TALL ADIRONDACK CHAIR & TABLE p.34

ISSUE 254 JULY 2018

Better Homes & Gardens

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Bend Solid Wood p.52

Plus Great Plans

- Dado Jig p.42
- Stand-up Desk p.26
- Sheet-Goods Hauler p.70
- Toy Troop Truck p.60

Shop Test: 3-hp Cabinet Saws p.44

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ROUTER TABLE

- Main table surface: 31" x 10"
- Sliding table surface: 31" x 12"
- Table counterbore: 3½"
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- Table height: 34"
- Fence size: (2) 3" x 12"
- Overall size: 30" L x 40" W x 42" H
- Footprint: 30" L x 40" W
- Approx. shipping weight: 132 lbs.

MADE IN AN ISO 9001 FACTORY

G0528 ~~$535.00~~ SALE **$505.00** $89 shipping

14" DELUXE BANDSAW

- Motor: 2 HP, 110V/220V, single-phase, 1725 RPM, prewired 220V, 19A at 110V, 9.5A at 220V
- Table size: 19¾" x 14⅜" x 1½" thick
- Table tilt: 45° R, 8° L
- Floor to table height: 42¼"
- Cutting capacity/throat: 13½" left of blade
- Maximum cutting height: 10"
- Blade size: 106" L
- Blade width: ⅛"–¾"
- Overall size: 29¾" W x 29½" D x 73" H
- Blade speed: 3000 FPM
- Dust port: 4"
- Approx. shipping weight: 284 lbs.

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G0457 ~~$1195.00~~ SALE **$1150.00**

OSCILLATING SPINDLE SANDER

- Motor: 1 HP, 120V/240V, single-phase, TEFC
- Cast iron 25" x 25" table tilts to 45° forwards, 15° backwards
- Spindle sizes: (10) ¼" x 5", ⅜" x 6", ½" x 6", ⅝" x 6", ¾" x 9", 1" x 9", 1½" x 9", 2" x 9", 3" x 9", 4" x 9", tapered and threaded
- Floor-to-table height: 35½"
- 1725 RPM spindle speed
- Includes formed and welded steel stand
- Spindle oscillates at 72 strokes-per-minute
- Stroke length: 1½"
- Built-in 4" dust collection port
- Shielded and permanently lubricated ball bearings
- Approximate shipping weight: 296 lbs.

G1071 ~~$875.00~~ SALE **$845.00** $115 shipping

PLANER / MOULDER WITH STAND

- Motor: 2 HP, 240V, single-phase, 10.8A, 3450 RPM
- Precision-ground cast iron table measures 14⅛" x 10" x 7/16"
- Max planing width: 7"
- Max planing height: 7½"
- Cuts per minute: 14,000
- Number of knives: 2 HSS
- Approx. shipping weight: 324 lbs.

W1812 ~~$1650.00~~ SALE **$1550.00** $115 shipping

14" DELUXE BANDSAW 35TH ANNIVERSARY EDITION

- Motor: 1 HP, 110V/220V, single-phase
- Amps: 11A at 110V, 5.5A at 220V
- Precision-ground cast iron table size: 14" x 14"
- Table tilt: 10° left, 45° right
- Floor-to-table height: 43"
- Cutting capacity/throat: 13½"
- Max. cutting height: 6"
- Blade size: 93½" (⅛" to ¾" wide)
- Blade speeds: 1800 and 3100 FPM
- Overall size: 27" W x 67½" H x 30" D
- Footprint: 23½" L x 16½" W
- Approx. shipping weight: 247 lbs.

INCLUDES QUICK-RELEASE BLADE TENSION LEVER

G0555LA35 ONLY **$625.00** $89 shipping

3 HP DUST COLLECTOR

- Motor: 3 HP, 240V, single-phase
- Impeller: 12¾" aluminum radial fin
- Airflow performance: 2320 CFM
- Maximum static pressure: 16.9"
- Sound rating: 87 dB
- 7" inlet has removable "Y" fitting with (3) 4" inlets
- Canister filter size (dia. x depth): 19⅝" x 23⅝" (2)
- Max. capacity: 9 cubic feet
- Overall size: 57⅞" W x 32" D x 71" H
- Approximate shipping weight: 214 lbs.

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G0562ZP ~~$785.00~~ SALE **$750.00** $89 shipping

15" HEAVY-DUTY PLANER

- Motor: 3 HP, 240V, single-phase, 14A
- Max. cutting width: 15", depth: ⅛"
- Max. stock thickness: 6⅜", min.: ¼"
- Min. stock length: 6⅜"
- Feed rate: 16 and 30 FPM
- Cutterhead diameter: 3"
- Number of knives: 3 HSS
- Knife size: 15" x 1" x ⅛"
- Cutterhead speed: 5000 RPM
- Table size: 20⅛" x 15" x 3½"
- Overall size: 32" W x 28" D x 23½" H
- Approx. shipping weight: 382 lbs.

OPTIONAL STAND AVAILABLE

G0815 ~~$995.00~~ SALE **$950.00** $169 shipping

10" CABINET TABLE SAW WITH RIVING KNIFE

- Motor: 3 HP, 220V, 12.8A, single-phase
- Blade tilt: Left, 45°
- Table size with extension: 27" x 40"
- Floor-to-table height: 34"
- Arbor: ⅝"
- Arbor speed: 4300 RPM
- Max. dado width: 13/16"
- Capacity @ 90°: 3⅛", @ 45°: 2⅜"
- Max. rip capacity: 29½" Right, 12" Left
- Overall dimensions: 62" L x 41" W x 40" H
- Approx. shipping weight: 530 lbs.

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G0690 ~~$1750.00~~ SALE **$1695.00** $169 shipping

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Pitching a fit

Last weekend I needed to plane a long strip of walnut down to about ⅛", but there was some swirly grain in the piece that I feared would tear out in the planer. So, I switched over to my drum sander to finish thicknessing. It should be an easy task to simply switch the dust hose from one machine to the other, because both ports are the same size.

Almost.

In fact, they are *so* close, I was sure that if I just forced it a little more, it would fit well enough to get the job done. No dice. After about 20 frustrating minutes of trying every adapter and cheater in my arsenal (a 5-gallon bucket full of random dust fittings collected over the years), I just strapped the ill-fitting hose on with duct tape so I could get back to work.

Of course, this happens nearly every time you buy or upgrade any tool with a dust-collection port. In a recent test of sanders, for example, we found at least five different sizes and shapes of ports on those 15 models.

Even "standard" vacuum hose sizes—1¼" and 2½"—aren't standard. Some manufacturers use the standard for the inside diameter of the fitting; others for the outside diameter; some hoses, I can't even guess where the diameters come from. So, when I want to add a dust-collection port to a shop-made jig or fixture, I just pray that it will actually fit the hose when I get it home. Often it doesn't. (Thus, my big bucket of fittings.)

It's the 21st century, for crying out loud. Isn't it time for tool, vacuum, and dust-collector manufacturers to get on the same page? If they're serious about mitigating the dangers of dust, they need to set aside their competitive differences and do what's right for woodworkers.

Here's what I propose:

- Standardize hose sizes so that the stated dimension is the hose fitting's *inside* diameter.
- Make all dust ports and fittings round, and their *outside* diameter matches the hose fitting's inside diameter.
- Establish a universal interface of ports and fittings that seal tightly, connect quickly, and work on any tool, hose, and collector.

So, what do you say, manufacturers? You stepped up to the plate last year when OSHA mandated HEPA-level filtration for concrete dust on jobsites. Let's make 2018 the year that woodworkers spend more time making sawdust than trying to "MacGyver" ways to collect it.

See you in the shop.

Dave Campbell
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Facebook and Twitter: @WOODeditor

Better Homes & Gardens®
WOOD®
July 2018
Vol. 35, No. 3 Issue No. 254

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In This Issue of WOOD®

JULY 2018 · ISSUE 254

PLANS

TOOLS & TECHNIQUES

DEPARTMENTS

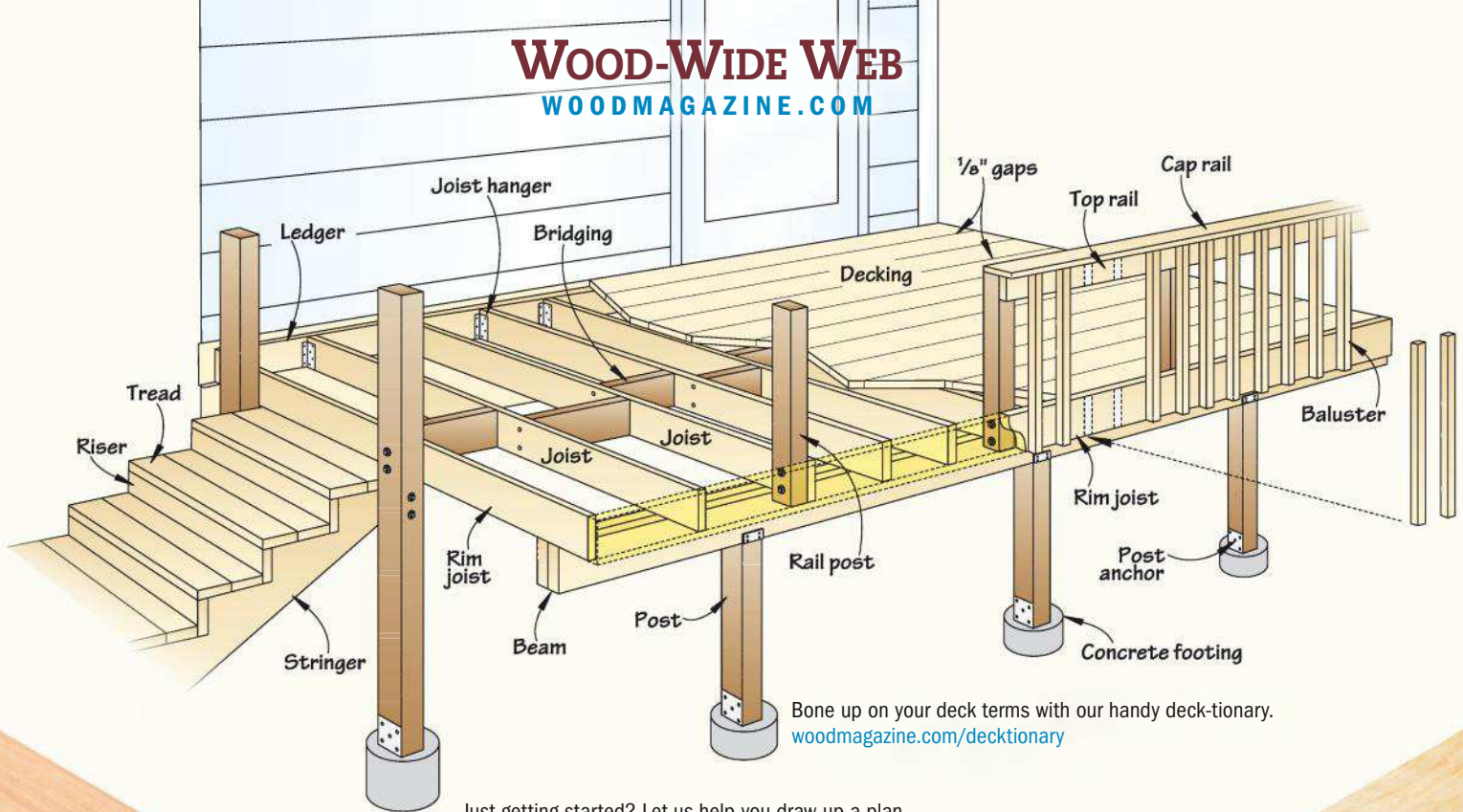

26


70


60


34


42

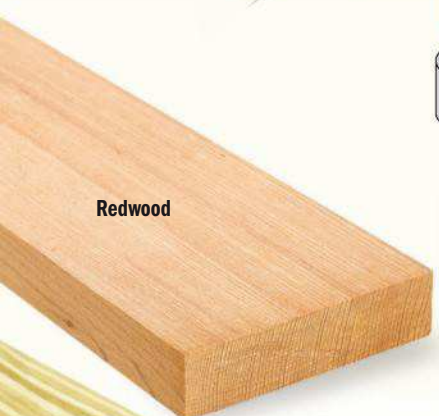


Bone up on your deck terms with our handy deck-tionary.
woodmagazine.com/decktionary

Just getting started? Let us help you draw up a plan for your deck. woodmagazine.com/deckplan

Time to Hit the Deck

Amp up your outdoor time by making your deck the best seat in the house. We'll get you started with these deck-building basics.



Redwood

Pressure-treated Southern yellow pine

White oak

Our chart guides you to the right outdoor wood for your deck project.
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Pick this late entry to show

My cousin, Glenn Fisher, of Russiaville, Ind., made this rocking horse out of Brazilian cherry. A very active 90-year-old, he has always been interested in working with wood, especially cherry and quartersawn oak. He is a self-taught woodworker who has made dry sinks, china cupboards, buffets, end tables, gun cabinets, clocks, frames, and desks. And, when the kitchen was remodeled, he made all the cabinets.

Over the years, Glenn has built many toys for children, such as teddy-bear rocking chairs and doll cradles. But rocking horses are his pride and joy. At the age of 88, for the first time ever, he entered one of his rocking horses in the Howard County Fair. The judge said his horse was good enough to be entered in the Indiana State Fair. So Glenn made a different horse, which won third place there.

He has won other awards since then, and is now contemplating what he will enter in the 2018 fairs. As they say, they don't make people like him these days.

—Sara Wheeler
Covington, Ind.

Why can't I see the saw?

Your review of modestly-priced bandsaws in issue 253 (May 2018) recommended the Craftsman BAS350 as a worthwhile machine. Inspired, I sought to purchase one of these mythical machines only to find that it doesn't actually exist for sale.

Do you have any insight as to whether this is a temporary absence of this product or if it only exists on the pages of your magazine?

Thank you for your insightful reviews.

—Ralph Burr
Marietta, Ga.

Larry Costello of Sears assures us that the BAS350 is only temporarily out of stock and should be available again "in May/June timeframe."

Vinegar for epoxy clean-up

Your article on "Must-have Glues" suggested using acetone or lacquer thinner to clean up uncured epoxy. I have found that white vinegar also works great. Keep the good articles coming!

—Dr. Jeff Greenberg
via e-mail

Jeff, our epoxy-expert friends at System Three (systemthree.com) tell us that white vinegar does, indeed, work great for cleaning up the resin portion of two-part epoxy. But you will need lacquer thinner to remove the hardener or mixed, uncured epoxy.

A Very Charlie Brown Christmas

Just wanted to share this photo of a dozen boxes built from your Zigzag Box plans in issue 243 (November 2016). My husband, Earl, and son, Johnny, made them for Christmas gifts last year.

—Elizabeth Bowers
Troutman, N.C.

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continued on page 8

2018

NEW MUST-HAVE TRITON PRODUCTS

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10A BELT SANDER 4" X 24"

T4 1200BS

Technical Specification

Power	10A
No Load Speed	656–1312 ft/min
Product Weight	13.2lb
Suitable For Inversion	Yes - inversion clamps and pad included
Variable Speed	Yes
Belt Dimensions	4" x 24"
Sanding Area	4" x 6-1/8"
Dust Extraction	Yes
Kit Contains	Inversion kit, dust bag, 3 x sanding belts (80, 100 & 120 grit) & spare drive belt

MSRP $179.00

2.5A RANDOM ORBIT SANDER 5"

TROS 125

Technical Specification

Power	2.5A
No Load Speed	7000 - 12,000rpm
Sanding Disc Size	5" dia.
Sanding Disc Attachment	Hook & Loop
Variable Speed	Yes
Dust Extraction	Yes
Accessories	3 x mesh sanding discs (80, 120 & 220 grit), dust bag & dust port adaptor

MSRP $79.00

2.6A OSCILLATING TILTING SPINDLE SANDER 15"

TSPS 370

Technical Specification

Power	2.6A
No Load Speed	1725rpm
Table Size Diameter	15" dia.
Oscillations	30spm
Product Height	19"
Product Weight	29.5lb
Sanding Sleeves	1/2", 13/16", 1-1/8", 1-9/16", 2"
Dust Extraction	Yes
Dust Extractor Dimensions	Inner: 1-7/8" and Outer: 2"

MSRP $229.00

6.5A ORBITAL ACTION JIGSAW

TJS 001

Technical Specification

Power	6.5A
Stroke Length	1"
Max Cutting Capacity	Wood 4-5/16", Steel 3/8" & Aluminium 1"
Blade Type	T-shank
Product Weight	7.8lb
Angle Adjustment Range	0° - 45°, left and right
Pendulum Mode	Yes - 3-Stage
Dust Extraction	Yes
Kit Contains	Parallel guide, dust port adaptor, track adaptor, 3 x jigsaw blades (wood cutting blade, wood & plastic cutting blade & metal cutting blade)

MSRP $129.00

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*Aside from the back and veneered sides, **Matt Lillemoen**, of Forest Lake, Minn., constructed this gorgeous armoire from storm-felled cherry harvested from his backyard.*

*Charter WOOD® magazine subscriber **Monte Pollner**, of New Boston, Ill., built this Southwestern-style entertainment center of birch and walnut. It features bold walnut and abalone inlays of Kokopelli, a Native American fertility deity.*

*Modeled after plans he found online, **Al Palinkas**, of Penn Yan, N.Y., crafted this workbench from white ash, black walnut, and American beech. He turned the vise handles from black locust.*

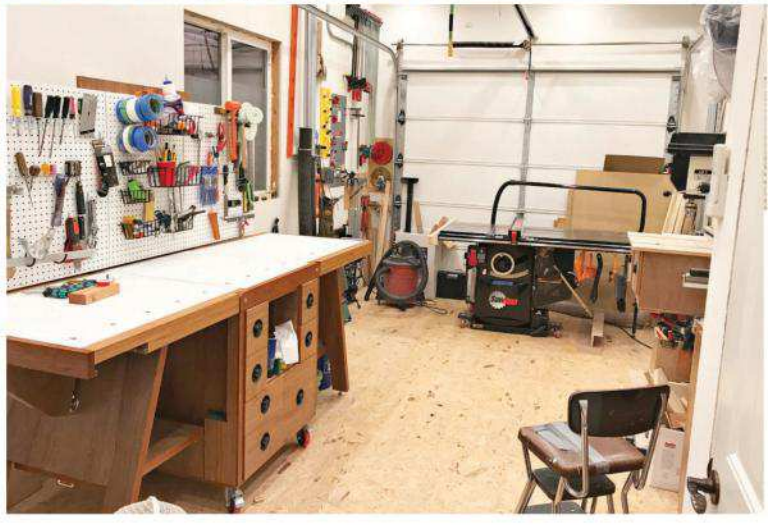
*Woodworker **Mark Avery** and his quilter wife, **Asen**, of Raritan, N.J., married their passions in this heirloom dining table and quilt set. Each of the four family members chose a pattern that was duplicated in both pieces.*

*Inspired by the Big-time Wall Clock plans in issue 243 (November 2016), **Gary Parchman**, of River Oaks, Texas, finally found the perfect use for a spare clock movement and a piece of oak harvested from his backyard.*

Send us a photo of your work

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

Third bay his way



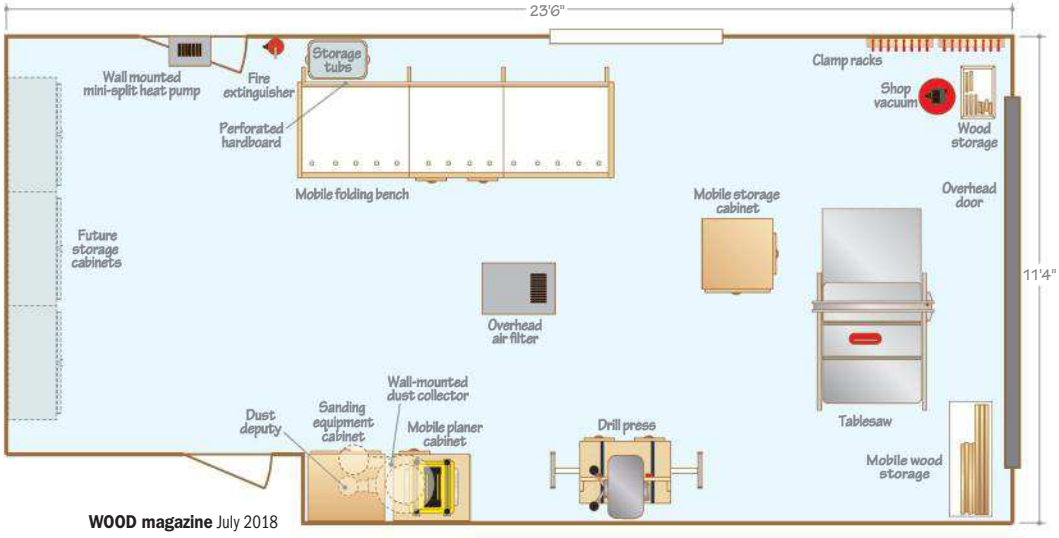
A bench with pegboard storage that folds up into one-third of its expanded footprint makes efficient use of floor space.

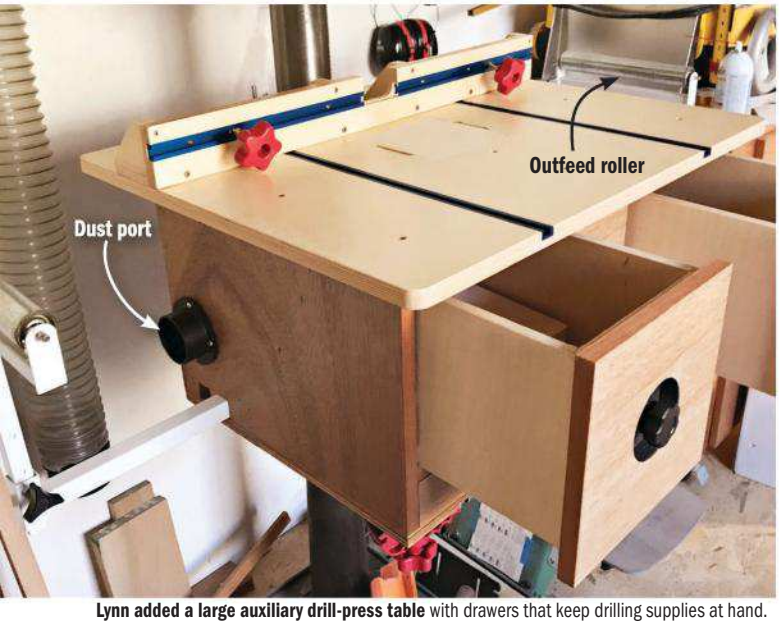
Over the course of three moves across the United States, Lynn Eberhardt gathered plenty of experience setting up workshops with limited floor space. For his latest setup, he closed off the 11×23' third bay of his three-car garage to contain noise and dust. And he is stocking it with multipurpose cabinets, benches, and storage that make the space efficient and comfortable. Mahogany plywood used for most of these fixtures makes them as handsome as they are functional.

After the walls were up to separate the shop space from the rest of the garage, Lynn covered the floor with DRIcore subflooring panels (dricore.com). The waffle-like pattern of its vinyl base allows the concrete underneath to breathe while providing cushioning, and the OSB top helps prevent damage to dropped tools. Lynn topped the flooring with four coats of polyurethane.

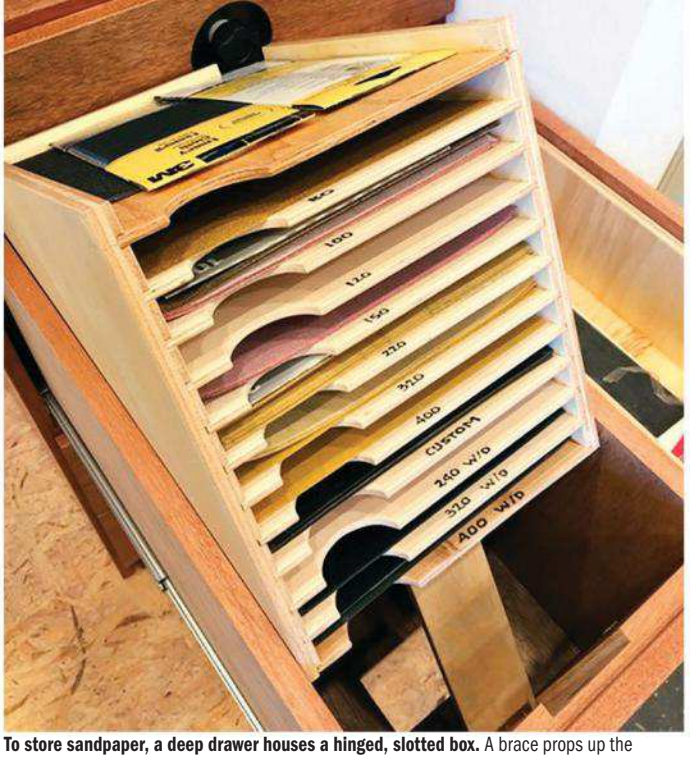
Lynn lives in a windy area, and drafts through his overhead garage door bothered him. Replacing the factory hinges with the Green Hinge System (greenhingesystem.com) created a tighter seal between the door

continued on page 12





Lynn added a large auxiliary drill-press table with drawers that keep drilling supplies at hand. The table incorporates a vacuum system to clear sawdust and chips. Adjustable outfeed rollers support long workpieces.



To store sandpaper, a deep drawer houses a hinged, slotted box. A brace props up the organizer for easy access. A magnet secures the brace in a drawer-front recess when not in use.

This small cabinet on casters usually serves as the base for his benchtop planer. The drawers hold various supplies, including Lynn's Tormek sharpening system. A door on each side conceals plywood shelving with one side holding his collection of hand planes.

Lynn mounted the base and blower of his dust collector to the wall. An Oneida Dust Deputy below collects the bulk of the chips. Lynn says, "This system has been so effective at catching the larger dust that the plastic bag on the Jet dust collector has not had but maybe a gallon of material in a year of use."

Lynn Eberhardt never had much time for woodworking until his retirement. Now he stays busy building a variety of projects for family and friends.

and its weatherstripping. For heating, Lynn installed a wall-mounted mini-split heat pump above the exterior walk-in door.

The wall-mounted dust-collection system further maximizes floor space. And a ceiling-mounted dust filtration system keeps the shop air clean. The end of the shop opposite the overhead door will soon receive more cabinets, a work desk, and room for a TV.

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From left: files, rasps, and rifflers give you fine control over stock removal, and virtually no tear-out when shaping workpieces. Files work best with metal, while rasps and rifflers serve only to carve wood or soft stone.

Q Subtle distinctions separate files, rasps, and rifflers

Can you describe the best applications for each of these hand tools, and how to use them? Do I need all three in my shop?

—Tim Farley, Marshall, Texas

A All of these tools give you great control when removing small amounts of material, Tim, but each is so different from the others that it makes sense to have all three types in your shop (as well as different versions of each type). Here's what you need to know:

■ **Files** have long teeth running across their width. Those with only parallel teeth are known as straight-cut or single-cut files. Those with rows running at opposing angles are called cross-cut or double-cut files—these cut more aggressively than straight-cut files. Largely used for metal removal, files occasionally come in handy for fine wood removal, though they quickly clog in that application. You'll find an array of profiles and sizes designed for specific tasks, such as deburring metal edges or sharpening steel teeth on handsaws or chainsaws. Four grades—smooth, second cut, bastard, and coarse—give you additional choices in cutting aggressiveness.

■ **Rasps** get greater use in wood shops than files and rifflers. Why? Their teeth, shaped like tiny mountain peaks, cut wood aggressively, but with little tear-out or clogging. Available in various coarseness grades, rasps perform superbly in controlled-cutting tasks, such as shaping cabriole legs or gunstocks, carving, easing edges, and tuning joinery. Better rasps have randomly spaced teeth, as shown *below*, that help give you smoother surfaces and better cutting control.

■ **Rifflers**, also known as riffler rasps because they have teeth like those on rasps, have variously shaped cutting surfaces at each end. You hold them in the middle when finely shaping hard-to-reach and concave surfaces. The greater the variety of rifflers you have on hand, the better the odds you'll have just the right shape to meet the task at hand.

Even the coarsest files (*top right*) don't cut wood as well as rasps, and tend to clog. Rasps with randomly spaced teeth (*lower right*) don't steer your hand straight back and forth or cut grooves, as rasps with regularly spaced teeth (*middle right*) do.

Tips for using files, rasps, and rifflers

■ Store them so they don't contact each other and become damaged.

■ File and rasp handles increase comfort in holding the tool and controlling it. When making your own, drill the tang hole diameter to match the width of the tang at its midpoint.

■ For best control, hold the tool with both hands. Push with one hand and guide the cutting surface with a finger or two of the other hand.

■ Cut on the push stroke; a pull stroke will prematurely dull the teeth. Get into the habit of lifting the tool at the end of each stroke and returning to the start position.

■ For longest life, clean rasps with a bristle brush, not a file card designed for files.

