

Saws for cutting **DOVETAILS** pg 40

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Projects, Techniques, and Products

magazine

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- Quilt-pattern cutting board
- Thomas Jefferson's swivel chair

The Freud logo is displayed in a red, stylized font within a black octagonal border. The background of the advertisement features a large, detailed image of a CNC router bit with a red cutting edge, set against a blurred industrial background. A smaller image at the bottom shows a collection of various router bits, including a red-tipped one, and several circular logos for TiCo, Black ICE, and Perma-Shield coatings.

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Projects

- 24** **Quilt-pattern Cutting Board**
Patch together woodworking, kitchenware, and quilting to create one of the prettiest cutting boards you've ever seen.
- 31** **Narrow Display Cabinet**
Build your hand-cut dovetail skills as you craft this distinctive wall cabinet.
- 45** **Black Walnut & Copper Vase**
Combine walnut and copper to make a unique, functional vase. Plus, learn how to add patina with simple, household chemistry.

Tools & Techniques

- 40** **Saws for Dovetailing**
When the task is hand-cut dovetails, the right saw makes all the difference. We'll help you find the tool to suit your sawing style and budget.

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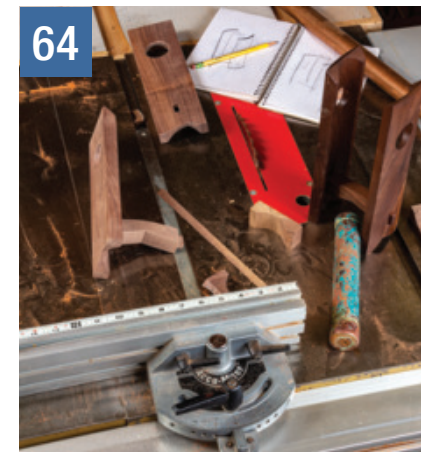
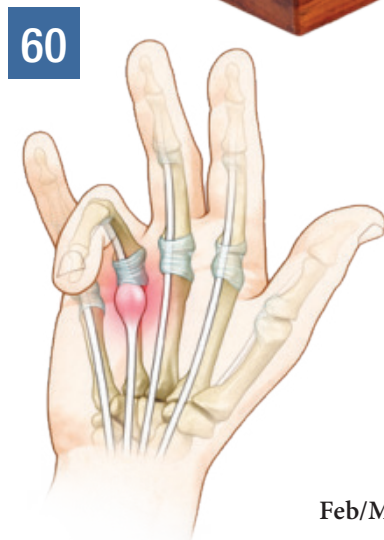
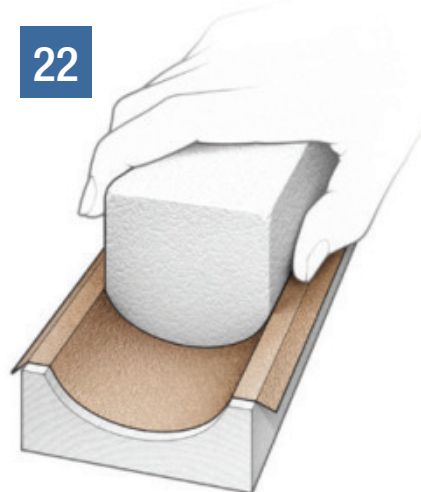
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Contributors



Vaughn McMillan's first exposure to woodworking was at the age of six, when his grandfather helped him build a simple cheese board as a gift for his grandmother. With the guidance of a great shop teacher, he learned woodworking basics in high school. He also credits much of his woodworking education to magazines and friends he has made through online forums. He enjoys turning and making small projects like the Quilt-pattern Cutting Board on page 24. His award-winning work has appeared in art shows and galleries in Southern California. A retired technical writer and editor, he lives in Albuquerque, NM where he plays guitar and performs regularly with his band.



Working in a shop that's a veritable woodworking museum, **Craig Bentzley**, has been restoring antiques and building furniture for nearly fifty years. Steeped in the craft's history, Craig is the right guy to pen our Famous Furniture columns. This issue's entry is about Thomas Jefferson's celebrated swivel chair (see A Revolutionary Chair on page 52). Craig's writing and woodworking acumen have also graced the pages of *WOOD* and *American Woodworker*. His antique restoration and furniture-making skills keep him in high demand. When time permits, he enjoys teaching at Guilds and Woodcraft stores. ■

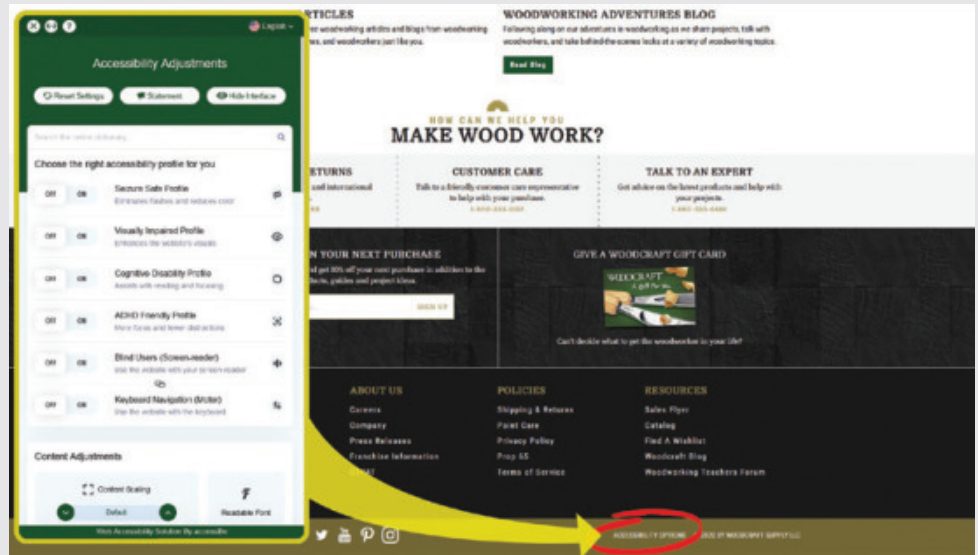
On the Web



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Woodcraft is proud to announce a robust accessibility menu for its website *woodcraft.com*. This new widget makes navigating our website easier for some, and for others, possible for the first time. That includes folks who are visually- and hearing-impaired, people with motor and cognitive disabilities, and an aging population reckoning with muscle weakness, memory loss, and the many other consequences of senescence.

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The upside of downtime

I appreciate working in my shop this time of year, when the frenzied gift-making that overtakes the holidays is in the rearview mirror. I like the calm, the re-centering. Clearing my bench. Clearing my mind. No banshee-wail from the dust collector or whirl from the air filtration unit. My saws and routers are quiet. It's time to reset the shop after the wreckage left in the wake of a holiday-project monsoon.

I sweep the floors, tuck away my tools, and organize stray hardware. Now's a great time to resharpen my chisels and planes, clean my bits and blades, and tune-up the machinery. I even find joy in emptying the dust collector, taking out the trash, and replacing filters. Hey, it beats sanding.

But when the dirty work is done, and I don't have a project deadline banging on my shop door, I'll settle into the respite by practicing some techniques. I find that no matter how accomplished I am at a particular task, it never hurts to test my talents by, for instance, cutting dovetails by hand. Sawing straight lines requires rehearsal, and paring consistent pins take practice. I also take the opportunity to learn entirely new skills and techniques.

If you, too, are looking to make good use of post-holiday downtime while working your way into the new year, you'll discover plenty in this issue to help you out. For starters, on page 31 you'll find a lesson in hand-cutting dovetails wrapped in a gorgeous display cabinet. Why not gain or polish a valuable skill while giving birth to something beautiful? A companion story on page 40 demystifies the handsaws used for such joinery. Another project rife with lessons is the distinctive vase-on-stand on page 45. It highlights unusual procedures like cutting coves at the table saw and applying a shop-made patina to the copper pipe vase. And the quilt-pattern cutting board (p. 24) features unique design and glue-up challenges. Fun experiments when you don't have looming obligations.

The point is, you showered your loved ones with presents, so take some time to give yourself the gift of continuing education. You better make the most of the unrushed hush before someone starts tugging at your sleeve again! ■



Share your ideas.

We love hearing from readers! And there are all kinds of reasons to get in touch with the crew at *Woodcraft Magazine*. Check out the details below.

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Have a tough woodworking question?

We'll do our best to find the expert and provide the answer. Email us at editor@woodcraftmagazine.com and put "Expert Answers" in the subject line.

News & Views:

This catch-all column is where we do our best to correct mistakes, publish feedback from readers, and share other noteworthy news items. It's easy to participate in this discussion. Just email us at editor@woodcraftmagazine.com and put "N&V" in the subject line.

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magazine

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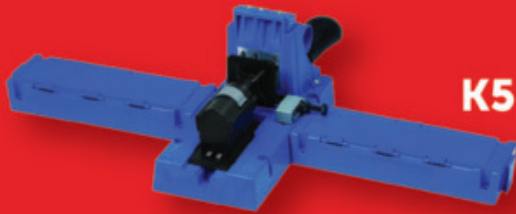
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MIKE FARRINGTON

*Woodworker, content creator;
a lesson in contradictions*

Colorado cabinetmaker Mike Farrington began our conversation by telling me he wasn't comfortable around people. Despite this introversion, the hour that followed was filled with friendly conversation, woodworking insights, and philosophical tidbits often cloaked in his distinctive dry wit. Despite an aversion to woodworking instruction on social media, Mike produces videos for his eponymous YouTube channel that have gained him a broad following. While he demonstrates diverse abilities in the videos, his preferred styles stand at opposite ends of the spectrum — simple shaker and complex Kumiko. Even the music he listens to in his shop and recommends at the end of each of his videos runs the gamut from classical to classic rock to rap. If he wasn't a woodworker, he would be a musician, he jests while acknowledging that he can't carry a tune in a bucket. Tying all of it together, though, is a love of the craft and a desire to share it with others despite his confessed misanthropic nature. —Derek Richmond

WM: What gets you out of bed every day and into the workshop?

MF: I work hard and do my level best, but I don't like taking orders. I like to physically build something. It's cool to work on a project for a couple of days or weeks then stand back and say, "Hey, look, I built that." That's what drew me to woodworking. It is physically challenging, but it does make you feel good too.

Then you have something like Kumiko that's an escape from the normal stuff. Once I figured out that a hand plane and a jig can give me a perfect angle on the end of a tiny piece of wood, Kumiko came easy. It's just figuring out the jigs. I like being able to sit down and make a piece without having to do a ton of thinking — you can just zone out, put on some music, and enjoy the sounds of the woodshop.

WM: How would you describe your style?

MF: The best thing about working with customers is it forces you to be all over the map. That's given me the chance to work in a million different design styles. Variety is the spice of life. I'm a simple guy. I like modern, not ultra-modern, but a really good execution of a contemporary shaker look. Then, once in a while, something like a highly complex Kumiko panel catches my eye. Maybe it's not normal to be pulled in a couple of different design directions, but that's part of the fun — to put together two things that don't belong together and figure out how to make it look nice.

WM: What made you decide to start producing woodworking videos?

MF: I get a kick out of teaching. That's been a big motivation for me to jump on YouTube. My channel has allowed me to teach at a high level. I want to create an educational and fun feel for anything that I put out there. I never had the dream to become famous on YouTube. If you can develop a social media machine, whether you are an idiot or a master craftsman, you can get people to believe whatever you say. Good camera angles and



Nice socks. Mike keeps a pair of these cherry and ebony tables in his own home.

good lighting make you seem like an expert. That trend annoys me.

I wouldn't necessarily say YouTube videos are the way to learn woodworking. I would turn people toward magazines and other publications. At least they have editors looking at them. On YouTube, if you have a cell phone and a table saw, man, you're a professional woodworker.

WM: How has your social media presence changed your perspective on woodworking?

MF: On social media, people want to show only the best, and I attempt to combat that. Your project will have flaws. Accept and learn to love those flaws. Be at peace with those little things. Focus on completing the project and relishing in the achievement, and woodworking will be a much more enjoyable hobby. A lot of woodworkers will build something and then point out their mistakes, "Well I screwed



Built in to stand out. Mike designed and installed this custom alder cabinet for a client's precious book collection.

up this part, and the door is a little off blah, blah, blah." Don't ever say that to anybody; just know that the mistakes are there and be ok with them. It's a beautiful indicator that the piece was handmade. Never forget what an honor it is to be able to take a piece of once-living material and turn it into something, no matter what the project is or who it's for or what tools you have.

WM: You have an array of large woodworking machines in your shop.

MF: Every tool in here, I bought used or broken for pennies on the dollar and fixed them up. I just bought a 16-inch jointer for three hundred bucks that was in some dude's barn for 35 years. I bought a 20-inch planer that weighs more than my wife's car, and cost even more when it was new. I had to drive 1,098 miles in a day but I picked it up for fifteen hundred dollars. Rather than paying for a new tool, I'll work on it here



and there over a few months and at the end of it, have a very nice tool.

If you have the means to pick up a new tool, design a project around it. If you're going to buy a lathe or a bandsaw, use that purchase to create a project and learn a new skill set. The best thing about woodworking, either as a hobby or as a profession, is that the learning will never ever end. There are so many facets to explore within woodworking that if you get bored of it, that's kind of your own fault. ■

Advice for Novice Woodworkers

- Experiment in different styles.
- Accept the flaws in your project. Learn from them, but don't point them out.
- Buy used tools and fix them up — be patient.
- Design a project around a new tool purchase — get a new tool and a new skill set.
- Keep learning and exploring the many facets of woodworking.



Star of the show. Mike is drawn to the complexity of this Kasane-Rindo kumiko panel.



Bob Bascom and his wife, Ruth Esherick Bascom

Bascom's legacy continues

We are saddened by the loss of Mansfield "Bob" Bascom, who died on October 26, 2020, at the age of 96. Bascom was Wharton Esherick's son-in-law and biographer. He was also the co-founder, along with his wife, Ruth Esherick Bascom, of the Wharton Esherick Museum in Paoli, PA, and was instrumental in preserving Esherick's artistic legacy. His legacy, and that of Esherick, will live on in the museum, which recently announced a \$10 million endowment gift from the Windgate Foundation. Bascom learned of the gift a few weeks before his passing. For more information, visit whartonesherickmuseum.org.

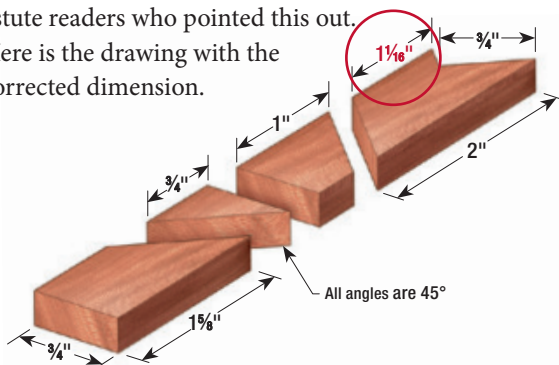
A puzzling dimension

The Broken Tee puzzle drawing on page 44 (Two for Tee, Dec/Jan 2021) has an error. On the largest piece, the dimension labeled as $1\frac{1}{16}$ " should be $1\frac{1}{8}$ ". That's the only way to get all the angles to be 45°.

—Steve Corwin, via email

Senior editor Ken Burton replies:

Good catch, Steve. Thanks to you and several other astute readers who pointed this out. Here is the drawing with the corrected dimension.



