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WOODCRAFT[®]

Projects, Techniques, and Products

magazine

Make this classic

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- Turn off your table saw with a toe tap

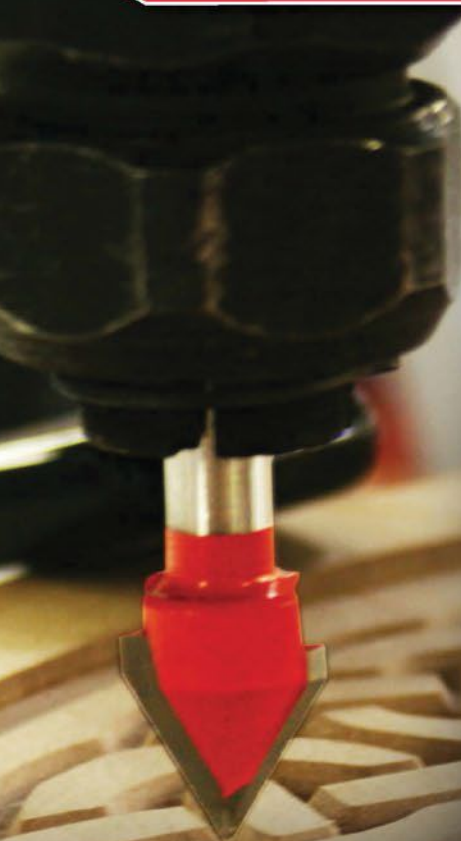
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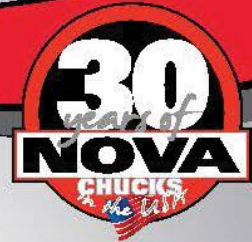


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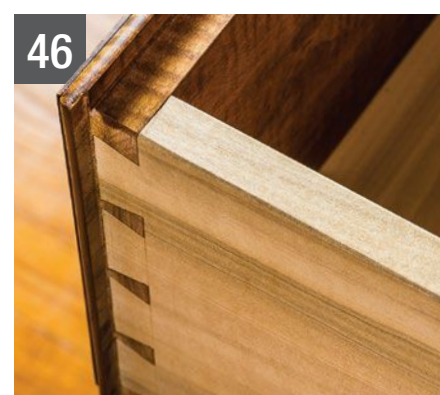
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During Minnesota's infamously long and cold winters, **Larry Okrend** ("Standing Mirror with Storage," p. 50) spends his time designing, building, photographing, and writing about woodworking in the Twin Cities. Combining a lifelong interest in photography and woodworking led him to a career in how-to editorial. After over 30 years as an editor for national woodworking and home-improvement magazines, Larry is now semi-retired and is an avid cyclist and kayaker—weather permitting. Check out his new book, *Black + Decker: Small Space Workshops*.



After a 15-year stint at *Fine Woodworking* magazine, **Asa Christiana** packed up and moved cross-country. Now in Portland, Oregon, he is a freelance writer and photographer. Asa also teaches woodworking classes and maintains a blog featuring all manner of DIY projects. He made plenty of sawdust for his "Bust Dust for Good" article (p. 30), and it paid off; you'll find loads of good dust collection advice on these pages. Asa spends his leisure time working on his fixer-upper house and biking with his wife and teenage daughter. ■



Master woodworker **Chris Hedges** has developed a liking for challenging projects. The spice box he built for us took two issues to cover (75 & 76). In this issue, he ups the ante with another heirloom-quality piece: the "Shaker Counter" featured on the cover and on p. 36. Not long after completing the project, his counter won "Best in Show" at the East Tennessee Woodworkers Guild's 19th Master Woodworkers Show. When he's not building award-winning furniture, Chris and his wife Miriam like to take long hikes in southeastern Ohio.

Looking Ahead

Here's a sneak peek at our next issue.

Get to work with a **TOOL STOOL**

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Same crew, new captain

Your magazine has a new chief editor. Chad McClung has settled into the driver's seat at magazine headquarters in Parkersburg, West Virginia, with his hands firmly on the wheel. This transition in leadership has actually been going on for quite a while. From my first day as the magazine's chief editor over three years ago, Chad has been an able and enthusiastic partner in making all kinds of changes to improve your magazine.

Chad's first involvement with Woodcraft began over ten years ago, when he took on freelance assignments as a graphic artist. It didn't take long for him to be offered a full-time spot, with responsibilities ranging from handling quality checks at the printer to laying out articles, hiring photographers, and directing technical artists to produce the drawings that appear in every issue. Armed with a ready sense of humor

and an above-average ability to keep Woodcraft's workshop clean and organized, this guy is going to take good care of your magazine.

Of course, a captain needs a good crew, and we've got that requirement covered. I'm glad to be staying onboard as a major contributor, along with senior editors Joe Hurst-Wajszczuk, Paul Anthony, and art director Bobby Schehl. Together with other team members (shown below), we're set to handle everything from reader queries and advertising campaigns to subscription drives and premium

content creation. What's more, we're connected to a network of 76 Woodcraft stores across the country—a great source for the article ideas and expertise we need to make each issue special. We all share the same mission: making woodworking rewarding and enjoyable for woodworkers everywhere. You're part of this mission, too. We're counting on you to let us know how we can make the magazine better and better. ■



A Good Crew. (back row, left to right) Stacey Bartenschlag, Connie Harmon, Vic Lombard, Gary Lombard, Bobby Schehl, Joe Hurst-Wajszczuk (front row, left to right) Paul Anthony, Chad McClung, Tim Snyder, Kim McLaughlin.

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Art Director: Bobby Schehl
Copy Editor: Sharon Hambrick
Publisher: Gary Lombard
Advertising Sales Manager: Vic Lombard
Circulation Support: Kim McLaughlin, Stacey Bartenschlag
Office Manager: Connie Harmon
Circulation: Circulation Specialists, Inc.

Contact us:
4420 Emerson Avenue, Suite A
P.O. Box 7020, Parkersburg, WV 26102-7020
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editor@woodcraftmagazine.com

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Safety First! Working wood can be dangerous. Always make shop safety your first priority by reading and following the recommendations of your machine owner's manuals, using appropriate guards and safety devices, and maintaining all your tools properly. Use adequate sight and hearing protection. Please note that for purposes of illustrative clarity, guards and other safety devices may be removed from tools shown in photographs and illustrations in this publication.

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John Malecki *goes from gridiron to workshop*



When he wasn't blocking charging linemen as an offensive guard for the Pittsburgh Steelers, John Malecki picked up woodworking in the off-season to stay focused and disciplined. Before long, friends started asking him to build stuff. Now he runs his own furnituremaking business and teaches the craft through his blog and website. I caught up with John, and we tackled a few woodworking topics.

—Chad McClung

WM: What did you learn on the field that you apply in the shop?

JM: Developing plays and formations and then executing them on the field is like planning a project, drawing it up, and taking it to the shop. I was not the biggest, fastest, or the strongest lineman in the NFL. I had a different set of skills, but I still had to practice a little harder and a little longer to stay in the game. And I didn't rest on my laurels. I take a similar approach to

furnituremaking; I want to be a better woodworker. I can't be content with one technique because it's fast. I want to keep learning and keep pushing myself as a craftsman to design and build better furniture.

WM: What do you love about woodworking?

JM: I love plucking an idea from my head, putting it on paper, and making it a reality. I grew up helping my family with remodeling and working around the house—working with my hands. So I guess that stuck.

I don't care how much time you put into it, you can always learn something new. You can always improve. I cringe when I look at projects that I built a few years ago. It will be interesting to see what I think of my current project in five or ten years from now. But that's a beautiful thing about woodworking, you can always push yourself to do better.

WM: Do your hometown roots show in your work?

JM: Pittsburgh is a steel town with old bones and great architecture. I tailor my designs to the city's industrial vibe, and I think my work embodies that. I like to use reclaimed material from the area. And not just wood; I do metalwork as well. Those

materials have a story, and I like to work that story into my projects. Pittsburgh has been fantastic to me, and it's my way of giving back.

WM: What's your favorite tool in the shop?

JM: I don't pick favorites. For me, it's about having the right tool for the job. We've all made do with cheaper tools and work-arounds, but everything is easier when you have the exact tool, or jig, or technique for the task at hand. Upgrading my table saw, jointer, and planer has made a huge difference in my work. Assemblies and glue-ups are easier, my projects look better, and I enjoy my shop time more. I actually look forward to milling lumber. Good dust collection is also important in that equation.

WM: Do you have anything else to offer a beginner?

JM: I really enjoy listening to podcasts when I'm in the shop, but there are plenty of other ways to discover new ideas and find inspiration for your next project—like woodworking magazines and websites featuring the work of skilled craftsmen.

WM: What would you like to leave your fans with?

JM: Woodworking isn't just a basement hobby for grandpa. It's cool, and people really do appreciate quality craftsmanship. There is a Renaissance of woodworkers and makers right now and it's inspiring. Find your passion and go for it. ■



onlineEXTRA

John had more to say than what we could fit here. Visit our website for the full interview.



Industrial roots. This bar's mix of metal and wood pays homage to the Steel City. See what John's building next at johnmalecki.com.



WHITESIDE

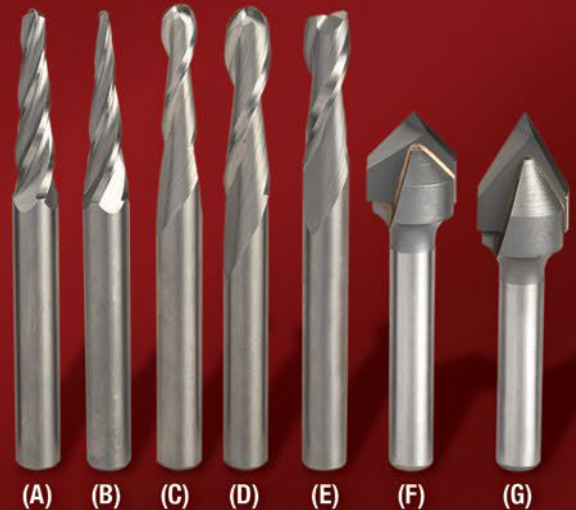
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Making beautiful music

Please thank Dave Boyt for sharing his Mountain Dulcimer (#80, Dec/Jan 2018). As you can see, I took some artistic licenses, but the project turned out great. Now I just have to learn how to play it.
—Mike Dunn, Columbus, Ohio

Author/builder Dave Boyt replies:

That is one nice looking instrument! Adding your own touches to my basic plans was exactly what I hoped builders would do.

Learning to play is part of the fun. To get started, I suggest that you pick a simple tune and try strumming the top pair of strings to follow the melody, and let the others strings drone. Once you've figured out the tune, try adding some background chords.

For more detailed instruction, I suggest treating yourself to Jean Ritchie's *Traditional Mountain Dulcimer* book and CD set (amazon.com). You'll find great info online, such as Bing Futch's "Dulcimerican" series on YouTube, and Homespun (homespun.com). I also found an online forum for dulcimer enthusiasts (everythingdulcimer.com). I'm sure that they'd welcome your photos in their builder's section.



Bad news for California oaks

"Sudden oak death," a pathogen that has killed millions of oak and tanoak trees in California's coastal forests since 1995, has officially reached "Phase 3" epidemic levels. According to the report in the *Proceedings of the National Academy of Sciences*, eradication is no longer possible.

The killer is a waterborne and airborne mold (*Phytophthora ramorum*) that infects trees and causes trunks to crack open and bleed sap. Although some trees seem immune to the pathogen, millions of acres have already been affected. By 2030, the tree-killer is expected to cover 5,400 square miles.

Removing infected trees and planting disease-resistant species can help contain the disease but unless a cure can be found, California must live with the disease's impacts, which include increased risk of forest fires.

Thomas Flinn & Co.
Saw & Hand Tool Manufacturer
Sheffield, England

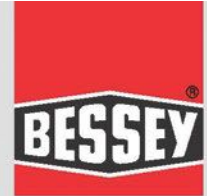


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More about the mortiser

I really liked the lift-top coffee table project that appeared in issue #79 (Oct/Nov 2017), but I am particularly interested in the shop-built mortising jig that employs Micro Jig's new MATCHFIT clamps. I suppose that I could use the photos to create my own version, but a little advice or sketch would be a real time saver.

—Stanley C. Pearse, via the internet

Consulting Editor Tim Snyder responds:

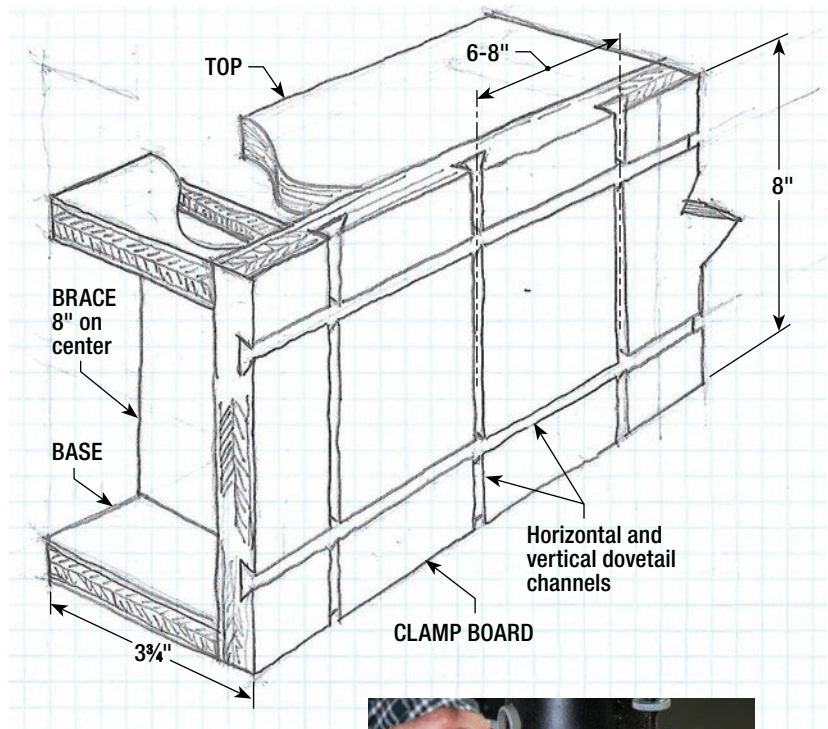
Thanks for writing. Considering that I used my jig not only for mortising, but also to support the rails when routing the decorative beads, it deserved a better treatment.

I had planned to take some photos; however, I'm sorry to say that my puppy borrowed the jig for use as a teething aid. Hopefully, this sketch, and few additional construction notes, will suffice.

Size your jig to suit. My long-ish version (32") enabled my jig to support boards when routing the edges of longer boards, in addition to serving as a mortising platform. Make the top of the jig at least 3" wide to provide good support for your router. The spacing of the dovetailed channels is up to you, but you should position them at least 1" away from the edge, or else the clamp pressure could split the plywood. (I routed the grooves in two passes, starting with a 1/4" straight bit, then a 14° dovetail bit.)

Assemble the jig in stages. I recommend completing the clamp board first. Then, fasten it to the base, and add braces every 8". Attach the top last, making sure that its outer edge is straight and smooth (to work with your router's edge guide) and that it is parallel to the face of your clamp board. Keep the base open at the jig ends so you can clamp it to the workbench.

For the record, I've found that the MATCHFIT clamps are very useful for other applications too.



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Advice for a would-be woodworker

I'm interested in becoming a woodworker, but I'm at the very beginning of my learning curve. Do you know of any good courses in my area? I'd appreciate any advice you can offer.

—Erasmó Calderon, San Antonio, Texas

Tim Snyder replies:

Thanks for reaching out to us. The world can't have too many woodworkers; I'm glad you're aiming to learn more about this area of craftsmanship.

Here are a few ideas that might help you get started:

- Make friends with the folks at your local Woodcraft store. (To find a nearby store, go to: woodcraft.com/store_locations.) There you should be able to make some new friends with similar interests, get free advice about tools, and perhaps take a few classes to build your skills.
- Read about it. Find a library or a used bookstore that has a selection of carpentry, woodworking and home-improvement books, and dig in.
- Start your tool collection. Don't forget to invest in eye, ear, and respiratory protection.
- Start making some sawdust. Take on some basic projects. Learn from your mistakes.
- More than anything else: enjoy the journey.

One day, I'm sure that you'll have a chance to pass on your knowledge to another aspiring craftsman. ■



How to reach us



Email

editor@woodcraftmagazine.com



Direct Mail

Woodcraft Magazine, 4420
Emerson Ave., Suite A, Box 7020,
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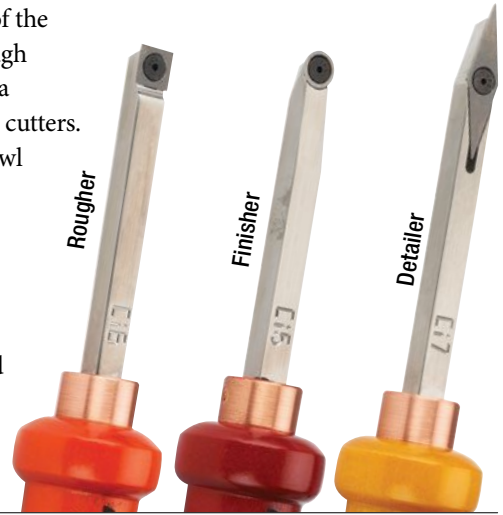
Easy Wood Tools Micro Turning Tools

Fans of Easy Wood Tools who enjoy turning miniature work will welcome the company's latest addition to its popular family of carbide-cutter turning tools. The "micro" tools are a scaled-down version of the company's larger tools and include a rougher, a finisher, and a detailer cutter. Although diminutive at an overall length of 9", these tools are beautifully made, each sporting a stainless steel shaft, a copper ferrule, a well-designed handle, and downsized carbide cutters.

Despite its size, the micro rougher efficiently removes waste from spindle and bowl stock. That said, it certainly is meant for small work; I'd probably limit it to spindle stock with a diameter of less than 2½", and use it for bowls no wider than about 6" or deeper than about 1½". The micro finisher is suited to curves and coves with a ⅜" or larger radius. I find it a great tool for smoothing the bottoms of very small bowls. The micro detailer excels at very fine grooves. With some persistence, it can be used for tiny coves and beads, as shown above. In short, if you've been frustrated trying to effectively downsize your work, this set may be exactly what you need.

—Tester, Michael Kehs

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Snap-in
chip covers

Routers are among the most versatile tools in a woodworker's arsenal, but they produce massive amounts of sawdust. Manufacturers have made dust-busting advancements with newer routers, but these improvements don't mean anything for thousands of older models. Fortunately, the folks at Oneida have developed an effective retrofit to solve this dust collection problem.

The clear polycarbonate Universal Router Hood is designed to replace the base on a wide range of routers (it won't fit trim routers). The integral "dust dome" captures dust above the workpiece, and connects to a round port where you can attach a 1½"-dia. shop vac hose. Use this setup when routing dados or doing other interior routing operations and for plunging bits up to 1¼" in dia.

For edge work, attach one of two chip covers and catch dust below the base. The covers work great with straight bits and cutters up to 2½" in dia.

