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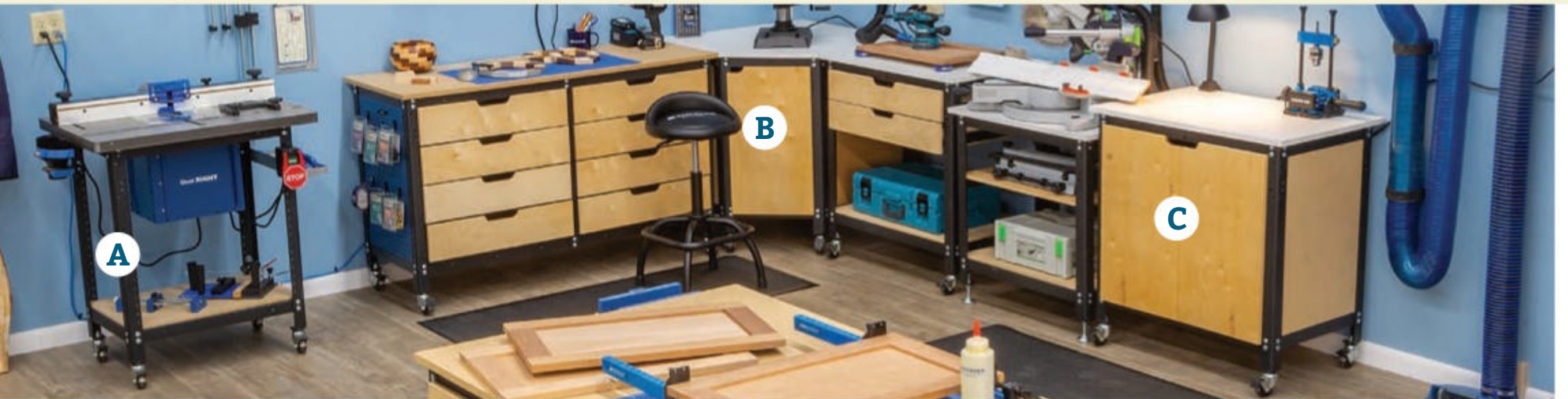


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WOODWORKER'S JOURNAL

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Walnut Storage Cabinet

By Alex Fang

This influencer's sleek and trendy cabinet offers ample storage while remaining relatively easy to build.

Benchtop Drill Press Mobile Stand

By A.J. Hamler

Give your small drill press a rock-solid base system on wheels and clear off some valuable shop counter space.

Breakfront Plant Stand

By Chris Marshall

Our senior editor puts Leigh's FMT Pro Jig through its paces to mill a bunch of mortise-and-tenon joints for this Arts & Crafts-inspired piece.



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⚠️ WARNING: Drilling, sawing, sanding or machining wood products can expose you to wood dust, a substance known to the State of California to cause cancer. Avoid inhaling wood dust or use a dust mask or other safeguards for personal protection. For more information go to www.P65Warnings.ca.gov/wood.

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The fact that you are reading a woodworking magazine is a good indication that you value high quality woodworking information. But "quality" can be tricky to find. There seems to be an unlimited number of people online "teaching" the ins and outs of woodworking. To be frank, some of them make me cringe as they deliver bad or incomplete information about the craft I love so well. While I sure appreciate their enthusiasm, I wish they'd take a class. (Or read some woodworking magazines!)

One online location where I can assure that you will get quality woodworking information is the "Learn" section of *rockler.com*. These pages have been under development for years and are now ready for prime

time. This substantial and ever-growing body of content offers a collection of woodworking articles, advice and videos from *Woodworker's Journal*, contributions from reputable online woodworkers and even a wonderful series of long-form videos from The Center for Furniture Craftsmanship. There are free plans and project ideas, too. It's a great place to spend your online learning time, and you can count on information that's safe, informative and vetted by experts on our staff and at Rockler.

—Rob Johnstone

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FROM OUR READERS

Hibernating is Not an Option



PUTTING 2021 TO BED IN A BIG WAY

The new year is upon us, and it's time for me to get into the shop in a big way. I need a substantial project to help me while away these long, cold and dark winter evenings.

So what am I building? I am making a bed. It's such a practical project for dealing with all the challenges that January evenings bring to bear. I'm already imagining myself snuggled under a thick quilt, a good book or woodworking magazine to

read and maybe a winter beverage of some sort on the side table. It's a nice dream.

Curiously, while I have made several beds in my career as a woodworker, I have never made one for my own use. And to be frank, I am feeling a little nervous about that. Since I am in charge of all aspects of this project, no one else really has any significant input into the design and execution of the bed. If it turns out to be a nice and practical project, well, one would expect that from a woodworker of my august experience. But if it comes up a big stinker, there will be no one to blame except me!

Even so, you won't find a bed in the *Journal* this time (I am guessing mine might be in a future issue), but you will find some great projects to build. The walnut cabinet on page 28 is a classic design with tried-and-true construction. Or consider making the tiered mahogany plant stand on page 42. But as this is our "back to the shop" issue, you will also find a handy mobile stand for a benchtop drill press on page 36, featuring storage and extension wings. I know I am very fond of building improvements for my shop. So see you in the shop, where there is a headboard and footboard calling me.

— Rob Johnstone

LETTERS

Eye Wash to the Rescue

While I certainly agree that personal protective equipment ["PPE: Your First Line of Defense," October 2021] is important, accidents still happen, and woodworkers should be ready for anything. To that end, I keep a \$5 bottle of sterile eye wash in my shop. Sometimes I use it for a bit of water on a rag to clean up glue or just to rinse dust out of my eyes. But I once needed it for a serious purpose after splashing weed killer in my eye. If you're wondering, yes, it worked.

Steve Pomper
via the Internet



ROCKLER PRESS
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FEBRUARY 2022
Volume 46, Number 1

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Safety First Learning how to operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary guards have been removed from equipment shown in our magazine. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturers' instructions and safety precautions.

Woodworker's Journal (ISSN: 0199-1892), is published in February, April, June, August, October and December by Rockler Press Inc., 4365 Willow Dr., Medina, MN 55340. Periodical postage paid at Medina, Minnesota and additional mailing offices. Postmaster: Send all address changes to Woodworker's Journal, P.O. Box 6211, Harlan, IA 51593-1711. Subscription Rates: One-year, \$19.95 (U.S.); \$28.95 U.S. funds (Canada and other countries). Single copy price, \$7.99. Reproduction without permission prohibited. Publications Mail Agreement Number 0861065. Canadian Publication Agreement #40009401.

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February 2022 Woodworker's Journal

Seated but Can't See?

Concerning the inset picture for the "Sit/Stand Desk" project on page 46 of the October issue, there may be a problem. It appears unlikely that a seated person could see the complete laptop screen, because the Upper Desk Panel (piece 6) seems to obstruct the view. This would be exacerbated by taller users. How can that problem be avoided?

Jeff Grzeca
Milwaukee, Wisconsin

WJ Responds: Taller desk users can slide the top panel out of its dadoes, if needed, for a better view. It's height adjustable and removable.



While taller users might opt to remove the desk's upper panel when seated for better laptop viewing, it works well to prevent overhead lights from glaring on the screen.

Universal Tool Batteries and Chargers, Please!

I'm writing to address a problem that has been simmering on my back burner for some time. The epitome of the problem hit me when I received the October 2021 issue. There on the front cover is a very nice-looking project to help solve an ongoing and

burgeoning problem: battery packs, chargers and what to do with them. Displayed inside the cabinet are five different brands of 18-volt battery packs and their related chargers. When tools had cords, did we need a cabinet to store the cords and

Continues on page 10 ...

READER PROJECTS



Bed Sofa Gets Built, Finally!

Around 30 years ago I had an idea to build a bed sofa, and recently I finally got around to doing it! I call it a bed sofa because unlike a sofa bed, which is mostly used as a sofa and rarely used as a bed, mine is just the opposite. My initial design concept for the conversion became too complex. I resolved that by simply making the back articulate to either position. It sits and sleeps surprisingly well.

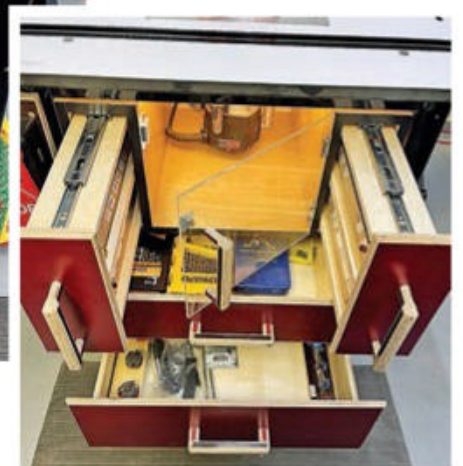
Bruce Kieffer
Edina, Minnesota

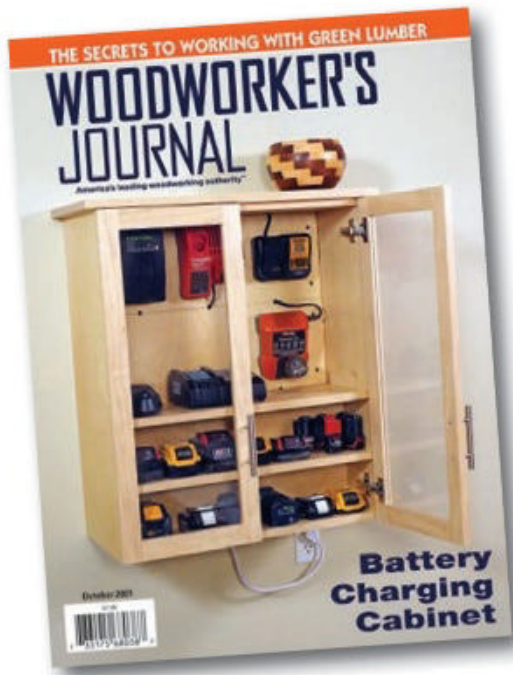


Souped-up Router Table

I ran out of room to store router bits and accessories, so I've customized my Rockler router table with two drawers, two side-loading bit storage compartments and an illuminated, sealed compartment for my router and lift. Many of my shop tools and supplies are from Rockler, including my SawStop table saw, clamps, dust collection system, hand tools, hardware and even the wood I use. Just about everything. Thanks for being a great woodworking supplier and magazine.

Steve Schclair
via the Internet





plugs for each brand? Were we forced to be brand-specific because we had only one wall socket pin configuration? The answer to these questions is no. Proprietary battery pack designs and chargers need to be eliminated. We only need one universal

battery pack design and charger. The industry seems to have standardized the voltage of battery packs at 12

and 18 volts for most of the common cordless hand tools. As I see it, the only valid reasons for brand-proprietary chargers is to increase the profit margin for the tools or to prevent, for example, a DeWALT battery from being used on a Milwaukee tool. This is accomplished by forcing us consumers to be brand-specific in our tool purchases for no other reason than to eliminate the necessity of purchasing another brand-specific charger.

Manufacturers would argue that their battery packs include electronics that are specific to their tool. This may or may not be a valid argument, but I feel reasonably certain that those electronics could be made universal and just as easily be incorporated into the tool itself with a single connection to the battery pack.

Jeffrey W. Gehm
via the Internet

Continues on page 12 ...

SURVEY

WE ASKED OUR SURVEY GROUP ABOUT THEIR 2022 SHOP ASPIRATIONS

The future is now, as they say, so we were wondering what your woodworking plans are for the new year.

There's more online at woodworkersjournal.com



Check online for more content covering the articles below:

Woodturning (page 20):

Ernie interviews calabash bowl expert Emiliano Achaval (video)

Breakfront Plant Stand (page 42):

Watch Leigh's FMT Pro Mortise and Tenon Jig in action (video)

Skill Builder (page 50):

Mortise-and-tenon joints are essential to woodworking, and here's why (video)

Power Tool Fundamentals (page 52):

Discover why the table saw is such a critically important shop tool (video)

What's in Store (page 58):

Featured tools in action (videos)

Tool Preview (page 60):

Overview of Festool's newest track saw and benefits (video)

Hardworking Hardware (page 62):

Learn how to install Euro hinges (video)

What are you most likely to make in the upcoming year?

Furniture	15%
Shop improvements	19%
Small projects (boxes, lamps, etc.)	19%
Outdoor furniture	6%
Toys	6%
Turned items	10%
Carved items	3%
Kitchen cabinets	3%
Home improvement projects	17%
Other	3%

Which of these skills would you most like to develop in 2022?

Dovetail joinery	18%
Woodturning	14%
Carving	6%
Veneering	3%
Inlay	7%
Hand tool skills	14%
CNC routing proficiency	5%
Finishing	16%
Working with epoxy resin	13%
Other	5%

Compared to last year, do you think you will be doing:

More woodworking in the upcoming year	50%
Less woodworking in the upcoming year	5%
About the same amount of woodworking in the upcoming year	45%



Tile-Topped Plant Stand

This project from our December 2019 issue is now available as a templated plan from Rockler (item 65064).

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Steel Cabinet for Battery and Charger Storage

Regarding your “Tool Battery Charging Cabinet” project in the October issue, I wouldn’t recommend enclosing so many chargers and batteries in a flammable cabinet. To give my shop a bit more isolation, I’m using a steel cabinet, aluminum tape over the vents and an 8-hour shutoff timer for the power strip. I’ve confirmed that there isn’t noticeable heat buildup with the closed vents.

Dave Burkett
via the Internet

Why the Gearhead Gear?

I just started getting your magazine during the pandemic, and I love it! But I’m disappointed with *Stumpers*. Why, you ask? Well, as the title of your magazine is *WOODWORKER’S Journal*, I expected to see woodworking tools to be showcased in this section. Imagine my horror when the April and June issues showcased automotive tools! Come on folks, this is not “Car Mechanics” or “Classic Car Magazine.” I am a woodworker, not a machinist! Thanks for accepting my “venting” in the spirit it is

intended, with tongue firmly — sort of — in cheek, but maybe sticking out a bit.

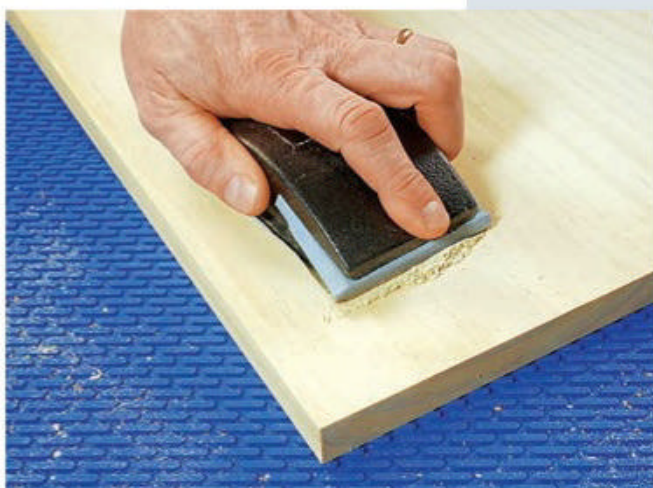
Andrew French
Albion, Michigan

Chris Marshall Responds:

We’ll try to keep our heads out from under the hood in the future, Andrew! But the mail really poured in from fellow readers who shared their guesses and personal stories about those two valve-grinding tools. So brace yourself: there may be more gearheads among us than you realize. But it’s all good!

TRIVIA

Harmful Wood Dust — It’s What You *Don’t* See



How small are the fine [wood] dust particles that can harm us? We can’t see most of them: Individual particles smaller than 100µm (0.1 mm) are invisible to the unaided eye. Particles between 10µm and 20µm tend to become trapped in the outer passages of your respiratory system (resulting in the grotty goo that you see on a clean hanky when you blow your nose after a sanding session). Minute wood particles — particularly those between 0.3µm and 10µm — easily penetrate deep into the farthest reaches of your lungs, even into the tiny air sacs called alveoli.

Sandor Nagyszalanczy
Woodshop Dust Control: A Complete Guide to Setting Up Your Own System
The Taunton Press; ISBN: 1561584991

STUMPERS

Ticktock Talk

But why might a modeler own it?

Even though Paul Doman, owner of our October mystery tool (shown at far right), has been unable to determine exactly what it does, 78 respondents couldn't wait to unanimously explain his watch crab's purpose. "This tool is an adjustable spanner wrench for removing the watertight back on watches," says **Robert Hobday** of Honeoye Falls, New York.

"As a watchmaker for 40-plus years, I have used a tool like this often," assures **Jim Hill** of Sudbury, Massachusetts. **Benny Bridges** of Charlotte, North Carolina, **Dave Knapper** of Willmar, Minnesota, and **Michael Walters**, who all regularly work on watches, are well familiar with it, too. "I own a couple different versions of this tool, admits **Rob Harrison**, "as my wife thinks that I have a watch collection problem."

"You have two main types of backs on watch cases — those that pop off and those that unscrew. The latter have little indentations or notches of different shapes," **Zachary Amend** says, to set the stage. "There is usually an O-ring or gasket helping to maintain the tightness of the cover," adds **Dick Doubrava** of Bixby, Oklahoma. "The (watch crab) spans the indents/slots in the watch case back. Once engaged, you twist it off like a screw-



Vince Piacenti's watch crab closely resembles Paul Doman's October mystery tool. Here, its jaws are engaged in the notches of a watch back. Twisting the tool right or left threads the back on or off for repairs.

driver," explains **Richard Beirne** of Galesville, Wisconsin.

"Since watches vary in diameter, the two 'toes' are adjustable in width by the knurled screw in the center," reports **William J. Knox**, hailing from Carrickfergus, United Kingdom. "Roll the adjustment wheel to move the jaws in or out to set the spacing of the watch's back case grooves," continues **Jim Liles** of Lena, Illinois.

"This (two jaw) type is one of the cheapest styles made and does not work very well," asserts **Scott Hudgins**. But in spite of their low cost (around \$6), **Doug Sele** of Bemidji, Minnesota, says they're handy to have when your battery dies. "It saves going to the jeweler to have a battery replaced at 10 times the cost," adds **Ted Dzik**.

Greg Munson, a jeweler of 35 years, and **Paul Weintraub** of Deltona, Florida, report that other watch crabs have three lugs instead of two, which allow a better grip on the back of the watch. And **Rob Krauer** offers that some watch crabs even come

with replaceable pins.

A number of you, including **Orville McConnell**, **Brian Napoli** and **Muhammad Raza**, own similar watch crabs because they were included among a kit of tools for repairing watches.

But in spite of your unequivocal certainty of what Paul Doman's mystery tool does, very few ventured guesses as to why a "highly regarded model ship builder" would have owned it first. A few shared their hunches. "Maybe the ship builder used it as a small clamp when gluing pieces together," speculates **Darrel Bickel**. "Or he used it on small dowels as a repeatable measuring tool to cut small spars," ponders **Mike Strange**.

The most likely purpose might be this. "[A watch crab] sits under the model boat — usually four of them — and holds the boat up," explains **Tom Redd** of Grand Haven, Michigan. "Screw the crab claws snug to the keel of the ship you are building, and do the same with the other three."



What's This?



Geoff Strauss inherited this 3"-long Stanley tool from his father. Its two wings are tightened by a pair of long bolts and opposing wingnuts. Inside the wings are two flanges, and one is stamped 0575. Geoff recalls how his father used the tool, but do you know its woodworking application? Email your answers to stumpers@woodworkersjournal.com or write to "Stumpers," Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340.

TRICKS OF THE TRADE

High-friction Fences, Low-friction Vac Sweep

Jar Lid Preserves Finish and Brush

Here's a way I preserve the surplus finish I'm brushing on, as well as my foam brush, when I'm applying multiple coats. I insert the wooden handle of my brush through a hole in the metal lid of a small Mason jar, and I leave the lid on the handle. The lid helps to keep the brush handle and my fingers clean when I'm applying a coat. Then, when it's screwed back onto the jar between coats, it keeps the finish fresh, and I can leave the brush right in the jar without having to clean it.

Bill Wells
Olympia, Washington



Thrifty Three-way Edge Clamps

Here's a simple alternative to three-way clamps for gluing on shelf lipping or face frames that uses the C-clamps or F-style clamps you already own. All you need to do is locate and secure the clamps far enough above the lipping or face frame to slide a shim underneath the clamp body or bar. I create my shims with a gentle taper down to about 3/16" or 1/4" thick. Once you've got the parts glued together, tap the shim into place under the clamp to apply lateral pressure that presses the joint closed.

John Cusimano
Lansdale, Pennsylvania



Drill Bits Handy for Routing Setups

When I need to set a precise bit height at my router table, I take two drill bits with diameters that match the router bit height I need. I lay both bits down on the table so they're parallel with one another and on either side of the router bit. Then, with the router bit raised higher than necessary, I rest a small scrap on the top cutting edges and on one of the two drill bits. I lower the router bit slowly until the other edge of the scrap touches the second drill bit. At this point, I know my router bit height is dialed in correctly.

Serge Duclos
Delson, Quebec



Non-slip Fences with Gaffer's Tape

Gaffer's tape, available at camera stores as well as some hardware stores or online, is a black fabric-type tape that's used in the film industry and by photographers. I've found that applying a strip of it to the plastic or melamine-coated fences of my jigs and accessories creates a helpful nonslip surface. Workpieces stay in place better when held or clamped against this tape, and that improves my cutting accuracy.

Jim Wilson
San Marcos, Texas



Adding Wheels Brings Sweeping Changes

I have an old shop vacuum with a floor sweep attachment. The suction produced by the vacuum is so great that the floor sweep used to be difficult to move around the floor for cleanups. To fix the problem, I drilled holes on each side of the attachment and added small wooden wheels with bolts, washers and locknuts to lift the floor sweep slightly off the floor. Now I can easily roll the floor sweep around and pick up all the dust on my shop floor. It made a big improvement!

Carol Johnston
Portland, Indiana



In addition to our standard payment (below), Carol Johnston of Portland, Indiana, will also receive a Milwaukee M12™ Heated TOUGHShell™ Jacket for being selected as the “Pick of the Tricks” winner. We pay a one-time sum of \$150 for each trick used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. For your chance to win, submit your Tricks to Woodworker’s Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send us an email: tricks@woodworkersjournal.com

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Cypress	4/4		Select	3.00	8/4		4.00		4/4	\$ 99.00	8/4	\$109.00
Hickory-Pecan	4/4...1C	2.00	Select	3.00	8/4	Select	3.50		4/4	\$110.00	8/4	\$137.00
Mahogany (African)	4/4		Select	5.25	8/4	Select	5.55		4/4	\$124.00	8/4	\$127.00
Maple (Hard)	4/4...Select (N)	3.00	Select (W)	3.65	8/4	Select	4.50		4/4	\$118.00	8/4	\$126.00
Maple (Soft)	4/4		Select	2.60	8/4	Select	3.00		4/4	\$ 97.00	8/4	\$107.00
Oak (Red)	4/4...1C	2.10	Select	2.80	8/4	Select	3.95		4/4	\$107.00	8/4	\$129.00
Oak (White)	4/4...1C	2.20	Select	2.80	8/4	Select	4.95		4/4	\$107.00	8/4	\$135.00
Poplar	4/4...1C	1.30	Select	1.80	8/4	Select	2.00		4/4	\$ 87.00	8/4	\$ 91.00
Walnut	4/4...1C	3.25	Select	6.25	8/4	Select	7.00		4/4	\$129.00	8/4	\$149.00
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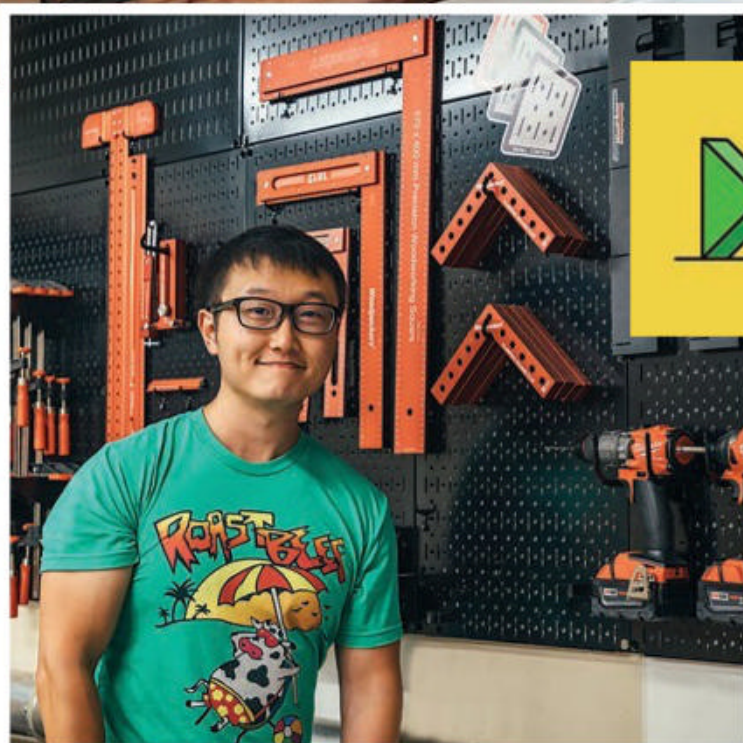
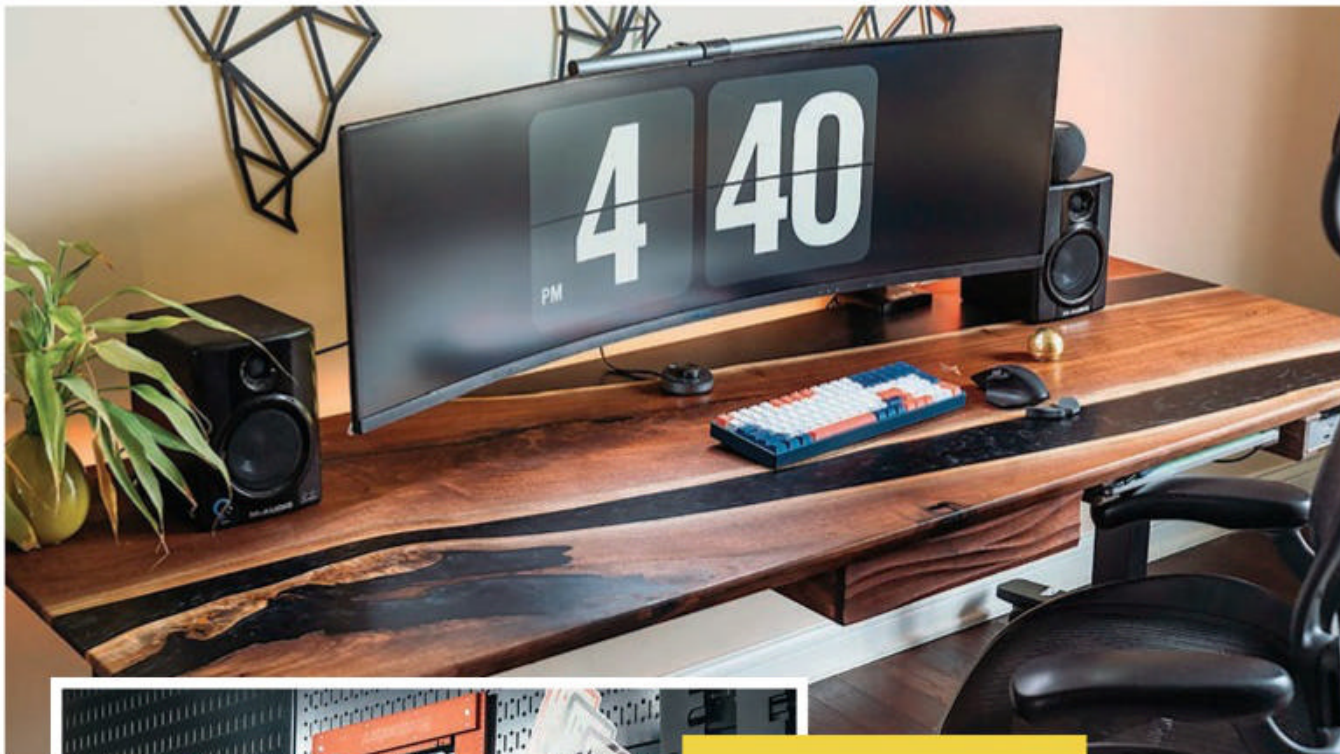
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SHOP TALK

Door Project Opens Other Creative Doors

By Alex Fang

Influencer credits fellow content creator for providing the nudge to start sharing project builds online.



