

WOOD

The World's Leading
Woodworking Resource

Hidden-door Bookcase

p.26

Plus More Great Plans

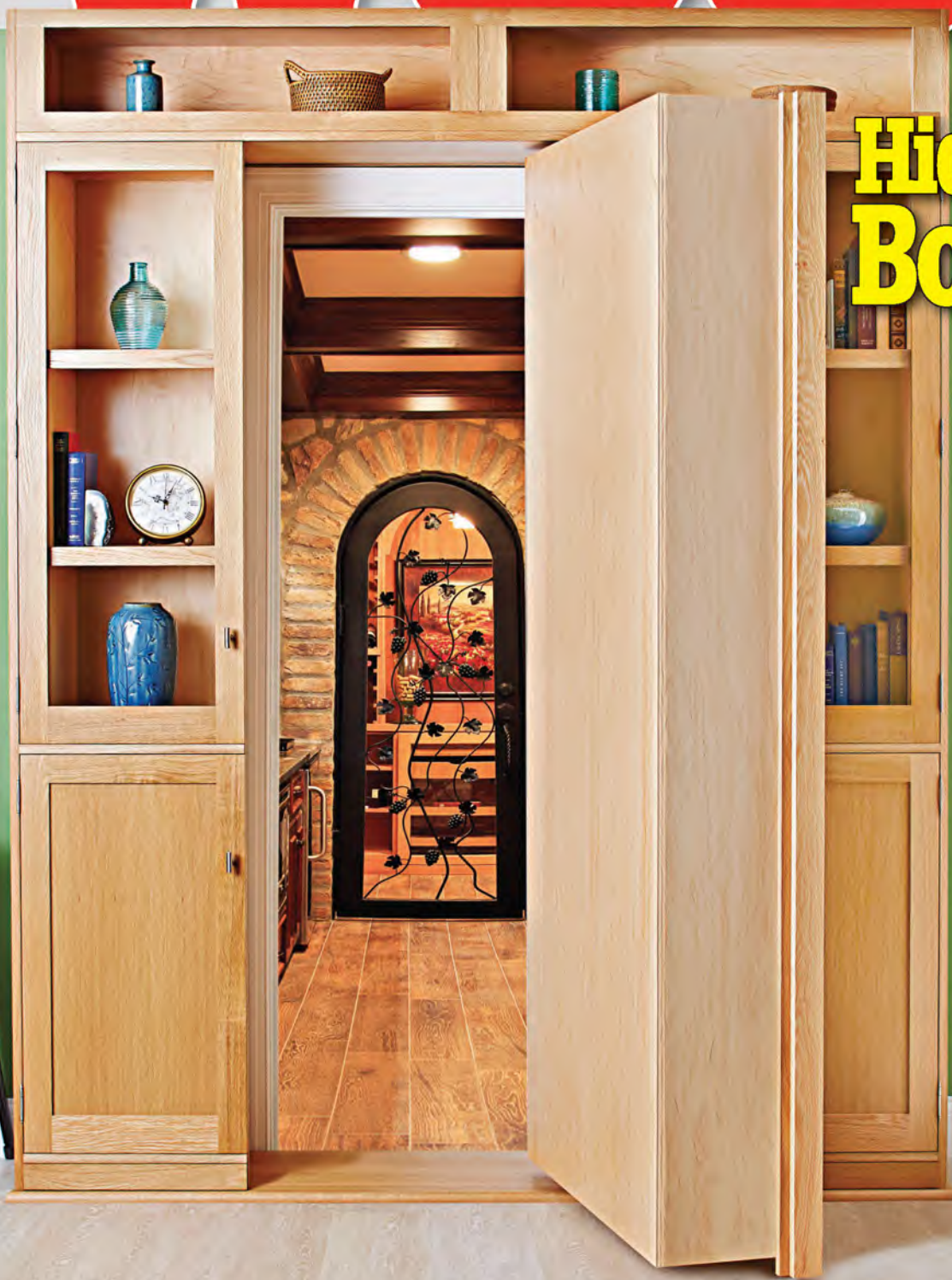
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- Number of knives: 2 reversible HSS
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- Table tilt: 45° R, 10° L
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Blade size: 92 1/2"—93 1/2" L (1/8"—3/4" W)
- Blade speeds: 1800 & 3100 FPM
- Approx. shipping weight: 247 lbs.



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- Table tilt: 45° R, 15° L
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Blade size: 92 1/2"—93 1/2" L (1/8"—3/4" W)
- Blade speeds: 1500 & 3200 FPM
- Approx. shipping weight: 196 lbs.



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WOOD LATHE WITH DIGITAL READOUT

- Motor: 2 HP, 110V, single-phase, 14A
- Swing over bed: 16" • Swing over tool rest: 13"
- Distance between centers: 46"
- 1" x 8 TPI RH headstock spindle
- MT#2 spindle & tailstock tapers
- Spindle bore: 3/8"
- 10 Speeds: 600-2400 RPM
- Indexed headstock rotation at 0°, 60°, 90°, 120°, and 180°
- Overall size: 72 1/4" L x 19" W x 48" H
- Approx. shipping weight: 354 lbs.

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- Motor: 2 HP, 120V/240V, prewired 120V, single-phase, 60 Hz • Amps: 15A at 120V, 7.5A at 240V
- Precision-ground cast iron table w/ wings: 40 1/2" W x 27" D
- Table height: 35 1/2" • Footprint: 21" L x 19 1/2" W
- Arbor: 3/8" • Arbor speed: 3450 RPM



- Max. depth of cut: @ 90°—3 1/4", @ 45°—2 1/4"
- Rip cap.: 30" R, 15" L
- Overall size: 57 1/4" W x 35 3/8" H x 37 1/2" D
- Approx. shipping weight: 348 lbs.

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- Motor: 3 HP, 240V, single-phase, 14A, 3450 RPM
- Cutting capacity: 8" L, 26" R
- Max. depth of cut @ 90°: 3"
- Max. depth of cut @ 45°: 2 1/2"
- Table size (with 2 solid extension wings attached): 40" W x 27" D
- Base dimension: 20 1/2" x 20 1/2"
- Approx. shipping weight: 508 lbs.



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It's kind of a big deal

I'll never forget the first time I saw a C-130 military transport plane in real life. My wife, Annette, and I were driving near the Des Moines airport (home to the 132nd Wing of the Iowa Air National Guard) as this massive, lumbering, olive-green C-130 did touch-and-go landings. We pulled over and watched, slack-jawed and awed, as it seemed to approach in slow motion until its wheels just kissed the runway and then those huge engines roared to life to carry it up and away in a steep climb.

That memory flashed back to me when Senior Design Editor Kevin Boyle popped out of the *WOOD*® shop with the AC-130—the gunship version of the C-130—shown below. (Note to purists: Kevin's design is actually a hybrid, with both weaponry on the port side and a hinged cargo ramp at the rear of the fuselage.) With its 42" wing span, this behemoth serves as an impressive start to our Military Spec (MilSpec) toy series. You'll find the plans on page 44.

We've already dreamed up a pretty long list of equipment to model from all branches of the armed services—including a tank that will fit inside the AC-130! But I welcome your suggestions, too, on toys for the series. Drop me an e-mail with your short list and we'll keep Kevin busy for a very long time.

As we learned from our Construction-Grade toy series (woodmagazine.com/cgtoys), many *WOOD* readers like to one-up us by adding details and mods to our plans. And truthfully, we love it when you do. All I ask is that you e-mail me a photo of your toy (or any other project you build) when it's completed. You might very well see it on the Your Projects page of an upcoming issue.

Speaking of big deals, we'll be hosting our fourth annual *Weekend With WOOD*® educational event in our shops and offices again next May. You'll find dates and details on page 23. 🌲

See you in the shop!


Dave Campbell
dave.campbell@meredith.com



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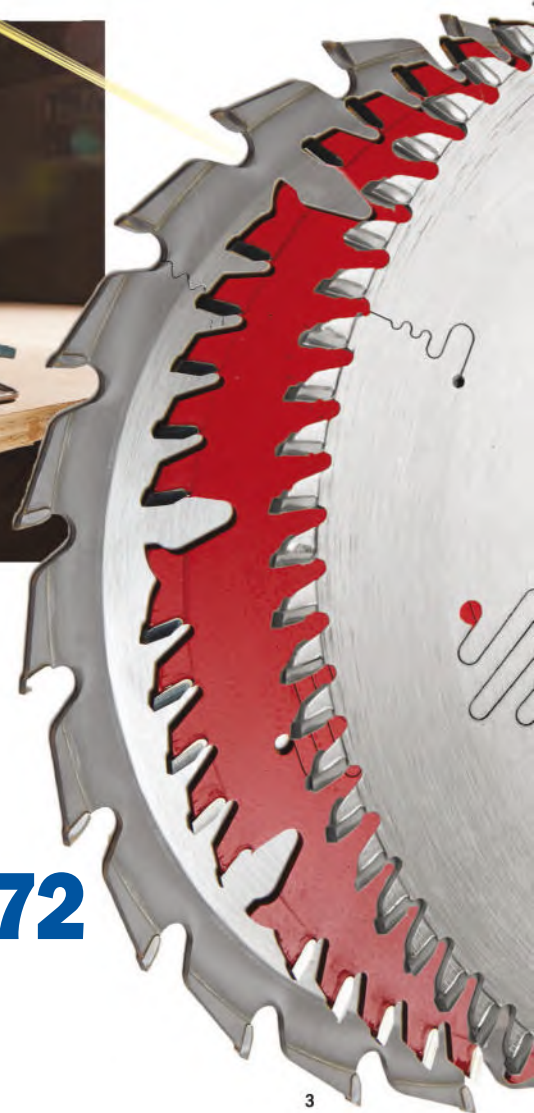
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2x4 CHALLENGE

The gauntlet has been dropped in the *WOOD* Online forums. What masterpiece can you fashion from a single 8' 2x4? Answer the challenge and post your pics:
woodmagazine.com/2x4challenge

TIME IS ON YOUR SIDE WITH THESE FINISHES

- ▶ Color-changing wood: Prevent it or provoke it.
woodmagazine.com/colorchange
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For years, this Mission-style tall clock endured the full brunt of direct exposure to sunlight, draining the dye finish of its color and bleaching the white oak. A pigmented stain would have held its color better.

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YOUR VOICE

CNC is for me!

I strongly agree with the Editor's Angle in issue 229 (November 2014) and the notion that woodworking is in your heart, not your tools. Using my CNC keeps my hands away from dangerous blades when

making molding and can add complex embellishments to my projects. I'm glad that today's schools are teaching young woodworkers how to use CNC; I think it's the way of the future.

—George Mons, Bluffdale, Utah



WOOD's new look

No more than a few pages into the September issue, I felt something had changed. Project plans seemed crystal clear and easy to follow. You've hit a home run. This is a very different magazine.

—Marlin Bailey, Richardson, Texas

When other woodworking mags are getting thinner and thinner, you buck the trend and expand. I really like the new larger photos, especially on the projects.

—Dennis Cropper, via e-mail

What a great magazine. But it seems like you've changed the caption font and size. It's much smaller and harder to read. Just me?

—Alan Conner, via e-mail

I couldn't help noticing in the "new" WOOD the absence of the full-size pattern section. Please don't eliminate this very useful feature.

—Robert Sawdey, Rockton, Ill.

We'll still include full-size patterns when warranted. You'll find those patterns within their respective articles. And, we've enlarged the caption font starting with this issue.

—WOOD Editors



What we didn't see in SawStop

In your review of SawStop's portable job-site tablesaw in issue 234 (September 2015), you incorrectly stated there are no adjustments for calibrating the tabletop and rip fence to the blade. Both adjustments are there, but not obvious, and neither is described in the owner's manual. We'll be adding these adjustment details to our manual, and also making the updates available on our website (sawstop.com).

—Matt Howard
Vice-president of Marketing, SawStop



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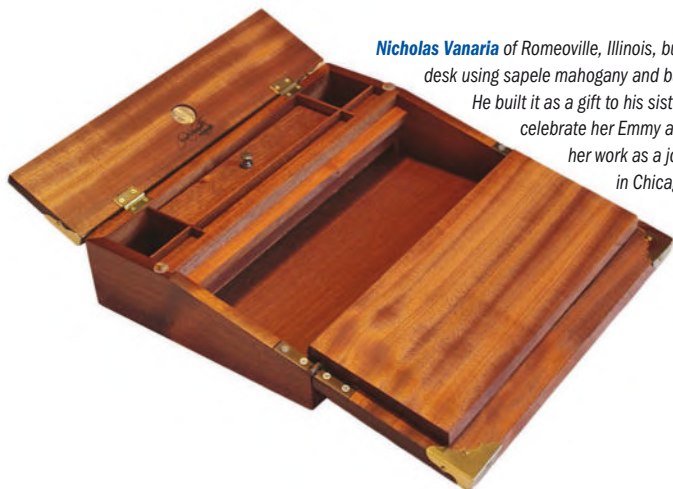
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YOUR PROJECTS

Nicholas Vanaria of Romeoville, Illinois, built this lap desk using sapele mahogany and bubinga.

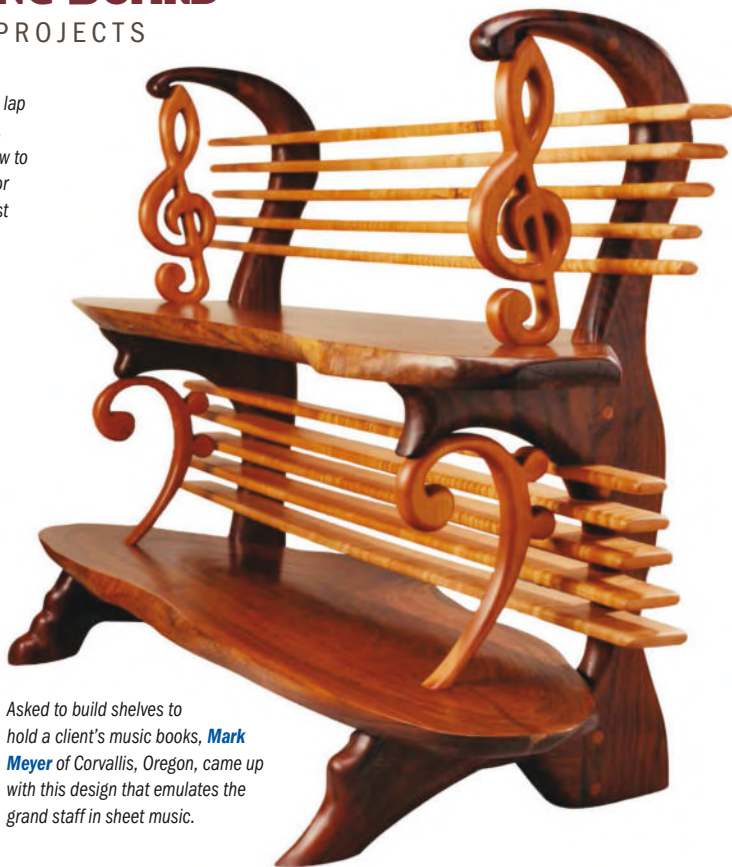
He built it as a gift to his sister-in-law to celebrate her Emmy award for her work as a journalist in Chicago.



Inspired by the design featured in issue 230 (Dec/Jan 2014/15), **Chris Fall** of Rochester, New York, built this cribbage board with a discreet shop-made button catch to hold the lid in place.



Asked to build shelves to hold a client's music books, **Mark Meyer** of Corvallis, Oregon, came up with this design that emulates the grand staff in sheet music.



As a gift for his barbecue-enthusiast son, **Dick Kossen** of Jenison, Michigan, built this grill center from issue 227 (September 2014).

Send us a photo of your work

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

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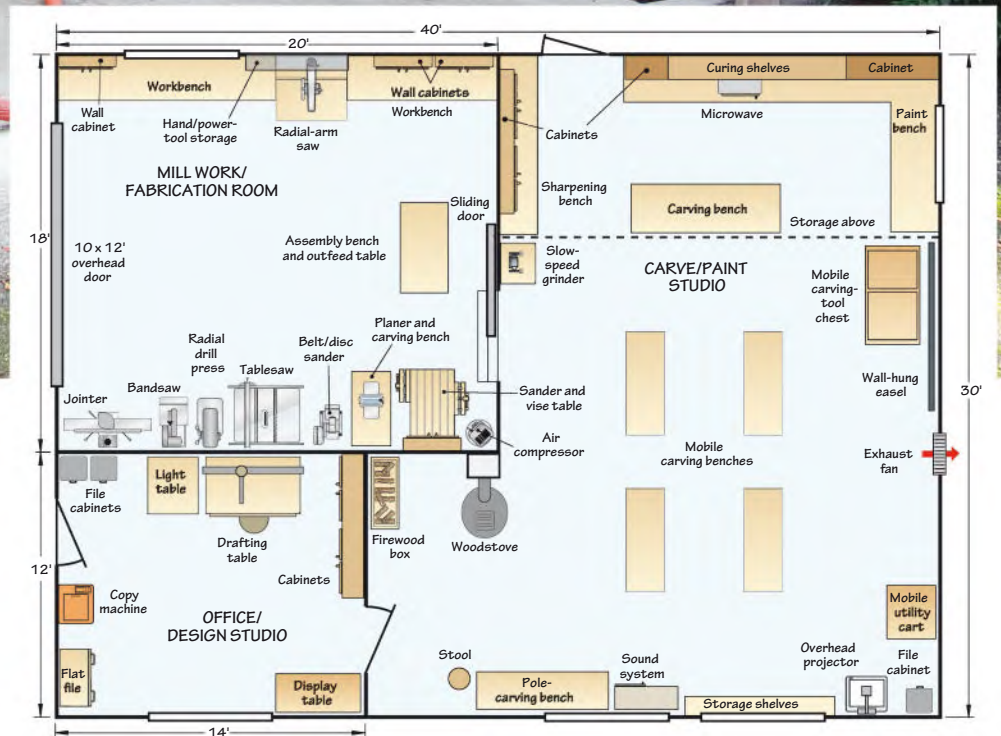


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CELEBRATING 25 YEARS

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YOUR SHOP



Dale Faulstich of Sequim, Washington, goes through woodworking shops the way some go through cars. “This is the fifth shop I’ve had in my life,” says the renowned carver of Northwest Native American totem poles. But like a vehicle you finally customize just the way you like,



Dale's shop features an all-cedar exterior perfectly suited to its home in the heavily wooded Olympic Peninsula northwest of Seattle, Washington.

he's found his keeper in this shop. With nearly 1,200 square feet of space, the shop's spacious interior and 15'-tall cathedral ceiling ensure Dale has plenty of room to maneuver large workpieces and teach classes. A 10×12' overhead door makes unloading lumber or tools a breeze. Plus, "All my tools are on wheels," Dave says, "so I can just roll them outdoors when it's a pleasant summer day." 🌲

Show us your shop

Send digital photos of your shop to woodmail@woodmagazine.com and we may showcase it in a future issue of WOOD® magazine!



For Dale, every project begins at the drawing table and desk he created out of birch plywood and alder framing. He also constructed the cabinets above and on floor level to match.



Shape up without the burn

Triton's Oscillating Spindle Sander offers an outstanding performance and a precise finish to every woodworking project.

Stability and enhanced material support for larger stock is provided by the cast iron table. The oscillating action moves the drum up and down during rotation, eliminating band marks and reducing the static friction that causes burning.

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Q “Face frames first” fends off fitting flaws

I’m planning to build new cabinets for my kitchen, and a buddy said I should make the face frames first and then the carcasses. That seems backwards to me. Is there an advantage to this method?

—Tom Casey, Columbia, S.C.

A Although it may sound counterintuitive, Tom, there’s a good argument for making face frames first. When multiple cabinets have to line up next to each other in a row, small errors of even $\frac{1}{32}$ " multiply quickly across that span. To eliminate these errors, first make the frame for each cabinet to exact width. Then mill grooves on the back side to accept rabbeted cabinet sides, allowing the face frames to overhang the case sides by $\frac{1}{16}$ ". (The wider

the overhang, the more “wasted” space you’ll have between cabinets.)

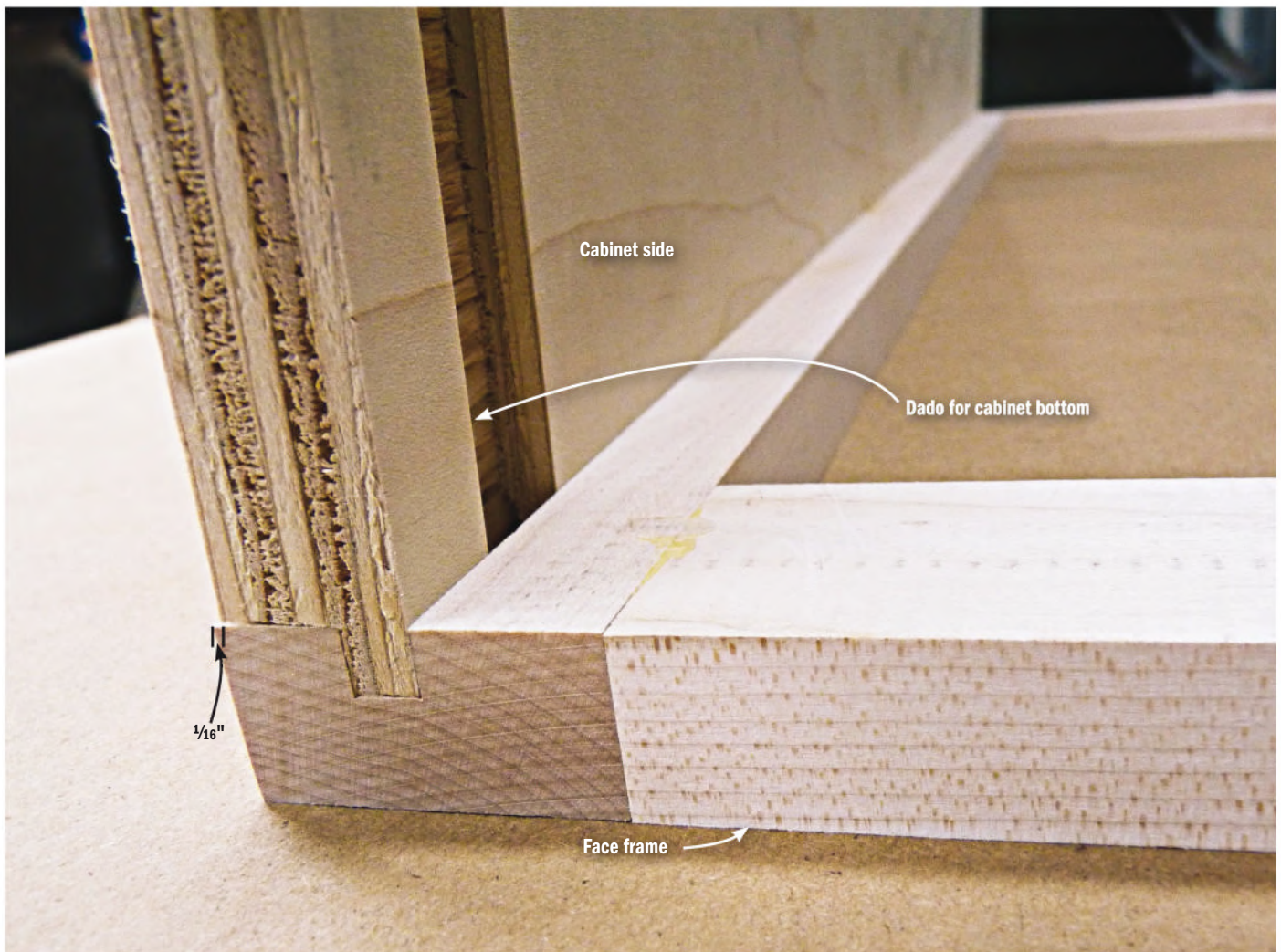
For cabinets that mount against an adjacent wall, increase the face-frame overhang that contacts that wall by $\frac{1}{2}$ " or so (or as much as needed to prevent gaps). This provides room to scribe that stile to match the wall’s contour and cut it to fit, avoiding any gaps.

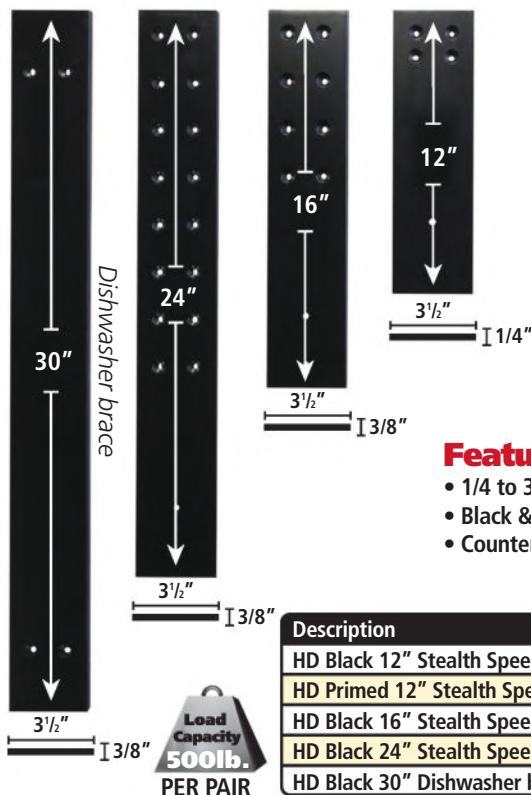
With the face frames done, dry-fit the sides in place and use the exact distance between them to determine the width of the carcase top (if it needs one), bottom, and back for that specific cabinet; each cabinet could be slightly different. Not only does this reduce measuring errors, but it also eliminates any discrepancies caused by nominal-thickness plywood. 🌲

► Learn Marc Adams’ method of building face-frame-first cabinets in issue 203 (March 2011).

► Seeking advice from other woodworkers? woodmagazine.com/forums

Or drop us an e-mail. askwood@woodmagazine.com





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The Stealth Speedbrace supports your countertop and bar overhangs with no visible kicker or expensive corbels. A pair of HD braces will support 500 pounds of weight and a pair of Stealth (below) braces will support 300 pounds! Sold individually.

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- Countersunk screw holes

Great for...

- Countertops & bars
- Dishwasher installation
- Extra Bracing

Patent Pending

Description	Part Number	Price
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HD Primed 12" Stealth Speedbrace	SB-12 HD STEALTH PRIMED	\$12.00
HD Black 16" Stealth Speedbrace	SB-16 HD STEALTH BL	\$24.00
HD Black 24" Stealth Speedbrace	SB-24 HD STEALTH BL	\$32.00
HD Black 30" Dishwasher brace	SB-30 HD STEALTH BL	\$45.00

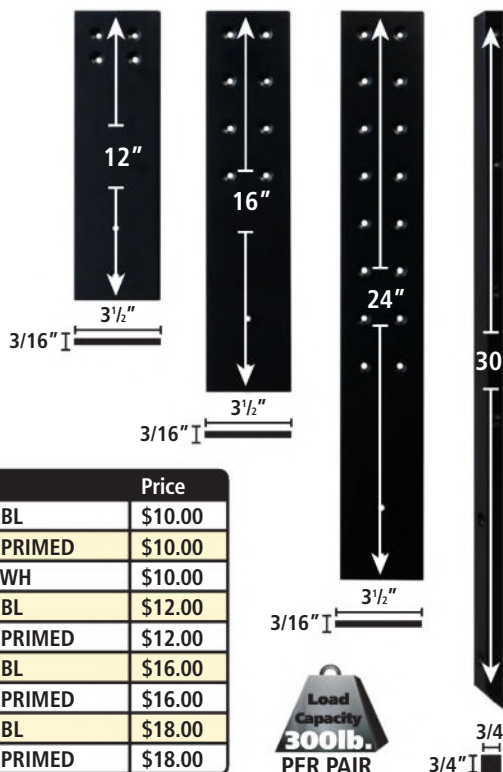
SpeedBrace STEALTH

Features...

- 3/16" to 3/4" steel
- Black, white (12" only) & primed finish
- Countersunk screw holes

Great for...

- Countertops
- Bars
- Extra Bracing

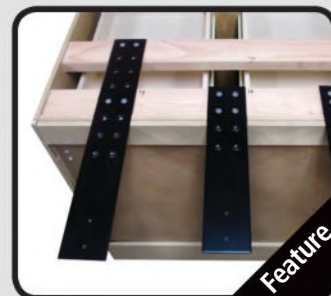


Description	Part Number	Price
12" Black Stealth Speedbrace	SB-12 STEALTH BL	\$10.00
12" Primed Stealth Speedbrace	SB-12 STEALTH PRIMED	\$10.00
12" White Stealth Speedbrace	SB-12 STEALTH WH	\$10.00
16" Black Stealth Speedbrace	SB-16 STEALTH BL	\$12.00
16" Primed Stealth Speedbrace	SB-16 STEALTH PRIMED	\$12.00
24" Black Stealth Speedbrace	SB-24 STEALTH BL	\$16.00
24" Primed Stealth Speedbrace	SB-24 STEALTH PRIMED	\$16.00
30" Black Stealth Speedbrace	SB-30 STEALTH BL	\$18.00
30" Primed Stealth Speedbrace	SB-30 STEALTH PRIMED	\$18.00

Patent Pending



Look Ma, no corbels!



