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UNDER THREAT

DOES WOODWORKING FACE AN EXISTENTIAL CRISIS DUE TO RISING LUMBER COSTS?

A recent reader letter encapsulated sentiment we see regularly–especially in a tough economy. Recently retired, he was expecting to ramp up his shop time only to find that lumber and plywood prices were prohibitively high for the project he wanted to build.

"Are high lumber prices here to stay? Should I give up and sell my tools? Do I confine myself to projects requiring less material or cheaper species of wood? Do lumber prices threaten our hobby?"

Are high lumber prices here to stay?

Probably. Lumber prices are in constant flux–like other costs of goods, easily climbing upward, reluctant to descend again. As a natural resource, lumber's price is not only susceptible to market demands and unexpected world events, but natural and regional forces. So, in addition to a pandemic, an Eastern European war, and interior design trends, prices contend with climate events, natural disasters, infestations, and regional availability. On *page 64*, we discuss working with reclaimed lumber, a potential money-saver. And the link *below* suggests other savings opportunities. There are almost always ways to save.

But is your hobby threatened? I'd answer that question with this one: Which part is your hobby?

I asked that question of myself when I felt my hobby was threatened after it became part of my job. Finding joy in woodworking became more difficult when it was also my day-to-day work.

When I thought about the parts of woodworking that gave me joy and the parts that gave me pause, I realized that the only thing threatening my hobby was the way I defined it around metrics that so closely resembled my job duties: output volume, deadline obligations, demands from "the boss," and budget constraints.

When I detached those burdens from my hobby, the things that I enjoyed about woodworking–being lost in thought while I worked with my hands, learning a new skill, crafting something purely for my own enjoyment–remained largely untouched. In point of fact, they became amplified. *Those* are the parts that make up *my* hobby. *None* of them require large projects or an expensive species of wood.

When we reduce our view of our hobby to things like cost; size of project; or a specific technique, tool, or material, I suspect we've partitioned our joy into a box we will find difficult to open.

I certainly don't want to be dismissive of anyone's financial situation, but I also don't think anyone that's been woodworking for any length of time can, with honesty, claim surprise at its expense. Once again with passion, dear reader: *Life imitates woodworking*! When you seek, you can always find external reason for outrage, or hopelessness, or simply an excuse to quit. When the joy is inside, those external forces are storms that pass by your settled soul. Loud? Often. Intimidating? On occasion. But never a threat.

Lucas

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See tips on finding cheaper lumber in your area at woodmagazine.com/lowcostlumber

WOOD®

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DIRTY OR CLEAN?

Your insights on the dichotomy of us shop-types in May 2023's *Taking Measure* (issue 288) were spot-on: for some, just being in the shop is good enough. Ironically, I (occasionally) enjoy cleaning up my shop but I usually don't stick to that, either. I now feel much less guilty with your reminder: "It's a hobby!"

John B. Herman, M.D.
Boston, Massachusetts

After reading your column, I am sure enough "Team Dirty." I have a working shop, not a "pretty boy" shop. The shop measures 14×20' and it is my shop, so if you are looking for nice, don't bother to stop by!

Derryl Nelson
Sweetwater, Texas

I am from the dark side. I am still working on a shed workshop but never seem to have enough time. The "honey-do" list, grandkids, great grandkids, houses, two cars, and two boats eat up time.

At age 79, I think I am doing good. My shop isn't picture-perfect but I sure enjoy my time there. Your article gives me permission to be OK with myself.

Cal Van Meter
Clayton, North Carolina

WATCH THOSE CURVES!

I really enjoyed making this beautiful table featured in issue 172 (October 2006). It challenged my woodworking skills with the shaped legs, elliptical top, and bent-wood curved apron. I made the legs from alder, the apron from birch plywood, and the top from padauk. I finished it with Waterlox Original Formula gloss. As with all my projects, it's not perfect, but I'm getting better at hiding my mistakes.

Dennis Johnson
via email

That table looks fantastic, Dennis! Every woodworker is critical of their own projects. Woodworking is not only an opportunity to show off your craftsmanship but also come up with creative ways to cover your mistakes. I've always said if anyone gets close enough to point out the mistakes, kindly ask them to leave!

Kevin Boyle
Senior Design Editor

WORKBENCH UPGRADES

I customized my workbench much like you did in the article from issue 287 (March 2023). I started with an inexpensive hardwood bench from Harbor Freight. After adding casters, I reinforced it with heavier screws and plugged all the holes. Cross-bracing and an MDF lower shelf make it even sturdier.

For utility, I added T-track into the top, a second vise I picked up at a public sale, a tool tray, and a deadman. I replaced the slides with full-extension versions. To gain the needed clearance for the slides, I ganged pairs of drawers together and joined them with a double-length false front. I splurged on iron pulls instead of reusing the wooden ones that came with the bench. All told, my investment was less than $250.

Jim Moyer
Reading, Pennsylvania

STATIC ELECTRICITY

In your "Dust Collector Basics" article in issue 286 (Dec. 2022/Jan. 2023), I was disappointed to see that static electricity safety and grounding were not addressed.

Many years ago, I ran metal ductwork across the ceiling and added a blast gate at the end with a 4" flex hose connected to the planer. While planing a few boards, the shavings that did not get sucked into the hose came out on the top of the board and rose up off the board from the static electricity. To correct this, I found a flexible hose with an integrated wire. The wire grounds the planer to the dust collector through the metal ductwork. This eliminated the static.

Gary Fuess
via email

Thanks for your concern, Gary. Many woodworkers will repeat the warning that static discharges can set off fires or explosions. While this has been known to happen in facilities producing fine dust on an industrial scale, the jury's still out on whether it is really a safety concern in a home workshop. We've been unable to find a credible reference of this happening in a small shop. At the most, you might get an alarming static shock. Our stance is that if grounding your system makes you rest easier, then by all means do so. It certainly can't do any harm for peace of mind.

Randy Maxey
Contributing Editor

Good find, Paul. You have the Sargent bullnose rabbet plane—what collectors call a "Ladybug" or "Beetle" for its unique shape. You managed to snag one for only a dollar or two more than its original early-20th-century retail price.

John Olson
Design Editor

A PLANE DEAL

I just read your article about shoulder planes in issue 287 (March 2023). I thought I would share a photo of the Sargent no. 1506 shoulder/rabbet plane that I picked up several years ago for $6 in a Habitat for Humanity ReStore.

I've seen these valued for way more than that, but mine's not for sale. Some tools are just too good not to use.

It was a bit dirty, but had no rust when I picked it up. A little elbow grease and sharpening got it up and running. I've seen these valued for way more than that, but mine's not for sale. Some tools are just too good not to use.

Paul Welter
Pewaukee, Wisconsin

PAUL SCHENK of Dunwoody, Georgia, helped his dad build this bridge when he was much younger. His dad hand-cut all the timber from pine. Paul's job was to cut and install all the cross members and the roughly 1,200 "nuts and bolts"—one at each joint. Overall, the bridge is 30" long and 19" tall. Paul has been modeling HO-scale train layouts since his first Lionel kit as a youngster.

Not satisfied with the thought of buying an ordinary gift for his four children, **GEORGE SIERACKI** of Oconomowoc, Wisconsin, took on the task of designing and building not one, but four chessboards from birch and mahogany. The storage drawers snap closed using rare-earth magnets to keep the pieces from spilling during transport. George says learning how to use his new router table was a bit of a challenge, as was applying flocking to the drawers. Great job, George!

When **BOB SAMPSON** of Lakeland, Florida, built this cradle for his expectant granddaughter, he never expected that his great granddaughter would be born the next Christmas day. Bob says that at just under six lbs., this special Christmas gift takes up very little space in her new cradle and seems perfectly content as she swings gently.

Purchase plans for this Pendulum Cradle at woodstore.net/pendulumcradle

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.***

SCOTT VETTER of Round Rock, Texas, made a shortened version of the "Beefy and Beautiful Bench" (issue 273, March 2021) using hickory for the base and mahogany with inlaid hickory for the top. Scott took advantage of technology to assist with the build, using CAD to create templates for the curves and a 3D-printed base for his plunge router to rout the curves on the stretcher.

Purchase plans for the Beefy and Beautiful Bench:
woodstore.net/beautifulbench

With nothing more than a photo from a catalog to use as a reference, **EDWARD ZIEVERINK** of Cleves, Ohio, built this display case from mahogany hardwood, mahogany plywood, and bending plywood. He made it smaller to fit the space in the room.

ENGINEER'S EDEN

The tablesaw with its large auxiliary table occupies the center of the shop. Plenty of lighting, power receptacles, and a spacious layout make shop time more efficient and enjoyable.

When a mechanical engineer designs a workshop, the result is an eclectic mix of machinery to produce expertly crafted woodworking projects.

WRITER: RANDY MAXEY

Dennis Wilson inherited his father's desire to build things. He enjoys traveling to exotic locations around the world as much as spending time in his workshop.

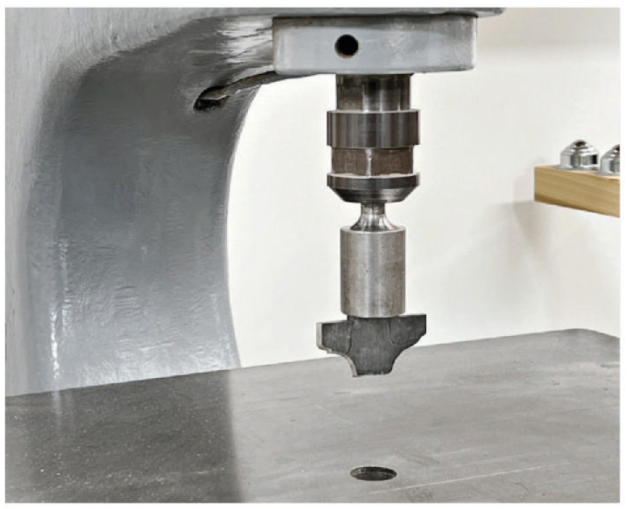
After setting up six home workshops at previous residences, Dennis Wilson knew what he wanted in his new shop after moving to central Ohio. As a retired mechanical engineer, he designed a shop with a spacious floor plan and a unique blend of tools, including machine- and production-shop tools repurposed for his woodworking hobby.

At first, Dennis used the size of his most recent shop as a basis for his new layout. He made a scale drawing of the floor plan and cut out paper templates representing tools, benches, cabinets, and storage racks to help him determine a good workflow for maneuvering full sheets of plywood and 8' lengths of lumber. But he soon realized his proposed floor plan was too small. His solution was to expand it to the final 30×46' structure.

His new shop features a concrete floor with integrated radiant heating for comfort and has 10' ceilings. A half bath offers convenience, while a dedicated room displays completed pieces and souvenirs from his world travels. Bookcases in this room house Dennis's extensive library of books and magazines.

A dedicated 200-amp electric panel supplies ample power for the shop full of tools. Dennis created four specific lighting zones to supplement the general shop lighting. All lighting is supplied using LED fixtures.

Dennis installed the ductwork for the Oneida 3-hp cyclone dust collector and outfitted it with three remote switches to turn the unit on or off. Three of his five shop vacuums are dedicated to machines, which helps with shop cleanup.

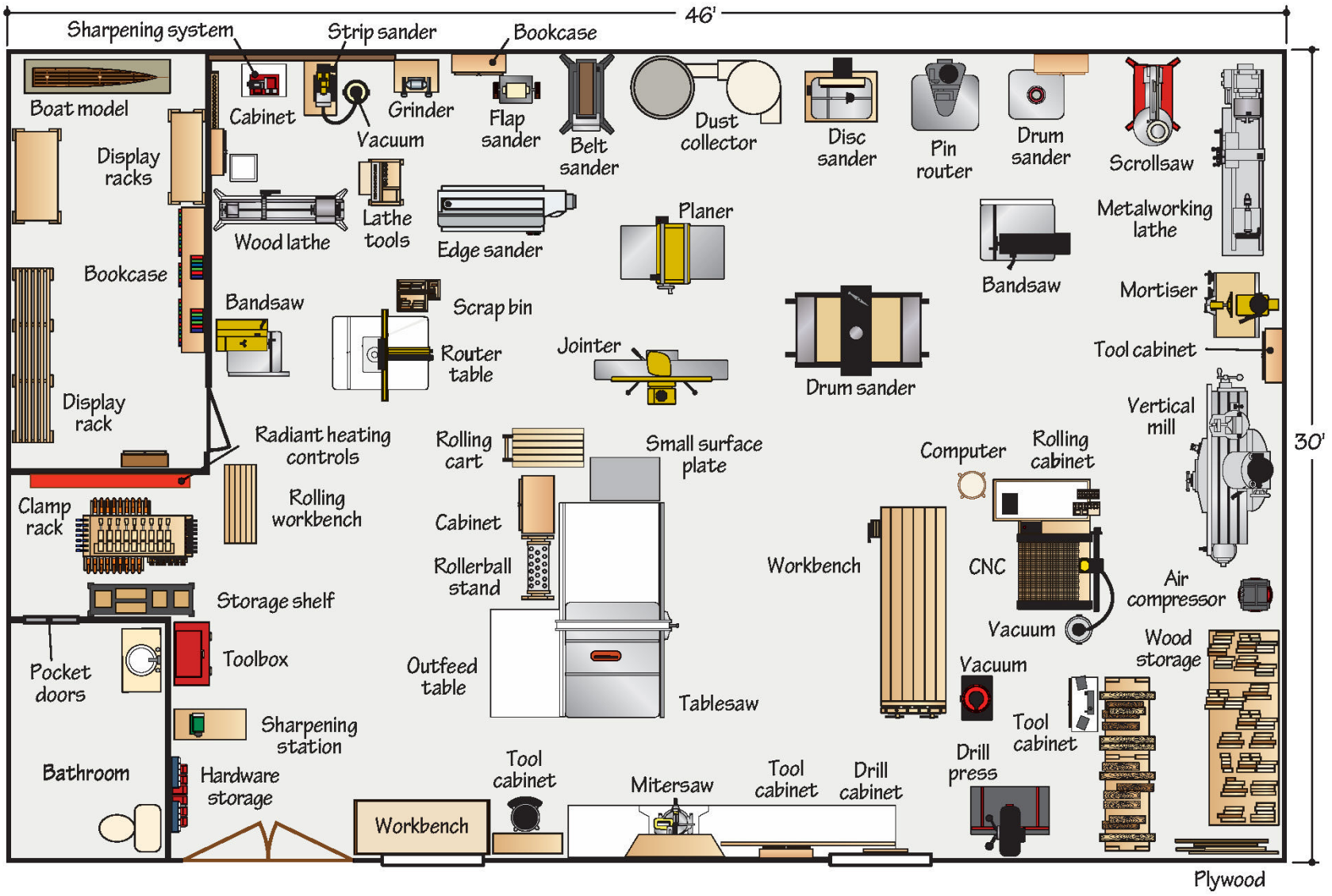


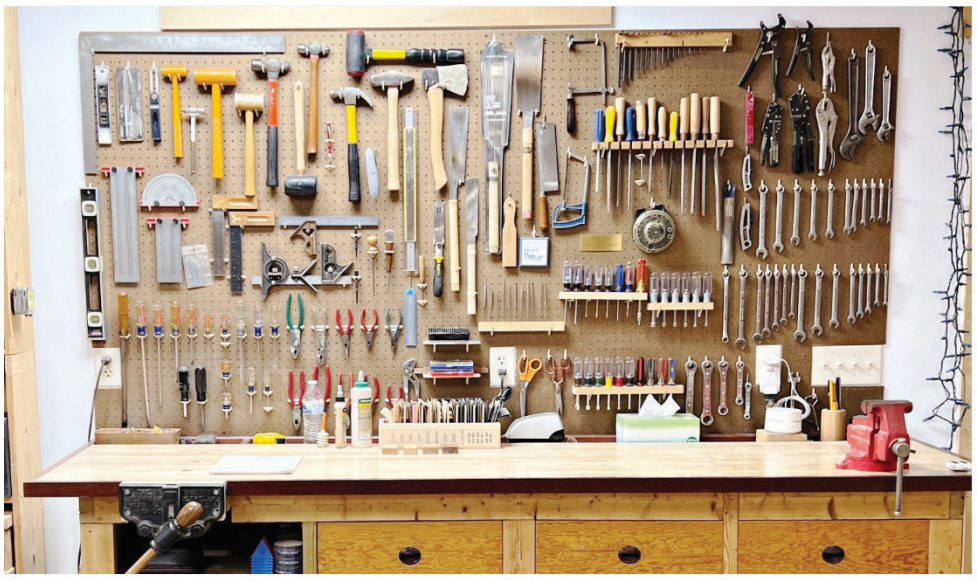
The industrial overarm pin router is ideal for pattern-routing. Dennis grinds custom bits from tool steel to create unique edge profiles.

SHOW US YOUR SHOP

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

PHOTOGRAPHER: DENNIS WILSON; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON





Hand tools are within easy reach on this pegboard wall panel. Dennis groups the tools according to their function so he can quickly and easily retrieve (and put away) the right tool.

Dennis's shop space houses a few tools that might look out of place in a hobbyist woodworking shop, including a 1948 Bridgeport vertical milling machine, a full-sized South Bend metalworking lathe, and an Ekstrom Carlson overarm pin router. Typically found in industrial manufacturing or machine shops, these now serve as woodworking tools. Dennis uses standard router bits and mills in the pin router, and creates bespoke profiles using custom-ground cutters. He uses the vertical mill for making small parts and accurately machining keyhole slots.

To take his engineer's passion for precision a step further, Dennis owns two large granite plates. Machine shops use these as flat reference surfaces. Dennis uses them for project assembly to aid in squaring or straightening glue-ups.

A trio of workbenches has followed Dennis from shop to shop over the years, but not without periodic modifications to improve their functionality. These include an original 2×8' bench and a rolling workbench he built for use in the apartment he occupied when he started his career. A versatile, traditional-style

Dennis keeps his collection of clamps on this mobile rack. It's easy to move to any location in the shop to be close by when needed, and rolls out of the way for storage.

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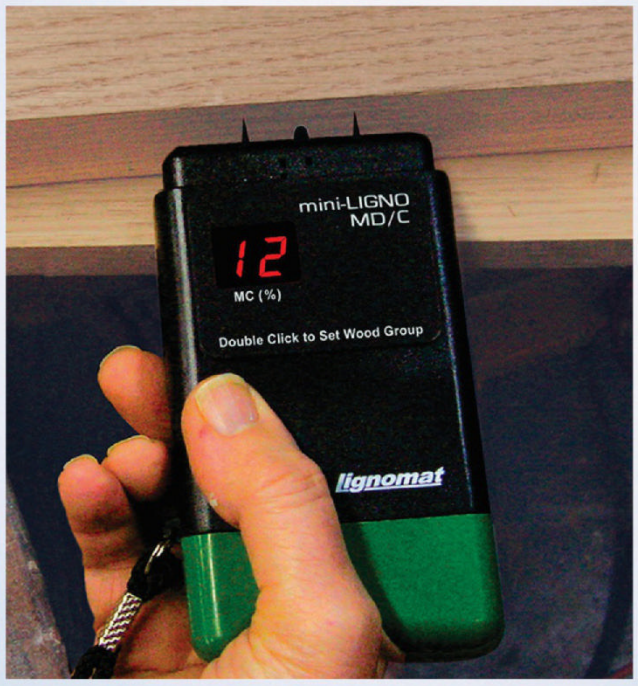

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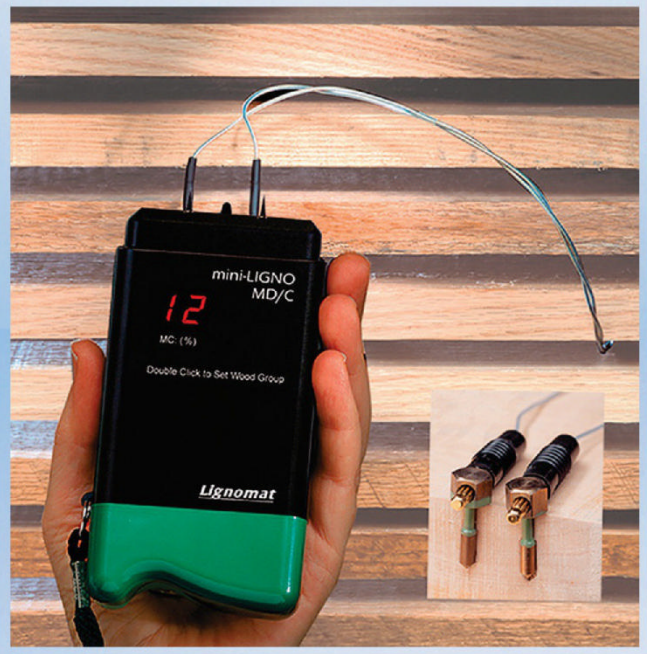

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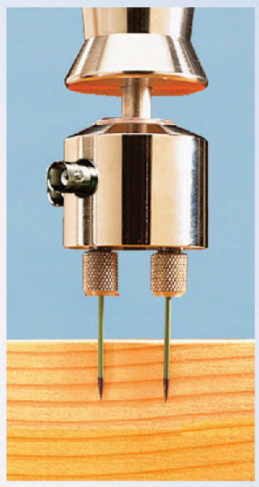

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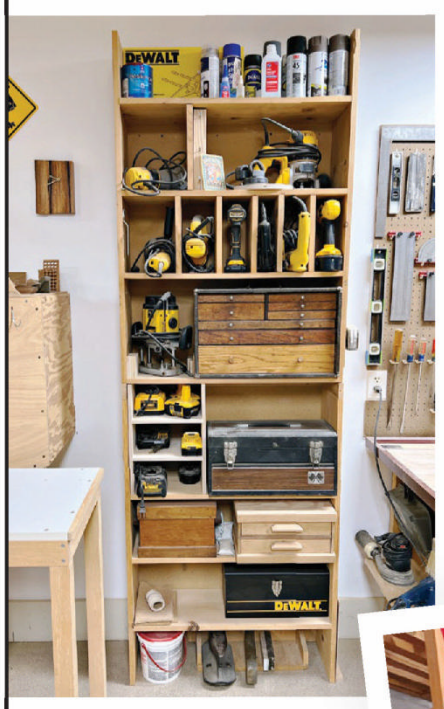
Dennis relies on the precision of three old metalworking machines and a high-tech CNC router to get accurate, repeatable results.

36×82" workbench sports a top made from 2"-thick pieces of laminated oak flooring salvaged from railroad cars. This bench also features a traditional face vise and a twin-screw tail vise.

Dennis has accumulated a stockpile of exotic and domestic lumber, including boards from Indiana and Arkansas where he had lived. He says, "I still continue to buy wood occasionally for specific projects but I don't think I can ever use up all the wood I have in my lifetime." But he will, no doubt, enjoy trying to do just that in the latest and, to him, greatest of the many shops he's had.



Dennis put a lot of thought, time, and effort into shop organization. This shelving unit serves as a home for portable power tools, chargers, batteries, and other accessories.

The library's tiled floor serves as a nod to stones Dennis collects from around the world and places around his koi pond. Shelves on one wall display small projects he has built as well as souvenirs from his travels.

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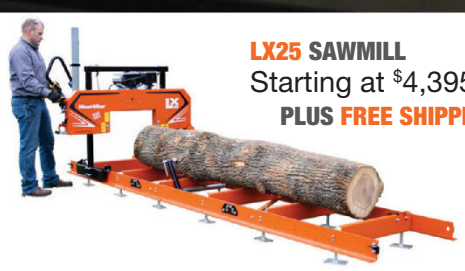

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Q: IS WOOD GLUE A CAN-DO WITH DYED WOODS?

I'm going to build a jewelry box and use dye to add color. I'd like to dye all the small parts, such as the tray dividers, before assembly to make it easier. Will glue adhere to dyed wood?

John Long
Belle Plaine, Iowa

A: Wood glue has a scientific superpower: It bonds molecularly to the cellulose present in all wood. Dye doesn't interfere with that bond, so you can go ahead with your plan to color your parts before assembly.

This is possible because a dye is a chemical colorant that dissolves completely in a solvent, usually water or denatured alcohol, forming a solution. Dye penetrates into wood, and the color remains behind after the solvent has evaporated.

By comparison, wood stain contains finely ground particles of pigment–usually minerals of various colors. Those particles hang around in suspension within a liquid, commonly oil or water, with binders and other ingredients. Pigment doesn't dissolve or change state; that's why you'll find that it eventually settles to the bottom of the stain can.

Unlike dye, stain on wood does interfere with glue adhesion. The pigment, oils, and binders sit on the surface, creating a barrier that keeps the glue from forming a bond on a molecular level with the cellulose.

So, feel free to dye your project parts before assembly, but take a few precautions. First, be careful to prevent glue squeeze-out because you won't be able to wipe and sand it away. If you're using water-based dye, the squeeze-out could emulsify it, too, and change the color. Second, clamp gently to prevent dents or dings. Finally, handle the pieces carefully to avoid scratches or damage that would prove difficult to repair.

Good luck with the jewelry box. We know you're dye-ing to get started.

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- Dye sapwood to even out its tone to match the rest of a board.

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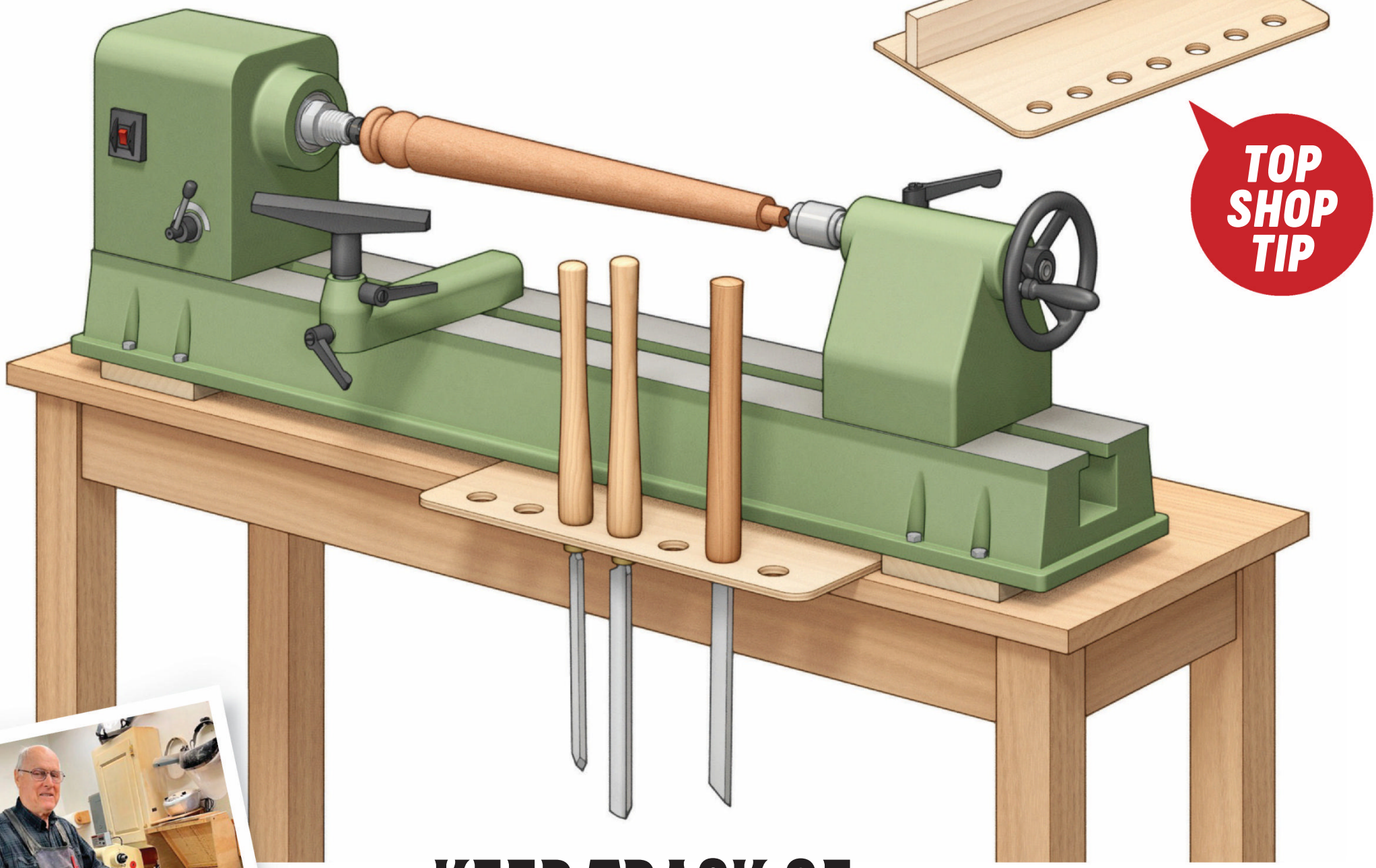

For his shop tip, Robert wins a Triton 3¼-hp fixed-base router worth $350.

KEEP TRACK OF TURNING TOOLS

When I'm turning a piece on the lathe, I don't want to have to hunt for the right tool. With a few pieces of scrap and a little effort, I made a simple accessory for keeping them close to the work.

The rack starts with a base made from ¼" plywood. I sized it for the number of tools I have while allowing it to overhang the front of the lathe stand or benchtop. I used a Forstner bit to drill the holes.

A strip of ¾" pine fastened to the back edge of the base butts against the lathe bed, preventing the rack from falling out when loaded with tools. The rack easily slides under the bed and out of the way when not needed. On my benchtop model, the tool rack fits nicely on top of the bench and under the lathe bed. If your lathe is freestanding, the rack can easily be modified to fit the lathe stand.

Robert Bernhardt
North Conway, New Hampshire

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ILLUSTRATOR: CHRISTOPHER MILLS

continued on page 18

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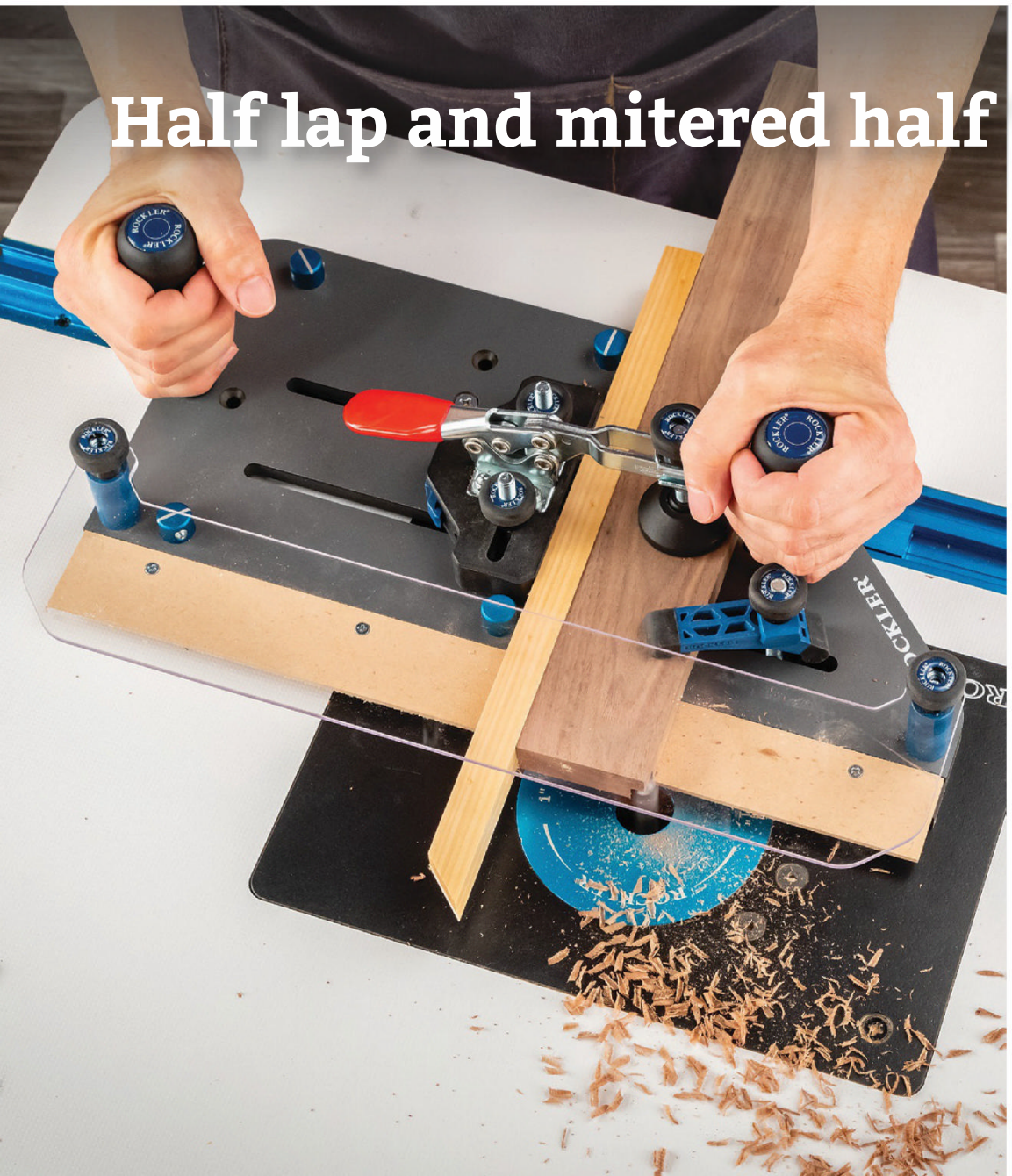

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Half lap joints boast maximum glue area, resulting in an incredibly strong joint. Introducing the first jig that allows you to cut regular as well as mitered half lap joints on your router table. Use the mitered version for a pleasing appearance on things like picture frames, and the square version for more structural frames — and *create with confidence.*

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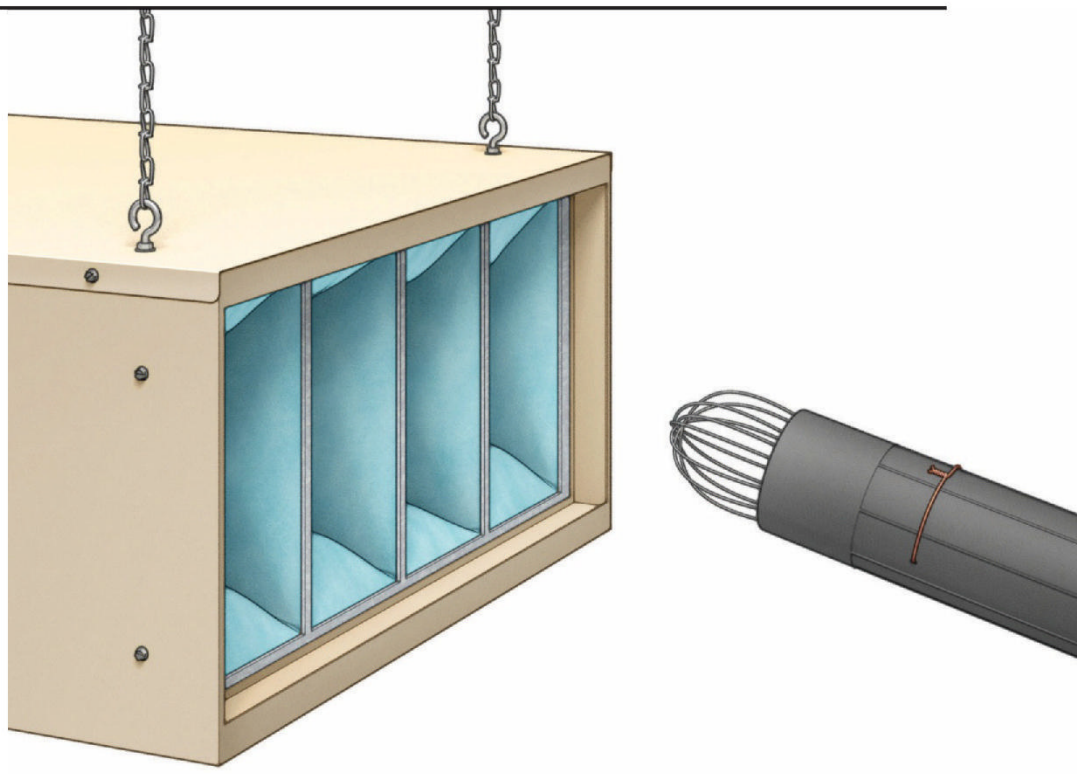
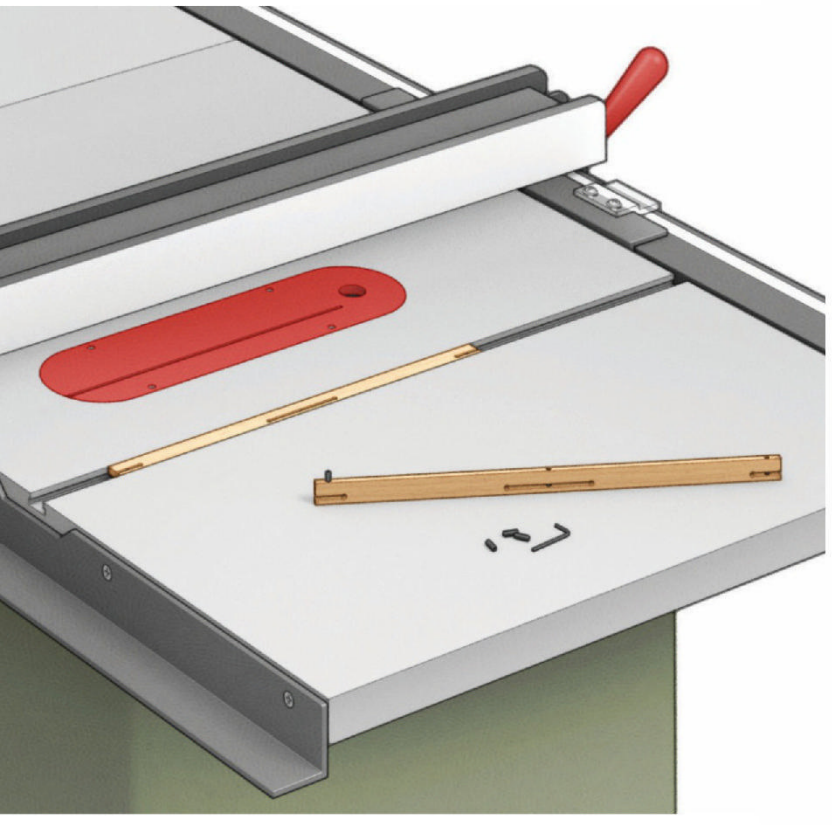
WHISK AWAY THE DUST

The filter on my air cleaner needs cleaned periodically to maintain its efficiency. But trying to vacuum the caked-on dust from the cloth filter wasn't working. Watching my wife whisking eggs in the kitchen, it occurred to me to use a whisk inserted into the end of the vacuum hose. This way, the filter doesn't get sucked onto the hose and the whisk works great to loosen the sawdust on the filter.

Insert the handle end of a dollar-store whisk into the vacuum hose extension. Drill two small, opposing holes in the extension aligned with the loop on the whisk handle. Thread a copper wire through the holes and whisk handle before twisting the ends tightly together.

Gary Janes
Charlotte, North Carolina



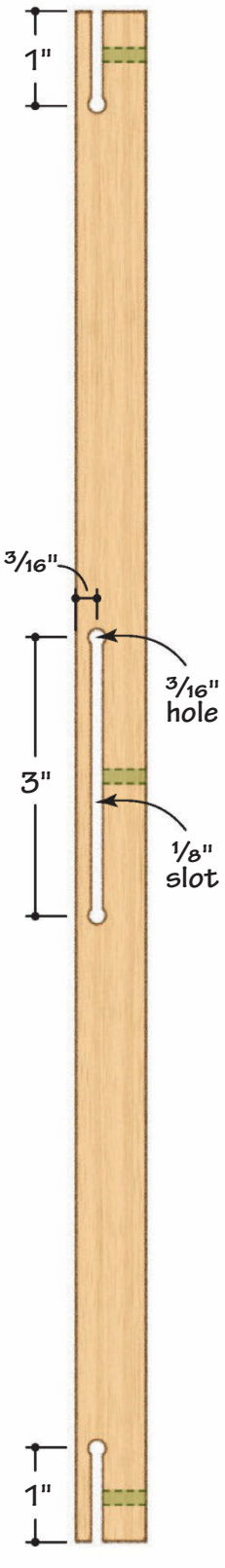


NO WIGGLE IN YOUR JIG(GLE)

I make a lot of jigs and fixtures that rely on a snug-fitting bar to ride in a miter slot. My inexpensive hardwood miter bars adjust for a perfect sliding fit.

Start with ⅜"-thick maple strips ripped for a loose fit in the ¾"-wide miter slot. Drill ³⁄₁₆" holes to form the ends of expansion slots located ³⁄₁₆" away from one edge—one centered and one on either end of the bar. Use an ⅛" straight router bit to complete the slots. Drill and tap for 10-24 threads in the side of the miter bar, centered on the length of the slots. Use ½"-long setscrews to adjust the fit in the miter slot.

Mark Rauzi
Gillespie, Illinois



SUPPORT YOUR LOCAL STAND

The inexpensive roller stands I bought had one major weakness—they collapse with the slightest bump or nudge. This quick and easy fix results in a rock-solid support.

