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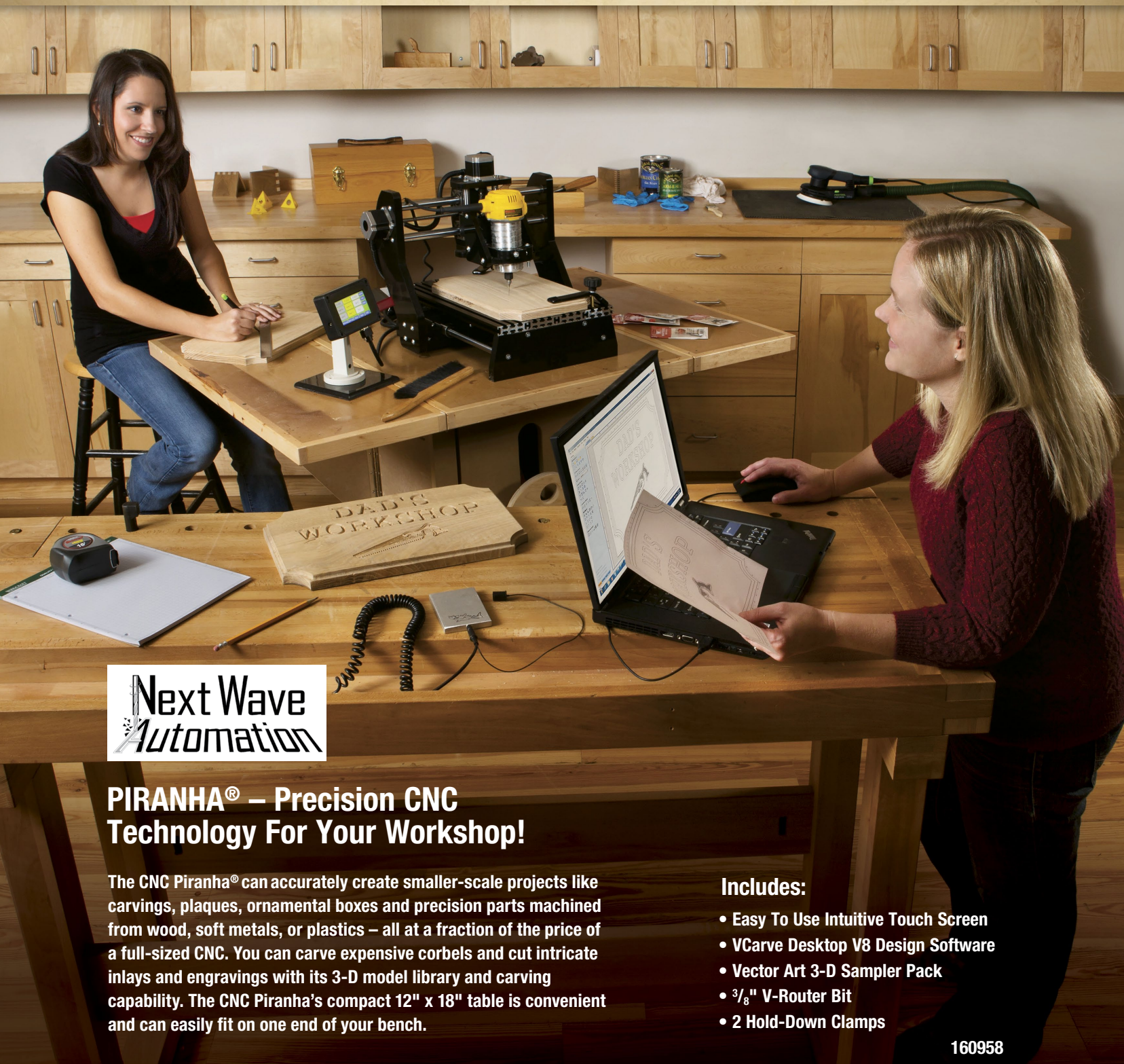
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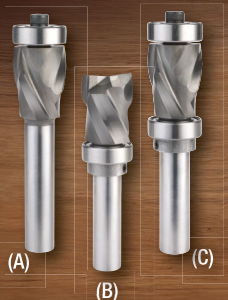
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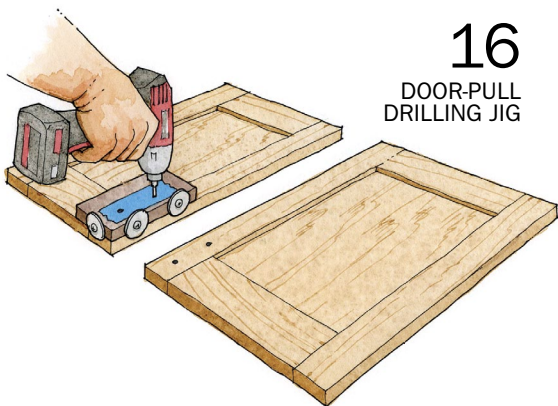
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16

DOOR-PULL
DRILLING JIG

up front

6 On the Web

8 Contributors

10 Letters

14 Methods of Work

- Magnetic catch for a blast gate
- Space-saving support for a miter saw
- Simple jig lines up cabinet door pulls

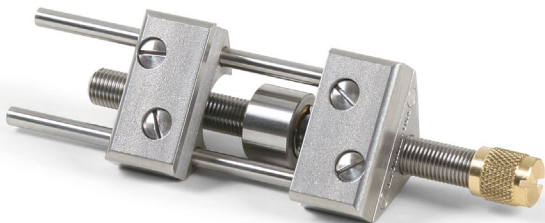
18 Tools & Materials

- Honing guide is a cut above
- Big bit has the teeth for flattening slabs
- Pneumatic nailer is versatile and comfortable

22 Designer's Notebook

Energized door panels

18 LIE-NIELSEN
HONING GUIDE



features

24

COVER
STORY

Bedside Table

This small project features stout joinery and angles that will challenge your skills

BY GARRETT HACK

32

Tablesaw Blades for Joinery

Cut joinery faster and cleaner with a set of four blades

BY BOB VAN DYKE

38

A Pro's Secret to a Perfect Finish

Use a grain filler to get a deep, lustrous look

BY PETER GEDRYS

44

TOOL
TEST

Benchtop Planers

The best machines produce smooth, parallel surfaces on your lumber

BY KELLY J. DUNTON

50

These Puppies Have Bite

Clever bench jigs grip workpieces of any size or shape

BY TIMOTHY COLEMAN

54

Learn to Resaw

Expert tips on setting up a bandsaw to cut perfect veneers and custom parts

BY TIMOTHY ROUSSEAU

62

Build a Longboard

Make something fun while learning new skills

BY CHRIS GOCHNOUR



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54 LEARN TO RESAW



70 GALLERY: DINING TABLE

in the back

68 Gallery

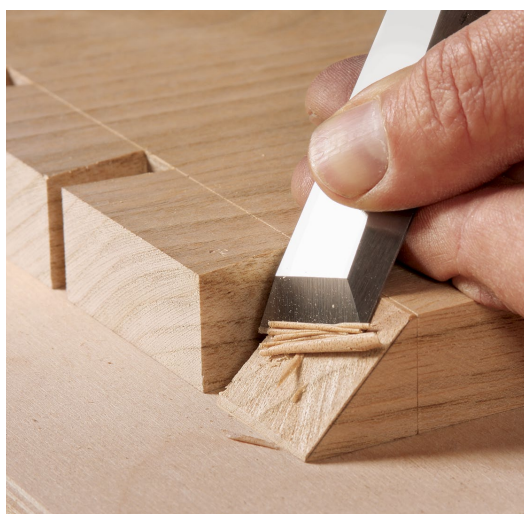
72 Handwork
Mitered dovetails

78 Master Class
Sculptural bowls

82 Looking Back
Sam Maloof: How I make a rocker

90 How They Did It
The back cover explained

Back Cover
A new home for old hardware



72 MITERED DOVETAILS

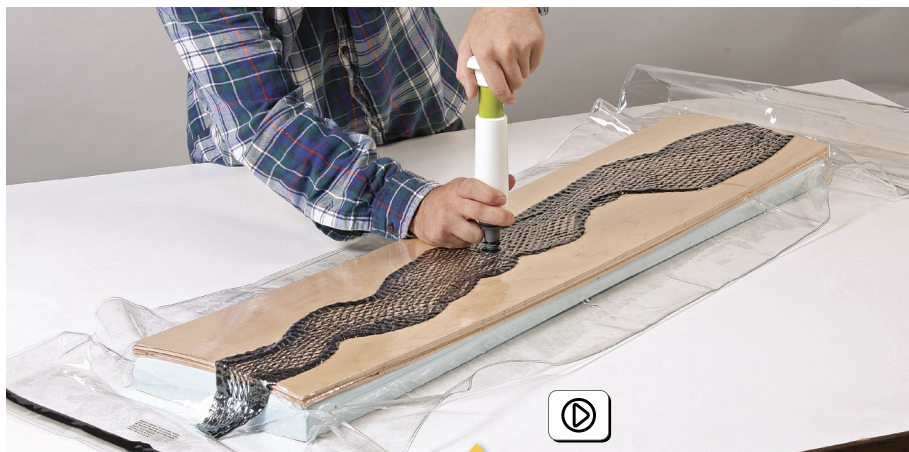


62 MAKE A LONGBOARD

on the web

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

Visit our website to access free online extras, available Feb. 10. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.



Vacuum Veneering Unplugged

You don't have to spend a bundle to try vacuum veneering. Watch how a simple hand-pump method can make quick work of small curves like the ones Chris Gochmour incorporates into his skateboards (p. 62).



Free Firewood Box Plans

Time to cozy up to the fire? Help keep your fire burning with this beautiful kindling box at the ready. Plus, dress it up with mitered dovetails (p. 72).

Tablesaw Joinery

Bob Van Dyke tells you everything you need to know about blades that turn your tablesaw into a joint-making machine (p. 32).

Go online to see how easy it is to make fast, accurate dovetails and box joints.



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VIDEO WORKSHOP

Arts and Crafts Coffee Table

Watch as master furniture maker Kevin Rodel shows you how to build his elegant interpretation on a classic Limbert design. In this project series, you'll learn how to:

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- get gap-free through-tenon joinery
- dress up your furniture with pierced panels



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contributors

The son of a classical musician, **Chris Gochmour** (“Build a Longboard”) learned from his father that if you pursue what you love as a career you’ll enjoy a fulfilling life. Chris played the French horn as a youth, but moved on to other things because the horn didn’t move fast enough. He took to skiing, skateboarding, and snowboarding, which led to his first job building skateboards and snowboards for the Winterstick company. This love for building things transitioned in his college days from decks he could ride to furniture for his home. Our newest contributing editor has been building furniture and teaching and writing about the craft for the past 30 years, and credits the pages of *Fine Woodworking* for helping him develop his skills. When he’s not in his studio, he enjoys spending time with his wife and two children skiing in the Wasatch Mountains, cycling along the banks of the Jordan River, or boarding in the hills surrounding the Salt Lake Valley.



When he entered junior high school, **Timothy Coleman** (“These Puppies Have Bite” and Designer’s Notebook) was devastated to discover that he couldn’t take shop class—his school had decided that the girls would take shop and the boys would take home economics. He has recovered from that early blow by spending a career working wood. After college he worked as a carpenter and cabinetmaker, eventually studying under James Krenov. He’s been building custom furniture for 25 years now.



Deputy art director **John Tetreault** (Handwork) and *Fine Woodworking* were born in the same year. Lately, as he works on each issue of the magazine, placing “40 years” logos all over the pages, he can’t help but feel that his birthday is getting way too much hype. This year he is building a small timber-frame studio next to his woodshop as a place for his family to make art. When he’s not chopping large mortises in reclaimed chestnut beams, you’ll find him enjoying his new favorite hobby, playing with Legos in front of the fireplace with his wife and toddler.

Peter Gedrys (“A Pro’s Secret to a Perfect Finish”) spent the past year restoring and gilding a dozen pieces of ornate, high-style French furniture from the historic Kings Theatre in Brooklyn. The theater opened in 1929 at the end of the Roaring ’20s, but closed in 1977 and sat neglected for 36 years. Luckily the furniture was saved so that when the theater was rescued by the city of New York in 2013, both it and the furniture could be restored to their original grandeur. “It was a dream job,” he said.



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

NEW FACES AT FINE WOODWORKING

I'm very happy to announce that I've filled our editorial and web producer positions.

Our new associate editor, **Anissa Kapsales**, is a familiar face, as she was on staff from 2006 to 2011. Anissa's solid editorial and photography experience, along with her strong woodworking knowledge, made her an easy choice for the job.

Anissa graduated from one of the most prestigious woodworking schools in the country—the College of the Redwoods in California—and exudes a passion for the craft that's reflected in what she builds and the content she's created for *Fine Woodworking*, in print and online. During her previous tenure she helped us discover a bumper crop of new, young woodworkers eager

to share their ways of working and help us expand the magazine's furniture aesthetic. She started in November and is already hard at work developing maps to the future furniture-making stars.



Ben Strano is our new web producer. Ben grew up a few miles from our offices. As a youngster, he became engrossed in music, a passion that brought him to the Berklee College of Music in Boston, where he received a degree in music production and

engineering. Soon after graduating, he began a recording career in Nashville.

After discovering a career, he discovered love, and got married. That relationship led to a home purchase, which led to home renovations, which led to woodworking.

While expanding his woodworking and home-building skills, Ben also expanded his job skills, taking on video and audio projects for Lost Art Press, among others. He dove into web production and the social media landscape, connecting with all manner of woodworkers young and old.

Ben started right after the New Year, and has hit the ground running while waiting for his shop to get moved up north. I'm sure he'll be a familiar face to all very soon.



Where are the apprenticeships?

I am trying to crosscut (first and last pun I promise) my way into the woodworking and furniture-building crafts. I have been working with wood since I was 4 years old. In the last two years, I have attempted to turn this passion into a career. I have failed, but not faltered. My resolve is still strong. Many reasons have contributed to my failure: lack of start-up money, lack of client base, lack of business experience, etc.

Historically, the United States has been necessarily opposed to apprenticeships. A capital-driven economy, rapid economic growth, and an influx of skilled immigrant labor have all contributed to the waning apprenticeships. It was unjustifiable to train someone from scratch when they would anxiously leave for their own business endeavors once the requisite skills, not mastery, were achieved. Let us not forget the skilled immigrant laborers who would work for pennies on the dollar and required little to no training. The language barrier has never been much of a barrier when it comes to a form of indentured servitude. It is understandable that apprenticeships were not strong in the past.

We are now facing different circumstances. We have no influx of skilled labor, and starting a new business is not as easy as moving to the next town where there is no furniture maker.

Schools are certainly an option for some. They are fantastic for constructing the foundations on which mastery can be built. However, only a few can leave a school with a mastery of the craft. After all, we are not all Sam Maloofs, who, by the way, did not attend a woodworking school.

Would you be willing to write an article encouraging fine woodworkers to take on apprentices or possibly a how-to guide for those of us flailing about the Internet with no road map?

Please be our resource and inspire change.

—BRIAN DEER, Houston, Texas

—Tom McKenna, editor

Editor replies: We already know of some veteran furniture makers taking on apprentices. It's a great way for the

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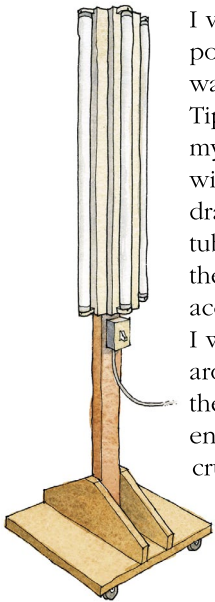
maker to get help in the shop and for the apprentice to gain woodworking wisdom. In most cases, the apprentice simply made a call or sent an email to the woodworker. Perhaps your letter will encourage others to take the chance. Meanwhile, we'll look at the article possibilities.

Bathroom humor

My wife and I recently met my cousin for lunch. The conversation got on to the subject of funerals and how expensive they are, etc. I mentioned that if I have enough warning, I'm going to build my own coffin and save my family thousands. My wife's immediate reply? "Can you finish the bathroom first?"

—MIKE NOLIN, West Greenwich, R.I.

LEDs for lighting



I very much liked the light pole from Denny King that was just awarded the Best Tip in *FWW* #250. However, my enthusiasm was mixed with horror when I saw the drawings of the naked light tubes. In my workshop, the tubes would be accidentally crushed while I would maneuver material around, or I'd push over the trolley. And I hate the environmental impact from crushed tubes.

Brilliant as Mr. King's idea is, I would highly recommend using LEDs.

They are getting cheaper and more powerful by the day. And best of all, they are much safer, take a beating, and last infinitely longer (while using less energy). There are lots of sources for buying complete fixtures or for DIY (which is simple).

But many thanks to Mr. King for his great idea, and I would like to add that I

will be building a low-level one as well for when I crawl around underneath my car for safety inspections and possible repairs. Mr. King should receive the Best Tip Award from *Car and Driver* as well!

—STEN MÖLLER, Hemsedal, Norway

Router lift?

I got a big laugh out of the article about the Dowelmax Router Lift as shown on p. 18 in the December 2015 issue of *Fine Woodworking*. Why a reputable magazine such as yours would print an article about the Dowelmax Router Lift and have the nerve to call that a router lift is beyond me. I have a router table with a lift top and the only reason I lift it is to clean around my router and my true JessEm Router Lift.

For those who do not have a real router lift, the lift top should be called an option to a router table to ease changing bits,



speeds, and adjusting the router height, as opposed to calling it a router lift.

Lift-top router tables have been around for years and are not considered router lifts.

—KEN BROGLIN, San Jose, Calif.

Editor replies: We labored over this issue. In the end we decided to use the

manufacturer's description of the product while accurately describing its purpose.

Another method of flattening a big slab

The article about working with big slabs in the February issue ("Discover the Beauty of Big Slabs," *FWW* #252) was



informative

but a bit too late. Recently, I was working with a couple slabs of oak measuring approximately 2½ in. thick by 30 in. wide by 6 ft. long.

I pondered how to flatten the cupped, bowed, and twisted slabs. In the end I decided to purchase an electric plane. Having never worked with this piece of equipment before, a little education was required. Soon, however, having to remove as much as ¼ in. of thickness, I was on my way, making thin passes. It did take a while, but the slabs came out "fairly" flat.

—EDWARD JASEK, Austin, Texas

Shopmade thickness sander

In the latest *Tools & Shops* issue (#251, Looking Back), Tom McKenna recalls a few manmade machines that appeared in the magazine. One machine in particular brings back memories: the thickness sander that originally appeared in issue #58. I actually made a sander like this, but of metal. One of my friends, a machinist, helped me.

—NORM PFEIFER, Victoria, Canada

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

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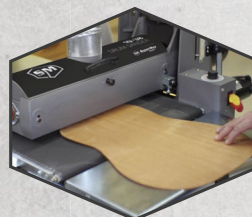
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Best Tip

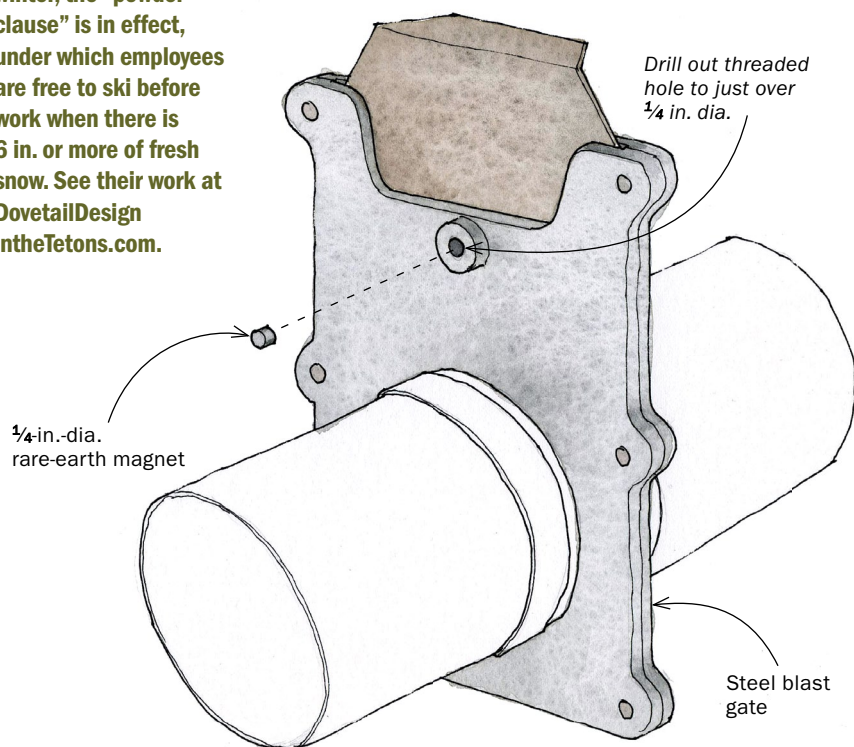


Andy Olerud works with his wife and daughter in Idaho's Teton Valley building custom projects for clients using wood, metal, and other media. In the winter, the "powder clause" is in effect, under which employees are free to ski before work when there is 6 in. or more of fresh snow. See their work at DovetailDesign.intheTetons.com.

Magnetic catch for a blast gate

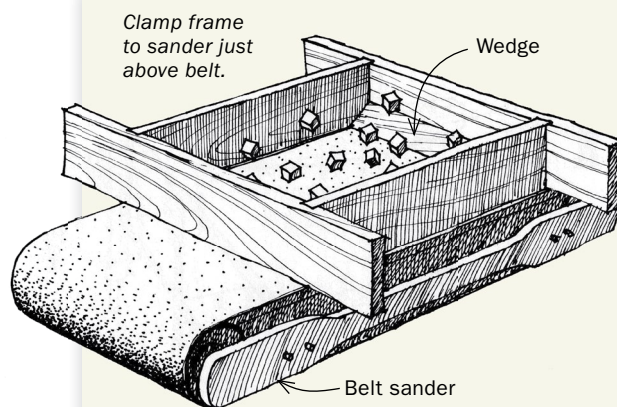
In *FWW* #248, Dean Hedstrom suggested using a ball-nose plunger to hold a dust-collection blast gate open or closed without having to loosen and tighten the locking knob. My variation is to drill out the threaded hole for the knob to just over $\frac{1}{4}$ in., then drop a $\frac{1}{4}$ -in.-dia. rare-earth magnet into the hole. I find that one standard magnet is strong enough to hold the gate in any position, but you could put one on each side of the gate or use a longer magnet if necessary. Rare-earth magnets are widely available online.

—ANDY OLERUD, Driggs, Idaho



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 12-volt drill/driver kit from DeWalt.



Making little wooden balls

Faced with having to reproduce a number of $\frac{1}{2}$ -in.-dia. wooden balls (to replace missing ornamentation on an old fireplace), I discovered a virtually painless procedure using a large belt sander. Build a box frame, open on the bottom, and clamp it to the stationary part of the sander so it sits just off the belt. For $\frac{1}{2}$ -in.-dia. balls, cut $\frac{1}{2}$ -in. cubes and toss them in the box frame. Put a cover on the box (Plexiglas is best) and turn on the sander. The sanding belt will throw the cubes around the frame like dice on a game table, knocking off their corners and edges until they're perfect spheres.

If the cubes don't tumble about but rather line up neatly against the far wall of the frame, glue a wedge there. If this doesn't work, you could vary the number of cubes, presand the corners, or throw in a few ball bearings to keep the cubes tumbling. Using this method, I produced a dozen or so perfectly shaped balls in an hour's sanding time. Had I shaped the balls by hand it would have taken much longer and the result would have been less uniform. Perhaps laziness really is the mother of invention.

—CHARLES REED, Washington, D.C.

Editor's note: Starting with rectangular blocks you can use Reed's technique to produce oval shapes.

CELEBRATING
40
YEARS

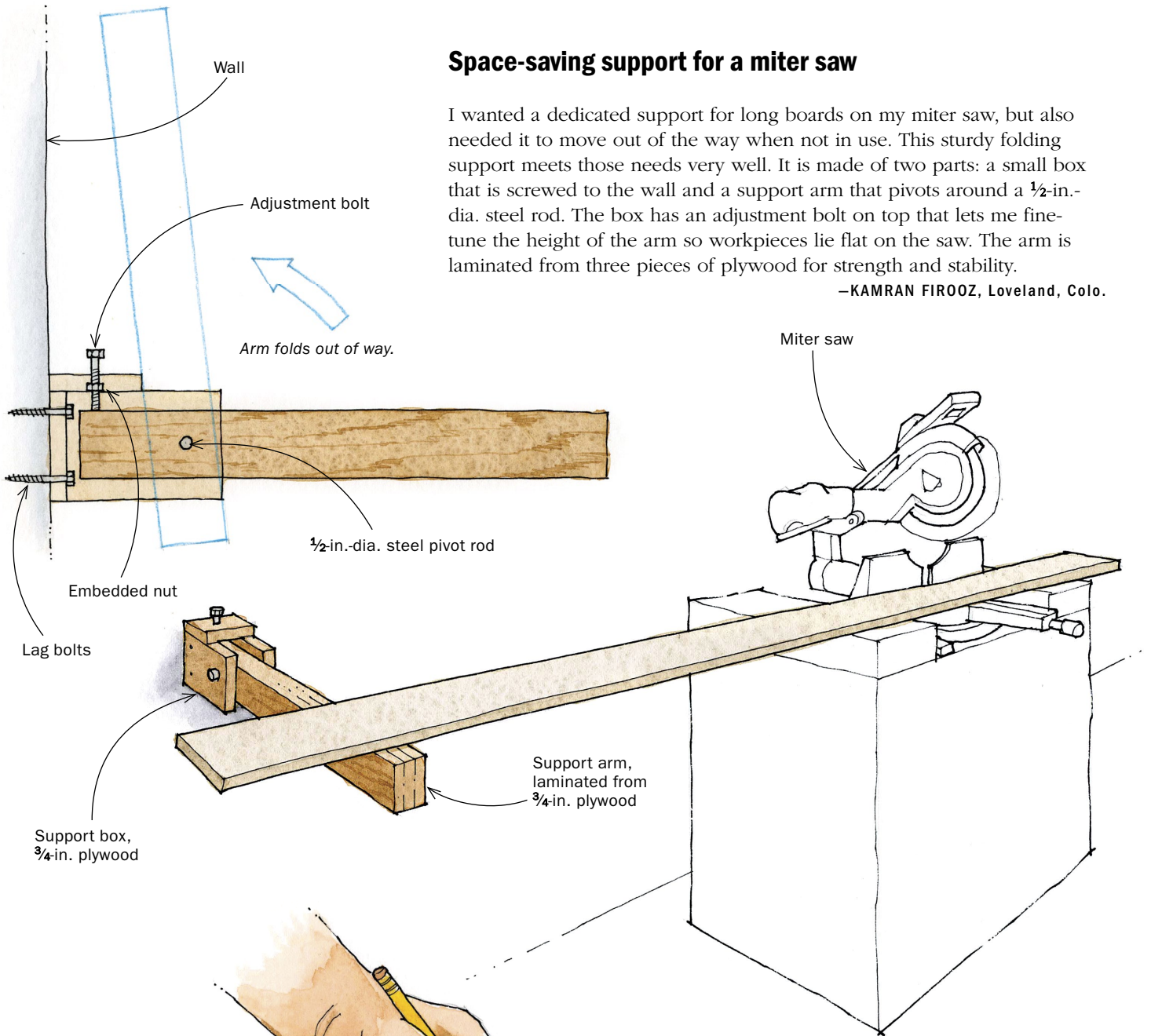
Classic Tip

To mark *FWW*'s 40th anniversary year, we are presenting some classic Methods of Work tips. This tried-and-true tip is from *FWW* #23.

