Choosing Compact Compressors
5 questions you've got to ask

AMERICAN WOODWORKER®

Super-smooth Polyurethane in 2 easy steps!

Tune up even the ugliest jointer

New tenoning jigs make accuracy easy

Sharpening gouges —the key to great bowls

Plumb your shop with compressed air

Modern Mission Wall Cabinet

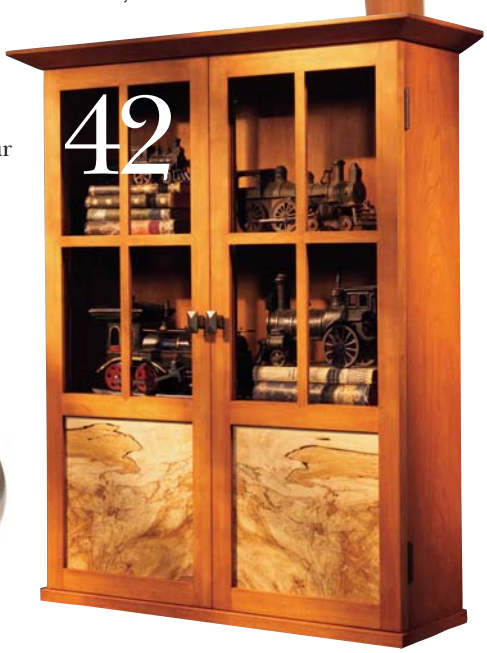
#123 September 2006
www.americanwoodworker.com
$5.99 U.S. / $6.99 CAN

BUILD YOUR SKILLS • BUILD YOUR SHOP

Contents

#123, SEPTEMBER 2006

Features



Departments

COVER PHOTOGRAPHY: BILL ZUEHLKE;
INSET: VERN JOHNSON

Subscriptions

American Woodworker Subscriber Service Dept., P.O. Box 8148, Red Oak, IA 51591-1148, (800) 666-3111, e-mail AWWservice@rd.com

Article Index
A complete index is available online at www.americanwoodworker.com

Copies of Past Articles
Photocopies are available for $3 each. Write or call: American Woodworker Reprint Center, P.O. Box 83695, Stillwater, MN 55083-0695, (715) 246-4521, 8 a.m. to 5 p.m. CST, Mon. through Fri. Visa, MasterCard, Discover and American Express accepted.

Back Issues
Some are available for $6 each. Order from the Reprint Center at the address above.

Comments & Suggestions
Write to us at American Woodworker, 2915 Commers Dr., Suite 700, Eagan, MN 55121, (651) 454-9200, fax (651) 994-2250, e-mail aweditor@readersdigest.com.

The Joy of Woodworking

My earliest woodworking memory goes back to when I was 8 years old. I sneaked a handsaw out of my dad's shop and used it to saw some branches off a willow tree limb that had blown down in a storm. I can still feel the excitement and satisfaction as I stroked the saw through the branches and watched sawdust gather on the ground.

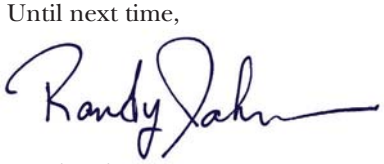
In later years, I enjoyed many fine hours woodworking with my dad in his shop. I'm sure those happy times working with tools contributed to my eventually becoming an industrial arts teacher, furniture builder and now an editor of a woodworking magazine.

Recently, I had the opportunity to teach an introductory class on shop safety and power tools at a local woodworking school. The class had five students: a woman who wanted to learn more about tools so she could remodel her house, a man who had been a chemical engineer for 35 years and had always wanted to learn about woodworking, and a father and his two daughters, ages 14 and 17. The father and daughters came because they thought it might be fun to try something new and different.

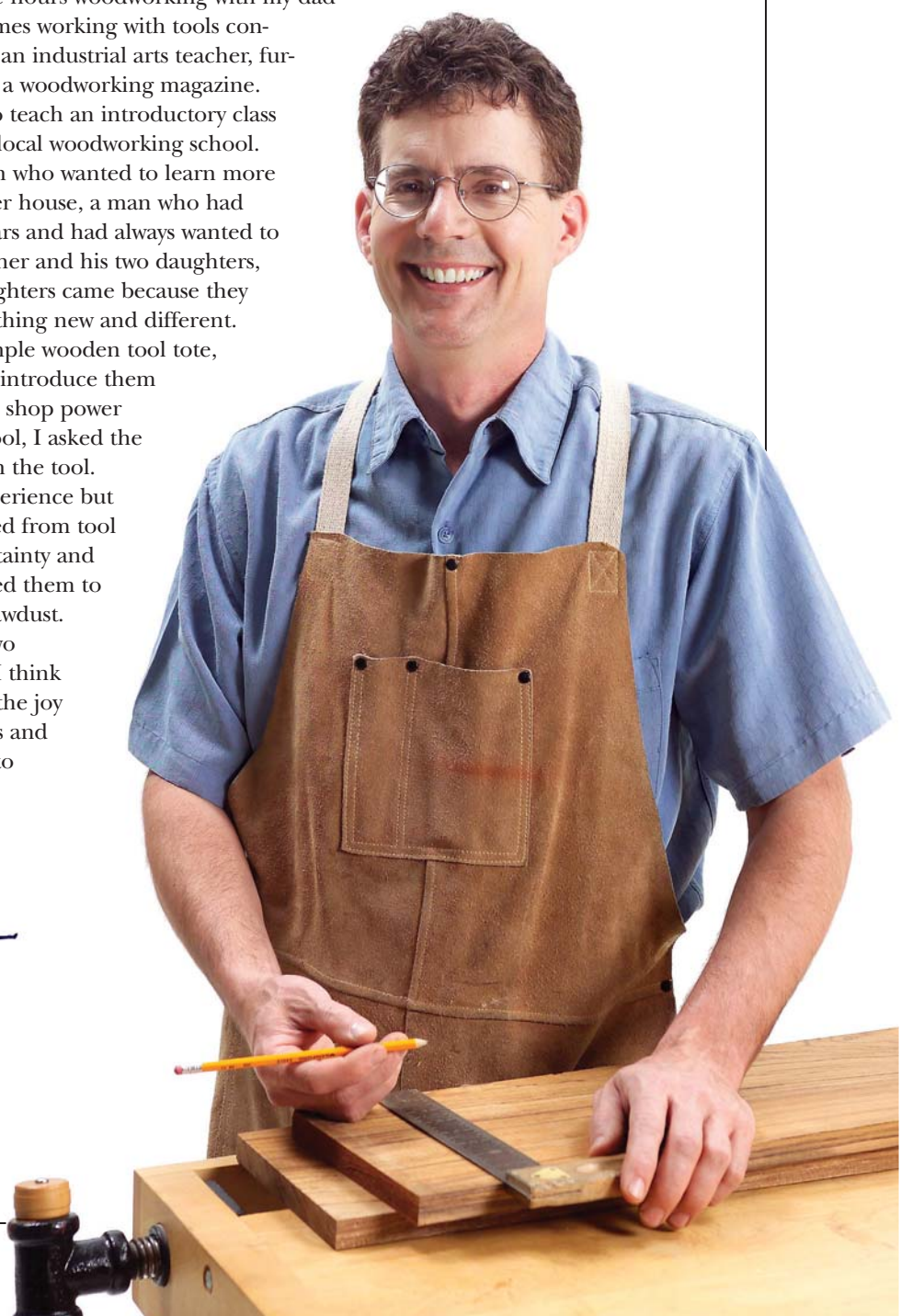
The project for the class was a simple wooden tool tote, but the more important goal was to introduce them to the safe operation of all the main shop power tools. As I introduced each power tool, I asked the students about their experience with the tool. Most had little or no power-tool experience but were eager to learn. As we progressed from tool to tool, I watched for signs of uncertainty and tried to anticipate questions. I wanted them to also experience the joy of making sawdust.

As class ended, I overheard the two daughters say to their father, "Dad, I think we found a new hobby." Now that's the joy of woodworking! I hope the projects and techniques in this issue inspire you to make some sawdust, too.

Until next time,



Randy Johnson
Executive Editor
American Woodworker magazine
randy_johnson@rd.com



AMERICAN WOODWORKER

Editor	**Ken Collier**
Executive Editor	**Randy Johnson**
Senior Editor	**Tom Caspar**
Associate Editors	**Tim Johnson** **Dave Munkittrick**
Tools and Products Editor	**George Vondriska**
Editorial Intern	**Luke Hartle**
Design Director	**Sara Koehler**
Art Directors	**Vern Johnson** **Joe Gohman**
Copy Editor	**Jean Cook**
Fact Checking Specialists	**Jennifer Feist** **Nina Childs Johnson**
Production Manager	**Judy Rodriguez**
Production Artist	**Lisa Pahl Knecht**
Office Administrative Manager	**Alice Garrett**
Financial Assistant	**Steven Charbonneau**
Reader Service Specialist	**Roxie Filipkowski**
Administrative Assistant	**Shelly Jacobsen**

Group Director, Home & Garden Group	**Kerry Bianchi**
Publisher	**Rick Straface**
Group Marketing Director	**Dawn Eggerts**
National Sales Manager	**James Ford**
Promotion Manager	**Andrea Vecchio**
Marketing Associate	**Jennifer Hill**
Promotion Coordinator	**Joanne Noé**
Designer	**Barbara Vasquez**
Business Manager	**Vicki Adler**
Advertising Coordinator	**Barbara Berezowski**
Research Manager	**Georgia Sorensen**

ADVERTISING SALES
260 Madison Ave., New York, NY 10016; (212) 850-7226
CHICAGO **James Ford** (312) 540-4804
Sherry Mallit (sales assistant) (312) 540-4824
NEW YORK **Tuck Sifers** (212) 850-7197
Classified Advertising, The McNeill Group, Inc.
Classified Manager, **Don Serfass,** (215) 321-9662, ext. 30

PUBLISHED BY HOME SERVICE PUBLICATIONS, INC., A SUBSIDIARY OF THE READER'S DIGEST ASSOCIATION, INC.

President, U.S. Magazines	**Bonnie Kintzer Bachar**
Vice President, Consumer Marketing, U.S. Magazines	**Cara L. Schlanger**
Vice President, CFO North America	**Stephen W. Simon**
President and Chief Executive Officer	**Eric W. Schrier**
Chairman of the Board	**Thomas O. Ryder**

Issue #123. American Woodworker®, ISSN 1074-9152, USPS 738-710 Published bimonthly, except monthly October and November by Home Service Publications, Inc., 260 Madison Avenue, 5th Floor, New York, NY 10016. Periodicals postage paid at New York, NY and additional mailing offices. Postmaster: Send change of address notice to American Woodworker®, P.O. Box 8148, Red Oak, IA 51591-1148. Subscription rates: U.S. one-year, $24.98. Single-copy, $5.99. Canada one-year, $29.98 (U.S. Funds); GST # R122988611. Foreign surface one-year, $29.98 (U.S. Funds). U.S. newsstand distribution by Hearst Distribution Group, New York, NY 10019. In Canada: Postage paid at Gateway, Mississauga, Ontario; CPM# 1447866. Send returns and address changes to American Woodworker®, P.O. Box 8148, Red Oak, IA, USA 51591-1148. Printed in USA.

Bowl-Gouge Sharpening Jigs

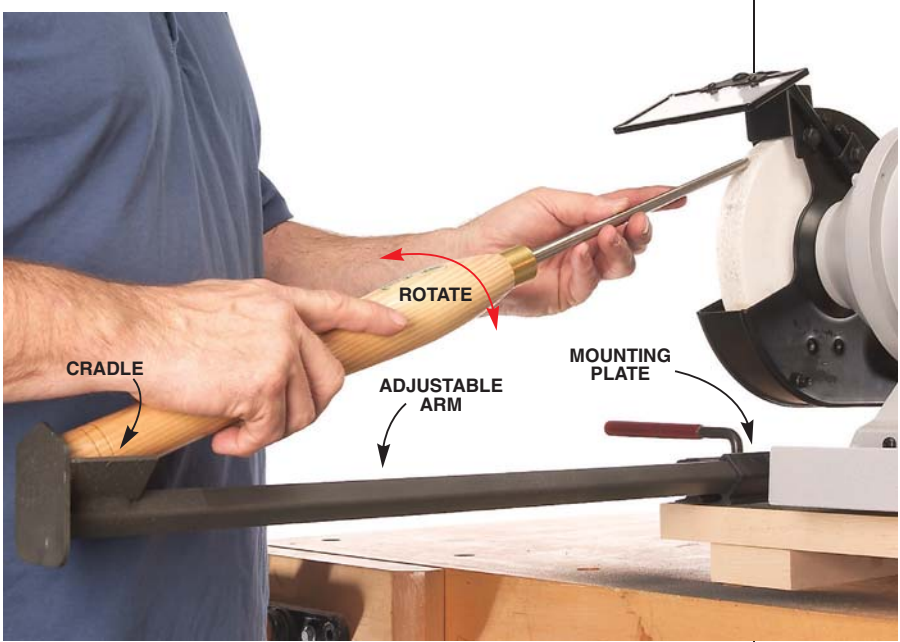
Q Try as I might, I can't seem to get a good edge on my bowl gouges. Are bowl-gouge sharpening jigs worth looking into?

A Bowl-gouge sharpening jigs do a great job. The jigs give many turners a higher degree of control and repeatability than they get doing it by hand. But don't kid yourself; using a jig is not like using a pencil sharpener. The technique does involve a learning curve; it's just not as steep as learning to sharpen by hand. You still have to know how to shape the tool and when to stop grinding by observing the sparks (see "Sharpening Bowl Gouges," page 78).

According to expert turner and instructor Alan Lacer, the motion used to sharpen a gouge on a grinder is very similar to the one used to turn a bowl on the lathe. As you master one skill, you'll be learning the other. However, if you're spending more time on the grinder than on the lathe, a sharpening jig can get you over the hump and allow you to concentrate on developing your skills on the lathe first.

There are a number of jigs on the market and all of them work well. The basic jig usually consists of a mounting plate that holds either an adjustable arm or a tool rest (not shown). (The tool rest, an adjustable platform used for sharpening chisels and plane irons, is far superior to most stock tool rests.) The adjustable arm has a cradle to hold the gouge handle to create a traditional grind (Photo 1). To create a fingernail profile, you need to purchase a tool holder to go with your basic set (Photo 2).

Source Oneway Manufacturing, (800) 565-7288, www.oneway.ca Wolverine grinding jig for traditional profile plus large adjustable tool rest, #2291, $80. Vari-Grind attachment for fingernail profile, #2480, $48.



1 To grind a traditional profile on a bowl gouge, you need a basic jig setup consisting of an adjustable arm with a cradle to hold the gouge and a mounting plate to hold the arm. To use, simply rotate the tool handle in the cradle.

2 To create a fingernail profile, you need a specialized tool holder. The tool holder pivots in a cradle on an adjustable arm. Rocking the handle back and forth creates the profile.

RESEARCH: BILL SZYDLO • ART DIRECTION: JOE GOHMAN • PHOTOGRAPHY: JOE GOHMAN, UNLESS NOTED

Square Drive vs. Phillips-Head Screws

Q What's the advantage to square-drive screws over Phillips-head screws?

A The primary advantage to square-drive screws is they are much less prone to "cam-out." Cam-out refers to the slipping of the bit in the screw head as the screw is driven.

The square-head screw was invented by P. I. Robertson, a Canadian, in 1908. It offered a big advantage over the slotted screw head because it was self-centering and not prone to slipping when driven. But, an early attempt to market these screws in the United States failed. This left the Robert-son screw confined to the Canadian market.

The Phillips-head screw was initially developed in the 1930s for industrial use. It offered the same self-centering advantage as the square drive but was designed to cam out. Cam-out was considered an advantage in the industrial assembly line, preventing screws from being overtightened and giving a little cushion to the furious power drivers of the day. But the advantage for industry was the bane of woodworkers. Cam-out for them meant marred finishes and scarred wood.

Eventually, the Robertson-head or square-drive screw migrated across the border and, by the 1970s, was making strong inroads in the furniture and woodworking trades.

A new hybrid screw-head design is a square-drive screw that, in a pinch, allows you to use a Phillips driver.

Source McFeely's, (800) 443-7937, www.mcfeelys.com
All types and sizes of square drive and combo screws.

PATRICK HUNTER

Make padded sanding blocks by gluing cork onto a wood block. Trim the excess. Then cut and shape the block to fit your hand (see photo, right).

Shop-Made Sanding Blocks

Q Commercial sanding blocks all have some kind of padded bottom. Do my shop-made blocks need to be padded, too?

A Yes they do. Padded blocks have two primary benefits: They increase the life of your paper and they make it possible to use pressure-sensitive-adhesive (PSA) paper.

Cork is the easiest way to pad a shop-made sanding block. Cork is flat, firm and stiff enough to sand a plug flush or flatten a finish. The bit of give in a cork bottom provides some shock absorption for the individual grains of abrasive so they are not so easily knocked off the paper. This helps your sandpaper last longer.

It's also much easier to remove PSA paper from a cork bottom than from bare wood. PSA paper can be cut exactly to fit your sanding block, so there's no waste. Regular paper has to be cut oversize so you can hold the paper onto the block with your hand.

To make a padded sanding block, glue a piece of 1/8- or 1/4-in.-thick cork (available in hardware stores or home centers) onto the wood. Wood glue works fine as an adhesive; just be sure to keep the glue layer very thin because cork is porous and the glue can easily seep into it.

If you have a question you'd like answered, send it to us at **Question & Answer, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to qanda@readersdigest.com.** Sorry, but the volume of mail prevents us from answering each question individually.

Stuck Gib Nut

Q I managed to round-over a gib nut on my planer's blade holder. I've tried everything to free that nut. Any suggestions?

A You can free a stuck nut by striking it with a center punch (available at hardware stores). Center punches are made of hardened steel and are designed to make a dimple mark in metal as a starting point for a drill bit. In this case, they work quite well for coaxing a stubborn nut loose.

Place the point of the punch on the flat of the gib nut so a light hammer blow will turn the nut in the desired direction. The point on the punch will dig into the soft gib-nut head and force the nut to turn.

edited by Tim Johnson *and* Brad Holden

Better Winding Sticks

Winding sticks are very useful for gauging twist in a board, but they're difficult to read. My improved version of these time-tested helpers makes the twist stand out.

I start with a pair of straight, flat 2-in.-wide sticks made from 3/4-in.-thick light-colored wood. Then I stain both of them dark—the darker, the better.

When the stain is dry, I cut shallow rabbets in both faces at the top of both sticks. This exposes a ribbon of light-colored wood above the stained surface on each face. To cut the rabbets, set the blade's height to 1/2 in. and the rip fence 1/32 in. narrower than the stick. Rip all four rabbets from this setting.

Joint the top edge of one board to remove the stain. Then rip this board narrower by the width of the rabbet on the other board. That's all there is to it.

During use, the narrow stick goes in front. Any twist in the board shows as a dark-colored wedge between the top of the rabbet on the near stick and the bottom of the rabbet on the far stick.

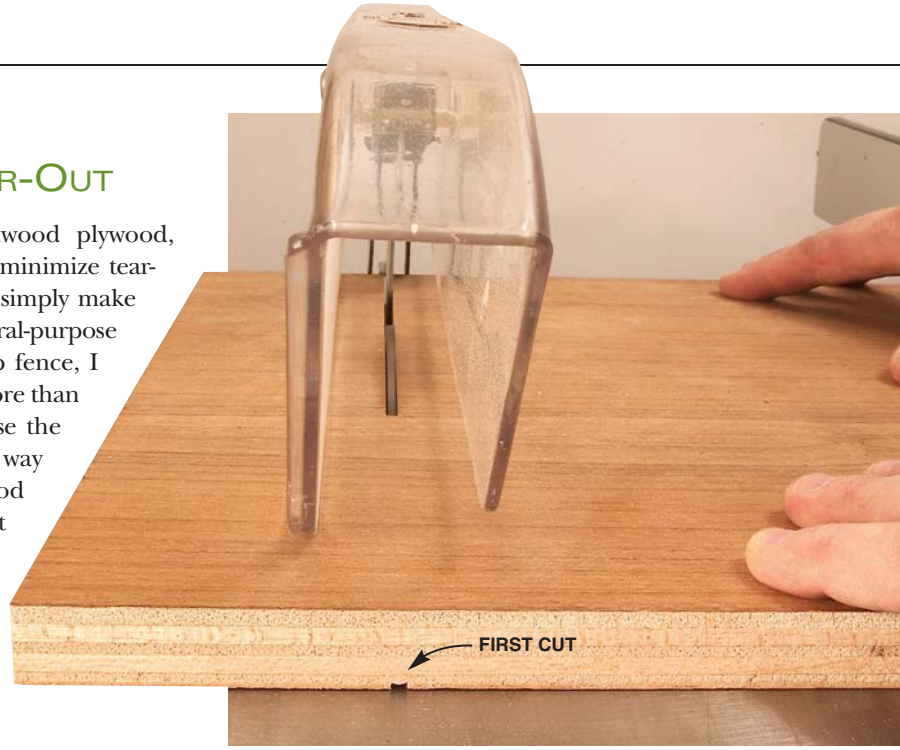
Stephen Youngerman

ART DIRECTION AND PHOTOGRAPHY: VERN JOHNSON

Shallow Cut Eliminates Tear-Out

When I crosscut hardwood plywood, I use an old technique to minimize tear-out on the bottom face. I simply make two passes with my general-purpose blade. After setting the rip fence, I cut a shallow groove, no more than 1/32 in. deep. Then I raise the blade and cut all the way through. Cutting plywood this way takes longer, but I'm not in a hurry and the tear-out-free results are worth the extra effort.

Eric Swanson



Glue Squeegee

I stack-laminate boards to create turning blanks. Each blank contains numerous laminations, so I have to work fast during assembly. To spread glue quickly and evenly, I use a squeegee designed for silk-screening. You can buy one at an art supply store for about $7. (A regular window-cleaning squeegee from the hardware store would also work.) After squeezing glue onto the surface, I spread it with the squeegee. The amount of pressure I put on the squeegee determines how much glue remains on the surface—I like to leave an even, semi-transparent layer. It's easy to transfer excess glue to a glue-starved area or to the next piece, and cleaning the plastic squeegee is a snap.