Robert Sorby
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Wooden trunk?

The Kissmas Tree (Dec/Jan 21, page 28) is a neat little project, but I'd like to carve or turn my own finial as the article suggests. Could I swap a dowel for the threaded rod and simply glue the base and finial to it?

—Laurence Wyatt, via email

Associate editor Derek Richmond replies:

A dowel could work, but the rod allows the pieces to be tightened together for stability when standing and for security when packed flat. The rod also allows for seasonal changes in wood. No matter how much you compress the all-wood pieces when you glue on your ends, shrinking wood in the dry winter air will likely leave the branches rattling by the holidays. If you build it in a dry environment, a swing in humidity will cause the wood to swell, possibly popping the glue joints. A better solution is to install a tee-nut into the bottom of your handmade finial, allowing it to screw on like the spike nut finial used in the story. ■

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Reader Showcase



RICHARD SERPENTINI,
MIDDLETOWN, NY

That takes the cake. A retired jeweler and life-long woodworker, Serpentine saw something familiar in Bill Sands's saw blade safe (June/July 20). Serpentine built this storage box in 2018 to house his wife's extensive collection of bakeware. From the sliding shelves to the exterior color, Serpentine suspects our contributor might have taken inspiration (and maybe some baked goods) from his kitchen. If baking doesn't work out, at least Serpentine will have a place to store his saw blades.



CLIFFORD UTERMÖEHLEN,
COLORADO SPRINGS, CO

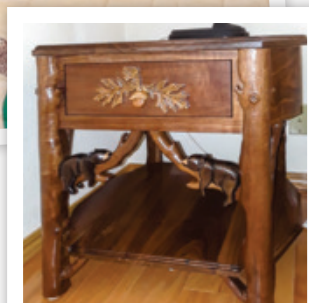
Stego-drawer-us. For his dinosaur-obsessed grandson's fourth birthday, the Colorado woodworker designed and built this bandsaw box from laminated red oak. The drawer provides a place to stash valuables, while the spikes add a layer of protection.



MARK GALASSI,
MENASHA, WIS

This one is just right.

When his nature-loving son needed a bed, Galassi carved a black bear headboard from poplar. The bedside table, from black walnut, continues the theme showcasing sleeping bears in the boughs of the tree-shaped legs. Peg joinery is used in both pieces, without the need for nails or screws. Bear-y nice!



JOHN GONDEK,
PLAINVILLE, CT

Board and Aggravated. Gondek crafted this unique version of the popular board game Aggravation from $\frac{3}{4}$ -inch cabinet grade plywood finished with walnut stain and framed in padauk. The game-play lines were added with paint markers. If a sore loser flips the board, there's a four-player version on the back side! ■

Show off your work!



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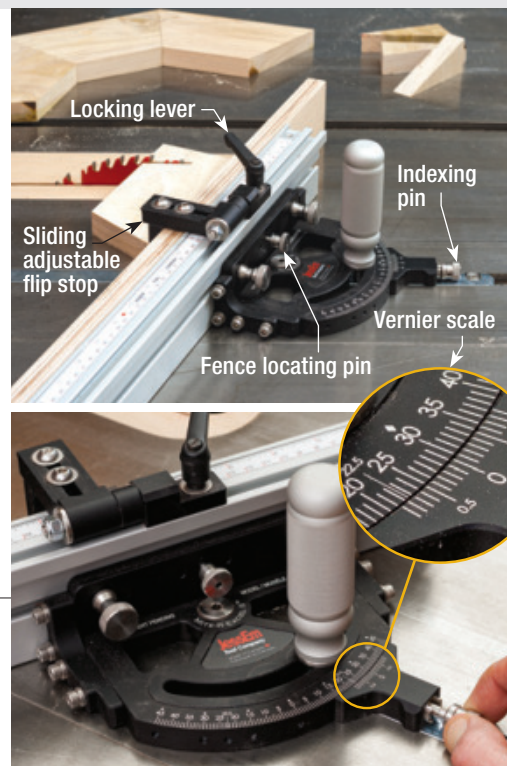
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- Vernier scale for tenth-degree miter adjustments
- Miter bar "snuggers" ensure miter gauge slides perfectly in your miter slot



Canadian toolmaker JessEm has introduced a substantial sequel to their popular Mite-R-Excel table saw miter gauge. Impeccably made, this drool-worthy accessory is flush with well-designed features, and is one of the best accessories you can get for your table saw. The head is solid machined aluminum, and sports easy-to-read, dead-accurate, laser-engraved markings. The Mite-R-Excel II comes with straightforward instructions and everything you need for assembly and adjustment. I had the unit together and was cutting box parts in an afternoon.

As for features, the head squares to the table and the guide bar via a few accessible screws. Three "snuggers" along the length of the guide bar adjust to fit your saw's table slot. A sliding stop on the 20"-long fence accommodates an auxiliary fence up to 3/4" thick. The fence includes an internal telescoping arm outfitted with a stop at its end that reaches to 36". A fence-locating pin in the head allows quick resetting of the fence to the proper distance from the blade when reverting back to 90° after a miter cut.

To set up to cut any of the most common angles

(15, 22.5, 30, and 45°), loosen the handle, retract the spring-loaded indexing pin, and rotate it to lock it out. Swing the head to the desired detent, reengage the pin, and retighten the handle. For all other angles, follow the same procedure, but leave the indexing pin locked out. A Vernier scale helps to dial in angles to a tenth of a degree. The unit is configured to work only in the left-hand slot of a table saw, but that's not really a limitation for most work. My only complaints are minor. One is that the flip stop moved slightly under light pressure, but tighten-

ing its locknut remedied that. Also, the rearmost guide bar snigger hangs off your saw when cutting wider boards, potentially compromising accuracy.

Anyone who finds it tough to justify spending \$300 on a miter gauge has probably never used a top-shelf model like this. But you get what you pay for, and the Mite-R-Excel II is rock-solid and smart. Every part is beautifully machined with clean lines and smooth edges. Most importantly, this feature-rich tool delivers the goods with precise, repeatable crosscuts and miters. —Tester, Chad McClung



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Mohawk puts their spin on turners' finishes

Wood Turner's and Plastic Polishes

Mohawk Finishing Products recently added two new turning finishes to its already substantial line of wood polishes—one for wood and one specifically for plastics.

Both finishes are applied to turnings the same way. The manufacturer advises sanding through at least 800 grit, then using a soft cloth or paper towel to apply the polish in an end-to-end motion with the lathe running at a low

speed. Wipe off the excess, and repeat as desired.

The woodturning finish is a traditional friction polish and has a color and consistency similar to gravy. It is easy to apply, with minimal splatter off the turning at low speed. Missing from the instructions on the bottle is the fact that, because this is a friction polish, heat and pressure are needed to build any gloss. After applying the liquid at a low speed, increase the lathe speed and

Overview

- Liquid high-gloss polishes
- Easy application
- Designed for wood and plastic turnings

apply a good bit of pressure with a clean rag. Let the turning (and your fingers) cool down before applying additional coats. I found that 2-3 coats gave optimal gloss, while additional coats had minimal effect.

I tested the polish on a pair of pens and a bowl. I sanded the bowl to 1200 grit, and gave the pens the micro-mesh treatment to 12,000 grit. Despite the difference in prep, the degree of final shine was negligible.

Mohawk bills the wood turner's polish as "high gloss," but the final sheen is less glossy than other friction polishes on the market.

While both the wood and plastic polish tout use on carvings and flat surfaces in addition to turnings, no instructions are provided. I tried the wood finish on the top of a vase that couldn't be finished on the lathe. After sanding, I rubbed on a coat of finish before wiping off and buffing. A good bit of elbow grease gave a shine on the flat surface that approached the lathe-finished sections, but it didn't come easy. This is a finish best applied on a running lathe.

In contrast, the plastic polish shined up acrylic



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pens nicely when following the printed instructions. And when applied after micro-mesh sanding, the shine was even brighter. The plastic polish has the color and consistency of everyone's favorite typo correction fluid, making it easy to tell where the polish has been applied and where it's been buffed. Like the wood turner's friction polish, the plastic polish benefits from increasing the lathe speed and applying significant pressure after initial application.

I tested the plastic polish on a variety of pens turned from acrylic, acrylester, and alumilite resin. All three materials polished up brilliantly with the Mohawk finish, and spared the mess

and time commitment of a cyanoacrylate finish.

Curious whether the wood or plastic finish would fare better on popular burl-and-acrylic pen blanks, I applied each finish to a turned and sanded would-be pen. The plastic polish shined up the acrylic but left the wood portion dull and muddy. The wood polish, on the other hand, shined both the acrylic and burl portions to a glossy finish—not surprising since pen-turners have used similar friction polishes on acrylic pens for years.

Overall, while the wood finish is ultimately comparable to other friction finishes on the market, the plastic polish shined—both literally and figuratively. ■
—Tester, Derek Richmond



Mohawk Wood Turner's Friction Polish #173572, \$19.99
Mohawk Plastic Polish #173573, \$14.99

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*By J. Kelly Casey
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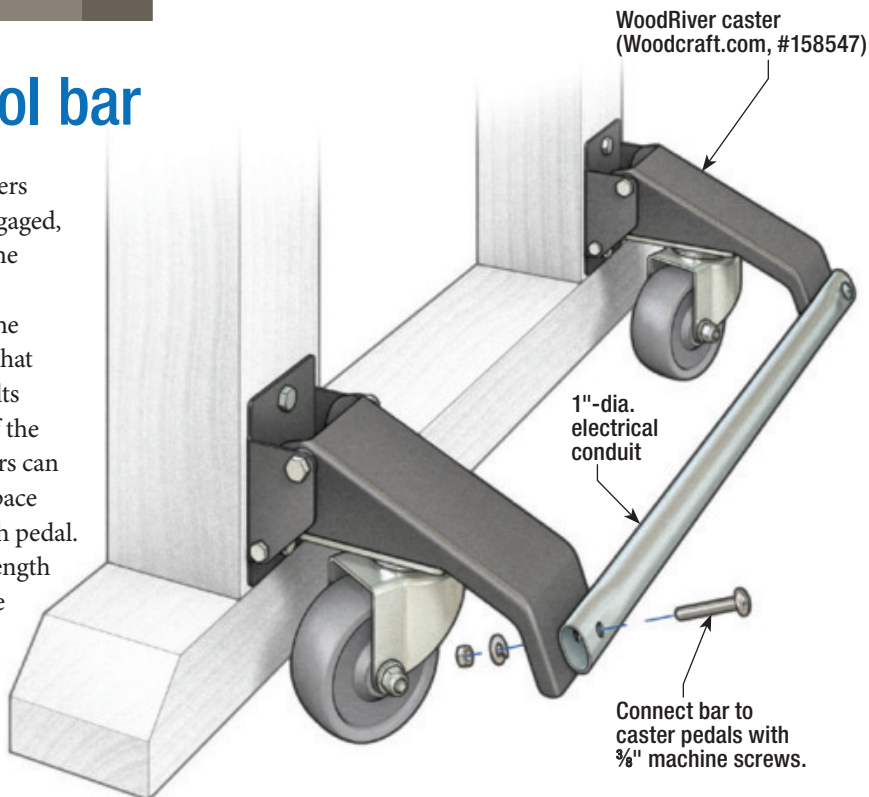
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TOP TIP

Bench caster control bar

I outfitted my workbench with pedal-style casters that attach to the sides of the legs. When disengaged, these wheels allow the bench to sit solidly on the floor. For mobility, stepping on each pedal lifts the bench slightly to transfer the weight onto the casters. They work great for the job, but I find that individual operation of the pedals cocks and tilts the bench, sometimes sending items rolling off the top. Also, raising the pedals to retract the casters can be a bit cumbersome, as there isn't much toe space underneath, so I have to stoop down to lift each pedal. Turns out the solution was simply to attach a length of 1"-diameter electrical conduit to connect the two pedals on each end of the bench. After cutting the pipe to length, drill $\frac{3}{16}$ "-diameter holes near each end, and slightly flatten the ends in a vise. Then clamp the pipe to the caster pedals, and drill the mating holes in the pedals. Finally, make the connections with $\frac{3}{16}$ " $\times$ 1 $\frac{1}{4}$ " machine screws, lock washers, and nuts. Now it's a quick, easy foot-push on each bar to raise that end of the bench. And there's plenty of toe room to lift the bar for retracting the casters.

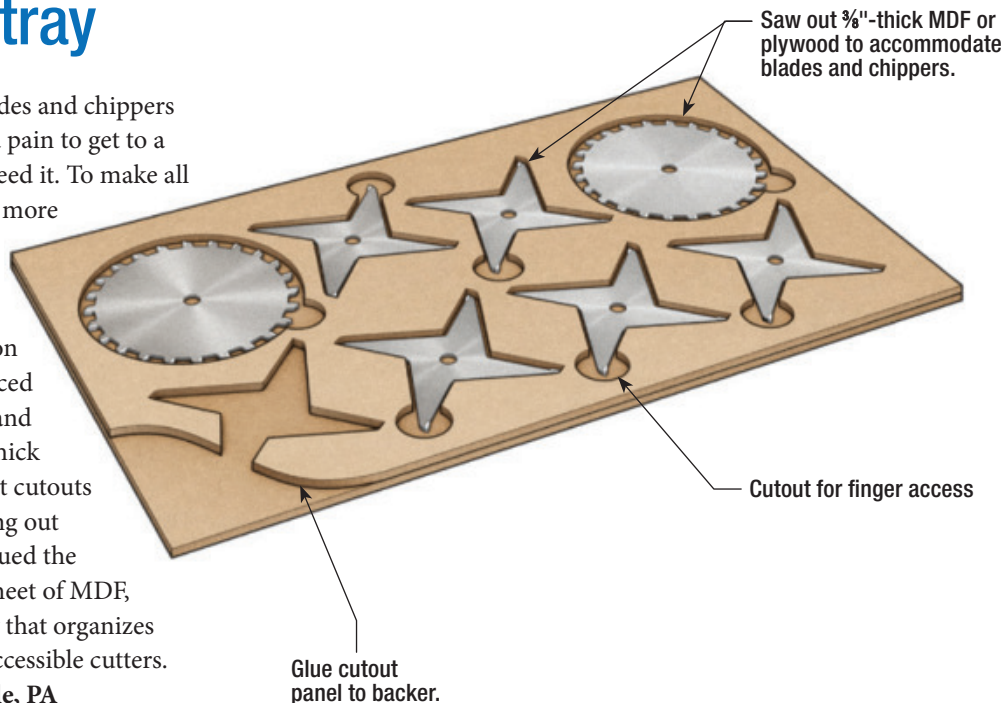
—Tom Rosga, Hinckley, Minnesota



Dado blade tray

I find that stacking dado blades and chippers on a spindle often makes it a pain to get to a specific chipper when you need it. To make all my dado components much more accessible, I made a tray to accommodate them, placing it atop a cabinet under my saw's side extension table. To make the tray, I traced out the shape of each blade and chipper onto a piece of $\frac{3}{8}$ "-thick MDF, incorporating adjacent cutouts for finger access. After cutting out the shapes with a jigsaw, I glued the cutout panel onto another sheet of MDF, creating a custom-fitted tray that organizes and protects my now very accessible cutters.