Space-saving support for a miter saw

I wanted a dedicated support for long boards on my miter saw, but also needed it to move out of the way when not in use. This sturdy folding support meets those needs very well. It is made of two parts: a small box that is screwed to the wall and a support arm that pivots around a $\frac{1}{2}$ -in.-dia. steel rod. The box has an adjustment bolt on top that lets me fine-tune the height of the arm so workpieces lie flat on the saw. The arm is laminated from three pieces of plywood for strength and stability.

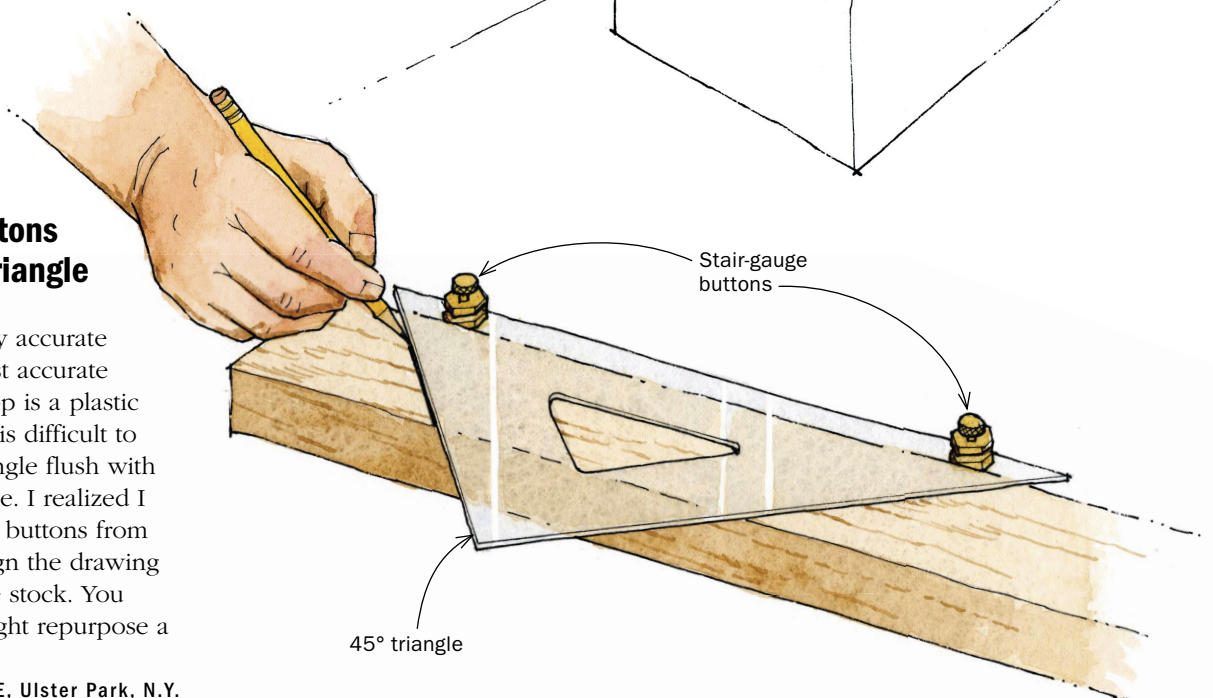
—KAMRAN FIROOZ, Loveland, Colo.



Use stair-gauge buttons to align a drawing triangle

I needed to lay out a very accurate 45° cut recently. The most accurate 45° layout tool in my shop is a plastic architect's triangle, but it is difficult to keep the base of the triangle flush with the edge of the workpiece. I realized I could use the stair-gauge buttons from my framing square to align the drawing triangle accurately on the stock. You never know how you might repurpose a tool you already have.

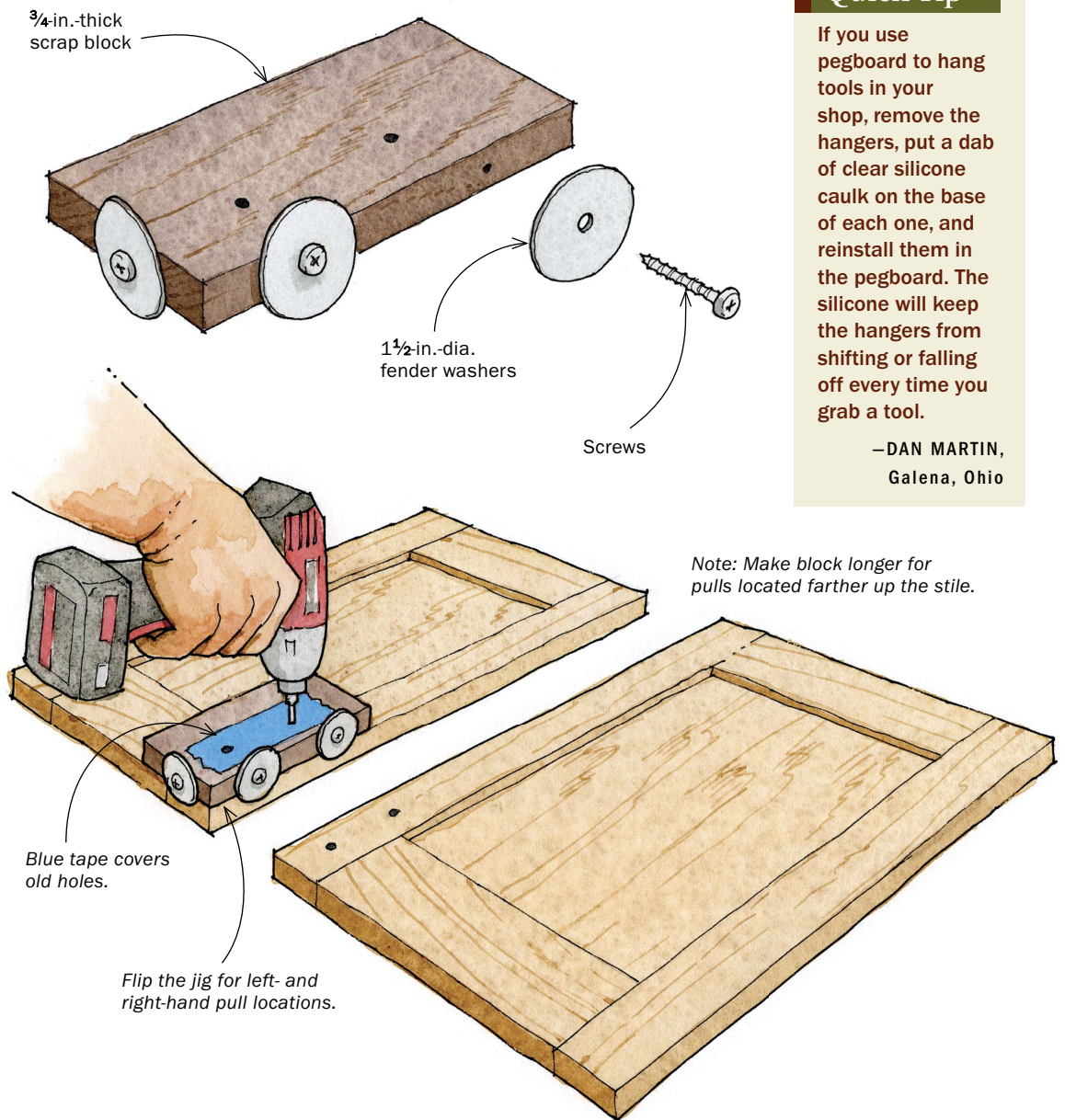
—ROB HARE, Ulster Park, N.Y.



Simple jig lines up cabinet door pulls

Cabinet door pulls can be difficult to install in line across a number of doors. This simple drilling jig, made from a scrap block and three fender washers, guarantees perfect results. Carefully lay out the location of the holes on the block, treating it like a corner of the actual door, and drill the holes on the drill press for accuracy. Then screw on three fender washers to register the jig on the door. These wide washers make the jig two-sided, so it can be flipped over for the right- and left-hand placement of pulls on adjacent doors. My jig has provided reliable service over several projects and now has a number of holes in it. When I use it on a new project I just cover the old holes with painter's tape so that I don't put my drill in the wrong one.

—BARRY THALHEIMER,
Prince Albert, Sask., Canada



Quick Tip

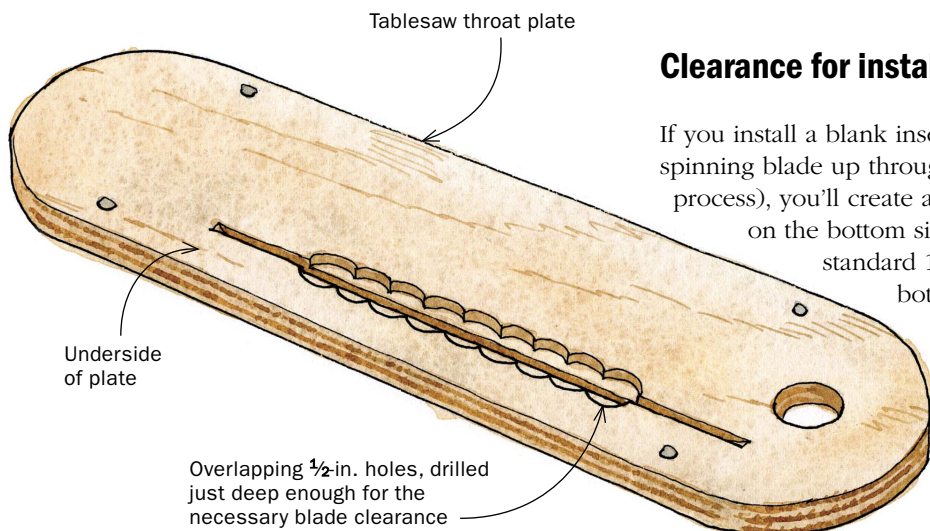
If you use pegboard to hang tools in your shop, remove the hangers, put a dab of clear silicone caulk on the base of each one, and reinstall them in the pegboard. The silicone will keep the hangers from shifting or falling off every time you grab a tool.

—DAN MARTIN,
Galena, Ohio

Clearance for installing a tablesaw throat plate

If you install a blank insert in your tablesaw's blade opening, and bring the spinning blade up through it (making sure to hold down the insert in the process), you'll create a zero-clearance slot that will prevent splintering on the bottom side of cuts. However, on some tablesaws, a standard 10-in. blade can't be lowered enough to clear the bottom of a blank insert. To create the small bit of additional clearance needed, without weakening the plate, I drill a series of overlapping counterbores, using a 1/2-in.-dia. Forstner bit. This is easier than setting up a router cut, and better than ripping a shallow slot down the entire plate.

—JOHN CUSIMANO, Lansdale, Pa



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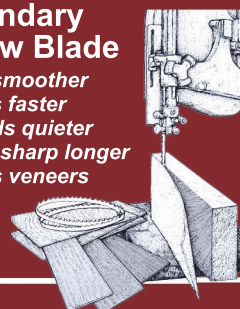


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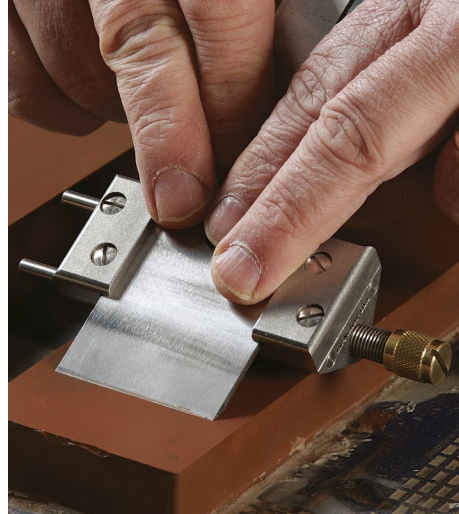
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■ HAND TOOLS

Honing guide is a cut above

MY FAVORITE HONING GUIDE has always been a generic side-clamping guide available from just about any woodworking catalog. With a little tune-up, these guides work well enough, and because they're inexpensive and easy to find, I can replace them as needed if they rust or seize up. At first glance, Lie-Nielsen's new honing guide looked a lot like my generic guide, and I wondered if there was any reason to justify the extra cash. Turns out there are a few really good reasons.

First off, the workmanship is fantastic. The stainless-steel and bronze construction will guarantee that rust won't be an issue. And with its precise machining, the guide is ready to use right out of the box—no tune-up required. The dovetailed jaws hold a plane iron securely and the finely threaded adjustment knob tightens with just hand pressure (though I still use a screwdriver out of habit). Additional jaws are available for specialty blades as well. The angled jaws are useful for sharpening a skewed block-plane blade, and the longer jaws handle short spokeshave blades. In addition, there are jaws for narrow chisels and mortise chisels. All the jaws are indexed with pins for precise alignment and the captured



Side clamp, perfected. Every part of Lie-Nielsen's new honing guide is perfectly machined from stainless steel or brass, which means the guide won't rust. The jaws grip the blade so that it doesn't shift or move during use.



Honing guide by Lie-Nielsen

\$125

\$25 to \$35 for each additional jaw

screws mean you'll never lose one in a pile of sawdust.

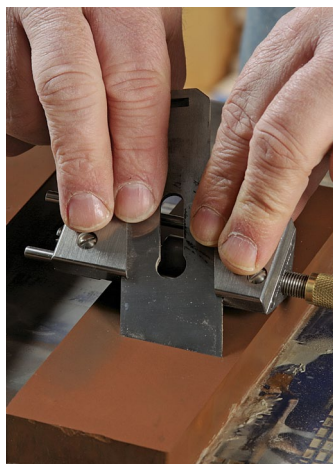
While Lie-Nielsen designed the guide to handle all of their chisels, it had a hard time clamping some of my oddball chisels securely. That said, it is a first-rate honing guide and my new favorite for plane irons and spokeshave blades.

—Michael Pekovich is FWW's executive art director.

QUICK-CHANGE JAWS FOR SPECIALTY BLADES



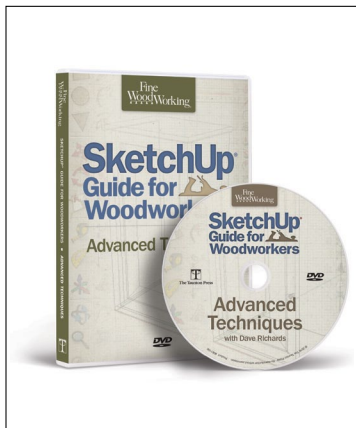
The right angle for skew blades. The tricky thing about skew blades is that the cutting edge must be ground to a precise angle; otherwise, you'll never get the plane to work properly. With angled jaws attached, the Lie-Nielsen honing guide secures a skew blade at exactly the right angle for honing.



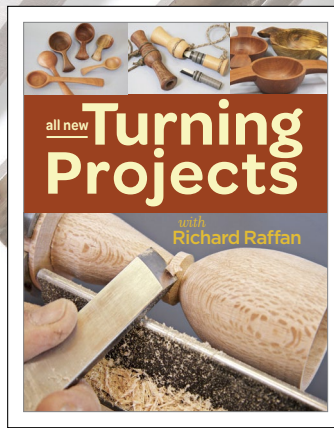
Long jaws for short blades. Switch over to the long jaws, which grab a spokeshave blade securely, and the job is no more difficult than sharpening a bench plane blade.

See what the publisher of ***Fine Woodworking*** has in store

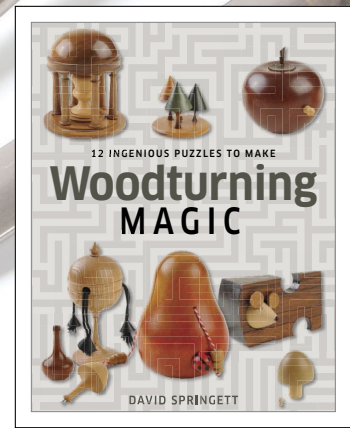
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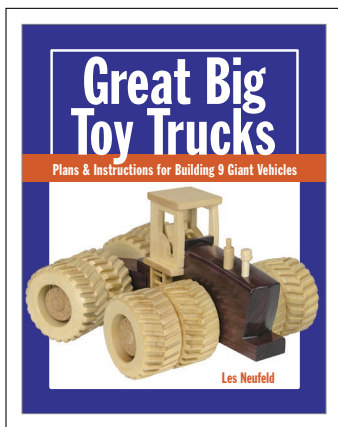
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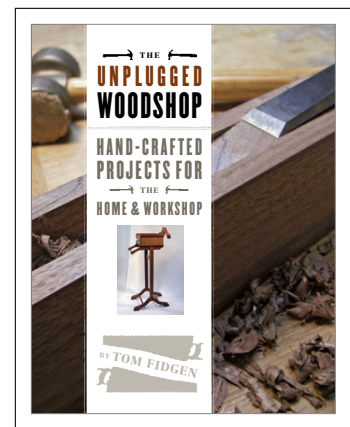
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■ ACCESSORIES

Big bit has the teeth for flattening slabs

I WAS EXCITED to fire up Infinity's new Mega Dado & Planer bit in my router jig for surfacing slabs (*FWW* #222, p. 44). It looked mean and sharp, like I could spin it in my fingers and knock down some high spots. Surfacing slabs can be tedious, so any savings in time or elbow grease is highly prized.

Launching the bit upon a 5x7 slab of old-growth redwood burl, I was immediately gratified when it cut through the burl like it was a block of soap. I increased the depth gradually, and found that in this softwood I could get to a ½-in. depth of cut using slow, deliberate force to move the router, but it felt pretty intense and my shopwise Spidey-sense told me to back off the depth to more like ⅜ in. Next it was time to step up to a slab of claro walnut, and Matt Micucci (also of the Offerman Woodshop) had

a similarly joyful experience. Because of the harder material, Matt found the sweet spot for depth of cut at ⅜ in.

This bit was fantastic. It cut with almost no tearout, even around knots and irregularities. What's more, after the two slabs were done, the bit was still sharp. I usually have to sharpen a bit after one slab, so this is a big deal.

—Nick Offerman is a furniture maker and actor in Los Angeles.

Planer bit for routers by Infinity

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Aggressive and durable. With Infinity's new planer bit in your router, you can hog off an impressive amount of wood quickly, speeding up the job of flattening a slab.

■ POWER TOOLS

Pneumatic nailer is versatile and comfortable

IF YOU'RE GOING TO HAVE ONLY ONE NAIL GUN in the shop, it ought to be an 18-gauge brad nailer. Delicate enough for small moldings, but robust enough for more demanding woodworking jobs like assembling jigs and fixtures and installing crown molding, it strikes a great balance for a furniture shop.

Senco's new FinishPro 18BMg, which fires nails ⅝ in. to 2½ in. long, is lightweight (2.8 lb.) but solidly built with a magnesium body. It's compact and comfortable in the hand, thanks to a textured rubber hand grip. It's easy to load and has a depth adjustment and a swivel air connector. Other useful features include a belt hook and an LED headlight. These are great if you install cabinetry or woodwork, like I do. When nailing face frames onto ¾-in.-thick cabinet parts, hitting dead center is critical, and the headlight helps focus on the target. The belt hook is great when working on a ladder installing

crown molding.

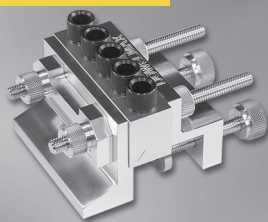
You can buy similar brad nailers for less money (I've had a half dozen over the years) but if reliability and comfort make a difference, the Senco is a smart choice.

—Tony O'Malley is a professional furniture and cabinet maker in Emmaus, Pa.



18-gauge nailer by Senco
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PIERCED AND CARVED, THESE PANELS ADD PUNCH TO ANY PIECE

BY TIMOTHY COLEMAN

I have always loved the pierce-carved screens and panels in Asian and Middle Eastern architecture and interior design. I'm fascinated with their interplay of positive and negative elements and how the panels have substance yet allow light and air to pass right through. I first explored openwork myself on the lids of some small boxes. Then I got a commission for a low cabinet and decided to see what I could do on a larger scale.

To create panels with the look of solid wood but the strength to be pierced with so much scrollsawing, I

make my own plywood.

I glue up layers of shopsawn veneer, turning the grain direction 90° in alternate layers. For the panels in this cabinet I chose a light-colored wood, English sycamore, knowing that this would create a dramatic contrast when the cutout shapes were viewed against the dark interior of the cabinet.

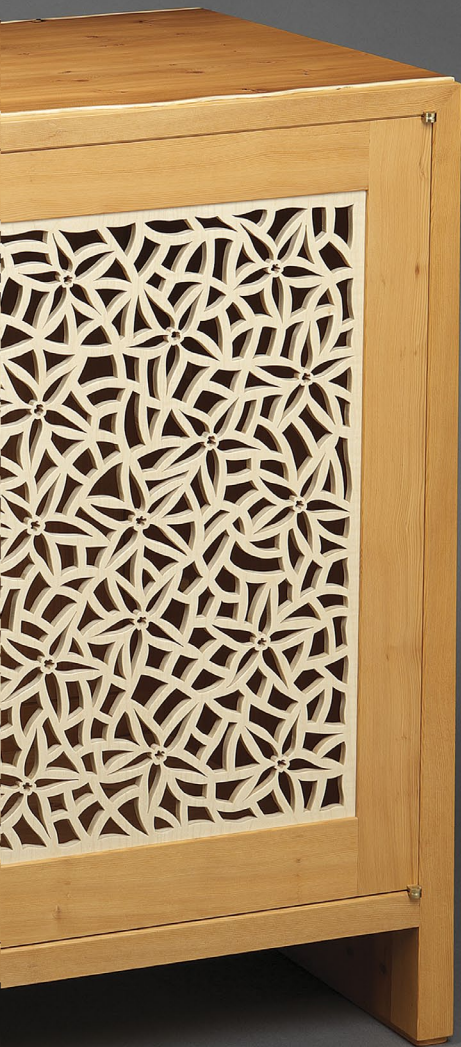
Some openwork patterns I've seen are based on repeating geometric shapes, while others are random and organic. With this new cabinet, I was interested in exploring floral motifs. Not specific plants, necessarily, but the abstract patterns that emerge when flowers, foliage, light, and shadow come together. I developed the pattern with full-size drawings, first scattering a repeated

flower design across the expanse, then filling in the remaining space with a matrix of connecting shapes. I wanted the floral elements to be recognizable but not dominant; the challenge was to create a pattern that was random and energetic without feeling chaotic. I spent many hours in the drawing phase—doing as much erasing as drawing. To better see the pattern as it emerged, I darkened the areas that

would be cut away.

I gave the cabinet itself a simple, geometric shape so the panels could shine without competition from the overall form. Digging through my piles of wood, I unearthed some lovely yew veneer. It had yew's characteristic blend of dark, scattered knots with fine grain swirling around them, a combination of wild and refined that suited this piece. The veneer had been cut from a live-edge board and retained a meandering white sapwood edge alongside the honey-colored





Patternmaker.
Coleman made full-size sample boards like this one to explore various patterns and to gauge the impact of his drawn designs.

heartwood. I arranged the veneer so it cascades across the top and down the sides of the cabinet, which put a light line of sapwood at the front that helps define the edge and frame the doors. □

Timothy Coleman builds custom furniture in Shelburne, Mass.



Bedside Table

This small project features stout joinery and angles that will challenge your skills

BY GARRETT HACK

I love building small tables. They are not only fun, quick to make, and useful (or saleable), but they're also perfect for trying new designs and techniques. In my teaching, I have found they are ideal projects to improve hand-tool and joinery skills.

This sweet little table is loaded with lessons and challenges. It's also a great showcase for creating strong joinery in delicate parts. It features splayed, tapered legs, slightly angled joints, and two asymmetric drawers that fit not-exactly-square pockets. I'll show you how to build this piece, and give you tips on how to deal with angles.

Taper and mortise the legs first

The legs taper from top to bottom. Before cutting them it's a good idea to make a full-size pattern out of thin material. The pattern should show the joinery locations, as well as the foot layout.

I trace the pattern on the stock and cut the tapers on the band-saw. Then I clean up the sawmarks and refine the taper using a smoothing plane. Once I have all four legs made, I play with their arrangement to pick the best show faces. Then I mark the legs so I maintain the proper orientation while cutting the joinery.

I chose to make $\frac{5}{16}$ -in.-wide mortises for these fine legs, allowing for adequately strong tenons

yet not weakening the legs as $\frac{3}{8}$ -in.-wide mortises

could where two mortises intersect in the back leg. To maximize twisting resistance, my apron tenons are as wide as possible, nearly the entire height of the aprons. And to preserve the overall strength of the mortise, the top section is much shallower and is angled to accept a haunched section of tenon.

