

MINI MODULES
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p.27

WOODCRAFT[®]

Projects, Techniques, and Products

magazine

High-Tech

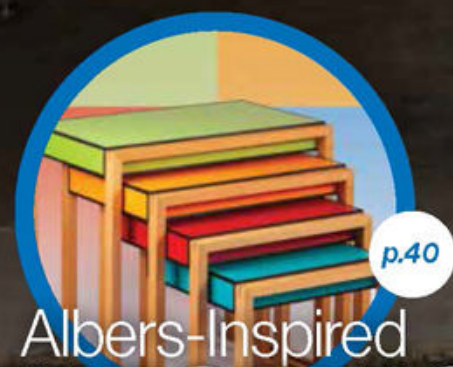
ROUTER TABLE

Hard-Hitting

JOINER'S Mallet

Working with

PLASTIC LAMINATE



p.40

Albers-Inspired

NESTING TABLES



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Aug/Sep 2023 | Issue 114



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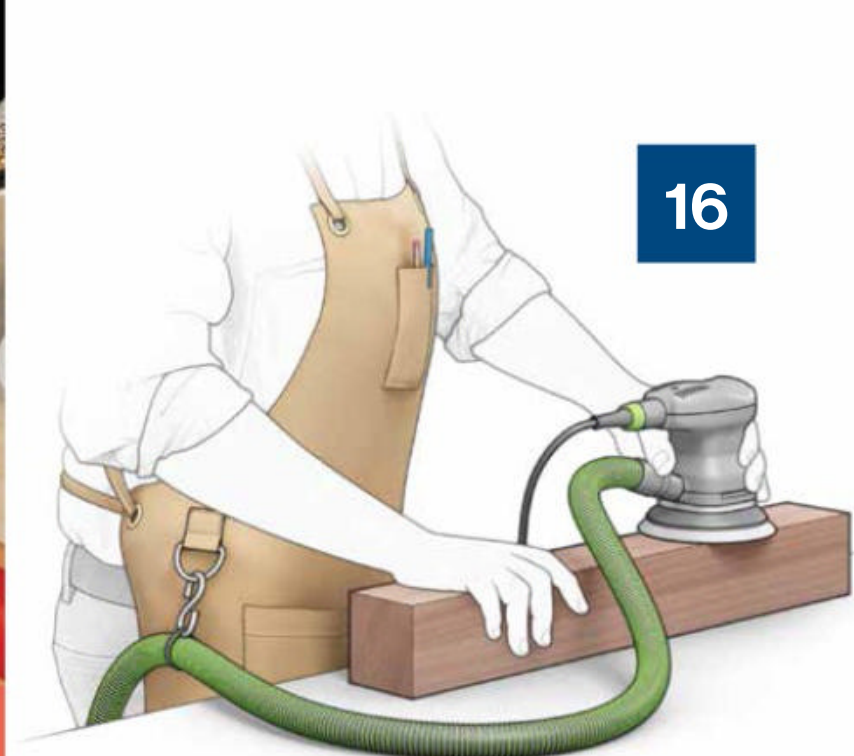
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Contributors



ROBERT THOMPSON worked 40 years as an analytical chemist and a professor at Oberlin College. He is married with three children and two grandchildren. Rob's hobbies include crafting in the woodshop and kitchen, playing golf, gardening, and watching movies.

Read Robert's Expert Answer on page 64.



ROBERT J. SETTICH has been a woodworking journalist for nearly 30 years, serving as both a staff editor and freelancer. He has authored hundreds of articles on virtually every topic and also provided photography and original project designs. In addition, he's written eight books and produced seven videos.

Read Bob's articles on pages 54.



ROMEO is making history as *Woodcraft Magazine's* first official feline contributor. He assisted with the Albers-Inspired Nesting Tables by thoroughly inspecting and approving the plastic laminate selection. After supervising the construction of the project, he looks forward to knocking objects down from the tables.

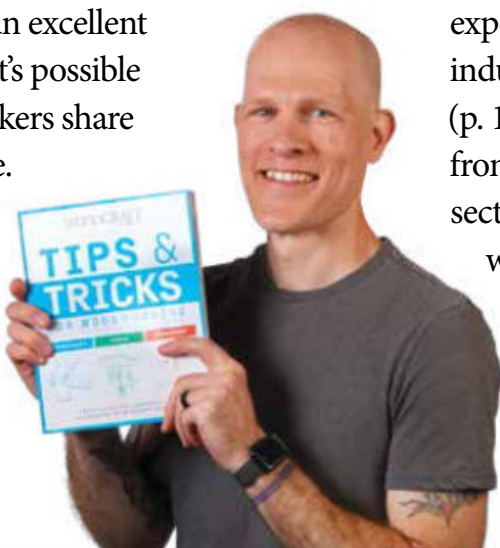
Read Romeo's article on page 40.

Share what you know

We all know that if you asked three woodworkers how to do something, you'd get four different answers. But this isn't a problem. It simply illustrates that there is more than one way to do any one thing, especially in woodworking. This explains why Tips & Tricks is the most popular two pages in the magazine: Woodworkers of all stripes share *their* way (or ways) to save you time, money, energy, and space or to save you from potential injury.

Given the popularity of this section of the magazine and its evergreen nature, we decided to collect the best tips from all the way back to issue 1 into a single helpful volume. *Tips & Tricks for Woodworking* holds over 500 clever ideas, and Aha! moments. For quick and easy reference, the book is divided into three practical sections: techniques, tools, and workshop, and it deserves a spot on your shop shelf. It's available in August 2023 from Woodcraft and other book retailers.

This book is an excellent example of what's possible when woodworkers share their knowledge. Occasionally, we editors add to the stack of great ideas, as do our regular contributors.



But most of the ingenious techniques are from you, our resourceful readers—woodworkers who share what they know. And just because we collected all our past tips doesn't mean the well has run dry. I know you have more great ideas. So, let's keep the information exchange active. I'm calling on all our loyal readers to submit new tips. Share what you know with your fellow woodworkers.

You could win money if we pick your trick. The Top Tip, selected by senior editor Ken Burton, brings \$250. An illustrated tip will earn you \$125, while a quick tip, sans drawing, will put \$75 in your pocket. What's to lose? You share your knowledge, help someone become a better woodworker, and get cash for your effort. It's a win-win-win situation.

As is the case with every issue, see page 16 for a fresh collection of shop solutions. But if tips aren't your thing, you can still contribute to the magazine. You may have a woodworking question in need of an expert (p. 64), have news to share about our industry (p. 6), or have a project to show off (p. 10). And, of course, we'd also love to hear from you if you have a story idea. See the section below for how to get in touch. Let's work together to share what you know.

Chad McClung, Chief Editor
Chad_McClung@woodcraftmagazine.com

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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Submit an article idea:

Do you have a story idea? We'd love to hear about it. To find out how to submit a project or technique article, email us at editor@woodcraftmagazine.com and put "Submission" in the subject line.

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Important: Please include your phone number, as an editor may need to call you if your trick is considered for publication.

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.

Share photos of your projects:

We'd like to see what you're building. To show off your work send your photos to editor@woodcraftmagazine.com, or find us on social media.



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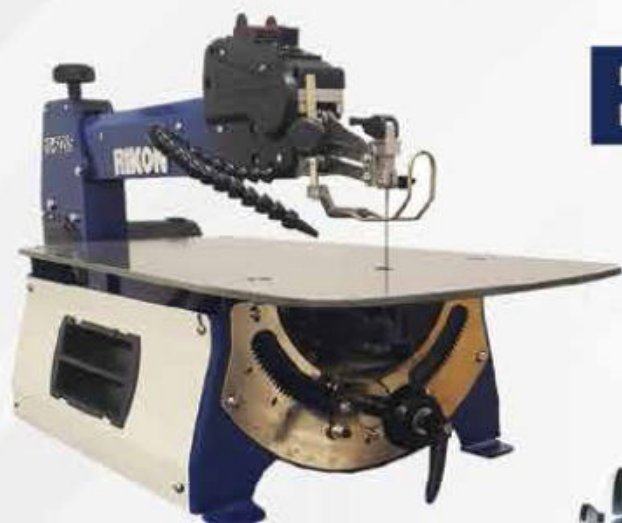
Always make shop safety your first priority by reading and following the recommendations of your machine owner's manuals, using appropriate guards and safety devices, and maintaining all your tools properly. Use adequate sight and hearing protection. Please note that for purposes of illustrative clarity, guards and other safety devices may be removed from tools shown in photographs and illustrations in this publication.



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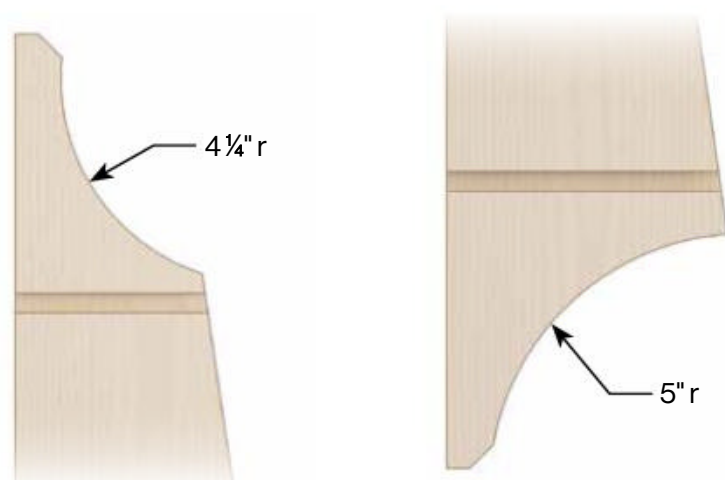


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Erroneous radius

The radii of the cutouts on the sides of the Simple Wall Shelf (Jun/Jul 2023) were incorrectly stated in the drawing. The top scoop should have a radius of $4\frac{1}{4}"$ and the bottom a radius of $5"$.



Correct dimensions

Farewell to a friend

Bill Sands, an expert woodworker and friend of the magazine, died in April. Over the years, he designed and built more than two dozen projects, wrote articles, shared tips, and consulted for the magazine. Bill was generous with his wisdom but always ready and willing to learn new techniques. His legacy lives on through the knowledge he shared with us.



Bill Sands

A different angle

The photo caption labeled "Crosscut test" on p. 51 of Crosscut Sled (Jun/Jul 2023) incorrectly stated that the gap created after test



cutting and flipping represents half of the angle error. That caption should read "any gap represents twice the angle error." It seems that half right is still all wrong.

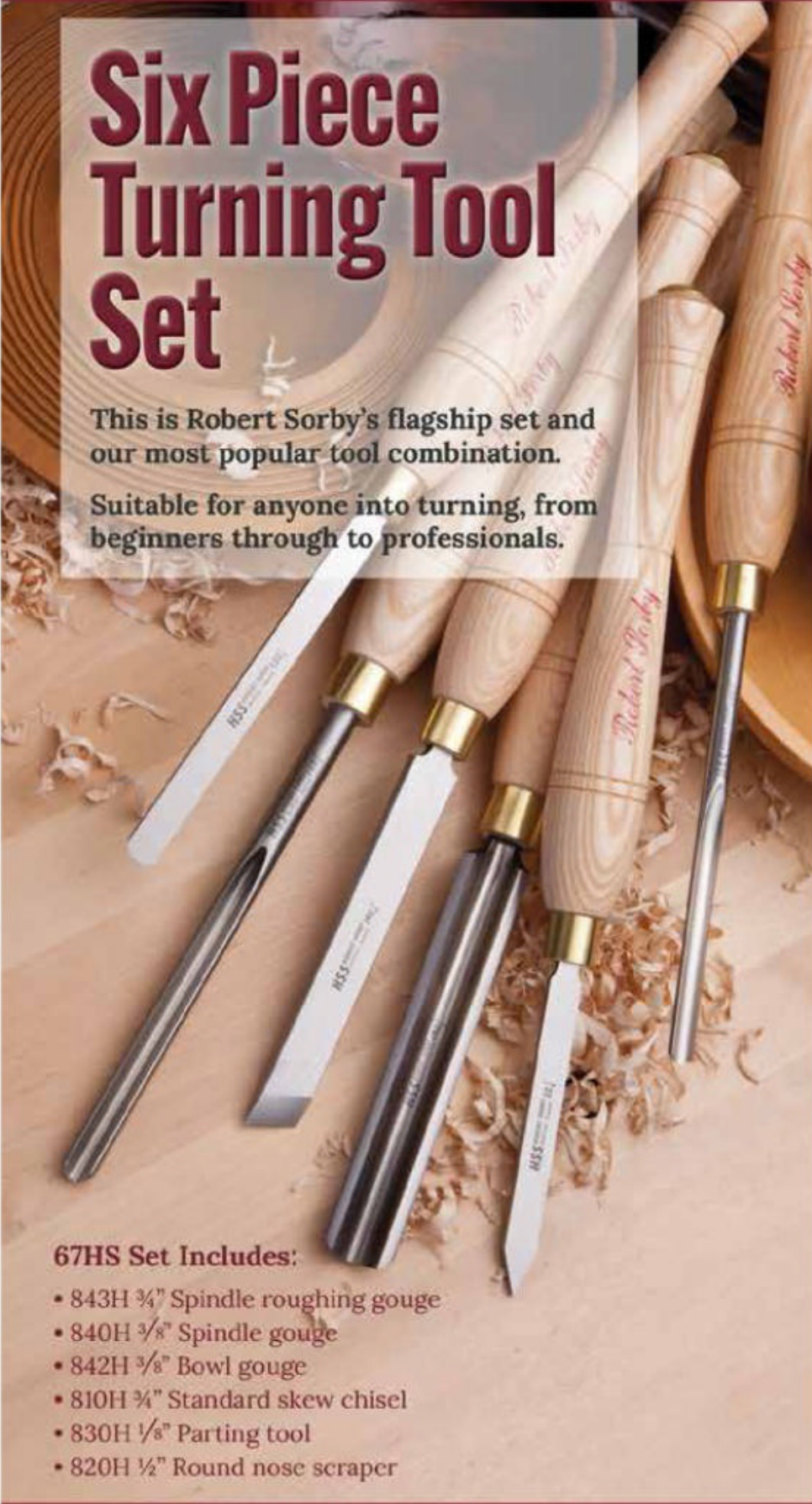
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Amps to share

Power tool manufacturer Fein has joined the AMPShare alliance powered by Bosch Battery Systems. AMPShare makes more than 300 tools from more than two dozen manufacturers compatible with Bosch's powerful and reliable 18V batteries and chargers. Multi-brand compatibility allows woodworkers, DIY-ers, and industry professionals to purchase new tools from a variety of brands without buying new batteries or chargers. Bosch and Fein say they expect more brands to join the AMPShare alliance in the future. Visit ampshare.com for more information on compatible brands and tools.



Osage wisdom

I was surprised to read that Osage orange was the densest North American wood (Woodsense, Dec/Jan, 2023). I remember hearing that persimmon was the densest. Then I noticed you quoted Osage's Janka rating. The Janka scale measures hardness, not density. I found that Persimmon comes in at a whopping 52 lbs./cu.ft. Osage orange is a not-too-shabby second at 48.

—Mark Funk, Uniontown, OH

Contributor Robert J. Settich replies:

I consult many sources in gathering Woodsense data, including Eric Meier's Wood! Identifying and Using Hundreds of Woods Worldwide. Meier's data shows 54 lbs./cu.ft. for Osage orange, compared to 52 lbs./cu.ft. for persimmon. The Janka numbers—measuring resistance to denting but widely used as a shorthand for wood toughness—are 2760 for Osage and 2360 for persimmon, while their specific gravities at 12% moisture are 0.83 and 0.86 respectively. Osage orange rates higher in several other strength properties as well. But regardless of the numbers, each species has its own attributes; exploring them numerically is interesting, but working with the actual material is even more rewarding. ■

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Reader Showcase

MARK WOLF

WEST FARGO, ND

No-elm Christmas gift.

Inspired by an American Elm leaf he found near his rural home, Wolf designed and built this unique jewelry box as a Christmas present for a neighbor. Wolf laminated black walnut, cedar, and pine (but no elm) for the box body. After cutting out the leaf shape, he lopped off the box top and split it down the middle to add a $\frac{1}{8}$ "-wide leaf spine of pine. Then he attached the lid to a monkeypod backer and drilled it to swivel on a $\frac{1}{4}$ " dowel. After boring out and sanding the box cavity, Wolf lined it with black velvet. The box measures 5" long and 4" wide with a 2"-deep well.



ERNIE STUTZ

WICHITA FALLS, TX

Raising Cain. Second-generation woodworker Stutz designed and built this toybox/bench combo for his six-month-old grandson. The solid maple framework surrounds walnut-veneered panels and is assembled with walnut pegs. A pair of double-deep drawers designed to look like four separate drawers provide plenty of room for Cain's toys. Stutz says he learned woodworking from his father and wanted to pass the fruits of that gift on to future generations.



JOSIE VOGEL

WINSTON-SALEM, NC

Getting the scoop. Vogel says she wanted to practice seat scooping and the Fireside Stool (Dec/Jan 2023) provided the perfect excuse. After drilling for the legs, she shaped the seat at her bench, using a curved spokeshave and card scraper. When her shaping accidentally revealed where the brad point of her drill bit went a little too deep, Vogel drilled shallow $\frac{1}{2}$ " holes and inserted plugs. Then she installed the legs with fox wedges. What started as a mistake became a design feature. And most importantly, it's comfortable.



DWAYNE SMYTH

WEST SPRINGFIELD, MA

Beveled and box-jointed. Longtime hobbyist woodworker Smyth merged the grain-wrapping tip from Issue 92 (Dec/Jan 2020) with an angled box joint learned from a woodworking family member to craft this unique keepsake box. The 5" tall box is made from birch, with a 4" square base and 6" square lid both made of mahogany. He says he loves the reaction he gets when people see the unique shape and joinery. ■



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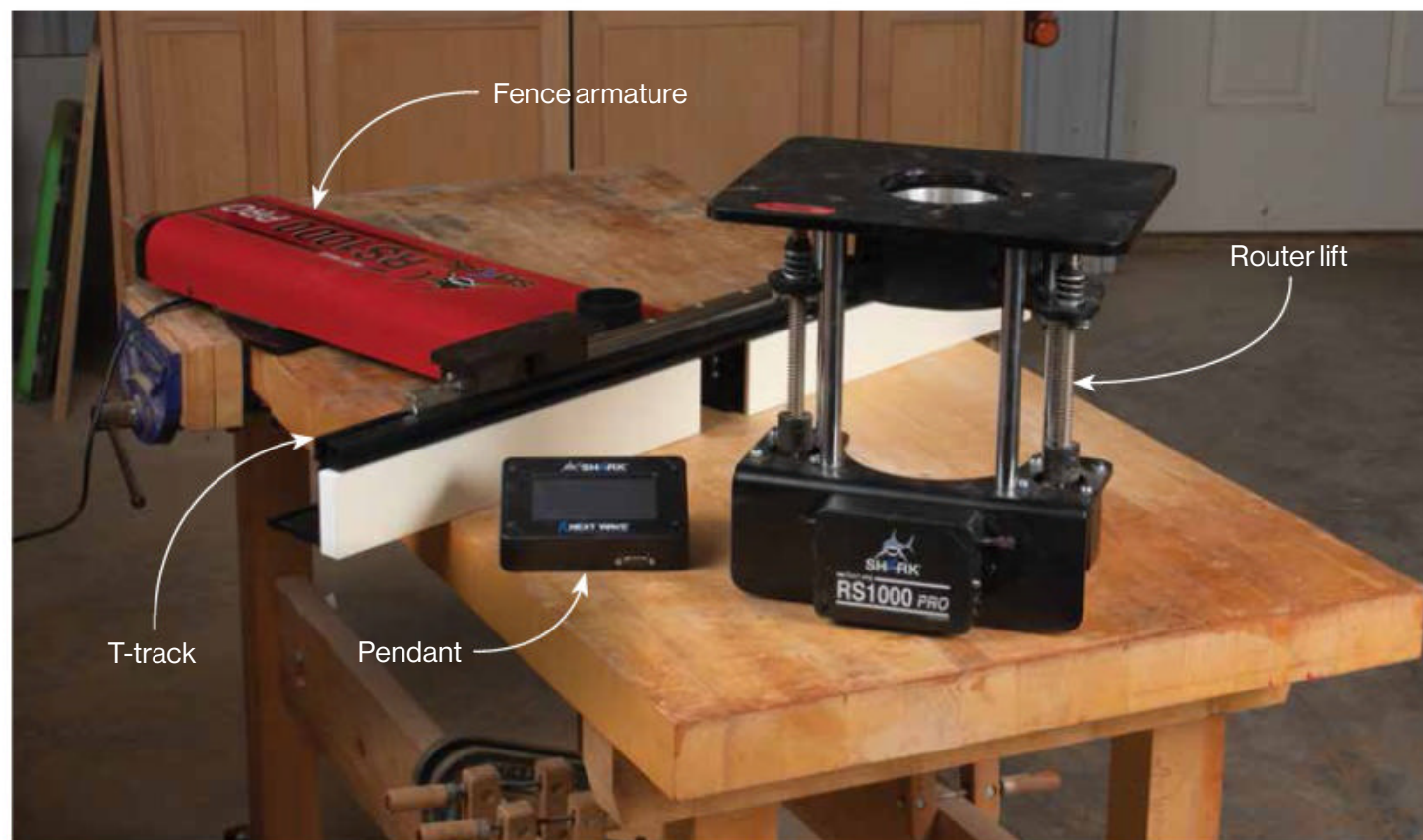


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Next Wave—maker of a full line of three- and even four-axis CNC machines—has gone two-dimensional, adapting their computer-controlled positioning systems for router table use. The RS1000 Pro is Next Wave's innovative two-axis CNC router control system that makes precise, complicated, or repetitive router table operations simple and accurate.