Follow Alex Fang on Instagram @bevelish_creations.

Ever since I was young, I've always been a creative and curious person. I liked to draw, I liked photography and videography, and I especially enjoyed working with my hands. As an engineering student in college, my favorite classes were the ones where I got to go down to the lab and make things. College was where I was exposed to CAD design, 3D printing and

a little welding. It's also when I realized I loved coming up with my own designs on the computer and then turning them into physical products to help solve problems that I was facing at the time.

After college, I took a job as an automotive design engineer where 95 percent of my time was spent sitting in front of a computer. It was completely different from what I did in college, and there were very limited opportunities where I got to do any hands-on work. But my job always kept me busy, so I never had much time or energy to explore hobbies.

I didn't discover my interest in woodworking until after my wife and I bought our first house. One problem with it was that there wasn't

a door between the master bedroom and bathroom, which made showers in the winter months very chilly. We wanted to put up some barn doors, but all the ones we liked were really expensive. I remember thinking, "How hard would it be to make one?" At the time I'd never done any woodworking, so I went to the obvious place to learn: YouTube.

It All Started with a Door

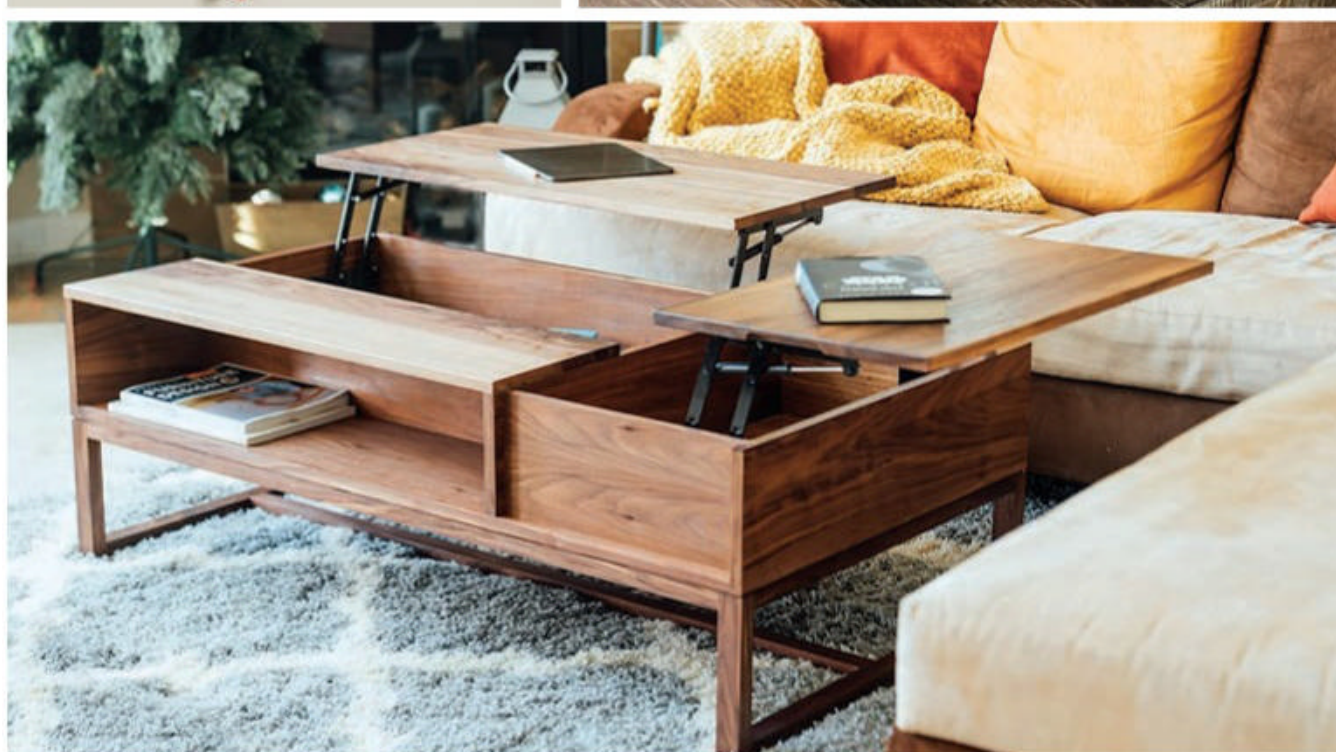
After watching a bunch of videos from several popular influencers, I bought a circular saw, router, pocket-hole jig and a random-orbit sander and got to work. It turned out that making a door was not easy! It took me much longer than I expected, it wasn't pretty and the size wasn't even right. But I could not contain the excitement that came from building something with my own hands. So the next thing I asked myself was, "What else can I make with these tools?" But I didn't want to just build things for the sake of building. I wanted to build things that better fit our lifestyle and the aesthetics that both my wife and I love. But I knew I had a lot more learning to do.

That's when I found Chris Salomone's YouTube channel, "Four Eyes Woodworking & Design." I was inspired by both his designs and his teaching style that made me feel like woodworking wasn't beyond my abilities. Even

though I only had a couple of projects under my belt then, I ended up designing and building my first Mid-century Modern credenza. That was the piece that really boosted my confidence and love for woodworking. I not only designed something useful that fit our lifestyle needs and space, but also something that was aesthetically pleasing to us.

When we were expecting the birth of our son, I decided to build him a crib. I thought it'd be cool to document the process so I could show it to him when he was older. I began sharing photos and video clips on social media, and a lot of people urged me to post the full-build video to YouTube. So that's what I did. I not only enjoyed being able to share my hobby with the world and inspire others, but I also discovered a rare opportunity to combine three of my biggest passions: designing, woodworking and filmmaking.

My builds nowadays still revolve around creating things that can function to improve my family's daily life as well as fitting our aesthetic style. I feel very lucky to have stumbled on this creative outlet that fulfills me. And I hope to continue producing content that's entertaining and educational for my audience. I hope it will help spark someone else's creativity the way others have sparked mine.



Spring-Loaded One-Handed Bar Clamps

By WJ Staff

Innovative instant-closing feature enables clamps to be positioned and tensioned with only one hand.



Bar clamps are about as integral to woodworking as the rule in your combo square. But even tried-and-true “F-style” bar clamps have an annoying problem: you need one hand to position the clamp, the other hand to slide the movable jaw into place to tighten it and often another hand or two to hold workpieces together. Sound familiar?

Well, Rockler’s product development team set out to solve this three-handed conundrum with these new Spring-Loaded One-Handed Bar Clamps. They feature a patented internal spring mechanism that retracts the extendable jaw automatically when a metal trigger is depressed. Then, just one or two pumps of the pistol grip tightens the glass-reinforced jaws up to 150 lbs of clamping force. This way, the clamp can be both positioned and tensioned

easily with only one hand.

“Many of the basic components of these 6” and 10” clamps are not much different than other clamps of their kind,” says Jay Owens, one of the clamps’ developers. “Our clamps simply have an additional feature that saves you time and effort.”

Owens says the shroud around the spring mechanism was a big engineering focal point. The spring was exposed in early prototypes, inviting dust to build up in the mechanism and even create a potential pinch point during use.

So the team developed a shroud to completely seal in the spring and rear portion of the clamp’s steel bar.

“We focused on the connection between the shroud and clamp body to ensure that the parts flow together aesthetically and are very durable.”

Another challenge was achieving the correct spring tension. Owens says numerous springs were tested before the team settled on one that delivers “just about perfect” tensioning.

These clamps offer either 6½” or 10½” of open capacity and a 2¼” throat depth. Non-marring thermoplastic rubber pads protect clamping surfaces. Available now, the 6” size (item 69764) sells for \$19.99 and the 10” clamp (item 65890) costs \$22.99.



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WOODTURNING

Turning a Hawaiian Calabash Bowl

By Ernie Conover

Inward sloping walls and a rounded base are signatures of this unique style.



This stunning calabash bowl by Emiliano Achaval is made of koa wood. Butterfly patches were often put into weak spots in the wood, and Hawaiians revered bowls with repairs like these. My bowl example for this article (inset) is made of cherry with sapwood areas.

Calabash bowls are part of the cultures of Hawaii. They have been made for centuries, and many Hawaiians have examples that have been handed down for generations. Historically, wood calabash bowls were intended for royalty while common people used ones made from calabash gourds. Because of their royal connection, Hawaiian wood bowls have always exhibited superb craftsmanship and were made from tropical woods (deemed sacred) that exhibit stunning figure,

grain pattern and color. After 1819, they could be owned by anybody, so wooden calabash bowls have prevailed.

Until the last quarter of the nineteenth century, Hawaiians did not have lathes, so their bowls were made by using stone and coral to shape and then pumice and shark skin to bring them to a very high polish. The calabash shape is not flat on the bottom but rounded with the sides tapering slightly inwards. The height varies from shallow to very deep, and there is usually sap

wood at each edge. Many extant Hawaiian bowls are quite curved on the bottom; the lack of a flat bottom may seem off-putting, but it works out fine on tables and counters as well as on the ground. That Hawaiian craftsmen could bring a piece of wood to look like it had been turned but without the use of a lathe is truly amazing, but craftsmanship in woodworking offers much to amaze us.

Thoughts Before Turning

With all of this in mind, we should try to incorporate the following thoughts into our rendition of the Hawaiian calabash motif so as to best honor the people and culture of our fiftieth state.

- Use a close-grained wood with some sapwood at each edge. Choose wood that will exhibit beautiful grain and color as it ages. Cherry and hickory are good, widely available North American woods, but tropical woods are fair game as well.
- Be faithful to the shape. A round bottom to the bowl is part of the fun and will be a good topic of conversation with guests.
- Sand and finish a calabash bowl to a very high sheen, both inside and out.
- The size of a calabash bowl can be anywhere from 6" in diameter to very large, with depth generally going down as the diameter increases. Small bowls can be spindle-turned, allowing them to be much taller.

Start with a suitable blank that has been chainsawn or bandsawn from a green log. If possible, choose a log that exhibits contrasting sapwood for a more authentic calabash effect.

Mount the blank to a face-plate or a worm screw held in a four-jaw scroll chuck. Here the author is using a Stronghold chuck with a large worm screw.

Turn the outside shape of the bowl, leaving a bit extra in the base area for either a short tenon or a shallow recess that the chuck jaws can clamp onto or expand into. Sand the outside, exclusive of the base area, to a very smooth but not a final sheen. Depending on your gouge skill and the wood you are turning, start with between 40- or 80-grit and finish at 120-grit. If starting at 40, continue with 80 and then 120. In sanding, never skip more than one grit.





Reverse the bowl from the faceplate or screw center and remount it with a compression or expansion hold, employing appropriate size chuck jaws. Then hollow out the bowl's interior, working from the center outward and down. It is best to leave extra at the bottom area so that the bowl can be reversed to turn the convex shape of the bottom. This is especially so if you use an expansion hold. Bring the walls to a uniform thickness ranging between 1/4" and 1/2" thick.



Do not be afraid to switch from your bowl gouge to a large roundnose scraper to fair the surface and to help remove any tearout in the end grain areas. Hold the handle high so the scraper's burr can cut effectively, and use a light touch.



Sand the inside to a final finish, starting with 40- to 80-grit and working to 220, skipping no more than two grits as you go; 40, 80, 120, 180 and 220 would be a good grit sequence.

Turning Process

Most modern turners of this art form start with green wood, which makes the shaping and hollowing much faster. Because of the round bottom, if you turn your calabash bowl all the way to completion, expect that the rim will become slightly warped as the wood continues to dry. But that's just part of the fun. The wall should be in the 1/4"- to 1/2"-thick range, becoming thicker as the overall bowl size increases.

If you're familiar with basic bowl-turning procedures, the photo series in this article should be familiar territory to you already. Start the turning process with your green bowl blank mounted to either a faceplate or a worm screw held in a four-jaw chuck. Turn the bowl's outer profile as well as a short tenon or a shallow recess for re-chucking. Sand the bowl's outer surface extremely smooth, to 180-grit. Remove all evidence of tearout during the sanding process — remember, one of the signature features of calabash bowls is that they are sanded to a high polish.

When you're satisfied with the exterior, remount the bowl in a four-jaw chuck so you can hollow the bowl's interior with a gouge and scraper. Leave extra material at the bottom in order to

VIDEO To watch an interview with calabash bowl expert Emiliano Achaval, visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.



7 Apply the first coat of finish to the inside. The author is using Waterlox Original Sealer Finish, but mineral oil, walnut oil or various "salad bowl" finishes would be other good choices, too.



8 Reverse the bowl onto either a jam chuck or a vacuum chuck. Turn the bottom to a very uniform, convex shape, and bring the wall of the bowl to a constant thickness from the rim to the center of the base.



9 Sand the bottom and outside to 220-grit as was done on the inside, being careful to remove all traces of tearout. Power-sanding with a random-orbit sander is a fast method, but hand-sanding will also yield good results.



10 It will take three or more coats of finish to bring the sheen to a level that Hawaiian culture demands. Subsequent coats can be done off the lathe or on the lathe if you have a vacuum chuck.

complete this area in the next step by reversing it again on the lathe. Sand the interior up to 220-grit.

Apply finish to the interior before remounting the bowl on either a jam or vacuum chuck. Turn the bottom to a uniform, convex shape, and bring the wall of the bowl to a uniform thickness from the rim to the center of the base. Then, while the bowl is

mounted on the lathe, sand the bottom and outside up to 220-grit and apply finish to the exterior to complete it.

Once your bowl is finished, go on a picnic and think of the warm sands of a Hawaiian beach as you eat lunch out of your calabash. It will sit nicely on the ground and be a thing of beauty at the center of the tablecloth.

I want to thank Emiliano

Achaval, an expert Hawaiian bowl turner, for all his help and sound advice with this article. You can watch an interview between the two of us as a "More on the Web" extra. Be sure to visit his website too, which is: hawaiiankoaturner.com.

Ernie Conover is the author of *The Lathe Book* and *Turn a Bowl* with Ernie Conover.



Setting up shop

By A.J. Hamler

**Starting from scratch?
It's the best way to start!**

The greatest luxury for a woodworker is setting up a new shop in a completely empty space. Whether it's a garage, basement, utility building or something different, the fact that it's empty means you can arrange everything from scratch. No need to work around existing cabinets, furniture, or someone else's idea of what a shop should be – you're starting with a blank page.

The possibilities are endless, and when you're standing in the middle of a great big nothing, maybe a little daunting. But by keeping five main considerations in mind, your new shop will fit your needs perfectly.

How much space do I need?

That's like asking how many clamps you need – the answer is that there's never enough. An abundance of space is great, but the real key is efficiently utilizing the space you have.

For practicality, think more about straight lines than area, and where things will go in the space rather than how much there is. A lot of shop processes involve working lengths of wood, such as planing or jointing. For that reason, a longer space (or even an L-shaped one) may be better than a square one.

Square footage is important, but utilizing it takes thought. You'll find lots of shop planners online with adjustable layouts and common shop tools. Download one of those, cut out the tools and try some layouts that maximize the space you have, keeping in mind the direction wood moves when worked.

Planers and jointers are linear tools – the width of their location isn't as important as overall length of the workpiece.



Make sure you have enough infeed and outfeed space when processing long stock; orient machinery whatever way gives the most linear space.



A single ceiling outlet, paired with a retracting extension cord, can easily supply electricity to just about any spot in a small shop

For example, a planer may be less than 24" wide, but if you're planing an 8' board you need 16' of linear space for the job. A miter saw is also linear, but in width, not front to back. A table saw works wood in both directions.

Also, consider workflow. Generally, you'll proceed from wood storage, to milling and prep, to cutting, to assembly and, finally, finishing. Arrange your layout so what you do flows directly from one process to the other.

One final thought on space: Adding wheels to your tools can effectively multiply the working space you have. That planer example above? Put that planer on a wheeled stand wherever you get the length you need while using it, then roll it into a corner when done. In fact, your whole shop can be on wheels.

Mechanical considerations – power, heat, cooling, etc.

Unless you'll work 100% with hand tools, your woodworking machines need electricity. Meanwhile, your body (and wood finishing) has temperature requirements. You can't get around either.

Home spaces like basements and garages usually have outlets; older construction tends to have fewer, while newer homes have more. After considering your layout from the previous section, think about getting electricity to those tools.

For a small shop, a few outlets and judicious use of extension cords – properly rated for your tools – may suffice. For a larger shop, consider hiring an electrician to run some additional lines. If you do, know in advance where your tools are going to go, and direct new lines and outlets where needed. Don't forget a few on the ceiling for lighting.

Also, be aware of how much voltage/amperage your tools draw. Many homes these days have breaker boxes with 110-volt, 20-amp lines going to outlets. Amperage in older homes may be less, and the total amperage may be insufficient to run household needs as well as workshop tools. Your electrician can guide you here, but have a list of what your tools need in advance.

Your heating and cooling needs depend on the structure housing your shop, and your geographical location. Basements may get chilly in winter, but they're generally comfortable year-round. Garage shops, on the other hand, get cold in the winter (although usually not freezing) and uncomfortably hot in the summer. A freestanding structure, meanwhile, has the same heating and cooling needs a small house would.

To adapt your space, consider space heaters and dressing in layers for cold months, and store temperature-sensitive glues and finishes in a warmer location. For basement shops,

**See our entire
Guide for Updating Your Shop
(and links to all products featured here)
on Rockler.com**



When projects keep you on your feet on a hard floor for extended periods, a cushioned mat helps prevent sore feet, legs and back.

consult an HVAC professional to find out if your household heating/cooling system can handle more square footage with some additional vents in the shop. For garages, consider adding a window for a fresh breeze or even an air conditioner. Floor fans are excellent additions to any shop, both summer and winter.

Those fans are important for more than just temperature control. Shop air can get stale quickly, and you certainly don't want to breathe fumes from finishing products. Typical garages usually have at least one window to use for ventilation,

plus you can always raise the door a few inches. A well-placed floor fan or window unit can quickly exhaust fumes and dust from a small shop.

For a basement shop, consider converting a window – the common fold-down type located at the top of a wall – into an effective ventilation unit by replacing a glass pane with an exhaust fan. These fans usually have closeable doors to keep out insects in the summer and cold weather in the winter when not in use, and many have selectable airflow directions so you can choose to exhaust shop air

or draw fresh air in from outside.

What type of floor?

Usually, the floor your space comes with is fine. Basements and garages will probably have concrete floors; a separate structure could have concrete or plywood flooring. All of these are good, but can be made better with a coat of floor paint. Painted surfaces are easier to sweep, and help prevent the occasional spill from soaking in.

If you spend a lot of time working on a concrete floor, you'll find your feet, legs and back tiring after a long day. Place cushioned work mats where you stand and work most – in front of major tools, workbenches, cabinets, etc. Other options include interlocking cushioned vinyl tiles.

For whole-shop foot comfort, it's hard to beat a wooden floor. If your ceiling height (and budget) allow, a new plywood floor laid over the concrete is a blessing. It's not nearly as punishing as concrete, and if raised sufficiently you can install wiring, dust collection and HVAC ducts underneath.



Foot-activated casters make it possible to turn even a 400 lb. workbench into a mobile workspace.



Maximize shop traffic patterns with accessory worksurfaces – like this convertible router table – that fold down against a wall and out of the way when not in use.

Can I share a garage shop with cars?

Absolutely, but it takes planning. To be able to park cars in a garage, nothing can be permanently located in the middle of the garage. That's where mobile bases – a good idea anyway – really earn their keep.

Arrange mobile tools around the back and sides of the garage, allowing for walking paths and car doors. Use the upper part of the garage for wood and long-term shop storage, and consider wall cabinets for everything else. Meanwhile, use whatever wall space is available for hanging tools, extension cords, folding sawhorses and the like.

A narrow workbench aligned with a wall makes for efficient woodworking without taking up too much space. Or, consider a hinged worksurface that flips down whenever you work and back up against the wall when the cars are there. Similar ideas include fold-down router tables, miter saw stations and bench-top tool platforms.

The key to making this work is to start with the cars in the garage, and use masking tape

on the floor to outline their position. Open the car doors and mark those on the floor, too. Be aware of where the top edges of the doors extend, so as not to interfere with cabinet mounting. Then, outline the walking path for each car.

With these taped guidelines in place, you can now accurately determine how the remaining space can be arranged and efficiently utilized.

Lighting considerations

Like clamps and working space, you can't have too much light. Fortunately, hanging shop lights are inexpensive and available at any big box store. Shop

Light fixtures are the easiest way to brighten up a workspace. Overhead or spotlight LED fixtures like this one provide ample light, and outlast those with fluorescent tubes by years.



lights are easy to hang on basement or garage joists; for finished ceilings, mount them with screw-in hooks.

Consider LED fixtures over fluorescent. They don't flicker like fluorescents, are unaffected by cold weather, and last seemingly forever. Initially, LEDs are a bit pricier but represent a better value in the long run.

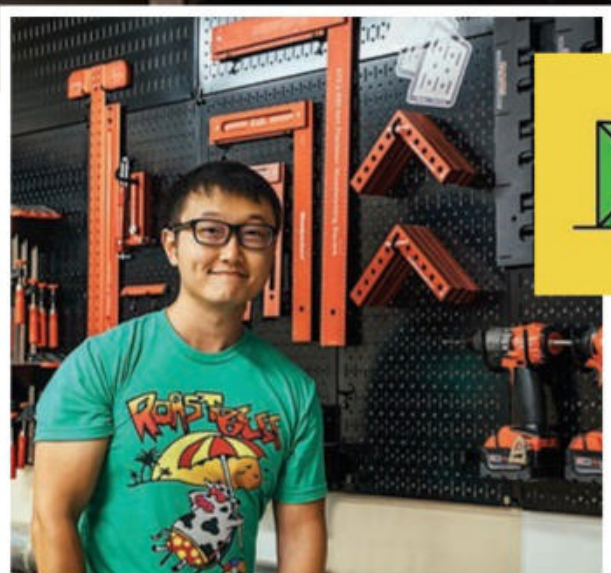
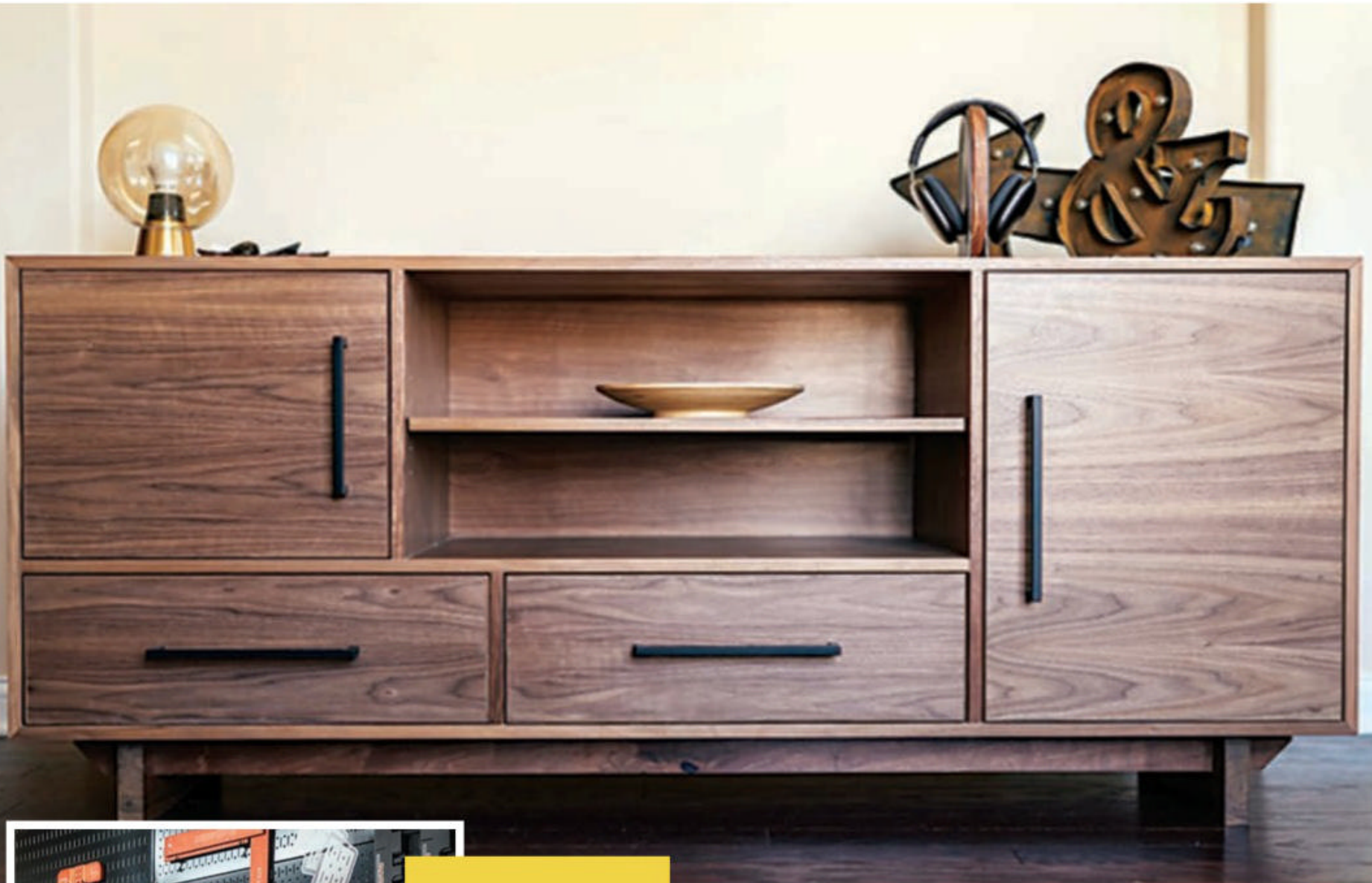
LEDs also use less power than other lights, and most are linkable. That is, once the first is hung, additional fixtures can be connected in a continuous line of bright, full-coverage lighting, all using a single outlet. Models vary as to how many can be linked, so check package specs.

An important aspect of light is often overlooked, and that's the shop itself. Garages and basements can be drab, with bare drywall, wood studs, plywood sheathing, or concrete walls that swallow light like a sponge. You'd be amazed at how much brighter a space is simply by applying a coat of white paint to the walls and, if there is one, the ceiling.

WALNUT STORAGE CABINET

By Alex Fang

Elegant in styling and relatively simple to build, this trendy cabinet can satisfy many of today's storage needs.



Follow Alex Fang on Instagram @bevelish_creations.

Even though we're now more than two decades into the new millennium, there's just something about the clean lines and simple styling of Mid-century Modern furniture that appeals to me. While this walnut storage cabinet is my own design, if you were to flip through the pages of a furniture catalog from the 1950s, I think you'd agree that the look of those old stereo consoles and sideboards is not too

far off from this project. And yet, my interpretation here still blends in nicely with today's design trends. You'll see that it's not difficult to build, either. Whether you use this project to store an audio or gaming system and set a big flat-screen television on top of it, or park it in your dining room for tucking away fine china and other tableware that you don't use every day, its two spacious cabinets and matching drawers offer ample storage wherever you need it most.

With the exception of the cabinet's base components and 1/8" solid-wood edge banding, this project is made entirely of walnut veneer plywood — 3/4" for the cabinet carcass, doors and drawer faces, 1/2" for the drawer boxes and 1/4" for the carcass back panel and drawer bottoms. So you won't have to scour your hardwood lumber supplier for lots of heartwood walnut boards to build this cabinet. Premium walnut can be hard to find and expensive. But do choose your plywood with really attractive face veneer, because you're going to see that figure and grain every time you look at this substantial piece.



Break down 3/4" plywood to create panels for the top, bottom and sides of the carcass. Whether you use a table saw, circular saw and straightedge guide or a track saw and track, be sure to install a sharp blade to cut the walnut veneer cleanly. It's most liable to splinter across the grain.

The author glued 1/8"-thick banding to every part edge where the plys would show. Rockler's Bandy Clamps are handy for holding this edging in place.

