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WOOD®

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- Sound rating: 83–85 dB
- 6" inlet has removable "Y" fitting with three 4" inlets
- Canister filter size (dia. x depth): 19 $\frac{1}{2}$ " x 23 $\frac{1}{2}$ "
- Bag capacity: 4.5 cubic feet
- Overall size: 37 $\frac{3}{8}$ " W x 31 $\frac{1}{2}$ " D x 71" H
- Approx. shipping weight: 150 lbs.



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G0548ZP ~~\$515⁰⁰~~ **SALE \$489⁹⁵**

12" BABY DRUM SANDER

- Sanding motor: 1 $\frac{1}{2}$ HP, 115V, single-phase, 13A
- Conveyor motor: $\frac{1}{8}$ HP, 115V, single-phase, variable speed 5–55 RPM, 0.3A
- Drum surface speed: 2127 FPM
- Maximum board dimensions: 12" W x 3 $\frac{1}{2}$ " H
- Minimum board length: 8"
- Sanding drum size: 4"
- Sanding belt size: 3" hook and loop
- Dust collection port: 2 $\frac{1}{2}$ "
- Approx. shipping weight: 166 lbs.



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G0459 ~~\$650⁰⁰~~ **SALE \$619⁹⁵**

14" EXTREME-SERIES RESAW BANDSAW

- Motor: 1 $\frac{3}{4}$ HP, 110V/220V, single-phase, 1720 RPM, 15A/7.5A, prewired 110V
- Table size: 16 $\frac{1}{2}$ " x 21 $\frac{3}{4}$ " x 1 $\frac{1}{2}$ "
- Table tilt: 45° R, 5° L
- Floor-to-table height: 44 $\frac{1}{2}$ "
- Includes deluxe extruded aluminum resaw fence and miter gauge
- Cutting capacity/throat: 13 $\frac{1}{2}$ "
- Maximum cutting height: 12 $\frac{1}{4}$ "
- Blade size: 104" to 105" L ($\frac{1}{8}$ " to $\frac{3}{4}$ " W)
- Precision-ground cast-iron table
- Computer-balanced cast-iron wheels with rubber tires
- Overall size: 26" W x 31" D x 78" H
- Approximate shipping weight: 337 lbs.

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G0555XH ~~\$1150⁰⁰~~ **SALE \$1095⁰⁰**

10" HYBRID TABLE SAW WITH RIVING KNIFE

- Motor: 2 HP, 110V/220V (prewired 220V), single-phase
- Amps: 16A at 110V, 8A at 220V
- Precision-ground cast-iron table with wings measures 40" W x 27" D
- Table height: 34"
- Arbor: $\frac{5}{8}$ " • Arbor speed: 3850 RPM
- Capacity @ 90°: 3 $\frac{1}{2}$ " • Capacity @ 45°: 2 $\frac{3}{16}$ "
- Cutting capacity: 30" right, 12" left
- Overall size: 62" W x 39" D x 48" H
- Footprint: 20 $\frac{1}{2}$ " L x 19 $\frac{1}{2}$ " W
- Approx. shipping weight: 416 lbs.

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*110V operation requires part T23999 circuit breaker and wiring procedures that must be completed by an electrician or other qualified service personnel.

12 SPEED 17" FLOOR DRILL PRESS

- Motor: 1 HP, 110V/220V, single-phase, prewired 110V
- Swing: 17"
- Drill chuck: $\frac{1}{4}$ "– $\frac{5}{8}$ "
- Drilling capacity: 1" steel
- Spindle taper: MT#3
- Spindle travel: 4 $\frac{3}{4}$ "
- Speeds: 210, 310, 400, 440, 630, 670, 1260, 1430, 1650, 2050, 2350, 3300 RPM
- Quill flange/collar diameter: 2.85"
- Precision-ground cast-iron table
- Table size: 13 $\frac{5}{8}$ " x 13 $\frac{5}{8}$ "
- Table swing: 360°
- Table tilts: 90° L & R
- Overall height: 70"
- Approximate shipping weight: 283 lbs.

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G7947 ~~\$695⁰⁰~~ **SALE \$665⁰⁰**

35TH ANNIVERSARY 17" HEAVY-DUTY BANDSAW

New!

- Motor: 2 HP, 110V/220V, prewired 220V, single-phase, TEFC capacitor 110V start induction, 60 Hz, 1725 RPM
- Amps: 20A at 110V, 10A at 220V
• Power transfer: belt drive
- Precision-ground cast-iron table size: 17" x 17" x 1 $\frac{1}{2}$ "
- Table tilt: 10° left, 45° right
- Floor-to-table height: 37 $\frac{1}{2}$ "
- Cutting capacity/throat: 16 $\frac{1}{4}$ " L of blade
- Max. cutting height: 12 $\frac{1}{2}$ "
- Blade size: 131 $\frac{1}{2}$ " long
- Blade sizes available: $\frac{1}{8}$ "–1" wide
- Blade speeds: 1700 and 3500 FPM
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- Overall size: 32" W x 73" H x 32" D
- Footprint: 27" W x 17 $\frac{3}{4}$ " D
- Approx. shipping weight: 342 lbs.

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G0513ANV ~~\$999⁰⁰~~ **SALE \$949⁹⁵**

13" PLANER/MOULDER

- Motor: 1 $\frac{1}{2}$ HP, 110V/220V, prewired 110V, single-phase, 15A/7.5A
- Maximum cutting width: 13"
- Maximum lumber height: 6"
- Maximum cutting depth: $\frac{1}{8}$ " (planing)
- Maximum profile depth: $\frac{3}{4}$ " (moulding)
- Maximum width capacity: 4 $\frac{1}{2}$ " (moulding)
- Planing feed rate: 24 FPM
- Moulding feed rate: 12 FPM
- Number of knives: (3) HSS
- Knife size: 13" x $\frac{5}{8}$ " x $\frac{1}{8}$ "
- Cutterhead speed: 5000 RPM
- Overall size: 23 $\frac{1}{2}$ " L x 23" W x 44 $\frac{1}{2}$ " H
- Approx. shipping weight: 236 lbs.

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G1037Z ~~\$1150⁰⁰~~ **SALE \$1095⁰⁰**

10" LEFT-TILTING TABLE SAW WITH RIVING KNIFE AND CAST-IRON TABLE

- Motor: 3 HP, 240V, single-phase, 14A
- Max rip: 8" left, 26" right of blade
- Max. depth of cut @ 90°: 3"
- Max. depth of cut @ 45°: 2 $\frac{1}{8}$ "
- Table size w/ extension wings: 48" W x 27" D
- Footprint: 20 $\frac{1}{2}$ " x 20 $\frac{1}{2}$ "
- Approx. shipping weight: 550 lbs.

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G1023RLW ~~\$1525⁰⁰~~ **SALE \$1449⁰⁰**

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TAKING MEASURE

Give thumb thanks



The hottest part of last summer was spent with my hand in a splint, thanks to a broken left thumb. Six weeks of explaining it to friends, colleagues, and even total strangers, who would stop me and say, “Oooooo, what did you DO!?”

The natural first question from people who know me was, “Was it a woodworking accident?” No. But technically, yes, only because I was trying to pull a dead branch out of a tree with a pole saw (no good story ever starts with “I was doing this really smart thing...”) when the handle slipped free and smacked into my thumb, HARD, and I was pretty sure something broke.

A couple of days later—don’t judge me—the hand doc confirmed that yes, my thumb was broken; there was a bone chip that should reattach if I keep it isolated for six weeks.

And I was thankful.

Thankful it wasn’t worse. For example, the handle could have struck me in the head or eye. The ridiculously sharp sawblade could have cut me. I was thankful to be right-handed so I could still write, and that the splint didn’t impact my ability to two-finger type. Thankful I could remove the splint for bathing, and to replace the cloth mitt under the splint (which would begin to stink after only a couple of days).

And I had a healthy dose of perspective: During my six weeks in the splint, I lost three friends: one to a freak flash flood, another to an inoperable brain tumor, and a long-time church friend to a heart attack.

Before my “incident,” I had promised to build a flag case for a friend, and about two weeks into my splint, I headed out to the shop to start on it. Although it was awkward, I did pretty well machining the materials, but when it came to joinery, the lack of dexterity made me set it aside for a few more weeks. I’m thankful that my missing digit was only temporary, and now have even deeper respect for woodworkers with disabilities.

Never too old to adapt

For nearly 35 years, our tool-review charts have indicated the top grades with the warm color red, and lower grades with progressively cooler tones. Recently, I’ve heard from more readers who find that scale unintuitive (“red means stop... danger... warning...”). So, starting with this issue, as you’ll see on *page 48*, the top grades are colored green (“go”), and the lowest grades are in red. We’ve also increased the type size of our photo captions and on drawings throughout the issue to make them a little easier to read. Let me know what you think.

See you in the shop!

Dave Campbell
dave.campbell@meredith.com
Facebook and Twitter: @WOODeditor

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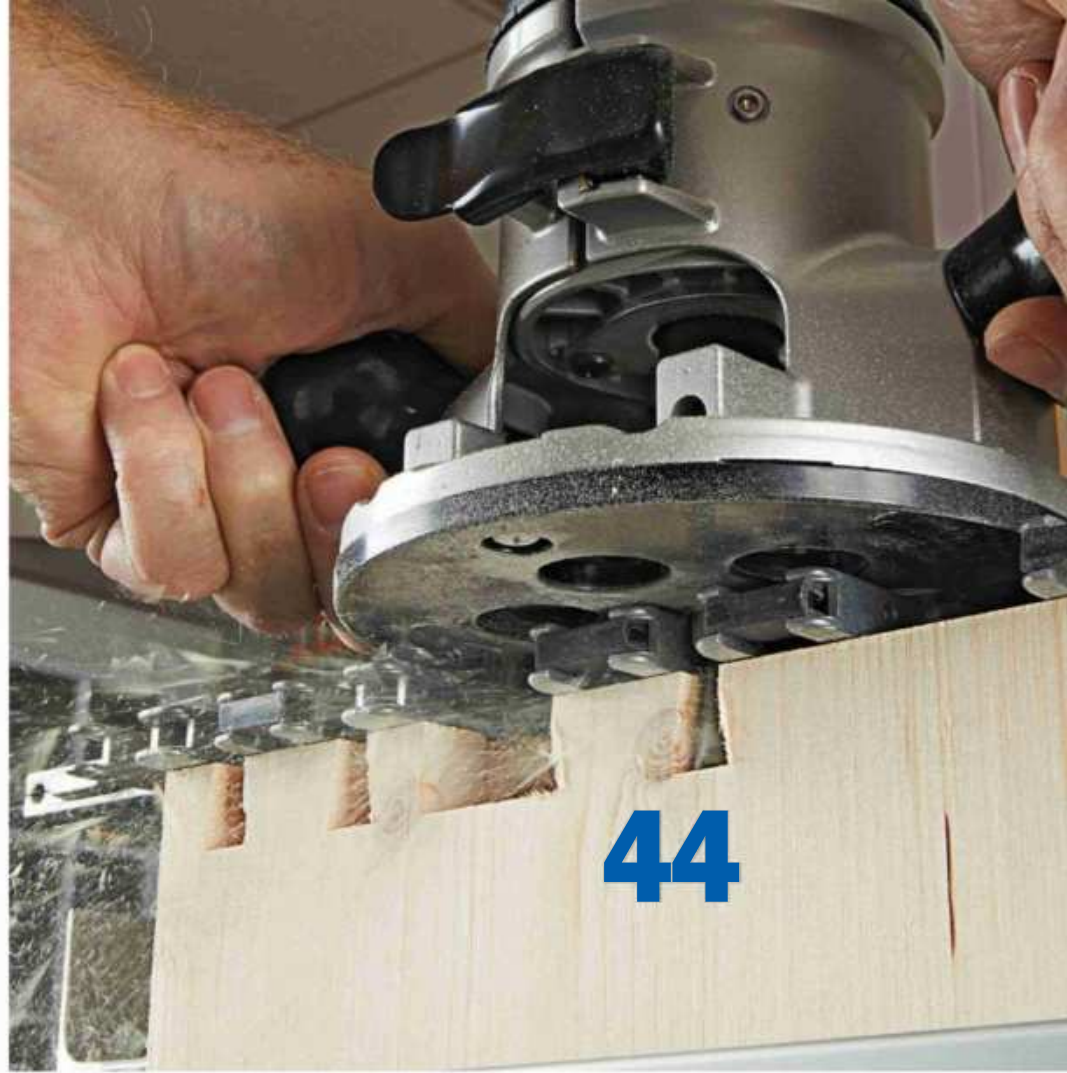
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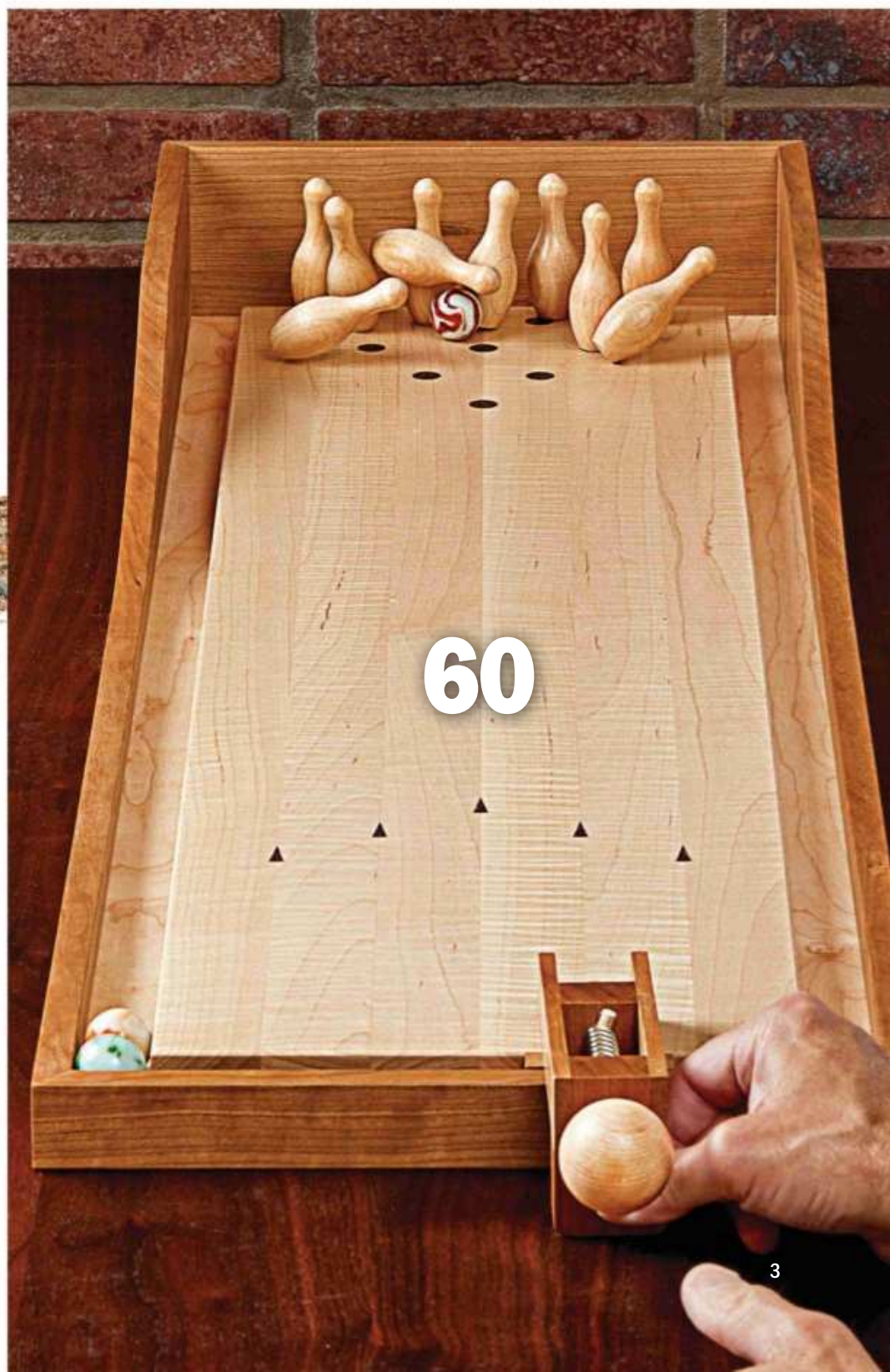


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woodmagazine.com



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Safety Is the New Sexy

The fall fashion season is upon us, and everything safe is chic again! The with-it woodworkers are accessorizing with understated pushsticks and must-have safety glasses. Stay safe, stay sexy with these hot tips!

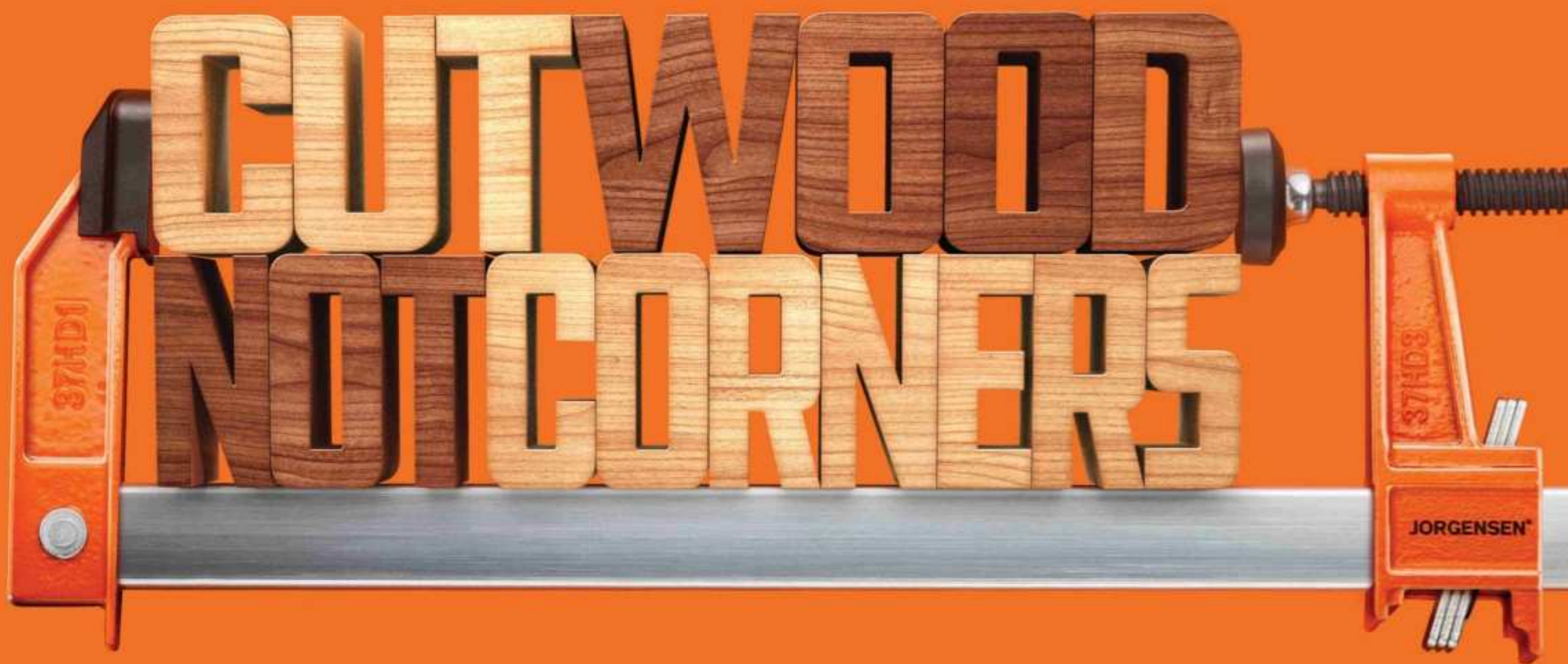
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All the hottest tablesaws sport these classic safety gadgets, hand-selected by our trend-attuned editors.
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The word we're hearing is that ears are "in." And the "it" ears are into hearing protectors. Sound safety strategy meets fashion advice with the always-stylish Jim Heavey.
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SOUNDING BOARD

YOUR VOICE

Bench warrants a mentor



My 12-year-old grandson, Luca, has been hanging out in my shop for several years, doing small projects as he developed his skills building and using tools. When issue 252 (March 2018) arrived, he wanted to build the Compact Workbench on its cover. So, we purchased the materials together and went to work building two of them. I demonstrated each step on the workbench that I would keep, and supervised while Luca built his own. He even turned the vise handle on the lathe. We made a few modifications to

the plan, adding casters, an electrical outlet, and a T-track, and made the bottom tray recessed.

Just wanted to let you know how much I appreciate WOOD® magazine and the opportunity it provides to pass woodworking skills on to the next generation.

—Phil Saroyan
Vallejo, Calif.

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Taking crib safety to new a level

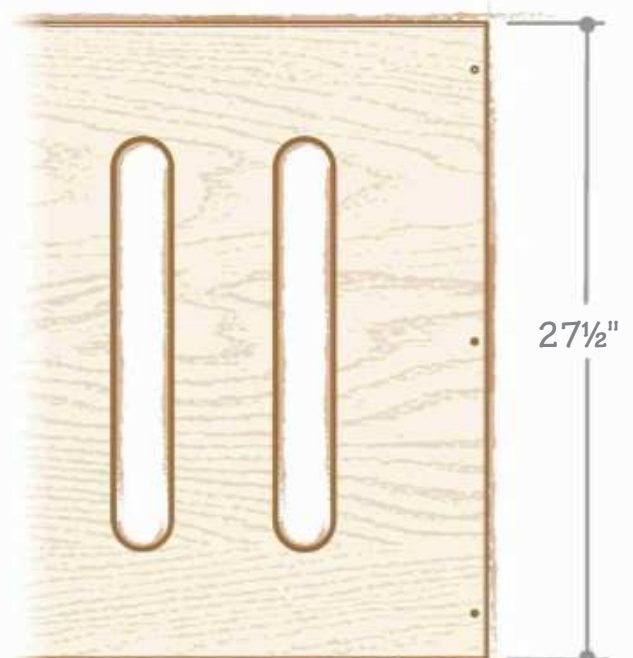
Your Convertible Crib plan in issue 255 (September 2018) arrived just in time for me to build two for a couple of soon-to-be moms. I thought most cribs had a way to raise the mattress higher for better access at the newborn stage, but your design only has one mattress height: low. Would you have any thoughts or suggestions on how I might incorporate some mattress-height choices? Thanks!

—Terry Jorgensen
via e-mail

Especially when it come to infants, federal safety regulations are constantly evolving, Terry. To create an escape-resistant sleeping environment, the Consumer Product Safety Commission (CPSC) says the distance between the top of the mattress and the top of the side rail must be no less than 20". So, when using a 6"-thick crib mattress, the top of the mattress support (part D in our plans) must be at least 26" below the top of the side

rail. The CPSC also recommends discontinuing crib use when the child reaches 35" in height.

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SOUNDING BOARD

YOUR VOICE



Hammer hits home

For years, Dave, I have been trying to think of something nice I could do for my two sons, and your *Taking Measure* column in issue 255 ("Hammer and Hood") finally "hit a nail" in my head. Allow me to explain.

After a forced late-in-life career change, I began a very successful second career as a self-employed handyman. As the business grew into more remodeling work, my younger son, Greg, joined me, eventually took it over when I retired, and this year will add new home construction to the business! He has taken my dream, scrunched it up, altered its direction, and reshaped it into his own successful dream. My older son, Jason, after being discharged from the Navy, founded and built his own home-repair and remodeling business in the Seattle area and has likewise become very successful, mainly remodeling high-end homes.

After digesting your column, I promptly went out and bought a pair of the same Stanley hammers your son presented to you, and inscribed each. I know that both sons will cherish their hammers for the rest of their lives, and I hope they will pass on their skills to their offspring and workers.

Thanks a million for sharing your son's tribute and waking up this old soldier's mind to pass something concrete on to my own sons. And thanks for an excellent publication!

—John Wickham

Woodland Park, Colo.

I just received issue 255 and wanted to say what an awesome message you delivered in *Taking Measure*. I especially liked the last paragraph about how a gift coming from the heart doesn't have to be perfect. Thank you for the reminder!

—Michael Melovich

Crescent City, Calif.

Thumbs-up for the tall chair pair

Within a week of receiving issue 254 (July 2018), I built the High-style Adirondack set using some cypress I already had on hand. Great chairs—my wife loves them! As you can see in the photo, I added a bottom shelf to the table, and a back brace to the chair near the top of the back splats. Thanks.

—Tommy Ayers

Texarkana, Texas



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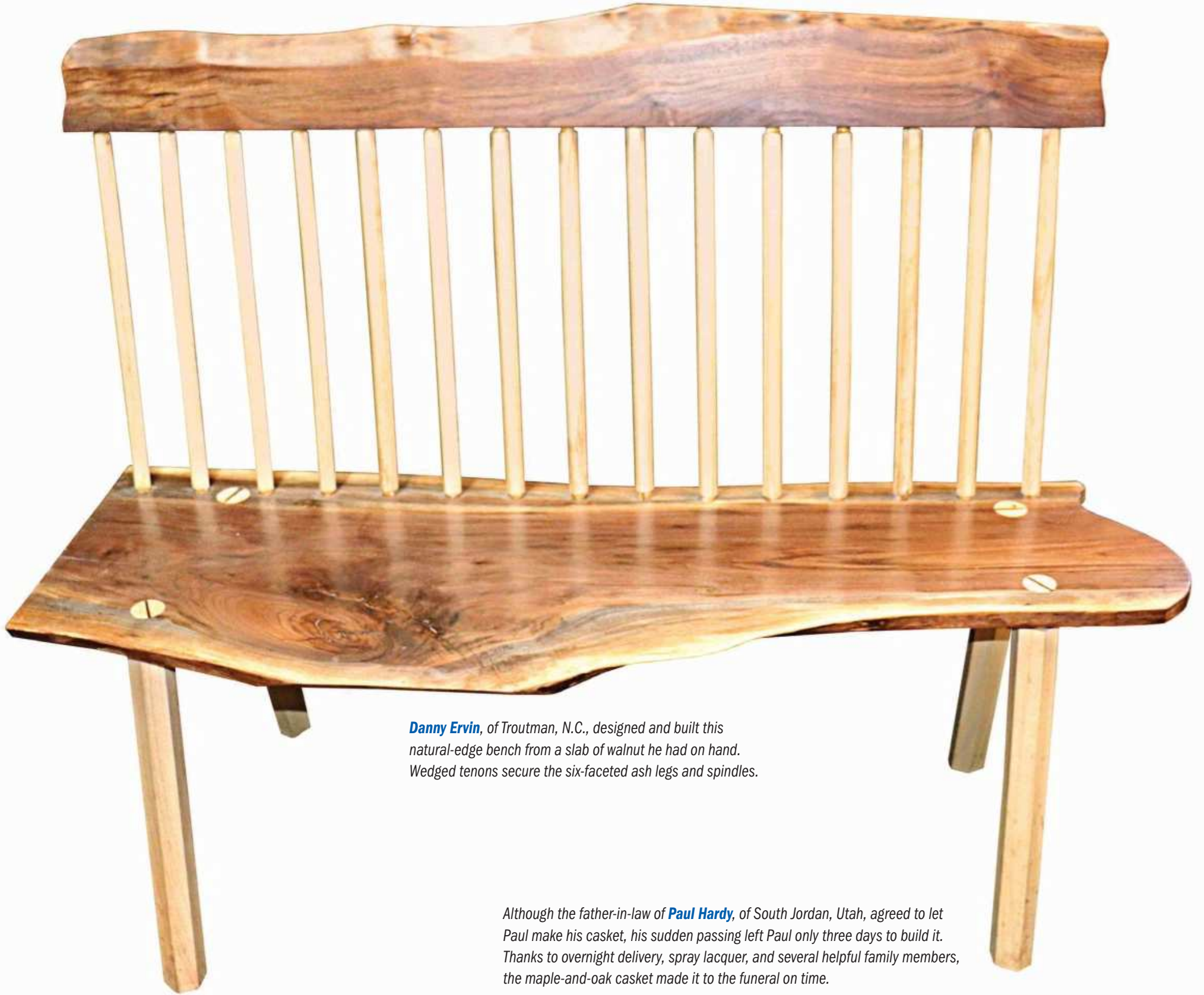


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SOUNDING BOARD

YOUR PROJECTS



Danny Ervin, of Troutman, N.C., designed and built this natural-edge bench from a slab of walnut he had on hand. Wedged tenons secure the six-faceted ash legs and spindles.

Although the father-in-law of **Paul Hardy**, of South Jordan, Utah, agreed to let Paul make his casket, his sudden passing left Paul only three days to build it. Thanks to overnight delivery, spray lacquer, and several helpful family members, the maple-and-oak casket made it to the funeral on time.



In honor of his British dad and grandpa, **Jaeger Griffiths**, of Algonquin, Ill., adorned the cedar cooler stand he built with a painted Union Jack.





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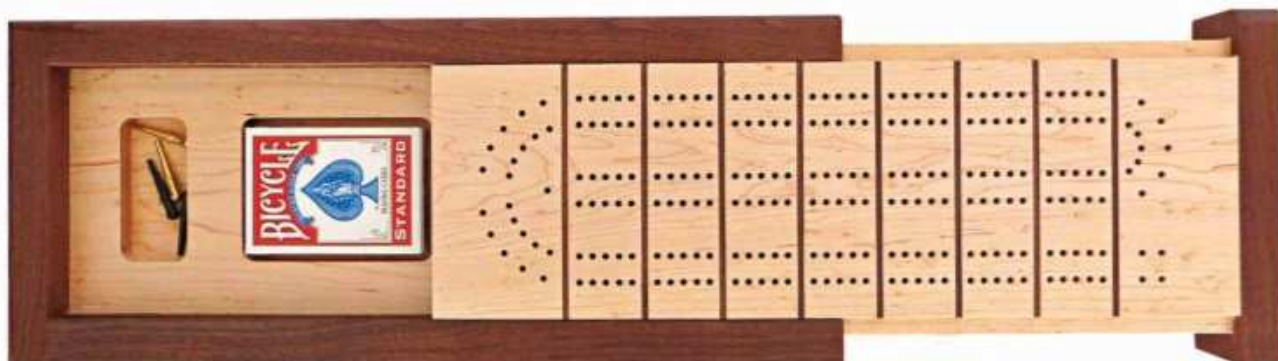
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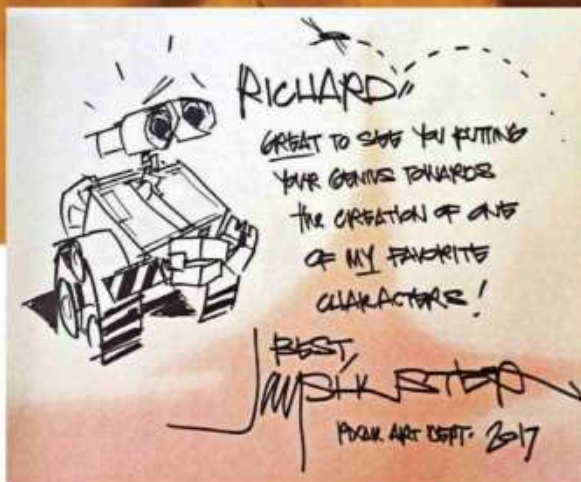
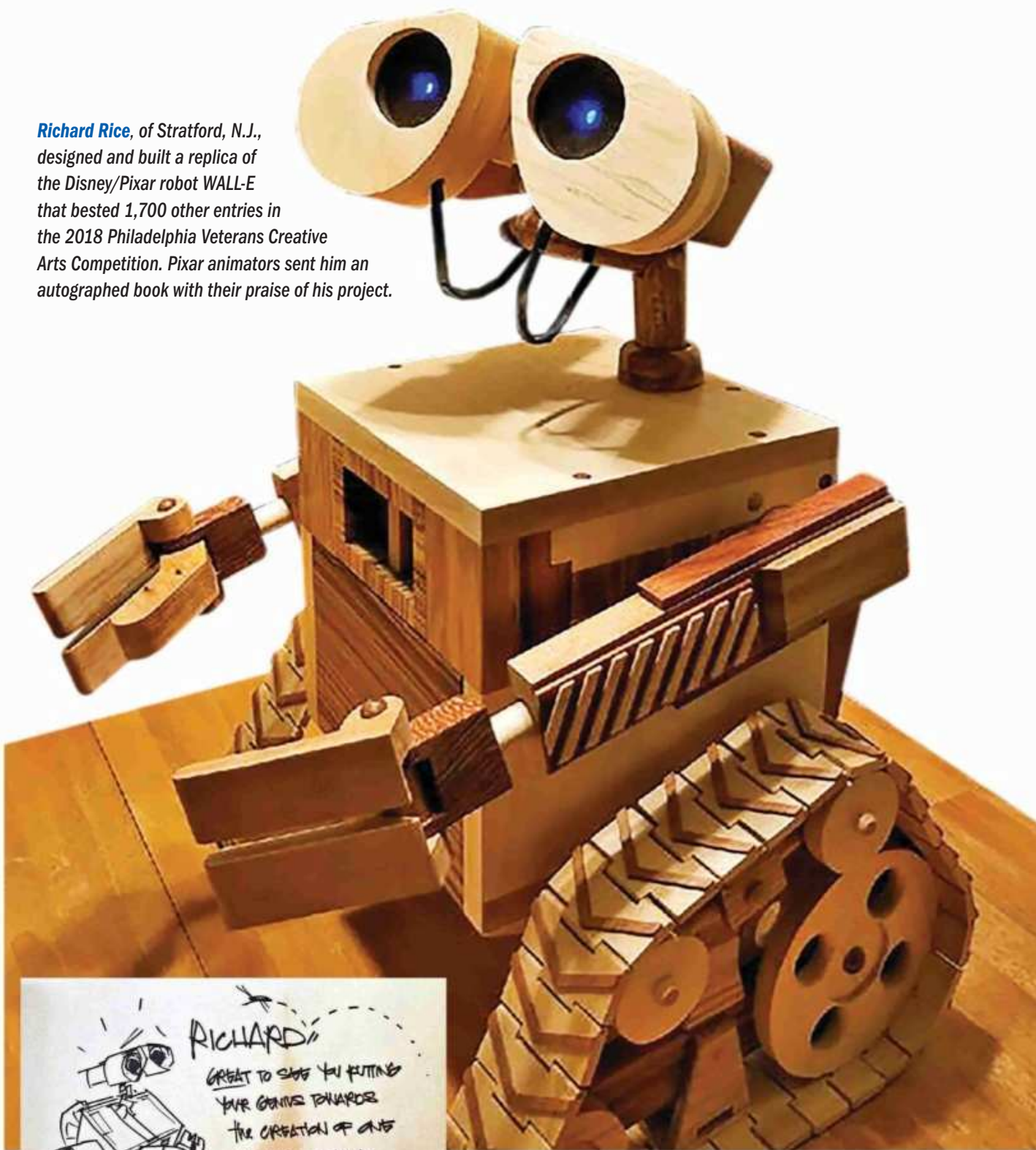
SOUNDING BOARD

YOUR PROJECTS



Using birds-eye maple and walnut harvested from his childhood dairy farm, **Don Davis**, of Sun City Center, Fla., made this cribbage set that self-stores the pegs and a deck of playing cards.

Richard Rice, of Stratford, N.J., designed and built a replica of the Disney/Pixar robot WALL-E that bested 1,700 other entries in the 2018 Philadelphia Veterans Creative Arts Competition. Pixar animators sent him an autographed book with their praise of his project.



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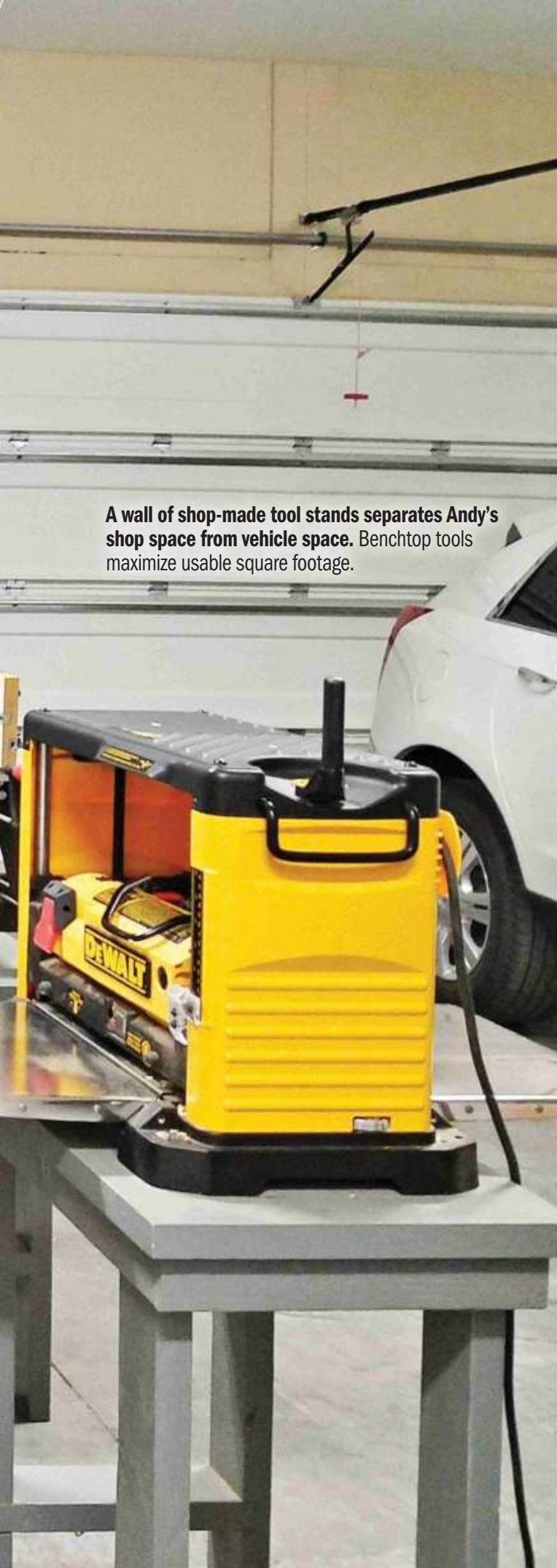
One Stall, Not Small at All



When Andy Webster built his new home, he made sure to reserve one stall of the three-car garage for his workshop. Because he likes to work on smaller projects such as desktop clocks, he's perfectly happy in his approximately 300-square-foot space. Having his home builder bump out two walls created recesses for tucking in tools and cabinets, providing clear walking paths. Plus

he has the option of temporarily expanding into the adjacent parking stall.

Wire shelving just inside the overhead door holds small power tools and accessories. Benchtop power tools on dedicated stands line up from the front to the back of the shop adjacent to the wire shelving unit. This layout separates the shop space from the two remaining garage stalls where he parks his vehicles.



A wall of shop-made tool stands separates Andy's shop space from vehicle space. Benchtop tools maximize usable square footage.