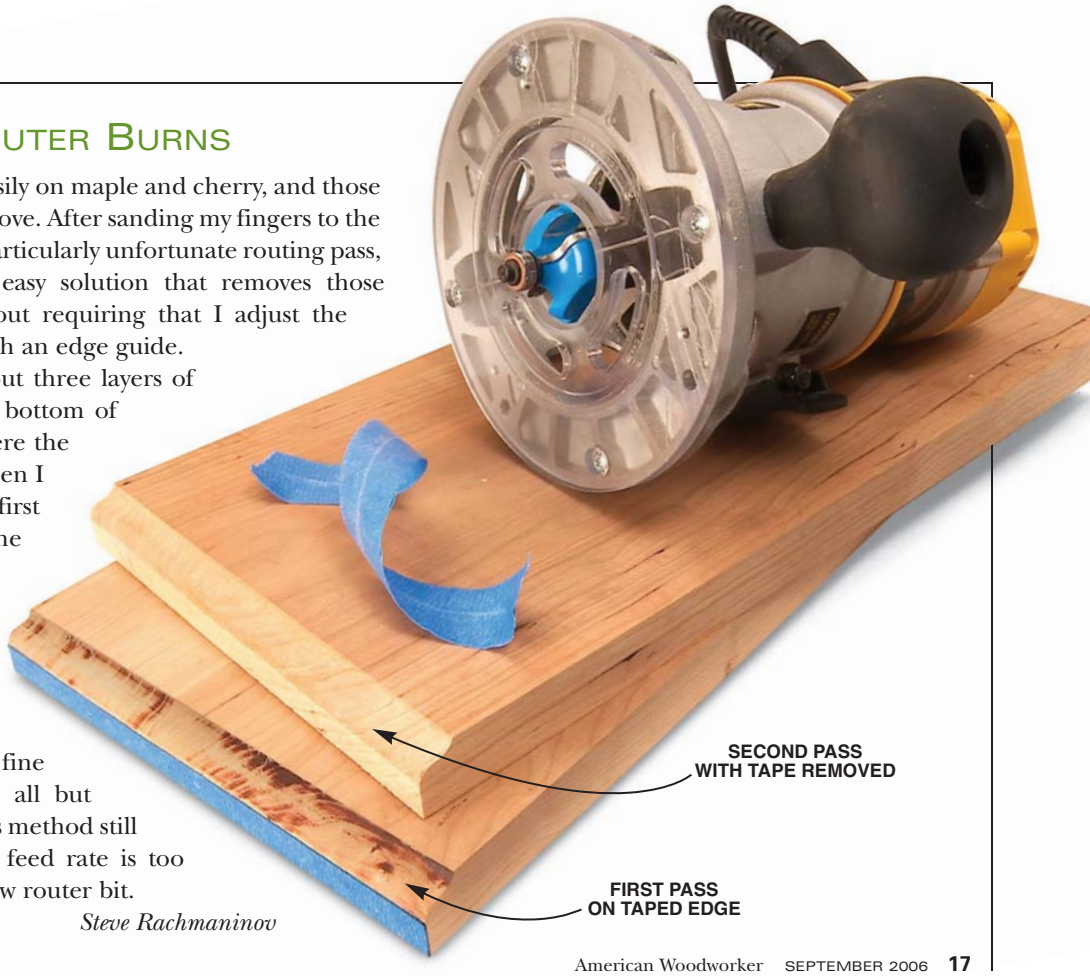
Don Hollenbeck

Minimize Router Burns

End grain burns easily on maple and cherry, and those burns are hard to remove. After sanding my fingers to the bone following one particularly unfortunate routing pass, I came up with an easy solution that removes those unsightly burns without requiring that I adjust the bit's height or fuss with an edge guide.

Before routing, I put three layers of masking tape on the bottom of the board's edge, where the bit's bearing rides. Then I make two passes. The first pass produces the rough profile, when burning is most likely to occur. After making the initial pass, I remove the tape and rout again. This very fine second pass removes all but the worst burns. If this method still leaves scorches, your feed rate is too slow or you need a new router bit.

Steve Rachmaninov



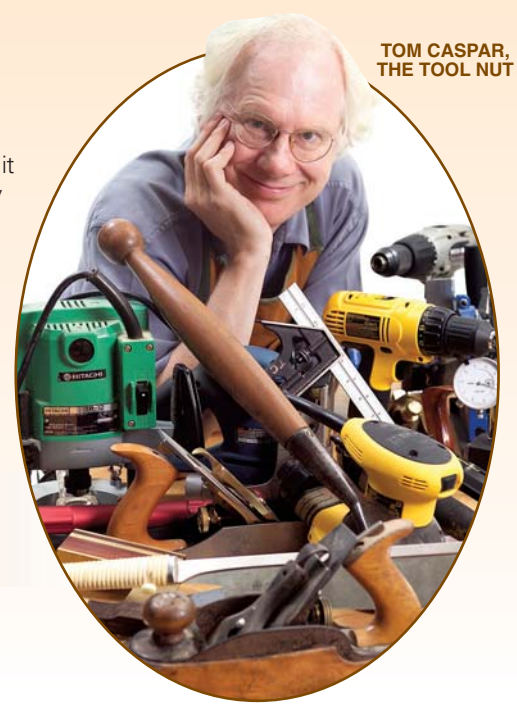
Calling all Tool Nuts!

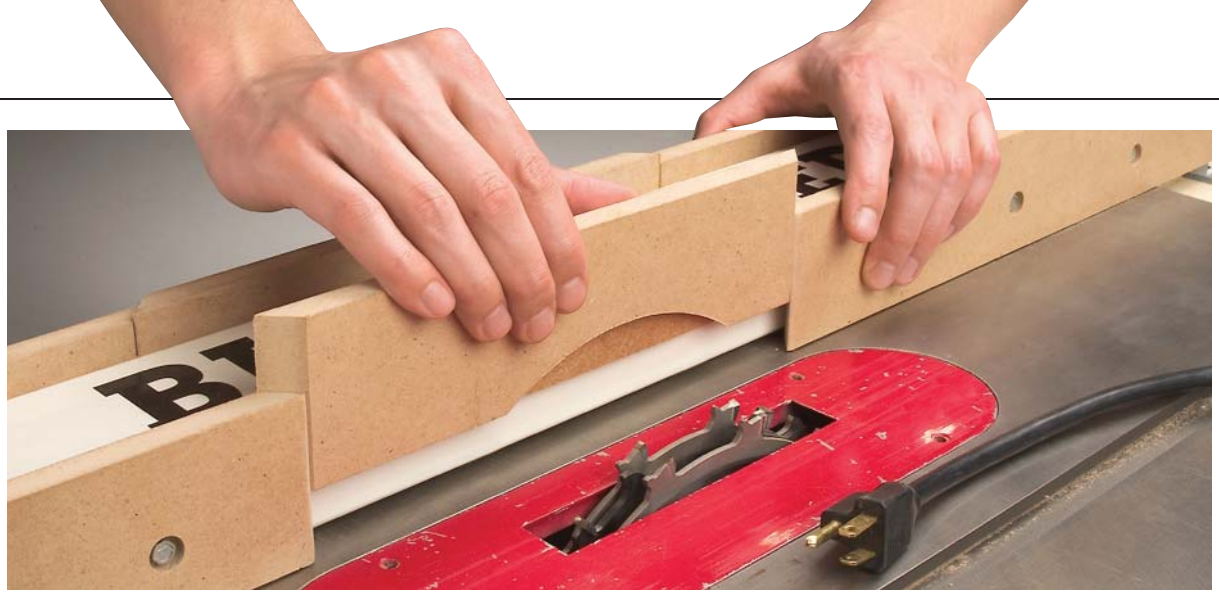
I really don't need five cordless drills, seven routers or 24 antique hand planes, but I can't help it. I'm a tool nut. **Are you?**

Have you ever bought an old woodworking machine just because it looked cool? Tried a new tool and said, "Wow! This just changed my life!" Used a big, industrial machine and wondered how in the world you could sneak it into your shop?

We'd like to hear your stories. So e-mail or send us a letter about a tool or machine that really gets you excited. We'll pay you $150 if we publish your story. Please include a photograph, too. We'd prefer a digital image, but a slide or print is OK. Visit our Web site, www.americanwoodworker.com/toolnut for some examples of what we've got in mind.

E-mail your entry to thetoolnut@readersdigest.com or write to us at The Tool Nut, American Woodworker magazine, 2915 Commers Dr., Suite 700, Eagan, MN 55121.


TOM CASPAR, THE TOOL NUT



Replaceable Fence Faces

It's hard to improve on the performance of a T-square fence, but I think I've done it. I got frustrated with clamping on an additional subfence every time I wanted to make a rabbet with a dado set (where part of the blade is actually housed in the fence), so I made a new set of fence faces with interchangeable inserts. One insert has a cutout for rabbeting; the other is plain for ripping. When the arc in the rabbeting insert becomes too large, I just install a new insert.

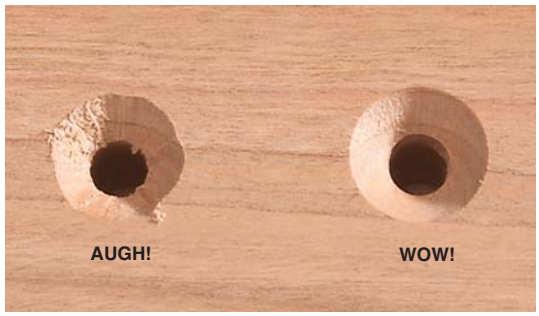
To maintain the usefulness of the fence's scale and cursor, I removed the original 1/2-in.-thick faces and replaced them. I made the new faces from 1/2-in. MDF and mitered the ends at 45 degrees. The original faces were glued to the fence; I attached the new faces with self-tapping hex-head screws. The inserts don't need to be screwed because they slide firmly in place.

William Akers

Tape Simplifies Gluing Miter Joints

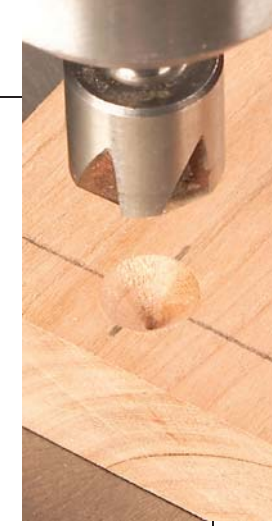
Let's face it: Gluing mitered frames is a hassle. You need four, five or even six hands—or the time-honored shop staple, masking tape. I like the good, strong blue kind. You'll need one piece for each corner. Lay the masking tape face up and place the joint's pieces tip to tip on the tape. Spread a thin, even coat of glue on both faces of the joint. Fold together the pieces for each joint using the tape as a hinge. For small frames, the tape alone can be enough to hold the joint while the glue dries. On large frames, the tape securely holds the parts in place while you apply clamps.

Martha Jones



Smooth-as-Silk Countersink

Countersink first, drill the pilot hole second. That may sound backward, but it's the easiest way to ensure a perfectly smooth countersink. I used to drill the pilot hole first on the drill press, but if that hole was relatively large or the wood quite dense, the countersink bit would inevitably chatter and make an ugly, rough surface.



One day I tried the countersink bit first with no pilot hole. What a difference! It made a perfect conical depression. It's easy to locate the hole because a countersink bit has a sharp tip. Centering the pilot hole is easy, too. A twist bit practically positions itself in the hole's bottom.

Tom Caspar

We'll give you $150, this great-looking shirt and a durable shop apron for your Workshop Tip!

Send your original tip to us with a sketch or photo. If we print it, you'll be woodworking in style.* **E-mail your tip to workshoptips@readersdigest.com or send it to Workshop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

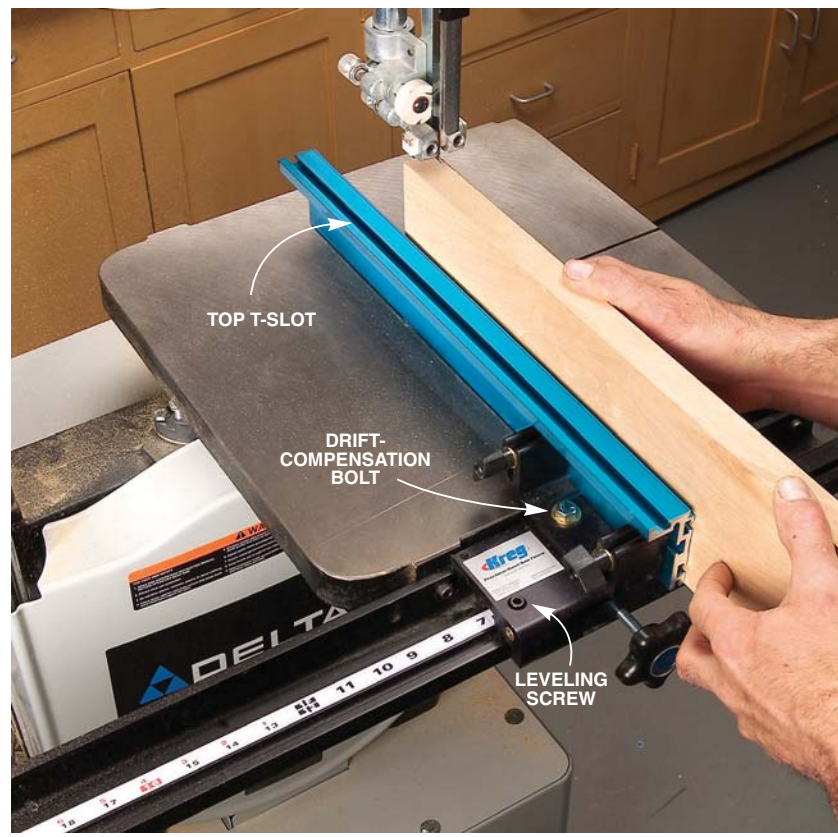
*Shirt and apron offer good only while supplies last.

Great Bandsaw Fence

by George Vondriska

When it comes to successfully resawing on the bandsaw, the fence can make it or break it. Kreg's Precision Bandsaw Fence, $120, provides everything you could ask for in a bandsaw fence.

If you're going to resaw, you've got to catch the drift—the bandsaw blade's drift, that is. Drift compensation on the Kreg fence (see photo, right) is easily done, accomplished by two bolts connecting the fence's body to its head. Great instructions are included in the owner's manual—not just for setting up the fence, but also for finding the drift angle of a bandsaw blade.



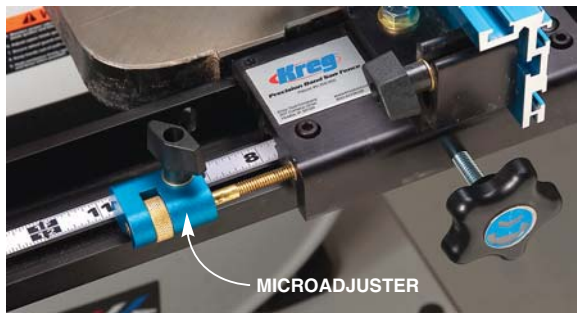
Like a T-square tablesaw fence, the Kreg bandsaw fence clamps only at one end, yet it's rigid enough to resist flexing, even under demanding resaw applications. The head of the fence also contains leveling screws that allow you to fine-tune the face of the fence, guaranteeing it's square to the table and parallel with the blade.

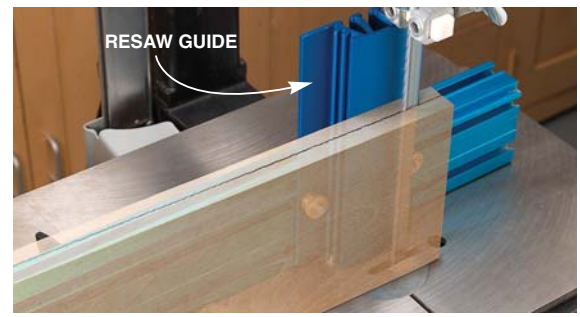
The body of the fence contains T-slots that let you mount accessories or your own taller fence faces. Additionally, the T-slot in the top of the fence allows you to reposition the fence flat on the table. This is a great safety feature, because it lets you keep the upper guide close to your work when cutting thin stock.

Kreg's fence is designed to fit most 14-in. bandsaws, including those from Delta, General, Grizzly, Jet and Ridgid. It will certainly work on other saws but may require drilling the table to mount the guide rail.

Accessories available for the Kreg bandsaw fence include a Microadjuster and two additional resaw guides. The Microadjuster, $15, can be used to fine-tune the fence position. This is a handy add-on if you plan on cutting veneers or other small parts. You can also add a 4-1/2-in. or 7-in. single-point resaw guide for $18 and $20 respectively.

Source Kreg Tools, (800) 447-8638, www.kregtools.com Kreg Precision Bandsaw Fence, #KMS7200, $120. Kreg Microadjuster, #KMS7215, $15. Kreg 4-1/2-in. resaw guide, #KMS7213, $18. Kreg 7-in. resaw guide, #KMS7214, $20.





EDITOR: RANDY JOHNSON • ART DIRECTION: JOE GOHMAN • PHOTOGRAPHY: JOE GOHMAN, UNLESS NOTED

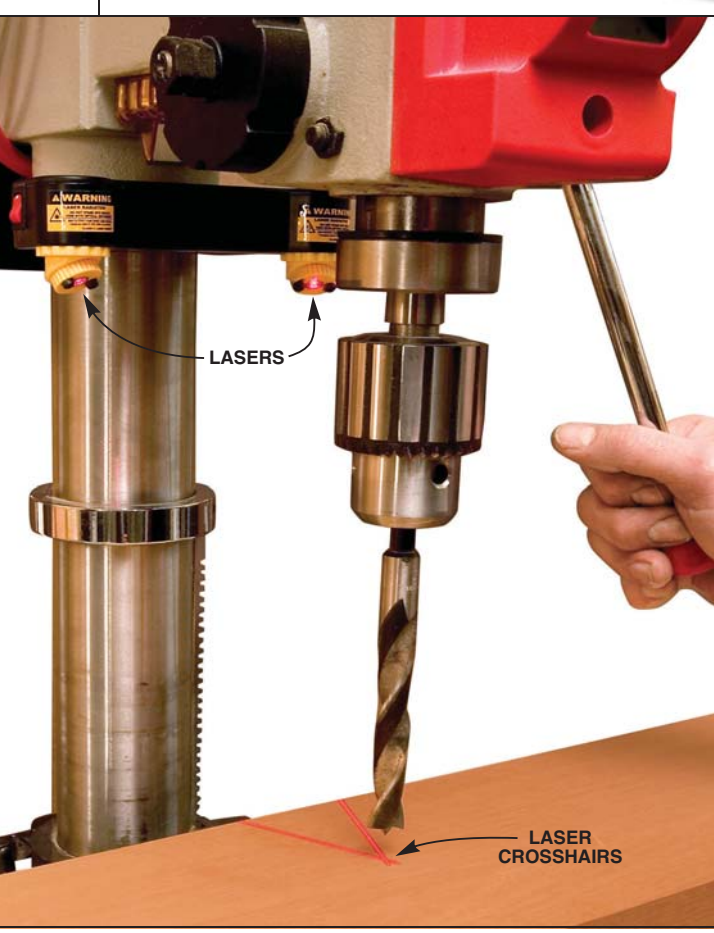
Steel City Tool Works Enters Market

The woodworking industry has been buzzing with rumors about a new tool company on the horizon, and I finally got to see what the buzz is all about. Steel City Tool Works, based in Murfreesboro, Tenn., is introducing a complete line of more than 30 new woodworking tools at the 2006 International Woodworking Fair in Atlanta this August. The line includes tablesaws, jointers, dust collectors, sanders and more.

Steel City Tool Works is a new company, but the folks running the show aren't new to the industry. They bring an impressive list of credentials to the table, with many years of experience at a variety of well-known tool companies.

You can look for distribution of Steel City tools through retail stores in your area. Locate a dealer by checking the company's Web page or calling its toll-free customer service number.

Source Steel City Tool Works, (877) 724-8665, www.steelcitytoolworks.com



Drill-Press Laser Guide

Lasers are lighting the way toward woodworking's future, and here's an excellent application of laser technology: a drill-press laser guide that maintains calibration no matter where you place the drill-press table. The secret lies in its use of two lasers. A one-laser setup can only be used to cast a single point of light to mark the spot and the calibration goes kerflooey every time you raise or lower the drill-press table. This two-laser setup casts two lines. The intersection of the lines *always* indicates center of the drill chuck, no matter how high or low the table—very cool.

It took me about 10 minutes of setup and alignment to get this dual-laser unit working. First, you clamp the laser unit to the column of the drill press with the included hose clamp. With the included alignment tool in the drill-press chuck, you dial the lasers in one at a time. The written directions are good, and the process is simple. You'll need to provide your own 9-volt battery to power the unit.

The lasers are plenty bright, even under good shop lighting. Once they're sighted in, you're ready to shoot holes right where you want 'em, every time.

Source Woodcraft Supply, (800) 225-1153, www.woodcraft.com
Drill-press laser, #146709, $40.

Digital Readout for Your Planer

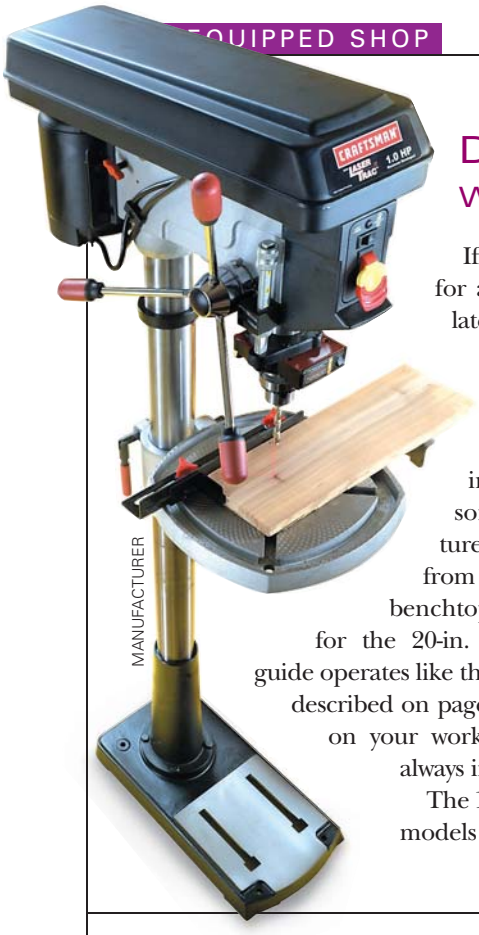
Benchtop planers' performance has come a long way, and the machines can be used to do very precise work. But getting a precise reading off the planer's scale can be tough, so I usually end up using calipers to measure board thickness. Well, put away your calipers, because now you can make your planer measures up using the Wixey Electronic Digital Readout for benchtop planers, $60.