I made a locking latch from an aluminum strip 9¾" long. After drilling a ⁵⁄₁₆" hole 1" from each end, I cut a notch in one end. I used these holes to locate the screws on the stand that secure the latch, then drilled and tapped for 8-32 threads. I secured the pivot end of the latch to the stand using a roundhead machine screw. A screw in the opposing leg engages the slot on the latch. I tightened the screws as needed to adjust tension.

Bob Cooke
Downington, Pennsylvania

continued on page 20

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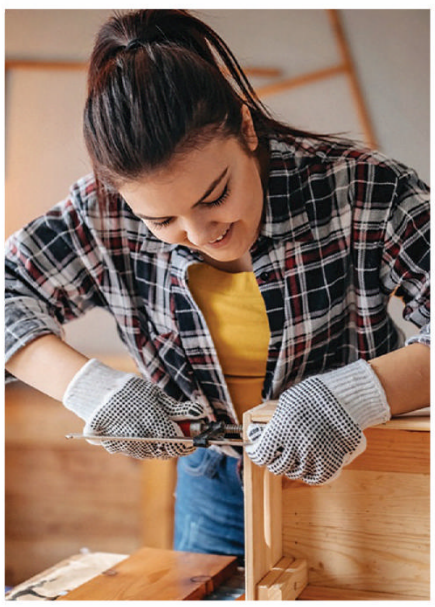

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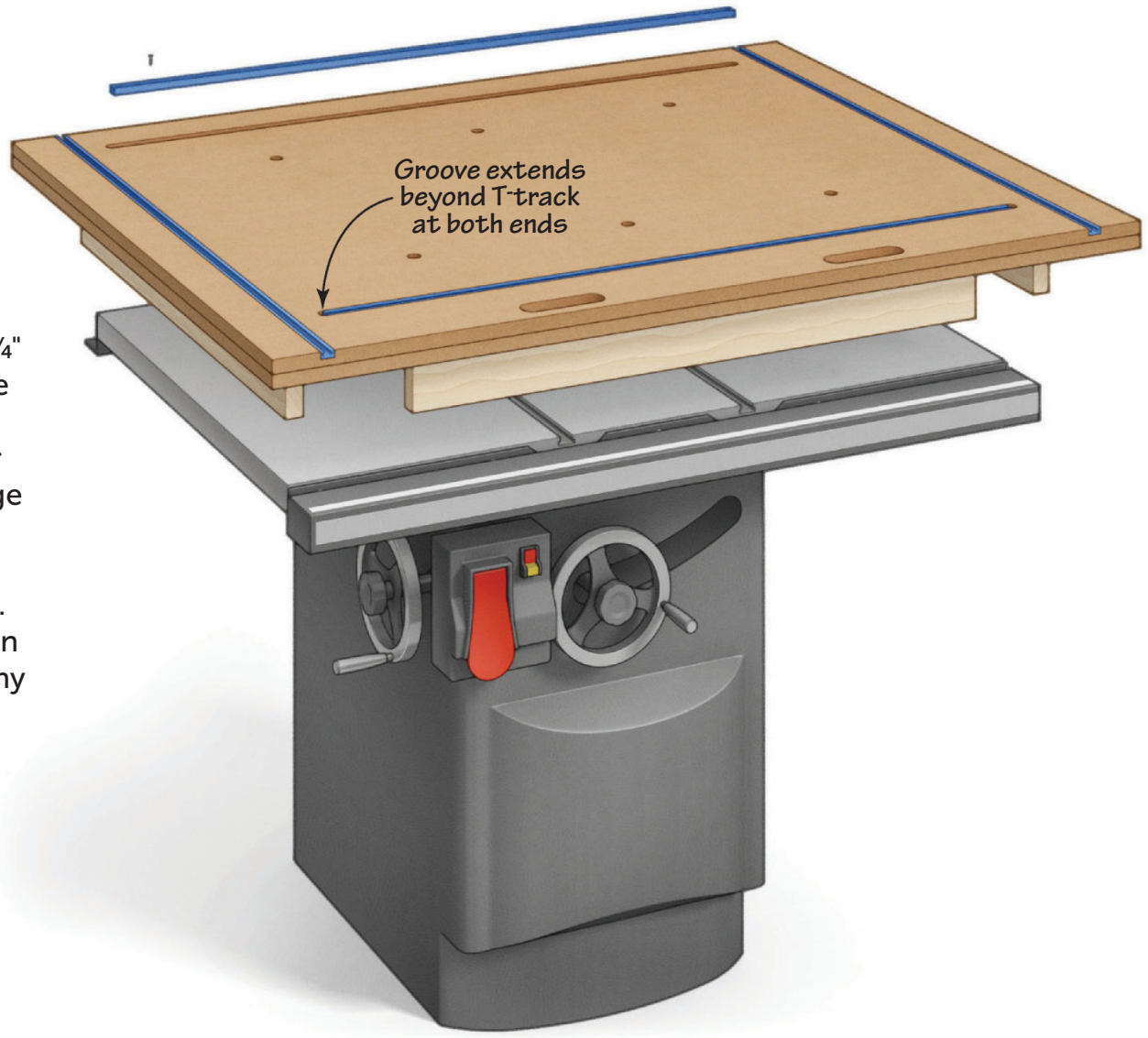
BONUS BENCHTOP

With benchtop space at a premium in my shop, I made this multipurpose auxiliary top for my tablesaw. It features T-tracks and dogholes for workholding. Handholds make it easy to install and store out of the way.

I made the base by laminating two layers of ¾" MDF. You can also use plywood. I sized the base 6" wider and deeper than the tablesaw surface, including the fence rails. Next, I cut grooves for the T-track using a handheld router with an edge guide. While installing the captured T-track, I made sure to allow space at each end for the insertion of T-track bolts and other accessories.

For the handholds, I drilled out each end, then cut out the remainder with a jigsaw. Add as many dogholes as you need to allow for additional clamping options. Finally, I glued and pocket-screwed cleats on the bottom to fit snugly over the tablesaw.

Larry Lyons
Centennial, Colorado



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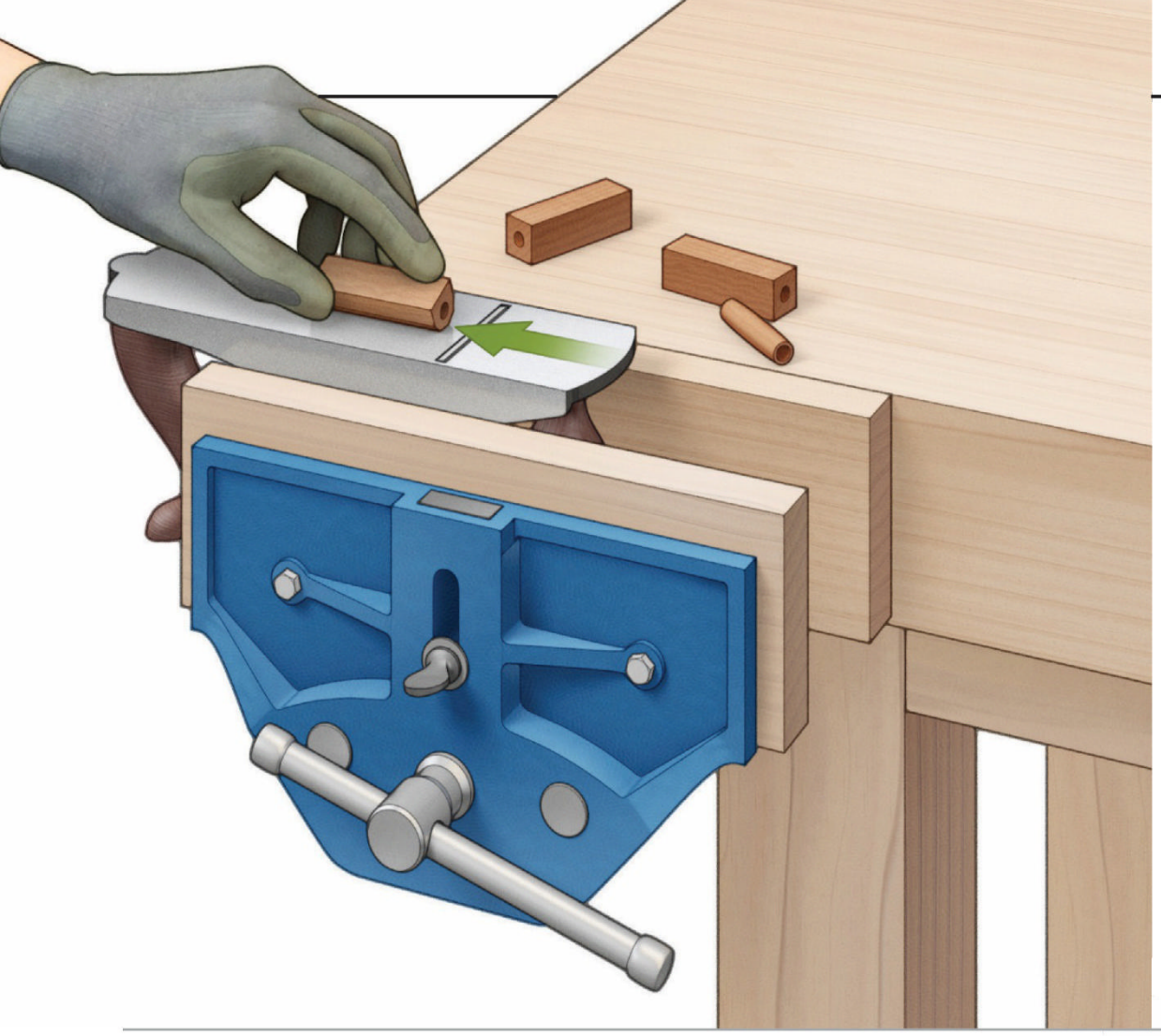


NO LATHE? PLANE IT!

My apartment has no room for a shop, so I rely on hand tools for making pens. With no lathe, I had to come up with another method for shaping the pen barrels.

I cut the blanks and drill for the tubing using a brace and bit. To shape the outside of the barrel, I flip my smoother plane belly up, carefully hold the blank from the top, and pull it across the plane's blade, slightly rotating the barrel with each stroke. I wear a glove to protect my fingers from the sharp blade. As the barrel becomes slimmer, I switch the position of my hand for safety. I drag from the midpoint to the tip and then flip the barrel to do the same from the other side. It creates a unique tapered look that I quite enjoy.

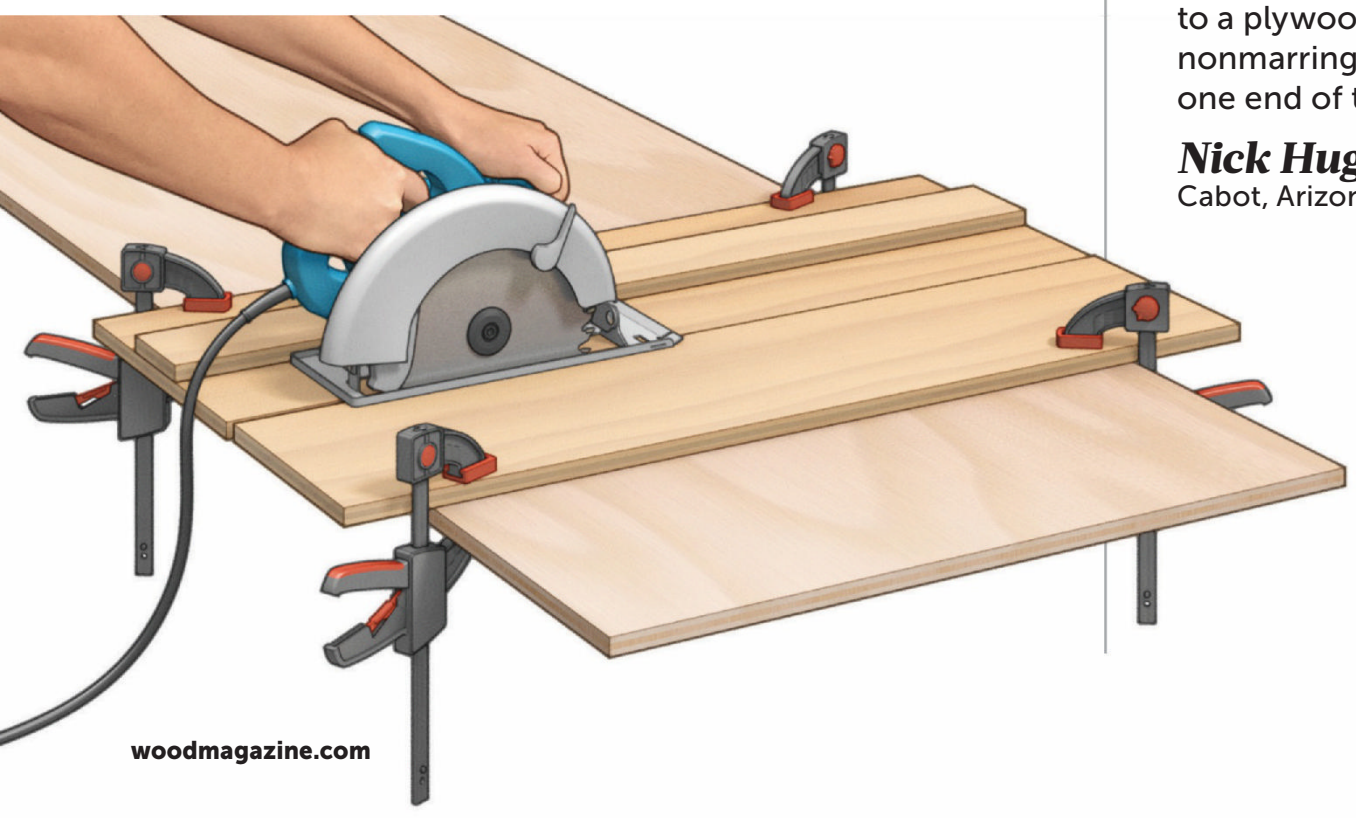
Hunter Menken
West Hollywood, California

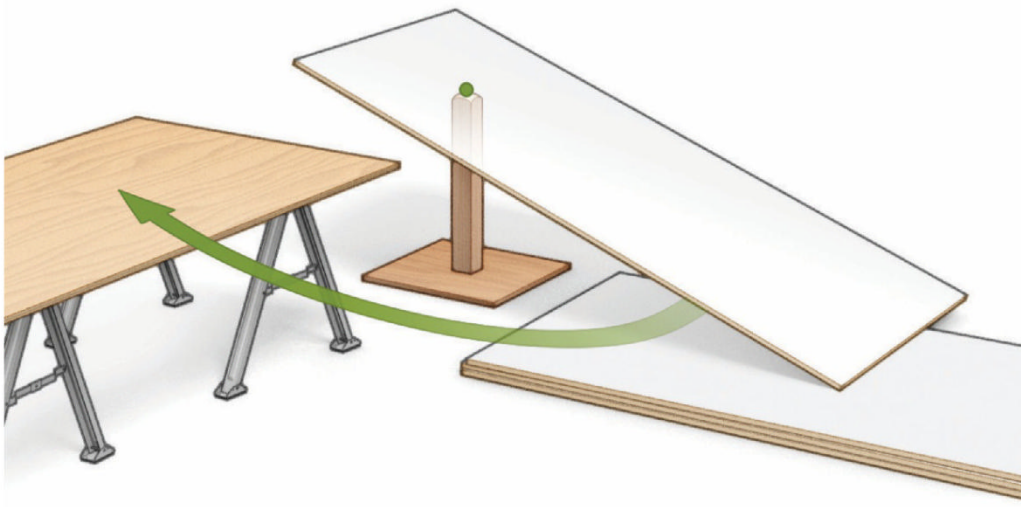
CONSISTENTLY CLEAN CUTS

Like a lot of woodworkers, I use a shop-made edge guide for my circular saw. To make one, glue a cleat to an oversize base, then cut through the base with the saw riding against the cleat. This makes locating the cut hassle-free because you simply align the edge of the base with the desired cutline. The edge guide also serves as a backer, making clean cuts without chipping on the keeper piece under the guide's base.

I go one step further by using a scrap of plywood as a zero-clearance support for *both* sides of the cut. This is great for getting clean cuts even on the waste piece. Simply clamp the scrap against the edge guide before making the cut.

Keith Krueger
Bellefontaine, Ohio





PIVOT POST

Manhandling sheets of plywood or MDF around the shop is cumbersome. This simple support stand serves as a helper to make lifting and positioning the sheet easier.

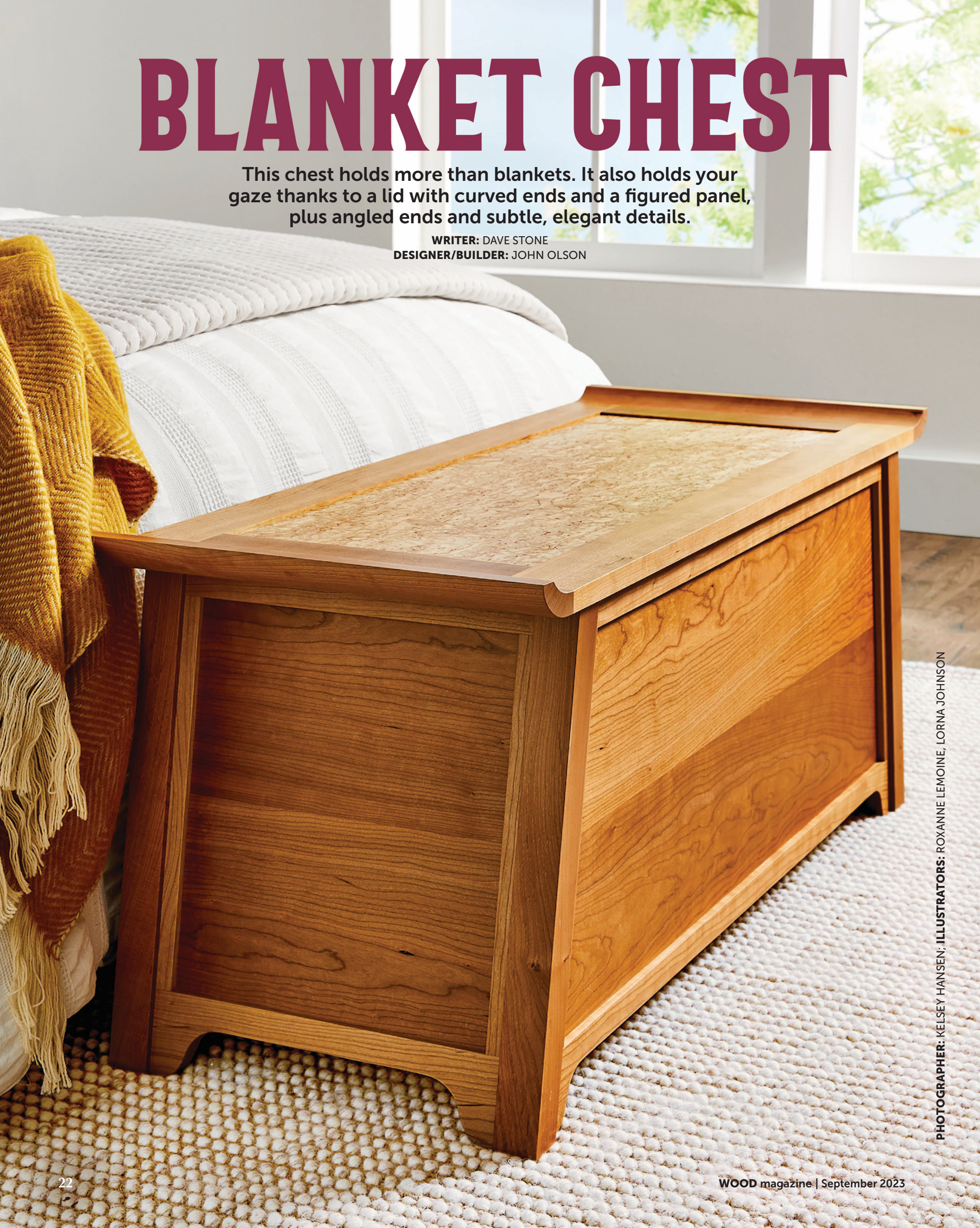
The support is easy to make with a length of 4×4 fastened to a plywood base. Round over the top edges to create a nonmarring pivot point. Use the top of the post to support one end of the sheet as you pivot it into position.

Nick Hughes
Cabot, Arizona

BLANKET CHEST

This chest holds more than blankets. It also holds your gaze thanks to a lid with curved ends and a figured panel, plus angled ends and subtle, elegant details.

WRITER: DAVE STONE
DESIGNER/BUILDER: JOHN OLSON



PHOTOGRAPHER: KELSEY HANSEN; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON

Blanket chests are great for storing linens and bedding. But they're also big boxes that often end up "storing" other things on top. The beautiful design of this chest ensures you'll want to leave the outside fully visible, so you won't turn it into a piling place.

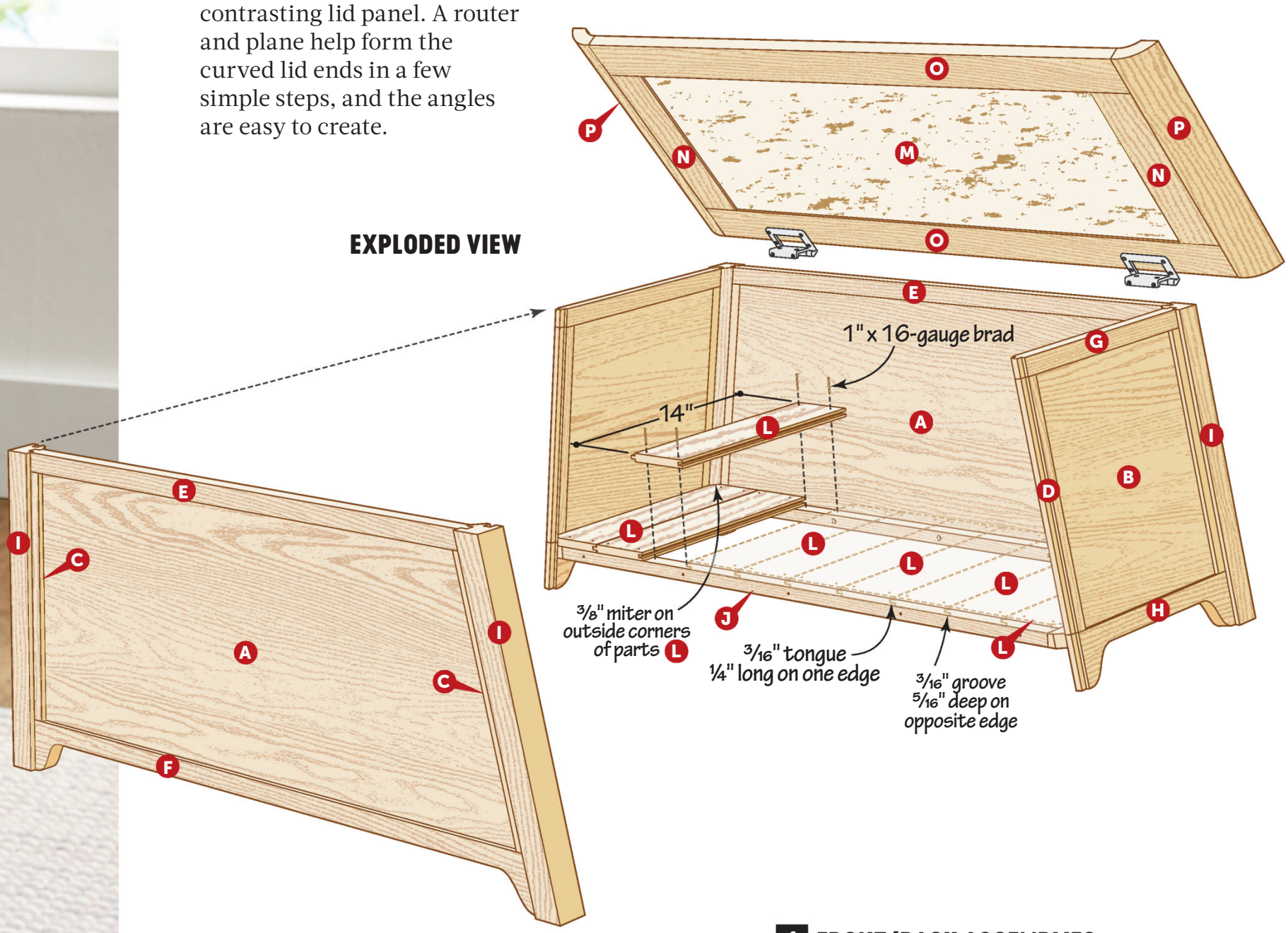
Thankfully, the extra details that mark this elegant chest don't add a lot of complexity. Veneer creates the contrasting lid panel. A router and plane help form the curved lid ends in a few simple steps, and the angles are easy to create.

START WITH THE SIDES

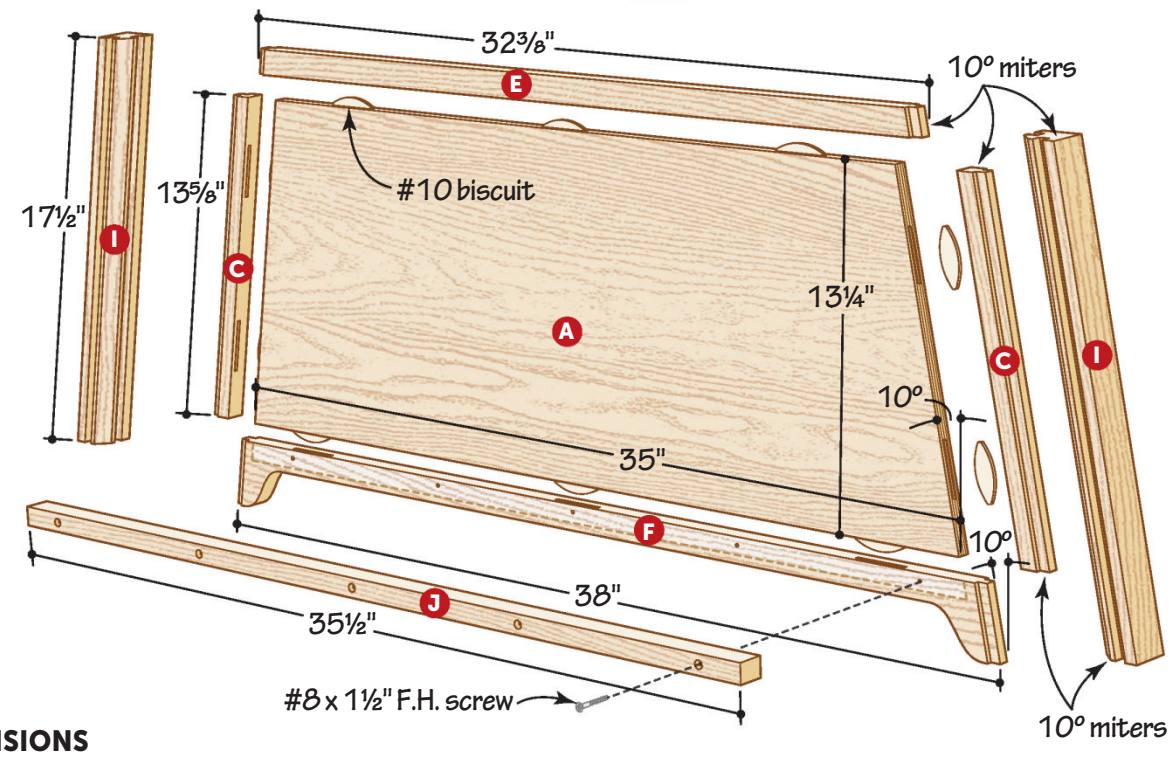
1 Begin by cutting the front/back (A) and end (B) panels to size **[Materials List, Drawings 1 and 2]**. We used an 80-tooth plywood blade to avoid tear-out. Miter-cut the ends of the front/back panels to 10°. Finish-sand the panels, taking care to avoid sanding through the thin plywood veneer.

Note: **Because they lean inward, the end panels (B) are slightly wider than the front/back panels (A).**

EXPLODED VIEW



1 FRONT/BACK ASSEMBLIES



OVERALL DIMENSIONS
41 3/8"W x 16 1/2"D x 18 1/2"H

2 Cut the front/back stiles (C) and end stiles (D) to size **[Materials List]**, miter-cutting the ends of the front/back stiles at 10° **[Drawings 1, 2]**.

3 Cut slots for #10 biscuits in the edges of these parts, positioning them so that the inside face of the stiles and panels will be flush. Finish-sand. Then glue the stiles to the panels **[Photo A]**.

4 Cut the front/back upper (E) and lower (F) rails to size, miter-cutting the ends at 10° to fit the end panel/stiles assembly **[Drawing 1]**. Also cut the end upper (G) and lower (H) rails to size **[Drawing 2]**. Note, once again, that the end rails start out slightly wider than the front/back rails.

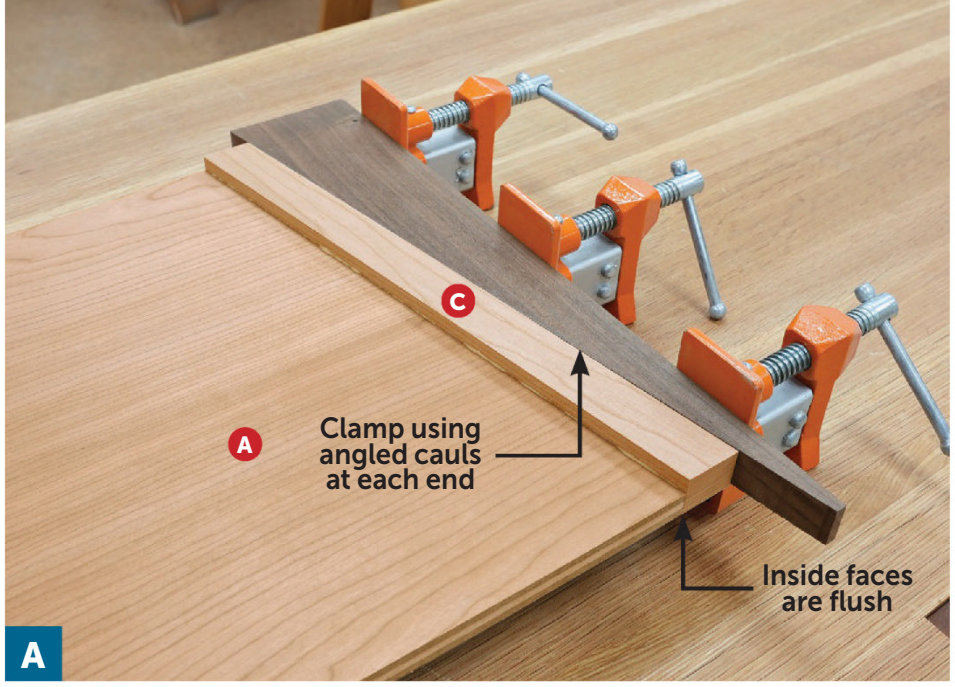
5 Cut biscuit slots, finish-sand, and then glue the upper and lower rails to the front/back and end assemblies. After the glue dries, shape the cutout in the lower rails using the *Lower Rails Full-Size Pattern* **[Drawing 3]**. Also see *Pattern Routing for the Win* on the *next page*.

GIVE IT LEGS

1 Cut four legs (I) extra long (we made ours 20") **[Materials List, Drawing 1]**. Select and mark the two best adjacent faces on each to be the show surfaces.

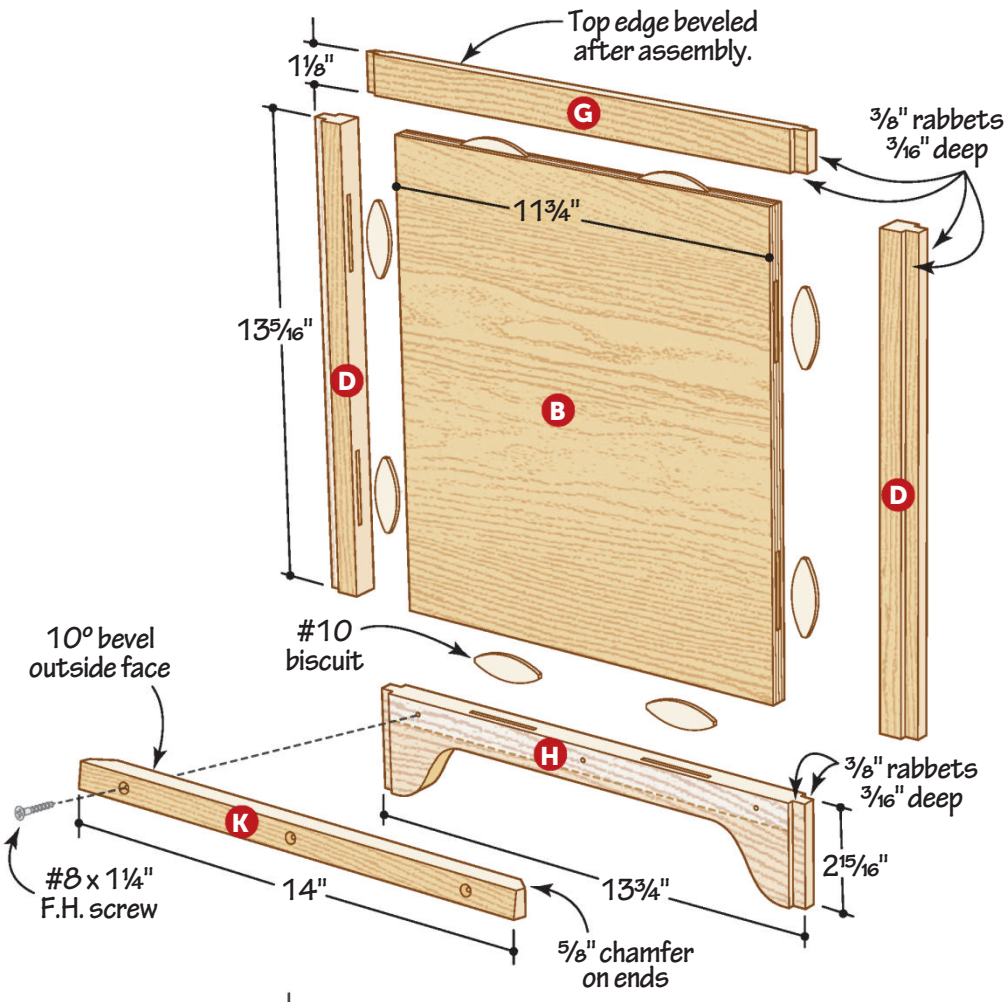
2 Install a 3/8"-wide stacked dado in your tablesaw and, with the fence set 7/16" from the edge of the blade, cut a 3/8"-deep groove along the two inner faces of each leg blank **[Drawing 4]**.

3 Clamp an auxiliary rip fence to your saw fence and butt the fence against the edge of the dado set. Set the blade height to 3/16". On scrap the same thickness as the stiles, cut a 3/8"-wide rabbet on two faces to form a tenon. Check the fit in a leg (I) and adjust the cut as necessary before forming tenons on the ends of all the panel assemblies **[Drawings 1 and 2, Photo B]**.

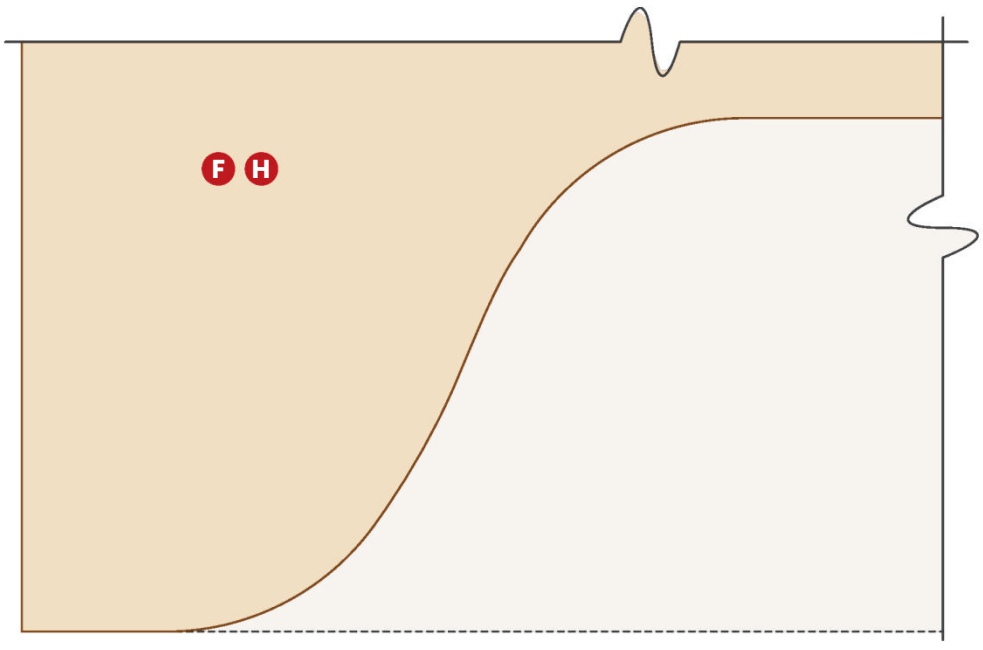


Spread glue on the ends of the front/back panel (A) and in the biscuit slots in the front/back stiles (C). Clamp the assembly using a pair of angled cauls. Repeat for the other front/back assembly.

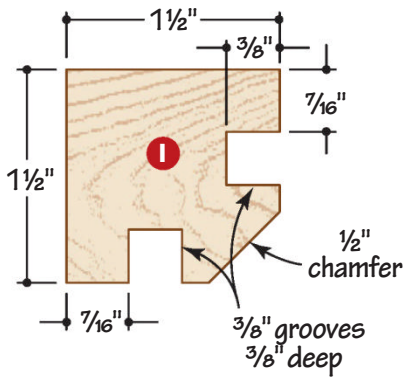
2 END ASSEMBLIES



3 LOWER RAILS FULL-SIZE PATTERN



4 LEG TOP VIEW

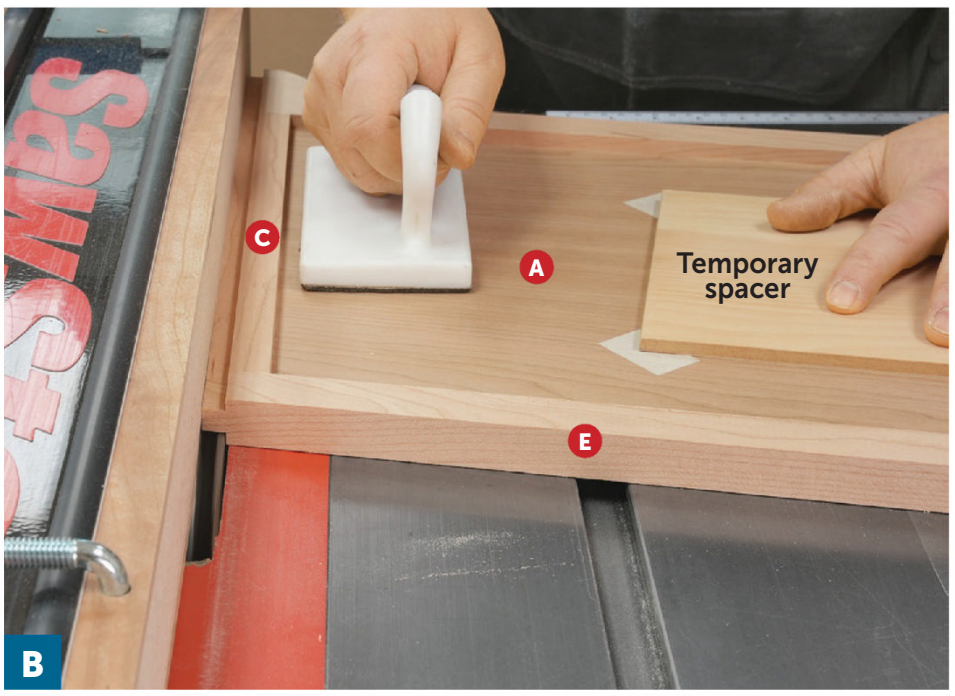


4 Dry-fit an end and side assembly to a leg and mark where the inside faces contact. At the router table, cut a 45° chamfer along the inside corner of each leg to match those layout lines. Ours was about ½" **[Drawing 4]**.