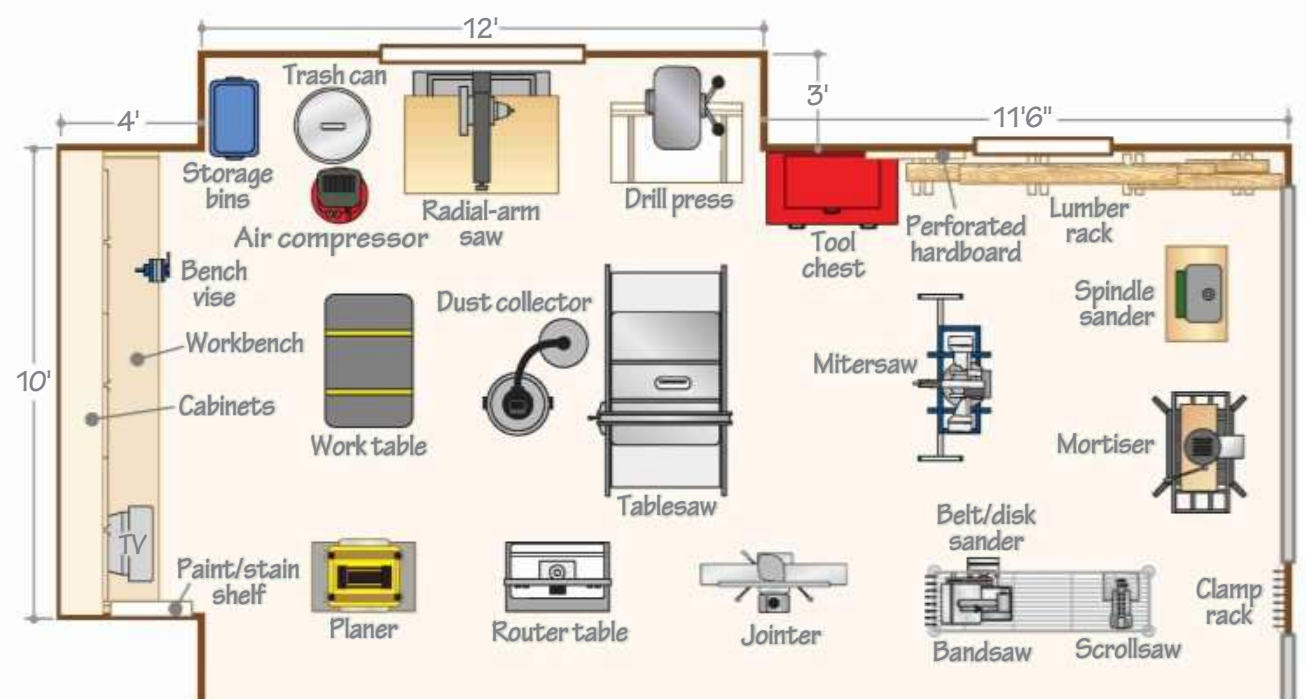
A bumpout in the back of the shop created an ideal location for cabinets and a countertop for additional storage and workspace. The radial arm saw and drill press tuck away in a second bumpout in the side wall.



A folding worktable serves as the main worksurface for clamping and assembly. It provides a variety of clamping options for workholding.

You may notice that Andy's shop doesn't have a conventional woodworker's workbench. Instead, he uses the countertop at the back of the shop for small project assembly. A portable worktable made by Keter (keter.com) serves for clamping and workholding. It also serves as a temporary mounting spot for benchtop power tools that don't have dedicated stands.

continued on page 16





Home of the Low Angle Pocket



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~ Ramon Lara, Foreman
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Racks built from 2x4s and 1x4s hold longer boards for Andy's projects. Totes and bins below collect smaller cutoffs. Dowels store in a vertical section of PVC pipe.



Most of Andy's benchtop tools have dedicated stands. An old shaper serves double-duty as a stand for his mortiser. When he needs more space, he temporarily moves tools outside.

Instead of a central dust-collection system, Andy uses a shop vacuum attached to an Oneida Dust Deputy cyclone separator. He has developed the habit of cleaning up as he goes and after a project is completed.

When Andy had the shop built, he specified two 20-amp circuits dedicated to just the shop. Each includes plenty of wall outlets. An outlet in the floor serves the tablesaw.

Two large windows provide natural light. And, on nice days, Andy opens up the garage door and instantly expands his shop space into the driveway. 🌳



Andy Webster retired from a 45-year career in the insurance industry. He lives in Florida and enjoys making projects for his kids, grandkids, friends, and relatives.

Show us your shop

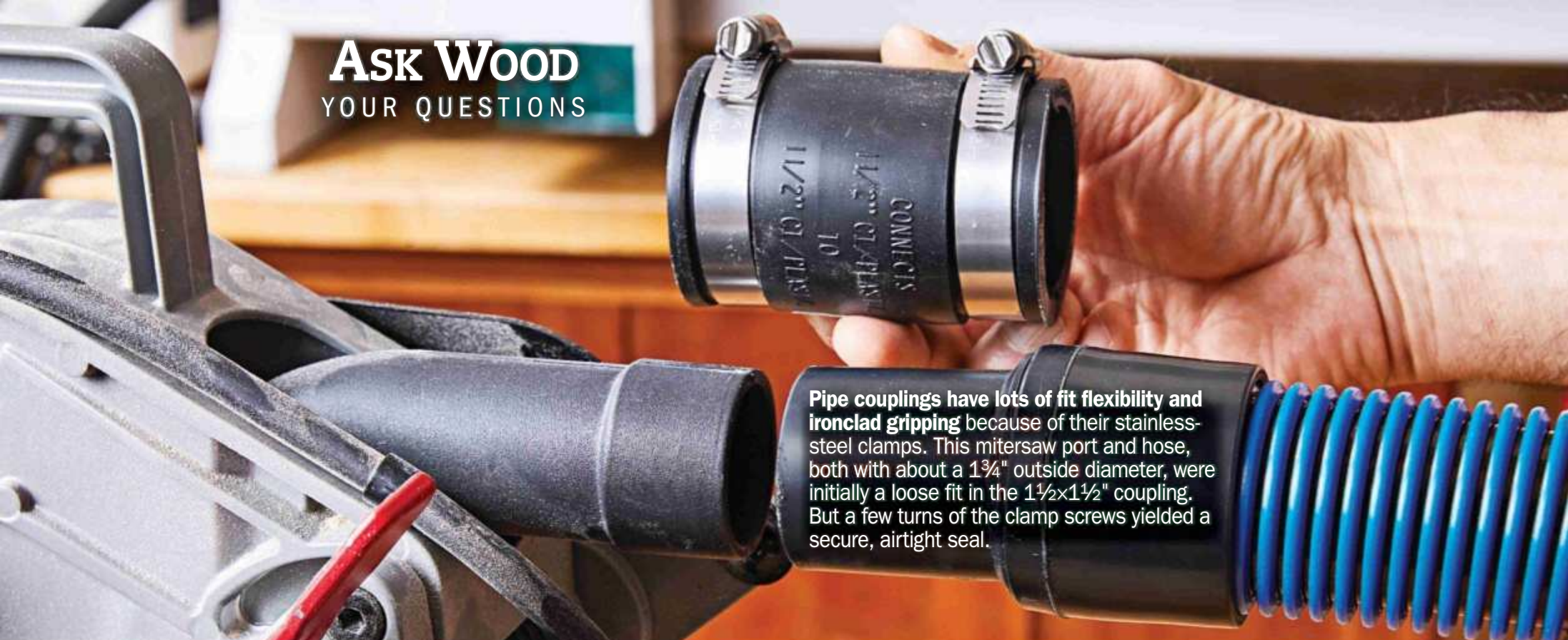
Send high-resolution digital photos of your shop to woodmail@woodmagazine.com and we may showcase it in the magazine!

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SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
OCTOBER 2018	1 Fuji Sprayers \$425 value 	2  Affinity Tool Works \$400 value	3 Bosch \$149 value 	4  Lignomat \$119 value	5  Grizzly \$199 value	6  McFeely's \$65 value	
	7  Peachtree \$80 value	8 Delta \$599 value 	9  Jorgensen \$80 value	10 Triton Tools \$129 value 	11  TG Tools \$65 value	12 Woodpeckers \$300 value 	13 Surebonder \$195 value 
	14 Craftsman Gallery \$58 value 	15  Castle \$475 value	16 Grizzly \$139 value 	17 Bosch \$179 value 	18 Affinity Tool Works \$400 value 	19 Fuji Sprayers \$435 value 	20 Lignomat \$210 value 
	21 Woodpeckers \$150 value 	22  Triton Tools \$289 value	23  McFeely's \$50 value	24 Craftsman Gallery \$179 value 	25  Castle \$475 value	26 Surebonder \$195 value 	27 TG Tools \$65 value 
28 Delta \$50 value 	29  Peachtree \$50 value	30 Jorgensen \$150 value 	31  Apollo Sprayers \$899 value	Enter for your chance to win a different prize each day in October! WWW.WOODMAGAZINE.COM/DAILYSWEEPS			



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Pipe couplings have lots of fit flexibility and ironclad gripping because of their stainless-steel clamps. This miter saw port and hose, both with about a 1 $\frac{3}{4}$ " outside diameter, were initially a loose fit in the 1 $\frac{1}{2}$ ×1 $\frac{1}{2}$ " coupling. But a few turns of the clamp screws yielded a secure, airtight seal.

Make a good connection even when it's a bad fit

Q I'm doing my level best to corral airborne dust at its source, but hooking my portable and benchtop tools to a shop vacuum has proven a challenge. Tool dust-port diameters vary—some metric and some imperial—and don't mate with my vacuum hoses. Any suggestions for making connections between ill-fitting ports and hoses?

—Randy Welch, Royal Oak, Mich.

A Before you break out duct tape to make the connection (at least temporarily), Randy, try one or more of the following:

- **Check the tool manufacturer's website.** You might find the adapter you need—one not originally supplied with the tool or one you simply lost over time.

- **Get a second-party rubber adapter.** Woodworking retailers sell various hard-plastic adapters, but we prefer flexible rubber ones [Photo A] for their greater adaptability and no-clamp grip.

- **Buy a flexible rubber pipe coupling.** You'll find these fittings online and in hardware-store plumbing departments, sized for $\frac{3}{4}$ " to 12" pipe. Some couplings, like the one above,

bridge ports and hoses of similar outside diameters (o.d.); others adapt diameters that differ by $\frac{1}{4}$ " or more. When choosing a rubber pipe coupling, remember they are sized by the inside diameter (i.d.) of the pipe they fit over. For example, a 1 $\frac{1}{2}$ ×1 $\frac{1}{2}$ " coupling has an i.d. of 1.94", the approximate o.d. of 1 $\frac{1}{2}$ " plastic pipe.

- **Look outside of woodworking and plumbing channels for fittings.** A pool-hose connector [Photo B], though made of a plastic that's only slightly flexible, has a narrow taper, and ribs that solidly grip inside openings from 1 $\frac{1}{4}$ " to 1 $\frac{1}{2}$ " diameter. (To fit the hose shown, we cut off the hose's factory-installed port.)

- **Use tape to increase a diameter.** Though we don't recommend using tape to bridge a connection, it does provide a good means of slightly increasing the outside diameter of a tool port, as shown [Photo C].

- **When all else fails, go ape on the connection.** If you're in a hurry and absolutely have to tape over the connection, get Gorilla Tape—it's tougher and stickier than run-of-the-mill duct tape. 🐼

► Find inside diameters for various PlumbQwik couplings (available at many hardware stores). woodmagazine.com/coupling

Have a question? Drop us an e-mail. askwood@woodmagazine.com



A Rubber adapters stretch to grip tightly. These two adapters (nos. 192407 and 192408, highlandwoodworking.com), have respective diameters of $\frac{19}{32}$ ×1 $\frac{1}{8}$ " and 1 $\frac{11}{16}$ ×1 $\frac{1}{8}$ ".



B A pool-hose connector gets the job done. When using a connector that goes inside the hose, cut off any excess at either end to lessen air resistance. Find the connector at swimming-pool suppliers or woodmagazine.com/hoseconnector.



C Go bigger with a few layers of tape. Most any tape will do; we enlarged this biscuit joiner's port with masking tape, applying enough for a good friction fit.

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SHOP TIPS

WORK FASTER, SMARTER, SAFER

Add decorative splines to big projects using a biscuit joiner

Like most woodworkers, when cutting slots for exposed corner splines, I typically use a tablesaw jig with a V-shape saddle to hold frames upright. But when faced with cutting such slots in a large table apron too cumbersome for a tablesaw jig, I built a fixture that helps get the job done with a biscuit joiner.

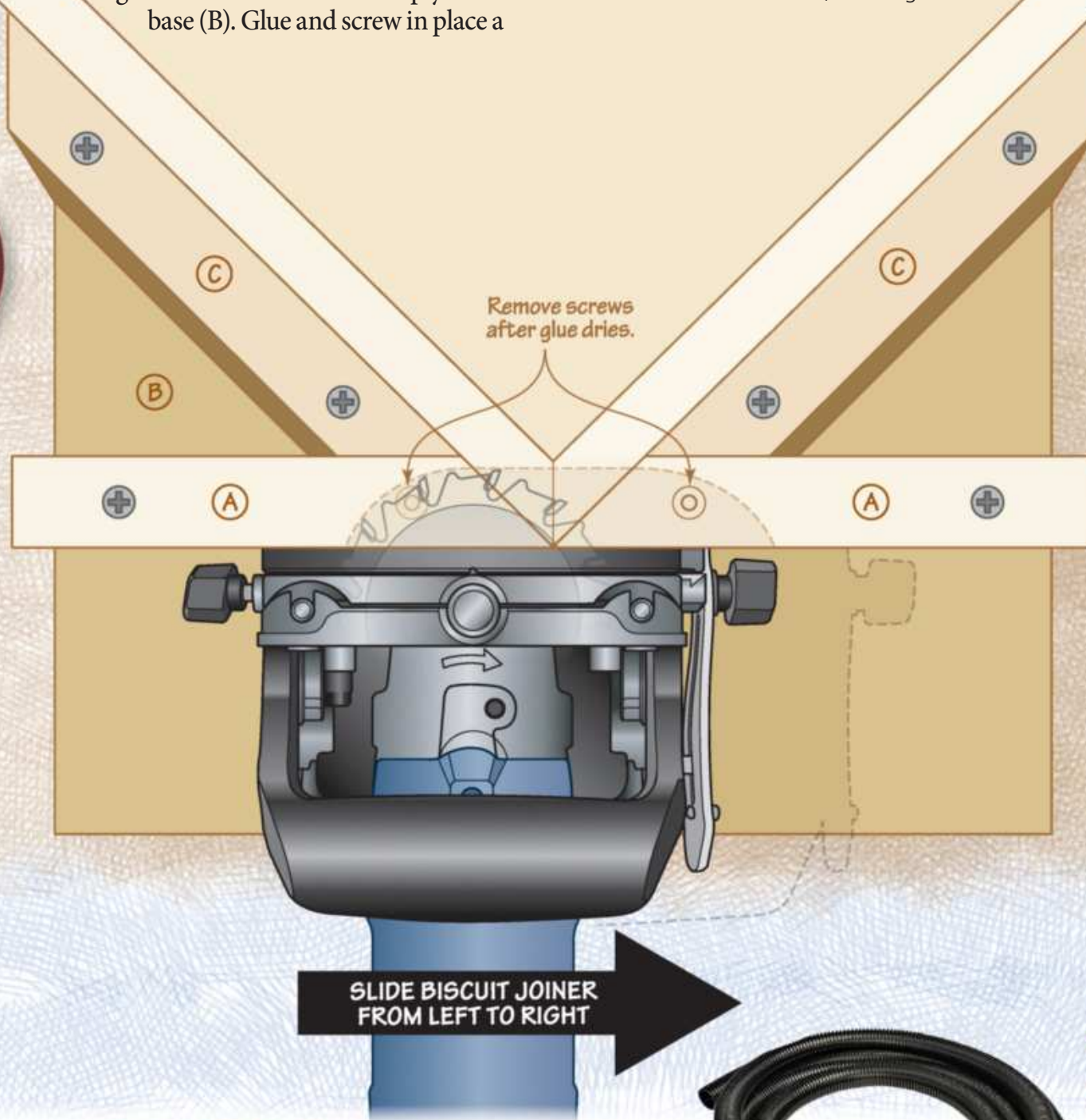
To build the fixture, simply cut 45° bevels on the ends of two fence pieces (A) and glue and screw those to a plywood base (B). Glue and screw in place a

pair of extensions (C) to form a V-saddle. Then, remove the screws closest to the cutting area to prevent any chance of the blade striking them.

Cut a slot by plunging in the biscuit joiner to the left of the fence's center and sliding the joiner to the right. Vary the heights of the slots by placing scrap under the biscuit joiner. Finally, plane spline stock to fit the kerf.

—David Chaffee, San Diego

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TIP**



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



For sending this issue's **Top Shop Tip**, David receives a Mirka DEROS 5" random-orbit sander, dust hose, and assorted Abranet discs worth \$720.



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SHOP TIPS



Easy-made shelving units with lots of space to hang tools

The recent installation of four heavy-duty steel shelving units added a lot of much-needed storage space to my workshop. But adding those resulted in the loss of wall space for hanging tools. To bring back that storage, and tidy up the look of the shelving, I mounted doors with pegboard skins.

First, bolt together adjacent metal shelving units top and bottom, front and back. Then, anchor them at the top to the wall. Rip door jambs from 2-by material to match the width of the shelf-unit uprights (in this case, 1½" on the ends; 3" where two uprights meet). On the backs of the jambs, drill shallow counterbores

where shelf-hanging studs protrude from the uprights. Attach the jambs plumb and parallel with screws through the keyhole-shape shelf-hanging holes.

Build the door frames with 2x2s joined with pocket-hole screws. (I put two doors on each shelving unit to keep them from swinging too far into my workspace or becoming too heavy with tools.) Add the pegboard skins, handles, hinges, and magnetic catches. Locks on the pegboard hooks keep them in place when opening and closing the doors.

—Lenny Wheeler, Bracey, Va.

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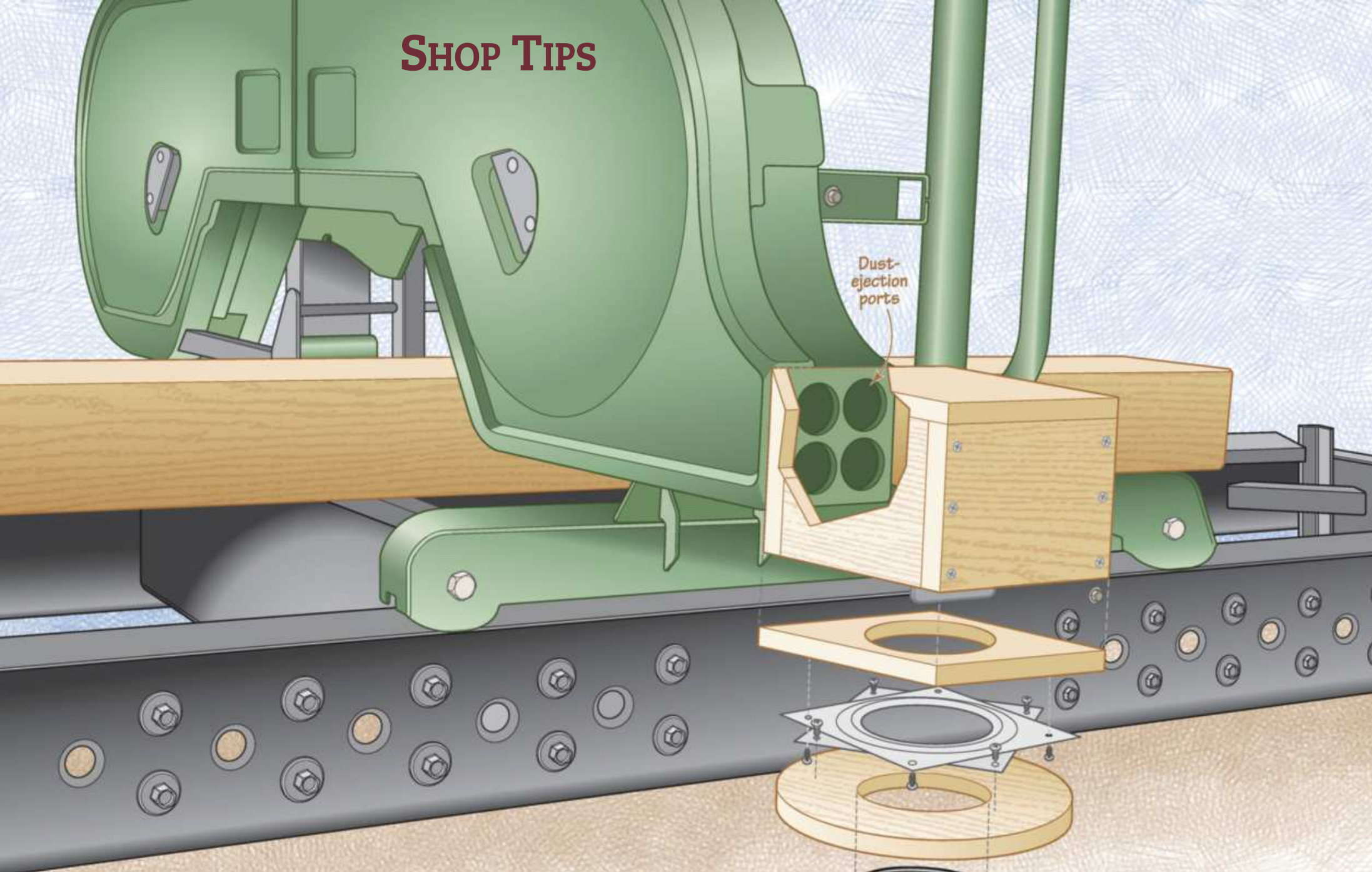
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SHOP TIPS



Lazy Susan eases dust collection with moving tools

The dust-collection hose on my bandsaw mill would tangle and break due to the back-and-forth movement of the saw. Adding a 6" lazy Susan with a 4" center hole (Rockler item no. 28977, 800-279-4441, rockler.com) at the dust-collection port solved the problem. A similar arrangement would prove beneficial on other tools that frequently move.

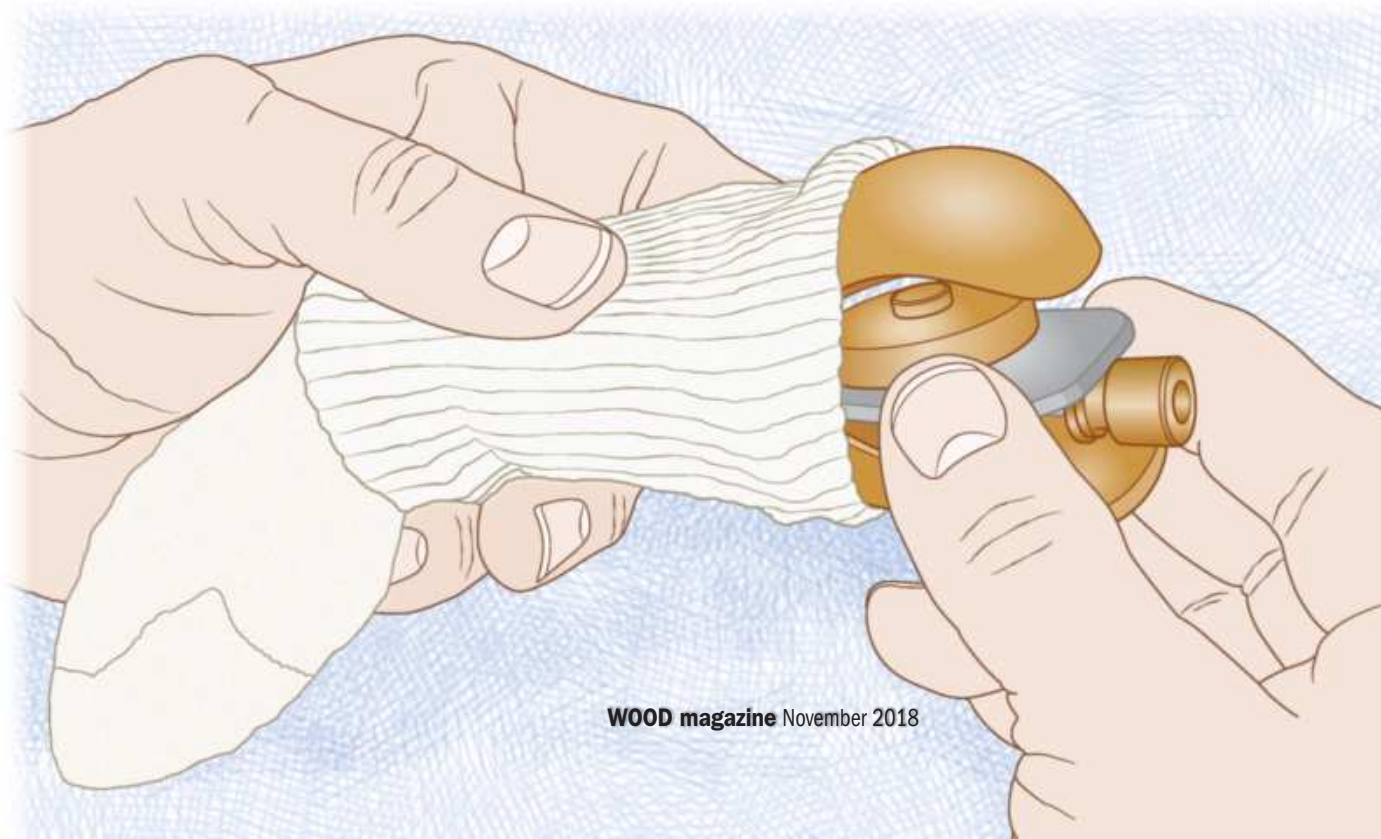
—Paul Honl, La Center, Wash.



Sock it to your planes for their own protection

Here's a frugal alternative to commercial bags intended for protecting hand planes. Store them in old socks—heavy winter socks work especially well.

—Father Chrysanthos, Etna, Calif.

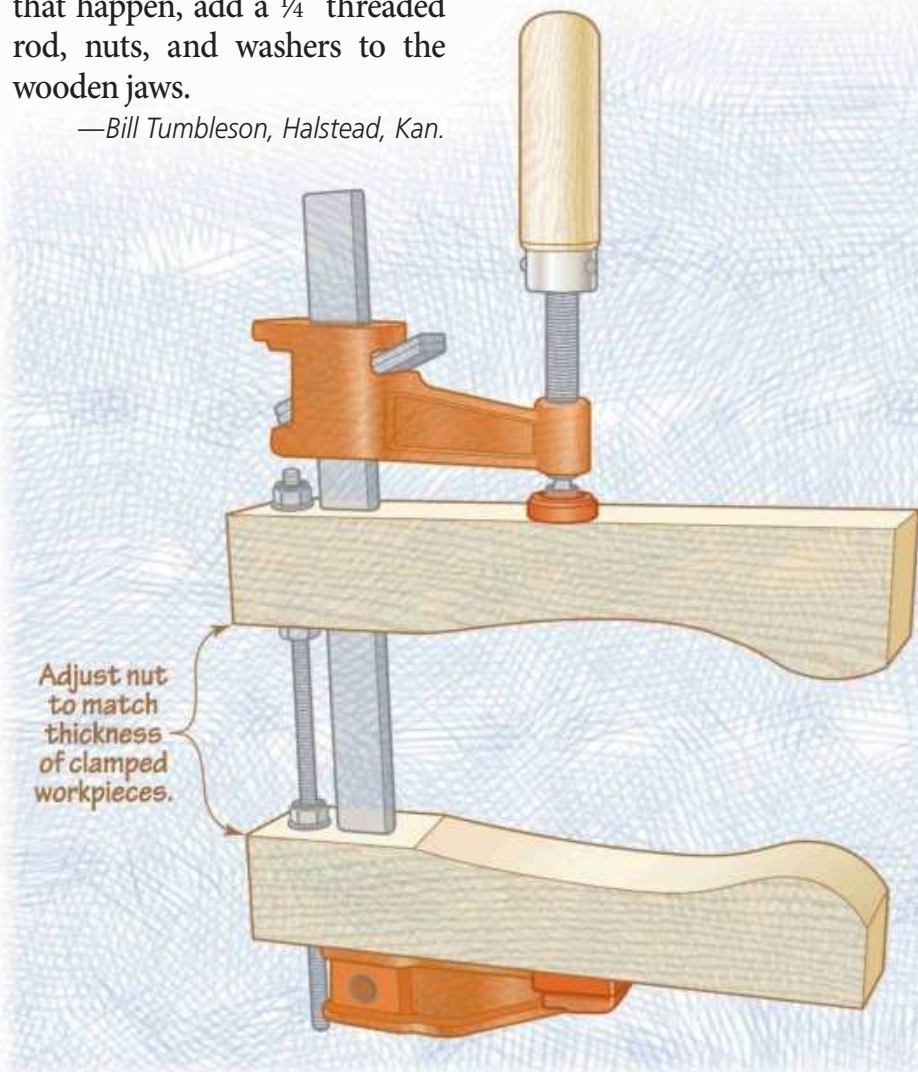


SHOP TIPS

A better way to extend clamp jaws

You can easily extend the reach of F-style clamps by adding a pair of long wooden jaws. That idea has been around for a while, but there's a problem: The jaws will bind under clamping pressure. To prevent that situation, the distance between the wood jaws at the clamp bar has to be at least the thickness of the clamped workpieces. To make that happen, add a ¼" threaded rod, nuts, and washers to the wooden jaws.

—Bill Tumbleson, Halstead, Kan.



Prevent petrified wood putty

To avoid throwing away half-full containers of hardened, water-based putty, attach a 1½×1½" piece of adhesive-backed foam weather stripping to the inside middle of the lid on new putty containers. Add a few drops of water to the sponge material after

each use to ensure a damp, putty-preserving atmosphere inside the container. 🌿

—Richard Heath,
Yorba Linda, Calif.



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Football Pen Kit in Antique Pewter

Firefighter



Firefighter Pen Kit in Chrome & Red

NEW

Discover the joy of making a one of a kind Bolt Action, Motorcycle, Football and Firefighter pen. All pen kit styles are completely authentic with precision engineered components that were carefully designed to ensure uniqueness and reliability. They feature a Parker™ style refill for smooth writing performance and instructions for how to make them.



Easy and
fun to make
on a lathe

On shock absorber you'll find a super cool "kick-start" mechanism that replicates the kickstarter on the motorcycle. This mechanism functions the same way as our Bolt Action pen kits to smoothly advance and retract the refill. Requires a pen making mandrel, bushings (Item #PKPT100BU \$5.95) and 10mm drill bit (Item #PK10-10 \$7.95).

Football Pen Kits **NEW!**

Create this pen for the ultimate game day gift. The top of the pen is sculpted to honor the grand architecture of a professional football stadium. The interior of the stadium captures essential stadium components in wonderfully fine detail; from a scoreboard with lights, fan seating and hallways, player entrances and of course, the field. The pen clip features a graceful player in motion, cradling the ball with one arm and stiff arming with the other. The player runs on top of a yard marker that marks the football field center band; When you twist the pen to extend the refill, the marker will mark different points of the field center band to mimic a scoring drive. The pen tip replicates a football with pigskin texture and contoured for a comfortable writing experience. Requires a pen making mandrel, bushings (Item #PKFBALLBU \$5.95) and 10mm drill bit (Item #PK10-10 \$7.95).

Firefighter Pen Kits **NEW!**

The details of the pen pay homage to the dedication, sacrifice and bravery these hero's display. Including; a pen clip that represents a Firefighter's ladder and iconic Firefighter's Maltese Cross. The pen end depicts a silhouette of a Firefighter in uniform a holding a hose with the words "Honor" "Bravery" "Duty" and "Dedication" displayed behind

the silhouette. The pen top features a classic Firefighter's helmet form. The pen tip is shaped like a Firefighter's hose nozzle. While the "Push and Lock" Pen Mechanism emulates an American fire hose. To extend the refill, simply push the back-end of the pen downward and rotate to lock the upper adapter clips into place. Requires a pen making mandrel, bushings (item #PKFIREBU \$4.95) and 10mm drill bit (item #PK10-10 \$7.95).

Bolt Action Pen Kits

Our best-selling pen kits enjoys a huge following in the pen making community. It's beloved for its realistic bolt-action handle that smoothly advances and retracts to securely lock the refill in place. Includes a bolt-action rifle clip and replica 30 caliber cartridge and rose gold tip for added authenticity. Requires a pen making mandrel, bushings (Item # PKCP3000BU \$5.95) and 3/8" drill bit (Item #PKEXEC-3/8 \$3.95). Patent No.: US D682,352 S

Motorcycle Pen Kits **NEW!**

From the straight pipes to the muscular lines of the old school single cylinder engine with kickstart mechanism, your custom-built Motorcycle pen will make a statement. The pen tip features a fierce, intricately cast eagle head with the engraved words, "Ride Hard. Live Free" as a band above the eagle head. A true to life old school single cylinder engine adorns the pen end.

Need a lathe to get started?



This basic pen making starter set includes our top rated Turncrafter 10" Variable Speed Midi Lathe and includes enough tools and accessories to start turning 10 beautiful 24kt Gold plated slimline pens and pencils. You will also get other essentials you need to start making pens including a Pen Mandrel, 3pc Carbon Steel Chisels, Assortment of Pen Blanks, Mid Cure Epoxy Glue, Barrel Trimmer, Shellawax Cream and a 45 minute instructional pen making DVD.

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Gun Metal	#PKCP8020	\$12.95	\$12.05	\$11.15	\$10.25
24kt Gold	#PKCP8000	\$14.95	\$13.95	\$12.95	\$11.95



Bolt Action Pen Kit in Gun Metal



Bolt Action Pen Kit in 24kt Gold

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Matte Black & Chrome	#PKMOTMBCH	\$22.95	\$21.95	\$20.95	\$19.95
Chrome <i>(shown opposite page)</i>	#PKMOTCH	\$21.95	\$20.95	\$19.95	\$18.95



Motorcycle Pen Kit in Antique Pewter



Motorcycle Pen Kit in Matte Black



Motorcycle Pen Kit in Matte Black & Chrome

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	Item #	1-4	5-9	10-24	25+
Chrome	#PKFBALLCH	\$18.95	\$17.95	\$16.95	\$15.95
24kt Gold	#PKFBALL24	\$19.95	\$18.95	\$17.95	\$16.95
Antique Brass	#PKFBALLAB	\$19.95	\$18.95	\$17.95	\$16.95
Antique Pewter <i>(shown opposite page)</i>	#PKFBALLAP	\$19.95	\$18.95	\$17.95	\$16.95



Football Pen Kit in Chrome



Football Pen Kit in 24kt Gold



Football Pen Kit in Antique Brass

4 Football Pen Kit Starter Set

You get one of each pen kit in Chrome, 24kt Gold, Antique Brass and Antique Pewter. Plus, you get the bushings and drill bit.

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Firefighter Pen Kits **NEW!**

	Item #	1-4	5-9	10-24	25+
Chrome & Red <i>(shown opposite page)</i>	#PKFIRECHR	\$23.95	\$22.75	\$21.55	\$20.35
Antique Brass	#PKFIREAB	\$29.95	\$28.45	\$26.95	\$24.95
Polished Brass & Red	#PKFIREBRR	\$27.95	\$26.55	\$25.15	\$23.75



Firefighter Pen Kit in Antique Brass



Firefighter Pen Kit in Polished Brass & Red

3 Firefighter Pen Kit Starter Set

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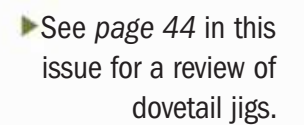
Contrasting corners Dovetailed Box

Through-dovetail impact with the ease of half-blind routing

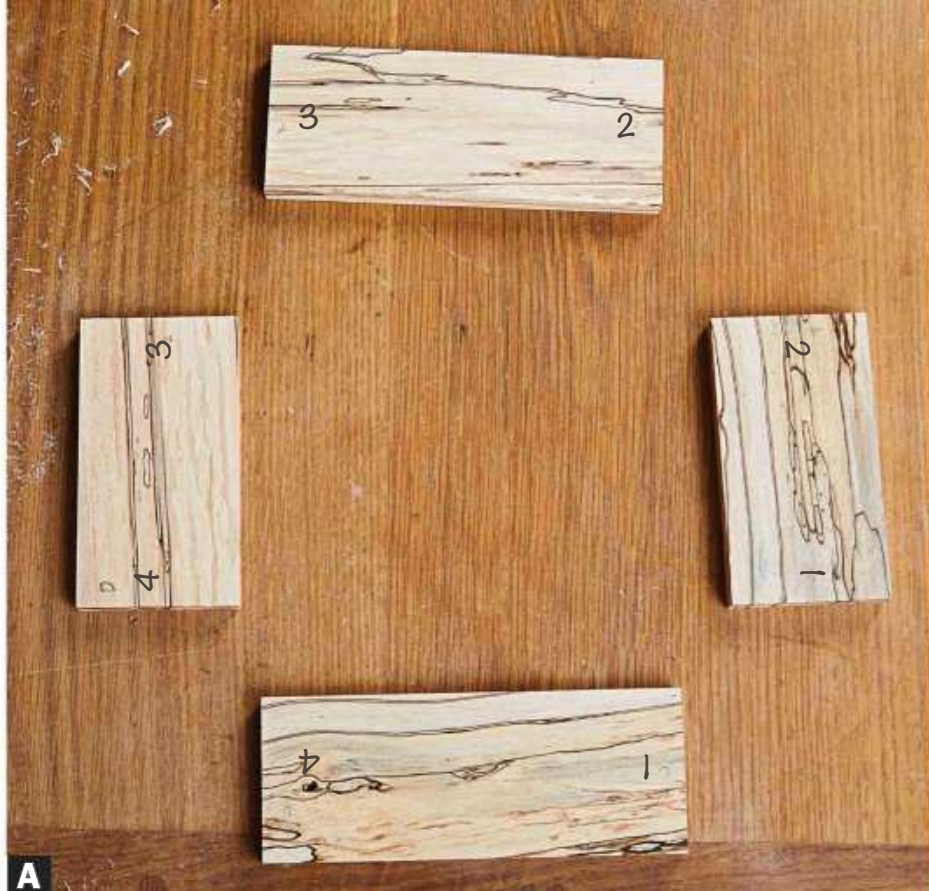
Though easy to make, jig-routed half-blind dovetails only show on one side of a box corner. But in building this project, you'll discover a surprisingly simple technique for mirroring the dovetails around a corner. Select contrasting woods to really make the joints pop.



