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5 Must-Have Jigs from a Half-Sheet of Plywood p.34

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\$10,000
to Outfit
Your Shop!
See page 14

Turn Unused
Tools into \$\$ p.50

Plus these
Great Plans

- ▶ Rolling Tool Chest p.20
- ▶ Space-Saving Loft/Desk p.26
- ▶ Elegant Dining Chair p.45



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- Max. cutting height: 6"
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- Max. cutting height: 6"
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- Max. cutter dia.: 5"
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G1035 ONLY \$595⁰⁰
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G1035P ONLY \$595⁰⁰



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- Motor: 2 HP, 120V/240V, single-phase, 60 Hz (prewired 120V)
- Amps: 15A at 120V, 7.5A at 240V
- Precision-ground cast iron table with wings measures: 40 1/2" W x 27" D • Table height: 35 1/2" • Footprint: 21" L x 19 1/4" W
- Arbor: 3/4" • Arbor speed: 3450 RPM
- Max. depth of cut @ 90°: 3 1/4" • Max. depth of cut @ 45°: 2 1/4"
- Rip capacity: 30" right, 15" left
- Overall size: 57 1/4" W x 35 1/2" H x 37 1/2" D
- Approx. shipping weight: 348 lbs.

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12" BABY DRUM SANDERS

- Sanding motor: 1 1/2 HP, 115V, single-phase, 13A
- Conveyor motor: 1/4 HP, 115V, single-phase, 0.3A
- Drum surface speed: 2127 FPM
- Maximum stock dimensions: 12" wide x 3 1/2" thick
- Minimum stock length: 8"
- Sanding drum size: 4"
- Sanding belt size: 3" x 70" hook & loop
- Dust collection port: 2 1/2"
- Feed rate: 2.5-17.3 FPM
- Approx. shipping weight: 166 lbs.



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G0459P \$695⁰⁰ **SALE \$575⁰⁰**



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8" JOINTERS

- Motor: 3 HP, 220V, single-phase, TEFC, 15A
- Precision-ground cast iron table size: 8" x 72 1/2"
- Max. depth of cut: 1/4" • Max. rabbeting depth: 1/2"
- Cutterhead dia.: 3" • Cutterhead speed: 4800 RPM
- Cuts per minute: 20,000 (G0656P), 21,400 (G0656PX)
- Approx. shipping weight: 500 lbs.

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15" PLANERS

- Motor: 3 HP, 240V, single-phase, 15A
- Precision-ground cast iron table size: 15" x 20"
- Min. stock thickness: 3/4"
- Min. stock length: 8"
- Max. cutting depth: 1/4"
- Feed rate: 16 & 30 FPM
- Cutterhead speed: 4800 RPM
- Approx. shipping weight: 666 lbs.



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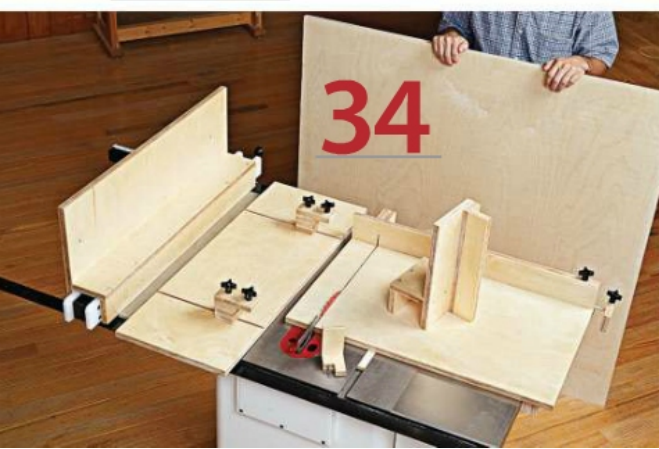


The **WOOD**® magazine difference: We build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.

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TACKLE A TABLESAW TUNEUP

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WOOD

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EDITORIAL CONTENT CHIEF DAVE CAMPBELL

DEPUTY EDITOR CRAIG RUEGSEGER

ART DIRECTOR KARL EHLERS

DIGITAL CONTENT MANAGER LUCAS PETERS

SENIOR DESIGN EDITOR KEVIN BOYLE

DESIGN EDITOR JOHN OLSON

TOOLS EDITOR BOB HUNTER

GENERAL-INTEREST EDITOR NATE GRANZOW

ADMINISTRATIVE ASSISTANT SHERYL MUNYON

CONTRIBUTING CRAFTSMEN BOB BAKER, TOM BRUMBACK, STEVE FEENEY, JIM HEAVEY, MARK LANE, DOUG LEY, BOB SAUNDERS, MATT SEILER, BRIAN SIMMONS
PHOTOGRAPHERS DEAN SCHOEPFNER, JASON DONNELLY
CONTRIBUTING ILLUSTRATORS TIM CAHILL, LORNA JOHNSON, ROXANNE LeMOINE
CONTRIBUTING DESIGNER KAYLI KUNKEL
PROOFREADERS BABS KLEIN, BILL KRIER, IRA LACHER, JIM SANDERS

ADVERTISING AND MARKETING

VICE PRESIDENT & GROUP PUBLISHER SCOTT MORTIMER
GROUP BUSINESS DEVELOPMENT DIRECTOR CURT BLADES
ADVERTISING SALES REPRESENTATIVE LISA GREENWOOD
SALES ASSISTANT NANCY ECHEVERRIA
ONLINE MEDIA KIT [woodmagazine.com/mediakit](#)

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CONSUMER MARKETING MANAGER BLAINE ROUBICK RETAIL BRAND MANAGER-NEWSSTAND TAMMY CLINE
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Skip the scams

Have you been tempted by those websites that offer thousands of woodworking plans for just a few dollars? The pitchman (typically "Ted") boasts that he personally designed 16,000 woodworking plans—which would take about 45 years doing one plan a day, 7 days a week, I figure. Curious, I bought the download.

Turns out that all of the plans are either pirated (used without permission from the copyright holders) or in the public domain. So what you're buying is stolen plans and ones that are already free, such as the actual plan from the download, shown *below*. Pretty great, right?

My advice: Steer clear. Instead, reward with your dollars the hardworking people who actually create high-quality plans. Don't "like" or "follow" the scammers on social media, and when you see ads for those sites, report them as spam. If you've fallen for the scam, contact your credit card company and report it—they should refund your money and flag the vendor as fraudulent.

Scammers renew their efforts

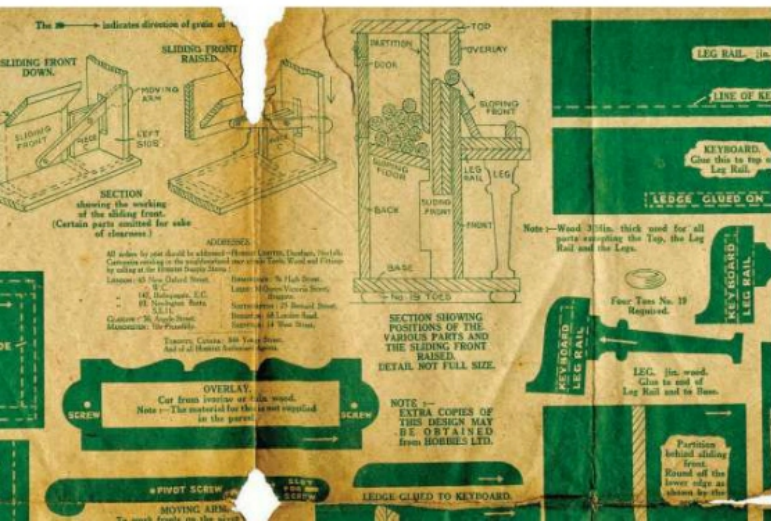
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I can't make this clear enough: All legitimate renewal notices from **WOOD** will come attached to your magazine; in the mail with a return address in Boone or Des Moines, Iowa; or on rare occasions by telephone.

The company names I hear most often associated with this rip-off are Publishers Billing Association, Readers Payment Service, and Publishers Billing Emporium. I've posted a list at woodmagazine.com/renewalscam of other names these shady companies are known to use, so please check it before responding to any offer. And please send any bogus renewal offers you get to me at 1716 Locust St., LS-253, Des Moines, IA, 50309-3023. Thanks. 🌲

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WOOD® toy box weathers the storm

In the fall of 2012, I built the Toy Box/Blanket Chest featured in your December/January 2010/2011 issue as a Christmas gift to our daughter and her husband, who were in the process of adopting a child from Russia. But that December, Russia terminated all pending adoptions. In light of the sad turn of events, I finished the toy box, but stored it in our upstairs closet.

A year later, our home was leveled by an EF4 tornado. Several days after the storm, we were delighted to find the toy box buried in the rubble—dinged up, but intact. It was one of the few pieces of our furniture that survived. Nine months after the storm, our kids successfully adopted a handsome baby boy, who is now using that toy box for its original purpose. We chose to leave the damage, but did soften the sharp edges to protect little fingers.

—Dick Stinson, Washington, Ill.



The EF4 tornado that tore through Washington, Illinois, damaged or destroyed more than 1,000 homes.

Tool review forgot a brand

I just read the jigsaw review in issue 228 (October 2014) and noticed that, though you said you reviewed “10 better-quality corded jigsaws,” you neglected to test any of Festool’s jigsaws—normally one of the better tool lines on the market. Why is that?

—Nick Vanaria, Romeoville, Ill.



Nick, that review focused on jigsaws priced between \$70 and \$175—a price range based on feedback from readers, who largely wanted jigsaws of good quality and performance, but with a value-conscious price. The Festool jigsaws are priced outside that range, as is Bosch’s JS572E.

—WOOD Editors



Box-tops article inspires

Someone gave me several small enameled tiles years ago, and I’d been trying to find a way to incorporate them into a woodworking project. Your technique for dressing up box tops in issue 228 (October 2014) provided just the inspiration I needed. I made a box from quilted maple, and the top with mitered strips of walnut and a backer board with the tiles glued on. My wife loves the box and is keeping it for herself. Thanks for the ideas, and keep them coming!

—Mike Aronhalt, St. Petersburg, Fla.

AFTER THE STORM



continued on page 6

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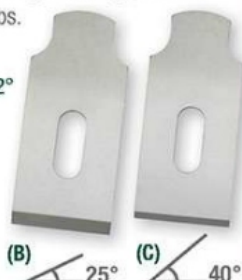
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Sounding Board



Trick for better butt joints

I really liked the technique for bolstering butt joints in issue 228 (October 2014), but I noticed you used an alternating top-bevel blade, which leaves tiny "ears" in the spline slots (*above*). A blade with a flat-top grind, such as a rip blade, cuts perfectly square ends and eliminates those little voids between the spline and the slot ends.

—Shaun Harper, Portland, Oregon

Article Update

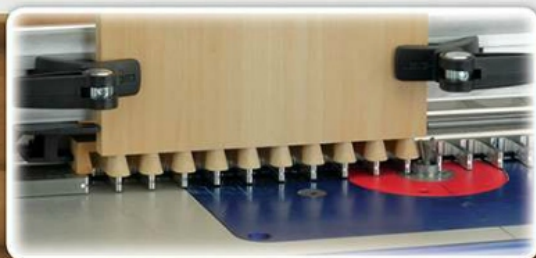
► Construction-grade crane

In issue 229 (November 2014), page 54, Step 2, under "Round up the boom cylinder," the text should specify a ¼" core-box bit, not a ⅛" bit. On page 55, Step 3, the last sentence should read "...bring the piston cylinder (P) to a final length of 6". On page 56, Drawing 5, part P should be 6" long, not 8". In the materials list, the length of part P should be 6", not 8".



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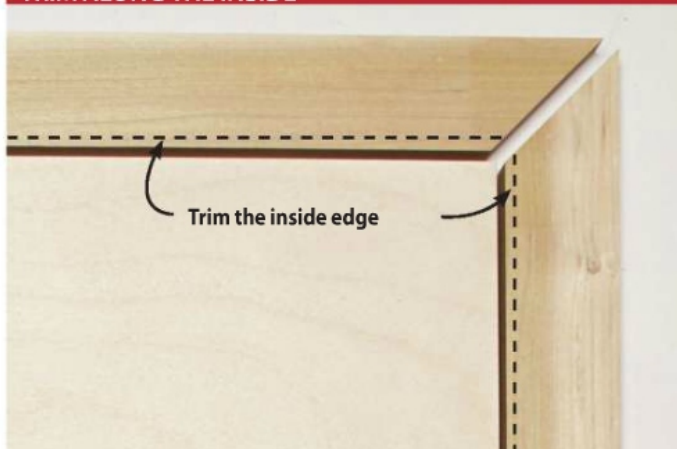
Without cutting a new piece!

Yikes!

Anyone who has tried to edge-band plywood, or fit molding or trim around an existing panel, has at one time or another cut a piece of banding too short—

leaving a gap where a tight miter should be. Here's a handy fix that doesn't require going back to cut new pieces...by "stretching" the too-short workpiece. 🌲

TRIM ALONG THE INSIDE



By removing material from the inside edge of each adjacent banding piece, you effectively "lengthen" your banding to close the gap. Remove a small amount with each pass, checking your progress as you go.

RIP AWAY A LITTLE MATERIAL



If your banding is wide enough to safely cut on a tablesaw, you can dial in repeatable cuts easily on that machine. But if the gap you're trying to close is a small one, try making a few passes with a hand plane.

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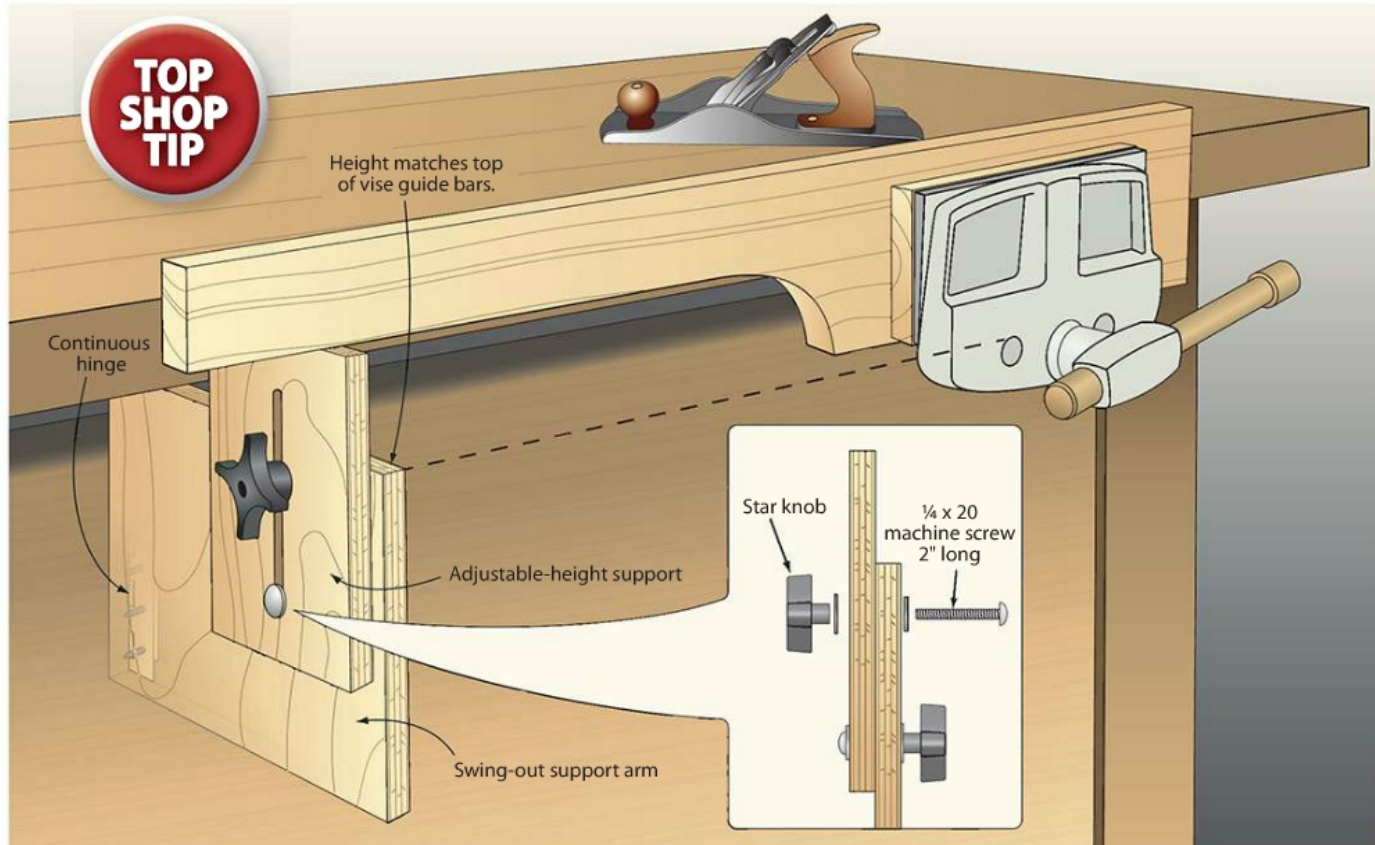
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This stock support really knows how to swing

When clamping long pieces in my bench vise, no matter how much I tighten the jaws, the far end of the workpiece tends to drop when I work on it. This swing-out, adjustable-height workpiece support, connected by a length of continuous hinge, prevents that.

To use it, simply swing the support out, slide the adjustable-height support to touch the workpiece, and lock it in place. When not in use, the support lies flat against the face of the workbench.

—Dan Martin, Galena, Ohio



For sending this issue's Top Shop Tip, Dan receives a Grex P650LX 23-gauge pin nailer valued at \$300.



TIPS EARN \$\$\$

Have a clever trick for overcoming a shop conundrum? Share it with us, and if we print it, you could earn up to \$150. If your tip is the best of the issue, it'll win Top Shop Tip honors, and you'll receive a tool prize worth at least \$300!

Send your tip, photos or drawings, and contact info to

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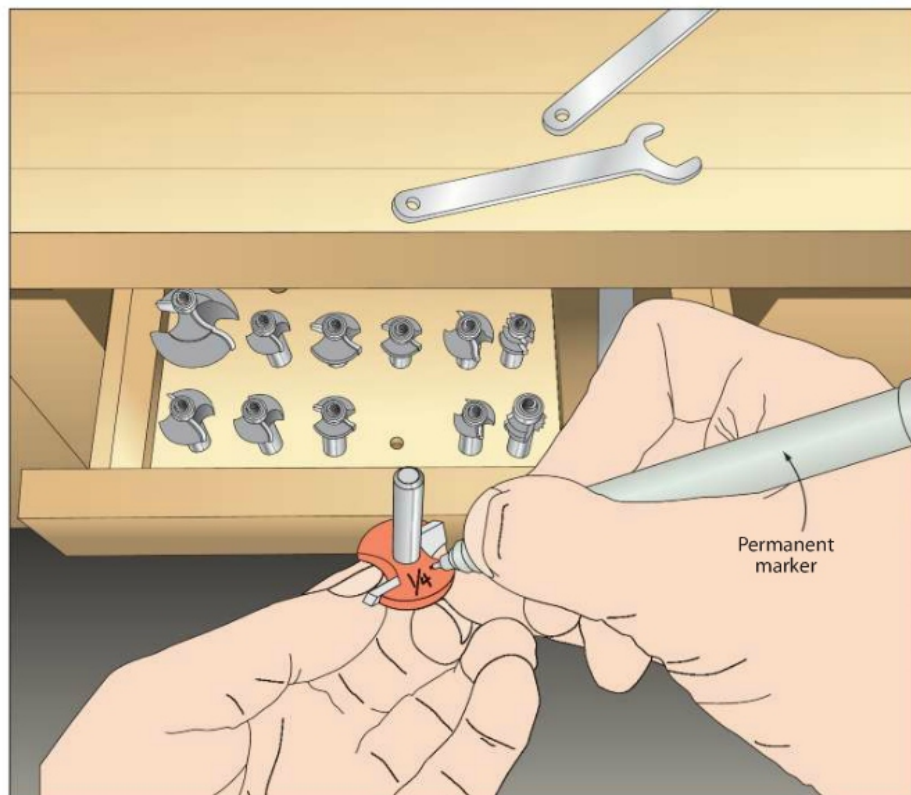
Shop Tips, WOOD magazine, 1716 Locust St., LS-253, Des Moines, IA 50309-3023.

Because we try to publish original tips, please send yours only to WOOD® magazine. Sorry, submitted materials can't be returned.

Remarkable tip IDs bits

Here's a great time-saver that takes the guesswork out of selecting the right router bit: Mark your bits with their size using a fine-point permanent marker. Write the information on the body of the bit so it won't wear off during use.

—John Cusimano, Lansdale, Pa.



continued on page 12

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11



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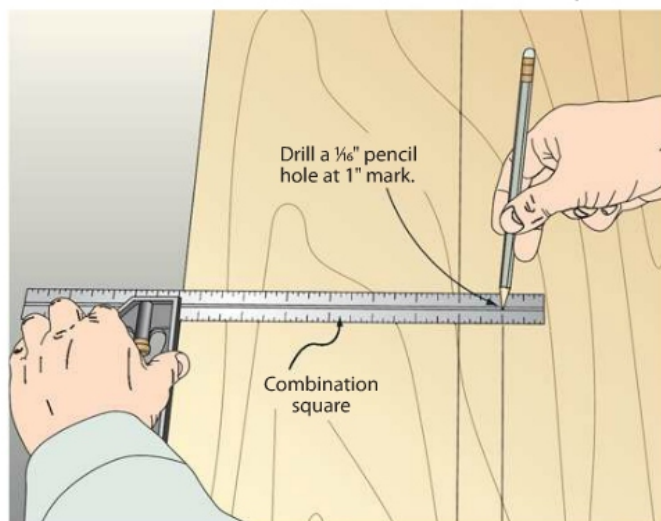
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Shop Tips

Hole in one makes an above-par marking gauge

By drilling a $\frac{1}{16}$ " hole in the center channel of a combination square at the 1" mark, I can easily lay out exact, parallel pencil lines—even farther from the board's edge than possible with a typical marking gauge. The hole doesn't affect the performance of the combination square whatsoever, and gives you two tools in one.

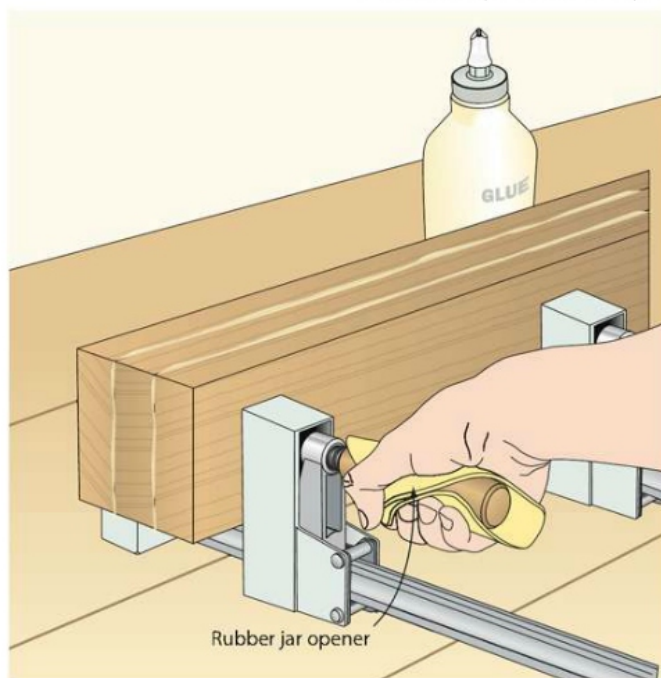
—Jim Moorehead, Barrigada, Guam



You may find this grip tip jarring

Some of my clamps have smooth, slick handles. When I need a little extra *oomph* on a big glue-up, I reach for the inexpensive rubber jar opener I keep in my shop apron. It gives me the extra grip I need to tighten up any clamp.

—Dell Littlefield, Fort Walton Beach, Fla.



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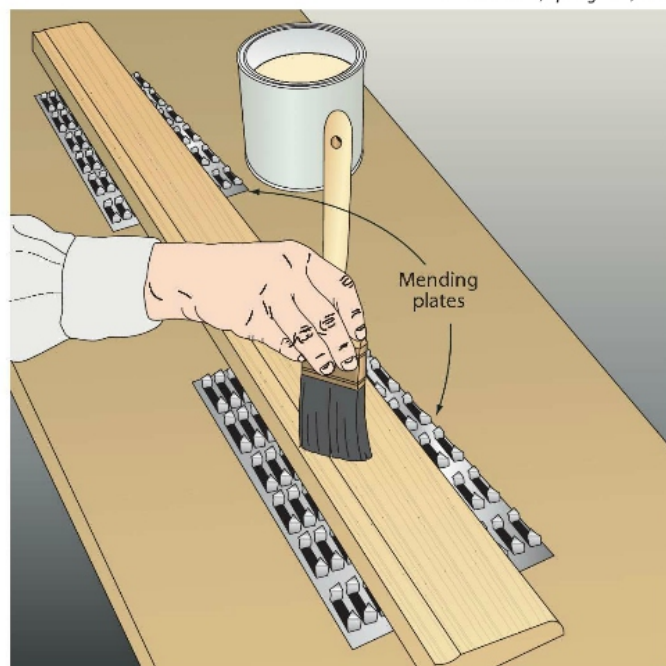


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Lay your workpiece on a bed of nails for finer finishing

For better access to the edges of workpieces while finishing, I rest them on pronged mending plates. Ordinarily used to connect construction lumber, mending plates have a large surface area with an entire "bed" of points that support even narrow workpieces.

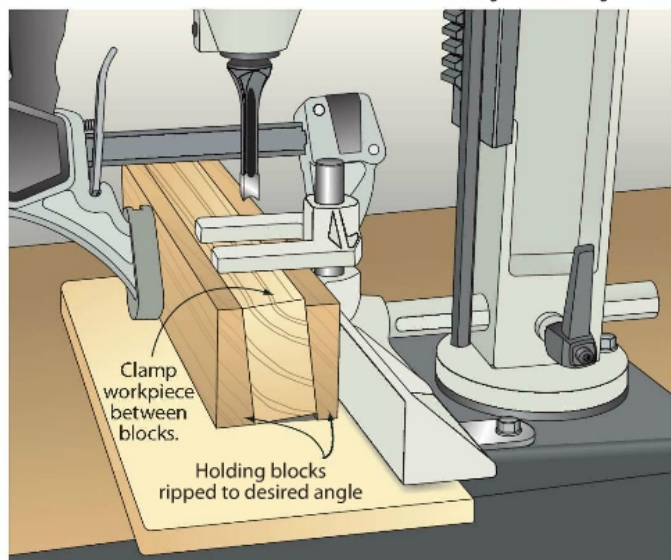
—Art Morris, Springfield, Ore.



