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CREATE TIGHTER, STRONGER
MORTISE-AND-TENON JOINTS

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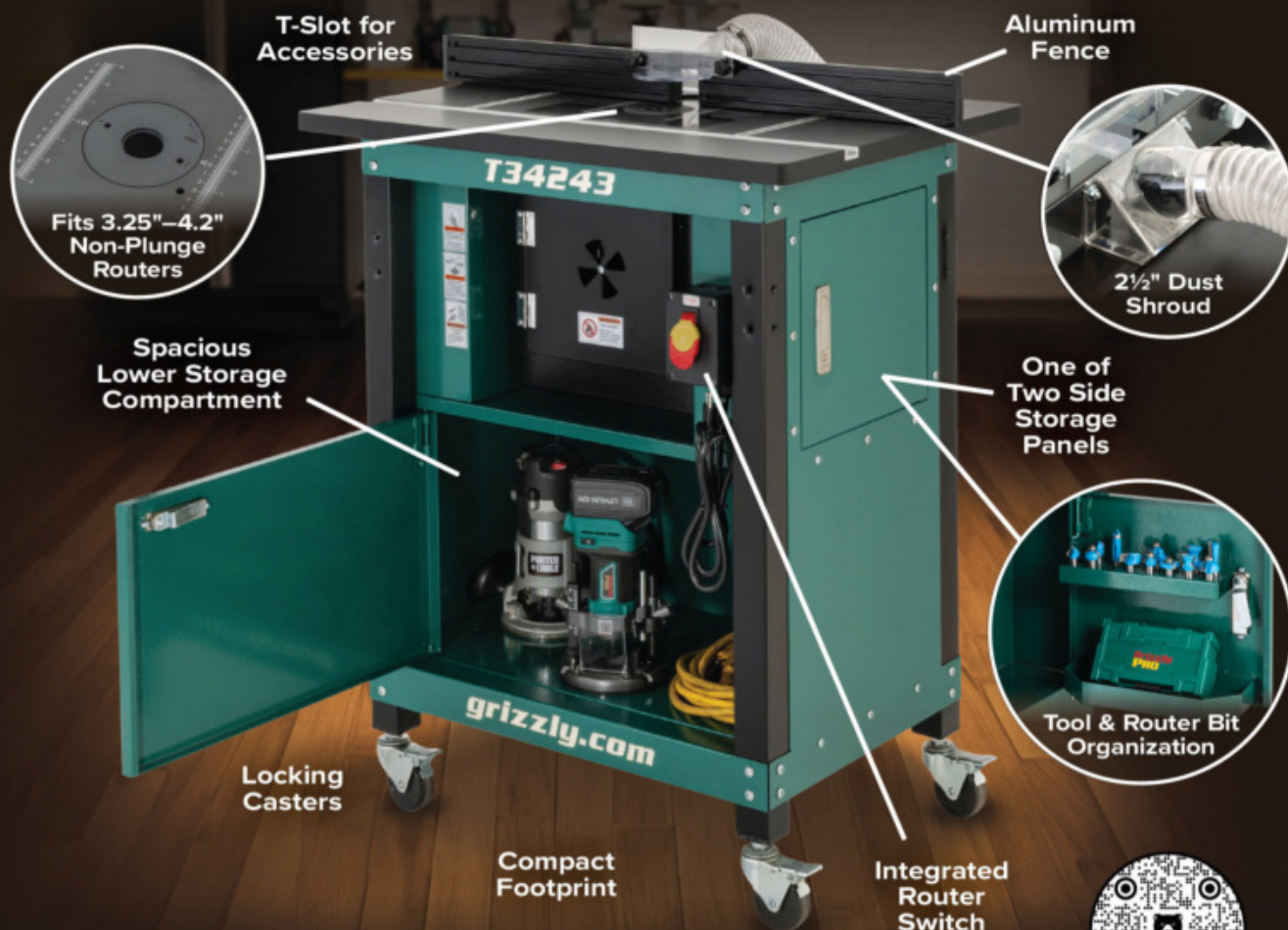
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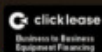
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GIVE IT A REST

**IF YOU WORK WITH YOUR HANDS, SABBATH WITH YOUR MIND;
IF YOU WORK WITH YOUR MIND, SABBATH WITH YOUR HANDS.
—RABBI ABRAHAM JOSHUA HESCHEL**

I recently took a week of vacation with the intention of doing ... nothing, really. I hadn't taken significant time off in a while, so I just wanted some downtime. Which of course meant that, on day one, I was out in the shop making sawdust.

Just my luck, then, that in hour one I somehow managed to tweak my back by—I don't know—sneezing at the wrong angle or something equally as trivial. These occurrences have become frequent enough that I could immediately tell that my plans for a week of shop time were looking dubious. Disappointing, sure. But, hey, at least I was going to fulfill my plans for doing nothing, right? I would just do it in the recliner instead of the shop. Even more restful, right?

Why, then, at the end of the week didn't I feel rested?

I think it has to do with Rabbi Heschel's quote, *above*. The Judaic idea of Sabbath means more than taking a Saturday off from the old nine-to-five. It's not about an absence of effort. Instead, it's sacred time set aside for rest *with a purpose*. For Rabbi Heschel and others in the Judeo-Christian tradition, the purpose of Sabbath is true rest—rest that is restorative to the spirit and soul, giving you time to reset and reflect. (Or for, you know, *Taking Measure*). To achieve that, according to Heschel, you need to understand yourself well enough to know *how* you rest best.

There are likely a lot of reasons we all found our way to woodworking. For me, I keep coming back to the workshop because it is restorative. My career, for decades now, has mainly seen me sitting at a desk all day long. As I type this, I'm staring at an array of three screens plus a phone. But in my shop, I can get lost in the tactile sensations, find satisfaction in tangible accomplishment, and insulate myself from outside expectations. When the weather is nice, I can throw open the garage door and get sun on my face. There's effort, yes, but it's the opposite of my daily grind. So, it transforms into the type of peacefulness that clears my head, resets my brain, and frees me to reflect. It's restorative. For me, it's rest.

Fortunately, my back feels better, and I can get back to “resting” in my workshop as I begin building projects for the holidays. I know that this season can put the “work” in “woodworking” for a lot of us. But I hope to get started early, so that my shop time remains restful. To help you do the same, we've included plenty of giftable projects in this issue. (I particularly like the “Slide & Swivel Stash Box” on page 26.) If woodworking is your rest time, like it is for me, don't forget that, while you're building for others, you need to make some of this time about you.

Then get out to the shop and get some rest. We'll help. 🌱

Lucas

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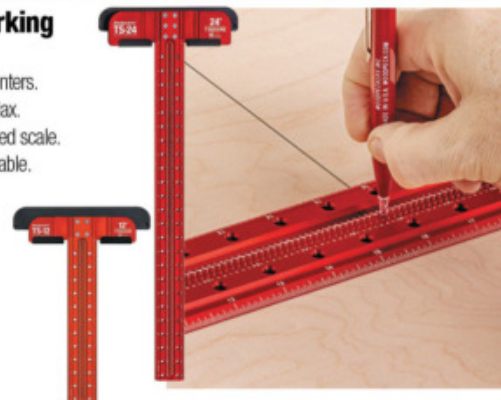
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WOOD

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PLANS

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With a novel locking lid and stacked swiveling trays, this box will upstage its contents.
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Build this decorative display to bring cozy Old World countryside to your home.
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Showcase your Timber Line Express rail cars on a shelf as finely crafted as they are.
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- 67 DEAD-CENTER MORTISE JIG**
Build this easy self-centering jig for foolproof routed mortises every time.
- 70 SCRAPWOOD COAT HOLDER**
Turn your cutoffs into a key and coat catchall.



ON THE COVER



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Few things in woodworking satisfy like the solid feel of a fine-fitting tenon seating in its mortise. While power tools can get you much of the way there, we teach the final hand-tool tuning tips.

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Maximum-strength mortise-and-tenon joints require fine fitting tenons. Turn to hand tools for the final tweaks.
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WOOD craftsmen Kevin and John raid our tool warehouse and film the whole thing. Take a look at their tool takes.

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MY WAY

My lovely wife saw the "Bread Slicing Tray" in issue 299 (November 2024) and said it would make a great Christmas gift. I agreed, but wanted to change it up. Designing and making this round version was fun and challenging. The lower tray is maple with the slats and ring made from cebil (Patagonian rosewood). Please pass on my thanks to the authors of the article.

Eric Krum

Elkton, Maryland

Thanks for sharing your version of the bread tray! One of the joys we experience is seeing how our readers creatively modify our project plans to make them their own.

Send photos and a brief description of your project to: woodmail@woodmagazine.com.

Dave Stone

Managing Editor



Make your own
bread slicing tray.

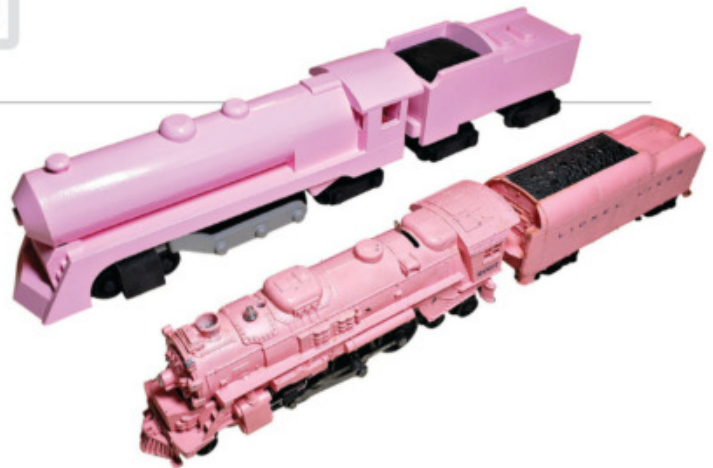
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breadtray](http://woodstore.net/breadtray)

PRETTY IN PINK

When I built the Timber Line Express locomotive and coal car featured in issue 291 (October 2023), I wanted to pay homage to my wife's 1957 Lady Lionel train set, which still runs circles under our Christmas tree each year. So, I stayed true to the design and construction but took, you might say, a slightly different approach to the finish. As a charter subscriber of *WOOD*® magazine, I never lack for project inspiration from the 300-plus issues on hand.

Michael Sivi

Burke, Virginia



CHERRY PICKING

When I needed to replace an early-'90s entertainment center, I drew my inspiration from your "Classic Cherry Sideboard" in issue 296 (July 2024). I loved the tapered legs and the arched bottom rail. I adapted the design to fit my TV and the allotted space.

The inset dovetailed drawers feature fully concealed, soft-close, undermount slides. The all-cherry construction is finished with three coats of oil-modified, water-based polyurethane which adds just a hint of amber and a very warm appearance.

Robert Sentell

Bedford, Texas



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CRACKED UP

I'm reading the article "Breadboard Ends Done Right" in issue 296 (July 2024). As a retired furniture repair technician, I've seen a few failures in factory-made breadboard tables. The most memorable was when the customer said, "We heard a noise in the middle off the night like a gunshot. We came out in the morning and saw a 1/4" crack from one end to the other in the dining table." Other people complained about the breadboard end either sticking out too far or being sunken in.

Today, I see people posting photos of tables they made that are just a few seasons away from splitting down the middle due to cross-grain construction that didn't allow for expansion and contraction.

Keith Mealy
Oregonia, Ohio

The article about breadboard ends is a great reminder about avoiding the pitfalls of wood movement with changes in humidity. Unfortunately, as many times as I have seen similar articles, they have never applied the instruction to projects other than breadboards, cutting boards, and tabletops. Where can one find more comprehensive design guidance for larger projects such as cabinetry and fine furniture? Before investing the time and money in more complex pieces, I'd like to enhance my chances of making them as robustly as possible.

Michael Allen
via email

One of the mistakes we as woodworkers make is forgetting to account for seasonal wood movement. Wood moves, regardless of the size of the project. Designing around it takes a little planning and know-how. Fortunately, we have a comprehensive article on the subject at the link, *below*.

Kevin Boyle
Senior Design Editor



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designing for
wood movement.
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movement](http://woodmagazine.com/movement)



SMALL SHOP. BIG IMPACT.

As a longtime reader I was glad to see Ed's "woodio" shop in issue 296 (July 2024). My glee was largely based on the inclusion of Ed's Shoptsmith. As the satisfied owner of a mid-70s Shoptsmith Mark 5, I'd put it up against any other 50-year-old machine of any type. I also have a 2016 Shoptsmith Mark 7 that can do 10,000 rpm, which is probably more speed than I'll ever need. I was gratified to see that I'm not the only owner of these versatile (if somewhat obscure) machines. Shoptsmith owners, come out from the shadows and be known!

Chris Hubert
Lakewood, Washington

Thank you for showing us Ed's very impressive and organized small shop. Not all of us have a 2- or 3-car garage to build out, so we always appreciate seeing well-done small shops. My shop is 12x14'. Given that I'm 6'3" and 230 lbs., this is a "one-butt shop." I stand in the middle and rotate from tool to tool.

Woody Volland
via email

Ed's tiny shop is one of many I see that simply blow my mind. I'm always amazed at how our readers build and organize their shops—large and small. We're always on the lookout for shops of all types and sizes to feature in the magazine. Send photos to: woodmail@woodmagazine.com.

Randy Maxey
Contributing Editor



HALF AS WIDE, TWICE AS NICE

Attached is my rendition of the "Mudroom Storage Center" from issue 292 (November 2023). It's half as wide as the original plans to fit the narrow space of my entryway. It works perfectly. I used birch and added a pop of color with stain. One of the many new skills I learned on this project was pocket-hole joinery.

Ryan Neff
Highland, Illinois



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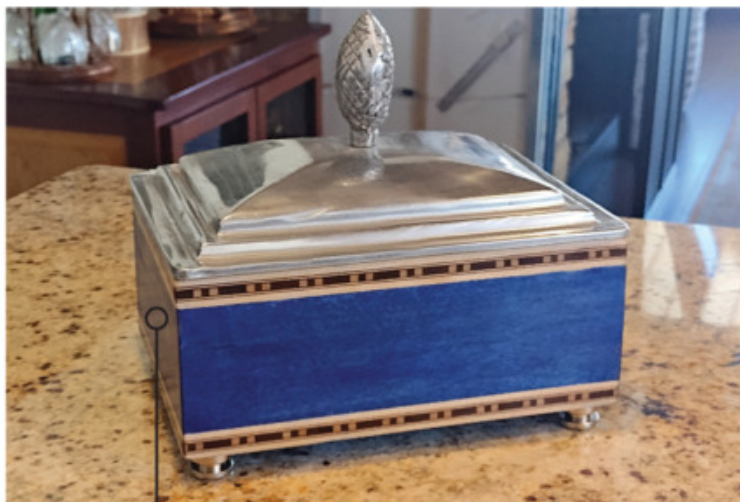


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Salvaging the lid from a broken, blue ceramic box, **BILL PARKINSON** of Tabernash, Colorado, built this replacement box using dyed wood highlighted with edge banding.



SHAUN WINTERSTEEN of Bloomsburg, Pennsylvania, made this low loft bed for his daughter. The lumber came from a red oak tree that fell on his property and that he had milled at a local sawmill and stacked to dry. Shaun used mortise-and-tenon joinery for the first time on this project and finished the bed with dewaxed shellac and polyurethane.



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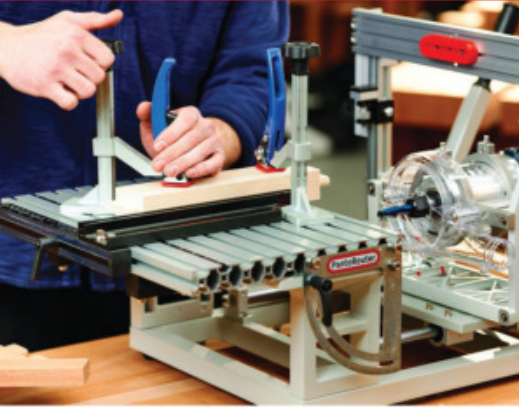
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YOUR PROJECTS

● **JAMES WOODRING** of Greenwood, Indiana, built this entertainment wall for—and with the help of—his father. They crafted it from solid red oak and oak plywood with veneer edge banding. James hired a cabinet shop to make the doors. He finished it with tung oil and polyurethane.



● After retiring as a school principal, **JENNIFER BELLER** of Princeton, Idaho, learned that St. Mary's Parish School in Moscow, Idaho, traded out their chalkboards for whiteboards. She made this rocking chair from the maple and cherry chalkboard trays dating back to 1956. The bandsawn curves on the legs and back give it a unique look and prove incredibly comfortable. Because of its history and uniqueness, Jennifer donated it to the school auction where it raised \$950.



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HIDEAWAY HAVEN

This small basement shop proves that great woodworking isn't restricted by space. Thoughtful tool placement and clever organization make a big impact.

WRITER: RANDY MAXEY



Vern takes advantage of every cubic foot in his shop. Large cabinets, plenty of pegboard, storage bins on shelves, and space between the overhead floor trusses keep everything he needs at hand.

▲ A **WOOD**® magazine subscriber since the very first issue, Vern started his woodworking journey in a small basement workshop and enjoys his time in one to this day.



SHOW US YOUR SHOP

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

Vern Foughty's childhood home in Fort Dodge, Iowa, didn't have much of a workshop, but Vern did take a woodworking class in junior high. That was the extent of his woodworking knowledge. But after getting married and purchasing a home, he quickly realized the cost savings of doing repairs and maintenance himself. So he jumped in with both feet and figured things out on his own.

His first tools were a Black & Decker drill, jigsaw, and a 24×48" piece of plywood for a workbench. He started accumulating tools and made sure that

wherever he and his family lived, there was plenty of room for a shop. Vern says, "My current shop is sufficient for me today, but it is the smallest I have had for many years."

His is not a stereotypical basement shop. At only 300 sq. ft., it doesn't feel cramped. In fact, it's inviting and relaxing. The secret lies in the way Vern keeps his shop well-lit, clean, and obsessively organized, making it easy to navigate and access tools and project materials.

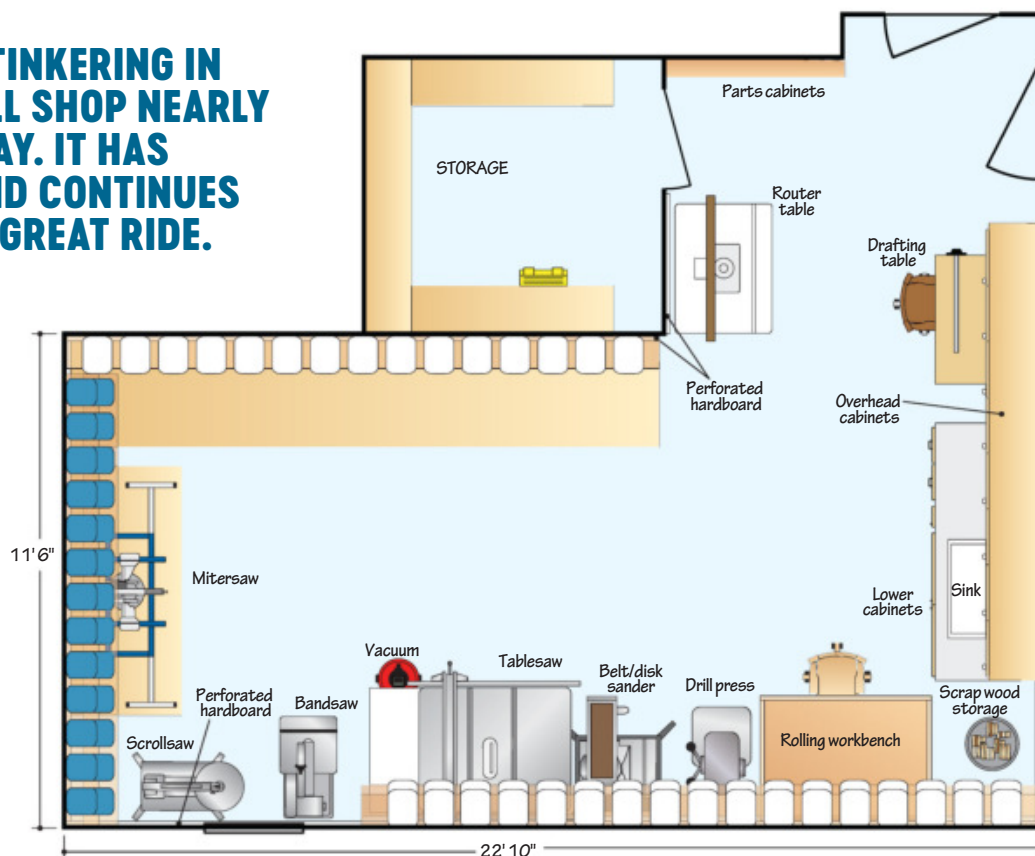
The white pegboard lining the walls not only reflects light but provides

“

I ENJOY TINKERING IN MY SMALL SHOP NEARLY EVERY DAY. IT HAS BEEN, AND CONTINUES TO BE, A GREAT RIDE.

-VERN FOUGHTY

”

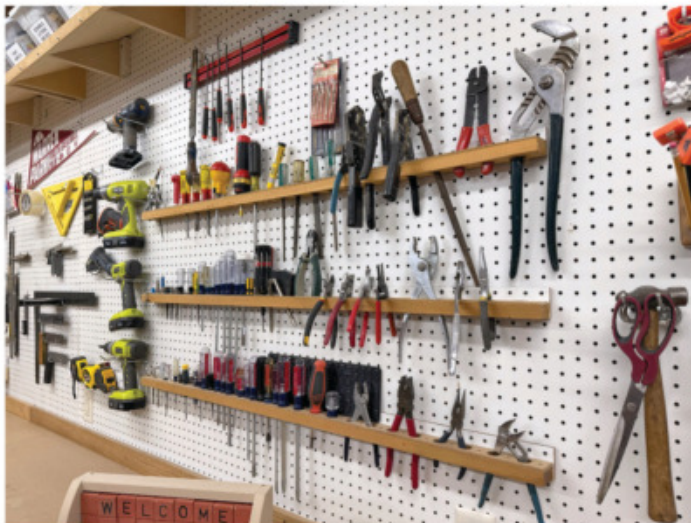


A space dedicated to sketching project ideas and plans resides next to his laptop PC used for research and streaming music. Short wall cabinets with a shelf above pack in a lot of tools and accessories.

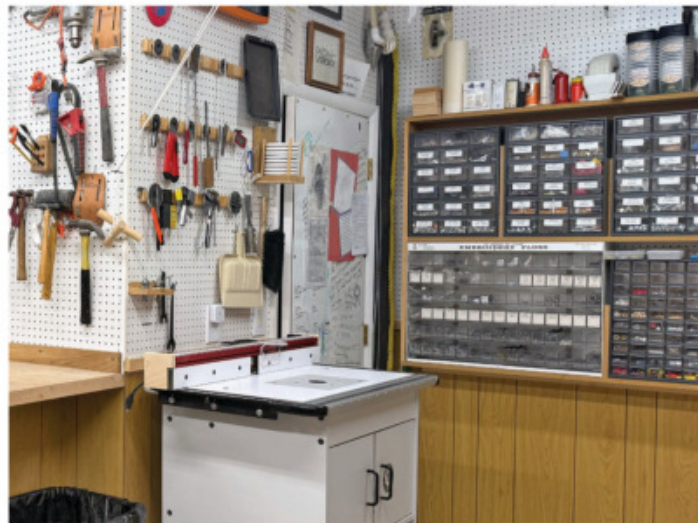
plenty of real estate for storing a wide variety of shop necessities. Vern fashioned custom hangers for some items, such as hand tools, while standard pegboard hooks fill in the gaps. Up above, Vern added unique shelving for plastic bins (see *Angled Accessibility* on page 16.)

All of Vern's larger tools reside on mobile bases or casters, making it easier to work on large projects. He has adjusted the height of his workbenches and tools to 42" above the floor—a comfortable height for him. When Vern works with large sheet goods, the rolling workbench makes a great outfeed support because it matches the height of the tablesaw.

Vern stresses safety in the shop. "I have a short thumb and a crooked finger as a result of carelessness," he says. "When using tools, undivided attention should be primary. Read the manual that comes with the tool and understand how to use it safely."



Pegboard opens up a wide array of options for storage. Vern made a series of racks for his collection of pliers and screwdrivers by simply drilling holes in a strip of wood.



This nook in the L-shaped shop serves as the entry and houses Vern's vast selection of hardware. Even here, the pegboard walls provide plenty of real estate to keep tools within easy reach.

When coming up with projects to build, Vern takes his ideas and puts pencil to paper at the drafting table to work out the details. He's produced drawings for house remodeling projects, furniture building, toys for grandkids, and jigs for the shop. He stores the larger drawings in a custom-made bin beside

his table, while others are carefully organized in a file cabinet.

Vern's shop also features a couple of luxury items: a 32" television, a small refrigerator, and a computer. "Some days a shop has to double as a man cave," he quips. 🌱

ANGLED ACCESSIBILITY

High along the shop walls, Vern built shelves canted downward at 30° to hold clear storage bins. A lip along the front edge keeps the bins in place.

He uses a custom-made tool resembling a scoop to reach and remove the bins when needed. The tool features $\frac{3}{4}$ " plywood arms fastened to a 2x4 block. $\frac{1}{4}$ " plywood on the inside of each arm forms a lip to fit under the rim of the bins. A dowel forms the handle.

The idea for these storage shelves came about after Vern realized he had lots of different screws, bolts, nuts, electrical boxes, and so much more scattered in random spots around the shop. Years ago, he started with a couple of inexpensive plastic parts cabinets with multiple drawers. As his hardware inventory grew, he had to come up with more storage space. He now has over 300 containers, all labeled and well-organized. "I've become the neighborhood hardware source," he says.



1920s Style for a 1920s Price

It was a warm summer afternoon and my wife and I were mingling with the best of them. The occasion was a 1920s-themed party, and everyone was dressed to the nines. Parked on the manse's circular driveway was a beautiful classic convertible. It was here that I got the idea for our new 1920s Retrograde Watch.

Never ones to miss an opportunity, we carefully steadied our glasses of bubbly and climbed into the car's long front seat. Among the many opulent features on display was a series of dashboard dials that accentuated the car's lavish aura. One of those dials inspired our 1920s Retrograde Watch, a genuinely unique timepiece that marries timeless style with modern technology.

With its remarkable retrograde hour and minute indicators, sunburst guilloché face and precision movement, this design is truly one of a kind. What does retrograde mean? Instead of displaying the hands rotating on an axis like most watches, the hands sweep in a semicircle, then return to their starting point and begin all over again.

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BUSTING BATTERY MYTHS

Should I charge my cordless tool batteries after every use, even if they're not fully drained, or wait until they're depleted? And then after they're charged, should I store them on the charger, on the tool, or disconnected from both?

Scott Russell
 Fargo, North Dakota

A: Much of the advice you may have heard about battery charging and maintenance comes from previous technology and does not apply to modern battery chemistries, Scott. Older cordless tools used nickel-cadmium (NiCd) or nickel-metal hydride (NiMH) batteries, which had a tendency to develop “memory” if they were continually recharged after only being partially discharged, eventually shortening the battery’s overall runtime. To avoid this, some woodworkers got into the practice of depleting the battery completely before recharging.

Another common trait of NiCd batteries was a tendency to self-discharge when not in use. To avoid returning to a dead battery, woodworkers would often leave their cordless tool batteries on the charger even after they were fully charged.

The lithium-ion (Li-Ion) batteries used in today’s cordless tools don’t have the same issues with battery memory and self-discharge. There’s no need to run the battery all the way down before recharging, and you won’t do any harm by topping off a battery that’s only partially discharged. Lithium-ion batteries also self-discharge at a much slower rate, making them capable of holding a charge for months. Not only is it unnecessary to store your batteries on the charger, there are a couple of reasons not to.

Most lithium-ion batteries pair with smart chargers that shut off current to the battery when it reaches a full charge or becomes too hot. So leaving the battery on the charger overnight or for a few days is usually okay. (Be sure to check your owner’s manual first, and avoid aftermarket batteries, which may not be compatible with these smart safety features.)

Over time, however, a continuous full charge stresses the battery’s internal components, affecting the long-term health of the battery and, in rare cases, leading to leakage, swelling, or even fire. To maintain battery health and reduce risk, manufacturers usually recommend storing lithium-ion batteries at 40–60 percent charge if you won’t be using them for extended periods.

Finally, many cordless tools feature a monitoring system between the tool and the battery. Even when the tool is not in use, these systems pull a small amount of energy from the battery. Your battery will hold a charge longer if you disconnect it from the tool before you store it. 🌱

TIP!

Store your batteries in a place where they won’t come into contact with water or metal objects that could cause a short circuit.



