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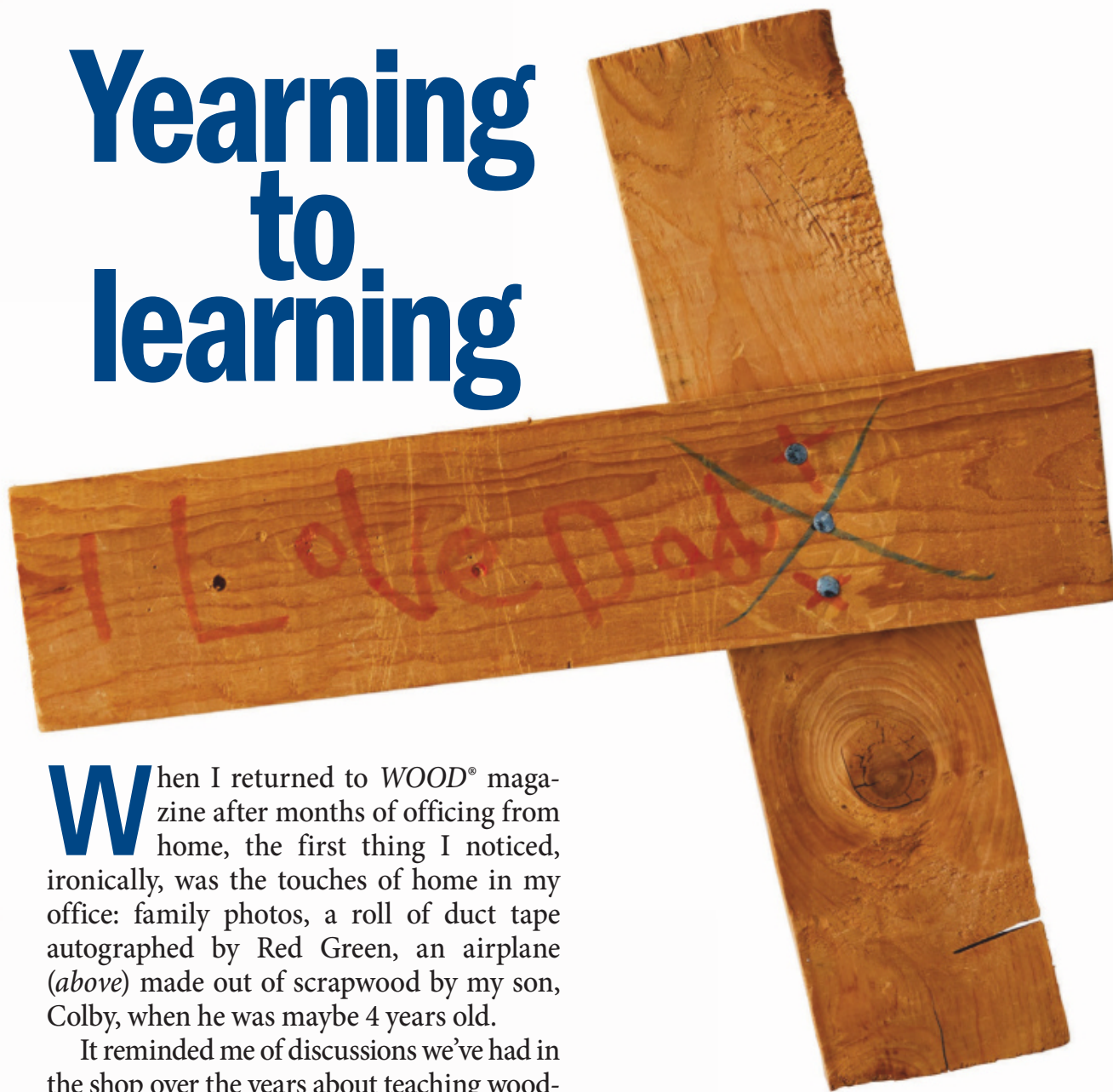
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Yearning to learning



When I returned to *WOOD*® magazine after months of officing from home, the first thing I noticed, ironically, was the touches of home in my office: family photos, a roll of duct tape autographed by Red Green, an airplane (above) made out of scrapwood by my son, Colby, when he was maybe 4 years old.

It reminded me of discussions we've had in the shop over the years about teaching woodworking to someone who's never tried it. Where do you start? Understanding wood and how it moves seasonally is essential (but, honestly, kind of boring). Do you start with teaching how to use hand tools, which can be fussy and intimidating, or power tools, which can be costly and intimidating? Every textbook or "for dummies" publication about woodworking I've seen takes a totally different approach; which one is best?

As I pondered these questions while sorting through a backlog of mail, I came upon a copy of Doug Stowe's new book, *The Guide to Woodworking with Kids* (Blue Hills Press). A lifelong woodworker, Doug teaches K-12 students using Sloyd, a Swedish method, which, in a nutshell, purports that hand skills and mental skills grow together and reinforce one another.

In other words, teaching woodworking to youngsters isn't about job training but instead integral to "mental, physical, and moral development in children."

Among the principles of Sloyd, woodworking instruction should move students from the known to the unknown and the simple to the complex; and projects should be practical in nature. Doug observes his students engage more if they choose projects that excite them,

and his book presents several projects embraced by his youngest students. (Colby's airplane would have fit right in.)

Although none of those juvenile projects would inspire adult woodworkers, the Sloyd philosophy applies to grown-up newbies, too. It's what we try to do in every issue of *WOOD* magazine: inspire you with unique and practical project designs, then help you grow your skills by building on what you already know.

I hope you find a plan or technique in this issue that moves you beyond what you already know and kindles a bit of childlike joy of discovery.

See you in the shop!

Dave Campbell
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► To preview or buy Doug Stowe's book, point your smartphone's camera at this code or visit woodmagazine.com/stowebook.



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PLANS

20 **Limbert-style Bookcase**

The Arts & Crafts-style classic features a glazed and paneled door and gallery top.

30 **Mini/Midi Lathe Stand**

This rock-solid base keeps your lathe working from home.

36 **Farmhouse Table and Benches**

A companion to last issue's sideboard, this set is built to last and last.

52 **Entryway Valet**

Take a day and build a compact catchall for your grab-and-go items.

60 **Shop Project: Saw Bench**

The just-right height suits hand- and power-sawing stock (and seating).

TOOLS & TECHNIQUES

26 **Straight-shooting Joints**

Learn the right way to make solid stock flat, square, and true.

33 **Make Strong, Easy Drawer Joints**

One simple tablesaw setup makes sturdy drawers by the dozens.

42 **Shop Test: Big-swing Drill Presses**

These feature-filled machines bore to the centers of workpieces up to 18" wide.

48 **Master Your Handsaw Skills**

Here's a guide to making perfect cuts without a guide.

56 **Meet the Stones**

Get sharpening satisfaction when you roll with the right honing stones.

64 **Tools & Materials**

Best drill-press tables, cylindrical air scrubber, and more.

DEPARTMENTS

1 **Taking Measure**

Turning yearning to learning.

4 **Wood-Wide Web**

Indispensable scrapwood.

6 **Sounding Board**

Your voice, your projects, your shop.

14 **Ask WOOD**

When to use wax.

16 **Shop Tips**

Flyover clamp rack and more.

72 **What's Ahead**

A sneak peek at your next WOOD.



42



30



36



56



48



26



52

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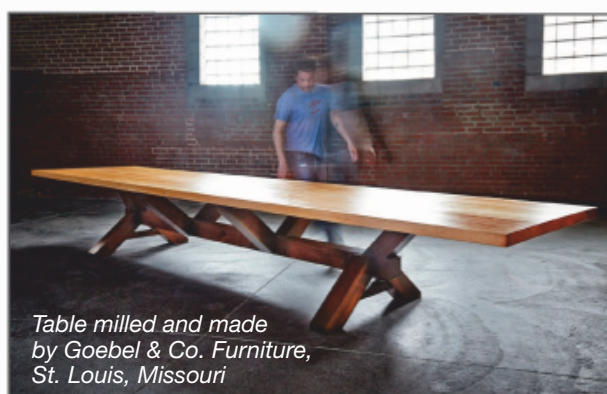


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SOUNDING BOARD

YOUR VOICE



Kenny did two, too, times two

I had to shake my head when I read folks questioning the value of a double router table, like the one you featured in issue 264 (November 2019). When I designed my router table several years ago, I went you one better. Actually, two better: I made the quadruple router table, shown above. (The fourth is behind the power feeder.) It measures about 4x4' and rolls on casters.

My only out-of-pocket cost was about \$200 for the MDF tabletop, a couple of insert plates, and some miter track. The rest is scrap lumber and routers I had on hand. In fact, I already had the power feeder, too, which I mounted in the center for use when needed.

When my daughter's house burned a few years ago, I saved her about \$15,000 by making her new cabinets. For raised-panel doors, I set the table for four separate bits—rail bit, stile bit, panel-raiser, and round-over (for the rails and stiles)—and made all the doors without changing a setting. When I'm not building cabinets, it is just a normal router table that I keep set up with the bits I use most often.

It does take up some space in the shop, and it's not as nice as yours, but it has been one of the best projects I ever made for my shop.

—Kenny Schiwitz
Kelso, Mo.

Clean WOOD: It's in the bag

I recently signed up for a 2-year subscription to WOOD® magazine and received my first copy in the mail today. Without even opening it, I wanted to write and say THANK YOU for enclosing the magazine inside a recyclable plastic sleeve!

I can't begin to count how many times one of my other magazines has arrived torn up or wet. I'm sure it isn't done intentionally but just the nature of the beast when a magazine is shipped loosely and unprotected.

I'm hoping this isn't just a "first issue" thing and that you will continue to send my magazine

inside a protective cover. Rest assured, the plastic sleeve will be tossed into the recycling bin to be recycled again!

—Jeff Johnston
Orlando, Fla.

Welcome aboard, Jeff! We occasionally get grief from people who think it's not environmentally responsible to ship the magazine in a poly bag. But, as you noted, it's more durable than paper and fully recyclable—just return it to wherever you recycle your plastic shopping bags.



Dream shops too dreamy?

I'm a little jealous of the "Handsome Hillside Two-story" workshop featured in issue 268 ("Sounding Board: Your Shop," July 2020). It has plenty of room (though the bathroom could definitely use a sink for washing hands) and seemed to have every woodworking tool you could imagine.

However, what I didn't see were any storage shelves for wood readily available in the shop, or bins, or boxes for all of those usable cutoffs we all manage to collect when completing a project. There wasn't even a bin for scrapwood that could be thrown into the wood stove. The article mentioned storage on the lower level; that would be pretty inconvenient to always have to go down to another floor to gather up a board or two for a project.

—Dave Grabarczyk
Perrysburg, Ohio

You folks have one of the very best woodworking mags on the market. But I'm really tired of seeing dream shops with no sawdust on the floor. Ever.

I'm happy for the dentist who has a freight elevator in his living-room-like shop. I really am. But most of us don't have a quarter million dollars to spend on a shop, and another for the machinery. Most of us are not dentists or hedge-fund managers. We have WORKshops, not showrooms. Show some shops that look used.

—Tom Stephan
Toccoa, Ga.

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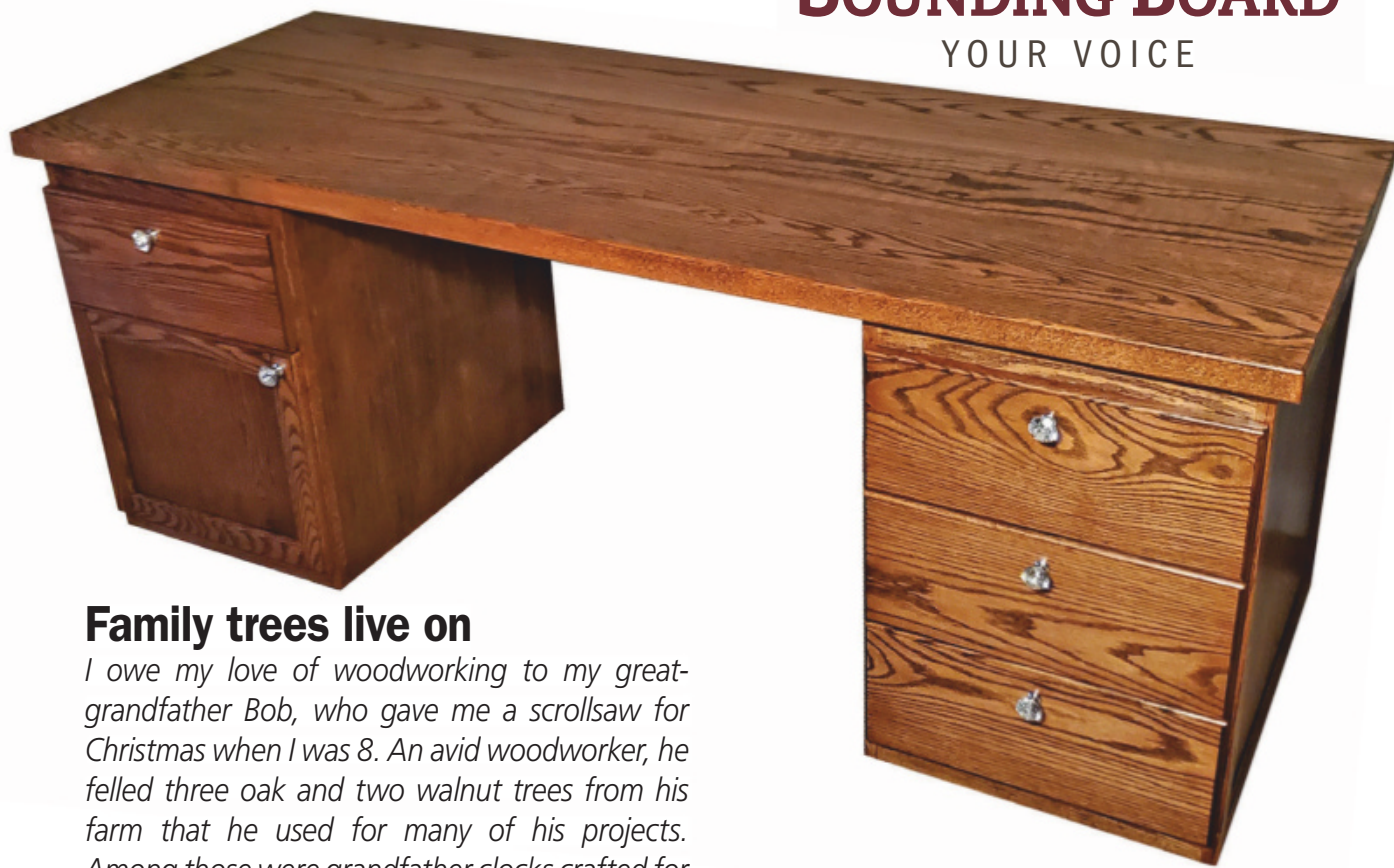
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SOUNDING BOARD

YOUR VOICE



Family trees live on

I owe my love of woodworking to my great-grandfather Bob, who gave me a scrollsaw for Christmas when I was 8. An avid woodworker, he felled three oak and two walnut trees from his farm that he used for many of his projects. Among those were grandfather clocks crafted for each of his kids. Many years later (while in his late 80s), he continued the tradition by using that wood in wall clocks he made for his grandkids.

I'm so fortunate that both he and my great-grandmother Ruth stayed with us long enough to see their first great-great-granddaughter, Annika

Ruth. For her 11th birthday last year, I built this desk out of oak, inlaid with some of her great-great-grandparents' walnut in the top (at right). Bob's wood should see another five generations.

—Rick Hillmer
Adel, Iowa



Vertical shelf

Mods keep Quilt Center bobbin along

The Quilting Center plans in issue 265 (December/January 2019/2020) couldn't have arrived at a better time because I had been looking at sewing-cabinet designs in fabric stores while my wife shopped for fabric. I modified your plans to accommodate her embroidery machine, as shown above. I also added a sliding worksurface

above the drawer bank (like an old desk's typewriter shelf) for ironing or cutting small pieces, and a pull-out vertical shelf along the left edge of the drawers for hoop storage.

—Jimmie Clifford
Davenport, Iowa



Oh, sir. It's only wafer-thin...

After building the 3-D Cutting Board in issue 266 (March 2020), I found myself with three extra blocks. You didn't specify what to do with them, so I sliced them into 1/8"-thick wafers, glued them onto a backing board, then made a frame of walnut and maple. My wife likes it almost more than the cutting board.

—Richard Howard
Jasper, Ga.

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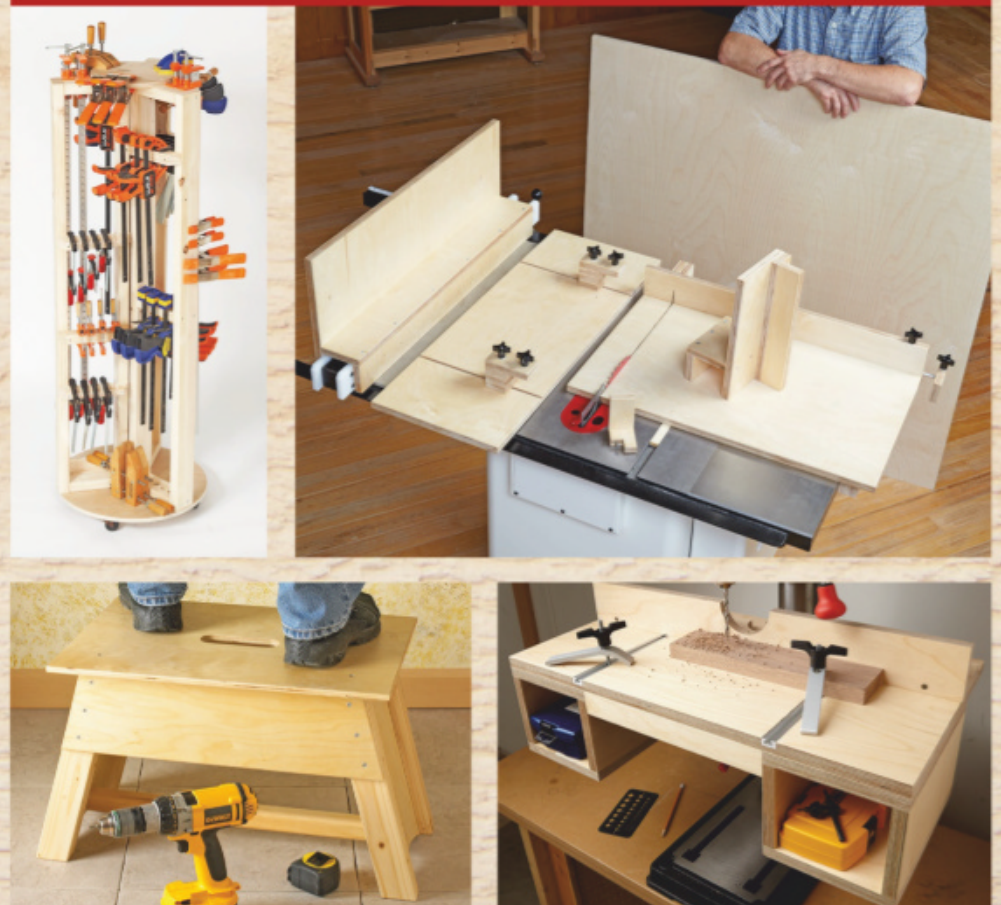
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SOUNDING BOARD

YOUR PROJECTS



It took 170 mortise-and-tenon joints and nearly 9 months for **David Black**, of Florence, Wis., to complete this set of dining-room chairs—one of which he converted to a rocker—based on plans in issue 146 (November 2002). The wood is black cherry; the cushions, black leather.



Glen Cutcher, of Vermilion, Ohio, built this Arts & Crafts-style clock from quartersawn white oak with a figured-maple face and black-walnut inlay. A 6×8" Motawi Tile ("California Oak") embellishes the base.



His wife likes antique hall trees, so **Dave Spinetti**, of New Milford, Conn., designed and built this one for her from locally grown black walnut. The 84×46" piece features intricate panels carved on a shop-built CNC router.

SOUNDING BOARD

YOUR PROJECTS



Rob Loeffler, of Pequannock, N.J., built the Double-feature Pergola, shown here in hammock-holding mode, from plans in issue 253 (May 2018). The stain is a home brew he came up with to match the adjacent ipe park bench.



Last summer, **David Parker**, of Cobbs Creek, Va., turned this 29"-tall vase. The vessel contains 1,044 segments of walnut, white oak, red cedar, and beech.



When his wife asked for a large outdoor table for her birthday, **Louis Cominiello**, of Clovis, Calif., delivered. He designed and built this 4x7' miter-framed table and benches from solid redwood with stainless steel fasteners.



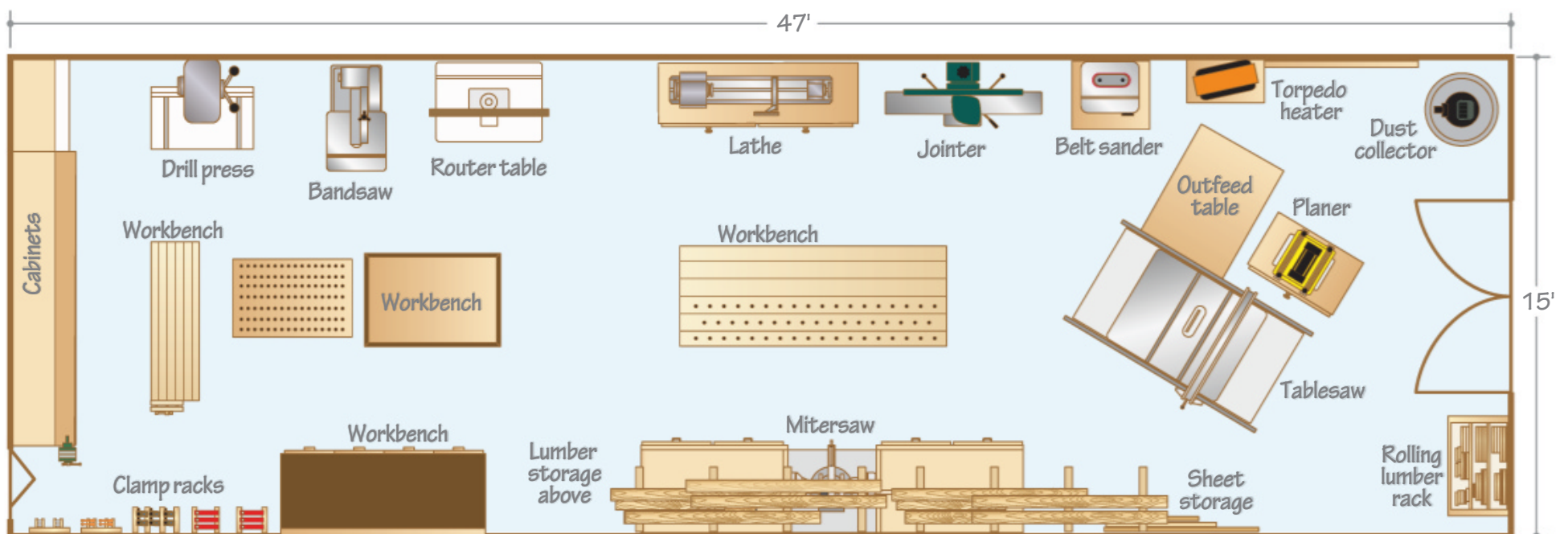
Mitchell Scott, of Smithfield, Va., multiplied the Shelving Showcase bookcase plans from issue 50 (February 1992) into this cherry wall unit. He also added LED lighting (which didn't exist when the plan was created) and mirrored backs.

Send us a photo of your work

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

Sweet Carolina Shop

The length of the workshop lends itself to a linear workflow starting with the tablesaw near the doors and moving to the assembly benches at the rear.



In 2013, Michael Hinson built a 15×15' shop. It didn't take long for him to outgrow that space, so after a couple of years he added another 54' in length, increasing the shop footprint to 705 square feet, and adding a 16'-deep storage area behind the shop and a 6'-deep porch on the front. Why so long and narrow? Because running the building along, rather than down, the slope

of his South Carolina lot eliminated the need for tall walls.

Michael's shop features a ceiling that vaults to 12' high at the peaks. Painted oriented strand board (OSB) walls reflect light and make the narrow space feel wider. Michael says the laminate flooring over the OSB subfloor is "easy to sweep and resists glue spills well."



Space under worksurfaces provides more storage. Drawers and cubbies keep tools and accessories within easy reach.

An 18,000-BTU window air conditioner installed in one of the walls cools the shop. A kerosene torpedo heater takes the chill off during the mild winters.

By locating most of his major tools along one wall, one run of dust-collection piping serves them all. A 2-hp single-stage collector with an Oneida Dust Deputy separator stands by the shop doors. Michael connected a shop vacuum to the mitersaw because the saw sits on the opposite wall from the dust-collection system.

Michael relies heavily on his Festool MFT worktable, and even duplicated its hole pattern in one of his rolling workbenches so he could use his Festool accessories there. Systainers store below.

Michael positioned his tablesaw in front of the door to facilitate feeding long stock. He built a height-adjustable mobile cart for his benchtop planer so his workbenches can serve as additional support when he planes boards. Michael's future plans include purchasing an 8" jointer and upgrading the dust collector and tablesaw. 🌳



Michael Hinson learned woodworking from his father, uncle, and grandfather. He constantly seeks to improve his skills building swings, toyboxes, birdhouses, and fine furniture.

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Michael's long, metal-clad shop building includes a small porch.

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Q Combine wax with a film finish for best results

I'm building a couple of end tables and would like to finish them with wax, but I'm concerned about the long-term durability of wax as a finish. Would these tables be well-suited for this type of finish?

—Charles Jarman, La Mesa, Calif.

A Wax is one of the oldest finishing methods, Charles, and it has a lot of things going for it: practically foolproof application, easy renewal, and it imparts a beautiful, soft sheen. Prepared furniture waxes are usually a blend of different types of waxes, from beeswax (the softest) to carnauba (harder) to microcrystalline (the hardest). Like other finishes, wax sits on the surface of the wood, creating a barrier against water and spills, making them easier to wipe up. If the surface becomes dull or scuffed, apply a new coat of wax right over the existing layers. Tinted paste wax enables you to match darker woods or provide a contrasting color to the pores of the wood.

But wax has its downsides as well. It ranks at the bottom of the scale in terms of durability and resistance to scratches and abrasions. Because wax has a fairly low melting point, it doesn't stand up to heat very well. So don't use wax on projects that will have hot items, such as a cup of coffee, placed on them. And as you might guess, wax finishes won't last on outdoor projects.

Wax really shines on projects that won't be handled or used on a daily basis, such as jewelry boxes, bookcases, picture frames, and detailed items, such as carved moldings. Work the wax into the intricate areas of the project with a brush, then buff away the excess with a soft cloth. Apply wax to turned projects right on the lathe, using a paper towel. The heat generated from the friction of the spinning workpiece helps melt the wax, distributing it evenly over the wood.

If a wax finish appeals to you, but you want something that offers a little more protection, combine wax with another finish. For example, you could finish your end tables with polyurethane, lacquer, or even shellac, and then apply wax over the cured finish. This gives you the best of both worlds—a durable, long-lasting finish with the warmth, beauty, and easy renewability of wax. But you'll still want to slide a coaster under your morning cup of Joe. 🌲

Tip! Unlike a cloth, a paper towel tears away easily should it wrap around a spinning item on the lathe.



Wax finishes don't provide much protection against scratches. But if the scratch isn't too deep, you can buff it out and reapply a coat of wax over the affected area.

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SHOP TIPS

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Cover-up clamp rack for added storage space

In my small shop, I needed a space-efficient storage solution for all my clamps. I found many plans for roll-around carts but couldn't justify the loss of usable floor space. So, I came up with an A-frame cart that parks over my benchtop planer stand. A brace on one end pivots up to allow rolling the rack away from the planer.

Because I would need access to the inside area, I had to get creative with bracing for the legs. To make the rack more stable, I attached a shelf that just clears the top of my planer. A permanent brace on one end near the bottom further reinforces the rack.

For the opposite end, a similar brace pivots out of the way to allow access to the inside area. I attached the fixed end of the brace using a fender washer in between the leg and the brace with a carriage-bolt-and-lock-nut combination to keep the fit snug, yet loose enough to pivot. For the non-fixed end of the brace, I milled a slot. A long bolt in a threaded insert through the leg of the rack forms a stud for a knob. This makes it quick and easy to just twist the knob loose and pivot the brace out of the way. No hardware ever has to be removed, which means it can't get misplaced or lost. And with the brace locked in place, the clamp rack is rock-solid.

—Chris Desmarais, Raleigh, N.C.

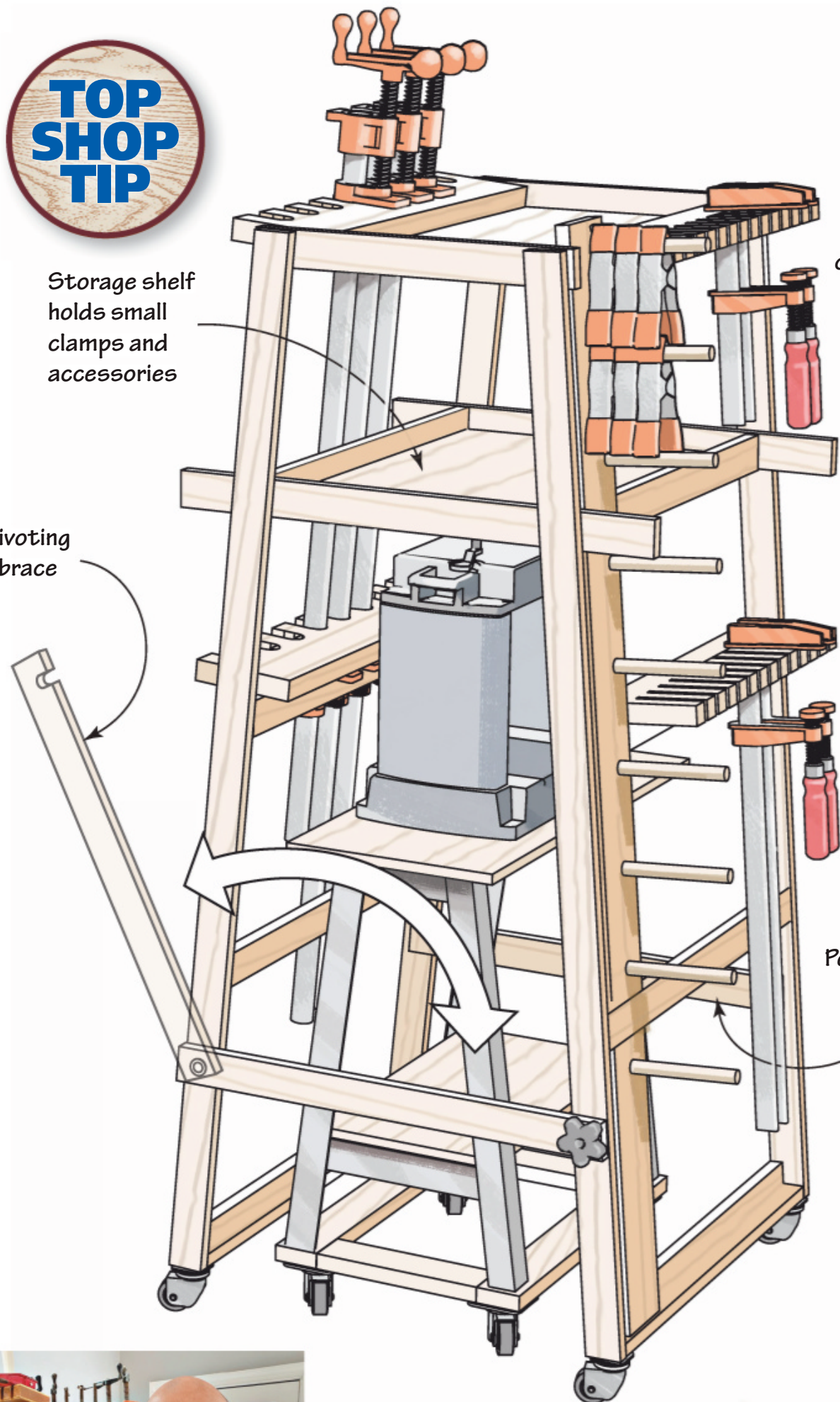


Storage shelf holds small clamps and accessories

Pivoting brace

Clamp racks are custom-designed for the type of clamps to be stored

Permanent brace



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



For sending this issue's **Top Shop Tip**, Chris receives a Senco compressor and nailers worth \$340.



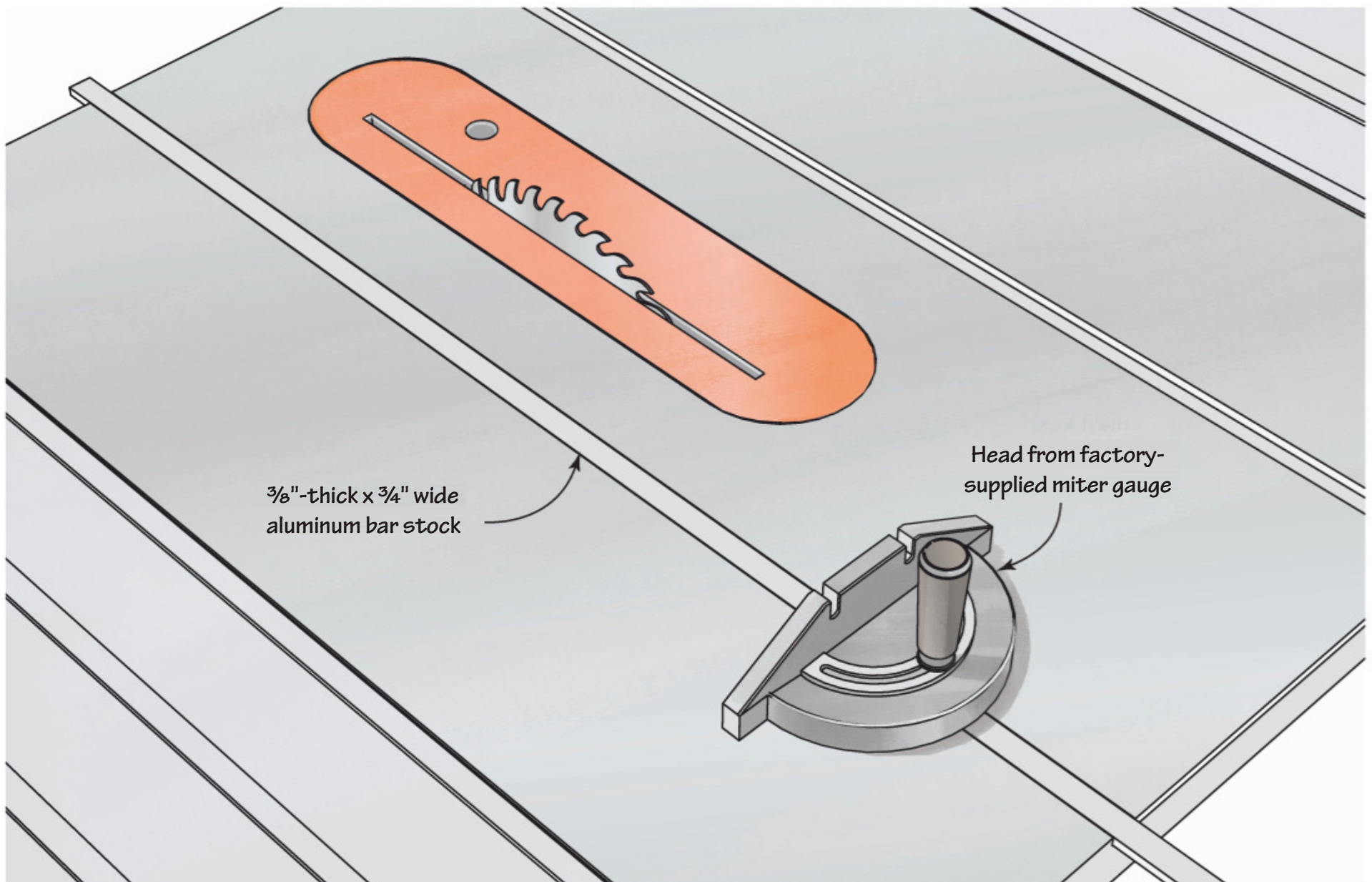
SHOP TIPS

Replacement miter bar adds accuracy and capacity

Using a conventional miter gauge when crosscutting workpieces wider than about 12" can be tricky. The bar on most gauges is too short to fully engage the miter slot to ensure a square cut. I solved the problem by replacing the factory-supplied bar on my

miter gauge with a 42"-long bar of $\frac{3}{8} \times \frac{3}{4}$ " aluminum from a metal supplier. Now, I have several inches of miter bar engaged in the miter slot at the beginning and end of the cut, ensuring more-accurate results.