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

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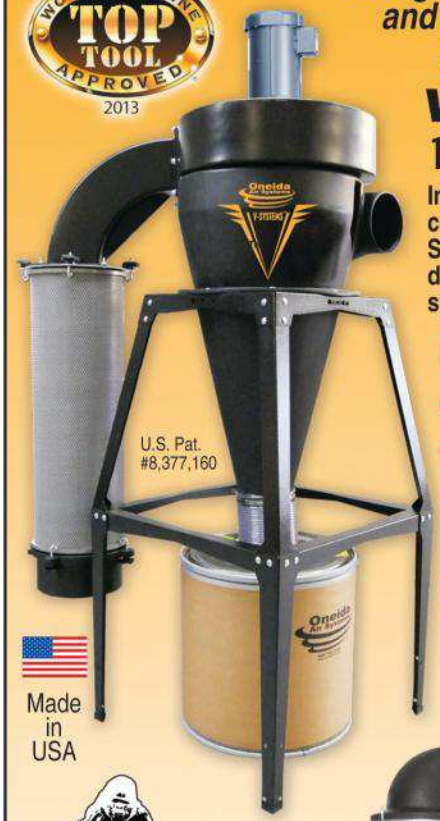

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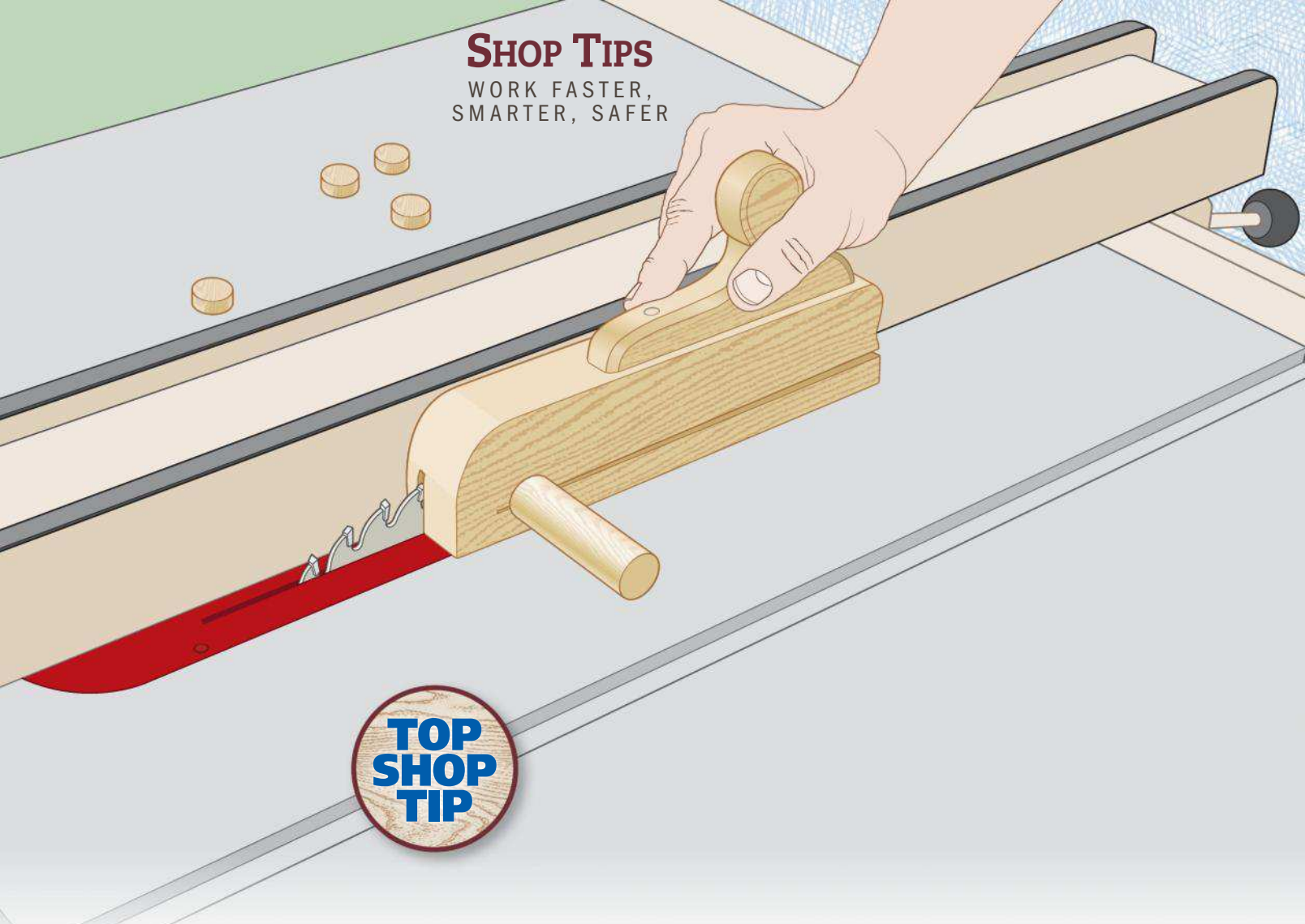

TOP SHOP TIP

Cut on-the-money "coins" with absolute safety

This simple jig allows you to precisely cut short lengths of wood dowels, for use as checkers or decorations, with no risk of chip-out or the coin firing back at you. Make the body of the jig from scrap 2-by material about 12" long, and the handle from 1-by material. Near the front of the jig body, drill a hole matching the dowel diameter. Then, bandsaw a wedge-shape kerf where shown. Glue the handle to the body.

To cut a coin, insert the dowel into the hole, push its end flush against the fence, and push the jig through the blade. Your hand pressure will squeeze the jig tightly around the dowel, holding it securely. Push the coin out, and repeat to make another.

—Bob LaDue, Grandview, Mo.

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

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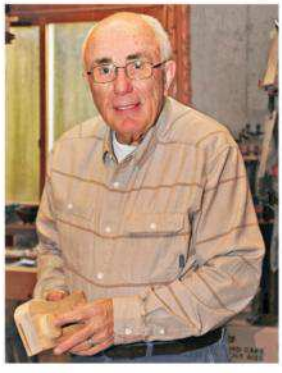

For sending this issue's Top Shop Tip, Bob receives a JessEm Pow-R-Tek router with remote control box and Mast-R-Lift II router lift; combined worth $700.

continued on page 18

FINISH FAST. FINISH ONCE. FINISH LIKE A MASTER.

Nathan Wiens
Artist & proprietor, Chapel Arts
Master woodworker
Vancouver

Varathane® stain gives true color in one coat. And Varathane Triple Thick Polyurethane has the durability of three coats, in only one. Providing you the ultimate finish, in less time. That's why master woodworkers, like Nathan, prefer Varathane. So don't just finish it. Varathane it.

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Add handy storage to your saw's rip-fence rail

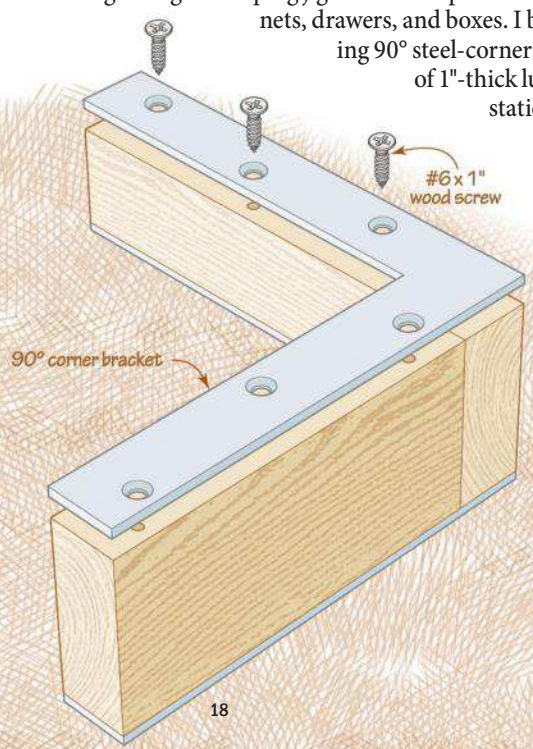
Never be at a loss for a pencil, wrench, or other easily misplaced small item when working at the tablesaw. Store them in a drawer housed within the hollow, square tube that serves as the front rail for many tablesaw rip fences. Make the drawer plenty long so you don't accidentally pull it completely out and spill the contents. If you have a router mounted in the saw's side table, add a drawer at that end, too, to store router wrenches or commonly used bits.

—Peter Kasper, Carlisle, Iowa

Get square without breaking the bank

Right-angle clamping jigs come in super-handy when building cabinets, drawers, and boxes. I built my own by screwing 90° steel-corner brackets to both edges of 1"-thick lumber. Then I used my stationary belt sander to make the wood surfaces flush with the bracket edges. They work great!

—Gaylord Sharp, Zephyrhills, Fla.



Take the vex out of Vix bits

One shortcoming of self-centering drill bits (also known as Vix bits): Their flutes tend to clog with drilling debris. A simple solution is to have nearby a block of wood with a hole in it larger than the drill bit but smaller than the metal housing around the bit. After each hinge hole you drill, simply plunge the spinning bit into the hole in the block to discharge the flute debris.

—Joe Godfrey, Forest City, N.C.

continued on page 20

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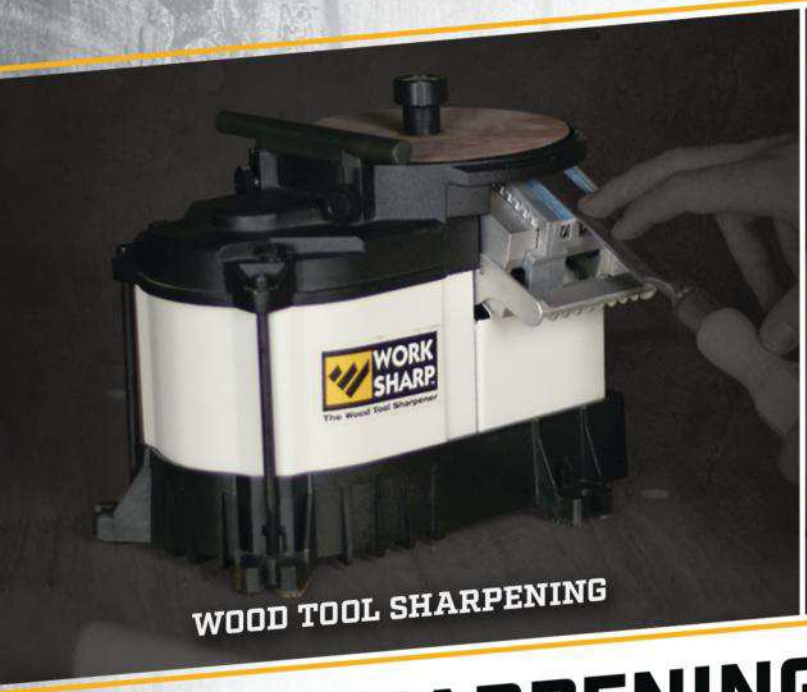

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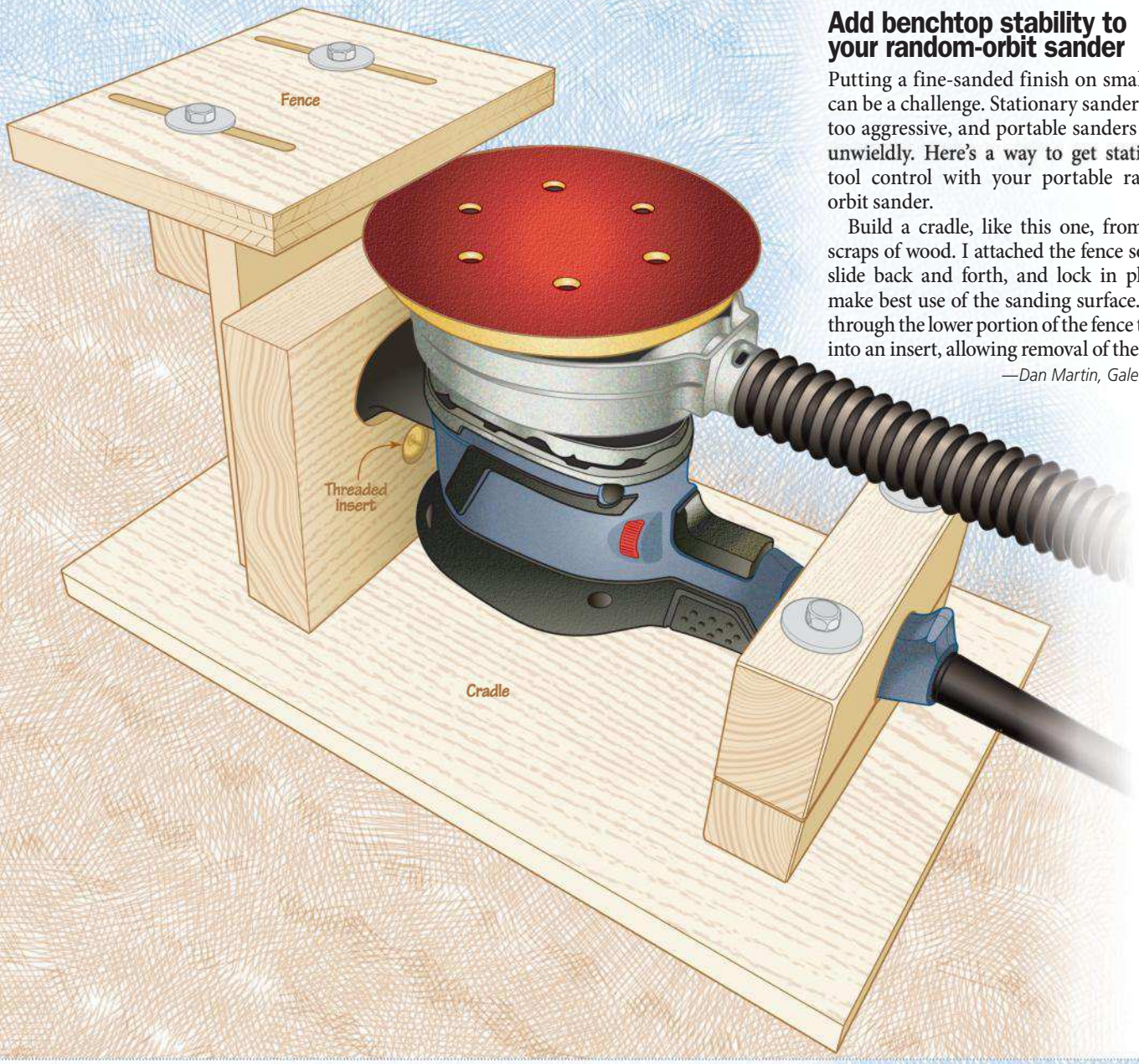
Add benchtop stability to your random-orbit sander

Putting a fine-sanded finish on small parts can be a challenge. Stationary sanders prove too aggressive, and portable sanders can be unwieldly. Here's a way to get stationary-tool control with your portable random-orbit sander.

Build a cradle, like this one, from a few scraps of wood. I attached the fence so it can slide back and forth, and lock in place, to make best use of the sanding surface. A bolt through the lower portion of the fence threads into an insert, allowing removal of the fence.

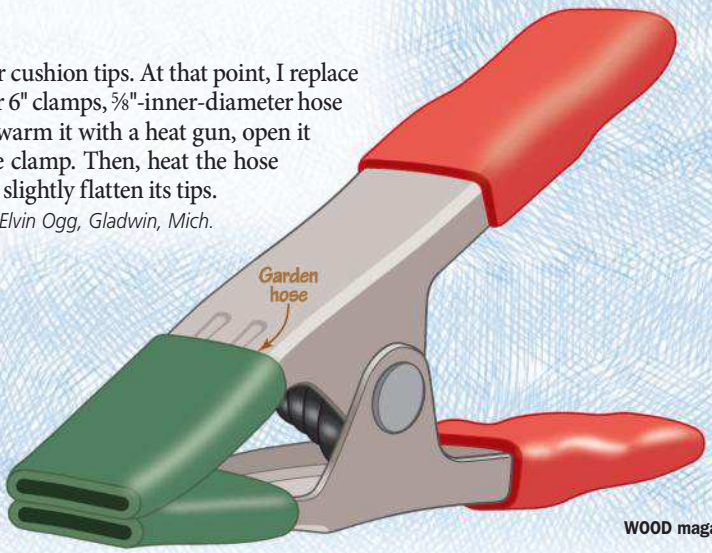
—Dan Martin, Galena, Ohio



New life for spring clamps

Frequent use of spring clamps wears out their cushion tips. At that point, I replace them with 1½" lengths of old garden hose. For 6" clamps, ⅝"-inner-diameter hose fits perfect. To get the hose piece into place, warm it with a heat gun, open it with needle-nose pliers, and slide it onto the clamp. Then, heat the hose piece again and press the clamp to a board to slightly flatten its tips.

—Elvin Ogg, Gladwin, Mich.



continued on page 22

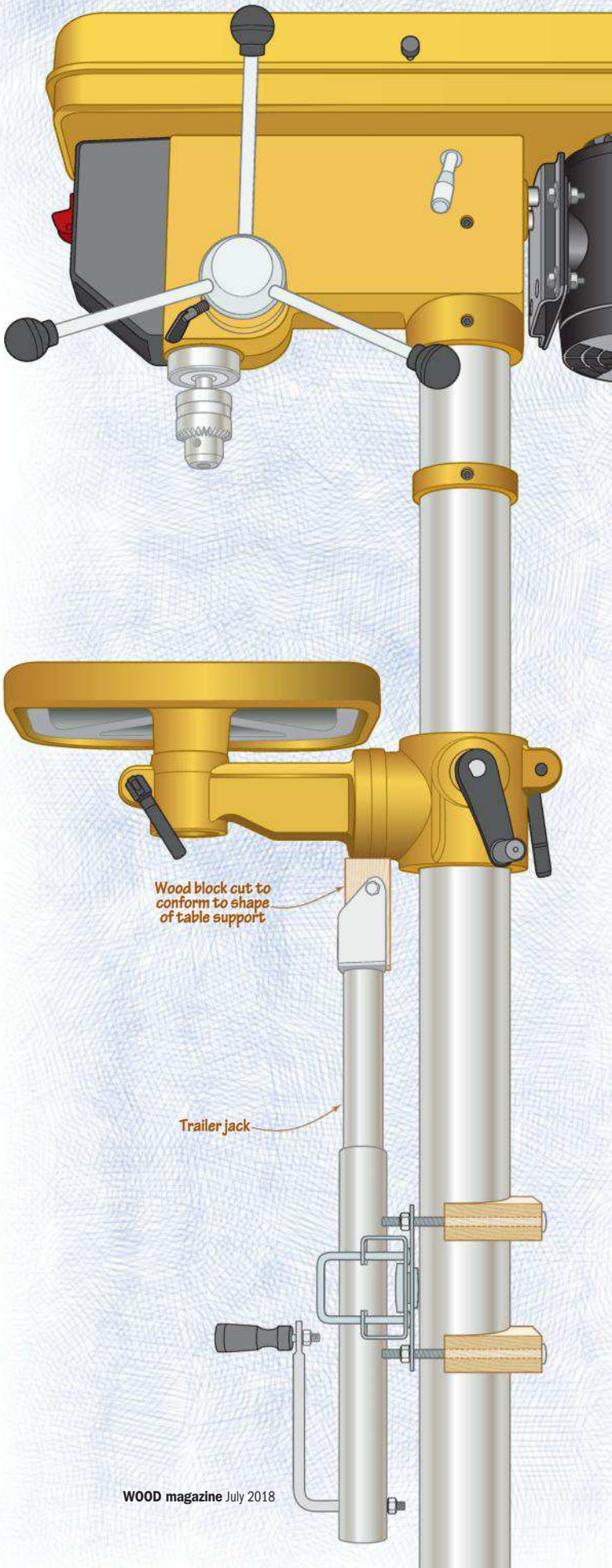
Shop Tips

Bring your drill-press crank to the forefront

The crank on some drill-press tables swings close enough to the table that you risk a good knuckle-banging with every rotation, especially when making large adjustments. To avoid that, I bought a low-cost trailer jack and mounted it upside down on the drill-press column, as shown. The jack provides more than 12" of adjustment.

My older-style drill press never had a built-in crank handle, but if yours does, remove the rack side of the gear mechanism. Then, remove the jack's wheel and substitute a wood block that conforms to the bottom of the table support. Make the column-mounting blocks by boring a hole that matches the diameter of the drill-press column into a short length of 2×6. Bandsaw the 2×6 in half to yield the two blocks.

—Joe Eide, Eau Claire, Wis.



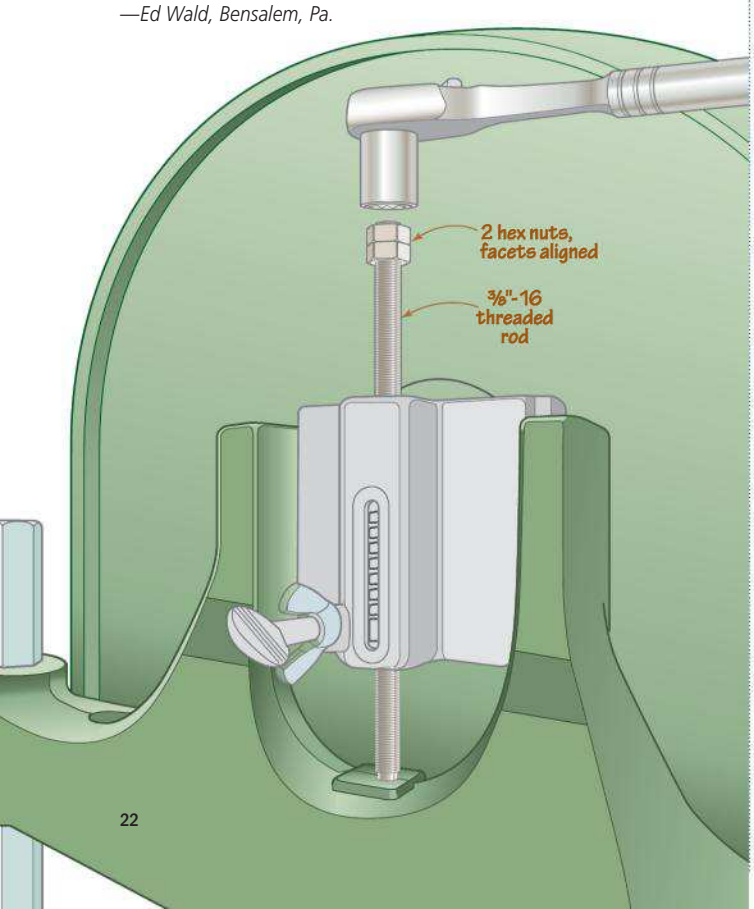
Easy modification speeds bandsaw-blade tensioning

I avoided de-tensioning and re-tensioning my bandsaw blade because the three-point knob and threaded shaft on my machine was such a pain to use. Here's how I put convenience into that chore.

First, remove the knob and threaded-shaft. Replace them with a ⅜"-16 threaded rod topped with two hex nuts. Align the facets on the nuts so you can fit a ⁹⁄₁₆" socket over them. Now use a ratchet handle to adjust the tension quickly. To make things go fast, use a cordless drill to drive the socket.

With this arrangement, you won't have to reach so high because the shaft doesn't have to extend above the upper-wheel housing. But if you're tall, you may want to use a threaded rod long enough to put the hex nuts above the housing, enabling you to spin the ratchet round and round.

—Ed Wald, Bensalem, Pa.



China pollution crackdown affects tool market

Most home woodworking machinery, and a good portion of everything else in your shop, originates in China. So when the Chinese government got serious about enforcing pollution regulations last summer, closing down thousands of factories and requiring others to upgrade equipment, shockwaves rippled through the woodworking-tool business. Blast furnaces went cold, metal-treating shops closed their doors, and many workers found themselves unemployed.

Chinese officials who, in a rush to grow the economy, once turned a blind eye to polluters, now face a prospering populace demanding a healthier environment. "Twenty-five years ago, streets were clogged with bicycles," one tool manufacturer told us. "Those days are over. Now it's cars everywhere. Chinese want the same quality of life that all of us do, and politicians have gotten the message."

"The crackdown started along the northern coast, because that's where a lot of the 'dirty' manufacturing, such as iron casting and metal plating, takes place," another manufacturer said. "And while I don't like the disruption it's caused to business, the environmental cleanup is long overdue—on some days you can now actually see blue skies in the coastal manufacturing areas."

Hardest hit have been small factories that supply parts to larger manufacturers. The "little guys" simply can't afford new environmental controls. As a result, big factories have had to bring more small-parts production in-house.

Although China's economic growth has dipped in recent years, its near 7 percent annual growth rate is still the envy of other nations. And experts generally agree China's economy is strong enough to weather further disruptions from factory closures.

It's not just about tools

From electronics, to clothes, appliances, and a million other gizmos and knickknacks, China dominates the manufacturing world. And all those products will be affected by the wave of environmental inspections sweeping the world's most populous country. "Any industry that uses chemicals or belches smoke is under scrutiny," one manufacturer told us.

While some industries, particularly textiles, may be able to shift production to other countries to rein in prices, that's not easily done with woodworking machinery. "Getting the machinery business going in another country, such as Vietnam, would be like starting from scratch—like China 25 years ago," the same manufacturer told us. "And nobody wants to go through that again. Switching to Taiwan would instantly raise prices 20–30 percent, and our customers won't tolerate that. Other countries, such as India, just haven't shown us they can make a quality product. China's still the best game in town."

Welding shops, like this one where tablesaw bases are fabricated, have not felt the brunt of environmental enforcement. But heavy polluters that discharge air particulates or chemicals in excess of regulations have had to upgrade their environmental controls or close.

What importers are doing about it

Some U.S.-based retailers and machinery suppliers report the crackdown has had little impact on business because their larger scale gives them priority in the supply chain, or because their Chinese sources were already compliant with regulations. But others told us they haven't been able to keep certain products in inventory, have had to order products farther ahead, or maintain larger inventories than they would like. Most say tighter supplies have raised the price they pay. "It varies greatly from product to product," one supplier told us. "We've seen increases of 5–10 percent, and many times we can absorb those. In some cases we've seen 15–20 percent increases that force us to raise retail prices."

What you can do about it

Besides being grateful that China is taking steps to clean up its air and water, there's at least one thing you can do to benefit your pocketbook. As one supplier told us candidly: "If you find a good deal, don't wait to buy; the price probably won't get better."

And be flexible with goods available only from smaller sellers. "We see the supply chain settling down by this fall," another supplier told us. "So the same products will still be available, but you might have to be patient in getting what you want."

Stand-up Desk

Steam-bent arcs add art to functional furniture.

Advocates of stand-up desks cite studies showing that after a meal, blood sugar levels return to normal faster when a person spends more time standing. And, for many, standing reduces the risk of shoulder and back pain. The desk shown is the right height for a 5'11"-tall person. To get the height right for you, see the sidebar at *right*.

What's the right height for *your* stand-up desk?

To maximize the benefits of a stand-up desk, make this simple height measurement:

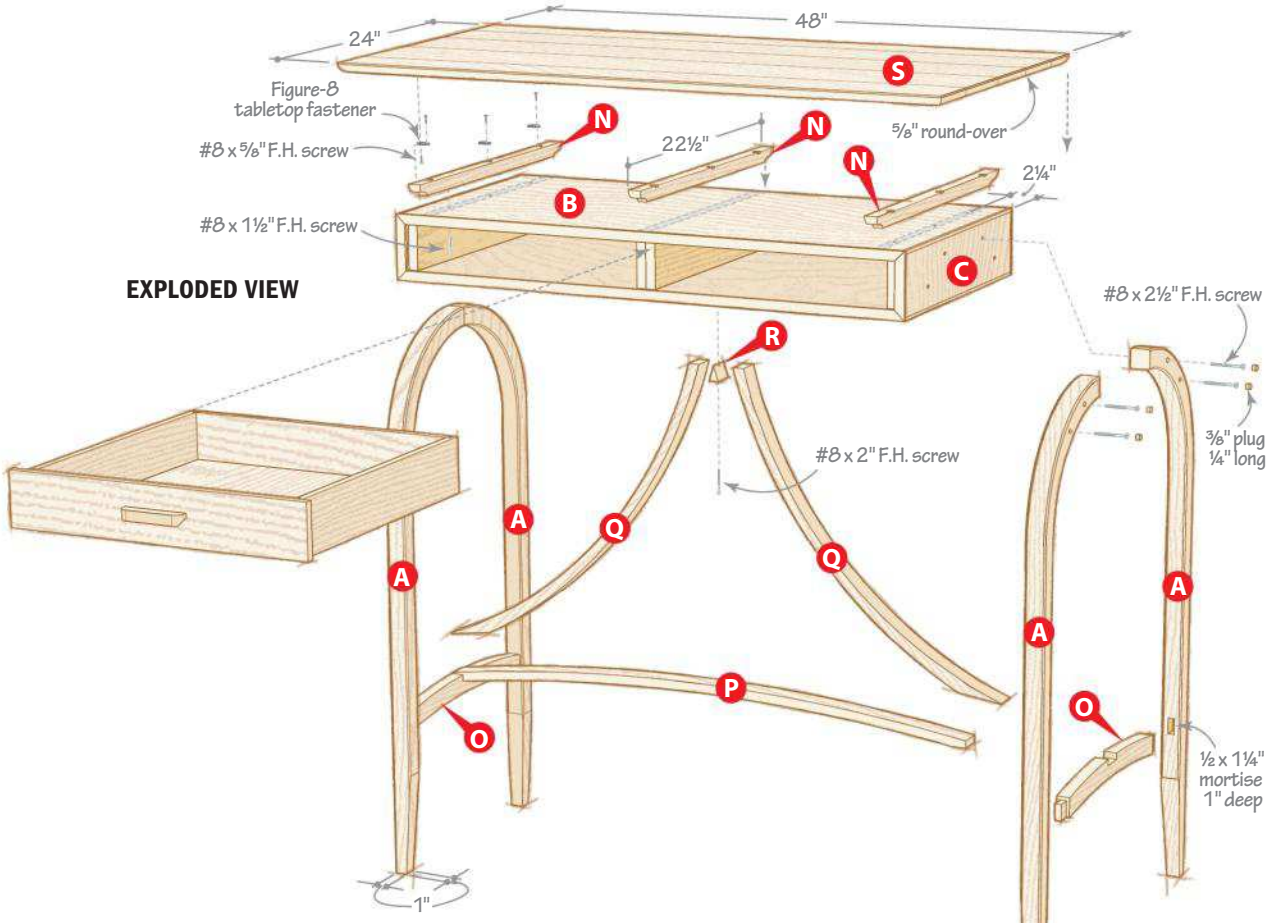
- Wearing your everyday shoes, stand up straight with shoulders relaxed and slightly back.
- Rest your arms by your sides and then bend your elbows 90°.
- Have a helper measure the distance from the floor to your elbow. If you'll be using a computer on the desk, subtract the height of the keyboard.
- From that measurement, subtract 1", and use that height to lay out the cutline on **Drawing 3**.

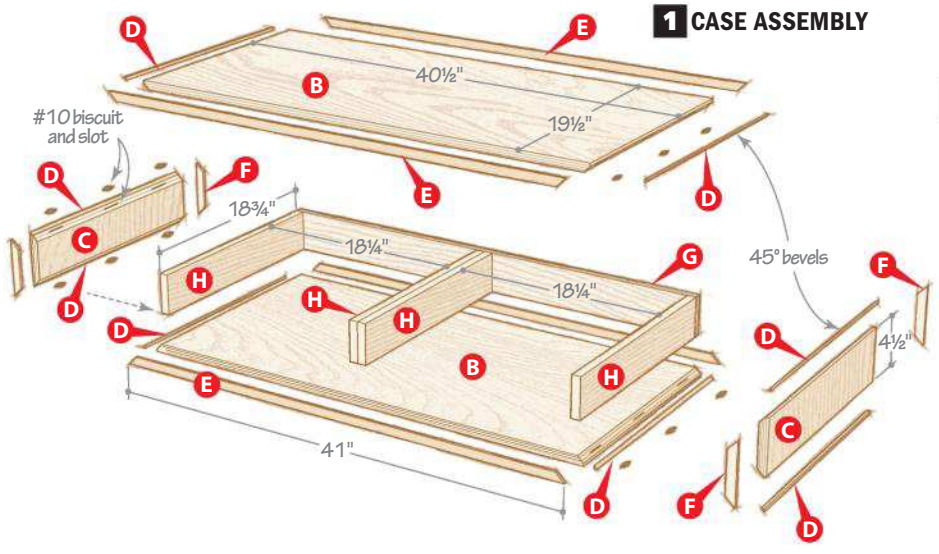
It is okay to set your desk at a slightly lower height, but setting it higher can be damaging to your wrists, elbows, and shoulders.

