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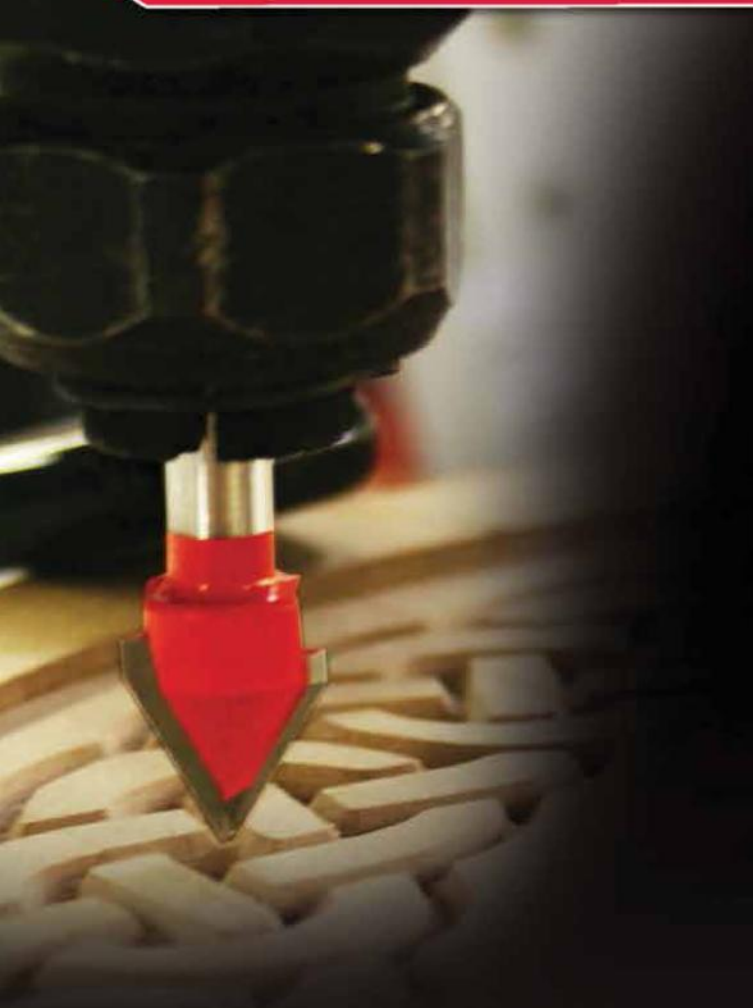

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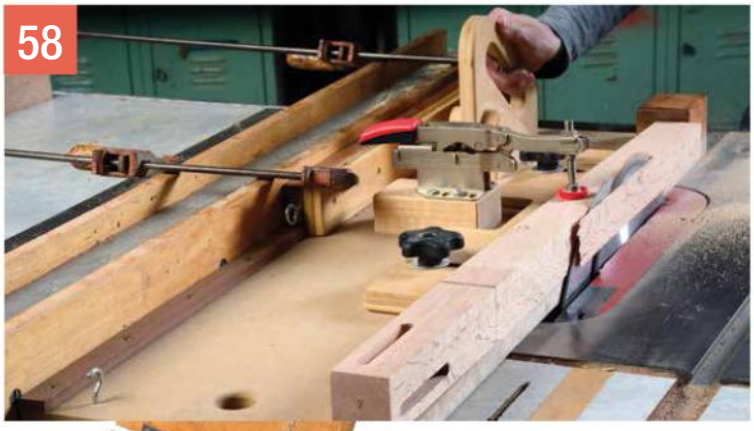
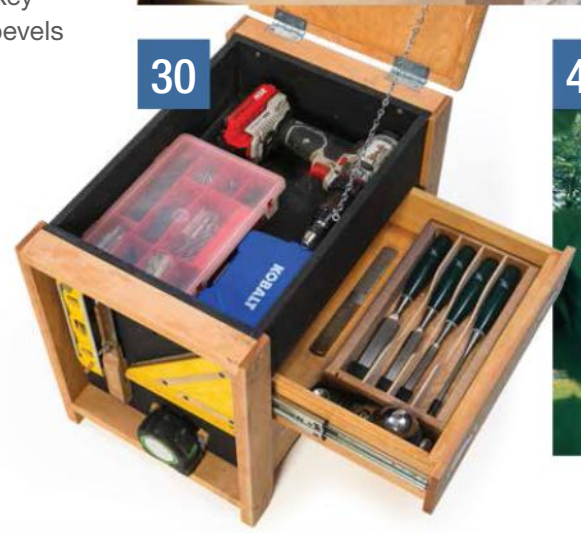


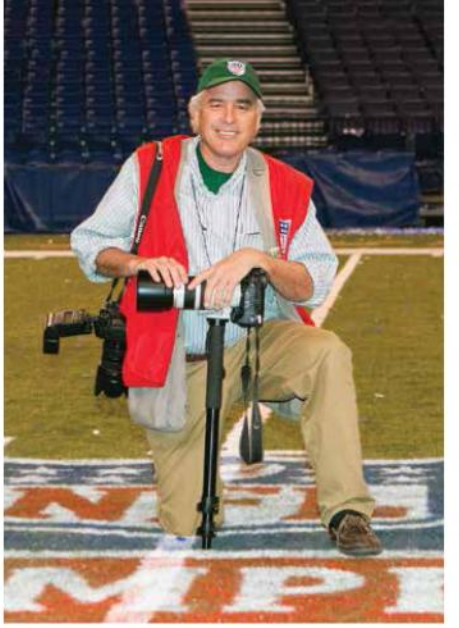


Cover photo: Ralph Lee Anderson

Contributors

As an Eagle Scout, **Daniel Friday** would build small woodworking projects with his father. That foundation in working with his hands led to an appreciation for the craft. Today, Daniel designs and builds custom Southern Swing Beds (p. 36) in Hoover, Alabama. When not in the shop, he enjoys the great outdoors with his wife, Marianna, and their 8-year-old Siberian husky, Dakoda.

Ralph Lee Anderson began his photography career at age 13 on the school yearbook staff. Since then, he has shot everything from fashion to food. Ralph recently retired from product photography at a major publishing company and now enjoys gardening, scale model building, and freelance photo assignments (see p. 36). Ralph and his wife, Sally, live in rural Kentucky.



Photography assignments have brought **Randy O'Rourke** to 26 countries and every state in the Union except Hawaii (Does anyone have photo needs in the Aloha State?). Along the way, his photos have filled over 50 woodworking and home design books. We're glad that he's added this publication to his portfolio (see p. 26). Randy has worked with some of the greats in the woodworking world (Sam Maloof, Michael Fortune, and Mira Nakashima, for example), but he's also familiar with many professional athletes. That's because he spends most Sundays in the football season photographing New York Jets games. Randy lives in Kent, Connecticut, with his wife, Stephanie. ■

On the **Web**

Slap it on the Wall! Check out our new Facebook Live series. Here's your chance to get a behind-the-scenes look at magazine-making. As we place the next issue's pages on the wall, you can track our progress, preview what's coming, and hear some entertaining stories about how our content comes together.

Tips & Tricks videos. We're making video versions of our favorite tips. These helpful hints are on our website. Let us know what you think, or submit your own trick to help someone become a better woodworker. ■

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Collaboration, innovation, and perspiration

I'm proud of our team. I get to work with the best woodworking journalists in the business. It's the same group that for years has consistently delivered an inspiring mix of projects, techniques, and tool stories in every issue. And we're always looking for new ways to make your time in the workshop more rewarding and enjoyable.

One such feature that I'm particularly excited about is BasicBUILDS. You'll notice an icon, designed by art director Bobby Schehl, on projects that can be easily built by anyone with a modest set of tools. This issue's BasicBUILD project turned out to be our strongest cover contender—proof that you can build something beautiful (and useful) with basic tools; it just takes a good design and the right instructions. Our own Joe Hurst worked with Alabama woodworker Daniel Friday to present a project that will take your outdoor enjoyment to a new level for years to come. If spring cleaning activities happen to morph into home repairs, don't worry, Tim Snyder has you covered. He's put together a tool kit that shows what you need to tackle any job in the house.

For the shop, senior editor Paul Anthony collaborated with Larissa Huff and Rob Spiece of the JD Lohr School of Woodworking to bring you two essential furnituremaking jigs: An inventive and easy-to-use tapering jig that stores neatly out of the way when not in use and a multi-tasking mortising jig perfect for slotting, edging, and of course, mortising.

As you can see, *Woodcraft Magazine* is a collaborative effort. And good teamwork extends far beyond the magazine staff; it includes a growing number of talented woodworkers across the country, who share their expertise. You're on the team, too. What do you think of the new features? What projects would you like to build? What techniques would you like to try? Email us at *editor@woodcraftmagazine.com* and let's work together to make your favorite woodworking magazine even better. ■

WOODCRAFT magazine

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2018

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Product Weight	13.2lb
Suitable For Inversion	Yes - Inversion clamps and pad included
Variable Speed	Yes
Belt Dimensions	4" x 24"
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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

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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)

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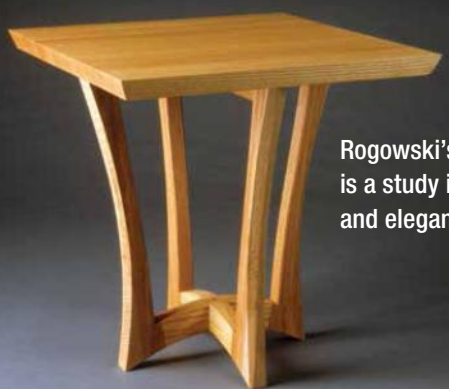
Gary Rogowski

From mountains to bench, tales of a master's journey.

Furnituremaker, teacher, author, playwright, photographer, mountain man… just exactly who is Gary Rogowski? To find out, I spoke with the man whose furniture lives in homes nationwide; who operates and teaches at Northwest Woodworking Studio in Portland, OR; who mentors high school students through his nonprofit organization Woodworking Ideas Northwest (WIN); who starred in four DVDs and authored three books, including his latest, *Handmade: Creative Focus in the Age of Distraction*; and who likes to traverse the Cascade mountains as a counterpoint to working in his shop.

Perhaps it's best to describe Rogowski as a modern Renaissance man—Leonardo da Vinci with a pen and a bandsaw, if you will. His hard work, curiosity, and the occasional walk in the mountains let him cut through the bull and busyness that define our day and age. Equal to his penned output is his furniture, which, much like the man, is straightforward and spare, with an angular functionality and a deep-rooted sense of purpose and beauty. It stands to remind you that, in masterful work, you see the master.

—Andy Rae



Rogowski's oak table is a study in simplicity and elegance.

WM: How did you learn the craft?

GR: In the 1970's there was no one around to help knuckleheads like me, although early on I did have the good fortune to know and spend time with Art Carpenter, one of the godfathers of West Coast woodworking. You could call me completely self-taught—with the published assistance of two well-known woodworking authors: Charles H. Hayward and Ernest Joyce. In the beginning, design and construction were all trial and a lot of error.

WM: Describe your preferred workbench.

GR: My ideal workbench is getting taller every year, as I get shorter. I don't like to hunch over while carving, so I have a small carving bench that I clamp to my main bench. I never have to bend my back.

WM: What does Northwest Woodworking Studio offer that other woodworking schools don't?

GR: It's a hands-on education covering design and technique. There's no design bias or influence, so students can discover where their interests and strengths lie. Technique is also open to a wide interpretation, from hand-cutting joints and woodcarving skills to router joinery and table saw tricks.

WM: Your latest book, *Handmade*, talks a lot about woodworking and hiking. What's the connection?

GR: It's twofold. First, I found encouragement in my friend and hiking companion, Wheaton, who, despite his own tragedies, would take on any challenge. That attitude was inspiring for me, a budding woodworker. Secondly, time spent at the bench presents us with a lot of mental challenges. Hiking gives our thoughts a chance to sidle up to these issues, sifting their way to an answer. For me, there's no better way to work things out than a walk in the woods.

WM: "I failed my way to success" is a quote from Thomas Edison in *Handmade*. Failure is a common theme in the book. Why?

GR: Mistakes are a constant at the bench. While we can minimize our blunders by front-loading the design process with models and prototypes, cutting sample joints, or building full-on constructions with screws, failure remains an important teacher. When you realize

A signature piece. This walnut stool with through wedged-tenons is one of Rogowski's most popular pieces.

that errors ultimately guide you toward doing better work, you learn to handle failure in a positive manner.

WM: Living or dead, list the top five designers who've influenced your designs.

GR: Gustav Ecke, Charles Rennie Mackintosh, the Greene brothers (can we count them as one?), Jim Krenov, and Wharton Esherick.

WM: It's been almost 20 years (whew!) since you, Lonnie Bird and I wrote the first three books in Taunton's *Complete Illustrated Guide* series, including your bestseller, *Joinery*. Has the craft changed much in the last two decades?

GR: The rise of the Internet and smartphones has created some disturbing trends. Although the web is chock-full of great centuries-old woodworking information, it's a jumble of unedited material. I see a lot of photos of cool designs that are unbuildable. And as for high schools, trade schools, and colleges they're embracing CNC machines and other computer-driven tools—hand tools be damned.

Making things means putting your hands on tools. You control them, they respond to your input, and you're responsible for the outcome. At the bench, we connect with our authentic self. That much hasn't changed.

WM: Any advice for the novice woodworker just starting out?

GR: Keep high standards, and forgive yourself when you don't reach them. Learn from your mistakes. Back up a little, let go of perfection, and congratulate yourself that you're working at the bench. There's no better place to be. ■

onlineEXTRA

Visit our website for more interview and a review of Gary's book, *Handmade*.

Bio photo: B. Click; Table and stool photos: Harold Wood

One sweet switch

I read Woodcraft Magazine *each month and buy more than a few things from my local store. I appreciate both the magazine and the store for advice, ideas, project plans and of course tools and materials.*

Last issue's (#81, Feb/March 2018) "Table Saw Kick Switch" story blew me away. As I looked at the different custom solutions, I wondered how I lived without one for all these years, and then, if I would be able to adapt this sweet solution to suit my SawStop.

As it turns out, it was very easy to do (see photo). I used 1¼" aluminum angle, the hinge section from a lock hasp, a piece of ¼"-thick acrylic, some button head machine screws, and a felt furniture glide. The round furniture glide focuses the beam's pressure onto the center of the paddle switch. I shaped the acrylic beam so that it would hit the on/off paddle and allow me to reach around it in order to lift the switch.

So far I'm quite pleased with the result. Thanks for a great idea.

—Rich Velardo, Long Dog Wood Studio, via email

Author and Senior Editor Paul Anthony replies:
I'm delighted to see your letter, and stoked to see the photo of your very cool kick switch. I'll let you in on a little secret: When I originally outlined the story, I had planned to round out the offerings with a kick switch designed for the SawStop. Unfortunately, my contributor had to decline at the last minute. But it turns out that maybe that's not a bad thing, since it led to you sending in your elegantly simple (and simply elegant) design.

Thanks for writing. It really makes our day to hear from truly engaged members of the *Woodcraft Magazine* community. I'm sure that many SawStop owners will appreciate seeing your modifications.

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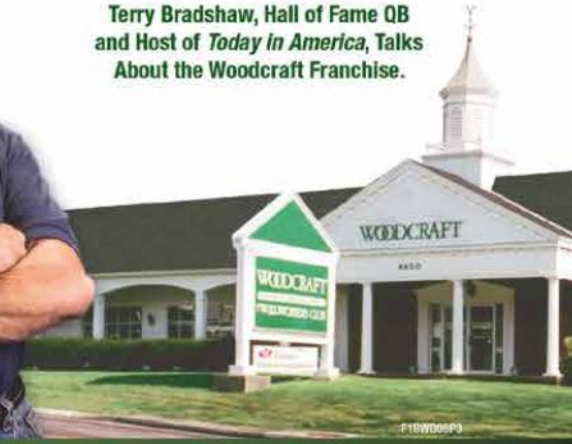
Terry Bradshaw, Hall of Fame QB and Host of *Today in America*, Talks About the Woodcraft Franchise.



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A Fein catch

In "Bust Dust for Good," there is an arrow pointing to the Fein Turbo II's on/off/auto switch that says, "variable speed," but this model does not have this feature. I made the mistake of thinking it did when I bought one last year.
—Chris, via email

Senior Editor Joe Hurst replies:
Good catch. You are correct: the Fein does not have an electronic variable-speed switch. However, should the need arise, this vac offers a simple mechanical solution: a slotted coupling on the handle. Opening the vent diverts the airflow, reducing suction at the end of the hose.

I hope you don't regret your purchase. I've used the previous model for over 15 years—for all sorts of workshop and home improvement projects—and it's still running strong. I'm still impressed by the vacuum's built-in outlet that allows it simultaneously power my 12" miter saw without popping a breaker.

How to reach us

Email *editor@woodcraftmagazine.com*

-or-

write to *Woodcraft Magazine*, 4420 Emerson Ave., Suite A, Box 7020, Parkersburg, WV, 26102-7020.

Important: Please include your full name, address, and phone number. Published letters are edited for length and clarity.

Go for the guild

In last month's "News & Views" column, Tim Snyder's advice to Erasmo Calderon about getting started in woodworking was dead on, but I believe he overlooked a valuable resource: local woodworking guilds. Despite what the name suggests, "guild" is usually synonymous with "club." Most of these groups accept woodworkers regardless of skill level.

I've found the exchange of information and guidance to be invaluable, and I enjoy the camaraderie. If you can't find a group online, check with your Woodcraft store. Many stores invite a local guild to meet in the building; some even offer discounts for guild members.
—Andy, via email

Consulting editor Tim Snyder replies:
Thanks for providing this additional advice and encouragement, Andy. Getting together with other woodworkers is especially gratifying because you don't just enjoy the good fellowship; there's always the opportunity to learn something new. ■

A familiar face with new skills

King Industrial 16" Scroll Saw

I started scroll sawing in 1971 with a Delta machine that had a primitive spring mechanism on the top of the blade. Thankfully, things have come a long way. Suzy and I both enjoy using our new King scroll saw. The King 16" model has all the features we love. Tool-free blade changing works like a charm. And with an easy-to-move upper arm that locks in the up position, you've got features that save time and trouble. That's a huge help when setting up for pierced cuts.

