

SNEAK PREVIEW: HOT NEW DRILL PRESS! (page 64)

WOODWORKER'S JOURNAL

"America's leading woodworking authority"™

SAW BLADES

Everything you
need to know (page 52)

SCROLL CHUCKS

The bowl turner's
secret weapon (page 26)

SMALL SHOP JOURNAL

Learn to work big
in small spaces!
(page 68)



GREAT PROJECTS

INSIDE

Art Deco Barstool
Stickley Bookcase
Steamer Trunk Dresser
Magnets in Your Shop
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February
2013



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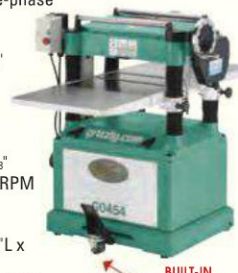
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- Min. stock length: 8"
- Max. cutting depth: 1/8"
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- Cutterhead speed: 4800 RPM
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- Blade size: 93 1/2" long (1/8" - 3/4" wide)
- Cutting cap/throat: 13 1/2"
- Max. cutting height: 6"
- Overall size: 67 1/2" H x 27" W x 30" D
- Footprint: 23 1/2" x 16 1/2"
- Table height above floor: 43"
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- Approx. shipping weight: 246 lbs.



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- Max. cutting height: 6"
- Overall size: 66 1/2" H x 26 3/4" W x 30 1/4" D
- Precision-ground cast iron table size 14" x 14"
- Table height: 43 1/8"
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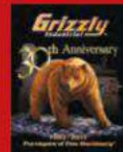


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IMAGINATION IN A CLASS OF ITS OWN

Introducing the all-new 15" bandsaw from Powermatic. The PM1500 packs all the features of a larger bandsaw into a size that is perfect for your workshop.



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Letters

Introducing Our “Small Shop Journal”

HERE NOW: SMALL SPACE WOODWORKING!

The only thing that remains constant is change. For example, some of our readers tell us they have decided that it is time to downsize their home situation. Less house to clean and keep up, lower utilities, lower taxes, more affordable mortgages ... it's all good. Except when it comes to our workshops. There, smaller is just a challenge. But the fact is that many woodworkers are figuring out how to work with less. (Truly, small shops have always been a fact of life for many of us.) That's why I decided to introduce a new regular feature called *Small Shop Journal* (page 68). Over the coming months, I hope to demonstrate some great woodworking done with modest tools in a small shop setting. I hope you'll let me know if you find it useful!

—Rob Johnstone



Two Shop Downsizing Dilemmas

Just finished Ned Thompson's letter in the August [2012] issue about what to do with one's tools after one downsizes (or worse) [*Letters*, “Who Gets the Tools?”]. What happens to many people like me is that we acquire tools because we needed them at the time and were not in a position to use or borrow our parents' tools. Then the situation is exacerbated because, over time, we subsequently inherit many of our parents' and grandparents' tools. In the meantime, our kids have started to build their own tool inventories because they do not live nearby.

I'm sure many readers would be interested in how to find good homes for that third set of quality wood chisels, fifth power drill, second table saw, etc. The number of readers, handymen, weekend woodworkers, etc. are legion, and we all shudder at the thought of sending good tools to Goodwill® knowing that, while someone will get a bargain, they will very likely have no idea how much quality they are getting or how to properly take care of them.

I'm going on 68 years old, retired military and have health issues that are putting a damper on my years of woodworking — arthritis of the arms and hands. My woodworking days are slowly coming to a halt, and my two sons have been promised my tools. Problem is, neither has roots established or a place for a large workshop. I value my woodworking tools as much as anything I can imagine — except for my wife (whew!). I have thought long and hard about the coming day when I won't be able to squeeze a clamp or turn a screw. That's when I'll have a serious talk with my sons. If they don't commit to taking the shop off my hands, I'll have to turn to Plan B — whatever that is! So here is where you guys can help me decide by asking your readers “what are the options I haven't thought of yet?”

I could donate the tools for a tax write-off. I could sell them in a variety of ways. I could be buried with them — nah. Any suggestions?

Scott Senecal
Stafford, Virginia

Letters continues on page 8 ...

Best Jig Ever!

Just wanted to drop you a quick line on Tom Flader's article “Shop-Made Band Saw Fence” [*October 2012*]. Built it last weekend and have tried it out a half dozen times. Each time I move it to a new position it lines up perfectly with the blade drift, allowing me to cut perfectly parallel sides, keeping one side against the fence. I've never been excited with the single-point jigs for resawing and have struggled keeping the cut straight and square. I look forward to using this great fence for many years to come.

Thanks for a great article and great magazine.

Joe Polich
Grapevine, Texas

Built your fence and put it to use. It is one of the best jigs and fixtures I have ever seen! I left the clamping foot full-size for support, eliminated the inner guides and support cleat and boxed in the beam, leaving space for the clamping foot to function.

Carl Allen
Oswego, New York



Two of our readers built versions of our band saw fence and are extremely happy with their results.

Chuck Johnson
Sacramento, California



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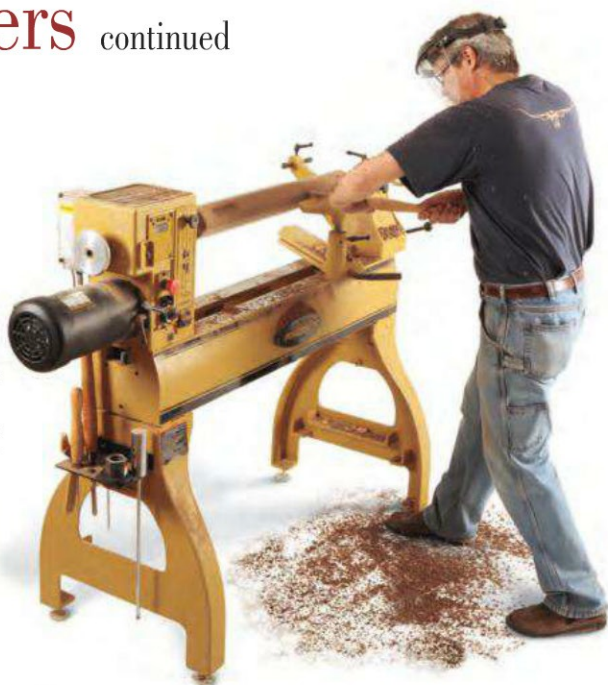
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*Based on comparisons with common 10" cabinet saws. Iron and Steel by weight.



Long-time subscriber Jim Vasi takes editor in chief Rob Johnstone to task for bad form at the lathe!



Blind Turning?

Shame. Shame. Shame. Only one of the four turners in the "Four Blanks, Four Turners, Four Bowls" article [October 2012] is using the proper safety equipment. Please make sure your articles address safety — it is difficult to turn if you are blind.

Tom Henry
Palermo, New Jersey

Congratulations on a really beautiful design and well-done article ["Walnut Game Table"] in the October [2012] issue. I've been a subscriber for more years than I can count and always enjoy your magazine.

If I may offer a suggestion to you regarding woodturning. I've been teaching and turning for 45 years and have picked up some good tips to pass along. The picture on page 41 illustrates three major "mistakes" commonly made when turning. May I humbly suggest the following improvements.

1. Keep your feet parallel to the lathe bed and about a shoulder's width apart.
2. Both elbows should be tucked in very close, touching your sides. Move your body side to side rather than moving your outstretched arms.
3. Keep your body much closer to the lathe (tucking in your elbows will necessitate that).

These changes will greatly improve your control of the cut.

Jim Vasi
Williamsville, New York

Maggie Lu: Part Two

Attached please find a photo of my version of your dresser as described in the August 2012 issue ["Maggie Lu's Dresser"]. As you can see, I made a couple of minor changes, including increasing the height by one drawer so my daughter and son-in-law can start out using it as a changing table. But the basic construction was exactly as described in the article.



I am now building a matching bookcase to complement the dresser and, with any luck, these pieces of furniture will serve her for many years to come. Thanks for the timely article.

John LeSuer
Manassas, Virginia

Letters continues on page 10 ...

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Contributing Editors
NORTON ROCKLER SANDOR NAGYSZALANCZY

Advertising Sales
DAVID BECKLER Advertising Director
dbeckler@woodworkersjournal.com
(469) 766-8842 Fax (763) 478-8396
ALYSSA TAUER Advertising Operations
atauer@woodworkersjournal.com
(763) 478-8366 Fax (763) 478-8396

Member



Audit Bureau of Circulations

Editorial Inquiries
ROB JOHNSTONE
rjohnstone@woodworkersjournal.com
JOANNA WERCH TAKES
jtakes@woodworkersjournal.com
CHRIS MARSHALL
cmarshall@woodworkersjournal.com

Subscription Inquiries
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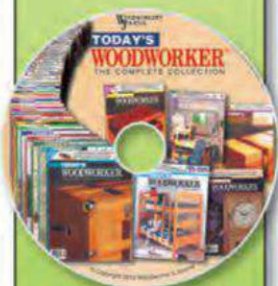
What's new from ...

WOODWORKER'S JOURNAL

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Chris Marshall's nail gun cabinet provided all the inspiration our reader needed to get busy in his shop.

Problems You Didn't Know You Had

When I saw the "Nail Gun Cabinet" in the June [2012] issue, I thought of the plywood I had left from a kitchen remodeling project. All the parts were cut, and I was ready for assembly when I realized I was out of 3/4" pins, so it was off to the store. When I got there, they were having a sale on drill/drivers, so I got a good deal on two. When I got back to the project, I realized I now had three drill/drivers and no place to store them.

I looked at the nail gun plans and realized all I had to do was move one side out and add a partition. I now have a fantastic dual-use cabinet to store both kinds of tools and room for all the accessories and chargers. Thanks for the great plans and for the inspiration to solve a problem I didn't know I had.

Jack L. Dalton
Bridgeville, Delaware

Quench Your Temper

The article "Bench Chisel Basics" [October 2012] talks about plunging the hot, hammered chisel into oil or water to "temper" it. That is not tempering; it is quenching, which significantly increases the hardness of the steel. However, this transformation also makes it more brittle, unsuitable for a cutting edge.

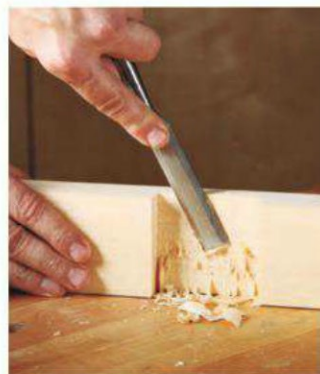
To make the steel more ductile and tough, it is tempered by reheating it up to a lower temperature than for the quenching.

Bruce D. Wedlock
North Reading, Massachusetts

Adapting Your Jigs

In the August 2012 issue, Ray Nielson of Atlantic Beach, Florida, says he has a Ryobi 10" table saw with built-in sliding miter [Letters, "Saw or Subscriptions?"]. I have one, too, and find it to be adaptable to most of the jigs you can come up with — with a little imagination. The miter sled and "auxiliary" table both are movable, and jigs that would work in the miter groove can be adapted by putting cleats on either side of the stationary saw table. A featherboard can be mounted from the slot in the sliding miter or mounted on a strip of wood and held in place between the sliding miter and permanent tables. Ray, I hope this is of some help and will convince you to keep your subscription!

Jack Williams
Las Cruces, New Mexico



Grouchy Old Man?

Mr. York's comments on cutting an oversized tabletop [Letters, October 2012, "Large Panel Debate"] indicate that he has no real grasp about working efficiently. Not only is his statement that most of your readers are a "step above" a carpenter insulting, but it is also untrue, if one goes by some of the questions asked by your readers.

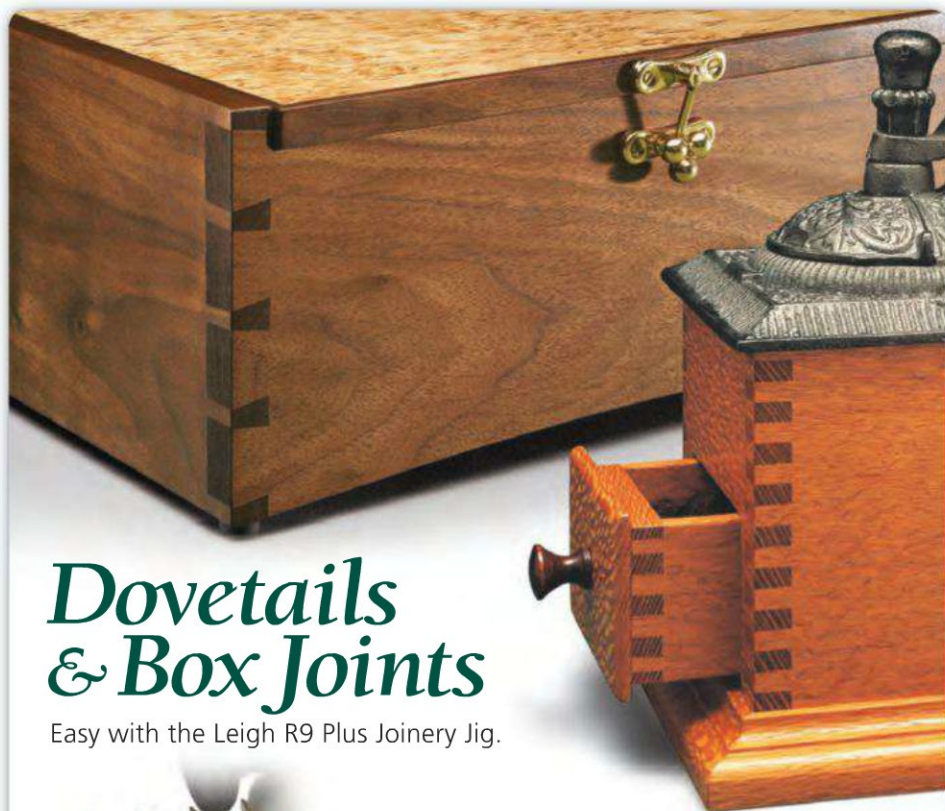
What the circular saw and straightedge method does is allow the work to be done quickly and efficiently with readily available tools. York tells us that to "do the job right," you must invest in jigs.

You can buy a Sorby Pro Edge sharpening system for five hundred plus dollars, or clamp a 10-year-old belt sander in a vise at the correct angle. A skilled man will quickly get a fine edge on a chisel with the belt sander and the right belt. (I was taught this by a carpenter — sorry!)

If I sound like a grouchy old man, it is because I am. I have been working wood for more than 50 years. The notion that a carpenter who can neatly trim a room with complicated crown molding in the course of a normal working day is somehow less skilled than an amateur laboring for days on a project requiring a variety of jigs and fixtures is ridiculous.

R.L. Miller
via Internet

Our article on chisels got a technical term wrong — our reader helps to put us on the right track.



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Tricks of the Trade

Expanded Uses for Common Shop Tools



Clear vinyl tubing

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.

Soft Grips for Wrenches

Stamped-steel router wrenches can be uncomfortable to squeeze when loosening a tight collet because of their sharp edges. And, they can nick the plunge rods on a router if the collet suddenly breaks loose. Here's a way to improve their design: I cover the handles with short pieces of clear vinyl tubing you can buy at a home center. Just warm it up in a microwave or with a heat gun to soften the vinyl, then quickly slip the tubing in place before it shrinks to fit. On some of my duplicate wrenches, I've even doubled them up inside the tubing to make the wrench jaws thicker for better purchase on the collet nuts. These vinyl grips sure take the "edge" off!

Steve Jaynes
Portland, Oregon

Scratch Awl from Recycled Screwdriver

Discarded screwdrivers tend to become paint can openers, but here's another way to give them a second life. When I needed a scratch awl, I took one of my Philips screwdrivers and gently reshaped the tip on my



Tapering jig does double-duty as a supersized miter gauge.

grinder. Then I followed by sharpening the tip to a point on a piece of plate glass with sandpaper. The whole process only took about 15 or 20 minutes. Now, it's the only awl I use, and it works great.

Alejandro Balbis
Longueuil, Quebec

Supersized Miter Gauge

When I was building a bench recently, I needed to angle-cut the ends of one of the stretchers. It was too wide to cut in one pass with my miter saw and too long and heavy to crosscut with my table saw miter gauge. Instead, I used my tapering jig (with the workpiece stop removed) held against the fence of my crosscut sled to set the cutting angle I needed. That way, I could stabilize the board at the correct angle and slide it safely through the blade. Success!

Serge Duclos
Delson, Quebec

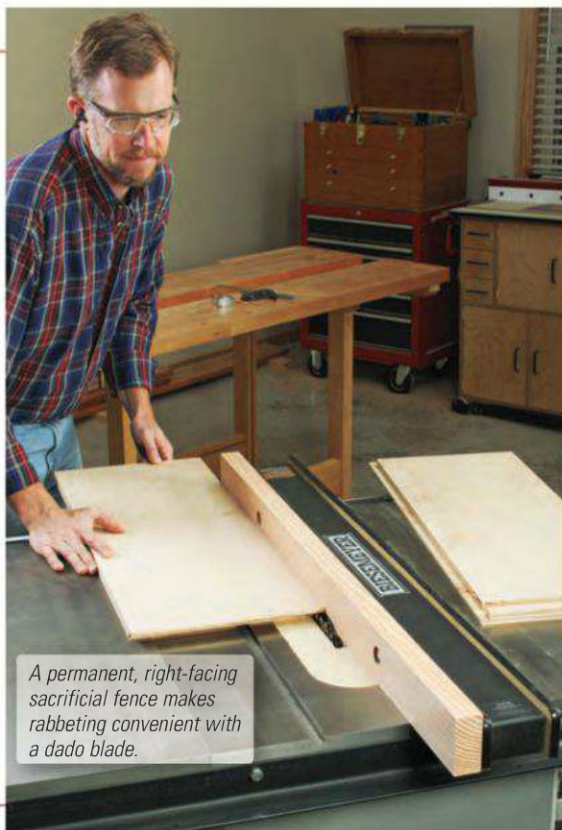
Twist Tie Blade Holders

If you replace band saw blades very often, you know that sometimes, even four hands aren't enough to get

them mounted easily. Here's what I do: I use the twist ties that come with the new blade — or any other twist ties you have on hand in the kitchen — to hold the blade on the top wheel while I thread it through the blade guides and over the bottom wheel. It makes the whole process safer, simpler and faster. Don't forget to take the twist ties off before you start cutting!

John Antone
Springfield, Oregon





A permanent, right-facing sacrificial fence makes rabbeting convenient with a dado blade.

PICK OF THE TRICKS

Rabbeting Fence Stays Put

I keep a sacrificial fence permanently attached to the right side of my table saw rip fence for cutting rabbets with a dado blade. It just makes sense; there's a lot more room on the right hand side of a saw table than the left, so I get better support when rabbeting the ends of big plywood panels this way. My sacrificial fence is nothing fancy — just a clean and true 2x4. Once you attach it to your fence, lower the dado blade until it's flush with the tabletop and then position the sacrificial fence over it. Turn your saw on and slowly raise the blade to the desired height. Now you can create rabbets of varying widths, as shown in the photo.

Randall Thomas
Salmon, Idaho



In addition to our standard payment (below), Randall Thomas of Salmon, Idaho, will also receive a Lamello Vario Box 440 Piece Set of Biscuits and Joining Elements

from Colonial Saw

(www.csaw.com) for being selected as the "Pick of the Tricks" winner. We pay from \$100 to \$200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary.

Submit your Tricks to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340.

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Questions & Answers

More Moving Parts ...

THIS ISSUE'S EXPERTS

Ernie Conover is the woodturning columnist for *Woodworker's Journal* and author of *The Lathe Book*.

A.J. Hamler is a woodworking author, former editor of *Woodshop News*, and the author of *Civil War Woodworking*.

Chris Marshall is a senior editor of *Woodworker's Journal* and author of several books on woodworking.

Contact us

by writing to "Q&A,"

Woodworker's Journal,

4365 Willow Drive,

Medina, MN 55340,

by faxing us at (763) 478-8396

or by emailing us at:

QandA@woodworkersjournal.com

Please include your home

address, phone number and

email address (if you have one)

with your question.

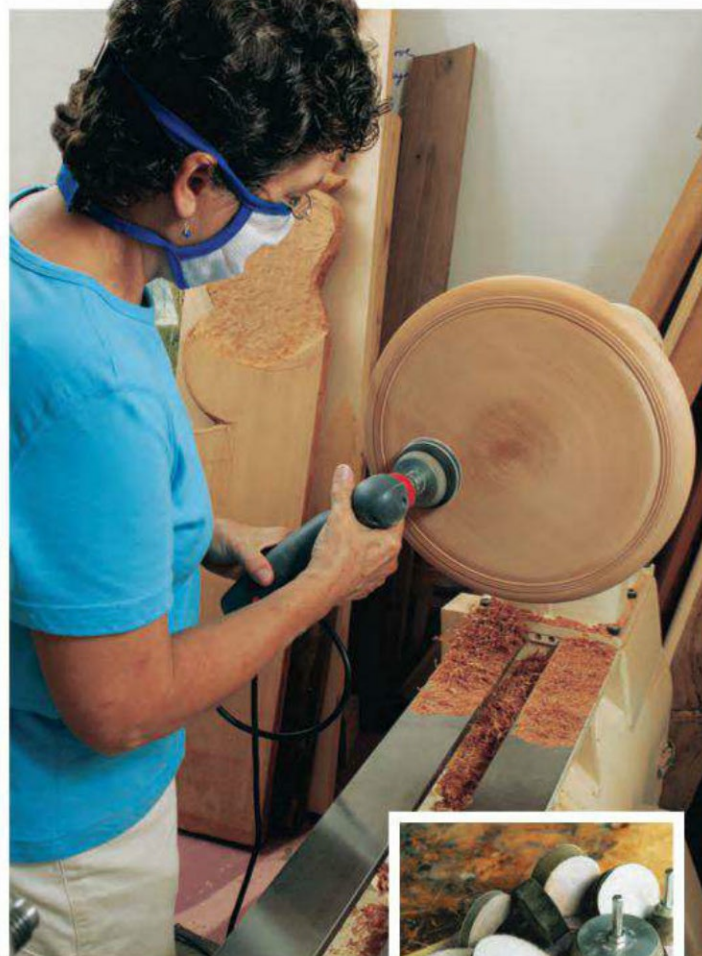
Q I have a Midi Delta lathe that has the reverse feature. Does it help to sand in both directions, e.g., 80-grit forward spinning/80-grit reverse spinning, then 100-grit forward/100 reverse and so on? Should it give a smoother finish?