—William Bartz, San Jose, Calif.



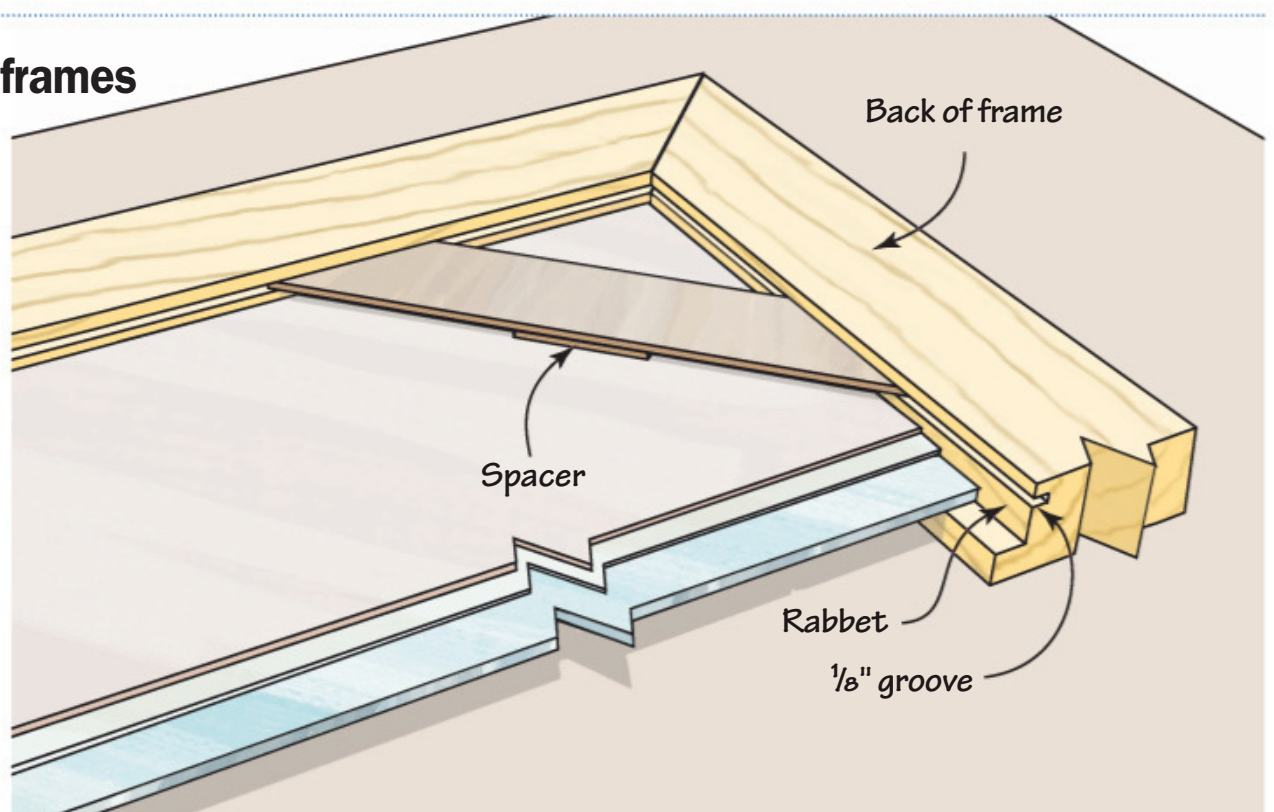
No-fastener solution for picture frames

I make a lot of picture frames and developed this easy-change method to secure the artwork or photograph in the frame.

First, cut a $\frac{1}{8}$ \" groove along the inside edge of the frame material. Then, rabbet deep enough below the groove to accommodate the glass, photograph, and backer board plus approximately $\frac{1}{8}$ \" extra depth for a spacer. After assembling the frame and installing the glass, photo, and backer, fit wood strips into the grooves at each corner of the frame without glue. Finally, make spacers thick enough to fit snug between the wood strip and backer board, and glue the spacers to the strips.

The strips and spacers are easily removed to change the contents of the frame.

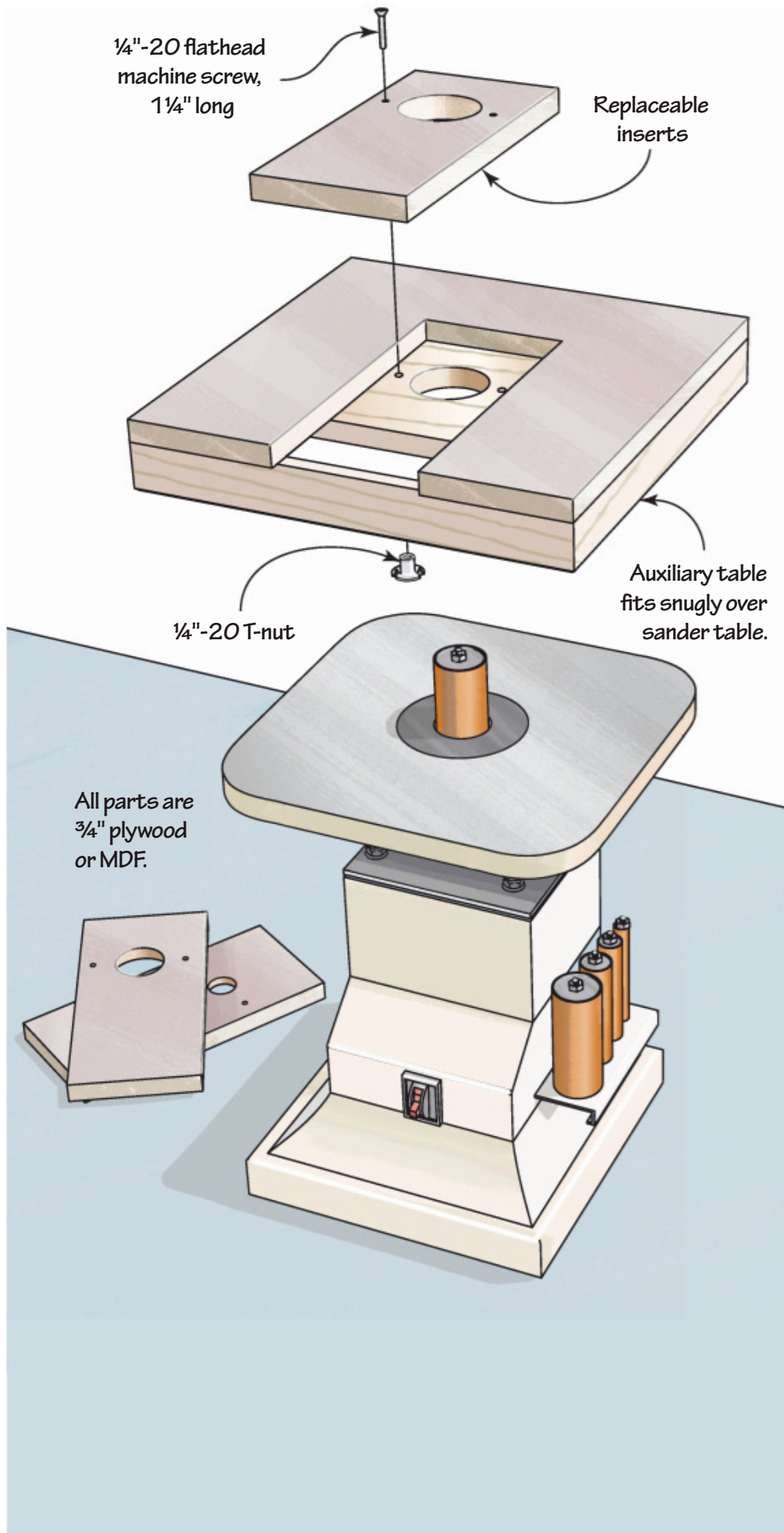
—Alex Deaver, Des Moines, Iowa



Simple solution for saving spindle-sander sleeves

While using my oscillating spindle sander, I realized that the bottom portion of the sanding drum does most of the work, while the top portion remains unused. I solved this problem by making an auxiliary table that elevates the workpiece to get more mileage out of the drums. I made custom inserts with holes sized to accommodate the various drum diameters.

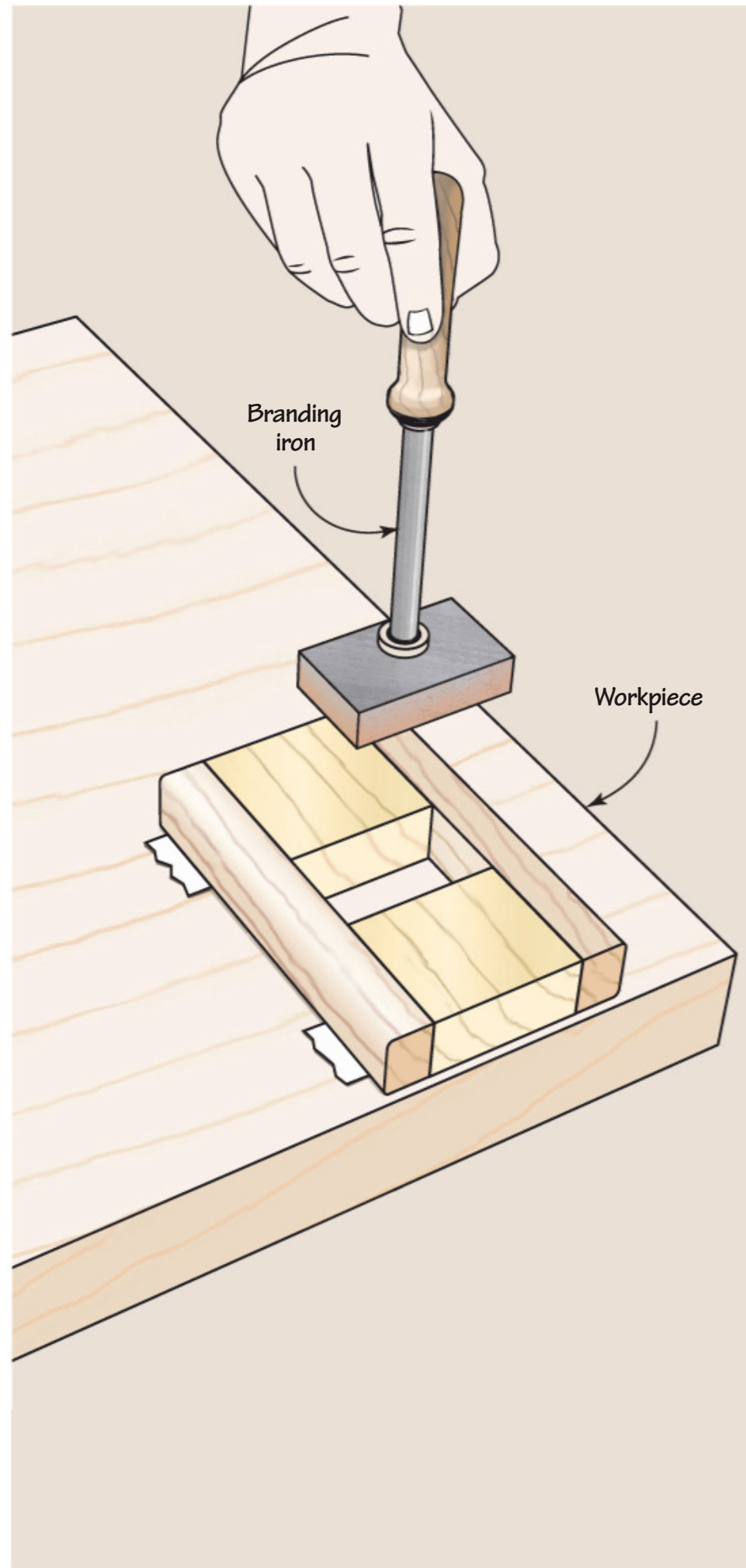
—Dan Martin, Galena, Ohio



Foolproof jig for branding your work

I use a branding iron to place my maker's mark on projects. To ensure that the mark ends up exactly where intended, I fashioned a simple jig with an opening sized to fit the head of the branding iron. I fasten the jig to the work with double-faced tape. And if the mark isn't dark enough, I can precisely relocate the iron and re-burn the area.

—John Padgham, Franklin, Tenn.

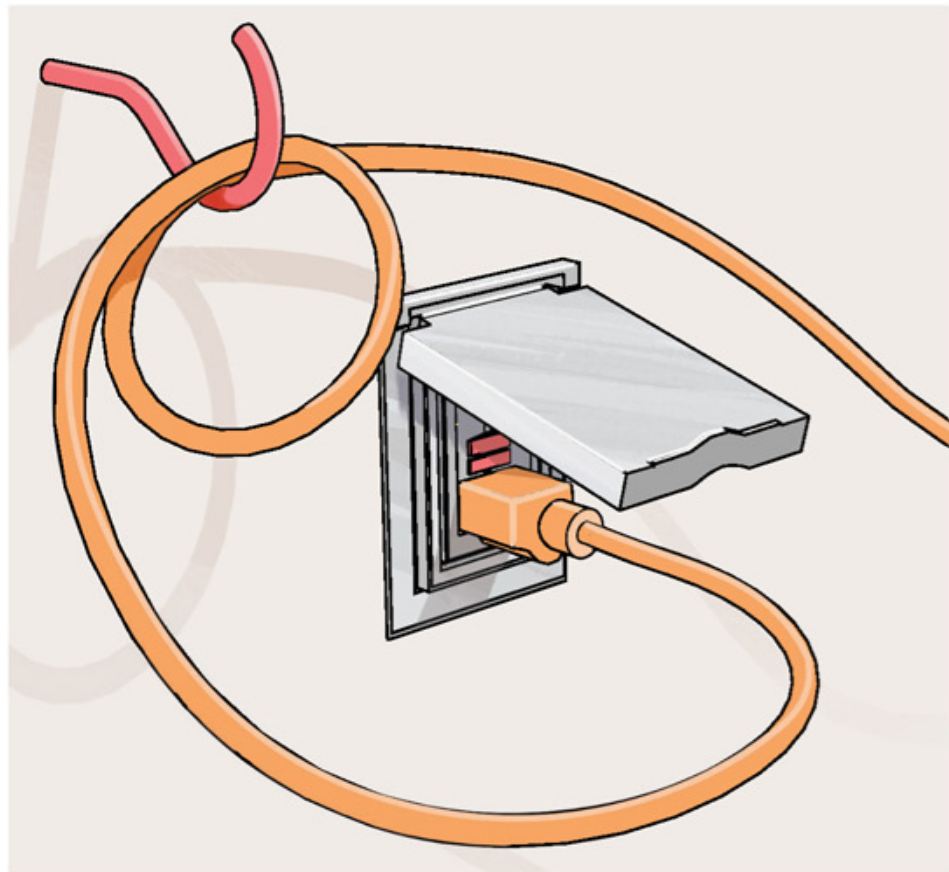


SHOP TIPS

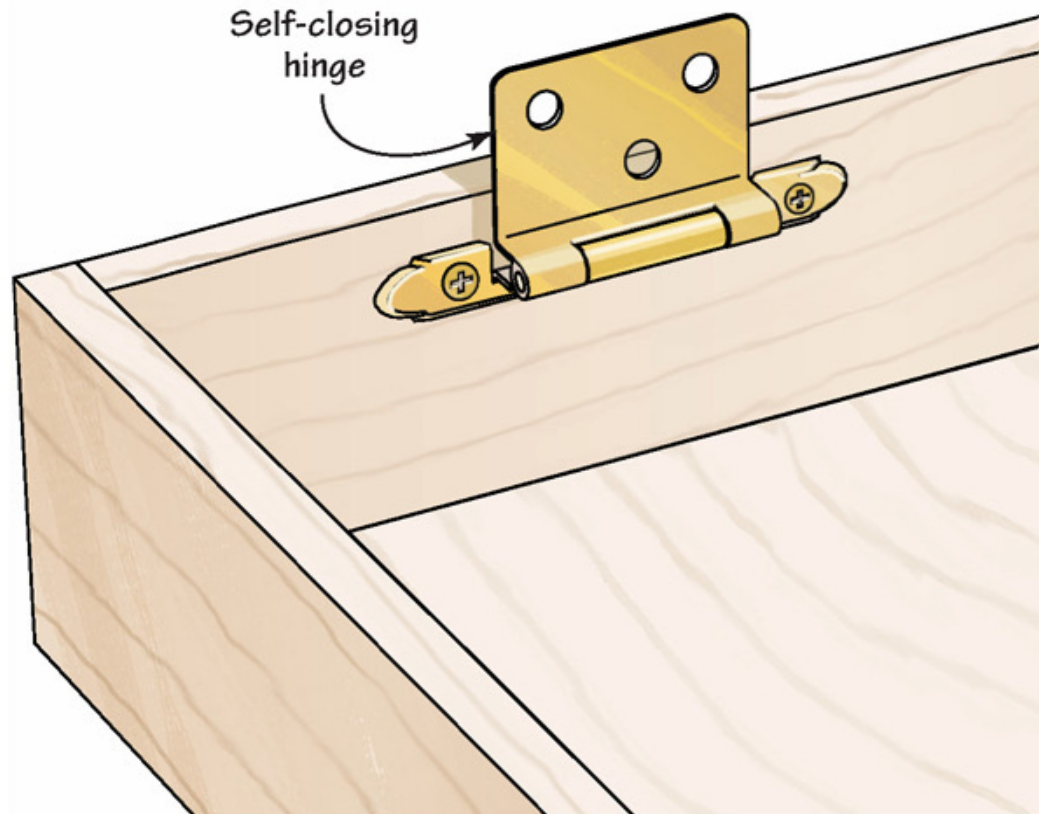
No-strain power cords

Using portable power tools, especially outdoors, sometimes results in pulling the cord out of the receptacle. I solved the problem by installing a screw hook near the outlet. By looping the cord around the hook, any extra tension on the cord simply tightens the loop around the hook.

—Eric Boyer, Coquitlam, B.C.



Self-closing hinge



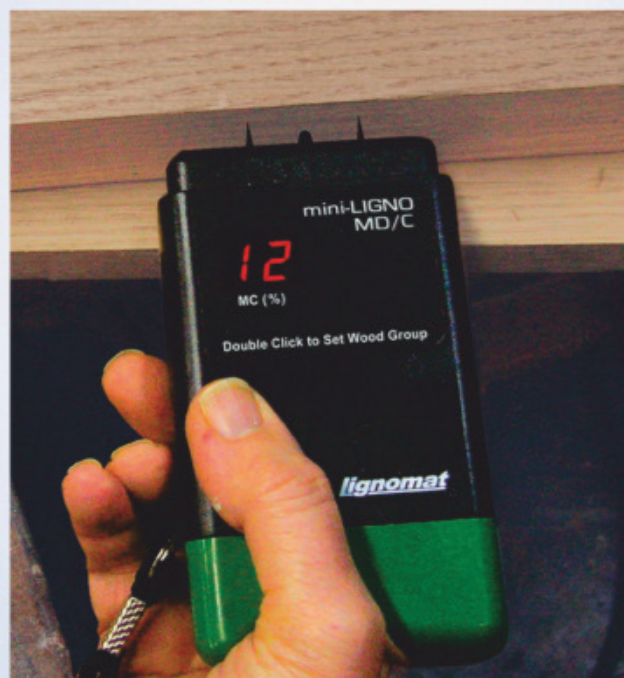
Turn a new leaf for drawer stops

To create drawer stops that prevent the drawer from accidentally being pulled out of the carcass, I raided my spare-hardware stash for self-closing overlay hinges. Installed on the inside drawer back, the hinge leaf stays upright, acting as a stop against the face frame of the drawer opening. To remove the drawer, I simply reach in and flip the leaf down. 🌲

—Dr. Jim Morgan, Smyrna, Tenn.

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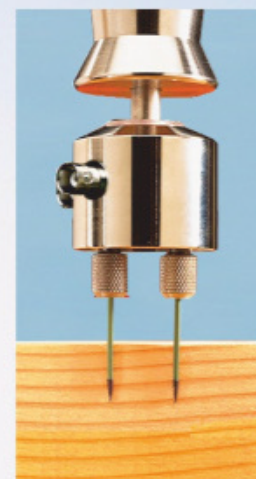
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Heritage Bookcase

A 20th-century classic

Based on a design by Charles Limbert (1854-1923), this oak bookcase captures the beauty and utility of American Arts & Crafts furniture. A glazed, paneled door and gallery top highlight the piece, one of many distinctive furnishings made between 1902 and 1923 at Limbert's factory in Grand Rapids, Mich.

DIMENSIONS:
32" W x 14 3/8" D x 60" H

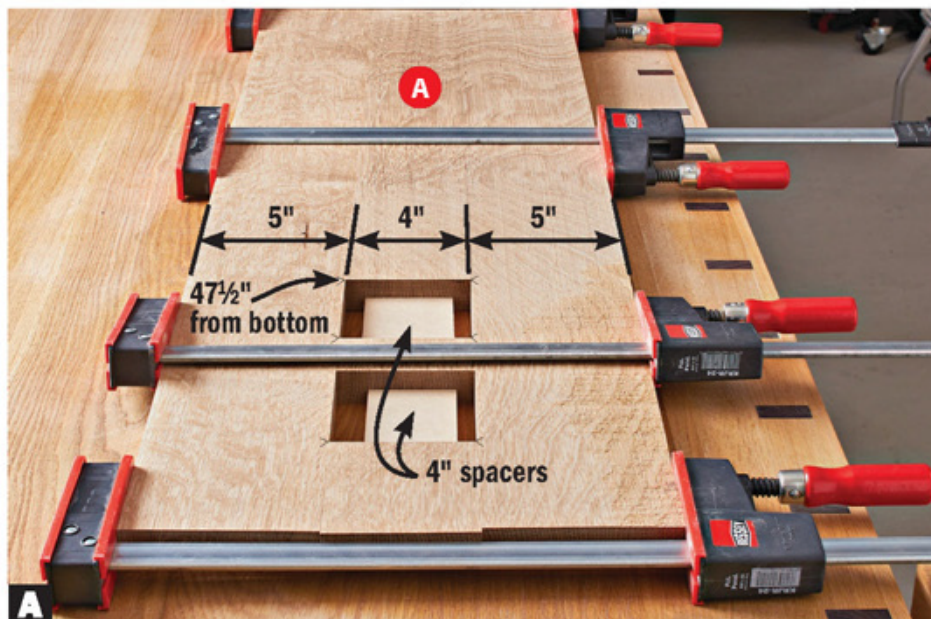
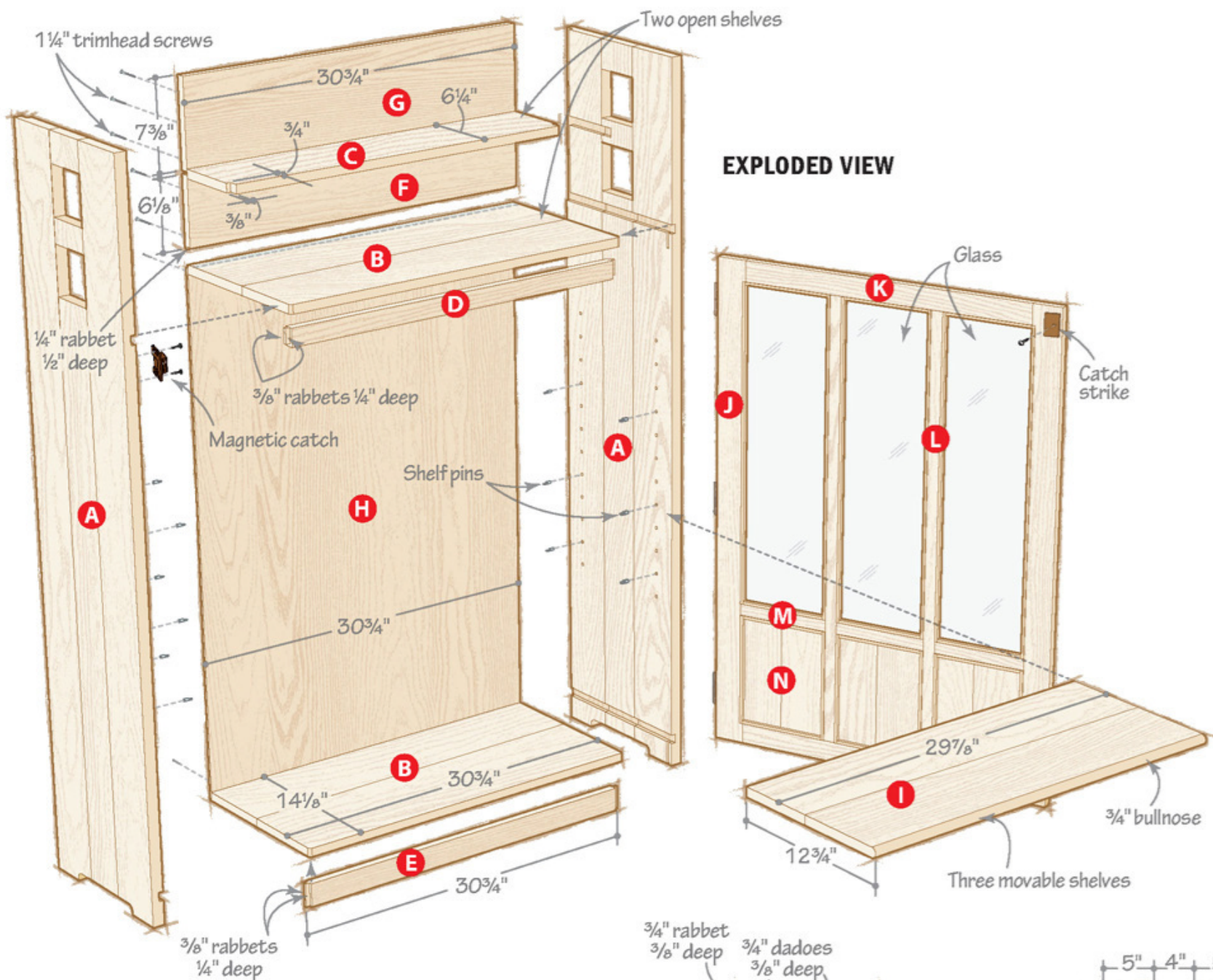
Approximate materials cost:

\$550

Including hardware

3
movable shelves
2
open shelves





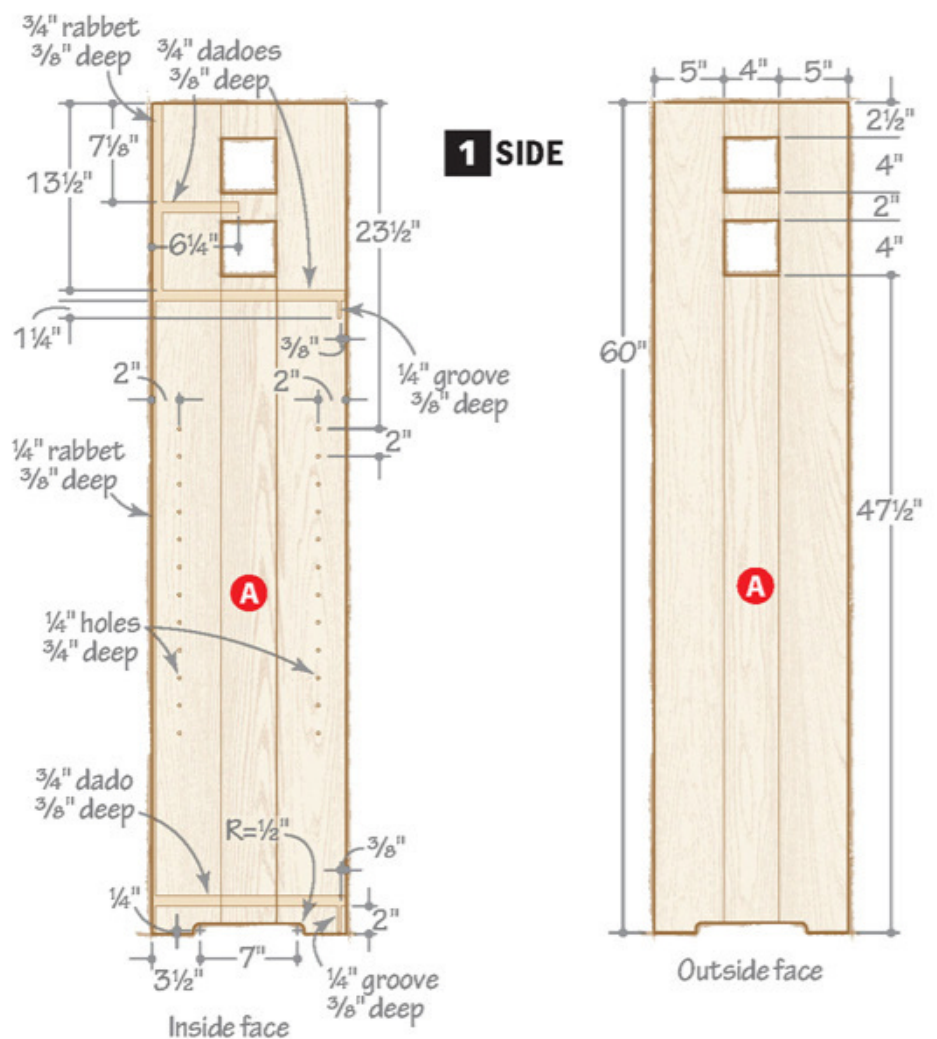
Place the middle pieces and insert 4" spacers to create square windows in the sides (A). Middle parts will extend beyond the top and bottom of the glue-up.

Make the sides

► Learn about creating striking grain displays. woodmagazine.com/woodgrain

1 Cut six 1" boards 64" long and at least 5" wide for the sides (A) [Materials List, Drawing 1]. Arrange them in two groups, striving for attractive grain display. Mark their positions.

2 Rip the outer boards in each trio to 5" and the middle ones to 4" [Drawing 1]. Crosscut the 5" boards to final length. Cut each 4" one to make parts 47 3/4", 2", and 2 3/4" long, removing two waste sections so you maintain grain alignment.



3 Mark the outer boards 47 1/2" from the bottom near the inside edges, apply glue to the edges of the 4"-wide pieces, and clamp the sides (A) [Photo A]. Trim the top flush, then crosscut the bottom to final length.

► Find six tips for better edge-gluing. woodmagazine.com/edgegluing



► To watch a video about making and using the guide, point your smartphone's camera at this code, or visit woodmagazine.com/routdadoes

SKILL BUILDER

No-guesswork guide makes dados fit tightly

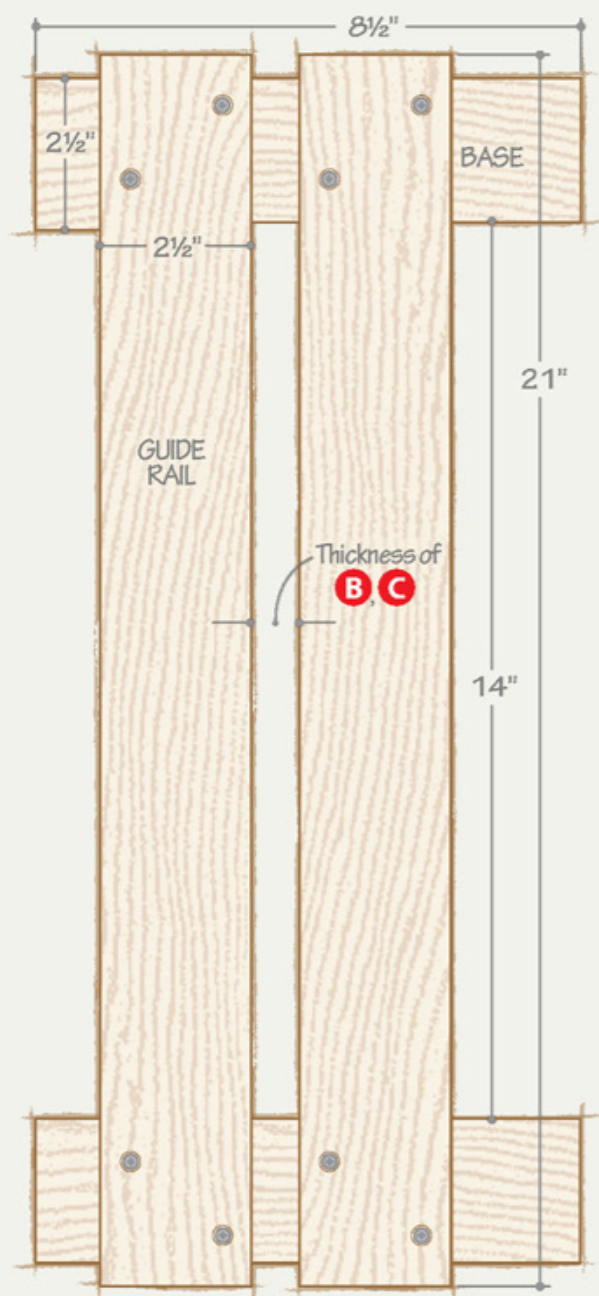
Precisely position the dados in the sides (A) and make sure they perfectly fit the shelves (B, C) with this simple router guide.

Cut the parts [Drawing] and attach one guide rail to the bases. Stand a shelf (B) on edge with its top face against the attached guide rail. Then, snug the other guide rail against the bottom of the shelf. Attach the guide rail to the bases in that position.

Install a top-bearing flush-trim bit [Photo, right] in your plunge router. Adjust the cutting depth, measuring from the bottom of the jig guide rails, and set the router depth stop.

Lay out the dados on the sides (A) [Drawing 1]. Position the guide rails on the layout lines for the first dado, and clamp the jig in place. Rout the dado in progressively deeper passes [Photo, below, left]. Repeat for the remaining dados, adding a stopblock on the guides for the stopped dados [Photo, below, right].

Tip! Center the dado for the upper shelf (C) on the 2" divider between the upper and lower side openings.



A top-bearing flush-trim bit with a short cutting height, such as this Freud no. 50-103 ($\frac{5}{8}$ " D x $\frac{9}{16}$ " H, $\frac{1}{4}$ " shank), works well with the jig.



Start with a shallow cut, then work down to the final depth in steps. Move the bit along both guides with each pass to achieve a full-width dado.



Attach a stopblock to rout the dado for the upper shelf (C), starting from the back of the side (A). Repeat for the other side.