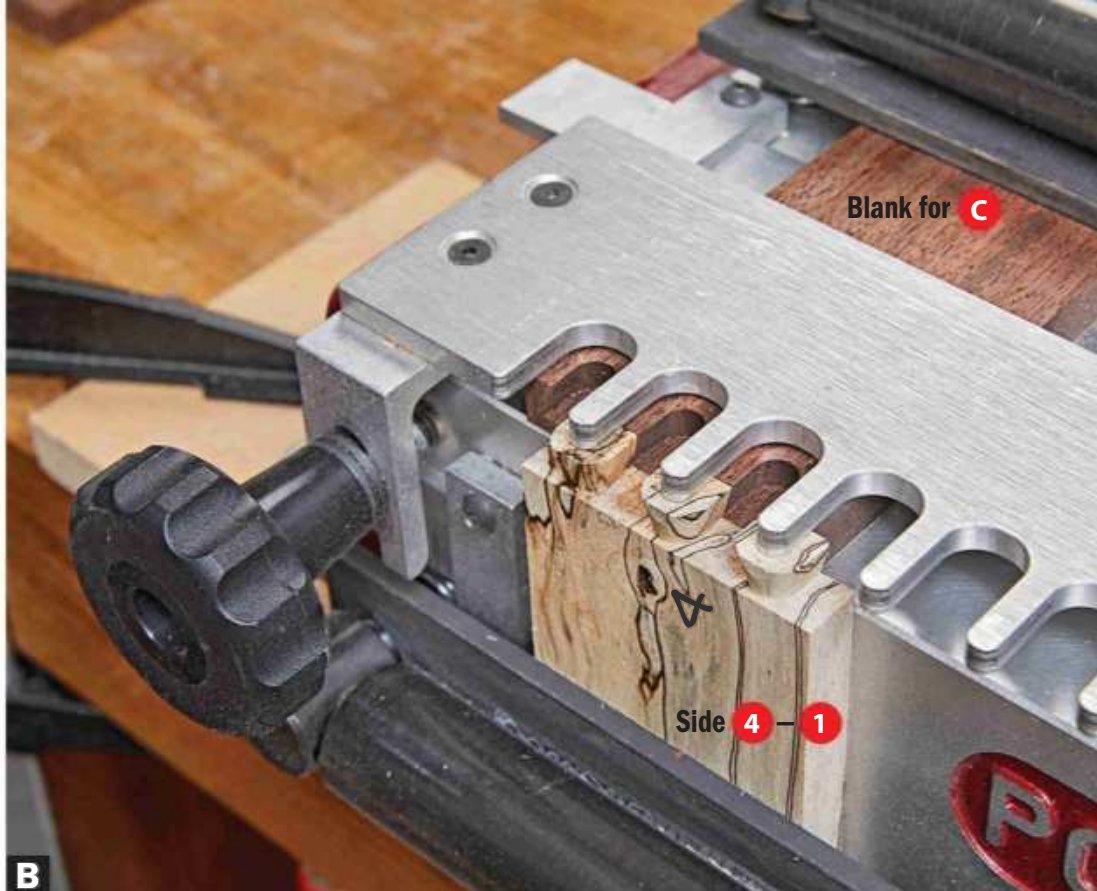
61
cubic
inches
under
lid



Note: We used a fixed-spacing dovetail jig designed to cut $\frac{3}{8}$ "-long dovetails $\frac{7}{8}$ " on center, set up with identical offsets on both ends of the jig.



A Mark the mating ends of sides and ends on the inside faces. Orient the labels to indicate the upper edges of the parts.



B Position the side vertically in the jig with the upper edge against the left stop and the end against the guide template. Position the corner blank horizontally with the end against the side and edge against the left stop. Rout the joint.

Note: Always position the upper edge of the part against the dovetail-jig stop, shifting from the left-hand to the right-hand end of the jig as necessary.

2 Using the scrapwood blanks, set up your dovetail jig [Drawing 1]. Make test cuts until the dovetails slide together with slight friction. Too tight a fit causes the fragile corners (C) to break during assembly.

3 Retrieve the sides and ends and arrange them on your workbench [Photo A].

Form the corners

1 Clamp the side marked 4-1, inside face out, and the corner blank (C) into your dovetail jig and rout the pins and sockets [Photo B]. Glue the side pins into the corner blank sockets, checking for square.

2 Position the rip fence so the face of a saddle jig is just a whisper more than $\frac{1}{2}$ " away from the blade. Trim the corner blank to form the corner (C) [Photo C]. Sand the corner flush with the inside face of the side.

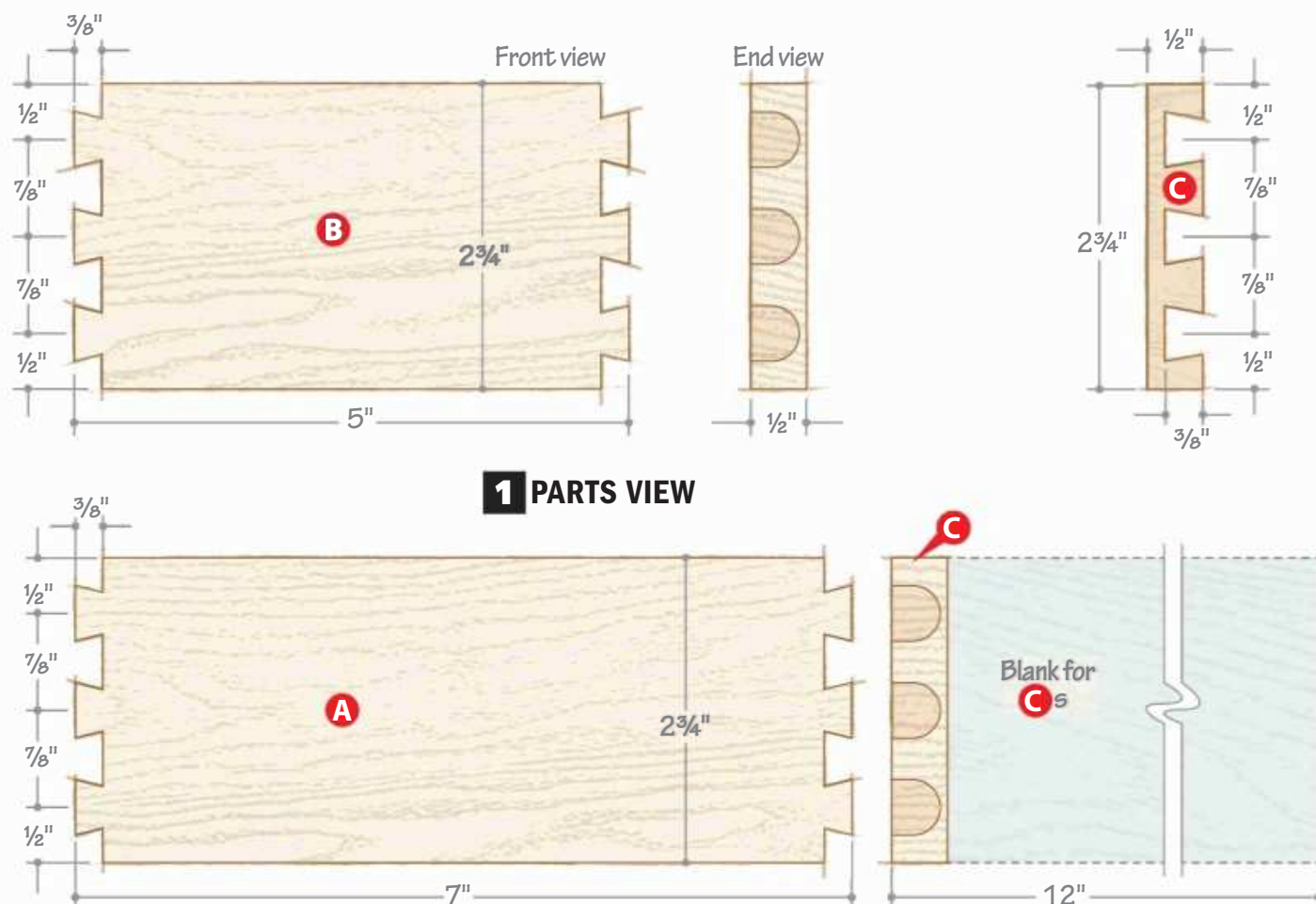
3 Repeat the processes in the two previous steps to attach corners to the three remaining ends of the sides (A).

4 Retrieve the side 4-1 and end 1-2, clamp them into the dovetail jig, inside faces out, and rout the pins and sockets [Photo D]. Repeat to form the three remaining corner joints. Glue the sides and ends to form the box, checking for square.

► Get a free rip-fence saddle jig plan.

woodmagazine.com/saddle

Tip! Check the end of the corner blank for square after each cut.





C Clamp the side/corner blank assembly to a rip-fence saddle jig and cut the corner (C) free from the blank.

Add the bottom, trim, and lid

1 Rabbet the lower inside edge of the sides/ends assembly [Exploded View]. Cut the bottom (D) and radius the corners to fit the rabbet. Glue the bottom in place. Finish-sand the outside of the box.

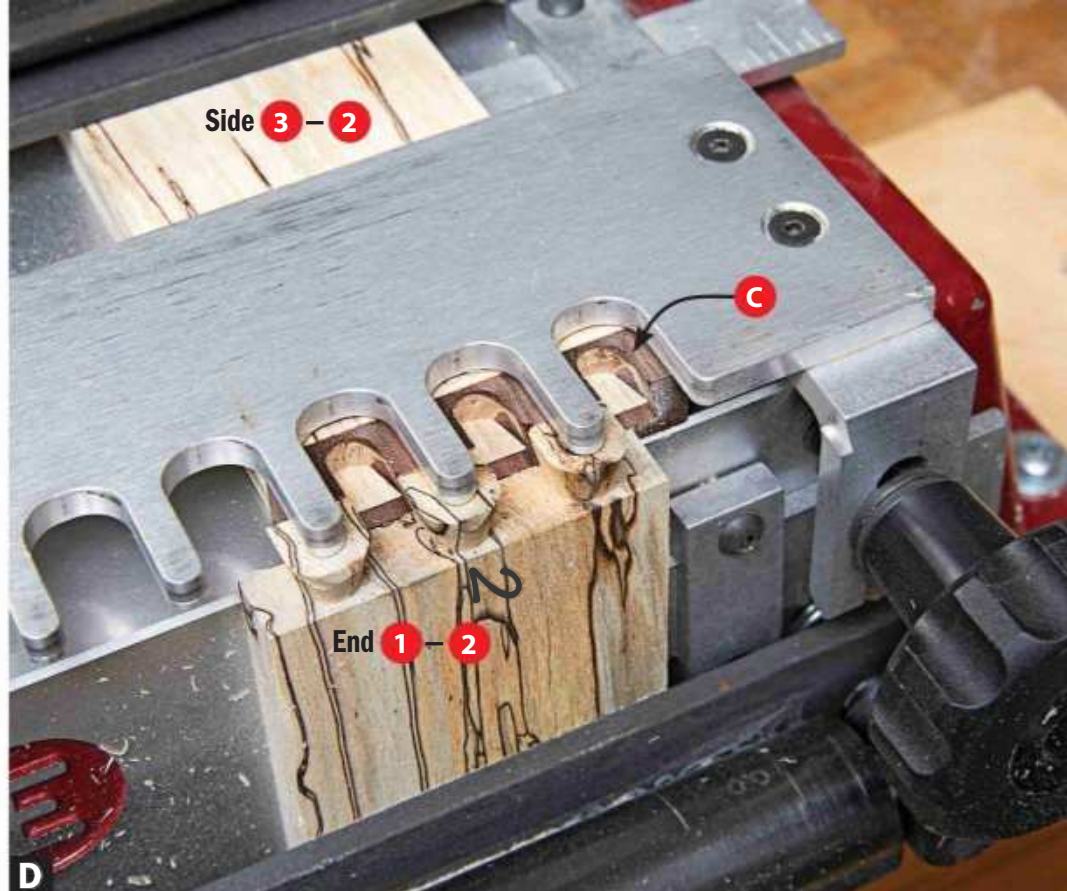
2 Cut the side and end trim (E, F) $\frac{1}{2}$ " longer than listed. Round over the edges and finish-sand the parts. Miter-cut the upper trim to length, making the inside edges flush with the inside of the box. Miter-cut the lower trim to the same lengths. Scribe lines on the bottom (D) $\frac{1}{4}$ " in from the box edges. Glue the trim in place.

3 Cut the lid (G) and rout the upper profile [Drawing 2]. (We used a portion of a Freud raised-panel bit, no. 99-518.) Rabbet the lower edge and finish-sand the lid.

4 Adhere a copy of the handle (H) pattern [Drawing 3] to an oversize blank and cut and sand it to shape. Finish-sand the handle and glue it to the lid.

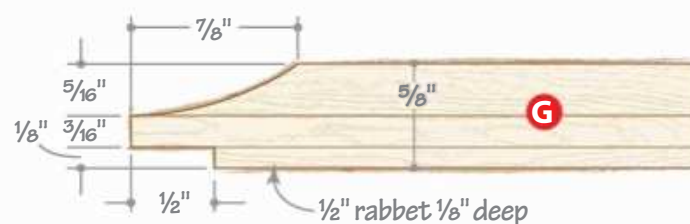
5 Inspect all surfaces and finish-sand where needed. Apply a finish. (We sprayed three coats of Varathane satin lacquer from an aerosol can.) 🌿

Tip! To eliminate chip-out, rout the lid profile in small increments and back the cut with a follower block.

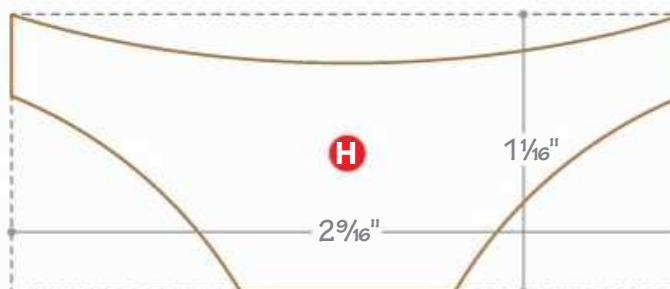


D Position the end vertically and the side horizontally in the jig with the top edges against the right stops. Rout the joint.

2 LID PROFILE DETAIL



3 HANDLE FULL-SIZE PATTERN



Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	sides	$\frac{1}{2}$ "	$2\frac{3}{4}$ "	7"	SM	2
B	ends	$\frac{1}{2}$ "	$2\frac{3}{4}$ "	5"	SM	2
C*	corners	$\frac{1}{2}$ "	$2\frac{3}{4}$ "	$\frac{1}{2}$ "	W	4
D	bottom	$\frac{1}{4}$ "	$4\frac{3}{4}$ "	$6\frac{3}{4}$ "	BP	1
E*	side trim	$\frac{3}{16}$ "	$\frac{5}{8}$ "	$7\frac{1}{2}$ "	W	4
F*	end trim	$\frac{3}{16}$ "	$\frac{5}{8}$ "	$5\frac{1}{2}$ "	W	4
G	lid	$\frac{5}{8}$ "	$5\frac{1}{4}$ "	$7\frac{1}{4}$ "	SM	1
H*	handle	$\frac{1}{2}$ "	$1\frac{1}{16}$ "	$2\frac{9}{16}$ "	W	1

*Part initially cut oversize. See the instructions.

Materials key: SM-spalted maple, W-walnut, BP-birch plywood.

Bits: Dovetail, $\frac{1}{4}$ " rabbet, $\frac{1}{16}$ " round-over, raised-panel, and $\frac{3}{4}$ " straight router bits.

Produced by **Jan Svec** with **Kevin Boyle**

Project design: **Bob Hunter**

Illustrations: **Roxanne LeMoine, Lorna Johnson**

Tip! For a rattle-free lid, install a $\frac{3}{4}$ " straight bit in your router table and position the fence to cut a narrower-than-needed rabbet. Sneak up on the final width by moving the fence back in small increments, testing the fit between cuts.

Remember, each movement of the fence doubles as you rout both sides and both ends.



Install Drawers Without Metal Slides

For centuries, before metal drawer slides were a thing, woodworkers relied on wood guides to prevent drawers from tipping or binding as they were pulled out. Today, wood drawer guides still have their place, preserving a traditional look on deserving projects, and saving you the expense of ball-bearing slides. So go ahead, use or adapt one of these approaches on your next set of drawers.

The trade-off

Full-extension metal slides allow you to build a drawer the full depth of the cabinet and still access its furthest reaches without removing it from the cabinet. To get that access using wood guides, you'll need to move the back of the drawer forward 2–4". When the back reaches the front of the cabinet it provides a visual cue that you've pulled out as far as you should. A portion of the drawer sides remain in the cabinet preventing the drawer from tipping.

Top, bottom, and side guides

Guides above and below the drawer prevent it from tipping, while side guides keep the drawer tracking straight. This approach provides a clean uncluttered drawer side, perfect for highlighting attractive joinery, such as dovetails.

- ▶ Mounting the bottom guides $\frac{1}{16}$ " proud of the face-frame rail prevents the drawer from rubbing on the rail and creates a reveal below the drawer.

On a cabinet with a face frame [Face-frame Cabinet Drawing], the inside edges and faces of the guides rest flush or near-flush with the edges of the rails and stiles. Mount the guides by adding blocks to some combination of the cabinet side, side stiles, rear of the face frame, or cabinet back. In some cases,

you can mount them directly to the sides [Photo A] or to web frames [Photo B].

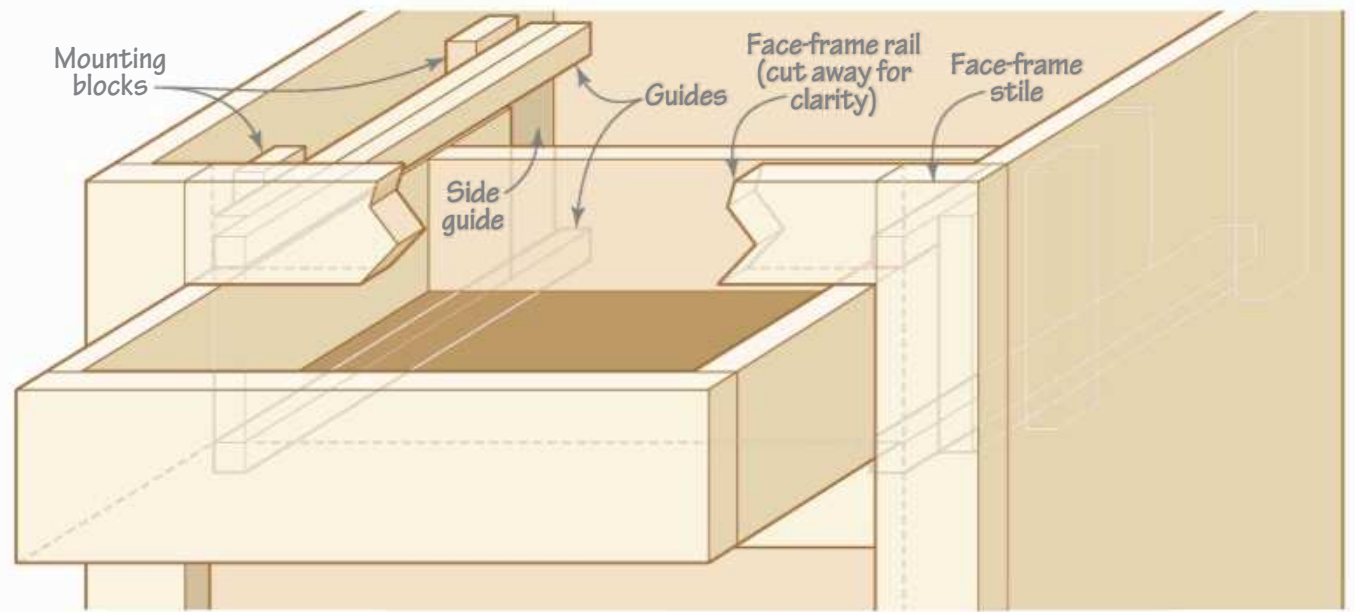
On frameless cabinets, eliminate the side guides and let the cabinet sides serve to keep the drawer running straight in and out [Frameless Cabinet Drawing]. If the cabinet sides are plywood, glue and screw the top and bottom guides in place.

If the cabinet sides include solid-wood panels, mount the guides to allow the panels to expand and contract with changes in humidity. To do this, drill slots in the guides and mount with screws only—no glue.

Tip! Make guides from hardwoods that wear well, such as hard maple or hickory. Rub on paste wax or paraffin for a smooth glide.

Tip! Make mounting drawer guides easier by installing the cabinet back after securing the guides.

FACE-FRAME CABINET



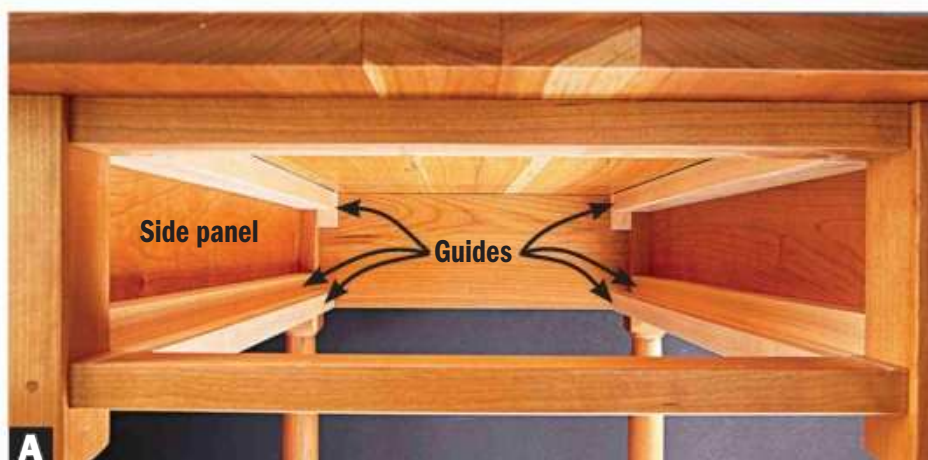
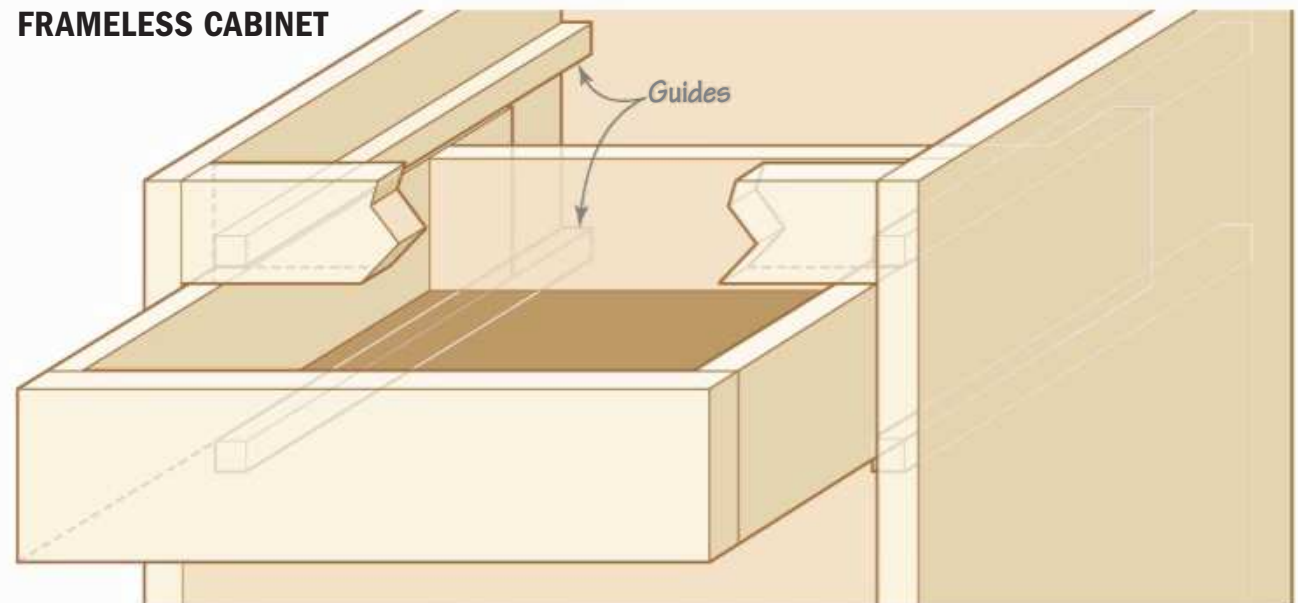
Drawer-building notes:

■ Because no part of the guides intrude into the opening, make the drawer box as wide as the opening, less $\frac{1}{8}$ " for clearance.

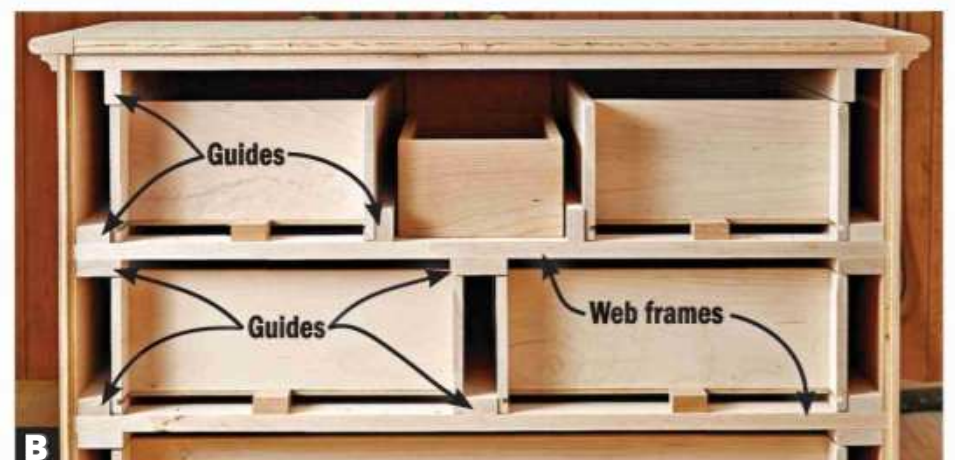
■ On frameless cabinets, you give up a bit of vertical drawer depth to accommodate the guide below the drawer.

■ For stacked inset drawers, extend the fronts above and below the drawer-box sides to cover the exposed ends of the guides between drawers.

FRAMELESS CABINET



A Because the grain of the side panels runs horizontally on this table, gluing the guides to them creates no cross-grain wood movement concerns.



B On a cabinet with web frames, the frames support the drawers. Guides above and beside each drawer keep them tracking straight in and out and prevent tipping.

Drawer-mounted cleats

Instead of trapping the entire drawer side between guides, this method traps only a cleat mounted to the drawer side [Drawing]. The guides may be separate pieces, or a single grooved piece that the cleat slides in. Because the guides prevent the drawer from tipping while also eliminating side-to-side

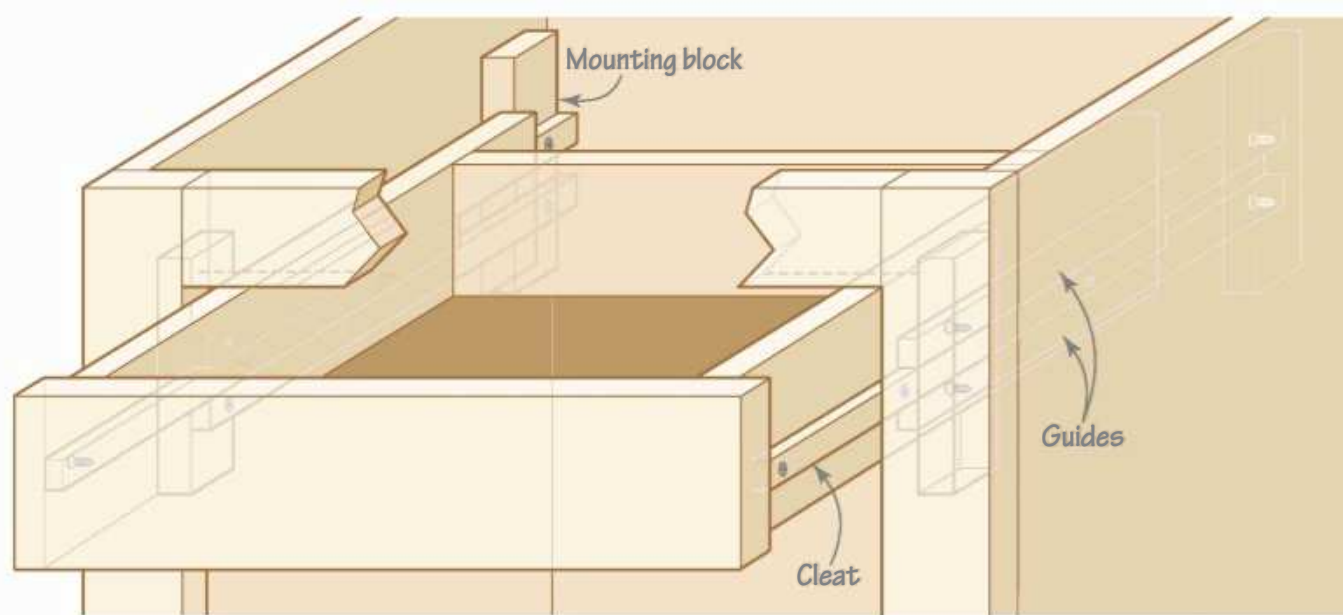
movement, no side guides are needed. Mount the guides using one of the techniques for mounting the top and bottom guides described in the previous section.

A narrow cleat expands and contracts very little compared to a single, wide side guide, so the drawer is less likely to bind.

Drawer-building notes:

► A $\frac{3}{8} \times \frac{1}{2}$ " cleat on the drawer minimizes bulk. Increase the width to $\frac{3}{4}$ " for drawers supporting heavy loads.

- You give up a bit of drawer width to accommodate the cleats. To determine the drawer width, subtract from the width of the opening the combined thickness of the cleats and an additional $\frac{1}{8}$ ".
- For inset drawers, the front must be longer than the horizontal dimension of the drawer box to conceal the cleat and guides.
- Screw the cleats to the drawer sides (no glue) to allow for removing them and making fine adjustments, if needed.



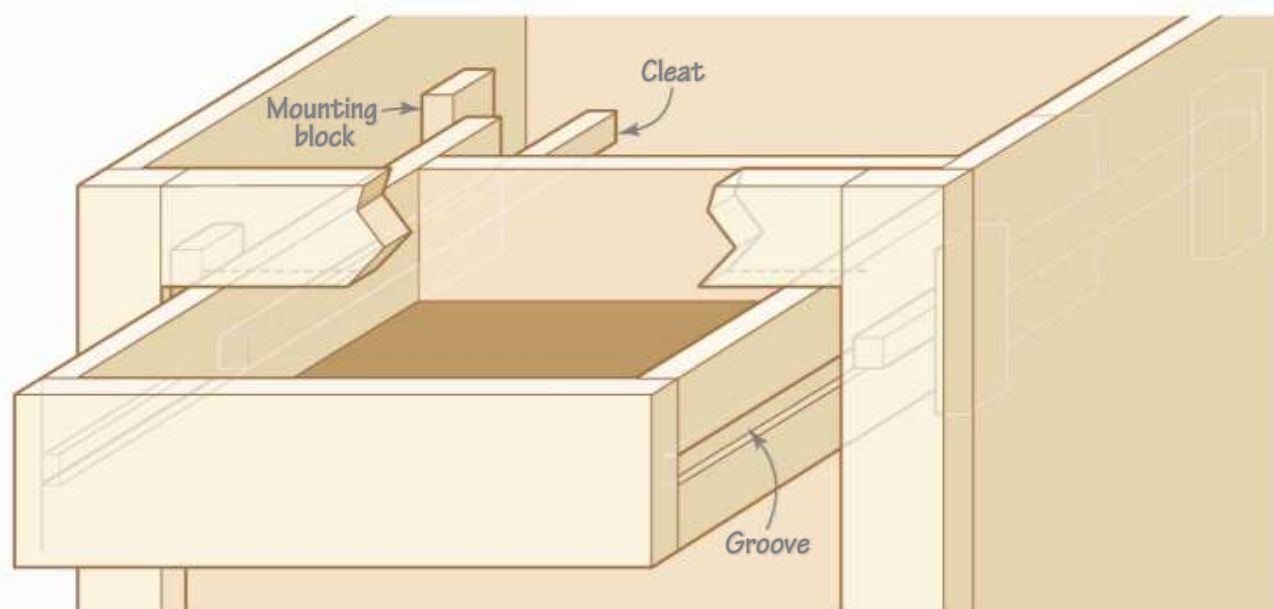
Grooved drawer sides

A cleat attached to each cabinet side fits into grooves in the drawer sides [Drawing]. The exposed drawer side looks cleaner than one with a cleat attached. You don't sacrifice

drawer width, and side guides are not needed. Size and mount the cleats so they extend into the drawer opening the depth of the groove.

Drawer-building notes:

- This method allows for drawers the full height and width of the opening.
- Because the groove should be at least $\frac{3}{8}$ " deep, the drawer sides should be at least $\frac{5}{8}$ " thick.
- Cut or rout the drawer-side grooves before assembling the drawer.
- Locating grooves at or near the centerline of the side maximizes material above and below the grooves, preserving drawer strength.
- An inset drawer front will match the box size, hiding the grooves.



Under-drawer guide

A center-mounted under-drawer guide [Source] provides a drawer box free of cleats or grooves. This system requires a web frame below the drawer opening for securing a rail with a dovetail profile [bottom drawing]. A guide with a matching groove mounts to the drawer bottom [top drawing]. Cut the

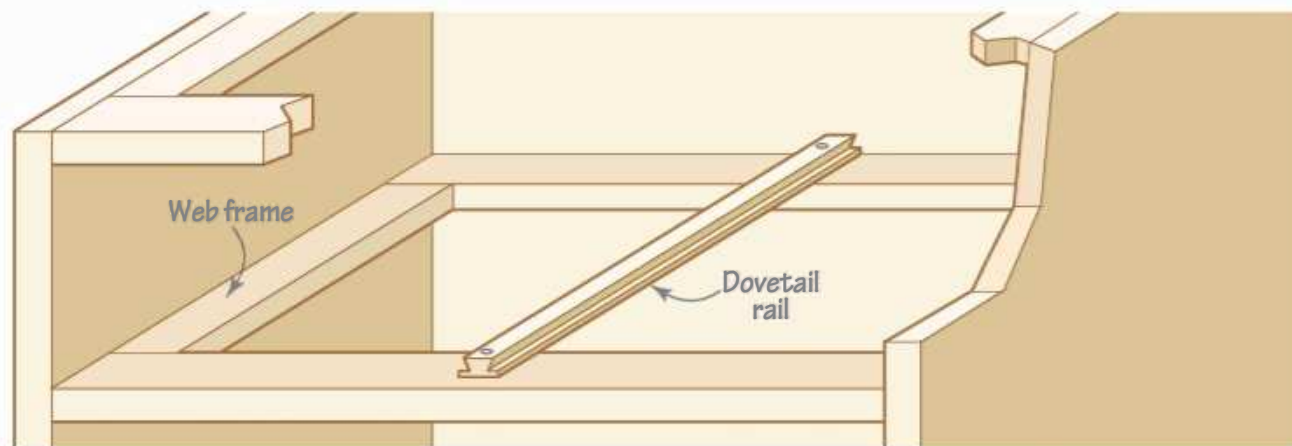
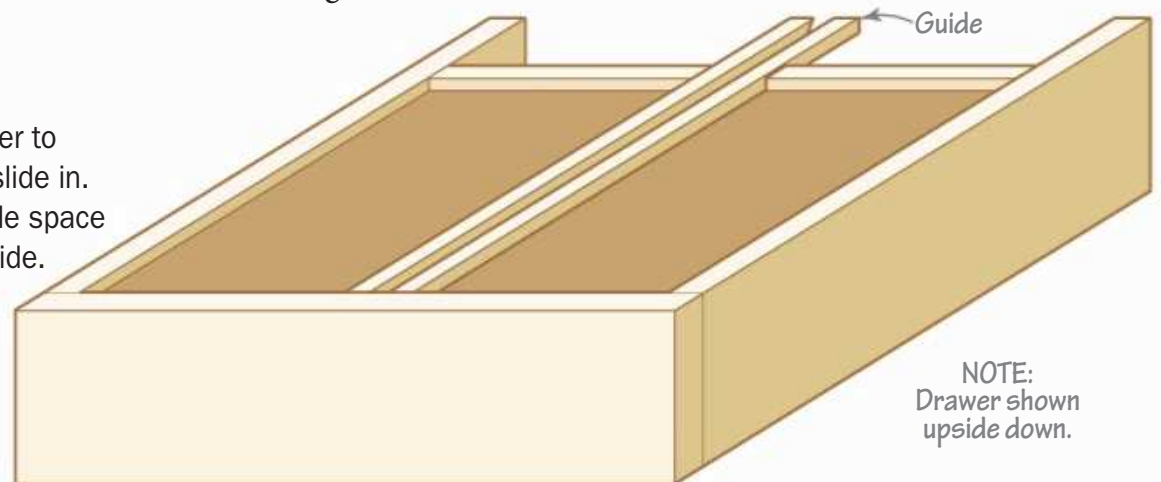
rail and guide to length to suit the depth of the cabinet and length of the drawer.

The rail and guide keep the drawer tracking straight as you move it in or out, eliminating the need for side guides. The web frame supports the drawer and prevents it from rocking.

Source: Center-mount drawer slide, 22", no. 24877, \$10, Rockler Woodworking and Hardware, 800-279-4441, rockler.com.

Drawer-building notes:

- You must notch the rear of the drawer to accept the guide and allow the rail to slide in.
- Position the drawer bottom to provide space below it (typically $\frac{5}{8}$ ") to accept the guide.
- Matching the guide to the length of the drawer sides keeps the drawer from tipping as you pull it forward.



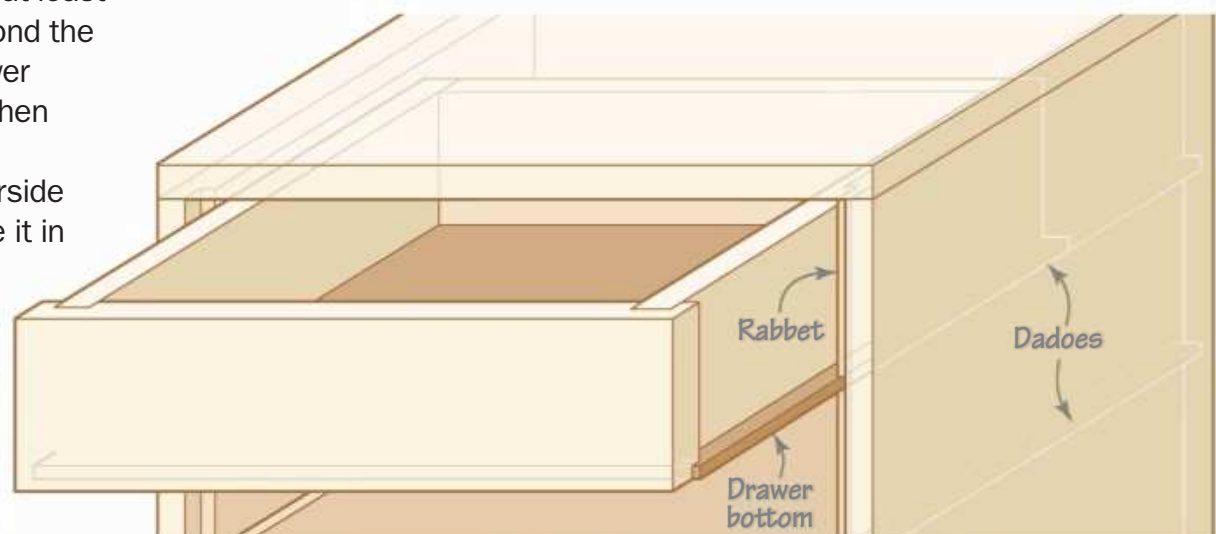
Bottom as slides

This method may not suit fine furniture, but it provides a quick and easy way to mount drawers in utility cabinets and shop fixtures.

