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ISSUE 263 OCTOBER 2019

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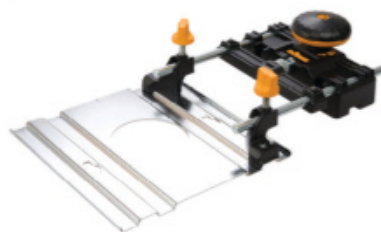
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The Next 35

With this issue, **WOOD**® magazine celebrates its 35th birthday. It's a milestone, to be sure, but you won't see us splashing a commemorative logo on the cover all year, or dedicating a bunch of pages in this issue to a retrospective of our history. It's certainly a storied one, but you read **WOOD** for shop-proven projects and to improve your skills, not for a bunch of self-absorbed navel-gazing.

So, instead of looking back at the *past* 35 years, I thought it might be fun to look ahead at what we'd like to see happen in the woodworking world in the *next* 35 years:

- Sandpaper that, like a toothbrush, changes color when it's worn out so you know when to replace it.

- Telescoping bar clamps that stretch out to tackle a big dresser glue-up and compress for smaller jobs, such as a gift box, without the excess bar hanging out everywhere.

- Titebond 4, a waterproof woodworking glue with unlimited open time that cures instantly when blasted with coffee breath.

- The wireless shop, where power tools operate on energy transmitted through the air via inductive coupling, not through wires or on-board batteries. (See also *the ductless shop*, with hose-free dust collection.)

- An electrostatically charged finish that repels dust particles until it's completely cured. Oh, and you can slop it on with a mop and it levels perfectly.

- 3D-printed lumber made of real wood. Botched the joinery on that waterfall joint?

Simply print an identical workpiece and try again.

- A noise-cancelling shop radio, which, just like today's headphones, creates "anti-noise" that negates the need for in- or over-the-ear hearing protection. Or, failing that, we'd settle for:

- Multi-pairing smartphones, which play music through both the shop stereo and Bluetooth-equipped hearing protection at the same time, for seamless audio transitions into and out of the power-tool zone.

- A self-sealing dust collector that detects when the bin is full, then compresses and bales the contents in a disposable bag. Think "Diaper Genie," but for sawdust.

- Shop classes taught in every school.

Some of these predictions may seem wildly implausible, but we thought the same thing about skin-sensing tablesaws and battery-powered routers only a few years ago. And Tesla (Nikola, not the car company) successfully transmitted electricity through the air more than 120 years ago.

I'd love to hear your vision for Future Woodworking World. Drop me an email on the subject, or message me on social media.

See you in the future,



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Boring, Abrasive, & Flawed

No, not you. I wasn't talking about you.
Don't go away mad. Let me explain.

Boring

What I really meant was drilling! That is to say, I really like your bits.
Wait! That came out wrong. Ugh, just read these...

Drill Spot-on Holes woodmagazine.com/spotonholes

6 Essential Drill Bits woodmagazine.com/6bits

Video: Drill-press Basics woodmagazine.com/drillpressbasics

Video: Trick Out Your Drill Press woodmagazine.com/drillpressupgrade

Video: Drill Shelf-support Holes woodmagazine.com/shelfpinmethods

Abrasive

When I say "sandpaper," I'm not saying you rub me the wrong way. I'm saying that you, um, have grit. And, uh, that you're fine. Definitely not coarse.

The Nitty-gritty of Sandpaper woodmagazine.com/nittygritty

Which Grits Should I Use? woodmagazine.com/whichgrits

Hand-sanding Success woodmagazine.com/handsanding

Sanding Discs Reviewed woodmagazine.com/sandingdiscs

Sand for a Perfect Finish woodmagazine.com/sandsmooth



Flawed

Look, flaws can be features. Not that you have flaws! You're not flawed. Anyway, flaws can be fixed. No! You don't need to be fixed. I'll just shut up now.

Making Nice with Knots woodmagazine.com/knots

Working with Natural-edge Slabs woodmagazine.com/naturaledge

Fixing Flaws in Film Finishes woodmagazine.com/finishflaws

Rescuing Discarded Lumber woodmagazine.com/salvagelumber

Dealing with Wood Defects woodmagazine.com/wooddefects



Cat Pen Kit Steampump Pen Kit Baseball Pen Kit DuraClick EDC Pen Kit

Aromatherapy
Necklace Kit

Measuring Spoon Kits

Discover the joy of making stunning lathe turned projects. From pens to crochet hooks to seam rippers to measuring spoons, the creative possibilities are endless. These small projects are easy to make on a woodturning lathe and are great to sell at craft shows or give them to friends and family as one of a kind gifts. We supply all the metal kit components and you make the project kit with any wood or plastic material and in any color you want.



“Wow! You Made Those?”

Cat Twist Pen Kit A great gift for cat lovers! Features a tail clip, sleeping cat on top, cat silhouettes on the center band and paws on the tip.

3 Cat Twist Pen Kit Starter Set

You get one of each Cat pen kit in Chrome (shown above), 24kt Gold and Antique Pewter. Plus, you get the bushings and drill bit you need to make the pens.

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Steampump Click Pen Kit With its unparalleled level of detail and striking design, this a must have creation for any Steampunk enthusiast. Inspired by the steam engine, the pen reliably extends and retracts using a steampump action click mechanism. The pen also features an intricately casted Victorian clock surrounded by gears and pipes, machined through-holes and rivets to complete the steampunk look.

3 Steampump Pen Kit Starter Set

You get one of each Steampump Pen Kit in Oil Rubbed Bronze & Antique Brass (shown above), Antique Pewter & Antique Brass and Antique Brass & Antique Pewter. Plus, you get the drill bit and bushings you need to make the pens

#PKSPASS **SAVE \$25.80 Only \$89.95**

Baseball Pen Kit Features a batter casted into the pen end, baseball bat pen clip, baseball stadium and field casted on the pen top, baseball on the pen tip and a “Curveball” Bolt Action mechanism.

3 Baseball Pen Kit Starter Set

You get one of each pen kit in Antique Pewter (shown above), Antique Brass and Chrome. Plus, you get the bushing and drill bit you need to make the pens.

#PKBASESS **SAVE \$14 Only \$59.95**

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5 DuraClick EDC Pen Kit Starter Set

You get one of each DuraClick EDC Pen Kit in Black Anodized Aluminum (shown above), Aluminum, Burnt Bronze Anodized Aluminum, Stainless Steel and Brass. Plus, you get the drill bit and bushings you need to make the pens.

#PKEDCSS **SAVE \$18 Only \$69.95**

Aromatherapy Necklace Kit Enjoy the benefits of Aromatherapy everywhere you go. Just add a few drops of your favorite essential oil to the cotton wick to absorb the oil. Unscrew the top of the kit and add the wick inside. Each kit Includes 5 wicks, a 28” chain, gift pouch and an empty 2ml sample jar (essential oil not included).

5 Aromatherapy Necklace Kit Starter Set

You get one of each Aromatherapy Necklace Kit in Satin Chrome (shown above), Chrome, 24kt gold, Rose Gold and Raw Brass. Plus, the bushings and drill bit to make the kits.

#PKATHNSS **SAVE \$10 Only \$57.65**

Measuring Spoon Kits - Set of 4 Create these must-have kitchen essentials for a fun and useful gift. Spoon set includes four of the most common measuring spoon sizes; 1/4-tsp, 1/2-tsp, 1-tsp and 1-Tbs. They sit on a handy chrome ring and you can detach them for individual use. Plated with durable, food safe chrome.

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Shop students build boards



From left to right, Alyssa Fiantaco, Andrew Johnson, Blake Felton, and Mateo Szpytek show off a few of the stand-up paddleboards they and their classmates built in woodshop class at Henry Ford II High School.

As a woodshop teacher, I'm required to do all kinds of professional development but none of it has anything to do with woodworking. I think it's good for woodworking teachers to challenge themselves and change up the projects. So, when I saw on Instagram a guy named Jason Thelen, who makes amazing hollow wooden stand-up paddleboards, I called him and asked if I could come work with him for a week to learn how to build them. He agreed, and it was money well spent.

At the start of the school year, I showed my classes the boards Jason builds, and they were

excited! The students worked in small groups designing and building the boards, and Jason has been an excellent mentor to my program. We are also building skateboards and snowboards; check us out on Instagram @henryfordiiwoodworking. The first board we built was donated to a suicide prevention auction and it sold for \$1,500. Another of our boards went to Kristy Petrillo, host of HGTV's Cabin Reno show.

—**Chris Davis**
Henry Ford II High School
Sterling Heights, Mich.



Hover your phone's camera over the smart code to see video of the students building boards, or visit woodmagazine.com/paddleboards

Timely arrival, untimely departure

As a U.S. Marine stationed at MCB Quantico, Va., I'm learning woodworking through a volunteer program where we build shadow boxes, displays, furniture, etc., from hardwood harvested on base. Dr. Todd Holm, one of my mentors, runs the program.

On February 3 of this year, I received a copy of issue 257 (November 2018), which contained plans for the Contrasting Corners Dovetailed Box. I'll always remember that date, because my father passed away unexpectedly that same evening. In keeping with his wishes, my father was cremated,

so I built this urn for him using those dovetailed-box plans as a guide. My box measures 7½x9¼x11½". I used zebrawood for the sides and walnut for the corners, and inlaid the letter "M" in brass on the front.

This was a challenging piece, and I think it turned out well. Our family is proud to have this piece honoring my father's memory, and I couldn't have done it without your help. Thank you.

—**Capt. Joe Masini**
Quantico, Va.



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SOUNDING BOARD

YOUR VOICE



There's more than one way to weave a bowl

I loved your Woven Bowl project in issue 253 (May 2018), but I don't own all of the machines you used. So I had to be a little creative when crafting the segments that make up this bowl, which I made for a charity auction to support Grace House in Grand Rapids, Minnesota.

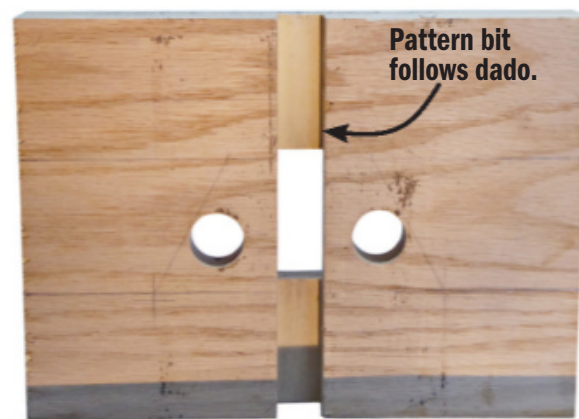
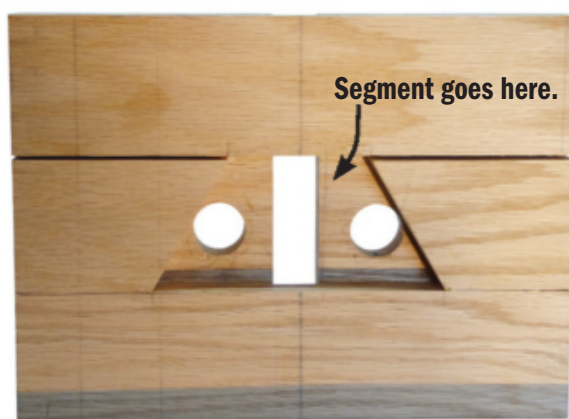
First, I laminated walnut stock to oak 1x3s, then used a planer to reduce the walnut to 1/16" thick. After miter-cutting the segments from these blanks, I made the jig shown in the photos.

A segment fits in the recess on one face, and a 1/2" pattern bit in my router rides in the groove on the opposite face. I used this jig to rout away the walnut, creating the gaps for the vertical oak pieces. Not quite as accurate as the method shown in the article, but it worked fine.

I make a lot of projects from your magazine. Sometimes I even closely follow the plans.

—Paul Williams

Inver Grove Heights, Minn.



Taking turning to new heights

I enjoy WOOD magazine and find it a source of both inspiration and information. However, in issue 261 (July 2019), the "Ask WOOD" column advises readers to position a lathe at waist height. I suspect that the woodturning community is uniformly in favor of an elbow height lathe.

—Paul Hirt
Salem, Ore.

The zones indicated in that article refer to the best typical tabletop height for each benchtop tool, Paul. Resting a benchtop lathe on a waist-high tabletop will place the spindle at about elbow height. Your mileage may vary.

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YOUR PROJECTS



Although she just started woodworking three years ago, **Laura Gower**, of New Glarus, Wis., created this 70x30" gaming table from hickory, with walnut, maple, and mahogany inlays. It was the first time she'd incorporated inlays and mortise-and-tenon joinery.



Ben Hackney, of Rice, Va., designed and built this ultrahip mid-century-style record cabinet from walnut.

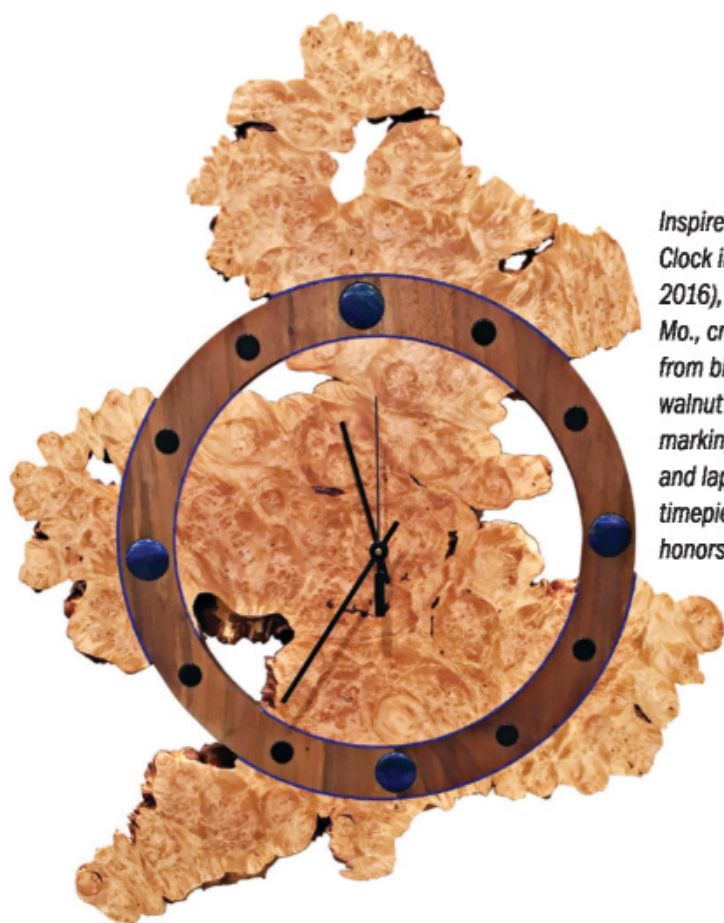


Ron Welch, of Miller, S.D., designed and built this "Murphy bed" for Ruby, the black Lab owned by his niece and nephew, Sara and Tom Viet. The half-faux dresser is screwed to the wall to prevent tipping.





This dresser is the first piece in a master-bedroom suite that **Sam Senter**, of New Orleans, is building. He made the drawer boxes and painted case from Baltic birch plywood; the drawer fronts and feet are solid walnut.



Inspired by the Big-time Wall Clock in issue 243 (November 2016), **Ira Papick**, of Rocheport, Mo., created his own version from big-leaf maple burl, with a walnut time ring. The hour markings are inlaid with onyx and lapis lazuli coin beads. His timepiece won third-place honors at a local art show.

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SOUNDING BOARD

YOUR SHOP

Owner Marc Manly calls it “the barn,” but you won’t find any animals inside. Rather, a spacious shop and a space to entertain—both as beautiful as the exterior—share the interior.

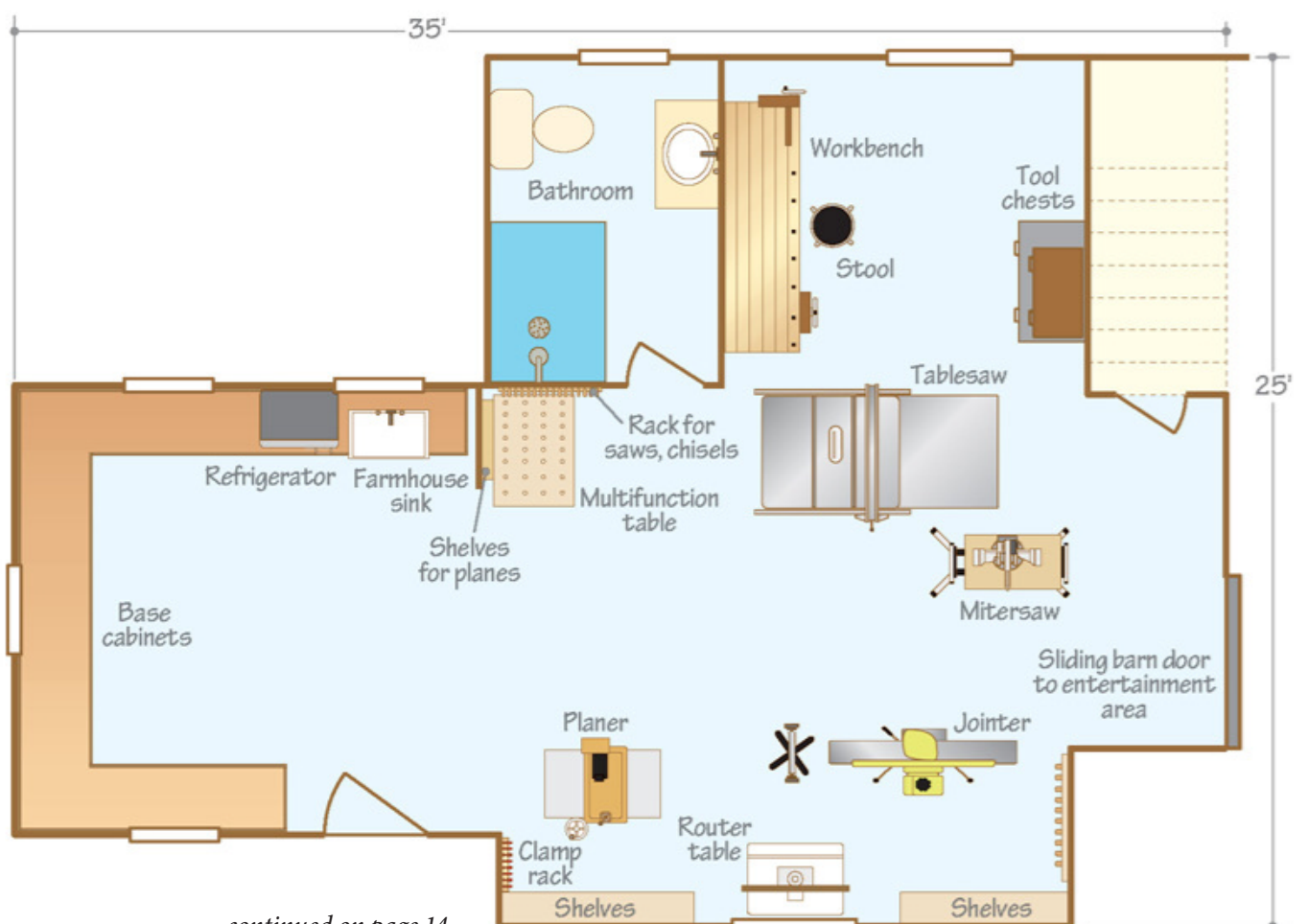


Kris Miller Photography for OakBridge Timber Framing

Timber-framed Dream Shop

In a southern Ohio backyard, a copper-roofed structure clad in stone invites you to come in and relax by the fireplace under the vaulted ceiling. The craftsmanship of an Amish timber-framing company wows guests—and provides the perfect setting for Marc Manly’s nicely appointed woodworking shop.

A rolling barn door separates the workshop from the entertainment area. At the opposite end, a room lined with base cabinets provides additional worksurfaces and storage, although it’s meant primarily for processing honey from Marc’s other hobby, beekeeping. Marc covered the shop walls with ½” medium-density overlay (MDO), an exterior-grade plywood with a smooth fiberboard facing. Lumber reclaimed from an old granary makes up the shop floor.



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Marc's main workbench sits in an alcove. Just around the corner, a Festool multifunction table provides more worksurface, and shelters his portable power tools stored below.



Exposed beams and reclaimed-lumber flooring create a warm environment. Marc made and installed all of the trim in the building. Tall windows and LED ceiling lights provide plenty of illumination.



The large shop area provides permanent locations for larger power tools while still allowing plenty of room to maneuver. The room farther back provides additional storage in base cabinets.



Kris Miller Photography for OakBridge Timber Framing

A rolling barn door, left, separates the shop from the comfortable and cozy entertaining areas and loft.

Placing the dust collector in the basement and hiding the dust-collection ductwork below the floor reduced clutter in the shop. Marc installed electronically activated blast gates in the ductwork that automatically open and close when a connected tool powers on or off.

For dust collection on portable hand tools, such as sanders, Marc relies on his Festool portable dust extractor. A ceiling-hung air filter helps capture dust that escapes the vac or central system.

Marc designed the shop space to accommodate his stationary tools without feeling

cramped. Since the shop is fairly new, he is taking his time figuring out storage options: "I am installing shelves and racks as I work and see what makes sense." Less-frequently used tools, project lumber, and garden equipment store in the basement.

One feature of his shop was built more for his wife—a bathroom with shower. "She would otherwise kill me bringing sawdust into the house." 🌳

Show us your shop

Send high-resolution digital photos of your shop to woodmail@woodmagazine.com and we may showcase it in the magazine!



Pounding nails and sawing wood since he was 6 years old, Marc Manly enjoys finish carpentry the most. A retired attorney, he also enjoys traveling and beekeeping.

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ASK WOOD

YOUR QUESTIONS

Are tools with lithium-ion batteries safe to use?

Q A battery-powered chainsaw or circular saw would be handy for me, but because of news stories about Li-Ion-powered phones, laptops, and hoverboards catching fire, I'm already leery about using my drills with these batteries. Am I over the top here?

—Chuck Stine, Hayward, Calif.



A We understand your concerns, Chuck, but you have little to worry about with your power tools. It is exceedingly rare for any type of Li-Ion-powered device to catch fire (less than 1 in 10 million for any type of device, according to Cadex Electronics, a manufacturer of battery charging and testing equipment). In other words, the odds of a properly manufactured Li-Ion battery catching fire are 14 times less likely than you being struck by lightning in a given year (1 in 700,000).

Know that problems with early cell phones and laptops have been resolved. Hoverboard fires resulted from the use of poorly made or improperly installed cells. Bear in mind, too, that power tools use rugged construction formats, Li-Ion chemical formulations, and charging-management systems different from those found in personal electronic devices, according to Sean Fitzgibbons, senior product manager for the battery category at DeWalt.

Though the odds of one of your power-tool Li-Ion batteries catching fire are incredibly remote, it still pays to follow these practices:

- Use original-equipment-manufactured replacement batteries designed for specific tools and chargers. As Ridgid's development team told us in a statement, "Many counterfeit batteries and inferior designs don't invest in the [safety] protocols that we do."

- Do not impact or damage a battery by using it as a mallet, and never use one that appears compromised in any way.

- Don't expose batteries to temperatures above 104°F or below 32°F, or charge them in direct sunlight. If you exceed those parameters, the equipment should prevent damage. "Our batteries work as a system with tools and chargers to monitor temperatures and shut down operation at temperature extremes," according to DeWalt's Fitzgibbons.

- Don't store or transport a battery in a container with loose metal objects that could contact the terminals and cause a short circuit. Also, avoid exposure to liquids, including rain, oils, and solvents.

- Never disassemble, modify, or tamper with a battery. If it appears damaged, replace it. Many retailers will accept your batteries for free recycling. ♻️

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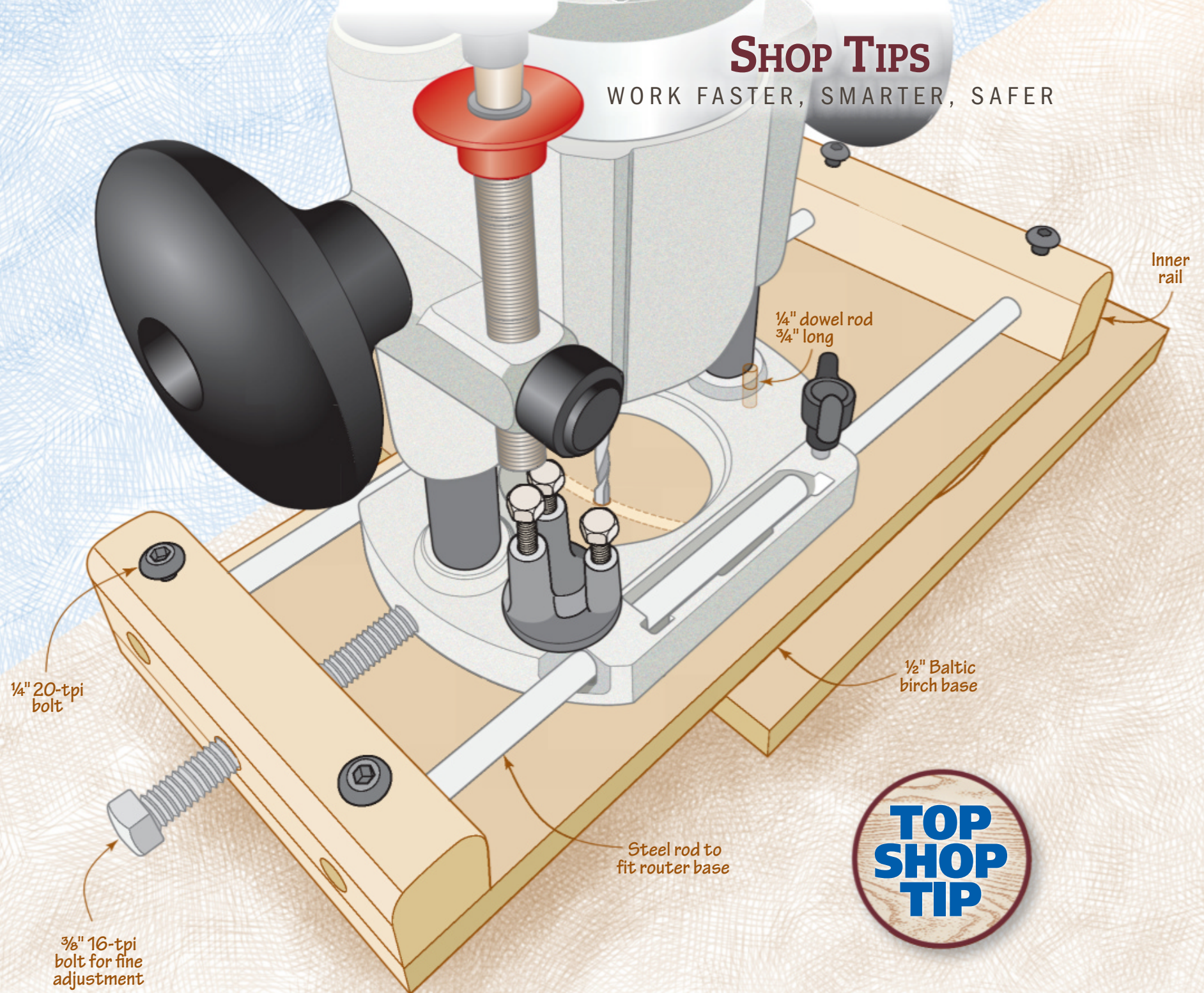
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SHOP TIPS

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**TOP
SHOP
TIP**

Simple circle-routing jig runs rings around other trammels

Unlike most shop-made circle cutters, this one has no limit to how small the cut circle can be, incorporates a fine adjustment, and doesn't require removing the router's subbase. And it's easy to make!

Build the jig as shown, but leave off the dowel rod (used as a pivot point) for now. Neither the bolts that hold the rods nor the

fine-adjustment bolt require inserts. Simply drill their pilot holes, then put drops of instant glue into the holes and allow the glue to cure before tapping the holes. The threaded holes will hold up in a dense hardwood such as oak.

After installing a 1/4" upcut spiral router bit, attach the jig to the router, slide the router against the inner rail, and plunge-route a hole

completely through the base. Glue the dowel into the hole.

To use the jig, insert the dowel into a 1/4" hole 1/4" deep in your workpiece. Turn the fine-adjustment bolt to dial in a stop the exact diameter of the circle to be cut, knowing that one full bolt turn equals 1/16".

—Keith Kroma, Menomonie, Wis.

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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*, Keith receives a vise and four 24" parallel-jaw clamps from Jorgenson, a \$340 value.





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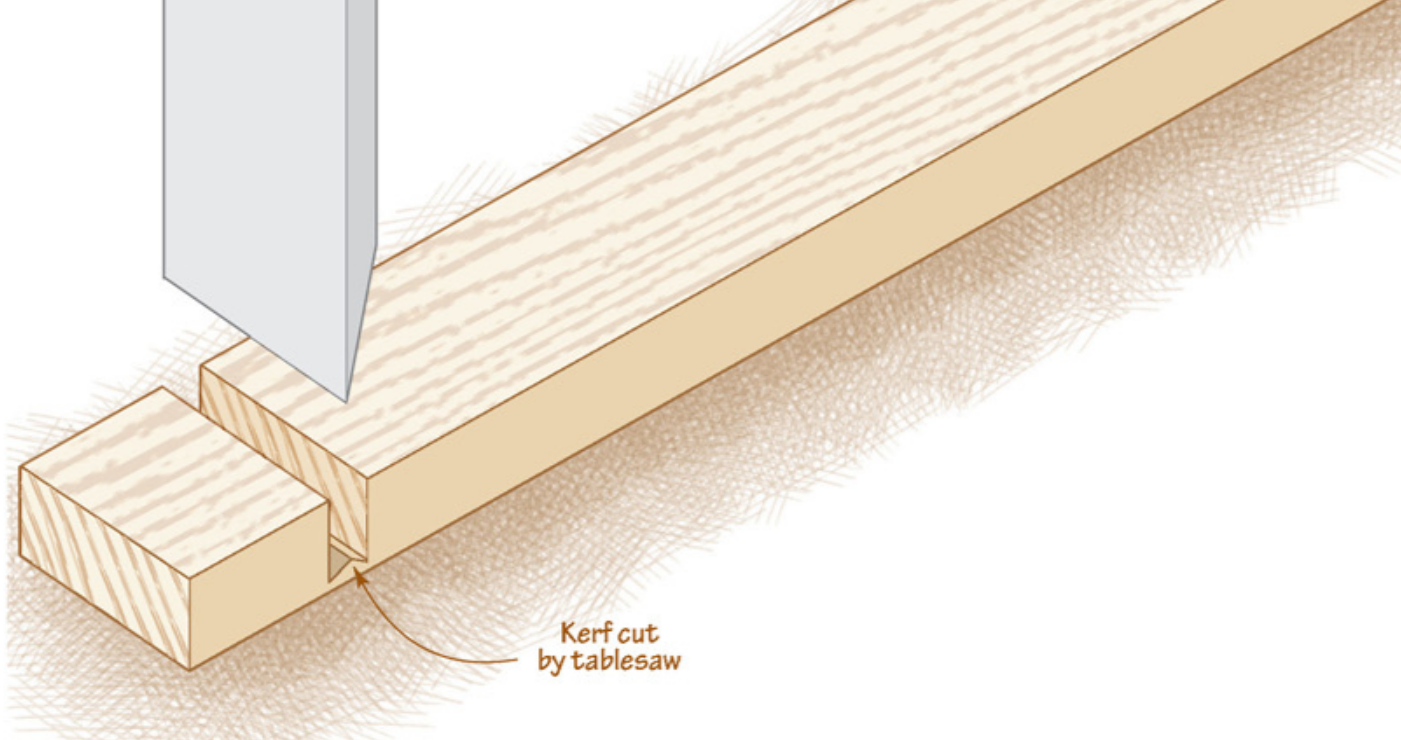
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SHOP TIPS

Enjoy big-time safety cutting tiny pieces

Making small parts using a mitersaw or table-saw can be a dicey affair. You want clean-cut edges while keeping your fingers well away from the blade and avoiding the parts becoming projectiles. Here's a simple solution. On your tablesaw set the blade height to cut just shy of severing the workpiece free of your blank. Then complete the cut with a chisel.

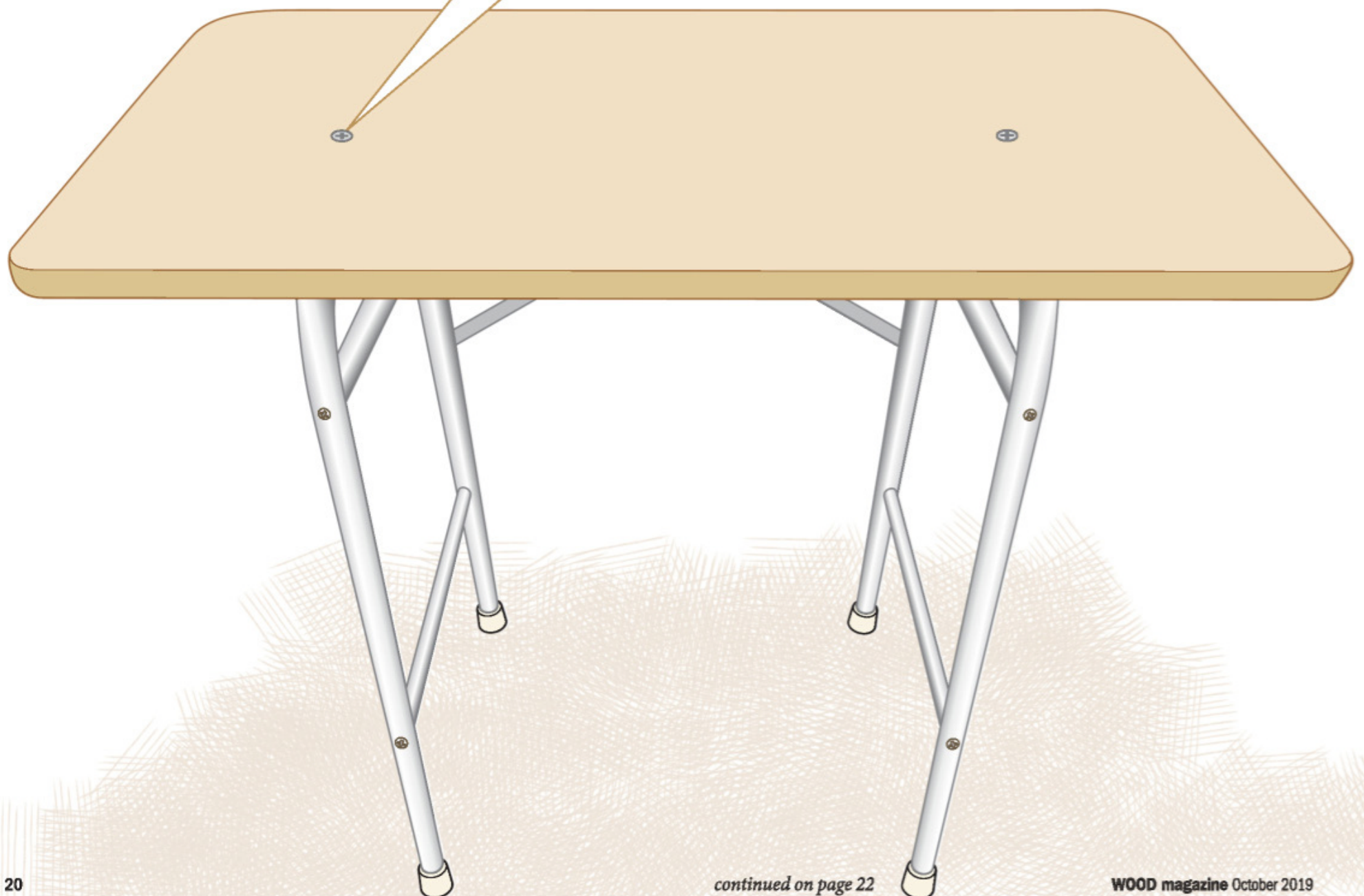
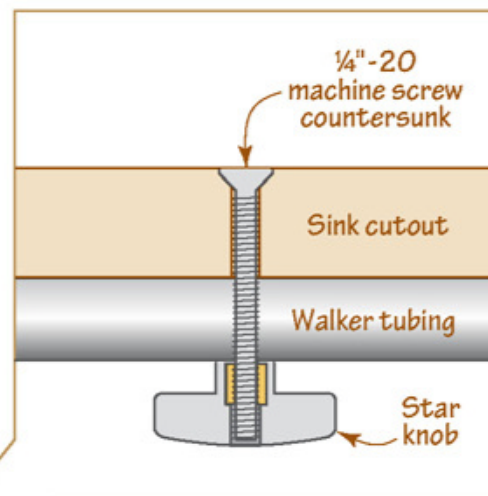
—Charles Mak, Calgary, Alta.