4 Glue up stock for the shelves (B) and cut them to size, along with the upper shelf (C), the front mid rail (D), and the apron (E) [Exploded View]. Notch the front corners of the upper shelf, and rabbet the

ends of the front mid rail and apron. Finish-sand the shelves, rail, and apron.

5 [Skill Builder], taking care to make mirror-image parts.



B Attach an auxiliary fence to the router edge guide and install a $\frac{1}{4}$ " straight bit to rout grooves for the front mid rail (D) and apron (E).

6 Groove the sides (A) below the dadoes for the upper and lower stationary shelves (B) [Photo B, Drawing 1]. Then, rabbet the back edge of each side [Photo C].

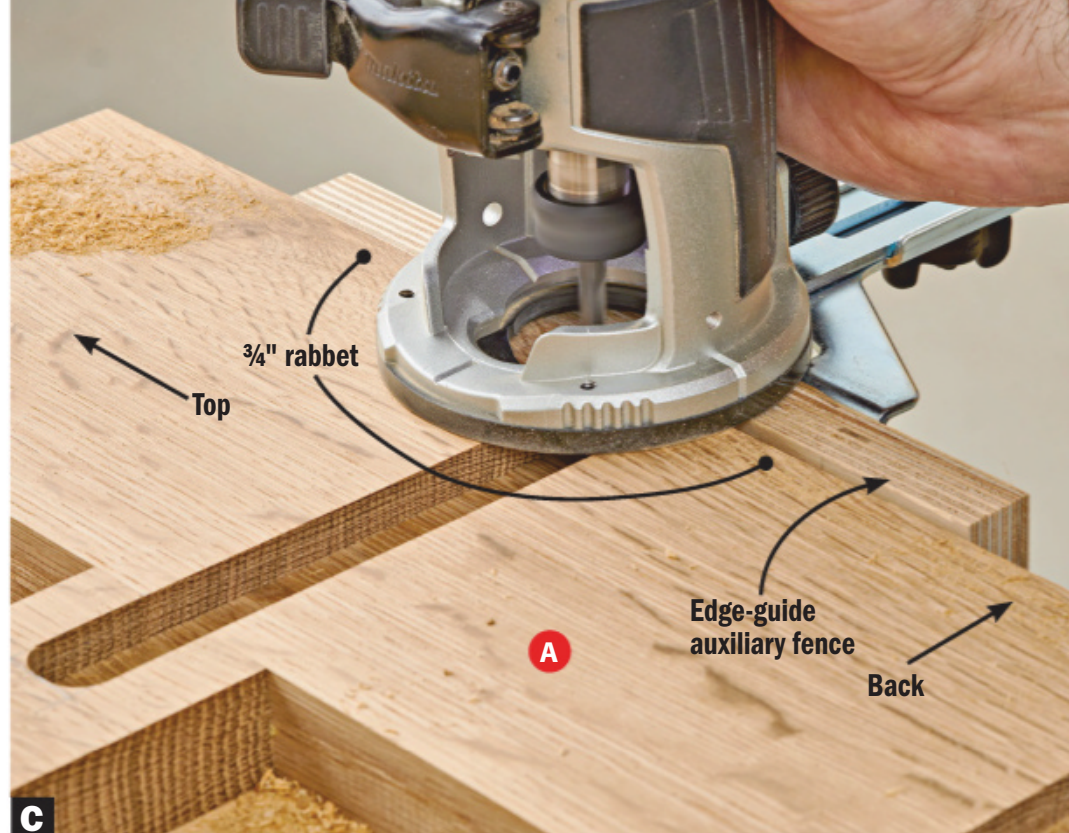
7 Cut out and sand a template of the side bottom cutout [Drawing 1] on a $\frac{1}{2}$ ×7×14" scrap of plywood or MDF.

8 Trace the template on each side (A) and jigsaw the cutout, staying about $\frac{1}{8}$ " on the waste side of the line. Then, clamp the template to each side in turn and rout with a top-bearing flush-trim bit [Photo D].

9 Drill the shelf-pin holes and finish-sand the inside faces of the sides.

Construct the carcase

Reduce your assembly-time stress by gluing and clamping the carcase in stages, allowing



C Reposition the guide to rout a $\frac{1}{4}$ " rabbet along each side's back edge. Widen the rabbets to $\frac{3}{4}$ " above the upper stationary shelf (B) dadoes.

each glue joint to dry before proceeding to the next one.

1 Glue the bottom stationary shelf (B) into its dado on one side (A) [Exploded View, Photo E]. Make the back of the shelf flush with the edge of the back rabbet.

2 Glue and clamp the upper stationary shelf (B) next, followed by the upper shelf (C), the front mid rail (D), and the apron (E). Then, glue the remaining side in place.

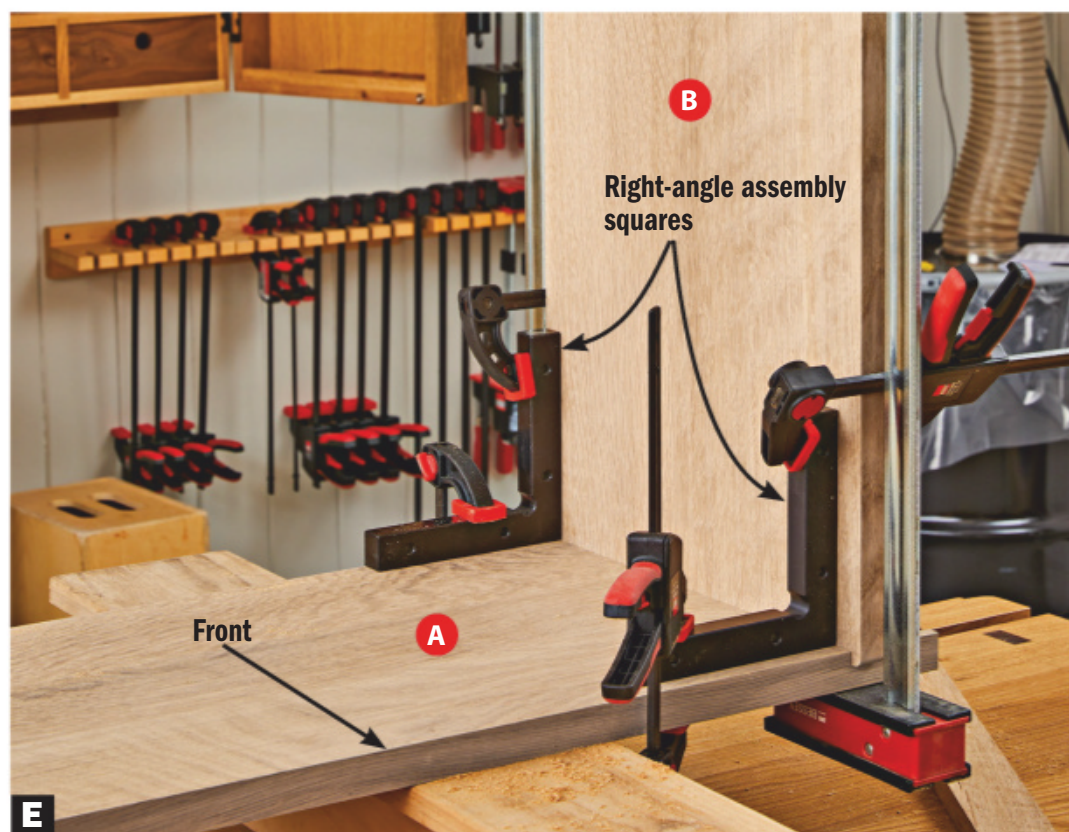
3 Cut to size the center and upper back rails (F, G) and the back (H). Rabbet the bottom of the center back rail [Exploded View]. Finish-sand the parts and set them aside.

4 Glue up stock for the movable shelves (I) [Exploded View] and cut them to size. Round over the front edges, finish-sand the shelves, and set them aside.

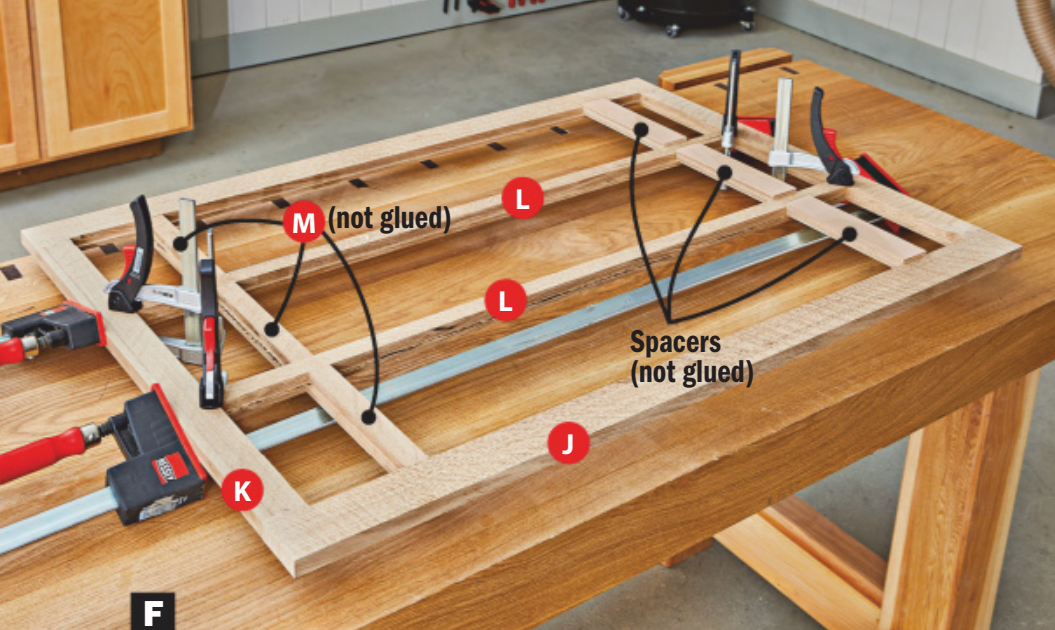
► Make your own assembly squares. woodmagazine.com/assemblysquare



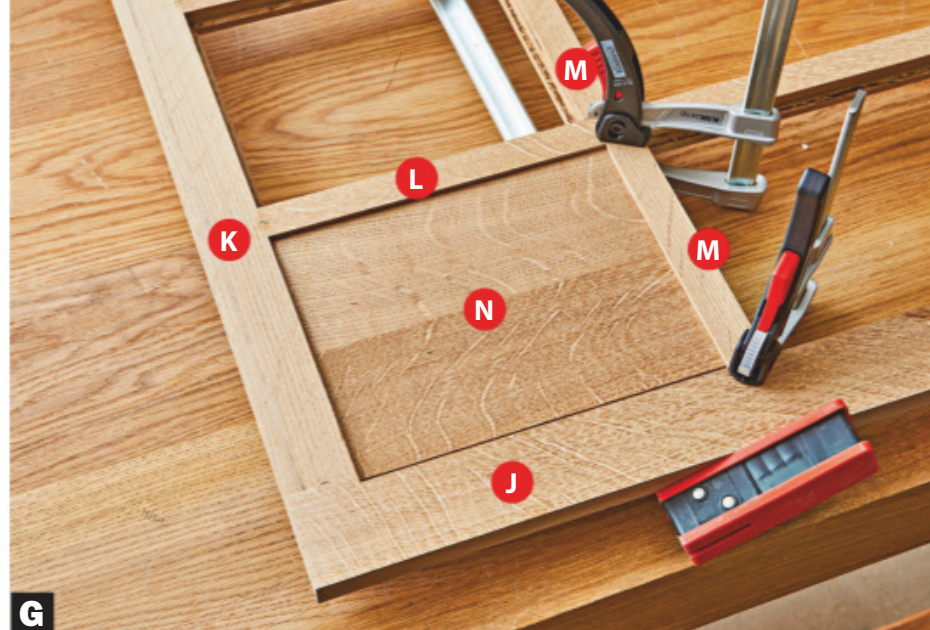
D Take several shallow passes to pattern-route the side bottom profile. Lighter cuts ensure a cleaner edge and minimize the risk of burning.



E Right-angle assembly squares simplify construction by establishing critical 90° angles as you glue up the carcase one joint at a time.



F Position the grid rails and spacers to keep the grid stiles (L) aligned for gluing. Keep the grid stile/frame rail joints flush with face clamps.



G With a panel (N) dry-laid for spacing, glue each grid rail (M) into place. Carefully lift the panel out after clamping so glue squeeze-out won't fix it in place.

Build the door frame

1 Cut to size the frame stiles and rails (J, K). Rip the grid stiles and rails (L, M) to width and trim each about 1" overlength [Drawing 2].

Tip! Drill a line of $\frac{7}{32}$ " holes with your drill press to form the mortise. Square the ends with a $\frac{1}{4}$ " chisel, and clean out the sides with a 1" chisel.

2 Mortise the frame stiles (J) [Drawing 2a] and form tenons on the frame rails (K).

3 Rabbet one edge of each frame rail (K) to make a top/bottom pair, and both edges of the grid stiles and rails (L, M) [Drawing 2a].

4 Glue together the frame stiles (J) and rails (K), checking for square. Rout rabbets along the frame stiles to match the rails, and chisel the corners square.

5 Square one end of each grid stile (L). Lay the stiles into the door frame (J/K) top and bottom rabbets, mark their length, and trim them to length.

6 Lay the stiles into the door frame and space them to equalize the rabbet-to-

rabbet spaces at top and bottom. Cut the rails (M) plus three scrapwood spacers to that length.

7 Rabbet the ends of the grid stiles and rails to form tenons [Drawing 2a]. Dry-fit the grid stiles and rails plus the spacers into the frame. Glue and clamp the grid stiles into the door frame [Photo F].

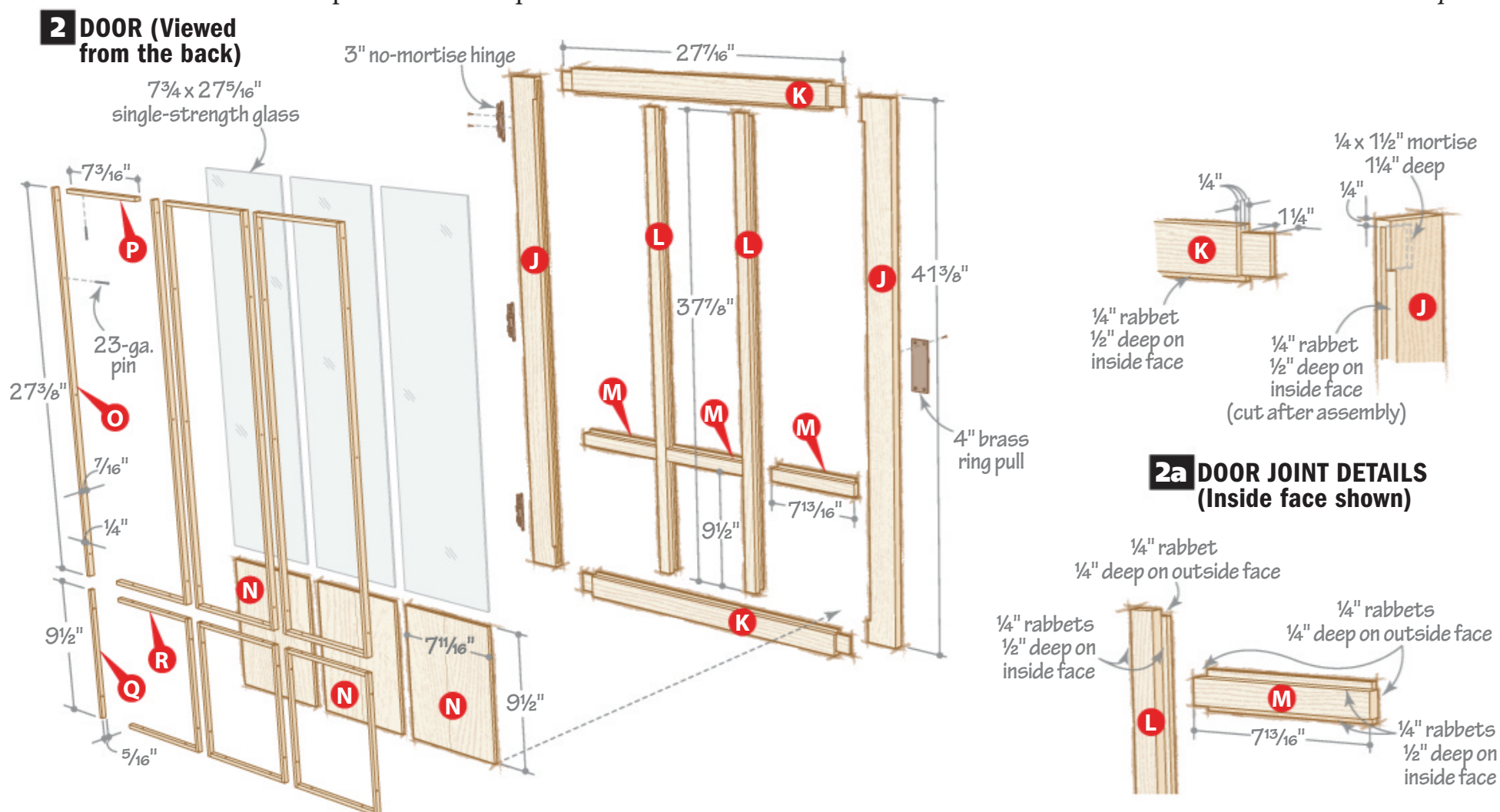
8 Resaw $\frac{3}{4}$ " stock and book-match three blanks for the door panels (N). Cut the panels to size. Without gluing, lay one panel into the rabbets at the bottom of the door [Drawing 2]. Position a grid rail (M), and glue the rail in place [Photo G]. Repeat for the other two panels.

9 Cut stock for the stops (O-R). Finish-sand the door frame (J-M), panels (N), and stop stock.

Tip! Mark the grid stiles (L) and frame rails (K) for position to aid in assembly and gluing.

► Brush up on book-matching. woodmagazine.com/bookmatch

Note: We cut six blanks $\frac{1}{4} \times \frac{7}{16} \times 36$ " and six $\frac{1}{4} \times \frac{5}{16} \times 18$ " to make the stops.



1 Test-fit the door; it should have $\frac{1}{16}$ " clearance on all four sides. Trim the door as needed. Attach the hinges to the door edge [Drawing 2].

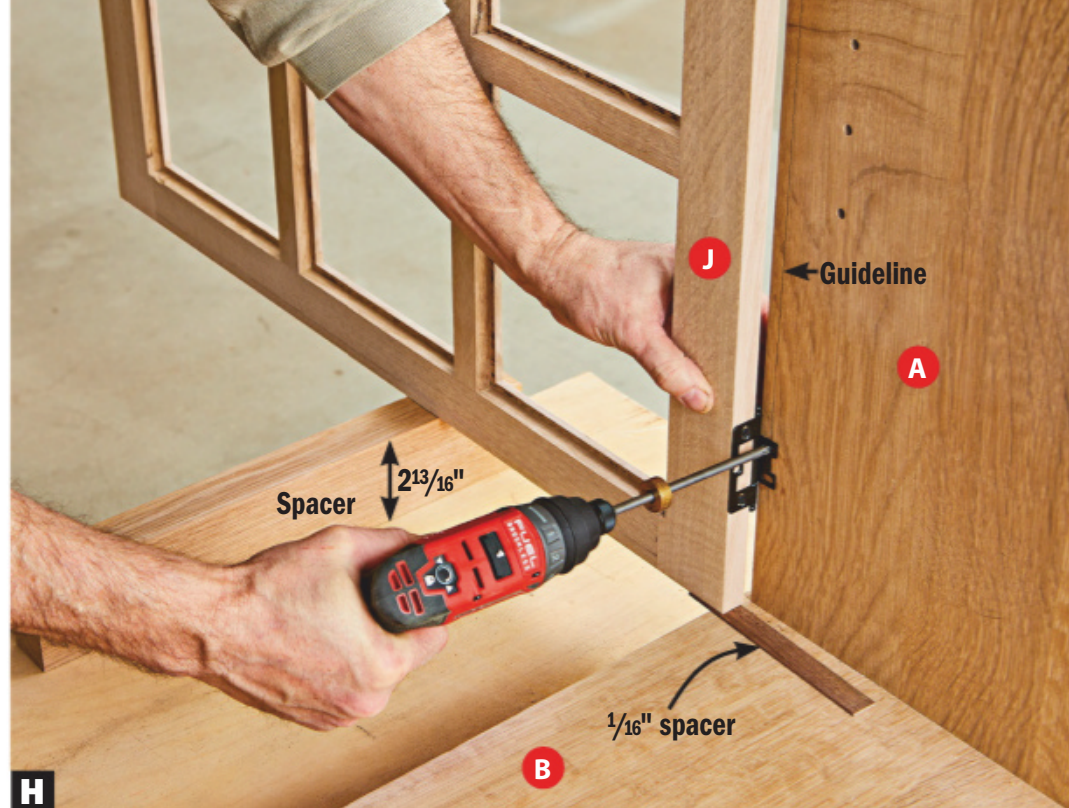
Note: You can hinge the door to swing from either side.

2 Mark a line $\frac{3}{8}$ " from the front edge on the inside face of the the hinge side (A) and parallel to it. Cut one scrapwood spacer $2\frac{13}{16}$ " wide and one $\frac{1}{16}$ " thick [**Photo H**]. Position the door in the opening with the spacers and attach the hinges to the side (A). Remove the door and remove the hinges from it.

3 Touch up the finish-sanding as needed, and finish all parts. (We stained the bookcase with Lockwood Early American Maple Golden Amber dye no. 144 followed by Varathane Gunstock stain, and applied a dull lacquer topcoat.)

4 Measure the door openings and have single-strength glass cut to size. Install the glass and panels (N) in the door frame, cut the stops to fit, and pin them in place.

5 Reinstall the hinges and hang the door. Fasten the back (H) in place with brads

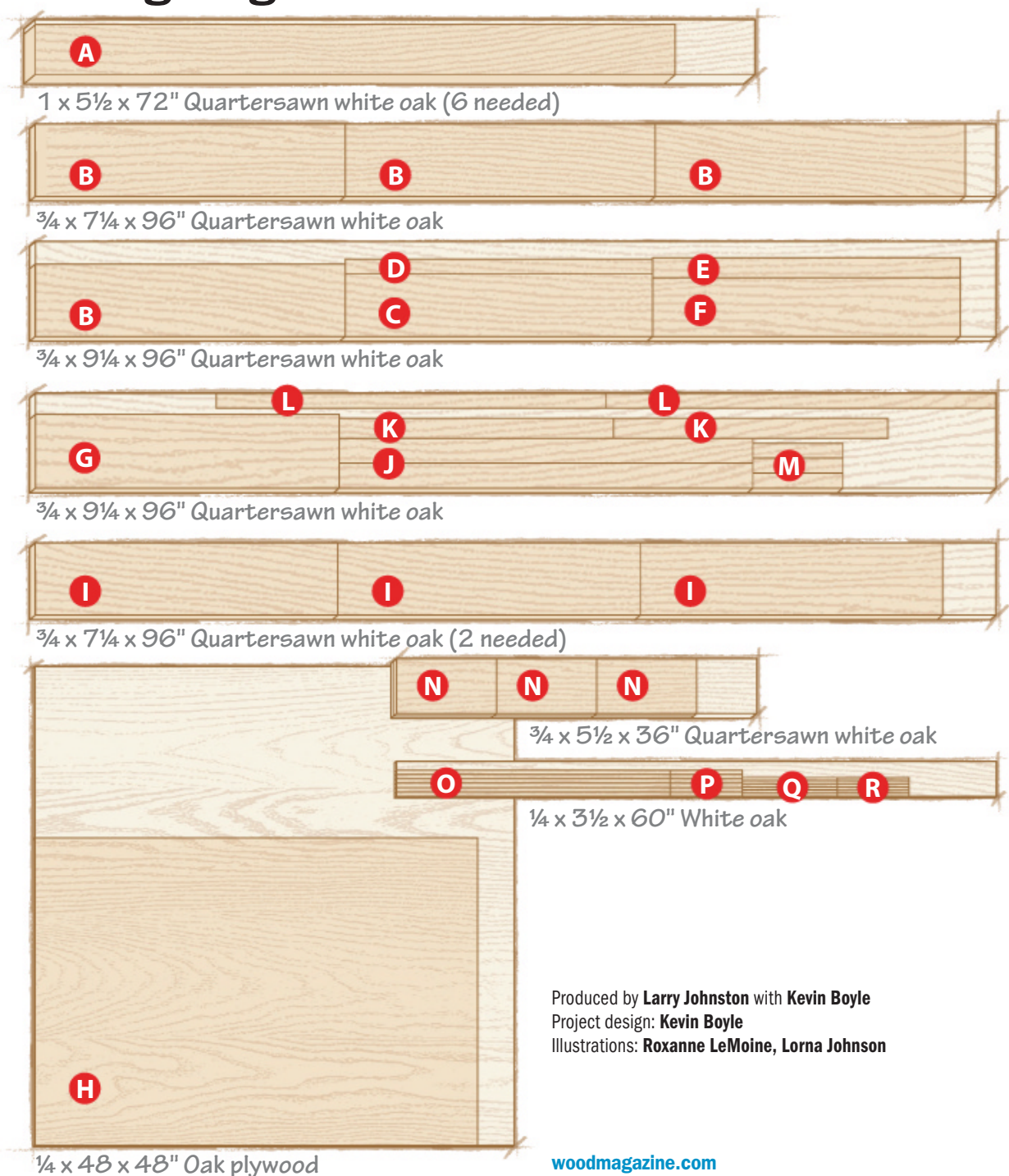


With the spacers supporting the door in position, line up the hinge screw holes on the guideline. Drill pilot holes, and drive in the hinge screws.

or narrow-crown staples and screw the back rails (F, G) to the case [**Exploded View**].

6 Install the door catch and pull, and slip the movable shelves into place. Then, book this project for a prominent spot in your home. 🌳

Cutting Diagram



Materials List

		FINISHED SIZE				
Part		T	W	L	Matl.	Qty.
bookcase						
A*	sides	1"	14"	60"	QSWO	2
B	stationary shelves	¾"	14⅛"	30¾"	QSWO	2
C	upper shelf	¾"	6¼"	30¾"	QSWO	1
D	front mid rail	¾"	1½"	30¾"	QSWO	1
E	apron	¾"	2"	30¾"	QSWO	1
F	center back rail	¾"	6⅞"	30¾"	QSWO	1
G	upper back rail	¾"	7⅜"	30¾"	QSWO	1
H	back	¼"	30¾"	44¼"	OP	1
I	movable shelves	¾"	12¾"	29⅞"	QSWO	3
door						
J	frame stiles	¾"	2½"	41⅜"	QSWO	2
K	frame rails	¾"	2"	27⅞"	QSWO	2
L*	grid stiles	¾"	1½"	37⅞"	QSWO	2
M*	grid rails	¾"	1½"	71⅜"	QSWO	3
N	panels	¼"	71⅜"	9½"	QSWO	3
O*	vertical glass stops	¼"	⅞"	27⅞"	WO	6
P*	horizontal glass stops	¼"	⅞"	7⅜"	WO	6
Q*	vertical panel stops	¼"	⅝"	9½"	WO	6
R*	horizontal panel stops	¼"	⅝"	7⅜"	WO	6

*Parts initially cut oversize. See the instructions.

Materials key: QSWO—quartersawn white oak, OP—oak plywood, WO—white oak.

Supplies: Magnetic door catch, 1/4" shelf pins (12), #8x1 1/4" trimhead screws, 23-ga. pins, 3/8" narrow-crown staples, single-strength glass.

Bits: Top-bearing flush-trim bits, 9/16" and 1" cutting depth; 1/4" straight bit. 3/8" round-over bit.

Sources: Arts & Crafts 4" vertical pull with ring, oil-rubbed bronze finish, no. R-08BM-1019-AC, \$15, House of Antique Hardware, 888-223-2545, houseofantiquehardware.com.

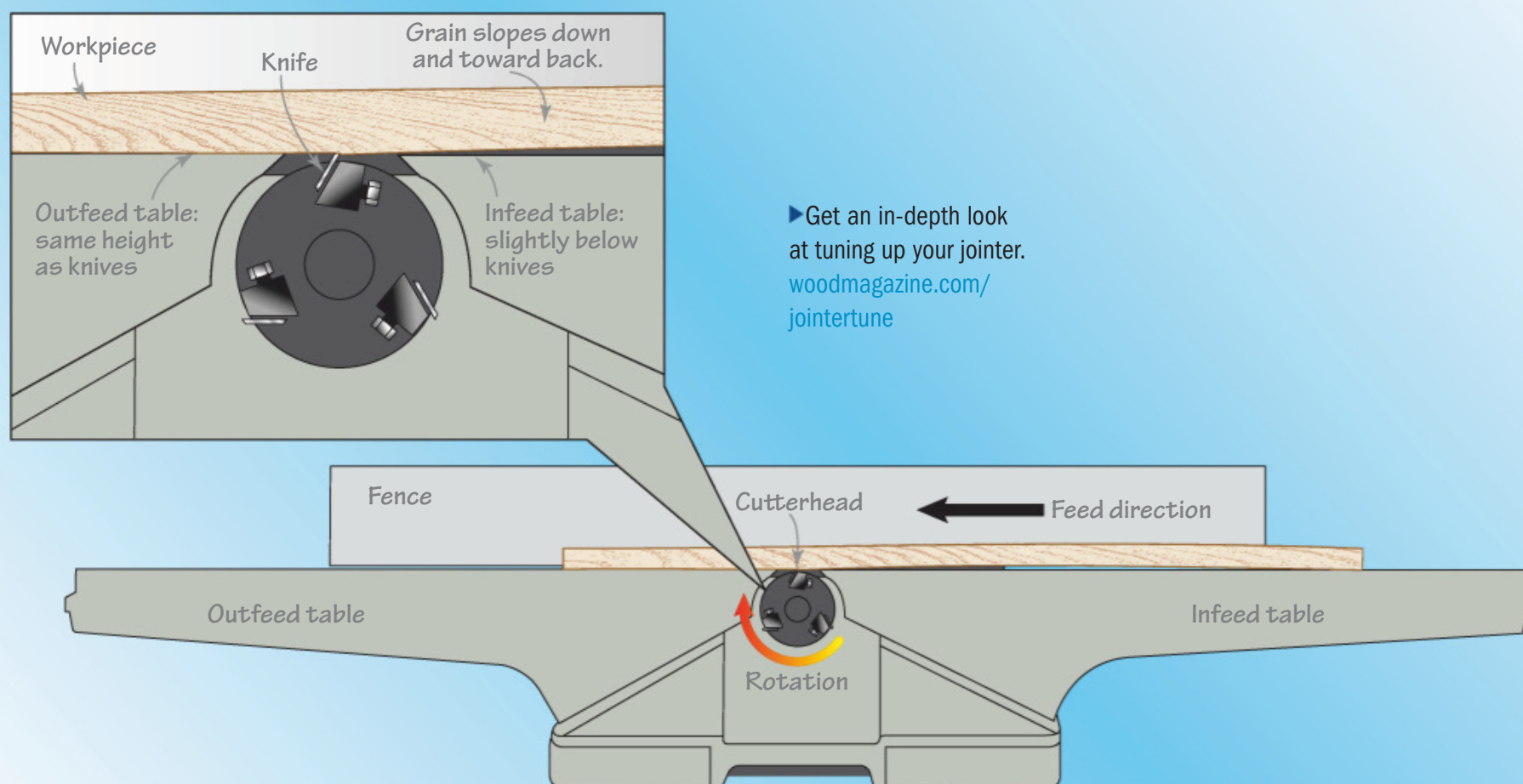
3" no-mortise hinges, oil-rubbed bronze finish (3), no. 1100B-10B, \$11.20, CabinetParts.com, 561-295-8476, cabinetparts.com.

Give It to Me Straight: Jointer Tips and Techniques



by Jim Heavey

The jointer helps you flatten one face of a workpiece, and then square one edge adjacent to that face: the first steps in turning rough lumber into cabinet-quality stock. Follow up jointing with a thickness planer (to make the board a consistent thickness) and a tablesaw (to rip the remaining edge parallel), and you create squared-up stock. Here's how to properly use a jointer—and some tricks you may not know it can perform.



► Get an in-depth look at tuning up your jointer.
woodmagazine.com/jointertune



A **Snipe happens** when the board drops off the infeed table onto a too-low outfeed table at the end of a pass. Raising the outfeed table eliminates this problem.



B **When raising the outfeed table**, be careful not to lift the test piece from the infeed table. You may have to repeat this adjustment to set the table perfectly.

Getting flat-out performance

► Learn to square up stock with a jointer, planer, and tablesaw.
woodmagazine.com/stockprep

On a jointer, infeed and outfeed tables flank a rotating cutterhead [Drawing]. The infeed table sits just below the highest arc of the cutterhead, and the outfeed table rests parallel to the infeed table and at the highest point of the arc of the cutterhead.

For a jointer to work efficiently, it must be properly set up. First, set the outfeed table even with the cutterhead height to prevent snipe at the trailing edge [Photo A]. To make that adjustment, lower the outfeed table slightly and set the infeed table to take a light cut. Joint a couple inches of the edge of a piece of scrap [Photo B]. Hold the scrap in place and turn off the jointer. Raise the outfeed table until it just kisses the newly jointed edge. Lock the outfeed table at that height. Run the test piece another few inches to ensure the jointed edge remains fully supported.

Next, using a square, check that the fence rests exactly 90° to both the infeed and out-



C **Light showing between the square blade and the fence** indicates the fence doesn't rest exactly 90° to the table.

feed tables [Photo C]. This ensures that boards glued edge to edge will rest flat.

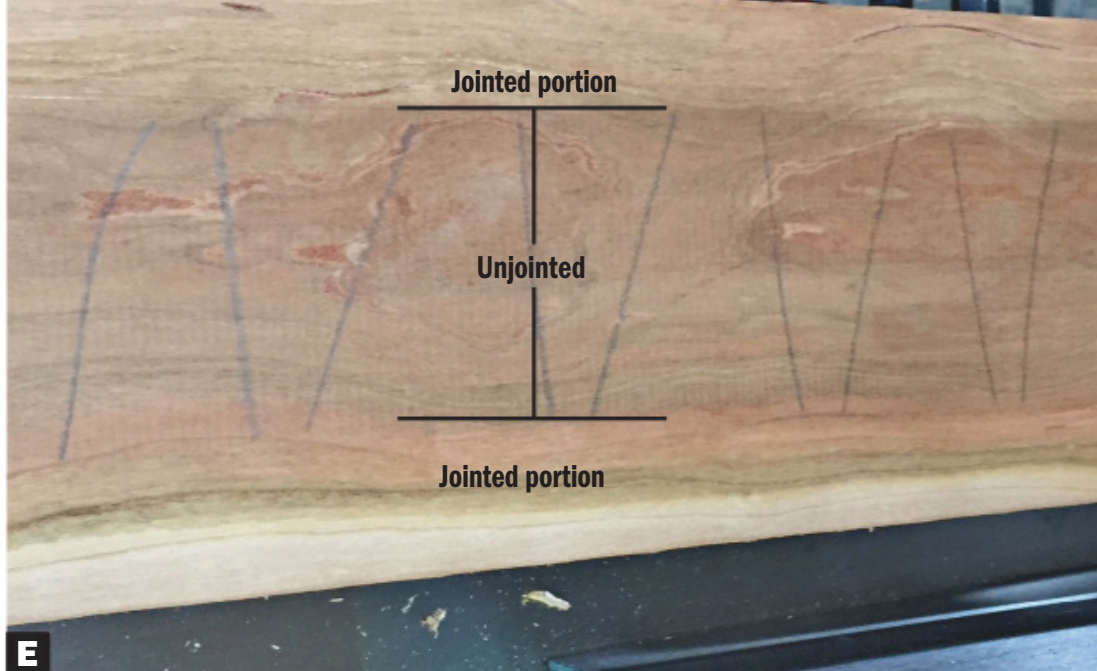
Coating the table and fence faces with a bit of paste wax (nothing with silicone, as that causes finishing problems later) allows boards to glide easily while being jointed.

