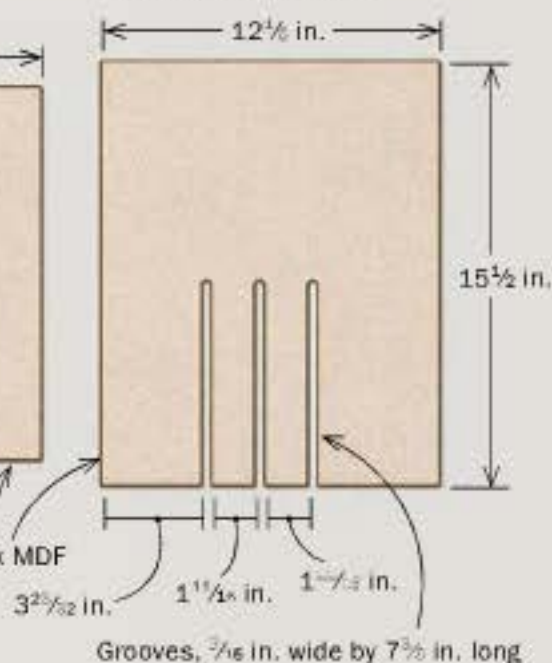
Bit and bushing.

Barty routs the dados using a $\frac{1}{2}$ -in. straight bit in a $\frac{7}{8}$ -in. guide bushing, which fits snugly inside the template slots.

DRAWER GUIDE TEMPLATE



PARTITION TEMPLATE



Shaping. Use a spokeshave and files to round the front edges of the partitions, which fit entirely in their stopped dados. Refine the shape to match the front of the dado and test the fit.

SPLINES

Barty uses splines in the center drawer compartment.



The envelope partitions were planed to fit the dados. Again, I rounded the front edge to fit into the routed groove and also scooped out a curve along the leading edge of the partitions using the bandsaw. I faired the curve with a spokeshave and rounded over all edges with a file.

A place for your drawers

The bottom of the middle drawer compartment is splined to the uprights. The stopped dados for the splines are cut on the router table, using a $\frac{1}{8}$ -in. straight bit. Make the splines of the same wood and orient the grain in the same direction as the piece you are joining, so it will shrink and swell in the same direction. The fit of each spline needs to be snug, but not too tight or it will bulge the opening. Creep up on the thickness, and if you make one spline too loose, just make another.

There are actually three drawers; the middle one is hidden in plain sight. On either side of the drawers, end blocks are doweled into the uprights at glue-up. Taken together with the secret drawer front, they create the look of a front apron. The front of the secret middle drawer is tenoned rather than dovetailed, and extends past the sides by $\frac{3}{8}$ in. One can get hold of the secret drawer front only by pulling out an adjacent drawer.

The drawer pockets are created by two sets of drawer guides—a pair of full-height dividers in the center, along with one shorter divider on the outside of both the left- and right-hand drawers. All four are held in place with splines, set into grooves cut with a routing template like the one I used for the envelope partitions.

The central drawer dividers create the pocket for the secret drawer. They are hidden behind the drawer front and must be set back to accommodate its thickness. These two guides are full height, and are splined into both the gallery and the bottom of the drawer compartment. The outer guides run along the left side of the left drawer and the right side of the right drawer. These guides sit behind the doweled end blocks, each in line with the block's inner edge. To reduce friction in the drawers' movement, I made these guides only $\frac{3}{4}$ in. high.

Before glue-up, rabbet the back edges of the case parts at the router table to accept the back panels.

Stopped at both ends. The end-grain groove that houses the spline in the drawer compartment bottom is stopped at both ends. Start by lowering the workpiece onto the bit, then pushing the piece through the cut. When you reach the opposite stop block, switch the router off before lifting the workpiece away.



You've got some splinin' to do. After thickening the blank, crosscut the splines so that their grain runs in the same direction as the pieces they join. The short pieces are fragile, but don't worry: if needed they can be glued in place in pieces.

Assembly

Barty first assembles the central portion of the case, then adds the compartments on each side. When the assembly is out of clamps, she attaches the top.



Start with the drawer compartment. Glue the guides to the bottom.

This is also time to mortise for the door hinges with a trim router and drill holes for the glass-shelf supports inside the cabinet. Last, pre-finish the interior surfaces. It's just too difficult to get into those small spaces later.

Glue-up starts in the middle

I started the glue-up in the center and worked my way out. First I glued the drawer guides into the bottom of the middle drawer compartment. I then splined this assembly to the inside of the two uprights. The drawer front end blocks were doweled at the same time.

When the assembly dries, glue the left-hand shelf into the dados of the upright and side, then glue and screw the bottom



Work your way outward. Next, glue the uprights to the drawer compartment bottom.



End blocks are next. These blocks frame the front of the drawer compartment and are joined to the uprights with dowels.



Glue up the side compartments. Clamp the assemblies together with shelves and bottoms in place (above). Secure the bottoms with screws (right). These strengthen the connection of bottom to sides, which would otherwise rely on the narrow glue surface of the stopped rabbet.





Drive the dowels home and set the top in place. To ensure that the dowels are seated at the proper depth, Barty uses a small reference block thickened to match the height of the exposed dowel (above). She uses blocks to elevate the work above the bench (left). This provides clearance underneath for the clamps that will bring the top home.

in place using $\frac{1}{2}$ -in. #2 brass screws. Then do the same for the right side.

To glue up the top, set the whole gallery on a board on some sawhorses so that you can get clamp pressure where you need it. Check for square in each section and then recheck. A slight adjustment of the clamp head can affect the outcome quite a bit. Also, it's a good idea to check for wind so that you don't glue a twist into the case. If you do not have deep-throated clamps to get pressure in the middle of the gallery, make cauls with slightly tapered ends. The $\frac{1}{8}$ -in. vertical envelope partitions are glued in at this time as well. Slide them in from the back once the top is in place.

Once the glue has dried, the back panels can be fitted. I chose something splashy for my back panels. This way the interior be-

hind the glass door is a little brighter and it looks fun if the piece is seen from behind. I used sycamore for the back panels as well as for the drawer bottoms to tie it all together. 🔍

Attach the top

Attaching the gallery to the desk is simply a matter of driving eight screws up through the bottom of the desktop and into the sides and uprights. I used #6 $1\frac{1}{2}$ -in. brass screws along with a #38 bit for the pilot hole and #17 drill bit for shank clearance. Make sure that you take the time to drill the proper hole and use a dab of wax on the end of the screw. This helps to reduce friction and prevents the screw from snapping. □

Taimi Barty builds furniture and custom cabinetry in Fort Bragg, Calif.



Cut and Fit Perfect Pins

Don't Fear the Dovetail, Part 2

Scribe the tails accurately
and the rest
is simple handwork

BY CHRISTIAN BECKSVOORT

In the first half of this two-part article, I described every step of the process I use to lay out, saw, and chop the tails in a through-dovetail joint (*FWW* #238). I always cut the tails first and use them as the template for the pins. In this part, I'll show you my method for transferring the tails to the pins, as well as how I cut the pins and assemble the joint. Even if you use a different method to cut the tails—as long as you cut them first—you can apply all these techniques to your process.