24" & 16" extended mounting



30" HD Dishwasher Brace



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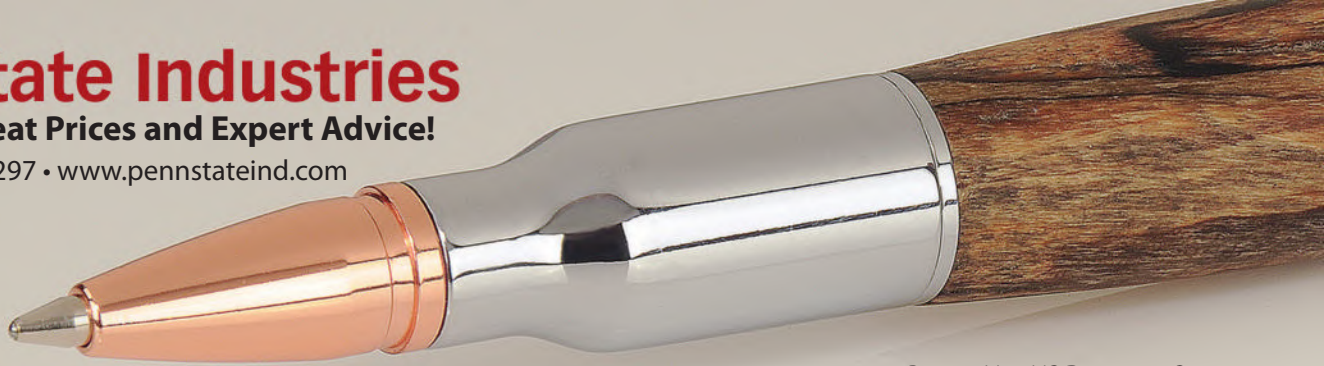
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UPS Shipping Cost	\$50	\$58	\$60	\$55	\$65	\$65
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Lathe	✓	✓	✓	✓	✓	✓
Slimline Pen Kits		5 (24 kt Gold)	20 (Variety)		5 (24kt Gold)	20 (variety)
Slimline Pencil Kits		5 (24 kt Gold)	20 (Variety)		5 (24kt Gold)	20 (variety)
Pen Mandrel		✓	✓		✓	✓
Mandrel Wrench			✓			✓
3pc Carbon Steel Chisels		✓			✓	
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Tube Insertion Tool			✓			✓
Shellawax Creame		✓ (30ML)	✓ (250ML)		✓ (30ML)	✓ (250ML)
Pen Assembly Press			✓			✓
Pen Making DVD		✓	✓		✓	✓

SHOP TIPS

WORK FASTER, SMARTER, SAFER

This slide-out tool setup saves space and your back

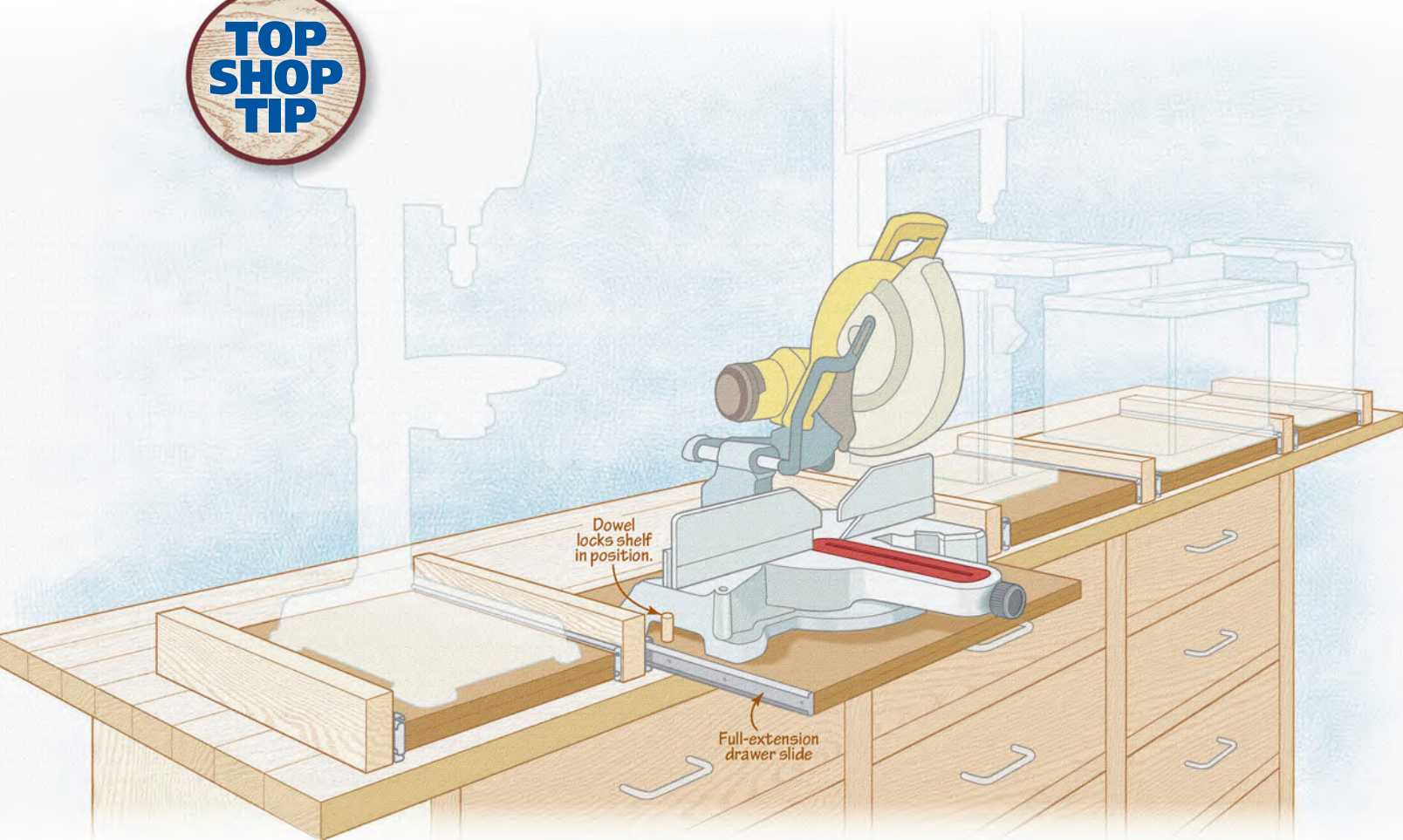
Benchtop tools are great space savers, but you still need to lug them into the open to use them. Maximize their space efficiency and spare your back with this setup.

I built slide-out “shelves” using laminated MDF or plywood panels, heavy-duty drawer

slides (sized according to the weight of the tool they need to support), and pieces of 2×4 mounted on edge to the benchtop. A dowel slides through each shelf and into a hole drilled in the benchtop, locking the tool in place either in its in-use or stored position.

—Bob Gillispie, Gruver, Texas

**TOP
SHOP
TIP**



For sending this issue's **Top Shop Tip**, Bob receives a Kreg Precision Router Table System worth \$500.



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Send your tip, photos or drawings, and contact info to shoptips@woodmagazine.com

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



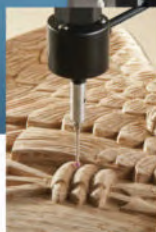
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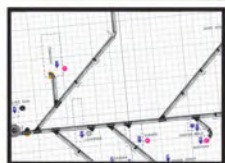
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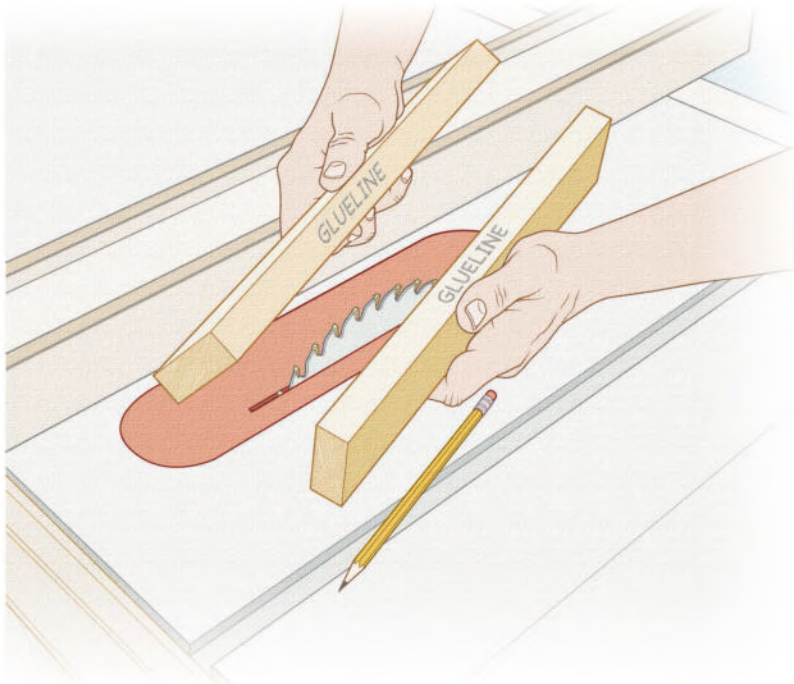
Clean Air! Clean Shop! Clean Tools!

SHOP TIPS

Get a perfect glued-up panel, even with imperfect tools

When ripping a glue-line joint on the table-saw, the smallest deviation of the blade from 90° can result in unflat panels. To avoid this, I write “glueline” on the freshly ripped edges of my pieces in the same orientation they came off the saw. I put together every joint so that the writing is upside down on one glue surface and right-side up on the other. The complementary angles cancel each other out, resulting in flat panels.

—M. Everett Clark, Marble Falls, Texas

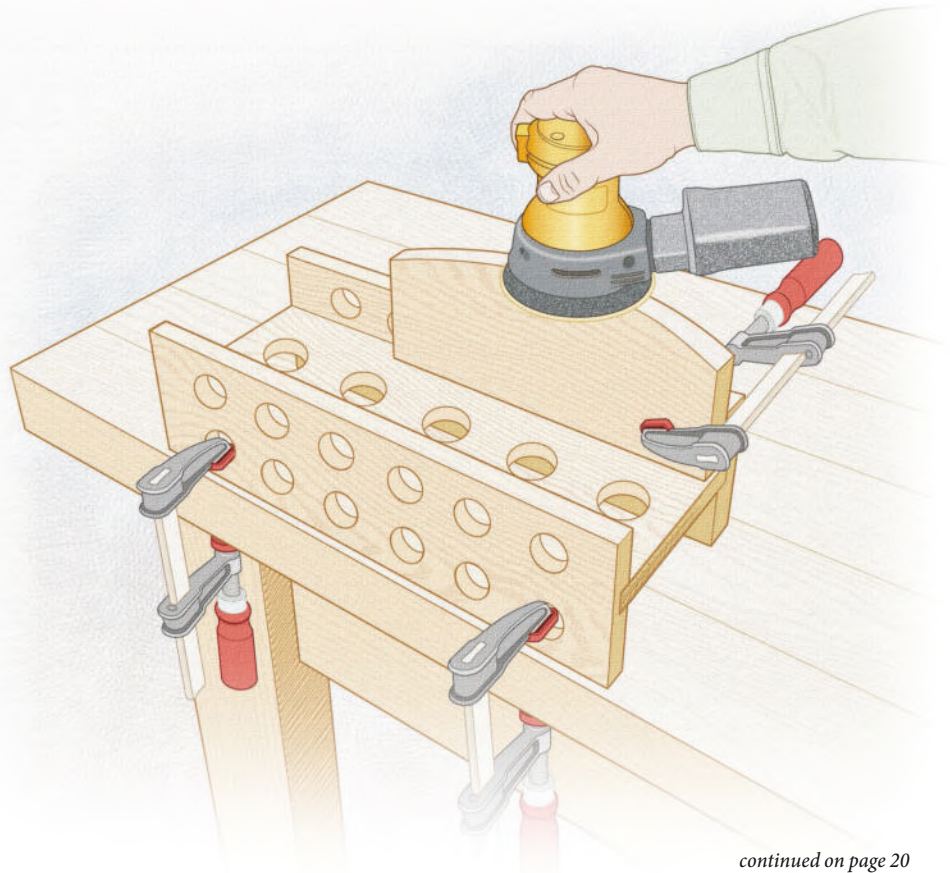


Note: Angles exaggerated for clarity

Holey I-beam clamping jig is quick to convert

Sometimes a clamping job requires more than your workbench for stability. This simple jig provides many options for challenging clamping tasks, such as securing a piece standing on edge. It also serves as a bench riser, putting the workpiece at a more comfortable working height, and can be used in the “H” position or the “I” position depending on your needs.

—Jim Moorehead, Barrigada, Guam



continued on page 20

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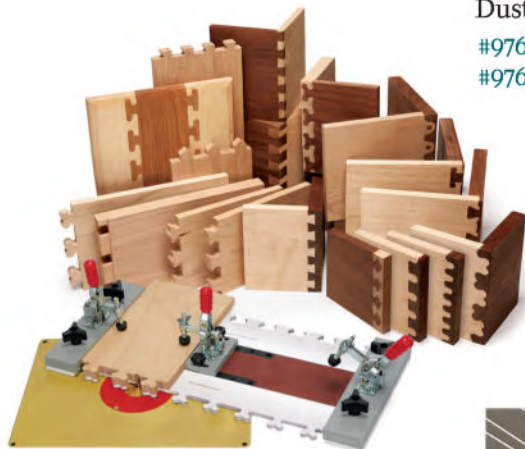
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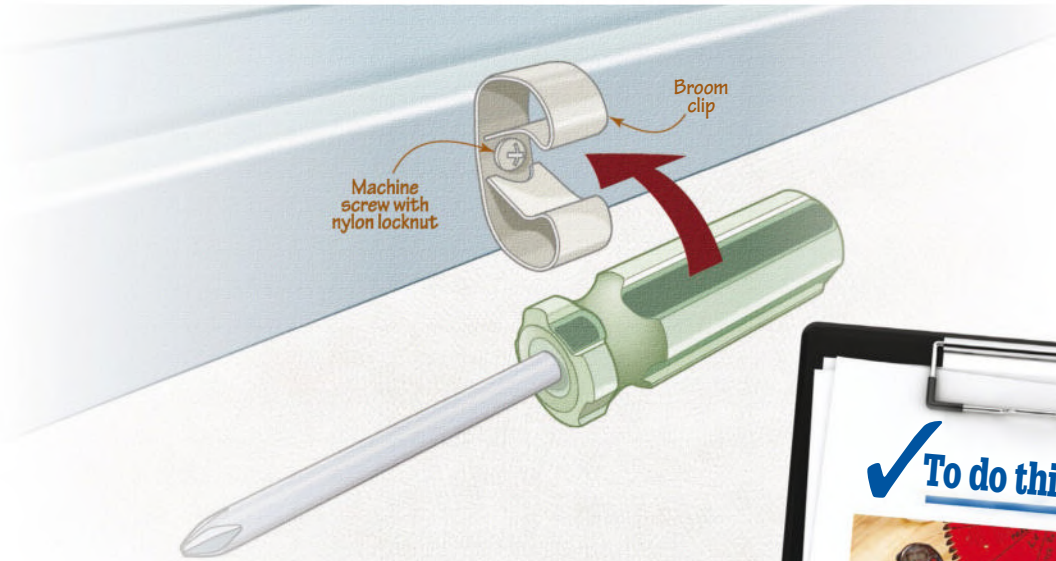
SHOP TIPS

There's just one catch to this screwdriver holder

I find it helpful to keep a screwdriver on hand to adjust jigs while at the tablesaw or to fine-tune my router table's fences. Rather than tote one around in my shop apron, I

mounted an inexpensive broom clip to the side of the tablesaw and router table—a perfect screwdriver holder.

—Dennis Peterson, Lewiston, Idaho

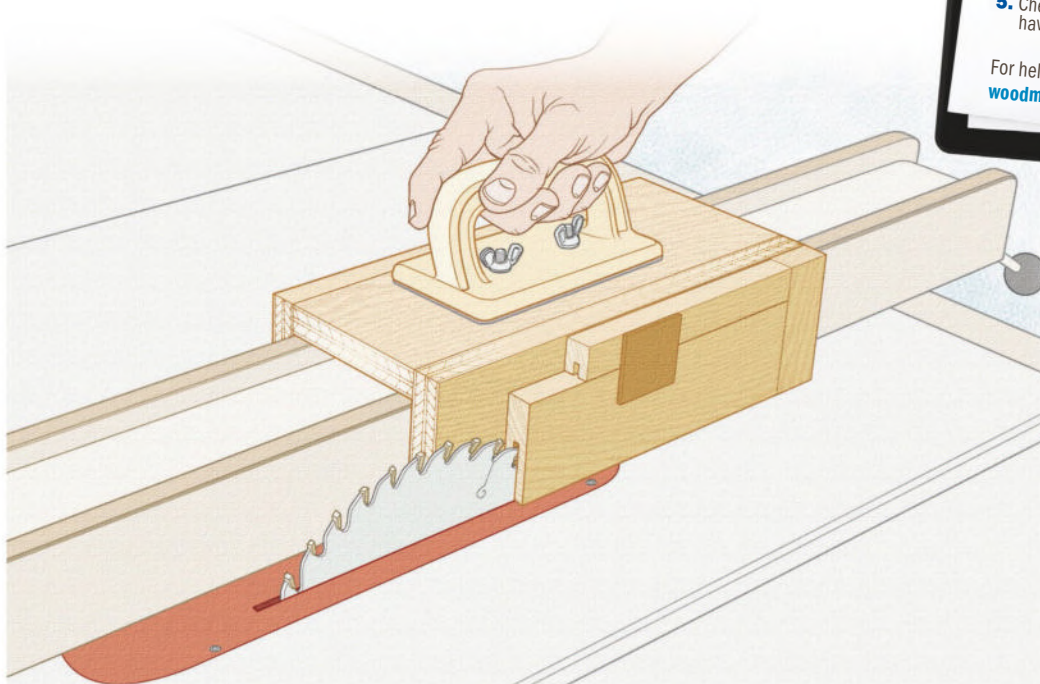


Push pad offers a quick, reusable grip for jigs

Need a better grip on a shop-made jig? Drill a couple of holes through a push pad and bolt it to your jig, securing it with wing nuts. When you're finished with the jig, simply

unbolt the push pad. The holes for the bolts don't impact the performance of the push pad during regular use.

—Keith Veronesi, Fuquay-Varina, North Carolina



✓ To do this month:



1. Remove resin buildup from saw blades.
2. Sharpen or replace planer knives and clean the feed rollers.
3. Clean the filters in your air cleaner.
4. Replace dull utility-knife blades.
5. Check the moisture levels of wood you have drying.

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continued on page 22

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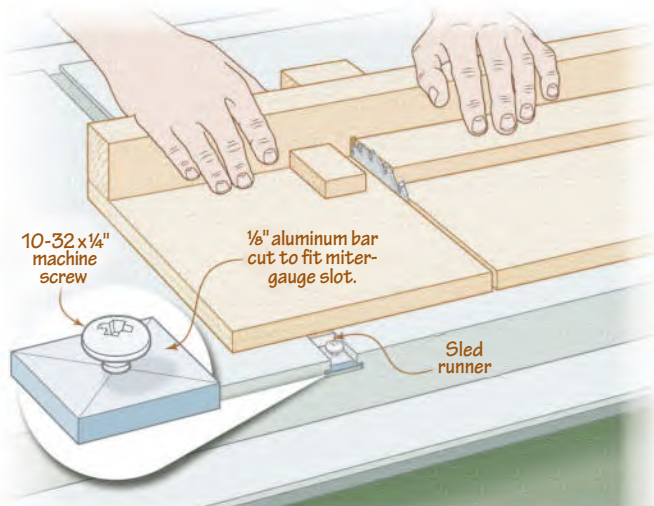
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SHOP TIPS

Put the brakes on runaway sleds

When making cuts using a tablesaw crosscut sled, it's easy to get carried away and push the sled too far forward, cutting through the rear fence. To protect your fingers and avoid regularly replacing your sled's back fence, make this low-profile sled stop. The 1/8"-thick aluminum bar fits inside most saws' miter-gauge slots. Just tighten the machine screw to lock the stop in place.

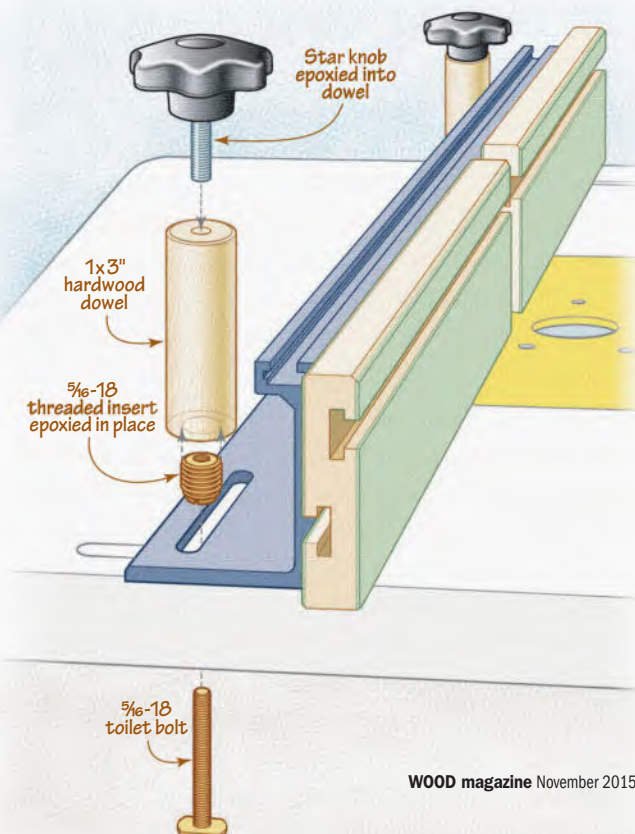
—Bill Wells, Olympia, Wash.



A real home run, this tip lifts one over the fence

Accessing the knobs for locking and unlocking my router-table fence required an awkward reach, as they were tucked away behind the fence. I decided to skip the acrobatics by adding these simple hardwood dowel risers to the knobs.

—Gary Ingber, Big Stone City, S.D.



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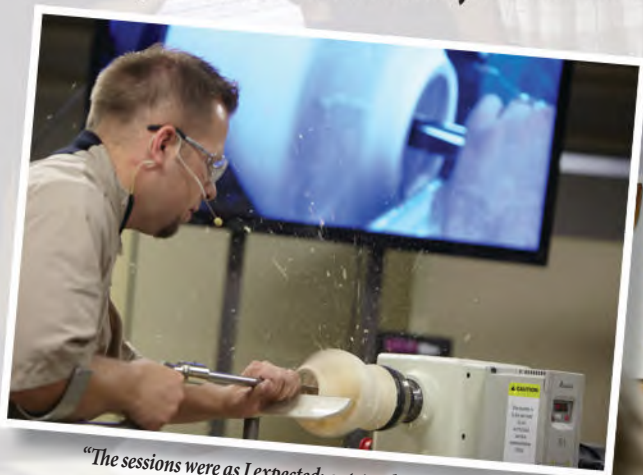
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Relax! They're not goof-ups, they're... Golden opportunities

by Tom Iovino

I can remember my first day of Catholic high school like it was yesterday, even though it happened back in 19—mumble-mumble. Our principal, Sister Patricia, minced no words when she greeted the new freshman class. “While you are here, you will make mistakes, and you will be called to account for them. But,” she continued, “you

should consider these golden opportunities from which to learn.”

My right eye still twitches when I think about that lecture, but how many times since she uttered those words has she been right? No one goes through life without making at least a few mistakes, but as long as we are open to learning from them, we get better.



What a lock rabbet should look like. The corner joint for a blanket chest I built should have looked like this.



Oops. Unfortunately I put the rabbet on the wrong side of the figured panel, leaving a stub protruding.



It's a feature, not a bug. A round-over routed on the protrusion makes it look as if it was my intention all along.

"You will make mistakes, and you will be called to account for them. But you should consider these golden opportunities from which to learn."

Nowhere else has this been more evident than in my time as a woodworker. How many times have I gathered my material, collected my tools, stepped to the bench and completed a project without making a single mistake? Let me see...carry the one...

Zero. It's never happened. There's always been the test cut gone awry, the joint that gaps just a little, the miscalculated measurement, the grain selection that leaves something to be desired, the rabbit cut on the wrong face (*previous page*)...you get the point.

But, it's what we do with that golden opportunity that makes us better woodworkers. The times I have cut a joint too loose, I have gone back to figure out how I made the mistake—and hopefully fix it (*top left*). Maybe it was the way I held the marking gauge, or that I leaned my pencil the wrong way. The times the joint was too tight? Well, I learned that it's easier to remove wood from a joint to get a better fit than to add wood back to the project.

Some interesting design ideas have presented themselves to me as well. For instance, on this small keepsake box (*top right*) I built for some friends who were getting married, I tried to hand-route the edge detail on the lid. It was going well, until the router wobbled going around the corner.

In this instance, I learned that cuts like this one should be done on a router table. I also discovered that a rasp and some sandpaper can help make a pretty cool design detail that caused lots of people to ask, "How did you do that?"

What's the takeaway from this? It's okay to make mistakes when it comes to woodworking. While you might grit your teeth and mutter under your breath about reworking a piece, as long as you remain open to the lessons the mistake has to teach you, it will make you a much better woodworker. 🌲

► When he's not talking about disasters such as hurricanes (his day job), Tom Iovino talks about woodworking. He blogs about it prolifically at tomsworkebench.com and speaks about it incessantly at modernwoodworkersassociation.com.



The repair for this too-loose tenon—wedges—provides an opportunity for a pop of contrasting wood that improves the final look.



What tear-out? Though unintentional, the rounded lid corners draw your eye to the dovetails, enhancing them.

Rout a beautiful family heirloom.

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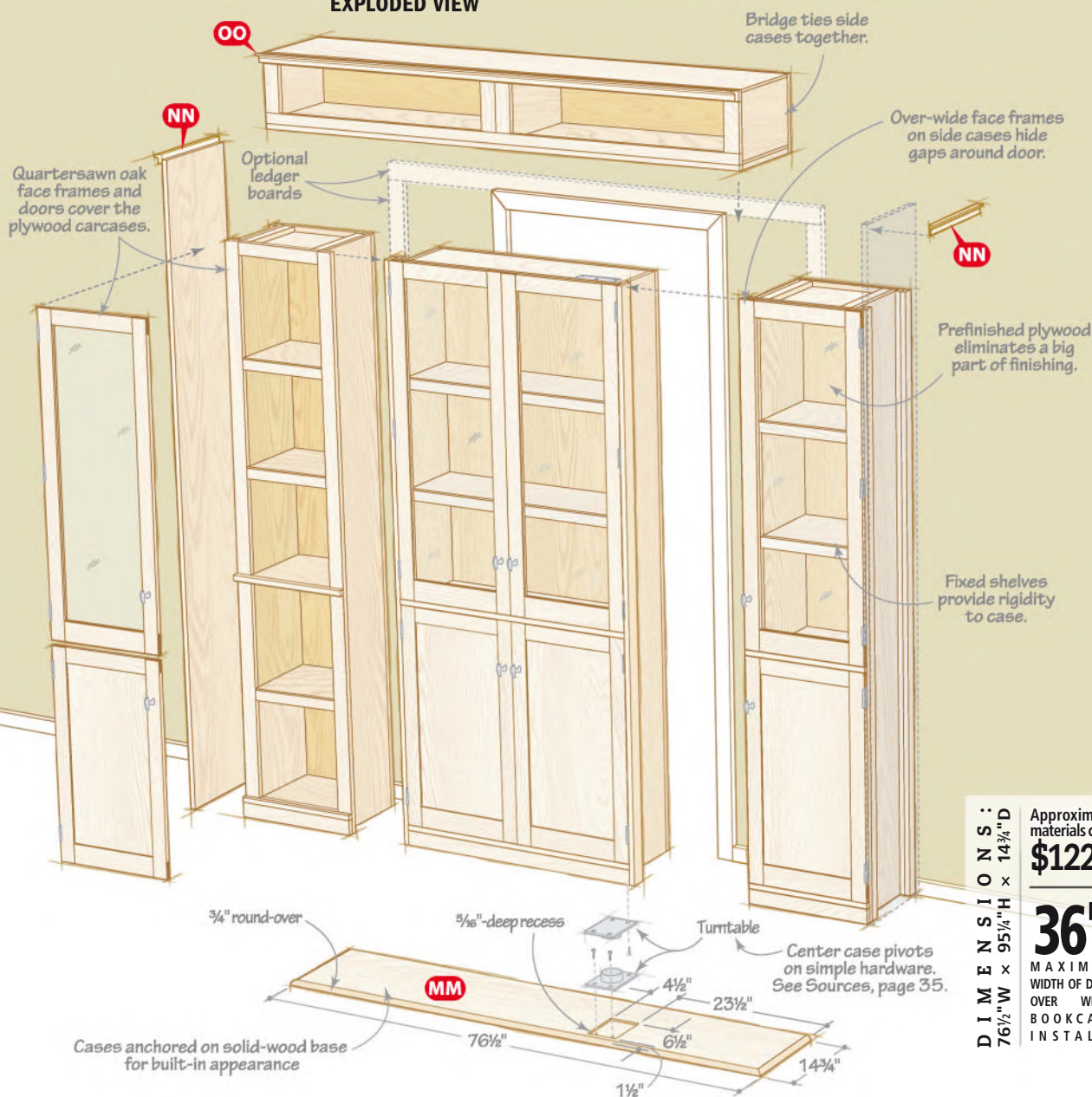
Hidden-door Bookcase

Like a moll in a mystery novel, this beautiful swinger has a secret. Install it over an existing doorway to conceal your hideout.



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woodmagazine.com/hiddendoor

EXPLODED VIEW



DIMENSIONS:
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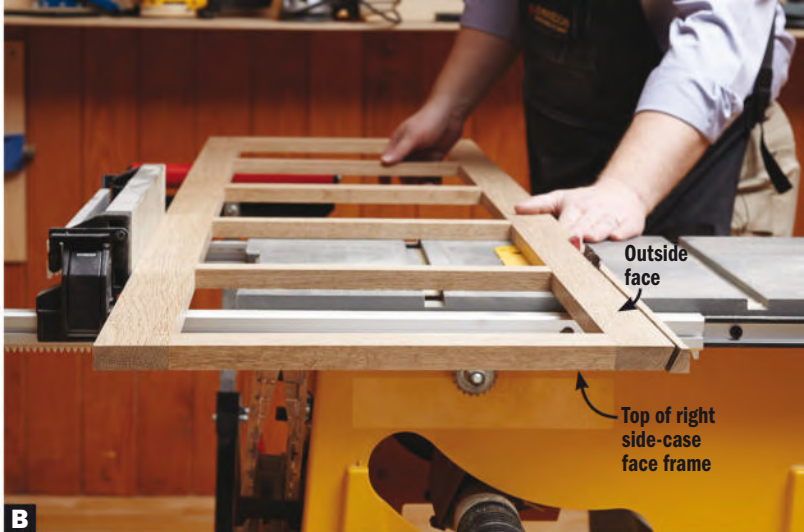
Approximate materials cost:
\$1220

36"
MAXIMUM WIDTH OF DOOR OVER WHICH BOOKCASE INSTALLS



A

To mark the rail locations, clamp a stile (C) flush with the ends and outside face of a side (A), align a square with the top face of the shelf (B), and mark onto the stile edge.



B

A bevel allows the swinging center case to clear the right side case. Rip away $\frac{1}{2}$ " of width (including the kerf) as measured on the outside face of the frame.

Start with the side cases

► Watch a video on getting perfect dados with only one test cut. woodmagazine.com/deadondados

1 To reduce repeating machine set-ups, and to ensure dados align between opposite sides, cut a double-wide blank, plus $\frac{1}{8}$ ", for each pair of parts A, M, and S [Materials List, page 35]. Machine the dados and rabbets across each blank [Drawings 1, 3] before ripping the parts to width. When ripping the bridge top/bottoms (M), rip the

third top/bottom using the same set-up. Set aside parts M and S.

2 Cut the side-case shelves (B) to size and glue them between the sides (A) [Drawing 2] to make two side-case carcasses.

3 Cut to size the face-frame stiles and rails (C, D, E, F). Transfer the locations of the five lower shelves (B) to a stile [Photo A], then transfer those marks to the three other stiles. Pocket-hole screw and glue two face frames together aligning the tops of the rails with the marks.