Sandwich your workpiece for easy angled mortises

To simplify making angled mortises with a mortising machine, try this trick. Simply bevel-rip a thick board at the mortise angle on a tablesaw to make two holding blocks. Sandwich the workpiece between the two blocks, and clamp the assembly together as shown.

—Giles Bergeron, Washington D.C.



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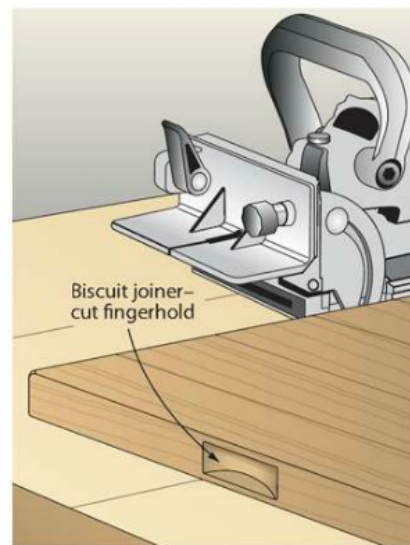
Materials code 620

Shop Tips

Biscuit joiner helps you get a grip

Here's a simple way to add a "handy" fingerhold to projects, such as cutting boards or lids on tool chests and keepsake boxes. Just use a biscuit joiner to make a series of stacked cuts, moving the blade down $\frac{1}{16}$ " for each cut, until the notch fits your finger.

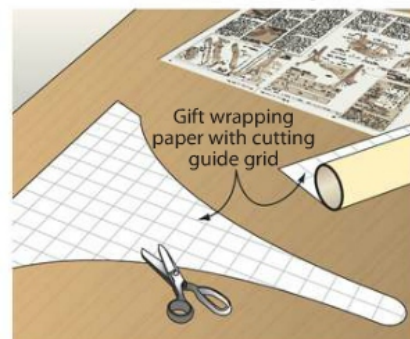
—Chris Finke, Chanhausen, Minn.



Supersize plans with gift wrap

When building a doll cradle for my buddy's daughter, I found that the plans he provided required enlarging. Without any grid paper on hand, I had to get creative. After some searching, I found a roll of our holiday gift wrap with a 1" grid printed on the back side to aid in cutting straight lines. It fit the bill perfectly.

—G.J. Collins, Georgetown, Texas



continued on page 16

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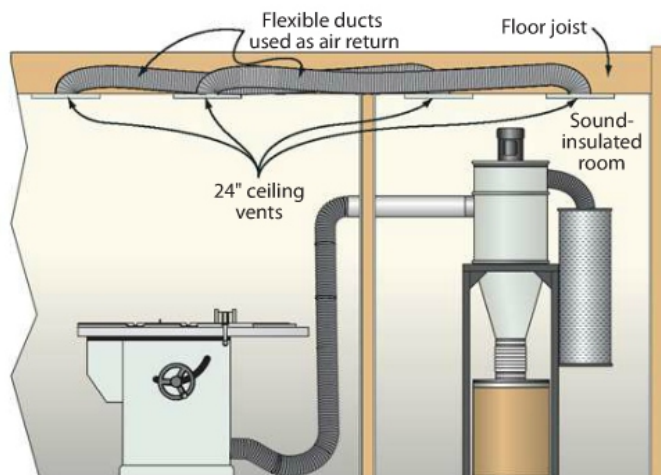
Shop Tips

Give your dust collector room to breathe

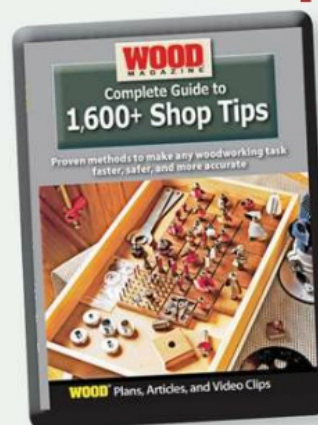
After upgrading my two-bag dust collector to a 5-hp cyclone, it didn't take me long to realize the cyclone took up a lot more space and made more noise. So I built a 6x8' extension to my shop to house the cyclone and contain the roar. But soundproof couldn't mean airtight; I needed a way to exhaust the air pressure in the room.

Rather than shoot my shop's heat outside during the winter, I used a combination of 8" flexible furnace ducts and 24" ceiling vents to circulate air back to my shop from the dust-collection room, much like a typical house's air return. Now, the air in my shop stays heated and clean, and the noise from the cyclone is barely noticeable.

—Darrel Brown, Vandalia, Ill.



More Terrific Shop Tips



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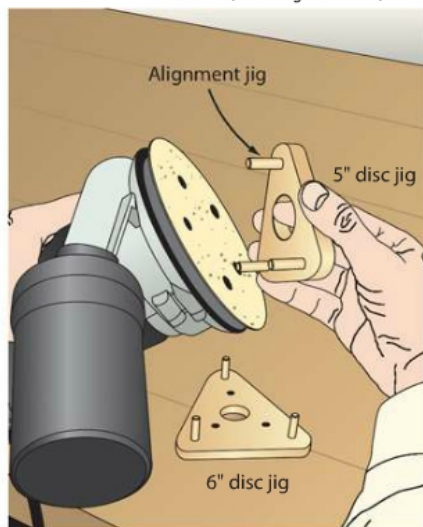
woodmagazine.com/CompleteGuide

Stick-it-quick jig aligns sanding discs

It's hard enough to capture the dust generated while random-orbit sanding, and even harder when the holes on the hook-and-loop sandpaper don't line up well with the vacuum holes in the sander's pad.

This simple jig aligns the new paper perfectly every time. Just slip the fresh paper over the jig's pegs, slide the pegs into the sander's dust-collection holes, and press down firmly against the pad.

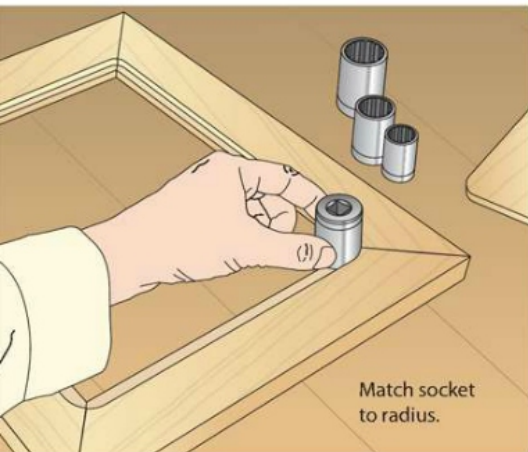
—F. David Riel, Huntington Beach, Calif.



Socket to rounded corners

When it comes to laying out rounded corners such as those on a panel cut to fit a frame with routed rabbets, I used to grab the nearest round object to do the job. Now, I go straight for my socket-wrench set. The small, consistent increments make matching rounded profiles a breeze. 🌲

—Father Chrysanthos, Etna, Calif.



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Keeping Woodworking Fun!

by Steve Carmichael

Tap into your creative juices to keep woodworking enjoyable.

Steve Carmichael enjoys making fun woodworking projects on his wife's side of the garage and records them all on video for your entertainment. Steve can be found at his website, TheCarmichaelWorkshop.com, and on his YouTube channel, TheCarmichaelWorkshop.



Have you ever lost interest in the middle of a project? It happens to all of us, but I've found that injecting an additional helping of fun into my projects keeps me motivated for the long haul. The more you enjoy working on a project, the more likely you will be to finish it—and the happier you'll be with the results. Here are a few tips to keep your woodworking fun, and have fewer incomplete projects taking up shop space.

Try a wooden makeover

Every day we use household items that are made of plastic, metal, or other clearly inferior materials. They could look better (and sometimes last longer) if made from wood. Look around your home for lamps, clocks, picture frames, etc. to see if they could use a wooden makeover. Rebuild the item from wood, repurposing only the parts needed to make it functional. I once removed a motor and switch from a broken plastic fan and rebuilt the whole fan from wood (*above right*). Not only do I now have a working fan, it is much cooler too!

Embrace your goofiness

Don't be afraid to incorporate humor and irony into a project. People connect with projects that make them smile



Ordinary household items become works of art with a wooden makeover. Steve built this reimagined box fan with—of course—box joints.

or laugh. It felt a little silly making the sub sandwich shown *top*, but I didn't let that stop me from having fun during its creation. And I can assure you that while I was making it, I never thought for a second that it would win a 2x4 contest, as well as a second-place ribbon at The Woodworking Shows.

Combine your hobbies

Do you have other hobbies and interests outside of the woodshop? As a musician and a woodworker, I enjoy making music-related projects. Look for opportunities to build a crossover project that incorporates your multiple interests.



This working acoustic guitar combines two of Steve's hobbies—music and woodworking. Surprisingly, it was made from a single 8' 2x4.

Make a display case for your golf-ball collection, build a wooden stand for your guitar, or create a shadow box for your sci-fi memorabilia. Such custom projects cannot be bought in stores, plus you get to spend time on two of your interests for double the fun.

Experiment with color

Stains, dyes, and paints can add fun to an otherwise mundane project. Pine and poplar make good choices for painted projects because they are inexpensive, easy to work with, and take paint well. Also you'll feel less guilty painting these than you would walnut, cherry, or zebrawood. If you've avoided the spray-paint aisle, take a fresh look; you may be surprised at the wide array of trendy colors. Always play around on a test piece to make sure the product you choose provides the desired results before applying it to your ready-to-finish project.

Defy convention

When pocket-hole jigs began to become ubiquitous, woodworkers went to great lengths to hide their pocket-hole joinery. But the hidden patterns that the pocket holes make looked like artwork to me. Wouldn't it be fun to take the opposite approach and *feature* the pocket holes as a design element? That piece turned out to be the Pocket-Hole Lamp shown right. Dare to be different, defy convention, approach things from your own quirky angle, and expect fun to follow. 🌲



Normally hidden, pocket holes are celebrated in this off-the-wall lamp that transforms the lowly joinery method into art.

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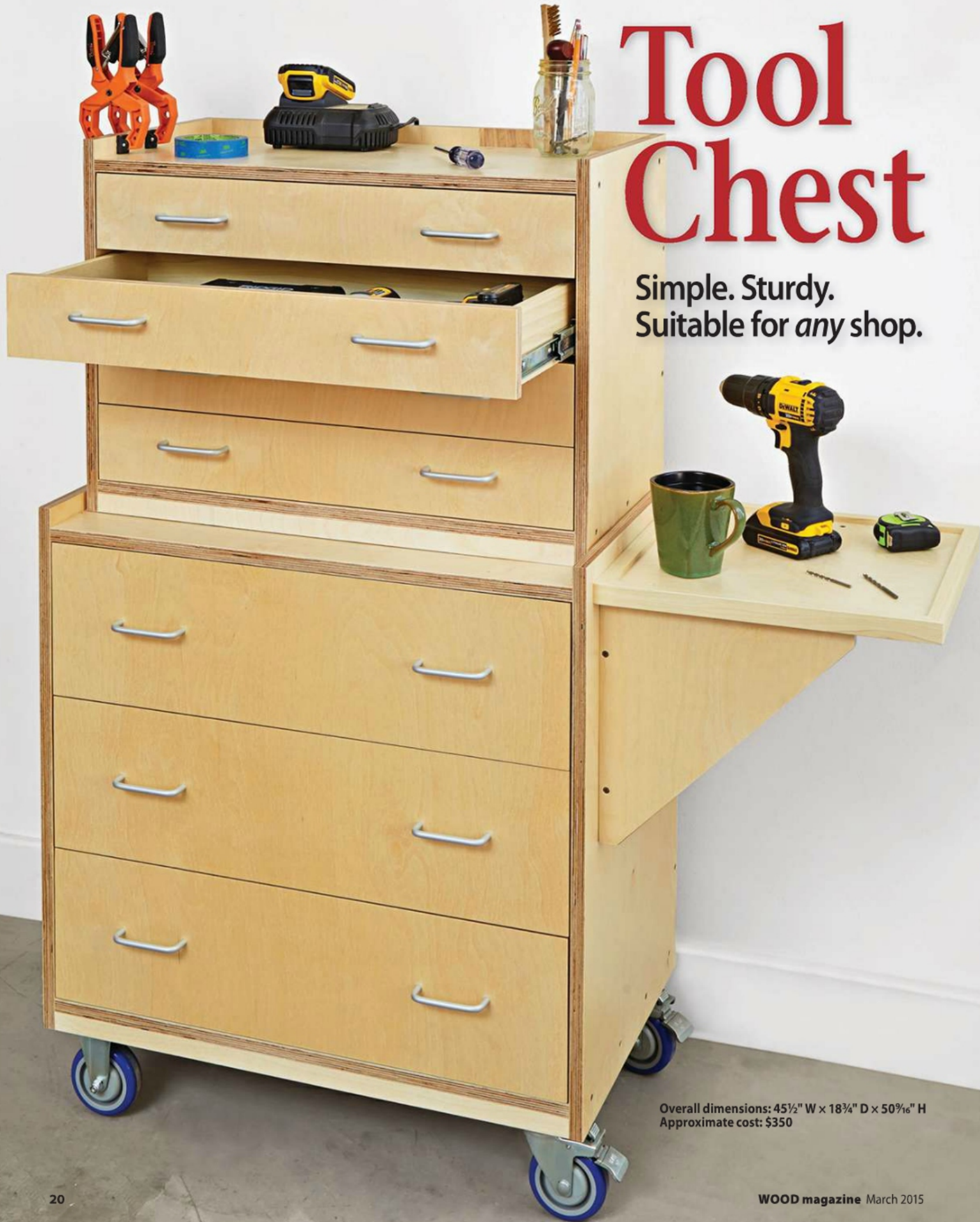
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Nate

Nate Granzow
General-Interest Editor



Construct the carcass

1 Begin by cutting the upper case sides (A), upper case top and bottom (B), and upper case back (C) to size [Materials List, page 24]. Sand all faces to 220 grit. Clamp and screw the case sides to the top and bottom [Drawing 1, Photo A]. Place the back in position and secure with screws.

2 Next, cut the upper case rail (D) to size. Apply glue to one long edge and clamp the rail flush to the front edge of the upper case bottom (B) [Drawing 1].

3 Cut the lower case sides (E), lower case top and bottom (F), lower case back (G), and lower case rail (H) to size. Assemble the lower case as you did the upper case.

4 From 1" stock, cut four caster blocks (I) to size. Glue them to the bottom face of the lower case bottom (F) in each corner [Drawing 1].

Machine the drawer parts

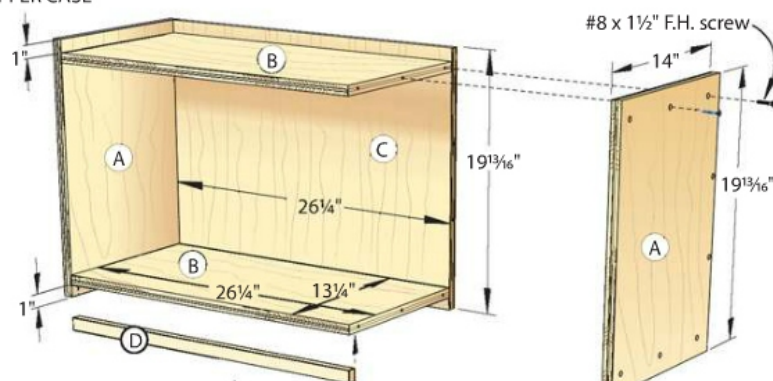
1 Cut the small drawer and large drawer sides (J, K) and fronts and backs (L, M) to size [Materials List]. Cut an extra piece of 1/2"-thick drawer stock to aid in setting up cuts, and set it aside for later.

Quick Tip! Want to add drawer dividers? Cut 1/4" dados 1/8" deep in the inside faces of the drawer fronts and backs (L, M). After assembling the drawers, slide in pieces of 1/4" plywood as dividers.

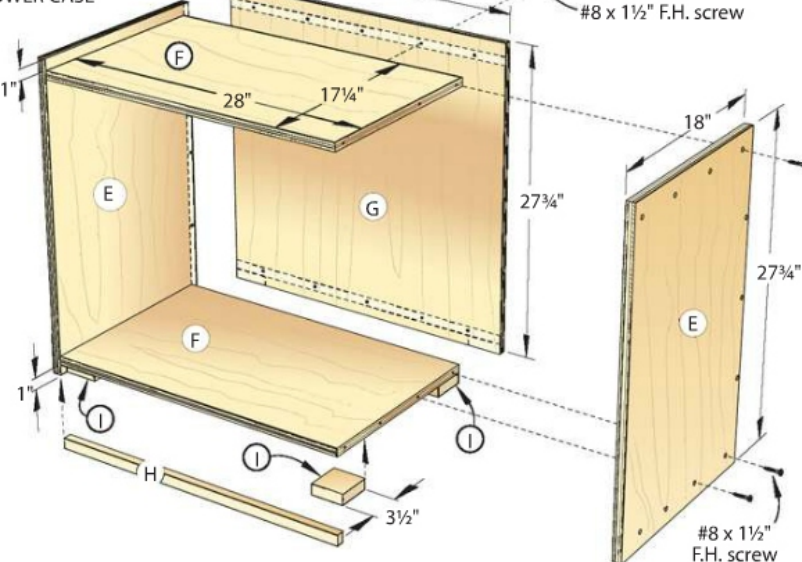
2 Mount a 1/4" dado set in your table-saw outfitted with a zero-clearance insert. Attach an auxiliary fence to your rip fence. Raise the blade to 1/4" and move the fence to 1/4" from the blade. Cut dados in the small drawer and large

1 CARCASE

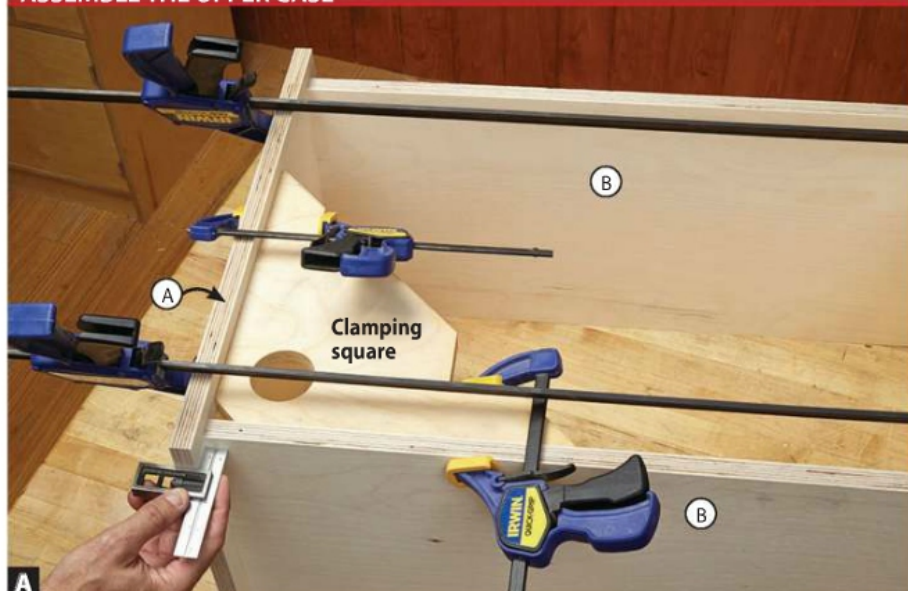
UPPER CASE



LOWER CASE



ASSEMBLE THE UPPER CASE



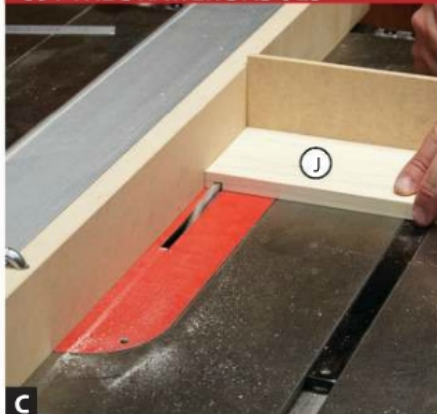
Using a clamping square and one-handed bar clamps, place the upper case top and bottom (B) 1" from the top/bottom edge of the sides (A). Screw together.

DRAWER STOCK HELPS SET THE FENCE



Set the fence precisely by placing the drawer stock against the fence and adjusting until the blade aligns flush with the stock's outside face.

CUT THE DRAWER DADOES



Because you're not making through-cuts, you can safely use the table saw's fence as a stop when cutting dados in the drawer sides (J, K).

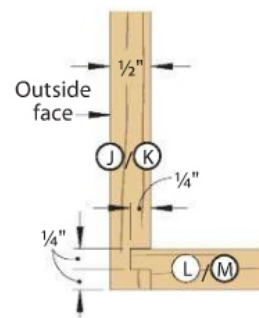
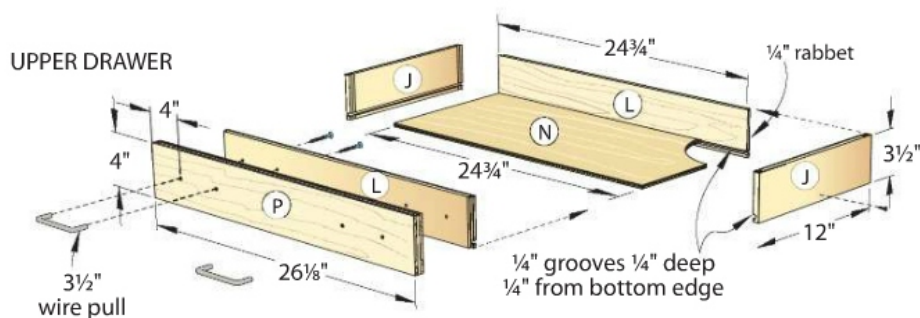
CUT THE DRAWER RABBETS



Move the fence against the blade until you can spin the blade and hear it rub lightly. Then, cut the rabbets as shown above.

2 DRAWERS

2a DRAWER JOINT DETAIL



backs (L, M) [Drawing 2, Photos B and C].

3 Move the fence against the blade, leaving just enough space so it can still spin by hand. Retrieve the spare piece of drawer stock. With this setup, test-cut a rabbet in the scrap and check the fit of the remaining tongue in a drawer side's dado [Drawing 2a]. Make any necessary adjustments, then cut rabbets on the drawer fronts and backs (L, M) [Drawing 2, Photo D].

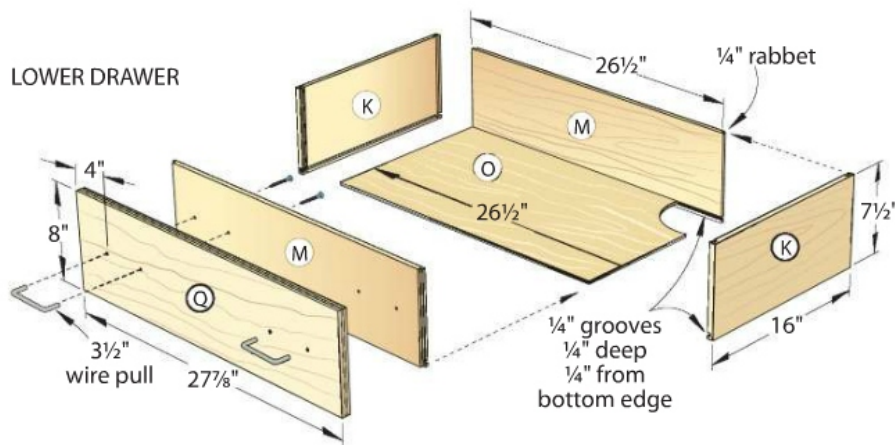
4 Cut the drawer bottoms (N, O) to size. Sand them and the inside faces of the drawer sides (J, K) and fronts and backs (L, M) to 220 grit. Apply glue to the tongues on the ends of the drawer fronts and backs and in the grooves for the bottoms, then assemble the drawers.

Quick Tip! With the drawers glued and clamped, check for square by measuring diagonally across each drawer. Adjust clamping pressure until the measurements are equal.

Install the drawers

1 Place a large drawer (K/M/O) on its side. Place one of the drawer slides [Source] on the drawer's side (K) flush with the bottom and front edges, the

LOWER DRAWER



slide's narrow inner bracket facedown against the drawer side. Screw the inner bracket in place [Photo E].

Quick Tip! Use the same adjustment slots when attaching the slide hardware to the drawers; this makes adjustments simpler.

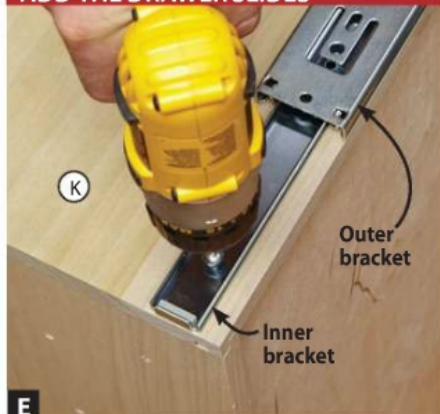
Repeat for all the drawers. Separate the outer slide bracket from the inner bracket.

2 Plane a piece of 15"-long solid stock to 5/16" for use as a spacer, and cut two additional 15"-long spacers from 1/4" plywood or MDF to widths of 6 5/16" and

2 5/16". Use the 5/16"-thick spacer to position the lowest two drawer slides' outer brackets to the upper case sides (A) and lower case sides (E) [Drawing 3, Photo F]. Install the remaining slide hardware in the lower case [Photo G]. Repeat for the upper case, but use the 2 5/16" spacer in between the slides.

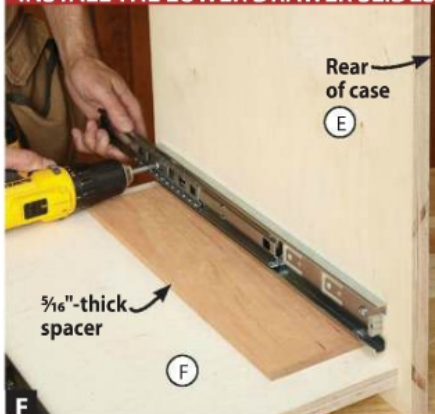
3 From 3/4" Baltic birch plywood, cut the drawer faces (P, Q) to size. Rip a 1/16"-wide strip of solid stock and cut it into 1 1/2"-long pieces for use as spacers.

ADD THE DRAWER SLIDES



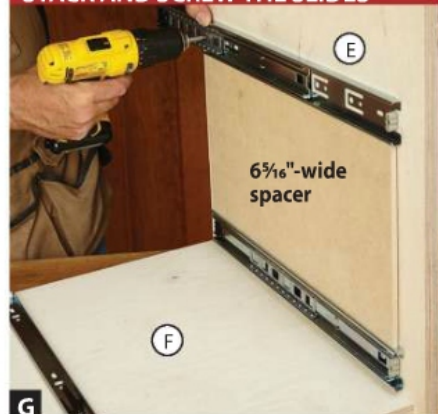
Fasten the slides to the drawer sides (K) with $\frac{1}{2}$ " panhead screws. Remember which direction the slide travels when installing the opposite side.