The Wixey scale can be attached to a variety of machines and calibrated for precision. Once calibrated, the digital readout provides millimeters displayed in decimal to .001 mm or in inches displayed either in decimal to .001 in. or in fractions to 1/32 in. The scale can be zeroed at any thickness setting, which is useful if you need to return to a given thickness for a later operation.

Installation of the digital readout is straightforward, and the instructions are good. Calibration is easy to do. The readout can be used to indicate the thickness of the board coming out of the planer or to indicate how much material is being removed per pass. The readout's low position forces you to bend over to see it. It would be nice if it angled upward. It would also be nice if the readout had an automatic shutoff. I'm sure to forget to shut it off a time or two, and a dead battery means recalibration of the tool.

The Wixey Electronic Digital Readout fits planers from Craftsman, DeWalt, Delta, Jet, Makita, Ridgid and Ryobi. Check the Wixey Web site for the specific model numbers of compatible machines.

Source Wixey, www.wixey.com Electronic Digital Readout, #WR500, $60.

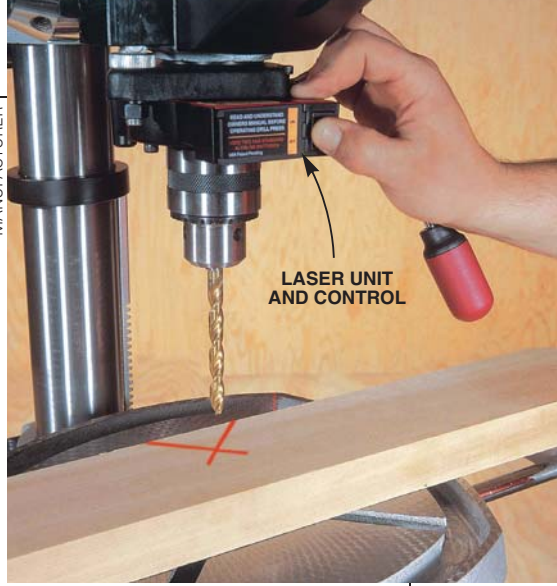


MANUFACTURER

Drill Press with Lasers

If you're in the market for a drill press with the latest dual-laser guides, Craftsman has you covered. Its four new 12-in., 15-in., 17-in. and 20-in. models include some other cool features as well. Prices range from $190 for the 12-in. benchtop machine to $600 for the 20-in. machine. The laser guide operates like the drill-press laser unit described on page 24; it casts two lines on your work so the intersection always indicates the center.

The 12-in., 15-in. and 17-in. models have keyless chucks, a handy convenience. The four machines have 1/3-hp, 1/2-hp, 3/4-hp and 1-hp motors, respectively. The three smaller machines have an adjustable work light, so you can see where you're boring. Left-handed woodworkers will appreciate the quill handle on the 15-in. machine: It can be used on either side.



MANUFACTURER

Source Craftsman, (800) 349-4358, www.sears.com 12-in. drill press, #21911, $190. 15-in. drill press, #22900, $320. 17-in. drill press, #22901, $446. 20-in. drill press, #22902, $600.

Complete Router Package

What first impressed me when I opened the Triton router package was the kit's completeness. Everything you need is there, including dust collection, fence and template guides. Add the fact that this plunge-based router is one of the few that are easy to adjust in a router table, and this is quite a kit.

The Triton MOF001KC router, $200, has an unusual design that takes a little getting used to, but the controls work well. Above- and below-the-base dust collection is included. Both ports connect to a 1-1/2-in. hose and work well at grabbing dust.

An oversize baseplate comes with the kit. This works great as an outrigger to prevent the router from tipping. It also accepts the included fence assembly. The baseplate also acts as a circle-cutting jig.

The Triton MOF001KC has a 2-1/4-hp, 13-amp motor with variable speed of 8,000 to 20,000 rpm and a soft start. The hole in the base is 3-in. diameter so won't accept some of the larger panel-raising bits.

In addition to the router, the kit includes both 1/2-in. and 1/4-in. collets and seven guide bushings. It will also accept Porter-Cable-style guide bushings.

With the router hanging in a table and the rack and pinion disengaged, you can use the included table winder handle to move the motor up and down. This requires drilling a 1/2-in. hole in your router table. It's recommended that you reach under the table and lock the motor in place before running the router. The collet can be brought up through the table for bit changes. The spindle automatically locks in this position, and the on-off switch is locked out. (You should still unplug your router for bit changes.)

Source Triton Manufacturing, (888) 874-8661, www.triton.com.au Triton MOF001KC router, $200.

Baby Sander Packs a Punch

Don't be fooled by its size: Grizzly's new 12-in. Baby Drum Sander may fit on your benchtop, but it's not a portable tool. It weighs 199 pounds, so it needs a sturdy home. The Baby is powered by a 1-1/2-hp, 18-amp motor and really hogs off wood, especially with an aggressive abrasive on the head. A second motor drives its conveyor belt. The conveyor speed can be varied from 0 to 15 feet per minute. Grizzly recommends a 25-amp circuit for this tool. It cannot be rewired for 220 volts.

At $425, this Baby is a *labor*-saving tool that *delivers* good performance without *contracting* your wallet too much. (OK, I may have overworked the "baby" angle there.) Kidding aside, this is a tool that's worth a look, unless you really enjoy sanding with portable sanders.

The sanding drum uses hook-and-loop sandpaper. A 50-ft. roll of abrasive, $30, contains eight applications of sandpaper. Although the hook-and-loop attachment does a good job of grabbing the paper, you must also tape the ends to keep them from coming loose. This step is a bit of a pain, compared to prepping other drum sanders with mechanical binders, but the system works.

Grizzly recommends a dust collector that provides at least 400 cfm at the machine. I was surprised to see a 2-1/2-in. dust port on top of the sander, instead of a 4-in, but equally surprised at how good dust collection was on this machine.

The Baby comes almost completely assembled. Maximum width capacity of this tool is 12 in.; maximum thickness is 3-3/4 in. The shortest piece of stock you can sand is 8 in. and the thinnest is 1/8 in.

Source Grizzly, (800) 523-4777, www.grizzly.com 12-in Baby Drum Sander, #G0459, $425.

by Brad Holden

MAKING CURVED DOORS

Kerfkore flexible panels handle curves with ease.

Curved doors and panels add elegance to any project, especially kitchen cabinets. Making these complicated parts requires careful planning and building. The task can be made much easier by using a flexible panel product called Kerfkore (see photo, below left). It follows the same principle that cabinetmakers use when they saw multiple kerfs on the back of a piece of plywood to make it flexible. A disadvantage to this saw-kerfing method is the risk of the face veneer cracking or kinking at the kerfs, spoiling the curve's smooth surface. Kerfcore's advantage is that that the kerfing is done for you. Its flexible paper backing provides a smooth surface to attach your veneer.

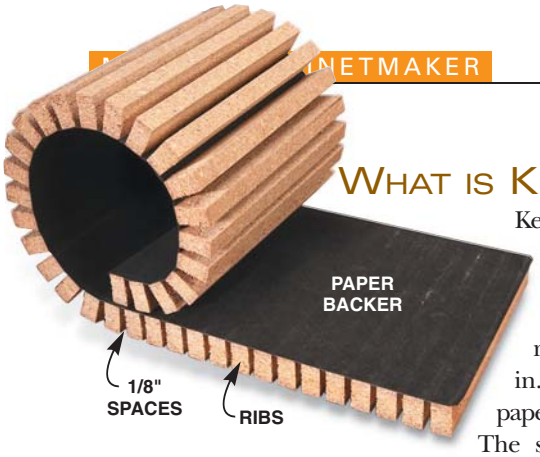
There are several important tricks and techniques to working with Kerfkore but it's a surprisingly easy material to work with. I'll walk you through the main steps of making a curved door with Kerfkore from layout to final trimming. Information on using Kerfkore in other applications can be found at the Web site www.kerfkore.com.

Kerfkore flexes easily in both directions.

PHOTO COURTESY OF ROBB YOUNG'S FINE WOODWORKING HONOLULU, HAWAII, WWW.ROBBYOUNGSFINEWOODWORKING.COM

Doors made with Kerfkore have a smooth, even curve.

EDITOR: RANDY JOHNSON • ART DIRECTION AND PHOTOGRAPHY: JOE GOHMAN, UNLESS NOTED

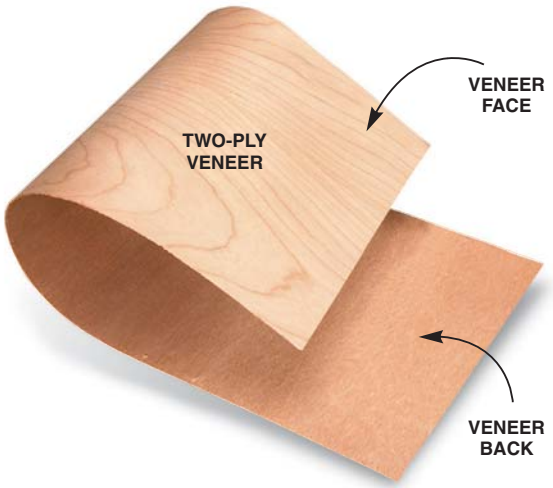


What is Kerfkore?

Kerfkore is a very flexible panel made of 3/8-in.-wide ribs spaced 1/8 in. apart on a paper backer sheet. The spaces between the ribs allows the board to flex. The flexible backer sheet provides a smooth surface for veneering. The ribs in different Kerfkore products are made of particleboard, luan plywood, poplar plywood, MDF, fire-rated treated particleboard or lightweight styrene foam. These different cores have different weights, strengths and screw-holding characteristics. The particleboard core works well for general-purpose doors, such as those for kitchen cabinets.

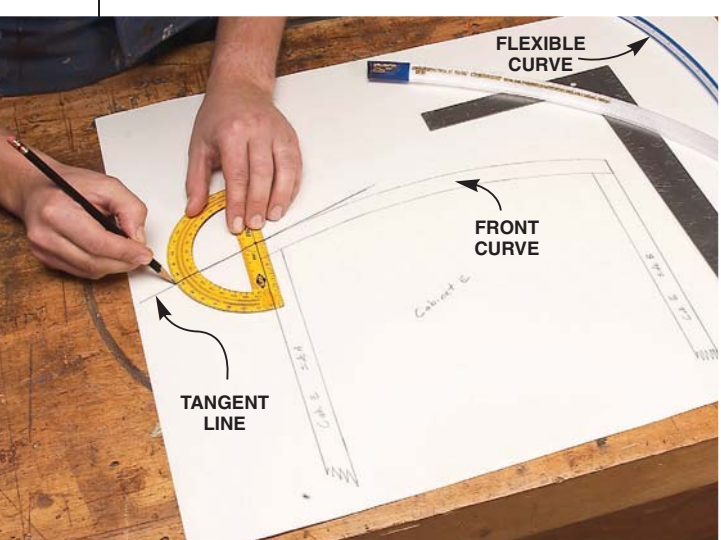
Kerfkore with paper backer on both sides is also available. This makes the material more rigid and somewhat easier to handle and enables you to create a curve that turns into a straight run. To make the two-sided variety bend, you cut the backer on one side with a utility knife where you need the bend to occur.

Kerfkore comes in 4-ft. by 8-ft. sheets in 1/4-in., 3/8-in., 1/2-in., 5/8-in. and 3/4-in. thicknesses and costs between $40 and $125 per sheet (see Sources, page 36).



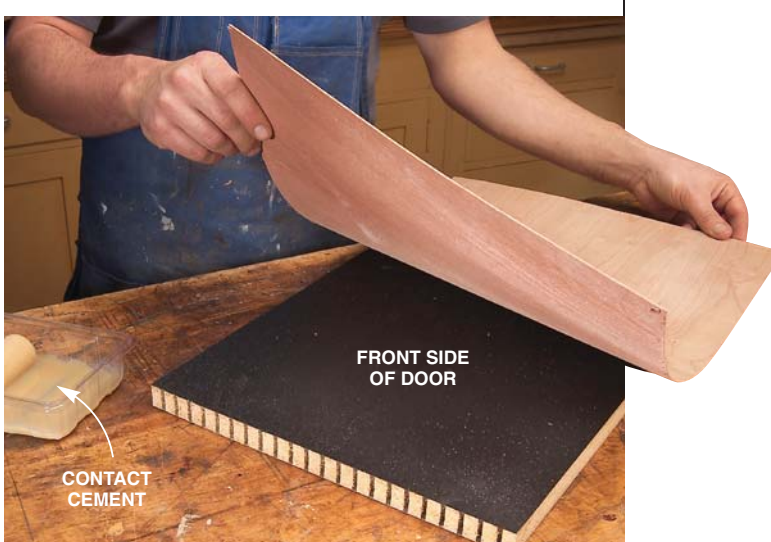
Pick Your Veneer

1 Your three main veneer choices are two-ply wood veneer (shown here), phenolic-backed (plastic-laminate) wood veneer or vertical-grade plastic laminate. The two-ply veneer is the most flexible of the three and is easily cut with a utility knife or scissors. The phenolic-backed veneer and plastic laminate must be sawn or scored and snapped. The cut edge of the two-ply veneer leaves a dark line that may show on your finished door, depending on the wood species and the finish you apply. The phenolic-backed veneer and plastic laminate both leave a black edge line.



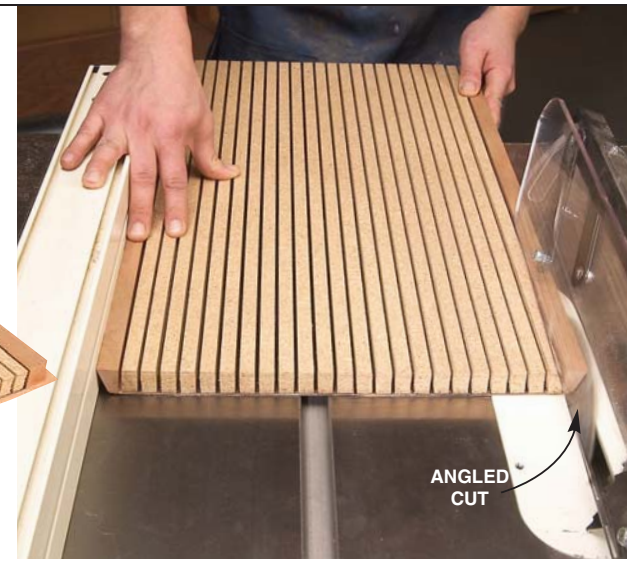
Make a Full-Size Drawing

2 Use a top-view drawing to determine the size of the Kerfkore panel and the angles at the edges. The width of the Kerfkore should be the outer circumference of the curve minus 1-1/2 in. to 2 in. for the solid-wood edges. The measurement is easy to take using a flexible curve. Calculate the angles of the edges by drawing a line tangent to the front curve at the corner of the door and then measure the angle with a protractor.



Apply the Front Veneer First

3 Use contact cement and work flat when applying the first sheet of veneer. Working flat may seem odd, but when you do so, the contact cement remains flexible and a good bond is ensured. The panel will gain a bit of stiffness but will remain flexible enough to form to its final shape later on.



Add Solid-Wood Edges for Strength, Appearance

4 Solid-wood strips provide durable finished edges when the door is done. Each strip can be up to 1 in. wide. Leave a 1/8-in. gap between the solid-wood strip and the adjacent rib to maintain maximum flexibility. Attach the strip with contact cement. After the edge strips are attached, use a small router and a shop-made edge guide (Photo 8) to trim the veneer flush around the entire panel.

Cut the Edges to the Required Angle

5 It's easier and safer to cut the angles on the panel while it's flat, rather than after it has been curved. Cut at the angles you measured on the full-size drawing (Photo 2). The panel is sufficiently stiff at this stage that it saws much like a normal piece of plywood.

Attach the Back Veneer with Yellow Wood Glue

6 Yellow glue dries stiff and helps the curved door hold its shape. The folks at Kerfkore recommend yellow glue for both two-ply and phenolic-backed veneer. The grain on the back of two-ply veneer runs 90 degrees to its face side and adds stiffness to the door when the glue dries.

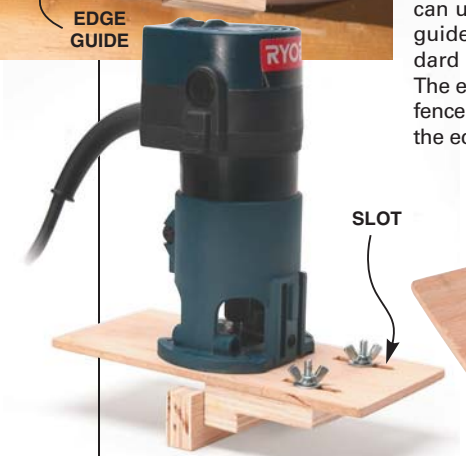
Attach the Back Veneer with a Vacuum Press

7 A curved form—made from two curved ribs and a spare piece of Kerfkore covered with plastic laminate—provide the shape. A vacuum bag provides clamping pressure.

Mark centerlines on the form and on the ends of the door. Line up the marks prior to clamping to ensure the curved door ends up straight after the glue dries. With the whole assembly in a vacuum bag (see Sources, page 36), pump the air out. Netting in the bag prevents air pockets from forming. Let the glue dry completely before you remove the door.

Trim the Curved Edges

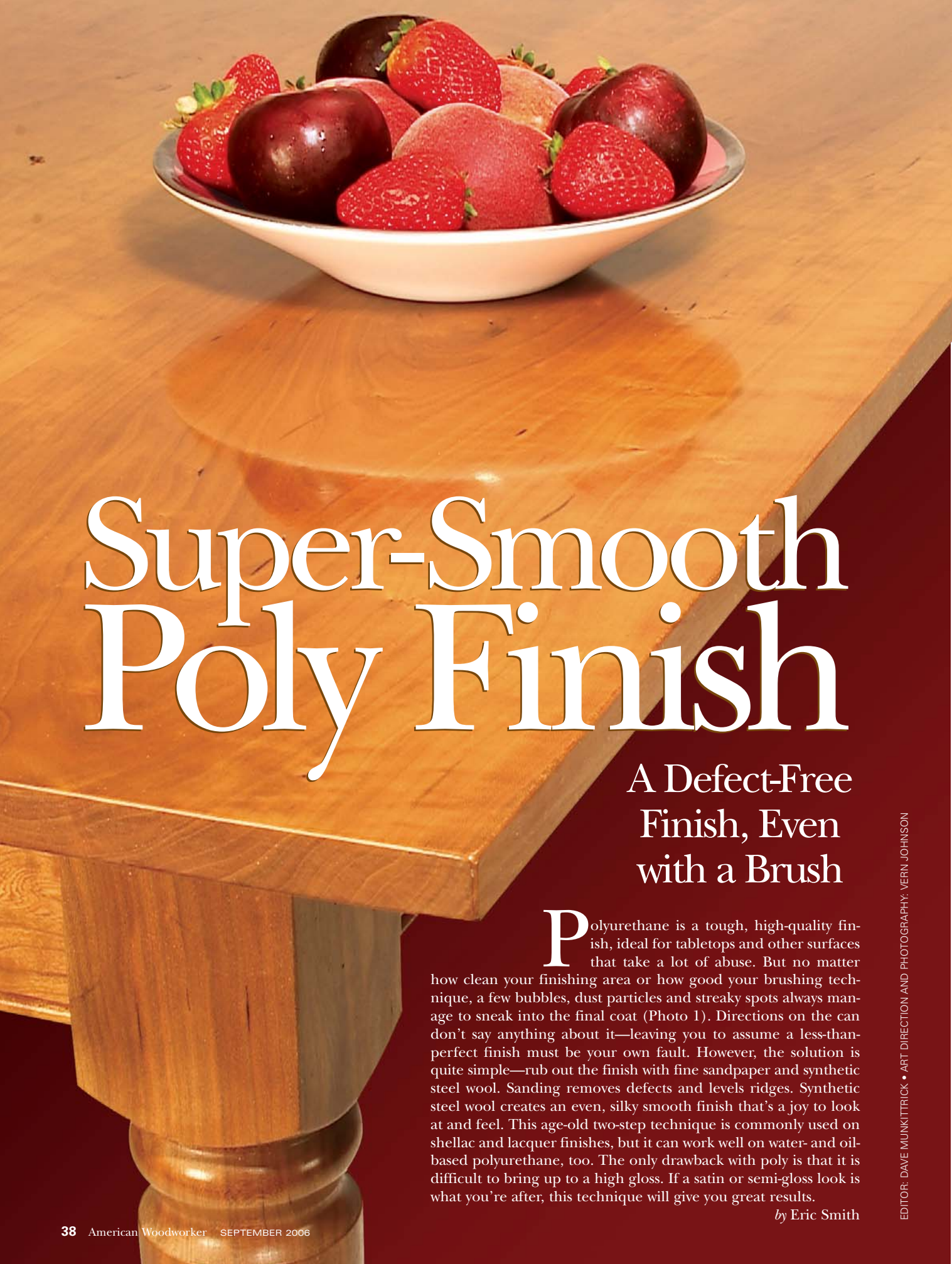
8 This shop-made edge guide (see photos, below) simplifies routing the veneer on the curved edges. The guide fence has an angled opening and clearance slot that allow it to trim around the curved overhanging veneer. It works equally well on the convex and the concave sides of the door. You can use either ball-bearing-guided straight bit or a standard straight bit with this guide. The edge guide is slotted so its fence can be adjusted flush with the edge of the router bit.



Veneer the Ends and Trim Flush

9 Apply veneer to the end with contact cement or yellow glue and trim flush. When all edges and veneers are trimmed, the doors can be installed. Hanging a curved door is not difficult. Butt hinges go on the same way as they do with a flat door. For European-style hinges, support the door on the drill-press table so the hinge-hole drill bit drills square to the surface of the door. If the hinge-cup screws land in a gap between the wood ribs, squeeze in some epoxy glue as a filler and anchor.

Sources Kerfkore Co., (800) 637-3539, www.kerfkore.com Kerfkore, 3/4 in. x 4 ft. x 8 ft. single-sided, $104; 3/4 in. x 4 ft. x 8 ft. double-sided, $125. • Roarockit, (416) 938-4588, www.roarockit.com Thin Air Press kit vacuum press, #01301, $55.