Constructing the Carcass

I mentioned that I glued 1/8" strips of solid walnut as edge banding to every edge of this project where the plywood edge plys would show. No one wants to see those! But you might decide to use self-adhesive or iron-on walnut edge tape instead, which has almost no thickness to it. So take note: in the *Material Lists*, if you're planning to use edge tape, just cut the parts to the dimensions listed. But if you would rather apply 1/8" solid-wood banding instead, which is a more durable option, adjust the part sizes when cutting your sheets to reflect the fact that you will be adding the banding to it — the *Material List* dimensions assume that whatever banding you're using is already applied to those parts.

Let's get this build underway by breaking down your 3/4" plywood into a top, bottom and two side panels. Be sure to use a sharp blade in your table saw, circular saw or track saw. You want to slice the walnut veneer as cleanly as possible to minimize splintering where these edges will show. Once those panels were cut to size, I ripped strips of solid walnut for edge banding and applied it to one long edge of each of these four carcass parts with glue and spring clamps. When the glue dried, I trimmed the edging flush with a block plane.

The corners of the carcass now need to be bevel-cut to 45 degrees. To do this, I clamped the top and bottom panels together so their ends aligned, tilted my track saw to 45 degrees and cut the bevels across both panels in one pass with the saw on



Set the top and bottom panels together with their ends aligned to prepare for bevel-cutting their ends. Gang-cutting them this way will ensure that the panel lengths remain the same.



Bevel-cutting the ends of the top, bottom and side panels will be easiest to do with a track saw tilted to 45 degrees. If you don't have a track saw, a conventional circular saw, guided along a clamped straightedge, will also work for this operation. Make these cuts slowly and carefully,



Use a 3/4" straight bit (or a 23/32" undersized plywood bit if your stock isn't a true 3/4") to plow matching 1/4"-deep dados across the top and bottom panels to house the large vertical partition.



Long bevel joints like these will be very difficult to keep aligned during glue-up unless you reinforce them with loose tenons or biscuits. These reinforcements also strengthen the carcass joints.



the track. Gang-cutting them ensures that their final lengths match. Then I clamped the side panels together the same way and bevel-cut their ends in two long passes.

We need to tackle some stopped dados in the carcass panels next before we can assemble them. Study the *Drawings* on the next page to see where these 3/4"-wide, 1/4"-deep dados need to be located. I clamped my top and bottom panels together again, back edge to back edge, so I could plow a matching dado across both panels in one pass for the large vertical partition. Set up this operation with a straightedge to guide your router so the dados will be arrow-straight. Stop the dados 3/4" from the front (banded) edges of the parts.

The stopped dados for the two smaller vertical partitions are offset between the top and bottom panels, so unclamp them and rout these dados separately. The left side panel also requires a stopped dado, located 8" up from the inside corner of its bottom bevel, which will house the horizontal shelf panel. Rout it now.

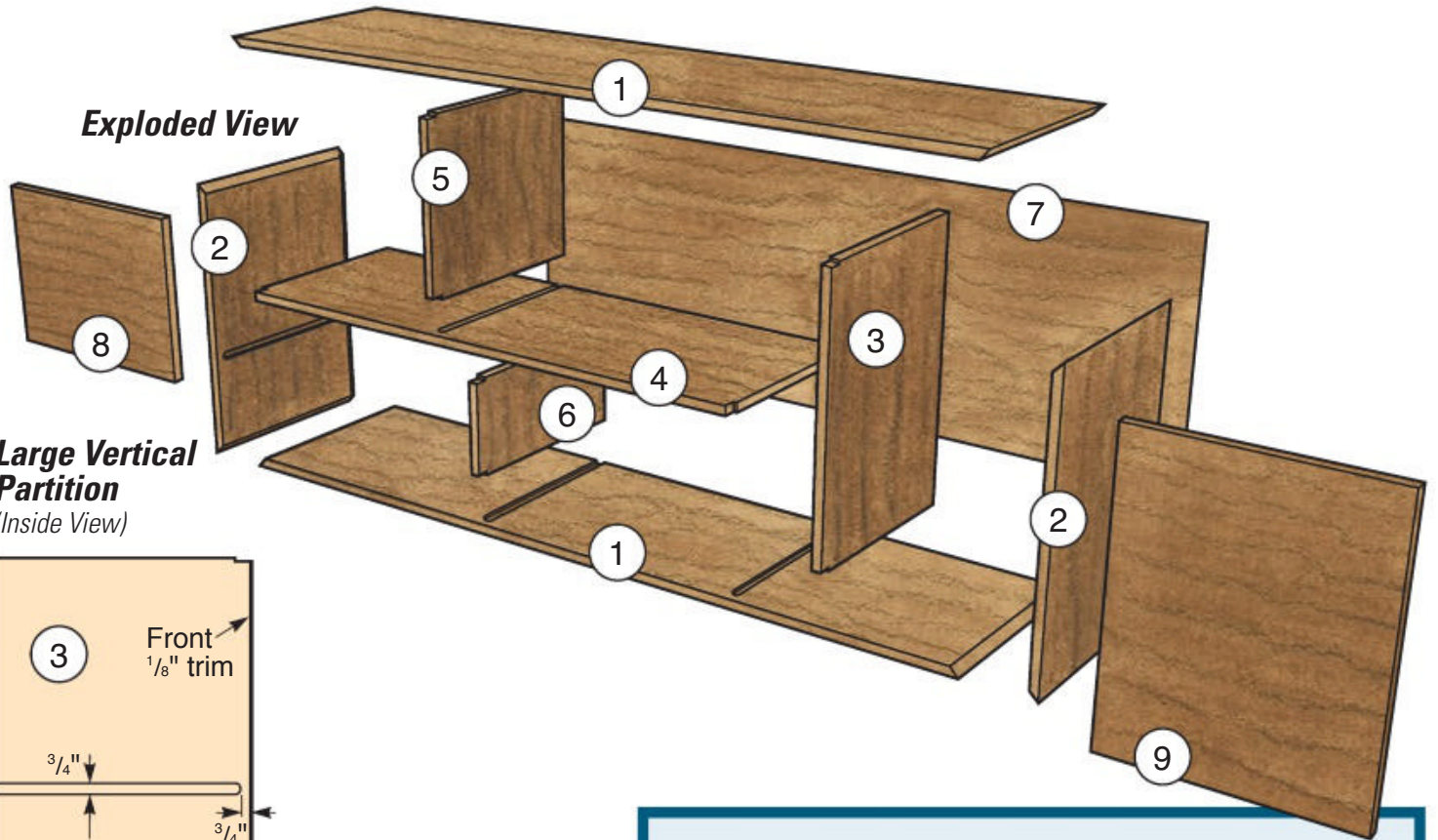
That takes care of the carcass dados, but we still need to mill a 1/4" x 1/4" rabbet around the inside back edges of the top, bottom and side panels for the back panel. I made these cuts with a straight bit in my router and an edge guide installed on the base, but you could use a rabbeting bit instead or a dado blade in the table saw.

The carcass bevel joints need some form of reinforcement to keep them aligned during glue-up and to provide some added strength. For that, I pulled out my Festool Domino and cut slots along each beveled edge for several Domino loose tenons. However, a biscuit jointer and #20 biscuits would also do the trick here.

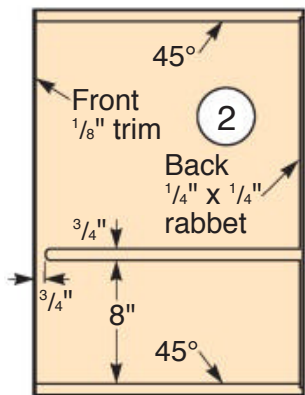
Once the loose tenon or biscuit slots are cut, go ahead and glue up the carcass. Be careful not to rack the assembly out of

Spread glue on the bevel joints, insert the reinforcements and bring the top, bottom and sides of the carcass together. The author used Rockler's Clamp-It Assembly Squares and One-handed Bar Clamps to close and square the corner joints.

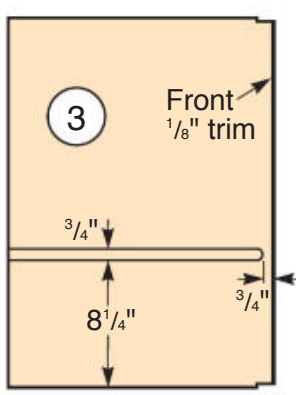
Exploded View



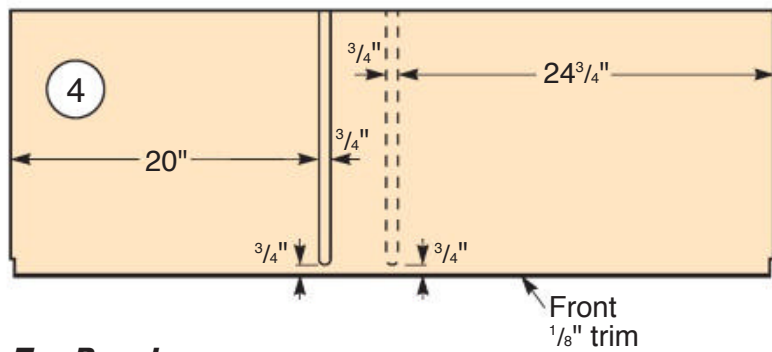
Left Side Panel
(Inside View)



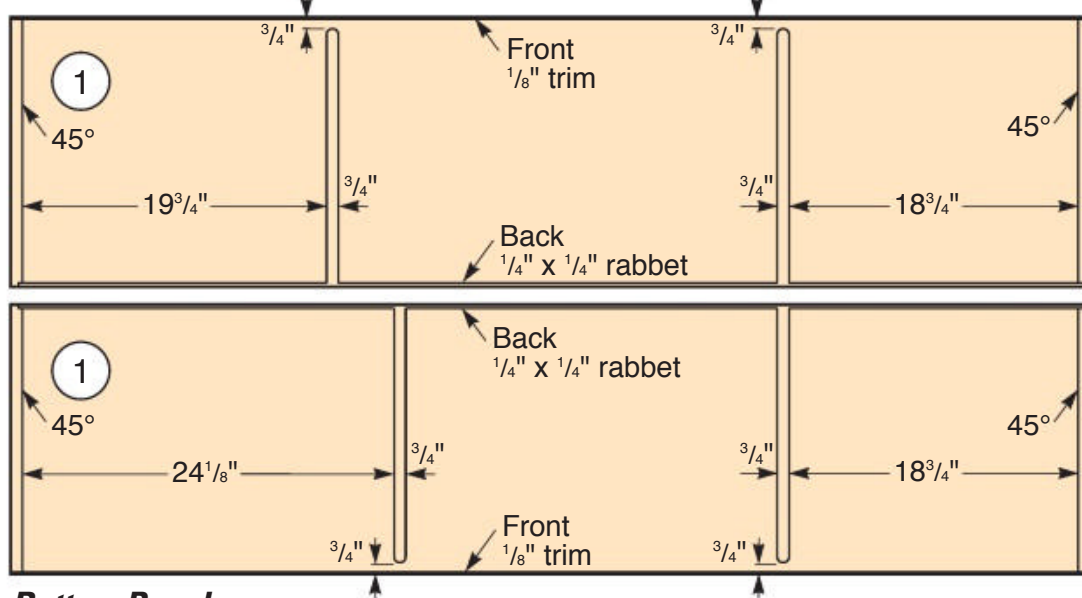
Large Vertical Partition
(Inside View)



Horizontal Shelf
(Top View)

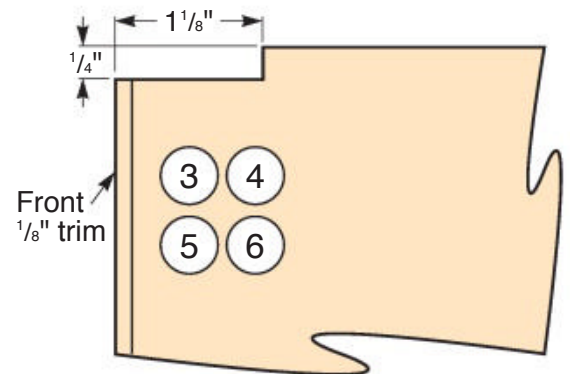


Top Panel
(Bottom View)



Bottom Panel
(Top View)

Notch Detail
(Side View)



MATERIAL LIST

Case	T x W x L
1 Top, Bottom Panels (2)	3/4" x 17 1/2" x 70"
2 Side Panels (2)	3/4" x 17 1/2" x 25"
3 Large Vertical Partition (1)	3/4" x 17 1/4" x 24"
4 Horizontal Shelf (1)	3/4" x 17 1/4" x 49 1/2"
5 Small Upper Vertical Partition (1)	3/4" x 17 1/4" x 15 1/4"
6 Small Lower Vertical Partition (1)	3/4" x 8 1/2" x 17 1/4"
7 Back Panel (1)	1/4" x 24" x 69"
8 Small Door (1)	3/4" x 14 1/2" x 19 1/2"
9 Large Door (1)	3/4" x 23 3/4" x 18 1/2"

Walnut Storage Cabinet Hard-to-Find Hardware

- Blum TANDEM Plus BLUMOTION Soft Close Drawer Slide Kit — Full Extension (1) #46974 \$35.99 pr.
- Rockler JIG IT Undermount Drilling Guide (1) #64695 \$29.99 ea.
- Blum Soft-Close 110° BLUMOTION Clip Top Inset Hinges for Frameless Cabinets (2) #34807 ... \$18.99 pr.
- JIG IT Deluxe Concealed Hinge Drilling System (1) #53420 \$139.99 ea.

To purchase these and other products online,
visit www.woodworkersjournal.com/hardware
Or, call 800-610-0883 (code WJ1577).



While the Material List provides the length of the large vertical partition, it's always a good idea to measure off of your actual project (left) to verify captured part lengths like these. Once it's cut to size, notch the front corners of the partition so it fits into and around the carcass dadoes (center, right photos). All three of the carcass's partitions and horizontal shelf will be notched this way.

square when you tighten the clamps. Check it for square before the glue sets by measuring the diagonals — their lengths should match.

While those joints dry, measure the actual distance between the bottoms of the dadoes in the top and bottom panels so you can cut a panel for the vertical partition accurately to length. I slipped a temporary brace into place between the top and bottom panels to spread them apart and keep the panels flat

before taking this measurement. Cut the vertical partition to length and band its front edge to hide the plys. Then nibble away a 1/4" x 1 1/8" notch along its front top and bottom corners so the panel can fit around the front ends of the stopped dadoes in the carcass.

Slide the vertical partition into its dadoes so you can locate and mark a stopped dado on its left face that will house the right end of the horizontal shelf. Rout that stopped dado, then



Slide the vertical partition into place and mark it for a horizontal shelf dado. The author installed a temporary plywood brace between the top and bottom panels to correct for slight sagging of the top panel.



Once the vertical partition is dadoed for the horizontal shelf, measure between the dadoes to cut the horizontal shelf accurately to length. Make up this banded shelf, notch its front corners and dry-fit it into place.



Mark the shelf to locate dadoes for the small upper and lower vertical partitions, and plow these 1/4"-deep stopped dadoes into it.



Again, measure between the dadoes in the shelf and top and bottom carcass panels to determine the small vertical partition sizes. Once you've cut, banded and notched them, check their fit in the carcass.



Cut 3/4" plywood to size for the two door panels. Be sure to take into account the thickness of the edge banding you'll be adding around their perimeters as well as the gaps the doors will require in their carcass openings.

cut and edge-band the horizontal shelf. Notch its front corners, just as you did for the vertical partition. Slip it into place in the carcass.

Now you can mark the horizontal shelf for a pair of offset dados in its top and bottom faces for the upper and lower vertical partitions. The *Horizontal Shelf Drawing* on page 31 will help you locate those stopped dados. Plow them, then make up edge-banded panels for the upper and lower vertical partitions.

Dry-fit the three partitions and horizontal shelf in the carcass to be sure the joints fit correctly and the shelf remains flat. If all is well, sand the inside and outside of the carcass and all of its internal components to 180-grit, and glue the shelf and partitions into place. Once that's done, cut and finish-sand a back panel from 1/4" plywood and attach it to the back of the carcass with 3/4"-long, 18-gauge brad nails or crown staples.



Bore a pair of 35 mm stopped holes in the back of each door for the hinge cup hardware. Here the author is using Rockler's JIG IT Deluxe Concealed Hinge Drilling System, which sets the spacing of these mortises and allows them to be bored with a handheld drill.

Hanging Doors on Soft-close Hinges

The two cabinet doors are just a pair of plywood panels cut to size with all four of their edges banded. When you calculate their size, be sure to take into account the amount of gap you want them to have around the inside of their openings in the cabinet. I factored in 1/8" for these gaps. Build the doors.

Concealed hinges are appropriate for this project's styling, so I chose Blum® Soft-Close 110° Frameless Cabinet Hinges. Set the doors into place in the cabinet so you can mark the door backs and the cabinet sides for hinges. Rockler's JIG IT® Deluxe Concealed Hinge Drilling System made it easy for me to locate and bore pairs of hinge cup holes on the backs of the doors with a 35 mm Forstner bit in a handheld drill. But if you'd rather not invest in this system, you can also install Euro hinges like these with a drill press instead. To learn how to do that, see *Hardworking Hardware* on page 62.

Mount the cup side hinge components to the doors with screws, then attach the hinges' mounting plates to the cabinet sides with more screws. Clip the hinge components together to hang the doors so you can check their operation. Adjust the hinges as needed to achieve an even gap all around.

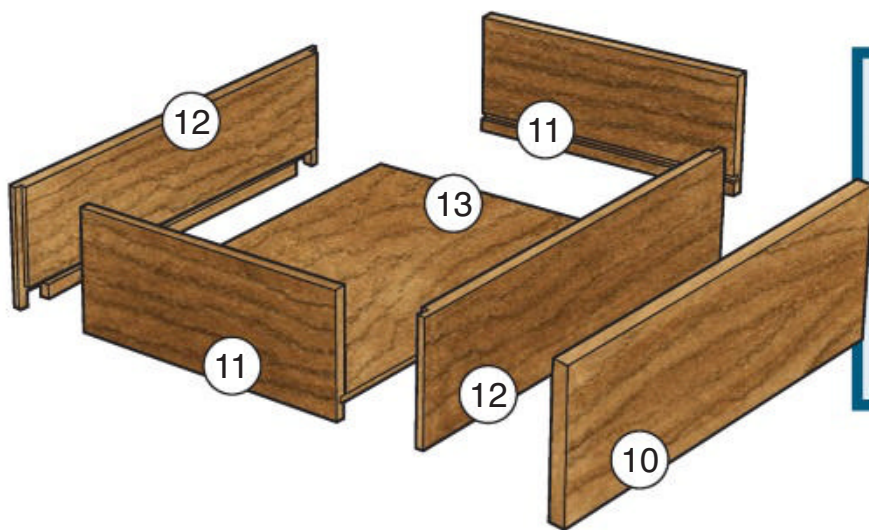
I wrapped up work on my doors by marking and installing a long black metal door pull on each one. I located these pulls 3" in from their inside edges.



Insert the cup-side hinge components into their mortises in the door, and attach the hardware with screws. Make sure the hinge arms are square to the door edges before driving the screws.

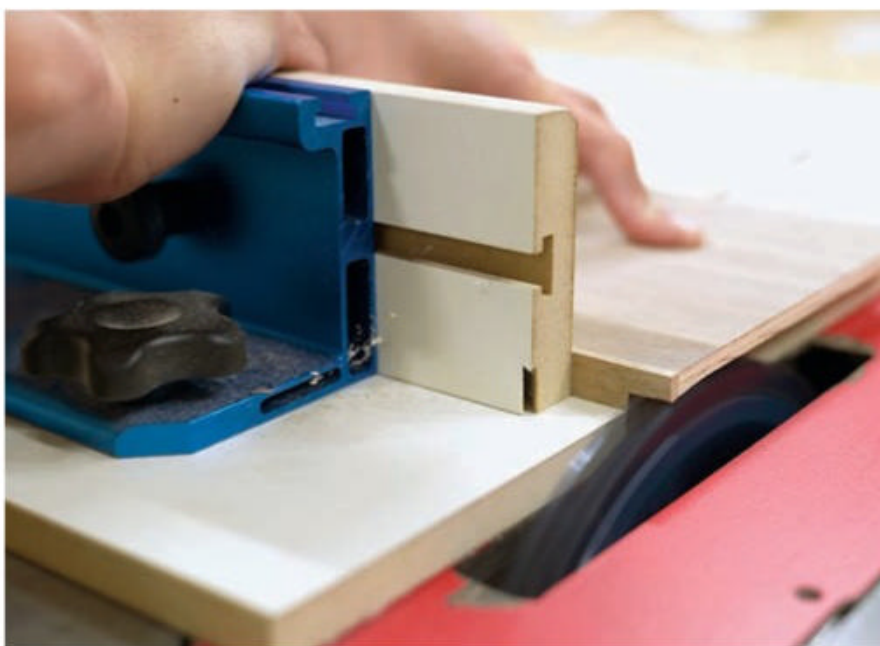
Building Inset Plywood Drawers

Flip over to the *Drawer Drawings* on the next page, and you'll see that their construction is about as easy as it gets. The drawer sides receive 1/4"-deep, 1/2"-wide rabbets on their ends to fit over the ends of the fronts and backs; 1/4" x 1/4" grooves house the bottom panels. Follow the *Material List* to cut the fronts, backs and sides to size for both drawers, and band their top edges to hide the plys. Then use a dado blade



MATERIAL LIST

Drawers	T x W x L
10 Drawer Faces (2)	3/4" x 7 3/4" x 23 7/8"
11 Drawer Box Sides (4)	1/2" x 6 1/2" x 14 1/2"
12 Drawer Box Fronts & Backs (4)	1/2" x 6 1/2" x 23 1/2"
13 Drawer Bottoms (2)	1/4" x 14 1/2" x 23"



Mill 1/2"-wide, 1/4"-deep rabbets into the ends of the inside faces of the drawer side panels. The author used a wide dado blade for this task.



BLUMOTION Soft Close Undermount Drawer Slides require that notches be cut into the bottom corners of drawer backs to accommodate the hardware.

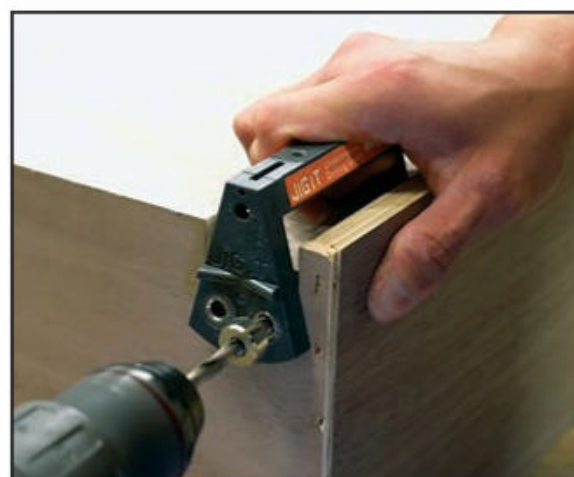
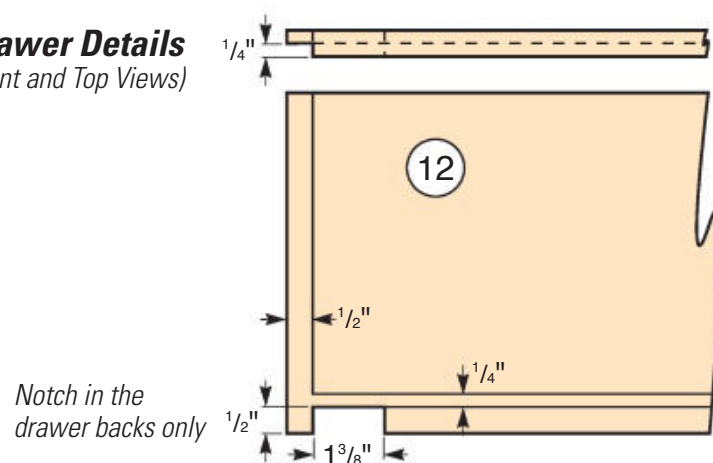
in your table saw to cut the rabbets and drawer bottom grooves. Dry-fit the drawer boxes together so you can measure for drawer bottoms, and cut those panels to size.

Then give all the parts a final sanding with 180-grit sandpaper.

I sized my drawers for Blum soft-close, full-extension drawer slides that mount underneath the drawer boxes rather than to their sides. This way, the slide hardware is nearly invisible when the drawers are opened — it's hidden behind the drawer faces. Space here doesn't allow for me to fully explain how to install the slide hardware; the instructions that come with the slides will guide you more thoroughly. But I'll suffice to say that the outside bottom corners of the drawer backs must be notched and drilled to accommodate the slide hardware, which clips to them. A second component of the slides fastens beneath the drawer bottoms, right behind the drawer fronts. Rockler's JIG IT Undermount Drilling Guide is very helpful for locating the holes you'll need to drill for the hardware and attachment screws to make this process easier!

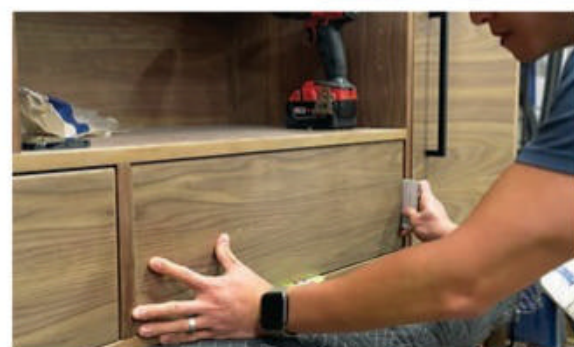
With the drawer backs now notched, assemble the drawer boxes with glue and clamps; be extremely careful that they're

Drawer Details (Front and Top Views)



Rockler's JIG IT Undermount Drilling Guide (64695) simplifies the process of drilling accurate holes in the backs of the drawers without measuring. The back end of the hardware clips into these holes.

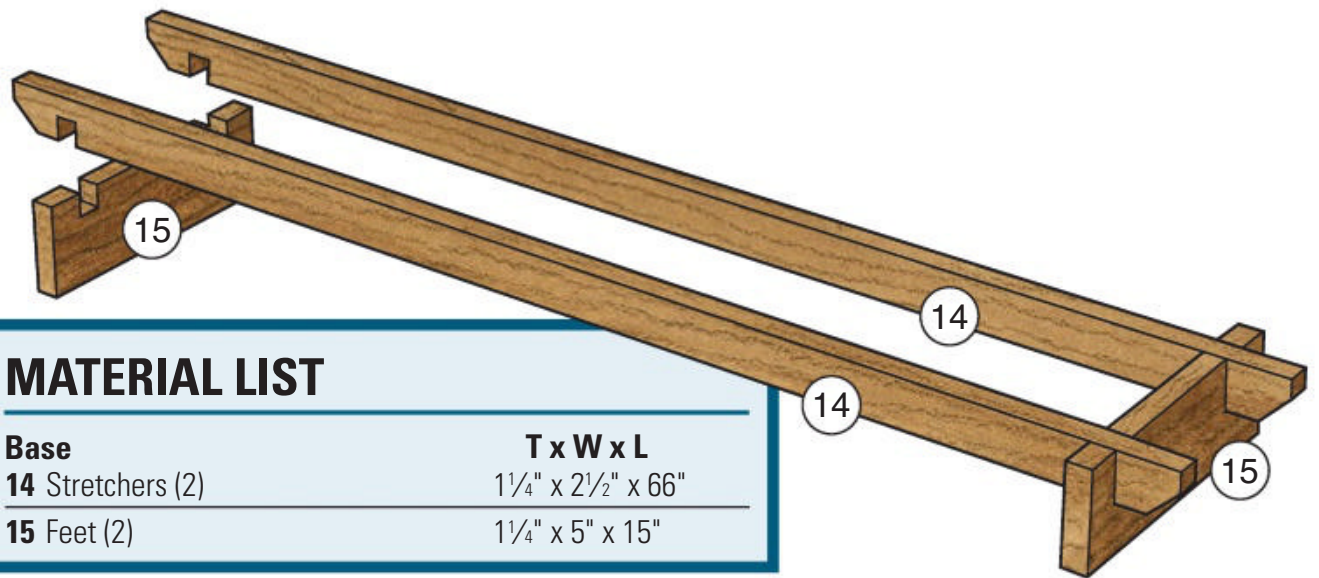
These orange components of the slides attach with angled screws beneath the drawer bottoms and up against the backs of the drawer fronts.