At the heart of the system is a computer-controlled router lift coupled with a servo-motorized fence. Like traditional CNC machines, the RS1000 includes a

touchplate that tells the computer the bit's location in relation to both the table and the fence. After locating the bit, the included pendant allows precise movement in both axes—raising or lowering the bit and moving the fence in or out by as little as .001" at the press of a button.

The extruded aluminum fence is stout and square, and faced with replaceable MDF faces. T-track on the fence's face and top provide mounting points for jigs and clamps, while an optional swivel miter gauge rides atop the fence, rather than on the table.

The fence armature includes a 2¼" dust port and provides 6" of travel on a standard 24"-deep router table, or up to 12" of travel on a deeper table. And while the router lift is attached to a standard 9¼ × 11¾" plate, I found that its mounting holes don't line up with pre-drilled holes in the ledges of some pre-fab tabletops. Next Wave gets around this by including a set of Kreg



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whitesiderouterbits.com, \$472.00



Scan here for a video overview and to see the RS1000 in action.

Optional miter gauge (with PSA sandpaper adhered)

router table plate levelers, but you could also modify your existing tabletop. The lift, however, is compatible with any standard 3½"-diameter router motor. It provides up to 3½ inches of up-and-down travel at the touch of a button.

Where the machine truly separates itself from standard router lifts, though, is in its functionality. The pendant comes pre-programmed with over a dozen common router applications—box joints, half-blind dovetails (both pins and tails), lock miters, biscuit slots, flutes, and dadoes among them. With the touch of a few buttons, the router system can be set up to cut complex joinery without the need for special jigs.

I quickly cut box joints by selecting the included app on the pendant. I punched in my bit diameter, zeroed the height and fence with the touchplate, then told the system my board dimensions. The computer did the math and adjusted the fence and bit accordingly. After one pass, I tapped the screen and the fence moved precisely in preparation for the next pass. With all the fingers of one board cut, a tap reset the fence to cut the mating fingers. While I used the optional miter gauge to guide my piece along the fence, you could easily employ a follower block instead. Other apps were equally user-friendly. In addition to the included apps, the pendant includes programmable memory locations for commonly used settings.

The interface quickly become intuitive, displayed on a clear and responsive 4" color LCD touchscreen. And manufacturer's videos are available online to walk you through each app step-by-step. For simple routing operations, both fence and bit can be moved incrementally or by inputting a specific dimension, either as fractions or decimals so there's no need to convert, or switch to metric input.

My only qualm is that the unit does not include a remote motor start, so you need to either turn on the router beneath your table or install a third-party remote switch. Aside from that, the level of precision this machine has brought to my shop is well worth the admittedly significant investment. ■

—Tester, Derek Richmond

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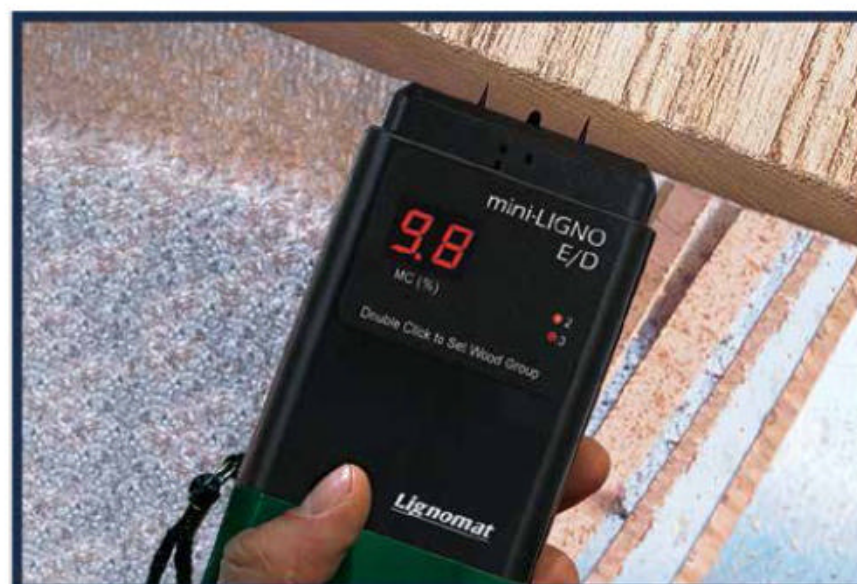
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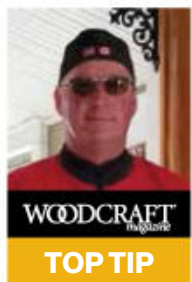
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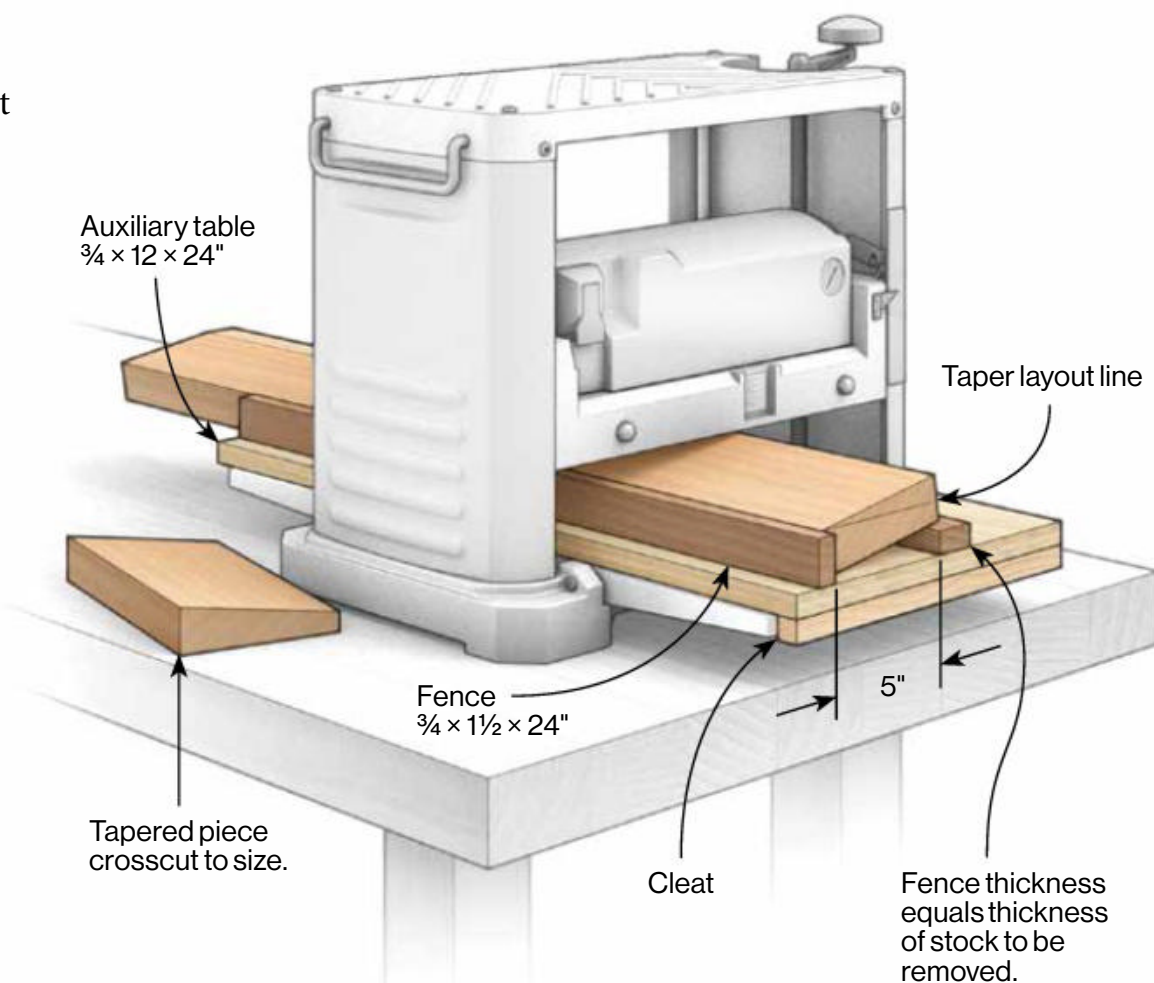
Thickness tapering



For a recent project, I needed 2×6s tapered in thickness. My first thought was to tilt the blade on my table saw, but a fully-raised blade isn't high enough for the job. So I turned to my thickness planer.

I cut a scrap of plywood to serve as an auxiliary table and screwed a cleat to its underside that would hook on the planer's infeed table and hold the plywood in place. Then I screwed a fence along one side of this auxiliary table. Next, I drew the desired taper on the end of one of the 2×6 pieces to determine the amount of wood I needed to plane away to achieve that taper. I made another piece, this time matching its thickness equal to the amount of wood I needed to plane away. I attached this riser parallel to the fence but offset 5" to the side. To taper the pieces, I made multiple passes through the planer with one edge against the fence and the other edge riding atop the riser.

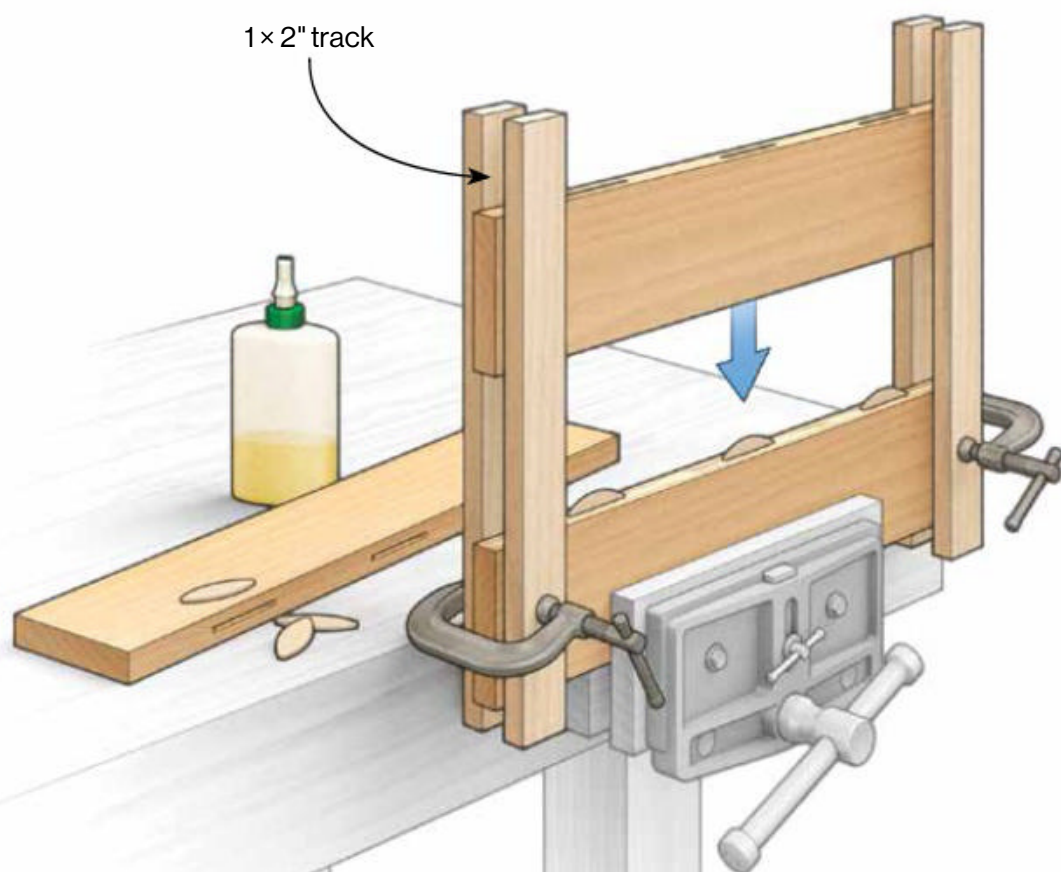
—Jeff Peters,
Redgranite, Wisconsin



Vertical edge gluing

Edge gluing boards is always a challenge. Even if you've added biscuits to keep the pieces aligned, getting everything in place atop your bar clamps before the glue drips is stressful at best. I've found working vertically makes the process go a lot better. After cutting biscuit slots in all the pieces of my panel, I place the first piece in my bench vice before clamping two sets of opposing 1×2s near the ends. These create "tracks" for aligning the subsequent pieces. After applying glue and biscuits and stacking all the pieces for my panel, I transfer the assembly to the awaiting bar clamps. Finally, I remove the 1×2s to avoid accidentally gluing them in place.

—William Purcell,
Laurinburg, North Carolina



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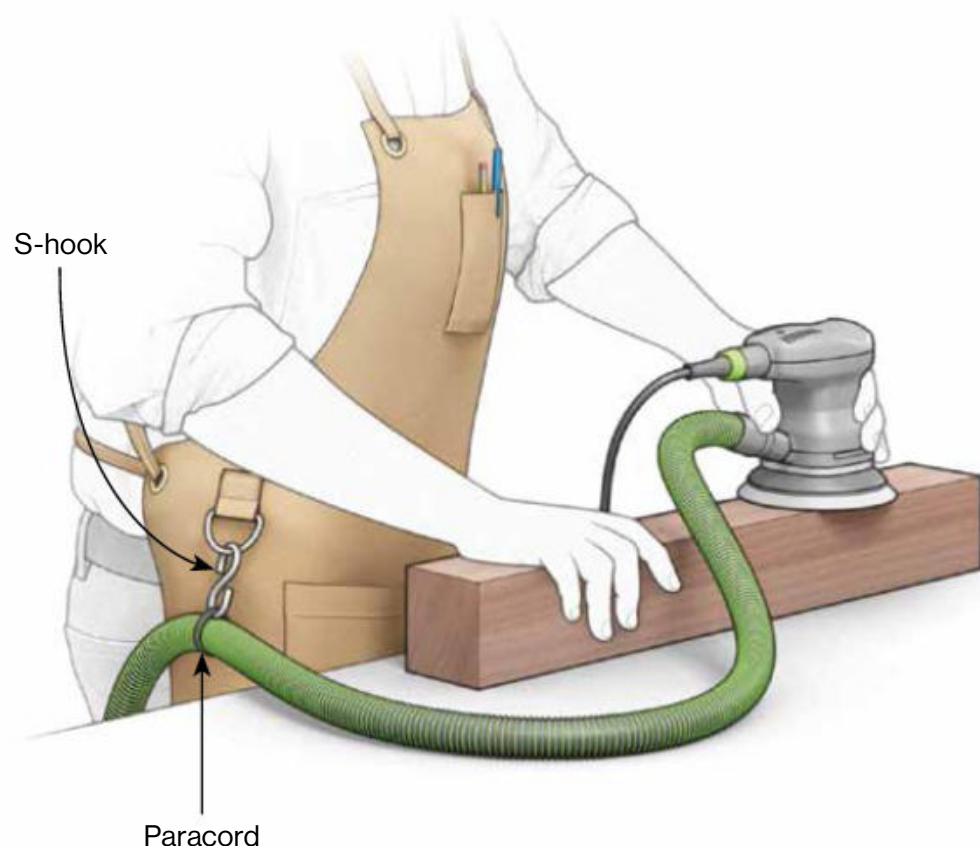


Tips & Tricks

Improved hose control

Instead of using a dust bag, I prefer attaching my orbital sander to a shop vac for the superior dust collection it offers. But wrangling the hose presents challenges of its own. I tried an overhead support but found it limiting for large panels or when I had to move my sanding table. A better solution is to attach the hose to my shop apron. To do so, I added an S-hook to the hose, hooking it to several coils of paracord I'd looped around the hose. My shop apron happened to have a steel ring attached to its right side that I could hook to, but a hammer loop would work as well. Now the hose is well supported and moves with me as I sand, and it's easy to disengage as needed.

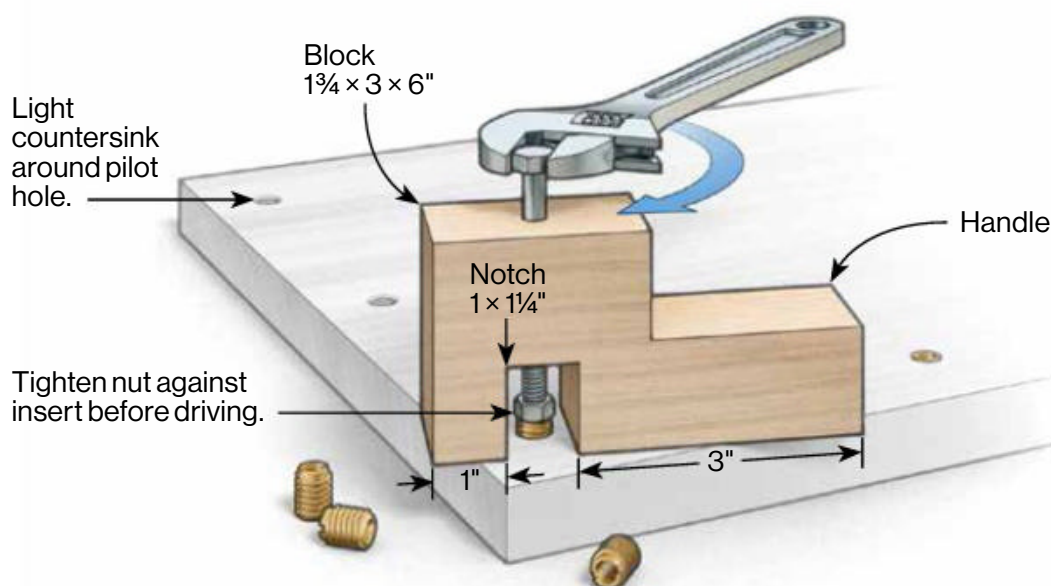
—David DePauw,
Cincinnati, Ohio



Driving threaded inserts

Threaded inserts are a great way to add the strength and knockdown capability of nuts and bolts to your wooden creations. But for them to function well, they need to be driven in straight. I've found this simple guide makes short work of getting it right. It consists of a block of 8/4 hard maple (or other suitably dense wood) with a notch cut near one end. Drill a perpendicular hole into the center of that notch, sizing it for a bolt that matches the inside diameter of your inserts. For example, if your inserts take 1/4"-20 bolts, drill a 1/4" hole. Then cut the long end of the block down to serve as a handle. To use the guide, slide a 4" bolt through the hole and thread a nut onto its end. Next, thread on the insert and tighten the nut against it to lock it in place. Drill a hole for the insert in your workpiece, making sure it is perpendicular to the surface. Lightly countersink the rim of the hole before driving the insert with a wrench.