—Rob Spiece, Schwenksville, PA





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Routing through-mortises in thick stock

When faced with cutting a through-mortise in a 3"-thick slab, I opted to rout it using a combination of commonly available pattern and flush trim bits. First, I made a template from ½" plywood, cutting an opening in it the exact size of my desired mortise. After securing the template in place, I installed a 2"-long, ½"-diameter pattern-routing bit (with a top mounted bearing) in my handheld router. Then I routed out the waste, keeping close to the edge without hitting it. When the mortise was deep enough for the bearing to ride the template, I routed the full perimeter. After drilling out most of the remaining waste with a large spade bit, I switched over to a ½"-diameter flush-trim bit (with a bottom bearing). Entering from the opposite side of the slab, I trimmed away the remaining stock with the bearing riding against the previously routed surface. The result was a hole with straight sides completely thru the workpiece.

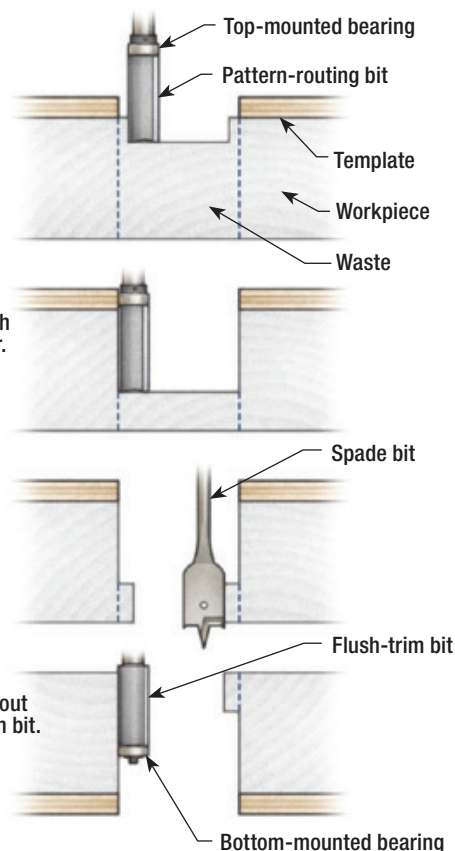
—Stephen Gross, Santa Fe, New Mexico

Step 1:
Remove waste,
avoiding template.

Step 2:
When bearing aligns with
template, rout perimeter.

Step 3:
Drill out most of
remaining waste.

Step 4:
Entering opposite side, rout
perimeter with flush-trim bit.



Complementary sanding backer

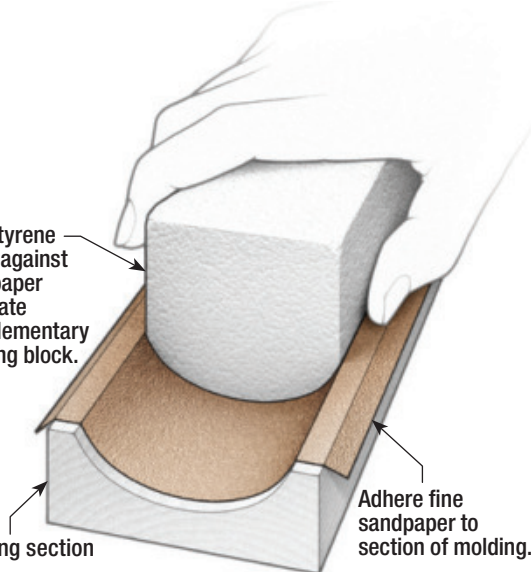
It's easy to make a sanding block that perfectly matches many coves. Just adhere fine sandpaper to the face of the target surface, and then rub a piece of packing styrene against the paper as shown. You now have a perfectly complementary styrene backer that you can wrap with sandpaper.

—Paul Anthony, senior editor

Rub styrene
block against
sandpaper
to create
complementary
sanding block.

Molding section

Adhere fine
sandpaper to
section of molding.



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White board in the wood shop

Many contractors rely heavily on dry-marker white boards for scheduling, sketching, notes, and reminders to name just a few uses. I find that they are just as useful in the shop. In addition to boards, the material is available in thin sheets with self-adhesive or magnetic backing. Suitably-sized and strategically-placed pieces of the material can be adhered to various machines to make notes regarding cutter details and settings, as well as machine maintenance records. ■

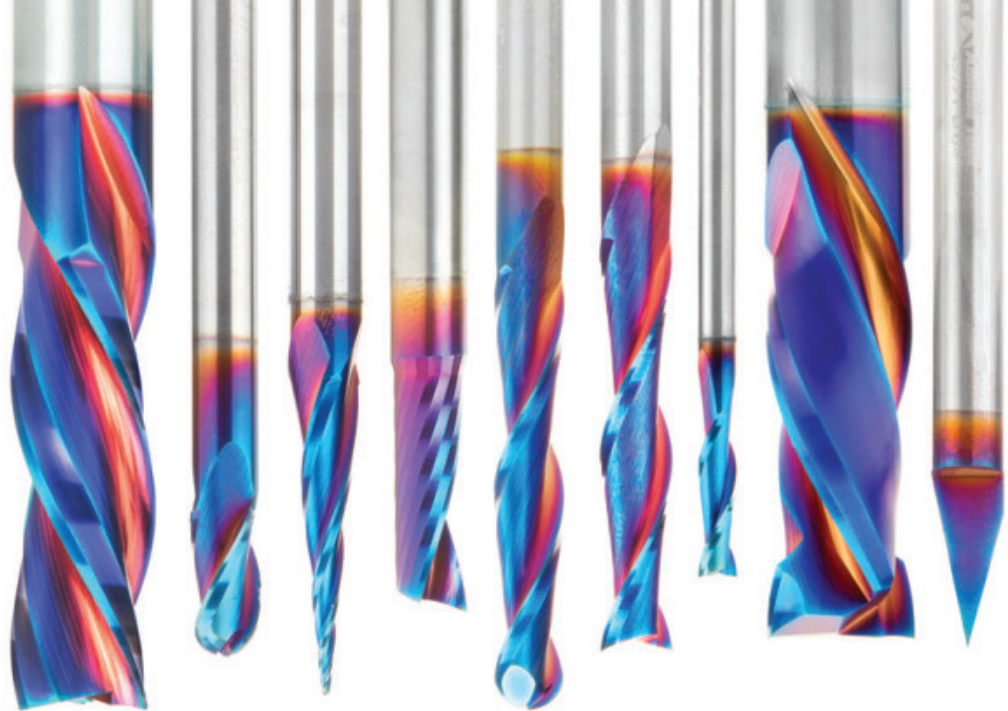
—Larry Koch, North Adams, Massachusetts

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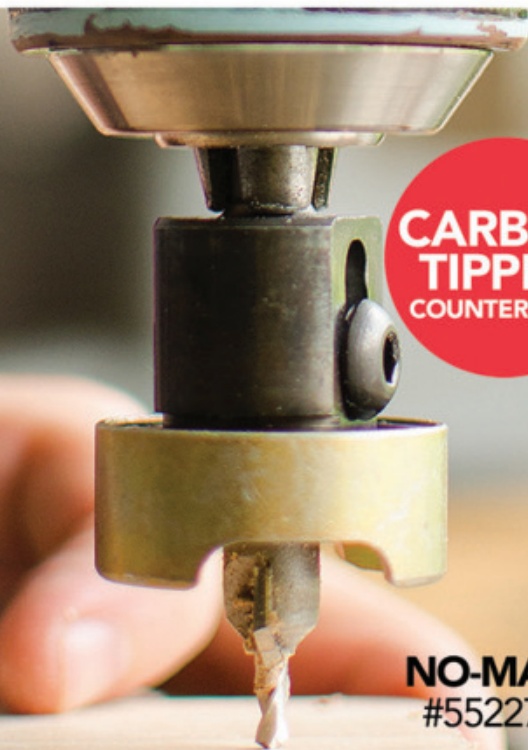
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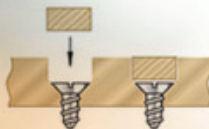


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Quilt-pattern CUTTING BOARD

This might be the prettiest kitchen helper you ever use

By Vaughn McMillan



A quilter friend recently requested a cutting board featuring a quilt pattern design. As if the challenge of incorporating a fabric-based pattern into wood wasn't enough, I wanted to make this project an end grain cutting board. With an end-grain surface, the knife spreads the wood fibers apart rather than slicing across them, preserving both the cutting surface and the knife's edge.

The design I developed requires precise cuts to accomplish tight joinery and a crisp pattern, but the technique offers near-infinite possibilities depending on wood choices and geometric layout. Laminated sandwiches of contrasting woods and corner blocks border a core pattern. The border stock should also be oriented end grain up like the rest of the blocks, so the parts move in unison throughout

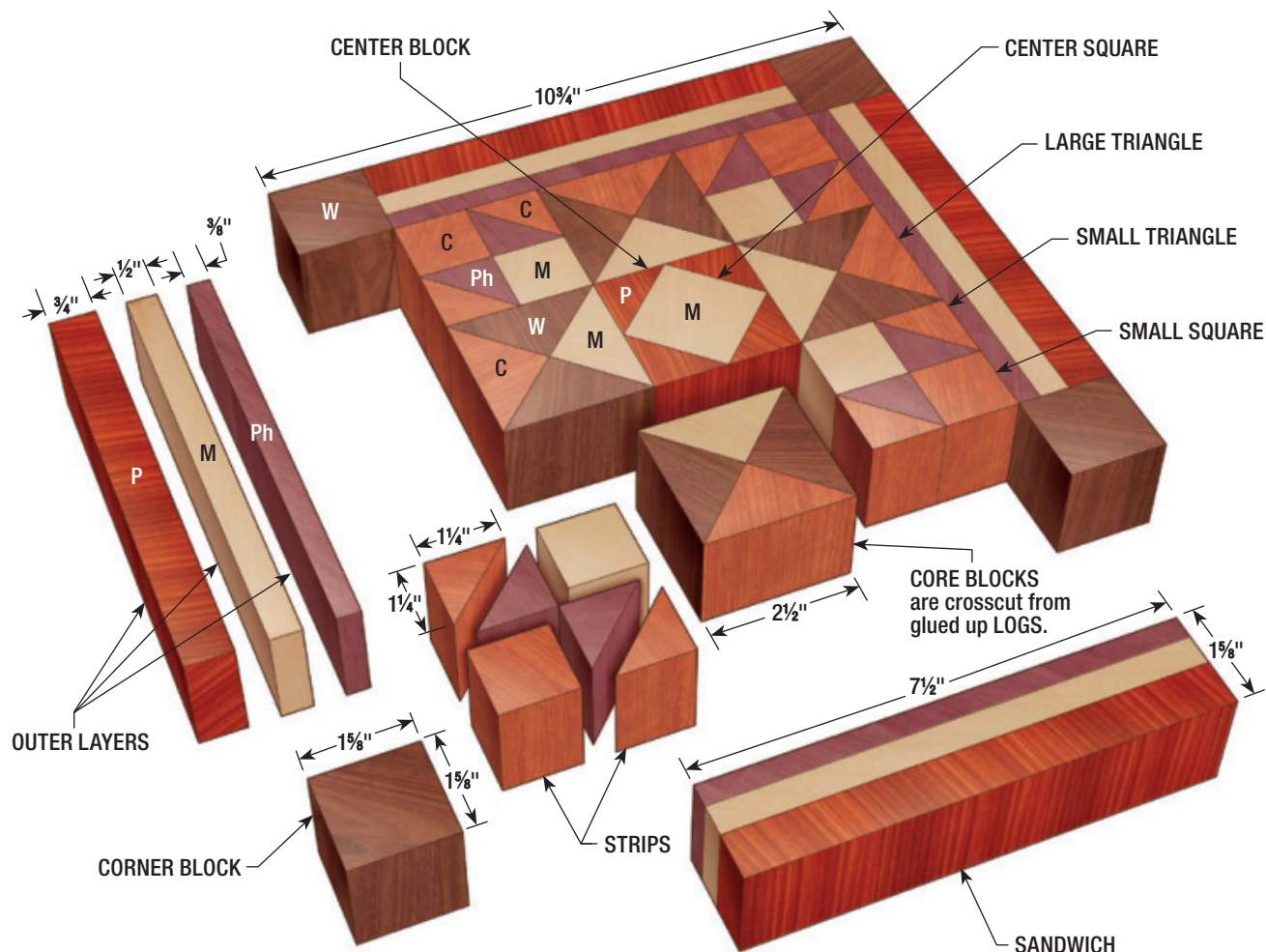
the seasons. You'll need wide boards to accomplish this, or if your jointer isn't wide enough, edge-join two narrower boards to make up the width. Just keep the seam centered. I don't recommend edge gluing to create the blocks that make the core, as glue seams would distract from the geometric pattern. This project is perfect for the quilter in your life or anyone who appreciates attractive kitchenware.

A complex configuration from several simple parts

The design incorporates maple, walnut, cherry, padauk, and purpleheart, but any tight-grained, contrasting hardwoods will work. To create the pattern, cut individual triangular and square *strips* 36" long. Crosscut these strips to 18" and glue them into two logs that are crosscut into the two sets of repeating 4"-long *blocks*. Also, a

single 4"-long log serves as the center block. Glue the nine blocks together to form the *core pattern*. Next, glue together the three *outer layers* to form the *sandwich*. Crosscut the sandwich and add *corner blocks* (I used a turning blank, see Buyer's Guide, p. 62.) to make up the border. Glue the border parts to the core in turn, then resaw

the resulting 4"-thick assembly in half to get two approximately 10 $\frac{3}{4}$ "-square by 1 $\frac{1}{2}$ "-thick cutting boards. Feel free to adjust these dimensions to match your needs and lumber availability. Just make sure all the core blocks are the same size and perfectly square before attempting glue-up.



Order of Work

- Rip individual strips
- Glue strips into logs
- Crosscut logs to blocks
- Glue blocks into core pattern
- Add border "sandwiches" and corner blocks
- Resaw in half
- Flatten each half with a router and sled
- Round over and finish

Wood Key

C=Cherry; M=Maple; P=Paduk;
Ph=Purpleheart; W=Walnut

Special Thanks

Thanks to Cormark International for supplying the lumber used to make this project. For more information, or to buy stock for your cutting board, visit cormarkint.com.

Assembling the core pattern

Mill all the stock for the core strips to 1¼" thick by at least 5" wide (I used 7") by 36" long. Include some scrap lumber for test cuts and setups. Be sure to run all the pieces at the same planer setting to ensure consistent thickness. Rip the triangular strips by cutting bevels on both sides of the blade as shown. Return the blade to 90° and the fence to the right to cut the square maple and cherry strips, running the bevel edge against the fence. Crosscut the strips to length, and glue up the logs with the help of shop-made clamps as shown. After the glue has cured, run each 18"-long log over the jointer, taking very light passes (no deeper than ½") to square two adjacent faces. Then finish squaring up the logs at the planer. (Clean up the 4" long center block at the table saw, if necessary.) In the process, you might shave off a tiny bit of one or more points, but strive to keep the pattern as consistent as possible. Crosscut the 18" logs into 4"-long blocks and mark for easy pattern reorientation. Arrange the nine core blocks into the pattern and glue them together as shown.



Cut the small triangles.

Make a 45° bevel cut on the edge of each species. The resulting offcut provides the small purpleheart and cherry triangles. The offcut from the maple and walnut is waste. You'll also need triangles this size from padauk stock for the center block of the core pattern, but you can cut that strip from an 18"-long piece.



Cut the large triangles.

