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- Arbor: ⅝"
- Arbor speed: 3450 RPM
- Max. depth of cut at 3¼" @ 90°, 2¼" @ 45°
- Rip capacity: 31" R, 16¾" L
- Overall size: 64" W x 40¼" D x 35½" H
- Footprint: 21" L x 19½" W
- Approx. shipping weight: 371 lbs.



⚠ WARNING! †¹
G0771Z ONLY \$995⁰⁰

15" 3 HP FIXED-TABLE PLANER W/ HELICAL CUTTERHEAD

- Motor: 3 HP, 230V, single-phase, 12A
- Max. stock width: 15"
- Max. stock thickness: 6"
- Min. stock thickness: ⅜"
- Min. stock length: 6"
- Max. cutting depth: ⅛"
- Cutterhead diameter: 2⅝"
- Cutterhead type: 4-row helical, 48 inserts
- Dust port size: 4"
- Footprint: 21" x 18½"
- Insert size & type: 15mm x 15mm x 2.5mm, 30° indexable carbide
- Cutterhead speed: 5200 RPM
- Feed rate: 16 FPM & 28 FPM
- Table size with extensions: 15" x 49"
- Overall dimensions: 25" W x 49" L x 47½" H
- Approximate shipping weight: 375 lbs.



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- Max. static pressure: 9.7"
- Approx. shipping weight: 375 lbs.



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G0860 ONLY \$825⁰⁰

10" 3 HP CABINET TABLE SAW

- Motor: 3 HP, 220V, single-phase, 13A
- Rip capacity: 36" right, 18" left of blade
- Max. depth of cut @ 90°: 3⅜"
- Max. depth of cut @ 45°: 2⅜"
- Table size with extension wings: 48¼" W x 30¾" D
- Distance from front of table to center of blade: 14⅞"
- Floor-to-table height: 35"
- Arbor diameter: ⅝"
- Arbor speed: 4000 RPM
- Max. width of dado: ¾"
- Dust port size: 4"
- Footprint: 23" x 21"
- Overall dimensions: 75" W x 44" D x 42½" H
- Approximate shipping weight: 587 lbs.



⚠ WARNING! †¹
G0941 ONLY \$1795⁰⁰

17" X 23" CNC LASER CUTTER/ ENGRAVER

- Laser type: Sealed CO2 laser tube
- Laser power: 60W
- Wavelength: 1064nm
- Cutting area: 17" x 23"
- Cutting speed: 0-1900 in./min.
- Resetting position accuracy: +- .002"
- Min shaping character: 0.04" x 0.04"
- Overall size: 61" W x 32" D x 18"H
- Approximate shipping weight: 176 lbs.



⚠ WARNING! †¹
G0872 ONLY \$3595⁰⁰

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- Table size: 32" x 24" x 1½"
- Table insert: 9¼" x 11¾" x ⅜"
- Table fence: 32" x 2¾" x 1⅜", aluminum
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- Router table stand: 26" x 18½" x 34¼"
- Dust chute-fence: 2¼"
- Dust collection box: 4"
- T-type outlet: 2" x 2½" x 4"
- Hose: 2½" x 23⅝"
- Fits routers 3.125" to 4.25"
- Approximate shipping weight: 223 lbs.



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T28780 ONLY \$924⁹⁵

WITH CAST-IRON WINGS
T28781 ONLY \$1249⁹⁵

17" 2 HP BANDSAW

- Motor: 2 HP, 110V/220V (prewired 220V), single-phase, 19A/9.5A
- Table size: 17" x 17" x 1½" thick
- Table tilt: 10° left, 45° right
- Floor to table height: 37½"
- Cutting capacity/throat: 16¼" left of blade
- Maximum cutting height: 12⅞"
- Blade size: 131½" long
- Blade width range: ⅛" - 1" wide
- 2 blade speeds: 1700 and 3500 FPM
- Wheels: Computer-balanced cast-aluminum with polyurethane tires
- Wheel covers: Pre-formed steel
- Overall size: 73" H x 32" W x 32" D
- Footprint: 27" L x 17¾" D x 2½" H
- Approximate shipping weight: 342 lbs.



⚠ WARNING! †¹
G0513 ONLY \$1150⁰⁰

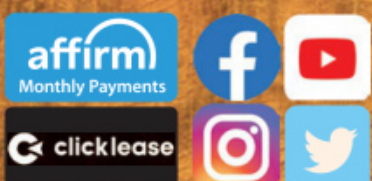
24" X 36" CNC ROUTER

- Motor: 3 HP, 220V, single-phase
- Amps: 8A at 220V
- Collet Type: ER20
- Collet Size: .015-0.5"
- Cutting Area: 23" x 35"
- Cutting Accuracy: +/- 0.005"
- Spindle Speed: 0-24,000 RPM
- X & Y Travel Speeds: 33 FPM
- Z Travel Speeds: 16 FPM
- Overall dimensions: 60" L x 54" W x 70" H
- Approx. shipping weight: 882 lbs.



Please note: This item does not include CAD/CAM software, see item T28100 or T28101 V-Carve software

⚠ WARNING! †¹
G0894 ONLY \$6295⁰⁰



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Roll the dice

My e-mail regularly delivers notes from readers who've tried for the first time a technique or product they learned about in *WOOD*® magazine, and the message often includes photos that share the results. Sometimes, the email asks, "What did I do wrong?" But most contain some variation of "I'm really pleased with the outcome!" (You'll see a few examples in "Your Voice" starting on *page 6*.)

The past year's events dragged many of us kicking and screaming out of our comfort zones, into video conference calls with friends and family, or cooking actual meals in our own actual kitchens. And for many woodworkers, including me, trying new things in the shop.

For example, when my daughter, Katie, asked me to make her a dice tower—a baffled box that tumbles dice dropped in the top and spits them out at the bottom—for her newfound Dungeons & Dragons fascination, I said, "Sure!" Intrigued by Deputy Editor Craig Ruegsegger's "Bandsaw Beautiful Boxes" article (issue 272, Dec/Jan 2020/2021), I decided to try my hand at making a dice tower as a bandsaw box.

Normally, I stick pretty close to the North American hardwoods, but for this project I chose padauk, an exotic wood that produces gummy, bright-orange sawdust when machined. I also flocked the interior—a

first for me. And, instead of finishing with one of my go-tos (Danish oil or rattle-can lacquer), I tried my hand at an oil/wax blend called Odie's Oil (odiesoil.com).

That's a lot of "new" for one project, but prototyping the box in scrapwood before building (another first) allowed me to make most of my mistakes there. I'm really pleased with the outcome, *above*, and perhaps more important, so is Katie.

So, how can we help you take a risk and break out of your comfort zone? Maybe it's as simple as changing up your plans for that coffee table to make it oval-shaped, instead of rectangular, with the help of one of the jigs on *page 36*. Or throw yourself a curve by adding a bent-wood lid for that blanket-chest graduation gift, guided by the article on *page 42*.

Take a chance. Roll the dice. We're with you all the way.

See you in the shop!

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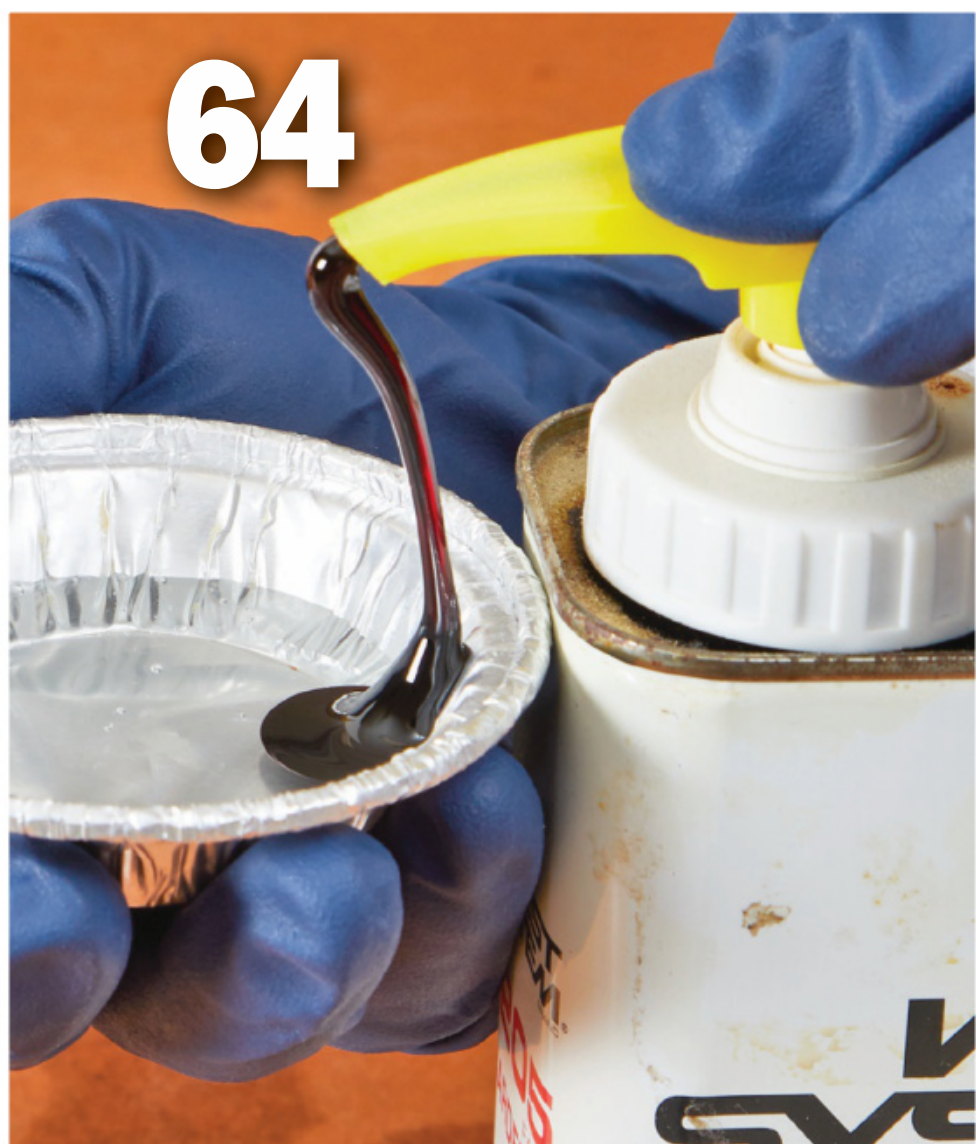
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DOPAMINE DEALER

Look, we get it. You just got this magazine issue, and, right out of the gate, we tempt you away to go watch a quick video or check out a social media post. Sure, you'll get a tiny dopamine rush—an unmerited brain reward—as if you've accomplished the portrayed project yourself. But 37 videos later, you realize you never changed out of last week's underwear, much less made it out to the shop, inspired by what you read here.

So, please: Read this magazine first. Change your hashtaggin' underwear. Then, return here to take some of these *free* plans out to your shop. They feature projects that you will have to complete *all on your own*. Now, proudly tell Siri, Alexa, or whoever else is listening in that you've got your own well-earned supply of dopamine. And clean underwear.



Swipe right on the person you see in this slideaway mirror to reveal the deodorant you bought for your totally-not-made-up date tonight. woodmagazine.com/myreflectionsipedleft



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SOUNDING BOARD

YOUR VOICE

Mailbox postscript

When I saw Dave Campbell's mailbox photo in issue 271 ("Taking Measure," November 2020) and read his message, it struck a chord with me. I, too, had stashed those same mailbox-post plans from issue 218 in a special projects folder that I keep.

It just so happened that a good friend of mine accidentally hit my old 6x6 mailbox post pretty hard as he was backing out of our driveway a few months ago. So I took the opportunity to replace that dilapidated 10-year-old post with the one shown at left.

I'm so glad I tried the draw-bore technique. I've received many compliments on the post from family and friends. And they're even more impressed when I tell them only eight oak pegs hold the whole thing together. (I used two to hold the board for the mailbox.)

I look forward to every issue of WOOD® magazine. Although I'm in my mid-70s, I am young at heart and love to try new things when I can.

—**Bob Booz**
Centre Hall, Pa.

More email about a female

I was excited to see Jenny Boles on the cover of issue 271! As a female who loves sawdust, I know I'm in the minority gender; it is encouraging to see a fellow female's talents and expertise showcased by WOOD magazine. Thank you!

I'm a third-generation woodworker: Both of my grandfathers and my dad are/were talented crafters of wood. When my dad died unexpectedly in 2014, I inherited his tools, boxes of old WOOD magazines dating back to the early 1990s, and the remainder of his subscription (which I have continually renewed). Over the years, I have read every issue in those boxes.

—**Alisa Roberts**
Sherman, Texas

Jenny Boles' article on scrollsawing was very good; to it, I'd like to add some tips I've learned over the many years I've been a scrollsawyer.

First, when making an inside cut into a square corner, don't try to turn a right angle at the cor-



ner. Instead, cut nearly to the line, then back up and cut a curve to round the corner a little.

After removing the bulk of the waste, go back and clean up the corners, this time cutting from the opposite direction.

Tip 2: To avoid the sticky mess of double-faced tape when stack-cutting, secure the stack with toothpicks pressed into holes drilled into the waste area. The toothpick should fit snugly enough that it has to be driven into the hole. (A #44 drill bit fits the toothpicks I use.)

Finally, I never use the scrollsaw blades with reverse teeth on the lower end. Although they

splinter the cuts less, I find they tend to jerk smaller workpieces up and down. Don't be lazy; remove the "fuzz" with sandpaper.

—**Wayne Holder**
Weeki Wachee, Fla.

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YOUR VOICE

Dining table is finely finished

I wanted to share this photo of the Contemporary Dining Room Table I built from plans in issue 230 (Dec/Jan 2014/2015). John Olson designed a very attractive dining table with all its curves and 15° angles, and I truly enjoyed the process of building it, as well as how the cherry matures and enriches its color from exposure to sunlight.

I finished my table using Tried & True Varnish Oil (triedandtruewoodfinish.com), which Randy Maxey featured as one of five “foolproof finishes” in issue 272 (Dec/Jan 2020/2021). After finishing the tabletop according to the label instructions, I stumbled across an article that suggested projects should be sanded to an amazingly fine 2,000 grit for that finish, so I tried that on the underside of the tabletop. It turned out so great, that side became the tabletop. I am not saying that every project should be sanded so fine, but I will always sand to 2,000 when using Tried & True.

It was a fun project for me. We are making new lifetime memories by surrounding the table with family and friends to enjoy dinner and conversations.

—Howard Walters
Prescott Valley, Ariz.



Howard's table is part of a three-piece dining room set. Download plans for the set, or its individual pieces, at woodstore.net/diningtable, or simply point your smartphone's camera at this code!



Built it like it's quilted

I was so impressed by the picture of Jerry Weedon's quilt-look doors in issue 268 (“Sounding Board,” July 2020), that I decided to try a similar project to dress up the doors of my wife's sewing/quilting room storage cabinet.

I followed the patterns in one of her quilting books and used various species of wood veneer—both natural color and dyed in bright colors—and glued the designs to thin panels, which I then attached to the cabinet doors (left). It was a fun but demanding project, and I have now gained a new woodworking skill!

—Harry Hunter
Tomball, Texas



From the apple of his eye

My dad had a passion for making apple cider in the fall with presses that we restored together—five, in all. When he passed away, I made this special urn (left) to honor the man who taught me the craft of woodworking.

I turned it from a piece of apple firewood, with a wenge lid and butterfly keys. The cracks I filled with antique-red tinted epoxy to match the painted metal parts of the press (visible behind the urn). It was one of the most important pieces that I've made, and it was an honor to make it for him.

—Karen Lockwood
Payette, Idaho

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SOUNDING BOARD

YOUR PROJECTS



Using western red cedar salvaged from friend Doug Kruse's deck, **Dennis Krumlinde**, of Wentzville, Mo., built this canoe (with walnut, cherry, and pine highlights) as his pandemic project. Dennis calls it the "Krumlinde Kruse Kovid Kanoë," and it's the sixth canoe he's made.



Steve Johnson, of Newport Beach, Calif., made this outboard motor display from cypress with teak inlay. Mortise-and-tenon joinery connects the riser to the base, and brass sheet stock protects the transom plate from the motor clamps. The stand supports a 1954 modified Mercury Mark 20 racing motor Steve restored.

Working from a "build me one, Hon" photo, **Mark Bitter**, of Melbourne, Fla., crafted this gravity-defying cherry table (which actually hangs on the wall). Laminated strips compose the curved front; a YouTube video provided Mark with both the sphere-routing jig and method for fashioning the 4½" ball foot.



Shane Melville, of St. George, Utah, crafted this workbench-of-art out of walnut, padauk (including the leg vise on the back side), and pine. He used mortise-and-tenon joinery throughout except for the ends, which are drawbored.



SOUNDING BOARD

YOUR PROJECTS

The case of this Krenov-inspired sapele jewelry cabinet, designed and built by **Bud Brook**, of Kennesaw, Ga., appears to float over its stand. Curly-maple veneered doors reveal drawers with zebrawood fronts; and zebrawood inlays ring each leg. Bud hand-cut the dovetails that join the case.



Inspired by a visit to Napa Valley, **Eloy Menoscal**, of Davie, Fla., designed and built this wine rack consisting of 91 Spanish cedar slats screwed to a frame of mahogany. Eloy hid the screws beneath leather straps that wrap the rack.

Send us a photo of your work

Want to see your work showcased in WOOD® magazine? Send a high-resolution digital photo of your completed project to woodmail@woodmagazine.com.

Needing seating for his counter-height table, **Greg Volkland**, of Shawnee, Kan., created this graceful oak stool, using dovetails to join the footrest parts, and pinned mortise-and-tenon joints for the cross braces. Greg's next project: to make three more just like it.



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Multipurpose Smith Shop

Outdoor lighting invites you into a cozy workshop. The welcoming 8×16' porch area also serves as additional work area by swinging open the doors that comprise one end of the shop.

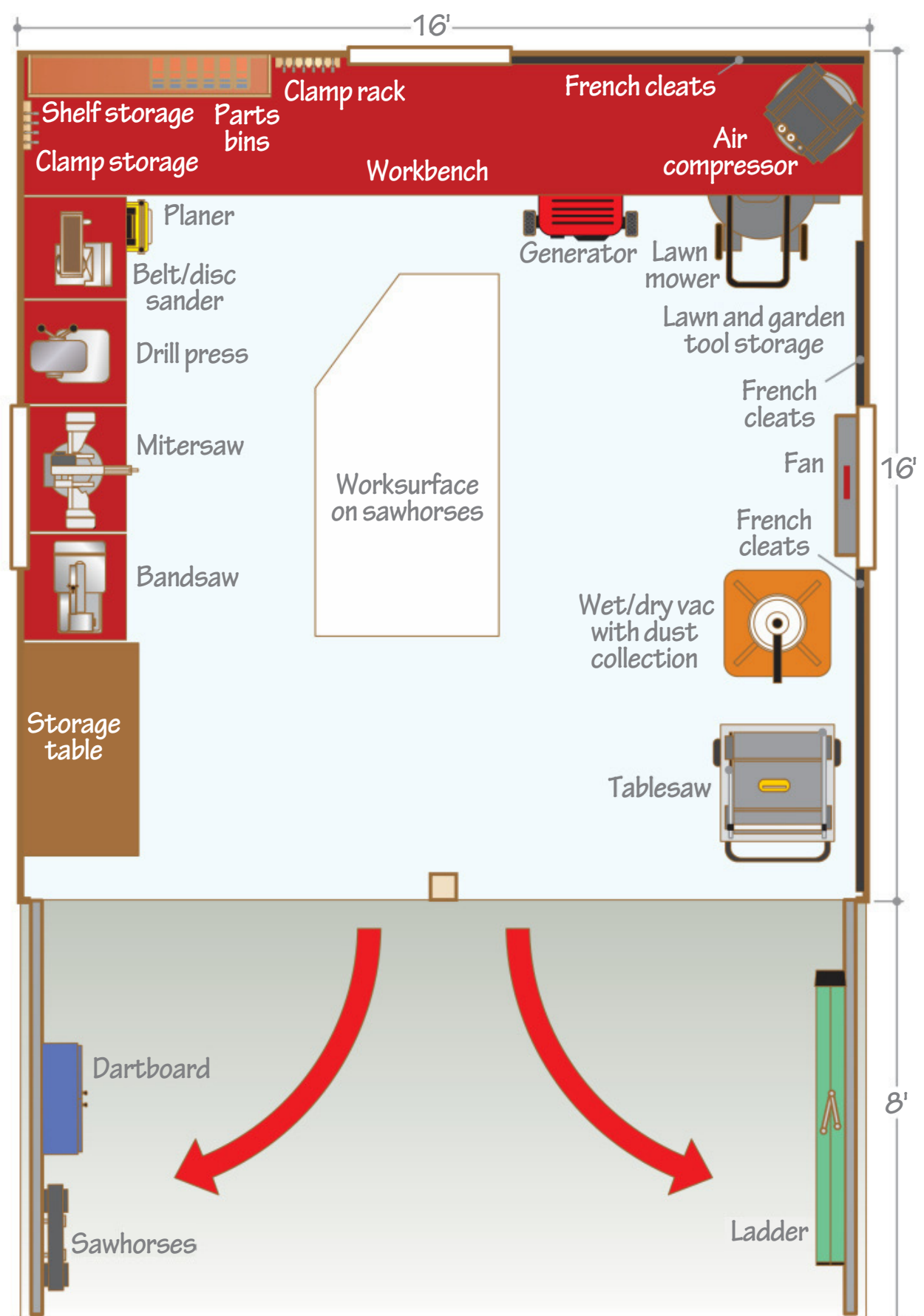


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When Chris Smith moved into a 200-year-old Rhode Island home, his only option for shop space was a damp basement with 6½' ceilings full of ductwork and plumbing. After putting up with this for a couple of years, Chris and his father-in-law, Bob Reynolds, built a stand-alone shop to fit available yard space.

The resulting shed includes an 8' porch, leaving a 16×16' enclosed space. The 8' bare-stud side walls and an open ceiling beneath the 16' roof peak provide plenty of storage area, including above the rafters.

The porch sees a lot of use. When the weather cooperates, Chris swings out and



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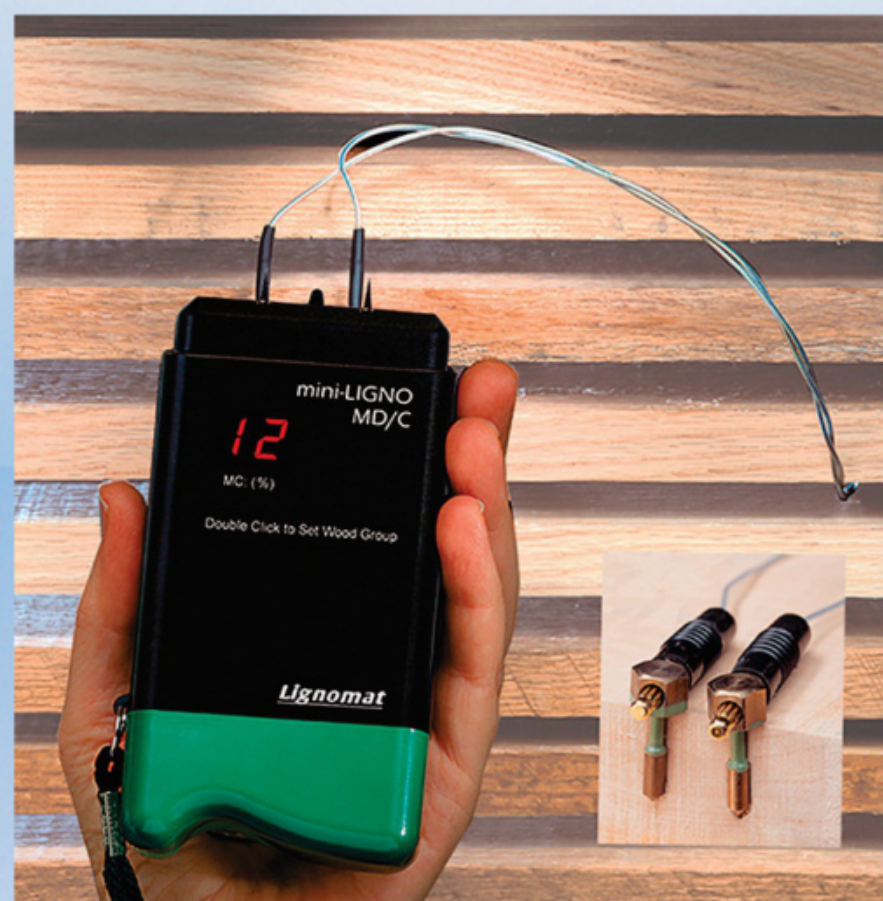


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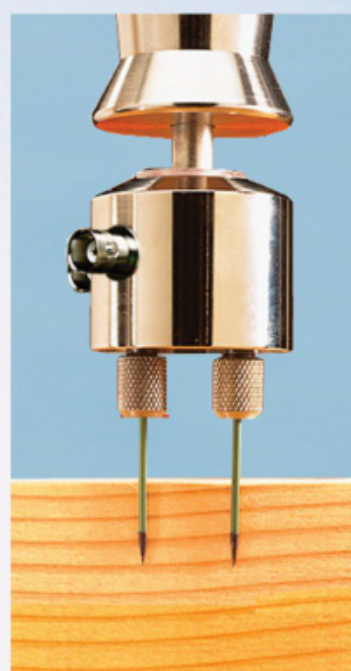
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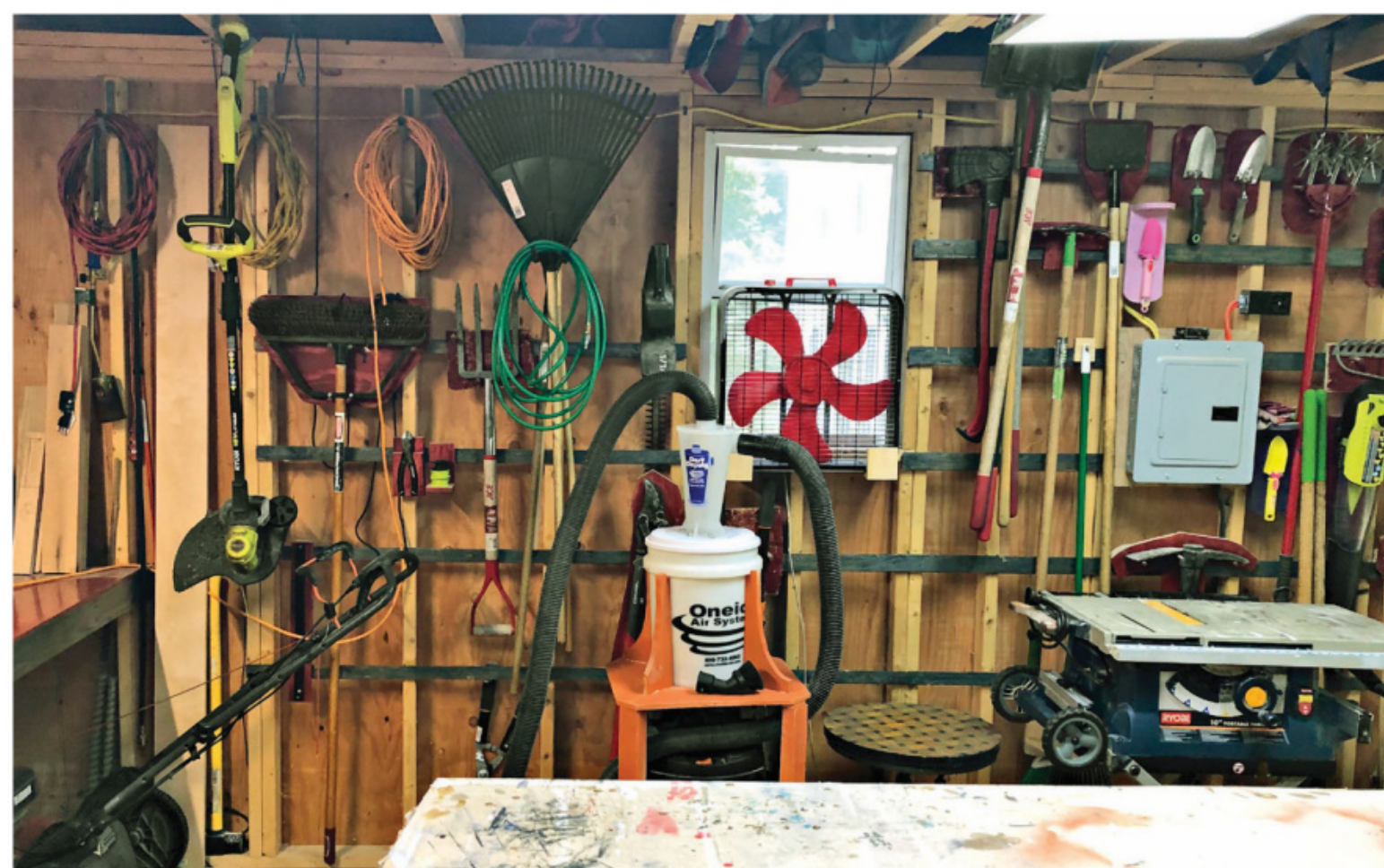
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With his benchtop tools on mobile carts, Chris can rearrange his shop to suit the project at hand while taking advantage of the 8×16-foot porch area, if needed.



Ample wall space provides many options for storing garden tools and recreation equipment on French cleats, between wall studs, and in the eave space above the wall.

secures the full-width double doors, extending his shop space onto the porch. Many of his tools rest on mobile carts he wheels in and out of the shop as needed. Chris designed the carts to match his workbench height for added flexibility in configuring his work area.

Chris's shed also stores lawn and garden equipment and recreational items. He hoists and stores kayaks and bikes between the rafters. Shovels, rakes, and other garden tools fit on racks hung on a French cleat system he uses for most of his wall storage. Cleats on the walls behind the workbenches hold his woodworking tools. Chris finds the cleat system easy to reconfigure as his needs change or he acquires new tools.

A 100-amp electrical subpanel in the shed supplies power, but Chris went one step further: He added a connection for a small generator that supplies power to a few vital

► Learn about French cleats.
woodmagazine.com/frenchcleats



Chris made custom holders for his portable and hand tools, which hang from French cleats on the walls. This allows him flexibility to add, remove, and rearrange tools as needed.



Green-painted faux doors disguise the full-width nature of the real doors. The porch provides a sheltered spot for a hammock when Chris wants to relax and unwind.

circuits in the main house electrical panel in the event of an outage.

Chris is a minimalist when it comes to heating and cooling the shop, using a box fan in the summer and a space heater in the winter. He went without insulation to maximize the storage space available. However, Chris added one important amenity to the porch: a hammock. He takes advantage of it “when the projects dry up,” he says. 🌳



When Chris isn't working his day job for the state government, he spends quite a bit of time in his shop, kayaking, or tending to his garden.

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Q Cutting acrylics and plastics

I've been asked to make several wood-frame display cases with acrylic (Plexiglas) panels. The acrylic I purchased comes in large sheets. What's the best way to cut it down to size?

—Richard Barerra, Little Rock, Ark.

A Cutting acrylic or other plastics (such as polycarbonate or phenolic) isn't a whole lot different than cutting wood, Richard. In fact, you use many of the same tools. However, follow a few finer points for best results.

A tablesaw is the most efficient tool for cutting sheets of acrylic down to size. Most manufacturers offer blades made specifically for cutting acrylic and plastics, so if you'll be working with these materials on a regular basis, you may want to invest in a dedicated blade. For occasional use, however, an 80-tooth, triple-chip-grind (TCG) blade for cutting laminate or plywood works fine. Even a 60- or 80-tooth alternate-top-bevel (ATB) crosscut blade will get the job done (although you may experience some chipping).

Equipped with an appropriate blade, next consider your feed rate. If you feed the acrylic into the blade too quickly, you may experience chipping. Feed it too slowly and friction from the blade may melt the acrylic, resulting in a poor-quality cut. Finding the right feed rate requires a bit of trial and error, but in general, use a slightly slower feed rate than you normally do when cutting wood.

Thin (less than 1/8"-thick) pieces of plastic can vibrate or bounce up and down on the saw table as you cut. Counteract this by sandwiching the plastic between two pieces of plywood or hardboard.

For curved cuts, use a bandsaw. To minimize chipping, match the bandsaw blade to the thickness of the plastic you're cutting. For cutting 1/4" or thinner acrylic, use a 10–14-tpi (teeth per inch) blade. With thicker plastics, a 6–8-tpi blade works well.

Remove saw-blade marks by filing or scraping, and then sanding with progressively finer grits. Or as an alternative, cut pieces slightly oversize initially, then use a template to bring the piece to final size and create smooth edges, shown *below*. 🌲

Note: Phenolic dust is a lung irritant. Wear a respirator and use dust collection when cutting or routing phenolic.

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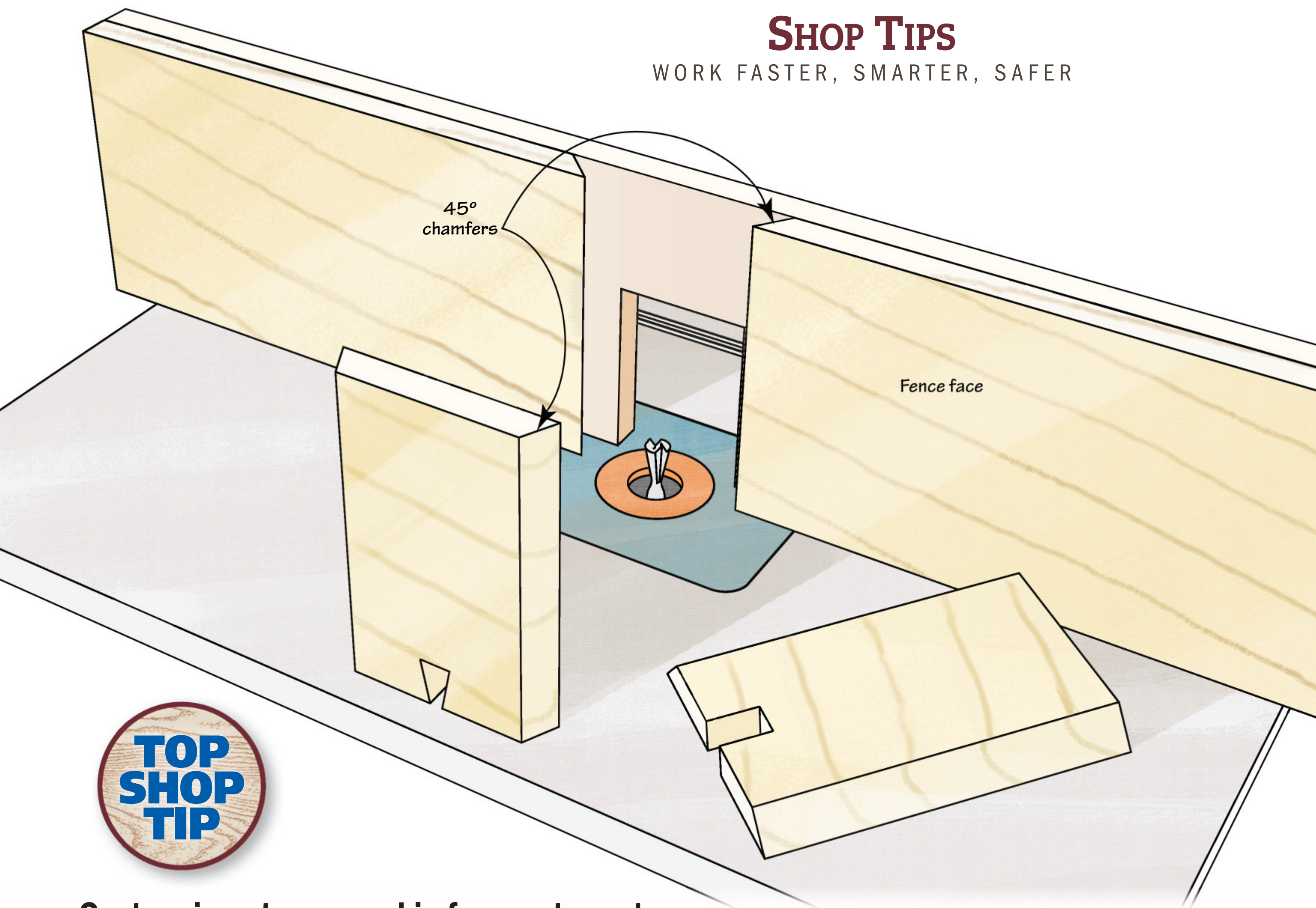
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SHOP TIPS

WORK FASTER, SMARTER, SAFER



Custom inserts mean chip-free router cuts

The split fence on my router table allows me to adjust the opening around the router bit. That's great for straight bits, but for anything with a profile, I would often get tear-out on the workpiece because there was nothing to support the wood fibers. And sometimes the workpiece would wander into the gap, resulting in an uneven profile.

To solve these problems, I created zero-clearance inserts for my router-table fence.

Using a 45° chamfer router bit, I routed chamfers on the inserts and on the fence faces, as shown. The resulting joint secures the insert and keeps it flush with the faces. I keep several blank inserts on hand.

Before routing a profile, install a blank insert in the fence. With the fence away from the bit, turn on the router and slowly move the

fence into the bit. This guarantees no gap around the bit and serves as a setup block for future cuts using the same profile. If the bit has a bearing, you'll need to notch the insert to provide clearance.

—Gary Dean, Prince George, B.C.

Tips earn up to \$150.

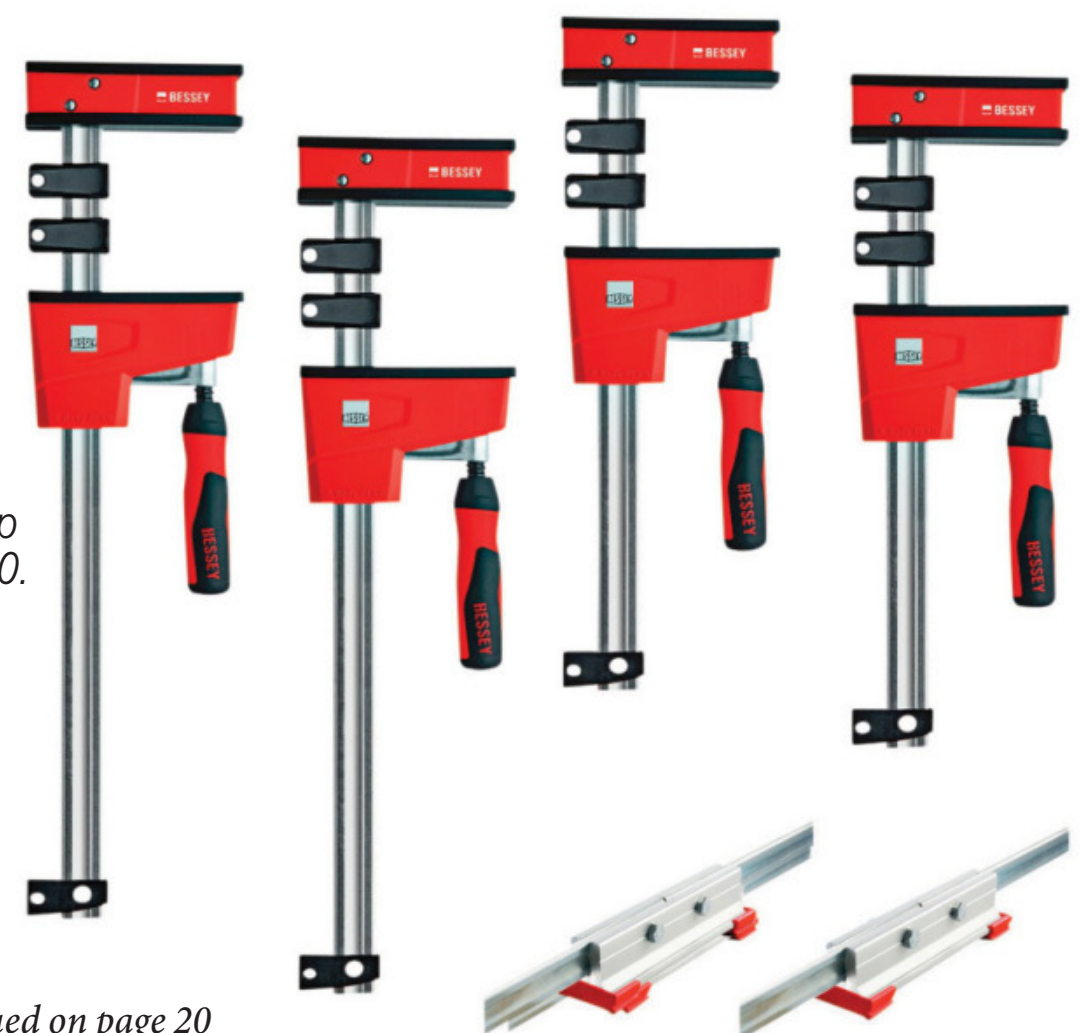
If your tip is the best of the issue, it wins **Top Shop Tip** honors, and you receive a **tool prize** worth at least **\$300**.

Send your tip, photos or drawings, and contact info to shoptips@woodmagazine.com

Because we try to publish original tips, please send yours only to **WOOD** magazine.



For sending this issue's **Top Shop Tip**, Gary receives a Bessey clamp kit worth \$300.





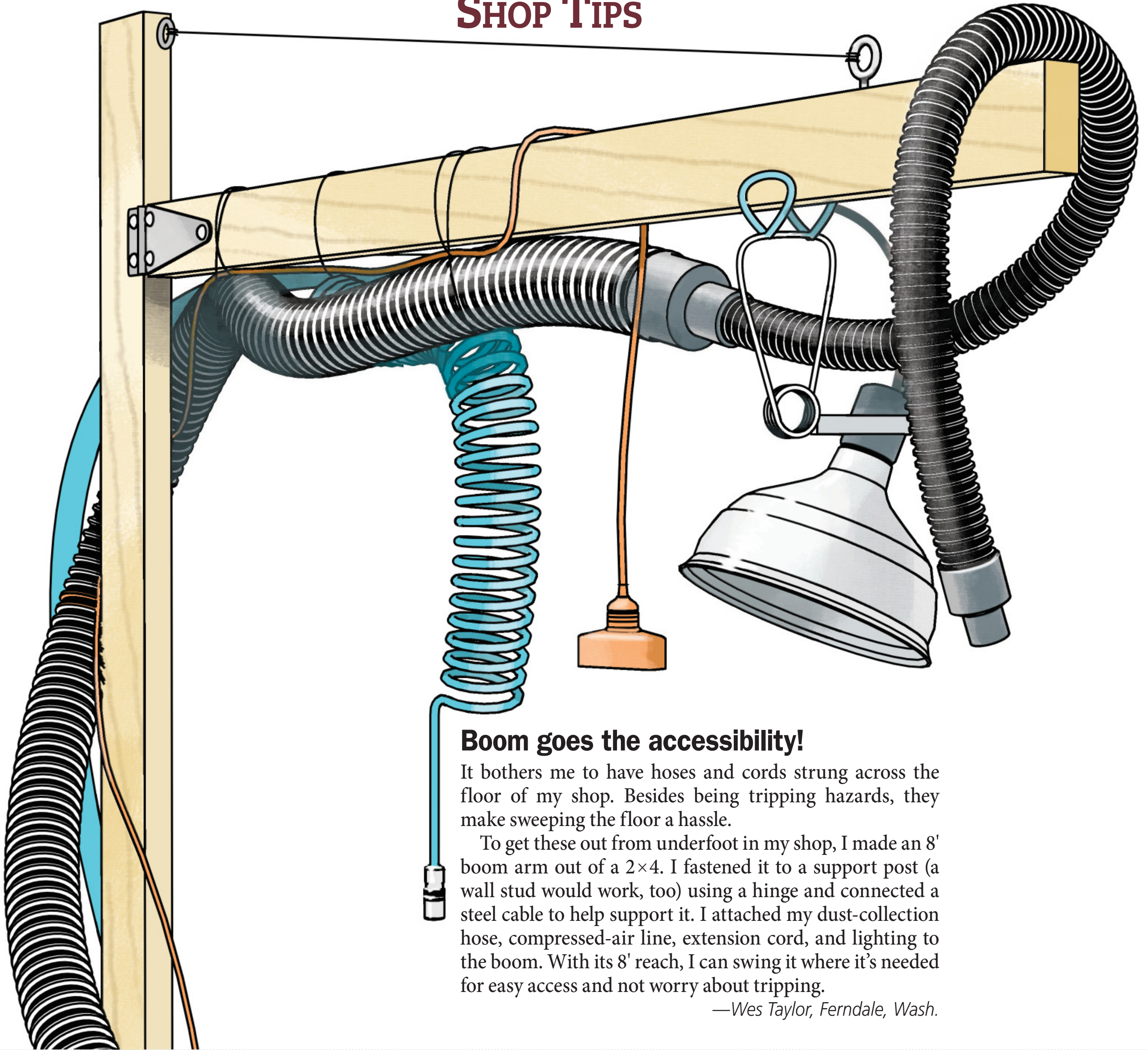
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SHOP TIPS



Boom goes the accessibility!