Brian Humbel
Frederick, Maryland



Reversing the rotation of a lathe does little to improve sanding for spindle work. Our expert recommends sanding disks and not skipping any sandpaper grits as a better path to successful sanding.

A Reverse sanding is of no value in spindle work where the grain runs between the centers of the lathe, hence you are always sanding across the grain. Reverse sanding is of some value in faceplate work where the grain runs across the centers of the lathe — the most common example being a wooden bowl. Since the grain can be bent downward in the "with the grain" areas, reverse sanding can cut through and remove this matted grain faster. I tested the technique extensively in my early bowl turning career and found that it is mostly overrated. It's most valuable in spalted weak woods where mating is always problematic. It does not replace a proper sanding



regime starting with 40- to 60- grit abrasive and working in small steps up to the desired smoothness. An electric drill with a sanding pad is of much more value than reverse sanding. The one danger of reverse sanding is unscrewing the faceplate or chuck from the spindle, so locking to the spindle with a setscrew or great care is imperative.

— Ernie Conover

Q I was fascinated with the ultra practical idea of using rivets as moving joints in your Civil War Officer's Chair. I can think of lots of ways to put them to use. But without ever using a rivet, I am concerned that I don't actually know how to work

with them. Are there any tricks for a novice "Rosey the Riveter?"

Rosanne Castalano
Newark, New Jersey

A As with the Civil War Officer's Chair that appeared in the August 2012 issue of *Woodworker's Journal*, rivets were the fastener of choice in the 19th century for any furniture that required two pieces of wood to pivot against each other. Furniture rivets were typically made of malleable materials such as iron, mild steel, brass and copper. For each riveted joint, you'll need a rivet and a pair of washers of the appropriate

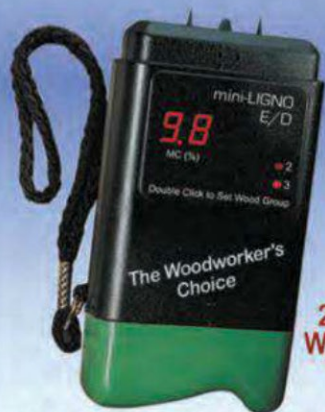
Continues on page 16 ...

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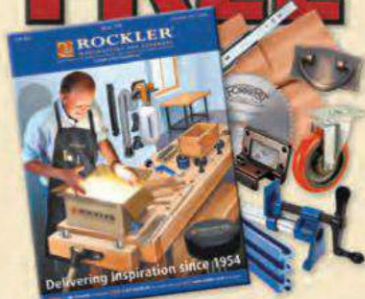
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Questions & Answers continued

"Are there any tricks for a novice 'Rosey the Riveter'?"



What is at the heart of a riveting experience? A.J. Hamler tells all.

size. You'll also need a ball-peen hammer and a very solid surface on which to work. A steel anvil is best, but a concrete block or floor will do.

1) Drill a hole sized to match the rivet through both workpieces. Check that the rivet slides smoothly into the hole without either binding or having too much play. It's a good idea to drill a hole in a piece of scrap first to perform this test before drilling the actual workpiece.

2) Insert the rivet into the first workpiece so that the head will be oriented on the outside of the finished project, then slip on a rivet washer to create a small gap between the two workpieces. This allows the components to pivot smoothly without rubbing.

3) Slip the second workpiece over the rivet and top

with another washer, then mark the rivet about half its diameter above the washer and cut off the excess length. For the 1/4" rivet shown in the photos here, the rivet protrudes 1/8" above the washer. For thin rivets, a good set of side cutters will snip it off nicely. For thicker rivets, cut off the excess with a hacksaw or perhaps a cutting wheel mounted on a rotary tool — my preferred method.

4) Strike the end of the rivet squarely a couple of times with the flat side of the ball-

peen hammer to flatten the tip of the rivet a bit.

5) Still using the flat of the hammer, strike the tip of the rivet at an angle around all edges. The edges of the rivet will begin to round over slightly.

6) Now, flip the hammer over and use the rounded side to continue striking the rivet around the edges, further expanding and rounding it. Take your time and aim carefully — you don't want to miss the rivet and mar the wood surface.

7) Keep the process up until the tip of the rivet assumes a rounded mushroom-like shape that has expanded snugly against the washer.

— A.J. Hamler

Q First, I enjoy each issue of *Woodworker's Journal*, both in electronic and print formats. I've been a subscriber for a number of years. I am in the final stages of

Continues on page 18 ...



Winner!

For simply sending in his question on reverse sanding, Bryan Humbel of Frederick, Maryland, wins an Osborne Miter Gage by Excalibur (from General International).

Each issue we toss new questions into a hat and draw a winner.



Finishing a cabinet, like the Shaker-inspired dresser that editor Chris Marshall is shown working on here, requires several choices to be made. But what about finishing the inside of a casework project?

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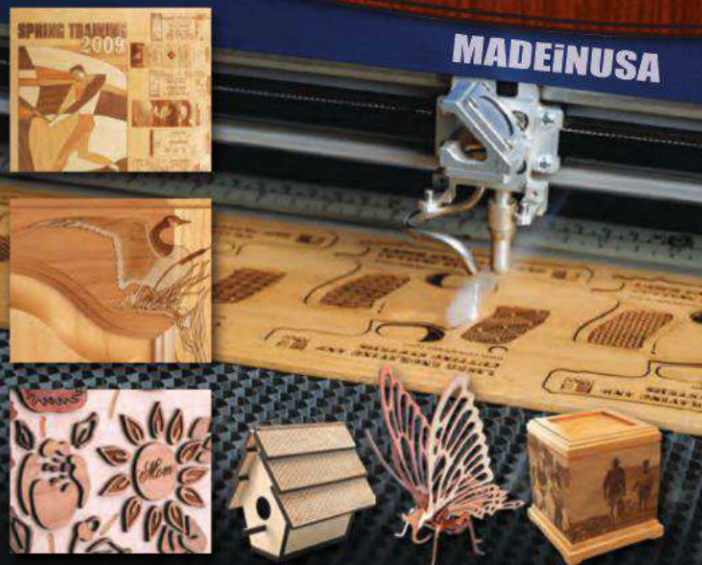


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Stumpers

Easy I.D. for Luthiers

This issue's mystery solution is music to instrument makers' ears.



What's This?



Len Urban of Rancho Mirage, California, says this thing works.

Do you know what it is and what it's used for? If you do,

send your answer to

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Drive, Medina, MN 55340 for a

chance to win a prize!

After the mystery tool belonging to the late father of **Ed Moss** of Statesboro, Georgia, appeared in the

October 2012 Stumpers, **Michael Shaw, Jr.** of Philadelphia wrote, "I know this, I know this! Finally, one that I know what it is, for sure!" (He did.) **Jerry Bowman** of Ringgold, Georgia, meanwhile, thought, "Ed Moss has a one-of-a-kind device, made by a machinist using the 'stuff' that was in the shop." Of

course, the statement from **Gary Glaze** of Elyria, Ohio, that "I recently purchased an identical tool" kind of puts a monkey-wrench in that idea. So what is it?

"The tool is called a tapered peg shaper," said **Karl A. Flegler** of Erie, Pennsylvania. "That's a cutter for tapering tuning pegs for violins, violas, flamenco guitars, old-time banjos, dulcimers and more," said **Jim Wagner** of Durham, North Carolina. Which instrument, said **Mark Hollerud** of Austin, Minnesota, "depends on size."

"It works like a pencil sharpener," said **Jerry Everard** of Canberra,

Australia, "except you can adjust the taper." **Michael Grigg** of Fort Smith, Arkansas, added "It's easy to use: simply maintain pressure with the top knob while turning the inserted peg for trimming. The angle of the blade is adjustable, and can be locked with an Allen key."

Tom Mitchell of Ijamsville, Maryland, continued, "The adjusting screw on top allows the user to raise or lower the block with the diamond-shaped opening, which in turn adjusts the diameter of the shaving area, making the peg either thicker or thinner. Whatever the thickness of the peg, the taper in the shaving area is always constant."

"The other tool needed to complement this is a tapered reamer, which has the same taper as the sharpener. The reamer is inserted in the instrument head's pegs holes and turned until the pegs fit properly," noted **Ron Cook** of Santa Cruz, California. Ron, like many others who answered Ed Moss's mystery tool, added, "Being a luthier, I have one just like it."

— Joanna Werch Takes



Winner! Alex Bacelar of Martinsville, New Jersey, wins a **Kreg Jig® Master System**.

We toss all the Stumpers letters into a hat to select a winner.

Questions & Answers

continued



Not everyone applies a finish to the inside of a cabinet. Our expert doesn't have a problem with it.

building a cherry 6-drawer dresser for my grandsons (twins) and have a question regarding the stain/finish. Is it common practice to stain and finish the interior surfaces of the dresser? Thanks for your feedback.

— Randy Crothers
Champaign, Illinois

A From a practical standpoint, I can't think of a compelling reason not to finish the interior surfaces of the dresser, aside from the issue that once the carcass is assembled, some of the interior surfaces will be harder to reach and it might be a bit tricky to get a good coat of finish on them. Why not take the project all the way to its fitting conclusion? I'd definitely finish the drawer interiors in order to seal and smooth the wood that will come in contact with clean clothing. I wouldn't stain the interior (and by interior, I mean any surfaces that would be hidden during normal use) unless it was a "secondary" wood that didn't look attractive under a clear finish (purplish or greenish poplar comes to mind), but I would still apply a final topcoat.

— Chris Marshall

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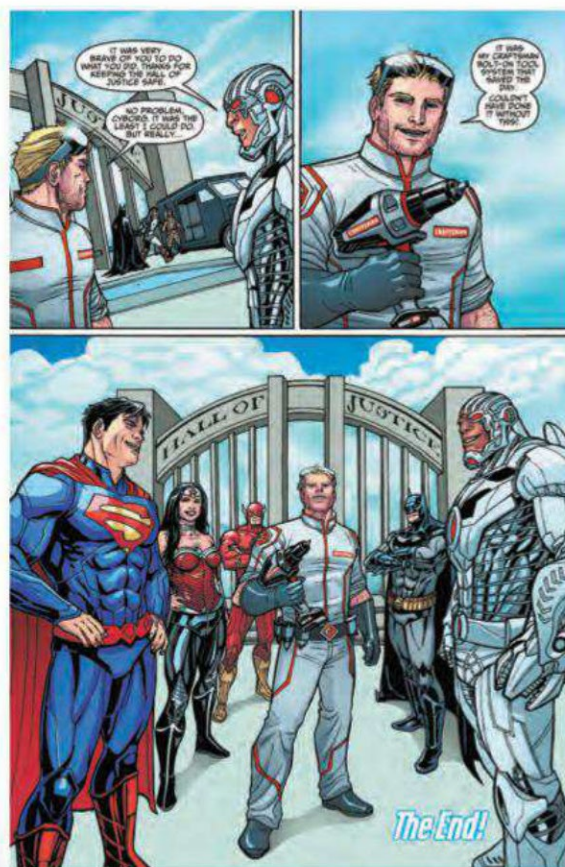
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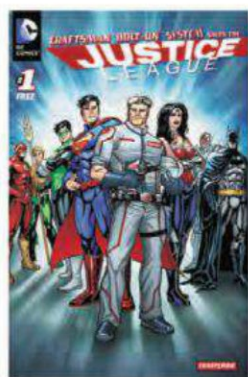


Shop Talk

A New Woodworking Superhero



Craftsman's new tool promotion launched at a comic book convention — an attempt to draw the interest of a new generation of tool users.



Boom! Pow! Tool Saves Superheroes

Users of Craftsman Tools now have their very own superhero. Literally. In partnership with DC Entertainment, Craftsman developed a comic book featuring their own new character, “The Technician,” who serves as handyman to the Justice League DC Comics characters like Superman, Wonder Woman, Batman and The Flash.

Attendees of the fall 2012 New York Comic Con convention received hard copies of the comic book, while the full digital comic is available, for free, either at CraftsmanComic.com or via the DC Comics app.

The storyline is a promotion for Craftsman’s new Bolt-On tool system. The base kit for the system is a tool base, 20-volt lithium-ion battery, drill/driver attachment and QuickBoost® battery charger; the kit price is \$119.99. Tool

base attachments that let you use the system as a router, jigsaw, multi-tool, sander and more sell separately for \$29.99 to \$39.99 apiece.

In the comic, “The Technician” makes use of several of these tool options for things like tuning up the Batmobile or using the compact drill/driver and the quick battery charge to save the Hall of Justice from the villain.

Why a comic? “We want to show DIY to a new generation of tool users,” said Michael Castleman, president of Kenmore, Craftsman and DieHard.

Winning Woods

San Diego Stylings

Some woodworkers who entered their creations in the 2012 San Diego Fine Woodworkers' Association's 31st annual Design in Wood show centered their creations around the year's theme of "Space," while others went for more traditional stylings. *Woodworker's Journal* was again a sponsor for the show, providing two-year subscriptions to winners.

If you're inspired, entry deadline for the 2013 Design in Wood show is May 3. This year's theme is "Game On." Exhibits will occur in conjunction with the San Diego County Fair, from June 8 to July 4. For more information, visit www.sdfwa.org or call 619-422-7338.

Photos by Andrew Patterson



Side table with four drawers; claro walnut, ebony, maple. By Keith McKinnon



Hawaiian Entry Bench with Mirror - Colonial Style; 100-year-old koa and figured hickory. By Hugh Elliott



"Altar of the Butterfly" table; carob, walnut, ebony, canary, zebrawood. By Justin Ames

D Size Acoustic Guitar — Dreadnought, 25.4" scale; East Indian rosewood, California redwood. By Gustavo Cardenas



"Rabbets and Splines" bowl, 201 pieces; utile, maple, wenge. By Peter Schultheiss



"Out of This World" urn; ash. By Terrell E. Deering



"Orb" hollow form; maple burl. By Philip Stivers



Some individual woodworkers find it hard to afford — or store — tools like laser cutters, CNCs and more.



Membership Woodworking *Community in the Shop*

Membership shops provide you with large workspaces and access to tools you couldn't afford on your own, in exchange for a membership fee. Also, says Brian Boyle, founder of The Mill in Minneapolis, "We provide the community of people to share ideas. When a woodworker is talking to someone who's good in metals, the creative process goes into hyperdrive."

The Mill offers classes and equipment in woodshop, metals, industrial sewing and soap making. Members are required to take a skills and safety class in equipment they wish to use and then may either come in and use it on a first-come, first-served basis, or reserve time.



"Not to have anybody get stuck" is a motto the staff of North Country Woodshop lives by when helping members with their projects.



Some people come into The Mill without a project in mind, while others want to accomplish something specific — which is also the case at North Country Woodshop in Burnsville, Minnesota, a membership shop specifically focused on woodworking.

When Sam Watts, his dad Tim Watts and Brian McDonald founded North Country, they offered specialty classes and

thought "we'd get retired guys," Sam said. "But, it turns out, guys who like woodworking have their own shop." Instead, most of their membership is between the ages of 35 and 50, with another large portion aged 20 to 35. "We have become their shop, and they're starting at ground zero," Sam said. "I'm 28," he

Shop Talk continues on page 24 ...



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Shop Talk continued



Membership shops might offer lumber storage or ordering as part of their services.



continued, “and my freshman year of high school is when they cut shop. Shop classes have been out of high schools for 13 years — in some cases, even longer.”

That has meant more classes in basics, as well as an effort to work with students, whether through homeschooling groups, local high schools or kids’ birthday parties focused on a woodworking project.

At The Mill, too, Brian has plans to develop parent-child classes. “The demise of shop classes is an unfortunate reality, and places like The Mill can provide valuable skills. Exposing the next generation to work with the mind and hands is important to me,” he said. Part of his inspiration for The Mill came from his experience building

an orrery (a mechanical representation of the solar system) for his young son and the difficulty he found in finding the tools to do so.

The inspiration for North Country Woodshop, Sam said, came because he and his father “were looking for a place to not have to back the cars out of the garage on a cold winter day. We thought ‘we’ll start what we want.’”

With memberships at varying levels (and fee-based shop access for non-members), “We haven’t had anybody waiting in line for a tool yet,” Sam said. “In the woodworking process, there’s usually something else you can do.”

“As a culture, we’ve gone through a shift with the economic downturn,” Brian said. “People realize they don’t

need to have this ‘thing’ if they can just have access to it.”

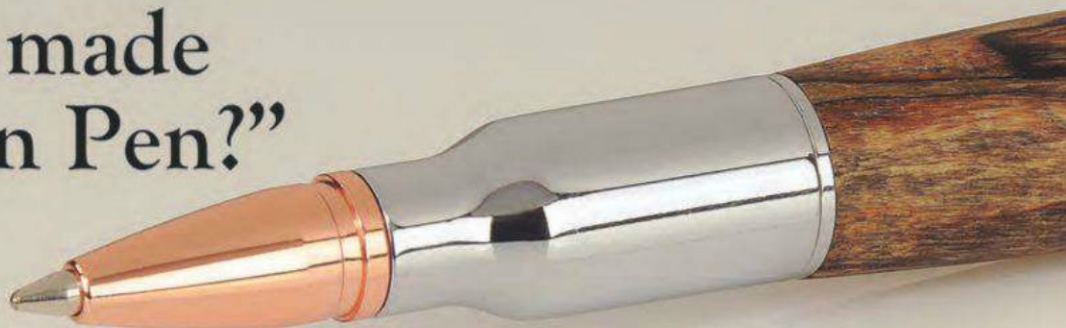
For more info on The Mill, visit mnmill.org or call 612-259-7509; for more info on North Country Woodshop, visit orthcountrywoodshop.com or call 952-500-8815.

— Joanna Werch Takes



Some shop members have a project in mind; some need ideas.

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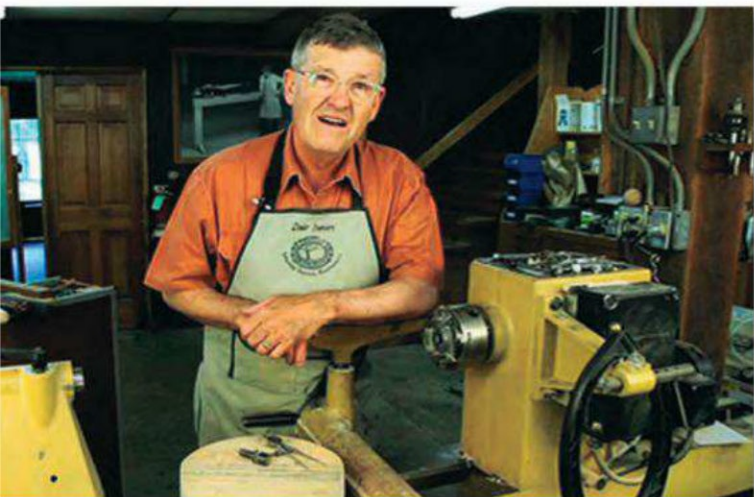
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Woodturning

Four-Jaw Scroll Chucks

By Ernie Conover



"A self-closing chuck is alluring because it offers no-hassle, vice-like grabbing of anything you want to turn ... at least, that is the advertising claim!"

A chuck is anything that holds work in the lathe, so a drive center, a live center or a faceplate are all chucks — and most lathes come with this useful trio. Simple spindle turning needs only the aforementioned drive and live center; however, they are insufficient for hollowing in spindle orientation. While it is possible to turn a bowl by just screwing a piece of wood to a faceplate, turning the outside of the bowl is awkward, and much depth in the finished vessel is lost to the screws. A glue block can overcome this problem.

Still, a self-closing chuck is alluring because it offers no-hassle, vice-like grabbing of anything you want to turn. At least, that is the advertising claim. This is all to say that what is properly called a scroll chuck is an easy sale to a turner — whether novice or seasoned veteran —

walking into a woodworking supply store. One of the most frequent questions I am asked is, "What brand/model of chuck should I buy?" This places me squarely on the horns of a dilemma, because a four-jaw scroll chuck is a very useful accoutrement for a seasoned turner. A beginner, however, will have a good deal of difficulty getting one to perform as advertised and may actually throw more work off of the lathe than with faceplates and glue blocks.

My aim in this article is to acquaint the reader with the desirable features to look for in a scroll chuck, and to detail the fine points of the basic holds you can accomplish with it, to lead to sure gripping of the work.