Transfer the tails with precision

When you're making hand-cut dovetails, transferring the first half of the joint to the second half is where the rubber hits the road. Accurate scribing is essential. Luckily, two of the big benefits to cutting tails first and pins second come into play as you make the

Scribe the pins from the tails



Easy alignment. Use a scrap block to support the tail board during scribing. First clamp the pin board in the vise so its top edge is flush with the block (left). Then move the block to support the far end of the tail board. If your boards are grooved for a bottom or back, insert a small square of wood into the groove to control side-to-side alignment (above).



Knife work. Align the tail board so the gap between its shoulder and the face of the pin board is just barely closed (above). This will leave the ends of the tails proud by about the thickness of a fingernail. Trace the tails onto the end grain of the pin board (right), starting with a light stroke and following with one or two heavier ones.



transfer. One is that you can lay the tail board flat as you trace the tails. The other is that you can make the marks with a knife into end grain for maximum accuracy. Before you begin tracing the tails, number the mating joints—1,1; 2,2; 3,3; 4,4—so it's clear which sets of pins belong with which sets of tails.

I use a simple trick to keep the tail board flat and steady while I scribe. Place a square block on the benchtop in front of the vise. Then clamp the pin board in the vise so its top end is flush with the top face of the block. Now when you set one end of the tail board on the pin board for scribing, you can use the scrap to support the other end.

Align the tail board so that its sides are flush with the sides of the pin board. Then line up the shoulders of the tails with the inside face of the pin board. The tails, which will be proud in



Finish the layout. Use a square and a pencil with a fine point to draw the lines between the scribed angles and the scribed baseline.

Saw and chop the waste



Down to the line. Your kerf should be right on the knife and pencil lines. Mark the waste with Xs to avoid mistakes.

the finished joint, will protrude slightly past the outside face of the pin board.

Holding the tail board down firmly with one hand, mark along both cheeks of all the tails. Use a sharp knife with a long bevel, and hold the bevel flat against the wood. For maximum accuracy, make a light cut first, followed by a heavier cut. Then use a square and a fine-point pencil to carry these knifed lines down the faces of the pin board to the baseline.

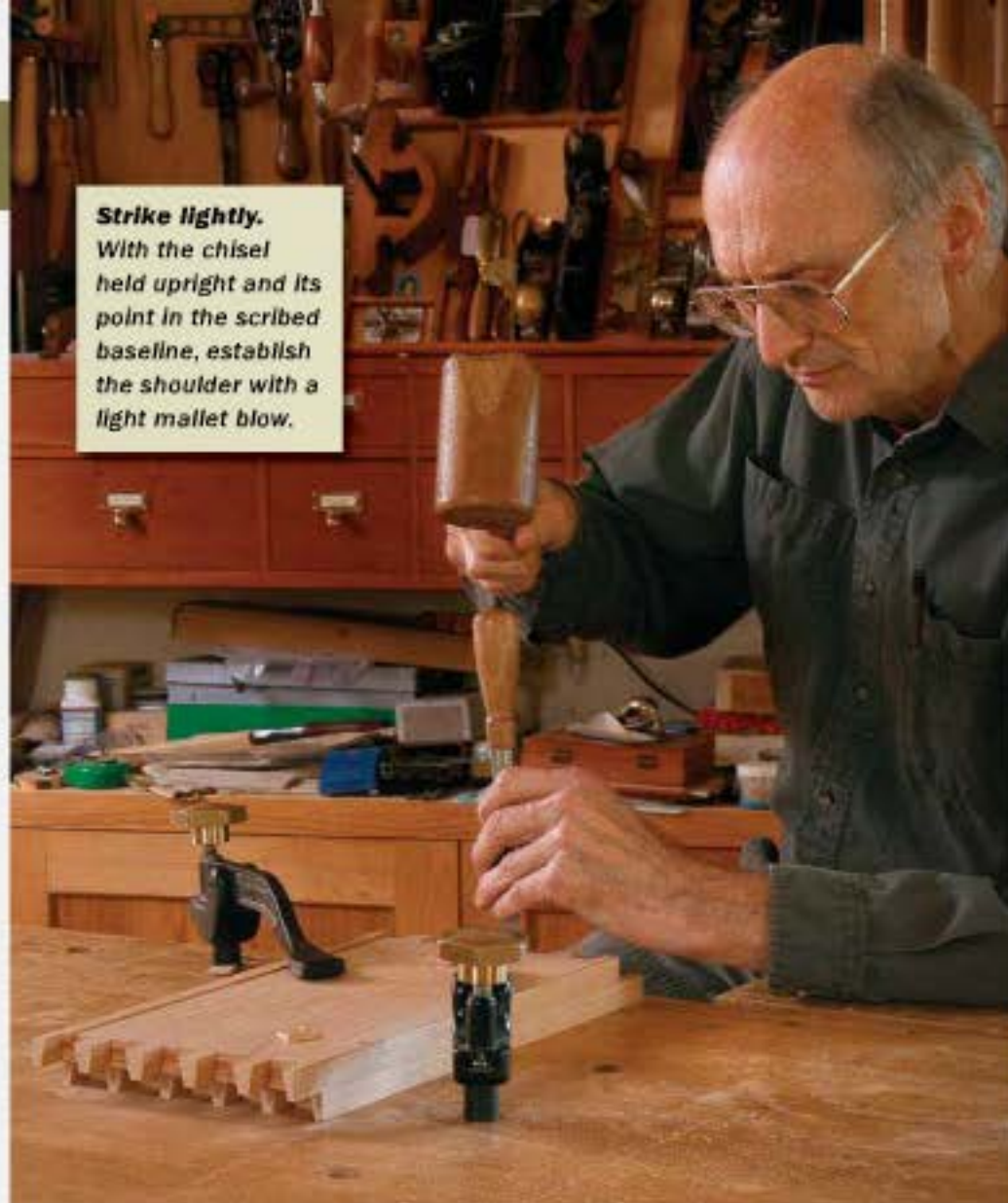
Remove the waste between pins

When you cut the pins, your sawkerfs should, ideally, be right on the layout lines. You could saw close to the lines and pare to them later, but this is a slow and inefficient process. Better to put the extra time into practicing cutting to a line beforehand.

Once all the pins are sawn, you can move on to chopping out the waste. Clamp the pin boards flat on the bench, stacked like steps, and begin by establishing the shoulder. Use a wide chisel held vertically and with its point right in the scribed baseline. Make one light mallet blow at each setting of the chisel—you'll likely have to set the chisel twice to span the baseline from pin to pin—and chop between all the pins. This light chop establishes the shoulder without driving the chisel beneath the baseline.

Use the same wide chisel held horizontally to tap into the end grain and take out a chip of waste about $\frac{1}{4}$ in. thick. Now you have a shallow, square shoulder. The rest of the joint will be

Strike lightly. With the chisel held upright and its point in the scribed baseline, establish the shoulder with a light mallet blow.