Super-Smooth Poly Finish

A Defect-Free Finish, Even with a Brush

Polyurethane is a tough, high-quality finish, ideal for tabletops and other surfaces that take a lot of abuse. But no matter how clean your finishing area or how good your brushing technique, a few bubbles, dust particles and streaky spots always manage to sneak into the final coat (Photo 1). Directions on the can don't say anything about it—leaving you to assume a less-than-perfect finish must be your own fault. However, the solution is quite simple—rub out the finish with fine sandpaper and synthetic steel wool. Sanding removes defects and levels ridges. Synthetic steel wool creates an even, silky smooth finish that's a joy to look at and feel. This age-old two-step technique is commonly used on shellac and lacquer finishes, but it can work well on water- and oil-based polyurethane, too. The only drawback with poly is that it is difficult to bring up to a high gloss. If a satin or semi-gloss look is what you're after, this technique will give you great results.

by Eric Smith

EDITOR: DAVE MUNKITTRICK • ART DIRECTION AND PHOTOGRAPHY: VERN JOHNSON

Materials and Supplies

Sandpaper

Sandpaper is used to flatten the finish and remove dust nibs and brush marks. Stearated aluminum-oxide sandpaper is by far the best product for sanding a finish. Stearated paper has dry lubricants that help prevent "corning" or the balling up of finish on the paper. Wet-dry silicon-carbide paper balls up like crazy if you don't use water as a lubricant. The trouble with wet sanding is the water slurry can make it difficult to see your progress.

Synthetic Steel Wool

I used synthetic steel wool on both water- and oil-based polyurethane. Traditional steel wool is not recommended for water-based finishes; it sheds steel particles that leave a mess and give the user steel wool slivers. Synthetic steel wool pads equivalent to 00 steel wool are widely available at home centers and hardware stores. Fine synthetic wool equivalent to 0000 steel wool is harder to find. I had good luck at auto-body supply stores and mail-order woodworking suppliers (see Sources, page 41).

Powdered Abrasives

Pumice and rottenstone are sold at some paint stores and at woodworking suppliers. Pumice is ground volcanic glass that comes in grades from 1F (coarse) to 4F (fine). Rottenstone is even finer than 4F pumice. It's made of ground limestone (see Sources).

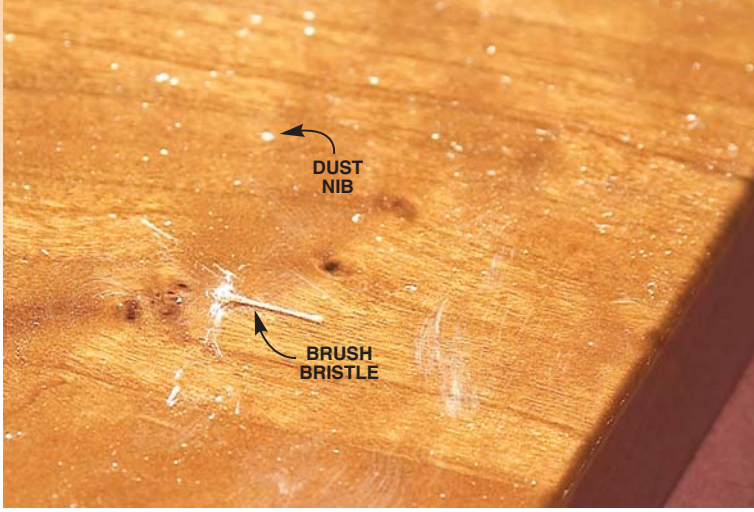
Build a Good Foundation for the Finish

1. I use 220-grit sandpaper for final sanding on raw wood. I always sand a little bit longer than I think is necessary. Then I vacuum thoroughly and wipe the wood with a clean, soft cloth until I stop getting dust on my fingers when I run them over the wood.

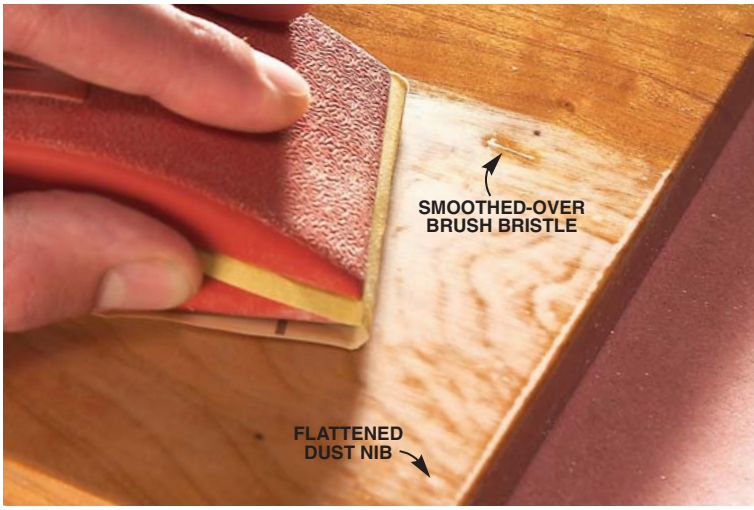
2. Use grain filler on open-pored woods, such as oak or walnut. Otherwise after rubbing out, the pores will look shiny compared with the rest of the wood.

3. Before applying finish on any project, test different finishing options on scrap pieces of wood. Water- and oil-based polyurethane finishes look completely different. If the color doesn't look right or seems too bland, which is sometimes a problem with water-based finishes, use a sealer coat of clear, wax-free shellac or experiment with stains to warm the color of the wood before applying the topcoats.

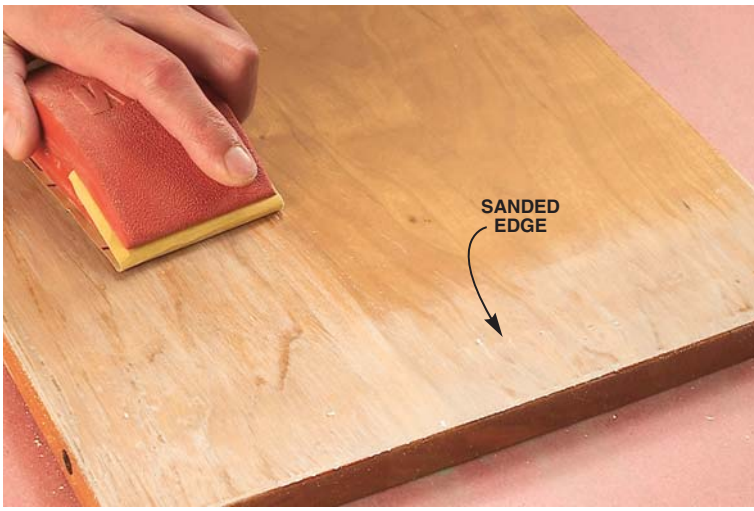
4. I applied a gloss polyurethane on my tabletop because it can be rubbed to any sheen from flat to semi-gloss. I used a semi-gloss poly on the rest of the table. Vertical surfaces and legs don't collect the



1 **The Problem:** A few dust nibs, broken brush bristles and bubbles are almost inevitable on big horizontal surfaces finished with slow-drying polyurethane.

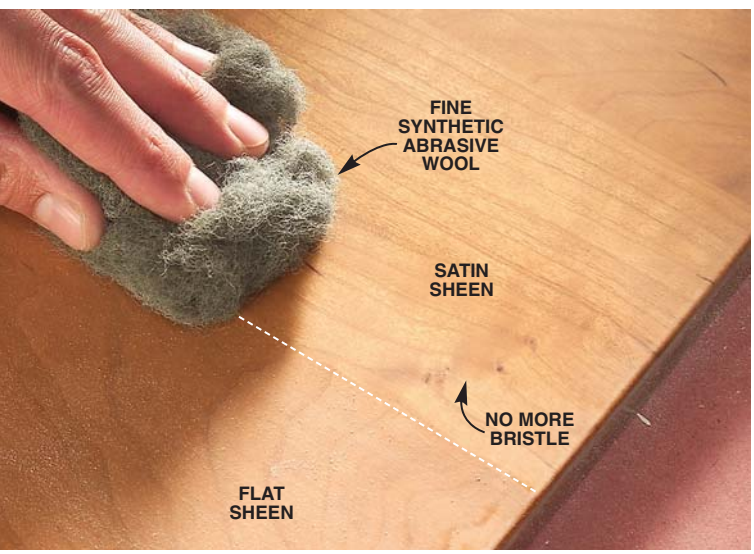


2 **The Solution:** Flatten the surface imperfections with 600-grit sandpaper on a sanding block (or 400-grit followed by 600 if the surface is really a mess). Sand just enough to flatten bubbles, dust nibs and ridges, but don't try to sand away all the shiny spots.



3 Extra care should be taken when sanding near the edges of a tabletop to avoid sanding through. Sand the 2 to 3 in. nearest the edge first. Short strokes make it easier to control the block. After the edges are done, sand the centers with long strokes that overlap the sanded border.

4 Rub out the finish using a medium synthetic abrasive pad (00 steel wool equivalent). Rub until you get a flat, even sheen across the entire surface.



5 Switch to a fine synthetic abrasive wool (0000 steel wool equivalent) to bring the finish to a satin sheen.

6 For a semi-gloss sheen, continue rubbing with fine synthetic abrasive wool lubricated with soapy water.

dust the way a flat, horizontal top does. A light buffing with steel wool will clean the occasional dust nib on vertical surfaces.

5. Sand with 320- to 400-grit stearated paper between coats, depending on how smooth the coat looks. Use a sanding block to level ridges and bumps. With a gloss finish, coarser paper may leave scratches that are visible through subsequent layers of poly.

6. Apply an extra coat or two of polyurethane on tabletops for more durability, depth and protection. Lay the last coat on a little thick to protect against accidentally rubbing through the top layer of finish. Remember, polyurethane does not melt into itself the way shellac or lacquer do. Each layer sits on top of the previous one, so there is a danger of sanding through one layer into the next. This will leave a visible ghost line where the top layer was sanded through. If this happens, you need to reapply the last layer of polyurethane and start over.

7. Finish the test boards at the same time you're finishing your tabletop. Use these sample pieces to make sure the finish is properly cured and ready to rub out. Then experiment on them to get a feel for rubbing out.

The No.1 rule for a successful rubout is to let the finish fully cure.

8. Let the finish fully cure! This is most important for a successful rubout. A finish that has not cured will not be hard enough to take an even scratch pattern from abrasives. The result will be an uneven sheen. Polyurethane should cure for two weeks to a month after the last coat is applied. If the finish balls up on the sandpaper or it won't buff out to more than a satin sheen, let it sit for another week or two.

Smooth and Flatten the Finish

It seems completely counterintuitive, but to make a finish really shine, you have to start by sanding it dull (Photo 2). Sanding removes dust nibs and brush marks and leaves the finish smooth and flat.

Caution: Finish tends to be thinner at tabletop edges. Use special care in these areas to avoid sanding through (Photo 3).

9. Apply consistent, light pressure as you sand. When you're done, the surface should feel smooth and level and will still have a few small shiny spots. Don't feel that you have to completely erase every

visual defect at this point—just go for a smooth feel. Unless you have lots of bubbles to flatten, you should only need to sand five to 10 strokes in any given area with the 600-grit sandpaper. Sand dry so you can see what's happening to the finish, and change paper often. Vacuum all the sanding dust off the surface and wipe with a damp cloth. Tackcloths can be used on oil-based poly but not on water-based.

Rub to an Even, Flat Sheen

10. Begin rubbing-out with medium-grade, (00 steel wool equivalent) synthetic abrasive pads (Photo 4). This is where the finish begins to come to life, taking on an attractive, flat sheen with no visible defects.

Rub to a Satin Sheen

11. Clean the top with a damp cloth and continue buffing with fine synthetic abrasive wool (0000 steel wool equivalent) (Photo 5). Rub until the whole piece has an even, satiny sheen, and then rub a little more. There's not much danger of rubbing through the finish at this point.

Rub to a Semi-Gloss

12. To bring up the sheen even more, use soapy water or paraffin oil as a lubricant for the abrasive wool (Photo 6). Rub thoroughly; then wipe dry.

13. If that's still not enough shine for you, rub the entire surface with 4F-grade pumice. After sprinkling the pumice on the surface, rub it into a paste with water and a dampened rag (Photo 7). Wipe the slurry away, and then repeat the process with rottenstone. Keep firm pressure on the rag, and sprinkle more of the powder or water as needed. Continue rubbing in any direction until your arms hurt and the finish looks satisfactory. Now your furniture has the good-looking finish it deserves.

7 Using finer and finer abrasives brings the sheen closer to a full gloss. Start with finest-grade (4F) pumice lubricated with water and a moist rag, followed by rottenstone. With these finer grits, it's OK to use a circular motion as you rub.

Sources Home centers and hardware stores 3M packs of two finishing pads, 00 steel wool equivalent, $3. 3M Sandblaster 400-grit stearated aluminum oxide paper, $4 for a pack of six. • Woodworker's Supply, (800) 645-9292, www.woodworker.com Oilfree abrasive wool, fine (000 to 0000 equivalent), #115-271, $18 for a 4.35-liter box; medium (1 to 00 equivalent), #115-274, $18 for a 4.35-liter box. 4F pumice stone, 1 lb., #849-832, $6. Rottenstone, 1 lb. #849-839, $6.

Dealing with Molded Edges

Avoid using sandpaper on molded edges, table legs and other vertical surfaces. The risk of cutting through the finish with the sandpaper is just too great. Instead, rub molded edges with synthetic abrasive pads and rub to the sheen of the top.

Modern MISSION Cabinet

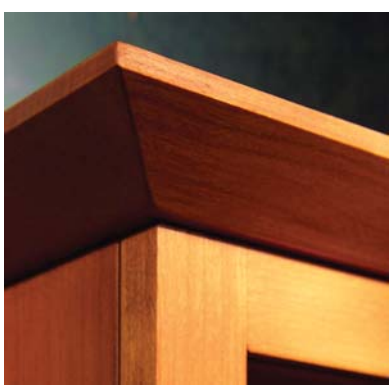
by Tim Johnson

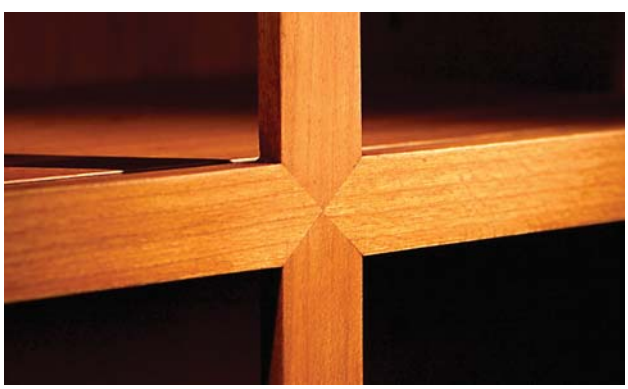
Simple jigs create stylish joints.

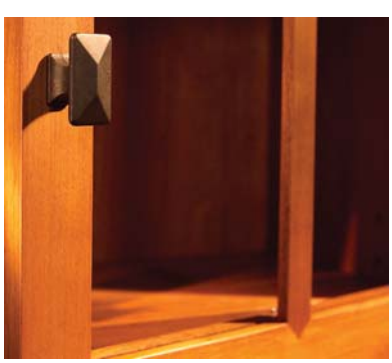
My dog's energetic tail inspired this cabinet. Anything within wagging range was endangered, including a number of my favorite antique toys. After one-too-many near misses, I decided to move these small treasures to safety—above the wag line and behind glass. The cabinet I built for them measures about 27 in. wide by 32 in. tall, so it's small enough to fit just about anywhere.

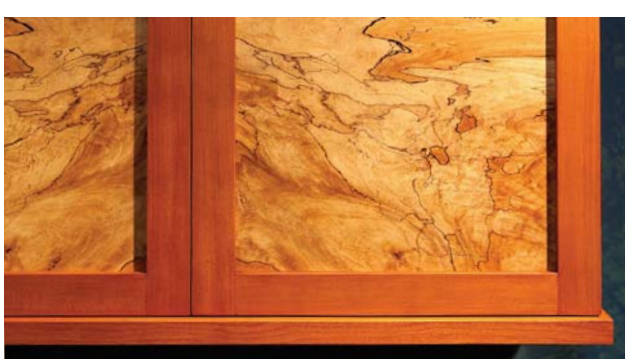
This elegant cabinet is deceptively easy to build, thanks to a couple of jigs that make quick work of the most challenging joinery: the doors' mitered, half-lapped muntins. The cabinet itself assembles with biscuits; the door frames use simple loose-tenon joinery.

I spent about $110 for top-grade cherry, but most of the cabinet parts are short or narrow, so you can save money by buying lower-grade boards and cutting around knots. The door panels provide a perfect setting for one of your treasure boards—I've been saving the piece of spalted maple that I used to make my panels for years. I paid $15 for a 2-ft. x 4-ft. sheet of 1/4-in. cherry plywood to make the back.









ART DIRECTION: JOE GOHMAN • PHOTOGRAPHY: PAGES 42 AND 43, BILL ZUEHLKE; OTHERS, JOE GOHMAN • ILLUSTRATION: FRANK ROHRBACH

Project Requirements at a Glance

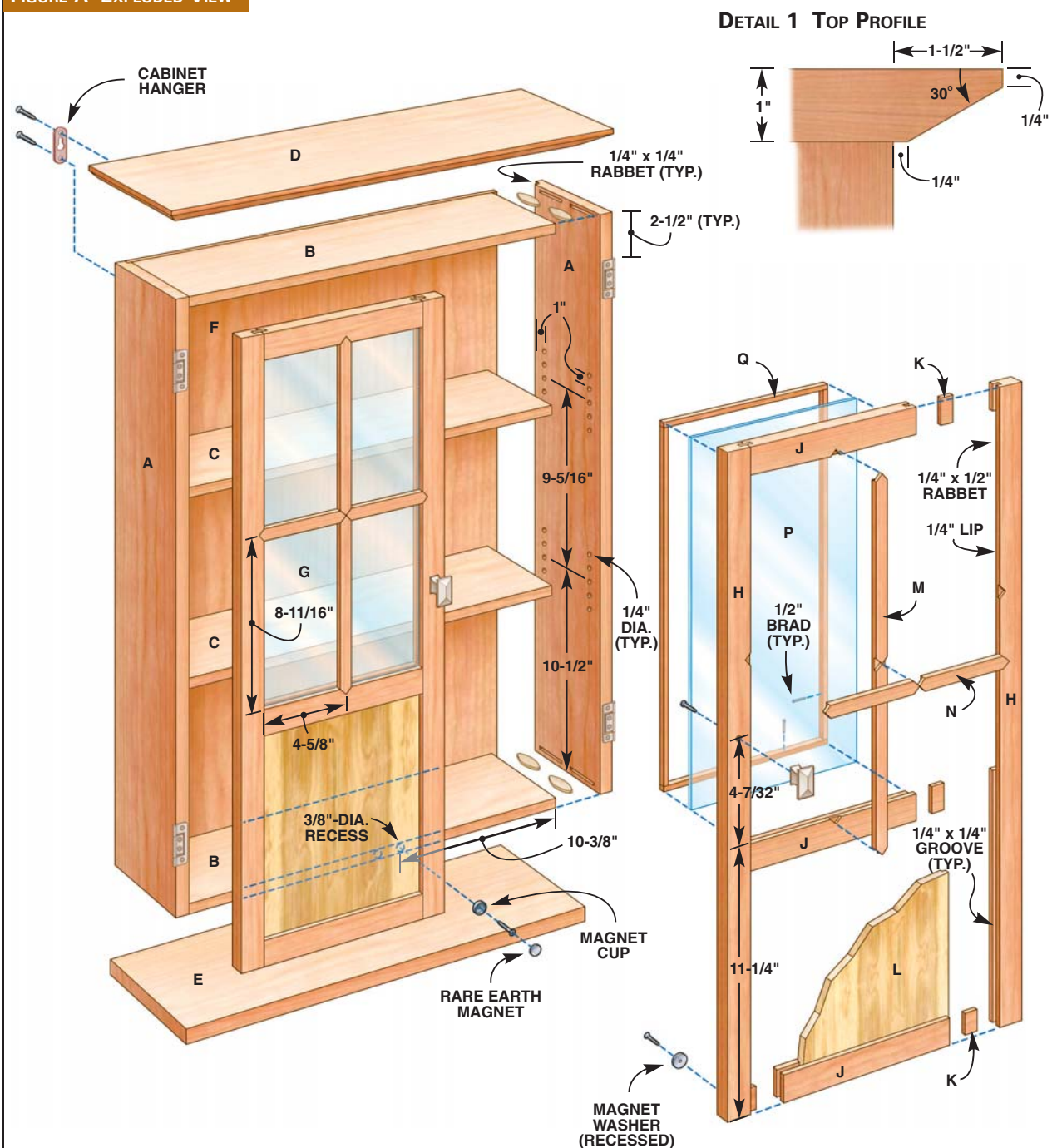
Materials
15 bd. ft. of 4/4 cherry
3 bd. ft. of 5/4 cherry
2 bd. ft. of 5/4 spalted maple
One 2 ft. x 4 ft. sheet of 1/4-in. cherry plywood

Hardware
Four no-mortise hinges
Two knobs
Two pieces of glass
Two rare earth magnet doorstop sets
Eight shelf pins
Two keyhole brackets
1/2-in. wire brads
Wood glue

Tools
Jointer
Planer
Tablesaw
Drill press or shelf pin-hole drilling guide
Drill
Router table and router
1/4-in. slot cutter and arbor
Rabbeting bit with oversize bearing
1/16-in. straight bit
1/2-in. and 1-in. bench chisels
Backsaw
Hammer
Screwdriver

Cost: approximately $165

Figure A Exploded View



Build the Cabinet

This joinery is as simple as it gets: four pieces joined with biscuits. The back, top and bottom are glued on.

1. Cut the cabinet sides (A), ends (B), adjustable shelves (C) top (D) and bottom (E) to size (Fig. A, page 44; Cutting List, page 49).

2. Rout rabbets in the cabinet sides for the back (F).

3. Drill or rout holes in the cabinet sides for shelf pins. Installing the pins in the center holes will position the adjustable shelves directly behind the doors' horizontal muntins and middle rails. For maximum adjustability, drill additional holes in the sides so they run full length.

4. Cut slots for No. 10 biscuits in the sides and ends.

5. Glue the sides and ends together. Make sure the cabinet is square.

6. Drill holes for the rare earth magnet cups.

7. Temporarily install four shelf pins (see Sources, page 49) so you can cut the adjustable shelves to final length.

8. Bevel the front and ends of the top on the tablesaw with the blade tilted 30 degrees (Detail 1, page 44). With the doors installed, the overhang on the front and sides will closely match. Plane, scrape or sand the top's beveled surfaces to remove the saw marks.