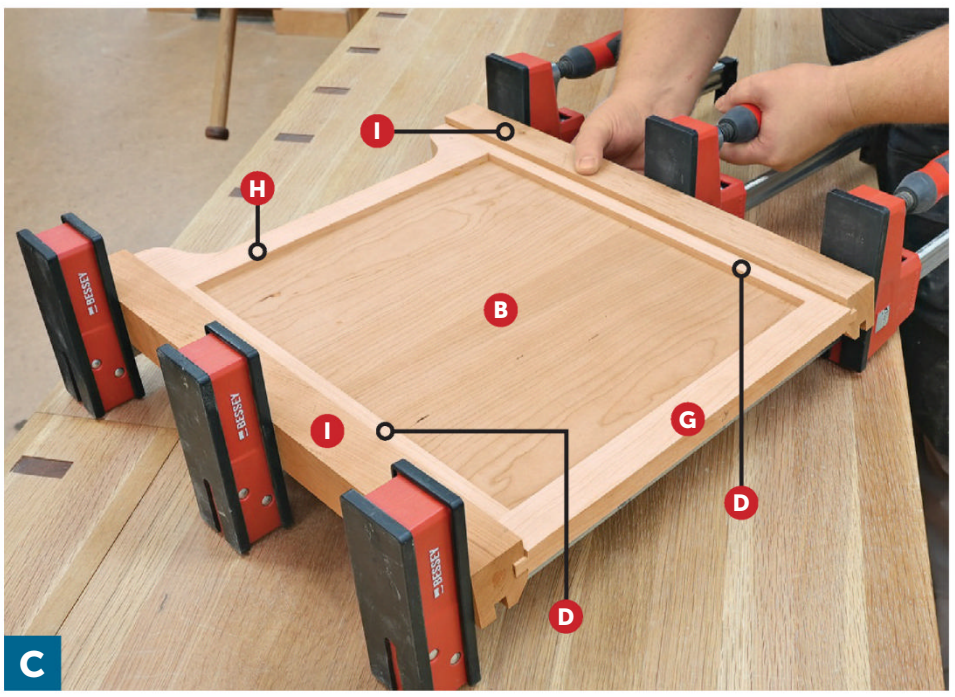
5 Keeping their final orientation in mind, bevel the ends of each leg to 10° **[Drawing 1]**, bringing them to final length. Finish-sand the legs.

6 Attach the legs (I), beginning with the end assemblies (B/D/G/H) **[Exploded View, Photo C]**.

7 Attach the end assemblies and legs to the front/back assemblies (A/C/E/F). Use angled cauls here, just as you did when gluing the stiles to the front/back panels.



Temporarily tape a spacer made from ¼" plywood to each panel assembly (A–D, E–H). This keeps the assembly flat on the saw table. Then rabbet the end of each face to form a tenon.



When gluing the legs (I) to the end (B/D/G/H), align the inner edge of the upper rail with the end of the leg. Because the leg is beveled, some of the upper rail will protrude. Plane the rail flush after the glue dries.

PATTERN ROUTING FOR THE WIN

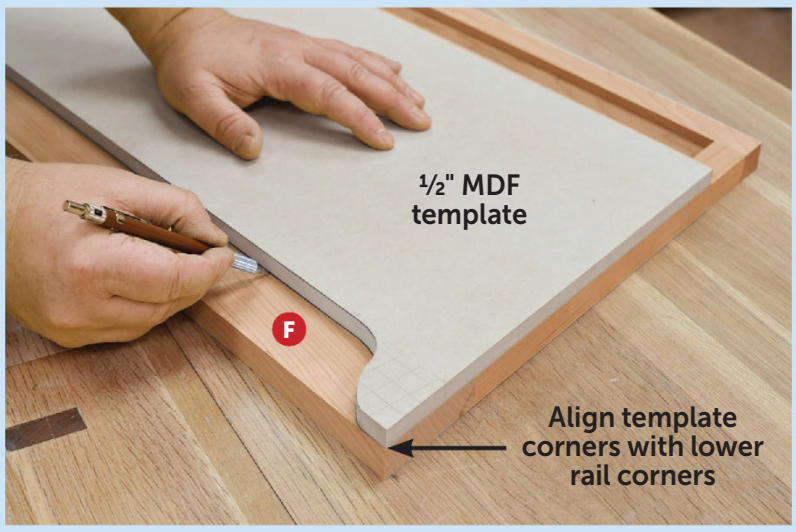
To form the cutouts in the lower rails of this chest consistently and accurately, cut outside the lines, then pattern rout to final shape.

Cut two ½"-thick MDF panels to size for the templates, one 12×38" for the sides and the other 12×13¾" for the ends. Make a copy of the full-size pattern **[Drawing 3]**, cut it out, and use that to lay out the curved shape at the lower outside corners of each template, flush to the ends. Then scribe a straight line between the ends of the curves to complete the cutout shape.

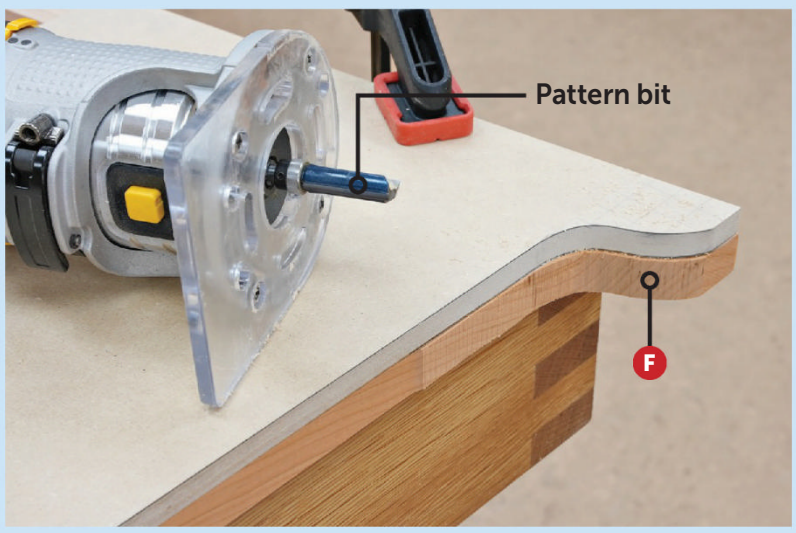
Use a jigsaw to cut the shape, staying 1/16" outside the line. Sand the pattern to the line, taking extra care at the transition from curve to straightaway.

Position the templates on the front/back assemblies, taking care to align the corners, *below, top*. Scribe the templates to the front/back and end assemblies along the lower rails. Cut just outside the marked lines using a jigsaw or bandsaw.

Clamp each template to its assembly and use a bearing-guided pattern routing bit to bring the lower rails to final shape, *below, bottom*.



Hold the template in place and transfer the layout line onto the lower rail. Remove the template and cut, staying 1/16" outside the layout line.



Clamp the template so it's aligned with the layout line. Set the depth to roughly center the bearing on the template's thickness. Then rout.

BUILD THE BOTTOM

1 Cut the front/back cleats (J) and end cleats (K) to overall size **[Materials List, Drawings 1, 2]**. Next tilt your tablesaw blade to 10° and bevel one face of each end cleat (K). On the beveled face, cut a chamfer at each end to fit the shape of the legs.

2 Align the top face of the end cleats with the upper edge of the end lower rails (H) in the case assembly **[Drawing 2]** and clamp them in place. Drill countersunk pilot holes through the end cleats and into the end lower rails. Remove the clamps, then glue and screw the end cleats to the assembly. Next clamp the front/back cleats into place, aligning their upper faces with those of the end cleats. Drill, glue, and screw these parts to the assembly.

3 Cut 10 bottom slats (L) to size **[Materials List, Exploded View]** and set one aside. With the tablesaw blade height at 5/16", position the rip fence 5/32" from the blade. Rip a groove along one edge of a slat then rotate the slat end-for-end and rip the groove again to ensure a 3/16"-wide centered groove. Repeat this process on eight more slats.

4 Install a 3/8" dado set in the tablesaw and set the blade height to 5/32". Partially bury the blade in the auxiliary fence, leaving 1/4" exposed. Form a tongue on eight of the grooved slats by making a pass on both faces of the edge without a groove. Repeat this with an edge of the ungrooved slat you set aside earlier.

5 Bevel-rip the outside edge of each outer slat at 10° and miter their outer corners to fit tightly into place **[Exploded View]**. Ease any sharp edges on all 10 slats with a sanding block, then dry-assemble the bottom slats in the case assembly. You'll notice that the slats fit a bit loose to accommodate seasonal wood movement. Remove and number the ends of the slats in order. You'll tack them into place later, after you've applied the finish.

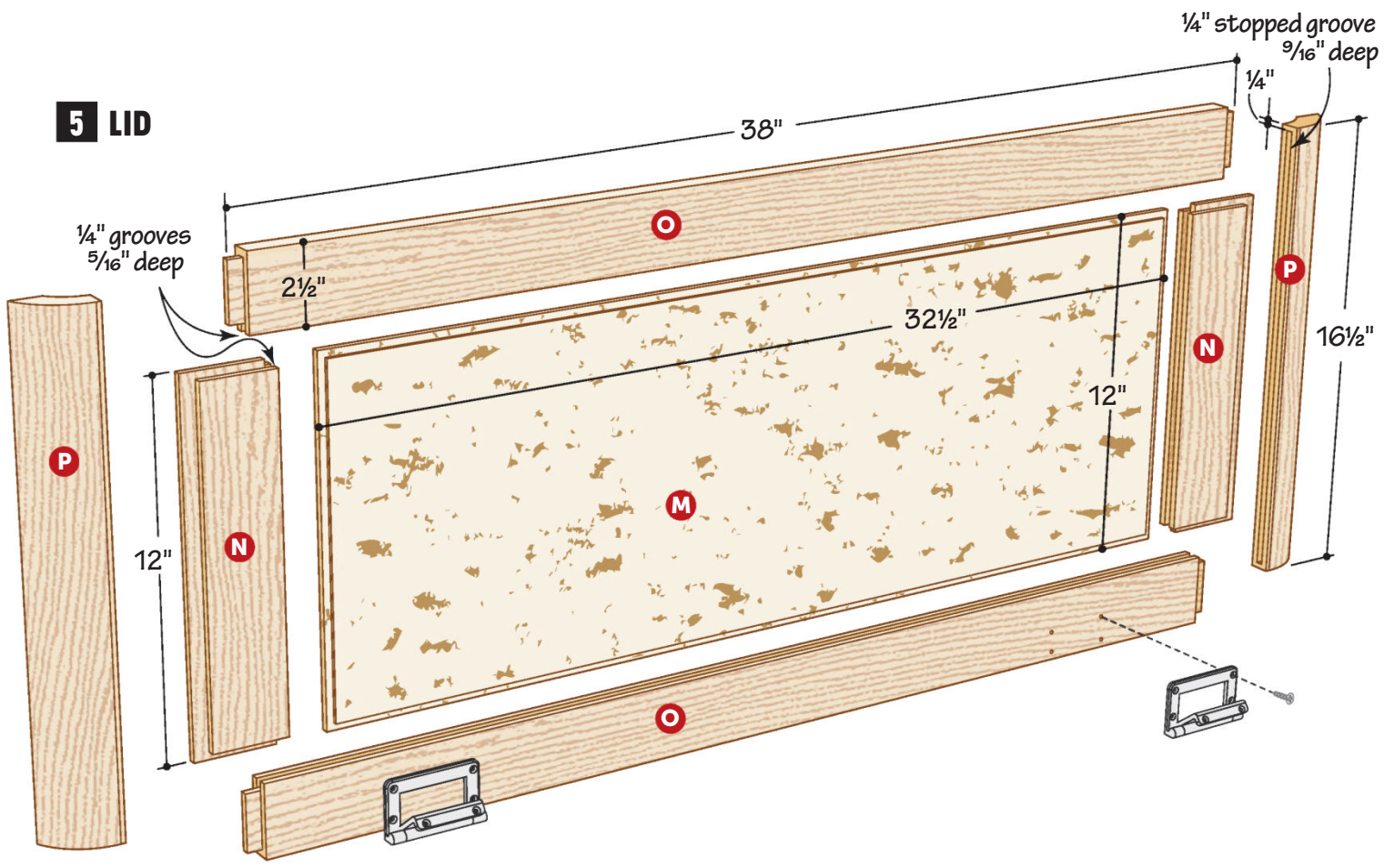
ADD THE LID

We made our lid with an MDF panel covered on both faces with Karelian birch burl veneer **[Sources]**. If you prefer, you could also make the lid panel from the same 1/2" cherry plywood used for the front/back and end panels.

1 Cut the lid panel (M) to size **[Materials List, Drawing 5]**. Then apply the veneer to both faces. We did this with a vacuum bag system, but you could also use clamping plates and cauls.

2 To prevent tear-out of the fragile veneer, form the tongues on the lid panel edges in two steps. First, make a shallow scoring cut along all edges on both faces of the lid panel to define the shoulder cuts of the rabbets **[Photo D]**. Then install a stacked dado and mill away the remaining waste to form the tongues **[Photo E]**.

Learn how vacuum-bag veneering can help you create flawless panels
woodmagazine.com/inthebag



D

Install an 80-tooth plywood blade in the tablesaw. Lower the blade to ⅛" and set the fence ¼" from the far side of the blade. Then make a pass along each edge and end on both faces of the lid panel (M).

E

Install an auxiliary rip fence and bury a portion of a dado set to leave ¼" exposed. Raise the blade to ⅛". Then make a pass on each edge and end to create ¼" tongues all around.

3 Cut the lid stiles (N) and rails (O) to size **[Drawing 5]**. Lower the tablesaw blade height to 5/16" and mill ¼"-wide grooves along one edge of each stile and rail to fit the lid panel tongues **[Drawings 5 and 5a, Photo F]**.

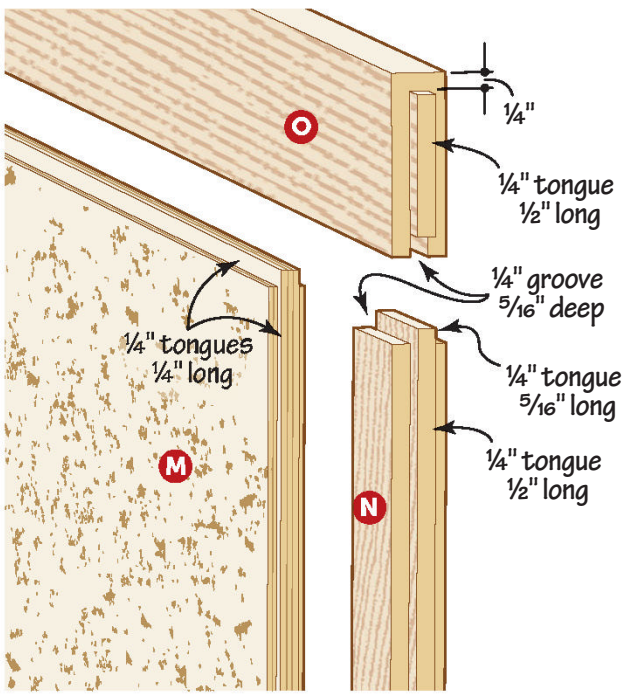
4 Install a ½"-wide dado set in the tablesaw and clamp an auxiliary fence to the rip fence. Bury a portion of the blade in the fence and, with the blade height set to ¼", cut ¼"-long tenons on the ends of the lid stiles **[Photo G]**.

5 Glue and clamp the lid stiles (N) to the ends of the lid panel (M). Next glue the lid rails (O) to the assembly. After the glue dries, form tongues on both ends **[Drawings 5 and 5a]**. Then trim a ¼" notch off each end of the tenons so they'll fit into stopped grooves you'll make in the lid ends next.

F

Use a featherboard to keep the lid stiles and rails (N, O) pressed tightly to the fence. Make a pass, then flip the board so the other face is against the fence and make another pass to complete the groove.

5a LID JOINERY DETAIL



G

Bury the dado set partially in the auxiliary fence to leave ¼" exposed. Set blade height to ¼", and then cut tongues on each end of the lid stiles (N).

Place the lid end (P) against the end of the lid assembly (M-O). Scribe the inside edge of the lid end to the inner/outer rail assembly. This line indicates the bit's final height when routing the lid ends to shape.

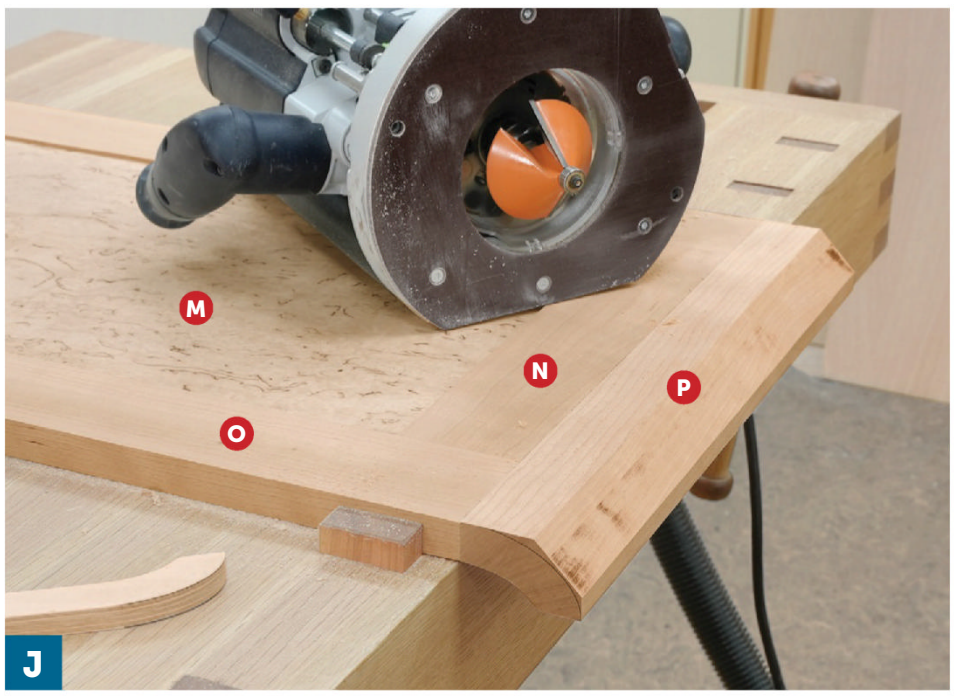
Use a featherboard to hold the lid end (P) against the fence as you rout the cove. Make multiple passes, raising the bit between each one, until you get to the final cutting depth you marked earlier.

6 Cut the lid ends (P) to size **[Materials List]**. At the router table, cut a ¼"-wide stopped groove along one edge of each lid end **[Drawing 5]**. Cut this groove with a spiral upcut bit in two passes (first about ¼" deep, then at the full depth of 9/16"). Square the ends of these elongated mortises with a chisel so they fit the tenons of the lid assembly.

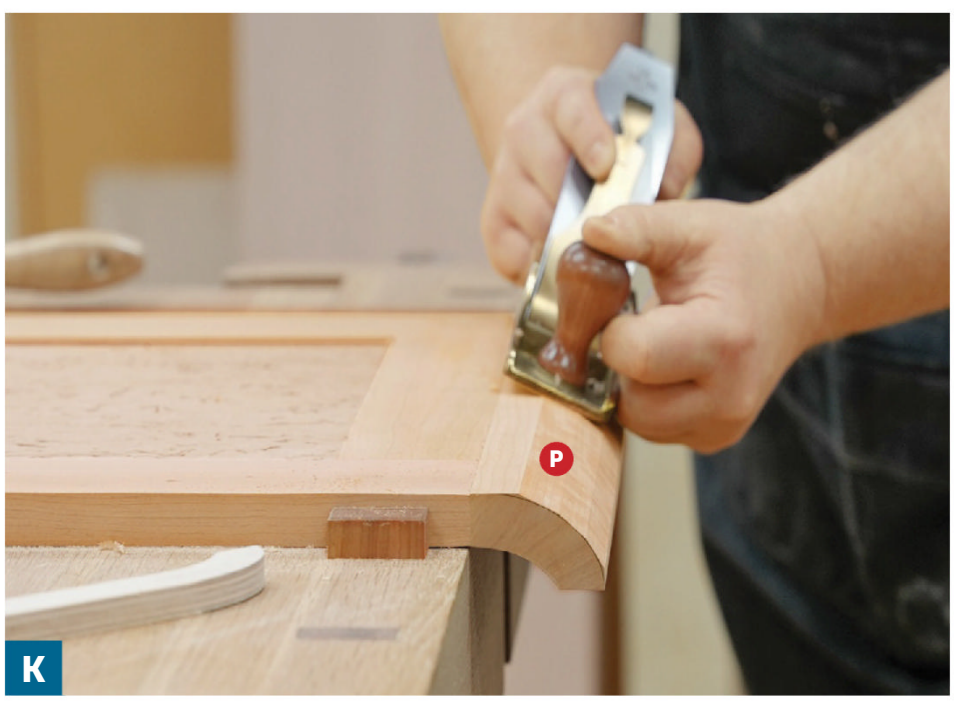
7 Dry-assemble the lid ends to the lid assembly, making sure you have the top of the lid facing up. Then scribe a line along the edge of each lid end where it meets the lid rails and stiles **[Photo H]**.

8 Install a cove panel-raising bit **[Sources]** in your router table. Then rout the arched shape in the lid ends **[Photo I]**. Glue and clamp the lid ends to the lid assembly.

9 Copy, cut out, and trace the *Lid Ends Full-size Pattern* **[Drawing 6]** to lay out the underside curve on the lid end. Install a large-diameter chamfer bit **[Sources]** in your handheld router, and remove the bulk of the waste **[Photo J]**. Then refine the shape with a hand plane **[Photo K]**. Finish by hand-sanding to smooth the round-over. Finish-sand the lid assembly.

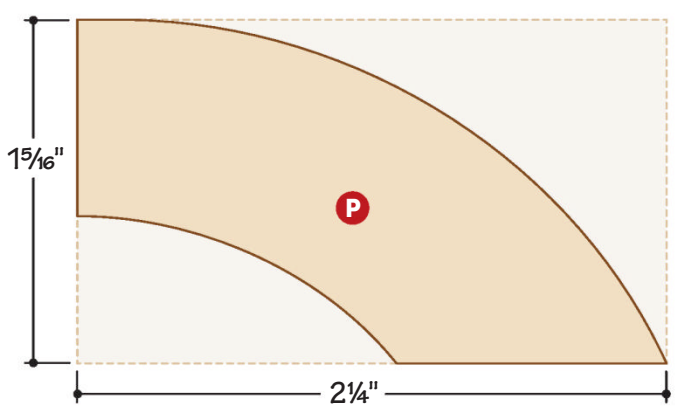


Begin shaping the underside curve by routing away most of the waste using a chamfer bit. Make multiple passes, routing at each end before adjusting the bit for a deeper cut, until you get close to the layout line.



Refine the curve using a hand plane. Start by knocking down the points, and then smooth the curve to final shape. Keep an eye on the layout lines on each end as you work.

6 LID ENDS FULL-SIZE PATTERN



TAKE IT TO THE FINISH

1 Sand the case and lid assemblies to 220 grit, easing any sharp edges. Apply three coats of clear finish to the bottom slats, case, and lid. We used lacquer, rubbing between coats with an extra-fine sanding sponge.

2 Install the bottom slats in the case, fitting the outermost slats tight against the ends and spacing the remaining slats equally. Attach the slats to the cleats using 1"×16-gauge brads **[Exploded View]**.

3 Install the torsion hinges **[Exploded View]** following the manufacturer's instructions. Give the finish a few days to cure. Leaving the lid open will help the smell dissipate. Then place the chest at the foot of your bed, load it up with blankets and bedding, and enjoy your more-organized, more-beautiful bedroom.

MATERIALS LIST

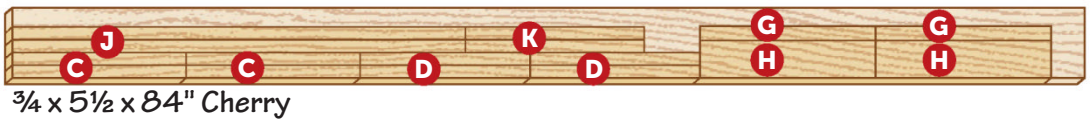
PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	FRONT/BACK PANELS	½"	13¼"	35"	CP	2
B	END PANELS	½"	13⁵⁄₁₆"	11¾"	CP	2
C	FRONT/BACK STILES	¾"	1"	13⅝"	C	4
D	END STILES	¾"	1"	13⁵⁄₁₆"	C	4
E	FRONT/BACK UPPER RAILS	¾"	1"	32⅜"	C	2
F	FRONT/BACK LOWER RAILS	¾"	2¾"	38"	C	2
G	END UPPER RAILS	¾"	1⅛"	13¾"	C	2
H	END LOWER RAILS	¾"	2¹⁵⁄₁₆"	13¾"	C	2
I*	LEGS	1½"	1½"	17½"	C	4
J	FRONT/BACK CLEATS	¾"	1"	35½"	C	2
K	END CLEATS	¾"	1"	14"	C	2
L	BOTTOM SLATS	½"	4"	14"	C	10
M	LID PANEL	½"	12"	32½"	VM	1
N	LID STILES	¾"	3"	12"	C	2
O	LID RAILS	¾"	2½"	38"	C	2
P*	LID ENDS	1⁵⁄₁₆"	2¼"	16½"	C	2

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: C–cherry, CP–cherry plywood, VM–veneered MDF.
SUPPLIES: 1"×16-gauge brad nails, #10 biscuits, #8×1¼" flathead screws, #8×1½" flathead screws.
BLADES AND BITS: Dado set, 80-tooth tablesaw blade, ½" pattern-routing bit, 3½" panel-raising bit, 45° 2⁹⁄₁₆"-diameter chamfer bit, ¼" spiral upcut bit.
SOURCES: (1) Karelian birch burl veneer, two pieces at least 13×34" each, Veneer Supplies, veneersupplies.com; 40 inch-pound lid-stay torsion hinges (1 pair), no. 31396, $70, Rockler, rockler.com
PROJECT COST: It cost us about $450 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

This project requires 9 board feet of 4/4 cherry, 4 board feet of 8/4 cherry, and 6 square feet of ½" cherry based on example boards shown.

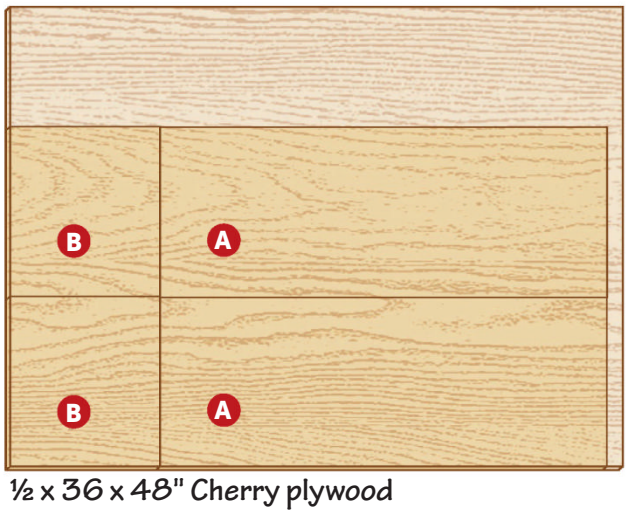


¾ x 5½ x 84" Cherry

¾ x 7¼ x 96" Cherry

½ x 5½ x 72" Cherry (2 needed)

1½ x 3½ x 84" Cherry *Plane or resaw to the thickness listed in the Materials List.



½ x 36 x 48" Cherry plywood

½ x 12 x 36" MDF

EASY WAYS TO INSTALL A FLOATING SHELF

We tried out several hardware options to see how well they work for creating shelves that appear magically suspended on the wall.

WRITER: DAVE STONE

Floating shelves made from solid-wood slabs have been all the rage in recent years. People love the chunky look and the way the shelves appear to cling to the wall without any supports.

Of course, these shelves don't work because of some antigravity magic. They simply trick the eye thanks to hardware that sits behind the shelf where it remains hidden from view.

Long posts that fit into deep holes in the back edge of the shelf are among the most common for mounting slabs. We picked up a few different examples online to see how they work and what you'll need to know to use them successfully.

Evald Floating Shelf Brackets

These posts simply screw to the wall using the included hardware for studs, drywall, and brick. You'll need a slab at least 1¾" thick and 6½–18" wide. The brackets hold 100 lbs each.

These brackets, and others of the same style, require perfectly level bracket installation; once on the wall, you can't adjust them. And you need to drill long, deep holes in your shelf that are centered on your final post spacing. An optional self-centering guide and long bit make drilling the holes in the shelf easier.

After drilling, you create ⅛" mortises to recess the wall plates so the back of your slab sits flush to the wall surface.

Evald, woodmagazine.com/evald
no. NFSB6 (bundle), $72

PHOTOGRAPHER: JACOB FOX; **ILLUSTRATORS:** DAVE STONE, LORNA JOHNSON

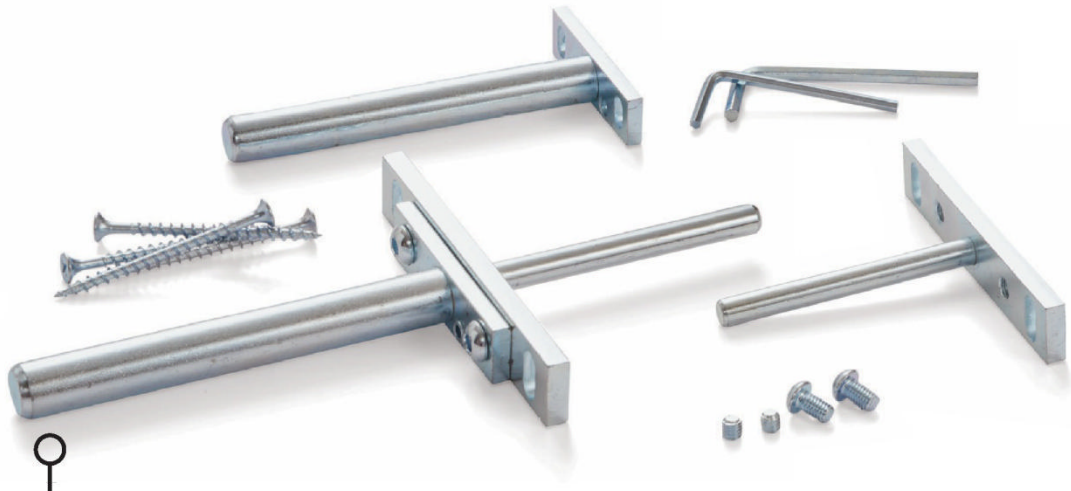
Rose's Rustics Heavy-Duty Bracket

With this setup, the posts are mounted to a ¼"-thick steel plate. Hole spacing is fixed, which makes aligning the holes in your shelf a bit more predictable.

The manufacturer doesn't provide minimum slab thickness, but as thin as 1" would work if you're okay with the matte-black plate showing behind your shelf. If you want to mortise the plate in, make your slab at least 1¼" thick.

Impressively, this manufacturer includes everything you'll need for installation: post brackets, drill bits, drilling guide, level—even a screwdriver. This two-post bracket is rated to hold 90 lbs.

Rose's Rustics, woodmagazine.com/rosesrustics, $50



I-Semble Heavy-Duty Shelf Supports

I-Semble heavy-duty brackets also use posts that fit into the shelf, but add a second, mating post that goes into the wall stud.

The cantilevered design bears more weight (125 lbs per pair) on a thinner post, meaning the shelf can be as thin as 1". Also, machine screws in slotted holes allow you to adjust the post position to level your shelf end-to-end. Setscrews provide a few degrees of front-to-back leveling adjustment, as well.

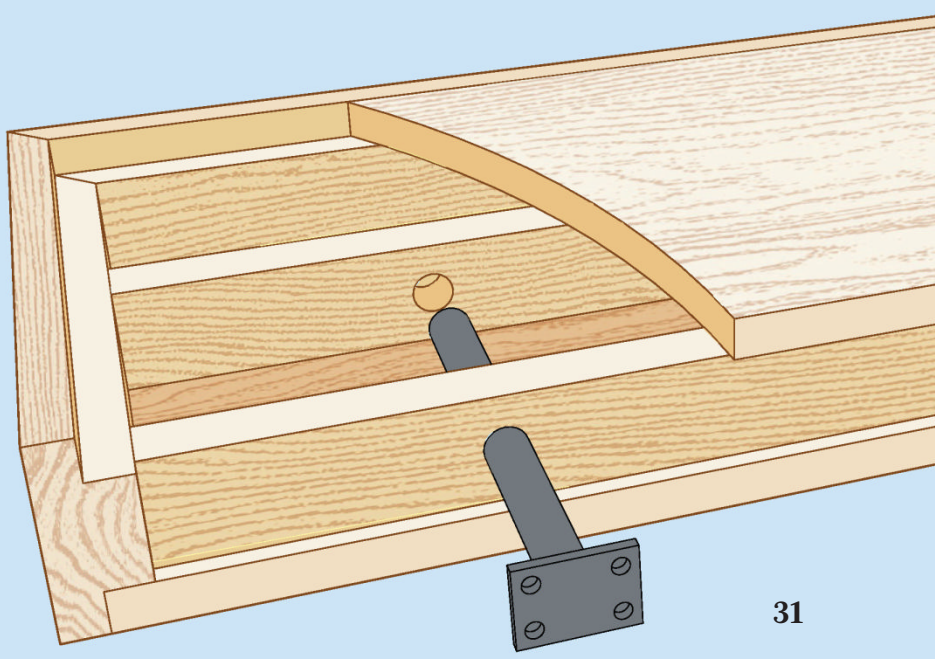
These brackets still require careful center-to-center aligning of the post holes and the holes in the wall. And you'll need to make deeper mortises to conceal the post-connecting plates.

Rockler, rockler.com
no. 59434, $20

A SIMPLE NO-SLAB SOLUTION

Thick slabs look cool, but they are often expensive and hard to come by. Plus, drilling the deep, straight holes in their edges for mounting posts proves challenging and requires long bits.

As an alternative, build a hollow box using solid-wood edging and a plywood top and bottom. Inside, add a pair of supports, running lengthwise, with predrilled holes at the post spacing you need.



• SHOP TESTED •

MIDSIZE MULTI-BASE ROUTERS

We put nine combo kits through a workout to see which of these middleweights can deliver their promise of a knockout one-two routing punch.

WRITER: JAN SVEC with DAVE STONE
TESTER: JAN SVEC

PHOTOGRAPHER: JASON DONNELLY, KELSEY HANSEN

Router combo kits promise the capabilities of a fixed-base and a plunge-base by combining both with a motor in a single, more-economical, more-compact package.

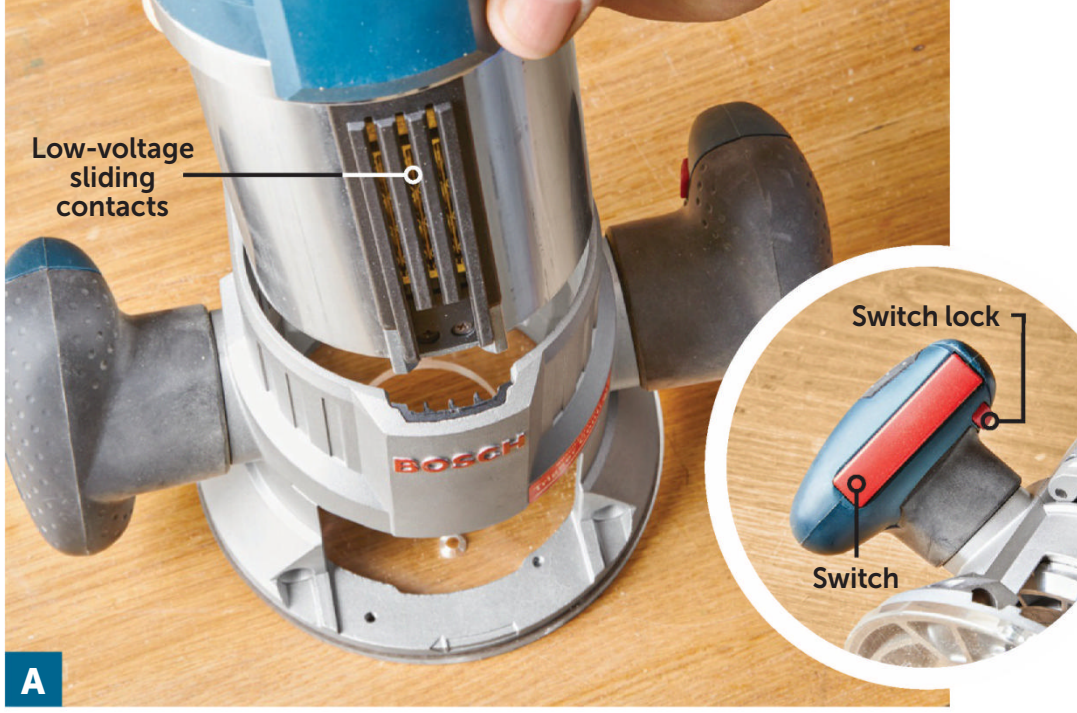
To find out if these dual-base kits can deliver on their promise of providing the best of both worlds, we ran nine models, all ranging from 1.75 to 2.3 horsepower, through their paces. Here's what we learned by examining their features and performance in an array of handheld and table-mounted tests.

POWER UP

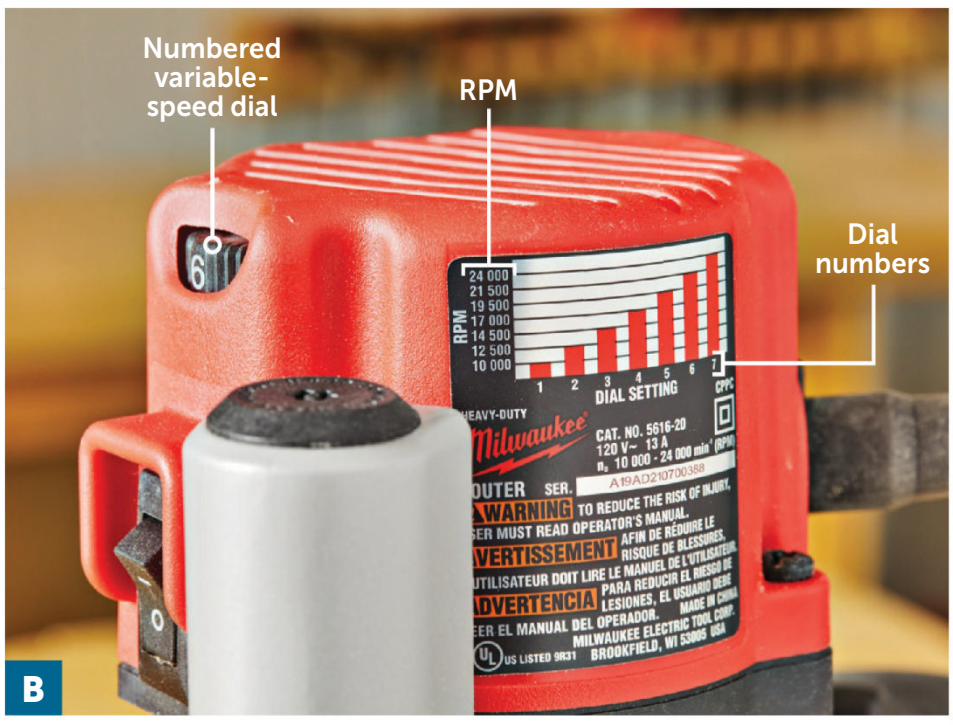
An easily reachable switch makes using a router safer. Only the Bosch MRC23EVS places the switch on the handle of each base—our favorite approach—using a unique connection system **[Photo A]**.

The other tested routers put the power switch on the motor. The Makita RF1101KIT2 and Metabo HPTKM12VC place their switch on top of the motor, so operating it requires letting go of one handle. The remaining routers with motor-mounted switches place them on the side within easy reach of a thumb or finger, a safer option.

To enhance bit-path visibility, the Bosch MRC23EVSK, Hercules HE041, and Skil RT1322-00 feature LED work lights. These shine toward the bit to greatly enhance routing-path visibility. The Bosch lights come on when you connect to power, doubling as a power indicator. Hercules and Skil power switches control their work lights. Both have separate lights that illuminate to show the router is plugged in.



Low-voltage sliding contacts on the Bosch MRC23EVSK allow handle-mounted switches on the fixed and plunge bases for the safest operation of all the routers we tested.

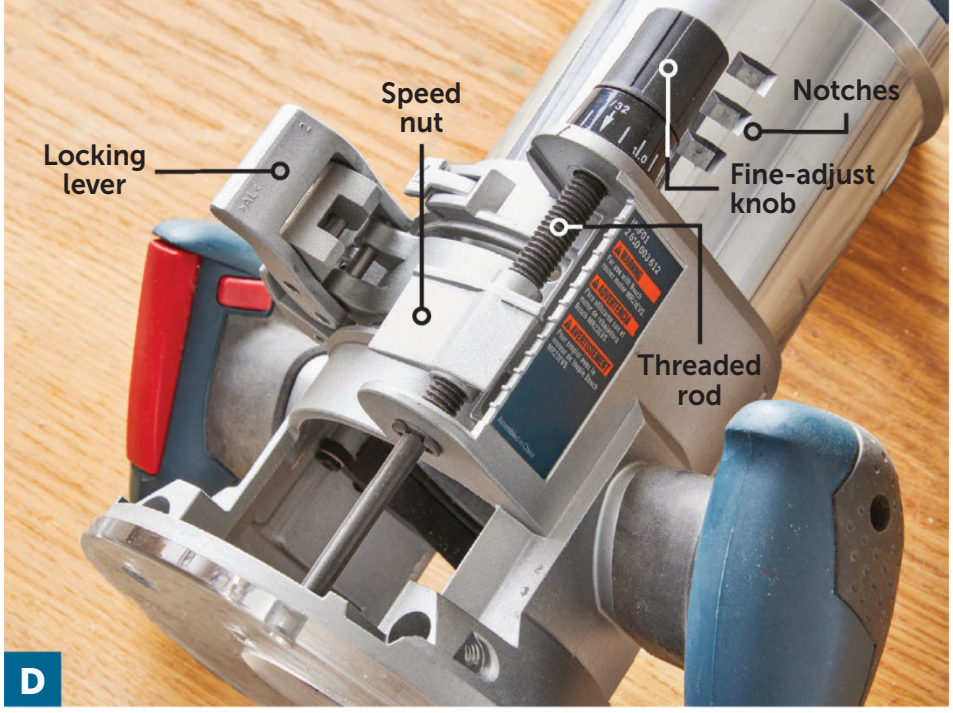


The Milwaukee (pictured) and Makita have speed information on the motor. Most others require consulting a chart in the manual. Hercules and Metabo don't furnish a speed chart.