I cut most of the mortise on a horizontal slot-mortiser and the shallow angled section by hand with chisels. While cutting the six mortises for the aprons, I also cut the mortises for the bottom drawer rail, so that I can cut the

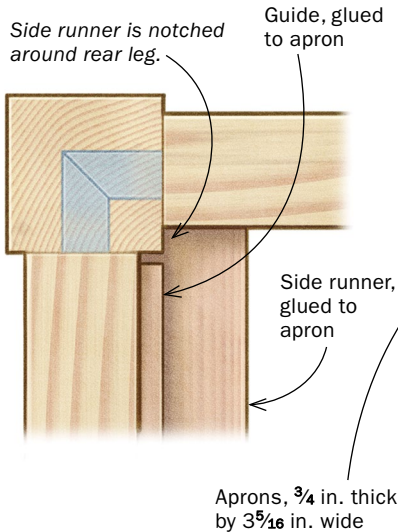




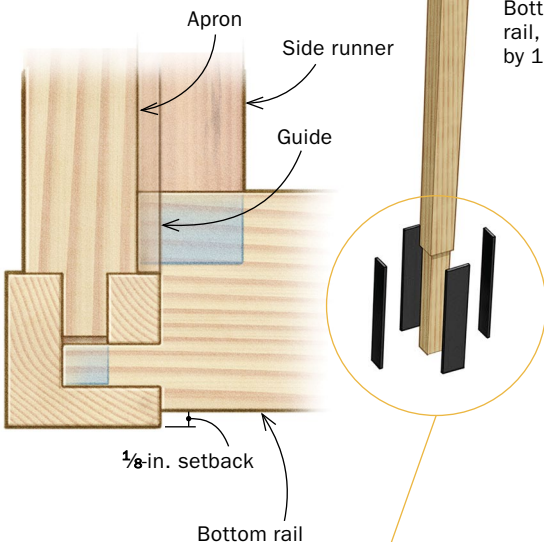
ELEGANT AESTHETICS, RUGGED CONSTRUCTION

For this small table, Hack used tight-grained Douglas fir—a soft but tough wood that ages to a beautiful reddish brown—and Brazilian tulip for the drawer faces to create a contrast of color and grain. The table has slender parts, so it relies on well-engineered, strong joints for its survival.

LEG JOINERY

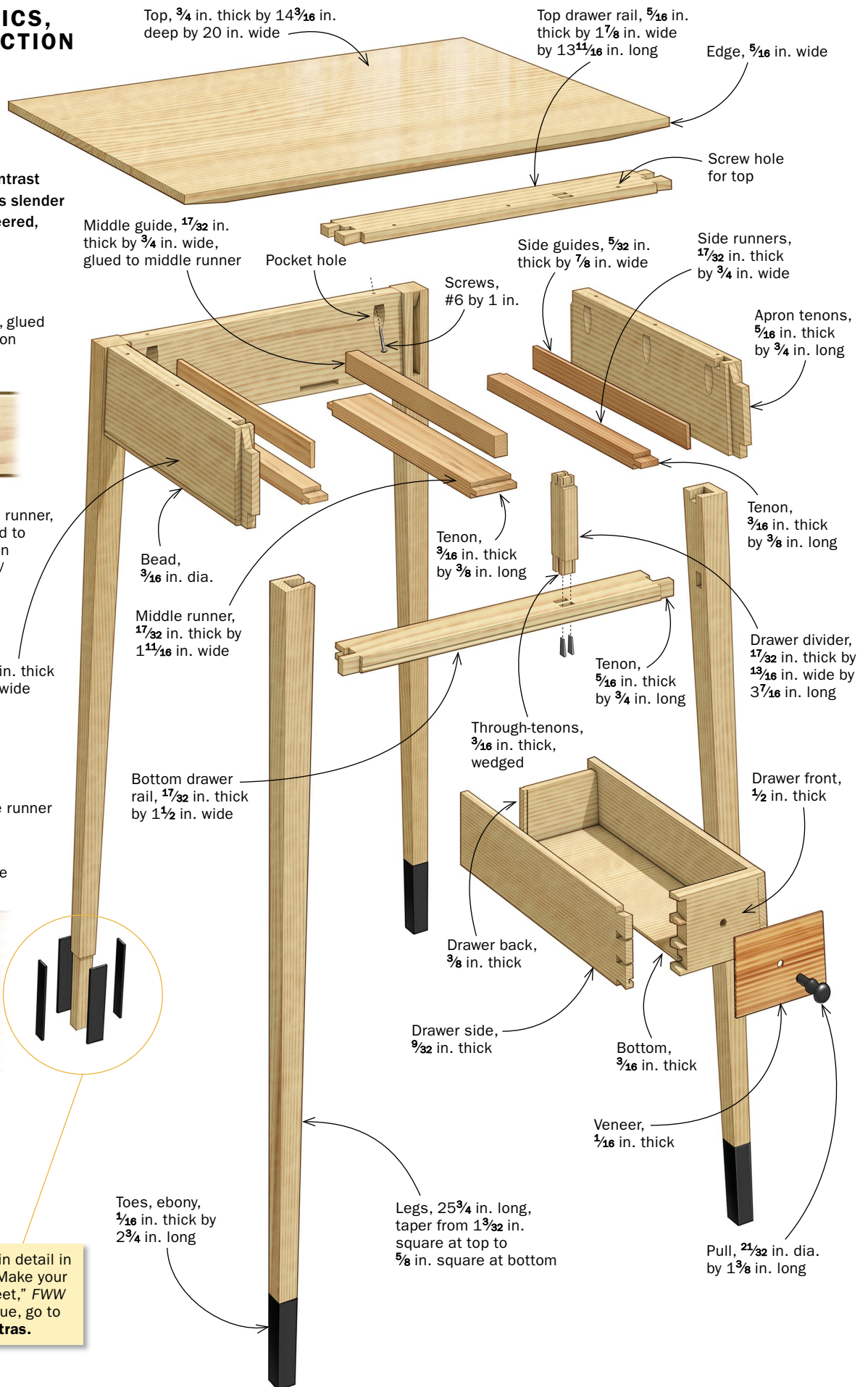


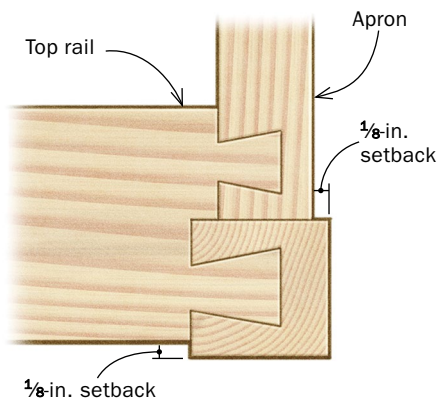
BOTTOM RAIL JOINERY



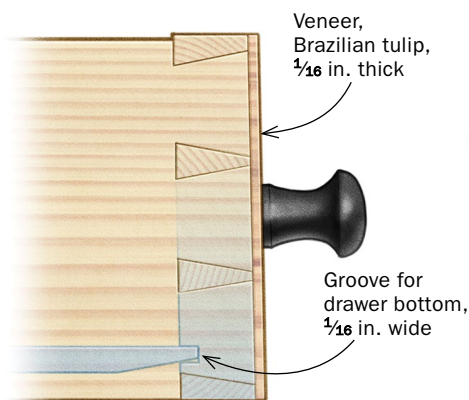
Online Extra

Hack covered this process in detail in a previous Master Class ("Make your legs stand out with inlaid feet," *FWW* #239). To learn the technique, go to FineWoodworking.com/extras.

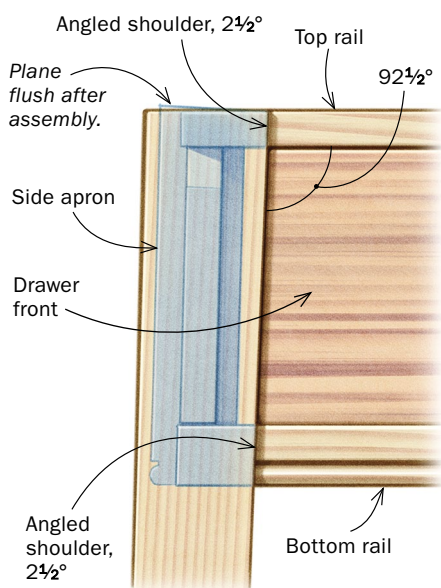




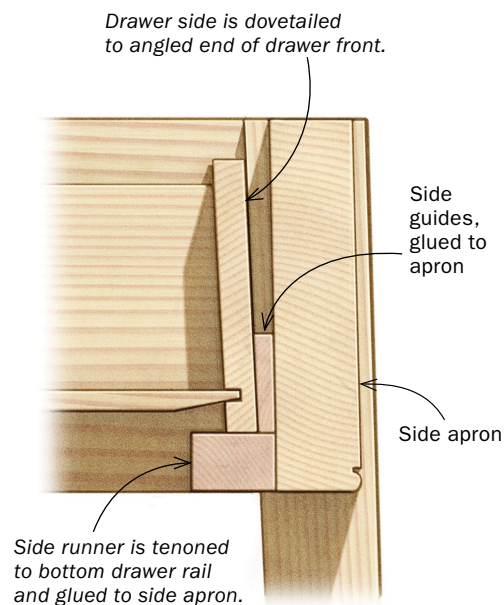
TOP RAIL JOINERY



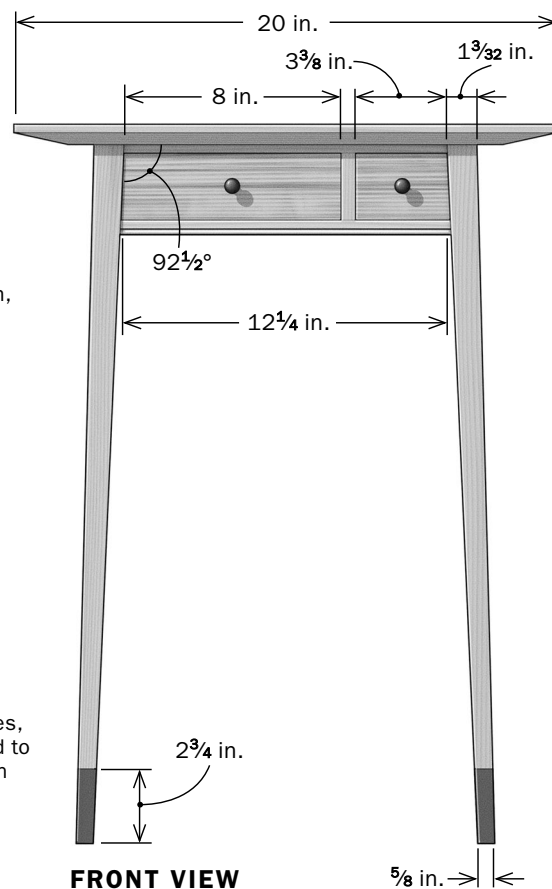
DRAWER SIDE VIEW



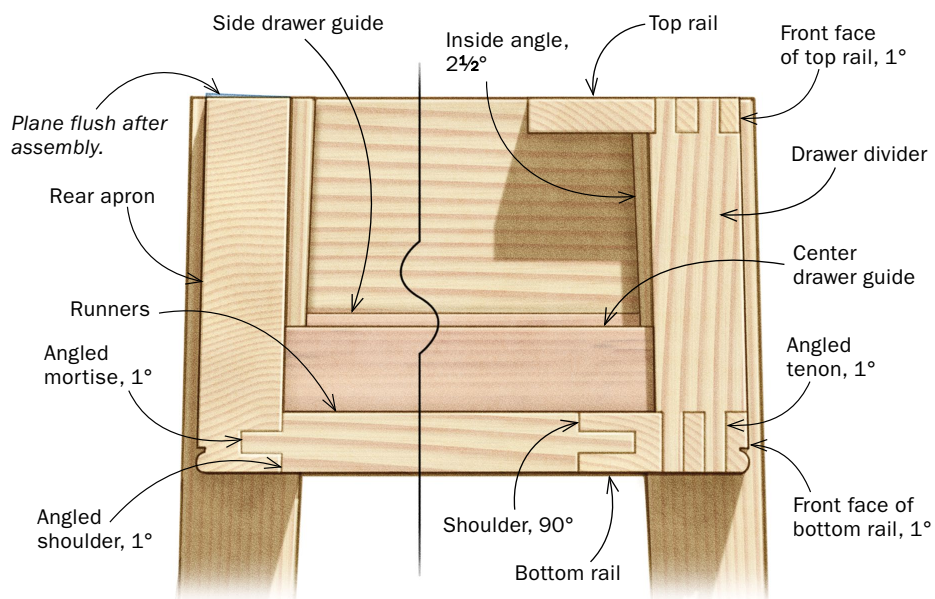
ANGLED JOINERY FRONT VIEW



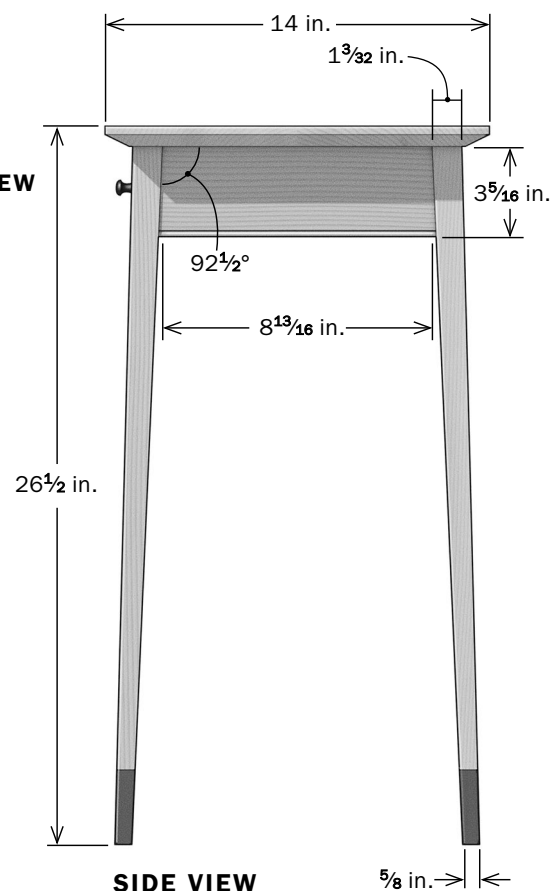
DRAWER CROSS SECTION FRONT VIEW



FRONT VIEW



CROSS SECTION SIDE VIEW



SIDE VIEW

Leg mortises are first



Make way for the tenon haunch. After cutting the mortises, Hack cuts an angled ramp at the top of the mortise to accommodate the tenon haunch. He uses a chisel (top). To guide the chisel work, he scores the ramp wall with a plane blade, registering it against the mortise wall (bottom).

rail tenons later with the same setup as the aprons.

Match aprons to the leg angle

In addition to being tapered, the legs are splayed. To create the splay, I cut the ends of the aprons at $2\frac{1}{2}^\circ$ using the miter gauge of my tablesaw. Before working on the tenons, I use a shopmade scratch stock to bead the bottom edges of the aprons and bottom drawer rail.

I cut the tenon cheeks using a tablesaw tenoning jig, and then I cut the shoulders with the aprons flat on the tablesaw. I register the angled ends of the aprons against the fence, which creates perfect angled shoulders. I cut and fit the tenon haunches using a handsaw and chisel.

Drawer rail is angled, too

With the aprons tenoned, I tenon the bottom drawer rail using a tablesaw tenoning jig. Here, the tenon is angled slightly (outside angle 1°) to ensure that the rail ends up level once installed. This rail also wraps around the back of the leg for added glue surface and stability. I fit each end to its leg by careful work with a saw and chisel. After dry-fitting the rail into the table, lay out and cut the mortises in the rail for the drawer divider. I angle the mortise walls with a chisel to accommodate the splay.

The rail also has three mortises for the drawer runners—a wide one at center and two narrower ones on the ends. After I cut the joints, I slip the runners into place and plane them flush with the top of the rail. The rear apron is also mortised for the center runner. It aligns with the mortise in the lower front rail and is the same size, but is angled 1° . The side runners get glued into the lower front rail and to the side aprons during assembly. With the apron and bottom rail joinery finished, I use a gouge and drill to cut the pocket holes for attaching the top.

Do some leg work before glue-up

Before assembly, you need to add the ebony toes at the bottom of the legs. I covered that in a previous Master Class (“Make your legs stand out with inlaid feet,” *FWW* #239). Then trim the tops of the legs. To get a clean cut at the proper angle, assemble a leg and apron, place a bevel gauge on the outside face, aligned with the top edge of the apron, and then knife a line across the leg. Using the gauge, transfer the line across the other outside face of the leg and cut to the lines with a handsaw. You’re ready for glue-up.

After assembly, complete the drawer pockets

The top drawer rail, which dovetails into the front legs and also into the side aprons, is added after this initial assembly. The double dovetails add to the drawer pocket’s strength by resisting both tension and compression forces. The shoulders of the dovetails are angled to match the leg splay.

Then cut the apron tenons



Get the splay right. The angled ends of the apron create the table's splay. They are cut at $2\frac{1}{2}^\circ$ using a miter gauge on the tablesaw (above). After cutting the tenon cheeks using a tenoning jig, Hack cuts the shoulders with the apron flat on the tablesaw and the angled end riding against an auxiliary fence that is raised to give clearance for the offcut (right).



Cut the haunch. Lay out and cut the tenon haunches. Make the straight cut from the end first, then come in at an angle.



Make the miters. The apron tenons are mitered and meet in the middle of the leg. Hack cuts the miters on the tablesaw and trims the mating tenons to fit using a block plane.



Trim the legs. The legs are left overlong for mortising, then trimmed. To get a clean cut at the proper angle, first dry-assemble a leg and apron. Place a bevel gauge on the outside face, aligned with the apron's top edge, then knife a line across the leg. Transfer the line across the other outside face. Cut to the line with a handsaw.

Assemble the base



This glue-up won't be square. After gluing the rear apron to the rear legs and setting that assembly aside to dry, glue the front legs to the bottom drawer rail (above). Use a bevel gauge to check that the splay angle is correct. Glue in the drawer runner, then glue the side aprons to the rear legs, and attach that assembly to the front legs and runner (right).



Dovetail the top rail. Lay the rail on top of the legs and use a knife to transfer the dovetails to the leg and apron.



Add the top rail and divider. First glue the divider into the lower rail, then add the top rail. Clamp across the top rail, and above and below the divider (left). Add the wedges (above) and plane them and the tenon flush.

Fit and install the drawers



Set the angle with a bevel gauge. This setting (left) will guide the work. Only one end of each drawer front gets angled. Hack marks the angle on the drawer and planes slowly up to it (above).

Before laying out the top rail joinery, plane the top of the base flush. Place the rail in position on top of the legs and knife the underside where it will fit around the leg and against the side apron. Use these lines to lay out the stepped shoulders for the two dovetails. Cut the dovetails and shoulders, reposition the rail on the legs, transfer the dovetails, and saw and chop out the sockets. Now mortise the rail for the drawer divider, angling the mortise walls, and drill and countersink the holes in the top rail for attaching the top.

Make and install the divider. Cut the divider tenons at 90° but angle the shoulders slightly for a snug fit with the angled mortises. The tenons are wedged, so cut the slots in them at this point, too. Next, glue the top rail in place and to the divider and then tap in the wedges. Finally, make and install the drawer guides.

Add the top and build the drawers

The tabletop is made from two nicely matched boards and is beveled on the underside and along the four edges. The underbevels are wider on the sides than on the back and front, which looks good. I saw the bevels by hand, following my layout lines.

The last step is building the drawers. I laminate the Brazilian tulipwood veneer to the Douglas fir drawer fronts first, then I fit each front to its opening. With a splayed table, the outside ends of the drawer pockets are not square and the top and bottom edges of the drawer fronts need a small bevel. I fit the drawer front barely snug to its opening end to end, top to bottom, and then cut the drawer joinery. Groove the drawer sides, and then cut and fit each bottom.

For a finish, I used shellac, specifically seedlac, which has a reddish hue that beautifully warms the fir and tulip. □

Contributing editor Garrett Hack teaches woodworking around the world.



Angle the top and bottom too. The top and bottom edges of the drawer fronts get a small bevel (1°). Again, use a bevel gauge to guide the plane work (left). The drawer front should fit snug in its opening (below) before you cut the joinery.



Tablesaw Blades for

Cut joinery faster and cleaner with a set of four blades



DADO

The tablesaw is one of the most useful power tools in a woodworking shop, perfect for ripping, crosscutting, and a variety of joinery tasks. I keep a high-quality 50-tooth combination blade in my tablesaw 90% of the time, which I use for most ripping and crosscutting operations. But when it comes to joinery, blades that are designed for specific operations usually do a better job because they increase your speed and accuracy. From basic rabbets and dados to finicky box joints and fine-fitting dovetails, a set of four blades makes many joints quickly and precisely.

The dedicated joinery blades I use most frequently are an 8-in. stacked dado set, a box-joint set, a specially ground flat-top rip blade, and a blade specially ground to cut dovetails. By the way, always invest in high-quality blades; I find they far outperform most cheap blades.

Here I'll show you how to take advantage of these specialty blades to increase the speed and precision of your machine-cut furniture joints.

Bob Van Dyke is director of the Connecticut Valley School of Woodworking.



FLAT-TOP RIP

Joinery

BY BOB VAN DYKE



DOVETAIL

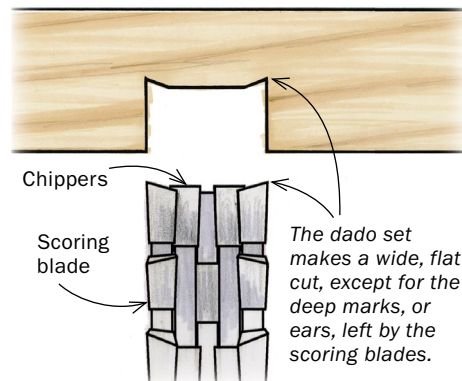


BOX-JOINT



Dado set

A dado set is a stack of blades that can be adjusted to cut wide, flat-bottomed kerfs (generally from $\frac{1}{4}$ in. to $\frac{3}{4}$ in. wide), ideal for grooves and dados. Two scoring blades go on the outside of the stack to score and cleanly cut cross-grain fibers. Flat-topped chipper blades are stacked between the scoring blades to hog out the majority of the waste. Most sets include shims to dial in slight changes in the width of cut.



Many people already own an 8-in. stacked dado blade set. It's the most versatile joinery blade, making jobs such as cutting tenons, rabbets, dados, and grooves simple and straightforward. You change the width of a cut by stacking different combinations of blades and shims.

To cut a groove or a dado, simply load the number of blades and shims needed to make a specific width, and use the rip fence or miter gauge to make the cut. Make sure the scoring blades are on either end, with the high point of the angled teeth on the outside (see above).

To cut a rabbet, use a sacrificial fence and bury the blade in it (I use my L-fence, covered in *FWW* #237). The width and height of the exposed section of blade determines the rabbet size. After dialing in the cut, run the board against the fence to create the rabbet.

Cutting tenons is quick and straightforward with this blade. With the dado set sized narrower than the tenon's length, use an accurate miter gauge or a push block to guide the workpiece and use the rip fence as a stop to set the length of the tenon. The narrower dado set doesn't have to be buried in the fence, and the smaller cuts are more accurate. While this is a very direct method and I use it frequently, inconsistencies in tenon thickness are common. The easiest way around this is to set the saw to cut the tenon just a little fat and then fit each one with a shoulder plane.



Easy grooves and dados. To cut grooves and dados, stack the blades and set the depth of cut.



Rabbets, too. To cut rabbets, clamp a sacrificial fence to the rip fence and position it over the blade. Set the depth of cut and run the stock against the fence.

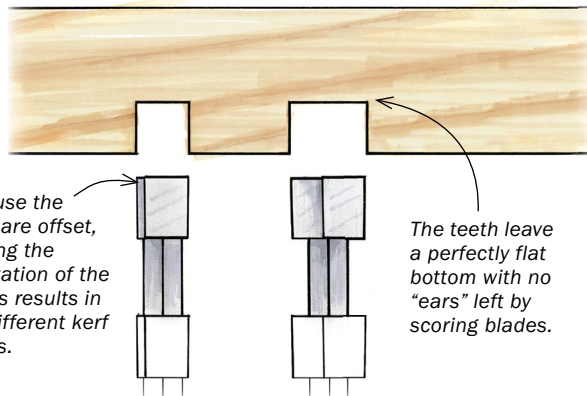


Tenons made simple. Cutting tenons with a dado set is fast and easy. Use a miter gauge to hold the workpiece and the rip fence to set the tenon's length. A few passes on each cheek will produce tenons ready to be fitted by hand with a shoulder plane.



Box-joint set

The box-joint set includes two 8-in.-dia. blades that have offset, flat-topped teeth that cut wide, flat-bottomed kerfs. You can buy a set that cuts a $\frac{3}{16}$ -in. and $\frac{5}{16}$ -in. kerf or one that cuts a $\frac{1}{4}$ -in. and $\frac{3}{8}$ -in. kerf.



Because the teeth are offset, altering the orientation of the blades results in two different kerf widths.

The teeth leave a perfectly flat bottom with no "ears" left by scoring blades.

A box-joint blade set is similar to the dado set, but has just two blades. It's used for cutting box joints, also known as finger joints. The blades have offset teeth so that when they are stacked interlocking, they cut a narrower kerf and when their order is reversed on the arbor, the cut is wider. Box-joint sets are designed to cut a perfectly flat bottom, so the joint fits together with no gaps visible along the baseline.

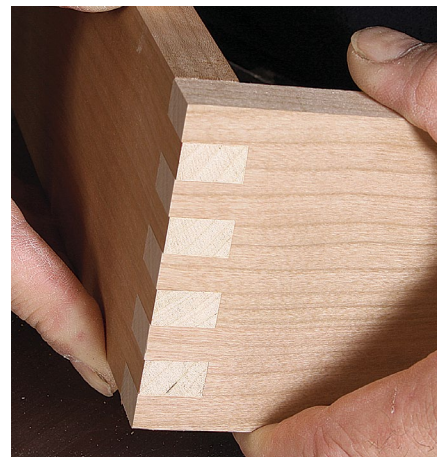
To cut box joints you must hold the stock vertically in a dedicated jig, where an indexing pin sized to the exact width of the kerf registers how much the stock is moved to create the fingers. The position of the pin controls the fit of the joint.