INSTALL THE LOWER DRAWER SLIDES



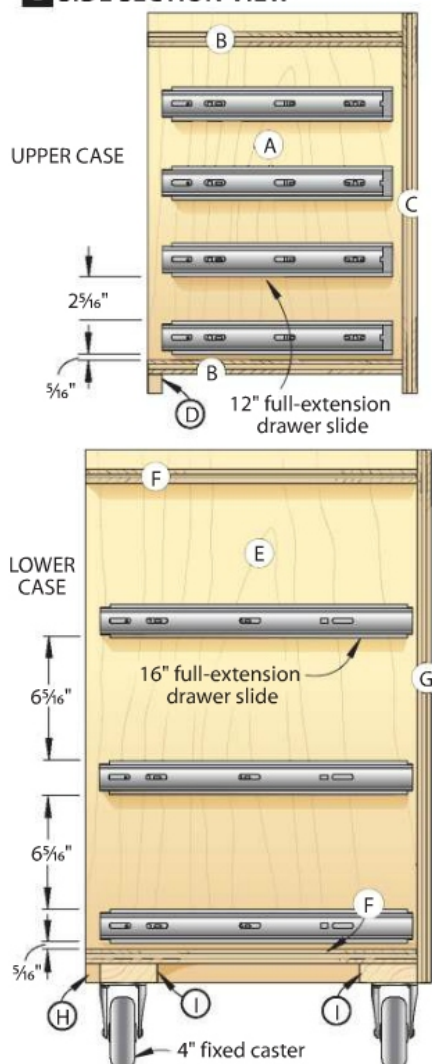
With the $\frac{3}{16}$ "-thick spacer beneath the drawer slide's outer bracket, and the bracket set back from the case front $\frac{3}{4}$ ", screw it to the case side.

STACK AND SCREW THE SLIDES



Place the $6\frac{5}{16}$ " spacer on top of the bottom slide on the lower case side (E) and use it to locate the two slides above it. Repeat for the opposite side.

3 SIDE SECTION VIEW



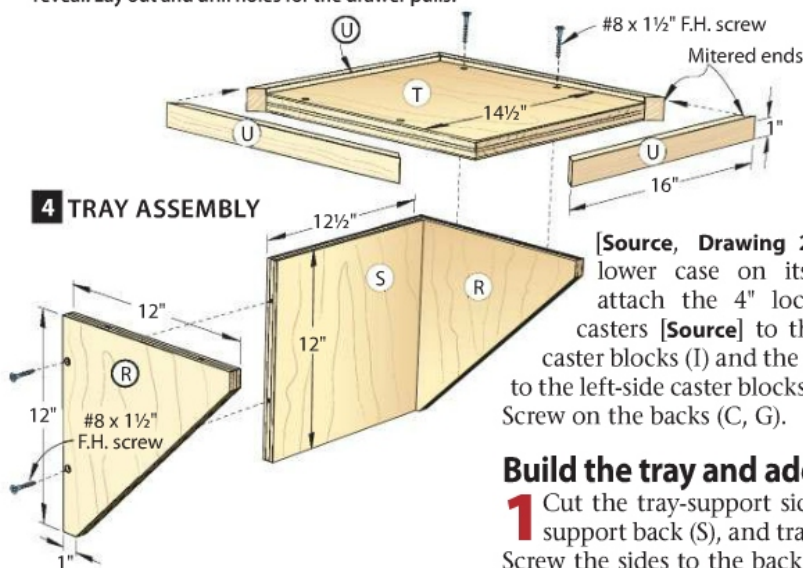
Install the small drawers (J/L/N) in the upper case's drawer slides. Apply double-faced tape to the back side of the drawer faces (P) and adhere them to the draw-

FIT THE FRONTS



Adhere the drawer faces (P, Q) to the drawers with double-faced tape, using $\frac{1}{16}$ " spacers to ensure an even reveal. Lay out and drill holes for the drawer pulls.

4 TRAY ASSEMBLY



[Source, Drawing 2]. Lay the lower case on its back and attach the 4" locking swivel casters [Source] to the right-side caster blocks (I) and the fixed casters to the left-side caster blocks [Drawing 5]. Screw on the backs (C, G).

Build the tray and add finish

1 Cut the tray-support sides (R), tray-support back (S), and tray (T) to size. Screw the sides to the back [Drawing 4]. Cut the tray trim (U) and miter it to fit around the tray. Glue the trim in place, flush with the tray's bottom face. After the glue dries, screw the tray assembly (T/U) to the support assembly (R/S), flush at the back and centered side-to-

ers, starting from the bottom [Photo H]. Repeat for the lower case.

4 Attach the drawer pulls centered on the height of each drawer face (P, Q)

side. Finish-sand to 220 grit. Screw the tray assembly to a lower case side (E) [Drawing 5].

2 Remove the drawer slides and pulls, and apply a finish. We wiped on

three coats of satin polyurethane, sanding between coats with 800-grit sandpaper. Reinstall the hardware after the finish dries. Then, unclutter your shop by loading up the tool chest!

Produced by **Nate Granzow** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
Carcase					
A	upper case sides	¾"	14"	19 ¹³ / ₁₆ "	BP 2
B	upper case top/bottom	¾"	13 ³ / ₄ "	26 ¹ / ₄ "	BP 2
C	upper case back	¾"	26 ¹ / ₄ "	19 ¹³ / ₁₆ "	BP 1
D	upper case rail	¾"	1"	26 ¹ / ₄ "	P 1
E	lower case sides	¾"	18"	27 ³ / ₄ "	BP 2
F	lower top/bottom	¾"	17 ¹ / ₄ "	28"	BP 2
G	lower case back	¾"	28"	27 ³ / ₄ "	BP 1
H	lower case rail	¾"	1"	28"	P 1
I	caster blocks	1"	3 ¹ / ₂ "	3 ¹ / ₂ "	P 4
Drawers					
J	small drawer sides	½"	3 ¹ / ₂ "	12"	P 8
K	large drawer sides	½"	7 ¹ / ₂ "	16"	P 6
L	small drawer fronts/back	½"	3 ¹ / ₂ "	24 ³ / ₄ "	P 8
M	large drawer fronts/back	½"	7 ¹ / ₂ "	26 ¹ / ₂ "	P 6
N	small drawer bottoms	¼"	11 ¹ / ₂ "	24 ³ / ₄ "	BP 4
O	large drawer bottoms	¼"	15 ¹ / ₂ "	26 ¹ / ₂ "	BP 3
P	small drawer faces	¾"	4"	26 ¹ / ₈ "	BP 4
Q	large drawer faces	¾"	8"	27 ⁷ / ₈ "	BP 3
Tray					
R	tray-support sides	¾"	12"	12"	BP 2
S	tray-support back	¾"	12 ¹ / ₂ "	12"	BP 1
T	tray	¾"	14 ¹ / ₂ "	14 ¹ / ₂ "	BP 1
U	tray trim	¾"	1"	16"	P 4

Materials key: BP—Baltic birch plywood, P—poplar.

Supplies: #8x1½" flathead screws (66), #8x1¼" flathead screws (2), #8x1" flathead screws (28), #14x¾" flathead screws (16), ¼" washers (16).

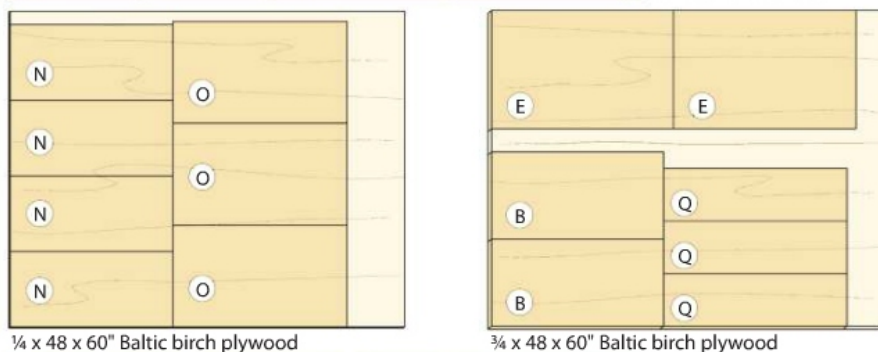
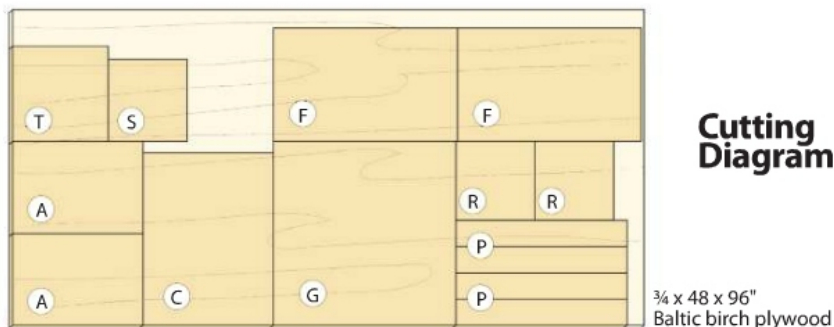
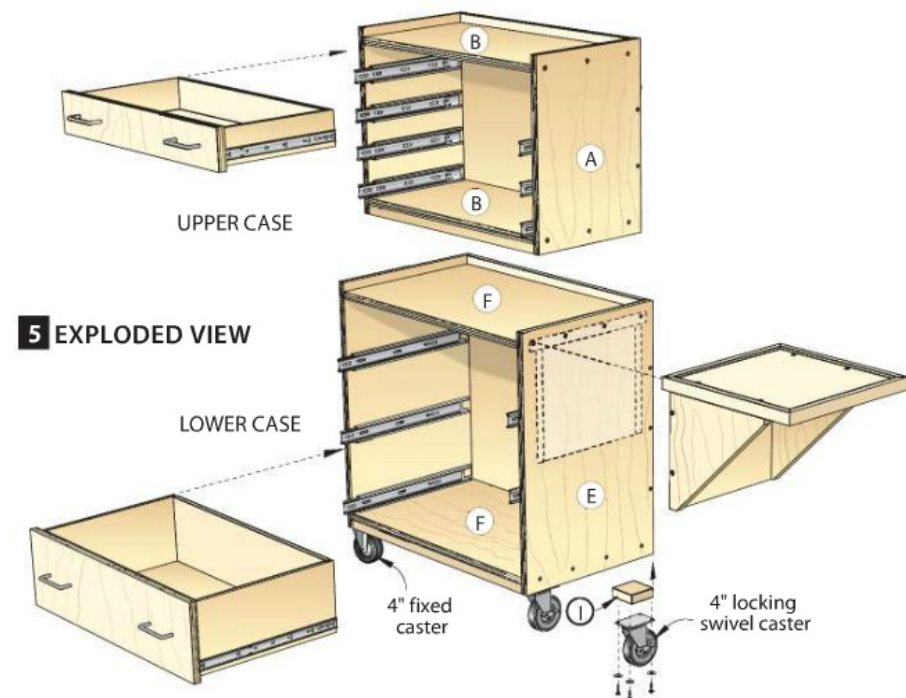
Blade: Dado set.

Source

Drawer slides, casters, drawer pulls: 16" full-extension drawer slides (3 pairs), no. 02K3016, \$14.50 pair; 12" full-extension drawer slides (4 pairs), no. 02K3012, \$12.40 pair; heavy-duty polyurethane casters (swivel, 2 needed), no. 00K2141, \$17.80 ea.; heavy-duty polyurethane casters (fixed, 2 needed), no. 00K2140, \$10.80 ea.; 3½" aluminum wire pulls, (14) no. 01W7602, \$1.60. Lee Valley, 800-871-8158, leevalley.com.

More Resources

- ▶ For additional tips on installing drawer slides, visit woodmagazine.com/drawerslide.
- ▶ Check out this FREE video on handling sheet goods with ease: woodmagazine.com/sheetgoods
- ▶ For tips on perfect plywood cuts, see woodmagazine.com/plywoodcuts.

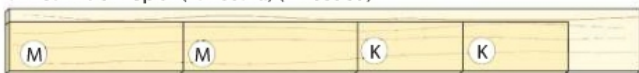


¼ x 48 x 60" Baltic birch plywood

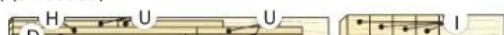
¾ x 48 x 60" Baltic birch plywood



¾ x 3½ x 96" Poplar (2.7 bd. ft.) (4 needed)



¾ x 9¼ x 96" Poplar (6.7 bd. ft.) (3 needed)



¾ x 3½ x 48" Poplar (1.3 bd. ft.)



1½ x 3½ x 24" Poplar (1.3 bd. ft.)

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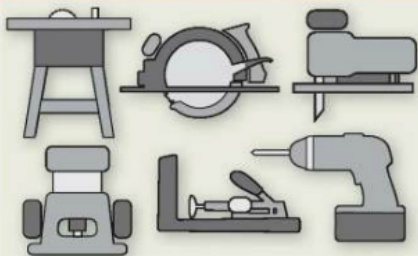


Loft bed and desk



BASIC-BUILT
GREAT PROJECTS MADE SIMPLE.

TOOLS NEEDED



Plywood for the project

For economy and best appearance, we built the loft from $\frac{3}{4}$ " A-C softwood plywood, faced with A-grade veneer on one side and C-grade on the other. If you plan to paint the loft, consider spending a little more on birch plywood for a better finish.

Lay out all parts with the better-looking A-grade veneer facing out. Knots in interior layers sometimes create voids along the edges of project parts when you cut into them; fill the voids with wood filler for best finished appearance.

Dimensions

Loft: $77\frac{1}{4}$ " H $\times$ $80\frac{1}{2}$ " W $\times$ $59\frac{1}{2}$ " D

Steps: $52\frac{1}{2}$ " H $\times$ 21" W $\times$ $68\frac{1}{4}$ " D

Approximate materials cost: \$525

Space-saving and straightforward in its construction, this loft bed supports a full-size mattress above a generous workspace and two storage shelves within a $68\frac{1}{4} \times 101\frac{1}{2}$ " footprint. The compact unit fits easily into a child's room, a college dorm, a city apartment, or anywhere else you'd like to make the most use of floor space. Knockdown hardware holds it all together, so you can easily disassemble and move it.

Start with sturdy legs

1 Cut eight blanks to size for the inner legs (A) [Materials List, page 33] and eight for the outer legs (B).

Quick Tip! For easier handling, lay the plywood sheet on a foam insulation board on your shop floor and cut the blanks with a circular saw [More Resources].

2 Lay out an inner leg (A) [Drawing 1] on the best face of one blank. For a quick way to mark the radiused corners, see the Shop Tip, right.

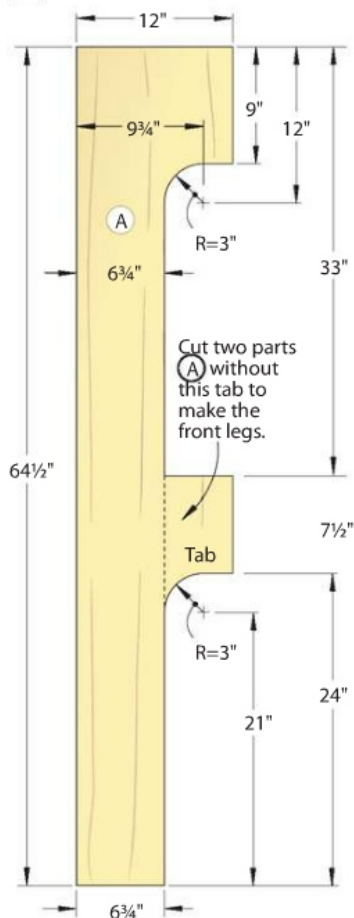
SHOP TIP



Finish can serves as template for quickly rounding corners

Instead of laying out centers for the corner radii and drawing them with a compass on the legs (A, B), stand a one-gallon can tangent to the sides of the corner (above) and trace around it. The can's radius is a bit larger than the 3" radius shown on the drawings, but that doesn't make any difference as long as all the radii are the same.

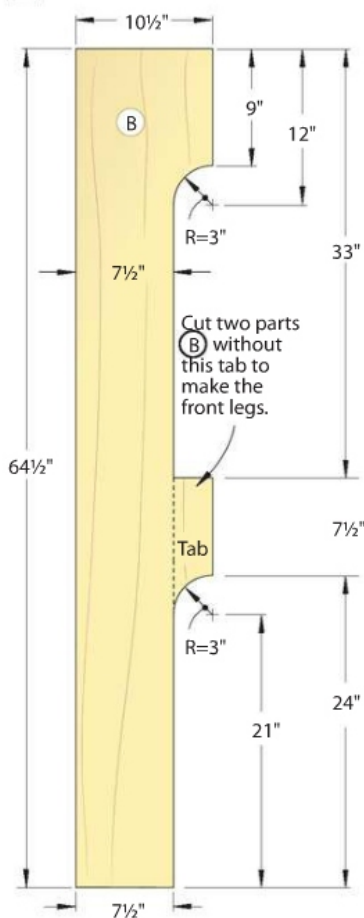
1 INNER LEG



3 Butt another inner-leg blank against the edge of the laid-out blank, best faces up, and lay out a mirror-image leg (A) [Photo A]. Lay out all eight inner legs in mirrored pairs. Lay out one pair without the lower tabs [Drawing 1].

4 Cut out the eight legs with a plywood blade in a jigsaw, staying about 1/8" outside the layout lines.

2 OUTER LEG



5 Install a top-bearing pattern bit in your router [Shop Tip, above right]. Clamp a straightedge along the layout line on one leg (A), and rout to the line along the straight portions [Photo B]. Sand to the line on the curves with a drum sander [More Resources]. Rout and sand one leg with the lower tab and one without.

SHOP TIP



Go with a wide bearing

You might ruin a project part if the guide bearing on your router bit dips into an edge void when pattern-routing plywood. Prevent such a disaster by installing a larger pattern bit, whose wider bearing, shown at right, rides on more layers in the plywood, above, than does a narrow bearing.



6 Use the completed legs (A) as patterns to rout the remaining inner legs (A). Make three pairs with the lower tab and one pair without.

7 Lay out and jigsaw the eight outer legs (B) [Drawing 2], following Steps 2-6, except lay out the parts on the backs (C-veneer side) of their blanks. Clamp an inner leg (A) face side up atop an outer leg (B) along the layout line, and rout the outer leg [Photo C] to make an inner and outer pair. Mark each set on the inside faces to keep them together, and set the outer legs (B) aside.

LAY OUT THE LEGS AS OPPOSITES



The eight legs make four left-right pairs. To lay out opposite pairs without confusion, arrange the blanks for each pair edge to edge.

REFINE SAWN EDGES WITH A ROUTER



A piece of plywood with a factory edge makes a good straightedge. Keep the pattern-bit bearing against it to rout a true, clean edge on the leg (A).

ROUT OUTER LEGS TO MATCH INNERS



Ensure that the inside edges on the inner legs (A) and outer legs (B) match up when you laminate them later by pattern-routing the leg parts in sets.

ASSEMBLE THE INNER LEGS



D Drill and countersink screw holes through the front and back inner legs (A). The good side of the plywood faces the inside of the corner.

8 Glue and screw together the inner legs (A) into four corner assemblies [Drawing 3, Photo D]. Attach the legs that will face the front and back of the loft to the edges of the legs that will face the ends. Make the corners flush.

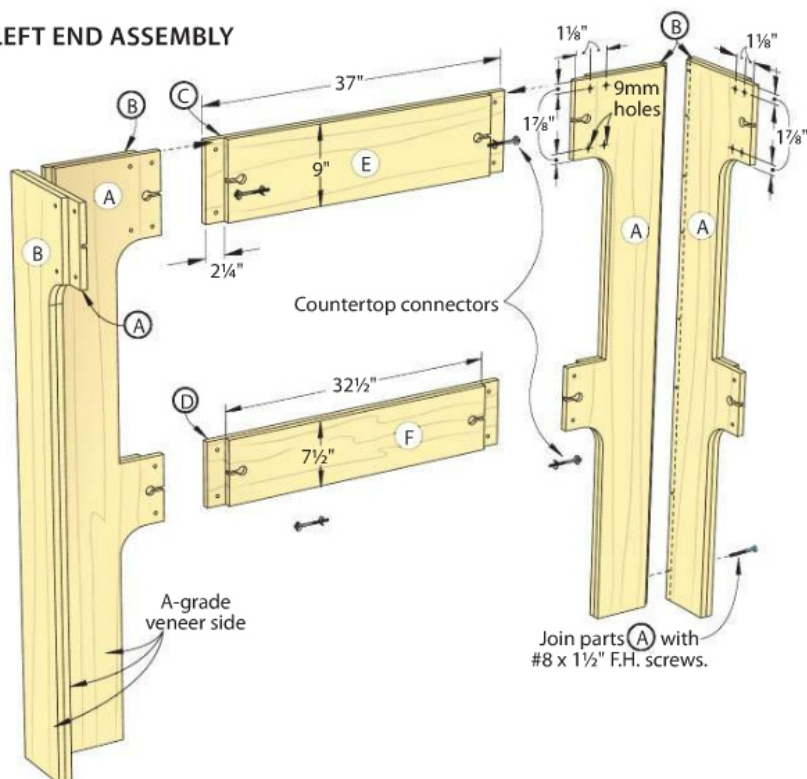
9 Glue the outer legs (B) to the assembled inner legs (A) [Photo E]. The good side of the plywood faces out.

Construct the frame

1 Cut the outer top end rails (C) and outer lower end rails (D) to size. Cut the inner top end rails (E) and inner lower end rails (F) to width, but make them 1" longer than listed.

2 Clamp an outer top end rail (C) and an outer lower end rail (D) between a front (without the lower tab) leg

3 LEFT END ASSEMBLY



assembly (A/B) and a back (with the lower tab) leg assembly (A/B).

Quick Tip! Check the end assembly for square by measuring the diagonals; equal measurements indicate square.

3 Scribe an inner top end rail (E) and an inner lower end rail (F) [Photo F], and cut them to length.

4 Glue and clamp the inner top end rail (E) and the inner lower end rail (F) to their corresponding outer rails (C, D) [Photo G]. Repeat Steps 2-4 for the other pair of leg assemblies (A/B).

5 Cut the outer top front/back rails (G) and outer lower back rail (H) to size. Cut the inner top front/back rails (I) and

inner lower back rail (J) to width, but make them 1" longer than listed.

6 Clamp the outer top front/back rails (G) and the outer lower back rail (H) in place between the end assemblies (A-F). Mark the inner rails (I, J) for length, as you did for the end rails in Step 3.

7 Glue and clamp the inner top front/back rails (I) and inner lower back rail (J) to their corresponding outer rails (G, H) (but not to the legs). After the glue dries, remove the rail assemblies and rout the recesses for the countertop connectors [Source, Routing connector recesses, next page].

COMPLETE THE LEG ASSEMBLIES



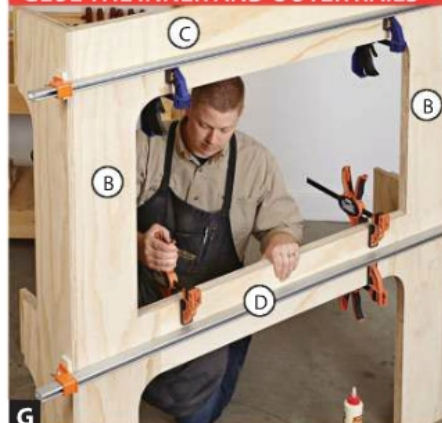
E Attach the outer legs (B) to the end-facing inner legs (A) first so the plywood edge grain won't show on the faces of the front and back legs.

MARK THE INNER END RAILS



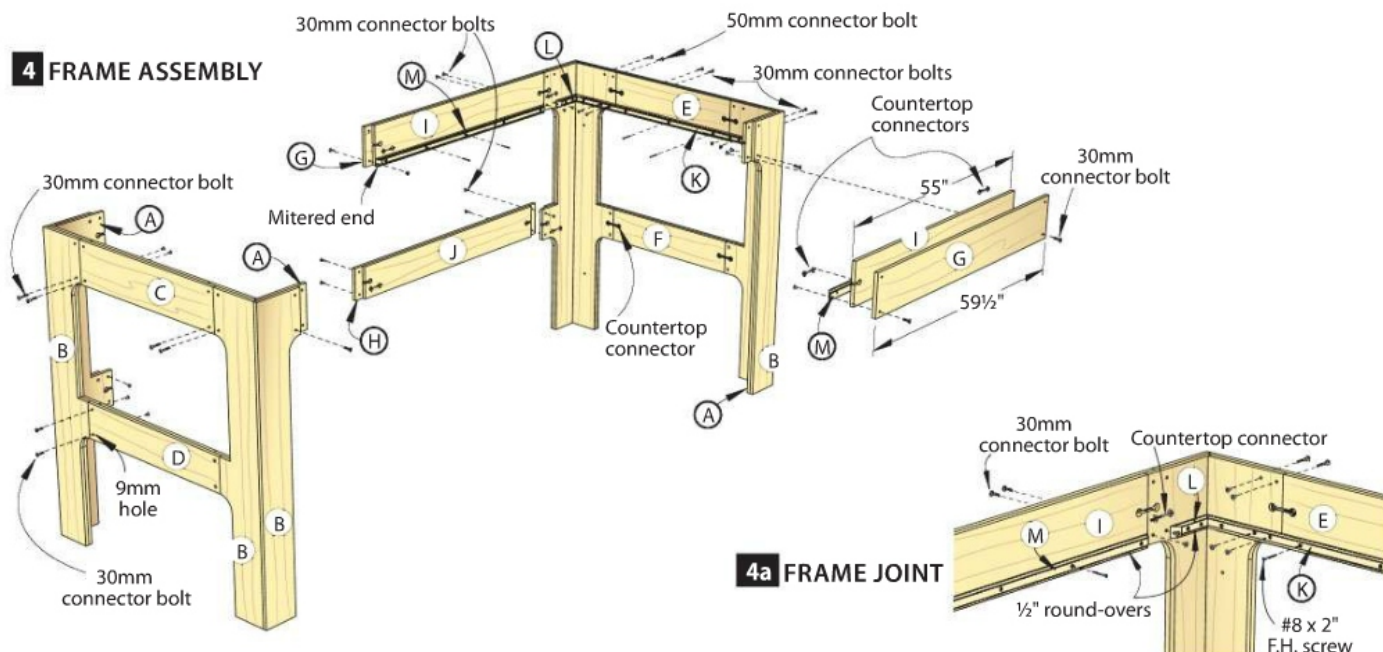
Hold each inner end rail (E, F) in position between the tabs on the legs (A/B) and mark the length directly onto the part for a tight fit.

GLUE THE INNER AND OUTER RAILS



Keeping the edges flush, glue the inner end rails (E, F) to the outer end rails (C, D). Be careful not to glue the end rails (C/E, D/F) to the legs (A/B).