—Robin Carmichael,
Waitsfield, Vermont



Heat shrink wrap for clamp handles

The older I get, the more trouble I have tightening clamps adequately. The solution came from my other passion: fishing. I wrapped heat shrink fishing rod grips around my clamp handles. This resilient material makes it a lot easier to get good purchase on the slippery wooden surfaces. ■

—Dan Hendricks,
Snohomish, Washington

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Joiner's MALLET

A hard-hitting shop hammer

By Derek Richmond

There are at least a dozen uses for a joiner's mallet in just about any woodworking shop. Whether you need to drive a chisel, insert a dowel, or knock together tight-fitting dovetail joints, this heavy, wood-headed mallet accomplishes the task. And it does it all with less chance of marring your carefully prepared surfaces the way a metal hammer would.

What's more, this is a tool you can make for yourself, customizing it to suit the way you work. I've specified the dimensions I used, but feel free to shorten the handle if you frequently find yourself choking up and swinging from the wrist rather than the elbow. Increase or decrease the head size to suit your common tasks. Or use heavier woods or added weight to increase the mallet's mass for more power. Better yet, make an entire set in various lengths, weights, and head sizes—each suited to a task. Even if you just make one, your shop will be the better for it.

Wood Selection

For the mallet's handle, choose a wood that is strong, durable, and resilient. Hickory, oak, and ash are classic choices, but maple, mahogany, beech, and even walnut will also suit. For the head, look for a heavy, dense species with a high Janka hardness rating. Commonly available domestics that work

well include hickory, locust, hard maple, beech, pecan, ash, oak, elm, and osage orange. A number of exotics also fit the bill, but be sure to take the necessary precautions when gluing. Many of these species contain

resins and oils that prevent glue from bonding properly. To prevent your mallet from delaminating in use, wipe the mating surfaces with mineral spirits or denatured alcohol and let the solvent evaporate immediately before gluing to promote better glue adhesion.

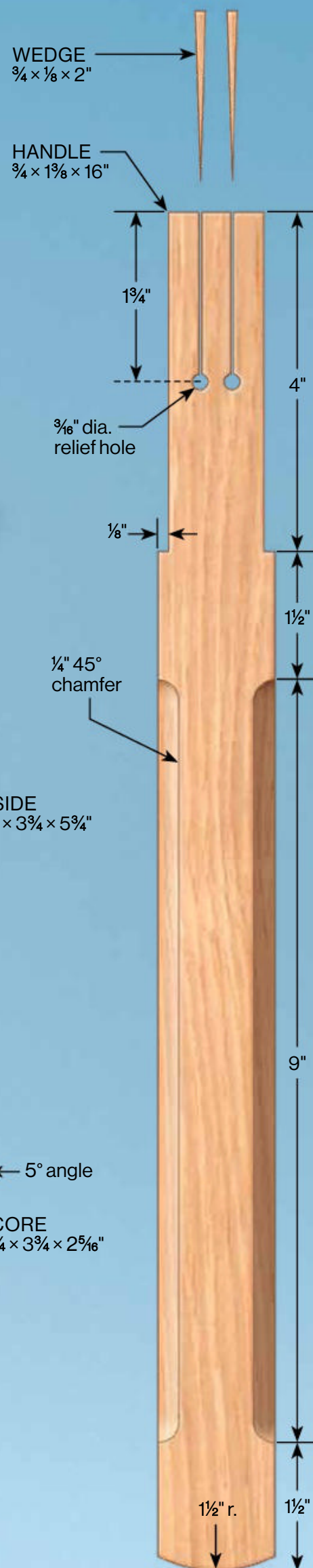


Heavy, hard-headed, and handsome

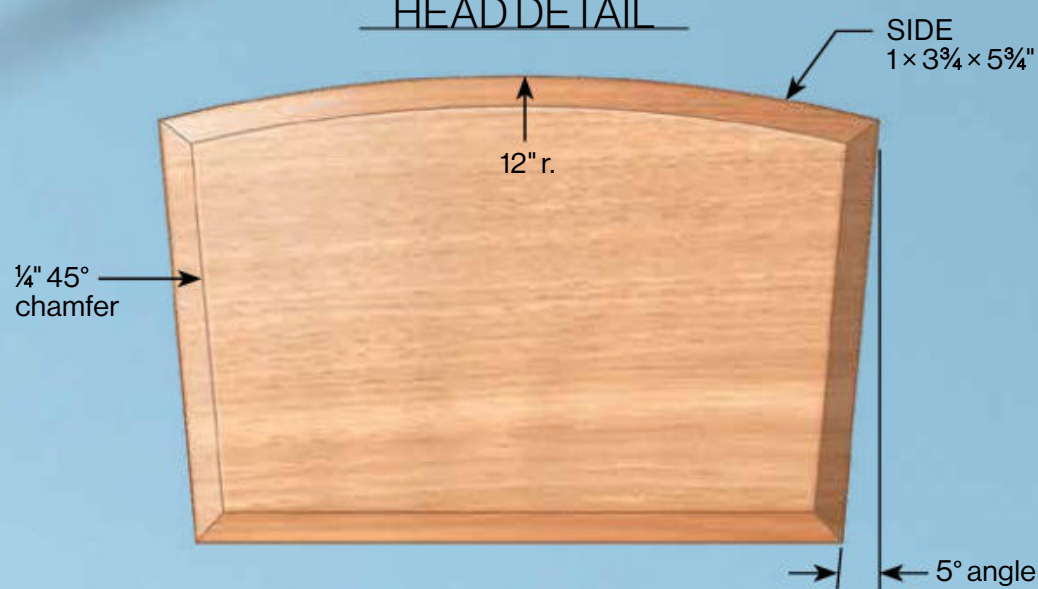
The four-part head is glued up leaving the handle slot open. The head then slides onto a tenon cut into one end of the handle. The rest of the handle is chamfered for comfort and control before being secured in the head with two wedges driven in—without any glue—from the top. The faces are angled for better striking and less arm and shoulder fatigue. On the top, a 12"-radius curve trims the handle and wedges flush, and gives the head a pleasing shape. The edges of the head are beveled to prevent splintering and to help protect workpieces from hammer dings.



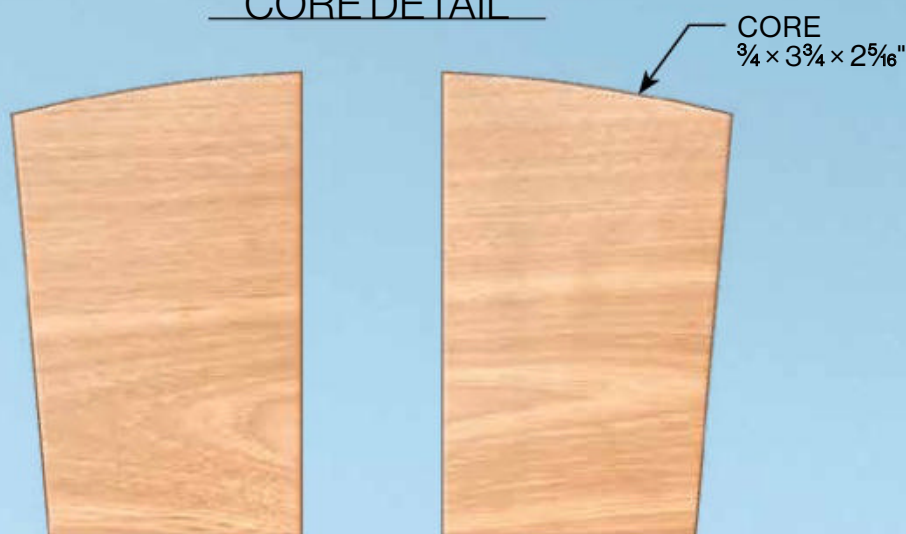
HANDLE DETAIL



HEAD DETAIL



CORE DETAIL



Order of Work

- ✓ Mill and chamfer handle
- ✓ Make and attach head
- ✓ Trim and shape head
- ✓ Finish and take a swing



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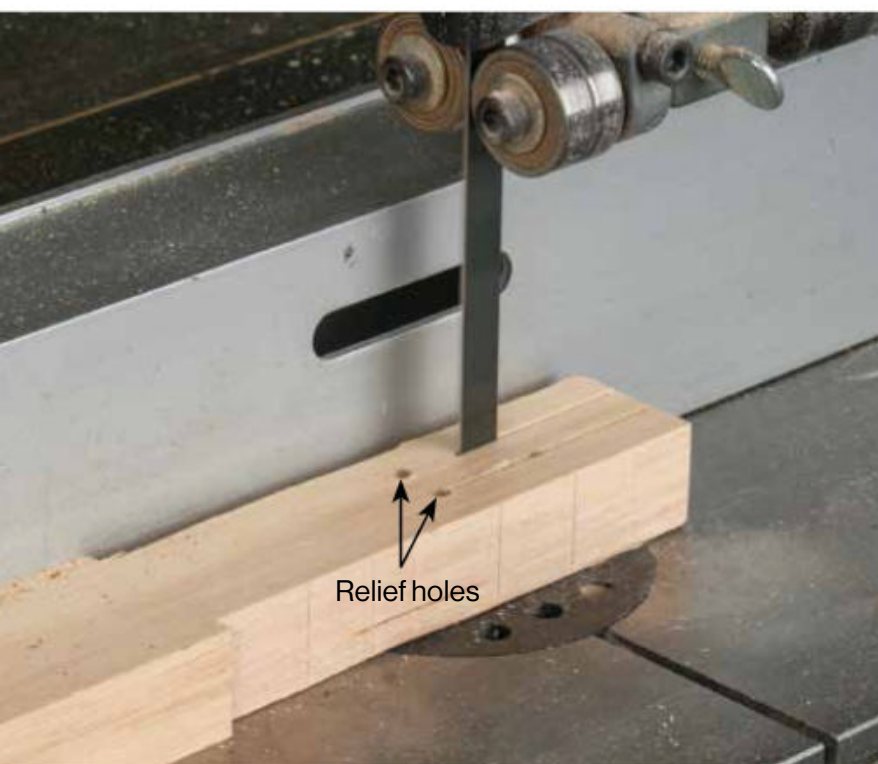
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Get a handle on things

Mill the handle to size along with sufficient stock for the two cores and the wedges. It's important these pieces match the handle's thickness. Cut a tenon on one end of the handle blank. Drill two $\frac{3}{16}$ " diameter relief holes about $1\frac{3}{4}$ " in from the end of the tenon. These help to prevent the handle from splitting as you drive the wedges home. At the bandsaw, cut the wedge slots and round the handle's bottom end. Then finish shaping the grip at the router table. I prefer a 45° chamfer to a roundover because it eases the edges to create a comfortable handle but still gives control over the head's orientation.



Tenon the handle. Set up a dado blade to make a $\frac{1}{8}$ " deep cut. Clamp a stop block to an auxiliary fence on the miter gauge to position the first two cuts 4" from the handle's end. Then remove the block and make repeated cuts to extend the tenon to the end you measured from.



Create wedge slots. At the band saw, set up a fence to align the blade with one relief hole. Cut to the hole, then flip the handle edge-for-edge and repeat to make the second wedge slot.



Shape the handle. At the router table, clamp a stop block to the right of the bit. To start the cut, register the handle against the block then pivot the handle until it touches the fence. Feed from right to left. Chamfer all four edges of the grip portion of the handle.

Heads up

If you'd like a heavier mallet and/or to dampen bounceback, bore a 1"-dia. hole through each head core near the handle gap and fill the holes with buck shot, BBs, or other small weights.

Cut the sides to size. Glue the core pieces to one side, centering them with the handle in between. After the glue tacks, remove the handle and glue on the other side. Then bevel both mallet faces at 5°, crosscutting the piece at the table saw. Create the wedges as shown, then slip the handle into the gap in the mallet head and tap the wedges into place simultaneously. Trim the top of the mallet, then chamfer the edges of the head at the router table before sanding and finishing the mallet. I used tung oil.

Tough end grain is more durable and harder to dent than edge or face grain, and makes the best face for the mallet head.

Glue up the head. Glue the two cores to one side, spacing them with the handle. Drive a couple brads in each piece to keep them aligned as you tighten the clamps.

Miter gauge set to about 1°.

Chalk line helps to size 1/8" thick wedges.

12" r. arc

Wedges driven into slots.

Create the wedges. Set the band saw's miter gauge to about 1° and trim the edge off a wide piece of 2" long milled stock. Flip the piece end-for-end and repeat the cut to create the first wedge. Then flip again and cut a second wedge.

Shape the head. With the head installed, lay out a 12" radius curve along the mallet's top edge. Then cut to the line at the bandsaw, trimming the tenon and wedges at the same time. ■

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Desktop ORGANIZERS

Mini modules for your modern workspace

By Chad McClung

Despite our mostly digital 21st century, we still need 20th-century office supplies. Pens, pencils, post-its, and paper clips still require places on our desks. Yes, some of us still use desks. Drawing inspiration from minimalist design, I made these modules to organize my most used supplies, painting in bursts of color for some fun.

Since we're in a modern world, I included a module that holds a smart device at an angle to easily distract you from your office work. And no workspace is complete without a cup of coffee, so I added a coaster to the set.

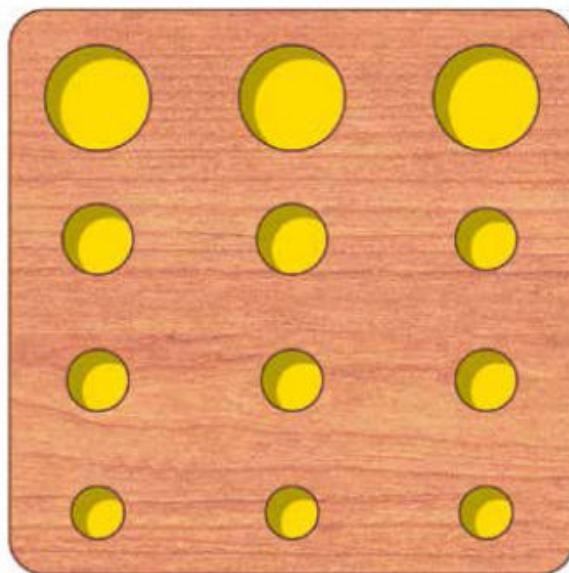
These modules are intended to be completely customizable. Make one or two or the whole set. You can mix, match, and move them around as needed throughout the day. But when the workday winds down, all the modules nest together neatly on a base. Let's organize your desk!

Design inspiration

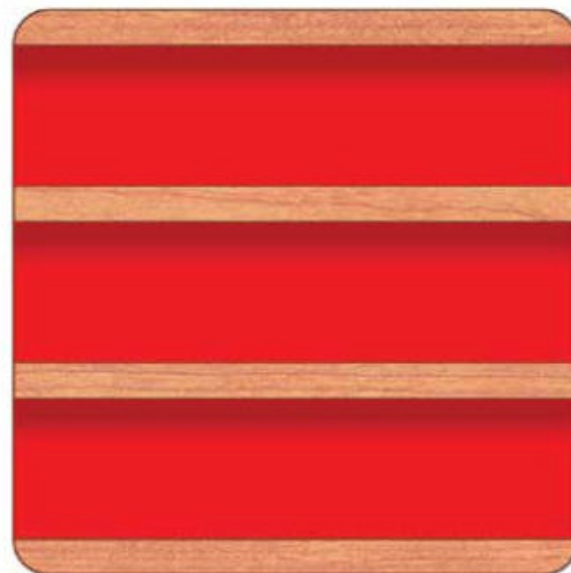
I started with five identical $1 \times 4 \times 4$ " modules, rounded their corners, and rabbeted the bottoms for feet. To keep them together, I routed grooves in the feet that nestle atop $\frac{1}{4}$ " dowels glued to a $\frac{3}{8} \times 4 \times 20$ " tray.

For the pencil holder, I threaded writing utensils through a drill bit size guide for exact diameters. I routed coved grooves to easily access paper or binder clips for the clips corral. A $3\frac{1}{2}$ " square opening centered on a face makes the post-its holder. Then, I measured my remaining accessories and organized them for the miscellaneous module. For the gadget keeper, three wide, angled grooves hold most smart devices and a stack of business cards. It also holds the sixth module—the thinner coffee coaster.

The coaster is lined with cork to absorb drips, but the others have bright bursts of acrylic paint. The most fun, though, is customizing these modules to hold *your* office supplies. Gather your most-used items and start measuring.



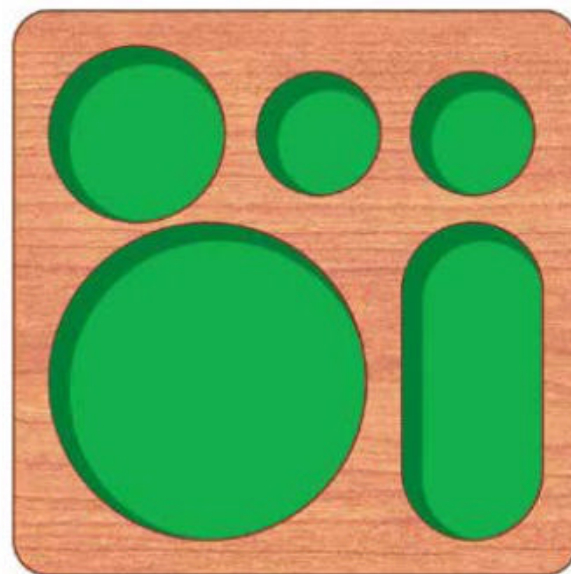
Pencils puck. Organize your favorite writing utensils for easy plucking.



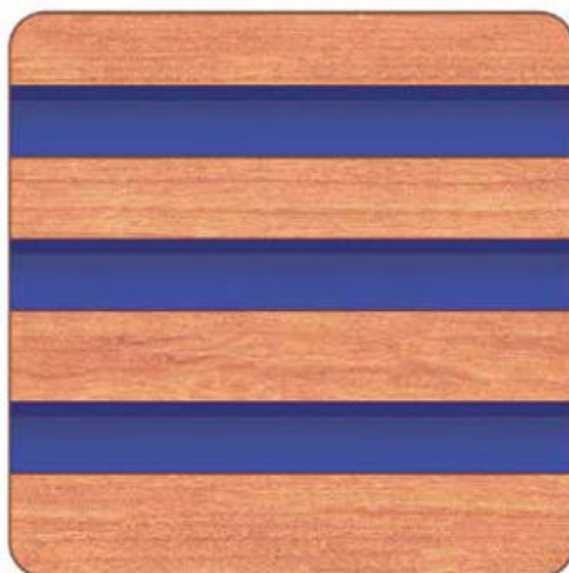
Clips corral. Whether paper or binder, keep your clips at the ready.



Post-its holder. Pull and place your notes from this handsome holder.



Miscellaneous module. A catchall for the extras that don't fit anywhere else.

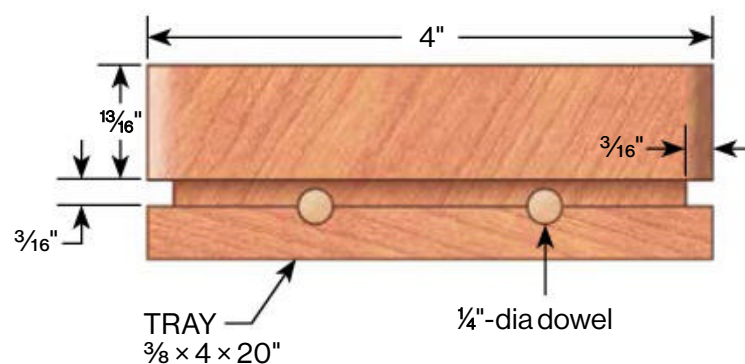


Gadget keeper. Great for smart devices or business cards.



Coffee coaster. For your caffeine fix. Stores in the gadget keeper.

Side view. Grooves along the bottom of each module rest on dowels glued to the tray.



Order of Work

- ✓ Make the modules
- ✓ Customize
- ✓ Sand, paint, and finish

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To make quick work of these modules, download the CNC files from our website.



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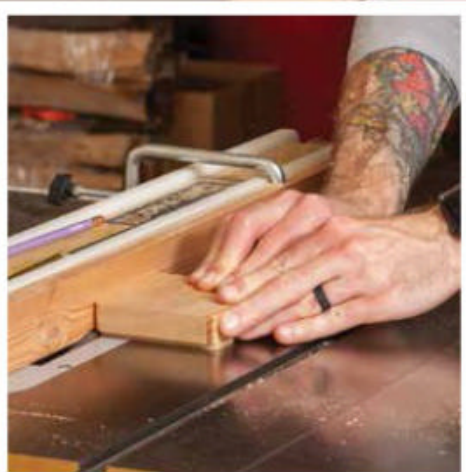
Make the modules

Mill 5/4 stock to $1 \times 4 \times 28"$. And mill another board to $\frac{3}{8} \times 4 \times 26"$. Crosscut the 1" thick board into five 4" squares, plus one for tool set-up. Then crosscut one 4" long piece from the 26"-long board for the coaster, before crosscutting the tray to 20" long.