It bothers me to have hoses and cords strung across the floor of my shop. Besides being tripping hazards, they make sweeping the floor a hassle.

To get these out from underfoot in my shop, I made an 8' boom arm out of a 2×4. I fastened it to a support post (a wall stud would work, too) using a hinge and connected a steel cable to help support it. I attached my dust-collection hose, compressed-air line, extension cord, and lighting to the boom. With its 8' reach, I can swing it where it's needed for easy access and not worry about tripping.

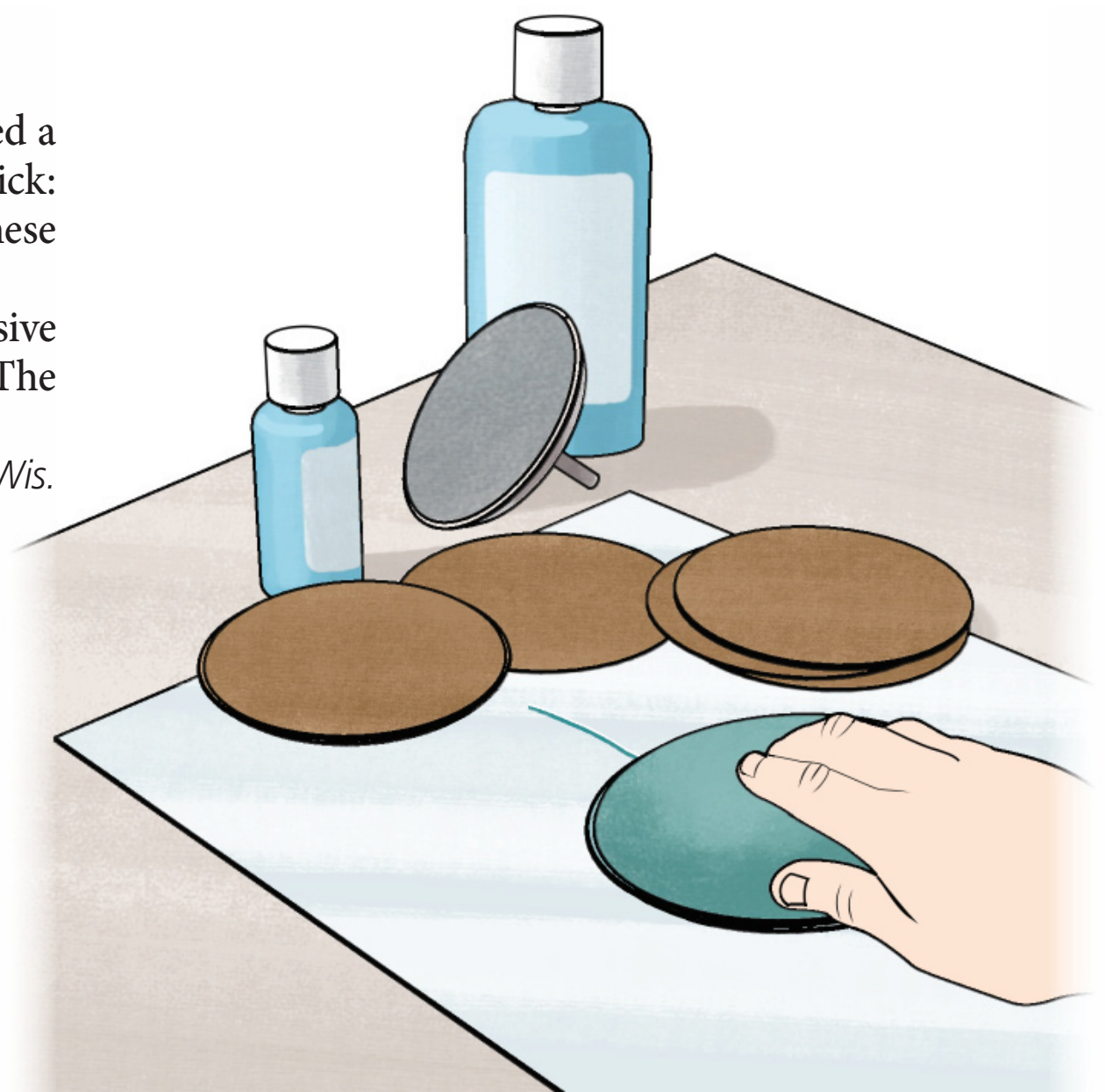
—Wes Taylor, Ferndale, Wash.

Head off scratches with a light polish

I was ready to install a clear acrylic panel in a display case when I noticed a large scratch. Rather than toss the panel, I resorted to an auto detailer's trick: using a headlight lens restorer kit to remove the scratch. You can find these wherever auto supplies are sold.

Simply follow the instructions in the box, progressing through the abrasive pads using lubricant, followed up by the included polishing compound. The scratch disappeared and the panel looked better than new.

—Larry Schaller, Edgerton, Wis.



SHOP TIPS

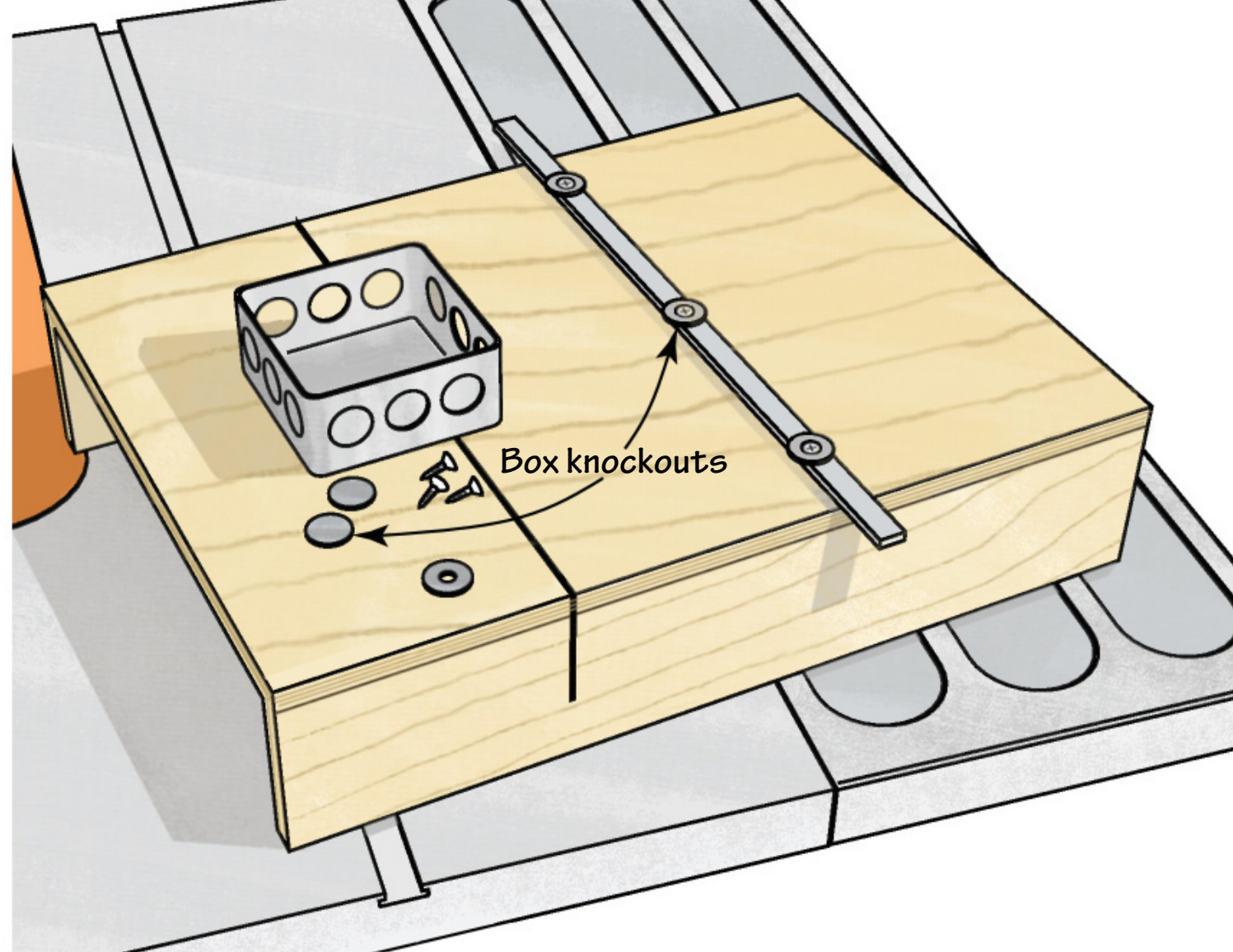


Pegs provide positive grip on shop jigs

Years ago, needing a handle for a pushblock, I spied a few jumbo Shaker pegs lying around, so I used one of them. That worked out so well, I've been using them for jig handles ever since. They cost very little and, quite frankly, I find them more comfortable than some of the plastic handles.

—Dwayne Smyth, West Springfield, Mass.

woodmagazine.com



Knock out miter-slot slippage

My table saw has T-shaped miter slots, so when building table saw jigs guided by a runner, a washer on the miter bar prevents the jig from lifting out of the slot.

The problem is locating washers the right diameter to fit the slots. While doing some electrical work using metal outlet boxes, I discovered that the $\frac{3}{4}$ " knockouts fit the miter slots. I located the center and drilled a countersunk mounting hole to fasten it to the runner.

—Michael Tenore, Bronx, New York

continued on page 22

21

Make bit changes



a snap – for less!

If you have a midsize router in your router table and you're looking for an affordable lift that makes changing and adjusting the bit faster and easier, look no further than the Rockler SL Router Lift. Besides a flat, low-friction plate and smooth lifting action, it features our acclaimed Snap-Lock insert ring system, which enables you to remove or change inserts with the push of a button. And with the available adapter collars, the SL Router Lift even fits most popular compact routers, providing more ways for you to *create with confidence*.

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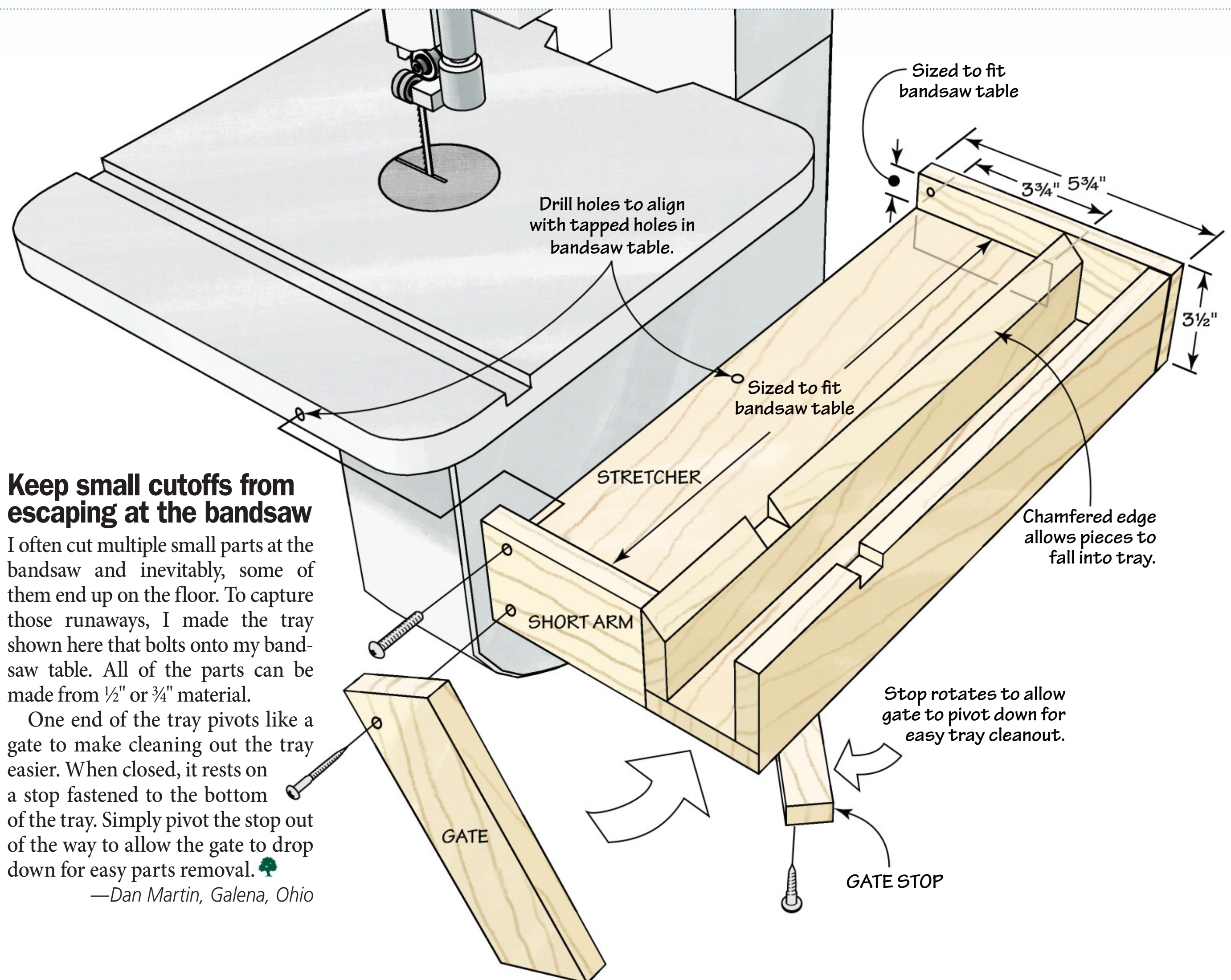
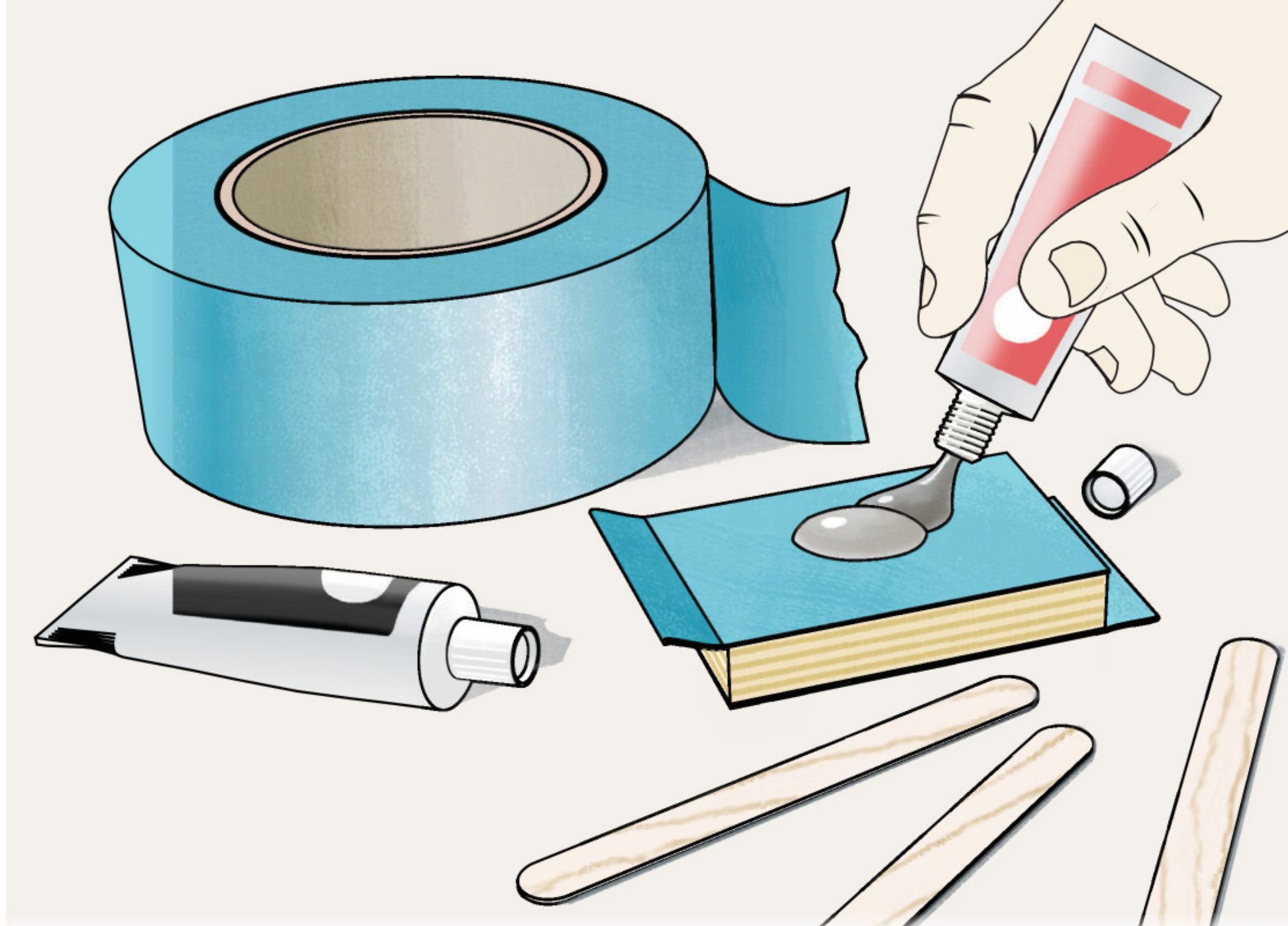
SHOP TIPS

Make mixing less messy

Mixing two-component wood fillers and epoxy can be a messy proposition. And then there's the cleanup. I solved the slop with reusable mixing blocks— $\frac{1}{2}$ " plywood cut into 2×3 " squares. I adhere a strip of 2" blue painter's tape on each side, leaving an extra inch to create a tab for easy removal.

Mix the epoxy on the surface of the tape. Cleanup is as simple as peeling the tape off the block. Apply a new strip of tape for the next time you need to mix.

—Tom Sanders, Palo Alto, Calif.



Keep small cutoffs from escaping at the bandsaw

I often cut multiple small parts at the bandsaw and inevitably, some of them end up on the floor. To capture those runaways, I made the tray shown here that bolts onto my bandsaw table. All of the parts can be made from $\frac{1}{2}$ " or $\frac{3}{4}$ " material.

One end of the tray pivots like a gate to make cleaning out the tray easier. When closed, it rests on a stop fastened to the bottom of the tray. Simply pivot the stop out of the way to allow the gate to drop down for easy parts removal. 🌿

—Dan Martin, Galena, Ohio



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Create a Workbench and Cabinet

Satisfy your two biggest shop needs with a basic workbench that's big on storage, plus a pair of simple wall cabinets.

D I M E N S I O N S :
30" W x 12³/₄" D x 30" H

Approximate materials cost:

\$140

for two cabinets

Adjustable shelves let you stack small tools or hardware.

► If this workbench and storage cabinets are part of a larger garage-shop upgrade, turn to *page 54* for tips on getting the most from your shop space.

Combo

D I M E N S I O N S :
80" W x 36" D x 34 7/8" H

Approximate materials cost:

\$220

for the workbench

A solid-core door has 20 square feet of benchtop.

No woodworker ever complained about a storage surplus. But with these quick and easy-to-build projects, you could be the first. Build a wall's worth of cabinets in a weekend, and put together the workbench just as quickly.

To simplify the workbench construction, we used a 36×80" solid-core door for the benchtop. For a more traditional top that you can resurface down the road, laminate maple boards to the same dimensions.

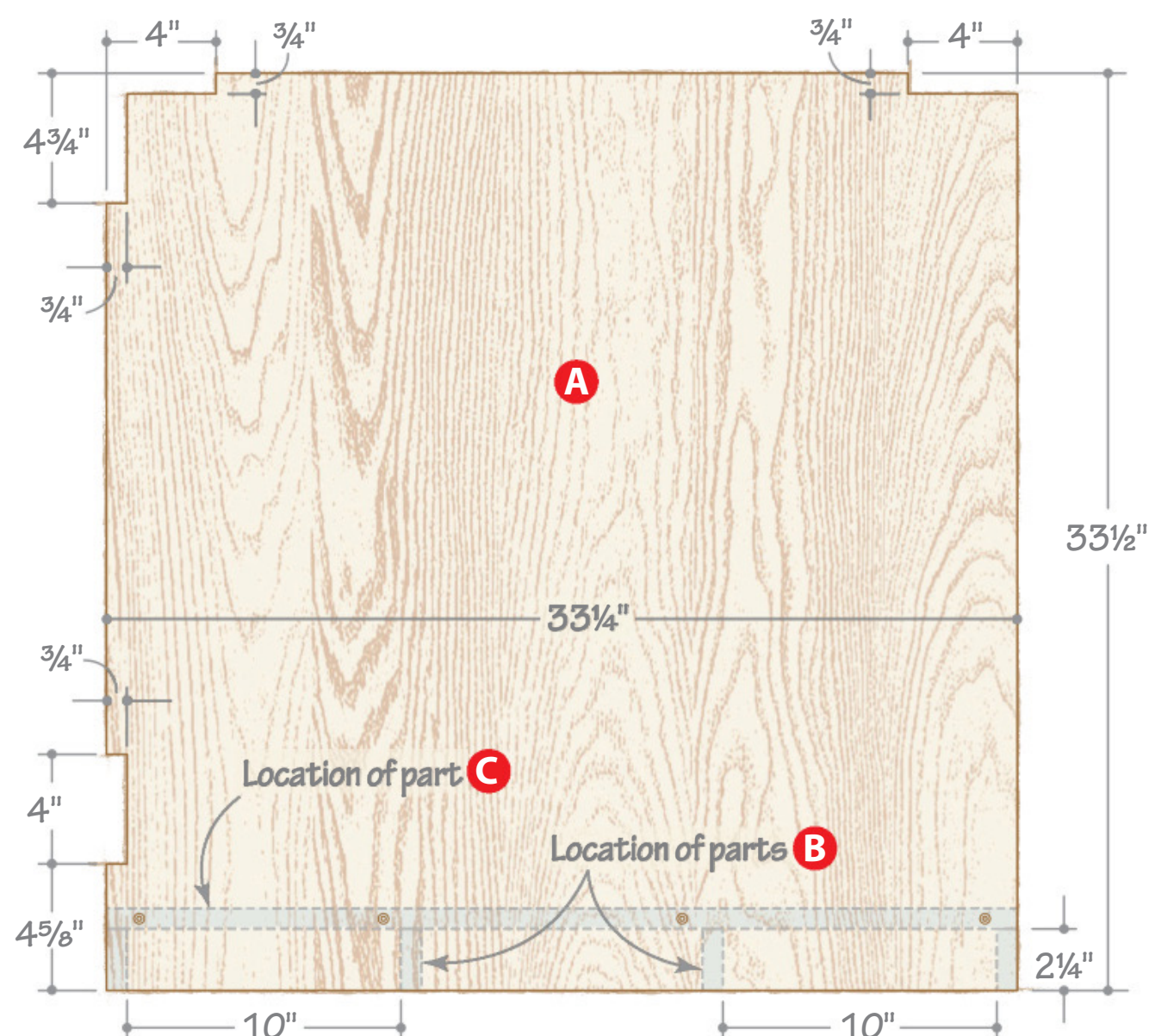
Put the base in basic bench

1 Cut the sides and divider (A) [Materials List], then jigsaw the notches [Drawing 1]. Set these panels aside.

2 Cut the platform supports (B) and platform (C). Glue and screw the platform to the supports [Exploded View, Drawing 1].

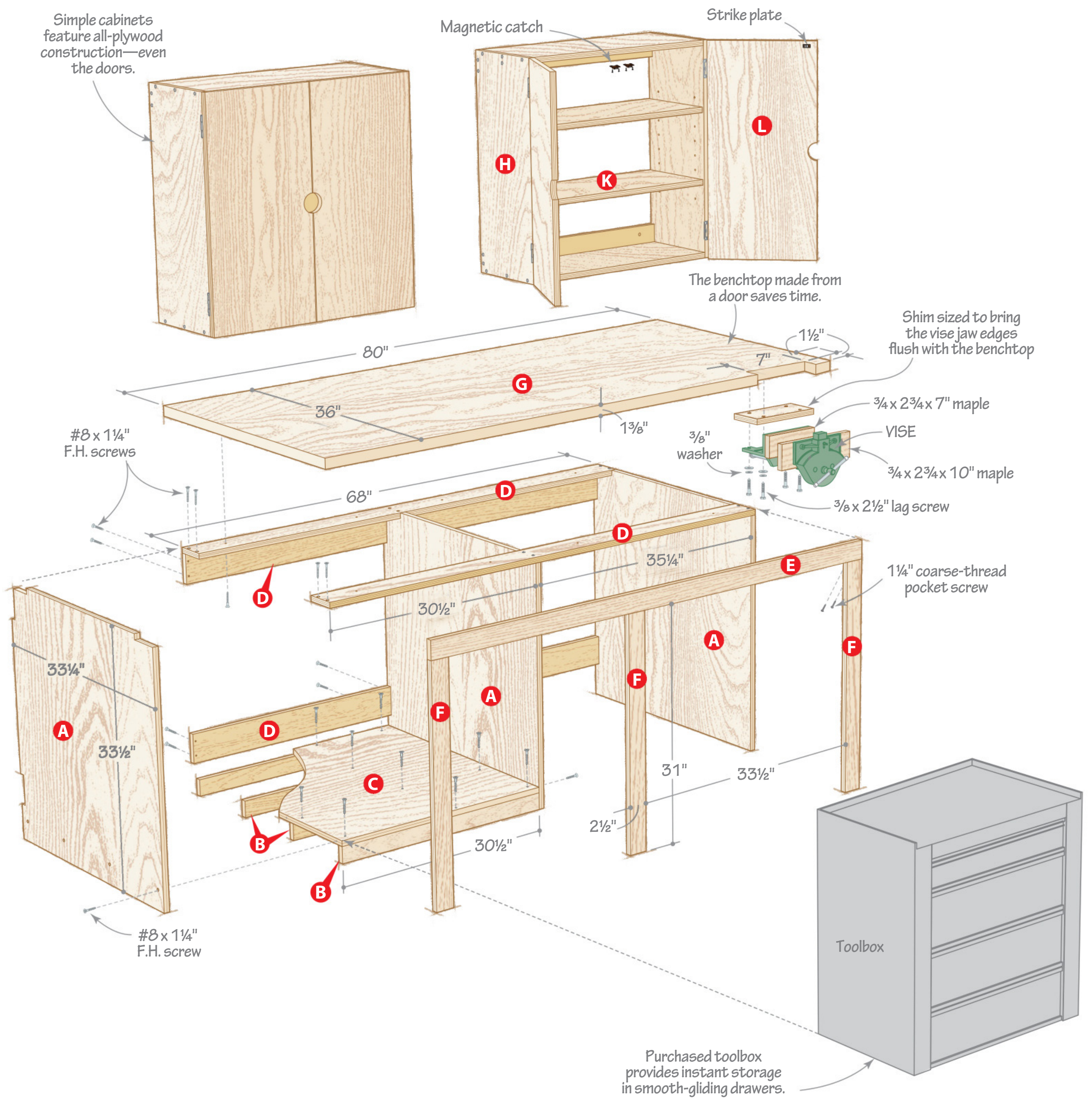
► Drill 3/32" pilot holes for the #8 screws used in this project.

1 BASE SIDES/DIVIDER



► Get plans in issue 273 (March 2021) for the tool tower shown to the left of the workbench or at woodstore.net/tooltower.

EXPLODED VIEW



Note: We sized the tool platform to accept a Husky four-drawer toolbox [Sources]. For a different-size toolbox, alter the part sizes.

3 Glue and screw a side and divider (A) to the platform assembly (B/C) and check for square.

4 Cut the cleats (D) to size. Glue and screw the top rear cleat to the side and divider

(A) [Photo A]. Fasten the remaining cleats to the assembly, then add the other side (A).

5 Cut the face-frame rail (E) and stiles (F) to size. Drill pocket holes in the stiles, then glue and screw them to the rail. Glue

the face frame to the front of the base assembly (A–D) with the outside stile edges and sides (A) flush.

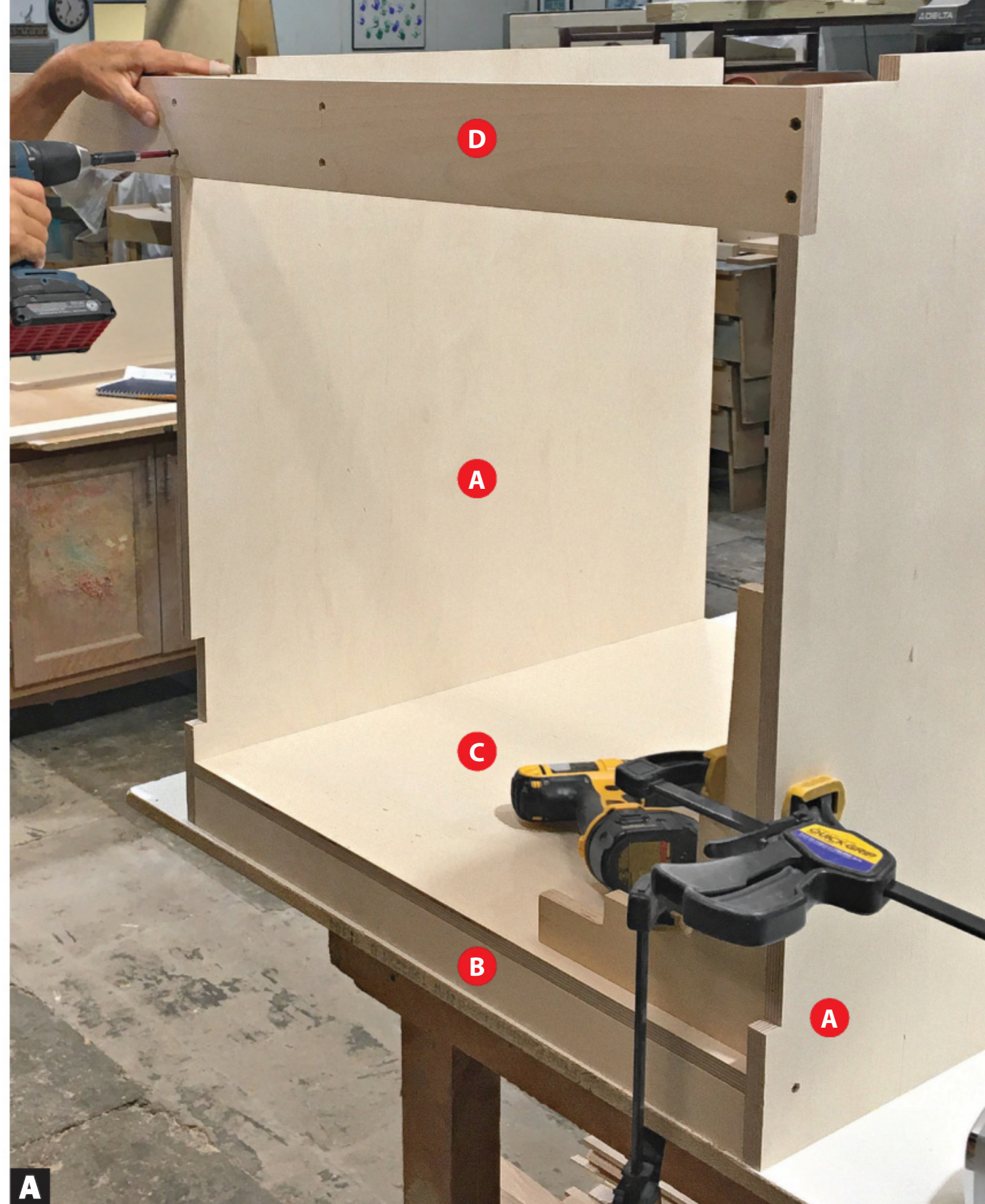
► Make your own
wipe-on finishes.
[woodmagazine.com/
wipeon](http://woodmagazine.com/wipeon)

6 Finish-sand the base, and apply a clear finish of your choice to it and the top (G). (We used a wipe-on satin polyurethane.)

7 Fasten the vise [Sources] to the top with the fixed jaw face aligned with the edge of the top (G). (See **Take our add-vise, below.**)

8 Lay the top (G) on the base assembly with its back edge flush with the rear cleat (D) edge and centered side-to-side. Screw the top to the cleats.

9 Position the bench where you want it in your shop and slide the toolbox (minus the wheels) onto the platform (C).



A Brace the side (A) and check for square on the side and divider before adding the top rear cleat (D).

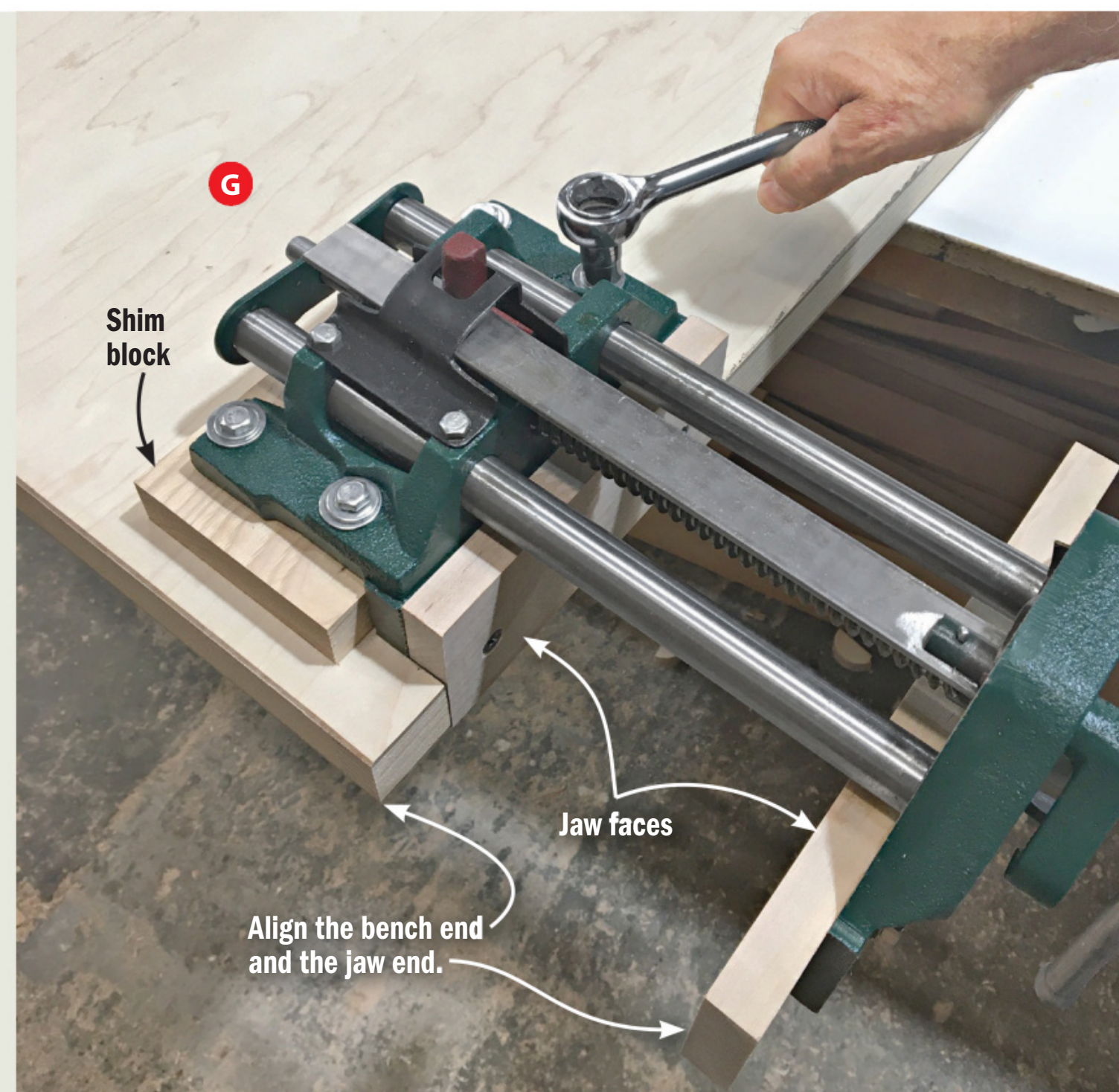
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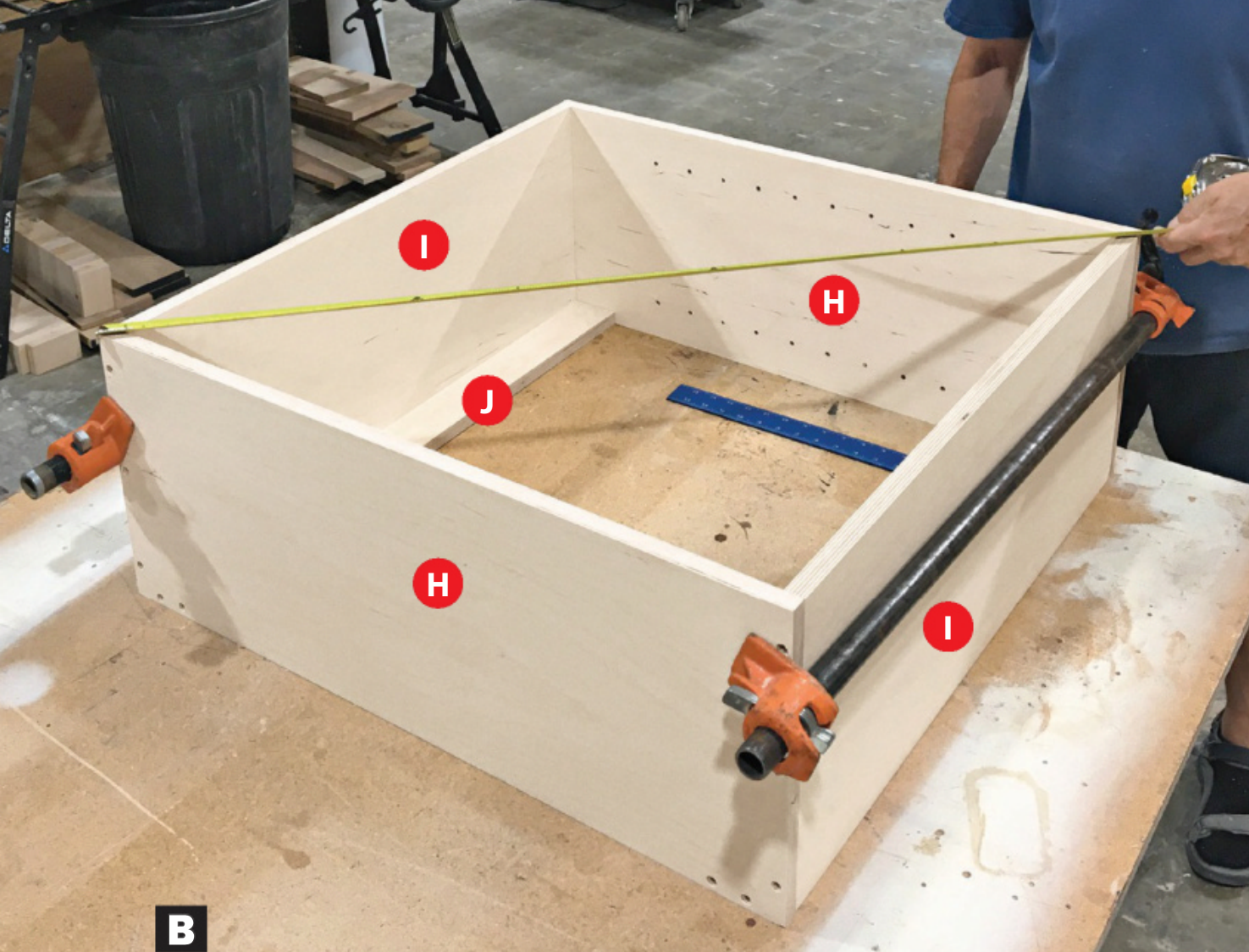
Few shop tools take the abuse a bench vise typically receives, but the right installation will ensure it survives.

First, cut $\frac{3}{4} \times 2\frac{3}{4} \times 7$ " and $\frac{3}{4} \times 2\frac{3}{4} \times 10$ " jaw faces from hard maple, hickory, or a similarly hard wood. (If you use a vise other than the one shown [Sources], adjust the jaw face sizes and benchtop [G] notch to fit.) Screw the smaller face centered on the fixed vise jaw and the larger piece centered on the movable jaw so both faces are flush at the top when the vise is closed.

Notch the front edge of the benchtop $1\frac{1}{2}$ " from one end and deep enough that the fixed jaw face aligns flush with the front edge of the top. Insert a hardwood shim thick enough to bring the top of the wooden jaw face flush with the top face of the benchtop. Drill pilot holes and drive lag screws to fasten the vise and shim to the underside of the benchtop.

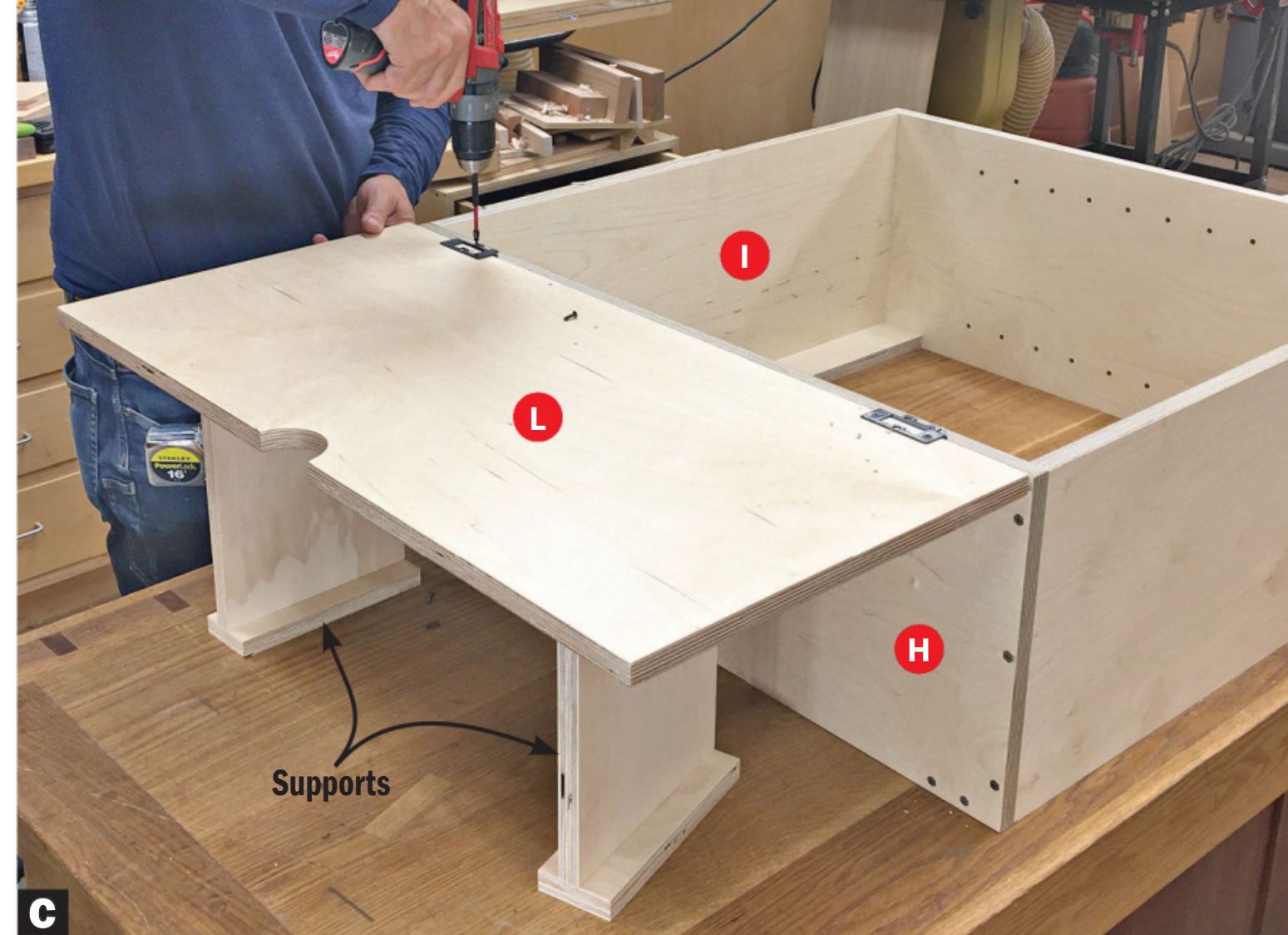


Notch the benchtop (G) front edge so that the end of the movable vise face rests flush with the end of the benchtop.