4 FRAME ASSEMBLY



8 Assemble the legs (A/B), top and lower end rails (C/E, D/F), top front/back rails (G/I), and lower back rail (H/J) with countertop connectors [Drawings 4 and 4a]. Drill holes for connector bolts [Source, Photo H] where shown and install the 30mm connector bolts joining parts C, D, G, and H to the inner legs (A) [Drawing 4]. (The other connector bolts go in when you install the side-, head-, and footboards.)

Make the bed

1 Cut the end bed cleats (K), short bed cleats (L), and side bed cleats (M) to size, mitering the ends [Drawing 4]. Rout a 1/2 inch round-over along the lower outside edge of each cleat [Drawing 4a].

DRILL CONNECTOR-BOLT HOLES



H Tighten the countertop connectors, and drill 9mm (23/64 inch) holes through the legs and rails for the connector bolts.



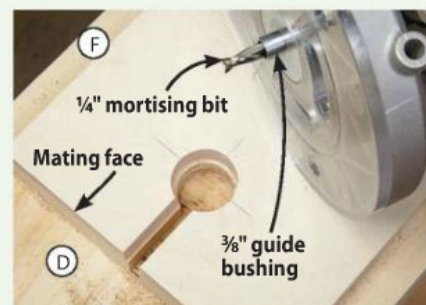
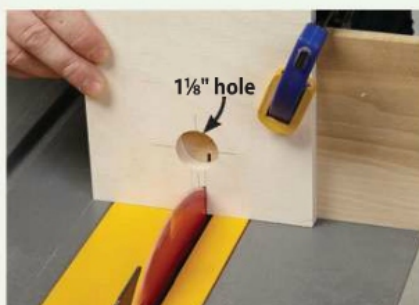
Routing connector recesses

Countertop connectors fit into routed recesses and draw the loft's legs and rails together to create tight joints, yet allow you to disassemble the loft if needed [Drawings 3, 4]. To install them, make the jig shown right. After boring the hole, cut the 3/8 inch slot on a tablesaw (below).

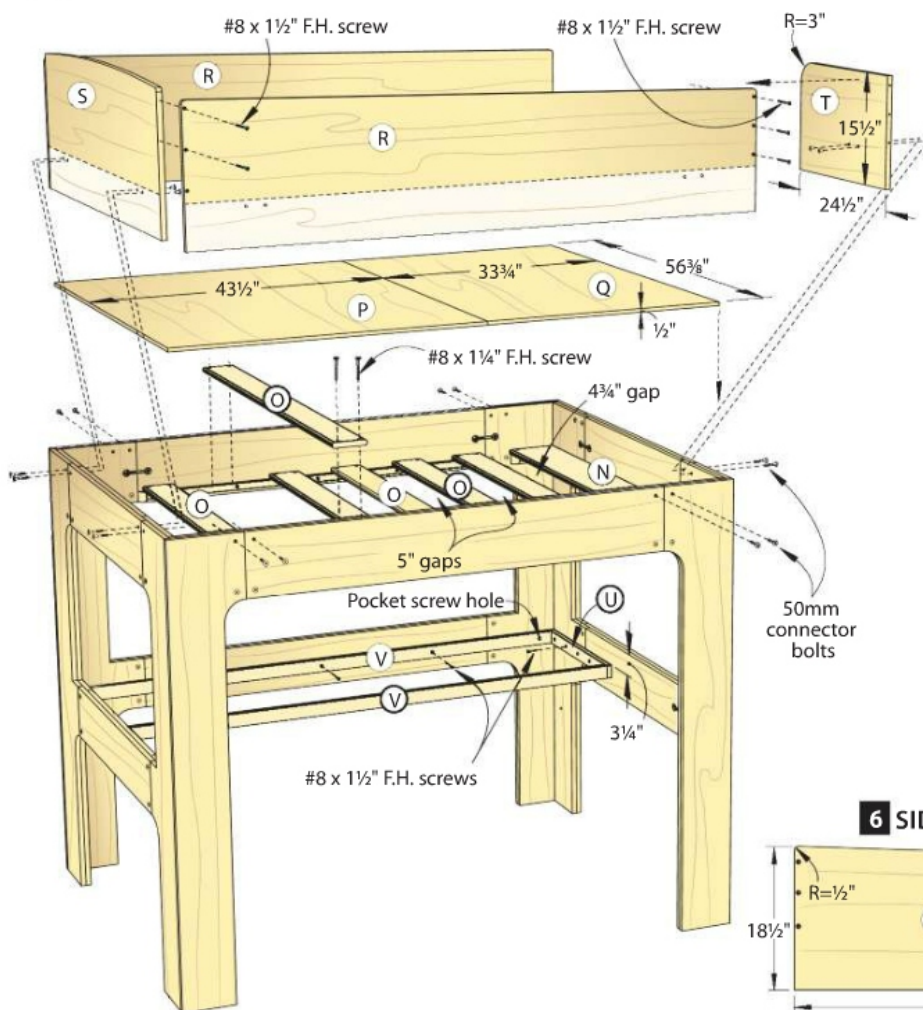
To use the jig, install a 1/4 inch mortising bit and a 3/8 inch guide bushing in your router (below, right). Center the jig on an inner rail (E, F, I, J), placing the slotted end flush with the mating rail end, as shown, and clamp it securely. Rout the recess through the entire thickness of the inner rail, making several shallow cuts. Rout both ends of all inner rails.

Place a rail in position and mark the slot location on the adjoining inner leg (A). Center the jig over the mark and flush with the mating face; then, rout the recess in the leg.

CONNECTOR ROUTING JIG



5 BED AND DESK



2 Glue and screw the side bed cleats (M) to the inner top front/back rails (I), flush with the bottom edge [Drawing 4]. Screw, but do not glue, the end bed cleats (K) flush with the bottom edges of the inner top end rails (E). Drive screws into the inner legs (A), too. Glue and screw the short bed cleats (L) to the legs.

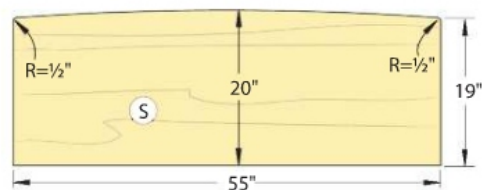
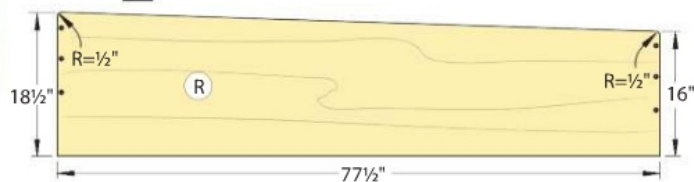
3 Cut the large slats (N) and small slats (O) to size. Rout $\frac{1}{4}$ " round-overs on the edges on both faces.

4 Drill and countersink two holes for #8x $\frac{1}{4}$ " screws near each end of each slat (N, O), and attach the slats to the side and short bed cleats (L, M) [Drawing 5]. Do not glue the slats.

5 Cut the large and small platforms (P, Q) to size. Lay them on top of the slats [Drawing 5].

6 Cut the sideboards (R), headboard (S), and footboard (T) to shape [Drawings 5, 6]. Lay out the top curve on the headboard (S) with a fairing stick [More Resources]. To mark the top-corner radii, trace around a U.S. quarter. Place the boards in position, and screw them together at the corners (no glue).

6 SIDEBORD AND HEADBOARD



7 ASSEMBLY VIEW

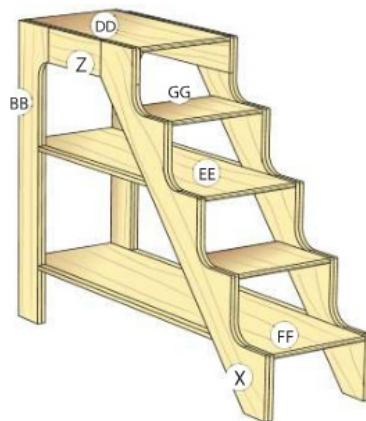
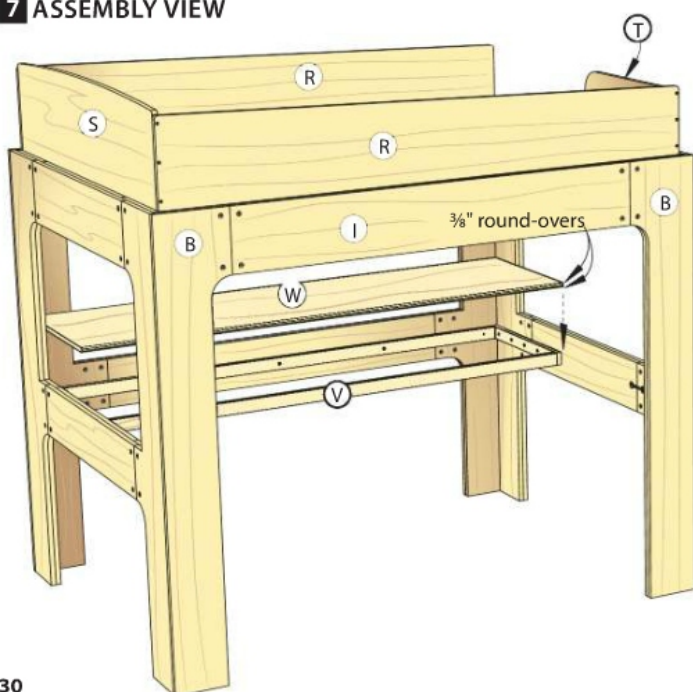


Diagram illustrating the dimensions of a hand plane. The top edge is labeled "Top" with an arrow pointing right. The back edge is labeled "Back edge" with a dimension of 6". The top tread is labeled "Top tread" with a dimension of $8\frac{13}{16}"$. A circled 'X' is marked on the top edge.

7 Drill the unfilled 9mm holes in the frame assembly (A-J) on through the sideboards (R), headboard (S), and footboard (T) **[Drawing 5]**. Install 50mm connector bolts and tighten them to secure the boards.

1 Cut the end desk cleats (U) to size. Clamp them in place [Drawing 5] and cut the front/back desk cleats (V) to fit between them.

2 Drill a pocket hole on the inside face at each end of each front/back cleat (V). Attach the end desk cleats (U) to the ends of the front/back cleats (V) with glue and pocket screws.

3 Attach the cleat assembly (U/V) to the frame assembly (A-T) with screws, but do not glue [Drawing 5].

4 Cut the desktop (W) to size. Rout $\frac{3}{8}$ " round-overs along the front edge on both sides [Drawing 7].

5 Glue the desktop to the cleat assembly (U/V), taking care not to glue it to the frame assembly (A-T).

Build the stair stringers

Note: If space doesn't allow the stairway shown, construct a ladder to climb up to the bed.

1 Cut blanks for the outer stringers (X) and inner stringers (Y).

2 To lay out the steps, start at the top of an outer stringer (X) blank. With a framing square, mark the top tread and back edge [**Drawing 8, Photo I**].

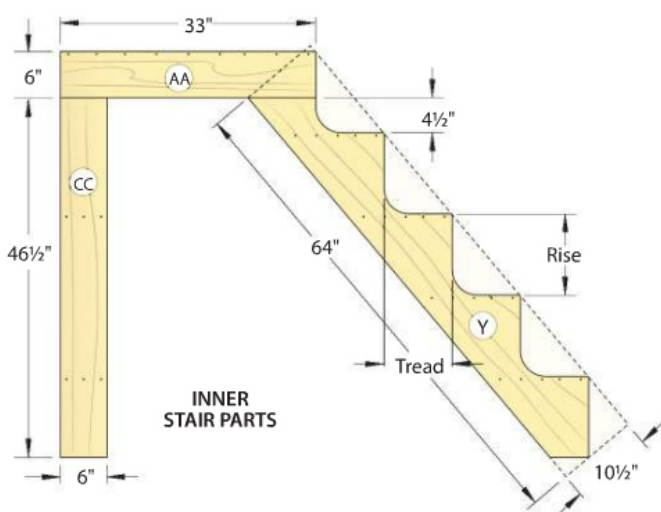
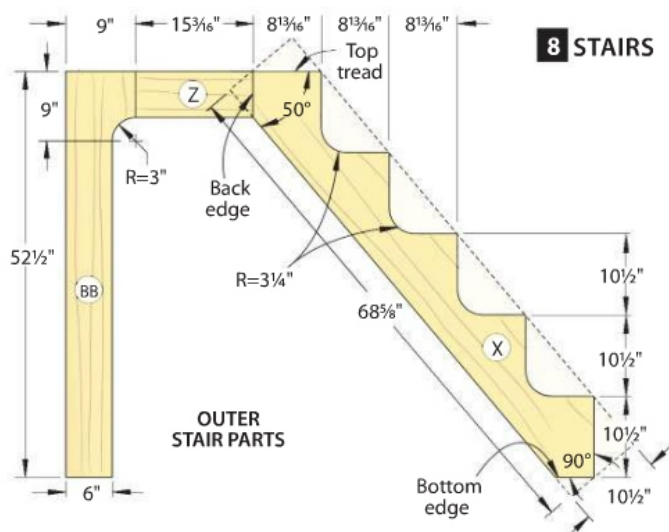
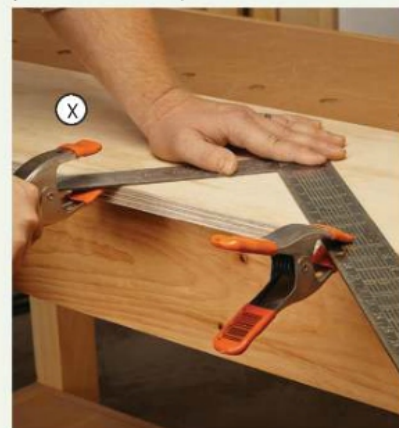
3 Next, attach a pair of stair gauges to your framing square [**Photo J**]. (If you don't own—or can't find—a pair of stair gauges, see the **Shop Tip** right.) Lay the square on the stringer (X) blank, with the gauges against the edge of the stringer. Move the blade with the rise setting (10½") up to intersect with the top tread at the edge of the stringer.

Trace around the outside edge of the square [Photo K]. Then, move the square down until the blade with the rise setting intersects the tread you just drew. Continue to the bottom of the blank, laying out four steps and finishing with a 10½" rise [Drawing 8]. Mark the bottom end cutting line.

Keep the stair gauges firmly against the front edge of the stringer (X) blank as you slide the square down the blank to lay out the steps.

Spring clamps stand in for stair gauges

To lay out the steps on the outer stringer (X) without stair gauges, simply clip a pair of spring clamps to the framing square, as shown. Be careful not to bump them, and double-check the measurements before you mark each step.



4 Use the framing square to lay out the rise and one tread on a piece of scrap plywood the same width as an outer stringer (X) and about 20" long. Radius the inside corner by tracing around a one-gallon finish can. Cut along the marks with a jigsaw, staying slightly outside the lines. Sand to the lines to make a smooth edge that will serve as a layout and routing template.

5 Trace the radiused corner from the template onto the steps of an outer stringer (X) [Photo L].

6 Cut out the radius-marked outer stringer (X) with a jigsaw, staying slightly outside the line. Clamp the plywood template to each step in turn, and rout with a pattern bit to finish each step.

7 Clamp the completed outer stringer (X) to the blank for the remaining outer stringer, with the good sides of both pieces facing in. Trace around the completed stringer, and remove it. Cut out the second stringer with a jigsaw, staying just outside the line. Then, using the completed stringer as a pattern, rout the second stringer to finished shape.

8 Lay out the inner stringers (Y) [Drawing 8] on their blanks, using the outer stringers (X) as patterns. Cut out and rout the inner stringers.

9 Glue the outer stringers (X) and inner stringers (Y) together in pairs, with the good sides of the plywood facing out.

Assemble the stairway

1 Cut the outer stair rails (Z) about 1" longer than shown. Cut the inner stair rails (AA), outer stair legs (BB), and inner stair legs (CC) to the sizes shown.

2 Lay out the outer legs (BB) [Drawing 8] and cut them to shape.

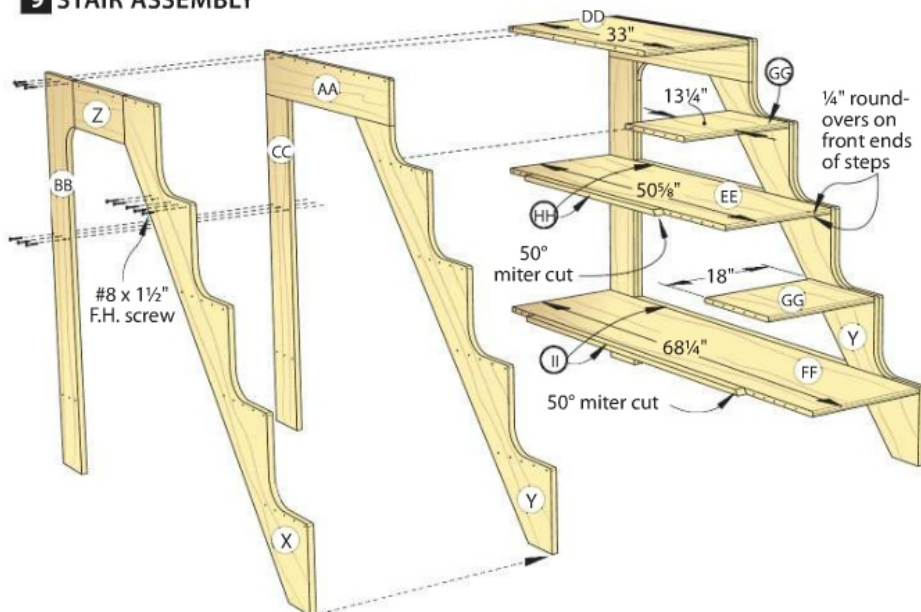
3 Glue and clamp the stringer assemblies (X/Y), inner stair rails (AA), outer stair legs (BB), and inner stair legs (CC) together. Scribe the outer leg rails (Z) to fit between the outer legs (BB) and outer stringers (X), cut them to length, and glue them in place [Drawing 9].

4 Cut the top step (DD), middle step/shelf (EE), lower step/shelf (FF), and small steps (GG) to size. Rout 1/4" round-overs on both faces of the front end of each part.

5 Screw the lower (FF) and middle (EE) shelf/steps in place [Drawing 9].

6 Cut the middle step trim (HH) and lower step trim (II) about 1" longer than shown. Fit the trim pieces, and glue them in place [Drawing 9, Photo M].

9 STAIR ASSEMBLY



7 Install the top step (DD) and the two small steps (GG) [Drawing 9].

Finish and install the unit

1 Disassemble the loft unit into smaller assemblies for ease of finishing. We applied a seal coat of shellac followed by several sprayed coats of lacquer. You could stain or paint the loft, if you prefer.

2 After the finish dries, reassemble the unit in its final location. You can

attach the stairway to the loft with screws driven through the stringers (X/Y) and leg (BB/CC) into the loft legs (A/B).

3 The stairway should sit close to a wall when the unit is set up, so attach a handrail to the wall using mounting hardware. 🌳

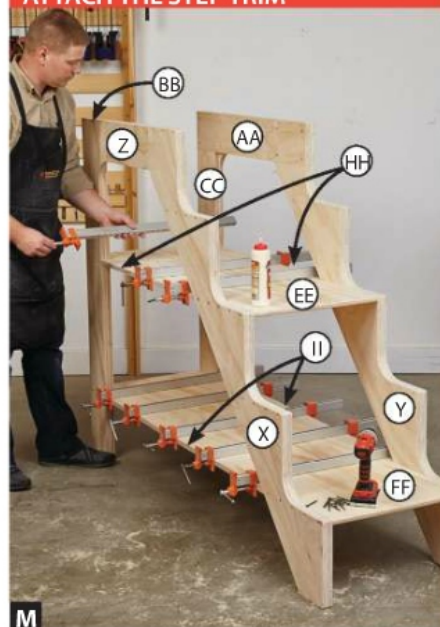
Produced by **Larry Johnston** with **John Olson**
Project design: **John Olson**
Illustrations: **Lorna Johnson**

MARK THE STEP RADII



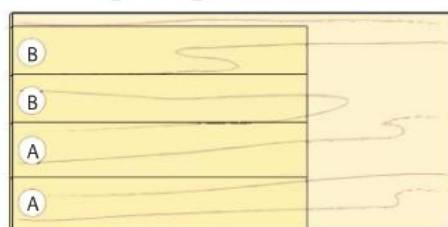
L Trace the radiused inside corners from the template onto an outer stringer (X). Join the radii smoothly into the rise and tread lines.

ATTACH THE STEP TRIM

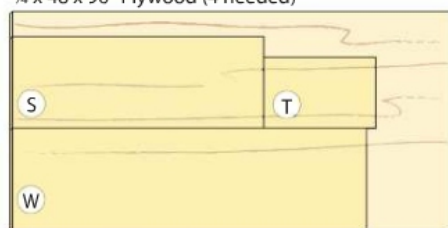


M Scribe and miter-cut the middle (HH) and lower (II) step trim to fit between the outer stair legs (BB) and the outer stringers (X). Glue them to the steps.

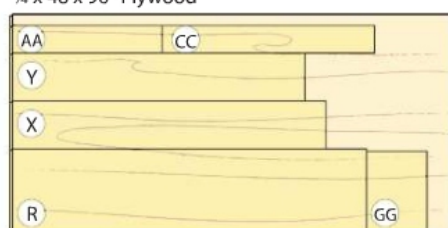
Cutting Diagram



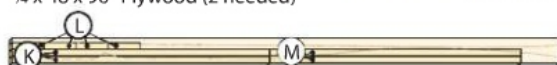
3/4 x 48 x 96" Plywood (4 needed)



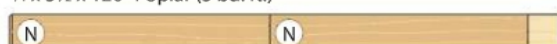
3/4 x 48 x 96" Plywood



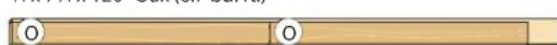
3/4 x 48 x 96" Plywood (2 needed)



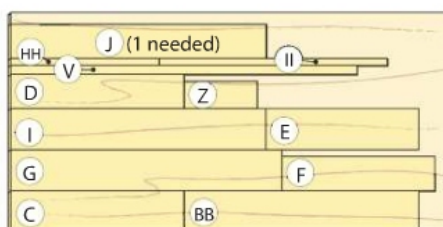
3/4 x 5 1/2 x 120" Poplar (5 bd. ft.)



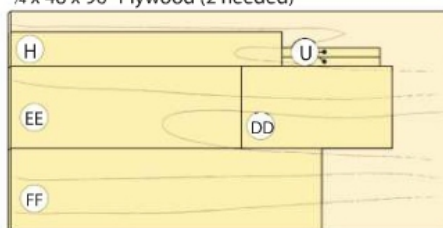
3/4 x 7 1/4 x 120" Oak (6.7 bd. ft.)



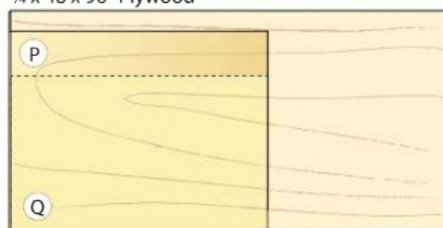
3/4 x 5 1/2 x 120" Oak (5 bd. ft.) (3 needed)



3/4 x 48 x 96" Plywood (2 needed)



3/4 x 48 x 96" Plywood



1/2 x 48 x 96" Plywood (2 needed)

Materials List

Part	Frame	FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	inner legs	3/4"	12"	64 1/2"	Ply	8
B	outer legs	3/4"	10 1/2"	64 1/2"	Ply	8
C	outer top end rails	3/4"	9"	37"	Ply	2
D	outer lower end rails	3/4"	7 1/2"	37"	Ply	2
E*	inner top end rails	3/4"	9"	32 1/2"	Ply	2
F*	inner lower end rails	3/4"	7 1/2"	32 1/2"	Ply	2
G	outer top front/back rails	3/4"	9"	59 1/2"	Ply	2
H	outer lower back rail	3/4"	7 1/2"	59 1/2"	Ply	1
I*	inner top front/back rails	3/4"	9"	55"	Ply	2
J*	inner lower back rail	3/4"	7 1/2"	55"	Ply	1

Bed						
K	end bed cleats	3/4"	1 1/2"	56 1/2"	P	2
L	short bed cleats	3/4"	1 1/2"	7"	P	4
M	side bed cleats	3/4"	1 1/2"	55"	P	2
N	large slats	3/4"	7 1/4"	56 1/2"	O	2
O	small slats	3/4"	4 3/4"	56 1/2"	O	6
P	large platform	1/2"	43 1/2"	56 3/8"	Ply	1
Q	small platform	1/2"	33 3/4"	56 3/8"	Ply	1
R	sideboards	3/4"	18 1/2"	77 1/2"	Ply	2
S	headboard	3/4"	20"	55"	Ply	1
T	footboard	3/4"	15 1/2"	24 1/2"	Ply	1

Desk						
U	end desk cleats	3/4"	2"	21 1/2"	Ply	2
V	front/back desk cleats	3/4"	2"	76"	Ply	2
W	desktop	3/4"	22 1/2"	77 1/2"	Ply	1

Stairs						
X	outer stringers	3/4"	10 1/2"	68 5/8"	Ply	2
Y	inner stringers	3/4"	10 1/2"	64"	Ply	2
Z*	outer stair rails	3/4"	6"	15 3/16"	Ply	2
AA	inner stair rails	3/4"	6"	33"	Ply	2
BB	outer stair legs	3/4"	9"	52 1/2"	Ply	2
CC	inner stair legs	3/4"	6"	46 1/2"	Ply	2
DD	top step	3/4"	18"	33"	Ply	1
EE	middle step/shelf	3/4"	18"	50 5/8"	Ply	1
FF	lower step/shelf	3/4"	18"	68 1/4"	Ply	1
GG	small steps	3/4"	18"	13 1/4"	Ply	2
HH*	middle step trim	3/4"	1 1/2"	31 7/16"	Ply	2
II*	lower step trim	3/4"	1 1/2"	49 1/16"	Ply	2

*Parts initially cut oversize. See the instructions.

Materials key: Ply—plywood, P—poplar, O—oak.

Supplies: #8x2" F.H.screws (32), #8x1 1/2" F.H.screws (86), #8x1 1/4" F.H.screws (32), #8x1 1/4" coarse-thread pocket-hole screws (4).

Bits: Pattern, 1/4" mortise, 1/4", 1/2", and 3/8" round-over router bits; 1/8" Forstner bit; 9mm brad-point drill bit [Source].

More Resources

► See a free video about handling plywood sheets at woodmagazine.com/sheetgoods.

► Learn how to make clean cuts in plywood at woodmagazine.com/plywoodcuts.

► Sand curved edges easily by building the drill-powered portable drum sander shown at woodmagazine.com/drumsandplan. Watch a free video on using this sander at woodmagazine.com/drumsandvid.

► See how to make a fairing stick and watch a free video about laying out a curve with it at woodmagazine.com/fairing.