Having grown used to a jumpy old saw, the smooth-running King makes us feel like royalty. We like the easy access speed control. We learned the hard way to use proper speed settings when working with delicate blades. With the King saw, it's easy to dial down the speed so thin blades don't break. The King's solid parallel arms keep the blade straight, reducing deflection, allowing smoother, burn-free cuts. You have to tilt the table to make beveled cuts on most scroll saws. But on the King, the head tilts, keeping your work flat. That's one of our favorite features.

Astute scrollers will notice that the King closely resembles the General International Excalibur scroll saw. That's because the original manufacturer produces the King using the same design, components, and motor. But improvements like a built-in 2½" chute for dust collector hook-up and dust holes in the table make this saw special. At $600, the King saw is a great choice for professionals and hobbyists alike. Add the optional stand and foot pedal for the perfect scroll sawing setup.

—Tester, Scott Phillips

Overview

- 16" scroll saw $599.99
- Variable-speed (1,550-4,000 strokes/min)
- Large 12 × 18½" stationary table
- Head tilts 30° to left, 45° to right
- Built-in dust blower system
- 2½" dust chute
- Tool-free blade change system

See the Buyer's Guide on page 66 for ordering and pricing information.

onlineEXTRA

See the saw in action on our website.

Handle the rough stuff

Porter-Cable Restorer Tool

The final, precise steps to complete a woodworking project are often preceded by tasks that require aggressive cleaning, shaping, and sanding. If you'd welcome a way to get through this rough work more quickly, Porter-Cable's Restorer tool might be just the ticket. This portable drum sander is lighter and more compact than a belt sander, offering greater maneuverability with less arm fatigue. And because it can spin a variety of abrasives, it's got impressive versatility. With the right drum or sleeve, you can clean a slab's live edge, remove paint from reclaimed lumber, erase rust from metal, clear grit from rough-sawn boards, wire-brush wood to create a distressed effect, and more. While the Restorer can't flatten a surface like a belt sander, it more than makes up for this limitation by doing plenty of other "dirty" jobs that would take a long time to accomplish by other methods.

A tool like this requires effective dust collection, and the Restorer didn't disappoint. The base model comes with a few sanding sleeves and will set you back about $100. But for $50 more, you get additional sanding sleeves, medium and coarse synthetic abrasive sleeves, and a rust and paint remover wheel to tame even more surfaces in and out of your shop. ■ **—Tester, Bob Poling**

Overview

- Base model $99.99
- 3"-dia, 4"-wide roller
- Variable-speed with locking switch
- Built-in dust port
- Use to buff, sand, grind, polish, or clean wood, metal, masonry, and fiberglass.

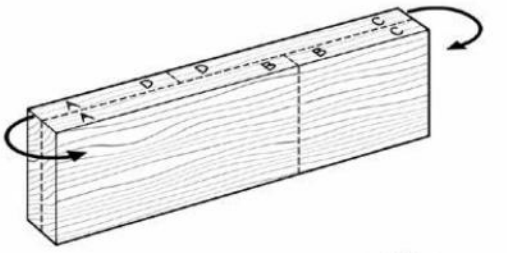
Photos: Doug Loyer

TOP TIP

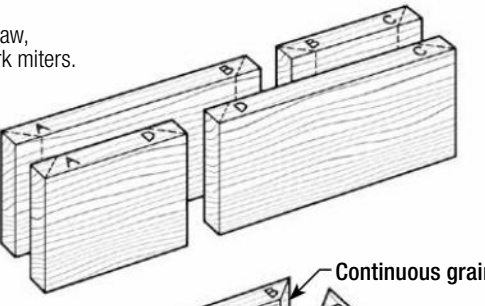
How to grain-wrap a box

A mitered box looks best when the grain runs uninterrupted around the corners. To perform this trick, begin with stock that's twice the desired thickness of your finished wall, plus ¼" or so for milling. Rip it to finished width, and about ¼" longer than the combined length of 2 contiguous walls. Lay the walls out to length in the order shown in the top drawing, lettering the individual parts for reorientation later. After resawing the stock, plane it to final thickness, and then cut the pieces to length. To lay out the miters, first swap the pieces as shown in the top 2 drawings, which effectively turns the blank inside-out. After cutting the miters and joining the letter-matched ends, one pair of diagonally opposed box corners will exhibit continuous grain, and the opposite corners will be book-matched. Nice!

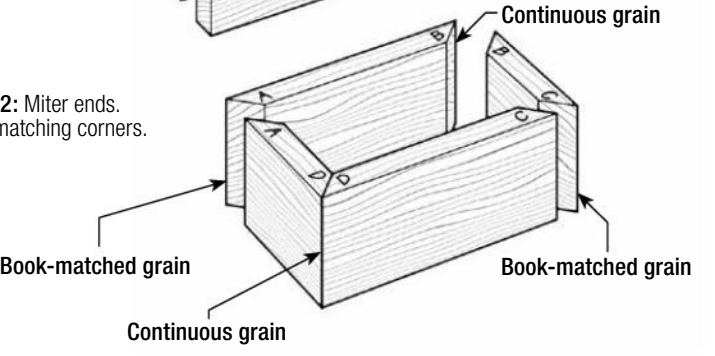
—Geoffrey Noden, Trenton, New Jersey



Step 1: Label edges, resaw, then flop boards and mark miters.



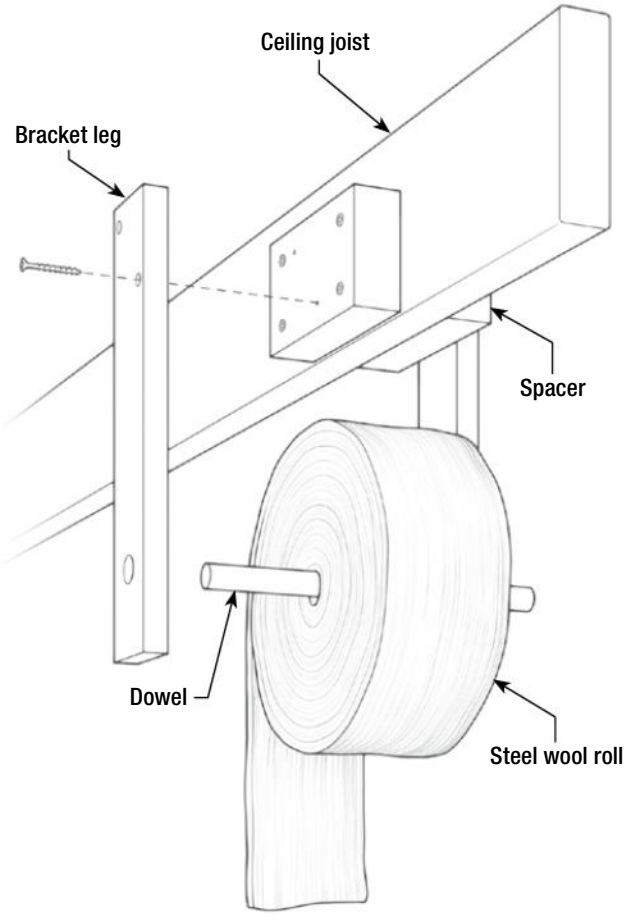
Step 2: Miter ends. Join matching corners.



Illustrations: Christopher Mills

Steel wool dispenser

I use a lot of steel wool for rubbing out finishes. Like many woodworkers, I buy the stuff in rolls. Rather than stashing it in a cabinet, I hang it from the ceiling joists on a simple shop-made bracket screwed together from wood scraps and a section of old broom handle. It's the easiest thing in the world to simply pull down the amount that I need, and trim it off with scissors.
—Howard Hirsch, Malvern, Pennsylvania



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- Air delivery: 5.8 CFM @ 40 PSI, 4.7 CFM @ 90 PSI

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15 AMP, 12-1/2" PORTABLE THICKNESS PLANER
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Customer Rating ★★★★★

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Tools sold separately.

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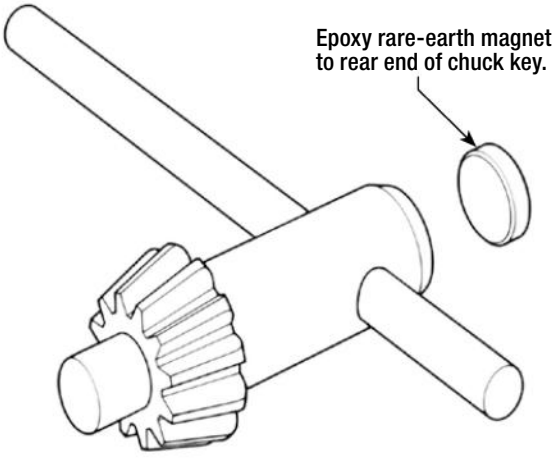
Magnetic drill press key

I recently read a drill press review where the writer complained that there was no place on the machine to store the chuck key. If you have a similar situation, do what I did when I got my drill press: I epoxied a rare-earth magnet to the rear end of my chuck key. That way, I can always find it attached to the underside of the cast iron table or other dedicated location. I don't even have to take my eye off the work to grab it or put it back.
—Richard Lewis, Port St. Lucie, Florida



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Here's your chance to help someone become a better woodworker and get rewarded for the effort. The winner of next issue's Top Tip award will receive a Woodcraft Gift Card worth $250. All others will receive $125 for a published illustrated tip, or $75 for a non-illustrated tip. Published tips become the property of *Woodcraft Magazine*.

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Woodpeckers®
ULTRA-SHEAR

NEW!

The Evolution of Carbide Insert Woodturning

Love Turning but Hate Sharpening?

If you love turning but don't have the time or equipment it takes to effectively sharpen your tools, you have to check out Woodpeckers new *Ultra-Shear* line. Just like other carbide insert tools, *Ultra-Shear* tools have a short learning curve, simply keep the tool flat and level on the centerline of the workpiece and cut the shape you want.

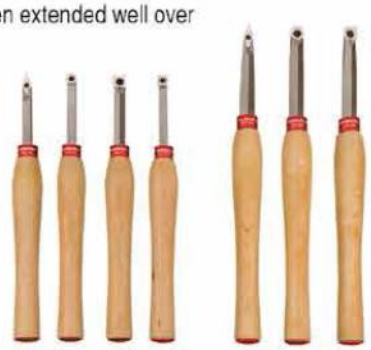
But *Ultra-Shear* goes even further, delivering a spectacular surface finish with a technique called ***shear scraping***. Roll the tool right or left on your tool rest and you will feel it land solidly on a secondary bearing surface. This sets your cutting edge at 45° to the stock. Coming into the work at this angle, the wood fibers slice cleanly, virtually eliminating sanding. The exclusive shape of the *Ultra-Shear* shaft allows you to switch from aggressive stock removal to super-fine finishing in the blink of an eye.

The Sharpest, Longest Lasting Inserts

On the "business end", Woodpeckers development team worked hand in hand with the best carbide manufacturer in the country to give you the best inserts on the market. It starts with a ***nano-grain*** carbide material. This extremely fine-grained carbide can be polished to a mirror finish, yielding a cleaner, sharper edge. Yet it is tough enough to hold that edge longer than virtually every other insert on the market.

Solid Support for the Insert Means Chatter-Free Cuts

The alloy steel shaft undergoes a two-step hardening process giving you a tool that floats smoothly across your tool rest and resists vibration, even when extended well over the tool rest. The tool pocket machined into the shaft supports the insert with three-point contact, not just the clamping force of the screw. You get a tool that feels and responds even better than most conventional tools.



Keep the tool flat on the tool rest and level to the ground for fast stock removal and basic shaping cuts.

For ultra-fine finishing cuts, roll the tool until it lands on the 45° bearing surface and take a light cut. You'll be amazed at the smooth finish.

Detail tool has two styles of tips, full sharp (standard) for creating precise vee lines, and radiused for making small beads and coves (optional).

See the New *Ultra-Shear* Tools in Action at these Woodcraft Stores!

September 30 – Loveland, CO
October 6-8 – Seattle, WA
October 6-7 – Chattanooga, TN
October 13-14 – Denver, CO
October 14 – Colorado Springs, CO
October 20-21 – Franklin, TN
October 27 – Austin, TX
October 28 – Fort Worth, TX
October 29 – Dallas, TX
November 3-4 – Greenville, SC
November 10 – Knoxville, TN
November 11 – Charlotte, NC
November 17 – San Antonio, TX
November 18 – Houston, TX (North)
November 19 – Houston, TX (Southwest)

For more details, visit our website: **www.woodpeck.com/ultra-shear**

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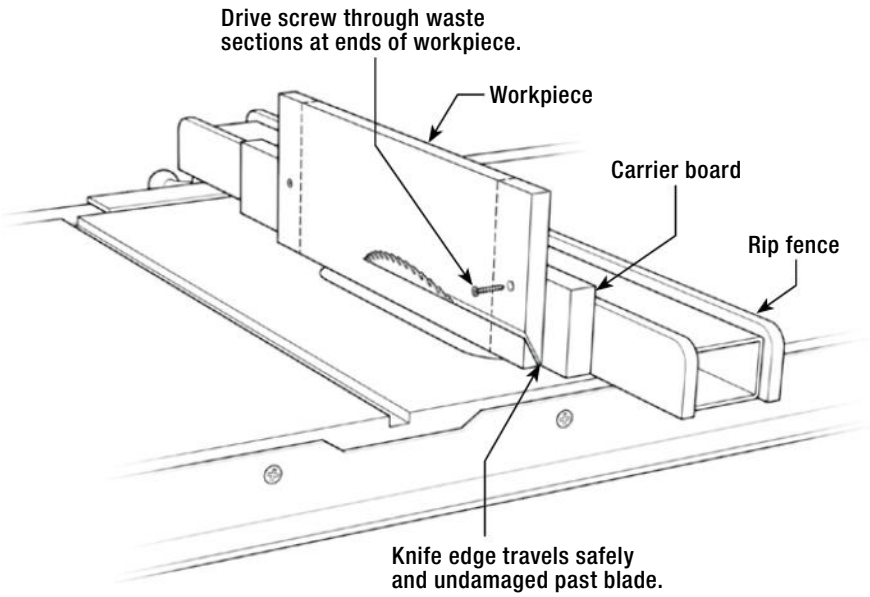
Strongsville, Ohio (800) 752-0725

CLASSIC TIP

Ripping knife-edge bevels

Ripping a knife-edge bevel of less than 45° is challenging because you can't feed the board on-the-flat since the blade won't tilt that far. Instead, you have to feed it on its edge. Unfortunately, this can be awkward and, because the work exits the blade traveling on the knife edge, it's subject to damage. In these cases, I use a thick, squarely dressed carrier board to do the job safely and securely. Although you can clamp the workpiece to the carrier board, I prefer the less cumbersome approach of making the workpiece a bit oversized in length, then screwing it to the carrier board at both ends. Afterward, I cut away the screw holes. ■

—Paul Anthony, senior editor



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SMOOTH
High density foam feathers absorb vibration to minimize chatter or chatter marks for a cleaner cut. FeatherPRO Feathers are thicker and have greater surface contact area, which disperses the tension over a wider area, while the high density foam material and living hinge combination results in a smooth glide and greater control.

VERSATILE
Choose between the Standard Feather or the optional Ultralight Feather for greater control and feedback when feeding more delicate workpieces.

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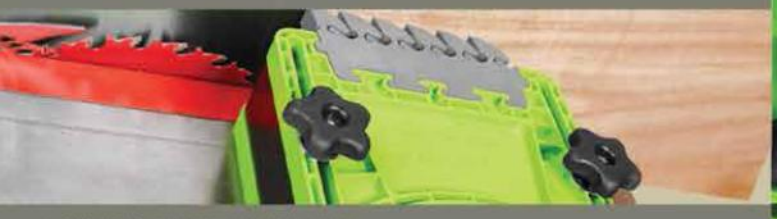

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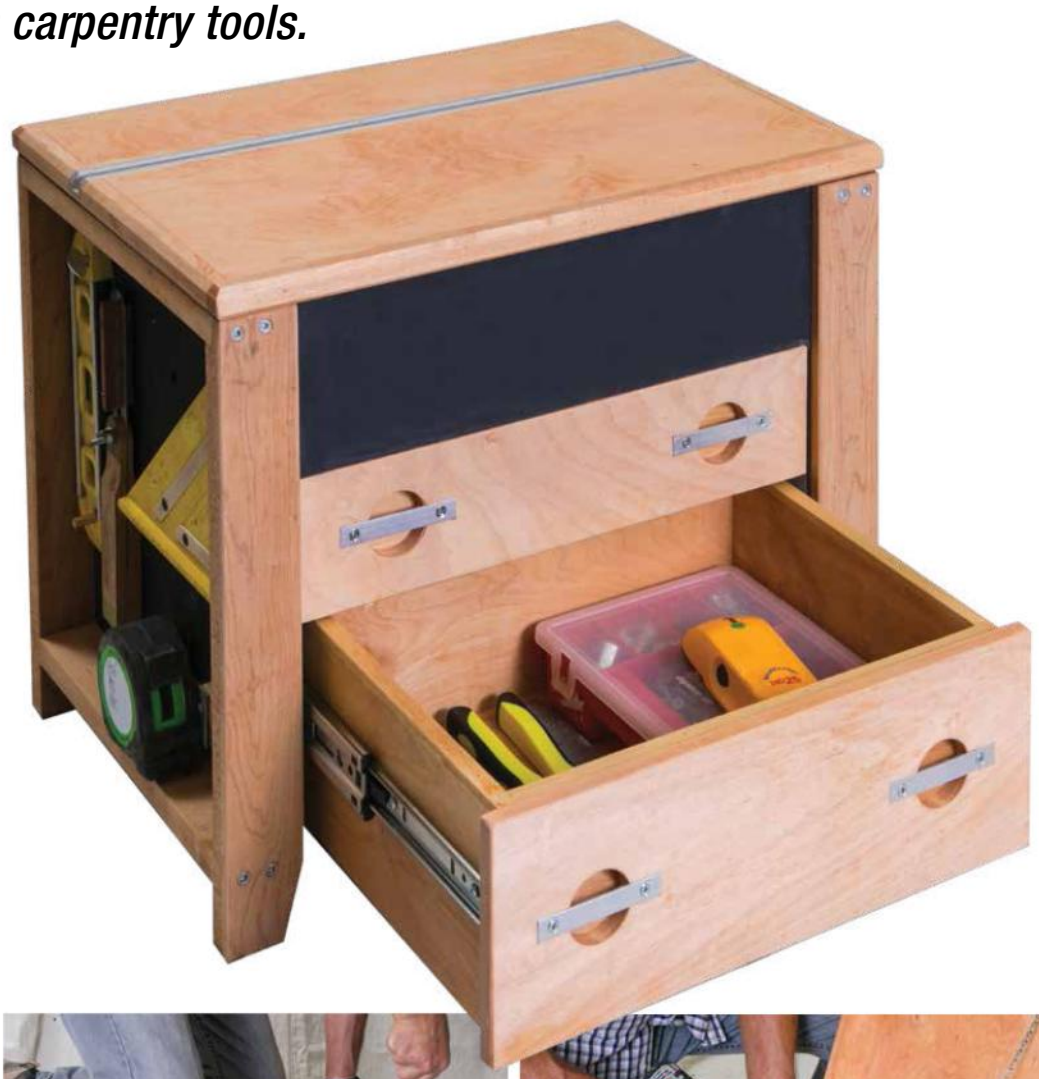
Get to work with a TOOL STOOL

This mini workbench is a workhorse you can pack with carpentry tools.