I worried initially that the dome would obscure the bit, but I had a clear sight line and could easily see through the clear plastic. And there was no dust cloud to contend with. I was also concerned that the hose would get hung up or pull the router, but the hose connector handily swiveled out of the way. And the chip cover followed me along edges and around corners. Add this accessory to your hand-held router for only \$35, and breathe a sigh of relief. ■

—Tester, Chad McClung

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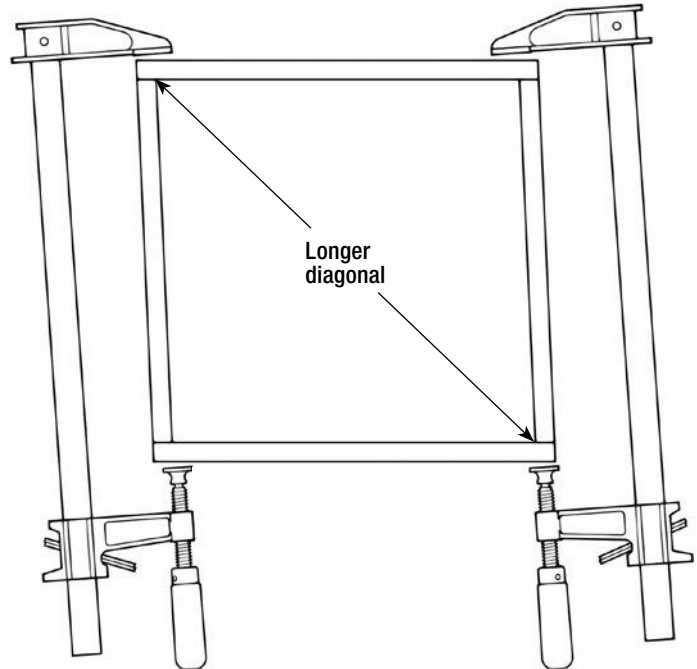
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TOP TIP

Cocking clamps for square assemblies

The best way to ensure a square glue-up of just about any kind of box is to cut your joints accurately, work on a dead-flat surface, and carefully center the clamping pressure across the joint. However, it's not unusual to find that you're still a bit out of square. It's time to get cocky with your clamps: simply shift them slightly in the direction of bringing the clamp bars parallel to the assembly's longer diagonal. Recheck for square by comparing your diagonals again, and make any adjustments until the diagonals match.

—Jean Devine, Santa Rosa, California



To bring assembly into square, cock clamps slightly, as though bringing their bars into parallel with the assembly's longer diagonal.

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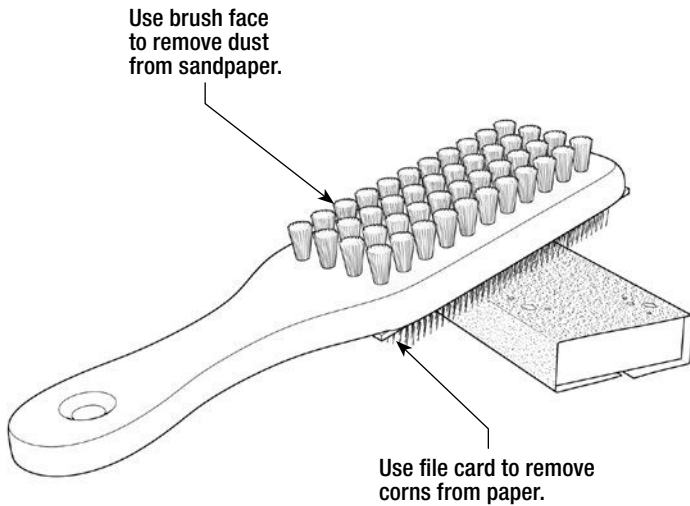







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Cleaner sanding for a better finish



Successfully smoothing a finish depends on keeping your sandpaper clean by frequently brushing or blowing it off. Paper loaded with dust won't cut properly. Worse yet, some finishes—particularly those that haven't cured a long time—can cause “corns,” tiny blobs of partially cured finish that accumulate on your sandpaper and can mar the surface, defeating the very purpose of sanding. To ward off these problems, I keep the proper weapon at hand: a *file card and brush*. This combination tool, which is designed to clean files and rasps, sports a soft-bristle brush on one side and wire brush on the other. I keep it in my free hand while using the other hand to sand with paper wrapped around a felt block. When the paper loads up with dust, a quick swipe or two with the brush does the trick. I attack corns with the file card.

—Andy Rae, Asheville, North Carolina


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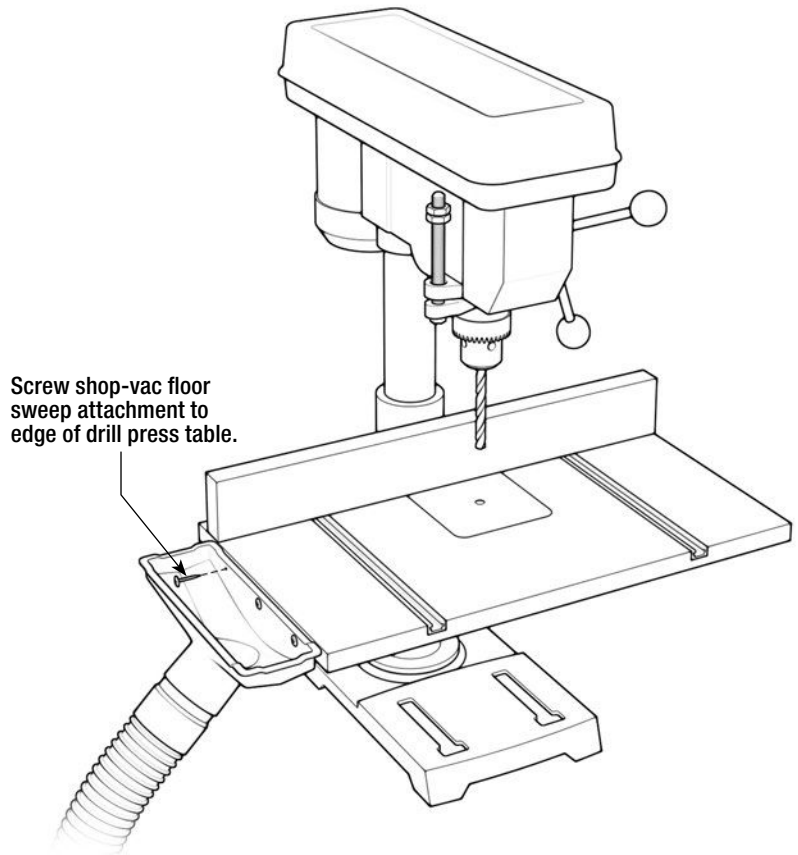
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Drill press chip collection

The area around my drill press sure gets messy from the wood chips that I'm always brushing off the table. I finally realized that, rather than vacuuming the chips from the floor afterward, it made more sense to mount the vacuum's floor sweep attachment to the edge of the table with a few screws. I leave it there permanently since I don't use the attachment for much else, but you could hang it using keyhole slots for easy removal if you like.

—Russ Svendsen, Olean, New York

Editor's Note: To avoid the chance of losing the chuck key, a bit, or some small part, try attaching a piece of metal mesh over the sweep's opening.



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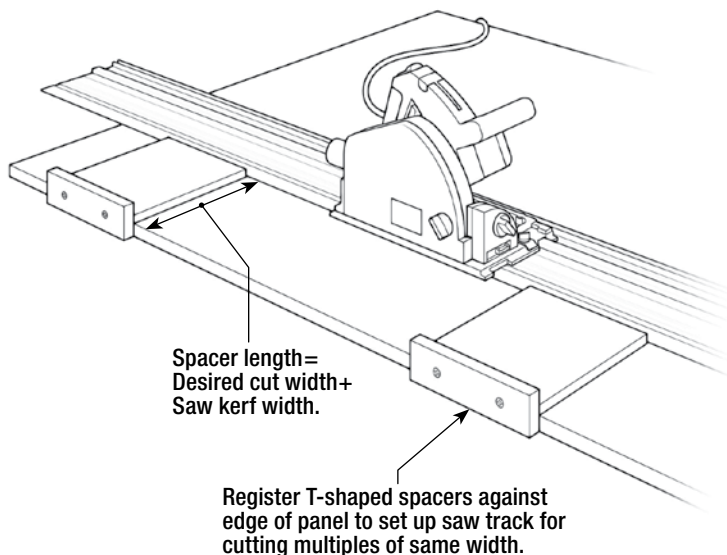


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Quick track setup for multiples

In my crowded, cramped shop, it can be difficult to rip long pieces from full-sized sheet goods using the table saw. That's when I turn to my track-guided portable circular saw. Although this eliminates the hassle of wrangling work onto the table saw, I don't have the convenience of using its rip fence for quickly sawing multiple pieces to the same precise width. When faced with sawing a bunch of identical cabinet sides recently, I cobbled up a pair of T-shaped spacers that allow for quick, accurate, repetitive track setup. Registered against the edge of the stock, the spacers ensure that the track is parallel to the edge, and that all resulting cuts are the same width. The spacers are simple to make; just ensure that their length includes the width of the saw kerf and that they're wide enough to provide a solid, reliable reference when setting the track. ■

—Joe Hurst, senior editor



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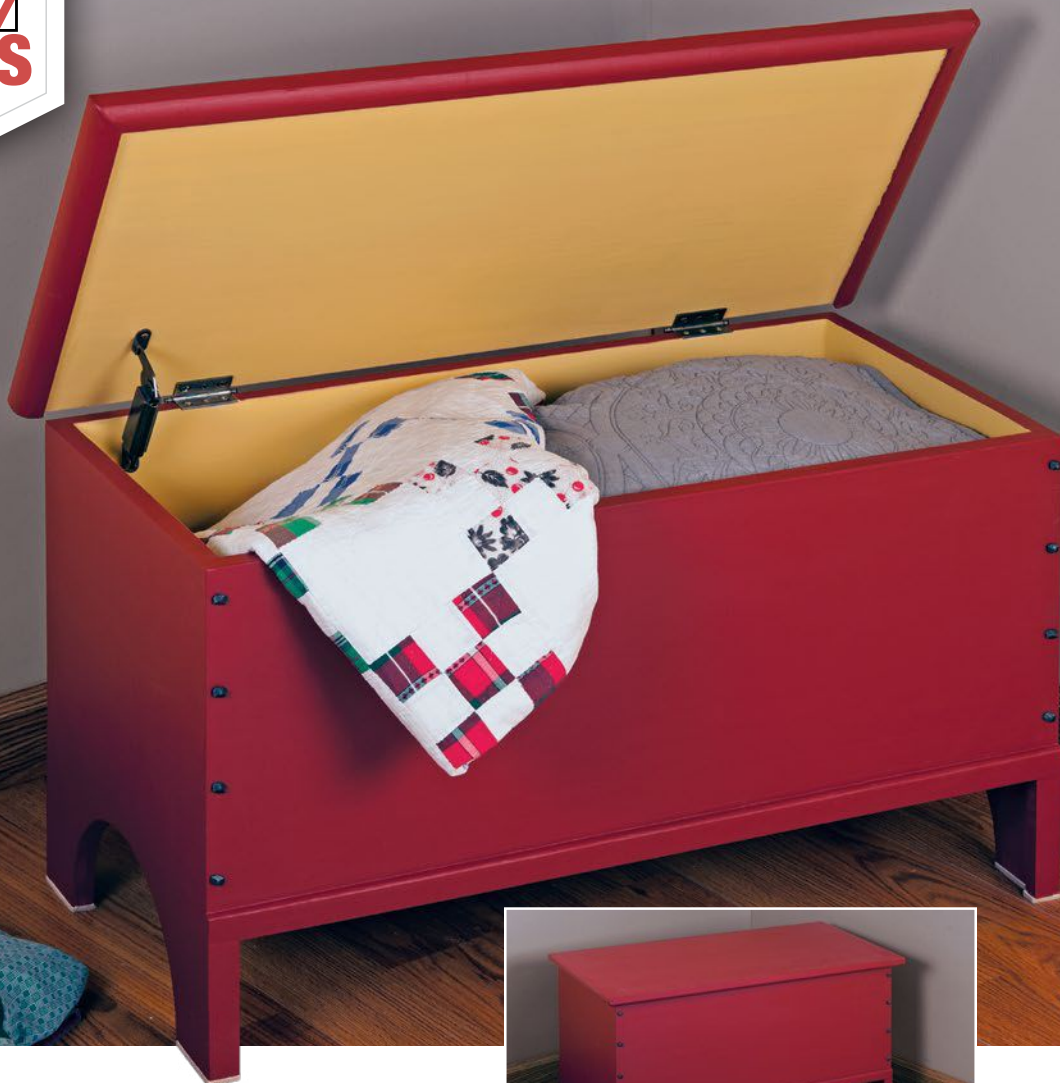
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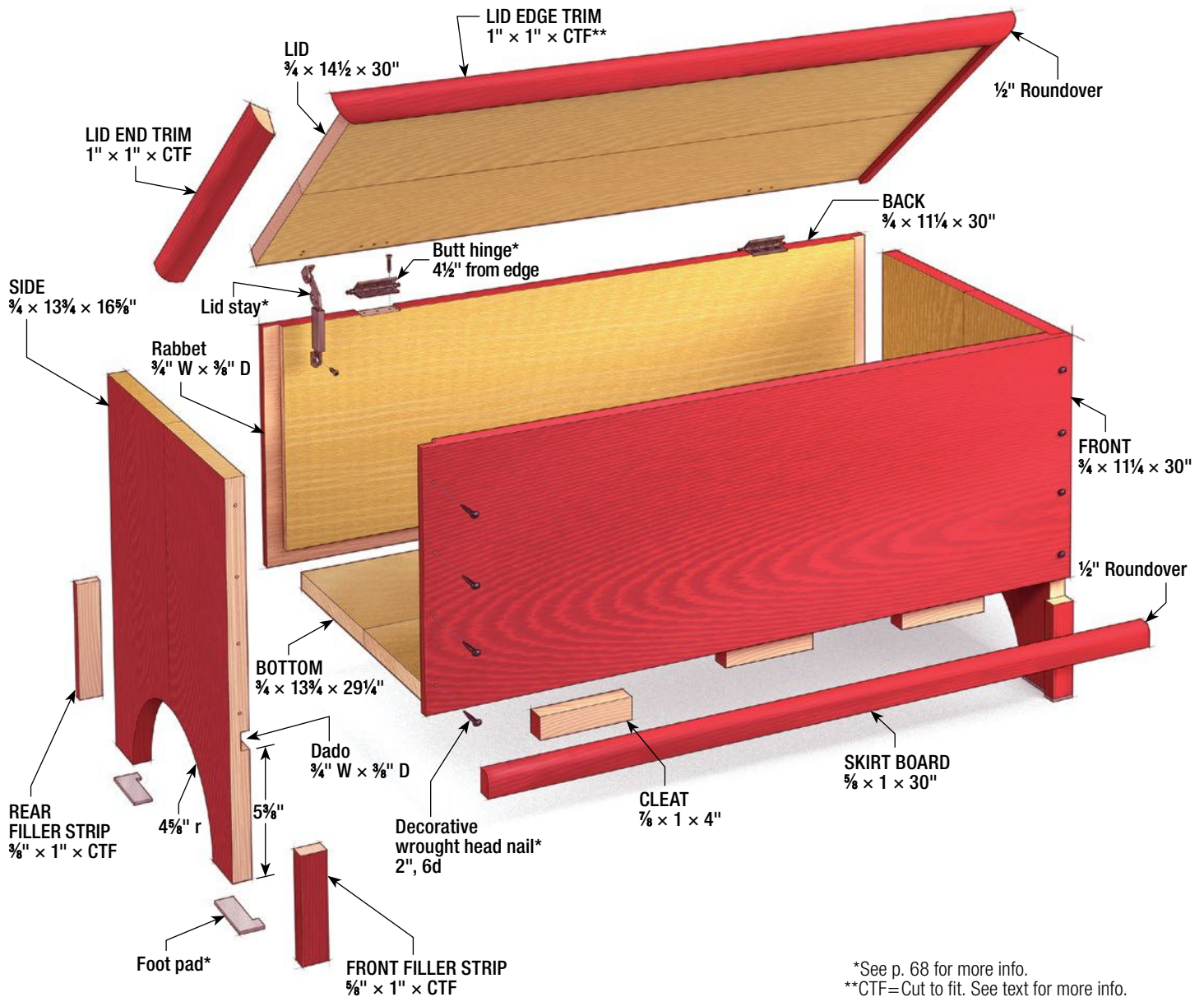
It only takes a weekend to build this classic storage piece, and it will last for years to come.

By Chad McClung

Antique versions of six-board blanket chests have endured for centuries, sometimes handed down from one generation to the next. It's not difficult to appreciate the popularity of a chest that can provide good basic storage, do double duty as a bench, and be built from a few wide boards.

Traditionally, a 6-board chest was exactly that: a top, a bottom, two sides, and a front and back. Admittedly, my version has a few more pieces, but I think it still follows the spirit behind the classic design. The home center 1×12s I used for construction needed to be edge-glued to be wide enough for some parts.

Other extra parts simplify joinery. Rather than cut a long notch in the sides, for example, I added filler strips. I also added the skirt board and lid trim for visual interest and to help conceal minor gaps. Feel free to experiment with the side cutout and molding profiles to suit your style and bit collection.



*See p. 68 for more info.
 **CTF=Cut to fit. See text for more info.

Simple joinery, classic looks, and rustic hardware

Contrary to its name, the six-board chest started out as three 8-foot 1x12s and some scrap 2x4 stock. Choose clear, flat boards to ensure accurate joinery and easy assembly. The chest's front and back are 11 $\frac{1}{4}$ "—the width of a processed 1x12. To make the ends, bottom, and lid, you'll need to glue two boards together and then rip these parts to finished width. Rabbet and dado joints add strength to the overall construction, while also minimizing exposed end grain and aiding the assembly process. Cut nails, rustic hinges, and a painted finish will give your chest a Colonial-style appearance. A more modern lid stay prevents the lid from slamming shut.

Order of Work

- Prep the parts and cut out the side profile.
- Rout the dados and rabbets, and then assemble the case with glue and brads.
- Cut the hinge mortises and make the lid.
- Rout and rip the trim, cut to fit the filler strips, and then install.
- Sand and apply finish.
- Drill pilot holes, and then drive the nails.

Curved cuts create the legs

To give the chest a graceful but solid stance, I made a semi-circular cutout in the sides. Set a compass to $4\frac{5}{8}$ " wide, and mark the cutout on one side. You could also center a bucket or a coffee can and trace around its edge. Affix the sides together with double-stick tape—show faces out. After the profile is cut and sanded, pry apart the two side pieces, taking care not to dent the soft pine. A little mineral spirits to break the adhesive bond and a plastic putty knife should do the trick.



Cut two at once. Keeping the sides together with double-stick tape saves time and ensures identical cutouts.



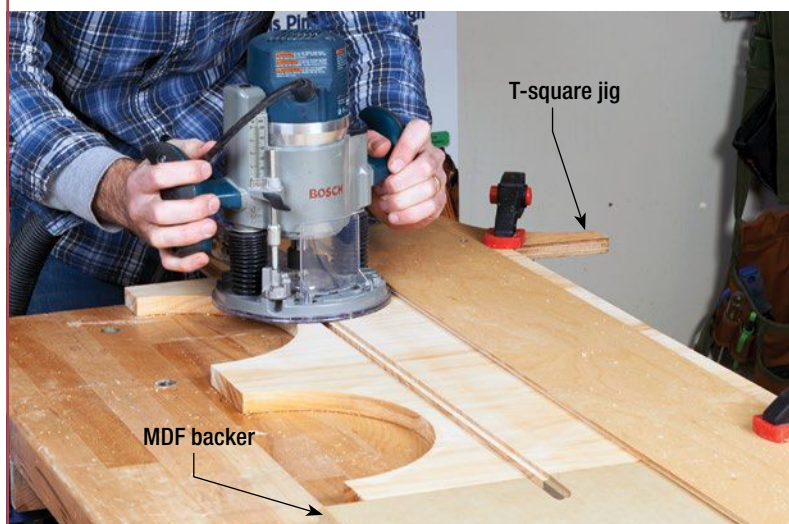
Curved sanding block

Round the curve. Keep the sides taped together, so you can smooth both curves at once. I used a file to do the heavy lifting and followed up with some sanding. A curved sanding block made from the offcut and some 120-grit sandpaper will do a good job. When smoothed to your liking, improve the look and feel of your legs by chamfering the curved edges with sandpaper.

Dadoes in the sides, rabbets in the front & back

The dadoes and rabbets are designed to register the parts, simplifying assembly. Rout the dadoes in the sides first. I used a $\frac{1}{2}$ " straight bit in a plunge router and a simple T-square jig.