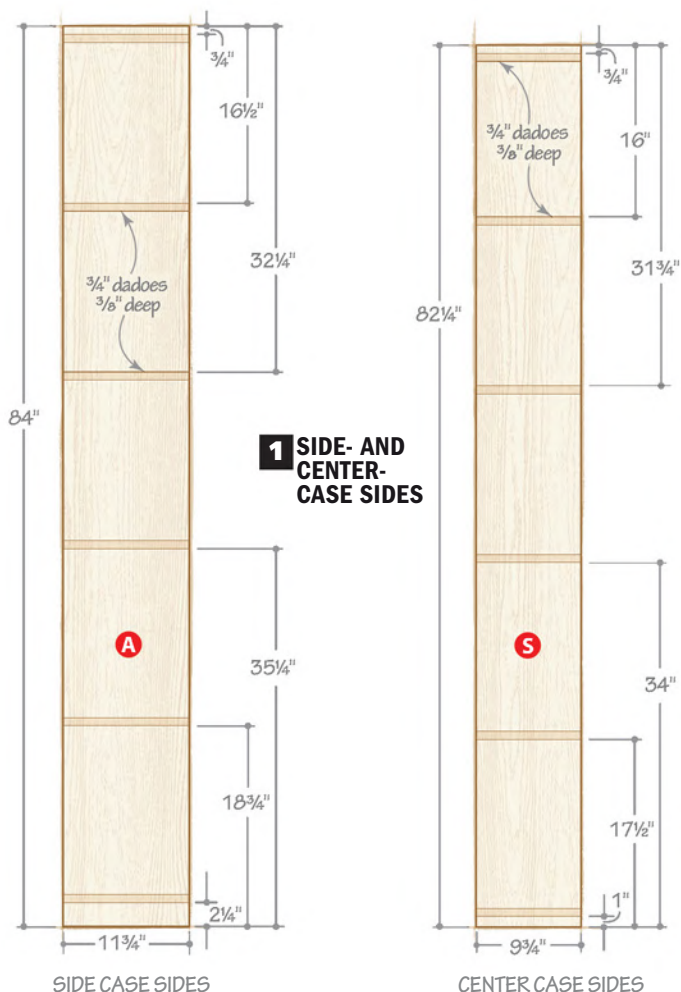
4 Bevel-rip the left stile for the right side case at 30° [Photo B].

5 Cut #20 biscuit slots in each face frame, registering the joiner fence on the inside edges of the stiles (C) and the inside faces of the case sides (A). Glue the face frames to the side cases (A/B).

6 Cut the backs (G) to match the dimensions of the side cases, and biscuit them to the cases [Photo C].

7 Laminate two strips of plywood to make each side filler (H) [Drawing 2]. Glue a pair to each case, making mirrored cases.

Note: Use polyurethane glue when joining parts to prefinished plywood; regular wood glue won't adhere to it.



C

Go easy with polyurethane glue as any squeeze-out will foam and make a mess. Wear gloves to prevent glue stains on your skin.

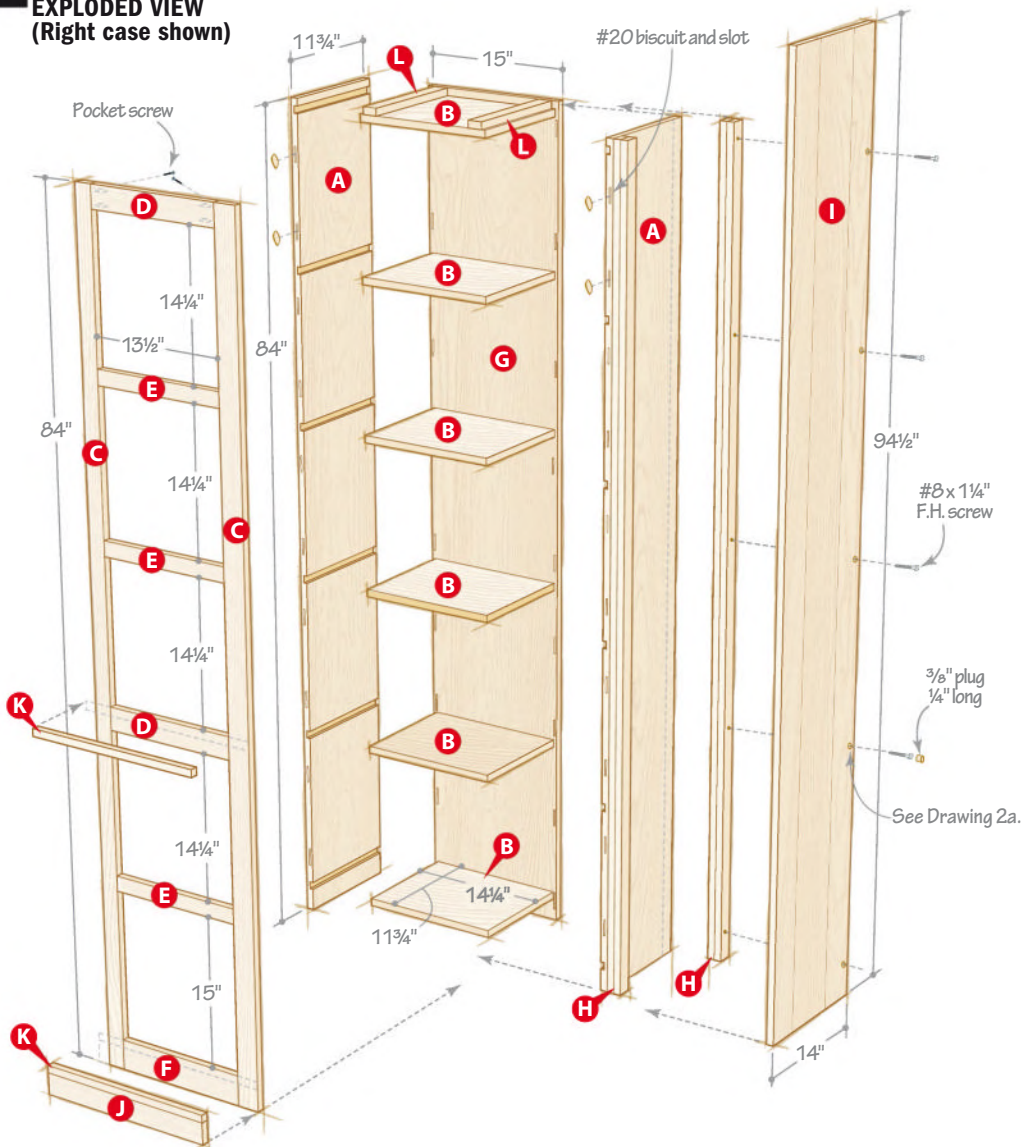
8 Glue up and cut to size the outer panels (I). Apply glue to only the front filler (H) and the stile (C), then clamp the outer panels in place. Drill holes [Drawing 2a] and screw the panels to the rear side fillers [Photo D].

9 To create a recess for the doors, you'll add a base board and faux moldings to the face frame. Cut the base boards (J) and faux shelf moldings (K) to size. Cut the rabbets along the front edges of the base boards [Drawing 2b]. Glue a faux shelf molding on the top edge to create a shadow line. Glue a base board assembly (J/K) to the left side case, and a shelf molding flush with the top edge of a mid rail (D) [Drawing 2]. For the right case, bevel the left end of these pieces at 30° before gluing them in place. Cut the top cleats (L) to size and glue them to the top shelf, against the sides (A).

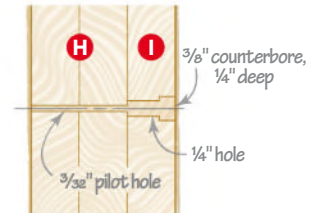


D Solid-wood panels will move, so drill the counterbores and 1/4" holes along the rear of the panel. Then drill 3/32" pilot holes through those holes into the fillers (H). Drive the screws, then plug the counterbores.

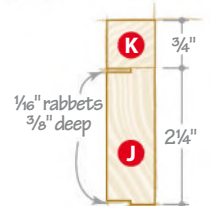
2 SIDE CASE EXPLODED VIEW (Right case shown)

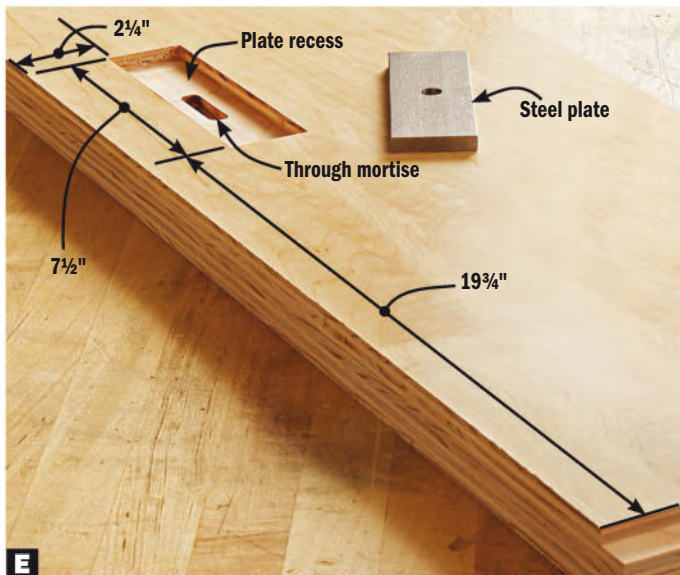


2a DETAIL SECTION OF SCREW HOLE

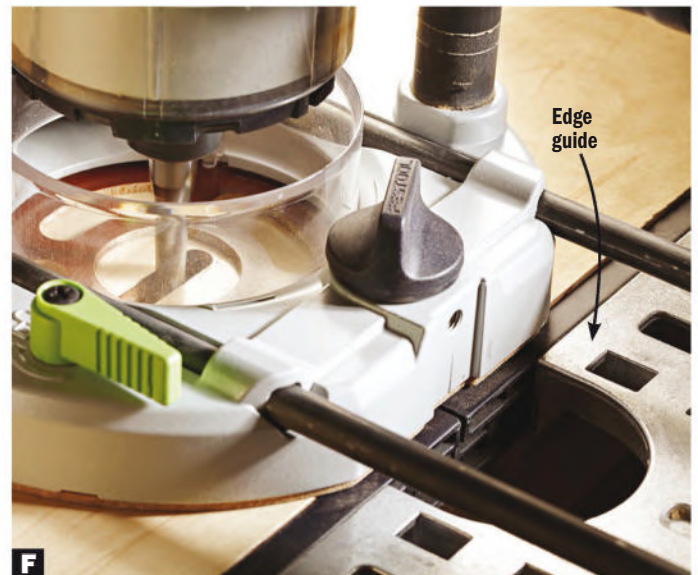


2b END VIEW





E Lay out a recess to match the width of the pivot plate and 7½" long. Mark the ends of a 1½"-long through mortise centered in the layout.



F Rout straight with an edge guide. Rout the ½" through-mortise in three passes, lowering the bit slightly between passes.

Build a bridge

►The steel plate accepts a pin that extends into the center case, serving as the top pivot point for the center case. Routing an over-long recess for the plate allows positioning the plate and pin to fine-tune the fit of the center case between the side cases.

The bridge ties the two side cases together, forming the opening for the swinging center case, and anchors the top hinge pin.

1 Retrieve the bridge top/bottoms (M) cut earlier. Glue a part M with dadoes to the M without dadoes with their ends and edges flush [Drawing 3].

2 To form the pocket for the steel plate [Photo E], then score around its perimeter with a marking knife. For visibility, darken the scored lines with a pencil. Rout a ½×1½" through mortise centered on the width and length of the layout [Photo F]. Reset the edge guide and bit depth and rout

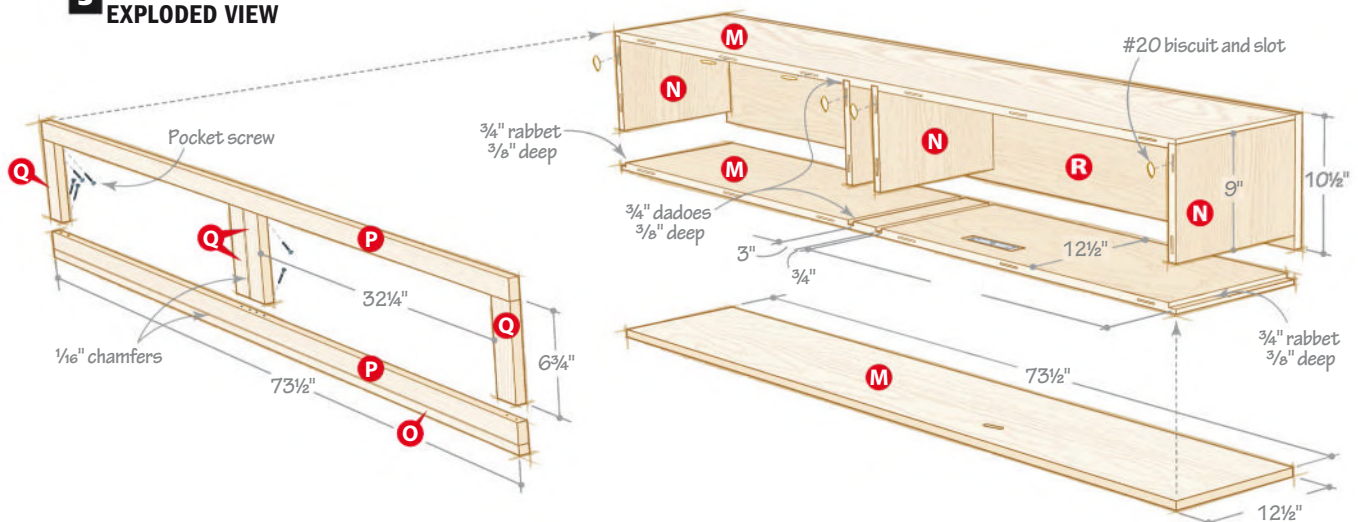
the ¾"-deep recess for the plate stopping just short of the end marks. Clean up the ends with a chisel.

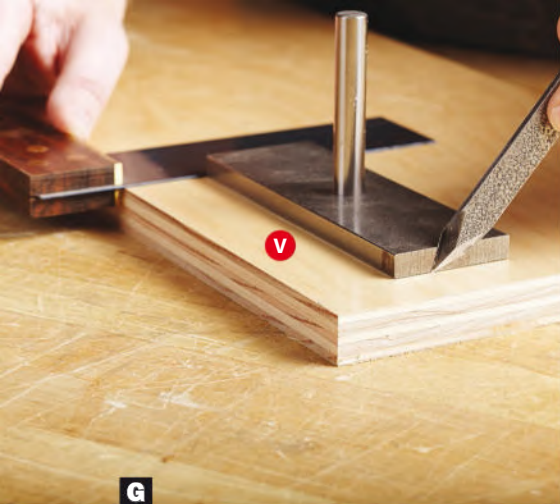
3 Cut the dividers (N) to size and glue them between the top/bottoms (M).

4 Cut the trim (O), and face-frame rails and stiles (P, Q) to size. To create a shadow line, sand ⅛" chamfers on the mating corners of the trim and lower rail, and the mating edges of the center stiles. Glue the trim to the lower rail, then glue and pocket screw the face frame together [Drawing 3]. Biscuit the face frame to the bridge.

5 Cut the back (R) to match the size of the bridge and attach it with biscuits.

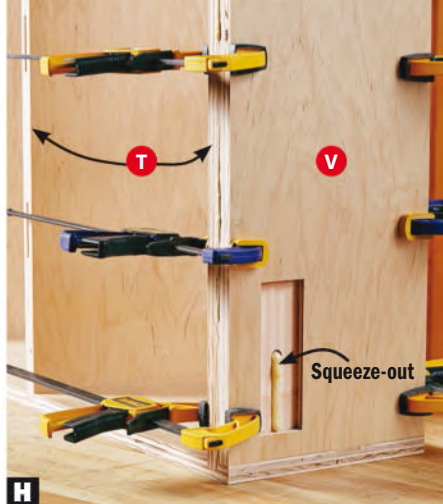
3 BRIDGE EXPLODED VIEW





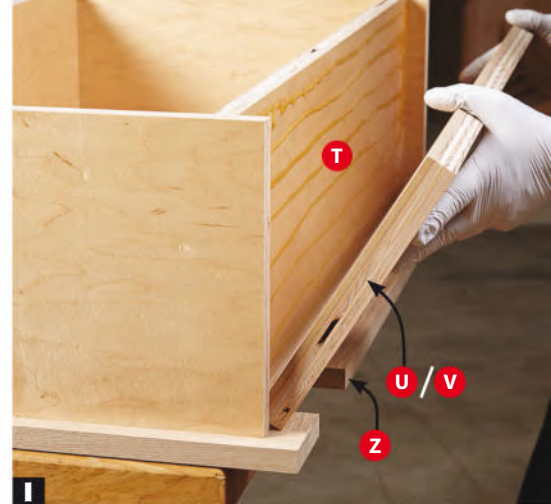
G

Set, square, score. Drop the pin into the hole, square the end of the plate to the edge of the filler (V), then score around the plate and pencil in the lines.



H

Let the foam flow. Allow the polyurethane glue to dry completely, then clean up the squeeze-out in the recess and drill the hole 1" deep, measured from the bottom of the recess.



I

Fillers beef up the bottom. Apply glue to the bottom shelf (T) and the bottom rail (Z) then clamp the filler assembly (U/V) to both.

Take a swing at the center case

1 Cut the shelves (T) to size and glue them between the center case sides (S) cut earlier [Drawing 4].

2 While that assembly dries, cut the fillers (U, V) to size. Drill a 1/2" hole through one filler (V) [Drawing 4a]. Register the pin in the steel plate and the hole, and mark around the plate [Photo G]. As you did before, rout a recess to accept the plate.

3 Glue the top filler (V) to the top shelf (T) [Photo H], and the thin filler (U) to the bottom filler (V). Drill and countersink a 3/32" hole near each corner of the steel plate, and screw it to the top of the center case.

4 Cut the face-frame stiles and rails (W-Z) to size. As you did with the side cases, mark the locations of the shelves, assemble the face frame, and attach it to the case with biscuits.

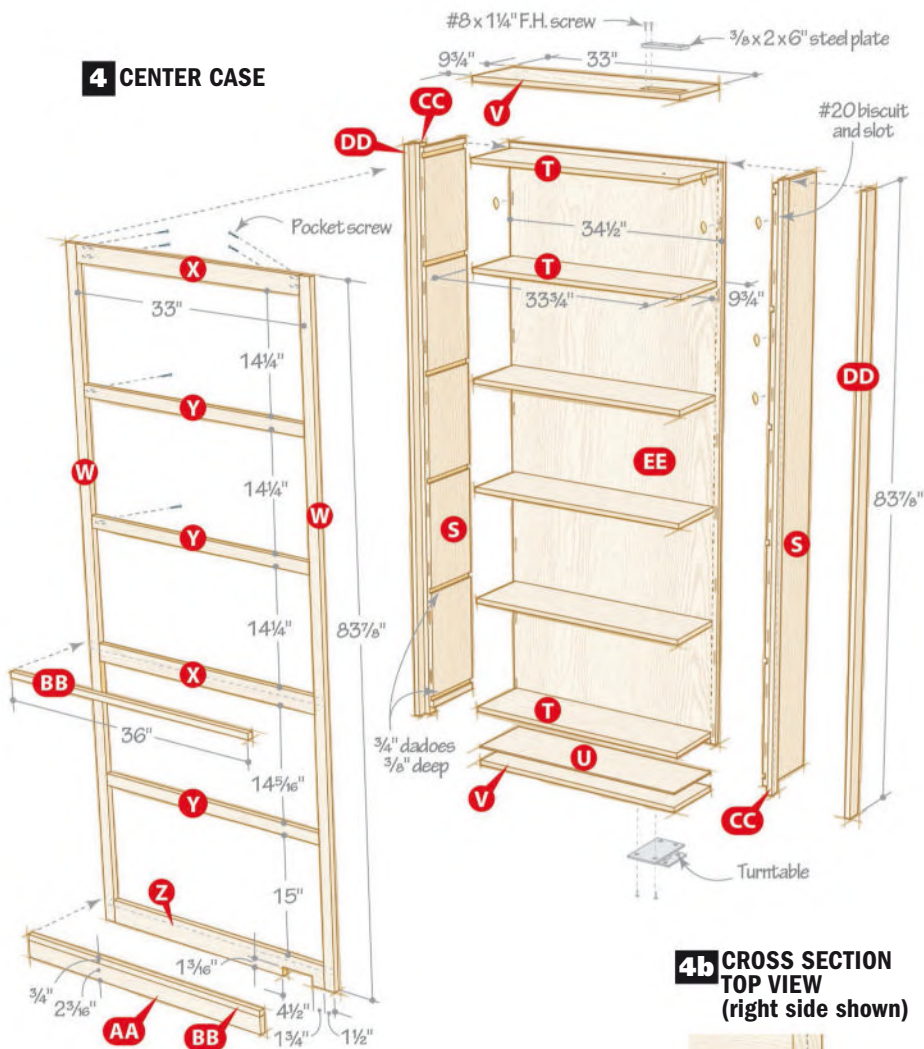
5 Notch the bottom rail (Z) to accept the turntable [Drawing 4]. Then glue the filler assembly (U/V) below the bottom shelf (T) [Photo I].

6 Similar to the side cases, cut the base board (AA) and faux shelf moldings (BB) to size. Rabbet the top edge of the base board and glue a faux shelf molding to this edge. When the glue dries, glue this assembly to the bottom rail (Z) [Drawing 4]. Glue the other faux shelf molding to the mid rail (X).

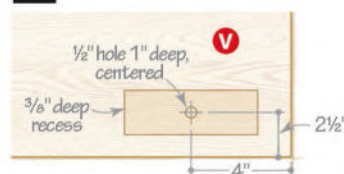
7 Cut the fillers (CC, DD) to size. Glue the inner fillers to the case sides (S) against the back of the face-frame stiles (W) [Drawing 4b]. Glue the outer filler (DD) to the inner filler and stile, flush with the outside faces of the faux moldings.

8 Cut the back (EE) to size and finish-sand the long edges. (These will be visible when the case swings open.) Attach the back with biscuits.

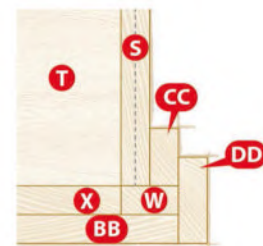
4 CENTER CASE



4a PLATE RECESS



4b CROSS SECTION TOP VIEW (right side shown)



Doors camouflage cracks

All eight doors are the same width with bridle joints at each corner. The lower doors have grooves to accept a plywood panel; the upper doors are rabbeted after assembly to accept glass.

Tip! To prevent machining errors while cutting joinery, label the door parts with their letter, designate which are for the upper and lower doors, and the top and bottom of each stile.

1 Cut the door stiles and rails (FF-II) and panels (JJ) to size. Set aside the upper door parts and the panels for the moment.

2 For the four lower doors, cut grooves in the stiles (GG) and rails (HH, II) to accept the plywood panels [Drawing 5, Photo J].

3 Cut the joinery for all of the doors [Skill Builder, next page]. Then glue up the doors, with the panels (JJ) in the lower doors.

4 After the glue dries, rout and chisel the rabbets in the upper doors [Drawing 5a]. Order glass to fit the openings in the upper doors. Cut the glass stops (KK, LL) and set them aside.

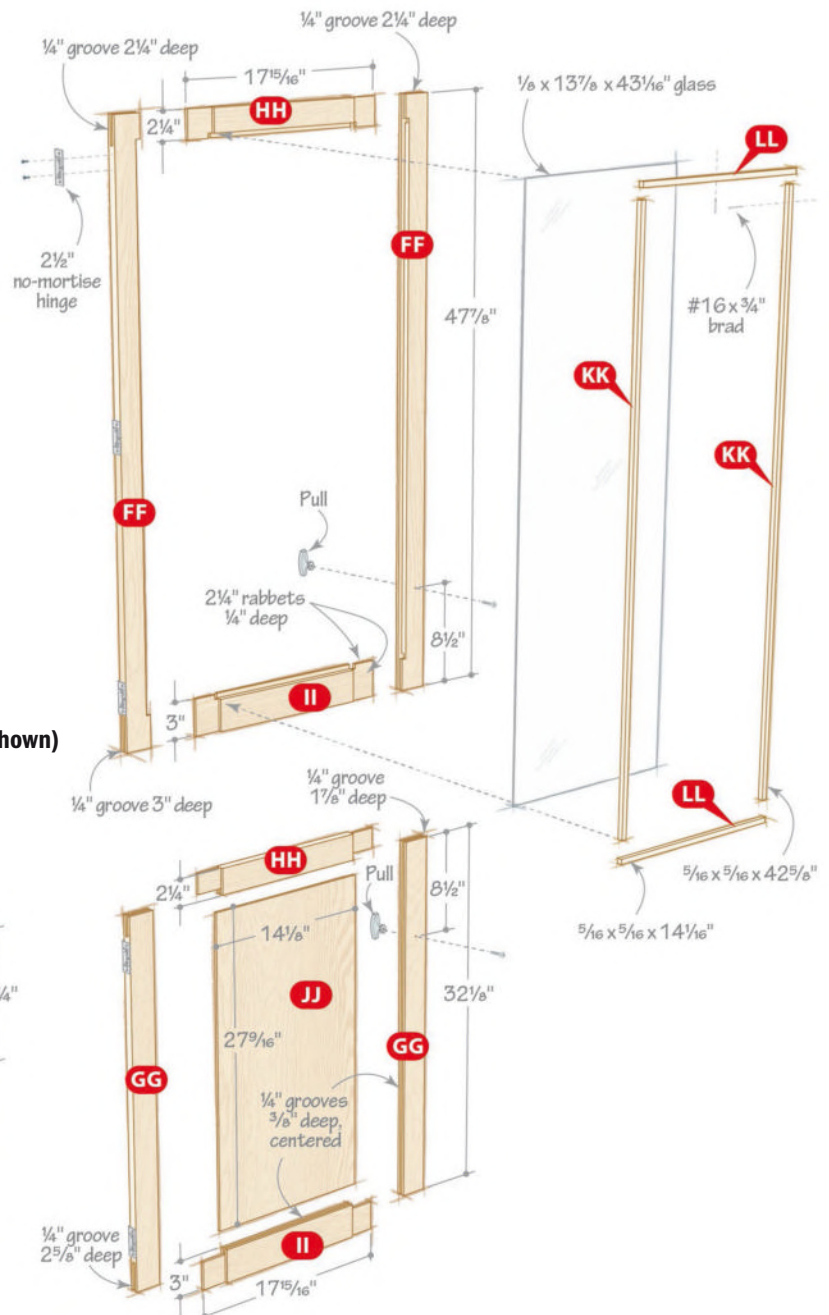
5 On the doors for the right case, cut a 30° bevel on the left stiles to match the bevel on the base board (J) and faux shelf edging (K).

6 Apply a finish to the face frames and doors. (We sprayed on three coats of lacquer, removing any overspray on the prefinished plywood by buffing lightly with a gray Scotchbrite pad.) Brush finish on the exposed edges of the center-case back (EE).

7 Secure the glass in the upper doors with the glass stops (KK, LL) [Drawing 5], and attach the pulls [Sources].

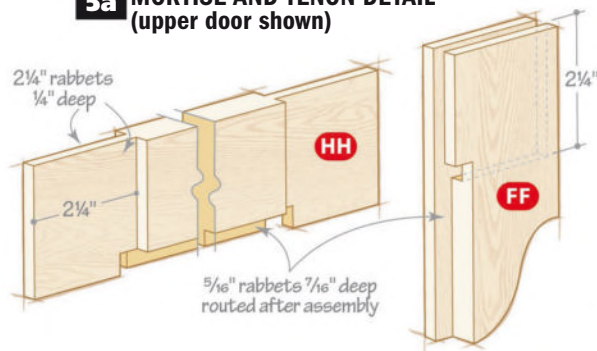


Center a groove. Attach a featherboard in front of the blade, and make a pass with each face against the fence to center a groove in the lower door rails and stiles.



5 DOORS
(inside face shown)

5a MORTISE AND TENON DETAIL
(upper door shown)



SKILL BUILDER

Rein in the bridle joint

► A bridle joint consists of a groove (or mortise) cut in the end of one piece, and a tenon on the mating piece that fits into the mortise.

► Get a free plan for a saddle jig. woodmagazine.com/saddle

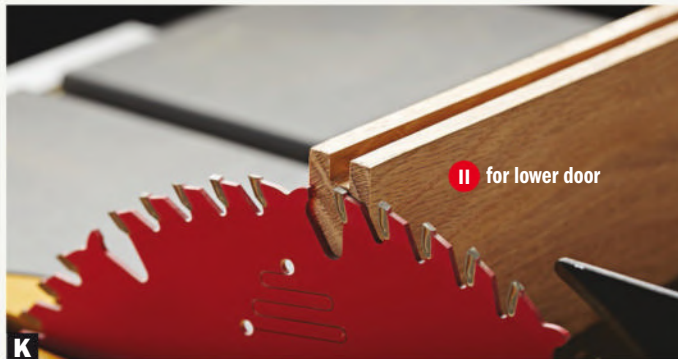
For a typical bridle joint, you cut the mortise depth to match the width of the mating piece. But with rails of different widths, and grooves for panels in the lower doors, the dimensions of the joints on the case doors vary. The simple way to handle this: Use the workpieces themselves to set up the joinery cuts.

For example, using a grooved bottom rail (II) as a gauge, set the blade height [Photo K]. Clamp a lower stile (GG) to a saddle jig, position the rip fence so the blade cuts away only material inside the groove, and make a

pass with each face against the jig [Photo L]. Repeat this process with the top rails (HH) for the lower doors. Leave the rip fence at this setting and follow a similar procedure to set the blade height and cut the mortises in the upper door stiles (FF) [Photos M, N].

To cut the tenons on the rails, set the tablesaw blade height to match the full width of a stile. Adjust the rip fence so the blade cuts along the outside face of the groove in a rail [Photo O]. Cut the tenon cheeks on all of the rails. Then lower the blade and cut away the remaining waste [Photo P].

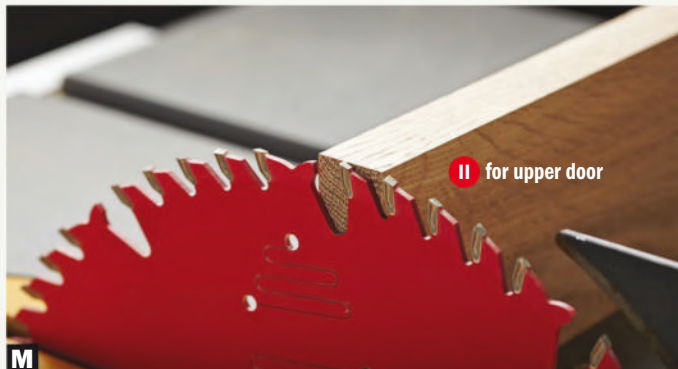
Note: A bridle joint is visible, so it's important to cut smooth tenon cheeks that fit well. Cutting the cheeks in a single pass over the tablesaw blade with the rails vertical eliminates the ridges that come from multiple passes over a dado blade.



K **Set the blade height.** Raise the tablesaw blade so the highest tooth reaches the bottom of the groove in a bottom rail (II).



L **Cut mortises in the lower stiles.** For best results, the jig must slide smoothly over the rip fence. Clamp the workpiece to the jig.



M **Reset for the upper door stiles.** Using the rails for the upper doors as gauges, set the blade height to match the full width of the rails, then cut the mortises as you did on the lower stiles.



Tip! Cut a test tenon in scrap to ensure the fit before cutting tenons on the rails. Cut only the cheeks, then handsaw away the waste to avoid changing the rip fence settings.