Clamp the six modules in a stack and rout the corners at the router table using a $\frac{3}{8}"$ roundover bit (See Buyer's Guide, p. 60.). Feed the stack at a steady pace to avoid burning. After the first pass, rotate the stack to rout the next corner. Then, reposition the clamp and repeat to rout the two remaining corners. At the table saw, rabbet the feet as shown (inset). Now chuck a $\frac{1}{4}"$ round nose bit into the router table and rout the placement grooves in the bottom of each module. Set the fence, run the piece, rotate it, run it again. Then rout the matching placement grooves on the tray.

New, clean shop apron

Follower block prevents tearout.



Dadoed rabbets. Saw the $\frac{3}{16} \times \frac{3}{16}"$ rabbets around the bottoms of each module with a dado set buried in a sacrificial fence attached to your rip fence.

Customize and finish

At the table saw, set up your dado stack to cut $\frac{1}{2}$ " wide, $\frac{3}{8}$ " deep dados as starter grooves for the clips corral. Then adjust your dado stack to saw a groove wide enough to accommodate your smart device, and saw the grooves for the gadget keeper as shown. Finish the grooves in the clips corral at the router table using a 1" round nose bit. Set the fence to rout through the sawn grooves on each side. Readjust the fence to rout the center groove.

These small workpieces require drilling large holes. Use a slower speed, and clamp them securely. I used a handscrew to hold the pieces and clamped the assembly to my drill press table. Cover the pencil puck and miscellaneous module with painter's tape before marking your hole locations. Drilling through the tape will automatically mask the pieces, simplifying the painting process. Drill at-least $\frac{1}{2}$ "-deep holes in the pencil puck and miscellaneous module, including three inline 1" holes to start the capsule-shaped cavity. For the post-its holder, drill $\frac{3}{8}$ " starter holes in its corners before routing the perimeter. To set up, chuck a $\frac{1}{4}$ " straight bit into your router table and set its height to $\frac{1}{2}$ ". Lower a hole in the post-its holder onto the bit so the piece is on the right. Bring the fence to one edge and clamp a block against the piece's back edge. Repeat on the left side. Rout the perimeter as shown.

Back at the drill press, use a large Forstner bit to drill out the waste for the post-its holder. For the coaster, drill in about $\frac{3}{16}$ " deep with a hole saw. This will leave a hole in the center that you can plug later. Use a trim router as shown to rout out the waste in the post-its holder, the miscellaneous module, and the coffee coaster. Follow-up with chisels as needed. Plug the hole in the coaster.

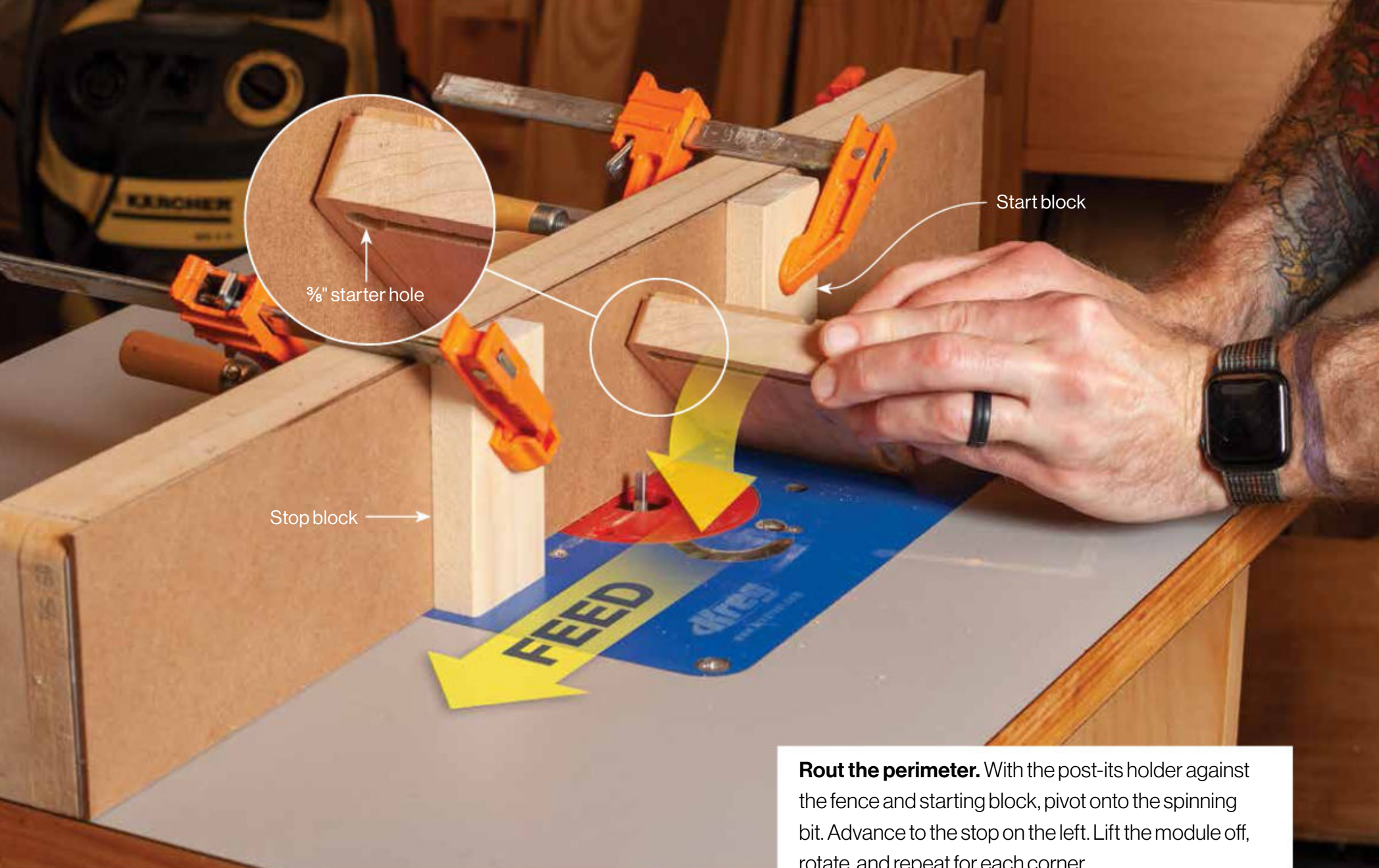
Roundover the top corners of all modules with a $\frac{1}{8}$ " roundover bit. Glue overlong $\frac{1}{4}$ "-dia. dowels into the tray's placement grooves and cut to length when dry. Mask as needed and paint the cavities as shown. For the coaster, cut a thin piece of cork to size and glue it in place. Remove the masking tape and sand the faces through 220 grit. Finish each module and the tray using an aerosol can of spray lacquer.



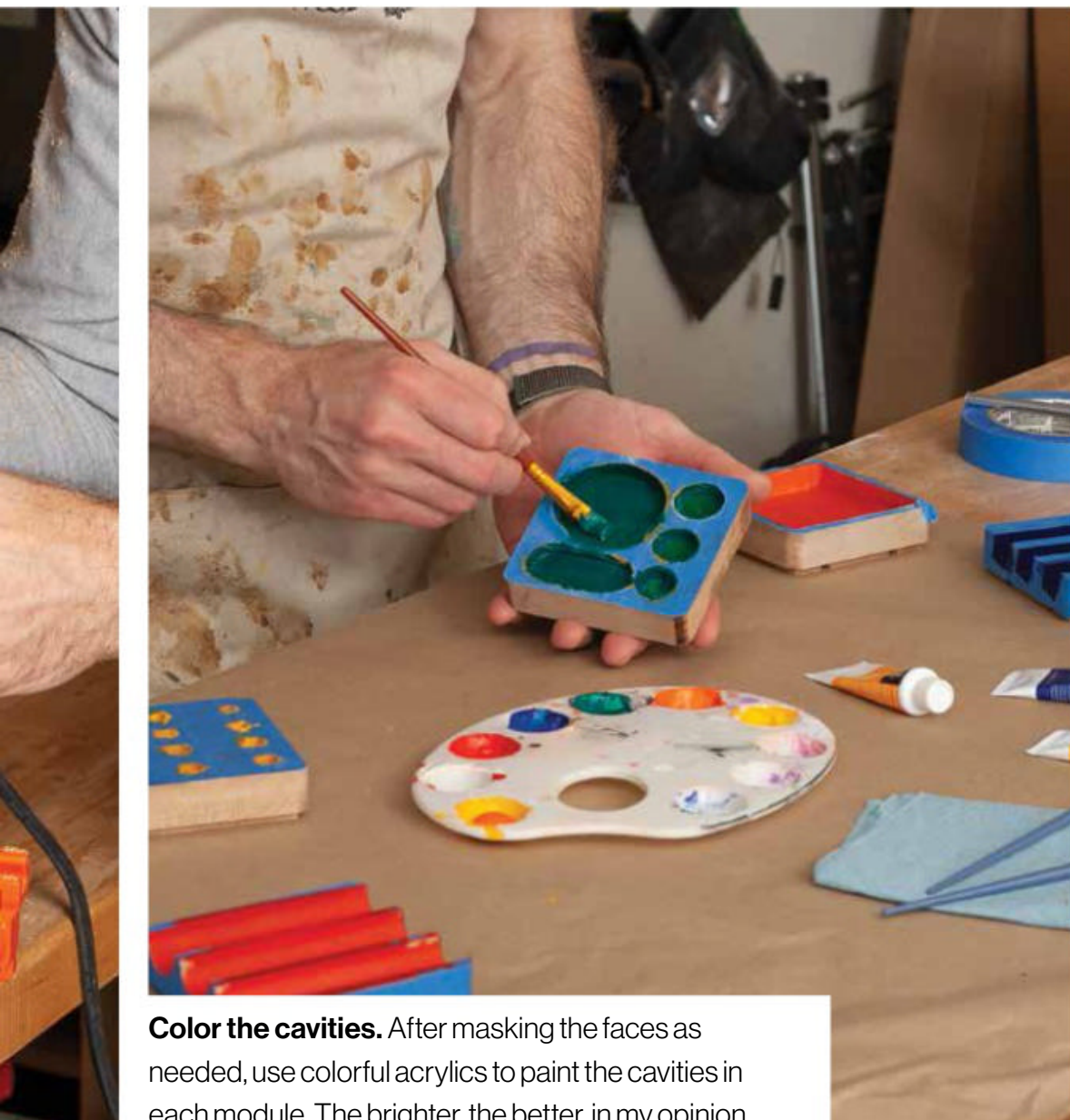
Blade tilt. Angle your dado stack to 10° and set its height to $\frac{5}{8}$ ". Set the fence to saw the groove on one side, then adjust to the fence to saw the opposite groove before readjusting for the center groove.



Trim the waste. Use a trim router and a $\frac{1}{4}$ " straight bit, and pivot the bit in to freehand-rout the waste. Be careful not to tip the bit into the work.



Rout the perimeter. With the post-its holder against the fence and starting block, pivot onto the spinning bit. Advance to the stop on the left. Lift the module off, rotate, and repeat for each corner.



Color the cavities. After masking the faces as needed, use colorful acrylics to paint the cavities in each module. The brighter, the better, in my opinion.



Sand the faces. Adhere sandpaper to a flat surface such as MDF. Remove the masking tape, and sand the faces flat and smooth. ■

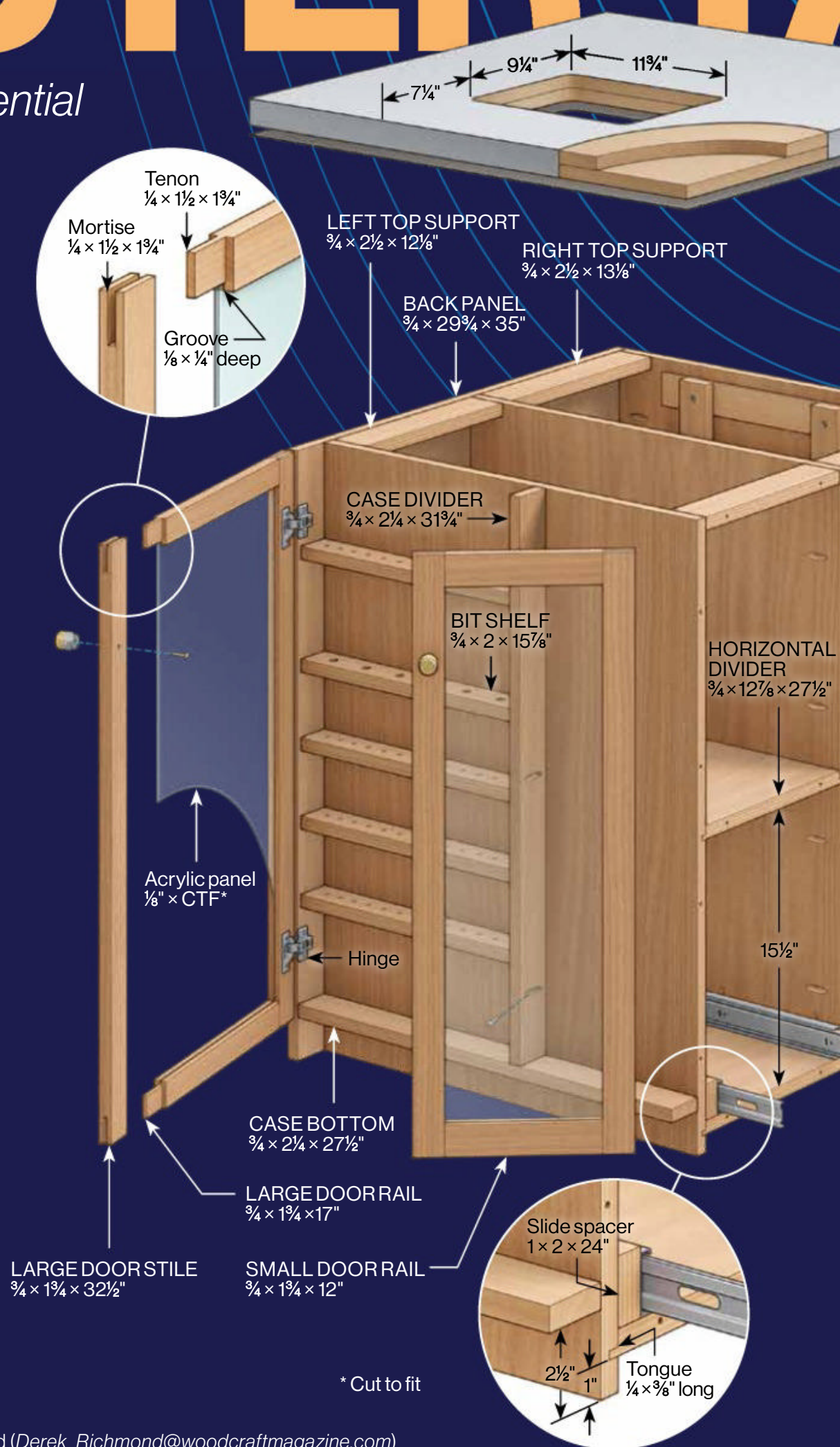
High-Tech ROUTER TABLE

A state-of-the-art shop essential

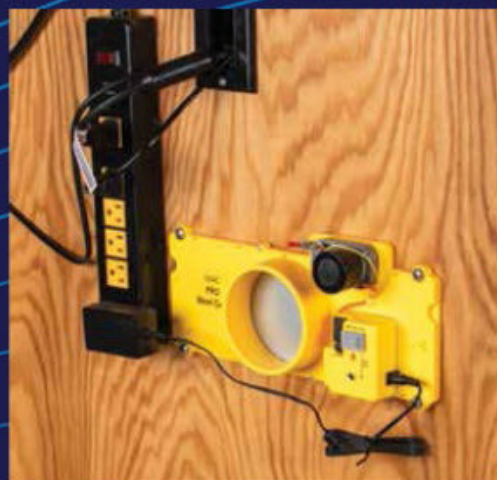
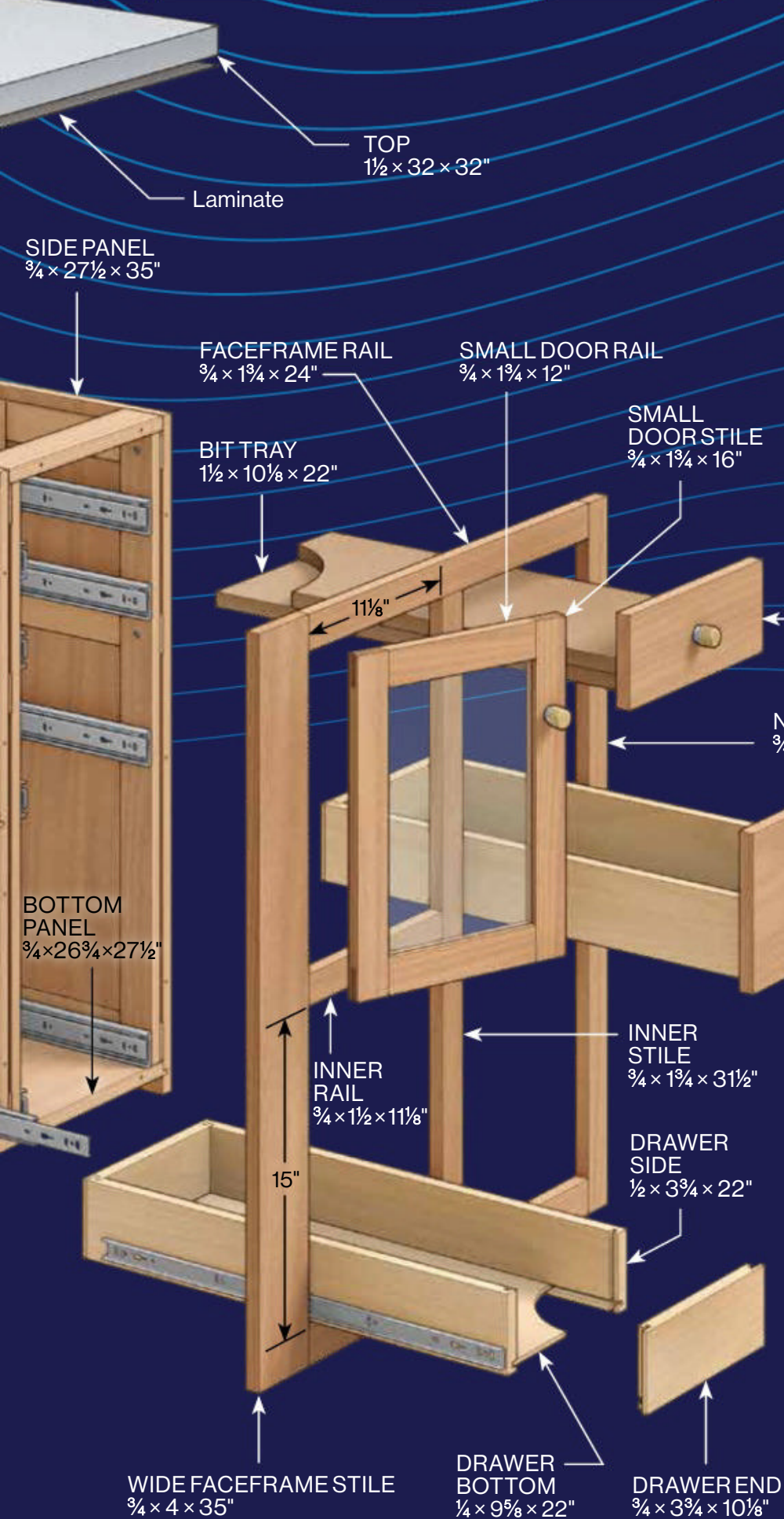
By Derek Richmond

My former router table was, shall we say, the lowest of low-tech. It was a rickety, stamped steel bench-top model with an underpowered motor and a sad fence. In designing a new one, I wanted everything that garage sale find lacked: storage for bits, collets, and wrenches; enclosed dust collection; mobility; simple bit height adjustment; plenty of power; and a reliable fence and miter gauge. With that wish-list in mind, I pulled together what I view as the state of the art in router tech and incorporated it all into one cabinet.