Source

Countertop connectors, driver bit: Zipbolt countertop connector, 100mmx25mm no. 00512.20 (14), \$1.80 each; 4mm hex bit for connectors, 19J41.04, \$1.10, Lee Valley, 800-871-8158, leevalley.com.

Connector bolts, caps, key, and bit: Quick-connect 1/4"-20 bolts, 30mm, no. 00N14.30 (30), \$0.46; 50mm, no. 00N14.50 (16), \$0.56; Quick-connect bolt caps no. 00N20.17 (46), \$0.52; 5mm hex key, no. 00M30.22, \$0.60; 9mm brad-point drill bit, no. 33J01.09, \$4.60, Lee Valley.

5 Essential Tablesaw Jigs

—From Just a Half-sheet of Plywood



Unleash your tablesaw's full potential for less than \$100 in materials.

Get dead-on crosscuts, create dados, cut pieces to identical length, make tight tenons, rip straight edges on boards...the list of jobs

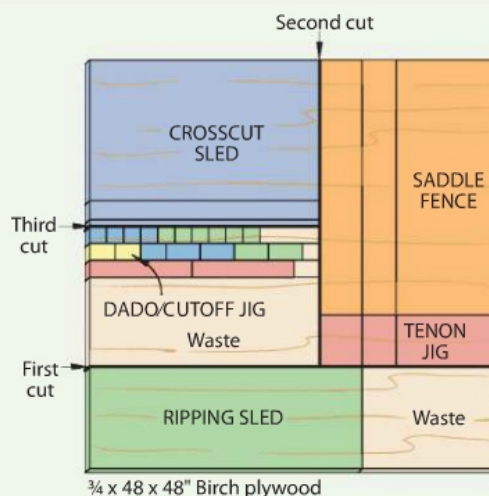
these jigs can tackle goes on and on. Once you have your $\frac{3}{4}$ " plywood and the hardware in hand [[Sources, page 39](#)], building all five should take only a

weekend. And from there forward, you'll realize it was a weekend well spent, as these jigs help improve and expand your woodworking.

First, cut down the plywood

Start by ripping a 12"-wide strip from one edge of the plywood [[More Resources, page 39](#)]. (Refer to the cutting diagram, right, as you work.) This becomes the ripping sled, so label it and set it aside for later. Crosscut a 27"-long piece from the remaining panel for the crosscut sled and various other small parts. **Note:** The 27" length allows for 3" to the right side of the saw blade and a minimum 2" overhang beyond the left wing. Measure your saw and adjust the length if needed. Label the 21"-long offcut for the saddle fence and tenon jig and set it aside.

Rip the crosscut-sled blank to 19 $\frac{3}{4}$ " wide. From the offcut of this panel, rip three 2"-wide strips. From these three strips, crosscut ten 2"-long blocks, three 3"-long blocks, four 4"-long blocks and two 12"-long blocks. Laminate eight of the 2" squares with their edges and ends flush to create four 1 $\frac{1}{2}$ "-thick blocks. Likewise, laminate two of the 4" blocks. While these pieces dry, you can start on the first jig.



1 CROSSCUT PRECISELY AND SAFELY WITH A SLED



This jig helps you steady wide panels or long pieces for crosscuts. Clamp a stop to the fence to crosscut several pieces to identical length; for longer pieces, extend the fence's built-in stopblock.

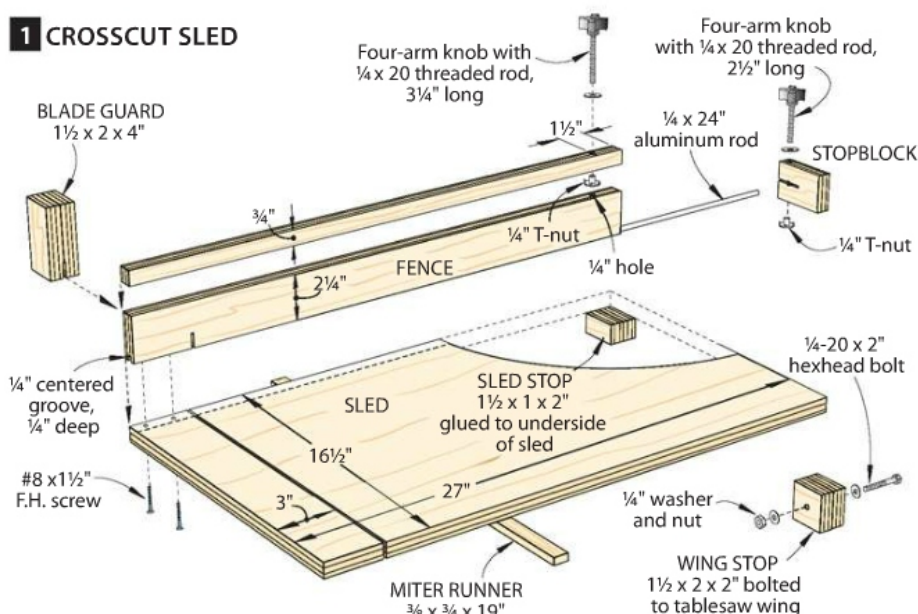
Retrieve the crosscut-sled blank and rip a 3/8"-wide fence blank from one edge [**Cutting Diagram**]. Set up a stop-block on your drill-press fence [**Installing T-nuts, below**] and drill a 1/4" hole 1 1/2" from one end of the fence blank [**Drawing 1**]. Rip a 3/4" strip from the blank, and in the just-ripped edge of this piece, drill counterbores for a 1/4" T-nut. Install the T-nut and reglue the fence strips, using a bolt through the holes and T-nut to help align the pieces.

After the glue dries, cut the groove in the bottom edge of the fence [**Drawing 1**].

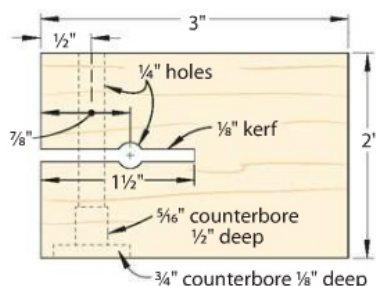
Retrieve the crosscut sled. Check that one end is exactly square to an edge, then place that end against the tablesaw rip fence, with the square edge closest to you. **Note:** For best results with your sled,

your rip fence and blade must be properly aligned. See **More Resources** on page 39 for details on checking this. Glue and clamp the sled fence to the sled flush with the rear edge **[Photo A, next page]**.

1 CROSSCUT SLED



1a STOPBLOCK DETAIL



SHOP TIP

Installing T-nuts

T-nuts provide a way to secure a threaded rod or bolt in a workpiece. Installing a T-nut flush with the surface of a workpiece requires drilling three concentric holes. (Refer to **Drawing 1a**.) To do this, lay out the centerpoint of the T-nut, then position your drill-press fence to place the drill bit exactly on the layout point, *right*. Clamp a stopblock to the fence against the end of the workpiece. Drill the $\frac{1}{4}$ " through-hole first, then install a $\frac{5}{16}$ " bit and set the drill-press depth stop to drill $\frac{1}{2}$ " deep. After drilling this counterbore, mount a $\frac{3}{4}$ " Forstner bit and drill a $\frac{1}{8}$ "-deep counterbore.

Tap in the T-nut with a hammer. To prevent splitting the plywood when installing a T-nut in the edge, squeeze the piece in a vise, *far right*.



A SQUARE SLED MAKES SQUARE CUTS



Check for precise alignment by feeling along the edge with your finger. Hold the fence in place for a few minutes to let the glue grab before clamping.

From a scrap of a hard wood (we used maple), mill a miter runner to fit the width of your miter-gauge slot. Using the rip fence to help position the sled, temporarily attach the miter runner with double-faced tape [Photo B], then screw it in place. Don't glue the miter runner, so that you can replace or adjust it if needed.

With the runner secured, place the jig on the tablesaw and cut through the sled until the fence reaches the highest point of the blade. Shut off the saw, and hold the sled in place. Retrieve two of the 1½×2×2" plywood blocks. Bandsaw one to 1" wide to make the sled stop, and glue it to the left rear corner of the sled, allowing at least ¼" between the stop

and the edge of the tablesaw wing. Bolt the second block to the tablesaw wing so it contacts the sled stop [Photo C]. Remove the jig and drive two screws through the sled and into the fence to secure the narrow right portion of the sled [Drawing 1].

Retrieve a 2×3" plywood piece for the stopblock [Drawing 1a]. Install a T-nut, drill a ¼" hole through the face and cut the kerf where shown. Secure the stopblock to an aluminum rod with a threaded knob [Shop Tip, below]. Slide the rod into the groove in the fence and secure it with a second threaded knob. Glue the blade guard behind the kerf in the fence [Drawing 1], and your crosscut sled is ready for years of service.

MOUNT THE MITER RUNNER



Elevate the runner above the saw table by resting it on washers. Remove the sled with the attached runner, drill pilot holes, and secure the runner.

PUT A STOP TO IT



Mark the wing-stop position and drill a hole in the wing to mount it. These blocks halt the sled after completing the cut.

SHOP TIP

Make knobs with custom-length threaded studs

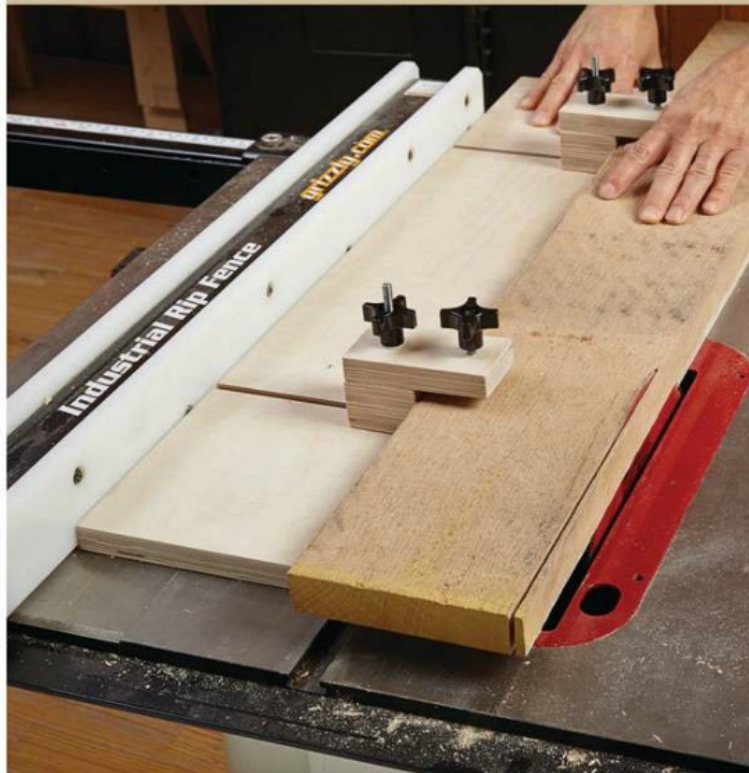
Several of these jigs require knobs with threaded studs in lengths not readily available. But it's easy to make your own. Simply cut the required length from ¼×20 threaded rod. (The lengths listed in the drawings account for ½" of rod threaded into the knob.)

Cut the threaded rod as shown, *near right*. Remove the nuts after cutting to clean up burrs on the threads.

Then, dab a metal-bonding epoxy on the end of the threaded rod, *far right*, twist it into the knob from below, and add more epoxy from above to fill and cover the top of the brass insert in the knob. Wrap the threads below the rod with painter's tape to catch any runs, and stand the knobs up to cure.



2 DUAL-PURPOSE SLED STRAIGHTENS AND TAPERS



Secure a piece of rough-cut lumber on this sled with the adjustable hold-downs and rip a clean edge, *above left*. Or create matching tapers for a set of table legs, *above*.

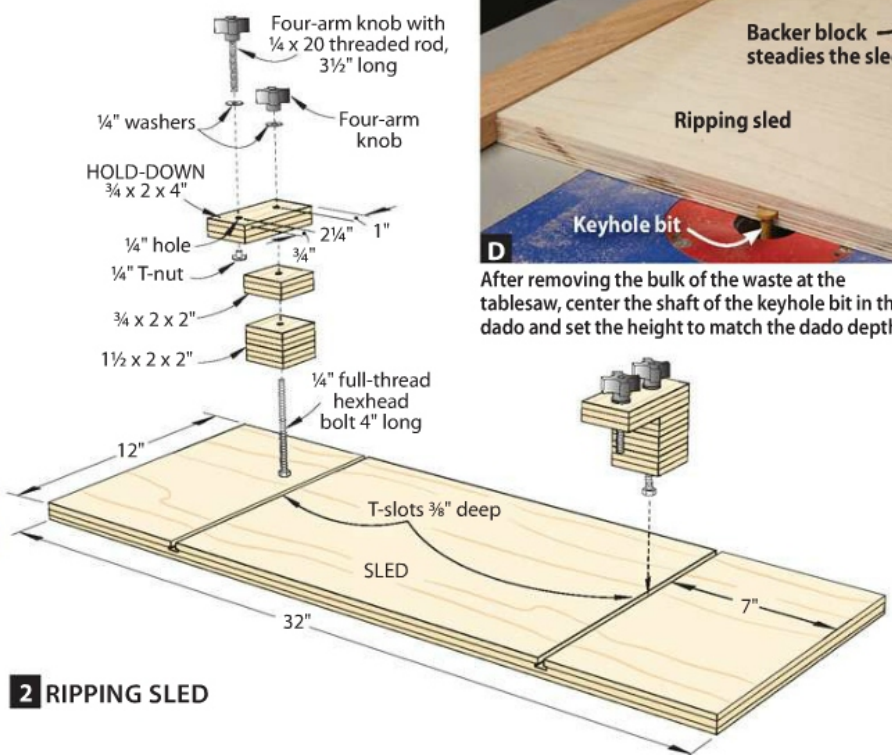
For this jig, crosscut to length the ripping-sled blank set aside earlier [Drawing 2]. To make the T-slots, cut two $\frac{1}{4}$ " dados $\frac{3}{8}$ " deep. Install a keyhole bit [Sources] in your table-mounted router and set it $\frac{3}{8}$ " above the table. Rout T-slots through each dado [Photo D].

For the hold-downs, use the remaining 2" plywood squares. Drill a centered $\frac{1}{4}$ " hole through the face of each square and a corresponding hole through the two 4" plywood blocks [Drawing 2]. Drill a second set of holes for T-nuts through the 4" blocks $\frac{3}{4}$ " from the opposite end. Install the T-nuts and assemble the jig as shown.

To use the sled to true up a rough edge, place it as close as possible to the tablesaw blade without touching it, bring the rip fence up to the opposite edge, and lock the fence in place. Remove the sled from the saw. Position the workpiece so it just overhangs the edge of the sled and lock it in place with the hold-downs [Photo above]. **Note:** To avoid damaging the hold-downs, apply only enough pressure to secure the workpiece. Use additional 2"-square plywood spacers as needed to accommodate the workpiece thickness.

To taper a leg, lay out the start and stop points of the taper on the leg. Align these marks along the edge of the sled. If

necessary, place a spacer between a hold-down and the leg to keep the hold-down back from the blade (*above right*). Raise the blade $\frac{1}{8}$ " higher than the top face of the leg, and make the cut.



2 RIPPING SLED

3 & 4 SADDLES HELP YOU CUT BEVELS, RABBETS, TENONS, AND MORE



The saddle fence, *above*, locks to the rip fence to support tall pieces, such as when moving a piece on end or edge past the blade, or to protect the rip fence when cutting rabbets, *center*. The tenon jig, *above right*, slides along the rip fence to carry a workpiece past the blade.

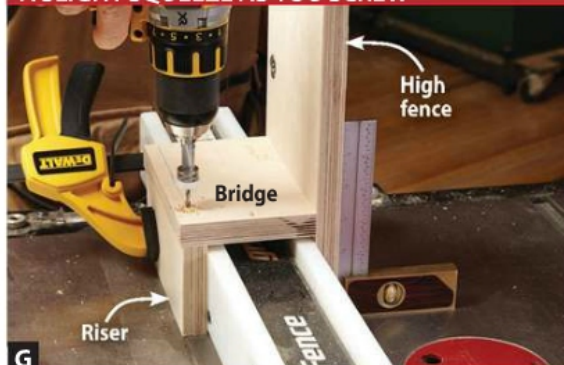
Retrieve the blank for the saddle fence and tenon jig. These two jigs share similar construction, so it makes sense to cut their parts at the same time. Measure your rip fence and size the risers and bridges as indicated [Drawing 3]. Cut them and the high fences to size. Drill the holes and install the T-nuts in the high fences of both jigs and the riser of the saddle fence. Assemble the jigs with glue and screws [Photo G].

For the tenon-jig backing fence, glue together the 2×12" plywood blocks.

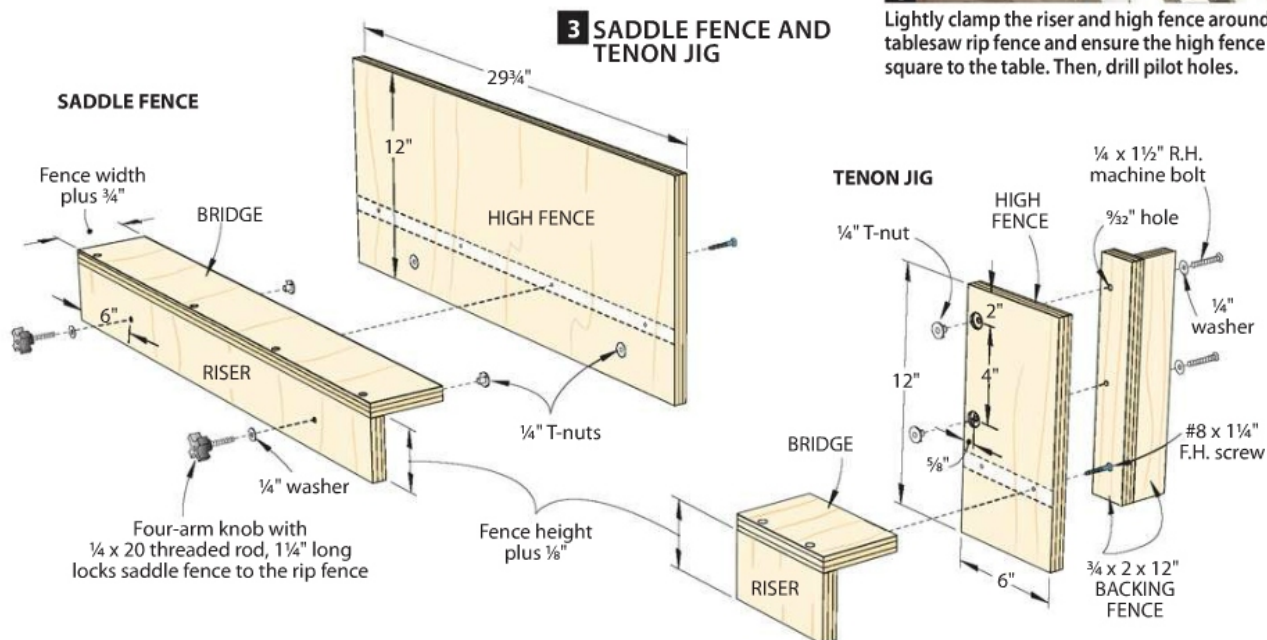
Quick Tip! Make several backing fences from the remaining plywood so you can quickly replace one when it gets chewed up from use.

After the glue dries, align the rear edges of the backing fence and the high fence of the tenon jig. Mark through the T-nuts with a 1 $\frac{3}{64}$ " drill bit and drill $\frac{3}{32}$ " holes on these marks. (The slightly over-size holes provide a small amount of adjustability when positioning the backing fence.) Install the backing fence, ensuring that it rests perpendicular to the saw table.

A SLIGHT SQUEEZE AS YOU SCREW



Lightly clamp the riser and high fence around the tablesaw rip fence and ensure the high fence sits square to the table. Then, drill pilot holes.



5 SAFELY CUT DADOES AND SHORT PIECES WITH ONE JIG



No dado blade? No problem. Set this jig to cut each shoulder, above, then clean out the waste between them. The screw allows for very fine adjustments. The jig also helps when cutting short pieces, below right. Simply add its 3" length to the desired dimension of the workpiece when setting the rip fence.

Construct this simple L-shape jig from the two remaining 2×3" blanks. It helps you in two ways.

First, it helps cut dados without a dado blade. To do this, adjust the screw in or out so that the distance from the screwhead to the wood finger of the jig equals the width of the dado, minus the thickness of the tablesaw blade. For example, to cut a ½"-wide dado with a full-width (⅞"-thick) blade, adjust the screw so it sits ⅜" from the finger. Butt the workpiece against the wood finger of the jig to cut one shoulder of the dado,

above left. Then butt the workpiece against the screw to cut the opposite shoulder, above right. Clean out the waste with additional passes over the blade.

Second, this jig enables crosscutting identical-length short pieces. Clamp the jig to the rip fence ahead of the blade,

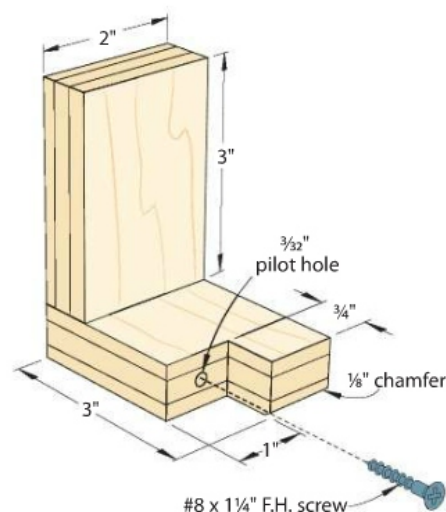
butt a blank against it, and make the cut, below. By creating clearance between the fence and blade, the jig allows each piece to fall away safely. 🍀

Produced by **Craig Ruegsegger**

Illustrations: **Roxanne LeMoine; Lorna Johnson**



4 DADO/ CUTOFF GAUGE



Supplies: 1½" four-arm knobs with through-holes and ¼×20 inserts (8), ¼×20 T-nuts (10), ¼×24" aluminum rod (1), ¼×20 threaded rod 18" long (1), ¼×20 roundhead machine screws 1½" long (2), ¼×20 full-thread hexhead bolts 4" long (2), ¼×20 hexhead bolt 2" long (1), ¼" washers (12), ¼×20 nut (1), ¼" plastic caps to fit the end of the threaded rod (2).

Bits: ⅜", 13/64", ¼", ⅝", ⅜", ⅝" drill bits; ⅜" Forstner bit.

Sources

Hardware kit: Contains all of the hardware listed under "Supplies" above, no. RS-01057, \$39.95, 888-636-4478, woodmagazine.com/Stsjigs.

Keyhole bit: no. 041271, \$12.90, Sommerfeld Tools for Wood, 888-228-9268, sommerfeldtools.com.

More Resources

► Watch a FREE video showing how to make and use a simple jig for a circular saw and router to cut straight edges on large plywood sheets:

woodmagazine.com/straightedge.

► Follow the steps in this FREE article to tune your tablesaw for peak performance: woodmagazine.com/tstune.

► Jim Heavey demonstrates how to tune up your tablesaw in this FREE video: woodmagazine.com/TStuneupvid.



12-volt Drill/Drivers

These handy tools feature the perfect combination of size, power, and finesse for woodworking.

I've used several drill/drivers of this size in my shop for nearly a decade now, and they've become the go-to tools for almost all drilling and fastener-driving tasks. You'll still need a larger drill (that means 18 volts for most of us) for heavy-duty jobs, but I bet you'll find it gathering dust more and more after getting your hands on one of these 12-volt drills. We tested 13 models to find the best ones.



Bob Hunter
Tools Editor

Torque pinpoints the leaders

All of the tested drills pack sufficient torque to drill the holes and drive the screws you'll typically use in a wood-working shop. But to find each tool's *maximum* power, we drove 2½" lag screws of increasingly larger diameters into treated pine. Nearly all the "pro" brands of drills (Bosch, DeWalt, Makita, Milwaukee, and Ridgid) could fully seat a ⅜" lag, even without a pilot hole. And the Bosch PS32-02 and Milwaukee 2403-22—both with brushless motors (see *next page, top*)—led the field by seating ½" lags. Impressive for such small tools!

On the other hand, the Black & Decker drill could not fully seat a $\frac{5}{16}$ " lag. The other models drove $\frac{3}{8}$ " lags to partial depths, but could not finish the job.

Batteries make the tools

All of the tested drills use the same basic battery platform: three 3.6-volt lithium-ion cells linked together for a total of 10.8 volts. Most manufacturers market these as having a maximum, albeit brief, output of 12 volts on a full charge, but they're essentially equal in terms of voltage.

The amp-hour rating—the amount of potential run time within each pack—determines how long each will power its drill. To measure run time, we drove thousands of screws and drilled hundreds of holes in 2x6 pine, exhausting each fully charged battery pack. See the charts at *right* for a full comparison.

The good news: When it comes to driving $\frac{1}{4}$ " screws, even the 13th-place drill, the Black & Decker, could sink 147 before calling for the charger. The others all drove at least 200 screws per charge, with the brushless Bosch and Milwaukee drills leading the way at more than 450. When it came to drilling $\frac{3}{4}$ " holes with a Forstner bit, the Bosch brushless drill bored at least twice as many as all but one competitor.

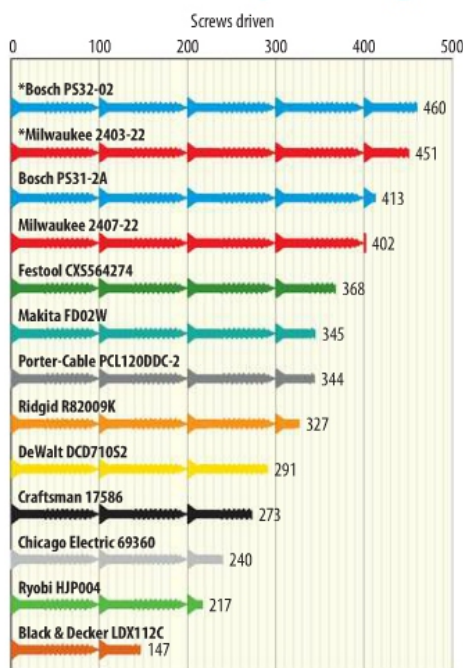
The Milwaukee brushless drill comes with 2.0- and 4.0-amp-hour packs (one each), tops among this test group. In our run-time testing (charts at *right*), we used the 2.0-amp-hour pack for this tool to level the playing field, because all the other tools use packs rated from 1.3 to 2.0 amp-hours. When we tested the 4.0-amp-hour pack, the Milwaukee 2403-22 drove a whopping 627 screws and drilled 91 holes. This larger pack does not make a significant difference in the weight or balance of the tool. (You can buy similar extended-run packs for

Go brushless for big benefits



Traditional cordless-drill motors (*left*) use carbon brushes to transmit electrical energy from the battery pack to the commutator, which spins to power the motor. This creates a lot of heat, decreases efficiency, and requires eventual replacement of the brushes. A brushless motor (*right*) draws power directly from the battery pack, electronically generating greater torque, longer run time, and longer tool and battery life.