9. Glue on the top and bottom.

10. Fit the plywood back; then install it with glue and nails.

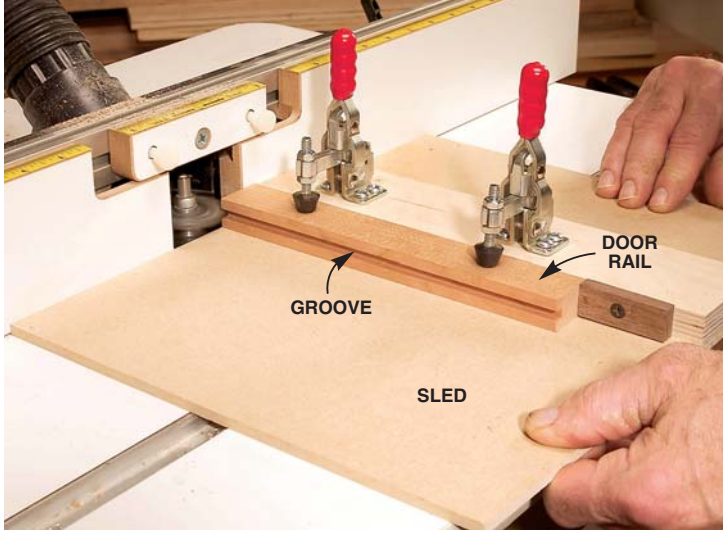
11. Mount the cabinet hangers (see Sources) after drilling clearance holes for the screws on which they will hang. These keyhole-style hangers can be surface- or flush-mounted. To flush-mount them, you'll have to rout shallow mortises.

Build the Doors

The frame-and-panel doors feature simple loose-tenon joinery. These joints are strong and easy to make. Just rout grooves in the stiles and rails and mill tenon stock to fit the grooves. Door frames made from straight-grained stock will look the best.

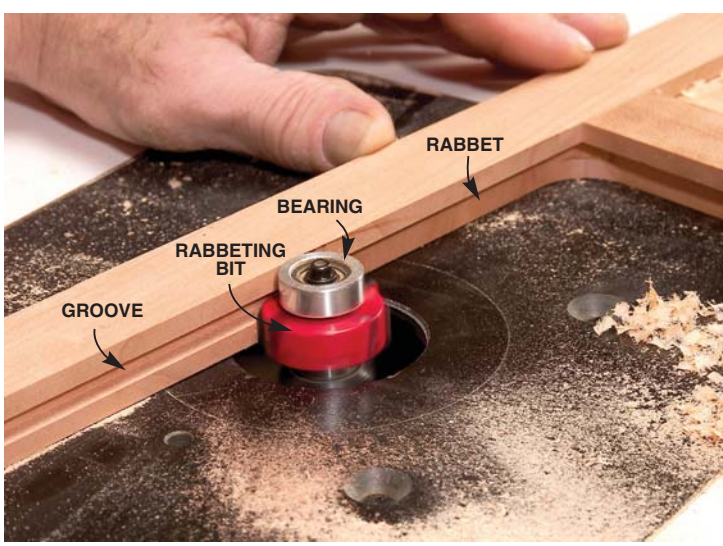
12. Cut the stiles (H) and rails (J) to final size. These pieces must be straight and flat. To get consistent, accurate widths, I rip these pieces slightly oversize and then run them on edge through my planer. The rails would be too short to plane individually, so I cut them from long blanks that have already been planed to width. Set aside a couple extra pieces of this 1-1/4-in.-wide stock to use later, while dialing in your setup for making and fitting the muntin joints.

13. Rout centered grooves in one long edge of the stiles and rails with a 1/4-in. slot-cutting bit (see Sources, page 49). Make sure the grooves leave a 1/4-in.-wide lip on the top edge. Use your router table's fence to set the grooves' 1/4-in. depth.



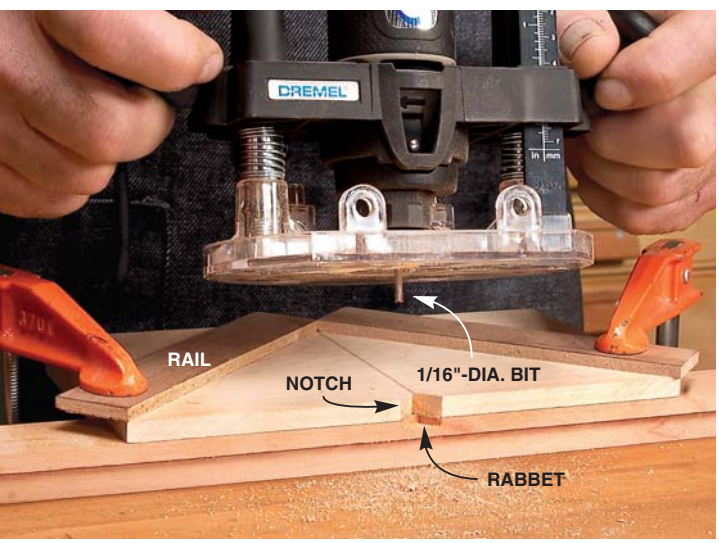
1 The door frames assemble with splines that fit in centered grooves (Fig. A). First rout grooves in the inside edges of all the stiles and rails. Then use a sled to rout grooves in the ends of the rails.

2 Resaw a board to make panels for the doors. Opening the two resawn pieces like a book reveals mirror-image, book-matched panels. Assemble the doors after fitting the panels.



3 Rout rabbets for glass in both assembled doors. Install an oversize bearing (see Sources, page 49) so the rabbet matches the groove's depth. Position the bit so the top of its cut is centered in the groove. Routing simply removes the lower lip.

4 To rout the mitered rabbets, clamp the rabbeting jig at the center of the glass opening on each stile and rail.



5 Rout tiny rabbets with a tiny straight bit. The jig's rails guide the router so the bit cuts just shy of the jig's mitered notch.

6 Finish each mitered rabbet by paring it flush with the shoulders of the notch.

14. Rout grooves in the ends of the rails using a sled (Photo 1). Keep the same fence setting from the previous step. Install the rail in the sled and then raise the bit to match the groove in the rail's long side.

15. Make spline stock. For strength, the grain on solid-wood splines should run across the joint, just like the tenon on a rail. Saw splines (K) from a board that you've thickness-planed to fit the grooves. Make the splines oversize in length so they can be trimmed flush after the doors are glued together.

16. Make panels (L) for the doors (Photo 2). If you want to resaw and bookmatch the panels, you'll need to start with a board that's at least 1 in. thick. Your board must also be at least 12 in. long, so the resawn blanks can be jointed and planed. Bookmatching is always somewhat risky, because you never know what resawing will reveal. Nonmatched or even asymmetrical panels can be equally attractive, as long as they complement one other and the cabinet. For a more subdued appearance, choose panels made from the same wood as the cabinet.

17. Cut the panels to final size. Then rout rabbets all around the back to create the 1/4-in.-thick tongues that fit the grooves in the stiles and rails.

18. Sand the panels and apply the finish. Prefinishing guarantees that seasonal movement in the assembled door won't reveal unfinished areas of the panel.

19. Dry-fit the stiles, rails, splines and panels. Then glue together each door, making sure they're flat and square.

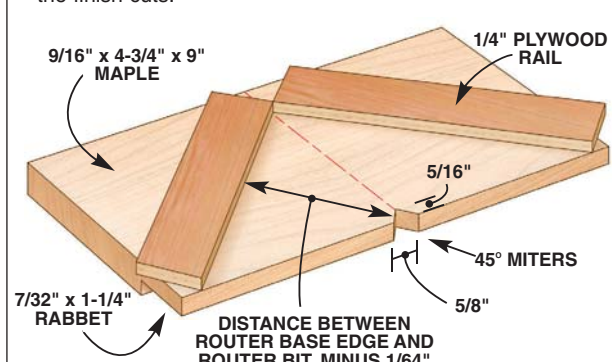
20. Rout rabbets for the glass (Photo 3). After routing, square the rabbets' corners with a chisel.

21. Mill stock for the glass retainers (Q). Trim these pieces to fit later, after you've applied the finish.

22. Mount the doors by installing the no-mortise hinges. Make sure the doors are flush with the cabinet sides and centered between the top and bottom. Trim

FIGURE B RABBETING JIG

This jig creates mitered rabbets in the door stiles and rails. The jig's rails guide the router when you rough-cut the rabbet. The V-shaped notch guides the chisel during the finish cuts.



the inside edges to create a slender gap of 1/16 in. or less between the doors.

23. Locate the holes for the doorknobs and magnet washers.

24. Remove the doors and drill the holes.

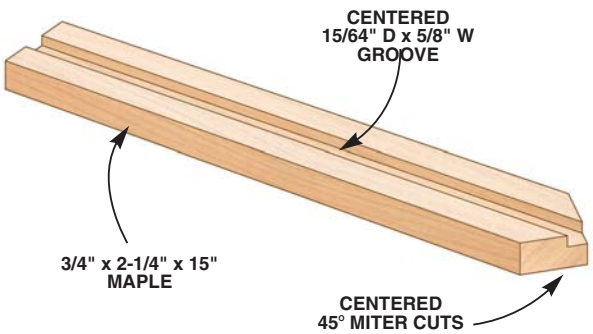
Make and Install the Door Muntins

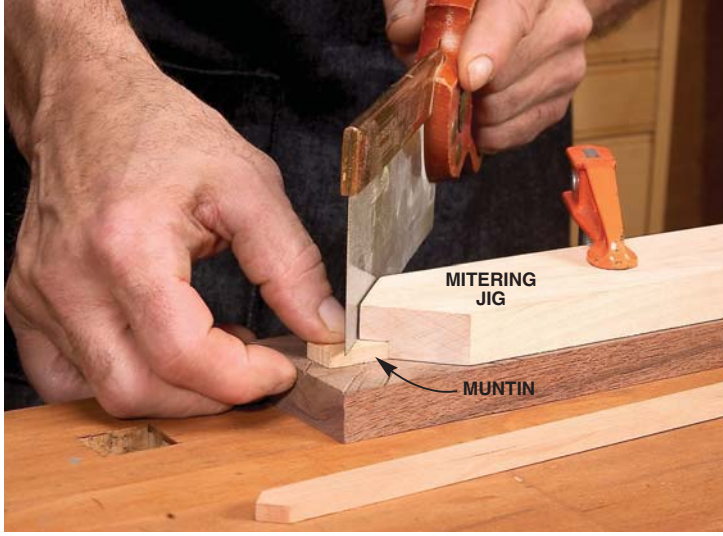
The mitered half-lap muntin joints (Fig. D, page 48) look like a woodworking tour de force, but they aren't difficult to make. Consistently sized muntin blanks, a couple of precisely made jigs and a razor-sharp chisel are the keys to success.

25. Mill extra muntin blanks to use while making the jigs, along with the extra rail stock you've already milled. Test your jigs and procedures on this extra stock. Don't start work on the real doors until your test joints fit perfectly.

Figure C Mitering Jig

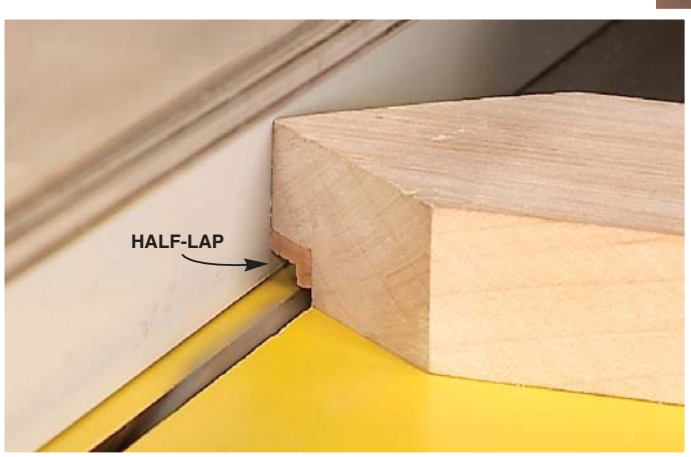
This jig creates mitered half-lap tenons on the ends of the muntins.

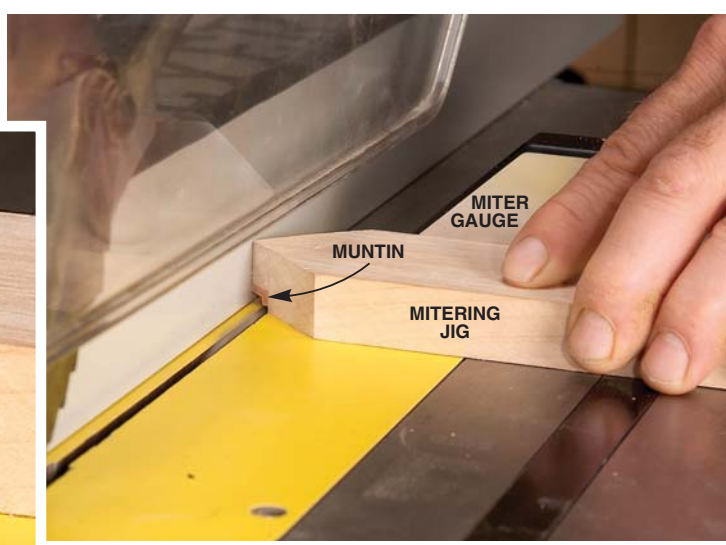




7 The mitering jig stabilizes the thin, slender muntins so you can accurately miter the ends. First, rough-cut the miters on the vertical muntins.

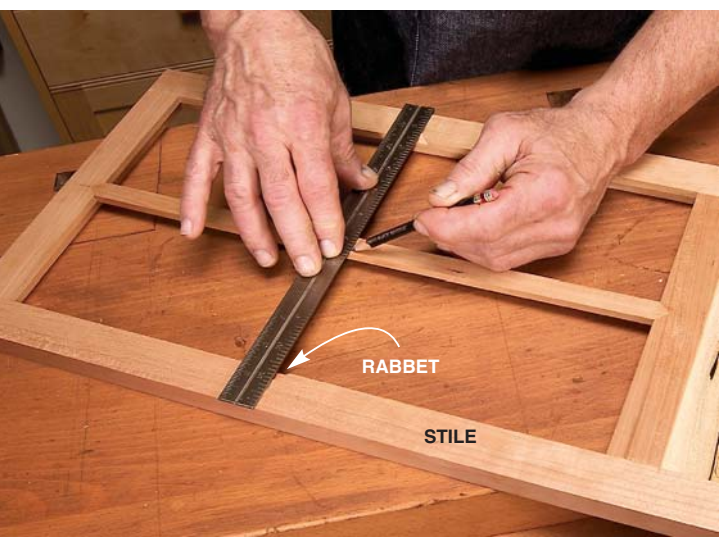
8 Pare the mitered ends, using the jig to support the chisel. Pare each vertical muntin to final length by test-fitting it in the door's mitered rabbets.





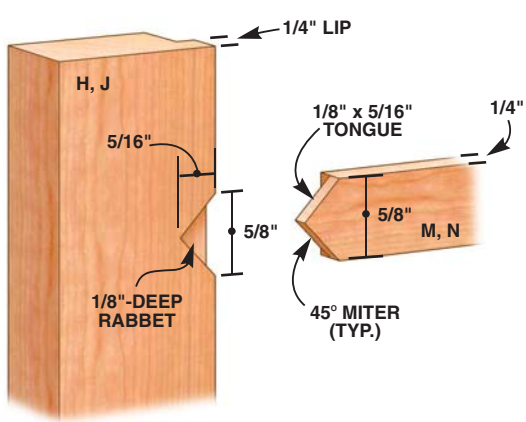
9 Saw half-laps on the ends of each mitered muntin using the mitering jig, your miter gauge and the rip fence. You can dial in the exact width of the rabbet by adjusting the fence, but it's best to play it safe and make this cut slightly undersize.

10 Pare the half-lap rabbets to fit, using the square end of the jig.



11 Use the centerpoints of the mitered rabbets in the stiles to locate the rabbets on the vertical muntin.

FIGURE D MITERED HALF-LAP MUNTIN JOINT



26. Make the rabbeting jig (Fig. B, page 46).

- The mitered notch determines the size of the rabbet, so it must be precisely cut. It's best to set the tablesaw blade's height a bit low for the two 45-degree cuts and then finish cutting the peak of the notch with a chisel.
- The width of the rabbet on the jig's bottom face must match the stiles and rails' width, so that when the jig is clamped in position, the outside edges of the jig and the workpiece are flush. The rabbet's shallow depth allows clamping the jig on the middle rail without bearing on the door's panel.
- The exact location of the jig's rails depends on the radius of your router's base. Locate the rails so that your straight bit cuts just shy of the notch.

27. Mark the centers of the glass opening on all four sides of each door. Use these lines to position the rabbeting jig (Photo 4).

28. Rout the mitered rabbets (Photo 5). The test cuts you made while building the jig have precisely dialed in the 1/8-in. depth.

29. Pare the shoulders of each rabbet (Photo 6).

30. Make the mitering jig (Fig. C, page 47).

- On the face of the jig, saw or rout a centered groove that matches the width of your muntin stock. The groove's depth must be slightly less than the muntin's thickness.
- Saw 45-degree miters on one end of the jig, making sure that they meet dead center, so the groove is precisely centered on the point.

31. Saw and pare the mitered ends of the vertical muntins (M, Fig. A, Photos 7 and 8). Start by cutting the muntins oversize in length. Use the door's mitered rabbets for test-fitting. Make an extra mitered muntin to use while setting up the next step.

32. Saw half-laps in the mitered muntins (Photo 9). Make test cuts to dial in the fence's position and the blade's height. Remember to include the blade's kerf when you set the rip fence. Install the muntin flush with the mitered tip of the mitering jig. Then cut the half-laps in several passes, using the miter gauge and the rip fence. Make the last pass with the mitered tip of the jig (and the muntin) butted against the fence. It's best to leave the shoulders a bit long and then pare them to fit (Photo 10).

33. Install the vertical muntins in the doors and mark them for rabbeting (Photo 11).

34. Rout and pare mitered rabbets on the vertical muntins (Photo 12).

35. Fit the horizontal muntins (N, Fig. A, Photo 13).

36. Glue the muntins in the doors.

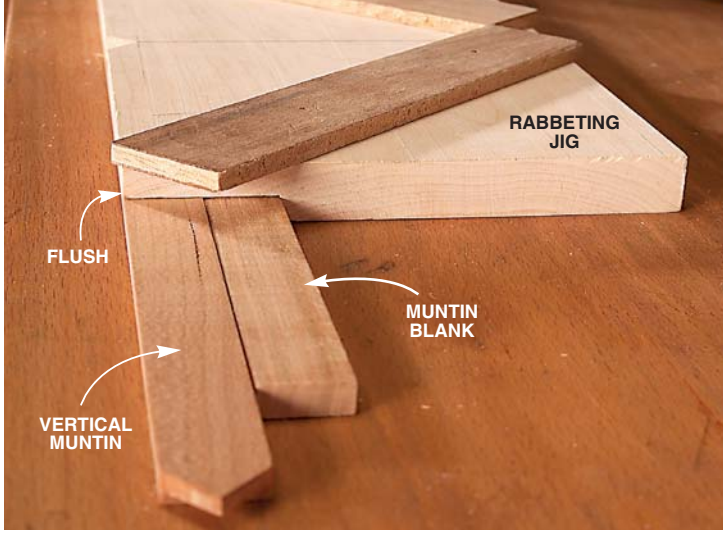
Finish and Final Assembly

Choose a clear wipe-on or aerosol-spray finish. Brushing on a finish is difficult, especially when it comes to the doors. Wipe-on finishes are goof-proof but somewhat tedious to apply. Spraying is faster, but sanding between coats is necessary and drips and sags will appear unless you apply very light coats. Mask off the finished door panels to protect them from overspray. Remember to finish the shelves and glass retainers. When the finish has completely dried, complete these three steps:

37. Install the magnet cups, magnets and washers.

38. Install the glass with the doors facedown on a padded surface. Cut and fit the glass retainers. Install the retainers after drilling shank holes for the 1/2-in. brads.

39. Install the knobs; then mount the doors on the cabinet.



12 To cut mitered rabbets on the vertical muntins, simply add a spacer to the rabbeting jig. A muntin blank is the perfect size.