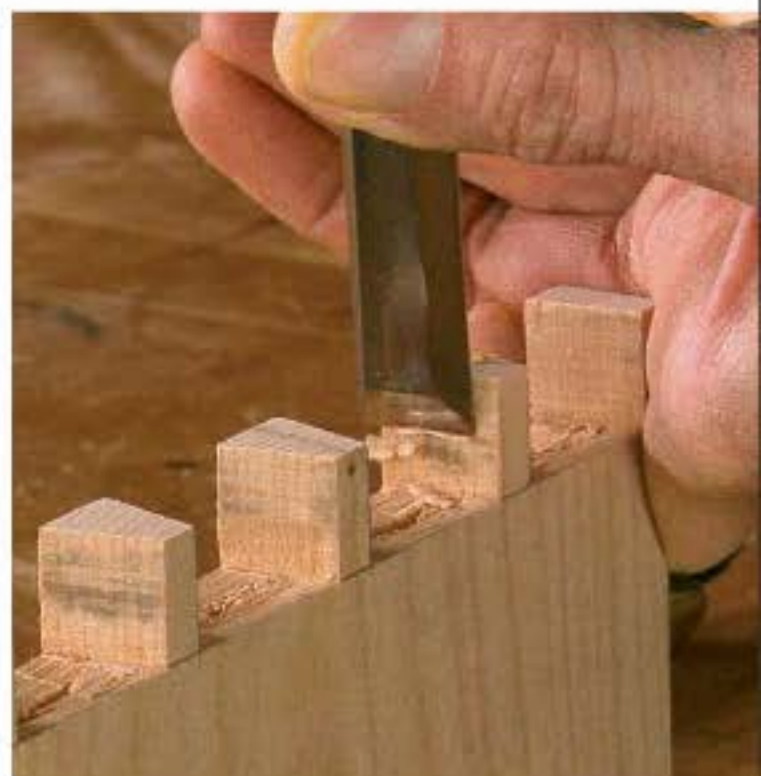
First chip is the slimmest. Remove a thin chip of waste with a tap on a horizontal chisel, and you'll have a $\frac{1}{4}$ -in.-deep square shoulder. To chop out the rest of the waste, hold the chisel just off vertical—tilted toward you—and use harder mallet blows. This undercuts the joint, leaving the shoulder intact.



Same sequence on side two. After chopping to the middle of the pin boards, flip them and use the same techniques to establish a square shoulder and chop away the waste on the other side. Lighten up at the end to avoid damaging the shoulder below.

Pare for a perfect fit

Slice on the scribe lines. If any of your scribed lines are visible on the end grain, put the tip of a chisel in the line and pare away the waste (right). If the grain is running into the pin, pare from the side instead of the top (far right).



Gauge the fit with graphite. Blacken the first $\frac{1}{8}$ in. or so of the tails' cheeks with a pencil (left). Engage the joint evenly with moderate fist pressure (center). Where the graphite has transferred to the pins, pare it away gingerly, coming from the top if the grain permits (right), or from the side if the grain is tricky.

undercut slightly, speeding up the process and leaving the shallow shoulder pristine. You can afford to undercut, since this is all end grain and is not a good glue surface anyway.

With the chisel tilted toward you slightly, make each chop with several firm mallet blows. Chop between all the pins and follow up by removing a thick chip of waste. Continue chopping this way between all the pins until you reach the middle of the boards. Then flip them, reclamp, and repeat the two-step chiseling process from the other face. When you are working on the last bit of waste, use a series of light hits to avoid damaging the shoulder and stock below.

With the chopping finished, clamp each pin board in the vise in turn and examine the end grain. If any of the scribe lines are visible, you have paring to do. Select a chisel that's wider than the pin, put its point in the scribe line, and pare straight down. Be careful of the grain here; if it runs in toward the pin and pulls the chisel with it, try paring from the side instead of from the top. After paring, use a knife to clean out all the inside corners. Lastly, check with a square to see that the joints are properly undercut—



Knock it home. After paring the pencil marks away, test the fit again, disengaging the boards and reapplying graphite as often as necessary until the joint slides snugly home.

Low-stress glue-up



Clever glue trick. To simplify the glue-up, assemble the box so the joints are just barely engaged. Then apply glue to the cheeks of all the pins and tails before pounding the joints home.



Use clamps if you need them. After pounding the joints home, use clamps if necessary to close any gaps and to adjust the box for squareness.

the shallow shoulders you established on each face of the board should be the high points.

Pare the pins to fit the joint

In a perfect world, you would now be able to drive the joints all the way home with moderate fist blows. But in reality, fitting comes next. Always do this paring and fitting on the pins; the tail board is the pattern, and the pins must conform to it.

With a pin board in the vise, align the matching tail board and press down lightly. If the two pieces barely engage, that's good. Remove the tail board and, with a pencil, darken the leading edges of the tails. Re-engage the pieces and pound a bit harder. Where the graphite has transferred onto the pins, pare ever so slightly, keeping the chisel vertical. Don't undercut, since this is your glue surface. If the joint is already engaging, don't pare all the way from the top of the pin, since it already fits there. Be patient; it may take three, four, or even five tries before you get a good fit.

If there are gaps between any of the pins and tails, you'll need remedial action after the glue-up (see opposite page).

Tricks for a confident glue-up

For small glue-ups, you can coat the pins and tails with glue while the parts are separate and assemble as normal. But for medium and large glue-ups, partially engage all four corners—by $\frac{1}{8}$ in. or so—before applying any glue. Then use a narrow stick to apply glue to the exposed faces of the tails and pins on all four corners. Pound the joints together with a caul and mallet. If the joints don't come completely home with the mallet, use clamps. I use scraps of pine as clamping pads. Even though the joints are proud, there's no need for custom clamping blocks. The pine conforms easily to the shape of the joint while delivering the clamping pressure. If there's much glue squeeze-out, slip a piece of waxed paper under the pine to keep the blocks from adhering to the workpiece. □

Christian Becksvoort is a contributing editor.



Easy squeeze. Becksvoort doesn't need specially made clamping blocks to contend with the proud tails. He just makes white pine blocks, which are soft enough to conform to the proud parts of the joint.

A fine fix for gaps

As the glue dries, examine the joints. If there are any hairline gaps between the pins and tails, you can fill them with commercial wood filler or with a homemade recipe: $\frac{2}{3}$ glue to $\frac{1}{3}$ water, to the consistency of heavy cream, then blend in sanding dust (not sawdust) to the consistency of peanut butter. With white or yellow glue, avoid contacting metal while you mix and apply the filler, since the glue will react with the metal and turn black.

Larger gaps—the width of a sawkerf or less—can be fixed after the clamps are off. Widen the gap with a handsaw. Then cut a thin shim from a scrap that matches your project and glue it into the kerf. Depending on which direction you insert it from, the shim's grain will match either the pin or the tail.