Brushless-motor drills do more work per charge



Number of $\frac{1}{4}$ " screws driven in 2x6 pine per charge, average of three charges. *These models have brushless motors.



Number of $\frac{3}{4}$ " holes drilled in 2x6 pine per charge, average of three charges. *These models have brushless motors.

Black & Decker LDX112C, \$50
800-544-6986, blackanddecker.com

Bosch PS31-2A, \$130
877-267-2499, boschtools.com

Bosch PS32-02, \$150
877-267-2499, boschtools.com

Chicago Electric 69360, \$45
800-423-2567, harborfreight.com



the Bosch, DeWalt, and Ridgid drills as optional accessories.)

When you deplete a battery pack's charge, most drills have a second one ready to replace it, but the Chicago Electric and Craftsman drills come with only one each. The packs of five models recharged in 40 minutes or less, led by the Craftsman at 28 minutes. And although the Black & Decker packs required 75 minutes to recharge, in most cases a charge from any of these models will last weeks in normal shop use, so this might not be an issue for you.

The Bosch, Craftsman, and Milwaukee drills have LED lights on the tool to indicate the charge level of an attached battery (*near right*). The other models have no indicators on the tool or battery packs.

More things you should know before buying

► **Chucks** — All of the test drills have three-jaw chucks, but only Milwaukee's brushless drill can hold a 1/2"-shank drill bit, a nice advantage. Most other models have 3/8" chucks, and Festool provides a 5/16" chuck.

Ridgid's chuck routinely slipped on the round-shank Forstner bit during our testing, but worked fine with hex-shank bits. And the Festool comes with three chucks (shown *above right*). We like the flexibility these additional chucks provide, but would prefer to see a three-jaw chuck larger than 5/16".

► **Lights** — All the tested drills include an LED task light that points toward the area in front of the chuck. But Festool's low-mounted light works best because it angles the light without creating shadows from the chuck.

► **Ergonomics** — How each drill feels in your hand depends on your hand size. Most of the tools have thick, triangular handles because their battery packs

READY FOR A DAY'S WORK



Battery-charge indicator LEDs, shown on the Bosch PS32-02, show more lights lit when the pack has a full charge.

ONE DRILL, THREE CHUCKS



Festool includes quick-change chucks for drilling and driving fasteners straight on, as well as for working at right angles in close quarters.

BATTERY PACKS DETERMINE HANDLE ERGONOMICS



Stem-style insert



Horizontal mount

insert vertically into the handles, as shown *above*. These models might not feel as comfortable if you have small hands. If you do, consider the Black & Decker, DeWalt (*above right*), Festool, or Ryobi drills, which have slimmer han-

dles due to different battery-pack mounting styles.

► **Clutches** — All the drills have built-in clutches with at least 10 settings. They all worked adequately, but we found no meaningful differences between them.

Craftsman 17586, \$50
800-549-4505, craftsman.com

DeWalt DCD710S2, \$140
800-433-9258, dewalt.com

Festool CXS564274, \$295
888-337-8600, festoolusa.com

Makita FD02W, \$120
800-462-5482, makitatools.com



Get a powerful punch from a pint-size drill/driver

BRAND	MODEL	PERFORMANCE RATINGS (1)								BATTERY PACKS		DRILL			BUILT-IN TASK LIGHT? YES/NO	BELT HOOK? YES/NO	STORAGE CASE (4)	COUNTRY OF ASSEMBLY (5)	SELLING PRICE (6)
		PRIMARY		SECONDARY						NUMBER OF PACKS INCLUDED	AMP-HOURS	MAXIMUM CHUCK SPEED PER RANGE, RPM	MOTOR TYPE (2)	CHUCK SIZE, INCHES (3)					
		TORQUE	RUN TIME PER CHARGE (AVERAGE OF DRILLING AND DRIVING)	CHARGE TIME, MINUTES	OVERALL FEEL AND BALANCE	EASE OF USING POWER SWITCH	EASE OF USING FORWARD/REVERSE SWITCH	EASE OF USING CHUCK	EASE OF CHANGING SPEED RANGES										
BLACK & DECKER	LDX112C	C-	C-	75	C	A-	B	C	NA	2	1.3	650	C	3/8	Y	N	N	C	\$50
BOSCH	PS31-2A	A-	A	43	A	A	A	A	A	2	2.0	350/1,300	C	3/8	Y	N	P	M	\$130
	PS32-02	A	A	43	A	A	A	A	A	2	2.0	400/1,300	B	3/8	Y	Y	C	M	\$150
CHICAGO ELECTRIC	69360	C+	B	57	B-	A-	C	A	A	1	1.3	350/1,200	C	3/8	Y	N	N	C	\$45
CRAFTSMAN	17586	B	B	28	A-	A-	B-	A	B+	1	1.3	400/1,300	C	3/8	Y	N	C	C	\$50
DEWALT	DCD710S2	A-	B+	60	A	A	A	A	A-	2	1.3	400/1,500	C	3/8	Y	Y	C	C	\$140
FESTOOL	CXS564274	B-	B+	29	A	A	A	A	A	2	1.3	400/1,200	C	5/16*	Y	Y	P	G	\$295
MAKITA	FD02W	A-	B+	48	A	A	A-	A	A	2	1.5	350/1,300	C	3/8	Y	N	P	C	\$120
MILWAUKEE	2407-22	A-	A	40	A	A	A	A	A-	2	1.5	400/1,500	C	3/8	Y	Y	P	C	\$130
	2403-22	A	A	40	A	A	A	A	A-	2	2.0, 4.0	450/1,700	B	1/2	Y	Y	P	C	\$180
PORTER-CABLE	PCL120DDC-2	B+	B	41	A	A	B	A	B+	2	1.3	315/1,200	C	3/8	Y	Y	C	C	\$100
RIDGID	R82009K	A-	B	30	C-	A	A	C	B	2	2.0	350/1,500	C	3/8	Y	N	C	C	\$99
RYOBI	HJP004	C+	C	51	B+	A	A	B	NA	2	1.5	600	C	3/8	Y	N	C	C	\$50

1. **A** Excellent **D** Poor
B Good **NA** Single speed only
C Fair
2. (B) Brushless motor
(C) Carbon-brushed motor
3. (*) This drill also comes with a 1/4" hex chuck and right-angle 1/4" hex chuck.
4. (C) Canvas
(P) Plastic
(N) No case included
5. (C) China
(G) Germany
(M) Malaysia
6. Prices current at time of article production and do not include shipping, where applicable.

The best of the best

You'd likely be happy using any of the drills that scored mostly "A" grades in the chart above. But the brushless Bosch PS32-02 and Milwaukee 2403-22 far outpaced the other models in terms of torque and run time, and they share our Top Tool award. The Milwaukee has the 1/2" chuck and 4.0-amp-hour battery pack, a nice advantage. But the Bosch

topped our run-time testing and sells for \$20 less. So you're a winner with either one.

For significantly less of a price, consider the Craftsman 17586, our Top Value. It delivers good torque and run time, and although you only get one battery pack, it recharges in less than a half hour.

Produced by **Bob Hunter** with **Bill Damman** Illustrations: **Tim Cahill**

Milwaukee 2407-22, \$130
800-729-3878, milwaukeeetool.com

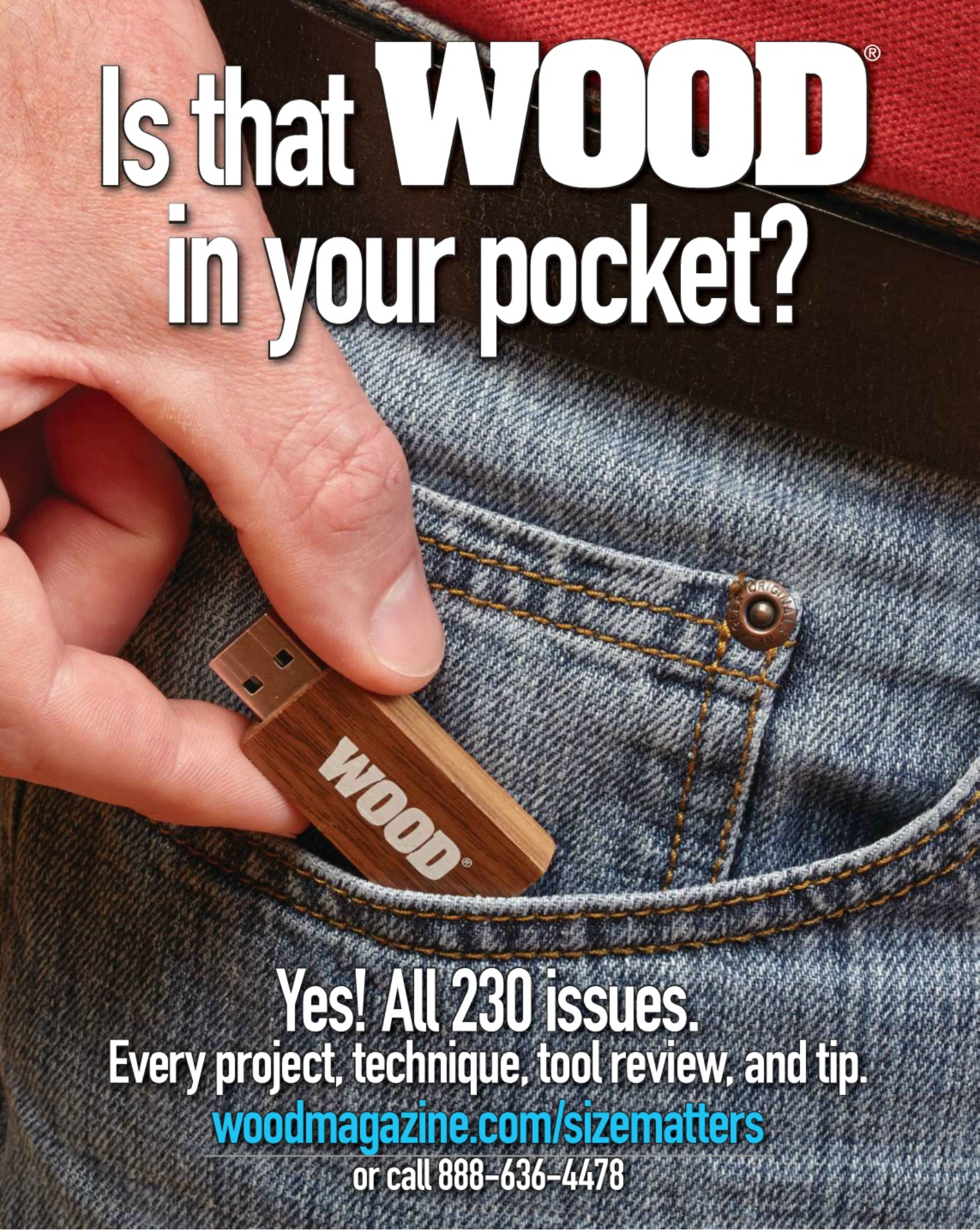
Milwaukee 2403-22, \$180
800-729-3878, milwaukeeetool.com

Porter-Cable PCL120DDC-2, \$100
800-544-6986, portercable.com

Ridgid R82009K, \$99
866-539-1710, ridgid.com

Ryobi HJP004, \$50
800-525-2579, ryobitools.com



A close-up photograph of a person's hand holding a small, rectangular wooden USB drive. The drive has the word "WOOD" printed on it in a stylized font. The hand is positioned near the pocket of a pair of blue denim jeans. The background is a solid red color.

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Dining Room Chair



The perfect companion to the hutch in issue 229 and dining room table in issue 230, this chair combines graceful contours with robust design and proves as sturdy and comfortable as it is attractive.

Materials cost: \$125 (@ \$6/bd. ft.)
A minimum of 20 bd. ft. of 8/4 material and
1 bd. ft. of 5/4 material needed for each chair.
Overall dimensions: 18" W x 18" D x 41" H



Hutch
issue 229
(November 2014)



Dining Table
issue 230
(December/January 2014/2015)

There are certain types of projects that cause me to break out in a cold sweat. Chair building is at the top of my list with all those complex joinery angles, tapers, and curves, combined with the fact that you almost never build just one chair. But this elegant chair is surprisingly easy to build. The joinery is simple, and all machining is done while the stock is square—the graceful curves and tapers are added later.

Nate

Nate Granzow
General-Interest Editor



Work from the legs up

1 From 1½" stock, cut the back legs (A), front legs (B), lower leg rail (C), and upper leg rail (D) to size [Materials List].

Note: Leave these pieces rectangular until all joinery is cut. Lay out the shape of the back legs with a pencil [Drawing 1]. Then, use a plunge router with an edge guide and an upcut spiral bit to rout a ⅝" mortise for the back rail (G) on the inside face of each leg blank [Drawing 1]. Square the lower end of the mortises [Photo A].

2 Lay out the shape of the front legs (B) [Drawing 2]. Then, cut the ½" mortises in the edges of the back (A) and front legs. Square both ends of these mortises with a chisel.

3 Lay out the shape of the leg rails (C, D) [Drawing 3] and cut matching tenons on their ends. Then, cut half-laps

SQUARE ONE END OF EACH MORTISE



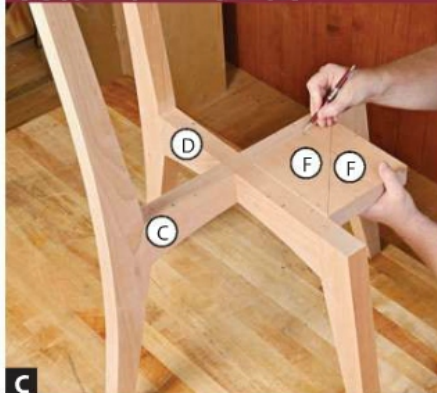
Use a ¼" chisel to shear the end grain of the mortise's bottom before the long grain. This prevents tear-out and yields a clean, square edge.

ASSEMBLE THE LEGS



When clamping the leg assemblies, insert a snug-fitting block into the notches in the center of the leg rails (C, D) to prevent damage from clamping.

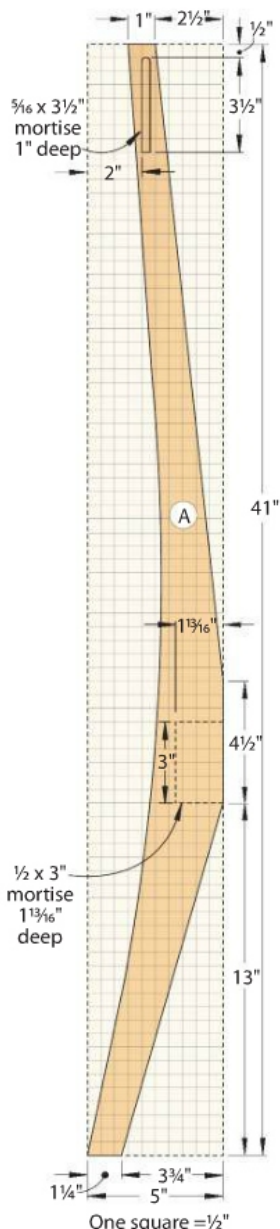
BISCUIT FOR THE BRACES



After marking the biscuit locations on the leg rails (C, D) and leg-brace (E, F) blanks, cut biscuit slots $\frac{1}{4}$ " from the top edge of the leg rails and corresponding slots in the leg braces. Then, adjust the joiner's fence to cut a second set of slots $\frac{3}{4}$ " from the top edges of the leg rails, and repeat.



1 RIGHT BACK LEG (Left leg is a mirror image)



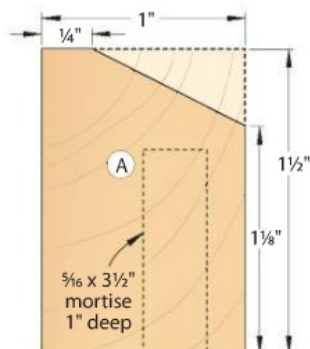
in the leg rails. **Note:** The half-laps are offset to the rear of each leg rail, and the depth of cut for the lower leg rail (C) and upper leg rail (D) differ by 1".

4 Bandsaw the back legs (A) to shape, cut the arc on the bottom edge of each leg rail (C, D) [Drawing 3], and the

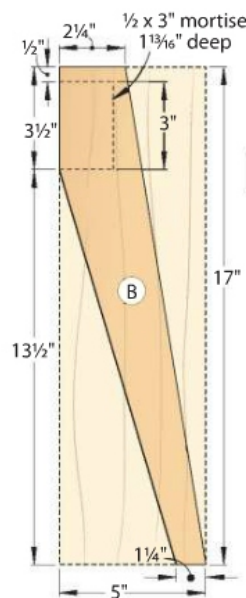
taper only on the inside (mortised) edge of each front leg (B). Sand or plane off any machining marks. (Leaving the front edge of the front legs square makes assembly easier.)

5 Glue and clamp together both leg assemblies (A/B/C and A/B/D) [Photo B]. When dry, cut the remaining taper on the front legs (B) and sand or plane smooth. Glue the two leg assemblies together at the half-lap.

1a TOP VIEW RIGHT BACK LEG (Left leg is a mirror image)



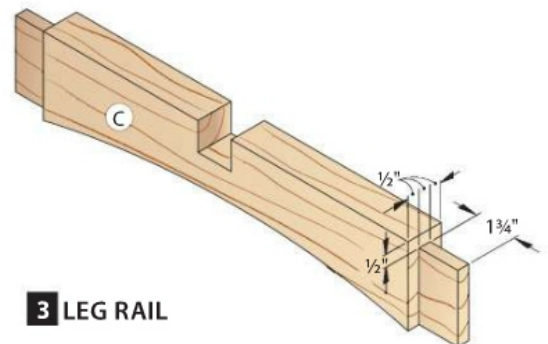
2 FRONT LEG



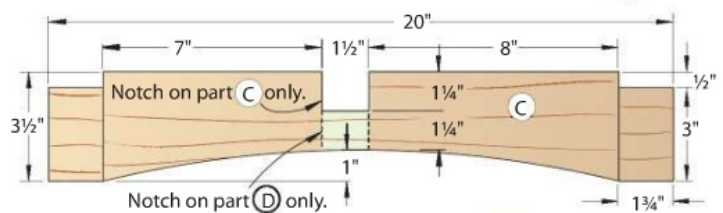
Brace for a strong back

1 From 1" stock, cut a 5 1/2"-square blank for the side leg braces (E), and a 7"-square blank for the front/back leg braces (F). Mark diagonally across the face of each blank. Then, mark biscuit locations across the leg assembly (A-D) and leg braces (E, F) [Photo C]. Cut the biscuit slots [Photo D].

2 Bandsaw the leg-brace blanks (E, F) along the diagonal lines. Sand or plane away any machining marks, and



3 LEG RAIL



Practice tricky fittings with a “stunt double”

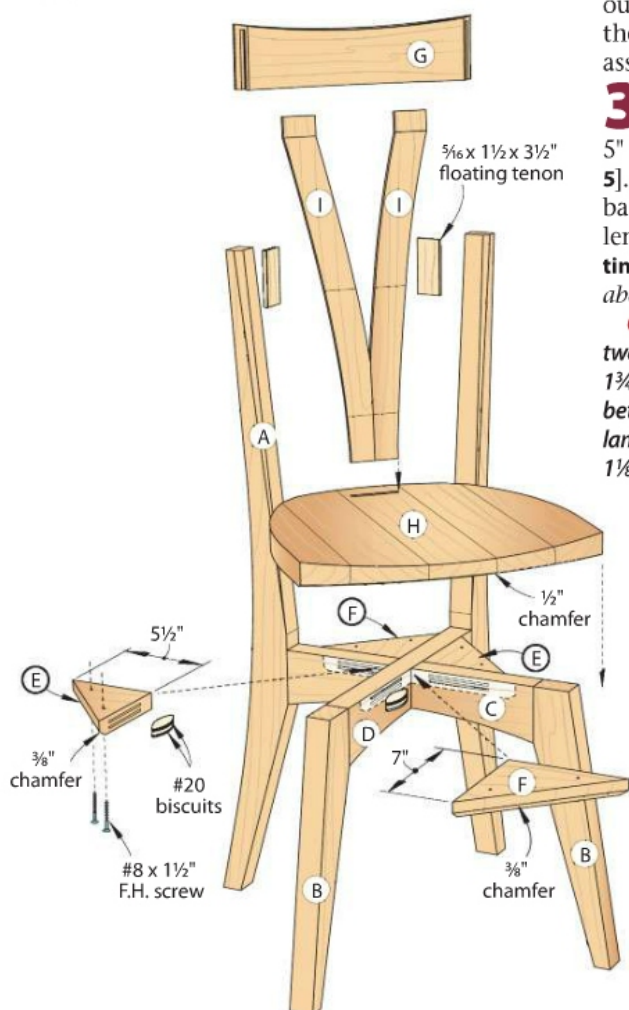
Marking the final length and cutting the joinery in the back rail (G) can be nerve-racking, so use a secondary wood—such as pine—for your first attempt. With a back rail

blank cut to size, but 5" longer than listed, place the blank on the back legs and scribe the actual length before mitering the ends (far left). Nest the mitered ends between the back legs (A)

and transfer the locations of the mortises in the legs to the ends of the test rail (near left). Cut 45° miters on the ends of the back rail along its back face in order to give your router's edge guide a surface to ride against. Then, rout $\frac{5}{16}$ " mortises in the ends of the back rail (below) on the marks [Drawing 5]. Mill and test-fit floating tenons to connect the test rail to the back legs. If you find the fit satisfactory, repeat the process along the back rail.



4 EXPLODED VIEW



then chamfer their bottom outside edges [Drawing 4]. Glue the biscuited braces to the leg assembly [Photo E].

3 Mill the back rail (G) to thickness and width, but 5" longer than listed [Drawing 5]. Mark it against the chair's back legs (A) and cut it to length. (See "Practice tricky fittings with a 'stunt double,'" above.)

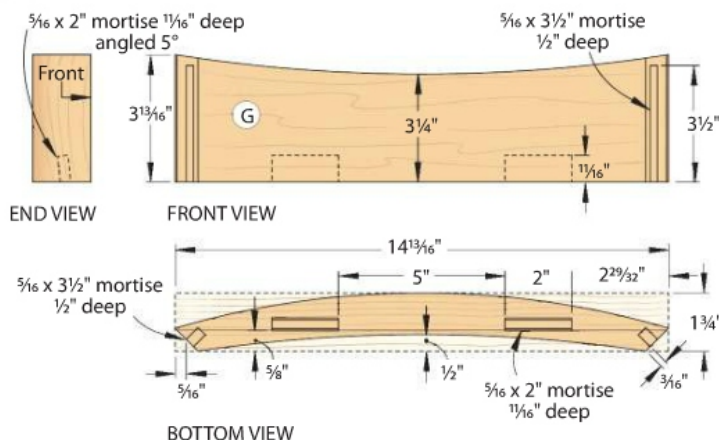
Quick Tip! If you must laminate two pieces to achieve the back rail's $1\frac{3}{4}$ " thickness, hide the seam between the chair's back legs by laminating a $\frac{5}{8}$ "-thick piece and a $1\frac{1}{8}$ "-thick piece.

ATTACH THE LEG BRACES

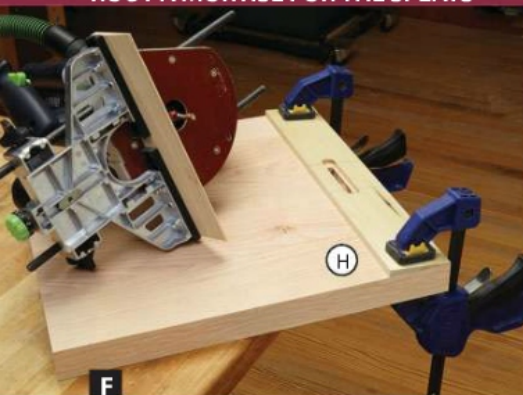


Glue and clamp the leg braces (E, F) between the leg rails (C, D) in opposing pairs in order to give your clamp's jaws parallel clamping surfaces.

5 BACK RAIL



ROUT A MORTISE FOR THE SPLATS



Use the same scraps you used for the back rail (G) to make an angled mortise in the seat (H), but flip the angled strip on the router's edge guide, as shown.

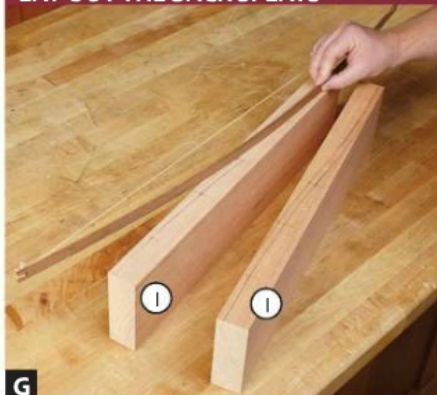
Rout angled mortises in the bottom edge of the back rail (see “**Rout angled mortises with ease**,” below) and square up their ends. Then, bandsaw the curves in the front and back faces of the back rail, keeping the cutoff from the front face for later. Smooth the curves.

Make a shapely seat

1 Glue up a 1½"-thick seat blank (H) and rout a 5°-angled mortise where shown [Drawing 6, Photo F]. Square the ends of the mortise with a chisel. Contour the seat (H) using a router sled and subbase. (See “**Jig up to scoop the seat**,” next page.)

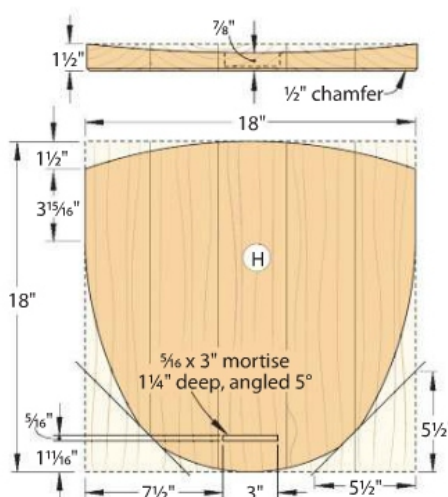
2 Cut to size two blanks for the back splats (I) and lay out their shape [Drawing 7, Photo G]. Then, bandsaw them to shape [Photo H] and smooth the edges. Dry-fit them together and check their fit into the mortises in the back rail (G). Adjust the fit as needed, and then glue the splats together along their lower edge [Drawing 4].