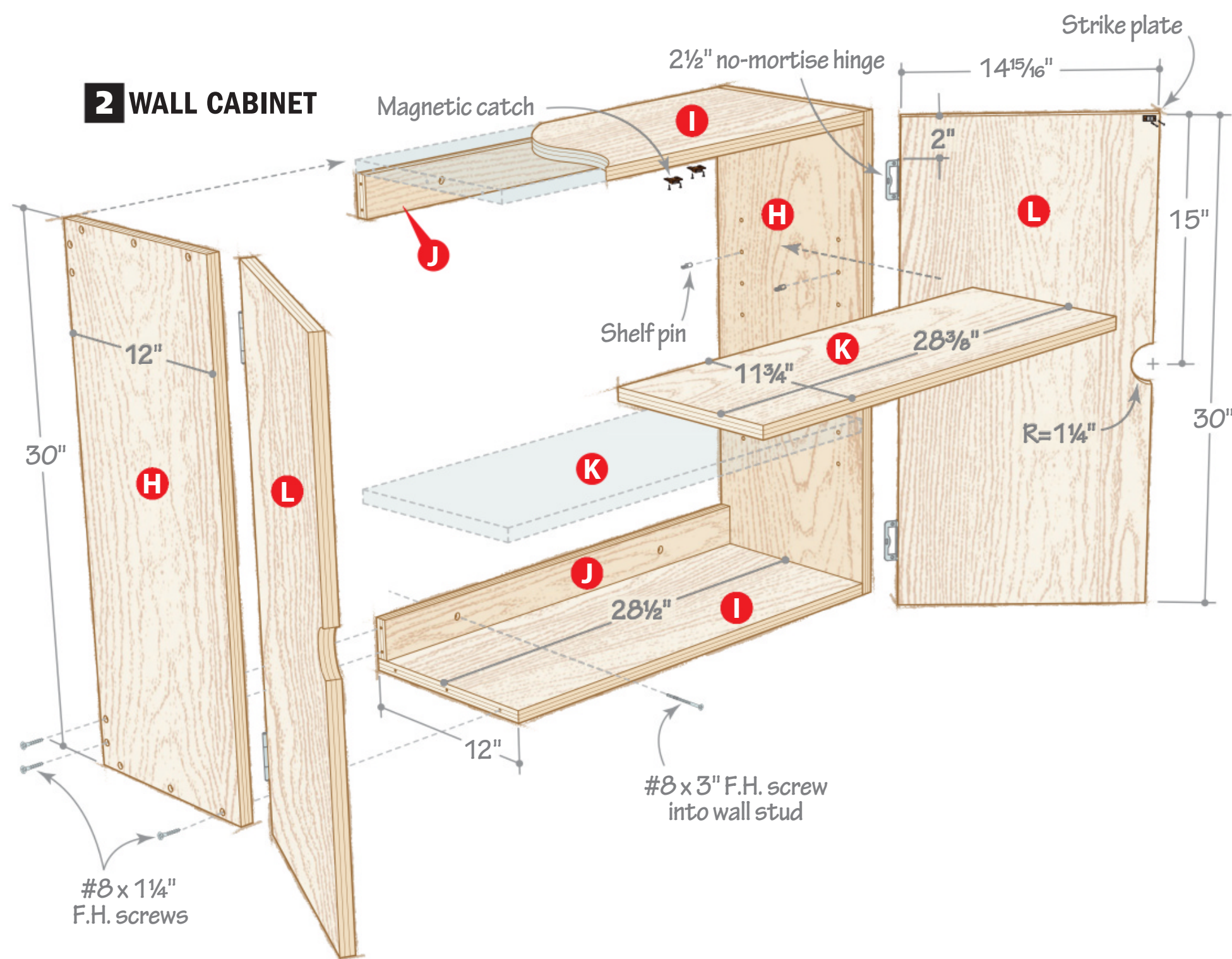
B

Check the case for square by measuring diagonally from corner to corner. Equal measurements indicate the case is square.



C

Build two 12"-tall supports and rest the doors (L) on them while screwing the hinges to the sides (H).



2 WALL CABINET

Stock up on storage

The **Materials List** shows quantities for a pair of cabinets. Cut the quantities in half for a single cabinet or multiply them to supersize your storage.

1 Cut the cabinet sides (H), top and bottom (I), and hanging cleats (J) to size. Label the inside faces and back edges of the top and bottom [Drawing 2].

2 Glue a cleat (J) to the inside face of the top (I) and bottom (I) flush at the back edges [Drawing 2].

3 Drill shelf-pin holes in the sides (H) where shown [Drawing 3]. Glue and screw

the sides to the top and bottom (I) and cleats (J) [Photo B].

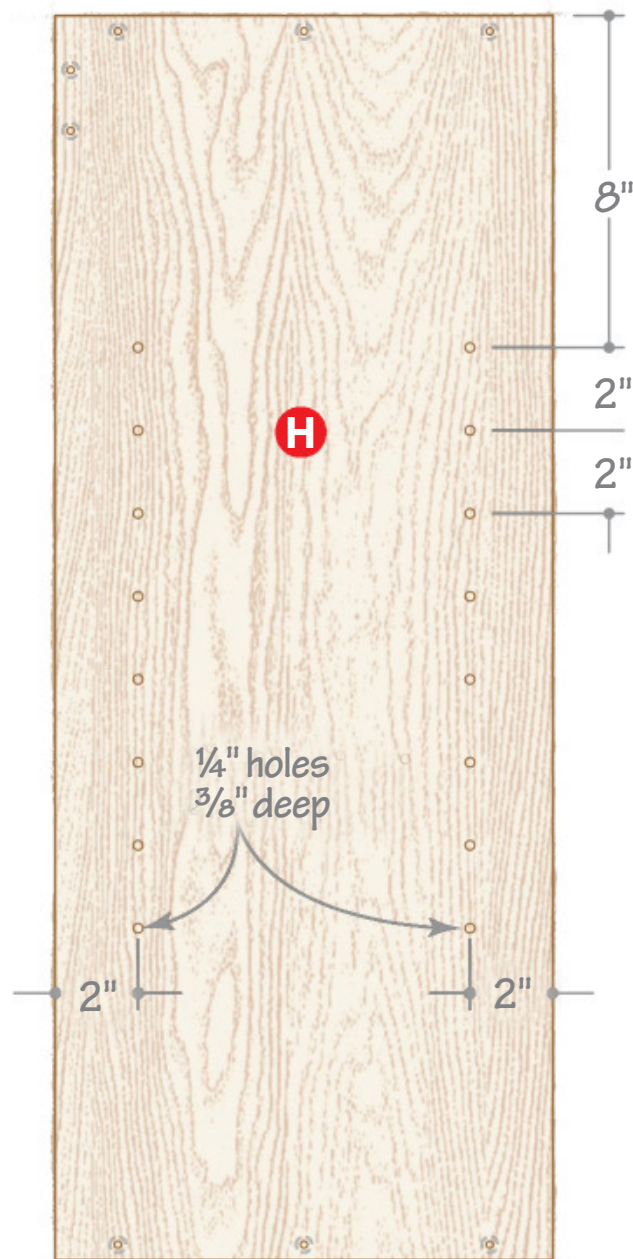
4 Cut the shelves (K) and doors (L) to size. Jigsaw or drill the notches in the doors [Drawing 2] and sand them smooth. Apply a clear finish to the case, doors, and shelves.

5 Mount the hinges on the doors and then to the case [Photo C]. Screw the magnetic catches to the case and doors.

6 Mark stud locations on the wall where you'll install a cabinet and transfer those to the hanging cleats. Drill pilot holes and screw the cabinets to the wall for the storage you need to keep your workbench clear. 🌳

► There's an easy way to drill accurate shelf-pin holes quickly.
woodmagazine.com/shelfpinholes

3 WALL CABINET SIDE



Produced by **Robert Wilson** with **Brian Bergstrom**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Workbench						
A	sides/divider	¾"	33¼"	33½"	BBP	3
B	platform supports	¾"	2¼"	30½"	BBP	4
C	platform	¾"	30½"	33¼"	BBP	1
D	cleats	¾"	4"	68"	BBP	4
E	face-frame rail	¾"	2½"	68"	BBP	1
F	face-frame stiles	¾"	2½"	31"	BBP	3
G	top	1⅜"	36"	80"	SCD	1
Upper cabinets (2)						
H	sides	¾"	12"	30"	BBP	4
I	tops/bottoms	¾"	12"	28½"	BBP	4
J	hanging cleats	¾"	2½"	28½"	BBP	4
K	shelves	¾"	11¾"	28⅜"	BBP	4
L	doors	¾"	14⅟ ₁₆ "	30"	BBP	4

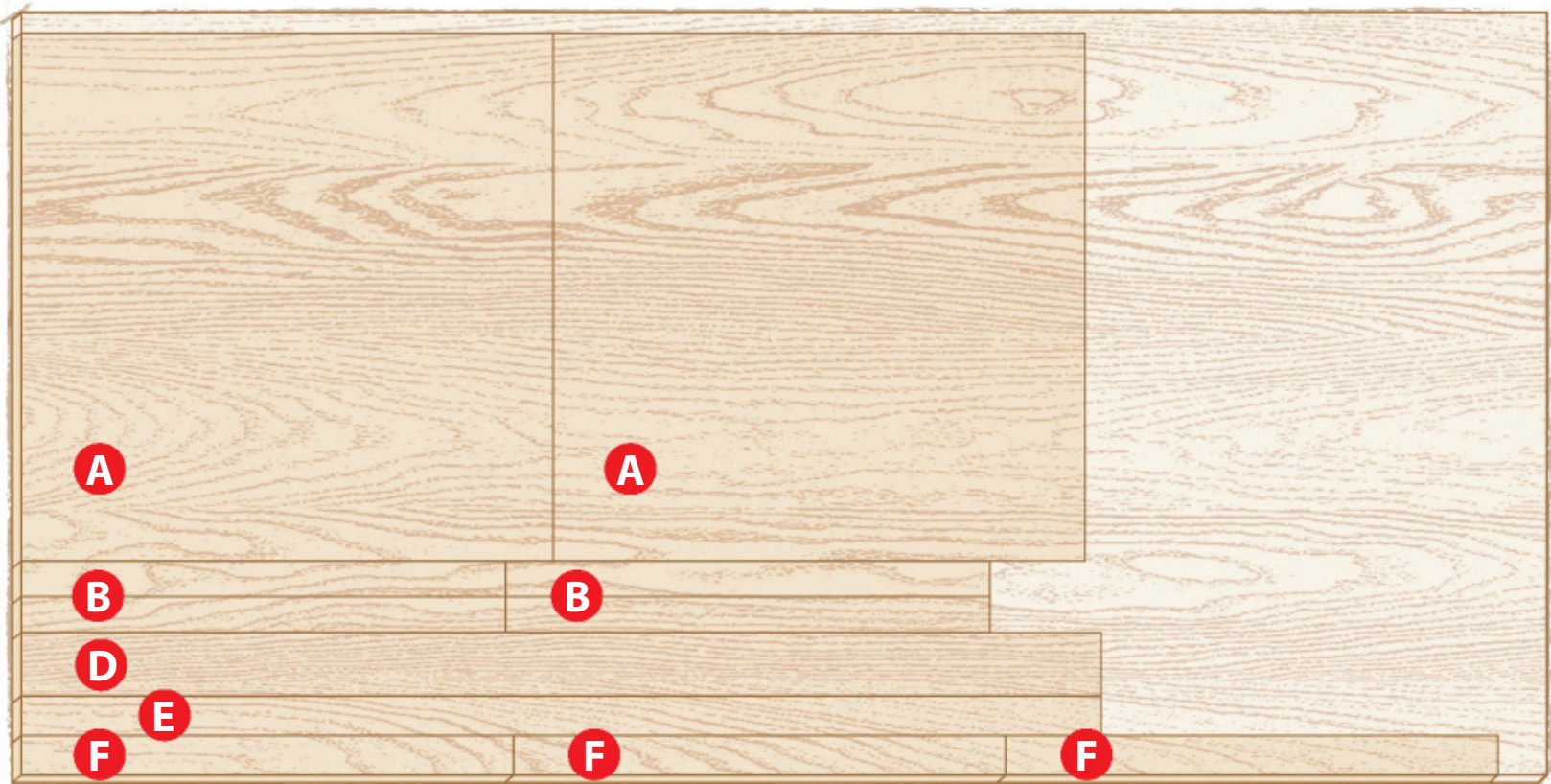
Materials key: BBP-Baltic birch plywood, SCD-solid-core door.

Supplies: 2 1/2" no-mortise hinges (8), magnetic door catches (4), 1/4" shelf pins (16), 1 1/4" coarse-thread pocket-hole screws, #8 x 1 1/4" flathead screws, #8 x 3" flathead screws, 3/8 x 2 1/2" lag screws, 3/8" washers.

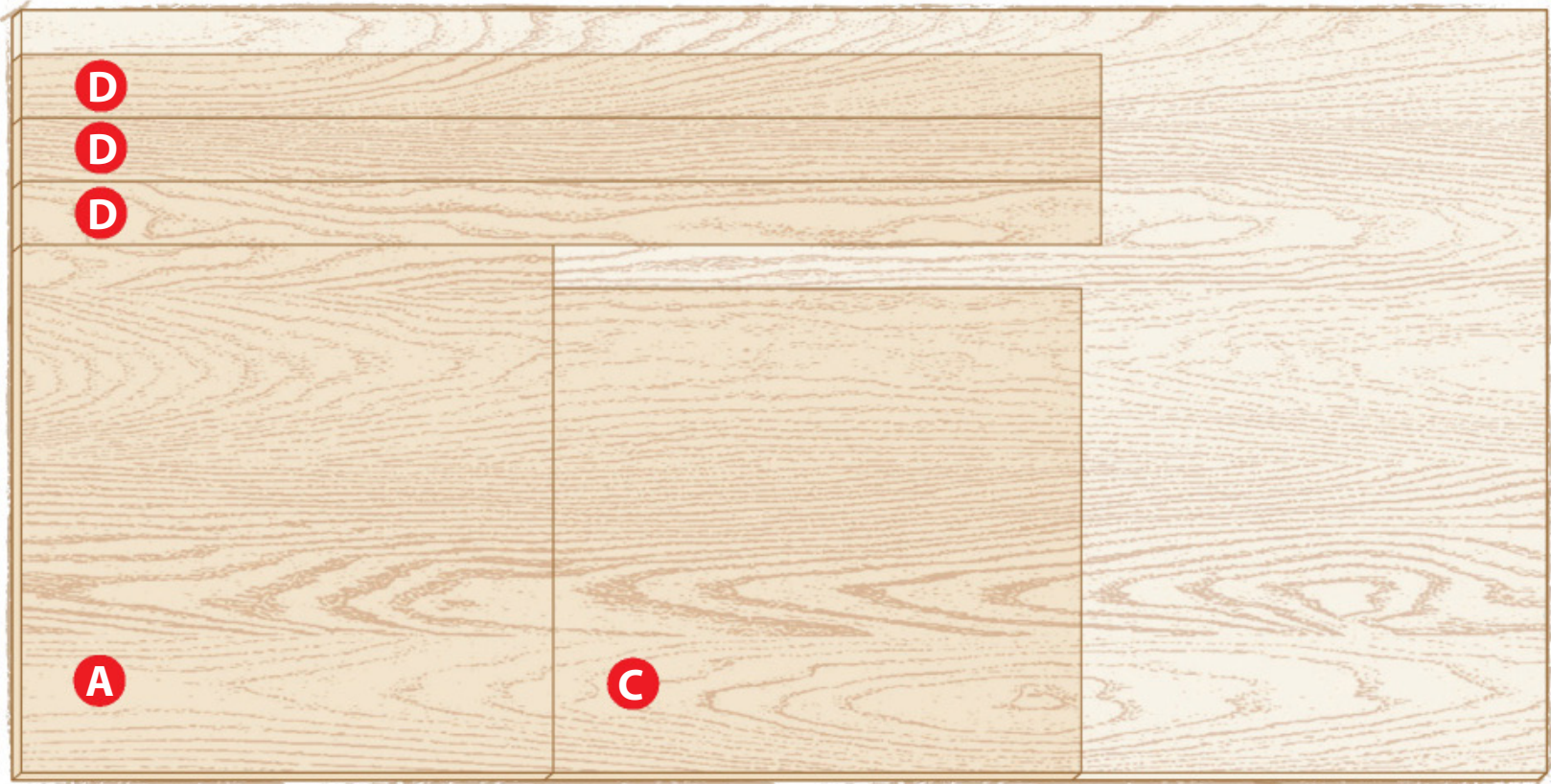
Sources: Four-drawer rolling cabinet toolbox, no. HKST98066BK, \$129, 36x80" solid-core interior door, no. 334219, \$80, The Home Depot, homedepot.com and local stores.

Wood River 7" quick-release vise, no. 162794, \$150, Woodcraft, 800-225-1153, woodcraft.com.

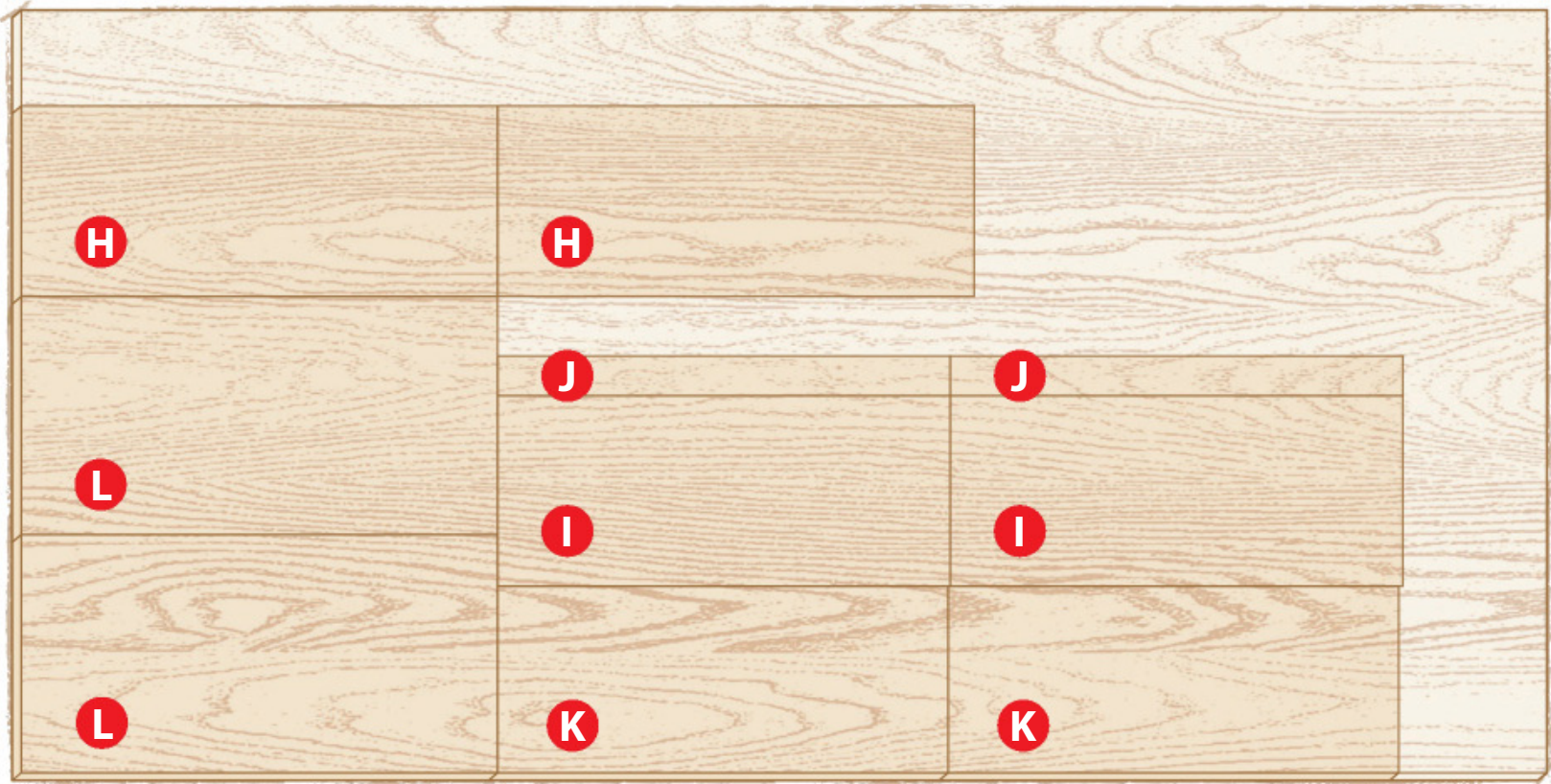
Cutting Diagram



3/4 x 48 x 96" Baltic birch plywood (workbench)



3/4 x 48 x 96" Baltic birch plywood (workbench)



3/4 x 48 x 96" Baltic birch plywood (2 needed for 2 cabinets)

Mortising Perfect-fit Box Hinges

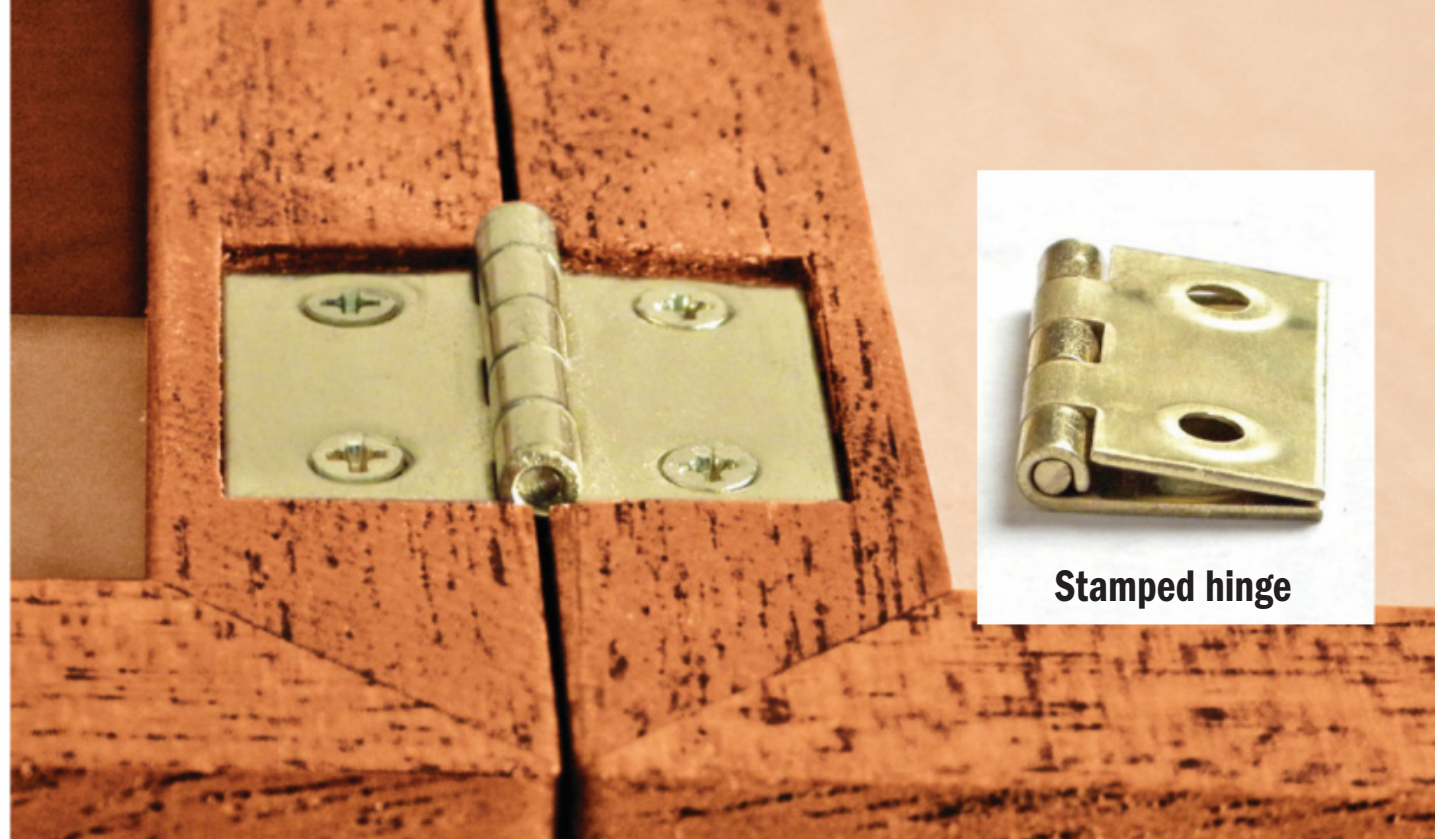
Learn the secrets to precise layout and installation.



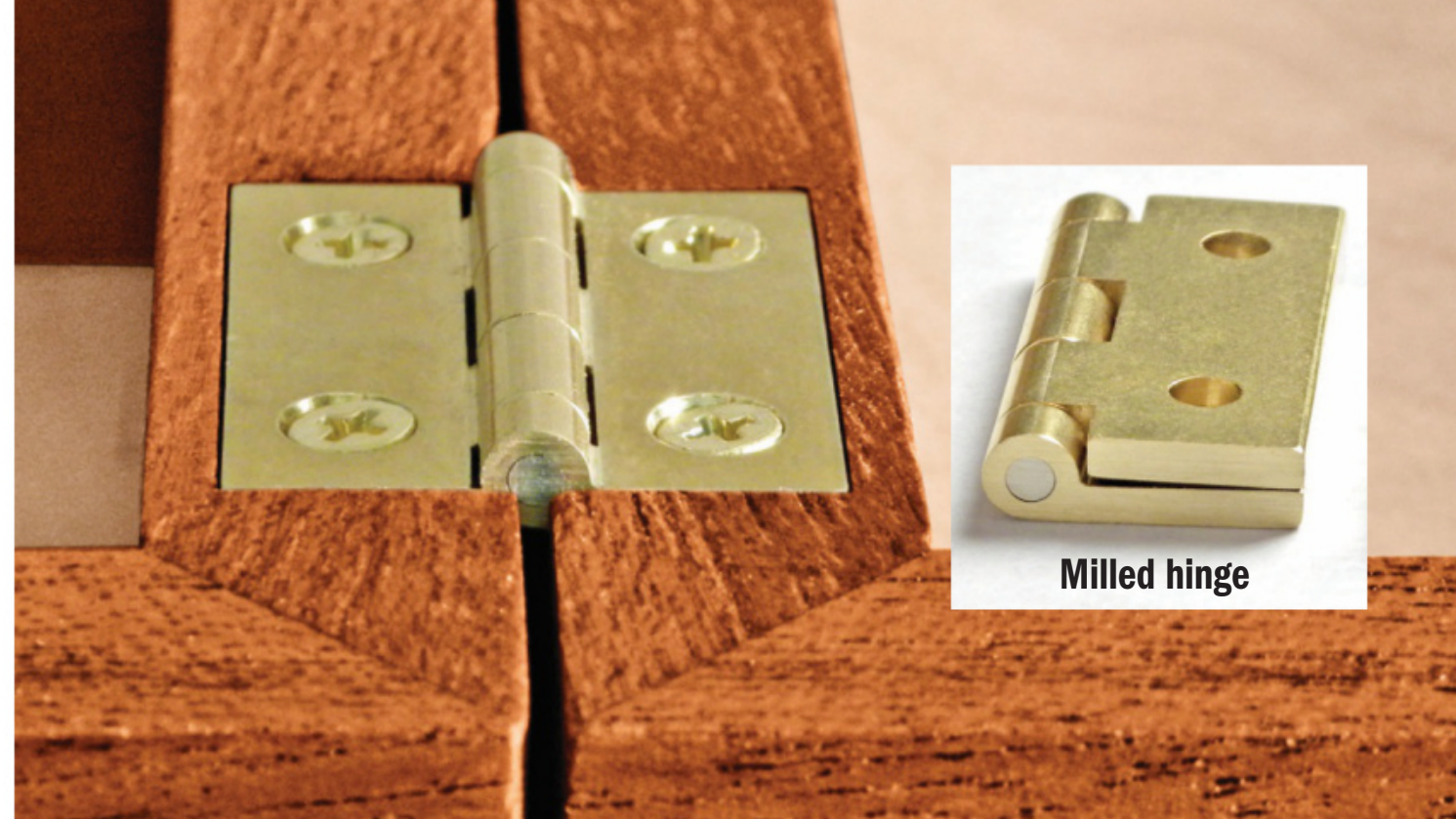
► Watch a video of this process. Point your smartphone's camera at this code or visit woodmagazine.com/boxhingemortise

After painstakingly crafting a beautiful box, you want the hinge installation to provide a perfectly aligned lid with a gap-free fit. Accomplishing that involves careful layout and work, but lies within the grasp of any woodworker with sharp tools.

Practice these techniques on scrap first, including installing the hinges. In addition to building your confidence, you'll see how the depth of the mortise affects the gap between the closed test pieces, and how the position of the barrel determines the gap between them with the lid open.



The leaves of stamped hinges rest below the surface of the box and lid—a less-tidy appearance.



Sturdy milled hinges sit flush with the box surface, providing a craftsman's touch to any box.

Choose your hinge

Box hinges come in two types: stamped and milled, *above*. While both work well, the difference in their prices reflects the difference in fit and finish. Stamped hinges sell for about \$2 per pair at home centers and hardware stores, and the small amount of play between the leaves and hinge pin won't

affect the lid operation. But because the combined leaves are thinner than the barrel, the leaves must sit below the surface for a gap-free fit between the closed lid and box.

Milled hinges cost \$25 per pair and up. For this investment, you get beefier leaves, a more finished appearance, a better fitting hinge pin, and larger, longer screws.

Start with layout

Each mating mortise in the lid and box must be ever-so-slightly shallower than half of the hinge's barrel thickness (the thickest portion of the hinge). This creates a gap-free fit between the box and closed lid. And positioning the hinge so the barrel centerline sits just outside the box provides the smallest

possible gap when the lid is open, without causing binding.

Mortises sized for precise fits begin with precise layout. A marking knife and marking gauge score clean, narrow lines, so we recommend them for marking the hinge locations. Follow the steps in Photos A-D to score exact-size mortises.

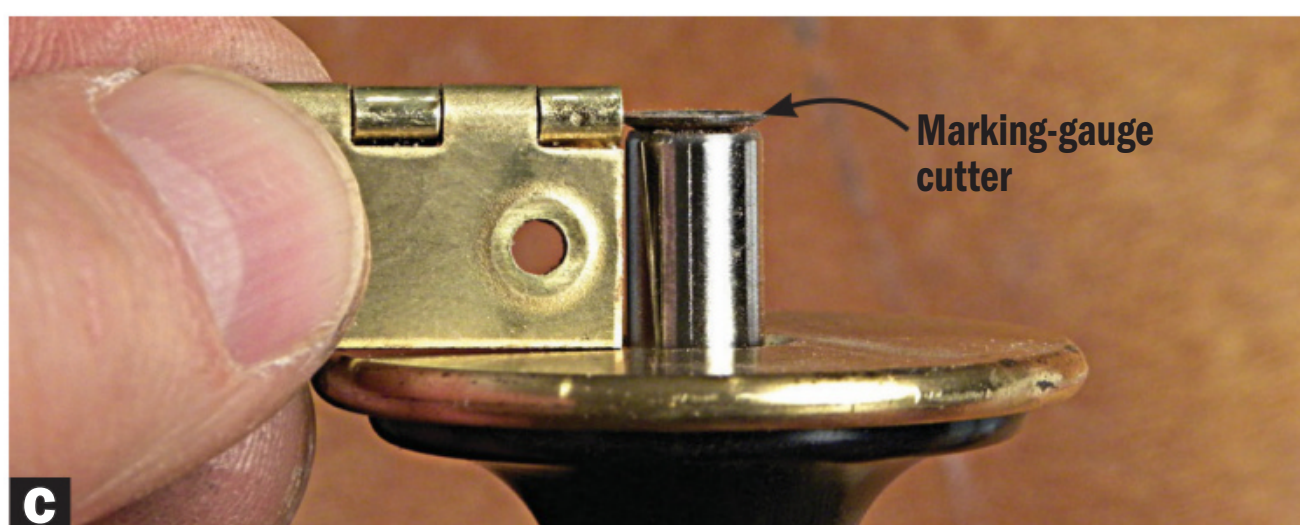
► Make your own heirloom marking knife and gauge. woodmagazine.com/markingsknife woodmagazine.com/markinggauge



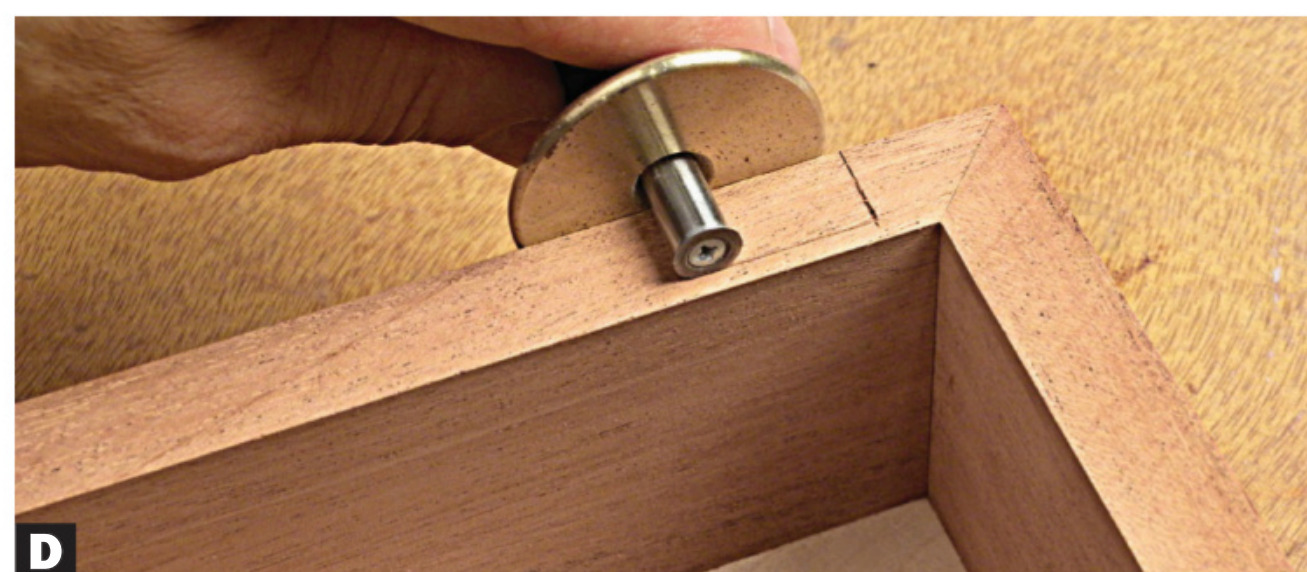
A Set your combination square to determine the outside end of a hinge. Score along the end of the square blade the width of a hinge leaf.



B Leave the square in place, butt a hinge against it, and score along the end of the hinge. This spaces the knife marks the exact width of the hinge.



C Set a marking gauge so the cutter falls just below the middle of the hinge barrel. The farther below the center, the larger the gap between lid and box with the lid open.



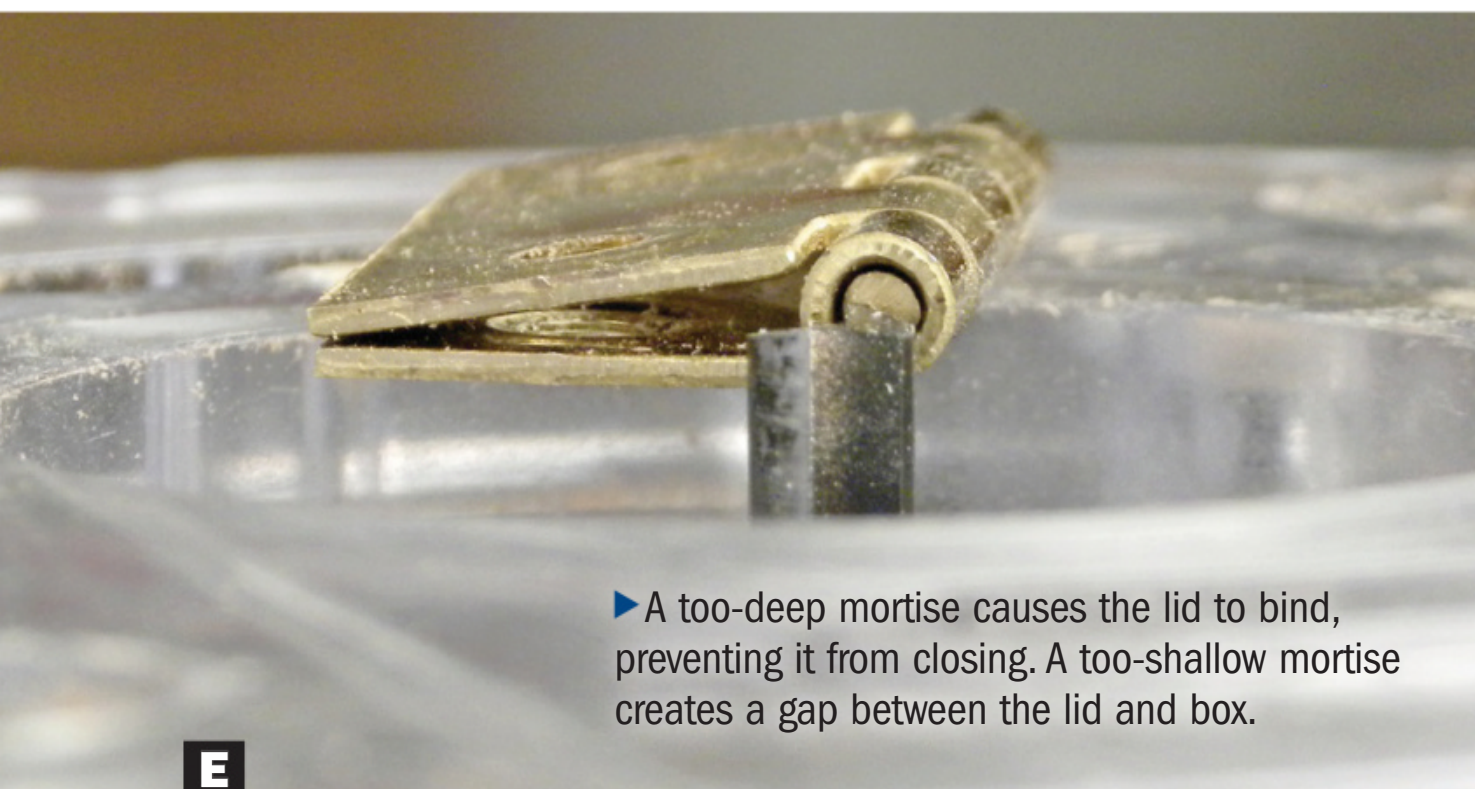
D Strike along each hinge location, connecting the knife marks.

Route away the bulk

► For cleanest cuts, use a down-cut spiral router bit.

A trim router with a 1/8" straight bit quickly removes the bulk of the waste in each mortise [Photos E-H]. The bit creates a flat bottom that serves as a reference when you chisel out

the remaining waste [Photos I, J]. After completing the mortises on the box, use them to help lay out the mating mortises on the lid [Photos K, L].



► A too-deep mortise causes the lid to bind, preventing it from closing. A too-shallow mortise creates a gap between the lid and box.

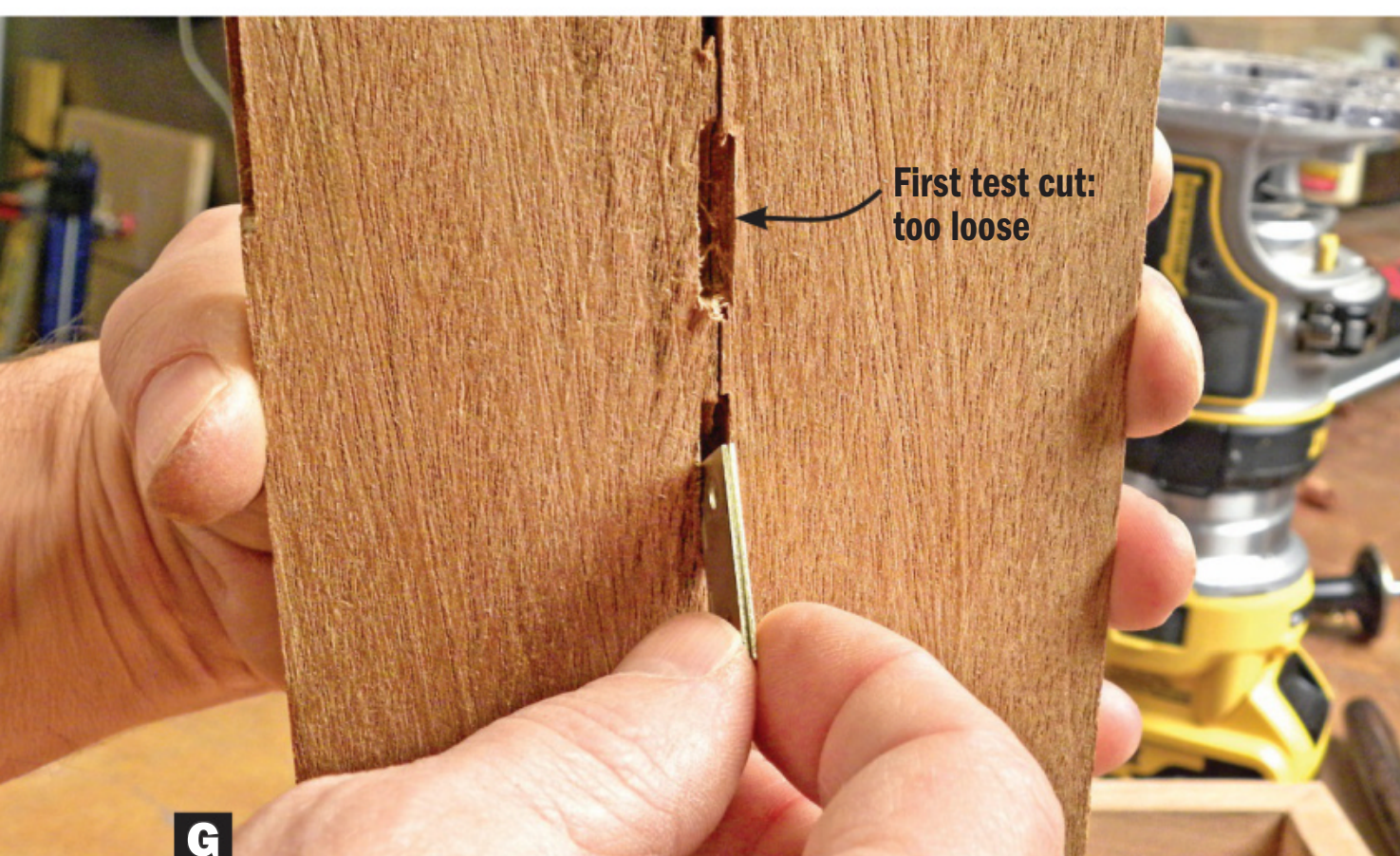
E

Set the bit depth slightly less than half of the barrel thickness for a stamped hinge (shown); or the same as the thickness of a leaf for a milled hinge.