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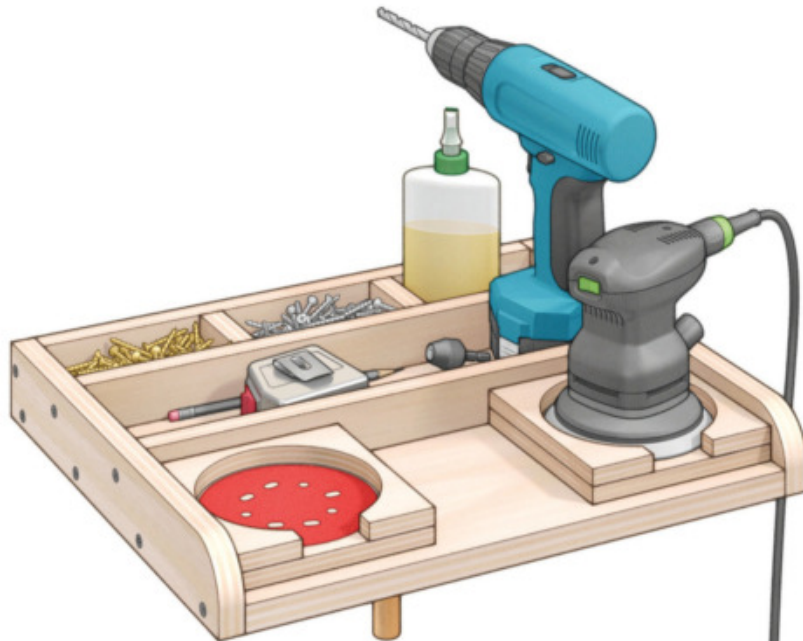
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**TOP
SHOP
TIP**

TOOL STOOL

I use wooden stools, not only for sitting while at the workbench, but also as convenient spots to keep tools close at hand thanks to a tool caddy that fits atop my stools. I made it from $\frac{3}{4}$ "x12x17" plywood with a $\frac{3}{4}$ "-dia. dowel glued in the center and extending underneath. The dowel fits into a hole drilled in the stool seat.

I added plywood sides and dividers to compartmentalize the caddy for tools, accessories, and hardware that I need for the project at hand, along with customized holders for my sander and sandpaper. I simply rotate the caddy to reach what I need. If I need to use the stool, the caddy simply lifts off to be stowed away by dropping it into a workbench doghole.

Perry Tornquist
New Braunfels, Texas



◀ For his Top Shop Tip, Perry wins a MATCHFIT Router Guide Kit and accessories from MicroJig worth \$300.

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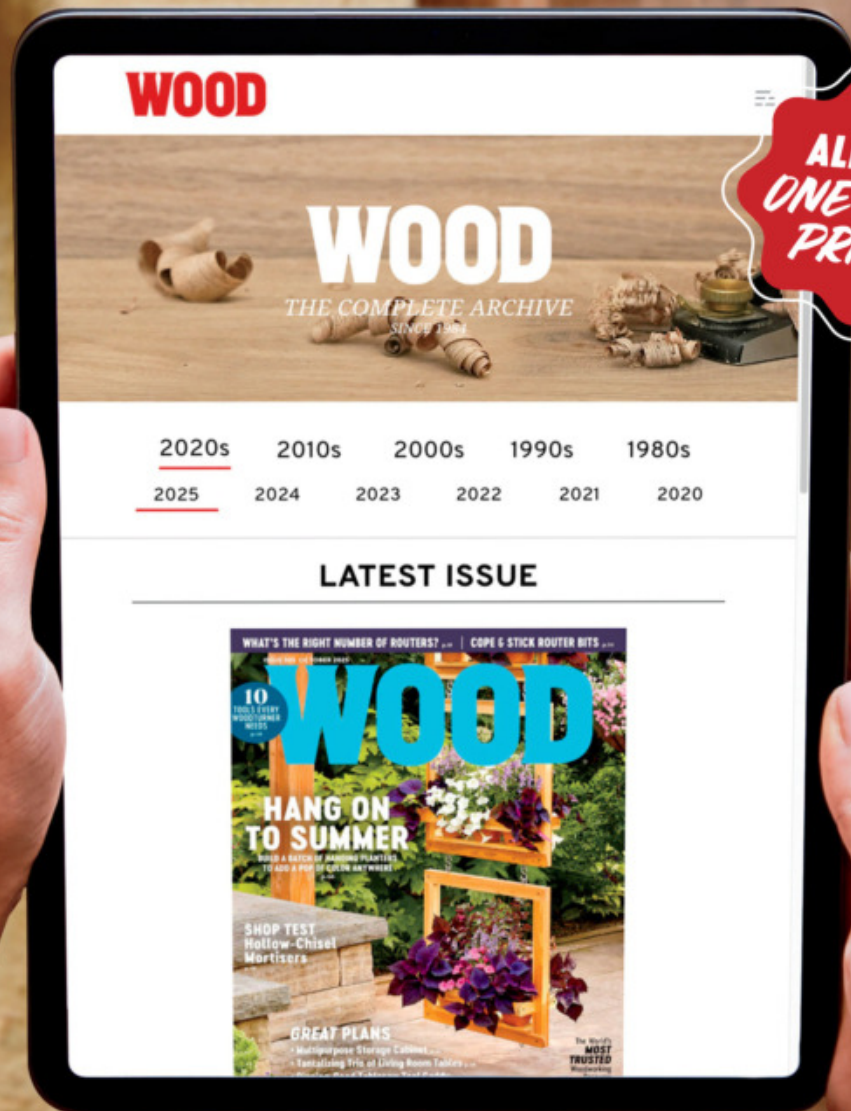
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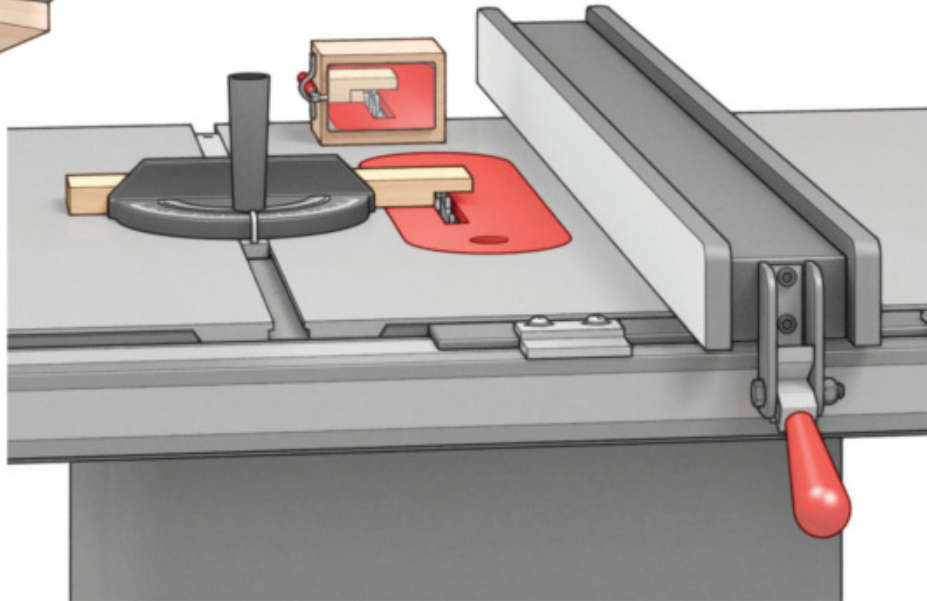
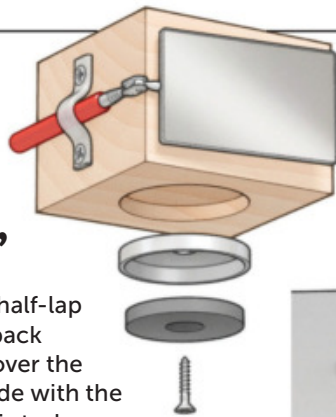


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MIRROR, MIRROR, ON THE SAW

When I'm cutting multiple half-lap joints at the tablesaw, my back quickly tires from looking over the stock to align the dado blade with the shoulder mark. To make this task easier, I use an adjustable inspection mirror and a round magnet from the hardware store. In a short section of 4x4, after drilling a shallow hole for the magnet, I mounted the mirror using a small strip of plastic tubing around the handle. I place the mirror at the back of the saw behind the dado blade with the magnet holding it in place. This makes it easy to see exactly where to make the next cut.

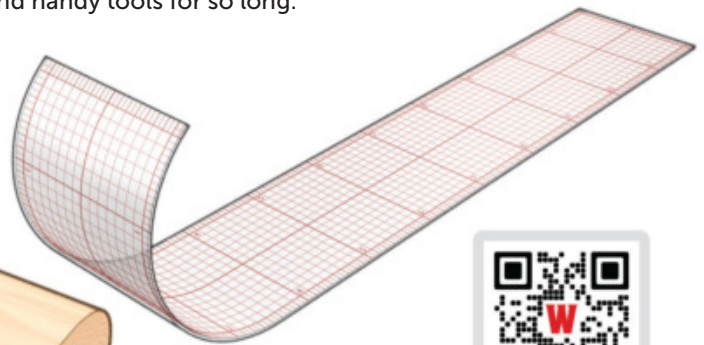
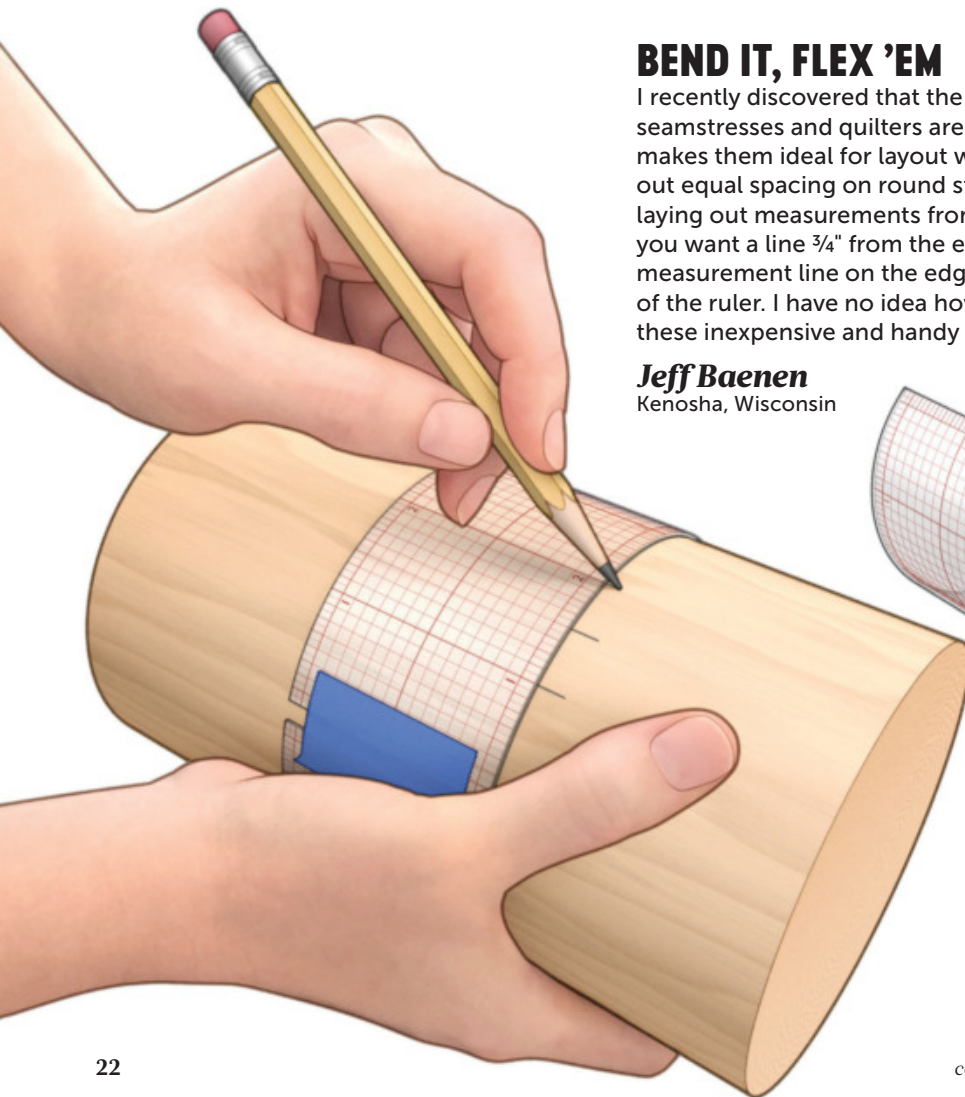
James Bolerjack
Oklahoma City, Oklahoma



BEND IT, FLEX 'EM

I recently discovered that the transparent, flexible rulers used by seamstresses and quilters are very handy in the shop. Their flexibility makes them ideal for layout work on curved surfaces, such as marking out equal spacing on round stock. Because the rules are transparent, laying out measurements from the edge of a board is also a cinch. If you want a line $\frac{3}{4}$ " from the edge, simply line up the $\frac{3}{4}$ " measurement line on the edge and make your mark at the end of the ruler. I have no idea how I've gotten along without these inexpensive and handy tools for so long.

Jeff Baenen
Kenosha, Wisconsin



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Throw Yourself a Bone

Full tang stainless steel blade with natural bone handle —now **ONLY \$79!**

The very best hunting knives possess a perfect balance of form and function. They're carefully constructed from fine materials, but also have that little something extra to connect the owner with nature. If you're on the hunt for a knife that combines impeccable craftsmanship with a sense of wonder, the **\$79 Huntsman Blade** is the trophy you're looking for.

The blade is full tang, meaning it doesn't stop at the handle but extends to the length of the grip for the ultimate in strength. The blade is made from 420 surgical steel, famed for its sharpness and its resistance to corrosion.

The handle is made from genuine natural bone, and features decorative wood spacers and a hand-carved motif of two overlapping feathers—a reminder for you to respect and connect with the natural world.

This fusion of substance and style can garner a high price tag out in the marketplace. In fact, we found full tang, stainless steel blades with bone handles in excess of \$2,000. Well, that won't cut it around here. We have mastered the hunt for the best deal, and in turn pass the spoils on to our customers.

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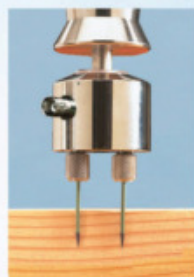
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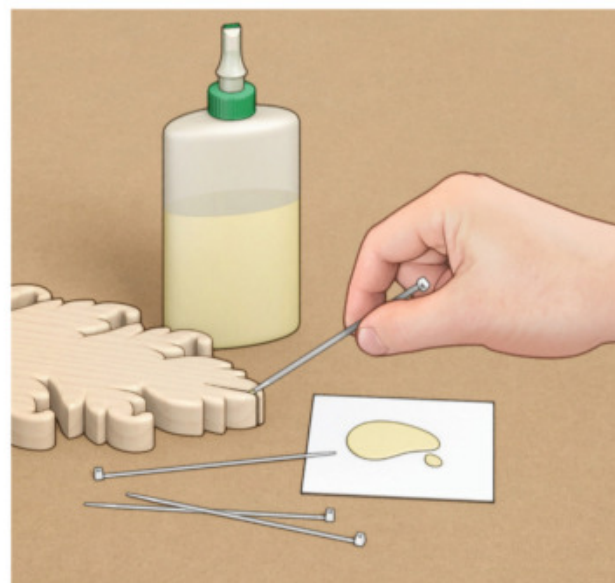


SHOP TIPS

HAND IT OVER

My old detail sander's motor bit the dust, so I upgraded. Then I figured out that the hole pattern in the pad is different. Rather than waste my remaining sandpaper, I converted the old sander's pad into a hand-sanding block. I removed the base and the hook-and-loop pad from the old sander and used it as a pattern to cut a piece of 2x6 on my bandsaw. I shaped the block to fit comfortably in my hand, then attached the base and pad using the original screw holes.

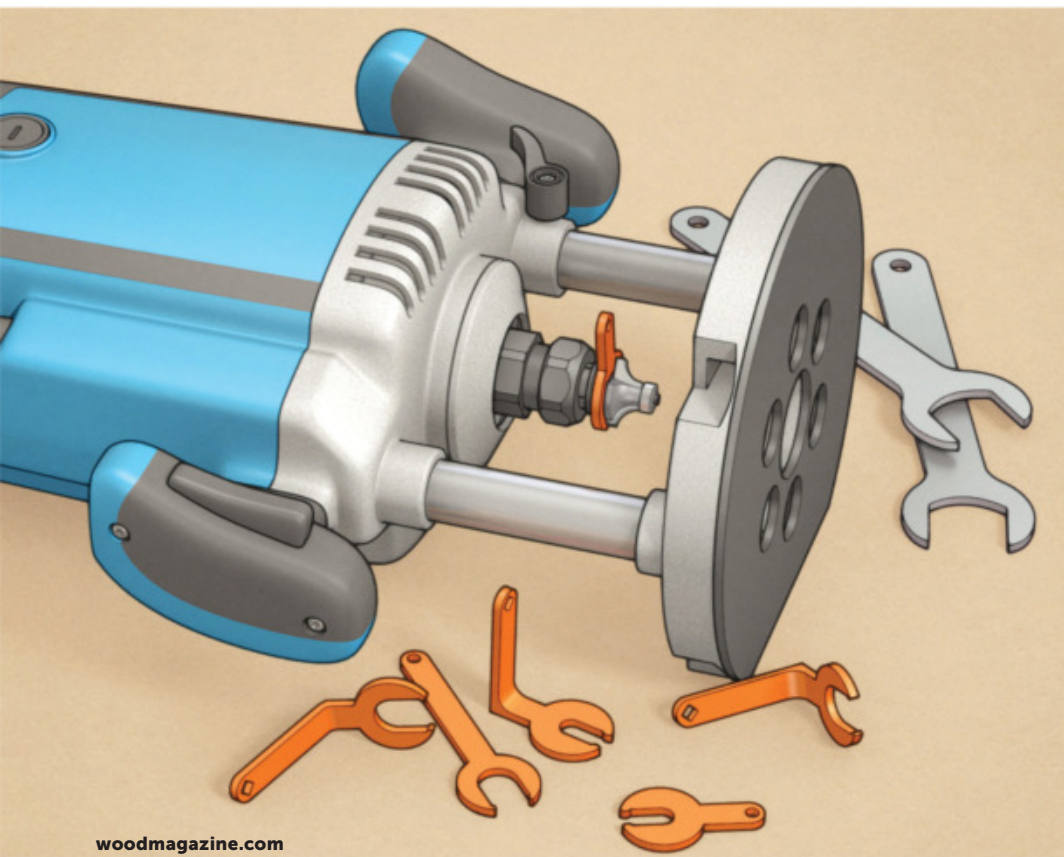
John LeSage
Kankakee, Illinois



ZIPPED UP TIGHT

Plastic zip ties make perfect applicators for those hard-to-reach places. Useful for epoxy and wood glue application, the thin tip easily slides into tight spots, and they're available in a variety of sizes to match the glue-up task at hand.

David Long
Lexington, Kentucky



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SPACED OUT

In issue 299 (November 2024) your article *Avoid Common Routing Errors* discusses how to correctly place the bit about $\frac{1}{8}$ " from the top of the collet. I designed 3D-printable spacers that can be used to set this spacing. They lightly snap around the bit shank and maintain this $\frac{1}{8}$ " spacing while you tighten the collet. Then they slide off easily. I created spacers with various handles for use on table-mounted or handheld routers. There are two sets, one for $\frac{1}{2}$ " shanks and one for $\frac{1}{4}$ " shanks.

Damian Bonicatto

Pequot Lakes, Minnesota



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SLIDE & SWIVEL STASH BOX

This three-compartment box is fun to use, is easy to build in a weekend, and makes a great gift.

WRITER: ZACH BROWN

DESIGNER/BUILDER: KEVIN BOYLE

OVERALL DIMENSIONS

9"W × 3"D × 3"H

PHOTOGRAPHER: CARSON DOWNING; ILLUSTRATOR: CHRISTOPHER MILLS

Slip your favorite trinkets, desk supplies, or even hardware and bits into this sliding-lid box that hides a clever twist: two upper compartments that pivot out of the way to reveal a larger box below.

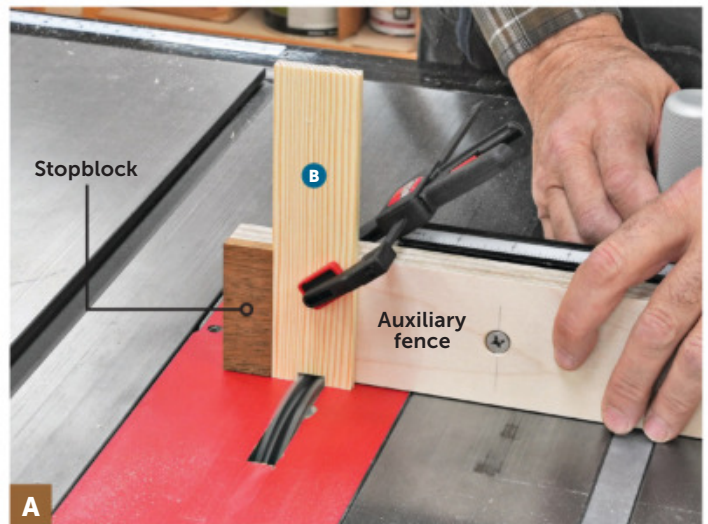
This compact keeper proves a perfect project for using up small scraps you have lying around your shop. We made this pine version, as well as one in quartersawn white oak, *page 31*. Throw in a couple of common binding posts [Sources], and you have a great keepsake box for under 10 bones.

We found the proportions of our box to be a good balance of compact and useful. Feel free to play with the dimensions to suit your own needs. If you do, let us know!

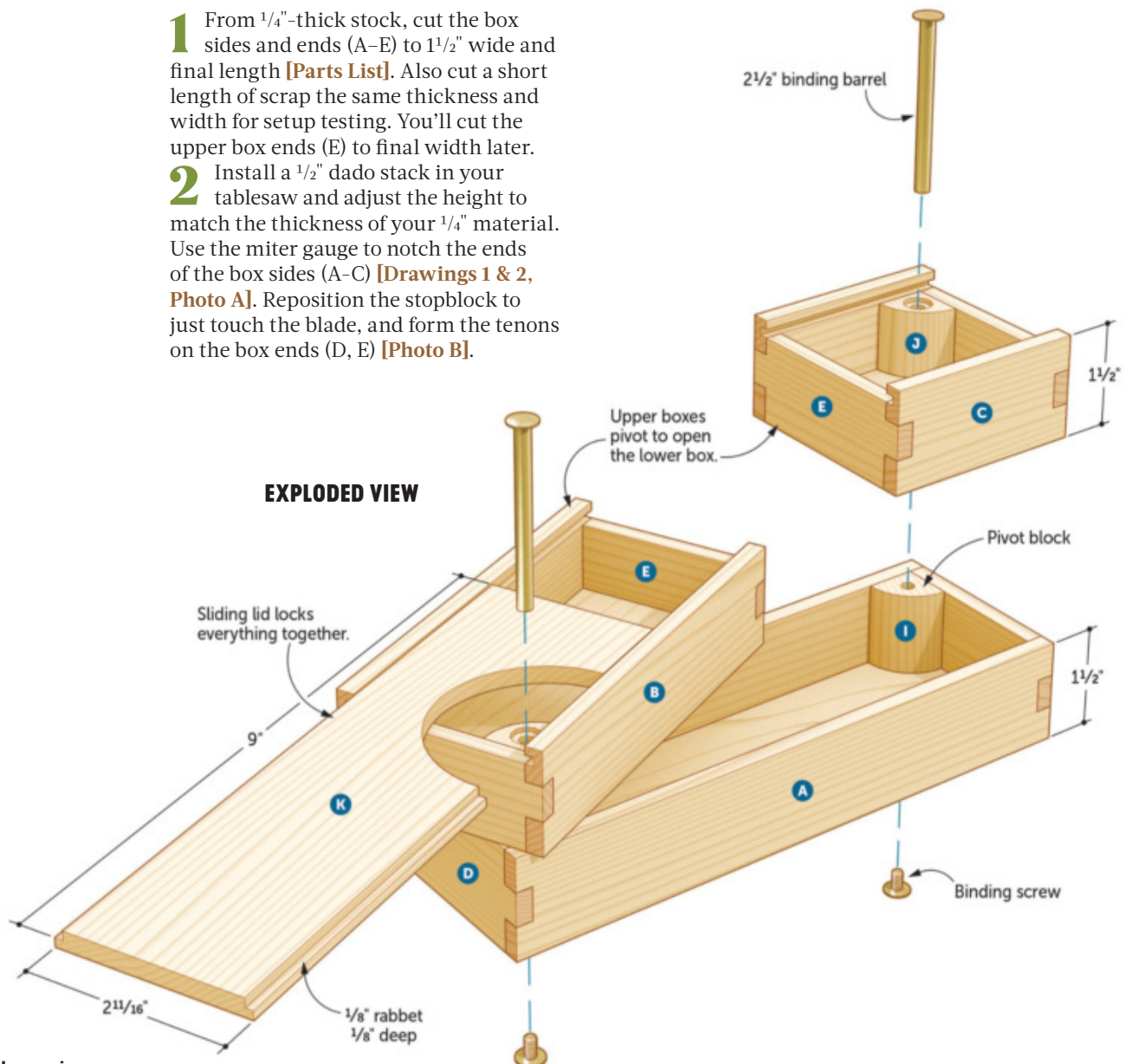
BEGIN WITH THE BOXES

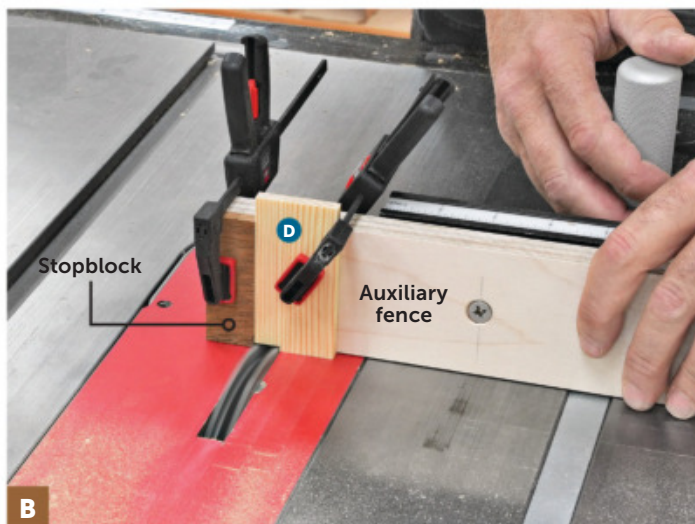
1 From $\frac{1}{4}$ "-thick stock, cut the box sides and ends (A-E) to $\frac{1}{2}$ " wide and final length [Parts List]. Also cut a short length of scrap the same thickness and width for setup testing. You'll cut the upper box ends (E) to final width later.

2 Install a $\frac{1}{2}$ " dado stack in your tablesaw and adjust the height to match the thickness of your $\frac{1}{4}$ " material. Use the miter gauge to notch the ends of the box sides (A-C) [Drawings 1 & 2, Photo A]. Reposition the stopblock to just touch the blade, and form the tenons on the box ends (D, E) [Photo B].

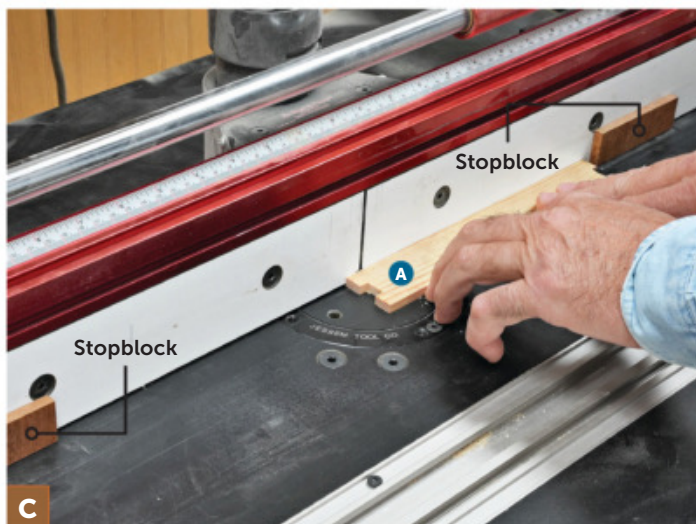


Position a stopblock on your miter gauge auxiliary fence that centers the box sides on the blade. Then notch both ends of each side (A-C).





On a piece of scrap the same width as the box ends, notch the end on both sides to form a centered tenon. Check the fit of the tenon in a side notch and adjust the stopblock if necessary. Then form the tenons on the box ends (D, E).



Attach stopblocks to the fence with double-faced tape to form the stopped groove in each lower box side (A). Reposition the stopblocks for the large upper box sides (B), then again for the small upper box sides (C).