► Retrieve or download your jointer's owners manual. This provides the information specific to your jointer.



D

Resting this cupped board on its outside edges stabilizes the board, preventing it from rocking during the cut.



E

The first pass removed the pencil marks along the outside edges. Subsequent passes continue flattening the face until the marks disappear.

Proper jointing technique

The first step in preparing a rough board is reading the grain direction on the edge. Feeding stock with the grain running “downhill” results in a smooth surface with little, if any, tear-out [Drawing]. I mark that direction on the board. If the board face is cupped, or bowed from end to end, place the concave side down to keep the outside edges or ends in contact with the tables [Photo D].

Turn on the jointer and, using push pads or a pushstick—never your hands—apply light downward pressure against the infeed table as the leading edge of your stock crosses the cutterhead. Transfer downward pressure to the outfeed table only after about 6-8" of the piece passes the cutterhead [Opening photo]. This prevents rocking the leading and trailing edges which would ruin a smooth, flat face. Take care not to press the board flat as you work; it will only spring back after completing the cut. To know when you’ve completely flattened a face, run a squiggly pencil mark on its surface. Make

► For boards longer than the infeed table, and bowed end to end, place the concave face up and joint from the middle toward the ends.

► Get a free jointer pushstick plan.
woodmagazine.com/jpushstick

passes until the pencil mark disappears [Photo E].

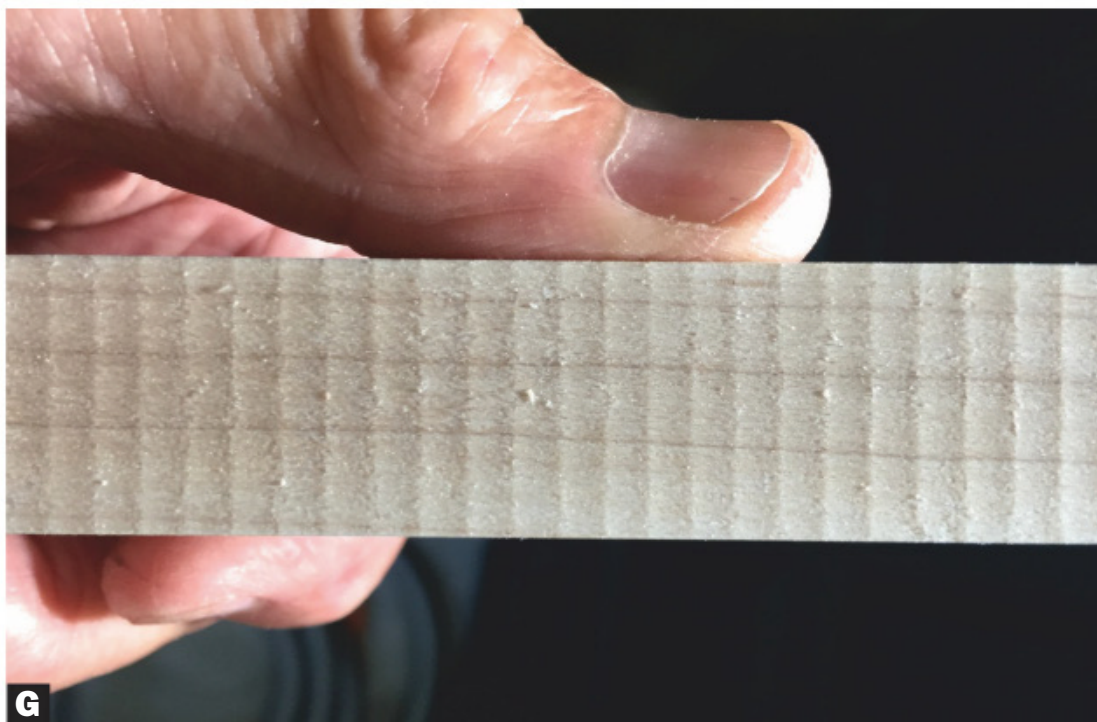
Twisted stock requires a patient approach. Often, you must press on diagonally opposite corners and prevent the board from rocking during the cut. With each pass, you create more flat surface along each corner, creating a more stable “platform.” Continue nibbling away these corners, working closer and closer to the center of the board. Exceptionally cupped, bowed, or twisted stock requires many passes to flatten, reducing the overall thickness of the stock, which may make it too thin for its intended use.

To joint an edge square to its now-flat face, place the freshly jointed face firmly against the fence [Photo F]. Use the same downward pressure technique as you did when jointing the face. Make enough passes to remove a pencil line marked on that edge. Watch your feed speed—it affects the final result [Photo G].



F

When jointing an edge square to a face, concentrate both on keeping the face against the fence, and on feeding the edge across the tables.



G

Feeding too fast leaves a “scalloped” edge. Too slow may burn harder or more resinous woods. Practice makes perfect here.



H Tilting the fence toward the tables captures the workpiece, providing better cuts. The jointer helps you create a chamfer cleaner than any made with a tablesaw.



J Position the fence to set the *depth* of the rabbet. Lowering the infeed table between passes increases the *width* of the rabbet.

Same jointer, more tricks

► Never joint end grain. It tears out excessively.

There are a couple more operations that the jointer does well. For example, you can chamfer an edge at any angle by tilting the fence [Photos H, I]. Each pass removes little material, so it takes multiple passes.

Many jointers allow for cutting rabbets far smoother than those done with a dado blade in a tablesaw. To cut a rabbet, remove

the blade guard, and adjust the fence so the distance between its face and the edge of the blades equals the *depth* of the rabbet [Photo J]. (You'll stand the workpiece on edge so the fence steadies it.) Now lower the infeed table to take no more than a 1/8"-deep cut. Make a pass, lower the table, and repeat until you reach the desired width. 🌲



One Strong Son-of-a-Beech

BauBuche differs from other laminated veneer lumber (LVL) because it's made from 3mm layers of beech, a plentiful hardwood grown in sustainable European forests. (By comparison, Baltic birch plywood plies are 1.5mm thick.) BauBuche starts as stacks of rotary-peeled veneers that are then bonded together with phenolic resin adhesive that's visible when panels are cut at an angle. Although it's super-strong, BauBuche can be worked and finished the same as any hardwood. That strength comes at a price, though. A panel measuring 35×680×4000mm (1.38×26.77×157.48") runs about \$270 plus shipping compared to \$115 for two sheets of birch plywood. Visit pollmeier.com for more information about BauBuche.

Rock-Solid Lathe Stand

Do your lathe a good turn with this vibration-absorbing base that won't gouge your budget.

The moment you spin your first slightly-off-center bowl blank or rough out a heavy maple table leg, you'll appreciate the rugged mass of this stand's thick parts.

We built ours from 35mm-thick BauBuche, a wood product new to the US (*previous page*). If you can find it, we invite you to try it. If not, the drawings and **Materials List** show economical laminated $\frac{3}{4}$ " birch plywood.

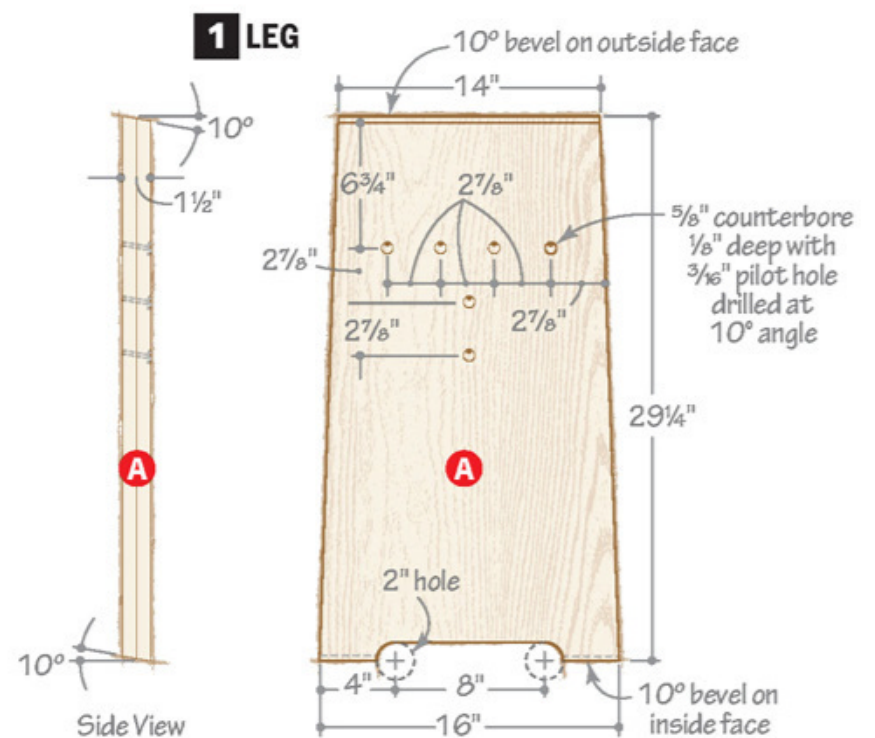
Build the base

Because of the size and weight of the base parts, cut the bevels and tapers using a track saw or with a circular saw and straightedge.

1 Laminate 16×31" plywood panels for the legs (A) [**Materials List**]. Bevel the ends to length [**Drawing 1**], then taper the sides.

2 Drill and jigsaw the cutouts on each leg (A). Drill the counterbored pilot holes at a 10° angle, then finish-sand the legs and set them aside.

► Turn a circular saw into a precision tool. woodmagazine.com/circsaw



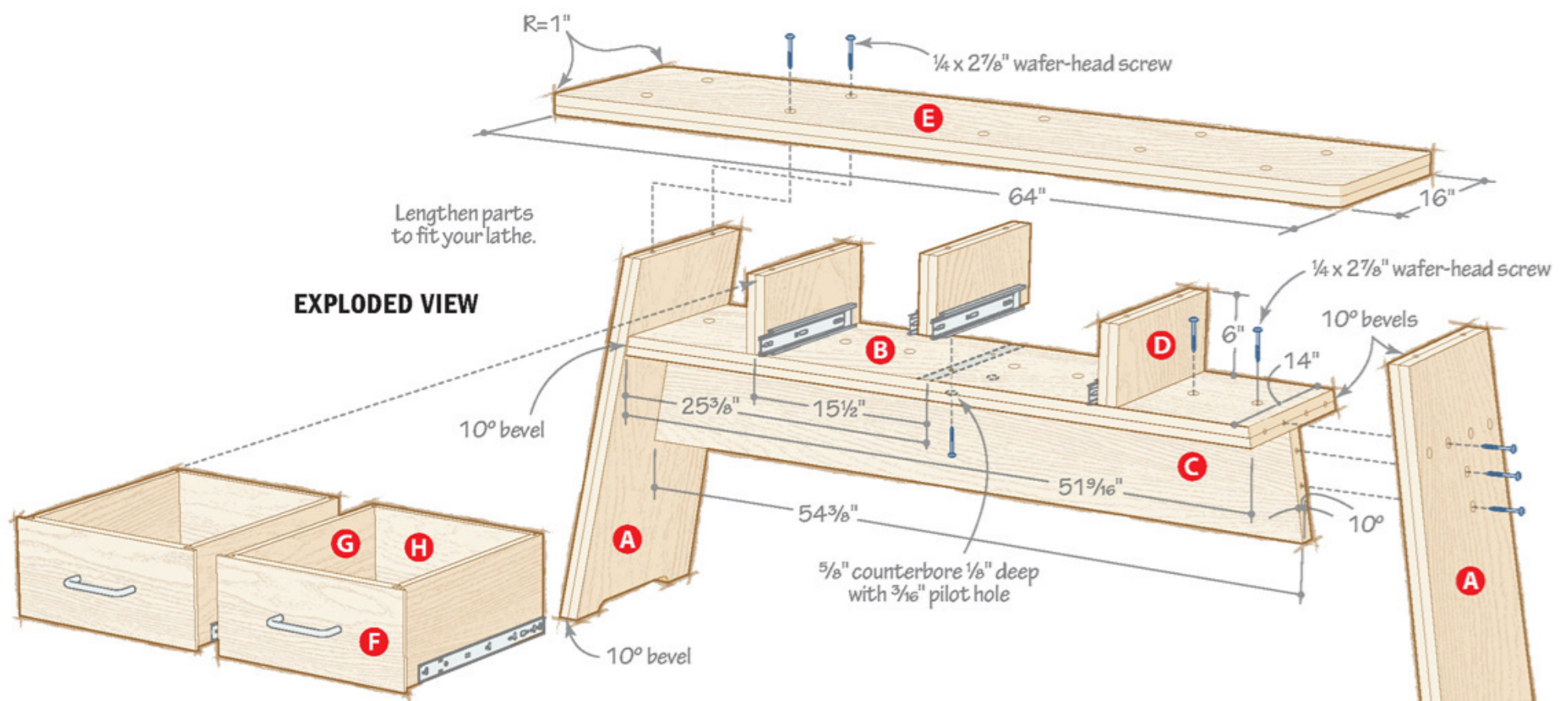
DIMENSIONS:
64" W × 16" D × 30 3/8" H

Approximate materials cost:

\$210

using laminated plywood

Two drawers hold chucks and accessories.



3 Laminate and bevel-cut the shelf (B) to length. Drill counterbored pilot holes from the top and below [Exploded View].

4 Laminate 8x59" plywood panels for the stretcher (C). Angle-cut the ends so that the top edge fits the underside of the shelf (B). Glue and screw [Sources] the stretcher centered on the underside of the shelf with the angles and bevels flush.

5 Make a 14x19" laminated blank and cut the drawer dividers (D) to size from it. Glue and screw them to the shelf (B).

6 Laminate and cut the top (E) to size and drill the counterbored pilot holes [Exploded View]. If you want to mount your lathe on the top, then mark and drill mounting hole locations. (Adjust the lathe position to avoid holes above a divider.) For mounting holes directly above a drawer, add a counterbore to recess the nut and washer.

7 Place the top (E) upside down on a work-surface. Center the shelf assembly (B-D) on the top. Clamp the legs (A) to the shelf assembly with the ends of the legs and dividers (D) atop the pilot holes [Exploded View]. Glue and clamp the assembly [Photo A]. Extend the leg pilot holes into the shelf (B) and stretcher (C), and drive the screws.

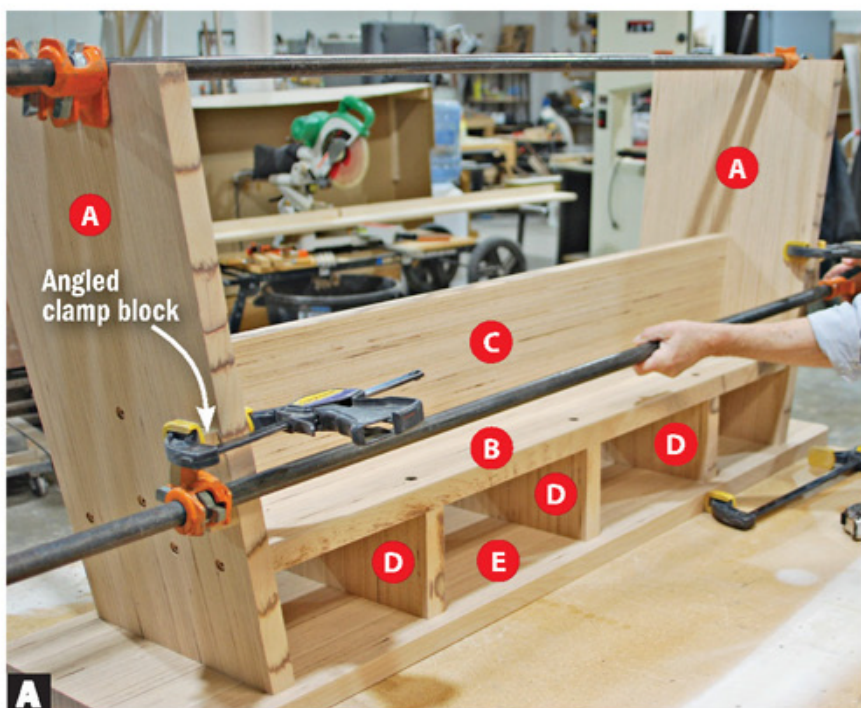
8 Radius the corners of the top (E) [Exploded View] and sand smooth. Glue and screw the base assembly (A-D) to the top.

Add a pair of drawers

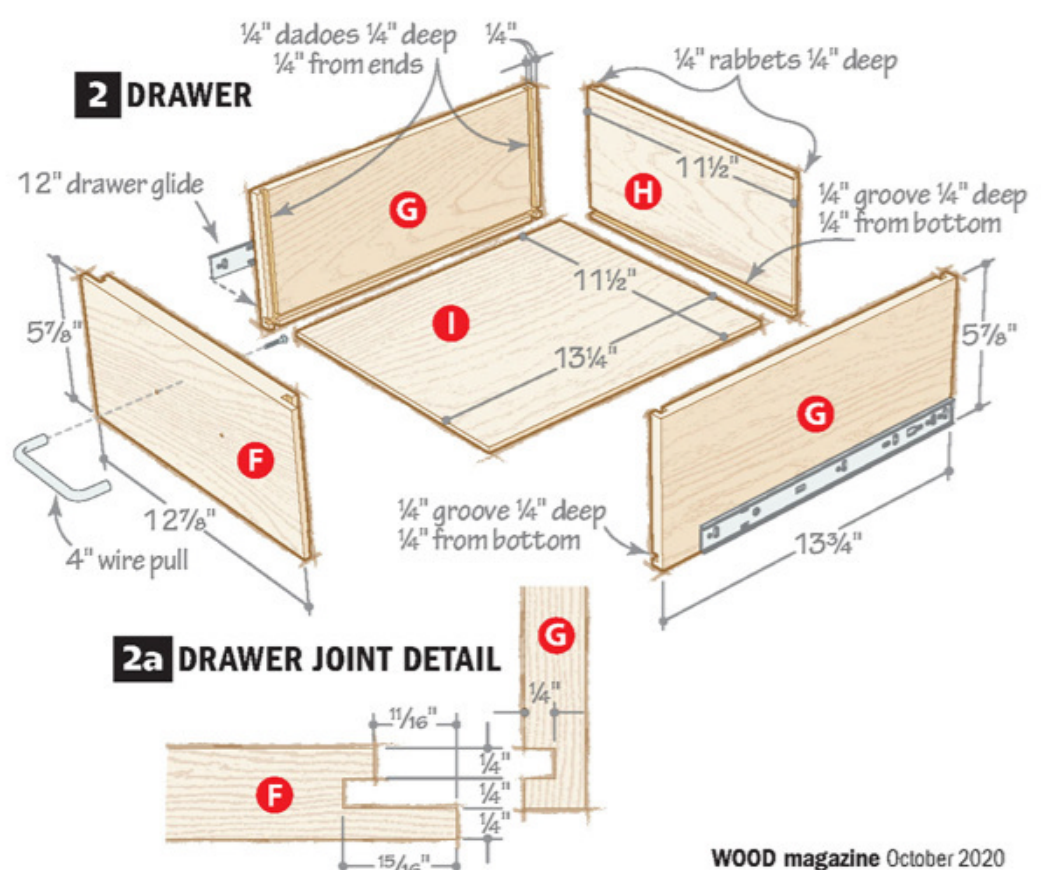
1 Cut the drawer parts (F-H) 1/4" over-width. Cut the drawer joints [Skill Builder].

2 Trim the drawer parts (F-H) to width and drill drawer-pull [Sources] mounting holes in the fronts (F). Dry-assemble the drawers and cut the bottoms (I) to fit.

Tip! Sawing the drawer parts 1/4" wider than listed lets you remove tear-out from cutting the joints by trimming parts to width along both edges.



A Building the base assembly (A-D) on the top (E) ensures flush leg (A) and drawer divider (D) ends. Angled blocks against the legs help stabilize the clamps.



SKILL BUILDER

Cut lock-rabbit joints quick as a bunny

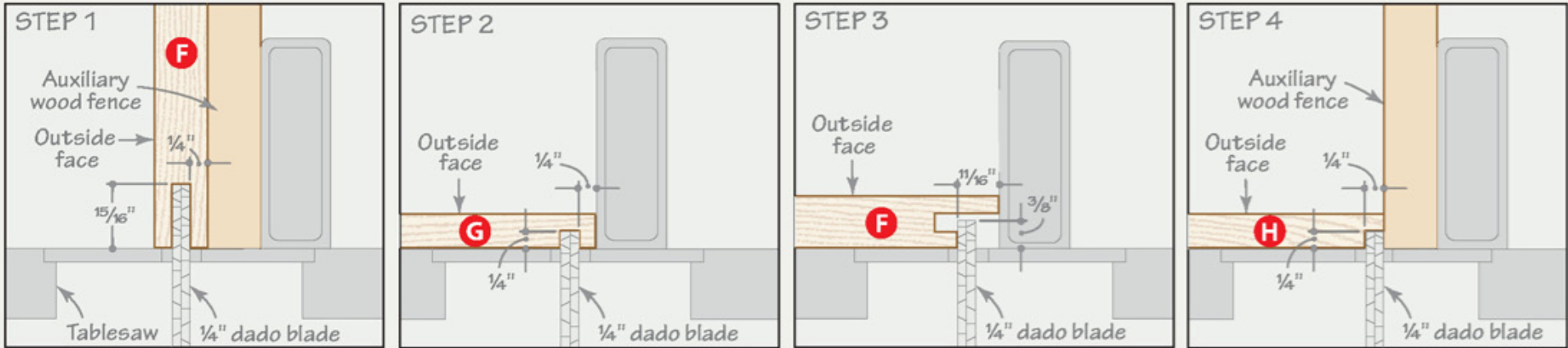
Drawers made using a lock-rabbit joint combine rugged mechanical strength behind an attractive face—perfect for storing heavy lathe chucks and accessories. And you can make them in four easy steps.

1. Mount a $\frac{1}{4}$ " dado blade and set the height to $\frac{15}{16}$ ". Use a rip-fence saddle jig (see woodmagazine.com/saddlejig) to support the workpiece. Back up the cuts and saw the ends of the drawer fronts (F).

2. Set the dado blade to $\frac{1}{4}$ " high and, without moving the fence, dado the ends of the drawer sides (G). Use the same setup to cut a groove for the bottom (I) in all pieces.

3. Adjust the fence to $\frac{11}{16}$ " away from the far side of the dado blade. With the outside face up, cut the ends of the drawer faces (F).

4. Attach an auxiliary fence and position it against the dado blade. Rabbet the ends of the drawer backs (H).



Tip! Nickels make good $\frac{1}{16}$ "-thick spacers in a pinch.

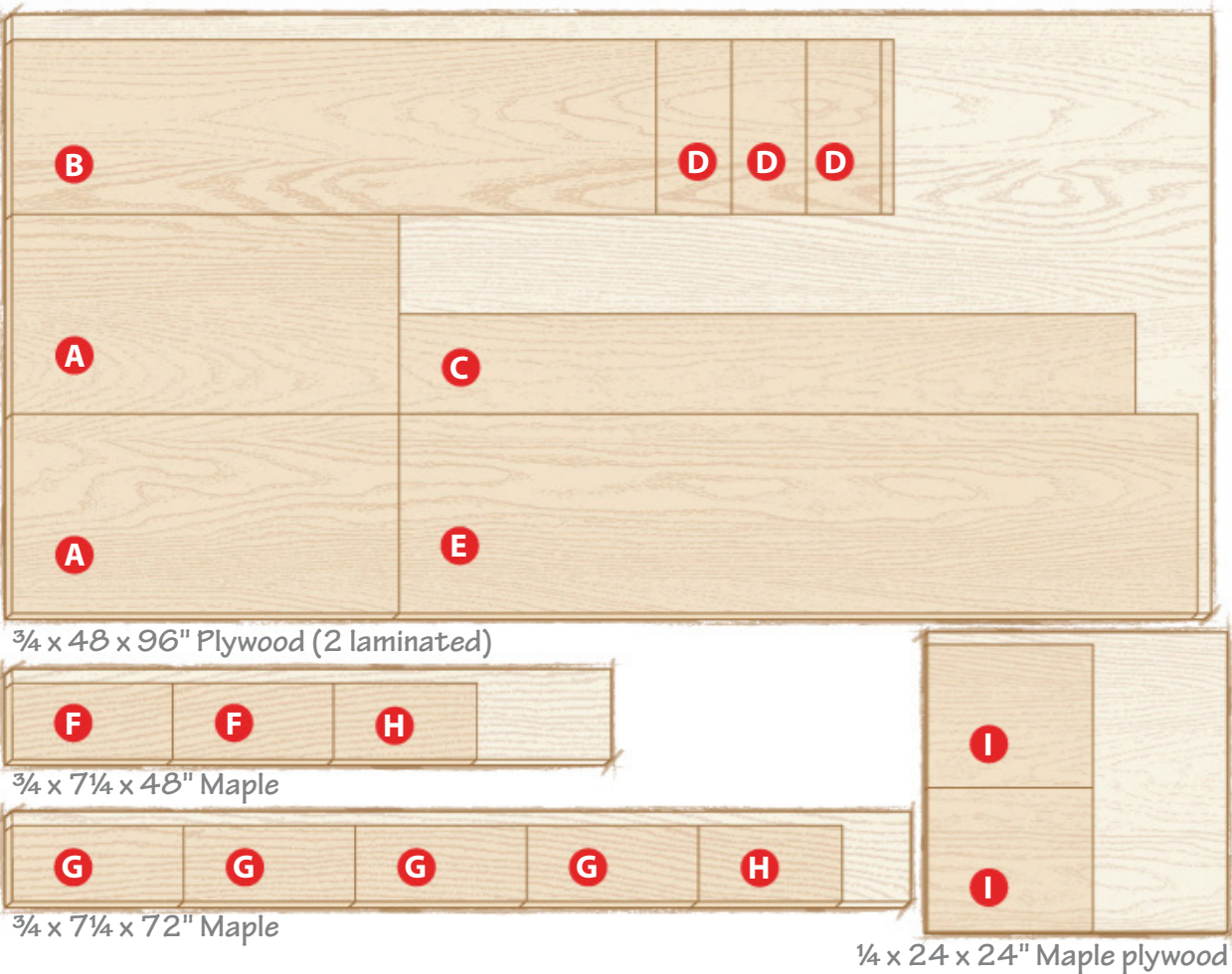
3 Glue and clamp the drawer parts (F–I). Finish sand and apply three coats of satin polyurethane to the drawers and base. Screw an inside half of a drawer slide along the bottom edge of each drawer side (G).

4 To center the drawer in the opening, place a $\frac{1}{16}$ "-thick spacer on the shelf (B) beside a divider (D) and rest the other half of the slide on the spacer. Screw the slide to the divider $\frac{3}{4}$ " from the front edge of the divider. Repeat for the remaining slides.

5 Fasten the lathe to the top (E) with hex bolts, nuts, and flat washers suited to the bed of your lathe. Screw the pulls to the drawers, then insert the drawers. Spin up your lathe and enjoy knowing the only thing that's going to move is your workpiece. 🌳

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

Cutting Diagram



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* legs	1 $\frac{7}{16}$ "	16"	29 $\frac{1}{4}$ "	LP	2
B shelf	1 $\frac{7}{16}$ "	14"	51 $\frac{1}{16}$ "	LP	1
C stretcher	1 $\frac{7}{16}$ "	8"	54 $\frac{3}{8}$ "	LP	1
D dividers	1 $\frac{7}{16}$ "	14"	6"	LP	3
E top	1 $\frac{7}{16}$ "	16"	64"	LP	1
F drawer fronts	$\frac{3}{4}$ "	5 $\frac{7}{8}$ "	12 $\frac{7}{8}$ "	M	2
G drawer sides	$\frac{1}{2}$ "	5 $\frac{7}{8}$ "	13 $\frac{3}{4}$ "	M	4
H drawer backs	$\frac{1}{2}$ "	5 $\frac{7}{8}$ "	11 $\frac{1}{2}$ "	M	2
I drawer bottoms	$\frac{1}{4}$ "	11 $\frac{1}{2}$ "	13 $\frac{3}{4}$ "	MP	2

*Parts initially cut oversize. See the instructions.

Materials key: LP-laminated plywood, M-maple, MP-maple plywood.

Supplies: Hex bolts, nuts, and flat washers to fit your lathe.

Blade: Dado set.

Sources: Power Pro $\frac{1}{4}$ x $2\frac{7}{8}$ " wafer-head structural wood screws no. 952223, \$0.88 each, Lowe's stores or lowes.com or LumberTite $\frac{1}{4}$ x $2\frac{7}{8}$ " wafer-head screws no. 48116, \$25.73 for 50, amazon.com. Torino 4" satin-nickel wire pulls (2), no. 860069, \$4.09; 12" full-extension side-mount drawer slides (2 pairs), \$9.99, no. 160231, Woodcraft, 800-225-1153, woodcraft.com.

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Precision Woodworking Squares

- Guaranteed accurate to $\pm 0.0085^\circ$ for life.
- One-piece blade machined to exacting tolerances.
- Wall-mountable storage case.
- Available in inch or metric.

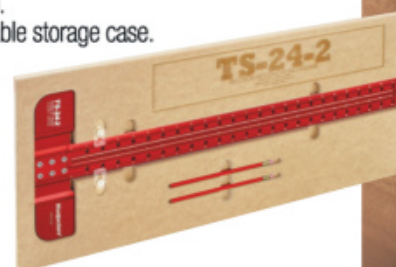


12" 1281 Square....\$119.99

12" 1282SS Stainless Steel Square.....\$159.99

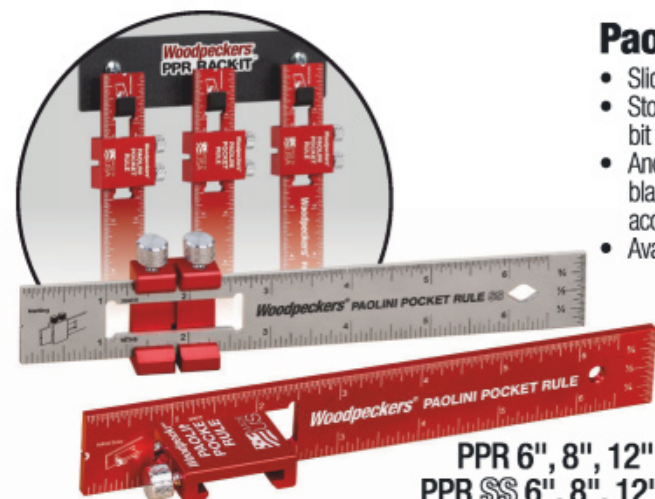
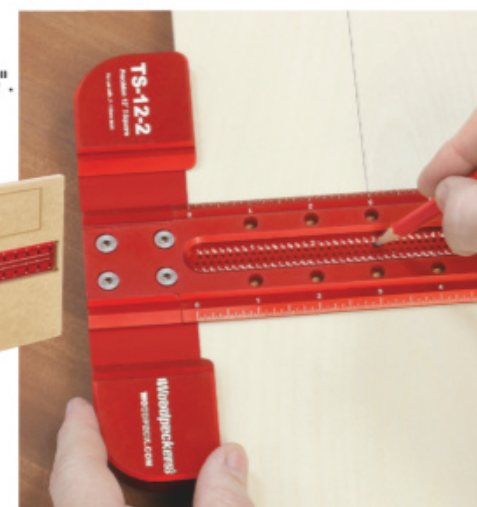
Precision T-Squares

- Precisely spaced 1mm holes machined every 1/16".
- Laser engraved scale accurate to ± 0.004 ".
- Outer edges machined to a 30° bevel for easy reading.
- Wall-mountable storage case.



12" TS-12 T-Square....\$94.99

24" TS-24 T-Square.....\$129.99



Paolini Pocket Rules

- Sliding stop simplifies repetitive marking.
- Stop doubles as stand to set router bit & saw blade height.
- Anodized aluminum or stainless steel blade with laser engraved scale accurate to ± 0.004 ".
- Available in inch, metric or combination.

PPR 6", 8", 12" Set & Rack-It....\$124.99

PPR SS 6", 8", 12" Set & Rack-It....\$149.99

Saddle T-Squares

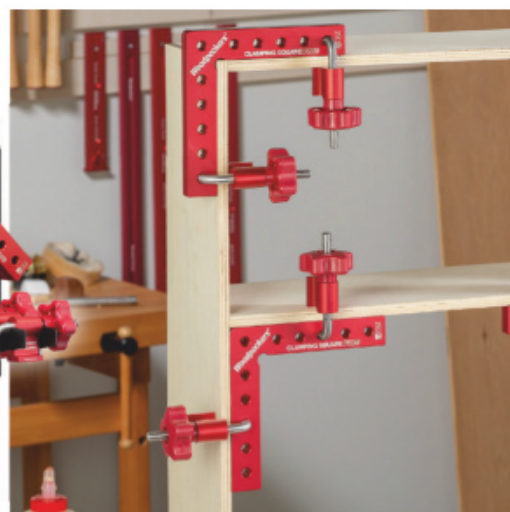
- Scribing holes on 1/32" spacing.
- One-piece construction with 3/4" deep wrap-around marking.
- Saddle-T Rack-It holds all 4 sizes of Saddle T-Squares.
- Available in inch or metric.



Saddle T-Square Set & Rack-It....\$299.99

Clamping Squares PLUS & CSP Clamps

- Positions stock at right angles for joinery & fastening.
- Precision milled for both inside & outside alignment.
- Works with any clamp.
- CSP Clamps add speed & convenience.



Clamping Squares PLUS Rack-It Kit....\$239.99

Clamp Rack-It™

- Holds up to 6 heavy-duty parallel jaw clamps.
- Installs on any stud or solid wall surface.
- Simple installation with (2) lag bolts (included).



Clamp Rack-It 4-Pack....\$119.96



Clamps not included.



ULTRA-SHEAR™

by Woodpeckers®

Parting Tool-Ci

- Creates crisp, clean, narrow parting cuts.
- Sharpest, longest lasting carbide inserts on the market.
- 3/32" cutting width saves stock & minimizes resistance.
- Two insert profiles:
 - Fluted cutter installed
 - Square cutter optional

Parting Tool-Ci....\$79.99

Woodturning Tools

- Eliminate the drudgery of sharpening with nano-grain carbide inserts mounted to hardened alloy steel shafts.
- Sharpest, longest lasting carbide inserts on the market.
- Exclusive shaft design delivers both fast shaping & fine finishing.
- Square, round & detail tools available individually or as a set.

Mid-Size Woodturning Tool Set\$269.99



Offset Base System

Made for Festool Domino

- Attaches to both Festool Domino DF-500 & DF-700 XL.
- Wider, deeper referencing surface improves stability.
- Precision-milled spacers center mortise on standard dimensions.
- Outrigger carries stops for accurate repeat spacing.



Offset Base System
with Systainer Case....\$429.99

Domino not included.