In metalworking, the use of a lathe chuck with jaws (sometimes called dogs) that close in unison to grip a workpiece is old hat. In my youth, I purchased a four-jaw metalworking chuck to quickly hold square pieces. Although

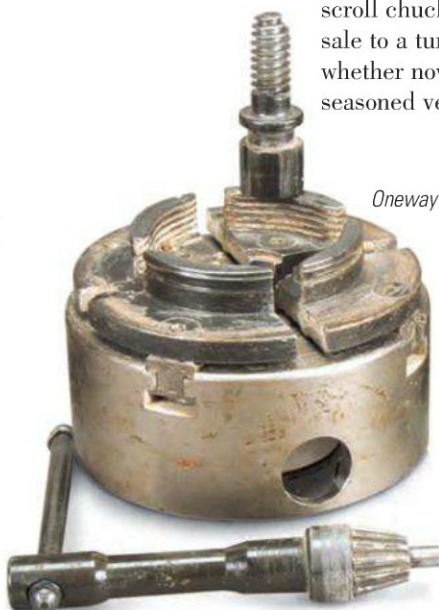
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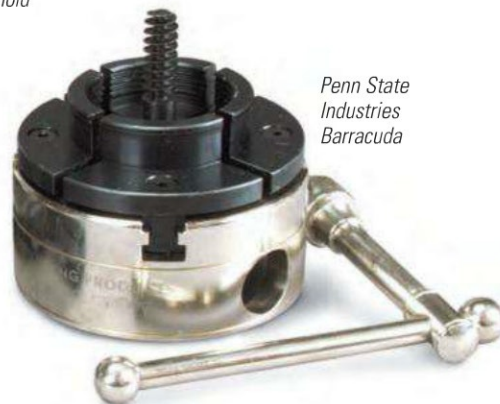
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Scroll chuck jaws are two-piece. The bottom half (left) engages the scroll, so the jaw closes or opens in unison. You can screw a variety of jaw extensions to the bottom jaw (right, below) for different needs.

useful, the problem with such chucks is that the jaws are designed for metal so they mar wood egregiously. So it was a marketing *tour de force* in 1988 when Teknatool under the brand name Nova introduced an economical four-jaw scroll chuck with top jaws specially designed for the needs of woodturning.

Now variously called engineering or scroll chucks, the jaws of these are usually of two pieces. The bottom jaw has

a rack on the bottom and fits snugly in a T-shaped radial keyway in the chuck body. A scroll plate engages the racks on the bottom side of the jaws. Turning the scroll opens or closes the jaws simultaneously. The top jaw interlocks with the bottom jaw and is further secured to it with socket head cap screws. This scheme allows the top jaw to be changed to different shapes for specialized holds. The crucial factor is that the jaws have much larger

surface area for holding wood securely without deforming it. Nova's initial chuck was a lever chuck.

In 1994, Oneway in Stratford, Ontario, introduced a superb gear-driven chuck called the Stronghold. In 1997, they started producing a smaller gear-driven chuck called the Talon. In a gear-driven chuck, the bottom side of the scroll is a bevel gear, which is engaged



"It was a marketing tour de force in 1988 when Teknatool introduced an economical four-jaw scroll chuck with top jaws specially designed for the needs of woodturning."

MORE ON THE WEB

For a video of the author demonstrating the use of a scroll chuck, visit woodworkersjournal.com and click on the "More on the Web" tab shown above.

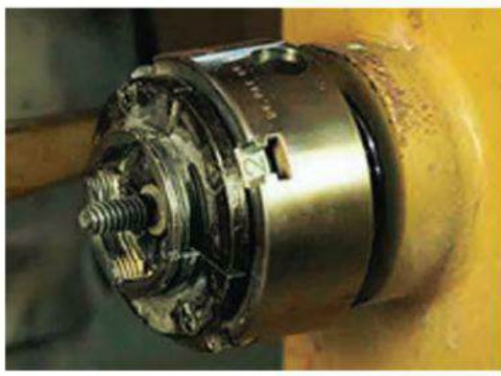
by a mating bevel gear either enclosed in the chuck itself or on the end of a T-handle, allowing greater closing force to be applied by the jaws, resulting in surer holds.

While lever chucks are still offered, a gear-driven chuck is much more desirable. The Australian firm Vicmarc offers a line of high-grade chucks well worth your consideration. Vicmarc's VM150 Chuck will work as either a lever or a gear chuck, making large

adjustments with a lever, while final tightening is gear-driven. Penn State Industries offers both an inexpensive lever and a gear-driven scroll chuck under the name Barracuda. The Woodturners Catalog offers what appears to be the same chuck under the name Apprentice. Both companies offer the gear-drive chuck with an assortment of jaws in a basic package. While not up to the quality of the other chucks mentioned, they are quite serviceable for someone just getting into turning with a small lathe. In general, most

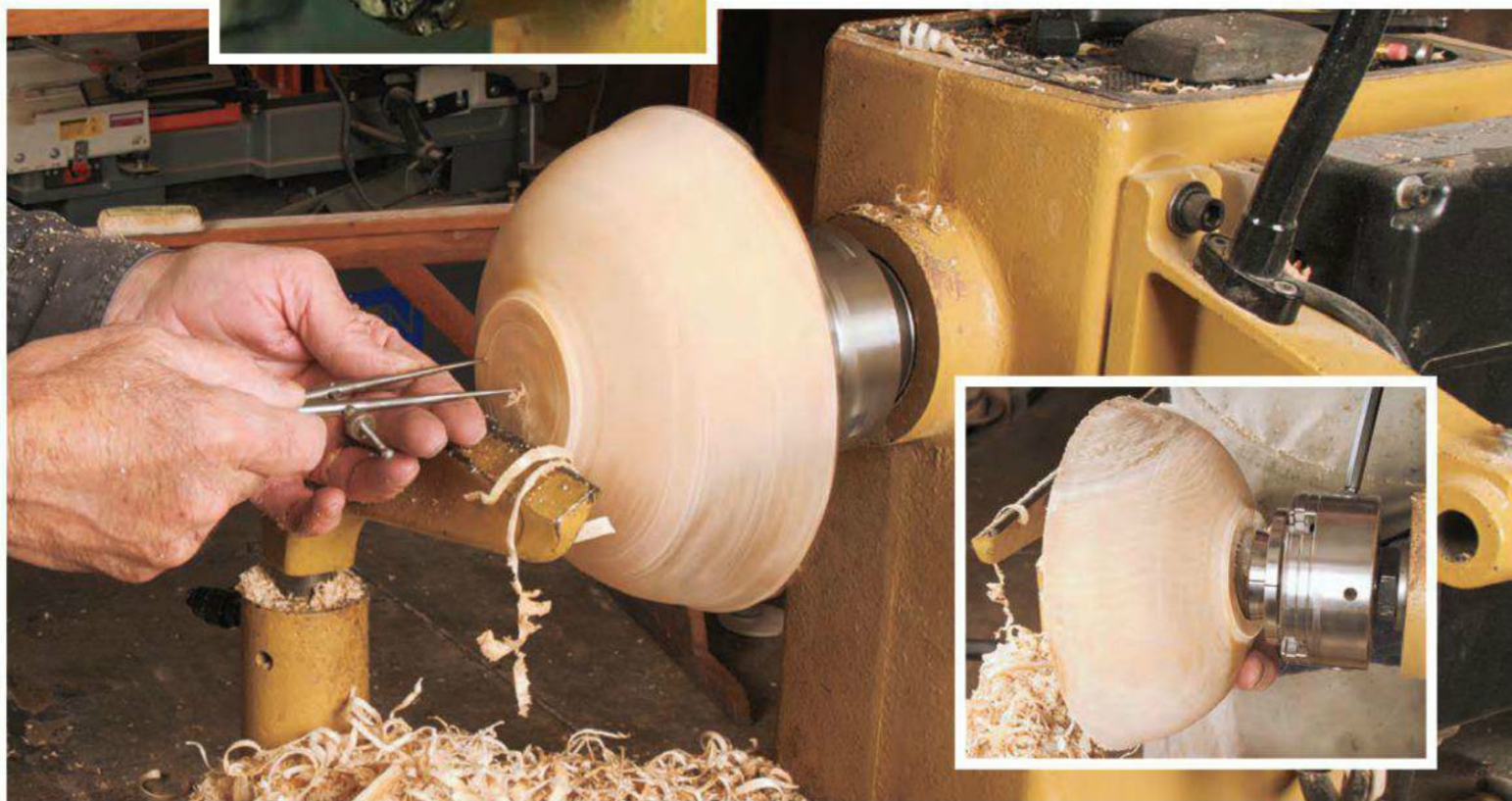
of the scroll chucks on the market perform the tasks reasonably well.

A safety concern with scroll chucks is that, at some point as you open the jaws, they lose their engagement with the scroll and may be pulled out of the keyways with your fingers. If you lose the engagement with one or more jaws and start the lathe, a very dangerous ballistic event will occur. An ironbound rule is that you never extend the jaws more than one-third out of the chuck! Nova realized this danger from the beginning and designed their scroll to spiral in the opposite direction from all other chucks. That is because the forces of starting the lathe with a chuck on the spindle that is holding nothing will



A screw in a Oneway chuck (left) turns it into a heavy-duty screw chuck for roughing bowls.

Below, the author prepares a dovetail-shaped mortise for mounting in the Nova chuck (inset below).





Setting dividers to the radius of the jaws when they form a perfect circle helps get a sure hold when reversing a bowl to turn its inside.

cause the chuck to close and not open.

Nova incorporated a further safety to their chuck: a stop screw that prevents the jaws from coming off of the scroll. Oneway does this same thing with a keyway. There are two keyways, with the shorter one not allowing the jaws to extend beyond the body of the chuck at all. This is a great feature for a young or beginning turner because they cannot be raked by the spinning jaws, which can leave a nasty wound.



Most manufacturers taper the outside and inside of their jaws to form a dovetail shape.

Disassembly should be part of regular maintenance to keep the chuck accurate. You will have to remove the safety screw, or the top jaws in the case of the Oneway. Remove the bottom jaws and even the scroll for a very dirty chuck. Brush everything off

and reassemble. Coating everything with paste wax or a dry lubricant like Dri-Slide® greatly enhances performance. The jaws are numbered and have to be inserted and engaged by the scroll in numerical order. Once the chuck is reassembled, replace the safety screw or the top jaws and open it as far as possible. Now pull on each jaw and make sure they are engaged by the scroll. The jaws not centering is a sure indicator that the scroll did not grab them in order.

All chuck manufacturers offer a heavy screw in the 3/8" to 1/2" range. When the screw is gripped in the jaws, it converts the scroll chuck to a screw chuck, which is most useful to a bowl turner. To use these screws safely, you must be sure to have the head of the screw behind the top jaws and further ensure that the bottom jaws engage the flats on the head.

All manufacturers, except Oneway, put a back taper (dovetail shape, photo left) on the outside of their jaws. By grinding a scraper to a mirror image of this taper, you can scrape a dovetail-shaped pocket in the base of the bowl. The jaws will then expand into this dovetail, giving a sure hold that is less susceptible to being pulled off the chuck. Oneway has a double edge on the outside face of their jaws, which works best with a mortise with straight sides.

Ernie Conover is the author of The Lathe Book, Turn a Bowl with Ernie Conover and The Frugal Woodturner.

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How to Make Doors with Perfect Miters

By Barry Chattell

Our author teaches a few simple steps that will allow you to make elegant doors with mitered stiles and rails using a chop saw. The key is setting up your miter saw.





The door panels can be raised and made from solid wood or sheetstock laid up with veneer. Veneer selection is only limited by your imagination (and budget).

Mitered frame doors are a nice change from those made with the traditional mortise-and-tenoned corners. They can be combined with elements of Shaker and Arts & Crafts styles to create contemporary designs. Mitered frames also allow the use of a wide and intricate range of edge and face profiles, because the shapes will flow together in the corners.

But making perfect miters is trickier than it may first appear. (For such a simple looking joint, it can be remarkably frustrating at times.) Closing up the miters without any gaps requires accurate setup and exacting stock preparation. And that starts with milling the stock.

Milling Material for the Frames

My process for milling the frame stock — if I'm making a number of doors of various sizes — is to first rough out the longest length needed. I start by crosscutting boards to length and ripping them over-wide. Those too twisted or bowed are cut into shorter lengths. In this way, I work through the cutting list from the longest to the shortest parts. (It's a good idea to cut some extra, just in case.) After letting them relax for several days, I joint one face and plane the stock to finished thickness with several light passes, alternating sides. I then joint one edge and plane to final width. Ganging several pieces together keeps them vertical when passing through the planer. Throughout the process, I check that each piece is flat and straight (using my jointer bed) and that the edges are square to the faces.

Routing the Panel Groove

I use the router table with a slot-cutting bit to form the panel groove. Slot cutters clear the waste better than straight bits, and the frame pieces are handled flat on the table rather than on edge. Several passes are required to make the groove the correct thickness, but I prefer the results. Adjusting the height of the cutter after the first pass is quick and accurate on the router table. To eliminate any chip-out along the edges of the groove, I like to do a shallow "scoring cut" before each full-depth 1/4" pass. Setup is fast and easy with a router table that has a pivoting fence. For the scoring cut, the fence is pivoted forward, leaving the slotting bit barely exposed. The fence can then pivot back against a pre-determined stop for the full-depth cut.

I make the scoring cut as a climb cut — where the workpiece is moved left to right along the fence. A 1/4" slotting cutter protruding only 1/32" will not grab and throw the workpiece; at most, there is a slight pull. A guard over the bit ups the safety factor even more.



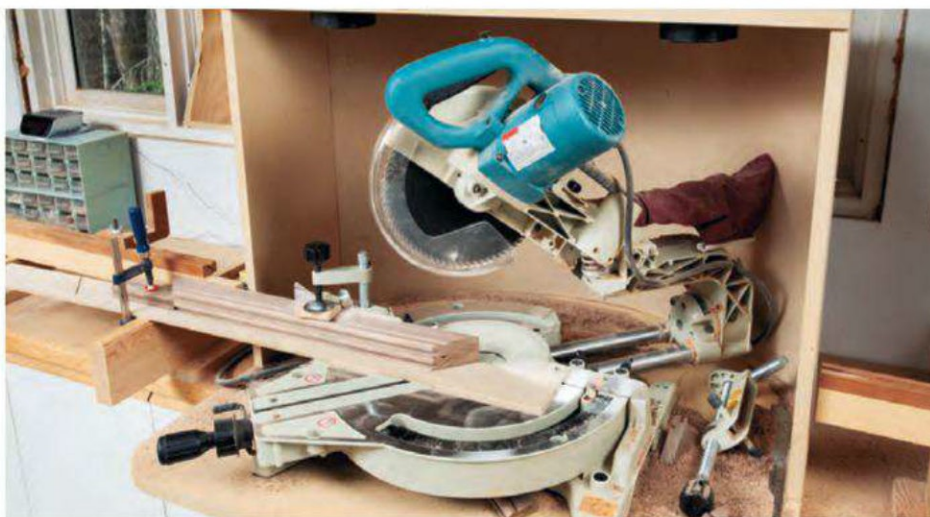
The author has a simple but effective way to check the accuracy of his miter cuts. A 90° fence jig formed from two strips of MDF taped to a piece of melamine is used to check the accuracy of miter cuts.



With one strip taped in place, a plastic square is held against it and the second strip is attached along the opposite side of the square. The author leaves a small gap between the strips.



Once the fences are secured, two test pieces can be positioned on the inside of the jig to check that the joint closes tightly. This simple method will allow you to check your miters as you cut them.



The frame pieces are mitered in pairs — securely clamped in place. Both ends are cut on the same side of the saw. A strip of MDF taped to the saw table serves as a medium for clamping on a mitered stop block. The first cut into the MDF sub-base forms a zero clearance slot that minimizes tearout.

Mitering the Frames

Dado or rout the groove in the frame stock and do any molded edges before cutting the miters. I prefer the miter saw for making mitered frames, but the setup is critical for consistently good results: with miter cuts, any slight error is doubled.

First, ensure that your saw is cutting accurately. I use a “perfect” 90-degree reference fence jig made by placing a plastic drafting square on a flat surface and attaching a strip of wood along two edges with double-sided tape. Leave a gap at the

to make contact with a wider section of the blade.

As a final step in the setup, I make a sub-base that extends out to one side for clamping on a stop block. Attach a 1/4"-thick strip of MDF to the miter saw table with double-sided tape. Make it wide enough that the blade doesn't cut all the way across. However you support the strip out to the side, make sure it doesn't angle upwards, as this could result in the mitered ends not being cut squarely. The strip also forms a zero clearance slot with the first cut.



Adjusting a Miter Saw Fence

Making minor adjustments to a miter saw fence is frustratingly difficult. Loosening the fence bolts, giving it a tap and tightening the bolts again can add to the misalignment. To get it right, you need two reference points to adjust the fence against. My simple fine adjuster tool can really help. It consists of a strip of wood about 1 1/4" square and slightly longer than the fence. Drill two holes — spaced to the ends of the fence — and thread through small bolts. Determine which way you would need to move the fence in order to get it cutting perfectly square. Carpet-tape the wood strip to the table with the ends of the bolts just touching the fence. Loosen the fence and turn the bolts in opposite directions to slightly reposition it as you determined. Hold the fence against the bolts as you retighten its fasteners. Take the fine adjuster off the saw and test the saw's cut again. Several tries may be needed to get it dead-on, but this will speed up the process.





The fixture positions and clamps the frame parts for cutting the biscuit slots. With the frame in place, the biscuit joiner is held firmly against the fence and stop block to ensure a precise cut.



To minimize small errors creeping in, I do several things. Firstly, I do all the cuts on one side of the blade — thus only one blade setting. The second thing I do is cut the opposite sides of the frame together as pairs to ensure they are exactly the same length. To get the outside edges perfectly flush, press them together on a machined surface using a couple of small pieces of double-sided tape. Thirdly, clamp the frame pieces securely to the table. And lastly, rest the frame pieces only against the miter saw fence. (I move my extension fence.)

Cutting Biscuit Slots

Reinforcing the corners with biscuits allows for easy construction. A 2"-wide frame, even when molded along the inner edge, will accommodate a #20 biscuit. Make a fixture (photos above) for cutting the slots by putting a frame piece between two strips of wood for the fences, and mark the miter cuts. Attach the fences to the base, making sure the mitered ends are aligned. Screw the toggle clamps to the longer fence and place a small block at each end of fences to prevent the biscuit joiner shifting sideways during the cut.

To use the fixture, align the ends of each frame part — do one end, then the other, at opposite ends of the mitered fence, clamp and slot.

Door Assembly and Glue-up

Size the panel and dry fit it in the frame. Leave about 1/16" play in the width and length of the panel. It's not a lot of clearance, so measure and cut accurately. As an example, for a square door, measuring 10" on the inside of the frame with a groove 1/4" deep, the panel is cut 10 1/8" square. I find band clamps particularly suited to mitered frames. They are easier to use, less cumbersome and better at pulling the frame into square than other clamps.

The gluing and assembly sequence I use is as follows: apply glue to the slots, then run a bead in the grooves. Glue and place

the biscuits in the long sides, press the long sides onto the panel, and then work the short ends into place.

Position the band clamp and make sure it's centered on the edges. Plastic or cardboard corner cauls make it easier to adjust the band and can prevent damage. Tighten the band clamp just enough to square the door and close the miters. The corners are then clamped flush with small blocks and the band fully tightened. Remove the corner clamps and clean any glue squeeze-out.

Barry Chattell is a woodworker who lives on an island in British Columbia, Canada.



The band clamp is tightened just enough to pull the door square and close the miters. Small clamp blocks applied across the corners bring the joints flush. The band clamp is then fully tightened and the corner blocks are removed.

Steamer Trunk Dresser

By Sandor Nagyszalanczy

When is a wooden trunk not really a trunk? When it's actually a four-drawer dresser. Wood slats and reproduction hardware add to the attractive design.

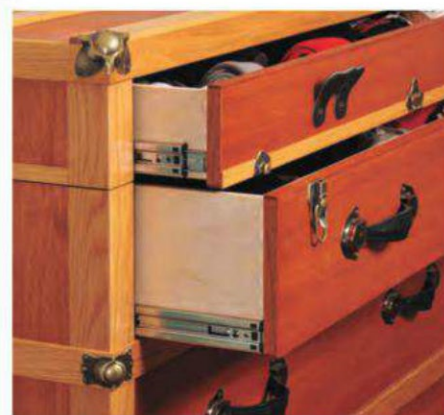


I always try to keep my promises...even if it takes me years to do so. Some time ago, I promised my wife that I'd build her a large dresser to replace the less-than-attractive modular wire bin unit that she'd patiently kept her clothes in (I'm pretty sure that's grounds for divorce in some states, but fortunately, my wife is very understanding). Anyway, this past summer I decided to build the piece in time for her birthday. One challenge I had was coming up with a design that fit in with both the ornate antiques and modern furnishings we have in our bedroom.

A flash of inspiration came one day when I ran across some photos of

Victorian-era steamer trunks on the website of a company that sold all the hardware necessary for restoring old trunks. What I like about these vintage travel chests is that they ooze nostalgic elegance yet they look right at home in a contemporary décor. It struck me that the arrangement of wooden slats and leather handles on the front of some trunks made them look a bit like they had drawers (they don't — they're all chest-like lidded trunks). A few sketches later, and I came up with the steamer trunk dresser design.

The piece is constructed like a basic modern dresser: A plywood carcass with an inset solid-wood face frame encloses a series of plywood drawers that run on



metal glides. But it's the wood slats, antique brass hardware and leather pulls (and a few surprise touches) that really give the piece a unique appearance and functionality. It took some effort to build, but I haven't made a piece of furniture in a long time that has evoked so many nice compliments — and my wife just loves it.

The Drawers

One of the really nice things about this dresser is its huge drawers, large enough to hold a ton of clothes. To make these drawers easier to install in the carcass, I constructed each drawer as a basic five-sided box — four sides and a bottom — and mounted a separate drawer face to the front (more on this later). To give these big drawers plenty of strength, the corners are box joined together. Box joints are easier to cut than dovetails, but they still add an attractive visible detail.