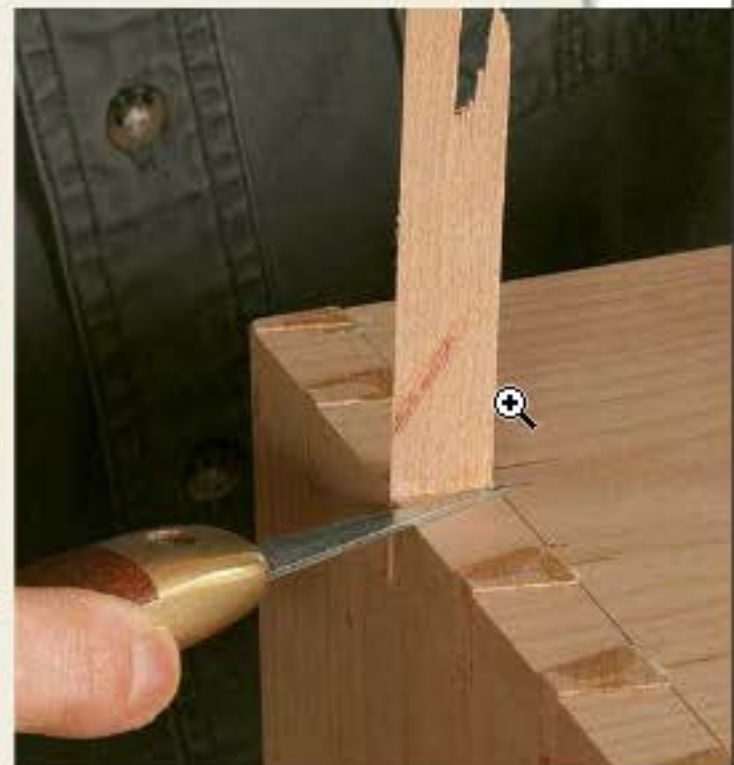
Kerf the corner. To repair a gap between a pin and a tail, start by sawing into the gap with the blade on a 45° angle. Cut the kerf from baseline to baseline.



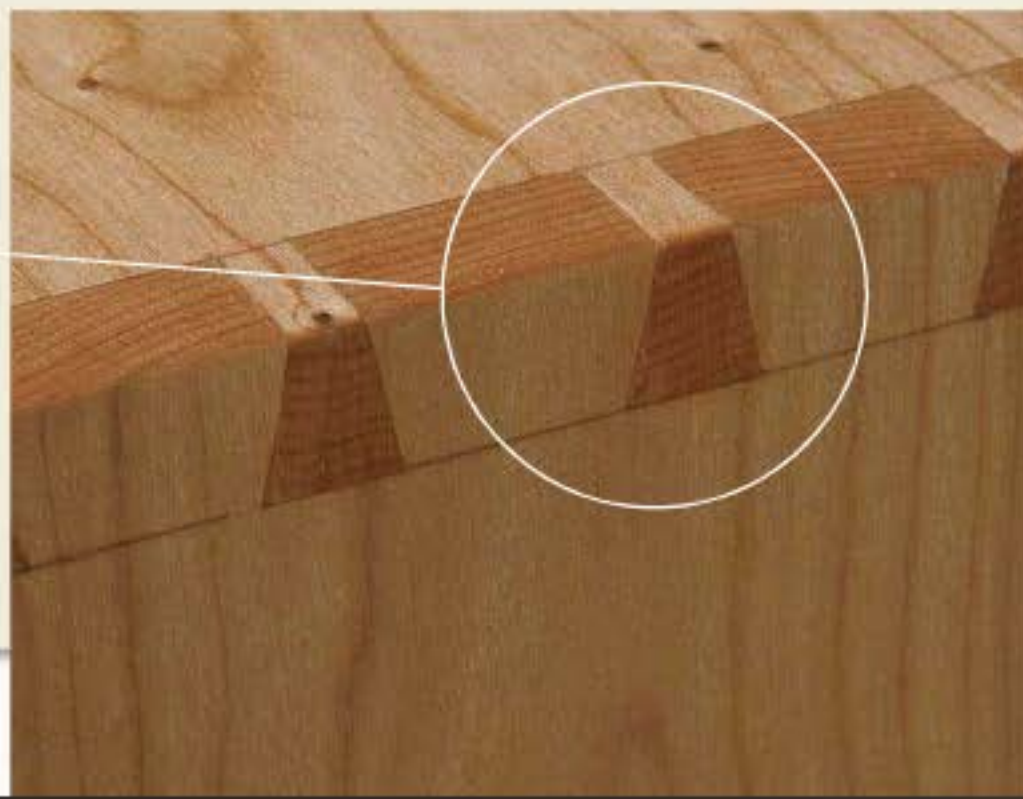
Create a kerf-sized shim. Using the tablesaw and a scrap of stock that matches your project, cut a shim that fits your handsaw's kerf.



Trim the shim. Cut one end of the shim on a 45° angle with the chop of a chisel. After gluing it in place, trim the shim flush (right) with a few strokes of a knife.



Seamless repair. Glued in with its side grain and end grain matching the neighboring pin (above), this shim is virtually invisible once it's sanded flush (right).



readers gallery

HERBY KIRSTE

Sooke, B.C., Canada

This credenza was designed for someone who loves music and wine. Full-size record albums can be stored in the bottom drawers, with CDs and bottles of wine in the top drawers. Kirste made the bottom drawer fronts short, not only to display the albums but also to showcase the live-edge maple he used. The credenza (17 in. deep by 68 in. wide by 31 in. tall) is made of local, sustainably harvested, old-growth Douglas fir, curly and spalted big-leaf maple, and walnut wedges. Kirste milled the Douglas fir with his mobile sawmill, which is powered by an old Volkswagen Beetle engine.

PHOTO: TREVOR BALL PHOTOGRAPHY



DANIEL ZENEFSKI

Fort Bragg, Calif.

Inspiration for this walnut box, with Port Orford cedar lining, came from the Prairie School of architecture and Frank Lloyd Wright. Zenefski designed the box (6 in. deep by 18 in. wide by 3 in. tall) with a long, low profile and a subtle stair step similar to Wright's Usonian homes. This box was Zenefski's first piece and it took approximately 200 hours to design and build. PHOTO: DAVID WELTER



CHARLES PALMER

Albuquerque, N.M.

After seven years of piano lessons as a child, Palmer was introduced to J.S. Bach's Baroque music and was hooked. He has built three harpsichords from kits since 1974 (he gave two away as gifts and sold one), but this is the first one he built from scratch, and it's the one he'll keep. It is a replica of a large 18th-century French double-manual (35 in. wide by 94 in. long by 11 1/4 in. tall without the stand), with the case and stand made of poplar. The soundboard is sitka spruce, and the keyboard is made of basswood, maple, ebony, pearwood, and bone. Palmer followed tradition and painted the harpsichord, using alkyd enamel and gold leaf. The elaborate soundboard painting is also typical of the period and was painted by Brad Clement.



GREG KLASSEN

Lynden, Wash.