Insert the bottom piece into the dadoes. Clamp if necessary to keep straight and square. Next, hold the front piece to the bottom and side assembly to check your measurement for the front and back. Now rabbet your front and back on the router table.



T-square jig

MDF backer

One dado, two sides. By clamping both sides edge-to-edge, you can quickly rout dadoes to hold the bottom. Measure $10\frac{1}{2}$ " down from the top end to lay out the dado, then clamp a straightedge parallel to the bottom line at the correct offset to guide the base of your router. Use a $\frac{1}{2}$ "-dia. straight bit to cut to a $\frac{3}{8}$ " depth in two progressively deeper passes. Then reposition the fence to widen the dado in the same manner.



Router table rabbets. Install a $\frac{3}{4}$ "-dia. straight bit in your table-mounted router, adjust the bit height to $\frac{3}{16}$ ", set the fence, and rabbet the front and back panels. Then raise the bit to $\frac{9}{16}$ " to complete the rabbets.

Assemble the chest, and prep for hardware

It's almost time for things to come together. Rabbets and dados help register the parts, but a successful glue-up also depends on a flat work surface and some squaring guides that will keep one joint clamped together while you fasten another. First, prep the parts by sanding them to 180-grit. Brush glue in the dados and install the bottom first. Then stand up the assembly, holding the front and back in place with glue and clamps until you can fasten them with brads. Remove the clamps and plane the top edges of the top and back to match the sides as necessary.



Put it together. Brush glue on the rabbeted ends of the front and back, then tack in place with a few 1" brads. Squaring guides hold the panel in place and ensure a square assembly.

Squaring guides



Scribe, chop, and pare. After locating your hinges on the top edges of the back, hold each hinge in place while scribing against its ends. Make a series of chops between your lines, to make it easier to pare out the waste. When paring, keep the bevel up and the blade horizontal. Test-fit the hinge and improve the fit as necessary with additional paring.

Make a top with mitered trim

The top piece can now be cut to fit the chest. But leave it an $\frac{1}{8}$ " oversized so the trim will easily slip over the chest unimpeded. The decorative trim adds an attractive overhang to the chest's design. Rout the profile on oversized stock, and rip it to width on the table saw.

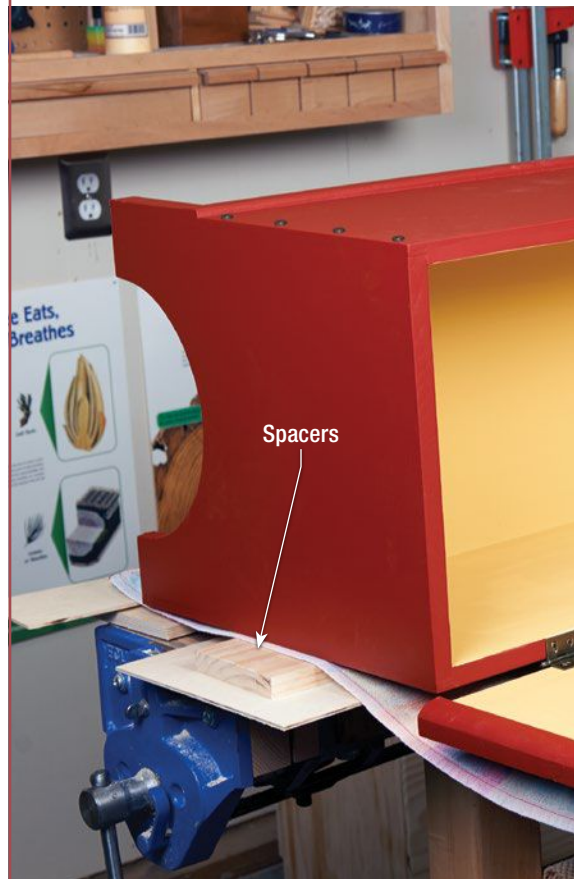
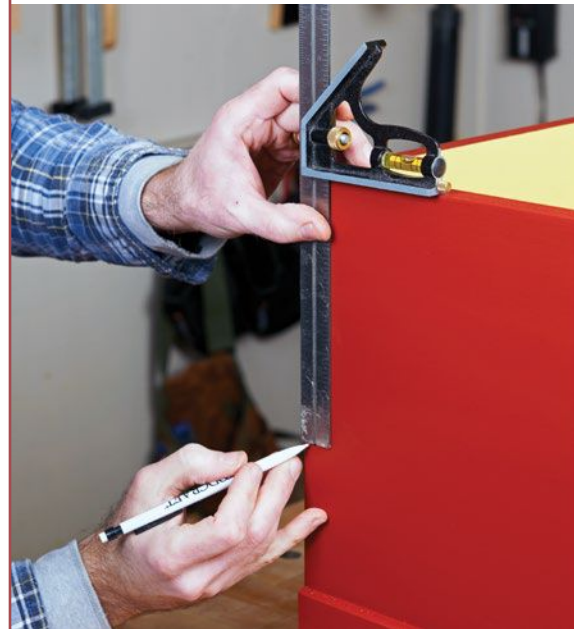
When you're done making the top, cut cleats and a skirt board to go along the bottom edge of the front (see drawing, p. 25), and attach it with glue and brads. As when fitting the lid trim, cut the filler strips long and trim them flush with the sides after installation.



Install the trim. Hold the trim piece to the edge of the lid and mark where to miter, but leave them long off the back. If the miter doesn't fit, try finessing it with a block plane, or simply cut a fresh miter. Glue the front-most ends of the end moldings, and attach the back half with $\frac{1}{4}$ " brads. This should keep the mitered ends tight, but allow the lid to expand and contract. Trim the ends flush.

Milk paint & antique

Your blanket chest is missing only two things: a finish and hardware. Add a slight chamfer to the outside edges with a sanding block. Apply your finish of choice. I used two coats of General Finishes Milk Paint—Brick Red for the exterior and Somerset Gold for inside the chest. I scuff-



hardware take your chest from bare to beautiful

sanded with 220 grit between coats. You have a great looking piece at this point so take careful aim when you drive the nails. To avoid scuffing hardwood floors, I affixed self-stick felt pads to the feet.



Hammer home. The cut nails can split the grain if you're not careful. Start by ensuring that you're in far enough from the ends and edge. I measured $\frac{3}{8}$ " from the end and 1" from each edge, and then 3" apart. Drilling pilot holes for cut nails is imperative, but go only about two-thirds the length of the nail. I used a $\frac{5}{32}$ " bit to drill $1\frac{1}{16}$ " deep pilot holes for 2" long nails. Orient the nails so that the taper is perpendicular to the grain direction of the wood, and drive them carefully with a hammer. Use a cardboard shield to pad errant hammer blows.



Attach the lid. Set the chest up on spacers so that the hinge leaves lay flush on the lid. Drill pilot holes and hand-drive the screws for the hinges and lid stay.

Bust Dust for Good

A dust collector handles the big stuff. A mid-sized dust collector is a smart bet for the table saw, planer and other big machines. Keep it connected to the most-used chip makers. Add blast gates and an expandable hose to extend its reach to other machines.



Grab it at the source with a two-step approach.

By Asa Christiana



A shop vac grabs the rest. Roll in a shop vacuum for portable power tools. A sidecar-style dust separator keeps the vac's filter clean to keep suction strong.

Photos: Asa Christiana

Years ago, woodworkers considered dust as a nuisance, or a by-product of a busy shop. Back then, “dust collection” was mainly focused on grabbing the big chips to avoid sweeping the floor at the end of the day.

Today we know that fine dust is the real problem. Those microscopic particles that hang in the air the longest and clog the furnace filters are the same ones that can become embedded in your lungs. Breathe in clouds of it for years on end, and wood dust becomes a carcinogen, according to the National Institute for Occupational Safety and Health (NIOSH). But even the smaller amounts can complicate the symptoms associated with seasonal allergies, or (if you work with a lot of MDF or exotic woods) trigger a host of annoying—for some, potentially serious—allergic reactions.

Lucky for us, the woodworking marketplace has heard the cry for more effective dust collection, and answered with a host of practical solutions, from better tool ports to finer filters, making it easier than ever to keep your lungs clean and, yes, avoid sweeping too, which is nothing to sneeze at.

Imagine being able to use almost any machine or tool in the shop for hours at a time with nary a wood chip in sight and the air as clear as when you walked in. The dream is closer than you think. Whether you are just setting up your first workshop or you're ready to step up your game and bust dust for good, this two-step approach will help you get started.

fastFACTS

- The secret to a clean shop is collecting dust at the source. That keeps it out of your airways and can eliminate the need for an overhead air cleaner.
- New tools and machines have better dust exhaust ports. For older tools, you can seal up cabinets, add ports, and improve hose fittings.
- Filters are better than ever. High-Efficiency Particle Attractant (HEPA)-level filters are available for vacs and dust collectors alike, leaving your lungs and your shop clean and happy.
- A host of new accessories make it easier to turn on collectors and vacs, connect them to tools, and keep filters clog-free.

Start with a shop vac ... then make it better

Woodworkers know that a shop vac is the first step to a cleaner shop, but many don't make the most of this workhorse. To get started, figure out how to connect your vac to all the tools and machines you can (see photos, facing page, top). With the right collection of fittings, it can be a decent partner for many benchtop tools and a great upgrade for any portable power tool that sports a dust bag or canister. For example, dump that useless little bag or canister on the end of your random-orbit sander, attach your vac, and you'll be shocked at how dust-free sanding will be. The benefits extend beyond a clean shop. Cleaner sanding discs will boost the tool's efficiency, resulting in less time sanding and longer-lasting abrasives.

The latest generation of shop vacs offer some attractive

features (see photo, facing page, bottom), but if you already own one, you can do a lot to improve it. Start by switching out the existing foam or fabric filter with a HEPA-level filter to catch the finest, most troublesome dust. Finer filters are more prone to clogging, but there are a number of solutions. Disposable collection bags can serve as a pre-filter, but buying bags is pricey and inconvenient. I recommend investing in Oneida's Dust Deputy. This ingenious sidecar cyclone canister grabs 95% of the dust and chips and deposits them in a plastic bucket that's easy to remove and empty. More than eliminating the hassle of shaking out the filter when you empty the can, the cyclone keeps the filter clean so that the vacuum continually works at peak performance.

HIGH-PERFORMANCE UPGRADES



Add a HEPA filter. HEPA-rated filters are available for all vac models old and new. They pop in easily and capture the finest dust.

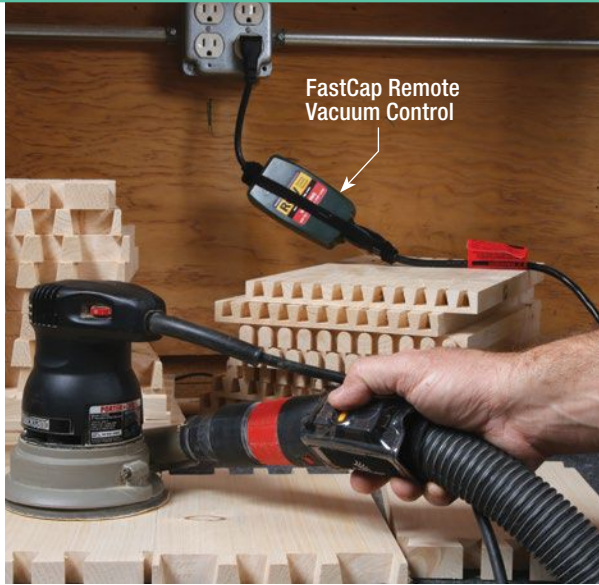


The clogging problem. All shop-vac filters clog, but HEPA-rated filters clog even more quickly.



Dust deputy keeps filters clean. I've found Oneida's Dust Deputy to be an amazing accessory for any vac. It will collect almost all of the dust and chips in its big pail, keeping the filter clean and suction at the max. The Deputy comes with casters and an attachment kit so you don't have to drag it around.

HANDY SHOP VAC ACCESSORIES



Add a remote trigger. If your vac doesn't have an auto-start outlet, you can activate it remotely with this two-part gadget that goes on the end of the cord and the end of the hose, right by the tool you are using.



Connect to everything. Inexpensive aftermarket hoses and fittings can connect any vac to almost any tool. I built a dust box on my router-table fence to accept the hose. The vac-assist on my miter saw grabs three-quarters of the mess, which I consider a victory with this notorious chip sprayer.



Buying New?

Today's shop vacs are designed to function more efficiently and quietly than their predecessors. Premium models like these offer features like auto-start outlets and filter cleaners.

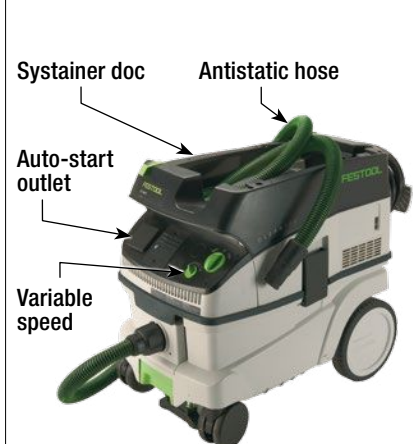
FEIN Turbo II, 8.4 gallon, \$349.00



Karcher WD5/P, 6.6 gallon, \$199.99



Festool CT 26E, 6.3 gallon, \$700



Step up to a full-sized dust collector

As souped-up as your shop vac now is, it still won't move enough air to grab the big chips thrown off by your big machines: table saw, jointer, planer, bandsaw. Considering that those are the tools you use frequently, it's best to have a dust collector dedicated to them, hooked up permanently with a blast-gate system and multiple hoses.

For most folks, a single-stage dust collector is the practical choice. A 1½-hp unit will provide the air volume and velocity to keep your biggest machines almost dust-free, as long as you limit the hose lengths to around 8 feet. (longer runs decrease airflow).

Like everything related to wood dust, full-sized collectors have gotten better, thanks to new filter technology. Old dust bags only grabbed particles bigger than 30 microns, blasting out the finest, most dangerous dust at head height. Next-generation dust bags boast 5-micron filtration, which helps

keep shops cleaner, but still leaves fine dust in the air.

A pleated cartridge filter is a smart investment for single-stage collectors. The increased surface area allows very fine filtration without choking airflow. If you are in the market for a new dust collector, get one with a pleated filter, sometimes called a cartridge or canister filter. If you already own a collector with one of those dusty old bags, a canister is a simple upgrade.

Like a shop vac's HEPA filter, a pleated cartridge filter with a single-stage collector is prone to clogging, especially if you let the chips pile up in the bottom bag. Although most employ internal flappers, which rattle the pleats to shake out caked dust, the flappers can abrade the paper and wear out your filter. To protect your investment, blast it out with compressed air once a week, or after heavy use.

SIMPLE AND SMART COLLECTOR UPGRADE



Ditch the bag and bust the dust. Canister filters provide better filtration and eliminate the dust cloud caused when the bag inflates. Once installed, the canister stays put.



Unclog it regularly. Blowing out the filter with compressed air eliminates the wear and tear that happens from using the internal flappers. Stay 6" away to avoid perforating the paper.

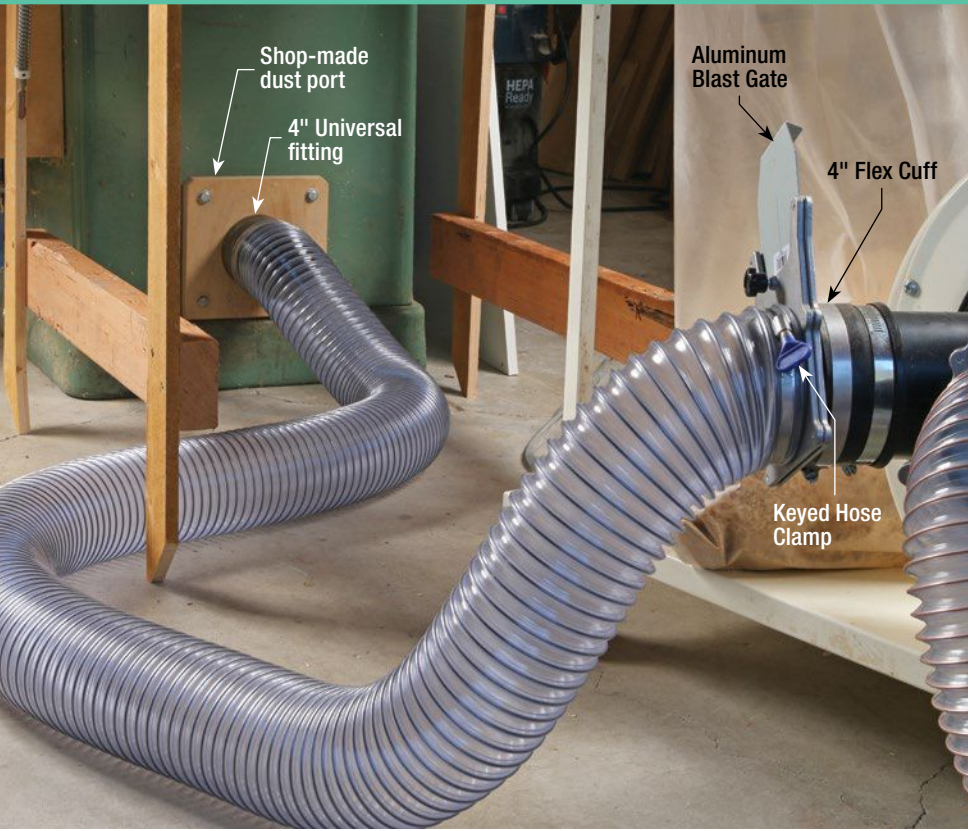


Add blast gates. A simple two-gate system lets me keep a short hose permanently connected to the table saw and offers a second hose for other machines.



Another awesome remote. Just plug your dust collector into this controlled outlet, turn it on, and use your remote control to switch the collector on and off. This unit keeps the collector running for a bit after you switch it off to clear the machine and line.

PICK THE RIGHT PIECE FOR A CUSTOM FIT



Permanent connection. Dedicate a standard hose to the machine that gets used most, like your table saw. I've retrofitted my old saw with a dust port and a raised floor in the cabinet to maximize dust collection. Don't forget to shut the blast gate when you're working on other machines.



Stretch hose goes everywhere else. This expandable hose reaches about 15 feet (though you should keep hose lengths shorter than that), letting me keep my big dust collector in one spot. Tapered hose-end fittings allow me to simply plug the hose into the ports on my newer machines.

New models to consider

Single-stage models are still the best deal in dust collection. Basic units start at \$300, but better collectors, like this Jet with a 2-micron pleated cartridge filter, keeps your shop and lungs cleaner. Cyclone collectors, like Laguna's CIFlux:2 cost significantly more, but these units provide even better filtration—99.7% of particles 1 micron or larger.

JET DC-1100VX-CK, \$713.99



Laguna CIFlux:2, \$1,599.00



Build a Classic SHAKER COUNTER

This shallow chest of drawers is a catalog of traditional joinery details.

By Chris Hedges

Of the many reasons I am drawn to Shaker furniture, the one that stands strongest is this: designing and building Shaker pieces affords me the opportunity to explore the basics of a form without being distracted by unnecessary design elements. Most folks would call this piece a bureau, but the Shakers called it a counter, probably because many such pieces were built to serve as work areas for sewing and other tasks.

The design for my counter was inspired by an antique example built by Grove Wright, in Hancock, Mass. Like many Shaker cabinetmakers, Wright placed a high value on balanced form, pleasing proportions, subtle ornamentation and excellent craftsmanship. Building my own counter was an opportunity to apply these high standards and create a new classic piece. My wood choice (curly maple) was guided by the original, but other domestic species would be just as suitable. I think the counter would look stunning in madrone or white oak.





Keys to Success

- Label all parts. Not just part names, but also their location in the case, including inside or outside faces.
- Mark, don't measure. Make a leg-size story stick marked up with key joinery details, and transfer this layout to your workpieces. Also, take the time to dry-fit the case together to mark dimensions and joinery layout for front dividers and drawer runners.
- Prefinish panels and other surfaces that will be difficult or impossible to access after the case is together.
- Wait until the case is fully assembled to size your drawers. Then generate the dimensions for drawer fronts and other parts based on completed openings (see p. 46 for more details).