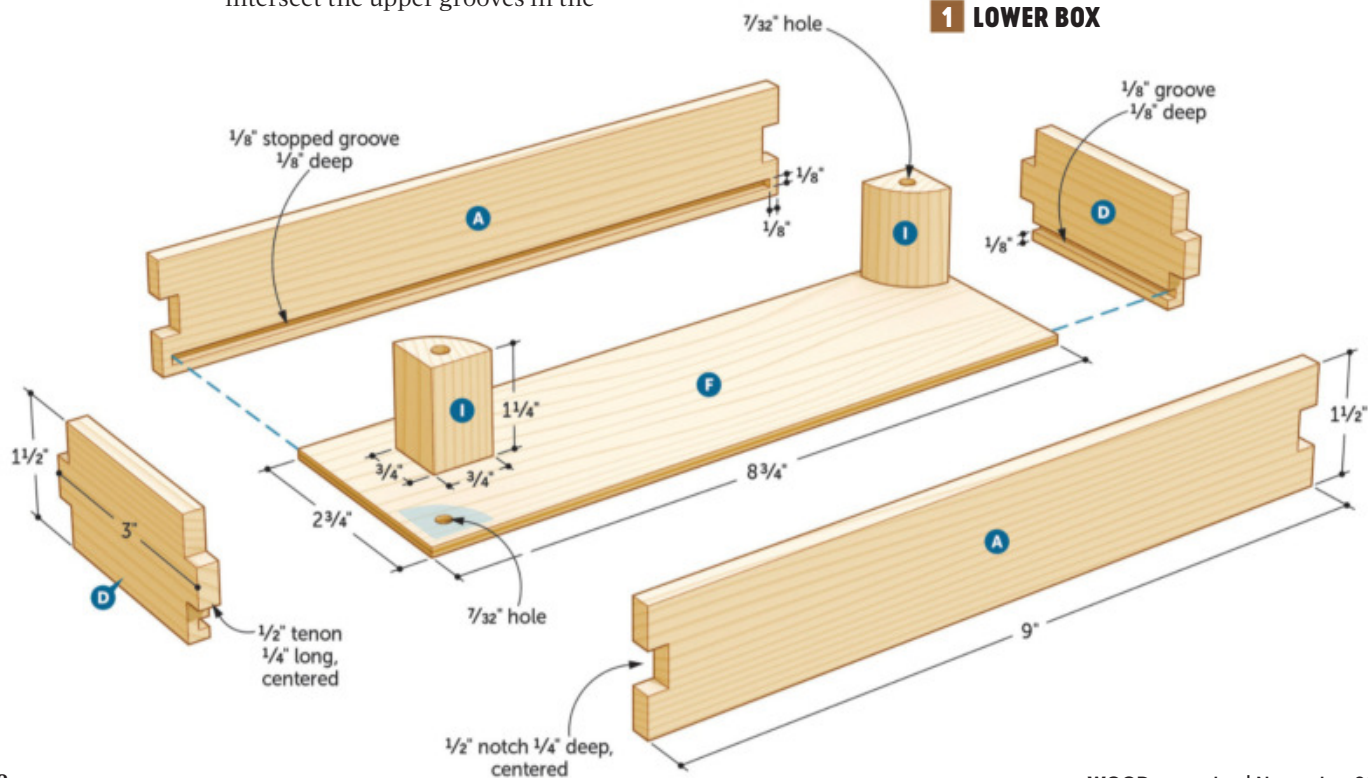
3 Install a $\frac{1}{8}$ " straight or spiral-cut bit in your router table and set the height to $\frac{1}{8}$ ". Position the fence $\frac{1}{8}$ " from the bit and rout a stopped groove in each box side (A-C) [Photo C]. Then square up the groove ends using a small chisel or a sharp utility knife. Rout the groove in each box end (D, E) and the upper groove in the upper box sides (B, C) for the sliding lid.

4 Dry-fit the upper boxes and mark the ends (E) where they intersect the upper grooves in the

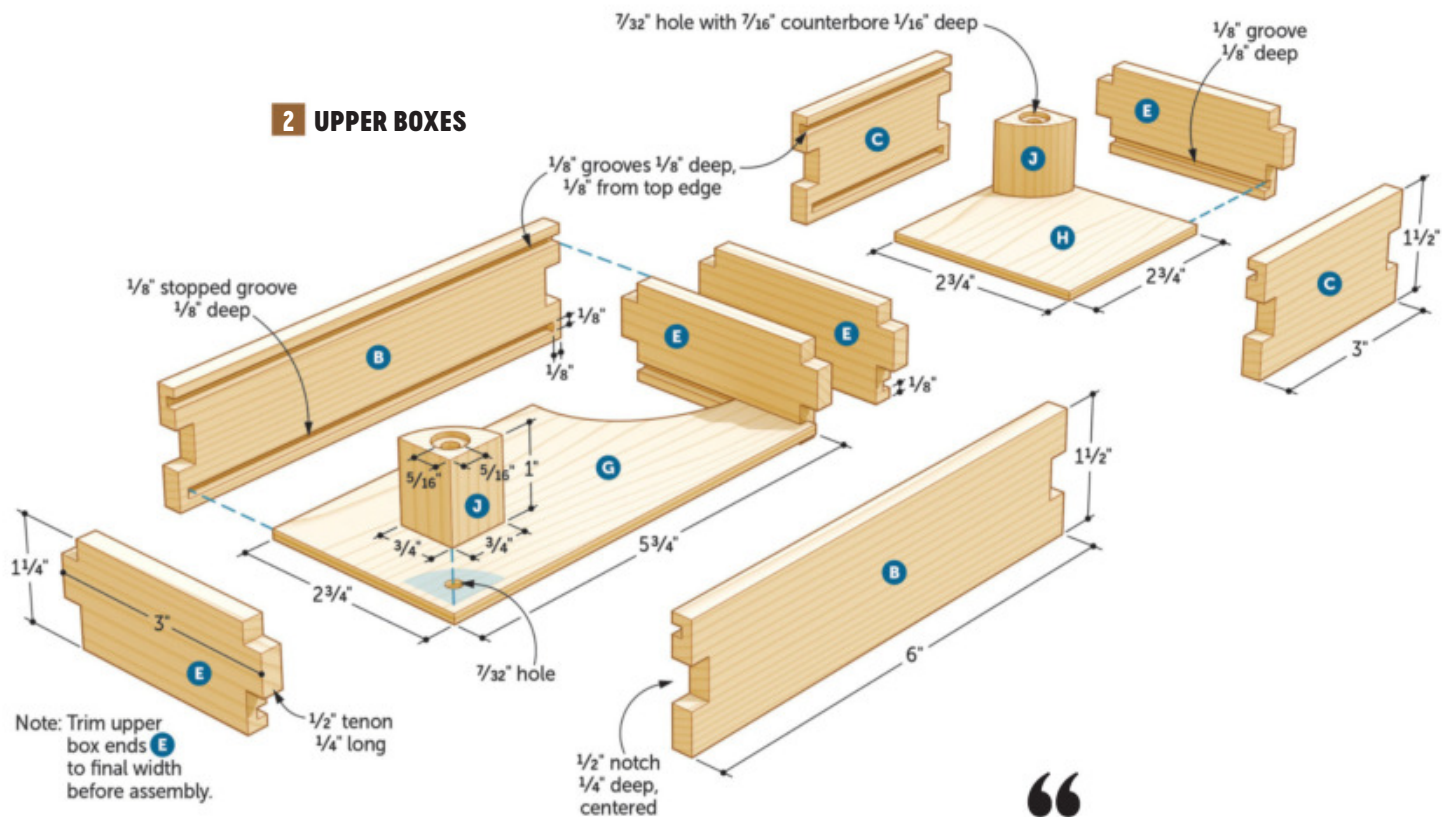
sides. Disassemble the boxes and ripcut the ends to fit below the grooves.

5 From $\frac{1}{8}$ " Baltic birch plywood, cut the box bottoms (F-H) to size. Apply a thin bead of glue to the box bottom grooves in the sides and ends of one box, and a thin coat to the mating surfaces of the corner joints. Clamp the box sides and ends around the bottom, checking for square. Repeat for the other two boxes.

1 LOWER BOX



2 UPPER BOXES

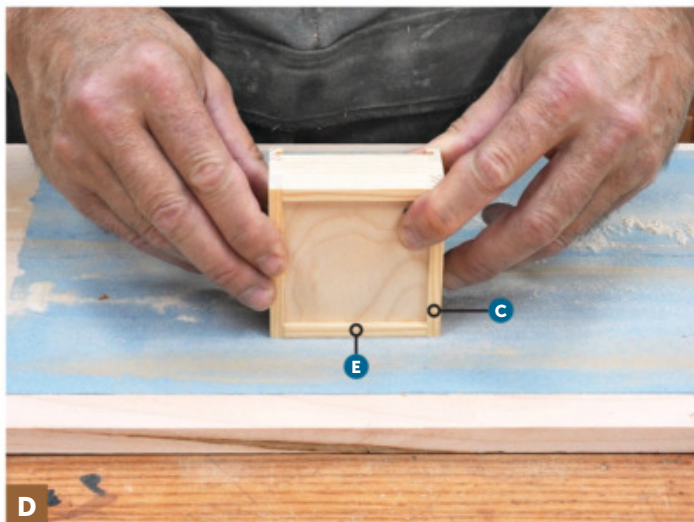


“THE CORNER-PIVOT DESIGN ALLOWS THE UPPER BOXES TO MOVE OUT OF THE WAY WHILE ACCESSING THE LOWER BOX.”

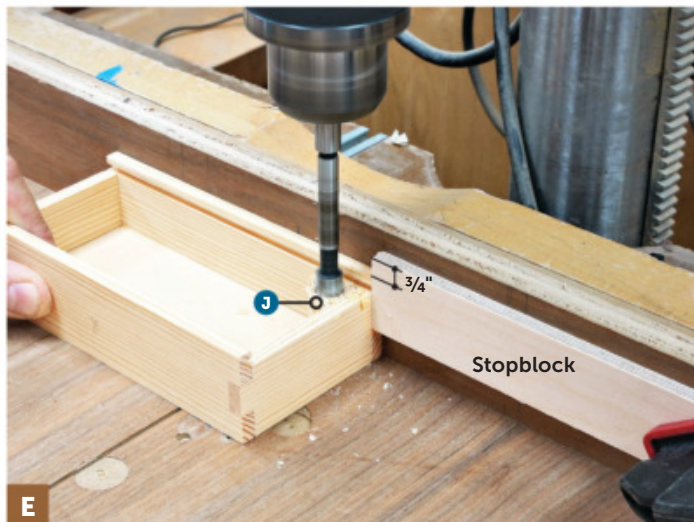
-KEVIN BOYLE, SENIOR DESIGN EDITOR

”





Use a piece of 80-grit sandpaper glued to a flat surface to carefully sand the end and adjust the length of the box. Take care to apply pressure evenly to avoid rounding or angling the ends or sides.



Clamp a stopblock to the fence that positions the bit on the upper pivot blocks (J) and extends $\frac{3}{4}$ " above the box for the next step. Drill a $\frac{1}{16}$ "-deep counterbore in each upper pivot block.

SORT OUT THE SWIVEL

1 Once the glue dries, place the upper boxes on the lower box and check that the ends and edges are flush. If necessary, sand the boxes to fine-tune the fit **[Photo D]**.

2 Cut a $\frac{3}{4}$ ×3×12" workpiece for the pivot blocks (I, J) and form a $\frac{3}{4}$ " round-over on one edge. Ripcut the rounded edge to $\frac{3}{4}$ "-wide; then cut the pivot blocks to length, making sure that they sit flush with the top of the box ends **[Exploded View]**. Glue and clamp the pivot blocks into the boxes **[Drawings 1 & 2]**.

3 Install a $\frac{7}{16}$ " Forstner bit in your drill press and form the counterbores in the upper pivot blocks **[Photo E]**. Without moving the fence or stopblock, replace the bit with a $\frac{7}{32}$ " brad-point bit. Drill the pivot holes through the upper and lower boxes **[Photo F]**.

4 Assemble the boxes using the binding barrels and screws **[Exploded View]**. Sand the sides and ends of the assembly as necessary to make them flush.

TIP!

If your drill bit doesn't reach through both boxes, remove the upper box after drilling halfway into the lower box.



Stack the lower box and small upper box against the stopblock, and clamp them together securely to the fence. Drill the hole through both boxes, raising the bit frequently to clear out the chips. Spin the box end for end and repeat with the large upper box.

“

FOR A CONTINUOUS-GRAIN LOOK, RIP THE BOX SIDES FROM A SINGLE, WIDE WORKPIECE, THEN CROSSCUT THE UPPER SIDES TO LENGTH.

-KEVIN BOYLE, SENIOR DESIGN EDITOR

”

LOCK IT WITH THE LID

1 Measure the length of the box assembly and the width between the upper box grooves. Cut the lid (K) to fit **[Exploded View]**.

2 To form the rabbets on the lid edges, install an auxiliary fence on your tablesaw rip fence and partially bury the blade to leave less than $\frac{1}{8}$ " exposed. Set the height to just under $\frac{1}{8}$ " and rabbet both edges of the lid. Plane or sand the rabbets to fine-tune the fit **[Photo G]**.

3 Disassemble the box, finish-sand, and apply a finish. We used a wipe-on varnish. Once the finish cures, assemble the boxes and slide on the lid. Have fun sliding, swiveling, and filling your box. 🌲

Note: We used a drop of thread-locker on the binding screw to keep the connection tight.



Use a shoulder plane or sanding block to fine-tune the rabbets. The lid should slide with low to moderate resistance, but stay in place when closed.

PARTS LIST

PART		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	LOWER BOX SIDES	1/4"	1 1/2"	9"	P	2
B	LARGE UPPER BOX SIDES	1/4"	1 1/2"	6"	P	2
C	SMALL UPPER BOX SIDES	1/4"	1 1/2"	3"	P	2
D	LOWER BOX ENDS	1/4"	1 1/2"	3"	P	2
E*	UPPER BOXES ENDS	1/4"	1 1/4"	3"	P	4
F	LOWER BOX BOTTOM	1/8"	2 3/4"	8 3/4"	BB	1
G	LARGE UPPER BOX BOTTOM	1/8"	2 3/4"	5 3/4"	BB	1
H	SMALL UPPER BOX BOTTOM	1/8"	2 3/4"	2 3/4"	BB	1
I*	LOWER PIVOT BLOCKS	3/4"	3/4"	1 1/4"	P	2

PART		FINISHED SIZE			Matl.	Qty.
		T	W	L		
J*	UPPER PIVOT BLOCKS	3/4"	3/4"	1"	P	2
K	LID	1/4"	2 11/16"	9"	P	1

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: P—pine, BB—Baltic birch plywood.

BLADE AND BITS: Dado blade, $\frac{1}{8}$ " straight or spiral router bit, $\frac{3}{4}$ " round-over router bit, $\frac{7}{16}$ " Forstner bit, $\frac{7}{32}$ " brad-point bit.

SOURCE: Low-profile brass binding barrels with screws $2\frac{1}{2}$ – $2\frac{3}{4}$ " (2) no. 93813A411, \$4 each, mcmaster.com.

PROJECT COST: It cost us about \$10 to build this project using scrap wood. Your cost will vary by region and source.

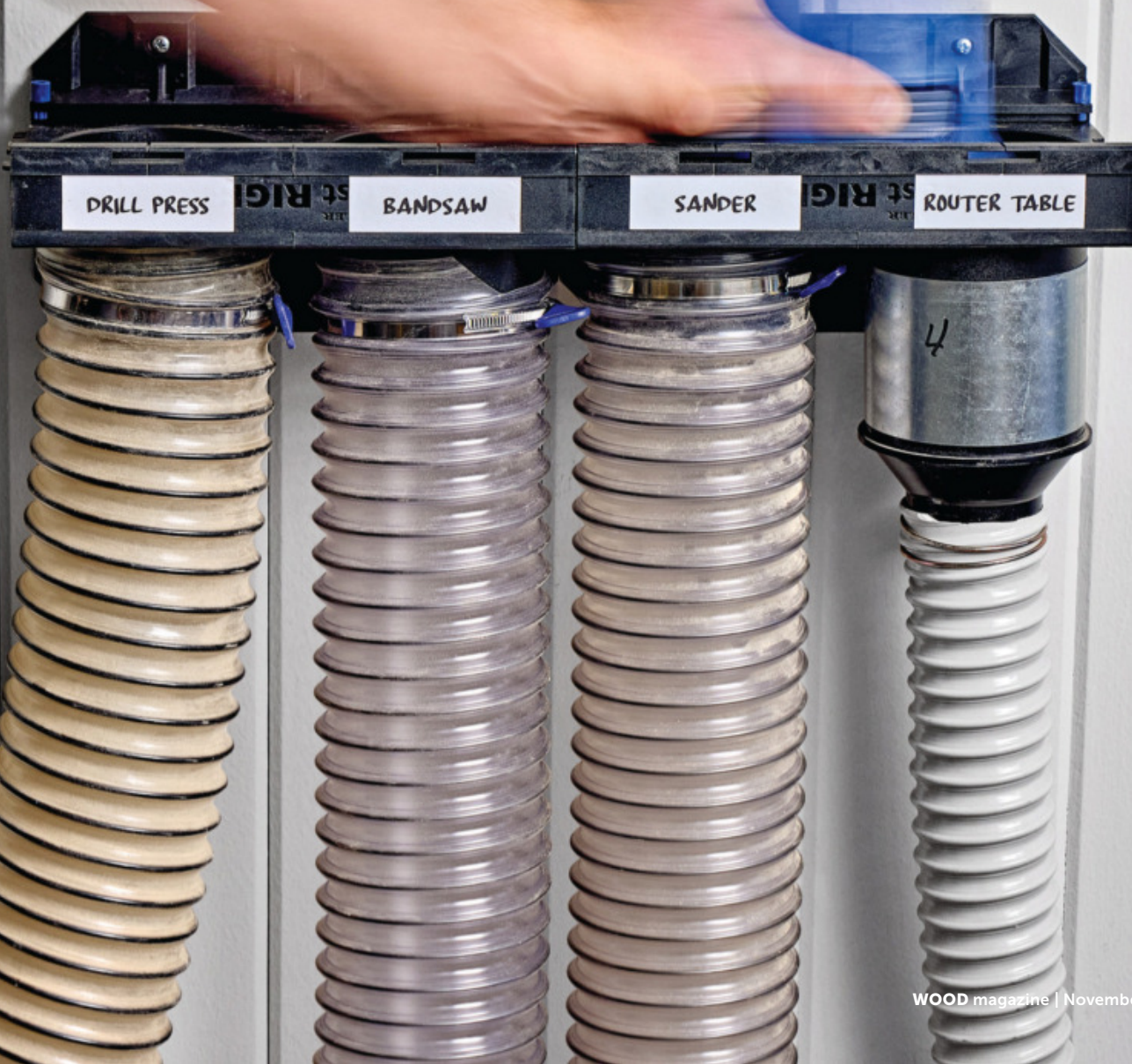


ZONE DEFENSE

DUST COLLECTION

Instead of waging an all-out battle, try taking a more targeted approach to corralling dust in your shop.

WRITER: VINCE ANCONA



If you ask just about any woodworker to describe the dust collection system in their dream shop, they'll probably start with a giant, high-horsepower collector connected to a large trunk line with numerous branch lines that drop down to blast gates and short runs of flexible hose for each tool. This type of system works great in a commercial shop where tools reside in relatively permanent locations and there's ample ceiling height and wall space to route all the ductwork.

In a home shop, though, such a system may prove impractical due to lack of space and the need to move tools around. This is especially true if your shop shares space with the family car.

In that case, consider a zoned approach. Divide your shop into specific work areas and then use one or more of the low-cost strategies shown here to tackle dust collection.



Jet, jettools.com
DC650 Dust Collector with
5-micron bag filter, \$640

In this two-tool setup, the main hose runs from the dust collector to the tablesaw and a Y-fitting allows for a branch line to the jointer. Blast gates control the airflow.

Rockler, rockler.com
Dust Right 650-cfm
Wall-Mount Dust Collector
no. 58860, \$420



This approach gives you the flexibility to change your shop layout or add new tools down the line without having to completely redo your dust collection layout. Plus, you can implement the plan in stages, as time (and your budget) allows. And fortunately, manufacturers have stepped up with all sorts of products geared toward dust collection in the home shop, making it a lot easier to adapt dust collection to suit your needs.

RIGHT-SIZE YOUR COLLECTOR

The first benefit with our zoned approach is that you don't need a 220-volt, high-horsepower cyclone collector able to move massive cubic feet per minute (cfm) of air to pull dust and chips through long ducts.

For a home shop where you're generally using only one tool at time, you can have a small (1- to 1.5-hp) single-stage collector on casters, *left*, that rolls from place to place or a collector that mounts to the wall, *above*. Either one will plug into a standard 120-volt outlet.

A wall-mounted collector works great in a small shop where floor space is at a premium. An extra wall bracket allows you to move the collector to a different spot in the shop, *right*. Or better yet, buy two units and you'll still save over a single big system. Some manufacturers offer cannister filters and two-stage chip separators as optional add-ons for these wall units. Augment this with a shop vacuum or two for other tools, then deploy your collector collection to the following zones to defend against dust.

A French cleat makes mounting the dust collector easy. Some manufacturers sell additional cleats, allowing you to move the collector around the shop.



BIG CHIP ZONE

Locate the collector near the biggest chip-producing machines in your shop so you can skip rigid duct and instead use a flexible hose that you can move from tool to tool. Quick-connect fittings make it easier to switch the hose between tools. Or, if your dust collector is powerful enough, use Y-fittings to create branch lines to additional tools, with blast gates at each tool to control the airflow, *left top*.

For some stand-alone tools, a dedicated setup makes more sense. Permanently pairing a small, low-cost dust collector with a planer allows it to remain hooked up at all times so it's ready to go at a moment's notice, *left bottom*. For smaller, benchtop tools that don't produce as many chips, a shop vacuum is a less-expensive alternative.



“

MORE CFM IS ALWAYS BETTER, BUT A SMALL DUST COLLECTOR CAN WORK IF YOU KEEP THE RUNS SHORT AND OPERATE ONLY ONE TOOL AT A TIME.

-VINCE ANCONA, CONTRIBUTING EDITOR

”

Powertec, powertecproducts.com
4" Y-fitting no. 70106, \$17;
4" dust collection hose no. 70244, \$84;
4" aluminum blast gate no. 70135, \$20

Grizzly, grizzly.com
Mini Portable Dust Collector
no. T33587, \$175; 30-Gallon
Dust Collection 2-stage
Separator no. W1049, \$20

A small dust collector paired with a trash-can lid separator makes an effective, dedicated system for a planer. When not in use, the dust collector stows away below the planer.

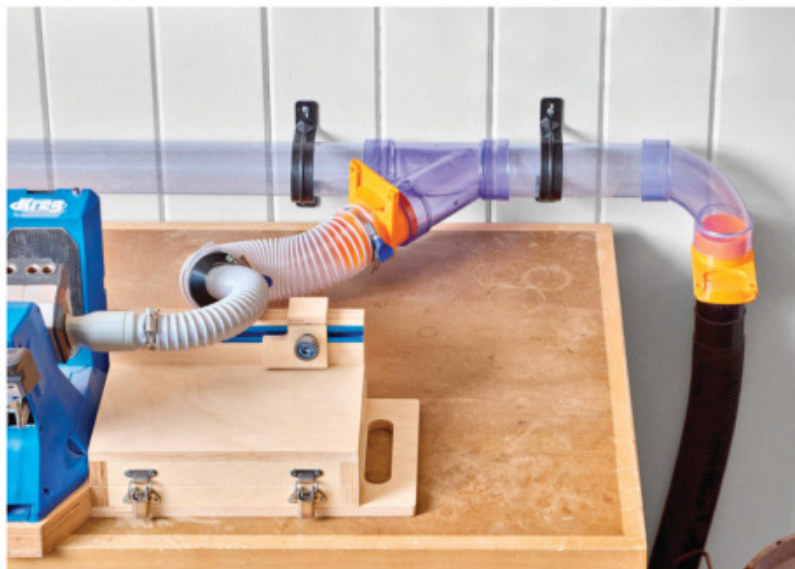
BENCHTOP TOOL ZONE

Mitersaws are big chip producers, too, and because they're most often located against a wall, dust collection can be hard to address. A mini-duct system works well here, and provides an opportunity to pair with other benchtop tools.

TIP!

A shop vacuum is often a better choice than a dust collector for tools like mitersaws that are frequently cycled on and off.

With two or three benchtop tools grouped together on a cabinet or large cart, you can mount rigid pipe directly to the cabinet or cart, or on the wall behind the cabinet, then use a short length of flexible hose to connect each tool, *right*. All-in-one kits contain the pipes, fittings, and blast gates needed to connect several tools to the same line, *below*. Then simply connect the hose from your dust collector or shop vacuum to the end of the pipe.



Smooth-walled, clear plastic pipes and fittings allow for improved airflow while letting you see any blockages. Brackets support the pipes on the wall, and a blast gate at each tool controls the airflow.



For a multi-tool workstation, a kit like this one provides everything you need for connecting up to four tools to a shop vacuum or dust collector. Choose between 2½" and 4" pipe sizes.

Powertec, powertecproducts.com
2½" Dust Collection Fittings
Network Kit no. 70304, \$170



Rockler, rockler.com
Dust Right 4" Mountable
Dust Coupler no. 58448,
\$17; Dust Right 4" Quick
Change Handle no.
55027, \$20

A narrow, expandable hose runs from the bench-mounted adapter to your portable power tool, providing dust collection without a shop vacuum getting in the way.

A quick-change handle on the end of the dust collector hose makes it easy to attach the hose to the adapter or move it to any other tool in the shop.

WORKBENCH ZONE

Portable, handheld power tools such as tracksaws, sanders, and routers often create large amounts of dust for their size. Instead of a shop vacuum, bring your dust collector to your workbench through the use of a mountable adapter. Screw the adapter to the side of your workbench to create a quick connection for your dust collector hose, *above*. (Clamp-on versions are also available.) Then connect a smaller hose to the opposite side that you can use with your portable power tools. Quick-connect adapters allow you to switch the hose between tools in seconds, *right*.



Rockler, rockler.com
FlexiPort Power Tool
Hose Kit no. 68966, \$50

Aftermarket adapters simplify connecting portable power tools to a dust collection hose. Quick-connect fittings allow you to switch the hose between tools without the need for clamps.

CLEANUP

Even the best dust collection systems don't eliminate dust entirely, so you'll still need to sweep up occasionally. But don't overlook the convenience of using your dust collector for shop cleanup. Installing a floor sweep on a wall of your shop allows you to mount a section of hose or rigid pipe to the wall with a floor sweep at the bottom. Slide the foot-operated blast gate open and push the sawdust directly into the mouth of the sweep, eliminating the need for a dustpan, *right*. Alternatively, ditch the broom altogether and use a floor sweep on the end of a rigid wand to quickly vacuum up sawdust and debris, *next page*. Smaller versions are available for sweeping up workbenches or machinery.



Rockler, rockler.com
Dust Right Floor Sweep
no. 66107, \$20

To suck up sawdust, slide the blast gate open and push the dust into the mouth of the floor sweep.

A MANIFOLD HANDLES MULTIPLES

Moving a hose from tool to tool is one way to use a single collector to serve multiple tools. But if connecting and disconnecting hoses between tools isn't practical, consider a manifold instead. Hoses from individual tools run to one side of the manifold, while a hose from the dust collector connects to the opposite side, *right*. Slide the dust collector hose to direct the airflow from the tool you wish to use, *below*. Locating the manifold in an easily accessible area in your shop makes tool changes quick and painless. And the use of hoses instead of metal ducts makes it easy to reconfigure your shop layout. 🌱



A manifold allows you to direct airflow without having to disconnect hoses. Additional extensions allow you to expand the system from two ports to as many as you need.



To redirect airflow, depress the locking tab on the side of the fitting and slide the dust collector hose to the port of the tool you wish to use.

Rockler,
rockler.com
Dust Right 4"
Manifold Starter
Kit no. 61680,
\$45; 4" Manifold
Extension no.
69160, \$30



Rollers on the bottom of this floor sweep make it easy to push across hard-surface floors as you vacuum up chips and sawdust.

Rockler, rockler.com
Dust Right 4" Quick
Change Floor Sweep
no. 59524, \$80

“
**EVEN WITH THE BEST DUST
COLLECTION SYSTEM, YOU
STILL NEED A RESPIRATOR
TO PROTECT YOUR LUNGS
FROM FINE, AIRBORNE DUST.**

-KEVIN BOYLE, SENIOR DESIGN EDITOR

”

COZY COTTAGE DISPLAY CABINET

Decorative curves, built-up moldings, and a tongue-and-groove back lend Old World charm to this wall-mounted shelving unit.

WRITER: VINCE ANCONA
DESIGNER/BUILDER: JOHN OLSON

OVERALL DIMENSIONS
21¾" W × 9¾" D × 36⅛" H



PHOTOGRAPHER: CARSON DOWNING; ILLUSTRATOR: CHRISTOPHER MILLS

Show off some of your favorite items with this compact cabinet. A scalloped face frame, mitered moldings at the top and bottom of the case, and a secret compartment [Exploded View] make the project build interesting.