When Klassen builds a new case piece, he'll usually begin with a drawing to rough out the shape he's after. But many of the important details of the design emerge in a full-scale mockup. "Building a full-size mockup," he says, "is a great way to find confidence in your design before you cut that first board." For this sideboard (16 in. deep by 48 in. wide by 35 in. tall) with its poised stance and superb proportions, he built the mockup out of cardboard. He didn't bother mocking up the base separately, he just created a box the size of the whole cabinet and drew the base on it with a pencil. The mockup let him experience the piece in three dimensions—and alter it with a snip of the scissors. Once he had a shape that felt right, he used the front of the mockup as a canvas to find a pleasing arrangement for the doors and drawers. He used double-stick tape to fix thin strips of wood to the front to represent the edges of the carcass and the door and drawer dividers. He tried various widths and moved the strips a number of times before arriving at the tranquil composition reflected in the finished piece. To finalize the base design, he cut shapes out of veneer and taped them to the mockup.

Klassen sawed his own afzelia veneers for the case, choosing calm grain to complement the gentle curves of the piece. He also carved the afzelia pulls to a softly flared shape that links them to the curve of the mahogany base and the slightly bowed front of the cabinet.

**GREG LAIRD**

Mendocino, Calif.

According to Laird, "a lounge must follow the shape of the human body when in a relaxed position." When he designed this chair, he combined this requirement with his appreciation for the Danish modern style. Laird used bent lamination for the curved back and base of the white oak lounge chair (23 in. wide by 80 in. long by 33 in. tall) and used a round carving file and card scraper to refine the radius of the inside corners of the base. When weaving the Danish cord seat, Laird thought the lounge chair took on a nautical feel, so he used sail canvas for the pillows. He finished the chair with wax.

PHOTO: DAVID WELTER



HERMAN VEENENDAAL

St. Marys, Ont., Canada

Since his first trip to Colonial Williamsburg many years ago, when he saw the original of this Massachusetts tea table, Veenendaal had wanted to make a slightly different version in cherry. He used hand tools for most of the table (18 1/8 in. wide by 28 7/8 in. long by 26 3/4 in. tall), but he cut the cove in the top molding using the tablesaw. He says the most difficult part was cutting and fitting the skirt moldings to the aprons. He finished the table with boiled linseed oil, followed by four coats of orange shellac, and nitrocellulose lacquer.



HIROSHI YANAGISAWA

Kamakura-shi, Kanagawa-ken, Japan

Yanagisawa's client had saved some beautiful vertical cypress lattice from the shoji screens in her parents' traditional Japanese house before it was torn down, and asked him to make a display cabinet for her using the lattice. Yanagisawa combined western and Japanese aesthetics in his walnut and cherry cabinet (14 1/4 in. deep by 63 3/4 in. wide by 39 3/8 in. tall). He steam-bent the lattice to make curved doors and added simple carved handles. The sliding doors are hung so that no track is visible. PHOTO: CHIHIRO MORIYAMA

Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For submission instructions and an entry form, go to FineWoodworking.com/RG.



CHEN LI

San Francisco, Calif.

As a student at Rochester Institute of Technology, Li was assigned to make a reliquary (a receptacle for keeping or displaying sacred objects) with a door and a drawer. He made this small maple desk (15 in. deep by 20 in. wide by 33 in. tall) to showcase and preserve his childhood memory of stamp-collecting with his grandfather, and to encourage himself to continue with the hobby. The desk has two identical mitered frames, top and bottom, with mortise-and-tenon "pillars" and panels that form the box and drawer carcass. Li joined the legs to the box and aprons with slip tenons. PHOTO: ELIZABETH TORGERSOON-LAMARK

TODD BRADLEE

Bishops, Calif.

This playful dresser (19 in. deep by 27 in. wide by 54 in. tall) is made of cherry, curly maple, and walnut with turned ebony pulls. Bradlee had just completed a dresser with curved sides when he began this piece, so he wanted to design something with straight sides, yet with a twist. The result is this stacked-box dresser where the drawer boxes can be rotated from 0° to 11°. To make the boxes rotate, Bradlee used 3/8-in.-dia. by 2-in.-long bolts between them. When the drawers are partway open, you can reach in the back and adjust the rotation with an Allen wrench. On the bottom of each box are four feet, attached far enough inside to allow for the 11° rotation in either direction.



LES CIZEK

Fort Bragg, Calif.

Cizek had a plank of wild tamarind in his shop for several months, so when his son asked him to make a humidor, he designed this piece (9 in. deep by 15 in. wide by 8 in. tall) around the wood, which had amazing figure at one end and straight grain everywhere else. The box top features diamond-pattern veneer, attached using a vacuum bag. The little drawer on the side is used to store a cigar clipper and other gear, and the box has a device in the top to keep the humidity at the proper level. The box also includes ebony and holly.



Make your legs stand out with inlaid feet

A TOUCH OF CONTRAST GOES A LONG WAY

BY GARRETT HACK

I want a viewer's eye to wander every inch of my furniture, right to the tip of the toes. So it makes sense to add some pizzazz there. One of my favorite ways to attract this attention is to make feet from a contrasting wood—especially if it echoes a wood used somewhere else in the piece.

An obvious way to add a foot of a different wood is to shape it from a piece of solid wood and tenon or screw it to the bottom of the leg. A far stronger method is to assemble and inlay the foot in a recess at the bottom of the leg.

A foot with the top line parallel to the floor is the place to start. Then you can get jazzy and angle the top line of the feet—a technique I show on p. 82.

Choose a wood that has a nice contrast with the leg, figured or plain. Straight grain is the easiest to work and will likely appear most like a solid-wood foot. My examples are for a



TAPER MEANS BEVELED ENDS

With a tapered leg, you need to bevel the ends of the foot faces. A straight leg requires no bevels.

Bevel ends to meet shoulder.

Recess, 1/2 in. deep

Foot faces, thicker and wider than recess

Make way for the inlay



Mark the shoulder. Once you've established the height of the foot, scribe a line around all four sides of the leg. For tapered legs (shown here), you'll need a bevel gauge.



Saw the recess. Bury the blade in a sacrificial fence, and clamp on a stop block. After cutting, withdraw the leg carefully—keeping pressure against the fence. Rotate and repeat.



Clean up the cuts. Use a handsaw to define the shoulder line, then chop and pare away material to make a clean landing pad for the inlay pieces.

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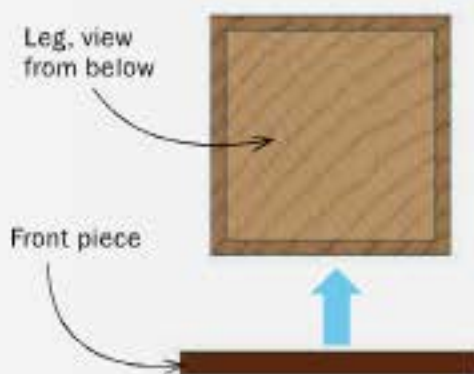
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Start with the front piece

1 MAKE IT OVERSIZE

Be sure to smooth the back of the piece so that it lays flat in the recess and will meet the side pieces seamlessly.



Bevel the end. A tapered leg will have an angled shoulder, so you need to angle the foot piece to match.



Slight overhang. The front piece should project beyond the thickness of the two side pieces.

tapered leg, but it's easy to adjust the method for a leg without a taper.