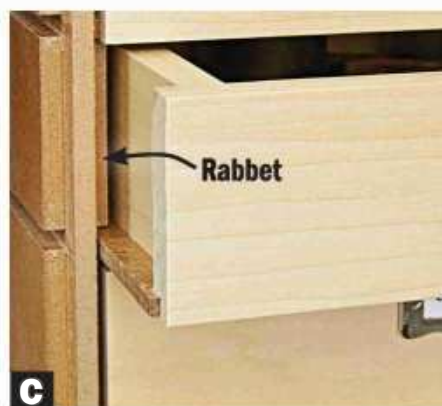
Extend the drawer bottom $\frac{1}{4}$ – $\frac{3}{8}$ " beyond each drawer side. These “wings” slide in dados in the cabinet sides. Let the dados show, or hide them by rabbeting the front edges of the carcass [Photo C], or by using overlay drawer fronts.

Drawer-building notes:

- To fully access the drawer while leaving it in the cabinet, make the bottom at least $\frac{1}{2}$ " thick and extend it 2–4" beyond the ends of the sides. A loaded drawer may snap off a thinner bottom when extended.
- Mount the bottom to the underside of the drawer rather than capture it in grooves. 🌳



Rabbets in the case sides allow the drawer fronts to sit flush with the case front, concealing the bottom and dado.





D I M E N S I O N S :
 129" W x 14 1/2" D x 56 3/4" H

Up to
65"
 screen size
 fits in center
 cabinet

Doors roll
 smoothly on
 nostalgic
 barn track



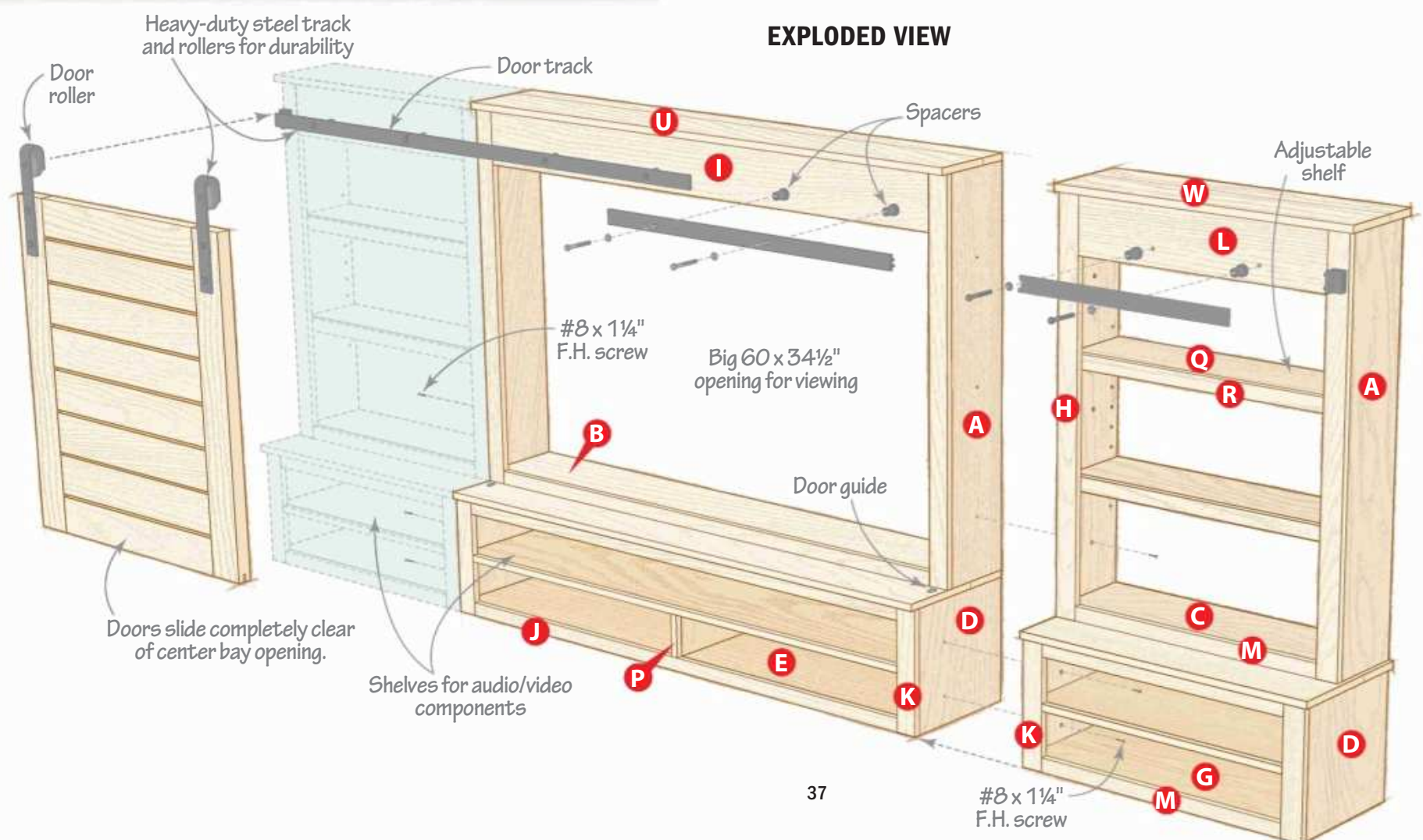


Starring roll Barn-door Entertainment Center

Stylized barn doors conceal a large flat-screen TV display in this handsome entertainment center. For viewing, the doors slide easily to each side.

Start by building six boxes

The entertainment center comprises a large center cabinet flanked by two matching units. Each unit consists of an upper and lower cabinet. For strength, they attach to each other as well as to the wall.



► Space shelf-pin holes accurately.
woodmagazine.com/
spaceshefpins

► Glue and clamp square carcasses.
woodmagazine.com/
clampsquare
woodmagazine.com/
clampingbrace

1 Cut parts A–G [Materials List, Drawings 1 and 2] with dados and rabbets where shown. Drill shelf-pin holes in the four sides (A) for the outer cabinets [Drawing 3].

2 Construct the upper and lower center cabinets (A/B and D/E/F) and outer units (A/C and D/G) [Drawings 1 and 2].

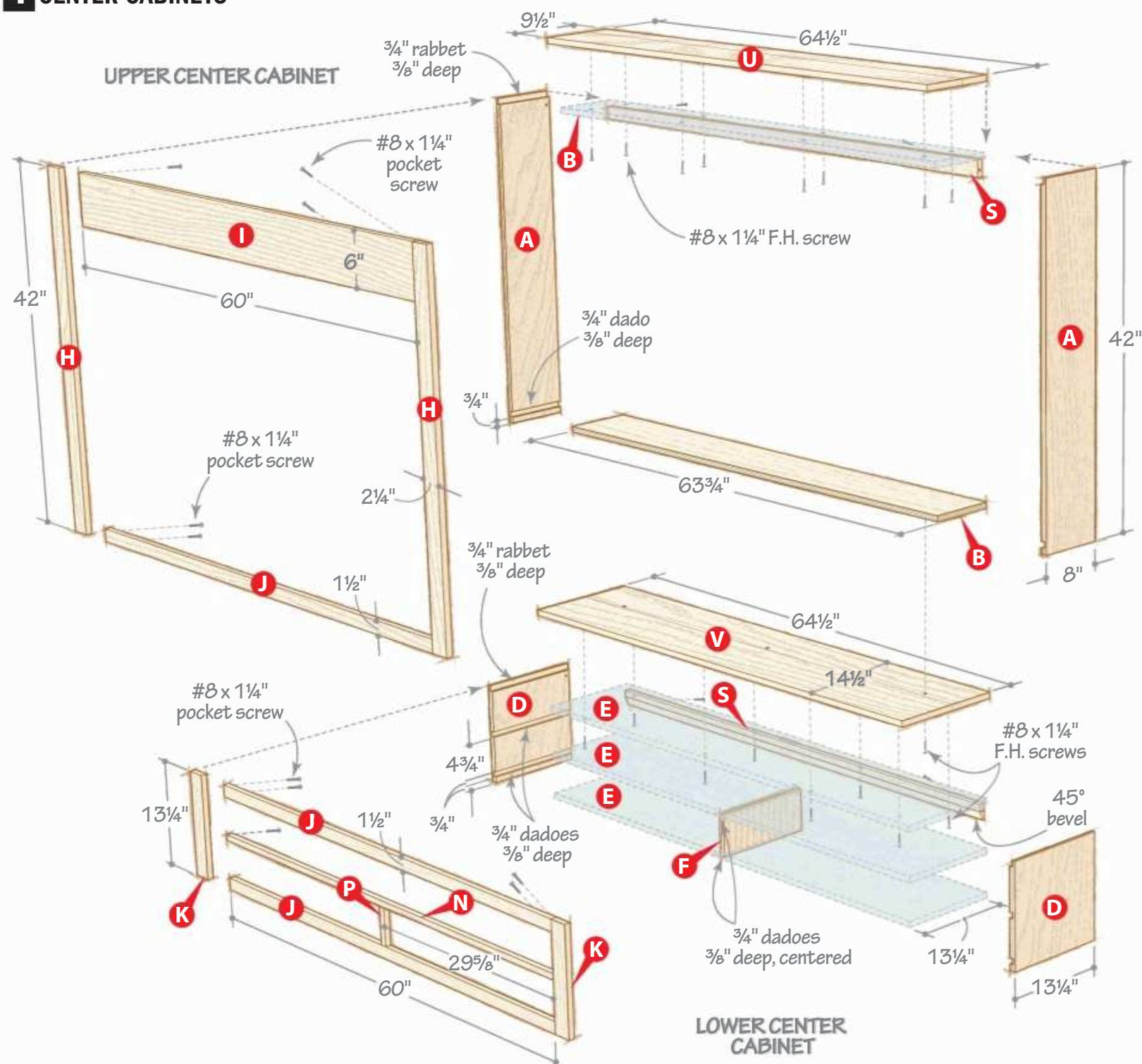
3 Cut the face-frame stiles and rails H–M to size. Assemble face frames H/I/J, J/K, H/L/M, and K/M with glue and pocket screws [Drawings 1 and 2]. Glue the face frames to the cases, flush at the sides, top, and bottom.

4 Mill blanks for the lower cabinet middle rails and stile (N–P) about 3" longer than shown. Trim the rails to fit [Photo A], and glue them in place. Then install stile P.



A Position the middle rail across the face frame and mark the length with a knife for maximum precision. Mark the stile for the center cabinet the same way.

1 CENTER CABINETS



Add shelves and cleats

1 Cut the shelves and edges (Q, R) to size. Glue the edges to the shelves [Drawing 2] and finish-sand the shelf assemblies.

2 After cutting the attaching cleats (S, T), rip a 45° bevel on one edge of two center cleats (S) and four outer cleats (T). Leave the other three cleats square-edged.

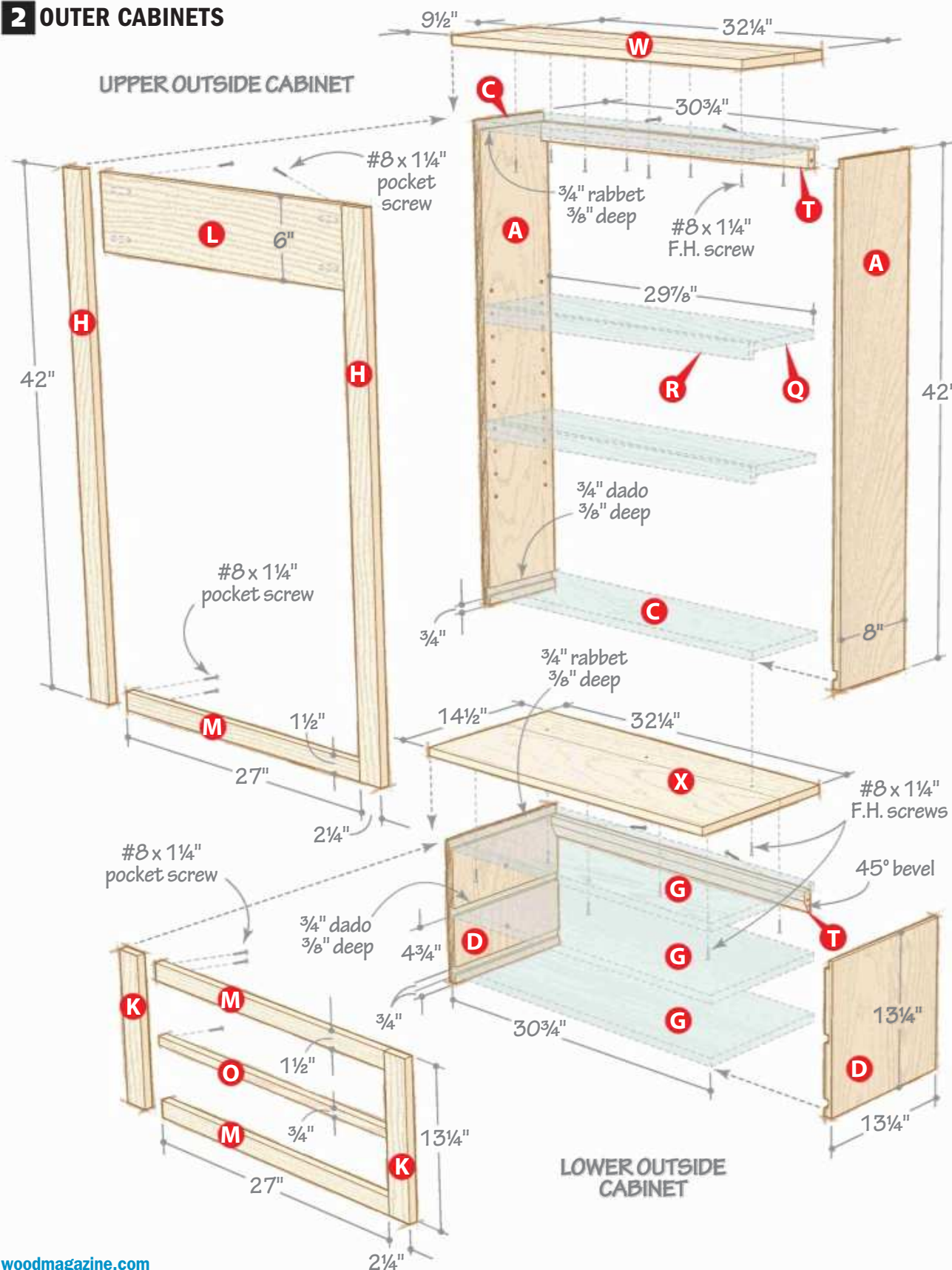
3 Screw and glue a square-edged cleat to the underside of the top on each upper cabinet, flush at the back [Drawings 1 and 2]. Similarly, attach a beveled cleat to each lower case [Photo B], keeping the three mating parts to attach to the wall later.

4 Glue up stock for the tops (U-X). Cut them to size and finish-sand. (You'll attach them to the cabinets later.) Finish-sand the six cabinets.

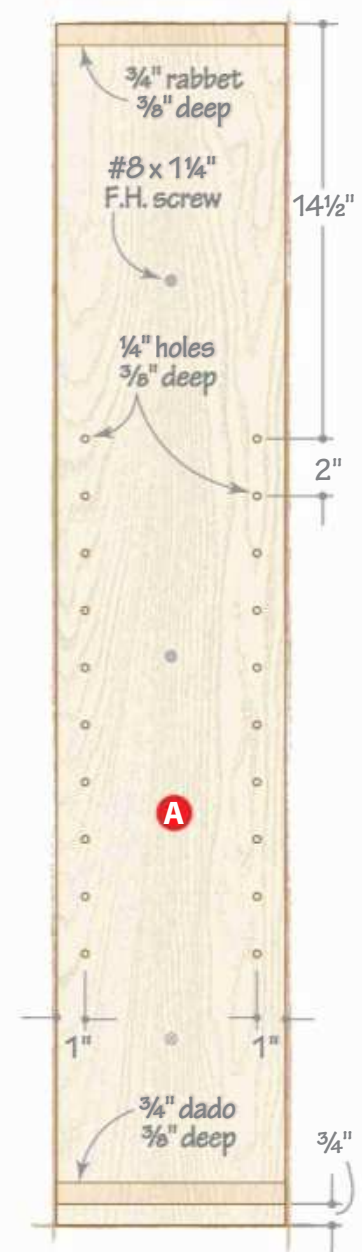


B Attach the beveled lower-cabinet cleats with pocket screws. The remaining beveled parts attach to the wall and mate with the case when you install the completed unit.

2 OUTER CABINETS

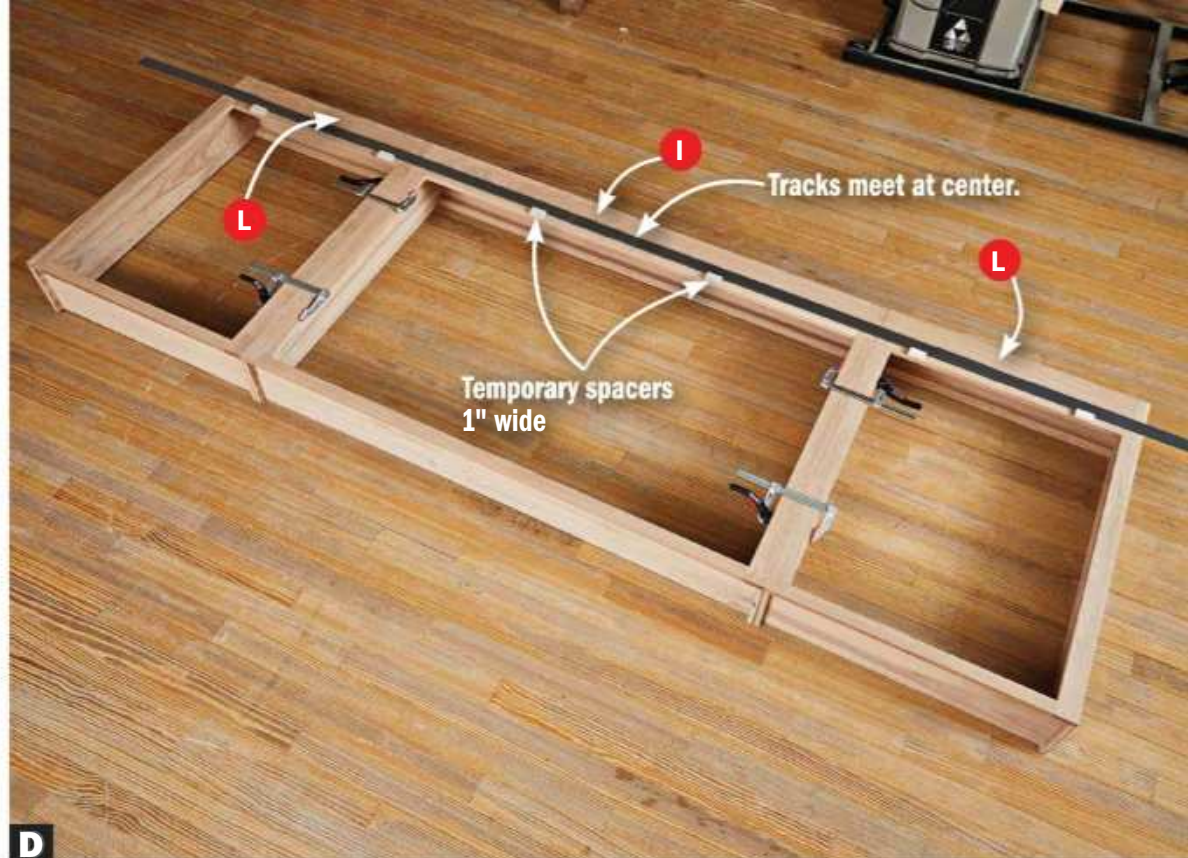


3 SHELF-PIN HOLE SPACING





C Position the slats flush with the front of the frame as you assemble the doors. Spacers (about $\frac{9}{32}$ ") maintain equal gaps between the slats and the top and bottom rails.



D Position the door track on the face-frame rails to mark the mounting-hole locations. Butt the two track ends together at the middle of the cabinet.

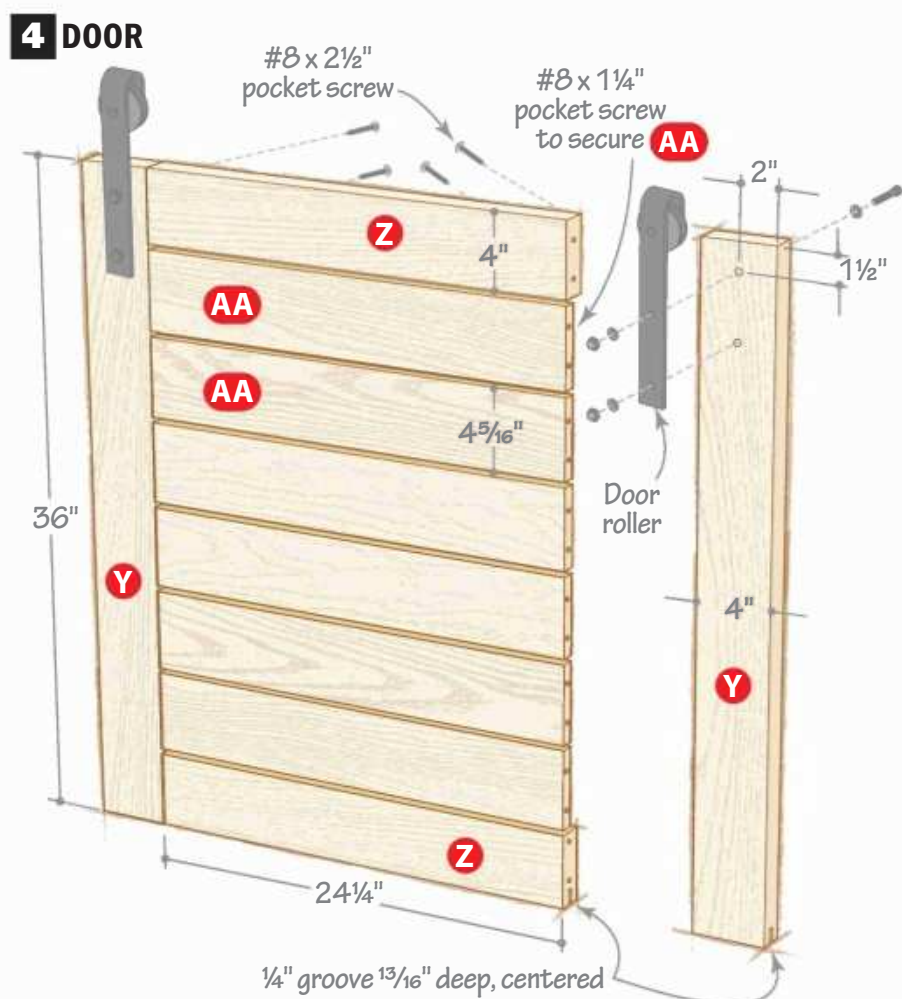
Make the barn doors

- 1 Cut the stiles, rails, and slats (Y, Z, AA). Drill pocket holes at the ends of the rails and slats [Drawing 4].
- 2 Assemble the doors with glue and pocket screws [Drawing 4, Photo C].
- 3 Saw or rout the guide groove along the bottom of each door and drill holes for the door rollers [Drawing 4, Source]. Mount the rollers to verify fit; then, remove them and finish-sand the doors.

Tip! Verify mounting dimensions for the door rollers with the manufacturer's instructions.

Attach the door track

- 1 Lay down the upper cabinets and clamp them together with the tops and bottoms



flush. Mark the middle of the center cabinet on the upper face-frame rail (I).

2 Attach six $\frac{3}{4} \times 1 \times 2$ " temporary spacers to rails I and L with double-faced tape, flush with the rail bottoms [Photo D]. Center the door track sections along the tops of the spacers.

3 Mark the track-mounting-hole centers [Photo E]. Set aside the tracks and remove the spacer blocks.

4 Cut blocking BB and CC. Temporarily attach the spacer blocks from Step 2 to the back of the face-frame rails I and L, flush at the bottom. Position BB and CC on the rails at the top of the spacers and glue the blocking in place [Drawing 5]. Remove the spacers.

5 Drill pilot holes for the track mounting screws at the marked locations. Cut the track sections to length and test-mount them with lag screws, washers, and track spacers, following the hardware manufacturer's instructions [Exploded View, Drawing 5]. Remove the tracks and hardware.



E Draw the track mounting holes on the cabinet face frames. Also mark the ends of the tracks flush at each side of the cabinets and identify each track for position.



F Screw the cleats to the wall with 3½" screws. Drive screws into studs. Keep the tops of the three cleats level and even.

Finish and install the units

1 Touch up the finish-sanding. Apply a finish to the cabinets and doors as desired. (We sprayed the units with three coats of clear lacquer.)

2 Fasten the tops (U, V, W, and X) in place with screws driven from inside the cabinets. Make left and right outer cabinets.

3 Measure from the floor to the desired bottom edge of the attaching cleats (S, T). Draw a level line at that height on the wall where the entertainment center will be installed. Mark the positions for the mating cleats along the line.

4 Screw the cleats to the wall, keeping them level [Photo F]. Hang the lower cabinets on the cleats.

5 Mark the edges of the upper center cabinet bay on the wall and install a TV wall mount, centered side-to-side at a suitable height. Wire the power and TV cable outlets according to local codes.

6 Screw the lower cabinets to each other. Set the upper cabinets on the lower ones. Attach them at the top with 3½" screws through cleats S and T into wall studs [Drawing 5]. Screw them to the lower cabinets and each other.

7 Reinstall the door tracks on the cabinets and the rollers on the doors. Hang the doors and install the door stops on the tracks. Install the door bottom guides on the lower cabinet tops [Exploded View, Photo G].

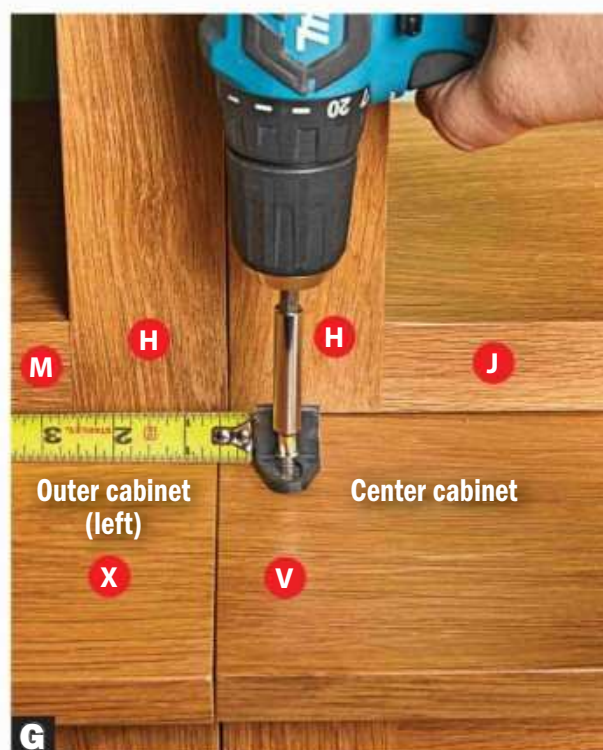
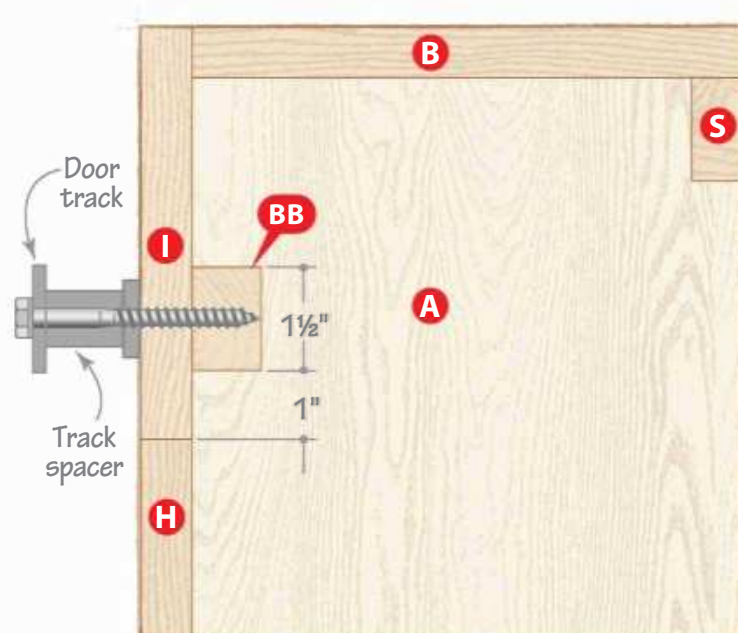
8 Install the electronics. Then, bring in friends and family and roll back the doors for the premier showing of your new big-screen production. 🌳

Tip! On the lower cabinets, drill screw holes through the top shelves (E, G). Then, drive screws into the tops (V, X) from inside the cabinet using a right-angle drill adapter.

Tip! Check the wall for plumb before installing the cabinets. Shim the cabinets as necessary to plumb them. Apply quarter-round or cove molding to cover gaps.

Tip! Determine where components will sit within the cabinets. Then, drill holes and run any in-wall cables to connect the electronics before installing the cabinets.

5 UPPER CENTER CABINET SECTION VIEW



G Attach the door guides to the top of the lower center cabinet. The tab on the guide engages the slot in the bottom of the door to keep it from swinging out while sliding.

Produced by **Larry Johnston** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Carcases						
A	upper sides	¾"	8"	42"	OP	6
B	upper center top/bottom	¾"	8"	63¾"	OP	2
C	upper outer tops/bottoms	¾"	8"	30¾"	OP	4
D	lower sides	¾"	13¼"	13¼"	OP	6
E	lower center shelves	¾"	13¼"	63¾"	OP	3
F	lower center divider	¾"	13¼"	5½"	OP	1
G	lower outer shelves	¾"	13¼"	30¾"	OP	6
Face frames						
H	upper cabinet stiles	¾"	2¼"	42"	O	6
I	upper center top rail	¾"	6"	60"	O	1
J	center cabinet rails	¾"	1½"	60"	O	3
K	lower cabinet stiles	¾"	2¼"	13¼"	O	6
L	upper outer top rails	¾"	6"	27"	O	2
M	lower outer rails	¾"	1½"	27"	O	6
N*	lower center middle rail	¾"	¾"	60"	O	1
O*	lower outer middle rails	¾"	¾"	27"	O	2
P*	lower center middle stile	¾"	¾"	4¾"	O	1

Shelves, cleats, tops						
Q	adjustable shelves	3/4"	7 1/4"	29 7/8"	OP	4
R	shelf edges	3/4"	1 1/2"	29 7/8"	O	4
S	center attaching cleats	3/4"	1 1/2"	63"	O	3
T	outer attaching cleats	3/4"	1 1/2"	30"	O	6
U	upper center top	3/4"	9 1/2"	64 1/2"	EO	1
V	lower center top	3/4"	14 1/2"	64 1/2"	EO	1
W	upper outer tops	3/4"	9 1/2"	32 1/4"	EO	2
X	lower outer tops	3/4"	14 1/2"	32 1/4"	EO	2
Doors						
Y	stiles	1 1/2"	4"	36"	O	4
Z	rails	1 1/2"	4"	24 1/4"	O	4
AA	slats	3/4"	4 5/16"	24 1/4"	O	12
BB	center blocking	1 1/2"	1"	63"	O	1
CC	outer blocking	1 1/2"	1"	30"	O	2

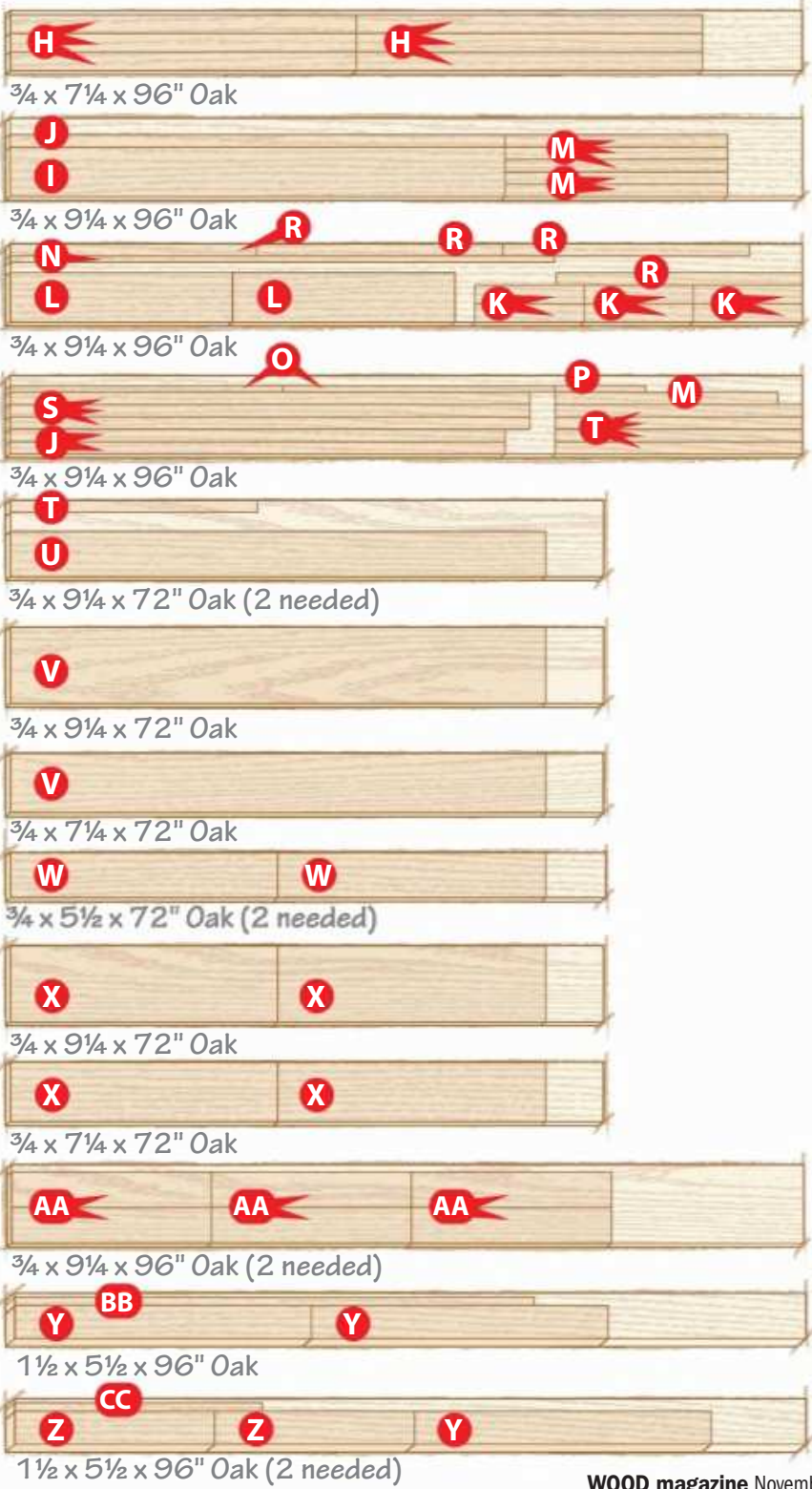
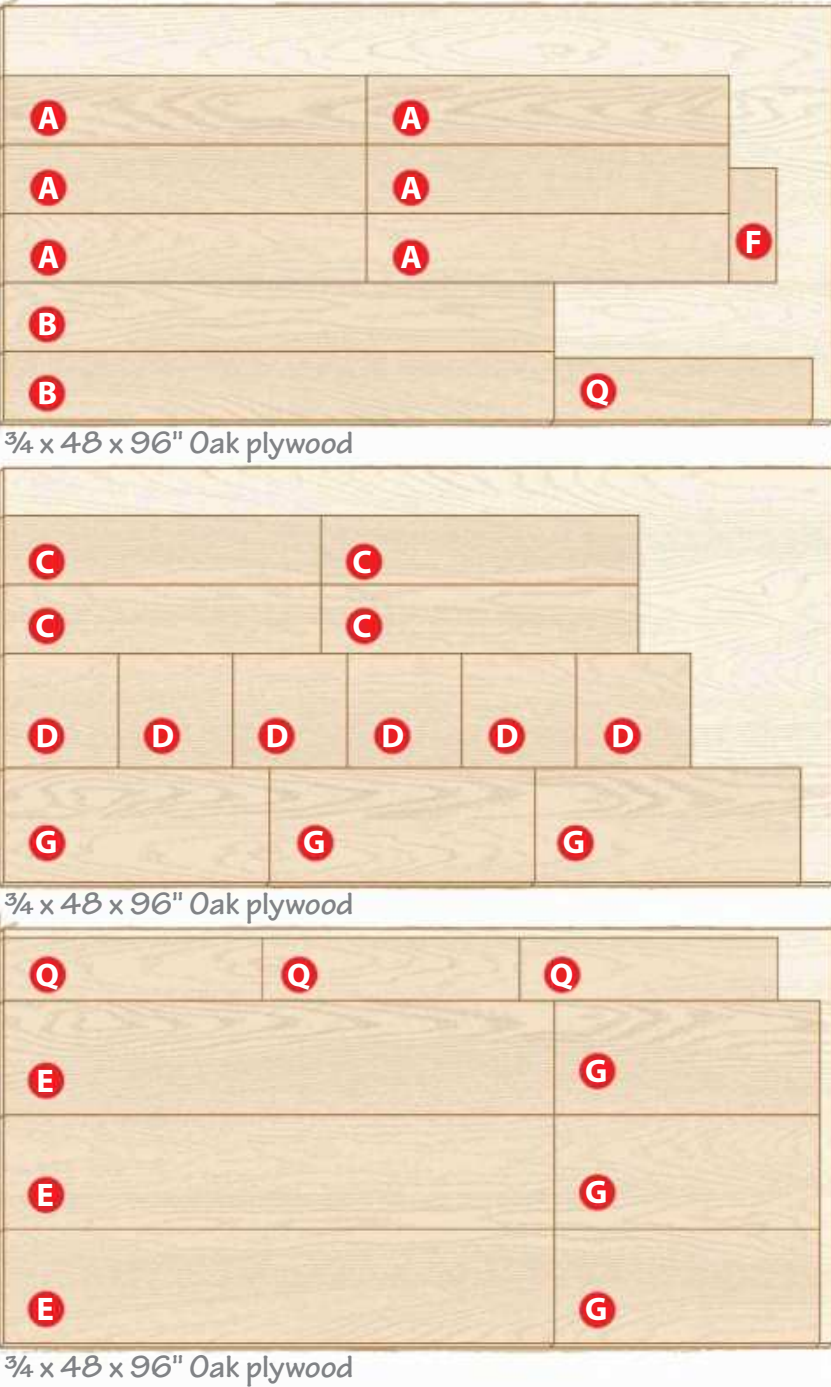
*Parts initially cut oversize. See the instructions.

Materials key: OP-oak plywood, O-oak, EO-edge-joined oak.

Supplies: #8x1 1/4" pocket screws, #8x2 1/2" pocket screws, #10x3 1/2" flathead screws, #8x1 1/4" flathead screws.

Source: Homedex 6.6' Country Black Barn Wood sliding-door hardware (2), \$43, woodmagazine.com/barndoor.

Cutting Diagram



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We test seven router-ready models capable of creating through-dovetails, half-blinds, and box joints.