Legs, rails, dividers, panels, and plenty of interior parts

This bureau is a good example of traditional leg-and-panel construction. The number of parts may seem overwhelming, but the project is less daunting when you break it down into a sequence of subassemblies. The case exterior—consisting of the back, front, and two end assemblies—gets built first. The drawer supports and drawer runners come next, followed by the drawers and the top. We'll begin by making the legs.

SIDE PANEL
 $\frac{3}{8} \times 10\frac{1}{2} \times 20\frac{1}{2}$ "
 (rough)

MIDDLE SIDE RAIL
 $\frac{7}{8} \times 2\frac{3}{4} \times 21\frac{1}{4}$ "

LEG
 $1\frac{1}{8} \times 1\frac{1}{8} \times 32\frac{3}{8}$ "

TOP SIDE RAIL
 $\frac{7}{8} \times 2\frac{1}{4} \times 21\frac{1}{4}$ "

TOP BACK RAIL
 $\frac{7}{8} \times 2\frac{1}{4} \times 45\frac{5}{8}$ "

BACK PANEL
 $\frac{3}{8} \times 10\frac{1}{2} \times 22$ "
 (rough)

MIDDLE BACK RAIL
 $\frac{7}{8} \times 2\frac{3}{4} \times 45\frac{5}{8}$ "

Notch rear drawer support to fit around leg and fasten to leg with $\frac{1}{4}$ " trim-head screw.

MIDDLE RUNNER
 $\frac{7}{8} \times 3 \times \text{CTF}$

BOTTOM BACK RAIL
 $\frac{7}{8} \times 2\frac{1}{4} \times 45\frac{5}{8}$ "

DRAWER GUIDE
 $\frac{1}{2} \times \frac{1}{2} \times 19$ "

SIDE RUNNER
 $\frac{7}{8} \times 2 \times \text{CTF}$

FRONT DRAWER SUPPORT
 $\frac{7}{8} \times 1\frac{1}{2} \times \text{CTF}$
 Notch to fit around leg.

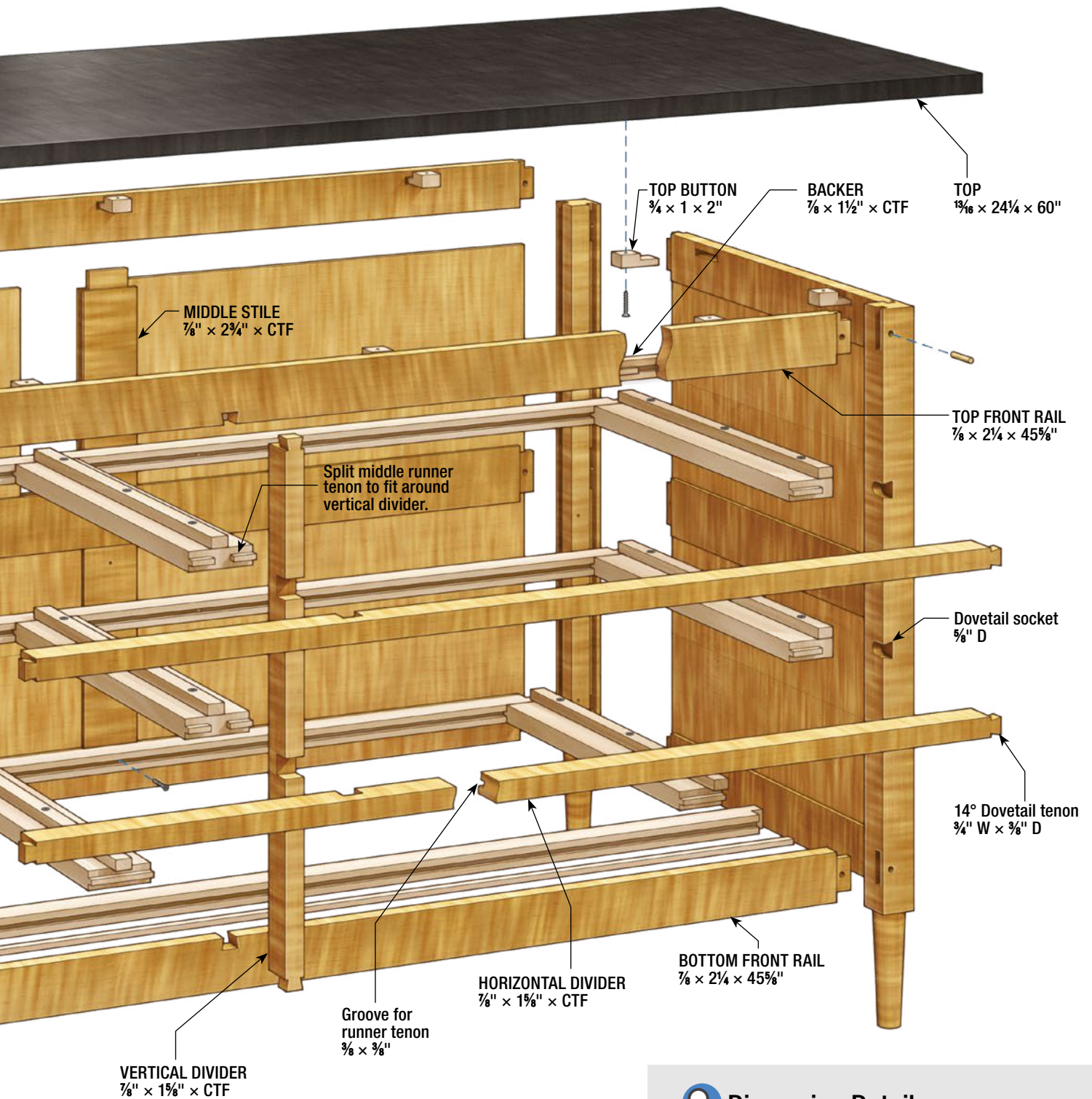
SPLINE
 $\frac{1}{4} \times \frac{1}{2} \times \text{CTF}$

BOTTOM SIDE RAIL
 $\frac{7}{8} \times 2\frac{1}{4} \times 21\frac{1}{4}$ "

DOWEL PIN
 $\frac{1}{4}$ " dia.

Order of Work

- Groove and mortise the legs.
- Groove and tenon the rails.
- Turn tapered feet on the legs.
- Dry-fit the case.
- Make the panels.
- Make the front rail-and-divider assembly.
- Make interior drawer supports, runners and guides.
- Prefinish selected parts.
- Assemble and finish the case.
- Make and finish the drawers.
- Make, finish, and attach the top.



onlineEXTRA

Download a scale drawing of the story stick for this project at our website.

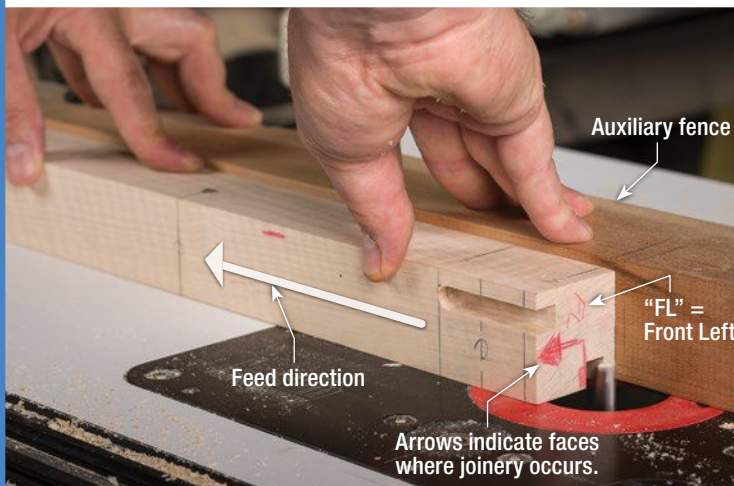
Dimension Details

- Legs and rails can be cut to the finished sizes given on the drawing. All remaining parts should be cut to fit.
- CTF = cut to fit
- Rail lengths include tenons.
- Rails, stiles, runners and drawer supports are all 7/8" thick.
- Panels are 3/8" thick.

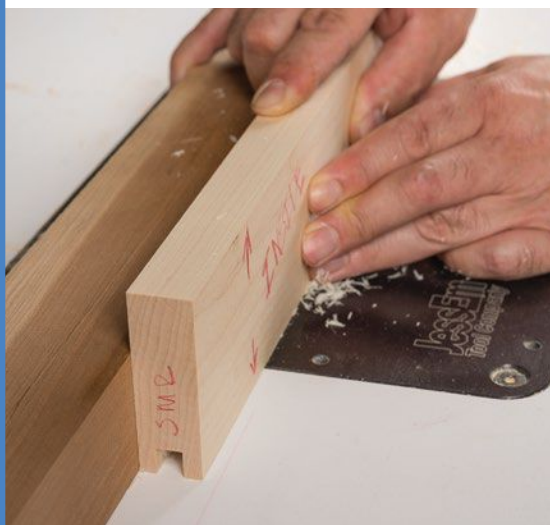
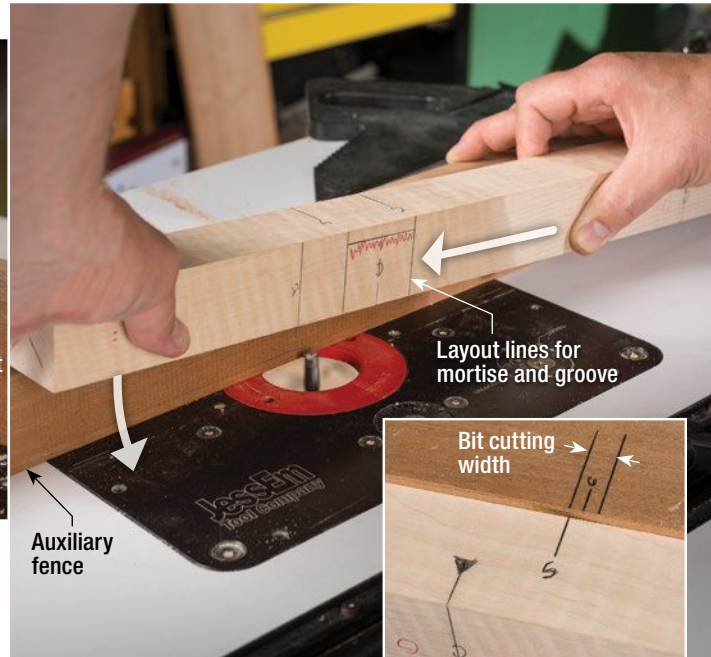
Leg-and-rail joinery begins on the router table

There are two goals here: 1) The panel grooves in the legs and rails must be aligned, and 2) When assembled, the exterior faces of the legs and rails should be flush. Achieving these goals isn't difficult if you make accurate layout markings and labels on all your parts. Keep the fence in the same place for grooving legs and rails. Also, remember that the outside faces of legs and rails should always run against the router table fence.

Mark the location of the $\frac{3}{8}$ " upcut spiral bit on the router table fence so that you can make stopped cuts in the legs for grooves and mortises. Raise the bit in small ($\frac{1}{4}$ " or less) increments to reach the full $1\frac{5}{16}$ " depth of your mortises. Work carefully; a firm grip is important when lifting the workpiece free or lowering it down onto the bit. Finish up this part of the job by cutting tenons in the rails, using a dado cutter in the table saw.



Run grooves, then plunge-cut mortises. Keep the router table's fence in the same location for both operations. Stopped cuts can be made accurately by aligning groove and mortise layout marks with the bit's cutting width shown on the fence.

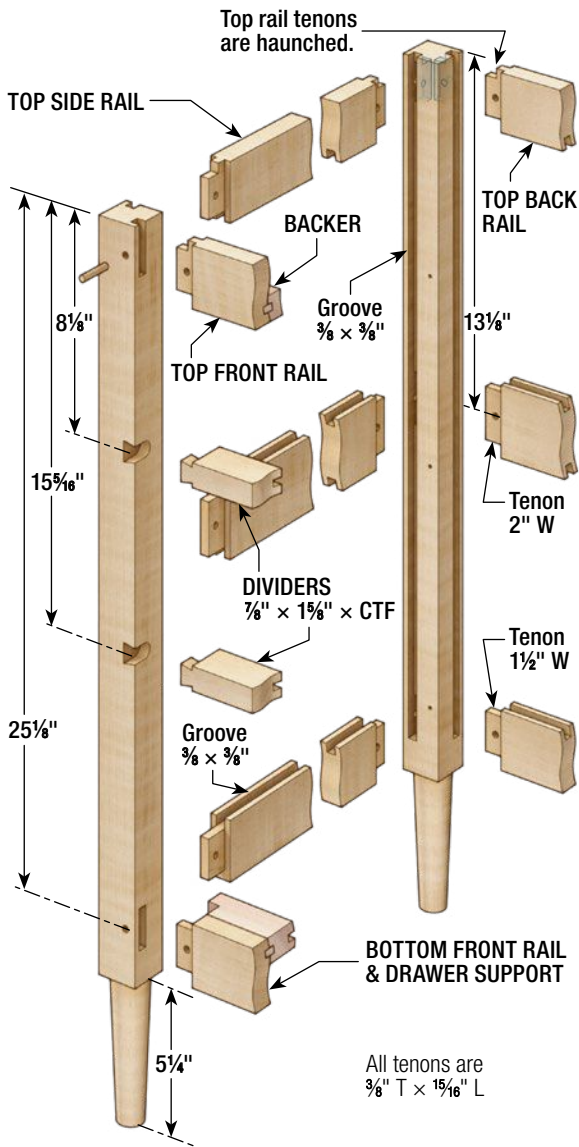


Groove the rails next. Without changing the position of your fence, run $\frac{3}{8}$ " \times $\frac{3}{8}$ " grooves in all rails. Remember to keep the outside face of the rail against the fence.



Turn tapered feet, then rout sockets for dividers

The legs take a lot of work, but we're almost done with them. The first of our final tasks here is to transform the square bottom of each leg into a graceful taper—a perfect example of the restrained ornamentation the Shakers are famous for. Once this is done, the two front legs need dovetail sockets for a pair of horizontal dividers. Both of these operations get their layout information from the project's story stick.



Start with a skew. Blue tape makes it easy to see where the shoulder cut needs to start. Angle the skew to cut a square shoulder at the transition point.



Turn to key diameters. Use a parting tool in combination with calipers to establish the largest part of the taper. Then rough out the form, part to the smallest diameter, and finish shaping.



Cut tenons carefully. To make sure tenons fit correctly, it's smart to use some scrap stock to set up these cuts. The rip fence acts as a stop, and a full-width dado cutter removes the waste. Make your first cheek cuts with the outside face of the rail against the tabletop, and cutter height set to make the rail's outside face flush with the leg's outside face. Finish up by making all inside-facing cheek cuts. If necessary, fine-tune the tenon fit with a shoulder plane to keep outside faces flush.



Small sockets are a big deal. Each front leg needs two dovetail sockets to hold mating dovetails cut in a pair of horizontal dividers. With the legs clamped together, I lay out socket centerlines using my story stick. However, perfect lateral alignment depends on clamping a thick square exactly the right distance from each centerline, to guide the router base. The distance between the center of the bit and the edge of your router base is the correct offset. Use this setup to remove waste with a straight bit before making your dovetail cuts.

Dovetails, lap joints, and drawer supports make dividers tricky

The divider assembly completes the outer frame of the case, and is connected to inner frames that support and guide the drawers. Making these interconnected parts is challenging. Use my order of work as a guide, and be prepared to dry-fit and clamp the case together and then disassemble it a few times to ensure precise cutting and joinery work.

You've already cut the dovetail sockets in the legs where the two horizontal dividers will fit (see p. 41). Use the same careful technique to rout dovetail sockets for the vertical divider in the case front's top and bottom rails.

When the divider assembly is completed, you'll need to focus on completing the three frames that support and guide the drawers. Each frame consists of a rear drawer support grooved to accept three tenoned runners. The runners also have tenons on their front ends, to fit in the grooves milled in the backs of the horizontal dividers, or along the back edge of the drawer support attached to the case front's bottom rail.

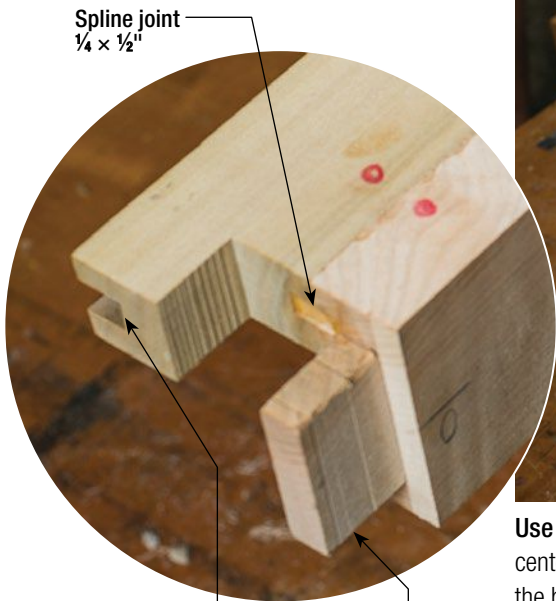
Order of Work

- Dry-fit and clamp the case together. Then mark and cut the two horizontal dividers to finished length. Cut dovetails on horizontal dividers using the router table.
- Remove the front assembly from the case. Using the rear assembly as a guide, cut all 4 drawer supports (3 rear supports, 1 front support) to length and notch them to fit around legs.
- Mill a $\frac{3}{8} \times \frac{3}{8}$ " centered groove on the interior edge of all drawer supports.
- Join the lower front drawer support to the bottom front rail with a $\frac{1}{4}$ "-thick, $\frac{1}{2}$ "-wide spline that fits in matching grooves. Make sure the top of the support sits flush with the top of the rail. Attach the backer to the top rail the same way.
- Mill dovetail sockets in top and bottom rails, centering each socket $14\frac{3}{16}$ " from each rail's left tenon shoulder.
- Reclamp the front assembly, and complete the vertical dividers the same way you created the horizontal dividers in the first step.
- Lay out and cut half-lap joints in dividers.
- Mill drawer side runners to finished size, and cut tenons that allow runners to fit in grooves milled in drawer supports and grooves milled in horizontal dividers.

NOTE: Wait until drawers have been built and fitted to install drawer guides, which are fastened to runners with screws.



Dry-fit for precise layout. Clamp the case together on a dead-flat surface so you can mark divider length precisely. Use a tall auxiliary fence and a square-cornered board on the router table when dovetailing the divider ends. Test your setup with scrap stock first, to make sure you'll be cutting snug-fitting joints.