Start by cutting all the 1/2" Baltic birch plywood drawer parts to size, following the *Material List*. You'll notice that each of the sides, fronts and backs are 1/16" longer than the final dimensions of the drawer. The idea is that you'll make the pin portions of each box joint just a hair longer than the thickness of the plywood, then sand them flush after it's assembled to get a clean final joint.

While there are many ways to cut the box joints, I prefer to cut them on the table saw, using either a commercial or shop-made sliding jig. The jig holds each workpiece vertically as it passes over a dado blade, set to cut slots 1/2" wide — same as the pin portion of the joint. After each pass, the workpiece is moved sideways and the just-cut slot is seated onto the jig's fixed reference pin. This pin is set so that the next cut slot cut creates a pin that's the same width as the slot. Before cutting the drawer box parts, I make a test joint from Baltic birch scraps, to check the fit. If the joint is too tight, I set the reference pin a little closer to the blade, to make the pins a little slimmer; vice versa if the joint is too loose. I set the cutting depth of the dado blade so that each slot is cut 1/32" deeper than the thickness of the plywood (to allow flush sanding later).

To keep things consistent and avoid joint cutting errors, I mark the top edge of each drawer back, front and side and always cut each joint starting from the



A box joint jig is used with the table saw to cut all the joinery for the drawer boxes. The jig's reference pin spaces the cuts for a snug fit.



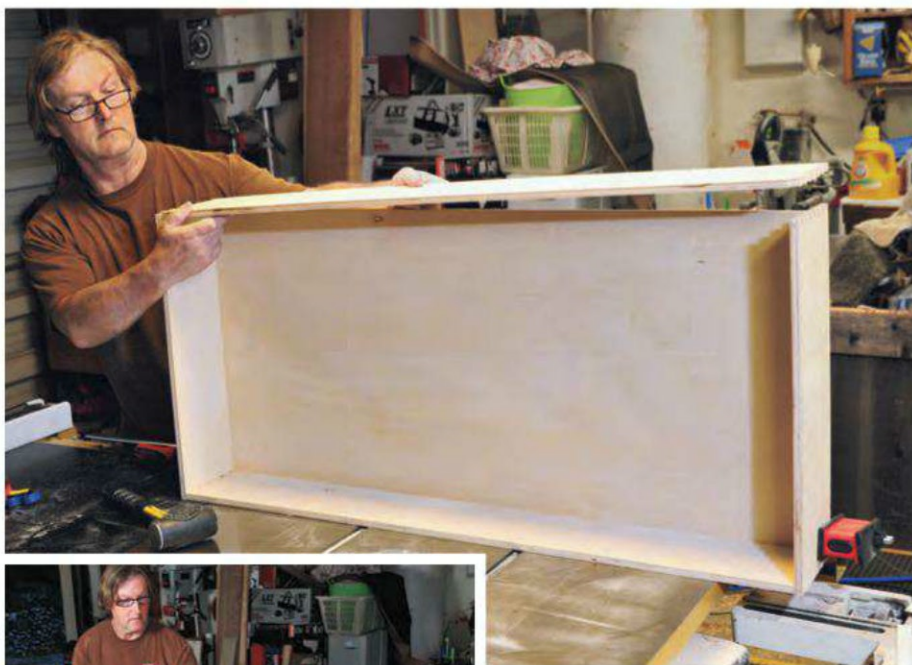
To make the drawer sides interlock, the first cut on the front and back parts must be spaced one width from the jig's reference pin.



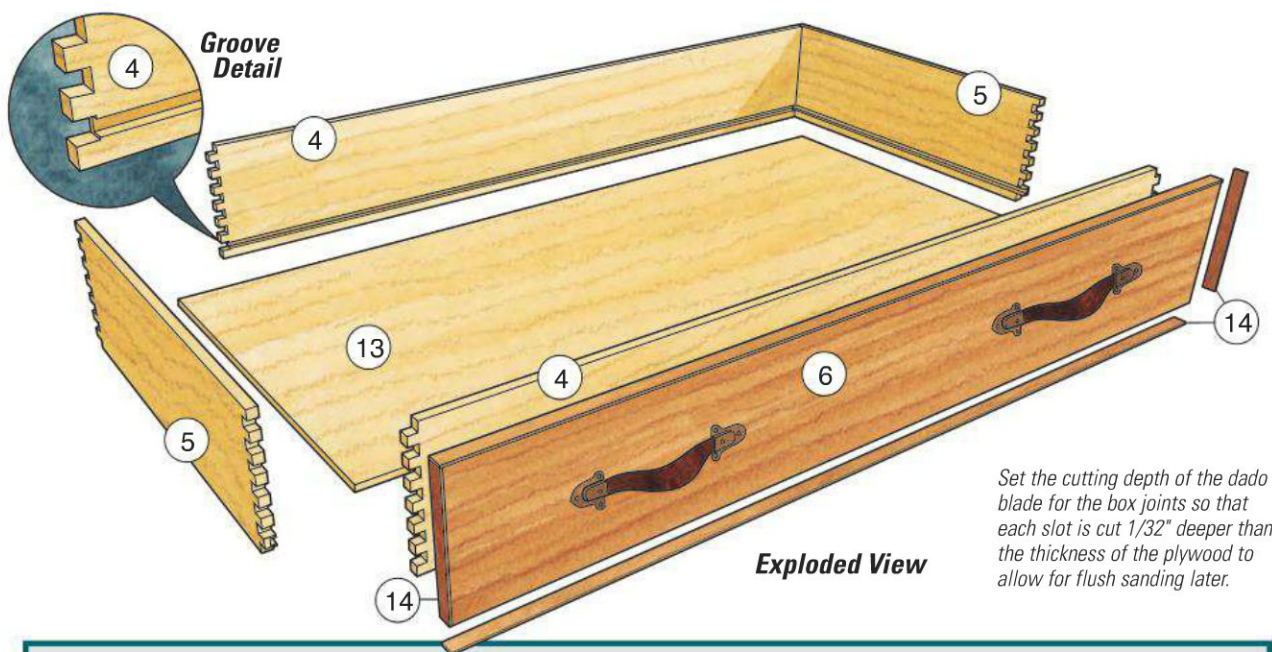
The slot for the drawer's bottom is located in between two of the pins, so that the slot will be hidden on the drawer's sides.



To assure a strong drawer, brush a thin layer of glue onto all mating surfaces of each corner joint. A disposable flux brush is used here.



After gluing and assembling the drawer's back and two sides, slide the drawer bottom into its slot before fitting the front piece in place. Before clamping up the drawer box, set it on a flat surface and check it for square by making sure it measures the same from corner to corner (inset photo).



Set the cutting depth of the dado blade for the box joints so that each slot is cut $1/32$ " deeper than the thickness of the plywood to allow for flush sanding later.

MATERIAL LIST (DRAWERS)

	T x W x L		T x W x L
1 Top Drawer Front and Back (2)	$1/2" \times 4" \times 46\frac{13}{16}"$	8 Third Drawer Sides (2)	$1/2" \times 8\frac{1}{2}" \times 22\frac{1}{16}"$
2 Top Drawer Sides (2)	$1/2" \times 4" \times 22\frac{1}{16}"$	9 Third Drawer Face (1)	$3/4" \times 9\frac{1}{8}" \times 47\frac{5}{16}"$
3 Top Drawer Face (1)	$3/4" \times 4\frac{1}{8}" \times 47\frac{5}{16}"$	10 Fourth Drawer Front and Back (2)	$1/2" \times 10\frac{1}{2}" \times 46\frac{13}{16}"$
4 Second Drawer Front and Back (2)	$1/2" \times 7" \times 46\frac{13}{16}"$	11 Fourth Drawer Sides (2)	$1/2" \times 10\frac{1}{2}" \times 22\frac{1}{16}"$
5 Second Drawer Sides (2)	$1/2" \times 7" \times 22\frac{1}{16}"$	12 Fourth Drawer Face (1)	$3/4" \times 11\frac{1}{8}" \times 47\frac{5}{16}"$
6 Second Drawer Face (1)	$3/4" \times 7\frac{1}{8}" \times 47\frac{5}{16}"$	13 Drawer Bottoms (4)	$3/8" \times 21\frac{1}{2}" \times 46\frac{1}{4}"$
7 Third Drawer Front and Back (2)	$1/2" \times 8\frac{1}{2}" \times 46\frac{13}{16}"$	14 Drawer Face Banding (1)	$1/8" \times 13\frac{1}{16}" \times 450"$

upper-facing edge of the piece. I start by cutting all the drawer sides first. With the end of the side down in the jig and the upper-facing edge set flush against the pin, I cut the first slot, then slide the part over until the slot is on the jig's reference pin and take the second cut. (Photo sequence, previous page.) The process is repeated until all the slots/pins are cut.

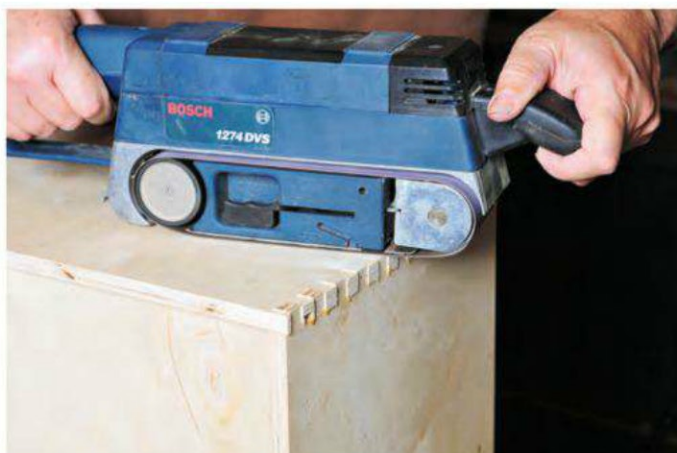
Once all the sides are done, the drawer fronts and backs are cut inverse to the sides, so that the joints interlock. This requires the use of a spacer — a short

scrap of drawer stock that has been cut on the jig. Slide the spacer over the jig's reference pin, then butt the top edge of the workpiece right up against it. Now remove the spacer and cut the first slot. Then, slide the part over the reference pin, and continue cutting as you did before.

Once all the joints are cut, plow a groove on the inside surfaces of the drawer parts to capture the drawer bottom. Because of the size of the drawers, I like to use $3/8$ " thick (9.3mm) Baltic birch

stock, which will support a good deal of weight without sagging. Using a dado blade in the table saw, plow a groove on the lower inside face of each drawer side, front and back part. The groove should be centered between two pins on the drawer's front and back (photo, page 35). This hides the groove on the sides of the assembled drawer.

Sand all the drawer parts smooth, then carefully dry-assemble each drawer box, to make sure that the bottom fits and that all the box joints go together easily



A belt sander makes quick work of trimming the overhanging pins flush at all the corners of each Baltic birch plywood drawer box.



Thin solid-wood edging is glued and taped onto the edges of the separately mounted drawer faces, to cover up the bare plywood.



Above left, the author uses a biscuit joiner to plunge-cut slots that join the parts of the dresser carcass. A marked stick (at left) is used to help space the biscuit slots evenly. The carcass sides, bottom and stretchers are glued and assembled at one time (above right).

(they'll be tougher to put together after the glue swells the plywood). Working atop a bench or other reliably flat surface, brush glue into the joints on the two sides and the back of a drawer box, then assemble them. Now slide the drawer bottom into its groove and glue the front side of the drawer in place. Before applying clamps, check the squareness of the assembly by measuring its diagonals; they should be equal. (Photo, bottom of page 35.)

Once all four drawers are done and the glue is dry, use a belt sander to sand the corner joints until all sides of the drawer are smooth and flat.

Now is a good time to cut out four drawer faces from the same plywood stock chosen for the dresser's carcass. To hide the bare plywood edges, cut and plane some 1/8"-thick, 13/16"-wide banding strips from solid stock that matches the plywood. Brush glue sparingly on both the strip and plywood edge, then tape it in place. I recommend gluing the strips on the ends of the drawer faces first, then trimming them flush before gluing on the longer strips.

Building the Carcass

The carcass of this dresser is really very basic, consisting of just nine parts: A top, bottom, two sides, a back and four internal stretcher strips. Cut the top, back and sides out of a nice sheet of 3/4" hard-wood plywood, following the dimensions listed in the *Material List*. (I chose mahogany, one of my favorites.) Also cut the four stretcher strips from any good 3/4"-thick plywood you have on hand. Now plow a 1/4" wide, 3/8" deep rabbet

on the inside-facing, back edge of the top, bottom and sides (see the *Drawings*), using a dado blade in the table saw.

All the carcass parts are joined using biscuits. To make cutting the slots quicker, I first mark a scrap stick with the center points of the five #20 biscuits spaced evenly across the width of the carcass (inset photo above). Clamp this stick atop one of the dresser sides and plunge cut the slots that join the bottom into the inside-facing surface of the panel using a biscuit joiner. Now cut the slots for the stretchers, which are positioned as shown in the *Drawings*. Cut slots for joining the carcass top into the top edges of the sides, using the same biscuit spacing. Once both side parts are done, plunge cut the slots on the ends of the dresser bottom, and bottom-facing side of the top. Finally, cut a single centered slot on each end of all four stretchers.

Assembly of the carcass is done as a two-part operation. First, the bottom and sides are glued together, along with all four stretchers (photo, top right). Dry-assemble the parts to check their fit and make sure you have all the clamps (or extra sets of hands) you need before you start the glue-up. It's easiest to set the whole assembly upside down on the floor and use bar clamps against scrap wood clamping cauls, to protect the plywood. Make sure that all the edges of the carcass are flush and allow the glue to cure.

The second assembly step is to clamp the top onto the sides. As always, test fit the top first, to assure that its ends are perfectly flush to the sides. Then glue in the biscuits and clamp the top on, once again using bar clamps and cauls (photos at right).

It's best to remove any glue drips with a chisel once they've dried to a rubbery

hardness; if you wait overnight, rock hard glue drips can be tough to remove cleanly. If the ends of the top overhang the sides at all, trim these flush either with a sharp block plane or with a flush-trim bit in a router. At this point, carefully finish-sand the outside of the carcass (not the edges!), taking care not to sand too enthusiastically, lest you go through the plywood's thin face veneers.



Glue is applied into the biscuit slots (and onto the biscuits themselves) using a pipe cleaner [chenille stem] with its end bent into a "U."



The second step in assembling the carcass is to glue and clamp the top onto the sides, using cauls to distribute the clamping pressure.



Face frame members are glued in place into the carcass flush with its front edges. Joinery may be added, but it isn't absolutely necessary.

Add the Face Frame

To add stability and strength, the carcass is next fitted with a face frame cut from a 3/4"-thick secondary wood. I used alder, but any wood that matches the tone of the wood you choose for making the slats is just fine (the reason for matching tone is that the frame may be seen slightly when the drawers are closed). Because the frame is inset into the front opening of the carcass, I don't feel there's a need for adding joinery to the frame members —

believe me, the final assembly is notably strong. Start with the long frame rails, crosscutting each piece a tad overlong, then trim it until it fits snugly into place. The two 1"-wide rails fit at top and bottom; the 1 3/4" rails get glued to the stretchers, with each rail's top edge flush with the top of the stretcher. Next, cut, trim and glue in place the face frame stiles that fit along the inside edges of the sides between the rails. Make sure each stile member is flush with the face of the rails and plywood edge of the side before clamping it in place (left photo).

Fitting the Drawers and Slides

To allow total access to each of the large drawers, I hung them on full-extension drawer slides. In order to mount the glides flush with the inside of the face frames, 1 1/4"-thick spacers must be added to the inside of the carcass. The spacers for the two middle drawers are glued and nailed directly atop the stretchers. The bottom drawer spacer is positioned 1" up from the carcass bottom. Use a pair of 1"-wide scraps to hold each spacer in place as you secure it. Use a pair of 5/8"-wide scrap blocks to position the spacers for the top drawer glides. Place the scrap blocks atop the spacers for the upper middle drawer, then fasten the top drawer spacers in place (photo below, left).

To attach the drawer slides, first separate each one into its inner and outer halves. The wider outer portion of the glide mounts on the inside of the carcass: Position each one so that its lower edge is flush

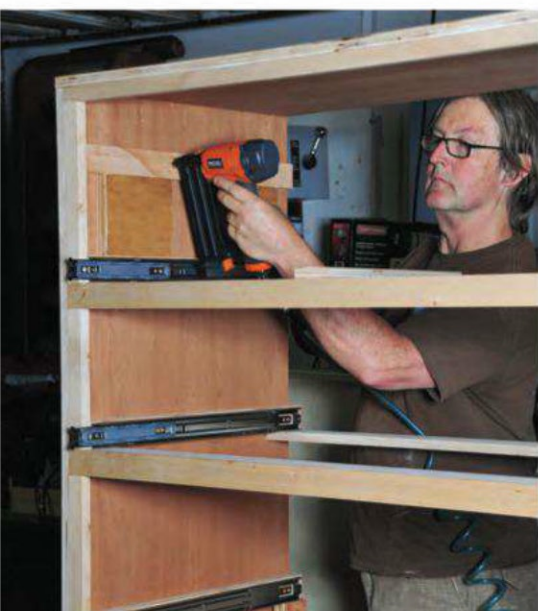
with the bottom of the spacer and its front edge is 3/4" back from the front of the carcass. For now, attach each slide with two screws driven through the horizontally-slotted holes, to allow front-to-back adjustments of the drawer later.

The narrow inner half of each drawer glide mounts to the sides of the drawers themselves. First, mark a line parallel to and 3/4" up from the bottom of each drawer. Then, position the slide with its screw holes centered on this line and its front edge flush with the front of the drawer box (sans drawer face). Use two of the vertically slotted holes to screw each slide on to allow for vertical adjustments of the drawer.

Now slide all the drawer boxes into the carcass. The two halves of each slide should fit together easily. If the side-to-side fit is too loose, you may need to shim the spacers out a little. Each drawer box should be roughly level and parallel to the face frame rails. If it's not, adjust the narrow glides up on one side or another as needed.

Mounting Drawer Faces

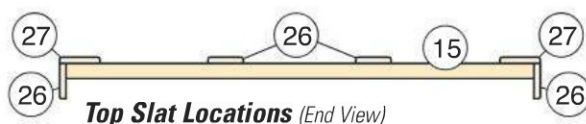
Now it's time to mount the drawer faces to the drawer boxes. Start by boring a few pairs of holes through the front of each drawer box. Drill from the inside using a #8 countersinking drill bit. Drive a 1" long #8 flathead screw into each hole only part way, leaving just about 1/8" of its tip protruding (photo sequence, below). Slide the drawers back into the carcass, then carefully set the drawer



At left, plywood spacers glued to the inside of the carcass provide a mounting surface for the dresser's full-extension drawer glides. To mount the drawer faces, screws are first partially driven through the drawer box fronts (above). With the drawers mounted on their glides, each drawer face is set in place, then tapped from behind (right top). The screws are then fully driven to secure the face (right bottom).



To achieve a classic steamer trunk appearance, the author used mahogany plywood for the sheetstock components, alder for the face frame pieces and red oak for the various slats.

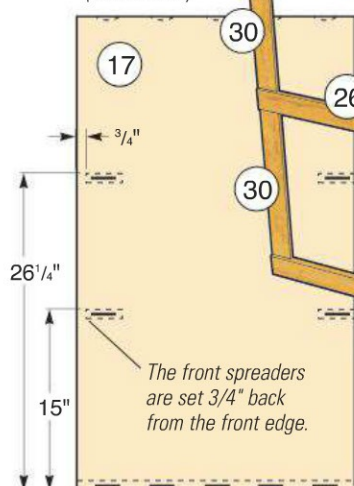


Top Slat Locations (End View)

At the corners, pieces 27 overlap pieces 26. Space the remaining slats evenly across the top.

Note: The lid lipping is cut to fit around the hardware.

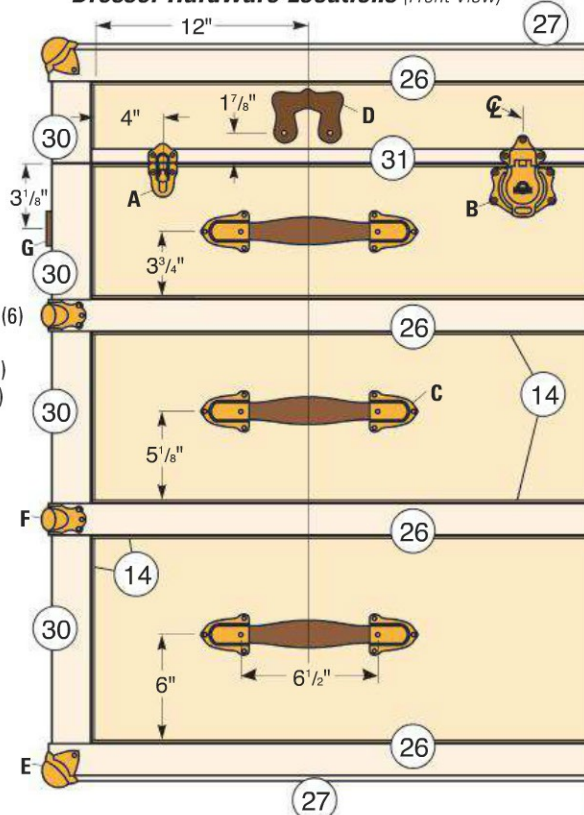
Side
(Inside View)



The front spreaders are set 3/4" back from the front edge.

The back spreaders are flush to the back panel's rabbet.