The author adjusted his banded plywood drawer faces with playing cards to achieve an even gap all around before attaching the drawer faces to the boxes with screws and metal drawer pulls.

square; any racking out of square will impact how well they function on the slides and fit in their openings. Go ahead and install the slide hardware on the drawers and inside the cabinet so you can hang the drawers and check their action.

When mine were dialed in, I cut a couple of drawer faces from 3/4" plywood. I sized them carefully to allow for 1/8" walnut banding all around and to account for 1/8" gaps in the cabinet openings. Make up the drawer faces and install them on the drawer boxes with countersunk screws driven in from inside the drawers. Then mark and install your drawer pulls.



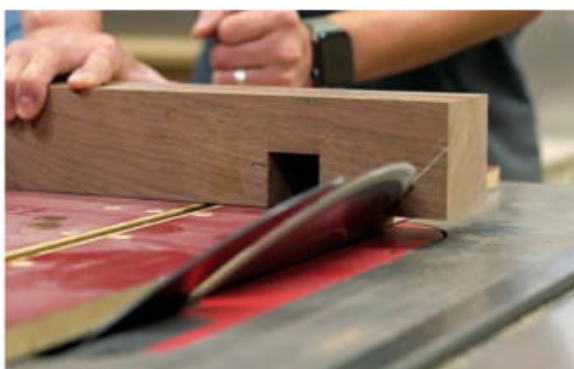
MATERIAL LIST

Base	T x W x L
14 Stretchers (2)	1 1/4" x 2 1/2" x 66"
15 Feet (2)	1 1/4" x 5" x 15"



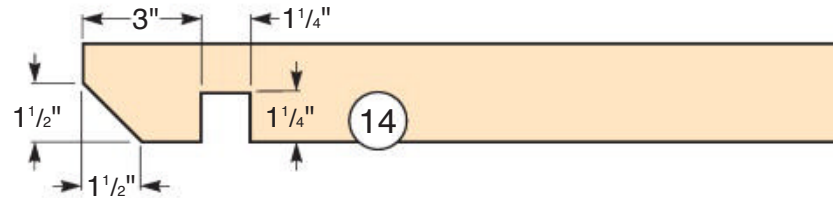
Use a wide dado blade to cut a pair of 1/4" x 1/4" notches into the top edges of the stretchers for cross-lap joints.

Cut matching notches in each of the base's feet to interlock with those you've cut in the stretchers. Back all of these joinery cuts up with a crosscut sled or a miter gauge with a long, wide sacrificial fence installed.

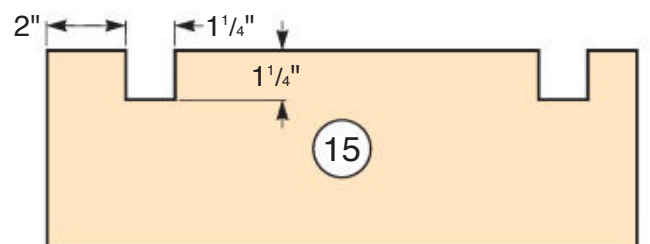


Tilt the blade on your table saw or miter saw to 45 degrees so you can miter-cut the bottom ends of the stretchers.

Stretcher
(Front View)



Feet
(Front View)



Once the base was glued together, the author drilled shallow holes along the inside edges of the stretchers to act as mortises for eight figure eight fasteners that attach the base to the cabinet bottom.

Building a Solid Walnut Base

The simplicity and aesthetics of this cabinet's recessed base, which I saw first on the Internet, complements this project's design perfectly. It consists of a pair of rectangular feet that connect to two long stretchers with cross-lap joints. To build it, start by milling some 8/4 walnut down to 1 1/4" thick for all four parts, and cut the stretcher and foot workpieces to size, according to the *Material List* dimensions shown above.

Now stack a wide dado blade in your table saw and raise it to 1 1/4" so you can cut a pair of notches in each foot and corresponding notches in the stretchers to create these interlocking joints. Test-fit the joints before removing the dado blade to make sure the cross laps engage correctly. If they do, switch to a standard blade and tilt it to 45 degrees so you can trim off the bottom corners of the stretchers. It will lighten the look of

the base. Sand the feet and stretchers through the grits up to 180, then glue and clamp the cross-lap joints together.

Steel figure eight fasteners are a handy means of attaching the base to the cabinet. I drilled four shallow "mortises" for these fasteners along the inside edges of each stretcher, and screwed the hardware into them. Then, invert the cabinet and base, center the base on the cabinet bottom and drive more screws through the fasteners to connect the two components.

While it isn't shown in the drawings, I added a shelf to the cabinet's open compartment. It hangs on adjustable shelf pins.

Complete your walnut storage cabinet with the finish of your choice. I removed the slides and hinges first before top-coating my project with varnish using an HVLP sprayer.

See more of Alex Fang's work at bevelishcreations.com.

Benchtop Drill Press Mobile Stand



By A.J. Hamler

Convert your benchtop drill press into a mobile floor model with this sturdy cabinet — and get plenty of storage for bits and accessories at the same time.

Benchtop drill presses are great ... until you run out of benchtops. Instead, how about a custom-built cabinet that not only supports the machine but also makes it mobile for use anywhere in the shop and adds plenty of storage in the bargain!

Made almost entirely of 3/4" Baltic birch plywood, this cabinet has some definite heft, ensuring a stable base for a tall machine. Built with rock-solid rabbit-and-dado joinery, it's easy to make and can be tweaked to fit specific drill presses and storage needs.

Since woodworkers (and benchtop drill presses) come in all sizes, it's a good idea to first measure your ideal working height. You don't want to reach higher than is comfortable or have to bend over. Stand as you normally would using a drill press with your hand held where it would rest most comfortably on the feed handle, and measure the floor-to-hand height.

Now measure your drill press and use both measurements to determine how tall the cabinet must be, including the height of your wheeled base. I'm 5' 11", so a cabinet about 31" high works perfectly for me.

Cutting Parts, Milling Joinery

Begin by cutting workpieces for the main carcass. A table saw is perfect for breaking down your plywood sheets, but you



Cut all the plywood components at the table saw (or with a guided circular saw). During this process, orient workpieces so the blade cuts down into the face side of the stock for the cleanest cut.



Make all the needed rabbets and dados for the workpieces on the table saw with a dado cutter, as shown here, or using a router table equipped with a straight or spiral bit.

can also use a track saw or a clamp-on guide for a circular saw. Keep in mind that plywood is prone to splintering, so use a sharp, clean blade and orient the stock so the blade cuts down into the face side of the material. This way, any tearout will be on the unseen side.

This is a solid cabinet, thanks to a simple but strong combination of rabbets and dados (and technically, grooves when the dado is in-line with the grain). A dado blade on your table saw, or a straight (or rabbeting) bit in a router table tackles all the joinery you'll need to make quite nicely.

Cut the drawer and shelf sides, and the sub-top workpieces, to length only. This provides a longer working edge to make cutting these joints safer and more efficient — fewer passes needed over the blade or bit. Once your joints are milled, just rip the parts to final width.

Finally, cut the door and drawer front slightly larger than their *Material List* dimensions on pages 39 and 40. Since those must fit perfectly inset into the face frame, we'll tweak the fit a bit later.

Marking and Fitting the Top, Sub-top

Speaking of fitting, before reaching for a glue bottle, there are a few preliminary things to do, beginning with a dry assembly.

Visually, the main top is just a flat surface, but there's a lot happening underneath it. With the dry assembly clamped up, mark the underside of the main top to show where the three



The author mills dados and rabbets first, then cuts the workpieces to final width when making particularly narrow parts. It's safer and more efficient.

sub-top pieces are located by tracing them from underneath.

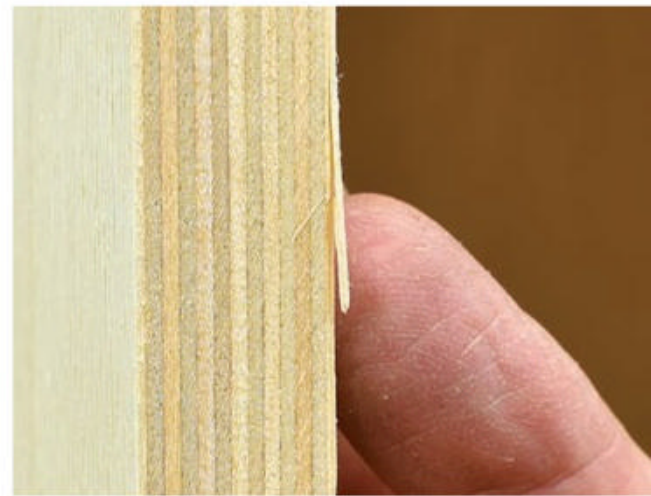
Disassemble the top and sub-tops, and arrange them on your marks to lay out the leaf supports. The separate sub-tops create gaps for attaching the supports on the underside of the main top. You'll need to stagger the supports for internal clearance, but this won't affect their holding ability. Their exact location depends on the supports you use, so a bit of tinkering will show the best arrangement. Trace around the mounting plates and mark screw holes, and also carefully mark where the supports will exit the sides of the cabinet.

Plywood Playbook: Tips for Taming Baltic Birch

Baltic birch plywood is a reliable building material, but the thin outer plies easily splinter on the corners when they're freshly cut. Take care when handling it, not only for personal safety (I can't tell you how many splinters I got during this project), but also to avoid damaging the plywood. These edge splinters, while seemingly tiny where they stick out, can continue separating from the stock for several inches if snagged, potentially ruining a clean edge.

Lightly sand all fresh edges and corners to remove protruding splinters while a project is in progress, then give them a more thorough sanding afterward to slightly round over these areas. Once sanded, a few coats of finish such as polyurethane can help prevent further splintering of the delicate edge plies.

Should a completed plywood project get "dings" on the edges during use, sand these over to prevent another running splinter from forming.





Before assembling the cabinet carcass, use the three sub-tops to lay out and mark locations for the leaf support brackets on the underside of the main top. Then mark the exit hole locations of this hardware on the cabinet sides.



Using a jigsaw or handsaw, cut the exit holes for the four leaf supports. Use a fine-cutting wood blade or even a metal-cutting blade and set your saw's orbital action to zero to prevent splintering.



Transfer your exit hole marks to the top edges of the cabinet sides, enlarging them a bit for wiggle room. (Mine are 1" high by 1¼" long.) Cut the holes for these openings with a jigsaw. To minimize splintering, use a fresh fine-cut blade for wood or even a metal-cutting blade, and turn the saw's orbital action as low as it goes. Clean up the exit holes with a light sanding.

Assembling the Cabinet Carcass

Assembling and gluing a cabinet this large and heavy while keeping everything square is difficult, so I like to start with a single corner and let it dry before going further. In the bottom left photo on this page, I've glued and clamped the cabinet back to one of the sides, using Rockler's Clamp-It® Assembly Squares to ensure a 90-degree joint. Once dry, this secure corner joint helps register the rest of the assembly as you add the remaining side, structural bottom and the three sub-tops.

A separate inner bottom piece adds weight for even more stability. Just brush some glue onto the structural bottom, slide the workpiece in, and anchor it with a few screws driven up from underneath the cabinet where they won't show.

The last piece of the cabinet is the main top. Because it'd be more difficult to do later, lay out and mark the hinges for the folding wings now. This is also the time to drill pilot holes and drive in all the screws for the hinges and leaf supports; having those pilot holes already threaded will make things easier later. As with the supports, you may need to stagger the hinges.

Remove the hardware, then place and attach the main top to the cabinet with screws driven up through the sub-tops.

Putting on a Good Face

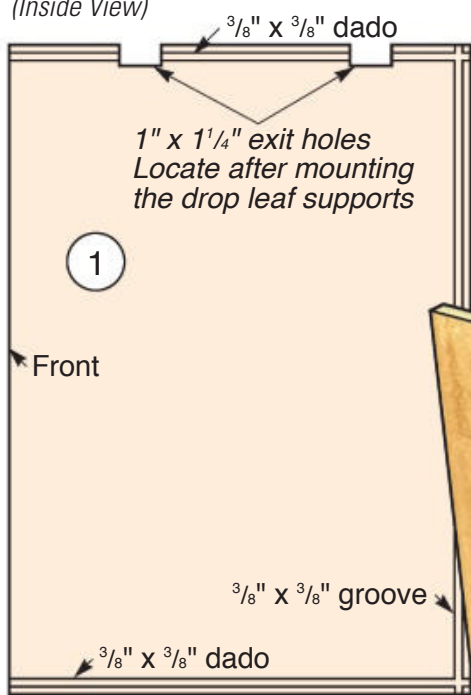
Cut the face frame rail and stile workpieces to size. I've opted to assemble the face frame with fast-and-easy pocket-hole joints. I doubled up the screws on the wider bottom rail and used single screws on the ends of the narrower top rail.

Before attaching the assembled frame, measure the opening and trim the door and drawer front to allow a uniform gap all around. Do a test-fit on your worksurface. A reveal of 1/8" is ideal; it'll look great and allow the door to swing freely. When the gap is just right, give these workpiece edges a careful sanding to remove their sharp corners.

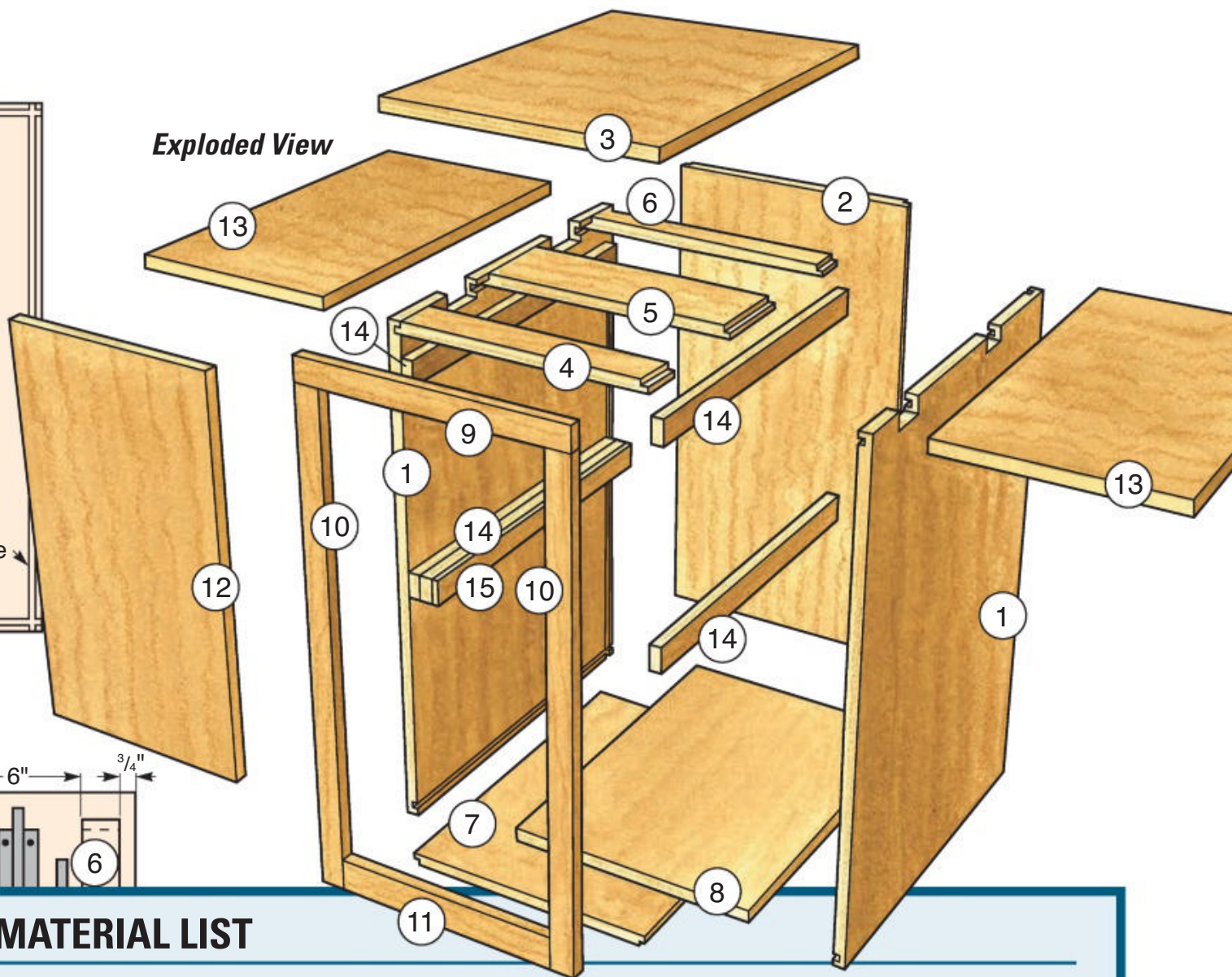
Attaching face frames can be done in a variety of ways: brads and glue, pocket screws from

Set up one perfectly square corner of the carcass before proceeding with the rest of its assembly. Rockler clamping squares hold the assembled joint at 90 degrees until the glue dries.

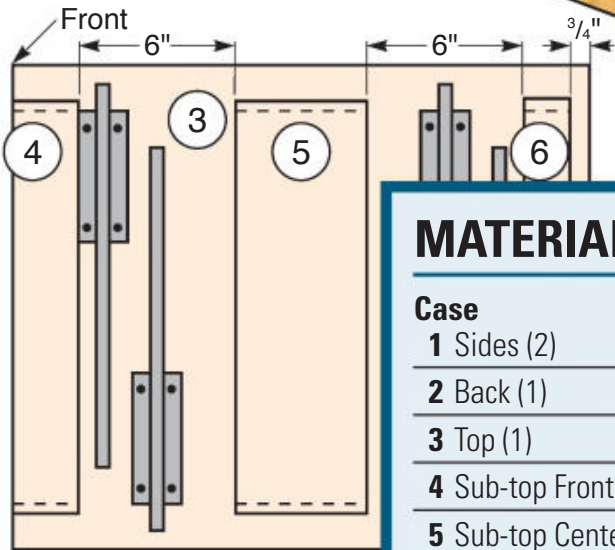
Left Side
(Inside View)



Exploded View

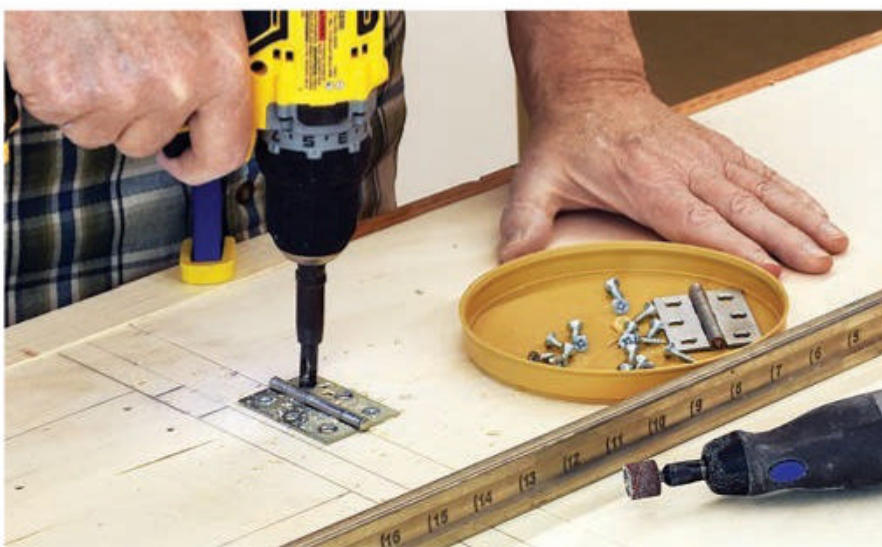


Sub-top Locations
(Bottom View)



MATERIAL LIST

Case	T x W x L		T x W x L
1 Sides (2)	3/4" x 22" x 31"	9 Face Frame Top Rail (1)	3/4" x 1 1/2" x 16 1/2"
2 Back (1)	3/4" x 15 3/4" x 31"	10 Face Frame Stiles (2)	3/4" x 1 1/2" x 30 1/4"
3 Top (1)	3/4" x 18 1/2" x 22"	11 Face Frame Bottom Rail (1)	3/4" x 2" x 13 1/2"
4 Sub-top Front (1)	3/4" x 2 1/2" x 15 3/4"	12 Door (1)	3/4" x 13 3/8" x 24 1/8"
5 Sub-top Center (1)	3/4" x 5" x 15 3/4"	13 Wings (2)	3/4" x 12 5/8" x 22"
6 Sub-top Back (1)	3/4" x 1 3/4" x 15 3/4"	14 Drawer, Tray Spacers (5)	3/4" x 1 1/2" x 21 1/4"
7 Structural Bottom (1)	3/4" x 15 3/4" x 21 1/4"	15 Thin Tray Spacer (1)	3/8" x 1 1/2" x 21 1/4"
8 Bottom (1)	3/4" x 15" x 21 1/4"		



Before installing the main top to the cabinet assembly, mark, drill and attach the hinges and leaf supports temporarily to thread all pilot holes. You'll install the hardware permanently later in the building stage.

inside or with biscuit joints. But this cabinet's double-thick top and bottom offer a lot of gluing surface (nearly the full width of the face frame top rail, and more than half of its bottom rail), so I opted to just glue and clamp the face frame in place. Glue joints will be plenty strong here.

Mobile Stand Hard-to-Find Hardware

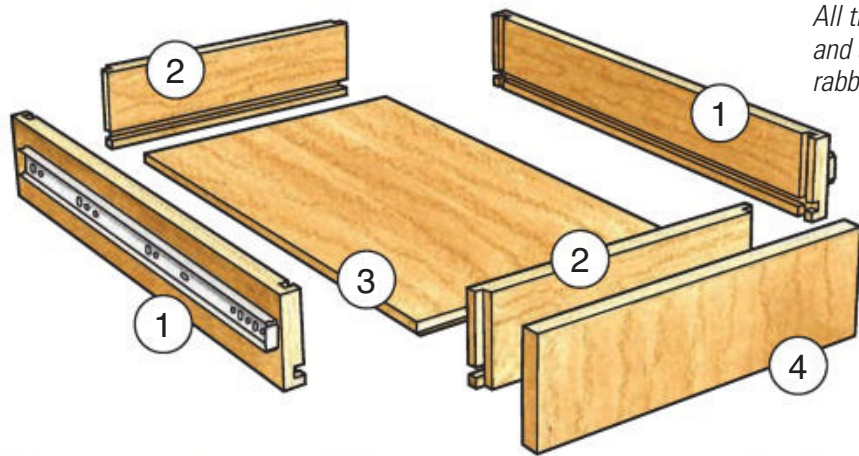
- 20" Series Centerline® Slides (2) #47758 \$19.99 pr.
- Salice Soft-Close Hinges, Inset (1) #52024 \$18.99 pr.
- Metal Drop Leaf Supports (2) #30006 \$13.49 pr.
- Bora Portamate Mobile Base (1) #39379 \$69.99 ea.
- Butt Hinges, 2 1/2" L x 1 1/2" W, Nickel (2) #54646 \$3.99 pr.
- Stainless Steel Metropolitan Pull, 5 1/4" (2) #24418 \$7.99 ea.

To purchase these and other products online, visit www.woodworkersjournal.com/hardware Or, call 800-610-0883 (code WJ1577).

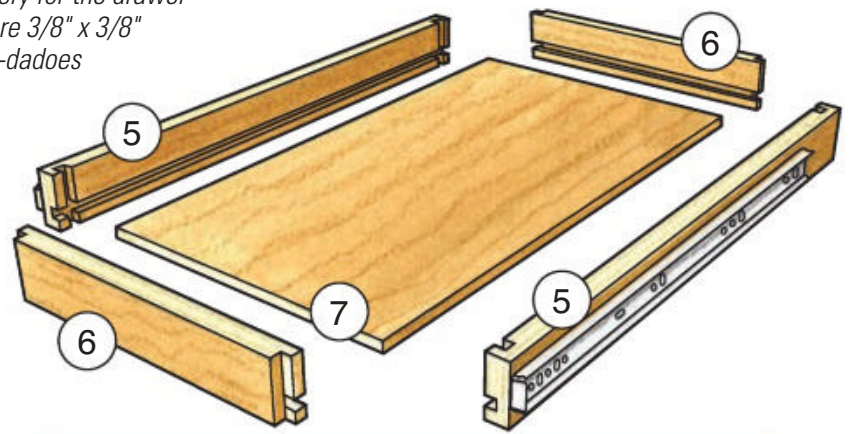
Inside Work Comes Next

While the face frame glue joints dry, build the drawer and pullout shelf. Assembling them is pretty much the same process as the cabinet, but because they're smaller it's easier to assemble everything at once. Just make sure the drawer and shelf remain square when the clamps are tightened.

Next, prepare the inside of the cabinet for drawer slides. Slide hardware varies widely, so follow the specific instructions that are included with your slides. However, for a framed cabinet like this, all slides need something to attach to.



All the joinery for the drawer and shelf are 3/8" x 3/8" rabbet-and-dadoes



Drill pocket-screw holes in the solid-wood face frame rails, then assemble the frame on a flat surface with 1/4" pocket screws.



Another task best done before attaching the face frame to the cabinet is checking and tweaking the fit of the door and drawer face. A gap of about 1/8" all around is fairly standard and looks good.

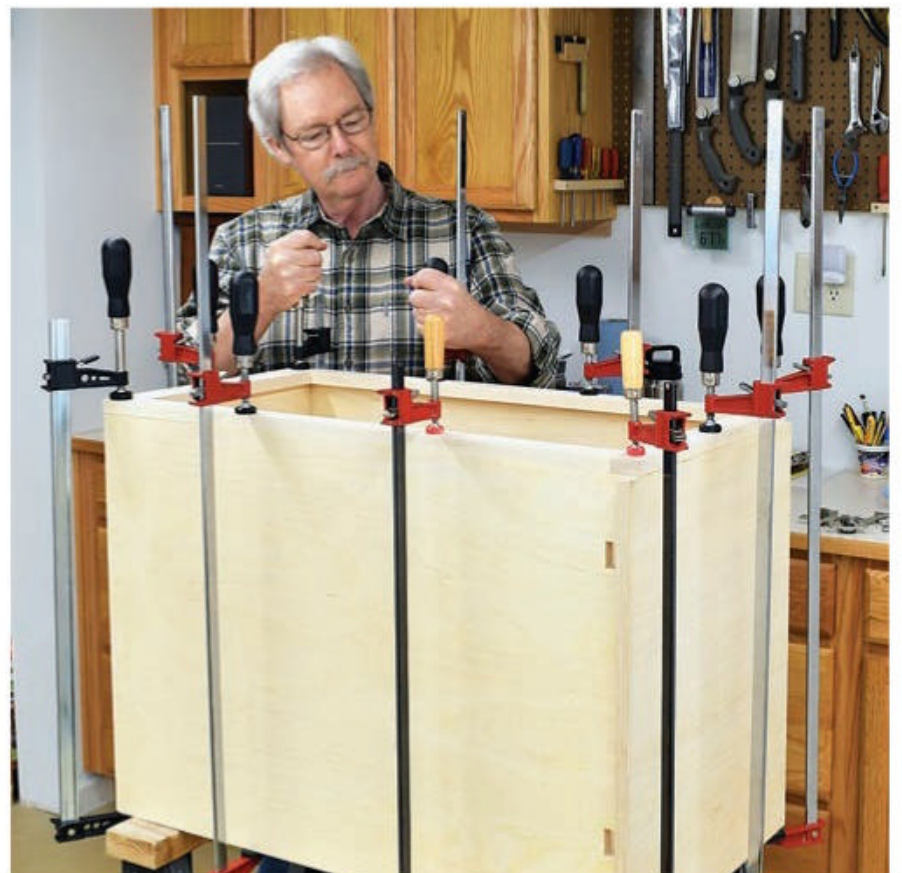
To support the slides used here even with the face frame, I've cut four 1 1/2"-wide spacers from 3/4" stock that run front to back in the cabinet. The slides attach to the middle of the drawer/shelf sides, so the drawer spacers should be located 1 1/2" down from the top. To center the shelf midway in the remaining opening, position their spacers 12 1/2" below the drawer spacers.

Locating these is straightforward for the first side, but getting an exact match on the opposite side can be tricky by measuring only. So I made a variation of story sticks using scraps cut to the exact measurements to serve as layout guides.