Parallel Guide System

Made for Festool Track Saws

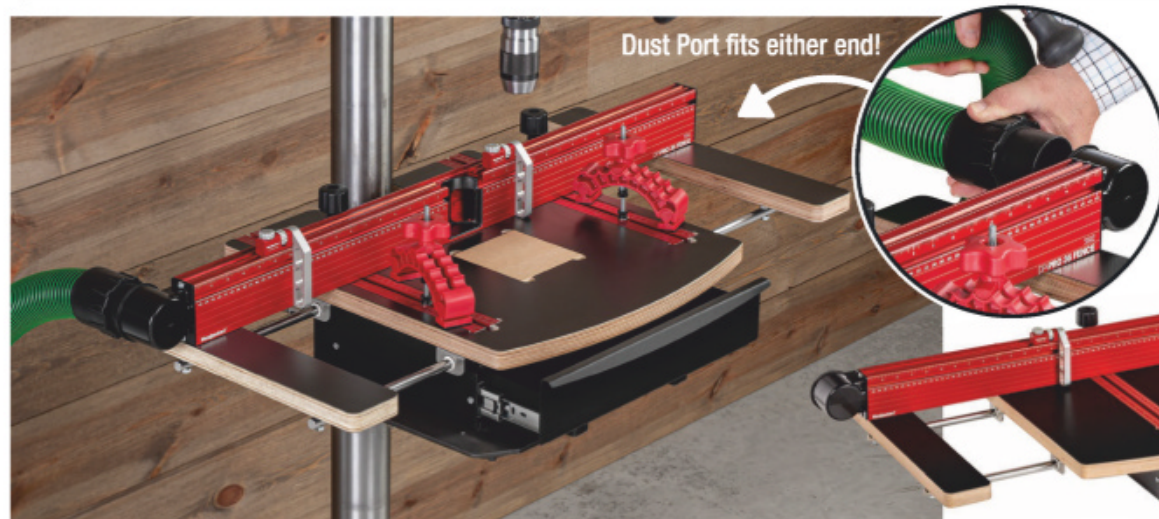
- Makes repetitive, parallel cuts with table saw accuracy.
- Maximum rip capacity of 52".
- Narrow stock guides deliver accurate results down to 1/4".



Parallel Guide System
with Systainer Case....\$429.99

Saw not included.

Dust Port fits either end!



DP-PRO Drill Press Table System

- DP-PRO Fence integrates dust collection & delivers accuracy.
- Micro-adjustable DP-PRO Flip Stops.
- DP-PRO Drawer Base simplifies installation on any drill press.
- DP-PRO Tables are full 1" thick with laminate top & bottom.
- Extension Wings for long material support.
- Drawer Base and Fence compatible with all drill press tables.

NEW
TOOL

DP-PRO Master System 48/48.....\$439.99
DP-PRO Master System 48/36.....\$419.99
DP-PRO Master System 36/36.....\$389.99
DP-PRO Master System 36/24.....\$369.99

Slab Flattening Mill PRO

- Wider, thicker, thinner & cleaner than the original.
- Router carriage now has adjustable height & built-in dust ports.
- Standard width of 48-1/2" expands to 62" with optional extension.
- Standard length of 59" expands to 132" with optional extension.
- Flatten stock as thin as 3/4" & up to 3-7/16" without shimming.
- Straight-line edges on stock up to 2" thick.

Rail can be positioned
for narrower slabs or
all the way to the edge!



NEW
TOOL

Basic Slab Flattening Mill PRO.....\$899.99
Extended Slab Flattening Mill PRO.....\$1149.99

Router, plywood base & connection hoses not included.

ULTRA-SHEAR™ by Woodpeckers®

Pen Mill-Ci

- Trims pen blanks square & flush with insert.
- Razor-sharp carbide inserts hold up to exotic materials.
- 12 Pilot Reamers cover almost every pen kit made.
- Cleanest cutting, longest lasting pen mill on the market.

Pen Mill-Ci 13-Pc Set....\$169.99

Pen Mandrel System

- Collets on both ends perfectly center & lock the mandrel shaft.
- Tailstock can adjust to exactly the length of your pen project.
- Fits all #2 morse taper head & tail stocks.
- Drive & live centers precision turned from stainless steel.
- Works with almost all pen bushings.
- Matching Precision Pen Bushings available for most popular pens.

Pen Mandrel System\$139.99



Farmhouse Table

Built to handle the heaviest bounty of any holiday feast, this set looks great every day.



D I M E N S I O N S :
Table: 90" W x 40" D x 30¹/₄" H
Bench: 72" W x 12" D x 18¹/₄" H

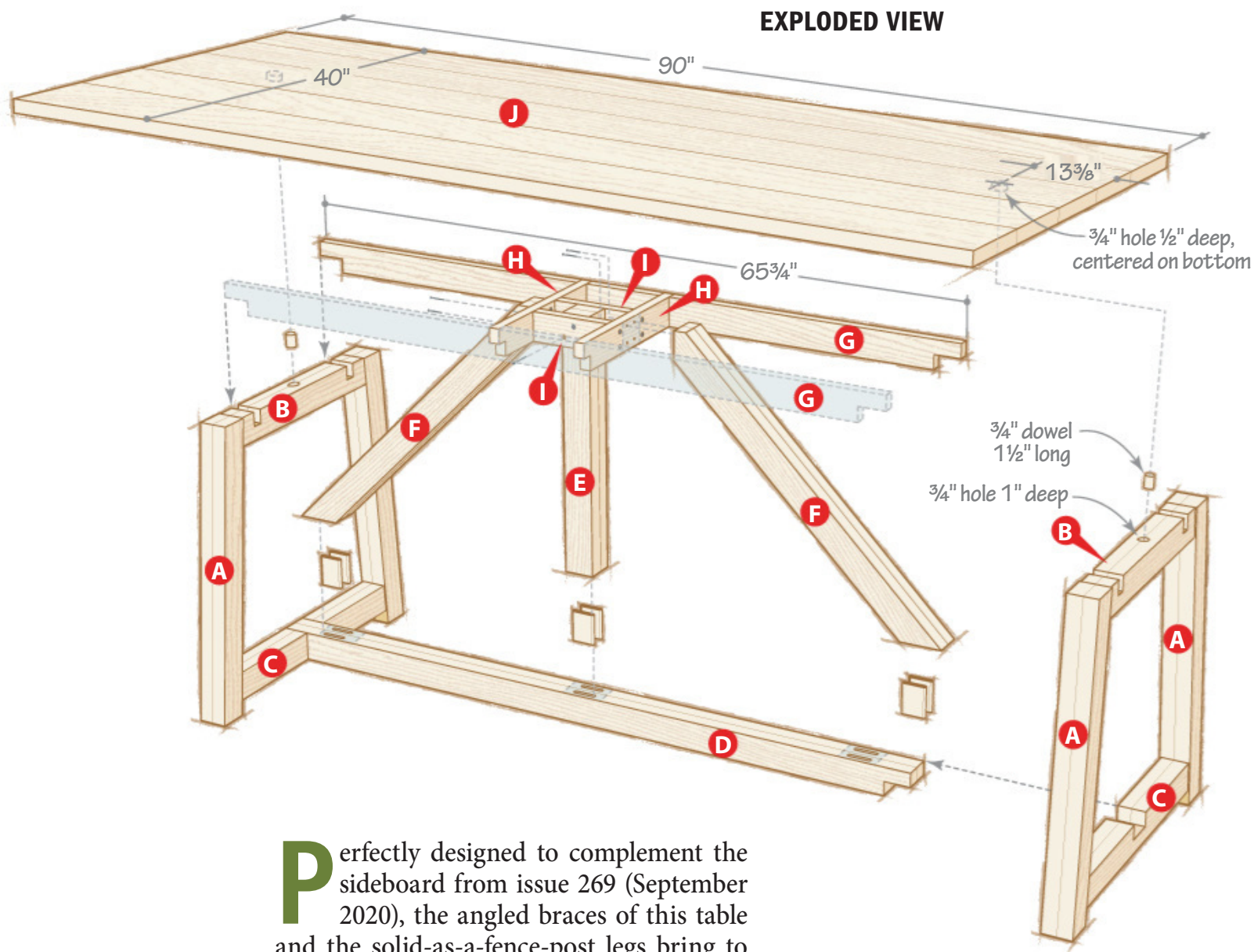
Approximate materials cost:

\$1125

2
Matching benches share table construction techniques



► Find plans for the rolling-door sideboard by aiming your smartphone's camera at the above code, or visit woodmagazine.com/sideboard.



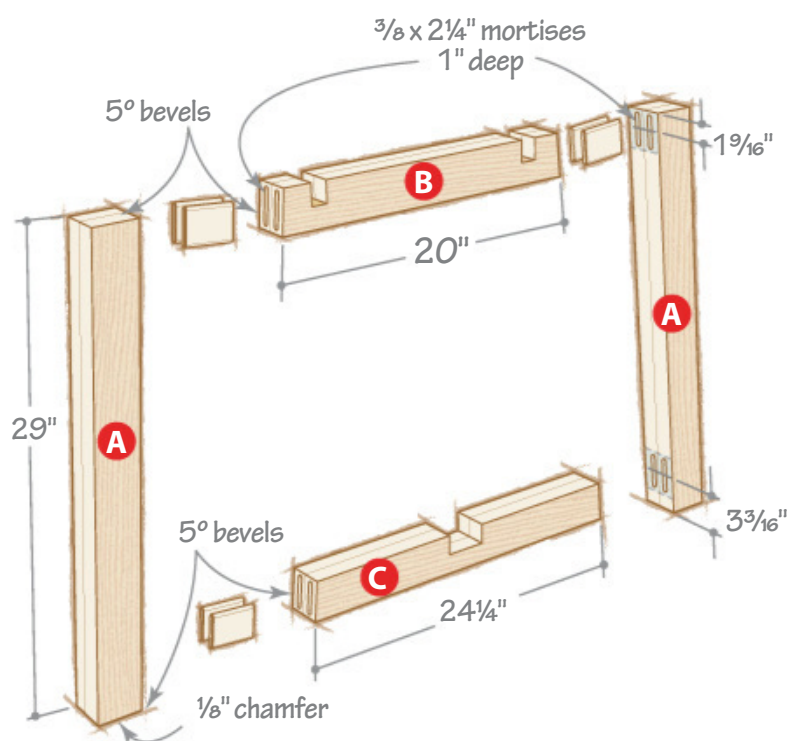
Perfectly designed to complement the sideboard from issue 269 (September 2020), the angled braces of this table and the solid-as-a-fence-post legs bring to mind the post-and-beam construction found in vintage barns. But rather than complicated angled mortises and tenons, we used a simple jig to help rout pairs of mortises in the braces and stretchers that accept loose tenons. Solid half-lap joints tie the leg assemblies together, making the table exceptionally sturdy. We used white oak for our

Tip! Tenons $\frac{1}{16}$ " narrower than the mortise lengths provide a bit of wiggle room during assembly.

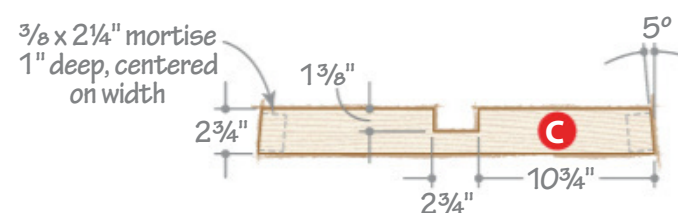
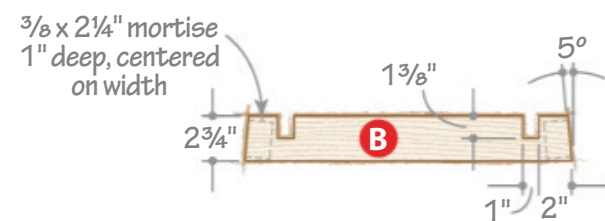
table, choosing to leave in knots and imperfections to add character.

Begin with leg assemblies

1 Laminate stock for the legs (A) and rails (B, C). Cut them to length, beveling the ends [Drawing 1]. Notch the rails.

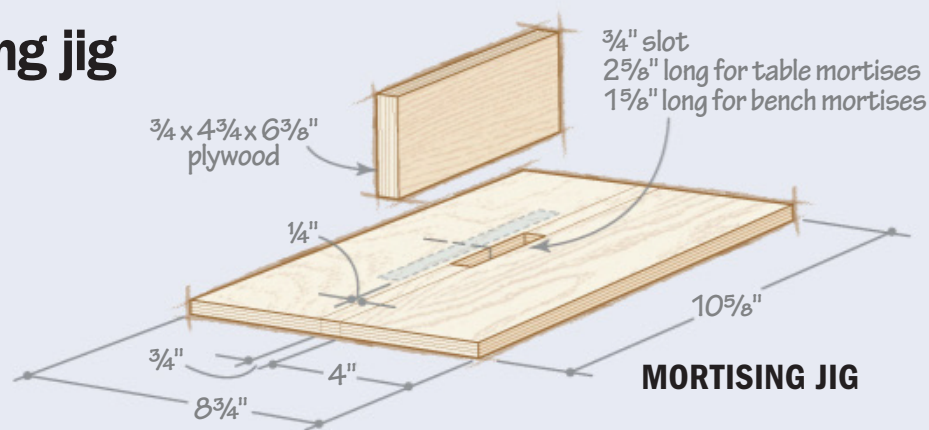


1 TABLE LEG ASSEMBLY



Strong joinery starts with a mortising jig

You'll need two mortising jigs for this project: one for the table and one for the bench. Construction is similar; only the length of the slot changes. Size the slot so a $\frac{3}{4}$ " guide bushing slides easily without slop. Mark the centerline of the slot length on the inside edges of the slot to accurately position the jig during use. To plow the mortises, use a $\frac{3}{8}$ " spiral upcut bit in your router.



Tip! Throughout this build, dry-fit loose-tenon joints before gluing. If needed, shave down the tenons to get tight joints.

2 Build the mortising jigs [Sidebar, above]. Mark the centerline of each mortise length on the legs and rails [Drawing 1]. Rout the mortises [Photo A].

3 For the loose tenons, cut two $\frac{3}{8} \times 2\frac{3}{16} \times 28$ " blanks. Rout $\frac{3}{16}$ " round-overs the length of all four corners, then cut the blanks into $1\frac{1}{16}$ "-long tenons.

4 Cut four clamping blocks with a 5° taper on one face [Photo B]. Glue loose tenons in one end of a lower rail, then glue this assembly to a leg. Repeat with the upper rail, add

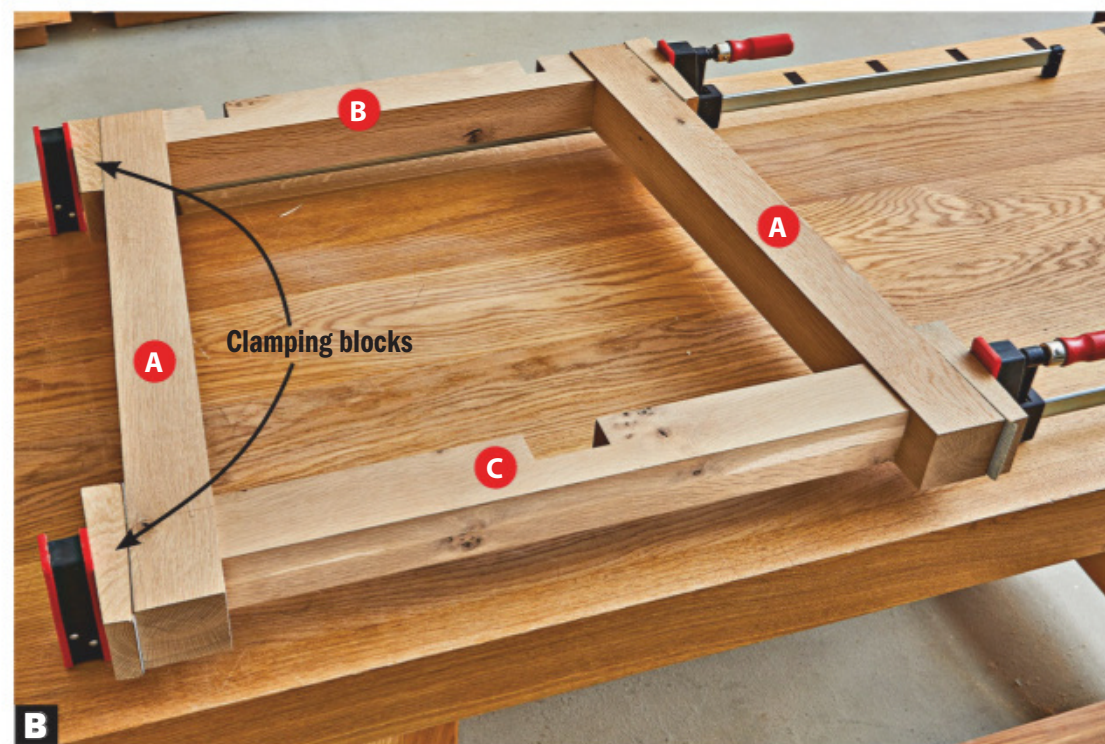
tenons and the other leg, and clamp. After the glue dries, finish-sand the assembly, and chamfer the leg bottoms [Drawing 1].

5 Laminate blanks for the lower stretcher (D), post (E), and braces (F). While the glue dries, cut the upper stretchers (G) and brace rails (H) to size. Cut parts D, E, and F to size, then angle-cut the ends of F and notch the ends of D, G, and H, and the middle of G [Drawing 2].

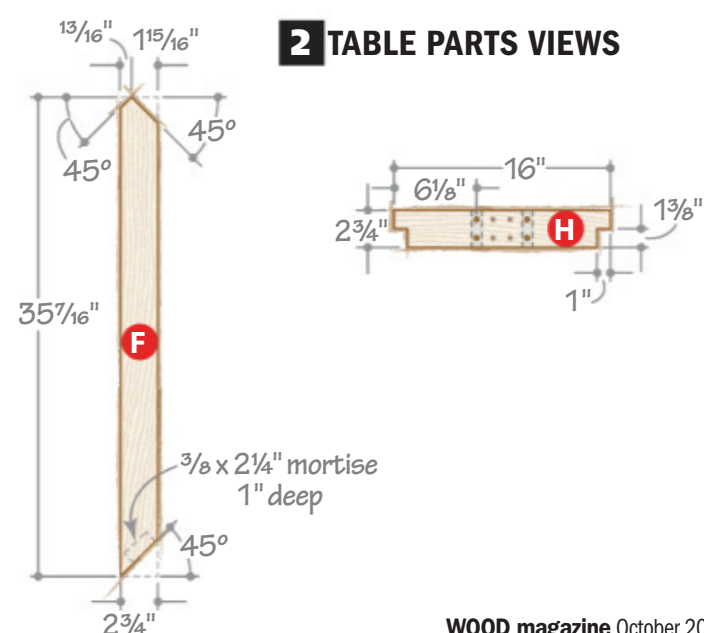
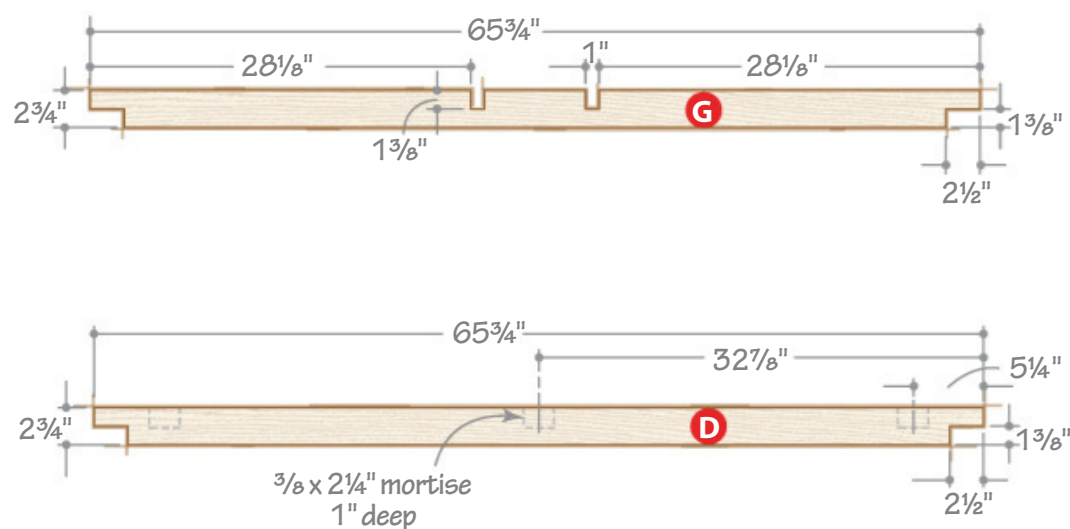
6 Rout the mortises in the lower stretcher (D) and post (E) [Drawing 2, Exploded View].



A When routing mortises in the rails (B, C), place a $\frac{1}{8}$ "-thick spacer between the jig fence and rail. Rout mortises in the legs without the spacer.

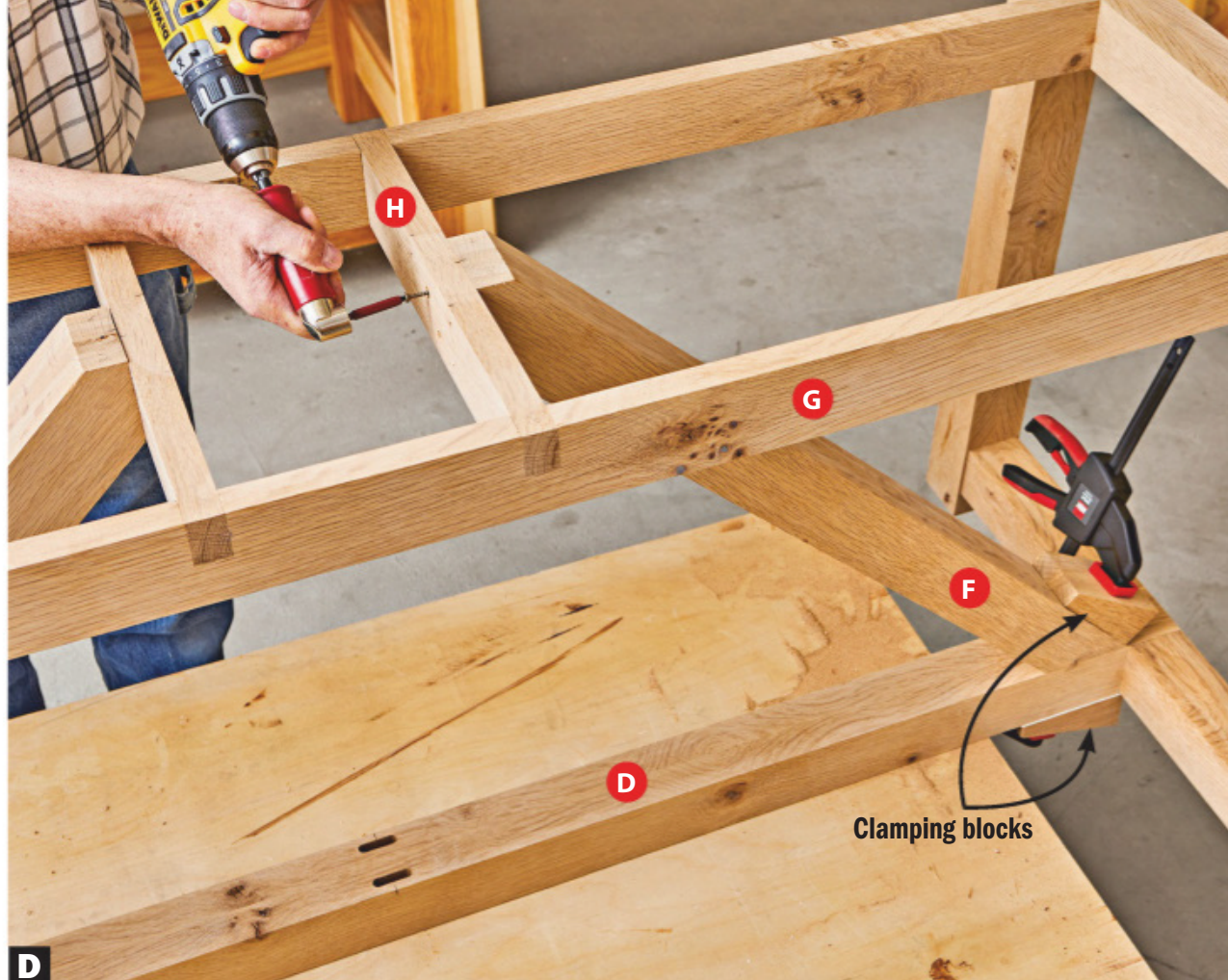


B Applying sandpaper to the faces of the clamping blocks prevents them from slipping during clamp-up.





C Place a brace (F) on the lower stretcher (D) and against the brace rail (H). Align the end of the brace with the inside edge of the lower end rail (C). Mark the mortise location on the brace.



D Angled blocks on opposing faces of the lower stretcher (D) and brace (F) provide clamping surfaces. Use a right-angle attachment or compact impact driver to drive the screws.

Start assembly

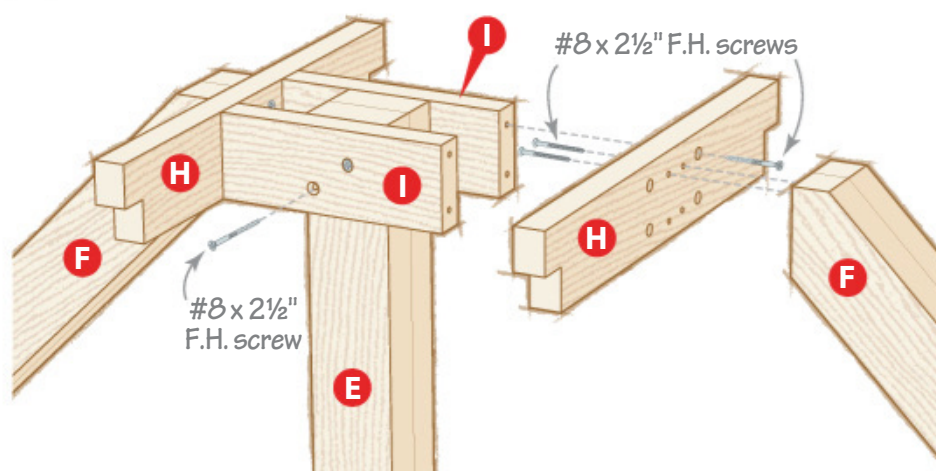
1 Join the end assemblies with the lower and upper stretchers (D, G) [Exploded View]. Drill holes in the brace rails (H) [Drawing 2] and glue the rails to the upper stretchers.

2 Transfer the centerline for the end mortises in the lower stretcher (D) to an edge of the stretcher. Then, transfer these marks onto the braces (F) [Photo C]. Rout the mortises in the braces.

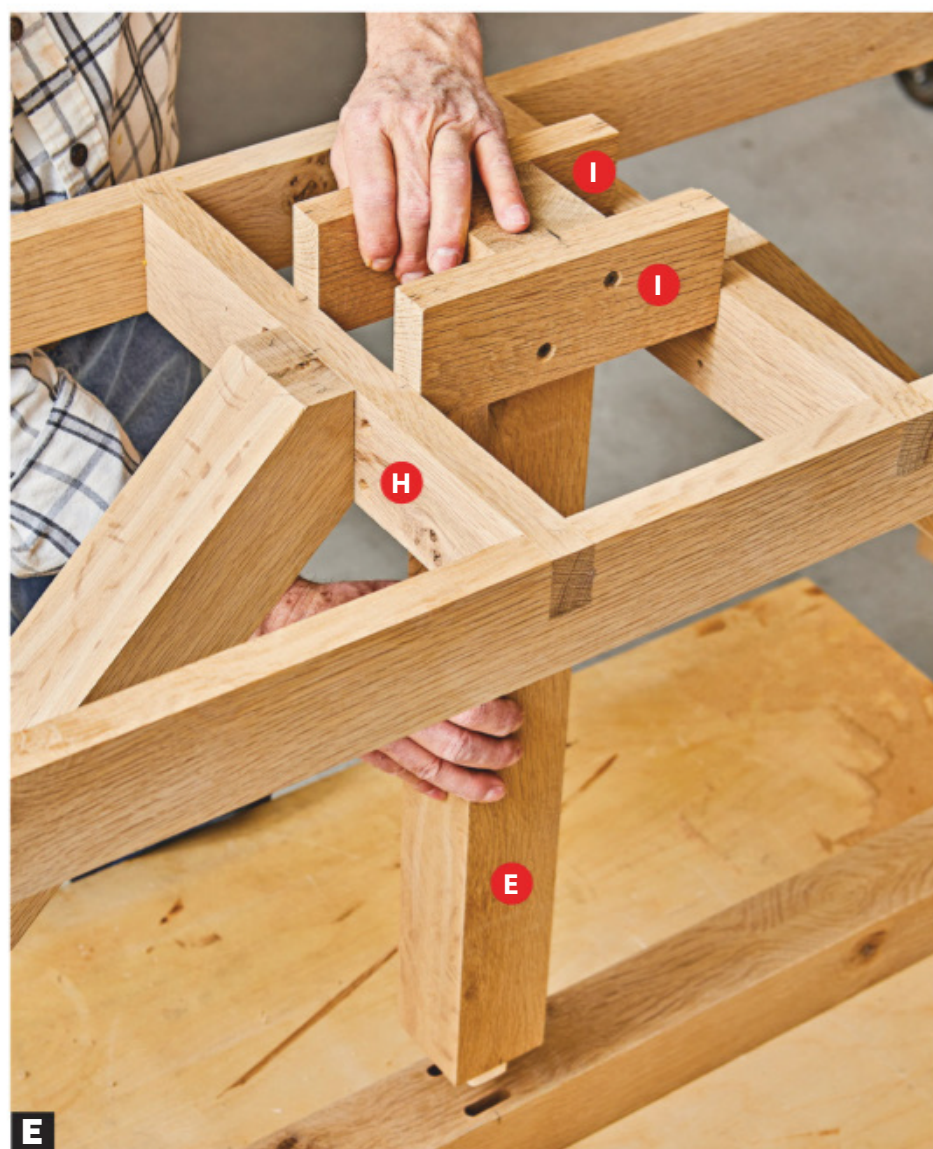
3 Glue and clamp the braces (F) in place [Photo D]. Drive screws through the brace rails (H) [Drawing 3].

4 Cut the post braces (I) to fit between the brace rails (H). Dry-fit the post (E) plumb between the brace rails and screw the post braces to the post [Drawing 3]. Glue this assembly in place [Photo E]. Drive screws through the brace rails into the post braces.

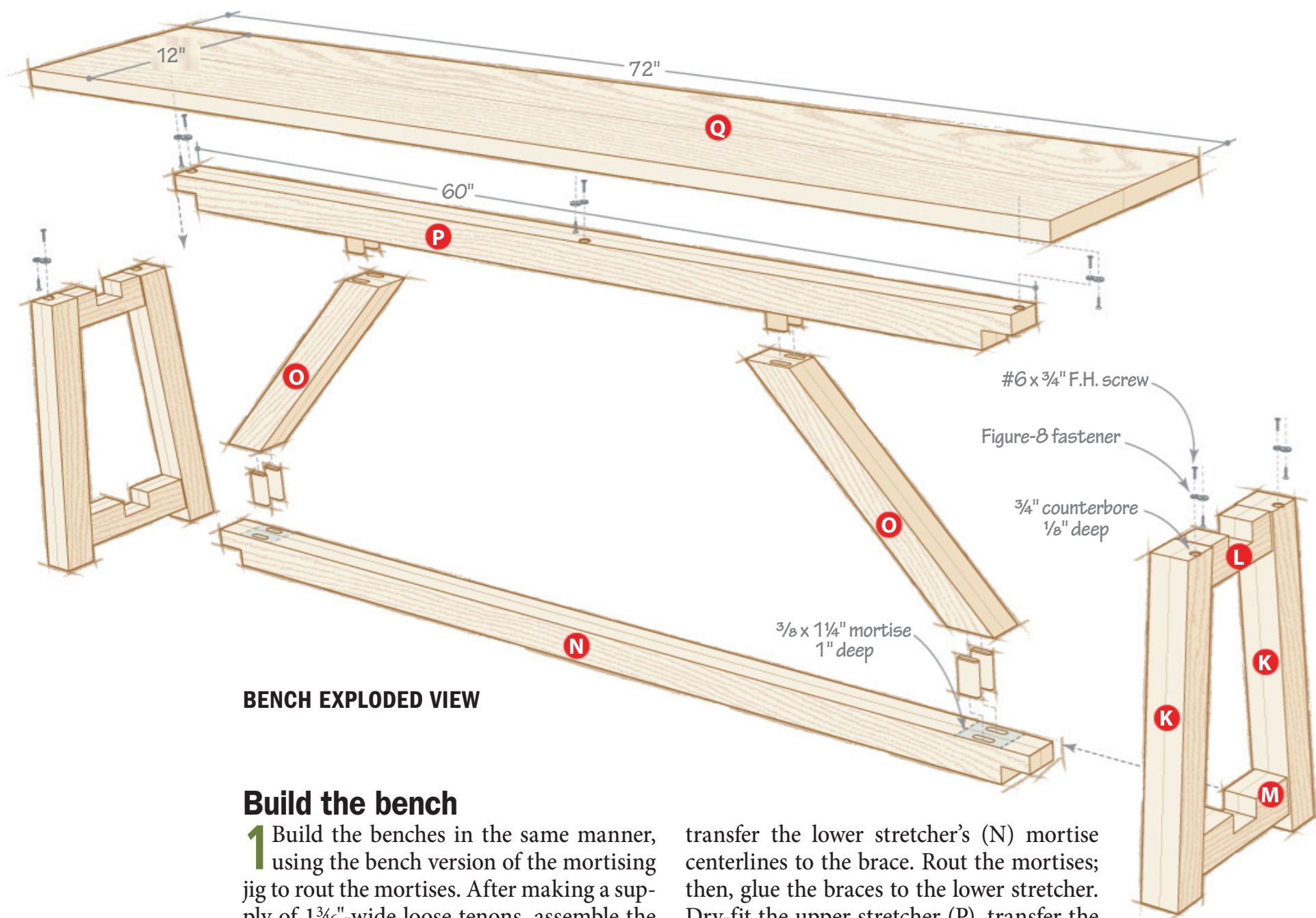
3 ASSEMBLY DETAIL



5 Glue up the top (J) and cut it to size [Exploded View]. Drill holes on the underside, then drill corresponding holes in the upper rails (B). Glue dowels into the upper rails.



E Glue loose tenons into the bottom of the post (E). Apply glue to the mortises in the lower stretcher (D) and seat the post.



BENCH EXPLODED VIEW

Build the bench

1 Build the benches in the same manner, using the bench version of the mortising jig to rout the mortises. After making a supply of $1\frac{3}{16}$ "-wide loose tenons, assemble the ends (K/L/M) [Bench Exploded View, Drawing 4].

2 Rout the mortises in the lower stretchers (N) [Drawing 5], then glue them to the leg assemblies.

3 Laminate stock for the braces (O) and upper stretchers (P). Bevel the ends of the braces, and rout mortises in the top ends only. Notch the ends of the stretchers.