F

Test your setup on two pieces of scrap clamped together. Rout across both pieces, forming a recess along the mating edges.



First test cut:
too loose

G

Face the two recesses toward each other. The hinge barrel should just slide into the opening with a friction fit.



H

A scrap clamped to the workpiece provides a broader surface for the router to ride on, and prevents chip-out. Rout close to the knife marks, but leave them intact.



Tip! Screw up a mortise? If you don't mind a slightly shorter box, simply saw or plane away the old mortises and try again.

I

Clean up the mortises with a chisel. Take small bites working your way back to the lines. Then, rest the chisel in the knife mark and press straight down to bring the mortise to finished size.



Scrap backs up
this material.

J

Lay the back of the chisel flat on the bottom of the mortise when cleaning up the mortise edges. A scrap clamped inside the box supports the narrow bit of material on the inside edge, preventing it from breaking off.



K

For greatest accuracy, transfer the outside edge of each mortise location from the box to the lid. Press the knife into the lid edge, then use a square to help extend the mark along the lid.



L

Place the knife in the mark in the lid and adjust the square blade up to it. Then, butt a hinge against the end of the square and mark the hinge length. Form the lid mortises the same as with the box.

Mark, drill, and screw

After creating perfectly sized mortises, make sure the screws hold the hinges exactly where intended. Driving a screw into an off-center hole pulls the hinge out of alignment, so follow the steps in **Photos M** and **N** to locate your screws properly.

► Drilling only one hole allows for making adjustments using the other hole, if needed.

Brass hinges come with soft brass screws, so to prevent damaging them, drive steel screws of the same size while checking hinge placement. Drive the brass screws only for final assembly. And use a handheld screwdriver, which provides more control than a drill/driver. 🌳

Produced by **Craig Ruegsegger**



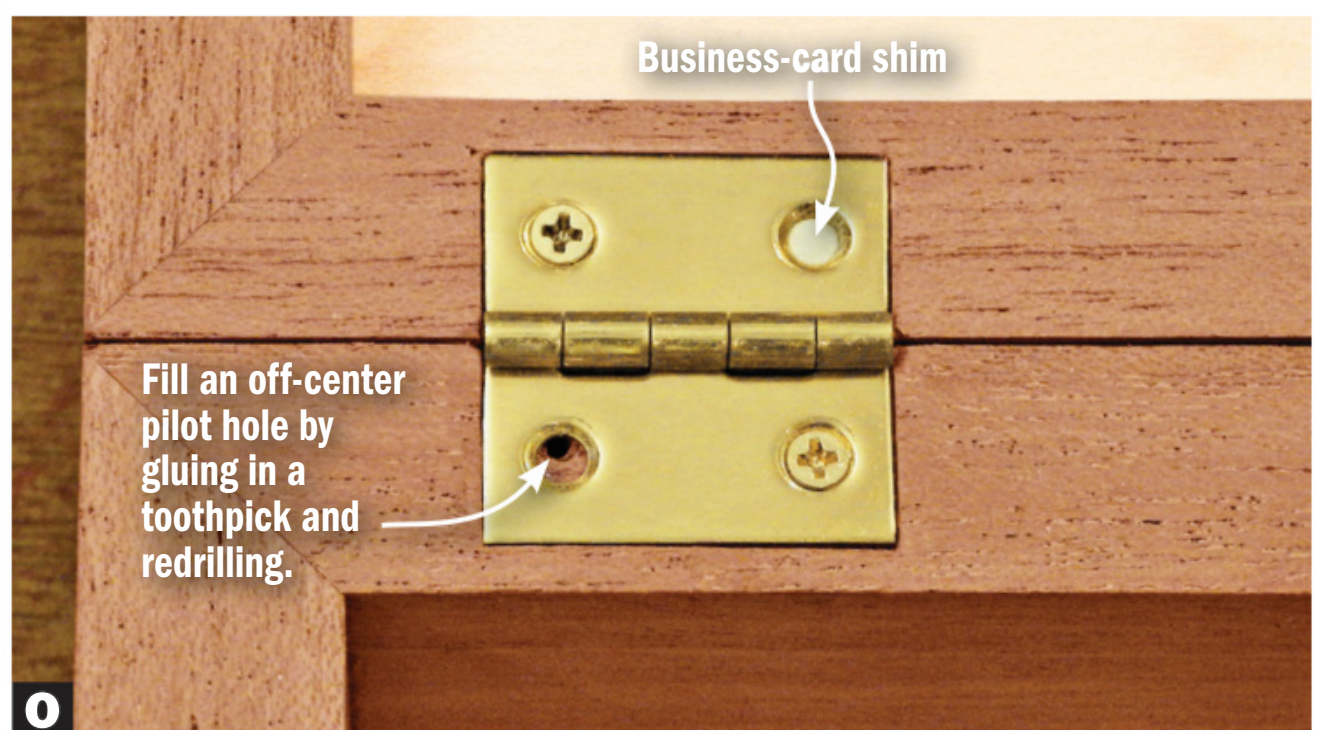
N

Install one screw in each leaf and check the lid operation and alignment. Make any needed adjustments (**Photo O**), then drive the remaining screws.



M

Use a self-centering drill bit to drill or mark the center of one hole in each leaf. This bit drills too large of a pilot hole for the hinge screws, but tapping it with a mallet creates a centered dimple for locating the proper-size bit.



O

Try these invisible fixes, if needed. Even though the first pilot hole was drilled off-center, the undrilled hole provides a second chance. A shim made from a business card or a layer of tape raises the hinge in a too-deep mortise.

Router Jigs

We tested dozens of accessories that make handheld routing more accurate. Then, we graded each one to make your buying decisions easier.

Tip! When routing circles or ellipses, use a plunge router with a straight or spiral bit, and rout in incremental depths of $\frac{1}{8}$ – $\frac{1}{4}$ ". Use a sacrificial backer, such as the rigid foam board shown here, to prevent workpiece tear-out and damage to your workbench.

Circle jigs

► Need a plunge router? Learn what to look for in one. woodmagazine.com/chooseroater

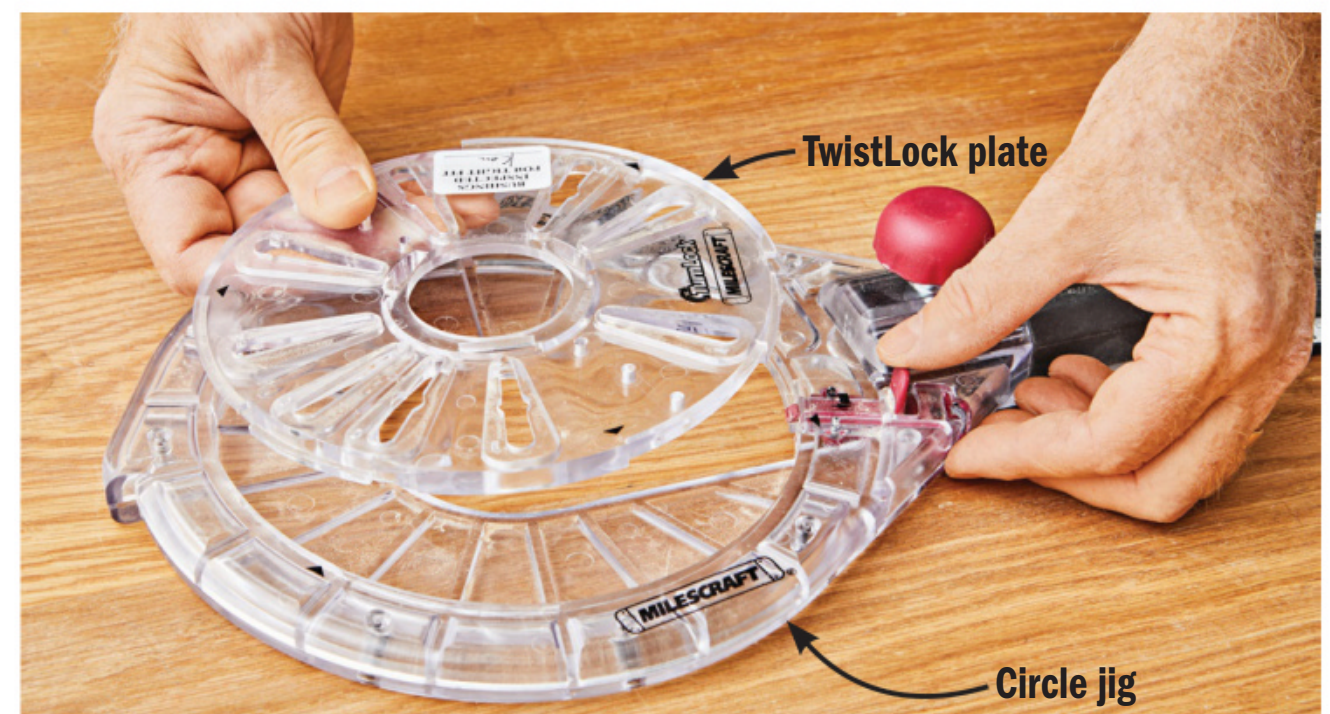
These jigs rout circles in much the same way you'd lay one out with a compass: Drill a pivot-pin hole at the center of the intended circle on the back face of your workpiece. Fit the jig's pivot pin into the hole, and the jig over the pivot pin, and then rout the circle with progressively deeper passes. All of the jigs have scales for quickly setting the circle radius, whether you want to rout an inside diameter, such as a speaker hole in a cabinet, or an outside diameter, such as a tabletop.



For quick mounting, the Woodhaven jig clamps to almost any router. Although it's not necessary, we removed the subbase to maximize plunge depth.

To maximize cutting depth, most of the tested jigs replace your router's subbase (see the exception, *below left*), and many come predrilled—and with mounting screws—for popular routers. If a jig doesn't fit your router out of the box, you can drill it to match, but you may need longer mounting screws to account for the jig's thickness.

► If you need to rout only one circle, make a simple router trammel. woodmagazine.com/routcircle



Replace your subbase with Milescraft's TwistLock plate, which locks into the circle jig for easy mounting. This plate also fits other Milescraft router bases and jigs, so you can leave it on your router.

Jasper M200 (medium), \$50

Overall grade: A

Diameter range: 2¼–18¾" in ¼" increments

This intuitive and accurate jig is almost goof-proof. The diameter settings read from the bottom, so it's best to set the pivot pin in the jig first, with the router upside down. As marked (for a ¼" bit), it creates perfect inside cutouts; for outside diameters, add twice the bit diameter to set the pivot pin. It comes with five sets of router-mounting screws, two pivot pins, and a can't-miss guide for centering your router on the jig.

Woodcraft

800-225-1153, woodcraft.com



Jasper M300 Pro (large), \$66

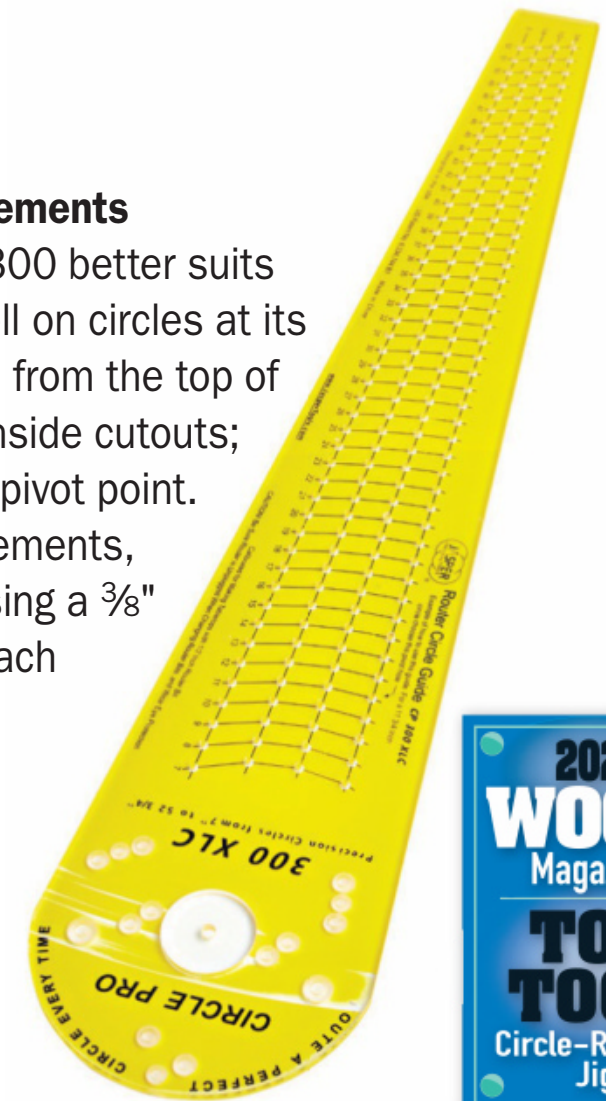
Overall grade: A

Diameter range: 7–52¾" in ¼" increments

A larger version of the M200, the M300 better suits larger projects, but also works as well on circles at its smallest setting. The markings, read from the top of the jig, require a ½" bit for precise inside cutouts; for outside diameters, add 1" to the pivot point. It would be nice to have smaller increments, but you can compensate some by using a ⅜" bit, which provides ⅛" offset from each pivot point.

Woodcraft

800-225-1153, woodcraft.com



Milescraft Small Circle Compass, no. 1210, \$33

Overall grade: B+

Diameter range: 1½–12"

Radial slots in the TwistLock plate (shown *previous page*) accommodate mounting almost any router. We found the scales easy to read and accurate. Although we didn't have any problems, the plastic feels brittle. This jig comes with a centering pin, guide bushing, two sets of mounting screws, and a ¼" straight bit.

Milescraft

224-236-2532, milescraft.com



Milescraft Circle Guide Kit, no. 1219/1269, \$45

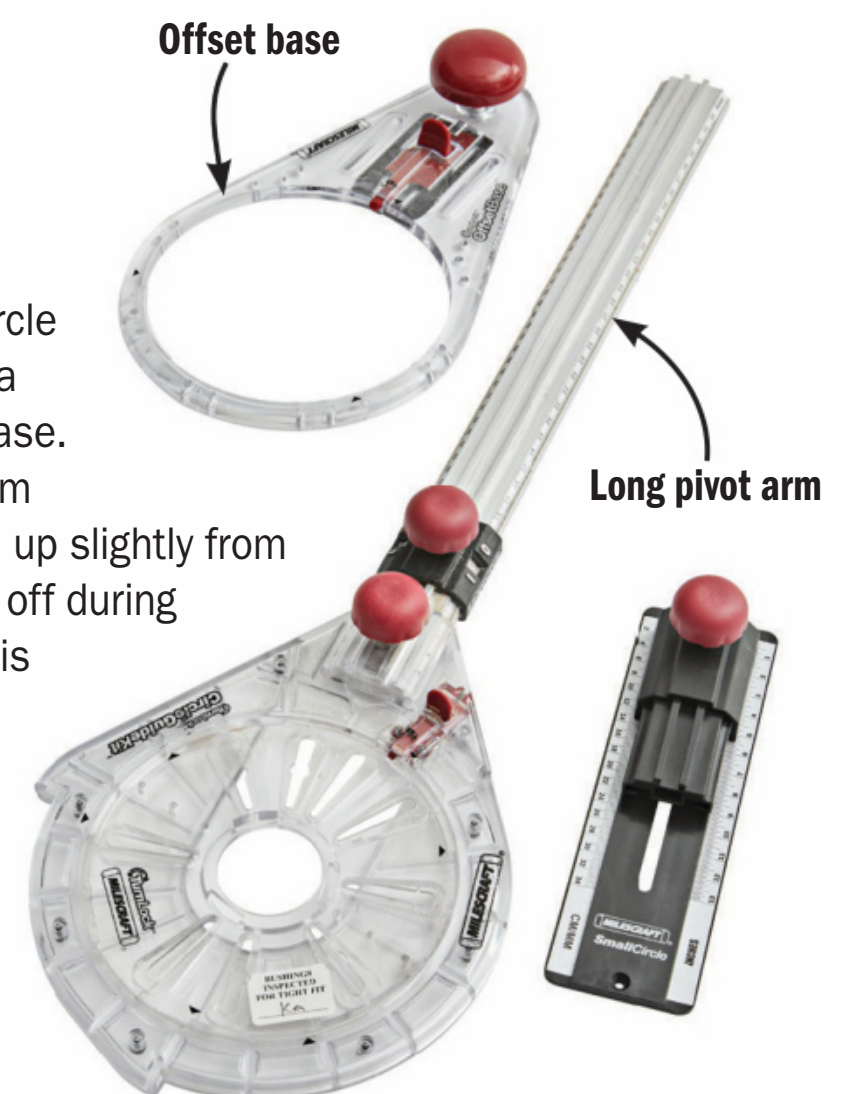
Overall grade: B+

Diameter range: 1½–52"

This kit includes the Small Circle Compass shown at *left*, plus a longer pivot arm and offset base. When routing with the long arm extended beyond 24", it lifted up slightly from the pivot pin, but never came off during testing. For all you get with this kit, it makes sense to buy it rather than the smaller one.

Milescraft

**224-236-2532
milescraft.com**



MLCS Router Compass, no. 9495, \$55

Overall grade: B+

Diameter range: 8–48"

With no predrilled mounting holes, you'll have to drill them to match your router. MLCS provides a thin rubber disc to center the bit in the jig when drilling mounting holes, but it deflected, and our jig ended up ¼" off center. (We redrilled the holes oversize to recalibrate it.) After securing the pivot pin where you want on the jig, it extends only ⅜" into the workpiece pivot hole. It never popped out, but we wish it was longer.

MLCS Woodworking

800-533-9298

mlcswoodworking.com



Woodhaven, no. 3260, \$139

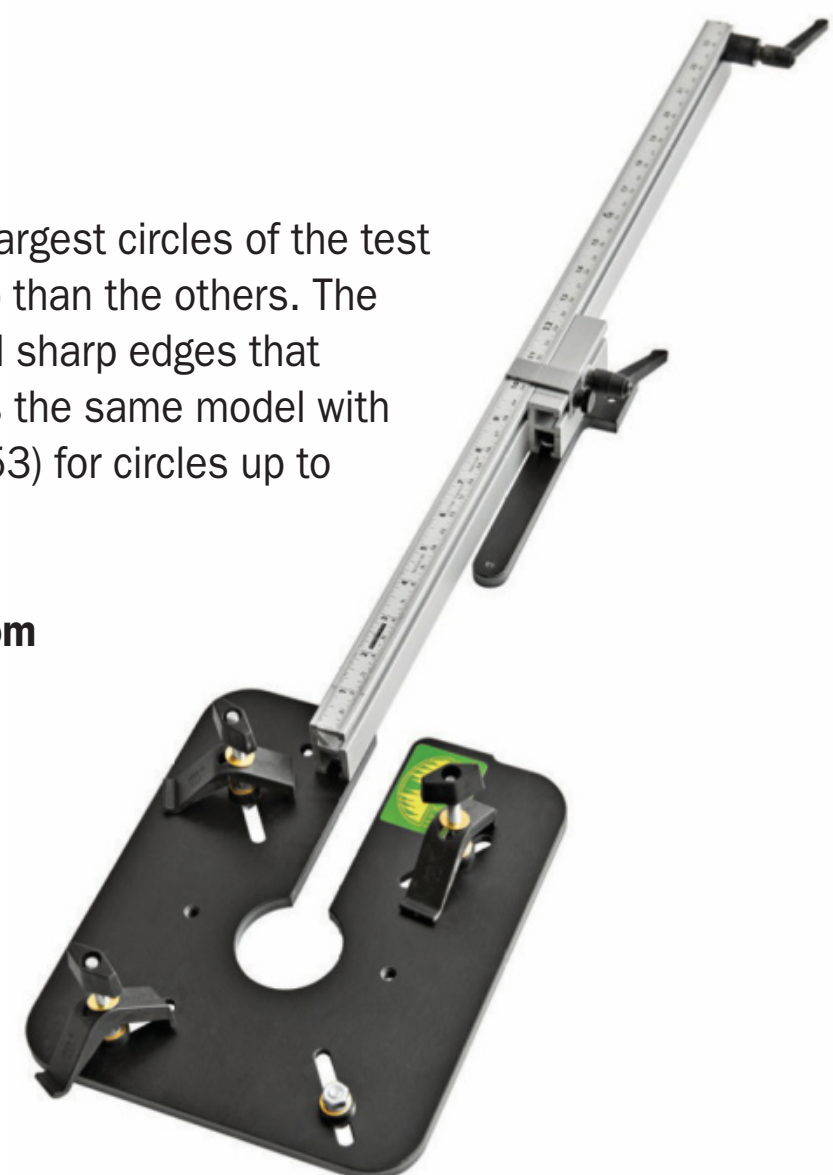
Overall grade: B

Diameter range: ¾–62¼"

This jig cuts the smallest and largest circles of the test group, but requires more setup than the others. The ends of its aluminum arms had sharp edges that needed filing. Woodhaven sells the same model with a longer arm (model 3270, \$153) for circles up to 110" diameter.

Woodhaven

800-344-6657, woodhaven.com





Ellipse/circle jigs

► Watch an ellipse jig in operation.
woodmagazine.com/ellipsevideo



An ellipse, *above*, is defined by two pivoting focus points, rather than the single fixed pivot of a circle. That requires a more complex jig that slides those points along the ellipse's major (long) and minor (short) axes.

Like the circle jigs, these jigs replace your router's subbase. Only the Trend Mini pro-

vides scales for setting the bit path. With the others, you set up as shown in the photos *below*. Once you lock the first slide in place for the major axis, the minor axis slide can only be set up to a certain length less than the major axis to prevent it from sliding out of the pivot plate.

► Learn how to lay out an ellipse/oval.
woodmagazine.com/layoutoval



To rout an ellipse, first secure the pivot plate to the workpiece at the center. Mark the desired length on the major axis, slide the jig to align the bit outside that mark, and then tighten the slider knob at the pivot plate's centerpoint.



Next, rotate the jig 90° and align on the minor axis, sliding the tightened slider within the pivot plate until you reach the desired ellipse width. Tighten the remaining slider knob, which should be at the center of the pivot plate.

Rockler, no. 27712, \$100

Overall grade: A

Circle diameter range: 9–52"

Major axis range: 17½–52"

Minor axis range: 9½–44"

Maximum difference between ellipse axes: 8"

Made of durable phenolic, this heavy-duty jig works smoothly and flawlessly. This jig's thick base requires ¾"-long mounting screws, which are provided for a router with a triangular three-hole pattern. For other routers, you'll need to drill to fit. (An optional large pivot plate, no. 38410, \$40, stretches the maximum difference between axes to 14".)

Rockler Woodworking and Hardware

800-279-4441, rockler.com



Rockler Compact, no. 55819, \$70

Overall grade: A

Circle diameter range: 6–24"

Major axis range: 11–24"

Minor axis range: 6–19"

Maximum difference between ellipse axes: 5"

Identical to the Rockler 27712 but smaller in scale, this model comes predrilled to fit the plunge bases of most 1¼-hp compact routers.

Rockler Woodworking and Hardware

800-279-4441, rockler.com



Trend Mini, no. UME/JIG, \$189

Overall grade: A–

Circle diameter range: 6¼–23¾"

Major axis range: 8⅝–22½"

Minor axis range: 6¼–17"

Maximum difference between ellipse axes: 5"

Designed primarily for European compact routers with mounting screws that align with the slots on either side of the bit opening, we had to drill holes in this jig to mount common U.S. models. But once done, it works superbly.

Trend Tool Technology

877-918-7363, trend-usa.com



Infinity Cutting Tools, no. 100–149, \$90

Overall grade: B+

Circle diameter range: 24½–90½"

Major axis range: 33½–90½"

Minor axis range: 24½–81½"

Maximum difference between ellipse axes: 9"

With this jig, you use one or both steel rods—they screw together for longer reach—as the trammel arm that attaches to the router base. The rods then slide through the sliders. It sets up easily and works well in all tasks. Screw the pivot plate to the workpiece, or use a vacuum pump (not included) to hold it in place without drilling any holes.

Infinity Cutting Tools

877-872-2487, infinitytools.com



Fulton no. 1262, \$60

Overall grade: D

Circle diameter range: 11½–52"

Major axis range: 17½–52"

Minor axis range: 9½–44"

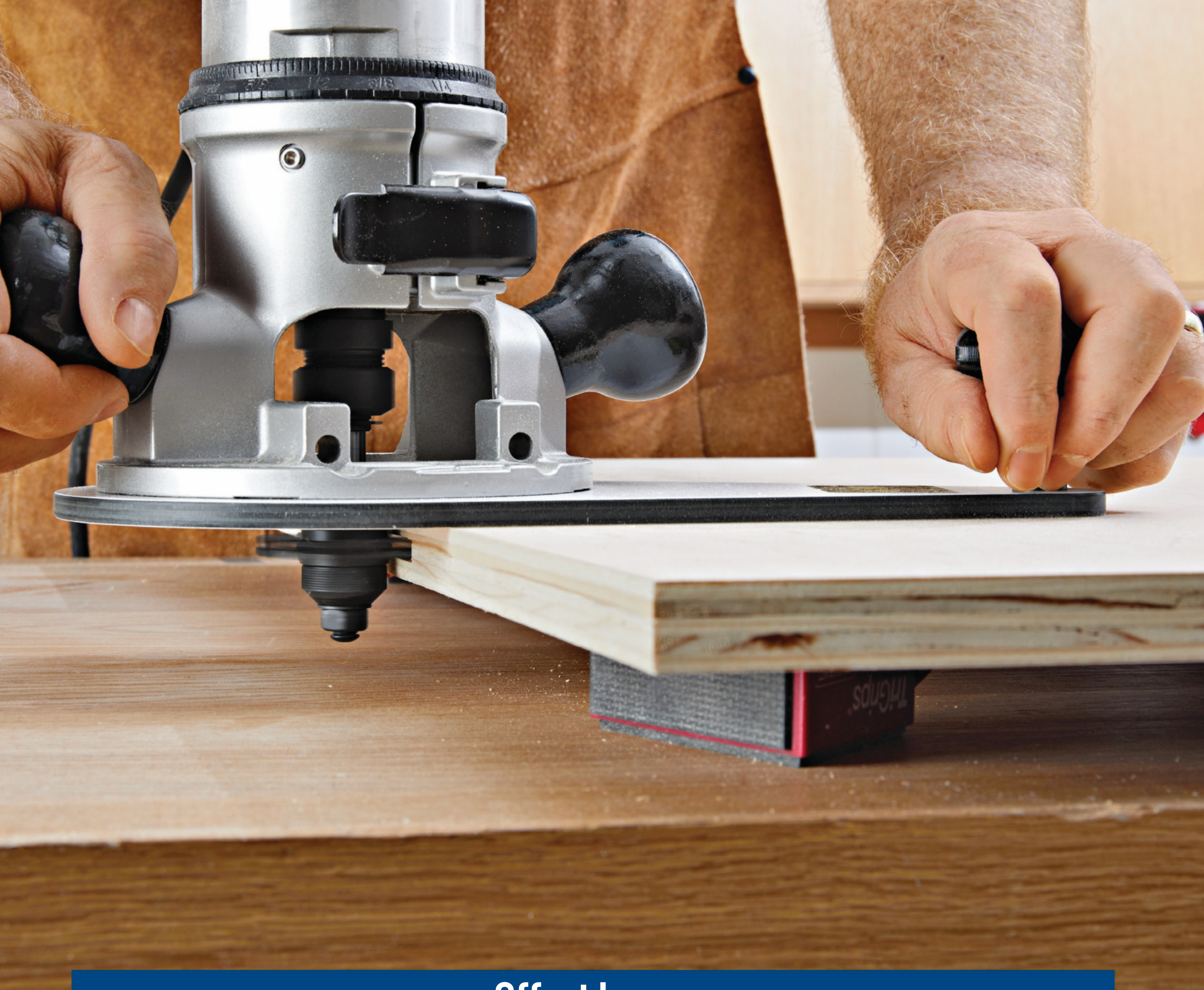
Maximum difference between ellipse axes: 8"

This high-density fiberboard (HDF) jig appears identical to the Rockler 27712. It works great for circles, but when routing ellipses, the aluminum sliders routinely caught in the fibery slots, resulting in uneven and marred cuts.

Peachtree Woodworking Supply

888-512-9069, ptreeusa.com





Offset bases

These accessories provide a larger footprint for your router, preventing tipping, especially when routing along an edge. And some of these bases supply other useful features, too. Each base has a knob or handle for gripping; we found no advantage to any size or shape.



Four tested bases include an edge guide. With this, you can rout along an edge with bits that lack a bearing guide, such as the straight bit routing this rabbet.

Rockler no. 31186, \$50

Overall grade: A

Made from $\frac{3}{8}$ "-thick acrylic, this sturdy base provides the largest bit opening ($3\frac{3}{16}$ "), with a reducer ring that accepts two-piece guide bushings. The edge guide works well on flat and curved edges. Built-in threaded inserts make it easy to add an optional dust-collection hood (no. 22877, \$15).

Rockler Woodworking and Hardware
800-279-4441, rockler.com



Infinity Cutting Tools no. 115-036, \$50

Overall grade: A-

Made of clear acrylic with a guide-bushing-ready bit opening, this base provides the most predrilled router-mounting holes. We like its reversible edge guide with a concave-lobed edge that maintains two points of contact with the workpiece for following curved edges better.

Infinity Cutting Tools
877-872-2487, infinitytools.com



Woodhaven midsize, no. 8395, \$34

Woodhaven compact, five models, \$28

Overall grade: A-

These no-frills bases work perfectly for adding bearing surface to almost any midsize or smaller router. Made of $\frac{5}{16}$ " phenolic, the 8395 comes predrilled for many midsize routers. For the compact-router bases, order the model specific to your router.

Woodhaven
800-344-6657, woodhaven.com

Fulton no. 3011, \$20

Overall grade: B

This basic clear-acrylic base comes drilled to fit most common routers. Its $1\frac{3}{16}$ " stepped bit opening accepts common two-piece guide bushings, but also limits the bit diameter.

Peachtree Woodworking Supply
888-512-9069, ptreeusa.com



MLCS On-Point no. 9098, \$60

Overall grade: B

LED task lights illuminate the cutting area well until they get covered in dust. Crosshair lasers show precisely the center of the bit for spot tasks, such as round-bottom holes for a marble game. But the slippery $\frac{9}{16}$ "-thick base (which reduces cutting depth) made it easy for the jig to stray from the intended bit placement. (We applied self-adhesive sandpaper to prevent this.) The included edge guide works well on flat and round edges.

MLCS Woodworking
800-533-9298, mlcswoodworking.com



Milescraft no. 1224/1274, \$33

Overall grade: B-

Most routers fit this jig easily, and the TwistLock mounting plate locks into the offset base. Its edge guide works well on flat and curved workpiece edges, but the base flexes more than the others, so it can make small gouges in your cut. Two roller guides install on the plate to make it a self-centering mortising guide.

Milescraft
224-236-2532, milescraft.com





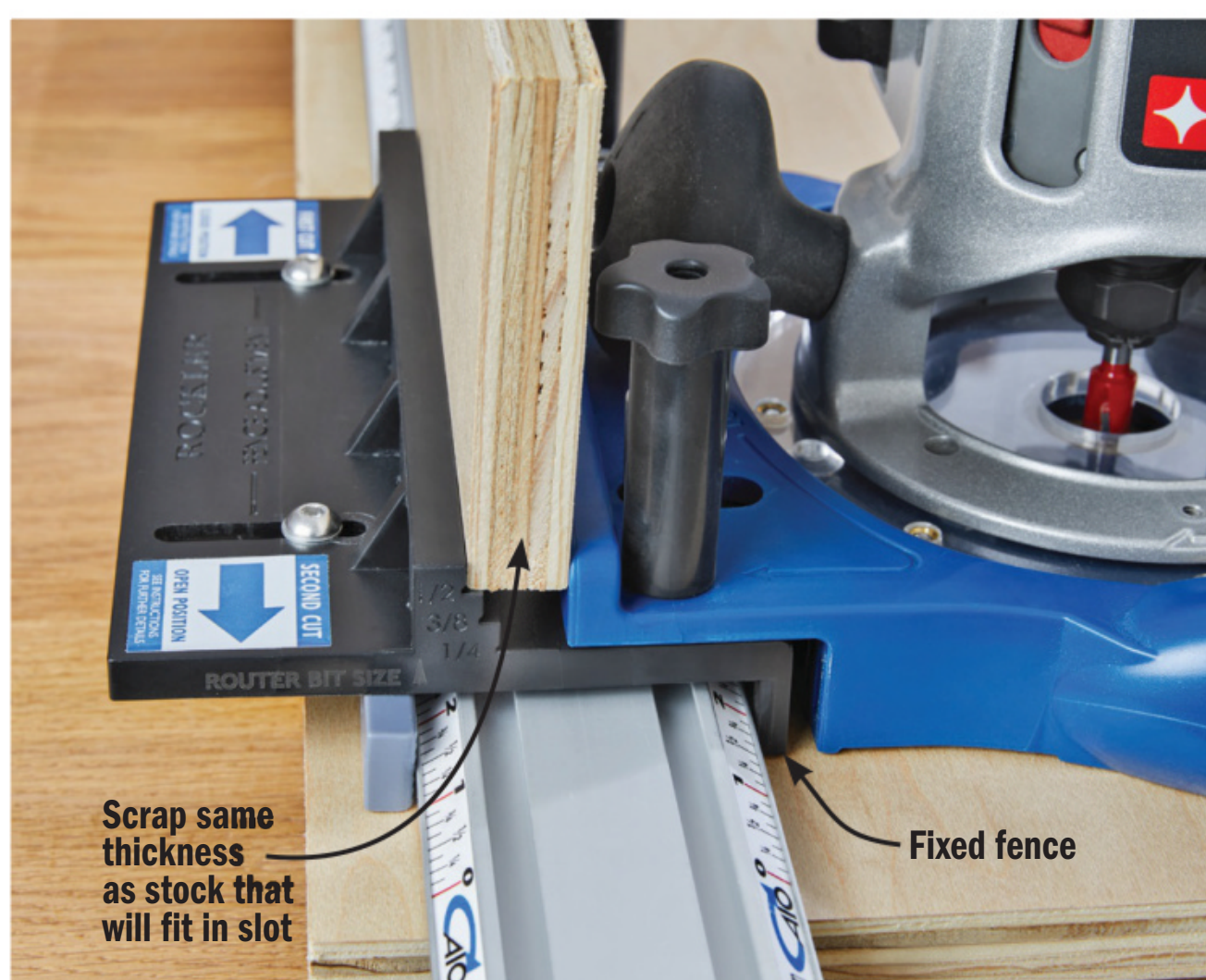
Dado jigs

Note: Most clamp-on straightedges do not self-square to the workpiece. You must manually square them for each task.

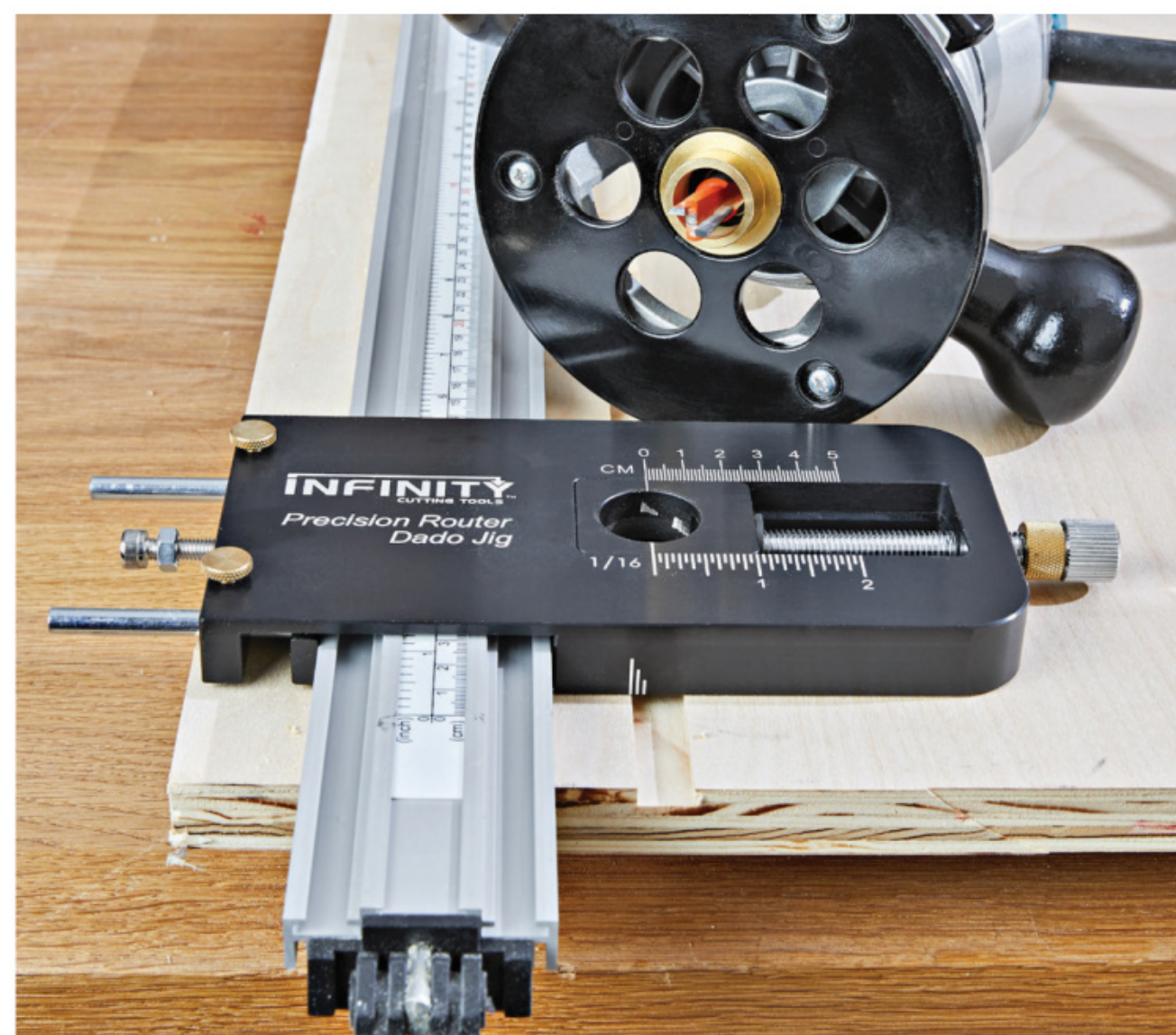
To keep your dados, grooves, and rabbets on the straight and narrow, each jig fits over a clamp-on straightedge (sold separately so you can choose the length), such as the one shown above.

If you use a bit that makes a perfect-width channel in one pass, you need only align the jig precisely on your layout marks. But more

often than not, you'll need two or more passes to create the perfect channel. With the best jigs, you set the width using the workpiece itself (or a scrap of the same thickness) for a can't-miss setup, *below left*. The other jigs require trial-and-error passes to achieve the perfect fit.



Rockler's jig uses the workpiece to set the spacing for two-pass dados prior to routing, locking in the spacing with two stops (not seen). Rout the first pass with the jig (blue body) against the fixed (black) fence. For the second pass, slide the router base away from the black fence until it reaches the stops you set.



Several jigs rely on a guide bushing to position the router in the jig. This makes aligning the jig less cumbersome without the router attached to the jig.

Rockler Perfect-Fit jig, no. 59385, \$50

Overall grade: A

Your router mounts to a predrilled clear-acrylic plate, which then screws to the jig (*previous page, top*). Rockler does not sell a straightedge clamp specifically for this jig, but it adjusts to fit most models on the market. This jig uses the workpiece to set the precise two-pass setup, but it lacks an indicator to align the first cut (you use the bit to set it). Built-in dust collection works very well. And at \$50 it's also a great value.

Rockler Woodworking and Hardware

800-279-4441, rockler.com



Bora router guide, no. 542005, \$50

NGX straightedge clamps: 24" \$50; 36" \$58; 50" \$59; 100" \$104

Overall grade: B

Like Rockler's Perfect-Fit jig, a workpiece scrap sets the jig spacing for precise two-pass dados, although the process is not as intuitive. The straightedge clamp jaws measure slightly thicker than $\frac{3}{4}$ ", so for $\frac{3}{4}$ " or thinner stock, you must hang both clamp jaws off the workbench or shim below the workpiece for it to rest flat on the bench.

Bora Portamate

248-588-0395, boratool.com



Infinity Cutting Tools no. PDJ-100, \$130

Pro-Grip straightedge clamps: 24" \$40; 36" \$45; 50" \$50

Overall grade: B

Nearly identical to the CMT model, the PDJ-100 uses a $\frac{3}{4}$ " guide bushing (included) for the router interface. The straightedge clamps appear identical to the CMT clamps.

Infinity Cutting Tools

877-872-2487, infinitytools.com



Triton Router Track Adapter, no. TRT A001, \$60

59" track \$90; track clamps \$50

Overall grade: C+

To mount any router other than a Triton model, you'll need to drill holes in the steel plate. The plate rides on Triton's aluminum track saw track, which requires two clamps (sold separately). The jig works on either side of the track, with one side allowing more lateral adjustment than the other. Its indexing mark unintuitively shows the center of the dado, but we found it easier to align with one edge, then sneak up on the second cut. 🌲

Triton

855-227-3478, tritontools.com

A dado jig with a different twist

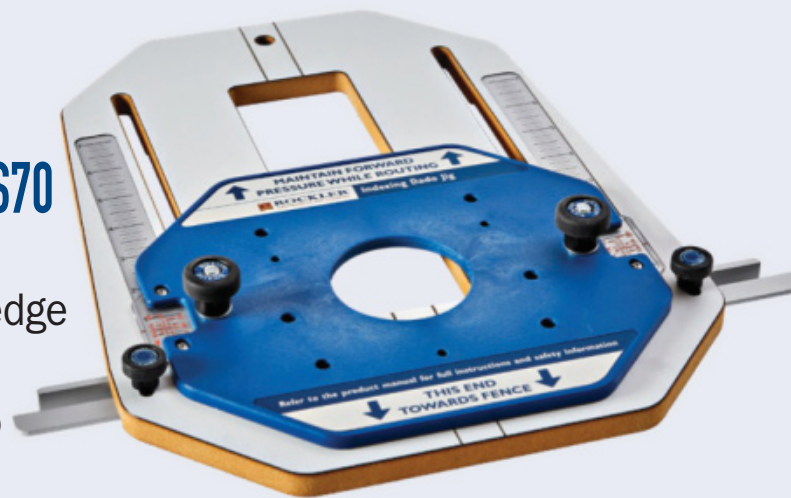
Rockler Indexing jig, no. 59237, \$70

Overall grade: A-

Rather than riding on a straightedge clamp, this jig rides its built-in fence along a workpiece edge to make a dado up to $6\frac{1}{16}$ " from that edge. You can then drop that fence into the dado, adjust it to fit the channel perfectly, and rout another dado spaced from $\frac{1}{8}$ " to $6\frac{1}{16}$ " from the first (depending on the bit diameter). The router mounts via predrilled holes in the jig plate.