I rarely make box joints, but the box-joint set is great for other joinery applications as well. If the bottom of a groove or dado is exposed, the flat surface of this blade allows through-dadoes and grooves to fit the mating portions of the joint perfectly.

Also, in cases where joinery is visible, such as through-tenons and bridle joints, the grooves left by the scoring teeth of a dado blade will noticeably affect the appearance of the joint. In these cases, I use a box-joint blade to get tenons that are perfectly flat and fit into the mortise with no gaps.



Box-joint basics. A jig holds the workpiece upright while an indexing pin sized to match the blade spaces out the joint precisely.



A perfect fit. When the jig is set up correctly, the cut is flawless and the joint is tight and free of gaps.



Flat-bottomed grooves and dados. The box-joint blade is perfect for making narrow grooves and dados that have a perfectly flat bottom.



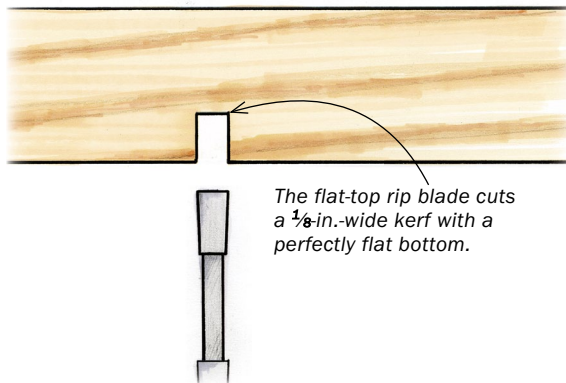
Article Extra

Watch the author demonstrate how to set up and cut a perfect box joint.



Flat-top rip blade

The flat-top rip blade has its teeth ground flat. These blades can be ground by a saw sharpener or bought new from companies such as Freud, Amana, and Forrest. They also come in heavy-duty versions for a slightly wider kerf.



The flat-top rip blade cuts a $\frac{1}{8}$ -in.-wide kerf with a perfectly flat bottom.

A specially ground flat-top rip blade leaves a perfectly flat-bottomed kerf. Most easily found in a $\frac{1}{8}$ -in. kerf size, this blade is useful when cutting narrow exposed grooves, dadoes, or rabbets, such as for fitting dividers or a bottom in a small box or cabinet.

It's an excellent choice for cutting splines in the corner of a miter joint, where the flat-bottomed kerf can form a crisp line with the spline being inserted. Here the miter joint is typically held in a fixture, which is then passed over the blade.



Flat-bottom grooves. The flat-top rip blade is perfect for making thin, perfectly squared grooves in small projects like boxes. The rabbeted portion of the box bottom fits into the flat groove of the side without gaps.

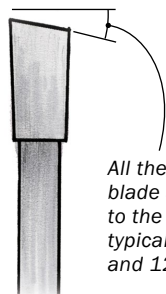


The secret to perfect splines. The spline jig (left) rides on the tablesaw fence and holds a mitered case or frame. Used in conjunction with the flat-top rip blade, it allows splines to fit all the way into the slots (above) without any gaps.

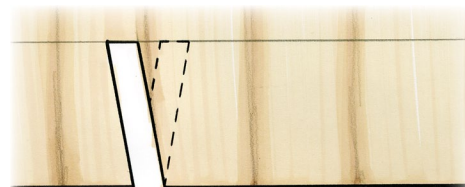


Dovetail blade

The dovetail blade is a modified rip blade that has had all the teeth ground to a set angle that matches the angle of the tails. Saw sharpeners can grind rip blades down to these specifications, and companies like Forrest sell blades that are ready to use.



All the teeth on the blade are ground to the same angle, typically between 7° and 12°.



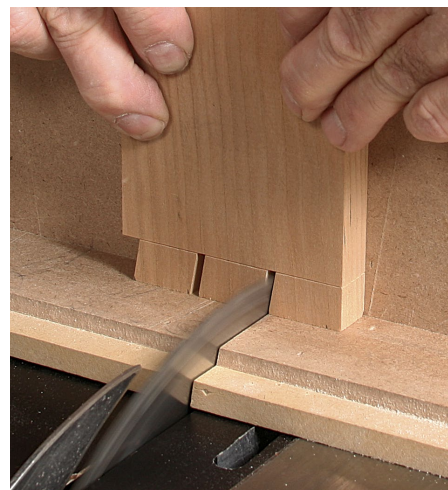
In use the blade is tilted to the same angle as the teeth, producing clean corners with just a little waste to remove in between.

A dovetail blade makes cutting dovetails on the tablesaw almost a no-brainer. Almost any blade can be reground by a good saw-sharpening service so that all the teeth are at a consistent angle, usually 7° to 12°. The tails are cut on the tablesaw with the blade tilted to match the slope of the dovetail and angled teeth. The pins are cut by hand. Because you are just cutting to a line, you can use any spacing, including asymmetrical. While you can use any blade to cut dovetails, this specially ground blade gives better results because the angled blade cuts right up to the baseline and leaves a flat, clean surface all the way into the corner with little to no cleanup required.

To use it, I set the angle of the blade to 10° and raise the blade until it just touches the baseline. If I have set the blade correctly, the top of each cut is smooth and exactly parallel to the baseline and there's very little paring to do. The real advantage of this system, aside from speed, is that each of the tails will come out dead straight and exactly square to the face of the board, which is critical before you can transfer the tails to the pin board.



Angle the blade. Because the dovetail blade's teeth are ground to match the angle of the tails (Van Dyke prefers 10°), tilting the blade to that angle results in a flat cut at the base of the tail.



One side first. A jig with an oversize fence holds the piece upright. With the tails laid out, make all the cuts on one side of the tails. For the end, make passes to remove the waste.



Article Extra

See how to cut dovetails with a specially ground blade on the tablesaw.

Flip and finish. Flip the piece edge for edge and make the cuts for the other side of the tails. All that's left after this is to chop out the small amount of waste and cut the pins to match.

A Pro's Secret to a

Use a grain filler to get a deep, lustrous look

A grain filler is a crucial step to getting a professional-quality mirror finish. Though some woodworkers try to fill grain using a slurry of sanding dust and oil or multiple coats of finish, all that repeated finish application and sanding is laborious and time-consuming. A better option is to use a commercial oil- or water-based grain filler.



Oil-based fillers

BEHLEN PORE-O-PAC GRAIN FILLER

Colors: Natural, medium walnut, mahogany
\$27/Quart

I used a paddle mixer to stir this filler to an even viscosity, then thinned it in the ratio of 3 parts filler to 1 part mineral spirits. It set up the fastest of the oil-based fillers, forcing me to work on a smaller area at a time, but the initial results were reasonably good.

OLD MASTERS GRAIN FILLER

Color: Natural (deep gray)
\$14/Quart, \$42/Gallon

This product is easily mixed by hand. To add color, it is recommended to add "1 part stain to 2 parts filler" because it needs the binder in a stain to perform as required. It was easy to work because it didn't set up very quickly, but it had a gummy texture. The initial results were reasonably good.

SHER-WOOD NATURAL FILLER

Color: Natural (light gray)
\$82/Gallon

I mixed this heavy filler to the viscosity of medium cream, roughly 3 parts filler to 1 part thinner. It filled the grain very well and had little to no shrinkage. It didn't set as fast as the Behlen and filled better than the Old Masters, so it's a good choice for an oil-based filler.

Perfect Finish

BY PETER GEDRYS

You may have admired the mirror finish on a piano or wondered how expert finishers get that dead-smooth clear coat on fine furniture. The secret isn't just in sanding or spraying, but also in an intermediate step called grain, or pore, filling. Unfortunately, this step often gets eliminated because it can be messy, a bit time-consuming, and at times troublesome. But this single process can help transform a finish from mundane to spectacular.

I'll show you when to use a grain filler, why it shouldn't be used only on tabletops, and how to get the best results with the least mess. I'll also describe the pros and cons of six commercial brands of filler.

Oil-based vs. water-based fillers

Grain fillers come in oil-based and water-based varieties. Water-based fillers don't smell as strong as oil types, tool cleanup is



Water-based fillers

AQUA COAT GRAIN FILLER

Color: Clear

\$20/Pint, \$35/Quart

This is an easy-to-use filler with low odor, but because it's a gel, removing the surplus was a bit difficult. Also, it takes a little more time to incorporate a color into the gel. It sands easily. Both this and the Crystalac can be used as clear fillers.

CRYSTALAC GRAIN FILLER

Color: Clear

\$30/Quart

This filler had low odor and dried slowly enough to make it easy to apply, but fast enough to apply a second coat fairly quickly. It was easy to sand. If you want to color a filler I'd give this a slight edge over the Aqua Coat because it was easier to incorporate color into it.

BEHLEN GRAIN FILLER

Colors: Neutral, mahogany, brown

\$22/Quart

This product filled very well, but dried extremely quickly, making it difficult to work. The surface had to be sanded to remove the final residue. I'd be cautious using this on veneered work. It's the only water-based filler used that is available in wood tones.

Prepare the filler

Most of the fillers have to be colored to either match the wood or be slightly darker.

Mix the right color. For an oil-based filler, dilute some filler with mineral spirits, then add artist's oils until you reach the desired color. For mahogany, burnt umber is a good base color tweaked by adding black or red.



easier, and they dry faster. This last feature, though, can be a double-edged sword. I like the fact that oil-based fillers take a little longer to dry because I can work on a larger area at a time. For example, when filling a mahogany desktop, I may be able to do it in three sections with oil-based as opposed to six with a faster-drying, water-based type.

Some fillers come in wood tones while others are only available as “neutral” or “natural.” Unless you want gray pores, these clear fillers must be colored. For oil-based fillers, you can use any solvent-compatible colorants such as artist's

oil paints, dry pigments, or universal tinting colors (UTCs). For water-based fillers, you can use Mixol concentrates, UTCs, or artist's acrylics.

It is best to blend the color thoroughly with a small amount of filler and mineral spirits (or water for water-based fillers) and then add that to a batch of filler; it will incorporate much more easily than if you add the color directly to the batch. If you use dry pigments, mix them in well; otherwise, you may have a pocket of unmixed pigment smeared on the surface.

If a can of filler has been sitting on a shelf for a long time, you may find that the solids have become tightly packed at the bottom. Don't throw it away; it may be perfectly viable. Use a metal paddle mixer chucked into a drill, or ask the local paint store to

Hide or enhance the grain?

You can emphasize the grain structure by making the filler slightly darker, a technique found on a lot of antiques (left section of panel). You can use a clear water-based filler to leave the wood looking unchanged, apart from the smooth finish (center). Finally, you can have the grain filler match the dyed or natural color of the finished wood to minimize the grain structure (right).





Add the color to the filler. Stir the colored concentrate into a slightly larger quantity of filler than you think you'll need. With oil-based fillers the color concentrate adds 10% to 15% by volume, with water-based, 5% to 10%.



Check your progress. To tell if you've reached the right amount or saturation of color in the filler, wipe some on a white paper plate. You want it to be pretty opaque, as in the left-hand sample.

put it in a paint shaker. After you've added any necessary color, thin the filler to the consistency of medium cream.

Sand, stain, and seal the wood first

You need a grain filler only if you want a film finish on an open-pored wood, such as a period reproduction made from walnut or mahogany, or a contemporary piece made from any open-pored wood such as white oak or ash.

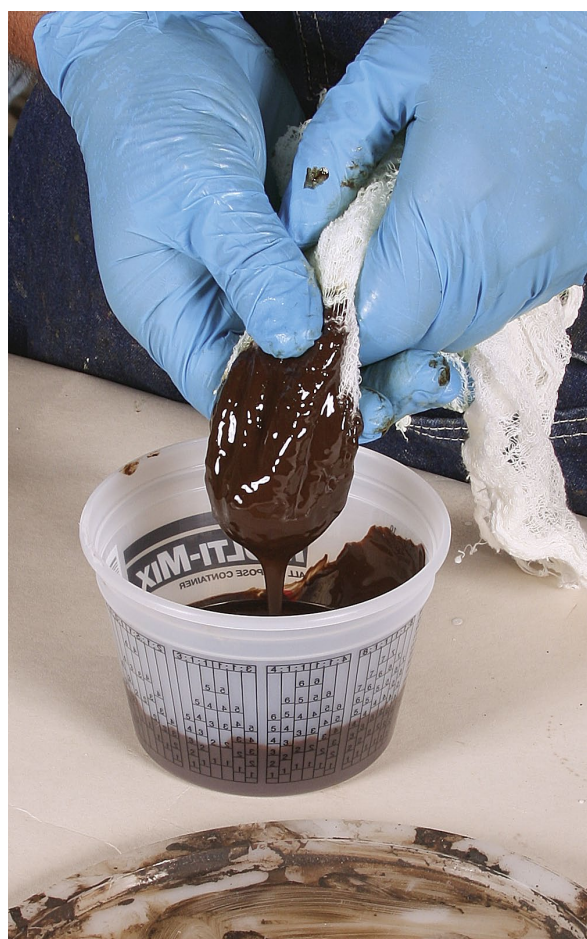
Prepare the surface as you normally would. Sand to 180 or 220 grit, and then apply dye or stain if desired. Next, instead of a full or heavy coat of clear finish, apply a thin washcoat. It seals the surface but does not distort or close off the top of the pores, which would interfere with filling them.

The washcoat should have a solids content of 7% to 15%. Two good options are a 1-lb. cut of dewaxed blond shellac, which has about 10% solids, or lightly thinned vinyl sealer, which has about 14% to 20%. I apply my washcoat with a French-polishing type of pad or even just an industrial paper towel folded flat. On a large top, the pad or towel should be wet but not soaking. Apply a thin, wet coat quickly and leave it alone. If you do need to sand, be very careful not to cut through the seal coat and especially your color coat. A safe way is to use the back of the sandpaper and do a light burnish.

Apply the filler, then remove the surplus

Apply the filler using a stiff-bristle brush. Brushes with short, thick bristles work best at forcing the filler into the grain. Be sure to clean the brush well afterward or it will harden like a rock.

After applying the filler, wait a few minutes and then remove any excess using a plastic putty knife or scraper. The filler should roll up the blade. If you're pushing liquid across the surface, give the filler a little longer to set up. Scrape away the bulk of



Consistent consistency. When you've achieved the right color, strain the filler through two layers of cheesecloth to remove lumps.

Apply and remove the filler

Both types of filler are applied in the same way, either with a brush or rubbed into the grain with your hand. Because the water-based fillers dry faster than the oil-based ones, you should work a smaller area at a time, and the final surplus may have to be sanded off.



A single coat. Wipe or brush on the thinned shellac. Resist the urge to touch up areas that absorb the finish. You are only sealing the wood, not finishing it.

the surplus, wait a few more minutes (less for water-based fillers), and then go over the surface with a white non-abrasive pad. Move the pad diagonally to the grain, first in one direction and then the opposite. Use a light touch so as not to remove any filler from the grain. Finally, go lightly with the grain to remove any remaining excess. The action is a lot like erasing chalk from a blackboard.

If you apply filler over too large an area and it is setting faster than you can remove it, wipe the surface with a cloth or paper towels wet with mineral spirits (or water for water-based fillers) and start over. This will only work if the filler hasn't fully hardened. If that happens, you will have to sand away the surplus and most likely dye and seal the surface again.

How to tell when you're done

Use a raking light to examine the surface. It should appear a little dull and have no visible removal marks. If you see crosshatching lines left by the putty knife or the pad, go over these lightly using the white pad with the grain. Don't worry if you still see a slight trace of the pores; the finish will bridge over this. If you need to fill the grain a second time, as I often do on woods with large, deep pores such as most mahoganies, wait 24 hours. Once the grain is filled and the surface is clean, let the filler rest for at least 48 hours and preferably three to four days to let all the solvents evaporate before applying a clear topcoat. If you don't, within six months there will be little bubbles in your finish. This is called "solvent pop" and the only way to fix it is to strip the finish and start over.

Apply the clear coat the same way as for unfilled wood with two precautions: Before using a water-based finish over an oil-based filler, or vice versa, first seal the filler with a 2-lb. cut of shellac. Before you use solvent lacquer, apply a coat of vinyl sealer over either type of filler. □

Peter Gedrys is a professional finisher and restorer in East Haddam, Conn.



Brush in the filler. Work the filler down into the grain using an old brush. Be careful not to cover too large an area or the filler may harden before you can remove the surplus.



Hand applied. Gedrys likes to work the filler into the wood with the heel of his gloved hand.



1

Not ready to remove. Don't try to squeegee away the surplus filler while it is still shiny and liquid. You'll just pull it out of the pores.

Work quickly. Move the squeegee at a 45° angle to the grain to scrape away the surplus but leave the grain filled. You have a narrow window from when the filler starts to set up to when it becomes too hard to work.

This beats burlap. To remove the residue missed by the squeegee, Gedrys uses a white, non-abrasive pad instead of the traditional burlap, which can scratch the wood.



2



3



4

A final wipedown. After an oil-based filler has cured for at least an hour, gently wipe the surface with a cloth dampened with mineral spirits to remove any haze of filler left on the surface.

TIPS

DEALING WITH DETAILS



Once the pad becomes loaded with filler you can use it to fill the grain on carved and curved areas.



You don't want to leave surplus filler anywhere, so use a sharpened dowel to clean out recesses and corners.

Benchtop



WHAT MATTERS MOST

When it comes to a planer, the most important evaluations are whether it makes smooth cuts with both faces of the board parallel to one another. After that, it's all about features, including dust collection.



FINISH QUALITY

The curly maple challenge. All of the planers we tested handled white oak and white pine without trouble, but only the two DeWalt machines and the Ridgid planer produced usable surfaces on curly maple.

Parallelism and snipe. A planer's job is to make two faces parallel to one another, and any machine that leaves surfaces more than 0.01 in. out of parallel is going to give you headaches. As for snipe on the ends, more than 0.01 in. is too much.



KNIFE CHANGES

Make it fast. Changing knives should be easy so that you can quickly get back to work. DeWalt embedded magnets into the handle of its wrench (above), making it a snap to lift old knives and put new ones in place.

Planers

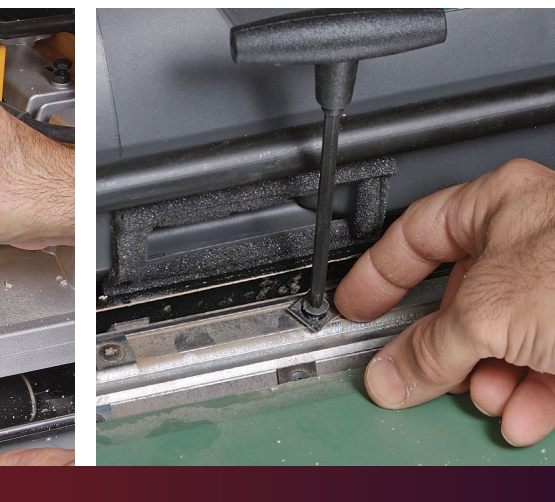


The best machines produce smooth, parallel surfaces on your lumber

BY KELLY J. DUNTON

I've had a benchtop planer in my shop for many years and it's starting to show its age. So when the editors at *Fine Woodworking* asked me to test the current crop of benchtop planers, I saw it as an opportunity to do some comparison shopping. These models handle stock 12½ in. to 13 in. wide (plenty for most furniture making) and 5 in. to 6 in. thick, so you can square up blanks for even the beefiest parts. The planers also run on a 120-volt circuit, so they can be used in any home shop.

There are a lot of benchtop planers on the market, but we limited our selection to the 11 models that have what we consider to be essential features: dust collection and indexed knives. Planers without a dust port will create a huge mess and flood the air with dust. Indexed knives have pins



Give it a twist. The insert cutters on the General International and Rikon segmented cutterheads can be turned to a fresh edge without completely removing the screw that holds them in place.



DEPTH-OF-CUT ADJUSTMENTS

Convenience is king. A depth-of-cut adjustment wheel on the side is easy to reach. Three of the machines have side-mounted wheels, but this convenience doesn't trump surface quality.



Depth stops simplify repeat milling. Stops for common thicknesses make it a snap to mill parts to the same thickness, a handy feature when you need to remake a part. All the stops tested were accurate.



DEWALT 735X

Price: \$649
Warranty: 3 years
Knives: 3
Size: 13 in.
Depth stops: 6
Snipe: 0.003 in.
Out of parallel: 0.000 in.
Dust collection: Excellent
Noise level: 102 db.
Surface quality
 White pine: Excellent
 White oak: Excellent
 Curly maple: Very good

The DeWalt 735X produced two faces perfectly parallel to one another, with surfaces far superior to what the other machines produced, thanks to its two feed speeds. At high speed, the planer works fast and leaves a smooth surface. But the slower, finish speed produces an almost glass-smooth surface. Knife changes are easy, with spacious access to the cutterhead from the top and a gib screw wrench that doubles as a magnetic lift to remove the knives. The 735X also has great dust collection, thanks to an internal blower that helps evacuate chips. The port has a 2½-in.-dia. opening, but has a built-in adapter for 4-in.-dia. hoses. My only complaint is the location of the dust port. It's on the outfeed side of the machine, and exits straight



back. If you don't pull the hose to the side, it interferes with material as it leaves the machine. The top is large and flat, so it's a great place to set material in between passes through the machine.



RIDGID R4331

Price: \$369
Warranty: 3 years
Knives: 3
Size: 13 in.
Depth stops: 8
Snipe: 0.003 in.
Out of parallel: 0.005 in.
Dust collection: Good
Noise level: 100 db.
Surface quality
 White pine: Excellent
 White oak: Excellent
 Curly maple: Good

Priced nearly \$300 less than the DeWalt 735X, the Ridgid R4331 is an excellent value. Its three-knife cutterhead left wonderfully clean surfaces on plainsawn white oak and white pine. It did not perform nearly as well on curly maple as the 735X, but it created less tearout than all but one of the other machines (the DeWalt 734 was its equal). Knife changes were quick and easy with the provided T-handle wrench. Dust collection was good, assisted by an internal fan. The 2½-in.-dia. port on the outfeed side of the machine is directed to the side, so the hose is out of the way. The planer's top is flat and provides a good surface for holding stock between passes.



that guarantee that all of the knives project the same amount and are parallel to the planer's bed. This feature takes the hassle out of knife changes, greatly speeding up the switch from old to new knives.

To test the planers, I looked at what matters most to woodworkers. I ran a wide board through each one to determine if it planed the surface parallel to the one that ran on the bed. I measured for snipe, a planer's tendency to cut a bit deeper at the leading and trailing ends of board than in the middle. I also evaluated the quality of the surface each machine produced.

My tests showed that all of the machines were suitable for woodworking, but the machines with three knives produced the best surfaces. Also, the two machines with segmented cutterheads performed about as well as those with two knives. I think this is because the cutters entered the wood straight on, just like straight knives. All the machines are loud. You'll need hearing protection when using any of them.

However, the planers were not all equal, and three were better machines than the rest. The DeWalt 735X clearly was the Best Overall. With a three-knife cutterhead and

two planing speeds, it produced nearly glass-smooth surfaces, even on curly maple. It left very little snipe and had outstanding dust collection, and the knives were dead-on parallel to the bed. Two other machines did very well, the DeWalt 734 and the Ridgid R4331. Both have three-knife cutterheads and produced very good surfaces, but with some tearout on figured woods. The Ridgid costs \$30 less than the DeWalt 734, so it's my pick for Best Value.

Kelly J. Dunton of Terryville, Conn., has a meticulous eye for all things mechanical.

CRAFTSMAN 21758

Price: \$303

Warranty: 1 year

Knives: 2

Size: 12½ in.

Depth stops: None

Snipe: 0.012 in.

Out of parallel: 0.019 in.

Dust collection: Good

Noise level: 96 db.

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

The knives on this planer were easy to access, and springs underneath the gib lift it up so that you can remove the knife without removing the screws. The 2½-in.-dia. dust port can be oriented to exit on either side of the machine. This planer's cutterhead was significantly out of parallel and the snipe was bad. The top of the machine has a single stock roller, so you can't rest boards there between passes. Because of a little tab molded into the cutterhead's housing, you cannot take off more than ¼ in. with a single pass unless your stock is narrow enough to pass through on either side of the tab. The Craftsman also is one of four planers without a gauge that indicates how much material is about to be removed.



DELTA 22-555

Price: \$339

Warranty: 5 years

Knives: 2

Size: 13 in.

Depth stops: None

Snipe: 0.006 in.

Out of parallel: 0.008 in.

Dust collection: Good

Noise level: 98 db.

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

Knife changes on this planer were easy enough, except that you need an Allen wrench to open the dust cover and gain access to the knives, and it's not the same size as the wrench used to loosen the screws that secure the knives. The 2½-in.-dia. dust port can be reversed for use on either side of the machine. Two material rollers on top of the machine aid with transferring stock from the outfeed side back to the infeed side. Finally, there is no gauge that indicates how much material you're about to remove, a convenience that three other planers also lack.



DEWALT 734

Price: \$399

Warranty: 3 years

Knives: 3

Size: 12½ in.

Depth stops: 4

Snipe: 0.002 in.

Out of parallel: 0.000 in.

Dust collection: Excellent

Noise level: 102 db.

Surface quality

White pine: Excellent

White oak: Excellent

Curly maple: Good

One of only two machines with a cutterhead perfectly parallel to its beds, the DeWalt 734 is a very good planer. Knife changes overall were straightforward, but access is difficult because you must remove a Phillips-head screw from under the dust shroud—not an easy task. The dust port on the back of the machine has a 2½-in.-dia. opening but can be hooked up to a 4-in.-dia. hose. Connected to a dust collector, it did an excellent job gathering chips. And because the port exits to the left of the machine, the hose is never in the way of exiting boards. The top of the machine is flat, making it a good place to stack boards between passes.



GENERAL INTL. 30-060HC

Price: \$700

Warranty: 3 years

Cutters: 26

Size: 13 in.

Depth stops: 8

Snipe: 0.002

Out of parallel: 0.008

Dust collection: Good

Noise level: 101 db.