The Skil display offers a menu comprising seven cutter types, four cutter-diameter ranges, and three materials. Set motor speed using these selections or directly by toggling "+" or "-" buttons.

The DeWalt DW616PK is the lone single-speed router in the group. All others feature variable speed. (See the chart on *page 39* for speed ranges.) A numbered dial **[Photo B]** controls speed on all routers except the Skil. It uses push-buttons and a digital display **[Photo C]**. While novel, setting speed using those controls proves more challenging than using a simple dial.

All but the single-speed DeWalt DW616PK have soft start—which brings the motor up to speed gradually to avoid a lurch at startup—along with electronic feedback to maintain motor speed under load.



Bosch, Hercules, and Skil use a base-mounted lever to engage a series of motor-housing notches you move the motor between for coarse adjustment. The Milwaukee runs through its range uninterrupted.

Motors that move straight up and down in the base always keep the switch in the same position.

Spiral-grooved motors that rotate as they move up and down cause the switch location to change.

FIXED-BASE FEATURES

Bosch, Hercules, Milwaukee, and Skil motors travel straight up and down in their fixed bases and employ a threaded rod with a speed-nut mechanism for depth adjustment **[Photo D]**. This requires an extra step for coarse adjustment, but we prefer this system because it keeps the switch in the same location relative to the base, *top right*.

Makita and Metabo achieve depth adjustment with spiral-grooved motors that rotate in their bases. This allows uninterrupted motor adjustment through the entire range but changes switch location relative to the base, *bottom right*.

The DeWalt routers also feature spiral-grooved motors, but a rotating ring on the base mates with the grooves. Turning the ring raises and lowers the motor without the motor rotating. DeWalt's depth-adjustment ring incorporates an indexing ring, which proved difficult to grip and turn. On the Makita, locking the motor into place made turning the indexing ring difficult, which hindered zeroing the cursor for subsequent fine depth adjustment.

FIXED-BASE PERFORMANCE

We formed five edge profiles with each router, making individual passes at one-third, two-thirds, and finally at full depth. All routers felt comfortable in our hands, vibrated little, and performed equally well in this test.

Switching to a ¾" straight bit, we set up each router to form ¼"-, ⅜",- and ½"-deep grooves and dadoes. We set the cutting depths using each router's onboard depth-setting features, then measured the actual depths. Once again, all routers performed well. We measured maximum depth variations of around .014", about the thickness of three sheets of copy paper.

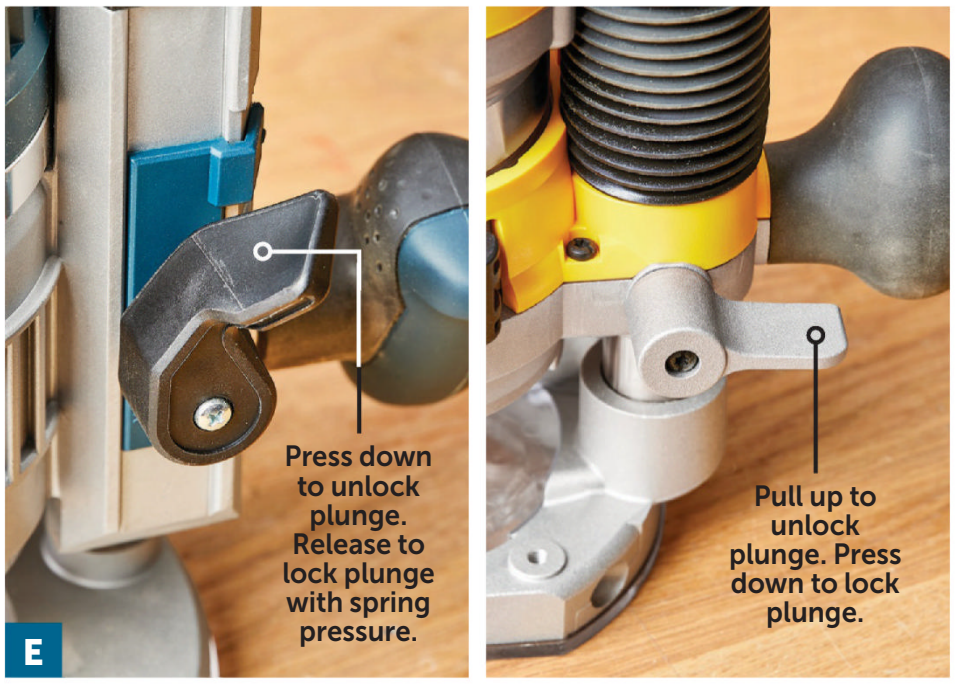
PLUNGE-BASE FEATURES

All of the plunge bases feature a lever that engages and disengages the plunge mechanism, letting you plunge, then lock the bit position at the desired depth. Spring-loaded levers on both Bosch routers, as well as on the Makita, Metabo, and Milwaukee, release when you press the lever down, allowing you to plunge, then lock when you let it go. Both DeWalt routers, the Hercules, and Skil are opposite: Pull up to release and plunge then push to lock in position.

We prefer the former because pushing the lever to activate the plunge action (the base's defining purpose) feels more natural **[Photo E]**. During one test, the DW616 lever vibrated loose due to bit chatter. The Metabo's plunge action felt sticky and its return action was sluggish.

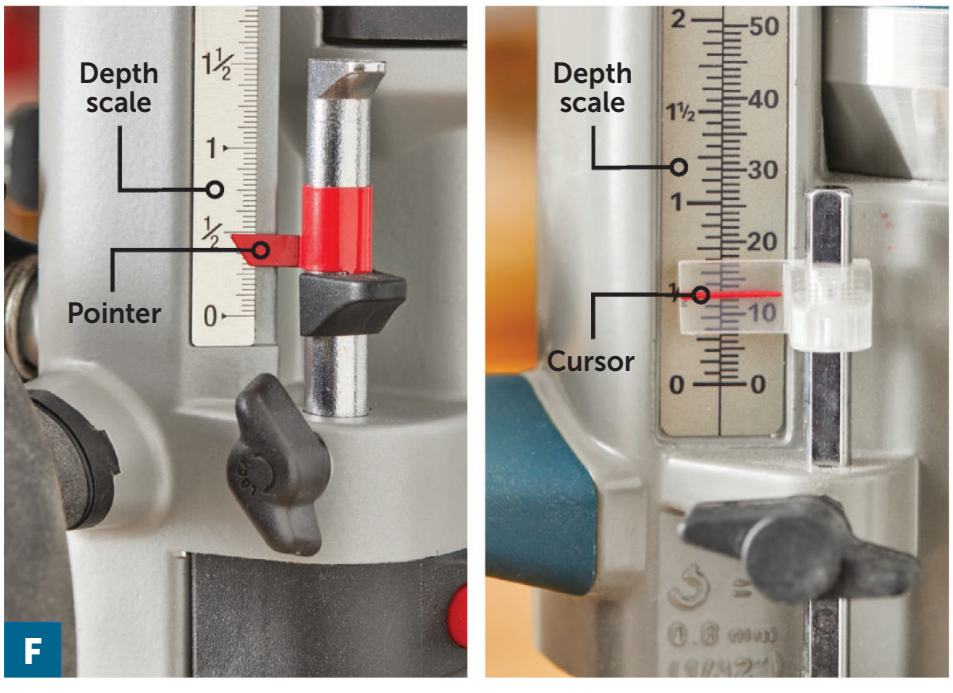
Except for the Bosch and Milwaukee **[Photo F]**, we found most plunge scales difficult to read and set accurately. Scales cast into the Hercules and Skil bases provide little visual contrast. For best results, we advise setting bit depth using setup gauges or a measuring device.

We like turret stops with lots of steps and question the usefulness of adjustable ones **[Photo G]**. The Bosch 1617EVSPK turret features seven steps at fixed 1/8" increments. The Bosch MRC23EVSK has the same turret, but two adjustable steps interrupt the even progression; this is not an improvement in our book. Turrets on the Hercules and Skil wobble when pressed down by the plunge-depth rod, making accurate adjustment dubious.

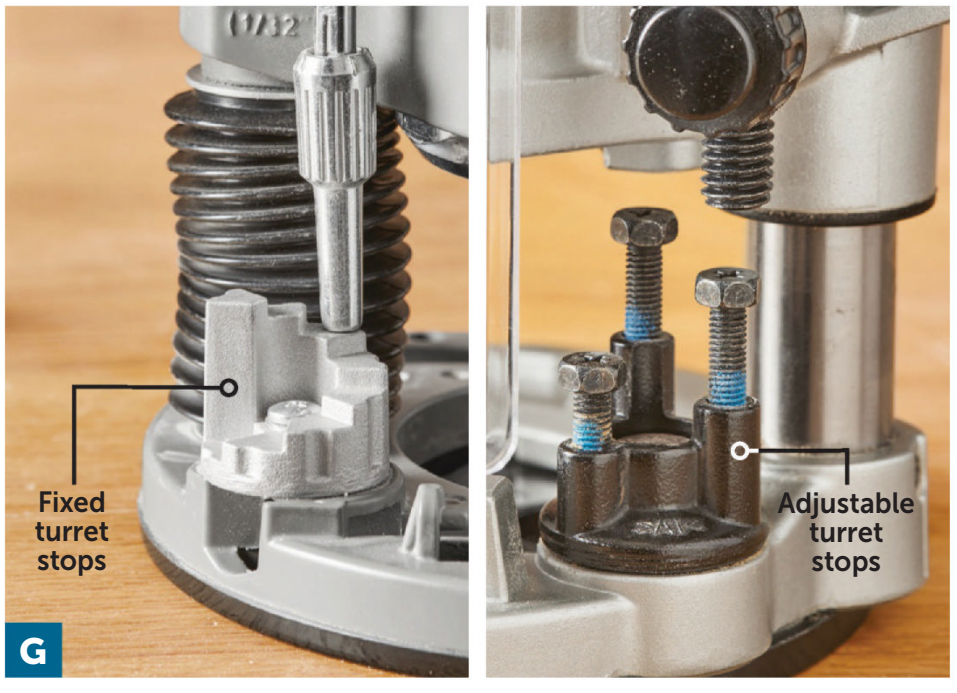


Plunge-release levers that lock when you let go (*left*) use spring pressure to ensure solid lock engagement. Levers you depress to lock (*right*) can allow plunge slippage if you don't firmly depress the lever.

All plunge depth-stop rods except the Metabo's incorporate fine adjustment. A unique Bosch MRC23EVSK feature allows fine adjustment after locking coarse plunge depth into place. The Makita threaded plunge-stop rod incorporates a speed-nut mechanism so it doubles as coarse and fine adjuster. Milwaukee's versatile plunge-depth rod features rack-and-pinion operation with a fine-adjustment knob as well as a speed-nut mechanism for coarse adjustment, a very thoughtfully engineered feature.



The plunge-depth scale on the Milwaukee (*left*) employs a pointer situated close to a highly legible scale. Both Bosch routers (*right*) feature a high-contrast scale, though the wide cursor obscures it a bit.



Multiple fixed-position turret stops (*left*) offer plenty of depth options. Adjustable-step turrets (*right*) prove more difficult to use because of limited accessibility with a wrench or screwdriver.

PLUNGE-BASE PERFORMANCE

Using turret stops and depth rods, we set up each router to form ¼"-, ⅜",- and ½"-deep grooves and dadoes and measured the actual depths. All but the Hercules and Skil made cuts within .009" of the target. Wobbly turrets and out-of-flat bases on those two routers likely caused variation up to .039".

Switching to a ½" straight spiral upcut bit, we routed 1½"-deep mortises, starting at ⅜" deep and proceeding in ⅜" steps. Although all mortise depths were within .010" of the target, the cursor on the Makita plunge rod slipped during progressive plunges and required re-zeroing.

To test stop slippage, we plunged 25 holes 1" deep with each router and measured every fifth hole. No router showed significant slippage, but the out-of-flat bases of the Hercules and Skil rocked slightly on the upstroke. This caused tear-out as the bit caught the edges of the holes on exit. Shimming the subbases with masking tape eliminated the problem.

BIT CHANGES

With two wrenches, both Bosch models, the DeWalt DW616, Makita, Metabo, and Milwaukee generally provide easier bit changes than the remaining routers equipped with an arbor lock and single wrench. Opposing wrenches eliminate the wrestling match sometimes encountered when depressing the arbor lock and holding the motor with one hand while turning the wrench with the other. On the Makita, a skinny arbor nut and thin, stamped wrenches combined to make holding the wrenches in place difficult.

Dust shields and ports on fixed bases block bit-change access, so it's best to install bits with the motor out of the base. The 3½" panel-raising bit used in the power test (see *Pushing for Power, next page*) didn't fit through the Makita, Metabo, and Milwaukee fixed bases.

DUST COLLECTION

Through-the-post dust extraction on both DeWalt plunge bases **[Photo H]** proved extremely effective. Snap-in shields on the Hercules and Skil totally enclose the fixed bases, and shrouds on the plunge bases surround the bit. Both work extremely well with normal router shavings, though larger splinters easily plugged the fixed-base port and the neck restriction in the plunge port. The Milwaukee port did an excellent job, fits both bases, and features tool-free installation.

H

The high outlet of the DeWalt plunge bases keeps the vacuum hose clear of benchtop obstructions, but a stiff or bulky hose makes the router tippy. Stabilize the router by suspending the hose overhead.

TABLE MOUNTING

The fixed bases of both Bosch models, as well as the Hercules, Milwaukee, and Skil, enable through-the-table bit adjustment. We found height adjustment easier and more accurate with these routers. All but the Hercules and Skil include height-adjustment wrenches.

When mounted in a table, depth-adjustment rings on the DeWalt routers tend to bind when turned with one hand, so you have to reach under the table with both hands. The digital display and speed controls on the Skil face down when table-mounted.

PUSHING FOR POWER

Measuring the power of a router proves challenging. That's because feed rate makes a big difference. If the router begins to bog down, you'll naturally slow your feed rate, whether you're routing handheld or with a table. Because of that, we knew we'd never be able to move the routers or the stock at the consistent rate required for an apples-to-apples test.

So, we came up with the router-table rig at *left*. We mounted each router in its fixed base and installed each one in the table using an identical phenolic insert plate.

To take feed-rate inconsistency out of the equation, we mounted a power feeder and ran the stock at 6 feet per minute—an aggressive rate we knew would tax the motors.

To further tax the routers, we installed a fresh Freud 3½"-diameter panel-raising bit in each router and adjusted the no-load speed as close as possible to 12,000 rpm. (No router locked in at the exact speed indicated by the settings.) Cutting the full profile in three progressive passes, we checked router rpm and amp draw. Then we ranked routers according to how far the speed dropped from the initial setting and whether amp draw exceeded motor ratings. We measured motor housing temperature before and after each cut.

PERFORMANCE UNDER POWER PRESSURE

RANK	ROUTER	AMP RATING	NO-LOAD RPM	MAX. RPM DROP	MAX. AMP DRAW	MAX. TEMP. RISE, DEGREES
1	Bosch MRC23EVSK	15	12,140	0	11.9	3
2	Milwaukee 5616-24	13	12,447	47	13.6	4
3	DeWalt DW618PK	12	12,220	120	11.3	8
4	Skil RT1322-00	12	12,958	2,958	13.7	8
5	Bosch 1617EVSPK	12	12,585	3,185	13.6	7
6	Makita RF1101KIT2	11	12,200	7,200	11.5	10
7	Metabo HPT KM12VC	11	12,215	9,715	13.0	10
*	Hercules HE041	12				
**	DeWalt DW616PK	11				

*On the first pass, the Hercules slowed to 5,800 rpm then rebounded to complete the cut, although rpm and amp draw varied wildly. On the second pass, the speed control reacted too slowly to power feeding and shut the router down. Hand-feeding the stock instead gave the speed controller time to react and we completed all cuts. As before, rpm and amp draw varied.

**At 24,500 rpm, the single-speed DeWalt DW616PK exceeds the 12,000 rpm limit for the 3½"-diameter panel-raising bit and was eliminated from this test.

OUR PICKS

With the most power, innovative handle-mounted switches, LED work lights, and through-the-base adjustment for table mounting, the Bosch MRC23EVSK proves hard to beat, unless you consider the Milwaukee 5616-24. Its well-engineered features place this router toe-to-toe on power. It also offers through-the-base adjustment, a body-grip fixed base, and dust collection. We award Top Tool honors to both.

With all but the Hercules and Skil closely packed price-wise, we give Skil, with adequate power and better features than some of its pricier competition, the nod for Best Value.

·2023·
WOOD®
TOP TOOLS
MULTI-BASE ROUTERS

MODEL	PERFORMANCE RATINGS (1)															
				FIXED BASE						PLUNGE BASE						
	POWER	EASE OF CHANGING BITS	EASE OF CHANGING BASES	EASE OF SETTING BIT DEPTH	DEPTH SCALE EASE OF USE	EASE OF USING ON/OFF SWITCH	ROUTER TABLE USE	SUBBASE VERSATILITY	DUST COLLECTION	PLUNGE SMOOTHNESS	RELIABILITY OF PLUNGE-LEVER LOCK	EASE OF USING DEPTH STOP AND TURRET	EASE OF USING DEPTH SCALE	EASE OF USING ON/OFF SWITCH	SUBBASE VERSATILITY	DUST COLLECTION
BOSCH 1617EVSPK	B	A	B	B	A	B	A	A-	NA	A	A	A	B	B	B+	NA
BOSCH MRC23EVSK	A	A	A	B	A	A	A	A-	NA	A	A	A	B	A	B+	NA
DEWALT DW616PK	B	B	B	B	B	B	B	C	NA	A	B	B	B	B	B	A
DEWALT DW618PK	A	B	B	B	B	B	B	A	NA	A	B	B	B	B	A	A
HERCULES HE041	C	A	B	B	A	B	A-	A	A-	A	B	D	B	B	A	A-
MAKITA RF1101KIT2	C	C	B	B	A	C	B-	A	NA	A	A	C	B	C	A	NA
METABO HPT KM12VC	C	A	B	B	B	D	B-	B	NA	B	A	C	C	D	B	NA
MILWAUKEE 5616-24	A	A	A	A	A	A-	B	B	A	A	A	A	A	A-	B	A
SKIL RT1322-00	B	A	B	B	B	B	B	C	A-	A	B	D	B	B	C	A-

2023 WOOD® TOP VALUE MULTI-BASE ROUTERS

1. A Excellent
   B Good
   C Fair
   D Poor
   NA Not applicable

2. **(L)** Spindle lock and one wrench
   (2) 2 wrenches

3. **(*)** Requires optional wrench, sold separately

4. **(A)** Subbase adapter for guide bushings
   (C) Centering cone
   (D) Dust-collection hood
   (D)** Dust collection only on plunge base
   (E) Edge guide
   (F) Fine-adjustment extension handle
   (G) Guide bushings
   (H) D-handle base
   (L) LED task lights
   (S) Extra subbases
   (W) Router-table depth-adjustment wrench

5. Prices current at time of article production and do not include shipping, where applicable.

MOTOR				BASE SPECIFICATIONS								ACCESSORIES (4)		WEIGHT				
				FIXED BASE				PLUNGE BASE										
SPEED RANGE (MIN.–MAX.), RPM × 1,000	RATED HORSEPOWER	RATED AMPERAGE	COLLET-TIGHTENING METHOD (2)	SUBBASE OPENING	BASE OPENING (W/O SUBBASE)	MAX. COLLET TRAVEL	THROUGH-TABLE ADJUSTMENT? (3)	SUBBASE OPENING	BASE OPENING (W/O SUBBASE)	MAX. PLUNGE DEPTH	NUMBER OF TURRET DEPTH STOPS	STANDARD (4)	OPTIONAL (4)	IN FIXED BASE	IN PLUNGE BASE	NOISE LEVEL AT MAX. RPM, NO LOAD	WARRANTY	SELLING PRICE (5)
8-25	2.25	12	2	2 1/16"	3 3/4"	1 7/16"	✓	2 1/16"	3 5/16"	2 1/4"	7	W	A,C,D,E,F,G	8.6 lbs	10.0 lbs	98 dB	1 year	$250
10-25	2.3	15	2	2 1/16"	4"	1 7/16"	✓	2 1/16"	3 5/16"	2 3/16"	7	W,L	A,C,D,E,F,G	9.9 lbs	12.6 lbs	101 dB	1 year	$330
24.5	1.75	11	2	1 3/16"	3 3/4"	1 1/2"		1 3/16"	3 9/16"	2 5/16"	5	C,D	E,S	8.1 lbs	10.9 lbs	102 dB	3 years	$230
8-24.5	2.25	12	L	1 3/16"	3 3/4"	1 1/2"		1 3/16"	3 9/16"	2 5/16"	5	D**,S	E	8.3 lbs	11.1 lbs	100 dB	3 years	$250
10-25	2.25	12	L	1 3/16"	3 5/8"	2 1/16"	✓*	1 3/16"	3 1/4"	2 5/16"	4	D,E,L,S	NA	7.8 lbs	9.1 lbs	102 dB	90 days	$140
8-24	2.25	11	2	1 3/16"	3 7/16"	2"		1 3/16"	3 7/16"	2 5/8"	3	S	D,E,G	8.0 lbs	9.9 lbs	96 dB	1 year	$340
8-24	2.25	11	2	1 3/4"	3 3/8"	2"		1 3/4"	3 7/16"	2 1/2"	3	A,G,S	D,E	8.1 lbs	10.7 lbs	96 dB	5 years	$225
10-24	2.25	13	2	2 1/2"	3 5/16"	1 3/8"	✓	1 3/16"	3 1/4"	2 7/8"	6	C,D,W	NA	8.4 lbs	11.6 lbs	99 dB	5 years	$285
10-25	2.25	12	L	1 3/16"	3 5/8"	2 1/16"	✓*	1 3/16"	3 1/4"	2 5/16"	4	D,E,L	NA	8.4 lbs	9.8 lbs	102 dB	90 days	$150

OVERALL DIMENSIONS
120¾"W x 103¾"D (at base) x 118¼"H

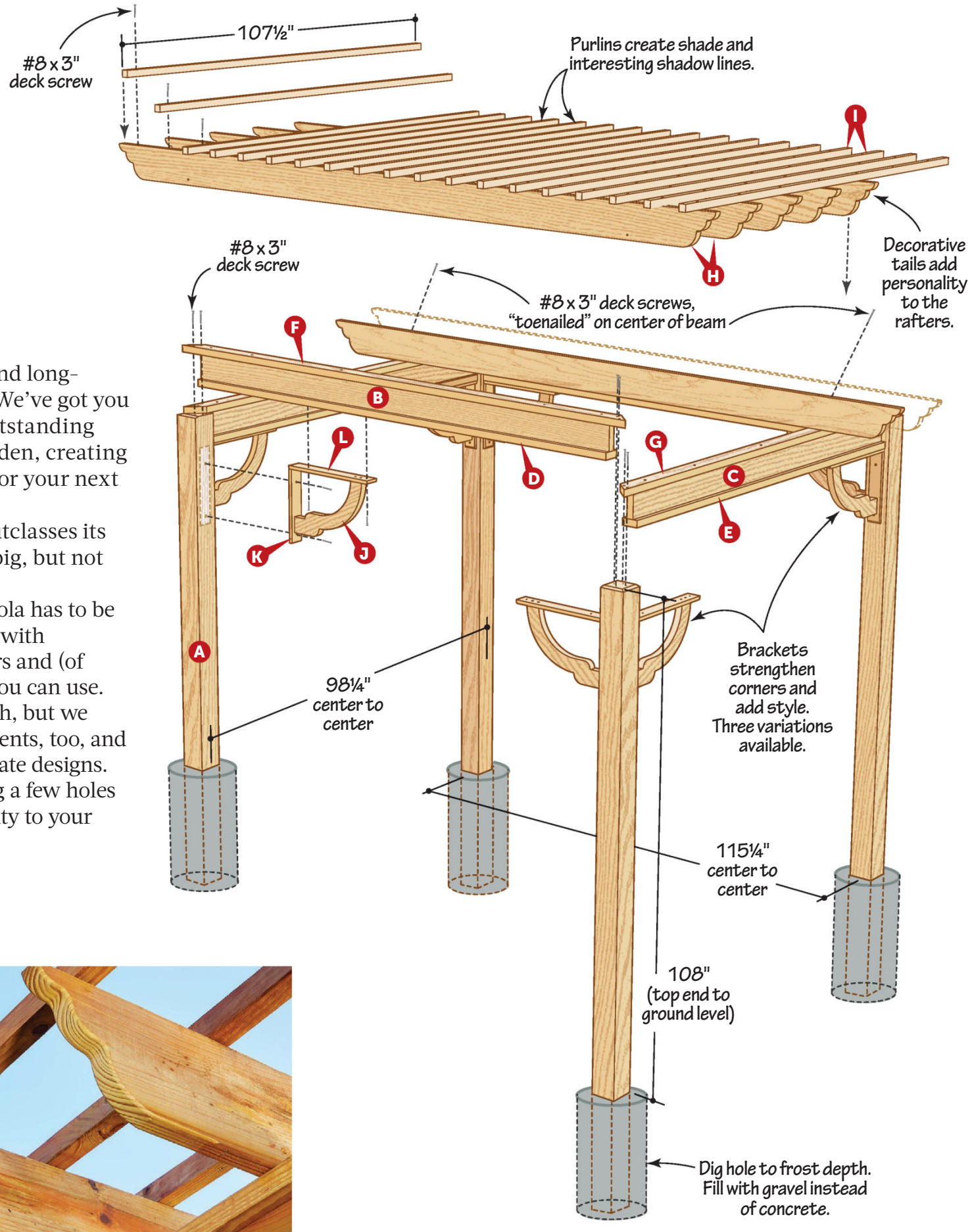
PHOTOGRAPHER: BRIE GOLDMAN
ILLUSTRATORS: ROXANNE LEMOINE, LORNA JOHNSON

GARDEN PERGOLA

A timeless design that adds instant atmosphere, and shade potential, to any landscape

WRITER: ZACH BROWN
DESIGNER: KEVIN BOYLE
BUILDERS: KEVIN BOYLE AND JOHN OLSON

EXPLODED VIEW



Looking for an elegant and long-lasting outdoor oasis? We've got you covered. A pergola is an outstanding addition to any yard or garden, creating a room-like space perfect for your next outdoor gathering.

A pergola's impact far outclasses its complexity. The parts are big, but not hard to build.

That doesn't mean a pergola has to be boring. We dressed ours up with decorative tails on the rafters and (of course) provide templates you can use. Corner brackets add strength, but we made them decorative elements, too, and even provide a trio of alternate designs.

Get out your tools and dig a few holes and you can bring this beauty to your backyard.

Note: **No additional finishing is required immediately for pressure-treated lumber, but consider applying a finish after a few seasons of weathering.**

POST AND BEAM FRAME

We selected 14'-long 6×6s for our posts (A) to accommodate 42"-deep footings plus a 108" finished post height (including some excess). Don't cut the posts before installation. Start with them full length.

1 Lay out the post locations **[Exploded View]** and install footings appropriate for your location and building codes **[Drawing 1]**. We dug holes below the frost line, then added a base of crushed rock.

2 Plumb the posts in the holes, making sure the posts are square to one another and the post faces are parallel, and temporarily brace them using stakes. Backfill the holes with additional tamped crushed rock.

3 Mark the finished height on one post **[Exploded View]**, then use a line level to transfer the cutline to the others. Cut the posts level and chamfer the ends **[Drawing 2]**.

TIP!

Senior Design Editor Kevin Boyle says, "A power hand planer makes quick work of these chamfers."

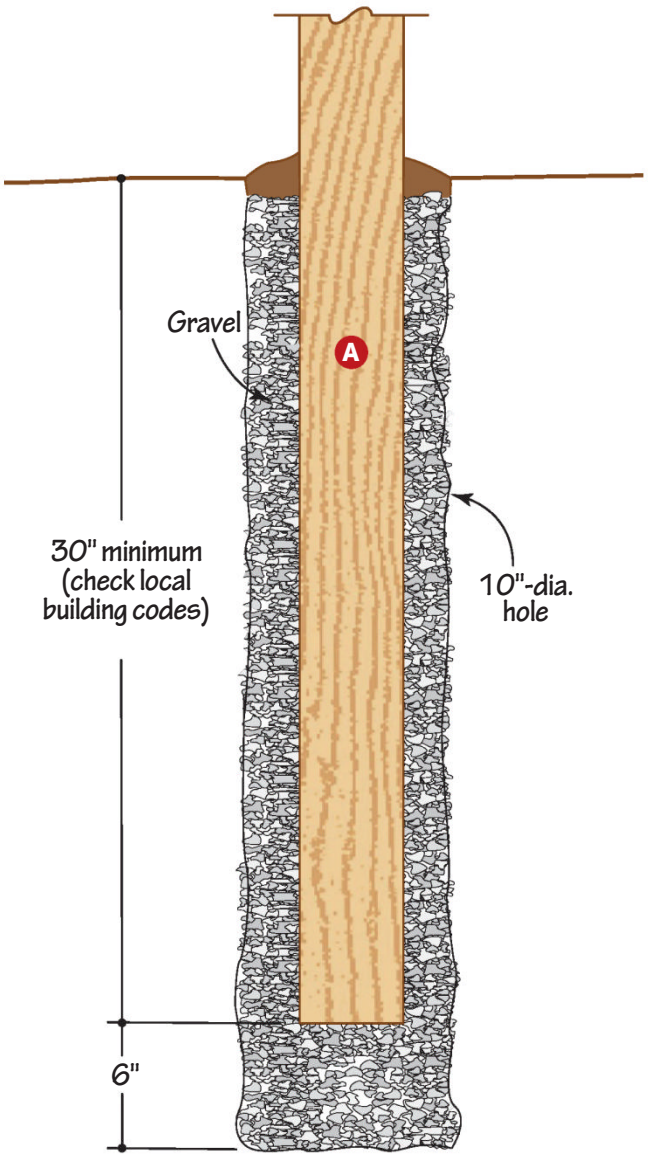
4 Measure between the posts and cut the beam webs (B, C) and bottom flanges (D, E) to length **[Materials List, Drawing 3]**, then screw the flanges to the bottoms of the webs, flush to the ends and centered side-to-side.

5 Miter-cut the top flanges (F, G) to length and screw them to the tops of the webs with equal overhangs on the ends and centered side-to-side **[Drawing 3]**.

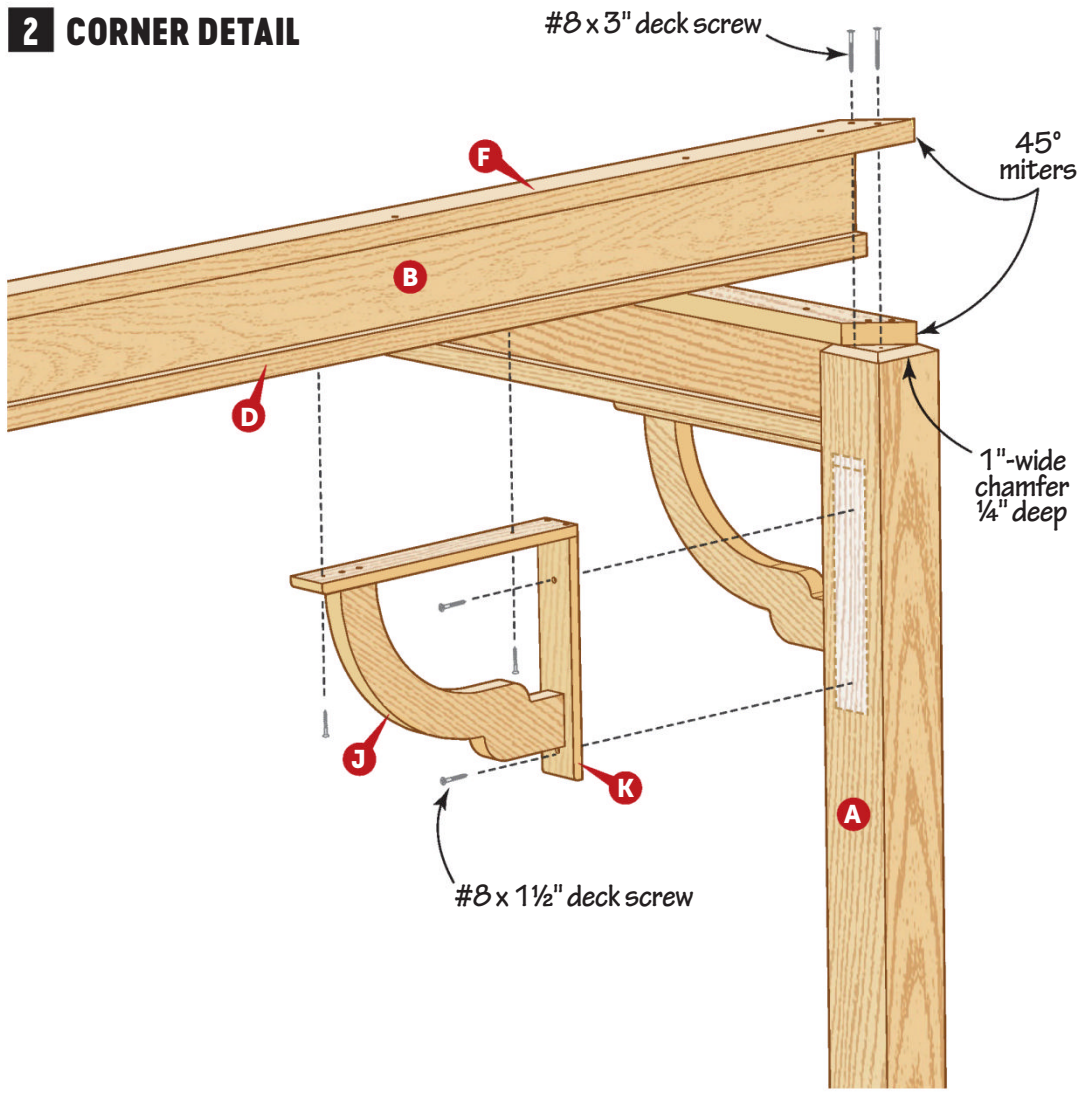
6 Screw the beams to the posts **[Exploded View, Drawing 2]**.

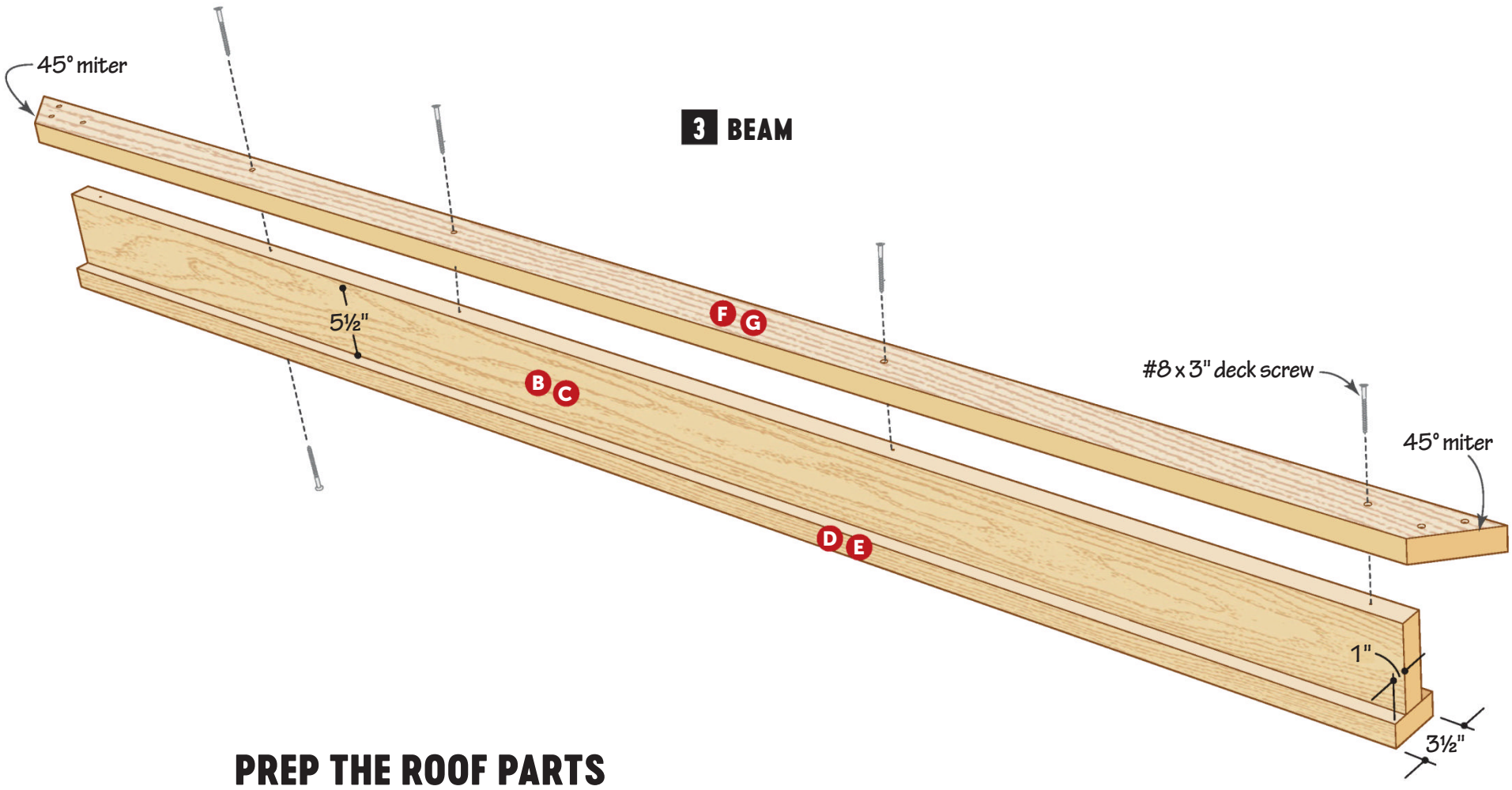
Note: **If the post-to-post measurements you made for the beam webs (B, C) differed from ours, add or subtract that same variance for the top flange (F, G) length.**

1 POST FOOTING DETAIL



2 CORNER DETAIL





PREP THE ROOF PARTS

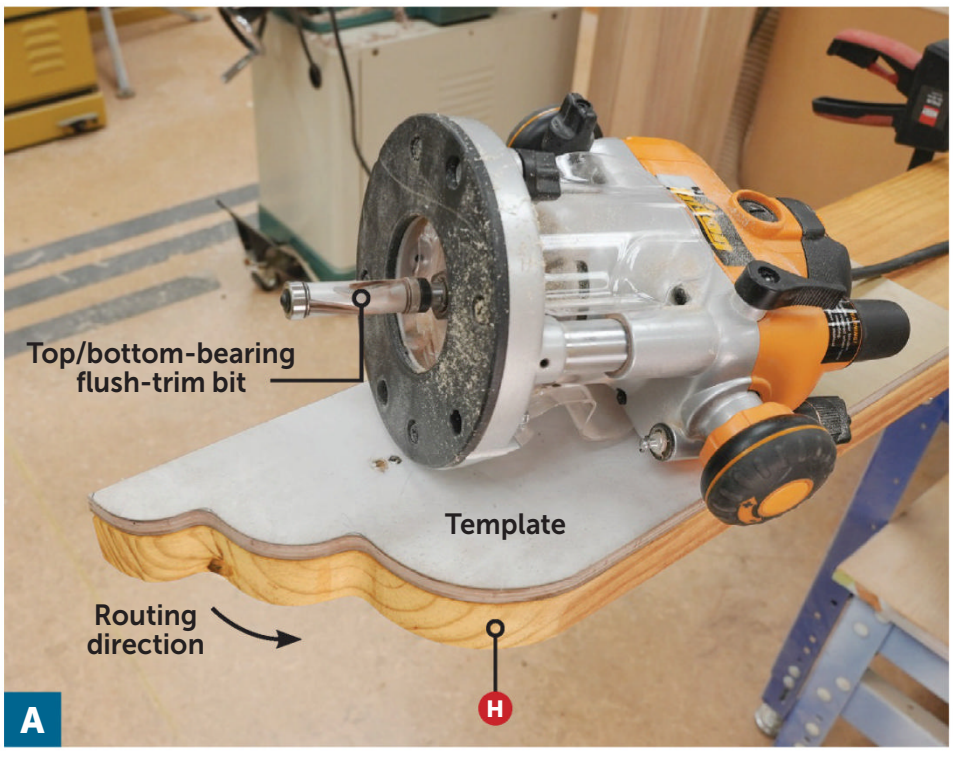
With the main structure up, turn your attention to the rafters, brackets, and purlins. You'll want to cut the decorative shapes and prep these parts on the ground before installation.