Rockler Woodworking and Hardware

800-279-4441, rockler.com



CMT no. PGD-1, \$135

PGC straightedge clamps: 24" \$53; 36" \$65

Overall grade: B

CMT's anodized-aluminum jig snugs up nicely on the track and glides along it on two bearings. The router connects to the jig via a $\frac{7}{8}$ " guide bushing (included). Indexing marks on the jig's edge help precisely align it to layout marks, based on the bit diameter. For the second pass (if needed), you microadjust the jig laterally. This requires sneaking up on a perfect fit, but once done, you won't change the stop unless your stock thickness changes.

CMT

336-854-0201, cmtorangetools.com



Woodpeckers Xact-Width, no. EWDJ, \$370

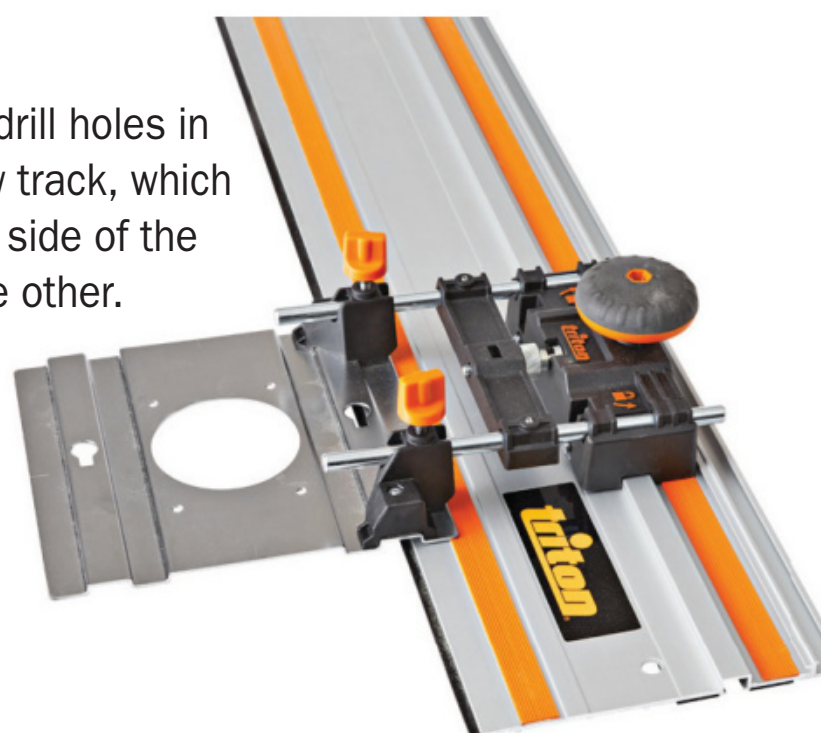
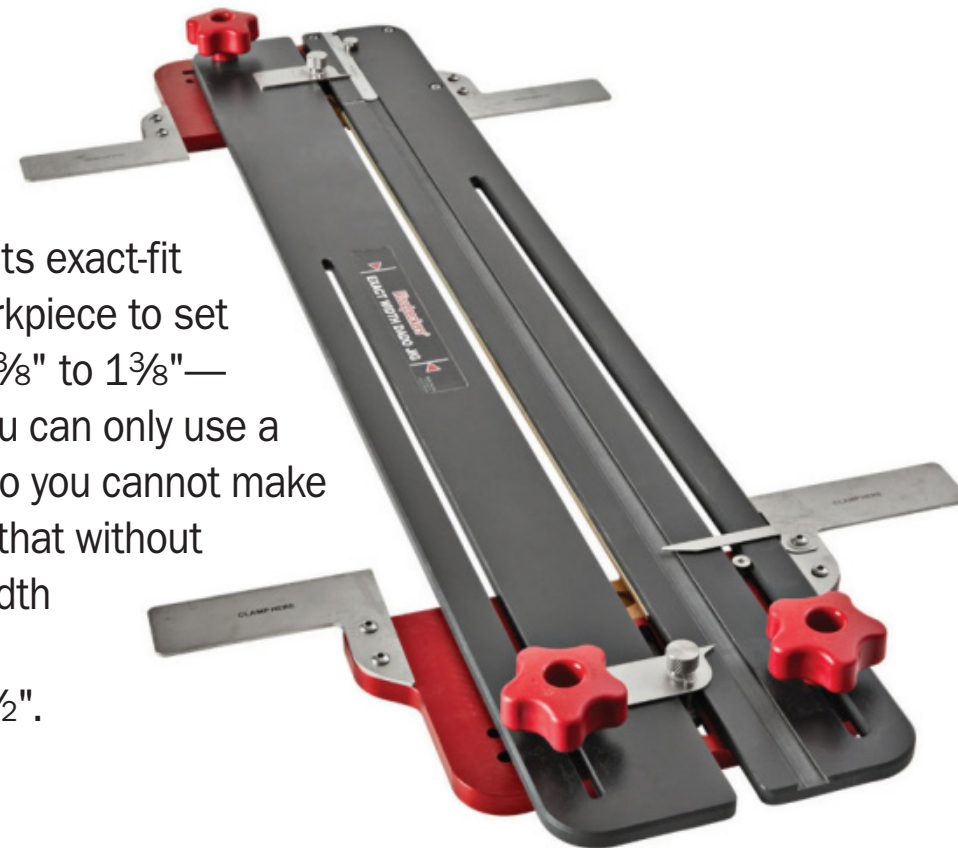
Overall grade: B

Made of aluminum and phenolic, this sturdy jig aligns easily with a layout line, and its exact-fit feature—using the workpiece to set the joint spacing from $\frac{3}{8}$ " to $1\frac{3}{8}$ "—works perfectly. But you can only use a $\frac{3}{8}$ " bit for most jobs, so you cannot make dados narrower than that without bypassing the exact-width feature. The widest workpiece it fits is $24\frac{1}{2}$ ".

Woodpeckers

800-752-0725

woodpeck.com





Caul

Kerfed plywood

Demiclune table
subassembly



(Not So) Dangerous Curves Ahead

If attempts at bending wood leave you steamed, try one of these simple methods.

As woodworkers, we spend a great deal of time making sure our projects end up straight, flat, and square. But not all woodworking is rectilinear. Bends and curves help break up straight lines, adding variety to design. Incorporating these elements into your projects definitely ups your woodworking game.

Traditional steam-bending involves special equipment and handling piping-hot workpieces in a hurried approach, often with unpredictable results. Thankfully, the following techniques and materials make it possible to create bent-wood projects while skipping the steam. Take a look at these approaches to throwing wood a curve and see if you can apply one of them to a future woodworking project.

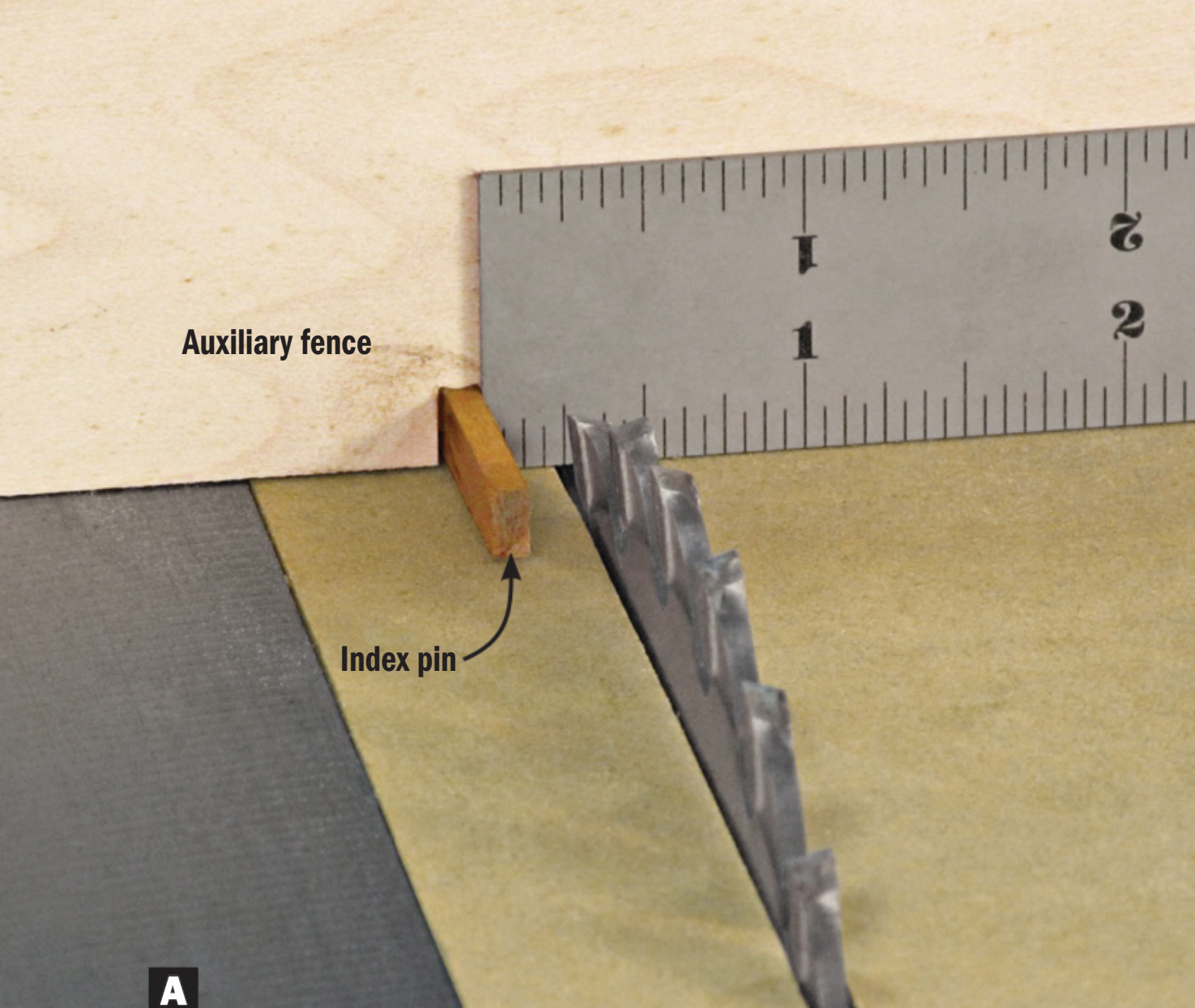
Kerf your enthusiasm

Kerf bending involves cutting a series of evenly-spaced, cross-grain kerfs on the back of a piece of wood or plywood. The kerfs stop just short of passing all the way through the thickness of the workpiece, allowing you to bend the piece. Unlike some other bending techniques, kerf-bent pieces won't retain their shape on their own and must be attached to a sub-structure, such as the apron being added to a demilune table, as shown at *left*.

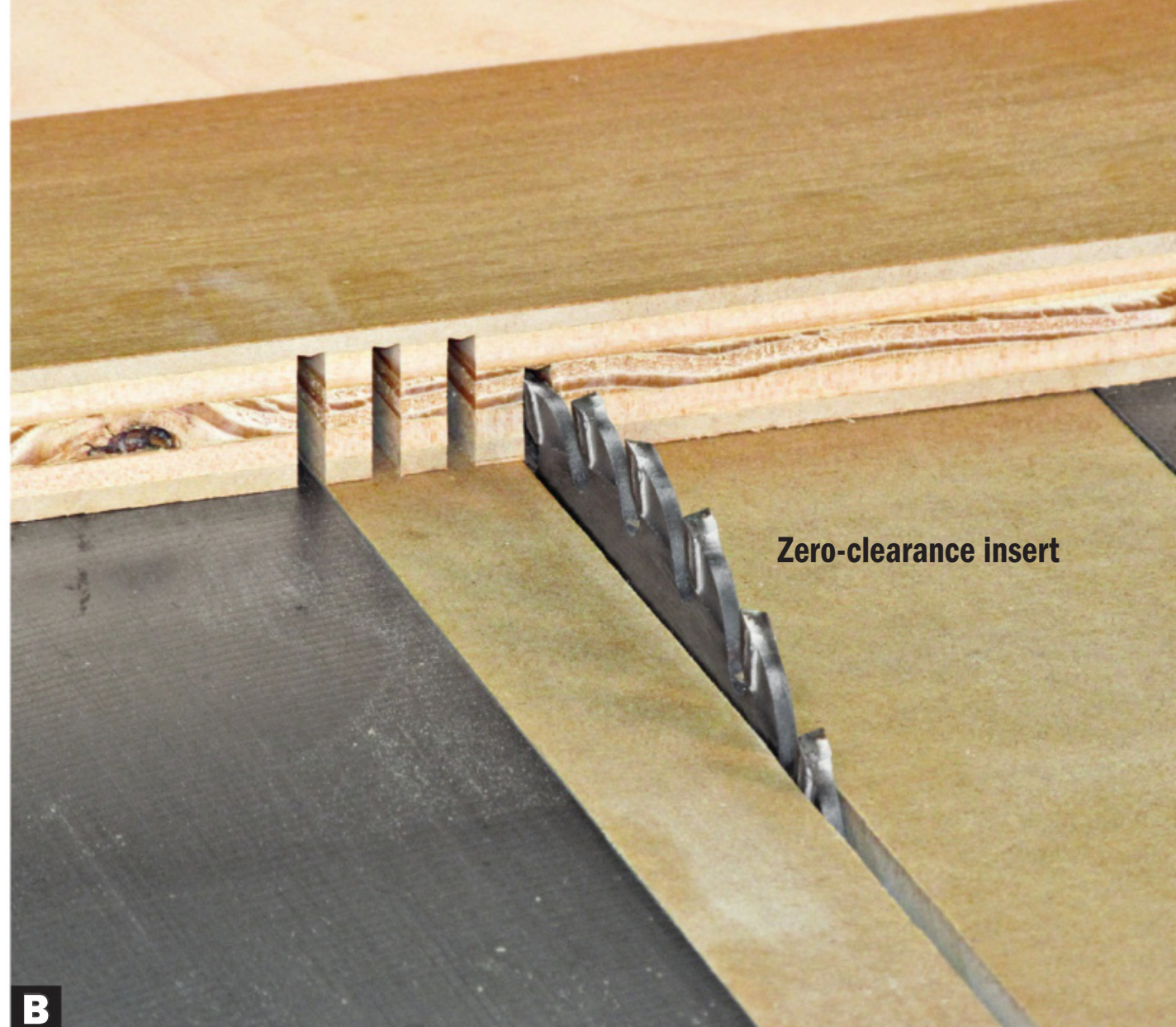
Kerf bending works best with narrow pieces that you can comfortably crosscut on the tablesaw. The kerf spacing and depth determines how tightly you can bend the workpiece. The closer the kerfs, the tighter the radius you can achieve. To determine the appropriate spacing and depth, make a series of cuts in a test piece first.

Tip! To save time, purchase pre-kerfed MDF, available in 2x4' sheets (rockler.com).

► Use an online calculator for determining kerf spacing. woodmagazine.com/kerfcalculator



A Cut a kerf in an auxiliary miter gauge fence and cut an index pin to fit. Glue the pin into the kerf and position it from the blade the desired kerf spacing.



B After cutting each kerf, fit that kerf over the index pin to cut the next one. Continue this step-and-repeat process until you reach the kerf where you want the bend to end.

Cut the first kerf on the tablesaw, right where you want the bend to start. Then cut subsequent kerfs using an auxiliary miter-gauge fence with an indexing pin [Photos A, B]. After cutting the kerfs, try bending the piece into the desired shape. If the test piece breaks, raise your blade to cut the kerfs a little deeper. If you can't bend the piece into

a tight enough radius, or if you notice facets (flat spots) between the kerfs, space the kerfs closer.

After determining the proper depth and spacing, kerf your workpiece and bend it around your project's substructure to check the fit. Use clamps and cauls to hold the piece in position while you glue or fasten it in place.

► Watch a video on kerfing plywood. woodmagazine.com/kerfbend

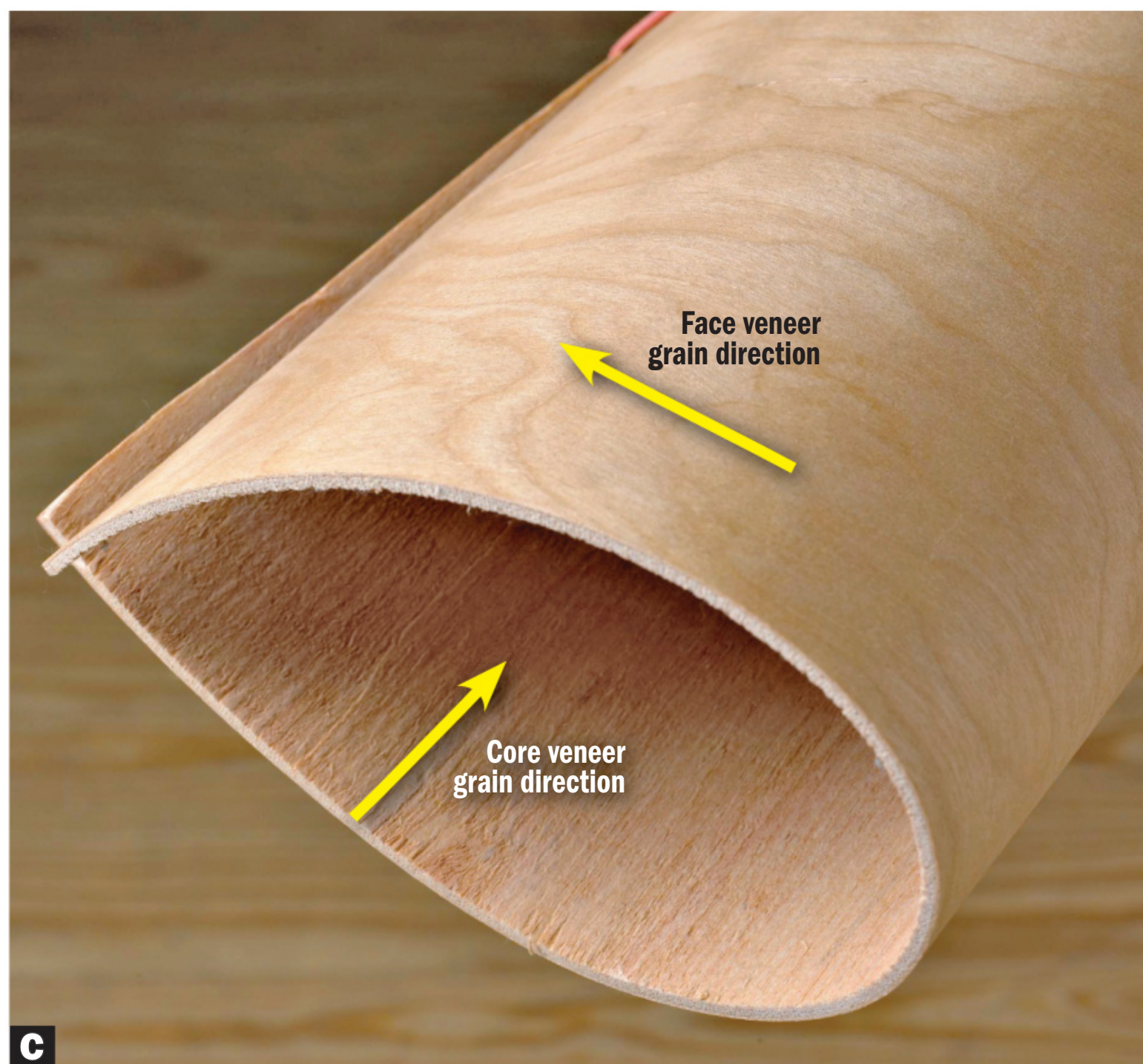
Play with pliable plywood

Tip! Manufacturers offer bending plywood in both 4×8' and 8×4' sheets depending on the bending direction. A 4×8' sheet bends into a tall, narrow column-like cylinder. An 8×4' sheet bends into a wide, short, barrel-like cylinder.

At first glance, bendable plywood looks like regular plywood. But instead of multiple plies glued up in alternating grain directions, bendable plywood consists of one or two core plies with the grain running in the same direction, with perpendicular face veneer [Photo C]. Bendable plywood comes in multiple thicknesses, with ¼" and ⅜" being the most common. Some home centers carry it or you can order it online.

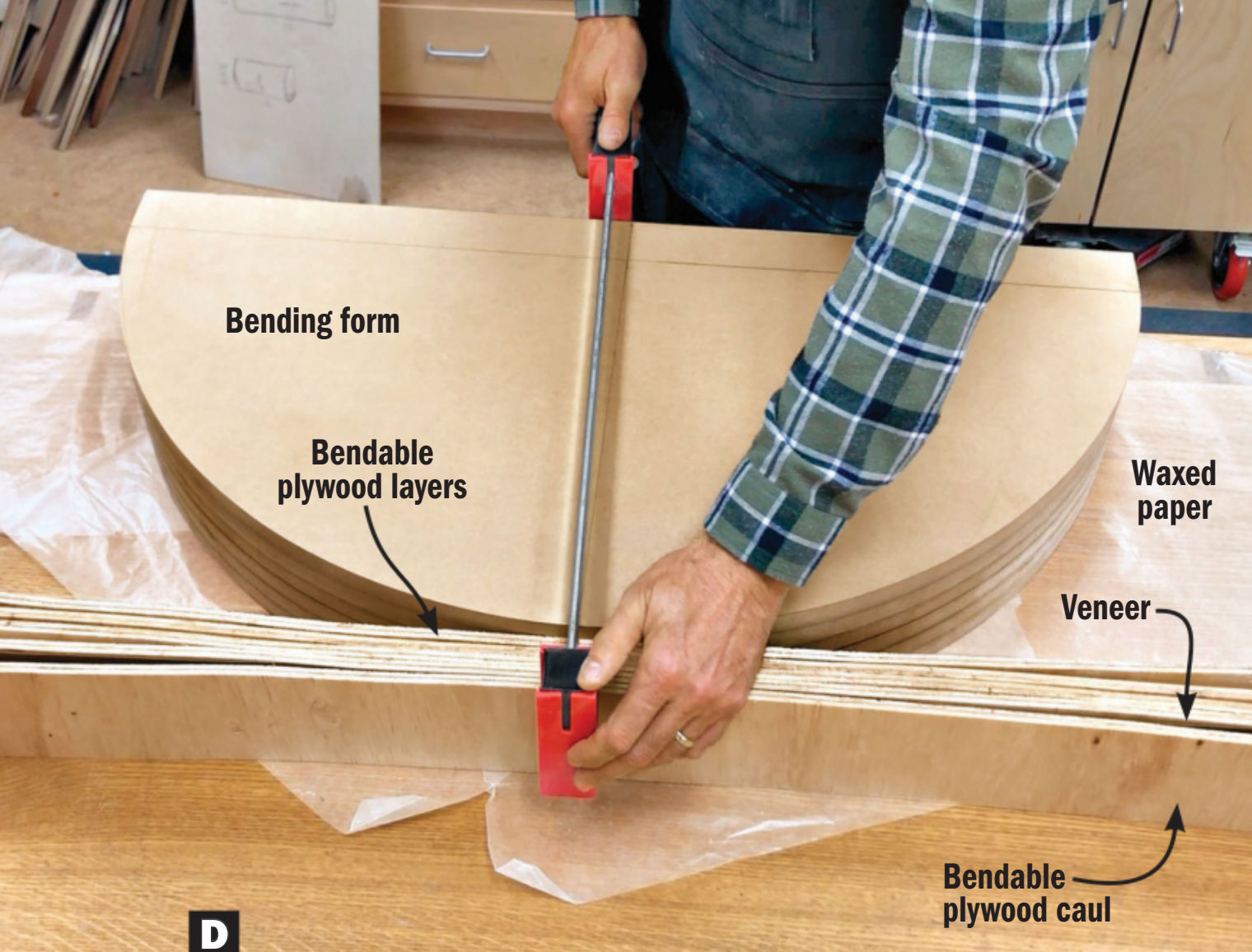
Use a single layer of plywood to wrap a smooth skin around a frame or substrate, such as when making a decorative column or the curved front of a bar or kitchen island. For structural parts, like the curved apron of a table, glue multiple layers around a plywood or MDF form, adding a veneer of your choosing on the outside layer. Once the glue dries, the plywood layers maintain the shape of the form with little or no springback.

To create an assembly from multiple layers, cut the plywood layers several inches longer (or wider) than needed to account for the bend and allow for trimming afterward. Cut an extra layer of bendable plywood to use as a caul during clamping. Mark the



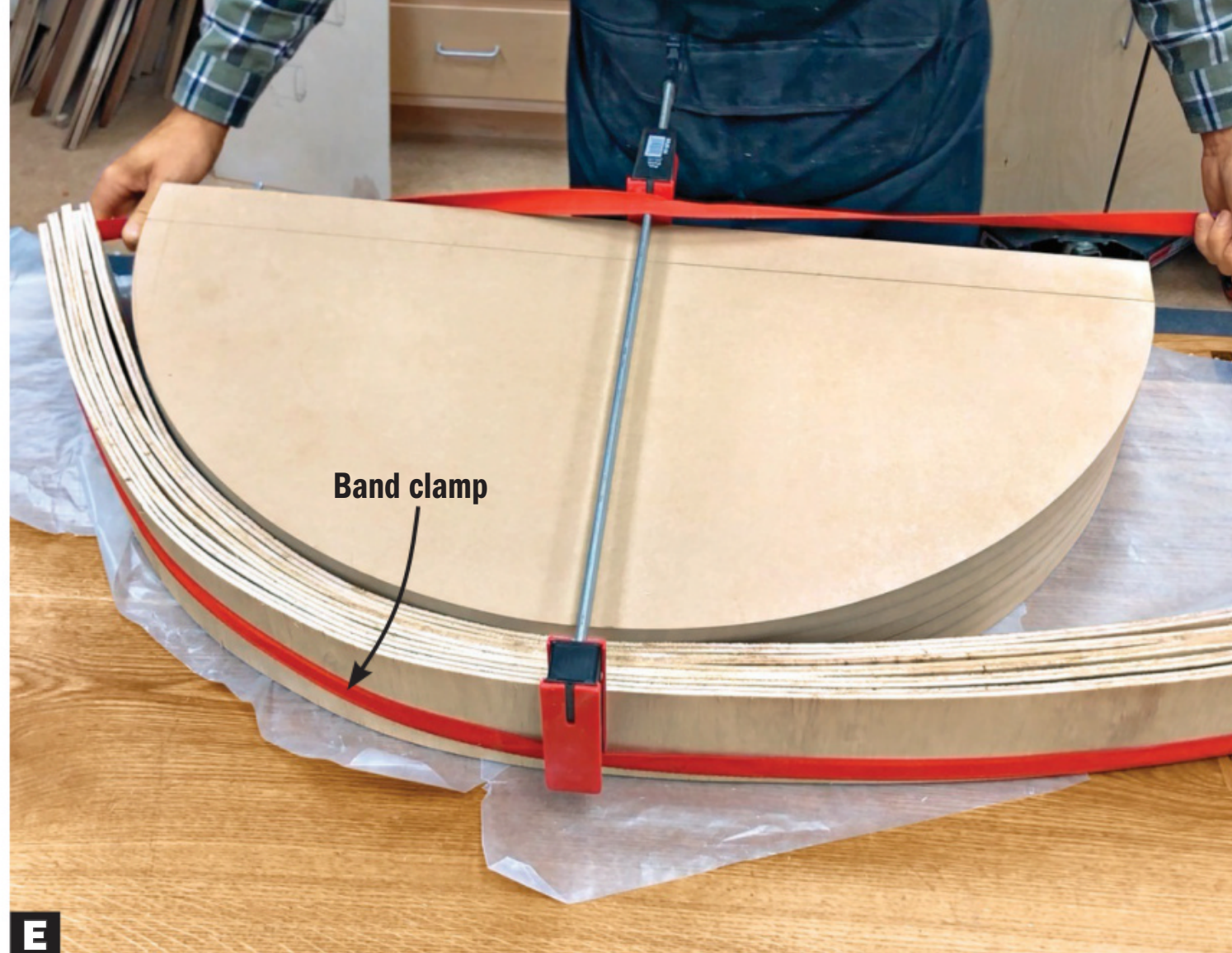
C The face veneer of bendable plywood runs perpendicular to the grain of the core veneers. This results in a flexible plywood that bends easily by hand.

► See bending plywood used to make a demilune table. woodmagazine.com/bendingply



D

Clamp the glued-up layers at the center of the form, using an extra layer of plywood on the outside as a clamping caul. Waxed paper underneath the assembly catches any glue squeeze-out.



E

Slip a band clamp over the assembly and tighten the clamp to pull the plywood tight against the form.



F

Add a second band clamp, removing the bar clamp temporarily if necessary. Check to make sure the plywood is pulled tight against the form without any gaps.

centerline of all the layers on their edges and make a corresponding mark on your form to help align the parts during the glueup.

Use a slow-setting glue (such as Titebond III or Titebond Extend) to give yourself more working time. Spread an even coat of glue on each layer with a foam roller, stacking each layer on the previous one as you go, lining up the center marks. Glue the veneer on last.

Clamp the layers to the form at the center to hold them in place [Photo D]. Depending on the size and shape of your form, use band clamps, bar clamps, or a combination of

both to pull the layers tight against the form, working from the center out [Photos E, F].

With the clamps in place, check that the layers didn't shift out of alignment. If necessary, use a mallet and a block of wood to force the layers flush. After the glue dries, remove the assembly from the form and scrape off any squeeze-out. Trim the workpiece to final width and length.

Bendable plywood lends itself to working with a vacuum press as well. Follow the same procedure as above, but instead of clamps, place the glued up layers and form in a vacuum bag.

► Learn about using a vacuum press.
woodmagazine.com/vacuumpress



G A planing sled prevents damaging the thin pieces as they pass through the planer. Secure the strips with short lengths of double-faced tape.



► To see this process in action, point your smartphone's camera at this code (no app needed), or visit woodmagazine.com/bentlam

Rip 'em and wrap 'em

It's no secret that a thin piece of wood bends easier than a thick one. Bent lamination builds on this principle by laminating several thin layers of wood around a form. Once the glue dries, the combined strips hold the shape of the form, while maintaining the structural strength of solid wood.

Start by making a bending form out of solid wood or by gluing up layers of MDF, particleboard, or plywood. Unlike bendable plywood, laminations made from solid wood have a tendency to spring back slightly after glue-up. To counteract this, you may want to tighten the curves of your form slightly. Sand the edges of the form smooth and cover them with packing tape to prevent glue from sticking to the form. Add holes or openings to the form as needed for clamps, as with the form for the kerf-bent table apron shown in the *opening photo*.

When it comes to the laminations, choose a wood species that bends easily, such as oak, ash, walnut, or mahogany. Look for straight grain that runs parallel to the faces of the board to minimize the chances of the strips breaking as you bend them. Cut strips from an extra-long and extra-wide blank, as you'll trim the assembled lamination to size after glue-up.

Bandsaw the laminations from the blank, using a rip fence to keep them a consistent thickness. (Cut extra in case some break.) Determining the correct thickness for the laminations depends on how tight the bend is and how many laminations you're bending at once. Thicker laminations require more clamping pressure and will have



H Bent laminations require plenty of clamps. Space clamps approximately 6" apart for maximum pressure and to eliminate gaps.

greater springback. In general, laminations between $\frac{1}{16}$ " and $\frac{1}{8}$ " thick work best, but after cutting your first strip, try bending it around your form. If it breaks, cut a thinner strip and repeat the test. After bandsawing all the strips, smooth the sawn faces with a drum sander or thickness planer [Photo G].

Before breaking out the glue bottle, make a dry run by stacking up the laminations, bending them around the form, and clamping them in place. Pre-bending the strips helps you anticipate any problems, as well as makes the strips a bit more pliable for the real thing.

For the glue-up, choose a slow-setting glue or epoxy to give yourself plenty of working time. Apply the adhesive to the laminations, stack them up, and place them on the form. Clamp the stack at the center of the form, then add additional clamps working toward the ends [Photo H]. Make sure the clamps press the laminations together tightly all along their length without any gaps. If the laminations begin to slip out of position, use a clamp or a mallet and a block of wood to realign them.

If you're unable to bend all the laminations around the form at one time, or for large glue-ups with lots of laminations, work in stages. Glue up just a few strips at a time, allow the glue to dry, and then add additional strips.

Leave the laminations in the form until the glue is completely dry (typically overnight). Then remove the assembly from the form and scrape off excess glue. Plane or sand the edges if necessary and trim the ends to length.

Tip! Moisten the laminations with water just before glue-up to provide extra open time during assembly.



I Using nothing more than hand pressure, twist and flex Cold-Bend hardwood into tight curves—even knots.



J Bend the wood around a form by hand, using clamps to hold it in position while drying. We let this coil dry around a 3"-diameter dowel for 12 hours.

► See how easily this product bends.
woodmagazine.com/coldbend

Bend it out of the box

Until recently, about the only way to bend thick, solid wood was to steam it until it became pliable. But a relatively new product known as Cold-Bend hardwood can be bent by hand at room temperature [Photos I-K].

Cold-Bend hardwood is made and sold by Pure Timber LLC (puretimber.com). The process starts by carefully selecting straight-grained timbers and steaming them in an autoclave. Then, the wood is compressed lengthwise to about 75 to 85 percent of its original length, while maintaining the original width and thickness. This process compresses the wood cells in an accordion-like fashion, similar to a flexible drinking straw.

After removing the wood from the press and allowing it to cool, it's wrapped and shipped in wet form. Bandsaw a piece from the block and simply bend it into the desired shape, either around a form or freehand. Once dry, it retains its shape. Store the remaining wood wrapped in plastic and it retains its elasticity for several years, according to Pure Timber.

Purchase Cold-Bend hardwood in five common domestic species: red oak, white oak, ash, maple, and cherry. (Other species are occasionally available as well.) Although somewhat expensive (prices start at about \$40 per board foot and go up depending on



K Removed from the form, the wood retains its shape and 90 to 95 percent of its original strength.

the species and plank size) it allows you to bend wood in ways that you can't easily do with any other method. 🌲

Produced by Vincent Ancona



Vertical Garden

Brighten up your balcony or deck with this space-saving plant tower.

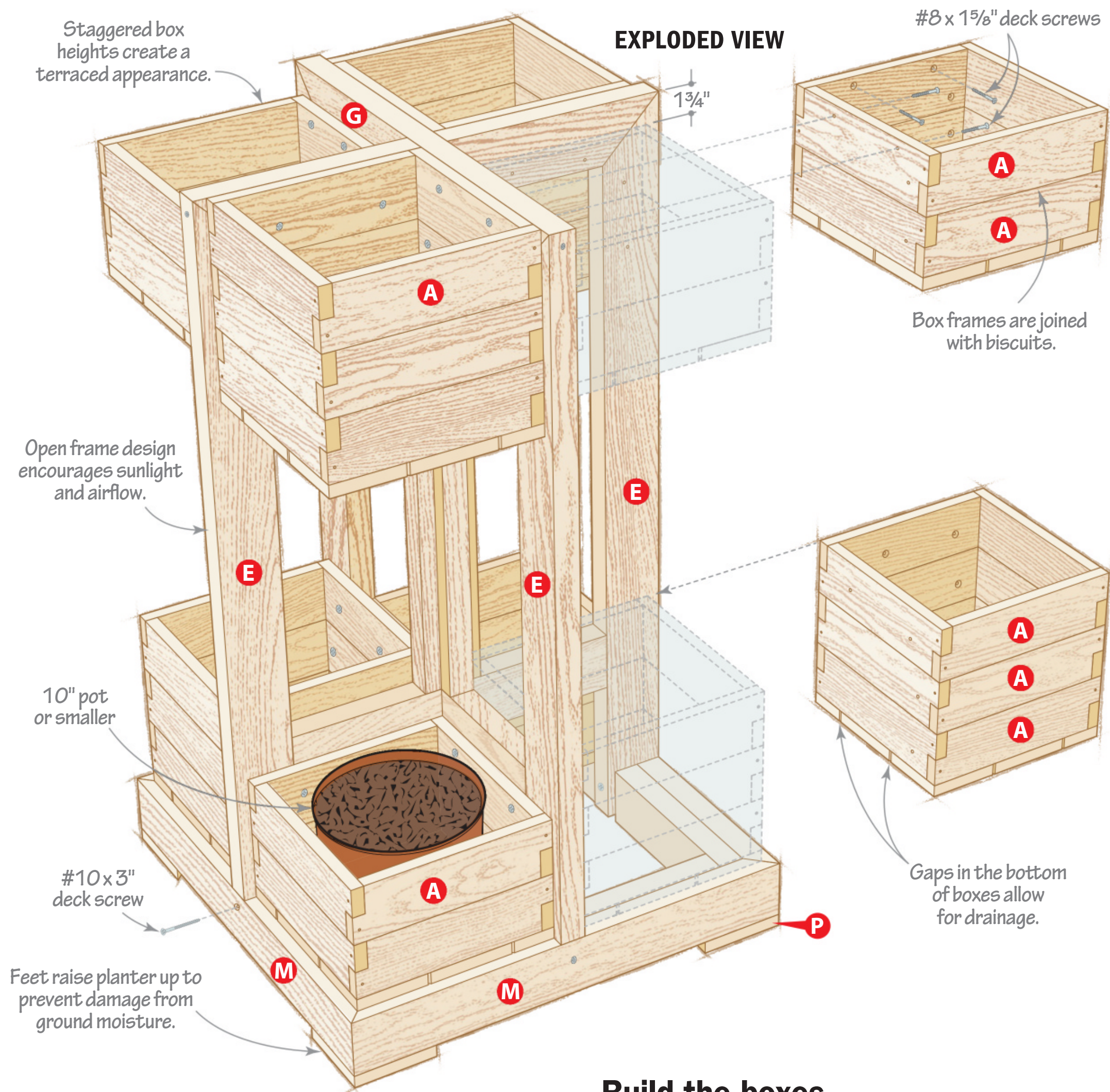
D I M E N S I O N S :
27" W x 27" D x 46 1/4" H

Approximate materials cost:

\$290

Lumber and screws

5.5
sq. ft. of growing area



Use this planter for ornamental plants or to stage your own herb garden. The boxes are sized to hold ceramic pots or plastic containers, making watering and plant maintenance a breeze.

Build the boxes

1 Cut to size the box sides (A) [Materials List]. (We used Western red cedar, but cypress or pressure-treated lumber will also work.) Using a bandsaw or jigsaw, notch both ends of the box sides [Drawing 1, Photos A, B].

Note: If your cedar is rough-sawn on one face (like ours), orient the pieces with the smooth face out.



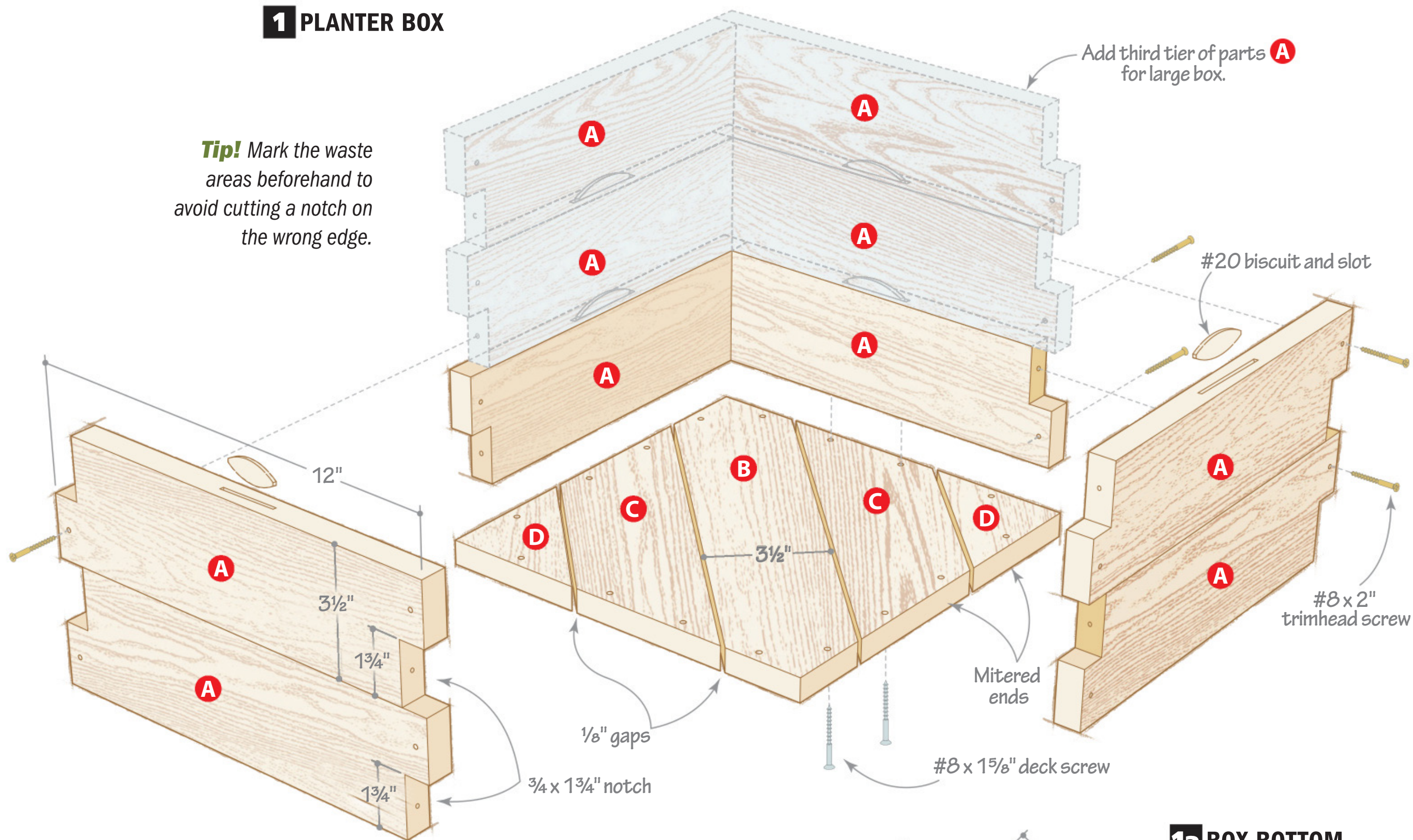
A Use a bandsaw fence and stopblock to make a crosscut at each end of the sides (A), stopping at the centerline of the part.



B Reposition the fence and stopblock to complete the notches. The waste piece falls safely to the side.

1 PLANTER BOX

Tip! Mark the waste areas beforehand to avoid cutting a notch on the wrong edge.



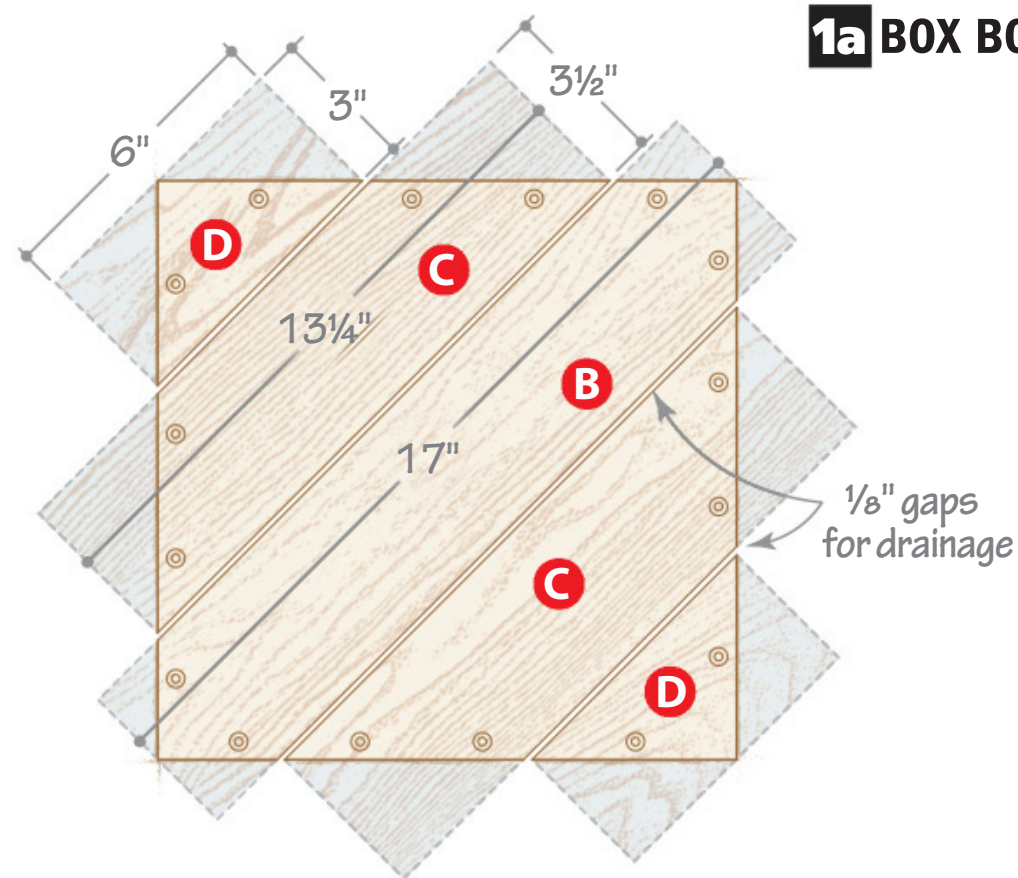
Tip! After gluing and screwing all four corners, clamp diagonally across the frame assembly to hold it square as the glue dries.