Nail the design

Decide first what length foot looks best on the piece. In general, I favor longer feet, giving a leg lift and grace, much like a ballerina on pointe. This can be hard to gauge from a drawing, so I'd experiment with a full-size mockup (or the real thing). Wrap a piece of tape around the leg at what will be the top of the foot. Move the tape up and down, and if you can, get a fresh look at it the next day before you commit.

Once you have the height figured out, mark it on all four sides of the leg. With a square leg, or one that's tapered on only two sides, you can use a combination square to mark the shoulders. But with a four-sided taper, you need to use a bevel gauge to scribe a line parallel to the floor. To set the gauge, put the blade on the bottom of the leg and bring the fence flush to the side of the leg. Adjust the gauge as needed until you can scribe a line all the way around the leg.

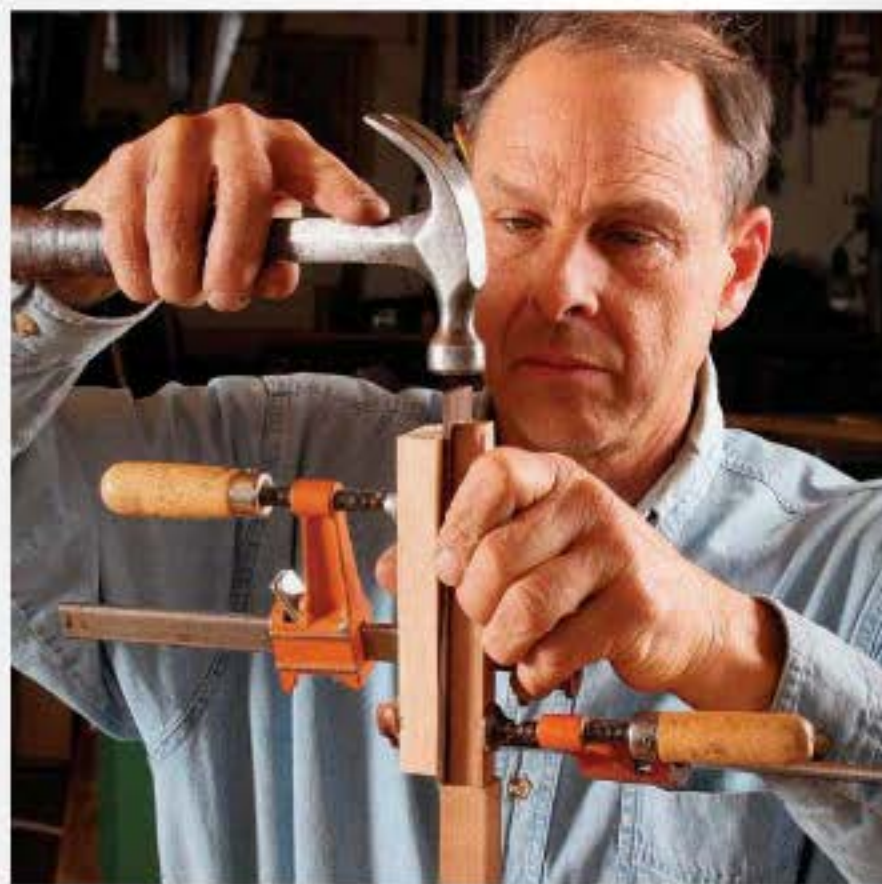
Cut the recess

To make way for the contrasting foot, you need to cut a recess that's about $\frac{3}{32}$ in. deep. For that job I use a tablesaw. It's worth having an extra leg for setup and test cuts.

I use a wooden sacrificial fence clamped to my tablesaw fence, with the blade buried and just exposed, and make short ripcuts with the leg against the fence and table. Then I remove the leftover wood with a chisel and chisel plane, and pare to the shoulder line, which I define with a handsaw.

When gluing, order matters

Resaw the inlay material slightly thicker than the recess, and slightly wider and longer. Lay out the pieces to get sets of four



Tap for a tight fit. When gluing and clamping all of the pieces, tighten the clamps just enough to hold the parts in place. Tap the top of the piece to snug it up against the shoulder. Then fully tighten the clamps.

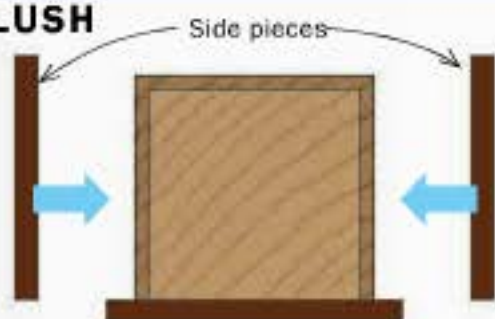
that work well together, where the grain will look natural at the corners. Plane or smooth the back surface of each face. This not only ensures that the inlay seats well but also that the pieces meet seamlessly around the foot.

Work on the front piece first, which is the most visible surface and thus the most important. Fit the blank to the top line with a block plane so that it overhangs the entire foot slightly in width and length; you'll have to work the end at an angle so

Sides, then the back

2 SIDES ARE FLUSH IN FRONT

The sides are prepped the same way as the front. But you need to joint the front edges to eliminate gaps.



First side piece. When gluing the side piece, put clamping pressure against the leg and against the front piece. Cauls make it easier to get the clamps around the inlay pieces.

that the inlay is flush with the top shoulder of the recess. Sand the back of the blank very slightly with a flat block and P220-grit paper, to give it some "tooth," especially if you are working with dense, oily woods such as rosewood or ebony. Glue it in place, tapping it down to the shoulder before you cinch down the clamps.

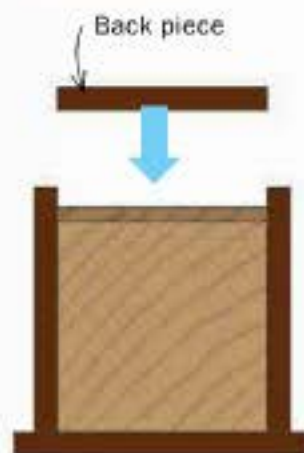
After fitting and installing the side pieces, work on the back, which is the most difficult to fit due to the taper. Lay it on the side pieces, draw the taper along the edges, then taper the back using a block plane. It should slide in from the top without binding. Once it fits, glue it in place.

The feet look rough at this point, long, and uneven at the corners. I plane the faces of the foot flush to the leg. Then I trim the bottom flush with the leg. Finally, I chamfer all four corners, as well as where it meets the floor.

Garrett Hack is a contributing editor.

3 BACK SLIDES IN

Taper the back piece with a block plane and fit it from above.