After cutting the small triangles, keep the blade set to 45° but move the fence to the left side of the blade. Orient the board so the 90° edge runs along the fence and the bevel faces down. (For right-tilting blades, the bevel should face up). Make a ripcut on the edge of the board as shown to produce the larger triangle pieces (walnut, cherry, and maple).

Core Pattern Strip Chart

Species	Rip	Qty.	Crosscut	Qty.
Small Triangles				
Cherry	1¼ × 36"	1	1¼ × 18"	2
Purpleheart	1¼ × 36"	1	1¼ × 18"	2
Padauk	1¼ × 18"	1	1¼ × 4"	4
Large Triangles				
Cherry	2½ × 36"	1	2½ × 18"	2
Walnut	2½ × 36"	1	2½ × 18"	2
Maple	2½ × 36"	1	2½ × 18"	1
Small Squares				
Cherry	1¼ × 36"	1	1¼ × 18"	1
Maple	1¼ × 36"	1	1¼ × 18"	1
Large Square				
Maple		1	1¾ × 4"	1

To yield the 1¼" thick stock for this project, you may need to start with 8/4, as 6/4 stock isn't commonly available. I used these dimensions to cut the strips:

CORE PATTERN:

- Padauk: 1¼ × 5 × 18"
 - Maple: 1¼ × 5 × 36"
 - Walnut: 1¼ × 5 × 36"
 - Purpleheart: 1¼ × 5 × 36"
 - Cherry: 1¼ × 5 × 36"
- (This provides extra material for safe handling.)

SANDWICH:

- Padauk: ¾ × 7¾ × 18"
- Maple: ½ × 7¾ × 18"
- Purpleheart: ¾ × 7¾ × 18"

CORNER BLOCKS:

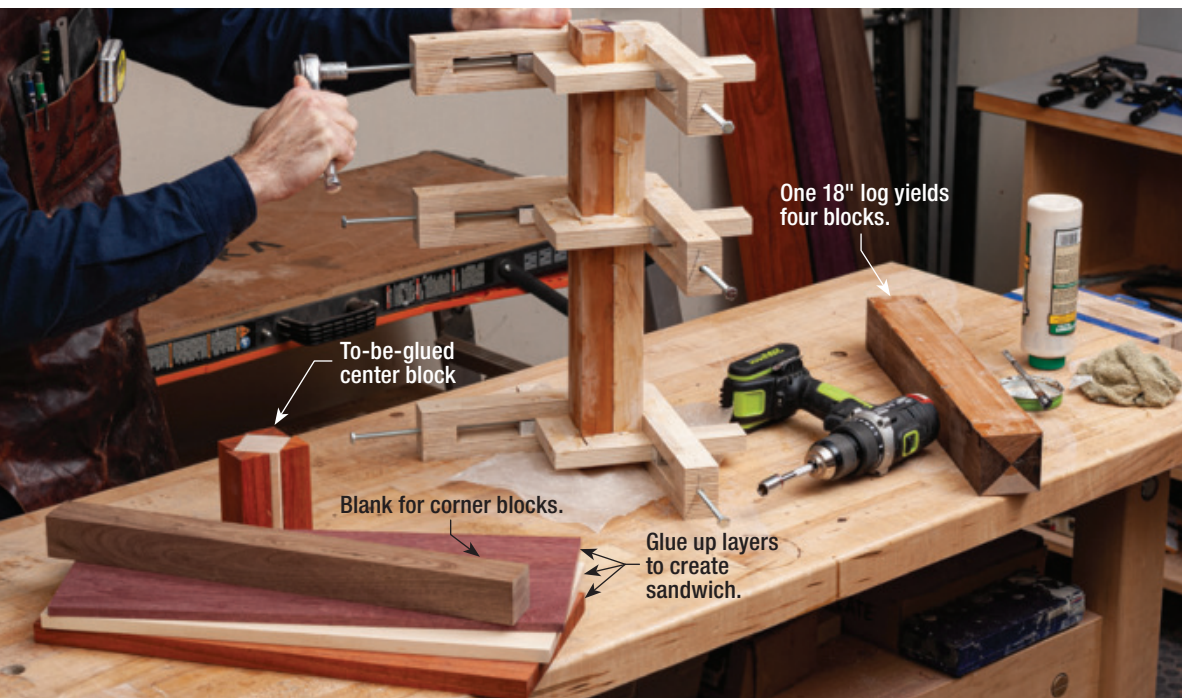
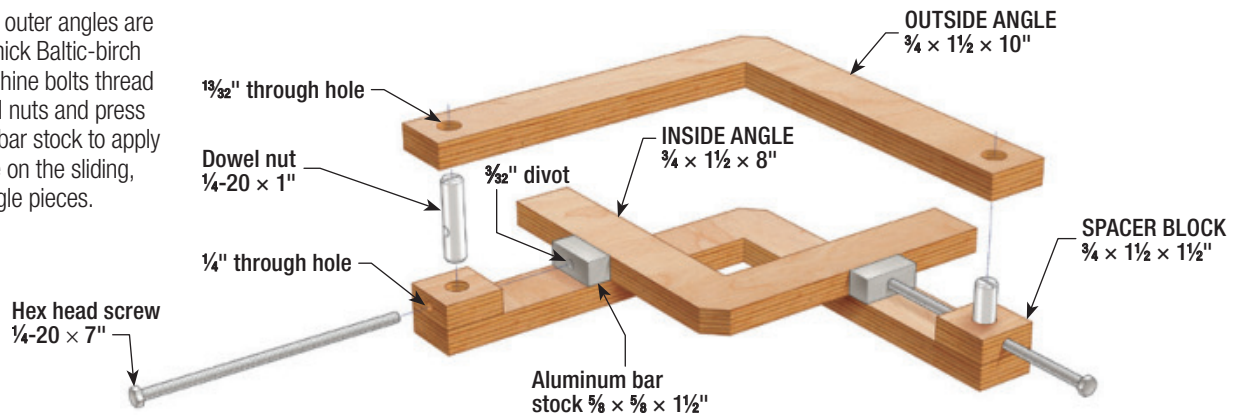
- Walnut: 1½ × 1½ × 18"

Saw Safety

The stock required for this project is thick and some of the species are dense. My 110 volt, 1.5hp contractors saw protested the 45° bevels. Take some precautions, especially if (like me) you don't have a riving knife on your saw. Make sure your planed and jointed stock is square and stable. Boards at least 5" wide will keep your hands clear of the blade when ripping the bigger triangles. Also, consider a thin kerf rip blade (See Buyer's Guide on page 62). At least make sure your blade is clean and sharp. Feed at a steady rate and use a push device such as the GRR-Ripper. An outfeed table will catch the piece after the cut.

Corner Clamp

The inner and outer angles are made of $\frac{3}{4}$ "-thick Baltic-birch plywood. Machine bolts thread through dowel nuts and press on aluminum bar stock to apply even pressure on the sliding, inner right-angle pieces.



Glue up the logs. To keep these slippery bevels together during glue-up, make three 90-degree screw clamps to the specifications above. Cover the inside edges of the clamps with packing tape to prevent gluing them to the project. Ensure that there are no gaps between the strips and that the edges and points line up with each other.

Completing the quilt pattern.

Glue the nine individual core blocks together to form the complete core pattern. Carefully align the joints between each block as you position them. The wooden parts of your shop-made log-gluing clamps can be repurposed here as cauls to maintain alignment. Take care to keep the upper surface flat.



At the border

Once all nine of the core blocks are glued together, true up the edges of the resulting core pattern at the table saw, as shown. To make the striped border, glue up a sandwich from three layers of $7\frac{3}{4}$ "-wide $\times$ 18"-long material. Once the glue dries, trim the width of the sandwich to match the width of the core pattern. Then crosscut the sandwich into 4" lengths. Also cut four walnut blocks approximately $1\frac{1}{2} \times 1\frac{1}{2} \times 4$ " to make up the corner blocks. Glue the sandwiches and corner blocks in place as shown.

Truing up the sides. Use a hand plane to flatten one side of the core pattern. Then true up the opposite side at the table saw, running the hand-planed side against the fence as shown. Due to the thickness of the piece, it will be necessary to make two passes through the saw for each side. So make sure the top and bottom are flat and parallel to each other. Use your miter gauge set at 90° and a stop to true the other two sides.



Glue on the sandwiches. Cut two sections of the border sandwich to fit, and then glue them to opposite sides of the core pattern. Carefully align the ends of the border precisely with the edges of the core.

Complete the border. Glue the corner blocks to the remaining two border sandwiches, as shown. Then complete the border by gluing the sandwich/corner block components to the core.

Resawing and routing

After the glue has cured, resaw the piece at the table saw, as shown. Or use a bandsaw with a sharp blade and a tall fence. Scrape away any glue squeeze-out so you have a face flat enough to run against the fence. Then use a shop-built router sled/base to clean up all the surfaces. The sled rides on a simple plywood frame that surrounds the workpiece. Stop blocks on the bottom of the sled keep the router from traveling too far, while opposing wedges hold the workpiece in place inside the frame. Use a handheld router and a ½" roundover bit to ease the edges, and sand through 320 grit. To finish, I applied three coats of Howard Cutting Board Oil.

One becomes two. I resawed the piece at the table saw, making multiple light passes from each side. Push sticks help apply consistent pressure while keeping your hands well clear of the blade. Finish the cut with a hand saw.



Flatten the faces. Set the router plunge depth to take a light cut, and work the router back and forth evenly across the face of the glue-up to make it flat. (Not perfectly smooth, but flat.) Take multiple light passes if needed. I used a CNC spoilboard surfacing bit. Cut around the outside first, to avoid chipping the edges before working your way into the center.



Finish the edge. Use a bearing-guided roundover bit to put the finishing touch on the edges of each cutting board. ■

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Narrow Display CABINET

Try your hand at revered joinery while creating this distinctive showcase

By Ken Burton

This display cabinet may be relatively small in stature, but its design incorporates one of the pinnacles of the woodworker's craft: hand-cut dovetail joints. For many woodworkers, the hand-cut dovetail is seen as a rite of passage, and for good reason. The joint requires a raft of hand skills, including careful layout, accurate sawing, and skillful chisel work. While the joint may seem intimidating at first, with a little practice and the right tools (See page 40), you'll soon be able to add this feather to your cap.

To build the cabinet as shown, you'll need to cut two kinds of dovetails. The corners of the cabinet are joined with *through* dovetails—those visible on both outside faces of the joint. The drawer front is attached to the drawer sides with *half-blind* dovetails, which show only on the side of the drawer, not its face. The techniques used for cutting both forms of the joint are similar, but with a few key differences, as I'll explain.

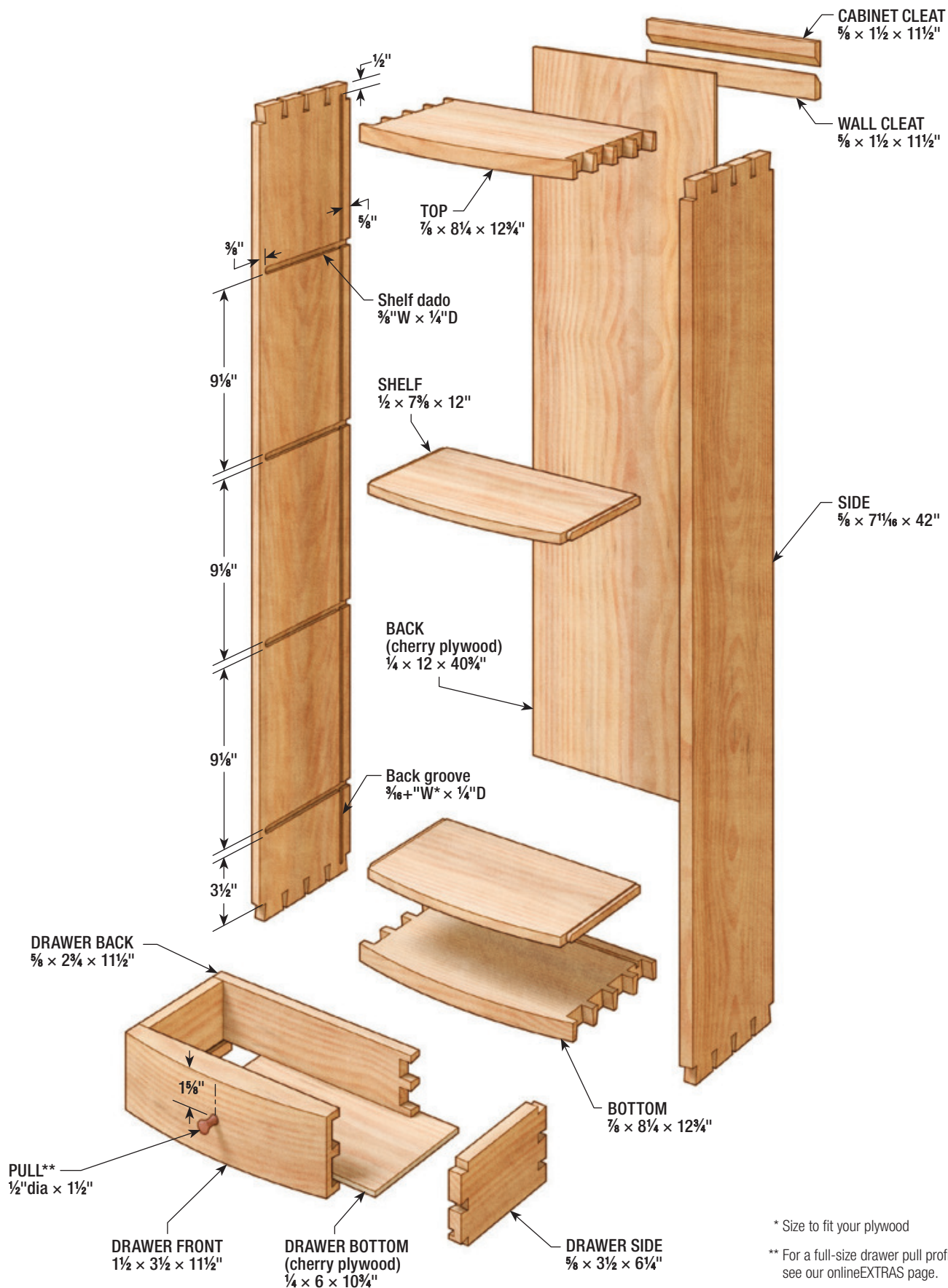


Order of Work

- Lay out and cut the pins
- Lay out and cut the tails
- Dado for the shelves
- Assemble case
- Make the drawer
- Sand and finish



32 WOODCRAFT
magazine



* Size to fit your plywood

** For a full-size drawer pull profile, see our online EXTRAS page.

Lay out the pins

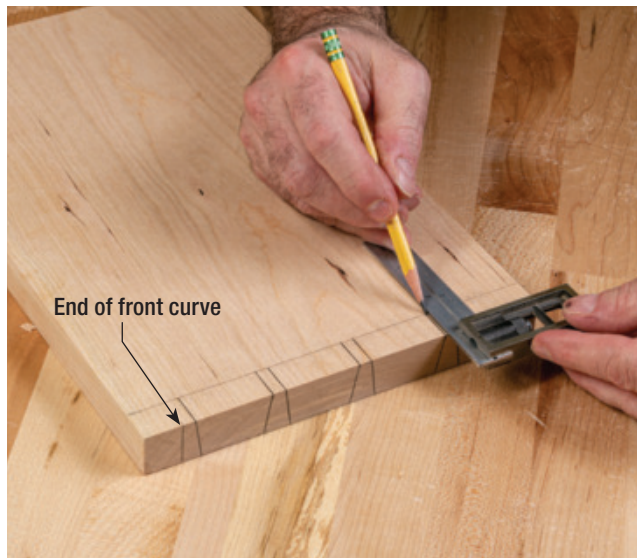
Mill the stock for the top, bottom, and sides to the sizes specified in the drawing on page 33. Lay out the evenly spaced pins on the ends of the top and bottom, remembering to account for the front curves. As you mark the ends of the pieces, offset the pins on one end to the left and on the other end to the right. Note that dovetails should always start and stop with a half-pin. This maximizes the joint's ability to resist failure due to warpage. For this project, I made the narrow part of the pins $\frac{1}{4}$ " wide and used 9° for the dovetail angle. For more on dovetail geometry see Dovetail Angles below.