No-dough collapsible sawhorse/work table

I like to recycle free (or nearly free) items into practical workshop projects. Recently I made a pair of fold-up work supports by attaching sink cutouts to old walkers. The supports stack compactly against a wall after removing the top and collapsing the walker. You'll find used walkers at garage sales, thrift shops, and through classified ads.

—A.J. Gatzemeyer, Morton, Ill.



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$\frac{1}{4}$ " bolt with
hex-key head

Tool-tray system adapts to your changing needs

I've long debated whether to add a permanent tool tray to my workbench: It would be handy at times, but it could also get in the way, or not be adaptable to my changing work requirements. So I added a tray that attaches to flush-mounted T-track using bolts, washers, and nuts, as shown. (Note that you will need to cut the T-track groove extra long so the bolts slide out easily.)

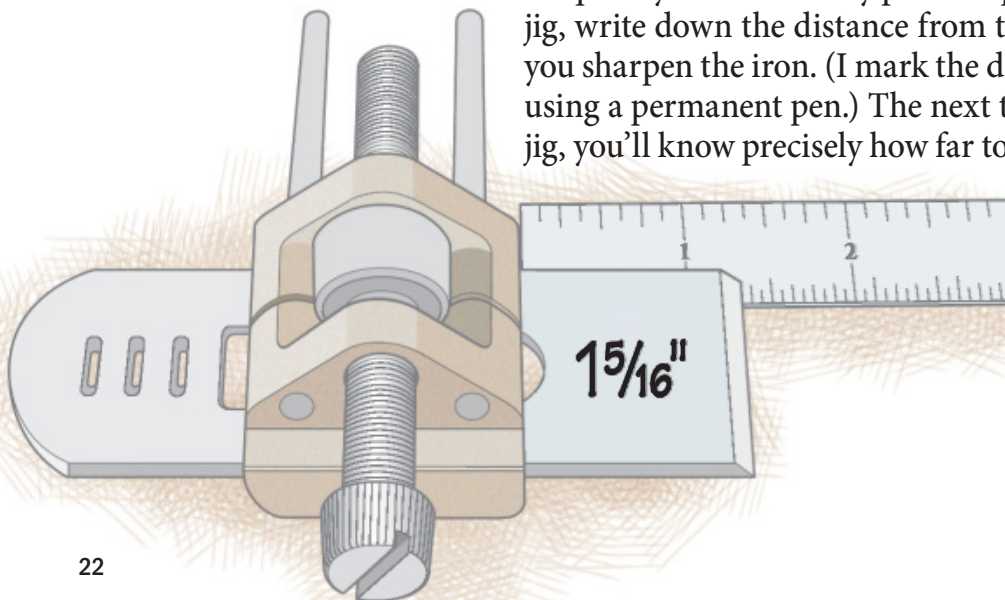
I plan to build other accessories that attach to the T-track, such as a small shelf for holding chisels upright but with the handles below the level of the benchtop. The possibilities are endless!

—John Harvey, Loveland, Colo.

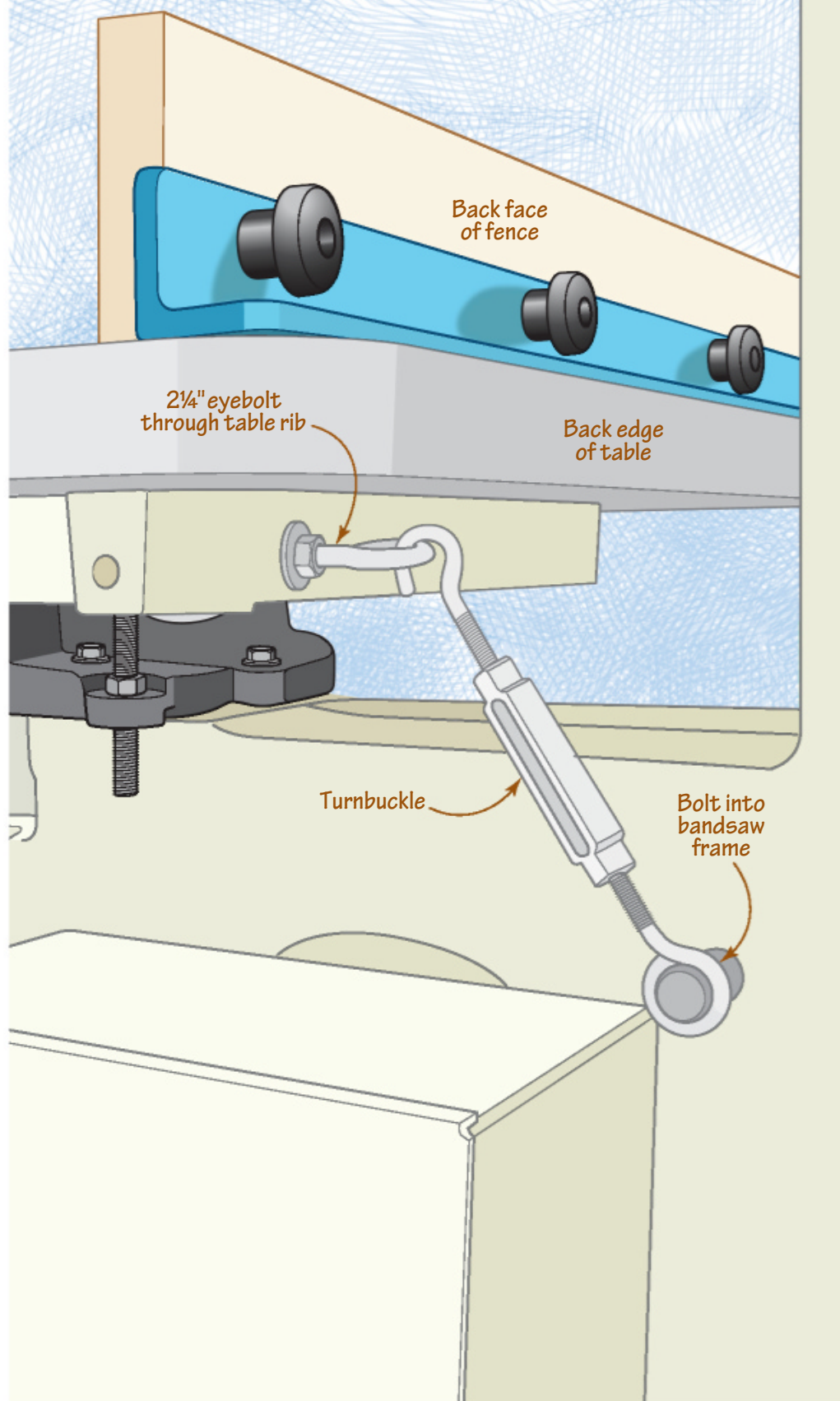
Get an edge on maintaining a consistent sharpening angle

To quickly and accurately position plane irons in a sharpening jig, write down the distance from the iron's tip to the jig after you sharpen the iron. (I mark the distance directly on the iron using a permanent pen.) The next time you set the iron in the jig, you'll know precisely how far to extend it.

—Dan Martin, Galena, Ohio



SHOP TIPS



Don't let big bowl blanks bust your bandsaw blades

Like most woodturners, I cut bowl blanks round on my bandsaw before mounting them on the lathe. Those blanks can be pretty heavy and have a tendency to tilt down the front of the table during sawing, even using a large, heavy-duty cast-iron saw. And when that table tilts in the middle of a deep cut, the blade often breaks.

My solution: Add a turnbuckle to hold the back of the table securely down on its stop. For times when I need to tilt the table, the turnbuckle has a hook on one end for easy disconnect from the eyebolt. Now I saw green blanks up to 18" diam. with no table movement and no broken blades! 🌲

—Jim McCleary, Apache Junction, Ariz.

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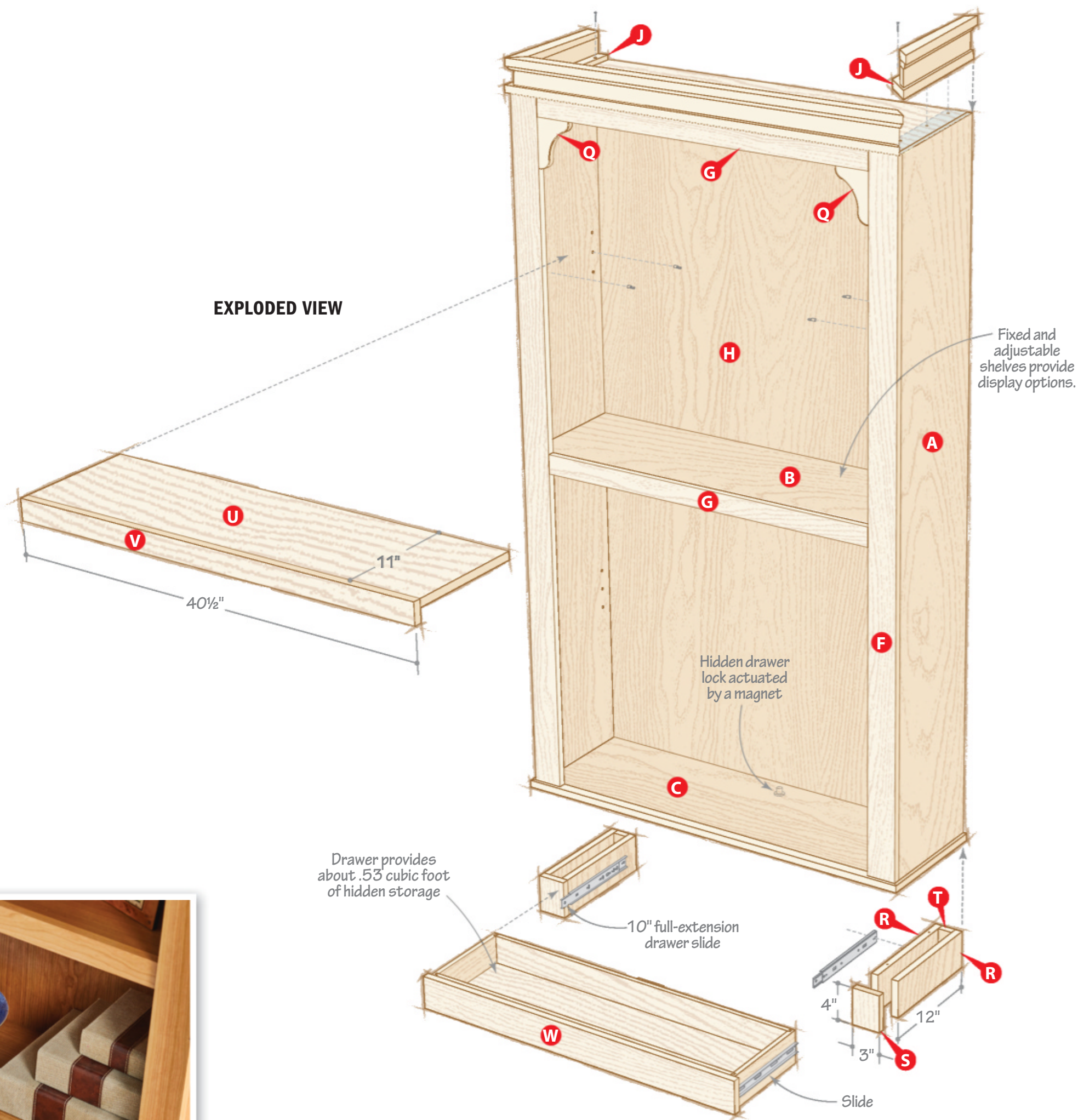
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Four shelves provide more than

13

sq. ft. of display space.





This attractive cabinet displays books and decorative items on four shelves (two adjustable for versatility) and cleverly conceals valuables in a base drawer with a secret magnetic lock.

Craft the carcass

1 Cut the sides (A) about 5" longer than listed [Materials List]. Trim them to finished length and save the cut-off pieces to make the outer base sides (R) later. Mark the sides and cut-off pieces to keep them in their original orientation so the grain will match. Cut the fixed shelf and top (B) to size.

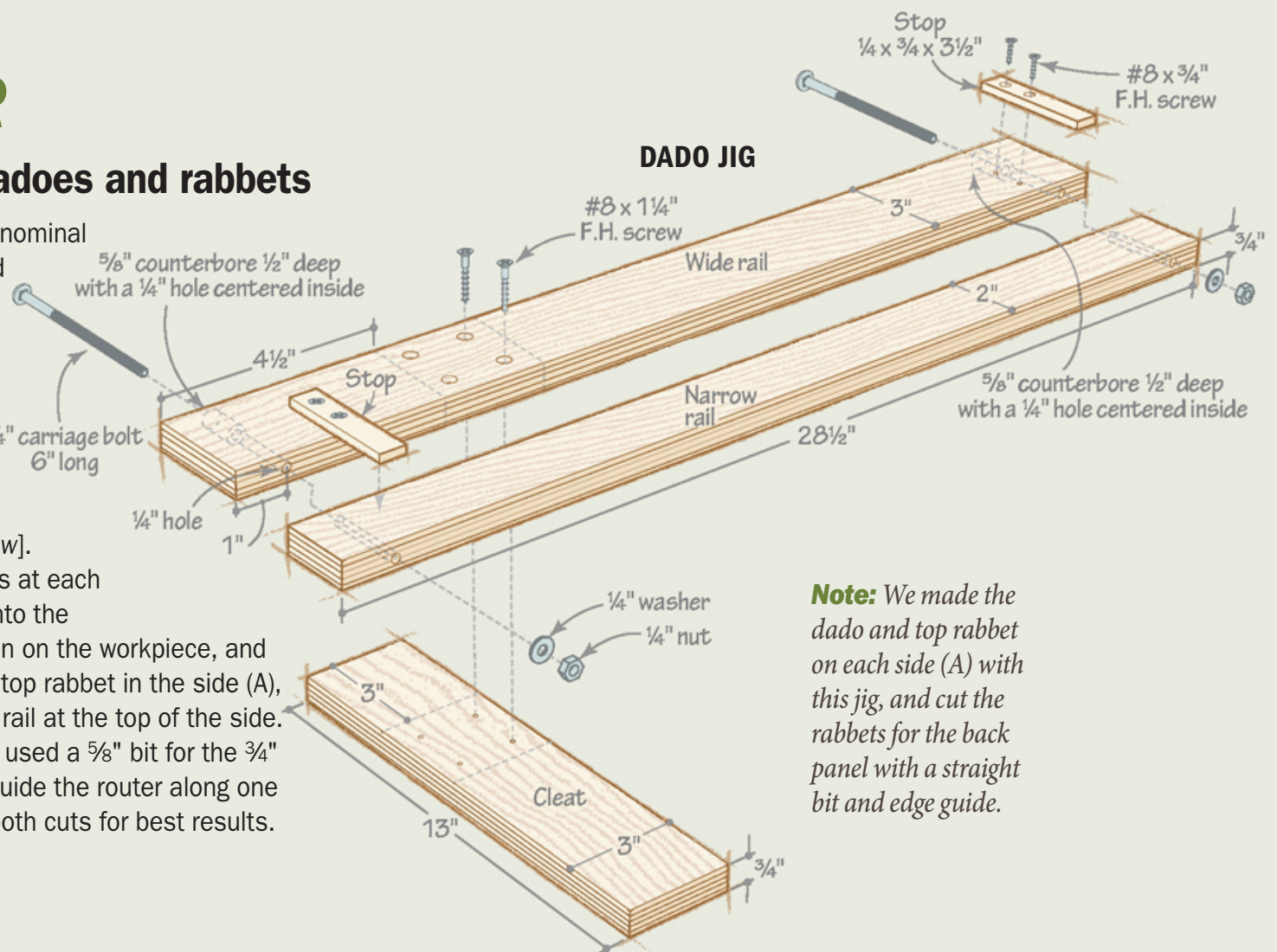
SKILL BUILDER

Rout just-right plywood dadoes and rabbets

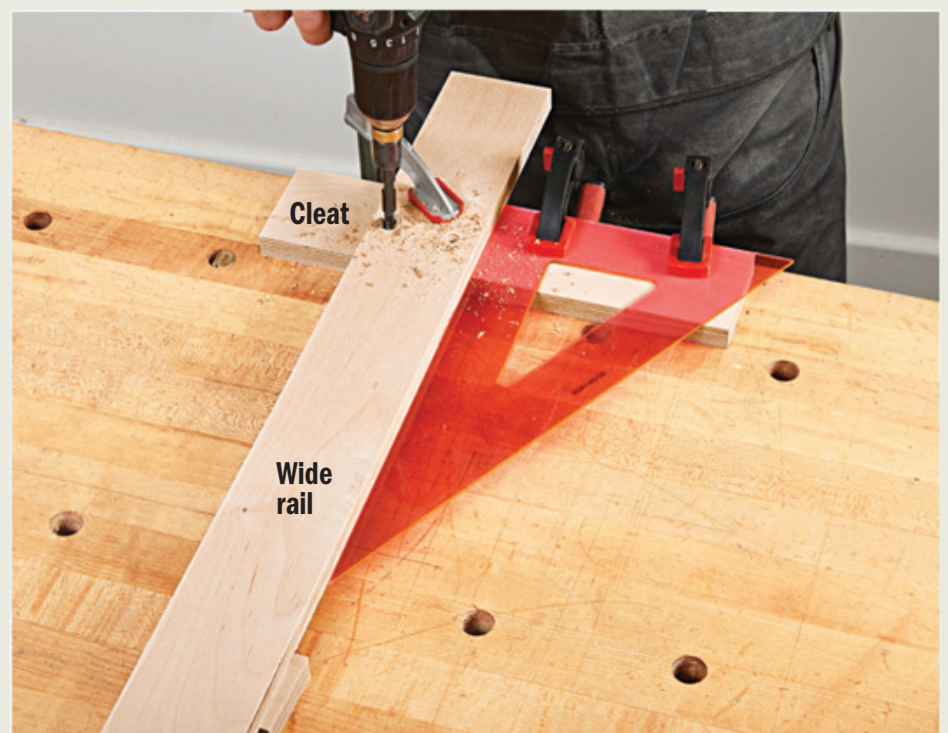
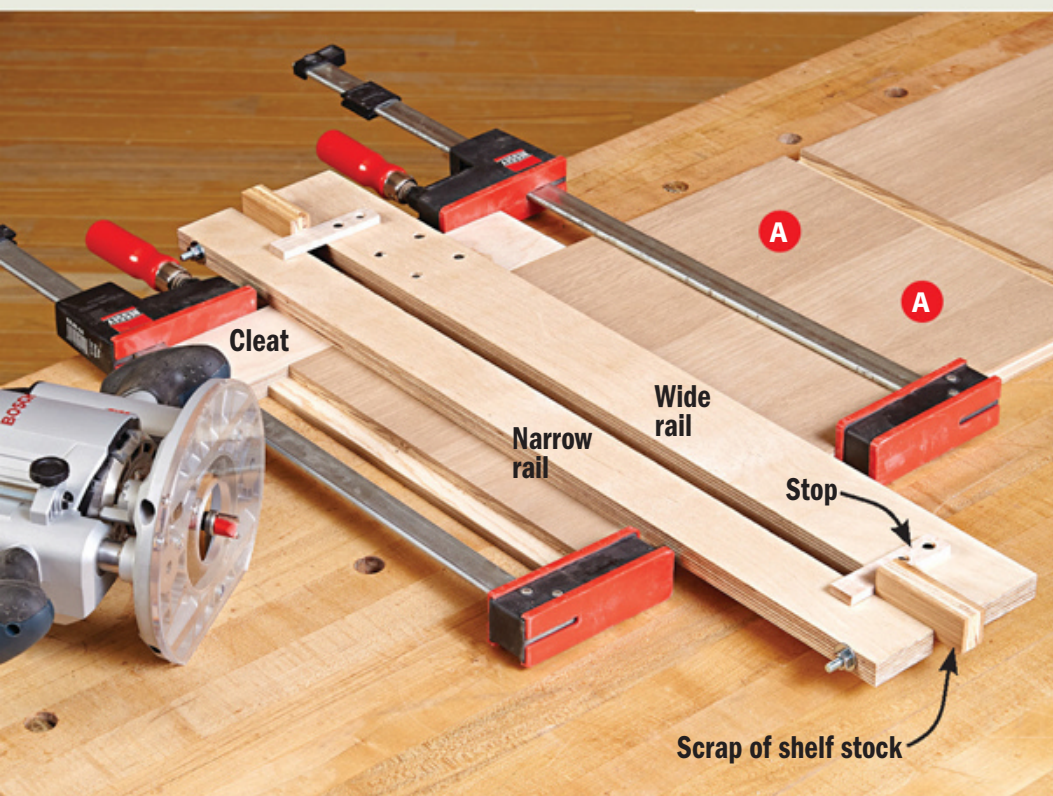
Plywood usually measures less than its nominal thickness, but router bits hit their stated size exactly, leading to ill-fitting dadoes and rabbets. This simple jig gauges plywood's exact thickness and guides a slightly narrower flush-trim router bit to make an exact plywood-size dado or rabbet. Note: Drill the bolt holes and counterbores in the rails before assembly [drawing right and photos below].

To use the jig, clamp between the rails at each end a scrap of the plywood that will fit into the dado or rabbet. Lay out the dado location on the workpiece, and clamp the jig in place *below left*. For the top rabbet in the side (A), index the inside edge of the jig's narrow rail at the top of the side.

Adjust a top-bearing flush-trim bit (we used a $\frac{5}{8}$ " bit for the $\frac{3}{4}$ " plywood) to the desired cutting depth. Guide the router along one rail, then back along the other. Repeat both cuts for best results.



Note: We made the dado and top rabbet on each side (A) with this jig, and cut the rabbets for the back panel with a straight bit and edge guide.



Square the cleat precisely to the wide rail to ensure an accurate jig. Glue and screw the joint for maximum durability.

►To watch three shelf-pin drilling methods, point your smartphone's camera at this code, or visit woodmagazine.com/shelfpinmethods



►Learn about miter-framing a panel on page 38.

2 Rout the dadoes and rabbets to make a mirror-image pair of sides (A) [Drawing 1, Skill Builder above], and drill the shelf-pin holes. Finish-sand the fixed shelf, top, and inside face of each side.

3 Glue the sides (A), fixed shelf, and top (B) [Drawing 2]. Check the assembly for square, and clamp.

4 Cut the bottom (C) to size and the bottom edging (D, E) about 2" longer than shown. Rabbet the back end of each end piece [Drawing 2a]. Miter-cut the edging to fit around the panel (C), and glue it in place. Finish-sand the bottom assembly.

5 Cut the face-frame stiles (F) 5" longer than shown and the rails (G) to the length shown [Drawing 2]. Trim the stiles to length, and retain the cutoffs to make the base fronts (S) later. Mark the pieces to ensure correct orientation.

6 Pocket-screw and glue the stiles and rails [Drawing 2], keeping the faces flush.

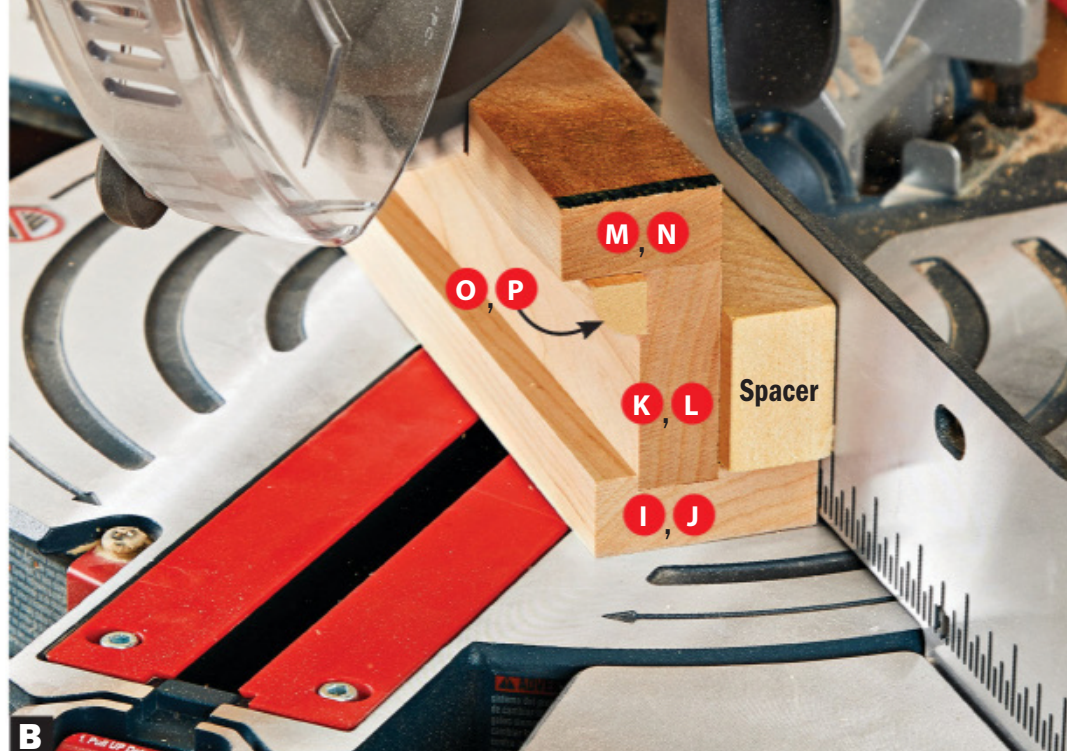
7 Glue and clamp the face frame (F/G) to the A/B assembly, flush with the sides and top. After the glue dries, finish-sand the outside of the carcass.

8 Glue and screw the bottom (C-E) to the carcass [Drawing 2 and Photo A].

Tip! Plane solid stock for the trim to the thickness of the plywood panel before gluing it on in order to minimize sanding.

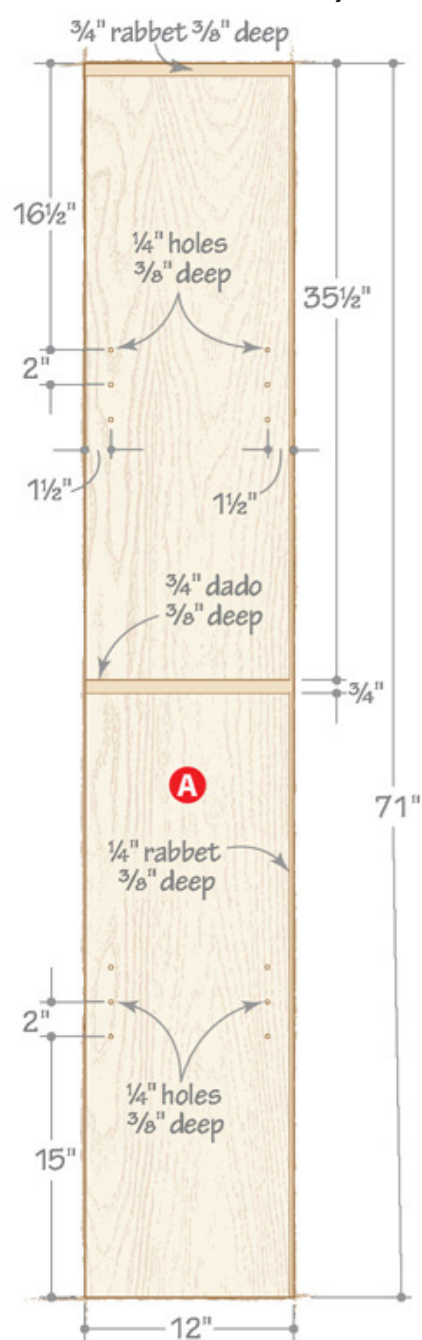


A Center the bottom from side to side and align the back of the bottom panel (C) with the inside edge of the side rabbets.

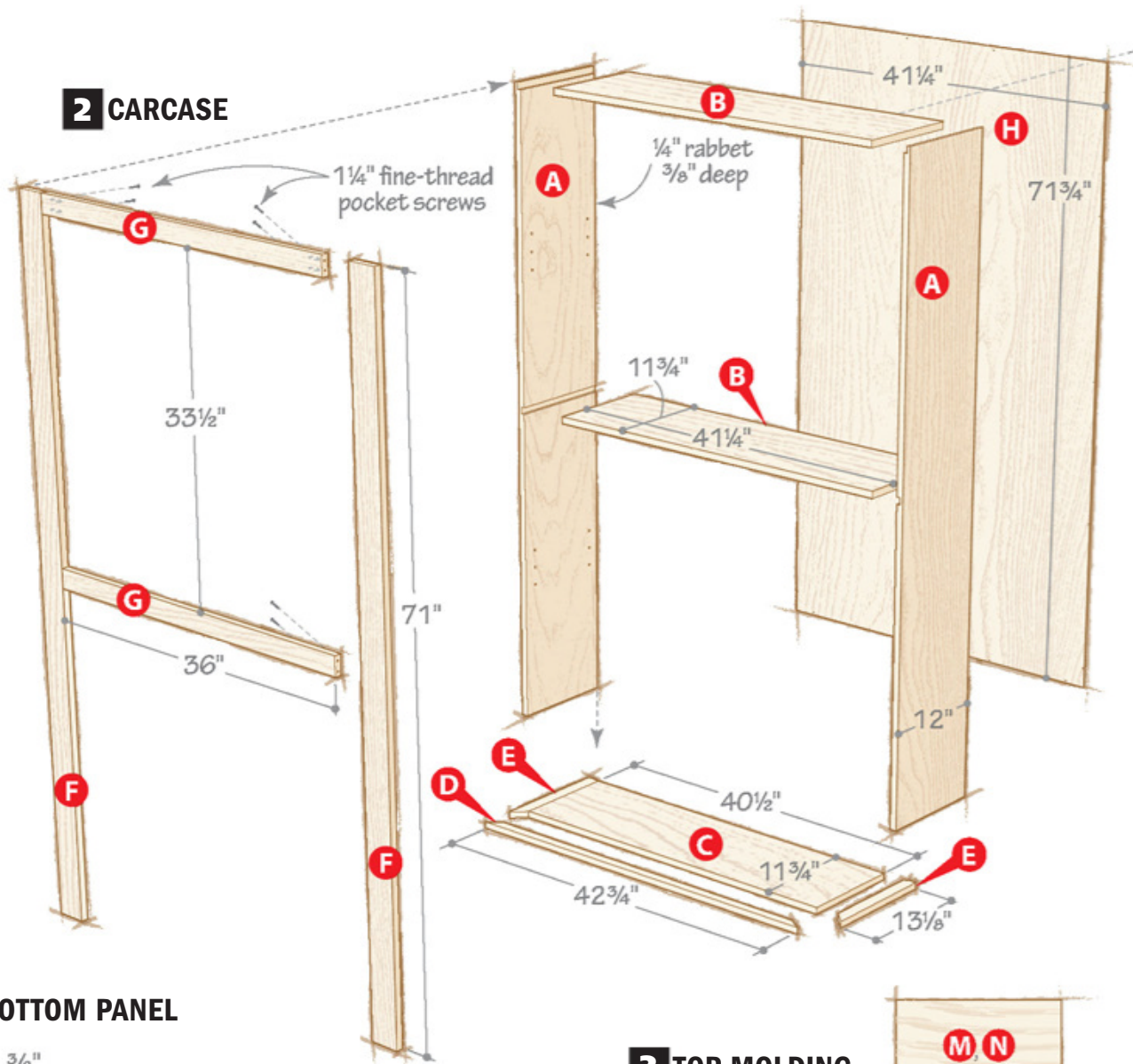


B Stabilize the top moldings with a scrap spacer as you miter-cut them to fit the carcase. Attach them with screws through I and J behind the cornices K and L.

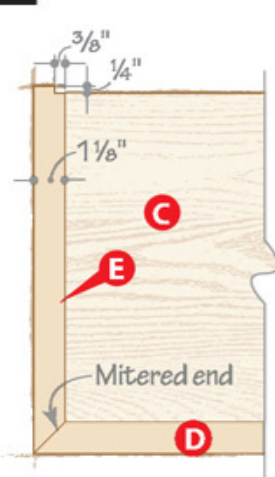
1 SIDE (inside face of left side shown)



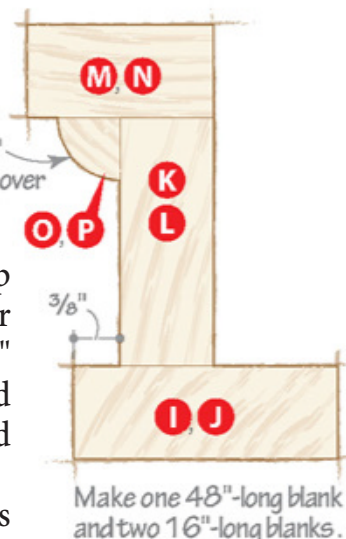
2 CARCASE



2a BOTTOM PANEL



3 TOP MOLDING



Trim the top, build the base

1 Rip stock to width for the built-up top molding components I–N and to 3" for parts O and P. Make parts I, K, M, and O 48" long and parts J, L, N, and P 16" long. Round over one corner and rip to width parts O and P; then, glue up the blanks [Drawing 3].

2 Miter-cut the blanks to the lengths shown for parts I and J [Photo B]. Attach the moldings to the carcase [Exploded View], overhanging the front and each end equally.