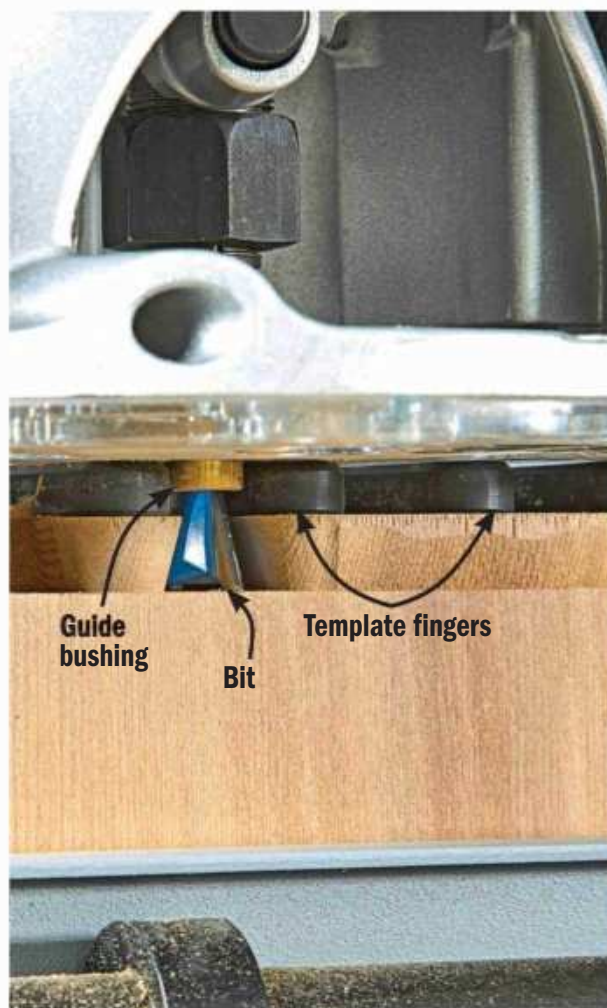


Projects with dovetails imply a level of craftsmanship and detail that adds both inherent strength and pizzazz. You can cut them by hand, but for reliability and quick repeatability, you just can't beat a good router-assisted jig. If you're going to invest in a jig, it makes sense to get one capable of creating all of the most common joints: through- and half-blind dovetails as well as box joints (see page 28). We put seven such jigs through rigorous testing, and found good options in several price ranges.

► Dovetail joints date back at least to ancient Egypt. It's not clear whether they cut tails or pins first.

Start with a cost analysis

The jigs we tested range from \$130 to \$600, but only four include everything you need to create through- and half-blind dovetails and box joints right out of the box. For example, the three sub-\$200 jigs require purchasing at least one additional router bit to make the three joints. In fact, the CMT 300 (\$130) does not include *any* bits, so you'll need to buy \$185 of accessories to create all three joints. The Porter-Cable 4216 and Rockler 22818 jigs come with everything except a straight bit for making box joints.



A guide bushing follows the jig's template fingers, directing the router bit to cut precise shapes that mate perfectly for tight-fitting joints.

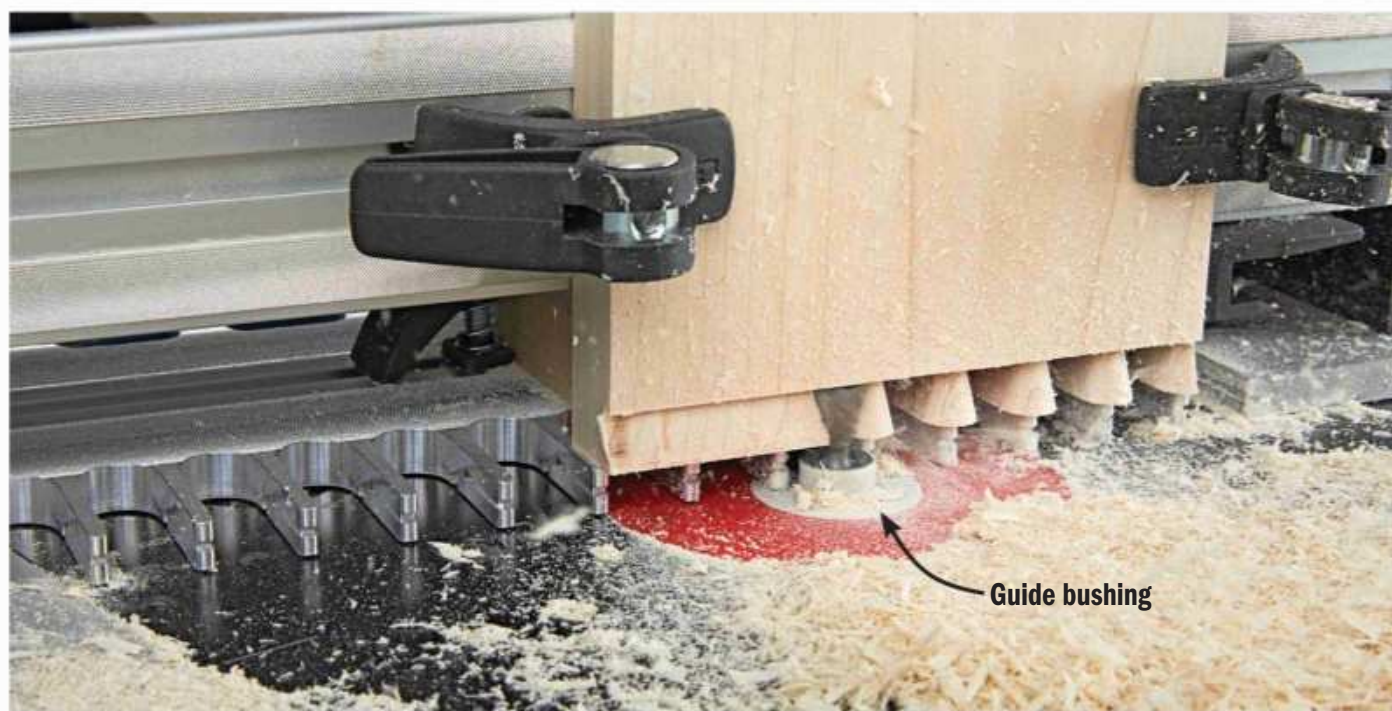
The essentials of operation

Each tested jig requires a guide bushing mounted in the router's subbase—or, in the case of the Leigh RTJ400, the router table—to steer the bit around the fingers on the templates (see photos *below*). CMT's guide bushing must be attached with screws, so it won't fit many routers. But, we successfully substituted a common two-piece guide bushing, shortened to work with the thin CMT template.

Workpiece stops locate boards precisely in the jig for the joint you want. Built-in clamps hold workpieces securely, and a backer board you provide prevents tear-out where the bit exits the wood. Once set up, you can duplicate the joint indefinitely with identical results.



The slightly elliptical guide bushing on Leigh's jigs lets you fine-tune a joint's fit by rotating it a few thousandths of an inch. But you must hold the router in exactly the same orientation with each cut.

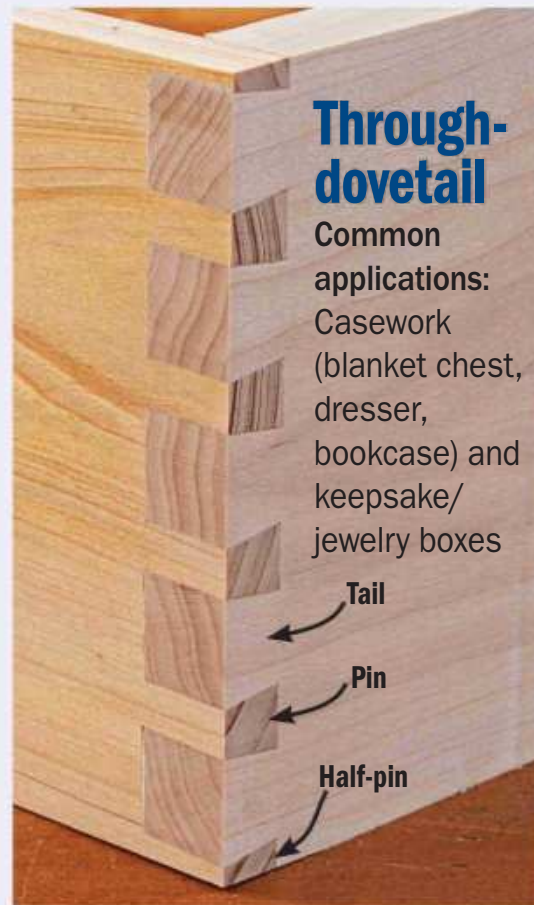
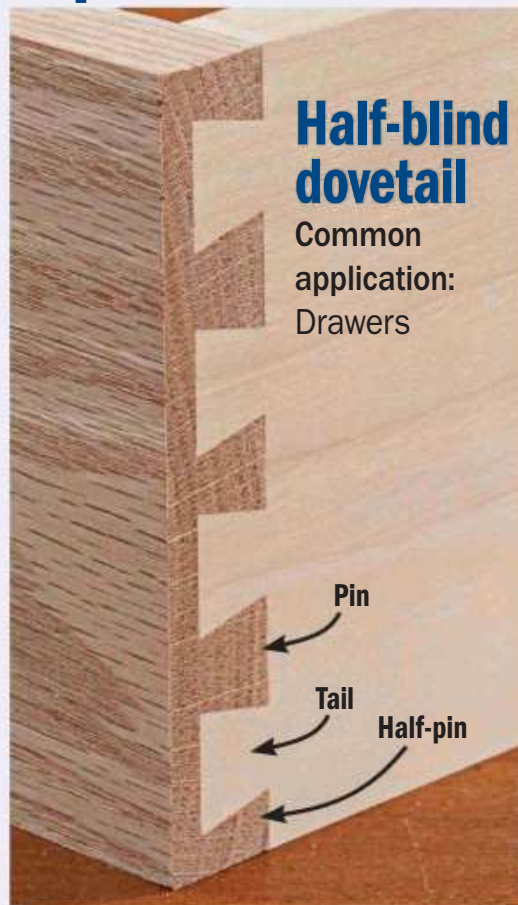


The Leigh RTJ400 works on a router table to cut all joints. To do so, you need a guide-bushing-ready insert ring. It's the only jig that makes one-pass half-blind dovetails using a router table.

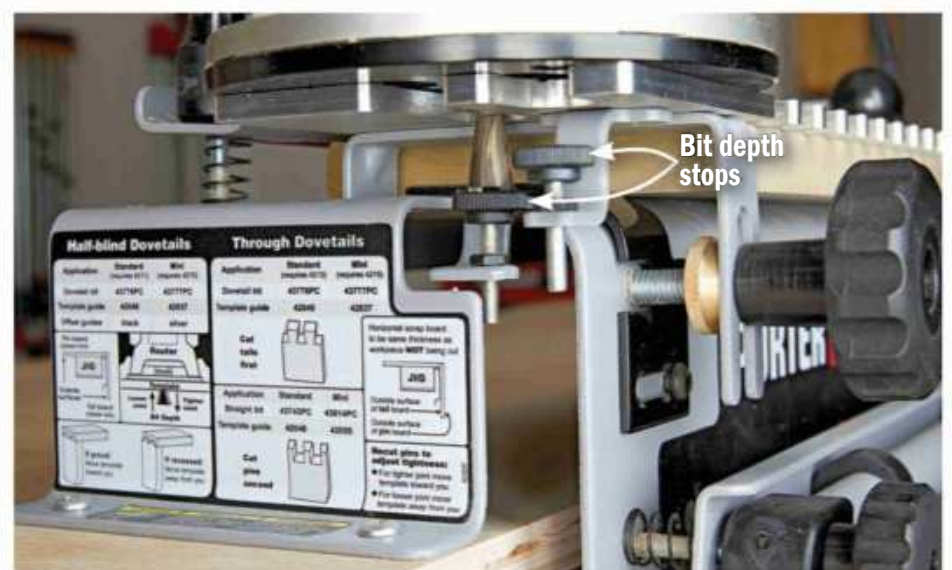
A quick joint primer

The three most common joints made on a dovetail jig are routed on the workpiece ends of square or rectangular assemblies.

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



Because each jig is designed to work with specific geometries of dovetail joints, it's best to use bits recommended by the jig's manufacturer. Other brands with identical geometry *should* work, but you risk slightly imperfect joints. We got the best results using bits with 1/2" or 8mm shanks; 1/4"-shank bits tended to vibrate and chatter more. (The jigs that use 8mm-shank bits include a reducer that fits into a 1/2" collet.) Some jigs, such as the Porter-Cable (shown right), have onboard tips and gauges for quick setup of the bit and template. The Leigh RTJ400's quick-reference strips, that slide into the top bar, help guide you in cutting each joint.



Porter-Cable's jig has onboard help for setting bit depth and quick-reference shortcuts for setting up and adjusting the jig.

The bottom line on the jigs and their joints



CMT 300, \$315

(including necessary optional accessories)

888-268-2487, cmtusa.com

After you purchase the necessary router bits, templates, and guide-bushing subbase, this jig helps you make perfect-fitting joints. But the critical tiny screws and parts can be easily lost.

Bottom line: If you just want to get a jig to make half-blind dovetails, this model (plus the optional \$20 bit) provides a great value at \$150. You can grow the system to through-dovetails and box joints as you go.

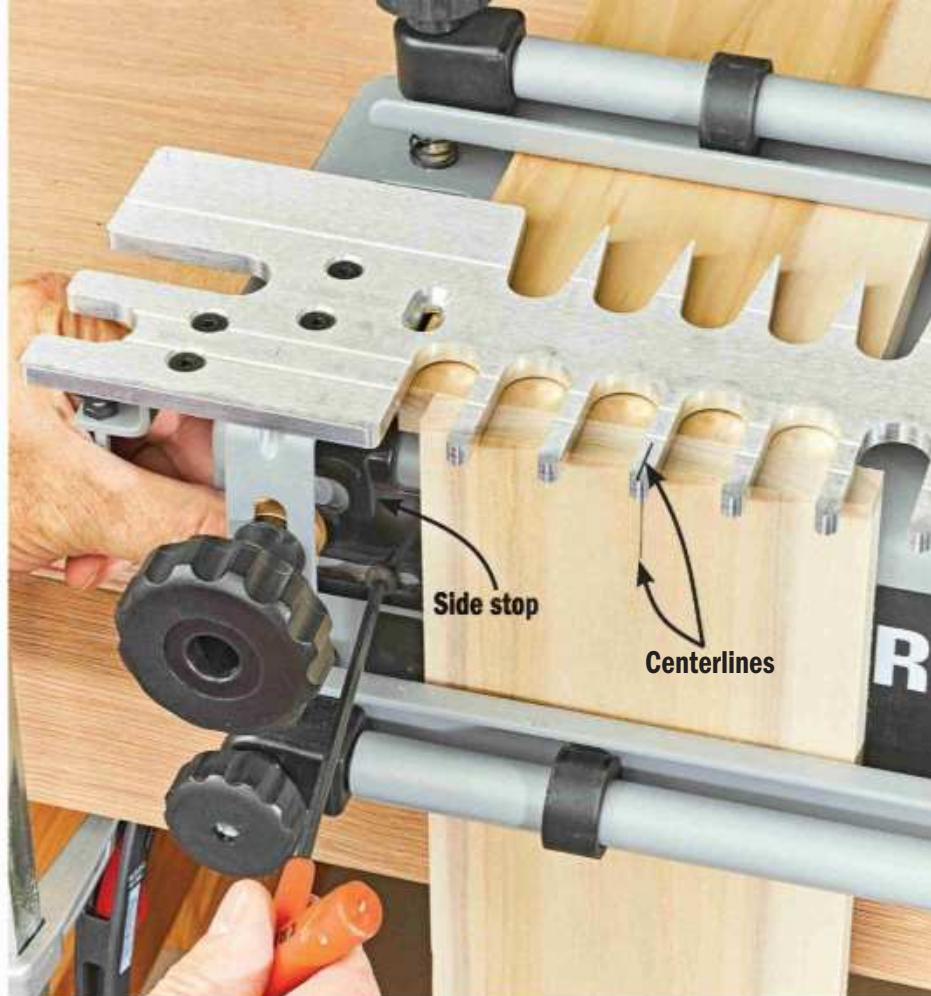


Leigh Super 12, \$275

800-663-8932, leighjigs.com

This jig oozes quality and versatility, and with it you can make four types of joints right out of the box. Leigh's owner's manual superbly walks you through each step, and its online videos provide valuable backup if needed. (This jig also sells in 18" and 24" versions.)

Bottom line: It's the lowest-priced jig with variable spacing, and well worth the investment.

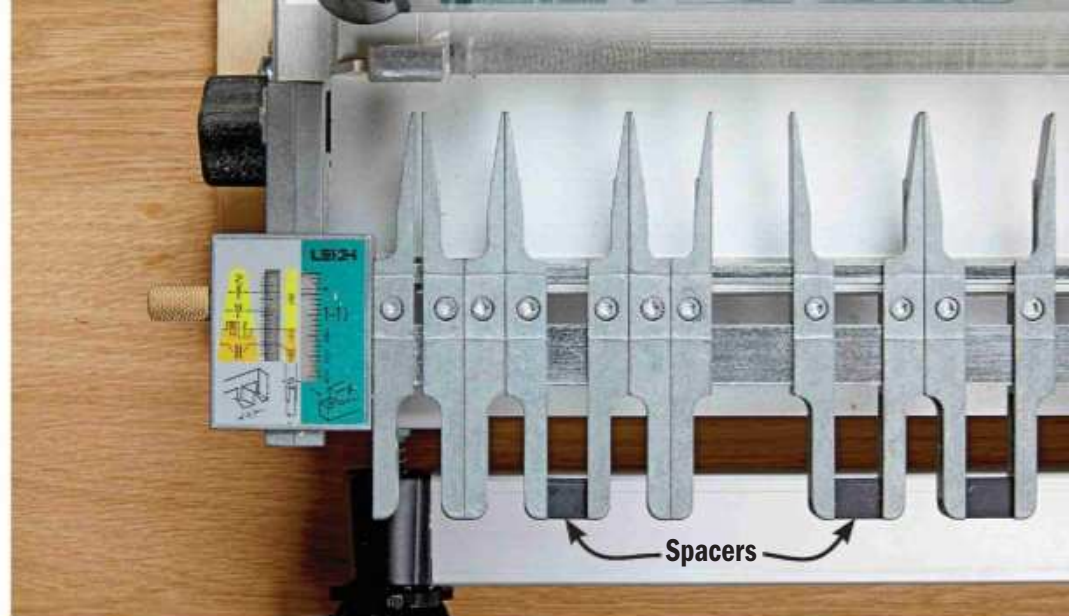


Fixed-finger templates dictate workpiece width in order to leave half-pins at each end of the joint. To set up such a jig, mark a centerline on one finger and another on the board, and align them in the jig. Set the side stop against the board edge.

Jigs determine workpiece size

All the tested jigs accommodate workpieces at least 11" wide. The Leigh D4R Pro handles boards up to 24" wide, and the RTJ400 up to 16" wide. (See the chart on *page 48* for capacities for the different joints.)

Spacing of the template fingers plays a key role in determining the width of your workpieces. Dovetail joints look best with symmetrical pins and tails and a half-pin on each end. Most of the jig templates have fixed fingers, so you must size your workpieces to the template, as shown *above*. The jigs that use fixed-finger templates range from $\frac{1}{16}$ " to 1" spacing for half-blinds, and from $\frac{1}{16}$ " to $1\frac{3}{8}$ " for through-dovetails.



Leigh's D4R has half-fingers that can be spaced at any interval (*top*). Plastic spacers prevent accidentally routing between those fingers. Full fingers on the Leigh Super 12 (*bottom*) can be spaced at any interval.

For more versatility, the Leigh D4R's movable half-finger guides, shown *top*, can be positioned wherever you like, letting you adjust the size and spacing of both tails and pins, and the workpiece size. Similarly on the Leigh Super 12, shown *above*, you can vary the width of the tails, but not the pins, on any width workpiece that fits in the jig.



Leigh RTJ400, \$330

Although it lacks the variable spacing of the other Leigh jigs, it's easy to use and creates perfect joints. We like the better visibility that comes from using a router table. And it has an equally thorough owner's manual and online support.

Bottom line: Get this jig if you prefer working on a router table versus using a handheld router.



Leigh D4R Pro, \$600

Not only can you work on 24"-wide stock (think blanket chest or toy box), but you also get infinite variable spacing of pins and tails, and the ability to create additional decorative joints, such as keys, clovers, ellipses, waves, and bear ears, with optional bits. It has the same quality, owner's manual, and support as the other Leigh jigs.

Bottom line: This top-of-the-line jig offers the most versatility and capacity, with a price to match.

Do-it-all Dovetail Jigs

MODEL	PERFORMANCE RATINGS (1)											JOINT CAPABILITY (2, 3)		TEMPLATE MATERIAL (4)	BIT SHANK SIZE (3)
	HALF-BLIND DOVETAILS			THROUGH-DOVETAILS			BOX JOINTS			HELPFULNESS OF OWNER'S MANUAL	ONLINE SUPPORT	OUT OF THE BOX	WITH OPTIONAL ACCESSORIES		
	EASE OF SETUP	EASE OF FINE-TUNING JOINT FIT	OVERALL EASE OF USE	EASE OF SETUP	EASE OF FINE-TUNING JOINT FIT	OVERALL EASE OF USE	EASE OF SETUP	EASE OF FINE-TUNING JOINT FIT	OVERALL EASE OF USE						
CMT 300	B	C	B-	C	B-	B-	C	B-	B-	C	C	*	HB, T, B	A	¼*
LEIGH SUPER 12	A	A	A	A	A	A	B+	A	A-	A	A	HB, T, S, B		Z	8mm
LEIGH RTJ400	A	A-	A	A	A	A	A-	A	A-	A	A	HB, T, B		A	½
LEIGH D4R PRO	A	A	A	A	A	A	A	A	A-	A	A	HB, T, S, B	I, MT	Z	8mm
MLCS 8701	C	C-	C	C	C-	C	C	C	C	D	B-	HB, T, B		A	¼,½
PORTER-CABLE 4216	B+	B+	A-	B+	B+	A-	B+	B+	A-	A-	B+	HB, S, T	B	A	½
ROCKLER 22818	B	B+	B+	B+	A-	A-	C	D	C	A-	A	HB, T	B	P	8mm

1. **A** Excellent
B Good
C Fair
D Poor

2. (HB) Half-blind dovetails
(T) Through-dovetails
(B) Box joints
(S) Sliding dovetails
(I) Isoloc decorative joints
(MT) Mortise and tenon

3. (*) No router bits included
4. (A) Aluminum
(P) Phenolic
(Z) Zinc



MLCS 8701, \$200

800-533-9298, mlcswoodworking.com

With patience and trial-and-error, you can make acceptable joints with this jig. But the vague owner's manual with unclear photos left us guessing on many steps. MLCS also sells a version of this jig (no. 8711) for making only half-blind dovetails (\$60).

Bottom line: It's hard to make a case for buying this jig.



Porter-Cable 4216, \$200

(including optional box-joint bit)

888-848-5175, portercable.com

You get templates for making typical half-blinds, through-dovetails, and box joints, as well as templates for making smaller versions of those same joints.

Bottom line: We found this jig easy to use, accurate, and easy on the wallet.



DOVETAIL ANGLE, DEGREES (3)		WORKPIECE CAPACITIES, INCHES (3)							ACCESSORIES (5)		WARRANTY, YEARS	COUNTRY OF ASSEMBLY (6)	SELLING PRICE (7)	PRICE TO DO ALL 3 JOINTS (7)
HALF-BLIND (STANDARD BIT)	THROUGH (STANDARD BIT)	MAXIMUM WIDTH	HALF-BLIND DOVETAILS		THROUGH-DOVETAILS		BOX JOINTS		STANDARD	OPTIONAL				
			MINIMUM THICKNESS	MAXIMUM THICKNESS	MINIMUM THICKNESS	MAXIMUM THICKNESS	MINIMUM THICKNESS	MAXIMUM THICKNESS						
7.5*	8*	12	5⁄16*	15⁄32*	5⁄16*	25⁄32*	5⁄16*	25⁄32*	G,H	D,R,S,T,X	1	T	\$130	\$315
8, 14	8	12	½	1	⅛	1	⅛	1	C,D,G,H,L,P,S,T,X	A,D,S	5	CA	\$275	\$275
14	8	16	½	1	⅛	1	⅛	1	D,G,H,P,S,T,X	D,S	5	CA	\$330	\$330
8, 14	8	24	¼	1½	⅛	1¼	⅛	1	C,D,G,H,L,P,S,T,X	A,D,I,S	5	CA	\$600	\$600
14	14	12	½	1	½	⅞	¼	1	D,G,H,S,T,X	G	3	CH	\$200	\$200
7	7	12	½	1⅞	¼	1	¼*	1⅞*	D,G,H,L,S,T,X	S	3	V	\$180	\$200
14	8	11	½	1⅞	⅜	¾	¼*	1*	A,C,D,G,H,S,T,X	A,D,S,T	1	T	\$180	\$200

5. (A) Dust-collection attachment
(C) 8mm collet reducer
(D) Dovetail router bit
(G) Guide bushings
(H) Half-blind template
(I) Isoloc decorative joint templates
- (L) Sliding dovetail template
(P) Plastic spacers
(R) Router guide-bushing subbase
(S) Straight router bit
(T) Through-dovetail template
(X) Box-joint template
6. (CA) Canada
(CH) China
(T) Taiwan
(V) Vietnam
7. Prices current at time of article production and do not include shipping, where applicable.

►Read reviews of routers and other accessories.
woodmagazine.com/review



Rockler 22818, \$200
(including optional box-joint bit)
800-279-4441, rockler.com

Out of the box, we were able to make half-blind and through-dovetails after a slight learning curve. Making box joints requires an optional bearing-guided pattern bit—no guide bushing—but we can find easier ways to make box joints. Buy optional templates (\$40 each) to make through-dovetails of wider spacing, and an optional template-and-bits kit (\$70) lets you make miniature through-dovetails.

Bottom line: This is a reasonably priced, good jig for making half-blind and through-dovetail joints in stock up to 11" wide.

The best jigs in the joint

At double the cost of the next priciest jig, the Leigh D4R Pro easily outperforms the field to earn Top Tool honors. Yes, it's a sizable investment at \$600, but if your budget allows, you won't regret it. For \$275, the Leigh Super 12 offers much of the D4R's versatility and quality.

Our Top Value honor goes to the Porter-Cable 4216. It sells for \$180 without bits for box joints, but if you only want to make dovetails, it's a great bargain—and performer—at that price. And if you already own straight or spiral bits, box joints won't cost you extra. 🌲

Produced by **Bob Hunter** with **Pat Lowry**

Mil-spec Multipurpose



Wherever personnel and supplies need to go, this burly broad-track keeps them humming along. *WOOD*® magazine reader Robert Coats designed this truck based on the military police vehicles his son and nephew used overseas.

Start with the chassis

1 Cut the chassis (A), subchassis (B), and fillers (C) to size [Materials List], beveling the ends of the subchassis [Drawing 1]. Finish-sand the parts, set the fillers aside, then glue the subchassis to the chassis, centered side-to-side.

2 Cut the hood (D) to size. Apply a copy of the Hood Full-size Pattern, page 55, to the side,

and cut and sand the hood to shape. Drill the hole for the steering wheel [Exploded View]. Finish-sand the hood, then glue it to the chassis (A), flush with the front and sides.

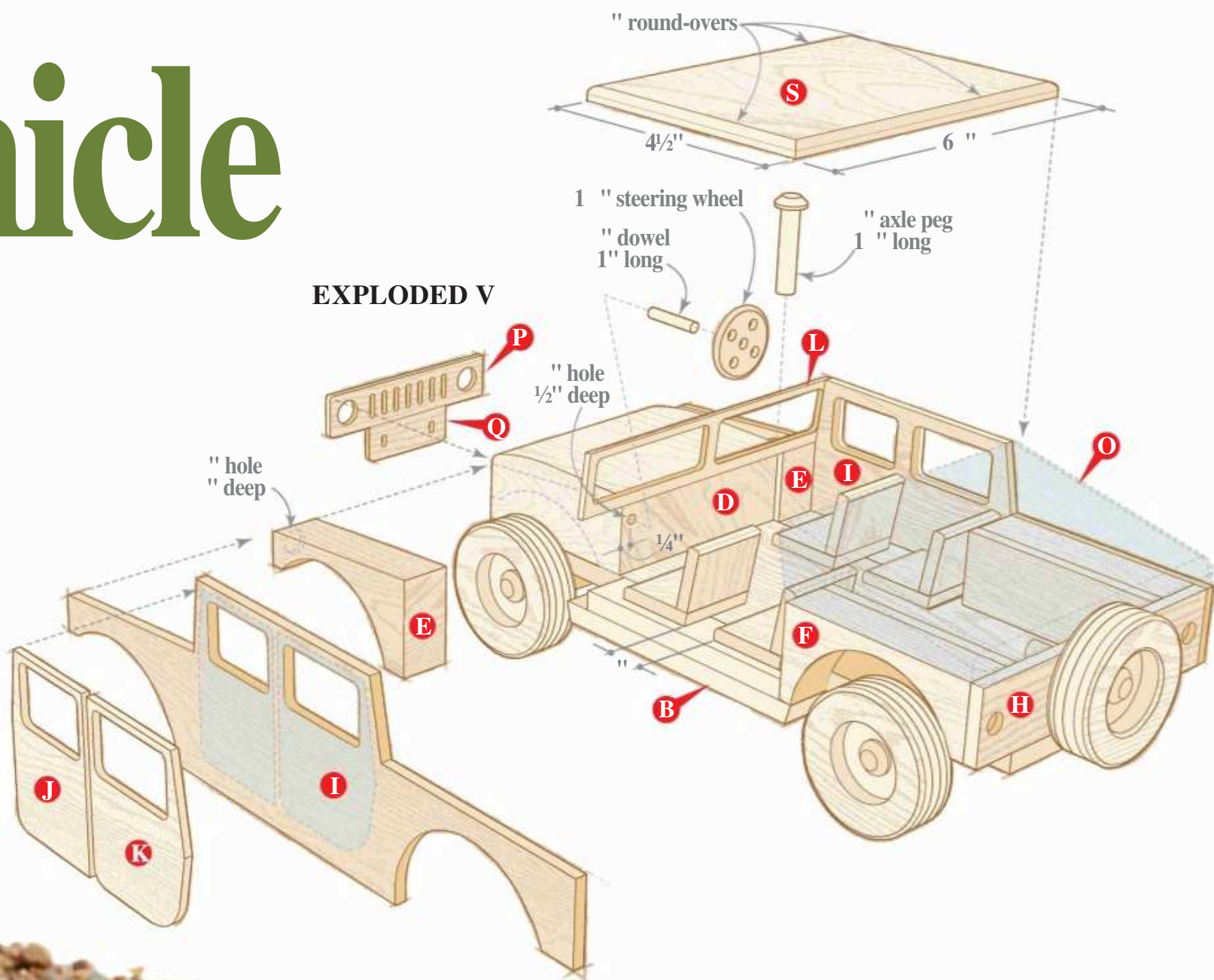
3 For the fenders (E, F), apply two copies of the Fender Patterns to a $\frac{7}{8} \times 1\frac{3}{4} \times 16$ " blank. Drill a hole in the top edge of one front fender, centered on its width, then cut the fenders to size and shape. Drill centered headlights in the front fenders.

4 Cut the fender skirts (G) and tailgate (H). Drill the taillight holes in the tailgate [Drawing 1]. Glue the skirts to the inside of each rear fender (F). After the glue dries, glue these assemblies to the chassis [Photo A].

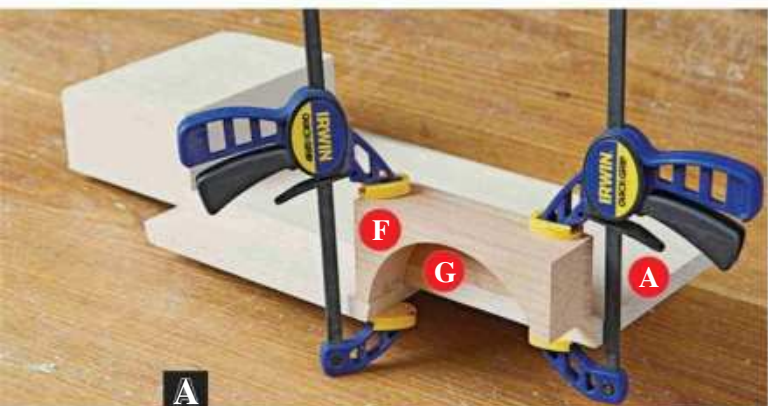
Vehicle



EXPLODED V

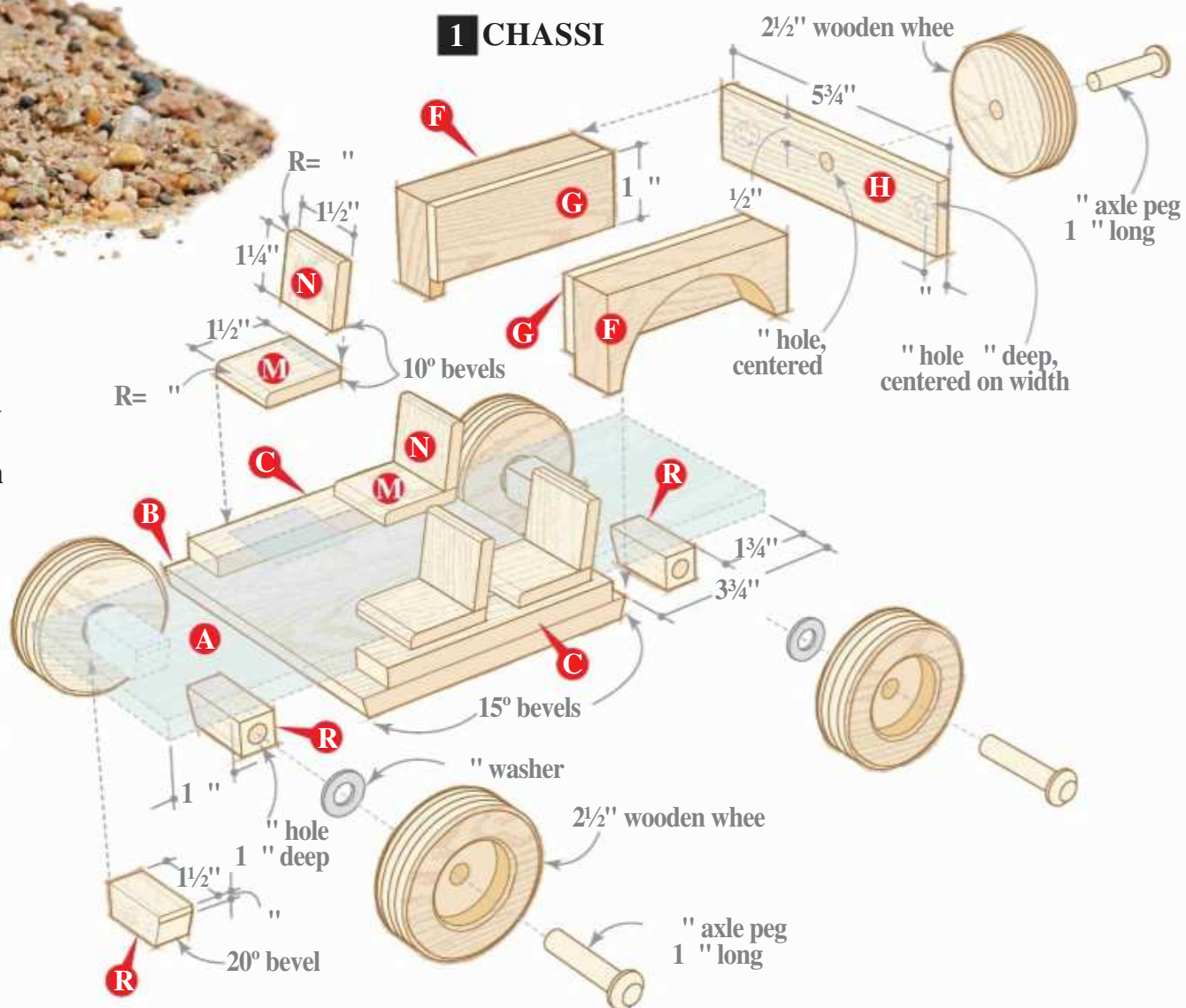


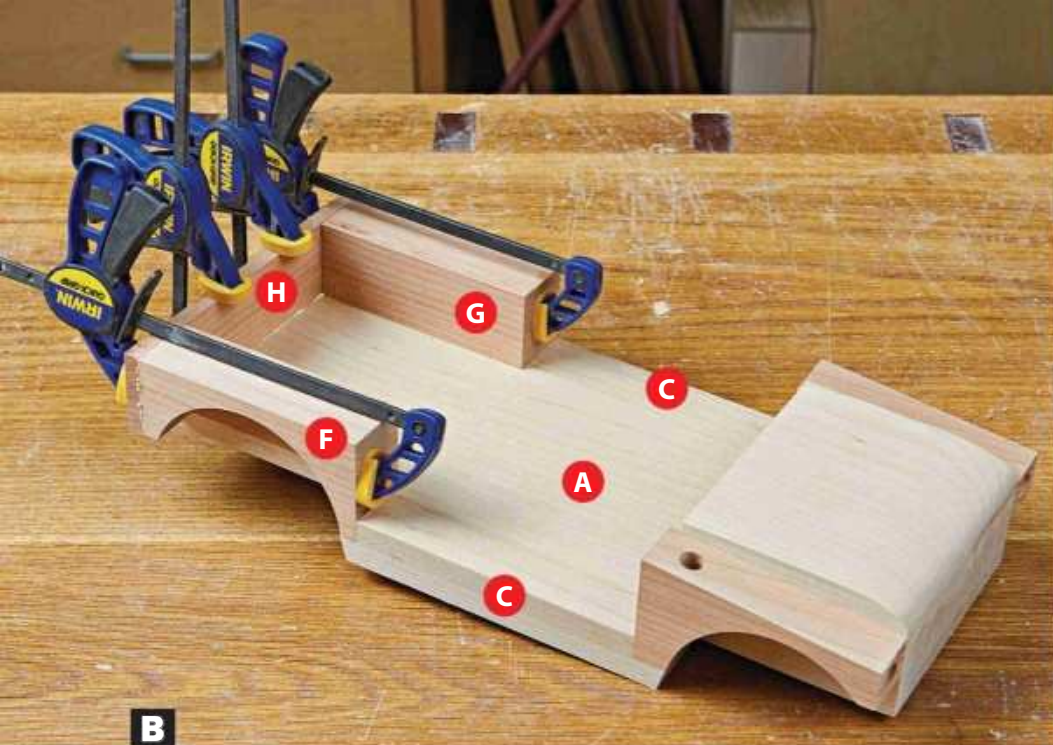
5 Dry-fit the fillers (C) against the rear fenders (F). If the fronts of the dry-fit front fenders (E) fit flush with the end of the chassis (A), glue the fillers and fenders in place.



A Position the rear fender (F) 1/4" from the end of the chassis (A) (use the tailgate [H] as a spacer), with the skirt (G) resting on the chassis.