Scribe the shoulder baseline. Set a marking gauge to about $\frac{1}{32}$ " more than the thickness of the sides. Scribe the shoulder baselines for the pins across both faces at the ends of the top and bottom. While you can use a traditional gauge with a pin, I find a gauge with a cutting wheel does a better job at making a crisp line.



Lay out the angles. Lay out the narrow part of the pins on the upper face of the top and the lower face of the bottom, spacing them as shown on page 32. Set a T-bevel to your dovetail angle and extend lines across the ends of the pieces to lay out the pins.



Extend the cut lines. Once the angles are drawn, use a square to extend the lines from the board's end to the shoulder baseline.

Dovetail Angles

Dovetail angles can be measured in degrees or as a ratio. When expressed in degrees, that number usually states how far off of 90° the angle is. Typical measures range from 5° - 20° with steeper angles (5° - 10°) used for hardwoods and shallower angles (9° - 20°) for softwoods. However, rather than deal with protractors, many woodworkers prefer to set their angles according to a ratio. Typical ratios used are 1:6 for softwoods (about 10°) and 1:8 for hardwoods (about 7°).



Easy angles. Rather than dealing with degrees, you may find working with a ratio easier. For a 1:6 angle, simply measure over 1 inch and up 6 inches, then connect the dots to determine your angle.

Cut the pins

With all the pins laid out, the next steps are to cut along your layout lines, and then to remove the waste in between them. In many ways, cutting pins is as simple as being able to saw straight. Secure the piece vertically in a vise with the shoulder line no more than an inch above the bench top to minimize vibration from the saw. Feel free to add a few extra lines in the waste areas to get warmed up. Be sure to cut right to (but not past) the shoulder baseline on both sides of the pieces. Then stack the pieces, clamp them to your bench top, and cut away the waste with a 1" chisel. Position them directly above a workbench leg if possible to best back up your mallet blows.



Cut to the lines. Align your body so your arm moves parallel to the cut. Draw the blade backwards a time or two to start the kerf. Then simply push the saw forward with minimal downward pressure, allowing the weight of the tool to make the cut. Try to split the line with the saw towards the waste side. Stop at the shoulder baseline.



Start chopping out the waste. Locate a 1" chisel vertically about $\frac{1}{16}$ " in front of the shoulder baseline, and rap it with a mallet to drive it in about $\frac{1}{16}$ ". Were you to start cutting right at the baseline, the chisel's bevel would drive the tool backwards past the line. Make this cut between all the pins, shifting the chisel sideways as necessary to cut all the way across the waste areas.



Pop out the chips. To pop the chips free, drive your chisel into the waste areas from the boards' ends. Alternate vertical and horizontal cuts until you have cleared away about $\frac{1}{8}$ "- $\frac{3}{16}$ " of the waste material from each space.



Now cut the shoulder. With the top layer of waste removed, you should now be able to make vertical cuts right along the shoulder baseline without fear of overcutting. Angle the chisel along the edges to avoid driving it into the pins. Once you have established a clear, flat shoulder, angle the chisel on the vertical cuts to undercut the center part of the tail socket.



Flip and repeat. Having cut halfway through from the first side, turn the boards over and repeat the process from the other side. Removing the waste in this manner is why you may hear this whole process referred to as "chopping" dovetails.

Lay out the tails

Start by ensuring the pins are square to the end of the board, paring them if necessary. Scribe shoulder baselines on the sides with your marking gauge, setting the gauge to slightly more than the thickness of the top and bottom pieces. This time, scribe across both edges as well as the faces, and mark the pieces for assembly orientation. Trace the pins onto their mating corners with a marking knife, then extend the knife lines across the ends of the pieces.



Check for square. Once the waste is removed, check all the pins to make sure they are square to the end of the board before tracing them to lay out the tails. Pare any errant pins to bring them into compliance.



Scribe and mark. After scribing the shoulder baselines, arrange the parts on your bench in their desired assembly orientation, and letter the inside faces of each joint at the back corner for easy identification.



Set up a back stop. Prepare a $1\frac{1}{2} \times 1\frac{1}{2}$ " back stop from an 8" dead-straight length of dense hardwood such as ash. Make sure the faces and ends are accurately squared. Clamp each side in turn to your bench with the back stop adjacent to the shoulder baseline.



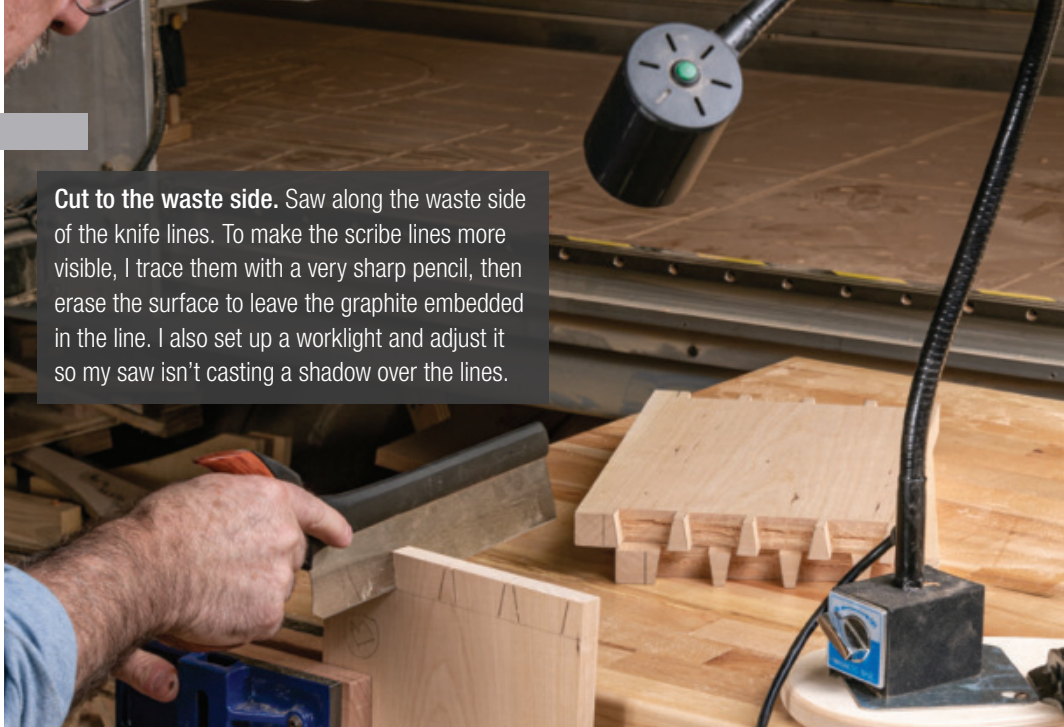
Trace the pins. Clamp the mating pin board in place with its back edge aligned with the back edge of the tail board and its inside face against the back stop. Trace the pins with a knife. While you can make any thin knife work, a true marking knife is easier to use because you can register its flat face against the pin's cheek.



Knife across. Finish the layout by extending the knife lines across the end of the tail board, guiding the cuts with a square.

Cut the tails

Cutting the tails is a lot like cutting the pins except that, after sawing the joint cheeks, I use a fretsaw to remove most of the waste in between before paring to the baseline. Saw along the waste side of the knife lines until you reach the shoulder baselines, and then cut away the little trapezoid-shaped waste areas, staying $\frac{1}{16}$ " away from the shoulder baselines. Pare right to the baselines with a narrow chisel.



Cut to the waste side. Saw along the waste side of the knife lines. To make the scribe lines more visible, I trace them with a very sharp pencil, then erase the surface to leave the graphite embedded in the line. I also set up a worklight and adjust it so my saw isn't casting a shadow over the lines.



Saw first. Instead of chopping out the majority of the waste, I saw across the pin sockets with a fret saw. I don't take this approach when cutting the pins because the angle at each end of the cut is troublesome to navigate.



Trim to the shoulders. Lightly chop right to the shoulder scribeline with a narrow chisel. Be careful not to mar the inside corners with the chisel's sides.



Tap, look, and listen. Gently drive the joint together with a mallet, using a piece of scrap to protect the pieces. Look for gaps, and listen carefully as the pieces slide together. A solid, dull thud indicates a properly seated joint, while a hollow-sounding tap indicates a too-tight fit. A feeling of resistance in a gapped section also means you have some paring to do.

Add the shelves

Mill the shelves to the size specified on page 33. Bandsaw the curves along the front edges of the top and bottom as well as the shelves, and sand to remove the saw marks and fair the curves. Bevel the front edges of the sides to align with the curves. Also cut a groove for the back along the rear edges of the top, bottom, and sides. The shelves are housed in stopped dados routed across the sides. Rout the dados first, then create the tongues as shown. Finally, notch the front edges of the shelves to fit as shown.



Rout the dados. Lay out the shelf locations along the rear edges of the sides. Rout the dados with a $\frac{3}{8}$ " straight bit, guiding the router along a T-square fence. Stop the dados $\frac{3}{8}$ " from the front edges.



Create the tongues. Using a $\frac{1}{4}$ " wide dado blade, saw rabbets on the ends of the shelves to create tongues to fit the dados in the sides. Make sure that the rabbet shoulder-to-shoulder distance exactly matches the baseline-to-baseline distance on the case top and bottom.



Notch the front corners. Tuck each shelf in its dado, sliding it as far forward as possible, and mark for the tongue offset. Then cut away the front end of the tongue at the rabbet shoulder as shown here.

Glue Up

Sand the shelves and the inside surfaces of the cabinet parts through 220 grit. Do a dry-clamp to make sure everything fits as it should. To aid in applying firm clamp pressure to the dovetails, make notched clamp blocks as shown. These have spaces cut to accommodate the slight protrusions of the pins and tails. Apply glue to the mating surfaces and clamp the cabinet together. Once the glue sets, sand the outside of the cabinet and glue the cabinet cleat in place.



Sixteen clamps needed. Clamp all of the joints, drawing the sides in as well as putting pressure from top to bottom. Take the time to make custom clamp blocks to apply pressure directly where it is needed.

Make the Drawer

The drawer is also dovetailed together. Mill the parts to the sizes specified on page 32. The joints at the back of the drawer are through dovetails. Other than the spacing, they are cut in the same way you cut the joints for the cabinet. The front joints are *half-blind* dovetails. As shown, cutting the pins for these joints requires a slightly different approach than cutting pins for through dovetails. Cut all the joints, then rout the groove for the bottom in the front and sides. Drill the hole for the pull where shown on page 33 before gluing the drawer together. After the glue dries, fit it to its opening and trace the curves onto the front. Shape the front on the bandsaw and sand away the saw marks.



Mark the tail length. Set your marking gauge to determine the length of the tails as shown on page 32. Scribe this line completely around the front ends of the drawer sides and across the ends of the drawer front, using its inside face as a reference. Reset the gauge to scribe the side thickness on the inside face of the drawer front.



Cut to the scribe lines. After laying out the pins with a T-bevel and square, saw along your layout lines until the cuts touch the shoulder baselines on the end and face of the front.



Chop chop. Clear the waste from between the pins with a chisel. Make the initial vertical cuts just in front of the shoulder baseline. As the sockets deepen, you'll have to use a chisel to deepen the saw cuts along the sides of the pins as you go.



Lay out the tails. Carefully hold the front in position along the shoulder baseline on the sides and trace inside the pin sockets to lay out the tails. You won't be able to use a back stop here as it would block access to the sockets. Cut the tails and fit the joints as you did with the cabinet.

Make the drawer pull and apply finish

As shown, the drawer pull is turned on a lathe. After the pull is shaped, glue it into its hole. Finish the cabinet as desired. I used several coats of a wiping varnish on all the exposed surfaces, rubbing out the finish with 0000 steel wool between coats. For the inside of the drawer, however, I opted to use shellac. I prefer the sweet smell of shellac to the odor of other finishes for drawer interiors.



Turn to shape. Turn the pull round between centers. Shape a tenon on one end, then switch to a jam chuck (simply a block of wood with a hole in one face). Press the pull into the hole and finish turning it to shape. (See onlineEXTRAS for full-size pull profile.)



Wipe on, wipe off. With wiped on finishes, the key to getting a smooth, even surface is to wipe on a generous coat to make sure the finish covers all the bare wood and then wipe off the excess before it has a chance to harden. Be sure to dispose of all oily rags properly to avoid the chance of fire. ■



Saws for DOVETAILING

Whether you're starting out or stepping up, get the saw that suits your work and budget

By Paul Anthony

Because of their terrific strength and good looks, well-made hand-cut dovetails are a hallmark of fine craftsmanship, as well as a source of pride for any woodworker accomplished enough to make them. Laying out and cutting the joint can be challenging, but it's certainly within anyone's reach, as shown on page 31.

It definitely helps to use a good saw for the job—one that cuts relatively quickly, smoothly enough, and without any ten-

dency to veer on its own. Saws suitable for cutting dovetails share two common characteristics: a relatively small size, and a spine on the blade to stiffen it. Otherwise, design varies widely. Some blades are thicker, some longer, and some have more teeth. Some cut on the push stroke; some on the pull stroke. Some are better quality and, of course, prices range to suit.

On these pages, I have curated a selection of generally affordable saws for dovetailing, dividing them into three basic

families: gent's saws, pistol-grip saws, and Japanese saws. My colleague Ken Burton and I tested each tool for ease of starting, sawing speed, smoothness of cut, and accuracy of tracking. While this list is by no means comprehensive, it does represent a good range of proven, capable saws. So whether you have yet to lay out your first set of dovetails or you're simply looking to tighten your game, you'll find something here to suit your work and budget.

Gent's saws

A gent's saw is a small, economically priced backsaw meant for general work. These saws are typically available in 6- to 10"-long versions, with teeth per inch (tpi) usually ranging from 12tpi to 22tpi. Although often configured for crosscutting, the teeth work fine for dovetailing. Like other western-style saws, these cut on the push stroke. Keep in mind that—all else being equal—a longer blade results in fewer strokes, and thus a faster cut. The turned handle provides a suitable grasp, but spending hours with it can tire your hand, especially your index finger.

A gent's saw is a thrifty choice for beginning dovetailers, although the teeth may need a bit of dressing first. The tool will certainly get the job done, but it can be somewhat slow going in denser, thicker wood. I find most gent's saws best suited to cutting moderately soft hardwoods $\frac{5}{8}$ " thick or thinner, which includes most drawer joinery. Of the families of saws on these pages, gent's saws tend to be the most prone to poor tracking. I recommend avoiding the cheapest versions. Twenty bucks may just buy you a poorly manufactured, slow, erratic-cutting saw that will frustrate your dovetailing education. Sometimes it *is* the tool, not the craftsman.