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

The General International is one of two planers in the test with a segmented cutterhead (the Rikon 25-130H is the other). The 26 cutters, arranged in six rows, enter the wood straight on. Each cutter has two cutting edges, and can be rotated to get a fresh edge. However, rotating and changing out the cutters is a bit tricky because there is no cutterhead lock, so it tends to move as you loosen and tighten the screw for a cutter. A dust chute on the outfeed side of the machine has both a 2½-in. and 4-in.-dia. port, one exiting to each side. The top of the machine is large and flat, a great place to rest boards between passes.



GRIZZLY G0790

Price: \$285

Warranty: 1 year

Knives: 2

Size: 12½ in.

Depth stops: None

Snipe: 0.004 in.

Out of parallel: 0.013 in.

Dust collection: Fair

Noise level: 99 db

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

Knife changes on the Grizzly planer were tricky, because access was tight, the screws were small, and the Allen wrench provided was hard to use. The machine has a single dust port that's not a standard size, and I needed tape to connect a hose to it. Two rollers on the top of the machine make returning material to the infeed side easy, and they're stable enough that you can stack boards on them, too. The Grizzly is one of four planers that do not have a gauge indicating how much material is about to be removed on the next pass through the machine.



MAKITA 2012NB

Price: \$546

Warranty: 1 year

Knives: 2

Size: 12 in.

Depth stops:

One, but it's adjustable

Snipe: 0.003 in.

Out of parallel: 0.002 in.

Dust collection: Fair

Noise level: 98 db.

Surface quality

White pine: Very good

White oak: Very good

Curly maple: Fair

Of the planers with two-knife cutterheads, the Makita produced the best surface quality. The knives are very narrow and a bit tricky to change, but Makita provides two magnets for lifting them off the cutterhead, and these make it easier. The machine's dust port is an odd size, with an outside diameter of approximately 2⅞ in. I used an adapter to connect it to a 4-in.-dia. hose, but dust collection was only fair. Finally, a full revolution of the height-adjustment wheel moves the cutterhead ⅜ in. The other machines move ¼ in. with a complete revolution of the handle, a dimension that's much easier to work with because the most common thicknesses for furniture are in multiples of ¼ in.



RIKON 25-130H

Price: \$650

Warranty: 5 years

Cutters: 26

Size: 13 in.

Depth stops: 8

Snipe: 0.003 in.

Out of parallel: 0.001 in.

Dust collection: Good

Noise level: 99 db.

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

The Rikon 25-130H, like the General International 30-060HC, has a segmented cutterhead with 26 cutters arranged in six straight rows, that enter the wood straight on. Rotating and changing the cutters was easier on the Rikon than on the General International, because it has an automatic cutterhead lock. There is a flat top that is a good staging area for boards between runs through the machine. There are two dust ports on the back of the machine (2½ in. and 4 in. dia.), with one exiting on either side of the planer. Dust collection was good with the planer connected to a 4-in.-dia. hose and dust collector.



RIKON 25-131

Price: \$450

Warranty: 5 years

Knives: 2

Size: 13 in.

Depth stops: None

Snipe: 0.002 in.

Out of parallel: 0.008 in.

Dust collection: Good

Noise level: 98 db.

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

The Rikon 25-131 has an open top, but two material rollers make it easy to pass boards back to the infeed side, and they're stable enough for stacking. Access to the knives was difficult, requiring you to remove the dust shroud and a metal hood beneath it and making knife changes tedious. However, once you get to the knives, you don't need to pull the screws all the way out. After loosening them, the gib is pushed up by springs and the knife can be pulled out. Dust collection was good, with a port that exits to the right of the machine. You can hook up either a 4-in. or 2½-in.-dia. hose to the port. Connected to a 4-in.-dia. hose and dust collector, chip collection was good.



TRITON TPT125

Price: \$426

Warranty: 1 year

Knives: 2

Size: 12½ in.

Depth stops: None

Snipe: 0.101 in.

Out of parallel: 0.01 in.

Dust collection: Good

Noise level: 102 db.

Surface quality

White pine: Good

White oak: Good

Curly maple: Poor

Accessing the knives on the Triton for changes was not difficult, but getting the knives out was tricky, because no magnetized handles were provided to lift the knives off the cutterhead. There is a 2½-in.-dia. dust port, and chip collection was good when hooked up to a shop vacuum. The housing has an open top and just one return roller on top, making it impossible to stack boards there in between passes through the machine. Also, there is no gauge that indicates how much material you are removing in a pass, making it one of four planers that don't offer this feature.



These Puppies

Clever bench jigs
grip workpieces
of any size or shape

BY TIMOTHY COLEMAN



The gift of grab

Used in conjunction with a tail vise, bench puppies can hold any size or shape workpiece against the front of the bench. Insert one puppy in a benchtop dog hole, hold the work against it, then insert the opposite puppy in a tail vise dog hole and tighten.

EDGE-PLANING



DRAWERS

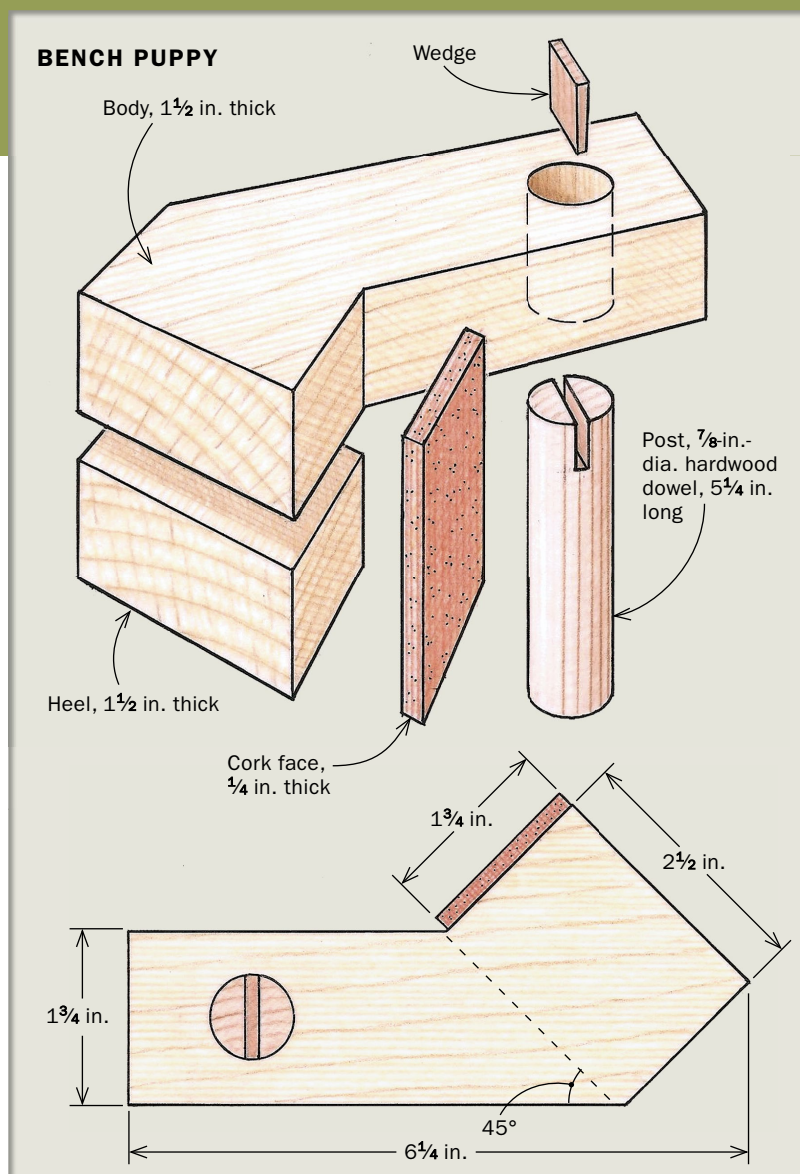
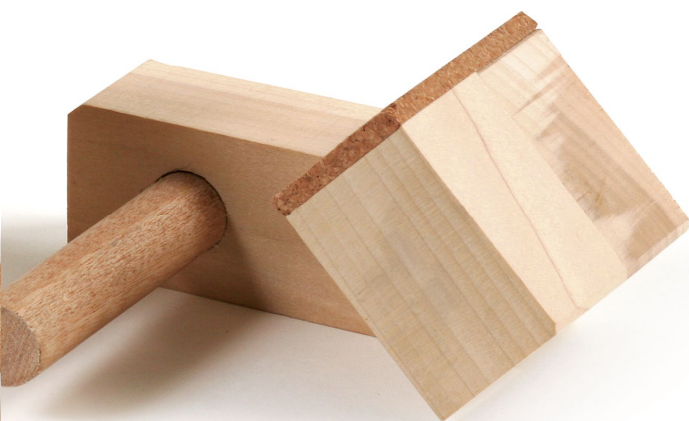


ODD SHAPES

Have Bite

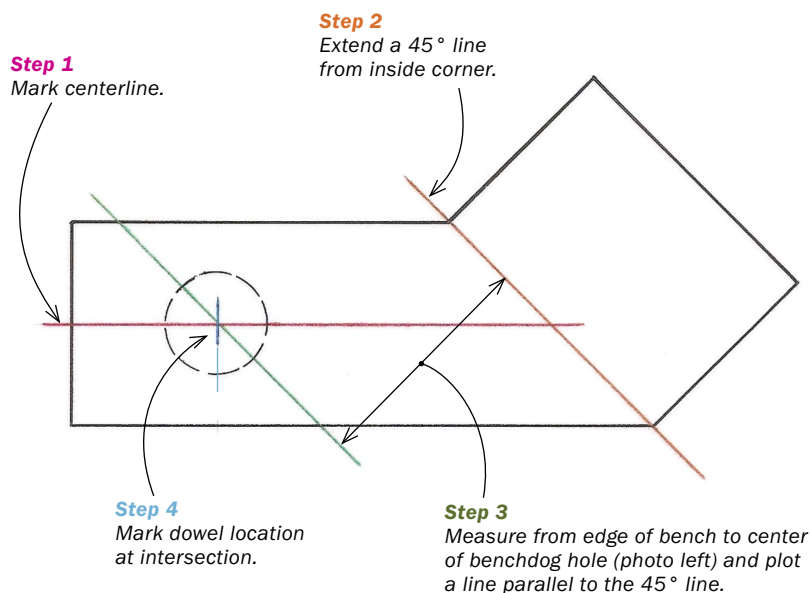
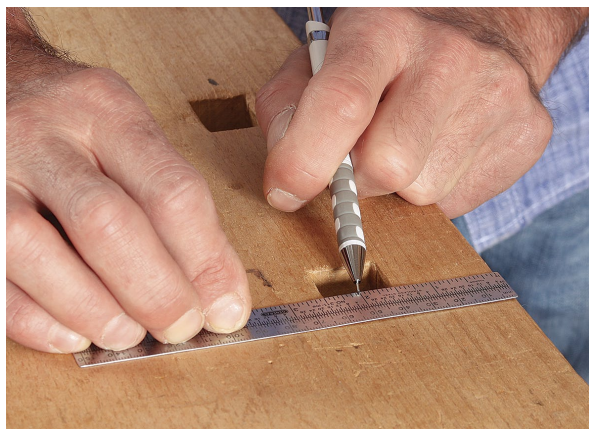
My workbench is one of the most valuable tools in my shop. It is a traditional European design and, with a few accessories, it has served me well for nearly 30 years. One accessory that I reach for often is a pair of shopmade jaws that slip into the dog holes in the benchtop and tail vise to clamp a workpiece on edge. I was introduced to these devices as a student at the College of the Redwoods, where they were affectionately known as “bench puppies.”

These helpers are about as simple as it gets when it comes to bench jigs. They’re made from scrap hardwood and a dowel, with a cork cushion glued to



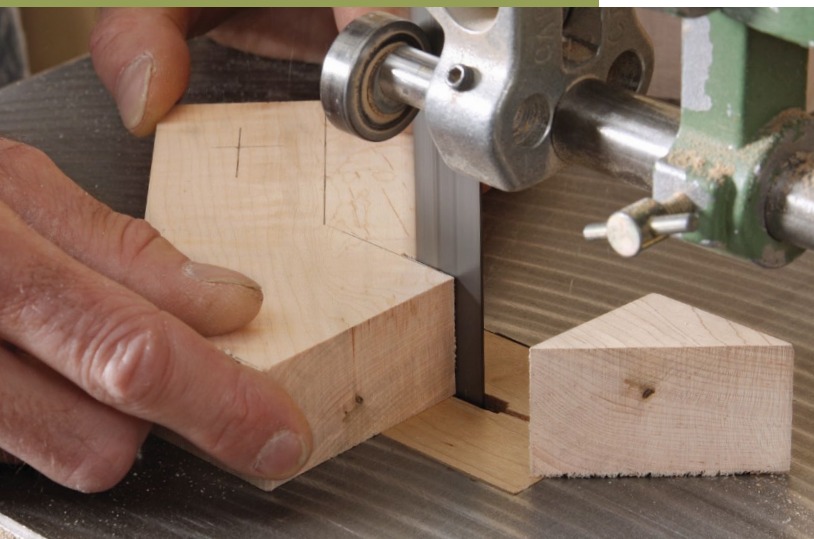
LOCATE THE POST HOLE

The post anchors the puppy in the workbench’s dog hole. Because the dog-hole placement varies from bench to bench, you’ll have to figure out the dowel location yourself. Fortunately, it’s not difficult. Start with a full-size plan view of the puppy, then follow the steps at right.

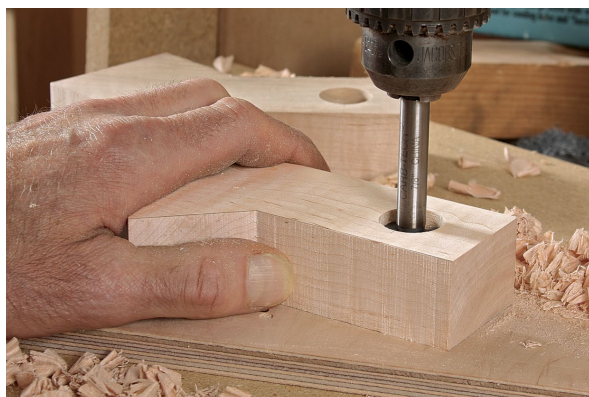


Assemble the body

The process begins with two hardwood blanks for each puppy—one for the body and one for the heel.



Cut the body to shape. All the cuts are easily made on the bandsaw. Make the angled cuts first (above), then use a fence to finish the straight inside cut (right).



Drill for the post. The post anchors the puppy in the benchdog hole. Transfer its location from the plan and then drill the hole for it using a Forstner bit.

the clamping faces to protect the workpiece as the puppies bite down.

The problem with a tail vise is that its grip is limited. It often leaves one end of a workpiece unsupported, and it doesn't easily hold odd-shaped pieces or drawers for planing. Bench puppies step in to stretch the clamping limits of the tail vise. They grab both ends of the workpiece and hold it against the front of the bench. They'll hold any shape workpiece, whether it's a long board that needs edge-planing, a door that needs fitting, or an odd-shaped piece that needs fine-tuning with hand tools. They even grip drawers securely.

The hardest part about making them is putting the dowel in the right spot. The location will vary based on the distance between the dog holes and the front edge of your bench. You'll also need to make two of them, a right- and left-hand puppy. Make sure you



Glue the heel to the body. Be careful at this stage. Make sure you don't make two righties or two lefties. You want one of each.

Add the post

The post is a store-bought hardwood dowel that gets glued and wedged into the body of the puppy.



A cradle for the wedge cut. The post is slotted on one end for the wedge that anchors it to the body. To support the post for the slotting cut, Coleman uses a cradle made from a scrap block (above). After marking the stopping point of the cut on the top face of the cradle, he inserts the post and uses the bandsaw fence to ensure a straight cut (right).



Glue it in. Be sure to orient the slot perpendicular to the grain of the body so that you don't split it when you drive in the wedge.

label each one, so you don't end up with two righties or two lefties.

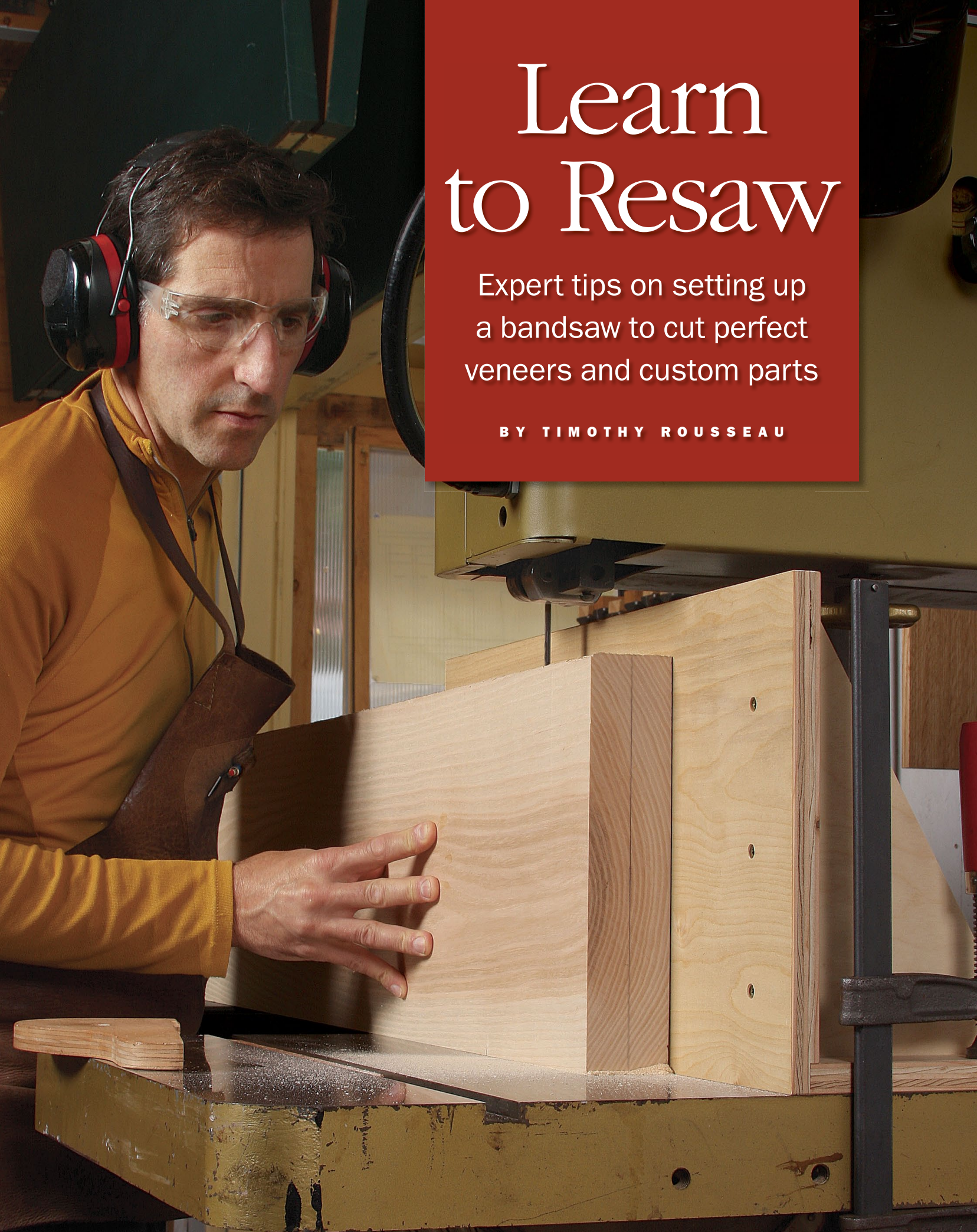
Start with two hardwood blocks for each puppy, one for the body and one for the heel. Use a full-size drawing to lay out the shape on the body, and to mark for the dowel location. Cut out the shape on the bandsaw and drill the hole using a Forstner bit. Glue the heel to the body, and then add the dowel and wedge. You don't have to spend a lot of time sanding the body. I simply break the hard corners with a sanding block. Finally, glue the cork pad to the jaw. You can get cork from almost any office-supply store. That's it. The puppies are ready for business.

Once you've made and used these, you will have reached clamping nirvana. □

Timothy Coleman is an award-winning furniture maker in Shelburne, Mass.



Add the jaw pad. Glue and clamp the cork face to the jaw of the puppy. A light sanding to break the hard corners is all that's left before you can put the jigs to work.

A man with dark hair, wearing a yellow long-sleeved shirt, a brown leather apron, large black and red headphones, and clear safety glasses, is focused on his work. He is standing in a workshop, leaning over a large, light-colored wooden block that is being cut by a bandsaw. The saw is mounted on a heavy metal stand. The background shows various workshop elements, including a green wall and a window. A red rectangular box is overlaid on the right side of the image, containing the title and author information.

Learn to Resaw

Expert tips on setting up
a bandsaw to cut perfect
veneers and custom parts

BY TIMOTHY ROUSSEAU

Few techniques in woodworking can have as much impact on the design of your furniture as resawing. Resawing, the process of cutting thinner boards or veneers from thick stock, frees you from the dimensional constraints imposed on the board at the sawmill. Rather than compromising your design to work with the lumber as you bought it, you can saw the wood to create perfect boards for the project at hand.

The bandsaw is the ideal tool for this task, whether you have a 14-in. saw with 6 in. of resaw capacity or a 20-in. monster that can handle boards 12 in. or wider. With the right setup, you can cut thin book-matched or slip-matched boards for a door panel, create frames with perfectly straight grain, or slice a gorgeous board into a stack of thin veneers, ready for a tabletop, drawer fronts, or case construction.

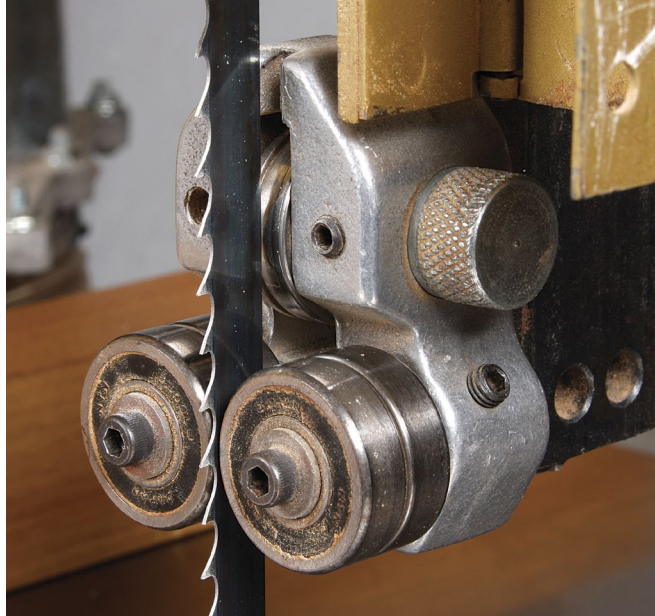
Ready your bandsaw for resawing

No matter what size saw you have, you won't resaw successfully if it isn't set up well. Especially important areas are the blade (see below), guides, and fence.

After putting the blade on the saw, many woodworkers fuss with centering

You don't need a fancy blade

There are many blades designed for resawing—even some with carbide teeth—but it's hard to beat a ½-in.-wide, 3-tpi, carbon steel hook-tooth blade. This blade is great for hard- and softwoods, and does very well with rosewood, ebony, and other tough exotics. I prefer the hard-edge, flex-back blades from Sterling Saw (diamondsaw.com), which I buy from Mathieu Saws (mathieusaw.com).



Get the guides right

After installing and tensioning the blade, adjust the thrust bearing and side guides so that they just kiss the blade. The side guides should be just behind the blade's gullets. This setup keeps the blade aligned and prevents binding.



Spin the wheel. The blade should touch the guides intermittently. Bearing guides will spin off and on when set the right distance from the blade.



Snug the thrust bearing. Move it up until it begins to spin, then back it off a fuzz. When you spin the top wheel, the thrust bearing should spin intermittently.

Add a resaw fence

Start by adjusting your saw's fence parallel to the blade to eliminate drift. Then use it to align the resaw fence when clamping it in place.



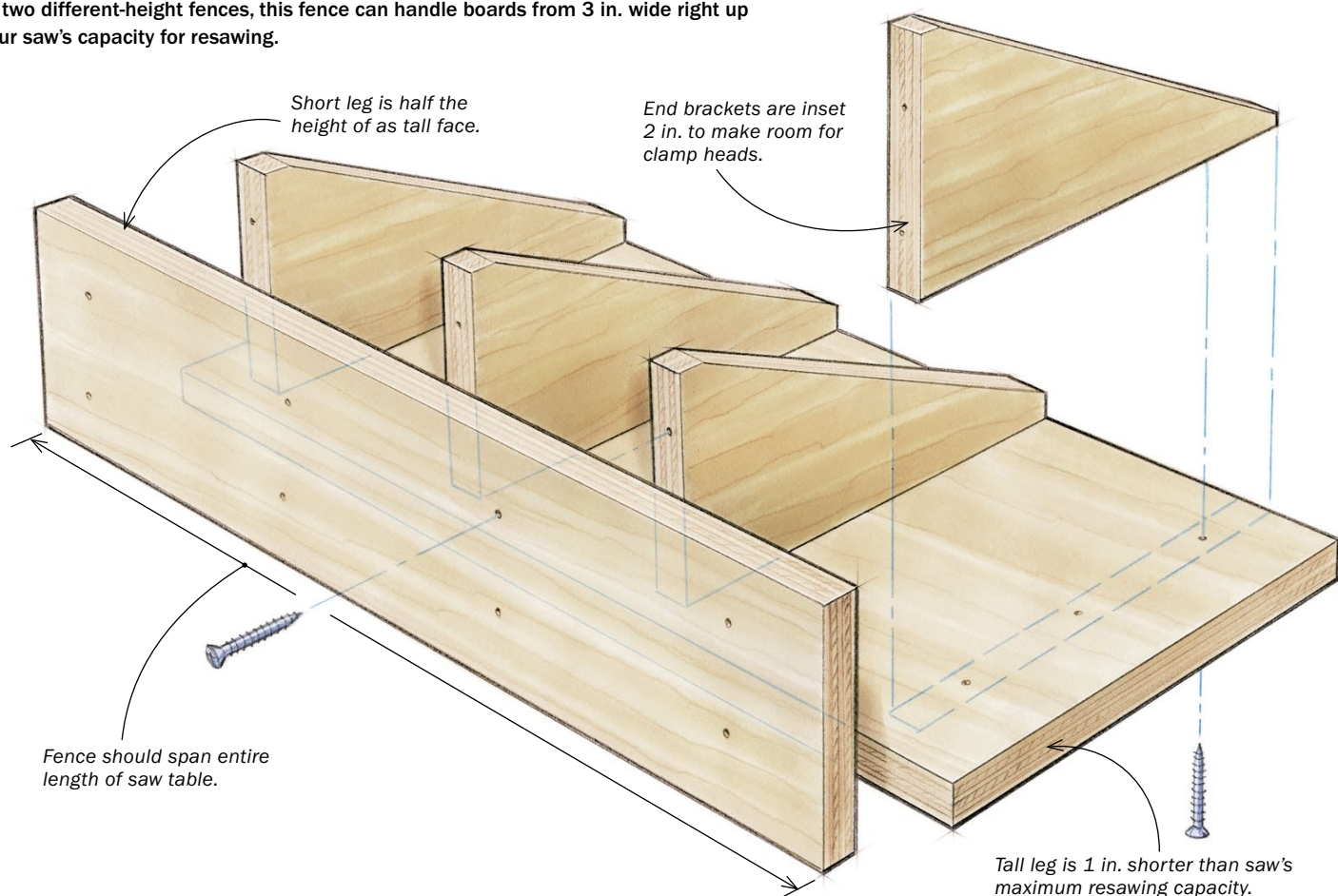
Cut freehand along a straight line. Mark a line parallel to the board's edge and inset $\frac{1}{4}$ in. Cut at least 8 in. into the board. Taking care not to move the board, clamp it in place.