4 Align the end of each brace (O) with the inside edge of the lower rail (M), and

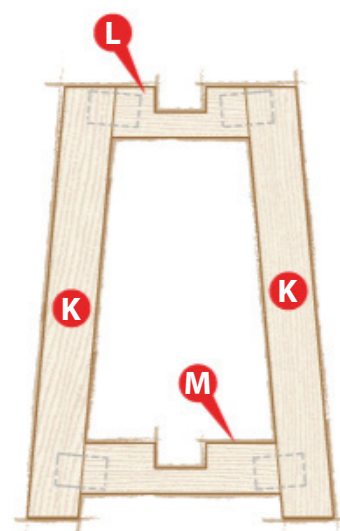
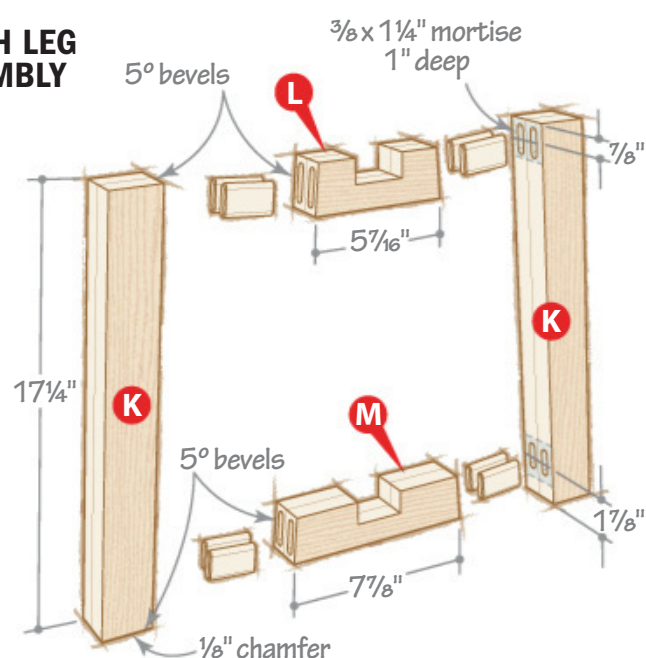
transfer the lower stretcher's (N) mortise centerlines to the brace. Rout the mortises; then, glue the braces to the lower stretcher. Dry-fit the upper stretcher (P), transfer the mortise locations to the stretcher, rout them, and glue the upper stretcher in place.

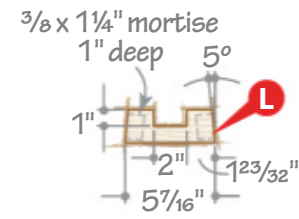
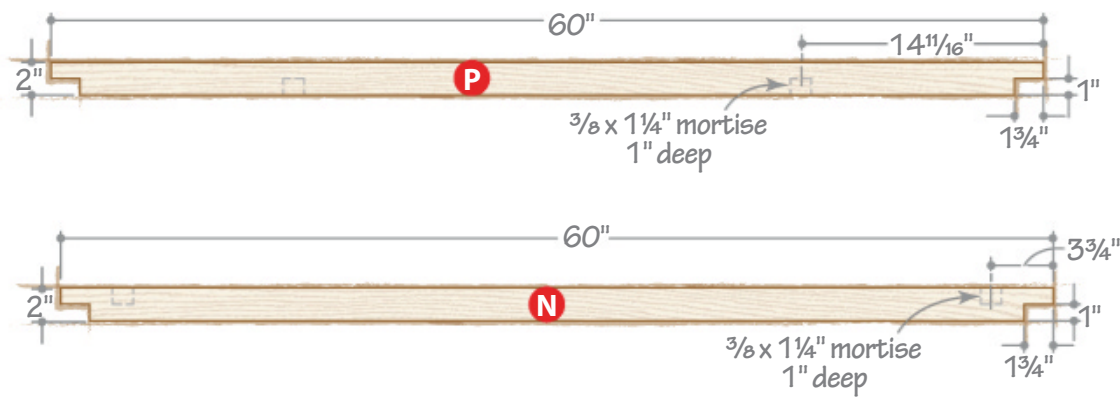
5 Glue up and cut the seats (Q) to size. Secure the seats with figure-8 fasteners on each leg, and one in the middle of the upper stretcher.

6 Finish-sand the table and benches, easing the sharp edges. Apply a durable clear finish, such as polyurethane or, as we did, a precatalyzed lacquer. 🌲

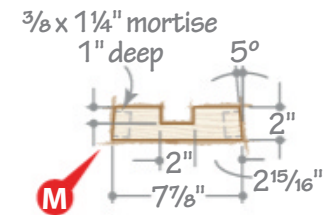
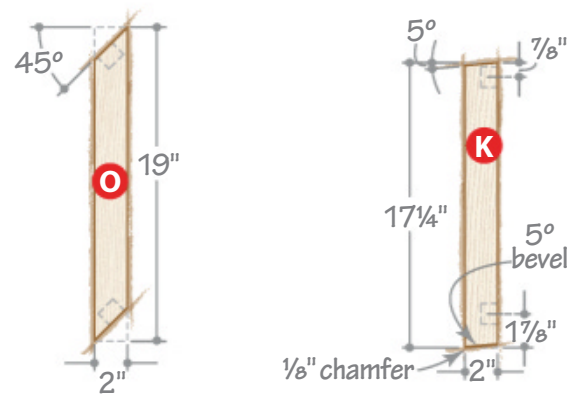
Note: We filled voids in our rustic oak with epoxy, then sanded them flush.

4 BENCH LEG ASSEMBLY

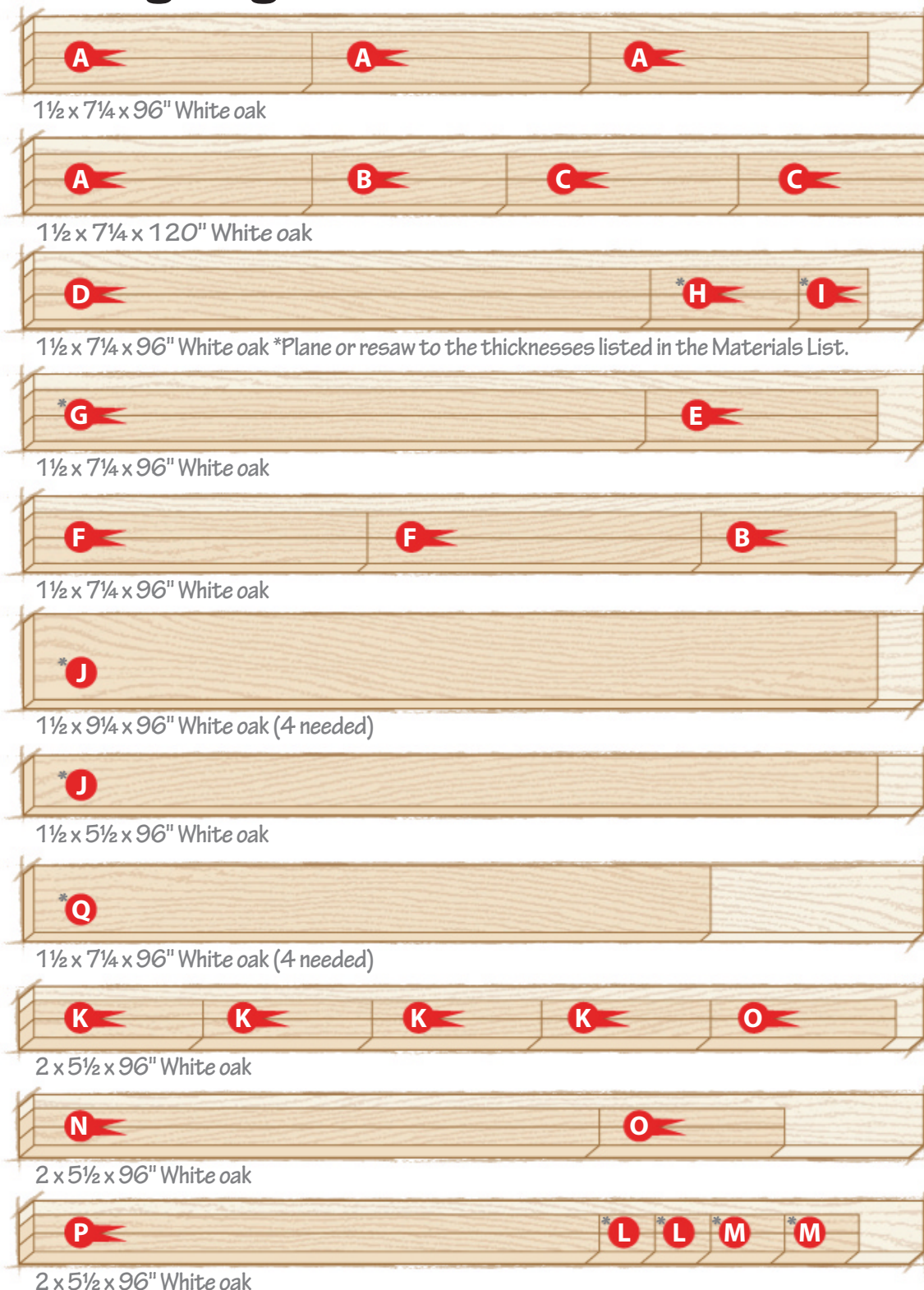




5 BENCH PARTS VIEWS



Cutting Diagram



This project requires approximately 113 board feet of 6/4 white oak, and 23 board feet of 8/4 white oak.

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

Table	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A legs	2 3/4"	2 3/4"	29"	LWO	4
B upper rails	2 1/2"	2 3/4"	20"	LWO	2
C lower rails	2 1/2"	2 3/4"	24 1/4"	LWO	2
D lower stretcher	2 3/4"	2 3/4"	65 3/4"	LWO	1
E post	2 3/4"	2 3/4"	24 1/2"	LWO	1
F braces	2 3/4"	2 3/4"	35 7/16"	LWO	2
G upper stretchers	1"	2 3/4"	65 3/4"	WO	2
H brace rails	1"	2 3/4"	16"	WO	2
I post braces	1"	2 3/4"	7 1/2"	WO	2
J top	1 1/4"	40"	90"	EWO	1
Benches					
K legs	2"	2"	17 1/4"	LWO	8
L upper rails	1 3/4"	2"	5 7/16"	LWO	4
M lower rails	1 3/4"	2"	7 7/8"	LWO	4
N lower stretchers	2"	2"	60"	LWO	2
O braces	2"	2"	19"	LWO	4
P upper stretchers	2"	2"	60"	LWO	2
Q seats	1"	12"	72"	EWO	2

*Quantities for two benches.

Materials key: LWO—laminated white oak, WO—white oak, EWO—edge-glued white oak.

Supplies: #8 x 2 1/2" flathead screws, 3/4" dowel 12" long, figure-8 fasteners, 3/4" guide bushing.

Blade and bit: Dado set, 3/8" spiral upcut bit.

SHOP TEST

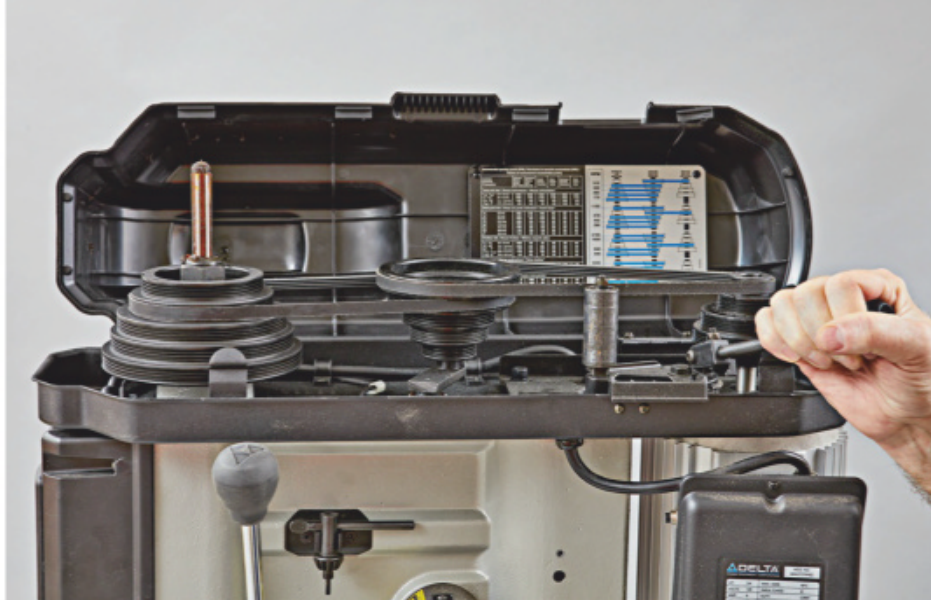
Big-swing Drill Presses

Bring the three Ps—precision, power, and perpendicularity—to all of your boring jobs.

A drill press ranks in our top five of machines every woodworker should own. (The others are tablesaw, band-saw, thickness planer, and jointer.) More than a glorified electric drill, the tilting table of a drill press makes it possible to drill holes at precise angles, and in perfectly aligned rows at repeatable depth for making mortises, and more. And, these machines bring to the table enough torque to safely drive bits too big for a handheld drill, such as a large Forstner bit.

Drill presses are classified by their swing capacity, and those with 17–18" of swing make up the most popular class, meaning one of these eight models may be the only drill press you'll ever need. To find the best in this class, we tested them head-to-head in the *WOOD*® magazine shop. Here's what we found.

► Definitions: *Swing* describes the maximum width of workpiece into which you can drill to the center, so a drill press with an 18" swing capacity measures 9" from its column to the center of the chuck.



To change speeds on the Delta, you release the belt tension with a cam lever, quickly freeing the belts so you can easily reposition them on the pulleys.

Torque matters more than horsepower

► Definitions: The *chuck* fits onto the *spindle*, which is turned by a set of belts and pulleys driven by the motor. The *quill* houses the spindle and moves it up and down. A drill press's *quill stroke* is the amount of its vertical chuck travel.

To test each machine's torque, we bored holes with increasingly larger Forstner bits in hard maple. Most of the drill presses in our test use a belt-and-pulley system to drive the spindle, and with belt-driven models, more horsepower doesn't necessarily translate into more torque. In practice, maximum torque is achieved at the stall point—when the amount of force required to turn the bit overcomes the belts' grip on the pulleys, and the bit stops.

We were able to eventually stall each of the seven belt-driven machines, with the Powermatic PM2800B besting the other belt-drives by powering a 3" Forstner bit without stalling and the Delta 18-900L spinning that same size bit but requiring a lighter touch to avoid stalling. By contrast, the Jet JDP-17 stalled while using a 2" Forstner.

Instead of drive belts, the Nova Voyager uses a direct-drive motor-to-spindle setup, which we were unable to stall. When the motor controller sensed heavy draw on a bit, it would simply supply additional torque to maintain cutting speed.

Changing speeds: Easier is better

► Download a free chart with recommended speeds for all types of drill bits. woodmagazine.com/dpspeed

Ideally, you should change drill-press speed depending on the type and size of bit. But we're guilty of not doing this every time, because it's almost always a hassle to reposition the belts on the pulleys. Luckily, two of the test models—both with infinite variable speed for the whole speed range—require no belt changes. On the Nova you simply set bit speeds using an electronic control pad, shown *above right*; with the Powermatic, you turn a crank to adjust the speed, as shown on a digital readout. Rikon's 30-217 also has variable speed, but in two ranges (200–700 and 600–2,200 rpm), so you have to reposition the drive belt to change ranges, which we found a little fussy. Of the multispeed models, the Delta, shown *above left*, makes chang-



With the Shop Fox (and a few others), the motor (and drive pulley) manually slides horizontally to add or release tension. But because it has so little travel and the handle is so short, the belts were still somewhat tight, and we had to "walk" them up and down each pulley step.



Nova Voyager's multifunction controller offers dozens of settings and adjustments, including choosing the bit speed for you based on your answers to its questions about bit type, size, material, etc.

ing belt positions easiest. The Delta, Jet, and Rikon 30-230 all have 16 speeds available. The Grizzly G7947 and Shop Fox W1680 have 12 speeds, with larger gaps between speeds.

The key to a great-gripping chuck

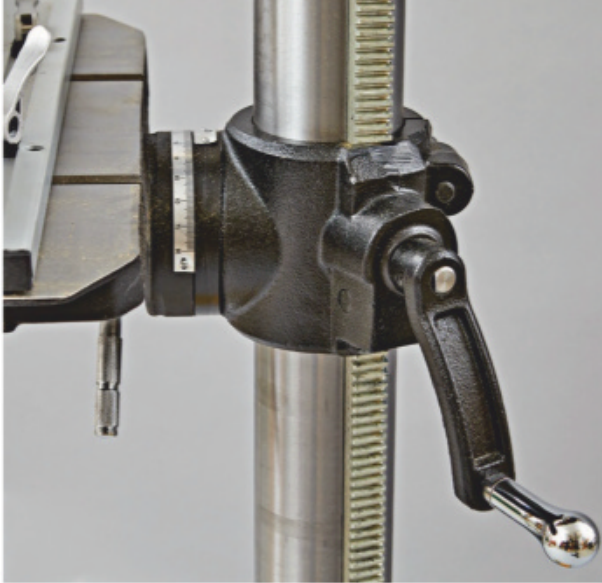
These machines all come with a keyed chuck that will accept any bit with a shank up to $\frac{5}{8}$ ". In our tests, each chuck held bits securely without slipping, and released them easily with the chuck key. Our favorite chuck key, on the Delta, has about a 4"-long handle with a thumb pad for better leverage, and a spring-loaded self-ejecting mechanism to prevent accidentally leaving it in the chuck. We also prefer to have the key store on the machine for easy access and to avoid losing it.

Precision comes from pinpoint placement

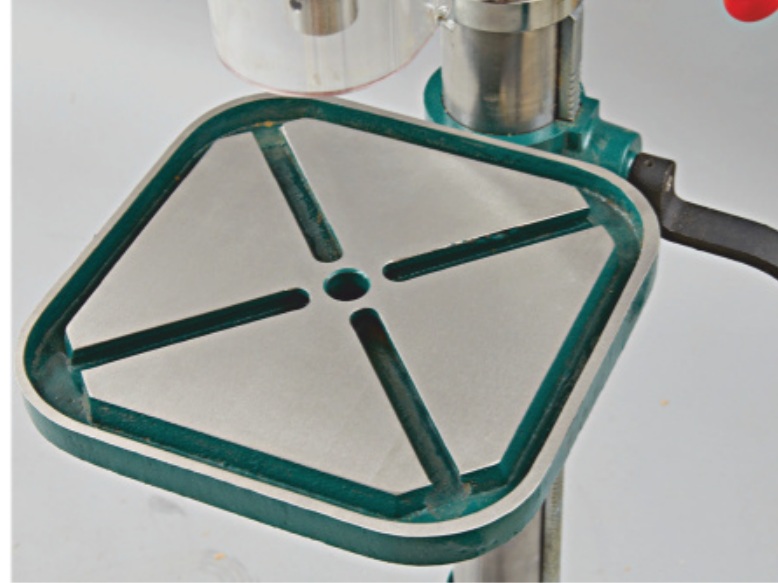
To ensure the hole goes where you want it, Delta and Powermatic use microadjustable crosshair lasers that show the center of the bit and calibrate easily, as well as LED task lights that can be positioned as needed. Jet also has lasers that work well when calibrated, but we found that process difficult. The others have either insufficient built-in task lighting or none at all.



Delta's table ranks best among the test machines, with slots for attaching accessories, easy clamping along its perimeter, and a replaceable insert.



Powermatic's height-adjustment crank angles away from the table, greatly reducing the risk of scraping your knuckles on the table as you crank.



Grizzly's table has wide channels and grooves with no opening to the bottom that we found difficult for attaching accessories or even an aftermarket table.

News flash: Woodworkers want good tables

► Read reviews of four aftermarket drill-press tables on *page 64*. Or build your own from our plans: woodstore.net/drillpresstables

A woodworking-friendly table makes life easier when you need to clamp a workpiece, or attach a fence or hold-down. Delta's large table, shown *above*, is our favorite, with a large surface, accessory channels, a large replaceable center insert, and front- and

side-tilting capabilities. The tables on the Jet and Powermatic also get high marks with similar features, except front tilt.

Tables on the other models seem better suited to metalworking, with either deep perimeter troughs (for catching coolant) or milled slots too wide for most woodworking accessory T-bolts and hardware.

► Learn more about how to use and get the most from your drill press.

woodmagazine.com/drillpressbasics

Pressing details about the tested models



Delta 18-900L, \$1,300

864-231-5888, deltamachinery.com

High Points

▲ With 16 speed selections and the easiest belt changes of the non-variable-speed machines, you can easily and quickly set the speed you need for each application.

▲ Its self-ejecting chuck key was our favorite of the test group, and stores on the machine. The table-tilt wrench and drill drift knockout tool (used to remove the chuck, if needed) also store on the machine.

▲ Microadjustable lasers and a flexible-neck LED task light improve drilling precision.

▲ The quick-adjust knurled knob on a threaded rod makes for an excellent and reliable depth stop. This machine also allows you to set a stop for hole depth rather than simply quill stroke, a handy feature.

▲ Its 6½" maximum quill stroke ties for longest in the test.

▲ This unit's large table proves best for woodworking, with T-slots for accessories; a wide, thin clamping edge; full 180° tilt left and right and 45° forward tilt; and a replaceable MDF center insert.

▲ It comes with a 5-year warranty.



Grizzly G7947, \$650

800-523-4777, grizzly.com

High Points

▲ The 4¾" quill stroke provides plenty of reach for common drilling tasks.

Low Points

▼ Its heavy-duty cast-iron table has ¾"-wide slots that prove difficult to use with accessories, a deep trough around the perimeter, and little space underneath to accommodate clamps.

▼ The chuck key is more difficult to use than others, and does not store on the machine.

▼ We found the plastic chuck guard to be more of an annoyance than a benefit.

▼ An incandescent bulb situated mostly within the drill-press body provides only basic lighting that gets obscured easily during use.

More Points

► Its 1½-hp motor requires a 20-amp, 110-volt outlet. It delivers adequate torque, but the 12-speed system lacks an option in the wide gap between 640 and 1,220 rpm.

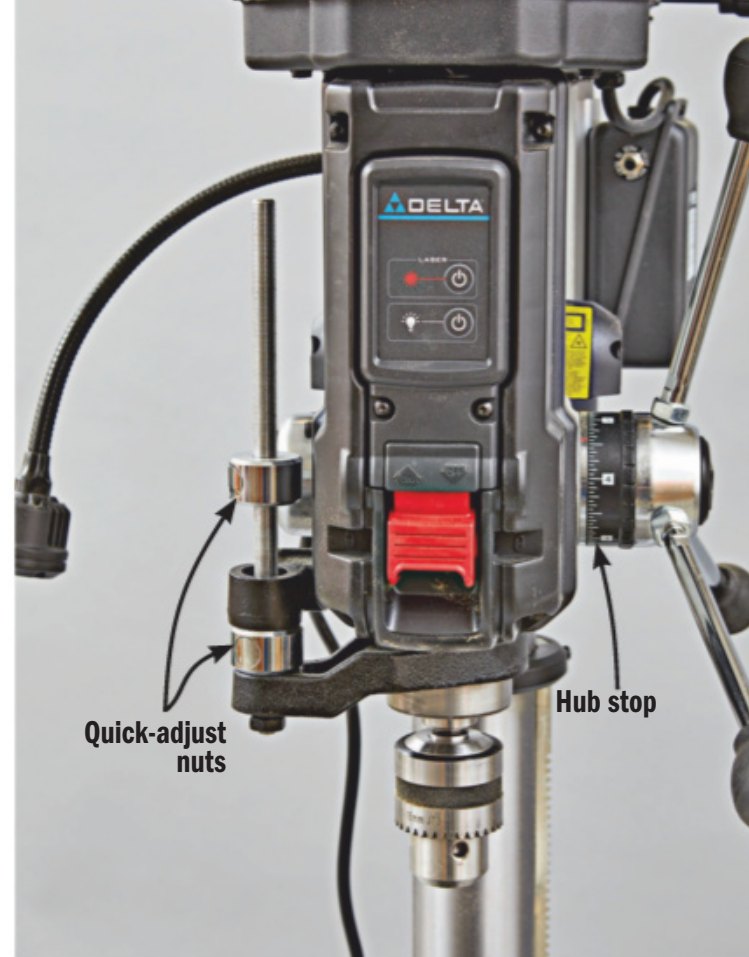
► The two-nut, threaded-rod depth stop proved reliable, but the 18mm wrenches needed to tighten the nuts don't come with the machine.

If it doesn't stop a bit, it's not a depth stop

Drilling to a preset depth without worry that you'll overdrill proves one of a drill press's best features. We tested the reliability of each machine's depth stops by drilling 100 holes in $\frac{3}{4}$ " MDF, then measuring each hole's depth with a calipers. The Delta and Powermatic fared best, differing no more than .005" in hole depth. The Grizzly, Jet, Nova, Rikon 30-217, and Shop Fox were all within .020", an acceptable amount. However, the quill-feed hub depth stop on the Rikon 30-230 slipped repeatedly, drilling deeper after just 10–15 holes. It needs to be checked regularly and reset.



To use a hub-mounted depth stop, you zero the bit on the workpiece surface, then turn the stop to match the depth of the desired hole.



The Delta has two depth stops: a hub stop and a threaded rod with two quick-adjust nuts that let you intuitively set depth based on quill travel.



Jet JDP-17, \$1,000

800-274-6848, jettools.com

High Points

- ▲ The large table proves ideal for woodworking, with a replaceable center insert, T-slots for accessories, and plenty of good clamping space around the rim. It's also the only machine with the table lock on the same side as the height crank, a nice convenience.
- ▲ It has a respectable 5 $\frac{1}{8}$ " quill stroke and good quill-feed handles.
- ▲ The speed chart printed on the machine's inner hood was the best among all the test models.
- ▲ The easy-to-use chuck key stores on the machine.
- ▲ It comes with a 5-year warranty.

Low Points

- ▼ With no way to tighten the belts sufficiently other than hand pressure, they slip far too easily on the pulleys, limiting us to drilling with a maximum of 2"-diameter bits—and that required a soft touch.

More Points

- ▶ An LED task light and lasers make it easy to drill precisely, but we found the lasers fussy to adjust and needed pliers to do so.
- ▶ Although the hub-style depth stop proved reliable, it proved confusing and frustrating to set without consulting the owner's manual each time.



Nova Voyager 58000, \$1,550

727-954-3433, teknatool.com

High Points

- ▲ This is the most technologically advanced drill press we've ever tested, with more electronic controls and options (and digital readout) than we thought we'd ever need, but now find handy.
- ▲ The direct-drive motor delivers more torque than any belt-driven drill press can muster. The motor senses load and delivers more power as needed. We could not bog it down.
- ▲ Its 6" quill stroke and 50–5,500-rpm variable-speed range make nearly any drilling task easy.
- ▲ With a heavy 18×23" cast-iron base, this machine proved the most steady of the test group.
- ▲ It comes with a 5-year warranty; the motor and controller have a 2-year warranty. Software updates can be downloaded to the controller via a port on the machine.

Low Points

- ▼ The spindle rotates so freely that changing bits can be challenging. You can activate an electronic spindle lock, but it requires several steps on the control pad to do so.
- ▼ The table's $\frac{3}{4}$ "-wide slots are impractical for attaching accessories, and the thick table rim and gussets make workpiece clamping difficult.
- ▼ It's the only test machine without either a light or cross-hair lasers to aid in bit placement.

More Points

- ▶ We found the mechanical depth stop more reliable and easier to set than the electronic one.
- ▶ The chuck key fits more loosely than others, but it's comfortable to use. It does not store on the machine. (The included table-lock wrench does store on the machine.)

Full bore: Floor-standing 17-18" drill presses for your shop

MODEL	PERFORMANCE RATINGS (1)								CAPACITIES, INCHES				SPEEDS		DIMENSIONS, INCHES		
	PRIMARY				SECONDARY				SWING	MAXIMUM QUILL STROKE	MAXIMUM FROM CHUCK TO TABLE	DEPTH FROM CHUCK TO BASE	TOTAL NUMBER (2)	RPM, MINIMUM-MAXIMUM	OVERALL, H x W x D	TABLE, W x D	BASE, W x D
	DRILLING TORQUE	BIT-PLACEMENT PRECISION	EASE OF CHANGING BITS	DEPTH-STOP RELIABILITY	EASE OF USING AND ADJUSTING TABLE	EASE OF CHANGING SPEEDS	EASE OF USING QUILL HANDLE	OVERALL STABILITY									
DELTA 18-900L	B+	A	A	A	A	B+	A	A	18	6 1/8	22	42 1/4	16	170-3,000	70x20x26	20x14	17x23
GRIZZLY G7947	B	C	C	C	C	C	B	A	17	4 3/4	26 1/2	46 7/8	12	180-3,240	70x21x29	13x13	15x23
JET JDP-17	D	B	A	B+	A	B	A	A	17	5 1/8	26 1/2	43 1/2	16	210-3,500	67x19x30	19x14	13x20
NOVA VOYAGER 58000	A	C	B	B+	B	A	A	A	18	6	24 3/8	44 1/4	VS	50-5,500	70x21x25	16x16	18x23
POWERMATIC PM2800B	A-	A	A	A-	A	A	A	A	18	6 1/8	24 1/4	42 5/8	VS	250-3,000	72x20x30	20x14	14x21
RIKON 30-217	B-	B	B	C	B-	A-	A	A	17	6 1/16	27 1/4	46 1/2	VS	200-2,200	72x17x29	14x14	17x23
RIKON 30-230	C	C	B	D	C	C	A	D	17	3 3/16	25 1/4	44 3/4	16	200-3,630	64x16x29	14x14	11x19
SHOP FOX W1680	C-	C	C	B	C	C-	B-	B+	17	3 1/4	28 1/4	46 1/8	12	150-3,050	66x15x28	14 dia.	13x21



Powermatic PM2800B, \$1,600

800-274-6848, powermatic.com

High Points

- ▲ Its variable-speed drive lets you choose any speed from 250 to 3,000 rpm; a hand crank and LED display make this job easy. Highest torque among the belt-driven units.
- ▲ Two LED worklights and microadjustable lasers make for precise bit placement.
- ▲ Its 6 1/8" quill stroke ties for longest in the test. And it's the only machine that lets you swap the quill-feed handles to the left side.
- ▲ The table proves ideal for woodworking, with T-slots, a fence with movable flip-stop, wide clamping rim, and replaceable center insert. The crank, angled away from the table, proves easiest to use for raising and lowering the table.

- ▲ It comes with a 5-year warranty.

Low Points

- ▼ The variable-speed belt-and-pulley system makes a constant clattering noise.

More Points

- We like the spring-loaded chuck key, but it does not store on the machine.
- The depth stop proves easy to use and reliable, but the spring-loaded nut occasionally catches in the scale groove on the threaded rod, making microadjustments finicky.
- The table tilts left and right, but the 24mm wrench needed for the locking nut is not included.



Rikon 30-217, \$1,050

877-884-5167, rikontools.com

High Points

- ▲ With two infinitely variable speed ranges, this model lets you set the exact speed you need for each application.
- ▲ It has a 6 1/16" quill stroke.
- ▲ It comes with a 5-year warranty.
- ▼ The drive belts slipped with bits larger than 2 1/2", with no way to increase belt tension. Belt changes between the two ranges can be difficult.
- ▼ This machine drilled holes varying in depth by as much as 1/32", but it was not a progressive slippage. We could not pinpoint the problem.

More Points

- The digital speed readout lags a few seconds when changing speeds.
- The chuck key is not self-ejecting, but does have a thumb pad and stores on the machine.
- We like the inclusion of an LED on a flexible neck, but we wish this light was brighter.
- The table's thin rim makes clamping workpieces easy, but there are no T-slots for attaching a fence or accessories; through slots work for this, but require longer, larger bolts. The table-lock wrench is included, but does not store on the machine.

ACCESSORIES (3)		STANDARD	OPTIONAL	WEIGHT, LBS	POWER-CORD LENGTH, FEET	WARRANTY, YEARS (4)	COUNTRY OF ASSEMBLY (5)	SELLING PRICE (6)
		D, L, R	F, G, V	230	7	5	C	\$1,300
		D, G, L	V	240	9	1	C	\$650
		D, L, R		188	6	5	C	\$1,000
		D		270	7	2/5*	T	\$1,550
		D, F, L, R	Y	240	7	5	C	\$1,600
		D, L	M, V	222	9	5	C	\$1,050
		D, L	M, V	166	7	5	C	\$680
		D, G, L	M, V, W	166	9	2	C	\$758

- A

Excellent

B

Good

C

Fair

D

Poor
- (VS) Variable speed
- (D) Drill drift knockout tool

(F) Fence

(G) Chuck guard

(L) Light

(M) Mortising chisel kit

(R) Laser guide

(V) Workpiece vise

(W) Workholding clamp

(Y) Keyless chuck
- (*) 2 years on motor and controller; 5 years on all other parts
- (C) China

(T) Taiwan
- Prices current at time of article production and do not include shipping, where applicable.

Drop your dollars into these drillers

The Powermatic PM2800B and Delta 18-900L both earned high marks in every area of performance and capacity, so they share Top Tool honors for this test. We liked Powermatic’s continuous variable-speed feature, but if you value a more woodworking friendly table (and \$300 more in your pocket) go with the Delta. 🌲

Produced by **Bob Hunter** with **Brian Simmons**



Rikon 30-230, \$680

High Points

- ▲ If you plan to drill primarily holes less than 2" in diameter, this budget-friendly machine can work for you.
- ▲ It comes with a 5-year warranty.

Low Points

- ▼ With the smallest base (11×19") in the test group, this machine needs to be bolted to the floor or to a larger base to improve stability.
- ▼ The quill-hub depth stop slipped gradually in our testing; we had to check it and reset it every 10–15 holes.
- ▼ We found the table’s 5⁄8"-wide slots impractical for attaching accessories, and the table’s uneven bottom made workpiece clamping difficult.

- ▼ An incandescent bulb situated mostly within the drill-press body provides only basic lighting that gets obscured easily during use.
- ### More Points
- It has a nice selection of 16 speeds, but the belts slip easily when drilling with a bit 2" or larger.
 - Its 3¾" quill stroke is adequate for most work, but shortest in the test. You’ll need to raise the table to drill deeper holes.
 - The chuck key is not self-ejecting, but does have a thumb pad and stores on the machine.
 - The table tilts left and right, but the 24mm wrench needed for the locking nut is not included.



Shop Fox W1680, \$758

800-840-8420, woodstockint.com

High Points

- ▲ It has two depth stops: a traditional threaded rod, and a locking hub stop. Both proved reliable but fussy to set.

Low Points

- ▼ The drive system makes it difficult to change speeds and get adequate belt tension, resulting in a lack of torque when drilling with bits larger than 1½" in diameter.
- ▼ Its 14"-diameter table leaves us wanting a more woodworking-friendly size and features.
- ▼ With only 12 speeds to choose from, we would have liked a speed option in the gap between 540 and 980 rpm.

- ▼ The chuck key is more difficult to use than others, and does not store on the machine.
 - ▼ We found the plastic chuck guard to be more of an annoyance than a benefit.
 - ▼ An incandescent bulb situated mostly within the drill-press body provides only basic lighting that gets obscured easily during use.
- ### More Points
- Its 3¼" quill stroke proves adequate for most work, but is second shortest among the test group. You’ll need to raise the table to drill deeper holes.



Master That Handsaw

A guide to making precise unguided cuts.

Even for the most seasoned woodworkers, cutting with a handsaw can be intimidating. Without a miter gauge, fence, or jig to guide the cut, you depend on your eye-hand coordination to cut true. Improving that skill is easy: The old saw (sorry) about practice making perfect applies. Cutting tenons helps you develop the muscle memory for making accurate rips and crosscuts. Plus, you'll learn a new skill for cutting joinery on oversize workpieces, and angled tenons that a router or tablesaw may not be able to tackle.