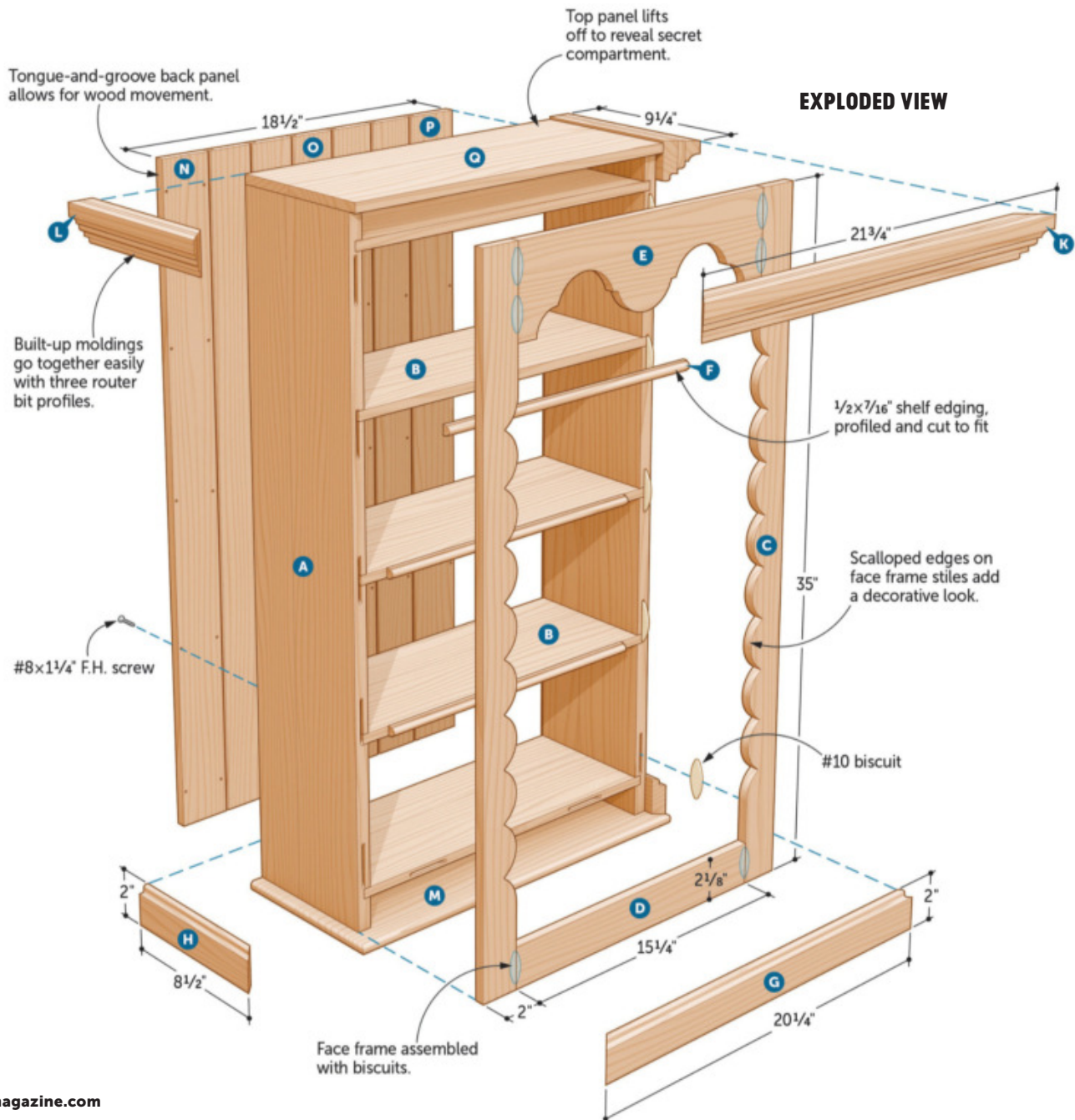
A CASE FOR DADOES

1 Edge-glue two blanks for the sides (A). Plane and cut the blanks to size [Parts List, Drawing 1].

2 Lay out the shelf dados and cut them at the tablesaw with a dado blade [Drawing 2, Photo A].



With a long auxiliary fence attached to the miter gauge, use a stopblock and dado blade to cut $\frac{1}{2}$ " shelf dados in the sides (A). Use a push pad to apply downward pressure for consistent dado depth.



3 Cut a rabbet along the inside back edge of each side (A) for the back slats [Drawing 2, Photo B].

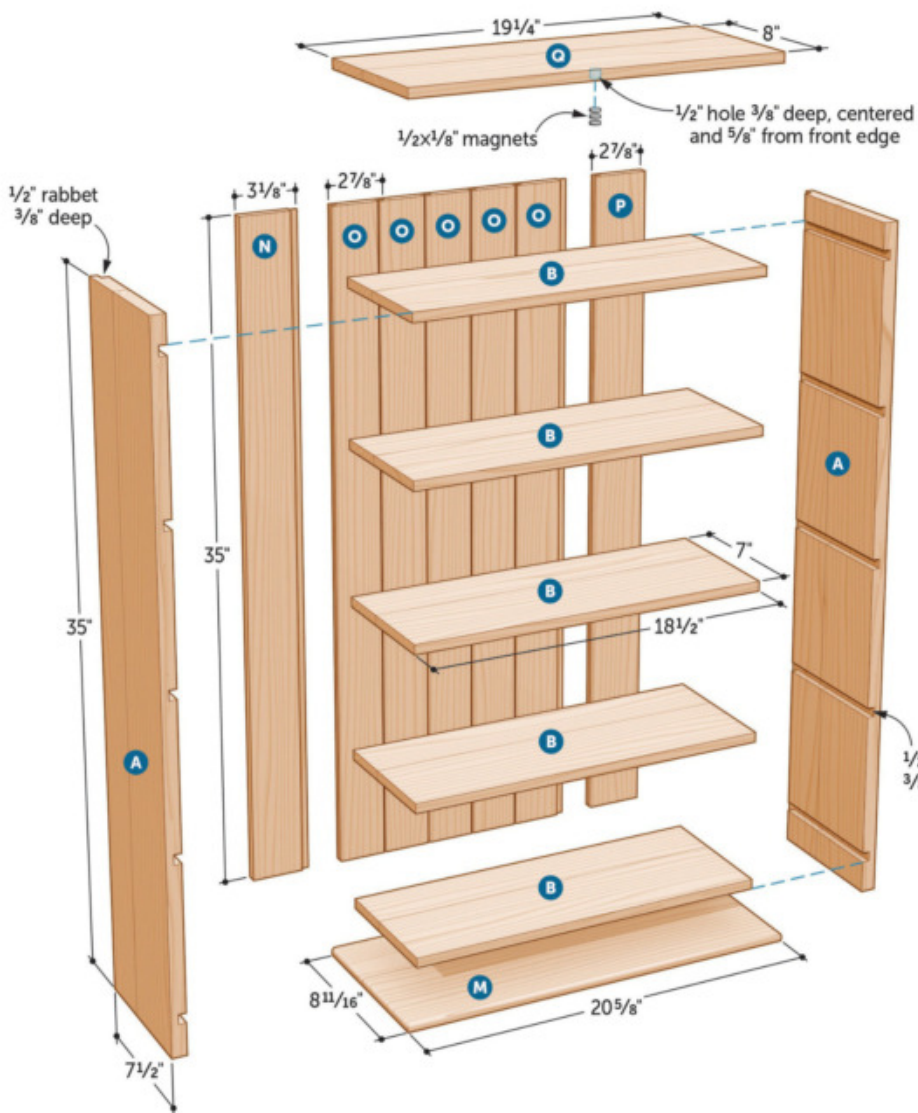
4 From 1/2" stock, edge-glue five blanks for the shelves (B). Sand the blanks and cut the shelves to size [Parts List, Drawing 1].

5 Glue and clamp the shelves between the sides, keeping the front edges flush and checking the assembly for square as you tighten the clamps.

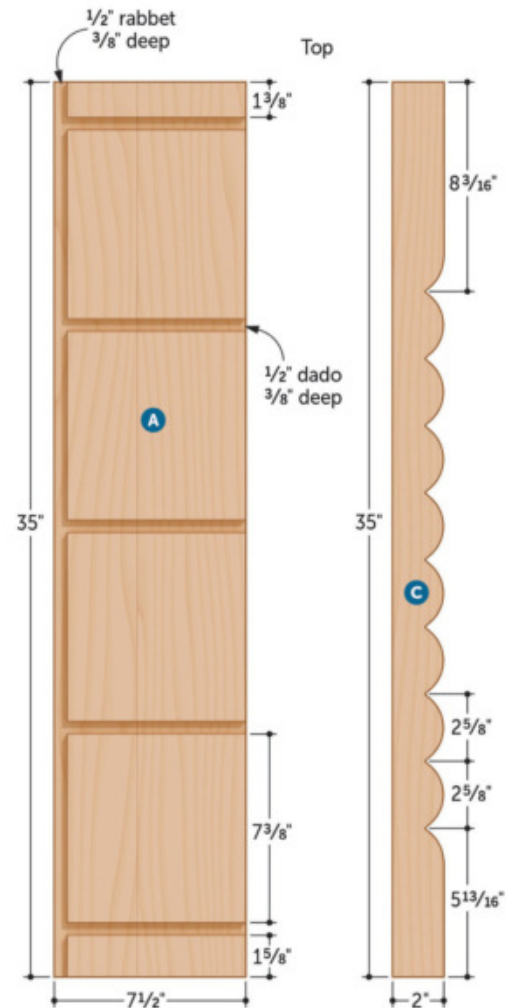


Clamp an auxiliary face to your rip fence and position it just touching the dado blade. Cut a rabbet on the inside back edge of each side (A), creating a mirrored pair.

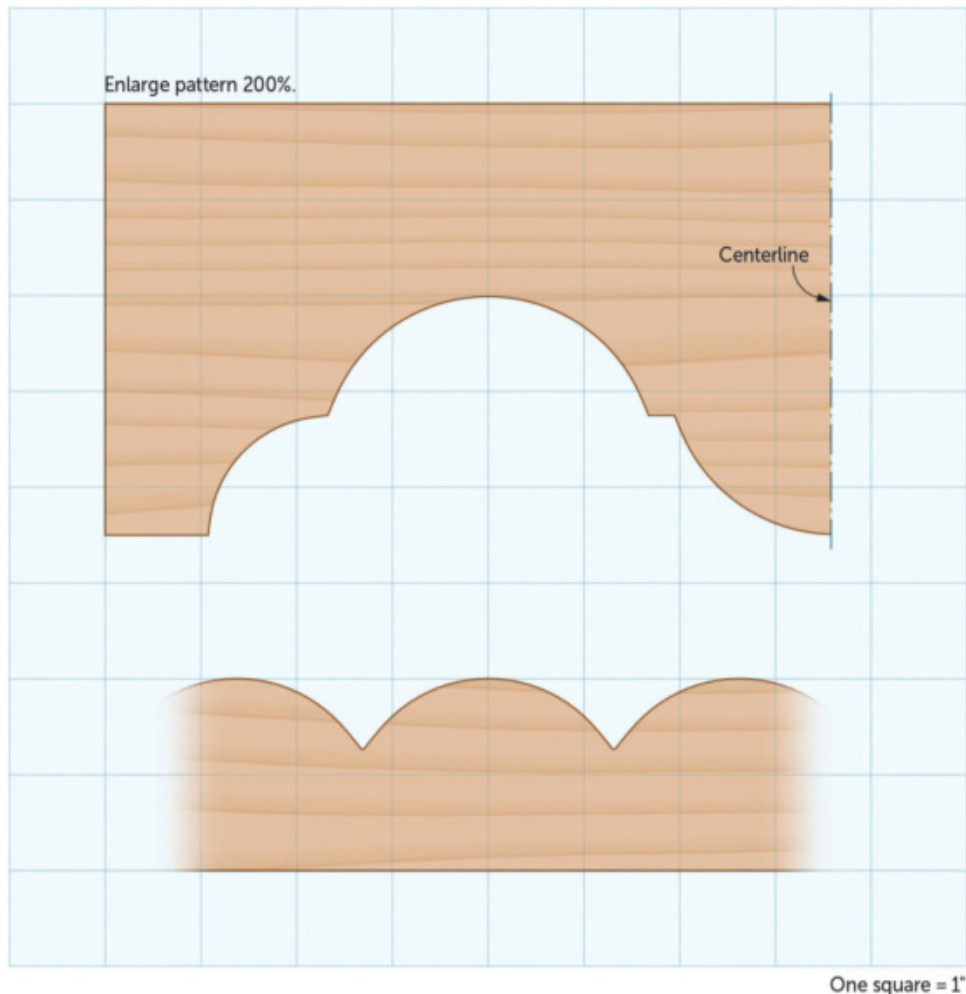
1 CASE ASSEMBLY



2 SIDE & FRAME STILE



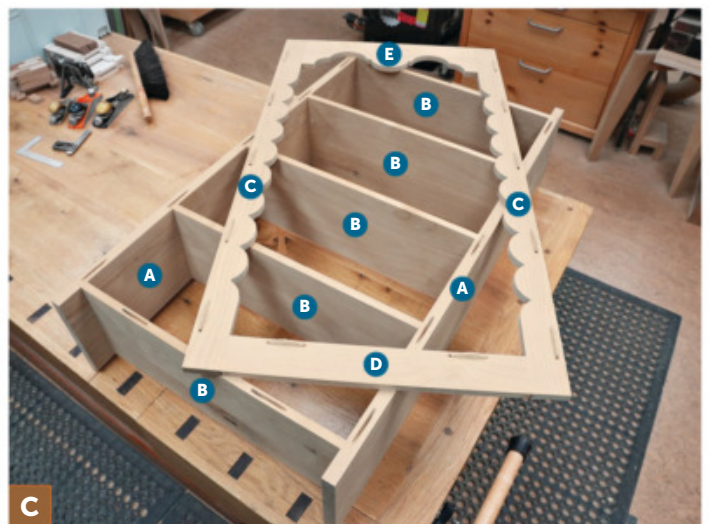
3 FACE FRAME (HALF-SIZE PATTERN)



Note: If using a bandsaw, you'll need to lay out the profiles on both faces and flip the workpieces halfway through to clear the saw frame.

PUT ON A HAPPY FACE FRAME

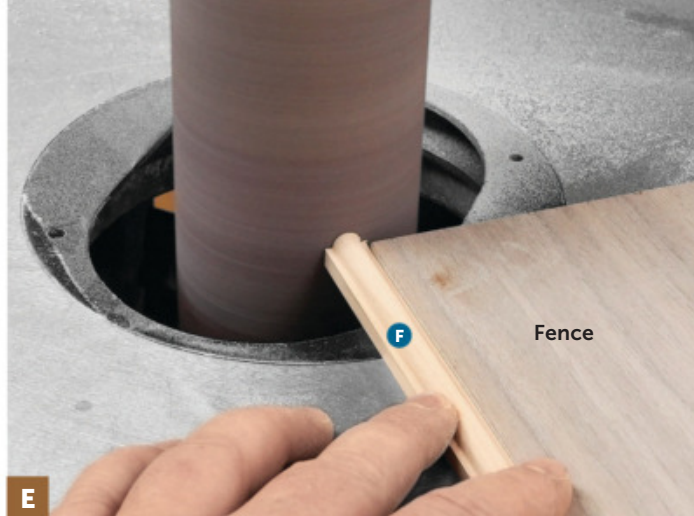
- 1** Cut the frame stiles (C), lower rail (D), and upper rail (E) to size [Parts List, Exploded View]. Using the patterns [Drawing 3], lay out the scallops on the stiles [Drawing 2] and contours on the upper rail. Cut the curves on the scrollsaw (or bandsaw), staying as close to the line as possible to minimize the sanding. Sand the cuts smooth.
- 2** Cut biscuit slots in the ends of the face frame rails and edges of the stiles [Exploded View]. Glue and clamp the face frame assembly together.
- 3** Cut biscuit slots on the back of the face frame assembly (C-E) and the front edges of the sides (A) and lower shelf (B) [Exploded View, Photo C]. Glue and clamp the face frame to the case.



Cut #10 biscuit slots along the rear of the face frame stiles (C) and lower rail (D), as well as in the front edges of the case sides (A) and lower shelf (B).



To create the profile for the shelf edging (F), use a $\frac{3}{16}$ " round-over bit to rout a half-round in two passes, flipping the blank in between. After routing the necessary edges, rip the edging to width.



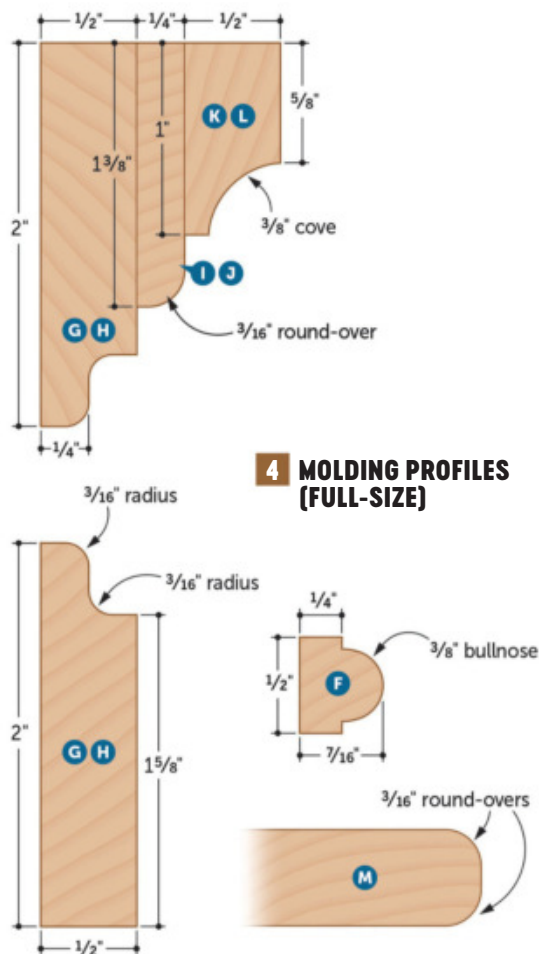
To cope the ends of the shelf edging (F), clamp a board to your spindle sander to act as a fence as you guide the edging straight toward the center of the 3"-diameter sanding spindle.

TIP!

Setting the router-table fence flush with the bit bearing prevents the bit from cutting too deep.

4 From $\frac{1}{2}$ " stock, cut two 2×20" blanks for the shelf edging (F). Install a $\frac{3}{16}$ " round-over bit in your router table and position the fence flush with the bit bearing. Rout a round-over, then flip the blank over to rout a second round-over on the same edge. Raise the bit in small increments, taking deeper passes until the bit cuts a half-round [Drawing 4, Photo D]. Rout this profile on the opposite edge of the blank, and along one edge of the other blank, as well.

5 From the routed blanks, cut the shelf edging (F) to width and about $\frac{1}{4}$ " overlong [Parts List, Drawing 4]. Using a 3"-diameter sanding drum, cope the ends to length to fit around the scallops of the frame stiles (C) [Photo E]. Glue the edging to the front edge of the exposed shelves.



4 MOLDING PROFILES (FULL-SIZE)

WRAP IT WITH MOLDING

1 Rip blanks for the front and side ogee moldings (G, H) to width [Parts List, Exploded View], then cut the individual pieces a few inches overlong. Rout an ogee on one edge of each piece [Drawing 4].

2 Miter-cut the ends of the lower front ogee molding (G) to length and glue the molding into place, flush at the bottom, using a couple of shop-made spacers to position it [Exploded View, Photo F].

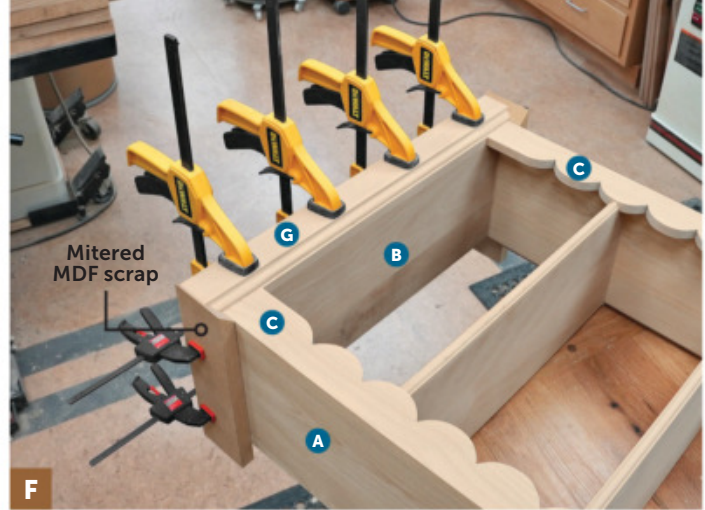
3 Miter-cut one end of the left and right side ogee moldings (H) and clamp them into place against the front molding (G) to mark them for final length. Trim them to length by cutting them at the opposite end, and then glue and clamp them into place. Repeat for the upper ogee molding, but position these moldings so they project $\frac{5}{8}$ " above the case.

4 Cut extra-long blanks to width for the front and side round-over moldings (I, J) and round over one edge of each blank [Drawing 4]. Cut blanks for the front and side cove moldings (K, L) and rout a cove along one edge of these pieces. Glue the front cove molding (K) to the front round-over molding (I) and the side cove moldings (L) to the side round-over moldings (J) to create crown assemblies [Photo G].

5 Miter-cut the ends of the front crown assembly (I/K) to length and glue it to the upper front ogee molding (G), flush with the upper edge [Photo H]. Miter-cut one end of the left and right crown assemblies (J/L), mark and cut them to length, and glue them to the upper side ogee moldings (H).

6 Edge-glue an oversize blank for the bottom panel (M). Cut the blank to final size [Parts List, Drawing 1]. Rout a $\frac{3}{16}$ " round-over on both edges of the front and ends [Drawing 4]. Glue and clamp the bottom panel to the case assembly, flush with the back and overhanging equally at both sides.

Note: The upper ogee moldings rise above the case sides and face frame by $\frac{5}{8}$ " to create space for a hidden compartment.



Miter-cut the ends of a couple of MDF scraps and clamp them to the sides of the case to serve as positioning blocks when gluing and clamping the front ogee molding (G) to the case assembly.



Keeping the square edges flush, glue the cove moldings (K, L) to the round-over moldings (I, J). A thick clamping caul makes it easier to position the clamps on the small moldings.



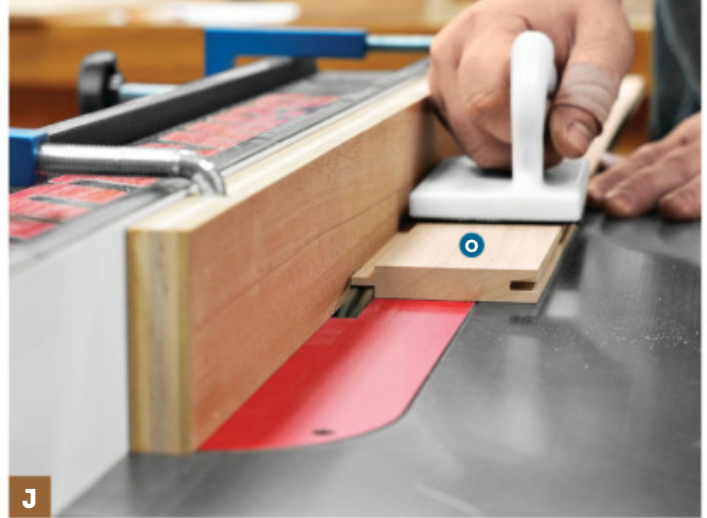
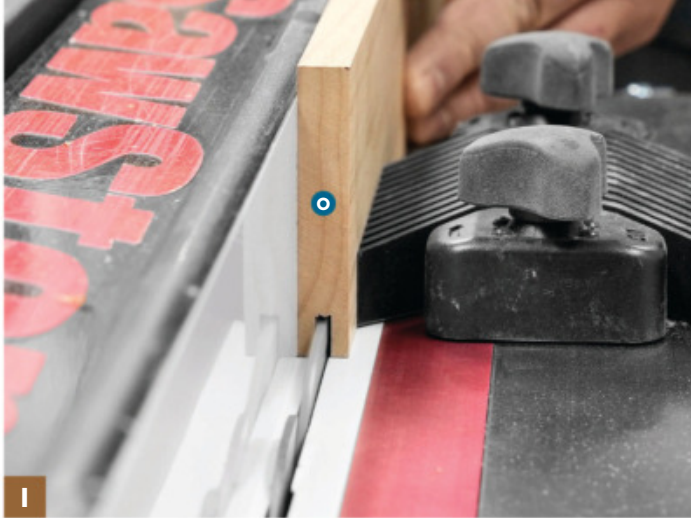
Using the mitered MDF scraps again, glue the front crown assembly (I/K) to the case. A $\frac{1}{2}$ "-thick clamping strip fills the offset between the molding and the case to provide a solid footing for the clamps.

“

TAKE YOUR TIME DRY-FITTING THE MOLDINGS, FOCUSING ON ONE JOINT AT A TIME TO ACHIEVE A PERFECT FIT.

—JOHN OLSON, DESIGN EDITOR

”



Center a full-kerf blade as closely as possible on the back slat. Then run both faces of each back slat against the rip fence to ensure the groove is centered.

Set up a dado blade and auxiliary fence to cut the tongues on the back slats. Sneak up on the blade height to size the tongues to fit smoothly in the grooves.

Note: The back starter slat is wider than the other slats.

BACK SLATS

- 1 Cut the starter slat (N), back slats (O), and end slat (P) to size [Parts List, Drawing 5]. Set the starter slat aside.
- 2 Position the rip fence $\frac{3}{16}$ " from the blade, then raise the blade to $\frac{3}{8}$ " to cut a groove in one edge of each back slat and the end slat [Photo I]. Set the end slat aside.
- 3 Using a dado blade, cut a $\frac{3}{8}$ "-long tongue, sized to fit the grooves, in the opposite edge of each back slat (O), and in one edge of the starter slat (N) [Photo J].
- 4 Use a block plane or sanding block to create a small chamfer on the front edges of all the slats.
- 5 Dry-assemble the slats and check their fit in the case assembly. Mark the location of the shelves on the slats, then drill countersunk shank holes in the back face of each slat at the drill press. Set the slats aside.

FINISH WITH A SECRET

- 1 From an edge-glued blank, cut the top panel (Q) to loosely fit the opening in the top of the case [Parts List, Drawing 1]. Counterbore the bottom face of the panel and use epoxy to add a stack of three rare-earth magnets.
- 2 Sand the case assembly, back slats, and top panel to 220 grit.

PARTS LIST

PART	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A SIDES	$\frac{3}{4}$ "	$7\frac{1}{2}$ "	35"	A	2
B SHELVES	$\frac{1}{2}$ "	7"	$18\frac{1}{2}$ "	A	5
C FACE FRAME STILES	$\frac{1}{2}$ "	2"	35"	A	2
D FACE FRAME LOWER RAIL	$\frac{1}{2}$ "	$2\frac{1}{8}$ "	$15\frac{1}{4}$ "	A	1
E FACE FRAME UPPER RAIL	$\frac{1}{2}$ "	$4\frac{1}{2}$ "	$15\frac{1}{4}$ "	A	1
F* SHELF EDGING	$\frac{1}{2}$ "	$7\frac{1}{16}$ "	$15\frac{5}{16}$ "	A	3
G* FRONT OGEE MOLDINGS	$\frac{1}{2}$ "	2"	$20\frac{1}{4}$ "	A	2
H* SIDE OGEE MOLDINGS	$\frac{1}{2}$ "	2"	$8\frac{1}{2}$ "	A	4
I* FRONT ROUND-OVER MOLDING	$\frac{1}{4}$ "	$1\frac{3}{8}$ "	$20\frac{3}{4}$ "	A	1
J* SIDE ROUND-OVER MOLDINGS	$\frac{1}{4}$ "	$1\frac{3}{8}$ "	$8\frac{3}{4}$ "	A	2
K* FRONT COVE MOLDING	$\frac{1}{2}$ "	1"	$21\frac{3}{4}$ "	A	1
L* SIDE COVE MOLDINGS	$\frac{1}{2}$ "	1"	$9\frac{1}{4}$ "	A	2
M BOTTOM PANEL	$\frac{1}{2}$ "	$8\frac{11}{16}$ "	$20\frac{5}{8}$ "	A	1
N BACK STARTER SLAT	$\frac{1}{2}$ "	$3\frac{1}{8}$ "	35"	A	1
O BACK SLATS	$\frac{1}{2}$ "	$2\frac{7}{8}$ "	35"	A	5
P BACK END SLAT	$\frac{1}{2}$ "	$2\frac{7}{8}$ "	35"	A	1
Q TOP PANEL	$\frac{1}{2}$ "	8"	$19\frac{1}{4}$ "	A	1

*Parts initially cut oversize. See the instructions.