Align the fence to the board's edge. Slide the fence over until it touches the board along its length. Lock it down at that angle.

AUXILIARY FENCE HANDLES MOST RESAWING

With two different-height fences, this fence can handle boards from 3 in. wide right up to your saw's capacity for resawing.





Use the saw's fence to position the auxiliary fence. Keep the auxiliary fence snug against the saw's fence as you set the width of cut (left), then clamp it in place (above).

it perfectly on the top wheel in an effort to eliminate drift, where the blade doesn't cut in a straight line. But that works only if the wheels are perfectly coplanar, which may not be the case with every saw. My simple approach is to get the blade aligned in center as best I can, set its tension, and then move on to the guides. I can adjust the saw's fence to match the blade's drift later.

Every bandsaw has two sets of guides—one above and one below the table. Each set has two guides on the side of the blade and one behind it. Set up correctly, the guides keep the blade cutting straight without deflecting. Start with the top set. It's critical to get the guides as close as you can to the blade without them being in constant contact, which means that when the blade is spinning, the guides should touch it only intermittently. With bearing guides, you'll see the guide spin off and on. If you have block guides, listen for the sound of the blade running against them. Set up the side guides first, and then the thrust bearing. Set up the guides beneath the table last.

A properly set up fence ensures that the veneers and boards you cut are of a consistent thickness. Most stock fences can be used to resaw narrow boards. My saw's fence is 2 in. tall, and I use it for boards up to 3 in. wide. For anything wider, I use an auxiliary fence clamped to the bandsaw

TIP

CHECK FOR VERTICAL ALIGNMENT



Start by cutting a kerf into a scrap of wood (far left). Then turn off the saw, bring the scrap to the top of the fence, and try to slide the kerf into the sawblade (left). If it doesn't align, shim the bottom of the fence with blue tape (below).



Resawing step by step

Resawing is the process of cutting a thicker board into thinner slices. The setup and technique are the same whether you're resawing to get a book-match for a door panel, or to cut frame parts, legs, or aprons.



1 **Start straight and square.** Joint one face and an edge. The face goes against the fence; the edge goes on the bandsaw table.



2 **A consistent feed rate is critical.** Changes in speed create pronounced blade marks. Press the board firmly against the fence with your right hand as you move it forward with your left. Keep a push stick nearby—Rousseau's is in the miter slot.

table. My fence is shaped like the letter L. The short leg is 6 in. tall and handles boards up to 8 in. wide, while the longer leg is 1 in. short of my saw's resaw capacity (13 in.), and I use it for boards wider than 8 in.

Clean and straight resaw cuts—ones that create veneer and boards with parallel fac-

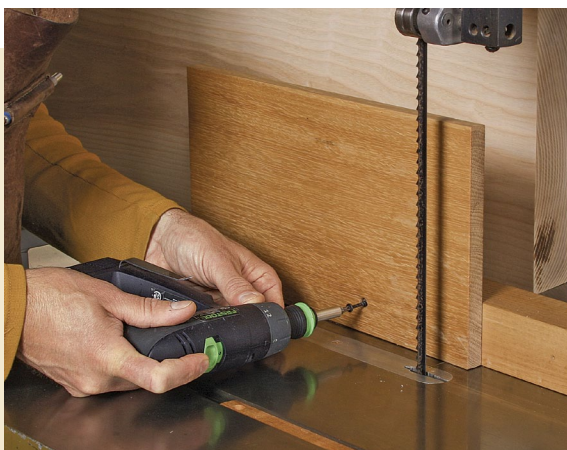
es—are impossible if the fence isn't parallel to the blade's drift, or the angle of its cut. Fortunately, adjusting the fence to account for drift is a simple process.

Mill a board flat and square, and then draw a line down its length, $\frac{1}{4}$ in. from the edge. Cut along this line until the board is 8 in. or more past the blade. More than

likely you'll notice that the board is slightly angled inward or outward. That angle shows which way the blade is drifting. Turn off the bandsaw, clamp the board in place, and bring the saw's fence up to the board's edge. Adjust the fence angle so that it touches the board along its full length. Lock it at that angle. The fence is

A FENCE FOR BOARDS THAT CUP

Because of internal tensions and imbalances in moisture content, thick boards can cup and bow when resawn. A short fence prevents that movement from fouling the cut, because it gives the wood open space to flex into. Rousseau made his from quartersawn hardwood, and it has remained flat after several years of use. It's 10 in. tall (a few inches shorter than his saw's resaw capacity) and extends 1 in. past the blade.



Attach it to the saw's fence. Rousseau uses screws, but double-faced tape works, too. When a board cups, the gap between the board and the saw's fence gives it a place to flex without pushing the board off the auxiliary resaw fence and spoiling the cut.





3

Switch to a push stick. To maintain the feed rate, keep pushing with your right hand as you engage the push stick. Rousseau uses his body to move the push stick forward.



4

Move both hands behind the blade. Do this one hand at a time as you near the end of the cut. It keeps your hands out of harm's way, and allows you to maintain the feed rate until the blade is free of the board.

now aligned to the blade's drift so that the saw will cut in a straight line.

Finally, make sure that the fence's vertical alignment is also parallel to the blade (see p. 57). Otherwise, the veneer and boards you cut won't have parallel faces. If it's not, shim the base with blue tape.

Technique: Steady feed rate improves the cut

When resawing, it's critical to apply side-ward pressure to the board so that it stays tight against the fence. To saw a thick board into thinner ones, I use my right hand to apply this pressure. However, when cutting veneers, a better option is a tall shopmade featherboard. I use a piece of $\frac{1}{4}$ -in. MDF held by a hand clamp, which spreads pressure over the entire width of the board, helping to create veneers of consistent thickness.

Equally as important as sideward pressure on the board is that you maintain a consistent feed rate as you send the board through the blade. Halting or stuttering the feed creates a much rougher cut, and that means you have to remove more material from the resawn face later to get it straight, flat, and smooth. And removing



5

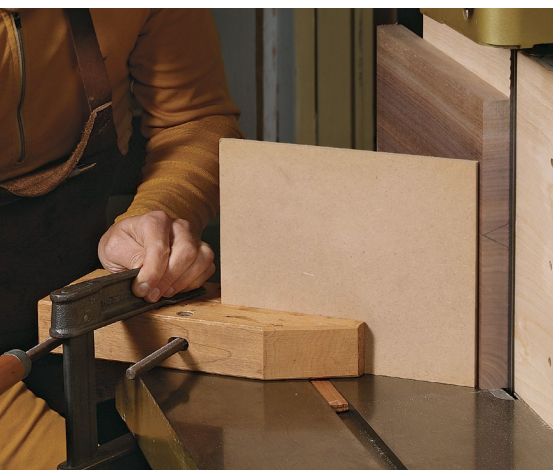
Sticker and stack. Wait 24 hours and then follow best practices for milling lumber.

Make your own veneer

A beautiful or rare board goes a lot farther when sliced into sheets of veneer.



Mark the end grain. This helps keep the pile of veneers in order after you've resawn them.



Use a tall featherboard. Grip a piece of $\frac{1}{4}$ -in. MDF into the jaws of a wooden hand clamp and clamp it to the saw's table. After each cut, loosen the clamp, slide the MDF forward, then retighten the clamp jaws.

more material will worsen any book-match you're trying to achieve.

By the way, if you're cutting three or more thin boards from a single thicker one, rejoin the face between each cut. If you're just cutting a thick board into two thinner ones, you can save the jointing until after you've let the boards sit for a while.

Sticker boards before milling

After resawing, new boards and veneers must be treated differently. Veneer is so thin that even if it's cupped or bowed you can still glue it to a substrate, because clamping pressure will flatten it easily. As for smoothing it, the most reliable way is with a drum sander, a handplane, or



Even speed is the key. The marks left by the blade will be less pronounced and more consistent in their depth, so you'll lose less wood to the cut. This makes for better grain matches from piece to piece.



Rejoin the blank between cuts. You need a straight, smooth face against the fence to ensure that the veneer thickness is the same from one piece to the next.

TWO WAYS TO CLEAN IT UP

There's no question that very thin pieces of wood are tough to surface. A drum sander is a great tool for the job, but here's how to do it if you don't have one.



Break out the hand tools. You can use either a plane (left) or a cabinet scraper (above), but with either tool you need to put the veneer on a piece of MDF, clamp them both to your bench, and work away from the clamps.

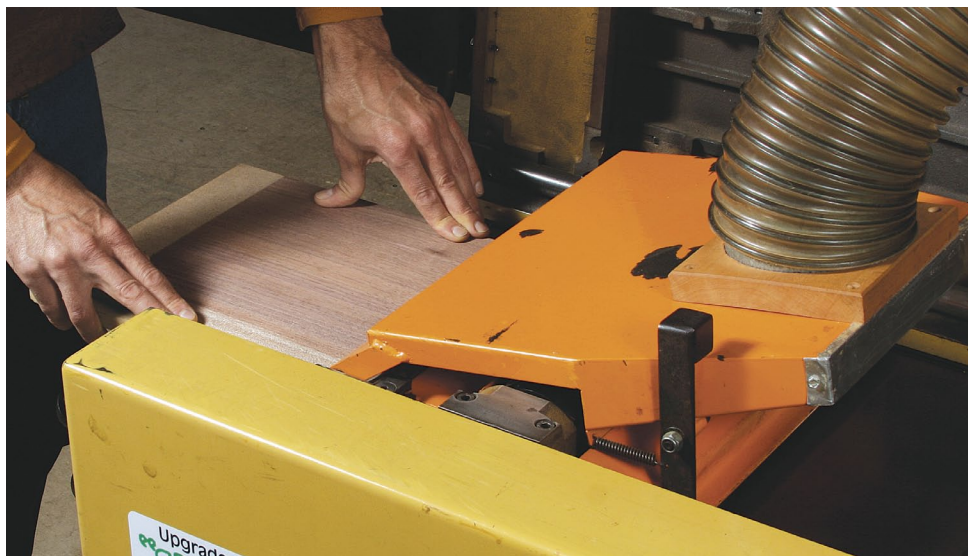
a cabinet scraper. Another possibility is a planer with a segmented cutterhead (see photos, right), but you should expect that some of the veneer will get chewed up by the cutters and will not be usable. Don't use a planer with straight knives, which eat up thin veneers like a kid mauling a bag of candy on Halloween.

Anything thicker than veneer should be treated just like lumber that hasn't been resawn. Resawing can release internal tensions that cause the new boards to move, so saw them overthick to allow for cupping, bowing, and other movement. How much? That depends on the board, but air-dried lumber is generally more stable than kiln-dried, quartersawn boards more stable than flatsawn, and boards that have a consistent moisture content throughout their thickness are more stable than those that don't. After resawing, give the freshly cut boards 24 hours to settle down, making sure to sticker them to allow airflow all around them. You can then joint and plane them. After this initial milling, let them rest again and proceed to mill to final dimensions as you normally would. □

Timothy Rousseau is a professional furniture maker who also teaches at the Center for Furniture Craftsmanship in Rockport, Maine.



Or take advantage of new technology. Straight knives tend to mangle thin veneers, but segmented cutterheads handle them much better. Send the veneer through the planer on top of an MDF platen. Spray adhesive on the MDF creates enough tack to keep the veneer in place without permanently joining the two.





I owe a lot to skateboarding because it introduced me to woodworking, a craft I've loved for 40 years. My love for skateboarding led me to start my own business building and selling

skateboards, which later transitioned to furniture making.

My children reintroduced me to board making recently because they wanted longboards of their own. Longboards, as their name implies, are longer than the standard skateboard deck and are made for the purpose of cruising downhill, rather than doing tricks.

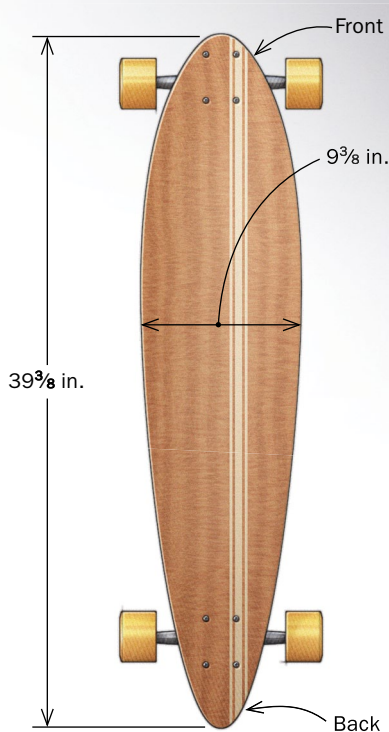
This project is fun to make, whether it's for you, your children, or your grandchildren.

Plus it's a great way to introduce yourself to new skills—like pattern making and routing, bent lamination, veneer work, and

Build a Longboard

Make something fun while learning new skills

BY CHRIS GOCHNOUR

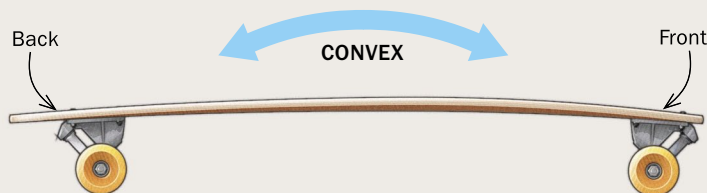


CLASSIC LONGBOARD

The surfboard-inspired board is a great gift or project for woodworkers and boarders. It's also an easy way to learn about bent lamination and veneer on a small scale.

CURVED TWO WAYS

The convex curve from front to back gives the board strength and responsiveness, and the side-to-side concave curve improves handling.



SHAPE THE FORM



Long curve first. You need two $\frac{1}{4}$ -in. MDF templates for the convex curve of the deck. Screw them to the long edges of the foam block (left), making sure the flat sides are flush. The curve of each template runs against a finger jig attached to the bandsaw table (center). This allows a perfect “resawn” curve to be taken from the form (right).

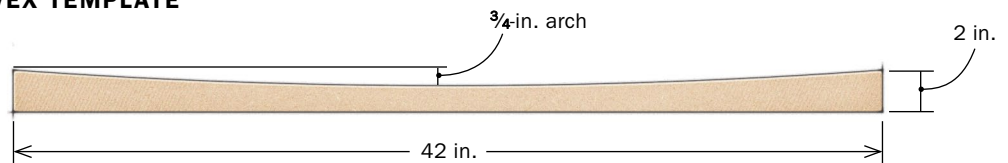
resawing—without a huge investment in materials. All these techniques can be used in your furniture making.

Building the form

The biggest part of building a board is building the deck, or platform, that supports the rider. It's curved in two directions, and the shape determines the responsiveness and stability of the board. Afterward, the trucks (which allow turning), wheels, and bearings are attached with hardware. To ensure this thin board is strong, board makers use maple or birch plies of alternating grain direction, pressed over a compound form.

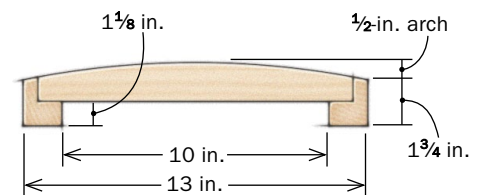
I make the form from a sheet of rigid polystyrene foam. To cut the curves in the foam, you

CONVEX TEMPLATE



Side-to-side curve next. To make the concave shape in the deck, you need to give the foam form a convex shape side to side. For a consistent curve, Gochmour uses a simple jig with a $\frac{3}{4}$ -in. bearing-guided straight bit. Be sure to insert and remove the router while it is turned off and in the center of the jig.

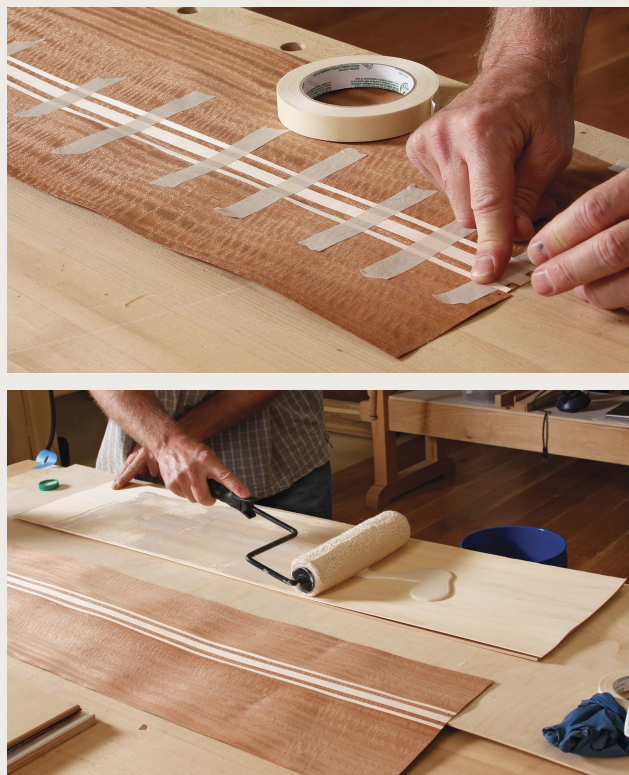
ROUTER JIG FOR THE CONCAVE CURVE



Sand it smooth. The router leaves light grooves in the form, so Gochmour gently sands them away with a sanding block and 180-grit sandpaper.



ASSEMBLE THE FACE VENEERS



Preparing the face. To make sure the face veneers won't get damaged or shift during glue-up, laminate each one to a core ply. Tape the thin veneers into their pattern, roll on some Titebond III to the maple core sheet, and then place the face veneer on it. Add a platen under the packet and put it in the vacuum bag with a piece of aerating mesh material on top. After an hour or two, the ply will be ready for use.

need to make a couple of templates and a router jig. Draw the long convex curve on a strip of MDF (see drawing, p. 63) using flexible battens. Bandsaw the piece to shape, clean up the sawmarks with

a spokeshave and sandpaper, and then resaw the strip to get two templates.

Screw one template to each long edge of the foam, and use a bandsaw to cut out the arch. To ensure a parallel cut, I use a simple finger jig. The jig gets clamped to the table or fence and the "fingers" straddle the blade and guide the two templates on the foam, cutting the form evenly across the profile. After cutting the long curve, remove the templates.

Next, you'll make a convex contour in the form to create the concave shape in the deck. I cut this curve across the form

using a router jig. I make the jig from a piece of poplar. Lay out the arch on the board's edge and then bandsaw and sand it to shape. Bandsaw the board in two along its length. Now glue a rabbeted cleat on to each end of the jig, leaving a $\frac{3}{4}$ -in. space for the pattern bit between the two top pieces. The rabbeted cleats serve as a fence to guide the jig along the form and they serve as stops to keep the router in the jig.

This jig straddles the form and, working from one end of the form to the other, the router shapes the curve. Be sure to overlap passes to avoid

any missed sections. Also, it's helpful to use foam offcuts the same width as the form to help support the jig as it reaches the ends of the cut.

Cut and assemble the deck veneers

One of the aesthetic factors with longboards is that they harken back to vintage wooden surfboards. In that spirit, I chose a simple pinstripe pattern using pre-cut makore and maple veneers. To make sure the decorative top and bottom veneers aren't damaged during glue-up, I laminate the thin face veneer to one of the inte-

SOURCES OF SUPPLY

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thelongboardstore.com

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rior plies while everything is still flat. The ply backs up the veneer and can now be glued up just like the standard plies.

Laminate the deck

I make the deck from eight plies of $\frac{1}{16}$ -in.-thick store-bought maple veneers, with two cross-grained plies balanced between the straight ones.

To laminate the board, spread out the plies on a panel of melamine backing material. With masking tape, secure them to the melamine to keep them from shifting.

Using a paint roller, apply Titebond III glue evenly to the plies. Then stack them, alternating the grain, with the decorative veneer plies on top and bottom. Put the packet onto the form followed by a platen. To keep the packet from shifting, drive a brad nail through the form at each end and secure the ends with stretch wrap. Now place the whole stack in the vacuum press. After a couple of hours, the board can come out of the bag for final shaping.

Shaping the board

Longboards come in a variety of shapes, but I stayed with the

LAMINATE THE DECK



Straighten out the plies. Glue and stack the plies on the form, making sure they are parallel to each other and to the form's edge.



Stake the plies. To keep the packet from shifting, place a $\frac{1}{4}$ -in. MDF platen on the stack and secure each end of the packet with a brad nail to the form.



Wrap it. Before putting the whole form in the vacuum bag, wrap each end of the packet with plastic wrap to keep the sheet from moving.

Hand-pump option

If you don't have a vacuum pump and bag, skateboard builder supply company Roarocket (roarocket.com) offers a variety of hand-pump powered bags that are perfect for pressing skateboard decks and other small projects. The setup is the same as with a standard vacuum bag, except when it comes time to draw the air out of the bag, an easy-to-use hand pump takes over. A few minutes of effort and the plies are drawn tight onto the form and can be left to dry.



Article Extra

See a hand pump-powered vacuum bag in action.

SAW OUT THE DECK



Lay out the deck. After putting a centerline down the blank, trace the outline onto the blank. Gochnour uses a half-template made from MDF to ensure both sides are symmetrical.

vintage surfboard shape with this one. The best way to get a symmetrical board shape is to make a half-pattern out of $\frac{1}{2}$ -in. MDF. The pattern can be drawn using flexible battens and circle templates.

Once the pattern's made, the deck can be shaped. Trace the halves onto the deck using a centerline and bandsaw it just proud of the lines. After sawing out the deck, I typically use a spokeshave followed by a final sanding to the line.

Once the deck is shaped, I rout a radius around the edge on both sides. It looks good, is more comfortable to hold, and strengthens the edge. I use a bearing-guided, $\frac{1}{2}$ -in. round-over bit, set so that it cuts to the center of the plies. It's important to keep the router as flat as possible.

Mounting the trucks

The longboard's trucks control the turning of the board and it's vital to mount them solidly and in line with each other. For perfect holes, use the mounting plates of the truck as a



Cut it to shape. Cut the deck shape from the blank at the bandsaw (left), leaving the pencil lines. Then use a spokeshave or sandpaper to level the edges to the traced lines. Ease the top and bottom edges of the deck with a bearing-guided roundover bit (above).

DRILL AND FINISH



Align and drill. Center the trucks on the deck and use a jointed board as a straightedge to make sure both trucks are aligned. The hardware holes in the trucks act as a drilling guide.



TRUCK PLACEMENT



drilling guide. The plates can be removed from the truck by unscrewing the kingpin and removing the axle section. Clamp the plates on the bottom of the deck and use a straightedge to align them. Now use a $\frac{3}{16}$ -in.-dia. drill bit to drill the holes, and the deck's ready for finish.

Finishing

Sand the entire deck one last time. I use DuraSeal Satin (dura seal.com) polyurethane floor varnish for its durability and apply it with a brush. While the finish is still wet on the

top, I take a large salt shaker filled with crushed glass blasting media and sprinkle it on evenly. Now put a coat of varnish on the bottom and edges and let the varnish dry. Finally, brush one more coat of varnish over the crushed glass to cement the grip material into the finish.

When the varnish is dry, mount the trucks and wheels to the deck and enjoy the ride. □

Contributing editor Chris Gochnour is a professional furniture maker in Salt Lake City.



A thick coat. After sealing the board with a 50% diluted coat of polyurethane, brush an even, heavy coat on the deck's top side (above). While it's still wet, apply a consistent layer of crushed glass blasting media to the surface using a salt shaker (left). A board with a nail in each corner keeps the board elevated. Once it's dry, put one more coat of polyurethane on the glass side to seal the abrasive to the top of the deck.

JIM DRAPER

Rice, Wash.

Draper had just completed a chest of drawers in the Shinto style and liked it so much he decided to make this sideboard next. The finish is shellac, polyurethane, and wax. "I love the look of cherry in a natural finish, as it ages and acquires such a rich patina."

CHERRY, BIGLEAF MAPLE, WESTERN ALDER, AND EBONY,
18D X 52W X 33H



PAUL RAMM

Bentonville, Ark.

Almost 15 years ago, Ramm fell in love with a grandfather clock at a bed and breakfast in Eureka Springs, vowing to reproduce it one day. "I had no plans or dimensions to work from; only photos of that clock I found so many years ago." So he took his time, adding his own touches along the way, including the scrollwork on the side, the painted fiberglass face, and stained wood cylinders with metal end caps that serve as clock weights.

WHITE OAK, 13½D X 24½W X 86H



DEVIN REAM

Holliston, Mass.

This box is modeled after a tea chest by Abraham Roentgen on display at the Metropolitan Museum of Art in New York City. Ream made a pair for a client to be used as funerary urns. "Both boxes have spring-loaded secret drawers that are released at the touch of a button." Ream used gold leaf on the corners instead of the traditional brass.