Dressing for success. The teeth on some gent's saws' stamped-steel blades may have an erratic set that causes a rough cut and poor tracking. The fix is to very lightly hone both faces of the teeth with a fine stone, which improves tracking and cut quality.



Classic 8" Gent's Saw

Crown Tools, 8" blade, 17tpi, \$29.90 (LeeValley.com #29T2003)

This saw started cuts without much jumping, and tracked pretty well. Cutting was somewhat slow, but yielded a relatively smooth surface. The 8" blade is a bit short for my tastes, but I adjusted my stroke. Overall, a nice starter saw for the money.



Lynx 410048 10" Gent's Saw

Thomas Flynn, 10" blade, 20tpi, \$32.95 (amazon.com)

The high tooth count on this saw made for easy starting, and a very smooth cut. It sawed reasonably fast for a 20tpi blade and tracked nicely. The 10" length makes for efficient cutting with fewer strokes. My only complaint is the heavy coating of hard-to-remove metal protectant.



Veritas Gent's Saw (rip)

Veritas, 7 $\frac{7}{8}$ " blade, 20tpi, \$59.00 (LeeValley.com #05T1001)

This modernistic looking saw with its polymer spine started cuts cooperatively and tracked very well. Solidly made and comfortable to use, it sawed aggressively, considering its high tooth count, and produced a smooth cut. It's one of the pricier gent's saws, but worth it.



Finger press. When using a gent's saw, your index finger points the way while applying subtle downward pressure. Don't overdo it; the weight and motion of the saw should primarily be advancing the cut.

Traditional pistol-grip saws

These smallish, pistol-grip, push-stroke backsaws represent the quintessential western dovetail saw. They are heavy-duty and ergonomically comfortable, with teeth configured for ripping. Blade lengths typically range from 8" to 10", with a tpi count usually between 14 and 20, with most leaning toward the lower end. Having fewer teeth helps power these saws through thicker, harder woods.

Many woodworkers find a pistol-grip saw much more comfortable to use than a straight-handle saw. The ergonomics of the handle relieves strain and takes advantage of wrist power. The weight of the tool also helps the cutting action of a push saw. A pistol-grip saw is more substantial than a gent's saw and well suited to sawing everything from typical drawer sides to thick casework pieces of dense hardwood. It is, however, not a good choice for thin, delicate stock.

As compared to gent's saws, most pistol-grip saws are manufactured to higher standards, with accurately filed and carefully set teeth, precision-fit spines, and comfortable, well-fabricated handles. And, like other western saws, you can readily sharpen them yourself, unlike most Japanese saws. If you prefer push saws over pull saws, this is the type to get for serious dovetailing.

Veritas Standard Dovetail Saw

Veritas, 9¼" blade, 14tpi, \$79.99 (*woodcraft.com* #153370)

This unusual looking saw with its composite spine has a crisp, clean bite that cut aggressively, but not as smoothly as some others. Starting was a bit jumpy, but then the saw moved through the cut very nicely and tracked beautifully. The open handle was very comfortable. Attractively priced, this tool offers a great introduction to pistol-grip dovetail saws.

Pax Rip Pattern Dovetail Saw

Thomas Flinn and Co., 8" blade, 20tpi, \$102.00 (*LeeValley.com* #33T0841)

This very traditional-style saw started easily with little balking, and tracked nicely. It cut relatively smoothly but fairly aggressively, and its considerable weight helped. At 8", it's a bit short in my book, but that's a quibble. The closed handle is pretty comfortable, and large enough that it didn't pinch my fingers. This is a substantial saw for a very reasonable price.

Florip Dovetail Saw

Florip Toolworks, 9" blade, 16tpi, \$119.99 (*woodcraft.com* #172200)

This beautifully made saw started easily and tracked perfectly, neither chomping nor nibbling. It cut aggressively but as smoothly as some blades with more teeth per inch. It has enough heft to help the cutting action, and one of the most comfortable pistol-grip handles I've ever grabbed. This tool really offers a lot to like, especially for the money.



Fire at will. With a pistol-grip saw, the index finger helps direct the cut, while three fingers wrapped around the handle take advantage of wrist strength, minimizing strain caused by twisting the hand. Cocking your wrist can subtly control the cutting pressure.



Show some spine.

The heavy brass spine folded over the top of the blade protects it from deflection and adds enough heft to help the cutting action. The idea is not to apply a lot of downward hand pressure, but to let the saw do the work.

Japanese saws

The Japanese saw used for dovetailing is called a *dozuki*. It cuts on the pull stroke, so the working blade is in tension, meaning it can be made thinner without danger of buckling under pressure. Being thin, it removes less material, and so tends to cut faster. Dozukis are typically available with blades ranging from about 7" to 10" with a tooth-count generally from 16 to 30. Again, fewer teeth normally result in a quicker, but rougher cut. Dozuki teeth are much harder than those on western saws. They stay sharp longer, but risk breakage. Because they're long, fine, and brittle, they're difficult to sharpen, which is why replacement blades are often available. Many dozukis come with crosscut teeth, but these work fine for ripping as well.

Although light in weight, they don't need heft, as the pulling action on the extremely sharp teeth means the tool does most of the work. And the long, straight handles provide much better control than gent's saw handles, while inducing less hand strain. One potential hindrance for a newbie sawyer is that the wood fibers pulled from the cut can somewhat obscure the cutline.

Japanese saws are very popular in the U.S. for their affordability and simply because they work so well. It doesn't take long to get used to pulling a saw if you're used to pushing. And at these prices, there's no excuse not to try one.

Choke stroke. When starting a cut with a Japanese saw, it can help to choke up on the handle, which provides better control.



Power pull. Once the direction of the cut is firmly established, sliding your grip to the end of the handle makes for more efficient cutting.



SUIZAN Japanese Hand Saw 9½" Dozuki Dovetail Pull Saw

SUIZAN, 9½" blade, 25tpi, \$39.80 ([amazon.com](https://www.amazon.com))

A nicely made saw, the Suizan started easily enough, and cut fairly aggressively for such fine teeth. It tracked satisfactorily, and produced a surprisingly smooth surface for an inexpensive saw. My only complaint is that the unwrapped handle doesn't provide much gripping friction, tiring my hand a bit from the extra clutching. Overall, a good introductory Japanese saw.



Razorsaw Dozuki

Razorsaw, 9" blade, 19.5tpi, \$68.99 ([woodcraft.com](https://www.woodcraft.com) #173495)

The tool started very easily, but didn't saw quite as aggressively as the Suizan. However, it cut smoothly and tracked beautifully with no problems at all. I love the feel of the elastomer handle, which provides a very sure grip that I prefer to the traditional rattan wrapping. In all, an excellent dozuki saw for dovetailing and general handwork.



Kondo Joinery Saw with Depth Stop

Kondo, 9" blade, 26tpi, \$80.99 ([woodcraft.com](https://www.woodcraft.com) #156947)

This uniquely designed saw started with no balking at all. It cut fairly quickly and tracked accurately, but produced a rougher cut than the other two saws. The rattan-wrapped handle provided more grip than the bare-handled Suizan, but not as much as the Razorsaw. The depth stop is a nice feature, but a bit less rigid than a fixed spine.



Depth stop. The stiffener on this Kondo brand dozuki allows the blade be adjusted up or down, creating a depth stop to prevent cutting past the scribed baseline on a dovetail joint. ■

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STEP 1:

Choose A Black Ceramic
Or Bocote Ring Core
And Inlay Material

STEP 2:

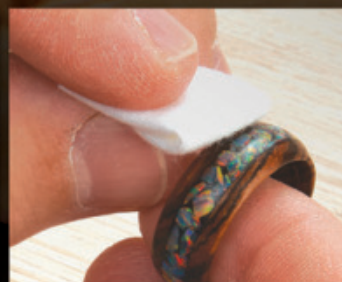
Set Inlay Material
Into Core With Epoxy,
Thick CA Glue Or Resin

STEP 3:

Once Dry, Lightly
Sand Ring Flush To
Smooth Finish

STEP 4:

Wipe Sanded Residue
From Ring And Buff With
Your Favorite Polish



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BLACK WALNUT & COPPER VASE

Wood & metal blossom together

By Derek Richmond

Flower arrangements, whether dried or fresh, will add a bright spot to any room. But all too often the vase is overlooked. This copper and walnut vase-on-stand designed by senior editor Ken Burton is equal to whatever floral display it may present. And while any turned, carved, or otherwise constructed wooden vase can work for dried flowers, this beauty is watertight. The center vessel that holds the flowers is made from copper plumbing fittings available at any hardware store. It nestles between two shapely sides, and displays a colorful patina that is created by salting the metal and then fuming it with ammonia. The result contrasts beautifully with the dark tones of the black walnut. I learned some cool woodworking techniques building this piece, and had a lot of fun at it. I think you will too.



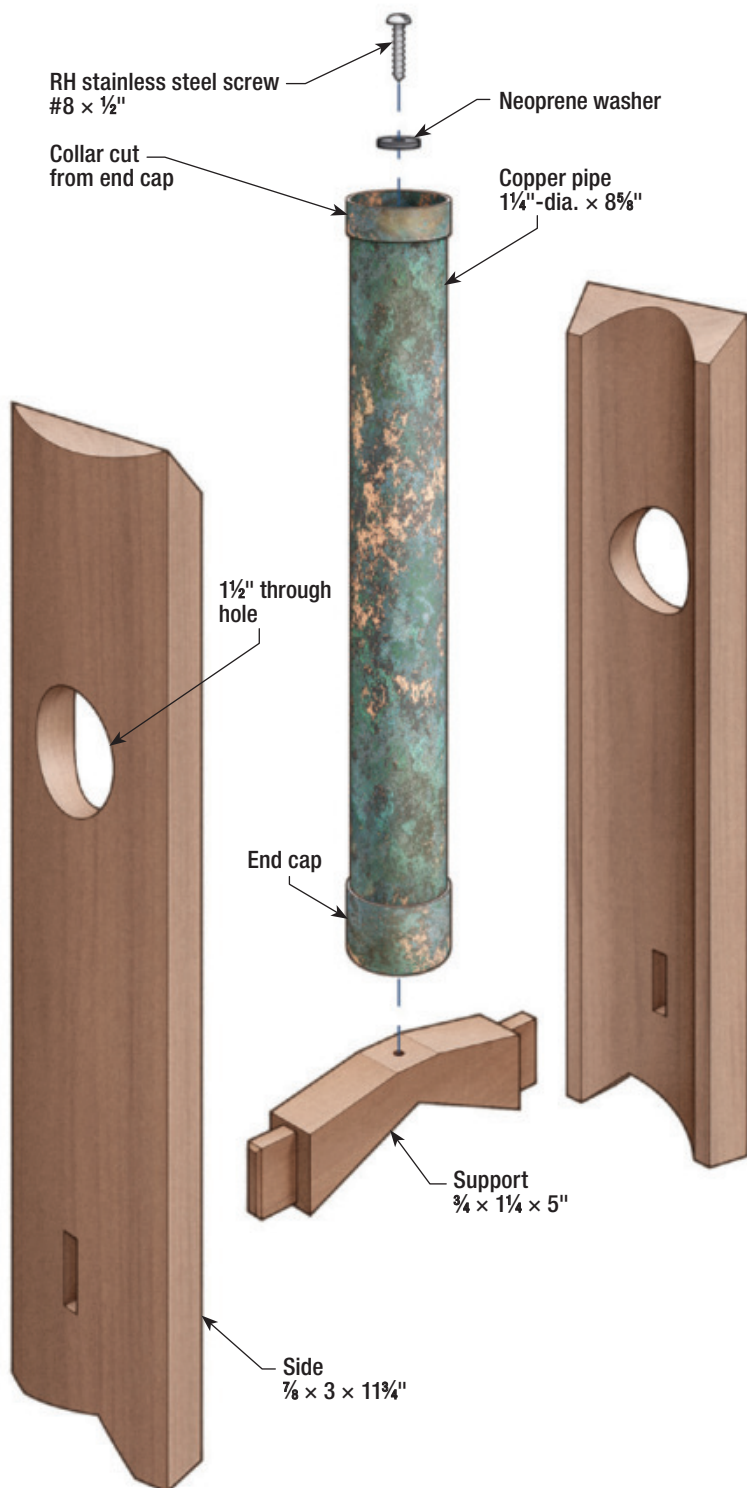
Order of Work

- Cut cove
- Plane outer curve
- Cut joints and assemble
- Make vase

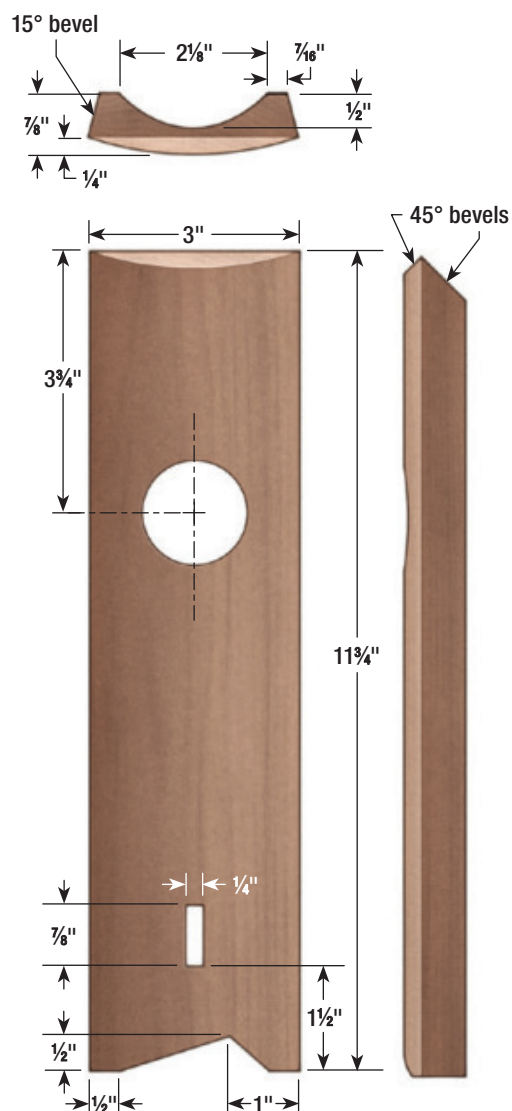


A play of curves and a shop-made patina

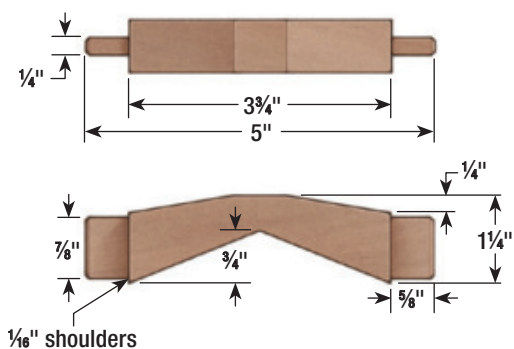
This vase-on-stand composition consists of a copper pipe standing atop a chevron-shaped support that connects two sides via through-tenons. The sides' coves are tablesawn, and their outside curves are handplaned. Opposing bevels crown the top of each, while the bottom ends are shaped with a bandsaw. The bottom-capped pipe is attached with a stainless steel screw through a neoprene washer to make it watertight. The pipe's colorful patina is created using common household chemicals.