By Tim Snyder



There's no shortage of ready-made toolboxes, buckets and bags designed to hold all kinds of carpentry gear. But there are advantages to building your own toolbox. One is that you can customize your box to store exactly what you need. Even better: You can create dedicated parking spots for tools that get the most use, eliminating the aggravation of fumbling around.

That was the main idea behind this project. But as the design developed, my toolbox morphed into a stool that can also provide a work surface, a helpful step, or a seat for lunch. The design shown here offers ample opportunities to trick out end and back surfaces based on your own go-to tools. And by building your own tool tote, you'll be adding to a tradition as old as carpentry itself.

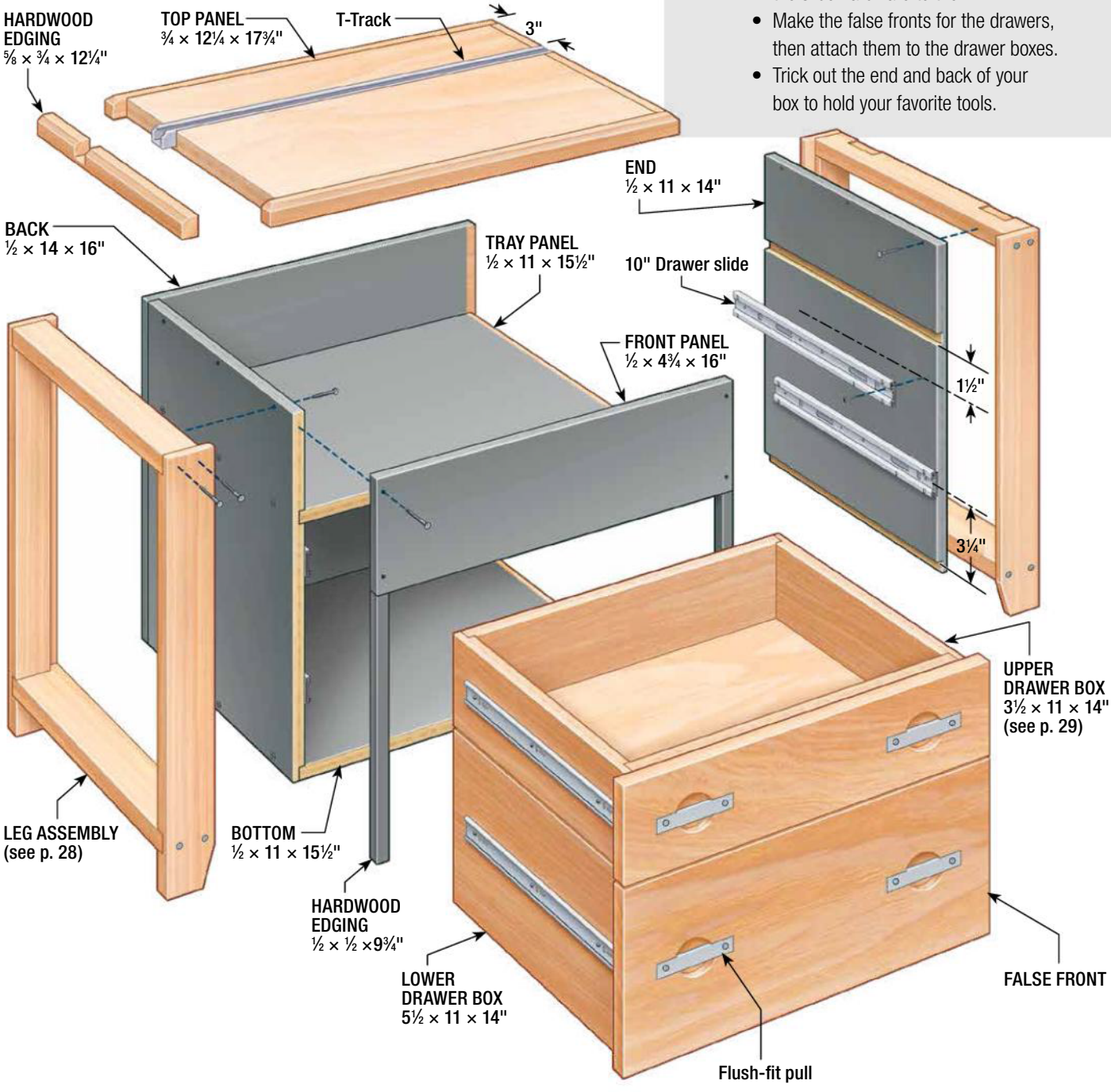
It doesn't take much in the way of hardware to build the tool stool (see Buyer's Guide, p. 66). But it might be worth spending some money up front to acquire all the tools you want to store. My remodeler's tool kit (p. 30) offers some useful suggestions, but you'll probably have some other items you want to include in your own stool.

Simple, sturdy construction

The tool stool is a collection of subassemblies: a plywood case, leg assemblies, and two drawers. I used ½" hardwood plywood to make the case and drawers. The top is made from ¾" plywood, edged with maple. The leg assemblies are made from maple. For long-term strength and durability, I joined parts together with Titebond II and galvanized, flathead screws. Make sure to drill pilot holes for all screws to avoid splitting the wood.

Order of Work

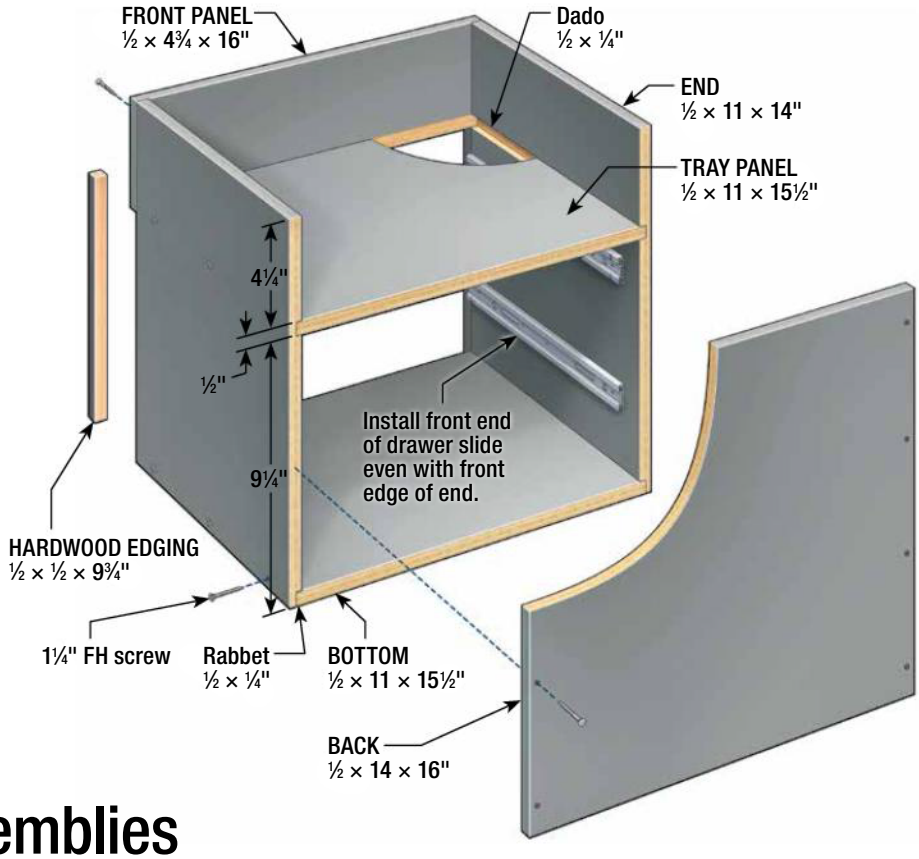
- Cut the plywood case parts, and drill holes in ends for drawer slide hardware.
- Assemble the case, and paint it with a durable outdoor finish.
- Build and finish the leg assemblies, then fasten them to the case.
- Make the top, hinge it to the case, and attach the chain stay.
- Make the drawer boxes, and attach the slide hardware to them.
- Make the false fronts for the drawers, then attach them to the drawer boxes.
- Trick out the end and back of your box to hold your favorite tools.



Photos: Randy O'Rourke; Illustrations: Frank Rohrbach III

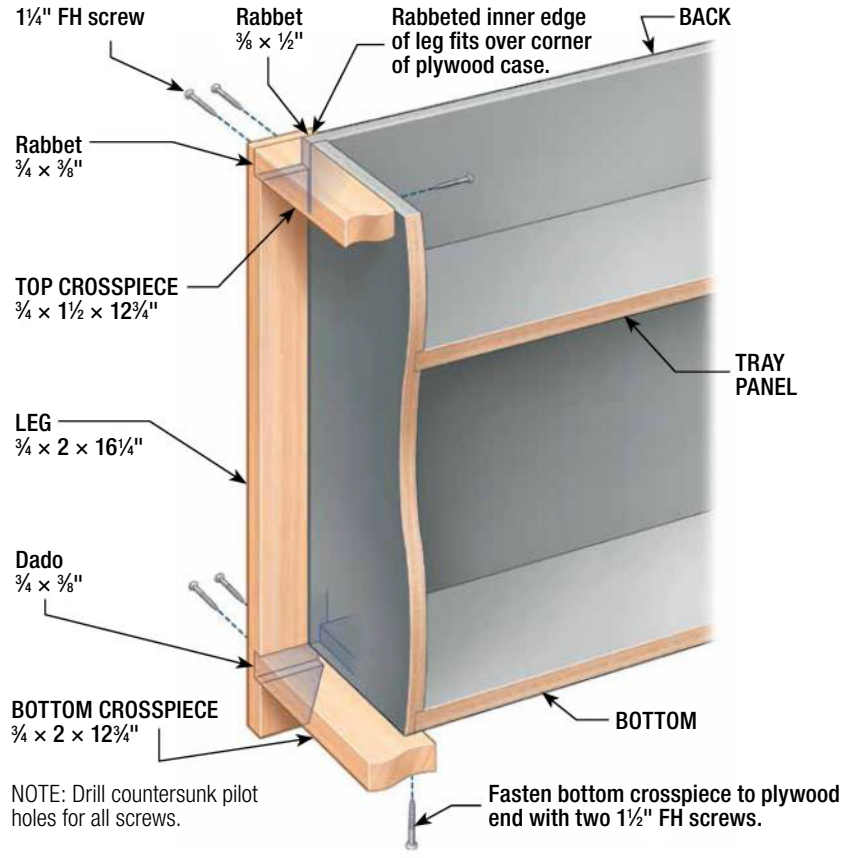
Use rabbet and dado joints to assemble the case

Cut a dado and rabbet in each case end, as shown in the drawing. I did this work on the router table, but you can get the same results using your table saw and a dado cutter. Before assembling the case, it's smart to install the receiving half of your drawer slides. Measure carefully to mark centerlines for the screws to install this hardware (see drawing), so your slides will be properly aligned when the case is assembled. Join the sides to the tray panel and bottom with glue and 1¼" screws (3 screws per joint should do fine). Make sure that case sides and crosspieces stay square as you attach the case back and front panel. For appearance and durability, I took the time to prime and finish-coat the completed case before adding the legs. I like the look of the tools and their holders set against the painted backdrop.



Make the leg assemblies to fit the case

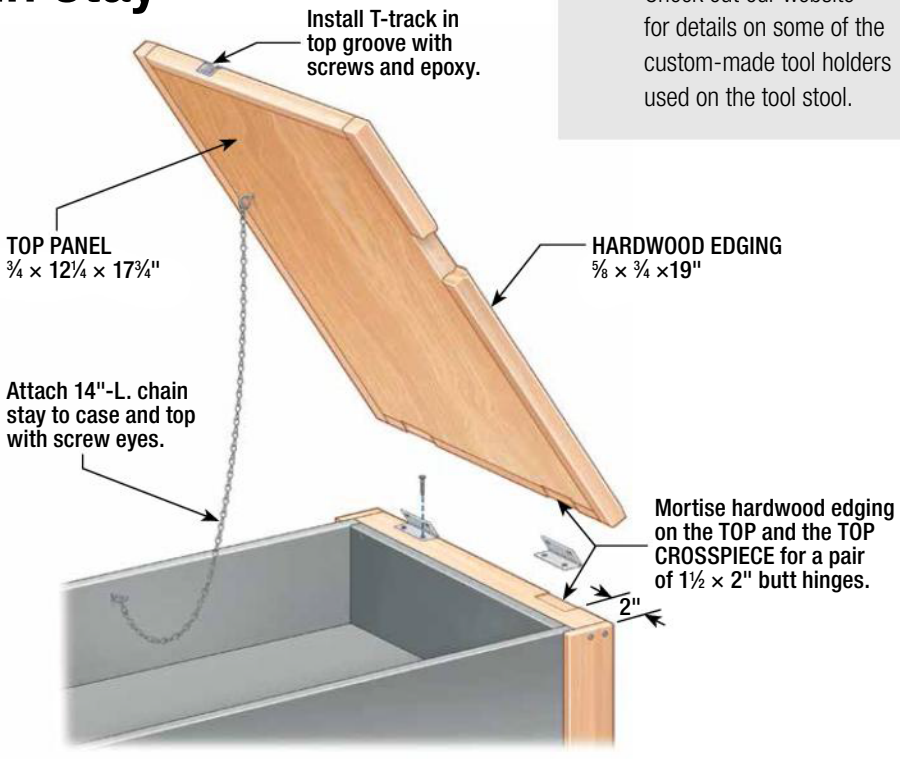
Like the case, the leg assemblies go together with rabbet and dado joints that are glued and screwed. Size your parts and cut these joints so that the leg assembly crosspieces will fit the case as shown in the drawing. Rabbet the legs to fit over the edges of the case, and note that the lower crosspieces need to extend under the bottom of the case, providing good support when you stand or sit on your stool. Drill countersunk pilot holes for a pair of 1¼" galvanized screws at each joint. Once your leg assemblies are together, fasten them to the case, driving screws at the locations shown in the drawing.



NOTE: Drill countersunk pilot holes for all screws.

Get the top done with edging, T-track, hinges, and a chain stay

Cut a piece of ¾" hardwood plywood to size, and attach hardwood edging with glue and finish nails. Then rout a chamfer along the top edges to make the top a more comfortable seat. Install a length of T-track in a routed groove with epoxy and short, flathead screws. The screws I used showed their points on the underside of my top, so I cut them flush with a Dremel tool. With the top complete and protected with a coat of polyurethane, I hinged it to the top crosspiece of a leg assembly, then attached a light chain stay with screw eyes to prevent the top from flipping back and stressing the hinges.

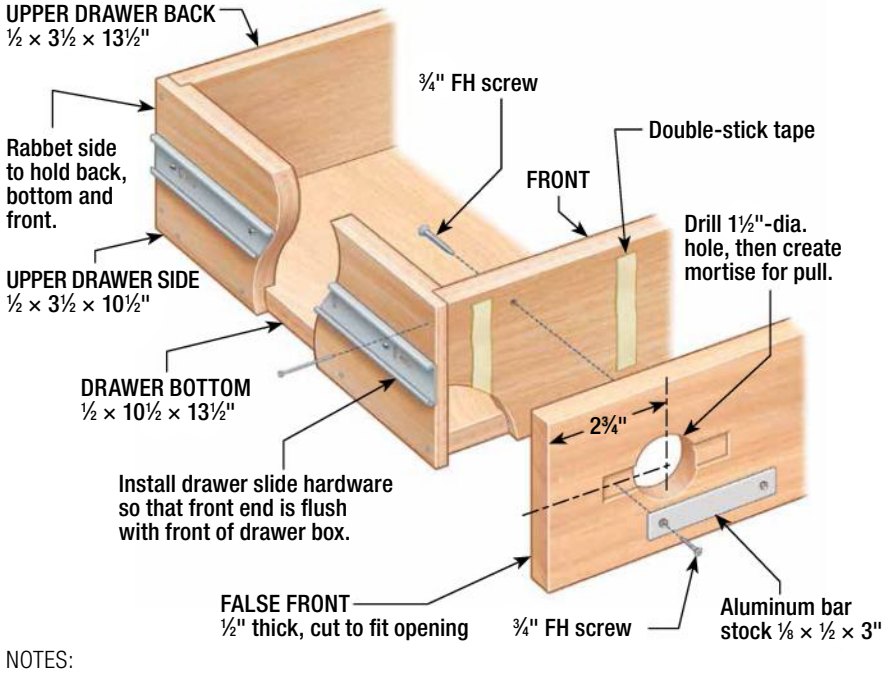


onlineEXTRA

Check out our website for details on some of the custom-made tool holders used on the tool stool.