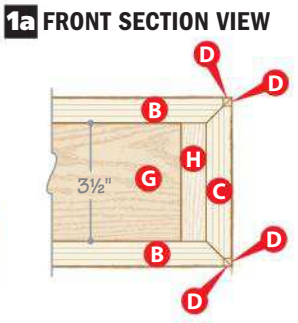
DIMENSIONS: 48" W × 24" D × 44" H

Approximate materials cost: **$160**

Standing burns **50** more calories per hour than sitting





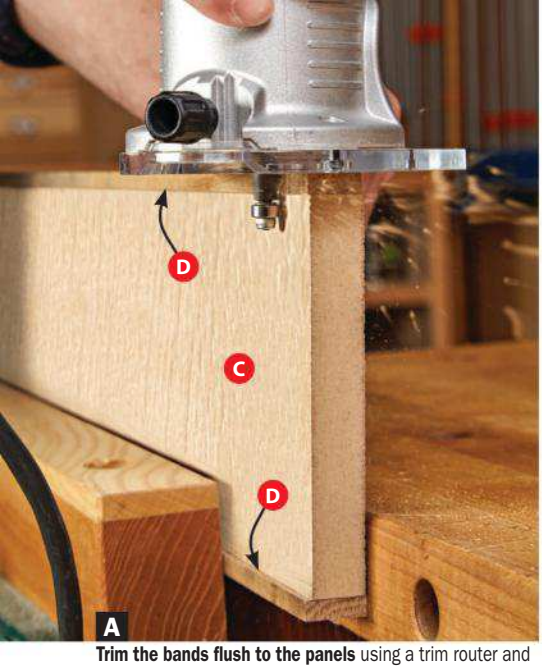


Bend, then build the case

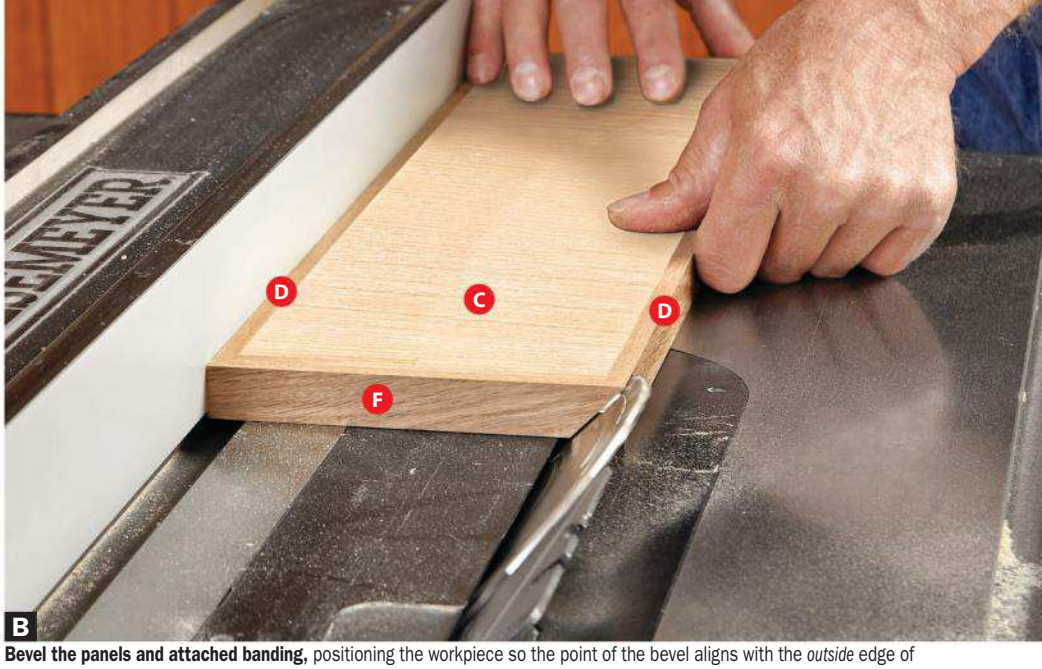
1 Cut six 54"-long blanks for the legs (A). (Steam bending can yield unpredictable results, so this is two more than required.) Bend the leg blanks, following the instructions starting on *page 52*. Clamp each blank to a drying form and set them aside for one week.

2 Cut the top and bottom panels (B) and side panels (C) [**Drawing 1**].

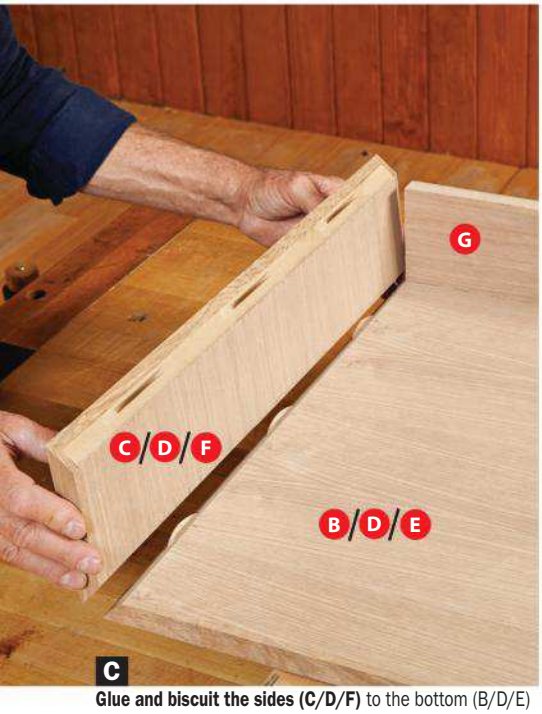
3 Cut strips for the banding (D, E, F) ⅞" wide and 1" longer than listed. Glue the end banding (D) to the panels (B, C). Flush-trim the banding [**Photo A**]. Then, glue the



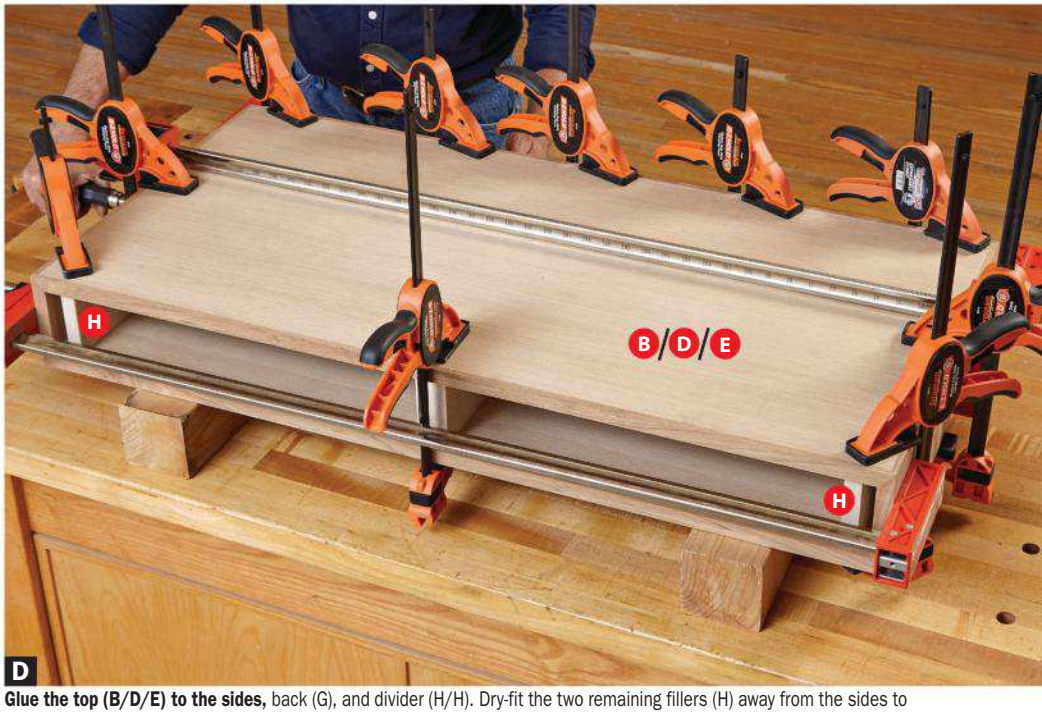
Trim the bands flush to the panels using a trim router and flush-trim bit.



Bevel the panels and attached banding, positioning the workpiece so the point of the bevel aligns with the *outside* edge of the band.



Glue and biscuit the sides (C/D/F) to the bottom (B/D/E) and back (G).



Glue the top (B/D/E) to the sides, back (G), and divider (H/H). Dry-fit the two remaining fillers (H) away from the sides to act as spacers before gluing them in place.

horizontal and vertical banding (E, F) to the panels and flush-trim them.

4 Bevel-cut the ends of the top and bottom (B/D/E) [**Drawing 1**] and the sides (C/D/F) [**Photo B**]. Cut the biscuit slots.

5 Cut the back (G) and fillers (H). Glue two fillers face-to-face to form a divider [**Drawing 1**]. Glue the back to the bottom (B/D/E), flush at the rear. Add the divider. With the glue dry, add the sides and top [**Photos C** and **D**]. Glue the fillers to the sides [**Drawing 1a**]. Finish-sand the case.

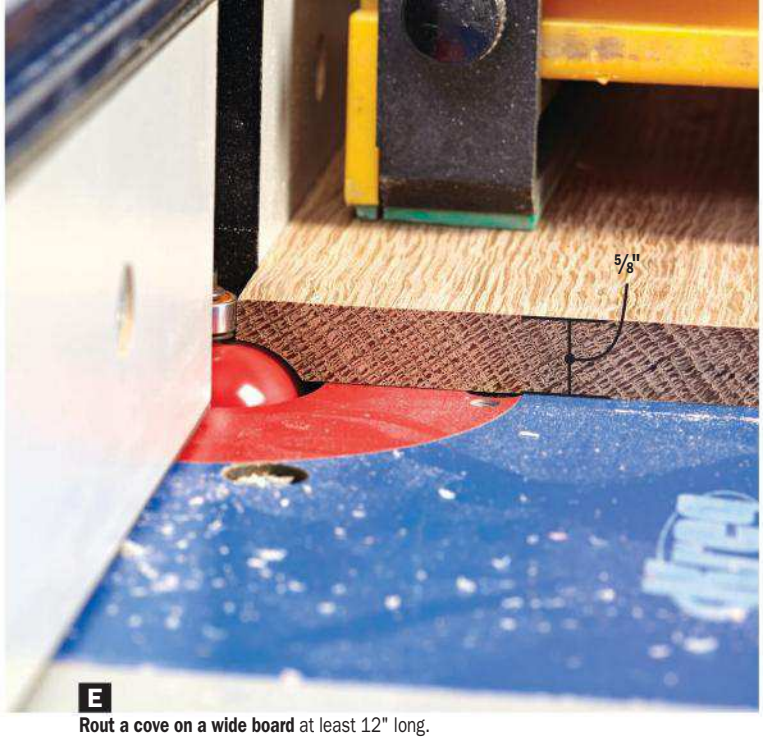
Make the drawers

1 Cut the fronts and backs (I), sides (J), and bottoms (K). Cut or rout the dadoes, rabbets, and grooves and assemble the drawers [**Drawing 2**].

2 Cut the false fronts (L) and make a blank for the pulls (M) [**Drawing 2a, Photos E** and **F**]. Cut the pulls to length and sand roundovers on the ends. Screw the pulls to the false fronts.

3 Screw the false fronts to the drawers to create an even reveal when they slide into the case. Set the drawers aside.

Tip! *For a pleasing grain match, cut the false drawer fronts (L) end to end from a single board.*



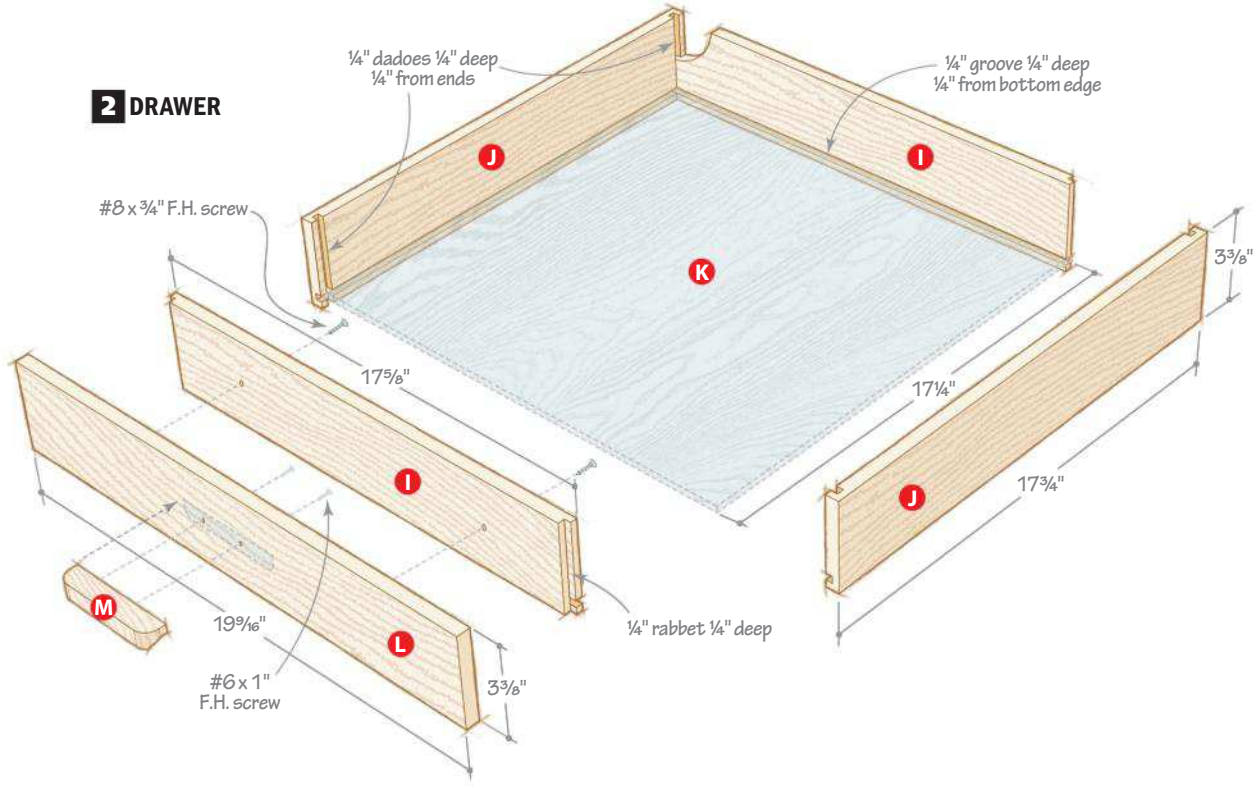
E

Rout a cove on a wide board at least 12" long.

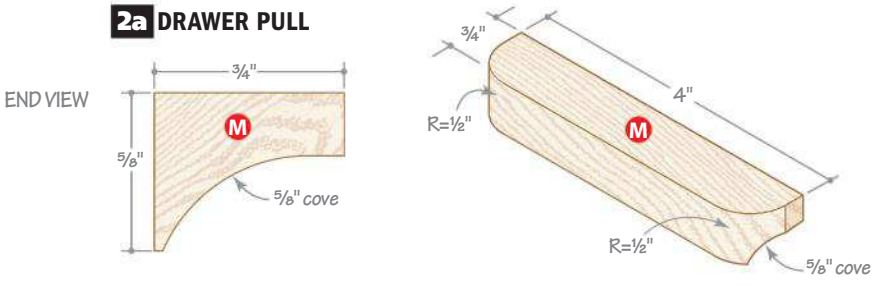
F

Rip a pull blank from the edge of the board.

2 DRAWER

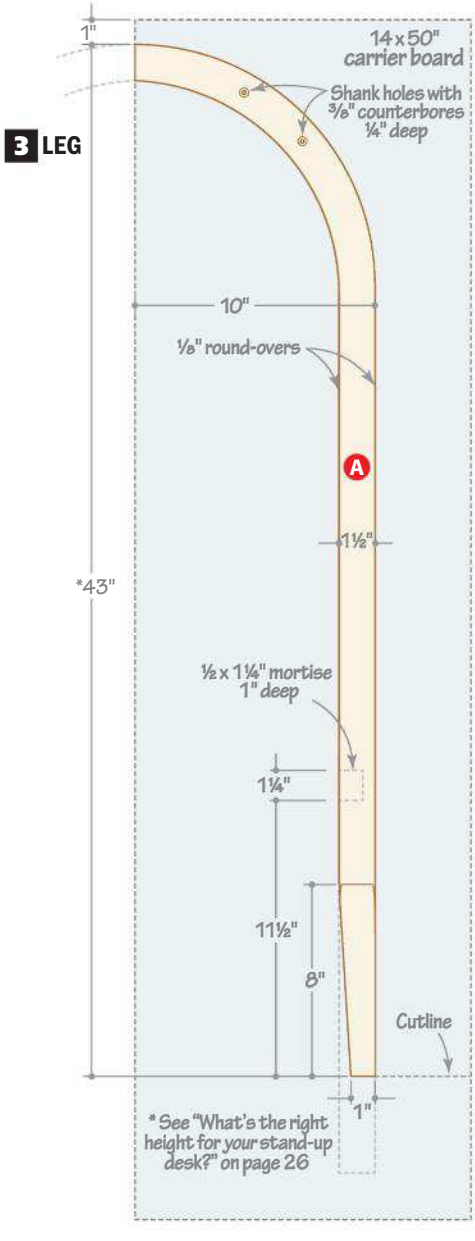


2a DRAWER PULL



Trim the upper end of the leg blank. When clamping the leg to the carrier board, be sure to align the blank with the cut-out profile, and the blade with the edge of the carrier board.

Transfer the lower cutline from the carrier board to the leg blank. Cut the leg to length.



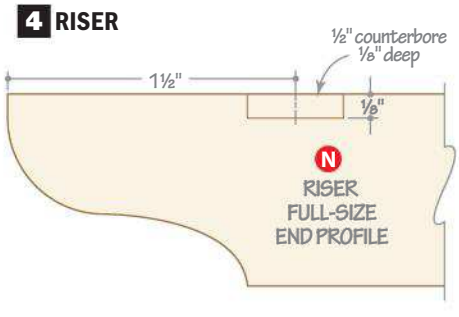
Mark tapers on the inside faces adjacent to the inside corner, bandsaw them to shape, and sand them smooth.

Add the leg assembly

1 Select the four best bent leg blanks and finish-sand them. Position one blank on a carrier board [**Drawing 3**] and trace the inside profile of the blank onto the board. Remove the leg blank, cut along the profile line, and mark the leg-length cutline on the carrier board. Trim both ends of each blank and form the bottom tapers [**Photos G, H, I**].

2 Form the leg mortises, drill counterbored holes, and round over the edges [**Drawing 3**].

3 Cut the risers (N) and form the end profiles [**Drawing 4**]. Drill counterbores for figure-8 tabletop fasteners [**Exploded View**]. Finish-sand the risers.



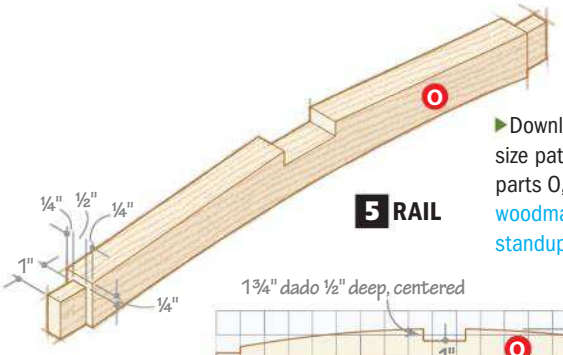
Rest the case on the risers (N). Clamp the leg/rail assembly with attached positioning guide to the case and drive screws through the counterbored holes.

4 Cut the rails (O) to size but do not cut the curves [**Drawing 5**]. Form the tenons and dadoes. Now bandsaw the arcs and finish-sand the rails.

5 Make a leg-positioning guide from a ¾×20×37¼" piece of particleboard. Attach a ¾×2½×20" cleat to one end [**Photo J**]. Glue the rail (O) tenons into the leg mortises and clamp the leg/rail assembly to the guide. Glue and screw the leg assemblies to the case [**Exploded View**]. Plug the counterbores and sand the plugs smooth.

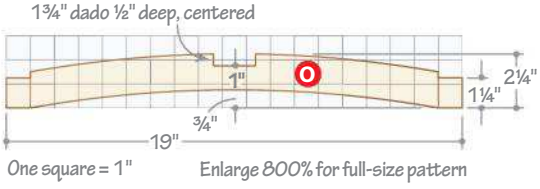
6 Bandsaw and sand the stretcher (P) and braces (Q) [**Drawing 6**]. Glue the stretcher in place [**Exploded View**], followed by the braces. Cut the brace block (R) [**Drawing 7**] and glue and screw it in place.

Tip! *Before cutting the stretcher (P), make a slightly longer one out of scrap and do not cut the end angles. Fit and scribe the scrap stretcher until you get the length and angles right. Then use this stretcher as a pattern for making the finished one. Repeat with the braces (Q).*

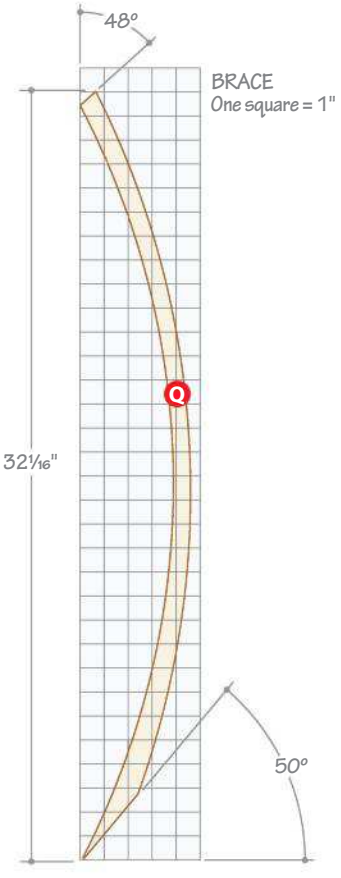


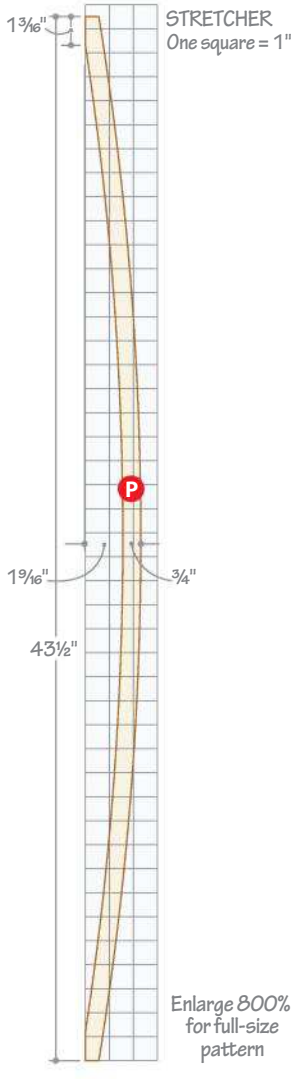
5 RAIL

▶Download full-size patterns for parts O, P, and Q. woodmagazine.com/standupdeskpatterns



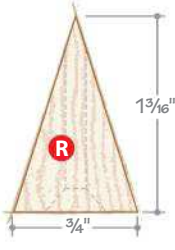
6 STRETCHER AND BRACE GRIDDED PATTERNS





Note: *To steam bend the stretcher (P) and braces (Q), cut one ¾×1¾×48" blank for the stretcher and two 1×1¾×36" blanks for the braces. Use the gridded patterns to make bending and drying forms. To compensate for springback, increase the height of each curve by ½". These gentle curves do not need tension straps.*

7 BRACE BLOCK



Top it off and apply finish

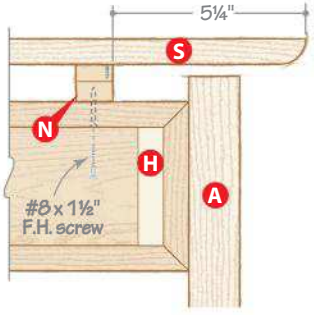
1 Edge-join boards to make an oversize blank for the desktop (S). Cut the top to finished size and round over the bottom edges [**Exploded View**]. Finish-sand the top.

2 Inspect all parts and assemblies and finish-sand where needed. Apply finish. (We used a water-based satin polyurethane.)

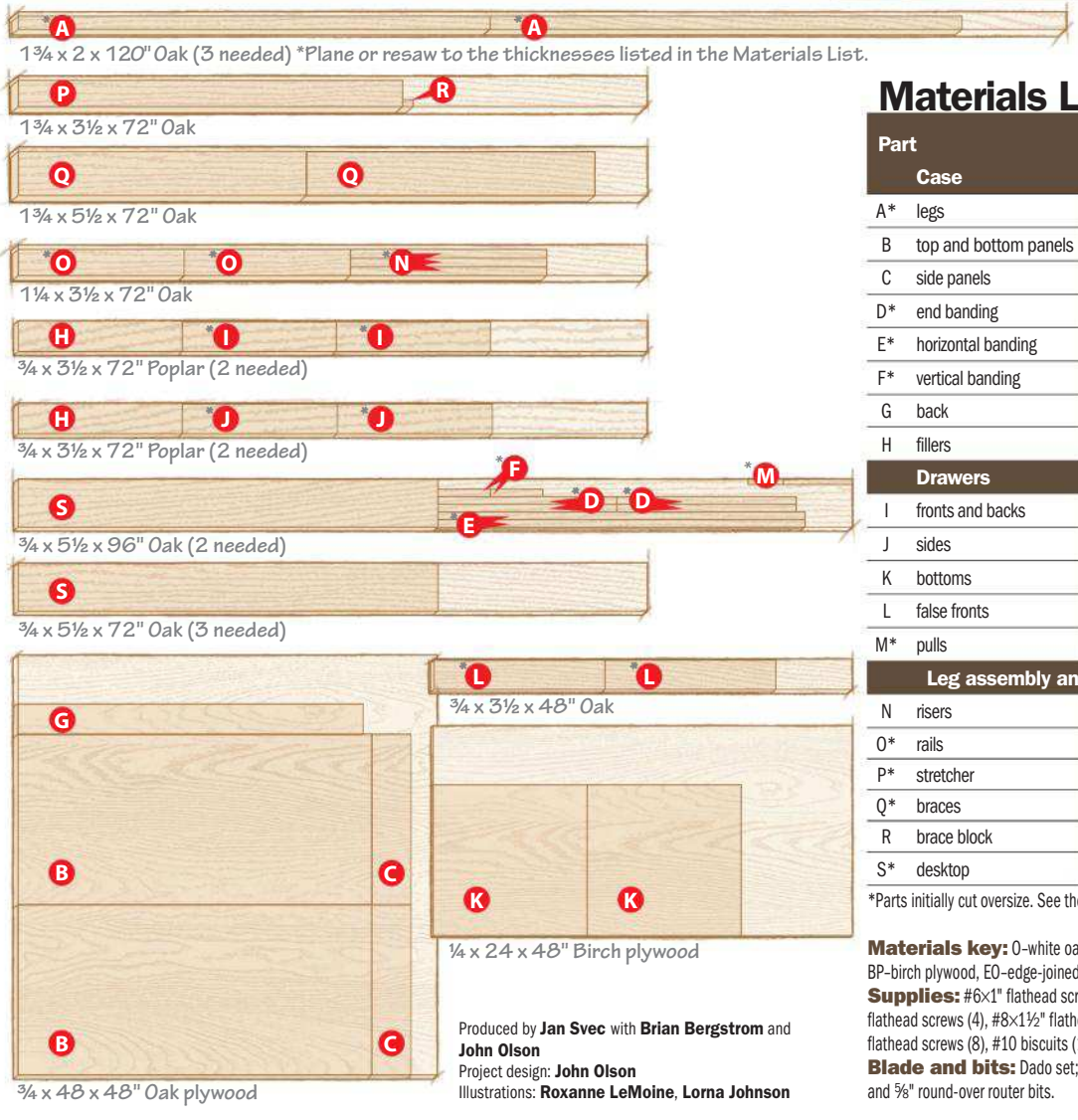
3 Screw figure-8 fasteners to the risers (N) and then screw the fasteners to the top (S) [**Exploded View, Drawing 8**]. Drill shank holes through the case top panel (B) at the location of the end risers. (The center riser floats.) Clamp the top/risers assembly to the case. Use a ratchet wrench with a ¼" socket and a screwdriver tip to drive screws through the case top and into the risers.

4 Slide the drawers into the case and start enjoying your healthier lifestyle.

8 CASE DETAIL



Cutting Diagram



Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
	Case					
A*	legs	1½"	1½"	43"	O	4
B	top and bottom panels	¾"	19½"	40½"	OP	2
C	side panels	¾"	19½"	4½"	OP	2
D*	end banding	¼"	¼"	19½"	O	8
E*	horizontal banding	¼"	¾"	41"	O	4
F*	vertical banding	¼"	¾"	5"	O	4
G	back	¾"	3½"	39½"	OP	1
H	fillers	¾"	3½"	18¾"	P	4
	Drawers					
I	fronts and backs	½"	3⅜"	17⅞"	P	4
J	sides	½"	3⅜"	17¾"	P	4
K	bottoms	¼"	17⅞"	17¼"	BP	2
L	false fronts	½"	3⅜"	19⁹⁄₁₆"	O	2
M*	pulls	⅝"	¾"	4"	O	2
	Leg assembly and top					
N	risers	1"	1"	22½"	O	3
O*	rails	1"	2¼"	19"	O	2
P*	stretcher	1¾"	2⁵⁄₁₆"	43½"	O	1
Q*	braces	1¾"	4⅝"	32¹⁄₁₆"	O	2
R	brace block	1¾"	¾"	1³⁄₁₆"	O	1
S*	desktop	¾"	24"	48"	EO	1

*Parts initially cut oversize. See the instructions.