Side Detail



Center Support



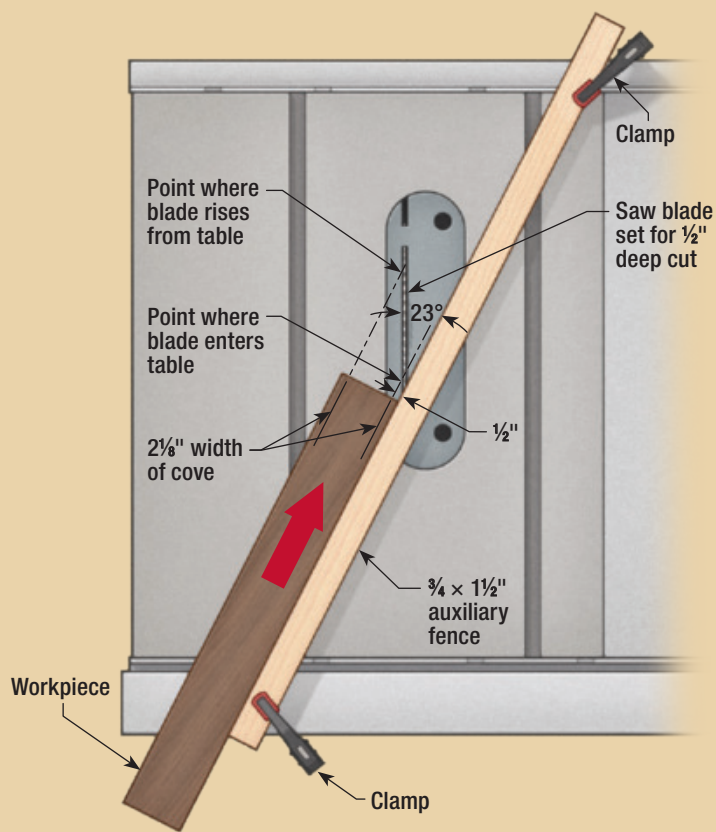
Start with the coves and holes

Mill a single length of $\frac{7}{8} \times 3\frac{1}{8} \times 22$ " stock to yield material for the two sides. Set up your table saw as shown and make the cove cuts. Then sand them through 220 grit using a complementary sanding block. (See page 22.) Crosscut the individual sides to length, and then trim the edges if necessary to center the cove. Next, bore the decorative holes at the drill press as shown. Drill with the curved sides up so that any exit tear-out will be planed away when shaping the outside face.



Cut the cove. Remove any splitter or riving knife from your table saw and set up for coving as shown below at left. Adjust the blade for a $\frac{1}{16}$ " projection and run the workpiece along the fence to make the first pass. Nibble away the same with each subsequent pass until you reach the desired profile.

Fence Placement



You know the drill. Set up a stop block and fence on the drill press to locate the holes in the sides. Drill them with a $1\frac{1}{2}$ " Forstner bit, holding the pieces cove-side-up to minimize tearout.

Plane the outer curve and shape the ends

Start shaping the outside surfaces of the sides by cutting two bevels on each piece to remove the bulk of the waste. Then hand-plane the surfaces to create a single, smooth curve. Trim the top ends and edges as shown before shaping the bottom ends on the bandsaw to create “feet.”



Bevel to start. After drawing the curve on the end of the workpiece, tilt the table saw blade and cut away the majority of the waste to make hand-planing easier.



Round the curve. With the bulk of the waste sawn away, secure the side in a vise, and smooth the curves with a handplane. Cut with the grain to avoid tearout.

Cut the joints and assemble

Lay out the mortise lengths on the outside faces of the sides. Rout the mortises at the router table, and square their ends with a chisel. Mill the center support to size, then saw the tenons with a dado blade. Pare them to fit their mortises, chamfer their ends, and then bandsaw the chevron shape. Sand and glue up the parts before applying a finish—I used Danish oil. Finally, make the vase (see opposite) and attach it with a screw fitted with a neoprene washer to keep the pipe watertight. Note that you’ll need an unusually long screwdriver for the job.



Rout the mortises. At the router table, adjust a $\frac{1}{4}$ " straight bit for a 1"-deep cut, and locate the fence to center the bit across the width of the workpiece. Then mark the bit diameter extents on the fence. With the router on, pivot the workpiece down onto the bit, starting and stopping the cut when the layout lines meet the lines on the fence.



Pare square. Square up the ends of the mortises with a small chisel. Then clean up the mortises with sand paper glued to a small piece of squared scrap.



Saw the tenons. Set up a $\frac{3}{8}$ " wide dado blade. Position the rip fence $\frac{5}{8}$ " from the outside of the blade to control the length of the tenons. Guide the piece with the miter gauge to cut the tenon cheeks, controlling the tenon's thickness by changing the blade height. Reset the blade height and hold the piece on edge to cut the tenons to width.



Cut the end bevels. Tilt your table saw blade to 45°. With the miter gauge to the right of the blade (on a left-tilt saw) bevel the top end, registering the cuts with a stop block clamped to the auxiliary fence. Then switch the miter gauge to the other side of the blade to cut the outer bevel.



On the edge. Tilt your blade to 15° to bevel both edges of the side pieces. Set your fence to leave a 1/8"-wide flat to run against the fence when cutting the opposite edge.

Make the copper vase

To make the vase at the center of this piece, you'll need a length of 1 1/4"-diameter copper pipe and two end caps—available at a hardware or plumbing supply store. Cut the pipe to length with a tubing cutter or hack saw. Drill a hole through the center of one end cap for the screw

that attaches the vase to the support. Cut about 1/2" off the other cap to make a decorative collar for the vase top. Solder the cap on one end and the collar at the other, flushing its end with the pipe end. Polish the pipe before fuming it with ammonia as shown to create the patina.



Solder the cap and collar. Polish the solder contact areas on the pipe, cap, and collar. Then apply flux to the pieces and fit them together. Heat the assembly with a torch until the flux sizzles, then touch the solder to the connection, allowing it to fully encircle the joint. Wipe away any excess flux and solder with a rag. After the vase cools, polish it through 180 grit. **Safety Alert:** Clean up well before using a torch in the shop to avoid an unwanted visit from your local fire company.



Patina process. Wet the pipe and coat it with salt to hasten the copper/ammonia reaction. Pour an inch or so of household ammonia in a bucket and suspend the pipe over it. Cover the bucket with foil and check the progress after 2-3 days. When the patina reaches your liking, wipe the pipe clean and dry. A coat of lacquer or wax will protect the patina, or you can leave it unfinished to continue natural aging. ■



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A REVOLUTIONARY CHAIR

By Craig Bentzley

There is no denying that Thomas Jefferson was one of the most skilled statesman and politicians in American history. The country's first secretary of state and third president, he was also a keen student of gardening, architecture, and mechanical devices. These disparate interests led his Federalist nemesis William Loughton Smith to assert in 1796 that "science and government are two different paths," charging that Jefferson was therefore not qualified to hold public office. Smith particularly chided Jefferson for his innovative revolving chair, remarking: "Who has not heard from the secretary of the praises of his wonderful whirling chair, which has the miraculous quality of allowing the person seated in it to turn his head without moving his tail?" It may be this politically disparaging quote that led to the belief that Jefferson himself invented the revolving chair. However, the truth is that revolving chairs—although rare—were around before Jefferson ordered his first one.

Jefferson arrived in Philadelphia on May 14, 1776, the day before the Second Continental Congress reconvened. He rented rooms from famous cabinetmaker Benjamin Randolph at his residence on Chestnut Street. But finding the noise and squalor of "Center City" unfavorable, Jefferson soon found quieter accommodations at the newly constructed home of Jacob Graff at 7th and Market Street. He rented the second floor, which consisted of a bedroom and the parlor where he wrote the Declaration of Independence.

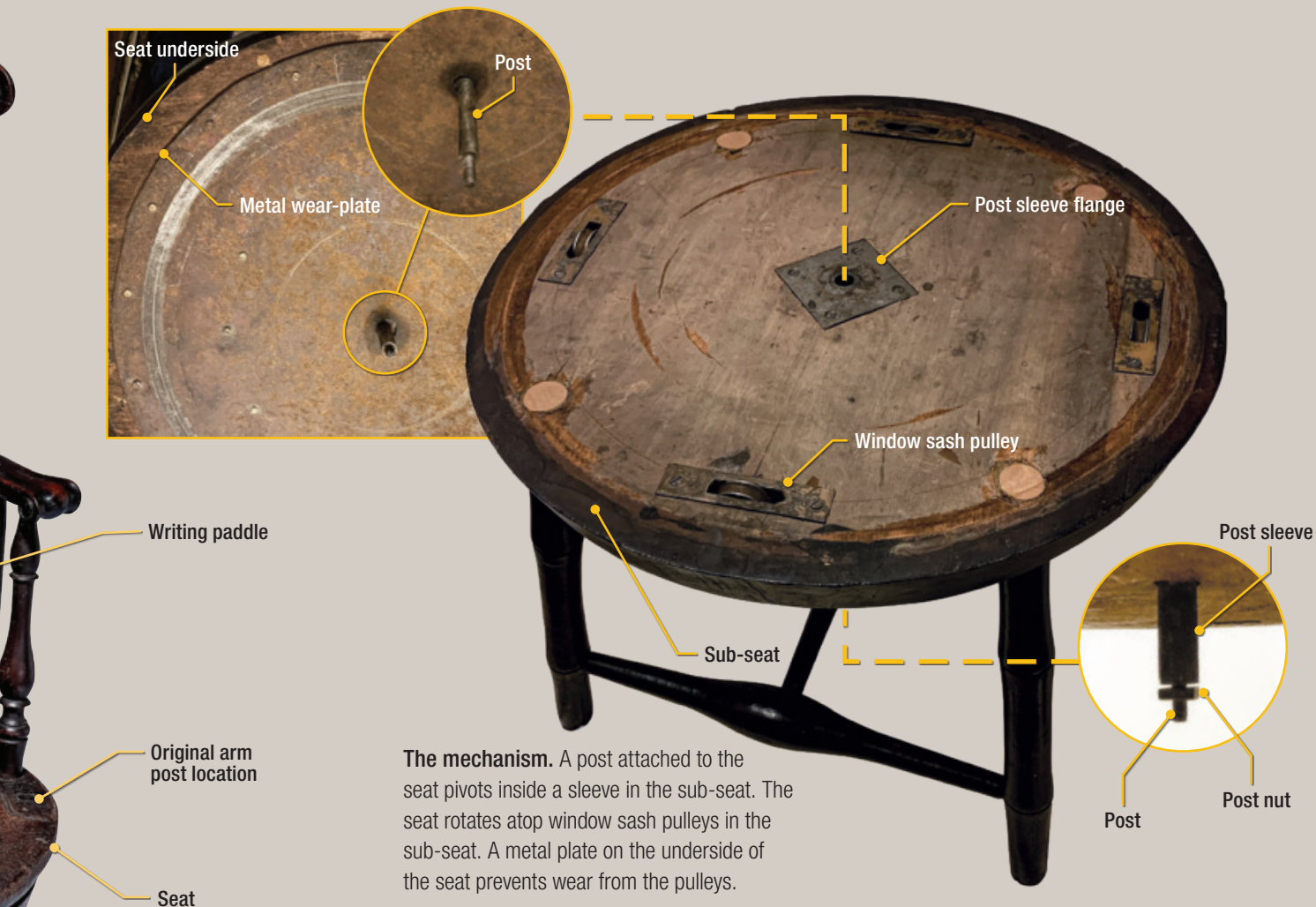
Shortly after settling in, Jefferson collaborated with a local Windsor chair maker to build a revolving chair that would increase his working efficiency, allowing him to access his library, writing desk, and table without getting up. The swivel mechanism was incorporated into a double-layered seat assembly. An iron post attached to the underside of the seat itself inserts into a sleeve projecting downward through the lower "sub-seat." Four window-sash pulleys inset

into the top surface of the sub-seat near its perimeter support the seat while allowing it to rotate. Although the original chair lacked it, a metal plate was at some point screwed to the underside of the seat to prevent wear from the pulleys.

When Jefferson returned home to Monticello, he took his furnishings with him, and in the late 18th or early 19th century, the revolving chair was greatly modified, probably by John Hemmings, Jefferson's enslaved joiner. The purpose



Revolving Windsor chair with writing arm. 1775-76 Mahogany, poplar, and other woods 43½" × 30 × 33½" American Philosophical Society. Gift of John Kintzing Kane, 20 April 1838.



The mechanism. A post attached to the seat pivots inside a sleeve in the sub-seat. The seat rotates atop window sash pulleys in the sub-seat. A metal plate on the underside of the seat prevents wear from the pulleys.

was primarily to shorten the chair to match the height of a long, low, upholstered bench called a Windsor couch. When pulled up against the swivel chair, the two pieces together created a sort of chaise lounge that Jefferson could use to alleviate back pain caused by the rheumatism from which he suffered by that time.

Unfortunately, the original vase-and-ring style turned chair legs could not be sufficiently shortened without compromising their strength. So it seems likely that a more contemporary Windsor chair with bamboo-style legs was cannibalized to provide new chair legs that matched those on the bench. A “writing paddle” was also added, at which time the front arm

posts were relocated rearward to improve access, and paddle supports were added to the right-hand side.

When Jefferson passed away on July 4, 1826, the chair was passed on to his daughter, Martha Jefferson Randolph. She kept it until 1836, when she gave it to Judge J. K. Kane. A member of the American Philosophical Society in Philadelphia, Kane fittingly donated the chair in 1838 to the society, of which Jefferson had been an active member for 35 years, including serving as its president. The highly modified original chair has resided there on display ever since.

In 1975 the National Park Service reconstructed the Graff house to coincide with the Bicentennial. A huge effort

was made to duplicate the original furnishings as closely as possible. Curator Charles G. Dorman brought in Windsor chair expert Charles Santore to help design a faithful reproduction of the chair as it would have appeared when first used by Jefferson. Philadelphia area master craftsman Robert Whitley built the chair (at right) which is on display at the Graff house today. ■

The original design.
This reproduction shows the swiveling chair before its modifications.



For further information visit:

The American Philosophical Society: amphilsoc.org

The Graff House: nps.gov/inde/planyourvisit/declarationhouse.htm

PADAUK

When seeing red isn't a bad thing

By Ken Burton

There's redwood, which grows in California, and then there's RED wood. If it's the *color* you're after, definitely consider padauk. Much of this imported lumber has such a bright red/orange hue that it is commonly called vermilion. Although the spectacular color does darken and lose some of its vibrancy over time, padauk is a lovely wood that's reasonably pleasant to work.

Where the wood comes from

While as many as seven species yield lumber marketed as padauk worldwide, the wood we see in the US is almost all African padauk (*Pterocarpus soyauxi*). It comes from the tropical forests of

central and western Africa. Size-wise, the trees are similar to many mature hardwoods in the eastern U.S., growing 100' or so tall and 2-4' in in diameter with wide, spreading crowns similar to those of elms. The trees are not designated on either the CITES list or the IUCN Red List as being endangered, and their harvest offers economic opportunity to their home countries.