1 CHASSI





B Glue the tailgate (H) against the rear fenders (F) and to the chassis (A).



C Scrollsaw the windows, leaving intact the line on the pattern. File and sand up to the line, blending the cuts into the corners.

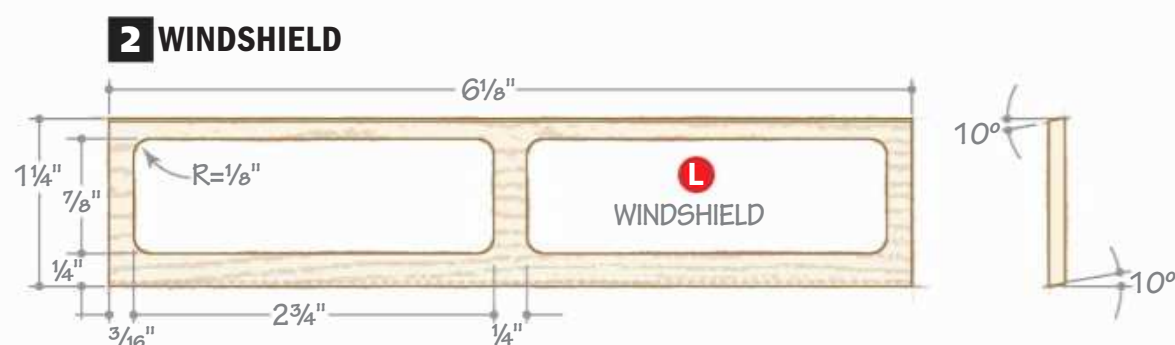
place. If not, trim the fenders or fillers to fit. After the glue dries, glue the tailgate (H) in place [Photo B].

6 Cut the side panels (I) to size. Join and adhere a copy of the Side-panel Pattern to

each, and cut the outside profile only, not the windows. Remove the patterns.

7 Following the patterns, cut and sand the doors (J, K) to size and shape (but don't cut the windows). Glue the doors to each side, making a mirrored pair.

Tip! When cutting the side panels, stay just outside the lines above the fenders. Sand the side panels flush with the fenders after assembly.



Build the rest of our Mil-spec series

M1A1 Abrams tank (issue 239, May 2016)

Roll this artillery into action to provide support for your green plastic Army men. Plus it fits inside the AC-130, right.



AC-130 aircraft (issue 236, Nov. 2015)

The 42" wingspan supports four spinning propellers. Drop down the rear door to load cargo.



A-10 Thunderbolt "Warthog" (issue 252, March 2018)

This Air Force mainstay, nicknamed "Warthog," proves its worth in close-air support.



Chinook helicopter (issue 245, March 2017)

The rotors spin, and fold for storage, just like on the real thing. Drop down the rear door to access the spacious interior.



Arleigh Burke class destroyer (issue 249, Oct. 2017)

Turn your shop into a shipyard for just a few evenings to create this naval workhorse.



8 Drill $\frac{1}{4}$ " holes in each corner of each window, then scrollsaw between them [Photo C]. Glue the side panels to the fenders [Photo D].

9 Bevel-rip the windshield (L) to size, and scrollsaw the windows as before [Drawing 2]. Finish-sand it, then glue the windshield to the fenders, side assemblies, and hood.

Add the interior and wheels

1 For the seats, cut a $\frac{1}{4} \times 1\frac{1}{2} \times 14$ " blank. Crosscut each piece (M, N) to length with a 10° bevel on one end [Drawing 1]. Sand round-overs on the front of the seat (M) and top of the back (N). Glue the seats together. After the glue dries, glue them to the fillers (C) and chassis (A) [Exploded View].

2 Glue a 1" length of $\frac{3}{16}$ " dowel into the steering wheel [Source], then glue this assembly to the hood.

3 Cut to shape the rear roof (O) [Drawing 3]. Round over the edges, finish-sand, and glue it in place.

4 Cut the grille (P) and bumper (Q) to size [Drawing 3]. Drill and cut the slots, and drill the headlights. Glue the grille to the front of the hood with its top edge flush with the top edges of the fenders. Glue the bumper butted against it, centered [Exploded View].

5 Cut the axles (R). Gripping each in a wood handscrew, drill the hole centered in each one [Drawing 1]. Bevel the inside ends, then glue the axles in place.

Tip! To get a gap-free fit between the rear roof and sides (I), apply 100-grit sandpaper to the front end of the rear roof and sand the side panels.



D Glue the side assemblies flush with the bottom of the subchassis and ends of the fenders. Sand the sides flush with the fenders after the glue dries.

6 Cut the roof (S) to size and round over the ends and edges [Exploded View].

7 Touch up any sanding. Mask off the top edges of the windshield and side panels, and apply a finish to the interior. (We sprayed on aerosol lacquer.)

8 Remove the tape, and glue the roof in place, centered. Apply finish to the exterior, wheels, and tops of the axle pegs. Glue the wheels and the exhaust pipe in place [Drawing 1].

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle; Robert Coats, Peoria, Ill.**
Illustrations: **Roxanne LeMoine, Lorna Johnson**



Iowa-class battleship (issue 243, Nov. 2016)

Patrol the waves of your living room floor with this stately warship, or anchor it atop the fireplace mantel.



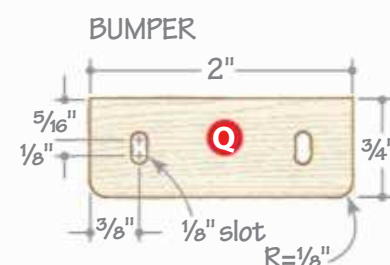
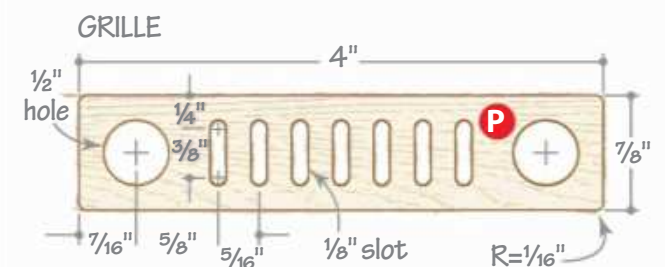
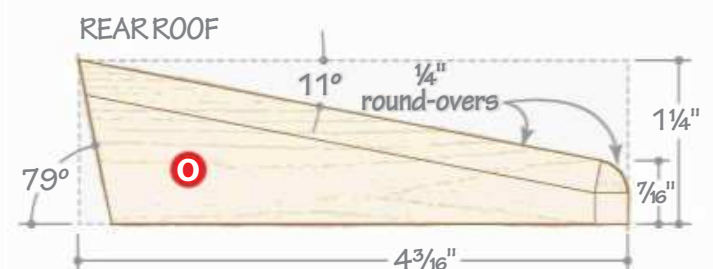
Jeep and 37mm gun (issue 247, July 2017)

This nimble vehicle and light artillery piece performed with distinction in rugged terrain from WWII through Vietnam.

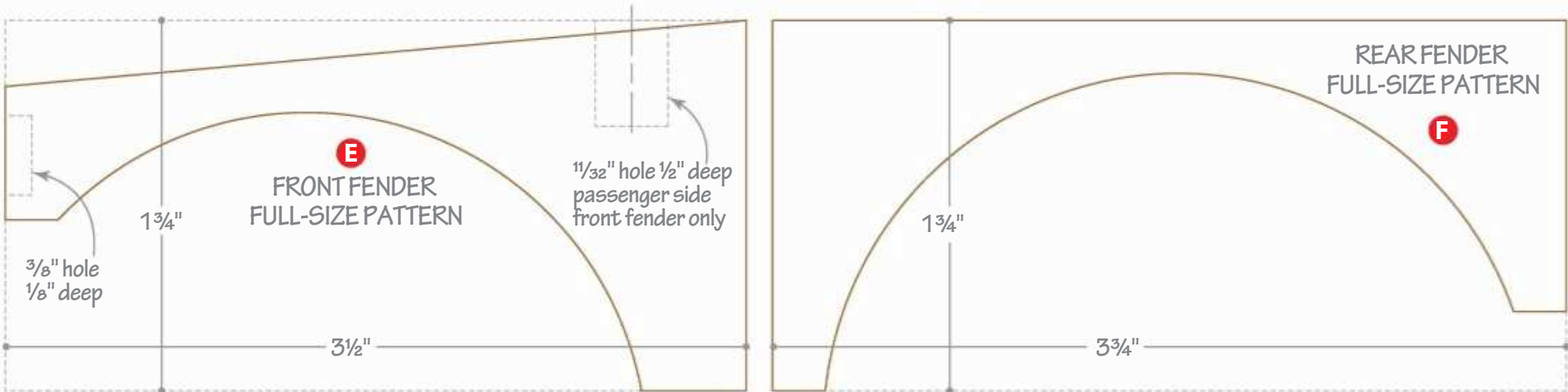
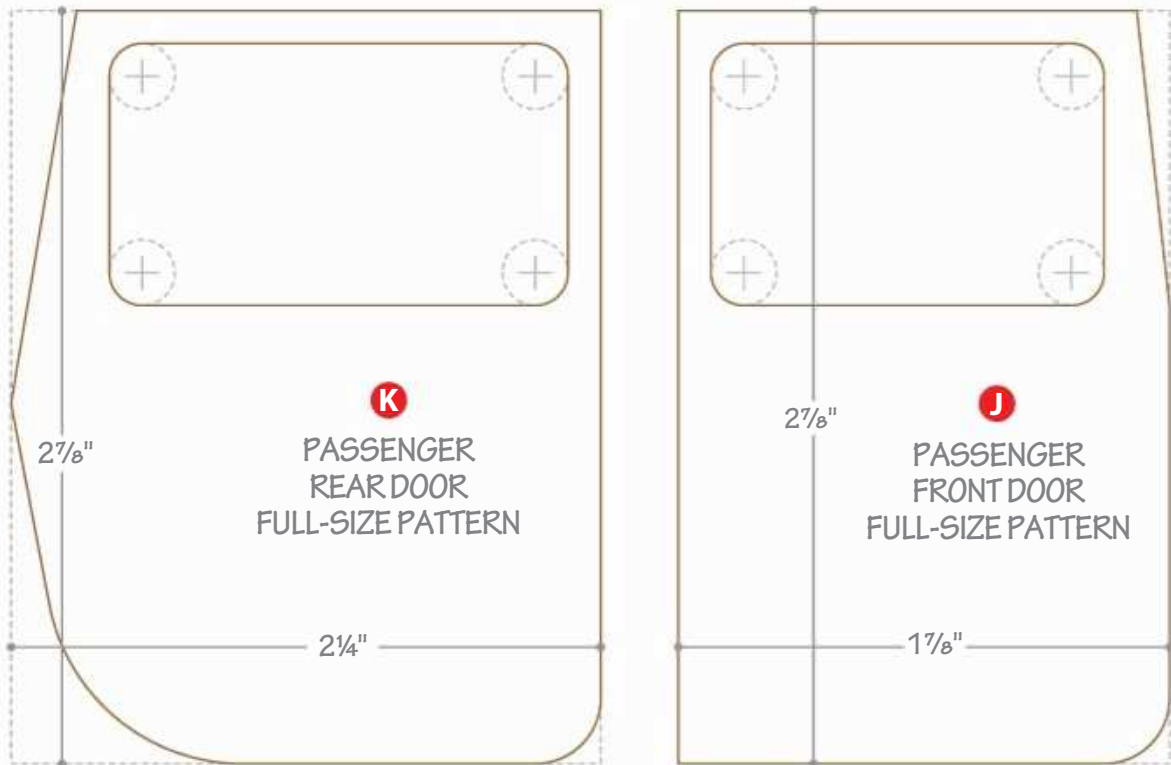
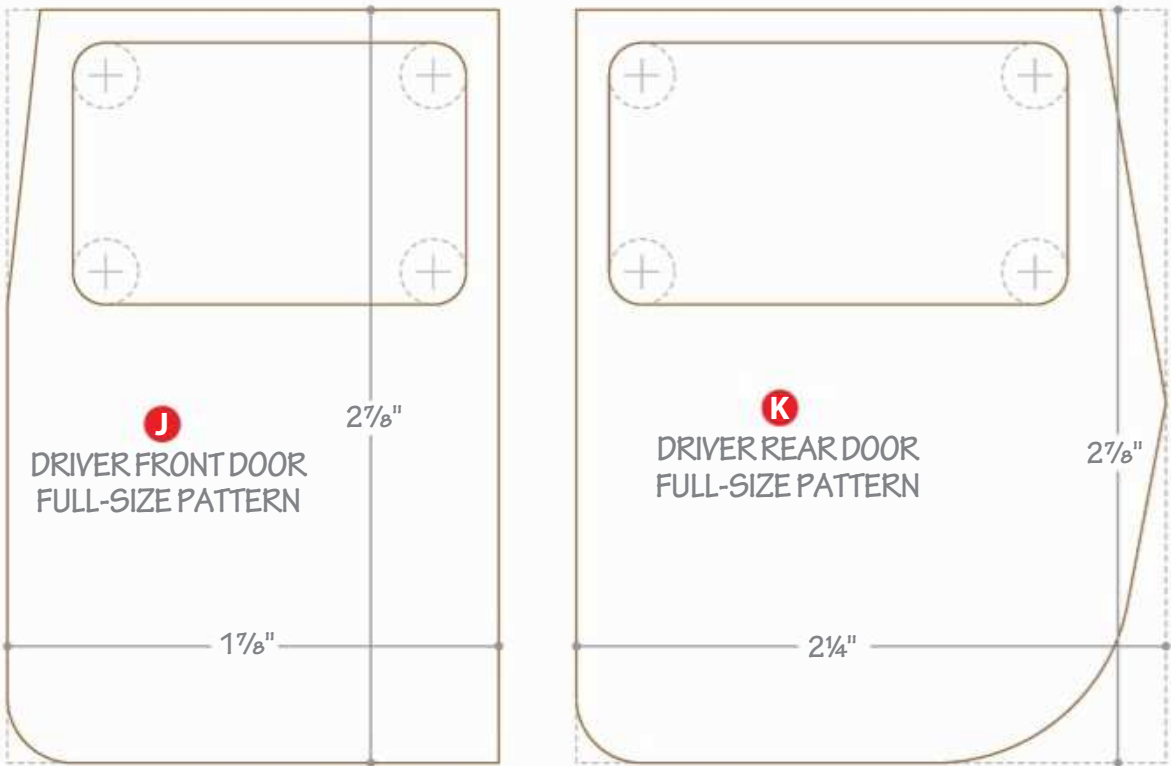
Troop truck (issue 254, July 2018) This 6x6 truck rumbles across the floor with plenty of room in back for green plastic Army men or other essential cargo.



3 PARTS VIEWS



FULL-SIZE PATTERNS



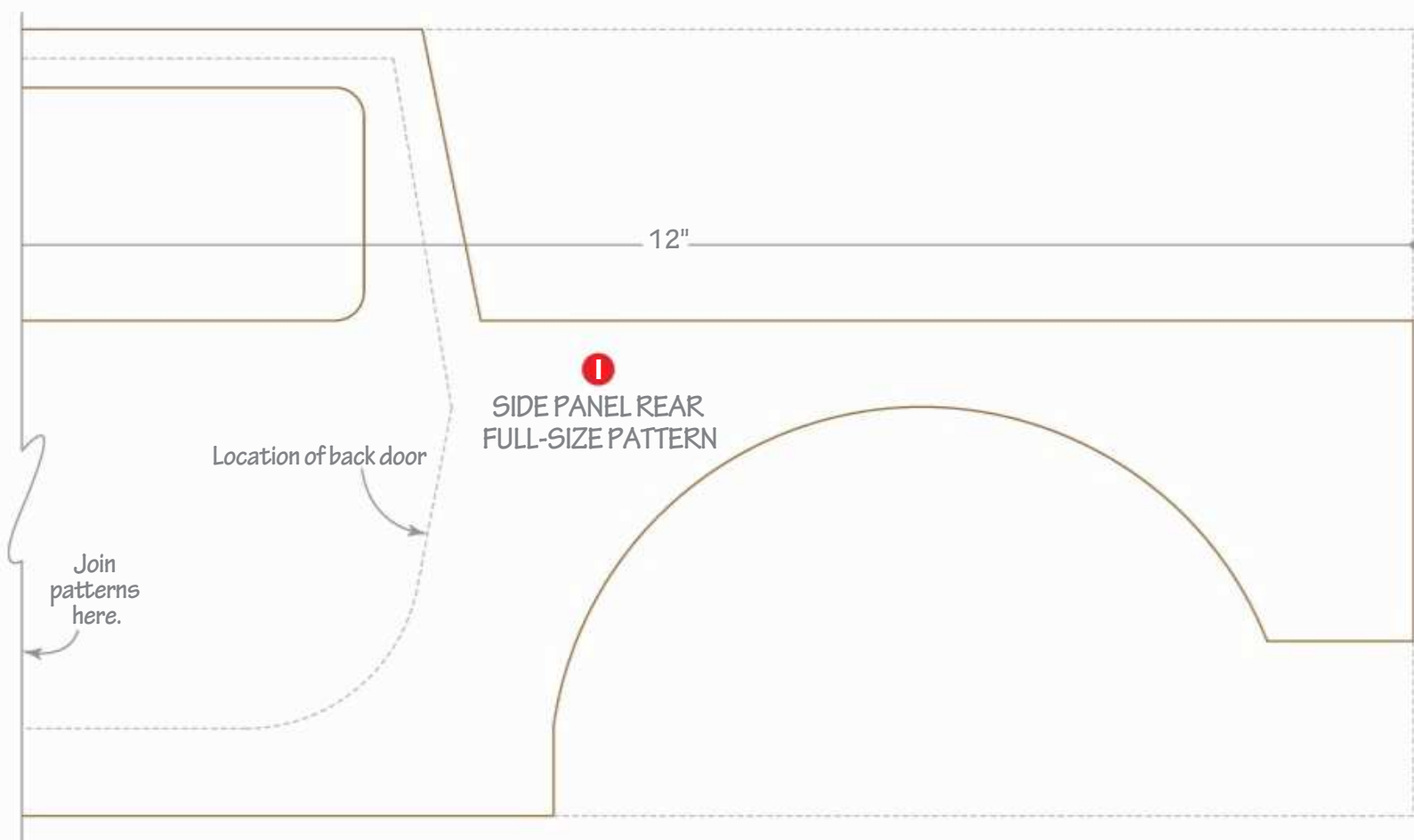
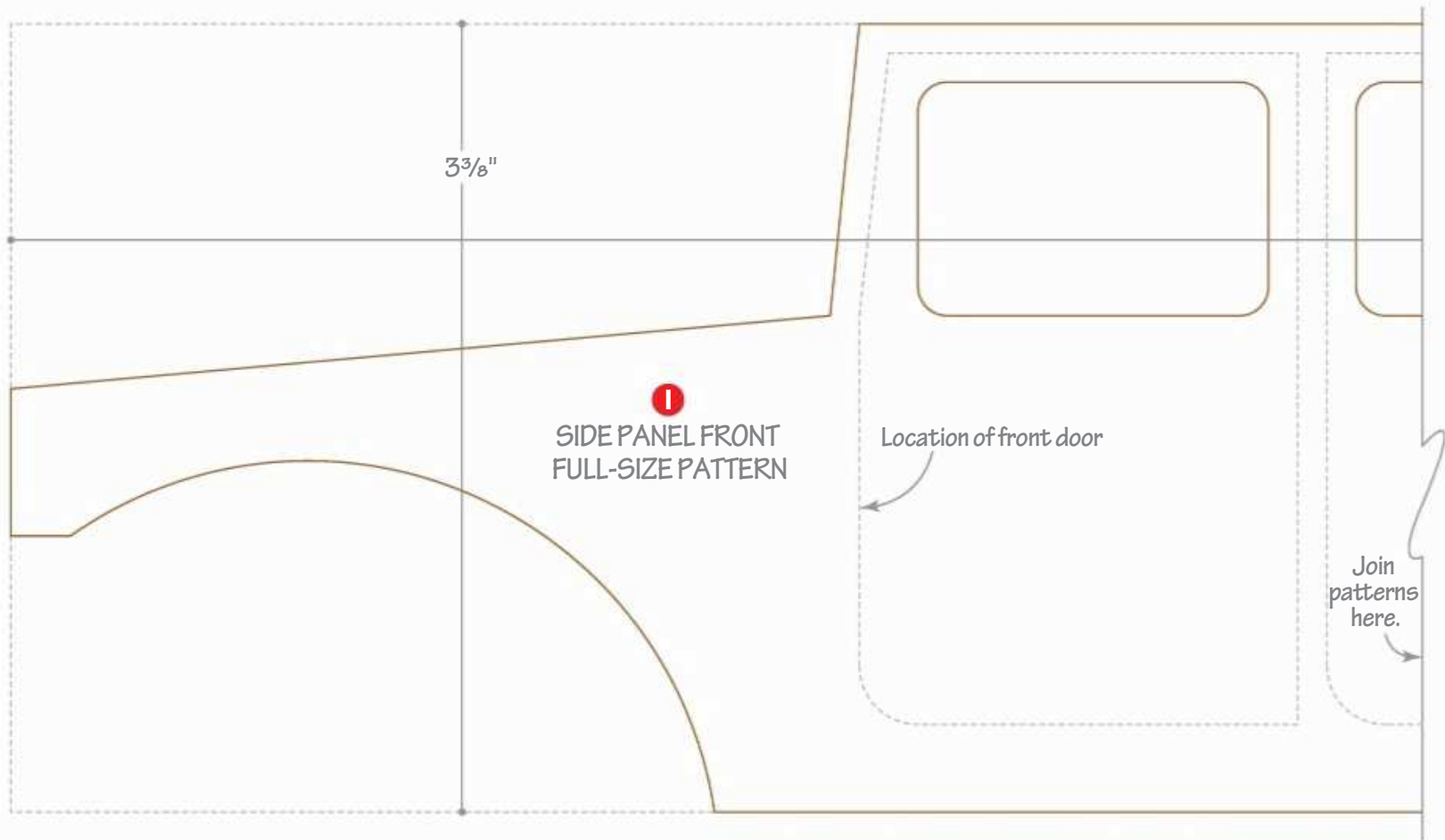
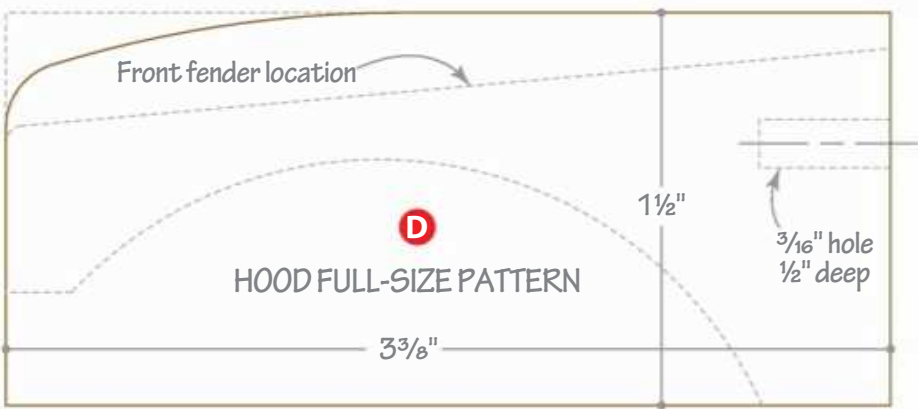
Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	chassis	3⁄8"	4"	12"	M	1
B	subchassis	3⁄8"	5 3⁄4"	5 1⁄4"	M	1
C	fillers	3⁄8"	7⁄8"	4 1⁄2"	M	2
D	hood	1 1⁄2"	4"	3 3⁄8"	M	1
E*	front fenders	7⁄8"	1 3⁄4"	3 1⁄2"	C	2
F*	rear fenders	7⁄8"	1 3⁄4"	3 3⁄4"	C	2
G	fender skirts	1⁄4"	1 3⁄8"	3 3⁄4"	C	2
H	tailgate	1⁄4"	1 3⁄8"	5 3⁄4"	C	1
I	side panels	3⁄16"	3 3⁄8"	12"	C	2
J	front doors	1⁄8"	1 7⁄8"	2 7⁄8"	M	2
K	rear doors	1⁄8"	2 1⁄4"	2 7⁄8"	M	2
L	windshield	1⁄8"	1 1⁄4"	6 1⁄8"	C	1
M*	seats	1⁄4"	1 1⁄2"	1 1⁄2"	M	4
N*	seat backs	1⁄4"	1 1⁄2"	1 1⁄4"	M	4
O	rear roof	1 1⁄4"	6"	4 3⁄16"	M	1
P	grille	1⁄8"	7⁄8"	4"	C	1
Q	bumper	1⁄8"	3⁄4"	2"	C	1
R	axles	5⁄8"	5⁄8"	1 1⁄2"	M	4
S	roof	1⁄4"	6 3⁄8"	4 1⁄2"	C	1

*Parts initially cut oversize. See the instructions.

Materials key: M-maple, C-cherry.
Supplies: 3/16x1" dowel, 1 1/32x1 5/8" axle pegs (6), 1 3/16" steering wheel (1), 2 1/2" wheels (5), 3/8" washers (4).
Bits: 3/8" Forstner bit, 1/4" round-over router bit.
Source: Purchase a kit with the dowel, axle pegs, steering wheel, wheels, and washers. RS-01200, \$12.95, woodmagazine.com/mpv, 888-636-4478.





Cut Perfect Circles with a Tablesaw, Router, or Bandsaw



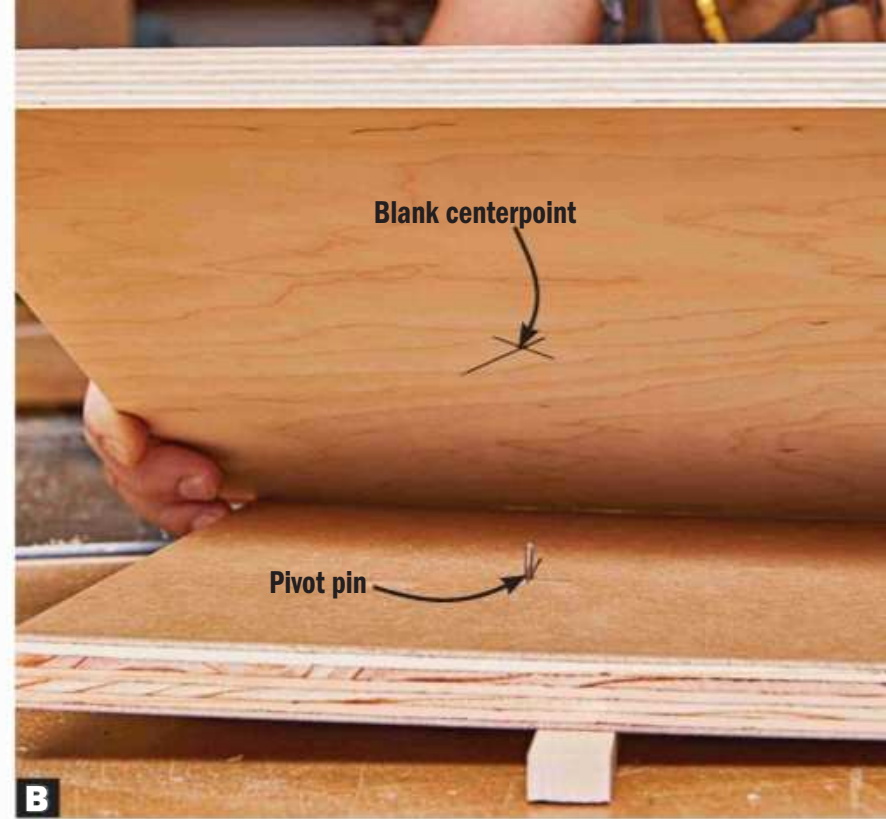
by Jim Heavey

Whether you're a tablesaw tinkerer, a bandsaw builder, or a router router, I have a method to make you a circle-cutting genius.

For each of these examples, I'll demonstrate cutting a 12"-diameter circle. For a different-size circle, just position the pivot point on the jig for the desired radius.



A After attaching the hardwood runner, trim the edge of the jig to produce a zero-clearance edge.



B Run a straightedge from corner to corner and draw intersecting diagonal lines on the bottom face to find the blank's center. Drill a $\frac{1}{4}$ "-deep hole to accept the jig's pivot pin.

Circles on the tablesaw...really

Let's begin with the tablesaw, a tool not normally known for cutting curves. But you can do it with a simple shopmade jig and a combination blade.

Start with a 16×16 " base of $\frac{3}{4}$ " plywood, a hardwood strip to fit the tablesaw's miter slot, and a scrap about $\frac{3}{4} \times 2 \times 14$ ". Screw and glue the scrap across the back of the base to form a handhold for pushing the jig during use. Attach the hardwood strip to the underside of the plywood base, parallel to one edge, with the right edge of the base butted against the blade [Photo A].

Mark a point half the diameter (6" in this case) from the blade and the leading edge of the jig. Drill a $\frac{1}{4}$ "-deep hole matching the diameter of a finishing nail and tap the nail into the hole. Clip off the head, leaving about $\frac{1}{4}$ " exposed to create a pivot pin.

To ensure a completed circle without a flat spot, cut a square blank $\frac{1}{8}$ " wider and longer than the desired diameter. Mount the blank on the jig [Photo B]. Turn on the saw and begin cutting away the corners [Photos C-E].

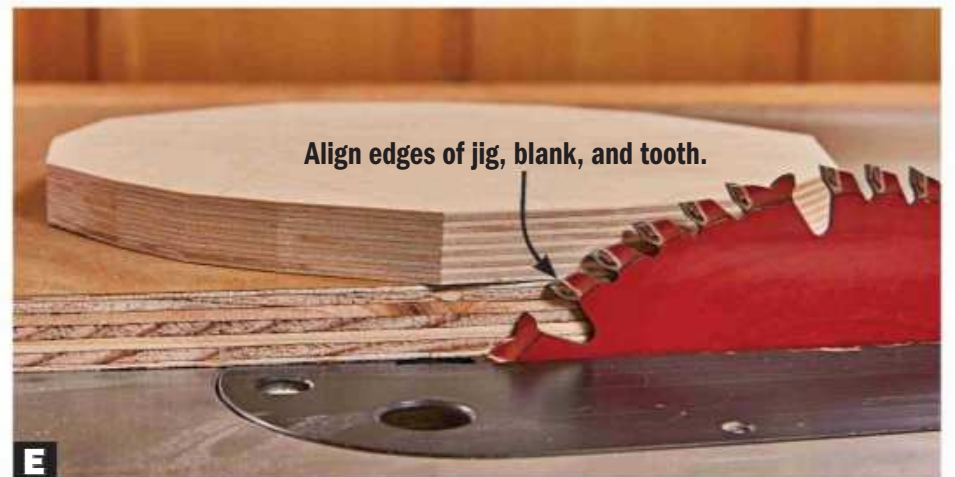
To complete the circle, move the jig forward slightly while rotating the blank to remove the last remaining waste and create a smooth edge [previous page].



C Cut away a corner, then turn off the saw. When the blade stops, pull the jig back to the start. Rotate the blank 90° and repeat to cut away each of the three remaining corners.



D Repeat this process to cut each of the remaining corners, creating a blank with 16 edges. One more series of corner cuts makes the blank nearly circular.

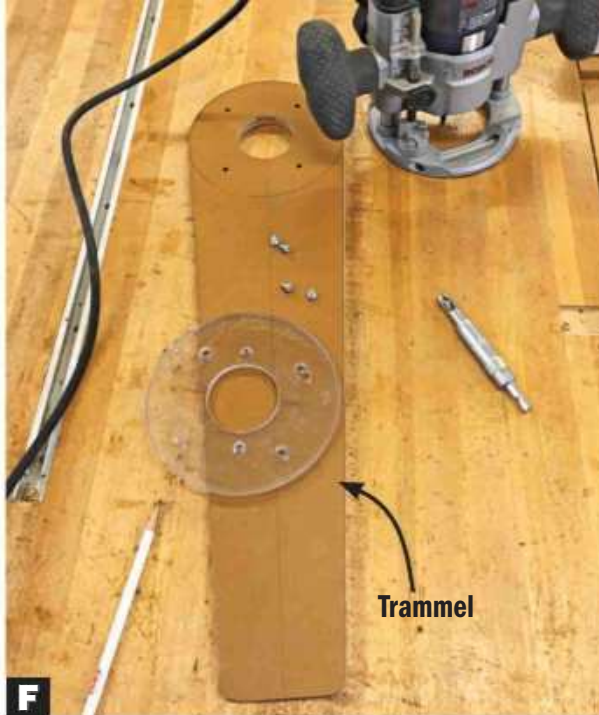
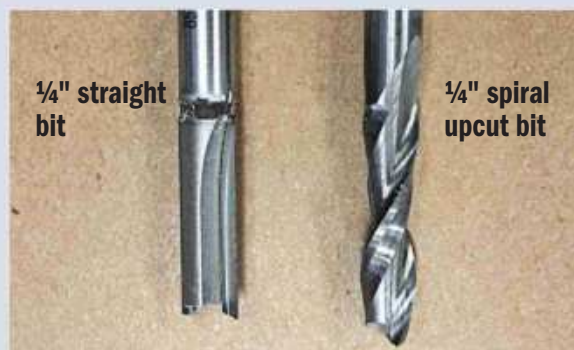


E When only small nubs remain, hold the jig so the point where the blank extends past the jig aligns with the front of the blade. Rotate the blank counterclockwise into the spinning blade.

SKILL BUILDER

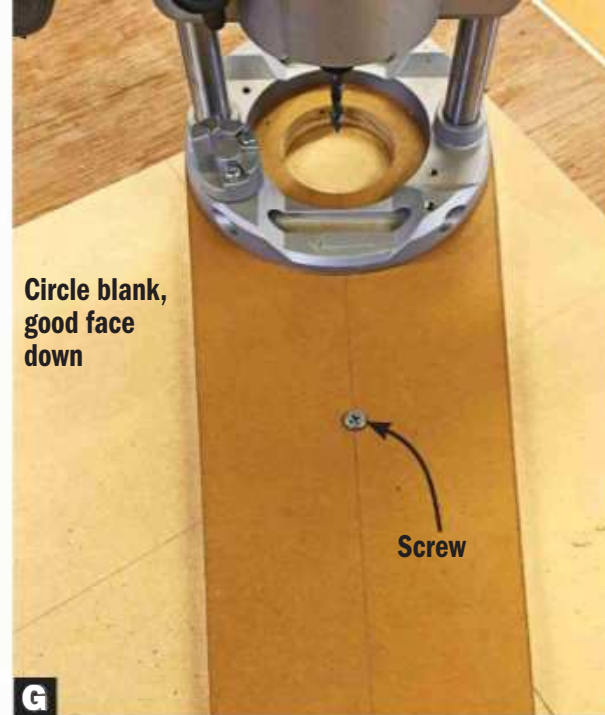
Routing with a twist

For routing on the back face of a blank, I use a 1/4" spiral upcut bit. The upcutting action creates a chip-out-free show face. By pulling sawdust up and out of the cut it eliminates burning along the cutline, a common occurrence with straight bits.



F

A trammel works with any size router, but a compact router handles easily and has plenty of power for the job.



G

Place the trammel on the blank and drive a #8 screw through the hole in the jig and into the corresponding hole in the blank, allowing the trammel to pivot.

Take the router for a spin

► A plunge router works best in this application.

Tip! The circle size is limited only by the length of the trammel. They are easy to make, so have several sizes on hand.

A router fitted to a trammel and using a straight or spiral bit [Skill Builder, above] helps you cut circles with baby-smooth edges. Plus, it gives you the option to create rings.

I've found that 1/2" plywood or MDF makes a lightweight trammel. First, cut the plywood to the width of your router base and at least 6" longer than the needed radius. This allows room to attach the router and a bit of extra length [Photo F]. Remove your router's subbase, trace around it, the bit opening, and the screw-attachment holes. Attach the router [Skill Builder, right]. Draw a line down the center of the trammel's length.

For a 12" circle, I cut a 14"-square blank. On the back face, drill a 1/8" hole 1/4" deep at the blank's centerpoint.

Using double-faced tape, mount the blank good-face down on a piece of scrap larger than the blank. Measure 6" from the inside edge of the router bit and drill a 1/8" hole

through the trammel at that mark. Mount the trammel to the blank [Photo G].

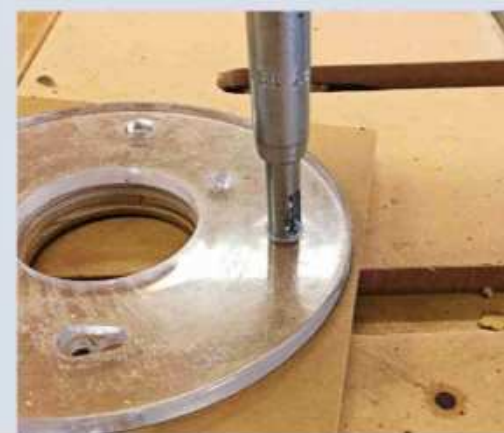
Set the router-bit depth at 1/4" and, while keeping slight pressure on the pivot point, slowly rotate the router in a clockwise direction to complete the first pass. Lower the bit another 1/4" and repeat this process until the circle separates from the blank [Photo H]. To rout a ring, see Photo I.

Note: Routing clockwise prevents the screw from winding out of the hole.

SKILL BUILDER

Drill spot-on mounting holes

A self-centering bit ensures accurate hole placement when mounting the router to the trammel. Countersink the screw holes to prevent the screwheads from dragging. You may need to purchase longer screws.



H

Routing with the good face down and using an upcut spiral bit created a chip-out-free face on this veneered MDF blank.



I

First, cut a circle as described above. Then move the trammel's pivot point toward the router the desired width of the ring plus the router-bit diameter. Rout as before.



J

The placement of the runner depends on the location of the miter-gauge slot in your table. I used double-faced tape to test the correct positioning before gluing the runner and stops in place.



K

Mark from the end of the kerf to the outside edge of the jig. Place the pivot point on this line.

The bandsaw rounds it out

Outfitted with a 16"-square jig made from $\frac{3}{4}$ " plywood, the bandsaw makes it easy to quickly cut circles. The jig should work on nearly every bandsaw table and accommodates circles up to about 25" in diameter.

Cut a miter-slot runner about $3\frac{1}{2}$ " longer than your bandsaw table. Using a square, draw a line 3" from the left edge of the plywood base. Attach the runner to the base so the blade cuts on that line. Allow enough of the runner to extend beyond the leading edge of the base so you can clamp the runner to the table. Two $1\frac{1}{2}$ "-wide plywood blocks on the bottom of the jig serve as stops when positioning the jig for use [Photo J].

Place the jig on the table, turn on the saw, and advance the jig into the blade until the stops contact the edge of the table. Turn off the saw.