Dresser Hardware Locations (Front View)



Hardware:

- A Drawbolts (2)
- B Trunk Lock (1)
- C Drawer Handles (6)
- D Lid Lifters (2)
- E Corner Bumps (8)
- F Edge Clamps (12)
- G Side Handles (2)

MATERIAL LIST (CARCASS)

	T x W x L
15 Top (1)	3/4" x 23 3/4" x 51 3/4"
16 Bottom (1)	3/4" x 23 3/4" x 50 1/4"
17 Sides (2)	3/4" x 23 3/4" x 39 1/4"
18 Spreaders (4)	3/4" x 3" x 50 1/4"
19 Back (1)	1/4" x 39 1/4" x 51 3/8"
20 Top and Bottom Face Frame (2)	3/4" x 1" x 50 1/4"
21 Center Horizontal Face Frames (2)	3/4" x 1 3/4" x 50 1/4"
22 Top Side Face Frames (2)	3/4" x 1 1/4" x 12"
23 Middle Side Face Frames (2)	3/4" x 1 1/4" x 9 1/2"
24 Bottom Side Face Frames (2)	3/4" x 1 1/4" x 11 1/2"
25 Drawer Spacers (16)	5/8" x 1 1/8" x 22 1/4"
26 Face Slats (10)	5/16" x 1 3/4" x 52 3/8"
27 Top and Bottom Slats (4)	5/16" x 2 1/16" x 52 3/8"
28 Side Slats (8)	5/16" x 1 3/4" x 23 3/4"
29 Narrow Corner Slats (1)	1/8" x 2" x 140"
30 Wide Corner Slats (1)	1/8" x 2 5/8" x 70"
31 Lid Lipping (1)	1/8" x 3 3/4" x 90"
32 Drawer Slides (4 pairs)*	Centerline #24396

*The slides are available at rockler.com



The author uses a router fitted with a V-bit and an edge guide to rout a shallow groove on the side of the carcass, to make the steamer trunk dresser appear to have a liftable lid.

faces into their frame openings, setting each atop a 3/32" strip of wood to shim it up from the frame rail below it. For the top drawer, set your shim strip directly on top of the face of the drawer just below it to get the right spacing. Center each face in its frame opening, then use a couple of strips of wide masking tape to hold it in place. With one hand over an end of a drawer face, reach around back and give the drawer box a light but solid whack with a mallet. Repeat at the other end of the drawer, then do this with all the drawers. These hits should drive the tip of the screws just far enough into the back of the face to provide an exact positioning reference. Remove all the faces and drawers, and set each face on its drawer box until you feel the screw tips slip into place. Drive the screws fully home.

Slide all the drawers once again into the carcass and check to make sure they are still level, and that the space around each drawer face is even. Make any adjustments that are necessary by moving

narrow glides up or down. Also check that each drawer closes fully. You may need to move the wide slides forward or backward slightly to adjust this. Once they're right, drive several extra screws into the round holes in each glide to secure it.

Remove the drawers and finish-sand all drawer faces, as well as the top, sides and bottom of the carcass. Now is a good time to fit and attach the dresser's 1/4" plywood back by nailing or screwing it into its rabbet recess.

Adding Slats and Trunk Edges

To help them stand up to the rigors of travel, traditional steamer trunks were reinforced with a series of wood slats across all surfaces. The slats were joined at the corners with "corner bumps" and "slat clamp" hardware that secured their ends and protected the trunk's edges.

But before working on the slats, there's one small detail to attend to: To create the illusion that the dresser is a real steamer trunk with a hinged lid, I add a groove and lip to the sides of the trunk, as well as a lip to the top drawer. With the trunk on the floor on its side, use a router fitted with an edge guide and V bit to rout a shallow, 1/16"-wide groove centered 6 1/2" from the top edge (photo

upper left). Then, rout the other side.

The slats for the trunk dresser are made from 5/16"-thick oak, resawn from 4/4 stock. After cutting all the long slats to length, put a 1/8" roundover on the long edges of all the slats with this exception: round only one edge of the slats that go at the top and bottom edges of the front, sides and back. Finish-sand all the slats before attaching them. Mount the eight slats on the ends of the carcass first, using glue sparingly to minimize squeeze-out. Make sure each slat's ends are flush with the front and back edges of the carcass. To secure the slats as the glue dries, I use a pneumatic pin gun that shoots very thin brads (below left). The tiny holes that are left behind are virtually invisible.

Next, cut and mount the long 1 3/4"-wide slats to the front and back of the dresser. Take care to keep the edges of the top slats flush with the carcass top. Once the glue dries, carefully scrape off any squeeze-out, then glue on the four 2 1/16"-wide slats: two at the top and two at the bottom. Finally, attach the two remaining 1 3/4" slats on the middle of the top, spacing them evenly. Carefully inspect to make sure you haven't missed any glue drips, then clean up the ends of the slats with sandpaper as necessary.

The next step is to add the 1/8"-thick wood vertical edging that fits between the

horizontal slats (photo left).

It's a good idea to cut all the edge pieces just slightly over length, then trim each one to fit snugly into place. Start with the 2"-wide edges that go on the dresser's sides. Sand each slat before gluing it in place and position it with its outer-facing edge



Thin red oak slats (at far left) are glued and nailed to the carcass sides, top and front, to enhance the dresser's trunk-like appearance. Thinner wood strips glued and nailed on vertically define the trunk dresser's edges and protect and hide the bare plywood edges (near left).

flush with the carcass. Then secure it, either with a gun-driven pin or with masking tape. Make sure to leave a 1/16" gap between the two upper-most edges (4^{15/32}" and 7^{15/32}") that lines up with the V-groove in the side. Now fit and glue on the 2^{1/8}"-wide edges to the front of the dresser. To continue the illusion of a lid groove, use a black marker pen to darken the face frame and plywood underneath the gap between the two uppermost edges.

Final Details and Finishing

There are a few details to attend to before it's time to apply a finish to the dresser. First, the trunk lock and drawbolts need to be cut to function with the dresser's upper drawers. Using a hacksaw fitted with a fine-tooth blade, cut the protruding lobes off the lower edge of the top half of each drawbolt. The hinged hasp that connects the two halves of the trunk lock must also be cut. With the hasp locked in place, cut it in half along where the upper and lower portions of the lock meet, then file the cut edges smooth.

For the trunk's false lip lid, cut the three 3/4"-wide strips from 1/8" hardwood stock and sand them smooth. Glue on the two side strips first, locating the lower edge of each strip flush with the upper edge of the V-groove. For the lid strip that attaches to the drawer, you must cut the strip into three separate pieces that fit around the chest's lock and drawbolts. Lay the upper portions of all three hardware pieces atop the strip, spacing them as shown in the inset photo, above right. Trace around each with a fine pencil, then cut them with a band saw or scroll saw. Fit them into place flush with the lower edge of the top drawer front.

To give the trunk dresser an appropriately "rustic" finish, I finish all outer surfaces with Danish oil. I finish the drawer fronts with the drawers out of the carcass. To prevent the finish from tainting clothes stored in the dresser, I chose not to finish the drawer boxes themselves. After a few days of drying, I waxed all finished surfaces with paste wax, to give the dresser a vintage-looking sheen. It worked nicely.



Dipping shiny hardware in a special brass darkening solution (above) gives them an antique brass appearance. The wood lid lipping strip on the front of the dresser (right) must be trimmed to fit around some hardware components.



Mounting the Hardware

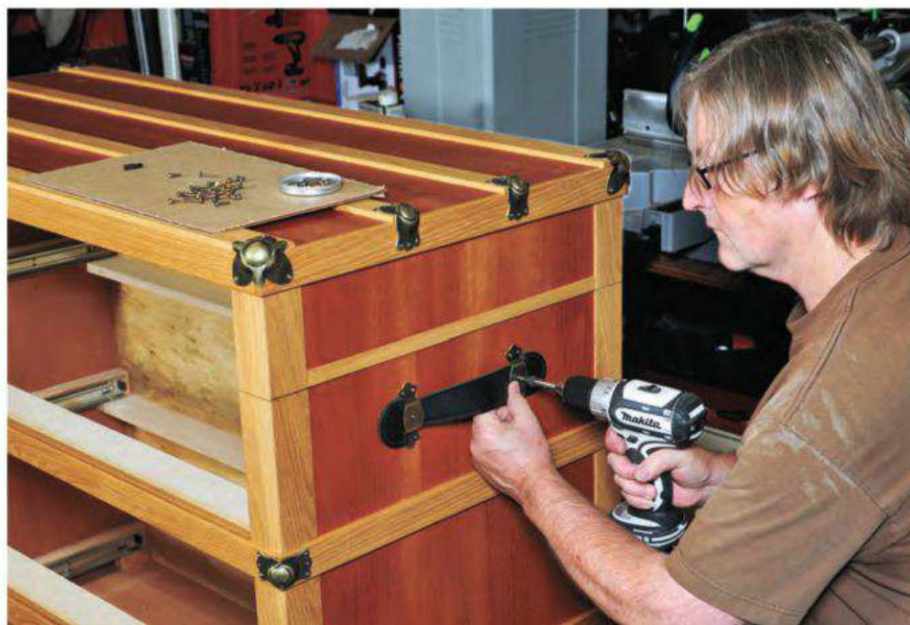
Even though I was able to get all the special vintage trunk hardware from one source (shenandoahrestoration.com), I couldn't get handle caps or mounting screws with the same antique brass finish as the other parts. I ended up treating these parts in a special brass darkening solution I also bought from Shenandoah. To give the caps a more antique look, I lightened up the edges by rubbing with a Scotch-Brite™ pad.

Mount all the hardware, locating the pieces as shown in the *Drawings*. This final task is easy and satisfying, but time-consuming: It takes more than 150 screws to mount all 27 metal pieces, plus the leather handles! Mount the trunk lock and drawbolts first, aligning all parts with the lip strip on the top drawer face. Tap the corner bumps and slat clamps into place

with a rubber mallet until each is fully seated on the slats before setting the screws. Position the cap-style handle loops on the three lower drawer faces, as shown in the *Drawing*. Slip a leather handle into each pair of loops, then drive a #8, 1^{1/4}"-long screw through the top of each to secure the end of the handle. The open-ended loops mount on the sides of the dresser and capture the tab ends of the large leather handles. Mount the lid lifter handles with 3/4"-long #8 roundhead screws driven through brass washers.

Now you're ready to put the dresser in place and fill it with clothes!

Sandor Nagyszalanczy is a contributing editor to Woodworker's Journal. His books are available at Amazon.com.



Deco Barstool in a Weekend

By Rob Johnstone

The juxtaposition of black lacquered clear pine and stunning bird's-eye maple adds drama and elegance to this basic barstool. You can build a pair in a weekend!



Curiously, I don't actually have a bar in my house, but I am planning to add one to my kitchen soon. So when a really nice stash of bird's-eye maple caught my eye, I knew that I needed to buy it and use it to make my stools. In addition to the maple, I used clear pine for the seat sections and foot rails, lacquering them black for a dramatic look. A long weekend in the shop produced two stools and a situation reminiscent of one described by the Beatles. ("I've got no car and it's breaking my heart, but I've found a driver and that's a start!") I guess it's time to get going on a new kitchen counter.

Kicking it Off

I chose to use loose tenons for the majority of the joinery on these stools. One reason I was able to make these stools so quickly was that I employed the Domino XL for that task. However, if you don't own that tool, any loose tenon process (except dowels) would serve you very well (see the sidebar on the top of the next page).

Because I was designing the barstools essentially from scratch, my first work in the shop was building a full-sized mock-up from my rough sketches. When I was satisfied with the mock-up, my next step was to pick through my pile of bird's-eye to find lumber with the best figure and color. Bird's-eye figure presents a bit of a challenge, as it easily tears out as you plane it and run it over the jointer, which is the task that follows lumber selection. So I honed my jointer knives and crossed my fingers ... with the results being a minimal amount of tearout. When the maple boards were flat, straight and out of twist and with one edge jointed to 90-degrees, I stepped to the table saw to rip stock for the legs to width.

It would be hard to overemphasize how important it is to properly prepare the leg stock. When you start to cut the miters that create the shape of the legs, if your stock is at all wonky, it will make the rest of your work much harder. And speaking of the miter cuts — they, too, have to be dead-on.

Building the Leg Assemblies

With the stock properly prepared, I stepped over to my chop saw to cut the leg sections to length. Because I had taken the time to

Loose Tenon Options

Tremendously useful and structurally sound when done well, the technique of using a loose tenon is not a new one. But in recent years, making the loose tenon joints has gotten even easier, albeit in some cases more expensive. This project is made using the Domino XL loose tenon system. It is on the expensive end of the spectrum, but it is also super easy to use. Other less expensive systems include the examples below. Check out Bill Hylton's how-to article (and video) on loose tenons at woodworkersjournal.com. When you get there, just click on the "More on the Web" icon and go to June 2012.



Dowels



beadLOCK®



Dominoes



Shop-made
loose tenons



make a full-size mock-up, I was able to set up the saw from those measurements — you can look to the *Material List* for those details. Cut and miter pieces 1 through 3 to length. Next, mark the locations of the loose tenons at the mitered joints between the lower and center leg components. Form the mortises and test the fit. (If you are making your own loose tenons, there are a couple of extra steps to take here.) If the joints fit properly, glue and clamp them together. Wet both surfaces of the miter joint with a thin coat of glue, and be sure to get glue in the mortises. I found I only needed one clamp to close the joint securely. Allow the glue to cure.

While the glue cures, go ahead and make the crossover (pieces 4) pieces. These short lengths of wood not only join each separate leg subassembly together, but form the joint that secures them both into a single unit; see the *Drawings* for details. When you've cut the crossover pieces to length using a chop saw, mark a center line and cut the through mortise as shown in the *Drawings*. Then drill a 1/4" diameter hole for a dowel, centered, on one edge of each piece.

You can now go back and take the lower leg subassemblies out of their clamps and mark and cut the joints that will allow you to glue the upper leg pieces to the glue-ups (see photos at right). When that is done, glue the upper leg sections in place and set them aside until the glue is dry.

When those components are ready, take them out of their clamps and mark the radii on the mitered corners as shown in the *Drawings*. Cut the curved shapes — I used a handheld jig-saw, but a band saw would work well — and then sand the saw marks smooth. The pieces are now ready for the next step in the assembly process.

As I've already mentioned, the crossover pieces are key to joining the leg subassemblies — and this leads to a moderately complicated glue-up process on this stool project. Start out by locating the crossover pieces between two of the glued-up leg subassemblies that you just completed, as shown in the *Elevation Drawings* on the next page. Mark the mortise locations for the loose tenons in the legs off of the center lines on the crossover pieces and cut the mortises. When that is done and you've tested the fit of the joinery, glue and clamp the pieces together. (Take note of the dowel hole orientation!) For our purposes, we'll call this the primary leg assembly glue-up. When the glue has cured on that effort, take it from the clamps and grab the remaining set of leg components.

Lay the loose leg pieces flat on a work surface in their correct orientation with the crossover blocks between the upper leg seg-



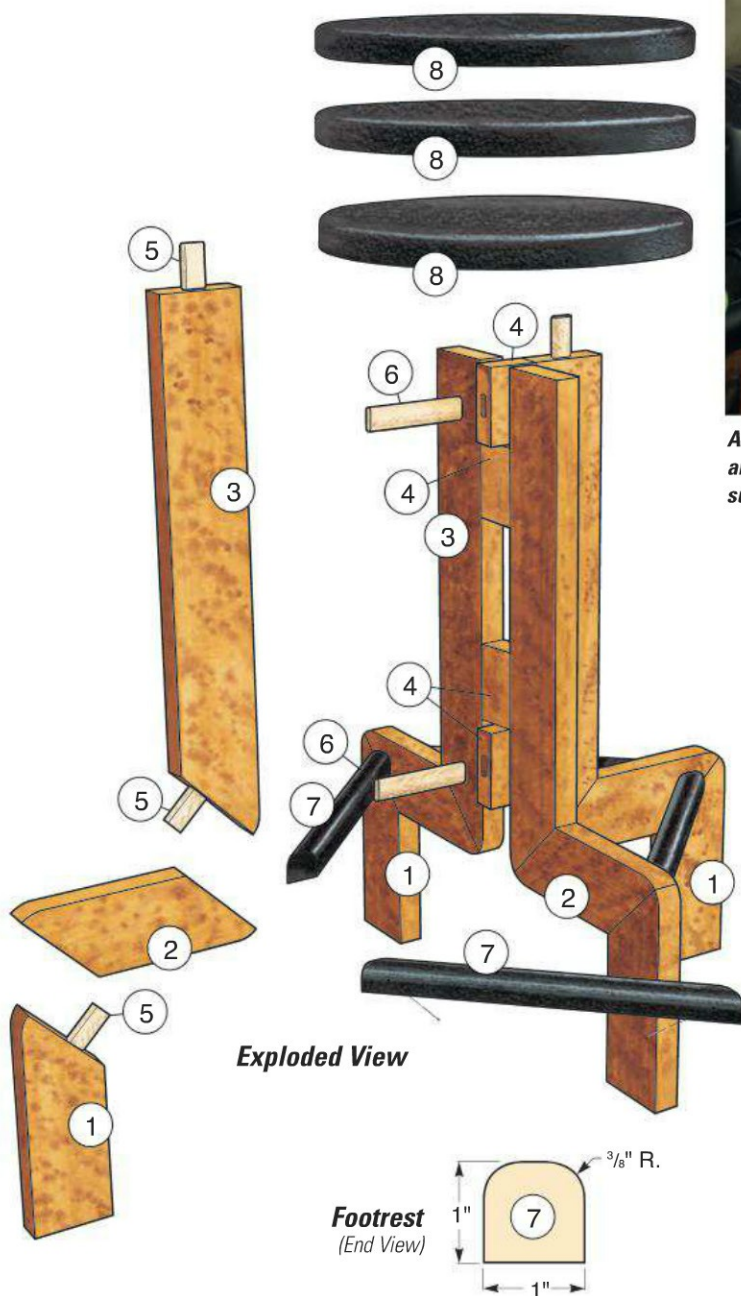
The mitered legs are made and glued up in sections. Here, the lower leg and crosspiece have been glued together. The author is marking the loose tenon location for the upper leg and lower section subassembly joint.



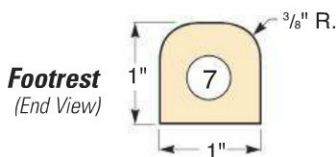
Cutting the mortise for the thick and strong Domino loose tenons is a matter of lining up the machine to a line. The adjustable horizontal fence on the machine locates the mortise in the center of the stock.



After the leg subassembly has been glued up, the loose tenon mortises are cut into the ends of the legs. Transfer their locations to the seat subassembly and cut the matching openings.



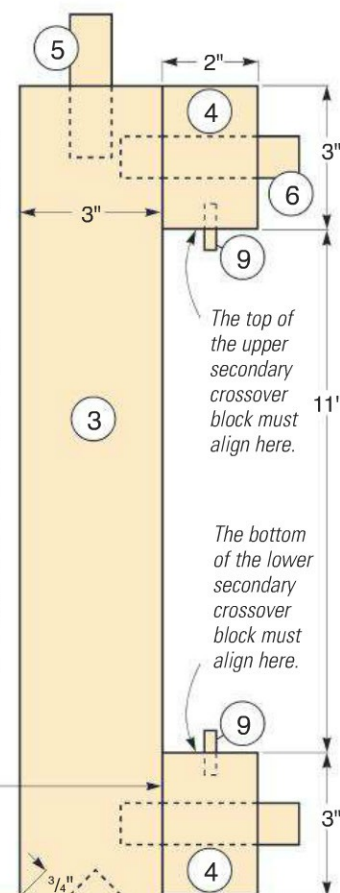
Exploded View



Footrest
(End View)

Primary Leg
Subassembly
(Front View)

The location of the crossover pieces shown here is for the primary subassembly glue-up. The placement of the crossover piece on the secondary glue-up is marked out by using the primary subassembly to establish the secondary crossover block locations.

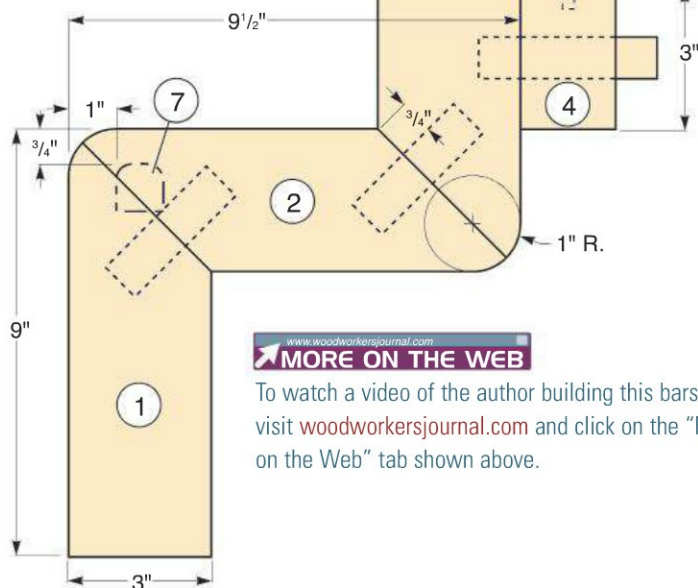


The top of the upper secondary crossover block must align here.

The bottom of the lower secondary crossover block must align here.