Starting with the right side, place the drawer guide at the top, then the drawer slide spacer, the shelf guide and the shelf slide spacer. Three screws in each spacer anchored them.

MATERIAL LIST

Drawer and Shelf	T x W x L
1 Drawer Sides (2)	3/4" x 3 3/8" x 21"
2 Drawer Front and Back (2)	3/4" x 3 3/8" x 11 3/4"
3 Drawer Bottom (1)	3/4" x 11 3/4" x 20 1/4"
4 Drawer Face (1)	3/4" x 4" x 13 3/8"
5 Shelf Sides (2)	3/4" x 2" x 21"
6 Shelf Front and Back (2)	3/4" x 2" x 10 5/8"
7 Shelf Bottom (1)	3/4" x 10 5/8" x 20 1/4"



Fit and attach the face frame to the main cabinet. Because the doubled top and bottom present a lot of contact surface, the author opted to simply glue the frame in place without fasteners or other reinforcements.

Then, just repeat for the other side for perfect alignment.

While the drawer slides are the same on both sides, the shelf slide on the left is offset to allow the door and hinges to function without blocking the narrower pullout shelf. Normally, slides are even with the face frame, which they are on the right side, but for the slides and hinges used here, I needed to offset the shelf slide on the left by 1 7/8". To do this, I tacked a second "thick" and third "thin" spacer to the first spacer (see *Exploded View Drawing*, page 39).

Attach the cabinet-side components of the slides to the spacers in the cabinet so the drawer box and shelf will be flush with the back edge of the face frame. Then, attach the mating components of the slides to the sides of the drawer and shelf,



Glue and clamp the drawer box components together, being careful to keep the assembly square. Repeat the process with the pullout shelf.

and do a test fit. Choose the slotted holes in the slide hardware when installing them so they can be adjusted if needed.

Euro-style hinges for hanging the door use an attachment “cup” that fits into a stopped hole into the back of the door bored with a 35 mm Forstner bit. This can be done freehand or with a drill press, locating the cup per the manufacturer’s instructions. There are a number of jigs made specifically for this task that make the process fast and easy by dialing in the required offset for drilling. (You can see one of them in action at right as well as in *Hardworking Hardware* on page 62.)

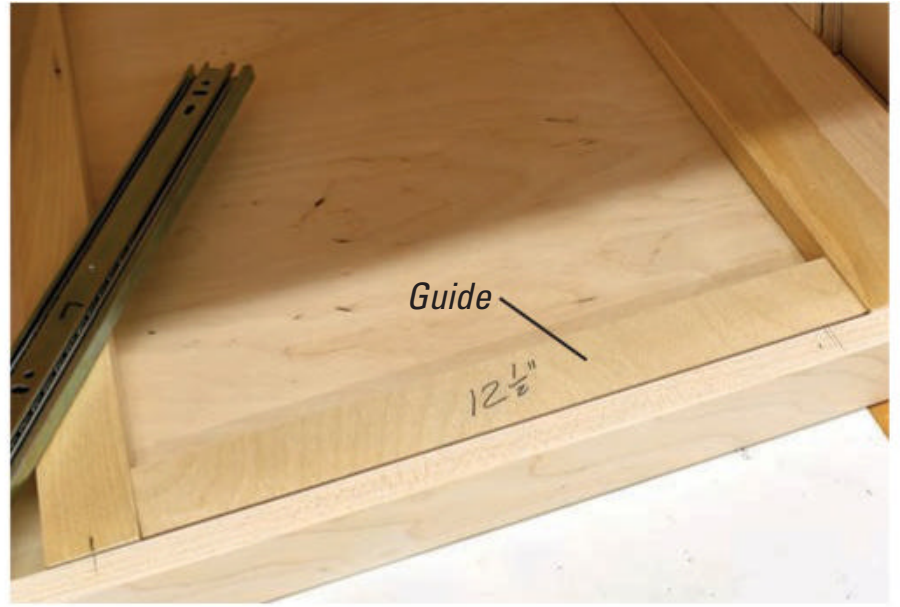
Attach the hinges to the door, then use the door hinges to mark the left frame for the hinge mounting plates and attach them on your marks. Mounting the door is as simple as snapping the hinges onto their mounts. Check the door action and fit. If it’s not centered or too far in or out, Euro hinges are adjustable up-and-down, side-to-side, and in-and-out with screws. Just tweak these screws until the door is perfectly set.

To locate and attach the drawer face, first drill holes for your drawer pull. Then, using 1/8" shims around the edges, snug the drawer face in place in its opening and drill through your pull holes and into the front of the drawer box behind it. Slip the pull’s screws into the holes to hold the drawer face in place, remove the drawer, and secure the drawer face with screws driven through the drawer front from inside.

The cabinet is now ready for attaching the internal hardware and hinges as well as hanging the folding wings. This is easiest to accomplish by turning the cabinet upside down on a large worksurface. Remove the drawers and unsnap the door hinges first, and get some assistance for upending the cabinet as it’s pretty heavy at this point.

Your pilot holes are already drilled and threaded, so it should only take a couple of minutes to screw the hinges and leaf supports into place. If you plan to use this project mainly in a corner, consider angling the back edges of the wings at this point so they can be lifted while the drill press is in place. Then remove the hardware so you can apply a couple of coats of your favorite protective finish (I used polyurethane).

With assistance, set the cabinet upright onto your rolling base. Center the drill press on top of the cabinet and drill down through the mounting holes in the drill press’s base plate. Slip a pair of bolts through the baseplate, and secure the machine with washers and nuts from underneath.



There’s no better way to ensure that spacers for the drawer and shelf slides are aligned than to use guide pieces cut to the desired measurements. Install one side, then use the same guides for the opposite side.



A cabinet door drilling jig paired with a 35 mm Forstner bit makes quick work of boring the mounting cup holes for Euro-style hinges.



Use 1/8" shims to center the drawer face, then drill through the handle holes and into the drawer box. Bolts for the drawer pull hold the front in place until it’s permanently attached with more screws from inside.

Now, customize your rolling benchtop stand any way you like to accommodate the accessories you plan to store in it. If this project will be one you’ll be moving around a lot (perhaps because a car needs to park in your shop space, too), it’s worth adding a rear handle. Doing that early on in the construction process will make the cabinet easier to muscle around and very handy thereafter.

A.J. Hamler is a regular contributor to Woodworker’s Journal.

Breakfront Plant Stand

By Chris Marshall

By the time you complete this handsome accent piece, you'll be a mortise-and-tenoning pro!



Slatted Arts & Crafts-style plant stands are timeless, but many look pretty ho-hum. I wanted to breathe some new life into this classic, so art director Jeff Jacobson and I decided to join two shorter plant stands to a taller center unit and break the front plane of all three. It triples the number of plants you can display while adding some pleasing visual details. Mine is made of quartersawn mahogany, but white oak, walnut or cherry would be other attractive choices. Regardless, you'll need both 8/4 and 4/4 stock to build it.

Initial Surfacing and Getting Organized

On many projects, it makes sense to prepare your lumber as you need it while you build. But for this plant stand, you'll gain some efficiency during the repetitive joinery stages if you make up most of the part blanks now, at the beginning of the building process. So that's what we'll do first.

Start by surfacing and rip-cutting enough 8/4 stock down to 1³/₈" x 1³/₈" to make four 36"-long legs for the taller center unit and four 25³/₄"-long shorter legs for the two outer units

(two legs per outer unit), plus at least one “test” leg to use for dialing in your mortise sizes.

You’ll need eight rails for the center unit and a total of 12 rails for the two outer units. Let’s make blanks for all of the 2¼"-wide rails first, following the *Material List* on pages 45 and 47. Rip several long strips of stock to 2¼" wide, and crosscut them to the following lengths for the center unit: two at 10¼" for the top side rails and two at 11" for the top front and back rails. Crosscut two top side rails to 7¼" for the outer units, then cut two more to 12⅝" for the top back rails. You’ll need two top front rails for the outer units as well; cut these ¼" overly long. And while you’re at it, crosscut two blanks for the center unit cross supports, making them about ¼" longer than specified.

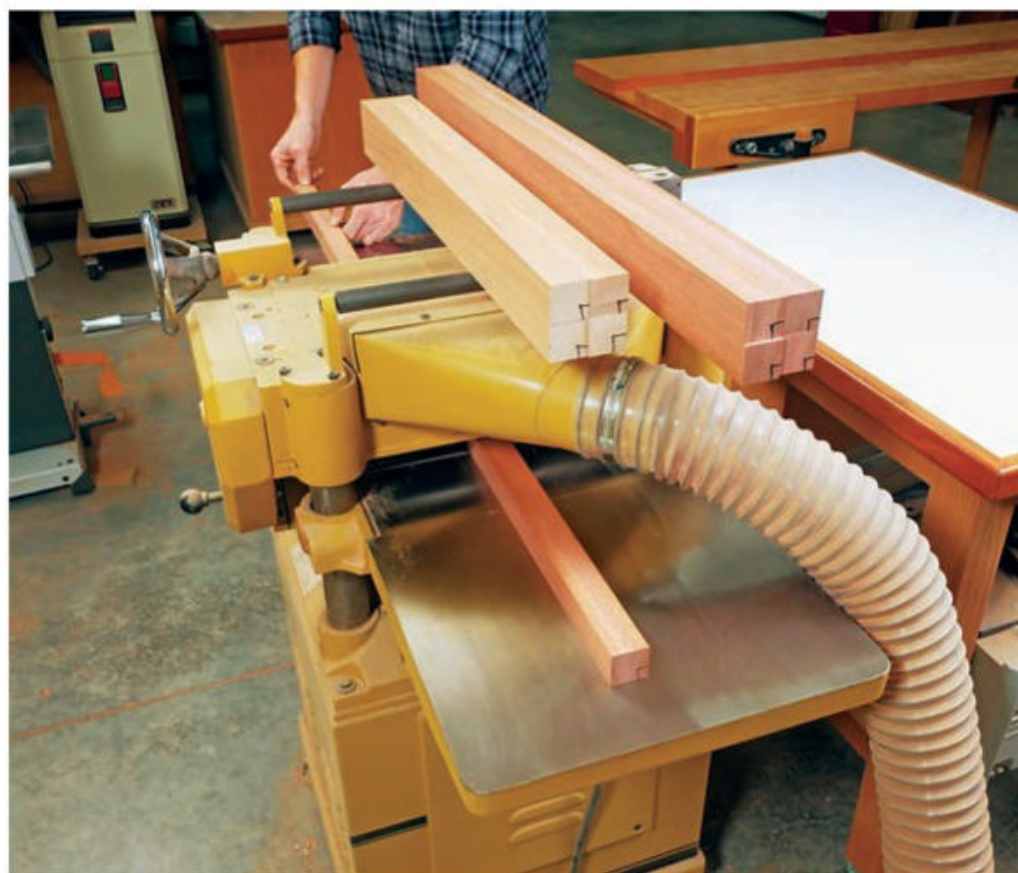
Continuing with rough stock preparation for the rails, rip several long strips to 3" wide. Follow the *Material List* lengths to crosscut blanks for the center unit’s two bottom side rails (10¼") plus a front and back bottom rail (11"). The outer units will need two bottom side rails (7¼") and two bottom back rails (12⅝") cut to length. Crosscut two bottom front rails for the outer units as well, but make these ¼" overly long. Label and group these rail blanks carefully to avoid confusion.

Blanks for the plant stand’s side slats can happen next. Prepare enough ½"-thick stock to rip a dozen slats for the center unit and two spares at 1" wide. Crosscut these ¼" longer than needed at 31". Rip 10 slats for the outer units (eight required plus two spares), and make them overly long at 20¾". We’ll trim all the slats to final length later.

Laying Out Leg Mortises

Arrange the legs into the orientation you’ll want them to be in when the plant stand is assembled, and mark their ends to make this clear. Then follow the *Drawings* on pages 45 and 47 to mark all the ½"-long mortises on one long leg and one short leg. All the mortises are centered on the leg thicknesses. Transfer these locations with a square onto the other legs — there’s no

Cut blanks for all the rails from 4/4 stock milled down to 3/4". Be sure to label them carefully to keep your parts inventory clear. Note in the Material Lists that several rails should be left overly long for now.

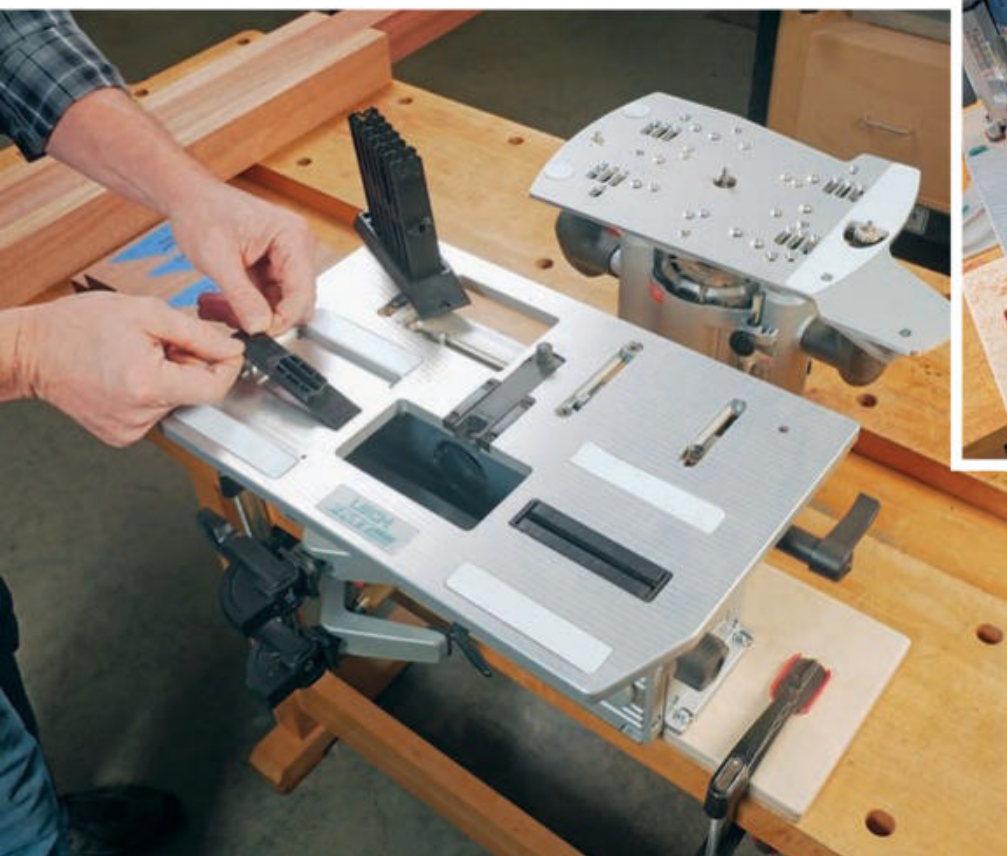


Prepare the long and short legs plus a spare from 8/4 lumber. The author made them 1½" square to begin with, let the legs sit for a day to allow any incidental distortion to occur, then surfaced them down to 1⅜" x 1⅜".

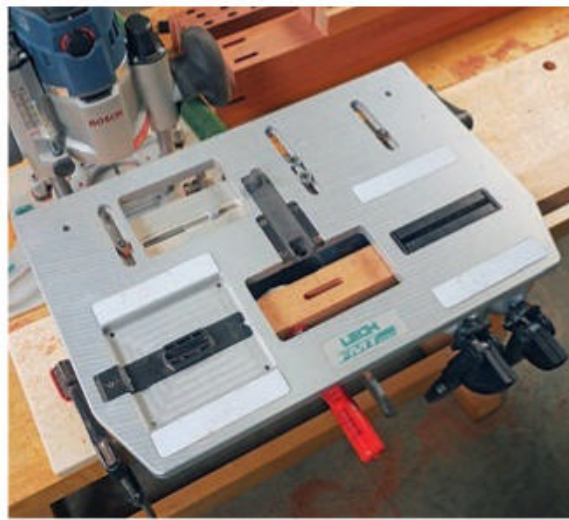
need to measure if you use the original marked legs as your guides. Notice in the *Exploded View* drawing on page 45 that the back two legs of the center unit have two extra mortises that receive the top and bottom back rails of the outer units.

Mortises for the plant stand’s 20 slats are all ¼" wide x ½" long and spaced ½" apart from center to center. Mark their locations on the inside edges of the top and bottom side rails of both the center and outer units, using the *Drawings* on pages 45 and 47 as layout guides.





Leigh's FMT Pro uses a system of plastic templates to guide a plunge router and spiral bit for milling mortises. A pair of pins on a subbase that's attached to the router limit the router's cutting path for this operation.



Plunging the bit down into the workpiece repeatedly removes the bulk of the waste in the mortise area, then sweeping left-right passes clean away what waste remains. The end result is a clean, accurate mortise that's ready for glue.

Milling Leg/Rail Joinery with an FMT Pro Jig

This project gave me a chance to try out the Leigh Industries FMT Pro Mortise and Tenon Jig to mill all of the mortises. Leigh's aluminum FMT jig employs a system of small plastic templates that snap into its movable table to set the size of a wide variety of mortises. An aluminum subbase attaches to a plunge router, and a pair of pins underneath the subbase enable you to rout the mortise by simply following along a slotted opening in the plastic FMT template and plunging downward with a spiral bit.

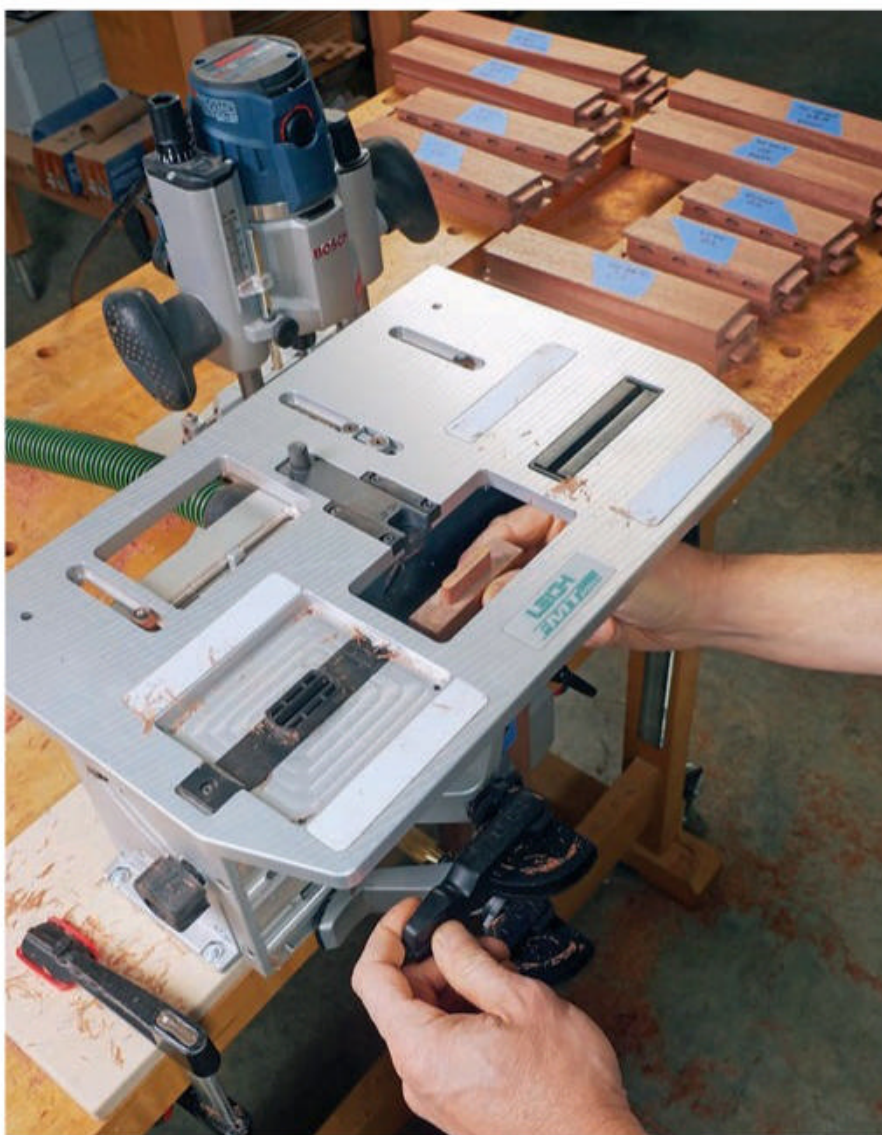
But you can certainly use a router and an edge guide, a hollow-chisel mortiser or a drill press and Forstner bit to cut these mortises instead. These options will work fine, too. Cut all the rail and leg mortises 9/16" deep, which leaves a bit of extra depth for excess glue to pool at the bottom.

When the dust clears from mortising, go ahead and machine tenons to fit them. Here again, the Leigh FMT Pro makes this process easy. It enables tenon workpieces to be clamped vertically against the jig's body for routing. The same plastic template for the mortise guides the tenon-cutting process, too. This time, tracing around the perimeter of the template with the subbase pin directs the router for milling the tenon with a spiral bit. But you can use whatever tenon-cutting method you prefer. All of the tenons on the rails and slats are 1/2" long. Be sure to keep in mind that one end of the top and bottom front rails of the outer units have no tenons where they butt against the cross supports and bottom side rails of the center unit.

Creating Side Assemblies for the Center Unit

Dry-fit the top and bottom side rails to the legs to create frameworks for two side assemblies of the plant stand's center unit and one side assembly for each shorter outer unit. Make sure the top edges of the top side rails are flush with the top ends of the legs. Now measure between the rails in order to double-check the slat lengths. The distance between the inside edges of the rails, plus 1", equals the overall slat length.

Trim all the slats to final length. Then raise tenons on their ends, using whatever tenon-cutting process you prefer, and install them in the side assembly frameworks to check their

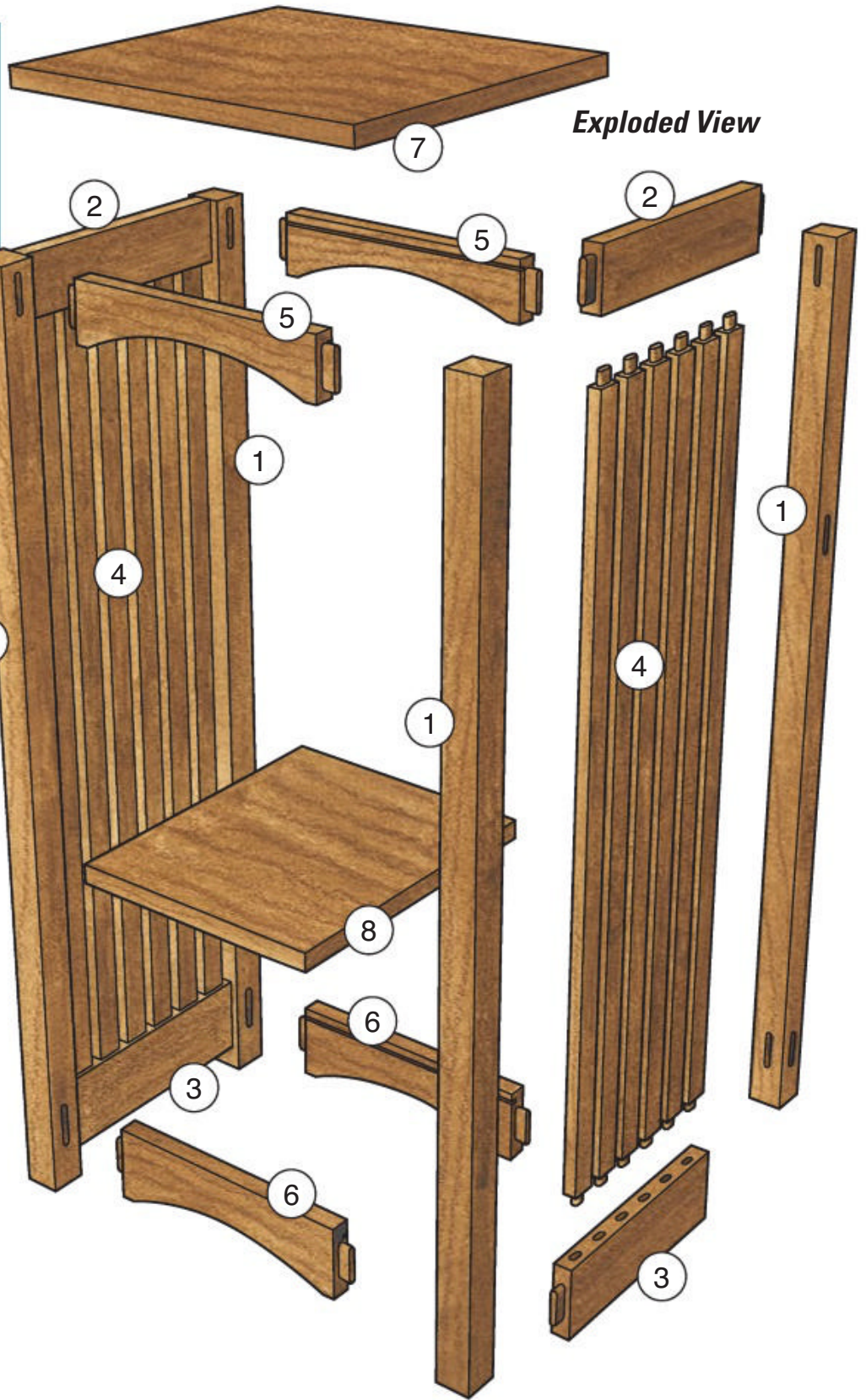


The same plastic template used for mortising also sets the jig for cutting a matching tenon. Two cam-activated clamps on the FMT hold workpieces vertically for this second milling operation with a spiral bit.

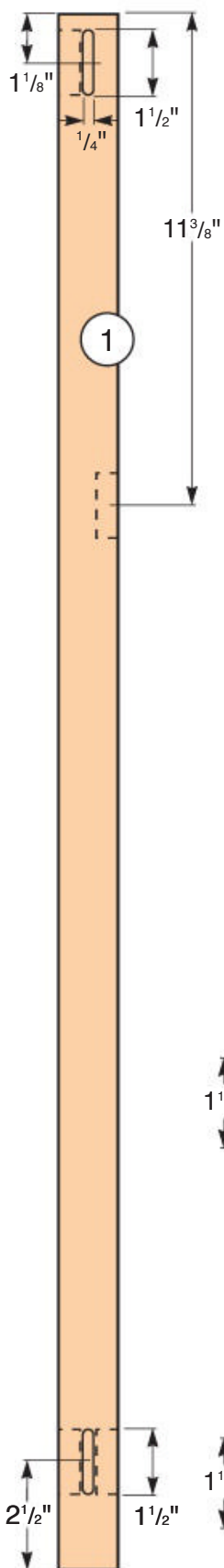
MATERIAL LIST

Center Unit	T x W x L
1 Legs (4)	1 3/8" x 1 3/8" x 36"
2 Top Side Rails (2)	3/4" x 2 1/4" x 10 1/4"
3 Bottom Side Rails (2)	3/4" x 3" x 10 1/4"
4 Slats (12)	1/2" x 1" x 30 3/4"*
5 Top Front, Back Rails (2)	3/4" x 2 1/4" x 11"
6 Bottom Front, Back Rails (2)	3/4" x 3" x 11"
7 Top (1)	3/4" x 13" x 13 3/4"
8 Shelf (1)	3/4" x 12" x 10"

* Initially cut overly long



Right Back Leg (Front View)

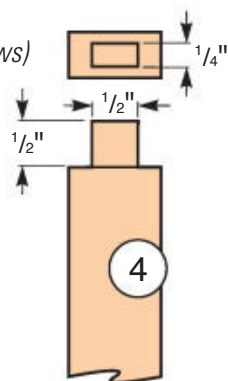


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MORE ON THE WEB

VIDEO To see the Leigh FMT Pro jig in action cutting a mortise-and-tenon joint, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

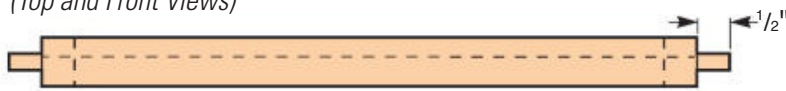
Slats

(Top and Front Views)



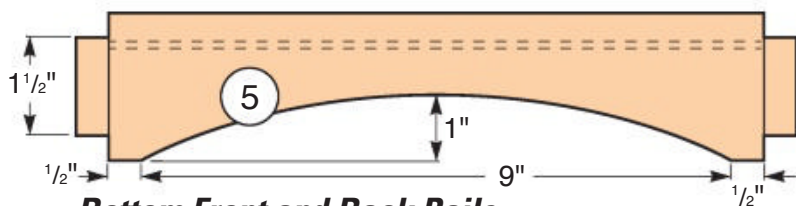
Top Front and Back Rails

(Top and Front Views)



Top Side Rails

(Top and Front Views)



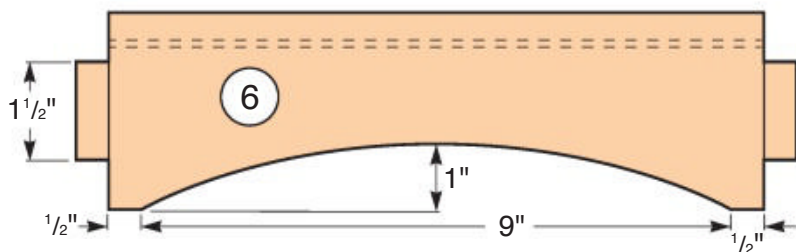
Bottom Front and Back Rails

(Top and Front Views)



Bottom Side Rails

(Top and Front Views)





Dry-fit the side rails and legs of the center and outer units together into four frameworks so you can verify the slat lengths you'll need. The distance between the inside edges of the top and bottom rails, plus 1", equals the actual slat lengths.