Build drawers with flush-fit handles

The drawers are simple and strong in construction. The upper drawer in my stool is 3" deep (3½"-wide sides); the lower is 5" deep; (5½"-wide sides). But feel free to adjust these sizes to better fit the tools you want to store. The important thing is to get the finished width right: an inch narrower than the opening, to allow for a pair of ½"-thick drawer slides. Once you've got the boxes built and the slide hardware attached, slide the boxes into their openings and get to work on the false fronts. After cutting the fronts to their finished sizes, you'll find the flush-fitting drawer pulls easy to make. Just drill holes through the false front as shown in the drawing, then chisel out recesses for the bar stock pulls. I use double-stick tape to hold each false front in place on its drawer box until it can be permanently secured with screws driven from inside. ■



NOTES:

- "RV-style" drawer slides (see Buyer's Guide p. 66) will stay closed until tugged firmly, preventing drawers from opening when moving the stool.
- Drawer boxes are made from ½" plywood, with top edges covered with ¼"-thick maple strips. False fronts are made from maple.

A Home Remodeler's TOOL KIT

You can't bring your workshop to the jobsite. The next best thing is to bring a useful selection of tools.

By Tim Snyder

I'd like to say that I've done more woodworking than home renovation, but it wouldn't be true. What I do know for sure is that the right angles and straight edges you take for granted in woodworking can be hard to find in home remodeling. It's wise to expect the unexpected. There are other concerns, too—like electrical wiring, rotten framing and big, rusty nails that can't be pulled without a lot of leverage. Coping with these conditions is a lot easier if you have the right tools. The gear featured here has helped me through years of home renovation. There are plenty of items I've left out, but this core kit will help you get through a wide range of remodeling tasks. You'll find a complete tool list in the Buyer's Guide on p. 66. If you want to build your own version of my remodeler's tool stool, the project begins on p. 26.

Paintbrushes

Whether you're touching up a wall repair or cutting in around trim, good paintbrushes make it easier to get first-rate results. Have at least one tapered brush for cutting in and reaching tight spots.

6-in-1 tool

Open a paint can, or tap it closed with the hammer end. Clean a paint roller, spread wood filler, scrape off dried glue, or pry off some window casing. This little tool will do it all.

Multi-bit screwdriver

A small multi-bit screwdriver packs a lot of fastening punch, enabling you to handle torx, Phillips and square drive screws. As a bonus, the hex-head bits are interchangeable with those in your drill and driver set (see p. 33).

Folding utility knife

I like this folding version. It's compact, equipped with a belt clip, and able to store an extra blade in the handle.

Nail sets

Nail sets don't take up a lot of room, and can do useful work besides setting nails, like helping to free frozen nuts. It's smart to get a set of 3: 1/32", 1/16" and 3/32".

Prying tools

Remodeling involves plenty of pulling and prying. A sturdy cat's paw is essential for nail extraction. As for pry bars, it helps to have a few sizes, so you can handle everything from removing delicate trim to dismantling a built-up beam.

Heavy hammer

Carpentry and remodeling require more pounding power than woodworking. A 20 oz. hammer with a flat face and a straight claw is just the ticket.

Adjustable pliers

If you can't carry around a socket set, the next-best-thing is a pair of adjustable pliers.

What's Missing?

This article just scratches the surface of all the tools that can help out in different remodeling projects. Email us at *editor@woodcraftmagazine.com* to share your own recommendations.

Photos: Randy O'Rourke

The right gear gets you set to measure, drill, cut, shape, shave, and fasten

Torpedo level

2' and 4' levels are good to have on hand, but you can't beat a torpedo level for portability and versatility. Match it up with a straight-edged board, and this tiny level can work like a longer version.

Sliding bevel gauge

Most houses are full of odd angles. It's easy to transfer them if you've got one of these infinitely adjustable tools.

Plastic squares

Light, rugged, and inexpensive, a plastic square gets angles right and also serves as a cutoff guide for your circular saw. It's worth it to have small and large versions.

25' tape measure

Shorter versions are fine for furnituremaking, but for remodeling, you need a 25' tape measure. The erasable writing surface on this FastCap model stores measurements that I'll otherwise forget.

4-in-hand rasp

This tiny tool won't take up much room in your toolbox, and it puts plenty of shaping and filing power in your hand.

Fasteners aplenty

A plastic case like this can't possibly hold all the screws, drywall anchors and nails you need, but it's a good start.

Utility chisels

Instead of dinging the edges of your good chisels on remodeling projects, get a set of utility chisels to put in harm's way. This 4-chisel WoodRiver set is a bargain at $39.99.

Low angle block plane

Invest in a premium plane to use as your all-purpose shaver and shaper. Keep a spare blade on hand, in case of damage.

Drill & drive bit set

Hex-shank, drill and drive bit sets are huge time-savers, enabling you to change bits in an instant. For maximum versatility, get a set that includes a variety of drill bits and screwdriving tips. The driving tips can also be used in your multi-bit screwdriver.

The bottom drawer is packed!

Stud finder

Without a stud finder, it's frustrating and time-consuming to locate framing members hidden by drywall.

Voltage detector

Always turn off the power if you're working around electrical wiring. But use a voltage tester like this to be doubly sure you're not at risk. Touching the tester's tip to wiring or inserting it into a receptacle will tell you if electrical current is present.

Electrician's pliers

Once you make sure the power's off, these multifunction electrician's pliers will enable you to tackle a variety of wiring tasks.

Kreg Automaxx clamp

Need a third hand? This fast-action clamp is the answer. It automatically adjusts to different thicknesses. Clamping pressure is also adjustable. Kreg's 3" model fits nicely in the toolbox.

Allen wrench set

Allen-head screws are used on hardware, tools, and furniture, so you definitely need a wrench set. This WERA set stays together in a handy holder. It's smart to have metric and imperial sets.

Folding saw

Compact but capable, a folding saw can handle plenty of cutting assignments that are too small or fussy for power tool cutting.

Auger bits

These aggressive bits meet home renovation's boring requirements, quickly powering through framing lumber.

LED Flashlight

Low light is a common problem in remodeling work, but an LED flashlight provides a bright solution. This SLYDE model really shines because it pulls apart to expose a powerful floodlight. And with a magnetized end, it will pick up spilled tacks or stand in place on metal duct work.

Scribing tool

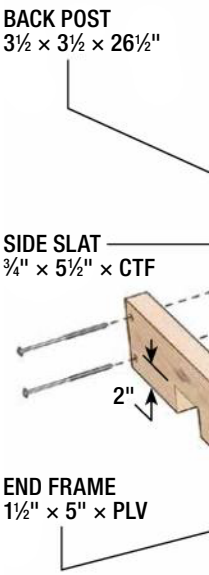
Installing built-in cabinetry often requires some scribe-fitting. This simple scribing tool makes it easy to transfer an irregular wall or floor surface to your workpiece.

Oscillating multitool

What this power tool lacks in size, it more than makes up for in precise cutout and plunge-cut capability. Make sure to keep a variety of different blades on hand. ■

Basic BUILDS

Build a SWING BED



This deceptively simple Southern classic can be customized to fit any space or decor.

By Daniel Friday

Swing beds have played a long and comfortable role in Southern history. In the days before central air-conditioning, folks slept on their covered porches to take advantage of the cool night air. My swings are still great for napping, but these days, they're outfitted with a stack of pillows and employed as nostalgic swinging seats.

The surprising secret to building this large project is that you don't need much woodworking experience or even a large workshop. After building more than 150 swings in my garage shop, I've come up with a solid, simple design that uses home center lumber and hardware, a few tools, and basic woodworking skills. In fact, you can assemble the project in one weekend, finish it the next, and hang it as soon as the paint's dry.

My swings are used indoors and out. For exterior installations, I recommend using a high-quality exterior paint, or a stain with a spar urethane topcoat. It's best to bring blankets and pillows indoors. To protect the mattress from wet weather, zip it up in a vinyl liner.

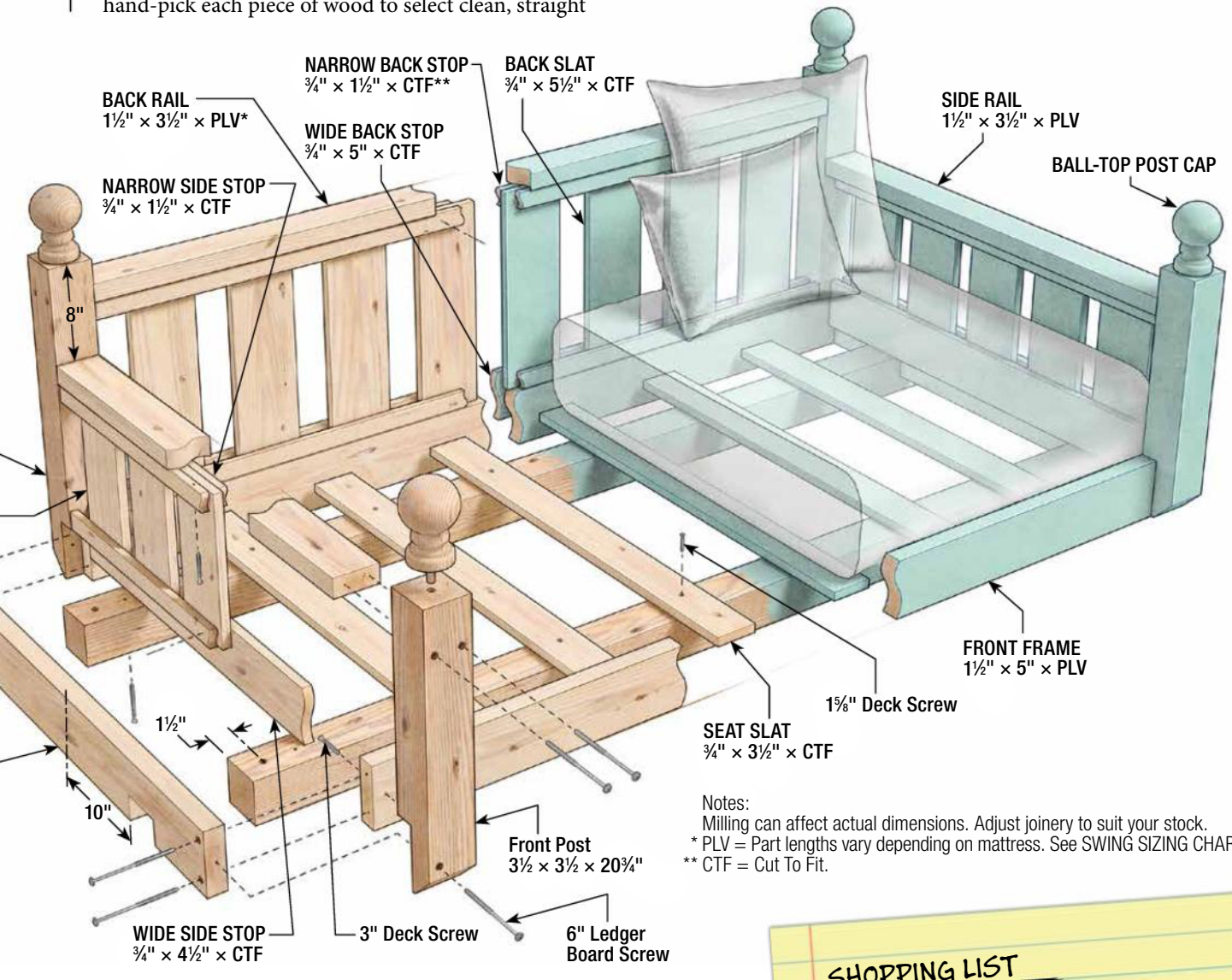
Have it your way

By selecting a different sized mattress, you can easily adjust the size of your swing bed to suit your needs. (See the Swing Sizing Chart, right.) I buy most of my mattresses at a local discount store, but you can also find them online.

There's plenty of room for other design variations: different infill options for the sides and back, finial posts, and different colors. Check out the "Designer's Notebook" on page 41 for ideas and inspiration.

Framing lumber and basic joinery, plus a few screws and glue

A swing bed is an impressive piece of furniture, but it's not difficult to build, nor expensive. Except for the mattress and bedding, everything you need for this project is available at your local home center (see Shopping List, below). Construction lumber is fine, but make sure to hand-pick each piece of wood to select clean, straight stock. You don't need a jointer, but I suggest planing and then sanding each piece with 80-grit sandpaper before assembly to avoid splinters and to ensure a smooth-looking finish. Use the dimensions provided in the chart to make the frame and rails, and cut the other parts to fit.



Notes:
Milling can affect actual dimensions. Adjust joinery to suit your stock.
* PLV = Part lengths vary depending on mattress. See SWING SIZING CHART.
** CTF = Cut To Fit.

SWING SIZING CHART			
BASE DIMENSIONS	65 × 36"	87 × 38"	87 × 47"
MATTRESS	52 × 28 × 8" (Crib)	75 × 30 × 8" (Cot)	75 × 39 × 8" (Twin)
BEAMS	65"	87"	87"
CORNER POSTS	20", 25"	20¾", 26½"	20¾", 26½"
FRAME	31", 53½"	33½", 76½"	42½", 76½"
SIDE & BACK RAILS	29", 50"	31", 73½"	40½", 73½"

SHOPPING LIST

- ☐ (3) 8' - 4×4 (Beams & Posts)
- ☐ (2) 10' - 2×6 (Frame)
- ☐ (2) 8' - 2×4 (Side and Back Rails)
- ☐ (6) 8' - 1×2 (Narrow Stops)
- ☐ (5) 8' - 1×6 (Wide Stops, Side & Back Slats)
- ☐ (2) 10' - 1×4 (Seat Slats)

Photos: Ralph Lee Anderson; Illustrations: John Hartman

Build the base: rabbet, notch, drilll, and drive

After cutting the corner posts and frame members to length, lay out the parts on a large, flat assembly table. Arrange the posts to make use of their best faces. If a 2×6 is crowned, flip it so that the crook faces up. Now, lay out the notches in the posts and end frame members, and cut as shown below. The base comes together quickly, but don't rush it. Despite their "self-drilling" claims, structural screws sometimes split the wood. For best appearance and to eliminate the risk of splits, start each screw with a ½"-deep counterbore and a 3⁄16" clearance hole. Once the parts are together, drill 5⁄32" pilot holes before driving the fasteners. Fill the counterbores with plugs or putty before finishing.

Next, flip the base assembly and set the beams into the notches. Make sure that the ends of posts protrude evenly, then attach them to the base, as shown below. Finally, drill through-holes in the post ends for the hanging hardware.

Circ-sawn shoulders. Clamping and gang-sawing the end frame members and posts saves time and ensures symmetrical notches. Measure the blade offset, then tack on a guide and cut the shoulders as shown.

Rip out the rest. A bandsaw outfitted with a ½" skip-tooth blade makes quick work of rabbets and notches. A jigsaw or a circular saw can get the job done too.

Flush-fit corners. After drilling the counterbore and clearance holes, I apply a bead of adhesive and tack the corners with 1¾" brads. Then, I drill the pilot holes and drive the 6" structural screws.

Drop in the beams. As you did with the frame members, drill the counterbore, clearance, and pilot holes, and then drive the 6" screws. Recruiting a few extra drills really speeds up the assembly process.

Attach the posts, rails, and slats

After assembling the frame, it's time to attach the posts. Although these posts don't support the weight of the swing, I still screw them from the front and back to ensure that they remain rock solid. Next, cut the side and back rails to fit, and attach them as shown.

The stop strips sandwich the back and side slats. After attaching the wide side and back stops and the outermost upper narrow back stop, you can install straight 1 × 6" slats, as shown below, or different slats or panels for a whole new look.

Corners come first. Set a post flush with the end of the frame and attach it with three 3" deck screws. A square is a handy positioning aid. Next, drill and drive one 6" structural screw through the post and into the frame. Be careful not to hit the other fasteners.

Pulling it together. A lightweight tie-down strap beats a heavy bar clamp. Loop the strap around a pair of posts, insert a rail, and tighten the ratchet mechanism. When the rail is snug, drill the posts and drive in a pair of 6" structural screws.

Bungees make it better. After screwing the bottom stop to the end frame, I use elastic straps to position the top stop directly above the bottom stop, and then screw it to the side rail.

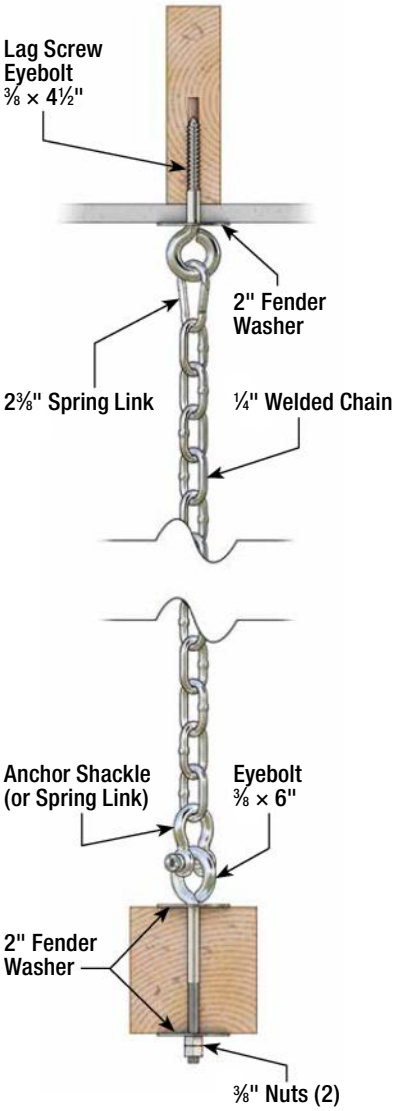
Space and tack the slats. Longer bungees help keep the slats upright while adjusting them for equal spacing. Nail on the inner stop strip to finish the back.