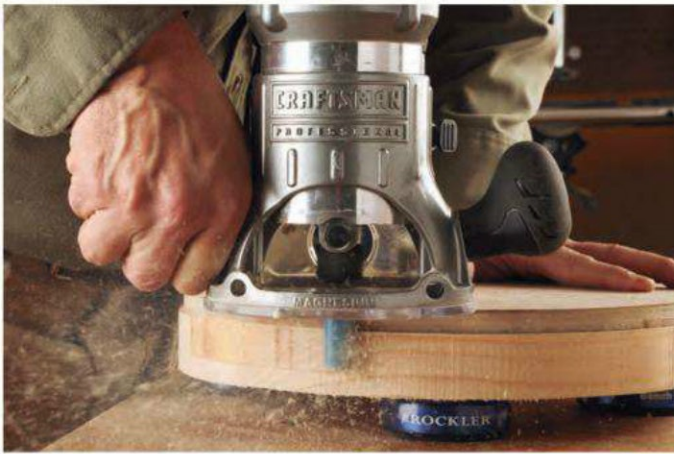
MATERIAL LIST

	T x W x L
1 Lower Legs (4)	1" x 3" x 9"
2 Center Legs (4)	1" x 3" x 9 1/2"
3 Upper Legs (4)	1" x 3" x 20"
4 Crossover Pieces (4)	1" x 3" x 2"
5 Short Dominos (10)	8mm x 80mm
6 Long Dominos (4)	8mm x 120mm
7 Footrests (4)	1" x 1" x 12 3/4"
8 Seats (3)	1 1/4" x 13 1/2" x 13 1/2"
9 Dowels (2)	1/4" diameter x 1"
10 Lazy Susan (1)	4" (optional)



MORE ON THE WEB

To watch a video of the author building this barstool, visit woodworkersjournal.com and click on the "More on the Web" tab shown above.



The author used a 1/2"-thick MDF template and a handheld router outfitted with a pattern-routing bit to make identical seat components. Later, the edges of the appropriate pieces were rounded over.



The author's coworkers thought that the seat should swivel and spin, so he added a lazy Susan to the last layer of the seat sandwich. The recess needs to be slightly less deep than the bearing's thickness.

ments (these pieces will become the secondary leg assembly). Square up the top ends of the legs to each other and then grab the primary leg assembly and place it right on top of the parts on the work surface. Now, here is the important part: slide the crossover pieces of the secondary leg assembly so that their edges (the ones with the dowel holes) align perfectly to the crossover pieces on the primary leg assembly. Carefully remove the primary leg assembly and mark the locations of the crossover pieces of the secondary assembly using the center lines you scribed on them earlier. At this point, it's time to cut the mortises and dry-fit the secondary leg assembly to be sure that it fits together properly.

Putting the Legs Together

One small oddity of this project is that the completed leg assembly needs to be put together with the parts standing upright (see photo at right). Gather the remaining parts together for a test fit (pieces 5, 6 and 9) and practice assembling and clamping the pieces together without glue. The order of assembly is this: put the dowels into their holes in the primary assembly. Push the crossover blocks of the secondary assembly onto those dowels. Slide the loose tenons into one of the secondary leg assembly leg segments and then through their crossover blocks. Push the remaining leg segments onto the loose tenons, and clamp them together. Once you've done this a time or two without glue, do it for real, making sure the primary and secondary assemblies are at 90-degrees to one another as they cure completely. When that is done, sand the assembly, break the edges with sandpaper and cut the mortises at the ends of the legs, as shown in the photo above left. Now you are ready to make the seat.

Sitting Pretty

I made the seat components (pieces 8) out of clear pine lumber because it is relatively lightweight, easy to work and paint ... and because I had it on hand. Any paintable lumber would work as long as it's properly dried and not too heavy. To make three identical pieces for each stool, I used a template and a pattern-routing bit as shown in the photo above. Next, the appropriate edges were rounded over, and then the parts were glued and screwed together. I primed the seats with B-I-N® from a spray can and then used black lacquer for the final finish. When it was dry, I transferred the mortise location from the leg assembly, and I cut the matching mortises. Then I glued

the seat in place and applied a few coats of Watco® Danish Oil, Natural, to the legs.

The last step was to make a long length of the footrest stock (pieces 7), priming and lacquering it black like the seats. Then I mitered each footrest to fit and nailed it in place. A little black lacquer over the nail holes, and they disappeared.

When I brought my first stool to the office to show my staff, they all agreed that I should have made the seat so that it would spin like the stools at a lunch counter. So I made the second one with a lazy Susan between the uppermost seat layers. I have to admit it worked pretty well ... but my rear end prefers the solid seat concept. That is an option for you to decide for yourself. Either way, I think you'll find it a fun project to build. (Now, on to the kitchen bar!)

Rob Johnstone is editor in chief of Woodworker's Journal. He is now in need of a new kitchen bar.



Gluing the two leg subassemblies together is not hard, but it must be done in a specific order. A no-glue test run is a must.

12 Magnetic Tricks for Your Shop

By Charles Mak

In theory, magnets and wood are not a good mix. In practice, however, you'll find many shop-made jigs and other solutions that use magnets as their key components — for both hand tool and power tool users. Here are an even dozen of my favorite magnetic tricks that I use for better efficiency, safety and economy.



Project plans holder



Hand plane and file storage rack

1 Project Plans Holder

To keep project plans out of the way but accessible, I put them in plastic holders and use magnets to “hang” them on my table saw, band saw, lathe, etc. wherever they are needed.

2 Hand Plane and File Storage Rack

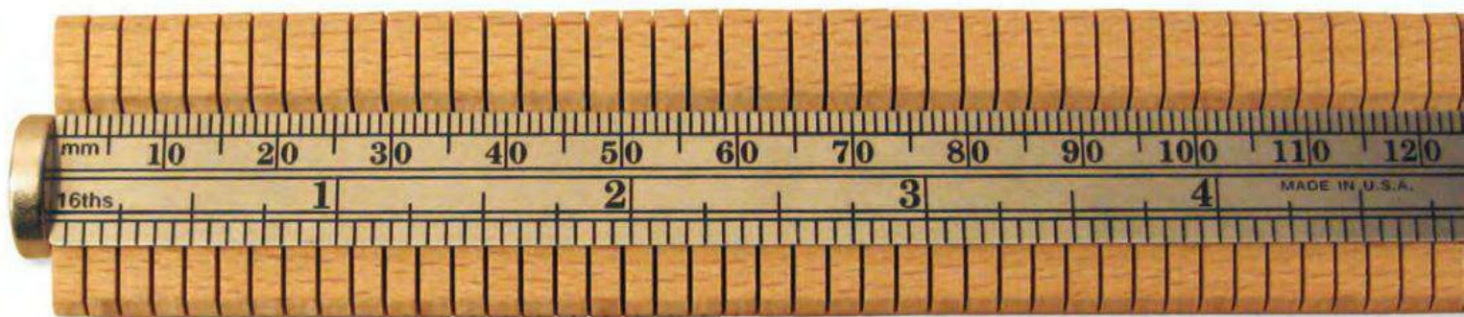
I learned this hand plane storage trick from woodworker and author Chris Wong of Port Moody, B.C. To secure the planes in my wall-mounted tool chest, I predrilled holes and glued magnets flush to the storage surfaces. The magnets keep all the planes in place securely. I use the same method to hold other hand tools such as rasps/files, marking knives and calipers.

3 Snap-On Storage Solution

Ever misplace an accessory or a tool that goes with a machine? I use magnets to keep my accessories attached to the machines they belong to. On my table saw, for example, I can reach for the wrenches, the can of lubricant, etc. below the tabletop quickly. Put magnets on every machine — your band saw, drill press, lathe, etc. — that has a metal surface, and you'll find good uses for them.



Snap-on storage solution



Hook rule "on the fly"

4 Instant Hook Ruler

This clever trick was first published in the February 2011 issue of *Woodworker's Journal*, contributed by a tipster friend of mine, Serge Duclos of Delson, Quebec. By snapping a rare earth magnet to the end of a rule, we can make a hook rule on the fly.

5 Clamp-free Magnetic Featherboard

You can make a clamp-free featherboard without breaking your wallet! Simply cut a notch on each side of a shop-made featherboard to fit a strong handle magnet. Place the board in position on the table saw and insert the magnets into the notches. To disengage the magnets, just pull them sideways.

6 Fridge Magnet Plane Protectors

Free fridge magnets have many uses in the shop. Stick one or two of them to the bottom of a hand plane and you can store the plane down flat without retracting the blade.

Affix gum labels on fridge magnets to turn them into magnetic sticky notes. Finally, you can cut them to size to make soft clamp pads for C-clamps.



Fridge magnet plane protectors

7 Clamping Spacers

The ribs on the underside of some machine tables always get in the way when I want to use an F-style clamp. Instead of filling the voids with auto body filler, I use a spacer block to provide the needed clamping surface. The block is a scrap with a rare earth magnet glued flush to its bottom to hold the block to the table.

8 Honing Jig for Your Scrapers/Scraper Blades



Magnetic honing jig

After filing, the edge of a card scraper or a scraper blade needs to be honed at 90° or 45° respectively. To help me hold the blade at the proper angle on the waterstone while working, I've created a honing jig with magnets glued inset in a wooden block on their 90° and 45° bevel faces.



Clamp-free magnetic featherboard



Magnetized underside clamping spacers



Quick bit finder

9 Quick Bit Finder

Here's a quick trick to save you time finding drill bits or screw bits every time you work with screws: throw a magnet into each container of screws with the drill bit and screw bit of the right size for the screws. To predrill for a screw or drive one, you know the bit(s) you need are right in the containers.

10 Magnetic Handles for Files

Strong handle magnets (100 lb. force) make good removable handles for files. Attach the magnet to the pointed tang of a file up to the teeth area to use as a file handle. By placing cling wrap material between the file and the magnet to protect the teeth, I can also use the handle magnet as an auxiliary handle for better control.

11 Straightedge Guide

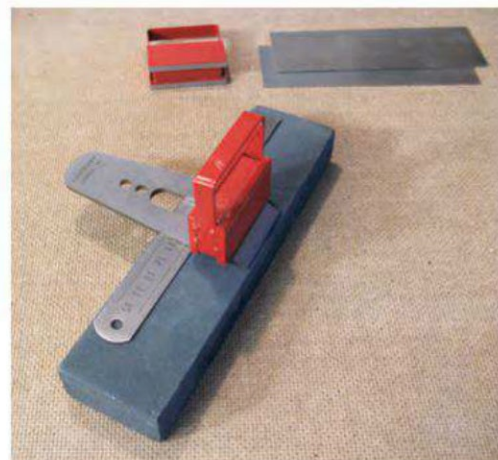
To get an accurate cut along a line marked on a workpiece, I've created an alignment guide using magnets to hold a straightedge flush with the table saw blade's teeth. Simply adjust the miter gauge with the workpiece until the line drawn on the stock matches with the straightedge. The cut will be dead on the line.

12 Handle Magnet Hold-down

British teacher David Charlesworth developed the quick trick of flattening the back of a blade. He places a thin ruler along one edge of a stone so only



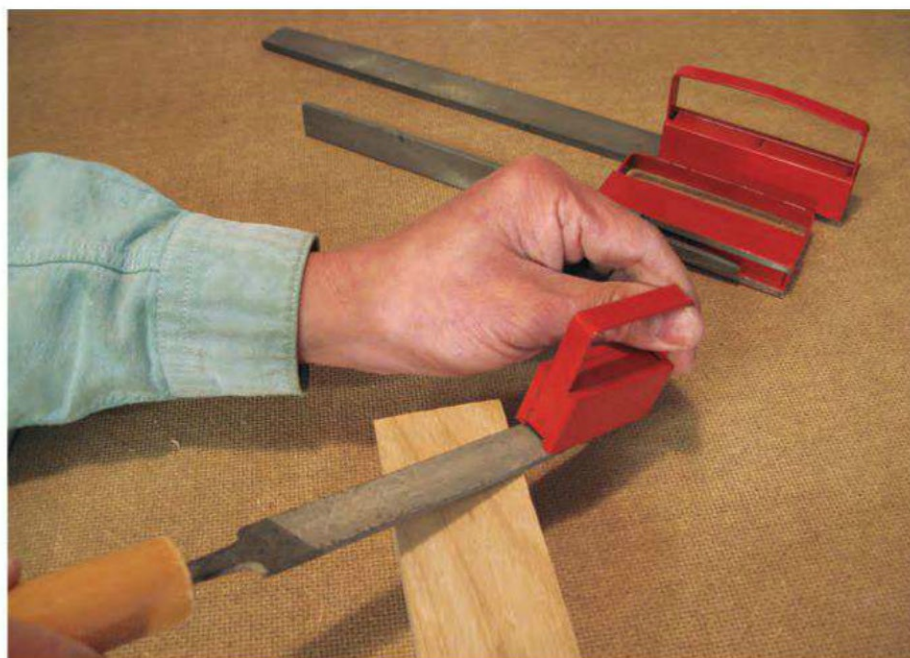
Straightedge guide



Handle magnet hold-down

the part that creates the cutting edge is honed. However, it is difficult to hold a thin blade or a card scraper to use this technique. Not so, if you make a handle for the blade to be sharpened by using a handle magnet.

Charles Mak frequently contributes tricks to Woodworker's Journal. He lives in Calgary, Alberta.



Magnetic handles

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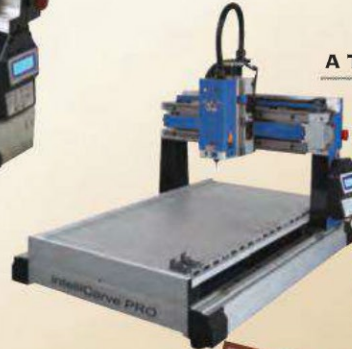
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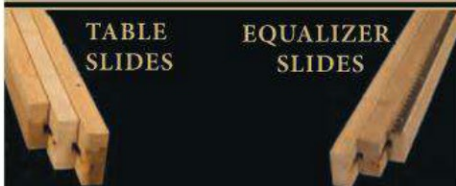
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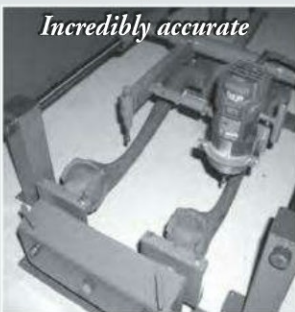
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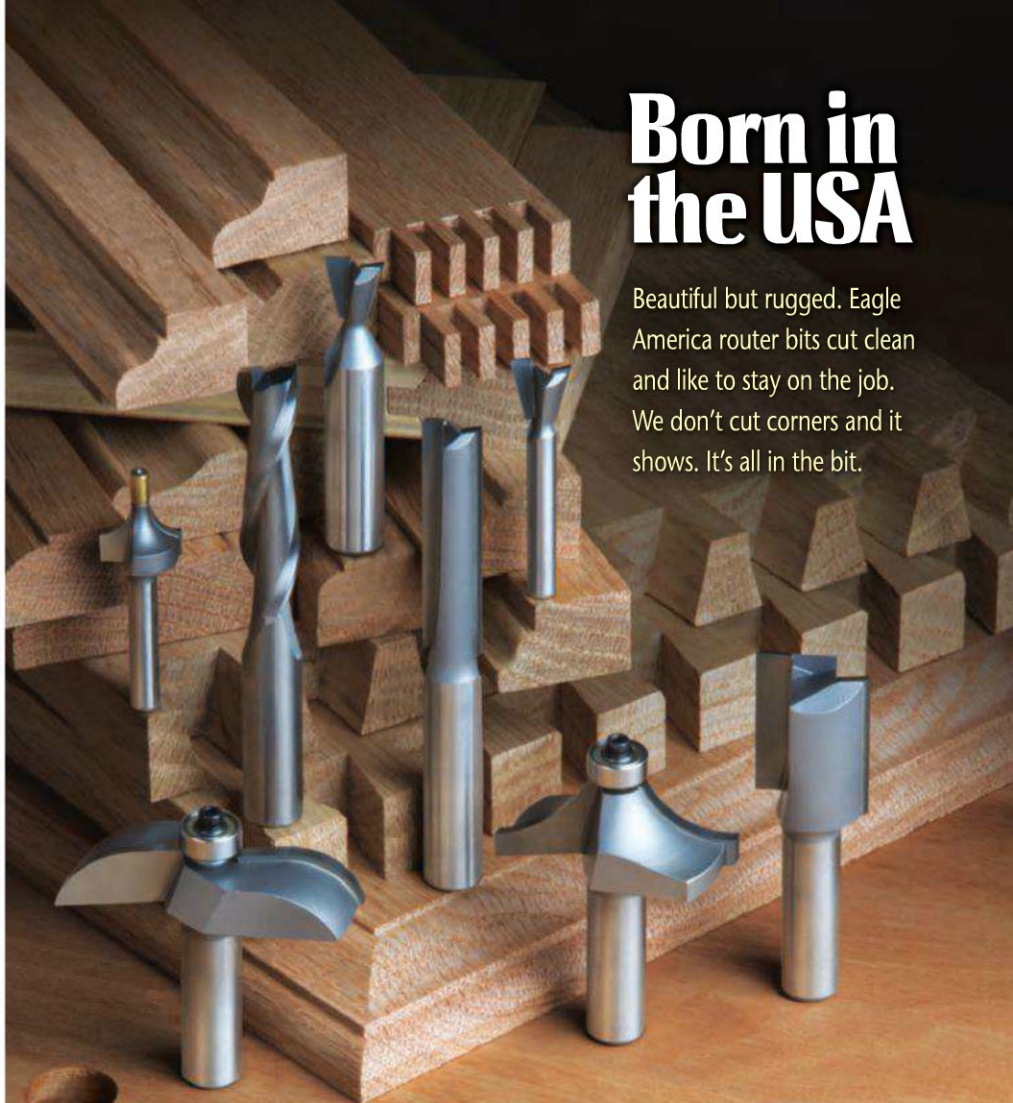
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Today's Shop

Saw Blade Questions Answered

By Chris Marshall

Clean, accurate and safe cuts are what we want — and circular saw blades are designed to satisfy those aims. What do we need to know to choose and care for them properly? Six manufacturers share their advice.

A few good quality saw blades can sure make woodworking more enjoyable, and often we spend a considerable chunk of change on them. We expect top-notch performance and long life from that investment. It only makes sense that questions come up now and then about how to choose, use and maintain blades properly, and you write in for our help. I think blade manufacturers are really the best sources for those answers, so I've rounded up some common FAQs that come into our offices and directed them to the experts at Amana, Forrest, Freud, GUHDO, Infinity and Irwin Marples. These folks were happy to share some nuggets of wisdom for our benefit, and some of their feedback may

even surprise you. I hope this article serves as a good quick reference for those recurring questions you might have about your blades.

Buying Tips

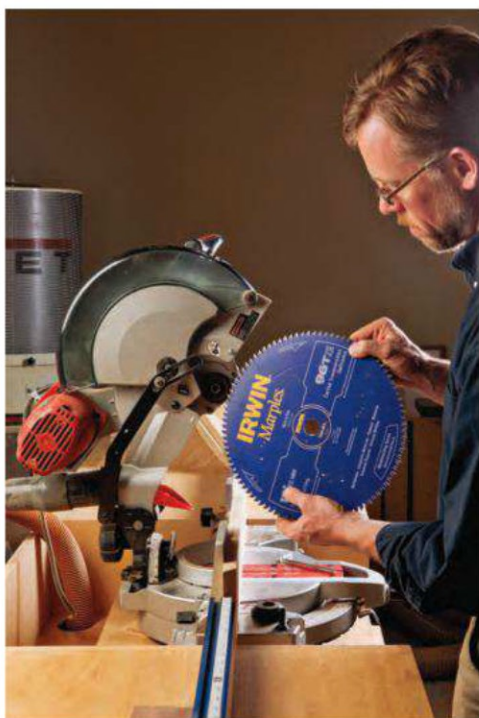
What do I need to know about blade tooth options?

Saw blades are optimized for fairly specific cutting applications and tools, and their carbide teeth are engineered precisely to suit the purpose. There are three main tooth shapes: beveled-edge, flat-topped or chamfered at the corners (called “triple chip”). Beveled teeth alternate left and right at a range of different angles, depending on the blade, to cut cleanly and quickly. Flat-topped teeth are used to clear away the remaining waste behind a

Common Tooth Styles



Blades are outfitted with three typical styles of teeth: alternating bevel-topped teeth (left), groups of beveled teeth followed by a flat-topped raker tooth (center) and triple-chip teeth (right) that may also be accompanied by flat-topped raker teeth.



For fine crosscutting from a miter saw, choose and install a blade with 80 to 100 teeth in a hi-ATB or triple chip grind.

group of beveled teeth on a combination blade or for fast stock removal on ripping blades. Triple-chip teeth are more stout than pointy beveled teeth and take smaller bites. You'll often find them on blades designed for cutting abrasive or chip-prone materials like melamine, laminates, solid surface, plastics and metal or for fine crosscutting.

Tooth geometries are very complex. Besides the top grind that establishes the overall tooth shape, there are shear and clearance grinds to boost performance even further. Space just doesn't allow for full explanation here. But one practical aspect to keep in mind when choosing a specific blade is hook angle. In lay terms, it's the degree to which the teeth tip forward or backward on the blade body. Teeth oriented in "positive" hook angles lean forward to cut more aggressively and quickly. Teeth canted to "negative" hook angles tip backward to withstand greater

abrasion while leaving a smooth cut. Hook angles range from 20° down to -5° or more; positive is typically used for ripping or general cutting and negative is reserved for slower, fine crosscutting applications and when sawing composites.