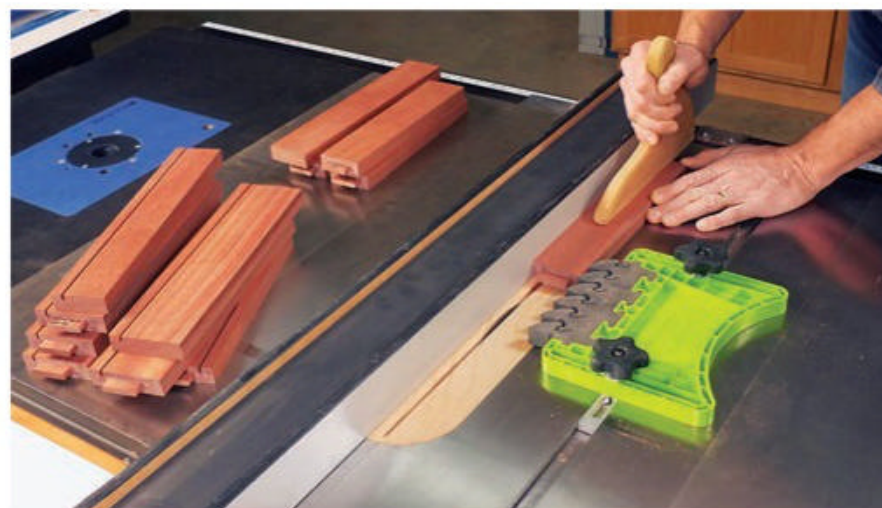
This plant stand has an enormous amount of surface area and many closely spaced parts that will challenge the finishing process. So staining and topcoating in stages before assembly is a wise strategy here!



fit. If the parts go together well, sand the legs, side rails and slats up through the grits to 180 and ease their sharp edges.

This plant stand will have a lot of nooks and crannies to contend with if you assemble it all before staining and finishing. Pre-finishing the parts in stages before putting them together simplifies things here and minimizes potential frustration.

It also makes glue easy to wipe away. I stained the legs, slats and side rails with an oil-based red mahogany stain, sealed it in with a coat of dewaxed shellac and then topcoated with aerosol satin lacquer. Be sure to keep the finish off of the tenons and out of the mortises. When that cures, glue and clamp all four side assemblies together.



Rockler's Table Top Fastener hardware requires that one end fits into a saw kerf. Cut these kerfs 5/16" deep and 7/16" in from one edge of each front and back rail on what will be the inside face of the parts.

Detailing the Front and Back Rails

We'll make top panels and shelves of this plant stand from solid wood, so cross-grain wood movement of those pieces needs to be taken into account. Rockler's steel Table Top Fasteners (item 34215) are a good solution here: one end of these offset fasteners fits into a saw kerf on a rail or apron, and the other end screws to the bottom face of a panel. This way, the fastener allows the panel to expand or contract while still holding it securely. We can prepare for this hardware now by cutting a kerf along the inside face of the 12 front and back rails at the

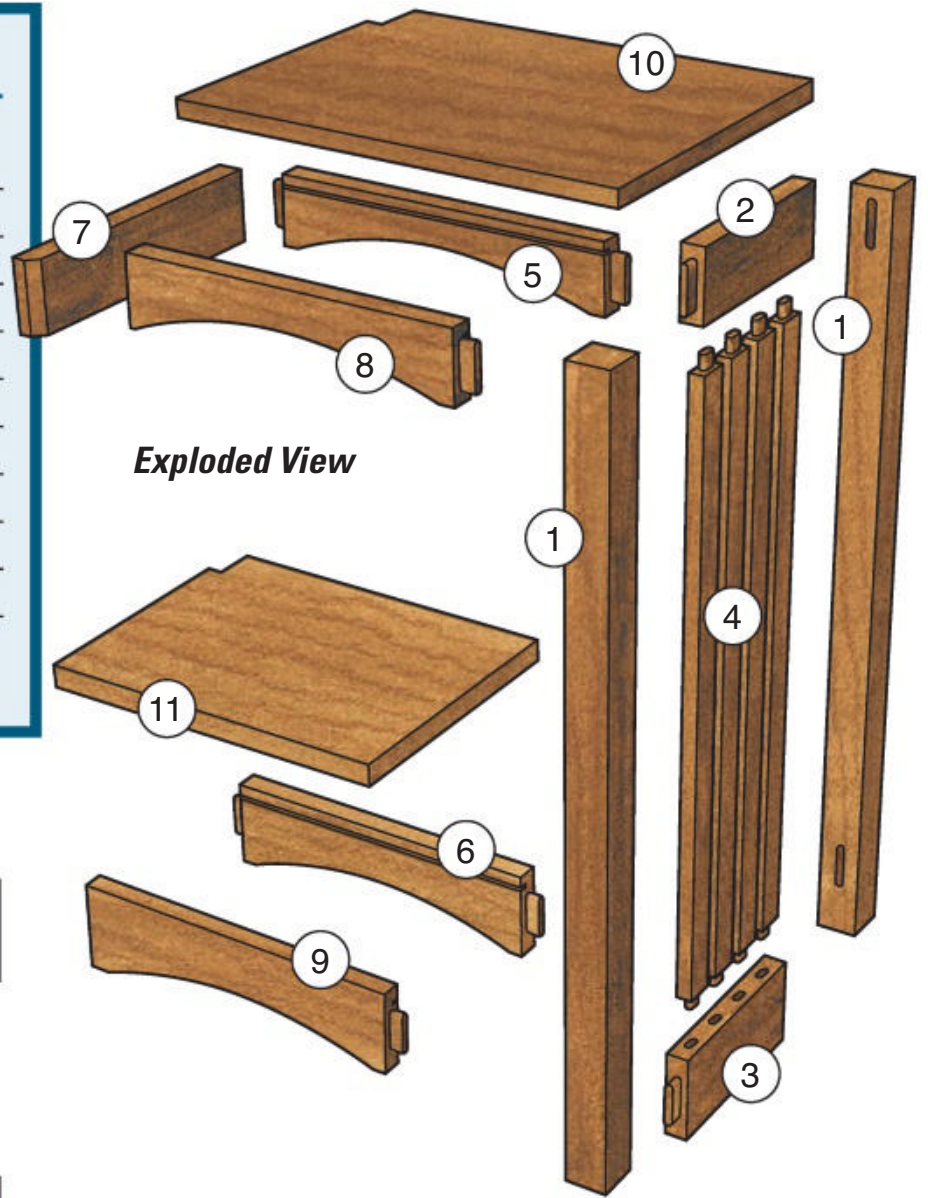
Once the final topcoat is thoroughly dry, glue and clamp the four side assemblies together. Any wood glue you prefer will work fine for this application.

table saw with a standard blade. Position the kerf 7/16" in from one edge of each rail. Make the kerfs 5/16" deep; they can run the full length of the rails.

MATERIAL LIST

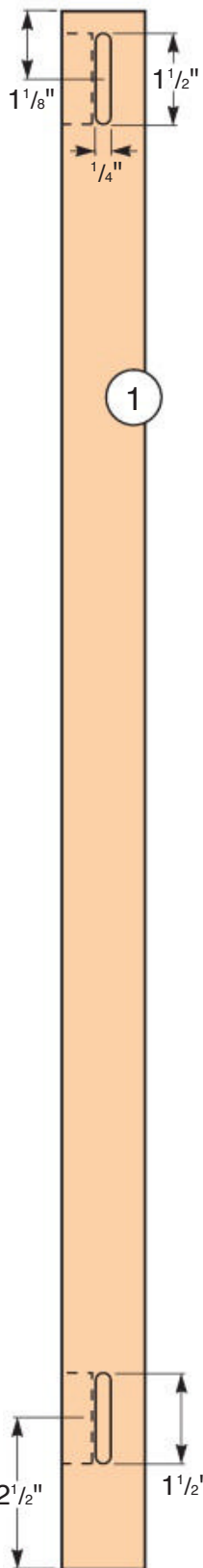
Outer Units	T x W x L
1 Legs (4)	1 ³ / ₈ " x 1 ³ / ₈ " x 25 ³ / ₄ "
2 Top Side Rails (2)	3/4" x 2 ¹ / ₄ " x 7 ¹ / ₄ "
3 Bottom Side Rails (2)	3/4" x 3" x 7 ¹ / ₄ "
4 Slats (8)	1/2" x 1" x 20 ¹ / ₂ "
5 Top Back Rails (2)	3/4" x 2 ¹ / ₄ " x 12 ¹ / ₈ "
6 Bottom Back Rails (2)	3/4" x 3" x 12 ¹ / ₈ "
7 Cross Supports (2)	3/4" x 2 ¹ / ₄ " x 9 ¹ / ₄ "*
8 Top Front Rails (2)	3/4" x 2 ¹ / ₄ " x 11 ⁵ / ₁₆ "*
9 Bottom Front Rails (2)	3/4" x 3" x 11 ⁵ / ₁₆ "*
10 Tops (2)	3/4" x 10" x 13 ³ / ₁₆ "
11 Shelves (2)	3/4" x 9" x 11 ⁹ / ₁₆ "

* Initially cut overly long

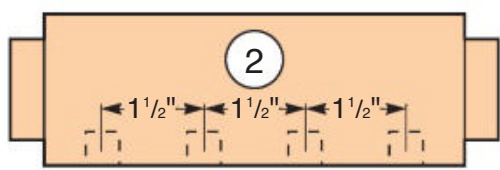


Exploded View

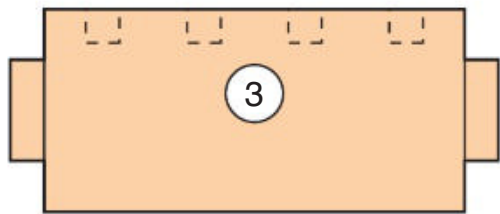
Right Back Leg
(Front View)



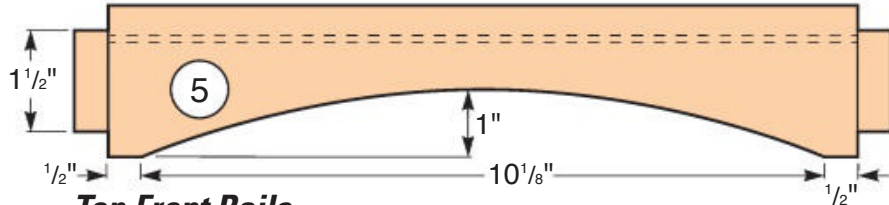
Top Side Rails
(Front View)



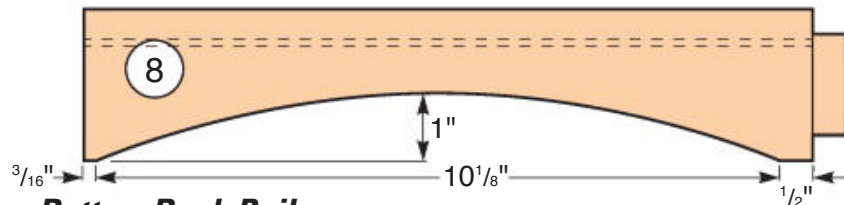
Bottom Side Rails
(Front View)



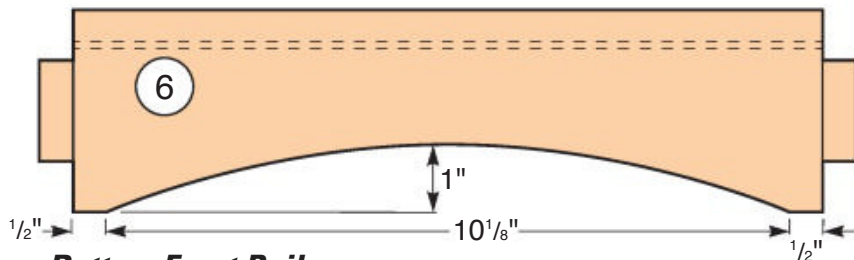
Top Back Rails
(Front View)



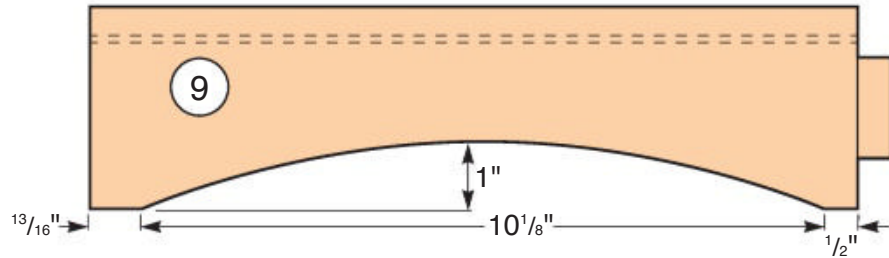
Top Front Rails
(Front View)



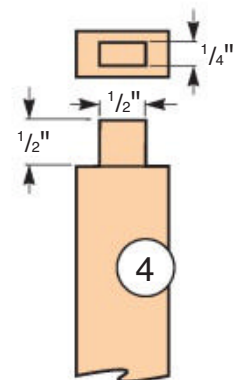
Bottom Back Rails
(Front View)



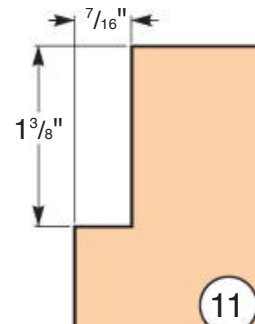
Bottom Front Rails
(Front View)



Slats
(Top and Front Views)



Shelf Notch
(Top View)

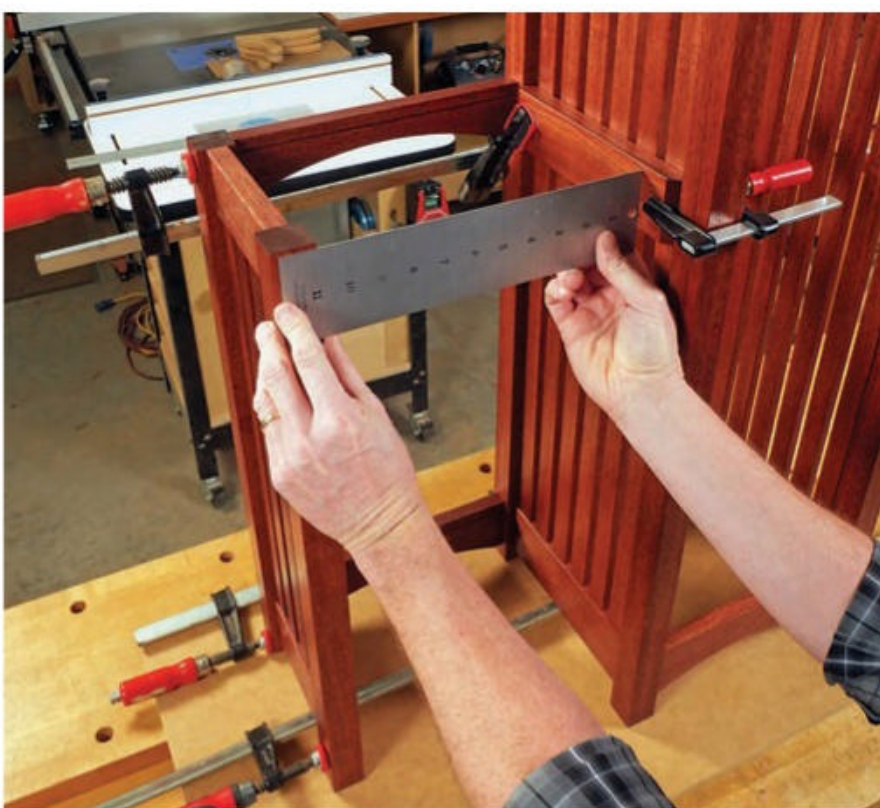




The author made a pair of rail templates from 1/4" scrap MDF (inset) to ensure that the arches on the front and back rails would be uniform. He used them for both tracing the curves and template-routing the actual parts.



Sand, stain and topcoat the arched rails, then go ahead and bring the center unit together with glue and clamps.



Once those are done, the front and back rails of the center and outer units are ready to receive a broad arch along their bottom edge. The large radii of these curves are $10\frac{5}{8}$ " for the center unit and $13\frac{5}{16}$ " for the outer units, and the apex of these curves extends 1" up from the bottom edges of the rails. To cut them uniformly and efficiently, I first created two rail templates from scraps of 1/4"-thick MDF — one for the center unit and one for the outer units. Cut out the templates and sand their bottom curves smooth and fair.

Use the templates to trace an arch onto each of your rail workpieces. Notice in the *Drawings* on pages 45 and 47 that the curves are centered on the lengths of the center unit's rails. However, on the outer units these curves are centered on just the top and bottom back rails. On the top and bottom



Attach the cross rail to the top front rail of the outer assemblies with 2" countersunk wood screws. Then clamp that assembly in place in order to fasten the cross support and outermost slats together with #6 x 1" screws.

front rails, the arches are actually offset. Locate them so the curves begin 1/2" in from the tenon shoulders on the outer ends of these particular rails.

Rough-cut the curves at your band saw or with a jigsaw, cutting about 1/16" outside your layout lines. Then adhere the hardboard templates to each rail with strips of double-sided tape, and template-rout them to final shape on the router table

When the center unit comes out of the clamps, dry-fit the cross supports and outer unit back rails and slatted frameworks so you measure for the top and bottom front rails. This span plus 1/2" equals their final lengths.

with a piloted flush-trim bit. Touch up these arches at your drum sander to remove any router bit marks before you final-sand, stain and finish all 12 side rails.



Check the fit of all of the outer units' components before opening a glue bottle. If all the joints close properly, round up a bunch of clamps and assemble the outer and center units with glue.

Putting the Pieces Together

At this point, assembling the center unit is a snap! Spread glue on the rail tenons and into the mortises of the side assemblies. Bring the whole framework together with clamps.

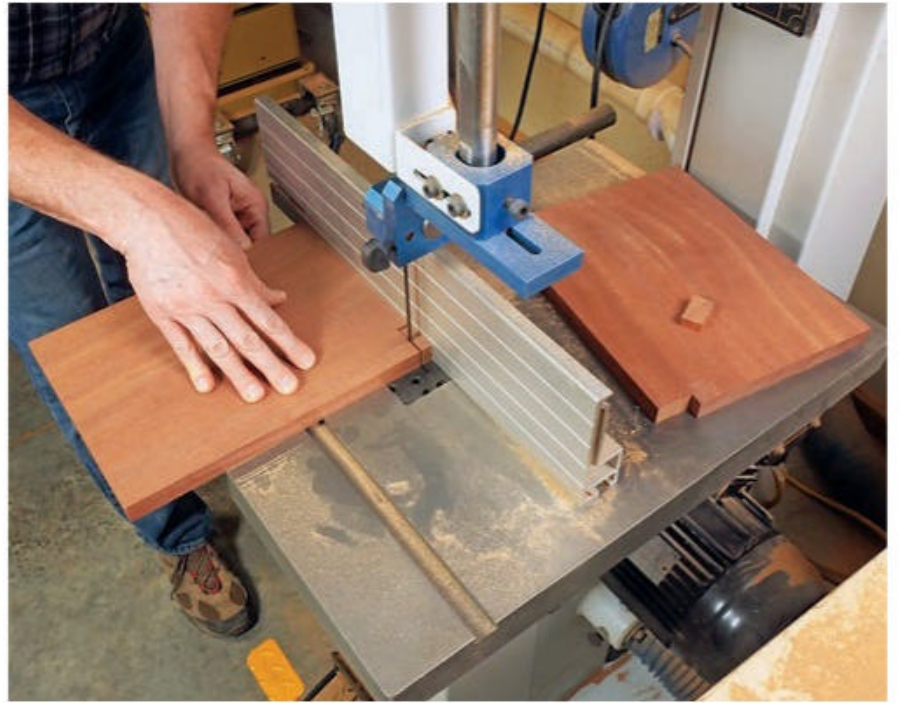
While those joints set, glue up panels for the three tops and shelves. In order to contend with wood movement, be sure to orient the long grain of these six panels so it will run left and right on the finished project, not front to back. This way, the panels can expand and contract outward without being constrained by the legs. When the tops and shelves come out of the clamps, finish-sand them and set them aside for now.

Round up the two cross supports you made earlier for the center unit and cut them to length, making sure they fit snugly between the legs. I trimmed the ends of their outer faces to 45-degree bevels; size these bevels to 5/16" x 5/16" so they'll transition the front face of the cross supports nicely into the leg faces. Sand the cross supports up to 180-grit, and apply stain and finish to complete them.

Position and clamp the cross supports to the side slats of the center unit so the top edges of the cross supports are 25 3/4" up from the bottoms of the legs. Then dry-fit the top and bottom back rails of the outer units as well as their slatted side assemblies to the center unit, clamping these components into place. Now measure the distance between the inside faces of the front legs and the cross supports to verify the final length of the top front rails. Trim the un-tenoned ends of these rails to that length. Repeat this process for measuring and cutting the bottom front rails to length.

Dry-fit the top and bottom front rails of the outer units into place and mark their locations on the cross supports and bottom side rails of the center unit. Then dismantle the outer units so you can attach the cross supports to the top front rails with pairs of 2" countersunk wood screws driven through the cross supports. Now attach the cross supports to the center unit by driving two #6 x 1" flathead wood screws through each outermost slat and into the cross supports.

With those installed, dry-fit all the rails and side assemblies of the outer units to the center unit one last time to check all the remaining unglued joints. If everything is shipshape,



Both the top panels and shelves of the outer units will require notches along their back inside corners in order to fit around the back legs of the center unit. Make these cuts with a band saw, jigsaw or backsaw.



Attach the top panels and shelves to the arched rails with a pair of tabletop fasteners installed in each rail's kerf. Be sure to account for how the panels will need to expand or contract when locating the fasteners.

bring the three plant stand frameworks together with glue and clamps. Attach the bottom side rails of the center unit to the bottom front rails of the outer units with pairs of 2" countersunk wood screws driven from inside the center unit.

Installing Tops and Shelves

We're in the homestretch now! Crosscut the tops and shelves to final length. Notch the back inside corners of the top panels and shelves of the outer units so they'll tuck around the back legs of the center unit. Then soften the edges of all these panels and apply stain and finish. I switched to satin polyurethane here; it offers better protection than lacquer against those inevitable spills that are bound to happen when watering plants.

To install the tops and shelves, insert two tabletop fasteners per rail into each of the saw kerfs and locate them about 1 1/2" in from the rail ends. If you're building this project during the wintertime when these panels are fully contracted across the grain, back the tabletop fasteners about 1/16" out of their saw kerfs to give the panels room to expand in the summer. Fasten them to the top panels with the included screws.

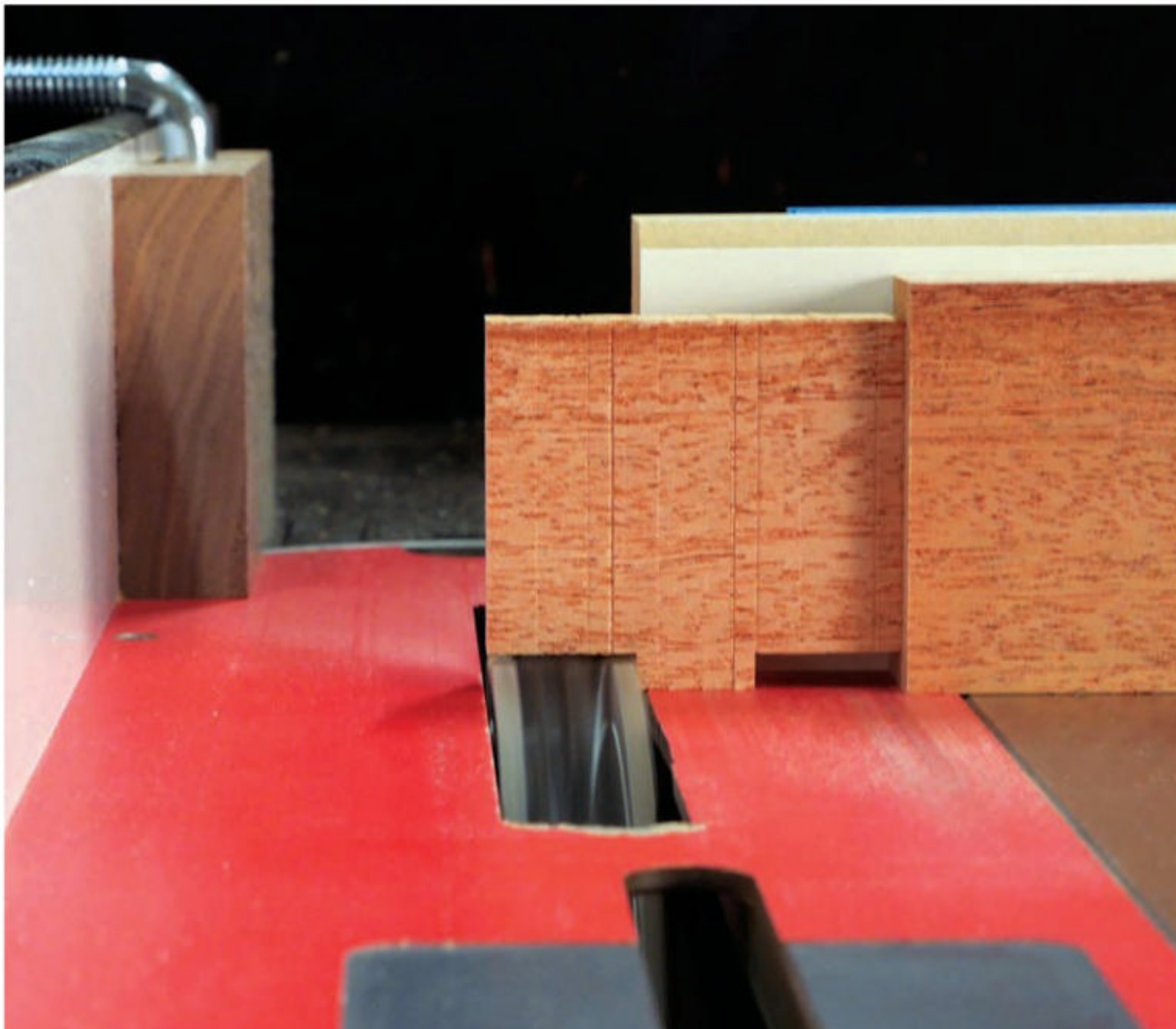
Chris Marshall is senior editor of Woodworker's Journal.