O **Cut away the walls of the groove.** Set the fence so the blade removes the walls of the groove, leaving a tenon that fits the mortise.



P **Complete the tenons.** A stopblock clamped to the rip fence establishes the tenon length and provides clearance for waste to move away from the blade.

Install the cases

At the existing doorway, remove the old door by pulling the pins from the hinges. If you leave the trim in place, install ledger boards the same thickness as the trim above the door and alongside it [Exploded View, page 27] to fill the gap and provide a surface to screw the bridge and side cases to. However, you can remove the door casing and base trim to place the cases against the wall.

The cases are secured to a solid-wood base (MM) that must be flat and level after installation so the door swings properly and the gaps between the cases disappear. Shim the base as needed to support it fully and prevent sagging.

For an uncarpeted floor: Check the floor for flatness. If you must shim the base, do not round over its ends or edges. Instead, use quarter-round molding after installing the cases to conceal any gap.

For carpeted floors: Install the base over the carpet, screwing it down every 6" along its length with two rows of panhead screws and

fender washers. Most carpets should spring up enough to conceal small gaps created by the shims.

1 Glue up the base (MM) [Exploded View]. Round over the front edge and ends, and rout a recess to fit the turntable. Secure the base to the floor, centered on the doorway.

2 Place the turntable in the recess in the base and drill $\frac{7}{16}$ " holes through the base and into the floor below [Photos Q, R]. Attach the turntable to the center case with $\frac{1}{2} \times 1\frac{1}{2}$ " lag screws and check its operation.

3 Cut pairs of 16"-long spacers, $\frac{3}{4}$ ", $\frac{1}{2}$ ", and $\frac{1}{4}$ " thick. Have these ready by the doorway. Drop lag screws through the bottom plate of the turntable and, with the help of a friend, stand the bookcase on the spacers, with the turntable above the pocket in the base (MM). Level the case, and insert the tips of the lag screws in the pilot holes [Photo S].

4 Turn each lag screw until the head contacts the turntable. Then, remove a pair of spacers and repeat until the turntable is

secured to the base [Photo T]. Swing the case closed and shim the side opposite the turntable to level and plumb the case.

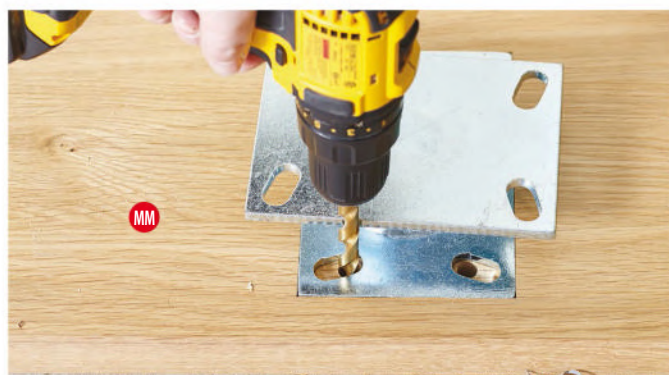
5 Set the side cases $\frac{1}{16}$ " from the center case, plumb them, and screw them to the base (MM) with 4" screws.

6 Secure the bridge to the side cases [Photo U]. Drop the second steel plate and the pin into the recess in the bridge, and secure the plate [Photos V, W]. If needed, cut and miter moldings (NN, OO) to conceal gaps between the cases and ceiling and install them [Exploded View].

7 Attach the doors to the cases with no-mortise hinges and install the catches. Check again for an even reveal on the side cases and that the center case clears the doors when opened. Screw the side cases and bridge to the ledger boards or into wall studs. Screw the steel plate in place.

8 Drill a $1\frac{1}{8}$ "-deep hole to accept the bullet catch [Sources] near the left corner on the top face of the center case (T/V). Place the

► A ratcheting box wrench greatly simplifies this process. Shop for them here: woodmagazine.com/ratchetwrench



Q Drill close to the center. To allow the lag screw heads to clear the case above it (Photo R), drill the holes at the ends of the slot nearest the center. Avoid drilling through the floor below to eliminate the chance of damaging pipes, ducts, or wiring.



S Position the center case. Have a helper steady the case while you position the turntable and locate the lag screws in the pilot holes.



T Tighten the lag screws. Use a box wrench or open-end wrench and be patient. It's a tight area to work in so you'll only get small turns of the wrench.

bullet portion of the catch in the hole, but don't screw it in place yet. Install the catch on the bottom face of the bridge. If the bullet doesn't engage the catch, adjust the bullet up. When the bullet engages the catch, screw the flange of the bullet in place.

9 If needed, add a surface-mounted handle on the back of the center case to assist in pulling it closed from the inside. When placing items in your new cases, avoid placing fragile items in the center case, as a too-enthusiastic open or close of the case could cause them to tip over. Now, enjoy your secret lair. 🌲

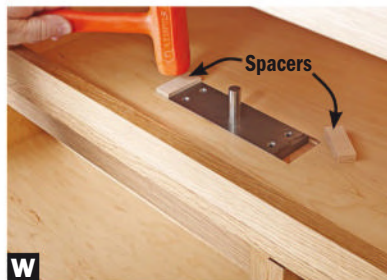
Produced by **Craig Ruegsegger** with **John Olson**
Project design: **John Olson** Illustrations: **Roxanne LeMoine**



U **Bring the bridge.** Clamp the bridge in place, then screw it to the side cases from the inside. Check the assembly for plumb and even gaps on each side of the center case.



V **Secure the upper plate.** Place the plate in the recess, then drop the pin through and into the hole in the plate in the center case. Cut spacers to fit on each side of the plate. Check the fit and swing of the center case, and adjust the spacer widths as needed to create even gaps and a smooth swing.



Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Side cases						
A*	sides	¾"	11 ¾"	84"	PM	4
B	shelves	¾"	11 ¾"	14 ¼"	PM	12
C	face-frame stiles	¾"	2 ¼"	84"	Q	4
D	face-frame top/mid rails	¾"	2 ¼"	13 ½"	Q	4
E	face-frame mid rails	¾"	1 ½"	13 ½"	Q	6
F	face-frame bottom rails	¾"	3"	13 ½"	Q	2
G	backs	¾"	15"	84"	PM	2
H	side fillers	1 ½"	1 ½"	84"	PM	4
I	outer panels	¾"	14"	94 ½"	EQ	2
J	base boards	¾"	2 ¼"	18"	Q	2
K	faux shelf moldings	¾"	¾"	18"	Q	4
L	top cleats	¾"	1 ½"	11 ¾"	PM	4
Bridge						
M*	top/bottom	¾"	12 ½"	73 ½"	PM	3
N	dividers	¾"	12 ½"	9"	PM	4
O	trim	¾"	¾"	73 ½"	Q	1
P	face-frame rails	¾"	1 ½"	73 ½"	Q	2
Q	face-frame stiles	¾"	2 ¼"	6 ¾"	Q	4
R	back	¾"	10 ½"	73 ½"	PM	1
Center case						
S*	sides	¾"	9 ¾"	82 ¼"	PM	2
T	shelves	¾"	9 ¾"	33 ¾"	PM	6
U	thin filler	¼"	9 ¾"	33"	OP	1
V	fillers	¾"	9 ¾"	33"	PM	2
W	face-frame stiles	¾"	1 ½"	83 ⅞"	Q	2
X	face-frame top/mid rails	¾"	2 ⅜"	33"	Q	2
Y	face-frame narrow rails	¾"	1 ½"	33"	Q	3
Z	face-frame bottom rail	¾"	2 15⁄16"	33"	Q	1
AA	base board	¾"	2 ⅜"	36"	Q	1
BB	faux shelf moldings	¾"	¾"	36"	Q	2
CC	inner fillers	¾"	1 ½"	83 ⅞"	Q	2
DD	outer fillers	¾"	2 ¼"	83 ⅞"	Q	2
EE	back	¾"	34 ½"	82 ¼"	PM	1
Doors						
FF	upper stiles	¾"	2 ¼"	47 ⅞"	Q	8
GG	lower stiles	¾"	2 ¼"	32 ⅞"	Q	8
HH	top rails	¾"	2 ¼"	17 15⁄16"	Q	8
II	bottom rails	¾"	3"	17 15⁄16"	Q	8
JJ	panels	¼"	14 ⅞"	27 ⅞"	OP	4
KK	vertical glass stops	⅝"	⅝"	42 ⅝"	Q	8
LL	horizontal glass stops	⅝"	⅝"	14 ⅞"	Q	8
Base and moldings						
MM	base	¾"	14 ¾"	76 ½"	EO	1
NN	side moldings	¾"	1 ¼"	14 ¾"	Q	2
OO	front molding	¾"	1 ¼"	76 ½"	Q	1

*Parts initially cut oversize. See the instructions.

► This project requires two square feet of ½" quartersawn oak, 86 board feet of 4/4 quartersawn oak, six sheets of ¾" prefinished maple plywood, and one sheet of ¼" oak plywood. Download a free cutting diagram for this project at woodmagazine.com/hdbookcase.

Materials key: PM—prefinished maple plywood, Q—quartersawn oak, EQ—edge-glued quartersawn oak, OP—oak plywood, EO—edge-glued oak.
Supplies: #8×¾" flathead screws, #8×¼" flathead screws, #8×4" flathead screws, 1¼" pocket screws, #20 biscuits, 13⅞×43⅞" single-strength glass (4), #16×¾" brads.
Blades and bits: Stacked dado set; ½" straight, ¾" round-over, rabbeting router bits.

Sources: Hardware kit includes 1,500-lb. capacity turntable, ⅝×2×6" steel plates (2), ½×3" steel shaft, ½"-diam.×1⅞" adjustable bullet catch, ½×1½" lag screws (8), #8×1¼" flathead wood screws (8), kit no. RS-01093, \$249, 800-636-4478, woodstore.net. Pulls no. P3372-SS (8) \$3.49, Menards stores or menards.com. Hinges no. 00H51.33 (20), \$2.10; door catches no. 00S16.01 (8), \$1.70, 800-871-8158, leevalley.com.

Buying and Working With Home-Center Lumber

The convenience and availability of ready-to-use lumber from big-box stores make it an attractive option. Learn to find the good stuff, and then how to make it work hard in your shop.



Home-improvement centers thrive because they sell not only lumber, but also most of the other things you need to complete a project. Getting it all at one place saves you time compared with shopping all over town. Before buying lumber from one of these outlets, though, keep in mind that most of their solid-wood stock is intended for construction and do-it-yourself jobs, not necessarily furniture-grade wood-working. But that shouldn't stop you from buying it for your better projects, as long as you follow these pointers.



Same price, different qualities. These two shrink-wrapped oak boards were found side by side at Menards. The one on the left has more-stable straight grain; the other, random flatsawn grain.



It pays to pick. We found this maple 1x6 with eye-popping curly figure hiding behind a stack of ordinary maple boards at a Lowe's store.

Buying the lumber

Hard facts about hardwoods

Like buying cold soft drinks from a vending machine, you pay a premium for that convenience. Home-center boards have been planed and sawn to make all faces and edges smooth (known as S4S). For that reason, their prices typically run about one-and-a-half to two times that of rough-sawn stock from a hardwood retailer, when comparing cost per board foot. (That difference grows even greater compared with buying lumber directly from a sawmill.) But if you lack the machines to mill rough-sawn stock, home-center lumber can often be your only option.

Most home centers stock red oak and poplar in varying sizes. Some also carry maple, cherry, walnut, mahogany (the Asian varieties), hickory, and aspen. These typically come in standard nominal thicknesses and widths, such as 1x4s (actually $\frac{3}{4} \times 3\frac{1}{2}$ "),

1x6s ($\frac{3}{4} \times 5\frac{1}{2}$ "), and so on. Lengths vary from 4' up to 16'.

Buying S4S lumber saves you the investment of a jointer and planer, but comes with a caveat: If that wood warps, you have to reduce the thickness, or cut it into shorter or narrower pieces, or both, to remove or minimize the effect of that warp.

So as you're shopping for boards at a home center, rather than simply grabbing the boards in the front or top of a stack, be choosy. Sort through the rack, looking for boards with matching color and grain. Avoid those with damage, deep scratches, dents, and end checking (splits). You might even find a hidden gem, such as the one *above*. Some species, such as cherry, walnut, and hickory, have sapwood that's lighter than the heartwood. Be prepared to cut away and discard the sapwood if that's not the look you want.

► Hardwood comes from deciduous trees, which shed their leaves annually. Softwood comes from coniferous trees: evergreens with needles and seed-bearing cones. So a board's actual hardness has no bearing on its classification.

► Learn how to calculate board footage.

woodmagazine.com/bdft



Typical pine. These typical home-center pine boards contain lots of knots, color variations, and grain orientations.



Select pine. Clear-pine boards, such as these, have no knots, and carry a hefty price because of that.



Good grain awaits. Most of these 2x12s could prove pesky to work with, but the highlighted ones, with quartersawn grain (minus the pith), would make for stable project lumber.



► A handheld moisture meter (\$80-\$400) proves a worthy investment for gauging wood moisture levels at the store and at home.

Softwoods built a nation

When you think of softwood, think construction lumber. Home centers carry pine, fir, spruce, cedar, and pressure-treated pine—products used primarily to build homes and decks. But you can still work with this lumber in your shop—we'll cover that later.

Softwoods are typically sold in 1-by ($\frac{3}{4}$ "), 2-by ($1\frac{1}{2}$ "), and 4-by ($3\frac{1}{2}$ ") thicknesses. Even though they're usually kiln-dried, don't expect hardwood levels of moisture (6–10 percent). Most softwoods range from 10 to 20 percent moisture when shipped to stores,

so be prepared to let them dry more before use. Avoid obviously warped boards at the store; instead, seek stock with stable grain, such as that shown at *top right*. Also avoid boards with large or loose knots, unless you want a more rustic look.

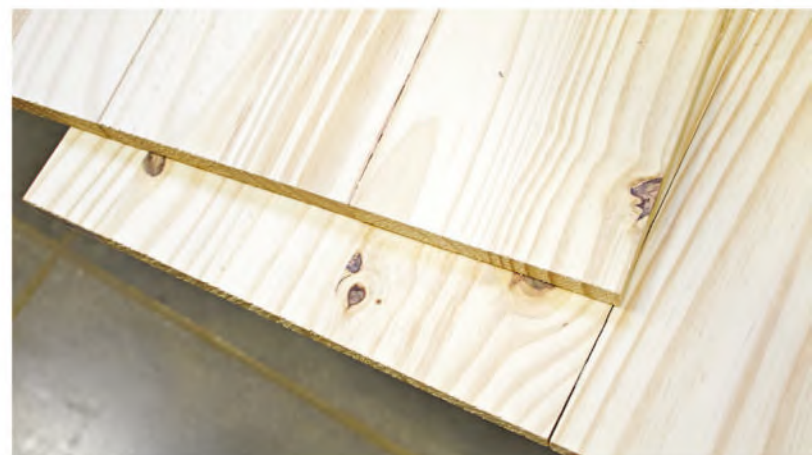
More so than with hardwood, be prepared to waste more with softwood as you cut around knots and problematic grain. If you have a thickness planer, you'll get better project lumber by buying wide boards, such as 2x12s, with mostly quartersawn grain. (More on that later.)

► Purchase WOOD's **Complete Guide to Choosing and Using Wood** DVD. woodstore.net/allaboutwood

Panels provide a shortcut

If you're unable to edge-glue panels, or simply don't have the time, premade panels can be a great idea. Available in softwoods and hardwoods (most commonly red oak), these panels come in a variety of sizes up to about that of a small dining-table top. Avoid warped panels because removing that warp can prove frustrating. Test a panel for flatness by laying it on the floor—if it rocks at all, don't buy it. Also, keep away from panels with glue-joint gaps (*right*), uneven surfaces, and putty-filled repairs. Look for consistent color and grain throughout if you intend to finish it naturally or with stain. If you'll paint the panel, you can be more accepting of knots and mismatched grain.

► Glue up your own flat panels. woodmagazine.com/flatpanels



Check for flaws. These edge-glued pine panels are coming apart at the glue joints. Avoid these. But if you must buy them, rip-cut split joints and reglue the boards into panels.



Give it a rest. Sticker lumber, such as this dimensional pine, and coat the ends with wax sealer or paint to allow for slow, tempered drying.



Premature build. This garden bench was built from pressure-treated pine 4x4s that were not fully dry. As the lumber dried after assembly, the bench twisted.

Working the lumber

Buy it, hurry, then wait

After buying your lumber, get it into your shop right away and sticker it (stacking with spacers), as shown *above left*. Let it sit until the wood has acclimated to the humidity level in your shop. For hardwoods, this could be a few days to a week or two. For softwoods, it could be twice as long, depending on the moisture level when you bought it. Treated pine should rest at least a month. If you stage your lumber outdoors, keep it under a roof or cover it with something that will keep rain and snow off, yet still allow fresh air to circulate through and around the sides and ends of the stack.

► Learn to craft different types of joinery.
woodmagazine.com/joinery

Start building your project

Once the lumber acclimates to your shop environment, cut project parts to approximate length and width. Then sticker them and let them sit for another day or two. If a board warps or twists, the wood is not stable—toss it and get a new board.

► Find additional tips on working with pine.
woodmagazine.com/pinetips

If you've bought 2x12s, rip away the pith and the most severe flatsawn portions and discard them. Allow the remaining pieces to acclimate another day or two. Then plane the lumber to desired thickness.

Cut all parts to final length and width, and then cut or drill the joinery. Glue and assemble project parts right away—letting them sit even overnight could lead to subtle wood movement and misaligned joints. Whether working with lumber or glued-up panels, make sure edges are straight and ends square (unless a project calls for something else).

If your store-bought lumber was clean and scratch-free, and you've maintained it well, you should be able to start sanding with 150 grit and progress through 180 and 220. If your workpieces have noticeable scratches, start with 80 or 100 grit and progress through 120, 150, 180, and 220. Then apply your finish of choice. 🌲

The three big home-improvement centers:

► **The Home Depot** began in 1978 in Atlanta as a giant one-stop warehouse, and now has 2,200 stores in North and Central America and China.

► **Lowe's** started in 1946 as a small hardware store in North Carolina, and has grown to 1,840 stores in North America.

► **Menards** started in 1958 in Wisconsin, and now operates 280 stores across the Midwest and Upper Plains.

Produced by **Bob Hunter**

Cut for best yield. We divided this 1x12 pine board into waste (identified by Xs) and usable sections. You're likely to lose about a third of a board to waste when working with home-center lumber, particularly softwoods.



Limbert-style End Table

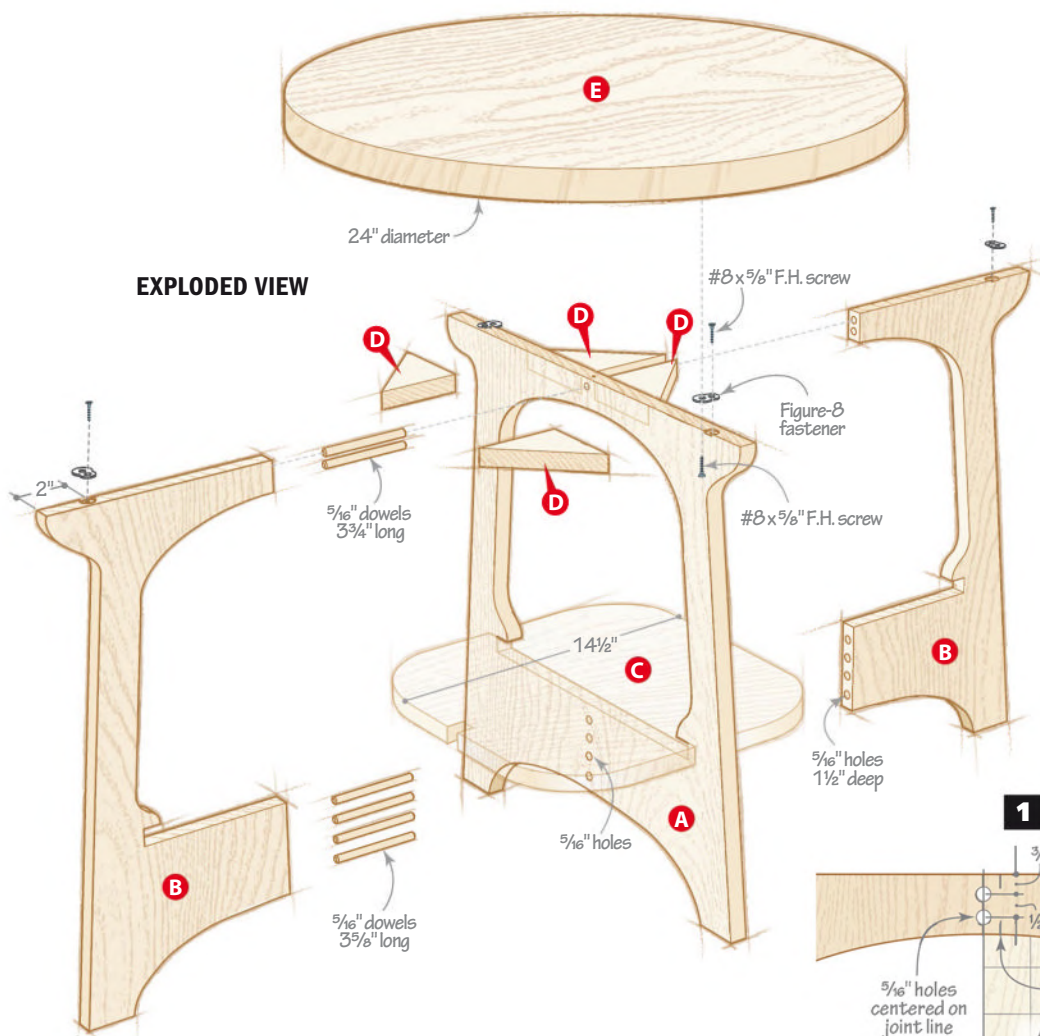
Simple flowing lines make it a natural fit in many interiors.

On the heels of the coffee table in issue 234 (Sept. 2015) we offer another Arts & Crafts classic in the style of Charles Limbert. Using just basic tools, and a few fasteners available at any hardware store, you can machine and assemble its 10 parts in a weekend. Though we used quartersawn oak and stained it dark to stay true to its roots, this table would look great in cherry or walnut, too.

DIMENSIONS:
22⁷/₈" H x 24" diam.

Approximate materials cost:
\$70

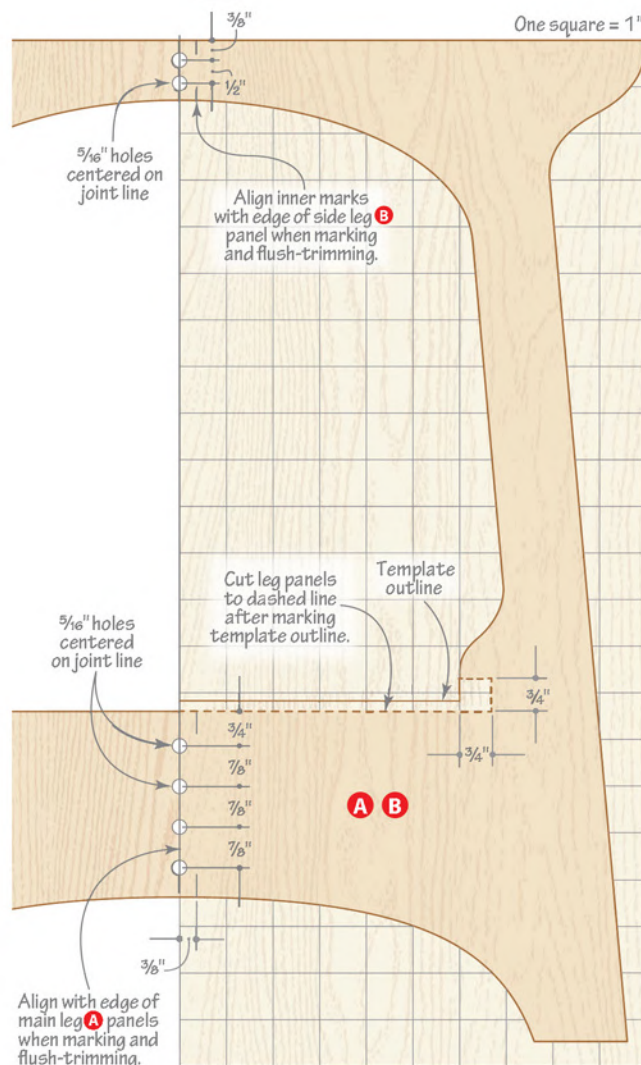
Did you know?
Charles Limbert worked in his father's furniture store and tried the carriage trade before opening a Michigan furniture factory in 1902.



EXPLODED VIEW

Tip! Make your sanding more effective and less labor intensive by finish-sanding parts as you make them, prior to final assembly. For stained projects like this one, we suggest sanding parts to 220 grit. With unstained project parts you can stop at 150 grit.

1 LEG PATTERN AND HOLE PLACEMENT



Let's start with the legs

Tip! When sawing outside traced template lines, leave as little extra material as possible, about $\frac{1}{16}$ ". This makes flush trimming easier, with less chance for tear-out.

1 From $\frac{3}{4}$ " stock, glue up four $10 \times 21\frac{1}{2}$ " panels for the legs (A, B). After the glue dries, sand the panels to 220 grit and trim two of them to $9\frac{5}{8}$ " wide for the side legs (B).

2 From $\frac{1}{4}$ " hardboard make a routing template using the gridded pattern [Drawing 1]. Mark the template with the inner marks set $\frac{3}{8}$ " from its inside edge.

3 Trace the template onto the four leg blanks. When marking each side-leg (B) panel, align the inner template marks with the edge of the panel. Cut just outside the traced line. Save the outside cut-offs for later use as clamping cauls.

4 Transfer the pattern's dashed lines onto each leg. Cut along the long and straight part of the dashed line using a jigsaw. (Don't cut along the two short dashed lines yet.)



A **Get trim.** Firmly clamp the leg and template to a bench. Then move the router in a slow and steady counter-clockwise direction. By having earlier sawed the straight edge that the shelf will rest on, you avoid any risk of tearing out end grain with the flush-trim bit.

Tip! For the smoothest flush cuts, especially on tearout-prone end grain, choose a router bit with shear (angled) cutting edges or downcut spiral edges.

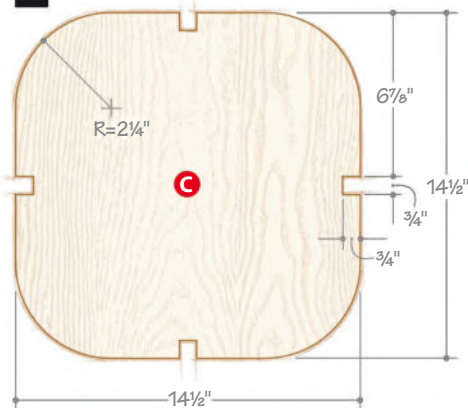
5 Attach the template to a leg using double-faced tape. Flush-trim the leg [Photo A]. Remove the template and cut the two remaining short notch cuts with a jigsaw. Repeat for the other legs.

6 Retrieve the two main legs (A) and dry-clamp them inside-edge-to-inside-edge with the ends flush. Mark and drill the six holes where shown [Drawing 1].

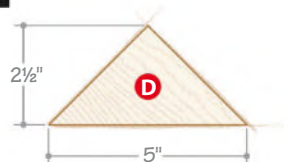
Now build the base

1 Glue up a blank for the shelf (C) [Drawing 2]. After the glue dries, trim it to 14½" square. Then, mark the blank as shown, and cut to shape.

2 SHELF



3 TOP BRACES



B **Put on the pressure.** After applying glue to all mating surfaces, clamp together the main legs, using two dowels to ensure all the holes align. Once clamped, remove the dowels and clear the holes of any glue.

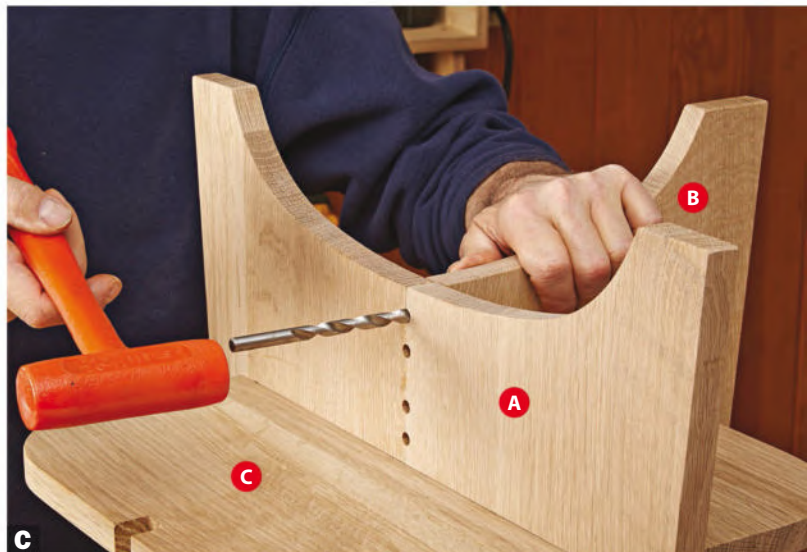
2 Glue and clamp together the main legs (A) and shelf (C) as shown [Photo B]. Remove the alignment dowels after applying adequate clamping pressure. Use those same dowels to clear any glue from the drilled holes.

3 Retrieve the side legs (B) and center one over the holes in the main-leg assembly. Mark hole centers in the side leg [Photo C]. Repeat for the other side leg.

4 Drill the marked holes in the side legs (B) [Exploded View]. Apply glue inside the holes and other mating surfaces and join the side legs to the base assembly, as done before.

5 Cut four top braces (D) [Drawing 3]. Glue them into the corners between the legs, flush with the leg tops [Exploded View].

Note: To ensure perpendicular holes in edges, use a doweling jig to guide the bit.



C **A bit marks the spot.** With the A/C assembly upside-down in a bench vise, tap a 5/16" brad-point bit to mark hole centers on both side legs.

Top it off

1 From 1½" stock glue up a panel slightly larger than 24×24". After the glue dries, use a large compass or trammel beam to lay out a 24"-diameter circle on the bottom face.