Spline joint
 $\frac{1}{4} \times \frac{1}{2}$ "

Groove for tenon in
drawer side runner
 $\frac{3}{8} \times \frac{3}{8}$ "

Tenon for front
left leg mortise



BOTTOM
FRONT
DRAWER
SUPPORT

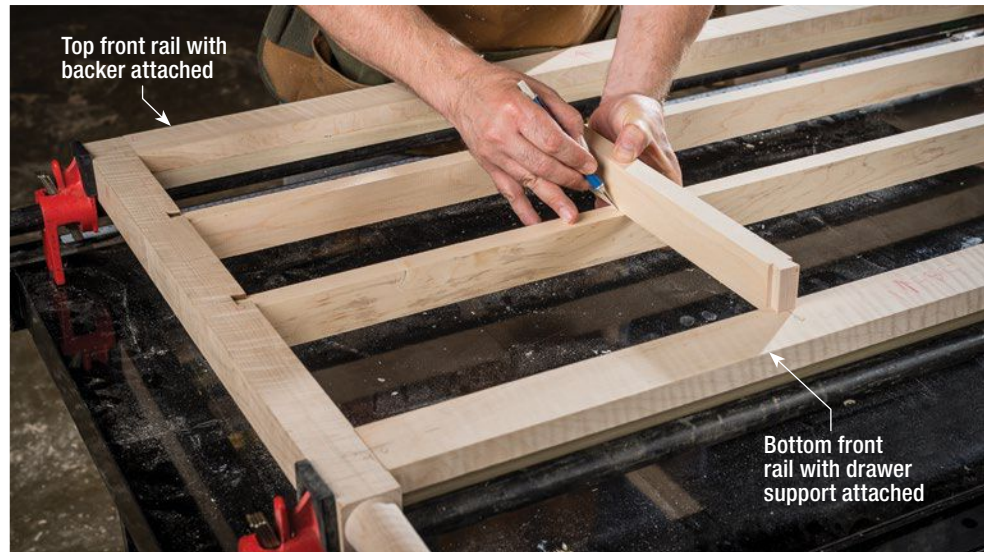
BOTTOM
FRONT
RAIL

Use a square guide for spot-on dovetail sockets. Mark the socket's centerline $14\frac{3}{16}$ " from the tenon shoulder. Then clamp a square across the bottom rail at the proper offset to center your bit on the layout. Use the same technique to rout the top rail's dovetail socket.

Dry-fit to lay out the lap joints.

For this critical layout work, it helps to cut the horizontal divider dovetails so they can recess slightly in their sockets, as shown.

This enables you to engage the vertical divider dovetails in their sockets and mark the laps precisely. In the final assembly, position the dividers so that their front edges are flush with the legs.



Top front rail with
backer attached

Bottom front
rail with
drawer
support
attached

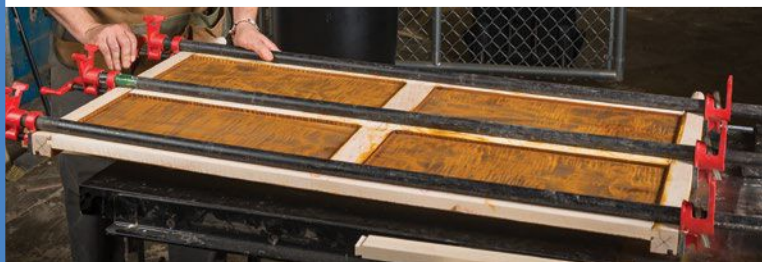
Laps and dovetails done right.

The reward for exacting joinery work is a case front that looks finely crafted and is sturdy enough to last for generations.



The home stretch: finish, assembly, top, and drawers

The aniline dye stain I used on this project does a much better job of highlighting figured wood than pigment-based stain. For the case, I used a blend of Dark Vintage Maple and Honey Amber dye (see Buyer's Guide, p. 68). The top is colored with black dye. To achieve the depth required to highlight the figure, apply a wet coat of dye, let it dry, then sand it off. This will leave some dye in the less-dense parts of the wood to impart greater depth. Apply and sand again, then wipe on a final application of dye. Once this coat has dried, apply a sealer coat of shellac, followed by a topcoat of water-base satin urethane varnish.

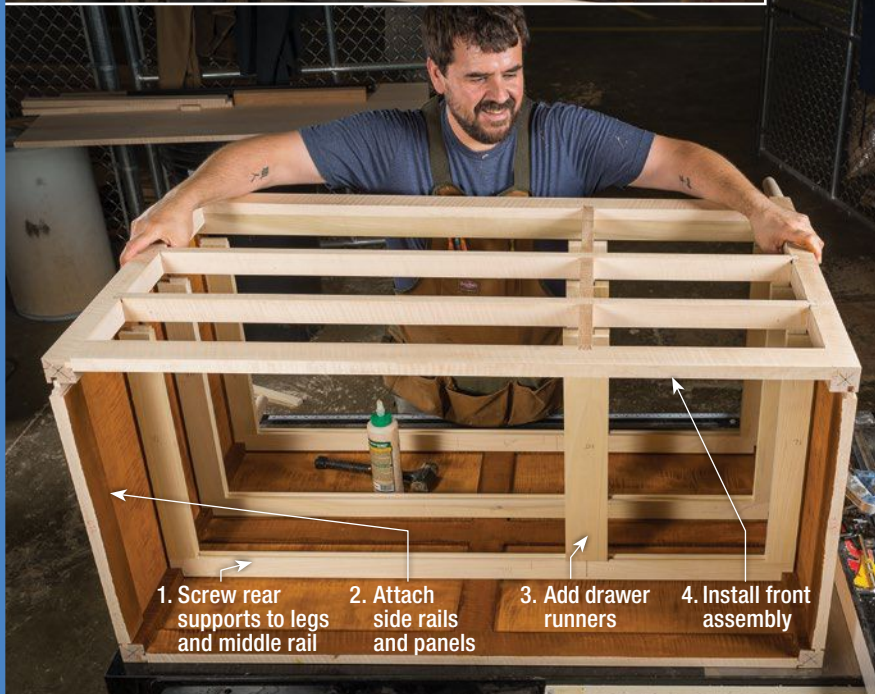


Order of Work

- Cut all panels to finished size, then sand and prefinish them.
- Assemble the case.
- Peg all mortises with 1/4"-dia. dowels.
- Final-sand and finish the exterior.
- Make rabbeted buttons for attaching the top, and rout matching slots in top of frame.
- Make and finish the drawers (See p. 46).
- Make and finish the top, then install it.

Assemble the back first.

Glue the leg-and-frame joints, but allow the prefinished panels to float in their grooves.



Where's my helper? Follow the sequence described in the photo for final assembly. Make sure to keep the completed case square as you clamp it together.



Button down the top. Make rabbeted buttons that screw to the top and fit into slots routed in the top rails. Two buttons for side rails and three for the front and back will do.

Get the drawers done right. With the case complete, it's time to focus on the drawers, which are traditionally made: solid wood parts, dovetailed corners, and partial overlay fronts (see p. 46). For smooth drawer operation, apply wax to runners and guide strips.





Rabbeted, HALF-BLIND DOVETAIL DRAWERS

You can build these difficult drawers with help from power tools and proven tips.

By Chris Hedges

Delicate but durable.

In the finished bureau, partial overlay drawers display a delicate composition of beaded edges, framed by legs, rails and dividers. Dovetail joinery provides strength and long term durability.

Dovetailed drawers have long been a standard feature on fine furniture. Within this category of drawer construction, rabbeted, half-blind dovetail drawers are among the most challenging to build. The top and sides of the drawer front are rabbeted to overlay the drawer opening, and a delicate bead extends around all four edges of

the drawer front. These are the drawers I had to build for the Shaker counter shown on p. 36. It's hard to believe that woodworkers once built these drawers with hand tools alone. The techniques I'll explain here will give you the look of hand-cut, half-blind dovetails, but with power tool assistance that saves time.

I usually build drawers entirely from solid wood. When thinking about drawer construction, I make allowances for the type of joinery at the front and back of the drawer. The joinery in the front is always the show joinery, while the joinery at the back is usually hidden. The drawers featured here have through dovetails at their back corners which I make using some of the same techniques applied to the front of the drawer (see drawing, facing page).



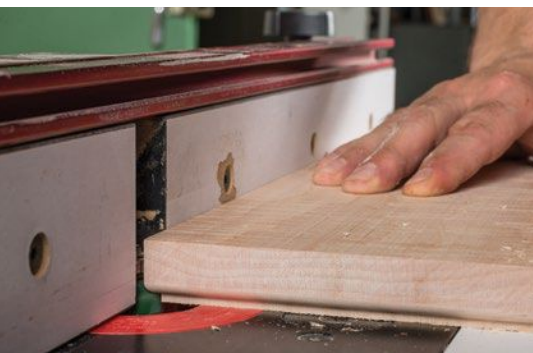
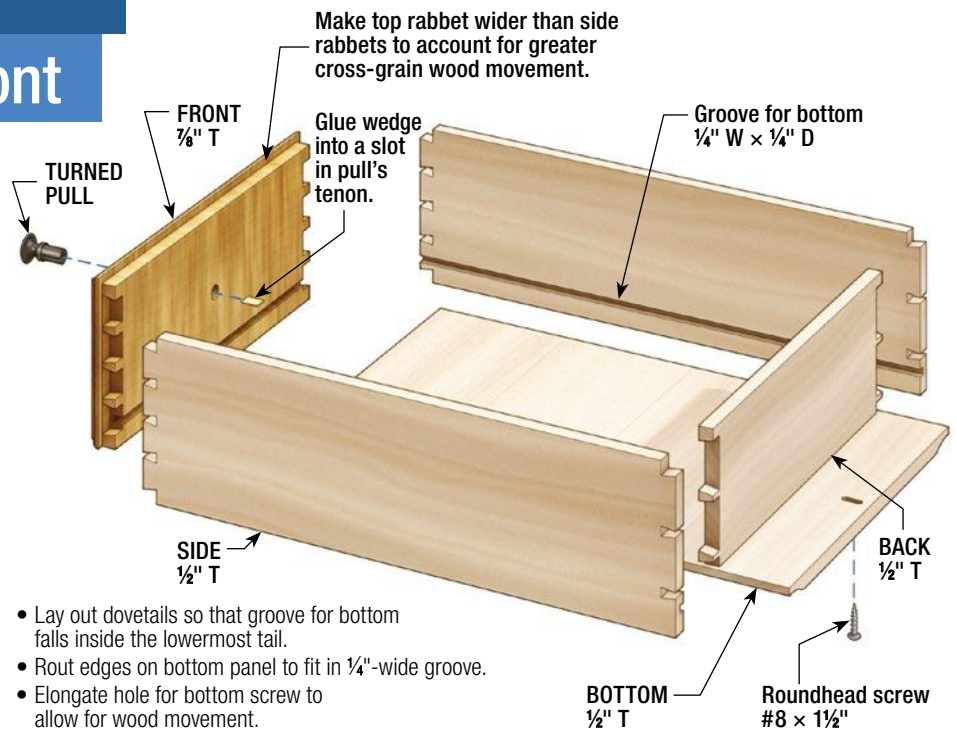
onlineEXTRA

Go to our website for a dovetail sled technique video.

Start with the front

The drawer sides, bottom and back all derive their finished dimensions from the finished size of the drawer front, so it's important to get the front dimensions right. To do so, measure the opening where the drawer will fit. In this case, I plan to rabbet the drawer front so that it overlays the opening by $\frac{1}{4}$ " on the sides and top. So I add $\frac{1}{2}$ " to the opening's horizontal measurement, and $\frac{1}{4}$ " to its vertical measurement.

To prevent binding when the drawer opens and closes, I allow for $\frac{1}{16}$ " of clearance between each side rabbet and the opening, and slightly more clearance at the top rabbet.



Rout a roundover. Use a $\frac{3}{16}$ " radius roundover bit to rout all four outward-facing edges. Aim for a $\frac{1}{8}$ " fillet.



Scribe for the rabbet. Set your marking gauge $\frac{1}{16}$ " shallower than the point where the flat edge meets the radius.



Rabbet on the table saw. Bury the dado cutter in an auxiliary fence, and rabbet each front's top and side edges.

Order of Work

- Cut drawer fronts to size and rout outside edges.
- Rabbet drawer fronts, then rip drawer sides to finished width.
- Complete front dovetails in sides.
- Complete pins in fronts.
- Cut sides to finished length.
- Cut backs to finished size and complete side-to-back joinery.
- Rout grooves for drawer bottom in fronts and sides.
- Assemble your drawers.



Creep up on the perfect fit. Here I'm checking to make sure that I have $\frac{1}{16}$ " of clearance between each side rabbet and the opening. I'll cut the top rabbet with slightly more clearance (between $\frac{3}{32}$ " and $\frac{1}{8}$ ") to allow for greater cross-grain wood movement.

Now for the sides

When all drawer fronts have been rabbeted, you'll be able to rip drawer sides to finished width. The rabbet's depth gives you the base line to scribe on sides for their dovetails. After scribing all the sides, lay out dovetails with pleasing proportions (my tails are cut at 14°). Even though I'm making drawers in three different sizes, the bottom-most pin in each drawer will always be the same size. This enables me to mill the bottom groove in all fronts and sides with the same setup.



Scribe baselines on the sides. Your marking gauge should have the same setting used to scribe the depth of the rabbets that you cut in your drawer fronts.



Saw perfect tails with a sled jig. A dovetail jig saves time and ensures precision, whether you're making one drawer or many. The adjustable stop that runs in a fence-mounted T-track enables you to set up repeat cuts in matching sides. Use these same techniques to cut the through dovetails at the back of your drawers.



Cope with the waste. Cut slightly above your baselines, so that you can finish the joint by paring to the line with a narrow chisel.



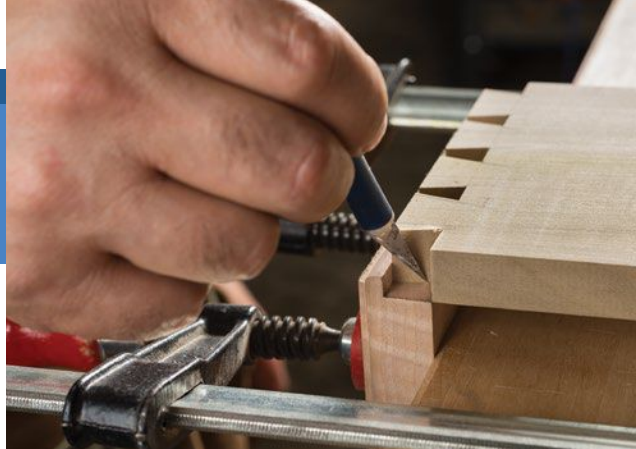
Make shoulder cuts where half-pins will fit. Make these cuts with a fine-cutting dozuki or backsaw, and stay on the waste side of the baseline.



Pare with care. Place the chisel's bevel in the scribe line, and pare in from both sides, tilting the blade to create a slight back bevel.

Scribe, rout, and pare to make the pins

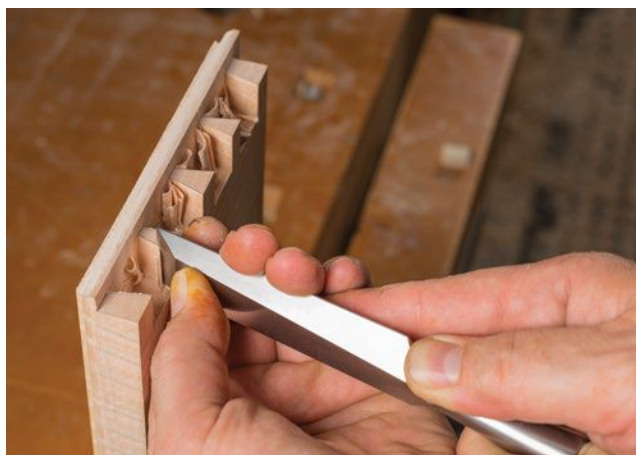
Creating pins that match your dovetailed sides begins with careful scribing. After darkening scribe lines with a pencil, you can rout sockets that require a minimum of paring, using a dovetail bit that matches the angle of your tails. Complete each joint by paring for a snug fit.



Mark sharp. Clamp side and front securely so you can concentrate on scribing the pin layout.



Stay inside the lines. Clamp a square across the front to act as a stop for the router base. Use slow, steady pressure to control the cut as you rout the sockets.



Chisel to fit. Pare away the waste that remains inside your layout lines, then test-fit and adjust as necessary.

Make the bottom fit, then finish the job

A solid wood drawer bottom requires more work than a plywood bottom, but it's consistent with traditional drawer construction. Drawer assembly begins by gluing the sides and front together. The back goes on next, then the bottom.



Rout some raised edges. A horizontal panel-raising bit does a good job of reducing the edge of the drawer bottom to fit in the grooved sides and front of the drawer.



Tap it tight. The reward for good joinery work comes when it's time to assemble your drawer. Slide the bottom into place after joining the sides to the front and back.

STANDING MIRROR WITH STORAGE

This stylish project reflects beauty inside and out.

By Larry Okrend

At first glance, a full-length standing mirror with a built-in storage compartment might seem as simple as hinging together two frames and bolting them between a pair of legs, but as they say, “the devil’s in the details.” The project’s size and storage requirements posed a few challenges that are sometimes overlooked by store-bought competition. Successfully solving these devilish details turned a story assignment into a lovely gift for my wife.

Finding a mirror was easy. After scouting several home centers and department stores, I picked the largest wall-hung mirror and sized the frames to suit. I soon discovered that the mirror was prone to toppling when the door was opened. To prevent this, I designed a frame retainer that could either lock the frame in place when choosing jewelry, or be pivoted out of the way to adjust the mirror’s tilt. To fine-tune storage issues, I met with my in-house jewelry consultant. This assortment of shelves and hooks holds a large collection of jewelry, but I suggest checking with your own in-house expert to ensure that the storage scheme suits the fairest one of all.



onlineEXTRA

For a project cut list and PDF patterns for the feet, pivots, and knobs, go to woodcraftmagazine.com and click on onlineEXTRAS.

Order of Work

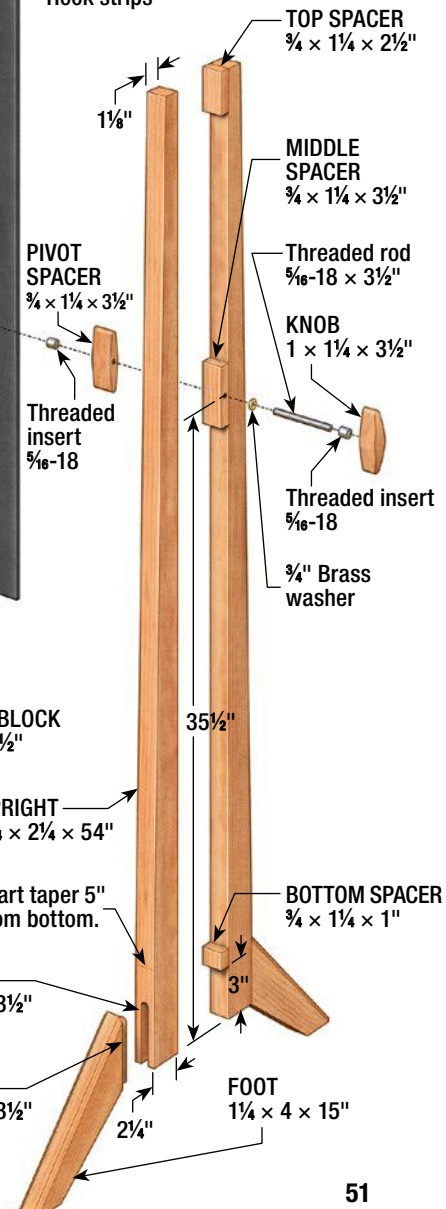
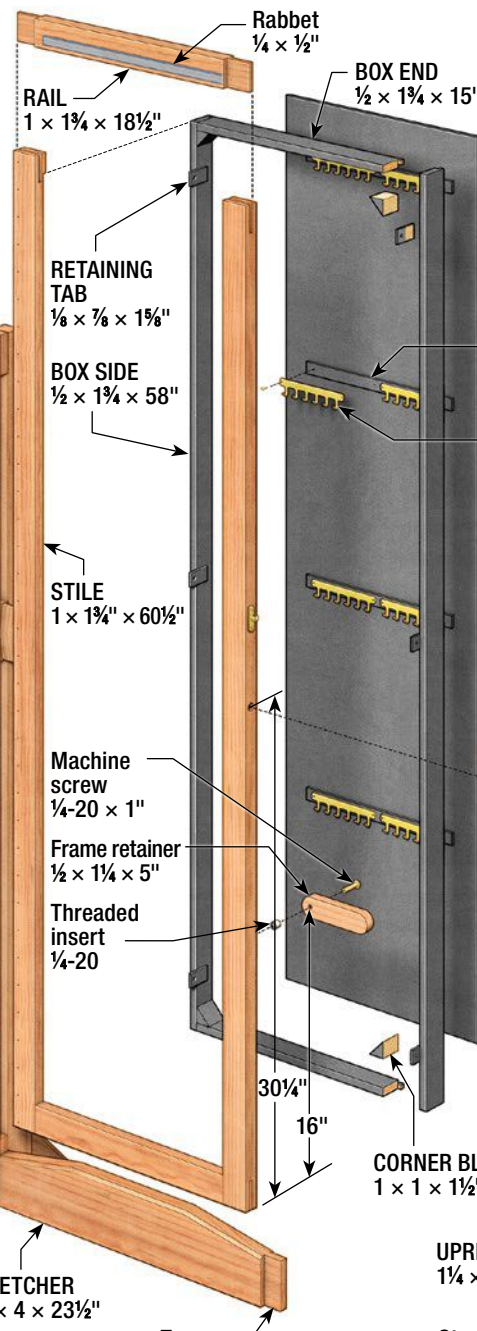
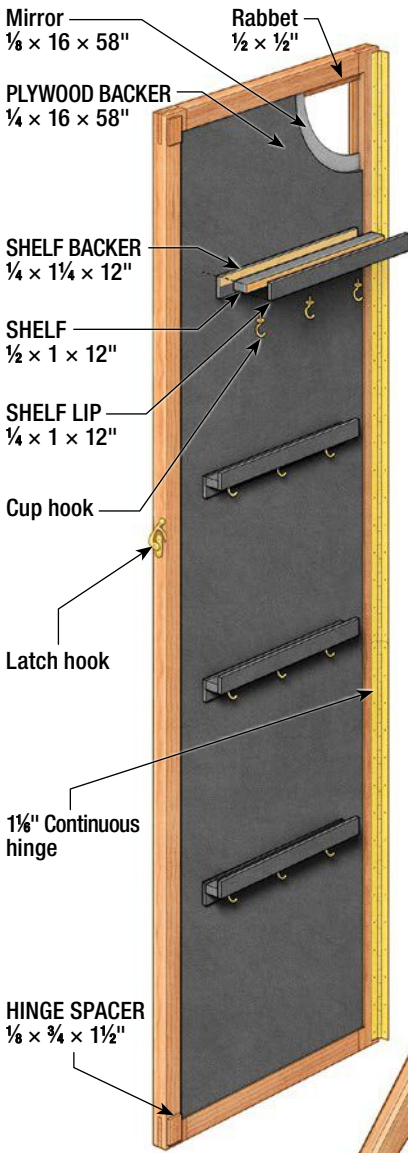
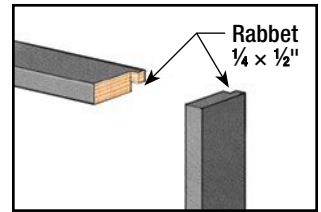
- Assemble the frames.
- Make the stand to fit the frames.
- Make the storage box.
- Finish the frames, stand, and storage box.
- Bolt the stand to the frame and attach the storage box.
- Attach the jewelry-hanging hardware and install the mirror.