ROSEWOOD, MAHOGANY, AND PINE, 9D X 14W X 11H

Submissions

The Gallery provides design inspiration by showcasing phenomenal work. For submission instructions and an entry form, go to FineWoodworking.com/rg.

KRIS EASTER

Niwot, Colo.

The top board for this table had so many cracks and knotholes that it seemed unusable at first, but Easter found the grain patterns too interesting to pass up, so she patched it with clear epoxy and designed a table around it. What started as an easy weekend project turned into a series of prototypes and her first venture into bent lamination. "The complexities of joinery on an asymmetric curve were new to me, as was the whole bent lamination process. The apron I ended up with was the third one to come out of the forms."

ELM AND WALNUT, 16D X 54W X 32H



DAN SOUTHERN

Huntington Beach, Calif.

Inspired by the famous Japanese torii gates, Southern wanted to make boxes that look like little pagoda shrines. The posts that suspend the box in the air are designed to echo the posts that suspend the handle. "I feel the rounded shape of the handle really completes the Japanese style I was after."

LACEWOOD AND WENGE, 6 $\frac{3}{4}$ D X 16W X 10H



MICHAEL FORTUNE

Warsaw, Ont., Canada

Fortune made the tapered parts for this pair of ash benches with bandsaw jigs that also pass through the planer. He left one bench natural, and finished the other using a three-step process: "Household black tea (introduces tannin into the wood) is brushed onto the wood, steel wool and vinegar impart the black color, and deep red mahogany stain is burnished into the black." The topcoat is a clear spray lacquer.

ASH, 16W X 40L X 17H
(7W AT NARROW END)





CHAD HILL

Fredericksburg, Va.

"My wife and I want a big family and a table that can accommodate everyone," Hill says, describing the impetus for this farm-style dining table. The walnut came from a tree he bought with the project in mind. Thick arches and flared legs take the place of an apron, and a ladder-style frame underneath keeps the top flat. "I kept the knots and imperfections in the wood to help keep the farm-table theme."

WALNUT AND MAHOGANY,
TABLE 40W X 96L X 30H, BENCH 14W X 37L X 17H



DARYL ROSENBLATT

Manhasset, N.Y.

There are no straight lines in this table, Rosenblatt says. "All the furniture I design has an organic curved look." The top was made from a piece of waterfall bubinga, and the inlay is holly and ebony with mother-of-pearl dots. The top appears to float when viewed from different angles.

BUBINGA, 21D X 21W X 21H

Photo: Owen Photography

MIKE KORSAK

Pittsburgh, Pa.

This piece was inspired by a small cabinet featuring an off-center door panel that caught Korsak's eye. The off-center drawer and contrasting woods continued the asymmetrical theme. The drawer is flanked by book-matched walnut crotch and framed above and below with a rosewood bead. The arrangement of the woods "felt just right as it took shape through sketches, and that feeling of 'right' was reinforced when I found the walnut crotch material that would eventually be used in the finished piece."

WALNUT, BIRD'S-EYE MAPLE, ROSEWOOD, AND CHERRY, 20D X 22W X 50H



JAMIE SCHELL

Winona, Minn.

Winner of Best in Show at the exhibition, this table was inspired by the Sanmon gates used in Japanese Buddhist temple construction. "It is my hope that it will initiate a passage to calmness upon entering the home."

OLIVE ASH BURL, ASH, AND WALNUT, 14D X 44W X 36H



MARK LAUB

Anoka, Minn.

The four curved doors, nine graduated drawers, and four pivoting drawers that you can see from the outside of this jewelry case are just a hint of the complexity inside—a copper cavity in the top, patinated copper walls, lift-out boxes, more pivoting drawers, and a brass revolving carousel. Floral and butterfly marquetry and inlay throughout are the final touches.

MAPLE, BUBINGA, SPANISH CEDAR, PAU AMARELLO, EBONY, 22D X 18W X 50H



JASON HOLTZ

Minneapolis, Minn.

A neighbor's Mid-Century Pfaff sewing machine cabinet inspired Holtz to design this stereo cabinet/sideboard. "I was struck with the simple beauty of the cabinet." Holtz kept the subtle details of the original in his design, choosing anigre for its understated look and blond color.

ANIGRE AND WALNUT, 16D X 42W X 36H



HIGHLIGHTS FROM NORTHERN WOODS

The annual Northern Woods Exhibition sponsored by the Minnesota Woodworkers Guild never disappoints. Here are a few of our favorites from the 32nd annual show, but this is only a glimpse of the many fine pieces offered. For a complete gallery, visit mnwwg.org.

Mitered dovetails

A BIT OF CHISEL WORK ADDS SOPHISTICATION TO AN OLD-TIME JOINT

BY JOHN TETREALT

MITER MAKES
CLEAN CORNERS
AT THE TOP

My town's agricultural fair has a farm museum that includes a woodworking shop. When I was asked to demonstrate hand-tool techniques at the fair, I decided to make this kindling box as I did so. It's a traditional piece that's also useful in the modern home. Simple and sturdy, the box has through-dovetails at the corners; however, to give it a more refined look, I mitered the joint at the top edge. I also mitered a section of the joint so I could hide the through-grooves for the bottom panel.

You might think that mitering a dovetail joint is difficult, but it isn't very different from cutting a normal through-dovetail joint. In fact, it differs only in the two spots where there are miters: at the top edge and where the groove is. Because I cut tails first, nothing about the technique changes until I transfer the tails. Fortunately, it's not complicated.

MITER HIDES
PANEL GROOVES

UNIQUE SOLUTIONS

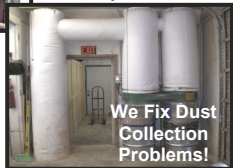


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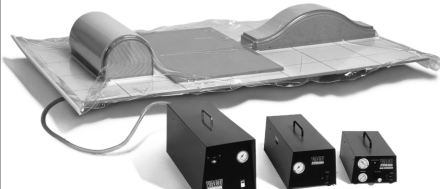


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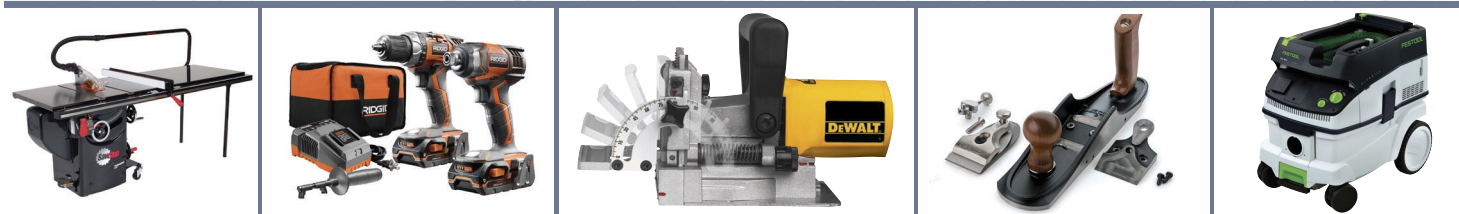
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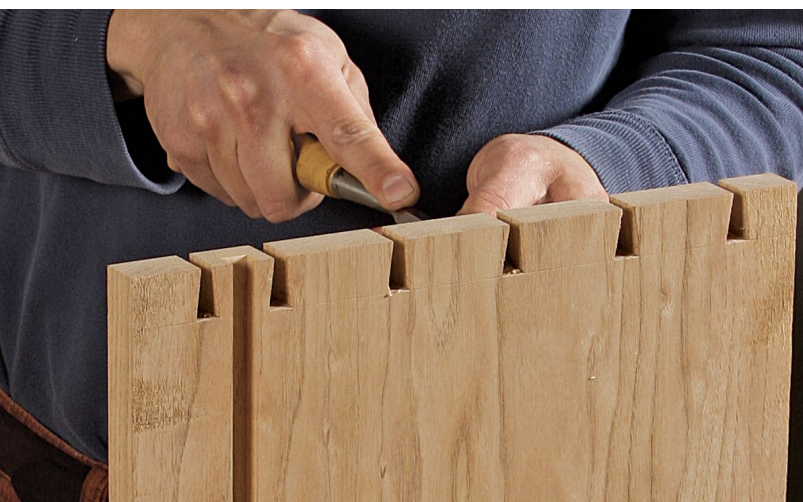
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Make an elegant corner

For all its strength and beauty, there is a little wart at both ends of a dovetail: a butt joint where the tail and pin boards meet. Replace the butt joint with a miter to raise the dovetail's refinement a notch.

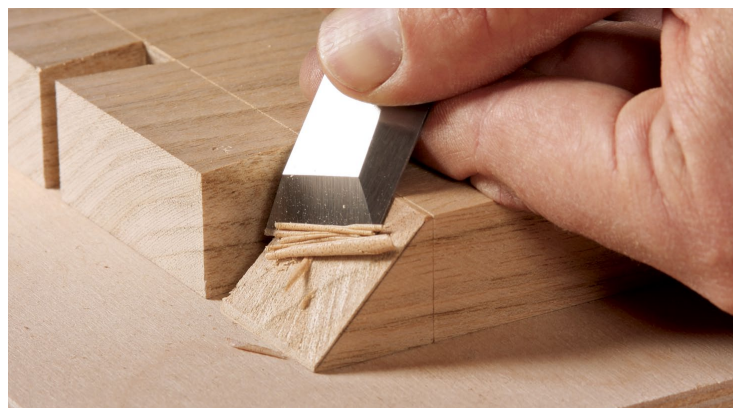
MITER THE TAIL BOARD FIRST



An important note about laying out the tails. Use a half tail at the top edges instead of a half pin.



Now transfer the tails. You must do this before you miter the tail board, because afterward the mitered tail lacks a surface for registering the knife.



Saw and pare to the line. After laying out the miter with a pencil and a combination square, cut just proud of the line (left). Then use a wide chisel to finish the job (above). The slope of the miter should run from the shoulder down to the corner.

Lay out the miters after cutting the tails

I start this joint as I would any through-dovetail joint—by laying out and cutting the tails. There is one thing to keep in mind when laying out the tails: Make sure to use a half-tail at the top edge of the board, where it will be mitered.

After cutting the tails, I transfer them to the pin board with a marking knife. It's necessary to do this before you miter the tail board, because after mitering there will no longer be a surface to register the knife against. Now, pull the tail board out of the way and raise up the pin board in the vise so that

THEN THE PIN BOARD

Mark the inside face of the pin board. Aligned with the knife mark on the end grain, this pencil line identifies where to cut a 45° kerf to define the mitered area and the pin next to it.



you can wrap the marks you just made down the outside face of the board to the shoulder line. A pencil and square do that job well.

Next, flip the board around and mark three lines down the inside face of the pin board. These lines indicate where the joint will be mitered: one line for the miter at the top edge, and two for the miter at the groove.

Miters are tuned with a chisel

With that layout done, you can go back to the tail board and miter the top edge. After marking the miter on the top edge of the board, grab a backsaw and rough it out. Then clamp the board to the bench and pare to the line. I do this freehand, keeping an eye on the shoulder line and the bottom corner of the end grain. Pare to those points and you get a perfect 45° miter. If you're uncomfortable paring the miter freehand, clamp a guide block to the board to keep your chisel at the correct angle.

Move down to the groove and chop out most of the waste at the miter, then switch over to paring and trim the miter, again watching the shoulder line and the corner of the end grain.

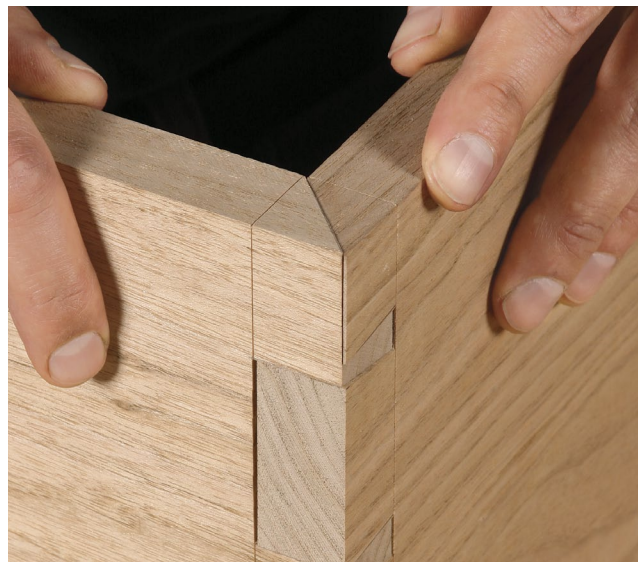
Next up is the pin board. The first step is to cut 45° kerfs at the three lines you marked on the inside face of the board. Cut down to the shoulder line, but stop short of the outside corner of the end grain, leaving just a bit of waste for paring.



Two cuts clear the waste. After cutting the 45° kerf (left), turn the board on edge and saw down the miter (above).



Clean up the miter. Work to the shoulder line and the bottom edge of the end grain. The miter will be exactly 45°.



Test the joint. Look for high spots that cause gaps. Pare them and retest the joint. Repeat until the joint closes tightly.

Conceal a groove

Mixing a through-dovetail with a panel groove normally requires a stopped groove; otherwise, it will be visible in the assembled joint. However, if you miter the joint over the groove, the groove disappears when the boards come together.

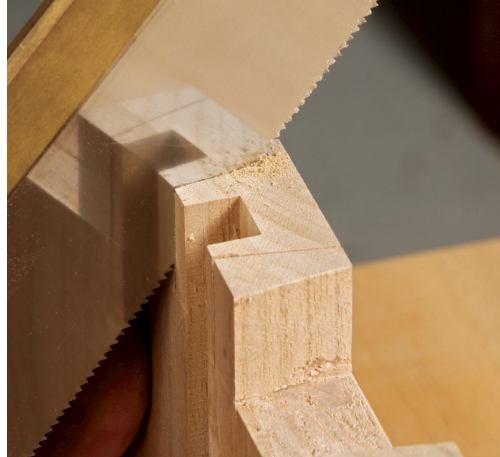


Here's the place for a guide block. It can be tough to pare this miter freehand, because there's no pencil line to help. Clamp the block right at the shoulder line and keep the chisel flat on it.

At the top edge, you can cut down the miter just like you did on the tail board, roughing out the miter as you go. Then, pare it clean. Down at the groove, rough out the miter with a mallet and chisel, then pare it to 45°.

With all of the miters done, test-fit the joint, paring as needed until everything closes up tightly. You're not far from having this kindling box next to your woodstove, where you can enjoy it every time you have a fire. Also, you might want to make a second. As I discovered after making the box, it is perfect for holding magazines and books. Placed next to your favorite chair, you'll always have some good reading nearby when enjoying the fire. □

John Tetreault is Fine Woodworking's deputy art director.



Make the cuts. Stop short of the end grain's outside corner, leaving just a bit of waste to pare. This produces a cleaner line on the outside corner when the joint is put together.



Pare between the pins. After removing the bulk of the waste with a chisel and mallet, work carefully to connect the shoulder to the edge of the end grain.



Hidden groove. When assembled, a mitered dovetail will hide the through-grooves for the box's bottom panel.

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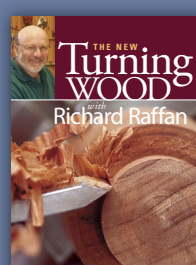
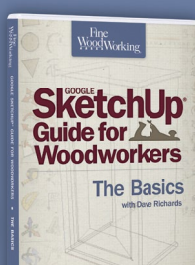
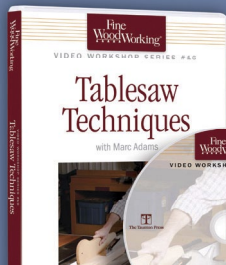


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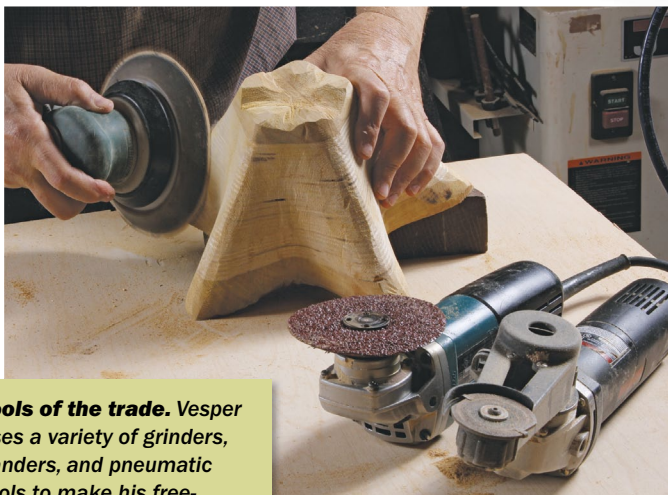


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Sculptural bowls

SHAPING BEAUTIFUL CURVES FROM PLYWOOD

BY KERRY VESPER



Tools of the trade. Vesper uses a variety of grinders, sanders, and pneumatic tools to make his free-flowing forms.

My process of making vessels evolved out of a desire to create expressive forms in spontaneous fashion. My goal is to capture a fluid form in wood. I start by gluing up multiple pieces of birch plywood cut roughly to shape and then I use power carving and sanding tools to create a flowing, sculptural form.

I began using plywood decades ago because I had no room for the equipment needed to thickness-plane boards. I also was inspired by the stack-lamination work of Wendell Castle, with whom I took a workshop in the early 1980s.

These days, I have a little more space, but by now I am hooked on the design possibilities offered by, among other things, the parallel lines of plywood's edges. Flowing around the organic form of a sculpted bowl, those lines remind me of the rock strata in the Southwest desert where I live, carved into graceful shape by wind and water.

Stack it up

Vesper makes his bowls from layers of plywood and solid wood. He cuts them to rough shape and then glues them together, leaving the bottom off until the interior has been shaped.



Cut a stack of rings

Each of my sculptural bowls is shaped from a “blank” created by stacking and gluing together a series of concentric plywood rings, graduated in size and built from the top down. Then I add a top rim and bottom made of solid wood. When I started making bowls years ago, I would draw ideas on paper, starting with the rim and imagining the shape getting smaller with each layer. These days I use a computer and a 3D drawing program.

I start by laying out and cutting the largest and topmost plywood ring. I draw a pattern for the exterior outline of this



Cut and stack the rings. After bandsawing a blank to shape, Vesper uses a shopmade marking gauge (1) to mark for the interior cut, which he makes using a scrollsaw (2). For the hardwood rim, he traces around the top plywood layer (3). A sturdy can elevates the glue-up (4) for easy clamping all around the assembly.

piece and then secure the pattern to a piece of $\frac{3}{4}$ -in. plywood that is cut to rough size. I cut the piece at the bandsaw using a $\frac{1}{4}$ -in. blade and with the table tilted at about 10° .

Once the exterior shape is cut, I mark a line for the interior cut as shown above. Then I take the work to the scrollsaw and, with its table also tilted 10° , make the interior cut.

This completed top layer now becomes the pattern for the smaller plywood ring that will go underneath it. To mark out for the next piece, I place the top ring on another sheet of plywood, small side down, and trace both the inside and

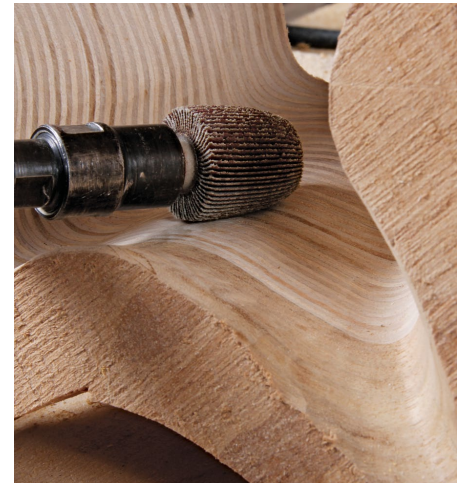
Shape the inside and add the bottom



Start with a mini grinder. The tool hogs away material to bring the walls to rough shape.



Move to the die grinder. Abrasive cones smooth the transitions between plywood layers and the faceted surface left by the angle grinder.



Finish with the flap sander. This narrow attachment refines the surface left by the abrasive cones.

outside edges. Then it is back to the bandsaw and scrollsaw. I repeat this process several more times, each time creating a smaller ring. I stack the rings as I cut them out and stop when I have enough to form a nice-looking bowl. For a simple hardwood rim like the one shown here, I place the largest plywood ring on a surfaced board of solid wood (bubinga, wenge, and canarywood are my favorites). With the large side down this time, I trace the pattern for cutting at the bandsaw and scrollsaw. For these cuts, the saw tables are set 90° to the blade. Instead of cutting this piece at an angle, just cut it slightly oversize so you have enough material to shape. The center scrap of the cutout will become the bottom of the bowl.

Now I stack and glue all the plywood rings and the solid-wood rim, leaving off the bottom for now.

Shape and refine the blank

The bowl's irregular shape makes it difficult to hold securely in a vise. Besides, I need to rotate the bowl often while I'm working. So instead of trying to clamp it down, I simply brace it against a piece of thick stock clamped to the top of my bench.

This process creates a lot of dust, so I use a shopmade air cleaner that I estimate filters 80% to 90% of the dust from the air. Also, be sure to use a respirator—every time—and protect your eyes and ears.

To refine the shape of the bowl's interior, I use a variety of grinding and carving tools, starting with an Arbortech Mini Grinder outfitted with a carbide cutter to remove material from the wide flats and convex portions of the interior. I switch to a die grinder with a narrow Kutzall carving burr to reach the inside curves and the tighter spaces at the bottom of the bowl.

To clean up the tool marks and begin creating a final surface, I use a die grinder outfitted with a series of cone-shaped, wrapped abrasives at 60-, 80-, and 150-grit. I switch to a narrow, 220-grit flap wheel to achieve the final surface.

Now the solid-wood bottom goes on. The inside bottoms of most of my bowls are flat, but you can make it concave. I sand the bottom to 220 grit and glue it to the bottom layer of plywood, taking care not to get glue on the inside surface.



Work in both directions. Leaving the bottom open makes it easier to access all areas of the bowl's interior.



Glue on the bottom. Once the shaping and surfacing of the interior is complete, the bottom gets glued in place.

Smooth the outside



Exterior. The mini grinder once again removes large amounts of stock to rough out the bowl's shape.



Smooth the transitions. Vesper uses an angle grinder with a resin abrasive disk to refine the shape and smooth the surface.



Feet are optional. Vesper uses the edge of a resin disk to quickly give the bowl a four-footed stance.

To shape the outside of the vessel, I again start with the Mini Grinder, using it to blend the transitions between layers and hollow out gentle upward arcs in the angled sides of the blank.

Then I switch to an angle grinder with a 24-grit resin disk. I try to get the walls reasonably thin and uniform in thickness. Because the bowl is asymmetrical and the contours of the outside surface usually are not the same as the inside, the wall thickness will vary. Try not to go thinner than about $\frac{1}{8}$ in. As I shape the bowl, I periodically hold it up to a light. If I can see light coming through, I know that area should not get any thinner. I taper the rim to a sharp edge. This gives the illusion that the walls of the bowl are thin and the bowl appears lighter.

With the bowl shaped, I use an orbital sander with a flexible pad to smooth the surface, working sequentially up to 220 grit. For the finish, I use General Seal-A-Cell Clear as the first coat, then apply several coats of Arm-R-Seal semi-gloss topcoats. My vessels are not intended to hold liquid, but this is a very durable, moisture-resistant finish. □

Kerry Vesper builds furniture and sculpture in Tempe, Ariz.



Preparing for finish. A wide flexible sanding pad follows the curves to gently smooth the surface without reshaping it.

How I make a rocker

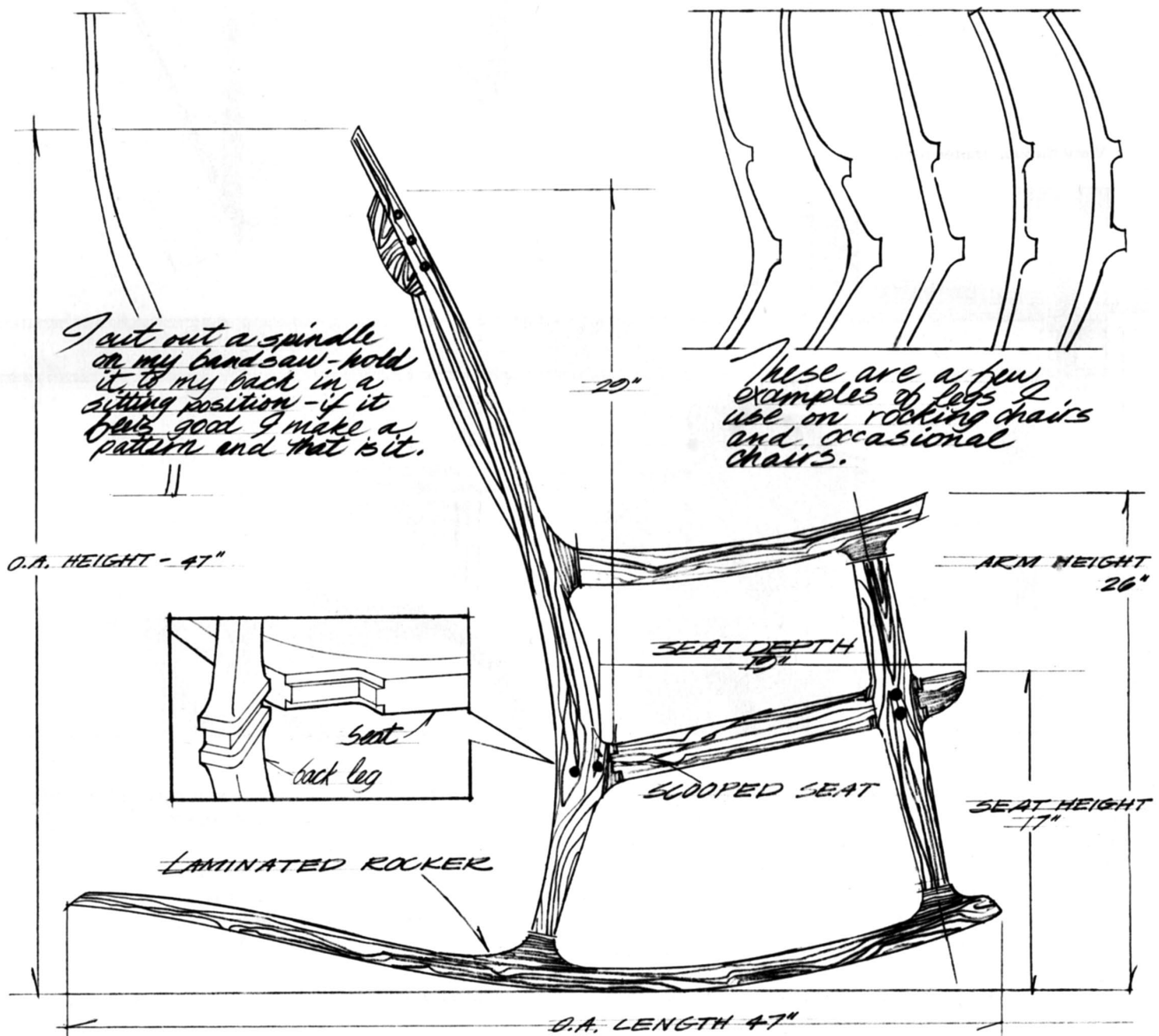
BY SAM MALOOF

A MASTER CRAFTSMAN REVEALS THE DETAILS

Of the 12 different basic rocker designs I make, the model with a solid-wood seat and flat spindles is the most popular, and the most imitated. I don't believe in copying, but if knowing the way I work will help other serious woodworkers develop their own ideas, I'm happy to share my methods. I don't have a formula that I follow, nor do I work out mathematically the way my rocker rocks. Each rocking chair differs somewhat in

dimension and also somewhat in the density of its parts, so I just work out its balance along the way. I aim for a rocker that doesn't throw you back or tip you out, and somehow I'm usually right on.