Cut a mortise in a piece of scrap and use it to help you gauge the thickness and squareness of your practice tenons, and you'll quickly identify where to improve your technique. Practice on a soft wood, such as pine or birch, to build confidence, and because you can more easily correct a line that drifts while you perfect your technique.



Small saws meant for fine work (top and middle) have tooth counts of 12 teeth per inch (tpi) or points per inch (ppi) and up. Tenon saws (bottom) have a lower tooth count for better rip cuts, and wider blades for deeper cuts.

Choosing a saw

Backsaws come in many sizes and varieties, *above*, and get their name from the spine along the top edge that stiffens the blade. This reduces the blade's tendency to buckle so it cuts truer. And while it may seem counterintuitive, a larger backsaw can help you best develop your skills. The longer blade wanders less, and its weight helps you cut with less downward effort.

Make your marks

Cutting precisely starts with sharp layout lines for the length and thickness of the

tenon. A marking gauge severs wood fibers, creating thin lines [Photos A-C]. Darken the cuts with a fine pencil lead if you need to improve their visibility.

See what you saw

Secure the workpiece in a vise, angled away from you, so you can easily see the adjoining layout lines on the end and edge of the workpiece. Grip the saw with your index finger extended along the handle and pointing to the end of the blade [opening photo]. Use the tip of the thumb or a knuckle on your free hand

Note: The end of your workpiece must be square to get accurate lines using a marking gauge.

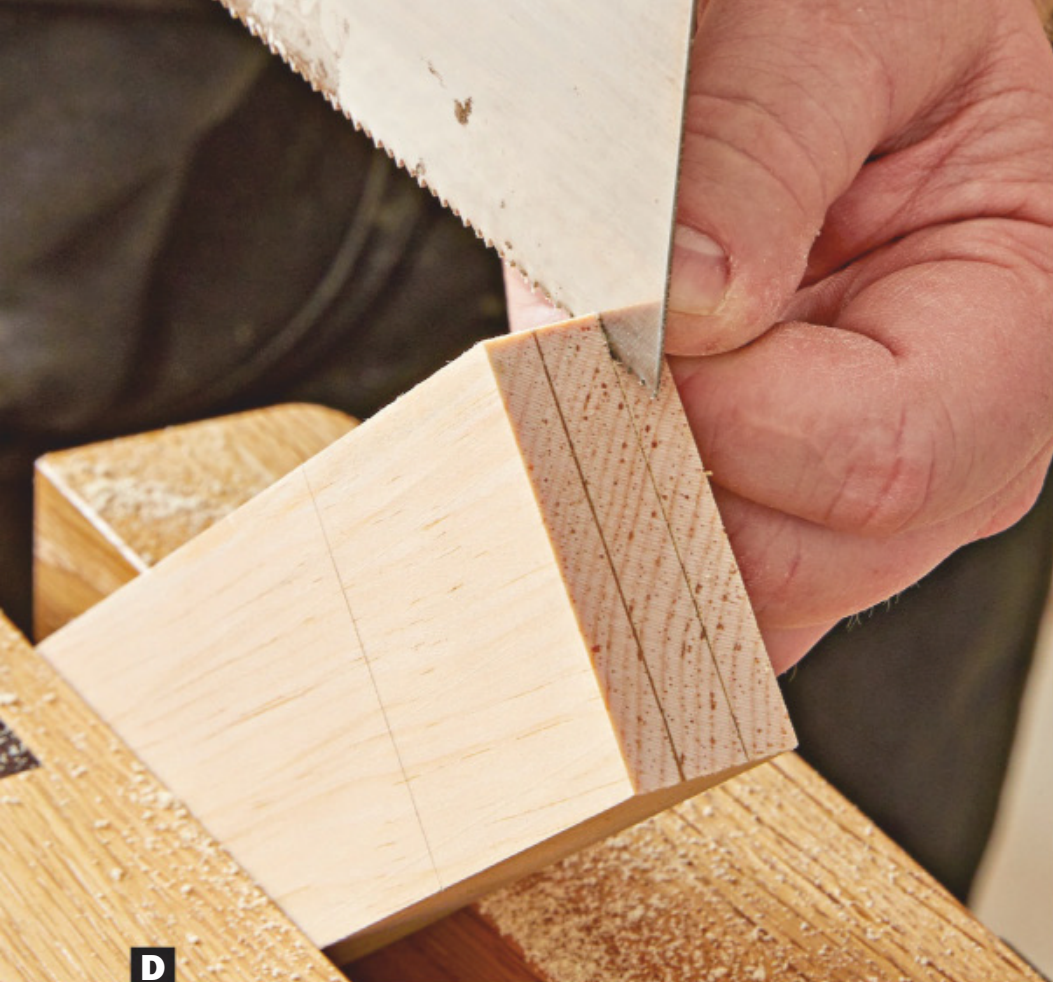


A Press the marking-gauge fence tight to the end of the workpiece. Scribe the faces first, then connect those lines with marks along the edges.



B To mark the tenon thickness on the workpiece end and edges, reset the gauge using the mortise as a reference. Strike lines around the end and both edges.





D

Position the blade to the waste side of the line. Do not apply downward pressure as you start the cut with strokes of about 1/4 to 1/3 the blade length. Gradually increase stroke length as the kerf deepens.



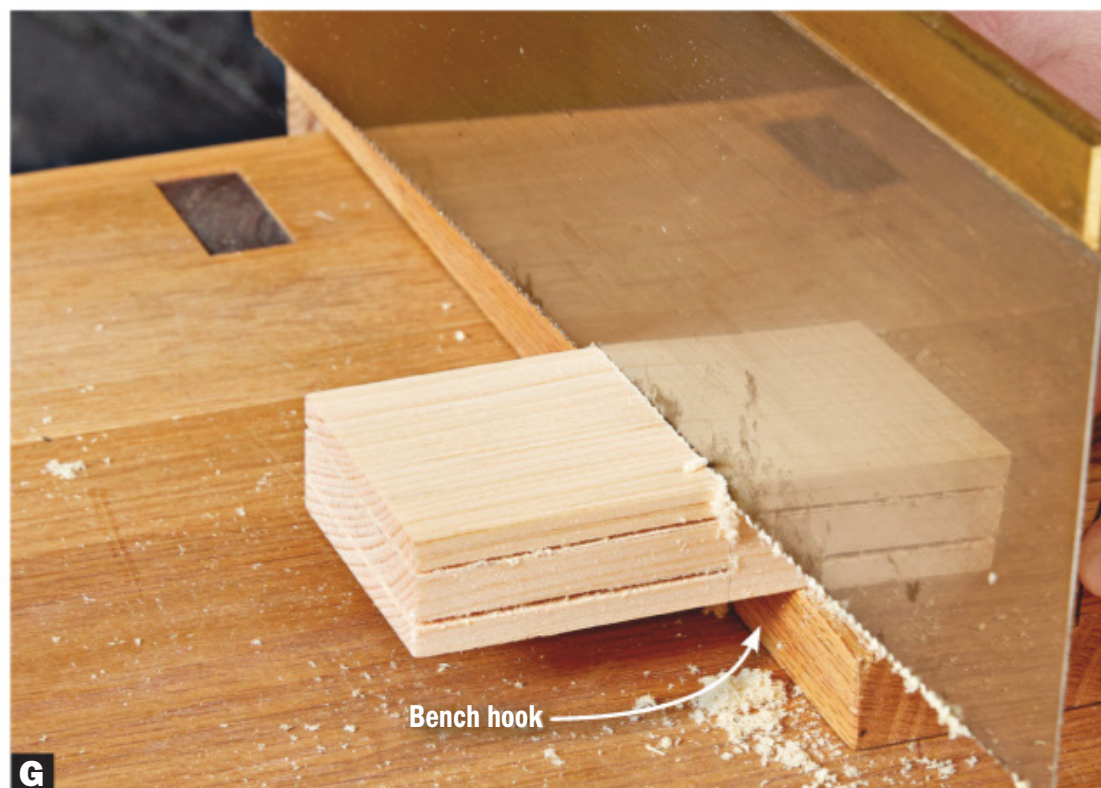
E

Stop when the kerf reaches the knife mark on the near edge of the workpiece. The kerf should extend through the width of the workpiece.



F

You can leave the workpiece angled and pivot the saw or, if it's more comfortable, reposition the workpiece vertically. Saw away the wedge-shape waste between the two shoulders.



G

Begin with short, light strokes on the far corner next to the cleat. After establishing the kerf, lower the saw to cut along the full length of the cutline. Slow and shorten your strokes as you near completion to prevent tear-out.

to guide the saw as you start the cut with short, light, back-and-forth strokes [Photo D].

Keep the spine of the saw horizontal, sight along the edge of the blade and kerf to the marked cutlines, and apply only light pressure as you work. Saw until you reach the shoulder line on the near edge [Photo E]. Watch the lines closely on the end and edge—if you begin drifting away from either, back up, angle the saw to guide it back to the line, and resume.

Flip the workpiece face for face, and use the kerf to guide the saw as you cut to the

opposite shoulder line. Pivot the saw parallel to the end and shoulder line, and square up the bottom of the cut [Photo F].

Cut the other cheek in the same fashion.

Use a bench hook when cutting the shoulders. Pressing the saw blade against the bench-hook cleat helps keep the blade vertical. Align the shoulder line with the end of the bench-hook cleat so the saw kerf just leaves the knife mark [Photo G]. After cutting away the waste, a few strokes with a shoulder plane or a sanding block with square edges smooths the cheeks, providing a good glue

► Make a bench hook and learn its many uses beyond sawing. woodmagazine.com/benchhook



H

The bench-hook cleat backs up the shoulder as you plane, preventing tear-out. Planing squares the shoulders to the cheek for a gap-free fit with the mortised workpiece.



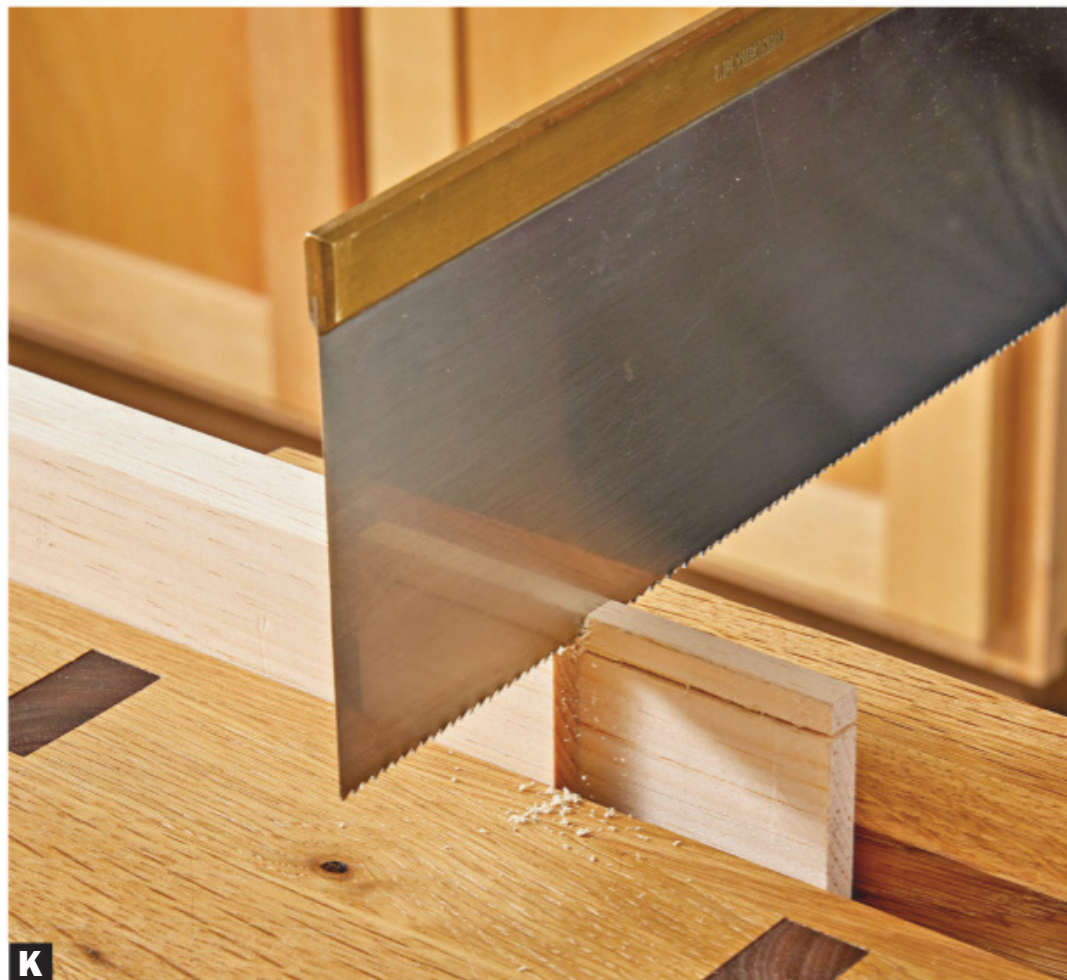
I

Mark the tenon width on the newly cut cheeks and transfer them around the end. Darken the lines if needed.



J

Start the cut on the far face so you can see the cutline. As you work, stop and check your progress against the marks on both faces of the tenon.



K

The short cutline on the edge makes it more difficult to cut perfectly square, so stay on the waste side of the line.



► Watch a video of cutting a tenon with a handsaw.
woodmagazine.com/handcuttenon

woodmagazine.com

surface. Clean up to the knife marks with the shoulder plane as well [Photo H].

Strike marks for the tenon width [Photo I], then cut to the lines [Photo J]. Work down to just short of the shoulder. Repeat for the opposite mark.

Grip the workpiece horizontally in the vise and trim a shoulder, [Photo K] leaving a tiny amount of waste to pare away with a chisel. Repeat for the opposite shoulder. Test

the fit of the tenon in your mortise and give it a close inspection. Even if you find a satisfactory fit (and congratulations, by the way), cut another tenon while the methods are fresh in your mind and work for an even better fit. You'll soon find the motions becoming second nature—and that's what you're after. 🌲

Produced by **Craig Ruegsegger** with **John Olson**

Tip! Rub a pencil across the tenon before inserting it in the mortise. Tight spots will smudge the marks.

Entryway Catchall

With all-plywood construction and simple glued joinery, you can build this inexpensive project in a day.



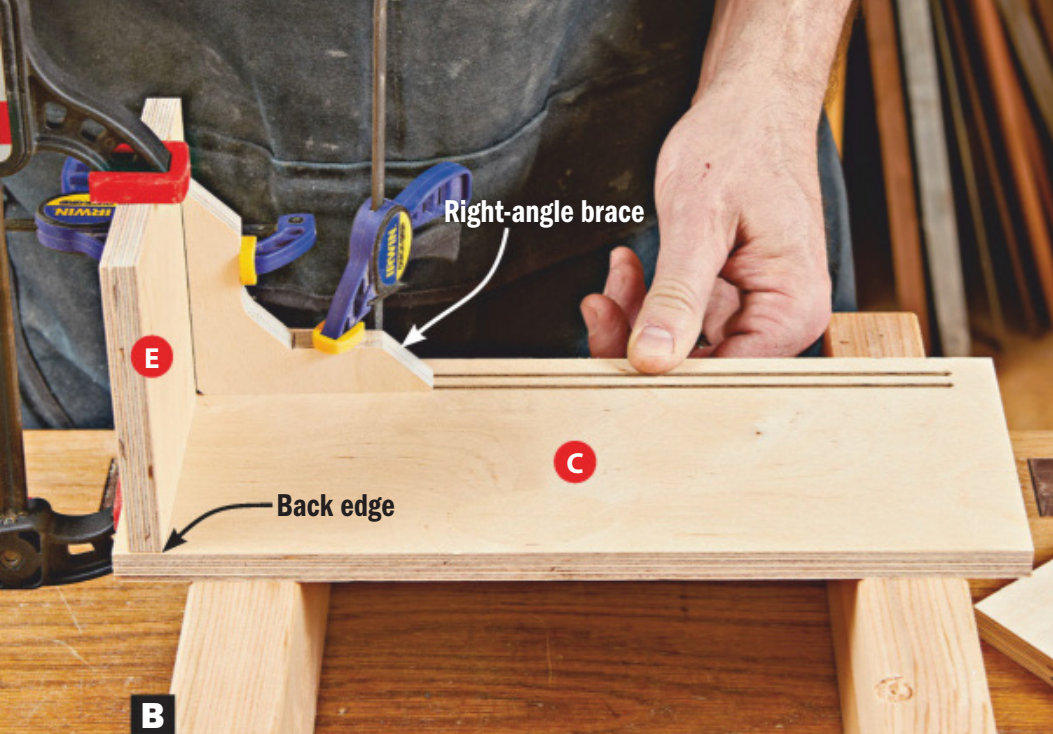
D I M E N S I O N S :
14½" W x 5¼" D x 19½" H

Approximate materials cost:

\$45

including hardware

Doors remove easily, if needed.



B Glue a lower side (E) to a bottom (C) flush at the back. Use a right-angle brace to ensure a square corner. Repeat for the other side.

► Make your own right-angle brace.
woodmagazine.com/brace

3 Finish-sand parts A–E. Glue the lower sides (E) to one of the bottoms (C) [Photo B], and then glue the other bottom to that assembly so the slots face each other.

4 Make three spacers: one 11" long and 3–4" in width, and two 4½×4½". Use them to help clamp the shelf (D) in place [Photo C].

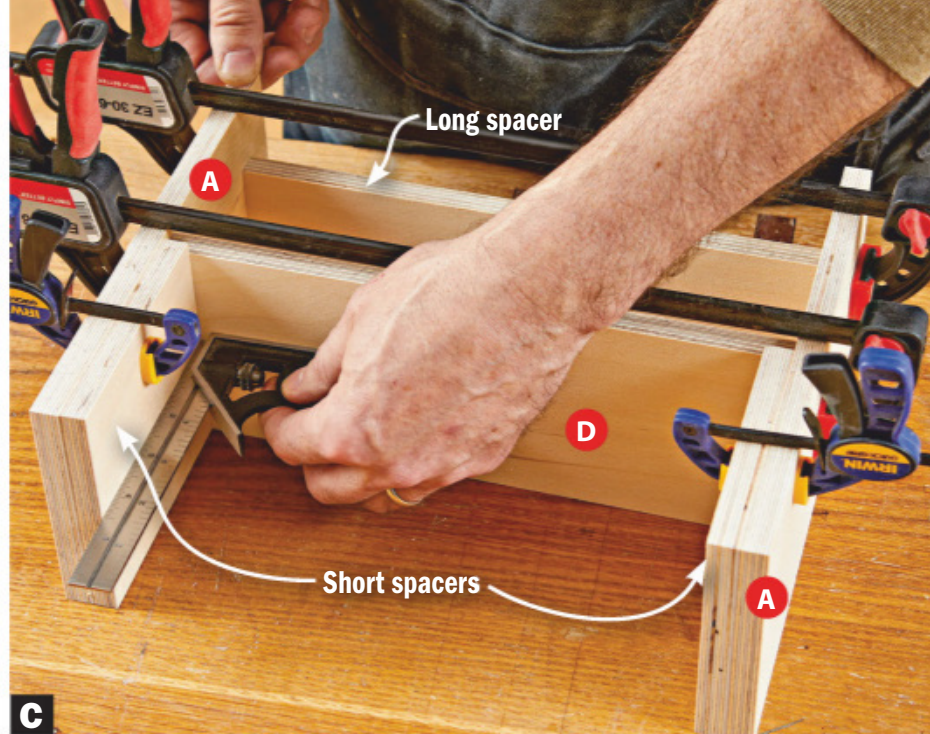
5 Do any touch-up sanding if necessary. Glue the remaining parts together [Photo D].

6 Cut the shelf trim (G) to size, finish-sand it, and glue it in place [Exploded View].

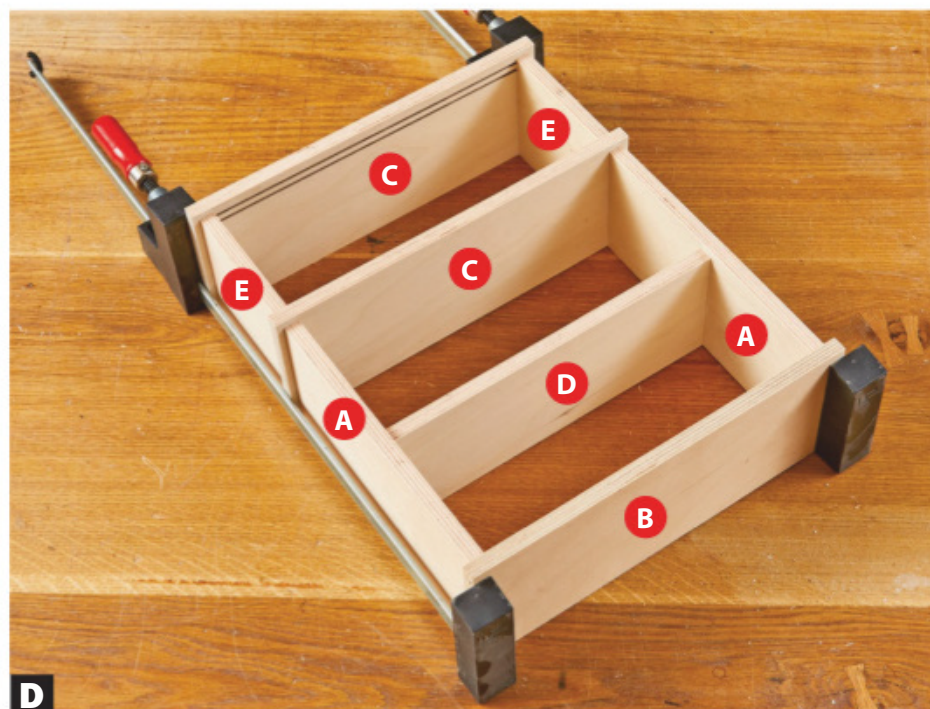
7 Cut the doors (F) to size [Exploded View]. Rabbet the top and bottom, making sure the top rabbet is wider. Drill a finger hole in each door, one on the left and the other on the right.

8 Cut the back (H) to size [Drawing 1]. Lay out the locations for the key hooks and drill pilot holes for each. Finish-sand the back, and glue and clamp the cabinet assembly to it, centered side-to-side and 1¼" from the top edge.

9 Apply your finish of choice. We sprayed ours with two coats of Watco satin lacquer. Screw the cabinet to the wall, and install the doors and key hooks. Now when



C Clamp the short spacers to the upper sides (A), flush at the top. Glue the shelf (D) to the sides resting against the spacers. Clamp the long spacer between the sides at the bottom.

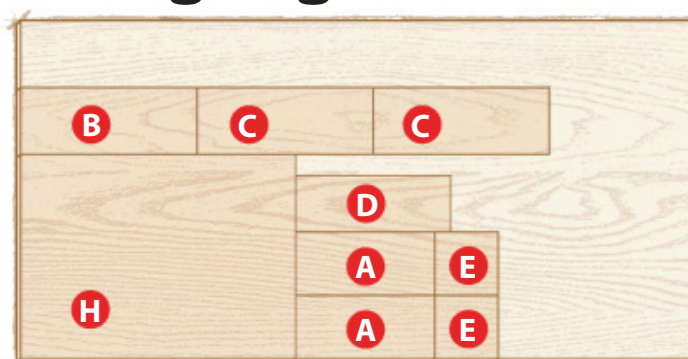


D Glue the top (B) and the two assemblies together flush along the back edges. Wipe away any glue squeeze-out and allow to dry.

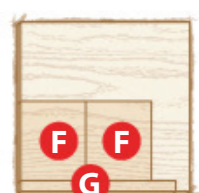
you get home, drop off your everyday carry, knowing exactly where it will be when you need it again. 🌳

Produced by **Bob Hunter** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**, **Lorna Johnson**

Cutting Diagram



½ x 24 x 48" Birch plywood



¼ x 12 x 12" Birch plywood

Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Upper Cabinet						
A	sides	½"	4½"	9½"	P	2
B	top	½"	4¾"	12½"	P	1
C	bottoms	½"	4¾"	12½"	P	2
D	shelf	½"	4"	11"	P	1
Lower Cabinet						
E	sides	½"	4½"	4½"	P	2
F	doors	¼"	5⅝"	4⅞"	P	2
G	shelf trim	¼"	¾"	11"	P	1
Back Panel						
H	back	½"	14½"	19½"	P	1

Materials key: P– birch plywood.

Supplies: Screw-in hooks, pack of 10, no. 29905T33, \$7.30; #8 finish washers, pack of 50, no. 94695A210, \$3.92; McMaster-Carr, 330-995-5500, mcmaster.com.

Bit: ⅛" straight or spiral router bit.

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What you need to know about Sharpening Stones

By Randall Maxey

We leave none unturned to help you get a fine edge.

Sharpening, in its most basic form, entails using an abrasive to remove metal to form a smooth cutting edge. The variety of methods and products used to accomplish this simple task generate heated discussion among woodworkers, and selecting the right sharpening stones can be a confusing venture. Here's the low-down on the various types of stones, their characteristics, and which to choose.

Oilstones: Tested and true

For decades, oilstones served as the go-to stones for honing edge tools. As the name implies, you apply a lightweight machine oil or honing oil to the surface of the stone to act as the lubricant when sharpening.

Oilstones include Arkansas stones quarried primarily (though not surprisingly) in Arkansas. These come in hard and soft types. Arkansas stones cut rather slowly, so sharpening takes longer than with other varieties of stones. But this long-wearing property also means that the stones require flattening less often.

Some man-made oilstones (India stones) use silicon carbide or aluminum oxide abrasives. These offer a wider range of grits than natural stones, but you won't find the finest grits available in other varieties of stones.

Pricing for natural stones varies widely, with man-made oilstones typically falling to the lower end of the price range.



Natural oilstones (top) are traditional sharpening media while synthetic versions offer a wider variety of grits, including the dual-sided, dual-grit stone (bottom).

Waterstones for a fine edge

Stones that use water as the lubricant fall into the broad category of waterstones. Some require soaking in water before use, and others require only a light misting just prior to and during use. Follow the manufacturer's directions.

You can buy naturally quarried waterstones, but they cost more than man-made varieties, which make up most of those sold commercially. And man-made stones offer the added benefit of consistently sized abrasive particles, with aluminum oxide as the most common.

Being relatively soft, waterstones sharpen faster because old, dulled abrasive particles break away, exposing fresh ones as you work. Higher-quality waterstones can be harder, which means they don't wear as quickly but also don't cut as fast. So the trick is finding a balance between reasonably fast sharpening and infrequent flattening of the stone due to wear.

► An oil or water lubricant suspends and carries away metal and stone particles that break away during sharpening.



A light spritz from a spray bottle provides enough water to keep this stone damp and lubricated during use.



Waterstones come in single- and dual-grit types. Use a flattening stone (top left) between sharpenings to ensure that the surface of the waterstone remains flat.



Shapton's GlassStones fuse a layer of ceramic abrasive onto a glass substrate.



Full-size ceramic waterstones provide a long-wearing, fast-cutting abrasive.

Hone on ceramic stones

The process of making ceramic waterstones is similar to firing clay in a kiln, thus their name. Consider these a subset of waterstones, as they also use water as a lubricant. The abrasives used include zirconium oxide, aluminum oxide, or silicon carbide, with grits ranging as high as 30,000 (0.5-micron) for creating the ultimate polished edge.

Some ceramic waterstones rival diamond stones for hardness, so they rarely need flattening, which requires a diamond stone. Like most stones, ceramic waterstones need to be treated with care to prevent cracking and breakage. Properly cared for, a ceramic stone should last for many years. Ceramic waterstones cost about the same as diamond stones and higher-end conventional waterstones.

Diamonds are (almost) forever

Bonding diamond particles to a steel plate creates a long-lasting sharpening medium that never needs flattening. Diamond stones come in a variety of sizes similar to waterstones and oilstones: Choose a stone 3" or

wider for plane irons and chisels; smaller stones are perfect for sharpening knives. Diamond stones can be used dry, but I recommend a spritz of water as a lubricant. Scrub diamond stones clean to remove the slurry and dry them after use to prevent rust. A white artist's eraser removes any remaining dirt on the stone.



Diamond sharpening stones are available in a variety of styles. Holes or patterns in the surface hold swarf away from the abrasive for faster sharpening.

A hybrid sharpening solution

After years of experimenting with and using several sharpening stones, I've settled on a mix of types and a process that utilizes the benefits of each stone type.

For fast metal removal, such as removing small dings and reforming a bevel, I like the fast cutting action of coarse diamond stones from 150–320 grit. For touch-ups and honing during use, 600–1,200-grit diamond stones or waterstones quickly restore an edge. For the ultimate polished, razor-sharp edge, and to form a micro-bevel, I use 3,000–10,000-grit ceramic waterstones.

So don't be afraid to mix and match the stones that will make your sharpening tasks more enjoyable and yield the sharpest cutting edge. 🌲

► Make your own honing guide.
woodmagazine.com/honingguide



Randy Maxey is a lifelong woodworker, writer, educator, and founder of minimaxworkshop.com. His book, *Sharpening: A Woodworker's Guide*, arrives in fall 2020.

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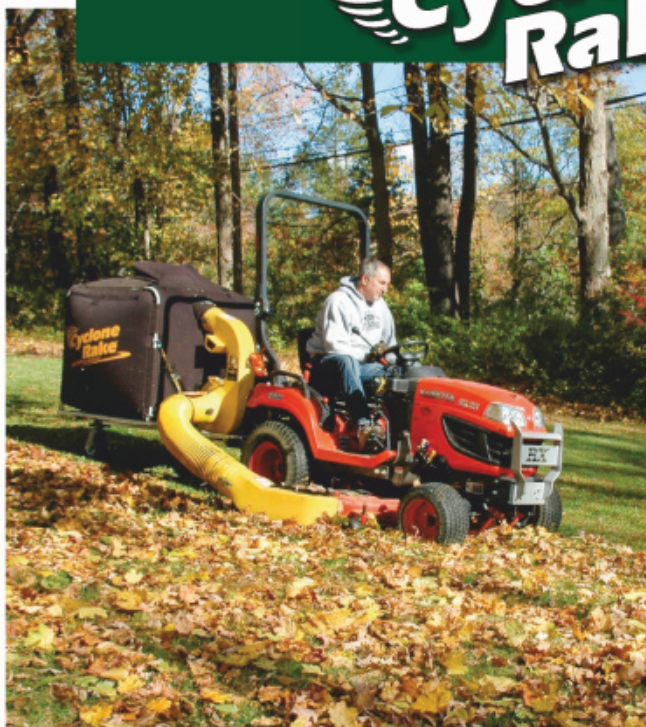
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Saw Bench



► Learn how to use a saw bench.
woodmagazine.com/sawbenchvideo

For sawing with a traditional handsaw, the lower-than-sawhorses working height of this saw bench allows you to use your entire upper body when taking long saw strokes. And when you're not using the bench for sawing, it makes a convenient place to sit down for a break.

D I M E N S I O N S :
27" W x 15½" D x 22" H

Approximate materials cost:

\$75

Consider building a pair of benches for working with sheet goods.

EXPLODED VIEW

3/8" hole 1/4" deep with a 5/32" countersunk shank hole centered inside

#8 x 2" F.H. screw

3/8" tapered wood plug

19"

1 1/2" half-laps

27"

10 3/4"

2 1/2"

2"

2"

1 1/2"

2 1/2"

1 1/2"

1/4" chamfers

1/4" chamfer

3"

27"

1 1/2"

2"

1 1/2" notches 1/2" deep

3/8" tapered wood plug

#8 x 3" F.H. screw

3/8" hole 1/4" deep with a 5/32" countersunk shank hole centered inside

1"

1 3/8"

3/8" hole 1" deep with a 5/32" countersunk shank hole centered inside

#8 x 3" F.H. screw

3"

1 1/2"

1 1/2"

35° bevel

15 1/2"

2 1/2"

1"

1 3/8"

2 1/2"

1 1/2"

3"

1 1/2"

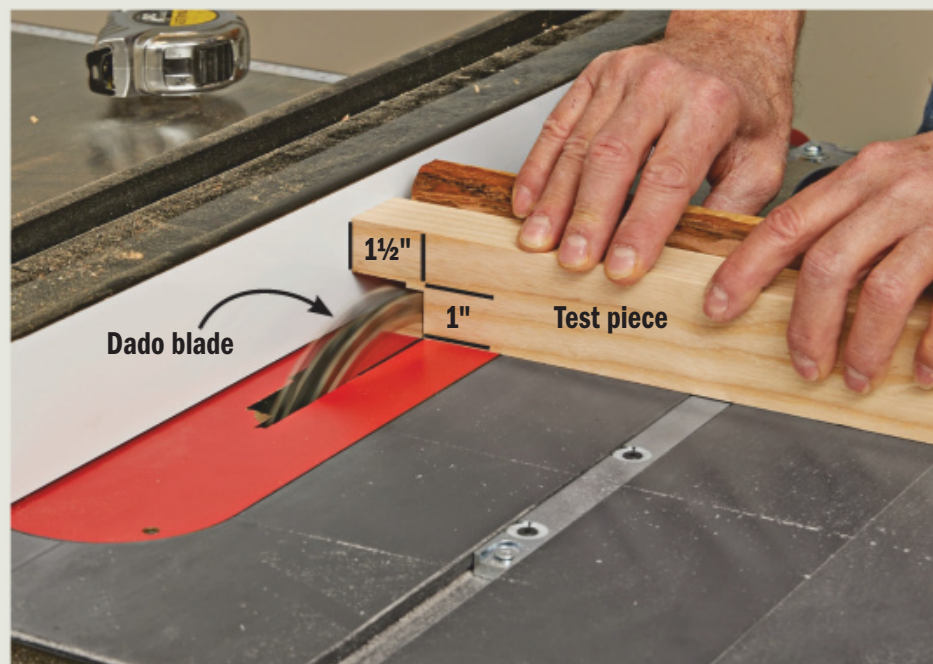
35° bevel

61

SKILL BUILDER

Test cuts ensure perfect-fitting half laps

Using a couple of test pieces that match the thickness and width of your workpieces, notch both pieces and check the fit of the joint to see if the edges line up. If you need to make adjustments to your setup, cut away



Set the dado-blade height to 1". Position the rip fence 1½" from the outside face of the dado blade.

the old joint and cut a new one on the test pieces. Once you're satisfied with the fit, cut the half-laps on the legs (A) and top rails (B).



Fit the two pieces together to see if the ends and faces fit flush. If not, adjust the blade height and/or rip-fence position as needed and repeat the test.

Tip! To create a consistent chamfer with a block plane, draw lines on both faces of the workpiece to indicate the edges of the chamfer. Then, simply plane down to the lines.

► Make perfect-fitting wood plugs.
woodmagazine.com/perfectplugs

4 Measure the width of the tongue on the lower rails (C) and cut the end spacers (D) and center spacers (E) to match [Exploded View]. Chamfer the end spacers (D) and lower rails (C).

5 Glue and clamp the lower rails (C), end spacers (D), and center spacers (E) between the U-shaped leg (A) and top-rail (B) assemblies, making sure that the legs face each other in a mirror-image fashion.

6 After the glue dries, drill the counterbores and shank holes through the outer faces of the legs (A) and drive the screws in place.

7 Glue tapered wood plugs into the counterbores. Trim and sand the plugs flush with the surface.

Add feet and finish

1 Cut the feet (F) and foot pads (G) to size [Materials List]. Bevel the ends of these pieces [Exploded View].

2 Set the two frames of the saw bench upside down and glue the feet in place.

3 Drill counterbores and shank holes through the feet (F) for screws to reinforce the connection [Exploded View]. Drive the screws [Photo B].