Buy the mirror, then build from the inside out

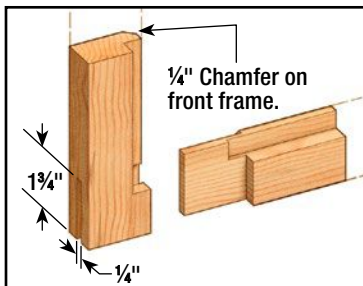
This project can be made from any hardwood, but I used cherry because it's easy to work, finishes well, and is reasonably priced. You'll need about 20 BF of 6/4 lumber.

To reduce the chance of breakage and bad luck, I suggest attaching the plywood backer to your mirror at the start of the project and then setting it safely aside. Be sure to select a mirror-safe adhesive; some will corrode the mirror silvering.

Frame Rabbet Detail



Frame Joint Detail



Notes: Overall part dimensions include tenons. Glass store mirror glass is thicker; adjust front frame rabbet to suit.

Make two frames—one for the mirror, one for storage

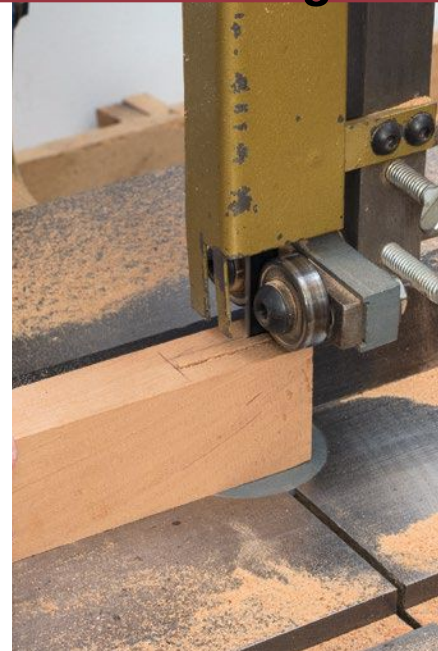
Building the project from the inside out ensures that the mirror fits within the front frame, and that the frames fit the stand. Since they're identical except for the rabbets and chamfers, you can make both frames at the same time. Mill the rails and stiles to size, and then lay out and cut the bridled joints as shown.

A slotting cutter makes quick work of the ½"-wide rabbets, but you'll need to identify the bit's reach on your router table's fence to make the stopped cuts in the stiles (see photo below). (Note that rabbets in the front and back frame are different depths.)

After assembly, finish off the rabbeted and chamfered corners as shown on the facing page. Then, install the hinges, the threaded inserts for the pivot rod and retainer, and the hinge spacers.



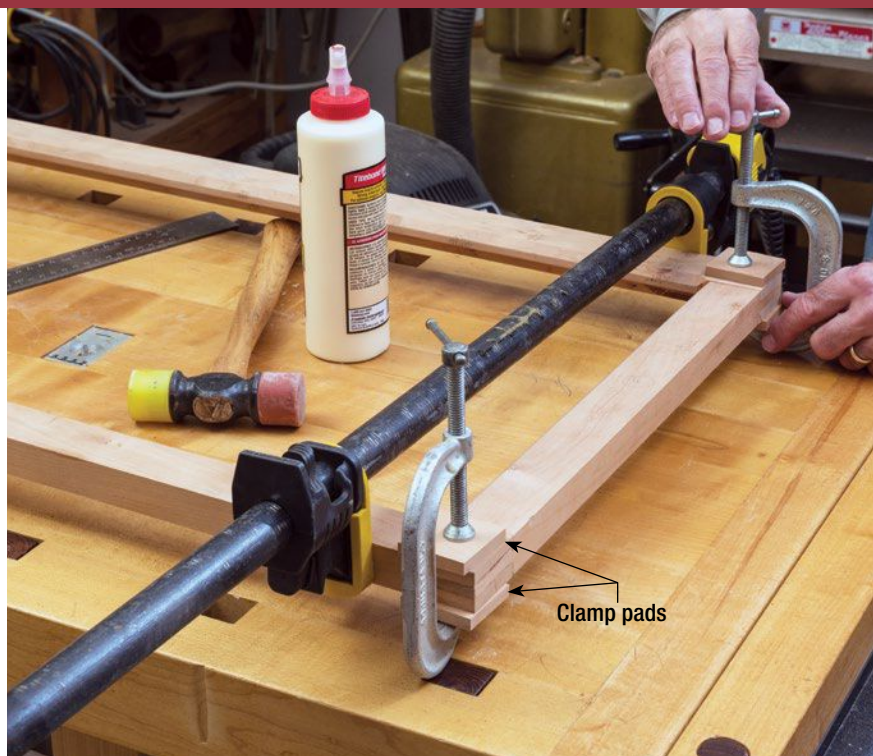
Make your marks. I prefer laying out the joints on all the ends of all the rails and stiles for both frames. The thin pencil lines make it easy to spot and fix fit issues.



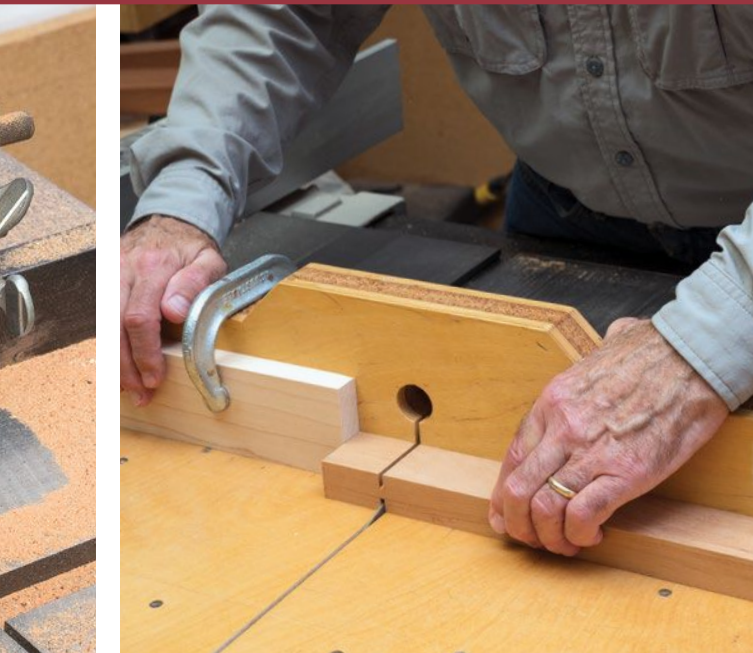
Mortises first. To ensure centered slots, saw one cheek, then flip the workpiece and make the second. Shift the fence to clean out the middle.



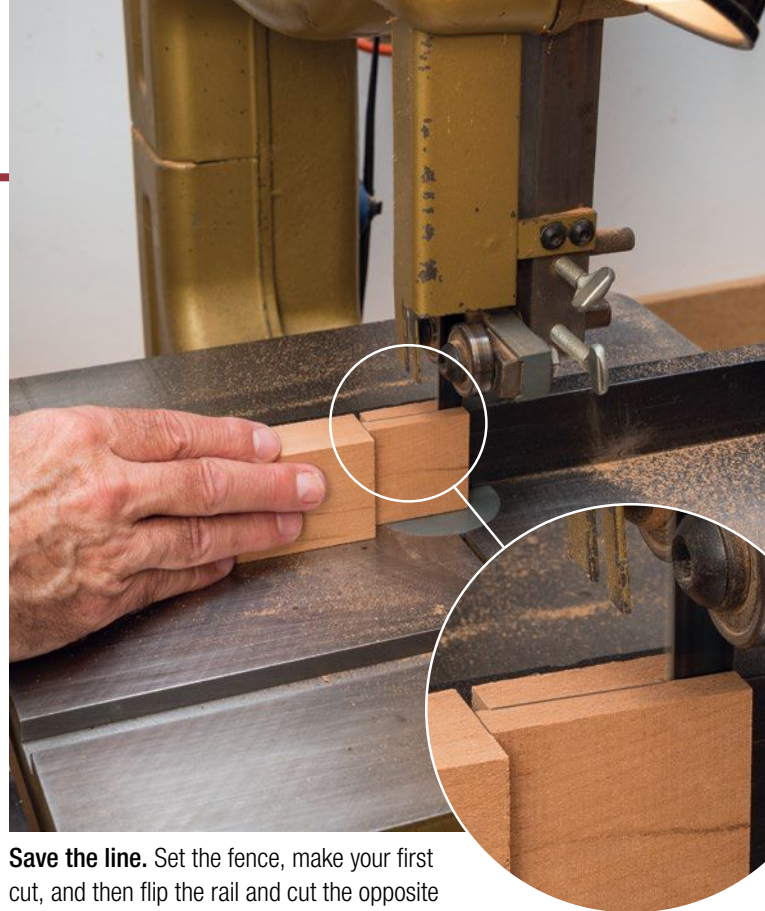
Stopped rabbets in the stiles. Mark the bit's reach on the fence and the rabbet's extents on the stiles. Pivot the stock into the bit to start the cut. Turn the router off when the lines touch at the trailing end.



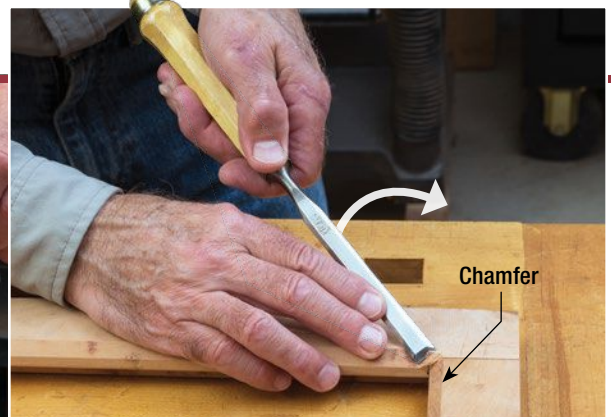
Assembling the frames. Check for square as you pull the joints together, persuading them with a soft-faced mallet if necessary. Then face-clamp the corners as shown.



Stop-cut shoulders. When equipped with a stop, a crosscut sled ensures consistent tenon shoulders on the rails. Adjust the blade height just under your line so that you can sneak up on a perfectly fitting tenon.



Save the line. Set the fence, make your first cut, and then flip the rail and cut the opposite cheek. Sand or plane to sneak up on a snug fit.



Chopped and sliced corners. Completing the routed rabbets and chamfers requires a little chisel work. To erase tool marks, I used a scrap of 100-grit sandpaper.



Hinge your frames together. To position the hinge, fold it over the stile, as shown. The "continuous" hinge requires two sections. Cut the hinge to fit the frame.

Make the stretcher, uprights, and feet

To allow room for the mirror to pivot, adjust the stretcher's length so that its shoulder to shoulder distance is 2½"-wider than your frames. After cutting tenon shoulders, taper its top edge as shown. Cut the cheeks to match the spacers.

After milling and mortising the uprights, I made four identical feet by tracing a stiff paper pattern, and then using a straightedge to darken the traced lines. When sawing, follow the lines around the tenon as closely you can for a seamless fit. After sawing out the feet, I used a sliding crosscut sled to cut the tenon shoulders, and then routed the cheeks to fit the uprights.



Taper the stretcher. Cut the tenon shoulders on the stretcher before tapering on the top edge. Cut as close to your taper as you can, and then smooth the sawn edge with a sanding block.

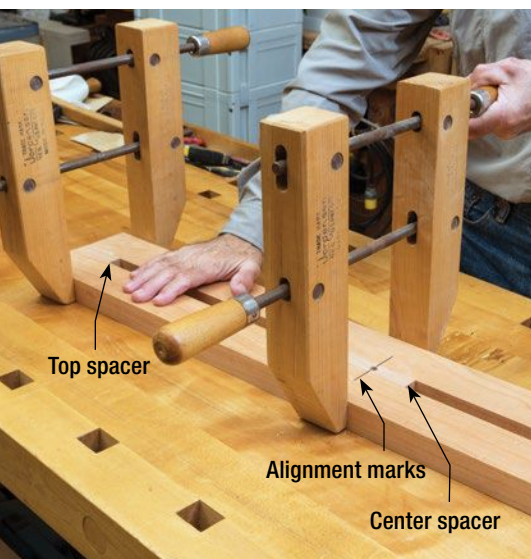


Mortise the uprights. Rout the open-ended mortises in ¼"-deep steps. The featherboards and stop help keep the bit between your lines.

Assemble the uprights and finish the stand

Drill the pivot holes in the center spacers, and then glue all the spacers between the untapered uprights, as shown below. Once the glue has dried, clean up the glue joints, cut the tapers on the bandsaw, and then remove the saw marks.

Next, cut the tenon cheeks on the stretcher to fit and do a dry assembly, as shown at right. In order for the frames to fit within the stand, it's important that the stretcher is square to both uprights. Adjust the stretcher's shoulders as needed, and double-check the assembly during glue-up.



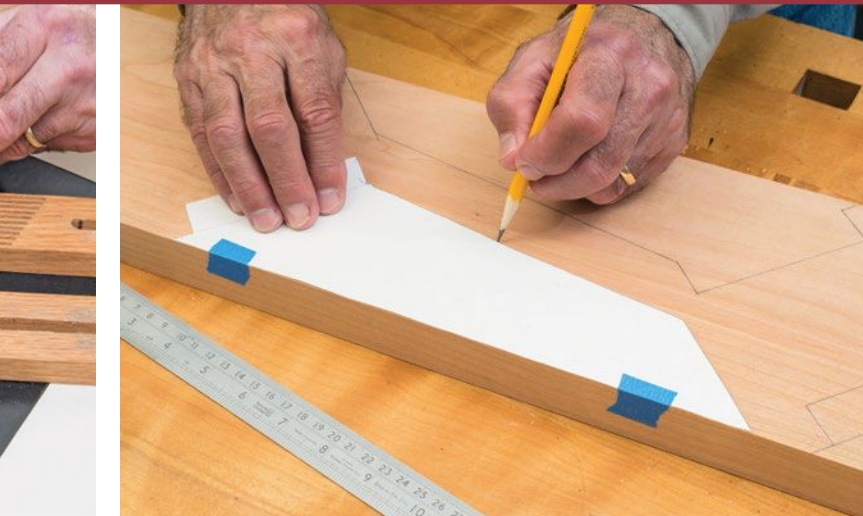
Spacer sandwich. Drill the pivot hole in the middle spacer, and make sure it's properly positioned as you set the clamps.



Plane-tamed tapers. Use a bandsaw to start the taper, then clean up the saw marks with a hand plane.

Keep it tight and square. The uprights must be parallel in order for the frames to fit. Dry-assemble the stand, check for square, and adjust the fit before applying glue.





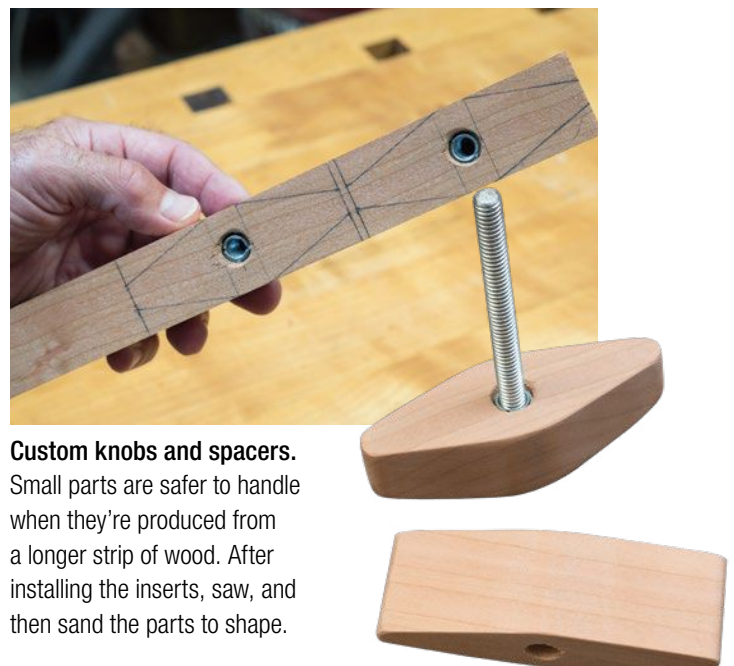
Straight-grained feet. To reduce post-cut cleanup, align the foot pattern's top edge with the edge of your stock.



Sliding sled with custom stops. To cut the tenon shoulders on the angled feet, I pin-nailed stop strips to my crosscut sled. I then used my router table to cut the cheeks to fit the uprights.

Make matching hardware

Lay out the pivot points and knobs on a single piece of stock, drill the through and blind holes, and then install threaded inserts in the knobs. Next, cut out the parts, and use a belt sander to finish the shaping process. To permanently affix the threaded pivot rods, apply a few drops of CA glue or epoxy before installing into the knobs.



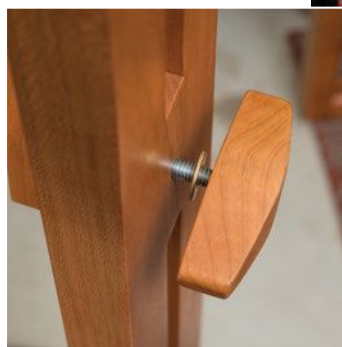
Custom knobs and spacers. Small parts are safer to handle when they're produced from a longer strip of wood. After installing the inserts, saw, and then sand the parts to shape.