2 At the center point, drill a ¼" hole ¾" deep.

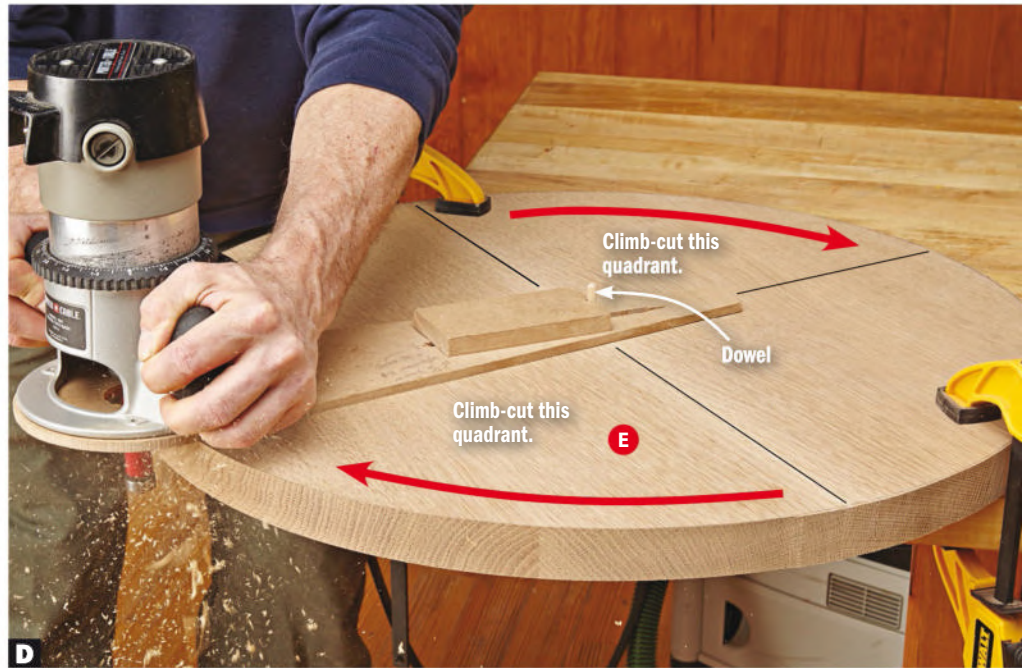
3 Now cut just outside the marked diameter.

3 Build the circle-cutting jig shown *below*. Then, insert a ¼" dowel 1½" long in the tabletop's center hole, fit the jig over it, and trim the top's edge [Photo D].

4 Using a ⅝" Forstner bit, drill ⅛"-deep recesses centered 2" from the top outside end of each leg to accommodate a figure-8 fastener [Exploded View]. Finish-sand the top and attach it to the base.

5 Apply the finish of your choice. We used Varathane Gunstock Stain and topped it with three coats of Old Masters polyurethane. 🌳

Produced by **Bill Krier** with **Kevin Boyle**
Project design: **Kevin Boyle**
Project builder: **Brian Bergstrom**
Illustrations: **Roxanne LeMoine; Lorna Johnson**



Smooth and steady does it. Hold the circle-cutting jig against the dowel as you move it fast enough to avoid burning yet slow enough to prevent tear-out. Move the router clockwise (climb cut) in two of the quadrants to further prevent tear-out.

SHOP TIP

This jig gives so you don't receive kickback damage

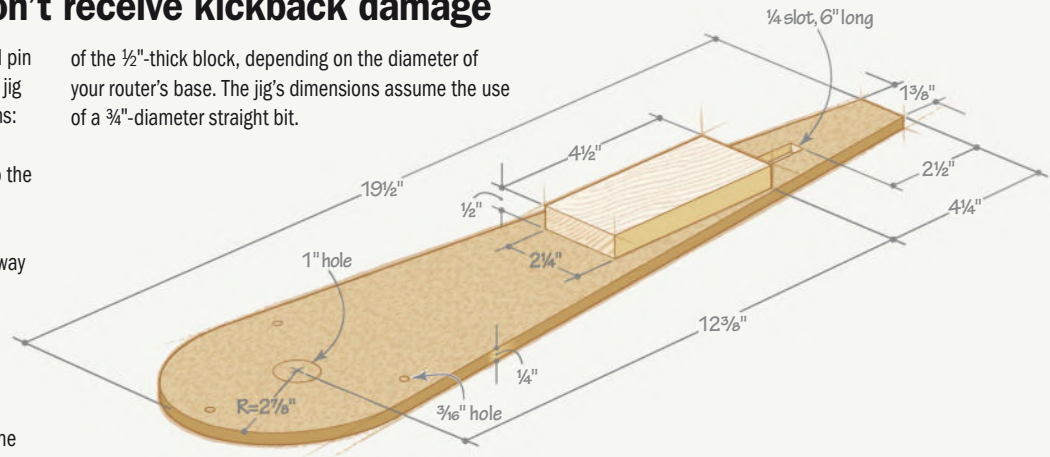
Because it slides forward in relation to the dowel pin in the center of the workpiece, this circle-cutting jig yields two key advantages over jigs with fixed pins:

1. You can slide the router well away from the workpiece edge, allowing you to ease the bit into the cut (and avoid kickback) by pushing the jig fully against the dowel.

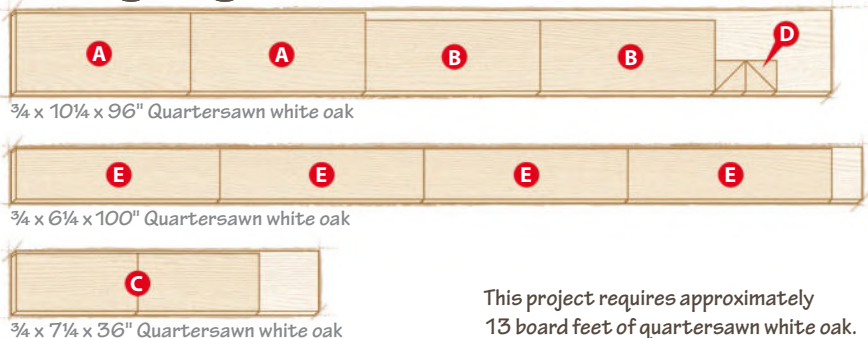
2. Should kickback occur, the router will jump away from the edge, helping to prevent damage to the workpiece.

To mount your router to the jig, remove the router's baseplate and use that as a template to mark the position of the jig's countersunk router-mounting holes. You may need to adjust the diameter of the wide end of the jig, and the position

of the ½"-thick block, depending on the diameter of your router's base. The jig's dimensions assume the use of a ¾"-diameter straight bit.



Cutting Diagram



This project requires approximately 13 board feet of quartersawn white oak.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* main legs	¾"	10"	21 ½"	QWO	2
B* side legs	¾"	9 ⅝"	21 ½"	QWO	2
C* shelf	¾"	14 ½"	14 ½"	QWO	1
D* top braces	¾"	5"	2 ½"	QWO	4
E* top	1 ½"	24" diam.		QWO	1

*Parts initially cut oversize. See the instructions.

Materials key: QWO=quartersawn white oak.

Supplies: Figure-8 tabletop fasteners (4); #8×⅝" flathead screws (8); ⅝" dowel 36" long.

Bits: Flush-trim router bit; ⅝" Forstner bit; ⅝" brad-point bit.

Mil-Spec AC-130 Gunship



Dimensions:
31" L x 42" W x 16 1/4" H
42
Inch
Wingspan
1954
First
AC-130
Flight

► During an attack run, the AC-130 performs a "pylon turn," flying in a broad circle around a target for sustained, accurate fire.

Roll Call: Bill Odom, Melbourne, Fla.

Military: Enlisted in the United States Air Force, July 1965. Three tours in Southeast Asia in support of the Vietnam War. Flew with the 16 Special Operations Squadron, SOS, on AC-130A and H model Spectre gunships as an aerial gunner in 1974 and 1975. Retired as master sergeant (E-7) in 1985.

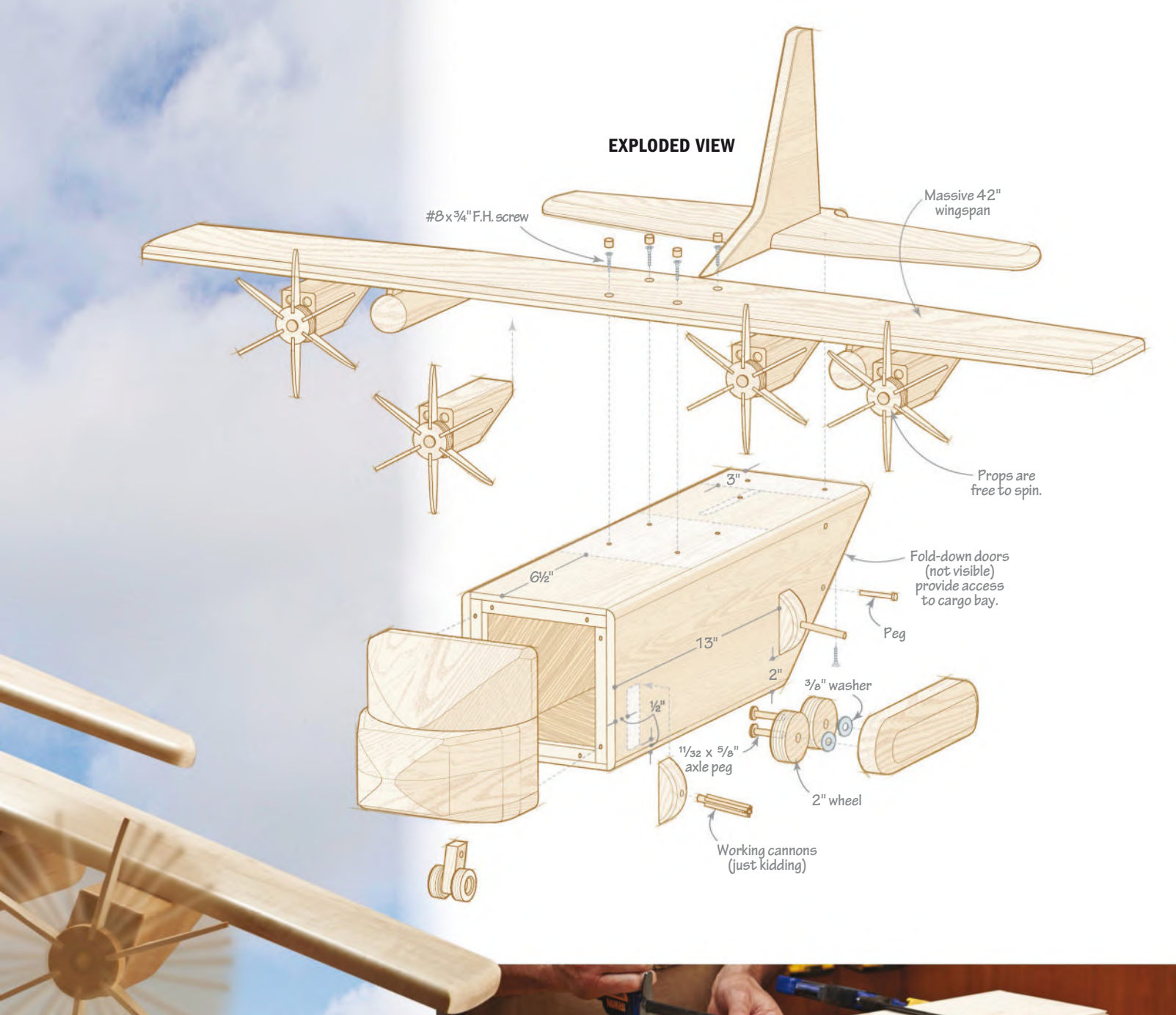
Woodworking: Started with a ShopSmith system in 1982 and gradually built his shop to include a tablesaw, mitersaw, planer, drill press, bandsaw, various routers, drills, etc. He enjoys building toys and furniture, and recently began restoring hand planes he finds at flea markets.



When your miniature plastic army men call in air support, this airborne behemoth will be on standby, ready to answer the call. With spinning propellers, armament aplenty, and a spacious cargo area, this magnum-size model stays true to the imposing nature of the original.

First, the fuselage

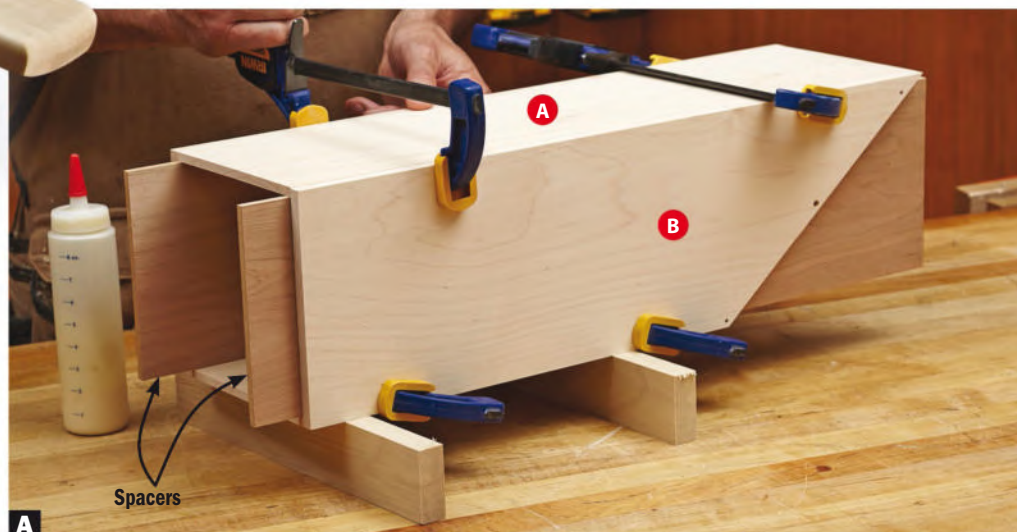
1 Cut the fuselage top and bottom (A), and sides (B) to size [Materials List, page 51]. Fasten the sides together face to face with double-faced tape before drilling the two 1/8"



holes through both pieces [Drawing 1a]. Cut diagonally to bring them to final shape. Rip a $\frac{3}{4}$ "-wide piece from each side-offcut for use as spacers, later.

2 Separate the two sides (B). Then, drill the $\frac{7}{32}$ " holes on the left side only. Cut the bottom (A) to final length (save this offcut, too), and cut a 45° bevel in the top's back edge [Drawing 1a]. (This will be sanded to match the 40° angle in the sides after the fuselage is glued up.) Glue up the fuselage [Photo A].

3 Cut the filler block (C) to size and glue it into place [Photo B, Drawing 1]. Cut the doors (D) to size, beveling one end of each



A Use spacers for support. Cut two spacers from 6"-wide scrap. Use them to keep the top and bottom (A) aligned with the sides (B), with their front ends flush, while gluing up the fuselage.

Tip! To ensure perfectly centered, vertical holes, clamp the rear doors (D) to your drill press fence when drilling the edges.

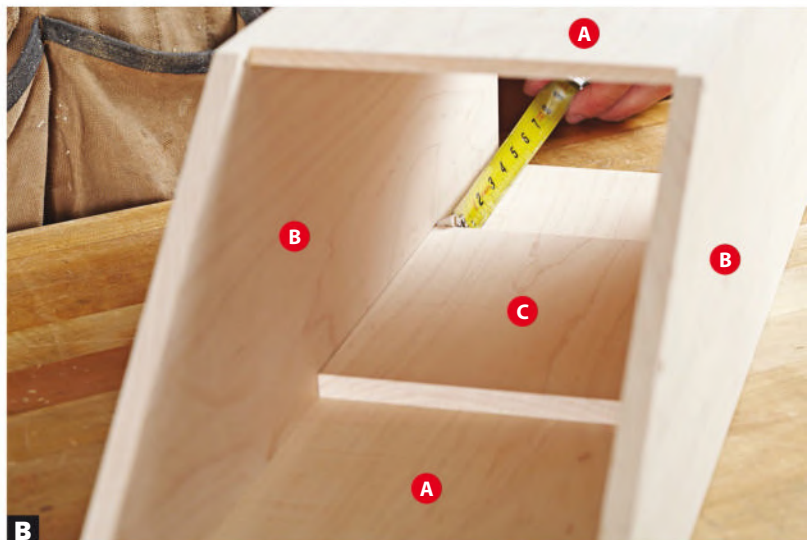
door and routing a bullnose profile on the other end [**Drawing 1b**]. Drill the holes in the door edges.

4 Temporarily mount the lower door (D) in the fuselage with short lengths of $\frac{1}{8}$ " dowel (no glue). Drill a $\frac{7}{32}$ " hole in the edge of the door [Photo C]. Finish installing the doors by putting a drop of glue in the holes in the door edges and sliding $\frac{1}{8}$ " dowels into them through the holes in the sides (B). This allows the dowels to rotate freely in the sides. Cut and sand the dowels flush with the sides. Sand the bevel in the top's (A) back edge to match the 40° angle in the sides.

Next, construct the cockpit

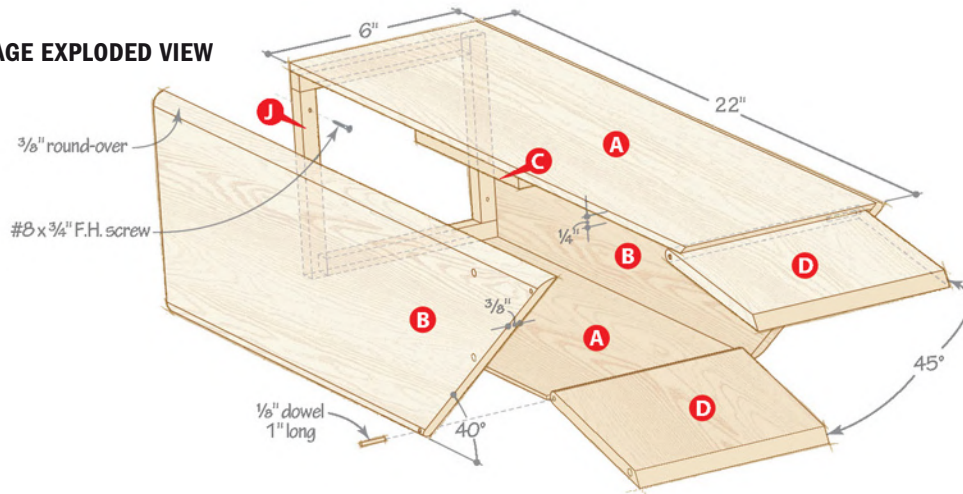
► Cut each part blank $\frac{1}{2}$ " wider and longer than the dimensions shown in the patterns.

1 Cut the lower nose (E) blanks, lower nose filler (F), and front landing gear (G) blank to size. Drill the hole in each lower nose blank [**Drawing 2**]. Then, apply the **Front Landing Gear Full-size Pattern** (page 53) to the landing gear blank, cut this piece to shape, and drill the holes.

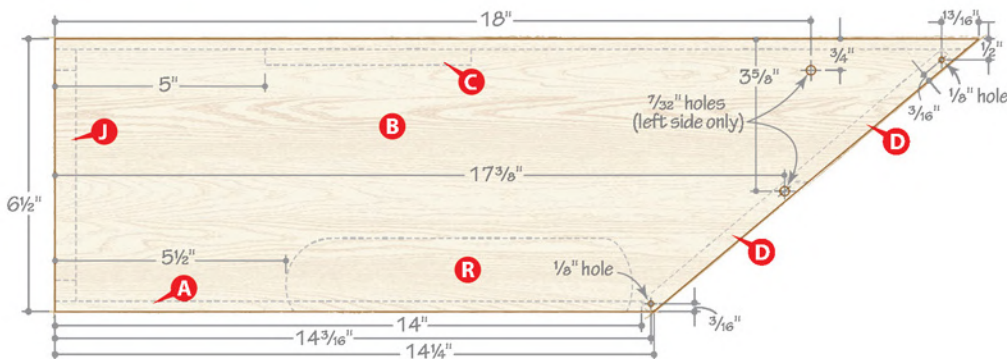


No clamps? Better give it a rub. There's no way to get a clamp on the filler block (C) when it's inside the fuselage, so apply glue to the center of the block's bottom face and rub it back and forth until the glue gets grabby. Position it 5" from the front of the fuselage and let dry.

1 FUSELAGE EXPLODED VIEW



1a FUSELAGE SIDE VIEW

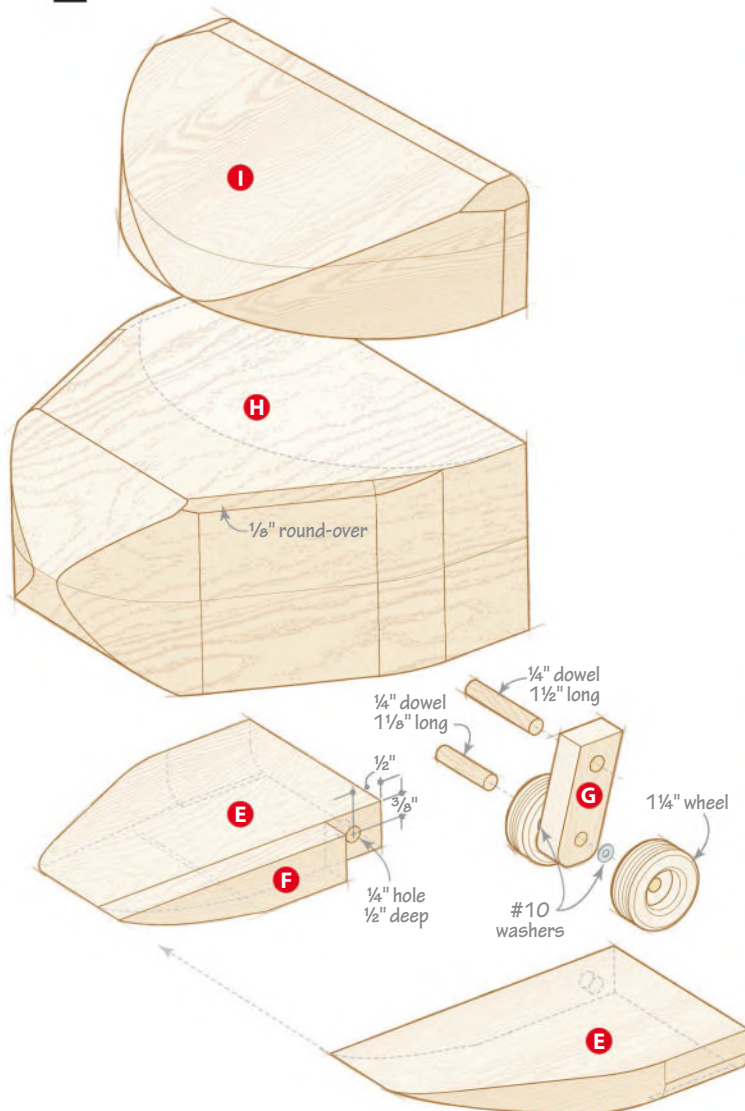
**1b DOOR EDGE VIEW**



C

A hole in one leads to a hole in the other. With the lower rear door (D) in the closed position, slide a $\frac{7}{32}$ " brad-point bit through the side's (B) middle hole and tap it against the edge of the door to mark the location of the hole.

2 NOSE EXPLODED VIEW

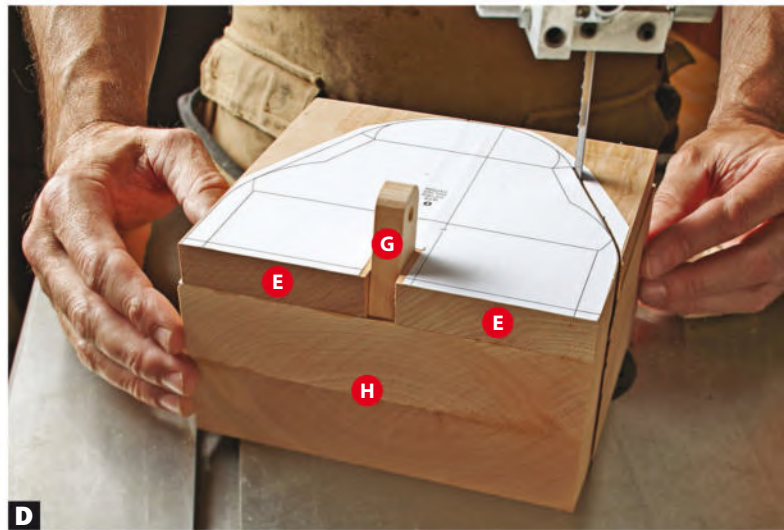


2 Glue the lower nose filler (F) and front landing gear (G) between the lower nose (E) blanks, pinning the landing gear in place with a $\frac{1}{4}$ " dowel [Drawing 2]. Now, laminate and cut the upper nose (H) blank to size and glue it to the lower nose assembly. When dry, cut the nose assembly to shape [Photos D and E] and finish-sand to 220 grit.

3 Laminate stock for the cockpit (I) and cut the blank to size. Then, using the same process as the nose assembly, enlarge and apply copies of the **Cockpit Top-view** and **Side-View Gridded Patterns** (page 52) and bandsaw the cockpit to shape. Sand the faces smooth.

4 Place the cockpit on the nose assembly and make sure they're the same width and height as the fuselage. Adjust as necessary. Mark where the round-overs terminate on the top edge of the nose assembly [Drawing 2]. Rout these round-overs and finish-sand the assembly. Glue the nose and cockpit together, keeping the edges and backs flush.

► Learn how to apply and cleanly remove patterns. woodmagazine.com/sticksolutions

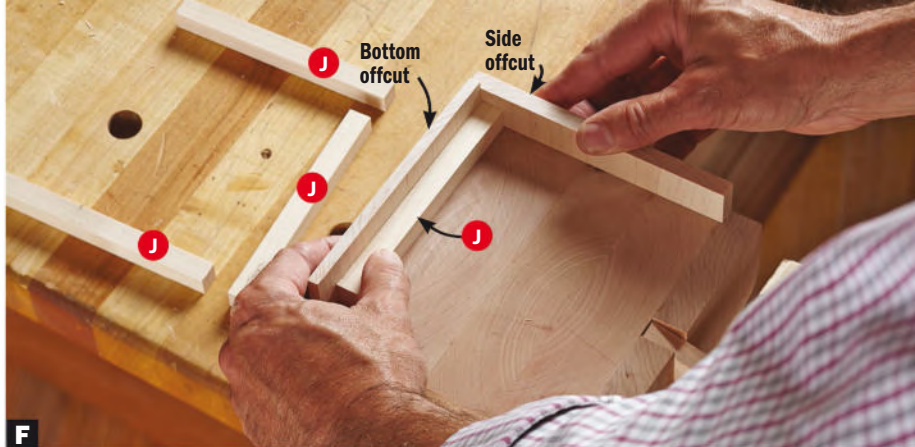


D



E

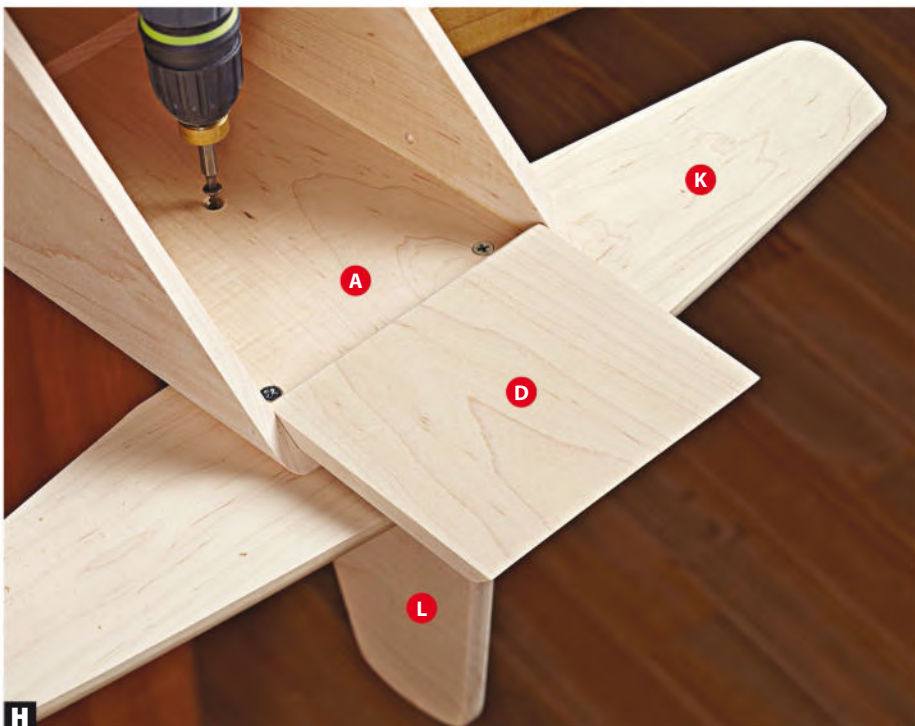
Shape up the nose. Enlarge the Nose Top-view Gridded Pattern (page 52), apply it to the assembly, and bandsaw to shape. Then, reattach the cut-offs to the assembly with tape. Apply an enlarged copy of the Nose Side-view Gridded Pattern to the assembly side and cut it to shape.



F **Scraps give you space.** Use $\frac{3}{4}$ "-wide spacers cut from the bottom (A) and side (B) offcuts to position the nose mounts (J) on the back of the nose assembly.



G **Stabilize the stabilizers.** With the vertical stabilizer (L) held in your vise, drill countersunk pilot holes through the horizontal stabilizer, careful to keep the two pieces square and perpendicular to each other.



H **Attach the tail from below.** With the fuselage upside down on your workbench and overhanging an edge, screw the tail assembly (K/L) in place from inside the plane's cargo bay.

5 Cut the nose mounts (J) to size [Drawing 1]. With the nose assembly clamped to your workbench or held in a vise, glue on the nose mounts [Photo F]. Screw the mounts in place after the glue dries.

6 Check for a snug fit of the nose assembly in the fuselage. Apply glue to the nose mounts (J) and glue the nose assembly in place. After the glue dries, sand the sides flush and rout the round-overs on the fuselage [Drawing 1].

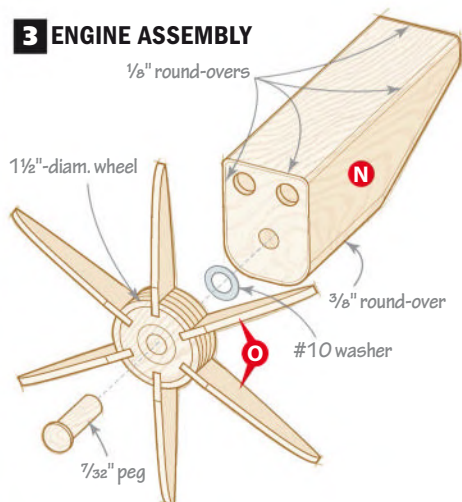
Give this bird its wings

1 Cut blanks for the stabilizers (K, L). Use the gridded patterns on the *next page* to lay out the stabilizers, then cut and sand them to final shape. Rout round-overs where shown. Finish-sand these parts and then glue and screw them together using countersunk #8 $\times\frac{3}{4}$ " flathead screws [Photo G]. Mount the tail assembly to the fuselage [Photo H].

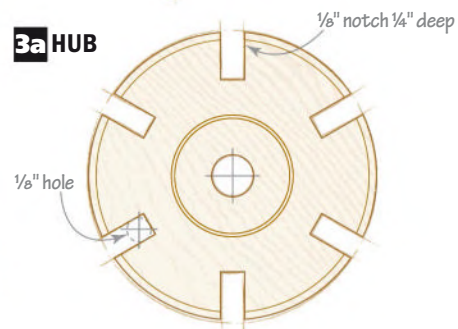
2 Cut a blank for the wing (M). Make a template for the wing using the gridded half-pattern and transfer the wing shape to the blank. Cut and sand the wing to shape, rout the round-overs, and finish-sand.