9 Cut the back (H) to size. Finish-sand and set it aside for installation later.

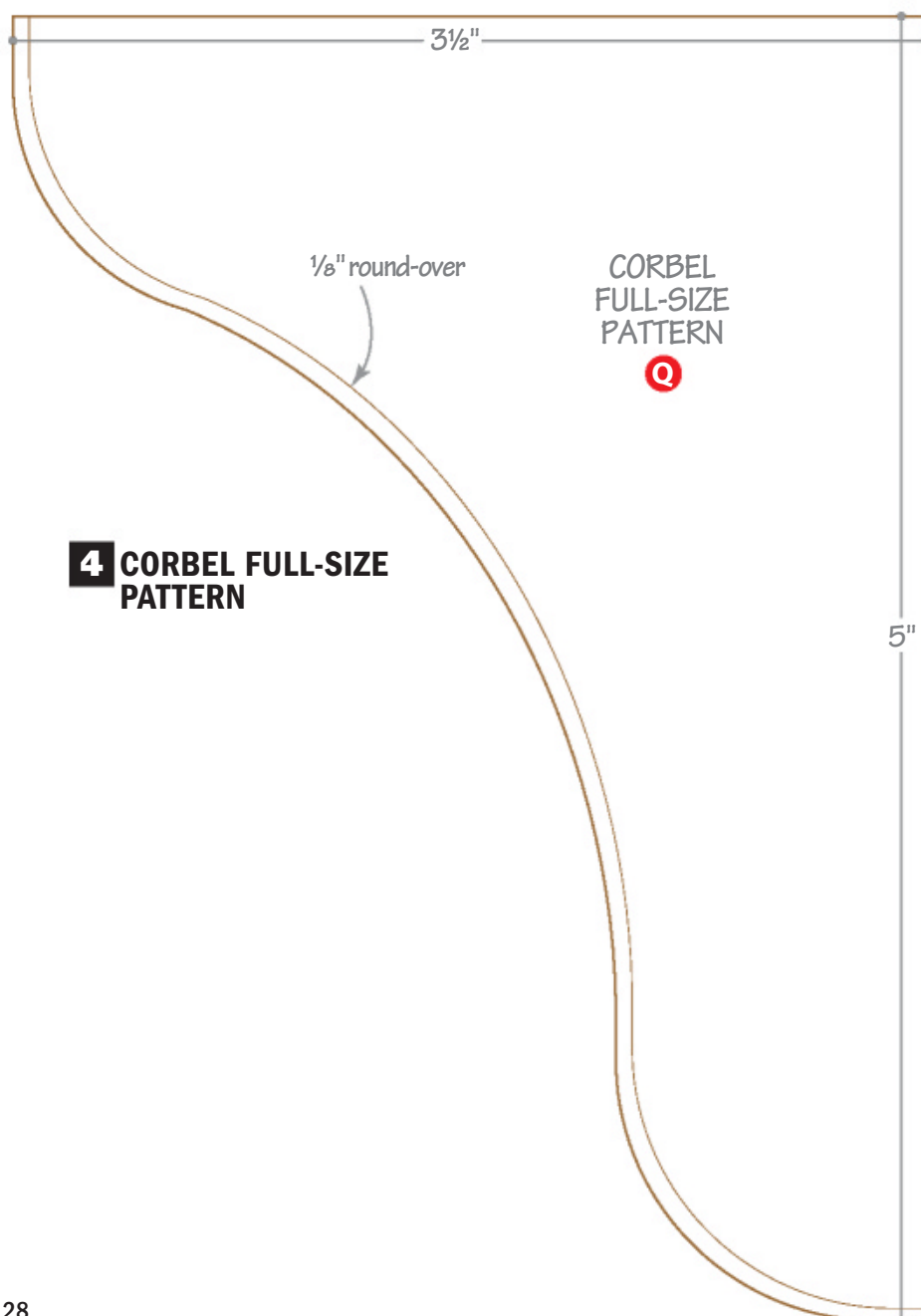


C Keep the base sides and fronts (R, S) flush with the carcass sides (A) and front stiles (F) when you glue them. Square them to the bottom front edging (D), too.

3 Cut two blanks for the corbels (Q) and attach a copy of the full-size pattern [Drawing 4] to each. Cut the curved edge, sand it smooth, and round over the curve on both sides. Finish-sand.

4 Glue the corbels inside the top corners of the face frame (F/G), flush at the back to leave a reveal at the front.

5 Retrieve the cut-off pieces from the sides (A) and face-frame stiles (F). Cut those to size for the base sides (R) and fronts (S), using the appropriate cutoff for the outer



4 CORBEL FULL-SIZE PATTERN



D Mark the center of the drawer lock hole on the bottom centerline. Make sure you close the drawer fully so the drawer front (W) will not stand out from the base.

side and front on each base. Cut two more sides (R) and the backs (T).

6 Glue together the bases [Exploded View]. Finish-sand; then, glue them to the bottom of the carcass [Photo C].

Build the shelves and drawer

1 Cut to size the adjustable shelves (U) and edges (V). Glue the edges to the shelves and trim flush.

2 Cut to size drawer parts W–Z. Machine dados and grooves in the front and back (X) and sides (Y) [Drawing 5].

3 Glue the drawer box (X, Y, and Z) together [Drawing 5]. Square the assembly and clamp.

4 Finish-sand the shelves (U/V), drawer face (W), and drawer box (X–Z). Touch up finish sanding on other parts as needed.

5 Apply finish to all parts (we used water-based satin polyurethane), leaving unfinished the rabbets that the back (H) fits into, the inside edges of the back, and gluing spots to attach the drawer face (W) to the drawer front (X).

6 Glue and nail the back (H) to the carcass. Install drawer slides on the bases and drawer sides [Drawing 5, Exploded View]. Allow clearance between the top of the drawer and the carcass bottom (C) [Drawing 6].

7 Slide the drawer into place and glue the drawer face (W) to the front (X), leaving an even reveal along the top and sides.

Make the lock

1 Drill a centered $\frac{5}{16}$ " hole through one leg of a 4" length of 1" aluminum angle [Drawing 5] for the drawer lock. Drill and counter-sink three screw-shank holes through the other leg.

2 Lay the bookcase on its front face. On the bottom of the carcass, draw a centerline extending about 1" from the back. With the drawer fully closed, hold the aluminum

Tip! A dado set and tablesaw make quick work of machining the drawer parts. Match the dado width to the thickness of Part Z for the bottom grooves.

Tip! A smooth lock bolt works best. Buy a bolt that has a plain shank at least 1½" long between the head and the threads, and cut it to length.

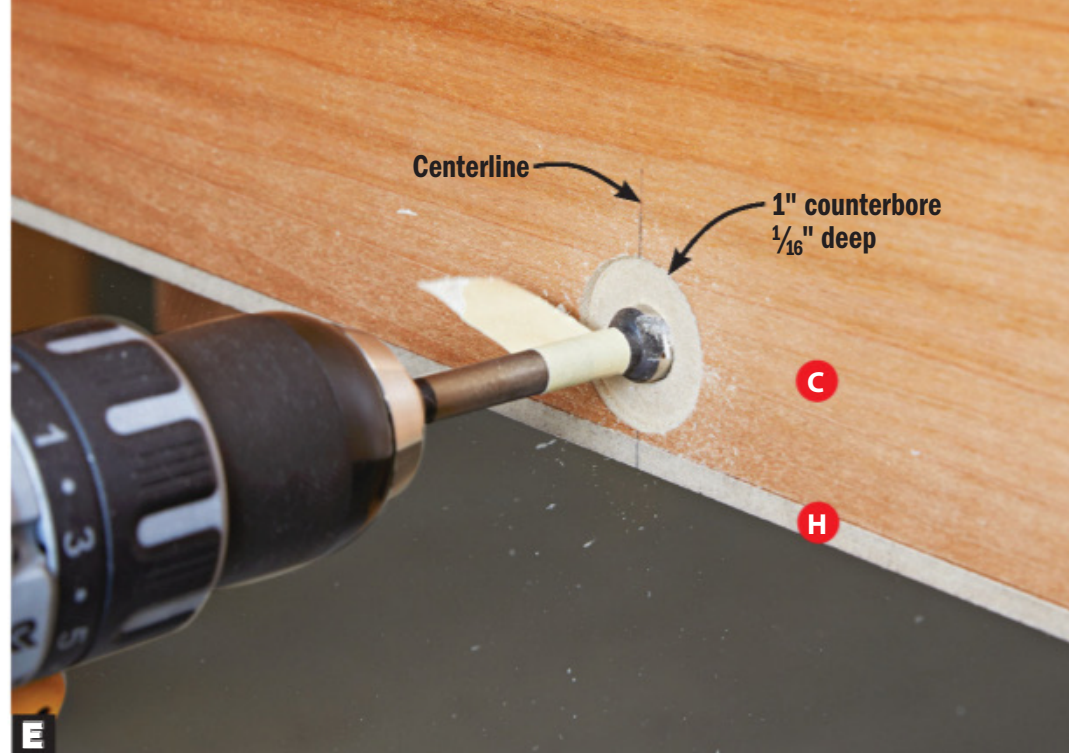
Tip! Take care not to glue the bolt to the washer—it must move freely. Wrap a strip of waxed paper around the bolt for insurance. Pull it out after the epoxy cures.

angle on the back of the drawer with the ⅝" hole against the carcass bottom [Photo D] and mark the hole. Slide the drawer out.

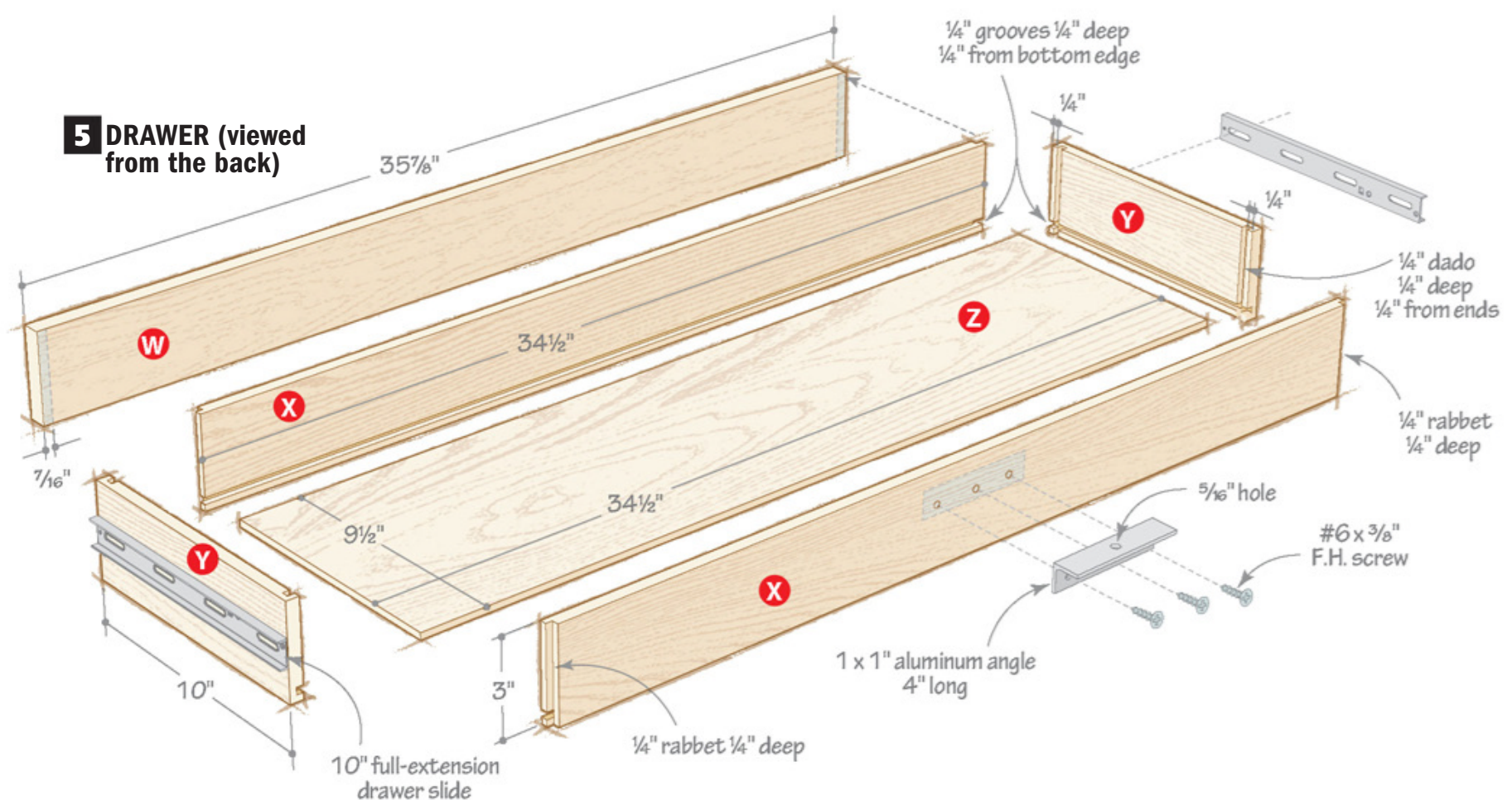
3 Drill a 1" counterbore ⅛" deep at the center mark. Center a ⅝" counterbore inside the first one [Drawing 6, Photo E].

4 For the drawer lock, cut a ¼"-20 bolt to 1½" long. Chamfer the end, and slide the bolt through a 1" fender washer [Drawing 6].

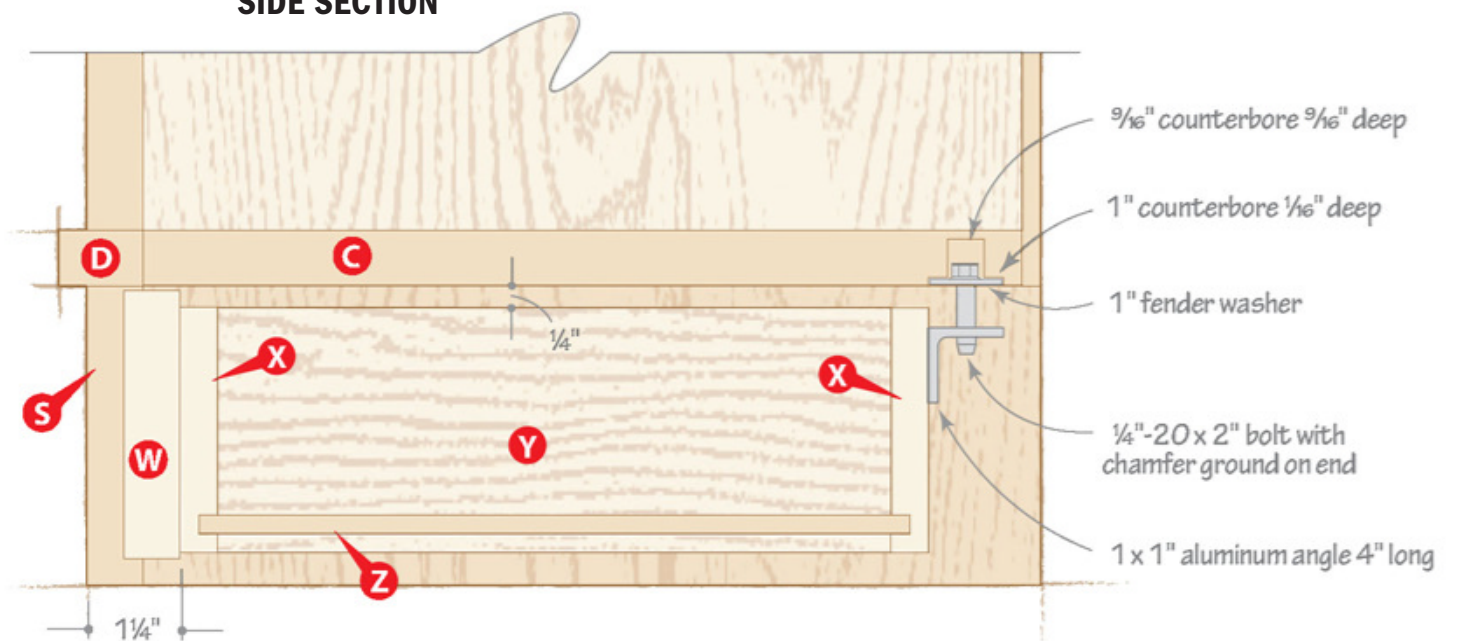
5 Put small dabs of 5-minute epoxy at the 3, 6, 9, and 12 o'clock positions on the edge of the washer on the bolt-head side. Additionally, put spots of cyanoacrylate (CA) adhesive on the washer face. Spray CA accelerator on the inside of the deep counterbore and seat the washer. Allow the epoxy to cure, making sure the bolt moves freely.



E Drill a ⅝"-deep counterbore for the lock bolt, centered in the larger counterbore. Take care not to break through the inside face of the carcass bottom.



6 BASE AND DRAWER SIDE SECTION

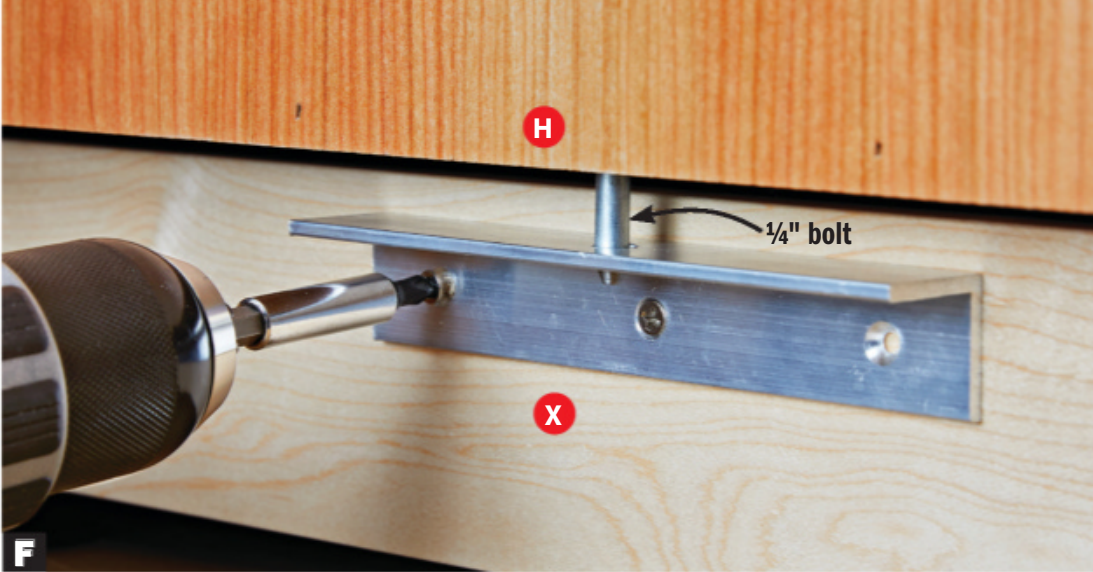


▶ A rare-earth magnet works well to raise the lock bolt and stores out of sight on a metal shelf pin.

6 With the bookcase upright, slide the drawer into place. Have a helper move the bolt up and down with a magnet from inside the case while you position the aluminum angle on the back of the drawer [Photo F].

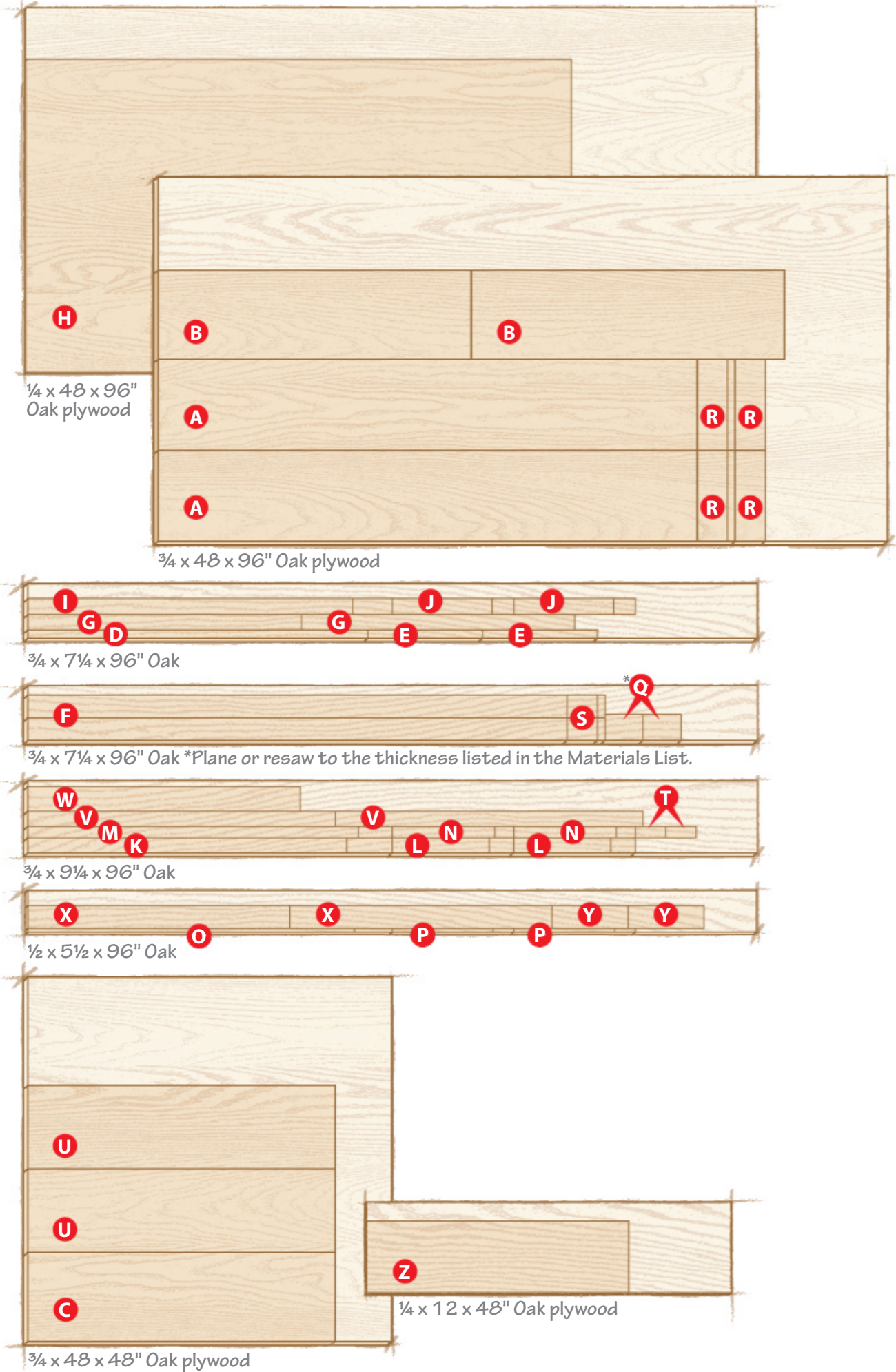
7 Put the case where you want to show off some things and hide a few others. 🌲

Produced by **Larry Johnston** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**, **Lorna Johnson**



At the position where the bolt goes in and out of the hole freely and lifts high enough to allow the drawer to open, screw the angle to the back of the drawer.

Cutting Diagram



Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Carcase						
A*	sides	¾"	12"	71"	OP	2
B	fixed shelf/top	¾"	11¾"	41¼"	OP	2
C	bottom	¾"	11¾"	40½"	OP	1
D*	bottom front edging	¾"	1⅛"	42¾"	O	1
E*	bottom end edging	¾"	1⅛"	13⅛"	O	2
F*	face-frame stiles	¾"	3"	71"	O	2
G	face-frame rails	¾"	2"	36"	O	2
H	back	¼"	41¼"	71¾"	OP	1
Top trim						
I*	top band front	¾"	2⅝"	42¾"	O	1
J*	top band sides	¾"	2⅝"	13⅛"	O	2
K*	cornice front	¾"	2"	42"	O	1
L*	cornice sides	¾"	2"	12¾"	O	2
M*	cap front	¾"	1½"	43½"	O	1
N*	cap sides	¾"	1½"	13½"	O	2
O*	fillet front	½"	½"	43"	O	1
P*	fillet sides	½"	½"	13¼"	O	2
Q	corbels	⅝"	3½"	5"	O	2
Base						
R*	sides	¾"	12"	4"	OP	4
S*	fronts	¾"	3"	4"	O	2
T	backs	¾"	1½"	4"	O	2
Shelves and drawer						
U	adjustable shelves	¾"	11"	40½"	OP	2
V	shelf edges	¾"	2"	40½"	O	2
W	drawer face	¾"	3¼"	35⅞"	O	1
X	drawer front and back	½"	3"	34½"	O	2
Y	drawer sides	½"	3"	10"	O	2
Z	drawer bottom	¼"	9½"	34½"	OP	1

*Parts initially cut oversize. See the instructions.

Materials key: OP-oak plywood, O-oak.

Supplies: #6 x 3/8" flathead screws, 1 1/4" fine-thread pocket screws, 1" brads, 10" full-extension drawer slides (2), 1" fender washer, 1/4"-20 x 2" bolt, 1 x 1" aluminum angle 4" long.

Blade and bits: Dado set; 5/8" top-bearing flush-cut and 1/8" and 1/2" round-over router bits.

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LiVE *the wood life*

Picking

A full-size plunge router (at left) easily handles heavy cuts with large bits in hardwood. For less-demanding jobs, a midsize (fixed base shown), compact (plunge base shown), or trim router may be easier to use.



FULL-SIZE



MIDSIZE

► More than 57 percent of *WOOD*® magazine readers surveyed said they own three or more routers.

Most woodworkers consider a router an essential tool. So useful, in fact, that the majority own more than one. Whether you're buying your first router or adding another to your tool kit, it pays to consider these keys to getting one best suited to your needs.

■ **Corded or cordless.** The most hard-working routers come with power cords. But lithium-ion batteries and improved motor technology give today's cordless routers the

runtime, torque, and speed necessary to complete most home workshop tasks. Added height and top weight may make some cordless models seem unwieldy, but portability might override that perception.

That said, for your first router, go with a corded model. Then look at the cordless ones as you add more routers or need the cord-free capability for a job.

■ **Size.** Routers fall into four categories: full-size, midsize, compact, and trim rout-

Out a Router



COMPACT



TRIM

►Take a look at the many tasks a router can do in your shop. woodmagazine.com/routerbasics
woodmagazine.com/startrouting

ers, *above*. When buying your first router, pick a midsize machine for general use. Woodworkers who make mostly small- and medium-size projects might prefer the lighter weight and reduced bulk of a compact router.

■ **Power.** Corded routers typically carry manufacturer horsepower ratings, making power comparisons easy. For tools without specified horsepower, a higher amperage rating generally corresponds to more power.

Battery voltage and amp-hours (Ah) ratings indicate motor power and runtime for cordless routers. Higher voltage usually equates to more power, higher Ah value to longer runtime. A spare battery and a quick charger minimize work delays.

■ **Base type.** A router comprises two basic parts: the motor to spin the bit and a base to hold the motor vertically. The base can be one of two styles: fixed or plunge. Which to buy depends on your intended use.

►Be an informed buyer using these router reviews. woodmagazine.com/reviews



The plunge-router motor slides up and down on rods with a spring return so you can start the motor in the workpiece field without the bit contacting the work.



► A stopped cut is one which does not extend to an edge of the workpiece.

A fixed base [Photo A] works well for edge-routing and cutting dadoes and grooves that extend the full length or width of a board. A plunge base [Photo B] lets you rout stopped cuts by lowering and raising the bit from the workpiece without lifting the tool base.

A D-handle fixed base [Photo C], available for some routers, allows positive one-hand control. This helps in routing long grooves or dadoes, forming edges on large workpieces, and using some jigs.

To increase versatility, some makers' cordless routers fit into bases made for their corded models.

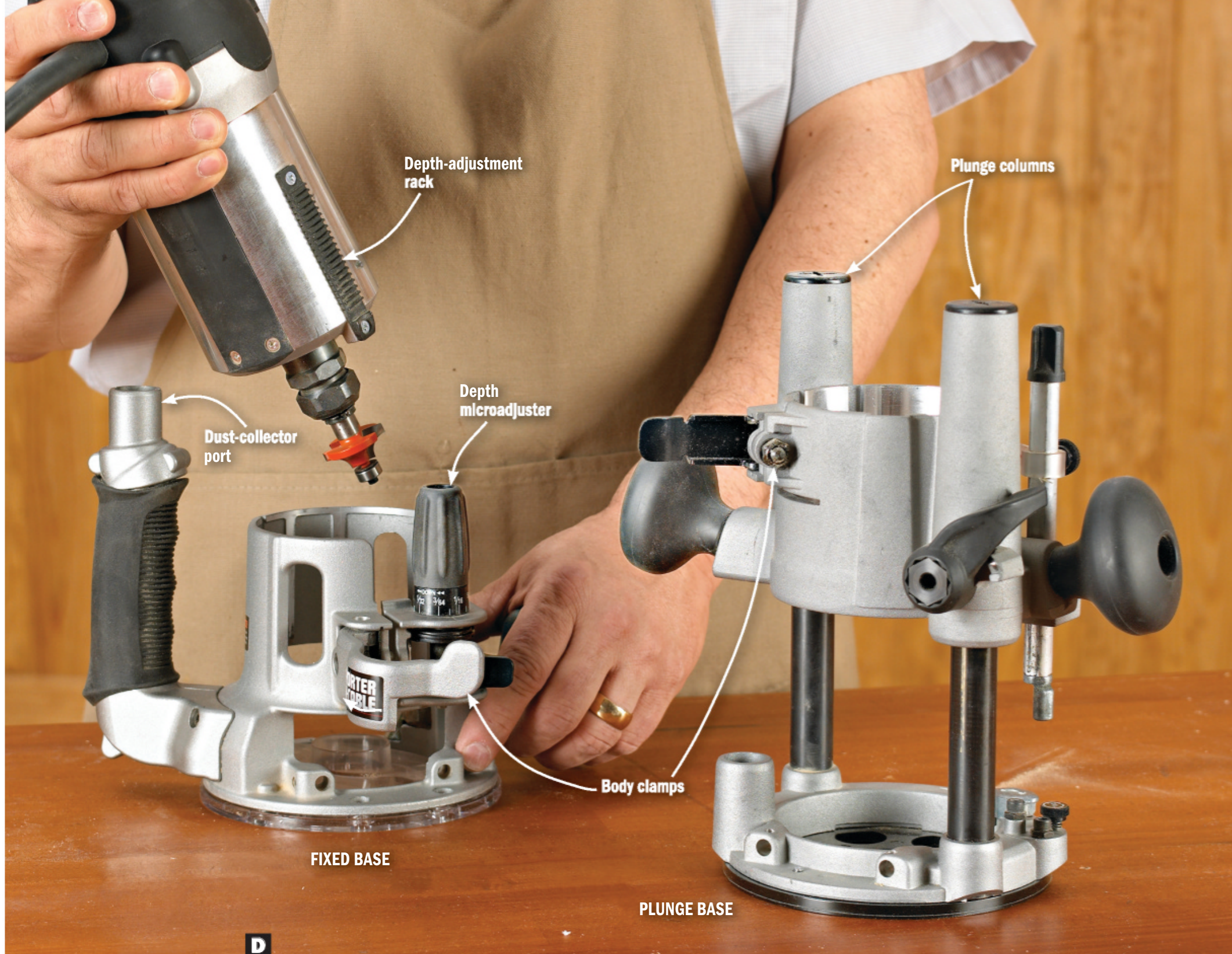
A combination kit [Photo D] that includes a motor plus interchangeable fixed and plunge bases often proves a good value for a first-buy general-purpose router. The motor easily swaps from one base to the other.

■ **Depth adjustment.** Look for smooth, easy-to-lock depth adjustments in a fixed-base router. A rack-and-pinion mechanism or vernier collar for fine adjustments makes precise depth setting easier [Photos A and D].

A plunge base should move down smoothly and return to raised position positively. A plunge lock, usually operated by a short-motion lever, lets you lock the bit depth at any position within the plunge range. A turret with multiple stops [Photo B] permits routing deep grooves or dadoes in steps.



A D-handle base provides trigger control so you don't have to let go of one handle to flip the motor switch on or off, ensuring full control throughout the cut.



D

Quickly, without tools, slip the motor into whichever base your task calls for. Kits provide full-featured fixed and plunge bases for maximum versatility.

■ **Collet.** Full- and midsize routers commonly take bits with $\frac{1}{2}$ " shanks, but usually come with a collet or collet insert that grips $\frac{1}{4}$ " bits. When a router accepts both sizes, opt for a $\frac{1}{2}$ " bit for greater stability and less chatter.

Changing bits goes more quickly on a machine that employs a single wrench and a built-in arbor lock instead of two wrenches.

■ **More favorable features.** Soft-start, which ramps up the router speed rather than slamming you with full torque and speed at startup, helps you keep the router under control. The more powerful the router, the more you need it.

Variable speed control helps you match motor speed to the bit size and workpiece to achieve cleaner, burn-free cuts. Some routers continuously vary speed across a range, some have fixed intermediate speeds.

Other worthwhile features include a work light that illuminates the bit area and a dust-

collection port; both help you see what you're doing. Dust collection with a router, though, is pretty much hit-and-miss.

■ **Accessorizing.** If a router will mount in a table, pay attention to depth-adjustment features. A rack-and-pinion adjuster makes it easier to make fine adjustments when the router is mounted upside down. Some routers offer a provision to adjust bit depth through the baseplate with a hex wrench, a boon to table mounting. Or consider a separate router lift that fits your tool.

Make sure you can easily install guide bushings on a router that will see duty in a dovetail jig or other use that requires following a guide or template. Common two-piece guide bushings mount in a standard-size hole in the subbase of most routers. Some routers use brand-specific guide bushings or require adapters for common bushings. 🌲

Produced by **Larry Johnston**

► See how fast you can spin various router bits.
woodmagazine.com/routerbitspeed

► Find out about table-mounted routers.
woodmagazine.com/tablerouting
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► Learn more about guide bushings on page 62.

Roll-around Planer Cart

This stand delivers.