1 Cut the rafters (H) to length. Make a template out of scrap plywood or MDF for the rafter tails **[Drawing 4]** and trace the pattern onto both ends of each rafter **[Exploded View]**.

2 Rough-cut each end about 1/16" outside the line with a jigsaw, then secure the template and rout them to final shape **[Photo A]**. Rout 1/8" round-overs on the newly cut edges.

3 Cut the purlins (I) to size. We ripcut 10' 2×4s in half, then crosscut them to length.

4 Make a full-size template for the brackets (J) **[Drawing 5]** and use it to trace the pattern onto 2×8 stock.



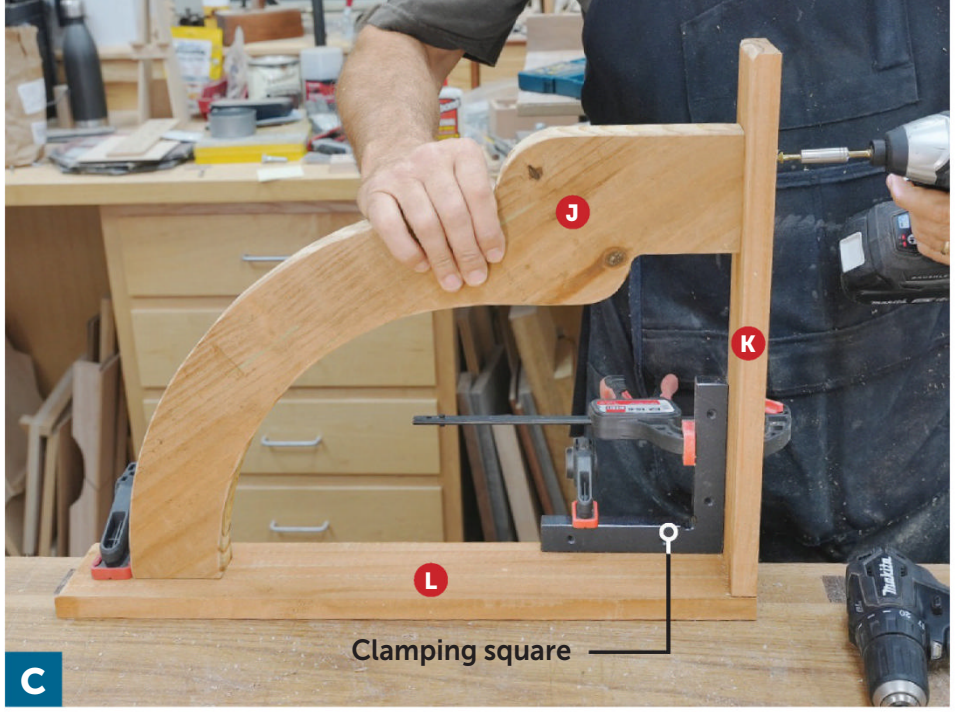
Attach the template on the layout line at the end of the rafter (H). Use a flush-trim bit to rout the end to final shape. Move the router from left to right (counterclockwise) across the end for best control.

Install a flush-trim bit in your router table (we used the dual-bearing bit from Photo A) and raise it to align the bearing with the template. Then move bracket (J) from right to left along the bit.

Rough-cut the brackets to shape, then attach the template and finish the job at the router table **[Photo B]**. After shaping the brackets, rout ⅛" round-overs on the edges **[Drawing 6]**. Follow these same steps if you choose either of the alternate bracket designs on *page 47*.

Note: **If you choose one of the alternate brackets on *page 47*, you'll need to make longer side plates (K).**

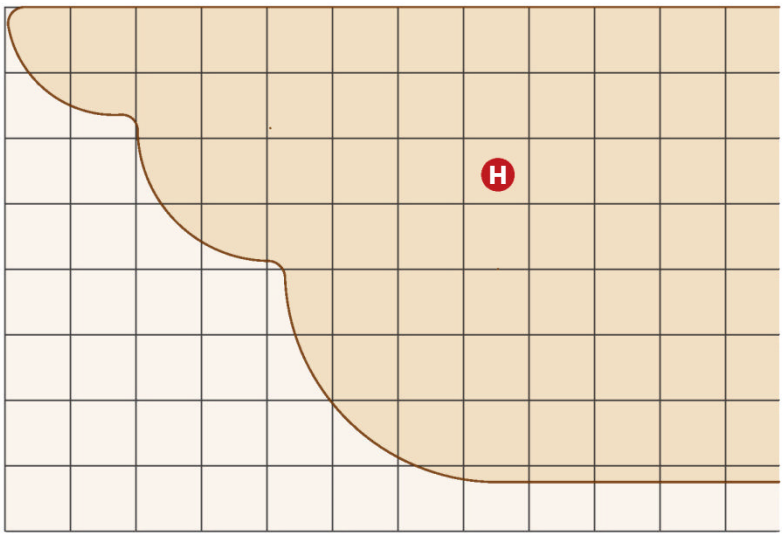
5 Cut the bracket plates (K, L) to size and round over one end of each **[Drawing 6]**. Screw them together in pairs, then attach a bracket (J) to each assembly **[Photo C]**.



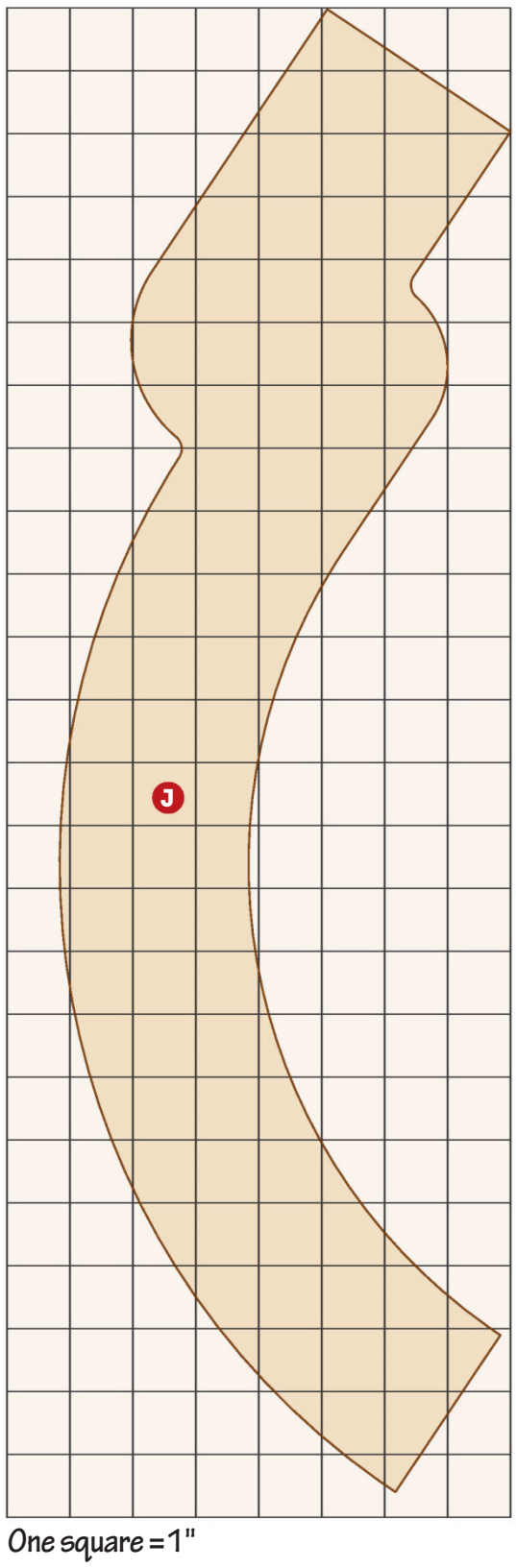
Use a clamping square to keep the mounting plate assembly (K/ L) square as you screw the bracket (J) in place.

4 RAFTER TAIL PATTERN

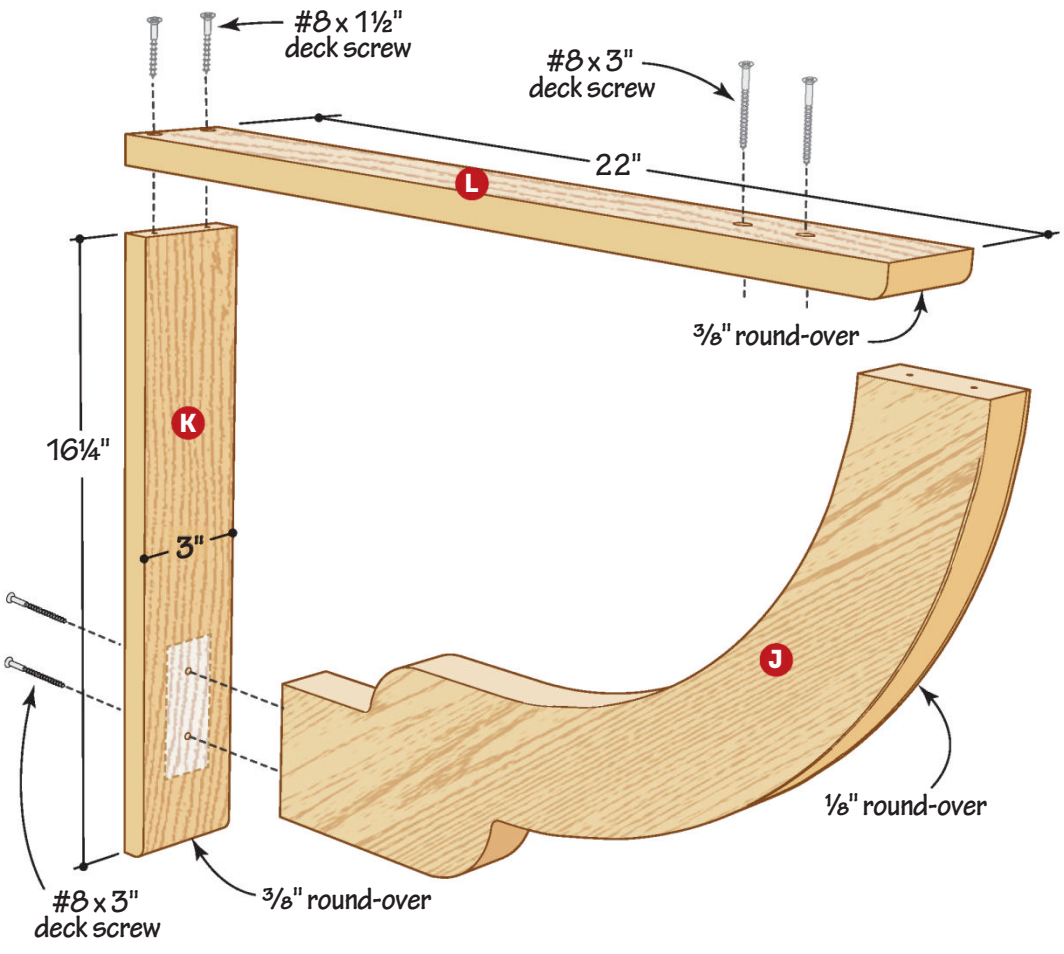
To download patterns from this issue, visit woodmagazine.com/290patterns



5 BRACKET PATTERN



6 BRACKET



TIP!

Cut a few 14⅞" spacer blocks to speed up the installation of the rafters (H). Afterward, trim them to 6½" to use as spacers for the purlins (I).

TOP IT OFF

1 Start the rafter layout with the center rafter, making sure it's square to the beams at both ends and with equal overhangs **[Exploded View]**. Screw the rafter to both beam top flanges (G) with screws driven at an angle through each face. Work outward toward the edges of the pergola, spacing the rafters 14⅞" apart.

2 Position the first purlin (I) centered on the length of the rafters, making sure it's square to the rafters and has equal overhangs **[Exploded View]**. Then space the purlins 6½" apart, working outward from the center.

3 Finally, screw the bracket assemblies to each post-and-beam connection **[Drawing 2]**. Enjoy the shade and ambiance of your pergola for many years to come.

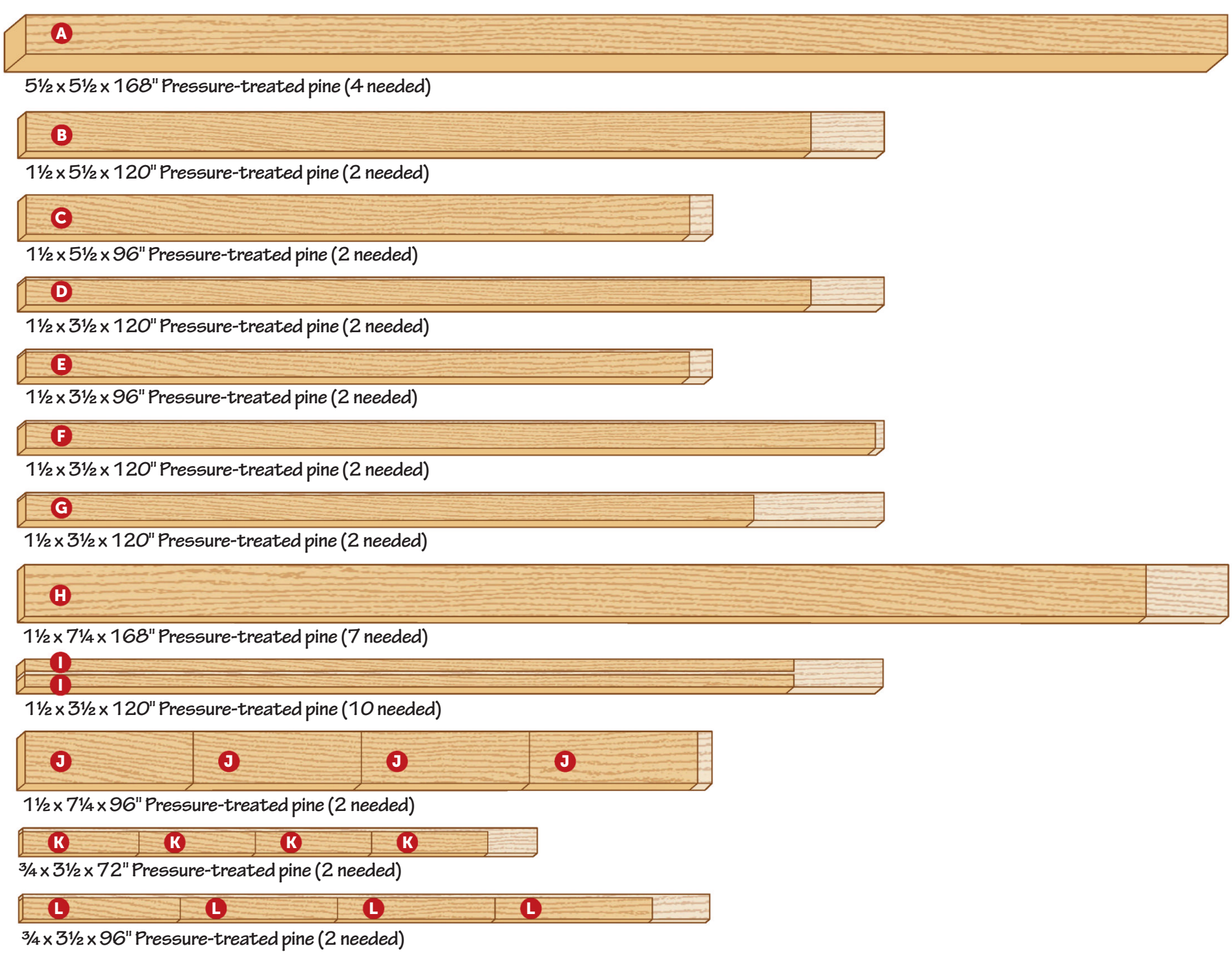
MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A*	POSTS	5½"	5½"	150"	PP	4
B	LONG BEAM WEBS	1½"	5½"	109¾"	PP	2
C	SHORT BEAM WEBS	1½"	5½"	92¾"	PP	2
D	LONG BEAM BOTTOM FLANGES	1½"	3½"	109¾"	PP	2
E	SHORT BEAM BOTTOM FLANGES	1½"	3½"	92¾"	PP	2
F	LONG BEAM TOP FLANGES	1½"	3½"	118¾"	PP	2
G	SHORT BEAM TOP FLANGES	1½"	3½"	101¾"	PP	2
H	RAFTERS	1½"	7¼"	157"	PP	7
I	PURLINS	1½"	1 11/16"	107½"	PP	19
J	BRACKETS	1½"	7¼"	23½"	PP	8
K	BRACKET SIDE PLATES	¾"	3"	16¼"	PP	8
L	BRACKET TOP PLATES	¾"	3"	22"	PP	8

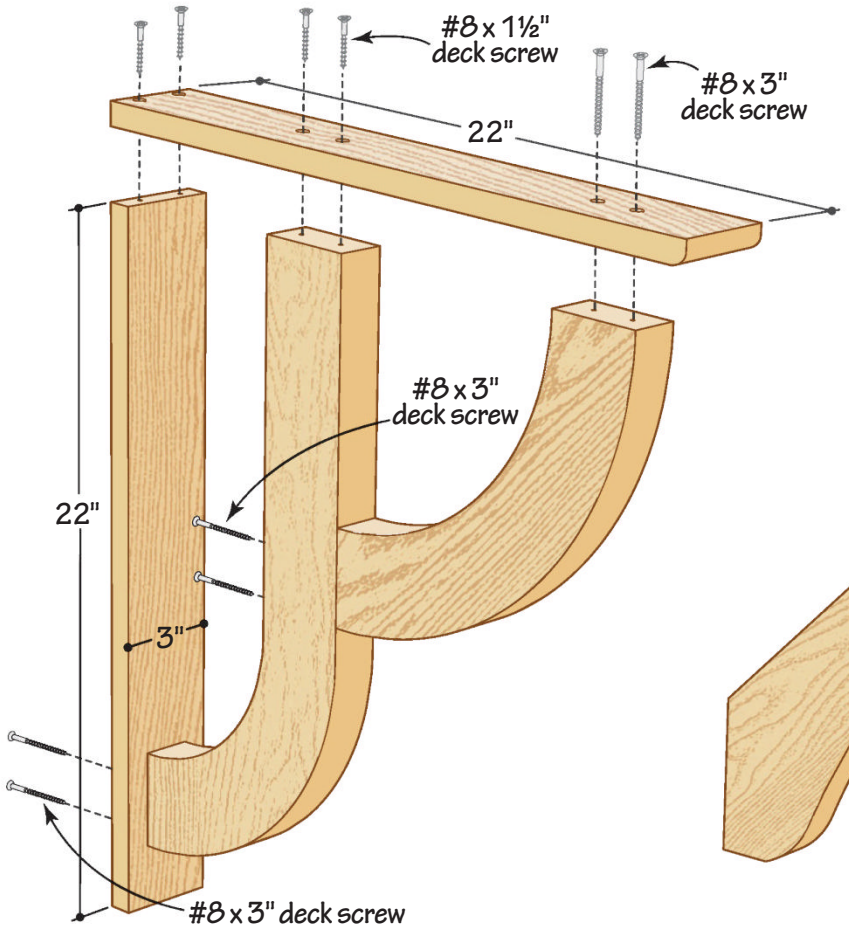
*Parts initially cut oversize. See the instructions.

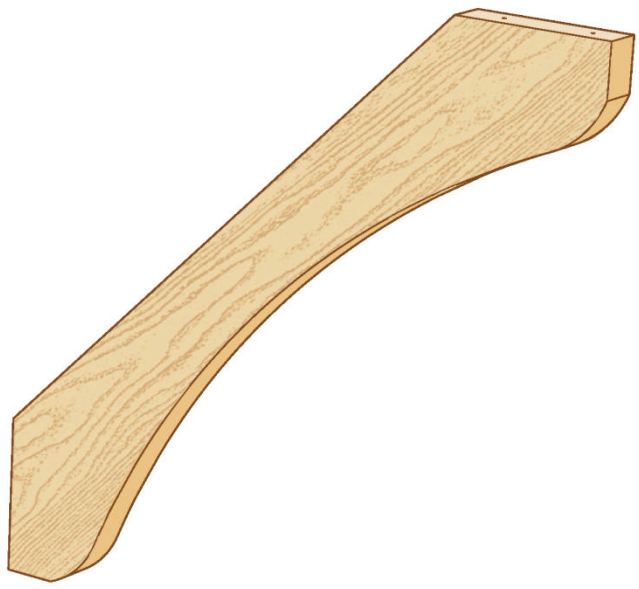
MATERIALS KEY: PP–pressure-treated pine.
SUPPLIES: #8×3" deck screws, #8×1½" deck screws.
BITS: Flush-trim router bit, ⅛" round-over bit, ⅜" round-over bit.
PROJECT COST: It cost us about $700 to build this project. Your cost will vary by region and source.

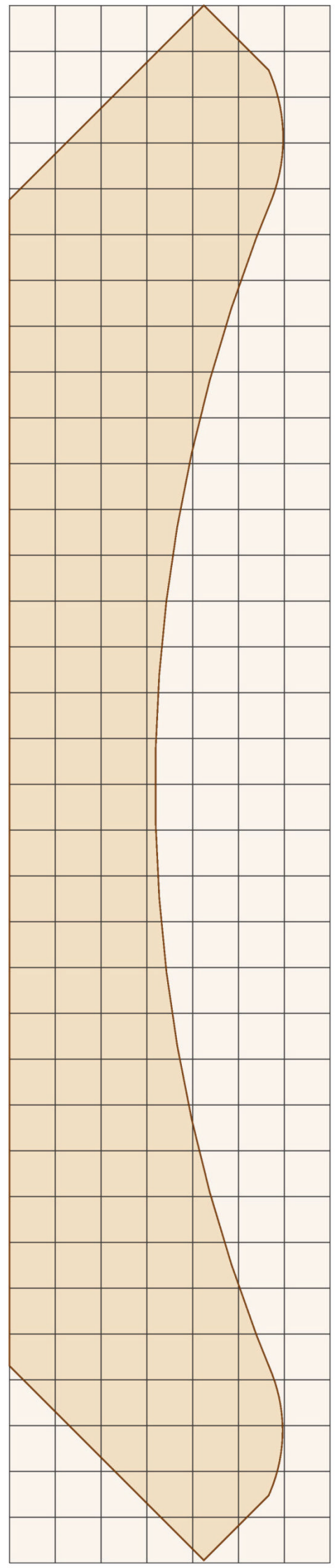
CUTTING DIAGRAM

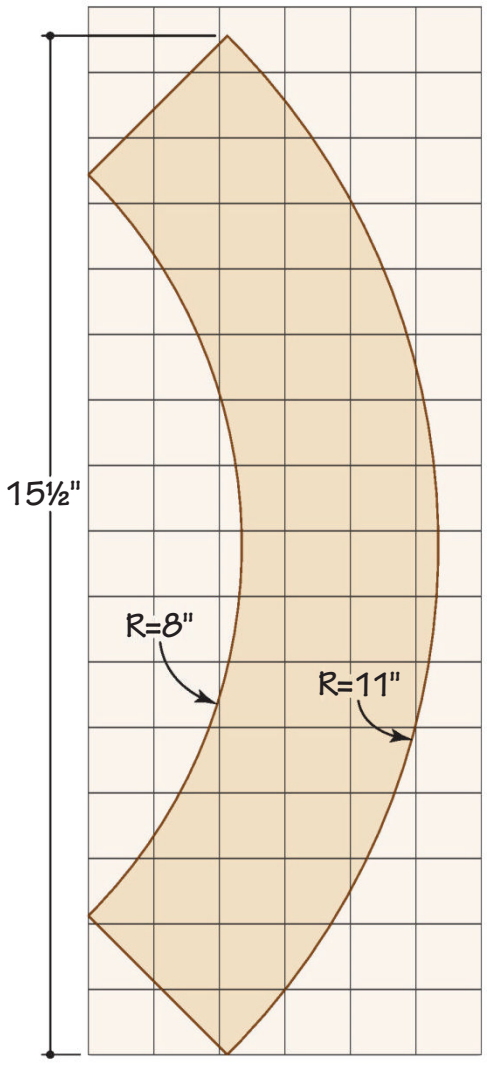


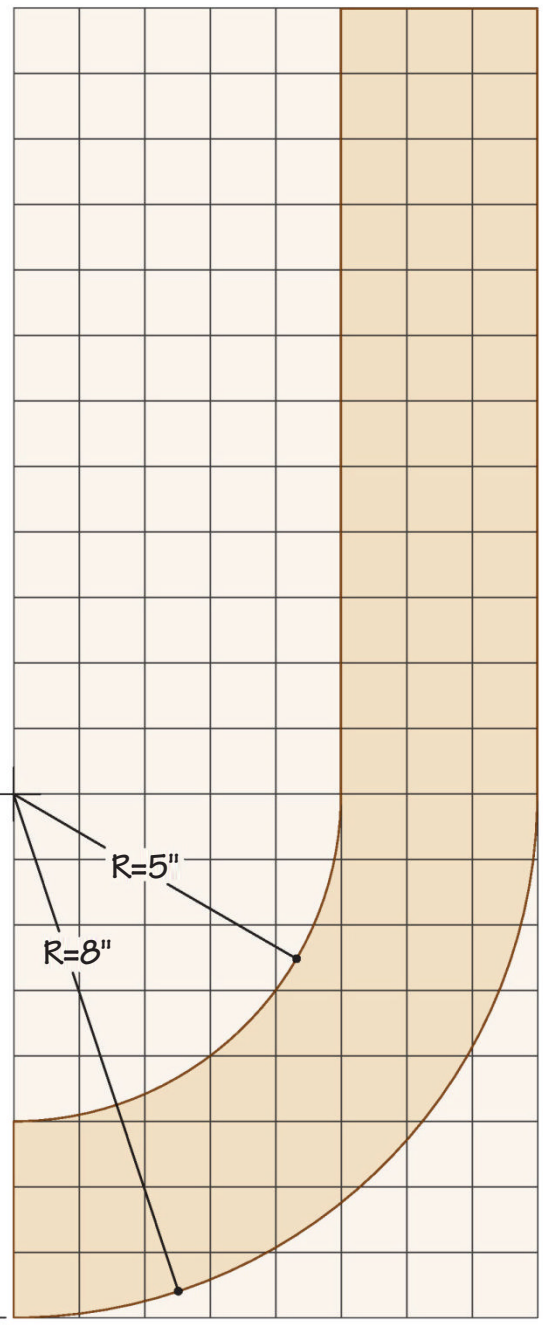
ALTERNATE BRACKETS











OVERALL DIMENSIONS
30"W x 9"D x 20"H (Closed)
30"W x 26½"D x 20⅛"H (Open)

DROP-FRONT DESK

Set up a handy workspace anywhere with this wall-mounted desk. The desktop drops down to create a first-class workstation when you need it, and an elegant wall accent when you don't.

WRITER: BRYAN NELSON
PROJECT DESIGNER: KEVIN BOYLE
BUILDER: BRIAN BERGSTROM

Working from home shouldn't mean plopping down at the kitchen table. Bring your executive lifestyle into a work-from-home form factor with this elegant desk.

The divided interior features compact drawers for odds and ends along with easy-access open areas for a laptop and larger items. Done with work? Store everything away and flip up the door for a clean, contemporary look.

And the dovetail keys not only add a decorative look, but also strengthen the corners. Bonus: The jig you build to rout the slots for the keys will always be handy for future projects.

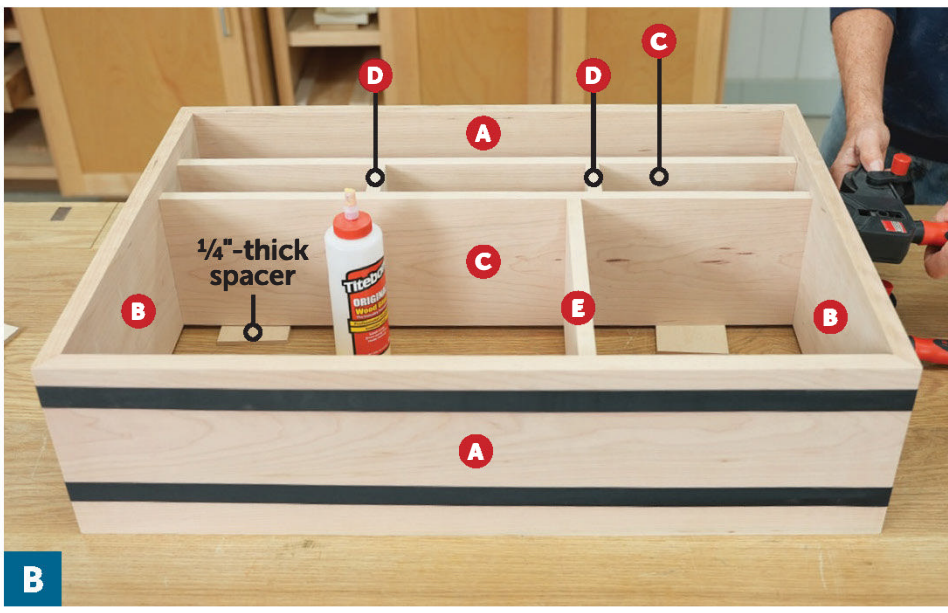
START WITH A STURDY SHELL

Beginning with the outside case provides the exact measurements needed for the interior parts. Then, once you've cut the shelves and dividers to size, you'll assemble the desk from the inside out.

1 Cut the top/bottom (A) and sides (B) to width and overlength (31" for the top/bottom and 21" for the sides) **[Materials List, Drawing 1]**. Then cut a rabbet along the back edge of each piece **[Drawings 1, 1a]**.

2 Bevel-cut the ends of the top/bottom and sides to final length. Dry-fit the case using a pair of band clamps and check the fit of the miters, adjusting as necessary for tight, seamless joints.

Assemble the shelves (C) and drawer dividers (D) with biscuits and glue and allow the assembly to dry. Then glue the vertical divider (E) into place, checking for square as you clamp it.

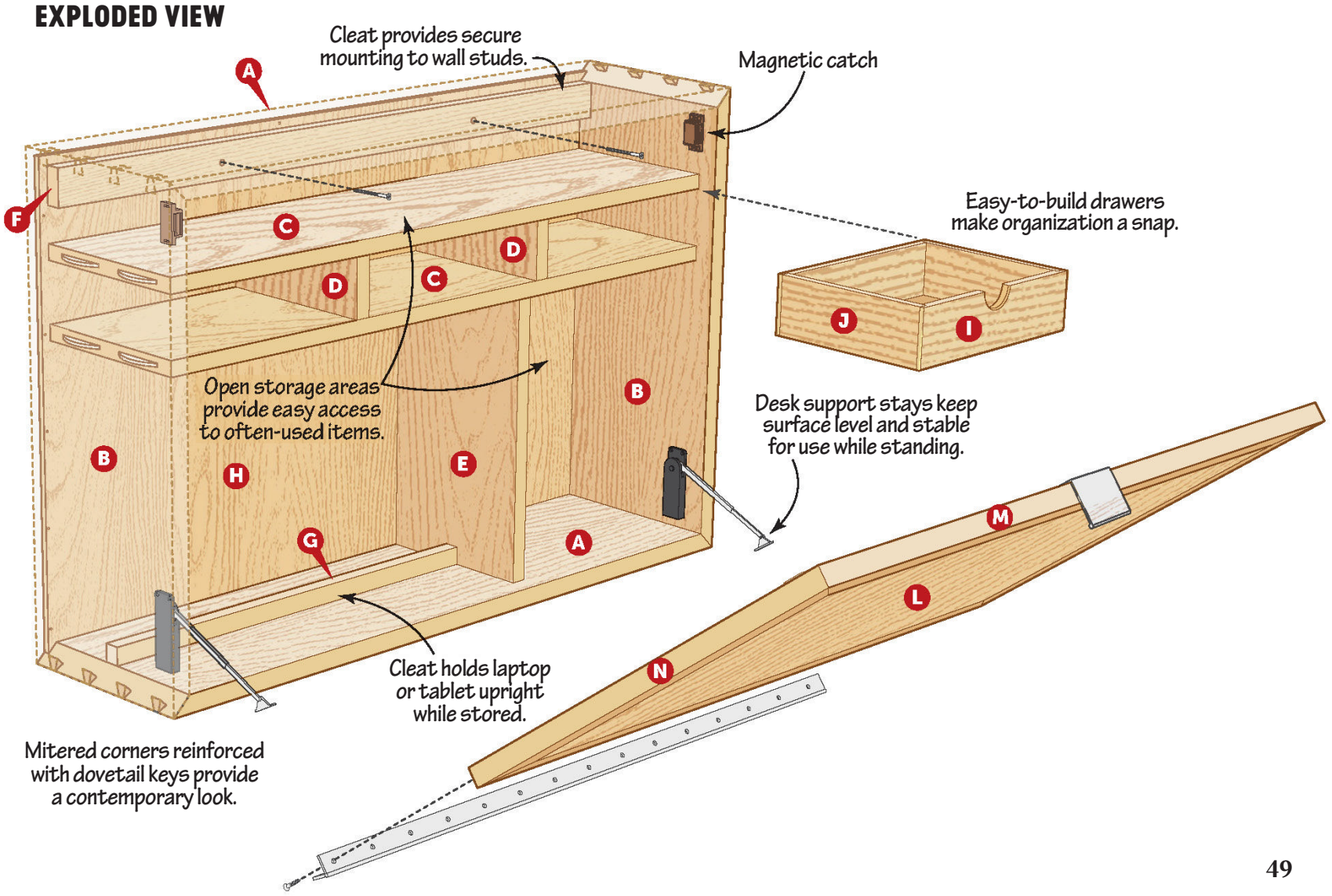


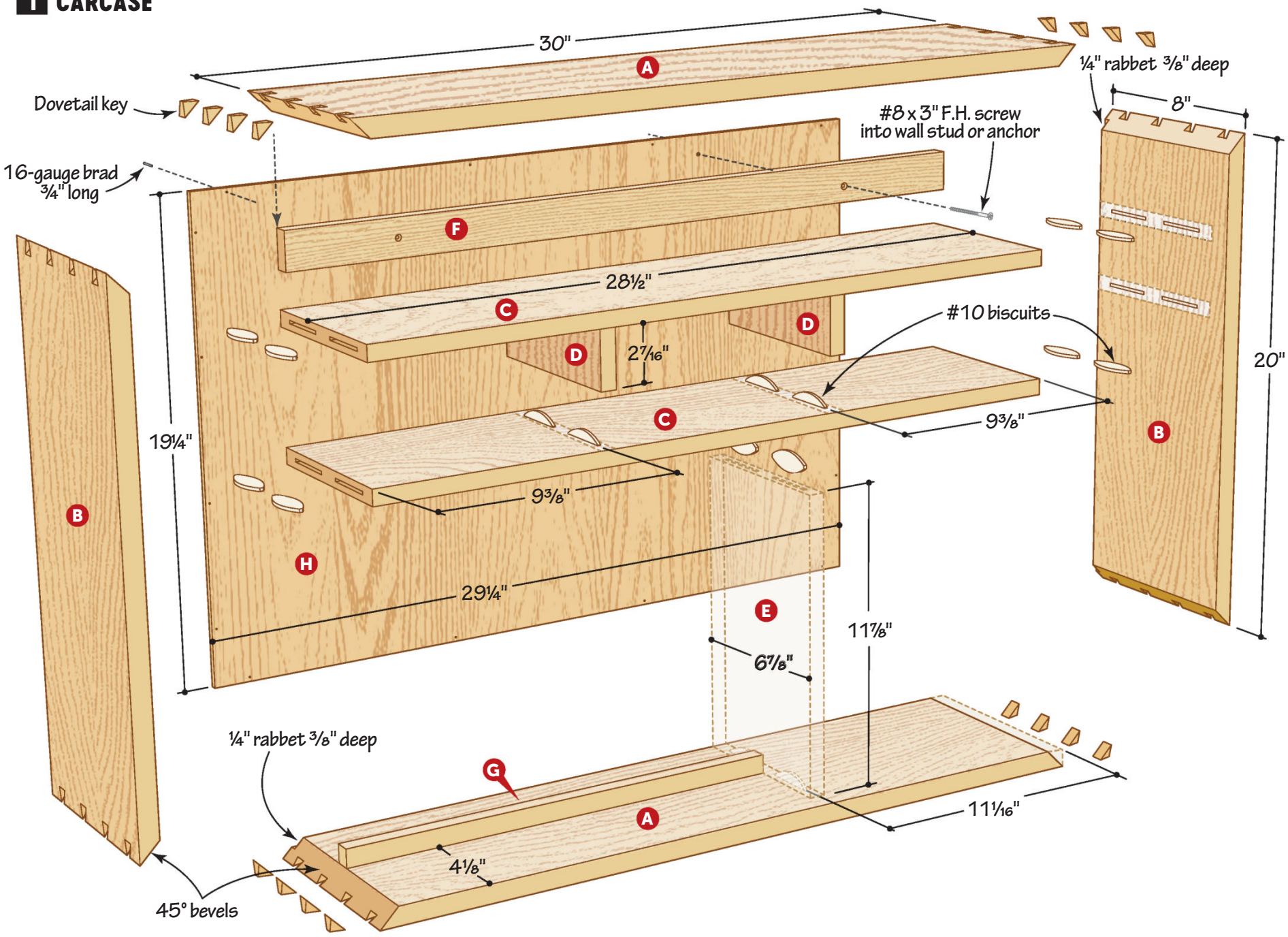
Glue the remaining biscuit joints and miters, clamping the case together with band clamps, while raising the interior to its final position using spacers cut from the same material as the back (H).

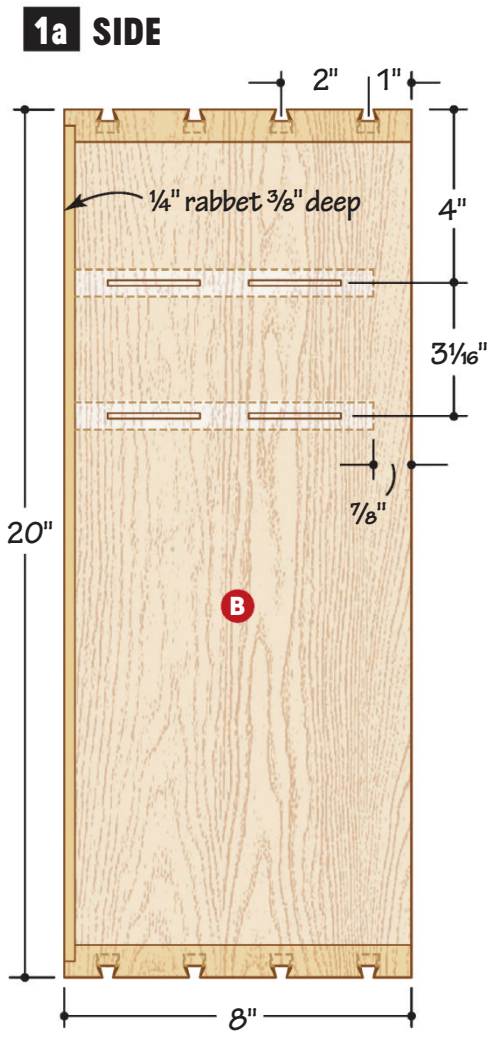
Check out this jig for quick and easy bevels on the tablesaw
woodmagazine.com/beveljig

PHOTOGRAPHER: KELSEY HANSEN; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON

EXPLODED VIEW







3 Measure inside the case side-to-side to confirm the actual length of the shelves (C), then cut the shelves, drawer dividers (D), and vertical divider (E) to size **[Drawing 1]**.

4 Lay out and cut the biscuit slots **[Drawings 1, 1a]**, then finish-sand all the parts.

5 Assemble the shelves and dividers with glue and biscuits **[Drawing 1, Photo A]**.

6 Glue the top/bottom (A) and sides (B) around the interior assembly (C–E) **[Drawing 1, Photo B]**.

KEYS FOR STRENGTH & BEAUTY

1 Lay out the locations of the dovetail key slots on the corners of the case **[Drawing 1a]**. Build a jig (see *Dovetail Slot Jig, next page*) and then rout the slots **[Photo C]**.

2 Rip a 1×30" key blank from ⅝"-thick cherry and shape the keys **[Photo D]**. Check the fit of the key blank in the slot. It should slide into the slot with a snug fit. Rip the key strip from the blank.

3 Cut 1½"-long keys from the key strip and glue them into the slots at each corner of the case. Once the glue dries, trim the excess flush **[Photo E]**, then sand the keys smooth.

Rout a set of dovetail slots in each corner of the case using a compact router. A shop-built jig clamped to the case guides the router as you mill each slot.

Raise the saw blade to 9/16" and tilt to 14°, then make a cut on each face of the key blank. Sneak up on the fit of the key by finely adjusting the rip fence after each pass.

Dovetail-shaped keys in the corners of the case add strength to the miter joint while providing a decorative look.

Use a flush-cut saw to trim away the bulk of the dovetail key waste, taking care to avoid chipping out the key near the miter. Then sand the keys flush with the surface of the case.