13 Saw, pare and rabbet the horizontal muntins to fit. Voilà! You've created a stylish, sturdy divided-light door.

Cutting List

Overall dimensions: 8-1/4" x 26-1/2" x 31-3/4"

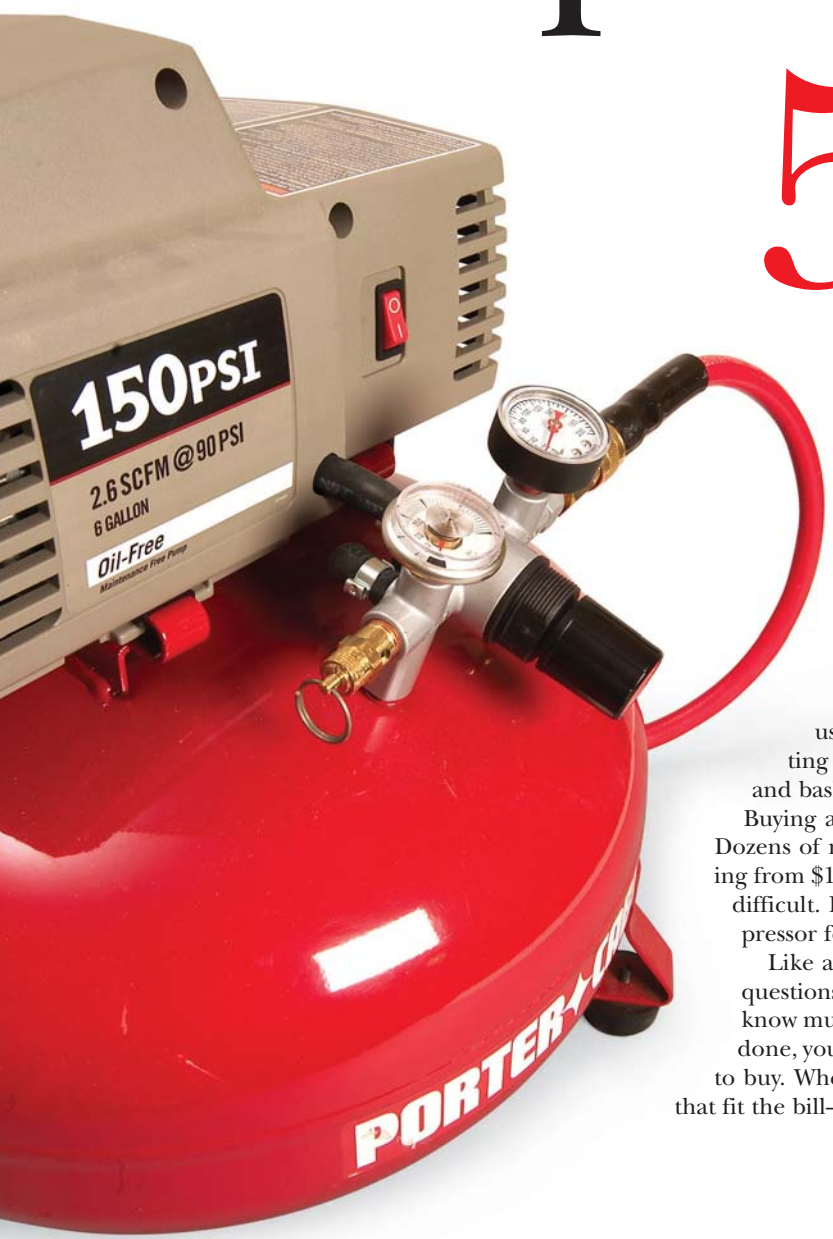
Part	Name	Number	Dimensions
A	Side	2	3/4" x 6" x 30"
B	End	2	1/2" x 5-3/4" x 22"
C	Adjustable shelf	2	1/2" x 5-3/4" x 21-15/16"
D	Top	1	1" x 8-1/4" x 26-1/2"
E	Bottom	1	3/4" x 7" x 24"
F	Back	1	1/4" x 22-1/2" x 30"*
G	Door	2	3/4" x 11-3/4" x 29-7/8"
H	Stile	4	3/4" x 1-1/4" x 29-7/8"
J	Rail	6	3/4" x 1-1/4" x 9-1/4"
K	Spline	12	1/4" x 15/32" x 1-1/2"
L	Panel	2	3/8" x 9-1/8" x 9-5/8"
M	Vertical muntin	2	1/4" x 5/8" x 18"**
N	Horizontal muntin	4	1/4" x 5/8" x 4-15/16"**
P	Glass	2	3/32" x 9-5/8" x 17-3/4"
Q	Retainer	8	1/4" x 3/8" x cut to fit

*plywood
**cut length oversize, then trim to fit

Sources Van Dyke's Restorers, (800) 558-1234, www.vandykes.com Bungalow doorknobs, 5/8 in. x 1-1/4 in., #CM-02018877, $3.50 each. No-mortise hinges, 1-3/8 in. x 2 in., #CM-02012668, $1.50 a pair. • Lee Valley Tools, (800) 871-8158, www.leevalley.com Shelf pins, #63Z06.04, $5.25 for a package of 20. Blind cabinet hangers, 1-7/8 in. x 5/8 in., #00S10.11, $2.40 for a package of 10. 1/4-in. rare earth magnet, 1/4 in. x 1/10 in., #99K31.01, $0.30 each. Magnet cup, 1/4 in. i.d., 3/8 in. o.d., #99K32.51, $0.40 each. Magnet washer, 3/8 in. o.d., #99K32.61, $0.40 each. • Freud Tools Inc., (800) 334-4107, www.freudtools.com 1/4-in. slot cutter, #56-112, $17. 1/2-in. Arbor, #60-102, $6. Rabbeting bit with bearing set, #32-524, $52. 1/16-in.-dia. straight bit, #04-096, $11.

small Air compressors

5 easy questions to choose the right one



by Richard Tendick

Equipping your shop with a small, portable air compressor opens the door to a whole line of time-saving pneumatic tools. You can use a brad nailer or stapler to quickly assemble jigs, furniture and shop projects. For more exotic uses, you can run a vacuum-bag veneering system or air-powered clamps. And you can use your compressor around the house for putting up trim, building a deck, inflating car tires and basketballs, and so on.

Buying a small compressor can make your head spin. Dozens of models are available, all varying slightly, ranging from $115 to $350. But your search doesn't have to be difficult. If you know what you plan to use an air compressor for, I'll help you figure out what type to get.

Like a good sales clerk, I'll ask you a series of basic questions to narrow your choices. You don't need to know much about compressors to answer. When you're done, you should know exactly what kind of compressor to buy. When you go shopping, you'll find a few models that fit the bill—just pick the best value.

EDITOR: TOM CASPAR • ART DIRECTION AND PHOTOGRAPHY: VERN JOHNSON

1. What tools will you use?

Figure out the amount of air you'll need.

When you shop for a compressor, the most important number to look for is the amount of cubic feet per minute (cfm) it delivers at 90 pounds per square inch (psi). Usually, the most prominent number you see on a box is the machine's horsepower. Everybody is familiar with horsepower ratings for other tools, but for compressors, it's not the most helpful guide. Stick to the cfm rating.

The cfm rating indicates the volume of air a compressor can supply in one minute. Air-powered tools have different cfm requirements. If you're going to run a brad nailer from your compressor, for example, you may only need a 1- to 2-cfm unit. A framing nailer requires a 2- to 4-cfm compressor.

Spray guns require 7 to 11 cfm, random-orbit sanders, up to 15 cfm. If you plan on using these tools, you'll need a much larger compressor than the small ones covered here, but the five questions still apply.

Multiple tools require more air.

Running more than one tool from a compressor increases the amount of air you'll need. If you work in a small production shop, work on a job site, or plan a home-remodeling job on which two, three or four people will be using air nailers, a small compressor may still provide adequate air, but each additional tool puts a heavier burden on the compressor. Shooting dozens of brads or staples in a short amount of time has the same effect.

It's better to buy a compressor with a higher cfm rating than one that marginally meets your requirements. Underestimating your air delivery needs will reduce your tool's performance, possibly shorten your compressor's life and, if the compressor runs frequently, create a very noisy shop.

Air flow affects your tool's performance.

When their tanks are fully charged, all small compressors deliver enough pressure to run most woodworking air-powered tools. But your tools won't perform well if you have a compressor whose cfm rating is too low.

Let's imagine you're driving brads. As you draw air from the tank, its pressure drops until the compressor's motor starts to run. If the compressor isn't able to supply enough air to the tank while you continue to work, the tank's pressure will drop further, even though the motor is running. The nailer may not get enough air pressure to drive a brad all the way in. At this point, you have to stop work and allow the compressor to build back up to pressure. Insufficient air flow prevents your tools from working at their full capacity and slows you down.

1 to 2 cfm

A 1- to 2-cfm compressor can drive one brad nailer or one finish nailer.

2 to 4 cfm

A 2- to 4-cfm compressor can drive two brad nailers, two finish nailers or one framing nailer.

4 to 5 cfm

A 4- to 5-cfm compressor can drive four brad nailers, four finish nailers or two framing nailers.

2. How hard will you use it?

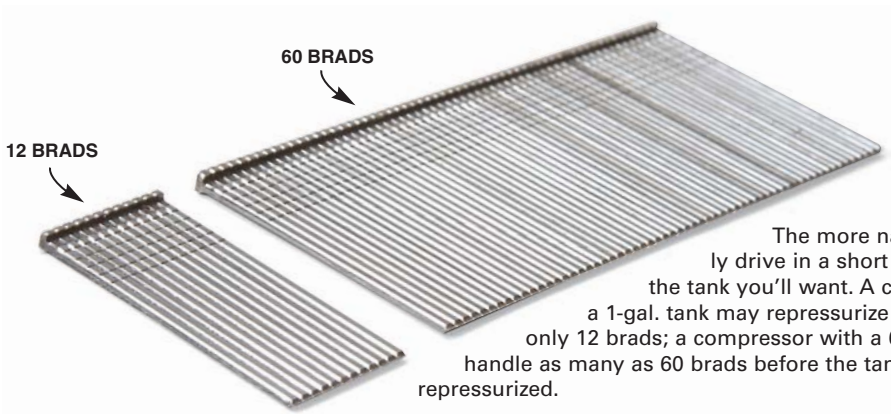
Choose the tank's size.

Tank shapes and sizes vary quite a bit. When you're shopping, don't get hung up on choosing among pancake, single or double tanks. Pay more attention to the tank's volume and less to its shape.

A tank's shape doesn't affect a compressor's ability to deliver air. Double tanks, for example, don't offer some secret advantage. A pancake or single-tank compressor performs just as well as a double-tank compressor.

The larger the tank's volume, no matter what its shape, the less often the compressor will kick in. If you're going to be a hard user, continuously shooting brads, staples or nails, go for the largest tank in your cfm range. If you'll be a light user, shooting a dozen or so brads at a time, you'll be OK with a smaller volume tank. It will be more compact and weigh less.

A pancake or single-tank compressor performs just as well as a double-tank compressor.



The more nails you routinely drive in a short time, the larger the tank you'll want. A compressor with a 1-gal. tank may repressurize after shooting only 12 brads; a compressor with a 6-gal. tank may handle as many as 60 brads before the tank must be repressurized.

3. Which is more important to you – long life or low maintenance?

Decide between an oil-lubricated or oilless unit.

Most oil-lubricated compressors can be run longer per hour than oilless compressors can. They have a very long life but require routine maintenance. On occasion, they might spit oil on your project.

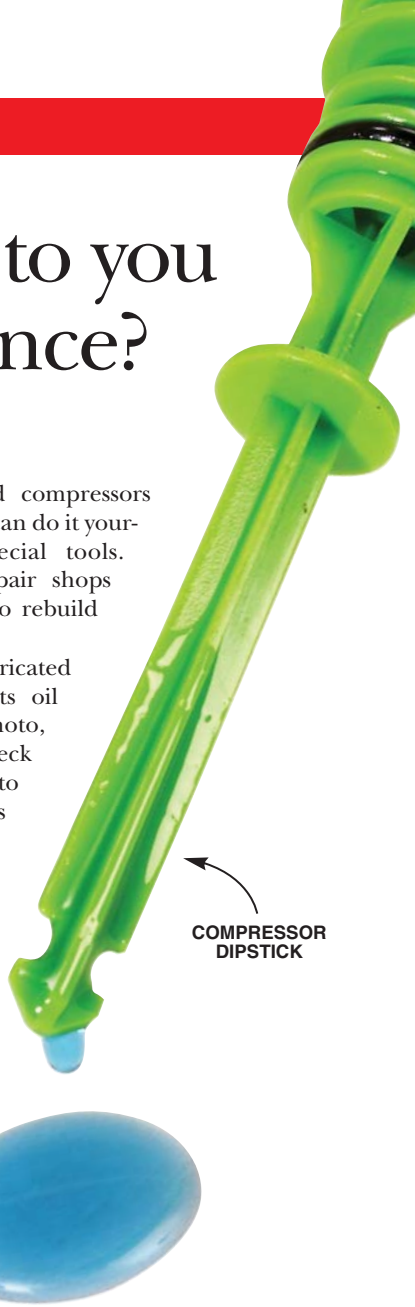
Oilless compressors shouldn't be run more than 30 minutes per hour, on average. They have a shorter life, but don't require much maintenance and won't spit oil. Oilless compressors generally cost about $50 less than oil-lubricated units with similar cfm ranges and tank sizes.

Duty cycle. This term refers to the length of time in one hour that a compressor should be allowed to run without stopping. Most oil-lubricated compressors can run 45 minutes out of every hour, giving them a 75-percent duty cycle. Most jobs in a one-person woodshop don't require a compressor to run this much, but when a compressor's air flow is barely adequate for a spraying or sanding job, or its tank volume is small, an oil-lubricated unit is the best choice. Most oilless compressors have a 50-percent duty cycle. They should be allowed to stop a total of 30 minutes out of each hour of use to cool down.

Life span. A well-maintained oil-lubricated compressor has approximately a 4,000-hour running-time life expectancy; an oilless unit will run from 500 to 2,000 hours. Let's put those numbers in perspective: To reach 500 hours, the bare minimum, you would have to run your compressor a total of 2 hours a week for 5 years. Many oilless compressors are inexpensive and easy to rebuild (see photo, below left). Rebuild kits aren't available for all models, however. Oil-lubricated compressors are not easy to rebuild. You can do it yourself, but you'll need special tools. Professional compressor-repair shops in your area may be able to rebuild your unit.

Maintenance. An oil-lubricated compressor should have its oil changed regularly (see photo, below right). You should check its oil level, too, from time to time. Oilless compressors don't need to be monitored this closely.

Oil spits. An oil-lubricated compressor may spray tiny droplets of oil. This should happen only on rare occasions, but an older compressor with a worn cylinder is more likely than a new one to suffer this problem. You can often sand or wash oil droplets off your project.



Oilless compressors are easy to rebuild. Usually, all you need is a new cylinder and a new piston to extend the compressor's life. The set costs less than $50. Replacing these parts doesn't require special tools or skills.

Oil-lubricated compressors require regular maintenance. Depending on the compressor, you should change its oil every three months to a year or after 100 to 300 hours of use.

4. Will you be moving it outside your shop?

Determine whether weight matters.

If you plan to park your compressor in one spot and rarely move it, its weight isn't important. But if you foresee using your compressor upstairs and downstairs, indoors and outdoors, its weight can make a big difference.

Small compressors range from 20 to 90 lbs. Obviously, it's much easier to carry a 20-lb. unit up a flight of stairs than a 90-lb. unit. Some heavier compressors come with wheels and a long handle to make them more portable, but these make the machine larger and more difficult to store.

Store a lightweight compressor just about anywhere. Park it on a shelf to save space. If it's secure, it can run up there, too.

5. How dusty is your shop?

Inspect the intake filter.

Dust can shorten your compressor's life. A good intake filter that's routinely cleaned offers the best protection.

Dust and dirt drawn into a compressor act like sand caught between the pump's piston and cylinder. They grind away with each stroke, reducing the motor's efficiency. The intake filter's job is to remove dust from the air before it reaches the pump.

Intake filters vary widely among compressors. Unfortunately, you can't easily upgrade the filter after you buy a compressor. Since you do know how dusty it gets in your shop, you can choose a specific air compressor by which type of filter it has. The larger a filter's surface area, the longer it will remain effective between cleanings. A pleated-paper cartridge filter is best, having the largest surface area.

Many compressors have foam filters, which are less efficient at trapping very small dust particles. Some compressors don't have any filter at all.

Filters require regular cleaning. A clogged filter blocks the free flow of air to the compressor, requiring it to work harder, which could damage your compressor.

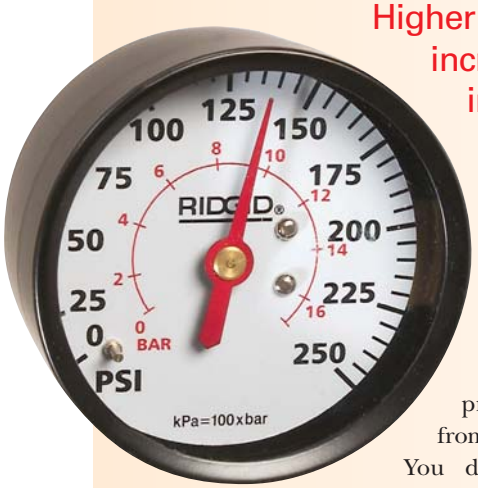
More Specs To Consider

Small, low-rpm machines run more quietly.

A loud compressor in a small shop can drive a person nuts. Fortunately, some compressors are much quieter than others. Their sound-pressure levels vary from about 80 to 90 dBA, a significant difference that's roughly equivalent to the noise of an idling tablesaw compared with the same saw ripping thick hardwood. As you might expect, 1- to 2-cfm compressors are generally the least noisy. Unfortunately, noise levels measured in decibels aren't widely reported in manufacturer's spec sheets. Try before you buy.

The speed at which a compressor runs also affects its noise level. Some compressors run at 1,720 rpm, while others run at 3,450 rpm. Low-speed machines are noticeably quieter.

Higher pressure increases air in the tank.

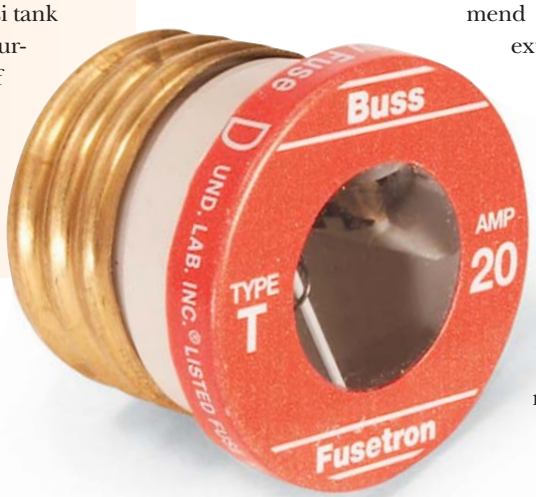


Some compressors are built to handle much higher maximum pressure than others. Overall, maximum air pressure ranges from 100 to 150 psi. You don't need this increased pressure to run most woodworking tools, but it does have a definite benefit: a 150-psi tank will cycle on and off less often, because it contains more air than a 100-psi tank of the same volume. A 1-gal. tank pressurized at 150 psi contains about 11 gal. of air, while the same tank at 100 psi contains only 7 gal. A high-pressure oilless compressor will have more time to cool down between cycles, which extends its life.

More horsepower requires more amperage.

The more air a compressor delivers, the more horsepower and amperage it needs. A 1/2-hp compressor typically draws about 4 amps, a 1-hp compressor, 10 amps, and a 1.6-hp compressor, 15 amps.

A compressor that draws 15 amps should be run on a dedicated 20-amp circuit to avoid blowing a fuse or tripping a breaker. Manufacturers recommend that you do not use an extension cord on a high-amp unit. (You can, however, use a long hose to deliver air far away from a compressor; see "Plumb Your Shop with Air," page 57.) Check out the amperage of your shop and home circuits before buying a high-amp machine.



Plumb your shop with air

Flexible Hose Saves Time and Money

by Richard Tendick

Moments after I tripped over the air hose and dropped an armload of boards, I decided it was time to plumb my shop for air. I was tired of having 50 ft. of hose on the floor and dashing back to the compressor to adjust the line pressure. I knew a permanent system could deliver the right amount of air where and when I needed it—without a big hose snaked dangerously across the floor.

Every article I read on plumbing air lines advised using either iron or copper. Because my basement shop holds a lot of obstructions, using iron or copper would result in a whole lot of threading or soldering of short little pieces. Besides, copper and iron fittings are costly.

Ultimately, I decided on a solution I had used many times in my 27 years as a manufacturing plant engineer. When installing printing presses and other large machines, I used rubber air hose as a flexible pipe to route compressed air in and through the equipment without having to do a lot of complicated plumbing.

That approach would certainly work with all the obstructions in my shop. I chose a rubber hose rated for 250 pounds per square inch (psi), plenty for my little pancake compressor. The 1/2-in. inside diameter meant no reduction in air pressure would occur along the length of the run.

EDITOR: DAVE MUNKITTRICK • ART DIRECTION: VERN JOHNSON • PHOTOGRAPHY: RAMON MORENO

The Layout

Rubber air hose is an easy, economical and industry-proven method of routing compressed-air lines in your shop. The rigid copper drops are installed on the wall where needed. The hose can then be

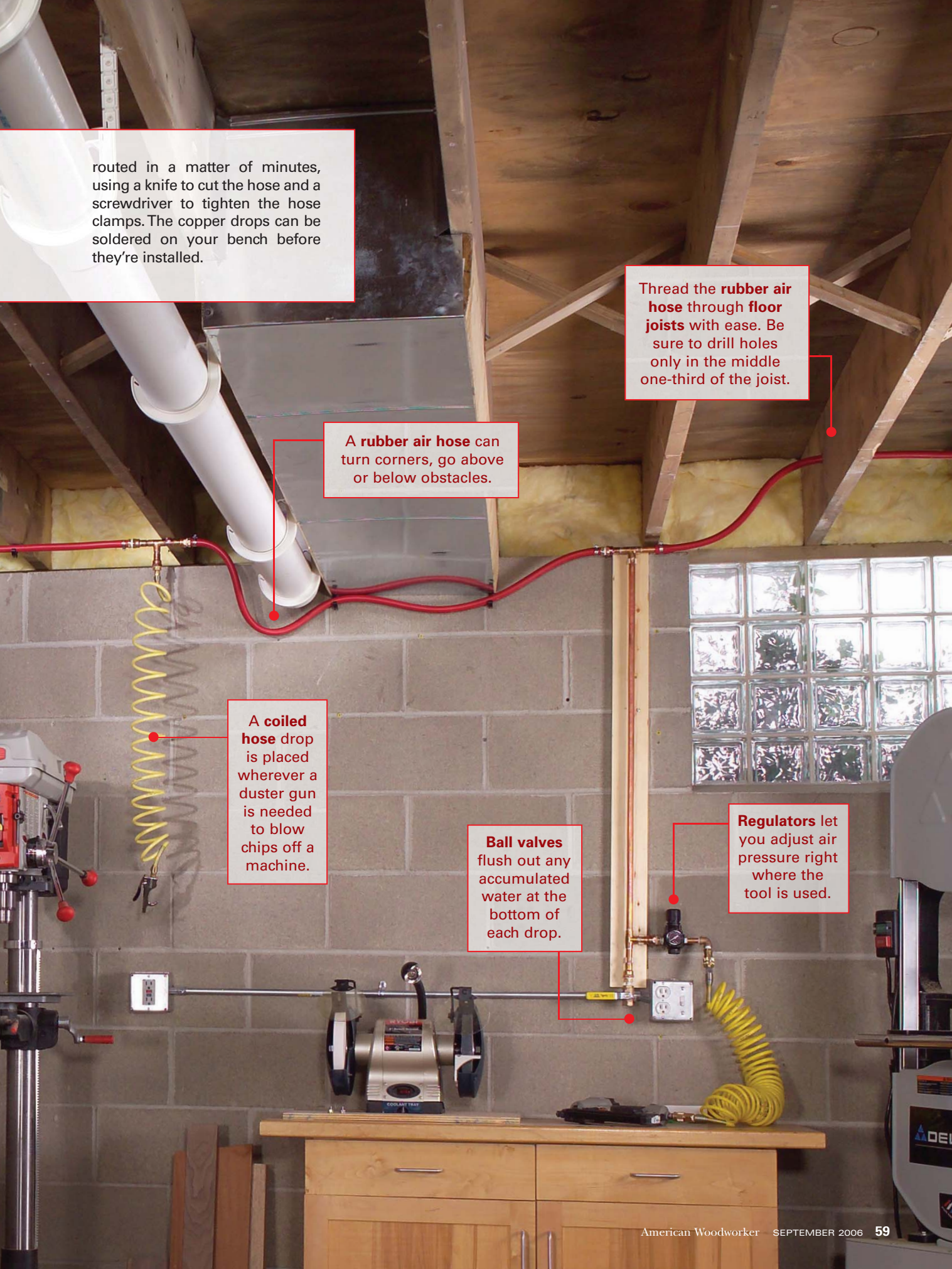
An **air filter** keeps water and oil out of the lines.