SKILL BUILDER

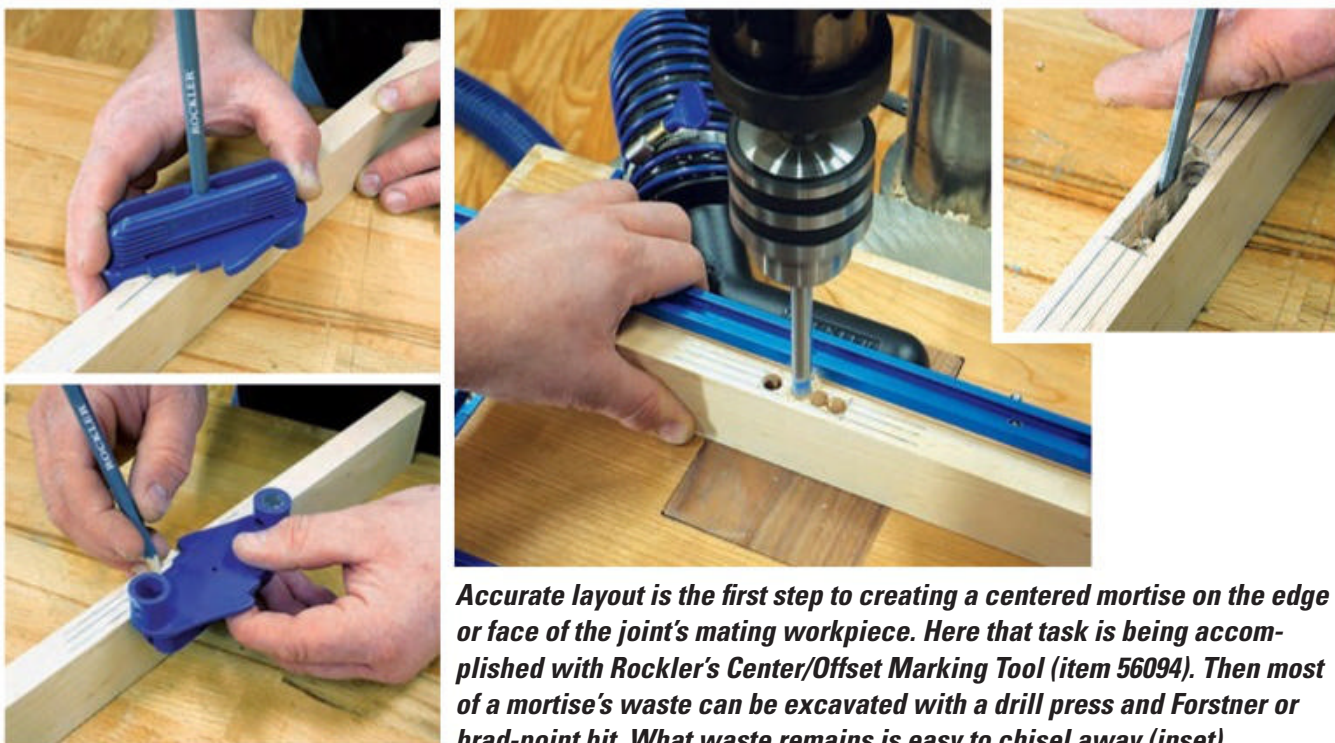
Mortise-and-Tenon Joints

By WJ Staff

This dynamic duo of interlocking parts has been integral to furniture building throughout history.



Tenons — the protruding portions of a mortise-and-tenon joint — are often formed at the table saw with a wide dado blade. Side-by-side cuts neatly remove the waste and establish the tenon's thickness, width and length.



Accurate layout is the first step to creating a centered mortise on the edge or face of the joint's mating workpiece. Here that task is being accomplished with Rockler's Center/Offset Marking Tool (item 56094). Then most of a mortise's waste can be excavated with a drill press and Forstner or brad-point bit. What waste remains is easy to chisel away (inset).

If there ever was a classic wood-to-wood joint, the mortise-and-tenon is it. Typically, its two halves are formed directly from the two members being joined with no separate components involved. These joints create strong, reliable bonds for all manner of wood furniture and cabinet assemblies.

Like the Chinese yin and yang, the two halves of a mortise-and-tenon joint are male and female: The male tenon is shaped on the end of one member (with shoulders stopping the cut) and fits snugly into the female mortise that's chopped, drilled or routed into the edge or face of the other member.

Mortise-and-Tenon Uses

Mortises and tenons are most commonly used for frame joinery; they're a strong and traditional way to connect stiles and rails end to edge for frame-and-panel doors or cabinet face frames. They're also great for attaching aprons or stretchers to the legs of a table, bench or chair, for both square and angled connections. In this issue, for instance, you can see mortise-and-tenon joints used extensively in the plant stand project on page 42.

Though less commonly used, mortise-and-tenon



Learn more about mortise-and-tenon joints by visiting woodworkersjournal.com and clicking on "More on the Web" under the Magazine tab.

Joint Report

Strength: **Strong**
Difficulty: **Moderate**
Versatility: **Excellent**

joints are also solid options for building picture frames and strong casework, such as chests and the carcasses for desks and dressers.

There are several variations of mortise-and-tenon joints (see photos at right). Standard mortise-and-tenons are cut stopped or "blind," meaning that the entire joint is hidden; through mortise-and-tenons are cut so that the end of the tenon sticks out of the bottom of the mortised member. You can also add wedges, keys or pins to these joints to decorate and lock them together. Another option is to cut loose-tenon joints, where two mortised parts are brought together by a third separate tenon piece.

Machining Options

Long before power tools were the order of the day, woodworkers created these joints entirely by hand, chopping the mortise with a chisel and mallet, then sawing a tenon into the end of the mating board to fit the mortise. Of course, if you're up for the challenge you can still build these joints like our forbears did, but there are many other machining options that can get the job done more quickly, accurately and with fewer hand-tool skills.

For example, if you have a drill press and brad-point or Forstner bits, you can remove most of the material for a mortise by drilling a series of holes in a straight line, then paring away the remaining waste to create flat walls and square ends. It's simple, even for beginners.

A router outfitted with a straight bit and an edge guide is another practical option for milling mortises. A router table can make this task even easier, because the fence can be marked to set the ends of the mortise, and you don't have to concern yourself with guiding and balancing the router over the workpiece by hand.

Typical tenons can be cut with a standard blade or dado blade on the table saw safely and easily, using the rip fence and miter gauge or a tenoning jig to register the cuts. Some woodworkers cut tenons on the band saw instead, or you can mill tenons on a router table with straight or rabbeting bits.

Festool's Domino machine and Rockler's Beadlock system are two popular options for creating mortises that are then fitted with "loose" prefabricated tenon stock. Once the mortises are cut, the busywork is basically done.



On typical mortise-and-tenon joints, the protruding tenon fits into a squared and matching excavation in the mating part, called a mortise. Once assembled, all visible evidence of the joint is hidden.



Sometimes an elongated tenon passes all the way through the mortised workpiece so its end extends beyond the other edge. This decorative treatment often appears on Arts & Crafts furniture.



A tenon doesn't have to be machined onto the end of one joint member; it also can be a third, separate element, bridging both workpieces and fitting into matching mortises in the parts.

POWER TOOL FUNDAMENTALS

The Table Saw

By Rob Johnstone

Table saws are at the heart of nearly every woodworking shop.



www.woodworkersjournal.com
MORE ON THE WEB



For a video discussing the versatility of table saws, visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Table saws take up such a big footprint in the realm of woodworking, both figuratively and physically, so approaching the challenge of explaining their fundamental worth in a shop is more than a bit daunting.

Table saws are in nearly every woodworking shop. In a *Woodworker's Journal* survey, more than 96 percent

of respondents said they own a table saw. (A full quarter of those woodworkers surveyed own more than one table saw.) In my last shop I had three of them, but I have to admit that was excessive.

Why are table saws so prevalent? Because they are exceptionally versatile and good at what they do. Table saws are truly the core of woodworking power tools.

What Do They Do?

In a woodworking shop, they cut wood. Table saws have a circular saw blade that is mounted under the "table," the flat work surface of the tool. The blade raises up through the table with their teeth rotating forward.

In my dad's cabinet shop, we had a table saw that was just that: a big flat table (48" x 60") made of plywood. It



Jobsite Saw

Cabinet Saw

Contractor's Saw

Table saws come in a variety of types, often aligned with a specific use. Jobsite and contractor's saws are two good examples. Cabinet saws, while routinely used in cabinet shops, get their name from the cabinet that surrounds the inner workings of the saw.

did not have a rip fence, so we clamped a straightedge in place to act as a fence. It had Babbitt bearings, almost no height adjustment for its 12"-diameter blade and was at least 60 years old when I was using it in the 1980s. I ripped miles of lumber on that primitive machine, and thankfully I still have all 10 fingers.

Two Basic Cuts

The two most basic cuts that a table saw performs are rip cuts and crosscuts.

Cutting along the length of a solid-wood board with the grain direction is referred to as a rip cut. The cut is nearly always guided by a rip fence attached to the table saw. The cut will be most accurate if the edge that runs along the fence is straight. When you rip a board you are cutting it to a specific width.

Crosscutting is when the saw is cutting across the grain of the lumber. The length of a board is determined in a crosscut. Crosscutting on a table saw is safely done using a fence that is set at 90 degrees to the saw blade. A crosscut sled or miter gauge are the most common means of creating

accurate crosscuts.

The terms are a bit less accurate when cutting sheet stock. Plywood, MDF, particleboard and the like do not have true grain direction that determines the type of cut being made. Even so, the table saw is still adept at cutting sheet stock into precise panels. Once again the pieces being cut are guided by a fence of some sort.

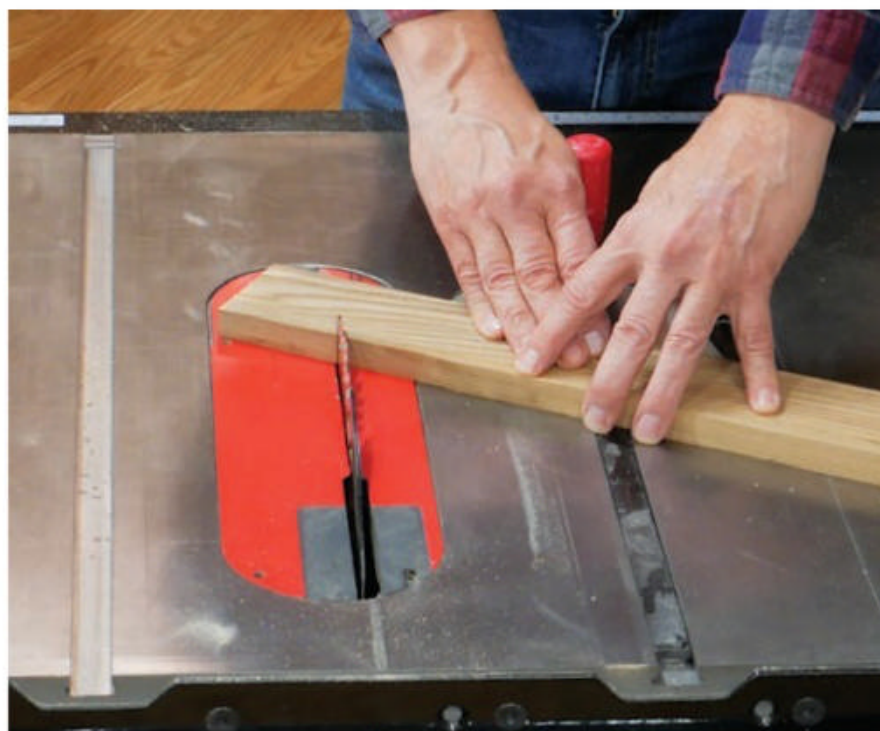
Advanced Common Cuts

While that old-fashioned saw of my youth faithfully ripped lumber day after day for years on end, that was really about all it was good for. Modern table saws, on the other hand, are tremendously versatile and can cut and shape wood in a variety of ways. Some of the more advanced but still common cuts are miters, tapers, grooves and dadoes as well as forming tenons, bridal joints, box joints, half-lap joints and more.

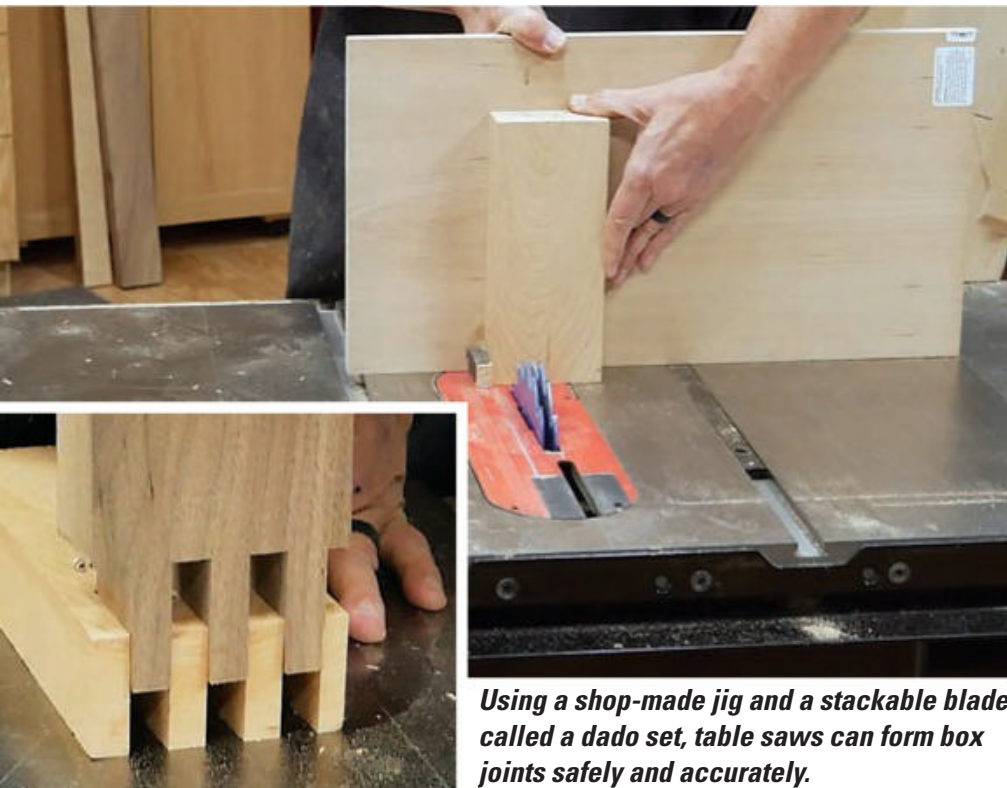
Miter and taper cuts require an accurate and safe miter fence or jig to hold workpieces at an angle to the blade. Grooves or dadoes are typically made with a special cutter known as a dado



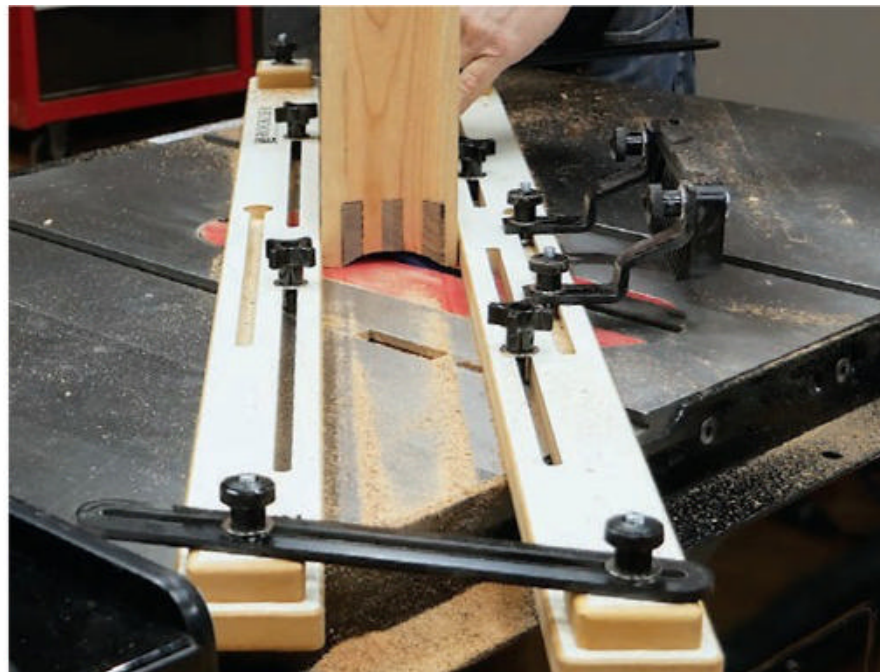
Crosscutting (here using a crosscut sled to make a 45-degree angled cut) is one of the two primary cuts performed by a table saw. A crosscut sled helps to make crosscutting safer and can add functionality.



Cutting miters, which is a special form of a crosscut, is another highly useful operation at which the table saw excels. In this photo a miter gauge is being used to guide the stock through the cut from behind.



Using a shop-made jig and a stackable blade called a dado set, table saws can form box joints safely and accurately.



This cove-cutting jig from Rockler guides wood diagonally across a saw blade. This configuration shaves the wood into the shape of a cove as the stock is pushed through the jig.

blade, and raising tenons can either be done with a miter gauge or a special tenoning jig. The same is true of box joints; a shop-made or manufactured jig is required to cut a series of repetitive slots and fingers that fit together within close tolerances.

More Advanced Cuts

Occasionally you can employ your table saw to make even more interesting cuts such as cove cuts. Again making use of a jig, they're easy to do. And while we may properly

consider raised panels the bailiwick of router tables and shapers, in a pinch you can make perfectly functional raised panels using your table saw and a standard saw blade tilted to an angle.

Another ability of the table saw is that it can be used to create decorative shapes. Bevels or grooves in repeating patterns are easy to form with a table saw. And spline joints, which can enhance a miter's strength or simply be decorative, are a piece of cake to make.

Table Saw Safety

Every year there are thousands of accidents, minor to major, that happen on home-shop table saws. And truth be told, almost all of them are due to "operator error." They fall primarily into two categories: laceration (including amputation) and kickback. Both are eminently preventable by practicing proper table saw techniques.

The easiest way to prevent injury is to make use of your safety equipment. That seems obvious, but when asked in a survey, "How often do you use a blade guard on your table saw?" 23 percent of woodworkers said they had permanently removed their guard, 29 percent said they "almost never" use it and 12 percent said only sometimes. So that totals 64 percent of woodworkers who are failing to take advantage of the blade guard's safety features.

In some ways, I understand. Back in the day, taking off and then putting the guard back on a saw was often an onerous task. It was frankly time-consuming

Table Saw Safety Basics

Keep Your Body Safe:

Protect your lungs with a mask, your eyes with safety glasses or goggles and your ears with hearing protection.

Use Common Sense:

Make every effort to keep your fingers clear of the spinning saw blade. If a cut you are attempting feels unsafe, stop doing it. Approach the problem with safety in mind. Keep your guards and safety equipment in place.

Use Sharp, Proper Saw Blades:

While almost all cuts can be made with a combination blade, using an inappropriate blade can make kickback or saw overloads more likely.



Don't Skimp on Safety Equipment



There is a wide variety of safety gear on the market that applies to table saw use. Push sticks of various types and styles protect fingers. Featherboards secure and guide stock. Personal protective equipment shields hearing, eyesight and lungs. But to be effective, these items need to be routinely used.

and annoying. (And some of those guards were so primitive as to be of questionable use.) But with newer saws, the guards are both effective and easy to install or remove. While blade guards won't protect your fingers 100 percent if you are truly careless, they do provide a solid barrier between you and the spinning saw blade.

Speaking of keeping your fingers safe, be certain to make use of push sticks to keep your fingers a safe distance from the blade and featherboards to hold the stock firmly against the fence. All of this falls into the realm of simple common sense. (But speaking for myself, I have foolishly pushed the envelope on push stick safety from time to time.)

New saws also have a true riving knife rather than a traditional splitter. Riving knives curve around the back of the saw blade and raise and lower with it. They prevent saw kerfs from closing up and pinching the back of the blade when stock distorts, which can cause a kickback. They're a great safety fea-

ture. When combined with anti-kickback pawls, they can make kickback nearly impossible. Keep them on your saw and properly adjusted.

SawStop Innovation

I was at an Atlanta trade show many years ago where SawStop's "hot dog saw" blade brake technology was first introduced. It was amazing to see, but at the time my concern was how it would age. After years in a dusty, grimy shop environment, would the system start to become erratic? Well, that is a Rubicon that we have passed. The saw brake technology has proved to be durable over time and has prevented thousands of injuries. So I am more than comfortable endorsing the technology.

But SawStop table saws are not one-trick ponies when it comes to safety. Their riving

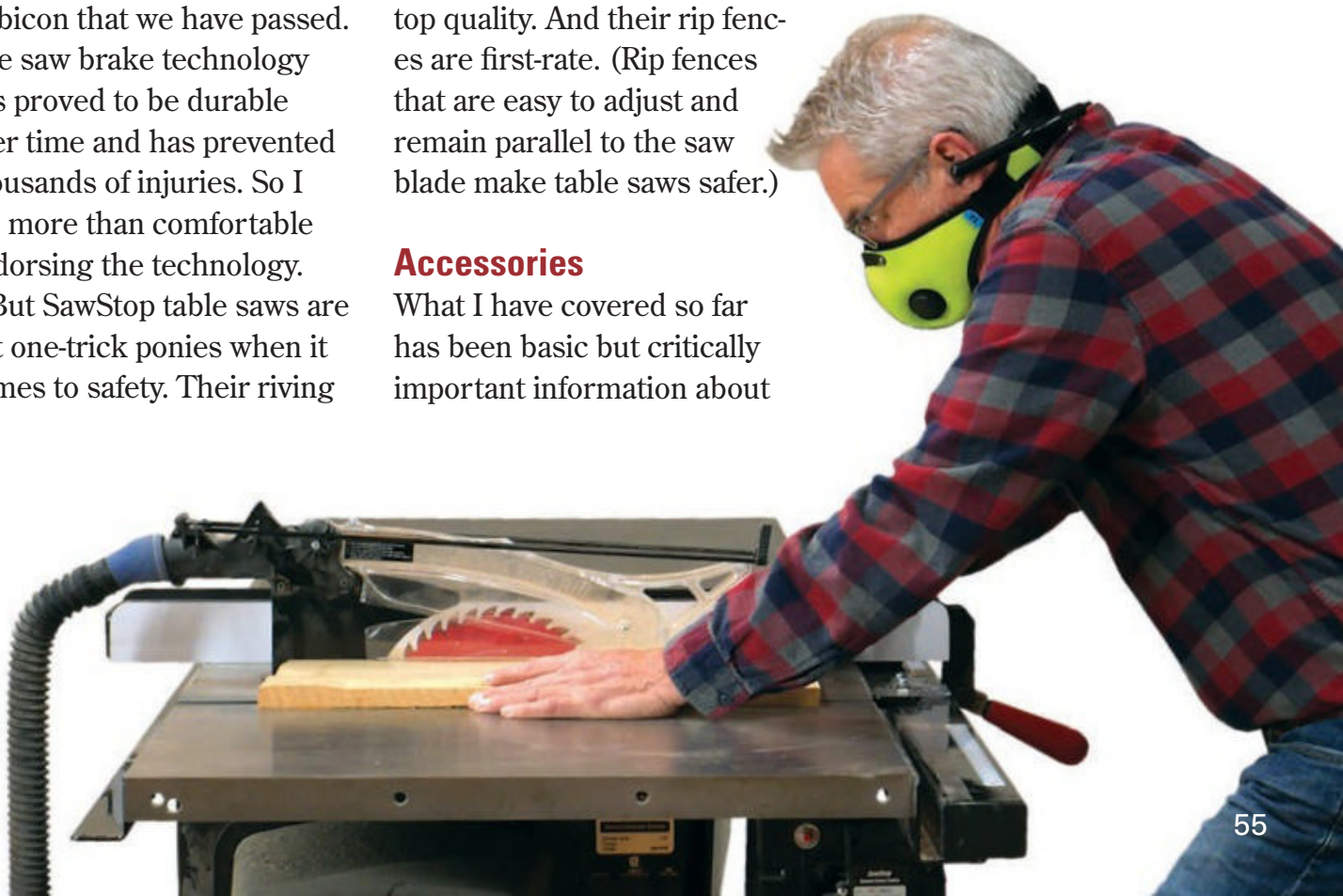


In addition to a proven blade braking system, SawStop's commitment to safety includes a riving knife, a quality blade guard and a top-notch rip fence. They could add a fore-and-aft fence adjustment feature to this mix.

knives and blade guards are top quality. And their rip fences are first-rate. (Rip fences that are easy to adjust and remain parallel to the saw blade make table saws safer.)

Accessories

What I have covered so far has been basic but critically important information about



POWER TOOL FUNDAMENTALS CONTINUED



1. Quality Rip Fence



6. Angle-setting Gauges



8. Zero-clearance Insert



7. Rockler's Thin Rip Tablesaw Jig



2. Quality Miter Gauge

3. Thin-kerf Saw Blade



table saws. Now I am about to journey away from those safe waters into the deep. Table saws are tremendously versatile, but much of that capability comes from a number of jigs and accessories that can be employed to enhance the basic machine. I am going to list, in my order of importance, what I believe are the most useful table saw accessories. I am sure there will be challenges to my list, but here goes.

fail to lock the gauge's pivoting head securely. The sheer number of aftermarket miter gauges available testifies that there is room for improvement to the miter gauges on many home-shop table saws.

1. Quality Rip Fence

Most modern table saws have a good quality rip fence. But as I pointed out with my old-fashioned saw from my youth, that is not a given. In fact, one of my chief gripes about table saw fences today is the lack of fore-and-aft adjustability.

Rip fences must remain parallel to the blade in order to prevent binding during rip cuts. Quality rip fences can be adjusted when needed to correct for parallelism. That helps to prevent kickbacks and results in cleaner cuts that are easier to make.

3. Essential Saw Blades

Most saw blades are of exceptional quality these days. That said, here are three I think every owner of a 10" saw should have: a 40-tooth standard-kerf combination blade, a 40-tooth thin-kerf plywood-cutting blade and an 80-tooth thin-kerf plywood-cutting blade. (You may need to add a thin-kerf riving knife if your saw does not come outfitted with one.) My rationale for this collection exceeds the space I have here to explain, but suffice to say with this assortment, you will be able to handle almost every table saw cutting task.

2. Quality Miter Gauge

This probably comes as no surprise. The quality of miter gauge "fences" provided with modern table saws ranges from acceptable to extremely good. Poor miter gauges fit loosely in the miter slots and

4. Dado Blades

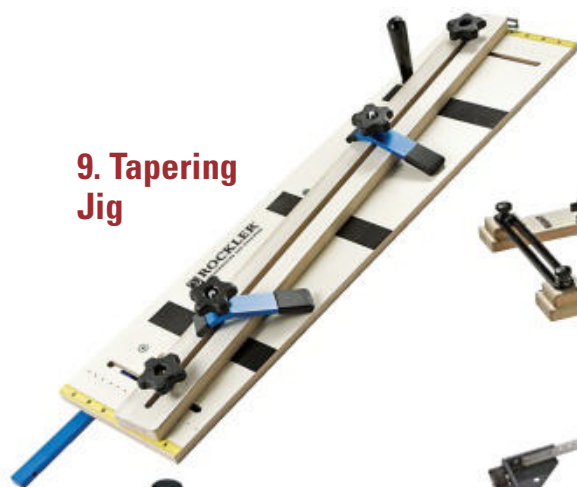
The table saw is my favorite tool for plowing dados and grooves. Most dado blades "stack" or nest together to vary the cutting width for these common and important joinery cuts. But dado blades are also useful for milling rabbets, tenons, lap joints, box joints and more. Is a dado blade essential? Maybe not at first, but eventually the need will arise. When it does, it's well worth the expense.



4. Dado Blade

5. Crosscut Sled





9. Tapering Jig



11. Cove-cutting Jig



10. Tenoning Jig



12 Mobile Base

5. Crosscut Sleds

The extra degree of control that crosscut sleds provide by lifting your stock off the saw table during cutting makes these jigs a go-to product. (See the photo on page 53.) Many have added mitering capabilities that make them even more useful.

6. Angle-setting Gauges

Table saws can cut precise angles but only if they are set accurately. Whether you use a Rockler Perfect Miter Set-up Block or a Wixey Digital Angle Gauge, these products will improve your results.