Finish and final assembly

After building the storage box to fit the frame, I finished the cherry parts with Arm-R-Seal and painted the plywood parts black. Follow this final assembly sequence to avoid seven years of bad luck. First, attach the stand to the empty frames. Don't over-tighten the knobs; the frames will need to move when installing the storage box and mirror.

Next, set the storage box into the back frame, join the two with retaining tabs and then tack in the plywood back. Now, install the shelves and hanging hardware. (I used construction adhesive to attach the shelves behind the mirror.)

Before installing the mirror, flip the frame retainer down to keep the frame from tilting. Starting at the bottom, gently press the mirror into the rabbet, and insert framing push points to ensure that it stays put.



Bolt in the frames. Brass washers allow the knobs to tighten the frame to the pivot spacers without binding.



Screw in the storage box. Set the storage box into its rabbet, then use shop-made tabs and #4 x 5/8" screws to attach it to the back frame.



Install the back of the box. Fit the back into the rabbeted back edge of the storage box, and then tack it in place with pneumatic pin nails or brads.



Go easy with the glass. The mirror and mirror backer unit go in last. Set it in at the bottom and then gently press it in place.



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Table Saw KICK SWITCH

The coolest table saw accessory you didn't realize you needed

By Paul Anthony

Years ago, I was working with my pal Andy at his shop, and had the occasion to use his cabinet saw, which he had outfitted with a shop-made kick switch. What a beautiful thing to be able to turn off the saw with a tap of the foot! The sheer convenience of it was a delight, not to mention the fact that the accessory is a potential finger saver when things start going awry mid-cut, as when a troublesome board pinches onto a spinning blade and struggles to kick back. Your instinct is to reach down with one hand to turn off the saw, but then you're in danger of releasing the board. With a kick switch, you just use your foot instead. Same thing if something gets bound up topside when cutting a joint; just kick the saw off.

The kick switches shown on these pages were configured to work with the *magnetic switches* common on cabinet saws. (These switches turn themselves off after a power outage so that the tool won't lurch to life by itself when the power is restored.) The 3 versions shown here offer a variety of solutions you can apply to your particular saw model. As further help, each maker has noted the particular challenges he faced, and how he solved them, so consider these case studies in design. Whatever your configuration, you'll be glad you came up with it. Trust me; once you install a kick switch, you'll wish you had done it a long time ago.



Andy Rae's Bridgewood

The challenge:

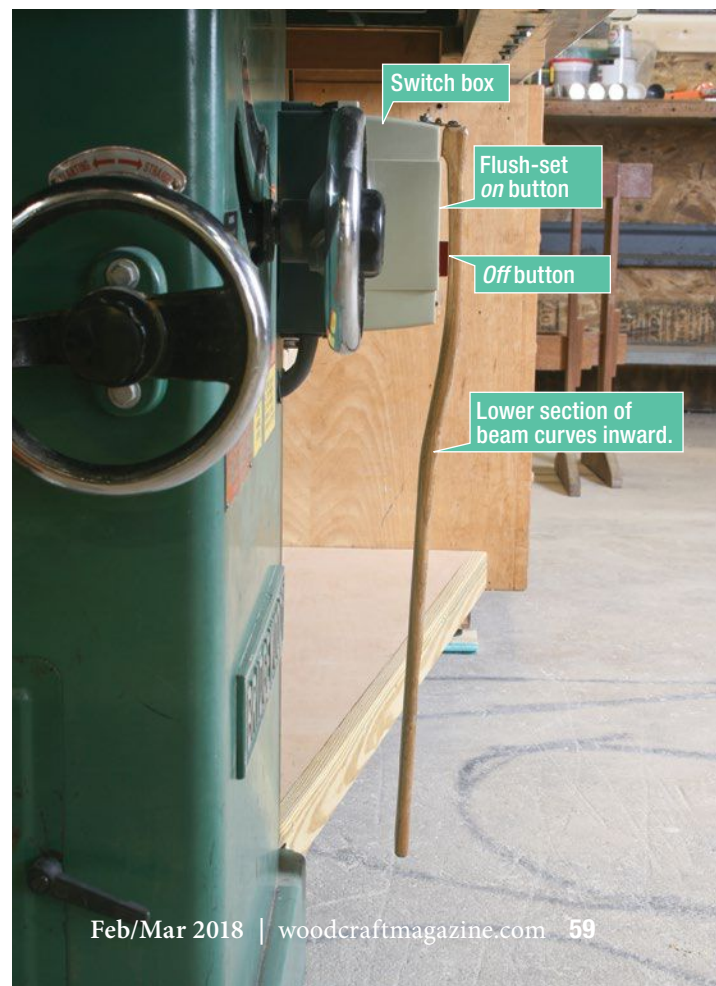
My saw's switch box sports a protruding *off* button. The task was to find a way to attach a hinged beam of wood to the casing that allowed easy access to the flush-set *on* button while providing sufficient contact to the projecting *off* button with a gentle tap of my foot or knee. For the switch to work effortlessly, I needed to shape it to the profile of the switch box and its buttons, and it needed to hang somewhat out of the way.

The solution:

The key was beginning with a blank of tight-grained hardwood thick enough for shaping. I used 1½"-thick white oak stock, dressing it to a 2"-wide strip that reached from the top of my saw's switch box down to about 5" above the floor. Positioning the blank level with the top of the switch box and parallel to the saw cabinet, I marked the location of the *on* and *off* buttons, and drew the contours of the switch box onto the edge of the stock. Next, I drilled a 1"-dia. through-hole for *on* button access, and then roughed out the blank on the bandsaw, first following my contoured lines, and then sawing to a general thickness of about ½". However, I did leave the upper section about 1" thick for the hinge leaf and screws. Last, I used a ¼" roundover bit to soften the edges of the hole.

To attach the kick switch, I first unplugged the saw and removed the switch box cover. Then I drilled two holes in its top, and attached one leaf of a 2" butt hinge using machine screws and nuts. After screwing the opposite leaf to the top of the beam, I adjusted the suspension for proper balance. To do this, I noted any tilt, and then bandsawed wood from the offending side until the piece hung about ½" away from the *off* button, and relatively parallel to the cabinet wall near the bottom. At this point, I found that a gentle tap was all it took to turn off the saw. By the way, don't be too disappointed if your first version doesn't come out perfect; it took me a couple of iterations to get it right myself. All the same, it was well worth the time spent.

Photos: Andy Rae





Finger hole allows access to *on* button.

Switch box

Cross bar increases area of foot contact.

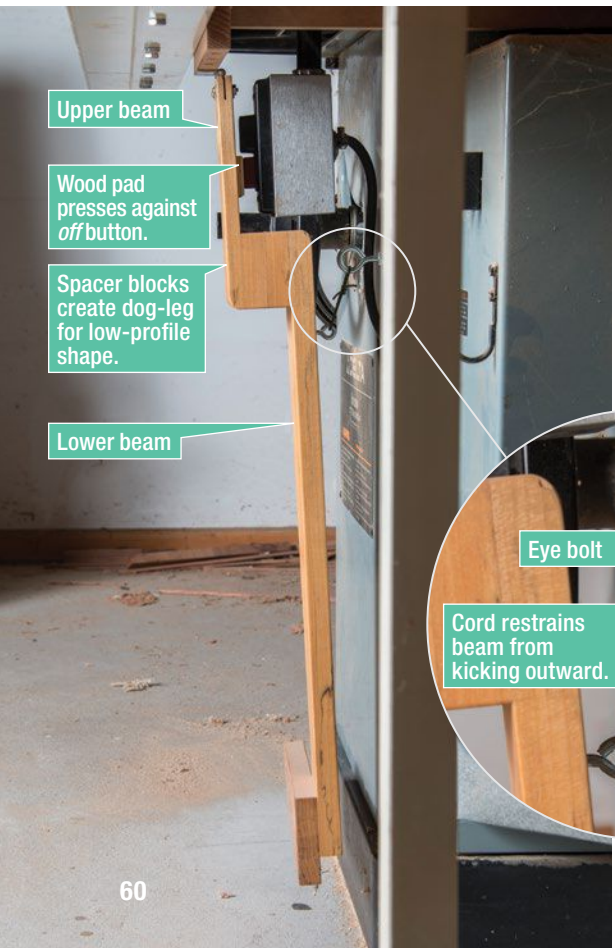
Paul Anthony's Unisaw

The challenge:

The top of the switch box on my mid-1990's Delta Unisaw is not easily accessible for attaching a hinge, as Andy Rae did. Also, the switch projects pretty far forward, necessitating a fairly extreme dog-leg to maintain the kind of low profile that I wanted to hug the saw cabinet. Furthermore, the *on* button sits within a raised surround, potentially impeding the beam from contacting the *off* button below.

The solution:

I began by screwing one end of a hinge-mounting bar to the frame of my side extension table, with the other end extending out above and forward of the saw's switch box. Next, I cut the upper and lower beam sections, as well as the spacer blocks that create the dog-leg. I temporarily attached the beam sections and blocks together with double-faced tape, and screwed a hinge to the beam assembly and to the hinge-mounting bar at what seemed to be the appropriate distance from the switch buttons. This allowed me to accurately locate the *on* button access hole and to test the operation of the assembly. As part of the test, I taped on pads of varying thickness to see what worked best as a pusher for the *off* button, while allowing the lower beam section to hug the saw body fairly closely with minimal swing. I also marked the lower beam section to length, making sure a push broom could clear it. When everything worked well, I removed the assembly, drilled the finger access hole, rounded its edges, and glued the beam parts together, adding a cross bar at the bottom to increase foot contact area. Finally, I attached an eye bolt to the saw cabinet, a screw eye to the beam, and connected them with a restraining cord to keep the off-balanced beam from swinging outward.

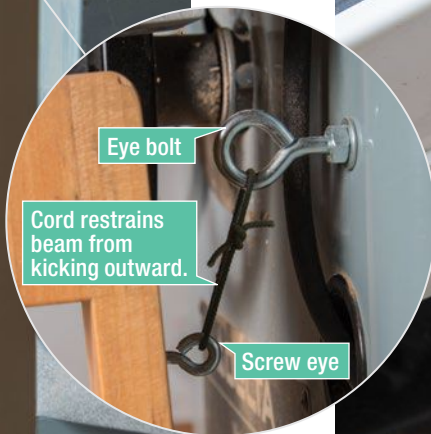


Upper beam

Wood pad presses against *off* button.

Spacer blocks create dog-leg for low-profile shape.

Lower beam



Eye bolt

Cord restrains beam from kicking outward.

Screw eye



One end of hinge-mounting bar attaches to extension table; opposite end cantilevers out under metal saw table.

Hinge-mounting slot buries hinge leaf and allows fine-tuning distance from button.

Ken Burton's Powermatic 66

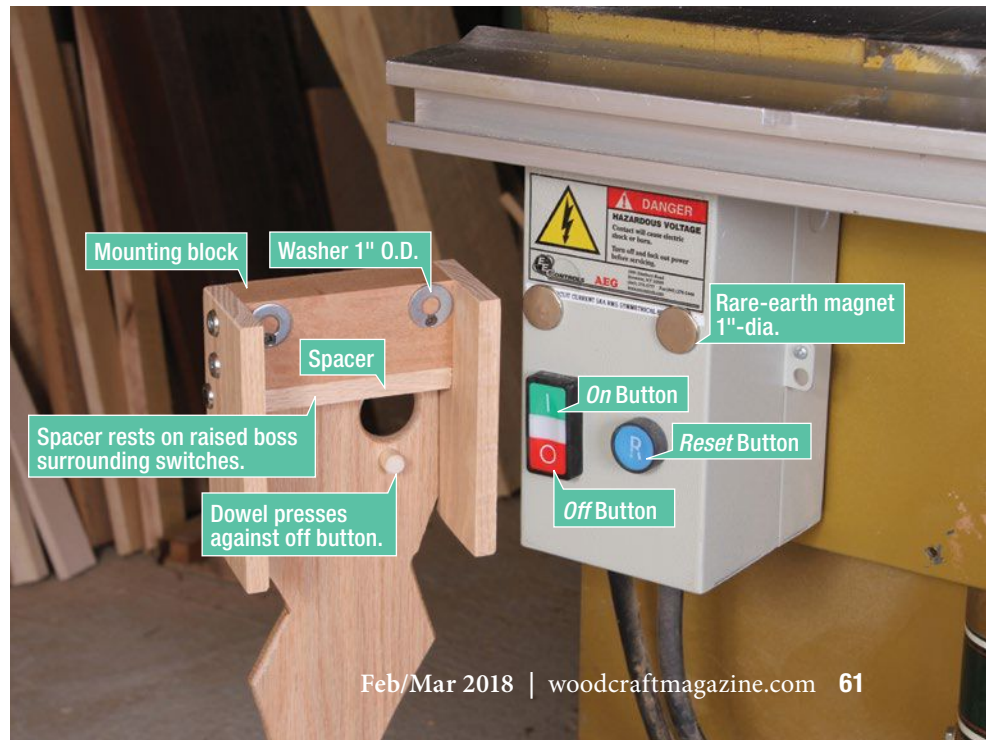
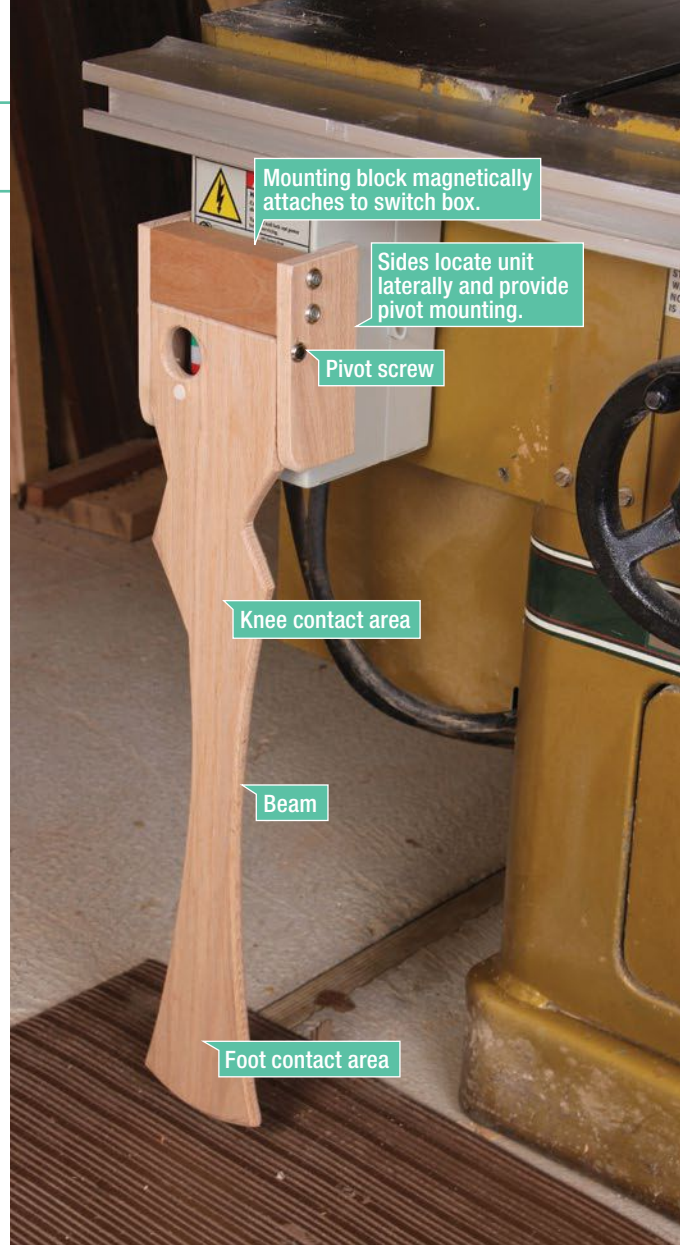
The challenge:

The aftermarket replacement switch on my Powermatic saw has three buttons: *on*, *off*, and *reset*. I was constantly pushing *reset* instead of *on*, so I wanted to mask that button while allowing easy operation of the other two. I also wanted to make the assembly quickly removable for accessing the *reset* button when necessary. The final criterion was that I wanted to be able to use my knee as well as my foot for switch operation.

The solution:

For removability, I decided to attach the unit with two 1"-dia. rare-earth magnets. I began by measuring the width of the switch box to determine the length of the mounting block. As for the block's width, 2" seemed about right. To calculate its thickness, I measured the $\frac{1}{2}$ " button protrusion, then added $\frac{1}{4}$ " for clearance and $\frac{1}{2}$ " for the thickness of the beam, making the mounting block thickness $1\frac{1}{4}$ ". I screwed two 1" O.D. washers to the back of the mounting block for magnetic attachment, and added a $\frac{1}{2} \times \frac{1}{2}$ " spacer to its lower edge. This spacer rests on the raised boss surrounding the buttons and keeps the assembly from sliding down. To stabilize the unit laterally, I screwed on $\frac{1}{2} \times 2\frac{3}{4} \times 6$ " sides with $1\frac{3}{4}$ " flathead screws, using finish washers to dress things up a bit.

With the assembly in place, I measured from the mount to the floor, and subtracted a few inches to gauge the length of the beam, which I cut from $\frac{1}{2}$ "-thick stock. Rather than use hinges, I decided to pivot it on screws passing through oversized holes in the sides. I cut the beam to a whimsical shape that's wider at foot and knee level to provide ample targets. After drilling a finger hole to access the *on* button, I eased all edges with a $\frac{1}{4}$ " roundover bit and attached the beam. I then located and drilled a hole for a $\frac{1}{2}$ "-dia. dowel to engage the *off* button. I friction-fit a length of dowel into the hole and adjusted it so that a deliberate nudge to the beam would depress the button. Finally, I cut the dowel to length, and glued it in its hole.



Spotlight on ROSEWOOD

Beauty runs in a big family

By David Schiff

Honduran Rosewood

Sometimes called “true” rosewood, Brazilian rosewood (*Dalbergia nigra*) is a beautiful hardwood. Its namesake is inspired by the sweet rose-like scent produced when cut. Woodworkers have coveted it for centuries to use in the finest furniture and musical instruments. In 1992, the Convention on International Trade in Endangered Species (CITES) listed *Dalbergia* as “most endangered,” suspending all commercial trade unless the dealer could prove that the wood was harvested before that date. As of January 2017, all *Dalbergia* species are listed on CITES Appendix II. This listing requires dealers to obtain permits in order to export from the country where the wood is harvested.

Fortunately, there are many branches in the rosewood family tree. In fact, there are approximately 300 tree species listed as *Dalbergia*. While most of them are shrubs or climbers, there are a dozen varieties that produce cabinet-grade lumber. These trees share many desirable qualities but vary in appearance and working characteristics. To know what you’re buying, you’ll need to familiarize yourself with a few scientific names. And consider purchasing a few stand-ins referred to as rosewoods, even though they aren’t technically members of the rosewood family.

History in woodworking

The Chinese revere rosewood and have used it to make exquisite furniture since the 16th-Century Ming Dynasty. China still ranks as the world’s largest consumer of rosewood. Today most woodworkers, find rosewood too expensive as a primary furniture wood. It’s more likely used as veneer or inlay, or for small, prominent parts such as knife and tool handles. Rosewood turns well, and small scraps are used to make pens and the black pieces in the finest chess sets. Rosewood’s excellent acoustic properties are great for making guitars and other musical instruments, like marimbas, that rely on wood vibration to produce sounds.

Where the wood comes from

Many rosewood offshoots grow in other parts of South America and in Central America. The common titles typically indicate the country of origin, though some species have a wider range than their names suggest.

Out of necessity due to restrictions, many woodworkers turned to two Indian species—*Dalbergia latifolia* and *Dalbergia sissoo* that are almost indistinguishable from each other. Plantation-grown *Dalbergia latifolia*, often marketed as “Sonokeling,” grows primarily in East

India and is sold either as East Indian rosewood or just rosewood. *Dalbergia sissoo*, sold as Indian rosewood, grows in northern and western India.