Materials key: O-white oak, OP-white oak fiber-core plywood, P-poplar, BP-birch plywood, EO-edge-joined white oak.
Supplies: #6x1" flathead screws (4), #8x⅝" flathead screws (18), #8x¾" flathead screws (4), #8x1½" flathead screws (6), #8x2" flathead screw (1), #8x2½" flathead screws (8), #10 biscuits (12), figure-8 tabletop fasteners (9).
Blade and bits: Dado set; ⅜" plug cutter; bottom-bearing flush-trim, ⅝" cove, and ⅝" round-over router bits.

Produced by **Jan Svec** with **Brian Bergstrom** and **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine**, **Lorna Johnson**

High-style Adirondack Pair

Sitting and relaxing on a porch or deck doesn't mean you have to miss out on what's going on around you. This tall Adirondack-style chair lifts you high enough to see over the railing—plus, your knees will appreciate the ease of getting into or out if it. The matching table holds your snack and beverage while you enjoy the commanding view.

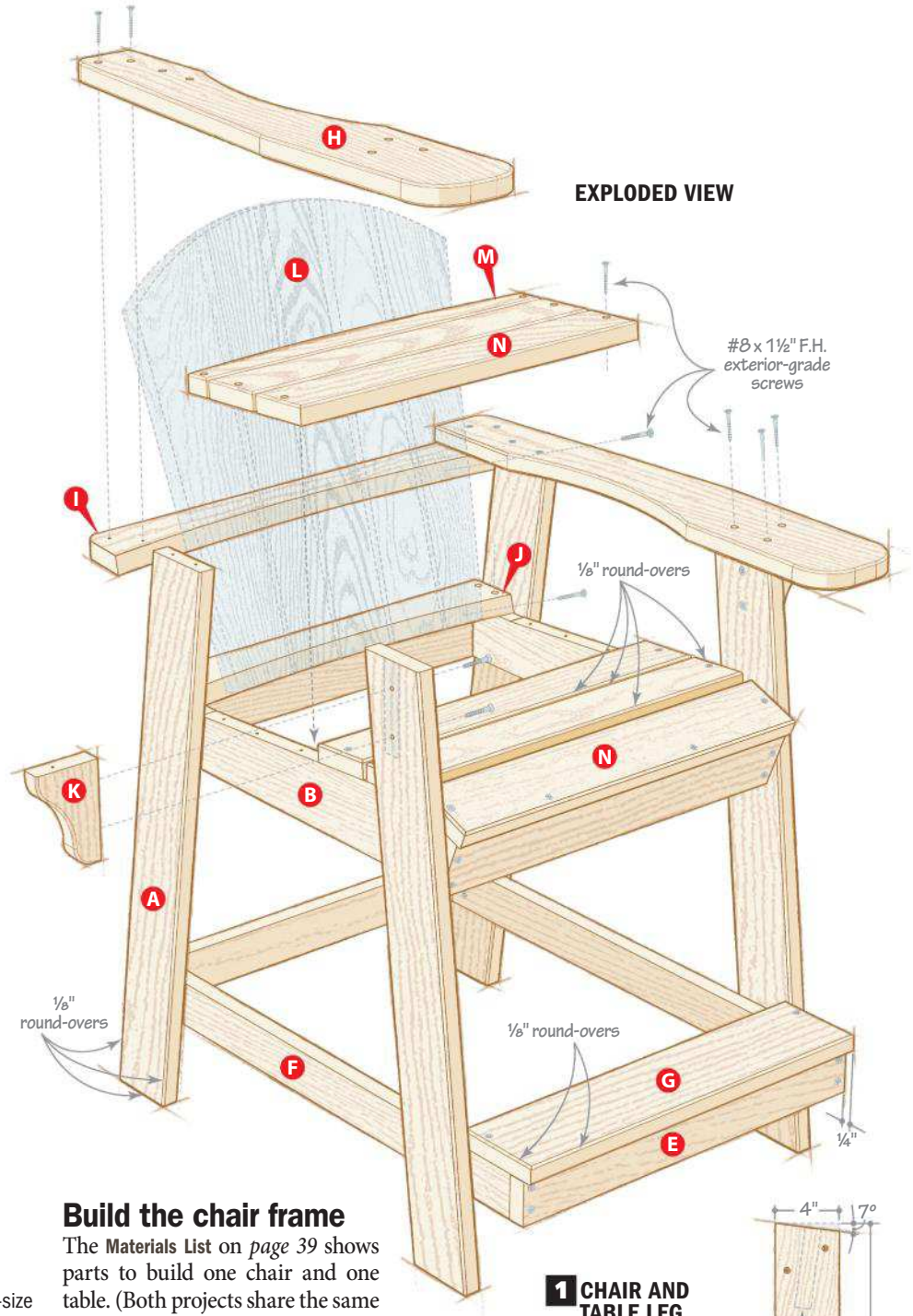
DIMENSIONS:
Chair 30¾" W × 33½" D × 52⅜" H
Table 20¾" W × 28" D × 36⅞" H

Approximate materials cost:

$330

to build a pair of chairs and one table.

Build the set with cedar or pressure-treated deck boards from the home center



Build the chair frame

The **Materials List** on *page 39* shows parts to build one chair and one table. (Both projects share the same legs.) Before you start, make full-size templates from heavy poster board or hardboard for parts B, H, I, J, K, and M using the gridded patterns on *pages 39–40*.

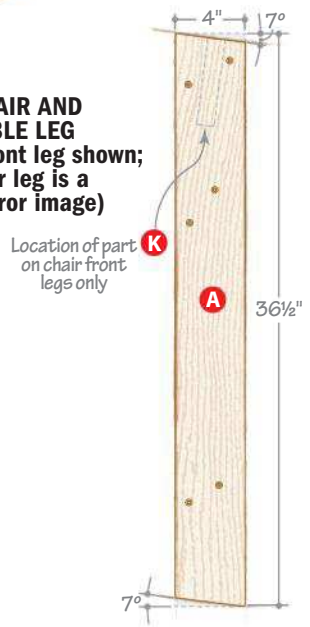
1 Miter-cut the leg (A) blanks to finished length [**Materials List, Drawing 1**]. Round over the edges and bottom ends [**Exploded View**], and finish-sand to 180 grit. Set four legs aside for the table.

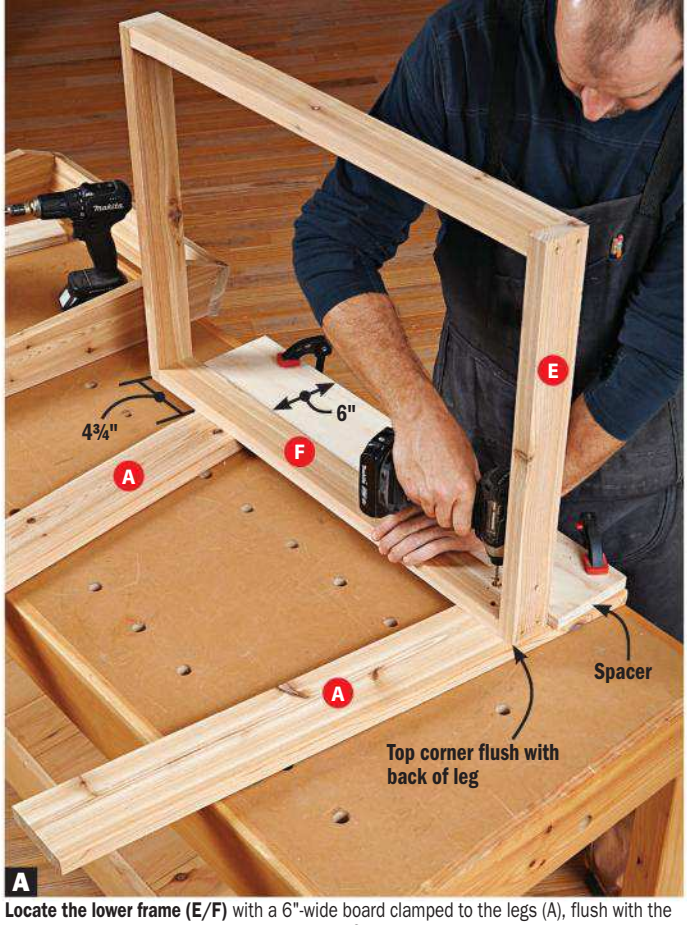
2 Cut oversize blanks for the seat side rails (B). Then, trace your part B template onto one of them and join the blanks together with double-faced tape with the edges and ends flush. Cut, separate, and finish-sand the parts. Cut rails C–F to size.

▶Download full-size patterns for these parts.
woodmagazine.com/254 Adirondack

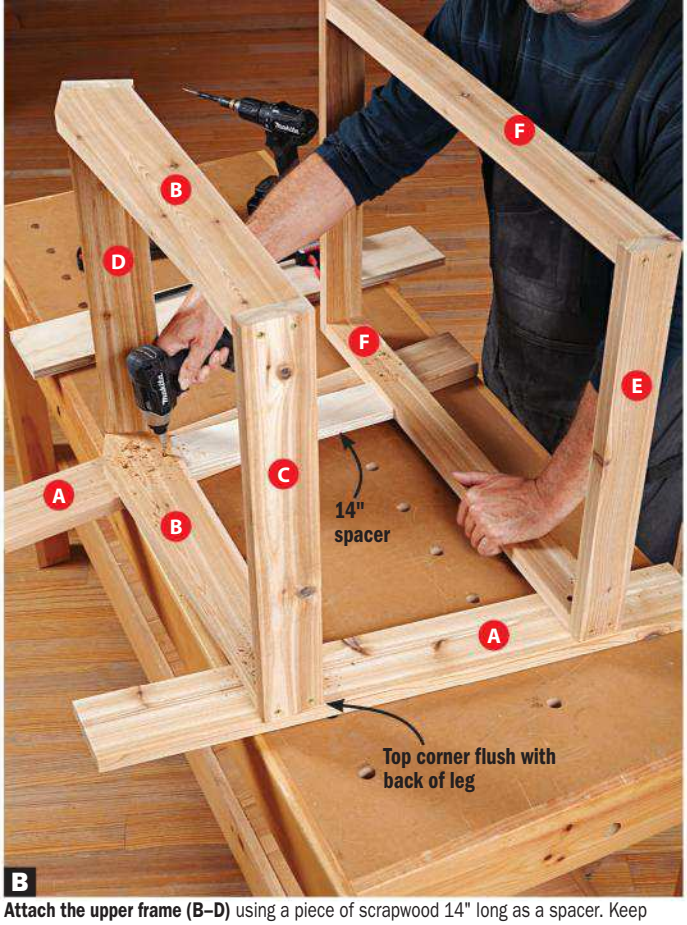
Tip! *Glue that meets ANSI/HPVA Type I or 2 water-resistance specifications will prevent joints from loosening due to weather exposure.*

1 CHAIR AND TABLE LEG (Front leg shown; rear leg is a mirror image)

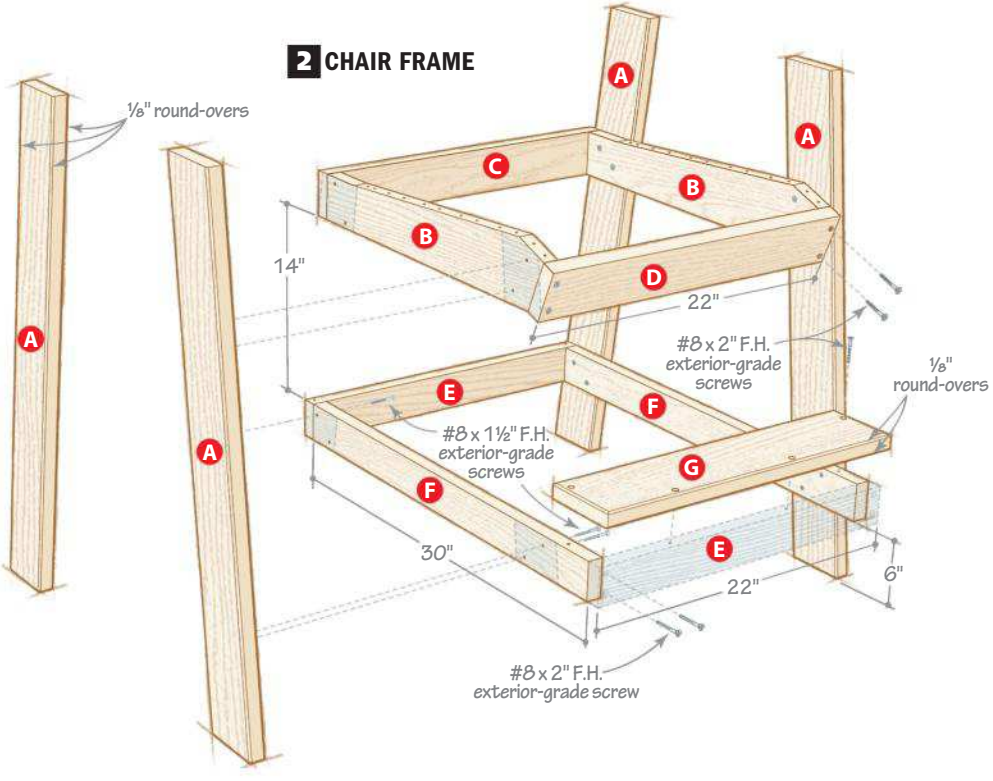




Locate the lower frame (E/F) with a 6"-wide board clamped to the legs (A), flush with the leg ends and bench edge. Place the front leg 4¾" back from the top corner of the frame.



Attach the upper frame (B–D) using a piece of scrapwood 14" long as a spacer. Keep the spacer perpendicular to the bottom of B and top of F.



Tip! *Drill pilot holes to keep the screws going straight and to prevent splitting the wood.*

3 Screw and glue rails B, C, and D together for the upper frame [**Drawing 2**]. Construct the lower frame with rails E and F.

4 Attach the lower frame (E/F) to two legs (A) for one side with glue and screws [**Photo A**]. Then, attach the upper frame (B–D) to the legs [**Photo B**].

5 Cut the footrest (G) to size, round over the edges and ends, and finish-sand [**Drawing 2**]. Attach the footrest to the bottom

Mark the curve at the back of each arm (H) on the backrest upper rail (I). Cut the ends of the rail, screw and glue the part in place, and sand the ends flush with the arms.

Keep the string taut as you scribe the arc across the top of the back slats (L). Hold the pencil perpendicular to the slats with the string loop right at the point.

frame, overhanging the front face of the lower rail (E) by ¼" [**Exploded View**].

Add backrest rails and arms

1 Cut blanks for parts H–K. Trace the part templates onto the blanks.

2 Cut the arm (H) and arm bracket (K) contours, making mirror-image parts. Sand the cuts smooth. Round over the arms and curved edges of the brackets.

3 Cut the long curves on parts I and J with your bandsaw or jigsaw tilted 15°. Return the saw to 0°. Sand the curves smooth, and finish-sand the parts.

4 Screw and glue the arms (H) to the leg tops, placing the front end of each arm 4" from the front edge of the leg, and the inside edge of the arm 1" from the inside of the leg.

5 Clamp the backrest upper rail (I) to the underside of the arms, flush at the ends of the arms and centered side-to-side. Trace the arm corner shape onto the rail [**Photo C**].

6 Screw and glue the backrest lower rail (J) to the upper frame (B/C), flush at the back [**Exploded View**].

7 Attach the arm brackets (K) between the underside of the arms and the front legs [**Exploded View**].

Note: *The slat spaces should measure about ¾" at their tops; yours may vary slightly.*

Add the back and seat slats

1 Cut the back slats (L) to size. Screw one in place (no glue yet) centered on the length of the backrest upper and lower rails (I, J).

2 Temporarily attach the other slats at the bottom with a single, centered screw in each, leaving ¼" spaces between them. Fan them out at the top, equalizing the spaces between the slats, and between the outer slats and the arms along the backrest upper rail (I).

3 Cut a piece of string about 3' long and tie a loop for a pencil at one end. Place the pencil point at the top center of the middle slat and hold the other end of the string at the bottom center of the slat [**Photo D**]. Draw an arc across the slat tops.

4 Mark the slats for position, and remove them. Cut the tops as marked, round over the edges and ends, and finish-sand. Screw and glue the slats to the upper and lower backrest rails (I, J) [**Exploded View**].

5 Cut the blank for the seat rear slat (M) and the seat slats (N) to size. Trace the rear slat (M) profile from the template, and cut and sand it. Round over and finish-sand the slats (M, N). Attach them with 5/16" gaps in between [**Seat Side Rail Gridded Pattern**].

Tip! *If you have a trammel or a yardstick with trammel points you can scribe the arc on the back slats (L) more easily and accurately.*

Build the table

1 Cut rails O–R to size. Screw and glue the upper and lower frames together [**Drawing 3**]. Finish-sand the frames.

2 Retrieve the four legs (A) you set aside earlier. Glue and screw the upper and lower frames (O/P, Q/R) to the legs [**Drawing 3**], the upper frame flush at the top. Place the top corners of the upper frame flush with the leg corners to establish the distance between the front of the lower frame (Q/R) and the front edge of the legs, about ½".

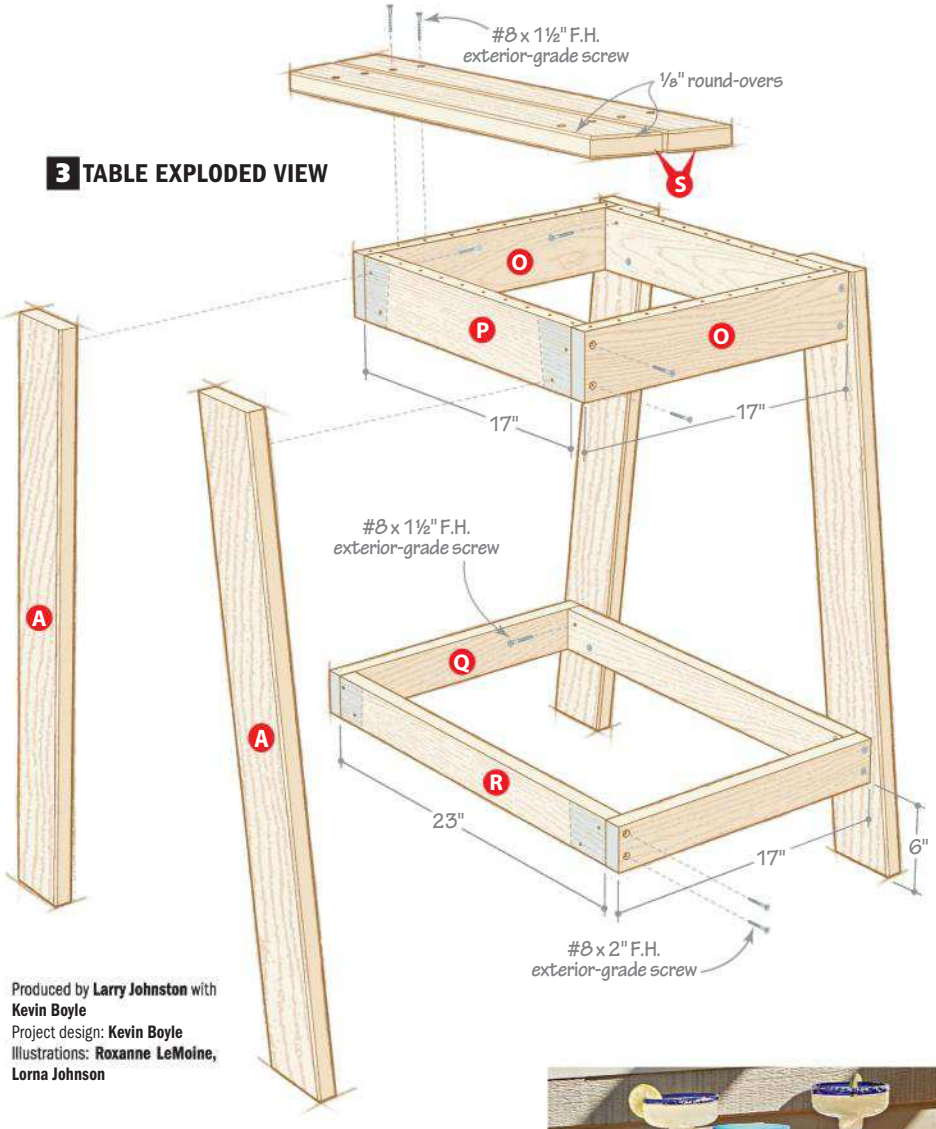
3 Cut the tabletop slats (S) to size. Temporarily attach the slats to the top of the table frame [**Drawing 4**].

4 Mark near the outside edge of both outer slats 2⅛" from each end. Using a fairing stick, draw a smooth curve between the endpoints through the middle of the gap between the center slats.

5 Mark the slats for position, remove them, and cut the end curves. Sand the curves smooth, round over the ends and edges, and finish-sand the slats. Reattach them to the table frame with screws and glue.

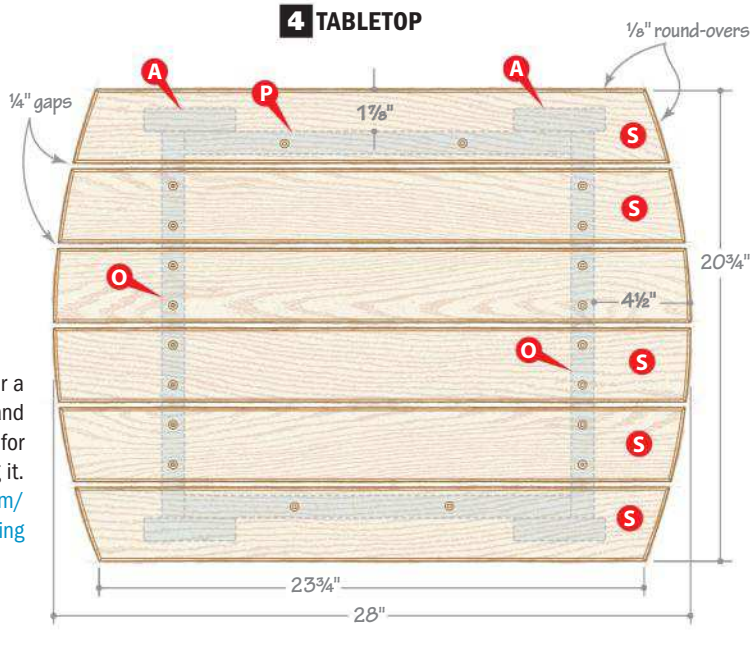
6 Touch up the sanding as necessary. Then, apply an exterior finish. (We put on three coats of spar varnish.) Finally, move the chair and table to your porch or patio and sit down for some rest and refreshment, accompanied by a great view.

3 TABLE EXPLODED VIEW



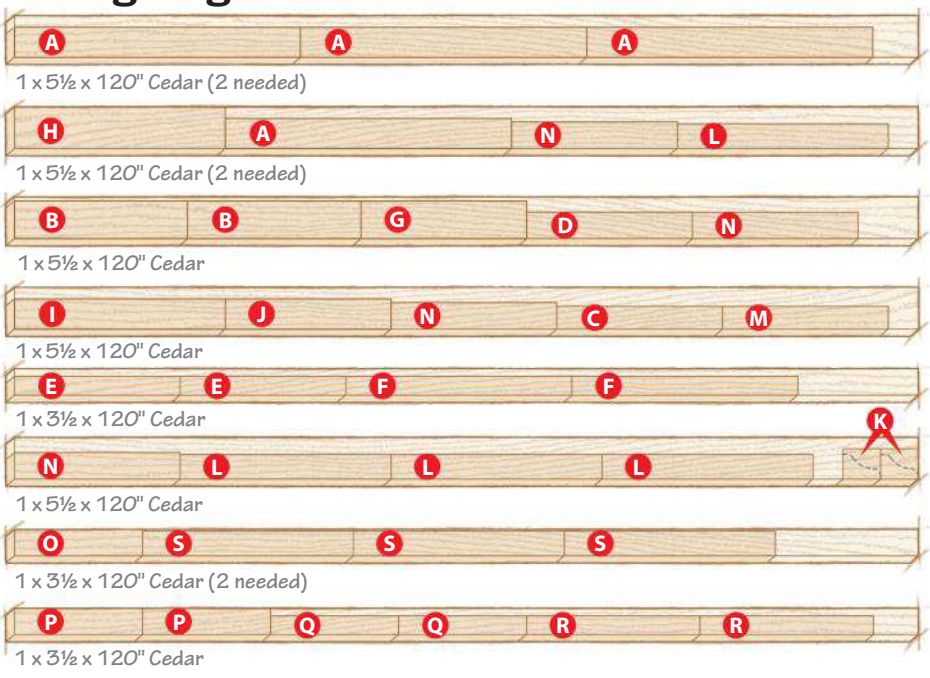
Produced by **Larry Johnston** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

4 TABLETOP



▶Find plans for a fairing stick and instructions for using it. woodmagazine.com/fairing

Cutting Diagram



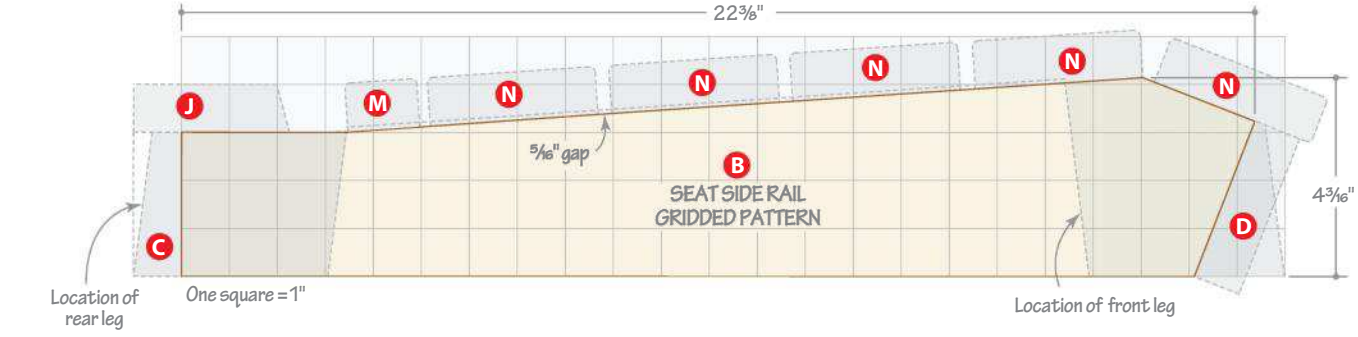
Materials List

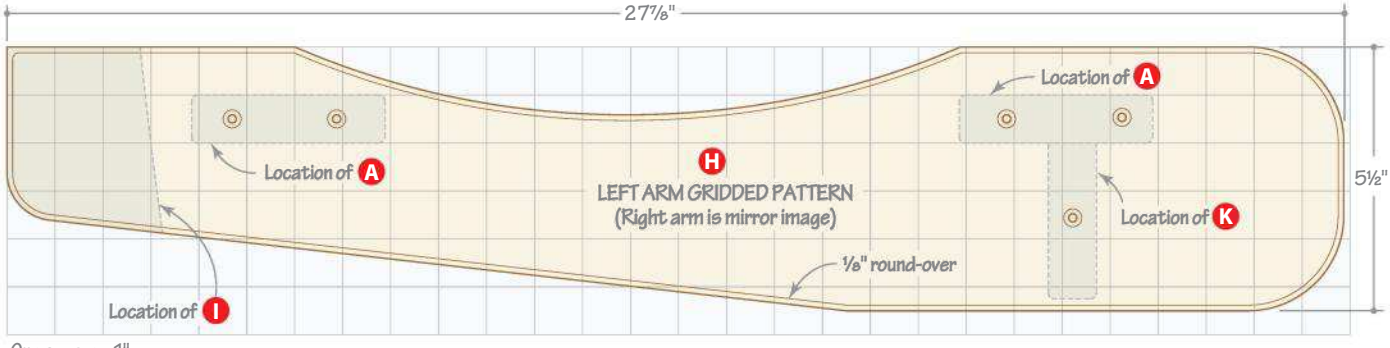
Part		FINISHED SIZE T	W	L	Matl.	Qty.
Chair						
A*	legs (chair and table)	1"	4"	36½"	C	8
B*	seat side rails	1"	4³⁄₁₆"	22⅜"	C	2
C	seat back rail	1"	3"	22"	C	1
D	seat front rail	1"	3½"	22"	C	1
E	front/back lower rails	1"	2½"	22"	C	2
F	side lower rails	1"	2½"	30"	C	2
G	footrest	1"	5"	22"	C	1
H*	arms	1"	5½"	27⅞"	C	2
I*	backrest upper rail	1"	4"	27⅞"	C	1
J*	backrest lower rail	1"	3¼"	22"	C	1
K*	arm brackets	1"	3¼"	5"	C	2
L	back slats	1"	3¼"	28"	C	5
M*	seat rear slat	1"	2⅜"	22"	C	1
N	seat slats	1"	3½"	22"	C	5
Table						
O	front/back upper rails	1"	3½"	17"	C	2
P	side upper rails	1"	3½"	17"	C	2
Q	front/back lower rails	1"	2½"	17"	C	2
R	side lower rails	1"	2½"	23"	C	2
S	top slats	1"	3¼"	28"	C	6

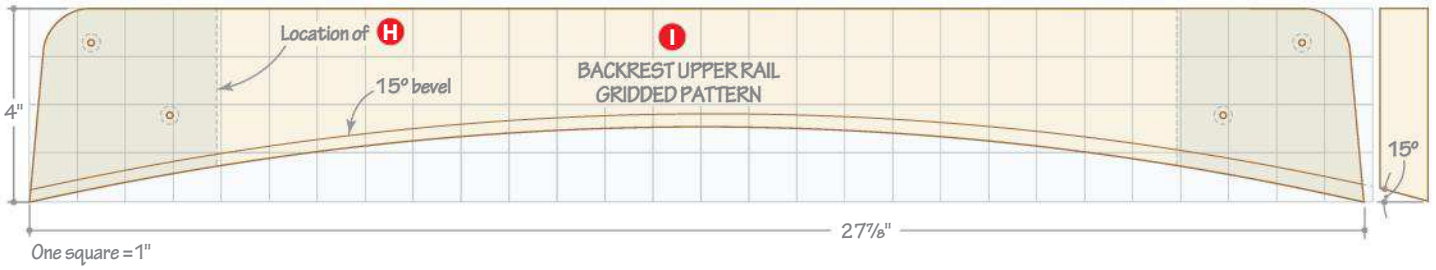
*Parts initially cut oversize. See the instructions.