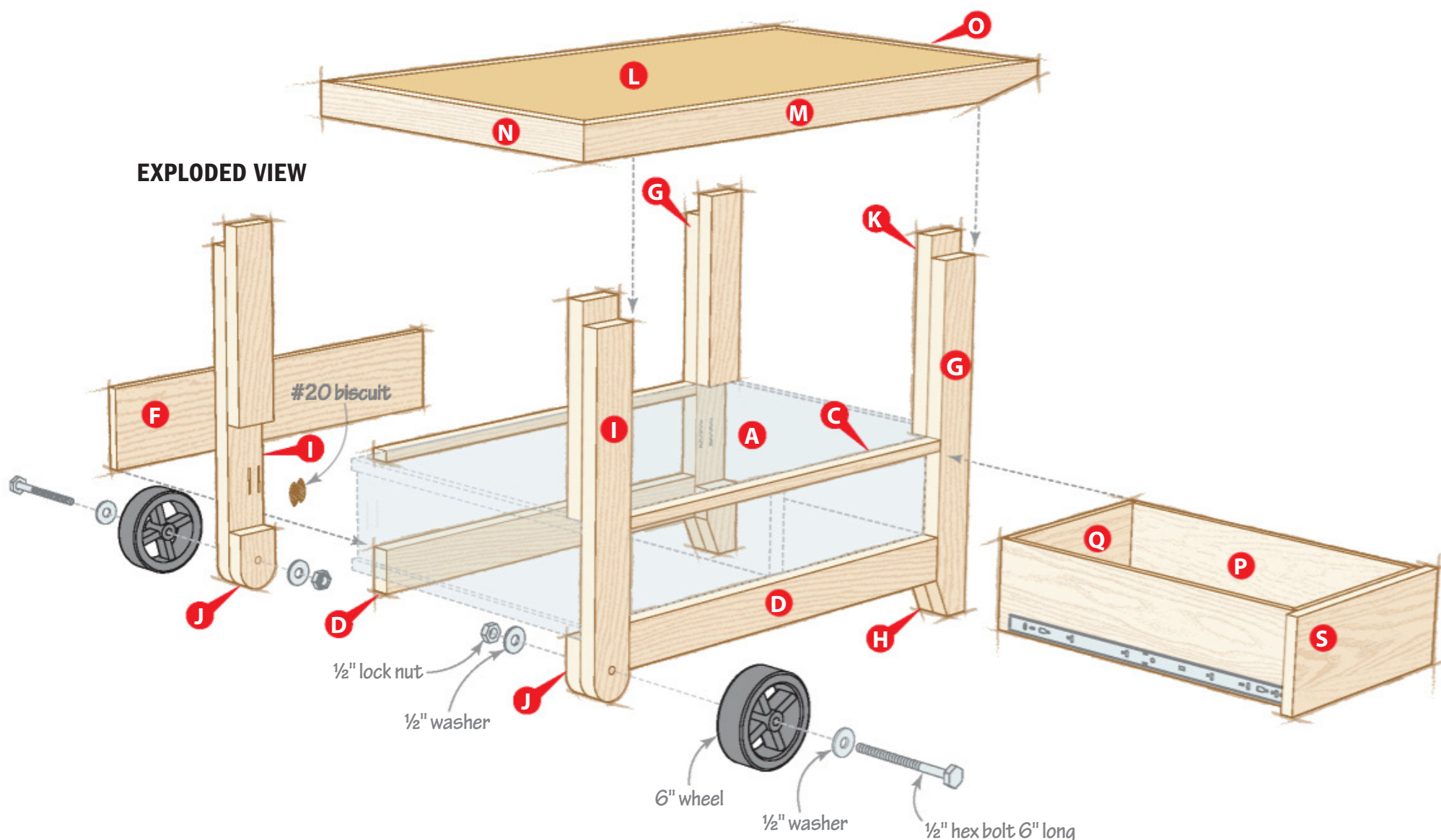
D I M E N S I O N S :
29½" W × 42½" L × 27" H

Approximate
materials cost:

\$160

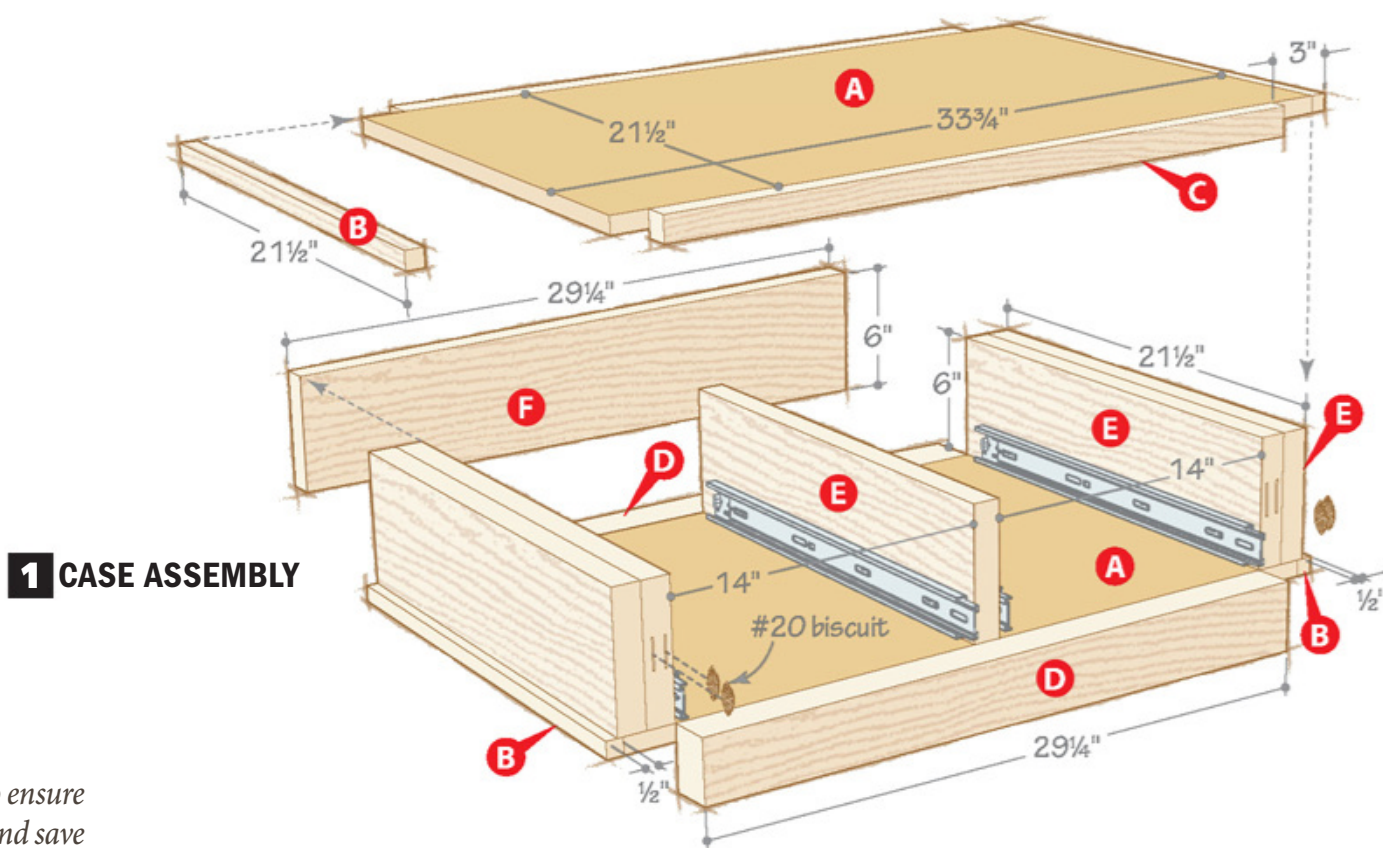
Size this
stand to
fit any
benchtop
tool in your
shop.





This sturdy shop helper holds its ground in use and picks up like a wheelbarrow for easy moving. First, build a case to house the inset drawers, then add beefy legs and a top. Drawers for dust-free storage

complete the project. We used 1½"-thick construction lumber for all solid-wood parts, except the drawer boxes, planing it to 1¼" to clean up the faces and bring it to uniform thickness.



Tip! To ensure uniformity and save time, plane stock for all parts of the same thickness at the same time. Then cut parts from this stock as needed.

Build the case

1 Cut the case panels (A), edging (B, C), and rails (D) [Materials List, Drawing 1]. Glue the edging and rails to the panels.

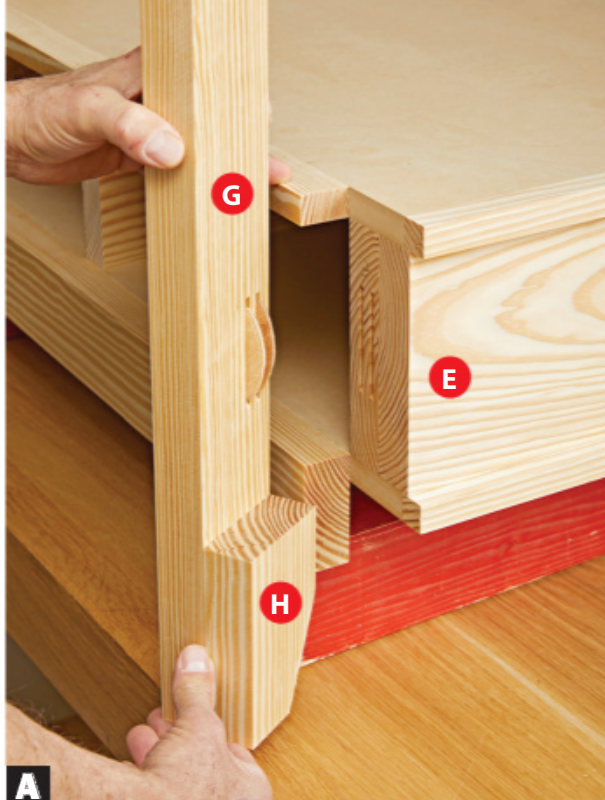
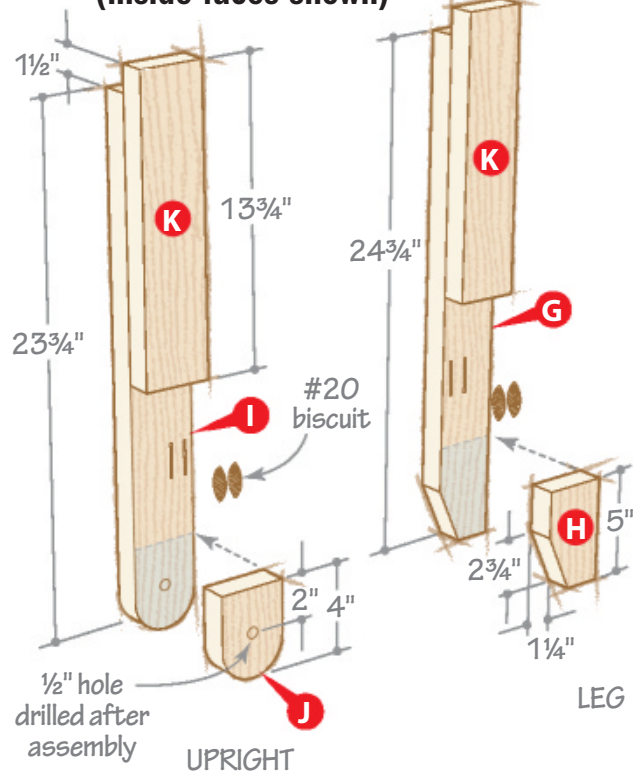
2 Cut the risers (E). Laminate two pairs of risers to make the case ends. Glue the

center riser and case ends to the case bottom (A/B/D).

3 Cut the back (F) and glue it to the riser (E) ends and rail (D) edge.

4 Glue the top assembly (A/B/C) to the bottom assembly.

2 LEGS/UPRIGHTS (inside faces shown)



A Twin biscuits reinforce the end-grain to face-grain joints where the legs and uprights attach to the risers (E).



B Mark the length of the fillers (K) on the filler blank to compensate for any slight dimensional variations in the case, leg, and upright assemblies.

Make the legs and uprights

1 Cut the legs (G), leg fillers (H), uprights (I), and upright fillers (J) [Drawing 2]. Glue the fillers to the legs and uprights. Then, taper the ends of the legs and round the ends of the uprights. Drill holes in the uprights.

2 Cut biscuit slots in the legs, uprights, and case ends [Exploded View, Photo A]. Glue and biscuit the legs and uprights to the case ends.

3 Cut a 57"-long blank for the fillers (K). Mark the fillers [Photo B], cut them to length, and glue them to the legs and uprights.

SKILL BUILDER

Miter-frame a panel

Making airtight miters on a picture frame can be a challenge, but at least you have some wiggle room with the final size of the frame. Not so when mitering edging around a panel. To ensure a tight miter joint at each corner, cut the edging at least 1" longer than the finished length. Cut a short scrap of edging to assist in aligning the

the miters. Miter one end of each piece of edging and the scrap. Now align, mark, and cut your way around the panel [Photos C-F]. When miter-cutting the edging to length, cut a little beyond your mark and then sneak up on the final length with additional cuts, checking the alignment of the miter with the panel corner between cuts.



C Align the mitered end of the first side edging (M) at the first corner using the mitered scrap.



D Clamp the side edging in place and mark the miter at the second corner. Cut the miter and clamp the side edging back in place.



E Position the first end edging (N) and secure the joint at the second corner with tape. Mark and cut the miter. Repeat with the second side edging.



F Align the second end edging (N) miter point to point with the second side edging. Mark and cut the miter.

1

bevel-rip on the tablesaw.

2

the



side edging (M).



1 Cut the drawer sides (B, C) [5 pieces each] C

■ (P, Q) [Drawing 4]. G
the drawer bottoms (R)

◀ clamp the drawers,
corner joints with brads

and drawer boxes [P
the drawer boxes into th

4 faced tape to the draw
press the false fronts



Align the drawer slide case member on a spacer, flush with the front of the riser (E), and screw the drawer slide in place. Remove the spacer.



Screw the drawer-slide drawer member to the drawer side (P), parallel to the bottom edge.

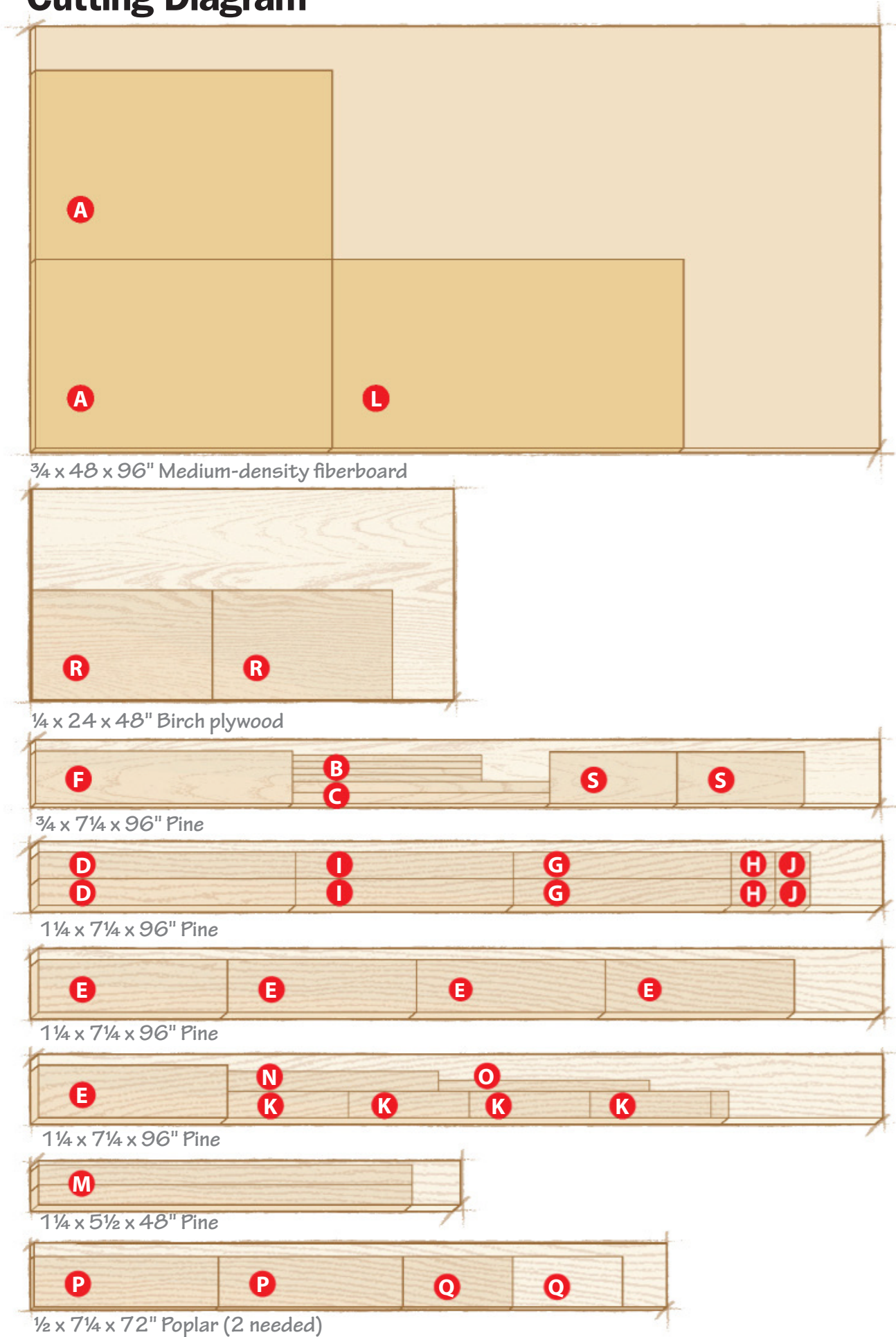
Finish it off

1 Remove all hardware, finish-sand where needed, and apply a finish. We sprayed on three coats of satin conversion varnish for wear resistance.

2 Attach the wheels [Sources, Exploded View]. (The wheels have grease fittings, so lube them.) Re-install the drawer hardware and slide the drawers into the case. Mount the planer, and you're off to the races. 🌲



Cutting Diagram



Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Case						
A	case panels	¾"	21½"	33¾"	MDF	2
B	end edging	¾"	¾"	21½"	P	4
C	side edging	¾"	1¼"	29¼"	P	2
D	rails	1¼"	3"	29¼"	P	2
E	risers	1¼"	6"	21½"	P	5
F	back	¾"	6"	29¼"	P	1
Legs and uprights						
G	legs	1¼"	3"	24¾"	P	2
H	leg fillers	1¼"	3"	5"	P	2
I	uprights	1¼"	3"	24¾"	P	2
J	upright fillers	1¼"	3"	4"	P	2
K*	fillers	1¼"	3"	13¾"	P	4
Top						
L	top panel	¾"	21½"	40"	MDF	1
M	side edging	1¼"	2¼"	42½"	P	2
N	end edging	1¼"	2¼"	24"	P	1
O	handle	1¼"	1¼"	24"	P	1
Drawers						
P	sides	½"	5¾"	21"	Pop	4
Q	fronts and backs	½"	5¾"	12½"	Pop	4
R	bottoms	¼"	12½"	20½"	Ply	2
S	false fronts	¾"	5⅞"	14½"	P	2

*Parts initially cut oversize. See the instructions.

Materials key: MDF—medium-density fiberboard, P—pine, Pop—poplar, Ply—birch plywood.
Supplies: #20 biscuits (24), 1 1/4 " brads, 1/2" hexhead bolts 6" long (2), 1/2" flat washers (4), 1/2" lock nuts (2).
Sources: 20" full-extension drawer slides no.32508, \$23 pr. (2 pr.); 4" hardware pulls, satin nickel no. 1007320, \$2.19 ea. (2), Rockler, 800-279-4441, rockler.com. High-strength rubber wheels, 6" diameter x 2" wide, 400 lb. capacity, for 1/2" axle no. 2319T922, \$15.11 ea. (2), McMaster-Carr, 630-600-3600, mcmaster.com.

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

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✓Yes



✓Yes



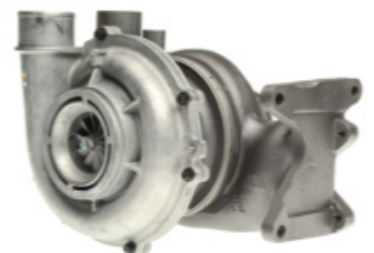
xNo



✓Yes



✓Yes



✓Yes

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Jointer/Planer

► You use a **jointer** to flatten a board's face and create a straight, square edge. A **planer**, then, machines the board to finished thickness and parallel to the jointed face. A planer cannot flatten a board without the use of a jig or sled, and a jointer cannot reliably make parallel faces.

When it comes to flattening and thickening lumber, a jointer and planer are like love and marriage in the old song: You can't have one without the other. So combining both similar machining operations—spinning a cutterhead to flatten a surface—in one machine would seem like a marriage made in heaven. And it can be, once you get past the sticker shock.

But let's do the math: Most of the combo machines in our test cost from \$2,955 to \$5,700, and will both face-joint and plane stock up to 12" wide. As you can see from the chart on the *next page*, a benchtop planer with that capacity costs only a few hundred bucks, but to make the jointing capacities even close to equal, you'll need to drop at least \$3,000 on a 12" jointer. By the time you figure in the additional benefits of 3+ hp motors and spiral cutterheads with four-sided carbide cutters, you'll start to see a combo machine as a smart investment.

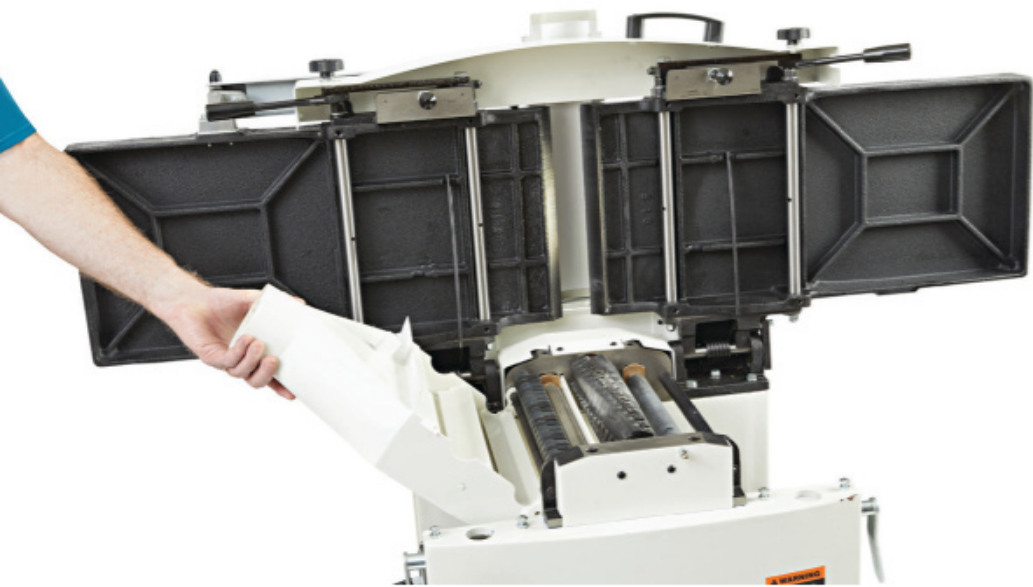
Combo Machines

Combining both wood-dimensioning functions into one unit saves precious shop space—and maybe some dollars.



Jointer/planer combo cost comparison

12" jointer/planer	\$2,955–\$5,700
10" jointer/planer	\$680–\$2,000
12" jointer	\$3,000–\$5,000
8" jointer	\$900–\$3,000
6" jointer	\$500–\$1,600
15–16" planer	\$1,000–\$3,300
12–13" benchtop planer	\$300–\$800



On three models, the jointer bed raises as one unit, and you rotate the chip-collection hood when changing between jointer and planer modes.



The Grizzly has separate chip-collection hoods and split jointer tables, making its changeover different from the other jointer/planers.

Because we know a machine at this price is still a lot for some woodworkers to bite off, we also tested two lower-priced and powered 10" combo machines to see how they compare with the big boys. One of those two—Jet's 10" JJP-10BTOS—had jointer tables we could not make coplanar despite several attempts working with Jet, preventing it from flattening a board face, so we eliminated it from the test.

Is one head better than two?

Each machine has a single cutterhead to perform both jointing and planing operations. The jointer uses the top of the cutterhead, which places the working bed height a few inches higher than a stand-alone jointer.

To switch to planer mode (*above*), remove or reposition the jointer fence, lift the tables up, and rotate the chip-collection hood into place before raising the planer table to set the cutting depth. The changeover for each machine takes less than two minutes.

You'll have plenty of power

The 12" machines use 3–5 hp, 220-volt motors, and all powered through test cuts with ease, even when we hogged 1/8" off 12"-wide hard maple. Even the 10" Rikon 25-010's 1½-hp, 110-volt induction motor proved impressive.

A quality cut = less sanding

With sharp cutters, all the machines turned out nice surfaces, although the insert cutterheads left less tear-out, especially in figured wood, compared to the straight-knife cutterhead on the Rikon 25-010. The carbide inserts, shown *below left*, also stay sharp longer and change out easier than straight knives. The Hammer A3 31 and Jet JJP-12HH cut cleanest, if only by a slim margin over the Grizzly G0634Z and Rikon 25-210H.

Planers (and sometimes jointers) create snipe. Once dialed in, Jet's 12" machine performed best with snipe a mere .001" deep, an amount easily sanded away. The Grizzly was next best at .002".

► **Snipe:** A slightly deeper cut about 2–3" from each end of a board.

Jointing

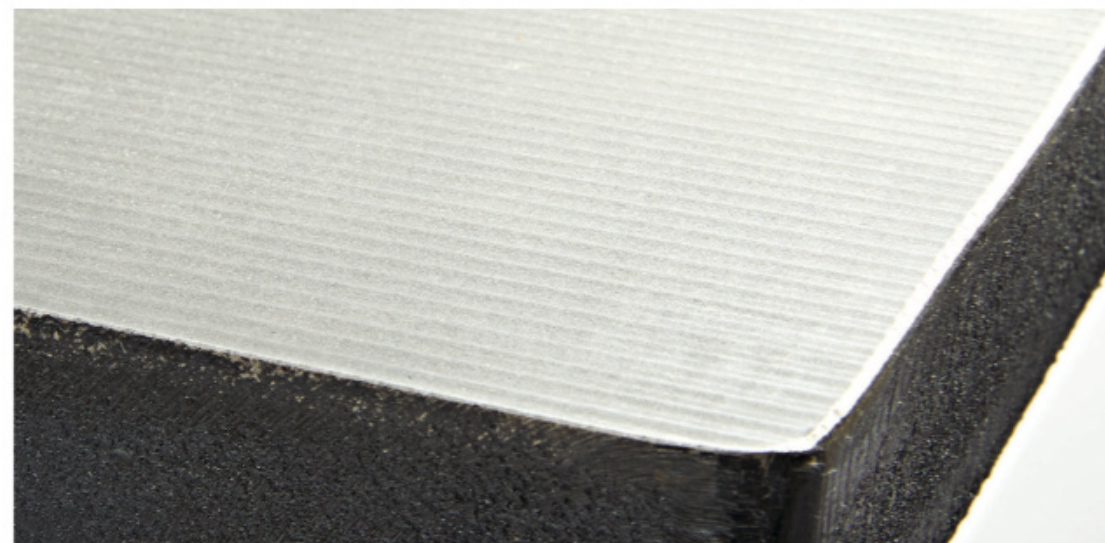
Combination jointer/planers have shorter beds than stand-alone jointers, so working with boards longer than 6' on the 12" machines and 4' on the 10" model can be cumbersome. We prefer the smooth-ground cast-iron tables on the Grizzly, Hammer, and Rikon 12" models to the ribbed cast-iron tables, shown *below*, on the 12" Jet and the milled aluminum 10" tables.

Most of the machines use a European-style cutterhead guard (shown *next page*), which take some getting used to, but once we did, we



▲ To watch the conversion from jointer to planer, point your smartphone's camera at this code, or visit woodmagazine.com/jointerplaner

Hammer's numbered carbide inserts help you quickly note how many sharp edges remain after you've turned each a few times.



Ribbed grooves on the jointer tables of the Jet 12" machine increase drag on boards as you feed them, especially when face-jointing.



European-style guards cover the full cutterhead, and raise and lower for different board thicknesses.



The chip-collection hood limits access to the planer infeed table on several machines (Rikon 25-210H shown here) when planing 2"-or-thinner boards.

liked them. Grizzly uses a familiar “pork-chop” guard, *below*, on its machine.

Aluminum jointer fences on all the test machines reduce weight, making change-overs easier. They all flex a little, but we never found it affected accuracy. Still, we recommend rechecking the fence angle every time you reset to jointer mode.

Planing

The planer portion of each machine sits a few inches lower than a typical stationary

planer. In some cases, the chip-collection hood or jointer outfeed table impedes access to the infeed table, *above*. However, the Grizzly has separate hoods—improving planer infeed-table access—so you simply swap the hose from one port to the other. With all the 12" units, you must engage the feed rollers before planing, and then disengage them before switching back to jointer mode. Each planer has one feed rate, with only the Jet moving boards at less than 20' per minute.



Grizzly G0634Z, \$2,955

800-523-4777, grizzly.com

Pluses

- + Boards glided easily on the polished-smooth cast-iron tables, our favorite among the test group.
- + This machine left so little snipe in both planer and jointer modes that we could quickly sand it away.
- + With separate chip-collection hoods for jointer and planer modes, you can use shorter flex hose to connect to a dust collector.

Minuses

- To change from jointer to planer, you must remove the fence and cutterhead guard before tilting the (separate) tables.
- The planer depth-adjustment handwheel rotates counterclockwise to increase the depth of cut—the opposite of the others and all dedicated planers—a source of frustration when making tiny adjustments.
- We found the jointer-table adjusters difficult to reach, and they require a hex wrench to lock.
- When changing or rotating the insert cutters, dust easily falls into, and builds up in, the counterbore around each screw.



Hammer A3 31, \$5,700

866-792-5288, felder-group.com/us-us

Pluses

- + Changing from jointer to planer and back proves easy with this machine. Simply lock the jointer fence midway over the cutterhead before lifting the tables.
- + A microswitch prevents accidental startups when changing modes.
- + The planer left so little snipe we could quickly sand it away. (It sniped a few thousandths more in jointer mode.)

Minuses

- The 120mm dust port requires an adapter (not included) to connect 4" or 5" flex hose. We wrapped it in tape to build it up for 5" hose.
- The 20"-long power cord is shortest in the test.
- The jointer depth-of-cut scale has no numbers or fractions to indicate increments.
- It takes 73 handwheel turns—the most in the test—to raise the planer table 6½" from its low point for rotating the chip-collection hood to the ¾" board-thickness setting.

Jointer/Planers combine two functions in one compact machine

MODEL	PERFORMANCE RATINGS (1)								MOTOR		CUTTERHEAD		CAPACITIES, INCHES			PLANER FEED RATE, FEET PER MINUTE	
	CUT QUALITY	ABSENCE OF SNIPE	POWER	EASE OF CHANGING WORK MODES	EASE OF CHANGING KNIVES/ CUTTERS	OVERALL EASE OF USE IN JOINTER MODE	OVERALL EASE OF USE IN PLANER MODE	CHIP COLLECTION	PREWIRED VOLTAGE	RATED HORSEPOWER	TYPE OF CUTTERS (2)	NUMBER OF KNIVES OR INSERTS	MAX. WIDTH	MAX. THICKNESS (PLANER)	MIN. THICKNESS (PLANER)		
12" MACHINES																	
GRIZZLY G0634Z	A-	A	A	B	B+	B+	A-	B	220	5	I	32	12	8¾	7⁄64	22	
HAMMER A3 31	A	A-	A	A-	A	A	B	A	220	4	I	48	12	9	5⁄32	21.3	
JET JJP-12HH	A	A	A	A	A	A-	B	A	220	3	I	56	12	9	5⁄32	12	
RIKON 25-210H	A-	B+	A	A	A	A	B	A	220	3	I	56	12	9	11⁄64	23	
10" MACHINE																	
RIKON 25-010	B	B-	A	C	B-	B	B-	C	110	1.5	2K	3	10	6¼	7⁄32	24.6	

1. **A** Excellent
B Good
C Fair
D Poor
2. (I) Four-sided carbide inserts
(2K) Double-edge high-speed-steel knives
3. (*) Includes table extension
4. (P) Push pads
(M) Mobile base
(S) Open-leg stand
(X) Extra inserts
5. (A) Austria
(C) China
(T) Taiwan
6. Prices current at time of article production and do not include shipping, where applicable.



Jet JJP-12HH, \$4,300

800-274-6848, jettools.com

Pluses

- + Because you don't have to remove or reposition the jointer fence, this machine tied for being easiest to convert from jointer to planer and back.
- + A mark on the planer depth-of-cut scale indicates how far to lower the planer table to clear the chip-collection chute. And it requires only 34 handwheel turns to get from this point to ¾" on the scale, best among the test units.
- + This unit created the least amount of snipe (.001") of any test unit.

Minuses

- The jointer's ribbed bed adds friction, especially when face-jointing.
- The jointer tables were not coplanar out of the box. It took us about 30 minutes to correct this following the owner's manual.

Note

- Jet makes a version of this machine with a three-knife cutterhead (no. JJP-12, \$2,800). We did not test it.



(Mobile base not included.)



(Mobility kit optional.)

Rikon 25-210H, \$3,500

877-884-5167, rikontools.com

Pluses

- + Because you don't have to remove or reposition the jointer fence, this machine tied for being easiest to convert from jointer to planer and back.
- + A mark on the planer depth-of-cut scale indicates how far to lower the planer table to clear the chip-collection chute.

Minuses

- The jointer tables were not coplanar out of the box. It took us about 30 minutes to correct this following the owner's manual.
- The jointer outfeed table does not have its own height adjuster, but it came set perfectly with the cutterhead. Instructions in the owner's manual explain how to adjust the outfeed table, if necessary.

	DIMENSIONS, INCHES							ACCESSORIES (4)		NOISE LEVEL (DECIBELS)								
	OVERALL HEIGHT X WIDTH X DEPTH	JOINTER BED		JOINTER FENCE LENGTH X HEIGHT	PLANER BED		DUST-PORT DIAMETER	STANDARD	OPTIONAL	JOINTER MODE	PLANER MODE							
		LENGTH	WORKING HEIGHT		LENGTH (3)	WORKING HEIGHT (MIN.-MAX.)												
	49½ × 59½ × 48½	59½	36¼	39½ × 6	23	24–32¾	4	P, X(5)	M	95	92	644	120	N	1	T	\$2,955	
	56½ × 60 × 43	55½	33½	43¼ × 6	21¼	22–31	120mm		M	95	91	556	20	N	1	A	\$5,700	
	52 × 55¾ × 42¾	55¾	33¼	43¼ × 6	21½	21¾–30¾	4	P, X(5)	M	92	91	488	96	N	5	C	\$4,300	
	52½ × 56 × 41½	56	34	43¼ × 6	33*	22–31	4	P, X(5)	M	95	90	492	96	N	5	C	\$3,500	
	41 × 44 × 36	41	36	24 × 4½	15¾	26½–32¾	4	S		96	94	153	84	Y	5	C	\$1,300	

Rikon 25-010, \$1,300

Pluses

- + Its 110-volt induction motor provides plenty of power.
- + This machine comes with an open-leg stand, and despite the unit’s small size, proves stable in both jointer and planer modes.
- + Its three-knife, high-speed-steel cutterhead with double-edge, disposable knives produced a respectable finish.

Minuses

- The jointer tables were not coplanar out of the box. It took us about 30 minutes to correct this following the owner’s manual.
- Converting from jointer to planer requires you to remove the jointer guard, fence, and outfeed table, a laborious process.
- Chip collection was less effective in jointer mode than planer.

Note

- Rikon makes a version of this machine with a carbide-insert cutterhead (no. 25-010H, \$2,000). We did not test it.



Make it a large combo

Investing in a jointer/planer shows your commitment to your craft, and to get the best, requires a generous financial outlay. The Jet JJP-12HH (\$4,300) and Hammer A3 31 (\$5,700) share Top Tool honors. Both machines earned high marks in every category except one to stand out.

But not everyone can drop that kind of money for a jointer/planer, and for you, we recommend the Grizzly G0634Z (\$2,955). It performed well for significantly less money, earning our Top Value award. 🌳



For setting or seating Nesting Tables

This versatile set consists of two projects: a large table and a small table. Two small tables slide comfortably under the large table. Sturdily constructed and standing 18" and 15½" tall, respectively, they'll find use throughout your home as more than just tables—they make great benches and footstools, too.