7. Rockler's Thin Rip Tablesaw Jig

Ripping very thin slices of lumber safely and accurately can be a bit of a pain. This jig provides an elegant solution.

8. Zero-clearance Inserts

These throatplates typically replace wider-gapped standard throatplates and hug the blade to keep thin stock from jamming against it. They also help to reduce tearout. For those reasons, they improve safety and cutting quality. One could challenge me as to whether these are “accessories,” but that is how I see them.

9. Tapering Jigs

The need to form angled rip cuts, known as “taper” cuts, is often required for furniture-building. A tapering jig can help you do this safely and repetitively, which you'll surely appreciate.

10. Tenoning Jigs

Mortise-and-tenon joints are ideal for solid-wood projects. While there may be better tools for raising tenons, the table saw and tenoning jigs have been cutting them effectively for generations.

11. Cove-cutting Jigs

Cutting coves on the table saw is downright fun. It also provides a way to machine large coves into solid wood safely. Specialized cove-cutting jigs tackle this unique shaping operation with ease.

12. Mobile Bases

As important and useful as a table saw can be, they are often large, heavy machines that can get in the way. If you need to move yours from time to time, a mobile base with swiveling, locking casters can be a real help.

I'll stop there with my “dandy dozen.” Accessories are the key to getting the most from your table saw. If you would choose some that are different from mine, please let me know!

More Table Saw Terminology:

All tools have specific terminology that applies to them. Here is a short list of some terms that apply to table saws.

Adjustment Wheels: Round handles that raise and lower the blade and typically tilt it on most models.

Anti-kickback Pawls: Spring-loaded, toothed levers behind the blade that allow stock to slide past during a cut but prevent it from moving backwards.

Arbor: Shaft on which the saw blade is mounted.

Base/Cabinet: Body of the table saw that might be a cabinet, open framework or a hybrid of the two and contains the saw's internal workings.

Extension Wings or Tables: Table attachments that provide side support when cutting wide workpieces.

Kickback: When stock binds on the back of the saw blade and then is thrown violently toward the operator with significant force.

Miter Slots: Grooves in the tabletop that run parallel to the blade and control the travel of the miter gauge as well as some other jigs.

Rip Fence: A movable, locking guide that stretches from the front to the back of the saw for accurately indexing and controlling rip cuts.

Throatplate Insert: A removable and replaceable section of the tabletop around the blade with a slot that allows the saw blade to pass through it.

Trunnions: Components that hold the motor and saw blade assembly under the table and allow them to tilt.

T-Square Fence: Rip fence style that rides on a rail at the front of the table saw and locks in place with a lever. Often referred to as a “Biesemeyer” style fence.

Much More to Learn

There have been scores of books written about table saws, and this article is just a fundamental overview. Clearly there is more to say. Proper use and maintenance, actual how-to instructions for safe rip cuts, crosscuts, dado cuts and more are missing. Still, these basics are important for anyone getting started with a table saw, and they're a good reminder for those of us who have been using them for years.



WHAT'S IN STORE

New Roller, Clamps Deliver Easier Glue-ups


Contact Information

Bosch
877-267-2499
boschtools.com

Milwaukee Tool
877-729-3878
milwaukeetool.com

Rockler
800-279-4441
rockler.com

www.woodworkersjournal.com **MORE ON THE WEB**

 For videos demonstrating featured tools, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Applying a broad, even film of glue to board faces and sheet veneer will be simpler and more consistent if you use **Rockler's 5" Glue Roller with Silicone Rest** for the job. Its 1 $\frac{3}{4}$ "-diameter silicone roller is ribbed in a V-groove pattern that spreads glue forward and outward for quick, even distribution with no voids and less waste. The roller detaches from the ergonomic ABS handle and slides off of a plastic core for easier cleaning when finished. A blue silicone drip tray/roller rest keeps glue application tidy, and the roller handle snaps onto its rim. A hole in the roller's handle enables this duo to be hung up conveniently between uses. The 5" Glue Roller with Silicone Rest (item 61645) sells for \$21.99.



Rockler Deluxe Panel Clamps

Rockler 5" Glue Roller with Silicone Rest



With several **Deluxe Panel Clamps** from **Rockler**, you can edge-gue panels for tabletops, workbench tops or doors up to 3" thick and 36" wide. These clamps are exceptionally heavy-duty. Each clamp includes two 1.8-mm thick, powder-coated blue cauls with sawtooth edges on top. They sandwich the panel above and below and are helpfully marked with common panel widths. A pair of heavy-duty steel headstock and tailstock couplers engage with the cauls and apply scissor-like action to the panel's

edges, top and bottom faces simultaneously when an Acme-threaded handle on the headstock is tightened. This four-way pressure prevents glue joints from slipping out of alignment and eliminates the tendency of panels to bow under pressure. The clamp's gray headstock and tailstock are also powder coated, and the threaded rod and handle are zinc coated to inhibit corrosion. Two feet install on the bottom caul to lift the clamp up off of work surfaces so it's easier to clean away squeeze-out. Each Deluxe Panel Clamp (item 67164) costs \$99.99. Space these clamps about 12" to 18" apart for any panel size.



Two new brushless, cordless random-orbit sanders from **Bosch** — the **GEX12V-5**

Bosch GEX12V-5 and GEX18V-5
Brushless Random Orbit Sanders



12-volt sander and the GEX18V-5 18-volt sander — offer many professional features for modest prices. These low-profile, palm-grip machines have variable-speed brushless motors with soft start and vibration dampening elements. Constant feedback circuitry keeps the sanders spinning consistently under load throughout their 6,000 to 10,000 oscillation per minute speed range. Lock-on switches make extended sanding sessions possible. Their 5"-diameter, eight-hole backing pads are flexible to accommodate flat or curved surfaces, and they have a hook-and-loop surface that accepts many brands of abrasive discs. Bosch provides a dust bag and vacuum port for both the 1.8 lb GEX12V-5 sander (\$99) and the 2.4 lb. GEX18V-5 machine (\$129). Each is sold as a bare tool without batteries or charger.

Milwaukee continues to expand its cordless nailer category, developing bat-

tery-powered solutions that require no gas cartridges for operation. Among them is this M18 FUEL™ 15 Gauge Finish Nailer. Driven

by a POWERSTATE™ brushless motor, the gun will fire clips of nails ranging from 1¼" to 2½" long though either sequential or contact-actuation modes. Its nitrogen air spring mechanism is designed for pneumatic-like performance with zero ramp-up time between shots. Milwaukee equips the 6.5 lb nailer with depth adjustment and jam-clearing features that require no tools, plus an LED worklight and a complement of bumpers and overmolds to protect work surfaces. Its 34-degree magazine will help the gun drive nails into tighter places. In kitted form (model 2839-21CT; \$399), the nailer comes with one M18 REDLITHIUM™ CP 2.0 Ah battery, an M12/M18 charger and contractor bag. Or you can purchase the nailer as model 2839-20 without the battery, charger or contractor bag for \$329.



Milwaukee M18 FUEL
15 Gauge Finish Nailer



Thanks to **Rockler's Dust Right Floor Sweep with Blast Gate** (item 66107; \$19.99), you won't need to use a dustpan or bend over any longer when sweeping up shop debris. Its 4" port fits standard dust collector hoses, and a blast gate on top can be opened or closed by foot when you're done cleaning up. This sturdy polymer accessory is reinforced with ribs and has a contoured shape to eliminate "dead spaces" in the airflow. At just over 18" wide and 6⅞" deep, the sweep can be attached to a wall. Or mount it to the floor using screw holes in its side tabs.



Rockler Dust Right Floor
Sweep with Blast Gate



TOOL PREVIEW


Festool TSC 55 K Cordless Track Saw

By Rob Johnstone

A further refinement of their high-performing cordless track saw now makes it even safer.



www.woodworkersjournal.com
MORE ON THE WEB

 To watch a video demonstrating the TSC 55 K, visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Track saws have long been centered in Festool's wheelhouse. The accuracy and versatility of their track saws has allowed some space-constrained woodworkers to avoid buying a table saw but still do fine woodworking with these instead. And of course, they are just part of Festool's systematic approach to power tools.

The TSC 55 K is a further refinement of their track

saw offerings. Powered by two 18-volt batteries, it has sufficient torque to cut hardwood, softwood and plywood alike. You can also use the saw with one battery for lighter duty.

I own the TS 55 REQ corded track saw, and while I did not use the two side by side as I checked out this new "K" cordless model, I noticed no appreciable drop in performance with the battery-powered tool.

What's New Here?

There are two significant changes to the TSC 55 K that separate it from its predecessors. The first is the use of thin-kerf saw blades. Thinner blades make better use of battery power because they remove significantly less material from the kerf. It saves energy and extends run time. (The blades are not backward compatible to earlier TS 55 saws.)

Consider the claim in Fes-



The new TSC 55 K can be used with a full complement of thin-kerf saw blades. Color-coded, three of them are for specific woodcutting uses. Another is for high-pressure laminate or aluminum and a fourth blade is for concrete. Thin-kerf geometry helps the 18-volt batteries deliver more cuts per charge.

tool's documentation: "Thin-kerf blade design allows users to work up to two times faster with up to 50 percent longer battery life for more cuts per charge. Additionally, enhanced tooth geometry provides up to 40 percent longer blade life with improved cutting performance and consistent cut quality."

Kickback Stop

We usually associate kickback with table saws where the blade grabs a piece of stock and throws it back at the user. That is not what is under consideration here. Occasionally with the plunge-cutting action that

track saws employ, the blade can become stuck, and its rotation can throw the whole saw back upward and out of alignment. It has happened to me before, and I have some scarred-up track and have damaged my workpieces because of it.

The TSC 55 K has an electromagnetic system that stops this dramatic event. If the saw senses kickback starting to occur, an internal lever pushes down to lift the saw up and clear of the cut. It does so in a much more controlled manner than a kickback, saving your workpiece and aluminum saw track from damage. It

not only protects your stock and track but also adds more safety to the plunge-cutting operation.

This new saw works with all of Festool's guide rails, dust extraction and MFT portable worktables.

Rockler reports that it will be available for sale in March. Sometimes you just have to wait to get the goods!

Festool: TSC 55 K

- Street Price (basic package): \$499
- Motor: Brushless EC-TEC with Soft Start
- No-load RPM (one battery): 2650 to 3800
- No-load RPM (two batteries): 2650 to 5200
- Net Weight (with batteries): 10.14 lbs
- Cutting Depth (90 degrees): 2 1/8"
- Cutting Depth (45 degrees): 1 11/16"
- Inclination: -1 degree to 47 degrees
- Kickback Stop: Electromagnetic
- Saw Blades: 160 mm*

* Thin-kerf saw blades are not compatible with other previous TS 55 track saw models

When the saw detects imminent kickback, an internal lever pushes down and lifts the saw and blade up and clear of the cut. This protects both the work surface and the track.



The anti-kickback feature can be controlled by a button on the left side panel of the saw. It can be turned off completely or adjusted to fast or slow.

HARDWORKING HARDWARE

Installing European Hinges

By WJ Staff

These rugged, easy-to-use hinges are ideal for most shop-built cabinet projects.



www.woodworkersjournal.com MORE ON THE WEB

 See a Euro hinge installed from start to finish by visiting woodworkersjournal.com and clicking on “More on the Web” under the Magazine tab.

While these sleek, versatile and user-friendly cabinet hinges are often called “European” style, they’re almost standard issue these days in mass-produced kitchen or bath cabinetry here in North America. There’s good reason for it: Euro hinges come in a wide variety of options to suit both face frame and frameless cabinets. They can accommodate door swing ranges from 95 up to 120 degrees or more, as well as complex door clearance requirements for inside-corner cabinetry. The hinges also offer easy adjustability once

installed — turning a couple of screws moves the door incrementally up and down, left and right or in and out to improve its fit, reveal and operation. Some Euro hinges also offer snap- or soft-close features that make additional door catches unnecessary.

There are two basic types of Euro hinges: concealed or long-arm (see inset photos, above). Both have a cup on one end of the hinge that fits into a round mortise on the inside back of the cabinet door; creating this mortise involves simply drilling a stopped hole. On the other end of the hinge, a mount-

ing plate fastens either to a face frame stile or the inside wall of the cabinet carcass with screws. No mortise is required.

Compact styles are one-piece hinges, while long-arm styles have two main components that snap together at the mounting plate. Long-arm hinges are particularly handy, because they make doors easy to remove.

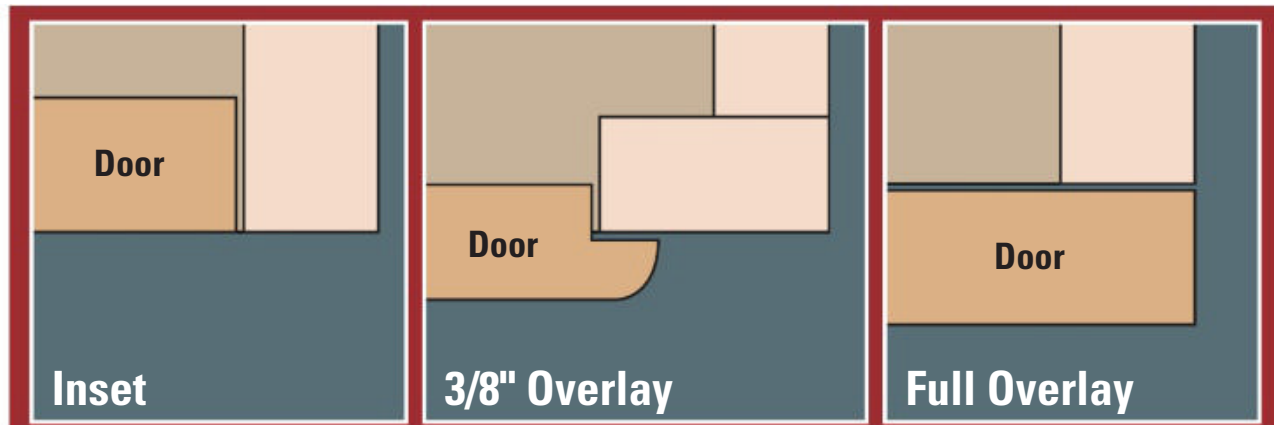
Installation Process

All the conveniences of these production-quality hinges can also be part of your shop-built cabinet projects, and they’re super easy to install! If you can drill holes, you can mount these hinges successfully on the first try.

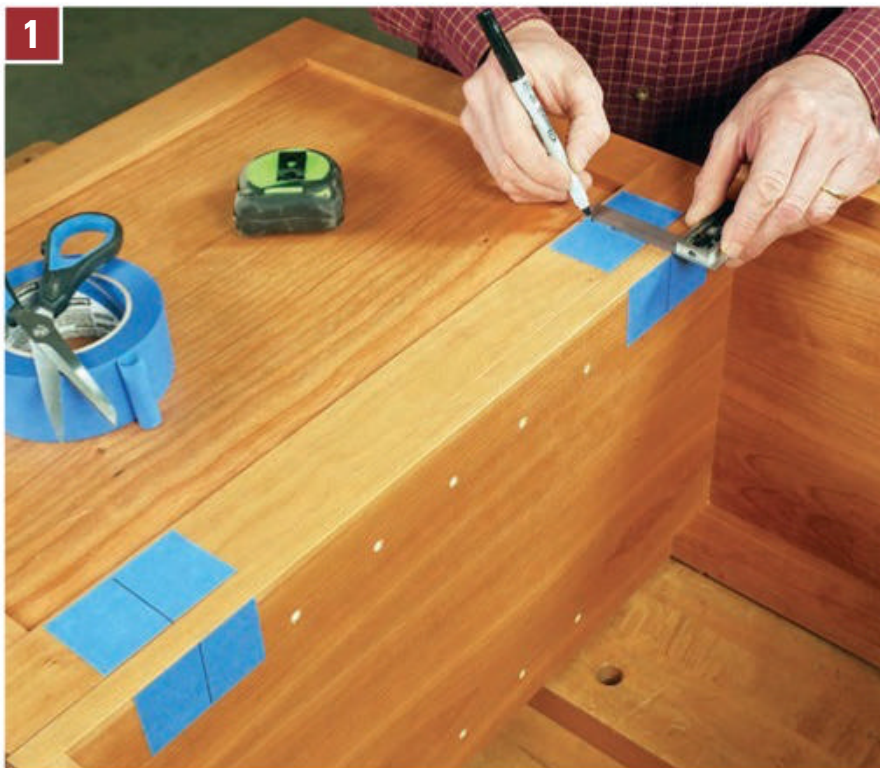
The photo series shown on the following two pages explains the process for mounting typical long-arm hinges

Door Details

The manner in which a door interfaces with the cabinet's carcass will impact which Euro hinge options are available for your project. Inset doors (left illustration) fit completely inside and flush with the cabinet opening. They're common on both frameless and face frame cabinet styles. Some doors, particularly on older cabinets, have a 3/8" x 3/8" rabbet around their back face, enabling them to recess partially into the face frame opening (center illustration). Other door styles overlay the front edges of the cabinet carcass or a face frame by the full thickness of the door (right illustration). Euro hinges are



made to accommodate these full-overlay doors with varying amounts of overlap around the opening; this may range from 3/8" up to 1 1/4". Hinge descriptions in catalogs or online will specify inset or overlay style, face frame or frameless cabinet type and maximum swing range, among other important product details.



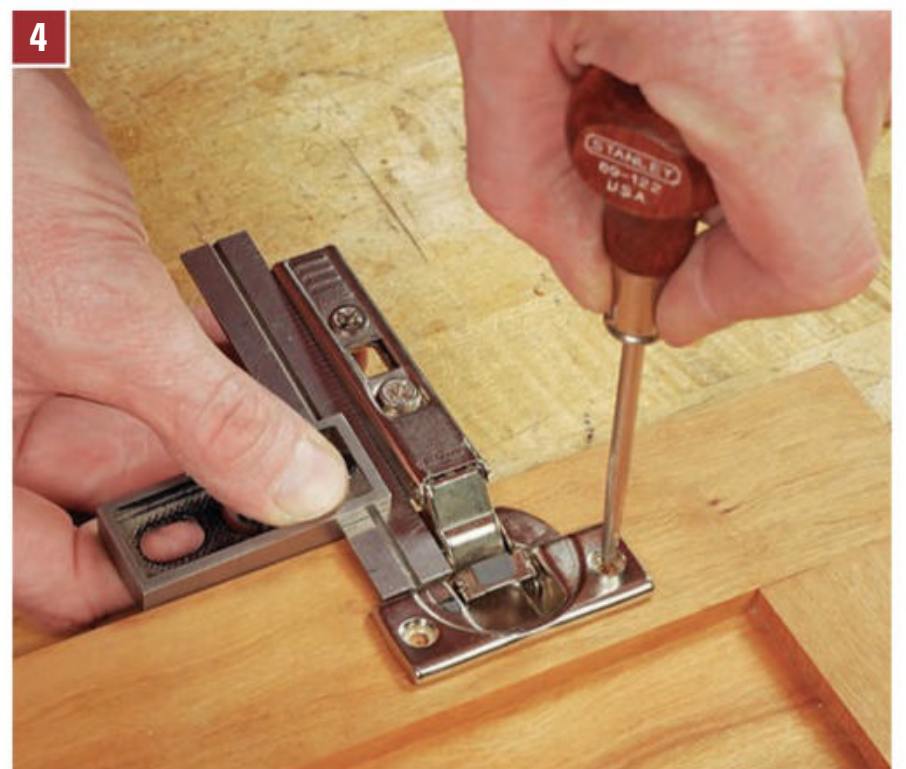
1 The first step to installing Euro hinges is to mark their positions on the cabinet face frame or inside wall and the back face of the door. Make sure these pairs of layout marks for each hinge align exactly.



2 Install a 35 mm Forstner bit in a drill press for boring mortises for the cups. Adjust its fence to the specific distance away from the bit required by the hinges. Rockler's Hinge Cup Jig (inset) makes this setup step easy.



3 While hinge cup mortise depths will vary, most are around 12 mm (1/2") deep. Set the drilling depth according to the hinge specifications, and bore a hinge cup mortise into the door at each layout mark.



4 When mounting the cup portion of the hinge to the cabinet door, be careful to first square the hinge arm to the door edge before marking centerpoints for the installation screws with an awl.

HARDWORKING HARDWARE CONTINUED



5 Drill pilot holes for the hinge cup screws with a 3/32" self-centering bit. Then drive in the screws to secure the hinge cups in their mortises. Installing these delicate screws by hand will help prevent breaking them.



6 Locate and drill pilot holes for pairs of screws that will attach the hinge mounting plates to the cabinet. Here, Rockler's JIG IT Mounting Plate Template "A" sets the screw placement and setback without measuring.



7 With long-arm style Euro hinges like these, the mounting plates are installed independently of the rest of the hinge hardware. Fasten the hinge plates to the cabinet with their attachment screws.



8 Set the door into position on the cabinet, and snap the long-arm portion of the hinges onto the mounting plates to hang the door. (If this were a compact hinge instead, the hardware would be a single component.)



9 Use the hinges' adjustment screws to fine-tune door placement on the cabinet opening. Depending on the hinge, these screws provide very helpful up/down, side-to-side and in/out door adjustability.

on a frameless cabinet with a frame-and-panel door. Most Euro hinges require that the cup mortise be drilled with a 35 mm Forstner bit. Using a drill press for this step is best, but a handheld drill will also work, provided you drill carefully and not too deep. A JIG IT® Deluxe Concealed Hinge Drilling System from Rockler simplifies the task.

Jigs Make It Easy!

Rockler offers several more inexpensive jigs, shown here, which will make the installation process even easier. A

JIG IT Hinge Cup Jig enables you to set the Forstner bit the exact distance away from a drill press fence to locate the hinge cup mortises accurately on the cabinet door. Then, several options of JIG IT Mounting Plate Templates can help locate the hinge mounting plate screws on the cabinet or face frame without measuring.

For an informative overview to help you choose the right Euro-style hinges, visit rockler.com/learn/european-hinge-buying-guide.

WOODWORKER'S
JOURNAL *presents*

The Way To Woodwork: Mastering the Table Saw



Learn to safely and confidently operate the most important tool in your workshop with the latest installment in *The Way To Woodwork* series: *Mastering the Table Saw*. Our experts teach everything, from the basics of ripping and crosscutting, working up to more advanced techniques. You'll also discover how jigs add versatility, safety and accuracy to your table saw. Expert or rookie, this DVD has something for every woodworker.

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FINISHING CORNER

Are Old Cabinets Worth Refacing?

By Tim Inman

Fresh veneer can give old cabinet carcasses in good repair a welcomed facelift.

Tim Inman is a professional woodworker and finishing expert and the author of *The Art of Classical Furniture Finishing*.

For a complete article teaching how to reface cabinets go to <https://www.rockler.com/learn/refacing-cabinets-veneer>



Pour filler works best on open-grained woods such as oak before other finishes are applied, to ensure consistent coverage.

Q We have some kitchen cabinets that are 1970s vintage, and they are particle board-covered with some type of veneer that gives them a “walnut” type look. The cabinets are in very good shape, but we just don’t like the look. Are they worth refacing? Is it a good idea to take this on or just replace the cabinets?

A Refacing kitchen cabinets can definitely be done, and most often that’s accomplished by installing wood veneer and/or thin sheets of veneered plywood over the old cabinet carcasses to spruce up their appearance. Then new cabinet doors and drawer faces are added to match the carcass veneer. In fact, refacing is a major part of some cabinet shops’ business.

There are a couple of common-sense precautions you should take. First, be sure the surfaces are clean, dry and grease-/oil-free before you attempt to bond anything to them. Second, remember Rule #1 in veneering: The grains must not run parallel between two adjoining layers, ever! In other words, you don’t want to lay a long-grain veneer over a long-grain cabinet part. If you do, I’ll guarantee a “glue” failure sooner or later. The solution



is easy: add a “crossbanding” layer under your new face veneer to fix the problem. This is super easy to do if you just buy veneer that is already “two-ply” with the crossbanding factory-installed for you. Presto! No worries.

Q Can pore filler still be used atop three coats of finish on oak?

A If the pores of the wood are still “open” and receptive to the filler, it will work. If they are closed or partially filled with finish (which they almost certainly would be after three good coats of finish) you’ll have trouble because the pore filler won’t provide consistent coverage.

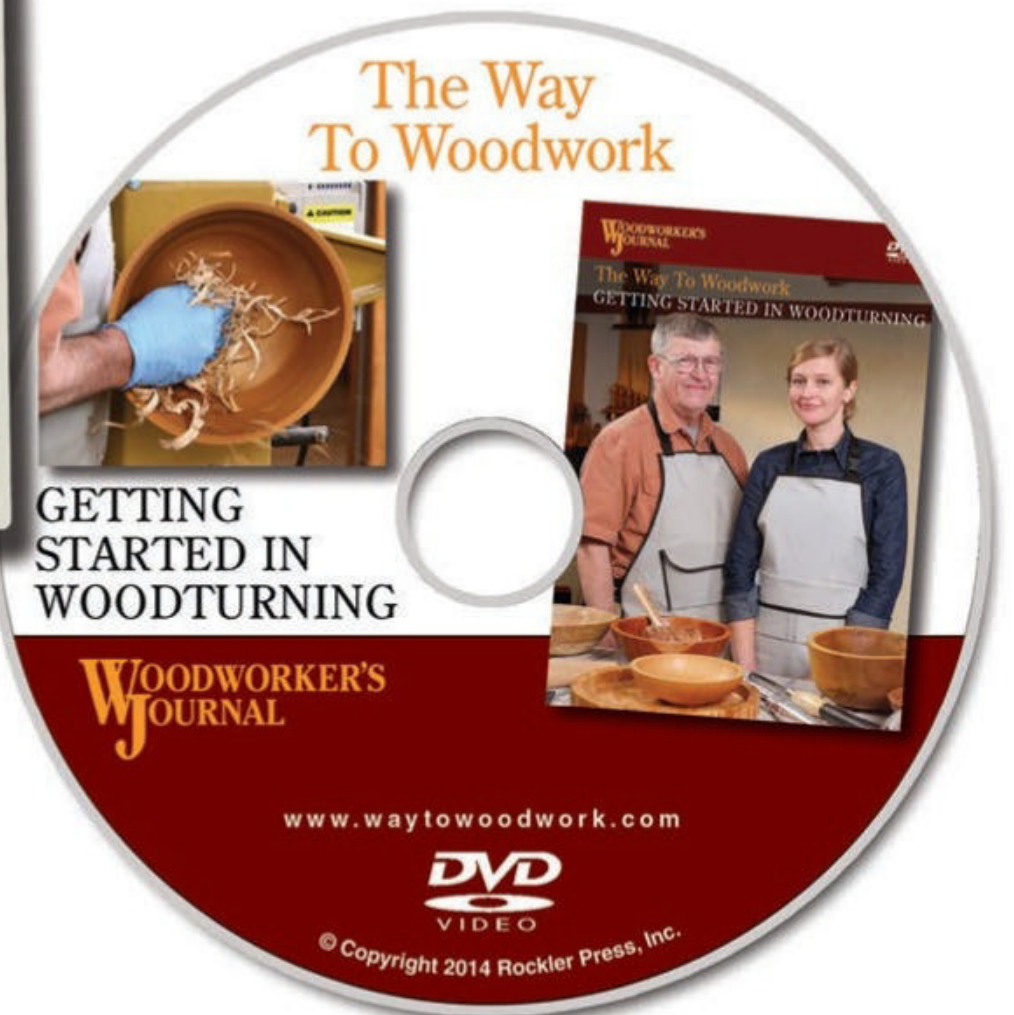
WOODWORKER'S JOURNAL *presents*

The Way To Woodwork: Getting Started in Woodturning

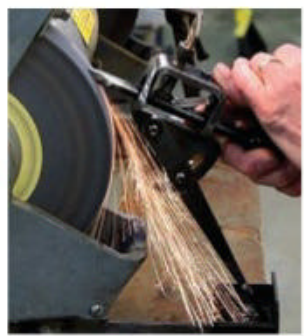


Woodturning is growing in popularity as people discover how inexpensive and easy it is to get started in this practical, fun and creative craft. This full-length DVD teaches everything you'll need to know to start woodturning safely and with more than enough knowledge to have fun right from the start.

And to make this DVD even more useful, we've added a bonus sharpening section to get you sharpening those curved tools perfectly!



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