Seat slats and hanging hardware

The last construction step is to attach the seat slats as shown. Then you're ready to install your work. Don't use rope, which can stretch and snap. Chain is strong and makes for easy level and height adjustment. Use a bolt cutter to remove excess links. For outdoor installations, stainless steel chain is best. If installing the swing indoors, follow the directions shown here, and make sure to allow at least 12" of swing room to the rear.

Screw in the seat slats. Evenly space out 5 or 6 slats across both beams, and then attach them with 1⅝" screws.

Installation Details



Note: Stainless steel hardware recommended for exterior installations.

Find the joists. Use a stud finder to locate the joist's center. If need be, you can position the bolts wider than the seat.

X marks the spots. When drilling pilot holes into the joists I prefer using a bit that's slightly smaller than the diameter of the bolt's shank.

Install the eyebolt. Driving the ⅜" eyebolts into the joist should require some muscle. Inserting a screwdriver or wrench into the fastener offers additional leverage.

Hook up the seat. Working one corner at a time, attach the posts to the chain so that the seat is at knee-level. Fine-tuning the height by a link or two can make a big difference.

Designer's Notebook

After building more than 150 swings, I'm still excited to start the next one. The reason for this might be because each swing is like a blank slate. Changing the shape of the slats, or using a different filler material, such as beadboard, or corrugated metal, transforms an assembly line project into a custom creation.

Here are a few of my favorites. I'd like to take credit for these designs, but in many cases, my clients deserve the credit. Of course, pillows and blankets provide a finishing touch. ■

Lattice can be tricky to cut and paint (use a sprayer), but it's easy to install.

I purchased 22-gauge corrugated metal from a roofing supplier and cut the panels with a sheet metal nibbler.

Beadboard panels help the swing blend in with traditional furniture.

I used a holesaw to create this "dogwood flower" cutout.

The lattice-style panels required a few 2x4's and careful work at the mitersaw. The parts were joined with pocket screws.

If you can't hang your swing, consider legs. You can add hooks later.

Get Wowed! AT WINTERTHUR

At this Delaware museum, rooms full of amazing furniture provide a unique tour through American history.

By Tim Snyder

Joined chest, made by in Ipswich, MA, in 1676.

"Turret-top" mahogany tea table, made in Boston between 1745-1765.

Many woodworkers (including me) have concerns about "keeping the craft alive." As our lives become increasingly digitized, creativity seems to involve clicks and keystrokes rather than the tactile challenges of fine joinery. We fear that future generations will lose track of the innumerable details that define true woodworking artistry and craftsmanship.

Not to worry. If you'd like some reassurance about the timelessness of fine woodworking, I can't imagine a better way to get it than to visit the Winterthur museum. Located just outside of Wilmington, Delaware, Winterthur is the former home and estate of the du Pont family. The museum's amazing collection of decorative arts (nearly 90,000 objects) includes over 3,600 pieces of American furniture, dating back to earliest Colonial times.

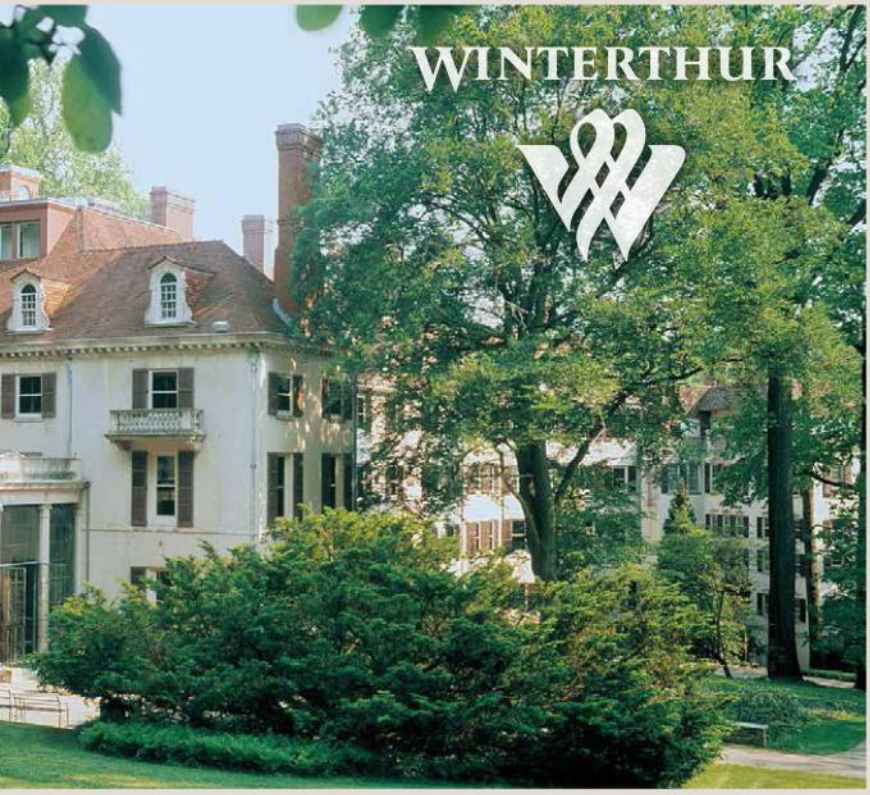
The du Pont family played a major role in early American history, settling in Delaware's Brandywine Valley in the early 1800s and building a business as a major manufacturer of gunpowder. By the time Henry Francis du Pont inherited the family's estate (named "Winterthur," in honor of an ancestral home in Switzerland) in 1927, the company had added chemicals to its product portfolio and become a leading industrial power. Primed with a Harvard education and the philanthropic potential of a family fortune, Henry Francis du Pont built a major addition onto the main house and began to fill it with period furniture, paintings, and other decorative arts. The Winterthur Museum was established in 1951 as a nonprofit, educational organization, opening permanently to the public that same year.

All photos courtesy of Winterthur Museum; Bombe-style desk, mahogany highboy, and chest on chest photos: Gavin Ashworth

Bombe-style desk, made in Boston between 1780 and 1795.

Mahogany highboy, made in Philadelphia between 1765 and 1775.

Chest on chest with carved shells, made in Providence, RI, between 1775 and 1790.



fastFACTS

- Winterthur is pronounced as "winter-tour."
- The museum has nearly 90,000 objects in 7 categories: ceramics, glass, metalwork, furniture, paintings and prints, textiles and needlework. These items were made or used in America between 1640 and 1860.
- Research and maker-creater fellowships are available, plus resources for schools, and adult education.
- Check the website for special events.

Address: 5105 Kennett Pike
(Route 52) / Winterthur, DE 19735

Phone (general info): (302) 888-4974

Website: *winterthur.org*

Tickets are available online and by phone: (800) 448-3883. Adult: $20; Senior and student: $18; Child: $5.

Exquisite examples. Displays like this one allow you to see how different furniture styles were interpreted by some of Colonial America's best woodworkers.

Grandeur preserved. Carefully removed from a southern plantation house built in 1820, this ornate staircase now graces one of the larger rooms at Winterthur.

Today, it's safe to say that Winterthur has become even more instructive and inspiring than Henry F. du Pont could have imagined. In addition to the furniture and other decorative arts displayed in the 175-room mansion, there's a 60-acre garden full of specimen plantings, colorful displays, gazebos, and summer houses. Winterthur has two graduate programs in conjunction with the University of Delaware, which utilize the museum's resources, including an impressive reference library. And there's an ongoing selection of special events that include exhibits, seasonal displays, lectures, and courses. You'll find the most up-to-date event information at *winterthur.org*.

When I contacted Winterthur about doing an article in the magazine, they put me in touch with Josh Lane, the museum's curator of furniture. The tour that Josh organized for me was truly awe-inspiring. What became evident right away was the discipline that Henry F. du Pont exercised in building his collection of furniture, ceramics, and other decorative arts. He took pains to fill a room with furniture built by woodworkers who practiced in the same era and area. As we moved from room to room, I was able to compare furniture made by Newport, Rhode Island, cabinetmakers with antiques made by woodworkers in the Connecticut River Valley, Philadelphia, Boston, and other regions. In many rooms, the furnishings and architectural details are faithful to the same era as the furniture: fireplaces, weathered beams, wainscot paneling, wallpaper—even ink wells and quill pens placed on writing desks. Yes, this is as close as you'll get to entering a time machine for a trip back through American history.

It's fortunate that Winterthur's staffers continue the practice that Henry du Pont started, acquiring historically relevant antiques, along with documentation tracing the

Step back in time. The Dominy workshop exhibit recreates the interior and exterior of a Colonial woodshop. Different projects are underway, and there's an amazing selection of tools on display.

Authentic interiors. Many rooms feature furniture, furnishings, and architectural details that depict a specific historical era or style.

history of each piece—who built it, where, when, and for whom. The museum's reference library is a treasure trove of original documents: work orders, invoices, correspondence, and other artifacts that describe the daily lives of furnituremakers. When more needs to be known, in-house experts can analyze paint, establish wood species, and conduct a forensic investigation to determine how the original piece may have been altered at different times.

Any woodworker who visits Winterthur will want to spend some time at the Dominy workshop exhibit (see photos, above). Remarkably, this 1800-era workshop survived largely intact and undisturbed on eastern Long Island, New York, until Henry F. du Pont bought the entire contents in 1941. After carefully cataloging the workshop inventory, two workshops from Dominy property were recreated at Winterthur. The clockwork shop contains a forge and metalworking tools, including a small, hand-powered metal lathe. The larger cabinetmaking shop is set up as if its occupants had just stepped out for lunch. Projects are underway at different work stations, with all essential tools close at hand. A spring pole lathe is set up in one corner. Massive workbenches face each other on opposite walls, with furniture parts clamped in vises and hand-forged chisels at the ready. A high shelf along the back wall holds the largest selection of wooden molding planes I've ever seen.

The images shown here touch on just a few of the high points of my visit. The main message of this article is simple: Put Winterthur on your bucket list. Spending a day at this museum is an opportunity to walk through American history as told by a remarkable community of artisans. If you're a woodworker, you'll see a standard of craftsmanship that's sure to leave a lasting impression. ■

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More Than a MORTISING JIG

This multipurpose routing jig is no one-trick pony.

By Robert Spiece

onlineEXTRA
To see a video of the jig in action, visit *woodcraftmagazine.com*.

At the JD Lohr School of Woodworking, we place a lot of value on practical jigs. I say "practical" because jig-making can get out of hand if you're not careful, resulting in contraptions that are overly complicated and that try to do too many things. Ideally, a jig should be versatile without overreaching in its capabilities, and should do its job(s) as simply and directly as possible. This mortising jig is a great example of such a design.

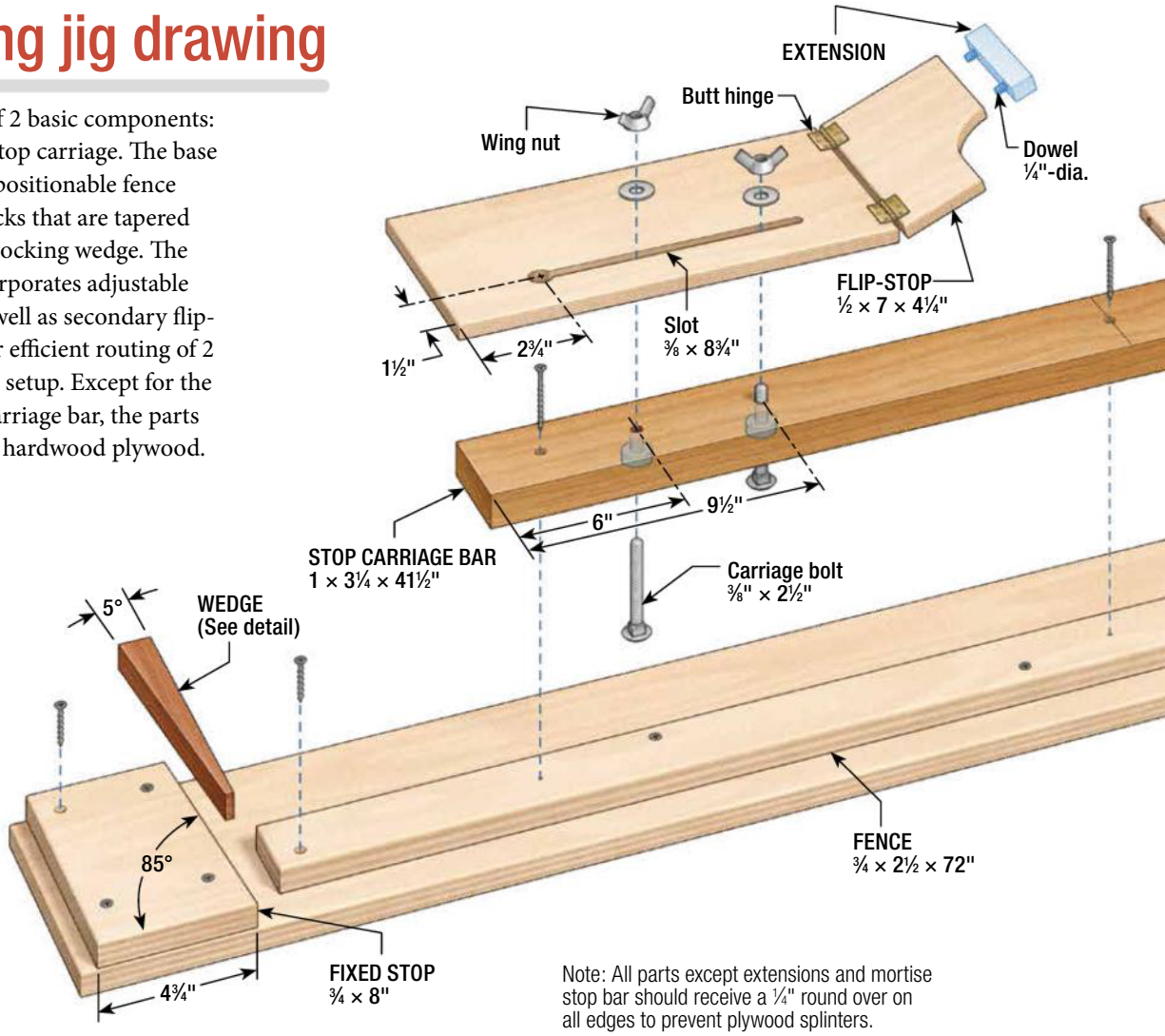
Used in conjunction with a router outfitted with an edge guide, this jig primarily serves for mortising furniture legs. However, we also employ it for other operations, such as slotting aprons to accept tabletop clips, and as a holding fixture to secure parts for edge-routing profiles. Part of its beauty as a mortising jig stems from its adjustable router-travel stops, which allow for quick, repeatable operation when cutting identical mortises in multiple legs. It works very well as a slotting or holding fixture because its fence-and-wedge system eliminates the need for numerous clamps, which would impede router travel.

The unit—made from a couple of long plywood strips, some wood scrap, and some inexpensive hardware—is a proven investment. Ours has been in play for years in regular production, and our students get a lot of use from it as well.

Photos: John Hamel

Mortising jig drawing

This jig consists of 2 basic components: the base and the stop carriage. The base parts include a repositionable fence and fixed end blocks that are tapered to complement a locking wedge. The stop carriage incorporates adjustable primary stops as well as secondary flip-stops, allowing for efficient routing of 2 mortises with one setup. Except for the wedge and stop carriage bar, the parts are all made from hardwood plywood.