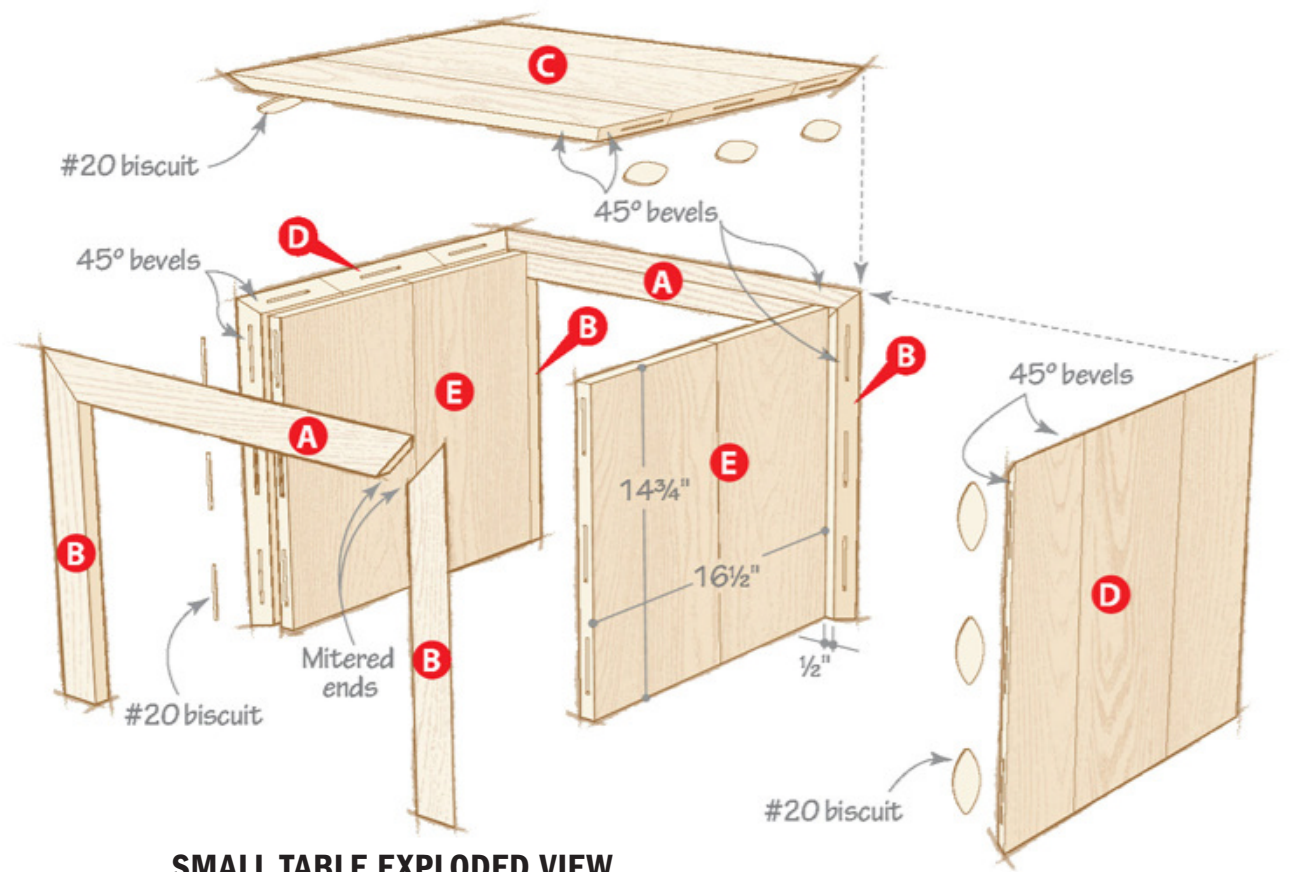
The following steps apply to both the large and small versions of the table. Only the sizes of the parts differ [[Materials Lists page 51](#)].

D I M E N S I O N S :
48" W x 18" D x 18" H

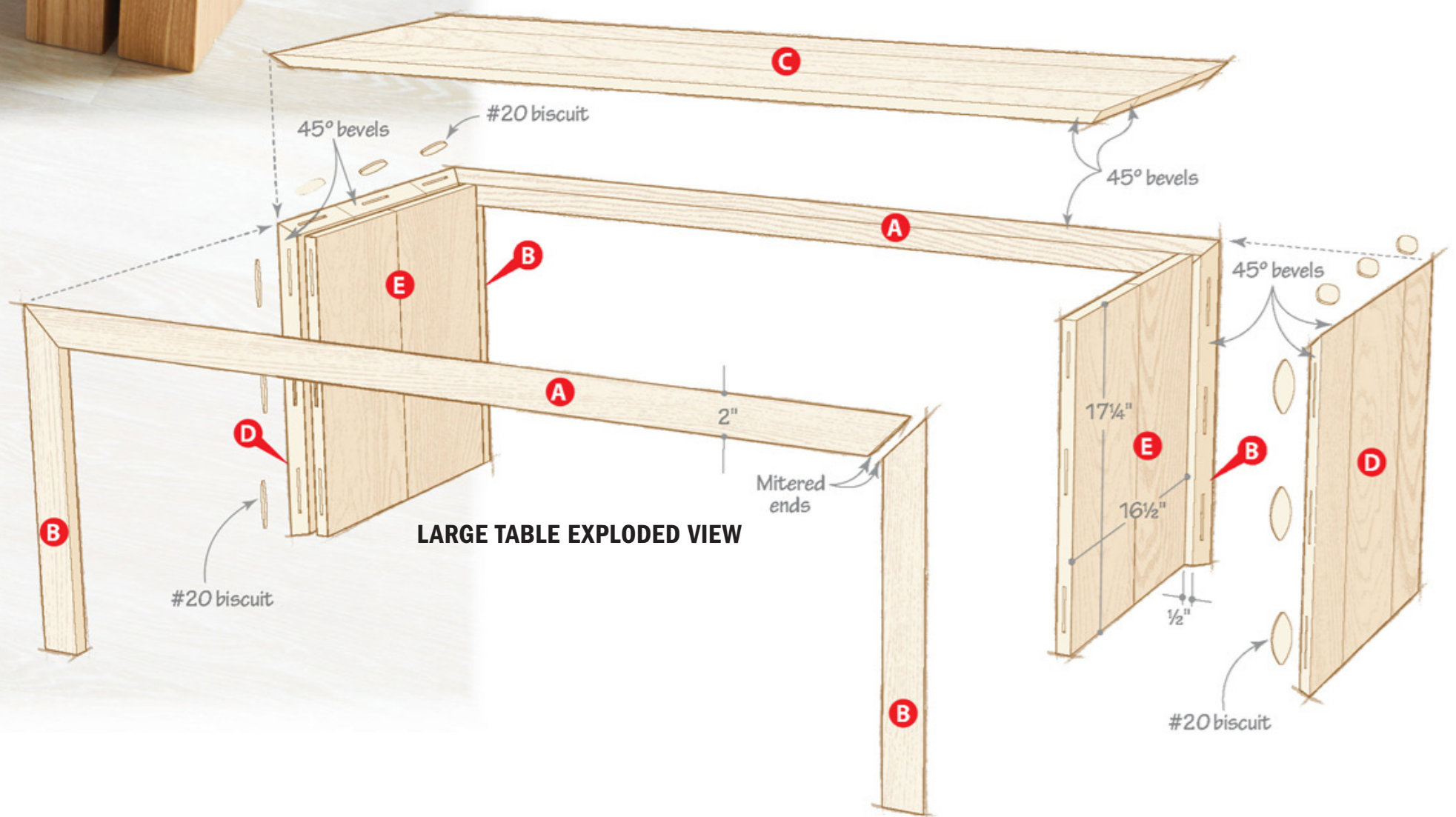
Approximate
materials cost
for all three
pieces built
from ash:

\$250

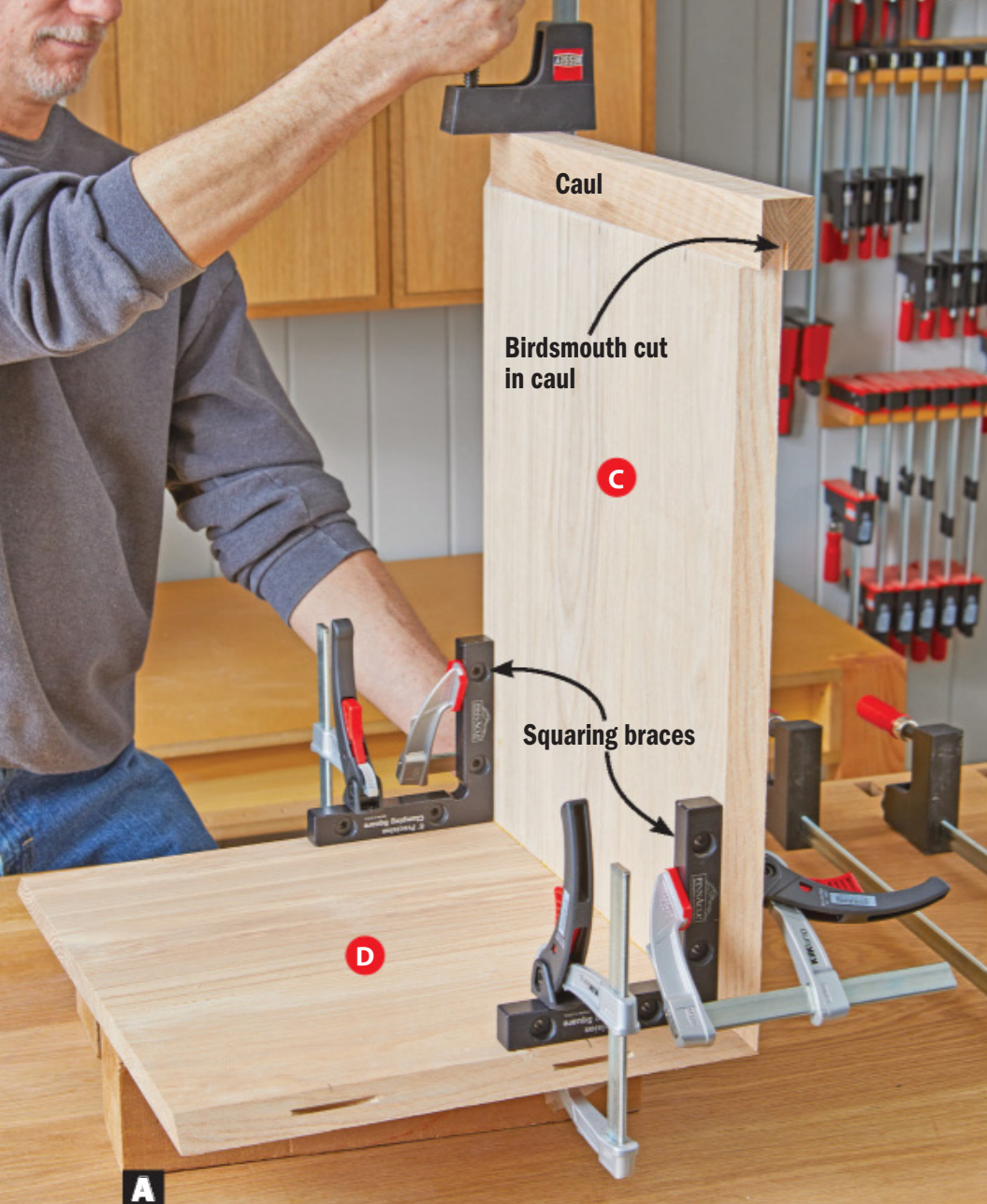
Craft the
whole set in
a weekend!



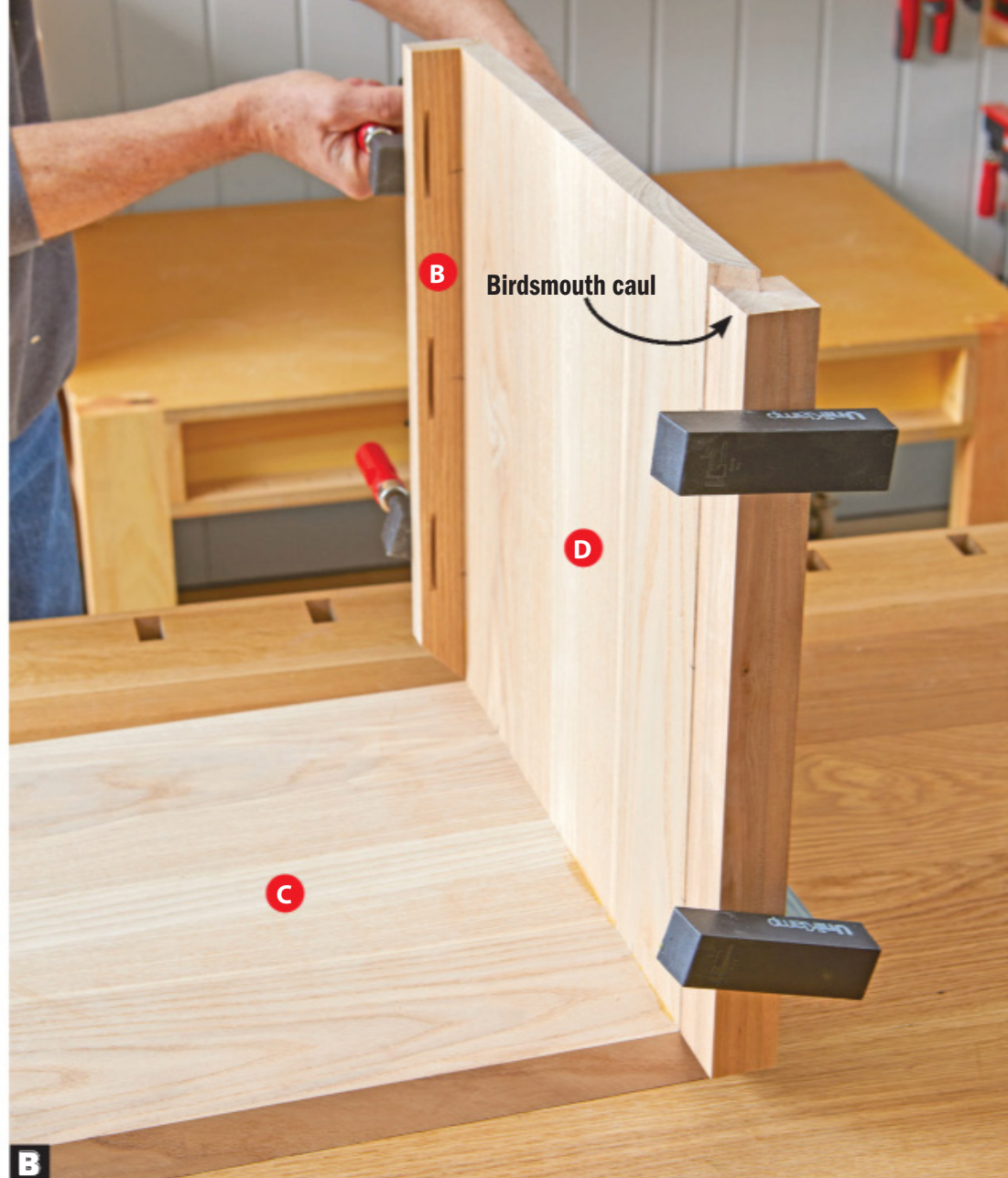
SMALL TABLE EXPLODED VIEW



LARGE TABLE EXPLODED VIEW



Braces help square the pieces. A birdsmouth caul provides a clamping surface and protects the mitered end of the top.



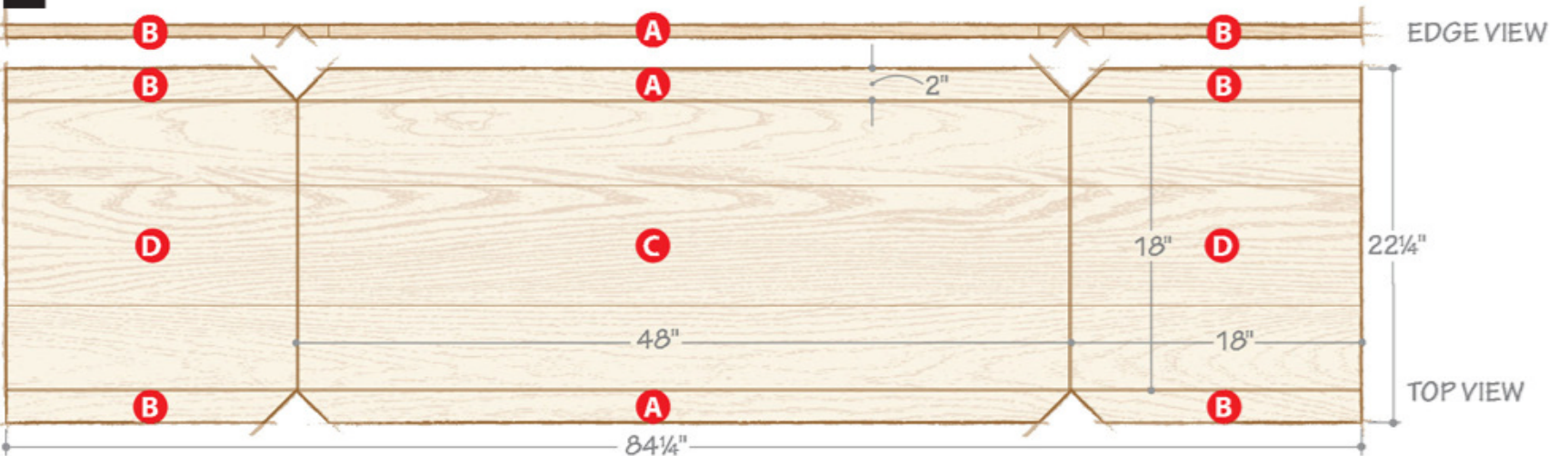
Again use a birdsmouth caul when attaching the vertical trim (B) to one edge of both sides (D).

Tip! For best results adjust your tablesaw for spot-on 45° bevel and miter cuts. Use a sharp, 40- to 50-tooth combination blade. Feed the workpieces steadily for smooth, glue-ready cuts, but fast enough to avoid burning. To learn how to tune your tablesaw to perfection, point your smartphone's camera at this code, or visit woodmagazine.com/tuneuptips



Tip! For the best grain match, remove as little width and length as possible when cutting the bevels and miters.

1 LARGE TABLE BLANK BEVEL CUTS



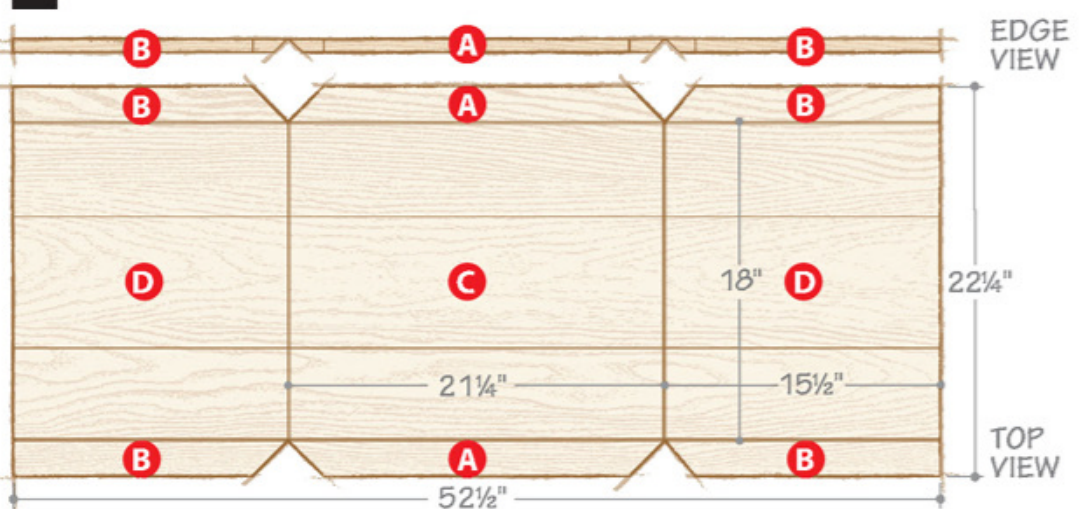
First, bevel a big blank

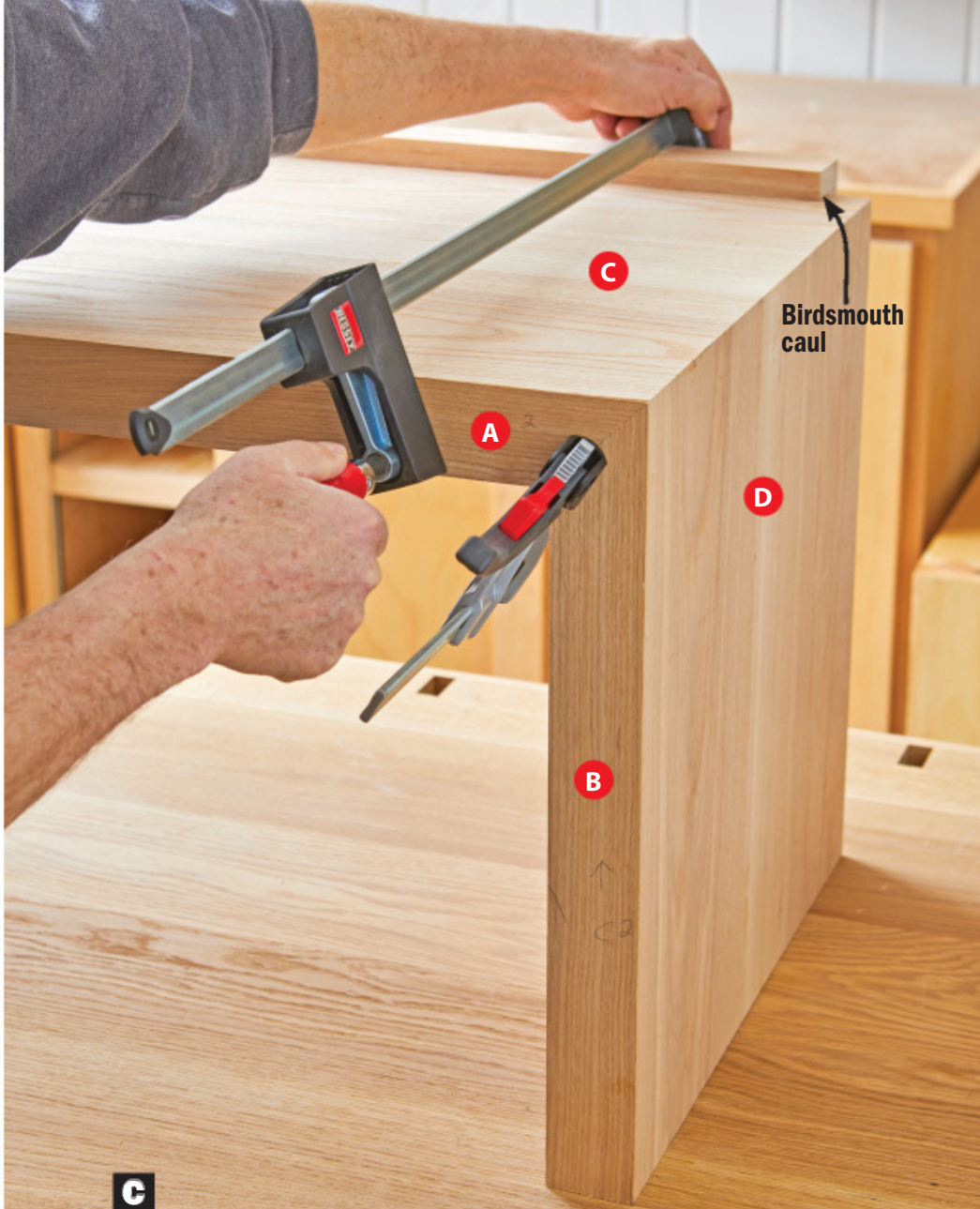
By cutting all of the exterior-facing parts from one glued-up blank, and maintaining the parts' orientation from the blank to the assembly, the grain "flows" in a continuous and pleasing manner at adjoining corners.

1 For the large table glue up a $\frac{3}{4} \times 22\frac{1}{4} \times 85$ " blank [Drawing 1]. For each small table glue up a $\frac{3}{4} \times 22\frac{1}{4} \times 53$ " blank [Drawing 2].

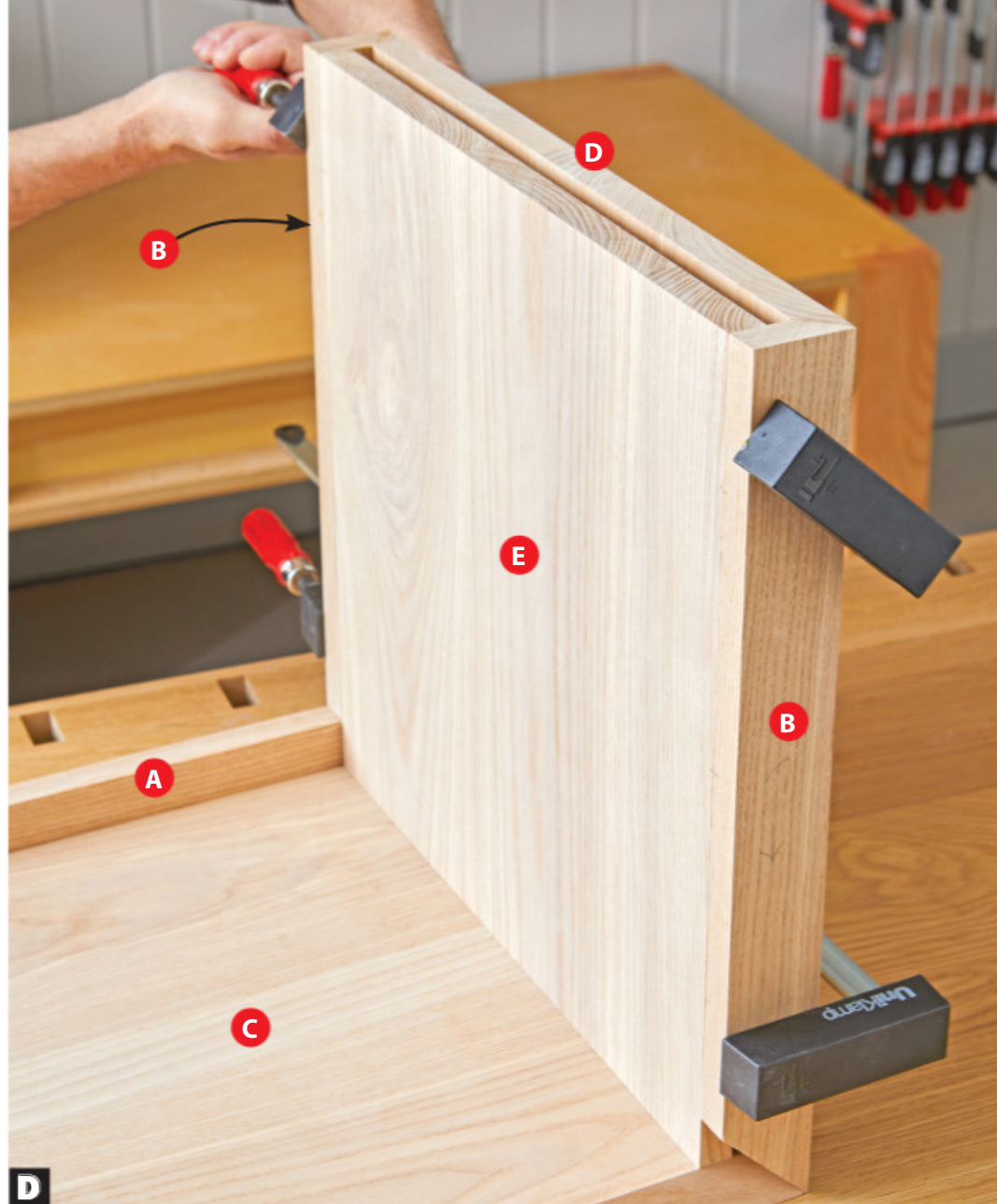
2 Bevel-rip 2"-wide blanks for the horizontal and vertical trim (A, B) from each edge of each blank [Drawings 1, 2, Exploded Views]. Then bevel-rip the remaining center of the blank to form the edges of the top and sides (C, D).

2 SMALL TABLE BLANK BEVEL CUTS





C Align the trim miters with a small clamp and attach the horizontal trim (A) using a caul longer than the ones used to clamp on the vertical trim (B).



D Attach the remaining vertical trim (B) and interior walls (E) to the A-D assembly.

3 Miter the top and sides to finished length. Cut the biscuit slots [Exploded Views].

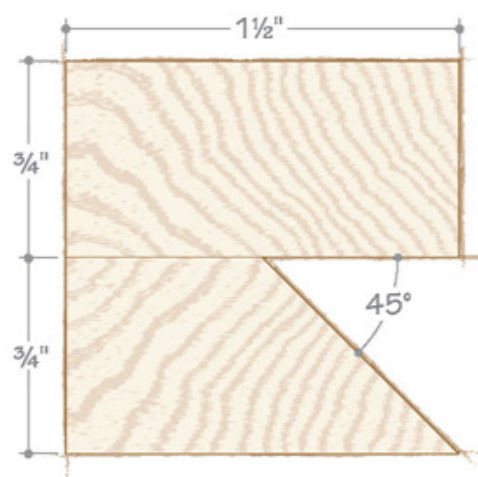
Now, let's get it together

1 Glue and clamp a side (D) to the top (C) [Photo A], using a birdsmouth caul [Drawing 3]. After the glue dries, glue and clamp on the other side.

2 Miter both ends of the horizontal trim (A) and one end of each vertical trim (B) to fit. Cut biscuit slots, then glue and clamp both vertical trim pieces on one edge of the table [Photo B]. On that same edge of the top (C) glue and clamp on the horizontal trim [Photo C].

3 Glue up and trim to finished size the interior walls (E). Cut biscuit slots in their

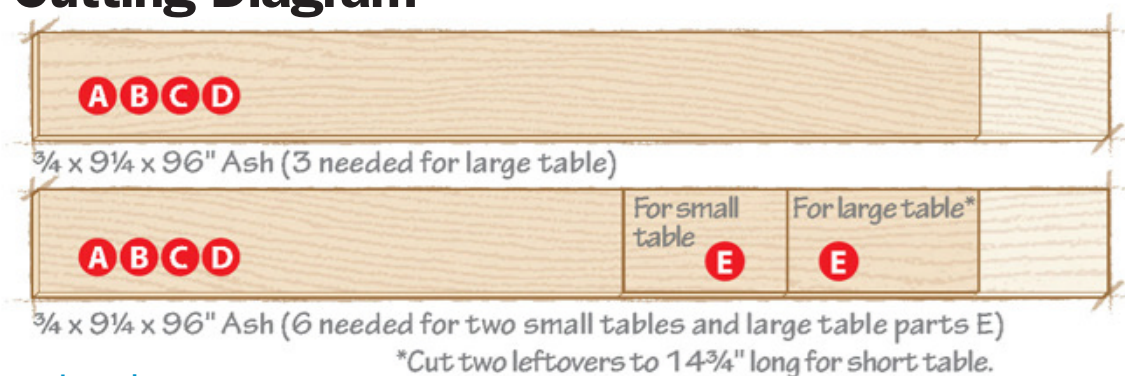
3 BIRDSMOUTH CAUL DETAIL



edges and glue and clamp the interior walls and the remaining vertical trim [Photo D]. Glue on the final piece of horizontal trim (A).

4 Finish-sand the table and apply a durable finish. We chose a water-based polyurethane on bare wood. 🌳

Cutting Diagram



Materials List

Large Table

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* horizontal trim	3/4"	2"	48"	A	2
B* vertical trim	3/4"	2"	18"	A	4
C* top	3/4"	18"	48"	A	1
D* sides	3/4"	18"	18"	A	2
E interior walls	3/4"	16 1/2"	17 1/4"	A	2

*Parts initially cut oversize. See the instructions.

Materials key: A-ash.

Supplies: #20 biscuits (30).

Materials List

Small Tables (two)

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* horizontal trim	3/4"	2"	21 1/4"	A	4
B* vertical trim	3/4"	2"	15 1/2"	A	8
C* top	3/4"	18"	21 1/4"	A	2
D* sides	3/4"	18"	15 1/2"	A	4
E interior walls	3/4"	16 1/2"	14 3/4"	A	4

*Parts initially cut oversize. See the instructions.

Materials key: A-ash.

Supplies: #20 biscuits (60).

Sources: Gray Zardoni Sofa and Copper Elazer Stool are available at ashleyfurniture.com
Ivory Coast White plank floor is available at usfloorsllc.com

Produced by **Bill Krier** with **Kevin Boyle**

Project design: **Kevin Boyle**

Illustrations: **Roxanne LeMoine, Lorna Johnson**



Frames Without Mitters



A

Offset the biscuit slots closer to the front face of the frame so you don't rout into them when rabbeting the rear face.

Mitters make a great choice for frames because they hide end grain, and the joint lines direct your eye to the framed item. But mitters can be finicky to cut and clamp, and they make a relatively weak joint. Instead, try these techniques to create simple, strong, handsome frames for pictures, mirrors, and more. Each of these frames shows end grain, but that's not necessarily a negative.

Butt joint

The simplest joint to cut

End grain doesn't provide a strong glue surface, so butt joints must be reinforced. If the rear of a frame will be visible, choose one of the hidden options listed below. Hanging a frame on a wall hides the less eye-pleasing visible choices.

Tip! Take care to position reinforcements far enough from the interior edges that you won't cut into them as you rout the recess for the artwork and glass.



► Learn how to cut biscuit joints.
woodmagazine.com/biscuitbasics

► **Rails:** Horizontal frame members
Stiles: Vertical frame members

Hidden Reinforcements

Biscuits require a biscuit joiner, which plows mating semicircular grooves in each frame piece. Gluing a football-shape biscuit into those slots aligns the workpieces and provides strong face-grain-to-face-grain glue surface [Photo A]. The shortest slot cut by a biscuit joiner dictates rails and stiles at least 2¼" wide.

Installing *dowels* requires a little more time and effort than biscuits, but dowels create the

strongest butt joint. Drilling the mating holes in each piece requires a jig to align them accurately [Photo B]. Dowels can join pieces too narrow for biscuits.

Visible Reinforcements

To assemble a butt-jointed frame quickly, choose *pocket screws*. Use a pocket-hole jig to drill angled holes toward the end of each rail, then drive in washer-head screws to pull the rails tight to the stiles [Photo C].