The cabinet itself is made of oak plywood with a solid oak face frame and topped with a custom, laminated tabletop (see p. 47). Spacious drawers on full-length slides provide plenty of storage for hand-held routers and their accoutrement, while bits and other accessories reside in either the pair of shallow tray-drawers or in the shelves behind the acrylic-paneled front doors. Everything is assembled with a combination of tongue and groove joinery and pocket screws. The high-tech part comes in the form of Next Wave's computer-controlled fence (see the Tool Review, p. 12) and the power-sensing blast gate for the dust hose. The entire unit sits atop a mobile base that allows me to wheel it effortlessly around my shop. Is all this tech necessary for every woodworker? Maybe not, but I'd bet at least some of it is on your wish-list too. For all the gadgets and gizmos I included, see the Buyers Guide, p. 60. Then get to making your own router table wish-list.



ABLE



The Next Wave RS1000 is the centerpiece of this table's tech, and it works with fixtures like JessEm's Stock Guides (top). Other tech includes an iVac auto blast gate and Bora mobile base.



Order of Work

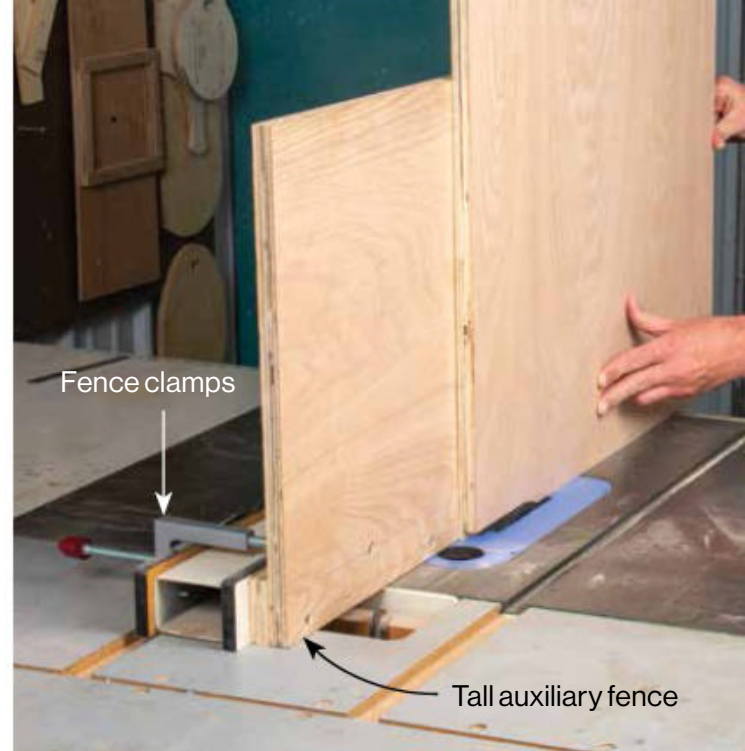
- ✓ Assemble case
- ✓ Build and attach face frame
- ✓ Assemble drawers and doors
- ✓ Install drawers, doors, and shelves

Create the case

Cut the plywood case parts to size and groove the side panels to receive the bottom panel. Also groove the left side panel and center panel to receive the horizontal divider. Then cut the mating tongues on the bottom and horizontal divider. Cut two $2\frac{1}{2} \times 26$ " plywood strips to use as spacers at the top of the case as you glue the sides to the bottom. Then recut the spacers to become the top supports and install the center panel and horizontal divider.



Get into the groove. Set a $\frac{1}{4}$ " dado blade to saw halfway through your plywood case sides. After cutting the grooves for the bottom panel, repeat the process to mill grooves in the left side and center panels for the horizontal divider, running the top edges of the panels against the fence.



Cut the tongues. Increase the width of the dado blade to $\frac{5}{8}$ " and lower the cutting height about $\frac{1}{32}$ " or so to ensure the tongues aren't too long. With a tall auxiliary fence in place, run the pieces vertically past the blade to cut the tongues. Start cutting them too thick, then bump the fence in to fine-tune the fit.



Install the divider and shelf. After recutting the spacers, install the shelf and center panel, using pocket screws to secure the center panel to the case bottom and to attach the top supports flush with the panels' top and side edges.



← The author is really getting into this project.

Portable pocket-hole jig



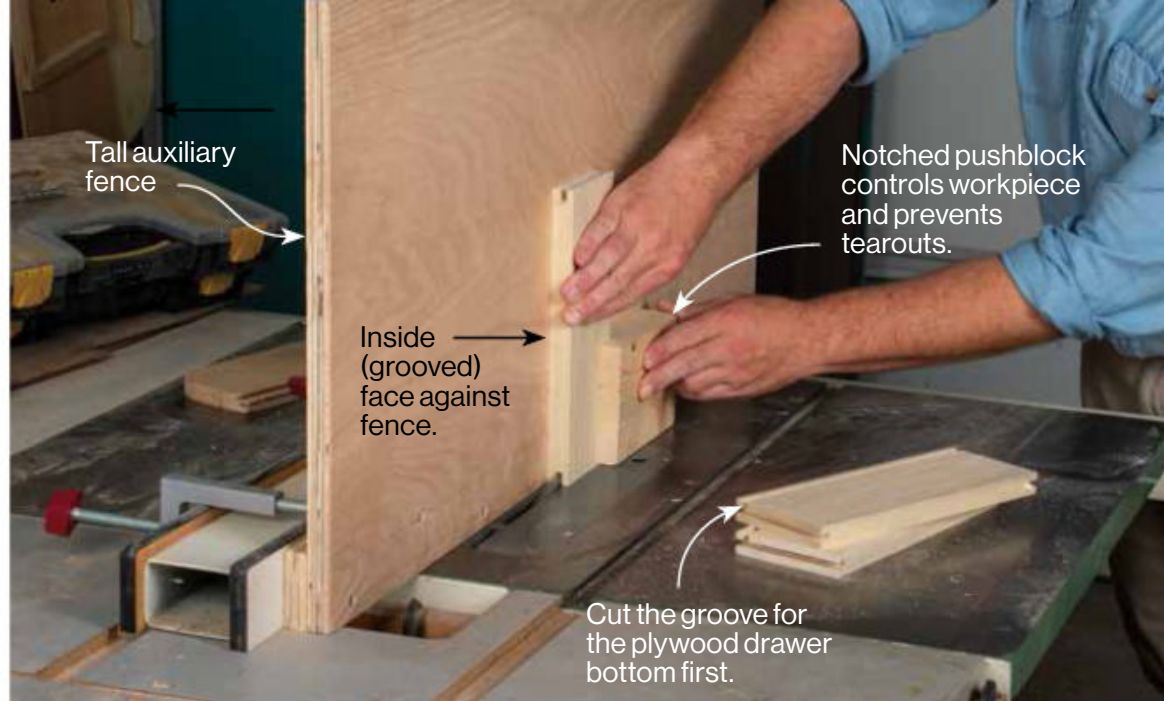
Pocket-hole jig

Make face frame and back

Fasten the parts of the face frame together with pocket screws. Then bore pocket screw holes into the case to attach the face frame and back panel. Attach the back panel and face frame to the cabinet so that they are flush along the right side of the cabinet; the back panel's opposite edge and the wide face frame stile will extend past the case's left panel to form the sides of the router bit case.

Make the drawers and doors

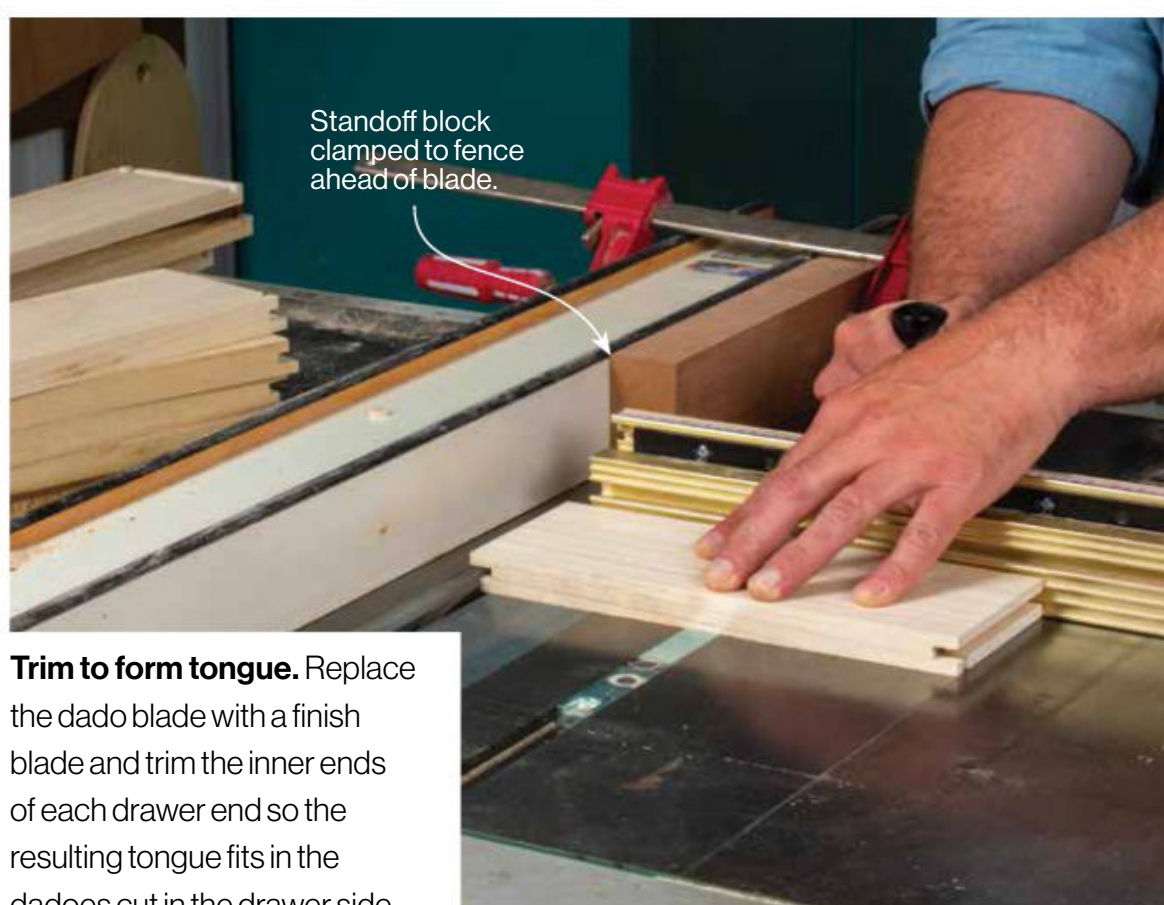
Size and laminate two thicknesses of MDF face to face for each of the tray-drawers. Drill them with a series of $\frac{1}{4}$ and $\frac{1}{2}$ " holes for bit storage. Mill stock for the drawer boxes, then set up a $\frac{1}{4}$ " dado blade to cut the grooves for the drawer bottoms and the corner joints. Make the locking corner joints with a series of three cuts as shown. Then size the drawer bottoms and glue up the drawers. Mill the door rails and stiles to size. Cut the bridle joints at the table saw using a tenoning jig (see OnlineEXTRAS for a shopmade tenoning jig). After cutting the tenons, reduce their width to match the $1\frac{1}{2}$ " depth of the mortise by running them on edge across a dado. Then cut a groove centered on the length of the rails and stiles to receive the acrylic panel. Cut the panels to size at the table saw and assemble the doors around their panels, putting glue on the tenons but leaving the panels to float.



Dado the drawer ends. Adjust the height of a $\frac{1}{4}$ "-wide dado blade to match the drawer side thickness and set a tall auxiliary fence precisely $\frac{1}{4}$ " from the blade. Hold the drawer end vertically with its *inside* face against the fence as you guide it through the cut with a notched push block.



Dado the drawer sides. Without moving the fence, reduce the blade height to $\frac{1}{4}$ ". Dado each end of the drawer sides, registering their ends against the fence and pushing them with the miter gauge.



Trim to form tongue. Replace the dado blade with a finish blade and trim the inner ends of each drawer end so the resulting tongue fits in the dadoes cut in the drawer side.

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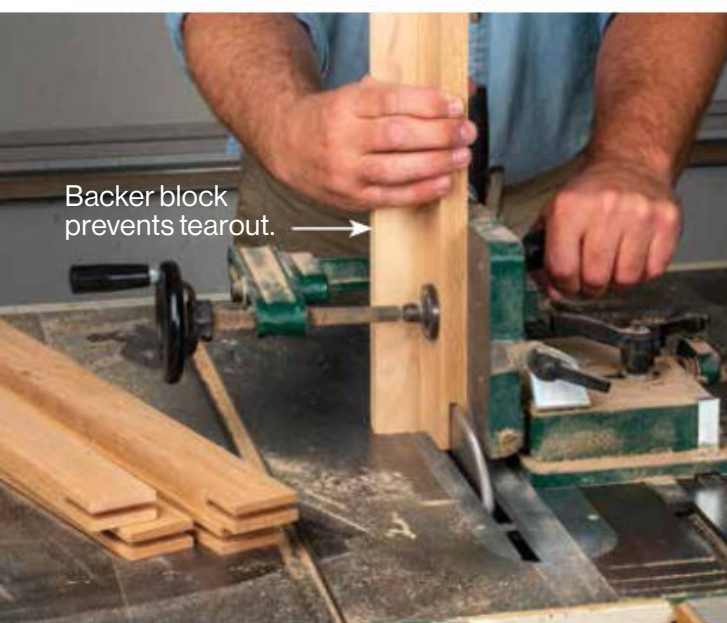
Visit our website to download plans for a shopmade router fence and tenoning jig, plus a deep dive into lock joint drawers.



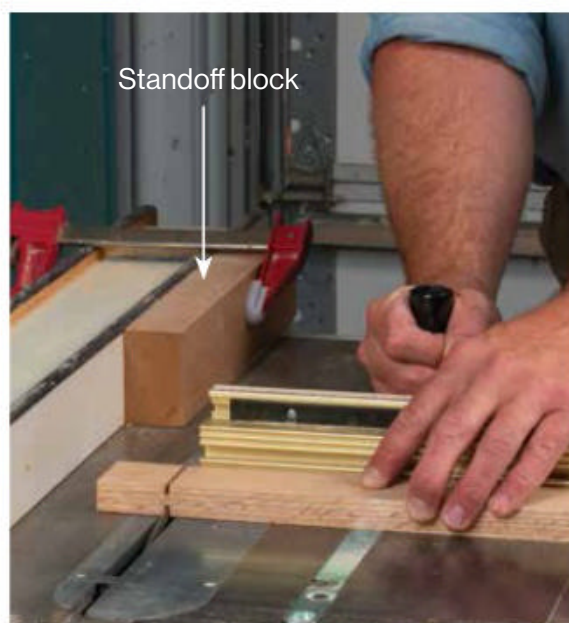
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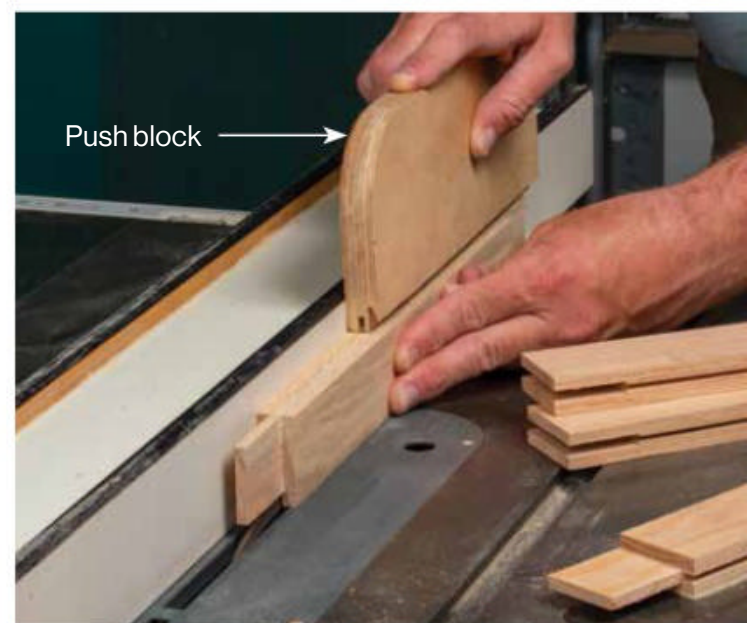
Draw up the drawers. Dry fit the drawers to make sure they go together right. Then apply glue to the joints, slide the bottom into its grooves, clamp, and check for square.



Mortise the stiles. With a $\frac{1}{4}$ "-wide dado blade raised to $1\frac{1}{2}$ ", guide the stiles vertically past the blade while clamped to a tenoning jig. Cut both ends of each stile with the same face against the jig.



Cut the tenon shoulders. Cut the tenon shoulders on the ends of the rails using a miter gauge. Register the pieces against a standoff block clamped to the rip fence to position the cuts. Make the cheek cuts similar to how you cut the mortises.



Cut the grooves. After reducing the width of the tenons, mill a $\frac{1}{8}$ "-wide, $\frac{1}{4}$ "-deep groove centered on the inner edge of the rails and stiles. Adjust the fence slightly to widen the groove if needed to fit your acrylic panel.

Install the shelves, drawers and doors

Install the case bottom and case divider with pocket screws. Then drill a series of $\frac{1}{4}$ " and $\frac{1}{2}$ " holes in the bit shelves and pocket screw them in place on the wide side of the case. Hang the doors on the front and side of the cabinet. Install the drawer slides where shown below. With the drawers and bit trays in place, size and attach their faces. The bottom edge of the two lowest drawers sit flush with the face frame's inner edge to give clearance to the mobile base. Screw the fronts onto the drawers, and use pocket screws to attach the fronts to the bit trays. Finally, add a coat of finish (I used General Finishes new Hard Wax Oil) and install hardware on the drawers and doors.

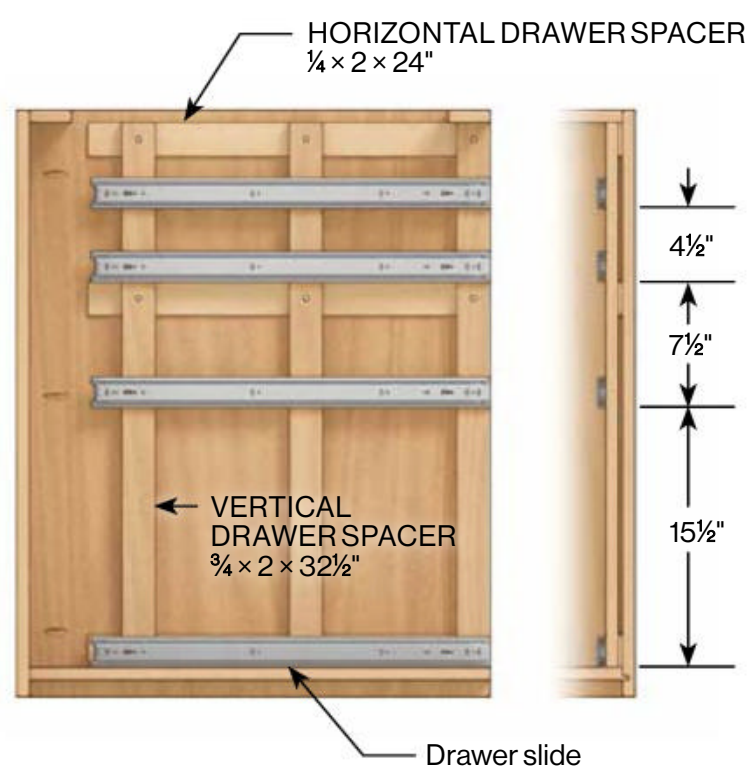


Drill for cup hinges. Bore $1\frac{1}{8}$ "-dia. holes $\frac{1}{2}$ " deep into the doors to receive the European-style cup hinges, locating the holes according to the hinge instructions. Predrill for the mounting screws, then attach the hinges.

Hang the doors. Predrill then screw the hinges in place. The smallest door's hinges mount to the face frame, while the two cabinet doors mount to the case (even though they use face frame hinges – see Buyers Guide p. 60).