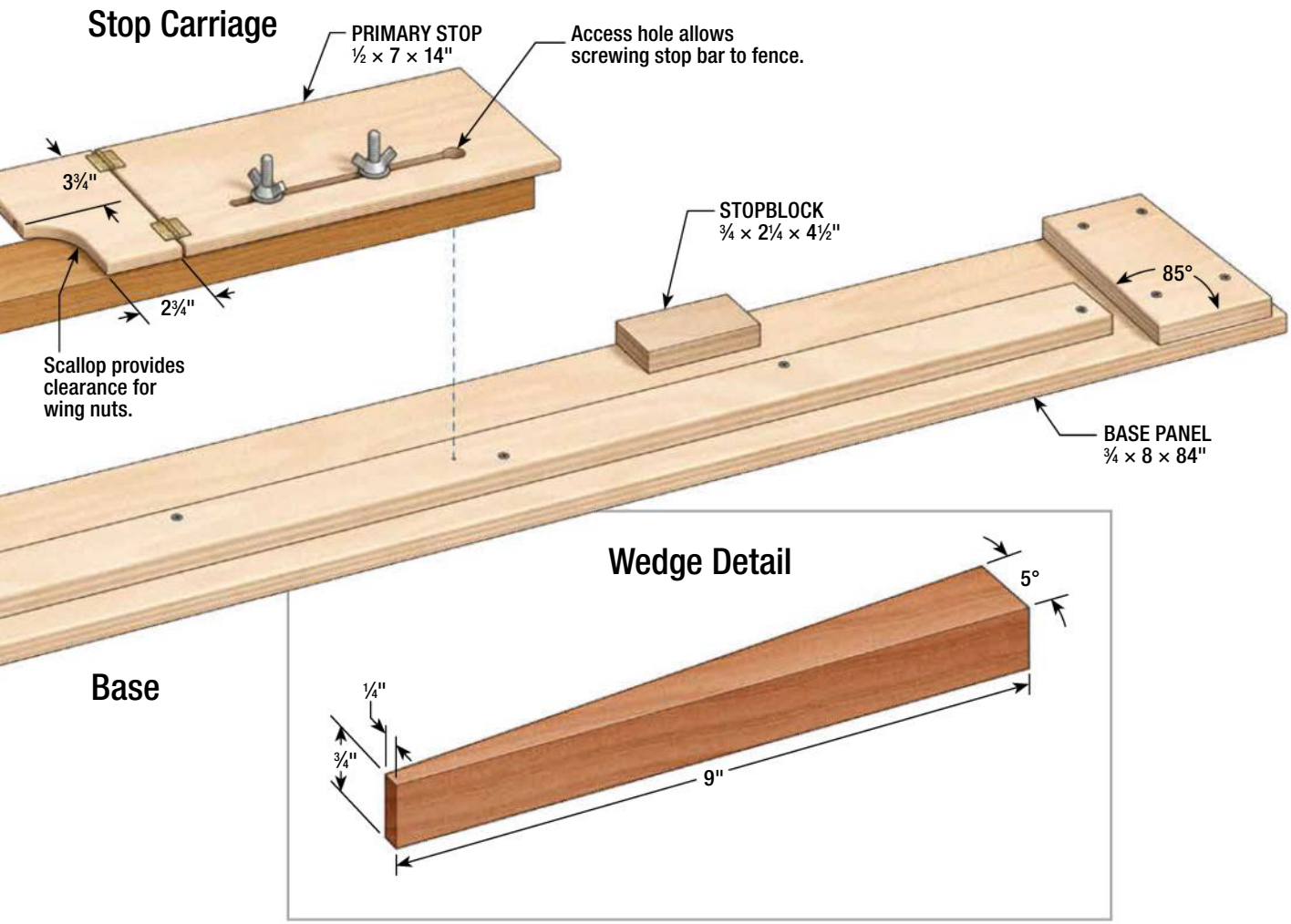
Note: All parts except extensions and mortise stop bar should receive a ¼" round over on all edges to prevent plywood splinters.

Slotting and edging

The base can be used to secure work for operations like slotting and edge-profiling. The beauty of the setup is that you only need to use 2 clamps, both of which sit out of the way of router travel. Whether you're working with long boards such as table aprons, or multiple, identically sized small pieces, the jig configuration is very similar.

Simple setup for long boards. To hold long workpieces for jobs such as slotting these table aprons, begin by repositioning the fence if necessary to create sufficient bearing across the width of the workpieces. Next, sandwich the pieces between a loosely placed wedge at one end, and a clamped stopblock at the other, and then push or tap the wedge inward to secure the work.

Illustration: Christopher Mills



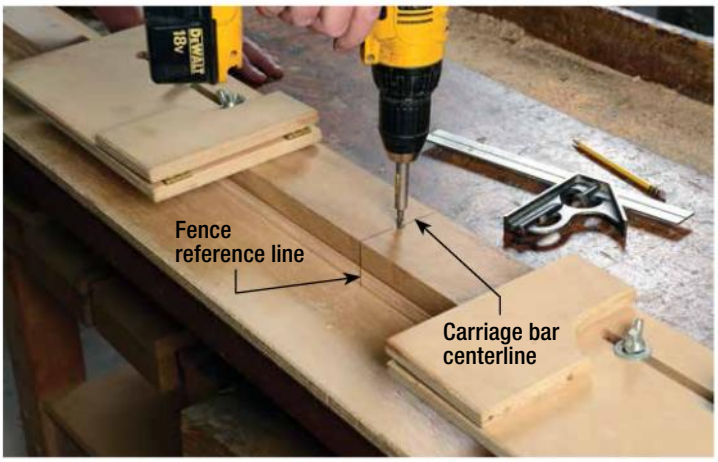
Small multiples. After rounding over the long edges of these pull blanks on a router table, they get mounted in the jig to gang-rout the ends. Spacers of similar thickness are included to provide router support at the beginning and end of the cut.

Opening photo: TK; Project photos: TK; Illustrations: TK

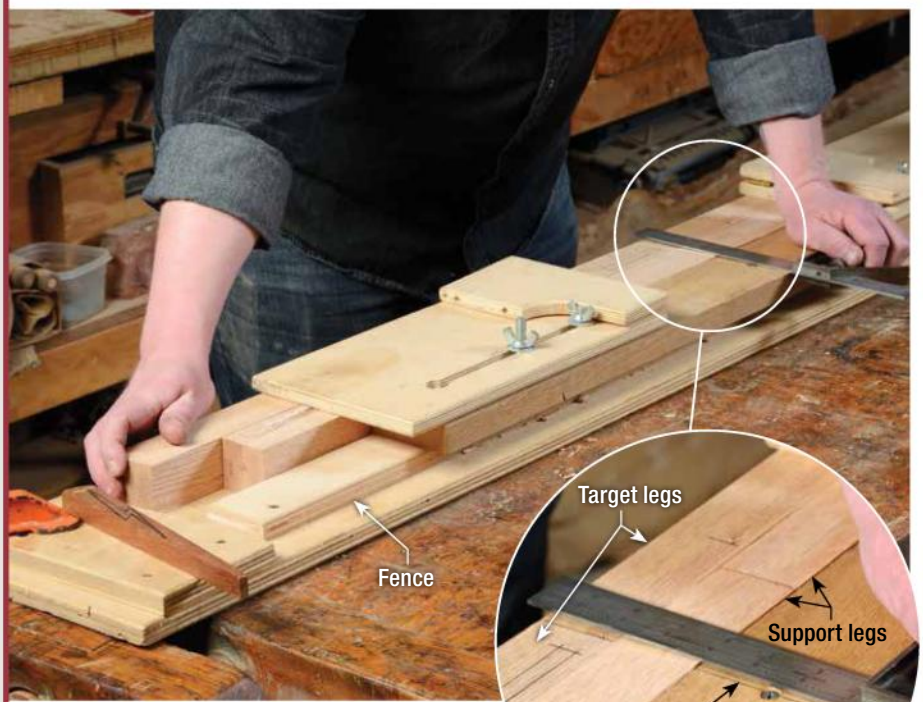
Mortising setup

To rout leg mortises, you secure all 4 legs in the jig, with 2 set up for routing, and the other 2 serving as additional router support. After laying out 2 mortises, you set the mortise stops and secure the legs in the jig to rout the first pair of mortises. Then, with the same jig set-up, switch the leg positions and rout the remaining mortises. Note that the carriage bar thickness on this jig is suited to 1¾"-square legs. For thicker legs, shim under the carriage bar. For thinner legs shim under the legs.

Mark 2 reference mortises. First, lay out one full mortise (top left) and just the length of another (top right). The width lines are reference for setting your router edge guide. Length lines are for setting the jig stops. Chalk squiggles will do for the rest.

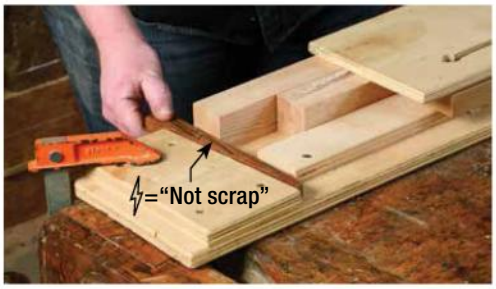


Attach the stop carriage. After locating the carriage to suit stops for legs of a particular length, extend the carriage bar centerline across the edge of the fence for future relocation of identically sized legs. Then screw the carriage to the fence.



Load the legs. Place 2 legs against the jig fence to serve as router support, offsetting their ends from the carriage centerline. Then load the 2 legs to be mortised, aligning their laid-out ends with the carriage centerline.

Set the stop. Locate the stopblock against the end of a target leg, and clamp the block in place, at the same time clamping the jig to the bench.

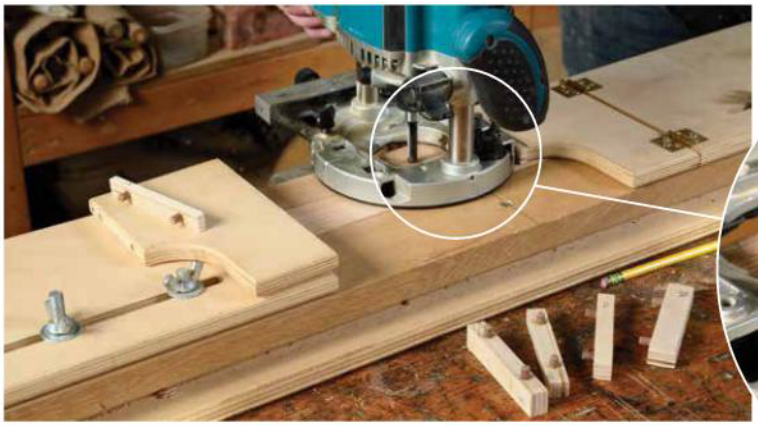


Secure with a wedge. Push or tap the wedge into place at the end of the butted target legs to secure both for routing.

Set one primary stop. After adjusting the router edge guide for the cut width, locate the bit at the outermost end of a mortise layout line (right), and slide the primary stop against the router base. Lock down the stop with the wing nuts (above).

Then set the other. Position the router bit at the outermost end of the opposite mortise, and locate and lock that primary stop in the same manner.

Flip-stops and extensions. When appropriate, outfit your flip-stops with the matched pair of extensions that suits the length of your mortises. When the stop is flipped down, the bit should be at the innermost end of the mortise on the leg that opposes the stop. We use ¼"-, ½"-, and ¾"-long extensions, as shown here.



Making the cuts

Once the jig is set up, you can cut all of the mortises in a set of identical legs without readjusting the jig's stops or the router's edge guide. Just cut the first pair of mortises as shown, then reorient those same legs in the jig to cut the mortises on the adjacent faces. Following that, invert the location of the mortised legs with the unmortised legs, and repeat. ■

Flip, rout, flip, rout. With one of the flip-stops down, rout in the usual fashion, beginning with the router against the first stop, and ending with it touching the second.

Next couple, please. After routing all mortises on the first pair of legs, switch them out with the unrouted pair, and complete the work in the same manner with the same setup.

BEST BITS for Big Holes

Get drilling done right with these boring details.

By Asa Christiana

In any workshop or homeowner's toolbox, you're sure to find a good selection of small bits—a set of standard twist drills and, if you're lucky, a full set of brad-point bits also. But that bit kit tends to peter out when you get to larger diameters, let's say ¾" or greater. There are plenty of tasks that require big bits (sidebar, right), but it's not always easy to choose the bit you need, because of the bewildering array of types available.

To solve the big bit puzzle, I ordered a bunch of plus-sized bits and collected plenty of wood to use for various drilling assignments. You'll find plenty of helpful information in the chart on the facing page, and in the write-ups that follow. With these details, you'll be able to match the bit to the job and get the best value from every bit of money you spend on these tools.

Big boring tasks

- Counterboring for screws, nuts and bolts
- Roughing-out large mortises
- Drilling ports for vacuum hoses
- Drilling dog holes in a workbench
- Remodeling jobs
- A wide variety of unique tasks, from decorative cutouts to finger pulls

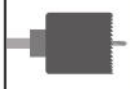
Choosing big bits: What's important?

Anatomical details vary greatly when you move from one big bit type to another. So it's not surprising that there are differences in cost and performance. By considering the following factors, you can make sure that you get the results you're after, and that you're not using an expensive bit to do work that a more affordable bit can tackle effectively.

- **Price.** You can expect larger bits to cost more, but big bit prices also vary greatly by type.
- **Size.** Some types come in larger diameters than others, so your choice may depend on the diameter of the holes you need to drill.
- **Smoothness/tearout.** In many cases you'll want clean holes, with smooth sides and a tearout-free entry. But sometimes perfection isn't critical.
- **Drill press and/or freehand use.** Some bits and cutters can only be used safely in a drill press, while others work with handheld drills too.
- **Deep holes.** Some bits excel at boring deep holes, while others are better suited to making shallow holes.
- **Stopped and/or through holes.** Some big bits enable you to drill a stopped hole with a flat bottom. Others can cut through holes only.
- **Angled holes.** Some drill bits can drill angled holes cleanly and accurately. Others will wander, flex, or even break when asked to do this, which can be dangerous.
- **Overlapping holes.** The ability to overlap without wandering is valuable when boring a series of stopped holes to clean out a mortise or other recess.

Big bits at a glance

These five types of big bits look very different from each other, and perform differently as a result. This chart gives you their basic capabilities at a glance, but be sure to read the full write-ups that follow for all the important details. Price ranges are for individual bits.

Type	Price	Sizes	Smoothness/ tearout	Drill Press	Freehand	Through holes	Stopped holes	Angled holes	Overlapping holes
 Forstner	$10-40	Up to 3"	Excellent	Yes	Yes	Good	Excellent	Excellent	Excellent
 Circle Cutter	$33	Variable to 6"	Excellent	Yes	No	Up to 1"	No	No	No
 Spade	$5-10	Up to 1½"	Good	Yes	Yes	Good	Fair	Good	Fair
 Holesaw	$8-40	Up to 6"	Moderate	Yes	Yes	Up to 2"	No	Poor	Good
 Auger	$10-40	Up to 1½"	Good	No	Yes	Excellent	Fair	Excellent	Good

In-use photos and opening photo: Asa Christiana; Bit photos: Bobby Schehl

Smooth operators.
Forstner bits cut cleanly and accurately, and offer excellent versatility for many woodworking tasks.

Forstner bits are the smoothest cutters, with unique capabilities

For many reasons, I consider a set of Forstner bits to be a must-have in any woodworking shop. Although there are slight differences in Forstner bits made by different manufacturers, the basic cutting geometry features a precisely machined rim, a center spur, and a chipper. These cutting elements work together to produce tearout-free, flat-bottomed holes in any type of wood. What's more, Forstner bits can bore straight, angled, or overlapping holes. You can even bore a partial hole on the edge of a board, as shown in the photo at left. Count on these bits for perfect counterbores, smooth dog holes, decorative cutouts, and round recesses of all kinds—and for clearing the waste out of mortises without wandering.

Contrary to popular wisdom, Forstner bits can be used with handheld drills, but be sure to go in straight and square and start with a light touch. Forstner bits can bore deep holes, but you'll need to withdraw the bit frequently to clear chips and help prevent overheating. The same geometry that cuts clean-sided holes puts a lot of steel in contact with wood, producing extra friction. If your bits will be subjected to heavy use, consider spending the extra money for carbide Forstners that can take the heat without getting dull.

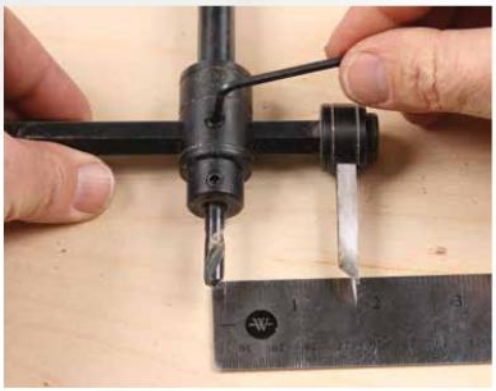
I tested a variety of Forstner bits; some had wavy teeth around the rim, while others had straight teeth or simply a sharp bevel. The performance differences I noticed were slight, with mid-priced Forstners performing as well as more expensive versions. To get the most for your money, buy a set of Forstner bits instead of acquiring them individually.

Call for backup.
Whenever possible, place a sacrificial board behind whatever you are drilling. It will support the wood at the back of the hole, leaving a clean exit.

One circle cutter will cut many diameters

You'll need a drill press to use this tool safely, but for holes larger than a Forstner can manage, you can't beat a circle cutter. Infinitely adjustable for diameters up to 6", this big-hole specialist replaces a pile of expensive holesaws, for example, and cuts cleaner, smoother holes in the bargain. Use it to cut snug-fitting openings for vac hoses in shopmade jigs, fences, etc. As a bonus, you can invert the cutter to create toy wheels and other perfect disks. The cutter is also very easy to sharpen. To use a circle cutter safely, choose a low speed on your drill press, clamp down the work, keep your fingers clear, and feed the tool slow and steady. You'll be amazed at the results.

Use it safely. Use a circle cutter in the drill press only. Set the speed well under 500 rpm, clamp down the workpiece, and feed the cutter slowly for great results.



Infinitely adjustable. The swing arm can be adjusted for holes from 2" to 6" in diameter. Always lock the arm tightly.

Spade bits provide great bore-for-the-buck value

A contractor's favorite, spade bits offer the least expensive path to moderately large holes, and they work in handheld drills and drill presses alike. Although they're designed to bore quickly through soft construction lumber, they drilled surprisingly clean holes in hardwoods in my tests. But the paddle-shaped design makes spade bits prone to vibration and rough cuts when they get dull, which they do relatively quickly. Also, while they can drill flat-bottomed holes, the long center tip leaves a deep, narrow hole on the middle. For all these reasons, buy spade bits in a pinch, but get a set of Forstners when you can afford them.

Check the tip. The screw tip on some spade bits can cause an aggressive feed rate. Don't use these bits in a drill press, and be wary of jamming.

Stopped holes, sort of. A spade bit can drill a stopped hole, but the long center spur leaves a deep, narrow hole in the middle.

Holesaws need a powerful drill

A holesaw won't cut as cleanly as a circle cutter, but it can make holes just as big. You can use these bits in a handheld drill, but make it a powerful one. These hefty bits demand high torque and a firm grip. In my tests, I found that holesaws with fewer teeth—and long slots ahead of those teeth to eject chips—cut worlds better than those with continuous teeth around the rim. Like circle-cutters, holesaws can only drill through holes, in materials up to about 2" thick. If you don't own a drill press, or you are facing a remodeling job that requires big holes in construction lumber, a holesaw is right for you. Holesaws equipped with "bi-metal" or carbide teeth can also drill through thin metal.