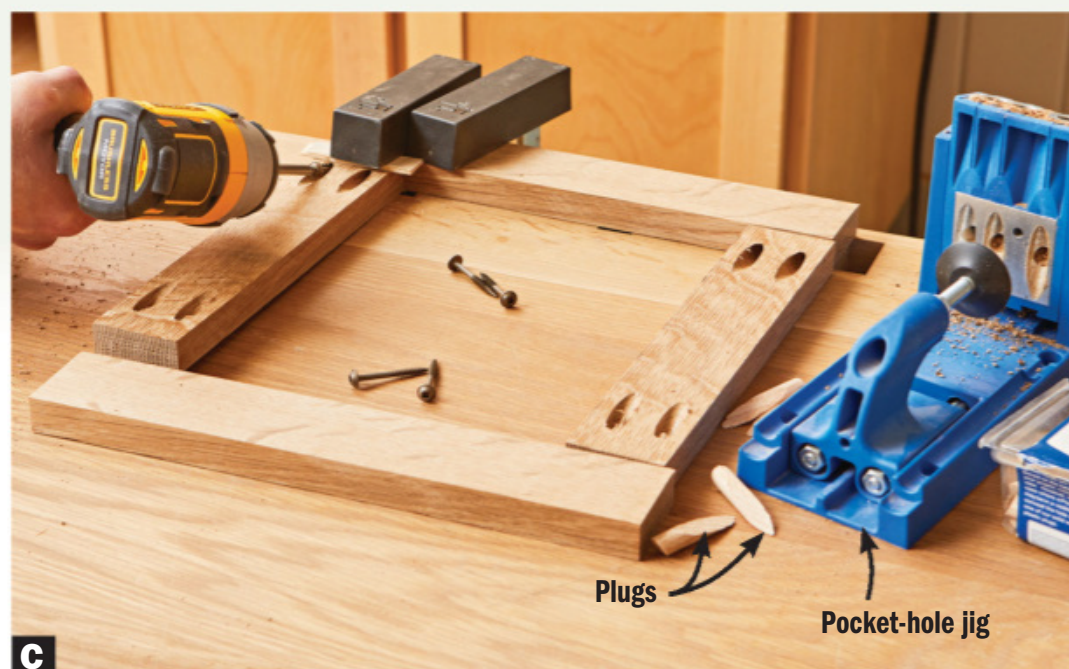
► Get tips for using pocket-hole joinery.
woodmagazine.com/pocketpointers



B

Use two dowels at each joint to prevent the pieces from twisting out of alignment during glue-up.

woodmagazine.com



C

Drill pocket holes on the back faces of the rails only. Pocket holes can be plugged to reduce their visibility.



Splines bridge the joint, providing face-grain glue surface. This approach can be purely functional and hidden on the back of the frame [Photo D], or used as an accent on the front [Photos E-H].



D

Inset a round spline on the rear face by drilling a $\frac{1}{4}$ "-deep recess across the joint with a Forstner bit. Use a holesaw without the pilot bit to cut a disc from $\frac{1}{4}$ " material and glue the spline in place.



E

Set a straight bit $\frac{1}{4}$ " above the table. Mark the edges of the bit onto the fence. Then move the fence back the desired distance to position the slot. (We centered ours on the width of the frame pieces.)



F

Mark start and stop points for each groove on the back face of the frame. Align the left frame mark with the left fence mark, and, with the frame against the fence, carefully lower the frame onto the spinning bit.



G

Move the frame until the right frame mark aligns with the right fence mark. Shut off the router and wait for the bit to stop before removing the frame.



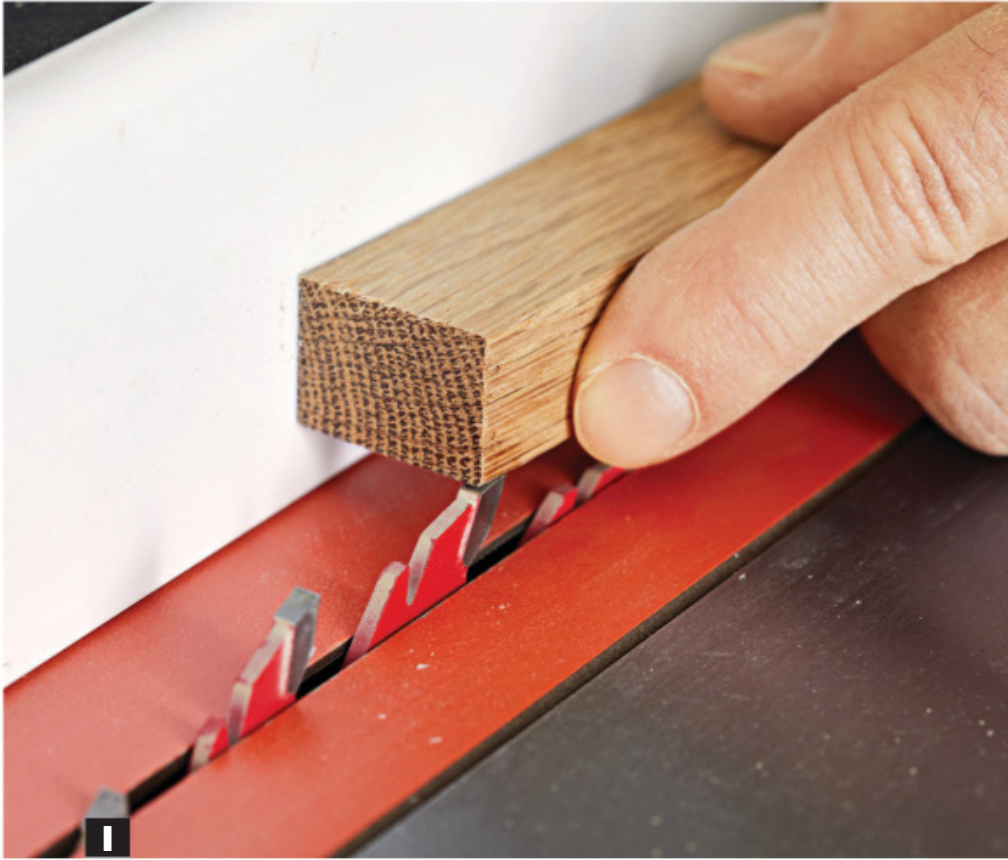
H

Square up the ends of the grooves with a chisel, or round the ends of the splines and glue them in place. We sized ours to stand $\frac{1}{16}$ " proud of the frame.

Half-laps

Sturdy and self-squaring

With lots of face-grain-to-face-grain gluing surface, half-laps make a strong choice for large frames and those that need to support heavy objects such as mirrors. Traditional half-laps have flush ends, edges, and faces. To cut this joint, follow the steps in Photos I-L.



I Set the rabbet width using a frame rail or stile as a gauge. Adjust the fence so the frame piece's outer edge aligns with the outermost point of the tooth.



J Rabbet the end of two scraps the same thickness as your frame pieces. Lying on a flat surface, the two rabbets should meet, with their top faces flush.



K Rabbet the ends of each frame piece. An auxiliary miter-gauge fence steadies the workpiece and prevents chip-out on the trailing edge of the cut.



L Glue up the joint with a clamp in each direction pulling the shoulders tight, and others pressing the joint faces together.



M Thicker stiles (or rails) keep the back faces of the frame pieces flush so you can rout a rabbet for the photo or artwork.

Customize half-laps for a variety of looks without sacrificing strength. For example, make one pair of frame pieces slightly thicker to create a frame where the rails or stiles stand proud of the mating pieces [Photo M]. Or cut dadoes, rather than rabbets, to create a frame with rails and stiles extending past the mating pieces [Photos N, O].



N To cut and align dadoes, clamp to the fence a stopblock the width of the workpiece less the width of the blade. The gap between the blade and stopblock determines the length of the “ears.”



O Move the stopblock back from the blade. Cut one shoulder with the workpiece butted against the stopblock. Make additional cuts to remove the waste until the piece butts against the rip fence.

Stub tenon and groove

Often used for doors, but great for frames.

With this joint, a tongue on one piece fits a centered groove on the mating piece [Photos P, Q]. After gluing up the frame, rout around the frame, removing the back of the groove to form the rabbet for the artwork.

If you have a cope-and-stick router-bit set [Photo R], it cuts a similar joint with an attractive molded edge that appears mitered around the interior.

► Set up cope-and-stick bits.
woodmagazine.com/copeandstick

Produced by **Craig Ruegsegger**



P

With a rip blade set between $\frac{1}{4}$ " and $\frac{3}{8}$ " above the table, make a pass on the inside edge of each stile, roughly centered. Center the groove by making a second pass with the opposite face against the fence.



Q

Measuring to the far side of the blade, position the rip fence to match the groove depth. Cut tongues by making passes on each face of the rails only. Sneak up on the blade height to get a tongue that fits snug in the groove.

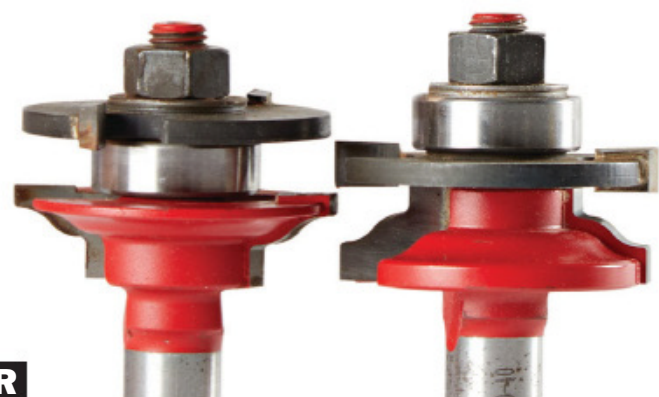


Note: To accept the artwork, rout a $\frac{3}{8}$ " rabbet after assembling a frame. Rout the same depth as the combined thickness of your glass, artwork, and backer board. Square up the corners with a chisel.



The chase is on

Another way to create an eye-catching frame without miters is to assemble it with a chasing or pinwheel pattern, rather than capturing the rails between the stiles. Use or adapt any of the joinery methods described in this article. 🌲



R

A cope-and-stick router-bit set contains two matched bits. One bit, right, creates the groove and molded edge on all four pieces; the other, left, copes the ends of two pieces, making a mating tongue and profile.

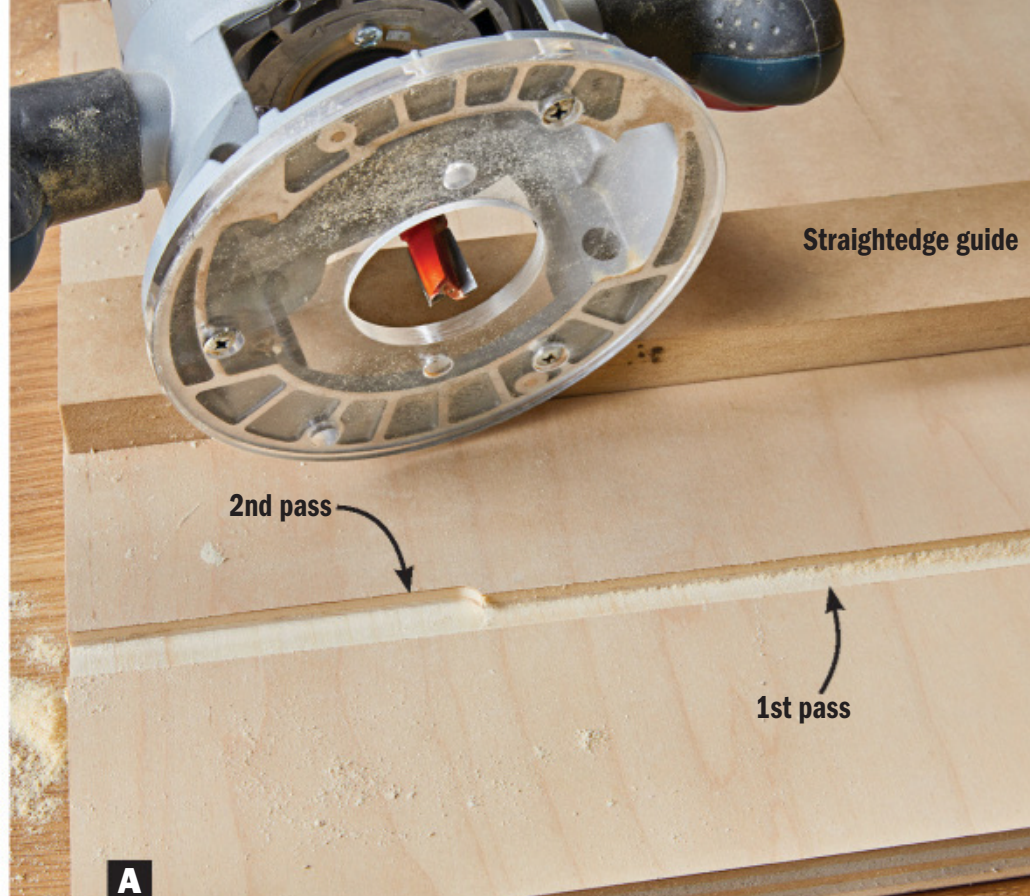
woodmagazine.com

Straight Talk on Straight Bits



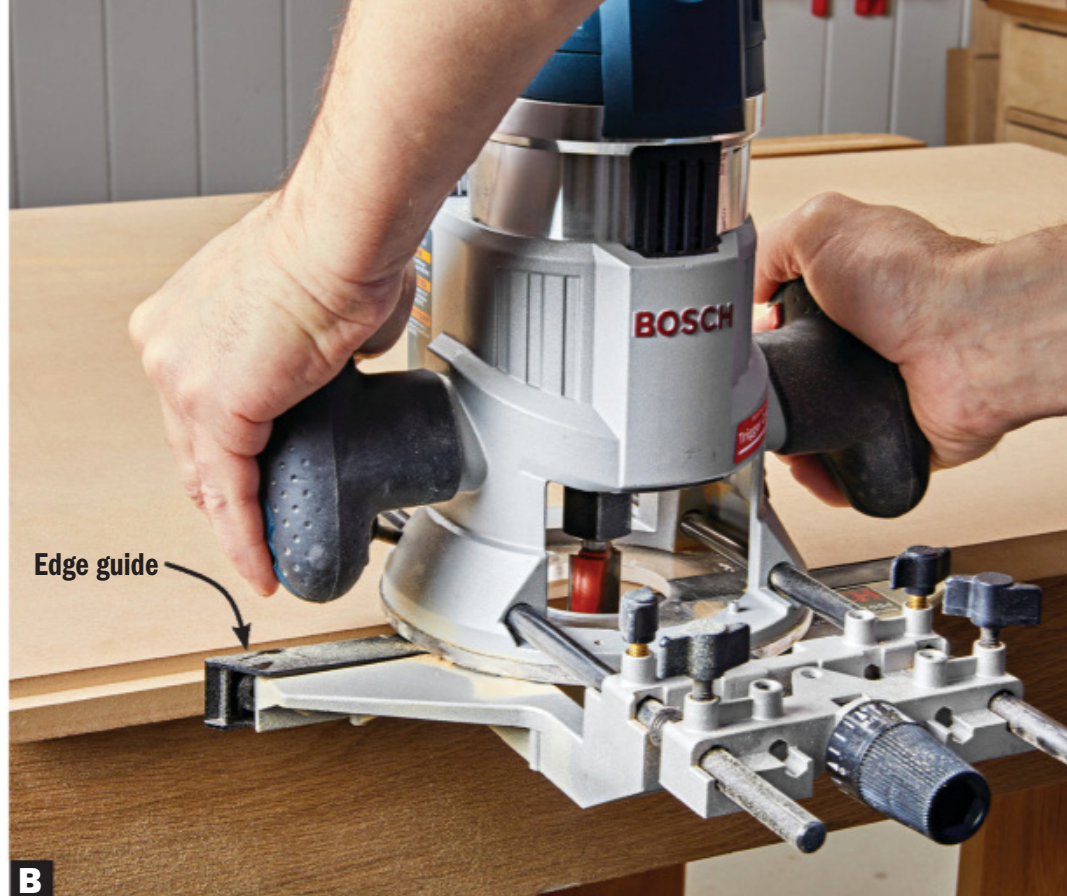
by Jim Heavey

Woodworkers love routers for their ability to create fancy edge profiles that draw the eye. Though profile bits get all the glory, the humble straight bit serves as the true workshop hero. Its work, often unseen, creates dados for shelving, rabbets in carcasses, mortises, duplicate parts, and so much more. Let's take a close look at the three main types of straight bits.



A

Route a groove or dado the width of the bit by making a single pass. Move the guide, even just slightly, and make additional passes to widen the slot.



B

An edge guide adds stability when routing rabbets, as more than half of the router may extend over the workpiece edge. Adjust the edge guide position to plow wider or narrower rabbets.

The basic straight bit

Use a straight bit for cutting grooves, dados [Photo A], and rabbets [Photo B]. They come in one-, two-, and three-flute variations ranging in diameter from $\frac{1}{16}$ " to 1". (Small bits have room for only one flute.) Larger bits with two or three flutes provide smoother cuts, but at a slower feed rate. You'll find these bits in a variety of cutter lengths from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Choose longer bits to cut deep grooves, and when routing with a guide bushing and template [Photo C].

► Learn more about using guide bushings on page 64.

Upcut and downcut spiral bits

When routing deep grooves or dados, trapped sawdust can cause the bit and router to work harder, overheating the bit, and burning the walls of the cut. An *upcut* spiral bit pulls out waste, similar to the way a standard drill bit evacuates shavings from a hole [Photo D].

Sometimes a clean edge takes precedence over clearing waste. In these cases, choose a *downcut* spiral bit. As it spins, it begins cutting on the top surface of the workpiece and shears downward, preventing chip-out. Because it tends to drive waste into the cut, avoid burn marks by making a series of shallow passes to reach final depth.

A *compression* bit combines the best of upcut and downcut bits. At its tip, it upcuts material while the balance of the length shears downward. Use this bit when trimming edges of veneered plywood or melamine. Because each end of the bit cuts toward the center of the panel, both faces emerge chip-out free.

Tip! As a general guide, make cuts no deeper than the diameter of the bit; for example, a $\frac{1}{4}$ "-deep pass for a $\frac{1}{4}$ "-diameter bit.



C

When using a guide bushing that runs against a template, a long bit reaches past the template to the desired cutting depth.



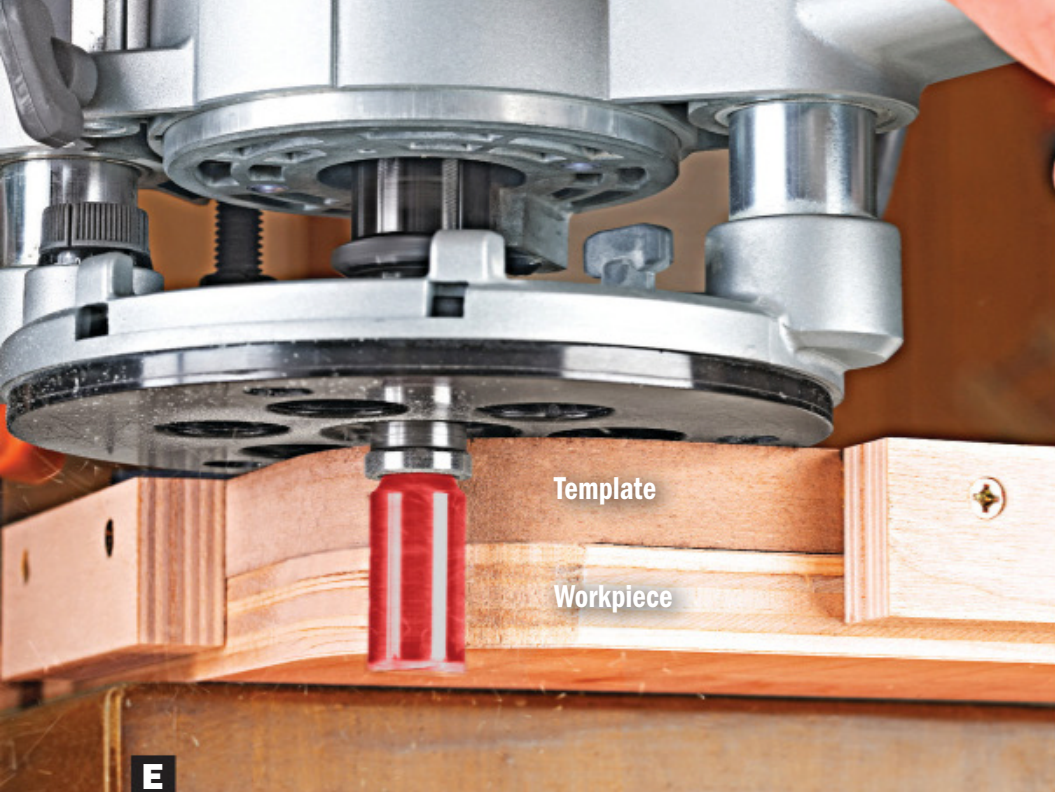
D

As an upcut bit spins, it pulls debris up and out of the cut. A downcut spiral bit cuts from the top down, shearing wood cleanly. A compression bit cuts from both ends toward the middle.

Upcut

Downcut

Compression



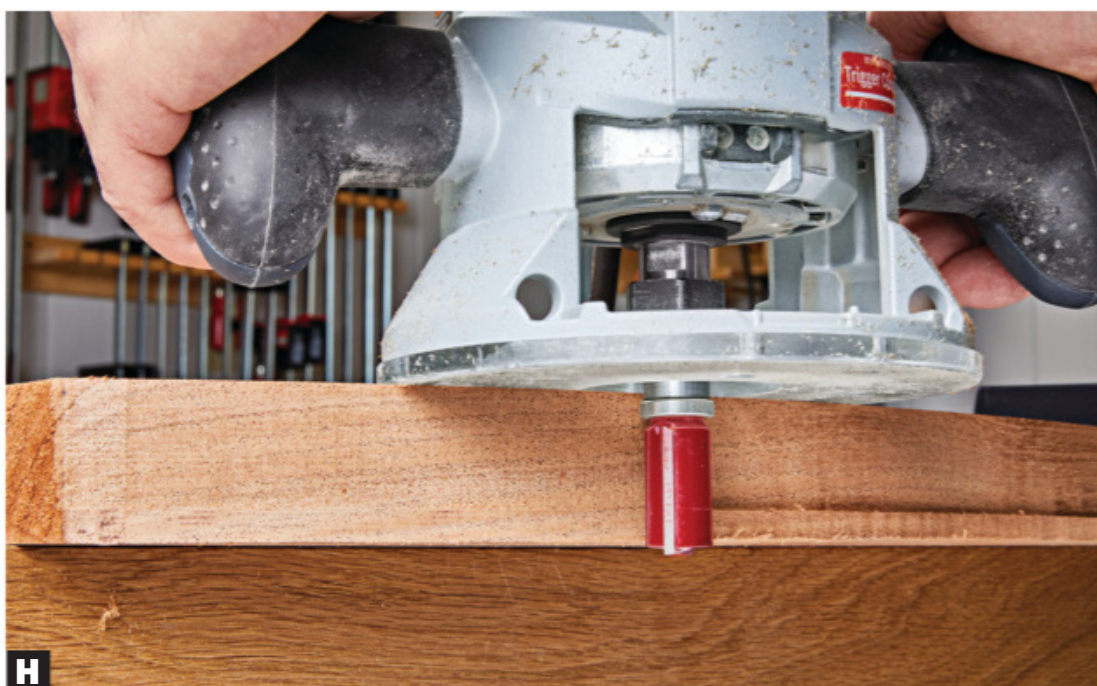
E A pattern bit places the bearing between the cutters and shank. The router rides on the template.



F A flush-trim bit bearing sits at the end of the bit. The router rides on the workpiece.



G After routing almost the full depth of the bit with the template in place, remove the template and ride the bearing against the freshly routed surface.



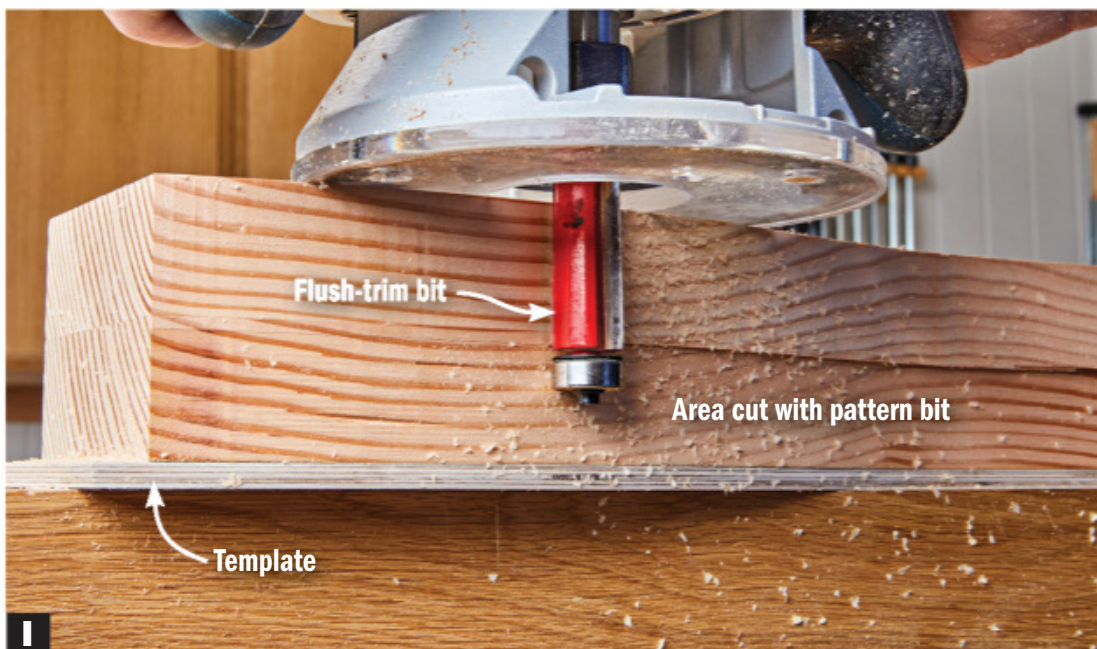
H

Pattern and flush-trim bits

A straight bit with a bearing the same diameter as the cutters can follow and create parts the same size and shape as a template. Secure the template to a workpiece slightly larger than the template, then set the bit height so the bearing rides on the template.

Which bit you choose depends on the job, and whether you prefer or need the template above or below the workpiece. A *pattern* bit, with its bearing above the cutters, can rout a dado following a template. It also requires exposing the full cutter so the bearing contacts the template [Photo E]; a *flush-trim* bit allows you to expose only as much bit as is needed [Photo F]. With a pattern bit, you can rout workpieces thicker than the bit length [Photos G, H]. You can even use the two bits in tandem [Photo I].

Use large-diameter bits whenever possible, as they prove more stable and less prone to breakage. Choose a small-diameter bit to reach into tight concave curves.



I On this 2"-thick workpiece, the pattern bit reached just over half of the thickness. To complete the cut, flip the workpiece over, mount a flush-trim bit, and rout with the bearing riding on the previously routed edge.

Now that you know a “bit” more about them, make sure your collection includes a variety of these perhaps underappreciated, but ready to perform, bits. 🌲

One-Wall Workshop Clamp Rack & Glue Station

De-stress glue-ups by storing clamps and supplies in these handy hanging holders.



GLUE STATION

D I M E N S I O N S :
11" W x 10 1/4" D x 13 1/4" H

Approximate materials cost:

\$12

When you pull out a shop rag, the box stays put.

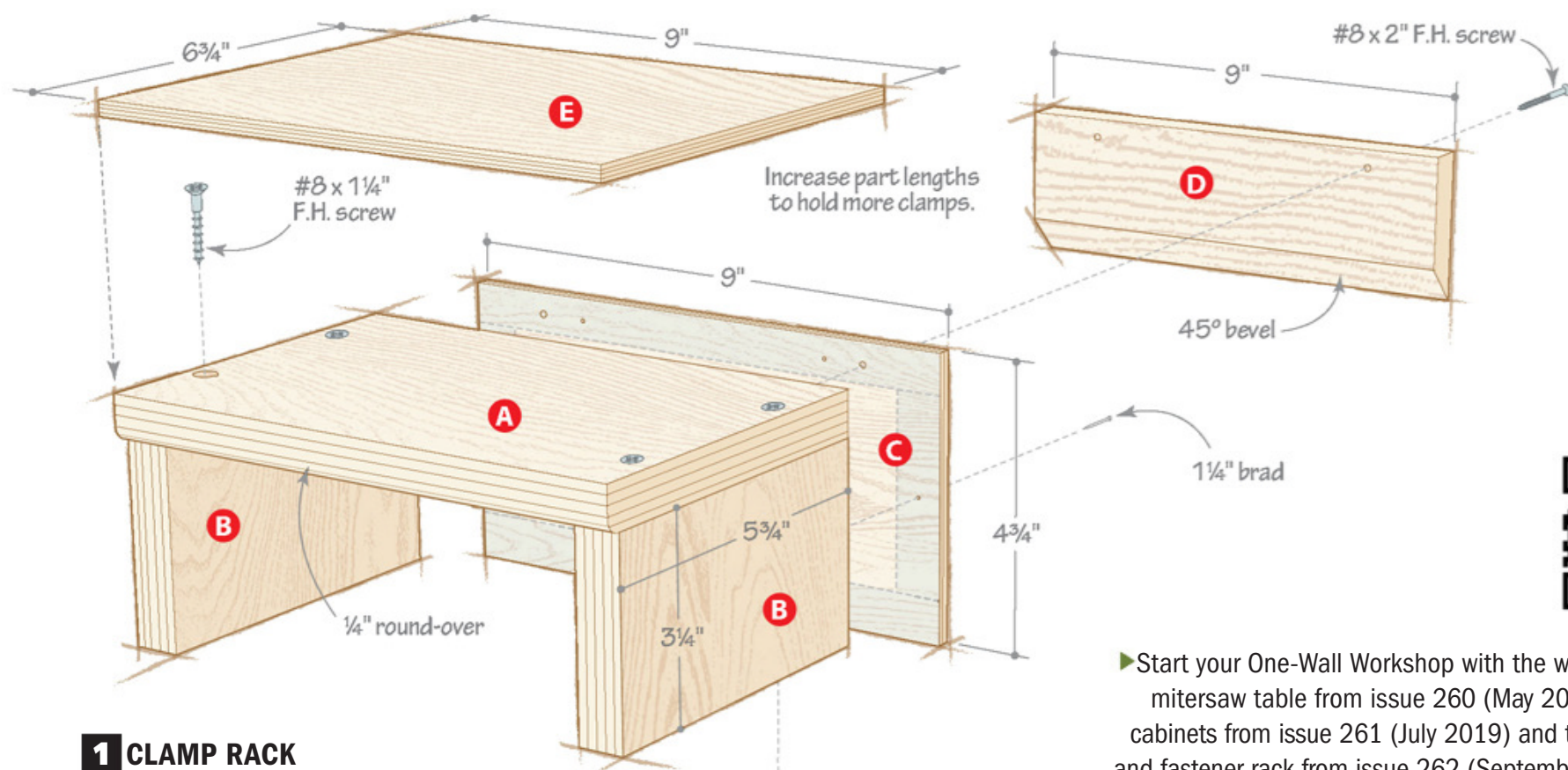
CLAMP RACK

D I M E N S I O N S :
9" W x 7 1/2" D x 5" H

Approximate materials cost:

\$6

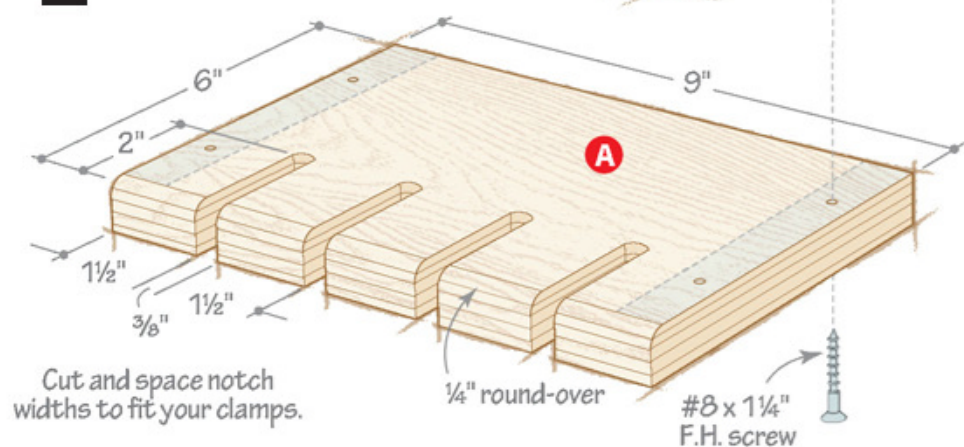
Use the top as a shelf for clamping pads and accessories.



► Start your One-Wall Workshop with the workbench and mitersaw table from issue 260 (May 2019). Then add cabinets from issue 261 (July 2019) and the drill holder and fastener rack from issue 262 (September 2019). See all of the plans by pointing your smartphone's camera at this code, or by searching for "one-wall" at woodstore.net.



1 CLAMP RACK



Put a pinch on clamp clutter

The $\frac{3}{8}$ "-wide notches hold most F-style and one-handed bar clamps. For pipe or aluminum bar clamps, widen the notches and adjust the spacing as needed, or hang them from the ends of the rack.

1 Cut a $6 \times 18\frac{1}{4}$ " blank for the bottom (A) and top (A). Cut clamp rack parts B–E to size [Clamp Rack Materials List].

2 Lay out the notches on the bottom (A) [Drawing 1]. Drill $\frac{3}{8}$ " holes at the end of each notch, then jigsaw the notches [Photo A].

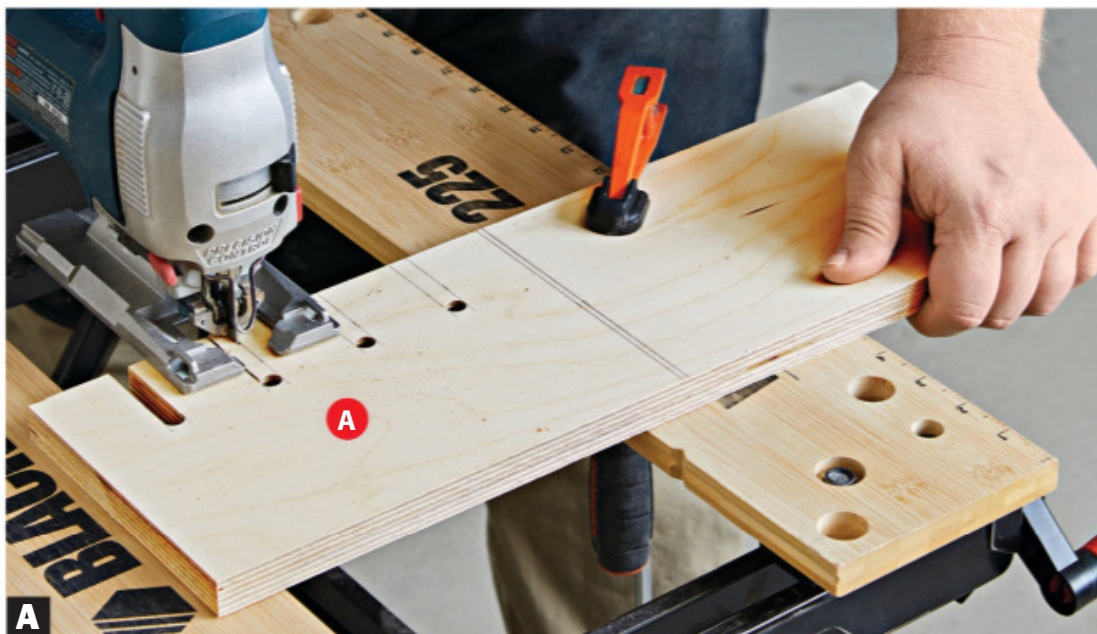
3 Cut the bottom and top (A) to length, and glue and screw them to the sides (B). Glue and nail the back (C) to the assembly.

4 Fasten the hanging cleat (D) to a sheet of Baltic birch plywood with the edges flush using double-faced tape. Bevel the cleat edge in two passes with a 45° chamfer bit. Then glue and screw the cleat to the rack.