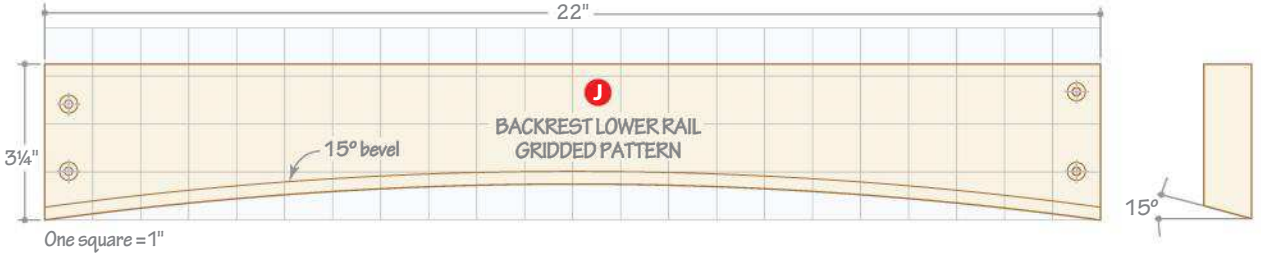
Materials key: C-cedar.
Supplies: #8×1½" and #8×2" flathead exterior-grade screws.
Bit: ⅛" round-over router bit.

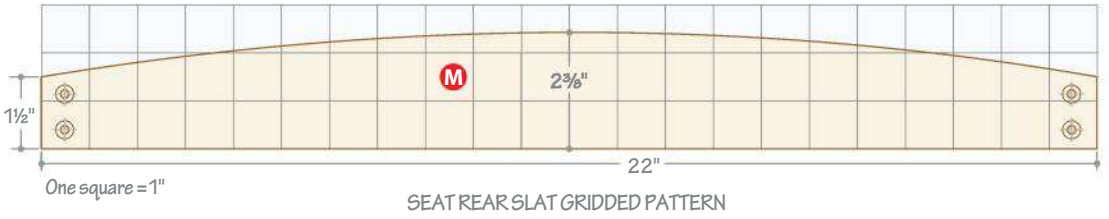
▶Learn how to enlarge gridded patterns. woodmagazine.com/enlargeplans



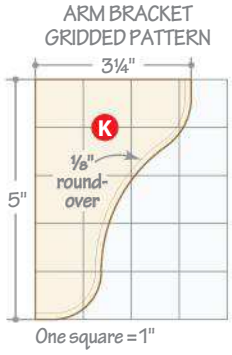








SEAT REAR SLAT GRIDDED PATTERN



No-guesswork Dado Jig

Forget the fussing. Adjust this jig just once for perfect-fitting dadoes.

Cutting a dado that precisely matches the thickness of the material going into it can be a time-consuming, trial-and-error experience. But not with this jig. You quickly set it up with on-the-money precision, first time, every time.

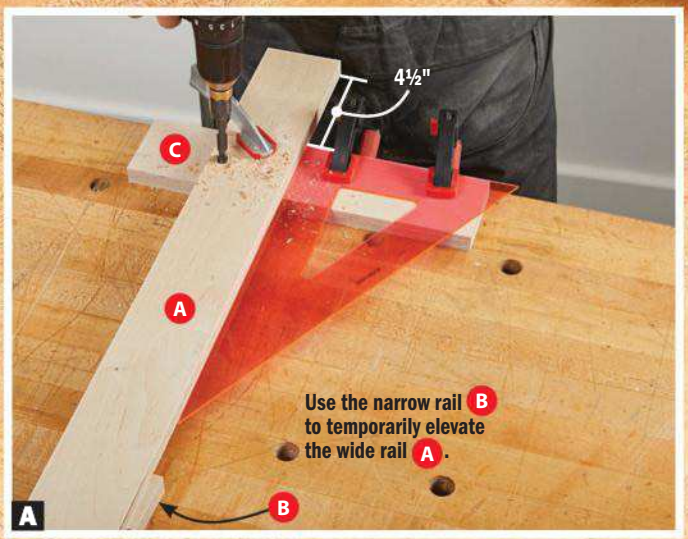
Cut and assemble the parts

As shown, this jig enables you to cut dadoes in panels up to 15" wide (and even slightly wider with smaller router bases). To cut dadoes in wider panels, simply lengthen the rails (A, B) [**Materials List, Exploded View**].

1 Cut the rails to size. Using a Forstner bit in your drill press, counterbore the wide rail (A) then drill through-holes centered in the counterbores [**Exploded View**]. Drill mating holes in the narrow rail (B).

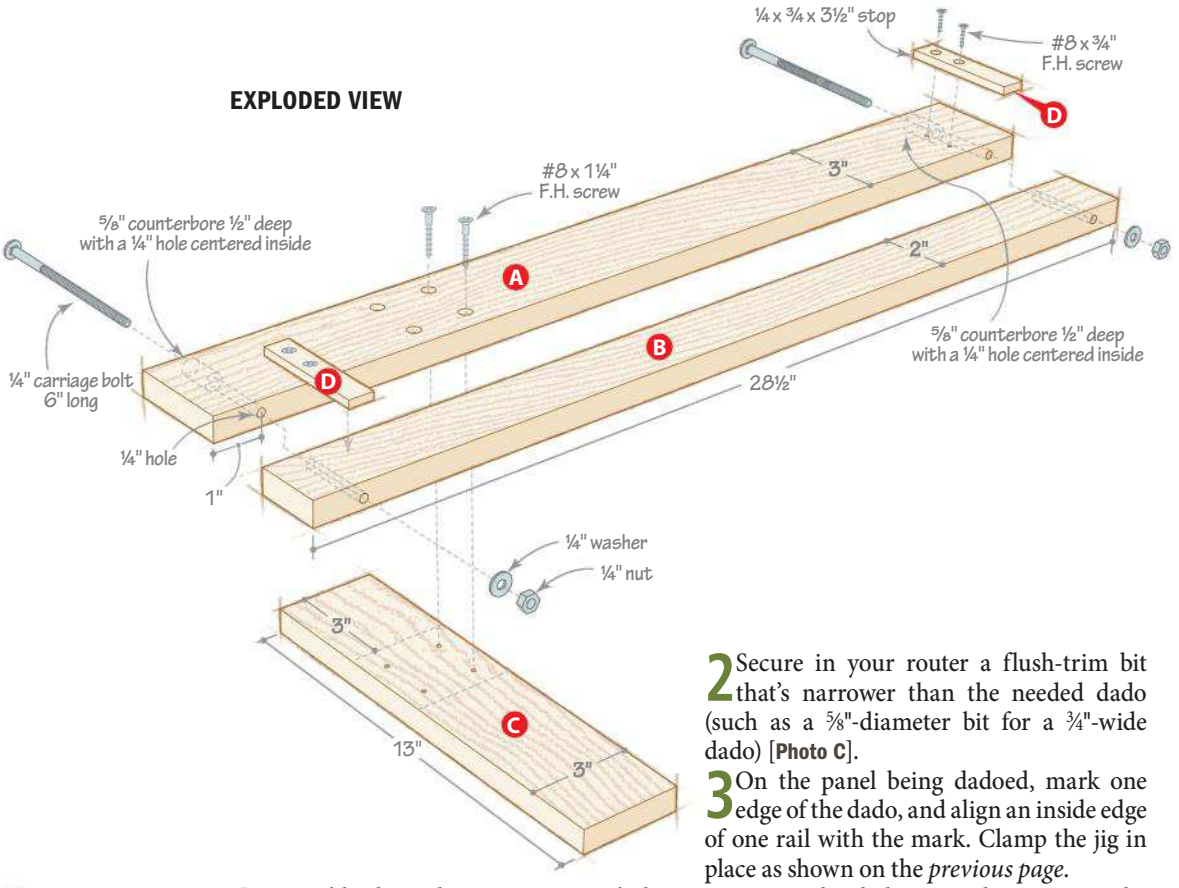
2 Cut the cleat (C). Glue and screw it to the wide rail, 4½" from its end [**Photo A**].

Tip! *To ensure the ¼" carriage-bolt holes in the rails align, set up your drill press with a fence and stopblock. Be careful to place the same face of each rail against the drill-press fence.*



Attach the wide rail (A) to the cleat (C) using the most accurate large square you have to position the parts. Clamps prevent the parts from shifting as you drive the screws.

EXPLODED VIEW



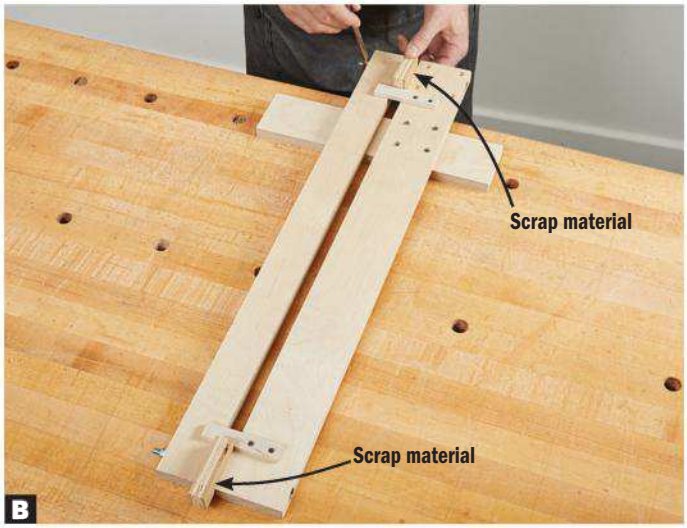
▶The 6"-long carriage bolts allow you to cut dadoes up to 1" wide. For wider dadoes, substitute longer carriage bolts.

3 Assemble the rails using carriage bolts, washers, and nuts.

4 Cut the stops (D) to size. Screw them to the wide rail, inside the bolts, to prevent your router's bit from accidentally contacting the bolts. Do not glue the stops—you may want to move them when routing stopped dadoes.

Put your dado jig to work

1 Set the spacing between the rails and tighten them together [**Photo B**].



Adjust the rails to perfect spacing using two scraps of the material that will be housed in the dado. Tighten together the rails just enough to keep the scraps from slipping out.

2 Secure in your router a flush-trim bit that's narrower than the needed dado (such as a ⅝"-diameter bit for a ¾"-wide dado) [**Photo C**].

3 On the panel being dadoed, mark one edge of the dado, and align an inside edge of one rail with the mark. Clamp the jig in place as shown on the *previous page*.

4 To cut the dado, start the router at the cleat end and move it down the length of the narrow rail and back against the wide rail. Repeat both passes to ensure a full-width dado.

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	wide rail	¾"	3"	28½"	P	1
B	narrow rail	¾"	2"	28½"	P	1
C	cleat	¾"	3"	13"	P	1
D	stops	¼"	¾"	3½"	S	2

Materials key: P–plywood, S–solid stock (any hardwood).
Supplies: ¼×6" carriage bolts (2), ¼" washers (2), ¼" nuts (2), #8×1¼" flathead screws (4), #8×¾" flathead screws (4).
Bit: ⅝" Forstner bit.

Produced by **Bill Krier** with **Kevin Boyle**
Project design: **Jim Scannell**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

C

Use the best bit for the job, one with a top bearing, and cutters no longer than necessary. This ⅝"-diameter bit, with ⅝"-long cutters, will handle the majority of work.

3-hp Cabinet Tablesaws

These brutes bring the power, capacity, and finesse you need.

For many of us, a 3-hp cabinet saw—so named decades ago for having a closed cabinet when other saws did not—ideally suits our needs. In addition to muscular motors, these saws have larger cast-iron tops, beefier trunnions and blade-support mechanisms, better dust collection, and less vibration than lower-powered saws. To find the best of the best, we tested seven machines priced from $1,795 to $3,200.

▶To even the playing field, we used new Freud rip and combination blades on each saw in all tests.

No problems with power

Each of the saws, with motors wired for 220 volts, has ample power to rip and crosscut hardwood and softwood up to 3" thick without bogging down. However, two saws (Jet XACTA 708675PK and Powermatic PM2000B) require you to supply a power cord and plug.

Rip fences don't disappoint

We configured these seven machines with long fence rails and rip capacities ranging from 47" to 53". (Each model is also available with 30–36" rip capacity.) All the saws come with T-square-style rip fences that locked solidly, yet glided smoothly along the rails. But deflection at the unsecured end can occur with this type of fence, so we measured for that with a dial indicator while ripping 4×4' sheets of plywood and 2×12 lumber. The SawStop Professional's fence deflected the least (.001") and the Shop Fox W1820's fence the most (.008"), but we saw no negative effects in any case.

The steel-tube fences have faces made of coated plywood, high-density plastic, or aluminum—all worked fine—and none have T-slots for mounting accessories, such as hold-downs. (T-slots are a common feature on lesser-priced saws.) All the faces were spot-on perpendicular to the tabletop, and each fence proved easy enough to adjust parallel to the blade and miter slots.

Most of the time, you'll rip with the fence to the right of the blade, where the scale provides reliable accuracy. The Delta and SawStop machines also have scales to the left of the blade and cursors to match—a bonus for times when you choose to rip on that side—as well as scales marked in 1/32" increments along the full length. The Grizzly G1023RLX, Jet, and Powermatic have these markings only in the first foot, with 1/16" increments beyond that; the Grizzly G0691 and Shop Fox have 1/16" and metric markings along the full length.

Nine detents for common angles makes Delta's miter gauge the best in our test. The detents are on three fully adjustable plates for dead-on accuracy, and a pin registers in the detents without slop.

Powermatic's miter gauge comes with a movable fence, and five angle detents, as well as bar adjusters. But its rack-and-pinion adjuster makes changing any angle fussy work—there's no bypass for it—and there's no adjustment to calibrate the angle detents.

Jet's basic, no-frills gauge is adjustable for the three most common stops (90° and 45°), and has a flip-style paddle to register against the stops. It has holes for mounting an auxiliary fence, but no bar adjusters.

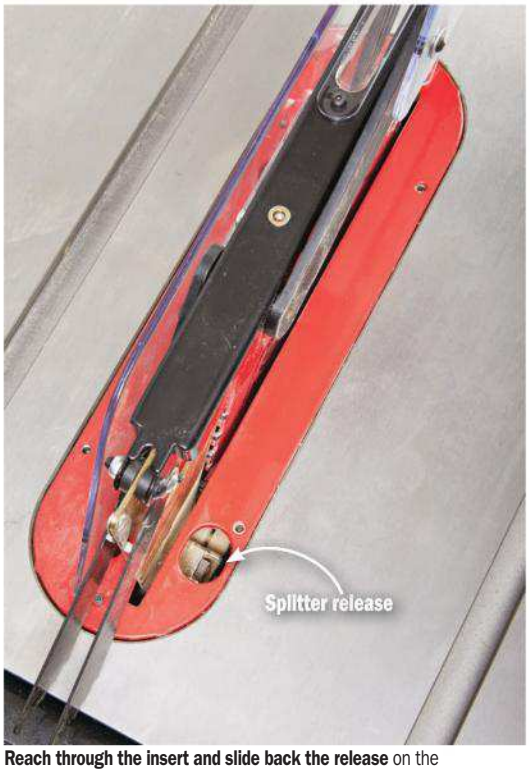
▶If your saw's miter gauge doesn't perform accurately or provide the workpiece support you need, upgrade to an aftermarket model, and consider adding a crosscut sled as well. Read reviews of these and other accessories. woodmagazine.com/tsaccys

Miter gauges barely make the cut

A miter gauge must have adjustability to calibrate angle stops, adjusters for snugging the fit of the bar in the miter slots, and a way to attach an auxiliary fence. Among the tested models, we found only a few miter gauges reliable and helpful enough to use regularly, particularly for cutting angles other than 90°. The Delta gauge, shown *above left*, was our favorite. It has setscrews to adjust the bar fit, and screw holes for mounting auxiliary fences.

Miter gauges on the Grizzly G0691 and Shop Fox were inaccurate at 45° angles, with no way to calibrate them. And, despite having angle adjusters, the SawStop gauge's sloppy pivot pin made it necessary to use a square to set accurate angles. All saws but the Grizzly G0691 and Shop Fox have built-in storage for their miter gauges.

All the tested saws incorporate similar safety systems: a blade guard and antikickback pawls mounted on a removable splitter.



Reach through the insert and slide back the release on the Grizzly G0691 and Shop Fox to remove the splitter assembly.

Delta Unisaw 36-L352, $2,650

800-223-7278, deltamachinery.com

(Mobile base not included.)

Grizzly G0691, $1,895

800-523-4777, grizzly.com

(Mobile base not included.)

Guards get better

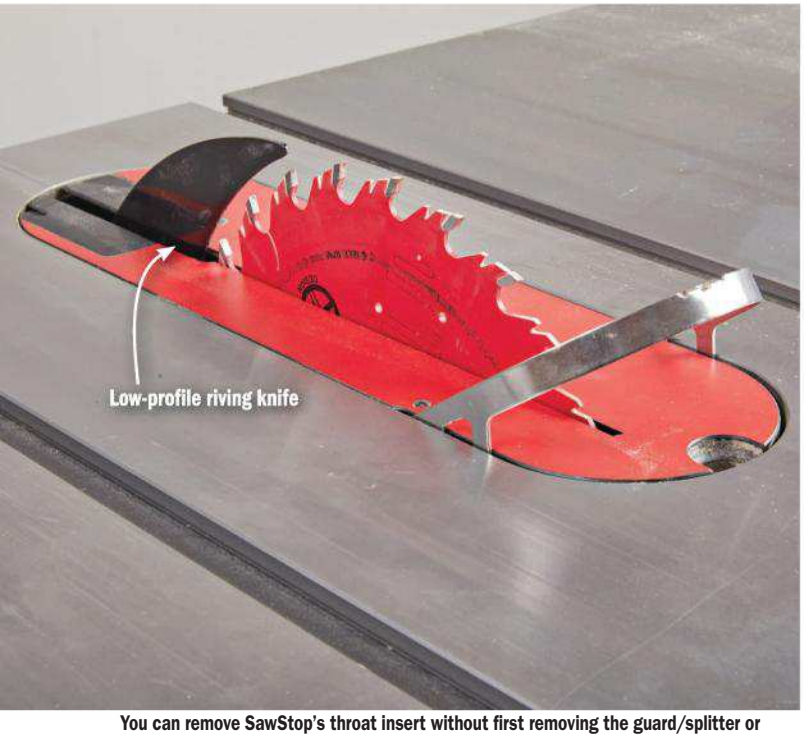
Thanks to mandates from regulatory agencies nearly a decade ago, the guard systems on these saws (*previous page, left*) work well enough so you won't want to remove them. The splitter holds open the kerf behind the blade to prevent kickback and follows it when you raise, lower, or tilt the arbor. A two-piece guard and antikickback pawls mount separately to the splitter, letting you use either or both with the splitter.

The Grizzly G1023RLX, Jet, and Powermatic saws require you to lift the throat insert and reach into the opening to release the splitter from its clamp—not an easy process. The Grizzly G0691 and Shop Fox saws make this easier because you can remove the splitter without lifting the throat insert, shown *previous page, right*.

We like the guard setups best on the SawStop and Delta saws. The SawStop guard has a 1¼" dust port built into it—the only one with this feature—letting you capture dust above and below the blade. Its open-split throat insert, shown *below, left*, lets you easily remove the guard assembly to swap the splitter for the low-profile riving knife or to change blades. Delta's machine has a quick-release lever beneath the front fence rail, shown *below*. With this model, you first remove the guard and pawls, then lower the splitter to use as a low-profile riving knife.

All saws but the Jet and Powermatic come with a separate riving knife. You can buy theirs as accessories for $30–$40.

▶A low-profile riving knife mounts behind the blade and moves with it, but sits slightly lower than the top of the blade. This allows you to make non-through cuts without removing the riving knife, as you would have to do with a taller splitter.



You can remove SawStop's throat insert without first removing the guard/splitter or riving knife. Lowering the lever-action "handle" locks the insert in place.

Pull the quick-release lever to remove the guard/splitter from the Delta—no need to remove the throat insert.

Grizzly G1023RLX, $1,795

800-523-4777, grizzly.com

(Mobile base not included.)

Jet XACTA 708675PK, $2,500

800-274-6848, jettools.com

(Mobile base not included.)

You *can* put a price on safety

In case you're not already familiar with SawStop's blade-brake safety system, here's a quick primer. A brake cartridge with a low-voltage, electric "fuse" rests below the blade, sending a current through the blade. Should anything more conductive than wood—flesh, in particular, but also metal or very wet wood—touch the spinning blade, it triggers the fuse, which slams the aluminum brake pawl into the blade, stopping it and pulling it below the tabletop in a fraction of a second. If your finger triggers the activation, you get only a tiny nick.

After such an activation, you must replace the brake cartridge (about $70) and the blade, but that's a small price to pay for what could otherwise have been a devastating injury. These saws use separate cartridges for 10" blades (included with the machine) and 8" dado blades. Swapping them takes just a minute or two.

A SawStop blade-brake activation leaves the blade and brake cartridge unusable, but your fingers completely usable.

MODEL	PERFORMANCE RATINGS (1)													
	PRIMARY						SECONDARY							
	OBSERVED POWER	ABSENCE OF RIP-FENCE DEFLECTION	EASE OF USING RIP-FENCE SCALE	QUALITY/ACCURACY OF MITER GAUGE	EASE OF USING BLADE GUARD/PAWLS/SPLITTER	EASE OF USING LOW-PROFILE RIVING KNIFE	EASE OF CHANGING BLADES	EASE OF USING ON/OFF SWITCH	EASE OF ALIGNING RIP FENCE TO BLADE	EASE OF ADJUSTING BLADE-TILT STOPS	EASE OF USING BLADE-TILT SCALE/GAUGE	DUST-COLLECTION EFFECTIVENESS	LACK OF VIBRATION	EASE OF USING HANDWHEELS
DELTA UNISAW 36-L352	A	A	A	A	A	A	A	A	A–	A	A	B	A–	A–
GRIZZLY G0691	A–	A–	A–	D	B	A	B	A–	A–	B	B–	C–	A	B
GRIZZLY G1023RLX	A–	A	A	B–	C	A–	B	A	A-	B	A	B	B+	B–
JET XACTA 708675PK	A–	A	A	B–	B	N/A	A	B	A	B	B	B+	A	A–
POWERMATIC PM2000B	A	A –	A	B+	B	N/A	A–	A	A	B	A	B+	B	A
SAWSTOP PCS31230-TGP252	A	A	A	C	A	A	A	A	A	B	A	A	A	A–
SHOP FOX W1820	A–	A–	A–	C–	B	A	B	A–	A–	B	B–	C	B+	A

More details to consider before buying

■ **Blade changes.** Whether you prefer using two wrenches or a single wrench with an arbor lock to remove blades—we don't have a strong preference, both methods work well—the key is access. That's why we like wide throat openings to avoid scraping knuckles. Delta's Unisaw is widest at 5", while the Grizzly G1023RLX has the narrowest at 3¾", a tight squeeze.

■ **Dado capacities/inserts.** The Unisaw can handle up to a 1⅛" dado stack; the rest max out at 13/16", plenty wide for ¾" stock. The two Grizzly saws and the Shop Fox include a dado throat insert. It's an optional accessory for the others.

▶Read reviews of other tablesaws.
woodmagazine.com/tsreviews

Powermatic PM2000B, $3,200

800-274-6848, powermatic.com

SawStop PCS31230-TGP252, $3,000

866-729-7867, sawstop.com

(Mobile base not included.)

The last tablesaw you'll buy

DIMENSIONS, INCHES				CAPACITY, INCHES									ACCESSORIES (2)						
TABLETOP HEIGHT FROM FLOOR (NOT INCLUDING MOBILE BASE)	OVERALL WIDTH × LENGTH	TABLETOP, D × L	THROAT WIDTH	MAX. CROSSCUT	MAX. RIP, LEFT OF BLADE	MAX. RIP, RIGHT OF BLADE	MAX. BLADE HEIGHT AT 90° BEVEL	MAX. BLADE HEIGHT AT 45° BEVEL	BLADE CHANGES: 1 OR 2 WRENCHES	NUMBER OF MITER-GAUGE ANGLE STOPS	BLADE-HEIGHT HANDWHEEL TURNS	BLADE-TILT HANDWHEEL TURNS	STANDARD	OPTIONAL	WEIGHT, LBS	CORD LENGTH, FEET (3)	WARRANTY, YEARS	COUNTRY OF ASSEMBLY (4)	SELLING PRICE (5)
35¼	44½ × 84¼	31 × 40⅛	5	14	12	52	3	2	1	9	17	31	A, B, P, R	D, M, Z	665	8	5	T	$2,650
33⅜	40 × 82¼	27 × 40¼	4	13	14	49	3⅛	2 3/16	2	3	8	20	B, D, P, R	M, Z	545	6	1	C	$1,895
34¼	42 × 84¼	27 × 30¼	3¾	12	11	50	3	2⅛	2	3	30	30	B, D, P, R	M, Z	522	8	1	T	$1,795
34⅛	39¾ × 84¼	29⅛ × 42¼	4¼	10⅜	15	50⅞	3 1/16	2 3/16	1	3	13	31	P	B, D, M, R, Z	500	N/A	5	T	$2,500
35¼	39 × 84½	30½ × 42	4¼	11	14	52	3	2	1	5	7	34	B, M, P	D, R, Z	540	N/A	5	T	$3,200
34	40½ × 84½	27 × 44	4½	10	13	53	3	2	2	3	18	28	B, C, P, R, Z	D, E, M	520	10	2	T	$3,000
34⅜	40 × 82¼	27 × 40¼	4	13	14	49	3⅛	2 3/16	2	3	8	20	B, D, P, R	M, Z	545	6	2	C	$1,996

1. A Excellent; B Good; C Fair; D Poor; N/A Not applicable

2. (A) 4" to 5" dust-port adapter; (B) 10" blade; (C) 10" blade-brake cartridge; (D) Dado throat plate; (E) 8" dado blade-brake cartridge; (M) Mobile base; (P) Pushstick; (R) Low-profile riving knife; (Z) Zero-clearance throat plate

3. (N/A) Cord not included

4. (C) China; (T) Taiwan

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

Shop Fox W1820, $1,996

800-840-8420, shopfox.biz

(Mobile base not included.)

Handwheels. All the saws have the blade-height handwheel located on the front of the cabinet, but only the Delta has the blade-tilt handwheel there as well (shown *page 47*). It's convenient after you get used to it being there. But to avoid inadvertently changing the blade angle rather than height—which we did—lock the tilt wheel in place at all times.

The Powermatic wheel needs only seven rotations to raise the blade fully, the fewest in the test group; the Grizzly G1023RLX requires 30 turns. For tilting, the Grizzly G0691 and Shop Fox need only 20 turns to reach their maximum angles. The Powermatic needs 34 turns.

Aligning the top. Typical of cabinet saws, all the test machines proved easy to align. Here's why: The trunnions—which hold the blade/arbor/motor assembly in place—mount directly to the cabinet. The top also mounts to the cabinet. To align the top, loosen three of the four mounting bolts—easily accessible outside the cabinet—and then simply pivot the top until the miter slots are within .002" parallel to the blade. (With most lower-priced tablesaws, the trunnions mount to the tabletop, so you have to reach inside the base to loosen the trunnions and align them and the blade to the top—much more difficult to do.)

Blade tilt. Each saw has a stop for setting the blade-tilt angle at 90° and 45°, typically adjusted by reaching inside the cabinet. Delta makes this easier by placing the adjustments on the front of the cabinet (*page 47*). Delta's tilt gauge reads easily, with large

▶Laguna and Rikon launched new 3-hp tablesaws just as we were sending this issue to the printer. We were unable to include them in this review.

▶Prevent rust on the cast-iron top of your tablesaw and other machines by treating them with Boeshield T-9. And then make workpieces glide smoothly across those surfaces by applying Bostik GlideCote. Both have been proven the best in their categories in the *WOOD*® shop. woodmagazine.com/T9glide

▶Learn all you need to know about assembling and adjusting a tablesaw for maximum performance. woodmagazine.com/setupsaw

Produced by **Bob Hunter** with **Tom Brumback**

numbers and clearly discernible increments. But Powermatic's digital gauge works best: It's easy to read, and maintains calibration when turned off.

■ **Dust collection.** Closed cabinets help with dust collection, but you need more than that. A step up from a simple 4" port on the back or side of the cabinet is a shroud around the blade with a hose that sucks dust directly to the port. All but the Grizzly G0691 and Shop Fox have this feature. We found the SawStop's dust collection most effective, especially when attaching a secondary hose on the blade guard. And all but the Delta have 4" dust ports; it has a 5" port, but comes with a reducer so you can connect to 4" flex-hose.

■ **Warranty.** The Delta, Jet, and Powermatic saws come with test-best five-year warranties. The others give you one or two years.

■ **Assembly.** We give kudos to SawStop for having the best owner's manual and assembly instructions, as well as for packaging all the hardware and small parts in separate, easily identifiable blister packs that correspond to steps in the manual. And leveling the cast-iron extension wings on the Delta, shown *above*, proved easiest.

Setscrews make it easy to level the wings on the Delta Unisaw. You simply attach the wings to the top by loosely securing the bolts, adjusting the setscrews until level, and then tightening the bolts.

Three finalists, but one claims the title

Three saws rose to the top of this seven-machine field: the Delta Unisaw, Powermatic PM2000B, and SawStop PCS31230-TGP252. They all excelled in nearly every test and specification, and we'd be happy with any of the three. But when we factor in SawStop's unique safety system—a monumental advantage—it's a no-brainer: The SawStop earns the Top Tool award.

Our Top Value award goes to the Grizzly G1023RLX. Yes, it's the lowest-priced saw in our test at $1,795, but it has greater rip capacity, better dust collection, and sturdier table legs than the other saws priced less than $2,000. Invest some of your savings in a miter-gauge upgrade.

Mobile: It's not just for phones

If moving your tablesaw around the shop would make life easier—or if it's a necessity—get a good mobile base. But with dozens of mobility options on the market, which should you choose? Here's our advice:

■ Buying a saw with a built-in mobile base, such as the Powermatic PM2000B (*right*) or some SawStop models, makes sense because the integrated casters eliminate tripping hazards, and the hydraulic jacks raise and lower the saws with ease.

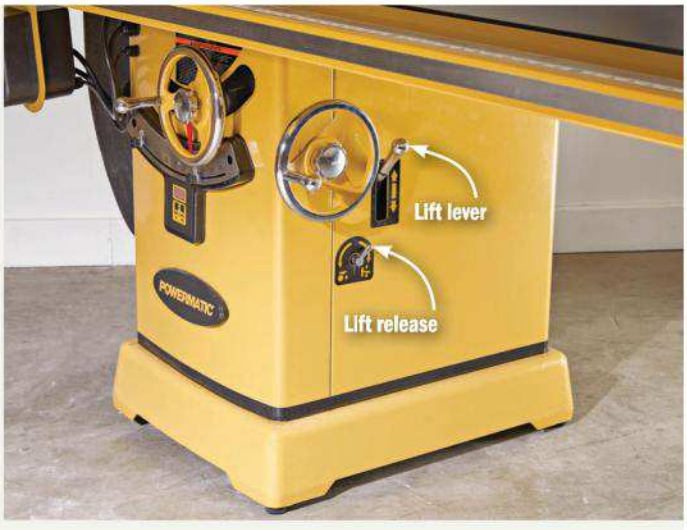
■ If possible, buy the optional mobile base designed specifically for that saw by the saw's manufacturer. For example, the Delta mobile base fits the Unisaw's cabinet perfectly (*page 46*), while also supporting the extension legs. It rolls nicely, and its kickstand works perfectly to elevate and lower it.