Fewer teeth, faster action. Holesaws with fewer teeth have long slots for clearing chips, which makes them work much better than holesaws with continuous teeth around the rim.

Pull the plug. After a holesaw cuts through the workpiece, you'll have to pry out the plug buried inside the bit.

Auger bits are construction and chairmaking specialists

With a lead screw that keeps them on track and pulls them through the wood, plus deep flutes for ejecting chips efficiently, auger bits drill deep, smooth holes, even if you enter the wood at an angle. The lead screw forces a feed rate that works well in softwoods, letting contractors bore big holes through a stack of studs at once, for plumbing and electrical components. But that aggressive feed rate can be a problem in hardwoods, causing auger bits to jam in a drill press or cordless drill. Put them in a hand-powered brace, however, and they are a chairmaking champion, boring round mortises in square or round legs, at any angle. ■

Hex or square-shaped ends will work better in a hand brace than round ends.

Hand power. Using an auger bit in a hand brace gives you more control than using a power drill.

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Top-Notch TAPERING JIG

Ease and flexibility make this accessory a real keeper.

By Larissa Huff

Tapers often play a big part in furniture design. At the JD Lohr School of Woodworking, we incorporate them quite a bit, particularly when creating table legs. There are dozens of ways to taper a squared leg using a variety of machines in the shop, but we prefer to use the table saw, which provides clean, consistent results when used in conjunction with the right jig.

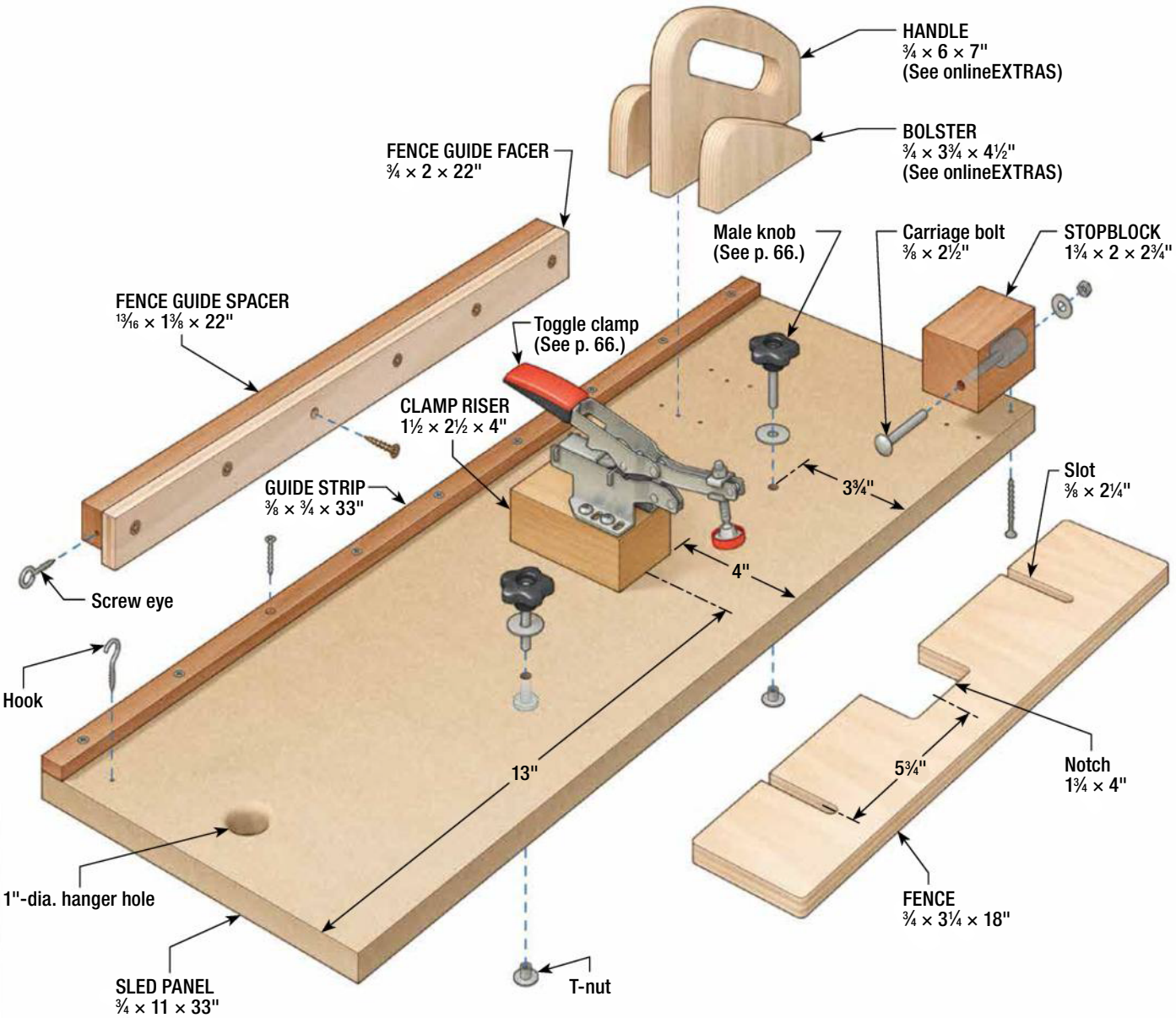
Commercial tapering jigs are available, but many suffer from serious shortcomings, such as the inability to secure the work to the jig during the cut. That's partially why so many shop-made designs proliferate. We've developed a variety of them ourselves over the years, and finally settled on the version you see here, created by instructor Eoin O'Neill.

The design intention was always to create a straight-edged carrier board that features an adjustable fence, as well as a method of safely securing the work to the jig. This model fits the bill nicely and also includes a fence guide to prevent the jig straying from the rip fence. The final touch is a hook-and-eye system that keeps the stored parts together. Made primarily from MDF and plywood, it's not terribly expensive to build, especially for such a useful jig.

Most importantly, the jig is easy to use and versatile enough to handle a variety of tapers while safely producing identical results every time. We love it; I doubt we'll have to improve it.

Easy to make, easy to use

The jig consists of 2 basic assemblies: the sled and the fence guide, which clamps to the rip fence to prevent sled wander. We used lightweight MDF for the sled panel and hardwood plywood for the fence guide facer, handle, bolster, and fence. The rest of the parts are solid wood. Make the sled panel and fence first, then use the notched and slotted fence to lay out the knob holes in the sled panel. After attaching the guide strip to the sled, make the fence guide, ensuring that its spacer allows snug, but easy sled travel. Note that the stopblock carriage bolt prevents trapped sawdust from misaligning the leg.



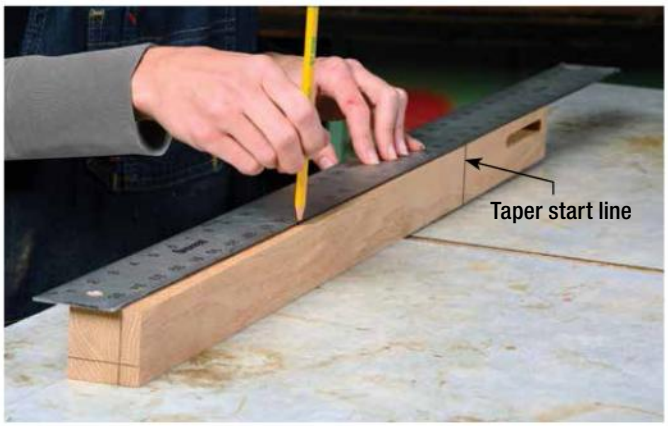
onlineEXTRAS

To see a video of the jig in action and to download patterns of the handle and bolster, visit *woodcraftmagazine.com*.

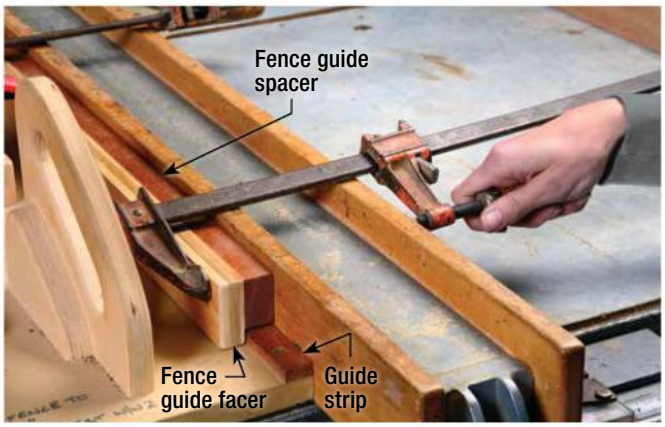
Photos: John Hamel; Illustration: Christopher Mills

Lay out a leg, then set up the jig

Setting up the jig involves laying out a single leg with your desired taper, which will allow you to set the jig's fence to the appropriate angle. Next, you secure the fence guide to the rip fence, which prevents the jig from wandering away from the fence, spoiling your cut and risking kickback. Finally, you position the leg on the jig, make the necessary fence adjustments, lock the fence in place, and you're ready to cut your tapers.



Lay out the taper. First lay out the taper start line across the upper section of the leg, then mark out the leg thickness at the bottom, extending the lines fully across the end grain. Finally, connect the top and bottom lines as shown.



Secure the fence guide. With the sled against the rip fence, position the fence guide just a bit above the guide strip on the sled, and clamp the guide in place. Make sure the sled travels easily but with no side-to-side slop.

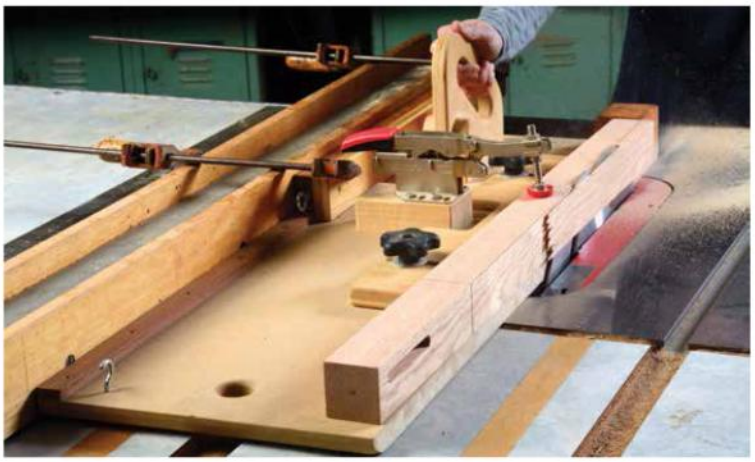
Hanging Tight

A screw eye inserted in the end of the fence guide allows hanging it on a hook screwed into the sled to keep the jig components together on a wall.

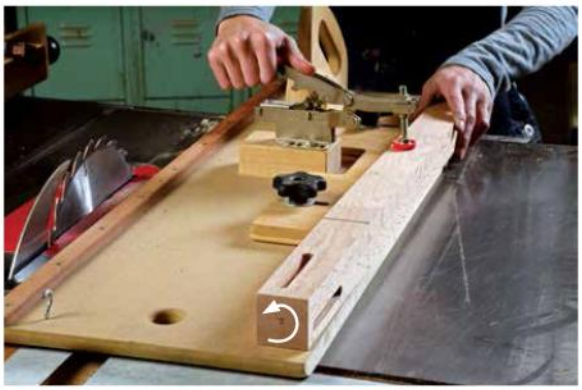
Align and clamp. Place the leg on the jig with its foot against the stopblock, and with one mortise facing outward and the other one facing down. Align the ends of the taper layout lines with the edge of the sled, slide the fence against the leg, and tighten the fence knobs. Finally, secure the leg in place with the toggle clamp.

Rip, roll, rip. Done.

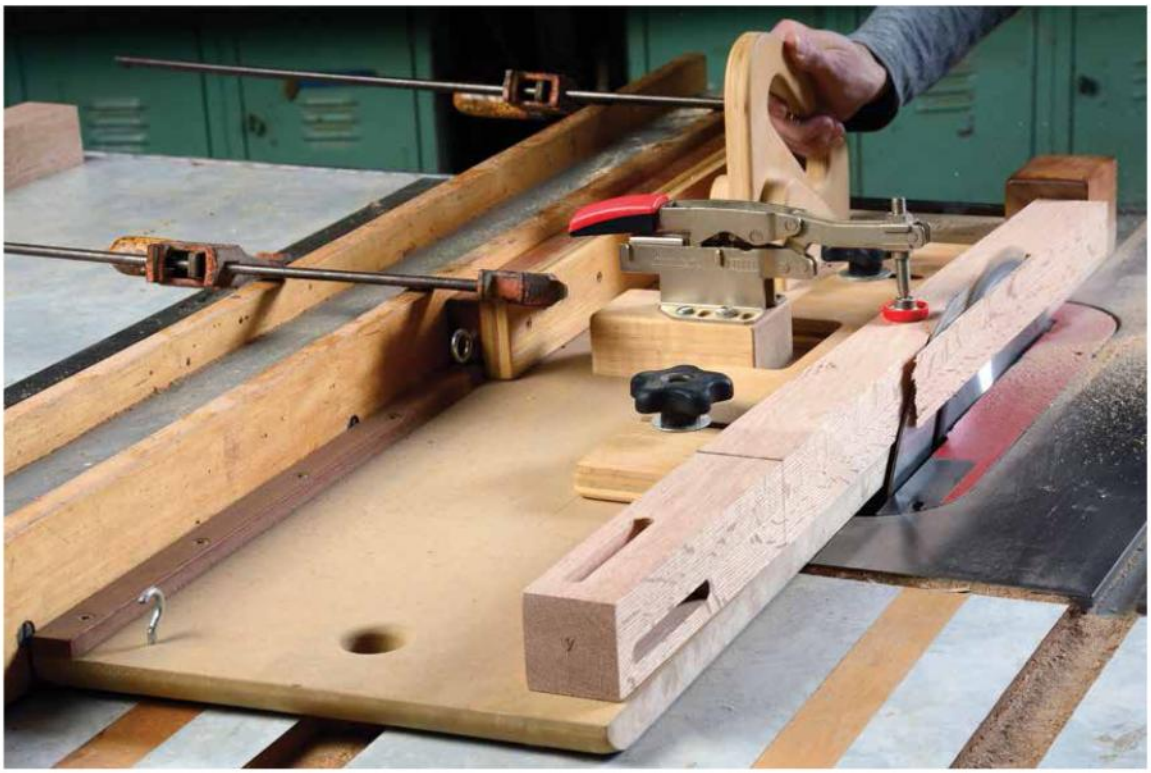
Cutting the tapers couldn't be easier. First, set your rip fence to align the sled's outer edge with the edge of the saw blade, and then make the cuts as shown. Note that feeding the leg from top to bottom like this results in the cleanest cut because you're sawing with the grain. All the same, you'll need to do a bit of cleanup using a jointer, hand plane, or sander. Also note that the toggle clamp shown is self-adjusting for stock of various thicknesses. ■



First cut. With the sled retracted so that the leg overhangs forward of the blade, feed at a steady, consistent rate to avoid burning. At the end of the cut, carefully push the sled past the blade and bring it around to the other side.



Leg rollover. Rotate the leg to orient the previously cut taper upward, and clamp the piece securely in place against the fence and stop. Taking this approach ensures that a completely straight face of the leg is against the sled for best stability.



Second cut. Make the second cut in exactly the same manner as the first. For most legs, which are only tapered on the inside faces, you'll be done at this point. However, if you want to taper all 4 faces, simply readjust the fence, and repeat the maneuvers on the remaining faces.

Spotlight on MAPLE

Hard, soft, straight, or figured, but never plain.

By Pete Stephano

The sugar maple (*Acer saccharum*) entertains millions of "leaf peepers" every fall with its fiery foliage, and pancakes everywhere drip with syrup made from the tree's sap. As for woodworkers, we also enjoy the treasure of its trunk. For almost as long as maple has been tapped for sap, the wood has found its way into everything from furniture and flooring to musical instruments.

Although sugar maple enjoys a certain celebrity status, it's only one of six commercially available species in the maple family. Sugar and black maple (*Acer nigrum*) make up the "hard" category. "Soft" maple includes several different species, with the stock at your local lumber dealer likely reflecting your region. For instance, if you live in Oregon, soft maple may be bigleaf maple (*Acer macrophyllum*). East Coast and central state woodworkers are most likely buying red maple (*Acer rubrum*) or silver maple (*Acer saccharinum*). Although each species has slightly different characteristics, the wood from these trees looks and performs similarly, with hard maple getting extra points for hardness and durability.

Maple Quick Take	
DENSITY	39-47 lbs./ft³
HARDNESS	Moderate to very hard
STABILITY	Average
ROT/INSECT	Low
TEXTURE	Fine
TOXICITY	Slight

USES: Furniture, flooring, paneling, millwork, cabinets, musical instruments, toys, and turnings

History in woodworking

Maple has been a favorite for woodworkers since Colonial days. New England craftsmen relied on maple for furniture, household implements, and farm tools. Hard maple, particularly curly stock, was reserved for musket stocks and violins (hence the term "fiddleback" maple).

Hard and soft maple are both found in flooring, furniture, paneling, cabinets, benchtops, tabletops, toys, kitchenware, and millwork. Hard maple remains the standard for butcher blocks and cutting boards because it imparts no taste to food and resists cuts and scratches. Turners cherish figured stock for bowls and platters.

Where it comes from

As a cold weather tree that favors a more northerly climate, hard maple grows best in the upper Midwest and New England, the source of two-thirds of all the commercial stock. You'll find the greatest stands around the Great Lakes, in the St. Lawrence Valley, and northern New England, where trees can attain a height of 130'.

Except for the bigleaf maple, a stalwart resident of the Pacific Northwest, most soft maple comes from the Mid-Atlantic States, principally southern Virginia through the Carolinas, although it does grow around the Great Lakes. Due to soft maple's widespread growth, it's more susceptible to regional color variations than hard maple.