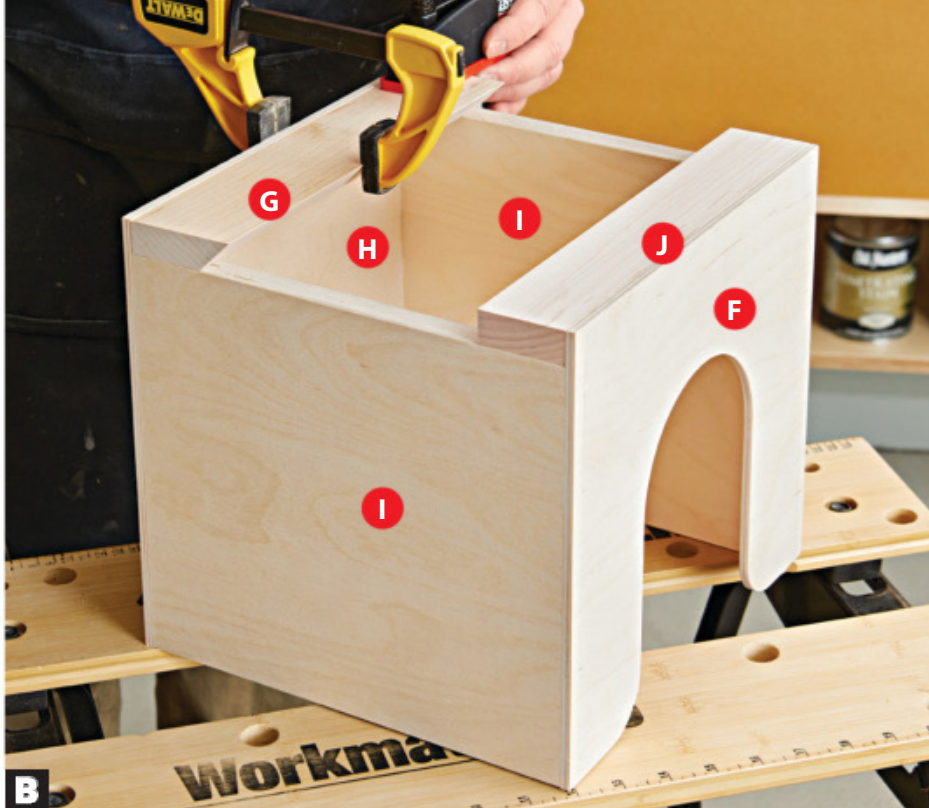
5 Glue the cover (E) to the top (A). Apply three coats of wipe-on polyurethane finish and hang the clamp rack.

Note: If the rack shifts as you remove clamps, drive a single screw through the back (C) and hanging cleat (D) to hold it in place.

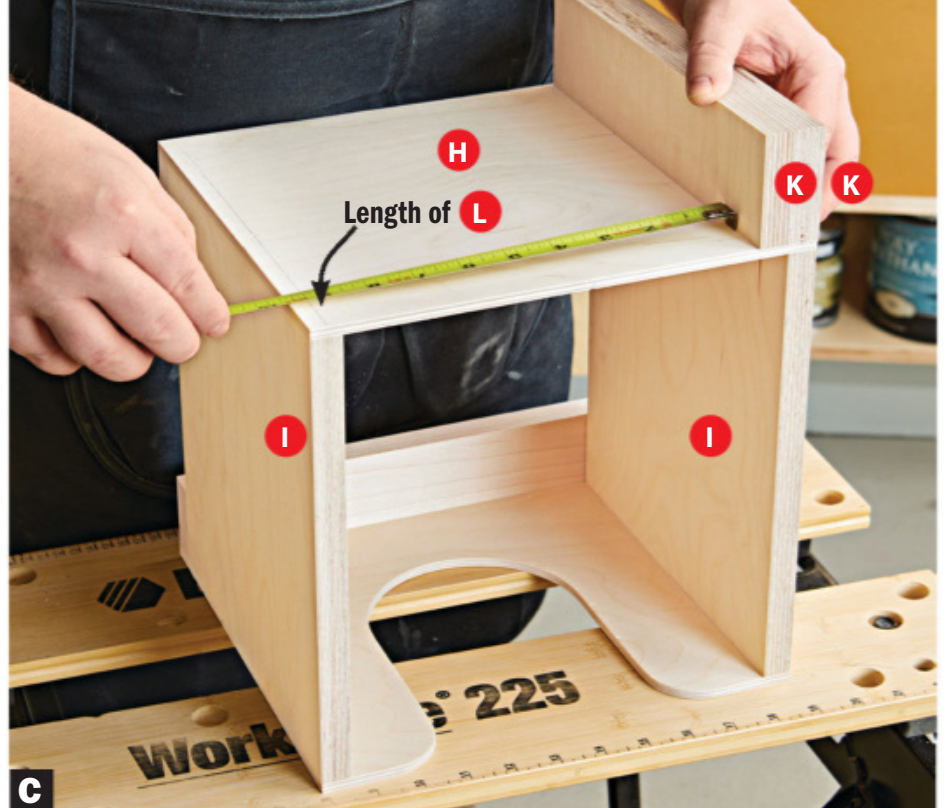
Tip! If you plan to make both the clamp rack and glue station, cut both hanging cleats at the same time.



A Drilling and cutting notches in the top/bottom (A) before cutting the blank in two provides a long workpiece for easy clamping to a worksurface.



B Glue and clamp the hanging cleat (G) and lower rail (J) to the sides (I), bottom (F), and top (H). After the glue dries, reinforce the joints with screws.



C Hold the upper sides (K) together on the top and measure for the length of the front, back, and divider (L). Cut these parts to fit.

Organize glue-up supplies

The glue station holds glue bottles and disposable towels in boxes measuring about $9\frac{3}{8}$ " square by $10\frac{1}{4}$ " tall. For different towel packages, adjust the part sizes as needed.

1 Cut glue station parts F–L [Glue Station Materials List]. Jigsaw the bottom (F) [Drawing 2], and sand the opening.

2 Bevel the hanging cleat (G) the same as in clamp rack Step 4.

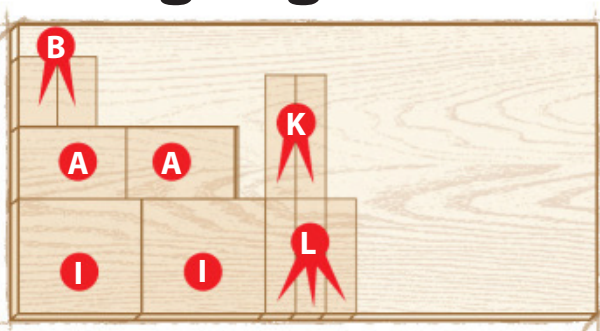
3 Glue and nail the bottom (F) and top (H) to the sides (I). Then add the hanging cleat (G) and lower rail (J) [Photo B].

4 Cut the upper sides (K). Measure for parts L [Photo C] and cut them to length. Glue the upper sides to parts L.

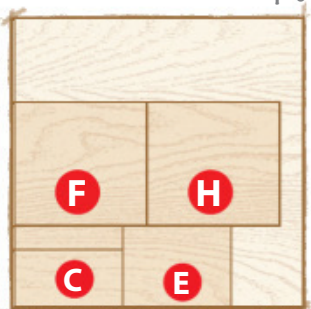
5 Glue and clamp the top assembly (K/L) to the top of the F–J assembly.

6 Apply three coats of wipe-on polyurethane and hang the glue station. 🌳

Cutting Diagram



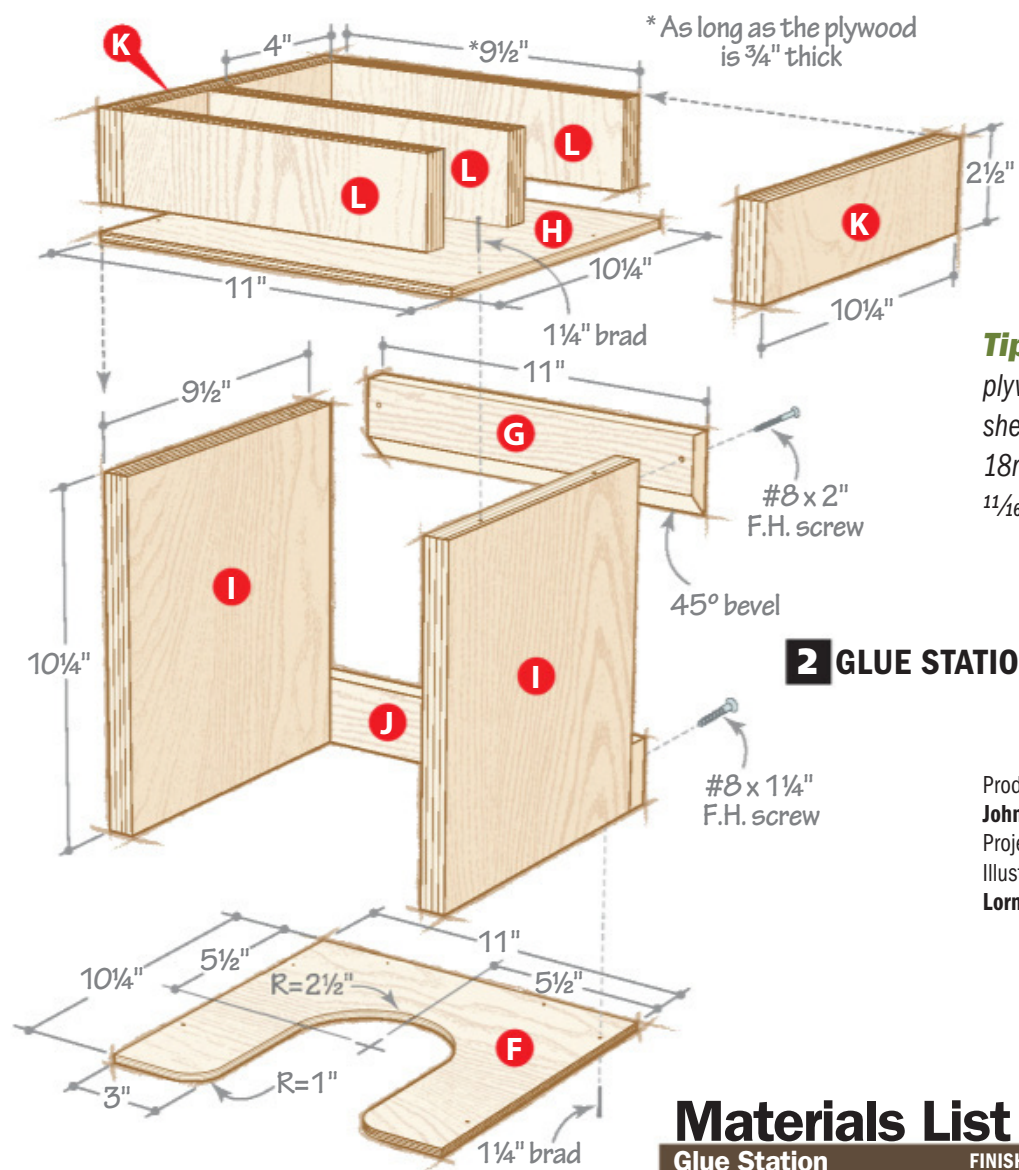
$\frac{3}{4}$ x 24 x 48" Birch plywood



$\frac{1}{4}$ x 24 x 24" Birch plywood



$\frac{3}{4}$ x $3\frac{1}{2}$ x 36" Maple



Tip! Though sold as $\frac{3}{4}$ " plywood, Baltic birch sheets actually measure 18mm thick—closer to $\frac{11}{16}$ " than $\frac{3}{4}$ ".

2 GLUE STATION

Produced by Robert Wilson with John Olson
Project design: John Olson
Illustrations: Roxanne LeMoine, Lorna Johnson

Materials List

Clamp Rack Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* top/bottom	$\frac{3}{4}$ "	6"	9"	BP	2
B sides	$\frac{3}{4}$ "	$5\frac{3}{4}$ "	$3\frac{1}{4}$ "	BP	2
C back	$\frac{1}{4}$ "	$4\frac{3}{4}$ "	9"	BP	1
D hanging cleat	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	9"	M	1
E top cover	$\frac{1}{4}$ "	$6\frac{3}{4}$ "	9"	BP	1

*Part lengths cut to fit. See instructions.

Materials key: BP–Baltic birch plywood, M–maple.

Supplies: #8x $\frac{1}{4}$ " flathead screws, #8x2" flathead screws, $\frac{1}{4}$ " brads.

Blade and bits: 12-teeth-per-inch jigsaw blade, 45° chamfer and $\frac{1}{4}$ " round-over router bits.

Materials List

Glue Station Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
F bottom	$\frac{1}{4}$ "	$10\frac{1}{4}$ "	11"	BP	1
G hanging cleat	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	11"	M	1
H top	$\frac{1}{4}$ "	$10\frac{1}{4}$ "	11"	BP	1
I sides	$\frac{3}{4}$ "	$9\frac{1}{2}$ "	$10\frac{1}{4}$ "	BP	2
J lower rail	$\frac{3}{4}$ "	2"	11"	M	1
K upper sides	$\frac{3}{4}$ "	$10\frac{1}{4}$ "	$2\frac{1}{2}$ "	BP	2
L* front/back/divider	$\frac{3}{4}$ "	$9\frac{1}{2}$ "	$2\frac{1}{2}$ "	BP	3

*Part lengths cut to fit. See instructions.

Materials key: BP–Baltic birch plywood, M–maple.

Supplies: #8x $\frac{1}{4}$ " flathead screws, #8x2" flathead screws, $\frac{1}{4}$ " brads.

Blade and bit: 12-teeth-per-inch jigsaw blade, 45° chamfer router bit.

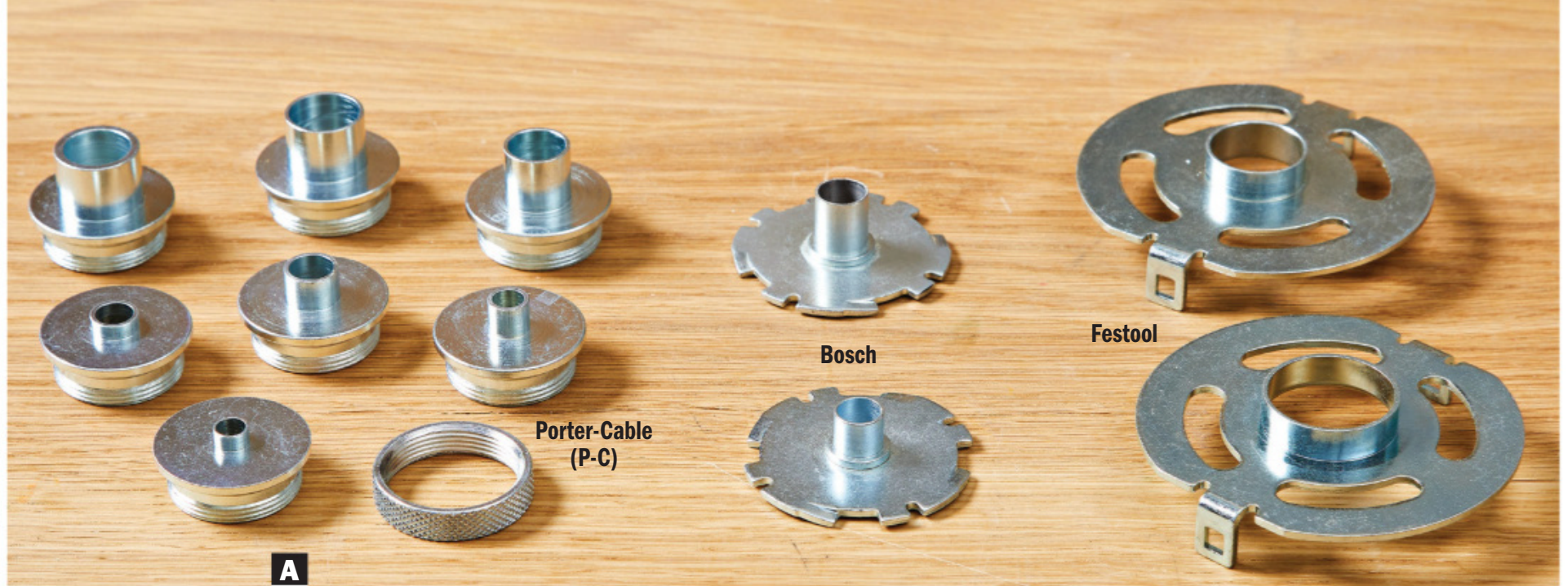
Get on board with Guide Bushings

by Glen Huey

Create identical parts, tight-fitting inlays, perfect circles, and more with this essential, low-cost router accessory. Here's how guide bushings make your woodworking easier, faster, and more accurate.



After running his own homebuilding business through cold winters and mud-laden springs, Glen began a new career building reproduction period furniture in the comfort of a heated shop. His passion for woodworking led him to teach and write about it, including four books.



A

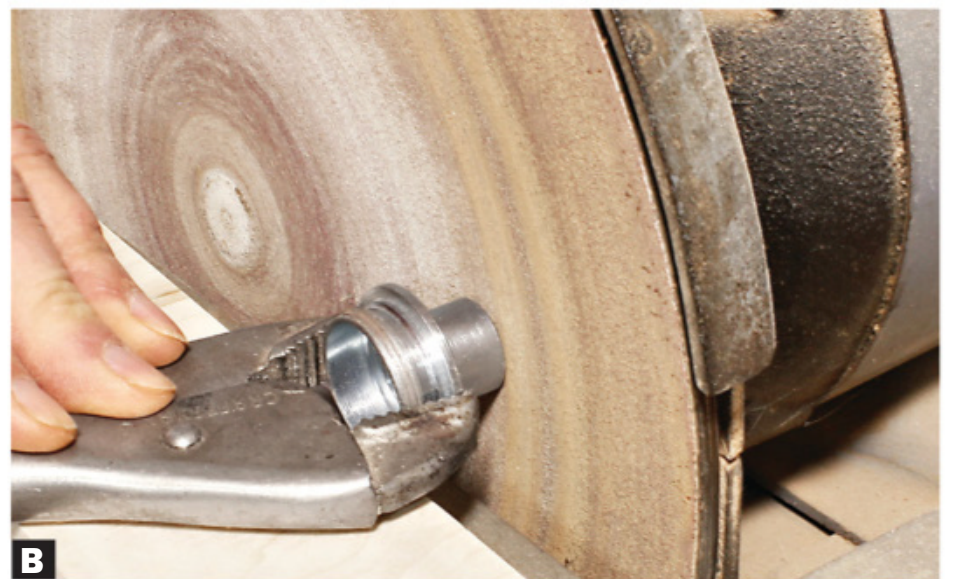
Guide bushings come in three types. Most routers have or provide subbases that accept P-C bushings. Bosch and Festool bushings fit only those router brands, but both manufacturers offer adapters that accept universal bushings.

Bushing types and sizes

Guide bushings are short tubes (or *barrels*) of various diameters and lengths, mounted to a metal plate that fits in your router's subbase and through which a router bit extends. The bushing serves to space the bit a fixed distance from a template or straightedge.

Most router subbases accept either universal bushings, also known as Porter-Cable (P-C) bushings, or a proprietary bushing [Photo A]. Universal bushings fit into a stepped hole that's 1 $\frac{3}{8}$ " in diameter at the outer face and 1 $\frac{1}{16}$ " in diameter on the inner face. A threaded ring locks it into the subbase.

Most guide bushings are referenced by the outside diameter (O.D.) of the barrel. Universal guide bushings range from $\frac{5}{16}$ " to 1" O.D. (Bosch has a guide bushing in one of its kits with an O.D. of 1 $\frac{3}{8}$ ".) The most used bushing in my shop is a $\frac{3}{4}$ " O.D., but having a full kit provides plenty of options. You also need to know the inside diameter (I.D.) to ensure that your selected bit will fit through.



B

If a barrel projects too far, grind it down. Firmly grip the bushing with locking pliers as you work.

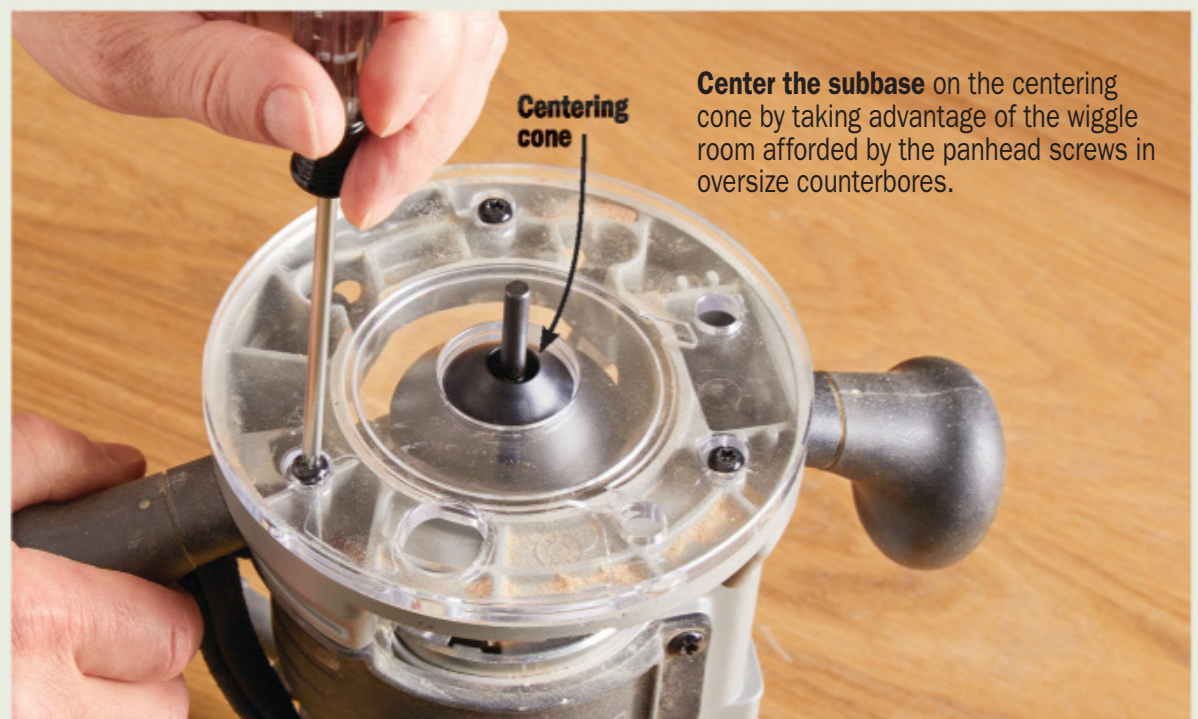
Bushing barrel lengths run $\frac{3}{16}$ " to $\frac{5}{8}$ ". The barrel needs to be shorter than the thickness of the template or straightedge so it doesn't rub on the workpiece. Because bushings are brass or steel, you can grind them shorter, if needed [Photo B].

SKILL BUILDER

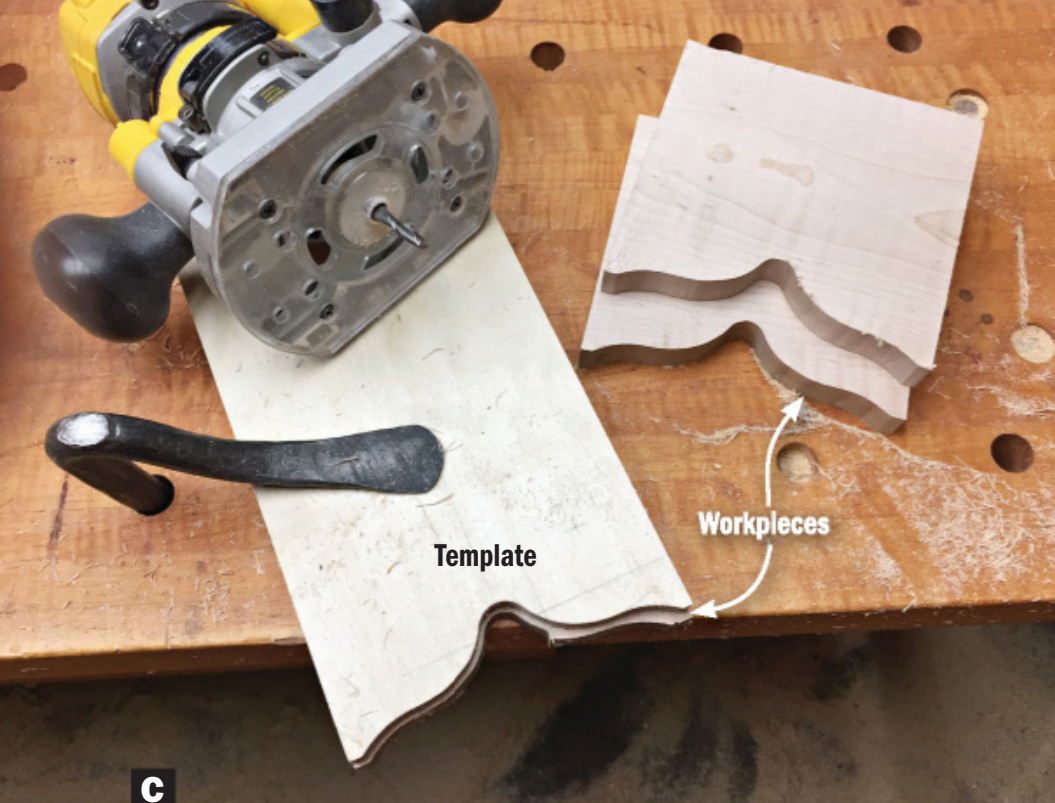
Accuracy requires centering

If your subbase—and consequently your guide bushing—sits off-center of the bit, the gap between the bit and bushing is larger on one side than the other, leading to inconsistent results as you move the router. To properly align the subbase, use a centering cone, which is often included in a router kit [Photo]. You can also find accessory cones at most woodworking stores, or use a chamfer bit if you stay mindful of the bit's sharp edges.

Buy a centering cone.
woodmagazine.com/centercone



Center the subbase on the centering cone by taking advantage of the wiggle room afforded by the panhead screws in oversize counterbores.



C

Calculate the offset between the bit and barrel, then size your template to account for that offset.

Create identical parts

Bushings excel for pattern routing. Shape a template from plywood, hardboard, MDF, or acrylic and use it over and over to produce identical pieces. Because of the offset between the bit and bushing, the bit traces a slightly larger version of the template [Photo C]. To calculate this offset, take the guide bushing's O.D., subtract the bit diameter, and divide by two. Note that to create identical pieces, you must use the same router bit and bushing each time. Switching either, or both, changes your results.

Route inlays

Create beautifully fit inlays with an inlay kit. It pairs a guide bushing with a collar matched to a specific-diameter bit. The collar compensates for the bit diameter and the offset between the bit and collar. Inlays routed without the collar [Photo D] fit perfectly in recesses routed with the collar in place [Photo E]. Sand or plane a slight chamfer on the bottom of the inlay, then glue it in place.

Route shelf-pin holes

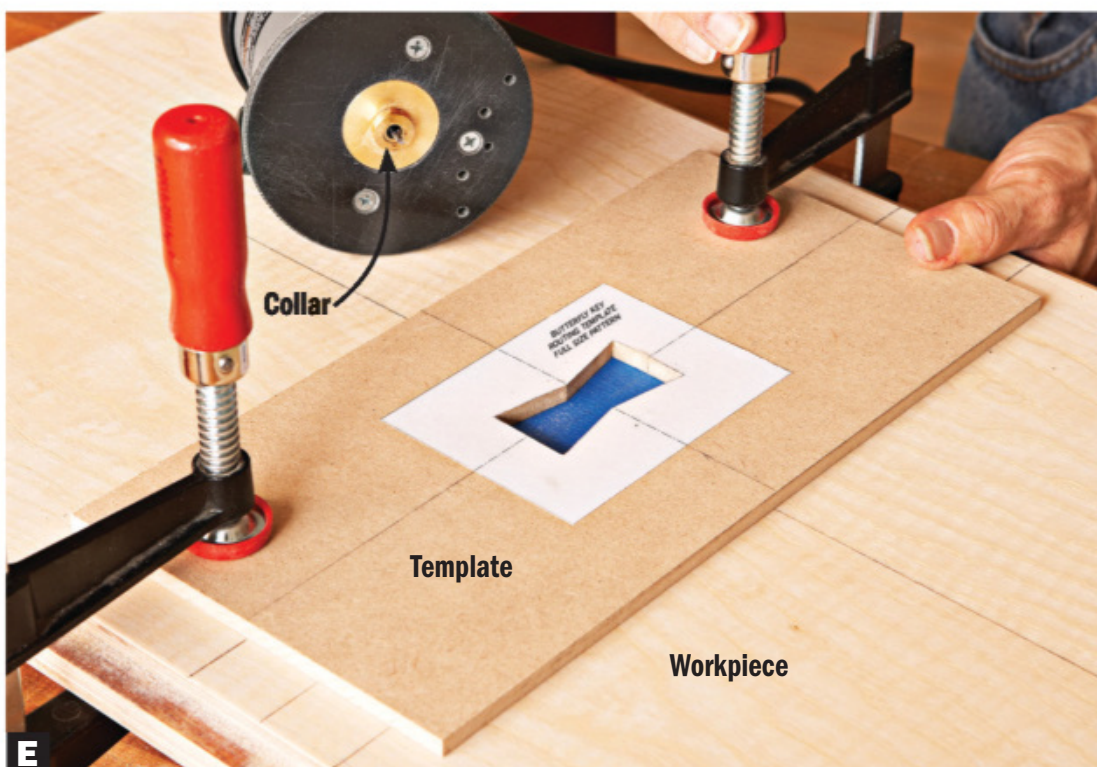
Make perfectly spaced holes for shelf pins with a shop-made template and a plunge router. To make the template, drill a series of holes matching the bushing O.D. into a piece of plywood, MDF, or acrylic. Space the holes as desired for the shelf pins. In your plunge router, install the bushing, and a spiral upcut bit that matches the shelf-pin diameter. Set the router depth stop so the bit reaches the desired depth below the template. Clamp the template onto a workpiece, register the bushing in a hole, and plunge the bit down to create a dead-straight shelf-pin hole [Photo F].

► Learn more about choosing straight bits on page 58.



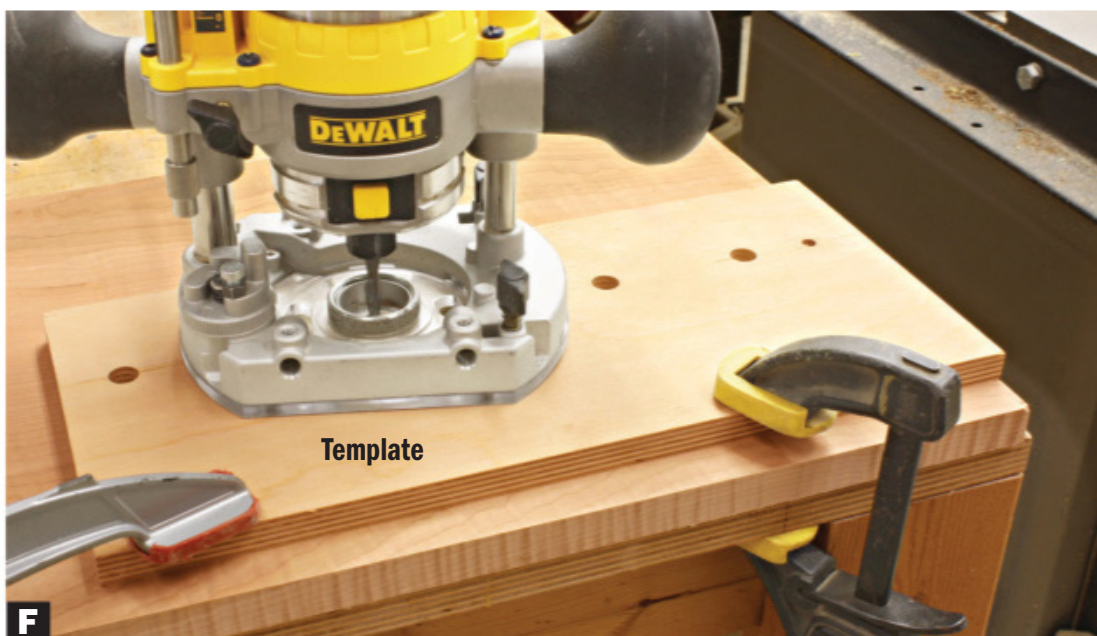
D

Create a template to shape the recess and inlay. This one creates a bowtie inlay to accent a door panel. Either rout through the material or resaw to release the inlays.



E

Slip the collar onto the bushing, and, using the same bit and template, rout the recess. For straight-edged inlays, such as this one, chisel the corners straight.



F

Make your own template to fit a guide bushing, customizing the template to the number of holes and the hole spacing desired.



G

Size the hole to accept the bushing barrel yet allowing the bushing to rotate within it.



H

Route deep passes in successively deeper cuts. If routing through a workpiece, secure it to a spoilboard with double-faced tape.

Cut circles hassle-free

With a typical circle-cutting jig, the router's cord wraps around the tool as you work, and at some point during the cut you must let go of the tool to reposition your hands. But cutting circles using a guide bushing and this trammel [Photo G] eliminates those issues.

Drill a hole near one end of the jig to match the O.D. of the bushing barrel. Install the bushing in your router and slip the bushing into the hole with the bit extended beyond the jig. Measure from the cutting edge of the bit to the desired radius, and drill a hole through the jig at that point to accept a pivot pin. (A cut-off finish nail works well.) Slip the jig over the pivot pin, and rout the circle [Photo H].

Tip! Use a spiral downcut bit for the cleanest cut, especially across the end grain.

Perfectly place sliding dovetails

The easiest way to create dovetail sockets for sliding dovetails, such as when connecting dust panels or dividers to case sides, is to pair a $\frac{3}{4}$ " O.D. guide bushing and $\frac{3}{4}$ " dovetail router bit. When run against a straightedge, the bottom edge of the bit cuts in-line with the outside edge of the bushing [Photo I]. Simply align the straightedge at half the bit diameter ($\frac{3}{8}$ " in this case) from the centerline of the desired slot. Because the widest portion of the bit sits below the bushing, the



I

When the O.D. of the bushing matches the cutting diameter of the dovetail bit, you can create sliding dovetail sockets precisely aligned with the guide.

bit never contacts the bushing. But this also limits your height adjustments, so create a template of appropriate thickness. 🌲

Protect-and-serve Tracksaw Guide Case



D I M E N S I O N S :
1 1/4" T x 9" W x 62 3/4" L

Approximate
materials cost:

\$25

including two
latches (or
just a few
bucks if you
build it from
scrap already
on hand).

*Tracksaw guides don't come
cheap; keep yours ding-free
with this on-the-go carrier.*



This case holds two guide sections (sandwiched face-to-face) for most tracks on today's market, as well as the hex key for joining the sections. Depending on the length of your guides, you may need to adjust the case's length; we sized this case for guides 59" long.