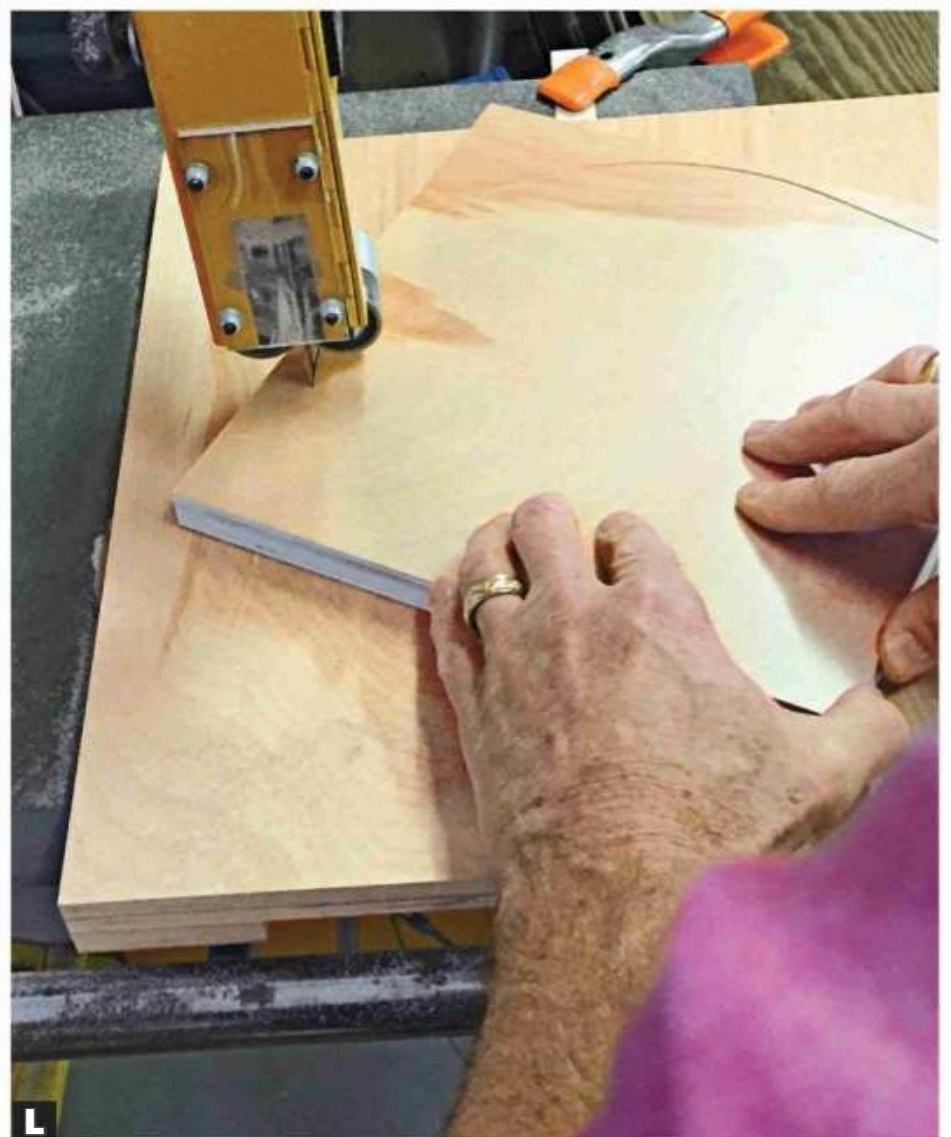
Where the kerf stops, mark a reference line perpendicular to the kerf [Photo K]. Remove the jig from the saw. Install a finish nail on the line 6" (for a 12" circle) from the blade and clip it off to $\frac{1}{4}$ " long.

Next, cut a square blank 1" wider and longer than the desired circle diameter. Drill a centered hole on the underside to accept the finish-nail pivot.

Place the blank on the jig. Advance the jig into the running blade until the stops contact the table, and apply a spring clamp to hold the jig in place. Slowly rotate the blank clockwise to cut the circle [Photo L].

► Fit your saw with a $\frac{1}{4}$ " 6-tooth-per-inch blade for a smooth cut.

► Using the bandsaw allows you to cut through materials too thick for the other methods.



L

Don't rush the cut. Steady, even rotation keeps the blade tracking true and provides a smooth, burn-free edge.

Pretty easy, huh? Now you have some options for that next circle-cutting job! 🌲

It's How We Roll Tabletop Bowling

Build this project in a spare weekend, then get busy striking the pins. (No special shoes required.)

D I M E N S I O N S :
39½" L x 12" W x 3¾" H

Approximate
materials cost:

\$70

including
hardware,
pins, and balls

A perfect
game:

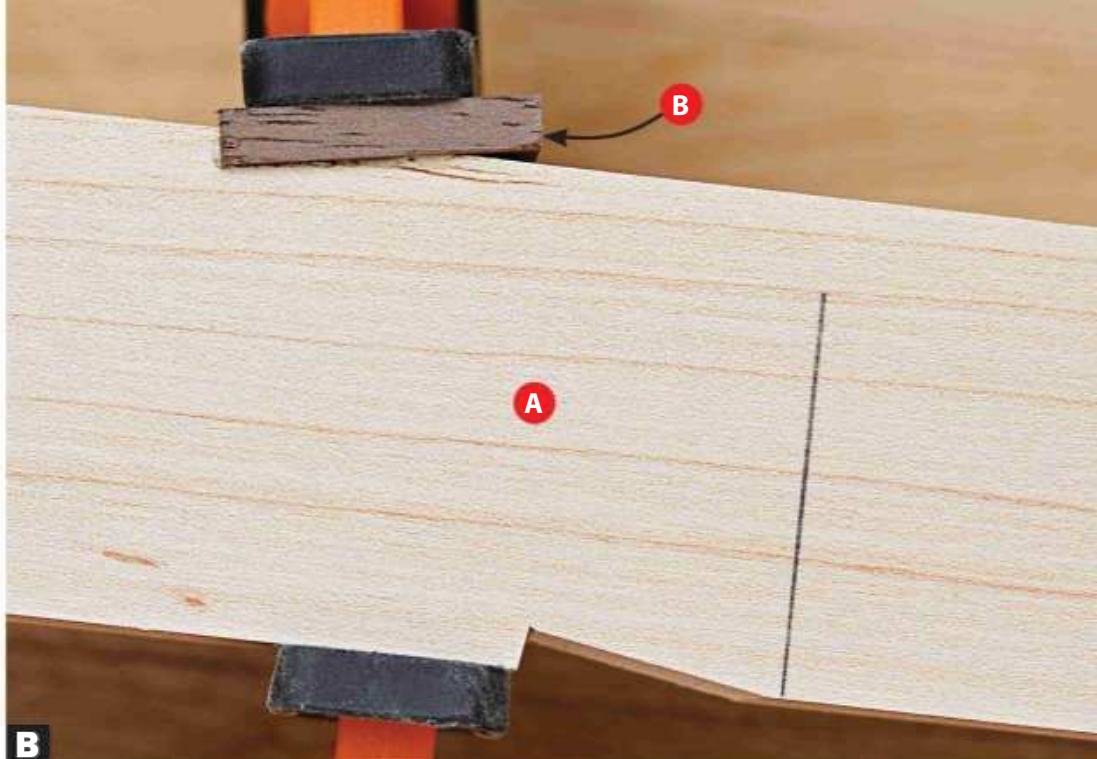
300





A

Align the dado set to notch the planks so it zeroes out at the layout mark. Repeat for the other arrow locations on each plank.



B

Cut arrow wedge (B) blanks to $\frac{1}{8} \times \frac{3}{4} \times \frac{7}{8}$ ". Glue these into the notches. When dry, trim flush with the plank edges.

► Learn to score a game, courtesy of the U.S. Bowling Congress. woodmagazine.com/bowlingcore

2 Install a $\frac{3}{4}$ " dado set on your tablesaw, tilt it 10° , and cut notches in the planks for the arrow wedges (B) [Photo A, Drawing 1a]. Cut and glue in wedges [Photo B].

3 Glue the planks (A/B) together to form the lane, aligning the arrows. Trim the ends square, if needed.

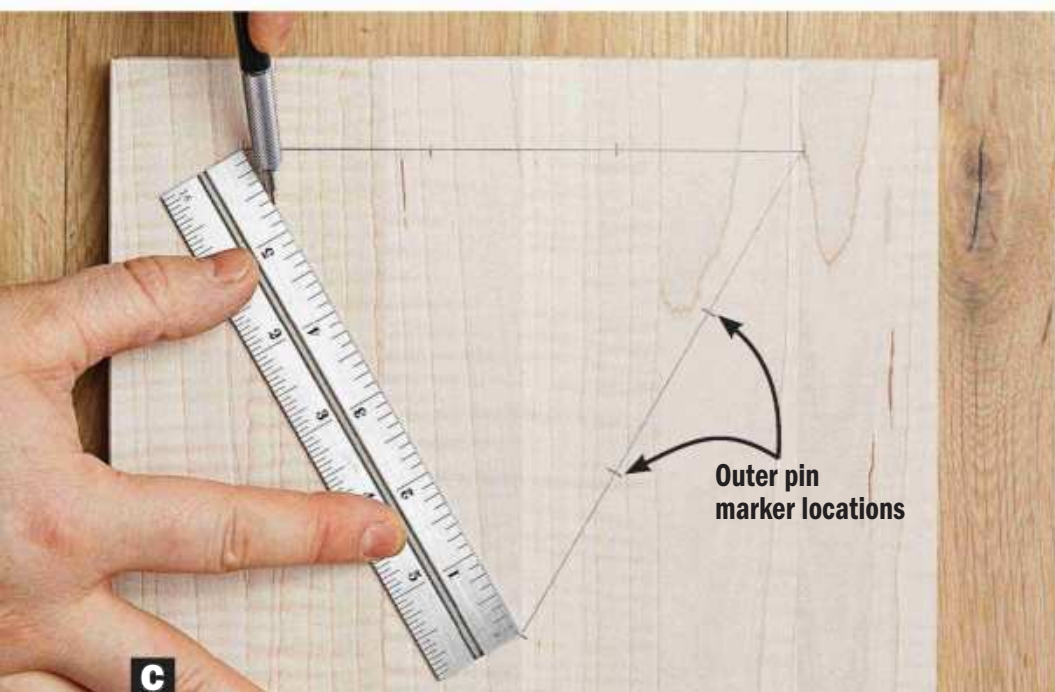
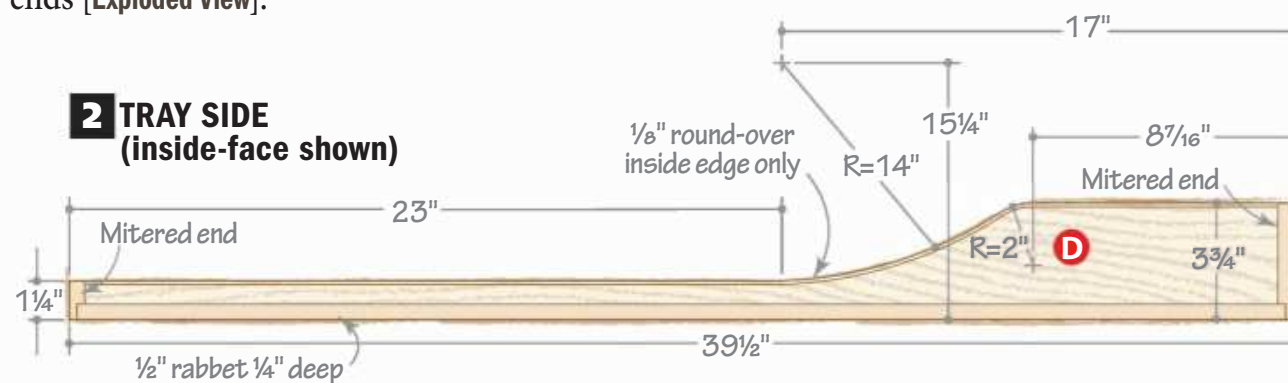
4 Lay out the pin marker (C) locations [Photo C, Drawing 1], drill the holes, and glue in markers (cut as tapered walnut plugs with a plug cutter). When dry, sand the assembly smooth and round over the top edges and ends [Exploded View].

Now make the tray

1 Cut the tray sides (D), back (E), and front (F) to size and shape [Exploded View, Drawing 2], mitering each end. Rabbet the bottom edge of each part.

2 Dry-clamp the tray frame, measure for the base (G), and cut it to size. Sand all parts smooth, and then glue together the tray.

3 Cut a $\frac{1}{2} \times \frac{3}{4}$ " cherry spacer block about 6–8" long. (Later, you will cut the pivot block [K] from this spacer block.) Position the spacer block at the "shooter" end of the



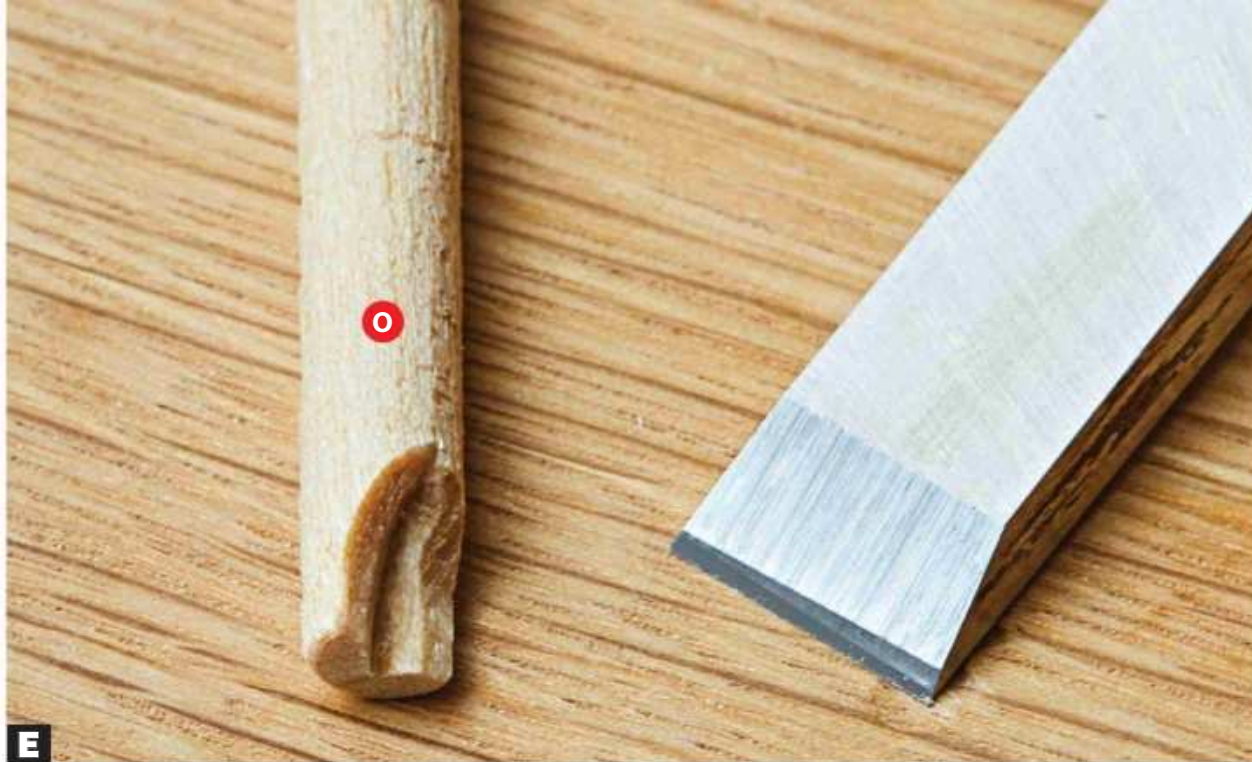
C

Lay out the triangular shape and locations for the outer pin markers, then simply connect the lines for the center pin marker.



D

Trap the striker (L) in a V-block so it won't roll when drilling into it. Make a V-block on the tablesaw by ripping two intersecting 45° -bevel cuts.



Carve the end of the spring hold (O), above, to create a hollowed catch for the spring-retainer pin (N) to rest in when retracted and locked in place, right.

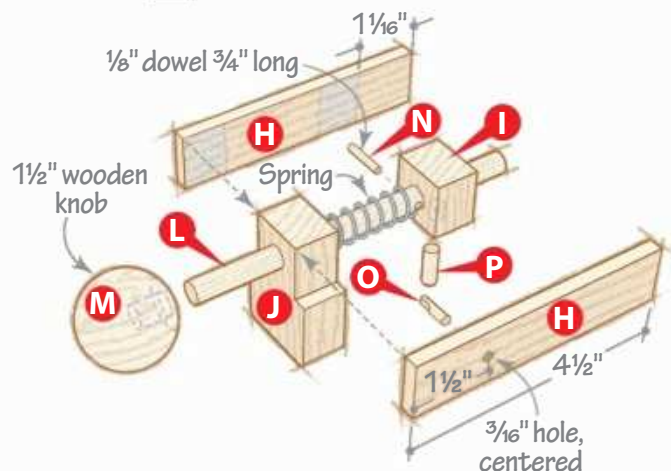
blank at the “shooter” end of the tray, and center the lane in the tray. Insert a shooter marble on each side of the lane within the tray. The marble should roll freely; if not, equally trim the lane’s edges and center it. The pivot-block blank should also slide freely side-to-side without slop. Once this is achieved, clamp the lane in place. Turn the assembly over, and secure them together with three screws [**Exploded View**]. (Doing this without glue allows the solid-wood lane to shrink and swell without splitting.)

Crank up a shooter

The shooter slides side-to-side and pivots, providing plenty of shot angles. A tension spring slipped over a dowel creates marble-propelling force when you pull and release the knob.

1 Cut the shooter sides (H), front block (I), and back block (J) to size [**Drawings 3, 3a, and 3b**]. Drill holes in the front and back blocks. Glue together these four parts.

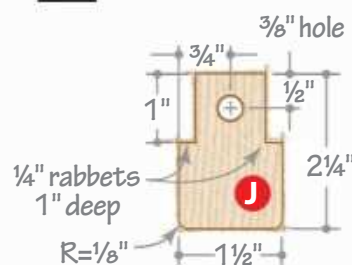
3 SHOOTER ASSEMBLY



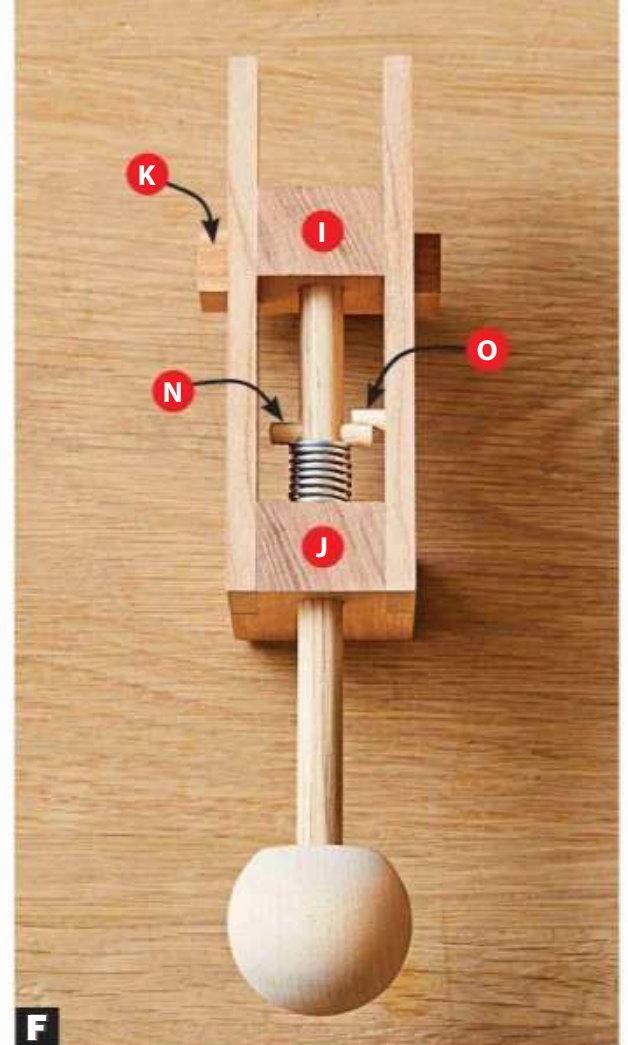
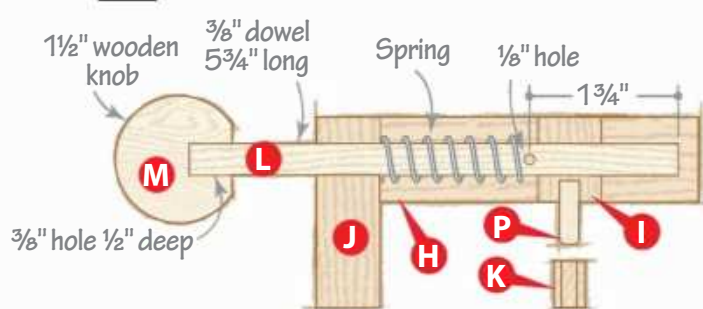
3a SHOOTER FRONT BLOCK



3b SHOOTER BACK BLOCK



3c SHOOTER SIDE SECTION VIEW



Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Lane						
A	planks	¾"	1½"	36"	M	6
B*	arrow wedges	⅛"	¾"	¾"	W	10
C	pin markers	½" dia.	⅜"		W	10
Tray						
D	sides	½"	3¾"	39½"	C	2
E	back	½"	3¾"	12"	C	1
F	front	½"	1¼"	12"	C	1
G	base	½"	11½"	39"	MP	1
Shooter						
H	sides	¼"	1"	4½"	C	2
I	front block	¾"	1"	1"	C	1
J	back block	¾"	1½"	2¼"	C	1
K	pivot block	½"	¾"	2"	C	1
L	striker	⅜" diam.		5¾"	MD	1
M	knob	1½" diam.			M	1
N	spring retainer pin	⅛" diam.		⅝"	MD	1
O	spring hold	⅜" diam.		½"	MD	1
P	pivot pin	¼" diam.		1"	MD	1

*Parts initially cut oversize. See the instructions.

Materials key: M-maple, W-walnut, C-cherry, MP-maple plywood, MD-maple dowel.

Supplies: #8×1" flathead screws (3).

Blade and bits: Dado set; 1/8" round-over router bit; 1/2" plug cutter.

Source: Kit with bowling pins, marble, hardware, and dowels: woodmagazine.com/bowlingkit, 888-636-4478

Produced by **Bob Hunter** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Not the same old saw

Put new life into neglected tools.

► These instructions pertain to Western-style handsaws that cut on the push stroke.

Perhaps you rediscovered the forgotten handsaw your dad used. Or seeing a saw at a yard sale stirred an urge to try back-to-roots woodworking.

Whatever the motivation, any handsaw you acquire on the secondhand (and beyond) market probably needs refurbishing to become a usable tool again.



File guide

Triangular file



A Commercial saw vises, like these vintage models, grip the blade securely and dampen vibrations caused by filing the teeth. A lever opens and closes the jaws quickly.

Note: Many handsaws from the recent past feature induction-hardened teeth, usually identified by blackened tips. Generally, these require pro sharpening.

Note: A slight, constant curve from toe to heel (handle end) along the cutting edge is acceptable. Called “crown,” it makes sawing easier.

► Triangular files for saw sharpening come in regular, slim, extra-slim, and double-extra-slim styles. For saws with 6–7 teeth per inch (tpi), use a 6" slim taper; 8–9 tpi, 6" extra-slim; 9–10 tpi, 6" double-extra-slim; and 11–14 tpi, 5" double-extra-slim.

Take a good first look

Not every old saw deserves rehabbing. The best candidates show evidence of careful use and maintenance during their lives—even teeth and undamaged blades and handles. Saws that were high-quality tools when new usually prove the best rehab subjects.

You can readily deal with a rusty blade, a missing handle screw, or dull teeth. But avoid any saw with a deeply scratched, corroded, kinked, or bent blade. Likewise, reject one with uneven teeth, a wavy cutting edge, or many missing teeth. (A saw still cuts all right with a few missing teeth.)

Set up your saw shop

Refurbishing a handsaw calls for some triangular files plus three specialty tools, chief among them a saw vise [Photo A] for holding the blade solidly. Once fairly common, these now show up at yard sales and junk shops. You can find new and used ones on the internet, too. Or, make a substitute [Shop Tip].

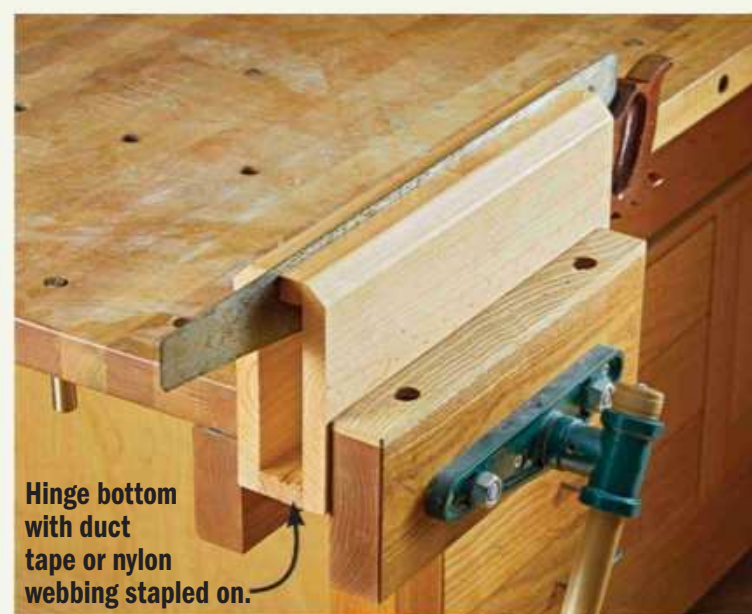
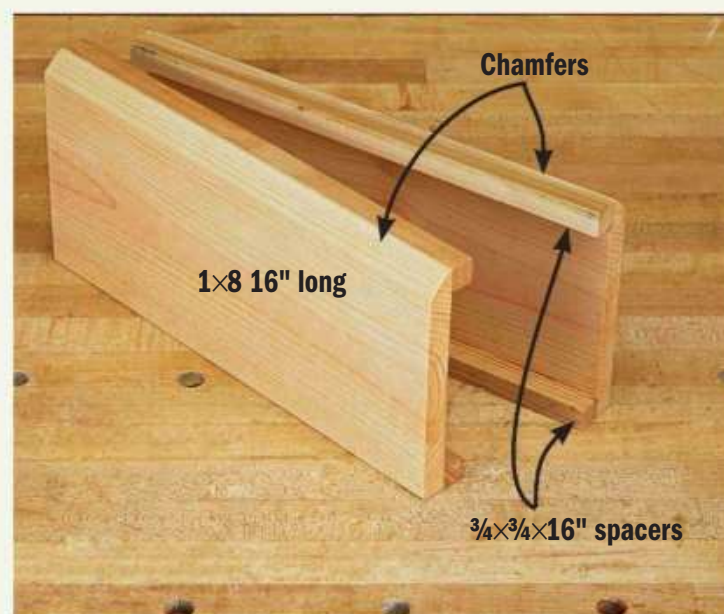
A file guide [opening photo, Source] makes it easier to hold the triangular file at the correct angles for rake and fleam [Drawing 1] as you sharpen the teeth. And, you'll need a saw set [Source] to set the teeth (bend the tips for kerf clearance) accurately and evenly.

Tip! Files are sold without handles, but you should buy separate handles and install one on any file you use for better control and to prevent hand injuries.

SHOP TIP

Shop-made jaws hold your saw rock-steady in a bench vise

Assemble two pieces of 1x8 and four 3/4x3/4" spacers, all 16" long, as shown below left. The spacers allow clearance for a saw handle or backsaw rib. Plane the spacers to ensure that the jaws meet squarely for maximum grip on the saw blade (below right). The jaws rest on the bench-vise rails, but you can hinge them together at the bottom with duct tape or nylon webbing for slightly easier use.





B An angle grinder with a bevel wire brush cleans up a rusty saw quickly. Work in short bursts over large areas to prevent heating the blade and affecting the temper.

Tip! The angle grinder and wire brush fling around a lot of fine dust. Wear a respirator and safety goggles, and work outside, if you can.

First, get rid of rust

Wipe down the blade with a citrus cleaner/degreaser. Then, remove rust with a rotary wire brush and a drill or angle grinder [Photo B], steel wool, a nylon abrasive pad, or fine sandpaper. On a blade with only light surface rust, clean up around the handle with small detail wire brushes. Remove the handle if there's heavy rust on the blade right up to it. Turn to chemical rust removal only as a last resort—usually, it isn't necessary. Before immersing the saw in a liquid rust remover, take off the handle.

Joint the saw

The tips of the teeth should stand equally tall along the blade edge. If not, the saw is said to be out of joint. To test the saw, file one pass along the tips of the teeth with a 10" or 12" second-cut or smooth-cut mill file [Photo C]. Keep the file perpendicular to the plane of the blade and slide it along the tips of the teeth. (Jointing jigs are available, but you don't need one to fix up a saw or two.)

Close inspection should reveal a slight flat at the tip of each tooth, all relatively equal in size. If some teeth have flats and some don't, or the flat sizes vary widely, you may need to joint the saw and file the teeth several times. This may prove more work than the saw is worth. (Worst case: A professional saw sharpener may need to recut the teeth.)

Set the teeth

Setting the blade—bending alternate teeth to the right and left—slightly widens the cutting edge and prevents the saw from binding in the kerf.

Set can have a greater effect on a saw's performance than tooth sharpness. Inadequate set leads to binding, while excessive



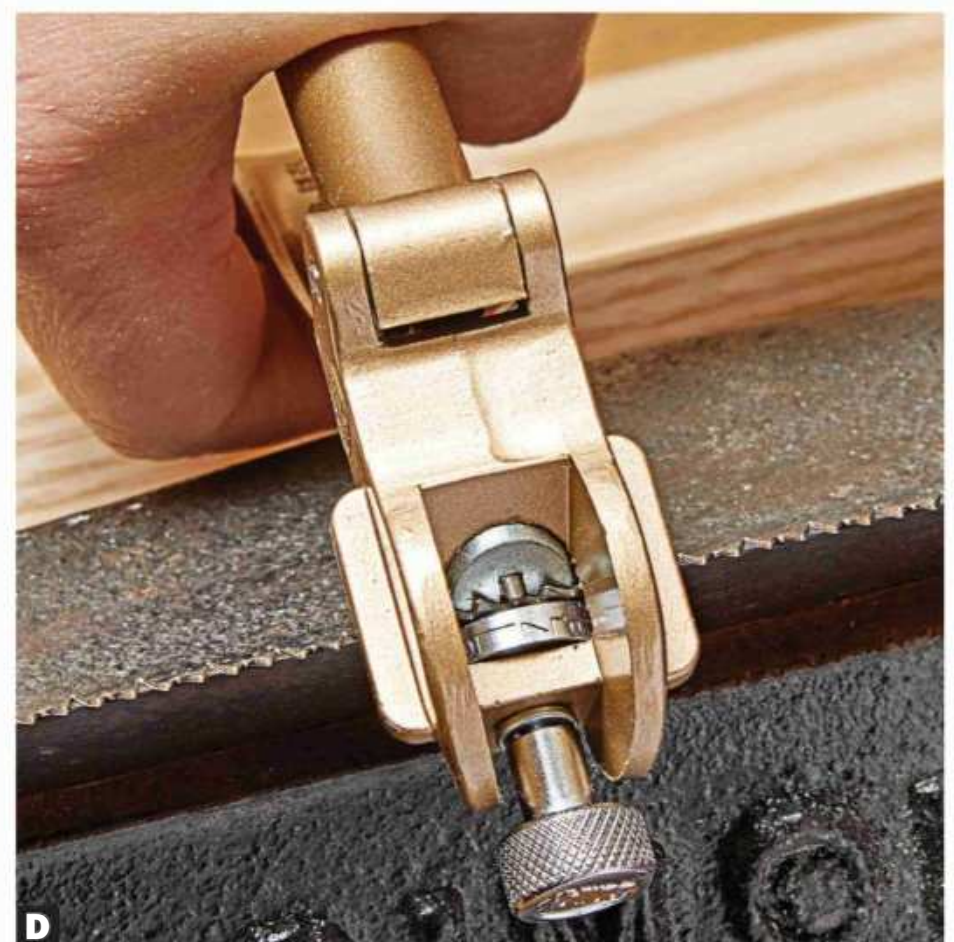
C Make a single light pass from the heel to the toe when jointing the saw. An out-of-joint saw may have been improperly sharpened.

set makes the saw harder to push. Unevenly set teeth make cutting straight difficult.

The amount of set a saw needs depends in part on the kind of wood being cut (softwood, hardwood, dried, green). A saw for cutting dried hardwood requires less set than a saw for green softwood.

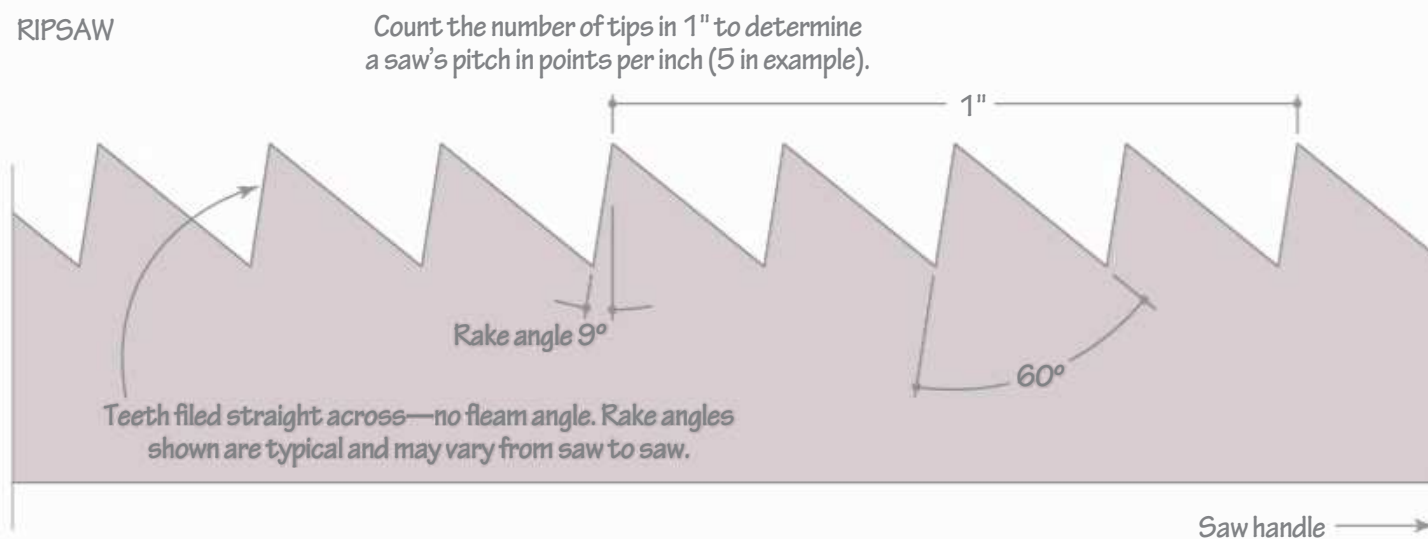
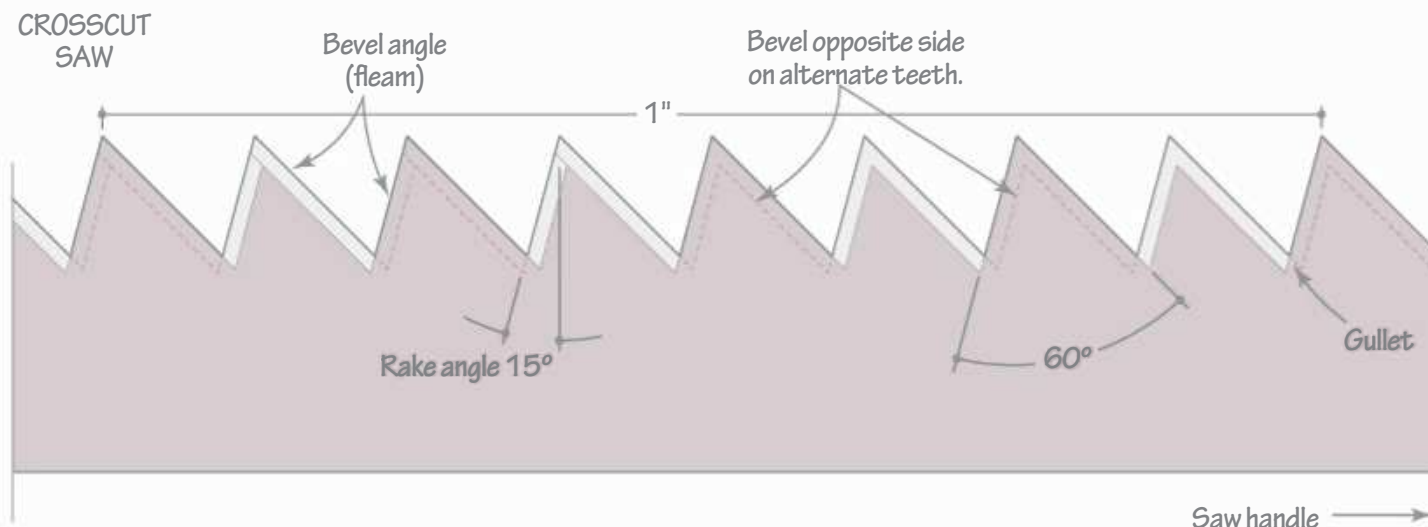
Saw sets usually establish the amount of set based on the number of teeth per inch. Adjust the tool for the pitch of your saw; then, set alternate teeth to one side first [Photo D]. Reverse the saw in the vise and set the teeth to the other side. Make a test cut; if the saw binds, adjust the tool for a slightly lower pitch (more set) and reset the teeth.

Note: Blades made from the late 19th century into the late 20th century were tapered ground to make them thicker at the tooth edge than at the back, so they require less set than a constant-thickness blade.



D A squeeze of the saw set bends the tip of each tooth the correct amount. Set teeth alternately, bending them in the same direction in which they were set originally.

1 SAW TEETH



Note: Saw pitch may be expressed as points per inch (ppi), as shown, or as teeth per inch (tpi). TPI, measured from gullet to gullet, is 1 less than ppi (4 tpi for the rip saw shown).

Tip! Gauge existing rake and fleam from teeth at the heel of the blade (nearest the handle); they're less likely to be worn because they see less sawing than teeth in the middle of the blade.

Sharpen the teeth

File the teeth to the existing rake and fleam angles. A usual rake for crosscut saws is 15°; for rip saws, 9°. Fleam varies, with 20°–25° common for crosscut saws. Rip saws have no fleam. On crosscut saws, shallow fleam angles around 15° result in durable cutting edges that produce a slightly rough cut and take more effort to push. Steeper angles give a smoother, easier cut, but require more frequent sharpening.

Attach the file guide [opening photo] to the proper file for your blade pitch. Adjust the guide to your saw's fleam and rake angles according to the manufacturer's instructions for the device.

Rip saw: Place the file in the gullet nearest the handle. File straight across that tooth,

making light, precise strokes only until the flat spot left by jointing disappears. Continue to the next tooth, and file each in turn.

Crosscut saw: Place the file in the first gullet near the handle in which the tooth to the right of the file is set away from you. File that tooth until the flat spot disappears. Skip the next gullet and file the next tooth. Continue filing alternate gullets to the toe of the saw. (Each stroke files the front of one tooth and the back of the adjacent one.) Then, turn the saw around in the vise and file the remaining teeth the same way.