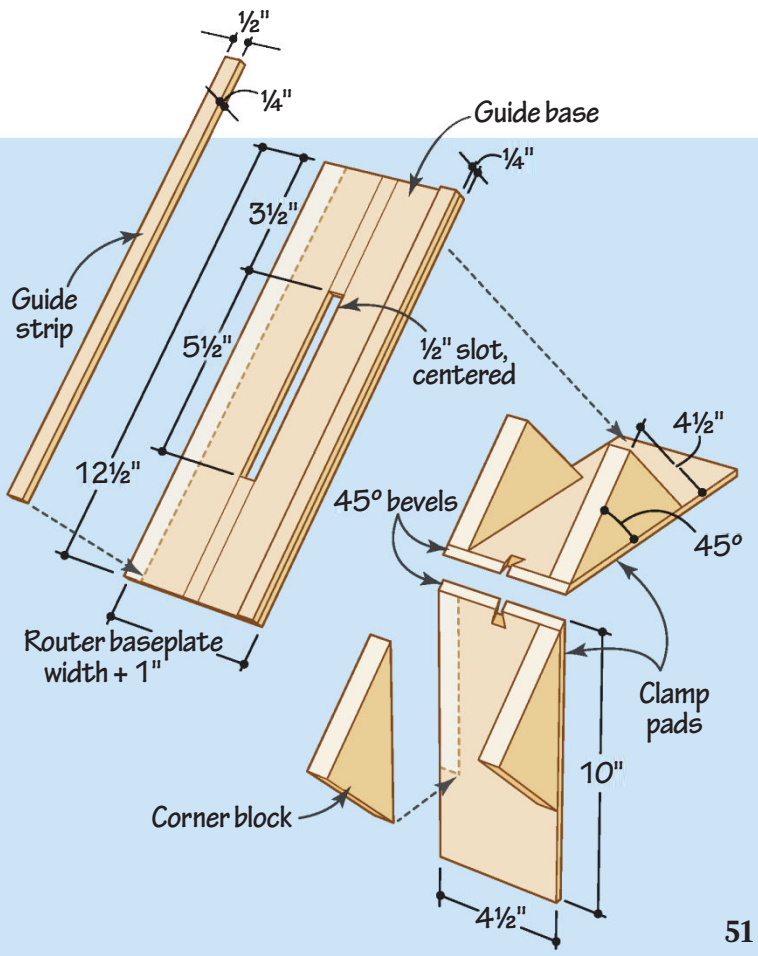
DOVETAIL SLOT JIG

Concerned about all the dovetail keys featured in this project? Don't be. The shop-built jig you see here, custom fitted to your compact router, makes the process quick and easy.

We built this jig using scraps of ¼" and ¾" MDF (plywood would work just as well), gluing the jig together in stages. To determine the final width of the guide base, measure the width of your router baseplate and add 1". Cut an extra-wide base and rip it in half, then glue a pair of ½"-wide strips in between to form a ½×5½" router bit clearance slot.

Trim the edges of the base equally to match the final width determined earlier, keeping the slot centered. Then glue ½"-wide strips along each edge to capture the router base. Build a pair of clamp pad/corner block assemblies and glue them to the bottom of the base, centered side-to-side with the beveled ends meeting at the center.

Install a ½" 14° dovetail bit in your router and set it to cut ½" deep when installed in the jig. Build a test corner and rout a slot to check the setup.



INSIDE DETAILS

1 Cut the mounting cleat (F) and laptop stop (G) to size **[Drawing 1]**, then finish-sand. Glue the cleat to the top (A), flush with the rabbet. Glue the laptop stop in position on the bottom.

2 Cut the back (H) to size **[Drawing 1]**, finish-sand, and set it aside.

3 Cut the drawer fronts/backs (I) and sides (J) to size **[Drawing 2]**.

4 Bury a dado blade in a sacrificial fence attached to your rip fence, then rabbet the ends of the fronts/backs to accept the sides. Readjust the rip fence and rabbet the bottom inside edge of the fronts/backs and sides to accept the drawer bottoms.

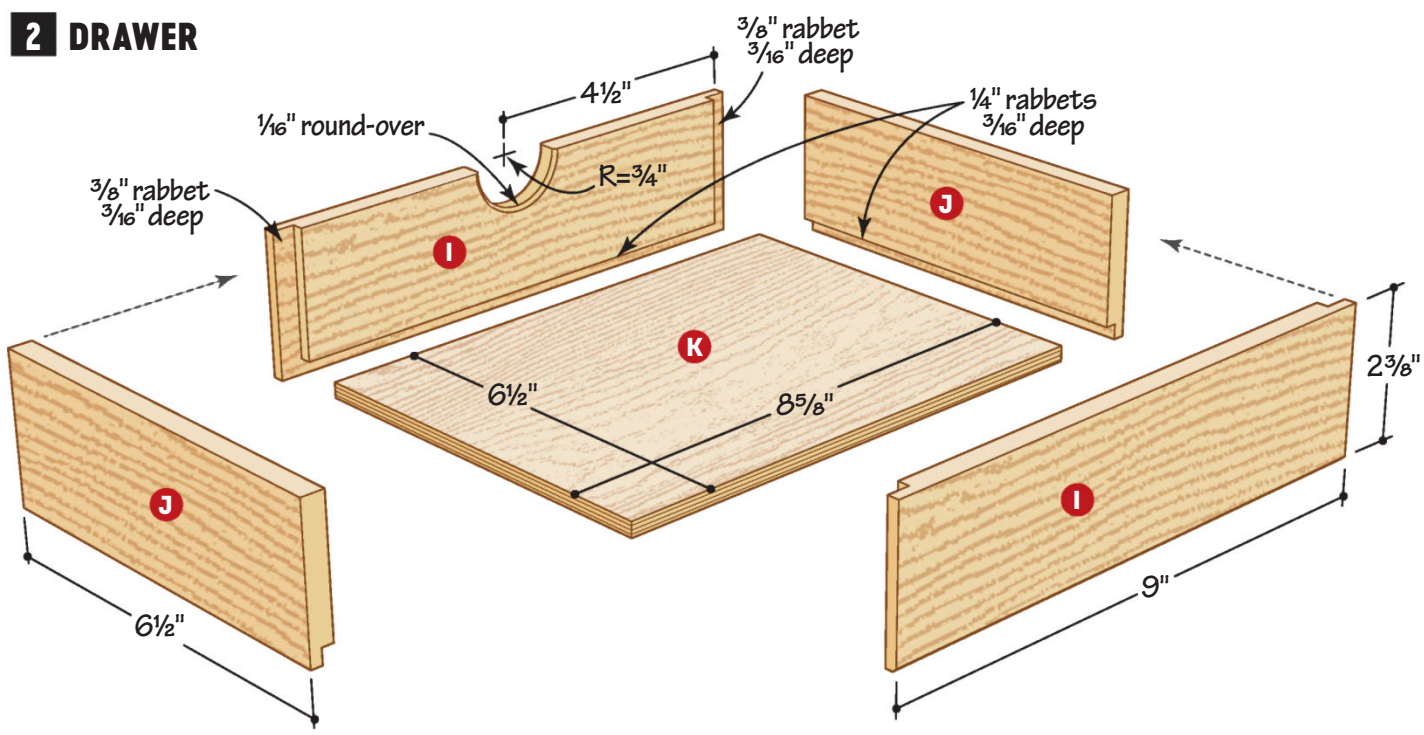
5 Drill the finger pull in the top edge of each drawer front using a 1½" Forstner bit **[Drawing 2]**, then round over the edges of the pull. Finish-sand the drawer parts.

6 Dry-fit one of the drawers and measure for the drawer bottoms. Cut the drawer bottoms (K) to size and finish-sand, then glue up the drawers.

TIP!

Clamp a scrap of the same thickness to the upper edge of the drawer front and align the bit's centerpoint with the seam.

2 DRAWER



ADD A DESKTOP WITH SWING

1 Cut the plywood desktop panel (L) to size **[Drawing 3]**. From ¾"-thick stock, cut edging (M, N) to width and extra long. Plane the edging to match the thickness of the desktop panel.

2 Miter-cut edging to fit around the panel, gluing each piece into place along the edge as you work your way around. Finish-sand the desktop.

3 Cut the hinge to length (28"), then install the desktop in the case **[Exploded View, Photo F]**. Lay out the position of the stays **[Source, Exploded View]** using the manufacturer's instructions, then drill mounting holes in the sides (B). Screw the stays to the sides and then to the desktop.

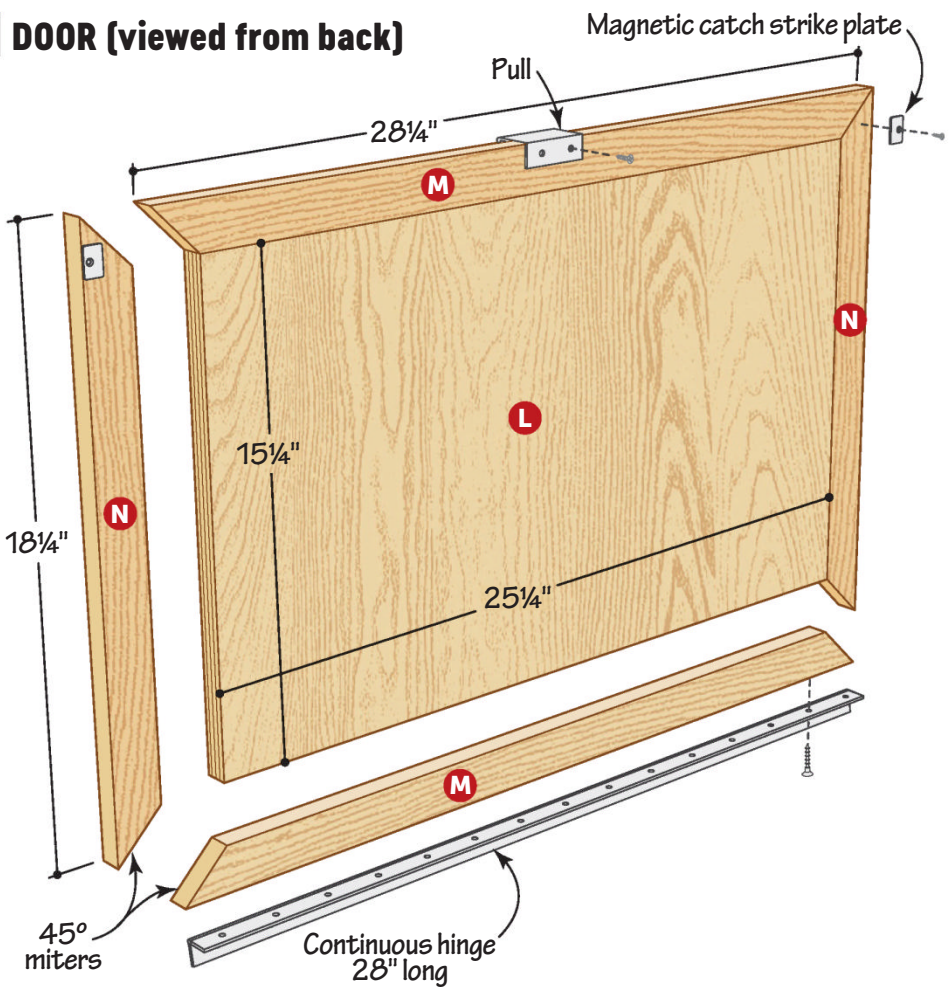
4 Attach the magnetic catches to the case and the strike plates to the door **[Exploded View, Drawing 3]**. Screw the door pull into place and check the door operation. Make any adjustments needed for smooth operation, then remove the hardware, finish-sand as needed, and apply a finish to the entire cabinet. We sprayed on three coats of lacquer, sanding between coats with 400-grit sandpaper.

After attaching the hinge to the desktop, rest the door on spacers for final positioning. Screw the hinge to the case bottom in three spots and check the operation. Then install the remaining screws.

Note: Mount the desk to wall studs using 3" screws. A good height for sitting is 28–30" from the floor. For standing, 44" works well. In either case, you can vary the height to suit your comfort.

5 Reinstall the hardware once the finish dries. Attach the back (H) with brad nails **[Drawing 1]**. Then mount this handy desk, gather up your laptop and accessories, and get to work!

3 DOOR (viewed from back)



MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A*	TOP/BOTTOM	¾"	8"	30"	C	2
B*	SIDES	¾"	8"	20"	C	2
C	SHELVES	⅝"	6⅞"	28½"	C	2
D	DRAWER DIVIDERS	⅝"	6⅞"	2⁷⁄₁₆"	C	2
E	VERTICAL DIVIDER	⅝"	6⅞"	11⅞"	C	1
F	MOUNTING CLEAT	⅝"	1½"	28½"	C	1
G	LAPTOP STOP	⅝"	¾"	17⅞"	C	1
H	BACK	¼"	29¼"	19¼"	CP	1
I	DRAWER FRONTS/BACKS	⅜"	2⅜"	9"	C	6
J	DRAWER SIDES	⅜"	2⅜"	6½"	C	6
K	DRAWER BOTTOMS	¼"	6½"	8⅝"	CP	3
L	DESKTOP PANEL	¾"	25¼"	15¼"	CP	1
M*	TOP/BOTTOM EDGING	¾"	1½"	28¼"	C	2
N*	SIDE EDGING	¾"	1½"	18¼"	C	2

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: C–cherry, CP–cherry plywood.
SUPPLIES: #8×3" flathead woodscrews, #10 biscuits, 16-gauge brad nails ¾" long.
BLADE AND BITS: Dado set, ½"×14° dovetail router bit, ¹⁄₁₆" round-over bit, 1½" Forstner bit.
SOURCE: Nickel continuous hinge no. 30085, $26; magnetic catch (2) no. 26559, $5 each; right desk support stay no. 60992, $30; left desk support stay no. 68151, $30; brushed nickel Bravo pull no. 1005889, $8, Rockler, 800-279-4441, rockler.com.
PROJECT COST: It cost us about $375 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

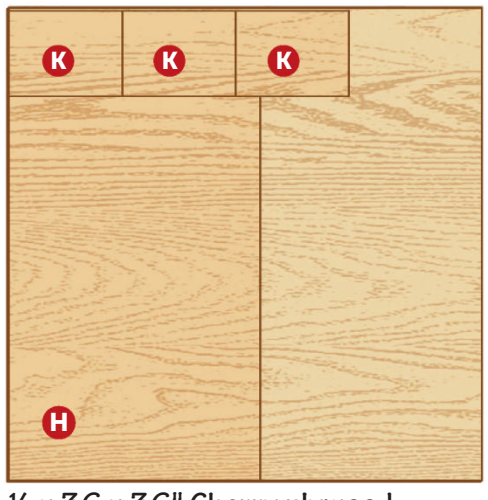
This project requires 16 board feet of 4/4 cherry and 3 square feet of ½" cherry based on example boards shown.

¾ x 9¼ x 108" Cherry

¾ x 7¼ x 108" Cherry *Plane or resaw to the thickness listed in the Materials List.

½ x 5½ x 60" Cherry *Plane or resaw to the thickness listed in the Materials List.

¾ x 3½ x 48" Cherry



¼ x 36 x 36" Cherry plywood

¾ x 36 x 24" Cherry plywood

SHELLAC

A CLASSIC FINISH FOR TODAY'S WOODWORKER

Ease of use along with many other advantages make shellac a must-have for any workshop.

WRITER: BRYAN NELSON

Shellac still offers plenty of advantages to today's woodworker, such as its ease of use, its short drying time, and the variety of available colors. Shellac originates from the lac beetle, mainly from India and Thailand. Female beetles deposit secretions on tree branches, which is then scraped off, heated, and strained to remove impurities. It's rolled into sheets and allowed to cool and dry, then the sheets are broken up into flakes.

Depending on the type of tree the beetles feast on, shellac colors range from a dark garnet to brown, red, orange, and yellow, creating options that allow you to find just the right look for any project. Amber and orange shellac impart a warm, rich look to woods like walnut, cherry, and mahogany while making the grain pop, *main photo.* Bleached shellac provides the option of clear, light-blonde, and super-blonde shades for lighter-colored woods such as pine and maple. The final result? A finish that offers up plenty of advantages to meet a wide range of needs.

PHOTOGRAPHERS: CARSON DOWNING, KELSEY HANSEN

A thin coat of clear, dewaxed shellac over pine knots seals in the resins, eliminating issues with bleed-through for any type of final finish or paint you use for your project.

Looking for an apply-at-the-last minute, quick-drying finish? Shellac's your solution. Additional coats require only an hour's wait between applications.

ADD UP THE ADVANTAGES

Sealant: If you need to deal with oil, wax, or resins in a material or project, a coat of shellac will bond well and seal the problem in, *above left*. Shellac works especially well on the interior of drawers with musty or smoky smells.

Quick drying: Shellac leads the pack when it comes to fast finishing. With quick-evaporating denatured alcohol as its solvent, shellac dries fast. That means you can build multiple coats quickly and complete those last-minute projects on time, *above right*.

Food-safe: While most finishes are food-safe once they cure completely, shellac just might get top food-safety honors. It's used to coat vegetables, fruits, and candies, and even shows up in hairspray, shampoos, and pharmaceuticals. So you can use it without concern on any project that will come into contact with a child's mouth or food, *below*.

Low-VOC: While not completely free of volatile compounds, shellac is more environmentally friendly than many other finishes. The denatured alcohol base makes it less harmful to breathe and less smelly overall.

Food-safe and even edible, shellac makes a fine finish for projects making contact with food or treats, or that mouthing little tyke.

◀ The manufacturing date of Zinsser shellac is coded into the lot number on the can. If it's unopened but nearing three years old, you'll need to use it soon.

Color choices are few in premixed shellac. Shellac flakes provide more options, ranging from almost clear to deep browns.

MIX OR MODIFY

Shellac also offers a wide range of options for your project's needs, *right*, and it's easily modified to suit. One easy option: Thin an off-the-shelf shellac by adding denatured alcohol, *Customize Canned Shellac*. For even more options, mix your own from flakes, *A Cut For Every Job*.

For results you can duplicate later, measure the flakes on a simple kitchen scale. Grinding the flakes with an inexpensive coffee grinder, *below*, helps the shellac dissolve faster and more completely. Stir the mix frequently during the next few hours, keeping the container covered. Allow the mix to dissolve overnight.

When you're ready to apply the shellac, stir the solution and filter it to strain out remaining debris, impurities, and lumps, *next page*. Don't forget to label the mix. Include the flake color used, the cut, and the date you mixed it.

Speaking of dates, one of the few disadvantages of shellac, whether you buy it off the shelf or mix your own, is its limited shelf life. Mixing your own means you know its age and can mix up only what you'll need. Once you do that, you have about six months to use it up. Seal any unused mix well and store it in a cool place.

Knowing the age of a premixed can proves more challenging. An unopened can has a shelf life of about three years. To verify the date, you need to decipher the code, *upper left*.

Note: **Need a small amount of shellac? Mix 1, 2, or 3 oz of flakes with 8 oz (1 cup) of denatured alcohol to make a 1-, 2-, or 3-lb cut.**

CUSTOMIZE CANNED SHELLAC

CHANGE IN CUT	ADD THIS ALCOHOL	TO THIS SHELLAC
3-LB TO 2-LB	2 PARTS	5 PARTS
3-LB TO 1-LB	3 PARTS	2 PARTS
2-LB TO 1-LB	1 PART	1 PART

NOTE: Zinsser premixed shellac equals a 3-pound cut while the sealer equals a 2-pound cut.

Simple kitchen items assist the process of mixing your own shellac from the flakes of your choosing.

A CUT FOR EVERY JOB

CUT	USES	SHELLAC*
½-LB	LIGHT WASH COAT TO MITIGATE STAIN BLOTCHING	1 OZ
¾-LB	MEDIUM WASH COAT, AIRBRUSH SPRAYER	1½ OZ
1-LB	FRENCH POLISHING, HVLP SPRAYER	2 OZ
1½-LB	WIPING, PADDING	3 OZ
2-LB	GENERAL FINISHING, BRUSHING ON	4 OZ
3-LB	SEALING KNOTS, SAP; BRUSHING FOR EXPERIENCED USERS	6 OZ

*Mix this amount of shellac (by weight) to one pint (16 oz) of alcohol. Reduce the amounts proportionally to make a smaller batch.

Garnet

Amber

Blonde

Just before you're ready to apply your shellac, stir it and pour it through cheesecloth or a paint filter for the cleanest solution.

APPLICATION EASE

A variety of easy-application options also make shellac a finish to consider. A film finish, shellac requires sanding only to 220 grit. Keep in mind that darker shellac colors, just like stain, collect in and highlight scratches.

When you're ready to apply shellac, options abound. A brush, a sprayer, or a cloth applicator pad are all great options. A pad makes wiping on a 1- or 1½-lb cut of shellac nearly foolproof, *below right*, by building thin, predictable coats.

To make an applicator pad, wrap tightly woven, lint-free fabric, such as an old linen handkerchief or washed T-shirt material, around cotton batting or a ball of wool the size of a golf ball. Pour enough shellac into the inside of the pad to moisten the outside cover without dripping, and then gather the top to hold the material together and to provide a handhold.

Make long strokes across the wood, wiping outward from a moist edge without going over the same area repeatedly. Replenish the pad regularly with more shellac. If the pad begins to harden, add alcohol to soften it. Because the coats are thin, up to four coats may be required to build a good finish.

To build a faster finish and still get smooth results, use any fine-haired, natural-bristle brush, such as a badger-hair brush. As you apply the shellac, avoid brushing back and forth. Instead, lay the finish down in one pass, making long strokes outward from a wet edge.

For the simplest application option, grab a can of spray shellac. It works best for smaller projects with hard-to-reach areas. Spray covers fast, and resists runs better than spray-can lacquer.

Regardless of the application method, allow sufficient time for the shellac to dry, about an hour for wiped-on or sprayed coats, and up to two hours if you brush it on. Sand between coats with 220 grit to remove any dust nibs that may have settled in.

Give shellac a try and you'll find a place for it in your shop. Start with an off-the-shelf solution, then customize as you gain experience to open up your finishing repertoire.

Wiping on shellac works best on flat project surfaces where you can finish the part separately before assembly and you don't have to worry about finish becoming trapped in corners where the pad won't reach.

ADJUSTABLE SAWHORSES

Put those worn-down, well-loved horses out to pasture and build a pair of thoroughbreds.

WRITER: ZACH BROWN
DESIGNER/BUILDER: JOHN OLSON

OVERALL DIMENSIONS
28"W × 18⅜"D × 28½–46"H

PHOTOGRAPHERS: CARSON DOWNING, KELSEY HANSEN
ILLUSTRATORS: ROXANNE LEMOINE, LORNA JOHNSON

TIP!

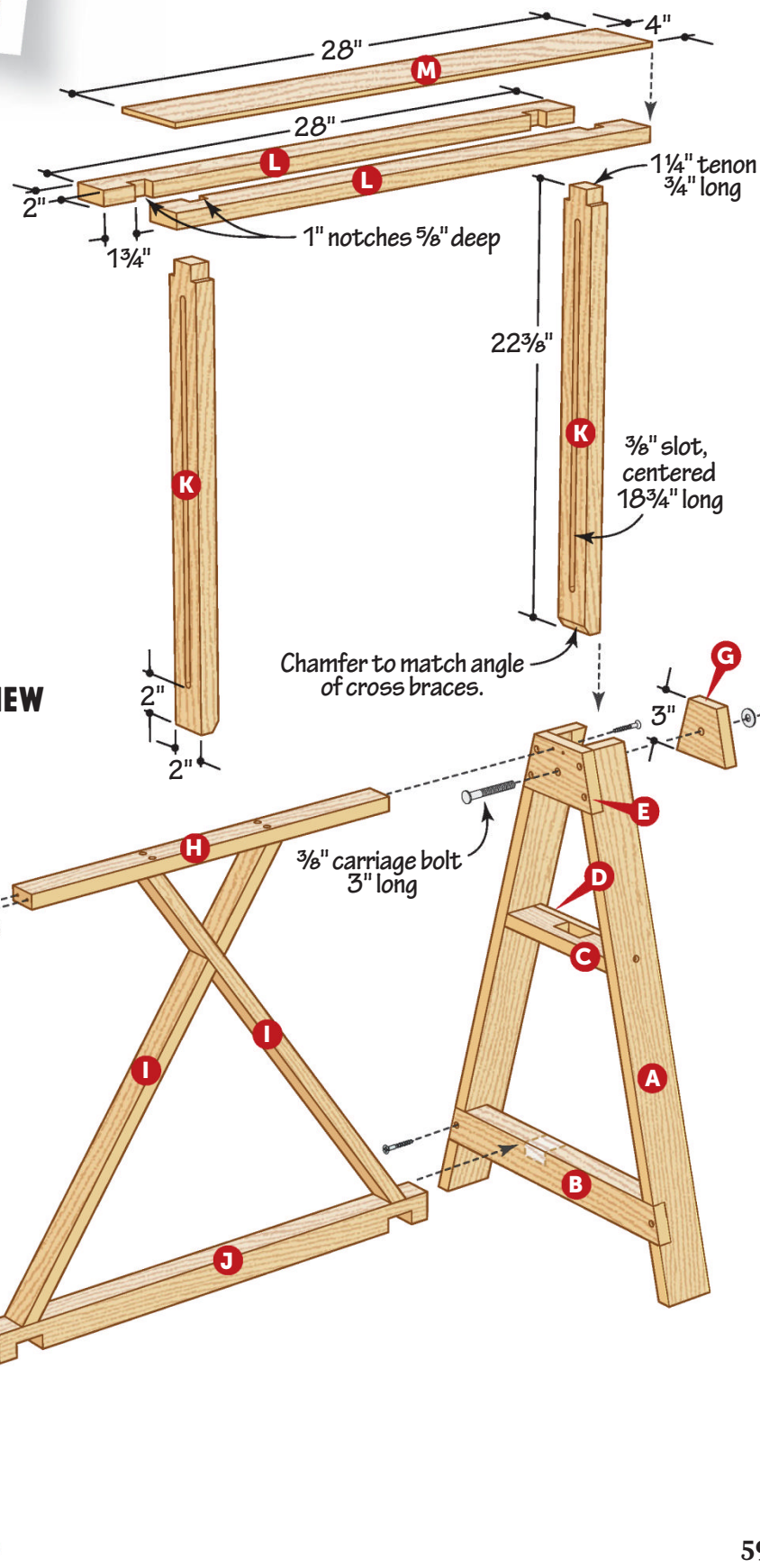
Not just for the workshop, these sawhorses make great supports for an adjustable-height desk.

These super sturdy, adjustable-height sawhorses will quickly become an indispensable fixture in your workshop. They make excellent infeed and outfeed supports for any machine, or use them as the base for a worktable that you can adjust to the perfect height for the task at hand.

START WITH STRONG LEGS

Many of the parts in these sawhorses contain angled cuts that are mirrored on interlocking or opposite-side parts. Be sure to label each part as left or right and keep them oriented correctly as you work.

1 Cut the legs and leg braces (A–E) to size **[Materials List, Drawing 1]**, bevel- or miter-cutting the ends of each part.



EXPLODED VIEW

2 Install a dado-blade set in your tablesaw and use the miter gauge while cutting the notches in the legs (A) **[Drawing 1, Photos A, B]**. See *No-Measure Joinery* (*next page*) for an easy way to ensure an accurate setup without math.

3 Cut the rabbets on the ends of the lower braces (B) to fit the notches in the legs **[Photo C]**.

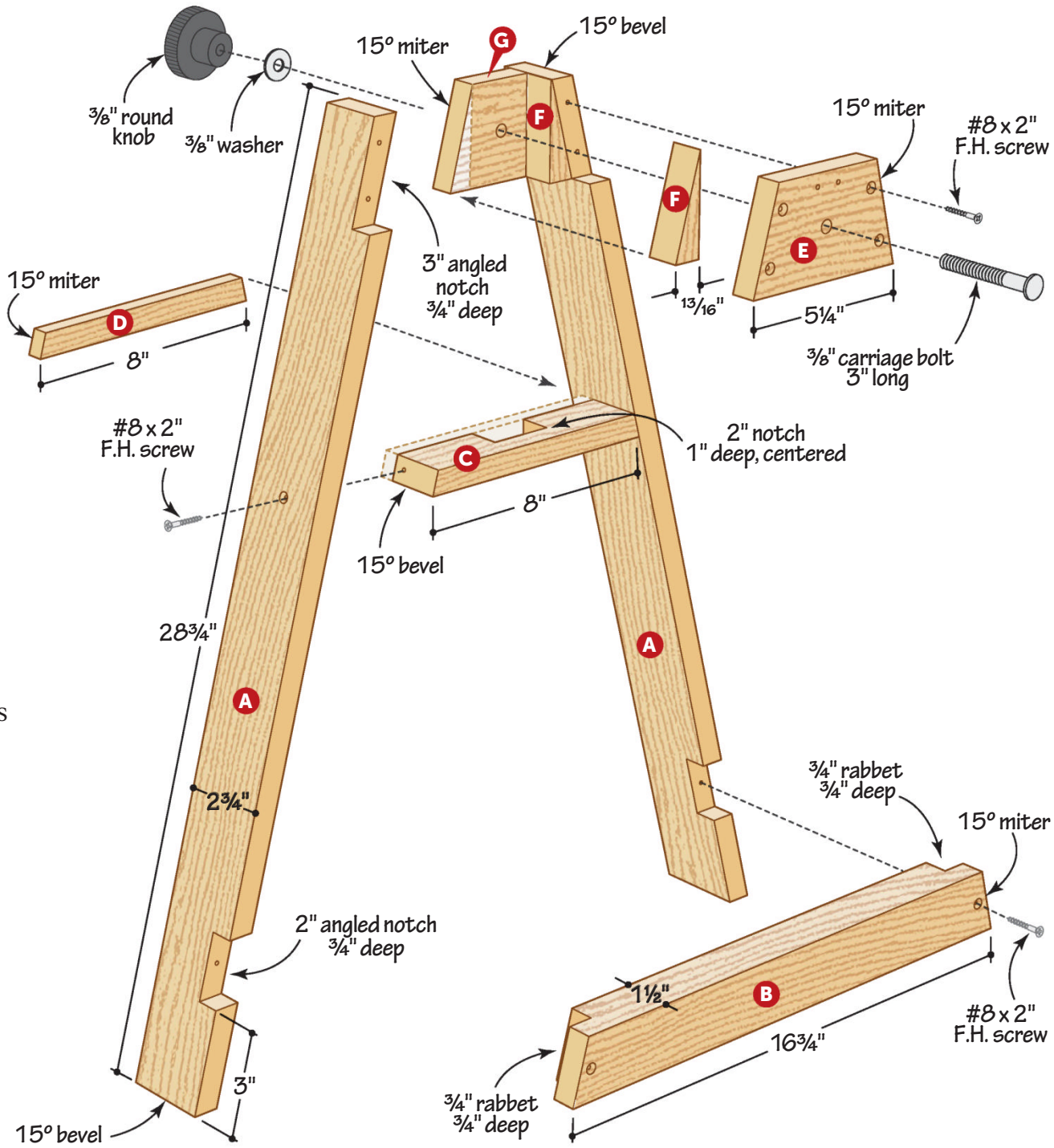
4 The middle braces (C) also serve as guides for the posts (K). Form the guide holes by cutting a centered notch on one edge of each middle brace **[Drawing 1, Photo D]**, then glue the middle-brace edging (D) over the notch.

5 Cut the guide wedges (F) to shape **[Photo E]**, then glue and clamp them to each leg **[Photo F]**.

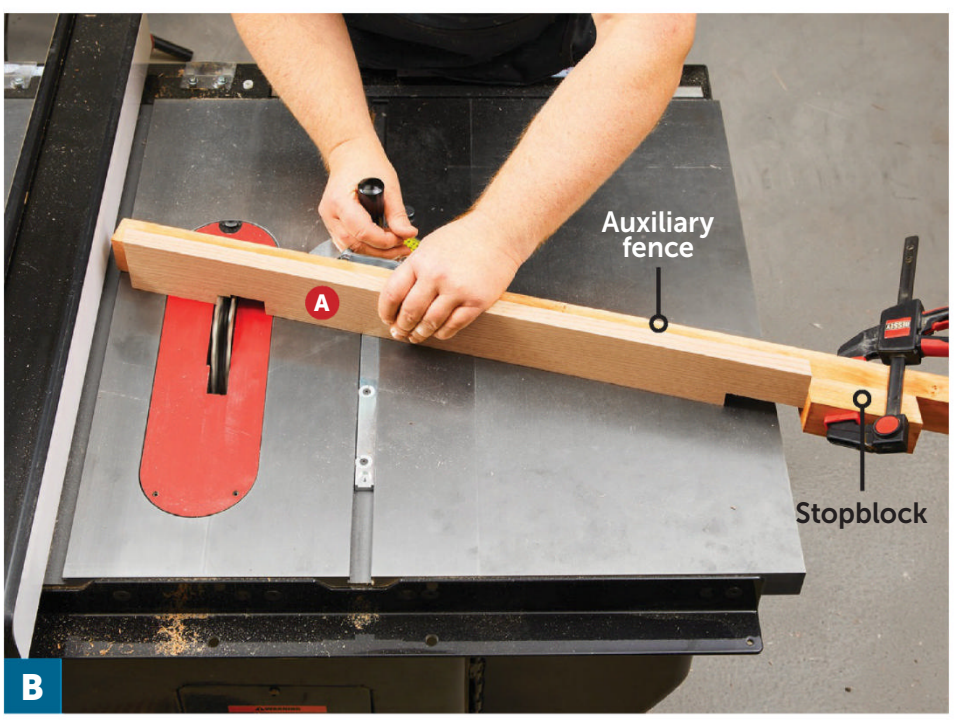
6 To start the end assemblies, glue and clamp the lower braces (B) and upper braces (E) into the notches on each pair of legs **[Drawing 1]**. Once the glue dries, reinforce the joints with countersunk screws. Then glue and screw the middle-brace assemblies (C/D) to the legs, flush at the inside edges.

7 Cut the clamp blocks (G) to fit between the legs of each end assembly. These float free, held in place by a carriage bolt and knob that tighten to hold the posts in position **[Exploded View]**. Drill 3/8" holes, centered, through the clamp blocks and upper braces.

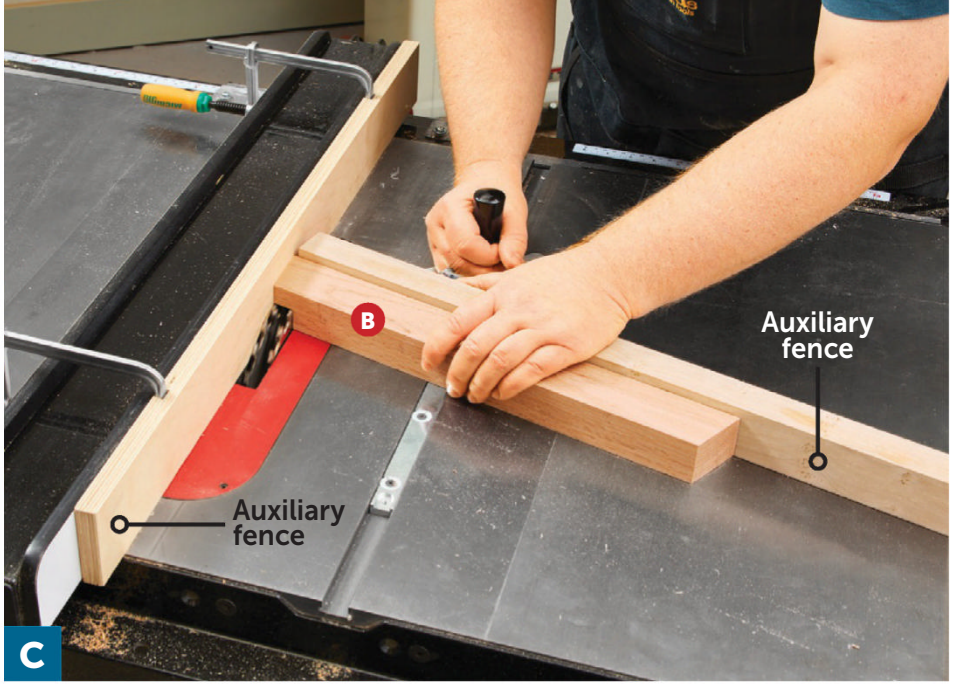
1 END ASSEMBLY



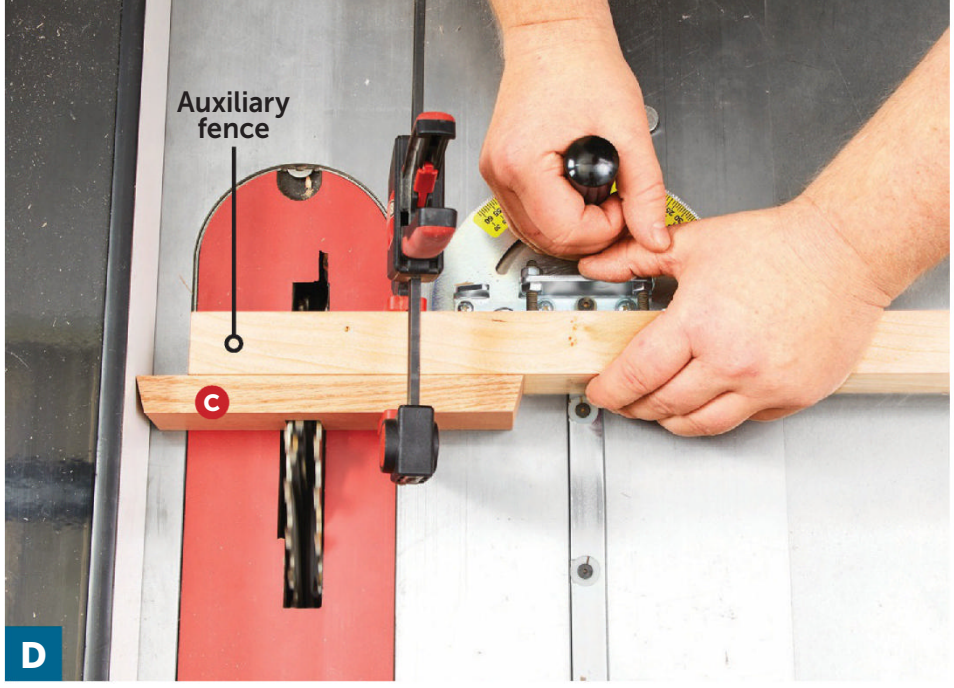
Adjust the blade height and rip fence, add an auxiliary fence to your miter gauge, rotate it to 15°, and cut the upper notches in four legs (A). Rotate the miter gauge 15° in the opposite direction to notch the other four mirrored legs.



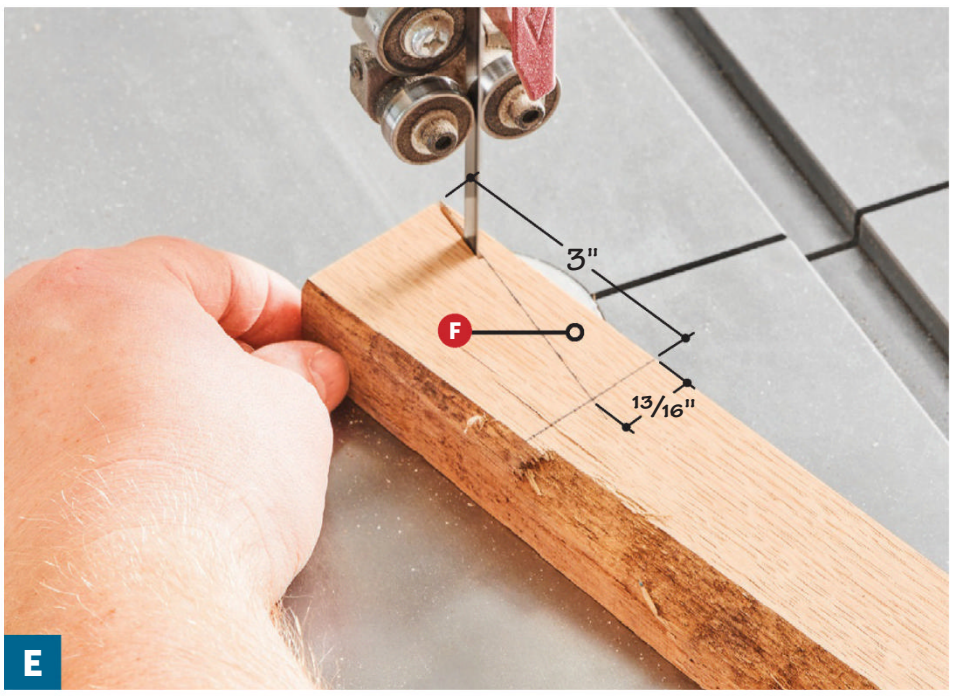
Lay out the lower notches on the legs (A) and adjust the rip fence and a stopblock to keep the blade within your layout lines. Notch the four legs that match this angle direction, then rotate the miter gauge to 15° in the opposite direction and notch the other four mirrored legs.



Use auxiliary fences on both the rip fence and miter gauge to rabbet the ends of the lower braces (B). Rabbet one end, then reset your miter gauge to the opposite 15° to rabbet the other end.