Selecting a species

Except for Brazilian rosewood, other varieties are relatively simple to obtain, but they can be expensive. Although family traits make the wood easily identifiable (dark heartwood and creamy sapwood that mellows when exposed to light), the *Dalbergias* vary in color and grain, even from one board to the next. Considering the investment (\$15-20 BF

Rosewood Quick Take

DENSITY	53-62 lbs./cu. ft.
HARDNESS	Very hard
STABILITY	Very stable
ROT/INSECT RESISTANCE	Very resistant
TEXTURE	Fine to moderately coarse
TOXICITY	Moderate to severe
USES	Furniture, instruments, turnings, carvings, tool handles
Note: Although similar, <i>Dalbergia</i> ’s attributes vary slightly according to species. Ranges indicate species differences.	



East Indian
Dalbergia latifolia

Honduran
Dalbergia stevensonii

Burmese
Dalbergia oliveri

It sounds as good as it looks. Luthiers love rosewood for its physical beauty and its excellent acoustic properties. The guitar back and sides shown here are made of East Indian rosewood.

and up) it's a good idea to select the stock in person if you can.

Luthiers love Brazilian rosewood's acoustic properties as well as the attractive colors ranging from a honey-gold to a dark chocolate brown. Indian rosewoods are beautiful in their own right, but don't have the color range of Brazilian—they are typically a reddish-brown.

Working rosewood in the shop

Brazilian rosewood earned its reputation for its beauty and working qualities. Despite being very hard and dense, the wood is flexible and unmatched as a “tone wood”—perfect for luthiers. The rosewoods share myriad qualities, including outstanding turning and shaping characteristics, exceptional stability, and excellent decay resistance. The Indian rosewoods perform most like their Brazilian kin, but there are some noteworthy differences with the other siblings. Honduran rosewood is difficult to work with hand tools, and while it machines well, it dulls cutters quickly. Burmese rosewood is usually straight grained and easy to work with hand tools or machines, but it also blunts sharp edges in a hurry.

Dalbergias contain extractives that can sometimes hinder adhesion with water-

based glue. To avoid adhesion failure, mill or sand the edges, and then wipe the surface with naphtha before gluing. Epoxy or polyurethane glue work well.

Despite its lovely fragrance, rosewood dust can be quite irritating. Depending on the species, symptoms range from dermatitis to skin lesions, and minor sinus irritation to asthmatic-type reactions. The *Dalbergia* extractive is a very potent allergen for some. In some cases, musicians who experience only minimal exposure to the wood—by way of skin contact with chin rests or fretboards—have developed skin rashes. As with any wood, wear a NIOSH-approved dust mask and use good dust collection.

Finishing

True rosewoods—and rosewood substitutes—can be polished to a shine, but the resinous, waxy sawdust gums up sandpaper. A cabinet scraper works great for removing mill marks. Wet-sanding is another good option. The extractives can prevent oils and oil-based polyurethanes from curing properly. Test before finishing, or seal the wood with shellac. Rosewoods vary when it comes to grain. Depending on the sample and species, you may need fillers to achieve a super-smooth finish. ■

A rose by many other names



Although not *Dalbergias*, these rosewood substitutes are reasonable stand-ins. *Macherium villosum*, sold as Bolivian or santos rosewood, morado, and pau ferro, all look like Brazilian, but do not have the same acoustic qualities. All the commercial supply comes from Bolivia.

Curapay (*Anadenanthera colubrine*), aka Patagonian rosewood, is a dense, durable Argentinian wood. Curapay, which is often used for high-end flooring in the United States, is less expensive than true rosewood. Its wild grain tends to tear when worked with either hand or power tools.

Bubinga (*Guiboutia demeusei*) and its close relative, *Guibourtia coleosperma*, are sometimes referred to as “African rosewood.” These woods have an attractive salmon pink color with a tight grain that can be wavy or straight. African rosewood planes and cuts well, but contains silica that quickly dulls steel blades and bits.

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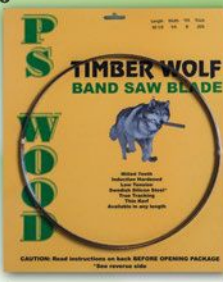
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ISSUE 77: JUNE / JULY 2017

PROJECTS

CHECK US OUT ONLINE!

pg. 50 River Table

Build your own version of this slab furniture project, which puts square edges on the outside and live edges on a meandering middle path highlighted with tinted glass.

pg. 50 Easy Chair

Bet you can't build just one! This classic Danish Modern design

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THE CONOID CHAIR

By Andy Rae



fastFACTS

- George Nakashima (1905-1990) was an American of Japanese descent, born of Samurai ancestry on both sides of his family.
- The term “conoid” refers to the cone-shaped roof structures designed by George for his architectural work.
- A typical Conoid chair, in walnut with a glued-up seat, retails today for \$2,300.
- Like her father, Mira Nakashima-Yarnall was trained as both architect and woodworker, and oversees the business today.

Browse the George Nakashima Woodworkers website at www.nakashimawoodworker.com.

“*Furniture should be lived with and not treated as something overly precious.*”

—George Nakashima

My unplanned woodworking career began in 1981 when I landed a job at George Nakashima Woodworkers, the same year that George published his book, *The Soul of a Tree*. Under George’s tutelage, I spent a year smoothing, polishing and finishing cabinets, tables, desks, chairs, and benches before heading off on my own, armed with nothing more than a favorite finish and a keen eye for beautiful wood. I was hooked.

Today, the name Nakashima is synonymous with huge, natural-edged table tops; casework with exposed dovetails;

lots of solid wood; and wooden keys, called butterflies by George. The Conoid chair is perhaps the most iconic of all Nakashima designs. Those produced in the Nakashima workshop today differ little from the first version George built in 1971. A study in minimalist elegance, the design features two legs that extend from sled-type feet, serving as uprights that support a cantilevered seat and a crest rail with cantilevered ends. These major parts are typically made from black walnut. Spindles are made from hickory, shaved

Crest rail

Hand-shaved
hickory back spindle

Upright

Sculpted,
cantilevered seat

Wood plug

Sled foot

Three Tables for Peace

On New Year's Eve, 1986, a table of American walnut measuring 10½ by 10½ feet by almost three inches thick was dedicated in the nave of the Cathedral of Saint John the Divine in New York City. Constructed from two enormous, book-matched slabs, the Peace Altar was the first of three tables conceived by George Nakashima to promote unity and world *peace*. Across the globe, two similarly-sized altars were dedicated, the second in the Russian Academy of Art in Moscow (1995); the third in Auroville, India (1996). To embrace all the continents, there are plans for four more altars.



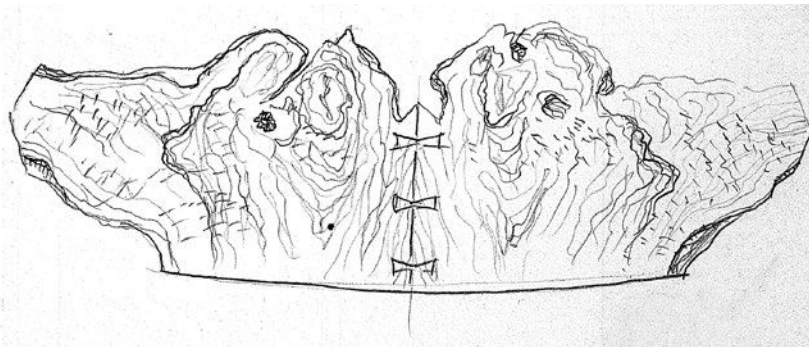
The first Peace Altar in the Nakashima workshop, bound for New York City.



The second Peace Altar, Moscow, Russia.



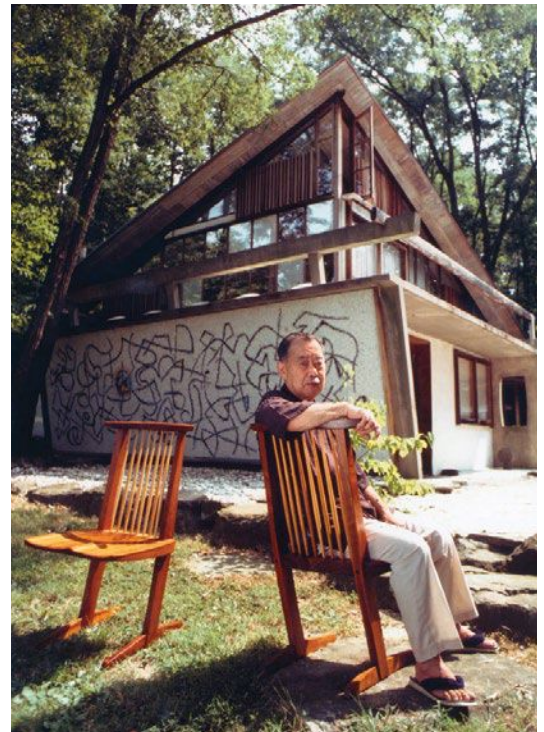
The third Peace Altar, Auroville, India.



Drawn in detail. Drawing grain patterns from actual slabs of wood was a typical Nakashima approach, including the precise placement of wood butterflies.

and faceted by hand with a block plane.

George passed in 1990, but the workshop is still going strong today under the direction of his daughter, Mira Nakashima-Yarnall. In her 2003 biographical work, *Nature Form & Spirit: The Life and Legacy of George Nakashima*, Mira recounts her dad's life and work, with colorful photos of the furniture this small company has been producing over the past 70-plus years. Located in New Hope, Pennsylvania, the showroom and museum are open to the public on Saturdays only, from 1 to 4:30 p.m. ■



Architectural seat. George Nakashima enjoys his famous chair outside the Minguren Museum that he designed and built on his property in eastern Pennsylvania.

Buyer's Guide

Hot New Tools (p. 14)

Easy Wood Micro Turning Tools

1. Easy Wood Tools Micro Rougher#163407, **\$79.99**
2. Easy Wood Tools Micro Finisher#163408, **\$79.99**
3. Easy Wood Tools Micro Detailer#163409, **\$79.99**

Oneida Universal Router Hood Dust Collection

1. Oneida Air Systems Universal Router Hood Dust Collection#163363, **\$34.99**

Simple Six-Board Chest (p. 24)

1. Decorative Wrought Head Black Oxide Finish Nail, 2", 6D, 1lb box*Tremontnail.com*, #CW6M, **\$15.25**
2. Hafele Mortised Decorative Solid Brass Butt Hinge with Finial in Antique Brass (2 needed)#159833, **\$11.99**
3. WoodRiver Lid Support, left, 35-45 lbs#04X21, **\$6.99**
4. Whiteside Straight Cut Double Flute Router Bit, 1/2" SH, 3/4" D, 1" CL.....#24A39, **\$18.34**
5. Whiteside Roundover Router Bit, 1/2" SH, 3/8" D, 1" CL.....#813855, **\$49.16**
6. 3D Squares Clamp-on Squares, 2 pack#144041, **\$34.69**
7. General Finishes Brick Red Milk Paint, Quart#825758, **\$27.99**
8. General Finishes Somerset Gold Milk Paint, Pint#148936, **\$17.99**
9. Slipstick 4 1/2 x 6" Blanket Heavy Duty Seld-stick Felt, Pair#153402, **\$5.99**

Bust Dust for Good (p. 30)

1. HEPA Filter*Home centers and online; filter price varies per vacuum.*
2. Oneida Deluxe Dust Deputy with 5-Gallon Drum Kit#149951, **\$99.99**
3. FastCap RCV Remote Control Vacuum*fastcap.com*, **\$29.99**
4. WoodRiver 1 1/2 to 2 1/4" Adaptor Dust Collection Fitting#144655, **\$5.99**
5. WoodRiver Universal Tool Adaptor Dust Collection Fitting#142173, **\$10.99**
6. Fein Turbo II Shop Vacuum#861108, **\$349.00**
7. Karcher WD5/P Wet/Dry Shop Vacuum#161498, **\$199.99**
8. Festool Dust Extractor CT 26#583492, **\$700.00**
9. JET Canister Filter for DC-1100 Dust Collector#821769B, **\$351.99**
10. WoodRiver 4" Aluminum Blast Gate#85007, **\$13.99**

Items above available at Woodcraft stores, at *woodcraft.com*, or by calling (800) 225-1153, unless otherwise noted. Prices subject to change without notice.

11. iVac Pro 115-Volt Remote Control for Dust Collectors#161816, **\$89.99**
12. WoodRiver 4" Universal Fitting#144654, **\$5.99**
13. WoodRiver 4" Dust Control Flex Cuff with Hose Clamps#153235, **\$11.99**
14. WoodRiver 4" Keyed Bridged Hose Clamp, 4-Piece#163449, **\$9.99**
15. WoodRiver 4" Hose End Dust Collection Fitting#151292, **\$8.99**
16. Flexaust 4" x 2' Stretch Dust Collection Hose#161626, **\$49.99**
17. JET Vortex Cone Dust Collector, 1.5 HP, 1 PH, 115/230-Volt, 2-Micron Canister Kit DC-1100VX-CK#849645, **\$713.99**
18. Laguna ClFlux 1.5 HP, 1-Micron Cyclone#866314, **\$1,199.00**

Build a Classic Shaker Counter (p. 36)

1. Whiteside Solid Carbide Spiral Upcut Router Bit, 1/2" SH, 3/8" D, 1 1/4" CL .#08K61, **\$49.64**
2. Whiteside Dovetail Router Bit, 14", 1/2" SH, 3/4" D, 3/4" CL#24D43, **\$21.37**
3. TransTint Honey Amber Aniline Dye, 2 oz.#128481, **\$20.99**
4. TransTint Dark Vintage Maple Aniline Dye, 2 oz.#821825, **\$20.99**

Rabbeted, Half-Blind Dovetail Drawers (p. 46)

1. Whiteside Dovetail Router Bit, 14", 1/2" SH, 3/4" D, 3/4" CL#24D43, **\$21.37**
2. Freud Quadra-Cut Raised Panel Router Bit Bevel, 1/2" SH#828932, **\$98.97**

Standing Mirror with Storage (p. 50)

1. 16 x 58" Frameless Wall Mirror*lowes.com*, **\$25.98**
2. National Piano Hinge, Brass Plated 1 1/2 x 48" (2 req.)#152156, **\$21.99**
3. HIGHPOINT Hook Latch Large Polished Brass Plated, 1-Piece with Screws#162712, **\$3.99**
4. HIGHPOINT Threaded Insert - Brass - 3/16-18, 8-Piece (4 req.)#159291, **\$6.99**
5. HIGHPOINT Key-Box 6-Hook Strip Brass Plated (8 req.)#158436, **\$3.99**
6. 3/4" Cup Hooks, 6-Piece (12 req.)*lowes.com*, **\$1.24**
7. HIGHPOINT Threaded Insert, Slotted, 1/4-20, 8-Piece (1 req.)#159282, **\$6.99**
8. HIGHPOINT Solid Brass Screws #4 x 3/8" Slotted 25-Piece (6 req.)#159686, **\$1.99**
9. General Finishes Arm-R-Seal Top Coat, Satin, Quart#85F08, **\$17.99**
10. Gorilla Heavy Duty Construction Adhesive*lowes.com*, **\$7.98**

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Better photos with your phone

Q *The camera phone tripod mount featured in issue #80's Tips and Tricks column really helps me take better shots of my work. However, I'm still struggling to improve my camera phone photography. Any advice?*
—Mark Clemons, Biloxi, Mississippi

A Professional photographer John Blackford replies: Shooting with a camera phone can be challenging because of its tiny sensor, which limits dynamic range and tends to produce digital noise, especially in low light. The fixed wide-angle lens can also cause distortion when the camera is too close to the subject. Try these suggestions to improve lighting and minimize noise and perspective distortion. And remember; the best way to learn is by experimenting.

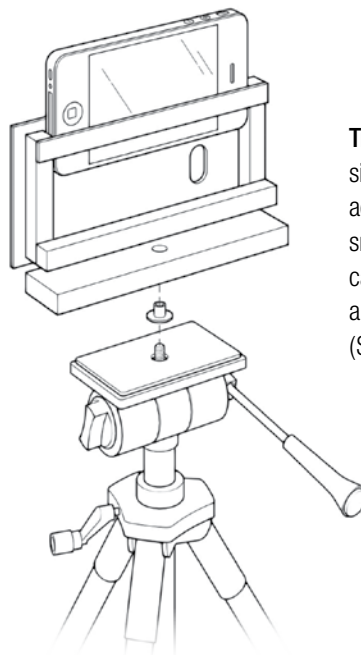
Camera settings. In your menu settings, select the highest *resolution* possible. Also, select *auto focus*, *auto white balance*, *auto ISO*, and *auto contrast*. These auto settings will help you initially, but as you gain more experience, try the manual controls for better results.

Camera position. To minimize perspective distortion, move the camera back until the project's vertical edges are nearly parallel. (As a reference, select *grid view* in your camera settings.) Then, fill the frame using digital zoom, by spreading your fingers on the live-view image. (Note: Digital zoom or cropping reduces image quality.) Using a tripod mount produces sharper images.

Composition. Avoid shooting a project straight-on. Orient it at an angle, with the front, a side, and a bit of the top visible. Avoid distracting backgrounds or shoot against a plain light-colored wall, a suspended bed sheet, or a roll of seamless photo paper.

Lighting. To compensate for the small sensor, flood the scene with light. For best color, avoid mixing natural and artificial light. If your light source is a window, use a white poster board to reflect light onto the project's darker side. If any highlights in your shot are "blown out" (lacking detail), adjust the exposure setting or move the lights back. To create more visual depth, begin by placing one light twice as close as the other, with each aimed in at about 45°. Then fine-tune direction and placement.

Post-processing. You can improve your images in a photo app, tweaking exposure, sharpness, color balance, and more. *Adobe Lightroom Mobile* lets you sync with your computer, and Google's *Snapseed* offers extensive filters and lighting effects. Both apps support iOS and Android. ■



Tripod mount. This simple shop-made accessory holds your smartphone steady for careful composition and sharp images. (See onlineEXTRAS.)



Perspective distortion. Placing your camera phone too close to your project can cause *keystoning*, in which parallel edges converge too sharply.



Normal perspective. Here, the camera was pulled back about 6 feet to gain normal perspective, and then the image was zoomed in digitally to fill the frame.



onlineEXTRA

For tips on making the camera phone tripod mount and more lighting and composition basics, visit our website and click onlineEXTRAS.

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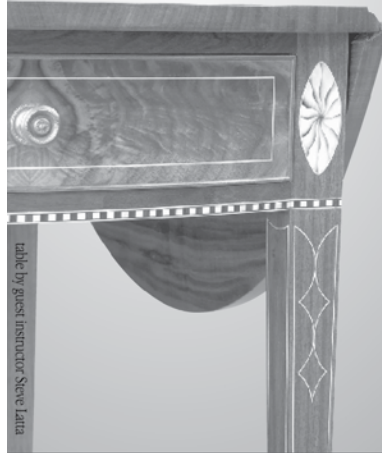


table by guest instructor Steve Latta

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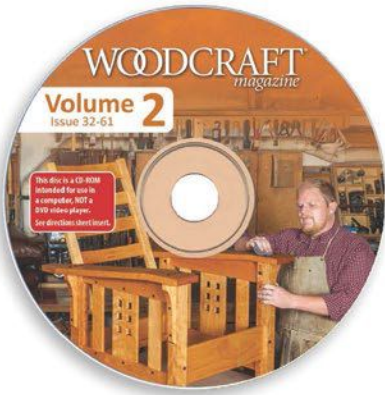
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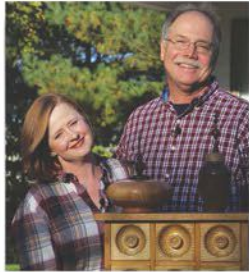
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