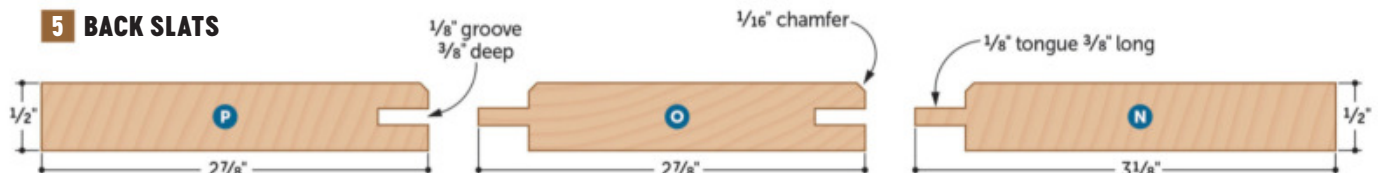
MATERIALS KEY: A—alder.

SUPPLIES: #10 biscuits, #8× $1\frac{1}{4}$ " flathead screws, epoxy.

BLADES AND BITS: Dado blade, $\frac{3}{16}$ " round-over bit, $1\frac{1}{4}$ " ogee bit (Freud 38-152), $\frac{3}{8}$ " cove bit.

SOURCES: $\frac{1}{2}$ × $\frac{1}{8}$ " rare-earth magnets (3) no. 99K3103, \$2 each; leevalley.com

PROJECT COST: It cost us about \$260 to build this project. Your cost will vary by region and source.

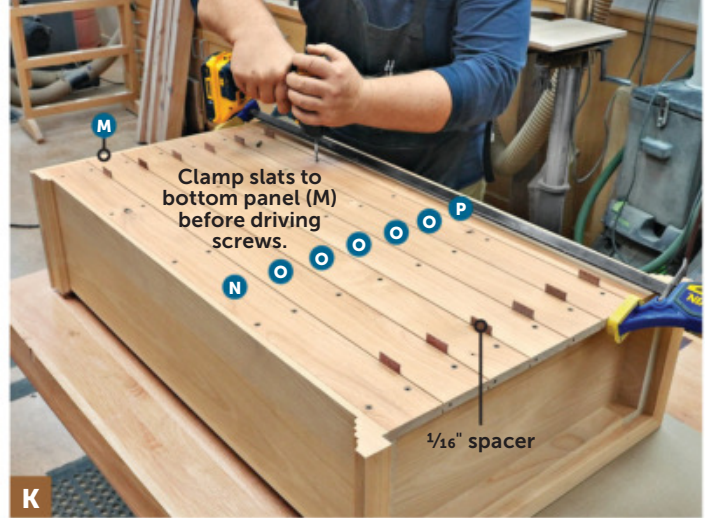


3 Apply a clear finish. We sprayed three coats of General Finishes flat Enduro-Var II, lightly sanding after the second coat with a 400-grit sanding sponge. A wipe-on or brush-on finish will also work, and may be easier to apply to the inside of the case.

4 Attach the back slats using spacers to position them before driving in screws [Drawing 1, Photo K].

5 Drill mounting holes through the back near the top and under one of the shelves. Screw the case to the wall, making sure to hit at least one wall stud (or use wall anchors).

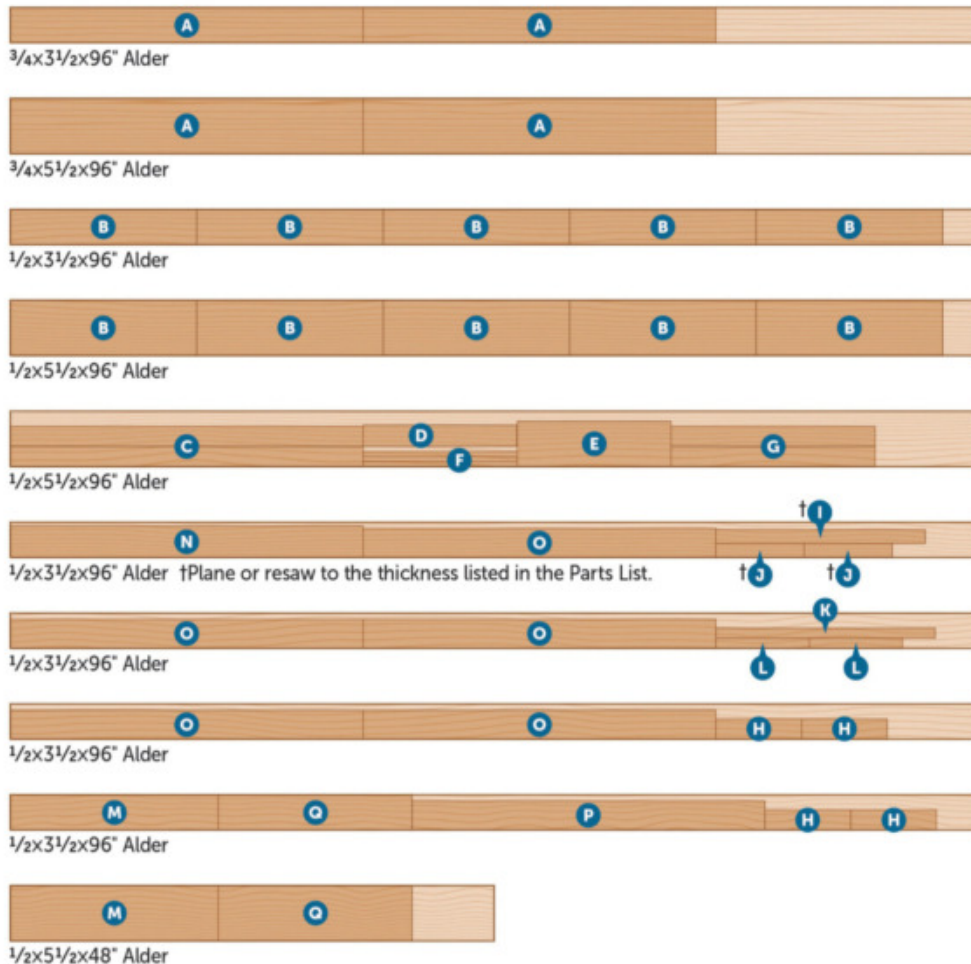
6 With the cabinet mounted, fill the shelves with the trinkets, books, or objects you want to display. Store items you wish to keep hidden in the secret compartment in the top, covered by the top panel (Q). To remove the panel, place a steel object over the area where the magnets are embedded and lift the panel out of the recess. 🌲



K Screw the starter slat into place, then add the remaining back slats using spacers in between each one. Drive screws along only the tongue edge of each slat (O), to allow them to expand and contract.

CUTTING DIAGRAM

We purchased 32 board feet of 4/4 alder. Before cutting parts to size, we planed them to the thicknesses shown in these example boards.



BANDSAW LOGS INTO LUMBER

Transform a backyard tree from a favorite piece of foliage into beautiful boards perfect for a passion project.

WRITER: KEN BURTON

Few aspects of woodworking beat finding perfect boards for a special project. If you have a bandsaw, you can skip the store and look in your own yard for trees that you can mill into extra-meaningful project stock. It's a great way to turn surplus, storm-damaged, or dead trees into something that will live on. By selecting the right log and outfitting your bandsaw with the proper blade, workpiece supports, and a shop-made guide, milling your own small boards is well within reach.



Lumber loses moisture fastest at its ends, which can cause large cracks called checking. To reduce this, seal the ends of the log. Commercial sealers are available, but leftover paint works fine.

SELECT THE RIGHT SOURCE

Note: Trees that have been dead for a long time can become brittle, harder, and less flexible, making them challenging to mill.

Any tree can be milled into boards, but some parts are more suitable than others. Branches have to fight against gravity as they grow, which leaves them with inconsistent grain structure, known as reaction wood, that creates tension in the wood. Cutting releases this tension, resulting in boards that often warp, split, or twist. Stick with trunk sections instead—the straighter the better. Their more-consistent grain remains stable.

TIP!

A wand-style metal detector, available for as little as \$25, locates metal hidden within the wood.

Also steer clear of trees that you know or suspect may contain metal from a nearby fence line, attached signs, etc., unless you can cut around it. Metal ruins bandsaw blades quickly.

Finally, choose pieces that you can fit onto your saw. To determine its capacity, raise your blade guides to full height and measure between them and the table. That distance, plus or minus an inch or two, determines the log diameter you can slice.



Before you mill the log, remove bark with a drawknife or a sharp hatchet. This facilitates drying and removes dirt and debris that can dull your bandsaw blade.

PREPARE THE LUCKY LOG

As you prepare the logs you plan to mill, remember that logs, especially freshly cut ones, can be very heavy. To keep them manageable, stick with 3–4' lengths, leaving longer logs to the pros.

It's important to seal the end grain of your lumber-to-be right away to minimize checking as the wood dries (*above, top*). Then strip away the bark before you cut (*above, bottom*).

PHOTOGRAPHER: KEN BURTON





Choose the right blades for your bandsawing needs
woodmagazine.com/bandsawblades

SET UP YOUR BANDSAW

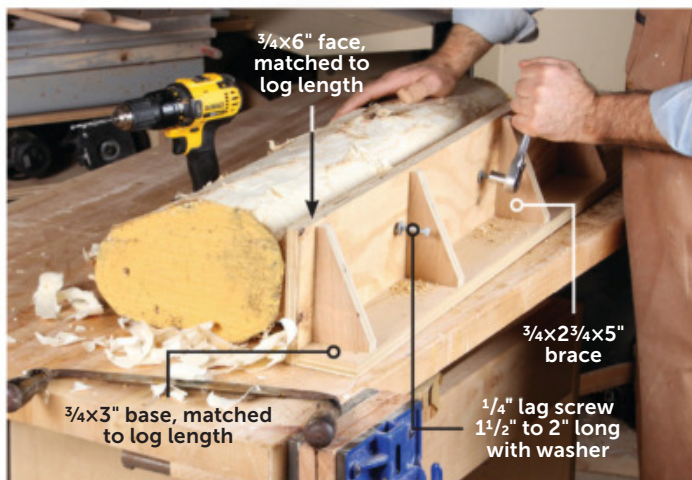
With your log prepared, equip your saw with a resawing blade. Consult your owner's manual or measure an existing blade to determine the proper length. A $\frac{1}{2}$ "-wide blade with 3-4 teeth per inch (tpi) serves well for occasional log milling without putting too much strain on your saw's motor or tensioning mechanism.

Before you install the blade, ensure that the bandsaw tires are clean, clear out sawdust, and wax or lubricate the saw table to help your logs slide easily. This will also protect your saw from the moist sawdust that cutting green wood creates. Make sure your saw is on stable footing, and add sturdy infeed and outfeed supports, aligned with the saw table, to help manage the weight and length of the log.

BUILD A SIMPLE LOG CARRIER

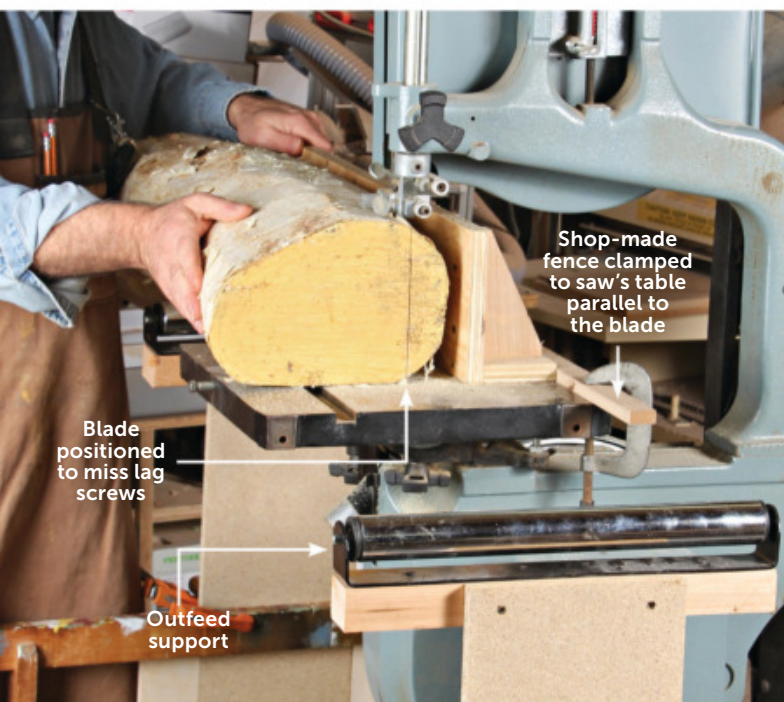
While cutting, you need to hold your log securely to prevent it from rolling and to guide it straight. A carrier made from $\frac{3}{4}$ " plywood accomplishes both things (*above, right*). There's no need to get fancy. We made ours from scrap.

Deciding how to orient the log for milling can be subjective. Depending on the log's shape, you may choose to maximize the number of boards you get from a log or the



Build your carrier to roughly match the length and diameter of the log. Place the log alongside and drill holes for a pair of mounting screws, locating them where they'll reach about $\frac{3}{4}$ -1" into the log.

width of the boards. In either case, your first cut will be at 90° to the orientation from which you cut the remaining slabs of lumber. Once you decide on that orientation, lay the log and carrier on your benchtop and drill a pair of holes where the log sits closest to or against the carrier fence. Then drive in lag screws. Use screws no longer than needed to get a good bite into the log.



NOW MILL SOME BOARDS

Rest the log and carrier on the saw table and infeed support. Then position them and make your first cut (*left*). This creates a flat face for your log to ride on during subsequent cuts.

Back at your bench, remove the cutoff from the carrier and rotate the log 90° with the flattened face down. Lag-screw the log to the carrier again, then make another cutting pass on the bandsaw (*next page, top*).

With your two faces established, you won't need to bolt the log to the carrier any longer. Instead, use it as a fence, clamping it to the table at the distance

TIP!

Drill new holes and use shorter screws, if necessary, to hold the log securely without creating excess waste.

Position the log so the first cut will miss the lag screws and create a flat at least two thirds the diameter of the log. Butt the bandsaw fence against the carrier or use a shop-made one.

from the blade matching your desired board thickness (page 46).

One big bonus of milling your own boards is that you aren't bound by conventional lumber thicknesses. Remember, though, the greener (wetter) the wood is, the more it may change as it dries. Cut your boards at least $\frac{1}{4}$ " thicker than the desired final dimension. This provides leeway for shrinking, along with extra material you can joint and plane away to get rid of any minor warp or twist that occurs while drying.

STACK, STICKER, AND WAIT

Drying your freshly milled boards requires patience. Hardwoods typically dry at the rate of one year per inch of thickness. Softwoods progress a bit faster. To dry consistently and resist warping, boards need air circulation. On a flat, stable surface, stack the boards with strips of



With the log reattached to the carrier, reposition the fence on your bandsaw table (again making sure to clear the lag screws) and make another pass to create a second face that's perpendicular to the first.

wood, known as stickers, in between (*below*). Make your own from $\frac{1}{2}$ "- or $\frac{3}{4}$ "-thick stock. For the first couple of months, you may want to stack your boards in a sheltered but unconditioned space, such as a shed, to keep the boards from drying too fast and potentially checking.



Stack your green lumber on stickers that are all consistent in thickness, placing them at 12-16" spacing and aligned vertically. On top, add extra stickers, a scrap board, and weights to hold the boards flat.



Air-dried lumber can reach an equilibrium moisture content (EMC) of about 12%, which is higher than 6–10% typical of kiln-dried wood, but dry enough for use in many projects.

Check the moisture content of your boards periodically using a moisture meter (*left*). As the moisture content comes down, move the stack into your shop to acclimate the lumber to the space where you'll be working with it. Check moisture content periodically until it reaches a suitable level for where you live. If your boards are drying unequally, periodically rearrange the inner boards to the stack's top or bottom.

It may be hard to wait for those home-harvested boards to dry, but the results will reward your patience. Stave off your impatience by hunting down more logs to turn into beautiful lumber. 🌲

TIP!

Avoid stacking lumber on concrete floors, which can shed a lot of moisture. If you must use a concrete floor, first lay down plastic.

OVERALL DIMENSIONS

Straight track with trestles: 49"W x 4¾"D x 7"H

Curved track with trestles: 15²¹/₃₂"W x 15²¹/₃₂"D x 7"H



TRAIN TRESTLE SHELF

Show off your Timber Line Express rolling stock on this wall shelf that bridges the gap between playtime and display time.

WRITER: CRAIG RUEGSEGG
DESIGNER/BUILDER: JOHN OLSON



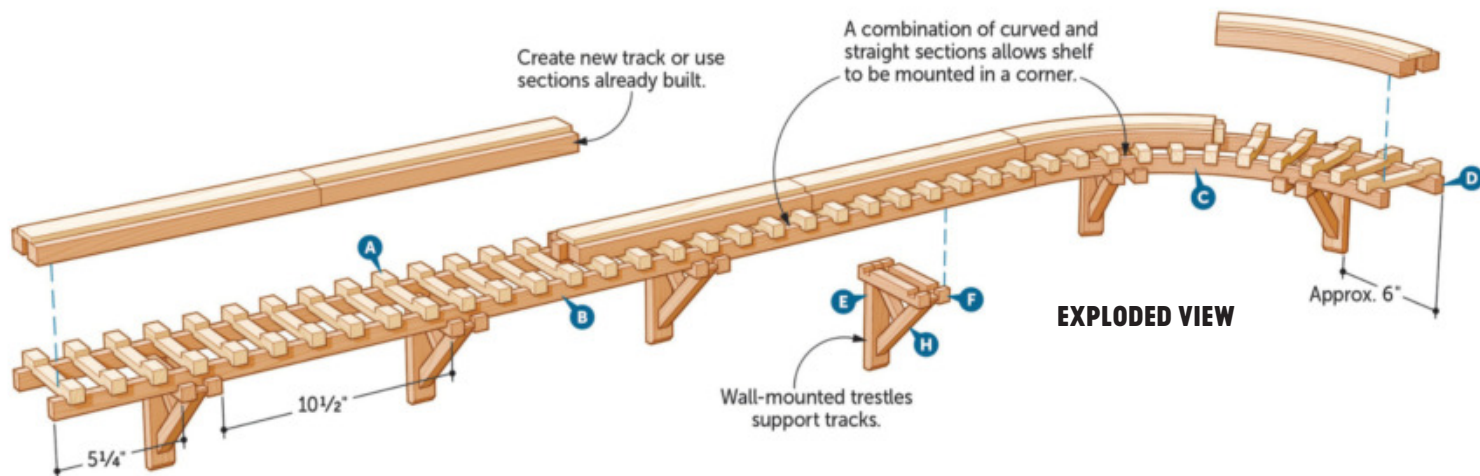


Find plans for the Timber Line Express track to fit your train trestle shelf at woodmagazine.com/traintracks

The handmade train cars of your Timber Line Express deserve to be seen and appreciated when they're not traversing the main line on the floor. This shelf provides a siding where you can park them high on the wall out of reach until playtime—or mount it lower and use it as its own track layout.

The Timber Line Express tracks you've already built drop right onto this shelf. If you haven't built them yet or you need to build more, find plans in issue 291 (October 2023) and at the link at left.

The quantities in the **Parts List** and the instructions are for one 49" length of straight shelf and one 90° turn of curved shelf (about a 16" radius on the outside). Adjust the quantities to make as many sections as you want for your rail yard.



TIE THE BEAMS TOGETHER

The Timber Line Express train tracks fit into ties (A) that rest on beams (B–D), giving the look of rails and ties, especially when viewed from below.

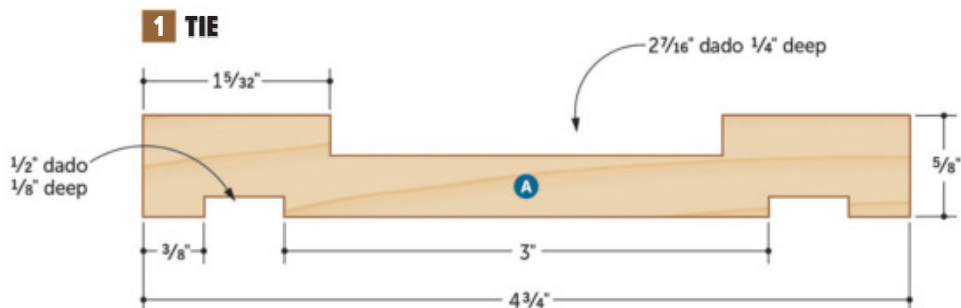
Note: One straight section of shelf has 28 ties. A curved section has 11.

1 From $\frac{5}{8}$ " maple, cut ten $3 \times 4\frac{3}{4}$ " blanks for the ties (A). These blanks will yield 40 ties, enough for one straight and one curved section of shelf.

2 Install a $\frac{1}{2}$ " dado stack in your tablesaw and set the blade height to $\frac{1}{8}$ ". Dado the bottom of each tie blank [Drawing 1, Photo A].



Position the fence $\frac{3}{8}$ " from the blade and make a pass with each end of the blank against the fence. Guide the workpiece with a pushblock and your miter gauge equipped with an auxiliary fence.





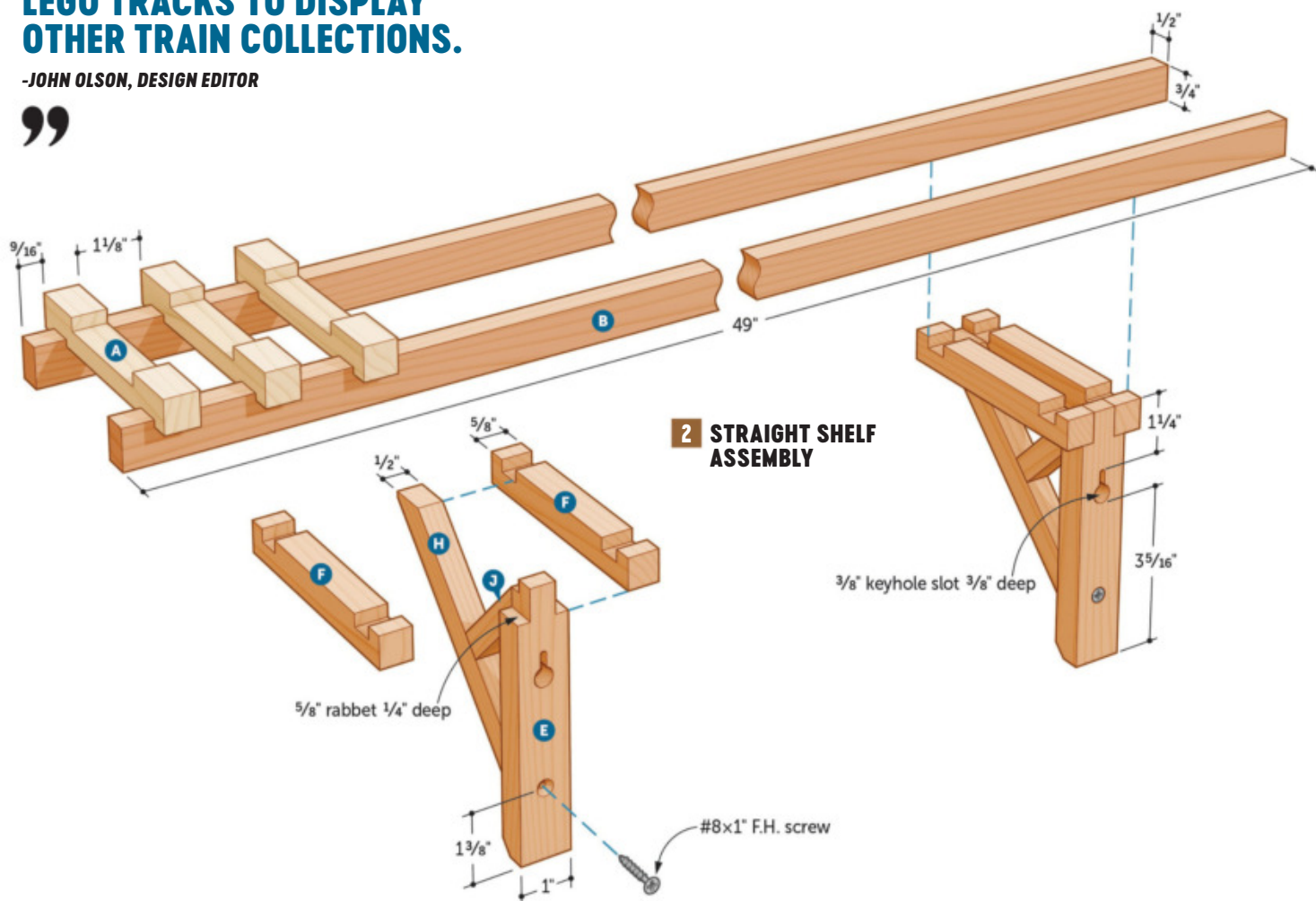
3 Raise the blade to $\frac{1}{4}$ " and reposition the rip fence to cut the wide dado on the opposite face to fit the base of a straight track [Photos B, C]. It should fit into the dado and lift out easily without excessive play.

4 Rip the ties (A) to final width at the bandsaw [Photo D]. Then finish-sand the ties.

5 Cut the straight beams (B) to size [Drawing 2] and finish-sand them. Glue 28 ties (A) to the beams [Photo E] to form one straight section of the shelf.

“ BUILD TIMBER LINE TRACKS WITHOUT THE MAPLE TOP RAIL AND ATTACH HO-, O-SCALE, OR EVEN LEGO TRACKS TO DISPLAY OTHER TRAIN COLLECTIONS. ”

-JOHN OLSON, DESIGN EDITOR





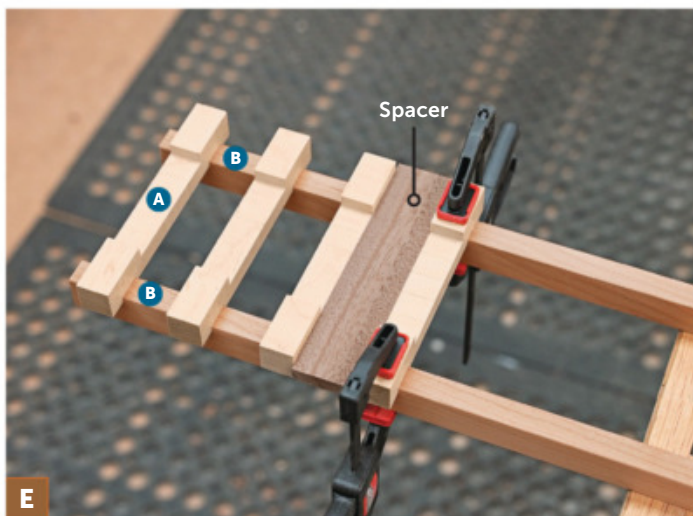
Make a pass with each end of a tie (A) blank against the fence. Adjust as needed to ensure that a straight base track fits between the outside edges of the dados. Repeat with the remaining tie blanks.



Nudge the fence away from the blade and run a pass with each end of each tie (A) blank against the fence, repeating until all of the waste is removed, making one wide dado.

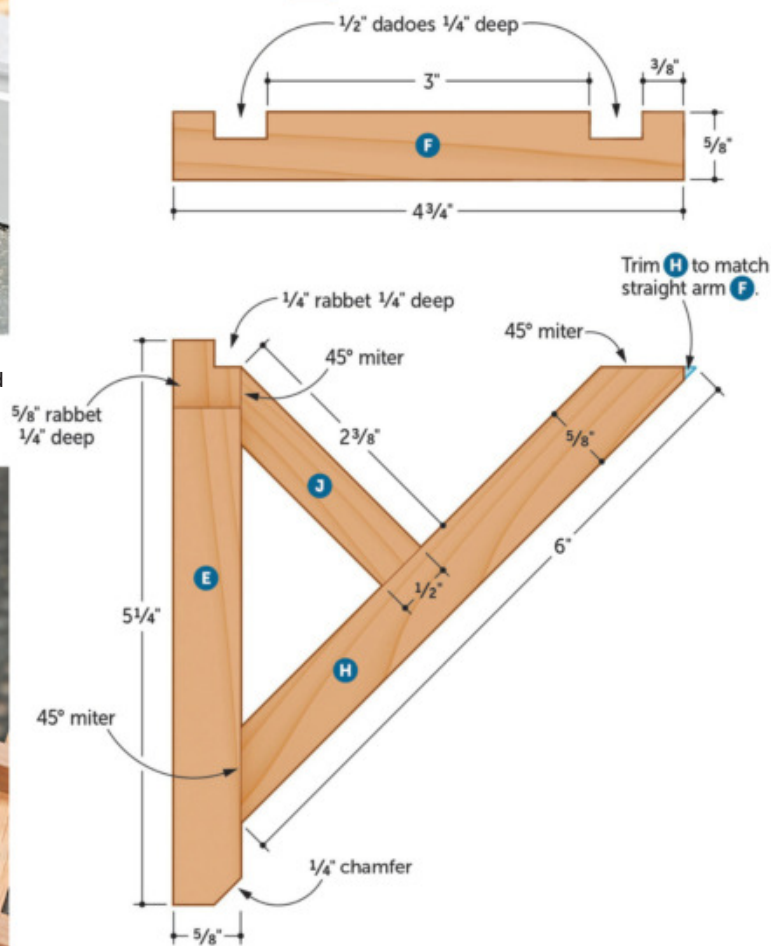


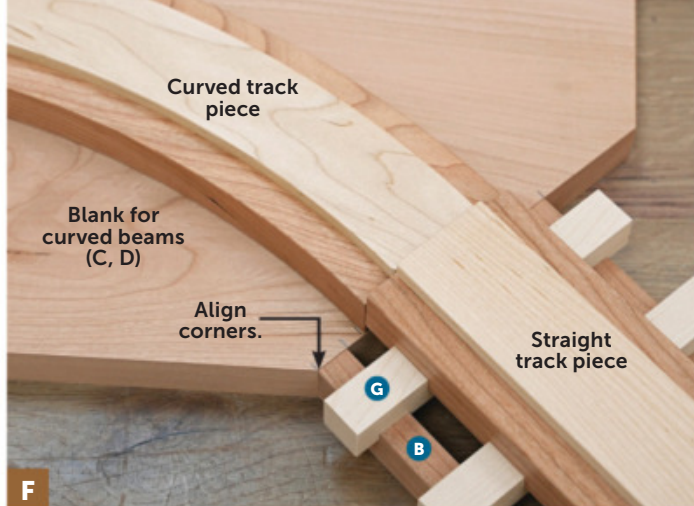
We found it safest to rip the ties (A) to width on the bandsaw. Set your bandsaw fence to rip $\frac{5}{8}$ "-wide ties from each blank. A slow feed rate provides a smoother surface that requires less sanding.