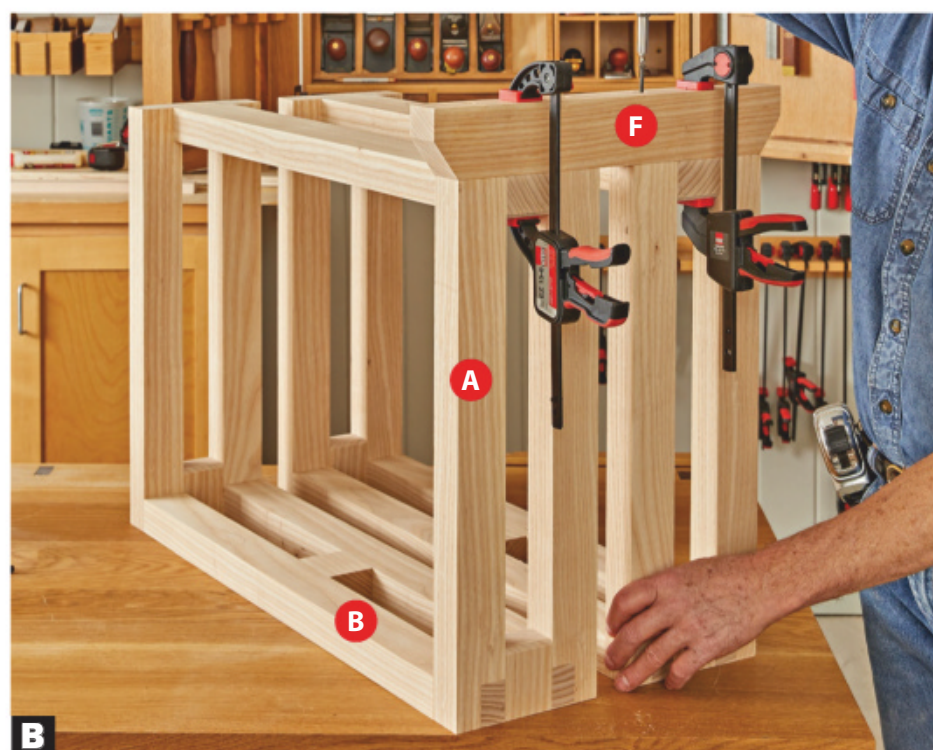
4 Sand the saw bench smooth to 180 grit and ease the sharp edges of the legs, rails, and spacers.

5 Apply a finish of your choice. We used three coats of a 50/50 mix of natural and light walnut Danish oil. 🌳

Produced by **Vincent Ancona** with **John Olson** and **Brian Bergstrom**

Project design: **John Olson**

Illustrations: **Roxanne LeMoine**, **Lorna Johnson**



After drilling 1"-deep counterbores and shank holes, screw the feet to the legs.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A legs	1½"	2"	19"	A	8
B top rails	1½"	2"	27"	A	4
C lower rails	1½"	3"	27"	A	2
D end spacers	1½"	2"	2½"	A	4
E center spacers	1½"	2"	2½"	A	2
F feet	1½"	2½"	15½"	A	2
G foot pads	½"	1½"	3"	A	4

Materials key: A-ash.

Supplies: #8×2" flathead screws, #8×3" flathead screws, ⅜" tapered wood plugs.

Blade: Dado set.



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Table Service

Some drill presses come with thick, deeply grooved tables better suited for metalworking than woodworking. For those machines, an aftermarket table makes good sense, and here are four of our favorites. Each table measures about an inch thick and at least 15×23", providing plenty of workpiece support, and includes T-track for attaching hold-downs, a replaceable center insert, and a fence with at least one stop. They all mount differently, but they should work with almost any drill press with at least 12" of swing.

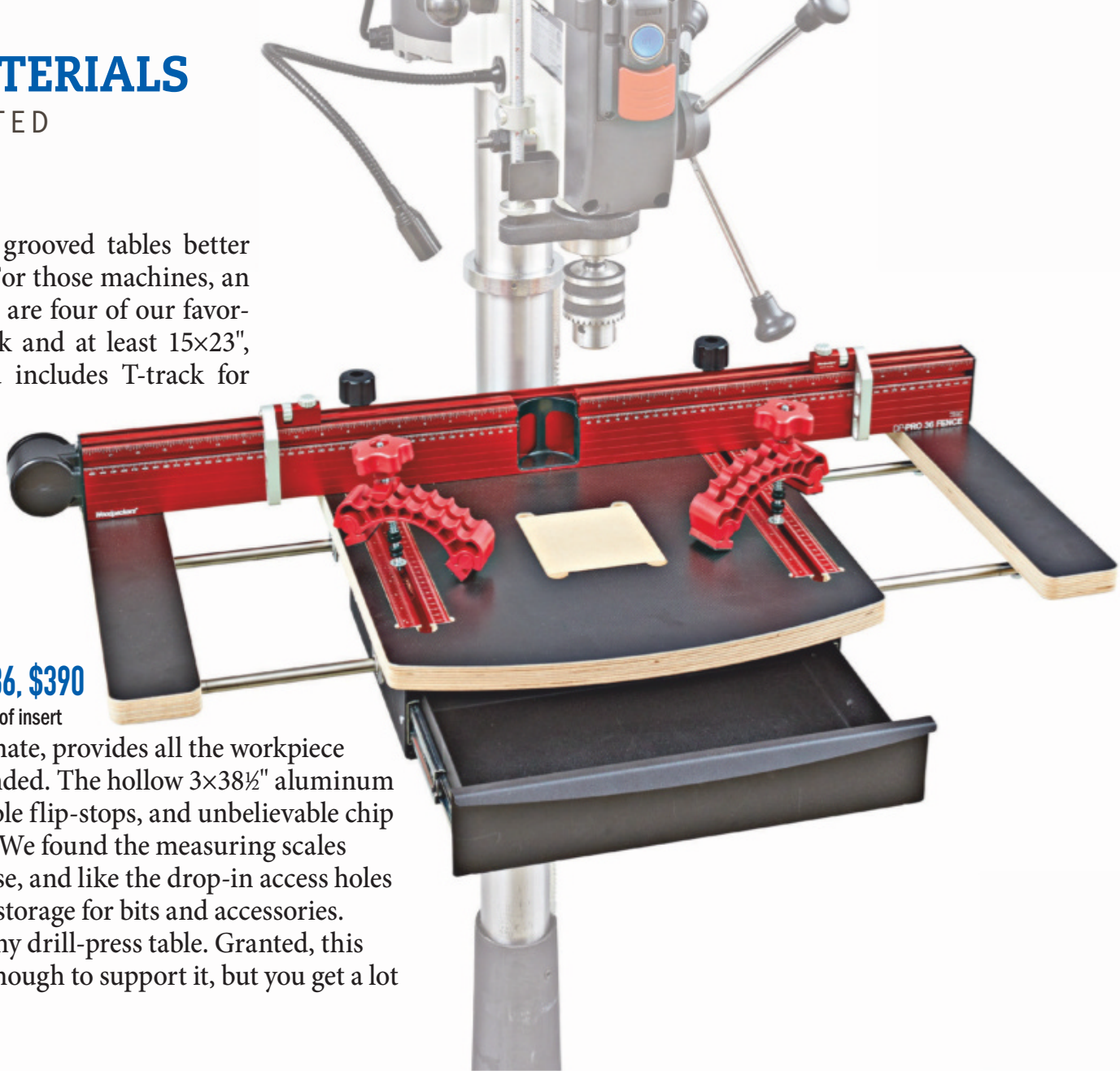
The Ultimate Table

Woodpeckers no. DP-PRO Master System 36/36, \$390

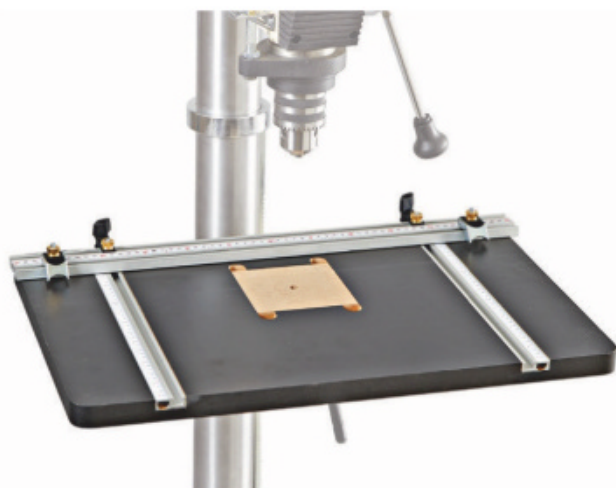
Size: 20×24" (36⅞" extended); maximum 6¾" from fence to center of insert

The plywood table, covered with durable laminate, provides all the workpiece support you'll ever need with both wings extended. The hollow 3×38½" aluminum fence has three T-slots, excellent microadjustable flip-stops, and unbelievable chip collection with a vacuum attached to one end. We found the measuring scales along the table T-tracks accurate and easy to use, and like the drop-in access holes at the front of each. A 10×15" drawer provides storage for bits and accessories. Mounting hardware is included for virtually any drill-press table. Granted, this table costs nearly as much as a drill press big enough to support it, but you get a lot for that investment.

800-752-0725, woodpeck.com



Hinder-free Fence



Woodcraft WoodRiver no. 165953, \$100

Size: 15½×23½"; maximum 3" from fence to center of insert

This melamine-coated MDF table's size works perfectly for a typical shop: big enough to support most workpieces, small enough to not be cumbersome. Its ½"-tall fence will never interfere with the quill-feed handles, but doesn't support tall workpieces as well. (WoodRiver's optional 3"-tall fence [no. 165954, \$80] would help.) We like the solid feel of the fence's locks and flip-stops. The table mounts via screws through slots in the drill-press table, but if your table lacks open slots, you'll need to find another method.

800-225-1153, woodcraft.com

Easy On, Easy Off



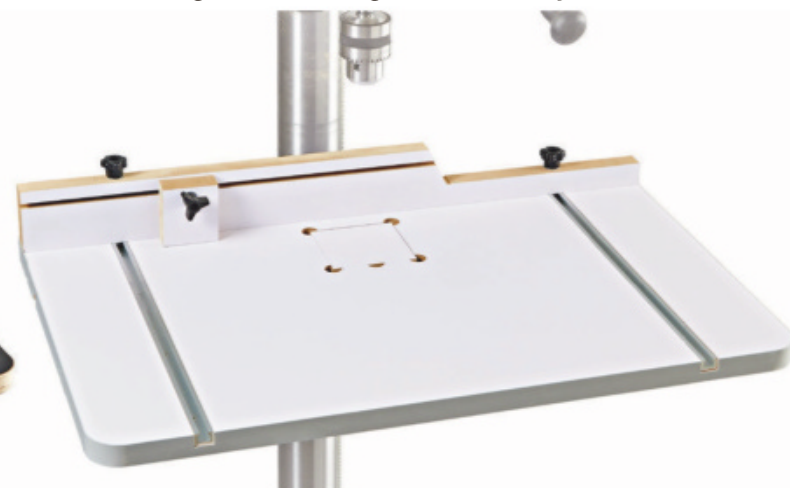
Infinity Tools no. DPT-200, \$170

Size: 15¼×23¼"; maximum 4¾" from fence to center of insert

Two toggle clamps secure this accessory to your drill-press table, meaning you can remove it and reinstall it easily without tools. With four T-tracks and two hold-downs included, you'll have no problems securing even small workpieces. The 2"-tall aluminum fence has three T-slots for securing accessories, and it locks securely and easily. The center insert has built-in leveling screws, a nice touch. Made from 1" plywood and topped with laminate, this rugged table should hold up to years of use.

877-872-2487, infinitytools.com

Big and Budget-friendly



MLCS Woodworking no. 9778, \$85

Size: 20×30"; maximum 5" from fence to center of insert

Although this melamine-coated MDF table will fit any 12" or larger drill press, its large size overpowers machines smaller than 17". Even then, you may find it seems a bit too deep to use easily. (MLCS also sells a 12×24" version of this table [no. 9765, \$60]). The cut-away on the 3"-tall fence provides clearance for the quill-feed handles, and the included stopblock slides in a T-slot. The table T-track accepts standard hold-downs (none included), but their wide spacing might not help for securing small workpieces.

800-533-9298, mlcswoodworking.com

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SHOP-TESTED

Aggressive sander also a smooth operator

6" dual-mode random-orbit sander, no. GET75-6N, \$299

I've happily used a Festool Rotex sander for years, so I was eager to try out Bosch's new dual-mode sander, which sells for half the price of the Rotex. This sander's 6" pad works great for sanding and flattening large surfaces, such as large case parts or tabletops.

I used the GET75-6N in aggressive mode (larger orbits) to quickly flatten and smooth the milling marks from a router-flattened natural-edge tabletop, but as you'd expect, it left significant scratch and swirl marks. Switching to finishing mode (smaller orbits), I worked through a series of abrasives, starting with 120 and continuing through 220, until the workpiece was mostly free of sanding marks. Not a concern, though—I'd normally hand-sand with 220- or 320-grit at this stage, anyway, to remove those marks.

The sander balances well, but it's definitely a two-hand tool. It comes with a screw-on right-angle handle, but I prefer holding it with one hand on the top grip and the other on the barrel. The sanding pad has dozens of holes for dust collection, but we had difficulty finding sanding discs to match. So our dust collection was good, but could have been better with a disc matched perfectly to the pad. (Bosch's Brittany Buchanan said Bosch is working to create sanding discs to match.)

—Tested by John Olson, Design Editor

877-267-2499, boschtools.com



Air-scrubbing tower of power

Stratus air-filtration system, no. AS300, \$499

Axiom's Stratus makes air filtration more portable and localized. Rather than mounting to a ceiling like box-type air-filtration units, the Stratus stands on its own base and can be placed where you're creating dust, helping it clear the air quicker. It draws air in through the holes in its cylindrical body, where it gets drawn through a washable prefilter and finally a 1-micron pleated canister filter. I like that it pulls dusty air downward, away from my nose and mouth, reducing the chance of breathing in dust.

To test its effectiveness, I turned Stratus on and then made repeated passes of MDF through a drum sander outfitted with 80-grit abrasive and no dust collection. In each trial, the Stratus restored the air to the pre-test cleanliness level in just under an hour at high speed—quicker than most traditional air-filtration units. It has three fan speeds, and with much more filter area than most boxy units, it can filter longer without cleaning or losing valuable airflow.

But this efficiency comes with a trade-off: Stratus is noisy. I measured its noise level at 81 decibels on high speed, below the standard of 85 dB where hearing protection is required.

—Tested by Tom Brumback

Axiom Tool Group
844-642-4902, axiomstratus.com



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Limit 1 coupon per customer per day. Save 20% on any 1 item purchased. *Cannot be used with other discount, coupon or any of the following items or brands: In the Truck Club membership, Extended Service Plan, gift card, soap, hair line, 3-day, 5-day, 7-day, 10-day, 15-day, 20-day, 25-day, 30-day, 35-day, 40-day, 45-day, 50-day, 55-day, 60-day, 65-day, 70-day, 75-day, 80-day, 85-day, 90-day, 95-day, 100-day, 105-day, 110-day, 115-day, 120-day, 125-day, 130-day, 135-day, 140-day, 145-day, 150-day, 155-day, 160-day, 165-day, 170-day, 175-day, 180-day, 185-day, 190-day, 195-day, 200-day, 205-day, 210-day, 215-day, 220-day, 225-day, 230-day, 235-day, 240-day, 245-day, 250-day, 255-day, 260-day, 265-day, 270-day, 275-day, 280-day, 285-day, 290-day, 295-day, 300-day, 305-day, 310-day, 315-day, 320-day, 325-day, 330-day, 335-day, 340-day, 345-day, 350-day, 355-day, 360-day, 365-day, 370-day, 375-day, 380-day, 385-day, 390-day, 395-day, 400-day, 405-day, 410-day, 415-day, 420-day, 425-day, 430-day, 435-day, 440-day, 445-day, 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1005-day, 1010-day, 1015-day, 1020-day, 1025-day, 1030-day, 1035-day, 1040-day, 1045-day, 1050-day, 1055-day, 1060-day, 1065-day, 1070-day, 1075-day, 1080-day, 1085-day, 1090-day, 1095-day, 1100-day, 1105-day, 1110-day, 1115-day, 1120-day, 1125-day, 1130-day, 1135-day, 1140-day, 1145-day, 1150-day, 1155-day, 1160-day, 1165-day, 1170-day, 1175-day, 1180-day, 1185-day, 1190-day, 1195-day, 1200-day, 1205-day, 1210-day, 1215-day, 1220-day, 1225-day, 1230-day, 1235-day, 1240-day, 1245-day, 1250-day, 1255-day, 1260-day, 1265-day, 1270-day, 1275-day, 1280-day, 1285-day, 1290-day, 1295-day, 1300-day, 1305-day, 1310-day, 1315-day, 1320-day, 1325-day, 1330-day, 1335-day, 1340-day, 1345-day, 1350-day, 1355-day, 1360-day, 1365-day, 1370-day, 1375-day, 1380-day, 1385-day, 1390-day, 1395-day, 1400-day, 1405-day, 1410-day, 1415-day, 1420-day, 1425-day, 1430-day, 1435-day, 1440-day, 1445-day, 1450-day, 1455-day, 1460-day, 1465-day, 1470-day, 1475-day, 1480-day, 1485-day, 1490-day, 1495-day, 1500-day, 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2005-day, 2010-day, 2015-day, 2020-day, 2025-day, 2030-day, 2035-day, 2040-day, 2045-day, 2050-day, 2055-day, 2060-day, 2065-day, 2070-day, 2075-day, 2080-day, 2085-day, 2090-day, 2095-day, 2100-day, 2105-day, 2110-day, 2115-day, 2120-day, 2125-day, 2130-day, 2135-day, 2140-day, 2145-day, 2150-day, 2155-day, 2160-day, 2165-day, 2170-day, 2175-day, 2180-day, 2185-day, 2190-day, 2195-day, 2200-day, 2205-day, 2210-day, 2215-day, 2220-day, 2225-day, 2230-day, 2235-day, 2240-day, 2245-day, 2250-day, 2255-day, 2260-day, 2265-day, 2270-day, 2275-day, 2280-day, 2285-day, 2290-day, 2295-day, 2300-day, 2305-day, 2310-day, 2315-day, 2320-day, 2325-day, 2330-day, 2335-day, 2340-day, 2345-day, 2350-day, 2355-day, 2360-day, 2365-day, 2370-day, 2375-day, 2380-day, 2385-day, 2390-day, 2395-day, 2400-day, 2405-day, 2410-day, 2415-day, 2420-day, 2425-day, 2430-day, 2435-day, 2440-day, 2445-day, 2450-day, 2455-day, 2460-day, 2465-day, 2470-day, 2475-day, 2480-day, 2485-day, 2490-day, 2495-day, 2500-day, 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3005-day, 3010-day, 3015-day, 3020-day, 3025-day, 3030-day, 3035-day

ITEM 63409/62750 shown **44013726** **LIMIT 1** - Exp. 9/21/20

ITEM 64911/62725 shown

Blue Hawk
77280
\$19.99
ITEM 69505/62418/6

ITEM 64434, 56105, 64432,
56104, 64162, 56106

Compare to
Dewalt
DW1369

Use Online

89%
Compare to

ITEM 60497/63095
63096/63097/63098

T830018Z
\$189.99
ITEM 56618/56619
56620/56617 shown

Compare to
Irwin
1964718

**Compare to
Porter-Cable**

Compare to
Grizzly
H7723
\$399.95

Compare to
Dewalt
DWHT16062

Compare to
Dewalt
DXV06P
\$76.63

Compare to
Husky
H4840GHVSG
\$49.98

Tools sold separately.

SCISSOR SUPER COUPON

CENTRAL MACHINERY ★★★★★ (962)

70 Gallon, 2 HP Heavy Duty High Flow, High Capacity Dust Collector

\$179⁹⁹

~~\$209⁹⁹~~ **Save \$226**

Compare to Shop Fox W1685 \$405.99
ITEM 61790/97869 shown

Use Online & In-Store

44 051 366 **LIMIT 1** - Exp. 9/21/20*



SCISSOR SUPER COUPON

HARDY ★★★★★ (5077)

5 Mil Powder-Free Nitrile Gloves Pack Of 100

\$5⁹⁹

~~\$8⁹⁹~~ **Save 59%**

12¢ PER PAIR

NOW AVAILABLE IN GREEN (L, XL)
ITEM 51022, 50922

AVAIL. IN SM, MED, LG, XL, XXL

Compare to Venom VEN4145 \$14.97
ITEM 56922, 56923, 64417, 61363, 68496, 68497, 61360, 61359, 68498, 64418 shown

Use Online & In-Store

44 052 381 **LIMIT 4** - Exp. 9/21/20*



SCISSOR SUPER COUPON

Bauer ★★★★★ (368)

15 AMP, 12-1/2" Portable Thickness Planer

\$299⁹⁹

~~\$349⁹⁹~~ **Save \$149**

Compare to DeWalt DW734 \$449
ITEM 63445

Use Online & In-Store

44 052 430 **LIMIT 1** - Exp. 9/21/20*



Powerful 15A, 9400 RPM motor for faster, smoother cuts in hardwood

Four-carriage frame reduces the movement that causes snipe

Two-knife cutter head leaves a blemish-free surface

Extra long in-feed and out-feed tables provide over 31" of material support

Handles lumber 12-1/2" wide to 6" thick



SCISSOR SUPER COUPON

PITTSBURGH ★★★★★ (447)

60" Aluminum F-Style Bar Clamp

LIFETIME WARRANTY

\$10⁹⁹

~~\$16⁹⁹~~ **Save 69%**

Compare to Shop Fox D2468 \$35.95
ITEM 60673

Use Online & In-Store

44 053 234 **LIMIT 4** - Exp. 9/21/20*



SCISSOR SUPER COUPON

CENTRAL MACHINERY ★★★★★ (2264)

8", 5 Speed Benchtop Drill Press

\$54⁹⁹

~~\$69⁹⁹~~ **Save 31%**

Compare to WEN 4208 \$79.97
ITEM 62520/60738 shown

Use Online & In-Store

44 057 633 **LIMIT 2** - Exp. 9/21/20*



SCISSOR SUPER COUPON

CENTRAL MACHINERY ★★★★★ (683)

Universal Tool Stand

\$29⁹⁹

~~\$39⁹⁹~~ **Save 41%**

Compare to Powertec UT1002 \$51.27
ITEM 69005

Use Online & In-Store

44 058 926 **LIMIT 3** - Exp. 9/21/20*



SCISSOR SUPER COUPON

McGRAW ★★★★★ (605)

20 Gallon, 135 PSI Oil-Lube Air Compressor

\$164⁹⁹

~~\$189⁹⁹~~ **Save \$85**

Compare to Porter-Cable 118903799 \$249.99
ITEM 56241/64857 shown

Use Online & In-Store

44 059 160 **LIMIT 1** - Exp. 9/21/20*

2x LIFE
25% QUIETER
27% MORE RUN TIME



SCISSOR SUPER COUPON

CENTRAL MACHINERY ★★★★★ (415)

12" x 33-3/8" Wood Lathe with Reversible Head

\$299⁹⁹

~~\$399⁹⁹~~ **Save \$140**

Compare to Jet J708352 \$440
ITEM 34706

Use Online & In-Store

44 062 291 **LIMIT 1** - Exp. 9/21/20*



SCISSOR SUPER COUPON

drillmaster ★★★★★ (1228)

1/4", 2.4 AMP Trim Router

\$19⁹⁹

~~\$29⁹⁹~~ **Save \$79**

Compare to Makita RT0701C \$99
ITEM 62659/61626/64314 shown

Use Online & In-Store

44 062 844 **LIMIT 4** - Exp. 9/21/20*



SCISSOR SUPER COUPON

CENTRAL MACHINERY ★★★★★ (327)

14" Oscillating Spindle Sander

\$109⁹⁹

~~\$149⁹⁹~~ **Save \$43**

Compare to Triton Tools TSPS450 \$152.99
ITEM 62146/69257 shown

Use Online & In-Store

44 063 922 **LIMIT 1** - Exp. 9/21/20*



SCISSOR SUPER COUPON

4 Piece Anti-Fatigue Foam Mat Set ★★★★★ (2934)

\$6⁹⁹

~~\$8⁹⁹~~ **Save 65%**

Compare to Norsk 061119346 \$19.99
ITEM 40187/61607/62381/94635 shown

Use Online & In-Store

44 069 017 **LIMIT 3** - Exp. 9/21/20*



SCISSOR SUPER COUPON

PITTSBURGH ★★★★★ (886)

6" Digital Caliper

Includes two 1.5v SR44 button cell batteries.

\$9⁹⁹

~~\$17⁹⁹~~ **Save 66%**

Compare to Husky 1467H \$29.97
ITEM 63711/61585/62381/47257 shown

Use Online & In-Store

44 076 828 **LIMIT 4** - Exp. 9/21/20*

SAE AND METRIC



SCISSOR SUPER COUPON

Pierce ★★★★★ (254)

18 Gauge Brad Nailer

\$49⁹⁹

~~\$59⁹⁹~~ **Save 44%**

Compare to Metabo NT50AE2M \$89.98
ITEM 64255

Use Online & In-Store

44 077 368 **LIMIT 3** - Exp. 9/21/20*



SCISSOR SUPER COUPON

WINDSOR DESIGN ★★★★★ (192)

Dovetail Jig

\$27⁹⁹

~~\$37⁹⁹~~ **Save 40%**

Compare to General Tools 861 \$47.16
ITEM 34102

Use Online & In-Store

44 079 382 **LIMIT 2** - Exp. 9/21/20*



SCISSOR SUPER COUPON

BRAUN ★★★★★ (7828)

5000 Lumen 4 ft. LED Hanging Shop Light

\$19⁹⁹

~~\$29⁹⁹~~ **Save 33%**

ITEM 64410

Use Online & In-Store

44 086 002 **LIMIT 3** - Exp. 9/21/20*



SCISSOR SUPER COUPON

drillmaster ★★★★★ (1105)

1/4" Sheet Orbital Palm Sander

\$9⁹⁹

~~\$13⁹⁹~~ **Save 66%**

Compare to BLACK + DECKER BDEQS300 \$29.98
ITEM 61509/61311 shown

Use Online & In-Store

44 091 462 **LIMIT 4** - Exp. 9/21/20*



SCISSOR SUPER COUPON

FRANKLIN ★★★★★ (862)

Heavy Duty Portable Scaffold

\$169⁹⁹

~~\$199⁹⁹~~ **Save \$90**

Compare to Baker I-CISCNB \$260.40
ITEM 63051/63059 shown

Use Online & In-Store

44 093 475 **LIMIT 1** - Exp. 9/21/20*



SCISSOR SUPER COUPON

Apache MODEL 2800 ★★★★★ (1137)

Ultra-Light, Crush-Proof, Weather-Resistant Lockable Case

\$21⁹⁹

~~\$27⁹⁹~~ **Save \$215**

Compare to Pelican 1400 \$237.63
ITEM 63926/64551 shown

Use Online & In-Store

44 096 377 **LIMIT 3** - Exp. 9/21/20*

Case contents and locks not included.



SCISSOR SUPER COUPON

DB DIAMONDBACK ★★★★★ (348)

7" Tile Saw with Sliding Table

\$229⁹⁹

~~\$269⁹⁹~~ **Save \$109**

Compare to Kobalt KWS S7-06 \$339
ITEM 64683

Use Online & In-Store

44 097 615 **LIMIT 1** - Exp. 9/21/20*



TOOLS & MATERIALS

NEW AND UNTESTED



Ridgid launches subcompact 18-volt tools

Using the same 18-volt battery packs as its current lineup of full-size tools, Ridgid says their new subcompact tools are 30 percent smaller, 35 percent lighter, and use brushless motors. The line consists of:

- a $\frac{3}{8}$ " impact wrench (no. R87207B, without batteries or charger, \$139)
- a $\frac{1}{4}$ "-hex-chuck impact driver (sold only in a combo kit, no. R9780, \$199), with the shown drill/driver
- a $\frac{1}{2}$ " drill/driver with 24-position clutch and two speed ranges (no. R8701K, including two batteries and charger, \$149)

■ and a 3" multimaterial circular saw (no. R87547B, without batteries or charger, \$99)

Other combo kits are available online.

Ridgid
866-539-1710, ridgidpowertools.com

Titebond rolls out quick-set wood glue

Speed Set wood glue, 1 gallon, \$30

Titebond's new glue sets twice as fast as other PVA glues, according to Franklin International, maker of Titebond. The company says Speed Set has an 8–10 minute assembly time, and requires just 15 minutes of clamp time to bond. And, they say, this glue better fills small gaps because it contains more solids than other Titebond PVA glues. The initial launch has Speed Set available only in 1-gallon or larger containers.

Franklin International
800-347-4583, titebond.com



Box Bonanza Bundle

25 downloadable box plans for \$35!



woodstore.net/boxbonanza

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family. Great compensation.
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vacation schedule.
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Cleans paper or cloth belts instantly.
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- ✓ Non-Flammable
- ✓ Biodegradable



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Work Better Than A New One?**



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- Low Maintenance
- Custom Designs
- Cleaner Air
- Longer Life
- Economical
- Best Size & Fit
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In Stock!**

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Woodworker's Marketplace

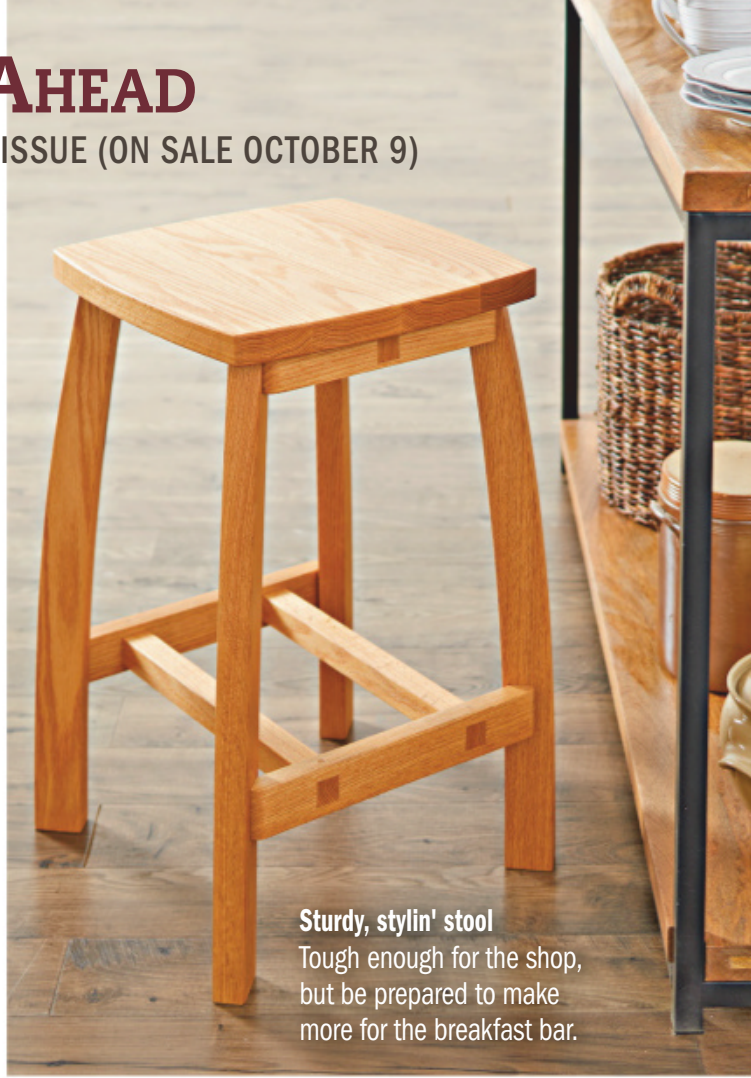
WHAT'S AHEAD

A GLIMPSE INSIDE THE NOVEMBER ISSUE (ON SALE OCTOBER 9)



Bathroom beauty

This modular design gives you *beaucoup* options based on your room size, configuration, and storage needs.



Sturdy, stylin' stool

Tough enough for the shop, but be prepared to make more for the breakfast bar.



Before you buy: air compressors

Whether mini- or monster-size, every workshop needs a compressor. Here's what to look for.



Table-tennis table

Family game night just got gorgeous with this regulation-size entertainment system.



Brush tips from a pro

Professional finisher Diane Shattuck simplifies your choice of brushes and what to use when.



Penn State Industries
1-800-377-7297 • www.pennstateind.com

More Power! More Features! More Fun!

Packed with features, the Turncrafter Commander™ midi lathes are the most advanced, powerful and easy to use lathes in their class. These 10" and 12" swing workhorses will help you easily, effectively and affordably tackle all your turning projects. Satisfy all of your woodturning needs at Penn State Industries with turning tools, chucks, pen kits, pen turning supplies, projects and more. Now ETL listed!

Our customers love their Turncrafter Lathes!

David H. wrote, "TOP OF THE LINE LATHE!!!! I have just received this set and was astonished at the beauty and quality! I couldn't have ordered a better product. Very easy to use and I recommend this to any newcomer to this hobby or business."



Our Pen Making Starter Sets make it easy to start making pens!

QUICK SPECIFICATIONS		
Model	10" Swing Variable Speed	12" Swing Variable Speed
Belt Positions	2 positions	2 positions
Speeds	Variable 500-1800 1000-3800 RPM	Variable 400-1900 900-3800 RPM
Motor Power	3/4 HP	1 HP
Headstock	1" x 8tpi, #2MT	1" x 8tpi, #2MT
Between Centers	18"	18"
Weight	82 lbs.	106 lbs.
Footprint	31" x 7-1/4"	31" x 9-1/2"
INCLUDED WITH LATHE PURCHASE		
Toolrest(s)	6" & 12" toolrests	6" & 12" toolrests
Faceplate	3" faceplate	3" faceplate
#2 Spur Center Heavy-duty	included	included
Tailstock Center	included	included

	10" Swing Variable Speed			12" Swing Variable Speed		
	Lathe Only \$369. ⁹⁵	Basic Starter Set \$426. ⁶⁵	Advanced Starter Set \$647. ⁸⁵	Lathe Only \$459. ⁹⁵	Basic Starter Set \$499. ⁶⁵	Advanced Starter Set \$727. ⁴⁵
UPS Shipping Cost	\$50	\$58	\$60	\$55	\$65	\$65
Item #	#KWL-1018VS	#KWL-10SSB	#KWL-10SSA	#KWL-1218VS	#KWL-12SSB	#KWL-12SSA
Lathe	√	√	√	√	√	√
Slimline Pen Kits		5 (24kt Gold)	20 (Variety)		5 (24kt Gold)	20 (variety)
Slimline Pencil Kits		5 (24kt Gold)	20 (Variety)		5 (24kt Gold)	20 (variety)
Pen Mandrel		√	√		√	√
Mandrel Wrench			√			√
3pc Carbon Steel Chisels		√			√	
Mini Pen Blank Mix		√ (Makes 10 kits)	√ (Makes 40 kits)		√ (Makes 10 kits)	√ (Makes 40 kits)
Mid Cure Epoxy Glue		√	√		√	√
7mm Barrel Trimmer		√	√		√	√
Tube Insertion Tool			√			√
Shellawax Creame		√ (30ML)	√ (250ML)		√ (30ML)	√ (250ML)
Pen Assembly Press			√			√
Pen Making DVD		√	√		√	√