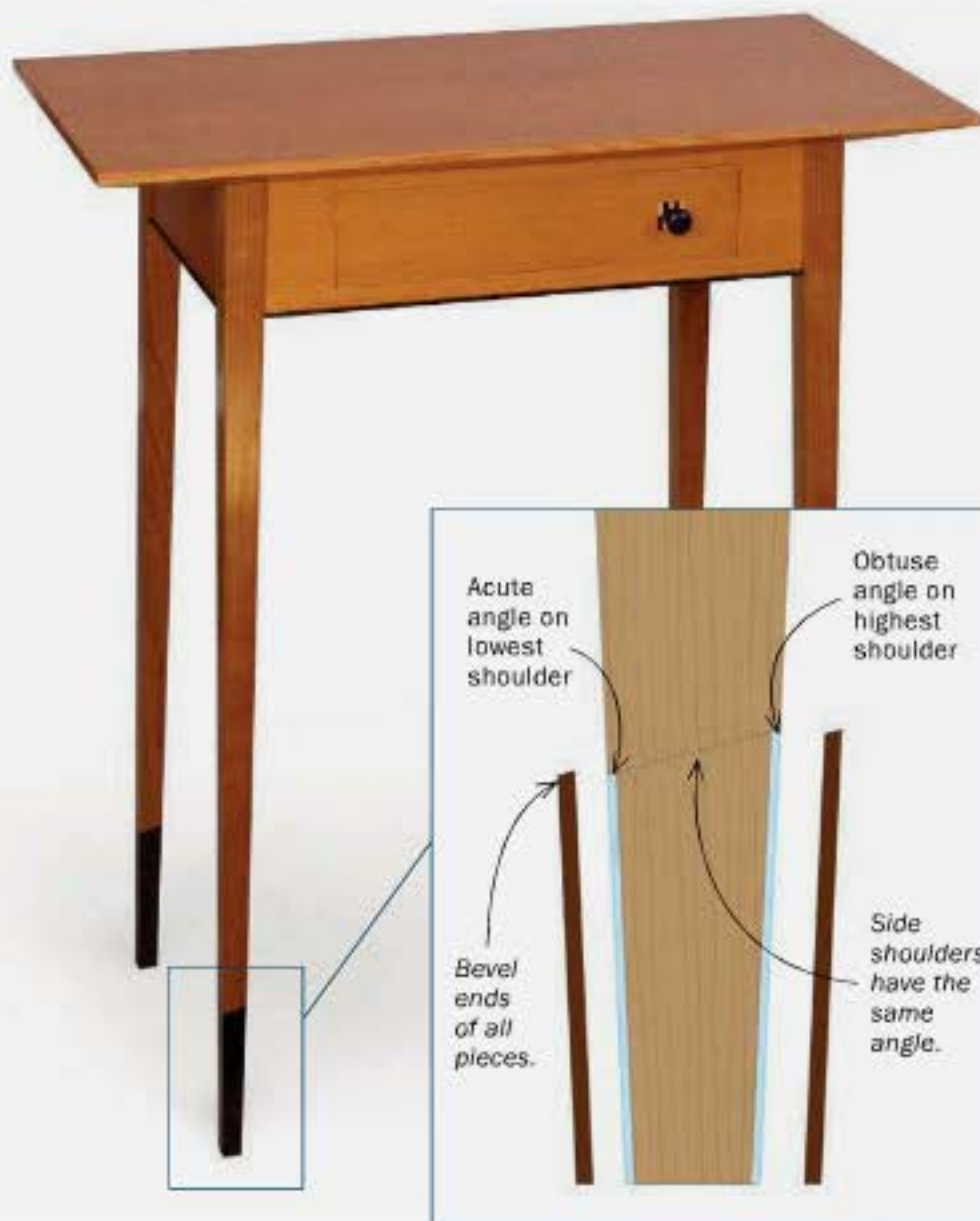


Back slides home. Mark the taper on the back piece (above) and plane away material until it slides in from the top without binding (below).



Pedicure. Plane the foot flush to the sides of the leg. Then trim the foot pieces flush to the bottom of the leg. Use a block plane to chamfer the corners and the bottom.

Angled feet are sharper



Feet with an angled top can give your legs even more of a stylistic lift, and they are only slightly more challenging to make than straight ones. Use tape as before to find the right height and angle. Most important are a consistent pattern around each foot and how each foot relates to the others. The outside corner of each leg should either be the highest or lowest point of that foot.

Use a bevel gauge and pencil to trace the angled line around the leg. There is a bit of fudging here because of the taper, so start marking out on the front piece, then the sides, and connect the sides on the back. Keep the bevel gauge locked in its setting, as you can use it to check your work.

Cut the recesses on the tablesaw. Unlike those on the straight-topped foot, the recesses for the angled foot are different lengths. After cleaning up the recesses, cut and fit the pieces one at a time. The big difference here is that the highest and lowest pieces are angled the opposite way at the shoulders (see drawing, above). Be sure to keep that in mind as you cut those shoulders and bevel the pieces. Beyond that, glue-up and cleanup are the same.



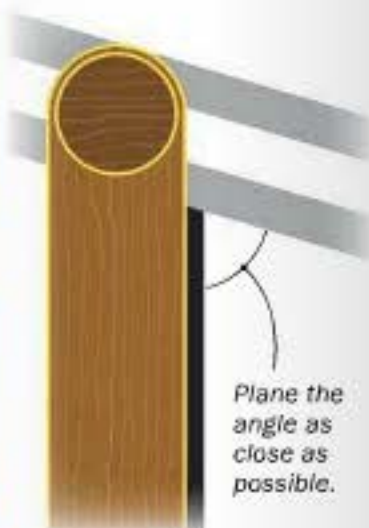
Shoulders are trickier. Set a bevel gauge to the angle, and trace around the leg so that all corners meet perfectly.



Plane the bevel. Hack uses a hand saw to cut the end of the inlay at the correct angle. Then he adds the bevel using a block plane.



Eyeball it. As you plane the inlay, use the bevel-gauge setting to check the angles on the ends.



Plane the angle as close as possible.



Flush fit. Each piece should fit the shoulder seamlessly.

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Q&A

Clear chips as you rout

Q: When routing mortises like in “A Guide to Guide Bushings” (FWW #207), I use a bit that’s the same size as the mortise, but my mortises

always get packed with wood chips, which really slows down the process. How can I avoid this?

—ROSS McPHERSON,
Coleman, Texas

A: **EXCAVATING THE WASTE** when you’re routing a mortise improves the quality of cut and keeps wood chips from getting caught in the mortise. Here’s how I keep my mortises clean.

Start with a router that can be connected to a shop vacuum. This way you can remove the chips from the mortise as they are created. You should also use an upcutting spiral bit, which pulls the chips up and out of the mortise.

It is also essential to choose a guide bushing that allows plenty of clearance for wood chips to flow past easily. In my experience, 1/8 in. of clearance is plenty. That means, when cutting a 1/4-in. mortise, use a 5/8-in.-dia. guide bushing.

Technique matters, too. Cut the mortise using multiple shallow passes, increasing the depth a little with each cut. As a general rule, the depth of each cut should not exceed the diameter of the bit that you’re using. This will reduce the volume of chips created at one time, so they don’t get packed in the mortise.

—Gregory Paolini operates a busy woodworking shop and school near Asheville, N.C.

Ask a question

Do you have a question you’d like us to consider for the column? Send it to Q&A, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwqa@taunton.com.



PROBLEM

Clogged mortise. A packed mortise slows down your work, and leaves a less-than-perfect cut.

THREE SOLUTIONS



1

Use a vacuum. Attach a vacuum to remove debris from the mortise while you’re working.