■ If you opt for a mobile base that supports only the saw cabinet, be aware the extension legs may catch on uneven surfaces and break off when moving. If available, get the extension to support the legs.

■ Get a mobile base rated for the weight of a cabinet saw. Overloading can hamper mobility and damage the casters.

■ Swiveling casters with toe-kick, over-the-wheel locks work best. A mobile base should have at least two locking casters, but four work even better.

■ Universal mobile bases adjust to fit a wide range of machines. This proves helpful should you replace your saw—no need to buy another base.



Here are a few of our favorite universal mobile bases:

■ Portamate PM-3500, $150, shown on the Shop Fox saw, *page 49*; PM-3245 extension, $110; 866-588-0395, portamate.com.

■ Grizzly Bear Crawl T28000, $60, shown on the two Grizzly saws, *page 46*; T28347 extension, $60; 800-523-4777, grizzly.com.

■ Rockler 22672 All-Terrain Mobile Base, $170, shown on the Jet saw, *page 47*; 800-279-4441, rockler.com.

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Put some limber in your lumber

Steam Bending

Team up heat and moisture to add curves to projects

Curves such as those of the Standup Desk on *page 26* add visual interest. And steam bending creates attractive curved parts.

Every wood species, and even individual workpieces of the same species, can react differently to steam bending. Start with these best practices and then let experience be your guide. Keep notes on species, thickness, bend radius, and steaming time, and always bend at least one more part than you need.

What you'll need

Why steam bend?

Here's how steam bending stacks up against other methods for making curved parts:

Steam-bent from solid wood

+ Finished part has best appearance with continuous end-to-end grain
+ No glue-up with visible glue lines
+ Strong; no short cross-grain structural weakness
– Bending and cooling forms required
– Steam box and boiler required
– Ultimate curve shape may be somewhat unpredictable

Laminated from thin strips

+ Cold process, no special equipment required
+ Strong
– Bending form required
– Lots of strips to cut and keep in order
– Difficult to control final part thickness
– Messy glue-up, strips want to slip sideways when bent
– Dried glue squeeze-out on part must be removed before further processing.
– Glue lines often visible

Cut from solid wood

+ No form or clamps required, no apparatus to build, just apply a pattern or lay out part directly on workpiece
– Board must be wide enough to accommodate the curve, often wasting material
– Wood grain does not follow curve of part giving an unnatural appearance
– Structural weakness where wood grain takes a short path across the part width (think broken rocking chair rockers)

Steam-bending science 101

Bending stretches wood along the outer side of the bend, and compresses it along the inner side, producing stress that wants to bring the bent piece back to its original shape, a tendency called "springback." Steaming softens the lignin to release this stress. When cooled, the lignin hardens, fixing the wood in the new shape.

Steamed wood compresses considerably but stretches little. That's why successful steam bending compresses the wood on the inside of the bend while restraining stretching along the outside. For tight bends (less than 4" radius), a steel tension strap with attached end blocks applied to the outside of the bend minimizes stretching [**Drawing 1**]. Mild bends, with minimal stretching along the outside, do not need strapping.

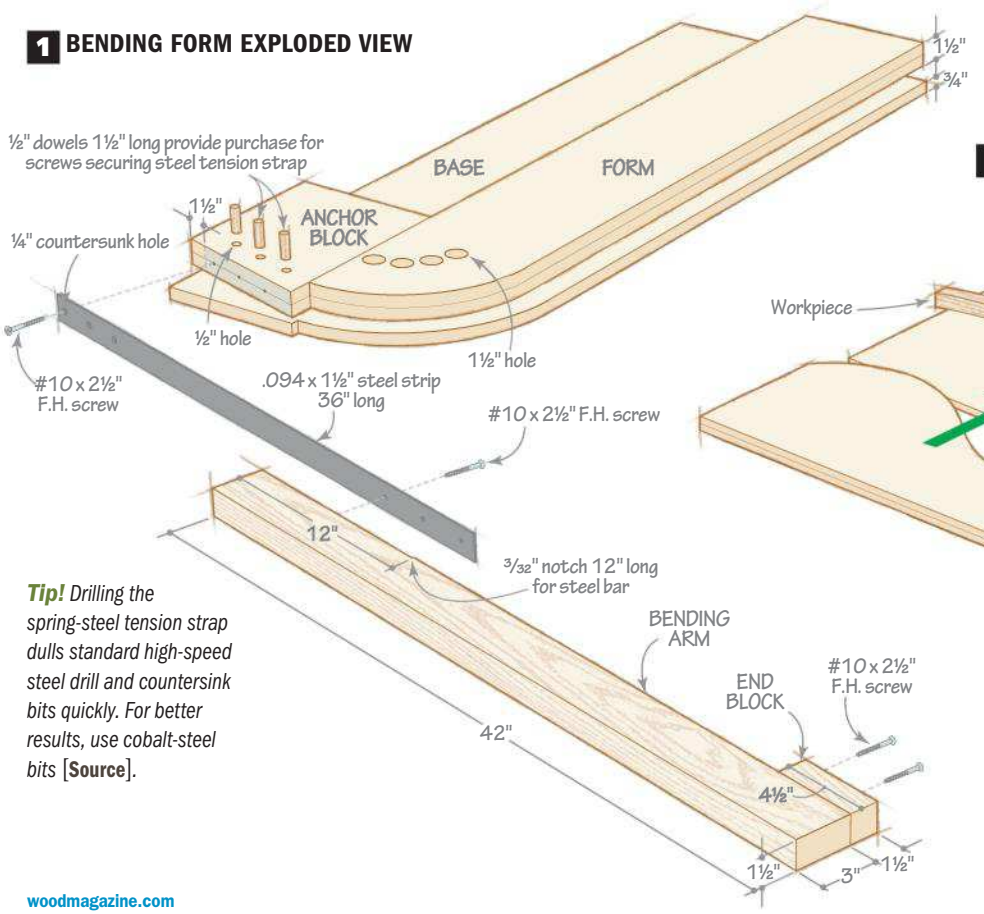
Parts incorporating convex and concave curves in the same plane require a two-part form to sandwich the workpiece [**Drawing 2**] or special tension-strap hardware [**Sources**]. Tension-strap hardware also is available to form parts with bends in two planes.

For best results, use air-dried lumber, with dehumidification-dried lumber a second choice. The heat of kiln drying makes lignin less susceptible to softening by steaming. Use kiln-dried lumber only for gentle bends.

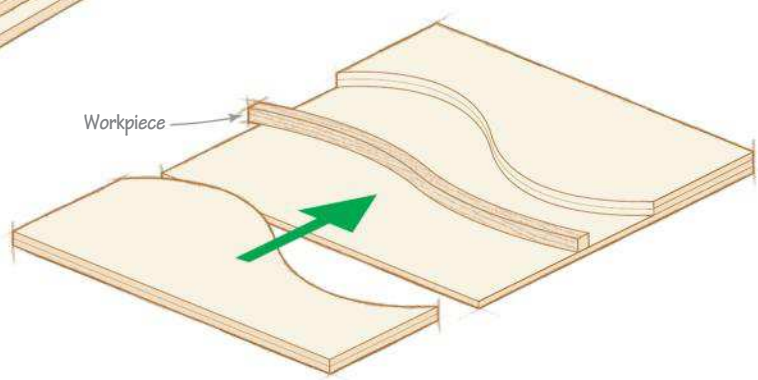
▶Lignin: An organic substance binding together the cells, fibers, and vessels that constitute wood.

Tip! *Before bending kiln-dried lumber, make a soaking vessel from 4" PVC pipe and end caps. Soak the lumber for one week in a mixture of ½ cup fabric softener per gallon of water. The pieces should be end-coated to prevent excessive end-grain absorption.*

1 BENDING FORM EXPLODED VIEW



2 TWO-PART BENDING FORM



Tip! *Drilling the spring-steel tension strap dulls standard high-speed steel drill and countersink bits quickly. For better results, use cobalt-steel bits* [**Source**].

Six steps to better bending

1. Choose a wood species

All temperate-zone hardwoods (chart *below*) steam-bend well and, in general, bend better than softwoods. Steam-bending other temperate-zone species is possible, but limit their use to gentle bends. Among tropical hardwoods, mahogany gives acceptable results. The brittleness of highly resinous tropical exotics make them unsuitable for bending.

2. Select your stock

Regardless of the species you use, careful board selection increases chances of successful bends. Choose straight-grained lumber without knots or other defects and avoid decay (even slight spalting). The grain should run parallel to the edges of the workpiece or "run off" the edge at a shallow angle (maximum of 1" slope to 15" length). The greater the run-off angle, the more likely the piece will break when bent. Splitting wood from a larger straight-grained billet guarantees straight, parallel grain but is not always practical.

Bending Quality of Wood Species

Rank	Species
1	White oak
2	Red oak
3	Elm
4	Hickory
5	Ash
6	Beech
7	Birch
8	Cherry
9	Maple
10	Walnut
11	Mahogany
12	Sweetgum

Note: *Air-dried lumber bends best with 20–30 percent moisture content and becomes nearly impossible to bend below 10 percent moisture content.*

3. Machine the parts

Straight stock runs through a planer or jointer easier than bent pieces, so do as much sawing, surfacing, or shaping as possible before bending. Surface irregularities can cause splintering, so remove rough saw marks. Holes or mortises distort or they cause the part to collapse or split; perform these operations after bending.

Leave extra length at both ends for trimming. Where a bend is near the end of the part, extra length also provides the leverage needed to anchor the bend. Cut stock for parts requiring tight bends so the annual rings lay flatwise against the surface of the bending form [**Drawing 3**]. For mild bends, grain orientation is less important.

4. Make a steam box

Steaming takes about one hour per inch of workpiece thickness and parts must stay on the bending form for one hour, so unless you make more than one form, the steam box only has to accommodate one part at a time. For efficient use of the steam boiler [**Sources**], a steam box should be only large enough to hold the part blanks with room all around for good circulation. For tight bends on thick parts, increase box size to accommodate resteaming a partially bent piece. The steam box shown in **Drawing 4** holds two leg blanks for the desk on *page 26* and accommodates resteaming of a partially bent leg.

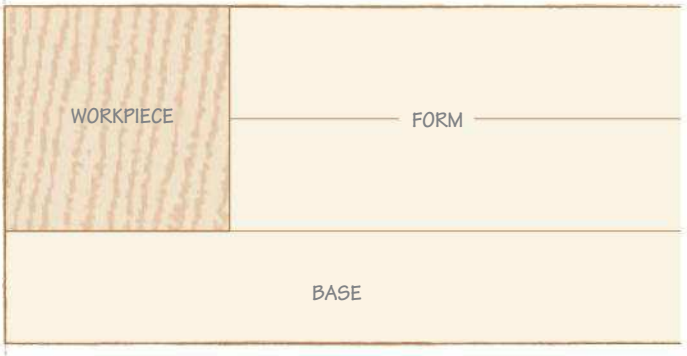
5. Build the forms

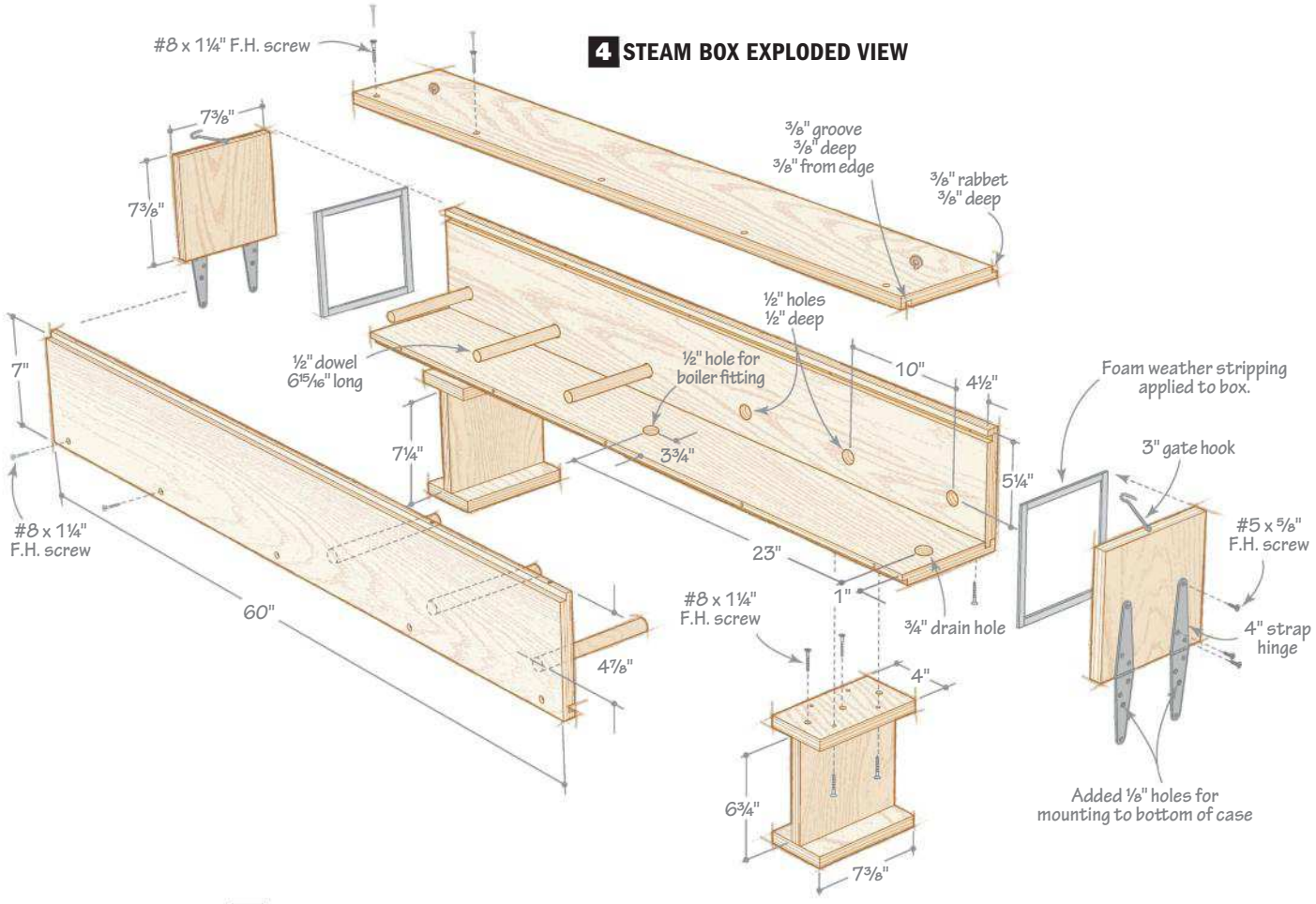
Make bending forms from particleboard or plywood laminated to a thickness equal to the width of the bending blank. Bending a workpiece puts considerable stress on the form, so when in doubt, more form width beats less every time. You'll never be disappointed by a tendency to overbuild.

Bent parts retain most of their shape after cooling but to minimize springback, must

Note: *Steam-bent parts partially spring back after cooling and drying. Build your bending and drying forms to slightly over-bend the part to compensate for springback.*

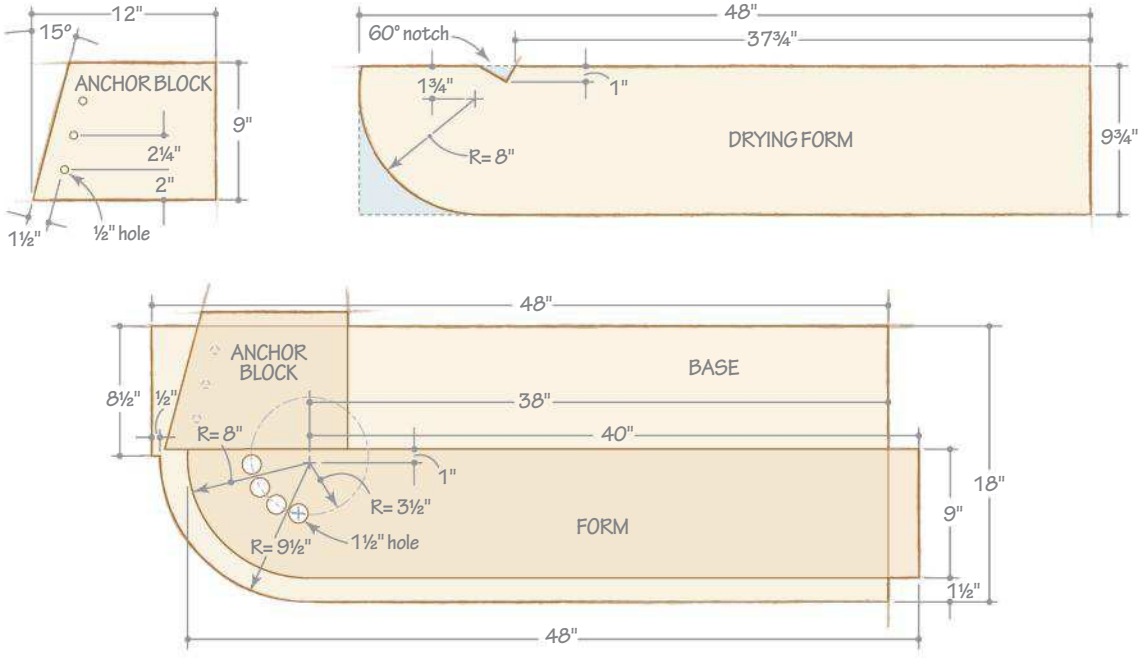
3 ANNUAL RINGS ORIENTATION





4 STEAM BOX EXPLODED VIEW

5 PARTS VIEWS



be held to a form until completely dry. To avoid tying up the the bending form, make lightweight drying forms from a single thickness of ¾"-thick material. The forms shown [**Drawing 5**] are for the desk on *page 26*. (We made six drying forms to accommodate four leg blanks plus two extras.)

6. Steam and bend

Securely clamp the bending form to a sturdy workbench. Have all clamps handy. Bending should be accomplished within five minutes after removing the blank from the steam box so you may want to rehearse your procedure.

Fire up the boiler. When steam steadily flows out of the drain hole, slide your blank into the steam box. Steam blanks for one hour per inch of thickness (regardless of the width). Remove the part from the steam box and bend it [**Photos A–F**].

Note: *Substantial over-steaming can cause the wood to wrinkle on the inside face as the bend progresses. Also, workpiece ends often check as the part cools and dries.*

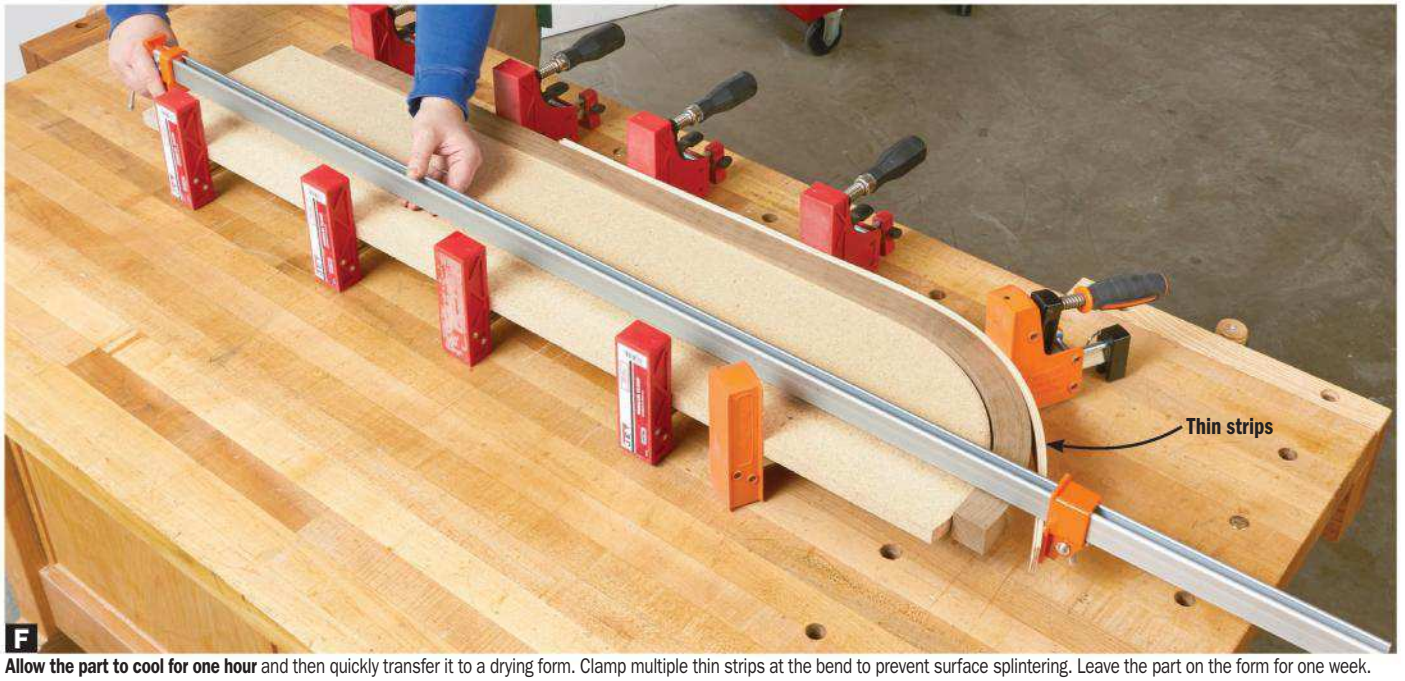
Working quickly, position the steamed blank between the anchor block and the end block on the tension strap assembly. Clamp the blank to the bending form and bending arm, applying clamps both vertically and horizontally.

Begin to bend the blank around the form. Thick parts, such as the legs on the desk, require significant force so put your body into the bend or enlist a helper.

Thick parts may not bend in one operation. When you feel too much resistance, remove the part from the form and re-steam it for 15 minutes. After an initial 1½-hour steaming, we re-steamed the desk legs three times.

As the bend nears completion, remove the bending arm clamps interfering with the bend. Then draw the free end against the form with a one-handed bar clamp.

Clamp the straight portion of the leg to the form and then add clamps along the curved section.



Allow the part to cool for one hour and then quickly transfer it to a drying form. Clamp multiple thin strips at the bend to prevent surface splintering. Leave the part on the form for one week.

Note: *Never attempt to bend a workpiece thicker than its width. Under bending pressure, the piece thins at the bend as the sides bulge out. To make a narrow workpiece, bend a wider cross section, and then saw it to the required width when dry.*

Safety note!

Steam scalds skin on contact. Opening the steam box releases a cloud of steam, so keep your face and any other bare skin away. Wear heavy leather gloves when handling steamed blanks. Make sure the drain hole remains open. Do not pressurize the steam chamber: Pressurized steam is detrimental to successful wood bending and extremely dangerous.

Produced by **Jan Svec** with **John Olson**
Illustrations: **Roxanne LeMoine**, **Lorna Johnson**

Steam-box Supplies: ¾×48×96" exterior plywood, #8×1¼" flathead screws, ½" dowel 48" long, 3" gate hook (2), 4" strap hinges (4), ¾×5/16×72" self-adhesive rubber-foam weather stripping.
Source:
Boiler: Steam-bending kit no. 42826, $79.99, Rockler, 800-279-4441, rockler.com.

Bending- and Drying-form Supplies: ¾×48×96" particleboard, ¾×24×48" particleboard, #10×2½" flathead screws (8), ½" dowel 12" long.
Sources:
Spring steel strip, .094×1½×36" no. 9074K186, $36.06; ¼" cobalt-steel drill bit no. 3069A25, $5.07; ½" cobalt-steel countersink bit no. 3285A352, $16.85, McMaster-Carr, 630-833-0300, mcmaster.com. Tension-strap hardware for complex curves: S-bend unit no. 05F12.01, $99.50; change-of-plane bend unit no. 05F12.02, $48.50. Lee Valley Hardware, 800-871-8158, leevalley.com.

Additional Resources:
USDA Forest Products Lab publication *Bending Solid Wood to Form*, PDF available at www.fpl.fs.fed.us/documnts/usda/ah125.pdf
Lee Valley Hardware publication *Veritas Steam-Bending Instruction Booklet*, PDF available at www.leevalley.com/us/html/05F1501ie.pdf

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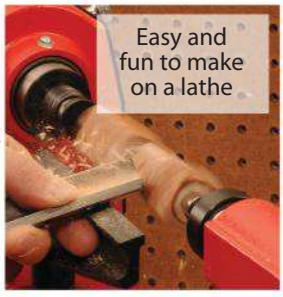

Bolt Action Pen Kits

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. A machined shock absorber sits beneath the engine while the engine's straight exhaust pipes act as the pen clip. On shock absorber you'll find a super cool "kickstart" 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).

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.

A retail value of $521.65

#KWL-10SSB SAVE $144 Only $377.95 (UPS $65)

Bolt Action Pen Kits *BEST SELLER!*

	Item #	1-4	5-24	25-49	50+
Chrome *(shown above)*	#PKCP8010	$12.95	$12.05	$11.15	$10.25
Gun Metal	#PKCP8020	$12.95	$12.05	$11.15	$10.25
24kt Gold	#PKCP8000	$14.95	$13.95	$12.95	$11.95

3 Bolt Action Pen Kit Starter Set

You get one of each pen in Chrome, Gun Metal and 24kt Gold plus the 3/8" drill bit and 2pc Bushing Set

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SAVE 16%

Bolt Action Pen Kit in Gun Metal

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Antique Pewter	#PKMOTAP	$24.95	$23.95	$22.95	$21.95
Matte Black	#PKMOTMB	$23.95	$22.95	$21.95	$20.95
Matte Black & Chrome	#PKMOTMBCH	$22.95	$21.95	$20.95	$19.95
Chrome *(shown above)*	#PKMOTCH	$21.95	$20.95	$19.95	$18.95

4 Motorcycle Pen Kit Starter Set

You get one of each pen in Antique Pewter, Matte Black, Matte Black & Chrome and Chrome. Plus, you get the bushings and drill bit.

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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 *(shown above)*	#PKFBALLAP	$19.95	$18.95	$17.95	$16.95

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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**Kits in packs may vary subject to availability*

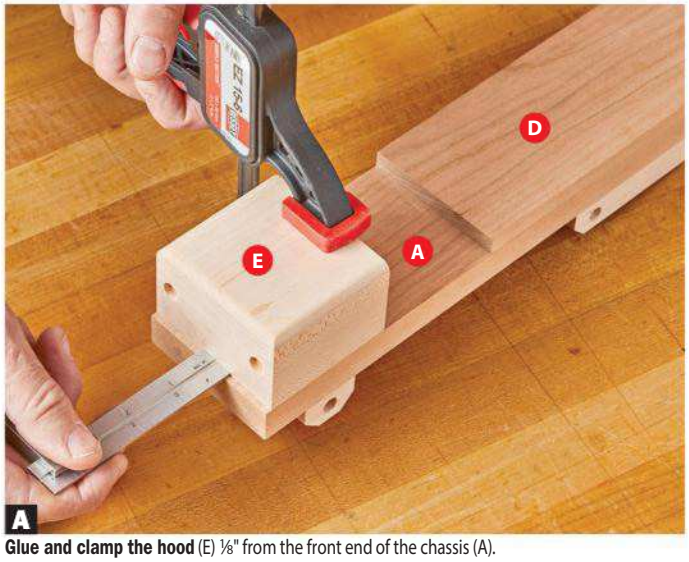
SAVE 20 %

Football Pen Kit in Chrome

Football Pen Kit in 24kt Gold

Football Pen Kit in Antique Brass

Mil-spec Troop Truck



Glue and clamp the hood (E) ⅛" from the front end of the chassis (A).

These 6×6 military trucks have hauled troops, supplies, and equipment to every accessible corner of the globe—and to many previously thought inaccessible. This one rumbles across the floor with plenty of room in back for green plastic army men or other essential cargo.

Build on the chassis

1 Cut the chassis (A) to size [**Materials List**] and drill the taillight holes [**Drawing 1a**].

2 Cut the front and rear axles (B, C), chamfer their ends, and drill the holes [**Drawing 1b**]. Glue the axles to the chassis [**Drawing 1**].

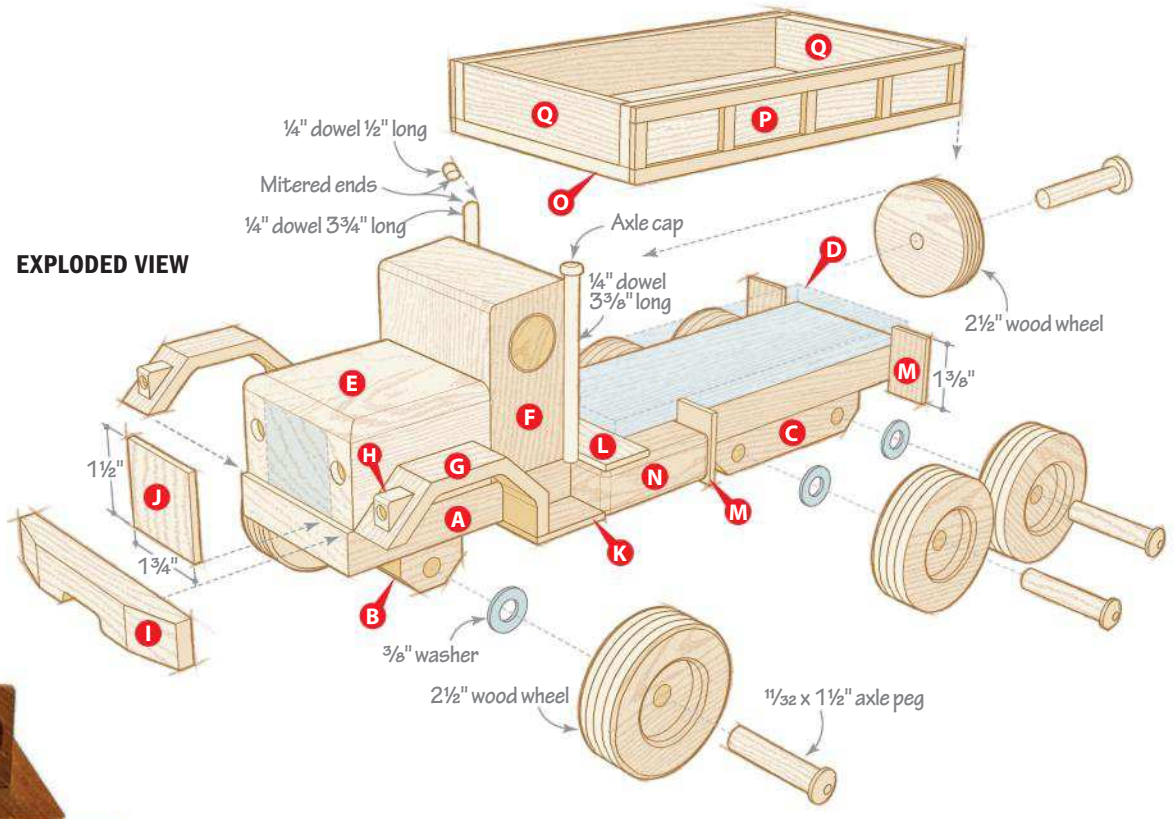
3 Cut the bed spacer (D) to size and glue it to the chassis, flush with the back end and sides [**Exploded View**].