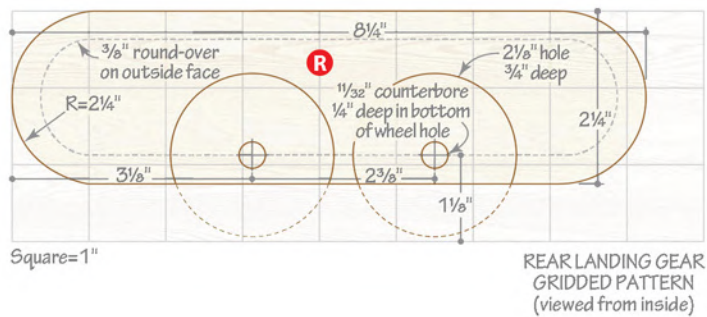
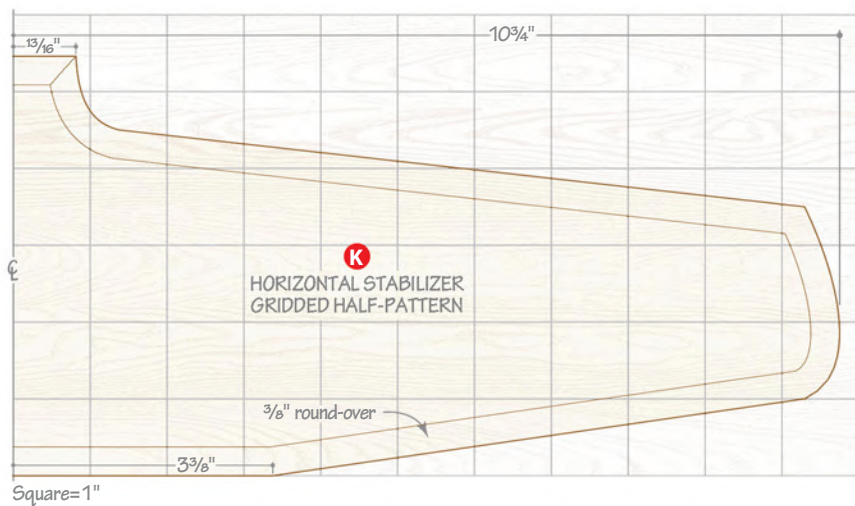
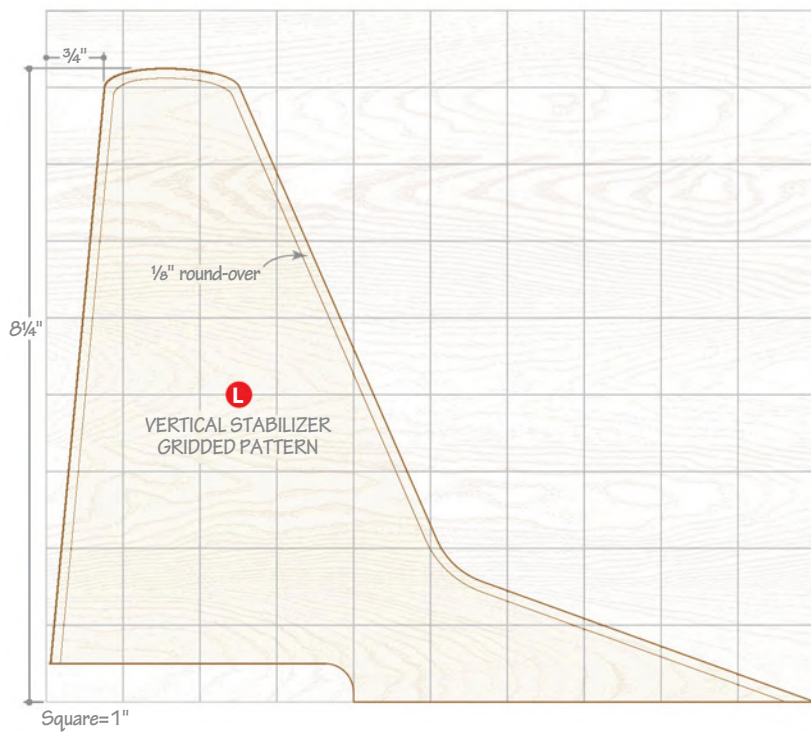
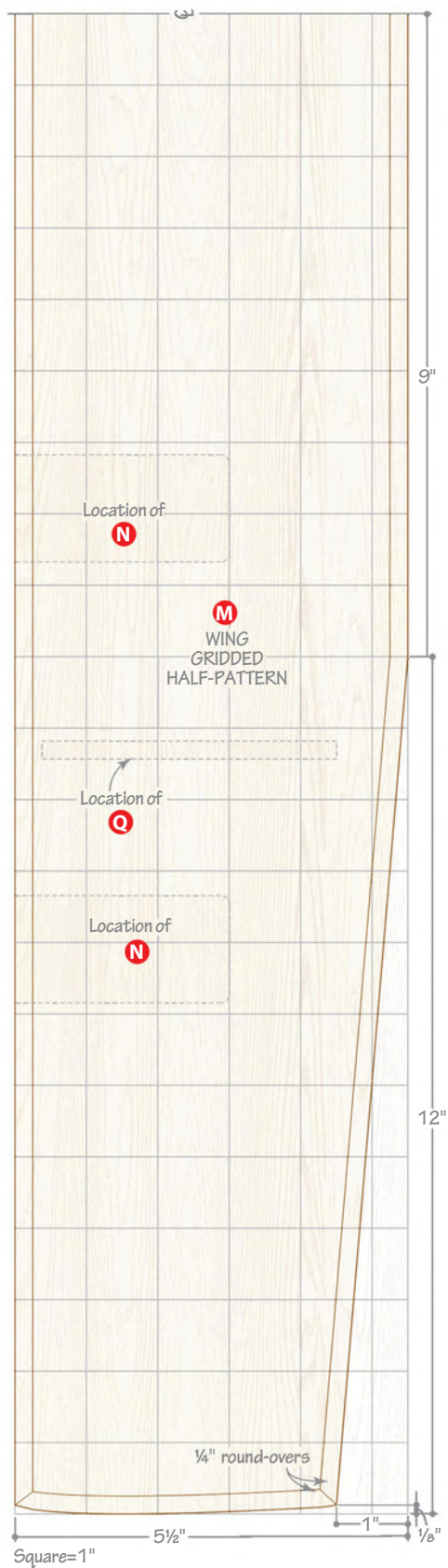
3 Next, make the engines (N) [Drawing 3]. Cut four blanks to size and make four copies of the **Engine Full-size Patterns**. Apply the side-view patterns to the blanks, then cut and sand the engines to shape. Apply the front-view patterns to locate and drill the holes. Rout round-overs where shown [Photo I].

3 ENGINE ASSEMBLY



3a HUB





SKILL BUILDER



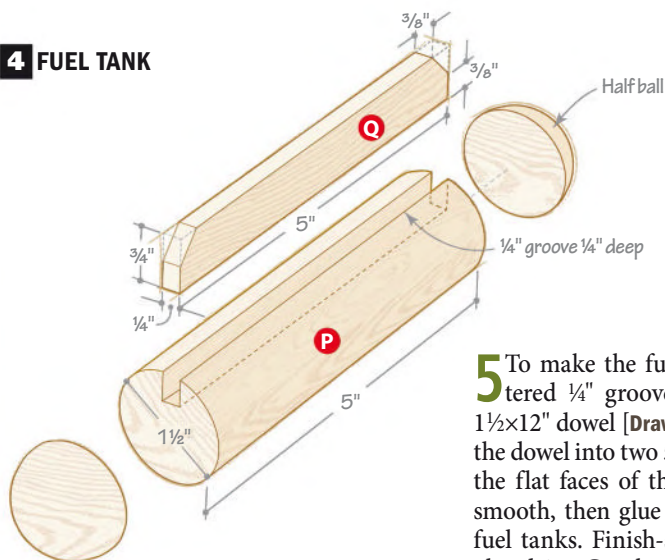
Hub-cutting pointers

To safely cut evenly spaced slots in the wheels used as hubs for the propeller blades (O), first cut a piece of $\frac{3}{4}$ " scrap to 2×12 ". About 3" from one end of the scrap, use a compass to draw a $1\frac{1}{2}$ "-diameter circle touching the scrap's bottom edge. Drill a $\frac{1}{4}$ " hole halfway through the scrap at the circle's centerpoint and glue in a 1" length of $\frac{1}{4}$ " dowel. Next, adjust the compass to $\frac{3}{8}$ " and place the compass needle at the point where the circle meets the scrap's bottom edge. Mark an intersecting line on the circle and drill a $\frac{1}{8}$ " hole halfway through the scrap at that point.

To use the jig, secure it to your tablesaw's miter gauge with double-faced tape, aligning the $\frac{1}{4}$ " dowel with the blade. Raise the blade $\frac{1}{4}$ " high, slip a wheel onto the dowel, and make the first cut. Then, turn the wheel so the kerf aligns with the $\frac{1}{8}$ " hole. Insert a 1" length of $\frac{1}{8}$ " dowel to lock the wheel in place, and make another cut. Index the wheel to the next slot before cutting again. Continue all the way around the wheel.

Tip! To get a perfectly centered groove in your fuel tanks (P), first rout a groove in $1\frac{1}{2}$ "-wide scrap stock, flip the scrap around and run it through again. If the bit wasn't perfectly centered, you'll feel and hear the bit taking off material on the second run. Fine-tune the router-table fence and repeat until the second pass removes no material.

4 FUEL TANK



4 Cut notches in the prop wheels [Source] using the jig shown in the Skill Builder, left [Drawing 3a]. To make the propeller blades (O), first make a template using the Propeller Blade Full-size Pattern. Cut four $\frac{1}{8} \times \frac{1}{2} \times 18$ "

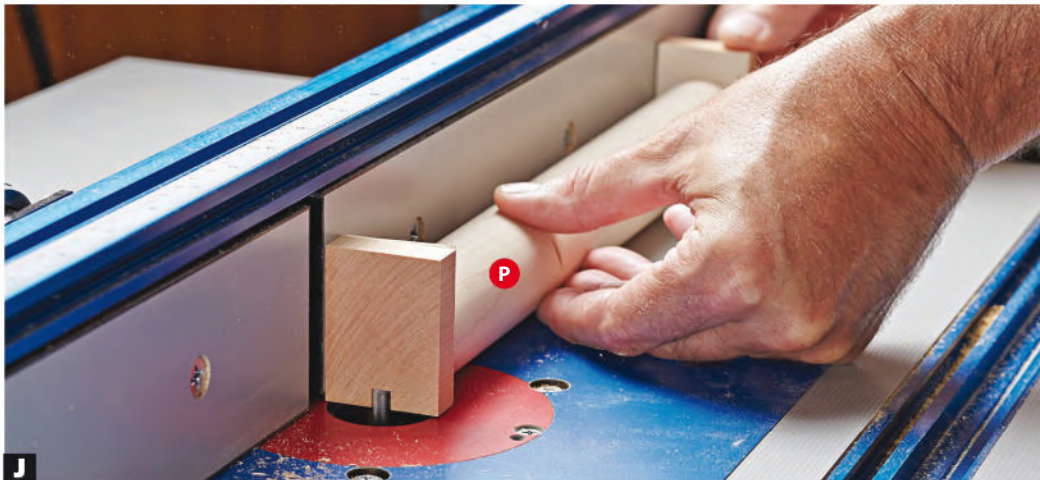
strips and transfer the shape of the template to these strips—six prop blades each. Band-saw and sand the blades to shape. Then, glue them into the kerf-cut wheels.

5 To make the fuel tanks (P), rout a centered $\frac{1}{4}$ " groove along the length of a $1\frac{1}{2} \times 12$ " dowel [Drawing 4, Photo J]. Then, cut the dowel into two 5"-long pieces. Make sure the flat faces of the half balls [Source] are smooth, then glue them to the ends of the fuel tanks. Finish-sand the tanks after the glue dries. Cut the fuel-tank brackets (Q) to size and shape, then glue one into each groove.

6 Glue the engines (N) and fuel tanks (P/Q) to the underside of the wing (M) where shown on the Wing Gridded Half-Pattern. Mount the wing to the fuselage [Photo K].



I A handscrew protects fingers. When routing the round-overs on the engines (N), hold the parts with a handscrew.



J Block the ends. Using double-faced tape, fasten $1\frac{1}{2}$ "-wide scrap blocks to each end of the fuel tanks (P) dowel blank in order to safely rout a groove along its length.

Time for the gear and guns

1 Cut the blanks for the rear landing gears (R). Enlarge two copies of the **Rear Landing Gear Gridded Pattern** (page 49) and apply them to the blanks. Using a Forstner bit, drill the holes for the wheels, followed by the axle holes. Bandsaw the landing gears to shape, rout the round-overs, and finish-sand. Then, insert the axle pegs [Source] through wheels and washers, and glue the pegs in place [Exploded View]. Install the rear landing gears [Photo L]. Install the front wheels [Drawing 2].

2 Make two blanks for the gun turrets (S). Following the **Gun Turret Full-size Patterns**, cut and sand the turrets to shape. Drill the holes for the cannons and glue $\frac{1}{4}$ " dowels into the holes [Drawing 5]. To make the front cannon look like a rotary cannon, glue $1\frac{1}{8}$ " lengths of $\frac{1}{8}$ " dowels around the outside of the $\frac{1}{4}$ " dowel. Glue the turrets to the left side of the fuselage [Exploded View].

3 Glue on the propellers (O) using the axle pegs and secure the rear cargo bay doors with an unglued axle peg. Finish-sand any unsanded parts on the plane and apply several coats of spray lacquer. When dry, this gunship is ready to leave the hangar! 🌳

Tip! To angle the cannon on the turret, make a 7° wedge and fasten it to the bottom face of the turret with double-faced tape before drilling.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
Fuselage					
A* top and bottom	¼"	6"	22"	M	2
B sides	⅜"	6½"	22"	M	2
C filler block	⅜"	6"	6"	M	1
D doors	⅜"	6"	42⅝"	M	2
Cabin					
E lower nose	¾"	3⅜"	6"	C	2
F* lower nose filler	¾"	½"	6"	C	1
G front landing gear	½"	1⅝"	1⅞"	C	1
H upper nose	3"	6¾"	6"	LC	1
I cockpit	2¾"	6¾"	3⅞"	LC	1
J nose mounts	½"	½"	5½"	M	4
Wings and things					
K horizontal stabilizer	½"	5¾"	21½"	M	1
L vertical stabilizer	½"	8¾"	10"	M	1
M wing	½"	5½"	42"	M	1
N engines	1½"	2"	5"	C	4
O propeller blades	⅞"	½"	2½"	M	24
P fuel tanks	1½" diam.	5"		C	2
Q fuel tank brackets	¼"	¾"	5"	M	2
R rear landing gears	1¼"	2¼"	8¾"	C	2
S gun turrets	1"	¾"	2½"	C	2

*Parts initially cut oversize. See the instructions.

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

Materials key: M-maple, C-cherry, LC-laminated cherry.

Supplies: $\frac{1}{8}$ ", $\frac{1}{4}$ ", and $1\frac{1}{2}$ " dowels, #8 $\times\frac{3}{4}$ " flathead screws.

Blade and bits: $\frac{1}{8}$ ", $\frac{3}{8}$ " round-over bits, $\frac{1}{4}$ " spiral upcut bit; $2\frac{1}{8}$ " Forstner, $1\frac{1}{32}$ " brad-point drill bits.

Source: The kit includes the following specialty parts and hardware to construct one aircraft. You provide the wood. 2" wheels (4), $1\frac{1}{2}$ " wheels (4), $1\frac{1}{4}$ " wheels (2), $\frac{3}{8}$ " washers (4), #10 washers (6), $1\frac{1}{32}$ " axle pegs (4), $\frac{7}{32}$ " axle pegs (5), $1\frac{1}{2}$ "-diam. half balls (4), $1\frac{1}{2}\times 5$ " dowels (2), $\frac{1}{4}\times 2\frac{1}{4}$ " dowels (2), $\frac{1}{4}\times 1\frac{1}{2}$ " dowel (1), $\frac{1}{4}\times 1\frac{1}{8}$ " dowel (1), $\frac{1}{8}\times 1\frac{1}{8}$ " dowels (9), $\frac{1}{8}\times 1$ " dowels (4), $\frac{3}{8}$ " maple plugs (4), kit no. RS-01094, \$19.95, woodmagazine.com/AC130kit.



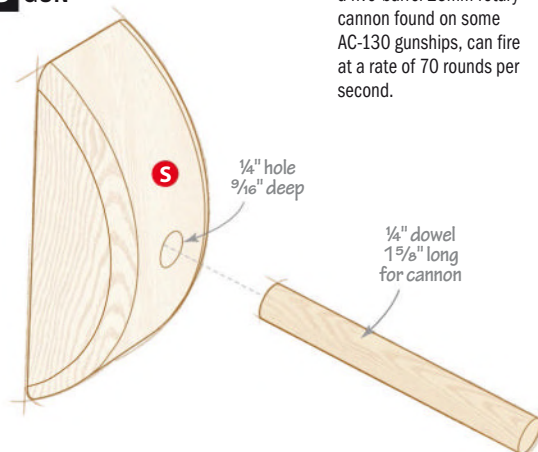
K **Take this wing and fly away.** Set the wing (M) 6 $\frac{1}{2}$ " behind the nose assembly and center its length on the fuselage. Counterbore for screws, then glue and screw the wing in place. Plug the counterbores.



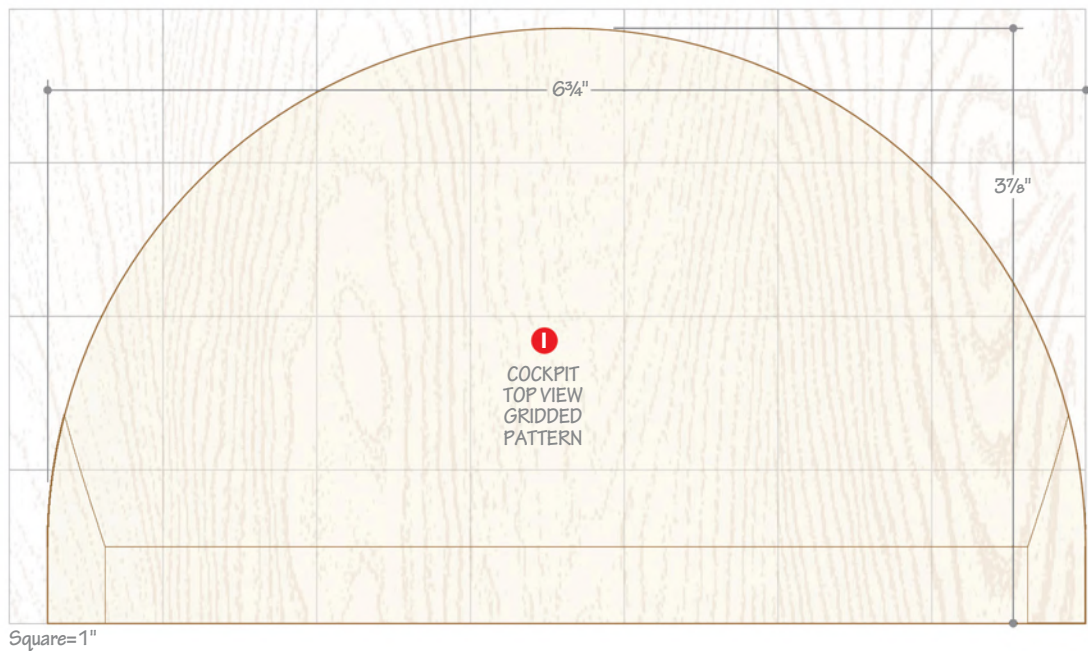
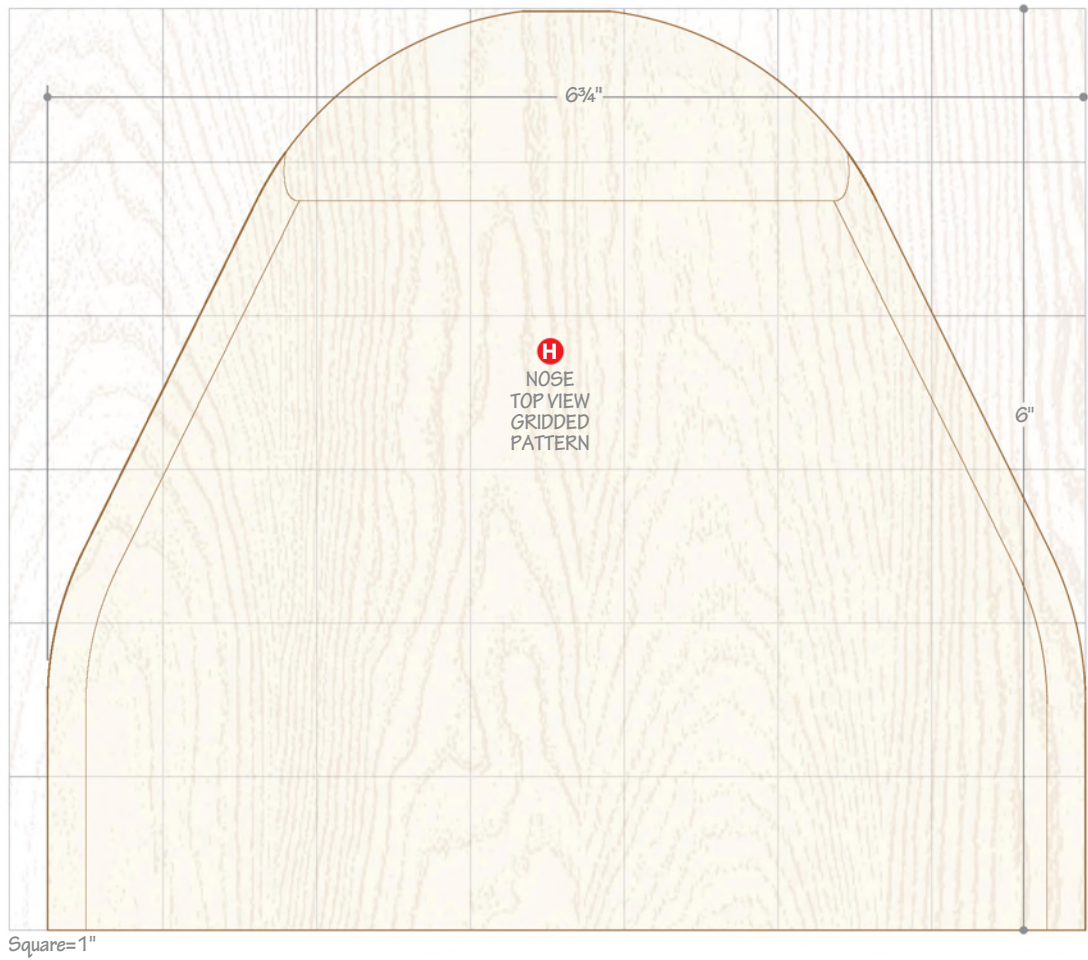
L **Tack on a set of wheels.** Place the plane on a $1\frac{1}{4}$ "-thick spacer to ensure the correct placement of the rear landing gears (R). Glue them in place 5 $\frac{1}{2}$ " from the front of the fuselage [Drawing 1a].

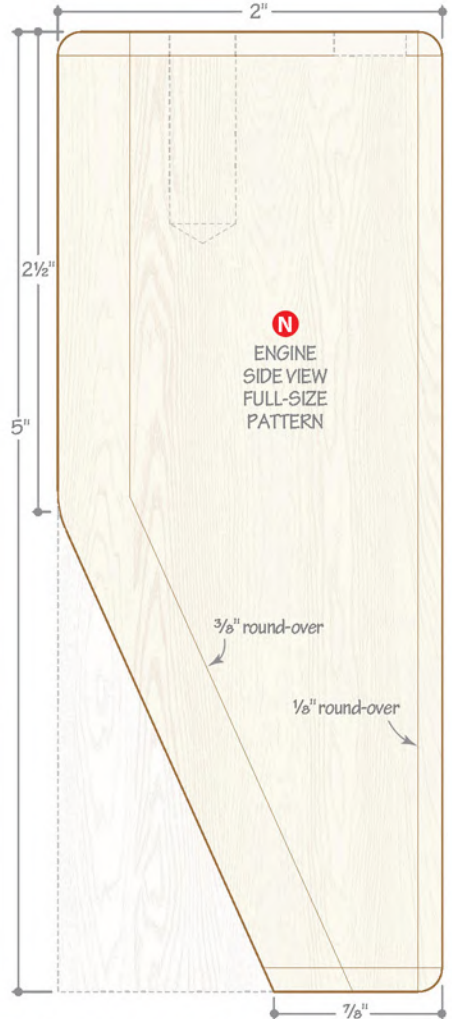
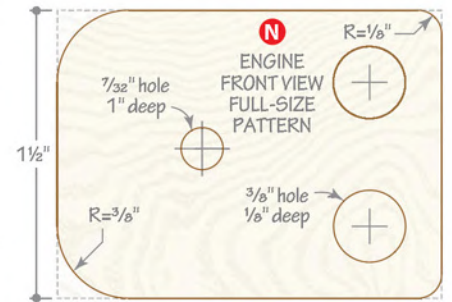
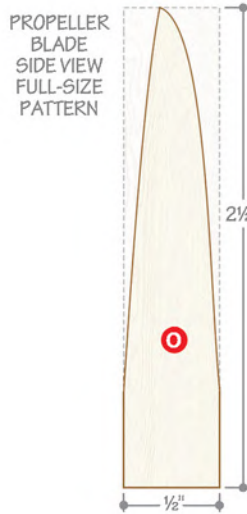
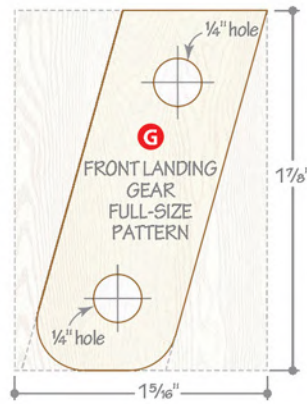
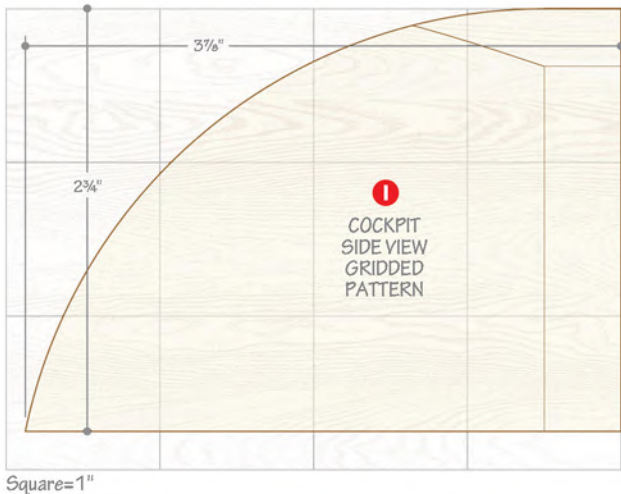
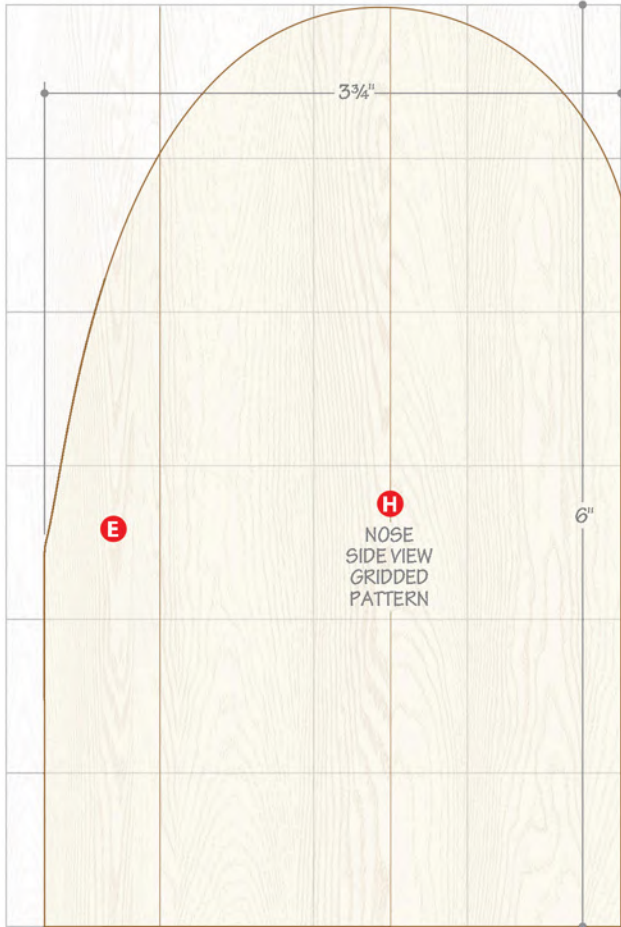
5 GUN

► The GAU-12 Equalizer, a five-barrel 25mm rotary cannon found on some AC-130 gunships, can fire at a rate of 70 rounds per second.

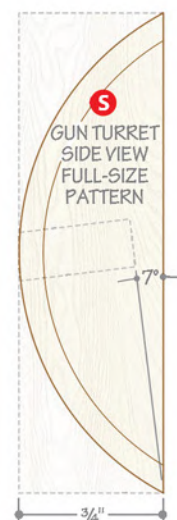
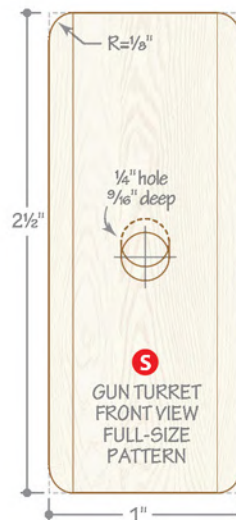


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FULL-SIZE PATTERNS





Clamping With Wedges

Short on clamps? Use custom-made wedges to draw together glue joints.

Make doors and frames

If you're making multiples of the same project, such as frame-and-panel doors or picture frames, it makes sense to build a jig, such as the one shown *above*. This simple jig uses opposing wedges to push together the joints while keeping the assembly square and flat.

To build a jig like this, glue and screw two cleats to the plywood base at a right angle. Coat the plywood and cleats with polyurethane or any finish that will seal the wood and prevent accidental glue adhesion.

Bandsaw eight wedges, each with about a

5° angle. Coat the smooth side of four wedges with polyurethane, and add self-adhesive sandpaper (180 or 220 grit should do) to the smooth face of the other four wedges. Dry-fit your project against the fixed cleats. Screw the remaining cleats to the plywood—no glue—about ½" from the project edges. Insert the sandpaper-backed wedges against the cleats at the joint lines, then insert the remaining wedges against their partners (coated side against the project), and tap them to close the joints. After doing a dry run, disassemble, add glue to the joints, and repeat the clamping procedure.

► Read reviews of traditional clamps.
reviewatool.com/clamps



Edge-wedge against a clamp

Simplify clamping solid-wood edging onto plywood with a few one-hand bar clamps and wedges. After gluing on the edging, secure a clamp to the plywood, leaving about a $\frac{1}{4}$ " gap between the edging and bar, as shown *left*. Tap a wedge into that gap to press the edging tight to the plywood. Repeat as needed along the workpiece edge.