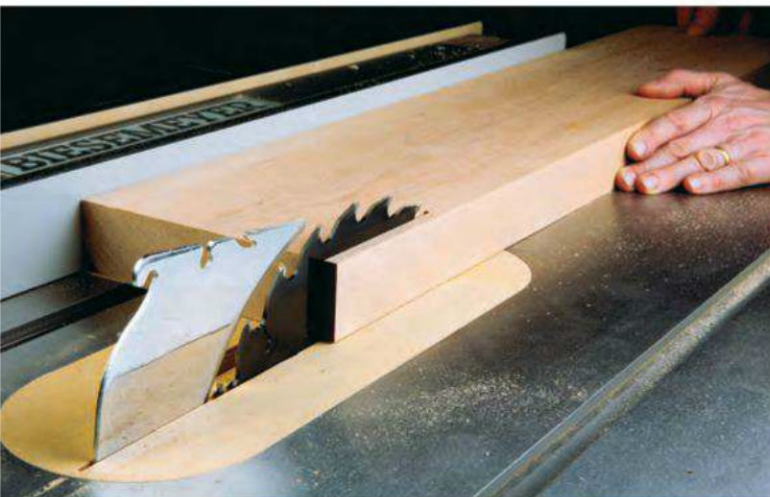
If I spend more and buy more teeth, do I get a better blade?

This is a complex question, because bargain basement priced blades typically won't deliver the results and long-term durability of more expensive, premium blades. On the flip side, an expensive blade with lots of teeth in a geometry that isn't suited for the way you're using it won't meet your expectations, either. More teeth doesn't make a blade "better." Manufacturers agree that we should benefit from their expertise: follow the



Improve your circular saw's capabilities with a two-blade approach: buy a general-purpose blade for DIY jobs and a fine crosscutting blade for more delicate sheet goods.





tool and material suggestions for which the blade is designed in order to use it properly. One blade does not suit all jobs.

OK then, so what are the best blades for my table saw, miter saw and circular saw?

Blade experts tell me that the best compromise for

Specialty Blades



Dedicated ripping blades (left) and blades designed for composites, melamine or plastic (right) can be helpful, but they aren't must-haves for many hobbyist woodworkers.

both smooth ripping and crosscutting on a table saw is a 40- to 50-tooth "combination" blade. Depending on the manufacturer, this might mean the blade has alternating top-bevel teeth (ATB) or has ATB teeth with an intermittent flat-topped or triple-chip raker tooth (ATB + R). For miter saws, if you use the saw for general-purpose cutting

where absolute smoothness isn't critical, choose a 40- to 60-tooth ATB grind with a positive hook angle. But if glass-smooth finish cuts on moldings and other fine work is what you want, switch to an 80- to 100-tooth "hi-ATB" grind (where the teeth are ground to extra-steep cutting angles) with a shallower hook angle, ranging from +10 to -5 degrees. In terms of circular saws, we use these tools for a broad gamut of cutting jobs, but two blades can cover the yeoman's share of tasks: use a 24- to 30-tooth general-purpose

Did your table saw fail the hot dog test?



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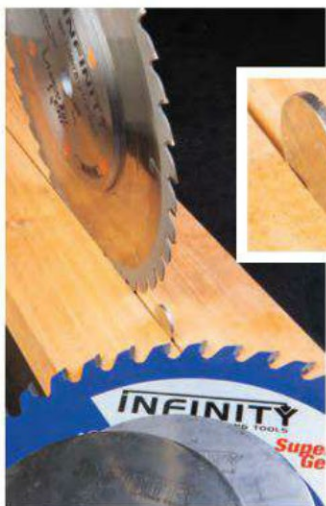
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The Truth About Thin Kerfs and Coatings

Why are there so many thin-kerf blades these days?

As miter saws and portable jobsite table saws have grown in popularity with both woodworkers and contractors, the industry is engineering thinner blades with narrower teeth to suit these lower-powered tools. A thin blade requires less energy from the motor to do its work. But, the experts agree that we should also consider thin-kerf blades to be excellent choices for



heavier-duty saws, too. They remove less material than regular-kerf blades — a benefit for both your wallet and the environment when working with expensive or precious figured woods and exotics. Thin-kerf blades also produce less sawdust for a cleaner, healthier shop

Portable saws, like the Bosch shown here, benefit from thinner blades. But so can heavy-duty hybrid or cabinet saws.

Today's Shop continues on page 56 ...

Thin-kerf blades produce a fraction of a regular blade's dust. Infinity's new Laser Thin Kerf features built-in blade stiffener plates.

ATB blade for rough cuts and construction lumber. Swap that out for a 40- to 60-tooth ATB blade for clean cuts in plywoods, MDF and melamine.

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setting. I was told that advances in blade metallurgy and CNC machining make it possible to create thinner and lighter blade bodies without compromising stiffness or cutting performance. So, don't shy away from choosing quality thin-kerf blades: today's premium options are suitable for every saw we use.

Do blade coatings matter?

On low-cost, "disposable" blades, sometimes coatings are nothing more than paint, I'm told. But, coatings of chrome, a Teflon® derivative or a blend of Teflon and metals such as nickel or aluminum definitely serve important purposes and are part of the blade's design. For one, they reduce friction to keep the blade body and teeth from overheating, which can lead to warping, accelerated tooth wear and pitch buildup. Coatings also prevent corrosion and make blade deposits easier to clean away.

Good coatings extend performance and longevity.

Resharpener:

If you notice harder cutting, more burning or certainly chipped teeth (as evidenced on the blade below), sharpening or repair is both economical and beneficial for your premium blades.



A quality blade coating isn't just eye candy — it's a functional component that reduces pitch deposits, corrosion and heat buildup.

Maintenance Advice

How can I tell when my blades need sharpening?

The experts echo what you've probably already guessed by experience: if cuts are harder to push through and the saw labors, the teeth are probably dull even if you can't see it with the naked eye. Increased burns and swirls on the wood are telltale signs, too. Of course, if any teeth are chipped, it's time to send the blade in for sharpening, but if the teeth all seem to be intact, try thoroughly cleaning your blades first to see if that improves their performance.

Is sharpening worth the cost?

Yes. Manufacturers outfit pro quality blades with thick teeth so that they can be resharpened five to 10 times before the teeth

are spent. If you've never sent a blade off for sharpening, here's what may surprise you: the experts say it typically only costs around \$20 plus shipping to service a 50-tooth blade. That's a bargain compared with replacing the blade and spending three to six times as much. But, you need to start with thick teeth in the first place and then choose a quality sharpening service for best results; blade companies often can recommend authorized sharpeners to keep your blade arsenal in tiptop shape.

Do dirty blade teeth wear out faster than clean teeth?

They do, say the blade gurus, and here's why. Pitch on the teeth and blade body creates friction, and friction creates heat. That heat becomes

Today's Shop continues on page 58 ...

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extreme at the cutting edges, where it can break down the carbide on the molecular level. As pitch builds up on all the contact surfaces of the tooth, the problem just compounds itself, exacerbating heat buildup and reducing the ability of the teeth to cool themselves. Pitch deposits also can throw the blade off balance like a car tire, where wobbling at the rim will lead to poor cutting quality and yes, even more heat buildup. A clean saw blade dissipates heat more evenly and spins true. So, an occasional cleaning is definitely worth the effort.

What's the best way to clean a blade?

There are many specially formulated blade cleaners on the market, and that's what we should use. The manufacturers agree that oven cleaner or other strong chemicals are altogether bad choices, regardless of how well they may seem to work. You wouldn't clean a prized shotgun or the chrome trim on your car with harmful chemicals, so use the same reasoning with your expensive saw blades. Strong acids and bases are too caustic for this application; they can deteriorate the blade coating and weaken the cobalt that binds the carbide particles together. Even if you can't see the results of chemical damage from using the wrong blade cleaner, that doesn't mean it isn't happening.

Neutral pH cleaners are best, say several of the experts I asked. Even a mild dish detergent and warm water can clean off pitch deposits, so long as the blade



Skip the oven cleaner and save your blade teeth. Use a dedicated blade cleaner instead to prolong carbide life.

is coated to protect against rust. Soak the blade until the deposits soften up, then gently scrub the teeth clean with a nylon- or brass-bristle brush. Most of all, be patient. You may have to soak, scrub and then repeat the process, but eventually, all of the baked-on crud will come off. Then dry the blade and apply a rust-preventative spray or oil.

Quality blades can be outstanding performers. With some sensible know-how from the folks that live and breathe blades, we can reap every bit of benefit from our saws.

Chris Marshall is a senior editor of Woodworker's Journal.





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Festool's *SysLite LED Worklamp KAL 100* (item 498568) illuminates your workspace with 170° of dispersion of evenly balanced white light. The light comes with six LED bulbs housed within a rugged casing. Festool says you never need to worry about the light-bulbs breaking, or needing to replace them. The SysLite can run on a variety of power sources, including its internal battery, which has a life of 90 minutes on high or 240 minutes on low (180-minute charge time). You can also use the SysLite with a compatible Festool battery as an auxiliary power source — or run or charge the SysLite from the 120" AC adaptor or 63" car charger included with it. The SysLite LED Worklamp KAL 100 is priced at \$175.

The *TurnMaster* from **Robert Sorby** allows woodturners of all skill levels to choose among three cutting edge materials, which will all fit on one tool. The round, square and detail point cutters are available in tungsten carbide, titanium nitride or high-speed steel versions, all of which will fit onto its indexable head, which allows for a variety of cutting



Festool's SysLite LED Worklamp KAL 100

angles. Users can change cutters with a high-tensile torx screw and key system, and loosen or tighten them with the Tommy bar (not shown) included for adjustments. The patented head on the TurnMaster has three lock-tight positions for shearing and scraping actions. The TurnMaster, made in the United Kingdom, is priced starting at \$116 (depending on the format chosen), while prices for the replaceable cutters start at \$15.



Rockler's 3-Piece Silicone Glue Application Kit

The silicone tools in **Rockler's 3-Piece Silicone Glue Application Kit** are easy to use and easy to clean: wet glue washes off the brush, spreader and tray with warm water, while dried glue cracks and peels off. Included in the kit are a 7" brush with silicone bristles (the opposite end features a tapered paddle

for detail work); a 2½" x 4" spreader for larger surfaces; and a 3" x 5½" tray. That tray provides a place for you to put the glue without leaving the bottle or tube open, and it comfortably fits the brush and spreader. The 3-Piece Silicone Glue Application Kit (item 43662) is priced at \$14.99.

The *LaSquare* from **LaGessee Products** is a combination square on an extra-wide 2" aluminum base that can be used on odd-shaped materials including crown molding, wooden posts, rounded objects and more. The LaSquare can give true line accuracy on multiple contact points. It has a built-in level, a fully hardened and tempered stainless-steel blade and a satin chrome finish with precisely etched graduation marks in 1/64" increments, which are black-filled for readability. The LaSquare combination square



NOTE: See Quik-Link at woodworkersjournal.com for web links to all of these products.



Robert Sorby's TurnMaster

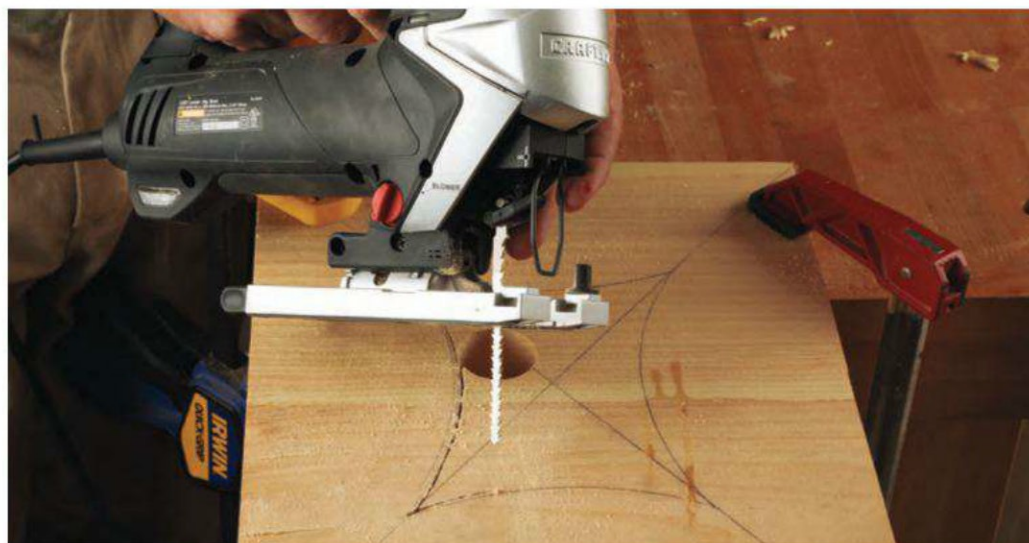
head and miter head is 5" long, with a 90° square face and a 45° miter face. The base model comes with a standard 12"-long blade, while other blade options include 18" or 24" precision ground machinist blades. LaGesse Products' LaSquare is a patented design made entirely in the U.S. Pricing starts at \$32.95.

Triton®'s TRA001 Dual Mode Precision Plunge Router can be used either handheld or mounted in a router table. A single-button switch changes the 3.25hp router from fixed to plunge-base, while a three-stage, pre-set height adjustment system allows the plunge return spring to be removed quickly for easy



Triton's TRA001 Dual Mode Precision Plunge Router

adjustment when mounted in a router table. It accepts both 1/4"- and 1/2"-shank router bits, and the automatic spindle lock will only engage when the power safety switch cover is closed, preventing the tool from being accidentally switched on during bit changes. The Triton TRA001 sells for around \$290.



Spyder Products' Double-Sided Jig Saw Blade



Spyder Products' new *Double-Sided Jig Saw Blade* is an attachment for reciprocating saws that has cross-ground teeth for a slim design. Its unique shaft form permits tight radius cuts and 90° turns. The Double-Sided Jig Saw Blade comes in a woodworking blade and a multi-surface blade. The woodworking blade has longer teeth on both sides of the blade, allowing the user to turn the blade without limitations: it's cutting while it's turning. The Double-Sided Jig Saw Blade is made in Germany of chrome vanadium steel. A set of two 4" woodworking blades sells for \$6.97, while a combination pack (one woodworking blade and one multi-surface blade) is priced at \$5.97.

Williams & Hussey has recently added a new *154CE molding machine* to their line which, like the model 206 and 209 molders, can mill straight, round top and elliptical moldings. Made in New Hampshire, the unit has a new chip extractor that improves waste flow. The 2hp knife motor operates at 230 volts and



produces moldings at a constant 11 feet per minute. The new molder comes with a compact steel stand and costs \$2,195.

Ryobi 18-volt ONE+ LITHIUM+

Ryobi has introduced the *18-volt ONE+™ LITHIUM+™* System of lithium-ion batteries. These batteries provide fade-free power for maximum performance throughout the charge, with 35 percent more runtime, a charge held four times as long and a 45 percent lighter weight than Ni-Cd batteries. The LITHIUM+ batteries also increase torque up to 15 percent and are backwards compatible with any of Ryobi's previously released ONE+ tools. The charger can charge batteries in as little as 30 minutes. Indicator lights show the battery's status as it charges, and a

Williams & Hussey's 154CE molding machine

temperature LED display indicates if a battery is too hot or cold to charge. Batteries stored on the charger are in

"maintenance mode" to maintain peak performance, while the Energy Star® qualified system enters an Energy Save Mode (when it's not charging or maintaining a battery) to conserve energy, protect battery cells and maximize battery life. The LITHIUM+ batteries are available in a single and double pack, with suggested prices of \$54 and \$99, respectively. Tools released with these batteries include the 18-volt 6-piece Ultimate Combo Kit, which includes two 18-volt batteries, drill, impact driver, circular saw, reciprocating saw, JobPlus™ base with multi-tool attachment, worklight, dual chemistry charger, universal multi-tool accessory adapter, saw blades, sandpaper and a tool bag. This kit, model P884 costs \$299.

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Powermatic Launches Drill Press “Just for Woodworkers”

by Rob Johnstone

The PM2800B 1hp drill press is just being released as we go to press — luckily, we got a sneak peek at this tool early last fall ... here’s what we found.



Here’s the latest entry in the collection of uncommon drill presses that have been designed primarily for woodworking. This sturdy offering from Powermatic has features that focus on accuracy.

From the perspective of this graying woodworking editor, new stationary power tool offerings have seemed a bit like a threatened species for the last few years: hard to find in the first place and even harder to get your hands on one of them when you do. That’s one of the reasons that I was motivated to travel to LaVergne, Tennessee, last fall to get a grip on this new drill press from Powermatic — literally and figuratively. The folks at Walter Meier were kind enough to let me check out their one and only sample ... with the caution that we could not publish anything about it until now. So here is your first in-depth look at the PM2800B drill press.

When you step back and think about it, the basic idea

behind a drill press is a pretty simple one. Whether it is a floorstanding model or one designed for the benchtop, its basic configuration (motor, quill, drill chuck, table and post, etc.) has not changed much in many, many years. And that is part of the problem — drill presses were born in the machine shop and made for drilling steel, brass and other metals. They made their journey to the woodshop without much difficulty, but without much focus on the differences between the materials being machined. In recent years, a few machines have been made with their focus specifically on the tasks that a woodworker would perform and, just as important, the material that we would be working with. The PM2800B is one of those.

POWERMATIC PM2800B DRILL PRESS AT A GLANCE:

- 1hp, 115-/ 230-volt motor
- 5/8" max-shank diameter, keyless chuck
- Aluminum extruded fence with cam locks
- Laser guide; Two LED worklights
- 250 to 3,000 rpm bit speed
- Table size: 14" x 20"
- Weight: 246 lbs.
- Warranty: 5 years
- Cost: \$1,399.99

What Goes Around

The proper operating rpm of various drill bits is a consideration that woodworkers should accommodate as we shift from large Forstner bits to slender brad points ... but mostly we don't. The reason is that, in most standard drill presses, changing the belt from one speed to another is an annoying, dirty and finger-pinching manual effort. That is why the on-the-fly variable speed controls on this tool are so valuable. In addition to making it easy to change the bit speed, this tool has a digital readout that tells you what the rpm are. This provides repeatability and control as you use different bits. In this case, the rpm adjustment wheel looks like a

control wheel on the front of your table saw — I found it easy to use, with clear labeling to tell me which direction was faster or slower. The display was easy to read as well.

With that bit spinning, one complete revolution of the quill handle delivers a full six inches of spindle travel. This is an example

of delivering value to woodworkers specifically, where boring deep holes is a common task. To control that depth of drilling, there is an easy-to-adjust depth stop. Another nice feature of this tool is the keyless chuck, which accepts shanks up to 5/8" in diameter ... so it can handle a hefty beast of a bit.



The revolutions per minute (rpm) of the drill bits is adjustable on the fly using the wheel shown at left. The digital readout (above) reports the actual speed — and is variable from 250 to 3,000 rpm.

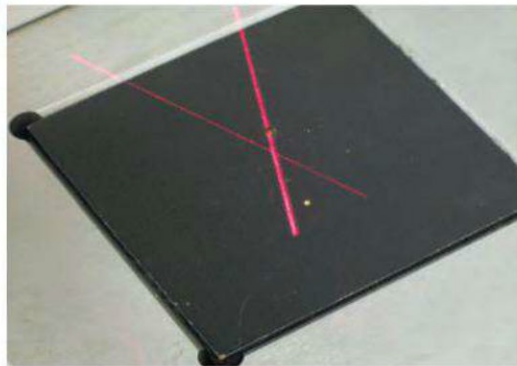


Two LED lights provide virtually shadow-free illumination to the workpiece. Also, note the left-hand optional placement for the quill handles to accommodate ambidextrous drilling operations.



A safety key must be in place or the machine will not turn on. Once removed, the machine will not start even if the large red button is pulled out. If the machine is plugged in, the green light is on.

Built-in Accuracy



Drilling accurately, especially repeated holes, requires accurate setup and fences. The PM2800B has a laser guide (upper left), a quick-adjust depth stop (lower left) and an adjustable flip-up stop attached to the fence (upper right). The fence has a slick and easy-to-use cam-lock system. The cams (above and lower right) are finger-operated, requiring no tools. The black square in the photo (above left), is a replaceable insert that can be adjusted to the level of the tabletop.



There are also two LED lights to illuminate the work surface and an adjustable laser guide to help accurately locate workpieces prior to drilling.

Cast Iron Table

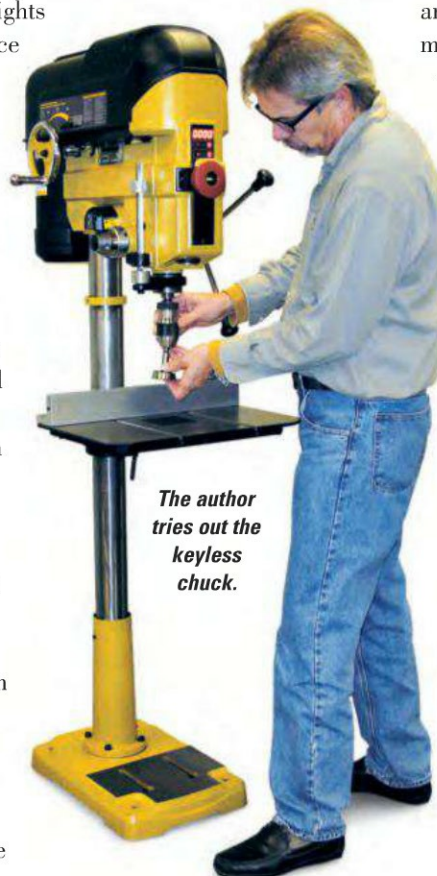
The rectangular work table on this drill press is outfitted with a replaceable square insert that is aligned to the table using leveling screws. Another nice option is that the table can be rotated a complete 90 degrees (or anywhere on that scale), letting you bore holes into the end grain.

I found the fence and its cam-lock adjustment system to be a really nice touch. The fence is made from an aluminum extrusion, and it is secured to the table with quick-adjust cams that have

anchor heads in the table's machined slots. The one I tried slid across the table smoothly and then locked tightly in place. There is also a flip-up stop attached to the fence.