A **ball valve** locks compressed air in the lines so you can disconnect the compressor from the system and go mobile.

Copper drops bring the air to work areas and provide rigidity for easy tool hookup.

A **shelf** for the compressor frees floor space.

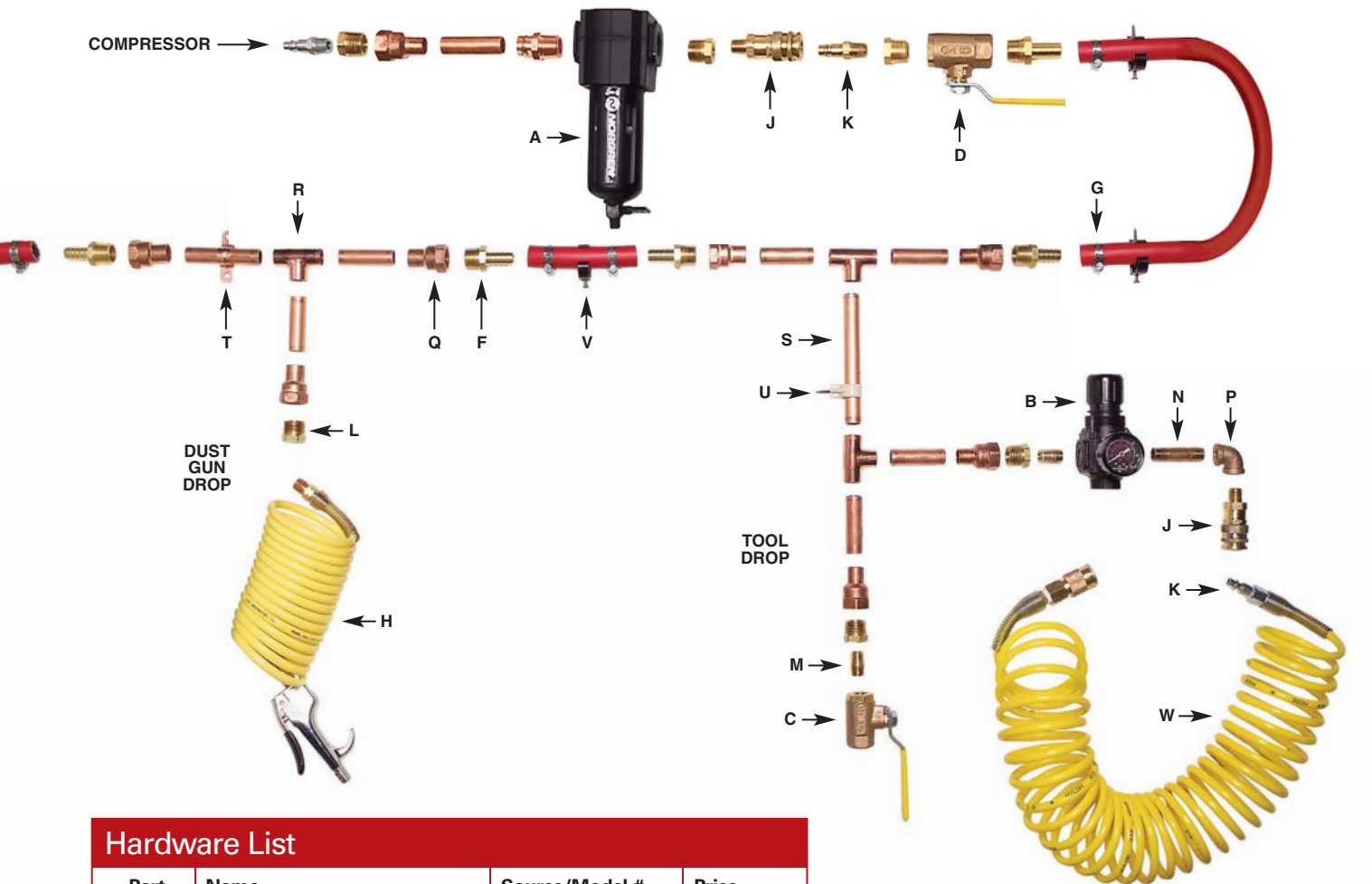
Quick disconnects are set 45 degrees from the wall to prevent skinned knuckles.


routed in a matter of minutes, using a knife to cut the hose and a screwdriver to tighten the hose clamps. The copper drops can be soldered on your bench before they're installed.
Thread the **rubber air hose** through **floor joists** with ease. Be sure to drill holes only in the middle one-third of the joist.
A **rubber air hose** can turn corners, go above or below obstacles.
A **coiled hose** drop is placed wherever a duster gun is needed to blow chips off a machine.
Ball valves flush out any accumulated water at the bottom of each drop.
Regulators let you adjust air pressure right where the tool is used.

The Parts

Figure A

Starting at the compressor, the air is filtered for oil and debris before it enters the system. At the two drops, the transition between the rubber hose and the solid pipe is made with a barbed hose fitting (F) and a hose clamp (G). The barbs grip the inside of the hose when the hose clamp is applied, resulting in a tight seal. Copper joints are joined with solder. Threaded brass fittings are sealed with Teflon tape wrapped around the threads.



Hardware List

Part	Name	Source/Model #	Price
A	1/2" compressed-air filter	MSC #01780337	$44
B	1/4" regulator with gauge	MSC #04290490	$31
C	1/4" ball valve	MSC #37009727	$9
D	1/2" ball valve	MSC #37009743	$9
E	1/2" air hose (red)	MSC #48563720	$1 per ft.
F	1/2" x 1/2" barbed fitting	MSC #48755516	$1.50
G	#8 hose clamp	MSC #48706097	$0.50
H	1/4" x 12' coiled hose and gun	MSC #48670400	$21
J	1/4" coupler	MSC #AP79863049	$14
K	1/4" connector	MSC #AP79863148	$3
L	1/2" x 1/4" reducer bushing	MSC #79870341	$1.50
M	1/4" close pipe nipple	MSC #48772180	$0.60
N	1/4" x 2" nipple	MSC #02204717	$1.50
P	1/4" 90° elbow	MSC #02201234	$3.50
Q	1/2" x 1/2" female adapter	Home center	$1.50
R	1/2" copper tee	Home center	$1
S	1/2" copper pipe	Home center	$3.50 for 10 ft.
T	1/2" copper hanger	Home center	$1 for 10
U	1/2" plastic hanger	Home center	$1.50 for 10
V	3/4" plastic hanger	Home center	$1.50 for 10
W	1/4" x 12' coiled hose	MSC #88121835	$25

Source MSC Industrial Supply, (800) 645-7270, www.mscdirect.com

Tip:
Check for air leaks by spraying a mixture of detergent & water at every connection; bubbles will indicate escaping air.

PERFECT EDGE JOINTS

by Dave Munkittrick

A 6-step tune-up sets your jointer straight.

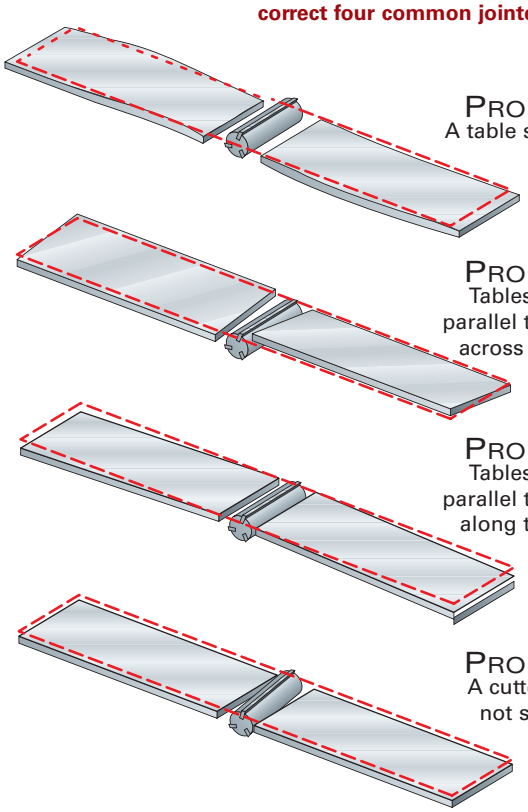
Jointers are simple machines with few moving parts, but the two beds, the fence and the cutterhead all have to be in alignment for a jointer to function properly. Few things are more frustrating or more common than problems with jointers. This is especially true when you're trying to get straight, square edges on your boards. I've come up with a six-step tune-up that should set your jointer straight. It's easy to do and will only take an hour or two, depending on how many problems you unearth.

Jointers are supposed to cut straight, square edges, but all too often, they leave a sniped or a bowed edge (see "Common Problems," page 62). Snipe results whenever the top of the outfeed table dips below the knife's top cutting arc. A bow cut results whenever the outfeed table rises above the cutting arc. A cutterhead that's not parallel to the outfeed table, or tables that are not parallel to each other, will make it impossible to get the table height set just right for all fence settings.

ART DIRECTION: JOE GOHMAN • PHOTOGRAPHY: PATRICK HUNTER • ILLUSTRATION: FRANK ROHRBACH

COMMON PROBLEMS

Our tune-up will help you identify and correct four common jointer problems:

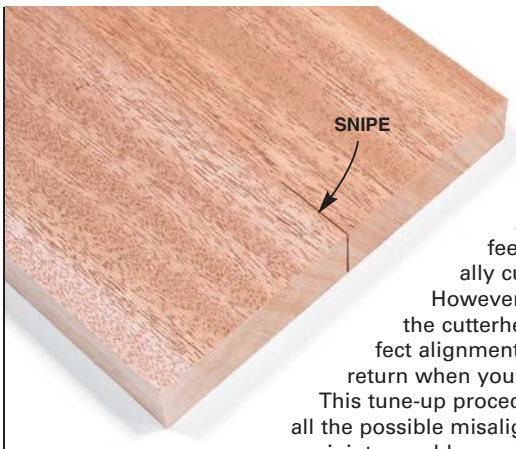


PROBLEM #1
A table surface that's not flat.

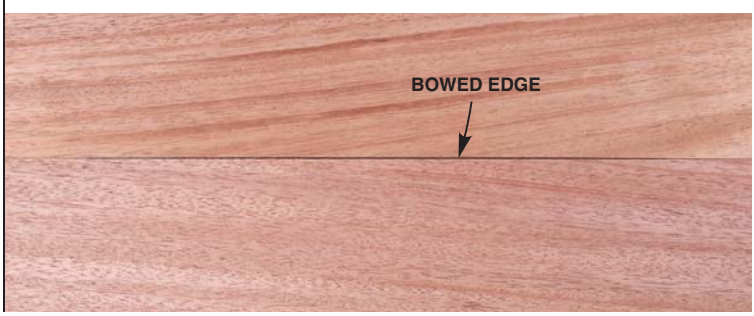
PROBLEM #2
Tables that are not parallel to each other across their widths.

PROBLEM #3
Tables that are not parallel to each other along their lengths.

PROBLEM #4
A cutterhead that's not set parallel to the tables.



Common jointer problems result in a sniped or bowed edge. Adjusting the outfeed table height usually cures the problem. However, if both tables and the cutterhead are not in perfect alignment, the problem will return when you move the fence. This tune-up procedure takes care of all the possible misalignments that can cause jointer problems.



THE RIGHT STUFF

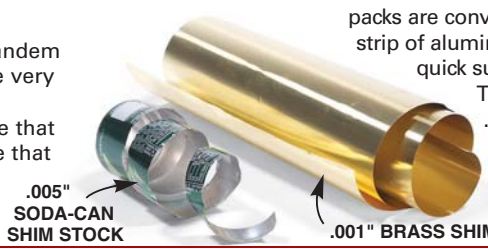
You will need a few tools to perform this tune-up: A good straightedge, a set of feeler gauges and machinist's metal shims are must-haves for this job. For some steps, a dial indicator is easier to use than a straightedge.

The straightedge, shims and feeler gauge run about $80 total. The optional dial indicator with a magnetic base and extension arms adds another $33 and is well worth the cost. All these tools can also be used to set and tune-up other shop equipment and to check your own work for flatness (see Sources, page 66).

A precision straightedge is essential. You can perform all the tune-up steps using this 50-in. precision straightedge that costs $58. Unlike inexpensive straightedges, this one has a precision-ground edge with a tolerance of .003 in. along its entire length. Such a good straightedge is not cheap, but it's a good investment for your shop.

A dial indicator with magnetic base and arm can't be beat for tool setups. A number of these six tune-up procedures are best done using a dial indicator. Like the straightedge, this tool is also useful for other machine setups.

A feeler gauge set is used in tandem with a straightedge to measure very small gaps. If the straightedge reveals a gap, you can measure that gap by finding the feeler gauge that fits under the straightedge.



Metal shims align jointer parts. Variety packs are convenient and easy to use. A strip of aluminum cut from a soda can is a quick substitute for a .005-in. shim. That coupled with some .001-in. shim stock should cover all your tune-up needs. Shims can be stacked to create any desired thickness.

1 To start your tune-up, check each table for flatness. Lay the straightedge on a table and use the feeler gauge to check for gaps. A gap of .003 in. or less is acceptable.

FINE-TUNING YOUR JOINTER

Step 1: Check For Flat Tables and Fence

Check each table and the fence for flatness (Photo 1). The accuracy of later measurements depends on flat tables. Measure for dips or a droop using the straightedge held parallel to the table bed. Then, hold the straightedge diagonally across the table to check for twist. The good news is that finding twist or dips in the table is highly unlikely. The bad news is that if you do find things out of whack, you can't do much about it. In extreme cases, a messed-up fence or table may be reground at a machine shop. You'll have to weigh the cost in time and money against simply buying a new jointer. If your jointer is under warranty, talk to the manufacturer.

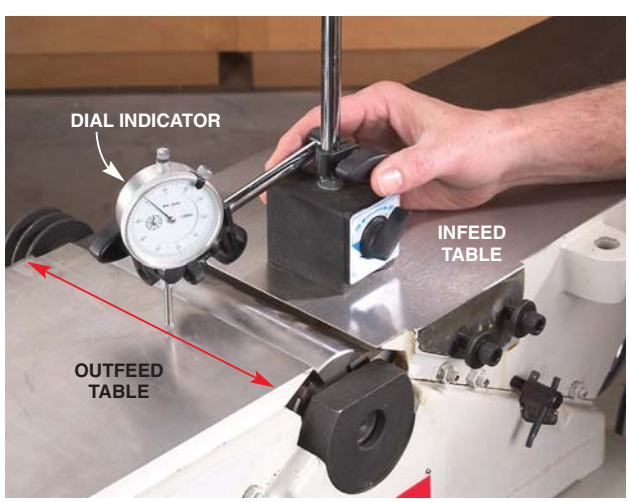
2 Infeed and outfeed tables that are not in the same plane across their widths need to be made coplanar. (With any luck, your tables aren't this bad.)

Step 2: Align Tables

It's not unusual for the two tables to be out of parallel across their widths (Photo 2). It's easiest to check the tables for parallelism with a dial indicator (Photo 3). You can also do the check with a straightedge. Hold the straightedge down on the middle of the infeed table so it extends over the outfeed table. Set the infeed table to the exact same height as the outfeed table. Slide the straightedge over to the fence side of the table and use feeler gauges to check for gaps. Repeat with the straightedge on the user side of the table.

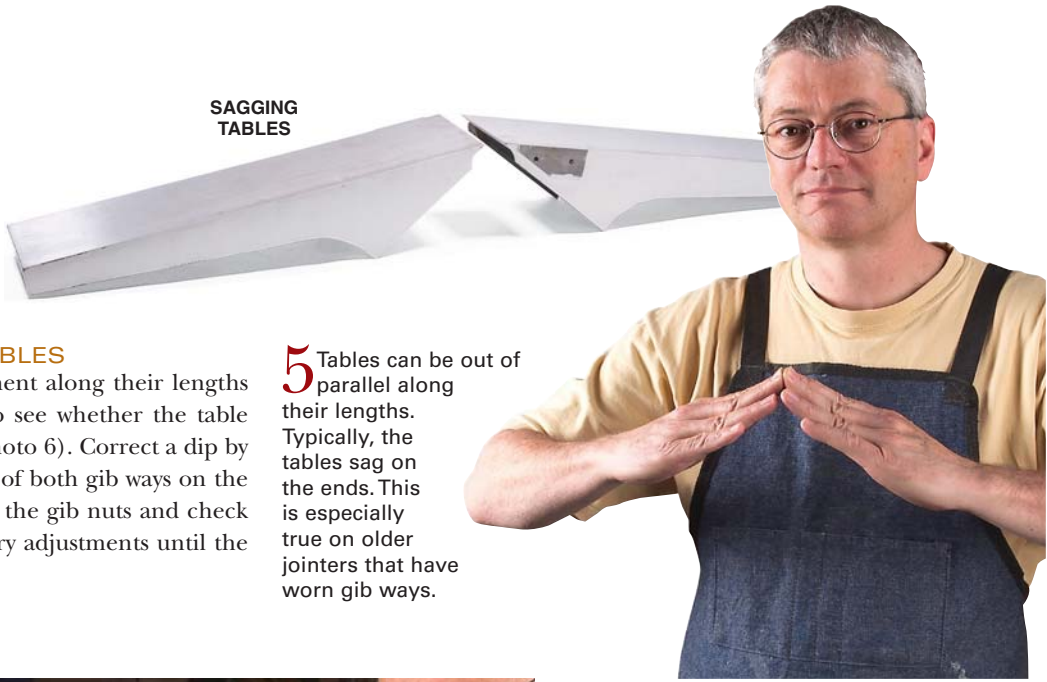
Align your tables by shimming the outfeed table. Loosen the outfeed table's gib nuts and lift the table so you can insert metal shims on the side of the table that's low (Photo 4). Shim the outfeed table only because it is moved very little and the shims are less likely to shift during table adjustments.

Recheck the tables and make any necessary shim adjustments until the tables measure in exact alignment.



3 Check the tables for parallelism across their widths. Bridge the dial indicator from the center of the infeed table to the center of the outfeed table and zero it. Slide the indicator across the width of the table to measure any difference in height.

4 Bring the tables into alignment by inserting metal shims on the low side of the outfeed table. Choose a shim thickness equal to the amount your table was off. Loosen the gib nuts and lift the table while you insert the shim or shims. Then retighten the gib nuts.



Step 3: Fix Sagging Tables

Tables can also be out of alignment along their lengths (Photo 5). Use the straightedge to see whether the table end dips below the infeed table (Photo 6). Correct a dip by adding shims to the top or bottom of both gib ways on the outfeed table (Photo 7). Retighten the gib nuts and check the tables again. Make any necessary adjustments until the tables lie in the exact same plane.

5 Tables can be out of parallel along their lengths. Typically, the tables sag on the ends. This is especially true on older jointers that have worn gib ways.

6 Check for table sag by holding a straightedge tight against the infeed table. Set the infeed table height so the straightedge just contacts the outfeed table. Then use a feeler gauge to determine the amount of dip or rise in your outfeed table.

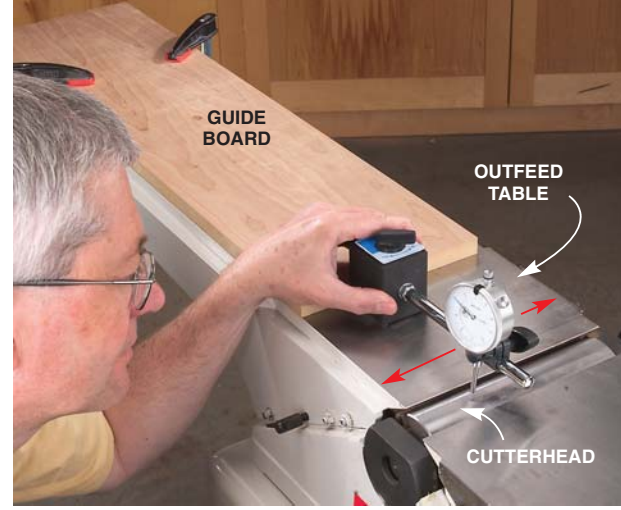
An hour of your time yields a lifetime of perfect accuracy from your jointer.

7 Correct a sagging table by shimming the bottom end of the two dovetailed gib ways on the outfeed table. A table that dips toward the cutterhead would be shimmed at the top end of the gib ways.

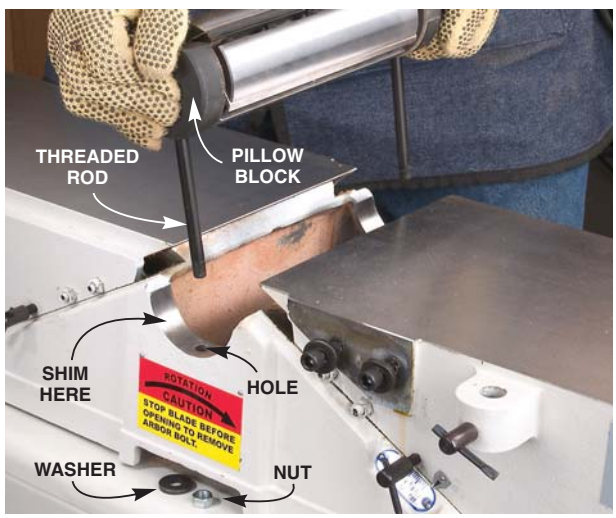
Step 4: Level the Cutterhead with the Tables

Now that the tables are parallel to each other along their lengths and widths, it's time to make sure the cutterhead is parallel to the tables. If the cutterhead is not level with the tables, your cut will be heavier on one side of the table than on the other. Jackscrew cutterheads allow you to set the knives to compensate for this; spring-loaded knives or a segmented carbide insert cutterhead do not. The fix for this problem is so simple that I recommend leveling your cutterhead no matter what type of knife holder you have.

Use a dial indicator or straightedge to check cutterhead alignment (Photo 8). If the cutterhead is off, measure the exact amount on the low side. This equals the size of shim you'll need to raise the cutterhead (Photos 9 and 10).



8 Check that the cutterhead is parallel with the tables. Rotate the cutterhead so the knives are below the table. Clamp a guide board parallel to the cutterhead. Set the dial indicator against the guide board so the plunger contacts the cutterhead. Zero your dial indicator; then slide it back and forth.