SIDE PANEL DETAIL



Install the drawer slides. Position the slides inside the case by cutting a scrap of plywood to use as a spacer. Start with the top drawer slides, then cut the spacer down for subsequent drawers.

Install the goodies

Make your own top by screwing together a double-thickness of MDF and laminating both faces and all four edges (see p. 47). Then cut a hole through the top appropriate to your router lift mechanism or mounting plate. Flush the table's back edge to the right side of the cabinet and leave 1½" overhangs on the cabinet's front and back. Drive screws up through the top supports to hold the top in place. Install and level the router lift, then attach the fence unit as shown. Note, if you don't want to splurge on the high-tech fence, there are plans for a shop-made one on our website, see Online Extras. Finally, drill for appropriate dust collection hardware and install a power strip to power the router, lift, blast gate, and any other high-tech accessories you've included from your wish-list. ■



Up top. Install corner plate levelers to support the router lift plate. The Next Wave unit I installed included a set of Kreg levelers (also available separately). Alternatively, you could simply rabbet around the opening and shim the plate as needed.



Good fences. Locate and attach the fence unit. The custom table top, about 8" deeper than many commercial router tables, makes full use of the Next Wave fence's capacity while providing plenty of space for drawers beneath. It does, however, necessitate routing a couple of relief channels for bolts that stand proud of the unit's bottom surface.



Collecting dust. Bore a 4"-dia. hole through the router cabinet's back just above the horizontal divider. Install a blast gate to receive dust a collection hose – this iVac unit can be set up to open automatically when the router powers on.

Albers-Inspired NESTING TABLES

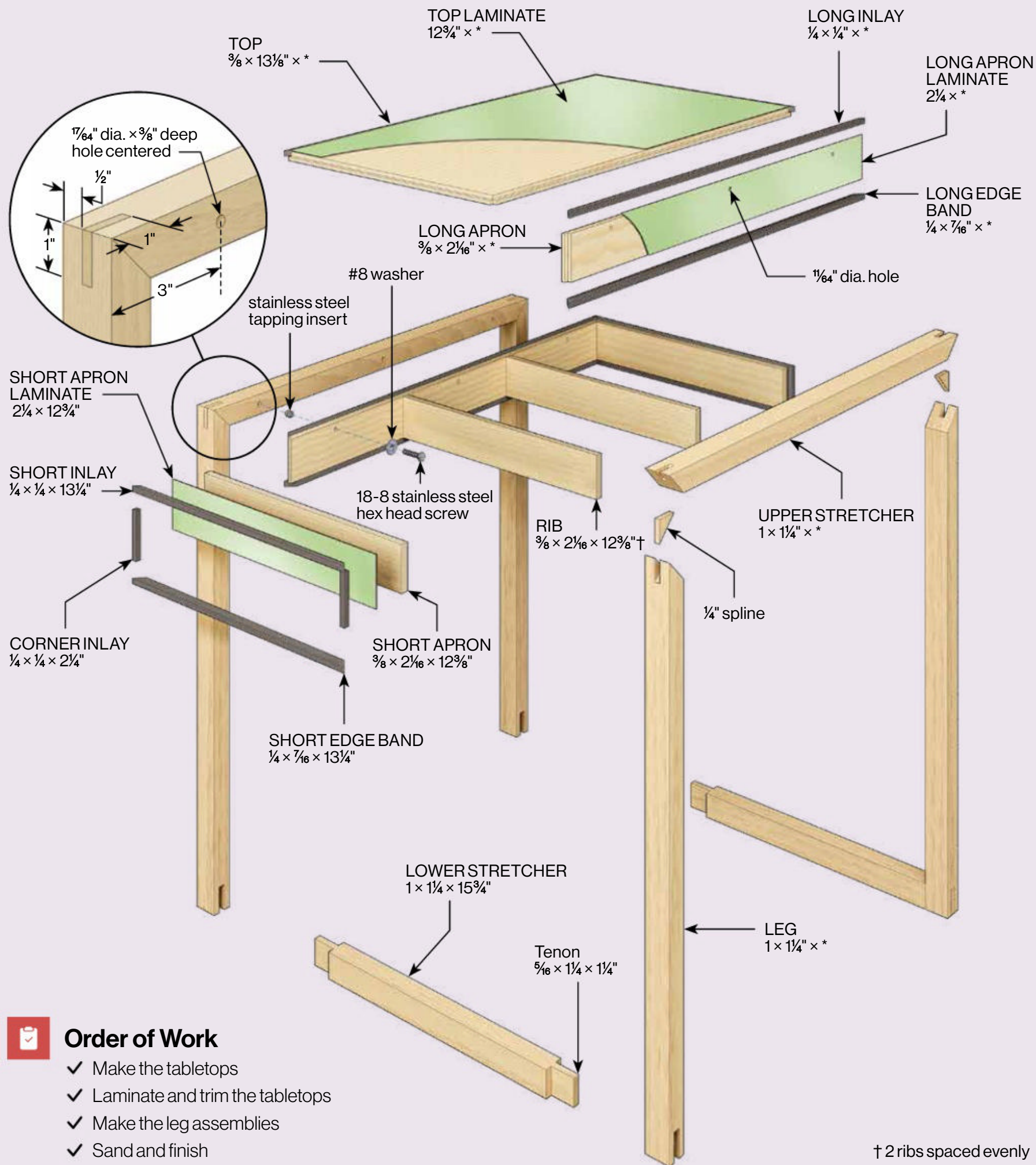
A colorful array of Bauhaus utility

By Sarah Marriage



Like many design nerds, the first style of furniture I fell in love with back in architecture school was the work that came out of the Bauhaus, a German art school that ran from 1919 to 1933 and served as an incubator for artists and designers whose work would lead into the post-war mid-century modern movement. The Bauhaus style featured meticulously-designed, yet deceptively-simple geometry coupled with straightforward functionality. A great example of this is found in a set of nesting tables designed by Josef Albers in 1926. Each table featured a different-colored glass top, black aprons, and oak legs. In revisiting these tables nearly 100 years later, I wanted to challenge myself to execute

Albers' clean and precise geometry, while swapping in a few different techniques. Instead of glass, my variation utilizes plastic laminate to bring similarly bright colors to the surface. Dyed black beech inlay and edge banding wrap each tabletop in a cartoon-like outline. (For more on beech, see p. 54.) And while my beech leg assemblies are geometrically similar to Albers' they employ exposed joinery where his do not. Small bolts attach the tabletops to threaded inserts in the leg assemblies, and like the original, all four tables nest neatly into one footprint, waiting to be deployed as needed. I hope you'll give this project a try, or maybe develop your own variation on the theme!



Order of Work

- ✓ Make the tabletops
- ✓ Laminate and trim the tabletops
- ✓ Make the leg assemblies
- ✓ Sand and finish
- ✓ Bolt tabletops to leg assemblies

onlineEXTRAS

Visit our website for a cut list and article on key miters.



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*TABLE (Largest to smallest)	A	B	C	D
TOP	23 $\frac{5}{8}$ "	20 $\frac{7}{8}$ "	18 $\frac{1}{8}$ "	15 $\frac{3}{8}$ "
TOP LAMINATE	23 $\frac{1}{4}$ "	20 $\frac{1}{2}$ "	17 $\frac{3}{4}$ "	15"
LONG APRON	23 $\frac{5}{8}$ "	20 $\frac{7}{8}$ "	18 $\frac{1}{8}$ "	15 $\frac{3}{8}$ "
LONG APRON LAMINATE	23 $\frac{1}{4}$ "	20 $\frac{1}{2}$ "	17 $\frac{3}{4}$ "	15"
LONG INLAY	23 $\frac{3}{4}$ "	21"	18 $\frac{1}{4}$ "	15 $\frac{1}{2}$ "
LONG EDGE BAND	23 $\frac{3}{4}$ "	21"	18 $\frac{1}{4}$ "	15 $\frac{1}{2}$ "
UPPER STRETCHER	23 $\frac{3}{4}$ "	21"	18 $\frac{1}{4}$ "	15 $\frac{1}{2}$ "
LEG	25"	21 $\frac{7}{8}$ "	18 $\frac{3}{4}$ "	15 $\frac{5}{8}$ "

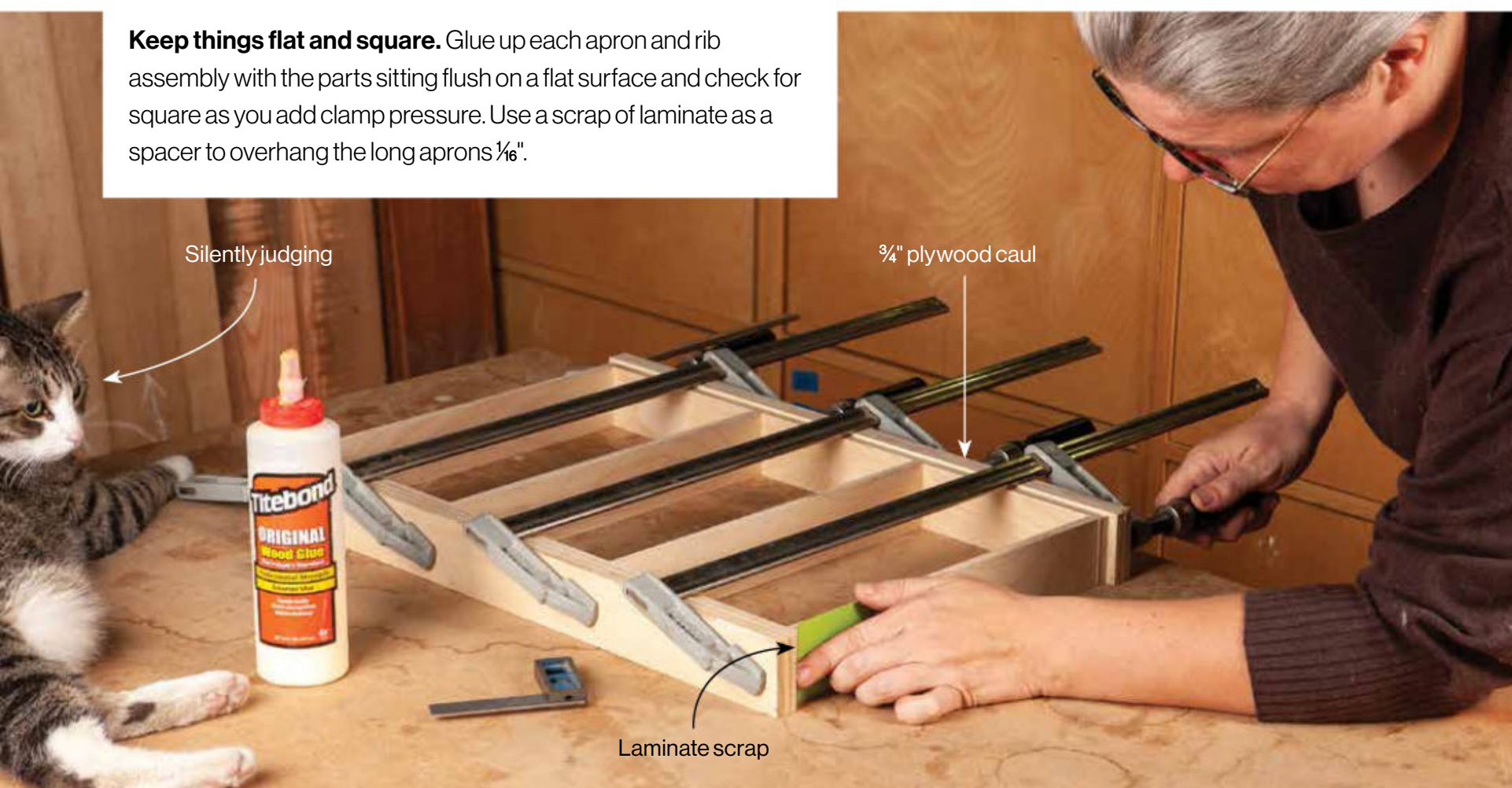
Four tabletops, shrinking in one dimension

Cut the plywood table parts to size, leaving the long aprons $\frac{1}{8}$ " overlong and the tops $\frac{1}{8}$ " overlarge in both directions. Mill strips of $\frac{1}{4} \times \frac{1}{4}$ " beech for the inlays and $\frac{1}{4} \times \frac{7}{16}$ " for the bottom edge banding. On a flat surface, glue up the apron and rib assembly for each table, leaving the long aprons overhanging the short aprons by $\frac{1}{16}$ ". Flush these corners at the router table. Glue on the oversized tops before flush routing as shown. Apply laminate to the five show sides of the table top

assemblies, using the methods outlined in *Working with Plastic Laminate*, p. 47. I used a mix of Formica and Wilsonart laminate to get the colors I wanted (see Buyer's Guide p. 60). Bury a dado set in a sacrificial fence attached to your table saw fence, revealing a hair less than $\frac{1}{4}$ " width of cutting surface. Raise the set through a fresh zero-clearance skin or throat plate until the cutting height reaches just under $\frac{1}{4}$ ". Saw the rabbets for the corner inlays and glue in short lengths of the $\frac{1}{4} \times \frac{1}{4}$ "

stock, leaving the inlay just shy of the laminate top and slightly overhanging the apron bottoms. Handplane these corner inlays flush with the apron laminate faces and the bottom of the aprons before sawing the remaining rabbets in the top. Miter the corners as you fit the inlay stock around each table top and repeat the process with the edge band stock on the undersides. Glue the inlays and bottom edge banding in place before handplaning them flush to the laminate surfaces.

Keep things flat and square. Glue up each apron and rib assembly with the parts sitting flush on a flat surface and check for square as you add clamp pressure. Use a scrap of laminate as a spacer to overhang the long aprons $\frac{1}{16}$ ".



Clean up the corners. Flush rout the overlong aprons, preparing a smooth, flat surface for the plastic laminate to adhere to.



Trim the tops. After gluing on the plywood tops with a slight overhang in all directions, rout the edges flush to the aprons.





Scrap MDF backer block

Corner inlay glued in place.

Sacrificial fence

Zero-clearance skin

Rabbet at the table saw. The freshly-cut zero-clearance skin on the table saw bed prevents the top laminate from chipping out. Clamp a piece of scrap at the back of each cut to support the corner inlays and prevent blow-out.



Tape it up. Painter's tape provides sufficient clamp pressure for gluing up the inlaid pieces and the bottom edge banding.



A clean shave. Handplane the hardwood inlays and edge banding flush to the laminate faces paying careful attention to grain direction to prevent tear-out.

Make the leg assemblies

Mill enough $1 \times 1\frac{1}{4}$ " stock for all of the leg parts and some $\frac{1}{4} \times 1$ " stock for the splines. Cut the lower stretchers to length equaling the actual width of your tabletops plus twice the actual width of the legs (about $15\frac{3}{4}$ " long). Saw the legs to length, mitering their top ends. Saw miters on both ends of the top stretchers, matching the length to the actual length of each tabletop. Using a tenoning jig, saw the bridle joints at the table saw before gluing up the leg-to-top-stretcher miter joints. With a dado set, saw $\frac{1}{4}$ " wide spline notches in the cured miter joints, and then glue up the bridle joints and miter splines. Handplane the splines flush to their joints.



Miter the top corners. Provide support to the cut with an auxiliary bed and fence skins on the saw, and angle the blade toward the longer portion of the stock to prevent small offcuts from getting caught between the blade and the fence.



Bridle the bottom corners. Set up a $\frac{5}{16}$ " wide dado set and cut the bridle joint mortises in the ends of the legs. Widen the dado set and attach a new sacrificial backer piece to your tenoning jig before sawing the matching tenons in the bottom stretchers.



Glue-up the miters. Arrange the legs and top stretchers with their corners touching and apply tape across the outside of the miter joints. Apply glue and hinge the joints closed, taping a scrap wood spacer toward the bottom of the legs to clamp and help keep the assembly square.

Tape serves as clamp.

Precut spacer

A scrap wood spacer keeps things square and protects the fragile miter joints from breaking open before their reinforcing splines are glued in.



Spline for strength. Cradle the leg assemblies in a spline jig to saw the $\frac{1}{4}$ " wide spline slots, centering them across the width of the pieces. The blade should be raised high enough for the slots to appear about 1" long when viewed from either side. For my set-up, that blade height was about $\frac{3}{4}$ " from the bottom corner of the cradle to the apex of the blade.



Risers, even just $\frac{1}{4}$ "-thick here, allow the bridge joints to fully seat, even if the cheeks are a little proud.



DRILL PRESSES

UNLOCK BED BEFORE ADJUSTING HEIGHT
HOLE BIGGER THAN $\frac{1}{2}$ " ASK A SHOP MONITOR

I like to cut my splines into triangles before gluing in, creating less waste and fewer steps to clean up the joint.

After fully seating the bridge joints, place clamp pressure through the cheeks, perpendicular to the glue surfaces.

Threaded insert time

Before drilling for the bolts, tape off the laminate faces and dye the inlays and the show face of the edge banding black. Then, for each table, prepare a piece of hardwood $1\frac{1}{2} \times 1\frac{1}{2} \times$ table length. Lay out the apron hole locations on these sticks along the centerline of each stick: one hole in the center, one hole 3" from each end. Drill $\frac{11}{64}$ " holes at your layout marks. Attach cleats to one end and one side of each drilling guide. Use the drilling guides to locate and drill holes in the aprons as shown. Add $\frac{1}{4}$ " spacers to the same drilling guides before marking the centers of the $\frac{17}{64}$ " holes in the upper leg stretchers. Drill the stretcher holes before screwing in the threaded inserts (see Tips & Tricks p. 16 for a fool-proof trick for keeping your inserts straight). Sand the leg assemblies and finish all the wood with clear finish. Bolt the tabletops to their leg assemblies and nest away! ■



Dye for drama. Carefully tape off the laminate faces before applying dye. If you get bleed-through, clean up with lacquer thinner.

A drilling guide keeps things straight. Align the drilling guide with the surface and one end of the tabletop with the cleats before drilling through the aprons. Use the same drilling guide, with a $\frac{1}{4}$ " spacer to mark the center points for the $\frac{17}{64}$ " holes in the leg stretchers. Be sure to reference from the same end of the table top and leg assembly throughout this process.

Bolt snugly. Align the apron bolt holes with the threaded inserts in the legs and spin the bolts into place. Turn the bolt with a $\frac{1}{4}$ " wrench until snug, taking care to not overtighten.



Working with PLASTIC LAMINATE

Adding a durable, smooth, and colorful surface to your work

By Ken Burton



Plastic laminate gets a bad rap. Maybe it's because of all the avocado kitchens from the '70s, or the acres of faux-woodgrain you come across in truck stop restaurants across the country. But the stuff has its uses. It's incredibly slick and durable—if you're making your own router table top, I'd definitely laminate it—and it comes in a wide variety of

colors—perfect if you're making a set of nesting tables like those on p. 40. It also requires no finish, nor any real maintenance. In all, it is well worth knowing how to work with. In this article, I'll show you the basics along with a few advanced tricks so you can incorporate laminate into your work.