Using the rip fence as a stop, cut one edge of the centered notch in each middle brace (C). Flip the workpiece end for end to cut the other end of the notch, then remove the waste in between.



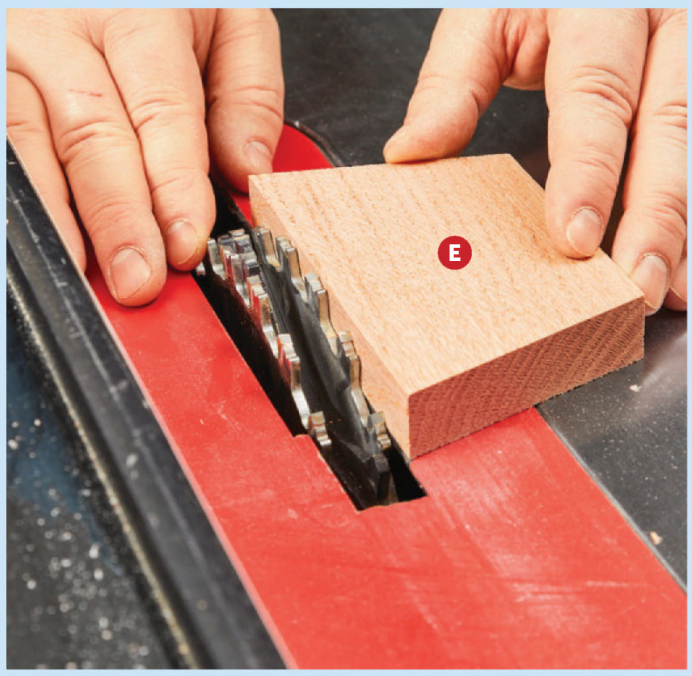
Lay out the rise and run of the guide wedges (F) and cut them to shape at the bandsaw. The angled edge you cut gets glued to the leg, so be sure to sand it smooth and flat.

Glue and clamp the guide wedges (F) to the legs (A), flush at the top of the leg and with the edge of the notch. Position the first clamp at the bottom corner of the wedge to eliminate slipping.

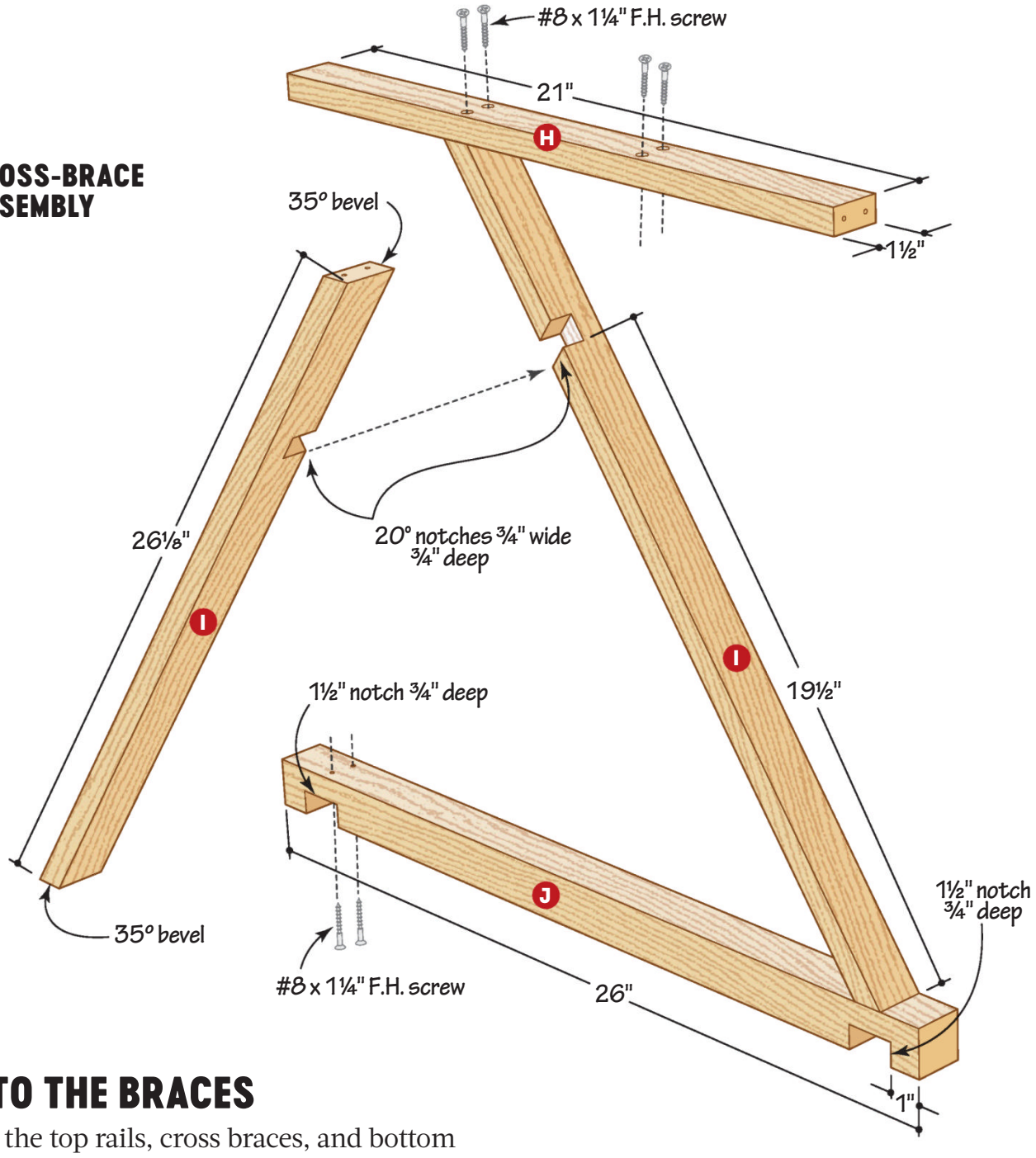
NO-MEASURE JOINERY

Throughout this project, you'll cut notches for intersecting parts to overlap each other, which makes a strong and long-lasting joint. The key is a tight fit.

Whenever possible, use the actual project parts (or off-cuts of identical stock) to set the blade height and fence distance on your tablesaw. Here, we are using an upper brace (E) to establish the depth *(left)* and length *(right)* of the upper-brace notch before cutting it in the legs (A) **[Photo A]**.



2 CROSS-BRACE ASSEMBLY



OFF TO THE BRACES

1 Cut the top rails, cross braces, and bottom rails (H–J) to size, making the cross braces 2" overlength **[Drawing 2]**. Bevel-cut only the lower ends of the cross braces for now. The tops will be scribed to fit later.

2 Form ¾"-deep notches on the bottom rails (J) to fit over the lower braces (B) **[Drawing 2, Exploded View]**. Adjust your miter gauge to 20° and notch the cross braces. Note that the notch mirrors the beveled end rather than parallels it.

3 Dry-fit the bottom rails (J) between the end assemblies, then glue and screw the top rails (H) to the upper braces (E), centered and flush at the top **[Exploded View]**.

4 Assemble the cross braces (I) without glue and center them on top of each bottom rail (J) **[Drawing 2]**. Scribe the upper ends to the top rails (H), disassemble, then bevel-cut the braces to length. Glue and clamp together the cross-brace assemblies.

5 Remove the bottom rails (J) and glue and screw a cross-brace assembly to the top of each rail **[Drawing 2]**. Then, apply glue to the bottom-rail notches and cross brace top ends and clamp the assembly to the lower braces (B) **[Exploded View]**. Drive screws through the top rails (H) into the ends of the cross braces.

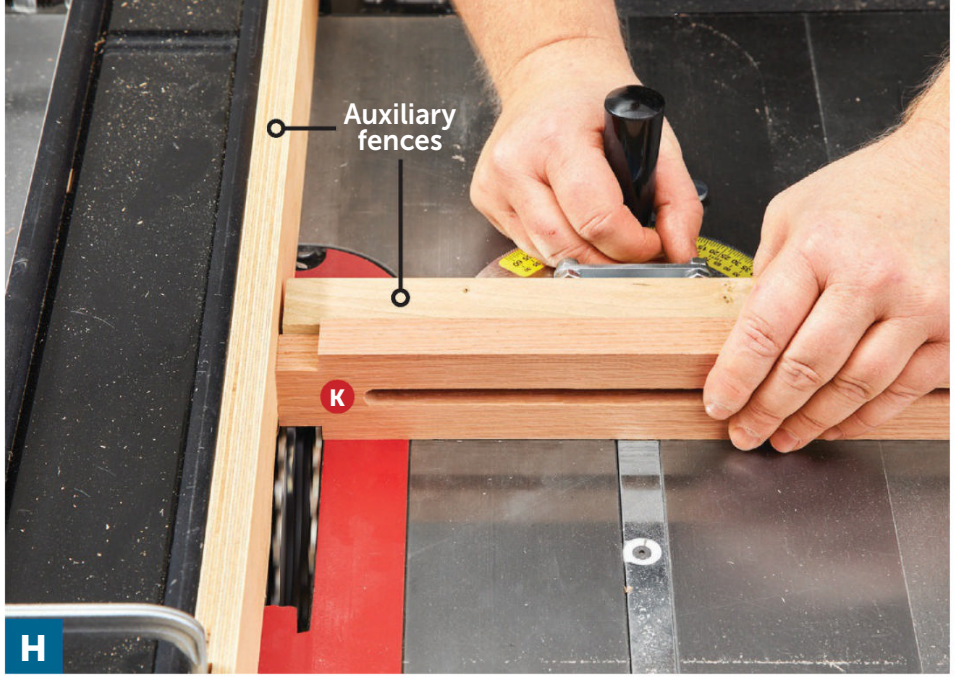
MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	LEGS	¾"	2¾"	28¾"	RO	8
B	LOWER BRACES	1½"	2"	16¾"	RO	4
C	MIDDLE BRACES	¾"	1¾"	8"	RO	4
D	MIDDLE-BRACE EDGING	¾"	½"	8"	RO	4
E	UPPER BRACES	¾"	3"	5¼"	RO	4
F	GUIDE WEDGES	15/16"	13/16"	3"	RO	8
G	CLAMP BLOCKS	¾"	3"	3¾"	RO	4
H	TOP RAILS	¾"	1½"	21"	RO	2
I*	CROSS BRACES	¾"	1½"	26⅛"	RO	4
J	BOTTOM RAILS	1½"	1½"	26	RO	2
K	POSTS	1"	2"	22⅜"	RO	4
L	POST RAILS	¾"	2"	28"	RO	4
M	TOP PLATES	¼"	4"	28"	RO	2

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: RO–red oak.
SUPPLIES: #8×1¼" flathead screws, #8×2" flathead screws, ⅜×3" carriage bolts (4), ⅜" washers (4), ⅜" knobs (4).
BLADE AND BIT: Dado blade, ⅜" spiral upcut router bit.
PROJECT COST: It cost us about $130 to build this project. Your cost will vary by region and source.

Use a ⅜" spiral upcut bit to rout the slots in the posts (K). With the router off, insert the bit through one of the drilled holes and adjust the fence to the edge of the workpiece. While securing the piece with a pushblock, switch on the router and rout to the second hole.



Add auxiliary fences to the rip fence and miter gauge and adjust the height of a ¾"-wide dado-blade stack to ⅜". With the auxiliary rip fence positioned against the dado blade, cut both edges of the post (K) to form a centered tenon 1¼" wide.

NOW IT'S POST TIME

1 Cut the posts, post rails, and top plates (K–M) to size **[Exploded View]**. Drill two ⅜" holes through each post (K), centered and 2" from the ends, to form the top and bottom of the slots. Then, finish the slots at the router table **[Photo G]**.

2 Form the tenons on the top of the posts **[Exploded View, Photo H]** and bevel-cut the bottom corners to provide clearance for the cross braces.

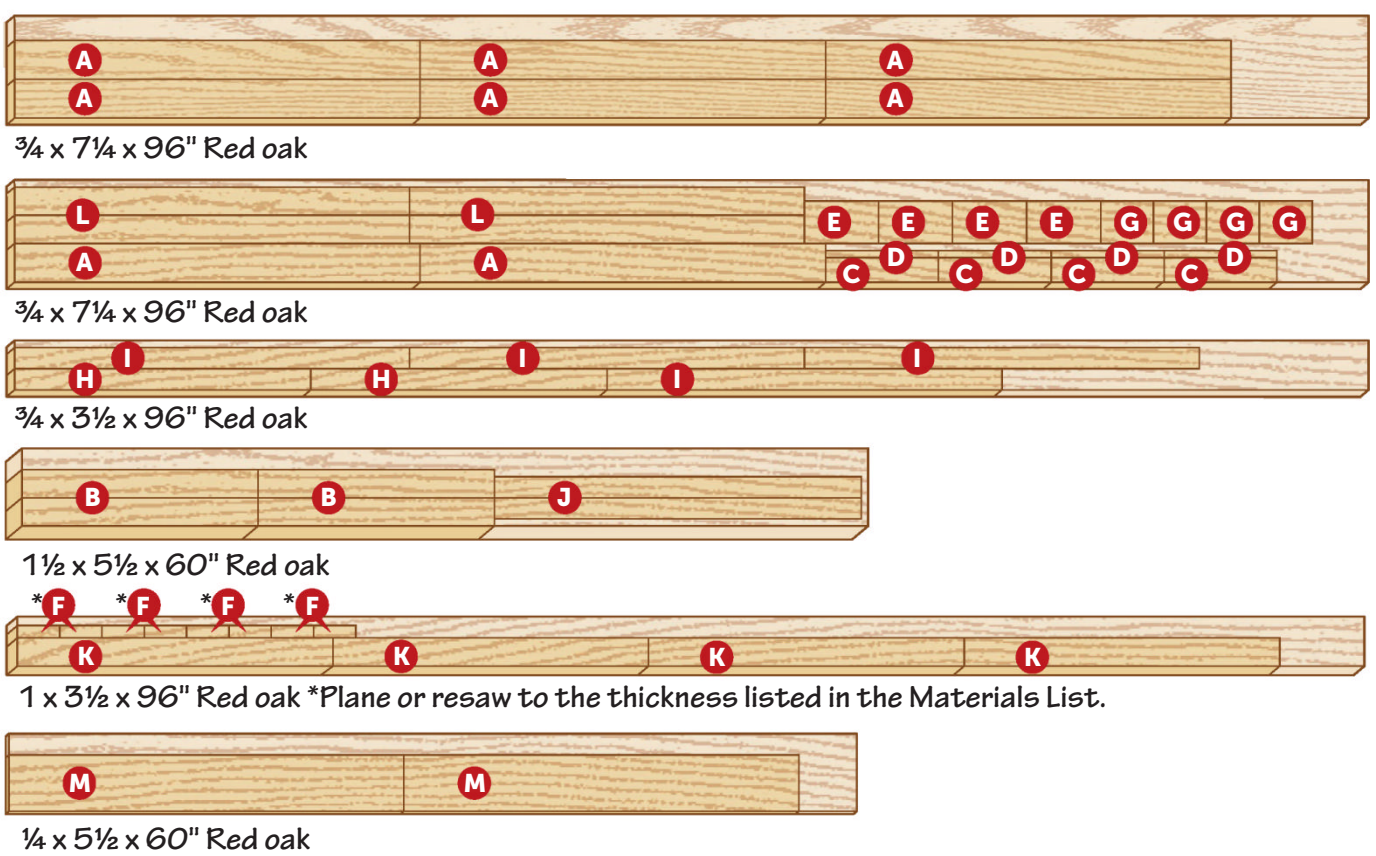
3 Cut the notches in the post rails (L), then edge-glue them together in mirrored pairs **[Exploded View]**. Once the glue dries, glue the post-rail assemblies onto the post tenons. Glue and clamp the top plates (M) to the top of the assemblies.

4 Sand the posts (K) and wedges (F) as needed for smooth movement, and install the clamp blocks (G) and hardware **[Exploded View]**. Knock down any remaining sharp edges on the sawhorses and apply a finish if you'd like. We sprayed on three coats of a water-based polyurethane.

5 Feed these horses a steady diet of sawdust and enjoy years of hard work and handy support from your new helpers.

CUTTING DIAGRAM

This project requires 13 board feet of 4/4 red oak, 4 board feet of 5/4 red oak, 5 board feet of 8/4 red oak, and 3 square feet of ¼" red oak based on the example boards shown.



RECLAIMED LUMBER

Trees aren't the only game in town when it comes to lumber sources. Give old wood a second look for your next project.

WRITER: LUCAS PETERS with BOB HUNTER

PHOTOGRAPHER: MARTY BALDWIN

As woodworkers, we tend to believe our final coat of finish marks the end of wood's lifecycle from tree to completed project. But locked away in dilapidated barn beams, discarded headboards, and demolished houses a treasure trove of lumber awaits its reincarnation as your next project.

There are many reasons to work with salvaged wood. If you're willing to trade sweat equity for value, you can save some hard-earned cash. Or maybe you're after the rustic look in the first place, so the appeal is the salvaged style. Provenance provides another purpose, emphasizing the personal or historical connection to the wood's past life.

Regardless of your reasons, seeking and salvaging lumber takes a practiced eye and a little extra care. Check out our advice on *Where to Find Salvageable Lumber,* on *page 66*, and then read on for tips on how to work with the lumber you reclaim.

RENEWING OLD STOCK

Underneath that weathered exterior lies prized lumber ... along with a few gotchas. If you're working that lumber back to raw wood, adding a few additional steps can protect your tools and your health.

First, don't skimp on the safety precautions. On top of generations of embedded dirt, reclaimed lumber might also carry mold, animal feces, or traces of lead paint, all of which become airborne as soon as you start sanding or cutting. Combine a respirator and dust collection to protect your lungs along with goggles or safety glasses to protect your eyes.

Blade-dulling dangers lurk in time-worn wood as well. Tackle them in three major steps before machining the wood to final dimensions at your tablesaw, jointer, and planer:

Weathered wood is generally much softer than new. Protect the surface surrounding the fastener with scrap wood to avoid marring it.

1. Remove the metal

Buried metal fasteners are the first hidden hazard to hunt for. Prices for wand-style metal detectors range from $30 for models with simple LED indicators to $150 for versions with laser locators and auto-tuning features, *right*. But they pay off when they prevent you from ruining tablesaw blades and router bits. Following the scan, gather hammer, prybars, and nail pullers and get to work on any hits. After your first round of metal-removal (*above*), repeat the scan with the metal detector to reveal any left-behind fragments or doubled-up nails you might have missed.

Thoroughly scan both faces and edges of the board, marking the locations indicated by the metal detector with chalk.

A FINISH FROM THE SOURCE

Matching weathered wood can be tedious. If you're struggling, try this novel approach that transplants the patina from weathered wood to fresh-cut.

Start by mixing mineral spirits with a natural- or neutral-tint oil-based stain in a 50/50 ratio. Apply a puddle to a donor board and use 220-grit sandpaper to stir up a slurry of old finish. Transfer that finish to your fresh-cut edges. Add coats as needed to make a match.

Opt for a brass-bristle brush, if possible, to avoid re-introducing problem metals to the wood while you're cleaning out the dirt.

If you can spare a set of blades, use a power planer to take off the weathering from the board's faces. Otherwise, a belt sander with 80-grit paper will work, but be mindful of any finish build-up.

2. Dislodge the dirt

Dirt's dulling effect on blades, bits, and abrasives is speedy, if not as abrupt as metal. Make your second task powering away the most obvious dirt. A wire brush, either handheld (*above, left*) or drill-powered makes short work of the task on the board's faces. That porous end grain, however, has spent the years wicking dirt up inside. Switch to your least-favorite circ-saw blade and cut a bit off each end to reveal clean wood.

3. Off with the weathering

With the bulk of the hazards removed, switch to a belt-sander or power planer (*above, right*) to remove the weathering, revealing the grain and clearing away any remaining dirt. That finally clears the path for machining. Rip the edges off at the tablesaw to remove the last bit of weathering. Flatten a face and square an edge at the jointer. Then thickness at the planer before cutting your workpiece to final size.

WHERE TO FIND SALVAGEABLE LUMBER

If you've only shopped for wood in the lumber aisle, you might think second-hand sources are scarce. But once you know where to look, you'll see viable lumber all around you. Consider these sources.

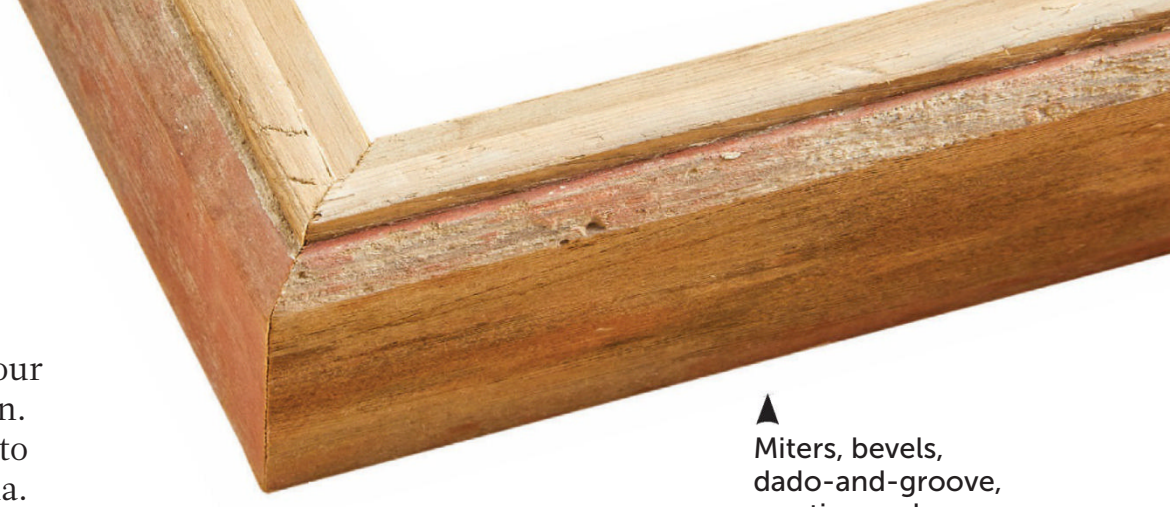
ONLINE MARKETPLACES. Websites like Facebook and Craigslist make searching in your area easy and can often net low-labor lumber that's already been cleaned and stacked. Also look for furniture discards with wide, all-wood panels. Tables, headboards, and church pews rack up the board feet.

PROFESSIONAL WORKSHOPS. Check your local listings for businesses that work in woods. Any shop that cuts wood produces offcuts. And they don't have the luxury of hoarding it like we do, so they may be willing to cut a deal for their discards. Look for doormakers, cabinet shops, and boat builders that often work in hardwoods and sometimes exotics.

PALLETS. Synonymous with upcycling, pallets aren't our favorite source of reclaimed lumber and here's why: That stack on the loading dock is often made up of poorly-dried, low-end lumber. Pallets are often used to transport chemicals and some are treated with pesticides. Plus, they likely aren't free for the taking, instead destined to return to the shipping company that owns them. If you're determined, seek companies that transport heavy objects for higher-yielding hardwood pallets, or importers whose pallets might contain exotics.

REMODELING/ DEMOLITION SITES. Seek out permission from the site manager before you dumpster dive at a construction site. Then, keep an eye out for pre-Depression-era homes and businesses that are getting a makeover. The older the building, the better chance of scoring old-growth lumber with tight, stable growth rings.

BARNS. A bonanza of weathered wood awaits in old barns, so they've become a popular target for salvage. However, lack of permission makes you a bandit rather than a boon to the owner no matter how dilapidated the building. Be aware that landowners' liability insurance might prevent them granting that permission in the first place. That said, if there is an opportunity to safely remove wood, look for classic timber-frame construction containing long, straight-grained beams and high-board-foot yields.



Miters, bevels, dado-and-groove, mortise-and-tenon, and loose-tenon joinery are all good options for hiding exposed fresh-cut wood.

KEEP THE SALVAGED LOOK

If your aim is to retain and display a salvaged-lumber look, center your design and build strategy around the joinery and finish. You'll still want to start by removing metal and giving your salvaged boards an initial brush-down. But switch to a plastic-bristled brush to avoid taking off too much of the patina. Prep more wood than you'll need for testing finishing options later.

TIP!

Weathered wood has a tendency to tear out, especially when cross-cutting. Use a utility or hobby knife to score cutlines before sawing.

Cutting reclaimed wood takes extra care. Plan your design around joinery that minimizes fresh-cut, unmatching wood that could bely the salvaged look (*above, right*). In your layout, consider incorporating previous joinery, nail holes, and even faded signage or branding to further emphasize the wood's provenance.

Where you can't avoid fresh-cut surfaces, mimic character or sawmill marks with power tools, (*below, left*). Then, use combinations of dyes, stains or other colorants, (*below, right*), to match the fresh-cut wood to the reclaimed. The two types of surfaces will change color differently under a clear-coat. Test both the colorant and clearcoat on scrap before finishing your project.

You can restore or mimic rough, weathered surfaces or mill marks with rotary steel-bristle brushes or sanding flap wheels.

Varathane's Weathered Wood Accelerator mimics the gray of a wood exposed to the elements. Multiple coats darken the effect.

We were able to conceal many of the fresh-cut edges in this salvaged-wood design, minimizing the amount of matching required.

A lot of trial and error on scrap netted a combo of dye, stain, and garnet shellac that blended old wood with fresh-cut.

18+

WHAT IS AVAXHOME?

AVAXHOME-

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ELEGANT ACCENT TABLE

Build a table loaded with great looks and must-know techniques to hone your joinery skills.

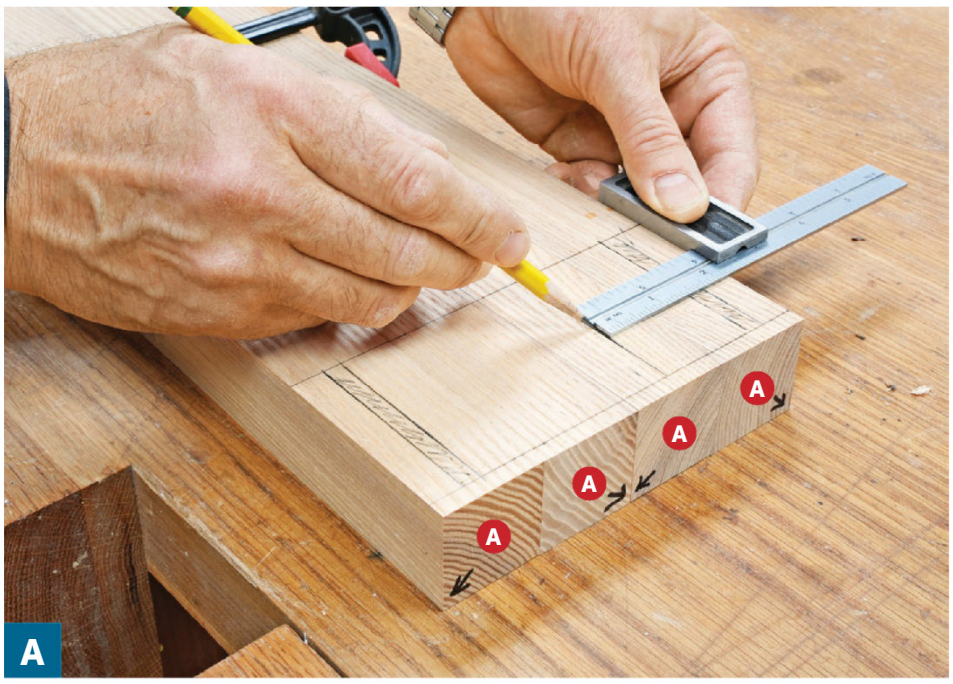
WRITER: BRYAN NELSON
DESIGNER: KEVIN BOYLE
BUILDER: BRIAN BERGSTROM

OVERALL DIMENSIONS
18"W × 18"D × 30"H

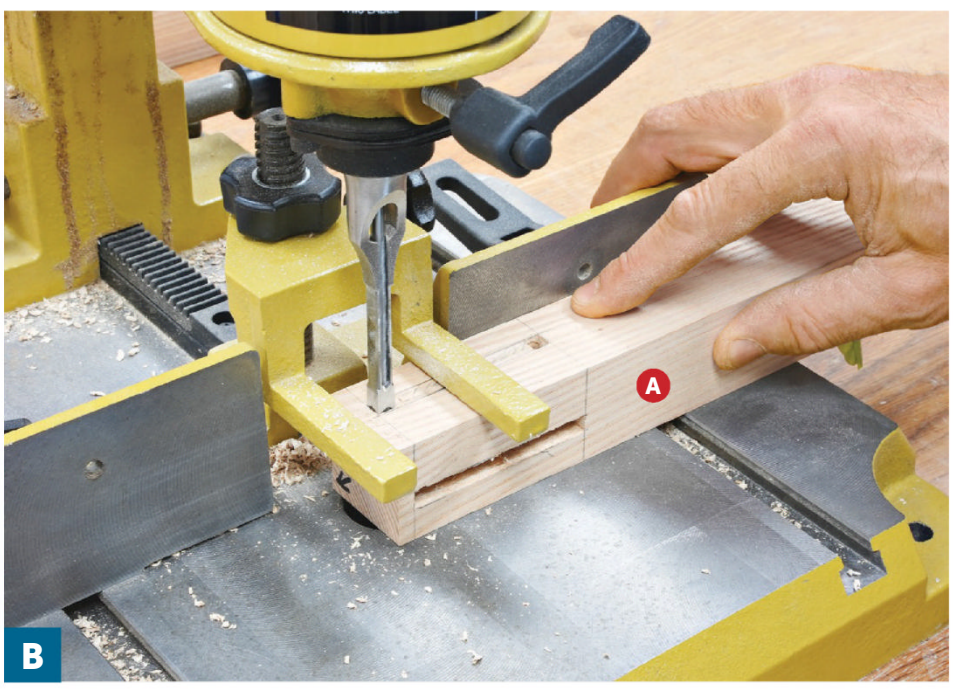
PHOTOGRAPHER: KELSEY HANSEN; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON

Tapered legs, arched aprons, and a tile top surrounded by a mitered frame give this table elegance that's easy to see. Harder to see, though, are elements that make this project a pleasure to build. The legs are all identical, as are the aprons, which makes the table easier to build and an opportunity to learn. Tapered legs lend it a delicate appearance, but tenoned aprons make it strong. There's more than meets the eye in that mitered top, too. Half-laps at each corner make the top much stronger than basic miters.

We'll take you step by step through the tapers, tenons, and the half-laps. These make this table perfect for learning or refining techniques you'll use in a variety of projects.

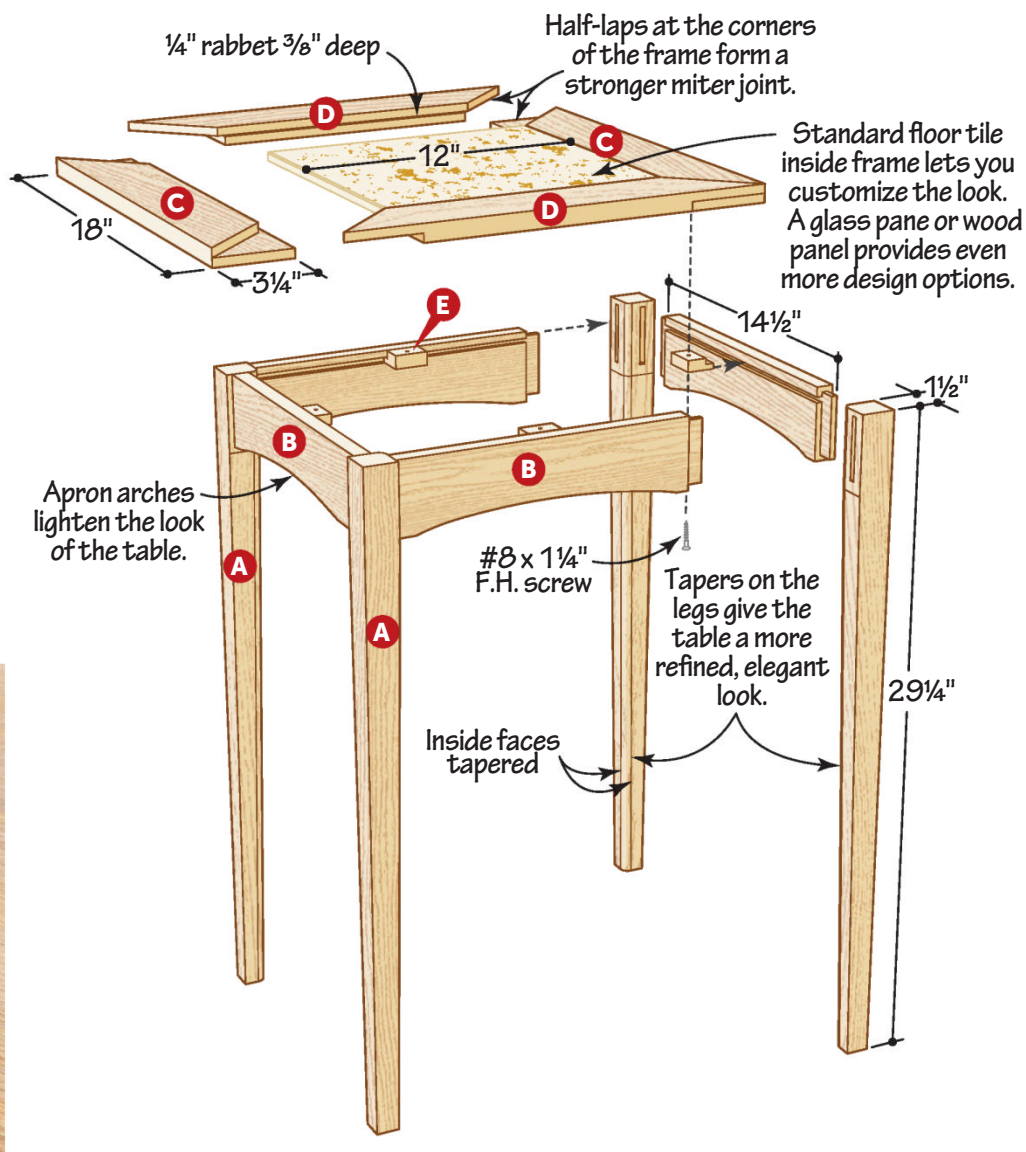


Clamp the legs (A) together, flush at the ends. Then mark the top and bottom of the mortises on the inside faces. Lay out the sides of each mortise using a combination square.



Cut the top and bottom of the mortise to establish its length. Then remove the waste in between. Making a second pass along the length helps clean up the bottom of the mortise.

EXPLODED VIEW



LEGS TO DIE FOR

1 From 1½"-thick ash, cut the legs (A) to size **[Materials List, Exploded View]**. Choose the best faces for the outside and then mark the outside corners on the top end of each leg for reference.

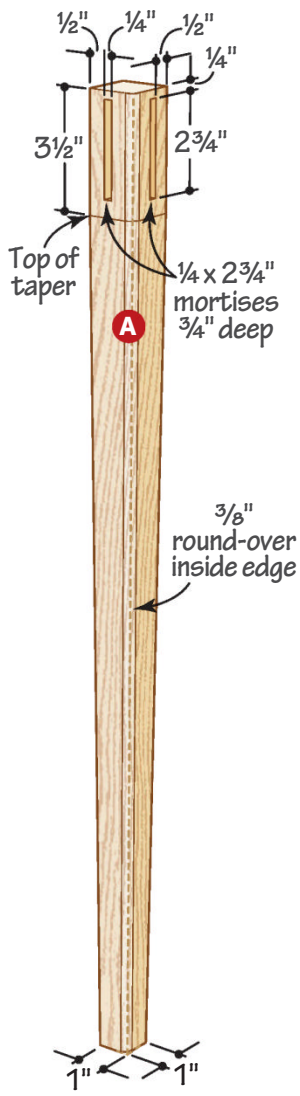
2 Lay out the locations of the mortises on both inside faces of each leg **[Drawing 1, Photo A]**.

3 Mortise the legs using a mortising machine **[Photo B]**. If you don't have a mortising machine, you can create precision mortises with a drill press and some basic chisel work. See *Mortises Without a Mortiser, next page*.

4 Mark the bottom of the tapers on the end of each leg and the top of the tapers on the inside faces **[Drawing 1]**. Taper the inside faces of each leg using a taper jig on the tablesaw. See *Top-Notch Tapers* on *page 71*.

5 Round over the inside corner of each leg **[Drawing 1]**. Finish-sand the legs then set them aside.

1 LEG



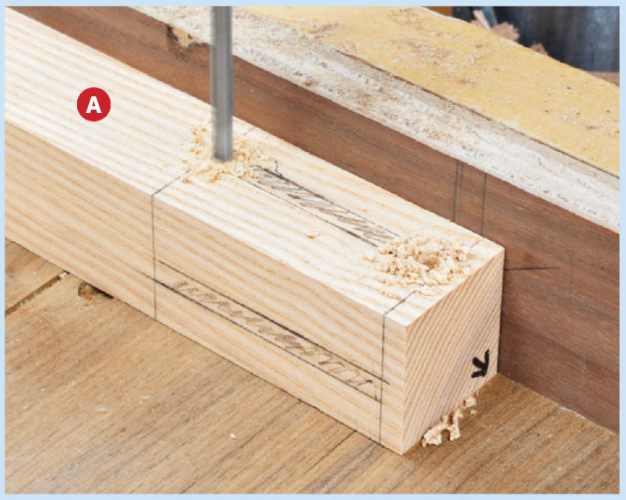
MORTISES WITHOUT A MORTISER

No mortising machine? No problem! Create perfectly sized mortises using nothing more than your drill press and a set of chisels.

For mortises less than ½" wide, install a brad-point bit 1/16" smaller than the width of the mortise. For wider mortises, use a Forstner bit. Both types of bits allow you to drill overlapping holes with ease. Adjust the depth of cut to 1/16" more than the length of the tenon. Establish the ends of the mortise, *right*, then remove the waste in between, *far right*.

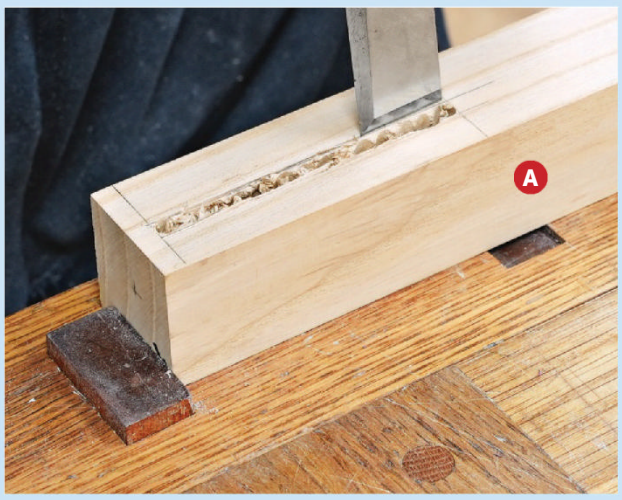
Use the layout lines to define the sides and ends of the mortise, *below left* and *below center*. The goal is a straight line deep enough to register the chisel.

Once you reach the bottom of the mortise, clear out any remaining waste, *below right*. Repeat the process for all the other leg mortises.



After adjusting the drill press fence to center the bit over the mortise, drill a hole at each end of the layout to define the length of the mortise. Drill to full mortise depth.

Remove the bulk of the waste between the ends by drilling overlapping holes as close as the bit will allow. Repeat the process for the remaining mortises.



Cut shallow lines with a ¾" chisel to define the sides. Straight, shallow lines provide a registration point for guiding the chisel later when removing the waste.

Repeat the process for the ends of the mortise with a ¼" chisel. Then work back and forth with the chisels to square up the sides and ends to full depth.

Use a ¼" chisel to clear out the bottom of the mortise. Position the chisel at an angle, with the bevel-edge down, and work from the center toward each end.

APRONS BRING IT TOGETHER

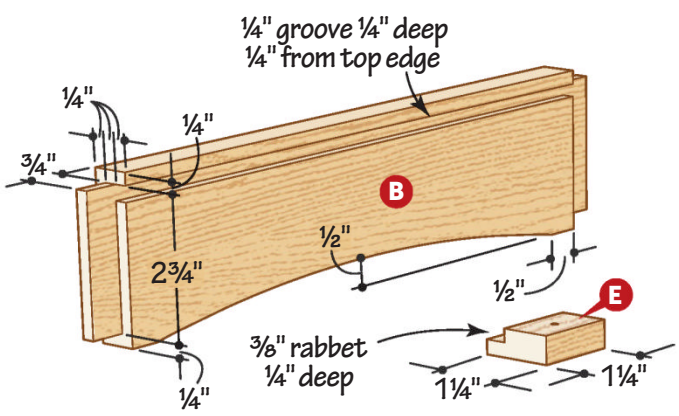
1 From ¾"-thick stock, cut the aprons (B) to size **[Materials List]**. Cut an extra apron to use as test piece.

2 Install a ¾" dado blade and attach an auxiliary fence to the rip fence of the tablesaw to act as a stop while cutting tenons on the ends of the aprons **[Drawing 2]**. Raise the dado blade to ¼" (or a hair under) and then adjust the rip fence so the face of the auxiliary fence just touches the inside face of the dado blade.