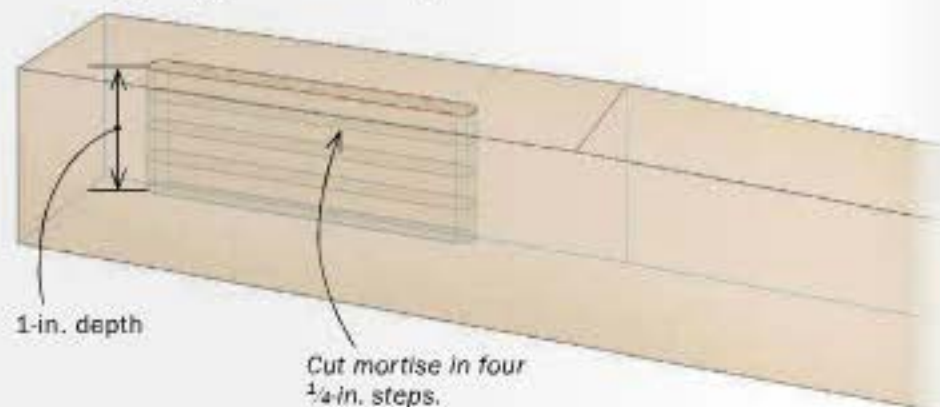
2

Use a spiral bit and a big bushing. An upcutting spiral bit pulls chips out of the mortise. To make a path for those chips to exit, use a bushing that leaves at least 1/8 in. of clearance around the bit.

3

TAKE MULTIPLE PASSES

Cutting in stepped increments will prevent the mortise from getting jammed with chips.



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Prevent staining from clamp pads

Q: My clamps have plastic pads that leave stains on the wood. Will these stains affect my finish?

—RUSSEL CHANDLER,
Perham, Minn.

A: I KNOW JUST WHAT YOU'RE TALKING ABOUT, and being an engineer, I ran some tests to find answers. I discovered that those stains are not visible under an oil finish, but they show up as unsightly blotches under waterborne finishes. So, with waterborne finish, use wooden clamping cauls or pads during glue-up to prevent the plastic pads from contacting the clean wood surface. After finishing, you'll see nothing but beautiful wood grain.

—Dean Hedstrom is the owner of Hedstrom Engineering, and is an avid woodworker.



Stain. The plastic pads that come with some clamps can leave an unsightly oily residue that shows through waterborne finishes.



No stain. The oily clamp-pad stains won't show under oil-based varnishes like Danish oil.



Use a pencil to lay out chamfers

Q: What's the best tool for laying out a nice, even chamfer all around a workpiece: a marking gauge or a pencil?

—ISAAC SANDERS,
Starkville, Miss.

A: FOR THIS TYPE OF TASK I USE A PENCIL. A marking gauge scores the wood, marring the chamfer by cutting into the corner of the chamfer you are trying to create. Working to a pencil line leaves a cleaner result and is accurate enough.

If I'm chamfering a straight piece, I might also use a combination square to help guide the pencil. Otherwise, I just hold the pencil, using my fingers as a fence. This also works well for curved pieces.

—Steve Brown is an instructor at North Bennet Street School.



Marking gauge leaves chipped corners. Since it marks by slicing the wood, the scored lines from the marking gauge leave the corners frayed and without sharp definition.



Pencil is the best tool for clean corners. Lay out the chamfer and plane to the lines. You'll get clean, straight chamfers with no broken corners or score marks.



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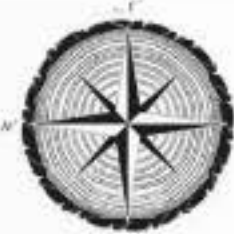
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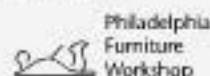
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how they did it

Making a splash

BY JONATHAN BINZEN

Danny Kamerath began making vessels and small sculptures because, in his work as a furniture maker, he was generating so many cutoffs that were too big and too interesting to throw away. He makes his droplet vessels primarily with power grinding, carving, and sanding tools (available from katools.com), and resorts to handwork with files and sandpaper only toward the end. The vessels range in size from 6 in. dia. down to just an inch. Early in the carving he can sometimes clamp the workpiece, but for most of the process his left hand is his vise. Two tools essential to this sort of work: a heavy leather glove and a good dust mask.



EXCAVATE THE INTERIOR



Quick cavity. Kamerath drills out the block with a large Forstner bit. After bandsawing it to an oval, he shapes the interior with a Proxxon mini grinder fitted with a needle-toothed carbide carving wheel.



Speedy sanding. Using a Guinevere flex-shaft sanding system with inflatable attachments that conform to the workpiece, Kamerath can smooth any surface quickly.



Slots between the drops. Following pencil lines, Kamerath uses the Proxxon grinder to cut notches between the droplets.

SHAPE AND SMOOTH THE OUTSIDE



The block becomes a bowl. An angle grinder fitted with an aggressive Holey Galahad carbide sanding disk shapes the outside. A scrap block inside the bowl keeps the droplets above the workbench.



Smoothing time. Using the mini grinder, Kamerath fairs the roughly rounded exterior left by the angle grinder. He follows this step by smoothing the surfaces with the Guinevere sander.



Carving water from wood. He refines the droplets using a Wecheer rotary tool and various bits, then finishes them with round files and sandpaper. All other surfaces are hand-sanded as well.



NEW! Festool Carvex Jigsaws – Completely Redefined



FESTOOL

Armed with the most advanced motor technology and the innovative features you have come to expect from Festool, the Carvex Jigsaws – both corded and cordless – will surpass all expectations. Challenge any scribe line and curve with ease, thanks to the fully automatic blade guidance system that makes blade drift and deflection a thing of the past. A revolutionary tool-less base-changing system adapts to any application, and the 4-LED, stroboscopic system penetrates through darkness and dust for perfect visibility of the cut-line. Cordless jigsaws accept any Festool slide-type lithium-ion or nickel based battery from 10.8V – 18V. All jigsaws come with a three-year warranty.

Corded

561593 Carvex PS 420 EBQ
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• Triple Blade Guidance For Unmatched Cutting Accuracy



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Splash!



For some reason that I don't understand," Danny Kamerath says, "I've got an impulse to turn wood into liquid." Kamerath, who describes himself as "home-schooled in woodworking," has been occupied full-time turning wood into all sorts of astonishing things since he ditched his 23-year career in advertising a decade ago. He makes these bowls—along with an array of other vessels, furniture, and sculpture—in a snug shop in the attic of his house in Dallas. Long fascinated with

slow-motion images of droplets falling, he decided to re-create the effect in wood. Turning would make them too symmetrical and take the life out of them, he says, so he coaxes the bowls from the block using a range of power carvers and hand tools. He makes them slightly oval rather than round, and he aims for something stylized rather than purely realistic. If he hasn't yet found a way literally to liquefy wood, he's getting awfully close.

—Jonathan Binzen

Photo: Danny Kamerath

How They Did It Turn to p. 90 to see how Kamerath makes one of his droplet bowls.

Audio Slide Show To see an array of other woodwork by Kamerath, go to FineWoodworking.com/extras.