Additional features worth noting: a large and heavy base for added stability, a safety key to prevent accidental startup, reversible handles for you lefties out there and a 5-year warranty to tidy up the package.

All in all, I found this new drill press to be a very good addition to a woodworker's shop. While this was not a true "tool test," I found the features and details on this tool to be top-notch.



The author tries out the keyless chuck.

The early years:

It seems likely that the drill press was invented some time between the development of the first high-functioning electric hand drill (approximately 1914) and the first U.S. patent for a drill press in February of 1920.

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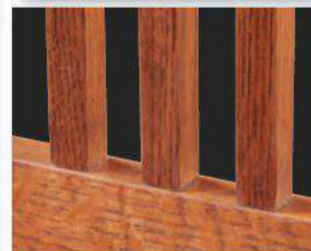
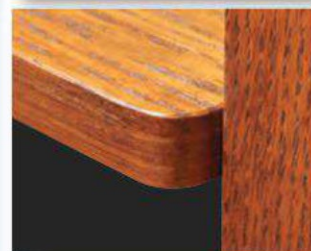
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NEW!

Small Shop Journal

Stickley-inspired Bookcase

Don't let a modest machine tool collection or a small shop stop you from building heirloom projects. Move this quartersawn oak bookcase to the top of your project list — it's easy!



There seems to be a cyclical nature to shop sizes — most woodworkers start small when they take up the craft, then end with small shops again late in life. But small shops and the smaller benchtop machines that suit those spaces shouldn't keep a woodworker from continuing to build substantive and challenging projects. That's why we're pleased to kick off our new "Small Shop Journal" article series with this compact Stickley-inspired three-shelf bookcase. It's designed with mortise-and-tenon joinery and detailed with cloud lifts, slatted accent stiles and pyramid-topped legs. Rift- and quartersawn white oak with showy ray flake are the ideal choices for Stickley pieces, but you don't need a huge quantity of it to complete this project — around 20 board feet of 4/4 lumber is enough. You'll need access to a

thickness planer for surfacing the lumber to both 3/4" and 5/8" thicknesses (we used a portable "lunchbox" style), plus a jointer or jointer plane to flatten the reference faces and edges. Otherwise, the required tool lineup is very modest (see the tint box, next page). Let's get started building it!

Starting with the Legs

It would take 8/4 stock to make the four 1½"-square legs (pieces 1) from single pieces of lumber, and that's tough to come by. So, here's an affordable approach that also provides more consistent grain pattern on all four faces of the legs: make them from doubled-up 4/4 riftsawn stock instead. Riftsawn, in which the growth rings run roughly 45° to the board faces, exhibits a

This Small Shop...

SHOP SIZE:
10' X 14'

PRIMARY TOOLS:
Benchtop Planer
Portable Table Saw
Router Table
Oscillating Spindle Sander
Jigsaw
Drill/Driver

ACCESSORIES USED:
Doweling Jig
Pipe or Bar Clamps
3/8" & 1/2" Mortising Chisels

more uniform, linear grain pattern from face- to edge grain. That helps the long glue seams on these legs to all but disappear in the blended edge grain. After surfacing two wide boards to 3/4" thickness, face-glue them together. When the glue cures, rip the four legs to rough width, square them up and cut the legs to final length. Arrange the legs together, marking which faces you'll want to see from the front and sides; orient the glue-seamed faces to the sides and solid faces to the front and back.

There's a good deal of mortising to do on these legs: five mortises each in either 1/2" or 3/8" widths, depending on the joint. Carefully lay out the mortise locations on a front and back leg, using the *Drawings* on page 70. Then, transfer corresponding mortise layouts to the other front and back leg for consistency. Remember, the front and back leg pairs are mirror opposites, not duplicates. Double-check your accuracy before setting up your router table to begin the milling process. Another tip to stay organized is to cut all the mortises of one width first before switching router bits to cut the remaining wider or narrow mortises. We started with a 1/2" upcut spiral bit to rout the short front shelf support mortises, followed by the three back stretcher mortises. Mark your router fence to identify the outer edges of the bit, then mill the mortises in a series of "drop cuts" against the fence to reach the final mortise depth of 1/2". When these are done, chuck a 3/8" spiral or straight bit and adjust the fence settings as needed to tackle the pair of 2 3/4"-long side rail mortises; they're also 1/2" deep. Chisel the mortise ends square.

Now you can head to the table saw to cut pyramid tops on the legs. Tilt your saw blade to 18.5°, and make a series of four beveled crosscuts 1/4" down from the top ends of the legs to raise the peaks. Use a sharp blade! Tip: hold the legs against a wide scrap fence on your saw's miter gauge to support these cuts. Make a kerf cut through the fence to help position each beveled crosscut accurately. Or, start with a very long fence so you can clamp a stop block to register the leg bottoms instead.

Completing the Side Assemblies

Set the legs aside, and mill stock for the four side rails (pieces 2) next. Their 3/8"-thick tenons are offset on the rail thicknesses, with 1/4"-wide shoulders adjacent to the inside faces of the rails and narrower 1/8" shoulders on the outside faces. This way, the side rails will install flush with the inside faces of the legs and against the shelf ends. Cut the 1/2"-long tenons on

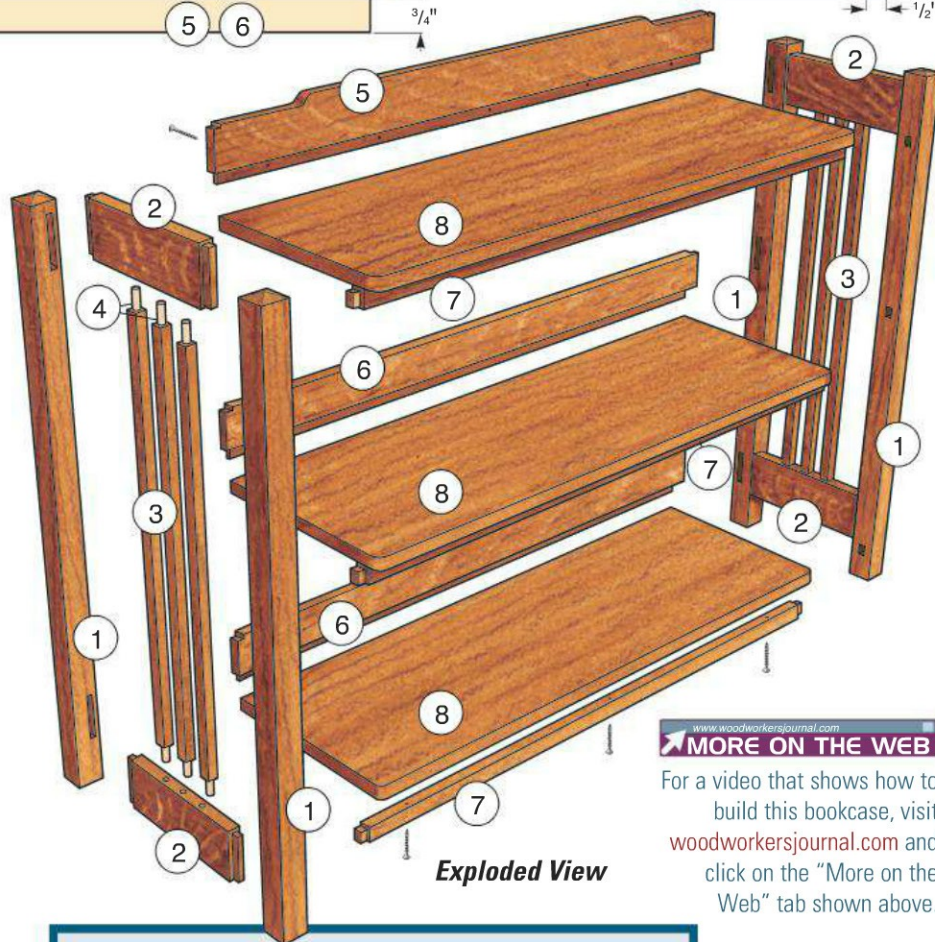
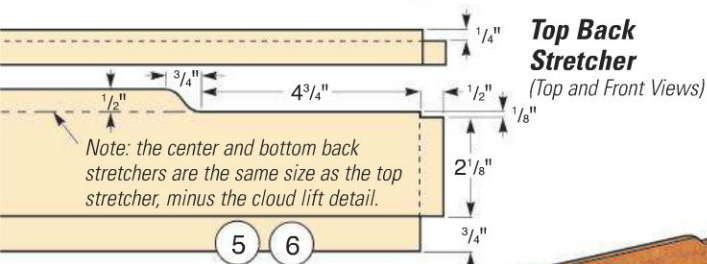


Once the leg blank mortises are marked, set up 1/2" and 3/8" spiral or straight bits to mill the five mortises each leg requires. Use a series of deepening "drop cuts" against the fence to reach the final 1/2" depth.



Mill the offset tenons in the side rails at the table saw (above), backing the workpieces against a tall scrap fence attached to the miter gauge. A clamped doweling jig (right) makes the narrow accent stiles easy to gang up and drill accurately. Glue and clamp the parts to form two side assemblies (below).





MORE ON THE WEB
For a video that shows how to build this bookcase, visit woodworkersjournal.com and click on the "More on the Web" tab shown above.

MATERIAL LIST

	T x W x L
1 Legs (4)	1 1/2" x 1 1/2" x 32 1/4"
2 Side Rails (4)	3/4" x 3" x 9 1/4"
3 Side Accent Stiles (6)	5/8" x 5/8" x 23"
4 Dowels (12)	5/16" Dia. x 2"
5 Top Back Stretcher (1)	3/4" x 3 1/2" x 35 1/2"
6 Middle, Bottom Stretchers (2)	3/4" x 3" x 35 1/2"
7 Shelf Supports (3)	3/4" x 1" x 35 1/2"
8 Shelves (3)	3/4" x 11 1/2" x 34 1/2"

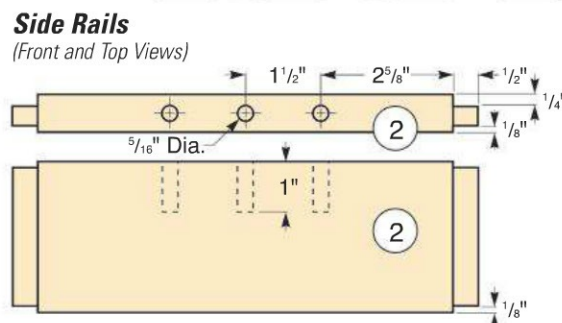
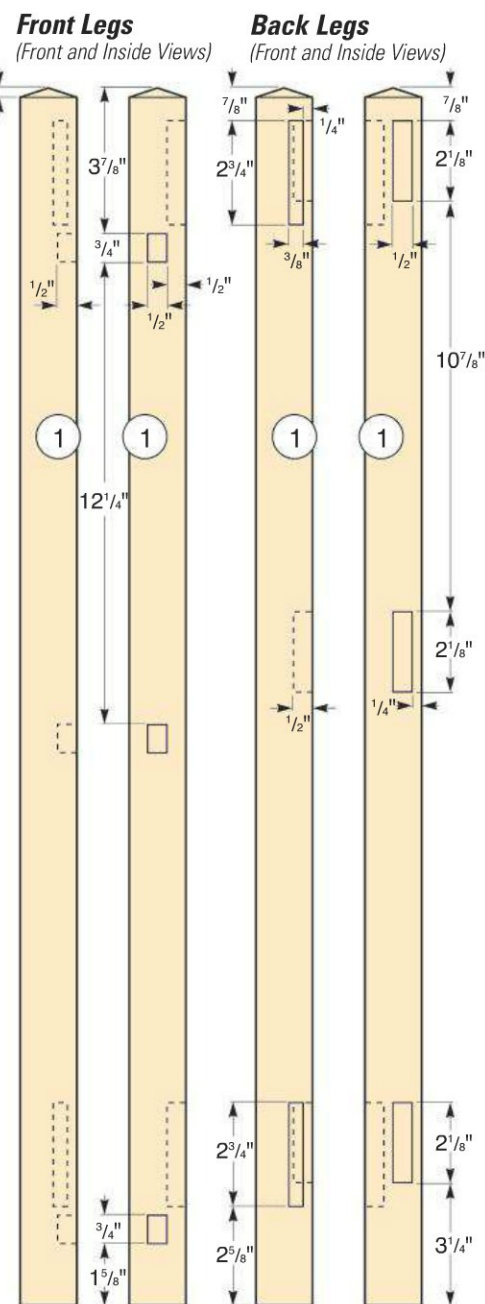
your table saw supported by the miter gauge — remember to change the blade height accordingly when cutting the two different shoulder sizes. A test piece cut first is always a good fail-safe in these situations. When the tenons are finished, mark and drill three 5/16"-diameter holes about 1/16" deep for the dowel pegs that will fix the accent stiles in place. Use a doweling jig and drill/driver outfitted with a brad-point bit, or bore the holes at your drill press, holding the rails against a clamped fence.

Wrap up the parts you'll need for the bookcase's two side assemblies by making the six accent stiles (pieces 3) from sticks

of 5/8"-square stock, with 11/16"-deep holes bored into both ends. Gang-clamp the stiles several at a time in your doweling jig to hold them squarely and evenly while you drill the centered dowel holes. Cut 12 dowel pegs (pieces 4) from a 5/16" rod and chamfer their ends to make them easier to tap into place.

Sand the legs, side rails and accent stiles up to 180-grit, and dry-fit the two side assemblies. If all seems in order, glue and clamp the parts together, checking the diagonals for square.

Small Shop Projects continues on page 72 ...





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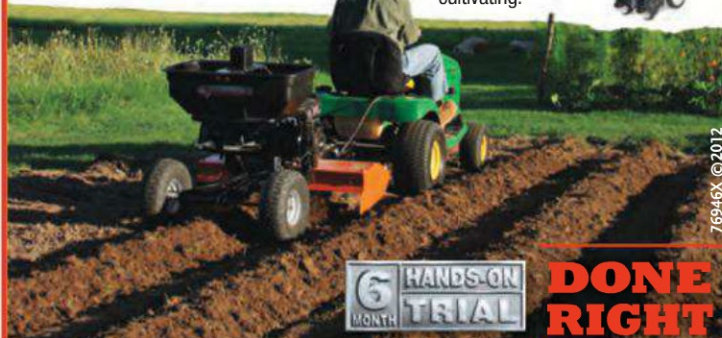
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Building the Shelf Stretchers and Supports

The three back shelf stretchers (pieces 5 and 6) have a unique tenon style: there's no shoulder on the inside face, a 1/8" shoulder on the top edge, a 1/4" shoulder on the back face and a 1/2"-deep, 3/4"-wide rabbeted cutout that takes the place of what would otherwise be the bottom shoulder. It allows these stretchers to sit flush with the back of the bookcase, and the tongue of their rabbeted bottom edges to serve as an attachment point for the back edges of the shelves. Study the *Drawing* on page 70 and the upper photo, below, for a visual reference.

You'll want to make a test piece for dialing in the cuts required to make the top support tenons and a separate test piece for cutting the center/bottom support tenons — the tenon positions vary because of the cloud lift shape on the wider top support. While you can mill the tenons by ordering the saw cuts however you like, here's a suggestion: mill a 5/8"-wide shoulder into the top edge of the top stretcher; it's just 1/8" for the center and bottom stretchers. Use your miter gauge and a wide dado blade buried in a sacrificial fence. Make the 1/4"-wide rear-facing shoulder cuts on all three parts next, and finish up with the 1/2"-deep, 3/4"-wide bottom rabbet cuts last. Once the tenons are roughed to size, lay out and cut the cloud lift shapes and their adjacent "flats" along the top edge of the top back stretcher. Smooth these cuts and curves carefully with a file and sandpaper, or use an oscillating spindle sander if you have one.

Now make the front shelf support stretchers (pieces 7). The tenons are 1/2" long and centered conventionally on the ends of these three parts.

Shave the tenons with a hand plane if needed, to tweak their fit in the mortises, then dry-assemble the six cross-supports between the bookcase sides. Final-sand them before gluing and clamping the big framework together.



Mill a rabbet along the bottom edge of the back shelf supports to form attachment surfaces for the shelves (top). A template and jigsaw create the cloud lift profile; file or sand the contours smooth (bottom).



Use long clamps to draw the side assemblies, stretchers and shelf supports together (top). Apply finish, then drive screws through the stretcher tongues and into the shelf backs (right). More screws attach the front supports to the shelves (bottom).



Wrapping Up with Shelves and Finish

Set the frame aside for a spell, so you can edge-glue some nice quartersawn stock to make your three shelves (pieces 8), then rip and crosscut them to final size. Round their outer front corners with 1/2" radii to add a subtle and attractive detail. Once you give the shelves a final sanding, all the bookcase parts are ready for finish — do it now while the shelves are loose. We used General Finishes Antique Walnut gel stain to mimic a traditional ammonia-fumed look, then topcoated with satin lacquer.

When the finish dries, drive five countersunk flathead wood screws through the tongues of the back stretchers and into the back edges of the shelves to pin them in place. Follow this with three or four 1 1/2"-long countersunk wood screws driven up through the front shelf supports and into the bottom faces of the shelves to secure them in front. Since these quartersawn shelves will expand and contract through their thickness and minimally across their width, unlike flatsawn stock, don't worry about wood movement issues by anchoring the shelves widthwise and restricting them. All will be well. Enjoy your new bookcase!

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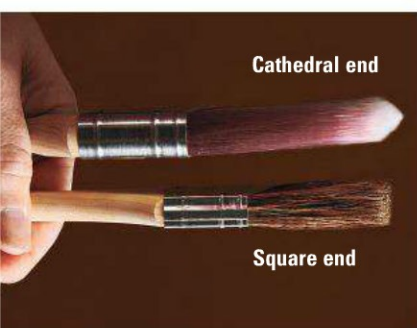
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Finishing Thoughts

Brushing Up on Brushes

By Michael Dresdner

How much is there to know about a “paint” brush? Well ... more than you probably would suspect.



Just as particular saws and planes excel at certain jobs, so it is with brushes. Conventional wisdom divides brushes into categories by bristle type, end configuration and body shape to match up with various tasks and types of finishes.

Bristle Type

Perhaps the most important choice is between natural and synthetic bristles. Natural bristles are made from a wide variety of animal hair. They

work well with solvent and oil-based coatings, but not with water-based finishes.

That's because natural hair gets waterlogged and loses its springiness, one of the characteristics you look for when buying a brush.

Choose natural hair that is springy, to give you control, but soft and fine enough, especially at the tip, so as not to leave brush marks. Good choices include badger, fitch, pony, sable and squirrel hair. One common varnish brush

configuration mixes springy China (hog) bristles with soft ox hair.

Most natural hair starts out as a bristle that tapers to a point, but with use, the end of the bristle splits. The hair care world calls them “split ends” and hates them, but we finishers call them “flagged ends” and love them. Once tips flag it's like having several ultra-fine hairs on a stiffer shaft. It's the best of both worlds: a whisper-soft end on a springy shaft.

Synthetic bristles, which work with both oil- and water-based coatings, can be made in any diameter, length or stiffness, and with either flagged or tapered ends. Various bristle trade names, like Chinex® and Syntox™, attempt to mimic the best qualities of natural hair, and often succeed. Oddly, while flagged ends work best with oil-based coatings, tapered ends excel with water-based, because multiple flagged ends tend to create more air bubbles as they whisk through the coating.

When buying a brush, whether natural or synthetic, flex the bristles. They should be springy, but not too stiff. Look at the tips with a lens to detect flagging or taper.

End Configuration

Paint brushes, designed for crude work, are cut square at the top, while varnish brushes have hair set in ranks to form a double tapered cathedral end toward the tips. When deflected during finish application, this taper forms a ramp terminating in a feathered line of soft ends, which flows finish with a minimum of brush marks.

Body Shape

The brush end may be at 90 degrees to the edge, or skewed at about 15 degrees. The latter, often called a sash brush, allows you to get into inside corners more easily. Use whichever is more comfortable and effective.

A Final Word

Keep two things in mind. First, there is a learning curve for proper brush use, just as with any hand tool. Second, use what works for you, even if it flies in the face of standard advice. For example, I find those flat, plastic-backed paint pads, with their thousands of very short, very soft bristles, better than brushes for applying smooth coats of water-based finish to flat surfaces.

CONTACT US with your “Finishing Thoughts” by writing to Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340, or by emailing us at: finishing@woodworkersjournal.com. Please include your contact information with your thoughts or questions.



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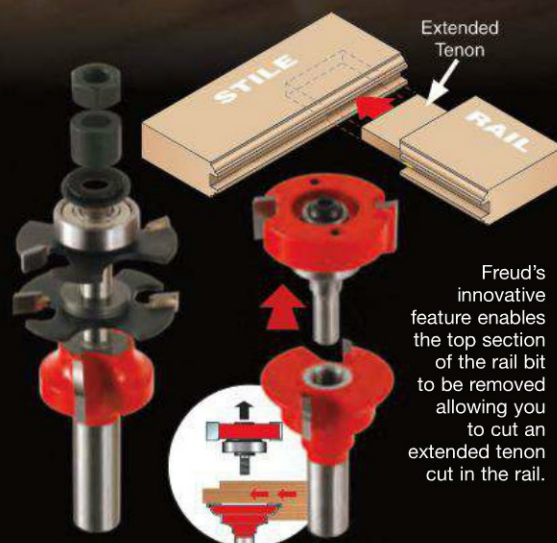


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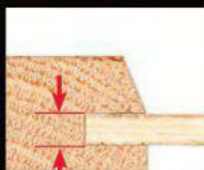


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