DIMENSIONS: 4¾" W × 14½" D × 6¼" H

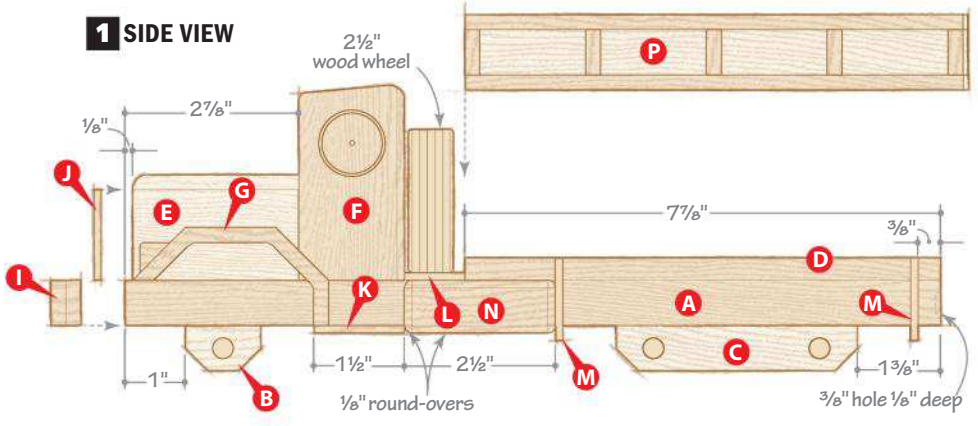
Approximate materials cost: **$30** including $15 parts kit

More than **¾"** ground clearance

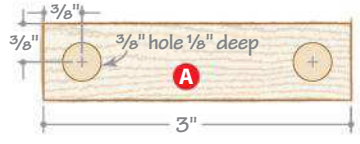
EXPLODED VIEW



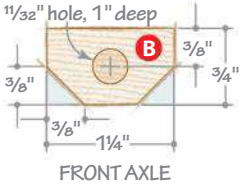
1 SIDE VIEW

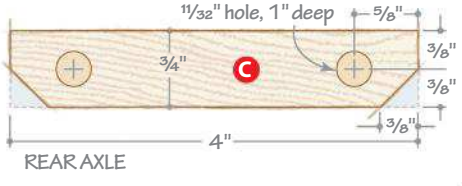


1a CHASSIS END VIEW DETAIL

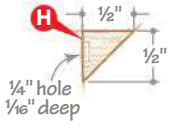


1b AXLES SIDE VIEW DETAIL





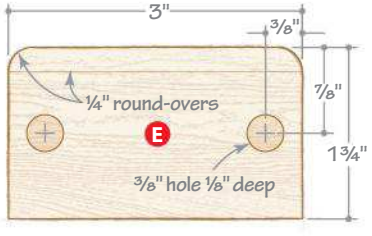
1c FENDER LIGHT

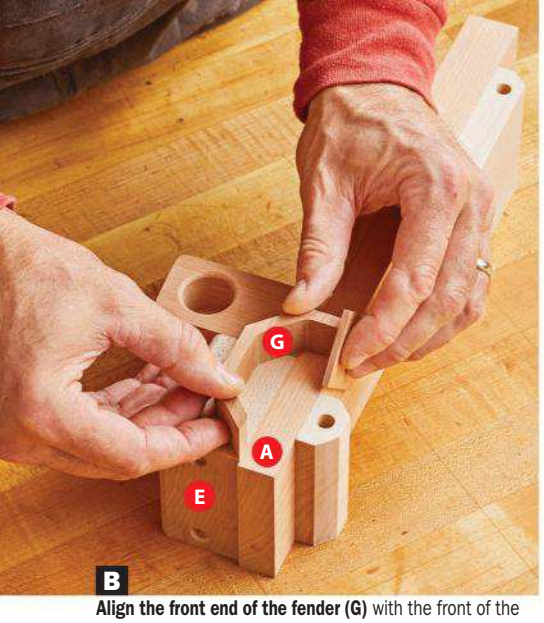


4 If needed, laminate a blank for the hood (E). Then cut it to size, round over the top edges and front end, and drill the headlight holes [**Drawing 2**]. Glue the hood in place [**Photo A**].

5 Cut the cab (F) to size and apply the **Cab Full-size Pattern**, *page 63*. Cut the cab to shape, drill a window hole on each edge, and rout the round-overs. Remove the pattern and drill the hole in the rear face. Glue the cab against the back of the hood.

2 HOOD FRONT VIEW





B **Align the front end of the fender (G)** with the front of the hood (E) and the rear end of the fender with the bottom of the chassis (A). A scrap of wood helps align the rear.

C **In each end of the blank,** drill a centered hole 1/16" deep with a 1/4" Forstner bit.

D **Drill 1/4" holes at each crosshair**, then bandsaw or scrollsaw the waste between them.

6 Apply two copies of the **Fender Full-size Pattern** to the face of a 7/8"-thick cherry blank. Cut and sand the fenders (G) to shape. Glue them in place [**Photo B**].

7 For the fender lights (H), drill holes in a 1/2×1/2×8" blank [**Photo C**]. Cut a light from each end [**Drawing 1c; Shooting boards double as miter boxes**, *below*], and glue them to the fenders, centered [**Exploded View**].

8 Cut the front bumper (I) to size. Apply the **Top** and **Front Full-size Patterns** to the blank and drill the holes [**Photo D**]. Bevel the ends following the top pattern. Finish-sand the bumper, then glue it to the chassis, centered [**Exploded View**].

Add chassis details

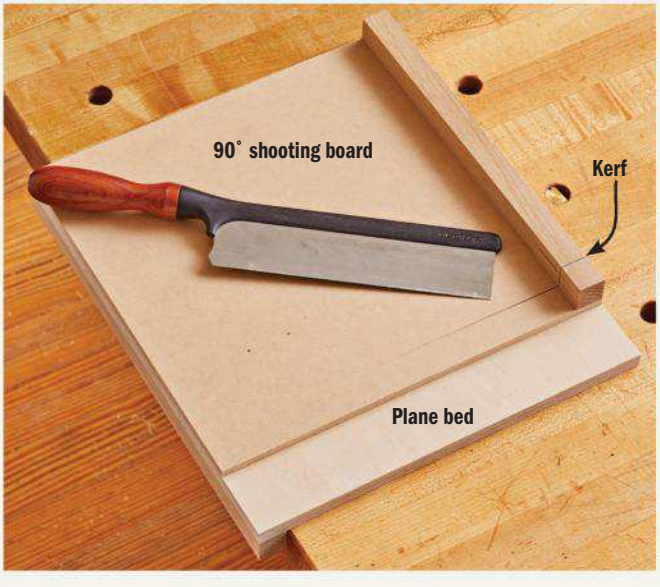
1 For the grill (J), running boards (K), spare-tire platform (L), and mud flaps (M), mill a 1/8×1 1/2×18" cherry blank. With a handsaw, cut the parts from the blank, starting with the grill, and ripping the blank to width as needed for parts L and M. Set the mud flaps aside for now.

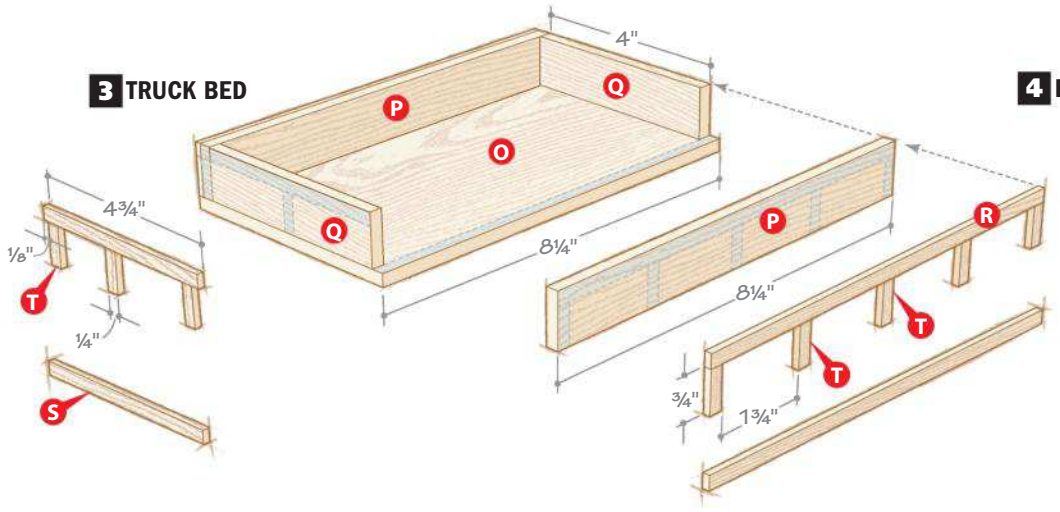
2 Glue the grill (J) centered side-to-side on the hood (E) and against the chassis (A) [**Exploded View**]. Then, glue the running boards (K) flush with the fenders, and the spare-tire platform centered behind the cab.

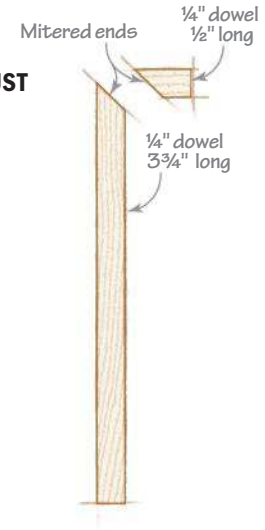
3 Cut the fuel tanks (N) to size [**Drawing 1**], and round over the outside edges and

Shooting boards double as miter boxes

For cutting small parts, Senior Design Editor Kevin Boyle modified his 90° and 45° shooting boards with a handsaw kerf cut parallel to the plane bed. With a blank pressed against the fence, you can accurately crosscut and miter parts too small to machine safely with power tools.







ends. Glue them to the chassis against the running boards and spare-tire platform.

Make your bed

1 Cut the bed floor, sides, front, and back (O, P, Q) to size. Finish-sand the inside faces, then glue up the bed [**Drawing 3**]. After the glue dries, finish-sand the exterior.

2 Mill six ⅛×¼×12" blanks for the rails and stakes (R, S, T) and finish-sand them. Cut the rails to length and glue them in place [**Drawing 3**]. Then cut the stakes to fit between the rails, and glue them in place.

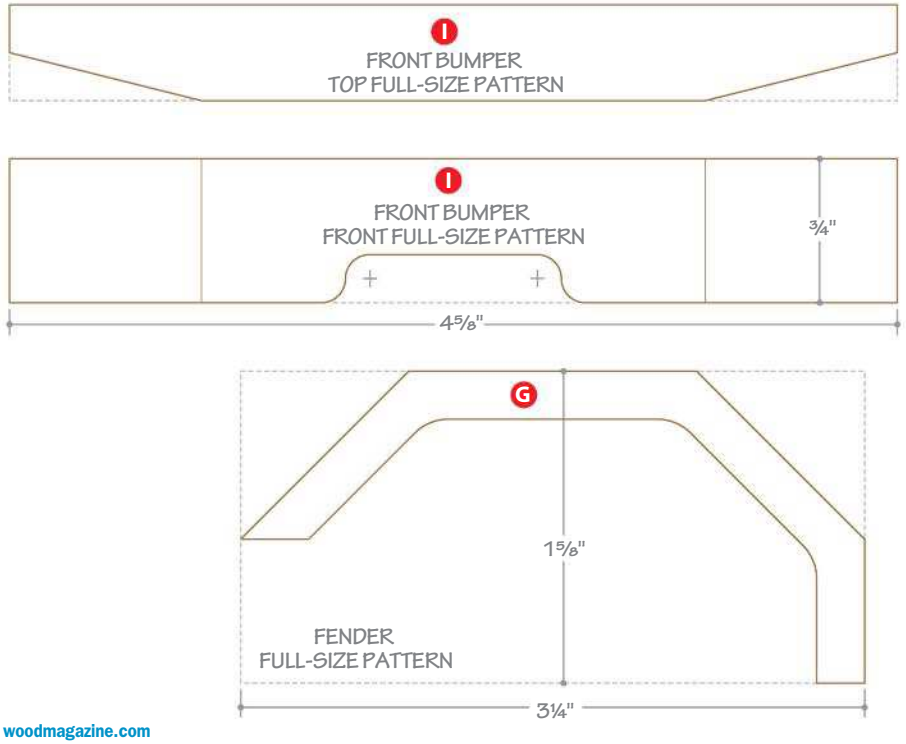
3 Secure the spare tire with an axle peg glued into the hole in the rear of the cab.

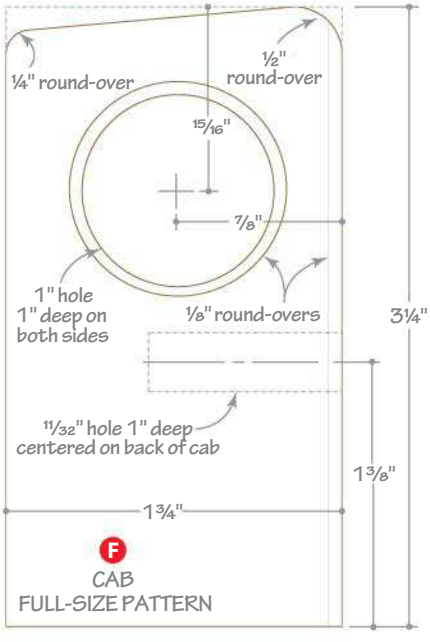
4 Glue the bed assembly flush with the front of the bed spacer (D), and centered side-to-side [**Drawing 1**]. Then glue the mud flaps (M) in place.

5 Cut ¼" dowels to length for the exhaust and breather stack [**Drawing 4, Exploded View**]. Using cyanoacrylate (instant) glue, adhere the cap of an axle peg to the end of the breather stack. Glue these assemblies to the rear corners of the cab, angling the top of the exhaust 45° away from the bed.

6 Insert axle pegs through the wheels and washers, apply a drop of glue to the end of the pegs, and install the wheels. After the glue dries, your truck is ready for service.

FULL-SIZE PATTERNS





Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	chassis	¾"	3"	13½"	C	1
B	front axle	¾"	1¼"	3"	M	1
C	rear axle	¾"	4"	3"	M	1
D	bed spacer	⅜"	3"	7⅞"	C	1
E	hood	1¾"	3"	2¾"	M	1
F	cab	1¾"	3"	3¼"	C	1
G*	fenders	⅞"	1⅝"	3¼"	C	2
H*	fender lights	⅜"	½"	½"	C	2
I	front bumper	½"	¾"	4⅝"	C	1
J*	grill	⅛"	1½"	1¾"	C	1
K*	running boards	⅛"	1½"	1½"	C	2
L*	spare-tire platform	⅛"	1"	4¾"	C	1
M*	mud flaps	⅛"	⅞"	1⅜"	C	4
N	fuel tanks	⅞"	⅞"	2½"	C	2

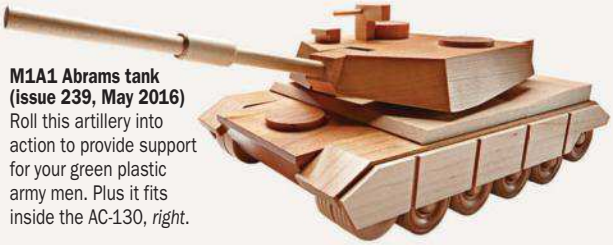
Bed						
O	floor	¼"	4½"	8¼"	M	1
P	sides	¼"	1"	8¼"	M	2
Q	front/back	¼"	1"	4"	M	2
R*	side rails	⅛"	¼"	8¼"	C	4
S*	tailgate rails	⅛"	¼"	4¾"	C	2
T*	stakes	⅛"	¼"	¾"	C	13

*Parts cut from oversize blanks. See the instructions.

Materials key: C-cherry, M-maple.
Supplies: ¼" dowel, 12" long; $^{11}/_{32}$×1½" axle pegs (8); ⅜" washers (6); 2½" wheels (7).
Bits: ¼", ⅜", 1" Forstner bits; ⅛", ¼", ½" round-over router bits.
Sources: Order a kit with the dowel, axle pegs, washers, and wheels (no lumber). No. RS-01185, $14.95, 888-636-4478. woodmagazine.com/trooptruck.

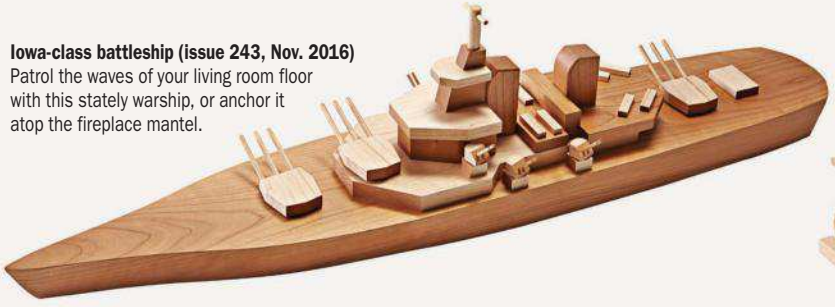
Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

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*.

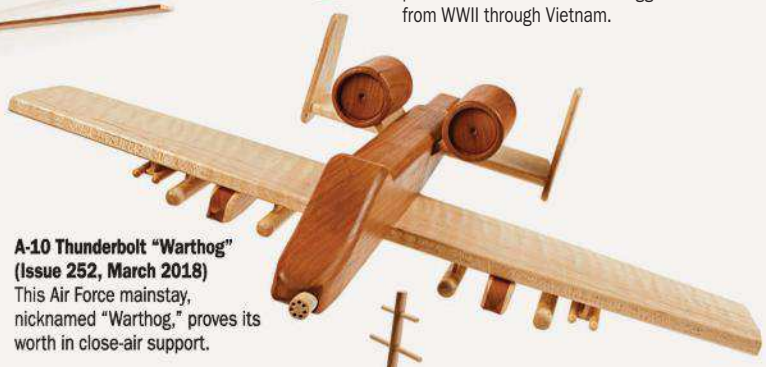
AC-130 aircraft (issue 236, Nov. 2015)
The 42" wingspan supports four spinning propellers. Drop down the rear door to load cargo.



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.

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.



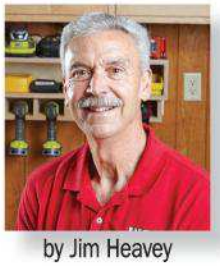
A-10 Thunderbolt "Warthog" (Issue 252, March 2018)
This Air Force mainstay, nicknamed "Warthog," proves its worth in close-air support.

Arleigh Burke class destroyer (issue 249, Oct. 2017)
Turn your shop into a shipyard for just a few evenings to create this naval workhorse.

Start Veneering Now

No special tools required.

▶This project shows how using an interesting veneer can put an exclamation point on your personal statement. Find plans at woodmagazine.com/winecabinet.



by Jim Heavey

▶Commericially available veneer is about 1/40" thick.

▶Resaw your own veneer on the bandsaw. woodmagazine.com/bandsaw-resawing

Covering the top of a table or a set of drawer fronts in veneer can dress up a project, providing an eye-catching focal point. The best part: The process is easy. Here's what you need to know to get started creating gorgeous veneered projects.

The basics of veneer

Veneer is simply a thin piece of wood, meant to be glued to a supporting substrate. This provides the beauty of the veneer's wood species at substantially less cost than a solid board of that species.

You'll find veneer in two common forms [**Photo A**]. *Raw* (unbacked) sheets are sold by the square foot and come packaged as a "flitch," a sequence of veneer sheets stacked in the order they came off the log. This makes creating patterns, such as book-matching, easier [**Skill Builder**, *next page*]. There are no standard sizes, but the flitch will contain similar-sized sheets totaling the square footage ordered. I prefer raw veneer for my projects because of the wide variety

This sequenced flitch of maple veneer on the left contains eight pieces that will cover 8 square feet. On the right is a single 24×96" sheet of paper-backed oak veneer with a pressure-sensitive adhesive (PSA) backing.

SKILL BUILDER

Read up on book-matching

By flipping consecutive sheets of a sequence-matched flitch as you would the pages of a book, you'll see that each piece mirrors the one adjacent to it. Joining two pieces of "book-matched" veneer creates a beautiful, nearly symmetrical pattern, *right*. When trimming the edges to join the pieces, remove as little material as possible to maintain the closest match in grain pattern along the joint.

Create a book-match pattern using two sequentially cut sheets of veneer. A light trimming along the joint line, and they'll be ready to glue to a substrate.

of species available, and I can buy just the amount needed to cover the project.

Paper-backed veneer comes in standard-size sheets, generally in widths of 24" and 48" and up to 96" long. The backing stabilizes the thin wood, so it can bend and flex without cracking. Some have a PSA backing, making installation as easy as peel and stick.

Prepare the veneer

Order enough square footage of veneer to cover the panel and some extra, just in case. For smaller projects, such as a box, you may find a single sheet of veneer large enough to cover the entire area. Raw veneer sometimes arrives slightly wavy or puckered; if so, follow the steps *below* to flatten it out.

SKILL BUILDER

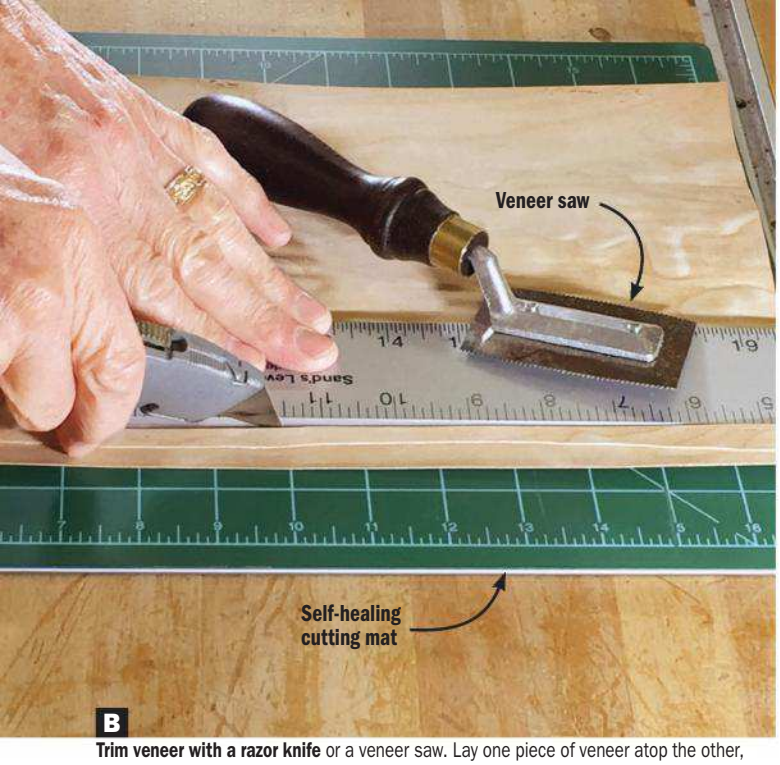
Tame wavy wood

Raw veneer, especially highly figured species, may have wrinkles and waves, and be brittle enough to make you leery of handling it without damage. Fear not—a simple spray-on solution helps everything relax.

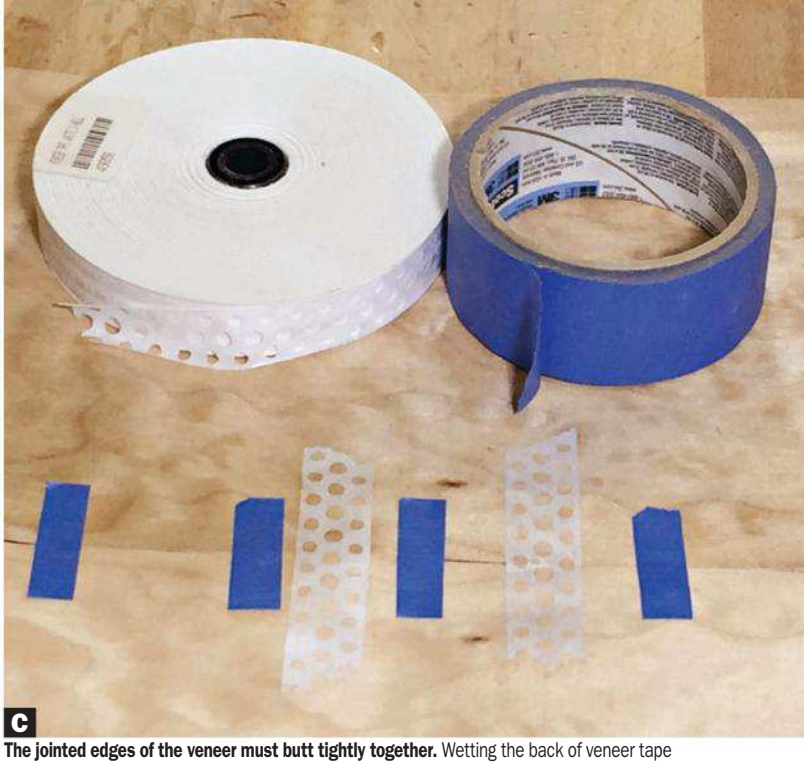
▶Purchase veneer softener.
woodmagazine.com/veneersoftener

Veneer softener, a water and glycerin mixture, makes veneer more pliable, so it can be pressed flat without breaking.

Spray the softener on the veneer, just enough to dampen the sheet. Sandwich the veneer between paper towels, then between sheets of MDF. Weight the stack and allow to dry for a day or so before using.



Trim veneer with a razor knife or a veneer saw. Lay one piece of veneer atop the other, and, guiding the cutter along a straightedge, cut the mating edges simultaneously.



The jointed edges of the veneer must butt tightly together. Wetting the back of veneer tape activates the glue. As the tape dries it shrinks, pulling the joint together. Painter's tape is somewhat elastic, so gently stretch it as you place it over the joint. Use either or both.

▶A razor knife works, but a veneer saw is less likely to follow the grain and veer off the cutline.

To seamlessly join two or more pieces to cover larger areas, or for book-matching, joint the mating edges [**Photo B**], then tape them together [**Photo C**].

Making a glue up "sandwich"

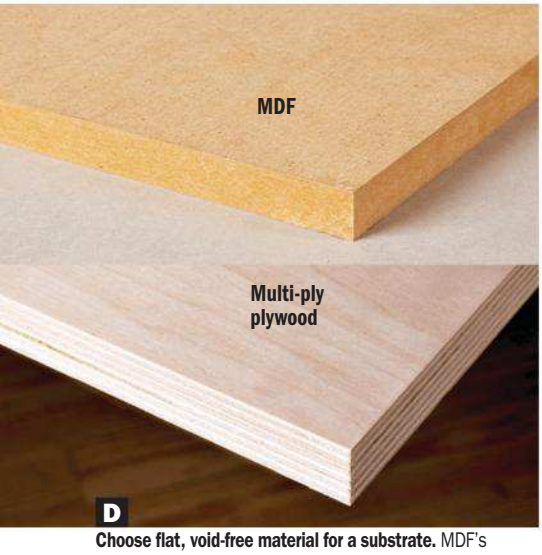
The veneer now needs to be glued to a suitable substrate. MDF or multi-ply plywood work well [**Photo D**]. These materials do not change dimensionally with seasonal fluctuations in humidity, and both take veneer well. Plywood provides a better substrate if the completed panel will be structural, because it better accepts screws or fasteners.

Cut the substrate slightly oversize so you trim the veneer flush when cutting the piece to final size. I also cut a piece of ¾"-thick sheet goods for a platen, which helps spread the clamp pressure over the glue up. You'll also need waxed paper to cover the panel.

Make a dry run before applying glue. Place the veneer on the substrate, taped side up. (The tape is removed after the glue dries.) Cover the veneer with a piece of waxed paper [**Photo E**]. Add the platen, and clamp the sandwich. Use a caul to apply pressure on areas beyond the reach of your clamps [**Photo F**].

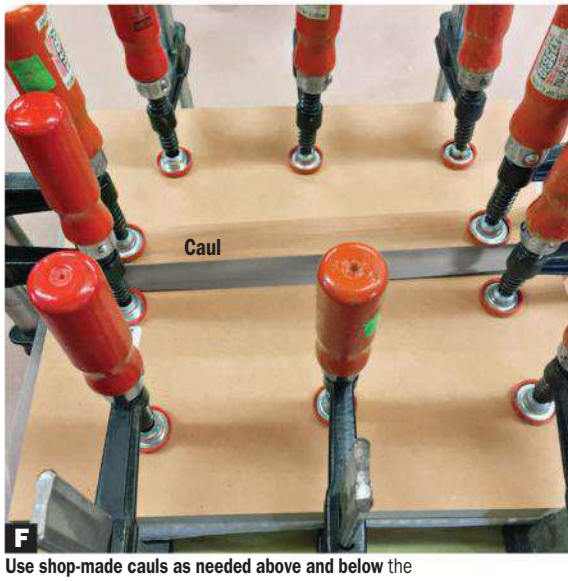
▶Purchase veneer tape. woodmagazine.com/veneertape

▶Even though very thin, veneer tape or painter's tape trapped between the substrate and the veneer will telegraph to the show side, showing up as small ridges.