2 Drill a centered pilot hole in each tab [Photo C]. Using an exterior glue (see **Choose the right glue, below**) glue and screw the box sides together into frames [Photo D].

3 Miter-cut to size the long (B), medium (C), and short bottoms (D) [Materials List, Drawing 1a]. Glue and screw the bottoms to the frames [Photo E].

4 Sort and stack the frames into three groups: top frames, middle frames, and

1a BOX BOTTOM



Choose the right glue for your outdoor project

Rain, snow, and ice take a toll on outdoor projects. To ensure that your project stands the test of time, start with the right glue.

For most outdoor woodworking projects, use an exterior-grade PVA glue, such as Titebond II or Titebond III. Titebond II is water-resistant, while Titebond III is actually waterproof (although it's not recommended for underwater use). The negligible difference in cost makes Titebond III the best choice in most cases. (We used Titebond III for the planter.)

Polyurethane glues (such as Gorilla Glue) work well for joining wood to other materials, such as plastic or metal. Polyurethane glue squeeze-out expands and foams as it cures, requiring a fair amount of cleanup after it dries. It costs more than exterior-grade PVA glues and has a shorter shelf life.

For applications that involve extended periods of exposure to water, use a two-part epoxy (see page 64). Marine-grade versions are even safe to use below the waterline. As the name implies, epoxy consists of two parts, a resin and a hardener, that you mix just before use. Like polyurethane glue, epoxy will join dissimilar materials. It's relatively expensive, so use it only where the application warrants.

For sheds, playhouses, or other outdoor structures, use a construction adhesive. Squeeze this thick, non-running adhesive out of tubes, similar to caulk. When used in conjunction with screws or other fasteners, it creates a strong, weatherproof bond, making it ideal for installing subflooring, rigid foam insulation, or general construction.



C Use a fence and stopblock to position each box side when drilling the 1/8"-dia. pilot holes.



D Clamp the box sides in a vise while driving the screws.



E To prevent splitting the ends, drill countersunk screw holes in the box bottoms before driving the screws.

Tip! If you don't own a biscuit joiner, use dowels to reinforce the glue joints and align the frames during assembly.

bottom frames. Mark a centerline on each outside face, and cut biscuit slots in the bottom of the top frames, the top of the bottom frames (A–D), and both the top and bottom of the middle frames [Photo F].



F Cut centered #20 biscuit slots on all the mating edges of the box frames.

5 Glue up the frames into box assemblies [Drawing 1], using biscuits to keep the frames aligned. With the glue dry, sand the outside faces of each box to 150-grit and ease the corners with a sanding block.

► Learn about biscuit joiners. woodmagazine.com/biscuitjoiners



G

Center the center stile (J) on the upper and lower rails (G, I) while gluing and clamping it in place.



H

Clamp a frame leg (E) to each side of the assembly, pulling the miter joints together tightly.

Add a frame and base

1 Cut to size the frame parts (E–K) [Materials List, Drawing 2]. Miter-cut one end of the frame legs (E) and upper half-rails (F) and both ends of the upper rail (G). Cut a pair of biscuit slots in each mitered end.

2 Notch the bottom end of the frame legs (E) [Drawing 2]. Drill pocket-screw holes in the half-rails (F, H), lower rail (I), center stile (J), support leg (K), and fillers (L).

3 Glue and clamp the center stile (J) between the upper and lower rails (G, I) [Photo G]. Biscuit and glue two of the frame legs (E) to the assembly [Photo H]. With the glue dry, remove the clamps and drive pocket screws into the holes. Add the support leg (K).

4 Glue and screw the fillers (L) to the half-rails (F, H) [Photo I]. Biscuit and glue a frame leg (E) to each assembly [Photo J].

5 Center the half-frame assemblies on the main frame assembly and glue and clamp them together [Drawing 2]. Drive pocket screws through the ends of the half-rails (F, H) into the upper and lower rails (G, I).

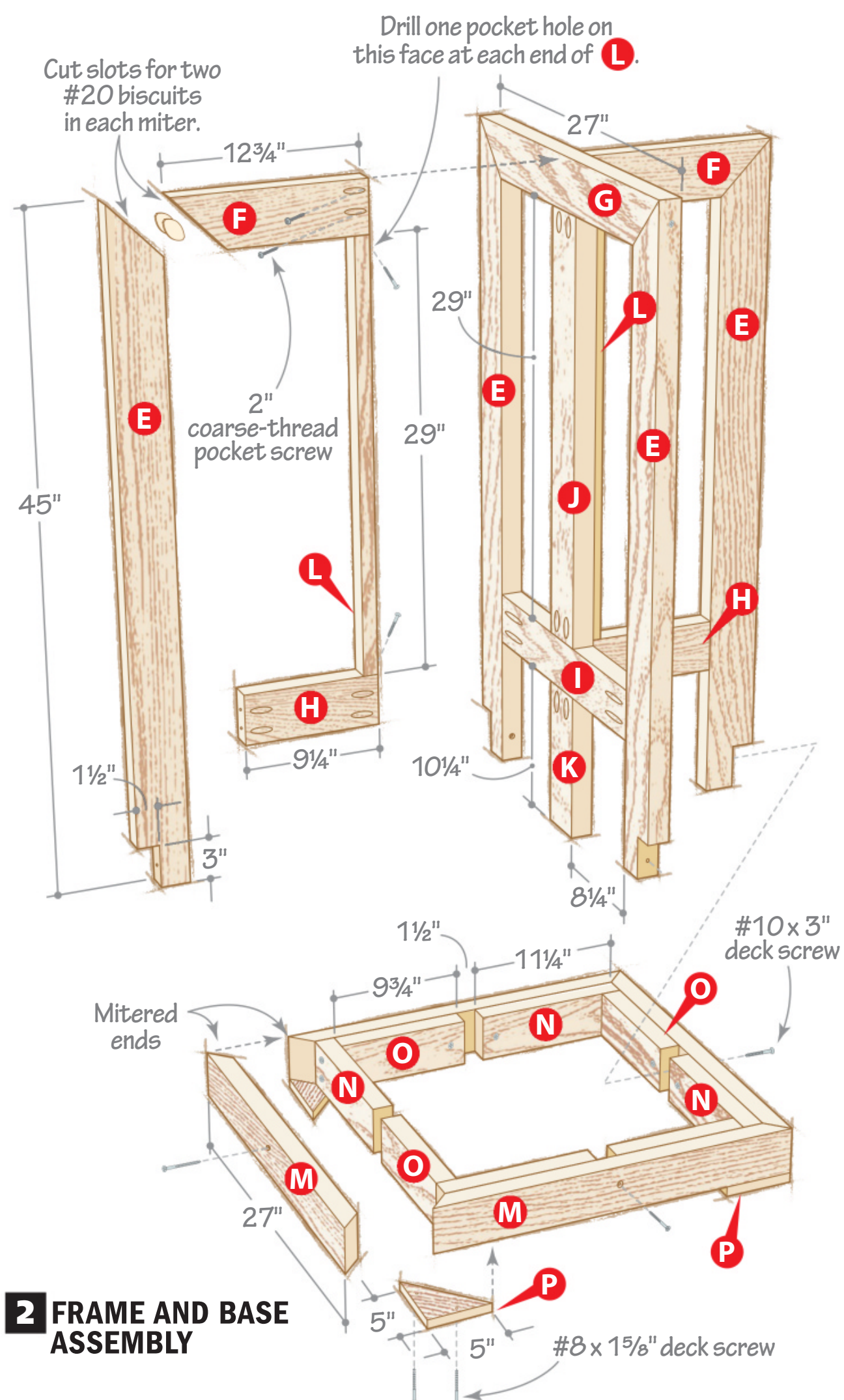
6 Miter-cut to size the base sides (M) [Drawing 2]. Glue and clamp the sides together.

7 Cut to size the long and short spacers (N, O) [Drawing 2]. Glue and screw the spacers together to create four L-shape assemblies.

8 Glue and clamp the spacer assemblies to the inside of the base. Cut the triangular feet (P) to size and shape, and glue and screw them to the base.

Tip! Clamps too short? Try this trick: woodmagazine.com/extendreach

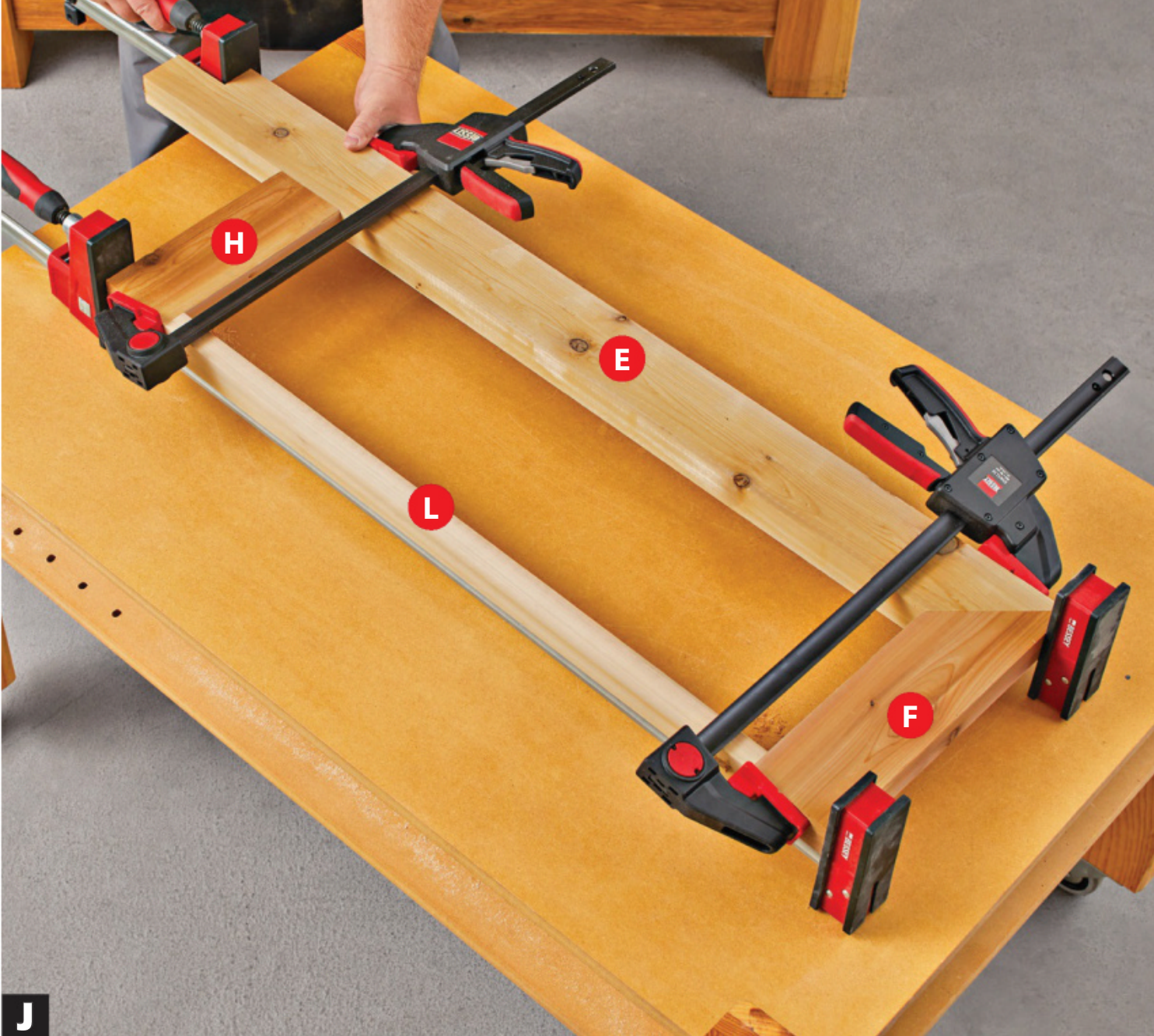
Tip! Clamp the spacer assemblies to the base and test the fit of the frame before gluing the spacers in place.



2 FRAME AND BASE ASSEMBLY



I Lightly clamp the filler (L) between the half rails (F, H) to prevent bowing the assembly. Drive a pocket screw at each end.



J Clamp a frame leg (E) to the half rails (F, H) to lock everything together. Clamps pull the miter joint tight.

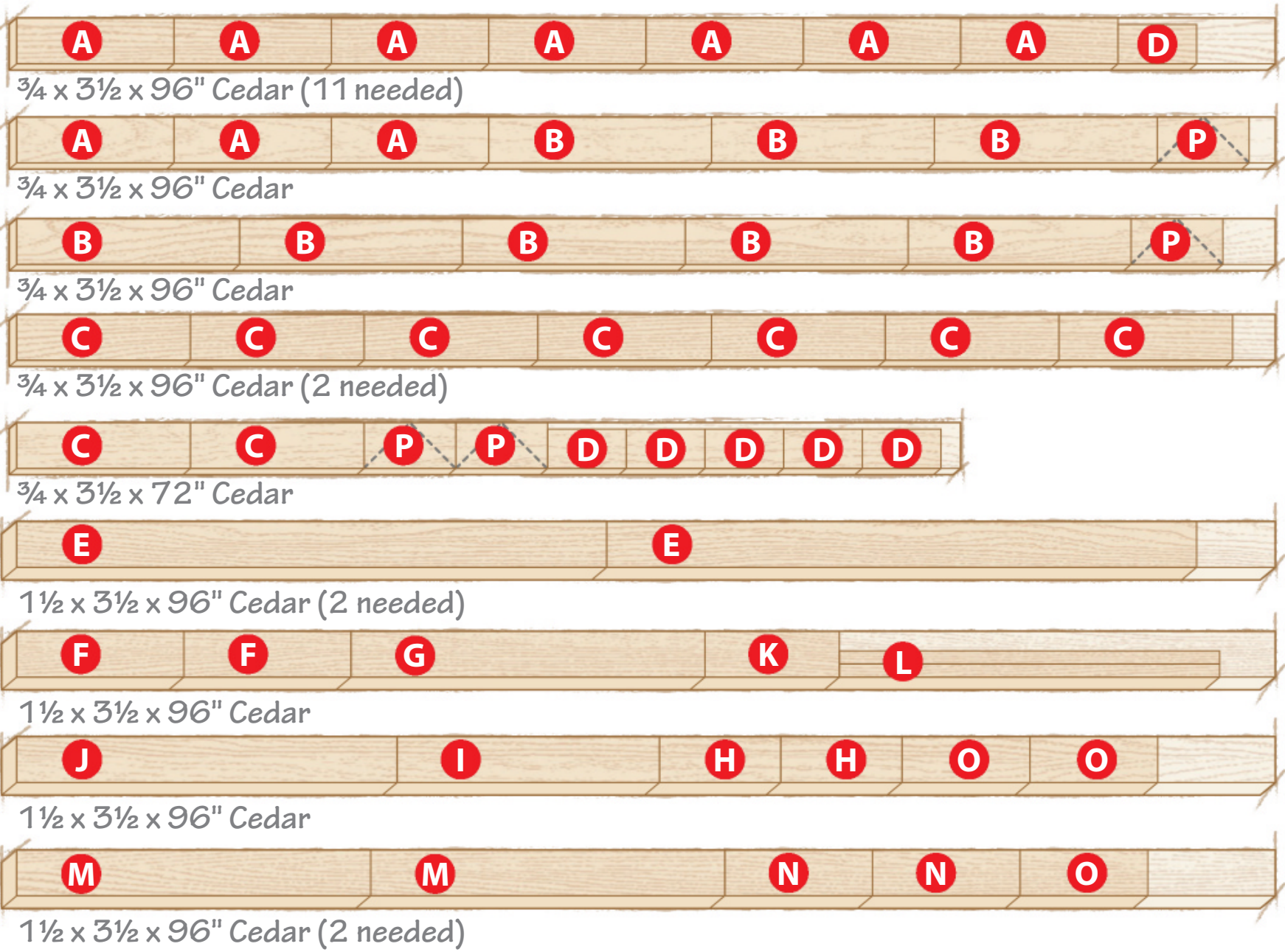
Bring it all together

- 1 Glue and screw the frame assembly to the base assembly [Exploded View].
- 2 Glue and screw the boxes to the frame and base assembly [Exploded View].

3 We chose to leave the cedar unfinished so it would weather naturally. (If you prefer, apply an exterior stain of your color choice.) Add some potted containers and enjoy your blooms. 🌿

Produced by Vincent Ancona with John Olson and Brian Bergstrom
Project design: John Olson
Illustrations: Roxanne LeMoine, Lorna Johnson

Cutting Diagram



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A box sides	3/4"	3 1/2"	12"	C	80
B long bottoms	3/4"	3 1/2"	17"	C	8
C medium bottoms	3/4"	3 1/2"	13 1/4"	C	16
D short bottoms	3/4"	3"	6"	C	16
E frame legs	1 1/2"	3 1/2"	45"	C	4
F upper half rails	1 1/2"	3 1/2"	12 3/4"	C	2
G upper rail	1 1/2"	3 1/2"	27"	C	1
H lower half rails	1 1/2"	3 1/2"	9 1/4"	C	2
I lower rail	1 1/2"	3 1/2"	20"	C	1
J center stile	1 1/2"	3 1/2"	29"	C	1
K support leg	1 1/2"	3 1/2"	10 1/4"	C	1
L fillers	1 1/2"	1"	29"	C	2
M base sides	1 1/2"	3 1/2"	27"	C	4
N long spacers	1 1/2"	3 1/2"	11 1/4"	C	4
O short spacers	1 1/2"	3 1/2"	9 3/4"	C	4
P feet	3/4"	3 1/2"	7"	C	4

Materials key: C-cedar
Supplies: #8×2" trimhead screws, #8×1 5/8" deck screws, #10×3" deck screws, 2" coarse-thread pocket screws, #20 biscuits.
Bits: 1/8" drill bit, pocket screw bit.

Make the most of your Garage Shop

*Are cars tailgating your tablesaw and shovels burying your bench?
Take charge of your garage shop and add storage, flexibility, and convenience.
Here's how.*



► To see how we tricked out this dream garage shop, point your smartphone's camera at this code or visit woodmagazine.com/dreamgarageshop.



A

Two-part epoxy floor finishes create a bright, easy-to-clean surface while protecting the concrete from oil drips and salt. These coatings come in DIY and professionally applied versions.



B

Disassemble and reconfigure snap-together floor tiles as your shop grows. Place them wherever you stand for long periods.

Start at the bottom

You can't upgrade your shop floor until you find it. Begin by moving everything out of the shop space and list which tools, accessories, and supplies will make the return trip. As for the rest, donate or toss what you can, and find a new home for non-shop-related items in a shed or elsewhere in the garage. (Keep reading for more storage ideas.)

Thoroughly clean the floor and seal any cracks or expansion joints large enough to trap the wheels of a tool base. For a bright, smooth floor, apply a concrete paint or epoxy-based coating [Photo A]. To give your feet and back a break, install snap-together tiles [Photo B], anti-fatigue mats, or vinyl flooring near tools and workbenches.

Control your shop climate

Frostbite or heatstroke needn't be shop hazards. To build in more comfort, insulate the garage walls, overhead doors, and ceiling

[Photo C]. After insulating, brighten the space by covering exposed studs with drywall, painted plywood, or pegboard.

In climates where the temperature regularly drops below freezing, replace—or at least insulate—open-cavity garage doors to prevent condensation in the shop from building up on frozen surfaces.

To remove winter chill, a wall- or ceiling-mounted electric or gas space heater takes up no floor space and reduces the risk of accidental fire from materials left too close to the heat source [Photo D]. Some gas-fired units may require venting to draw in outside air and exhaust combustion gases.

For cooling an overheated shop, an inexpensive box fan will help, but investing in an industrial fan will move more air. Ceiling fans circulate plenty of air, but consider your ceiling lighting locations and overhead door clearances before choosing and installing one or more.

► Learn more about controlling your shop climate.

woodmagazine.com/shopclimate



C

Attic or roof insulation traps rising warm air in the winter. In the summer, it provides a barrier between sun-heated roof shingles and your workspace.



D

Natural-gas or propane space heaters can warm an entire shop without periodic refueling, as with a kerosene heater.



E French cleats support racks or cabinets, and let you instantly reorganize or expand storage as your shop grows.

A place for everything

As you plan your shop organization, separate the tools you'll use every day from the ones you'll use only once in a blue moon.

►Find lumber rack plans.
woodmagazine.com/lumber-rack

Hang wall racks close to your workbench for tools you reach for regularly: hand tools, a drill/driver, and measuring tools, for example. Because your shop will grow and change, use a French-cleat mounting system for reconfigurable storage [Photo E].

Cabinets protect and organize tools and accessories. You don't even need to build them yourself. Repurpose inexpensive used cabinets from a Habitat for Humanity ReStore, for example, or use the tips at woodmagazine.com/stockcabinets to cus-



F BUILD FROM OUR PLANS: woodmagazine.com/benchtool

Shelves in this storage tower double as tops to a mobile base for benchtop tools. Casters let both move out of the way for parking.

tomize stock cabinets. Add locks to keep items away from any young shop assistants.

Park tools that don't need the protection of a cabinet on wall-mounted shelves or a mobile tower [Photo F]. Then get lumber up off your shop floor and store it overhead or on wall-mounted racks.

Running out of wall space already? Build a mobile cabinet that delivers maximum storage in minimal space [Photo G].

High garage ceilings create loads of unrestricted airspace. Claim the area above a raised garage door for hanging storage platforms to house surplus lumber or seasonal items that eat up space elsewhere in the garage [Photo H].

Tip! For plans to make simple wall cabinets, see Create a Workbench and Cabinet Combo on page 24.

Tip! Mounting shelves just above the height of your car hood won't rob parking space when the shop is idle.



G BUILD FROM OUR PLANS: woodmagazine.com/mobilecabinet

Fill this cabinet with tools, supplies, and hardware. Latch the doors and roll it into any 2x2' space.



H SHOP FOR RACKS: woodmagazine.com/overheadrack

Ceiling-mounted racks hold seldom-needed shop supplies or bins of seasonal items. Wire-grate shelving won't collect dust.

Work on a better bench

Garage shops that share space with a car can't afford the luxury of a fixed workbench in the center of the shop. Instead, consider putting one on wheels, *below*. If you're working in a spare garage stall or have extra space

along one wall, a stationary bench may be what you need, *center*. No bench space at all? Build a bench that collapses to a third its full size and wheels away, *below*.



This combination saw stand and workbench also provides a router table and storage. Build it from our plans. woodmagazine.com/rollingbench



This simple stationary bench gets you quickly back to your projects by using a toolbox for storage and a solid-core door as the benchtop. (See page 24.)



Mobile and compact, this workbench features a top that tilts vertically to store in only 6 square feet. woodmagazine.com/foldflat

Immobility has to go

Putting your shop on wheels opens up parking space for cars, lets you rearrange tools to fit the job, and roll tools onto a driveway to handle oversize workpieces. Reorganizing as a shop grows is a snap, too.

►Build your own mobile bases. woodmagazine.com/mobilebase

Locking mobile bases allow you to move even your heaviest tools, such as cabinet saws, bandsaws, and drill presses, and still fix them in place for use. For a miter saw, consider a folding stand [Photo I].

Now ask yourself whether your typical projects really require space-eating stationary tools. For example, if you only need to rout small trim parts, why have a large router table? Either incorporate the router table into your tablesaw extension or build a router table that's easier to store [Photo J]. If space limits you to a benchtop or no table-saw, consider adding an easy-to-store track-saw [Photo K].

Overhead—the good kind

Take advantage of the unused socket in the outlet powering a garage door opener by

installing an overhead cord reel. This can provide power to most of your shop without having a cord underfoot. Likewise, by



I Miter saw stands fold up with the saw attached for easy storage. Most manufacturer's stands include extendable supports for long workpieces.



J BUILD FROM OUR PLANS: woodmagazine.com/benchroutertable
Clamp this router table to your workbench when you need it. Then store it on a shelf when you're finished. Four drawers organize bits and accessories.



K A track saw rivals a tablesaw for cutting parts from sheet goods. The rigid foam serves as a flat, sacrificial worksurface.



L An overhead reel provides instantly available power for pneumatic tools, and stows the hose out of the way when not needed.

►Plumb your shop for compressed air. It's a breeze. woodmagazine.com/air

plumbing your shop for compressed air from an overhead air-hose reel [Photo L], the compressor can sit in an unused corner or a shelf. Free up even more floor space by wall-mounting your dust collector. If there's clearance in the attic, consider relocating the collector to this unused space [Photo M].

Bright done right

Once the details of your shop layout take shape, plan how you'll light it. Fixtures in the wrong place create problem shadows or glare. For example, you'll want at least one fixture directly over your tablesaw and another over the workbench, with additional fixtures close enough to overlap light on the worksurface [Photo N].

Upgrade lighting by replacing the usual bare-bulb garage lights with LED fixtures. These produce more light from less electricity, so you increase illumination without overburdening existing lighting circuits.

If you have a wall-hugging workbench, include task lighting or additional overhead fixtures to compensate for the typical lack of lighting along shop walls and in corners. For fine detail work, step up to a magnifying light fixture.

While you're focused on electrical upgrades, consider installing additional circuits and outlets, including 220-volt outlets if you plan to step up your tools. If you don't want to crack open finished garage walls, run wire in surface-mounted conduit.



M A collector mounted in the rafters frees up shop space, allows overhead ductwork, and reduces noise. Just make sure you have access for emptying the bin or bag.



N Evenly spaced fixtures provide uniform light throughout this shop. The light-color walls help reflect light within the room.



O Hanging canvas curtains create an impromptu finishing room. When not in use, the curtains pull aside and store beside the garage door.

You're almost finished

Creating a dust-free finishing space can be tricky in any shop, but especially so in an unfinished space where debris and insects can settle on a newly applied finish. If space allows, create a dedicated finishing area with low, angled lighting that lets you detect drips or gaps in a wet finish. In a tight space, make a temporary finishing booth to contain overspray and repel dust [Photo O]. 🌿

►Find more inspiration and dozens more plans from our Idea Shops. woodmagazine.com/ideashops

Produced by Robert Wilson

WOOD magazine May 2021

Super-secret Super Bundle

These downloadable plans have something to hide.



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plans for
\$25



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Two-for-one Tabletop Hockey

*Enjoy loads of fast-action fun
slingin' pucks and pennies!*



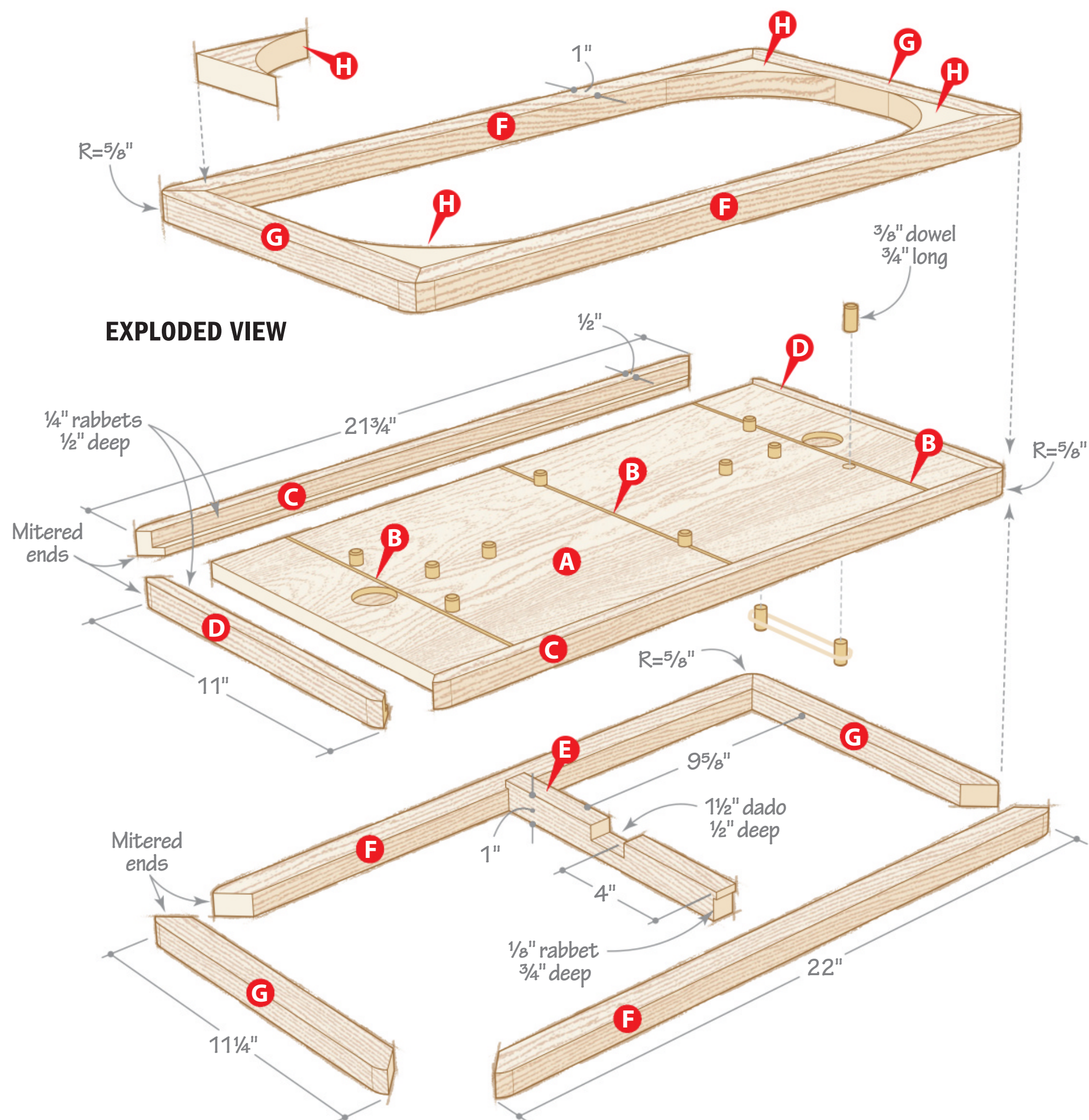
DIMENSIONS:
22" W x 11¹/₄" D x 2³/₈" H

Approximate materials cost:
\$50
(including pucks and rubber bands)

10
pucks included in project kit

\$50

10
pucks
included in
project kit



We can't all be Wayne Gretzky, but we can all enjoy these two hockey-inspired games. And you'll enjoy building this game so much, you might end up making several for gifts. Let's get started.

Put on a new face at face-off

Because it can be difficult to find plywood with two clean, attractive faces, we veneered ours, with a curly-maple book-match on the penny-hockey face and a single, wide piece

of curly maple on the sling-puck side. You can instead laminate two pieces of 1/4" plywood with the best faces out and begin construction at **Step 3**.

1 For the game board (A), cut a piece of ½" Baltic birch plywood to 11×22". Next, cut veneer sheets to cover both plywood faces. If you can't find veneer wide enough, join together two pieces [**Preparing a veneer book-match, next page**].

How to play penny hockey

Objective: Score a point by flicking a penny into the hole in the opposing end; first to 10 points wins the game.

Rules vary, but here are a few basics: Before play, agree on whether the penny must rest fully in the hole to count, or if you'll allow a penny that just tips into the hole, with an edge touching the bottom, to count. Each player takes turns flicking a penny with a finger, wherever it lies. Increase the strategy by playing with two or more pennies, giving you the choice each play of making offensive or defensive moves. (Play heads and tails to distinguish each player's pennies.)

How to play sling puck

Objective: Clear all pucks from your side of the game board.

Two players simultaneously shoot pucks with their rubber bands, aiming to get them through the opening in the divider. The first player to shoot all the pucks onto the opposing player's side wins. Vary game play by using the other rubber bands provided in the supplies kit [Source].

► If you prefer to make your own pucks, they measure $\frac{5}{16}$ " thick and $1\frac{1}{4}$ " in diameter with a $\frac{1}{4}$ " center hole.

SKILL BUILDER

Preparing a veneer book-match

To join together two pieces of veneer with a seamless joint to create a book-match, you need a perfectly straight edge on each piece. To do this, tape the pieces together along their ends—with the mating edges aligned—so they can't move, and elevate them on a piece of scrap stock. Then create a perfectly jointed edge using one of these methods [**Photos 1–3**]. Finally, tape the jointed veneer edges together to prepare for gluing to the substrate [**Photos A, B, and C**].

► Watch a video on prepping veneer for a book-match.
woodmagazine.com/bookmatching

Three ways to joint the joint



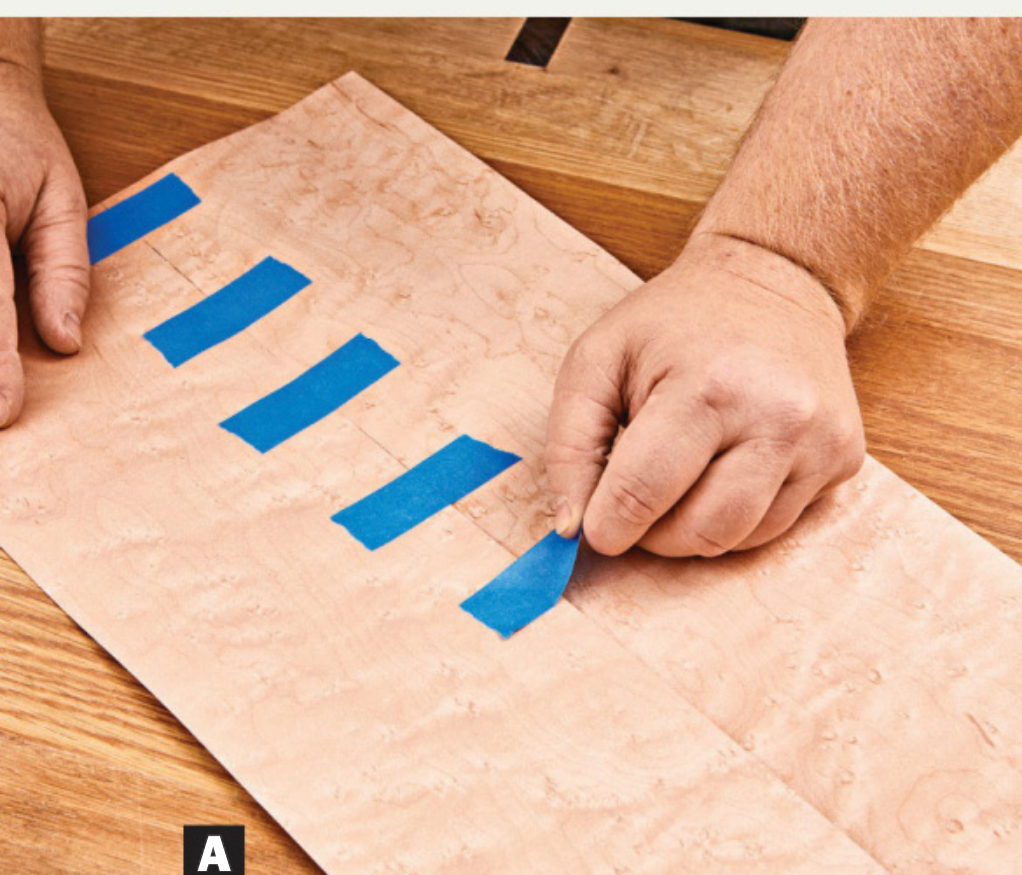
Hold the veneer in place with a board, then joint one edge using a low-angle hand plane.



Apply self-adhesive sandpaper to a straight board, then rub that along the veneer edge until straight.



Set a tracksaw for a shallow cut and trim the veneer edges straight.



With the veneer lying good face down, tape across the joint to pull the edges together tightly.



Flip the veneer over and apply tape along the joint. Remove the tape strips from the back face.



Sandwich the veneered game board (A) between two sheets of $\frac{3}{4}$ "-plywood on both faces to evenly distribute clamping force. Cover the inner faces of the platens with waxed paper to prevent glue squeeze-out from sticking to them.

2 Glue the veneer panels to the game-board substrate and clamp until dry [**Photo C**].

3 Trim the game board (A) to size [**Drawing 1, Materials List**]. Rout or saw the three grooves on the penny-hockey face of the game board. Cut the accent strips (B) and glue them into the grooves. When the glue dries, sand them flush.

4 Lay out and drill all holes on both faces of the game board [**Drawing 1**].

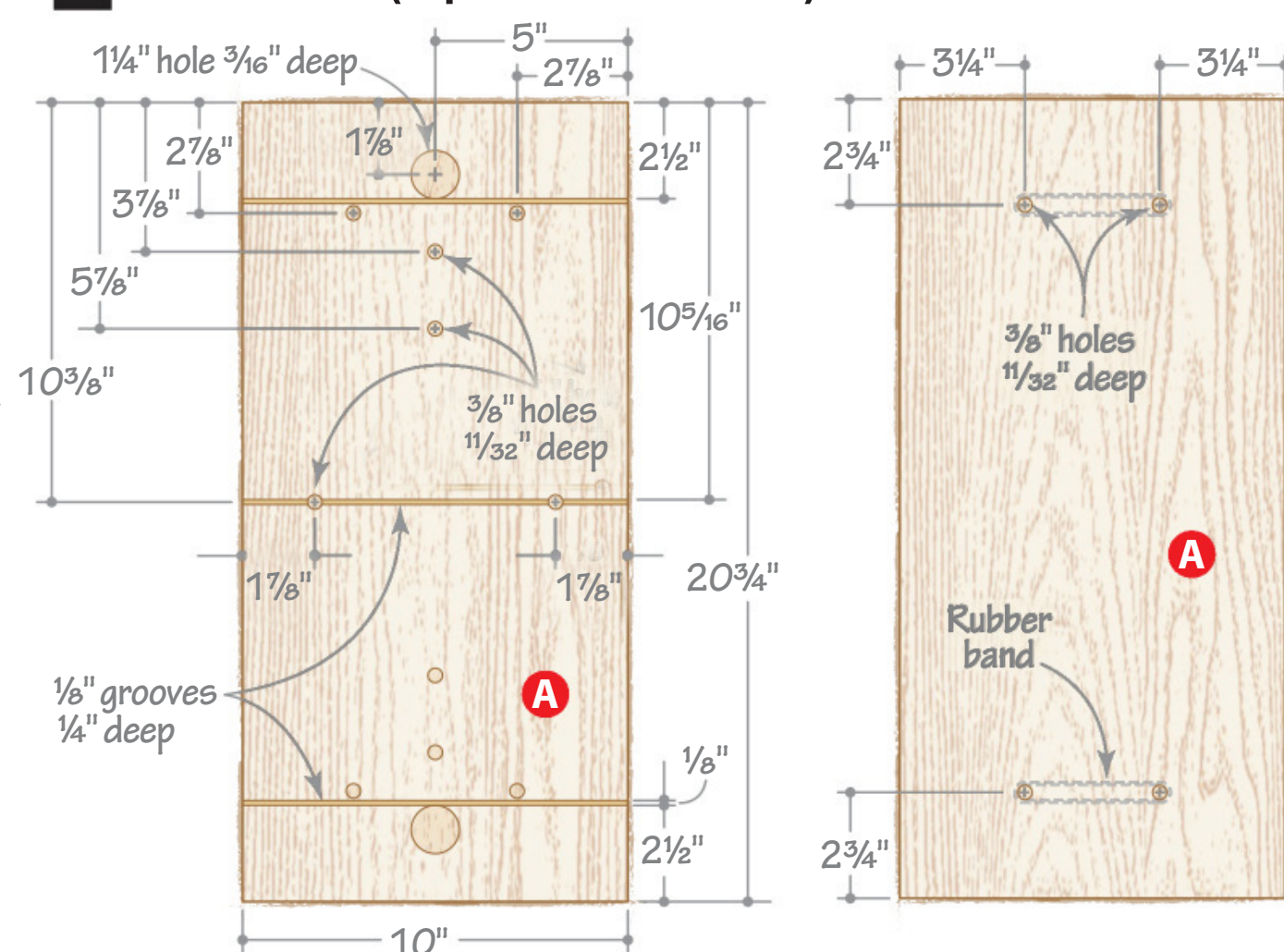
Wrap the game board

1 Miter-cut the long (C) and short edging (D) to size [Exploded View] and rout a rabbet in each piece [Photo D].

2 Glue and clamp the long and short edges together [Photo E]. When the glue dries, apply a thin bead of glue all around

Tip! Start drilling the holes along the centerline. If you drill a little too deep and the spur breaks through the opposite side, the puncture will be hidden by the sling-puck divider.

1 GAME BOARD (Top and bottom faces)

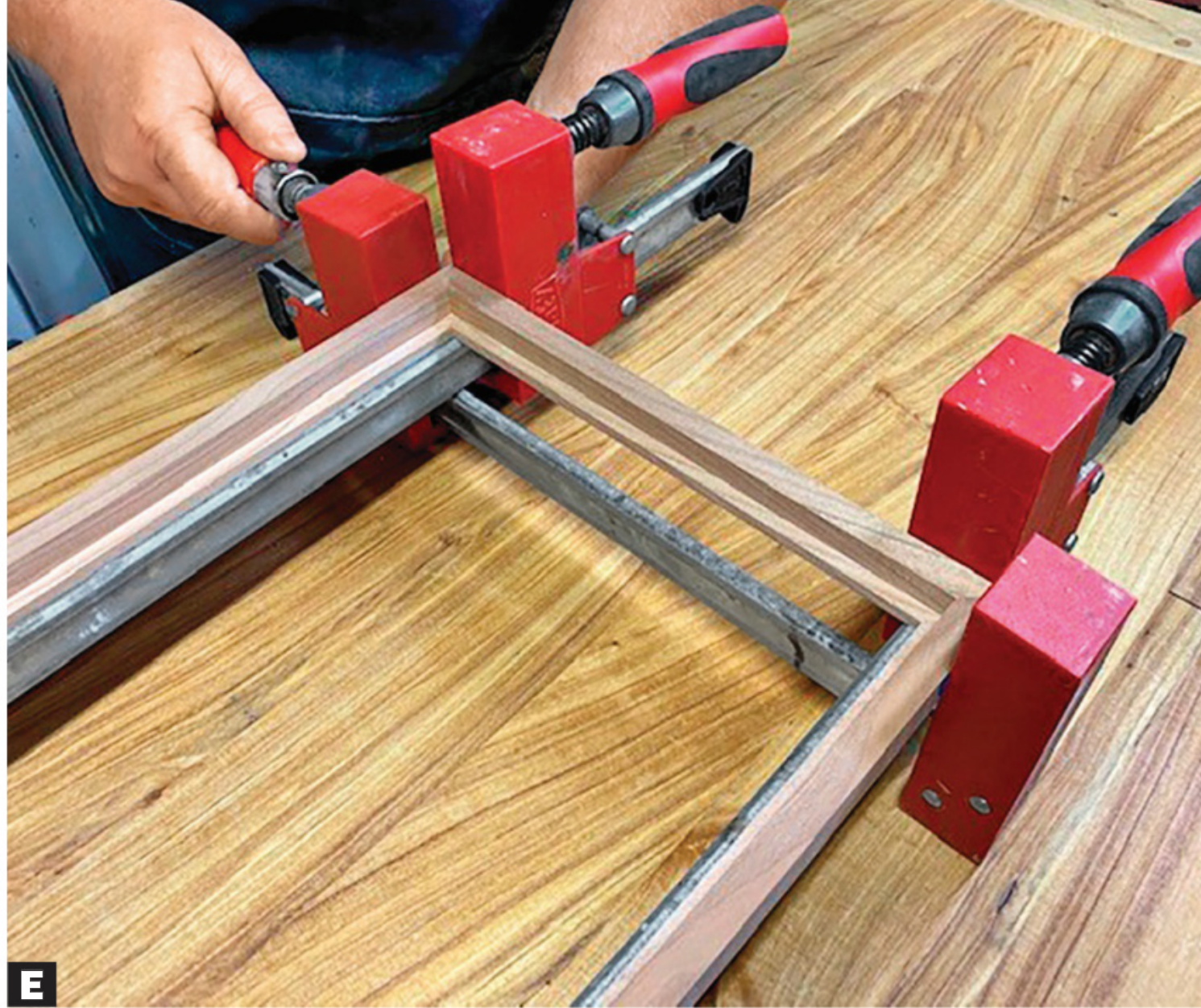


WOOD magazine May 2021



D

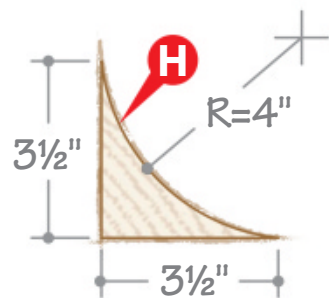
Using an upcut spiral bit, rabbet each edging, holding it tight to the fence and table.