Purchasing laminate

In broad terms, plastic laminate—also known as high-pressure laminate (HPL)—is made up of layers of kraft paper impregnated with phenolic resin and pressed flat. Formica and Wilsonart are the two most popular brands in the U.S., but you may also find sheets from Laminart, Nevamar, Pionite, and Panolam. HPL is usually sold in 4 × 8 sheets, though other widths and lengths are available. It comes in two thicknesses: 1/32" or *vertical grade* for walls and other light-duty applications, and 1/16" or general purpose (*horizontal*) grade for heavier-duty use such as countertops. Typically, a sheet's color is only embedded in the outermost layer, leaving the rest of the thickness a dull

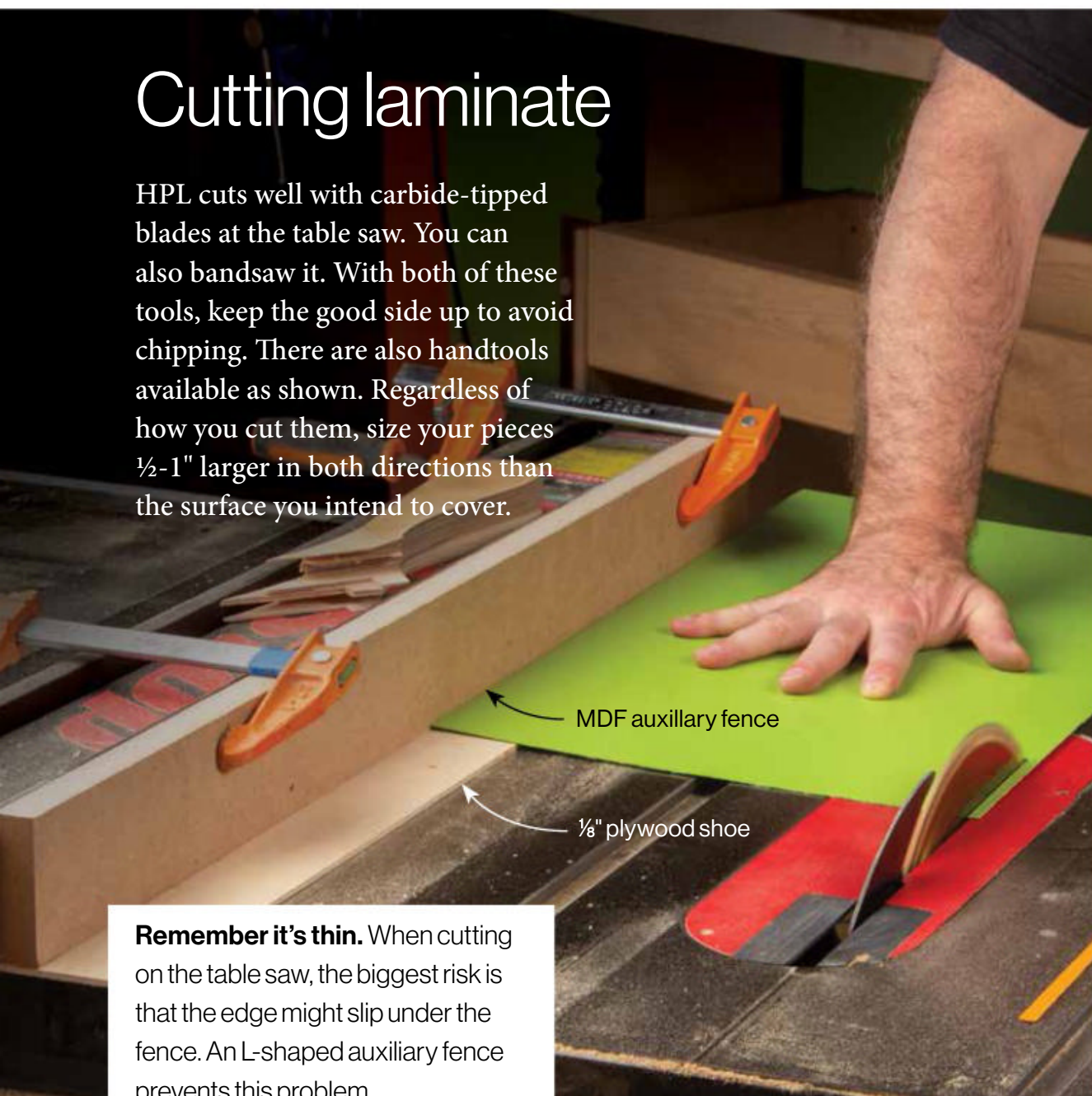
brown. This is where the dark line surrounding the edge of a laminated surface comes from. There is also a less expensive product known as backer that has no color layer. It is applied to the back or underside of an unsupported panel such as a door to prevent warping. You can generally purchase HPL through lumber yards and the big box stores although few places stock more than a few standard colors. For a wider selection, you'll need to place an order. Expect to pay about \$80 a sheet for most general purpose laminate and more for some of the exotic colors. Another option is to check with a local cabinet shop; they often have smaller offcuts from past jobs.



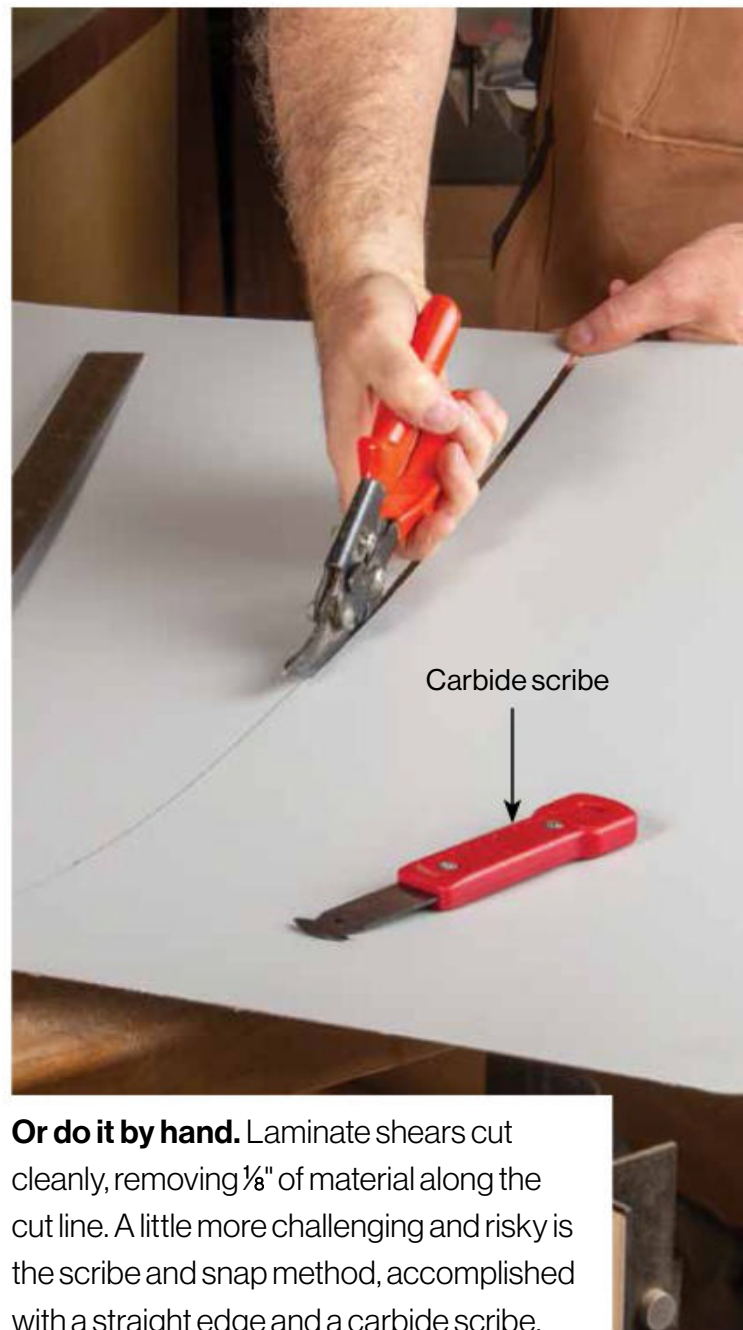
Unroll carefully. Full sheets often are shipped in a roll. If the package is cold when you receive it, allow it time to warm up before attempting to unroll.

Cutting laminate

HPL cuts well with carbide-tipped blades at the table saw. You can also bandsaw it. With both of these tools, keep the good side up to avoid chipping. There are also handtools available as shown. Regardless of how you cut them, size your pieces 1/2-1" larger in both directions than the surface you intend to cover.



Remember it's thin. When cutting on the table saw, the biggest risk is that the edge might slip under the fence. An L-shaped auxiliary fence prevents this problem.



Or do it by hand. Laminate shears cut cleanly, removing 1/8" of material along the cut line. A little more challenging and risky is the scribe and snap method, accomplished with a straight edge and a carbide scribe.

Applying the cement

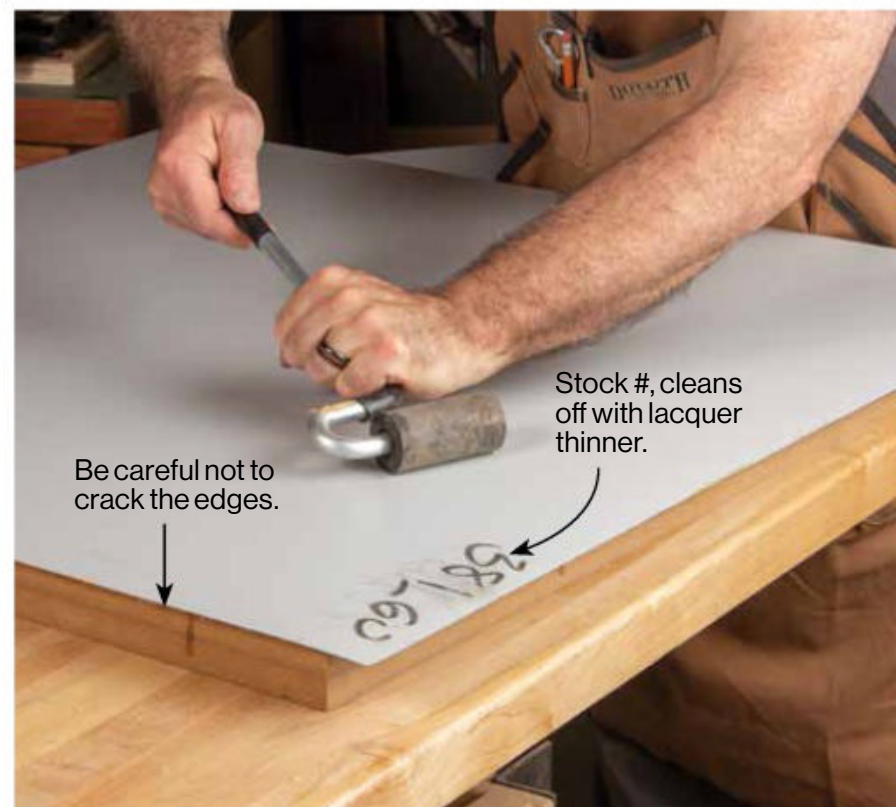
HPL is bonded to its substrate—usually plywood, particleboard, or MDF—with contact cement. Contact cement is an adhesive that sticks to itself. To use it, coat both of the surfaces to be bonded, allow the cement to dry, then press the pieces together. Porous surfaces such as the edges of MDF may require two or more coats. Contact cement comes as either water-based or solvent-based. The solvent-based formulas (if available in your area) tend to be a little cheaper and dry faster (about 15 minutes as opposed to 40). They are also extremely flammable and emit toxic fumes. Both types can be rolled or troweled on. Make sure both surfaces are flat and clean before spreading the cement. General purpose HPL can bridge countersunk screw holes and other small gaps, but double check that the screw heads are truly set beneath the surface. After the cement dries, position the laminate and press it firmly into place with a J-roller or a simple bull-nosed scrap.



Spread an even coat. For larger surfaces, I like to spread contact cement with a low-nap or foam paint roller. For smaller jobs like this one, I frequently use a scrap of laminate as a throwaway trowel.



Prop and position. Support the HPL over its substrate on thin scraps or dowels (I use shelf standards) to get it positioned. Then press it down in the center and work your way to the outsides. Beware that contact cement grabs immediately so you won't get a chance to shift it once you start.



Rolling, rolling, rolling. To complete the bond, you need to press the HPL firmly in place. If you intend to do a lot of laminate work, invest in a J-roller. These are made specifically for this task.

Flush trimming

Once the HPL has been rolled, you must trim it flush with the edges of the substrate. Do this with a flush trim bit in a router. Trim routers are made for this, but a regular router will do. Be sure to hold the router base flat on its reference surface to keep the bit from overcutting into the adjacent surface. When flush trimming the final piece, commercial shops often use a trim bit with an 8° bevel. This eases the edge so it isn't quite as sharp. I usually just use a regular flush trim here. Either way, I follow up by filing the edge to finish it.

Clean up solvent-based cement with lacquer thinner and water-based cement with either warm, soapy water, alcohol, or vegetable oil.

Use firm pressure to keep base from tipping.

Ball bearing guides offer better protection from burning than solid pilots.

FEED

Surface strategy

When laminating adjacent surfaces, give some thought to which one you do first. With tabletops, for example, the bottom is typically laminated first (if it is to be laminated) followed by the edges, then the top. After each surface is laminated, its HPL is trimmed flush before the adjacent surfaces are covered. Following this strategy protects the edges from the top down.



File to finish. After routing, the edges of HPL can be quite sharp. Ease them with a file.

Beyond the basics

Plastic laminate plays a huge role in the commercial cabinet industry, so it is no surprise that there are a number of specialized tools for working it. These include specialized attachments for trim routers such as Betterley's underscribe base. This is used for creating a seam where you need two pieces of HPL to butt against each other. There are also other way to treat edges, two of which are shown here, but the possibilities are vast. ■

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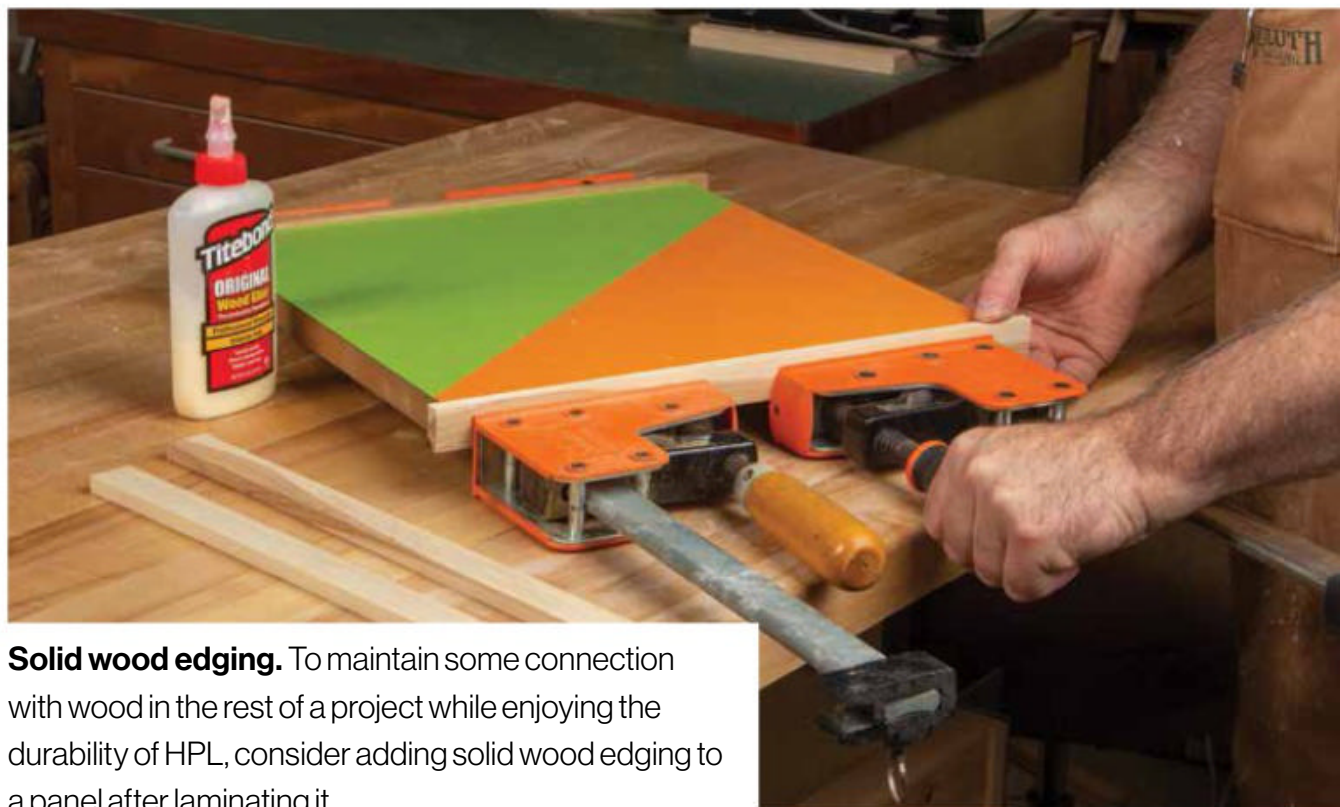
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Seaming made easy. To cut a joint with the underscribe base, both pieces are glued down with one lapping the other. The base has a built-in fence that registers on the underpiece while an $\frac{1}{8}$ " bit cuts the lapped piece to match.



Solid wood edging. To maintain some connection with wood in the rest of a project while enjoying the durability of HPL, consider adding solid wood edging to a panel after laminating it.



Or go bare. Depending on what you use as a substrate, you may be able to simply profile it to serve as the edge treatment. This table top is made from Baltic birch with HPL adhered to both sides.

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Beech

Plain looks, but a solid performer

By Robert J. Settich

American beech, *Fagus grandifolia*, may not have the dramatic figure or exciting color to earn a starring role in your next high-end woodworking project, but it is a solid performer that deserves an audition in your shop. Flatsawn beech generally has a bland appearance with subdued figure. Quartersawn beech typically shows tiny ray flecks, though these may sometimes be more pronounced. Regardless of how it's cut, beech's tight structure eliminates the need for a grain filler to achieve a smooth finish.

Beech's plain appearance isn't necessarily a liability. When showing off your joinery skills, for example, you don't want flawless hand-cut dovetails to get lost in dark wood or swirling figure. Much like using every fancy wood scrap in your shop to make a cutting board can leave the viewer confused—the eye doesn't know where to look. Plainer wood plays a supporting role to make fancier woods look their best. Plus, beech is not used to being treated as a star, so it doesn't ask for top dollar.

A wide range of roles

One of beech's great attributes is that it won't transfer taste or odor, making it perfect for cutting and charcuterie boards, rolling pins, spoons, and many kitchen accessories. It is also ideal for canisters storing flour (below), rice and other bulk foodstuffs, as well as spices. Chair makers and boat builders prize beech as it steam-bends well. Other commercial uses for beech include everyday items such as sticks for corn-dogs and frozen treats, tongue depressors, flooring, veneer, and components for building furniture and cabinetry.

Putting beech to work

My experience working with beech began with some web-ordered 8/4 stock. I initially noticed a few surface checks but wasn't too concerned. Over the next week, though, I noticed additional and expanding checks, possibly indicating that the wood was losing a considerable amount of moisture as it acclimated to my shop in early spring. Perhaps the wood I received wasn't quite as kiln-dried as claimed—

always a risk when ordering lumber from afar.

Preliminary sizing cuts at the mitersaw and table saw were problem-free. The jointer gave smooth results with only a minor bit of tearout on a quartersawn edge. The thickness planer also yielded smooth surfaces, but without the level of luster I get when machining maple. After edge-gluing to achieve the stock width needed I then surfaced the beech to ½"-thick for the flour canister. I used a router jig for the finger-jointed corners and received crisp results. There were no issues with gluing and sanding, nor with turning a knob for the top.

As for beech's few shortcomings, it has such poor resistance to insects and borers that calling it "non-durable" would be a compliment. "Perishable" is much more accurate. And it's prone to warping and checking if not properly dried. Even though I had to avoid checks in several boards with carefully-placed rip and crosscuts I hadn't initially planned, I was still able to salvage plenty of great material. Rather than making as many canisters as I had wanted, I will instead have plenty of cutting board strips, rolling pins, and kitchen utensils.

Accounting for no taste.

I usually apply finish to both sides but made an exception for this flour canister. The exterior got two applications of Waterlox, but the interior is bare to utilize beech's attribute of imparting no taste.



WORKABILITY	
TOXICITY	
ROT/INSECT RESISTANCE	
HARDNESS	



Beech trivialities



Nothing to see here, folks. Most beech has a ho-hum appearance. Seeing even a bit of figure passes for excitement.



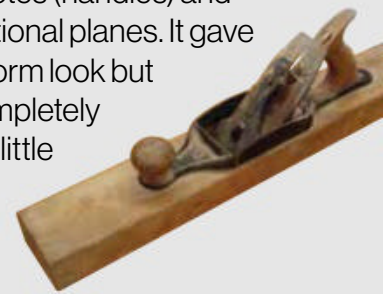
Are you a sensitive person?

In some individuals, successive exposures to beech, especially to the dust, can ramp up allergic reactions in the eyes, skin, and lungs. For this reason, beech is considered a sensitizer that deserves caution.

A good joint. Festool crafts its Domino tenons from beech for strength and great gluing. Most plate joiner biscuits are beech that's been compressed then die cut.

Making plain wood for planes even plainer.