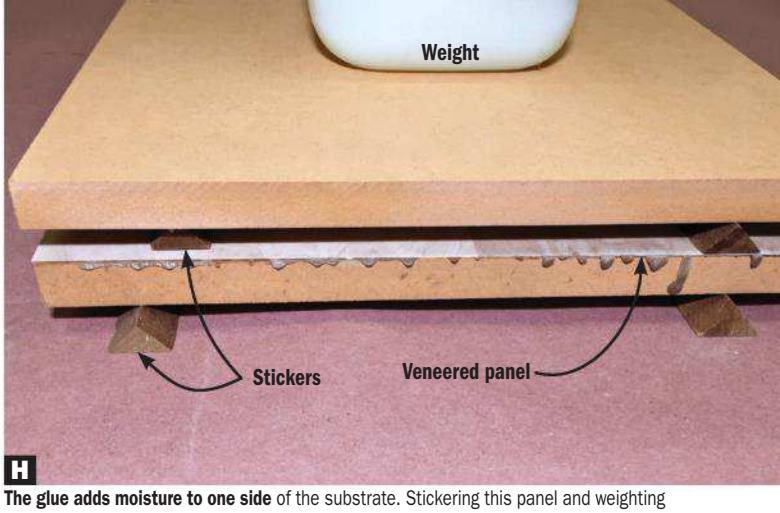
Choose flat, void-free material for a substrate. MDF's smooth face accepts glue well, though special fasteners are needed when screwing into it. Multi-ply plywood (Baltic birch shown) consists of numerous alternating layers of wood.

Glue can squeeze through the veneer onto its face under clamping pressure. Waxed paper prevents gluing the platen to the veneer.

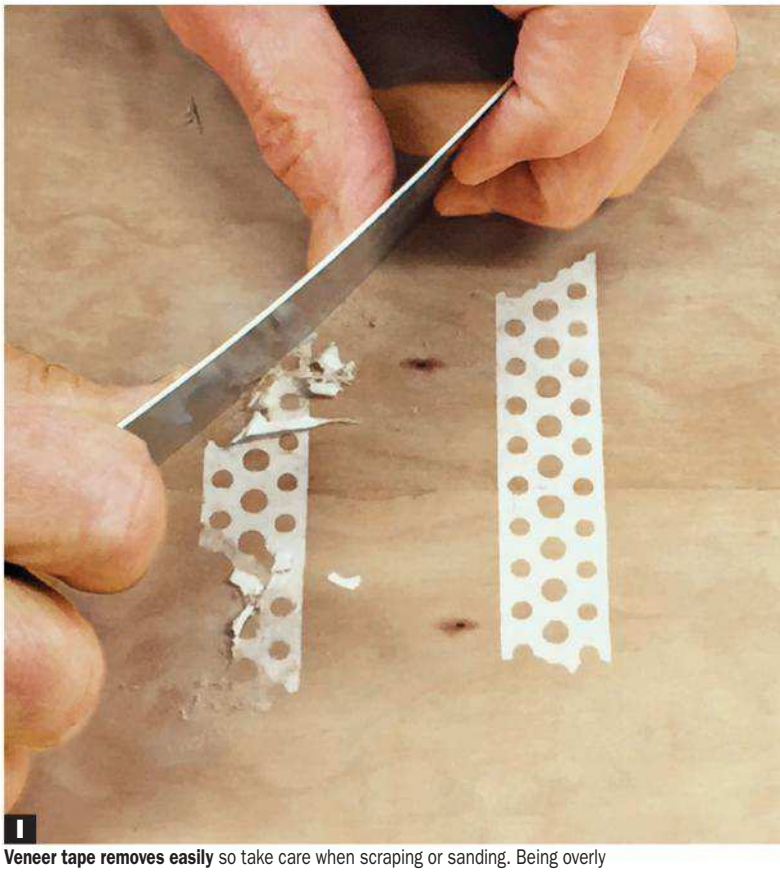


Use shop-made cauls as needed above and below the sandwich. Make a set of cauls by cutting or sanding two boards whose ends are slightly thinner than the center.

Apply a uniform coat of glue over the substrate all the way to the edges.



The glue adds moisture to one side of the substrate. Stickering this panel and weighting the top allows the panel to acclimate to the ambient humidity without warping.



Veneer tape removes easily so take care when scraping or sanding. Being overly aggressive may result in cutting through the thin veneer itself.

After confirming you have everything ready, evenly spread glue on the substrate using a glue comb or roller [**Photo G**]. Applying glue to unbacked veneer can cause it to curl.

Clamp the middle first and work out toward the edges, maintaining even spacing and consistent pressure over the entire surface. Raising the glue-up on a pair of 4×4s creates space for adding cauls and clamps. A bit of glue squeezing out on all edges indicates sufficient glue. For best results, leave the clamps on overnight. Repeat this process for a panel that will be veneered on both sides. After removing the clamps, sticker the piece for 24 hours so it dries completely and reduces warping [**Photo H**].

Remove the veneer tape with a card scraper or fine sandpaper [**Photo I**]. Peel painter's tape gently by hand, working toward the joint. Sand the completed veneered surface with 320- or 400-grit sandpaper to remove any glue squeeze-out. Then trim the panel to final size and add any banding or a final finish.

And that's it! This basic process is easy to master. As your confidence grows, you'll find there are so many more ways to use your newfound skill.

Pickup Truck Sheet-goods rack

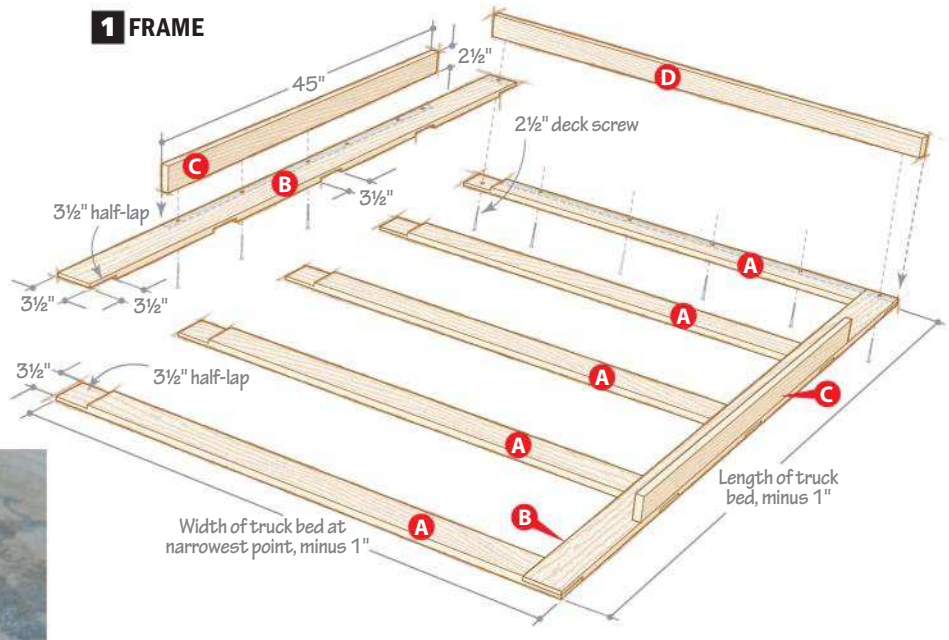
Smaller pickups have their advantages, but transporting 4×8' sheet goods isn't one of them. Here's an easy way to turn your less-than-full-size truck into an effective hauler of sheet goods and lumber. When not in use, it folds for easy storage.

DIMENSIONS:
*51" W × *72" D × *12½" H

Approximate materials cost:
$40
including hardware

Build this rack from 1 sheet of plywood

*Dimensions will vary depending on the truck.



Determine the width and length of the rack by measuring your pickup's bed. For the width, measure the narrowest part (not the wheel wells, because the rack sits on them—in this case, at the tailgate posts) to find the length of the cross rails (A).

Measure the length of the bed (not including the tailgate and gap between it and the bed) to determine the length of the side rails (B).

Build the rack

1 Begin by measuring your truck bed, and adapt the rack to fit that space [**Photos A and B**]. From a sheet of ¾" plywood, cut all rails (A–D) to size [**Drawing 1, Materials List**]. Cut or rout evenly spaced half-lap joints.

2 Assemble the frame [**Photo C**]. To ensure adequate time to clamp each joint square, assemble one side of the frame and let it dry before doing the other.

3 Sand the frame smooth, and round over its edges. Glue and screw the guide rails (C) centered along the side rails (B) [**Drawing 1**], then glue and screw the end rail (D) to the frame.

▶To rout the half-lap joints, use the dado jig on *page 42*.

▶This rack's half-lap joints consist of dadoes and rabbets on the side rails (B) and rabbets on the cross rails (A), each cut to half the part's thickness.

Apply glue to the half-lap portions of each part, then press together and clamp securely until dry.

4 Center the frame (A–D) on top of your truck's wheel wells. Measure for the vertical supports (E) [**Photo D**] and cut them to size.

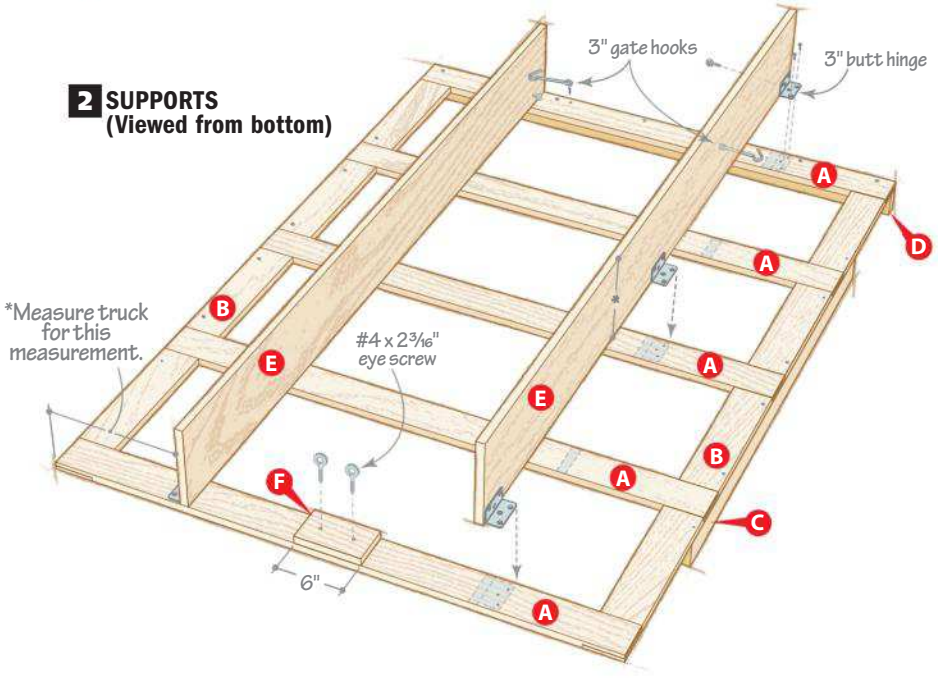
Make it collapsible

1 Attach hinges to the vertical supports [**Drawing 2**]. Align the supports with the marks on the frame, and screw the hinges to the cross rails.

2 Install the gate hooks at the cab end of the assembly so they hold the vertical supports tightly perpendicular to the frame.

3 Glue the anchor block (F) in place [**Drawing 2**]. When dry, install two eye screws to serve as anchors for ratcheting strap hooks. (The other end of each strap secures to a cargo hook or anywhere near the front of the bed.)

Determine the width of the vertical supports by measuring from the bottom of the frame to the bottom of the corrugated channels. Now transfer the location of the center of a channel to the frame. This marks the center of one of the vertical supports. Measure from the edge of the frame to the square, as shown, and transfer this measurement to the other end of the frame. Repeat for the other support.



Cutting Diagram

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	cross rails	¾"	3½"	*	P	5
B	side rails	¾"	3½"	*	P	2
C	guide rails	¾"	2½"	45"	P	2
D	end rail	¾"	2½"	*	P	1
E	vertical supports	¾"	*	*	P	2
F	anchor block	¾"	3½"	6"	P	1

*Parts cut to fit your truck bed. See the instructions.

Materials key: P–plywood.
Supplies: 3" butt hinges (6), 3" gate hooks (2), #4×2 3/16" eye screws (2), #8×2½" deck screws.

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

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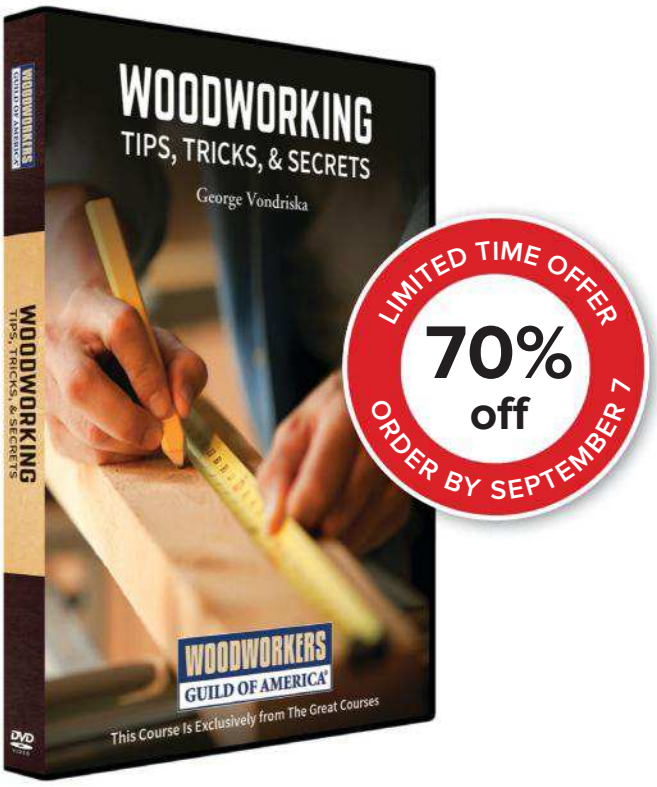

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Create solid connections in this economical material.

Cut a dado in plywood, and you're on your way to a strong joint. Cut a dado in medium-density fiberboard (MDF), though, and you'll weaken it enough to cause cracking and joint failure.

What makes MDF different is how it's made. Manufacturers compress glue and loose wood particles into a sheet that's hard and flat on the outside, but weak and crumbly on the inside. Because of this, MDF requires different joinery techniques than plywood or solid wood. But you can still assemble a strong joint using butt joints reinforced with dowels or specially engineered metal fasteners.

Dowels

Glued dowels bond with the MDF fibers to strengthen joints. And unlike screws, dowels can hide below the surface. Of course, there's no margin for error when positioning dowel holes in mating parts.

Oversize dowel holes can weaken MDF, so use ¼" dowels for ½"-thick stock, and ⅜" dowels for ¾" stock. We prefer fluted dowels that allow excess glue to escape as the dowel is inserted. Also follow these tips:

- Keep the first and last dowel locations about 1¼" from the ends. Space the dowels 8–12" apart.
- For the tightest joints, slightly bevel the mating edges of the dowel holes with a 1/16"-deep countersink.
- If a dowel can't be inserted and removed by hand, it may split the MDF upon assembly. Lightly sand the dowel with 180-grit abrasive until it fits. Then glue both sets of holes, and assemble the joint.

▶Read reviews of commercially available dowel jigs. woodmagazine.com/review

continued on page 76

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Screws

Screws made for fastening MDF can be installed faster than dowels, but with some precautions. Unlike conventional woodworking screws, MDF screws have deep threads that better penetrate and grip MDF fibers. Still, to avoid splitting, drill no closer than 2" from an MDF edge. Drilling a countersink or counterbore prevents fibers from mushrooming around the screwhead. Screws seldom provide enough strength alone, so reinforce the joint with glue. See the four great screw options *below* to find the right fastener for your needs.

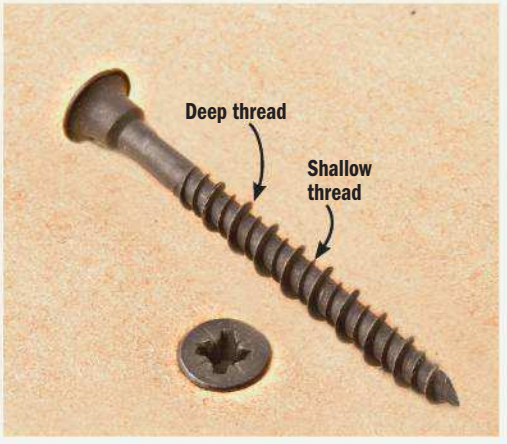
Tip! *Apply a thin coat of glue to the exposed edge and allow it to dry partially to seal the edge. Then apply a second coat and complete the joint.*

Use these fasteners made for MDF

Cabinet-connecting

Long sold as Confirmat screws, these require a stepped bit that drills a pilot hole, shank hole, and countersink. When fastening white or brown melamine MDF, hide screwheads beneath color-matching snap-on plastic caps.

Starter kit including 100 7×50mm screws, step drill bit, replacement pilot, Pozi-drive bit, no. 23332, $47.50, Woodcraft, 800-225-1153, woodcraft.com; ½" almond screw caps, no. 37366, $6 for 100, Rockler, 800-279-4441, rockler.com.



Hi-Lo

A lip around the head sits flush with the surface without the need for a special bit. Alternating deep and shallow threads provide extra grip to prevent the screw from pulling loose. Drill a 3⁄16"-diameter counterbore for the head and center a 9⁄64" pilot hole within.

#8×1¾" screws, no. 30202, $3.25 for 25, Rockler, 800-279-4441, rockler.com.

Powerhead

A smooth shank at the top allows the threads to pull the workpieces together. The wide screwhead stops pull-through and can be recessed using a counterbore/countersink bit that also starts the pilot hole. Although this screw has a self-piloting auger tip, play it safe and drill a ⅛" pilot hole into both pieces.

3" screws, no. 834206, $7 for 50; Counterbore/countersink bit, no. 147950, $50, Woodcraft.

Spax MDF

Spax screws made for MDF have extended smooth shanks (like the Powerhead) that allows the joint to pull together. Serrated threads and an oversize point cut through the MDF, reducing splits. However, we still recommend drilling ⅛" pilot holes.

#8×1¾" screws, no. 939986, $7 for 200, Home Depot stores, homedepot.com.

Tough Totes

Sometimes, you just have to pack up tools and work in a location other than your shop. That's when a generously sized tool bag comes in handy. Lots of pockets keep your tools organized and protected, and a large center compartment holds bigger tools. Most have shoulder straps to help you carry the load. Cushioned or rubber bottoms allow you to set the bags anywhere without scratching surfaces. We love these five bags.

Arsenal 19" open-top tool bag, no. 35208, $170

Tool pockets/holders: 8 exterior, 48 interior

This heavy-duty bag, made of a rugged polyester material, really impressed us. The aluminum-tube handles fold out of the way for easy access to the interior compartments, and make it easy to carry the tote when full. Many fitted holders corral small tools, as do outside pockets and sleeves. Runners on the bottom prevent damage to the bag, and it even has a bottle opener built in. But be warned: It's easy to load more tools than you may be able to carry.

Duluth Trading Co.
866-300-9719, duluthtrading.com

Legacy 16" tool bag, no. 260107, $70

Tool pockets: 23 exterior, 11 interior
Key feature: Rubber base protects the bottom from dirt and moisture.

Carhartt
800-833-3118, carhartt.com

12" Tradesman closed-top bag, no. DG5542, $23

Tool pockets: 20 exterior, 8 interior
Key feature: Compact, yet holds lots of tools.

DeWalt
800-433-9258, dewalt.com

17" open tote, no. GP-44118AN13, $25

Tool pockets: 14 exterior, 5 interior
Key feature: Lots of capacity for a bargain price.

Husky
800-466-3337, homedepot.com

Packout 15" tote, no. 48-22-8315, $100

Tool pockets: 9 exterior, 19 interior
Key feature: Rugged protective base interlocks with Milwaukee's Packout stackable hard-case storage system.

Milwaukee
800-729-3878, milwaukeetool.com

continued on page 81

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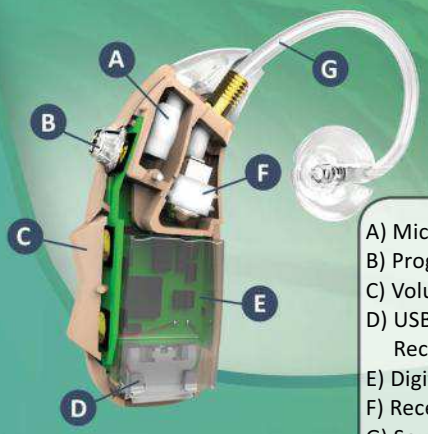

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Material Mate panel cart, no. 56889, $250

The older I get, the heavier plywood and MDF seem to get. No longer can I simply muscle a sheet off the truck, into my shop, and up onto the tablesaw. Fortunately, the Material Mate makes this job manageable again.

Built of rugged steel tube, the Material Mate handles up to two ¾"-thick sheets at a time. Slide flat from the truck bed onto the pivoting frame, then tilt to a near-vertical position so it passes easily—on smooth-rolling 4" polyurethane casters—through door openings as narrow as 30". Then, when you get to the tablesaw, simply lock the casters, release the latch, pivot and lock the frame back to horizontal, and slide the sheet onto the saw. (The stand's height adjusts to match your tablesaw's.)

Need another reason (besides fewer payments to the chiropractor) to buy? You can modify the Material Mate to serve as an assembly or storage table. Simply screw a sheet of plywood or MDF to the tilting frame via predrilled holes.

—Tested by Bob Hunter, Tools Editor

Rockler Woodworking and Hardware
800-279-4441, rockler.com

Four heads are better than one

FlexiClick 12-volt 5-in-1 drill/driver kit, no. GSR12V-140FCB22, $200

I love 12-volt drill/drivers for shop use because they provide great power without a lot of bulk. And I typically use a drill for drilling and a separate driver for installing screws. Bosch's FlexiClick tool does both jobs and more. By simply swapping out the keyless three-jaw chuck for the ¼" hex chuck, I can switch to driving screws in no more time than it takes to reach for another driver.

The offset driver head works great for driving screws up against an adjacent divider, side, or wall without the need to angle the screw. The right-angle head works well for reaching into tight spaces. Changing chucks is a simple twist-and-release action that takes a couple of seconds.

—Tested by Bob Hunter

Bosch
877-267-2499, boschtools.com

continued on page 84


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LIMIT 3 - Coupon valid through 9/1/18*

SUPER COUPON

4 PIECE ANTI-FATIGUE FOAM MAT SET

Customer Rating ★★★★½

- Each pad measures 25" x 25"

NOW $6.99

~~$8.99~~

COMPARE TO NORSK $19.99 MODEL: 6001193246 | SAVE 65%

ITEM 61607/62389
94635 shown

34921110

LIMIT 9 - Coupon valid through 9/1/18*

Bauer — SUPER COUPON

20 VOLT LITHIUM CORDLESS 1/2" COMPACT DRILL/DRIVER KIT

Customer Rating ★★★★½

- 450 in. lbs. of torque
- 1.5 amp hour battery
- Weighs 3.4 lbs.

NOW $64.99

~~$74.99~~

COMPARE TO PORTER-CABLE $99 MODEL: PCC601LB | SAVE $34

ITEM 63531

34922301

LIMIT 4 - Coupon valid through 9/1/18*

luminar OUTDOOR — SUPER COUPON

24 FT., 18 BULB, 12 SOCKET OUTDOOR STRING LIGHTS

Customer Rating ★★★★★

NOW $19.99

~~$25.99~~

ITEM 63483

COMPARE TO PORTFOLIO $39.98 MODEL: SLC12BK | SAVE 50%

34927505

LIMIT 7 - Coupon valid through 9/1/18*

drill master — SUPER COUPON

1500 WATT DUAL TEMPERATURE HEAT GUN (572°/1112°)

Customer Rating ★★★★½

NOW $8.99

~~$14.99~~

COMPARE TO BLACK & DECKER $28.05 MODEL: HG1300 | SAVE 67%

ITEM 62340/62546
63104/96289 shown

34936935

LIMIT 9 - Coupon valid through 9/1/18*

CENTRAL MACHINERY — SUPER COUPON

14" OSCILLATING SPINDLE SANDER

Customer Rating ★★★★½

NOW $109.99

~~$144.99~~

COMPARE TO ROCKWELL $164.98 MODEL: RK7011 | SAVE $54

ITEM 62146/69257 shown

34943985

LIMIT 4 - Coupon valid through 9/1/18*

CENTRAL MACHINERY — SUPER COUPON

4" x 36" BELT/ 6" DISC SANDER

Customer Rating ★★★★½

NOW $59.99

~~$79.99~~

COMPARE TO GENERAL INTERNATIONAL $99 MODEL: 937004 | SAVE $39

ITEM 62502/97181 shown

34944283

LIMIT 5 - Coupon valid through 9/1/18*

CENTRAL MACHINERY — SUPER COUPON

350 LB. CAPACITY FOLDABLE SAW HORSE

Customer Rating ★★★★½

NOW $8.99

~~$13.99~~

COMPARE TO STANLEY $16.01 MODEL: STST11200 | SAVE 43%

ITEM 60710
61979/69446 shown

34946463

LIMIT 8 - Coupon valid through 9/1/18*

WINDSOR DESIGN — SUPER COUPON

DOVETAIL JIG

Customer Rating ★★★½☆

- Use your router to make strong, beautiful dovetail joints

NOW $27.99

~~$34.99~~

COMPARE TO GENERAL TOOLS $46.99 MODEL: 981 | SAVE 40%

ITEM 34102

34947234

LIMIT 4 - Coupon valid through 9/1/18*

CENTRAL PNEUMATIC — SUPER COUPON

20 OZ. GRAVITY FEED SPRAY GUN

Customer Rating ★★★★½

NOW $9.99

~~$15.99~~

- 1.4mm tip included

COMPARE TO KOBALT $49.98 MODEL: SKU 418872 | SAVE 80%

ITEM 67181/62300
47016 shown

34951285

LIMIT 9 - Coupon valid through 9/1/18*

PITTSBURGH — SUPER COUPON

12" RATCHET BAR CLAMP/SPREADER

LIFETIME WARRANTY

Customer Rating ★★★½☆

NOW $2.99

~~$3.99~~

COMPARE TO IRWIN $19.98 MODEL: 9129CN | SAVE 85%

ITEM 62123/63017/69222 shown

34961639

LIMIT 8 - Coupon valid through 9/1/18*

drill master — SUPER COUPON

1/4" TRIM ROUTER

Customer Rating ★★★★½

- Cutting depth adjusts easily for accurate cuts

SAVE $79

COMPARE TO MAKITA $99 MODEL: RT0701C

NOW $19.99

~~$29.99~~

ITEM 61626/62659
44914 shown

34970644

LIMIT 6 - Coupon valid through 9/1/18*

Haul-Master — SUPER COUPON

1000 LB. CAPACITY SWING-BACK TRAILER JACK

- Height range: 12-1/2" to 24"

NOW $17.99

~~$25.99~~

Customer Rating ★★★★½

COMPARE TO REESE $44.99 MODEL: 74410 | SAVE 60%

ITEM 69780
41005 shown

34974245

LIMIT 7 - Coupon valid through 9/1/18*

CENTRAL PNEUMATIC — SUPER COUPON

3/8" x 25 FT. RETRACTABLE AIR HOSE REEL

Customer Rating ★★★★½

NOW $39.99

~~$54.99~~

COMPARE TO COXREELS $129.99 MODEL: 4641125 | SAVE $90

ITEM 69266/69234 shown

34975494

LIMIT 4 - Coupon valid through 9/1/18*

CHICAGO ELECTRIC POWER TOOLS — SUPER COUPON

MULTIFUNCTION POWER TOOL

Customer Rating ★★★★½

- Powerful 1.6 amp motor delivers 0-21,000 oscillations per minute

NOW $14.99

~~$19.99~~

COMPARE TO GENESIS $33 MODEL: GMT16A | SAVE 54%

ITEM 62279/62302/62866/68861 shown

34981981

LIMIT 6 - Coupon valid through 9/1/18*

PITTSBURGH AUTOMOTIVE — SUPER COUPON

PNEUMATIC ADJUSTABLE ROLLER SEAT

- 300 lb. capacity

Customer Rating ★★★★½

NOW $19.99

~~$26.99~~

COMPARE TO DURALAST $64.99 MODEL: 1NK201C | SAVE 69%

ITEM 61160/61896
63456/46319 shown

34984213

LIMIT 5 - Coupon valid through 9/1/18*

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Ridgid launches compact tablesaw

10" compact tablesaw on stand, no. R45171, $300

In the market for a portable tablesaw? This saw features a soft-start, 15-amp motor. It has a 19×28" tabletop, a 26" maximum rip capacity, cast-aluminum table, microadjustable tilt wheel, and a split blade guard with anti-kickback pawls.

Ridgid Tools
866-539-1710, ridgidpowertools.com

Next-gen lathe adds helpful features

20" wood lathe, no. 3520C, $4,500

Powermatic's fourth generation of the venerable 3520 lathe provides 20" of swing and 36" between centers. It has a 2-hp, 220-volt motor; electronic variable speed with a range of 15–1,200 rpm in low range and 40–3,200 in high; and digital readout for spindle speed and headstock indexing. The lathe has a movable control box, and adjustable riser blocks with a height-adjustment range of 6".

Powermatic
800-274-6848, powermatic.com

25 OUTDOOR PLANS FOR $25!

We've curated our top outdoor plans and packed them into one yard-transforming bundle. Save more than $230 on plans for shade-casting arbors, eye-catching planters, feet-easing seating, and more. For a limited time, reclaim your outdoors at woodmagazine.com/25for25outdoor.

What's Ahead

A GLIMPSE INSIDE THE SEPTEMBER ISSUE
(ON SALE JULY 3)

Arts and Crafts hall cabinet
Greet your guests with an heirloom-quality catchall.

Convertible crib
Oh, baby! You'll love this safe and simple crib that transforms into a toddler bed, and knocks down flat for storage.

Under-table saw accessory storage
Keep finger-saving pushsticks, featherboards, and other add-ons close at hand.

Work smarter with your smartphone
These tips go well beyond watching videos, and make your shop time brilliant.

Better Homes & Gardens® WOOD® magazine (ISSN-0743-894X); July 2018, Volume 35, No. 3, is published 7 times a year in March, May, July, Sept, Oct, Nov, Dec/Jan by Meredith Corporation, 1716 Locust Street, Des Moines, IA 50309-3023. Periodicals postage paid at Des Moines, IA, and at additional mailing offices. Subscription prices: $29.99 per year in the U.S.; $44.99 (U.S. dollars) in Canada; $49.99 (U.S. dollars) overseas. POSTMASTER: Send all UAA to CFS. (See DMM 507.1.5.2); NON-POSTAL AND MILITARY FACILITIES: Send address corrections to Better Homes & Gardens WOOD, PO Box 37508, Boone, IA 50037-0508. In Canada: mailed under Publications Mail Sales Product Agreement No. 40069223; Canadian BN 12348 2887 RT. Return undeliverable Canadian addresses to Better Homes & Gardens WOOD, PO Box 882 STN Main, Markham, ON, L3P 9Z9. Your bank may provide updates to the card information we have on file. You may opt out of this service at any time. Printed in the U.S.A.

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