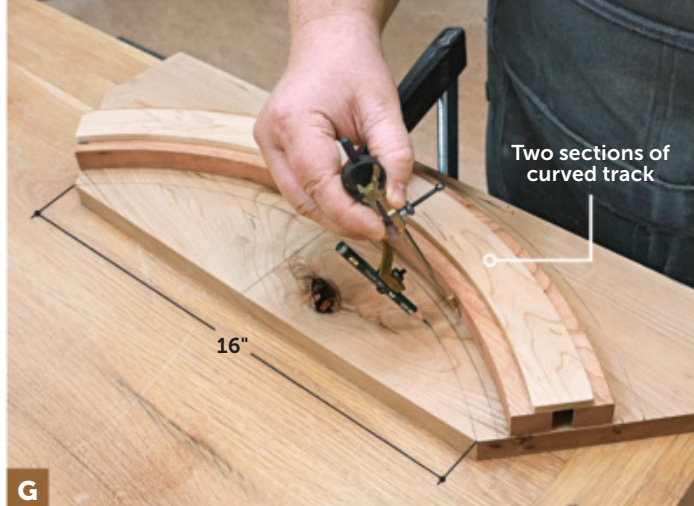
Glue the first tie (A) $\frac{1}{16}$ " from the end of the beams (B). Eliminate measuring for each additional tie and get consistent spacing by using a $1\frac{1}{8}$ " spacer to help position them.

2a STRAIGHT TRESTLE





Align the corner of the straight beam (B) with the inside corner of the miter. Align a curved track piece with the straight track piece. Mark the ends of the beams, along with the track position, onto the blank.



Set the compass point against the curved track base and adjust the pencil to touch an endpoint marked in Photo F. Scribe this edge on each side, then readjust the compass to scribe the remaining edges.

THROW IN A CURVE

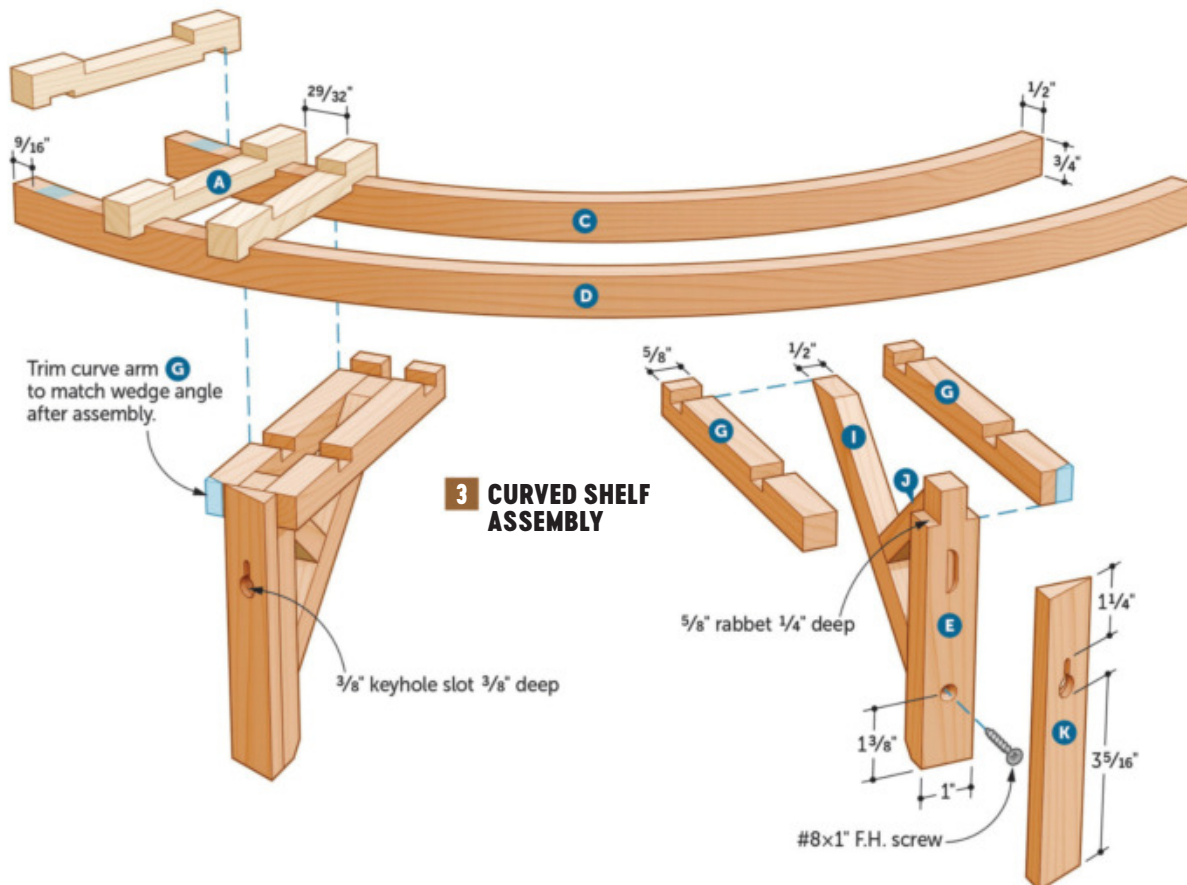
1 To make the inner and outer curved beams (C, D), cut a piece of $\frac{3}{4}$ "-thick cherry to $7\frac{1}{2} \times 24$ ". Miter-cut two corners at 45° , leaving one 16"-long edge. (Refer to **Photo G**.)

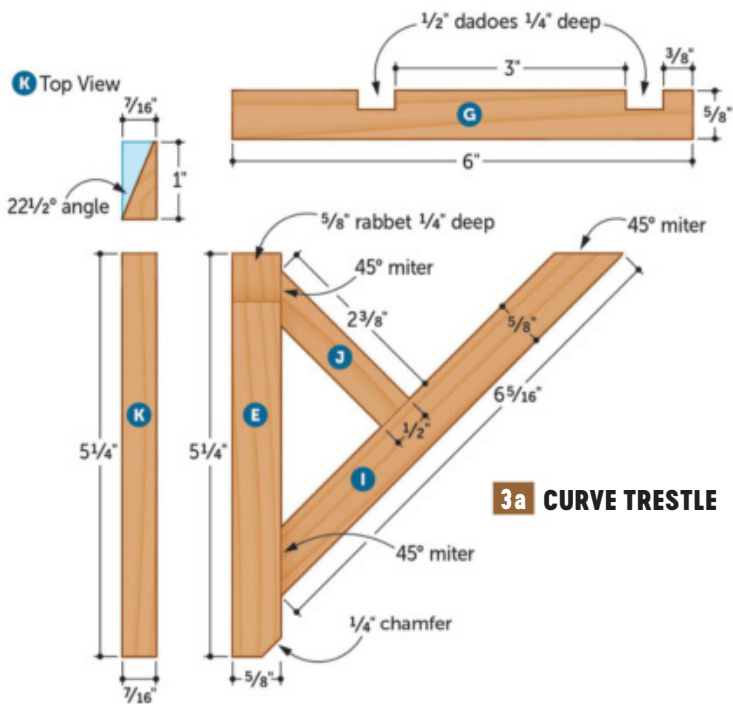
2 Place a curved track on the blank. Mark the endpoints for the curved beams **[Photo F]**, then use a compass to scribe their widths **[Photo G]**.

3 Bandsaw and sand the curved beams (C, D) to shape. Finish-sand them, testing the fit of the ties (A) as you go.

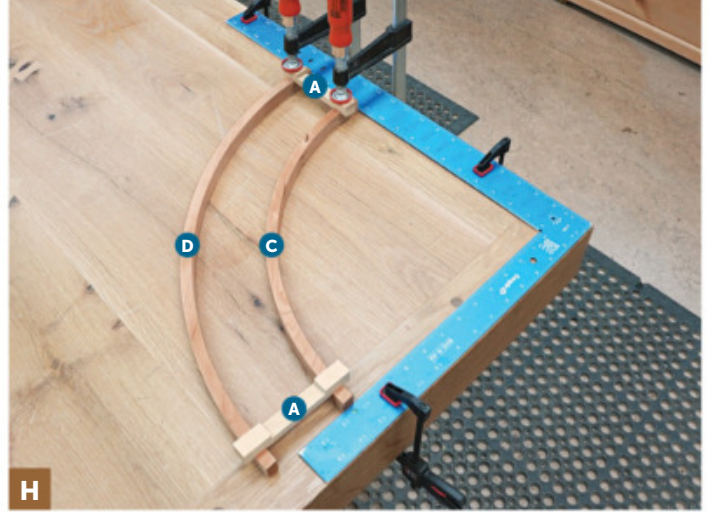
4 Align the inner and outer curved beams (C, D) against a framing square and glue the ties (A) to the beams **[Photo H, Drawing 3]**.

5 Test the fit of a curved track piece in the ties **[Photo I]**. Trim the ties as needed.

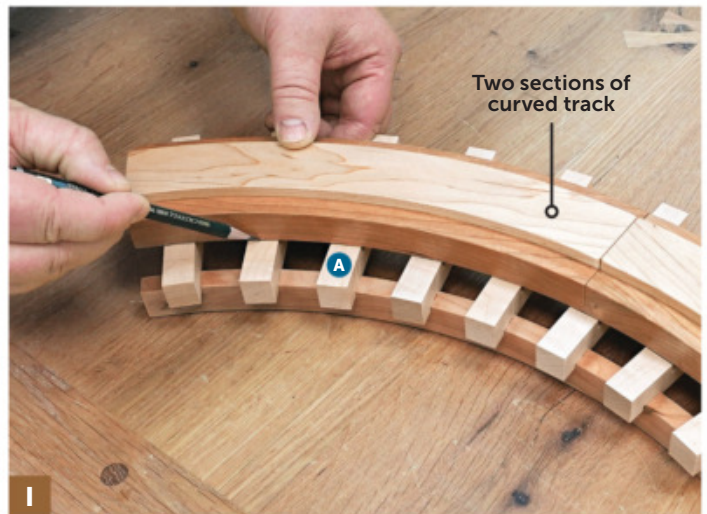




3a CURVE TRESTLE



Align the ends of the inner and outer curved beams (C, D) against a framing square. Glue a tie (A) $\frac{9}{16}$ " from each end, then evenly space nine more ties between the two end ties.



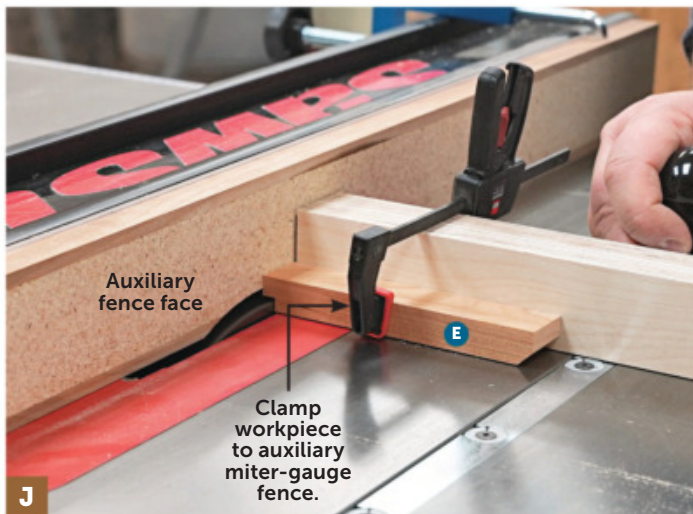
Scribe any ties that need to be trimmed to allow the curved track pieces to fit. Place a piece of scrap below the ties to support them, then trim away the waste with a chisel.

ENGINEER THE TRESTLES

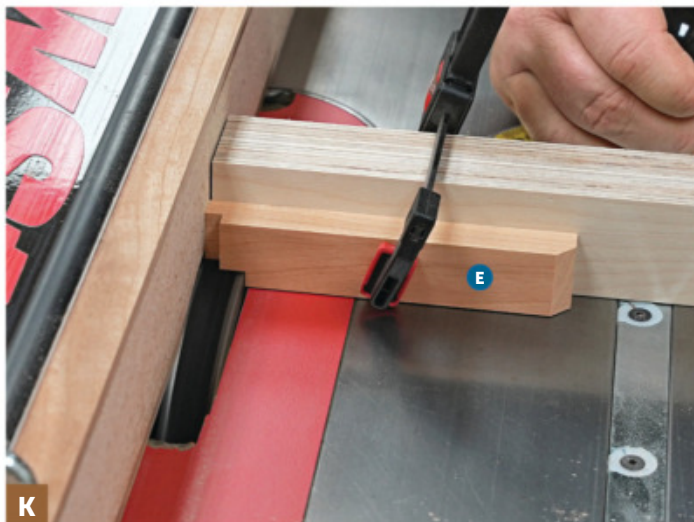
Triangular trestles attach to the wall and support the shelves. A straight section of shelf requires four trestles. A curved portion rests on two. In each trestle, two arms (F or G) sandwich a wall plate (E), brace (H or I), and a truss (J) [Drawings 2 and 3]. The straight and curved beams (B–D) fit into dadoes in the arms.

1 From $\frac{5}{8}$ " cherry, cut the wall plates (E) and the straight and curve arms (F, G) to size [Drawings 2a, 3a]. Chamfer a 1" face on one end of each wall plate.

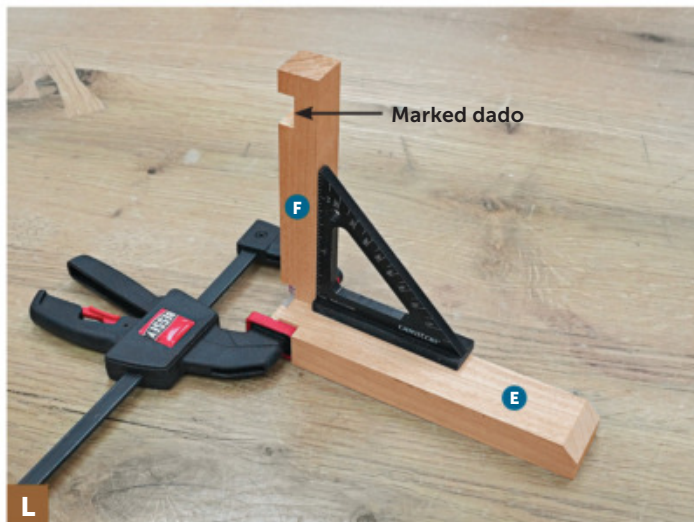
2 Install a $\frac{5}{8}$ "-wide dado stack in your tablesaw and add an auxiliary face to the rip fence. Raise the blade, partially buried, into the auxiliary face $\frac{1}{4}$ ". Cut a $\frac{1}{4} \times \frac{1}{4}$ " rabbet in the chamfered face of four of the wall plates (E) [Photo J, Drawing 2a].



After chamfering a wide face of the wall plates (E), rabbet the same face of only four wall plates on the opposite end to provide room for the straight beams (B).



Cut a $\frac{5}{8}$ " rabbet $\frac{1}{4}$ " deep in the top narrow face of one wall plate (E). Check that an arm (F or G) fits flush with the top of the wall plate. Then cut the remaining rabbets in both faces of each wall plate.



When gluing the straight arms (F) to a wall plate (E), make sure the marked dado is at the outside end so all dados align. Ensure the assembly is square.

3 Move the rip fence to expose $\frac{5}{8}$ " of the blade. Rabbet each of the narrow faces of all six wall plates (E) [Photo K, Drawings 2, 3].

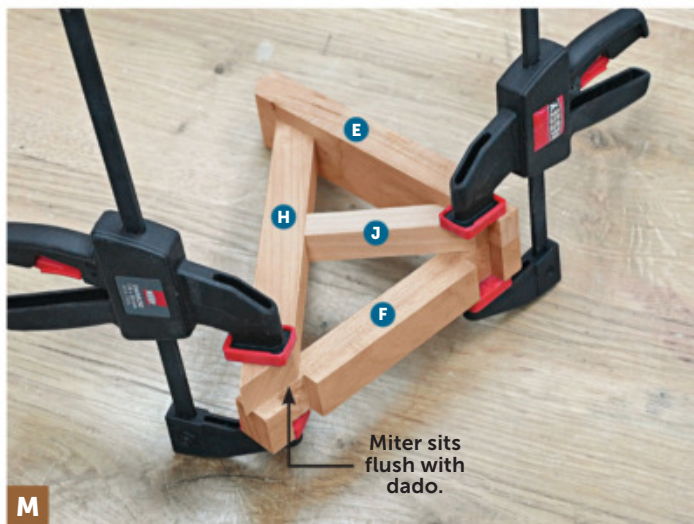
4 Restack the dado set to make it $\frac{1}{2}$ " wide. Cut a $\frac{1}{4}$ "-deep dado $\frac{3}{8}$ " from one end of the straight and curve arms (F, G) [Drawings 2a, 3a]. Mark this dado in the straight arms (F) to help with alignment during assembly later. Place one of these dados on its respective beam (B or C) and mark for the other dado. Cut the second dado in each straight arm, then reset the fence to dado the curve arms.

5 From $\frac{1}{2}$ " cherry, cut the straight and curve braces (H, I) and the trusses (J) to size. Miter-cut the ends [Drawings 2a, 3a]. Glue a truss to each brace, aligning the mitered ends against a straightedge. After the glue dries, finish-sand the trestle parts (E-J).

6 Glue and clamp one arm (F or G) into a rabbet in each wall plate (E) [Photo L].

7 Glue a straight brace/truss assembly (H/J) to each plate/arm assembly (E/F) [Photo M]. Do the same for the curve brace/truss assemblies (I/J) and plate/arm assemblies (E/G). Align the top end of the curve brace (I) flush with the top of the curve arm (G) [Drawing 3]. After the glue dries, glue the remaining arms (F, G) in place.

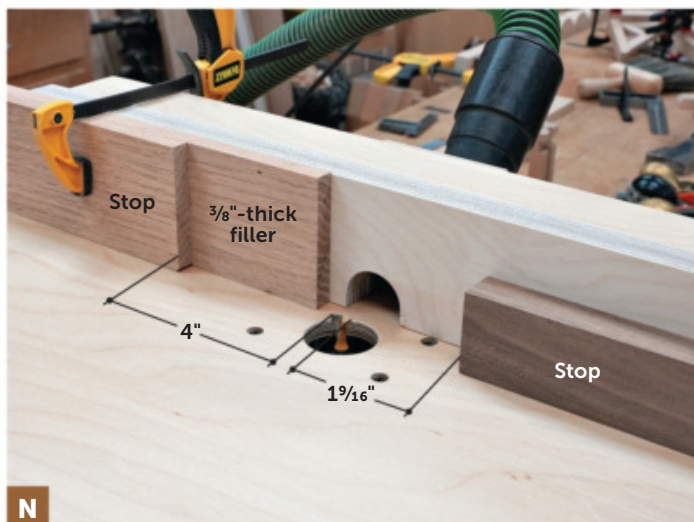
8 Drill a countersunk $\frac{3}{32}$ " pilot hole through each wall plate (E) into the brace (H or I) [Drawings 2, 3]. Drive a



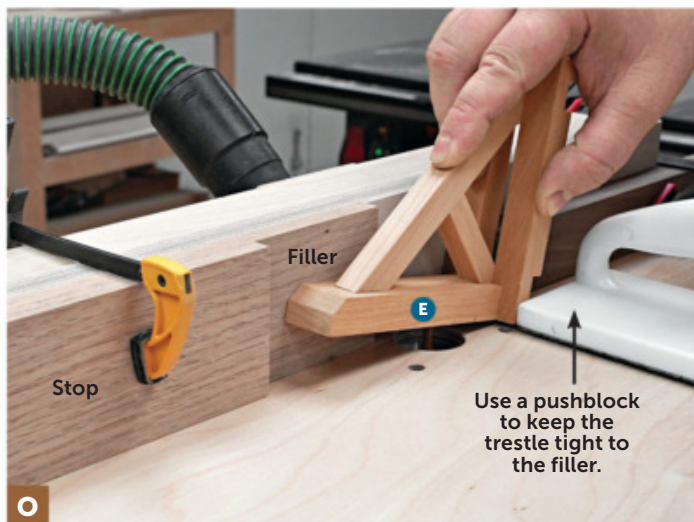
On the straight trestles, make sure the mitered ends of the brace (H) and truss (J) sit flush with the bottom of the dados in the arms (F). The point of the miter on the braces will be sanded flush later.

#8×1" screw. Chisel or sand the tips of the straight braces (H) flush with the ends of the straight arms (F) [Drawing 2a].

9 From cherry, cut a $\frac{7}{16}$ ×4×5 $\frac{1}{4}$ " blank for the wedges (K). Bevel-rip each edge at 22 $\frac{1}{2}$ °. Reset the blade to 90° and rip a wedge from each edge of the blank [Drawing 3a]. Glue a wedge to the wall plate (E) on each curve trestle [Drawings 3 and 3a]. Note that the wedges face opposite directions. Chisel or sand the back corner of a curve arm (G) on each trestle to align with the face of the wedge. Finish-sand the trestles.



N Clamp a stop at least $\frac{3}{4}$ " thick $1\frac{1}{16}$ " to the right of the bit. On the outfeed side of the bit, clamp a $\frac{3}{8}$ "-thick filler and a stop, positioning the stop 4" from the bit.



O Butt a trestle against the right stop and the filler. Lower the wall plate (E) onto the spinning bit, then move it to contact the left stop. Allow the bit to stop before removing the trestle.

10 Install a $\frac{3}{8}$ " keyhole bit in your router table and raise it for a $\frac{3}{8}$ "-deep cut. Clamp stops to the fence as shown in **Photo N**. Use this setup to rout the keyhole slots in all of the straight trestles **[Photo O]** and one curve trestle. Reverse the stops and filler setup and carefully rout the remaining curve trestle, moving the workpiece from left to right.

Note: The wedge (K) prevents the curve trestles from standing vertically, so you must reverse the stops to account for this.

DRIVE THE GOLDEN SPIKE

1 Retrieve the straight beam and tie assembly (A/B). On the bottom face, mark $5\frac{1}{4}$ " from each end. Glue a straight trestle to the inside of each mark. Then space and glue the two remaining trestles $10\frac{1}{2}$ " from these **[Exploded View]**.

2 For the curve trestles, have a helper hold the trestles to the wall where the shelf will be mounted. Place the curved beam and tie assembly (A/C/D) on the trestles, find suitable positions for the trestles about 6" from each end, and mark their locations onto the curved beams **[Exploded View]**. Glue the trestles to the curved beams.

3 Apply a finish. We sprayed on three coats of satin lacquer, buffing with 0000 steel wool between coats.

4 Install hollow-wall anchors in the wall to match the trestle spacing. Use a level to ensure all the anchors align. Drive a #8x $1\frac{1}{4}$ " panhead screw into each anchor, leaving the head about $\frac{1}{8}$ " proud of the wall. Slide the trestles over the screwheads. Adjust the screws in or out as needed to snug the trestles to the wall.

5 Place the tracks, linking them with the connectors. Then hook up your train cars and blow off some steam. 🚂

PARTS LIST

Quantities listed are for one straight section of shelf and one 90° curved shelf.

PART	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* TIES	$\frac{5}{8}$ "	$\frac{5}{8}$ "	$4\frac{3}{4}$ "	M	39
B STRAIGHT BEAMS	$\frac{3}{4}$ "	$\frac{1}{2}$ "	49"	C	2
C* INNER CURVED BEAM	$\frac{3}{4}$ "	$3\frac{3}{16}$ "	$16\frac{21}{32}$ "	C	1
D* OUTER CURVED BEAM	$\frac{3}{4}$ "	$4\frac{27}{32}$ "	$21\frac{5}{8}$ "	C	1
E WALL PLATES	$\frac{5}{8}$ "	1"	$5\frac{1}{4}$ "	C	6
F STRAIGHT ARMS	$\frac{5}{8}$ "	$\frac{5}{8}$ "	$4\frac{3}{4}$ "	C	8
G CURVE ARMS	$\frac{5}{8}$ "	$\frac{5}{8}$ "	6"	C	4
H STRAIGHT BRACES	$\frac{1}{2}$ "	$\frac{5}{8}$ "	6"	C	4

PART	FINISHED SIZE			Matl.	Qty.
	T	W	L		
I CURVE BRACES	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$6\frac{5}{16}$ "	C	2
J TRUSSES	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$2\frac{3}{8}$ "	C	6
K* WEDGES	$\frac{7}{16}$ "	1"	$5\frac{1}{4}$ "	C	2

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: C—cherry, M—maple.

SUPPLIES: #8x1" flathead screws, #8x $1\frac{1}{4}$ " panhead screws, hollow-wall anchors.

BLADE AND BIT: Dado blade, $\frac{3}{8}$ " keyhole router bit.

PROJECT COST: It cost us about \$25 to build this project. Your cost will vary by region and source.



TUNE UP A TENON

For professional looking mortise-and-tenon joints, let power tools do the heavy lifting. Then use hand tools to finesse the final fit.

WRITER: VINCE ANCONA with JOHN OLSON

PHOTOGRAPHER: JASON DONNELLY

The mortise-and-tenon joint is one of the most basic in woodworking. A square or rectangular tenon on the end of one piece fits into a matching mortise on the mating piece. The combination of square shoulders and large amounts of glue surface creates a strong, interlocking joint. To ensure maximum strength, the tenon should fit the mortise like a hand in a glove, which is where the challenge lies. Here are some of the strategies we use to ensure tight-fitting tenons in the WOOD® shop.

START WITH A PROPER MORTISE

You can't really talk about tenons without mentioning mortises. Because trimming a tenon is usually easier than enlarging a mortise, we recommend making your mortises first, then sizing the tenons to fit. We prefer using a mortising machine or plunge router because both of these tools create accurate mortises with smooth, parallel walls, which makes fitting the tenons easier. But drilling and chiseling out a mortise, or even chopping out a mortise entirely by hand, are both acceptable methods as well. No matter how you choose to make your mortises, shoot for consistency.



Using a marking knife and a small square, scribe the shoulder of the tenon along one edge of the workpiece. This will serve as your reference edge for the faces and opposite edge.

For most applications, follow the rule of thirds when sizing mortise-and-tenon joints: The thickness of the tenon should equal one-third the thickness of the workpiece. Make the mortise $\frac{1}{16}$ " to $\frac{1}{8}$ " deeper than your tenon length to allow for excess glue. And if you're making a large number of identically sized mortises, cut a scrap piece to the width and thickness of your tenons to use as a gauge block when making the mortises.



Place the tip of the marking knife into the scribed line you just made and butt the blade of the square against the knife. Scribe a line on one face of the workpiece. Repeat for the other face, then the final edge.

STOCK PREP AND LAYOUT

To guarantee the best tenon results, start with accurately machined stock. The edges, faces, and ends of the workpiece serve as references when laying out and cutting the shoulders and cheeks of the tenon, so make sure these surfaces are square and parallel with one another. Watch for planer snipe near the ends of workpieces that may throw off accuracy as you try to create consistent tenon thickness.

With accurately machined workpieces in hand, choose one of two equally useful methods for laying out the tenons. In the first method, lay out the shoulders of the tenon with a marking knife and small square. But don't just start in one spot and work your way around the tenon; your layout lines may not meet at the ends. Instead, score a line on one edge first, *above*, then extend lines from that edge down both faces of the workpiece, *left*. Finally, connect the score lines across the second edge to complete the shoulder layout.

TIP!

Start with extra-long workpieces, then trim sniped ends after planing.