Integrate wedges as "clamps"

You can design some projects with wedges that serve both functional and decorative purposes. As shown on the bench at *left*, wedges driven into mortises in the stretchers—with or without glue—draw the legs and stretchers tightly together. And in the *bottom* photo, a slot cut into the wide tenon on the leg accepts a slightly tapered wedge that spreads the tenon against the glued mortise walls in the seat. Drive it snug, let the glue dry, then trim the wedge flush for a nice, contrasting look. 🌲



► Buy plans for this wedge-tenon bench.
woodmagazine.com/wedgebench

Produced by **Bob Hunter**

Circular Saws

We tested 10 electric 7¼" sidewinder-style models priced \$90–\$160 in search of the ideal saw for your shop.





Track the line. Cutline indicators on the front and inside edges of DeWalt's footplate help you start a cut and then keep the blade cutting along a straight line.



Back-door help. The SkilSaw Sidewinder also has cutline indicators at the rear edge of the footplate to help you stay on course as you complete a cut.

Every workshop needs a circular saw for cutting up lumber and sheet goods. But, because you won't use one every day, you might be tempted to buy a low-dough model. Don't. The saws we tested cost a few bucks more, but reward you with

robust 15-amp motors, heavy-duty footplates, and other features that help them significantly outperform their lesser siblings. And because they're built to withstand job-site use, any of these should last a decade or longer in your shop.

Power and accuracy abound

To test the saws for power, we outfitted each with a new Freud Diablo 24-tooth blade and ran them through a series of demanding cuts, ripping 1½"-thick red oak and treated pine, and making full-depth rip cuts—all have the capacity to cut at least 2½" deep at 90°—in 4×4 treated pine. Each saw powered through all cuts with ease. So power won't be a concern with any of them.

Next, we tested the reliability of each saw's cutline indicators (one for 90° cuts and the other for 45° bevels (photos above). We found all of the indicators spot-on for aligning the blade to a cutline when free-handing a cut. But visibility may become an issue, depending on how you use the saw.

The Craftsman 27311, Makita 5007MGA, DeWalt DWE575SB, and Milwaukee 6394-21 saws provide the clearest sight lines to the cutline indicators, whether you're operating the saw from the right or left side, using one hand or two. (See the chart on page 60 for cutline-visibility ratings on each saw.)

Because circular saws cut on the upstroke, sawdust inevitably spews onto the cutline, often obscuring it. All the saws but the Kobalt K15CS-06AB, Milwaukee, and Ridgid R3205 have a built-in blower or direct the airstream coming off the blade to clear the cutline. And LED lights on the Craftsman, Makita, and Kobalt saws help illuminate the cutline. We did not, however, find the Craftsman's laser reliable or useful, and simply turned it off.

On solid footing

Low-priced, entry-level circ saws typically have small, thin stamped-steel footplates that can bend easily if dropped, and often have rolled-up edges that can ride up over a straightedge guide. The saws we tested have larger, thicker footplates made of lightweight aluminum or magnesium, and crisp 90° edges that butt nicely against a straight-edge guide for greater accuracy. The Hitachi C7BMR's footplate, though, had sharp edges as well as a rough bottom that created drag

► Skil created the first portable circular saw in 1924, and although the term "Skilsaw" has become synonymous with this type of tool, it's a trademarked name for that brand.



Quick lift. Setting the cutting depth on the Bosch saw is easy because the lever is easily accessible and the scale marked in common board thicknesses.



Easy tilting. Makita's footplate tilts to 56°, and has stops for the more commonly used 22½° and 45° cuts.

on workpieces. We resolved this by smoothing the footplate with 220-grit sandpaper.

Changing the depth of cut on these saws requires loosening a lever lock at the rear of the saw and adjusting the footplate to the

desired level. All the locks held solidly, but we prefer those mounted on the left side of the handle assembly (*top left*) because they provide better access than those pinched between the handle and blade shroud (DeWalt, Hitachi, Skil Sidewinder [shown *previous page*]). All but the Hitachi have cut-depth scales on the blade cover, either in inches or nominal board thicknesses (2x, ¾, etc.). We found the scales on the Bosch, Makita, and Skilsaw easiest to read.

Each saw's footplate also tilts to at least 55° for bevel-cutting. All use a lever to secure this setting except the Craftsman, which has a fussier wing nut. Each lock held without issues. All models have a 45° stop, except Kobalt and Milwaukee, which have no stops other than 0° and 56°. See the chart on *page 60* for a complete list of tilt angles and stops.



Bosch CS10, \$130
877-267-2499, boschtools.com



Craftsman 27311, \$125
800-349-4358, craftsman.com



DeWalt DWE575SB, \$140
800-433-9258, dewalt.com



Hitachi C7BMR, \$130
800-829-4752, hitachipowertools.com



Kobalt K15CS-06AB, \$90
877-465-6937, lowes.com



Find your comfort level. The Milwaukee's handle adjusts to any of eight positions. You might like the back position (left) for crosscutting lumber, but prefer the front position (right) for ripping sheet goods that requires a long arm reach.

Get a grip

Each saw's handle has some rubber over-mold for better grip; DeWalt, Hitachi, and Makita are our favorites. All have a single trigger—no safety release, a feature more common to DIY-level models—to power the saw. All the handle/trigger assemblies work well, but the small Ridgid handle opening could be awkward for large hands. Milwaukee's multiposition handle (shown *above*) is nice, and its front bale sits on the tilting mechanism rather than the saw body, keeping open sightlines to the cutline indicators.

More saw-buying factors

► **Blades.** All the saws come with a blade best suited for ripping lumber (16–24 teeth). Of these, the Makita and Skilsaw blades cut with the least amount of tear-out.

To change blades, you depress an arbor lock and loosen the bolt with a wrench. This wrench comes with each saw, but the Bosch CS10, Craftsman, Hitachi, and Porter-Cable PC15TCSM do not have on-board storage for the wrench.

► Get the most from your circular saw by applying our favorite tips.

woodmagazine.com/circsawtips



Milwaukee 6394-21, \$160

800-729-3878, milwaukeetool.com



Ridgid R3205, \$100

866-539-1710, ridgid.com



Makita 5007MGA, \$160

800-462-5482, makitatools.com



Porter-Cable PC15TCSM, \$100

800-544-6986, portercable.com



Skilsaw Sidewinder SPT 67 WM-22, \$130

877-754-5999, skilsaw.com

Circular saws over \$90: Powerful, rugged, precise

MODEL	PERFORMANCE RATINGS (1)									MAX. CUTTING DEPTH, INCHES		FOOTPLATE		AUTOMATIC BLADE BRAKE? (YES/NO)	NOISE LEVEL (NO LOAD), DECIBELS	WEIGHT, LBS-OZ	CORD LENGTH	WARRANTY, YEARS (2)	COUNTRY OF ASSEMBLY (3)	SELLING PRICE (4)
	PRIMARY			SECONDARY																
	POWER	CUTLINE VISIBILITY		EASE OF ADJUSTING BLADE DEPTH	EASE OF TILTING FOOTPLATE	HANDLE AND TRIGGER COMFORT	TOOL BALANCE	EFFECTIVENESS OF BLADE GUARD	EASE OF CHANGING BLADES											
		FROM LEFT OF SAW	FROM RIGHT OF SAW																	
BOSCH CS10	A-	A-	A	A	A	A-	A-	A	B	2 7/16	1 7/8	0–56	22 1/2, 45	N	93	11-8	10'	1	C	\$120
CRAFTSMAN 27311	A-	A	A	A	B	A	A-	A	B-	2 3/8	1 3/4	0–56	45	N	98	9-14	6'4"	1	C	\$125
DEWALT DWE575SB	A	A	A	B	A-	A	A	A	A	2 9/16	1 15/16	0–57	22 1/2, 45	Y	95	10-6	9'	3	C	\$140
HITACHI C7BMR	A-	C	C	B-	A-	A-	A	A	B	2 3/8	1 3/4	0–55	45	Y	96	11-15	8'	2	C	\$130
KOBALT K15CS-06AB	A	B-	C+	A	B	A	B	B	B	2 3/8	1 3/4	0–56	none	Y	97	10-12	12'	5	C	\$90
MAKITA 5007MGA	A	A	A	A	A	A	A	A	A	2 1/2	1 3/4	0–56	22 1/2, 45	Y	93	11-8	8'3"	1	C	\$160
MILWAUKEE 6394-21	A	A	A	A	C	A	A	A	A	2 15/32	1 7/8	0–56	none	Y	94	12	9'10"	5	C	\$160
PORTER-CABLE PC15TCSM	A-	A-	B	A-	B	A-	A	A	B-	2 5/16	1 3/4	0–55	22 1/2, 45	N	95	10-3	8'6"	3	C	\$100
RIDGID R3205	A-	A-	B	A-	A-	B-	B	A	A	2 3/8	1 11/16	0–56	15, 22 1/2, 30, 45	N	98	11-13	10'	3*	C	\$100
SKILSAW SIDEWINDER SPT 67 WM-22	A	A	A-	B	A	A-	A-	A-	A	2 7/16	1 13/16	0–56	45	N	103	10-10	9'4"	1	C	\$130

1. **A** Excellent
B Good
C Fair
2. (*) Lifetime service agreement upon registration
3. (C) China
4. Prices current at time of article production and do not include shipping, where applicable.

► **Blade guards.** Kobalt's blade guard hangs up slightly at the start of a full-depth cut, but works acceptably otherwise. The guards on the other saws worked well without issue.

► **Electric cords.** All saws but the Craftsman have supple rubber power cords that measure 8' or longer. That length proves especially helpful when ripping full sheets of plywood. Milwaukee's cord detaches for easy storage in its plastic case, or replacement should it get damaged.

► **Blade brakes.** DeWalt, Hitachi, Kobalt, Makita, and Milwaukee equip their saws with automatic brakes that stop the blade in about two seconds or less after you release the trigger. The others coast to a stop, taking nearly eight seconds for some.

► **Noise levels.** These saws are all so loud (at least 93 decibels under no load) that you need to wear hearing protection when using any of them. The Skilsaw measured loudest at an ear-piercing 103 dB.

Let's cut to the chase

Although you'd likely be happy with any of these saws, the Makita 5007MGA outshines the field and ranks as our Top Tool. This saw cuts fastest among this group with great sightlines, its footplate adjusts easily, it handles well, and comes with a plastic case.

The Ridgid R3205, selling for \$60 less, cuts well, adjusts easily, and comes with a 3-year warranty as well as Ridgid's opt-in Lifetime Service Agreement. These attributes earn it our Top Value award. 🌳

Produced by **Bob Hunter** with **Bob Baker**

► Read reviews of other circular saws from *WOOD* editors as well as other woodworkers. reviewatool.com/circsaw

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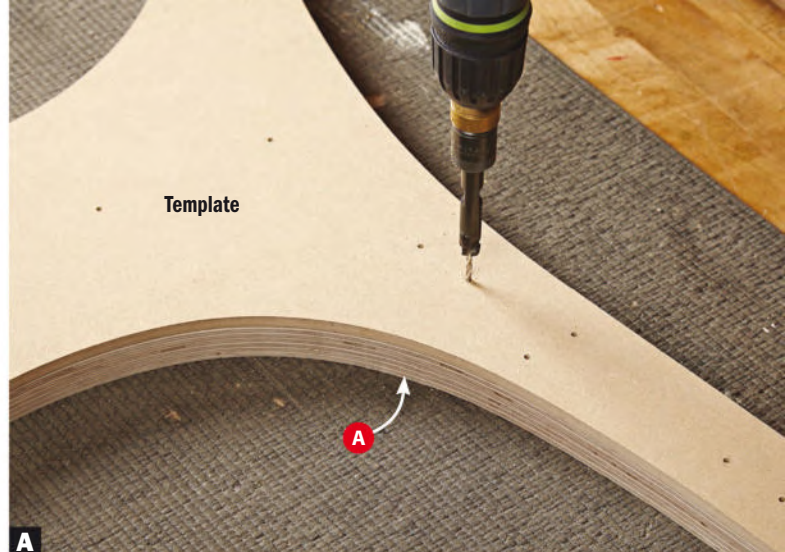
► Learn to template
rout with a
flush-trim bit.
[woodmagazine.com/
templaterrout](http://woodmagazine.com/templaterrout)

Tip! After making each
part, sand it to 150 grit.
Sanding goes easier
when you do it prior to
assembly.

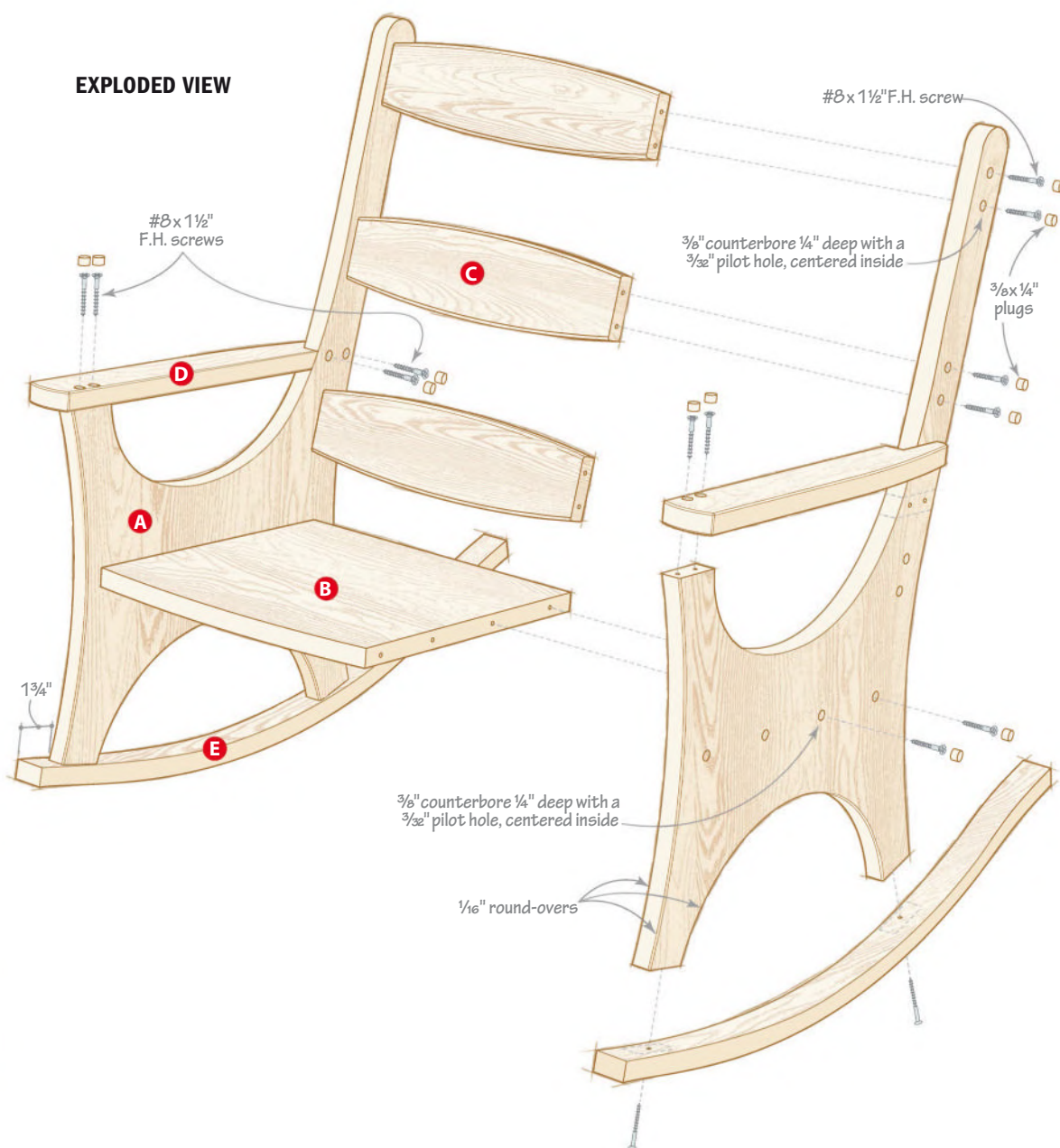
Start with a template

1 On a sheet of $\frac{1}{4}$ " hardboard or MDF, lay out a template using the **Side Gridded Pattern** on *page 65*. Cut and sand the template to shape, then drill the pilot holes in the template.

2 Cut two 19×28" plywood blanks for the sides (A) and trace the template onto one of the blanks. Jigsaw the side to rough shape, secure the template to it with double-faced tape, and clean up the edges of the blank using a router and flush-trim bit. Drill pilot holes into the blank as shown in **Photo A**. Repeat these steps for the other side (A). With the template removed, counterbore the pilot holes [Exploded View]. Remember, the sides must mirror each other. Round over the edges.



A Use the template to transfer pilot holes. To ensure all the screw holes in the sides (A) match perfectly, use the hardboard template as a guide for drilling the $\frac{3}{32}$ " pilot holes.





Hit the center of the seat. Mark down $\frac{3}{8}$ " from the center of the seat's pilot holes. With the bottom face of the seat (B) aligned with these marks and centered front to back, clamp the seat in place and drive screws to secure the seat. Repeat for the other side.

Next: Back and butt support

1 Lay out and cut the seat (B) to shape [Drawing 1]. Then, mark the location of the seat on the inside face of each side (A) [Photo B] and attach the seat [Photo C].

Tip! When notching the arms (D) to fit against the sides (A), make the long-grain cut on your bandsaw, but the angled cross-cut using a hand saw. It's more controllable and leaves less tear-out than a jigsaw.

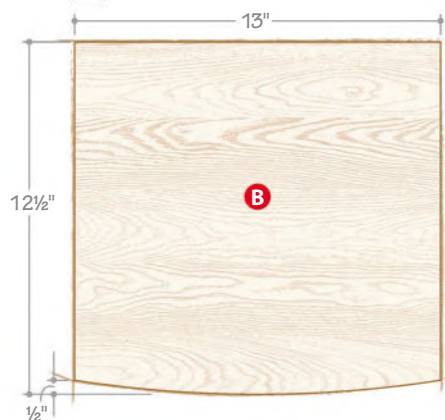
2 Next, cut the back slats (C) to shape and round over their edges [Drawing 2]. Clamp two $\frac{1}{4} \times \frac{3}{4} \times 18$ " spacers to the inside face of each side (A) and attach the back slats [Photo D].

3 Cut and shape the arms (D) [Drawing 3], and round-over the edges. Again, remember that you need two mirrored arms. Drill the counterbored pilot holes where shown, and screw the arms in place.

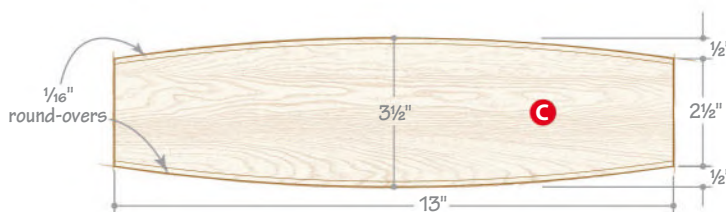


Let the scrap be your guide. Clamp the two scrap pieces $\frac{3}{8}$ " from the pilot holes for the chair's back slats (C). Butt the slats against the scrap to center the screws on the slats' thickness.

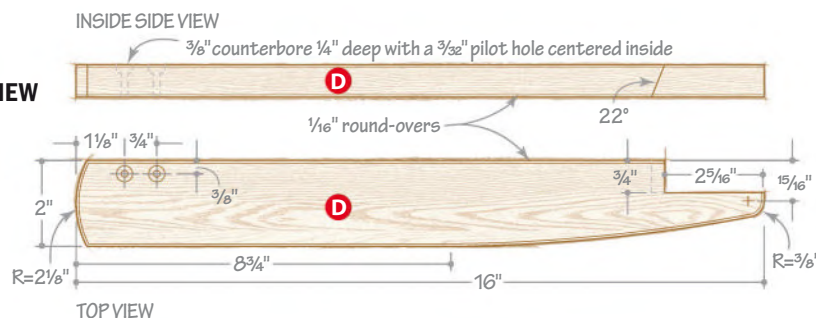
1 SEAT PART VIEW



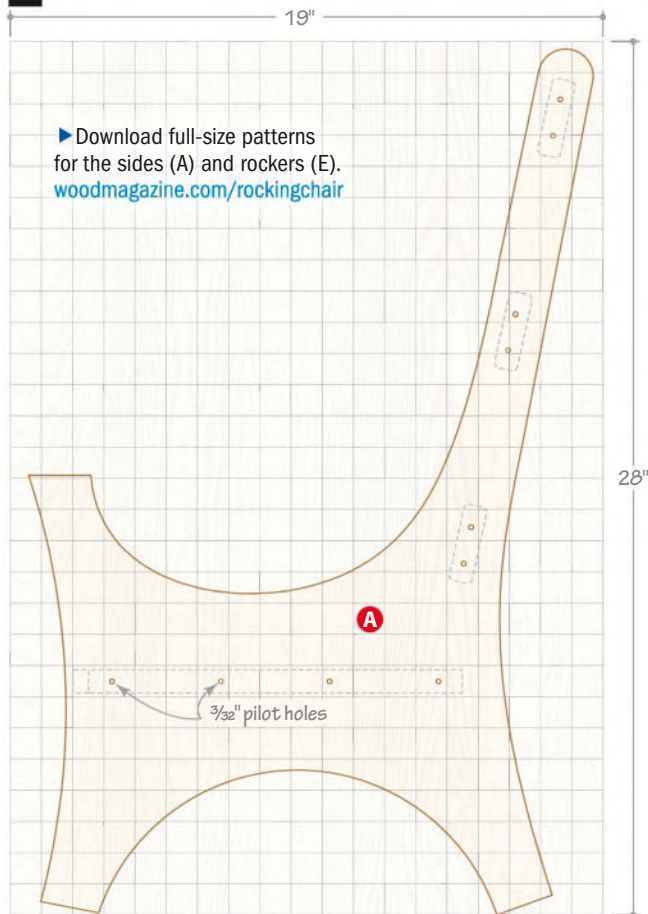
2 BACK SLAT PART VIEW



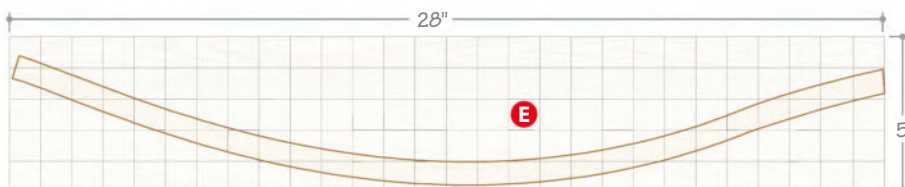
3 ARM PART VIEW



4 GRIDDED PATTERNS



One square = 1"



One square = 1"

Rock-ers on!

1 Make a rocker (E) template from $\frac{1}{4}$ " hard-board using the **Rocker Gridded Pattern** above. Prepare two blanks for the rockers, trace the template onto them, and cut and sand them to shape.

2 With the chair upside down on your benchtop, check the fit of the rockers (E). Fine-tune the bottom edges of the sides, if necessary, for a tight fit. Then, screw the rockers in place [**Exploded View, Photo E**].

3 Glue walnut plugs into all the counterbores, trim flush, and then finish-sand. Spray three coats of polyurethane onto the entire chair. When dry, hand the rocker off to the kiddos and enjoy the show. 🌲

Tip! For plugs that perfectly match the grain of the walnut parts, cut them from the scrap pieces left over after cutting the parts.

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



$\frac{3}{4}$ x $7\frac{1}{4}$ x 48" Walnut



$1\frac{1}{2}$ x $5\frac{1}{2}$ x 60" Walnut



Mount the rockers. After ensuring the rockers (E) fit tight against the bottom edge of the sides (A), drill pilot holes and counterbores.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* sides	$\frac{3}{4}$ "	19"	28"	BP	2
B seat	$\frac{3}{4}$ "	13"	$12\frac{1}{2}$ "	BP	1
C back slats	$\frac{3}{4}$ "	$3\frac{1}{2}$ "	13"	W	3
D arms	$\frac{3}{4}$ "	2"	16"	W	2
E* rockers	$1\frac{1}{4}$ "	5"	28"	W	2

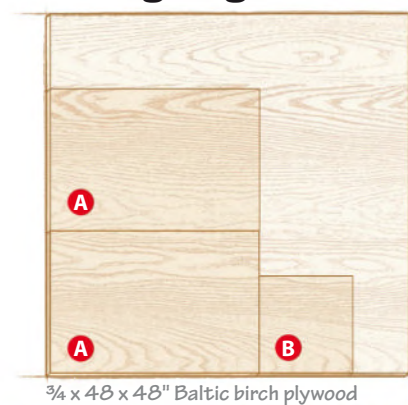
*Parts initially cut oversize. See the instructions.

Materials key: BP-Baltic birch plywood, W-walnut

Supplies: #8 x $1\frac{1}{2}$ " flathead screws.

Bits: $\frac{3}{8}$ " Forstner bit; $\frac{1}{16}$ " round-over, flush-trim router bits; $\frac{3}{8}$ " plug cutter.

Cutting Diagram



$\frac{3}{4}$ x 48 x 48" Baltic birch plywood

See What You Saw

Step out of the shadows with these illuminating solutions.



By the time you reach the age of 40, you'll need 50 percent more light to see as well as you did at 20. By age 70, you'll need twice as much light as you did at 40. But, before you light up your shop like a Broadway stage, consider these strategies for improving task lighting in areas where you're actually working.

Enlighten broader areas

Wall cabinets can cast shadows from overhead lights. Solution: under-cabinet fixtures that flood light over worksurfaces, *above*. These lights come in both hard-wired and plug-in varieties. If power isn't close, or you don't want to fuss with wiring, use battery-powered LEDs. They can provide weeks or even months of bright illumination from one set of batteries.

► Production of most incandescent bulbs over 40 watts ended in 2014. Compact fluorescent lamps (CFL) and light-emitting diode (LED) bulbs, while more expensive than incandescents, use much less electricity and last far longer, making them cheaper in the long run.

For a truly budget-friendly option, don't rule out the lowly, ever-affordable clamp-on flood lamp that you can quickly move from place to place, *right*.



A spring-loaded clamp grips an edge to hold the light where it's needed. A cool-burning CFL or LED keeps the shade cool to the touch.

Spotlight small areas

Sometimes you need a pool of light focused on a small area; for example, to help you see a cutline at the bandsaw, the center mark for a hole at the drill press, or a tool edge at the grinder. For these jobs, add an auxiliary light on or near the tool, *right*. To keep a cord out of the way, use a battery-operated LED model.

A magnifier with built-in LEDs, *below* (no. 57312, \$50, rockler.com, 800-279-4441), provides a clear view for close-up handwork and detailed inspections. And while it may not be the most stylish option, a headlamp goes wherever you do, *bottom*, putting light right where you look.

By focusing additional light on the tasks at hand, you'll create both a safer workshop and one that's more pleasant to work in. 🌲

Produced by Craig Ruegsegger with Mike Berger



Focus intense illumination into tight spots with a flexible LED. This one has a magnetic base as well as a clamp (no. 50449, \$30, rockler.com, 800-279-4441).



Ready for your close-up? A shop-made bench dog (right) allows for positioning the magnifier in any doghole on your bench. Or secure the fixture to the edge of a benchtop, shelf, or tool with the provided clamp base (not shown).



Free your hands. A pivoting multi-LED fixture with an elastic strap (find them at home centers and camping stores) can be adjusted from bright to super-bright.

Make Your Own Transitional Plane

Take an ugly yard-sale plane and give it new life as the most eye-catching—and useful—plane in your collection.



DIMENSIONS:
10 1/2" L x 2 9/16" W x 5 1/4" H

\$50

Approx. cost to
build this plane

\$152

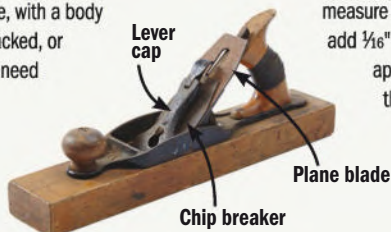
Avg. cost of a
comparable all-metal
No. 4 plane



► No walnut or maple? No problem. Check out some of the other species we used for this design. woodmagazine.com/transitionalplanes

Stanley alone produced 18 different models of wood-bodied transitional planes as an alternative to metal-bodied planes. Those who bought them typically either wanted Leonard Bailey's patented adjustments with the feel and heft of a wooden body, or didn't want to pay the higher price of an all-metal plane. Several other manufacturers copied Stanley's design, so thousands of these old planes still inhabit the dusty recesses of antique stores, sheds, and attics.

Our donor plane, the Stanley no. 26 shown *below*, cost less than \$10, as we sought out one with a broken or missing knob and tote, with a body that was worn down, cracked, or broken. Essentially, you need only the frog assembly, chip breaker, and lever cap from your donor plane



to be in good shape. If the original blade is badly pitted, you can buy a new replacement. For example, hocktools.com carries new blades in $\frac{1}{8}$ "-width increments to fit almost any model. (You will most likely find a donor plane with a blade width of 2", 2 $\frac{1}{8}$ ", or 2 $\frac{1}{4}$ ".) It's crucial that you use the original chip breaker, as the slot on the transitional chip breaker is in a higher location than that from a metal-bodied plane (*right*). The parts from all Bailey-pattern planes will work with this plan; just be sure to measure the width of the blade and add $\frac{1}{16}$ " to determine the appropriate width of the infills (B, C).



► Need to bust the rust on an old plane? woodmagazine.com/planerehab



EXPLODED VIEW

Mortise for the frog

A

$2\frac{1}{8}"$

$\frac{7}{8}"$

$\frac{7}{8}"$ notch $3\frac{1}{2}"$ long, centered $2\frac{3}{4}"$ once body is trimmed to final length

C

Drill to match hole locations in frog.

$R=1"$

B

$R=2\frac{1}{8}"$

$2\frac{1}{8}"$

D

Chamfer

A

$R=2\frac{1}{8}"$

1 Cut and sand to shape two $\frac{1}{4} \times 2\frac{1}{2} \times 12$ " maple blanks for the sides (A) using the pattern [Drawing 1]. Then, mill a walnut blank to the width of your plane blade plus $\frac{1}{16}$ ", $2\frac{5}{8}$ " thick, 12" long for the infills (B, C) [Exploded View].

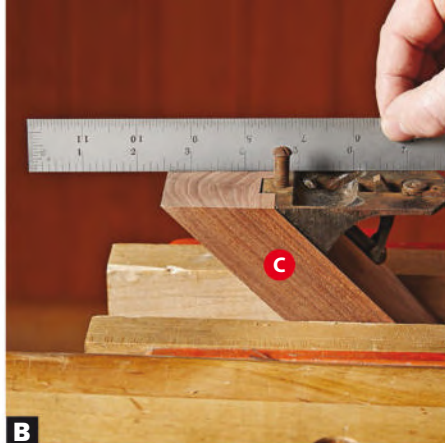
► Learn how to apply and remove patterns.
woodmagazine.com/stickysolutions

2 Attach the sides (A) to the infill (B, C) with double-faced tape. Drill holes for the alignment pins **[Photo A, Drawing 1]**. Remove the sides from the infill blank, then crosscut the blank to separate the front and rear infills **[Drawing 1]**. Set the front infill (B) aside for now.