LAY OUT THE BACK SPLATS



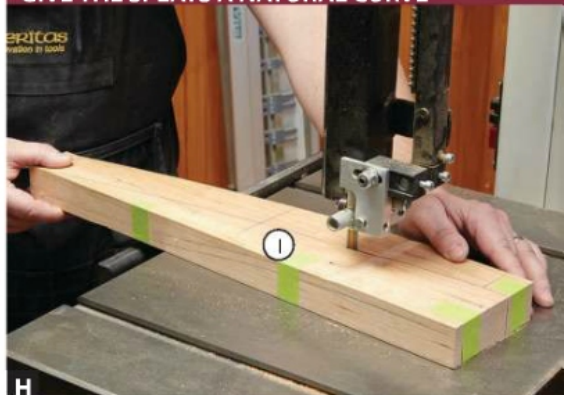
Use Drawing 7 to lay out the back splats (I) by transferring several points from the pattern and using a fairing stick to connect them.

6 SEAT



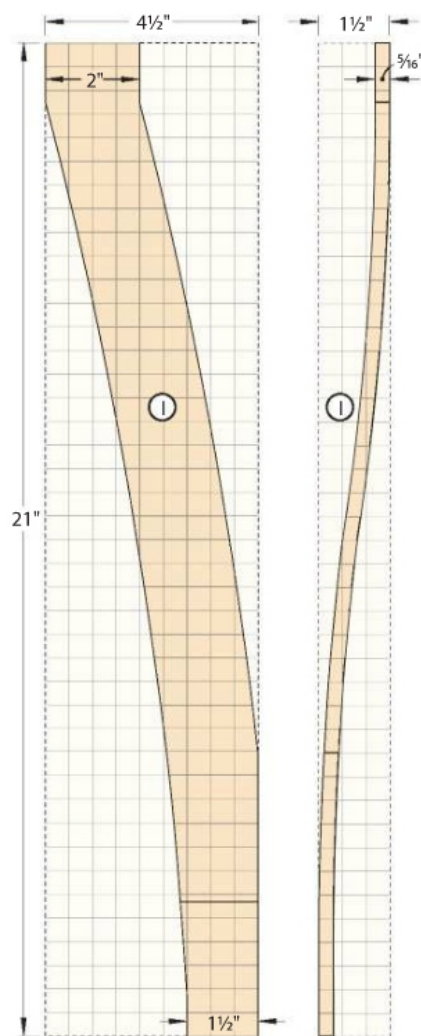
3 Cut the miters on the back corners of the seat (H) [Drawing 6] and dry-fit the chair. Mark the intersections of the back legs (A) on the seat [Photo I], and

GIVE THE SPLATS A NATURAL CURVE



Bandsaw the back splats (I) to shape, first cutting with the blanks on edge. Keep the offcuts, tape them back in place, and bandsaw along the faces.

7 BACK SPLAT (Left splat shown, right splat is a mirror image)



Enlarge 400% for full-size pattern.
1 square = 1/2"

Rout angled mortises with ease

To set up for the angled mortises in the back rail (G), rip two 3"-wide scrapwood strips at a 5° angle on your tablesaw. Then, rout oversize through-mortises in the face of one of these pieces to help you see the workpiece while routing. Mount this “windowed” strip to the back rail and the other strip to your router's edge guide using double-faced tape. Then, rout the mortises.



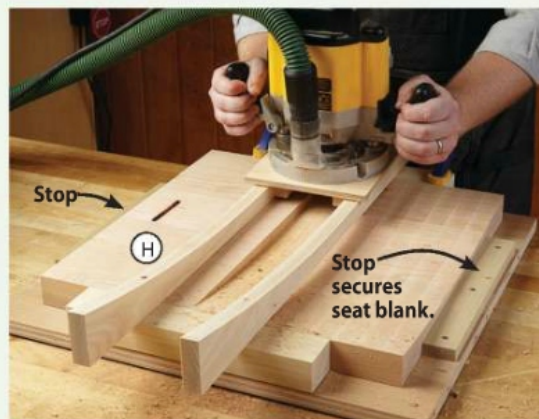
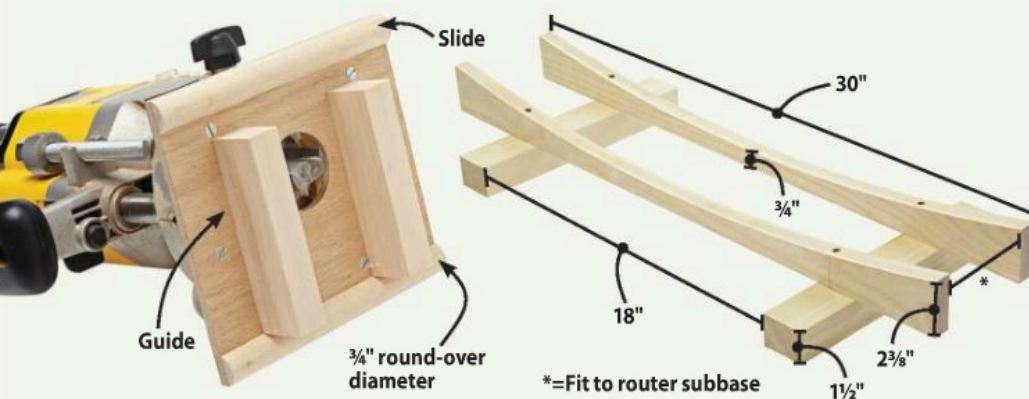
Jig up to scoop the seat

Add a uniform curve to the seat (H) with the help of a jig and a custom router subbase. First, mount a 1"-diameter straight bit (or the largest straight bit your router can safely handle) in your router, and then construct a router subbase, such as the one shown *below*, from a piece of ¼" plywood or MDF and a few

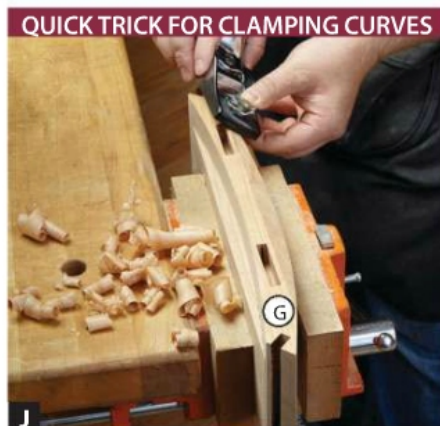
hardwood scraps. Make the rounded slides using a ¾" bullnose router bit on the edge of a piece of ¾" stock, and then ripping the rounded edge free.

Next, build a sled with two curved arms (*below*) using a fairing stick to lay out the curves. The sled's arms should trap the subbase's guides snugly, but allow the router to slide freely. With the subbase attached to

your router, the sled straddling the seat blank (H), and the seat blank held in place with a simple plywood holding jig (pin the blank in place between two screwed-in stops), adjust your bit height so each pass will begin and end crisply at the sled's supports. Begin making passes across the face of the seat (*below*). Finally, sand or use a card scraper to remove any machining marks or ridges.



I When shaping the seat (H), leave flat the areas where the seat meets the back legs (A) to ensure the seat fits tight after shaping.



J When chamfering the lower back edge of the back rail (G), use the bandsawn cutoff as a spacer in order to secure the piece.



K To allow the back rail (G) to sit flat on the bandsaw's table during the cut, tape the bandsawn cutoff back in place.

then lay out the seat's curves with a fairing stick.

4 Bandsaw the seat (H) to shape. Sand smooth, and then rout a ½" chamfer on the bottom edges of the seat with a 45° chamfer bit [Drawing 6]. Hand-plane a chamfer on the back rail (G) [Photo J].

5 Screw the seat (H) in place [Drawing 4], then glue the back splats (I) into place. Cut the curve in the top edge of the back rail [Drawing 5, Photo K] and smooth. Glue the back rail in place. Smooth the transition from the back rail to the back legs (A) using sandpaper or a spokeshave. Ease the leading edge of the back legs, removing more material at the top of the legs [Drawings 1a and 4] and gradually tapering to the seat.

6 After sanding all parts to 220 grit and clearing any dust with a clean rag, wipe on a coat of boiled linseed oil. After the oil cures, spray on three coats of satin lacquer, sanding between coats with 800-grit sandpaper. To achieve a hard and water-resistant finish, we used MagnaMax Pre-Catalyzed Lacquer (mlcambell.com). When the finish is dry, commence work on five more chairs just like this one! 🌲

Produced by **Nate Granzow** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine** and **Lorna Johnson**

More Resources

► For this chair's cutting diagram, visit woodmagazine.com/chairCD231.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A back legs	1½"	5"	41"	C	2
B front legs	1½"	5"	17"	C	2
C lower leg rail	1½"	3½"	20"	C	1
D upper leg rail	1½"	3½"	20"	C	1
E side leg braces	1"	5½"	5½"	C	2
F front/back leg braces	1"	7"	7"	C	2
G* back rail	1¾"	3 13/16"	14 13/16"	C	1
H seat	1½"	18"	18"	C	1
I* back splats	1½"	4½"	21"	C	2

*Parts initially cut oversize. See the instructions.

Material key: C=cherry.

Supplies: #8x1½" F.H. screws (8), #20 biscuits (16).

Bits: ¾", ½" spiral upcut router bits, 1" straight router bit, ¾" bullnose router bit, 45° chamfer router bit.

Cutting a Deal

The easy way to
sell tools online



Whether because of an upgrade or a lack of use or shop space, the time may come when you need to sell a tool. One of the most effective ways to turn that tool into cash is to list it online. Follow these steps to ensure a safe and profitable transaction.

Photos are essential

To build a successful ad, you need digital pictures that clearly show the tool. And for this purpose, a cell phone or tablet takes great shots. First, make the tool look its best by cleaning it thoroughly [Photo A]. Replace worn or broken parts, or be prepared to reduce your asking price accordingly.

For a backdrop, find an uncluttered wall, or hang a bedsheet or drop cloth behind the tool. That way, buyers see only what you are selling. Make sure the tool is well lit without harsh shadows; use a tripod, sawhorse, or chair to steady the camera; and fill the camera view screen with the tool [Photo B]. Take photos from different angles, and include in

CLEANLINESS GOES A LONG WAY



Just as you would clean up for a job interview, spend some time priming the tool. Use an air compressor to blow sawdust out of small crevices. Then give the tool a thorough wipe-down with a clean cloth to remove dust.

at least one frame the owner's manual and any shop-made jigs or accessories for the tool that you're willing to part with. Resist the urge to use photos of the

tool from the manufacturer's website. Such photos raise a potential buyer's suspicions that you're hiding something or worse—that you're a scam artist.



B Pointing a shop light at a section of white gypsum board or a silver or white surface reflects and diffuses the light, creating soft shadows. Steady the camera on a chair.

Draft an ad that sells

Before writing your ad, research pricing of similar tools on sites such as craigslist.org and eBay. Based on this research, price your item on the high side, taking into account its condition. Pricing it too low eliminates any bargaining cushion, and may cause potential buyers to think that something is wrong with the tool. Many folks enjoy the back-and-forth dickering of a sale; if you don't, indicate the price is firm.

To reduce chances of being scammed, and to eliminate shipping hassles, list the item on your local craigslist or on websites belonging to nearby wood-working clubs or guilds. They attract local buyers you can meet in person.

Create an ad title that clearly identifies the tool: "Porter-Cable 10" Miter saw" rather than "Saw For Sale." Then list the tool's main features and its condition. Keep it brief, as buyers won't read lengthy descriptions; 30–50 words should be plenty to describe most tools. For heavy items, state if you're able to deliver or help load it into a buyer's vehicle. Don't list identifying information, such as your personal email address, home phone number, or address.

Quick Tip! Create an e-mail address from Gmail, Yahoo, or another free e-mail provider just for the transaction. Although craigslist doesn't display your e-mail address in the ad, when you respond to a buyer, that person now has your e-mail address.

Doing the deal—smartly

Once your ad generates responses, review them carefully to weed out scammers. If a potential buyer e-mails generic inquiries, such as "I am interested in your item," or the message has particularly poor spelling or grammar, assume it's a scammer. Less-than-honest respondents often offer to pay more for the item than you're asking, claiming they will provide the extra money first to cover shipping costs—never accept such a deal. Read the "Avoid Scams & Fraud" link at craigslist for more details.

Try to meet your buyer in a public place, and, if possible, bring along a friend. If you must meet at your home (often necessary for stationary tools or if you need electricity), bring the item outside before the buyer arrives. Allow them to see only the tool for sale, and if anything makes you feel uncomfortable, end the meeting.

When you reach a deal, only accept cash; most buyers understand and will not take offense. (See **Detecting funny money, right.**) If a buyer wants to pay with a money order, wire transfer, or a check, politely decline. Instead, offer to follow them to their bank or an ATM where you can then conduct business.

Even if the sale doesn't happen, remember that it's just business—shake hands and be respectful; that way, both you and the buyer have a positive experience. 🌱

Detecting funny money

Although cash is the securest form of payment, even it is not foolproof—fake money is very real. The most commonly counterfeited denominations are the \$20 and \$100 bills. To protect yourself from accepting any bogus bills, check them with a counterfeit detector pen. Readily available at office supply stores, these pens quickly reveal counterfeit currency.



Counterfeit detector pens use an iodine solution that reacts to the starch in wood-based paper—a black stain indicates fake money.

More Resources

► Read free reviews of tools you are considering purchasing and add reviews of your tools at reviewatool.com.

REVIEW A TOOL

Produced by Mike Berger



Enhance your view with custom-made molding.



Unlike the console TVs of the past, today's super-thin flat-screen monitors have little character, just simple black frames. But the HD image on the screen shouldn't get to steal the show. As a woodworker, I prefer to dress up my TV with built-up moldings that I made. And by doing it myself, I can select wood species, such as the cherry shown here, not commonly available in stock moldings at home centers.

Kevin

Kevin Boyle
Senior Design Editor



Now build the frame

Note: You'll construct the frame from built-up moldings. Cut parts A, B, C, and D from molding blanks about 1' longer than your TV's width and height. This leaves plenty of material for miter-cutting these pieces to finished length later.

1 Rout a $\frac{5}{8}$ " round-over along one edge of a $\frac{5}{8}$ "-thick blank at least 5" wide. Rip away a $\frac{5}{8}$ "-wide strip for the quarter round (A) [Drawing 1]. Repeat this process three more times.

2 Cut four $\frac{3}{4} \times 2\frac{3}{4}$ " blanks for the big cove (B) [Drawing 1]. From $\frac{3}{4}$ " ply-

Before you make any cuts...

Measure your TV with its wall-mount bracket attached for maximum width, height, and depth. Allow sufficient depth for the TV to tilt, if your bracket includes that feature. Because the bracket secures the TV to the wall, the frame is purely decorative. Be careful that your frame doesn't cover remote-control sensors on the TV.

MEASURE THE TV DEPTH



With a helper holding the TV upright, place a piece of scrap against the mounting bracket and measure the depth from the TV face to the scrap.

wood, cut two 3"×4" fences for guiding the big-cove blank in the next steps.

3 Raise your tablesaw blade to $\frac{3}{8}$ " (the final depth of the cove). Adhere a piece of painter's tape across the front of the throat insert so the tape just touches the blade teeth. Angle your miter gauge to 57°, place one of the plywood fences against it, and slide the fence forward until it just contacts the blade. Mark a short line along the leading edge of the fence [Photo A]. Draw a second line $\frac{1}{4}$ " from the blade [Photo B], and clamp the fence at both ends to the tablesaw top

SET UP FOR CUSTOM-CUT CAN'T-MISS COVE MOLDING



A Slide the plywood fence forward until it just touches the nearest tooth tip. Mark a line along the fence edge onto the painter's tape.



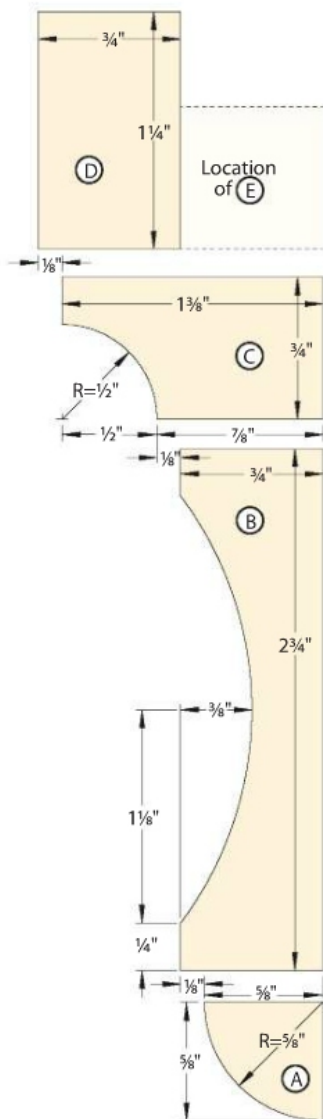
B Holding a steel rule perpendicular to the fence edge, slide the fence $\frac{1}{4}$ " away from the blade and then mark another line on the tape.

CUT THE COVE



C Hold the big-cove blank (B) down to the tablesaw top while using a pushstick to move the blank forward. Feed slowly and take shallow cuts.

1 STACKED MOLDING FULL-SIZE



along this line. This setback creates a $\frac{1}{4}$ " shoulder on the big cove (B) [Drawing 1].

4 Lower the blade below the table. Place one of the big-cove blanks (B) against the clamped plywood fence, and capture the blank with the other fence. The workpiece should slide freely across the table but not move side-to-side. Clamp the second fence to the tablesaw. Then, raising the blade $\frac{1}{16}$ " at a time, cut the $\frac{3}{8}$ "-deep cove on the four blanks in successive passes [Photo C, More Resources].

5 After cutting the cove to full depth, sand or scrape it smooth [Photo D].

Quick Tip! Make a custom sanding block to fit your cove from rigid foam insulation board. Cut it to shape to closely match the cove profile, then apply self-adhesive sandpaper. As you apply force while stroking it back and forth, the block will conform to the cove's shape.

6 On $\frac{3}{4}$ " stock, rout a $\frac{1}{2}$ " cove along one edge, and then rip away a $1\frac{3}{8}$ "-wide strip to create the small cove (C) [Drawing 1]. Repeat for three more moldings. Cut to size four outer bands (D).

7 Sand to 220 grit all surfaces that will show once glued up to form the stacked molding. Glue a quarter round (A), big cove (B), small cove (C), and outer band (D) together to create the four molding blanks [Drawing 1]. Wipe away any glue squeeze-out.

8 When the blanks have dried, miter-cut each piece to length so the heel-to-heel dimension is $\frac{3}{16}$ " less than the measured height and width of your TV. Glue and clamp the frame together [Photo E].

9 The box sides (E) mount to the back of the frame (A-D) with a $\frac{1}{2}$ " setback

MOLD A SANDER TO YOUR MOLDING



D Start sanding with 80-grit sandpaper to remove the saw-blade marks. Then follow up with 120, 150, 180, and 220 grit for a smooth, scratch-free cove.

BRING IT ALL TOGETHER



E Assemble the frame on a flat surface to ensure it remains flat. A band clamp applies even pressure to all four corners at the same time.

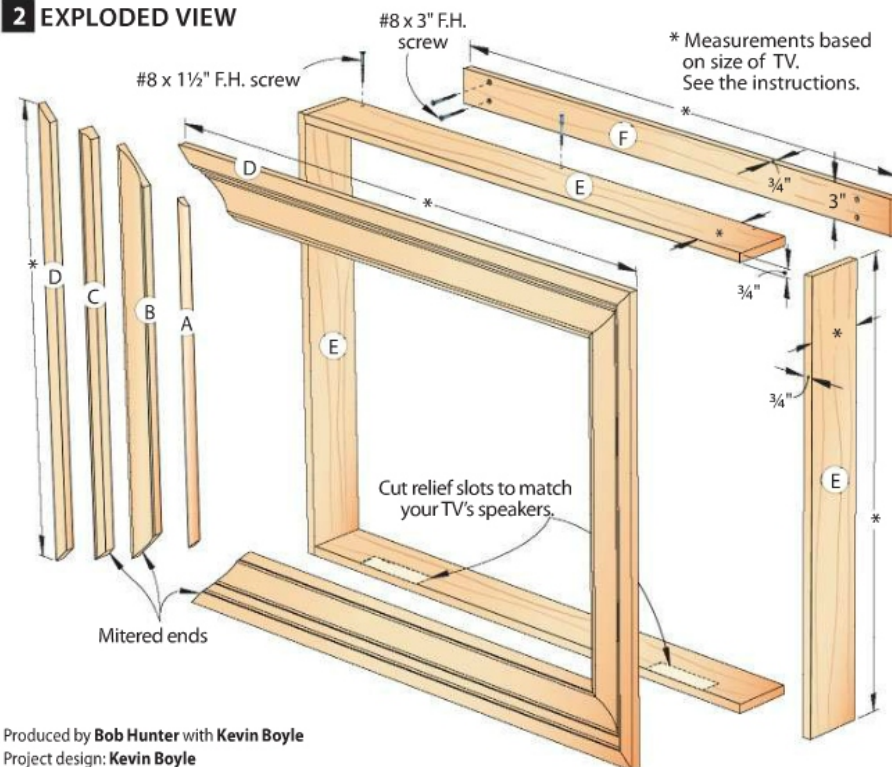
all around. Cut the vertical parts to size [Drawing 2] 1" shorter than the toe-to-toe length of the assembled frame's height. Cut the horizontal box sides $2\frac{1}{2}$ " shorter than the toe-to-toe length of the assembled frame's width. Cut relief slots in the bottom piece for sound to pass through. Sand the box sides to 220 grit, and glue them to the back of the assembled frame. **Note:** If needed, notch a box side to allow the power and other cords to pass through.

Finish and hang the frame

1 Apply finish to the assembled frame (A–E). We used Zar teak natural no. 108 stain to even out the cherry's tones, and then top-coated it with three layers of Old Masters water-based satin polyurethane.

2 Cut the wall cleat (F) to length so it fits between the vertical box sides (E) [Drawing 2]. Mount the TV bracket level where you want it, and attach the TV. Then install the wall cleat and frame [Photos F–H].

2 EXPLODED VIEW

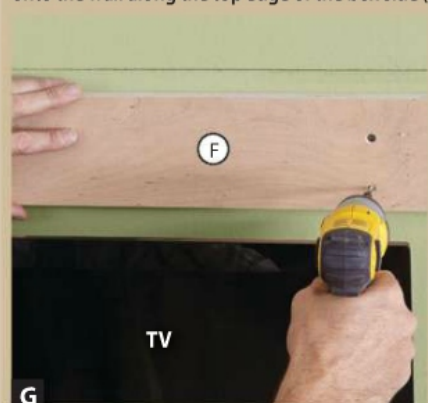


Produced by **Bob Hunter** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**

INSTALL THE FRAME AROUND THE MOUNTED TV



With a helper holding the assembled frame in place around the TV, level the frame and scribe a line onto the wall along the top edge of the box side (E).



Position the wall cleat (F) $\frac{3}{4}$ " below and parallel to the scribed line. Attach the cleat to wall studs with 3" screws.



Rest the frame on the wall cleat (F), and secure it with three $1\frac{1}{2}$ " screws through the box side (E).

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A*	quarter round	$\frac{5}{8}$ "	$\frac{5}{8}$ "	†	C	4
B*	big cove	$\frac{3}{4}$ "	$2\frac{3}{4}$ "	†	C	4
C*	small cove	$\frac{3}{4}$ "	$1\frac{3}{8}$ "	†	C	4
D*	outer band	$\frac{3}{4}$ "	$1\frac{1}{4}$ "	†	C	4
E	box sides	$\frac{3}{4}$ "	‡	*	C	4
F	wall cleat	$\frac{3}{4}$ "	3"	Δ	C	1

* Parts initially cut oversize.

† Mitered to fit around your TV.

‡ Cut to match depth of your TV and wall bracket.

* See the instructions.

Δ Fit inside assembled box sides.

Material key: C—cherry.

Supplies: #8x $1\frac{1}{2}$ " screws (3); #8x3" screws (4).

Bits: $\frac{1}{2}$ " cove and $\frac{5}{8}$ " round-over router bits.

More Resources

- Free online video on cove-cutting: woodmagazine.com/tscove
- Free online article on cove-cutting: woodmagazine.com/covecut
- Not interested in mounting your TV to a wall? Consider building one of our floor-standing TV stands or entertainment centers. Find complete plans at woodmagazine.com/tvstands.



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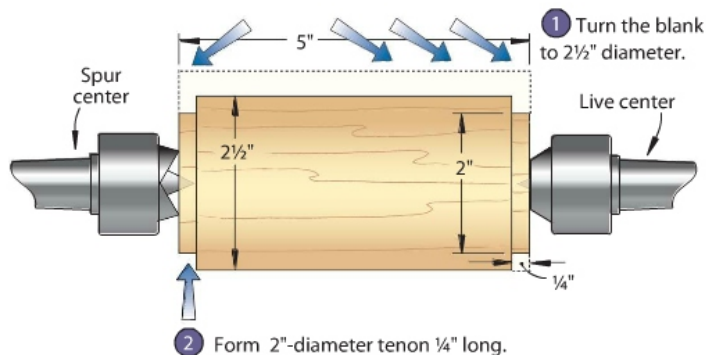
Finished dimensions:
3 1/4" high x 2 1/2" diameter



Rough the blank and form two tenons

Tools: Roughing gouge, parting tool **Speed:** 1,200 rpm

Mount a 2 3/8 x 2 3/8 x 5" blank (we used cherry) between centers on your lathe and turn the blank to a 2 1/2"-diameter cylinder with a roughing gouge. Then, use a parting tool to create a 2" tenon 1/4" long on each end of the cylinder.



Part and hollow the lid

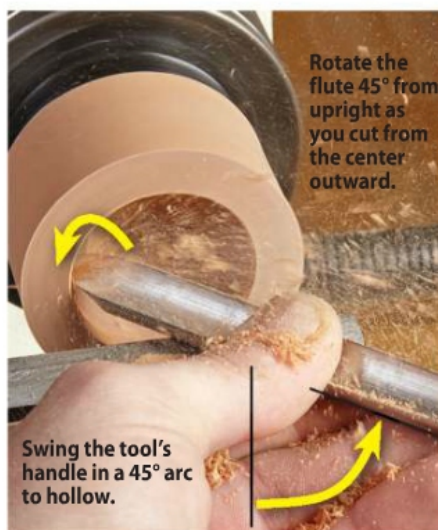
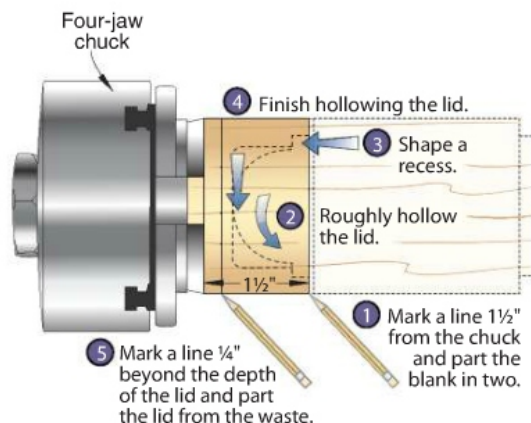
Tools: $\frac{1}{16}$ " parting tool, $\frac{1}{2}$ " spindle-detail gouge, squarenose scraper, roundnose scraper **Speed:** 1,200 rpm

Install a four-jaw chuck and mount the blank by one of the tenons. Make a pencil mark $1\frac{1}{2}$ " from the chuck's jaws and cut the blank in two at the line with a $\frac{1}{16}$ " parting tool, *below left*.