E

Clamp the edging frame together, aligning each miter precisely.

2 CORNER DETAIL



the frame in the corner of the rabbet. Place the game board in the frame, and clamp around the perimeter to eliminate gaps between the frame and game board.

3 Lay out the radius at each corner of the frame [Exploded View, Photo F] and sand round and smooth.

4 Cut the divider (E) to size, rabbet the ends, and cut the dado [Exploded View]. Glue and clamp the divider to the sling-puck face of the game board.

5 Miter-cut the long (F) and short trims (G) to length [Exploded View]. Glue up the two sets of trim frames separately and allow them to dry. Then, glue each frame to the game-board assembly.

Rounding the corners

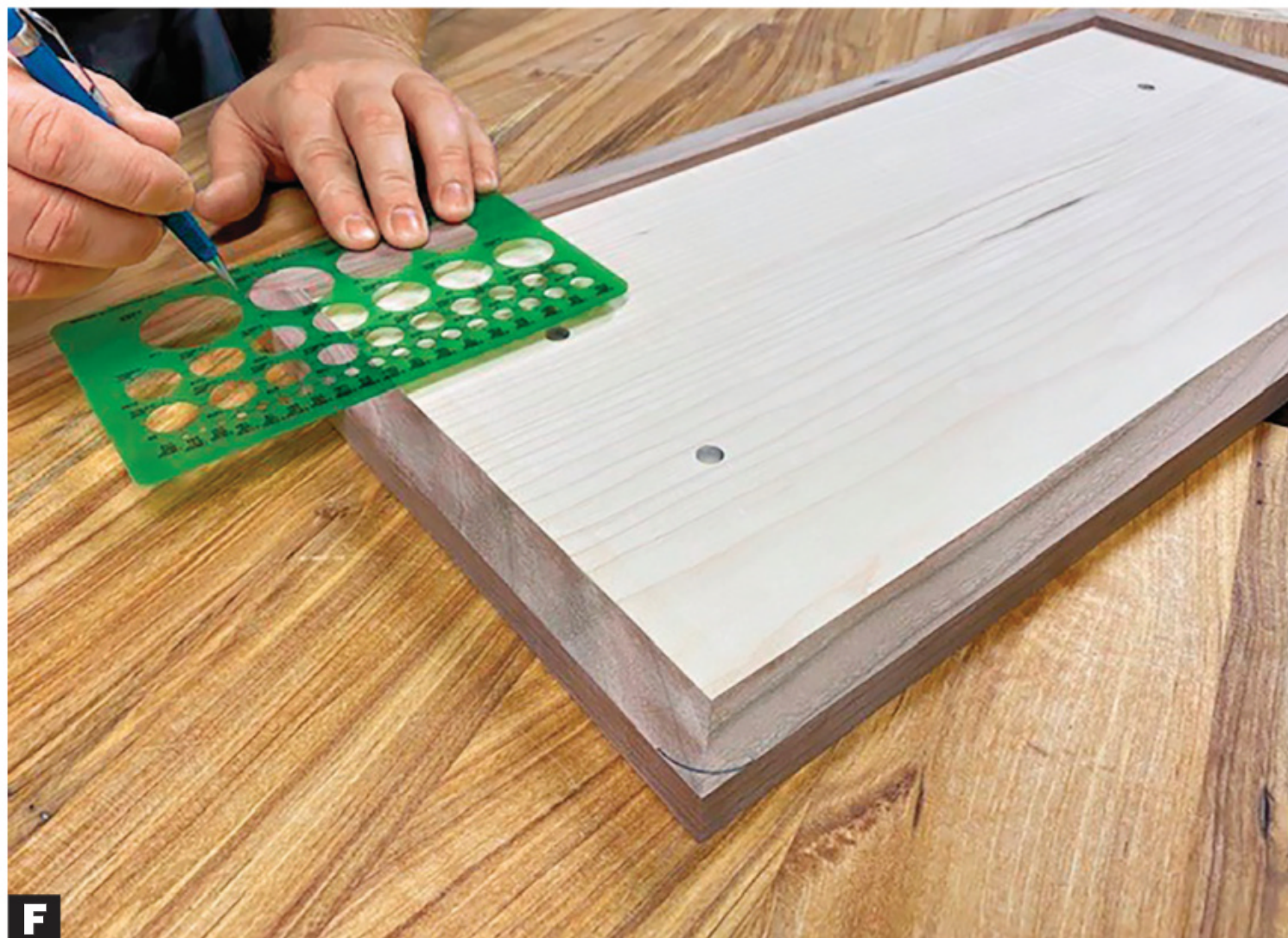
1 Cut the corners (H) to size [Drawing 2], sand smooth, and glue them in place on the penny-hockey face of the game board.

2 Mark the radius on each corner of both trim frames [Exploded View], and sand each to the line. Sand the assembly to 220 grit.

3 From a $\frac{3}{8}$ " cherry dowel, cut 14 pieces $\frac{3}{4}$ " in length. Sand a slight chamfer on one end of each, and glue the unchamfered ends into the holes in the game board.

4 Apply the finish of your choice to all surfaces. We sprayed on three coats of satin lacquer. 🌳

► Buy a circle template.
[woodmagazine.com/
circletemplate](http://woodmagazine.com/circletemplate)



F

Use a circle template or anything with a $\frac{5}{8}$ " radius to mark the frame corners. Sand to these lines.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* game board	$\frac{1}{2}$ "	10"	20 $\frac{3}{4}$ "	P	1
B accent strips	$\frac{1}{8}$ "	$\frac{1}{4}$ "	10"	W	3
C long edging	$\frac{3}{4}$ "	$\frac{3}{4}$ "	21 $\frac{3}{4}$ "	C	2
D short edging	$\frac{3}{4}$ "	$\frac{3}{4}$ "	11"	C	2
E divider	$\frac{3}{4}$ "	1"	9 $\frac{1}{2}$ "	C	1
F long trim	$\frac{3}{4}$ "	1"	22"	C	4
G short trim	$\frac{3}{4}$ "	1"	11 $\frac{1}{4}$ "	C	4
H corners	$\frac{3}{4}$ "	3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "	C	4

*Parts initially cut oversize. See the instructions.

Materials key: P-Baltic birch plywood, W-walnut, C-cherry.

Supplies: Veneer of your choice (optional).

Bits: $\frac{1}{2}$ " upcut spiral router bit; $\frac{3}{8}$ " brad-point or Forstner drill bit, $1\frac{1}{4}$ " Forstner bit.

Source: Game kit includes 10 rubber bands, 10 pucks, and two $\frac{3}{8}$ ×6" cherry dowels, Kit no. RS-01298, \$6.95, woodstore.net/slingpuckkit, 888-636-4478

Produced by **Bob Hunter** with
John Olson
Project design: **John Olson**
Illustrations: **Roxanne LeMoine**,
Lorna Johnson

Epoxy:

Still Gluing Strong After All These Years

Before dazzling rivers and bar-top coatings, epoxy simply served as a humble, high-performance adhesive and repair resin. Epoxy manufacturers catered primarily to boat builders, providing a product that withstands the harsh conditions of a marine environment. You've seen epoxy at center stage; now learn how this versatile adhesive can play an important supporting role in your woodworking.

Good bonding moments

Epoxy bonds to a wide range of surfaces, making it the adhesive of choice for joining dissimilar materials. And cured epoxy forms a waterproof bond, so it's also a good option for outdoor projects, especially those consistently exposed to moisture. Because it requires a surface with "tooth" for bonding, when gluing plastic, metal, or other smooth, non-porous materials, scuff up the glue surface for best adhesion [Photo A].

Choose your cure speed

Epoxy consists of two parts: a liquid resin, and a hardener that must be mixed in a precise ratio. Hardeners, available in fast and slow offerings, give you open times ranging from 10 minutes to 60 minutes or more.

If you need only small quantities, squeeze bottles or syringes work well for eyeballing the proper amounts of resin and hardener. But for mixing quantities larger than ½ oz. at a time, some manufacturers sell metered

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temperatures.



A

Use a coarse- to medium-grit sandpaper to scuff up smooth or polished parts, providing a better bonding surface for the epoxy.



B

From syringes to pumps, you have lots of options for an epoxy dispensing system. Consider how often you use epoxy in the workshop and how much you mix up at a given time.

pumps that dispense a precisely measured amount with a single push [Photo B]. Or, in lieu of pumps, use a kitchen scale and measure the parts by weight.

The temperature of the work environment can influence your choice of hardener. Epoxy gives off heat as it cures (known as an exothermic reaction), and the ambient temperature either accelerates or slows down the reaction. A fast hardener produces more heat, good for cool ambient temperatures, and a slow hardener gives you more working time in a hot environment. Always refer to the manufacturer's instructions for the appropriate working temperature range of your epoxy.

Mix it and stick it

It might seem like a small detail, but choose your mixing container carefully. Mixing epoxy in a tall, narrow container reduces surface area, concentrating heat buildup and speeding cure time. The built-up heat can also melt plastic containers, or even combust. A metal tray, or the hollow on the bottom of a soda can make good mixing containers.

After accurately measuring your resin and hardener, mix the two using a disposable spatula [Photo C]. Avoid the temptation to add more or less hardener to adjust your working time, as it decreases bond strength.

Spread epoxy with your spatula, brush it on with a stiff-bristle disposable brush, pour

it where you need it, or even dip parts into the mix container [Photo D]. Freshly mixed thin adhesive will flow into cracks and cran- nies. For jobs requiring a thicker viscosity, let the epoxy set up partially before applying [Photo E].

If you drip epoxy where you don't want it, wipe it off before it cures, using denatured alcohol. Otherwise, wait for the epoxy to fully cure and carefully remove the excess using a scraper, chisel, or sandpaper. Spread leftover epoxy in a thin film so the heat generated dissipates quickly as it cures. Once cured, you can cut, sand, and shape epoxy using the same cutters you use on wood. 🌲

Produced by Zach Brown



C

Mix the resin and hardener thoroughly until no visible streaks remain. For a small amount, a few strips of masking tape directly on your workbench provide a good mixing palette.



D

For a small part, such as this acorn nut, use the accompanying bolt as a handle and dip the nut into the epoxy. The bolt also serves as a visual guide that the nut is placed squarely into the workpiece.



E

For vertical surfaces or areas requiring a more controlled application, use a slower-setting mix and allow it to thicken slightly before applying.

Sofa Server

A sturdy stand for stacks of snacks

From lounging for one to seating for a crowd, the sofa serves as the centerpiece of living room furniture. The only dilemma is where to set your drink when you're sitting front and center.

This table provides a generous top and sturdy tip-resistant base, and tucks discreetly under the sofa. Sitting in the middle just got way more comfortable.

DIMENSIONS:
28" W x 15" D x 22" H

Approximate materials cost:

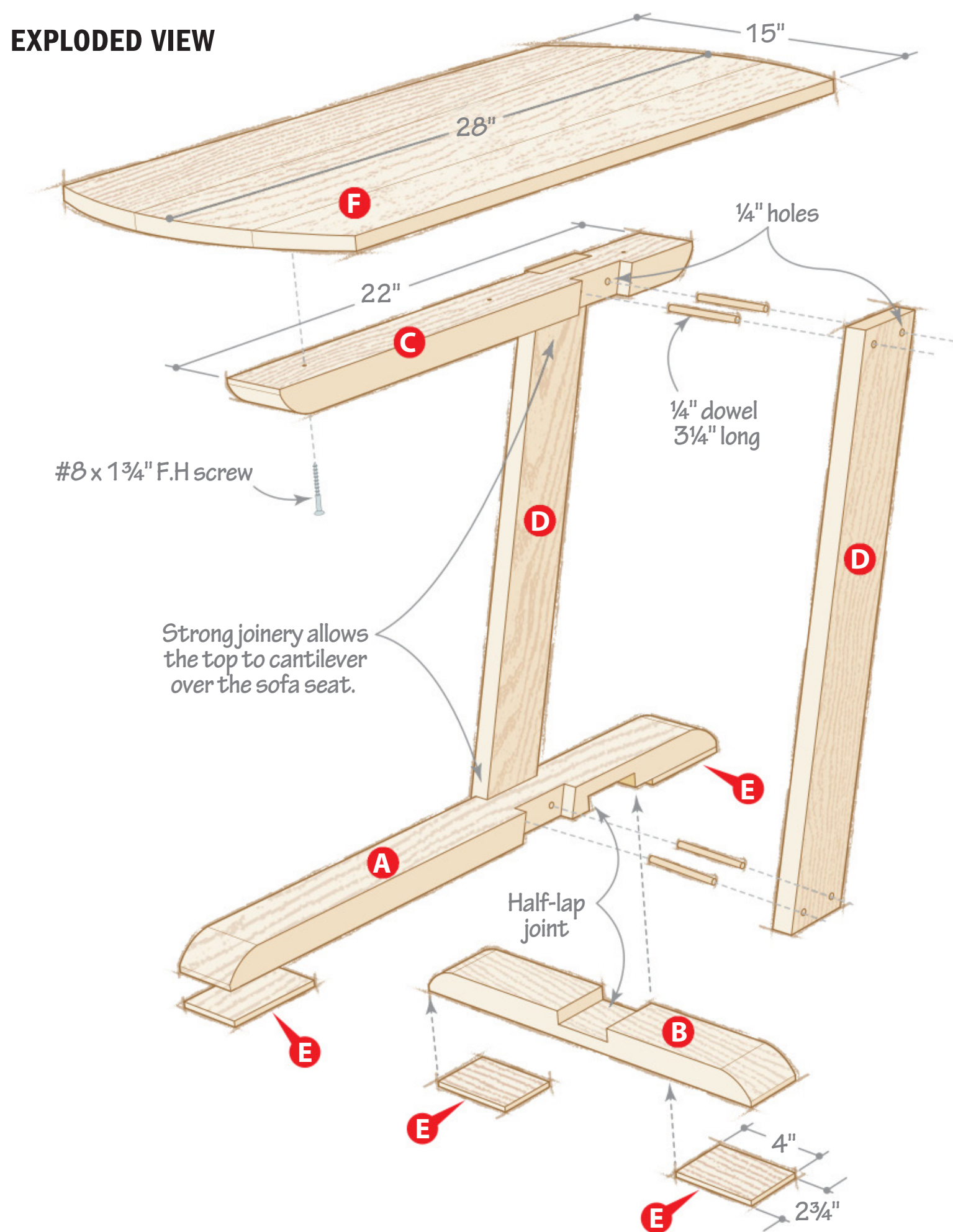
\$50

Americans spent

\$380

million on Super Bowl snacks in 2019.

EXPLODED VIEW

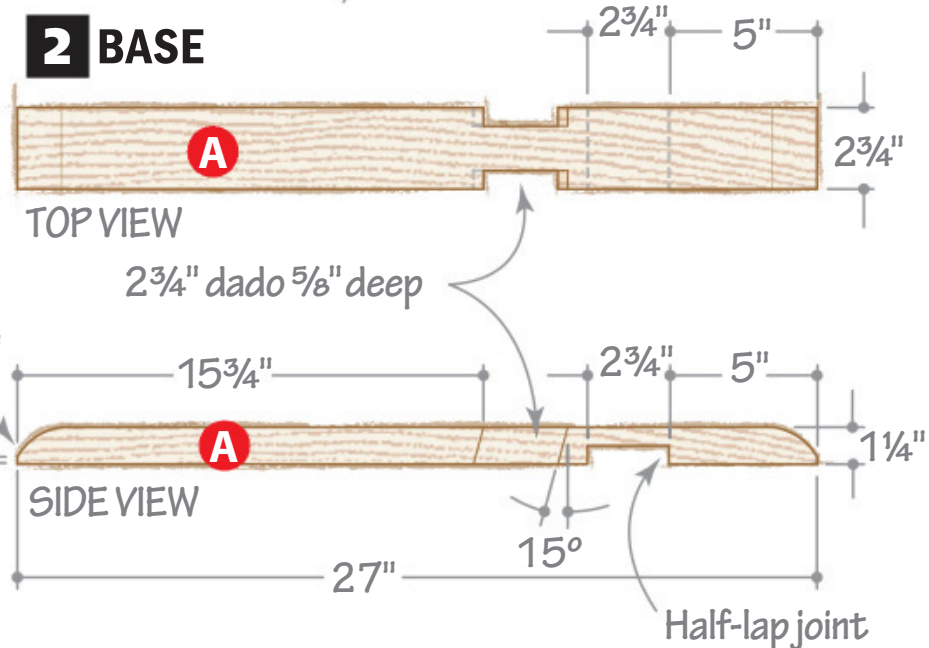
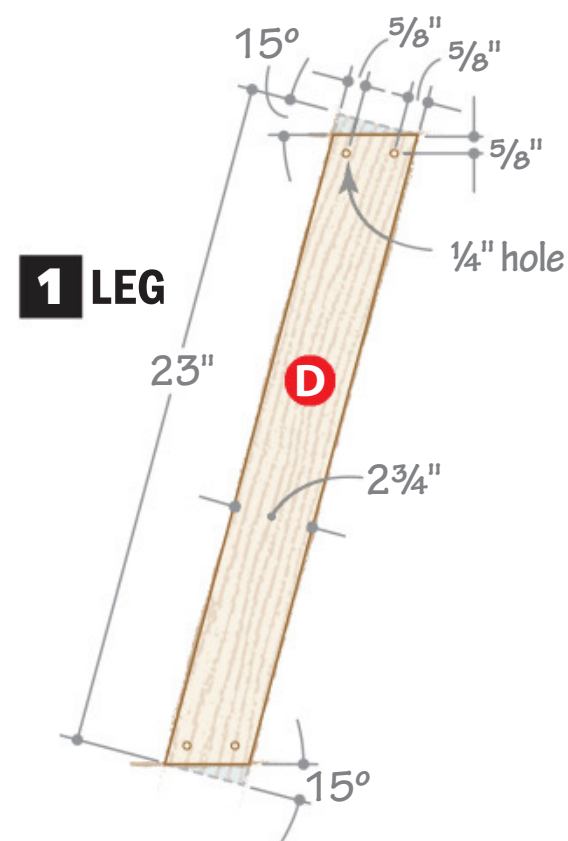


Start with a solid foundation

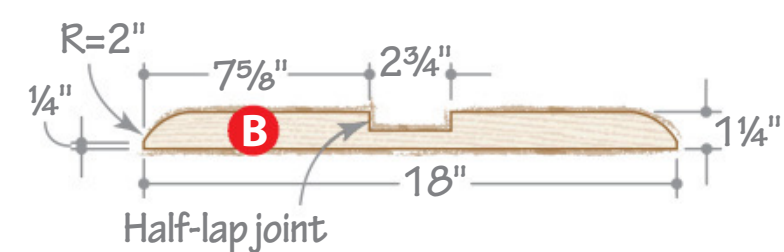
1 Cut the base (A), stabilizer (B), and top support (C) to size [Materials List]. Set aside two scraps of this stock to aid in setting up joinery later. Miter-cut the legs (D) to size [Drawing 1]. Finish-sand them and set them aside for now.

2 Lay out the half-lap joint on the base (A) and stabilizer (B) [Drawings 2 and 3], and

Note: Adjust the length of the legs (D) to fit your couch height. These are designed to fit a 20" couch.



3 STABILIZER

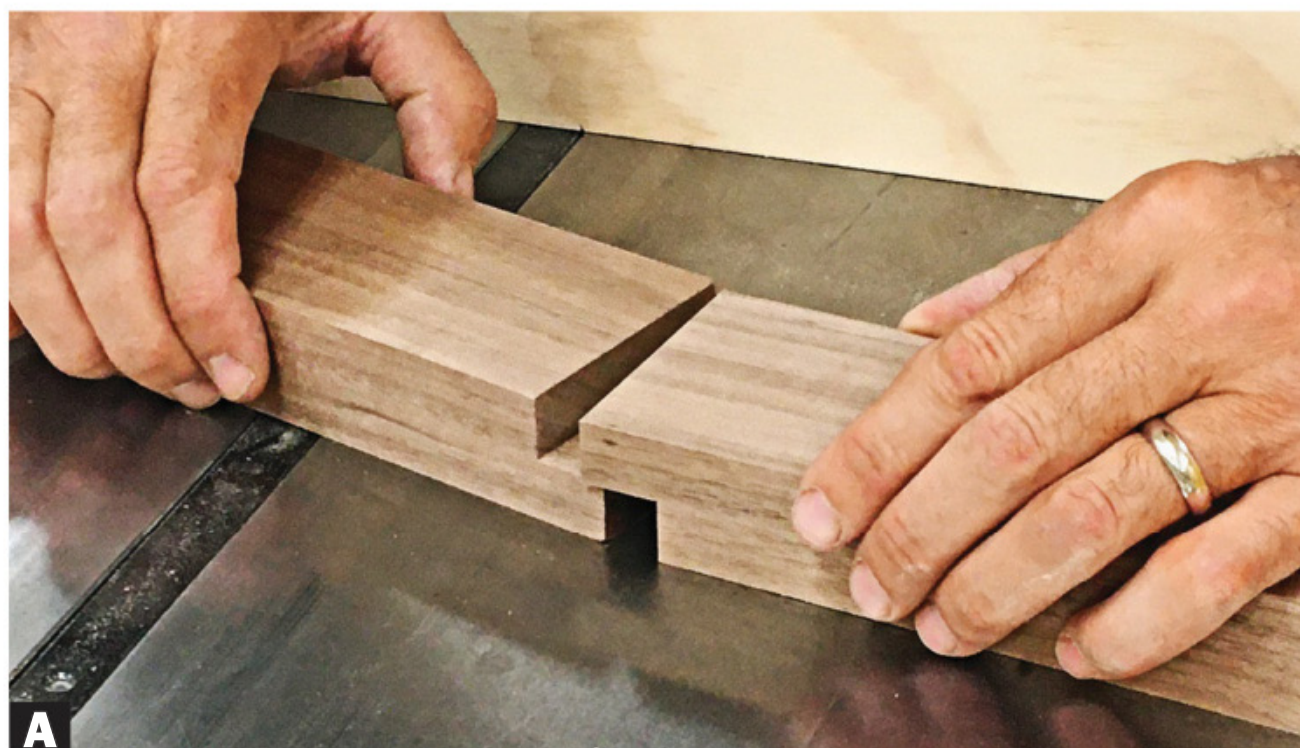


4 TOP SUPPORT

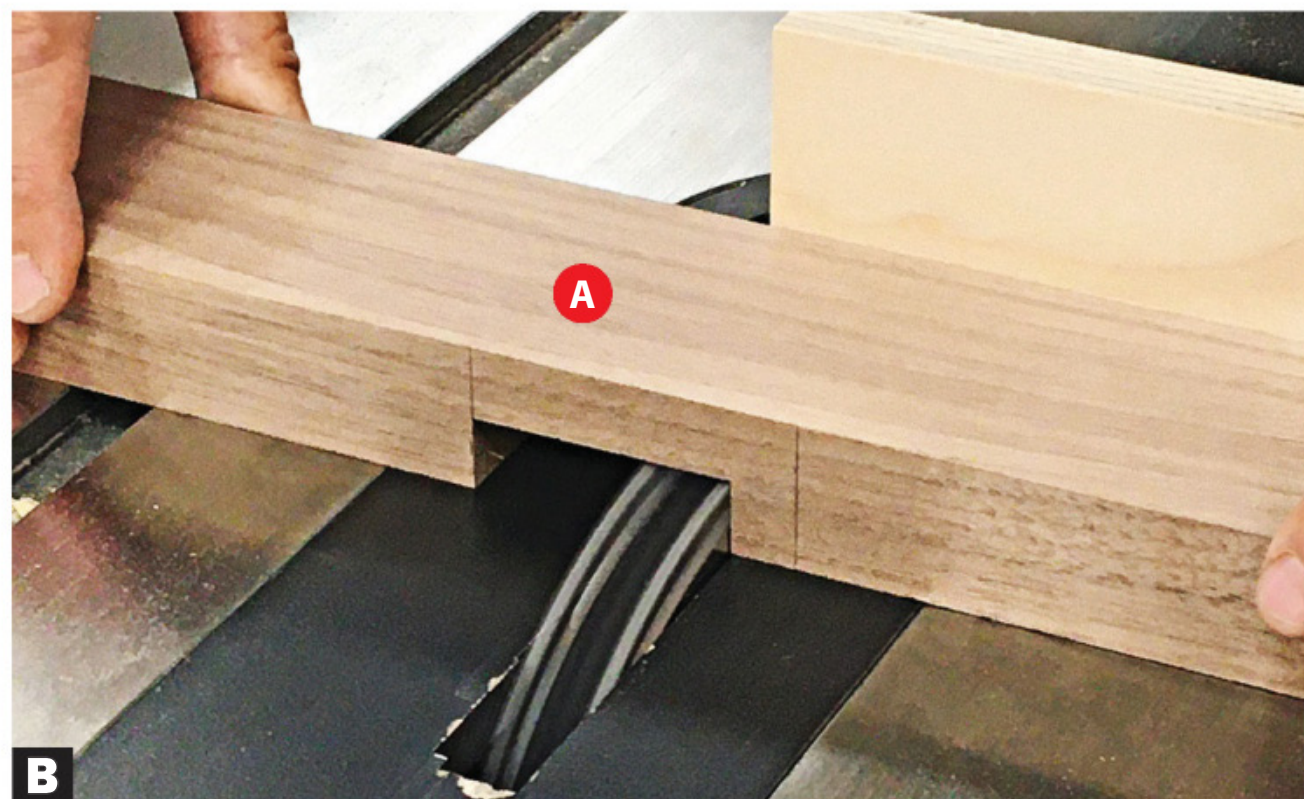


the angled dados on the base and top support (C) [Drawings 2 and 4].

3 Using the scrap set aside earlier, set the height of your dado stack [Photo A], then cut the half-lap joint on the base (A) and stabilizer (B) [Photo B].



A With a 3/4" dado set installed in the table saw and set to 5/8" high, rabbet the end of each test piece. Adjust the height of the blade until the pieces slide together while still touching.



B As you cut the half-lap joint, test the fit of the mating part as you near your layout lines. Work for a friction fit.



C Set your miter gauge to 15° and dado one edge. Check the fit of the legs (D) in the dado as you near your layout line. Then, simply reverse the miter gauge to cut the other edge.

- 4** Cut the angled dados on the sides of the base (A) and top support (C) [Drawings 2, 4, Photo C].
- 5** Lay out and form the radius on the ends of the base, stabilizer, and top support [Drawings 2–4, Photo D].
- 6** Cut the feet (E) to size [Materials List], then glue and clamp them to the base (A) and stabilizer (B) [Exploded View].
- 7** Finish-sand the base (A) and top support (C). Glue and clamp the legs (D) to the base and top support [Photo E].

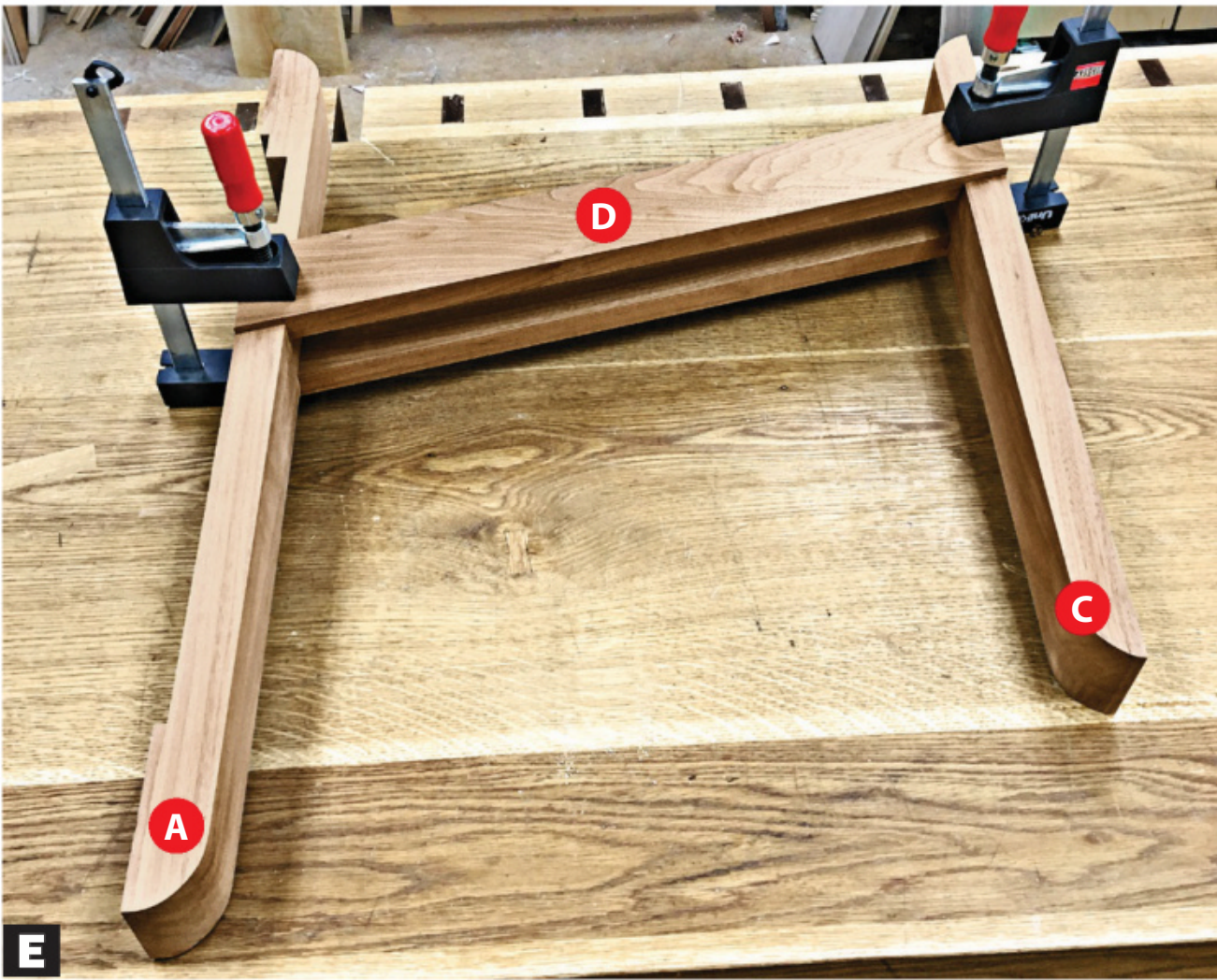
Reinforce and add a top

- 1** After the glue dries on the base assembly, drill holes and glue the dowels in place [Exploded View, Drawing 1]. Cut and sand the ends of the dowels flush once the glue dries.
- 2** Finish-sand the stabilizer (B) and glue it in place [Exploded View].
- 3** Glue up a panel for the top (F) [Materials List]. Cut the radius on the ends [Drawing 5] and then finish-sand all surfaces.
- 4** Apply a finish to all parts. We used a satin lacquer. Screw the top to the top support [Exploded View, Drawing 5], and settle in for a movie and some sofa snacks. 🌳

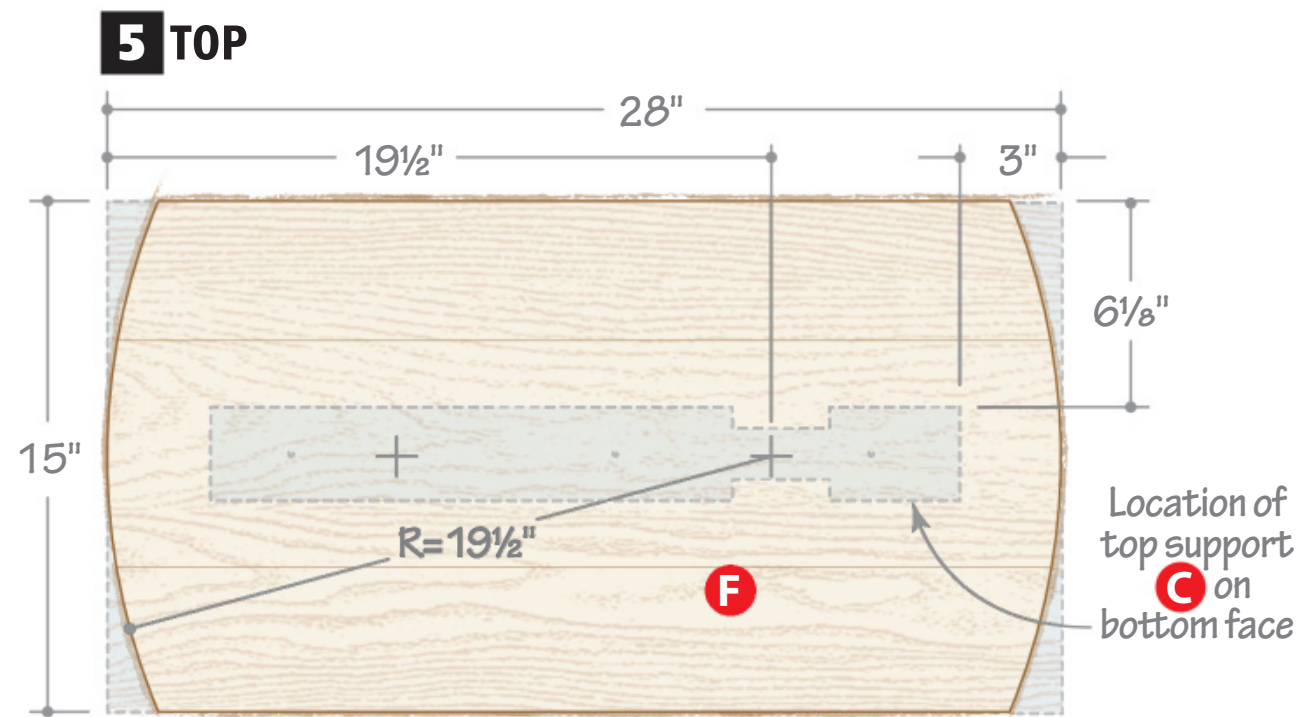
Produced by **Zach Brown** with **Kevin Boyle**
 Project design: **Kevin Boyle**
 Illustrations: **Roxanne LeMoine, Lorna Johnson**



D Use a pint can of finish to lay out the radius. Bandsaw away the bulk of the waste and then sand to the line.



E Glue up the base assembly with the ends of the legs (D) flush with the base (A) and top support (C). Touch up sanding as needed once you remove the clamps.



Cutting Diagram



1 1/4 x 7 1/4 x 72" Walnut
 *Plane or resaw to the thickness listed in the Materials List.



1/4 x 3 1/2 x 24" Walnut



3/4 x 5 1/2 x 96" White oak

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A base	1 1/4"	2 3/4"	27"	W	1
B stabilizer	1 1/4"	2 3/4"	18"	W	1
C top support	1 1/4"	2 3/4"	22"	W	1
D legs	7/8"	2 3/4"	23"	W	2
E feet	1/4"	2 3/4"	4"	W	4
F top	3/4"	15"	28"	WO	1

Materials key: W-walnut, WO-white oak.
Supplies: 1/4" walnut dowel, 15" long; #8 x 1 3/4" flathead screws.
Blade: Dado set.

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Gimbal Clock

Time to turn.

Inspired by gimbals that isolated a ship's chronometer from the motion of rolling seas, this project stands the assembly upright. The rings highlight a beautiful clockworks with visible gears. A convenient kit [Source] includes the clockworks and necessary hardware. We chose ash for the rings and walnut for the base, finial, and spacers.

DIMENSIONS:
7" W x 6 7/8" D x 10 3/4" H

Approximate materials cost:

\$60

Lumber, clockworks, and hardware

6

parts, all turned

► Watch a video of turning this clock.
woodmagazine.com/gimbalclock

► Cut all the way through the blank and slightly into the MDF. This dulls tools quickly, so resharpen frequently.

Step into the rings

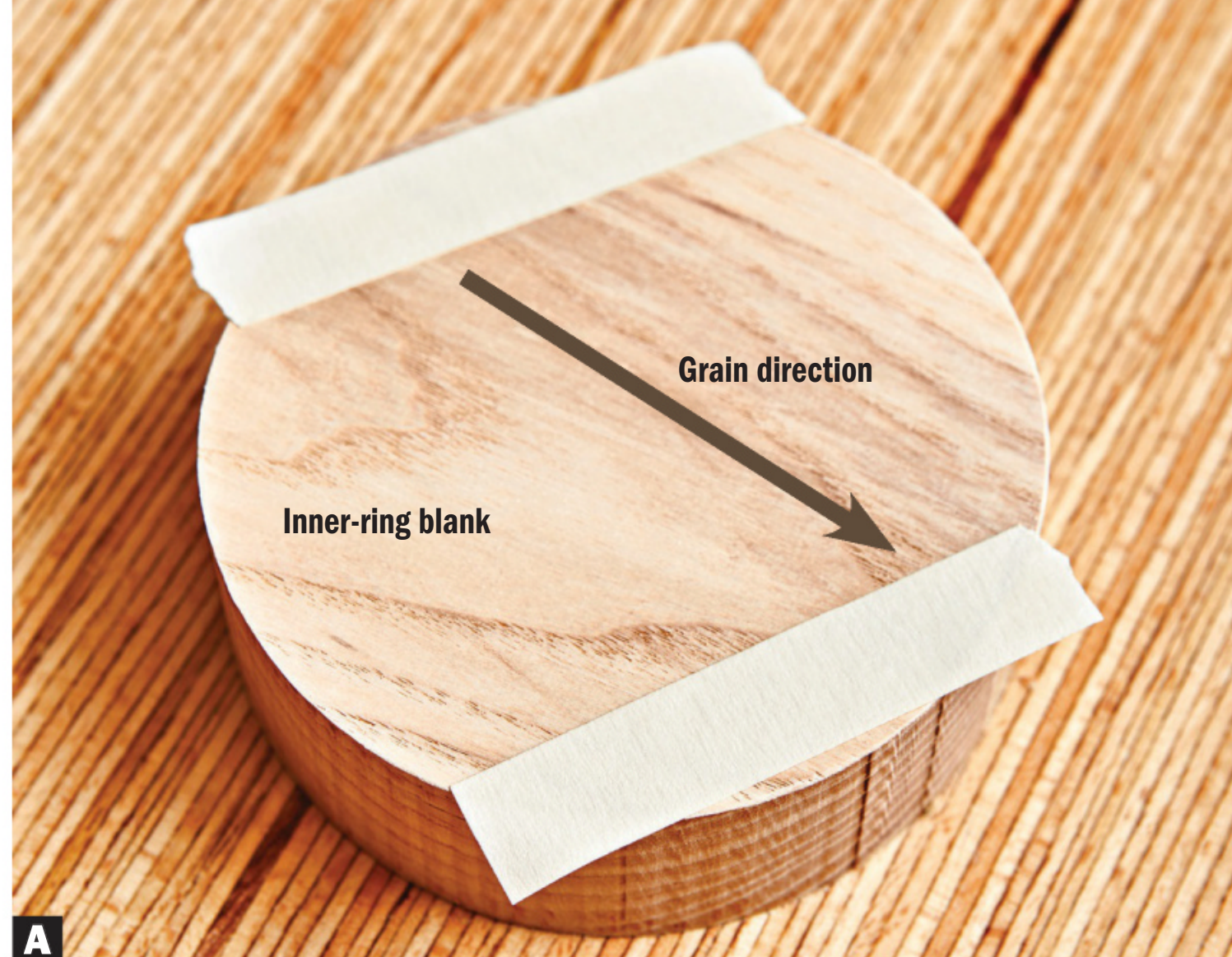
1 Bandsaw a 1½"-thick ash blank 4⅝" in diameter for the inner ring and a 1×7⅛" ash blank for the outer ring. For the base, finial, and spacers, prepare 3×3×4", 1×1×5", and 1×1×2" walnut blanks.

2 Cut an 8"-diameter disc of ¾" MDF and mount it to a faceplate, centered. Mount the inner-ring blank to the MDF [Photos A, B].

3 Set the lathe to 1,000 rpm. With a square-nose scraper, turn away the ring interior [Photo C]. Check the interior with calipers to ensure the walls do not taper [Photo D]. Work until the clockworks friction-fits the opening.

4 Using a spindle detail gouge, turn the outside to 4½" diameter [Photo E]. Use calipers to check for consistent thickness.

5 Mark a centerline around the ring's circumference. Using the lathe's indexing



A Adhere two 3"-long strips of double-faced tape to one face of the inner-ring blank at a 45° angle to the grain.



B Using the tailstock to help align the blank and press it in place, center the blank on the MDF faceplate.



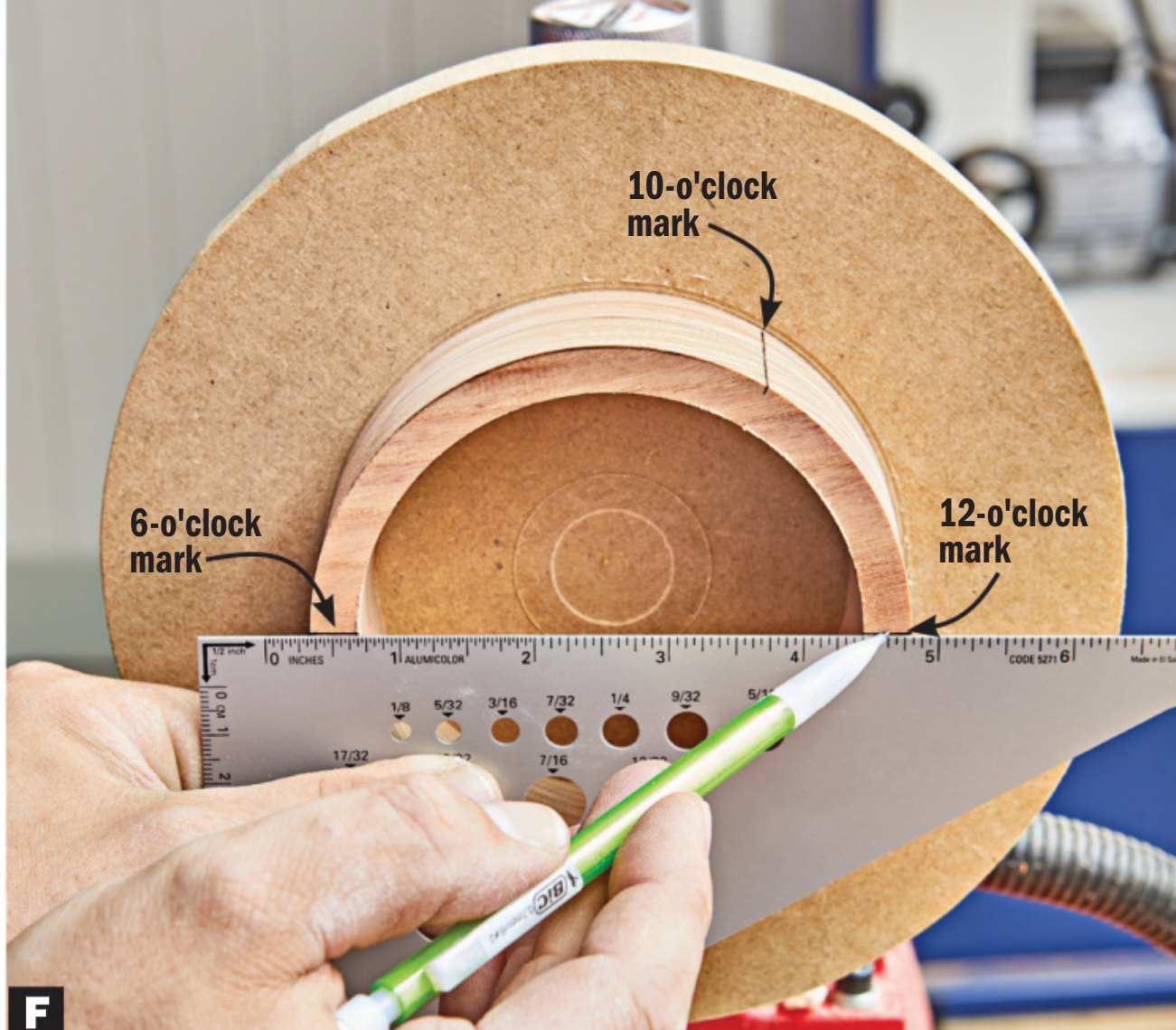
C Keep the tool parallel to the lathe bed both up and down and side-to-side. Make the first cuts near the center and on the horizontal centerline. Then, raise the tool rest to cut just above the centerline.