Bailey and Stanley typically slathered a thick coat of yellow-tinted varnish onto the beech plane bodies, totes (handles) and knobs of transitional planes. It gave the parts a uniform look but sometimes completely obscures what little figure the wood had.



A real bruiser.

Many craftsmen were reluctant to abandon planes with wood soles because they honestly felt that a cast iron bottom bruised their workpieces. That viewpoint helped keep the transitional plane design in production for 74 years, until 1943.

Basking on a European beech.

European beech, *Fagus sylvatica*, enjoys a wide range throughout that continent and into Asia, but also grows in the United States. Although the tree is a distinctly different species from American beech, the lumber is so similar that even experts have difficulty distinguishing them with absolute certainty.

Tiny pores make a huge difference. Beech is a diffuse-porous wood, and its pores are significantly smaller than those of red oak, making it a suitable choice for end-grain cutting boards.

Not a city-dweller. Beech is generally not well suited to harsh urban environments. In addition, the tree likes to send low horizontal branches over streets and sidewalks.

Right at home in your shop

Beech earns a rating of 1300 on the Janka hardness scale, just above Northern red oak but slightly less than white ash and white oak. It is also slightly less than sugar maple's 1450, but that difference shouldn't disqualify it a solid choice for a stout, sturdy workbench and other shop furniture, fixtures, or accessories. These include tool cabinets and boxes, stools, sawhorses, plane bodies, and handles for non-striking tools.

I also think that beech would be an excellent secondary wood in cabinetmaking; drawer boxes, in particular. Poplar is often recommended for this role, but I find its usual green color hard to take. Additionally—and even more annoying—is poplar's stringy/fuzzy texture.

Check on wood checking

To help prevent surface splits (checks) in your lumber, let the wood acclimate to your shop before machining it. Allow adequate circulation around each board, but don't try to speed the process with a fan. Monitor the boards every few days. If a check appears, mark its ends and note the date. If the lumber arrives wrapped in cardboard, individually cover the faces and edges of each board. But leave the endgrain exposed for moisture to escape.

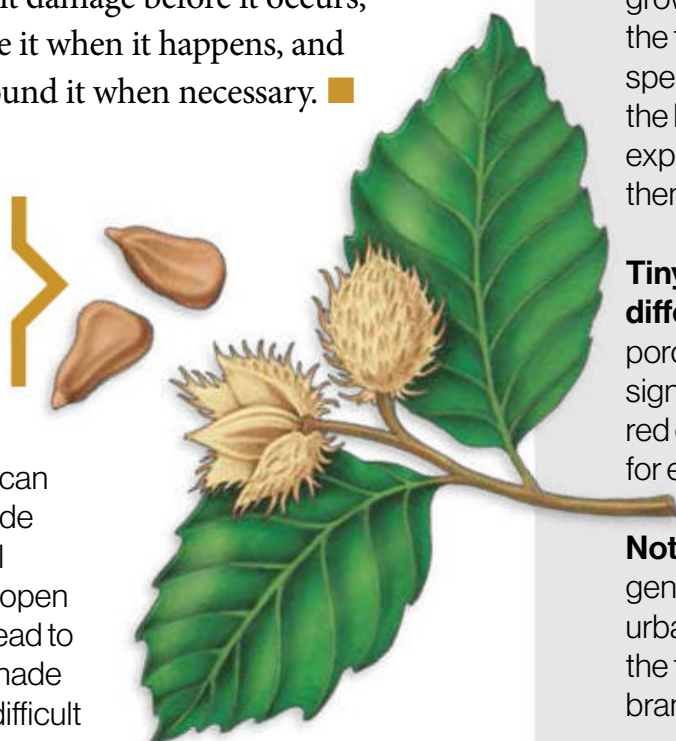
Change your inspections to once a week and allow at least one more week after no new (or lengthening) checks appear. Vigilance counts, but patience counts more.

As with many things in life, try to prevent damage before it occurs, minimize it when it happens, and work around it when necessary. ■



For the birds. Beech nuts, encased in prickly burred fruits that open in autumn, are popular with birds and small mammals.

Throwing shade. American beech is an excellent shade tree in suburban and rural environments. Planted in open areas, the crown can spread to 40 or even 60 feet. The shade can be so dense that it's difficult to grow anything under the tree.



Portable tornado

*Dewalt 20V MAX Jobsite
Blower DCE100B*

I recently started teaching classes at my local Woodcraft store. At the end of the first session, I turned on the air compressor to clean up, when the owner came in, shut the obnoxiously noisy machine off, and pressed the store's cordless blower into my hands. I was quickly hooked. When I got home that night, I ordered one of my own. Unless you keep your compressor on at all times, it's much quicker than waiting for a tank of air to charge. There's no hose to worry about and, with three speeds, you have better control over the intensity of the air stream and the noise generated. Even a tool with as many nooks and crannies as a Pantorouter can be cleaned in a snap. As a plus, you can use it outside for cleaning off your driveway or even blowing up pool floats. I went with Dewalt's unit as it is compatible with my other cordless tools, but several other manufacturers make similar blowers.

—Ken Burton



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My fine folded friend

Wood Folding Rule with Brass Extension

My shop has plenty of measuring choices: from a vaguely correct wood yardstick to a dead-on micrometer, and each has its use. But for certain tasks, I don't have anything that beats the quick accuracy of a folding wood rule with a six-inch brass extension. I got mine from my grandfather, but they're still sold in big box stores (about \$17.00 for a Lufkin model X46SLN).

With its sliding extension at one end, I can accurately gauge between two fixed points: for example, figuring the length of a hanging cleat that spans between the side walls of a cabinet. Notice that I didn't use the word "measure." I couldn't care less how many inches the cleat needs to be—I simply want to transfer the length, mark, and cut.

Another great use is gauging assemblies of all kinds for square by checking for equal diagonals. Again, actual measurements don't mean anything—you're simply looking for equality.

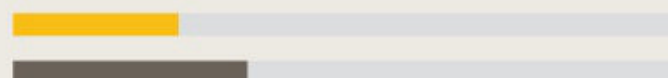
—Robert J. Settich



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Buyer's Guide

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- 1. Next Wave Shark RS1000 Pro.....#184575, **\$1,699.99**
- 2. Next Wave Shark RS1000 Pro Miter.....#184576, **\$299.99**

Desktop Organizers (p. 27)

- 1. Whiteside Roundover Bit, 3/8" R, 1/4" D, 1/2" SH.....#24C24, **\$30.99**
- 2. Freud Round Nose Bit, 1/4" D, 1/2" SH.....#834245, **\$29.97**
- 3. Freud Round Nose Bit, 1" D, 1/2" SH.....#829434, **\$65.97**
- 4. Freud Straight Router Bit, 1/4" D, 3/4" CL, 1/2" SH.....#828668, **\$23.97**
- 5. Mibro Bi-metal Hole Saw w/Mandrel and Pilot.....#183030, **\$28.99**
- 6. WoodRiver 2 1/4" Forstner Bit.....#125945, **\$27.99**
- 7. WoodRiver 1 1/4" Forstner Bit.....#125937, **\$14.99**
- 8. Watco Lacquer, Satin, Clear, Aerosol.....#146950, **\$15.99**
- 9. Cindoco Maple Wood Dowel, 1/4 x 36".....#158592, **\$2.49**
- 10. ArtMinds Hobby Cork Roll.....michaels.com, **\$16.99**
- 11. Liquitex Basics Acrylics Color Set.....michaels.com, **\$15.99 and up**

High-Tech Router Table (p. 32)

- 1. Bosch 2.25 HP Electronic Variable Speed Fixed Base Router.....#814269, **\$199.00**
- 2. Bora Portamate Heavy-Duty Universal Mobile Base.....#162003, **\$125.99**
- 3. Next Wave Shark RS1000 Pro.....#184575, **\$1,699.99**
- 4. Next Wave Shark RS1000 Pro Miter.....#184576, **\$299.99**
- 5. Salice 106° Self-Close 3/4" Overlay Face Frame Hinge, pair.....#159143, **\$6.99**
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- 7. Highpoint 24" Heavy Duty Full Extension Side Mount Drawer Slides, pair.....#160246, **\$20.99**
- 8. Pendant mount.....nextwavecnc.com #20362, **\$14.99**
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- 10. iVac Pro 4" Pro Plastic Blast Gate.....ivacswitch.com, PBG-04-NA, **\$123.95**
- 11. JessEm Clear-Cut Precision Stock Guides for Router Tables.....#158903, **\$132.99**

Albers-Inspired Nesting Tables (p. 40)

- 1. Baltic Birch Plywood, 3/8 x 30 x 48".....#152978, **\$53.99**
- 2. Transtint Alcohol/Water Soluble Dye, Black, 2 oz.....#128490, **\$23.99**
- 3. Steel Tapping Inserts, 8-32, 0.394" L, 25 pack.....mcmaster.com, #90192A157, **\$15.96**
- 4. Hex Head Screws, 8-32, 3/4" L, 50 pack.....mcmaster.com, #92314A197, **\$8.65**
Following available from homedepot.com
- 5. Wilsonart Laminate Sheet, Ocean, 4 x 8'.....**\$76.63**
- 6. Wilsonart Laminate Sheet, Orange Grove, 4 x 8'.....**\$76.63**
- 7. Wilsonart Laminate Sheet, Island, 3 x 8'.....**\$53.33**
- 8. Formica Laminate Sheet, Stop Red, 4 x 8'.....**\$68.80**

Working with Plastic Laminate (p. 47)

- 1. Weldwood Original Contact Cement, qt.....#161421, **\$20.99**
- 2. Weldwood Nonflammable Contact Cement, qt.....#161422, **\$32.99**
- 3. Freud Flush Trim Bit 3/8" D, 1/2" CL, 1/4" SH.....#828730, **\$20.97**
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- 6. Klenk Tools Plastic Laminate Shears.....hardwickandsons.com, #MA72500, **\$32.99**
- 7. Marshalltown Carbide Scribe Cutter.....hardwickandsons.com, #CBC813, **\$9.40**
- 8. Underscribe Router Base.....betterleytools.com, **\$209.00**

Great Gear (p. 56)

- 1. DeWalt 20V Max XR Cordless Handheld Blower Kit.....acmetools.com, #dce100b, **\$159.00**
 - 2. Lufkin Folding Rule w/Brass Extension.....homedepot.com, #184098, **\$16.97**
- Items above available at Woodcraft stores, at woodcraft.com, or by calling (800) 225-1153, unless otherwise noted. Prices subject to change without notice.

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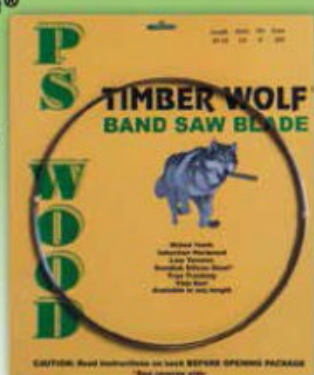
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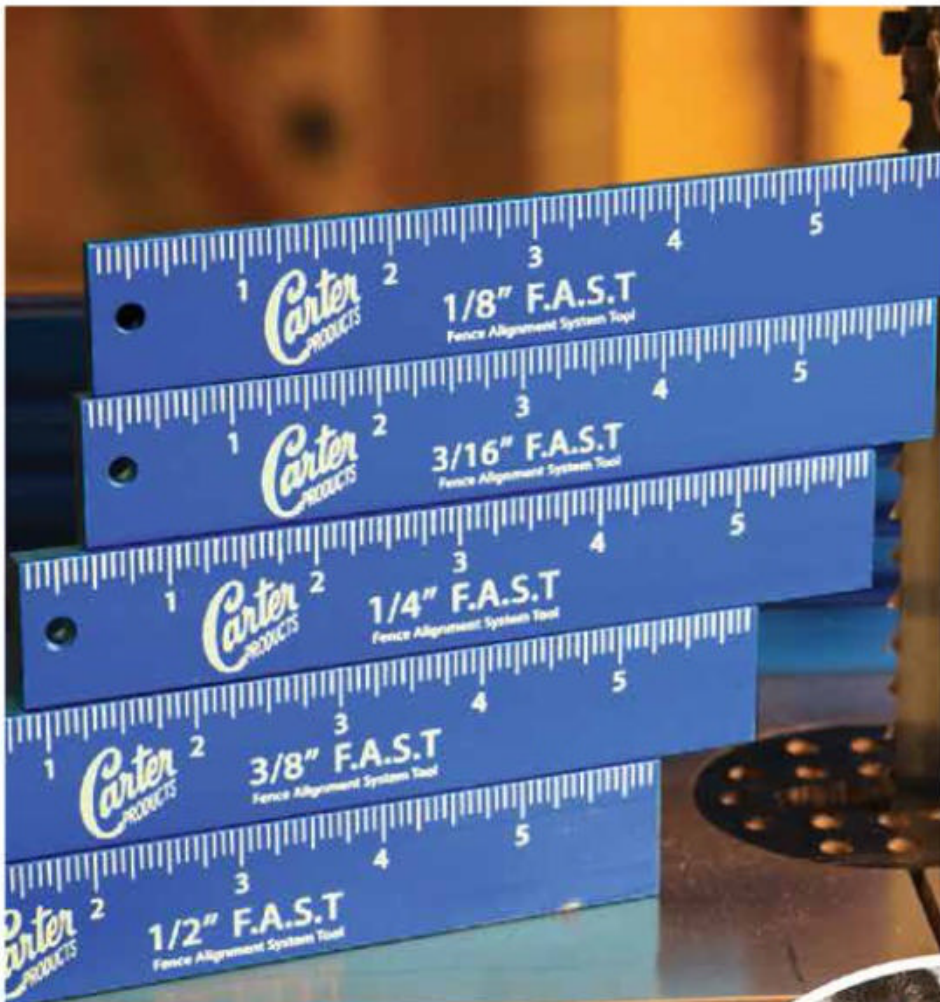


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A



Rob Thompson

Before hanging up his lab coat in 2022, Rob worked 40 years as an analytical chemist and a professor at Oberlin College.

A recipe backed by science

- 340mL (1.5 cups) distilled white vinegar, 5% acidity
- 4.0g #0000 steel wool

Combine ingredients in a non-metallic, uncovered, large-mouthed vessel. After 72 hours, filter the solution through a paper coffee filter. Wait for the green-brown solution to turn red before application.

The solution for ebonizing consistency

Preparing a solution for ebonizing wood from steel wool and vinegar seems like a magical and unpredictable process. Is there a way to get consistent results?

—Morgan Davies
Metairie, LA

Combining steel wool and vinegar creates an iron acetate solution. This solution is what reacts with tannins in some wood species to create an ebonizing effect. A foolproof and optimal recipe for iron acetate ebonizing solution, like that for a tasty dessert, involves the best ingredients mixed in exact proportions and reacted under prescribed conditions, as informed by chemical principles.

Ingredients. Steel wool (iron, Fe) found in hardware stores comes in various grades. The finest grade (#0000), with the finest wire and largest surface area per gram, reacts the fastest. Briwax brand is especially fine, made from a 5-µm-thick ribbon. There's no need to wash your steel wool or cut it into pieces.

Vinegar (acetic acid, CH₃COOH) is required by U.S. law to be produced by fermentation of



Controlled magic. Steel wool reacts with white vinegar, in precise proportions, to result in a consistent ebonizing solution.

alcohol, with phosphate as an added bacterial nutrient. Interestingly and coincidentally, phosphate is needed to catalyze our desired reaction. Thus, vinegar made by diluting pure acetic acid does not perform well, nor does apple cider vinegar that has suspended solids that can coat the steel wool. Use distilled white vinegar containing 5% acetic acid, the kind you can pick up at the grocery store.

Proportions. The chemical reaction is $\text{Fe} + 2\text{CH}_3\text{COOH} \rightarrow \text{Fe}(\text{CH}_3\text{COO})_2 + \text{H}_2$ (hydrogen gas). Using the right proportions of ingredients is critical to achieving good, consistent results. Too little vinegar in relation to steel wool causes solid iron acetate to form and, in some extreme cases, causes unwanted products of various colors. Too much vinegar dilutes the iron solution unnecessarily, leading to poorer ebonizing. The optimal amount of vinegar is 340 mL (1.5 cups) per 4.0 g of steel wool (about 1.5 inches of a Briwax roll).

Conditions. Run the reaction at room temperature in a non-metallic, uncovered, large-mouthed vessel to allow solution contact with air, since oxygen assists the reaction. After three days, filter out the remaining solids, resulting in a nearly clear, light green-brown solution. The solution quickly becomes red-colored in air as the ferrous acetate transforms into basic iron acetate $\text{Fe}(\text{II})\text{Fe}(\text{III})_2\text{O}(\text{C}_2\text{H}_3\text{O}_2)_7(\text{H}_2\text{O})_3$.

Application. Apply the iron acetate solution sparingly to minimize any final cleanup. For example, just ¼ cup of ebonizing solution per 7 sq. ft. of surface is sufficient to darken oak.

Have a tough woodworking question?

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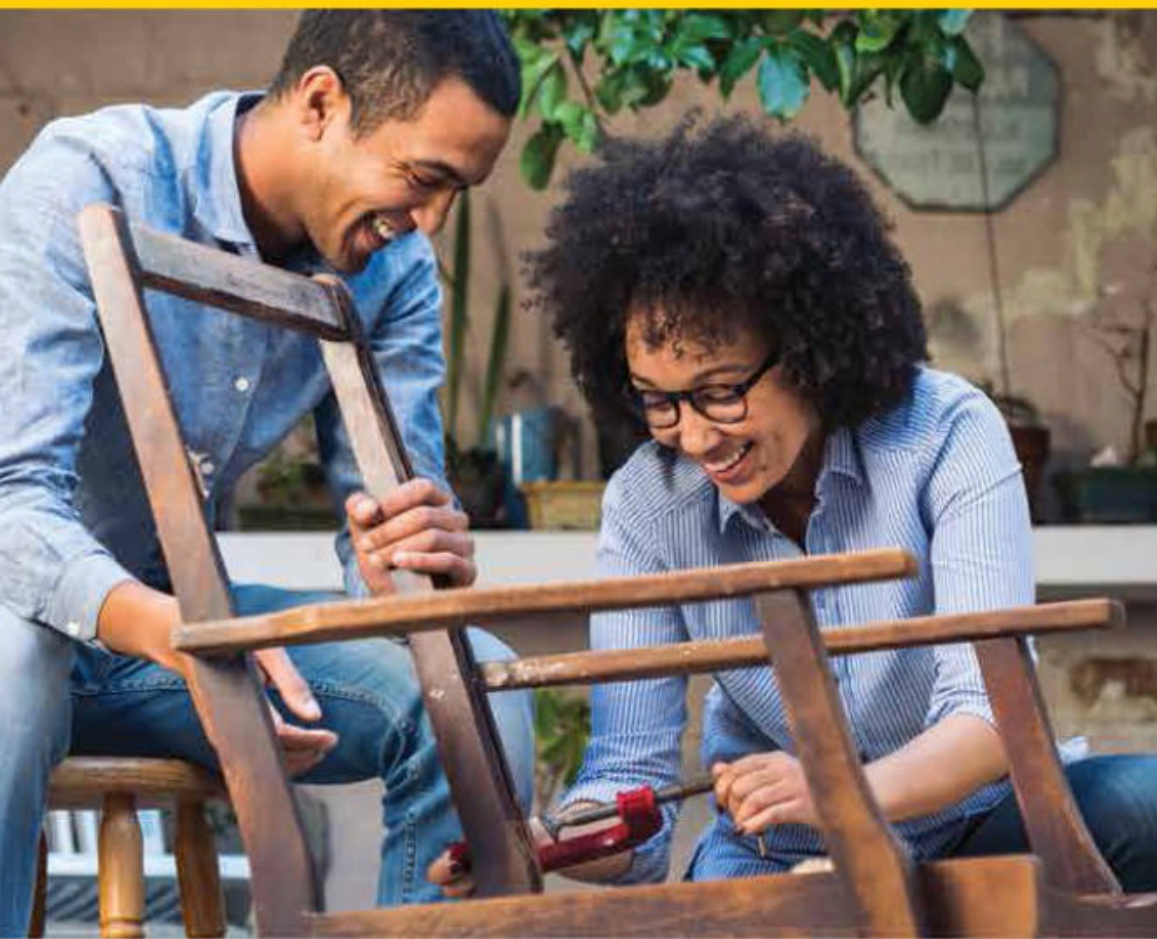


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