I begin with the seat, cutting from 8/4 stock usually five boards at least 22 in. long and 3 in. to 7 in. wide—enough to add up to a 20-in. width after glue-up. I buy random width and length, common #1 or #2 walnut because its figure is more



interesting than that of firsts and seconds. After milling the wood to size, I arrange the boards for the nicest figure match, regardless of whether this happens to be bark-side up or down. I then take the middle board and draw on its long edge the contour of a dished seat, a gentle curve whose maximum depth leaves $\frac{1}{2}$ in. of thickness about three-quarters of the way back from the front of the seat. I bandsaw this curve, holding the board on edge, then I angle the board through the blade and saw the top of the seat toward the front, to leave a ridge in the middle. I put this middle board back between the two seat boards to which it will be glued, and mark the contour I've just sawn on the edge of each. I bandsaw this contour, and transfer it to the edge of each outer board of the seat. I angle the boards to saw this contour, so that when joined together the five boards form a hollowed-out seat. Before gluing up, I mark and drill for 3-in.-long, $\frac{1}{2}$ -in.-dia. dowels, staggering them about 2 in. apart for ease of assembly, and for strength.

While the seat blank is in the clamps, I lay out both back legs, nesting them on a roughsawn $8\frac{1}{4}$ board about 7 in. wide and 48 in. long. I look for a curve in the grain to match the curve in the legs. I bandsaw the legs before jointing and thickness-planing them, because flattening the wide blank might result in a leg that is too thin. I get both legs to be the same shape with a $2\frac{1}{2}$ -in. long straight cutter on the spindle shaper, using a template. When I've decided which is the right leg and which the left—by how the grain looks from the back and the front—I saw off the bottom of each leg at a 5° angle. Canted to this degree, each leg will join its rocker properly, giving the chair back a nice splay.

Now I take the clamps off the chair seat and I square up the edges so that the blank is 20 in. wide by 21 in. long. With a 7-in., 16-grit disk on my Milwaukee body grinder, I rough out the bandsawn hollow in the chair seat. I continue shaping and smoothing with 5-in. and then 2-in. disks, up to 150-grit. The top of the seat thus shaped, I cut the notches in the seat to receive the legs. For the back legs, I tablesaw a notch in each rear corner of the seat blank, 3 in. in from the back and $2\frac{1}{2}$ in. in from the side. For the cuts with the back edge of the seat on the table, I set the miter gauge at 85° , first in one direction, then the other, so that the leg posts will cant outward at their 5° angle. On some chairs I also angle the cuts on the sides, to cant the legs backward or forward, but on the rocker design shown here I make the side cuts at 90° . Now using a router with rabbeting bits—regular 90° one for the front edges, and custom-made 85° and 95° bits for the side edges—I rabbet the top and bottom edges of these notches, as in the detail of the drawing on the facing page.

The notches for the front legs are less complicated: they're simply dadoed out at 90° and rabbeted, top and bottom, with a regular 90° rabbeting bit. (For a similar joint, see *FWW* #25, p. 54.) Having cut the leg joints in the seat, I bandsaw its outline. Then I round over the underedge of the seat along the back and the two sides, using a 5-in. dia., 2-wing router bit

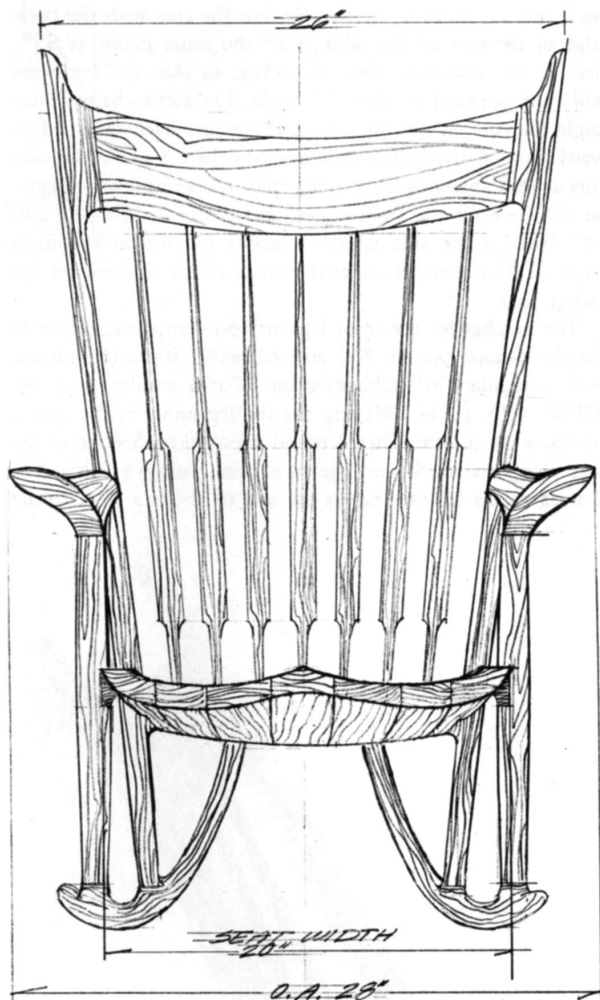
EDITOR'S NOTE

To help celebrate *FWW*'s 40th anniversary, we are reaching into our archives to reprint some classic articles. This one (*FWW* #42) comes from Sam Maloof (1916-2009), the celebrated furniture maker whose signature rocker is instantly recognizable and often reproduced.

CELEBRATING
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*Maloof's most popular
rocker design, in walnut.*



With assistant Mike Johnson tracing the curve, Maloof demonstrates how he casts the shape of a rocker on the piece of particleboard that will be its gluing form. Also shown is the glued-up blank, with platforms for smoothing the transitions between legs and rocker, ready for shaping.

that tapers the seat to about a 1-in. thickness. I leave the area around the joints unshaped, for fairing later. Before fitting the legs, I finish-sand the seat.

With backsaw and chisel I cut the dados in the back legs that fit the rabbeted grooves in the seat. I suppose I could jig up and cut these on the tablesaw, but because the back legs are irregularly shaped and because I vary the angles of the back legs in different chair styles, I find the backsaw easier. Next I bandsaw the thickness of the back legs to $1\frac{3}{8}$ in., leaving the full 2-in. thickness in the area of the seat joint and the crest-rail joint, for fairing. With the leg still basically rectangular in section, I drill a $\frac{1}{2}$ -in. hole in the bottom of the leg to receive the dowel that will connect it to the rocker. To shape the edges of the leg, including the corner that will fit the seat joint, I use a $\frac{1}{2}$ -in. roundover bit, but I leave unshaped the area where the arms will attach, and also the outside edges of the leg, because these will be hard-edged. Now I glue the back legs on, clamping across the width of the seat and from back to front.

I make each front leg out of $8/4$ stock, $2\frac{3}{4}$ in. wide and 18 in. long. First I dado it on the tablesaw on three sides to fit the rabbeted notch in the sides of the seat. I then lathe-

turn the leg, offsetting the center to the outside of the leg, so that the joint area will be thick enough for fairing into the seat. To complete the leg, I drill a $\frac{1}{2}$ -in. hole at each end for attaching the arm and the rocker. I then round over the corners that will fit the rabbet around the seat notch. Now I glue the front legs on. When the glue is dry, I secure all the leg joints, front and back, to the seat with 4-in. drywall screws, countersunk and plugged with ebony.

At this stage, the chair looks like a seat board with a leg at each corner: no back, no arms, no rockers. I fair the leg joints now, sanding to 150-grit before attaching the arms, so that I have room to work. Each arm requires a piece of $8/4$ stock, 6 in. wide and 19 in. long, although I usually cradle two arms on a longer piece. I lay out the arm, locating the dowel hole to attach the arm to the front leg, and saw the flat at the end of the arm to abut the flat on the back leg; this latter joint will be screwed from the back and plugged. Then I freehand-bandsaw the arm, shape it using a Surform, attach it, and fair the joints.

I make the back spindles, seven of them for this rocker, from pieces of $6/4$ stock at least 29 in. long. I also use the waste from the back legs, thickened to $1\frac{3}{8}$ in. I lay out the side

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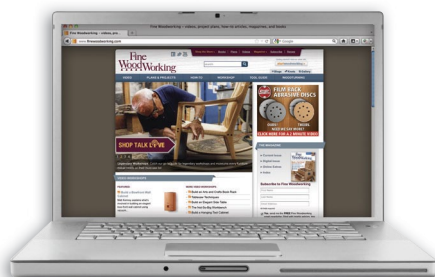


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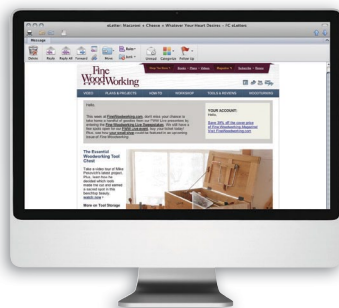


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looking back continued

profile on the face of the board, being careful to avoid areas where the grain will cross the width or the thickness of the spindle, and bandsaw. I also bandsaw and then spindle sand the contour of the spindles as seen from the front. I used to shape the spindles, but one day I had two shatter on me, and I said phooey, there must be a safer way. They're just too slender to feed into the shaper, and it doesn't take that much longer to bandsaw them. I round over the back edges of each spindle with a ½-in. roundover bit, and then shape both ends with a rasp. The end that goes into the seat is ½ in. in diameter; the end that goes into the crest rail is ¾ in. These dimensions are all eyeballed. I shape the slender parts by hand with a patternmaker's file, leaving hard edges along the front. Most of the front of the spindles remains flat.

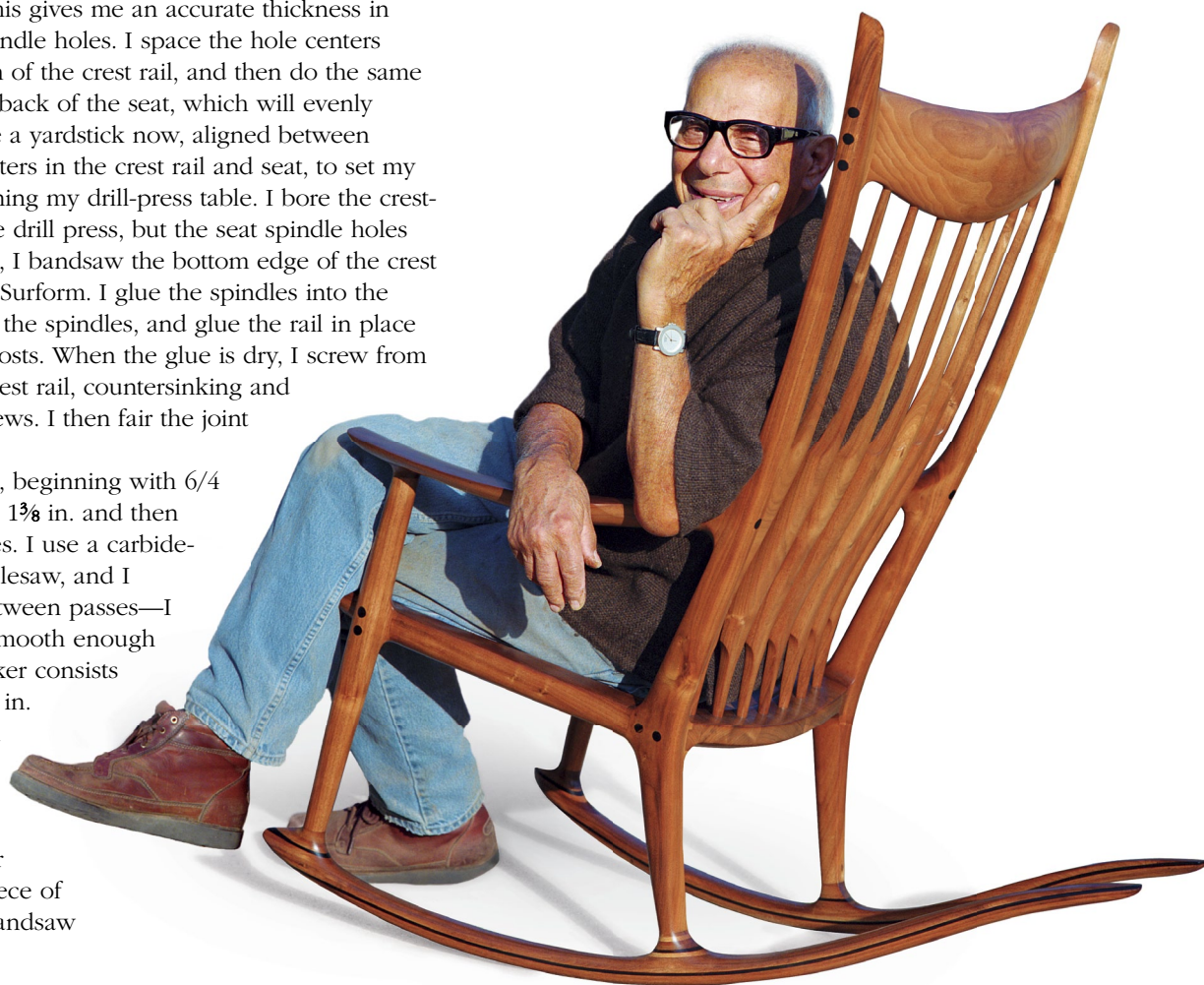
I aim for a rocker that doesn't throw you back or tip you out, and somehow I'm usually right on.

Next I make the crest rail out of 10/4 stock, 7 in. wide and 26 in. long. I cut the ends to the 5° angle that will accommodate the splay of the back leg posts, then bandsaw the curve of the front and back faces. This gives me an accurate thickness in which to lay out the spindle holes. I space the hole centers evenly across the length of the crest rail, and then do the same across the width of the back of the seat, which will evenly splay the spindles. I use a yardstick now, aligned between corresponding hole centers in the crest rail and seat, to set my bevel gauge for positioning my drill-press table. I bore the crest-rail spindle holes on the drill press, but the seat spindle holes by eye. All holes drilled, I bandsaw the bottom edge of the crest rail and shape it with a Surform. I glue the spindles into the seat, fit the crest rail on the spindles, and glue the rail in place between the back leg posts. When the glue is dry, I screw from the leg posts into the crest rail, countersinking and plugging the 2½-in. screws. I then fair the joint and finish-sand.

I laminate the rockers, beginning with 6/4 stock, thickening it to 1¾ in. and then sawing it into ½-in. plies. I use a carbide-tipped blade on the tablesaw, and I don't joint the stock between passes—I find the sawn surface smooth enough for laminating. The rocker consists of seven plies about 48 in. long. To make the form for gluing them up, I bend a strip of wood to a shape that looks right, and have a helper trace this curve on a piece of ¾-in. particleboard. I bandsaw

three pieces of particleboard along this line and face-glue them into a clamping form. I add seven more short plies to form two platforms for fairing the rocker into the legs. Then I glue up, using white glue. To ensure flatness, I clean up one edge of the rocker blank on my jointer, the other in the thickness planer. I round over the outside corners with a ½-in. bit, except in the area where the legs will connect. The rockers rough-sanded to shape, I put them on the flattest surface in my shop, my tablesaw, and mount the chair on top. The platforms allow for up to 2 in. of adjustment, forward or back, in the placement of the chair. I shift the chair back and forth until the rockers come to rest contacting the ground at about 2 in. in front of the rear legs. I find this looks best, and rocks best. I mount the chair to the rockers with ½-in. dowels, 4 in. long in the back, 3 in. long in the front. Then I fair the joint with a rasp.

I finish-sand the whole chair to 400-grit and apply three coats (at two-day intervals) of a three-part finish: equal parts of polyurethane varnish, raw tung oil, and boiled linseed oil, removing all excess oil after each application. I then apply a final coat of a mixture I mix up on a double boiler: a half-gallon each of tung oil and boiled linseed oil, with a couple of handfuls of beeswax grated in. Do this outdoors and be careful—linseed has a low boiling point. The mixture has a long shelf life (stir before using), and leaves a beautiful sheen when buffed with a soft cloth. □



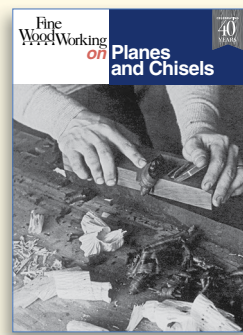
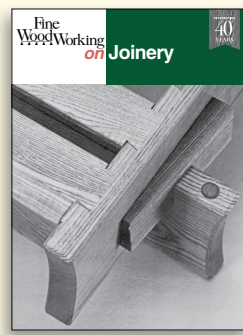
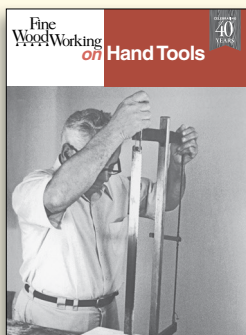
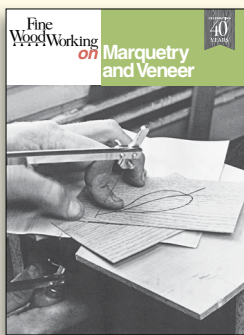
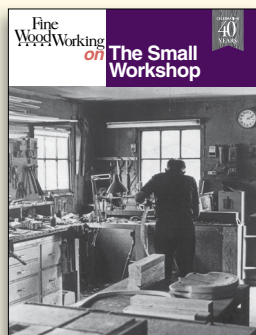
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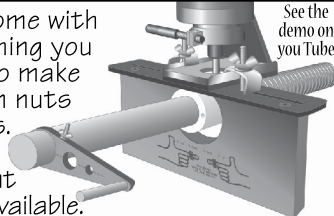
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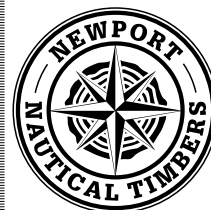


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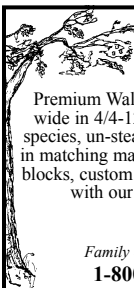
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INDEX TO ADVERTISERS

ADVERTISER	WEB ADDRESS	PAGE	ADVERTISER	WEB ADDRESS	PAGE
Alderfer Lumber Co.	www.alderferlumber.com	p. 88	Infinity Cutting Tools	infinitytools.com	p. 73
American Fabric Filter Co.	www.americanfabricfilter.com	p. 73	Inside Passage School	insidepassage.ca	p. 73
Anderson Ranch Arts Center	andersonranch.org	p. 17	Kay Industries	www.kayind.com	p. 77
The Beall Tool Co.	www.bealltool.com	p. 87	Keller Dovetail System	www.simplifiedovetails.com	p. 87
Berea Hardwoods Co.	www.bereahardwoods.com	p. 9	Knew Concepts	www.knewconcepts.com	p. 88
Berkshire Products	berkshireproducts.com	p. 21	Lee Valley	www.leevalley.com	p. 7
Center for Furniture Craftmanship	www.woodschoool.org	p. 13	Leigh Industries	leighjigs.com	p. 13
Chicago School of Violin Making	www.csvm.org	p. 88	Leigh Industries	leighjigs.com	p. 21
Connecticut Valley School of Woodworking	www.schoolofwoodworking.com	p. 21	Lignomat Moisture Meters	www.lignomat.com	p. 77
Corob Cutters	corobcutters.com	p. 87	Londonderry Brasses, Ltd.	www.londonderry-brasses.com	p. 73
Curvomatic	www.curvomatic.com	p. 21	Newport Nautical Timbers	newportnauticaltimbers.com	p. 87
Custom Branding Irons	www.branding-irons.biz	p. 17	Oneida	www.oneida-air.com	p. 3
DMT	www.dmtsharp.com	p. 7	Osborne Wood Products	www.osborneproducts.com	p. 3
Dowelmax	www.dowelmax.com	p. 21	Osborne Wood Products	www.osborneturnings.com	p. 17
<i>Fine Woodworking</i>	finewoodworking.com/4sub	p. 85	Osborne Wood Products	www.osborneturnings.com	p. 21
<i>Fine Woodworking</i> Books			Philadelphia Furniture Workshop	philadelphiafurnitureworkshop.com	p. 88
Sweeps	www.tauntonstore.com/timeless	p. 87	Pygmy Boats	www.pygmyboats.com	p. 88
<i>Fine Woodworking</i> Online Store	www.tauntonstore.com/shopfw	p. 19	Quality Vakuu Products	www.qualityvak.com	p. 88
<i>Fine Woodworking</i> Sweepstakes	finewoodworking.com/40sweeps	p. 73	Rikon Power Tools	www.rikontools.com	p. 91
Forrest Manufacturing	www.forrestblades.com	p. 17	Rockler Woodworking & Hardware	rockler.com	p. 9
The Furniture Institute of Massachusetts	www.furnituremakingclasses.com	p. 88	SuperMax Tools	supermaxtools.com	p. 13
Goby Walnut Products	www.gobywalnut.com	p. 88	3M Corporation		p. 11
GrnGate	www.grngate.com	p. 11	Triton Tools	tritontools.com	p. 7
Groff & Groff Lumber	www.groffslumber.com	p. 88	Vacuum Pressing Systems, Inc.	vacupress.com	p. 73
Hearne Hardwoods	www.hearnehardwoods.com	p. 9	West Penn Hardwoods	www.westpennhardwoods.com	p. 87
Highland Woodworking	highlandwoodworking.com	p. 17	Whiteside Machine Co.	whitesiderouterbits.com	p. 3
			Woodcraft	www.woodcraft.com	p. 2
			Woodworkers Source	www.balticbirchply.com	p. 88

how they did it

Hardware determines the design

BUILDING A CASE FOR ORNATE IRONWORK

BY JONATHAN BINZEN



Hardware is often an afterthought—the last thing a maker attends to when a cabinet is finally assembled. But in the instance of Tomas Braverman's vargueño (see the back cover), a handsome set of traditional hardware inspired the piece and determined the design. After establishing the size of the fall front by laying out the hardware on the floor, Braverman built a dovetailed case for it out of claro walnut. He designed the walnut turnings of the base to have a Moorish feeling that complements the old hardware, arriving at the shapes by first turning samples in pine. Braverman likes to design as he builds, and he didn't lay out the interior until the carcass was assembled. He made the drawers out of Honduras mahogany and veneered their fronts with slices of spalted curly koa from a long-treasured plank. He designed new drawer pulls to match the old hardware and had them cast in bronze. To antique them, he heated them with a torch, applied gun bluing, and polished them with 0000 steel wool and black wax.

Hand-forged hardware.

Braverman designed his vargueño by first laying out the hardware on the floor to determine a suitable size for the fall front. He also consulted plans of original vargueños and adapted some of the dimensions and carving and turning details. He bought crushed velvet to serve as the traditional background of the iron hardware.



What about the pulls? There were no drawer pulls in the set of hardware Braverman bought, so he designed his own. He carved and turned a slightly oversize prototype pull in walnut using shapes that echoed the old hardware. Then he sent that to a foundry (JD Manufacturing, Hermosa Beach, Calif., 310-376-1556) to be cast in bronze. The final cost was about \$8 per pull.



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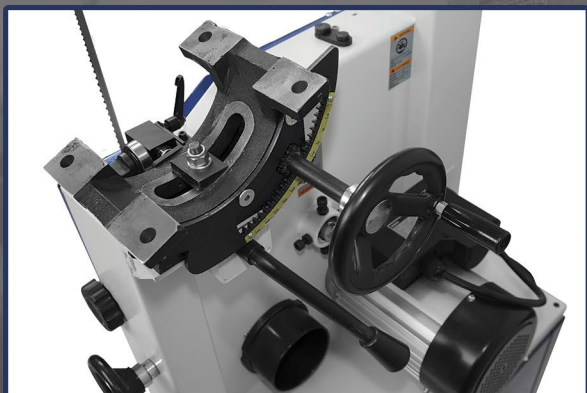
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A New Home for Old Hardware

In 1975, while studying with a Spanish carver, Tomas Braverman went to a flea market in Madrid and found a beautiful set of hand-forged iron hardware for a *vargueño*, the traditional Spanish portable chest for valuables. Such ornate hardware, Braverman says, brings a *vargueño* to life “like the ruffles on a Spanish shirt.” He vowed to build himself

such a chest when time and skill permitted. But some cabinets take longer than others to build. A busy career making traditional Hispanic furniture for Hollywood clients intervened, and it wasn’t until last year that Braverman, with planks of claro walnut and help from his wife, Kiyo, an expert in antique finishes, built a fitting home for the hardware.

—Jonathan Binzen



Photo: Todd O. Fuente

How They Did It Turn to p. 90 to see how Braverman designed this piece to complement the traditional hardware.



Tomas Braverman leads a guided tour of his work.