History in woodworking

As woods go, padauk has a pretty long pedigree. Legend has it that the pillars of King Solomon's temple were made of padauk about 3,000 years ago. Flash-forward a few millennia and you'll find royalty in the palaces of 17th century France drinking from chalices made from padauk. Apparently tannins that leached from the wood turned the water a yellowish color, giving it "medicinal" qualities. And in the early part of the

twentieth century, the Chicago-based Pullman Company used the wood extensively for paneling in their rail cars. These days, you'll find it used for a wide variety of woodcrafts ranging from cutting boards and pens to fine furniture, flooring, and tool handles.

Selecting the best stock

Padauk is available both as solid stock and veneer. The most common thicknesses are 4/4 and 8/4, but a lot of online sources sell precut turning blanks and other smaller "craft-sized" pieces. Boards are commonly available in widths from 4-10" and lengths from 8-12', although boards up to 15" wide and 16' long are also obtainable. As exotics go, padauk is one of the more moderately priced species, typically selling for \$10-14 per board foot. As you can see from the photos, the wood is typically a bright red-orange, though it can vary into more muted tones. Very few of the imported boards contain sapwood, which is a creamy white. As the wood ages, it darkens to a rich, reddish brown. One interesting side note: padauk fluoresces orange/yellow when viewed under a black (UV) light.

Better bring your A-game. While padauk works well, it is one of the harder species. If you're hand-cutting joints, your cuts need to be spot-on to get those joints to fit.



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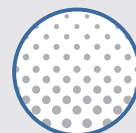
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HARDNESS

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The many shades of red. Freshly cut padauk can range a lot in color. The board at the left exhibits a more subdued red hue reminiscent of bubinga, while those to the right are more in the orange-red spectrum.

Working and finishing

Padauk's bright color sometimes eclipses its other fine qualities. It is comparable to white oak in strength, weight, and hardness, but it's much more stable. Padauk is also highly resistant to decay and insect attack, making it an excellent choice for outdoor use. In the shop, it is generally a pleasure to work with using hand tools, and it machines well, although some pieces may contain interlocked grain that can tear when run through a planer. Unlike many other exotic species, padauk glues readily without any special preparation. It also accepts both oil and water-based finishes well. It does have a relatively coarse grain structure, so if you are looking for a glass-smooth surface, you may need to employ a paste wood filler beneath your top coats.

Orange is the new gold

Despite padauk's red coloration, its dust is a bright orange and is remarkably pervasive and clingy. When I finished turning the Lazy Susan shown here, my shiny gold Powermatic lathe looked like a new offering from a certain orange-themed tool company. As for me, I looked like I'd been for a spray tan with my clothes on. Aside from that, the wood turned exceptionally well, cutting cleanly with no tearout, even on the end grain. It also sanded surprisingly quickly considering its hardness. Its grain is coarse enough that after 80 grit, I was tempted to stop, as the surfaces looked nearly ready for finish. I persevered, however, working my way up to 400 grit before spinning on several coats of wiping varnish. The finish was a little disappointing in that the wood's open grain structure doesn't lend itself to a nice, burnished surface. Next time I'll use a paste wood filler first. Dovetailing the piece for the photo on the facing page wasn't as easy as turning.

While the wood sawed readily, it tended to crumble in the tight spots when fitting the pieces together. One other observation is that the wood has a distinctive, spicy aroma that is generally pleasant. After burning a crosscut, however, I noticed an undertone similar to burnt hair that somewhat spoiled the olfactory experience. ■

Red with Black Highlights. The black streaks running through the plainsawn boards make for a strikingly handsome Lazy Susan top.



Padauk Uses

- Furniture
- Cabinetry
- Interior paneling
- Turnings
- Musical instruments
- Flooring

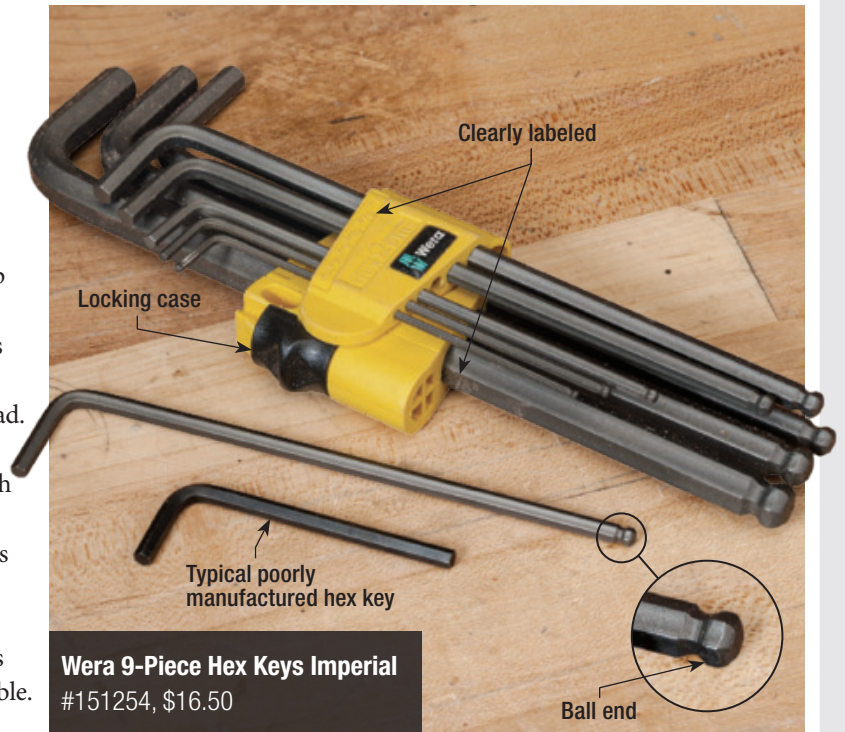
Aging gracefully. This 35-year-old padauk box with black wenge accents shows how the red wood deepens over time to a rich, reddish brown. The creamy sapwood on the lid darkened very little.



Excellent hex keys

New tools typically come with a few hex keys required for assembly and adjustment. If you collected and organized those Allen wrenches, you could probably get by without a dedicated set in your shop. The problem is that those cheap versions often strip easily and are too small to use comfortably. This set from Wera Tools solves all that. First, these wrenches are stronger and provide better contact surface with the screw head. Secondly, they're longer, making them easier to use and providing better access to tough-to-reach spots. But my favorite feature is the ball end that allows off-axis access to the fastener and prevents stripping out a hex head recess. The inexpensive Wera package comes with nine laser-labeled wrenches ($\frac{5}{16}$ " to $\frac{3}{8}$ ") in a colorful case that folds flat and locks in place. Metric sets are also available.

—Chad McClung



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CBN abrasive is nearly as hard as diamond, and lasts a long, long time. The metal wheels won't ever crack and explode like an aluminum oxide wheel can do. You can even sharpen against the side to grind flat bevels on skewers—a dangerous move on a conventional wheel. WoodRiver CBN wheels are available in 120 grit and 180 grit in both 6" and 8"



Machined steel wheel does not require balancing.

Cubic Boron Nitride coating is almost as hard as diamond, and never needs dressing.

WoodRiver CBN grinding wheels
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diameters to fit the most common grinder sizes. The coarser 120 grit makes fast, safe work of reshaping tools, while the 180-grit wheel is perfect for quick touch-up sharpening.

Downsides? Well, cost is probably the main one. And CBN is really meant for sharpening high-speed steel (HSS), as softer steels can clog the surface if you're not careful. So you might not want to sharpen your chisels and plane irons on them. That said, if you spend a lot of time at the lathe, a CBN wheel is a quantum step up from an aluminum oxide wheel. If you can afford it, it's well worth it. ■

—Paul Anthony

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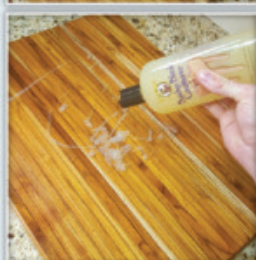
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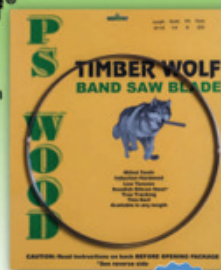
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2. How do you make the outer curve in the Black Walnut & Copper Vase?
3. Name every species used to make the Quilt-pattern Cutting Board.

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Finger joint pain

Q: Sometimes, my fingers painfully lock up while—or even after—using hand tools. What causes this, and what should I do about it?

Dale Kelly
Dayton, OH

A: These symptoms are common among woodworkers, especially those ages 50 to 60. The condition is called stenosing tenosynovitis, or “trigger finger.” It can cause popping or “catching” in the joint, along with limited finger mobility and moderate pain. The ring finger is often affected first, followed by the thumb. Many folks experience their fingers locking up several times a day, and as the condition progresses, they must use the other hand to unlock the affected finger.

Sufferers can develop a small lump or nodule in the palm, caused by inflammation of the hand’s tendon-and-pulley systems. This inflammation results in the narrowing of the pulley structure, impeding the gliding of the tendon that runs through it.

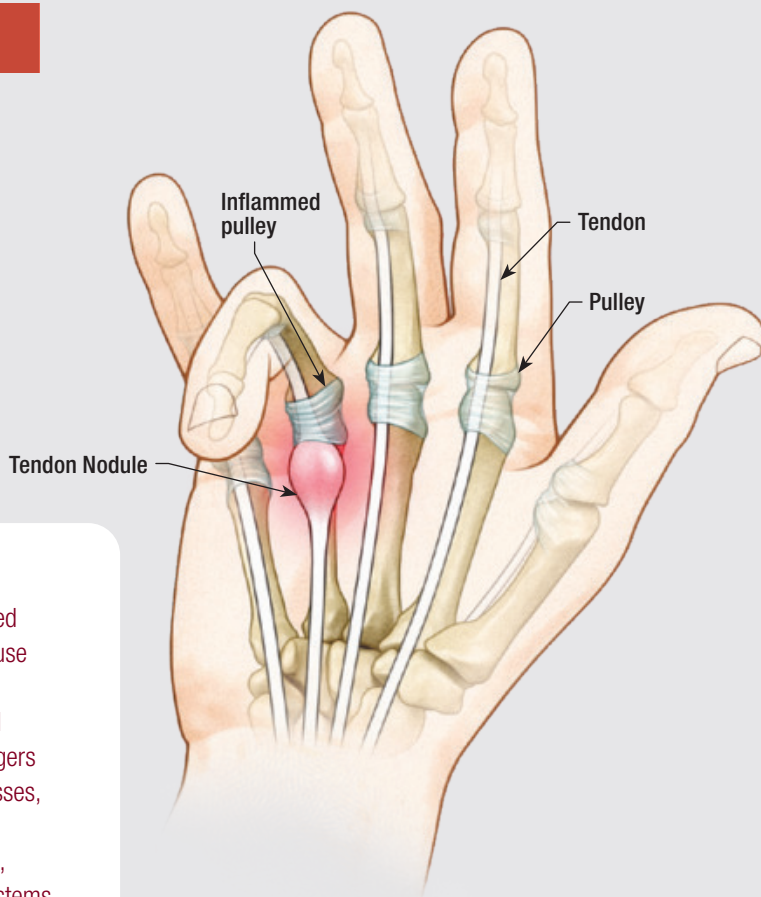
These symptoms, which are common in those with Rheumatoid Arthritis or diabetes, are often due to repetitive handwork or a continued force to the palm. For woodworkers, these activities include “power-gripping” chisels, hand saws, and other tools. One theory proposes that repetitive finger motion and trauma to the hand are the condition’s root cause. If left untreated, degenerative changes can occur in the tendon/pulley complex.

Conservative treatments include rest, splinting, and activity modification such as avoiding pressure on the tendon/pulley complex when handling tools. If the condition advances, corticosteroid injections or even surgery may be necessary.

Preventative measures include the proper use of tools that fit your hands comfortably without strain. Taking frequent breaks between repetitive-motion tasks that require prolonged hand-pressure will also help. If you experience trigger finger symptoms, consult a specialist of the hand and upper extremity as soon as possible. ■



Deb Hartenstein
Occupational Therapist,
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Woodcraft is delighted to partner with West Coast furnituremaker Jory Brigham, who grew up among generations of woodworkers and craftsmen, discovering his own creative voice at an early age. Learning the craft without formal training gave Jory a greater appreciation for the freedom his career path has afforded him.

Since 2008, Jory has designed and built custom furniture for his own company, Jory Brigham Design, as well as offering classes in furniture building. He uses mostly domestic hardwoods and time-honored techniques to craft unique furniture at his San Luis Obispo, California, studio.

To learn more visit
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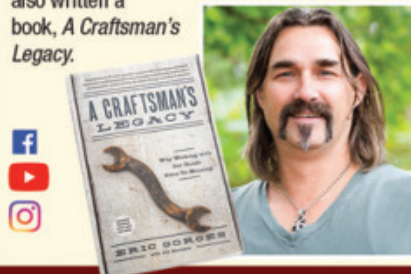
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www.craftsmanslegacy.com

Eric Gorges has been the host of *A Craftsman's Legacy* since it began in 2014. After a health crisis caused him to reevaluate his life, he knew he wanted to work with his hands and he loved motorcycles, so he signed on as an apprentice with one of the best metal shapers in the country. In 1999, he opened a custom motorcycle shop, Voodoo Choppers, in Detroit, Michigan, where he lives today.

Eric's passion for making things by hand led to the idea for his national television series where he showcases men and women who are specialists in their handcrafts. Eric has also written a book, *A Craftsman's Legacy*.



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Improvising at the TABLE SAW

Design as Jazz

By Ken Burton

One of my favorite aspects of woodworking is designing new objects. Most of them start out as sketches, but bringing them to life sometimes takes more than just paper and pencil. I liken the process to playing jazz. You start out with a simple concept, or melody, then improvise the design.

Take for example the vase on page 45. My sketchbook yielded the idea of framing a copper tube between two opposing coved moldings, but the exact proportions and interplay of curves and angles wasn't something I could coax from the end of my pencil. It was time to hit the shop.

Standing in front of the table saw with a short piece of copper pipe (cut from the 6' piece I had to buy) and my scrap bin nearby, I started by working out the basic proportions, width first, then nibbling away until the length seemed right. The cove came next. A quick sketch on the end of one of the pieces gave me enough information to make the cove set up. Then, angled fence clamped in place and a handful of light passes later, I had two pieces of coved molding. So far, the idea on the sketch was holding up.

Balancing the pipe on end and moving the coved pieces in and out on either side soon yielded the overall width of the piece and length of the crosspiece. But the coved pieces needed something to make them more than just lengths of molding. Holes? Maybe. 1"-diameter? Nah, they look too small. Good thing the fence is still in place on the drill press. 1½"? That seems better. Note to self: Next time, drill from the inside to avoid tearout. But the square ends need attention. Maybe a miter cut? No, too pointy. How about a reverse miter to remedy that? Ah, yes.

Now the crosspiece needs to be installed, so to the router table. Mortise, mortise, chop the corners. Then back to the table saw for the tenons. Now we're getting somewhere.



But things still look a bit chunky. How about rounding the outside too? Ah, a chance to hand plane. Nice! And that curve looks sweet with the reverse miter. But maybe the tenons should protrude? Yes, that works. But the sides are still too square. Tilt the table saw blade and cut. Nearly done. Feet? Yes. Symmetric? No, too predictable. Bandsaw, bandsaw, sand. Splash on a little finish, and Voila! Done! Looks nice and resolves a lot of the questions left by the sketch. Now to recreate this off-the-cuff design for the article.

But what to do with the extra pipe? Fortunately this jam session generated a raft of new ideas just waiting for an encore. ■



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