Build a case in no time

1 Cut to size the case sides (A) [Materials List, Exploded View]. (We used MDF—1/4" plywood would be a lighter option.)

2 Cut the case fillers (B, C) and glue them to one side. After the glue dries, glue on the other side to form the case.

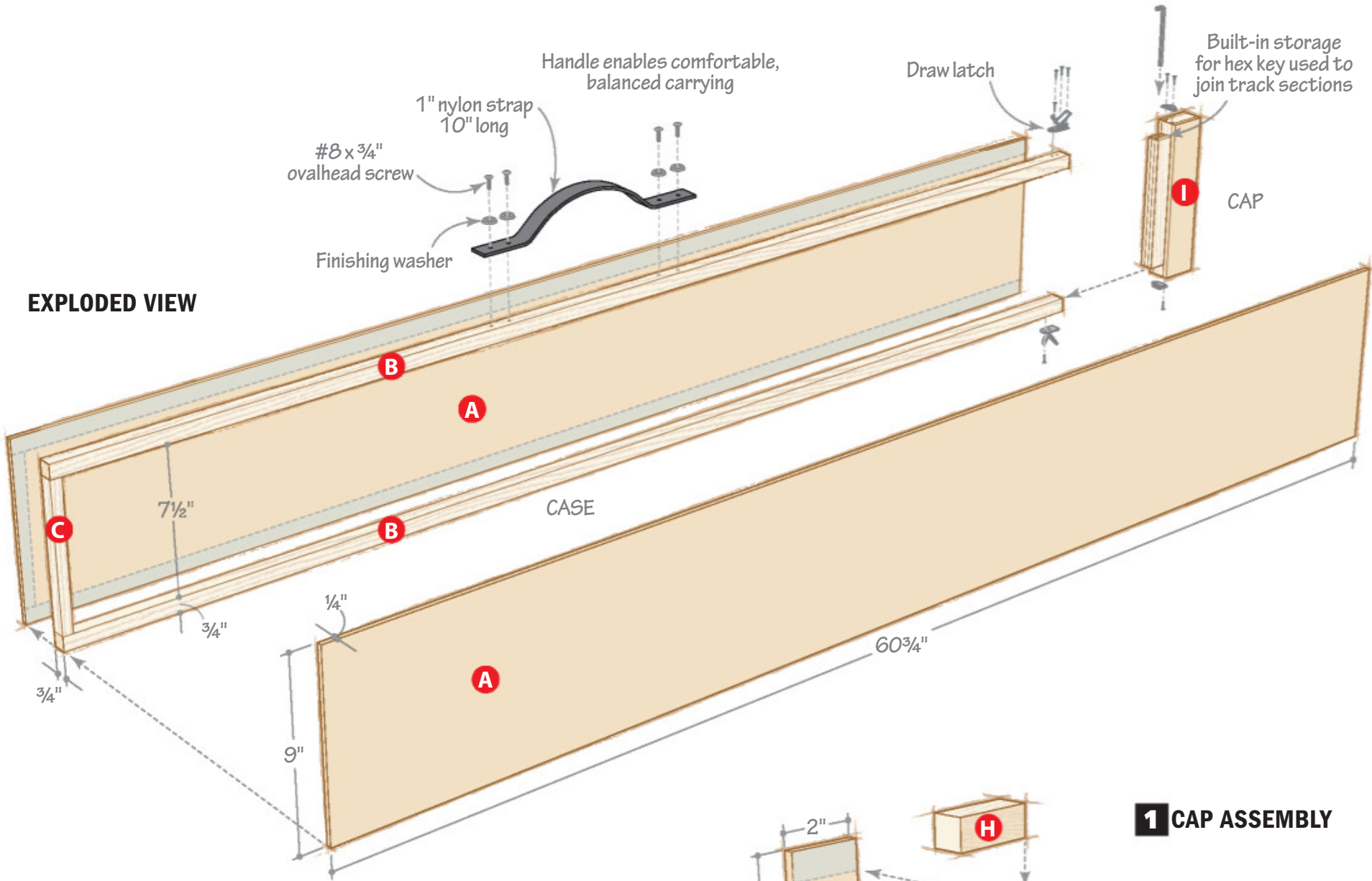
Now cap it off

1 Cut cap parts D–I to size [Drawing 1]. Glue fillers D, F, and G to one cap side filler (E). Allow the glue to dry, then glue on the other cap side filler.

After the glue dries, check the fit of the D–G filler block in the case opening. It should slide in and out easily.

2 Glue the cap ends (H) to the ends of the filler block, flush at the top and sides. Glue that assembly between the cap sides (I). Sand a slight chamfer along the sides and ends of the filler block to ease it sliding into the case.

3 Attach draw latches that are narrower than the case (available at hardware stores or Source), as well as a nylon strap [Exploded View].



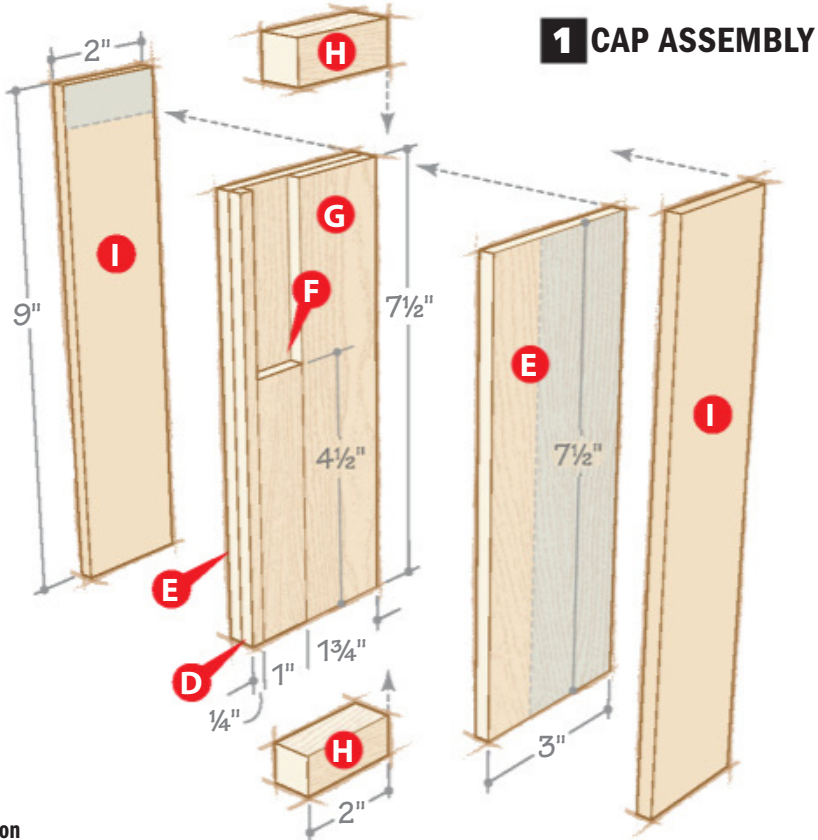
Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	case sides	1/4"	9"	60 3/4"	MDF	2
B	case side fillers	3/4"	3/4"	60 3/4"	M	2
C	case end filler	3/4"	3/4"	7 1/2"	M	1
D	cap bottom filler	1/4"	1/4"	7 1/2"	M	1
E	cap side filler	1/4"	3"	7 1/2"	M	2
F	wrench filler	1/4"	1"	4 1/2"	M	1
G	cap top filler	1/4"	1 3/4"	7 1/2"	M	1
H	cap end fillers	3/4"	3/4"	2"	M	2
I	cap sides	1/4"	2"	9"	MDF	2

Materials key: MDF-medium-density fiberboard, M-maple.

Supplies: #8x3/4" zinc-plated ovalhead screws (4), #8 nickel-plated finishing washers (4), 1" nylon strap 10" long (1).

Source: Draw latch, item 1590A43, \$3.86 each (2), McMaster-Carr, 630-833-0300, mcmaster.com



Produced by Bill Krier with Kevin Boyle
Project design: Kevin Boyle
Illustrations: Roxanne LeMoine, Lorna Johnson

Hide Sheet-good Edges Like a Pro

Don't let unsightly edges on veneered sheet goods detract from your projects. Conceal them for a flawless look.

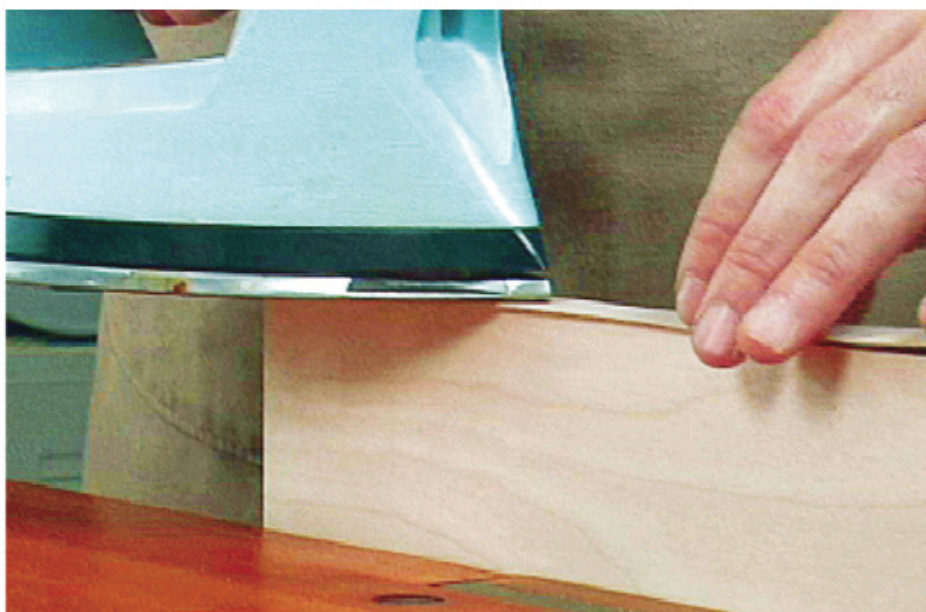


▲ Point your smartphone's camera here to watch "Applying Iron-On Edging," or visit woodmagazine.com/edgebandvideo

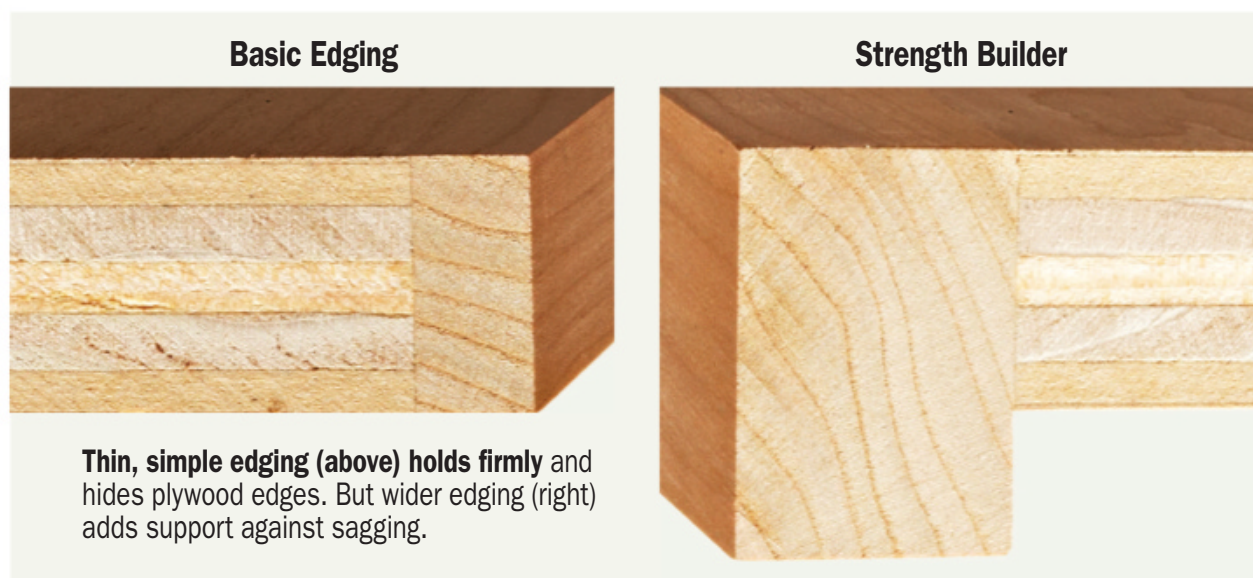
Super-stable plywood and medium-density fiberboard (MDF) simplify construction by freeing you from the concerns of using solid-wood panels that shrink and swell with the seasons. But plywood's layered edges don't pack the appeal of solid wood. Here's how to simply, affordably, and effectively hide the ugly edges.

Stick with solid-wood edging when possible

Sure, you could apply pre-glued, iron-on veneer tape, shown at *right*, to your sheet goods. This product, sold in a bulk roll, has thin edges that can hardly be seen, it goes on quickly with heat, and you don't need clamps. But for most projects we still prefer



To apply veneer edge banding, heat it with a household iron to soften its adhesive, and then burnish lightly with a round tool shank.



► Learn how to apply adhesive-backed veneer tape to sheet goods.
woodmagazine.com/edgebanding

solid-wood edging because it offers these advantages:

■ **Durable.** The added thickness of solid-wood edging resists chipping better than fragile veneer edging. And today's wood-working glues hold much better than the heat-activated adhesive on the back of veneer tape.

■ **Economical.** Cut strips of edging from those long off-cut scraps you can't use for anything else. And if you run out, a single plank yields enough edging for a raft of shelves.

■ **Stiff.** Adding a hardwood edge, especially one wider than a plywood or MDF shelf's thickness, stiffens it to reduce sagging—a potential downside to using sheet goods.

Make your own edging

You've got two choices here. The simplest is to rip and then glue solid-wood strips to the plywood or MDF edges with a common butt joint, shown *above left*. In 3' or shorter lengths of $\frac{3}{4}$ " plywood this joint will be plenty strong. When you go this route, make

an effort to match the edging's grain pattern and color to the panel's veneer because you want the transition to be unnoticeable. Make the edging as thick as you want. Wider and thicker edging, shown *above right*, adds greater stability for project parts, such as bookcase shelves, that might sag when weighted down with books or collectibles.

Specialty edging bits add mechanical advantages

Some router-bit manufacturers make two-piece V-groove and tongue-and-groove edging sets [Sources], shown *below*, that create self-centering, mating joints. They provide greater glue surface and assemble quicker than butt joints, which can slide around on wet glue. These joints prove ideal for edging not just shelves, but also case sides because you can set them to rout crisp veneer-like edges (see "flush" examples *below*) that make it easy to hide the seam of a solid-wood edge. For greater strength that will ward off shelf sagging, increase the thickness of the edging.

► Learn finishing tips for matching solid-wood edging to veneered sheet goods.
woodmagazine.com/blendband



V-groove bits



Flush V-groove edging



Thick V-groove edging



Tongue-and-groove bits



Flush tongue-and-groove edging



Thick tongue-and-groove edging



Using a flush-trim bit in a router, shave off the excess edging in a right-to-left direction (called “climb-cutting”) to avoid tear-out.



To wrap all the plywood or MDF panel's edges in solid wood, make edging pieces extra-long and then miter-cut to fit. Glue the mitered corner as well as the edges.

It takes a little more time to set up and machine the two parts on your router table, but if you keep a scrap with the final routed profile, you can use it to set up the bits the next time, saving yourself valuable minutes. Here's how to use these bits:

■ **Stick with the router table.** Except for large, cumbersome workpieces, such as a tabletop, use these sets in your router table rather than a handheld router. You'll appreciate the extra support and control the router-table surface and fence provide.

■ **Don't overcut.** Because the cutting edges on these bits typically measure 1" tall, the bearings don't help when routing the groove in $\frac{3}{4}$ " (or thinner) sheet stock. Instead, set your router table's fence so the bits remove just enough material to leave a crisp veneer edge without reducing the panel's width or length. Remove more material than that and you'll need to shim the outfeed fence to make up the difference between the original edge (against the infeed fence) and the newly routed edge.

■ **Rout the sheet first.** Rout the groove in your sheet goods first, making test cuts in matching scrap stock until you've got it perfectly centered. How will you know? After making a test cut, flip the scrap piece so the other face rests on the table and rout a few inches. When the bit doesn't remove any material on the second pass, it's centered.

■ **Now fit the solid edging.** For safety, begin with a hardwood blank at least 4" wide. Plane the blank $\frac{1}{8}$ " thicker than your plywood or MDF. (This will be trimmed off

after installation.) Now rout the tongue profile in scrap stock until it's centered. Rip the edging from the blank to the desired width.

■ **Go with bar clamps.** To clamp solid-wood edging to sheet stock, avoid using F-style clamps with circular jaw pads that rotate with the handles as you tighten them. These can cause your edging to slip off the mark. Instead, use parallel-jaw clamps or one-handed bar clamps with jaws that don't rotate.

■ **Size your panels after edging.** To avoid mistakenly cutting single-edged shelves undersized after you've applied the solid-wood edging, cut your plywood $\frac{1}{2}$ " or so greater than its final dimensions. Once you've glued the solid-wood edging in place, trim it even with the panel using a flush-trim bit, shown *above left*. (We like to use a trim router for this because it's less likely to tip the way a larger router can. If you use a bigger router, clamp on temporary support pieces to avoid tipping.) Sand or plane the face of the edging smooth. Finally, rip the plywood to final width along the unfinished back edge.

If you plan to finish both long edges, simply begin with narrower plywood and make your edging thicker than needed. Then rip it to final size after the glue dries, removing equal amounts from both solid-wood edges.

■ **Make it a wrap.** If you prefer to wrap edging around corners, as you might on a table or cabinet top, cut your plywood and edging to size, and then miter-cut the edging to fit, as shown *above right*. Flush-trim after the glue dries. 🌲

Sources:

Plywood edging router bits: MLCS Woodworking, V-groove $\frac{1}{4}$ " shank no. 5432, \$40, $\frac{1}{2}$ " shank no. 7732, \$40; Tongue-and-groove $\frac{1}{4}$ " shank no. 5433, \$45, $\frac{1}{2}$ " shank no. 7733, \$45; 800-533-9298, mlcswoodworking.com. Infinity Cutting Tools, V-groove, $\frac{1}{2}$ " shank no. 61-505, \$90; Tongue-and-groove, $\frac{1}{2}$ " shank no. 61-506, \$100; 877-872-2487, infinitytools.com.

Written by **Bob Hunter** with **Kevin Boyle** and **Ben Svec**

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- Gilmore B.

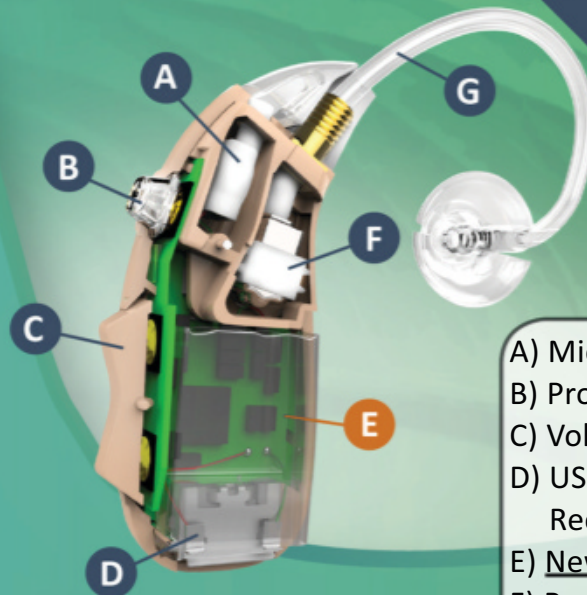


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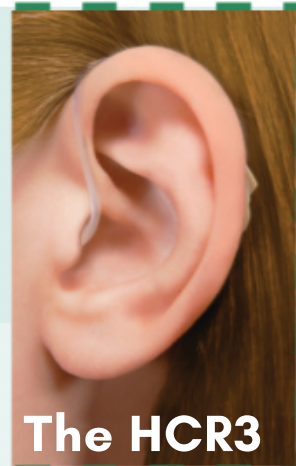
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Solid-brass side-rail hinges, no. 11040, \$30 per pair

Many small-box hinges, such as quadrant and Soss hinges, can be difficult to install, so we ask, "Why bother?" The polished-brass finish of these hinges looks great, and they could not be easier to install. Simply rout or chisel matching slots in the box sides and lid, and screw in the hinges. The hinges close flush and open to just past 90°, stopping at that point to hold the lid open.

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



Single-hole keyhole hanger, no. 125505, \$1.75 per pair

You could rout keyhole slots for hanging a framed picture or mirror flush against a wall, but these metal plates deliver a strong hold that won't tear away, as some all-wood keyhole slots might. Begin by routing a shallow slot to recess the plate flush with the back of the frame. Then, counterbore for the screwhead. Install the plate, drive a screw in the wall, and slide the plate over it; the hanger's tapered slot thickness ensures a tight fit against the wall.

Woodcraft
800-225-1153, woodcraft.com



Heavy-duty table-alignment lock, no. 159297, \$4.99

Tables with slide-together sections often present a particular problem: keeping the seam between sections closed up tight. Hidden beneath the table, these locks pull together those sections with ease and provide a sure hold. The clasp's ½" of travel means you can easily mount the two pieces to obtain a tight fit. And you can operate the lock simply by reaching under the table and twisting it a half-turn.

Woodcraft



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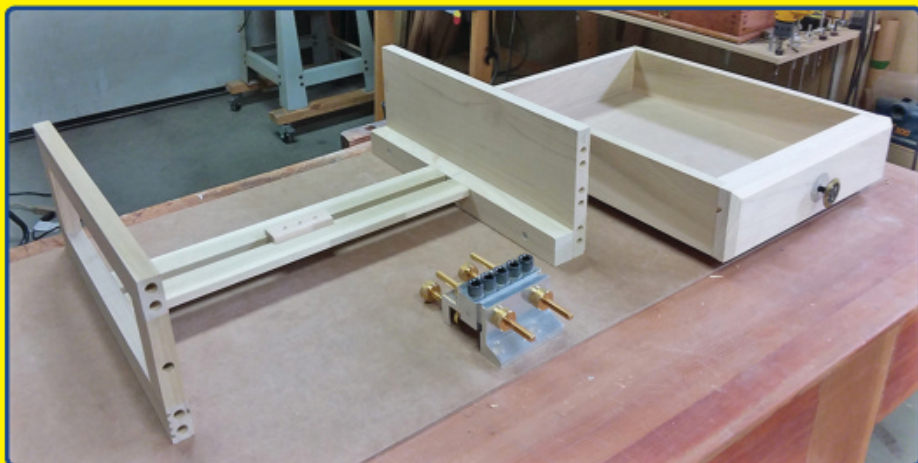
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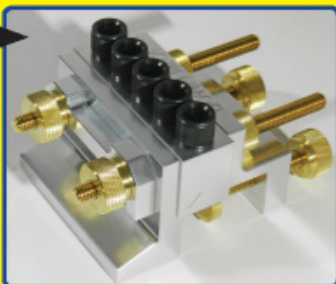
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This circ-saw system acts like a tablesaw

Adaptive Cutting System, master kit, no. ACS3000, \$900

Kreg's new Adaptive Cutting System marries a tracksaw with a portable work stand to provide much of the functionality of a tablesaw and mitersaw. At the heart of the unit sits a tracksaw: a left-blade, plunge-cutting 7¼" circular saw and aluminum guide rail. With those alone, you can rip and crosscut sheet goods and lumber. The zero-clearance rail edge and splinter guard on the saw left a flawless cut in even the most tear-out-prone veneered plywood, and the included bag provided exemplary dust collection.

Pair the saw and track with the project table, fold-up base, and other workholding accessories sold in the master kit, and it all works together to help you make precise cuts, like those from a tablesaw. The 29¾×55" MDF top has a gridwork of ¾" holes spaced 3⅞" apart in both dimensions, parallel T-tracks with rules for workpiece stops, and

a T-track around the edges for securing the track-holding brackets. It's a clever setup that you can use to make angled cuts, as well as 90° cutoffs.

The only downside with this system is the clumsy mechanism used to fold up the portable base. I found the small, retractable pins in the leg brackets difficult to depress, especially since you have to do both sides on the same leg simultaneously. And you'll want to fold the unit up, because then it stores upright in a pretty small footprint.

If you don't want the entire system, purchase just the saw and 62" track (no. ACS2000) for \$400; additional tracks and connectors are available.

—Tested by Kevin Boyle, Senior Design Editor

Kreg Tool
800-447-8638, kregtool.com

FRANKLIN **SUPER COUPON** Customer Rating ★★★★★

HEAVY DUTY PORTABLE SCAFFOLD

NOW \$169.99 ~~\$209.99~~

ITEM 69055/63051/63050 shown

COMPARE TO **BAKER** MODEL: I-CISCNB **SAVE \$90**

900 lb. capacity
30 height adjustments

21744902

LIMIT 1 - Coupon valid through 12/9/19

GOOD **CHICAGO ELECTRIC POWER TOOLS** Customer Rating ★★★★★

12" DUAL-BEVEL SLIDING COMPOUND MITER SAW

Not available in AZ, OH, OK, and VA.

ITEM 56775/56597
69684/61776
61970/61969 shown

BLADE SOLD SEPARATELY

3-1/2" VERTICAL CROWN HOLDING CAPACITY
2-5/8" TALL SLIDING FENCES
LASER GUIDE LIGHT

\$144.99 ~~\$199.99~~

COMPARE TO **PROFESSIONAL WOODWORKER** MODEL: 8637 **SAVE \$84**

21747373

LIMIT 1 - Coupon valid through 12/9/19

BETTER **ADMIRAL** Customer Rating ★★★★★

12" DUAL-BEVEL SLIDING COMPOUND MITER SAW

SUPER COUPON

ITEM 64686

6-1/2" VERTICAL CROWN HOLDING CAPACITY
4-1/2" TALL SLIDING FENCES
LASER GUIDE LIGHT & LED WORK LIGHT

\$179 ~~\$199.99~~

COMPARE TO **RYOBI** MODEL: TSS120L **SAVE \$90**

21764617

LIMIT 1 - Coupon valid through 12/9/19

BEST HERCULES Customer Rating ★★★★★

PROFESSIONAL 12" DUAL-BEVEL SLIDING COMPOUND MITER SAW

SUPER COUPON

ITEM 56682
63978 shown

FREE BLADE INCLUDED ~~\$44.99~~ VALUE

7-1/2" VERTICAL CROWN HOLDING CAPACITY
4-3/4" TALL SLIDING FENCES
LED PRECISION SHADOW GUIDE LIGHT

\$299 ~~\$349.99~~

COMPARE TO **DEWALT** MODEL: DWS723 **SAVE \$300**

21765049

LIMIT 1 - Coupon valid through 12/9/19

drill master **SUPER COUPON** Customer Rating ★★★★★

1/4" SHEET ORBITAL PALM SANDER

NOW \$9.99 ~~\$13.99~~

ITEM 40070/61509/61311 shown

COMPARE TO **BLACK+DECKER** MODEL: BD0EQS300 **SAVE 66%**

21765383

LIMIT 4 - Coupon valid through 12/9/19

HaulMaster **SUPER COUPON** Customer Rating ★★★★★

9" x 72" STEEL LOADING RAMPS SET OF TWO

NOW \$39.99 ~~\$57.99~~

1000 lb. combined capacity

COMPARE TO **MAXXTOW** MODEL: MT70120 **SAVE 49%**

ITEM 69591/69646/44649 shown

21767200

LIMIT 3 - Coupon valid through 12/9/19

HaulMaster **SUPER COUPON** Customer Rating ★★★★★

72" x 80" MOVING BLANKET

NOW \$5.99 ~~\$8.99~~

COMPARE TO **BLUE HAWK** MODEL: 77280 **SAVE 70%**

ITEM 69505/62418/66537 shown

21777185

LIMIT 4 - Coupon valid through 12/9/19

CHICAGO ELECTRIC POWER TOOLS **SUPER COUPON** Customer Rating ★★★★★

4" BISCUIT PLATE JOINER

NOW \$44.99 ~~\$64.99~~

COMPARE TO **MAKITA** MODEL: PJ7000 **SAVE \$134**

ITEM 38437/68987 shown

21782806

LIMIT 3 - Coupon valid through 12/9/19

ADMIRAL **SUPER COUPON** Customer Rating ★★★★★

12", 80 TOOTH FINISHING SAW BLADE

NOW \$22.99 ~~\$27.99~~

COMPARE TO **DEWALT** MODEL: DW3232PT-X **SAVE 61%**

ITEM 64911/62725 shown

21786270

LIMIT 2 - Coupon valid through 12/9/19

PITTSBURGH **SUPER COUPON** Customer Rating ★★★★★

6" DIGITAL CALIPER

Includes two 1.5V SR44 button cell batteries.

NOW \$9.99 ~~\$18.99~~

COMPARE TO **HUSKY** MODEL: 1467H **SAVE 66%**

ITEM 63711/98563/61585
62387/47257 shown

21787722

LIMIT 5 - Coupon valid through 12/9/19

WINDSOR DESIGN **SUPER COUPON** Customer Rating ★★★★★

DOVETAIL JIG

NOW \$27.99 ~~\$34.99~~

COMPARE TO **GENERAL TOOLS** MODEL: 861 **SAVE 40%**

ITEM 34102

21793109

LIMIT 2 - Coupon valid through 12/9/19

WARRIOR **SUPER COUPON** Customer Rating ★★★★★

11 PIECE, 1" - 2-1/2" CARBON STEEL HOLE SAW SET

Cuts to a depth of 1"

NOW \$5.99 ~~\$9.99~~

COMPARE TO **MASTERFORCE** MODEL: 3475 **SAVE 76%**

ITEM 69070/68114 shown

21801863

LIMIT 4 - Coupon valid through 12/9/19

PITTSBURGH AUTOMOTIVE **SUPER COUPON** Customer Rating ★★★★★

PNEUMATIC ADJUSTABLE ROLLER SEAT

300 lb. capacity

NOW \$19.99 ~~\$26.99~~

COMPARE TO **DURALAST** MODEL: TR6201C **SAVE 71%**

ITEM 61160/63456/46319 shown

21813114

LIMIT 3 - Coupon valid through 12/9/19

CENTRAL MACHINERY **SUPER COUPON** Customer Rating ★★★★★

14" OSCILLATING SPINDLE SANDER

NOW \$109.99 ~~\$147.99~~

COMPARE TO **TRITON TOOLS** MODEL: TSPS450 **SAVE \$60**

ITEM 62146/69257 shown

21818080

LIMIT 4 - Coupon valid through 12/9/19

CENTRAL PNEUMATIC **SUPER COUPON** Customer Rating ★★★★★

20 OZ. GRAVITY FEED AIR SPRAY GUN

1.4mm tip included

NOW \$9.99 ~~\$16.99~~

COMPARE TO **KOBALT** MODEL: SBY-AIR8BTZ **SAVE 80%**

ITEM 67181/62300/47016 shown

21819747

LIMIT 4 - Coupon valid through 12/9/19

Pierce **SUPER COUPON** Customer Rating ★★★★★

18 GAUGE BRAD NAILER

NOW \$39.99 ~~\$59.99~~

COMPARE TO **BOSTITCH** MODEL: BTFP12233 **SAVE \$79**

ITEM 64255

21840542

LIMIT 4 - Coupon valid through 12/9/19

CENTRAL MACHINERY **SUPER COUPON** Customer Rating ★★★★★

2 HP, 5 MICRON INDUSTRIAL DUST COLLECTOR

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COMPARE TO **SHOP FOX** MODEL: W1685 **SAVE \$226**

ITEM 61790/97869 shown

21846962

LIMIT 1 - Coupon valid through 12/9/19

CENTRAL MACHINERY **SUPER COUPON** Customer Rating ★★★★★

350 LB. CAPACITY FOLDABLE SAWHORSE

NOW \$8.99 ~~\$12.99~~

COMPARE TO **STANLEY** MODEL: STST11200 **SAVE 50%**

ITEM 61979/60710/69446 shown

21847103

LIMIT 4 - Coupon valid through 12/9/19

HYDROSTAR **SUPER COUPON** Customer Rating ★★★★★

50 FT. ELECTRIC DRAIN CLEANER

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COMPARE TO **COBRA PRO** MODEL: CP3020 **SAVE \$229**

ITEM 61856/68285 shown

21853942

LIMIT 1 - Coupon valid through 12/9/19

PITTSBURGH **SUPER COUPON** Customer Rating ★★★★★

24" CLAMP AND CUT EDGE GUIDE

LIFETIME WARRANTY

NOW \$7.99 ~~\$13.99~~

COMPARE TO **BORA** MODEL: S43030K **SAVE 88%**

ITEM 66126

21862967

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New planers designed for less snipe

15" planers, no. JWP-15B (straight-knife head), \$1,700;
no. JWP-15HH (helical head), \$2,600

Jet says its new 15" planers reduce snipe by using a Precision Air Strut System (PASS) to support the cutterhead assembly with heavy-duty gas struts. These 3-hp planers sell in two versions: a cutterhead with straight knives or a helical cutterhead with carbide inserts. The straight-knife machine comes with fold-up steel infeed and outfeed tables, while the helical-head version comes with cast-iron tables.

Jet
800-274-6848, jettools.com

Gas strut

JessEm brings back updated miter gauge

Mite-R-Excel II miter gauge, \$300

JessEm's new Mite-R-Excel II has a standard $\frac{3}{8} \times \frac{3}{4}$ " steel miter bar and aluminum head with positive stops at 0°, 15°, 22½°, 30°, and 45° left and right. It also has a Vernier scale for setting angles in .1° increments. The 20"-long extruded-aluminum fence telescopes to 36" with tool-free adjusters, and has a flip-stop that can be used with or without a shop-made auxiliary fence. 🌲

JessEm Tool Company
800-436-6799, jessem.com

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— J. Fitzgerald, VA



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sleep. Our chair’s recline technology allows you to pause the chair in an infinite number of positions, including the lay flat position and the zero gravity position where your body experiences a minimum of internal and external stresses. You’ll love the other benefits, too: It helps with correct spinal alignment, promotes back pressure relief, and encourages better posture to prevent back and muscle pain.



This lift chair puts you safely on your feet!

And there’s more! The overstuffed, oversized biscuit style back and unique seat design will cradle you in comfort. Generously filled, wide armrests provide enhanced arm support when sitting or reclining. The high and low heat settings along with the multiple massage settings, can provide a soothing relaxation you might get at a spa – just imagine getting all that in a lift chair! It even has a battery backup in case of a power outage. Shipping charge includes white glove delivery. Professionals will deliver the chair to the exact spot in your home where you want it, unpack it, inspect it, test it, position it, and even carry the packaging away! You get your choice of bonded stain and water repellent leather or plush microfiber in a variety of colors to fit any decor. **Call now!**

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~ Jaimie Al-Shamma, Owner
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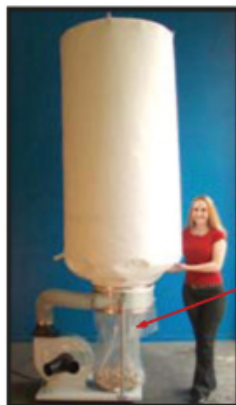
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WHAT'S AHEAD

A GLIMPSE INSIDE THE NOVEMBER ISSUE (ON SALE OCTOBER 4)



Divided-light hutch

No faux mullions and muntins in this classic case. Matching rail-and-stile router bits make the job easy.



Drawer-building basics

Here's what you need to know about dropping drawers, from simple to sophisticated, into your projects.



Elegant tea tray

Learn the art of line-and-berry inlay while building this beauty. Then use the technique to embellish a panel in any project.



Spindle-sander showdown

These smooth operators clean up all the right curves in all the right places. Our shop tests reveal the top tools.



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