3 Rip the rear infill (C) to a finished width of $1\frac{1}{16}$ ", and then miter-cut the bed angle at 45° to bring the rear infill to $8\frac{1}{2}$ " long [Drawing 1]. Chisel a centered mortise to accept the frog [Exploded



Drill for the alignment pins. The four holes, shown in Drawing 1, will accommodate the alignment pins, which ensure the parts glue up squarely. They will be cut away later.



B **Flush the frog and rear infill.** Rest a straightedge across the frog and bed miter, checking for gaps. Make adjustments to the frog's mortise and bed angle as needed to make the pieces coplaner.



C **Shape the sides' top edges.** Draw a line $\frac{1}{4}$ " from the sides' top edges with a pencil, following their curves. Use a spokeshave to chamfer to that line. (The edge is too narrow to use a router bit.)



D **Clamp up the body.** With the bottoms of the infills (B, C) flush with the bottom edges of the sides (A), glue and clamp the assembly together. Insert a scrapwood spacer in the tote (E) slot to avoid damage from the clamping pressure.

View], drill pilot holes, and screw the frog in place. Check for alignment [Photo B]. When aligned, remove the frog.

4 Bandsaw and chisel a centered notch in the back edge of the rear infill (C) to accept the tote (E) [Exploded View].

5 Transfer the shape of the front infill (B) and rear infill (C) onto those pieces [Drawing 1]. Bandsaw them to shape and sand them to 220 grit. Chamfer the top edges of the sides (A) [Photo C].

Now, give the body a sole

1 Glue the infills (B, C) between the sides (A), driving dowels into the alignment holes [Photo D]. After the glue dries, flatten the bottom of the plane body assembly (A-C) by placing adhesive-backed sandpaper on a sheet of glass, or your tablesaw's table, and rubbing the plane body against it.

► Lines drawn by a white colored pencil are much easier to see than a standard pencil when marking on dark woods, such as walnut.

► **Tip!** When flattening the body (A-C), use your tablesaw's rip fence as a guide to keep the plane's bottom and sides square.

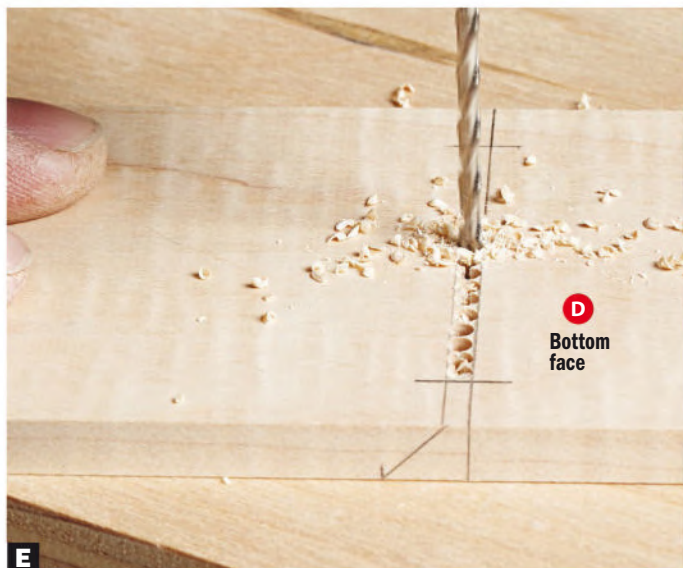
2 Cut the sole (D) to fit the plane body (A-C). Place the body on the sole and transfer the mouth location to the sole's top face. Then, extend the lines across the sole and down the edges (the front line square, the rear line angled), and onto the bottom face. Cut out the mouth [Photos E and F].

3 Glue the sole (D) to the plane body (A-C). Crosscut $\frac{3}{4}$ " off each end of the assembly, removing the alignment pins and bringing the plane to a finished length of $10\frac{1}{2}$ ".

4 Mark the radii on the toe and heel of the plane (we traced around a quart-size finish can), bandsaw the curves, and sand them smooth. Break the top edge of the plane's heel with sandpaper.

5 Cut the tote (E) to shape [Drawing 2]. Then round the edges [Photos G and H] and sand smooth. Glue the tote into the plane body [Photo I]. Apply a finish. We used three

► **Tip!** Use a combination square or a bevel gauge set to 45° to mark the lines on the edges of the sole.



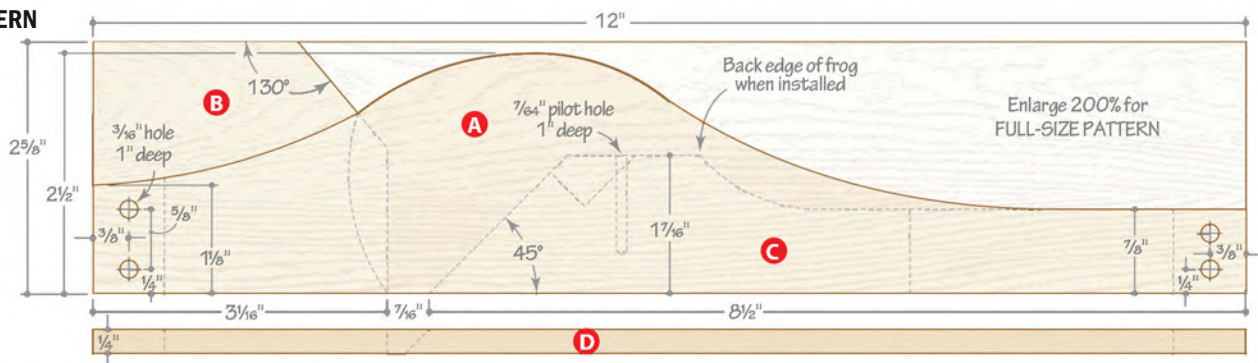
E

Make the mouth. Select a drill bit sized to fit between the marked lines on the sole (D) and drill out the waste. Then, flip the sole to its top face and, using a wide chisel, clean up the mouth edges.



F

1 SIDE PATTERN



Shape the tote. Use a chamfer bit in your router to break the tote's (E) edges. Then round and blend the profile with rasps and files until it feels comfortable in your hand.



Get a grip. Get a horizontal caul surface for clamping the curved tote (E) in place by cutting the profile of the tote's top into a piece of scrapwood.

► Watch a short video of how we shaped the tote.
woodmagazine.com/planetote

coats of spray lacquer, sanding between coats with 320-grit sandpaper. When the finish dries, mount the donor plane parts, set the blade depth, and put that new old plane to work! 🌲

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

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* sides	1/4"	2 1/2"	10 1/2"	M	2
B* front infill	2 5/8"	2 1/8"	2 5/8"	W	1
C* rear infill	1 7/8"	2 1/8"	7 3/4"	W	1
D* sole	1/4"	2 9/16"	10 1/2"	M	1
E* tote	7/8"	5"	3 3/8"	W	1

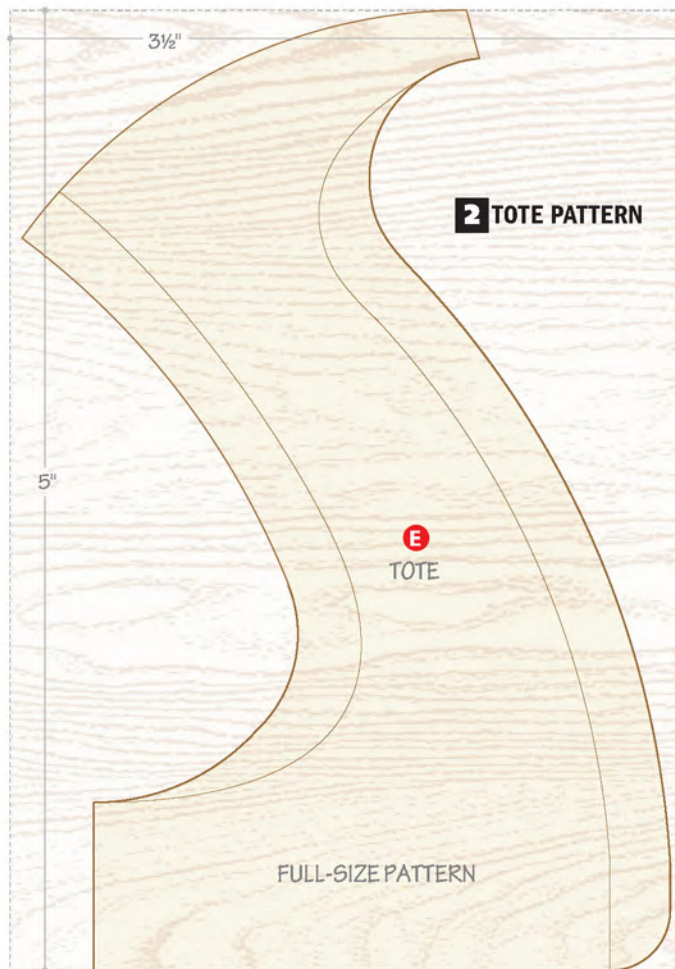
* Parts initially cut oversize. See the instructions.

Materials key: M-maple, W-walnut.

Supplies: 3/16" dowel 12" long (1), #8x1" screws (2).

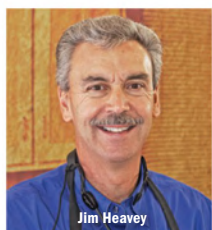
Bit: 45° chamfer router bit.

2 TOTE PATTERN



A Blade for

Rip blades stay cool and calm. Expansion slots across the surface of a rip blade and deep gullets between the teeth reduce vibration and heat buildup.



Jim Heavey

Tip! Opinions on blade height vary. I prefer exposing the entire gullet above the stock to lessen the number of teeth in the cut and provide more downward cutting pressure.

Tablesaws occupy center stage in most shops: They're used for ripping and crosscutting hard and soft woods, plywood, tempered hardboard, and the occasional acrylic. You can even use the saw to joint an edge or resaw. With such diverse materials and cuts, selecting the right blade is essential to getting a clean, burn- and tear-out-free edge. Tablesaw blades come in a wide variety of styles and designs, but they generally fall into one of three categories: rip, crosscut, or general-purpose.

Rip blade

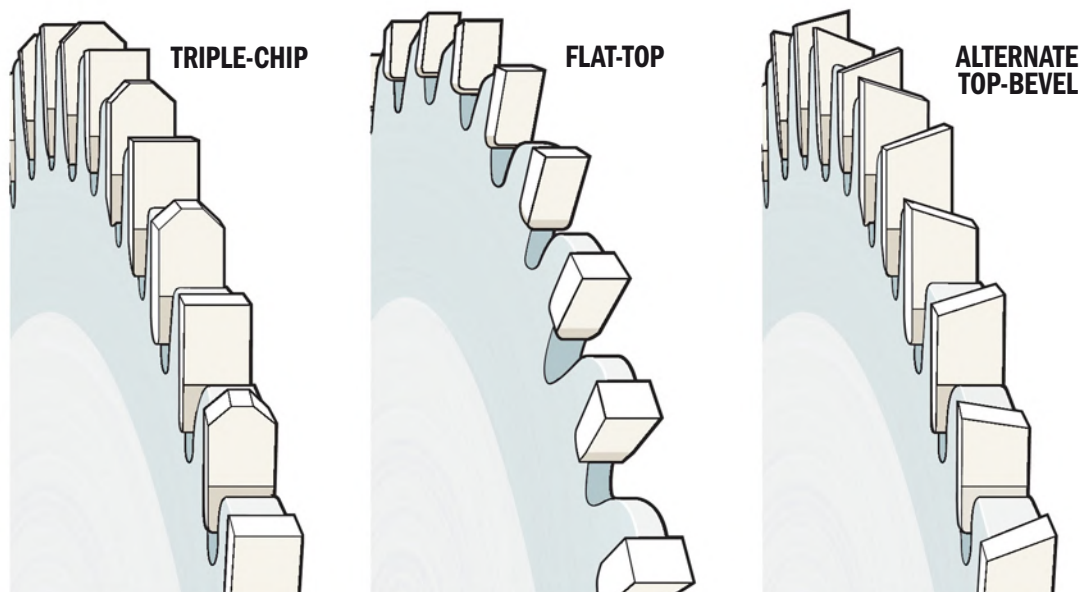
A typical 10" rip blade has 24–30 teeth, resulting in deep, wide gullets between each tooth that facilitate the removal of large

amounts of material without clogging the blade or straining the saw's motor. The blades also rely on triple-chip grind or flat-top grind teeth (*below*) that cut efficiently with the grain. These blades work well when jointing edges or resawing thick stock.

Crosscut blade

When cutting across the grain, lots of small bites work better than fewer big ones, so the more teeth the better. Typically, these blades have 60–80 teeth and employ an alternate-top-bevel (ATB) tooth configuration, resulting in an exceptionally smooth finished edge with little if any end-grain tear-out. This is also the blade of choice for clean cuts in plywood.

► A clean blade is a happy blade. Learn how to remove pitch buildup and gum. woodmagazine.com/cleancutters



► Learn more about blade terminology and tooth grinds. woodmagazine.com/toothgrinds

All Reasons

By Jim Heavey

Don't rush when crosscutting. These high-tooth-count blades require slower feed rates to allow each tooth to do what it does best: leave perfect, splinter-free edges.

The do-it-all blade. Extra-beefy carbide teeth on combination blades allow them to be sharpened multiple times, thus reducing their cost over their service life.

Tip! Let the pros do the sharpening. A high-quality saw blade is precision balanced, and its teeth are in perfect symmetry with each other. Maintaining both is next to impossible without professional equipment.

General-purpose blade

In a perfect world, every shop would have one blade dedicated to ripping and another for crosscutting. Quality blades can be expensive, so this may not be an option for many woodworkers. (And some of us are too lazy to change blades all the time!) A good compromise is the combination or general-purpose saw blade. With 40–60 teeth, these blades

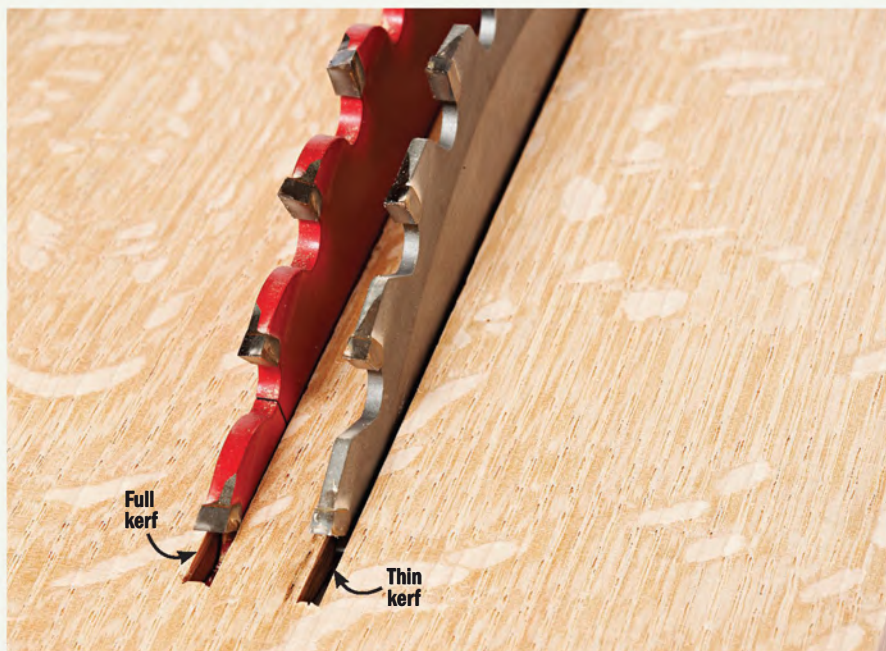
provide very acceptable edges, whether crosscutting or ripping. Teeth generally are an ATB configuration, gullets are deep enough to carry away the larger chips, and expansion slots keep the blade cool during long rip cuts. Although these blades can't match all the performance characteristics of dedicated blades, they're still great alternatives. 🌲

SHOP TIP

The skinny on thin-kerf blades

When selecting a blade, consider the width of the kerf. A standard saw blade removes $\frac{1}{8}$ " of material in a single pass. When cutting dense woods or thick stock, such a blade can cause a saw to labor, especially with a motor smaller than 3 hp. A thin-kerf blade, at just $\frac{3}{32}$ "-thick, overcomes this by removing less material per pass, easing the strain on smaller motors. Plus, it conserves stock: That extra $\frac{1}{32}$ " may pay off when making multiple cuts in expensive woods such as ebony or cocobolo.

Most blades can be purchased in either standard or thin-kerf configurations. But remember, the thickness of the blade must match the thickness of your saw's riving knife or splitter.





Avoiding Dust Nibs

A clean space and fast finishes defeat these nasty nuisances.

Most of us don't have the luxury of a separate finishing room. Instead, we apply finish in the same space where we rip, rout, and sand. So it's no wonder devilish dust nibs haunt our fresh finishes. When the going gets rough, use these strategies to smooth things over.

Work cleanly

It's easier to clean up dust as you go than to remove it after it builds up on everything. For starters, use a dust-collection system to snag sawdust at the tool source before it spreads throughout the shop. Running an

overhead air-filtration unit overnight traps fine, airborne dust that the collector missed, but remember to turn the unit off at least an hour before applying finish. Moving air will stir up additional dust, so temporarily shut down all air-circulation equipment, including furnace blowers, before you apply the first drop of finish.

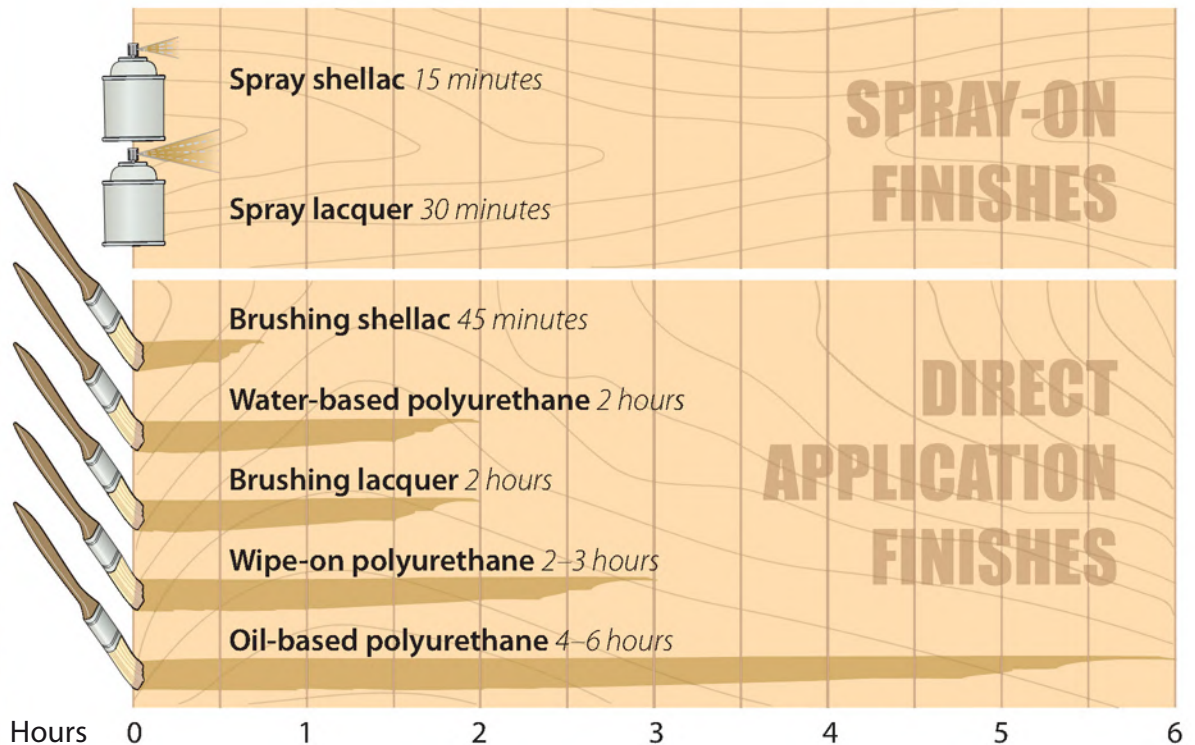
The day before your finishing session, give your shop a thorough vacuuming to suck up stray dust. Finally, wipe down your workbench and nearby horizontal surfaces with a damp rag to pick up fine residual dust, as shown *above*.

► Build your own dust collector and air-filtering tool stand. woodmagazine.com/filterplans

► Read reviews and shop for air-filtration systems. woodmagazine.com/filterreview

► Learn more about whole-shop dust collection. woodmagazine.com/dustcollection

FINISH DRYING TIMES



Pick a speedy topcoat

A fast-drying finish, such as shellac, lacquer, or water-based products, allows less time for dust to settle on the wet surface [chart, above]. Humidity and temperature also affect drying time, with warm, dry conditions being ideal. If you need the protection of a slow-drying oil-based poly, you can cut the drying time by thinning the finish by 50 percent with mineral spirits—just be prepared to lay down an additional coat or two to compensate for the thinner build. Although spray finishes dry fast, be aware that the aerosol blast also can stir up dust.

Dealing with the inevitable

Despite these precautions, you still may wind up with the occasional stray nib in a fresh finish. One quick way to remove them while minimizing sanding: Use a cabinet scraper, as shown *below left*. Then, *lightly* sand between coats with 400-grit sandpaper. Wipe with a damp rag to remove the sanding dust and apply the topcoat. After the topcoat dries thoroughly, buff it as shown *below*. 🌲

► Learn to sharpen a cabinet scraper. woodmagazine.com/scraper

Produced by Kerry Gibson



Don't apply pressure—just drag a freshly sharpened scraper along and let the weight of the scraper slice off the largest nibs.



Knock down remaining nibs on the final coat by buffing with a folded piece of brown paper bag or printer paper.

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24" CLAMP AND CUT EDGE GUIDE

SAVE 52%

\$7.99 REG. PRICE \$16.99

LOT 66126

13314384

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2 HP, 8 GALLON 125 PSI PORTABLE AIR COMPRESSOR
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LOT 67501 shown
68740/69667

13317657

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PACIFIC HYDROSTAR 1650 PSI PRESSURE WASHER

SAVE \$50

\$79.99 REG. PRICE \$129.99

LOT 69488
• 1.3 GPM

13258544

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5889/62281

13271832

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LOT 69684 shown
61776/61969/61970

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16 OZ. HAMMERS WITH FIBERGLASS HANDLE
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SAVE 62%

\$2.99 REG. PRICE \$7.99

LOT 69006
47872/60715/60714

LOT 47873 shown
69005/61262

13289359

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90 AMP FLUX WIRE WELDER
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LOT 61849/62719
68887 shown

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69643 shown

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LOT 69397
61427
95272 shown

• 704 lb. Capacity

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62659/44914 shown

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LOT 66783/60581/62334
60653 shown

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41005 shown

13338804

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Resin Stars

We tested dozens of products formulated to remove burnt-on, resinous gunk from saw blades and router bits—and some common household cleaners, too. These four resin-busters fared the best.

► These four cleaners can cause skin irritation (or worse), so be sure to wear nitrile or rubber gloves when using these products.

Pitch Rx

16 oz., \$14; 32 oz., \$18, 1 gal., \$43

Pitch Rx cleaned most buildup with just a spritz and five-minute soak, and needed an additional five minutes for the nastiest gunk. Buy the pint spray bottle initially for easy application, and then refill it with quarts or gallons to save money down the road. 770-680-0006; aroundtheshopinc.com



Sprayway Saw Cleaner

18 oz., \$8

Sprayway comes in an aerosol can, and cleaned on a level equal to Pitch Rx. However, it produces a choking vapor when sprayed onto the blade or bit, so be sure to use proper ventilation.

800-332-9000; spraywayinc.com



Boeshield Blade & Bit

8 oz., \$12

Sold in a pump-spray bottle, it's easy to apply and readily available at woodworking stores. It cleaned mild residue thoroughly with 10 minutes of soaking time, and burnt residue after 30 minutes.

800-962-1732; boeshield.com



LA's Totally Awesome

20 oz., \$1

Although sold as a general household cleaner (we found it at Dollar General), this stuff proved surprisingly effective at removing residue from blades and bits. It cleared most buildup with a 10-minute soak, and needed only 30 minutes for the really tough stuff.

714-562-8873;

lasttotallyawesome.com



► Remove the bearing from piloted router bits before spraying or soaking the bit with a cleaner. The solvents and other ingredients might damage the bearing.

continued on page 80

The most expensive Mercedes-Benz® ever made. Rarer than a Stradivarius violin.



Not actual size.
Shown is model in Pearl White finish.
Also available in Ruby Red finish.

How to Park \$11.7 Million on Your Desktop

The 500K Special Roadster is one of the rarest and most-sought after automobiles ever built.

It's hard to deny that one of the signature models of Mercedes-Benz® is the 500 series. So many striking and elegant bodies would grace the stalwart chassis. The 500K's of the 1930s were beautiful, elegant, and exclusive models often outfitted with voluptuous coachwork and sold to the wealthiest of clientele.

The most ravishing model of this species was the two-seater 500K Special Roadster launched in 1936. It was a limited production cabriolet, in total less than 30 were made, adding to its near-mythical qualities. In its day it went for top dollar—over \$106,000.

Today, these ultra rare masterpieces are going for millions. In 2012, a Special Roadster fetched more than \$11.7 million at auction at the Pebble Beach Concours d'Elegance.

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Eco3 Turbospray HVL P System, \$600 without bleeder spray gun, \$650 with nonbleeder spray gun, Apollo Sprayers, 888-900-4857; hvlp.com

For the smoothest surface possible, I prefer to spray finish rather than brush or wipe. And I'm a big fan of HVL P (high-volume, low-pressure) turbine systems that don't overspray and waste much finish. But lower-cost HVL P systems often require thinning finishes to get good results—a messy and time-consuming process that calls for more coats to build a durable finish.

Apollo's Eco3 Turbospray system sprays most finishes—ones similar in consistency to water, such as lacquer, shellac, or water-based polyurethane—right out of the can. You need only make one or two minor gun adjustments (and practice a little).

With each Eco-series unit—there are three versions; we tested the Eco3—you get your choice of two guns. A bleeder gun (model E5011) shoots a steady stream of air, even when you're not feeding finish into the



stream via the trigger. With the non-bleeder gun (model E7000), you start and stop both finish flow and airstream with the trigger. I like the nonbleeder best because you don't have to worry about the continuous airstream messing up your finish, and it has separate controls for the amount of finish and the spray pattern. The bleeder gun does not have a way to adjust the pattern, only the volume of finish.

The Eco3 turbine itself has no spray adjustments: Simply turn it on and it maintains a steady pressure. (Although we did not test the Eco4 and Eco5 units, they're rated to deliver about 15 more cubic feet per minute and greater hose pressure. This gets more finish through the gun and atomizes thicker finishes, such as paint or oil-based polyurethane.)

—Tested by John Olson, Design Editor

Contractor saw packs surprising punch

10" contractor tablesaw (no. 36-5000), \$900, Delta Machinery, 800-223-7278; deltamachinery.com

Because I'm used to a 3-hp cabinet saw, I have to admit to being pleasantly surprised at the performance of Delta's new contractor-style saw. In fact, I could not bog down its 1¾-hp motor, even when ripping 8/4 white oak. And despite having stamped-steel wings instead of cast iron, the 36-5000 showed no discernible vibration. (You can buy this saw with solid cast-iron wings, model 36-5100, for \$300 more.)

The T-square rip fence needed only a minor adjustment, but then locked solidly without moving or deflecting during ripcuts. And the 30" rip capacity lets you cut well beyond the center of a 4'-wide sheet of plywood. The miter gauge works well, with nine adjustable stops at the most commonly used angles.

After I upgraded to a premium-quality blade, the 36-5000 produced excellent cuts with little to no scoring. I like this saw's split blade guard and multiposition riving knife for keeping the kerf open behind the blade—preventing kickback—and keeping my hands safe. And despite having just a 2½" dust port, dust collection proved exemplary when I hooked it up to a shop vacuum.

—Tested by Randy Zimmerman



continued on page 82

Chicago Doctor Invents

Affordable Hearing Aid

Superb Performance From Affordable Digital Hearing Aid

Board-certified Ear, Nose, and Throat physician Dr. Cherukuri has done it once again with his newest invention of a medical-grade, all-digital, AFFORDABLE hearing aid.

Dr. Cherukuri knew that untreated hearing loss could lead to depression, social isolation, anxiety, and symptoms consistent with Dementia and Alzheimer's disease. In his practice he knew that many of his patients would benefit from new digital hearing aids, but many couldn't afford the expense, which is not generally covered by Medicare and most private health insurance policies.

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“I would definitely recommend them to my patients with hearing loss” —Amy S., Audiologist, Indiana

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7¼" sliding compound mitersaw (no. DCS361M1), \$400; sold without battery pack (no. DCS361B), \$320

The newest member of DeWalt's sliding mitersaw family boasts nearly 7½" of crosscut capacity and runs on a rechargeable 20-volt Max lithium-ion battery pack. This portable slider weighs just over 31 pounds with a 4.0 amp-hour battery pack attached. DeWalt says this saw will make 183 crosscuts in 2x4 pine. The left-tilting saw has 10 miter stops, a stainless steel adjustable miter scale, and dual LED lights around the blade. DeWalt, 800-433-9258, dewalt.com



New track saw cuts the cord

18- or 36-volt 6¼" track saw (no. TSC 55 Plus-XL-FS), \$825

Festool's newest rail-guided plunge-cut circular saw runs on 18-volt lithium-ion battery packs rather than an electric cord, a first for the company that pioneered the track-saw category. The TSC 55 runs on one or two 18-volt battery packs, increasing the run time when you need it. And its brushless motor should operate more efficiently (longer run time, cooler temperature) than a normal brushed motor.

You can buy this saw in three kits, each with more included accessories as the price goes up. It works with all existing Festool track-saw accessories and 18-volt battery packs, so buy just the saw alone (\$465) if you have the rest.

Festool, 888-337-8600, festoolusa.com

Industry Buzz

Two companies that make tools in the U.S. have joined forces. Pony Tools, makers of Pony and Jorgensen clamps, has acquired Easy Wood Tools, maker of lathe chucks and carbide-tipped woodturning chisels. Customers of Easy Wood Tools should not notice a change, according to a press release announcing the deal.

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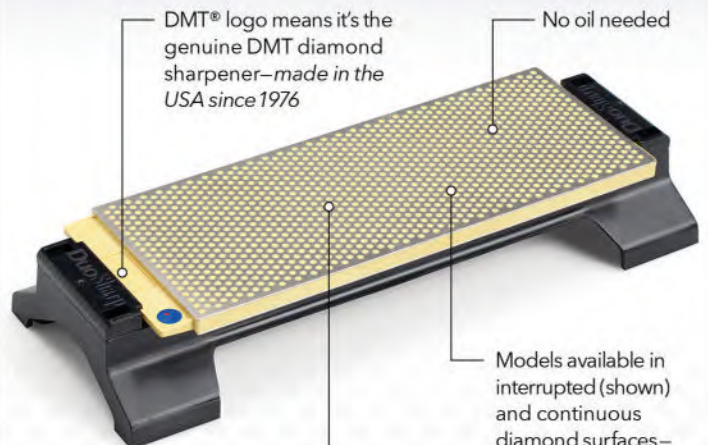
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Freud's
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4 Cutter
Design



Other
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Design



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