Adjust the marking gauge to match the tenon length, then hold it squarely and firmly against the end of the workpiece as you score the shoulder lines around all four surfaces.

“

IN THE END, THE EFFORT YOU PUT INTO PERFECTING TENONS IS PURELY FOR YOURSELF. YOU'RE THE LAST ONE THAT WILL SEE YOUR ACCOMPLISHMENT BEFORE IT DISAPPEARS INTO A MORTISE.

-JOHN OLSON, DESIGN EDITOR

”

The second method uses a marking gauge rather than a knife. Set the marking gauge to the desired length of the tenon and, working off the end of the piece, score lines on all four faces and edges, *above*.

Unlike a pencil-line layout, both of these methods leave a scored line that you'll use to register your saw or chisel when cutting the tenon. Regardless of which method you chose, after laying out the shoulders, lay out the width and thickness of the tenon with a marking gauge, *right*. (If all your tenons have similar-size shoulders, you really only need to scribe one tenon to be used as a setup gauge in the next steps.)



ROUGH OUT THE TENON

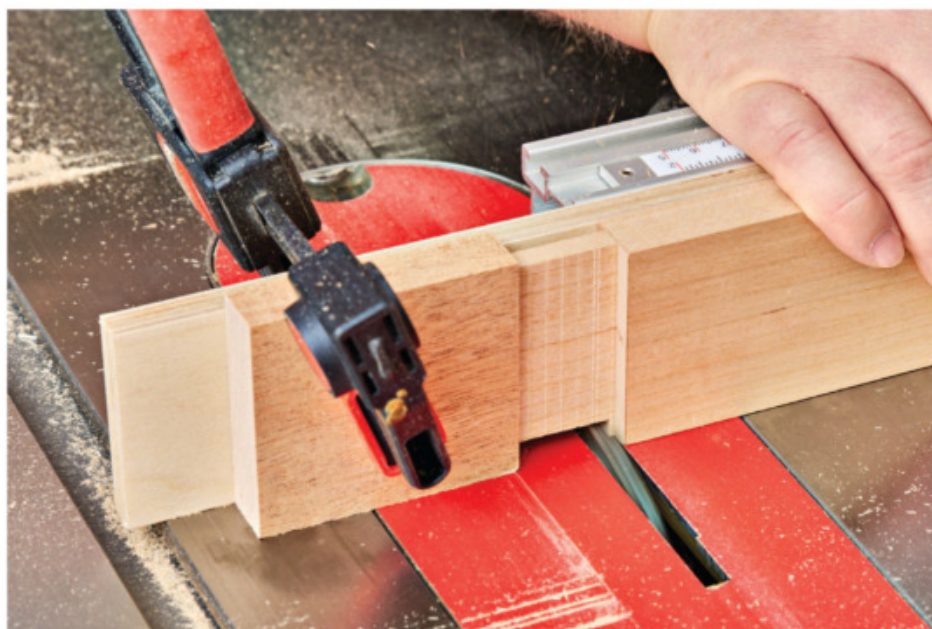
Form the tenons with a two-step process, using a tablesaw to remove the bulk of the waste and then fine-tuning the fit with a combination of hand tools. This allows you to rough out all similar tenons using the same tablesaw setup, then custom-fit each one to its mortise.

There are multiple ways to cut tenons on a tablesaw, but we prefer starting with a narrow dado stack to make overlapping cuts. Using just the two outside blades of a dado set may take longer, but results in a smoother tenon with less tearing of the wood fibers.

Set the height of the blade to cut the tenon $\frac{1}{64}$ " to $\frac{1}{32}$ " thicker than the mortise. To control the length of the tenon, use your rip fence as a stop or clamp a stopblock to an auxiliary miter-gauge fence. Cut the face cheeks first by making overlapping cuts, starting at the end of the tenon and stopping just shy of the score lines, *below, top*. After cutting both face cheeks, adjust the blade height if necessary and stand the workpiece on edge to cut the edge cheeks, again stopping short of the scored layout lines, *below, bottom*.



Clamp a stopblock to the miter-gauge fence to establish the tenon length just shy of the scribed lines. Then use the outer blades of a dado set to remove the waste from the face cheeks.



Raise or lower the blade if needed to cut the tenon's edge cheeks. Stand the workpiece on edge and trim away the waste with overlapping cuts, again stopping just short of your scored layout lines.



Learn more about shoulder planes and some of our favorite models. woodmagazine.com/shoulderplanes

FINESSE THE FIT

At this point, you should have a tenon that is just slightly too large to fit the mortise. The next steps refine the tenon until it slides into place.

Starting with the wide cheek shoulders, use a shoulder plane with a bench hook, *right*, or a chisel, *below*, to trim the shoulders down to the scored lines. For the narrow edge shoulders, a chisel usually works better than a shoulder plane. Check that all four shoulders are flush without any steps or offsets between them.



Planing toward the center, make a short chamfer at the end of the shoulder to prevent tear-out. Then reverse the shoulder plane to trim the full shoulders down to the scribed line, making the same number of passes on each shoulder.



Next, pare away material from the cheeks of the tenon so that it fits the mortise. You can use a shoulder plane here, but a router plane works even better and makes it easier to keep the tenon centered on the thickness of the workpiece. Rest the router plane on the face of the workpiece so it overhangs the tenon. Lower the cutter to just graze the cheek of the tenon and remove the waste by making overlapping, arcing passes, *below*. Flip the workpiece over and repeat on the other face to keep the tenon centered.





You can also fine-tune the fit of the tenon with files or a planemaker's float (shown). Count the number of strokes you take off each face to keep the tenon centered.



If the tenon shoulders fail to seat tightly against the mating piece, try undercutting them to remove any high spots or excess material that may be the culprit.

TIP!

If you accidentally make your tenon too loose, glue pieces of veneer or thin wood to the cheeks and refit.

Keep testing the fit of the tenon in the mortise and lower the cutter as needed until you sneak up on the right thickness. If you don't own a router plane, try using a chisel; a float, *above, top*; or even a scrap of wood with self-adhesive sandpaper attached.

The last step is to use your chisel to trim off material from the edge cheeks of the tenon until the width fits the mortise. Insert the tenon into the mortise and check the final fit.

If you notice a gap between the shoulders of the tenon and the mating piece, check to make sure that the tenon isn't bottoming out in the mortise. If it is, trim the end of the tenon slightly.

Excess material around the base of the tenon can also prevent the piece from seating fully. Slightly undercutting the shoulders, *above, bottom*, may help close up any gap, but don't undercut too much. The strength of a mortise-and-tenon joint relies partly on the contact at the shoulders.

A properly fitted tenon will slide into place with hand pressure and make a satisfying thunk as it seats fully into place. Even without glue, the mating pieces should hang together when you lift straight up on the tenoned workpiece. With joints like this, you can rest assured that your assembled project will last for years. 🌲

TIP!

Planing a small chamfer around the end of the tenon makes it easier to insert into the mortise.

TRI-TIERED TOWEL RACK

This handsome holder provides air-circulating space for damp towels and doubles as a great way to display favorite quilts.

WRITER: KERRY GIBSON

DESIGNER: KEVIN BOYLE

BUILDER: BRIAN BERGSTROM



OVERALL DIMENSIONS

28"W x 11¼"D x 38"H

Wall-mounted towel bars don't offer much in aesthetics or hanging space. By contrast, this three-tiered rack provides a decorative way to display and air-dry your plush towels. A slatted bottom shelf provides bonus storage and allows air to circulate. The rack is perfect for adding extra guest-towel space (for those nice towels nobody else gets to use), and can serve as a quilt display or blanket rack the rest of the time.

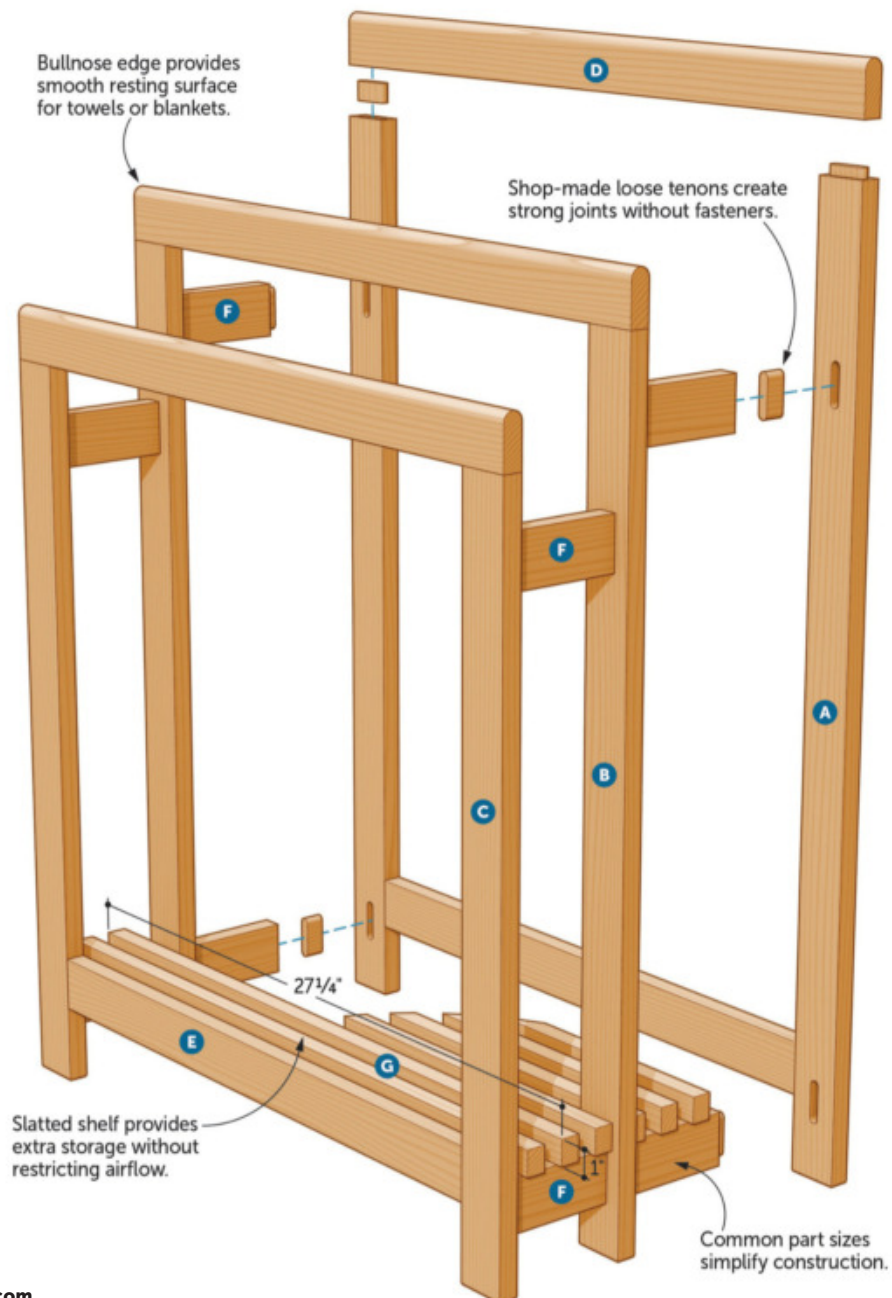
The rack parts are simple to create, and are connected with loose-tenon joints [Exploded View]. To make those, first build the *Sure-Fit Mortising Jig* on page 67, which works with your plunge router to quickly and accurately position and rout the mortises.

CREATE THE LEGS AND RAILS

1 Rip $\frac{3}{4}$ " stock to 2" wide, then crosscut the legs (A, B, C) and rails (D, E, F) to length [Exploded View, Parts List].

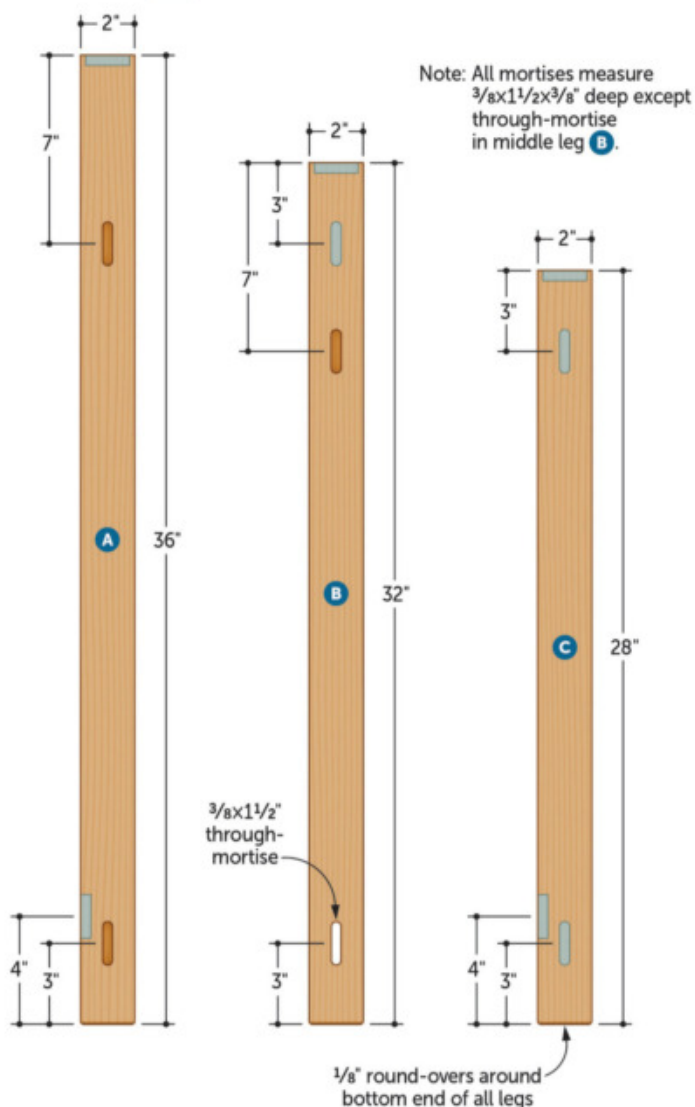
2 Lay out and mark the centerline of the mortise length on the top end of each leg and in both ends of each side rail (F) [Drawing 1]. Then lay out the centerlines of the mortises on the faces and edges of the legs. Be sure to lay out the mortises in the legs so the opposing legs mirror each other.

EXPLODED VIEW



PHOTOGRAPHER: JACOB FOX; ILLUSTRATOR: CHRISTOPHER MILLS

1 LEG DETAILS (right legs shown)

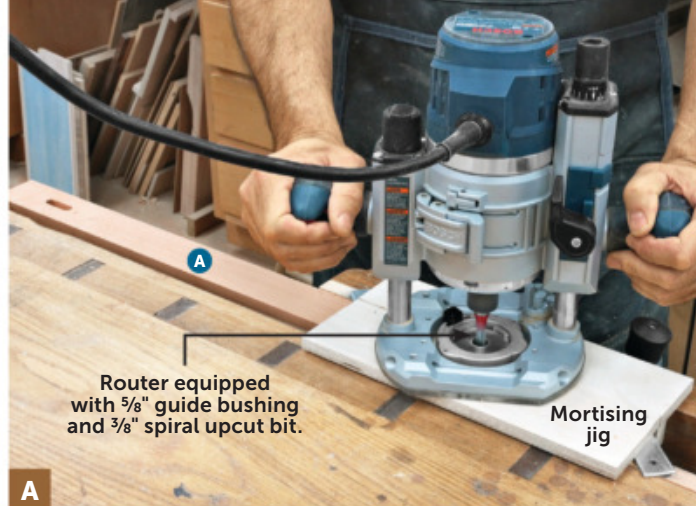


TIP!

A spiral upcut bit pulls chips out of the mortise that could otherwise become trapped, overheating the bit and burning the walls of the cut.

3 Install a $\frac{5}{8}$ " guide bushing and a $\frac{3}{8}$ " spiral upcut bit in your plunge router. Place the router on the mortising jig and set the plunge depth so that the bit projects $\frac{3}{8}$ " below the jig risers. Test your setup using the jig on scrap material to ensure it cuts $\frac{3}{8}$ " deep. Then set one of the router's depth stops at this level.

4 Rout the mortises in the appropriate face of each leg (A-C) [Photo A]. For the through-mortise in each middle leg (B), make a pass with the depth stop, then bypass it and make another pass to cut all the way through. Cut the mortises in an edge of each back and front leg (A, C) [Photo B], as well as the top rails (D). Then rout the mortises in the top end of each leg (A-C) [Photo C], and in both ends of the bottom rails (E) and side rails (F).



Align the jig mortising window's centerline with the centerline of the mortise, then secure the leg (A) between the jig's clamping bars. Set the plunge router to rout a $\frac{3}{8}$ "-deep mortise.



Clamp the mortising jig onto each leg to rout the mortises in the edges of the back and front legs (A,C) to accept the bottom rails (E). The pairs of legs should mirror each other.



Center the jig on the end of a leg and firmly clamp it in place. A bench vise helps hold the leg and jig. Rout the top end of all legs (A-C) and both ends of the bottom rails (E) and side rails (F).

SURE-FIT MORTISING JIG

Create clean, consistently sized mortises for this project and others with this handy, shop-built jig. It adjusts to fit the width or thickness of your workpiece and puts the mortise smack-dab in the center.

This mortising jig uses a plunge router equipped with a $\frac{5}{8}$ " guide bushing and a $\frac{3}{8}$ " spiral upcut bit to rout consistent $\frac{3}{8}$ "x $1\frac{1}{2}$ " mortises. Clamping bars swivel on aluminum pivot arms to draw tightly against your workpiece while centering the mortising plate on the

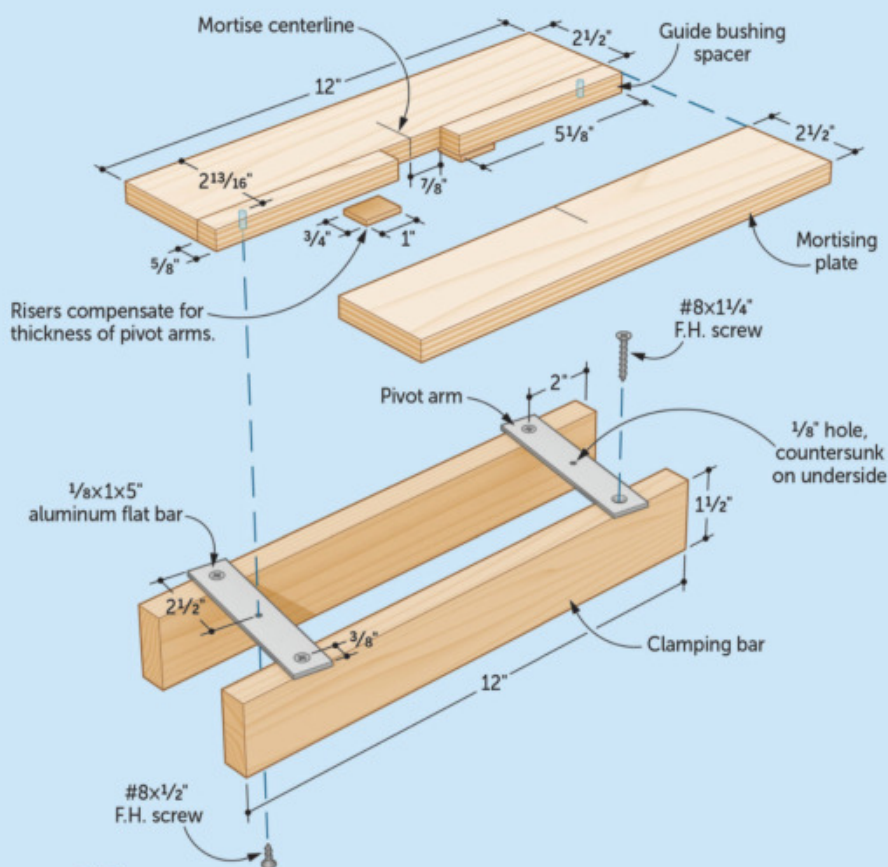
workpiece's width or thickness. Simply align the jig's centerline with your mortise centerline, press the clamping bars against the workpiece, clamp, and use the jig's window as a template to rout the mortise. Follow these steps to build the jig:

1 From $\frac{1}{2}$ " plywood, cut two $2\frac{1}{2}$ "x 12 " mortising plates and two $\frac{5}{8}$ "x $5\frac{1}{8}$ " guide bushing spacers [Drawing]. Glue the spacers between the mortising plates, keeping the ends flush to form a $1\frac{3}{4}$ "-long window between the mortising plates.

2 From $\frac{1}{8}$ " stock, cut two $\frac{3}{4}$ "x 1 " risers and glue them to the underside of the mortising plate assembly, flush with the ends of the window. Measure and mark a centerline for the window on the face of each mortising plate, extending onto the edges of the window.

3 From $\frac{1}{8}$ "x 1 " aluminum bar stock, cut two pivot bars 5" long. Drill a $\frac{1}{8}$ " countersunk hole in the center of each bar. Then flip the bars over and drill countersunk holes $\frac{3}{8}$ " from each end of both bars.

4 From $\frac{3}{4}$ " stock, cut two $1\frac{1}{2}$ "x 12 " clamping bars. Drill pilot holes centered in the edges of the clamping bars 2" from each end. Then attach the pivot arms with screws, taking care that the ends of the clamping bars align when the pivot arms are square to them. Screw the center of the arms to the underside of the mortising plate assembly, centered in both directions, and you're ready to rout mortises.



“

THIS SIMPLE JIG WORKS WITH STOCK FROM $\frac{3}{4}$ " TO 3" THICK OR WIDE, MAKING IT ONE THAT I REACH FOR OVER AND OVER AGAIN.

-KEVIN BOYLE, SENIOR DESIGN EDITOR

”

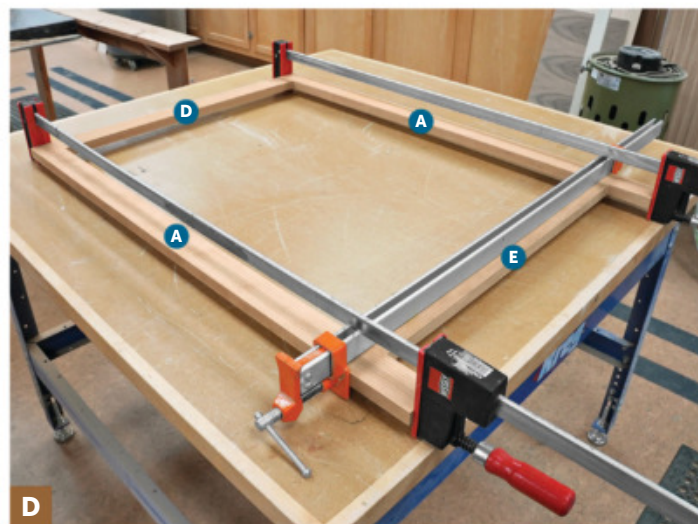
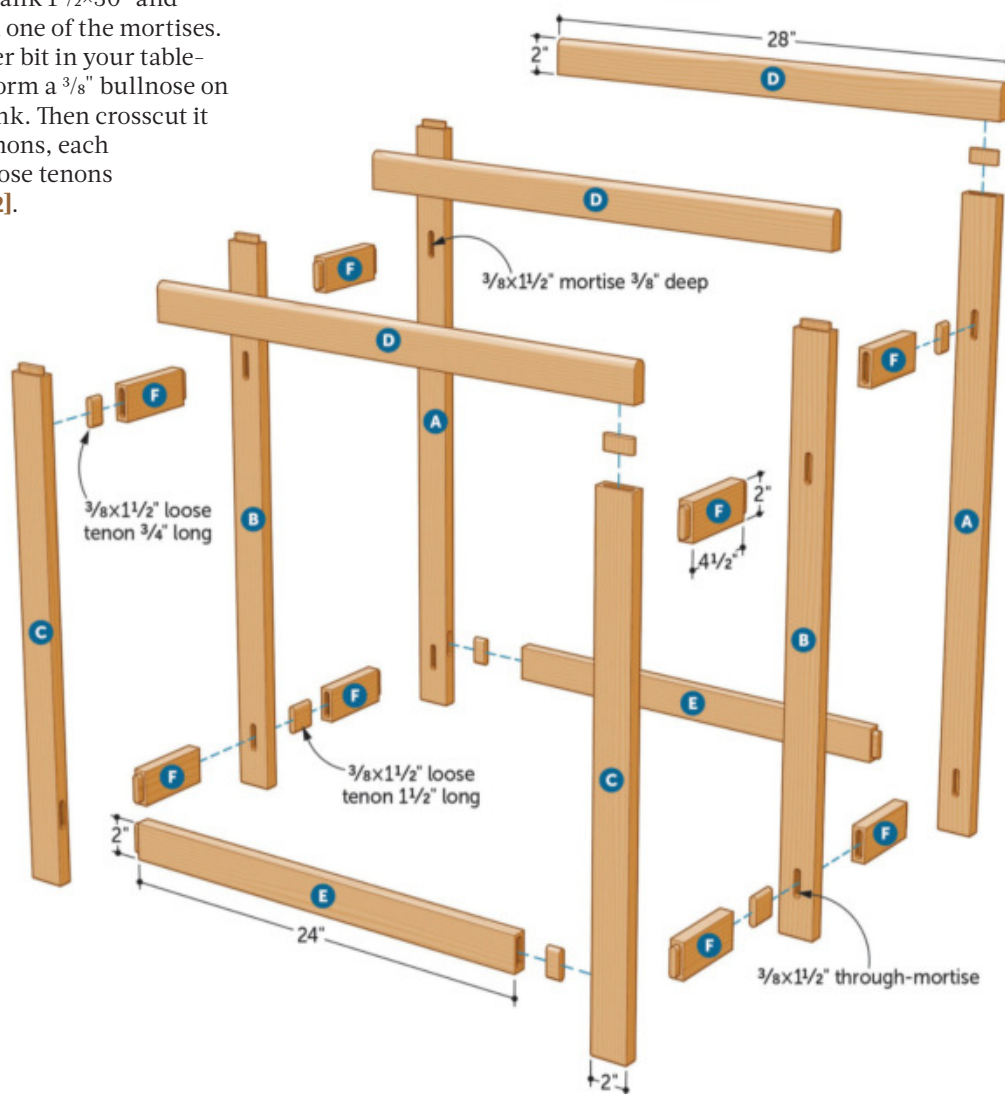
5 From $\frac{3}{8}$ " stock (we used scrap), cut a loose tenon blank $1\frac{1}{2} \times 30$ " and test the thickness in one of the mortises. Use a $\frac{3}{16}$ " round-over bit in your table-mounted router to form a $\frac{3}{8}$ " bullnose on each edge of the blank. Then crosscut it to create 22 loose tenons, each $\frac{3}{4}$ " long, plus two loose tenons $1\frac{1}{2}$ " long [Drawing 2].

“GIVEN THE LARGE NUMBER OF MORTISE-AND-TENON JOINTS, THIS PROJECT PROVES PERFECT FOR THE EASE AND SIMPLICITY OF LOOSE TENONS.”

-KEVIN BOYLE, SENIOR DESIGN EDITOR

”

2 FRAME ASSEMBLY

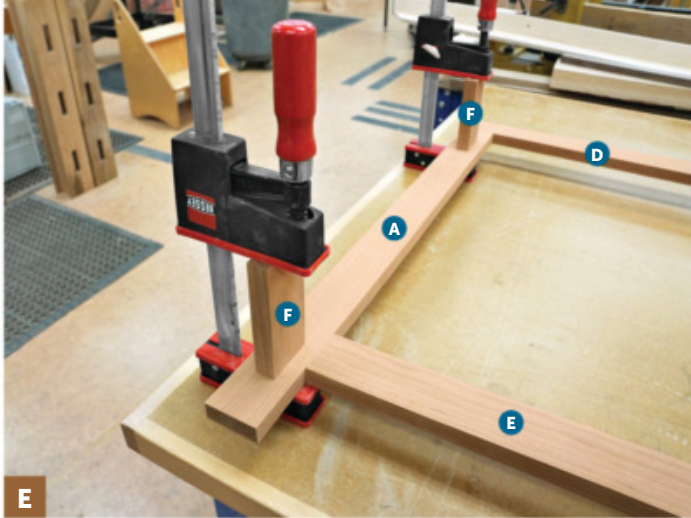


Apply glue to the mortised ends and edges of the back legs (A) and rails (D, E), as well as to the tenons, and clamp up the frame. Repeat for the front frame (C-E). Add the final top rail to the middle legs (B).