After filing either type of saw, make a test cut. Then, clean the blade and apply a rust protectant, such as Boeshield T-9. Add a nonsilicone dry lube, such as Bostik BladeCote, for easier sawing. 🌲

Source

Saw file holder, no. 05G46.01, \$43, or guide with set of files, no. 05G46.06, \$78; setting tool, no. 60K02.02, \$29. Lee Valley 800-871-8158, leevalley.com.

Produced by **Larry Johnston**
Illustrations: **Roxanne LeMoine**,
Lorna Johnson

► Buy Boeshield T-9 and Bostik BladeCote. woodmagazine.com/bladeare

Half-Lap Joints

Practically indestructible and beginner-friendly

Super strong and easy to make, few joints match the usefulness of the half-lap. Requiring little more than a sharp pencil and a stacked dado blade, lap joints can strengthen a variety of projects.



A Determine the half-lap length by aligning the workpiece edge with the teeth of the outside dado blade.



B Check for a perfect fit by touch on your test pieces. Check for flush top faces and solid contact between the faces of the half-laps.

Whole truth about half-laps

As you can see in the photo on the *previous page*, a half-lap joint consists of two workpieces reduced to half their thickness where they overlap. This creates lots of face-grain-to-face-grain contact area for glue joints. By contrast, simple butt joints rely on an end-grain-to-edge-grain bond, far weaker than a half-lap. In our tests, half-lap joints outlast even a dowel-reinforced butt joint.

One potential downside to half-lap joints: They reveal end grain on the outside edges of the joint, which may create appearance problems for your project. We often use half-laps for shop-cabinet door and face frames, workbench leg frames, outdoor furniture, and internal web frames for furniture such as dressers, where strength outweighs formality.

The good news is you need only a tablesaw or router table to make a half-lap joint. On the tablesaw, we prefer a stacked dado set for fast, smooth results. If you don't own a dado set that shears cleanly across the grain and leaves the sawn surface smooth and flat, use a router table with a straight bit or down-cut spiral bit.

Here, we show how to make corner and T-joints using a tablesaw, but you easily can adapt these techniques to your router table.

Lap joints in four easy steps

1 Install your complete dado set for the widest cut possible. Raise the blade above the table—the exact height isn't important yet.

Adjust the rip fence so one edge of the workpiece butts against the fence and the opposite edge aligns with the side of the dado set farthest from the fence [Photo A].

If all the workpieces are the same width, you can leave the fence in this position for all cuts. If you're working with pieces of different widths, use a workpiece's adjoining piece to set the fence for its half-lap cut. On a door frame, for example, use the horizontal workpieces (the rails) to set the fence to cut the vertical workpieces (the stiles), and vice versa.

2 Set the cutting depth of the dado set so it removes precisely one half of the workpiece thickness. This may require several test cuts in two pieces of scrap stock of the same thickness as the project workpieces.

After you rabbet one end of both scrap pieces, lay them on a flat surface and align them [Photo B]. The top and bottom faces should be flush with no gap between pieces. If not, adjust the blade height and repeat until the pieces slide firmly together.

3 Mark the mating faces of the project workpieces that you'll rabbet. Attach an auxiliary fence to your miter gauge to support the workpiece during the cut and prevent tear-out on the back edge.

Position the workpiece with one edge against the auxiliary fence and the end butted against the rip fence. Then cut successive passes until you reach the end of the workpiece [Photo C].

Tip! To make a strong joint even stronger, cut the joint faces as smooth as possible with no loose fibers.

Note: Because you're not cutting through the stock, it's safe to use the rip fence together with the miter gauge. Never use these two together when cutting completely through a workpiece.

► In wood-joint torture tests (issue 181, Dec./Jan. 2007/2008), half-laps proved more than twice as strong as any other joint tested.

Watch the tests.

woodmagazine.com/torturetest2

► Get the looks of a miter and the strength of a half-lap with mitered half-laps.

woodmagazine.com/miteredhalflaps



C Use the notch cut in the auxiliary fence from the first pass to align the workpiece for a series of overlapping passes that complete the half-lap.

4 Apply glue to all mating surfaces of each joint, clamp the assembly, and check for square [Photo D].



D A three-way clamping set-up eliminates joint gaps while pressing together the faces of the half-laps.

Make a half-lap T joint



E Half-lap T joints automatically align to form 90° angles when the dado is cut to the width of the rabbeted piece.



F Mark the dado edges using the mating piece to be rabbeted. If needed, place a center mark on the end of the rabbet part to align with a center mark on the dado part.

Sometimes, you need to cut a half-lap joint in the middle of a workpiece—for the centered vertical divider of a cabinet face frame, for example. Follow this three-step method to create a T joint [Photo E].

1 Using a sharp pencil or knife, mark the mating workpiece [Photo F].

2 Brace the workpiece against a miter-gauge auxiliary fence and align a pencil mark with the edge of the dado blade. If you're cutting multiple workpieces shorter than the auxiliary fence, clamp on stops.

3 Butt a workpiece end against one stop (or align the blade with a mark) and make a cut [Photo G]. Then butt the other end of the stock against the opposite stop, make another cut, and remove the material in between. 🌲

Half-laps can also be cut using a router and homemade jig. woodmagazine.com/routedhalflap



G Stops added to an auxiliary fence simplify duplicate parts, such as the top and bottom rails of a two-door cabinet face frame.

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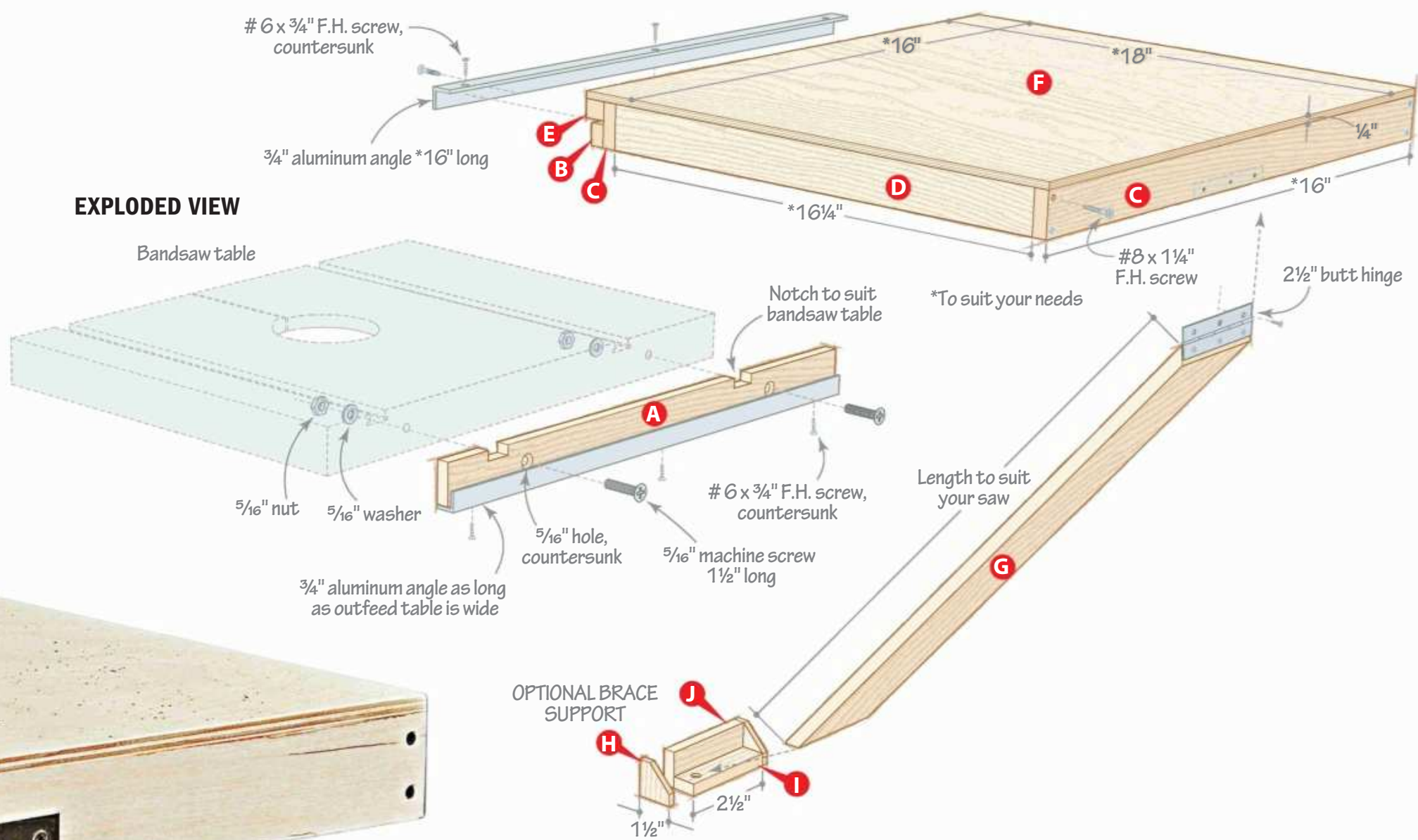
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Bandsaw Outfeed Table

Let it carry the load so you can concentrate on the task at hand.

EXPLODED VIEW



Note: We built this table to suit a Powermatic PWBS-14 14\"/>

With less than 8\"/>

Make the mounting system and table

- 1** Cut the mount plates (A, B) and two pieces of 3/4\"/>
- 2** Glue and screw an angle to one edge of parts A and B [Photos A–D].
- 3** Cut parts C–F. Glue and screw the frame (C/D) together [Exploded View].



To attach the aluminum angle, scuff-sand its gluing surface, apply a thin layer of epoxy, and clamp the angle in place using another length of angle as a spacer.



B Punch dimples at each screw location to prevent your drill bit from wandering.

4 Glue the table-mount plate assembly (B) to the frame, flush with the bottom edge [Photo D]. Glue on the filler strip (E) and tabletop (F).

Attach the table to the saw

1 Drill and countersink attachment holes on the saw-mount plate assembly (A) so they don't interfere with the cast-iron webbing on the underside of your bandsaw table [Exploded View]. Attach the plate assembly to the saw, aligning its top edge flush with the bandsaw tabletop. Mark the location of miter slots onto the mount plate, then remove the plate and cut the notches.

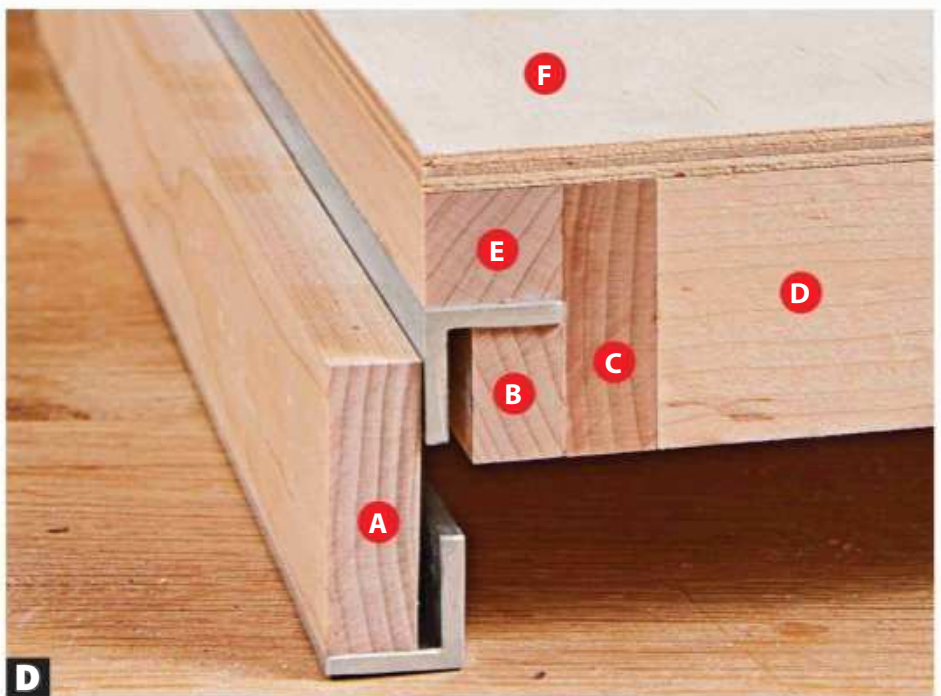
2 Reattach the mount plate to the saw. Slide the support table in place and confirm that it sits flush, too.

3 Cut the brace (G) about 1/2" longer than needed. Hinge the brace to the back edge of the outfeed table [Exploded View]. Then, trim the brace's extra length as you adjust the outfeed table level with the bandsaw table. If your saw doesn't have a good resting place for the bottom end of the brace, build and bolt on the optional brace support (H-J) [Exploded View].

Produced by **Bill Krier** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**



C Countersink each screw hole so the screwheads sit flush with, or just slightly below, the surface of the aluminum angle.



D The aluminum angles should slip snugly inside each other. If not, file or sand the outside faces of the angle.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A saw-mount plate	1/2"	1 5/8"	*16"	M	1
B table-mount plate	3/4"	1/2"	*16"	M	1
C frame front/back	1/2"	1 1/2"	*16"	M	2
D frame sides	1/2"	1 1/2"	*16 1/4"	M	2
E filler strip	3/4"	5/8"	*16"	M	1
F tabletop	1/4"	*16"	*18"	Ply	1
G brace	1/2"	2 1/2"	*26 3/4"	M	1
H† brace-support sides	1/4"	1 1/2"	1 1/2"	M	2
I† brace-support bottom	1/2"	1"	2 1/2"	M	1
J† brace-support back	1/2"	1 1/2"	2 1/2"	M	1

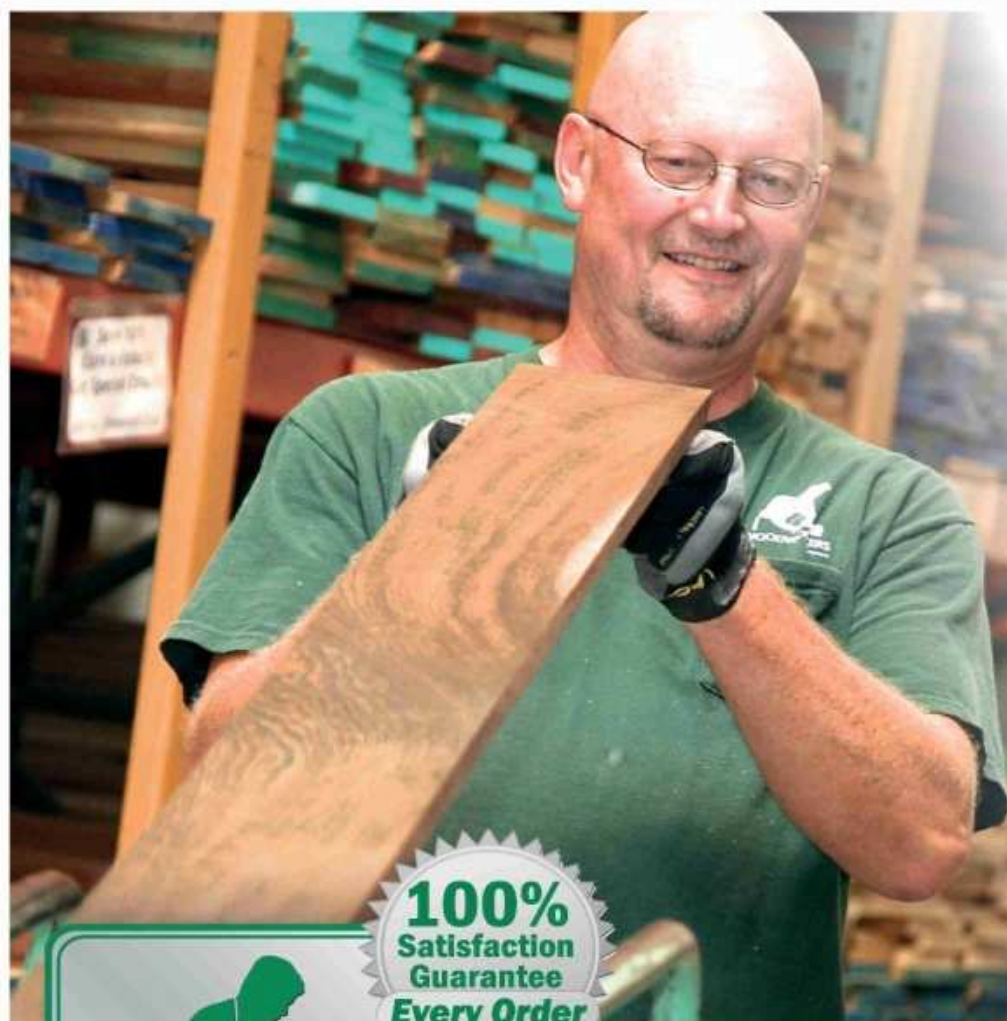
*Size to suit your bandsaw and needs.

†Optional, depending on your saw.

Materials key: Ply-plywood, M-maple.

Supplies: 2 1/2" butt hinge with screws, 3/4x1/8" aluminum angle (2 pieces, each as long as the width of your outfeed table), #8x1 1/4" flathead screws (8), #6x3/4" flathead screws (6), 5/16" machine screws 1 1/2" long (2), 5/16" nuts (2), 5/16" washers (2).

Bit: Countersink drill bit.



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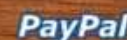
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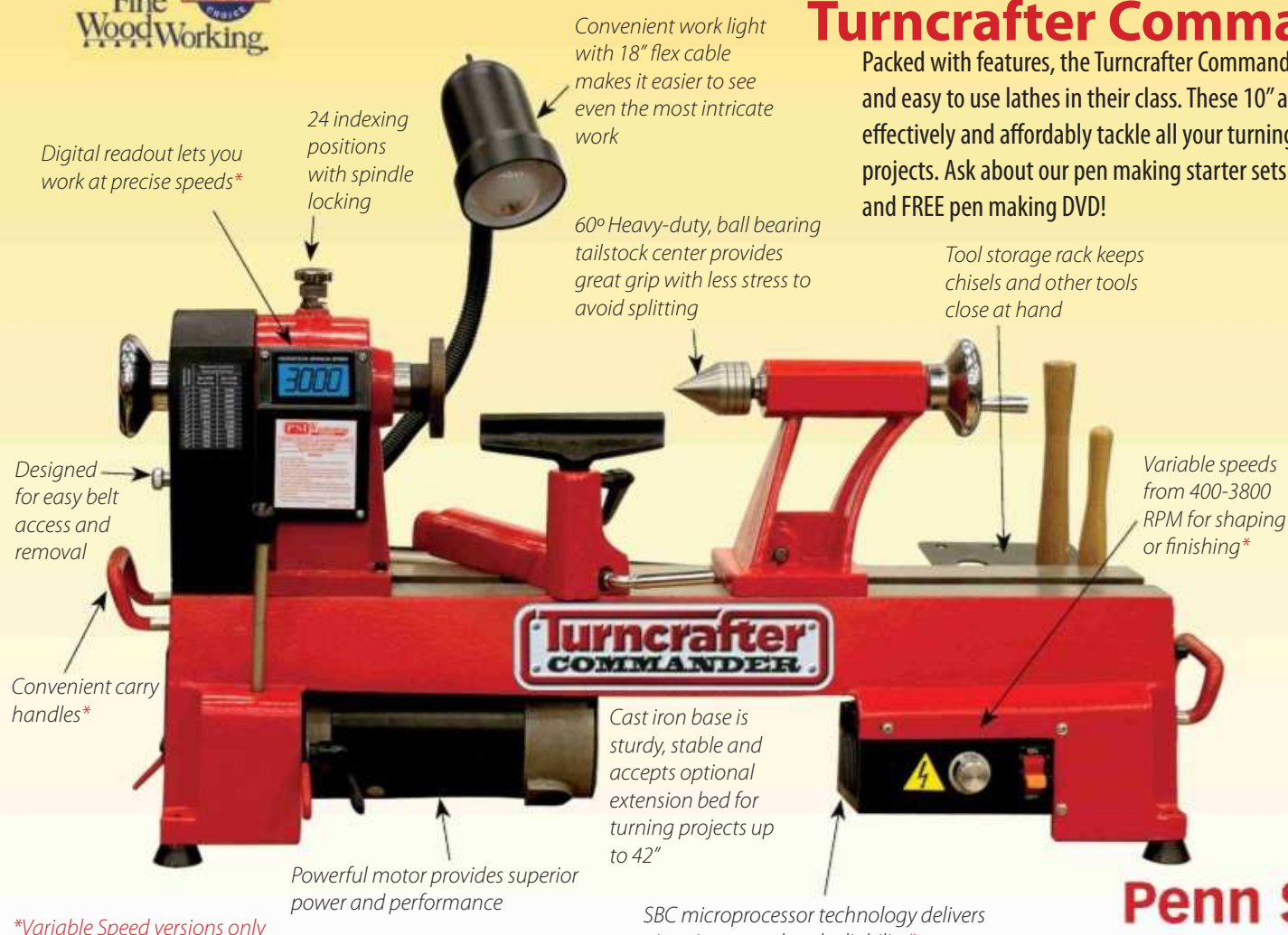


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Drilling and driving rock stars

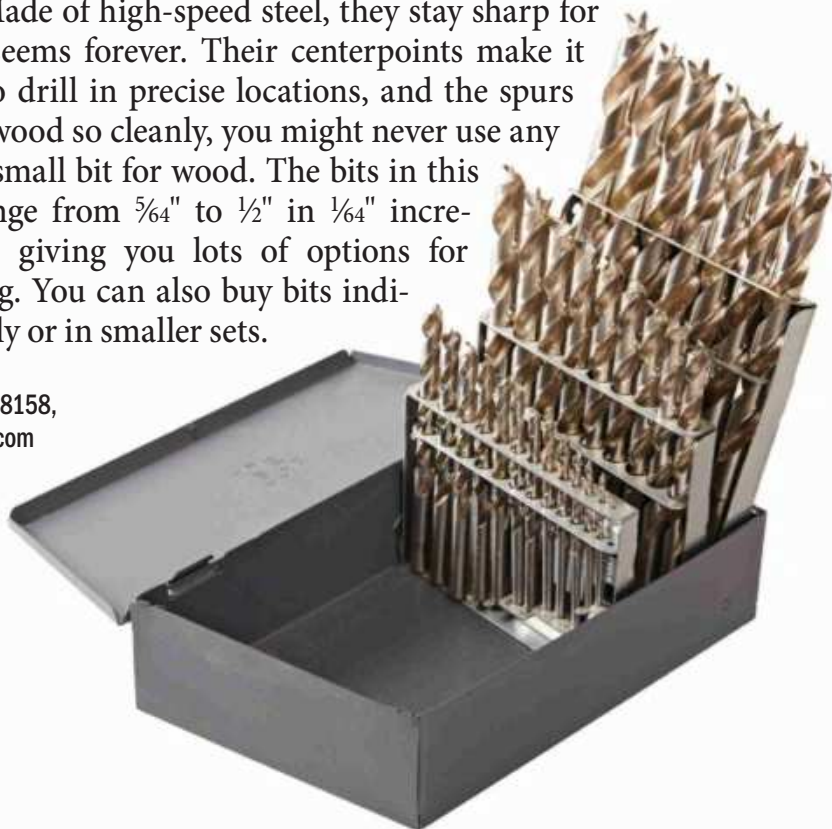
For woodworking, you need more than just a coffee can full of twist and spade bits. To up your game, add these favorites of the *WOOD*® editors.

Lee Valley brad-point bits

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800-871-8158,
leevalley.com



WoodRiver Forstner bits

16-piece set, no. 147067, \$106.50

Forstner bits drill large, flat-bottom holes with little risk of chipping at the hole's rim, or the centerpoint poking through the back side. This set does that at a value price. The bits have sharp cutting edges and rims, as well as short centerpoints, so they drill quickly and precisely. The $\frac{3}{8}$ "-shank bits range from $\frac{1}{4}$ " to $2\frac{1}{8}$ " in $\frac{1}{8}$ " increments.

800-225-1153, woodcraft.com



Snappy cabinetmaker's drill & drive bits

7-piece set, no. 43572, \$45.89

Snappy makes a lot of bit sets, but this one has the most basic and helpful ones for woodworking. The four countersinking bits—made for the most common screw sizes—drill pilot holes for screws and countersinks or counterbores at the same time. And the self-centering bits drill spot-on pilot holes for hinges. The square-drive screw bit also comes in handy.

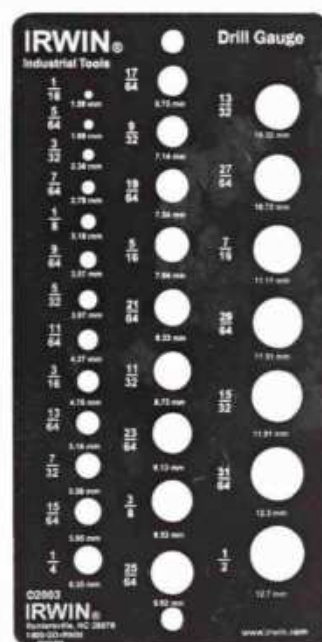
800-334-7472, snappytools.com

Irwin drill bit gauge

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Don't know a drill bit's diameter, or what size pilot hole to drill for the screw you're using? Use this simple gauge to find out. It's made of durable steel—no misshapen holes—with 29 clearly labeled holes from $\frac{1}{16}$ " to $\frac{1}{2}$ ".

800-464-7946, irwin.com



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PROFESSIONAL HVLP

Open-end sander makes sanding a joy

16-32 drum sander, no. 71632, \$1,200

Supermax's newest drum sander lives up to the well-earned reputation of its predecessors. This 16-32 model has many of the same great features found on other models (easy abrasive changes, no-sag cast-iron head, Intellisand auto-adjusting feed speed, and good dust collection), but it also brings new aspects to the table.

The quick-adjustment lever lets you bypass the leadscrew and move the head fully up or down in less than a second. A digital readout function constantly displays the belt speed and workpiece thickness during operation. The conveyor belt adjusts parallel to the drum via a single nut for easy calibration.

I sanded dozens of boards and wide panels (up to 32" wide), and the 16-32 always turned out nicely sanded workpieces of even thicknesses. And I can't stress enough how easy it is to change abrasives on the drum—making it more likely you'll change from a coarse to a finer abrasive while working the same panel.

—Tested by Bob Hunter, Tools Editor

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supermaxtools.com



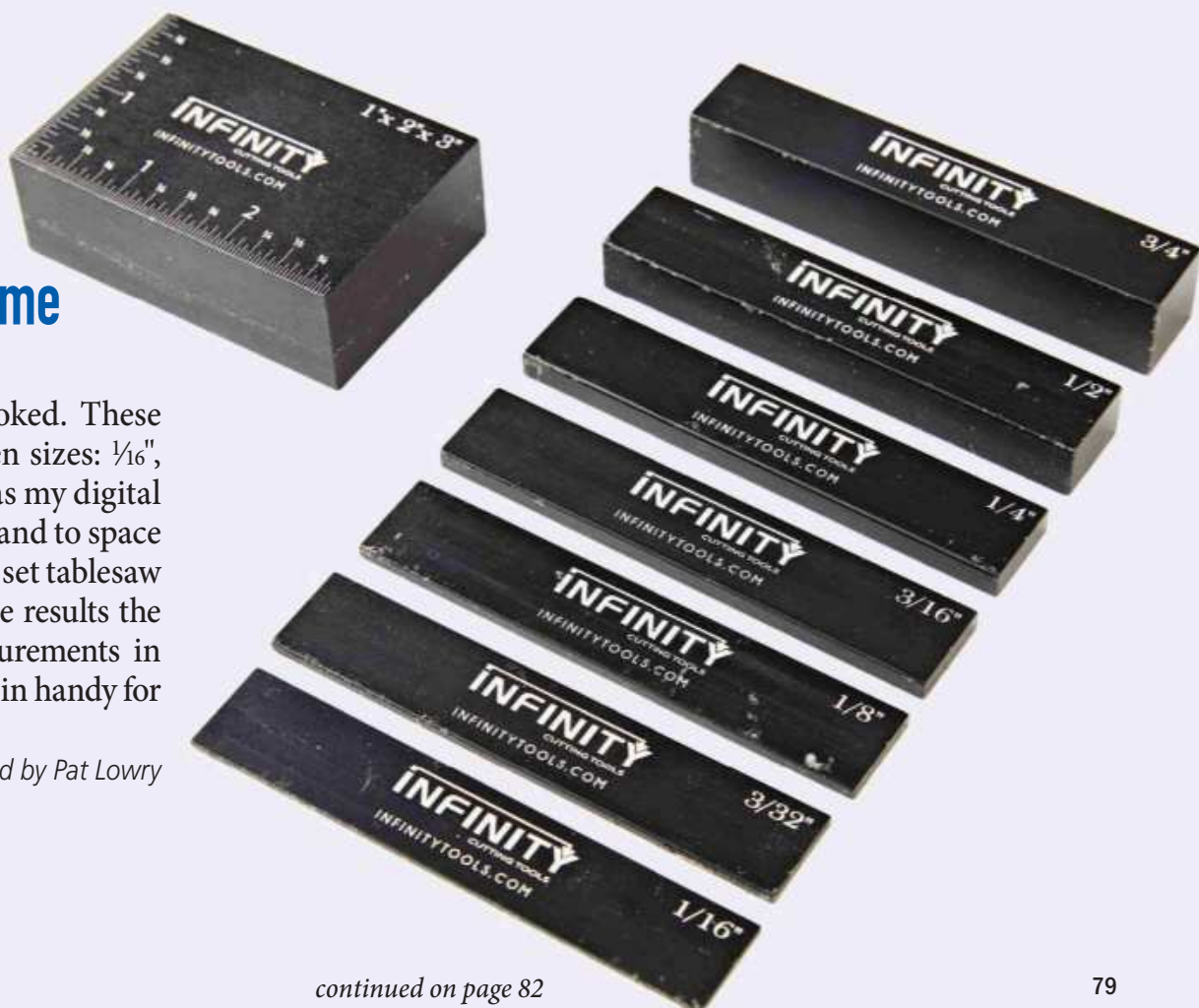
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—Tested by Pat Lowry

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L:50" R:60"	MAX MITER CAPACITY (LEFT/RIGHT)	L:50" R:60"	
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5	DRAWER COUNT	4
YES	DRAWER LATCHES	NO
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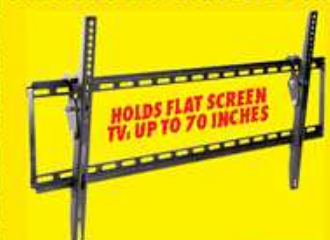
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ITEM 63471/60237 shown



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• 70 gallon capacity



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ITEM 61790/97869 shown



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ITEM 61585/62387/63711/47257 shown



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ITEM 69805



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ITEM 69703/61689 shown



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ITEM 63051 69055/63050 shown



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Customer Rating ★★★★★

ITEM 62281 61637 shown

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NEW AND NEXT



Grizzly launches portable cyclones

G0860, 1½ hp, 110-volt, \$699

G0861, 2 hp, 220-volt, \$975

G0862, 3 hp, 220-volt, \$1,295

Three new compact (each less than 7' tall) portable cyclone dust collectors now reside in Grizzly's machinery lineup. The G0860 has a 6" inlet and is rated for a maximum 868 cubic feet per minute (cfm) of airflow. The G0861 has a 7" inlet with a maximum 1,023 cfm. And the G0862 has an 8" inlet with a maximum 1,941 cfm. All three come with 1-micron-rated filters, collection drums with quick-release handles, and swiveling casters.

Grizzly Industrial

800-523-4777, grizzly.com

Straight-cylinder legs add appeal

Tablelegs.com, a leading source of ready-made turned table legs, now offers Circa Round legs. These legs, with contemporary, straight-cylinder profiles in cherry, maple, walnut, and white oak, come in three diameters (2", 2½", and 3") and 10 lengths (from 4" to 36"). You can also get the legs with metal bands at the feet. Each leg comes with an installation bracket and hardware, and can be prefinished for an additional charge.

Classic Designs by Matthew Burak/TableLegs.com

800-748-3480, tablelegs.com



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- Gilmore B.

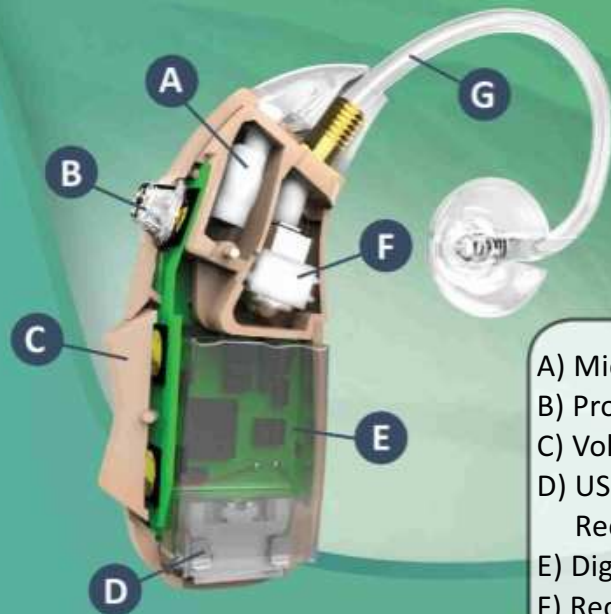


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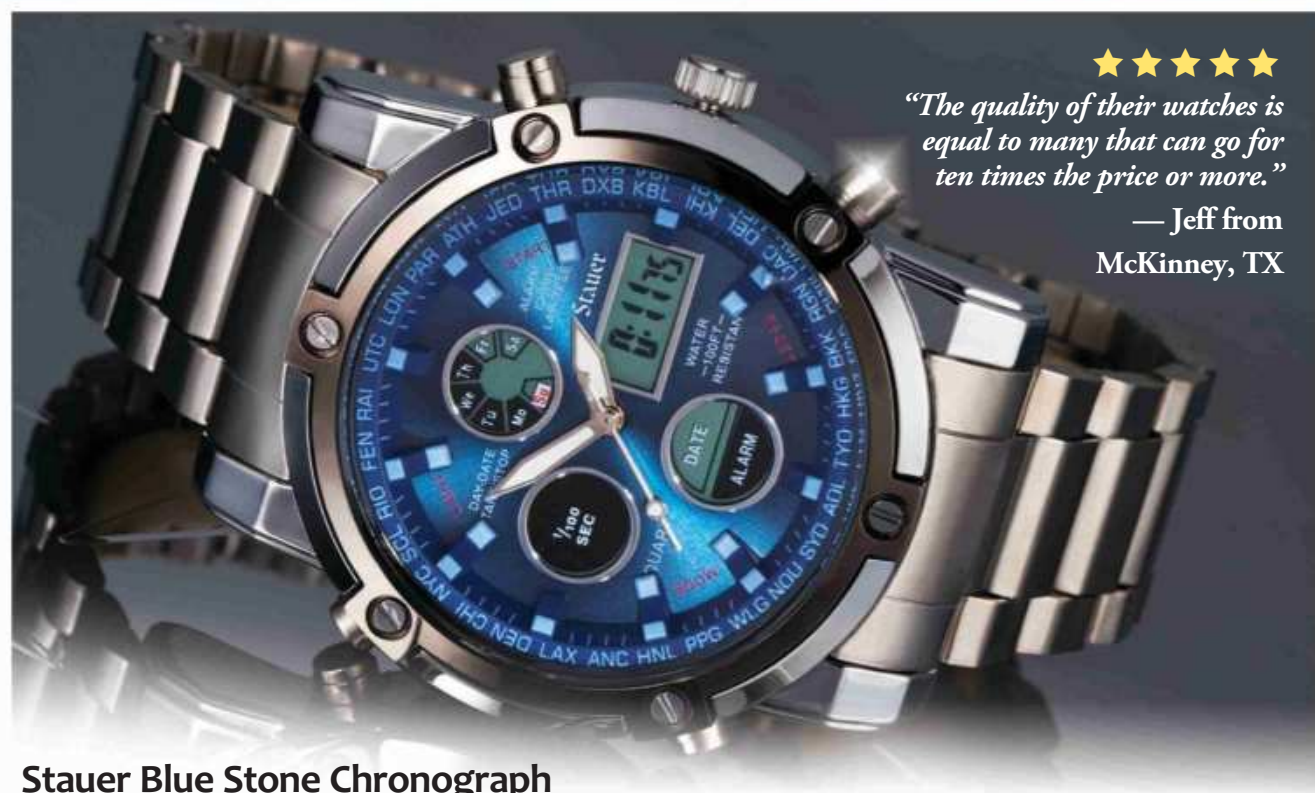
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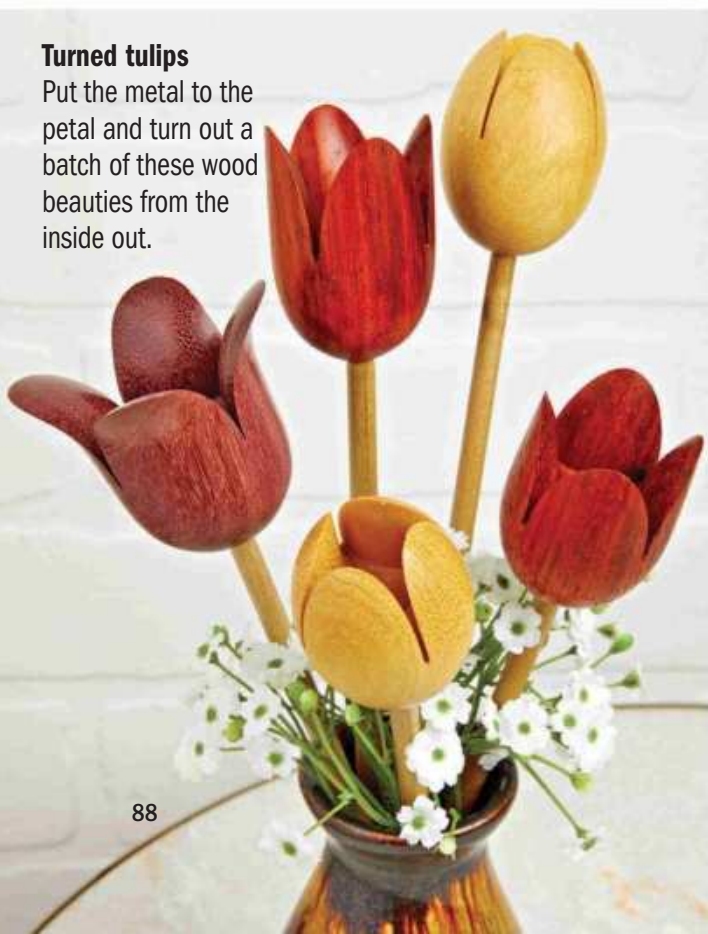


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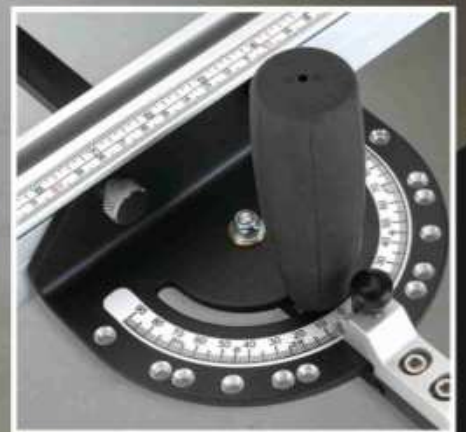
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