D Set calipers to match the diameter at the bottom of the ring. There should be no binding or gaps as you pull them outward.



E With the flute mostly closed, position the bevel parallel to the outside face. Push the gouge forward with your rear hand and the tool will cut, from right to left, parallel to the bevel.



F Align a straightedge with two opposing marks and mark onto the face of the ring. You'll use these marks later when drilling the ring.

► The dimple left by the centerpunch remains even after sanding and registers a drill bit later.

system, locate and mark lines intersecting the circumference line at the 12-, 4-, 6- and 10-o'clock positions. Centerpunch each intersection, and transfer the lines to the face [Photo F].

6 Sand the inside and outside walls, but not the face you just marked. Remove the ring from the faceplate.



G Define the half-cove and the base length with marks $2\frac{5}{8}$ " and 3" from the right end of the blank.



I Drill past the parting cut. Sand the base, then complete the parting cut, creating a slight undercut on the bottom of the base.

7 Mount and hollow the outer-ring blank in the same manner, creating a 5" inside diameter and a $6\frac{7}{8}$ " outside diameter.

8 As with the inner ring, mark a centerline on the circumference, and two intersecting marks 180° apart. Centerpunch the intersections, and transfer the opposing marks to the ring face. Sand the inside and outside walls, but not the marked face.

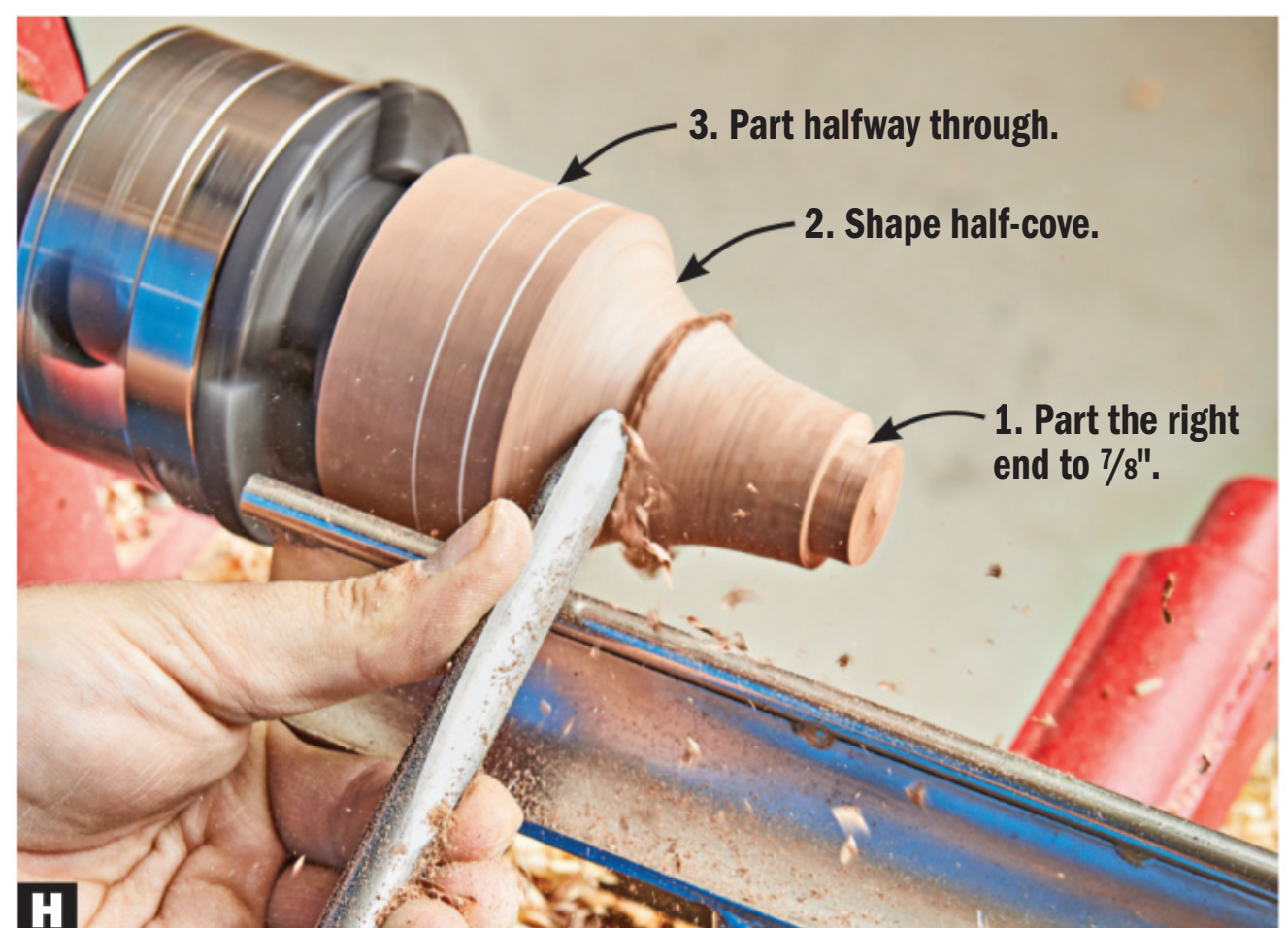
Give it a leg to stand on

1 Set the lathe speed to 2,000 rpm. Mount the base blank ($3 \times 3 \times 4$ ") between centers. Turn it round using a spindle roughing gouge. With a parting tool, create a $\frac{1}{4}$ "-long tenon on the end to fit your four-jaw chuck.

2 Grip the tenon in the four-jaw chuck and true the right end with a skew chisel. Mark lengths where shown [Photo G], then shape and drill the base [Photos H, I]. After parting off, countersink the bottom of the base for a #8 screw.

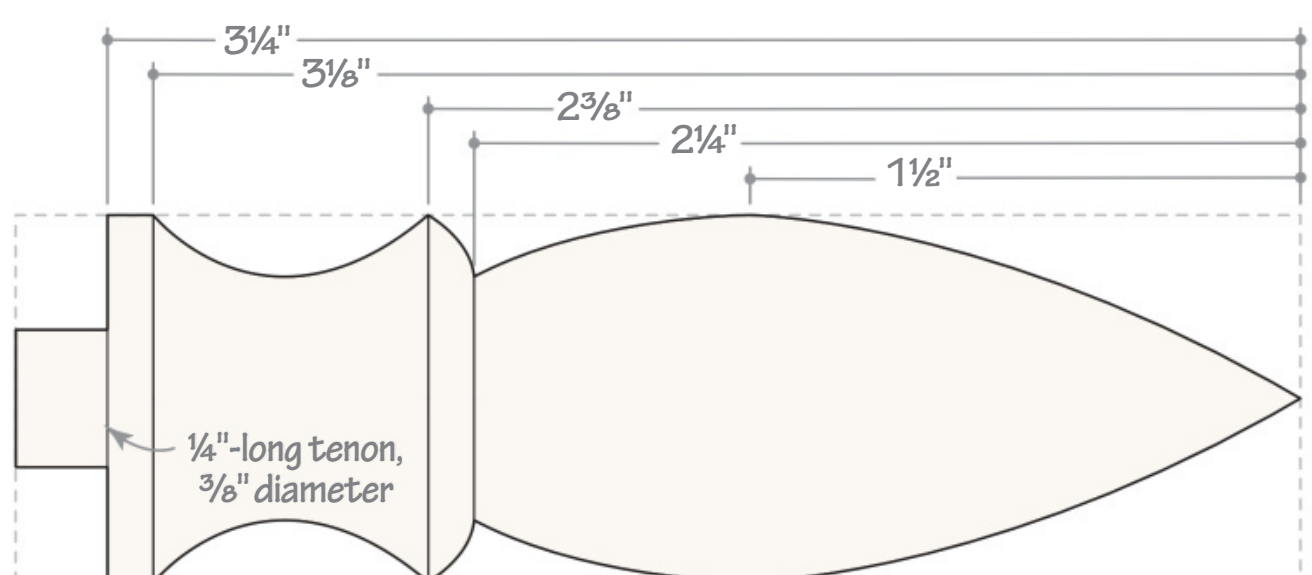
3 Mount the $1 \times 1 \times 5$ " finial blank in a four-jaw chuck with the jaws gripping the flats of the blank. Mark the dimensions shown in the **Full-size Pattern**, below. Shape the finial following the steps in Photos J-N.

► Undercutting the base forms a slight hollow, ensuring the base sits flat without wobbling.



H Part down to $\frac{7}{8}$ " diameter on the right end. Then, with a spindle detail gouge, shape a half-cove from the right line to the parting cut. Establish the base's length by parting to the left of the left line.

FINIAL FULL-SIZE PATTERN





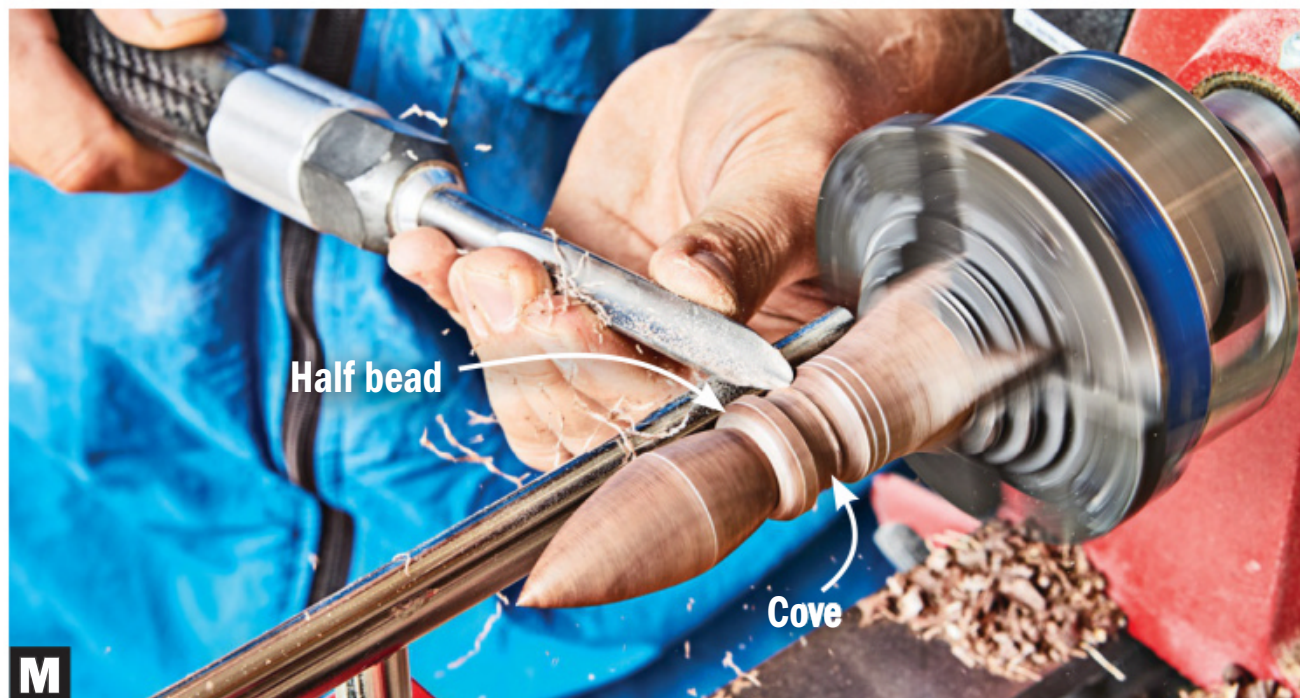
J With a skew chisel, shape a $\frac{1}{8}$ "-deep V $\frac{1}{4}$ " wide centered on the $2\frac{1}{4}$ " mark. Round over from the $2\frac{3}{8}$ " line to the bottom of the V.



K Round from the $1\frac{1}{2}$ " line to the bottom of the V. Leave the line intact.



L Form a smooth arc from the $1\frac{1}{2}$ " line to the right end of the blank, creating a pointed end.



M Switch to a spindle detail gouge and turn a $\frac{3}{16}$ "-deep cove between the $2\frac{3}{8}$ " and $3\frac{1}{8}$ " lines.



N With a parting tool, create a $\frac{3}{8}$ "-diameter tenon to the left of the $3\frac{1}{4}$ " line. Sand the finial, then part it off.

4 Mount the spacer blank in your four-jaw chuck and, using a spindle roughing gouge, turn it to $\frac{7}{8}$ " diameter. Flatten the end with a skew chisel.

5 Mount a drill chuck in the tailstock and drill in the blank a $1\frac{3}{4}$ " hole 1" deep. Make shallow parting cuts to define the two $\frac{1}{4}$ "-long spacers, sand the spacers smooth, then part them from the blank.

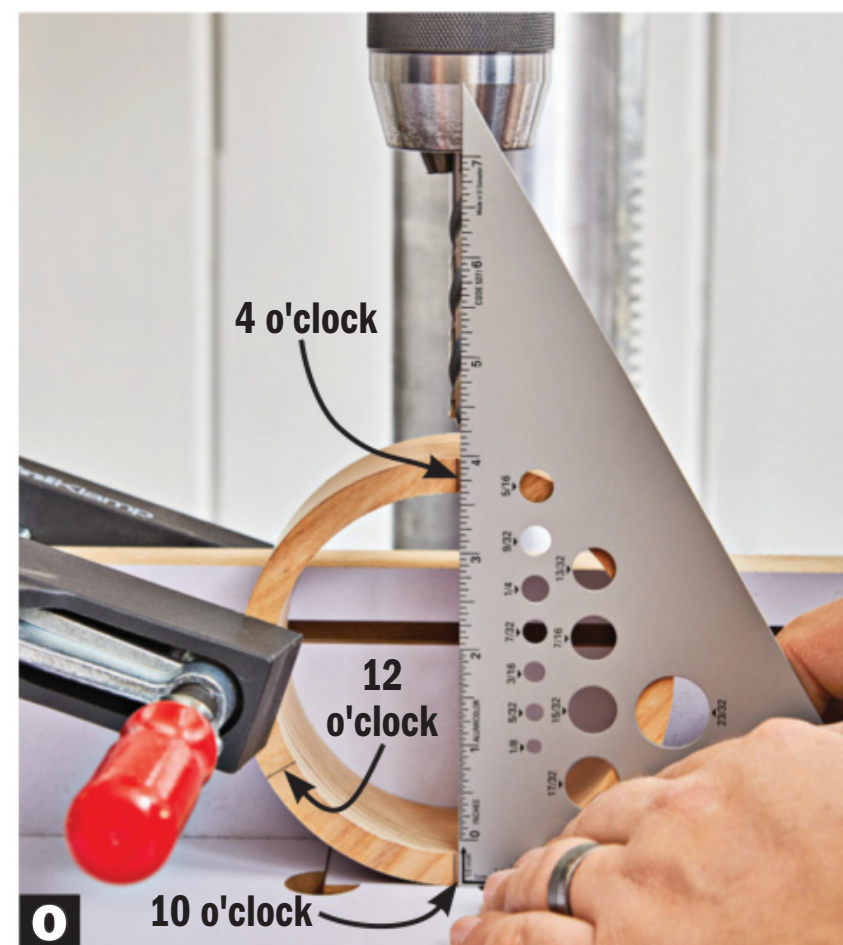
Rig the rings for drilling

1 Install a $\frac{1}{4}$ " drill bit in your drill press. Align the 4- and 10-o'clock lines on the inner ring with the drill bit [Photo O], and the bit with the centerpunched dimple; then, drill a hole. Repeat this procedure to drill holes in the inner ring at the 6- and 10-o'clock positions. Switch to a $\frac{3}{8}$ " bit and drill a hole at the 12-o'clock position.

2 Reinstall the $\frac{1}{4}$ " bit and drill and countersink holes in the centerpunched marks on the outer ring.

3 Sand the faces of the rings smooth, and apply a finish to all pieces. (We sprayed on three coats of aerosol satin lacquer.)

4 Assemble the clock frame by inserting a binding post inside the inner ring at the 6 o'clock position. Put a drop of blue thread locker or cyanoacrylate glue in the post, and secure the base to it with a $\#8 \times 2\frac{1}{2}$ " flathead brass machine screw.



O Use a square to align both marks on the face of the ring with the drill bit. Clamp the ring to the fence before drilling.

5 Insert binding posts at the 10- and 4-o'clock positions, apply thread locker, and place a spacer over each post. Trap the spacers with the outer ring, and secure them with $\#8 \times \frac{5}{8}$ " flat-head brass machine screws. Snug the screws enough to hold the outer ring in position, but allowing it to rotate with light effort.

6 Glue the finial into the remaining hole in the inner ring and press the clockworks into place. Let your new timepiece command a prominent position in your quarters. 🌳

Source: Gimbal clock kit includes clockworks, binding posts (3), $\#8 \times \frac{5}{8}$ " flathead brass machine screws (2), $\#8 \times 2\frac{1}{2}$ " flathead brass machine screw (1), Kit no. RS-01292, \$39.95, woodstore.net/gimbalclock, 888-636-4478

Tip! Sand a too-snug spacer on sandpaper adhered to a flat surface.

Produced by **Craig Ruegsegger** with **Brian Simmons**
Project design: **Douglas Gillie**, Halifax, Nova Scotia
Illustrations: **Lorna Johnson**

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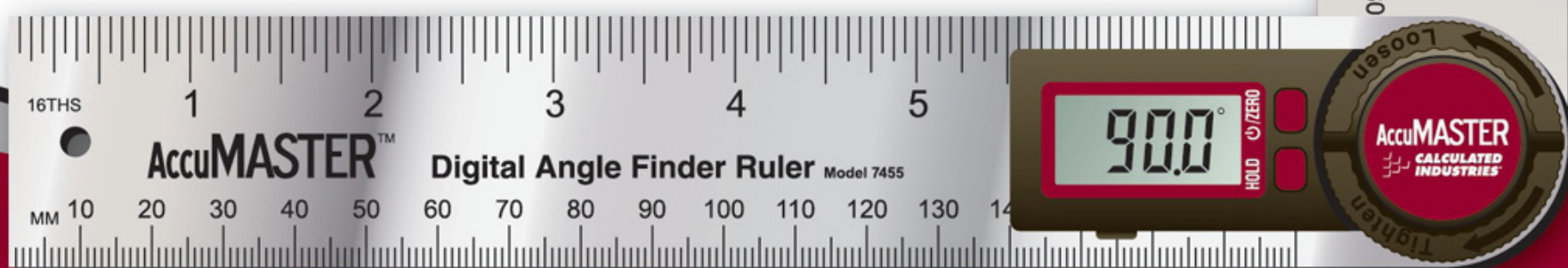


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As Seen In
Wood Magazine, No. 258

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TOOLS & MATERIALS

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Pick and Roll



These heavy-duty stacking systems keep you organized in—and out of—the shop. Each box sells separately, but they all stack and lock together for easy two-wheeling of the whole stack. (The roller-box handle collapses, if needed.) Most boxes include trays or bins within, making it easy to store accessories for specific tools in the same box as those tools.

Milwaukee Packout, \$375 as shown

(bottom to top) Rolling tool box, no. 48-22-8426, \$130; large tool box, no. 48-22-8425, \$80; regular tool box, no. 48-22-8424, \$70; regular organizer, no. 48-22-8430, \$35; compact organizer, no. 48-22-8435, \$30 each.

The six boxes shown fit just about anything, from circular saws to cordless drills to bits, blades, and screws.

The organizer boxes contain removable bins—great when you don't want the whole box on the workbench—and the cleverly designed lids keep the contents of each bin from spilling, even if some bins are removed. We like these organizer bins for storing screws, dowels, biscuits, hardware, and all sorts of small woodworking supplies.

The bigger boxes work great to keep portable power tools together and off the workbench, and the rolling tool box glides smoothly over small obstacles. The boxes uncouple quickly to get to the one you want, so you don't have to start at the top each time. Choose from more than two dozen components, including canvas bags with hard-plastic bottoms, wall-mount connectors, a cooler, and battery-powered vacuum, LED/charger, and Bluetooth radio/charger—all of which fit together. (Milwaukee launched boxes with drawers too late to be included in this review.)



Milwaukee
800-729-3878, milwaukeetool.com

DeWalt ToughSystem 2.0, \$227 as shown

(bottom to top) rolling toolbox, no. DWST08450, \$90; extra-large toolbox, no. DWST08400, \$72; large toolbox, no. DWST08300, \$65.

These three toolboxes lead the second generation of DeWalt's ToughSystem storage line and are fully compatible with first-generation products. They lock together securely, although not quite as firmly and easily as the Milwaukee units. The rolling toolbox holds a lot of tools and glides over power cords and floor cracks nicely. The top two bins include trays and lidded bins for more versatility. DeWalt offers more than a dozen other sizes of toolboxes and organizers (in the ToughSystem first generation); wall racking for mounting to the walls of a shop, work van, or trailer; a drink cooler; and battery-powered radio/charger.

DeWalt
800-433-9258, dewalt.com





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7 Ways Our Amazoy™ Zoysia Lawn Saves You Time, Work and Money!

1 CUTS WATER BILLS AND MOWING BY AS MUCH AS 2/3

Would you believe a lawn could look perfect when watered just once? In Iowa, the state's biggest Men's Garden club picked a Zoysia lawn as "top lawn – nearly perfect." Yet, this lawn had been watered only once all summer to August!

In PA, Mrs. M.R. Mitter wrote, "I've never watered it, only when I put the plugs in...Last summer we had it mowed 2 times...When everybody's lawns here are brown from drought, ours stays as green as ever." *That's how Amazoy Zoysia lawns cut water bills and mowing! Now read on!*

2 NO NEED TO DIG UP OLD GRASS

Plant Amazoy *your way* in an old lawn or new ground. Set plugs into holes in the soil checkerboard style. Plugs spread to create a lush, thick lawn, driving out weeds and unwanted growth. Easy instructions included with every order.

3 ENVIRONMENTALLY FRIENDLY

No weeding means no costly chemicals. Since Amazoy Zoysia lawns naturally resist insects, you'll save money, while helping to protect the environment. You'll never have to expose your family and pets to the risk of weed killers and pesticide poisons.

4 FOR SLOPES, PLAY AREAS, BARE SPOTS AND PARTIAL SHADE

You can't beat Amazoy Zoysia as the low-cost answer for hard-to-cover spots, play-worn areas, places that have partial shade and erosion on slopes.

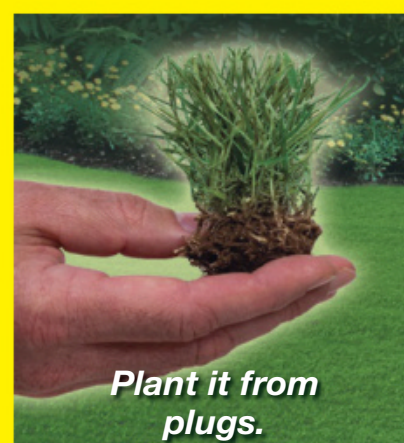
Meyer Zoysia Grass was perfected by the U.S. Gov't, released in cooperation with the U.S. Golf Association as a superior grass.

5 IT STAYS GREEN IN SPITE OF HEAT AND DROUGHT

"The hotter it gets, the better it grows!" Plug-in Zoysia thrives in blistering heat, yet it won't winter-kill to 30° below zero. It just goes off its green color after killing frosts, and begins regaining its green color as temperatures in the spring are consistently warm.



Thrives from partial shade to full sun.



Plant it from plugs.

6 CHOKES OUT CRABGRASS AND WEEDS ALL SUMMER

Your established Amazoy Zoysia lawn grows so thick, it simply stops crabgrass and most summer weeds from germinating!

7 NOW 3 WAYS TO START YOUR AMAZOY ZOYSIA LAWN!

1) **Freestyle plugs** come in uncut sheets containing a maximum of 150 - 1" plugs that can be planted up to 1 ft. apart. Freestyle plugs allow you to make each plug bigger and plant further apart – less cutting and planting – you decide.

2) **New Super Plugs** come precut into individual 3"x3" plugs ready-to-plant (minimum 1 per 4 sq. ft.). They arrive in easy to handle trays of 15 Super Plugs. Save more time and get your new lawn even faster!

3) **Amazoy Approved Seed-As** The Zoysia Specialists for 60+ years, we finally have a Zoysia seed available that meets our standards and homeowners expectations.

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Guaranteed to grow new green shoots within 45-60 days or we'll replace it FREE – for up to 1 year – just call us. Guarantee is valid on one order at a time, typically the most recent. We ONLY ship you hardy field grown genuine Amazoy Zoysia grass harvested direct from our farms. Easy planting and watering instructions are included with each order.

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Freestyle Plugs You decide how big to cut the plugs. Each grass sheet can produce up to 150-1 in. plugs. Plant minimum 1 plug per sq. ft.

Max Plugs	Free Plugs	Grass Sheets	Your PRICE	+ Shipping	SAVINGS
300	—	2	\$29.95	\$16.00	—
500	+100	4	\$50.00	\$18.00	25%
750	+150	6	\$66.00	\$22.00	36%
1100	+400	10	\$95.00	\$33.00	44%
2000	+1000	20	\$165.00	\$54.00	52%

Super Plugs Precut plugs 3 inches by 3 inches READY TO PLANT Packed in trays of 15 Super Plugs. Plant minimum 1 plug per 4 sq. ft.

Super Plugs	Free Plugs	Tray	Your PRICE	+ Shipping	SAVINGS
15	—	1	\$24.95	\$12.00	—
60	+15	5	\$90.00	\$24.00	35%
95	+25	8	\$110.00	\$34.00	49%
120	+30	10	\$125.00	\$40.00	53%
180	+45	15	\$180.00	\$54.00	56%

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Make clean, low-angle pocket holes in a snap

Pocket-hole machine, no. 110, \$399

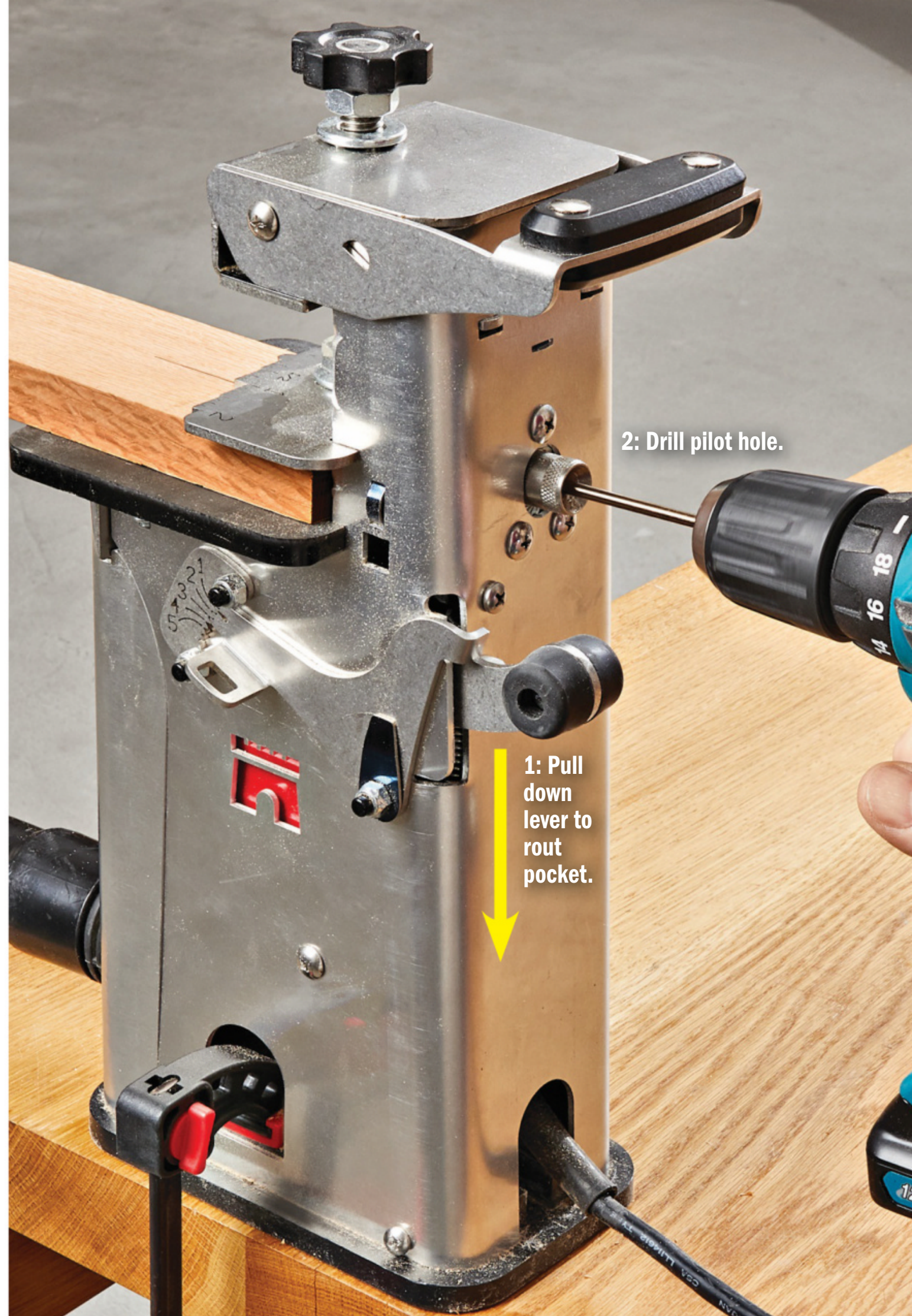
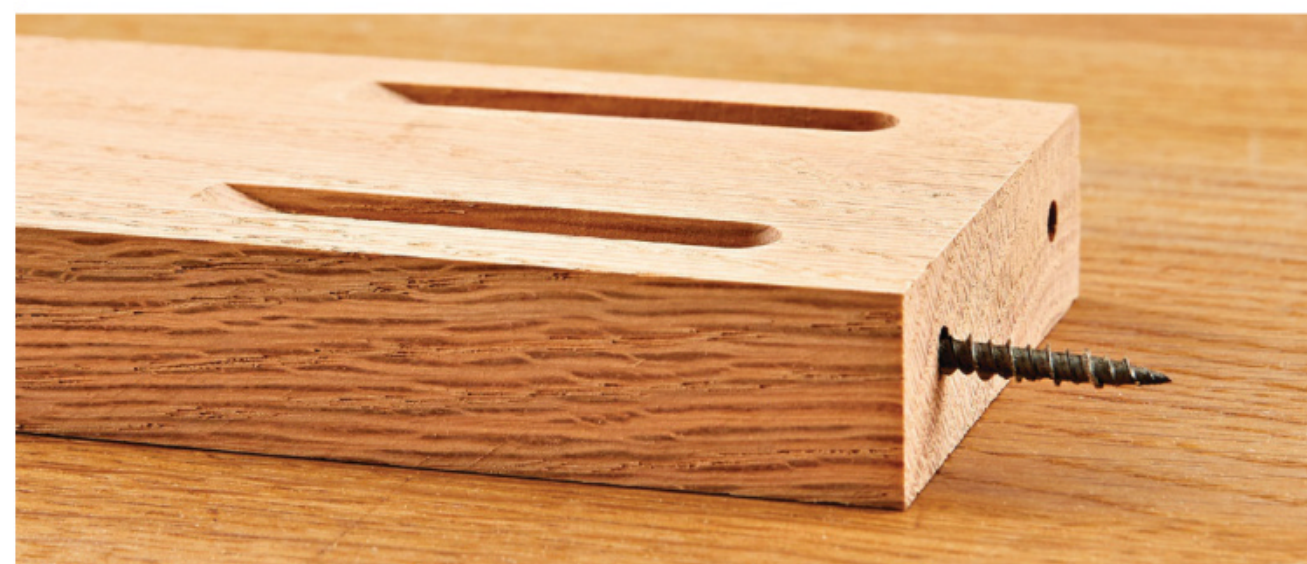
Unlike most pocket-hole jigs, which bore pockets at a 15° angle, the Castle 110 makes them at a 3° angle, as shown *below*. This shallower pocket means I can use longer screws (more bite into the mating workpiece) without fear of breaking through the face.

This machine uses a mini-router to cut cleaner pockets than you typically get with a drilling jig. But that requires a two-step process to first rout the hole, then drill the pilot hole, as shown at *right*. I love the cylindrical heads of Castle's cheese-head screws because the smaller-diameter heads seat low enough in the holes that they never stand proud of the workpiece surface.

The 110's clever cam-style hold-down holds workpieces securely, and a built-in scale makes it easy to line up cuts. A rubber grommet at the bottom front of the machine provides an easy connection for effective dust collection. And the machine mounts securely to your workbench thanks to built-in clamp pockets in its base.

—Tested by John Olson, Design Editor

Castle
707-765-0982, castleusa.com



I hear a symphony (and less noise)

Bluetooth earmuff hearing protection, \$80

I've used many types of music-enabled hearing protection over the years, and have found it hard to find one with a good combination of noise blocking, comfort, and good sound quality. These Isotunes Link earmuffs achieve all three. I wore them comfortably for several hours at a time, and they effectively blocked out excessive machine noise—they spec a 24-decibel noise reduction rating (NRR). And the sound quality proves excellent when Bluetooth-linked to my smartphone. With my phone in the shop, I could venture 50–60' into the house (including past three walls) before the signal broke up; outside with no walls to interrupt, the signal stretched to 100'.

A built-in rechargeable lithium-ion battery powers the unit and lasts all day. It recharges fully in two hours.

—Tested by Bob Hunter, Tools Editor

Isotunes
317-740-0419, isotunes.com



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Adding a separator between a dust collector and the machine creating dust and chips helps to divert most of this debris before it reaches the collector's filter. With this unit, the rocket-like cone spins as dusty air moves across it, and this disturbance allows heavier particles to drop into the collection bin. Jet sells this separator as a kit to attach to your own bucket or small drum, or as a complete unit with a 30-gallon steel drum. Both have 4" ports and come with all needed hardware.

Jet
800-274-6848, jettools.com

Teknatool launches next generation of lathe chucks

Pro Tek G3 chuck, no. 48290, \$140; Pro Tek Supernova2 chuck, no. 23262, \$180

More than 30 years after creating the first self-centering four-jaw lathe chuck, Teknatool rolls out new chucks and accessory jaws in the Pro Tek line. The company says these chucks feature rust-resistant nickel plating, stronger and more versatile 50mm/2" jaws with an improved dovetail and serrated profile, and upgraded star-drive fasteners for securing jaws to the chucks. These chucks require a threaded insert (not included) to fit your lathe's spindle threads. Each chuck comes with a 6-year warranty.

Teknatool
866-748-3025, teknatool.com





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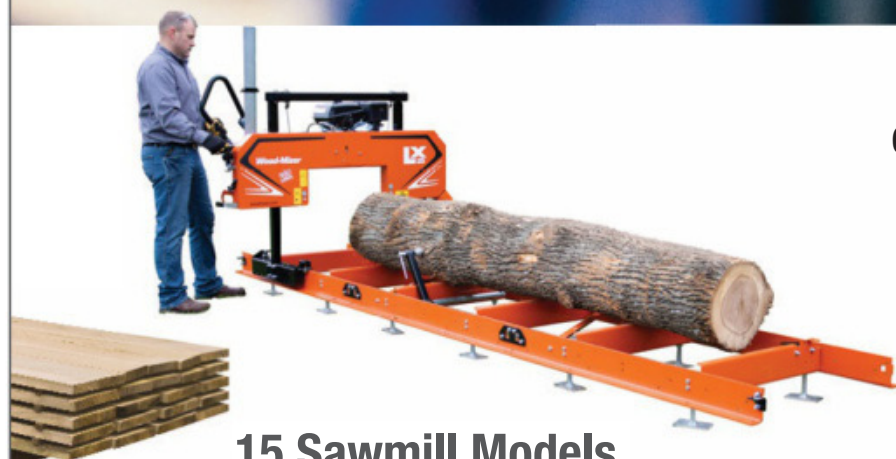
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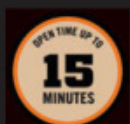


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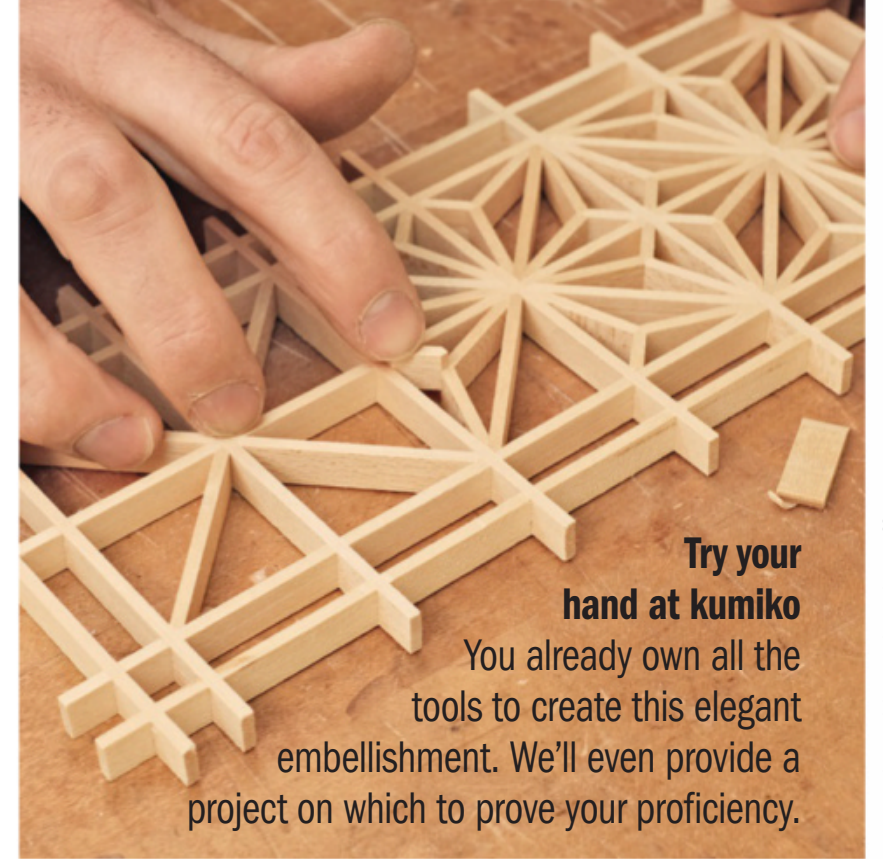
WHAT'S AHEAD

A GLIMPSE INSIDE THE JULY ISSUE (ON SALE MAY 7)



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Learn three easy ways to use this ancient, but newly popular, form of joinery in your projects.

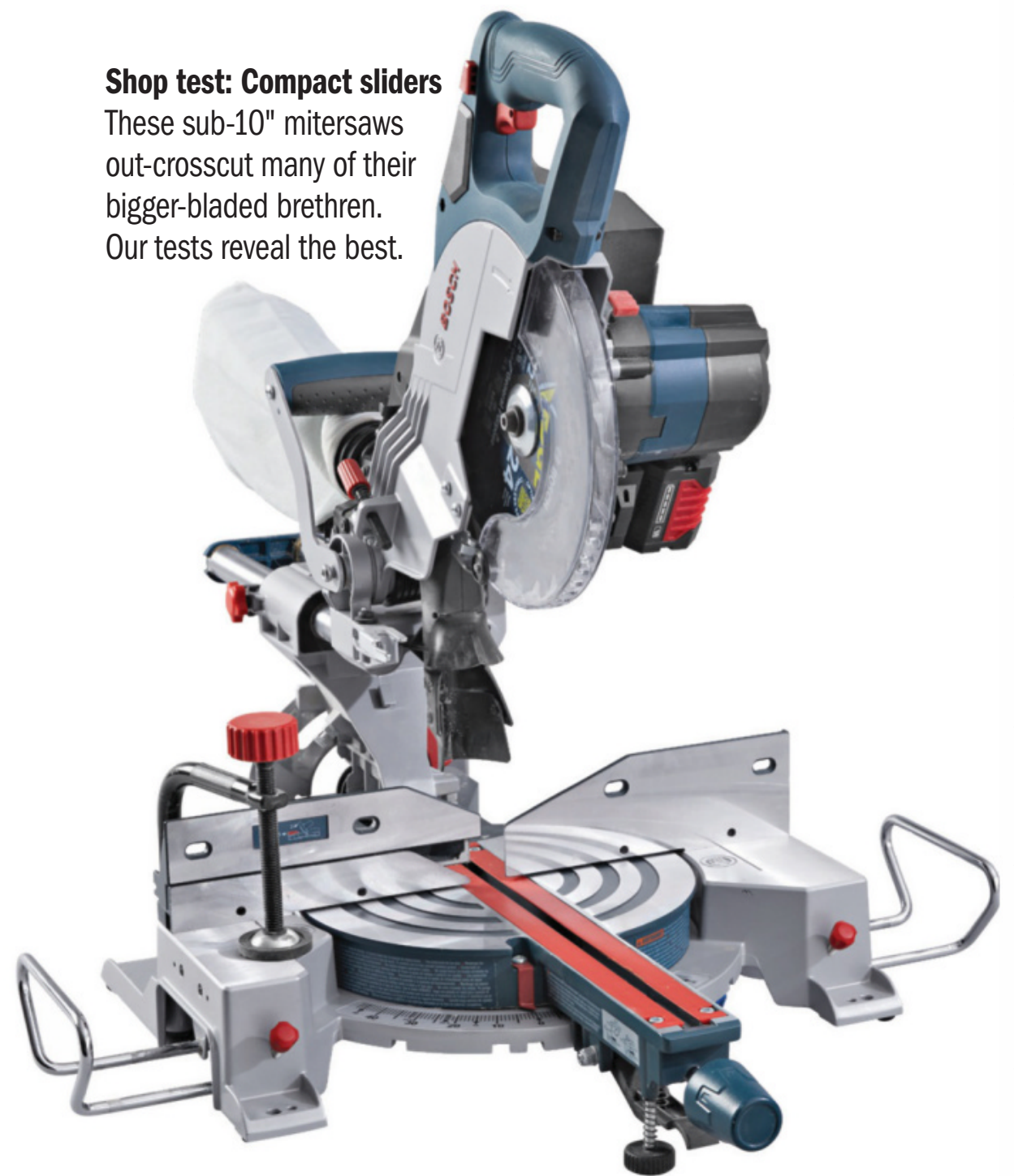
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