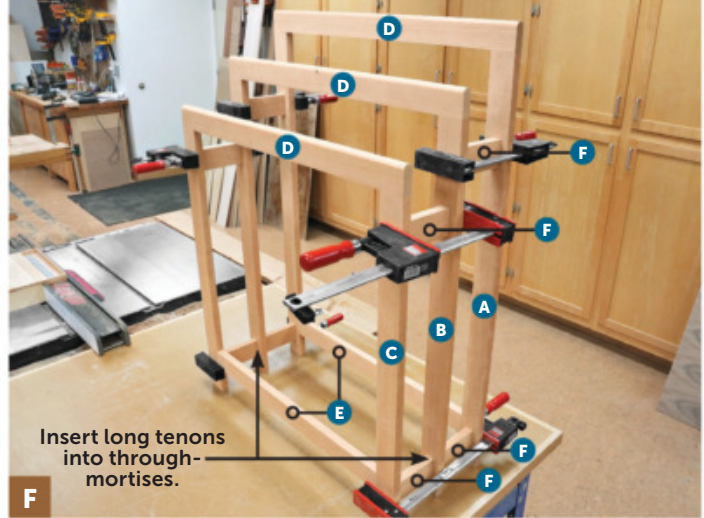
ASSEMBLE AND ADD SLATS

1 Glue and clamp each back, middle, and front frame assembly together [Photo D]. When the glue dries, install a $\frac{3}{8}$ " round-over bit in your router and round over both upper edges of the top rails (D) to form a bullnose profile. Then finish-sand the frame assemblies and side rails (F).

2 Glue and clamp side rails (F), with loose tenons, to the front and back frames [Photo E]. When the glue dries, insert the longer tenons through the lower mortises in the middle legs, then glue and clamp the towel rack assembly together [Photo F].



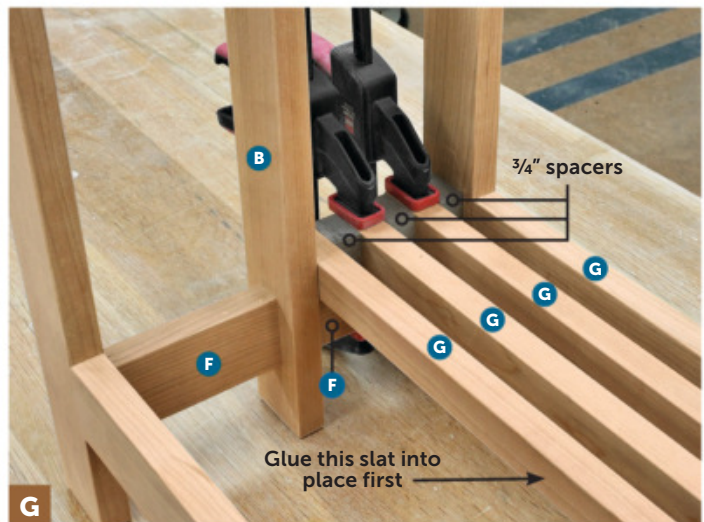
Glue side rails (F), with loose tenons, to the legs (A) of the back frame assembly (A/D/E). Then repeat the step to glue side rails to the legs of the front frame assembly (C/D/E).



Glue and clamp the middle frame assembly (B/D) between the front and rear frame assemblies. Move from clamp to clamp, applying pressure evenly to prevent the assembly from racking or twisting.

3 From $\frac{3}{4}$ " stock, cut the shelf slats (G) to size [Exploded View, Parts List]. Glue a slat to the side rail on one side of the middle legs (B) with an equal overhang on each end. Then use $\frac{3}{4}$ " spacers to glue the remaining slats into place [Photo G].

4 Touch up any finish-sanding needed and apply finish. We recommend several coats of spar varnish if you'll be using the rack to hang damp towels. Now, hop in the shower to wash off the sawdust, then hang up your wet towel on the rack to dry. 🌿



Glue a shelf slat (G) to the side rails (F), tight against the middle leg (B). Then use $\frac{3}{4}$ " spacers to position and attach the remaining slats. Repeat the process on the other side of the middle leg.

PARTS LIST

PART		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	BACK LEGS	$\frac{3}{4}$ "	2"	36"	C	2
B	MIDDLE LEGS	$\frac{3}{4}$ "	2"	32"	C	2
C	FRONT LEGS	$\frac{3}{4}$ "	2"	28"	C	2
D	TOP RAILS	$\frac{3}{4}$ "	2"	28"	C	3
E	BOTTOM RAILS	$\frac{3}{4}$ "	2"	24"	C	2
F	SIDE RAILS	$\frac{3}{4}$ "	2"	4 $\frac{1}{2}$ "	C	8
G	SHELF SLATS	$\frac{3}{4}$ "	1"	27 $\frac{1}{4}$ "	C	6

MATERIALS KEY: C—cherry.

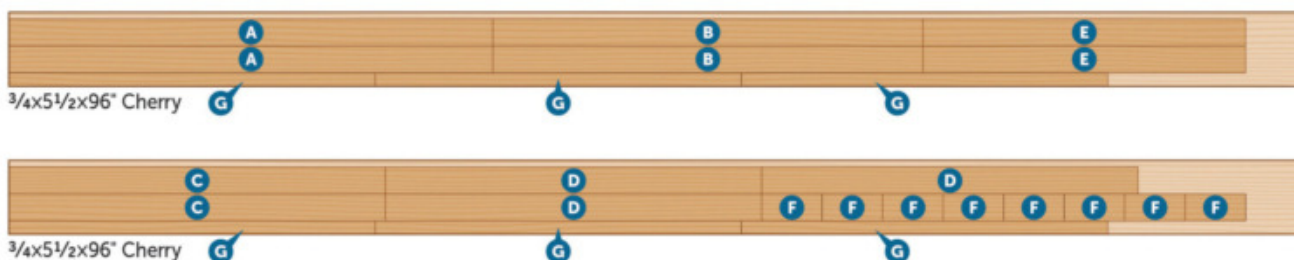
SUPPLIES: $\frac{1}{8}$ ×1×12" aluminum flat bar.

BITS: $\frac{5}{8}$ " router guide bushing, $\frac{3}{8}$ " spiral upcut bit, $\frac{1}{8}$ ", $\frac{3}{16}$ ", and $\frac{3}{8}$ " round-over bits.

PROJECT COST: It cost us about \$65 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

We purchased 8 board feet of 4/4 cherry. Before cutting parts to size, we planed the stock to the thicknesses shown in these example boards.



CONTRASTING COAT CATCHER

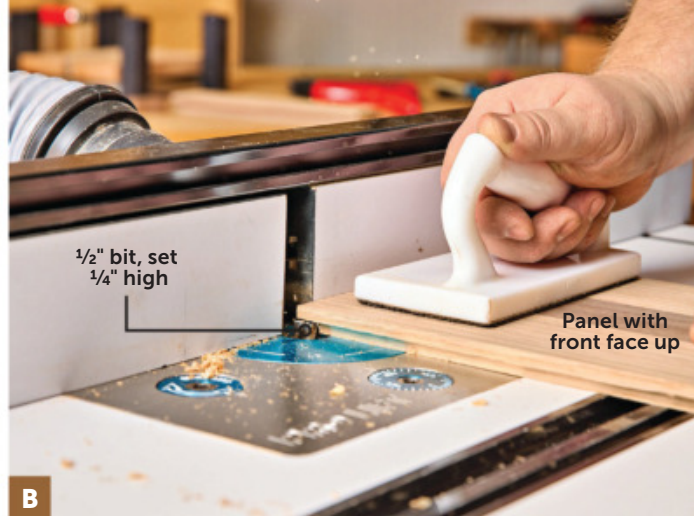


Turn the contents of your cutoff bin into an eye-catching coat-hanging rack, complete with handcrafted hooks.

WRITER: KERRY GIBSON
DESIGNER/BUILDER: JOHN OLSON

Most woodworkers find it difficult to throw away cutoffs of even the smallest size—but especially expensive or exotic hardwoods. So our scrap bins soon overflow with stock too good to pitch, yet too small to be useful for most projects. This shelf lets you celebrate those scraps in a mix of light and dark that creates style and interest.

PHOTOGRAPHER: JASON DONNELLY; **ILLUSTRATOR:** CHRISTOPHER MILLS



Glue the panel center (A) between the panel ends (B), making sure the edges align. Apply only enough clamping pressure to hold the pieces together so the panel assembly remains flat.

With a $\frac{1}{2}$ " spiral upcut bit installed in the router table, cut rabbets in the back face of the panel. Make the cuts in multiple passes, moving the fence between passes until the rabbets are $\frac{3}{4}$ " wide.

PREPARE THE PANEL

1 From $\frac{1}{2}$ " stock, cut the panel center (A), panel ends (B), and panel top and bottom (C) to size [Drawing 1, Parts List]. Glue the panel center between the panel ends [Photo A], then glue the center/end assembly (A/B) between the panel top and bottom (C).

2 Sand the glued-up panel smooth and cut a rabbet around the back [Photo B]. Finish-sand the panel and apply a finish. We wiped on two coats of polyurethane.

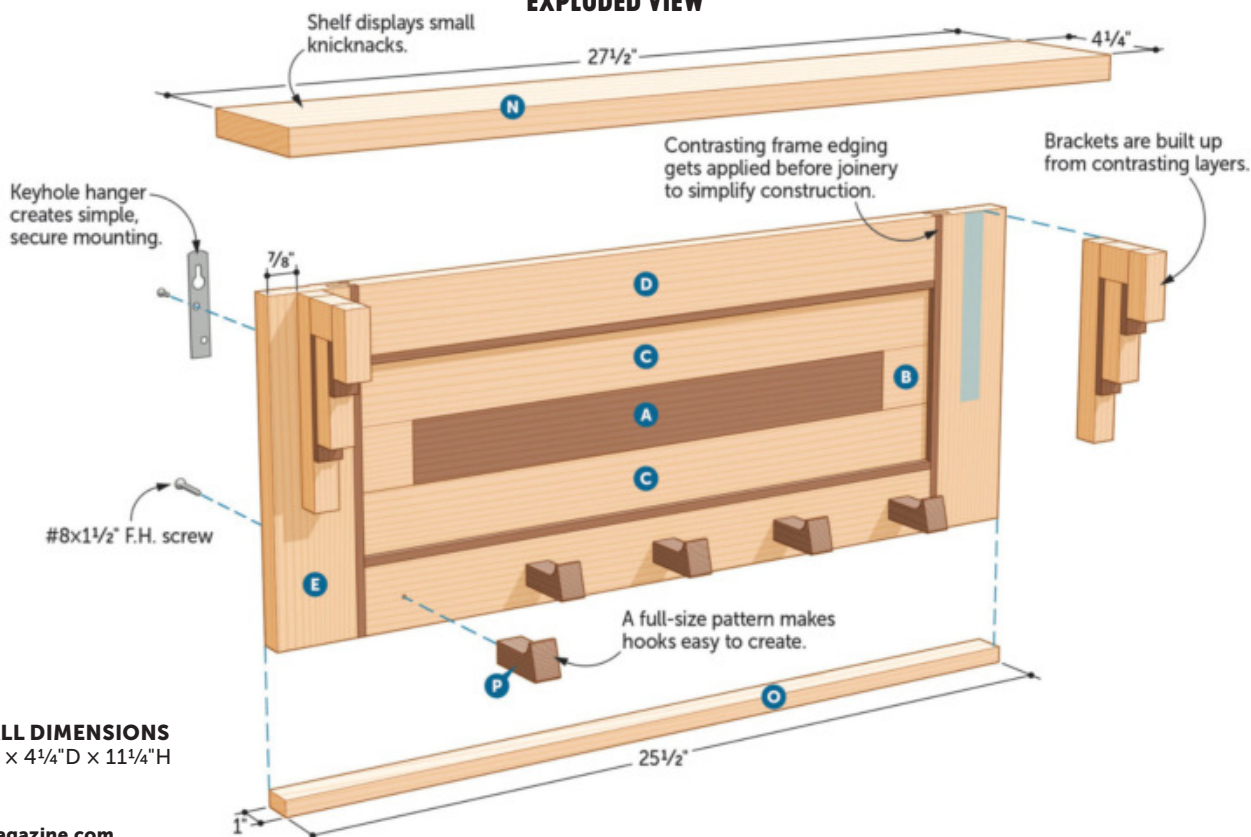
Note: The panel will float in the frame without glue, so apply finish to the rabbets to prevent bare wood from showing.

FRAME UP THE PANEL

1 From $\frac{3}{4}$ " stock, cut the shelf rails (D) and stiles (E) to size [Drawing 1, Parts List]. From $\frac{1}{4}$ " stock, cut the rail edging (F) and stile edging (G) to size. Glue and clamp an edging strip to the inner edge of each rail and stile.

2 After the glue dries, cut a $\frac{1}{4}$ " groove centered in the inner edge of each rail (D/F) and stile (E/G) assembly [Photo C].

EXPLODED VIEW



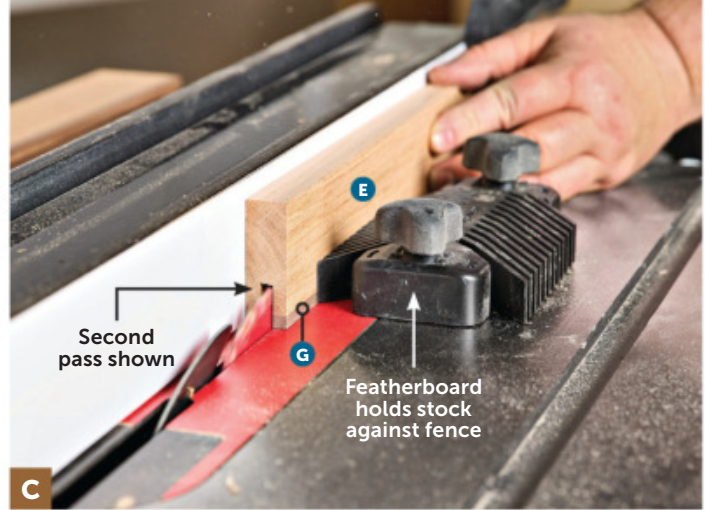
OVERALL DIMENSIONS
27 $\frac{1}{2}$ "W x 4 $\frac{1}{4}$ "D x 11 $\frac{1}{4}$ "H

3 Using the grooves you just cut to index the blade height, form tenons on the ends of the rails (D/F), cutting them in multiple passes [Photo D].

Note: You may need to rout these slots in two passes to match the width of the keyhole hangers.

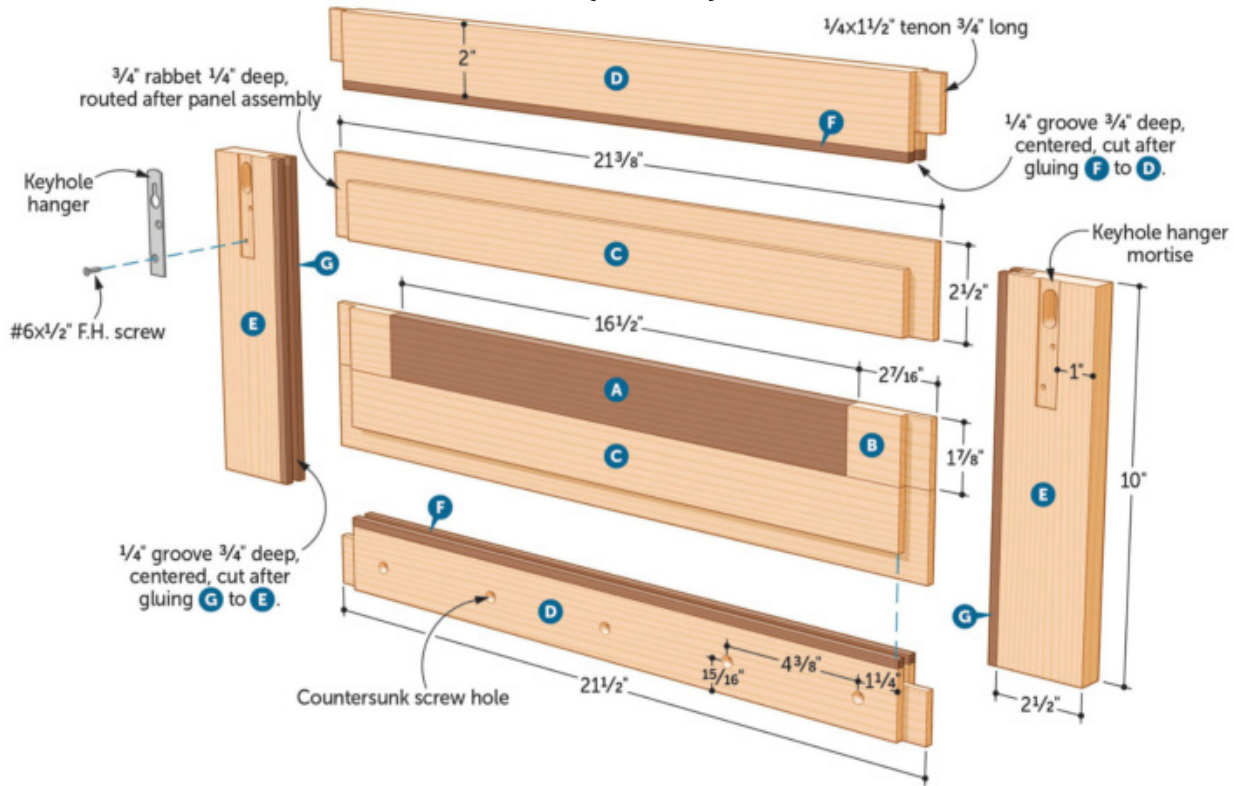
4 Rout a shallow slot in the upper back face of the stiles (E/G) for the keyhole hanger brackets [Photo E, Source]. With the slots routed, scribe the keyhole location on each stile. Use a $\frac{3}{8}$ " Forstner bit to drill overlapping holes to create a keyhole mortise [Drawing 1] for the wall-mounting screw heads. Drill pilot holes for the mounting screws.

5 Apply glue to the tenons on the rails (D/F), position the panel (A/B/C) without glue, then clamp the stiles (E/G) into place. When the glue dries, finish-sand the frame assembly.



Using a $\frac{1}{8}$ " blade set $\frac{3}{4}$ " high, cut a $\frac{1}{4}$ " centered groove in the edge of the stiles (E/G) in two passes, flipping the workpiece end for end between passes. Repeat to cut grooves in the rails (D/F).

1 FRAME ASSEMBLY (Rear View)



BUILD UP THE BRACKETS

1 From $\frac{3}{4} \times \frac{3}{4}$ " stock, cut the bracket back (H), middle (I) and front strips (J) to size [Drawing 2]. From $\frac{1}{4}$ " stock, cut the long (K) and short (L) keys to size. Glue the middle strips between the short and long keys, keeping the top ends flush.

2 While the glue dries, measure the width of the bracket assembly (K/I/L)

and cut a filler (M) to match. Glue and clamp the filler into place. When the glue dries, glue and clamp the back (H) and front (J) strips to the bracket assembly (I/K/L/M).

3 Finish-sand the brackets, then glue and clamp them to the stiles (E/G), keeping the ends flush [Exploded View].



Set blade height to match the groove shoulder in the rails (D/F). Using the fence as a stop, cut the tenon shoulder. Then make repeated passes to form the tenon cheek. Repeat for the remaining tenons.

Use the keyhole hanger thickness to set the bit height. Mark the length of the slot with tape. Cut the slot in two passes, centered on the stile (E/G). Then use a chisel to square the ends of the slot.

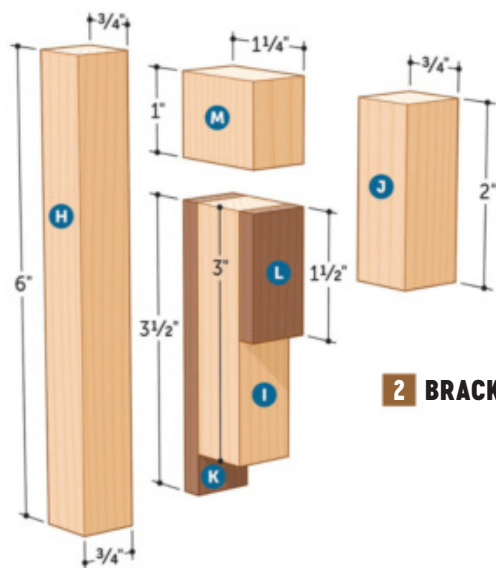
TOP IT, TRIM IT, HOOK IT

1 Cut the shelf (N) and the lower trim (O) to size, finish-sand them, then glue and clamp them to the frame and panel assembly (A–M) **[Exploded View]**.

2 Cut a $\frac{3}{4} \times 1 \times 16$ " blank for the hooks (P). Make five copies of the Shelf Hook Full-size Pattern **[Drawing 3]** and adhere them to the blank. Rough-cut the hooks, then sand them to shape.

3 Finish-sand the hooks and ease the exposed edges. Lay out and drill countersunk mounting holes in the lower frame rail (D/F) **[Drawing 1]**. Drill a pilot hole, centered, in the end of each hook, then glue and screw each hook into place **[Exploded View]**.

4 Complete any finish-sanding needed and apply the same finish you used for the center panel. Fasten the hanger brackets into place in the routed slots, then mount the shelf to the wall and enjoy a project you can really hang your hat on! 🌿



2 BRACKET

PARTS LIST

PART		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	PANEL CENTER	1/2"	17/8"	16 1/2"	W	1
B	PANEL ENDS	1/2"	17/8"	27 1/16"	O	2
C	PANEL TOP/BOTTOM	1/2"	2 1/2"	21 3/8"	O	2
D	RAILS	3/4"	2"	21 1/2"	O	2
E	STILES	3/4"	2 1/2"	10"	O	2
F*	RAIL EDGING	1/4"	3/4"	21 1/2"	W	2
G*	STILE EDGING	1/4"	3/4"	10"	W	2
H	BRACKET BACK STRIPS	3/4"	3/4"	6"	O	2
I	BRACKET MIDDLE STRIPS	3/4"	3/4"	3"	O	2
J	BRACKET FRONT STRIPS	3/4"	3/4"	2"	O	2
K	BRACKET LONG KEYS	1/4"	3/4"	3 1/2"	W	2
L	BRACKET SHORT KEYS	1/4"	3/4"	1 1/2"	W	2
M	BRACKET FILLERS	3/4"	1 1/4"	1"	O	2
N	SHELF	3/4"	4 1/4"	27 1/2"	O	1
O	BOTTOM TRIM	1/2"	1"	25 1/2"	O	1
P*	HOOKS	3/4"	1"	2"	W	5

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: O—red oak, W—walnut.

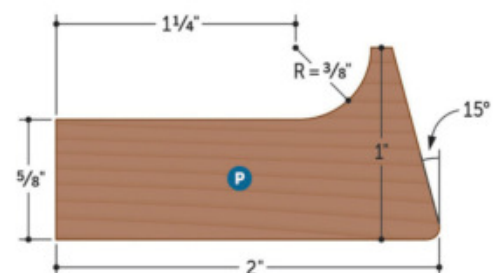
SUPPLIES: #6 $\times\frac{1}{2}$ " and #8 $\times 1\frac{1}{2}$ " flathead screws.

BITS: $\frac{1}{2}$ " spiral router bit, $\frac{3}{8}$ " Forstner bit.

SOURCE: Keyhole cabinet hanger no. 00S0402, \$1 each, leevalley.com

PROJECT COST: Because we built this project from scrap, it cost us about \$2 to build. Your cost will vary by region and source.

3 SHELF HOOK FULL-SIZE PATTERN





LIGHTS. CAMERA. TOOLS!

The video cameras are rolling on a new series in the *WOOD*® studio, chronicling Design Editor John Olson and Senior Design Editor Kevin Boyle unboxing and testing new and interesting tools. Check out these low-priced tools they've recently put through their paces, and tune in to our YouTube channel, youtube.com/wood, to see more reviews.



Compact bandsaw packs a punch

When John and Kevin cracked open the Harbor Freight shipping box, they weren't sure what to expect from a \$600 Bauer bandsaw. But they ended up impressed with features that include ball-bearing blade guides, rack-and-pinion adjustment, quick-release blade tension, and heavy-gauge steel construction. Despite its compact size, this saw delivers an 8" depth of cut and over 13" of throat capacity, both of which can be well used by its 1-hp, two-speed motor. Tune in to see the results John and Kevin got when they put the saw to the test cutting big tenons and resawing wide stock.

Harbor Freight, harborfreight.com

Bauer 1 HP, 14 in. Stationary Woodcutting Band Saw no. 70813, \$600



See how well the Bauer bandsaw resaws and cuts tenons.

woodmagazine.com/bauerbandsaw



Small planes offer big value

Jorgensen's claim to fame is its line of high quality clamps. So how good could a new inexpensive mini block plane (\$17) and no. 60½ block plane (\$38) really be? The answer surprised John and Kevin. Both planes feature excellent castings, reliable adjustments, and irons made from O1 steel. Watch to see how these planes produce fine wood shavings while offering serious dollar savings.

Jorgensen, ponyjorgensen.com

Mini Block Plane no. 70700, \$17;

No. 60½ Low-angle Block Plane no. 70710, \$38



See how this pair of bottom-dollar planes performs.

woodmagazine.com/jorgensenplanes



Bargain-priced HVLP sprayer

Always on the hunt for new finishing solutions, John and Kevin checked out the Titan EP 60X HVLP spray system. Available at Home Depot for \$350, it's equipped with 2.5-psi turbine with adjustable airflow, along with an all-metal, siphon-feed gun with three spray patterns that connects with a 25' hose. Watch to see how well this low-priced system performs.

Titan, titantool.com

Fine Finishing HVLP Sprayer no. EP 60X, \$350



Watch John and Kevin put this sprayer to the test.

woodmagazine.com/titansprayer



SHOP-TESTED BUCKET-LID SEPARATOR KEEPS VACUUM ALMOST DUST-FREE

Tester: Dave Stone

Despite having a dust-collection system, I still regularly use my shop vacuum for catching sawdust and chips in my shop, especially with my miter saw. And every time I use it, I grumble about the mess and hassle of emptying the vacuum.

This new dust separator from Kreg makes it a lot easier by capturing most of the dust and chips in a 5-gallon bucket instead. While bucket-lid separators are nothing new, this one has a few features that I appreciate over others I've tried.

First, it actually works. Kreg claims the separator captures 99.9% of dust and particles. I didn't measure, but I can say the internal fins knock even fine dust out of the airflow and into the bucket instead of into the vacuum.

Second, the separator includes a hose that mounts to a swiveling elbow. So I don't need a second shop vacuum hose, and I don't have to fight against the stiffness of two hoses that can limit bucket positioning or knock it off balance.

Kreg, kregtool.com
Dust Separator no. KWS-DS100, \$60

SHOP-TESTED COATING CREATES A SLICK TABLESAW TOP

Tester: Jim Heavey

While doing my annual tablesaw tuneup, I decide it was time to recondition the saw table. Time, humidity, and repeated use as a multipurpose worksurface had taken their toll. Instead of my usual cleaning and application of paste wax, I tried a carbon coating kit from Carbon Method.

Before starting, I used Naval Jelly and an abrasive pad to remove stubborn rust spots. Then I turned to the kit that contains all of the needed coatings and applicators.

First, I applied Carbon Cleanse to remove any residual contaminants. The graphene Carbon Coat comes next—a process of applying, waiting, leveling, and buffing that is repeated three to four times. Each coat builds depth and increases protection. After curing for 24 to 48 hours, a final coat of Carbon Glide friction reducer goes on.

I'm very pleased with the results. Material literally glides on the surface, and the protection should far outlast the continual waxing I had used in the past. The kit included enough product for one to two tools, so I have plenty left over to refresh the finish as needed to keep my saw functioning better than new. Larger kits for multiple tools are also available.

Carbon Method, carbonmethod.com
Carbon Coating Kit for 1-2 tools, \$85



SHOP-TESTED TABLESAW JIG MAKES EASY WORK OF RIPPING THIN STRIPS

Tester: Dave Stone

I don't have to rip a lot of thin strips for my projects, so I've always cobbled together my own setups instead of investing in an expensive thin-strip ripping jig.

When Rockler introduced its Thin-Rip Table Saw Jig for only \$40, though, I decided it was finally time to give a commercial jig a try.

I'm impressed with the sturdy aluminum and polymer construction. I'm confident that it will outlast me. I also like the dual bearings that the workpiece rides against. They ensure smooth movement and register positively for accurate cuts. The jig has imperial and metric scales with $\frac{1}{16}$ " and 1mm increments. It fits any standard $\frac{3}{4}$ " x $\frac{3}{8}$ " miter-gauge slot that's within $2\frac{1}{4}$ " to 7" from the blade.

Rockler, rockler.com
Thin-Rip Table Saw Jig no. 70948, \$40





IMPRESSIVE PEDESTAL TABLE

Stacked trim and thoughtful jigs make building big easier than you think. We'll serve up a recipe for how to build this table that's as substantial as the feast you'll spread on it.



LOFTY CANDLE STANDS

The branching design of these candlesticks gives a nod to the trees they were made from. Sturdy and airy at the same time, they'll brighten your mantel or tabletop.



CNC HALF-TONE POP ART

Learn this fun and easy V-carving technique that transforms your favorite photos into modern art using your CNC machine.



BLANKET CHEST

Inspired by the designs of Arts & Crafts furniture-maker Charles Rohlf's, this chest adds versatility in the form of a spacious drawer.

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