3 Cut the tenon shoulders on one end of your test apron **[Photo C]**. Then cut the cheeks of the tenon **[Photo D]**. Test the fit in a mortise. It should be snug enough to fit by hand without hammering, but should not fall out when held facing down. If the fit is too tight, raise the blade very slightly (remember, any height change will be doubled) and trim down the tenon. If it's too loose, lower the blade and cut a fresh tenon on the other end of your setup apron. Once the fit feels right, cut the tenons on each of the aprons.

4 Adjust the dado blade to a ¼" width, set the rip fence, and then cut a groove near the top inside edge of each apron **[Drawing 2]**.

2 APRON & TABLETOP FASTENER



Butt the apron against the auxiliary fence and cut the tenon shoulders on each end of the apron using a miter gauge with an auxiliary fence.

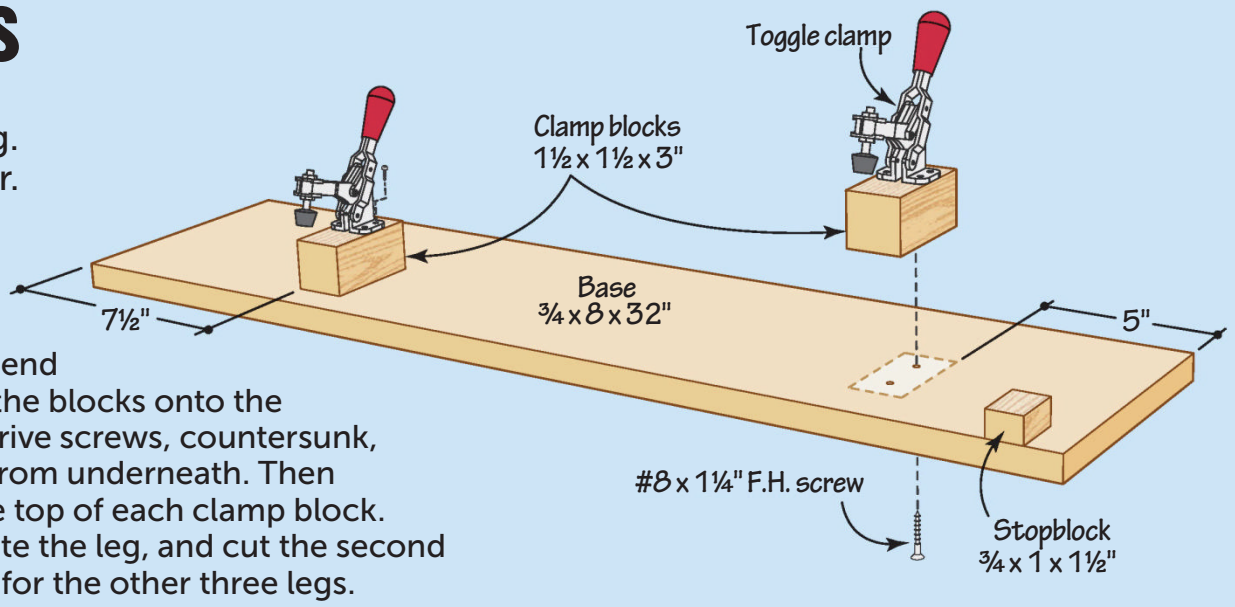
Lay the apron flat against the table and tight against the auxiliary fence to cut the tenon cheeks on each apron.

5 Lay out the arc on the bottom of each apron **[Drawing 2]** and cut just outside the layout line at the bandsaw. Sand to the layout line and then finish-sand the aprons.

6 Glue a pair of legs (A) and an apron (B) together, then repeat for the other pair of legs and apron. Once the glue dries, glue these assemblies together using the remaining two aprons **[Exploded View]**.

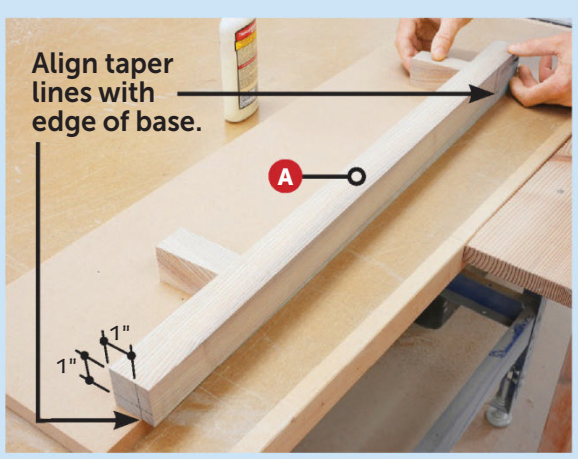
TOP-NOTCH TAPERS

A shop-built taper jig makes quick work of creating a more refined leg. And building one couldn't be easier.



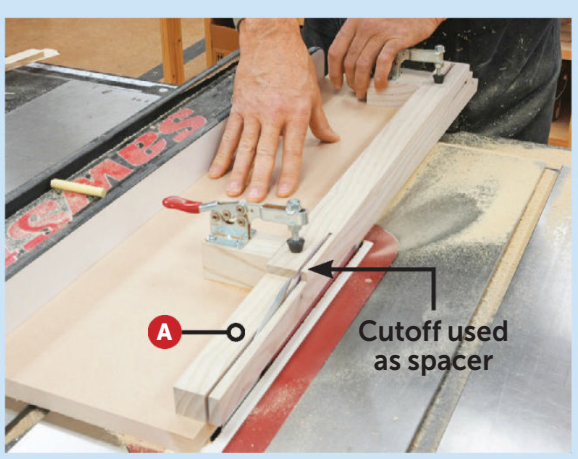
Start by cutting a base to size from ¾" plywood or MDF. Cut two clamp blocks to match the thickness of the leg. Align the taper layout lines on the end and face of the leg to locate and glue the blocks onto the base, *below left*. After the glue dries, drive screws, countersunk, through the base and into the blocks from underneath. Then attach a toggle clamp **[Sources]** to the top of each clamp block.

Cut the first taper, *below center*, rotate the leg, and cut the second taper, *below right*. Repeat the process for the other three legs.



Align the taper layout lines with the base edge. Glue clamp blocks to the base, butted against the face of the leg. Glue a stop to the base at the top end of the leg.

Adjust the rip fence to position the edge of the base in line with the saw-blade teeth. Clamp the leg into place, then cut the first taper.



Rotate the leg and clamp it into place. Use the cutoff from the first taper as a spacer so you don't have to adjust the clamp. Then cut the second taper.

MORE THAN MITERS

1 Cut the frame sides (C) and frame front/back (D) to size **[Drawing 3]**. Then cut a pair of identical pieces from scrap hardwood to use as setup guides. Mark the top face of each piece with an "X" to keep track of the orientation.

2 Cut the mitered half-lap joinery on all the pieces, testing first on the setup pieces. See *Half-Lapped Miter Magic, below*.

3 Rabbet the inside top edge of the frame pieces. Match the rabbet depth

HALF-LAPPED MITER MAGIC

Dead-on miters with half-lap joinery don't have to be a magic act. Attention to detail and accurate setups are the key.

Angle your miter gauge to 45° and attach a long auxiliary fence that extends past the saw blade. Then make a cut through the auxiliary fence to establish a reference kerf. Miter-cut one end of each frame side (C). Flip each frame side end-for-end and miter-cut the opposite end, *top left*.

Install a ¾" dado stack in your tablesaw and set it for a ⅜"-deep cut. Using scrap material planed to the same thickness as your frame parts, make a set of test cuts to verify the setup, *top center*.

When the setup is dialed in, make a cut at one end of each frame side, making sure the top face that you marked earlier with an "X" is facing up, *top right*. Repeat the process for the opposite end of the each frame, *bottom, left*. Remove the stopblock and cut away the remaining waste.

For the frame front/back (D), the process is similar to establish the shoulders and remove the waste. Start by setting the miter gauge to 45°. Then follow the steps in the photos, *bottom, center and right*.

Line up the outside corner of the frame side (C) with the kerf in the auxiliary fence, then clamp a stopblock into place. Miter-cut both ends of each frame side.

Make a pass over the dado blade at one end of each setup guide. Flip one guide over and check the fit. If they slide together without any gap, the dado blade height is perfect.

Line up the inside corner of the miter on the frame side (C) with the dado blade, clamp a stopblock into place, and make a pass. Repeat the process for the other frame side.

Rotate the frame side, aligning the inside corner of the miter with the dado blade. Clamp the stopblock and make a pass across the end of each frame side.

Align the outside corner with the edge of the dado blade. Add a stopblock and make a pass in each frame front/back. Remove the stopblock and cut away the remaining waste.

Reverse the miter gauge and cut the opposite end of each frame front/back in the same manner. Remove the stopblock and cut away the remaining waste.

Note: Cutting the buttons from the end of a blank orients the grain perpendicular to the tongues to maximize strength.

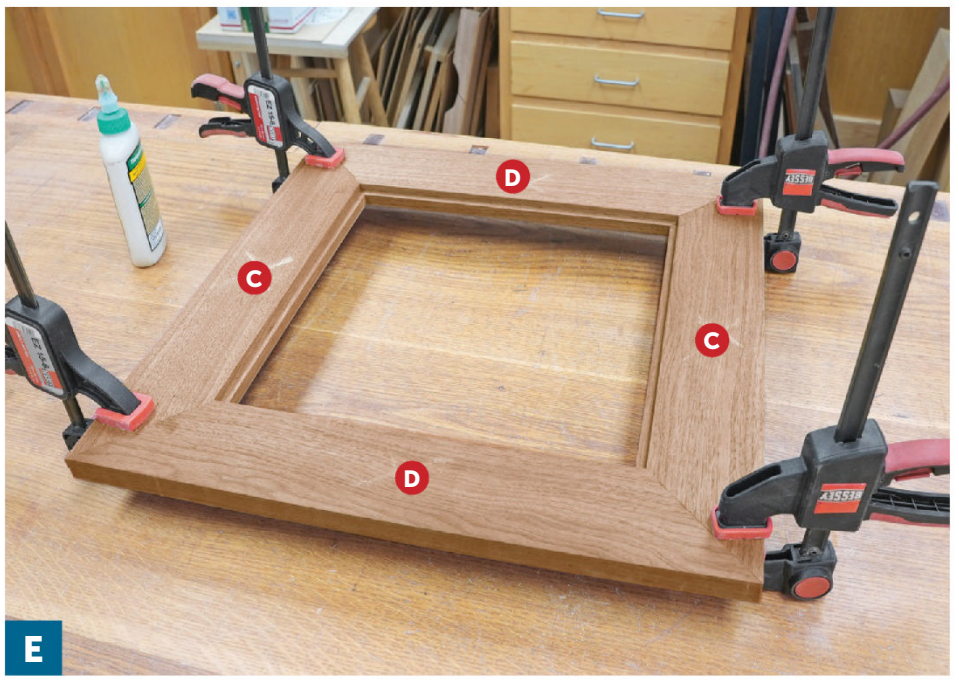
to the thickness of the tile **[Sources]** and the rabbet width to allow for a 1/16" gap all around.

4 Glue the frame together **[Photo E]**, then finish-sand.

5 From 1/2" stock, cut two 1¼×12" blanks to size. Rabbet both ends of each blank **[Drawing 2]**, then cut a tabletop button (E) to final length from both ends of each blank. Drill a countersunk hole, centered, on the top face of each button.

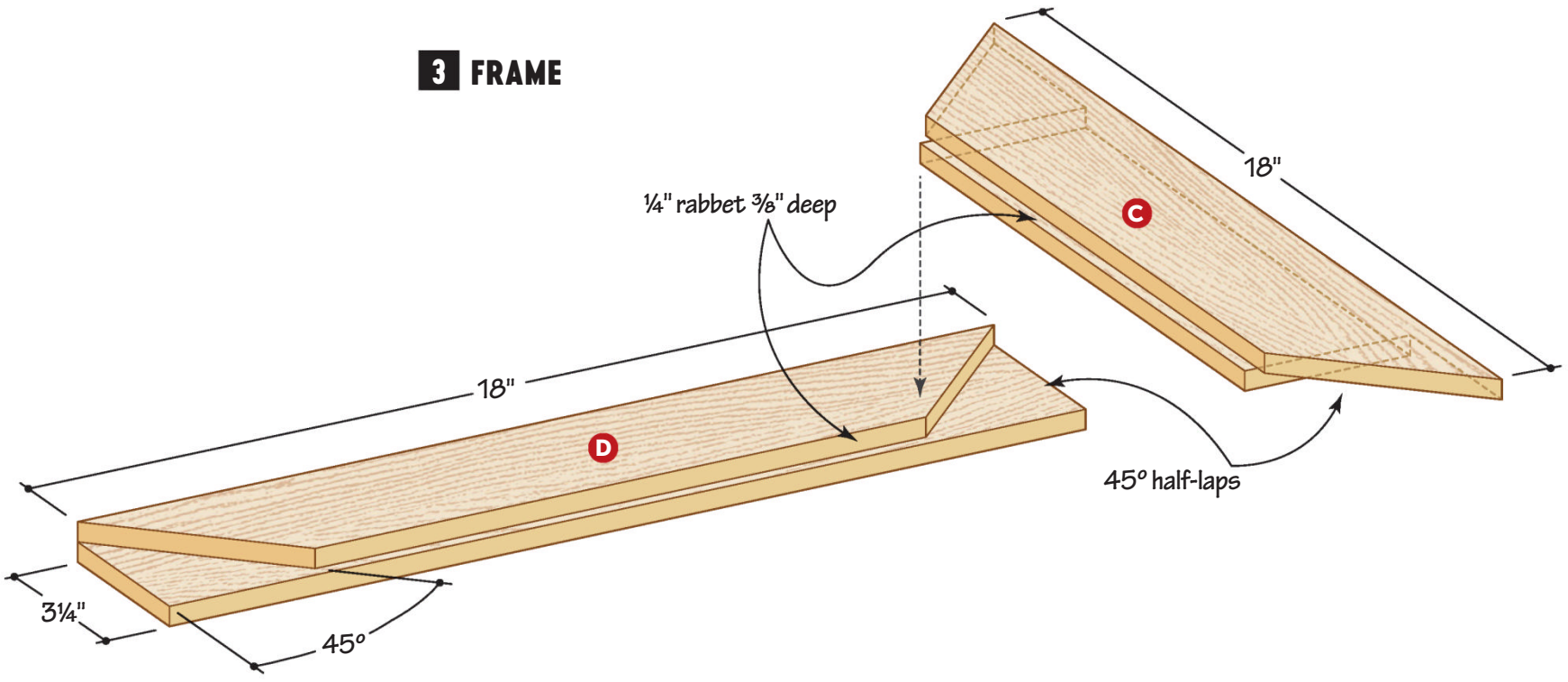
6 Complete any touch-up sanding, then apply a finish to the base (A/B), the frame (C/D), and the tabletop buttons (E). Once the finish dries, attach the frame to the base **[Exploded View]**.

7 Install the tile with a couple of dabs of silicone adhesive in each rabbet. The challenge now is figuring out which area of the house gets an elegant added "accent."



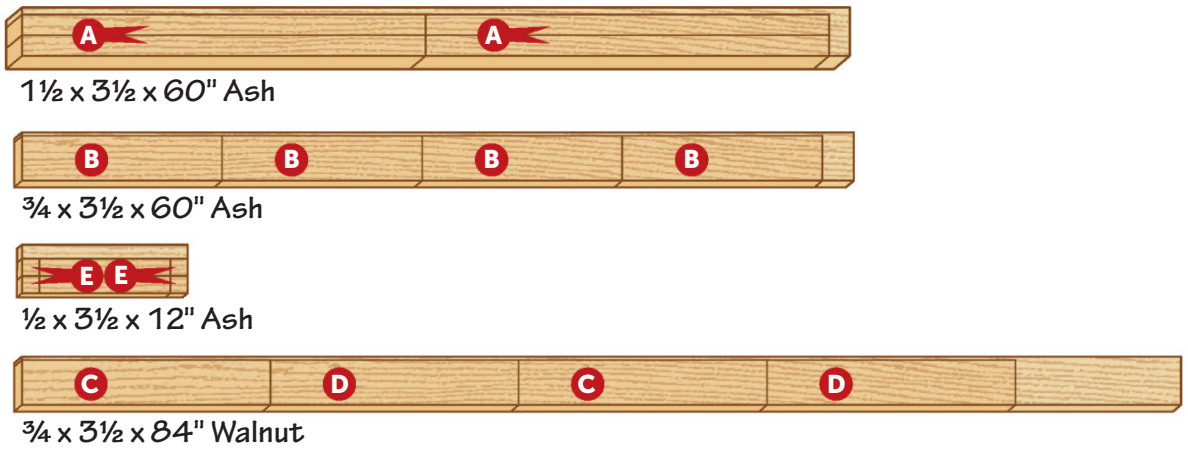
Glue each mitered half-lap joint and add a clamp on each corner. Use a band clamp around the perimeter of the frame, if needed, to pull the joints tight.

3 FRAME



CUTTING DIAGRAM

This project requires 3 board feet of 8/4 ash, 2 board feet of 4/4 ash, 1 square foot of 1/2" ash, and 3 board feet of 4/4 walnut based on example boards shown.



MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	LEGS	1½"	1½"	29¼"	A	4
B	APRONS	¾"	3¼"	14½"	A	4
C	FRAME SIDES	¾"	3¼"	18"	W	2
D	FRAME FRONT/BACK	¾"	3¼"	18"	W	2
E*	TABLETOP BUTTONS	½"	1¼"	1¼"	A	4

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: A–ash, W–walnut.
SUPPLIES: #8×1¼" flathead screws, silicone.
BLADE AND BIT: Dado set, ⅜" round-over router bit.
SOURCES: Horizontal-handle toggle clamp (2) no. GH-201-BS, $10 each, Penn Tool Co., 800-526-4956, penntoolco.com. Glazed porcelain stone tile no. 55236, $2, Lowe's, 800-445-6937, lowes.com.
PROJECT COST: It cost us about $105 to build this project. Your cost will vary by region and source.

A FEW OF OUR FAVORITE CLAMPS

We have a lot of clamps in the *WOOD*® shop—like an embarrassment-of-riches amount of clamps. But we still have favorites. Here are some that our project designers, Kevin and John, depend on every day and recommend to anyone looking to chase that elusive "enough clamps" status.

Merle Corner Clamp

The Merle Corner Clamp stands as our favorite band clamp because it's built to last with aluminum jaws, a steel band, and heavy-duty construction. Clamping pressure adjusts easily. We like that the steel band doesn't fall limp like a nylon band and that all 23' of band, which provides clamping capacity from 2⅝×2⅝" to 69×69", reels neatly away in an enclosed metal case. The Merle comes with pivoting jaw inserts to hold non-90° corners that stay in place well. You can purchase additional jaws for clamping assemblies with more than four sides, as well as replacement inserts and even a new reel and band, so we'll be impressed if you can actually wear one of these out. We haven't yet.

MLCS Woodworking, *mlcswoodworking.com* no. 9012, $40

PHOTOGRAPHER: JACOB FOX, MARTY BALDWIN

continued on page 76

For the Man Who Gives Everything and Expects Nothing

If you're anything like my dad, you give your family everything. Your name, your time, your values — the people in your life know they can depend on you for practically anything. In exchange for imparting all of this energy and experience, you expect nothing in return.

The point? You deserve to treat yourself once in a while. You do so much for the people you care about. Now it's time to focus on you for just a few minutes. That's where the Men's Due Volta Watch comes in. This astonishing innovation provides a digital readout that's powered by a precise quartz engine, combining both analog and digital timekeeping.

Outfitted with a stopwatch, alarm, a.m./p.m. settings, and day, date and month complications, this timepiece stands out from the crowd. With its large face and handsome, masculine design, this watch is perfect for the back nine and the happy hour afterwards. Water-resistant up to 3 ATM, this timepiece won't wimp out if you have a run-in with a water hazard.

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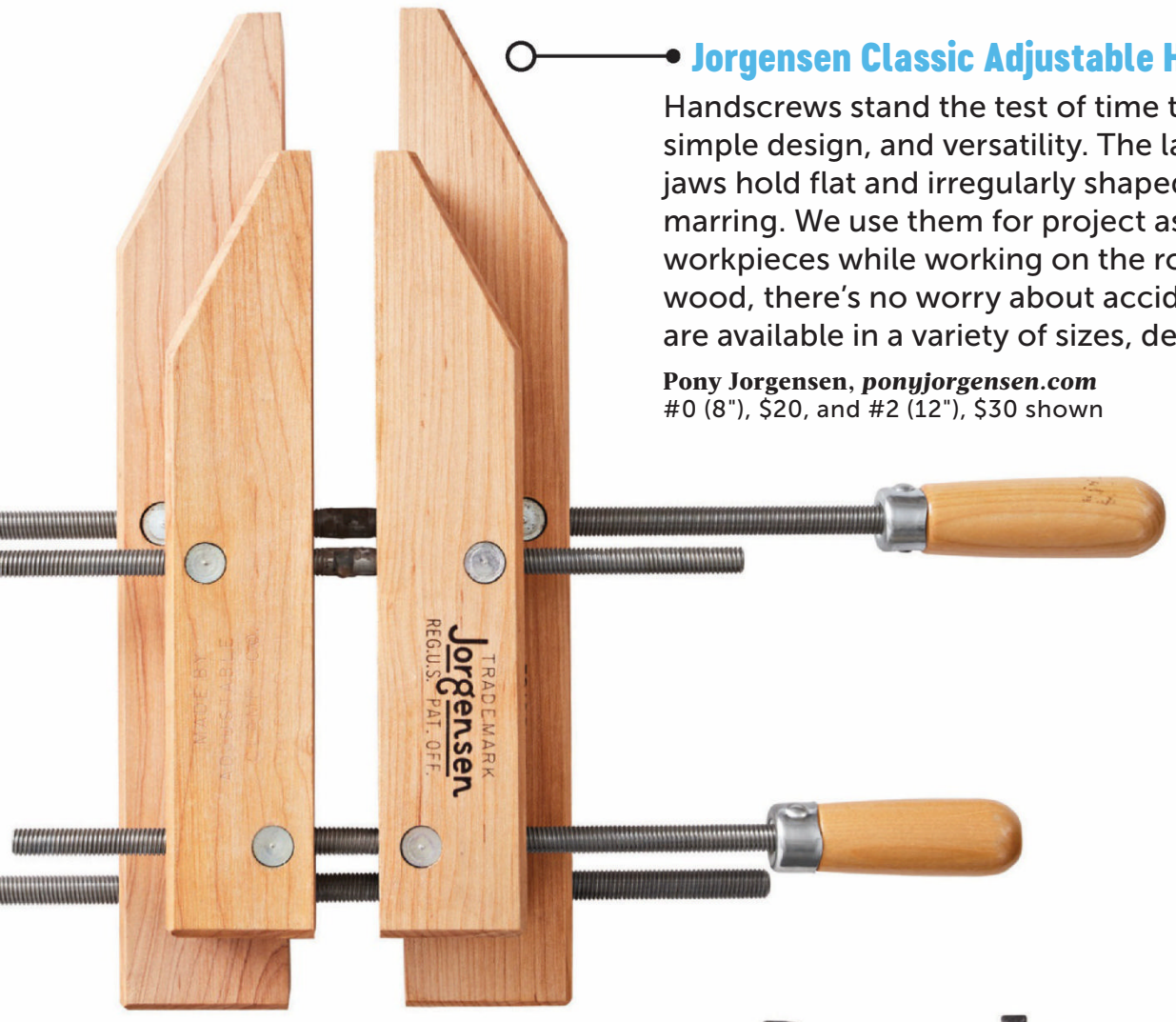

Jorgensen Classic Adjustable Handscrews

Handscrews stand the test of time thanks to durable construction, simple design, and versatility. The large clamping surface and deep jaws hold flat and irregularly shaped workpieces securely without marring. We use them for project assembly and for holding small workpieces while working on the router table. Because the jaws are wood, there's no worry about accidental bit contact. Handscrews are available in a variety of sizes, depending on the manufacturer.

Pony Jorgensen, *ponyjorgensen.com*
#0 (8"), $20, and #2 (12"), $30 shown

Bessey K Body Revo Jr.

K Body Revo Jr. clamps provide serious clamping pressure (up to 900 lbs.) and the parallel jaw design we love from Bessey. But these clamps weigh only about half as much as their standard K Body Revolution clamps. Shedding weight didn't seem to weaken them; these clamps are tough enough for anything we throw at them, and the bars resist flex to hold the jaws parallel. They're available in lengths from 12–50".

Bessey, *bessey.de/en-us*
12", no. KRJR-12, $38 shown

Irwin Mini and Medium-Duty One-Handed Bar Clamps

One-handed clamps sometimes get a bad rap from woodworkers. Sure, they're not the choice for panel glue-ups, but we find them invaluable during project assembly when one hand has to hold workpieces in place. The other hand can easily hold the clamp and squeeze the trigger to apply clamping pressure. John prefers the Irwin mini (available in 6" and 12" lengths) and medium-duty (available in 6–36" lengths) versions because he likes the trigger action.

Irwin, *irwin.com*
18" medium-duty, no. 1964719, $20 shown

Jorgensen Aluminum Bar Clamp

We rely on aluminum bar clamps because they're lightweight, strong, and easy to adjust. They're our go-to clamps for securing hardwood edging to plywood. Available in lengths from 24–72", these clamps easily span large distances without being too cumbersome and heavy to use.

Pony Jorgensen, *ponyjorgensen.com*
24", no. 3524, $30 shown

Bessey EHK Trigger Clamps

Kevin likes one-handed clamps for the same reasons as John, but prefers the feel of EHK Trigger Clamps from Bessey. They're available in lengths from 4½" up to a whopping 50", so he's never without a size he needs to assemble almost any project.

Bessey, *bessey.de/en-us*
12", no. EHKL12, $19, and
18", no. EHKL18, $26 shown

continued on page 78

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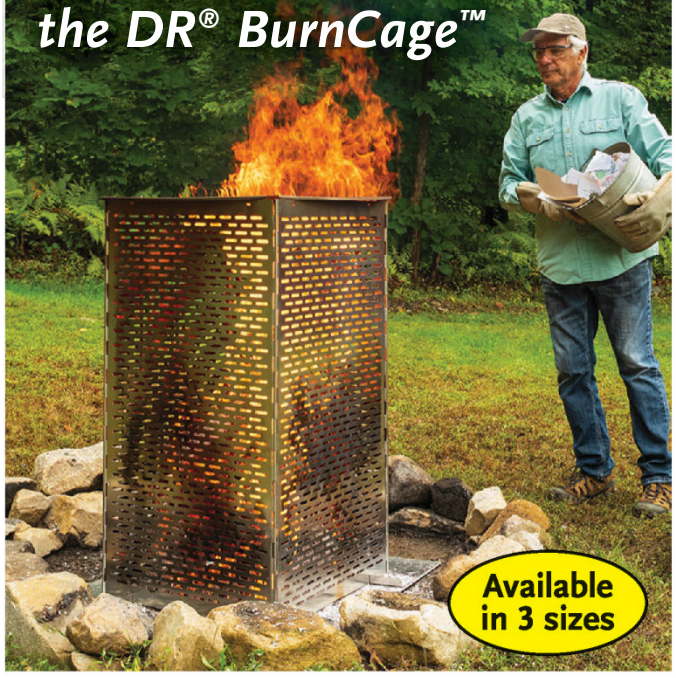

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DR POWER EQUIPMENT

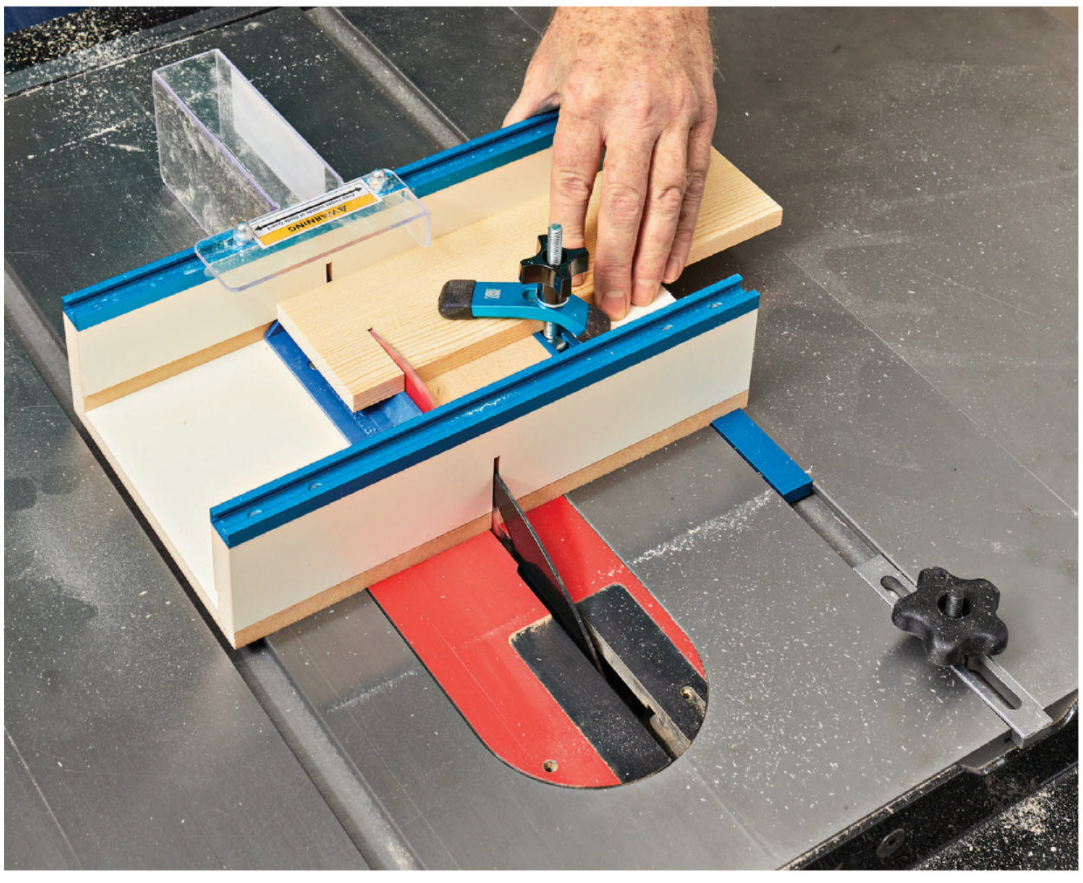
SHOP-TESTED

THE DRILL-PRESS FENCE WITH A MAGNETIC PERSONALITY

Tester: Bob Hunter

Few drill presses come with a fence these days, so it's an upgrade woodworkers need. If you like the cast table your drill press came with, consider one of Magswitch's fences. These solid-steel fences use two MagJig on/off magnets to hold firmly to the cast-iron table. You can attach the MagJigs in several locations along the fence to fit your table's size or to avoid clamping slots. The Pro fence measures 4⁵⁄₁₆ × 21", while the standard fence is 2½ × 13". Both come with a magnetic stopblock that works just as easily. I like both fences because I could quickly install them and remove them from the table, and the magnets held without slipping. Plus, the MagJigs detach so you can use them in shop-made jigs.

Magswitch, *magswitch.com*
Pro fence, no. 81101371, $289 shown;
standard fence, no. 81101375, $217



SHOP-TESTED

GET SAFE IN SHORT ORDER

Tester: Bob Hunter

Crosscutting small workpieces on a tablesaw can be a harrowing experience with a miter gauge. That's why I love this small-parts sled: It turns a potentially dangerous task into a safe one by holding small workpieces securely while keeping your hands safely away from the blade. I adjusted the miter bar to the slot on my saw to remove any side-to-side play, and cut a zero-clearance kerf in the base. Then I cut numerous small pieces with perfect results. The offcut side of the sled slopes down and away from the blade so offcuts fall away, preventing accidental kickback. A miter-slot stop limits forward travel of the sled to prevent exposing the blade after making the cut, a nice touch.

Rockler, *rockler.com*
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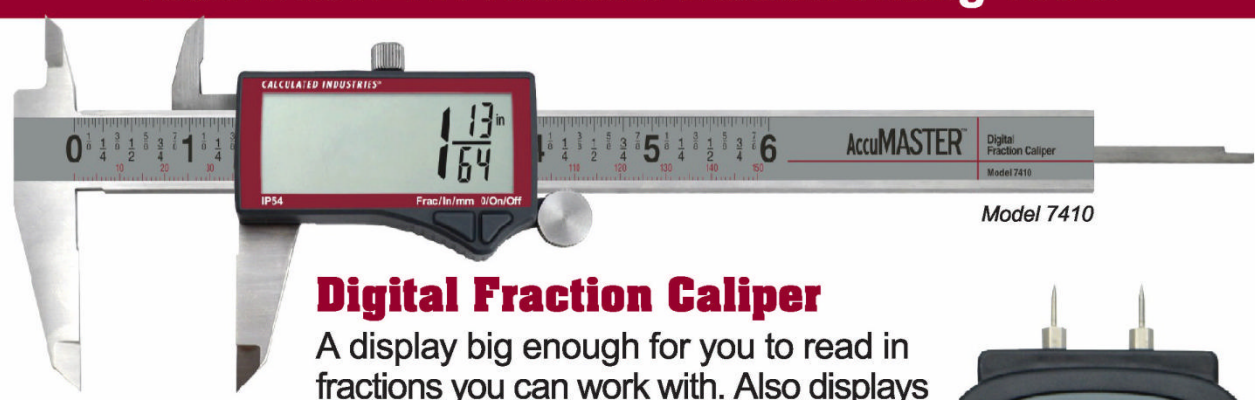

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Digital Fraction Caliper

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Model 7445

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WHAT'SAHEAD

A GLIMPSE INSIDE THE OCTOBER ISSUE (ON SALE AUGUST 18)

ALL A BOARD
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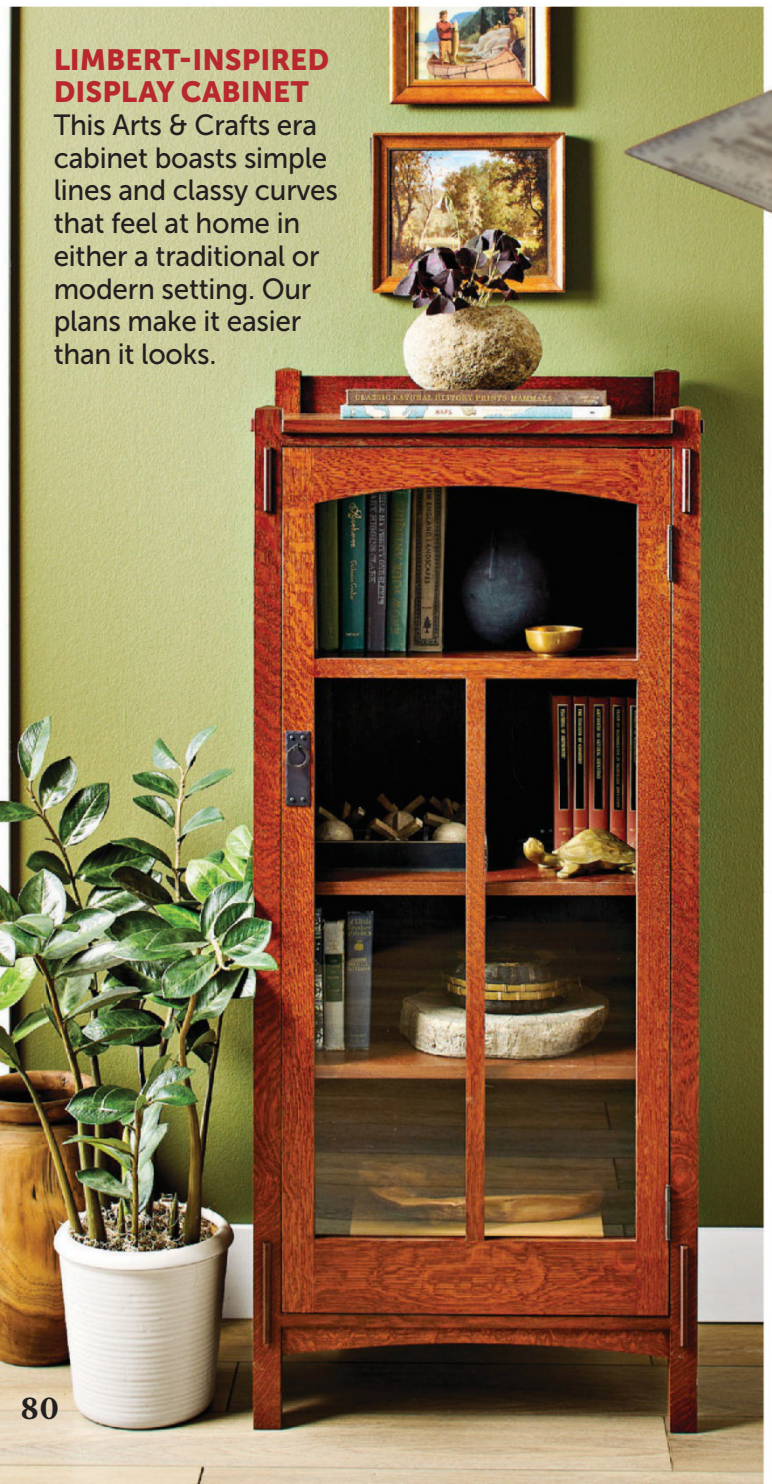

LIMBERT-INSPIRED DISPLAY CABINET
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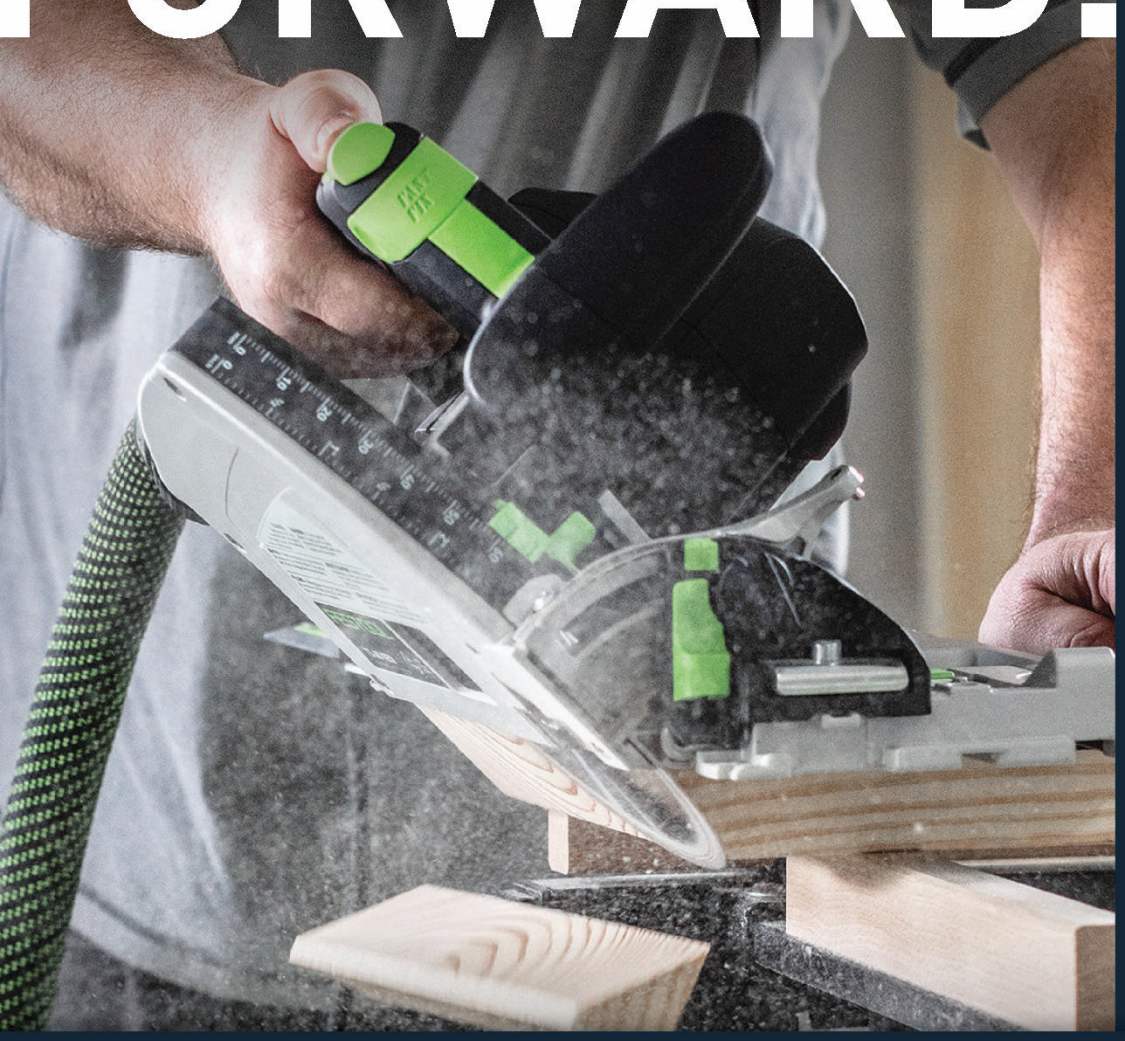

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