Position the tool rest parallel to the lid blank's end-grain face and adjust the height so that a $\frac{1}{2}$ " spindle-detail gouge cuts on center while you hold the handle level. Using incremental cuts that move from the center outward, hollow the lid to a depth of about 1", leaving $\frac{1}{4}$ "-thick walls, *below center*.

Raise the tool rest slightly above center and shape a straight-sided recess about $\frac{1}{4}$ " deep outside the hollow with a squarenose scraper, *below right*.

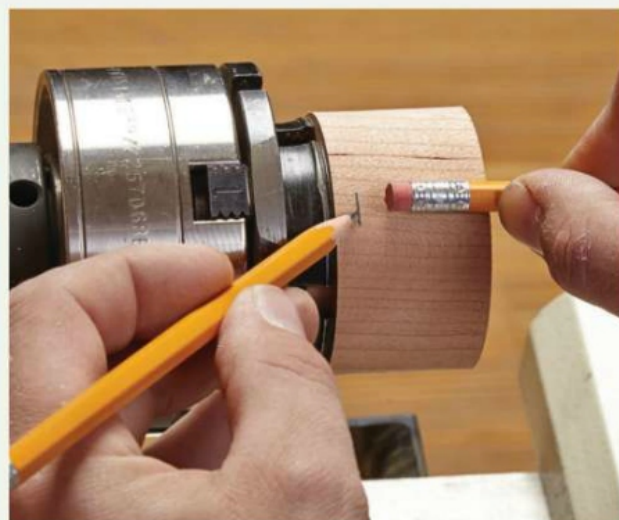
Finish hollowing the lid using a roundnose scraper as you did with the spindle-detail gouge. Sand the interior of the lid to 220 grit, being careful not to round over the edges of the recess. Then, mark a cutline for the lid (see **Shop Tip**, *bottom*), and part the lid from the waste with the $\frac{1}{16}$ " parting tool.



SHOP TIP

Pencil-in noncritical measurements

Use a pencil (or dowel, or small scrap, etc.) as a makeshift depth gauge. With your thumb acting as a stop, transfer the depth of the lid's interior to the outside as shown at *right*. Add an eyeballed $\frac{1}{4}$ " to allow for the thickness of the lid's top.



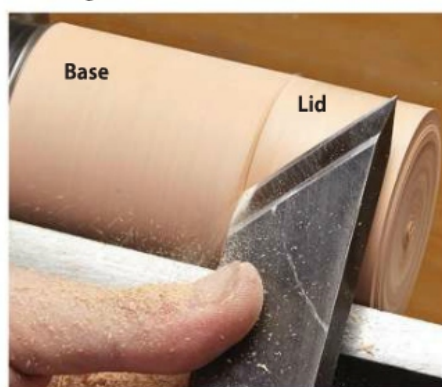
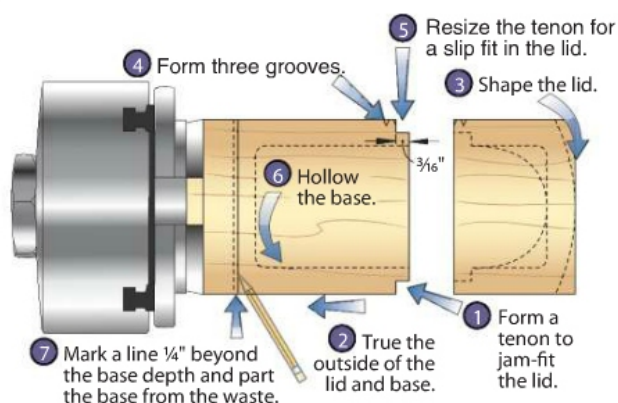
Round the lid; hollow the base

Tools: Parting tools, skew chisel, spindle-detail gouge, roundnose scraper **Speed:** 1,200 rpm

Retrieve the base blank and secure its tenon in the four-jaw chuck. Checking the fit frequently, use a parting tool to create a $\frac{3}{16}$ "-long tenon sized to jam-fit the lid. Place the lid onto the base blank, and use a skew chisel to true the outside of the entire box, *below left*.

Form a slight dome on the lid's top with a spindle-detail gouge, *center*. Then with the toe of the skew chisel, cut three small grooves to create shadow lines: one on either side of the joint line, and one on the joint line, *below right*. Sand the outside of the box to 220 grit. Remove the lid and use the parting tool to trim the base's tenon slightly so the lid slips on and off.

Hollow the base as you did the lid, using the spindle-detail gouge for the bulk of the hollowing and a roundnose scraper to finish the interior. Sand the interior to 220 grit. Then, as you did with the lid, mark a cutline $\frac{1}{4}$ " beyond the depth of the base's bottom and use a $\frac{1}{16}$ " parting tool to part the base from the waste. Leave the waste in the chuck.

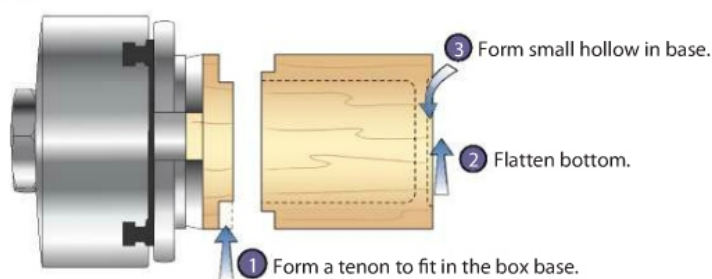


Finish it up

Tools: Parting tool, spindle-detail gouge, roundnose scraper **Speed:** 1,200 rpm

In the waste material, use a parting tool to shape a tenon to jam-fit the opening in the base, *below left*. Jam the base opening onto the tenon and use a spindle-detail gouge to smooth and flatten the bottom. Create a slight hollow in the bottom of the base with a roundnose scraper, *below right*. Then, sand the bottom to 220 grit.

Finish the box with a clear coat. We applied three coats of General Finishes' semigloss Arm-R-Seal to the exterior. Use caution if you decide to finish the interior as this can affect the fit of the lid. 🌱



Produced by Lucas Peters with Brian Simmons
Project design: Brian Simmons
Illustrations: Lorna Johnson

More Resources

► Watch a free video of Brian Simmons turning this box at woodmagazine.com/turnedbox.

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Tools & Materials

Texturing tools dress up the plain surfaces of turned pieces, such as the end grain on top of the box featured on [pages 56-58](#). To demonstrate these decorations, we tried out three texturing tools on the box top.

Each tool creates a specific pattern on the wood, but the appearance varies, depending on wood grain and density, position and movement of the tool, the contour of the surface, and other factors. Cherry, walnut, maple, and other popular turning woods work well with texturing. Most of these tools perform best on end grain.

Experiment; if you create a pattern you don't like, simply turn the surface smooth and try again.

Texturing tools for turning



HENRY TAYLOR DECORATING ELF

A high-speed steel (HSS) cutter spins freely in the handle of this tool to create the pattern. The tool comes in a kit with ball- and bud-shape burs that produce different patterns on convex (rounded), concave (dished), and flat surfaces, and a cylindrical burr that works only on flat

or convex surfaces. The photos show the ball-shape burr.

With the lathe running at 800–1,200 rpm, hold the tool level and at an angle to the lathe axis as you push it into the surface along the horizontal centerline of the workpiece. Press the tool firmly

against the surface, and work from the center outward. Move the tool slowly and steadily to make the texture in one pass; don't go back and forth.

Enhance the texture band by making shallow V-cuts with a skew tip on the inside and outside, if you like.



ROBERT SORBY SPIRALING SYSTEM

A toothed cutter, held at an angle to the workpiece by an adjustable fixture, rotates when it contacts the revolving wood to create swirling lines. Changing the angle changes the pattern.

Run the lathe at 800–1,500 rpm; low speed gives you greater control. Lay the flat side of the fixture on the tool rest and engage the cutter along the centerline of the work. To achieve the pattern

shown, we angled the cutter one mark to left of center, viewed from the tool handle. You can slide the tool along the rest to create a larger pattern. This tool works on end, side, or face grain.





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WAGNER TEXTURING TOOL

The knurled wheel on this tool stamps a pattern of pyramids into flat or convex side grain or end grain. We used the $\frac{3}{8}$ "-wide tool with 12 teeth per inch; others available are $\frac{3}{8}$ " $\times$ 16 TPI and $\frac{1}{4}$ " $\times$ 16 TPI.

Run the lathe at 500 rpm, with the cutter wheel making contact at the

centerline of the work. Hold the tool steady and straight into the surface to imprint a decorative band; you'll have to apply a lot of pressure and hold the tool steady for at least one minute and perhaps longer to develop a well-defined pattern. To texture a wider area, make one band. Then place the

tool wheel lightly against the work beside the textured area, overlapping one edge slightly. When the wheel engages the pattern and starts turning, increase the pressure to create an adjoining band.

Shallow V-cuts on the inside and outside set off this texture, too. 🌲



Sources:

Henry Taylor Decorating Elf: combo package includes ball, bud, and cylinder cutters, and burnishing brush, no. 104088, \$69.95, Packard Woodworks Inc., 800-683-8876, packardwoodworks.com.
Sorby Spiraling/Texture system, no. 108777, \$199.95, Packard.
Wagner texturing tool, no. 155-0015, \$39.95, Craft Supplies USA, 800-551-8876, woodturnerscatalog.com.

More Resources

► Watch a free video of these texturing tools in use at woodmagazine.com/texture.





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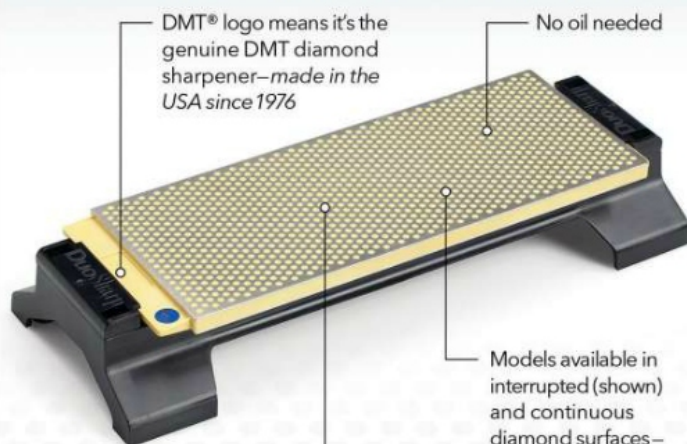
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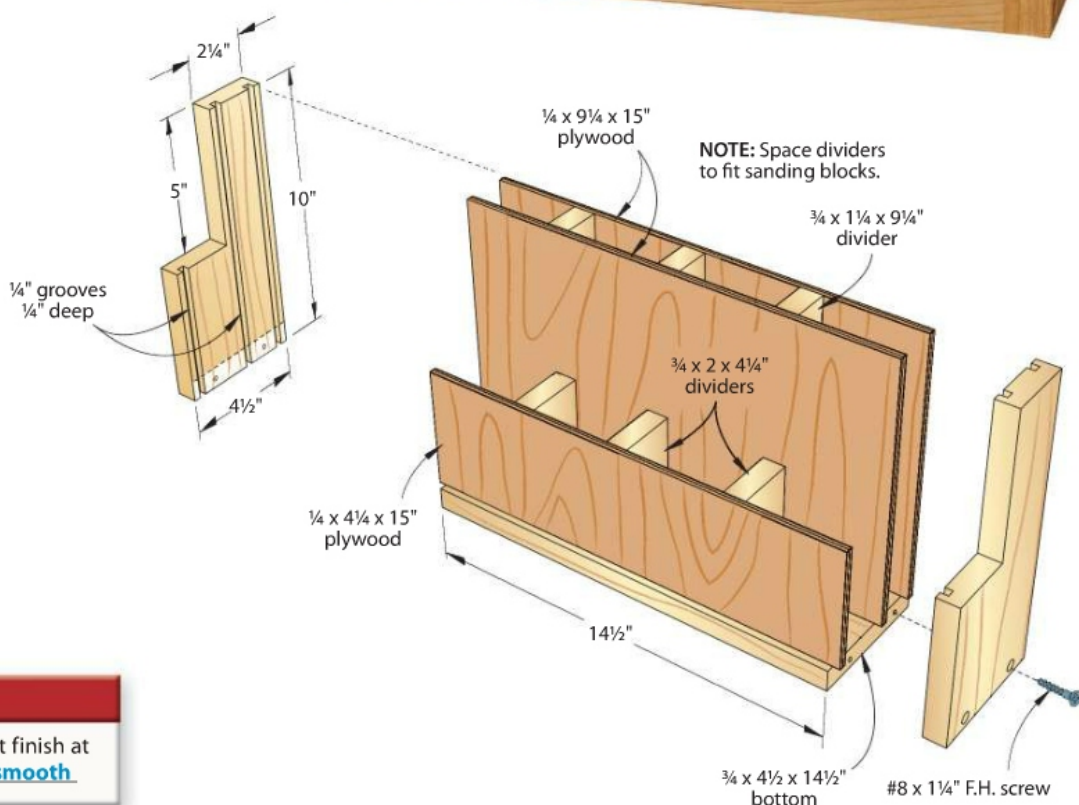
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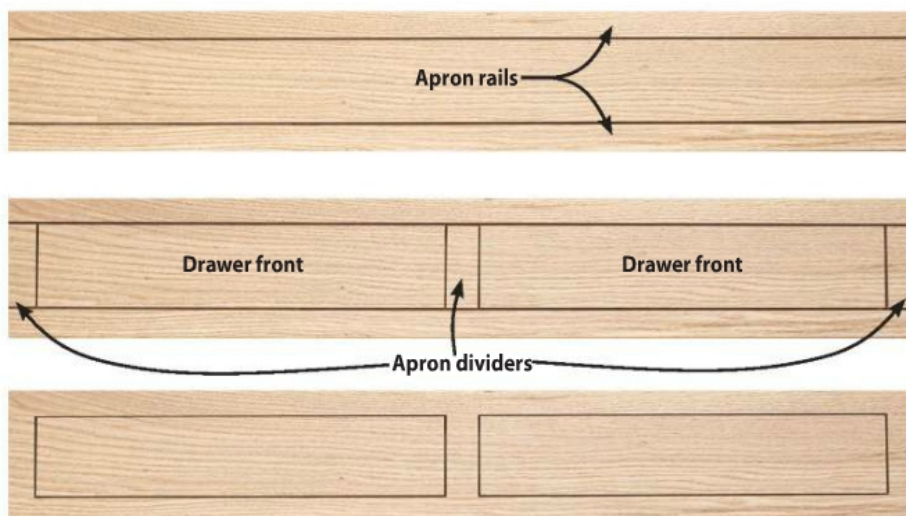
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Rip and reglue for a perfect grain match

I want to build a hall table with continuous grain along the apron and drawer fronts. How can I cut out the fronts, leaving the apron intact, while avoiding large reveals around the drawer fronts?

—Ryan Rethman, Orono, Maine

Try this simple rip-and-reattach technique, Ryan. Start by cutting your apron $\frac{1}{8}$ "– $\frac{1}{4}$ " wider than finished size, about twice the thickness of your tablesaw blade. Lay out the locations for the drawer fronts. Rip the apron into three segments: top and bottom rails and a middle [top photo]. (A thin-kerf blade will remove less material and create a better grain match.) Crosscut the middle segment to make the drawer fronts and dividers [center]. Set the drawer fronts aside, and glue the dividers to the top and bottom rails. When the glue has dried, sand the



apron smooth and assemble the table. When you build the drawers, simply place the drawer fronts back in their original orientation for a perfect

continuous-grain match [bottom]. (You might have to trim the drawer fronts' top and bottom edges to get an even reveal.)

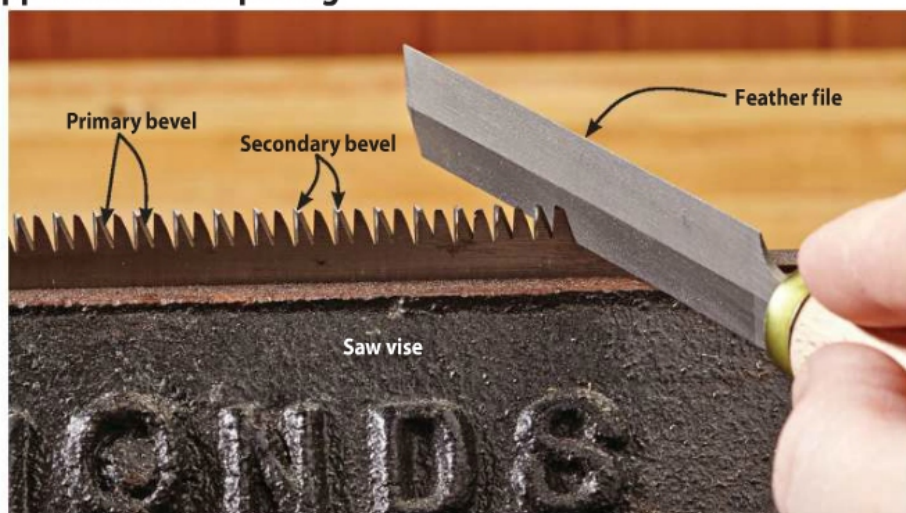
Japanese saws take a different approach for sharpening

I have a Japanese-style pull saw that's starting to dull. How do I sharpen it?

—John Eisenberg, Toledo, Ohio

It depends on whether the saw teeth were hardened during production, John. Some Japanese saws have impulse-hardened teeth, where a high-frequency heating technique hardens the teeth but not the rest of the blade. These teeth stay sharp several times longer than non-hardened saws; but because they are harder than sharpening files, they can't be resharpened. How do you spot impulse hardening on a saw? The teeth tend to have a bluish discoloration different from the blade body, and if you draw a file over the teeth, they'll scratch the file.

If your saw was not factory hardened, you can sharpen it using a specialty tool called a feather file. Feather files come in several sizes for different tooth counts. The two most common are a no. 3 (75mm) for dozuki saws (reinforced spine, fine teeth for crosscutting), and a no. 4 (100mm) for ryoba



saws (dual-edge blade for crosscutting and ripping).

To sharpen with a feather file, clamp your saw in a vise with the teeth just above the jaws. Because these teeth are sharpened in an alternating left-right pattern, you'll sharpen every other tooth from one side, then flip the saw around and sharpen the remaining teeth. Push

the file across each individual tooth 3 or 4 times, more if necessary to repair damaged teeth. After completing this step, file tiny secondary bevels on the tips to avoid having them break off during use.

Source:

Japanese saw files (set of 2): part no. 06Q10, \$40, Woodcraft Supply, 800-225-1153, woodcraft.com.

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Ask WOOD

Wipe the ooze to help the glues

While building cutting boards from multiple exotic species, including purpleheart, bloodwood, padauk, and teak, I noticed that after I had ripped all the strips to width, some had an oily residue seeping out. Will this affect my glue joints? Are these woods safe choices for use with food?

— Julian Hernandez, San Antonio, Texas

As you discovered, Julian, many exotic wood species contain oil even when dry. Before gluing the joints together (using a water-resistant wood glue), you need to clean them, as shown at *right*. Not doing so could cause those joints to come apart later. And, although the oils are not harmful, regular cleaning of cutting boards after each use will prevent any issues.

Before applying glue to exotic woods, wipe each to-be-glued surface with acetone to remove oil. The acetone will flash-dry quickly, letting you apply glue almost right away.

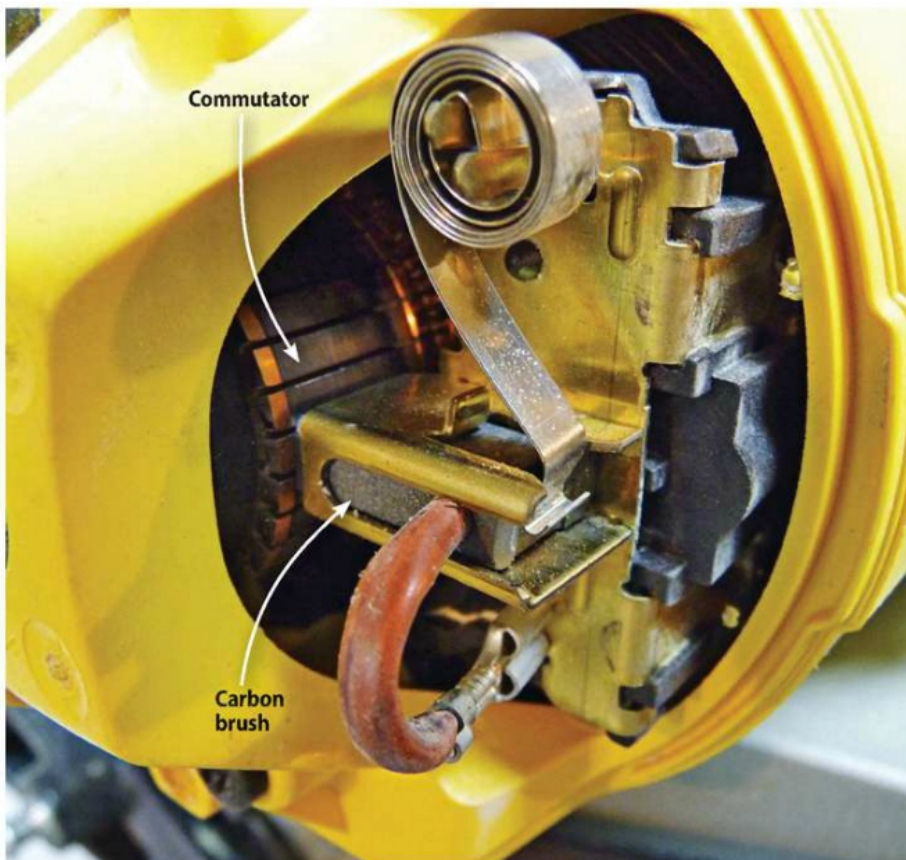


Brush off the blade-brake blues

My miter saw seems to take longer to wind down than it used to after making a cut. The blade is not loose, so it seems to be an issue with the electric brake. What can I do?

—Miguel Reyes, Tempe, Arizona

An electric brake should stop a miter saw blade within two to three seconds, Miguel. The brake works by reversing the flow of electricity in the motor when you release the trigger. Over time, the brake can lose its effectiveness as a result of a dirty commutator, a failing armature, or a bad switch. But there's a good chance the solution is even simpler: Replace the motor brushes (less than \$20). If these carbon blocks have worn too short or aren't seated properly, they won't make good contact with the commutator. Allow the new brushes a short while to conform to the round commutator shaft, and your saw will be back to braking like normal. 🌱



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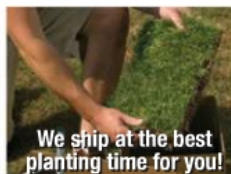
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800-334-4107, freudtools.com

Forrest Woodworker II general-purpose blade

The traditional 40-tooth Woodworker II has proven its worth for many years as a do-it-all blade, and now Forrest's 48-tooth version makes even cleaner crosscuts, leaving smooth end grain that needs little sanding. It rips stock with ease, but leaves slight scoring marks that disappear with the swipe of a hand plane.

10", 48 teeth, full kerf (WW10487125, \$131)
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800-733-7111, forrestblades.com

Amana ElectroBlu crosscut/trim blade

You'll get tear-out-free crosscuts with this blade in solid wood and sheet goods. The blue film coating helps reduce pitch buildup nicely.

10", 80 teeth, no. 610800C, \$110
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Infinity Dadonator stacked dado set

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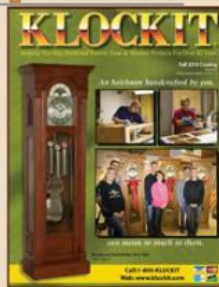
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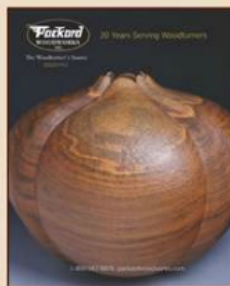
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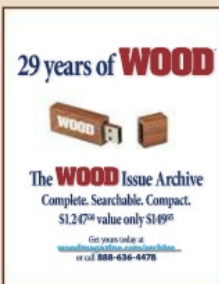
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The plastic base has legs with a wide stance and rubber feet that grip well. Magnets hold the stone in place on the base, and the side clearance let me sharpen knives and flatten chisel backs without bumping my knuckles.

If I could have one wish from DMT, it would be the choice to mix and match the diamond grits, because I’d really love to get coarse and extra-fine grits on the same stone rather than having to buy two stones to get the ones I use most.



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—Tested by John Olson, Design Editor



Get clean, accurate cuts with Carverx jigsaws

I demand three things from a jigsaw: accuracy, as little vibration as possible, and no chip-out. Festool’s Carverx jigsaws deliver superbly on all three. The guides on these 110-volt saws capture the sides and back of the blade, ensuring spot-on cuts with zero deflection. The brushless motor provided all the power I needed to cut through solid wood and sheet goods in my shop, and did so without the annoying vibration common to many jigsaws. And the included zero-clearance inserts, when used with a high-quality blade appropriate for the job, all but eliminated workpiece chip-out.

Dust collection was better than expected with these saws when tethered to a shop vacuum, although the slide-down plastic shield needed to help corral the dust impaired my sight line to the blade. Tool-free blade changes—pushing a lever ejects the blade from the saw—and LED lights around the blade are nice touches.

The one downside to these saws is you cannot tilt the shoe. Although I rarely need to do that, to make beveled cuts with the Carverx saws I’d have to buy a \$105 optional shoe (no. 496134). Festool sells other optional shoes (with tool-free installation), such as for cutting circles or attaching to a guide rail, but I can’t imagine needing them in my shop.



—Tested by Ruth Walker



Carverx electric jigsaws

No. PS-420 (barrel grip)	\$350
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In the shop, I do everything I can to keep dust out of the air. That's why a shop vacuum sits right next to my workbench and gets hooked to every tool possible. Makita's vacuum (they call it a dust extractor) provides great suction for collecting dust, and its included fleece bag and cartridge filters keep that dust trapped inside. It's also pleasantly quiet at about 70 decibels.

Another great feature—a must-have for a workbench vac—is the on-board outlet for simultaneously powering a sander, router, or biscuit joiner. However, the included hose (1⅜" inside diameter) did not easily connect to my tools without some makeshift rigging. To avoid this, buy an optional 1" hose (no. P-70487, \$70) that connects to portable woodworking tools. 🌱

—Tested by Kevin Boyle,
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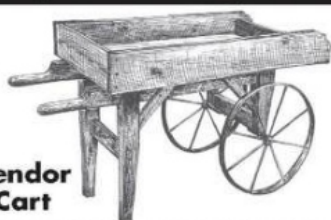
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