What you'll pay

Combined, hard and soft maple account for almost 10% of all commercially available hardwoods, so it's safe to say that maple is widely available. It's also reasonably priced. Hard maple costs about $4.60 per board foot, but you're likely to pay less the closer you are to its source. Soft maple costs less than hard maple, but this margin lessens with wide, clear boards. Not surprisingly, figured wood prices vary greatly.

Plywood comes in thicknesses from ⅛" to ¾", with the thickest and best grade running close to $125 for

a 4 × 8' sheet. Figured veneer starts at around $20 per square foot.

How to select the best stock

Hard maple normally appears light tan to almost white in color, especially the most-valued sapwood. Soft maple tends to have a reddish tinge. Plainsawn stock traditionally exhibits straight, close grain.

Although color variance doesn't factor into commercial grading, some sellers charge extra for the more desirable, whiter sapwood boards. Stock with heartwood and mineral streaks won't necessarily cost you less, so be sure to sort and select the boards that match best. (Who knows, you might run across some figured stock in the sorting!)

Maple (both hard and soft) is more prone to figure than any other commercially available species. You'll commonly find burl, curly, quilted, and birds-eye. Note that "curly" is a very general term covering tiger, fiddleback, and flame. Tiger has wider stripes spaced further apart than fiddleback, and flame looks like flickering flames of uneven width.

Arrested decay creates two premium-priced types of figured maple. Spalted maple's characteristic dark veins result from a fungus, while "ambrosia" maple features long, dark streaks caused by wood-boring worms.

Working maple in the shop

Because plain, unfigured maple is easy to work and holds fine detail, it's prized for cabinetry, turning, and carving. With sharp tools, it's possible to create a surface that requires little or no sanding. But maple is prone to burning, so take care to keep boards moving on the table saw, and don't let your router linger in mid-pass.

Thanks to modern machinery, hard maple isn't more difficult to work than soft maple, but it does have a moderate blunting effect on blades and bits. The differences between the two types become clear when working with hand tools. To make life easier, some chairmakers and turners work with green maple lumber when possible.

Working with figured maple can be challenging, as it's prone to tear-out. Feeding it across jointer and planer knives at an angle can help with lightly figured stock. For highly figured boards, skip the thickness planer and use a drum sander instead. When smoothing with hand tools, try a plane with a high bedding angle and/or a cabinet scraper.

Finishing

As a group, maples accept all finishes well. If you sand after assembly, *don't overdo* it. Using grits finer than 220 for finish-sanding can burnish the wood, creating problems when staining.

Although less dramatic than cherry, maple does darken over time, gradually achieving color reminiscent of light maple syrup. ■

Maple Finishing Tips

- Want to retain maple's light look? Coat it with a clear, water-based finish. Be sure to damp-sponge the wood to lift the grain, then sand, both before and between coats.
- Give maple an aged look with dye and an oil/varnish mix. Sand to 220 grit, wipe off dust, then damp-sponge the wood and sand as above. Wipe on a dye stain to suit, and let dry. Then sand with a fine grit (320 or 440), remove dust, and add a coat of oil/varnish blend, wiping off the excess. After it dries, apply a brown varnish-based stain and wipe off lightly (until it looks right to you). Let that dry, then give it an oil-varnish blend topcoat.

Photos: Staff

Buyer's Guide

Hot New Tools (p. 14)

King Industrial Scroll Saw

1. King Industrial 16" Scroll Saw ..... #163508, **$599.99**
2. King Industrial 36" Scroll Saw with Floor Switch ..... #163510, **$899.99**

Porter-Cable Restorer Tool

1. Porter Cable Restorer Handheld Drum Sander ..... #163939, **$99.99**
2. Porter Cable Restorer Handheld Drum Sander with Attachments ..... #163940, **$149.99**

Get to work with a Tool Stool (p. 26)

1. Knape & Vogt 10" Full Extension Drawer Slide RV-StayClose ANO, 2 Pairs needed ..... *opentip.com*, **$12.98** per pair
2. Incra T-Track, 18" Length ..... #142803, **$10.99**
3. Woodpeckers Deluxe Hold-Down Clamp ..... #142603 **$10.99**

A Home Remodeler's Tool Kit (p. 30)

1. Purdy 6-in-1 Painter's Tool ..... *amazon.com*, **$8.71**
2. Milwaukee 8-in-1 Compact Ratchet Multi-Bit Driver ..... *homedepot.com*, **$14.97**
3. Kobalt Folding Utility Knife ..... *lowes.com*, **$8.98**
4. 8" Groove Joint Pliers ..... *homedepot.com*, **$3.49**
5. Dasco Pro Nail Setter Kit, 3-piece ..... *homedepot.com*, **$5.97**
6. Husky 20 oz. Hammer ..... *homedepot.com*, **$9.88**
7. Grip 9" Stainless Steel Pry Bar ..... #856640, **$3.99**
8. Estwing 9" Pro-claw Nail Puller ..... *homedepot.com*, **$10.96**
9. Johnson 9" Magnetic Torpedo Level ..... *lowes.com*, **$8.98**
10. WoodRiver Bevel Gauge ..... #152000, **$35.50**
11. Empire 12" Rafter Square ..... *homedepot.com*, **$7.97**
12. Empire 7" Rafter Square ..... *homedepot.com*, **$3.97**
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27. Nebo Slyde LED Flashlight and Work Light ..... *amazon.com*, **$27.99**
28. Irwin 6-piece Tri-flute Auger Bit Set ..... *lowes.com*, **$29.98**

Build a Swing Bed (p. 36)

1. FastenMaster 6" Hex-Drive Wood Screw 12 pack, (24 needed) ..... *lowes.com*, **$12.86**
2. Liquid Nails Heavy Duty Off-white Construction Adhesive (10-fl oz) ..... *lowes.com*, **$2.52**
3. Grip 1" × 15' Ratchet Strap Tie Down ..... #28580, **$9.99**

Top-Notch Tapering Jig (p. 58)

1. Bessey Auto-Adjust Horizontal Toggle Clamp ..... #152929, **$19.25**
2. WoodRiver Knob, Four Arm with ¼"-20 × 1½" Stud (2 needed) ..... #27R15, **$3.99**

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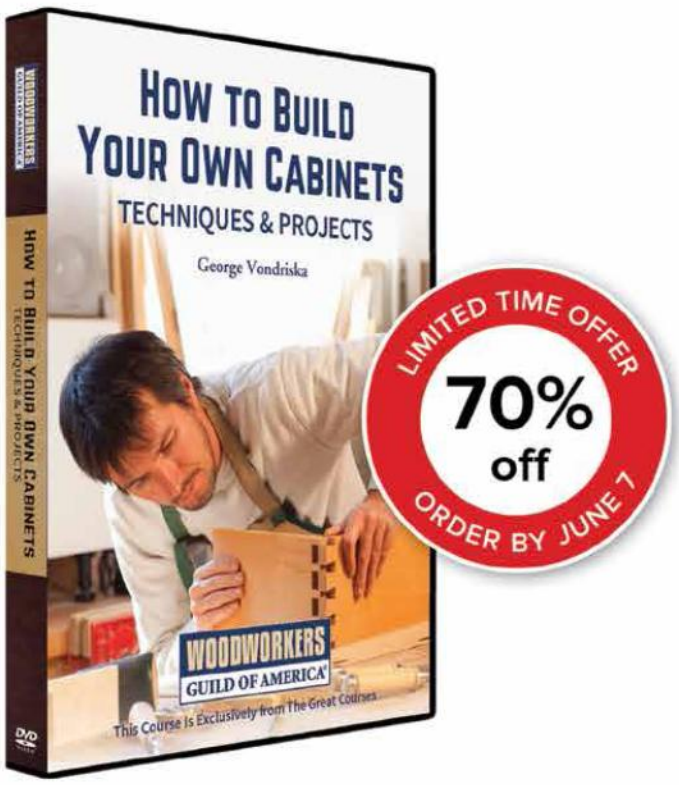

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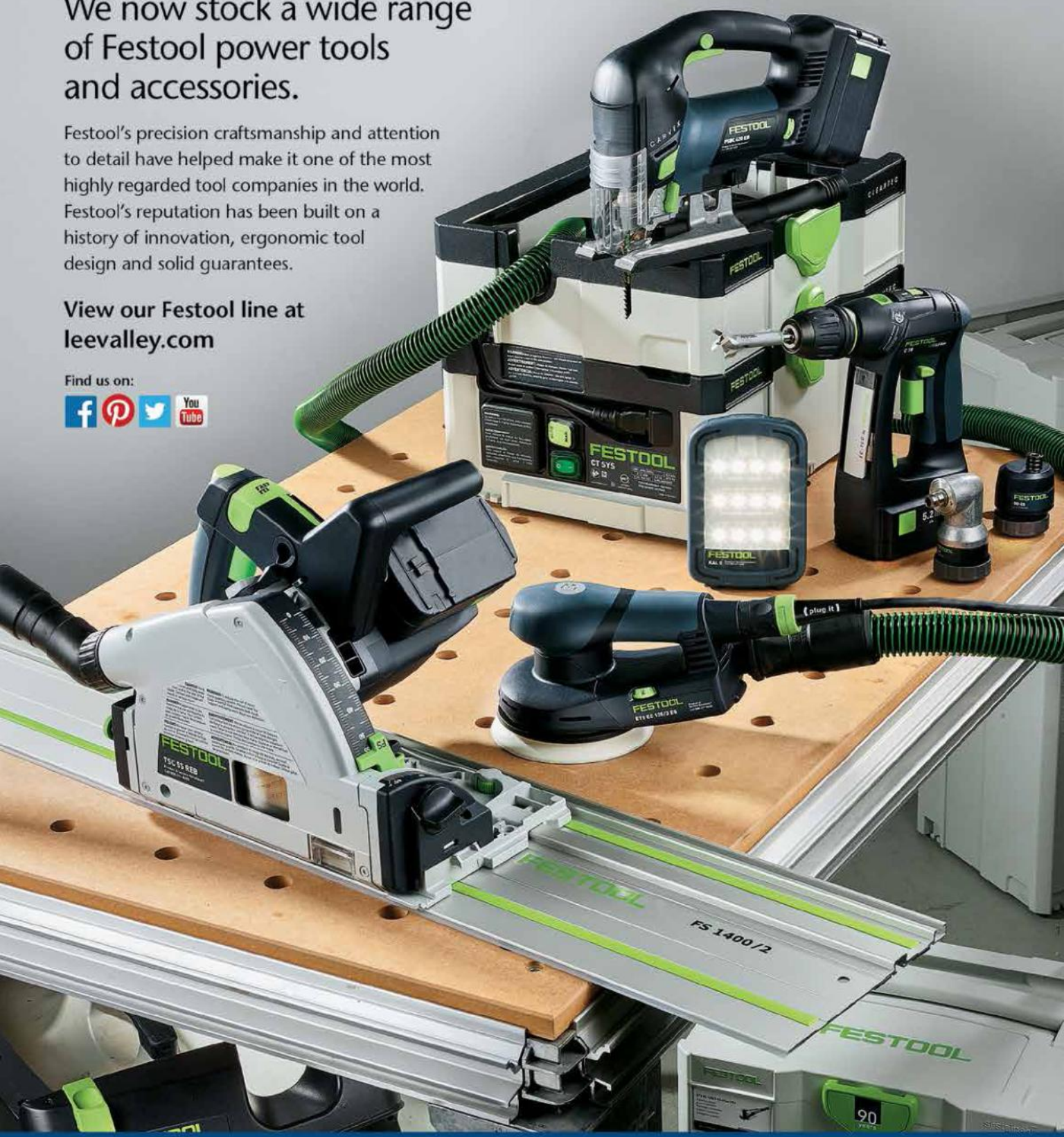

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Ripping bevels on the table saw

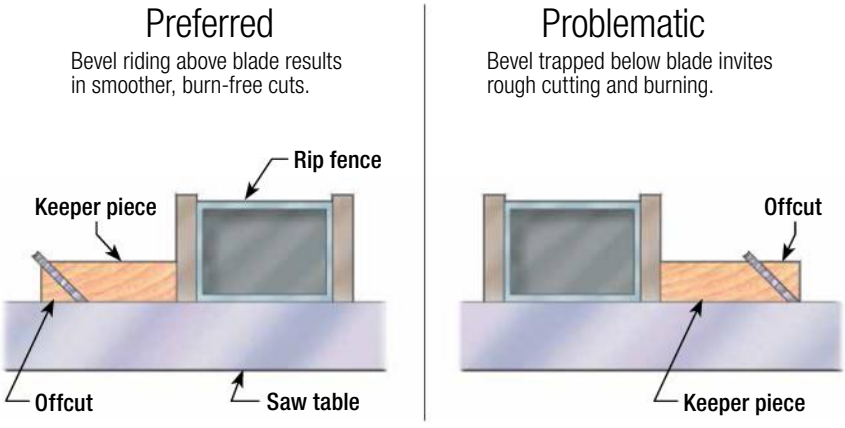
Q *An upcoming job requires ripping a lot of bevels on the table saw, a process I've always found challenging. What's the best approach to the operation?*
—Marty Kinwood, Phoenix, Arizona

A **Senior editor Paul Anthony replies:** It's true that ripping bevels can feel a bit dicey at times, but there are things you can do to ensure safety, success, and ease. First of all, it's important that your stock has been dressed flat, square, and with parallel edges. Then set up the saw and orient your workpiece so that the beveled edge of the keeper piece will be above the leaning blade. This is important because a bevel that's trapped under the blade invites burning or rough cutting if a bow in the board causes it to lift up during the cut. Also, a blade that's not perfectly parallel to the cutting path can tend to scorch a trapped bevel.

With a right-tilt saw, this approach generally dictates working with the rip fence to the left of the blade, which can feel a bit awkward at first, but you get used to it. The real problem with beveling on a right-tilt saw is that the fence typically only has about 12" of travel to the left of the blade. Therefore, beveling very wide panels forces you to work with the fence to the right, trapping the bevel under the blade. In this case, just do your best to keep the panel pressed down firmly near the blade to prevent it from lifting.

If you have a splitter that tilts with the blade, definitely use it when ripping bevels, as it will prevent kickback and ensure a clean cut. If you're forced to work without a splitter, take care to hold the workpiece solidly against the fence throughout the cut to prevent it from drifting toward the blade.

Editor's note: For a neat trick allowing you to cut bevels steeper than 45°, see page 24.



Note: Drawings show left-tilt saw with fence to right of blade, or right-tilt saw with fence to left of blade (as viewed from outfeed side of saw).

Ripping right. Ripping bevels on a right-tilt saw requires working with the fence to the left of the blade to avoid trapping the finished bevel under the blade.

Photo: Paul Anthony, courtesy Taunton Press; Illustration: Dan Thornton

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Woodcraft is proud to partner with John Malecki, a former NFL offensive lineman turned self-taught woodworker and furnituremaker. John crafts custom furniture in Pittsburgh, PA, as well as producing tutorials and videos on his website, JohnMalecki.com and YouTube channel, JohnMaleckiBuilds.

John attended the University of Pittsburgh and played four seasons in the NFL. After wrapping up his NFL career, he began building and selling furniture in 2014. Since then, he has worked with brands like Lululemon and West Elm Workspace PGH to build high-end industrial and reclaimed style furniture. John emphasizes the use of metal and wood in almost all of his furniture, pairing modern and industrial styles brilliantly.

johnmaleckibuilds

john_malecki

JORY BRIGHAM DESIGN

handcrafted in california

www.JoryBrigham.com

Woodcraft is delighted to partner with West Coast furnituremaker Jory Brigham, who grew up among generations of woodworkers and craftsmen, discovering his own creative voice at an early age. Learning the craft without formal training gave Jory a greater appreciation for the freedom his career path has afforded him.

Since 2008, Jory has designed and built custom furniture for his own company, Jory Brigham Design, as well as offering classes in furniture building. He uses mostly domestic hardwoods and time-honored techniques to craft unique furniture at his San Luis Obispo, California, studio.

To learn more visit brighamworkshop.com

jorybrighamdesign

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Jumbo Jenga

The most fun you can have with 2×4's.

By Chad McClung

In warmer months, my friends and our families get together for food and fun. We play Frisbee, Beersbee (the inebriated version), horseshoes, and beanbag toss. During a recent case of the winter blahs, I found myself surfing the web for a new game to add to our repertoire, and came across Jenga® Giant™. It's a super-sized version of the popular block-stacking, tower-toppling tabletop game. You can buy Jenga Giant if you're willing to shell out $100, but why not cut up your own blocks for less than $20, like I did?

I began by crosscutting six of the clearest, straightest 8' 2×4's I could find to a more manageable size and then face-jointing and planing the lengths to 1¼" thick. (For this game, it's important that all the blocks are of consistent thickness.) After edge-jointing and ripping the stock to 3" wide, I set up a stop at the chop saw and cut 54 blocks to 9" long. Then it was time to cozy up to the router table to ease all the edges with a subtle chamfer, followed by gang-sanding the faces of the blocks through 220 grit. To further increase the all-important sliding action, I applied a coat of polyurethane and, after scuff-sanding the contact faces, followed up with a coat of wax.

Itching for a test-run, I gathered some of the magazine crew in the shop for a crash test. We found that stacking the pieces on a sheet of plywood straddling a couple of sawhorses elevated the game to a more comfortable height. It also made for a more exciting crash! But play however you like. The "rules" are pretty simple. (See box.) The most important thing? Have fun. And watch your toes. ■

Stories wanted! Have a humorous or inspiring story with a woodworking theme? Email your submission to *editor@woodcraftmagazine.com*, and put "Wood Filler" in the subject header.

Game on!

To play, stack the 54 pieces in crosshatched rows of three. Then take turns sliding a block from any lower row, and setting it atop the stack, maintaining the crosshatched pattern. Repeat until the tower tumbles. The player to make it crash loses.

Photos: Doug Loyer

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