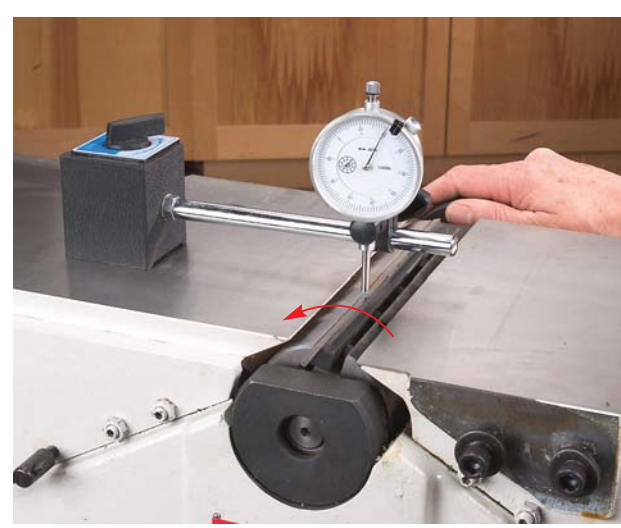
9 I removed the cutterhead here to illustrate how it is mounted. Two threaded rods attached to pillow blocks run through holes in the base and are held in place by a nut and a washer. Place shims between the pillow block and the jointer bed casting.

10 The cutterhead is easy to shim. Remove the drive belt and loosen the bolts that hold the cutterhead in place. Lift the low end of the cutterhead and insert shims under the pillow block. Then retighten the bolts.

Step 5: Set Proper Knife Height

To minimize kickback hazards, jointer knives should not project more than .020 in. from the cutterhead. (Owners of spring-loaded cutterheads have a knife-setting gauge that automatically sets the proper knife projection.) A potential hazard exists with knives set parallel to the outfeed table: It's easy to unintentionally set the knives so they project too far.

A dial indicator is the best instrument for checking knife projection (Photo 11), but you can make do with a straightedge and feeler gauge.



11 Proper knife projection increases jointer safety by limiting the cut's aggressiveness. Use a dial indicator set to zero on the cutterhead. With your hand on the pulley, rotate the cutterhead backward. As the knife rides under the dial indicator, it should read no more than .020 in.

12 To set the outfeed table height, place a straightedge on the outfeed table so it projects over the cutterhead. Rotate the cutterhead backward and raise or lower the table until the knife barely kisses the straightedge when it's at top dead center.

13 Fine-tune the outfeed table height by edge-jointing a couple of boards that are narrower than the fence height and no longer than the infeed table.

14 Put the newly jointed edges together and hold the joint up to a light source. No light leaks indicate a jointer that's perfectly tuned. If you are getting a snipe at the end of your cut, raise the outfeed table a bit. If the jointer puts a concave edge on your board, lower the table. Repeat the process with the fence set at the far edges of the table. The results should be the same, and that should put a smile on your face.

Step 6: Set Proper Outfeed Table Height

Your knives should be set so that the very top of the cutting arc, also referred to as top dead center, is the same height as your outfeed table. We used the straightedge to accomplish this task (Photo 12), but a dial indicator is another option. To do this, set the dial indicator on the outfeed table and zero it. Then set the plunger over the cutterhead with the body of the indicator on the outfeed table. Rock the cutterhead back and forth; the indicator should hit zero as its highest mark. Check this at several points along the width of the table. Repeat for all three sets of knives.

Edge-joint a couple of boards to test your jointer (Photos 13 and 14). In practice, it often takes a little tweaking of the outfeed table height to get it just right. Often the table ends up set .001 or .002 in. below the cutterhead. Now your jointer is ready to go and should create perfect edge joints every time.

Sources Lee Valley Tools, (800) 871-8158, www.leevalley.com 50-in. aluminum straightedge, #05N63.05, $58. Dial indicator and magnetic base and arm, 88N31.20, $33. Feeler gauges, #86K99.01, $14. Brass sampler, 6-1/2 in. x 6 in., .001 to .010 thickness, #27K07.50, $7.

edited by Tim Johnson

Pipe-Clamp Vise

My bench has only one vise, so it needs to be versatile. The jaws on my vise can be positioned to hold objects flat on the bench or cantilevered off the end. In addition, the clamp is removable, so I can still use it for regular clamping jobs.

My vise is based on an ordinary 3/4-in. pipe clamp with one modification: The pipe is threaded 1-3/4 in. (extra long) for mounting.

I used scraps of 1/2-in. Baltic birch for the brackets. I got everything else, including the clamp, at a hardware store for about $25.

1. Drill holes in the brackets for the screws and pipe (Fig. A, below). Enlarge the 1-in.-dia. holes with a file to make the pipe fit.

2. Mount the brackets and install the clamp with its jaws positioned vertically. Fasten the clamp to the front bracket by threading on two 3/4-in. electrical conduit lock nuts.

3. Drill a 1/4-in. hole through the bracket and the clamp head for the positioning pin (a 1/4-in. quick-release pin from the hardware store).

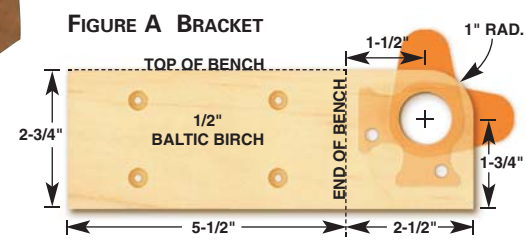
4. Loosen the nuts, rotate the clamp head 90 degrees and retighten the nuts. Use the hole in the clamp head as a guide while you drill the second positioning hole in the bracket.

5. Install the positioning pin.

Floyd E. Adams

To change the jaw's position, remove the pin, loosen the nuts and rotate the clamp head. Then reset the pin and tighten the nuts.

FIGURE A BRACKET



ART DIRECTION, PHOTOGRAPHY AND ILLUSTRATION: VERN JOHNSON

Hook Your Cordless Drills

While building this little station to organize my cordless-drill paraphernalia, I discovered that bicycle hooks make great drill holders. Mounting the station on the wall saves valuable benchtop space. Now I never have to hunt for my drills, chargers and bits.

Hans Wendt

Freshness Date for Finish

I never thought about the risks of using finish from an old, previously opened can until I had to entirely strip a project because the ancient varnish I used didn't dry properly.

Now I play it safe. I date every can when I first open it, so I know at a glance how long the remaining finish has aged. If the date shows the can has been sitting for a year, I test the finish it contains on a sample. Before I use any old finish on a project, I want to make sure it dries hard.

After two years, my freshness date expires. Using vintage finish may be appealing because it doesn't cost anything, but buying a fresh can is a much better idea.

R.B. Himes

We'll give you $150, this great-looking shirt and a durable shop apron for your original Small Shop Tip!

Send your tip to us with a sketch or photo. If we print it, you'll be woodworking in style.* **E-mail your tip to smallshoptips@readersdigest.com or send it to Small Shop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media. *Shirt and apron offer good only while supplies last.

Free plans!

1

Join *American Woodworker*'s Online Panel and get 5 of our best projects absolutely free! Log on to

www.americanwoodworker.com/panel

Complete a brief questionnaire and periodically after that you may receive short online surveys. You can opt out at any time. We won't share your e-mail address with any outside companies. Thanks for your help. We look forward to hearing from you!

The editors of *American Woodworker*

2

3

4

5

Woodworker's Marketplace

Accessories

GLASS SOURCE for WOODWORKERS. Glass and mirror custom cut, beveled, edged, grooved or fabricated to your specifications. Shipped direct from our shop to yours. For free brochure, inquiries, orders call: Glass Source: 1-800-588-7435
www.theglasssource.net

Help Wanted

$400 WEEKLY ASSEMBLING Electronic Circuit Boards/Products. SASE: Home Assembly – AW Box 216 New Britain, CT 06050-0216

Homeworkers needed Assemble products In your home $525+ wk. Free information Package. Toll free 24 hrs 877-213-4724 Ext. 3000

Schools/Instruction

WINDSOR CHAIR CLASSES: 1 week intensive, including woodturning. Comfortable lodging, fine food included. Midwest. www.Chairwright.com

Tools/Equipment

www.nailzone.com Fast shipping on Senco, Hitachi, Paslode, and other nailers, staplers and fasteners. Low Prices. 800-227-2044

CNC ROUTER SALE 4X8 With Controller $4,999.00 www.cncwoodrouter.com 912-269-0134 Call after 2:00 PM

Cadex and Nikle Pinners, Flexeel air hose,Coilhose air fittings. Stainless steel fasteners. We ship fast. **www.floydtool.com**

Wood/Veneer

Shaker Oval Box Bands. Sawn from solid cherry. Very High Quality www.shakerboxesnb.com Toll free: 1-877-503-4440

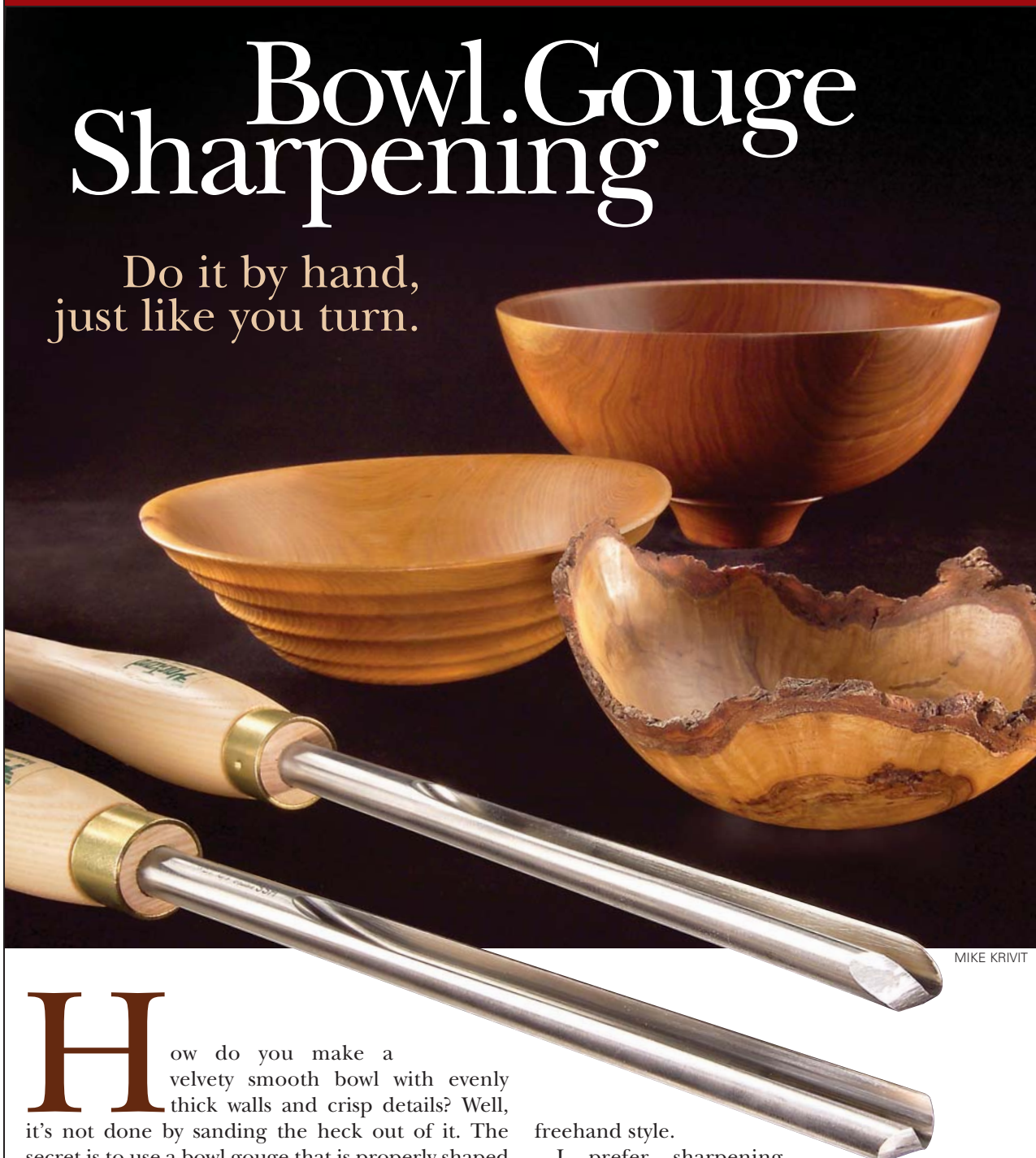
www.walnutwoods.net Featuring Walnut and Buckeye. Instrument Wood, Turning Blanks, Slabs, Crotch or Burl Veneer. 559-277-8456

Sawmill direct 100 Species of Exotics, Turning, Lumber, Logs, Slabs, Musical Instruments **Tropical Exotic Hardwoods L.L.C.**: Toll Free (888) 434-3031 www.anexotichardwood.com

by Alan Lacer

Bowl Gouge Sharpening

Do it by hand, just like you turn.



MIKE KRIVIT

How do you make a velvety smooth bowl with evenly thick walls and crisp details? Well, it's not done by sanding the heck out of it. The secret is to use a bowl gouge that is properly shaped and very sharp.

Most bowl gouges aren't ready to do this kind of fine work right out of the package. They must be shaped, sharpened and honed. Shaping a bowl gouge means altering its profile, also called its grind. Sharpening maintains the profile and renews a dull edge. Honing further sharpens the edge. I'll cover how to do all three operations freehand style.

I prefer sharpening freehand, as opposed to using a jig, because it's similar to turning a bowl. When you sharpen, the tool sits on a rest and meets a round object—in this case, the grinding wheel. You rub the bevel on the round object and manipulate the edge. That's what turning is all about, too. Once you've learned to sharpen freehand, you're all set to make a fantastic bowl.

EDITOR: TOM CASPAR • ART DIRECTION AND PHOTOGRAPHY: JOE GOHMAN, UNLESS NOTED

How to Sharpen 3 Profiles

Woodturners shape their bowl gouges into three basic groups of profiles: traditional, fingernail and swept-back. Any gouge can be modified on the grinder to match these profiles. Your choice of profile depends on your skill level and preference.

I use a coarse wheel for shaping a bowl gouge and a finer one for sharpening (see "Equipment," page 83). The basic procedures for shaping and sharpening are the same. After you shape the profile, you grind a bevel to follow the shape.

Most bowl gouges are made from high-speed steel (HSS). If your HSS gouge turns blue as you grind, don't worry. This change won't soften the steel. If the tool becomes too hot to hold, don't quench it in water. Let it cool in the air or lay it on a metal surface to dissipate the heat.

When you're sharpening a gouge, it's important to grind the entire bevel, rather than just the edge. To find the correct position, contact the heel of the bevel first, and then raise the tool's handle until the entire bevel contacts the grinding wheel.

1 Traditional Profile

Top View

The end of a traditional profile is straight across.

Side View

The cutting edge is approximately vertical.

The traditional profile is the easiest to sharpen. It's created by rotating the tool. To begin, set the tool rest to create a 45- to 60-degree bevel. Lay the tool on the rest, positioned to start at one side (Step 1). Slowly push the gouge toward the wheel. When you contact the wheel, rotate the gouge until you reach the other side, and then reverse direction. As you grind, hold the gouge firmly on the rest and keep its end square to the wheel.

The traditional profile works well in general but has some limitations. It's good for shaping the outside of a bowl that's mounted with its opening facing the headstock. But if the bowl is mounted the other way, facing the tailstock, this profile doesn't work as well. The traditional profile is good for opening up most of a bowl's interior, but not too good at the transition from the sides to the bottom unless the tool is ground with a very steep angle. This profile doesn't have drawn-back sides, so it's more difficult to make the fine finishing cuts that are possible with the fingernail and swept-back profiles.

Step 1

Shaping and sharpening the traditional profile is very easy. Simply start at one side and rotate the tool on the grinder's tool rest. Stop grinding when sparks flow evenly over the cutting edge. These sparks indicate the edge is sharp.

Step 2

Use a protractor to check the angle of your profile (see Sources, page 83). There is no perfect angle for all situations. To start, 45 to 60 degrees is fine. With experience, you'll see how different angles affect a tool's performance.

2 Fingernail Profile

Top View

The end of a fingernail profile should be oval, but not too pointy.

Side View

The line from the point to the top should be straight or slightly convex, never concave.

Grinding the fingernail profile requires more dexterity than making the traditional profile, but it's not difficult. In fact, the operation is very similar to a few cuts in bowl turning itself.

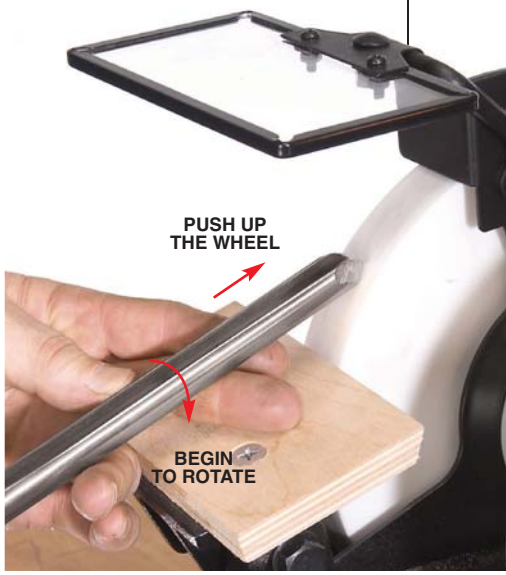
To begin, set the tool rest about 120 degrees to the wheel (Step 1). The front edge of the tool rest must be very close—1/8 in. or less—to the wheel, so you can't pinch your fingers in the gap. Rest the gouge on top of two fingers and push it slowly toward the wheel. Contact the middle section of the bevel first. Then raise the gouge's handle until the full bevel touches the wheel. Begin a slow upward twist, continuing until the tool is heeled over on its side (Steps 2 and 3). Repeat this process on one side of the gouge until sparks come over the edge and travel down inside the flute—that's the sign the edge is done. Do the same procedure on the other side of the tool and then work on the middle of the gouge to make a uniform, continuous bevel.

The fingernail profile is the best shape for a beginning bowl turner. It's more versatile than the traditional profile. It works well whether the bowl is mounted toward the headstock or tailstock and is useful for detailing work on a rim or foot. The sides can be used for shear cutting and shear scraping finishing cuts.

MIKE KRIVIT

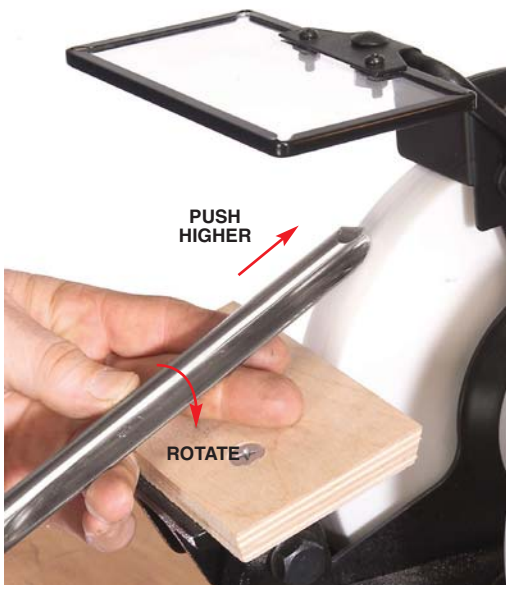
Step 1

Sharpen the fingernail profile in a fluid motion, one side of the bevel at a time. Begin at the center. You'll rotate the tool and push it up the grinding wheel, all in one shot, using your fingers for support.



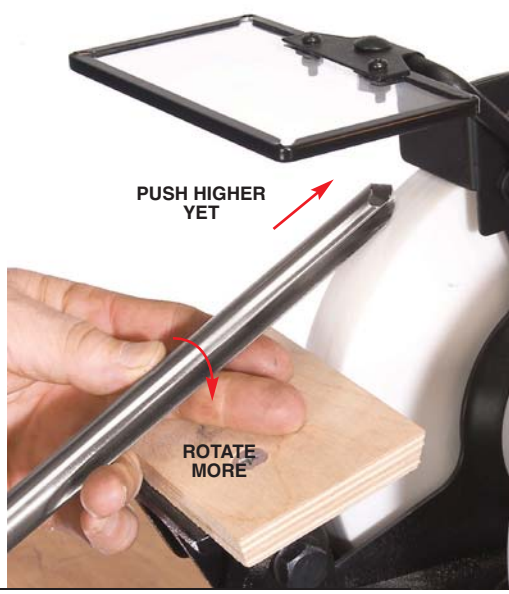
Step 2

Twist the gouge and push it higher on the grinding wheel.

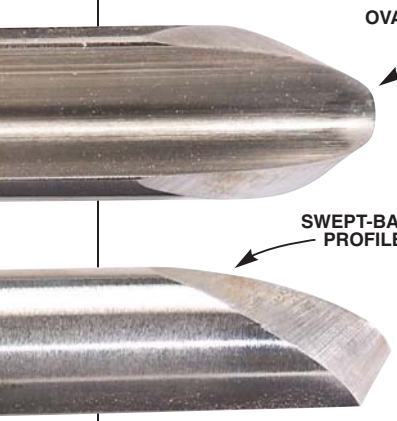


Step 3

Stop twisting and pushing when the tool is fully on its side, at a 90-degree rotation. Make light passes in this manner, on each side, until sparks just begin to come over the cutting edge.



3 Swept-Back Profile



Top View

The swept-back end is oval or elliptical, but not pointy.

Side View

The sides are ground back much farther than a fingernail profile. The line from the point to the top should be straight or slightly convex, never concave.

The swept-back profile is the most difficult profile to create, but it doesn't take a lot of practice to master. If you have trouble, remember that you can't ruin a turning tool by grinding; you only shorten it.

To begin, set the tool rest in the same manner as for a fingernail profile. The procedure is very similar to making a fingernail profile, but here you work on the long sides of the tool first (Step 1). When both sides are done, grind the front (Step 2). Then blend the front into the sides (Step 3). Aim for a uniform bevel, but the transition doesn't have to be completely smooth. The front and sides are used in two different turning operations, so the area in between isn't critical.

The swept-back profile is also called an Irish, Celtic or Ellsworth grind. It's the most versatile profile. Your bowl gouge can be used as a roughing, scraping and fine finishing tool. It's easy to level any surface, inside or out, when using the gouge in a shear cutting or shear scraping action. The swept-back profile is not for beginners, however. It can be too aggressive for inexperienced hands. A gouge with a swept-back profile also requires considerable power from the lathe to remove large amounts of material. Some small lathes don't have enough horsepower to handle it.


MIKE KRIVIT

Step 1

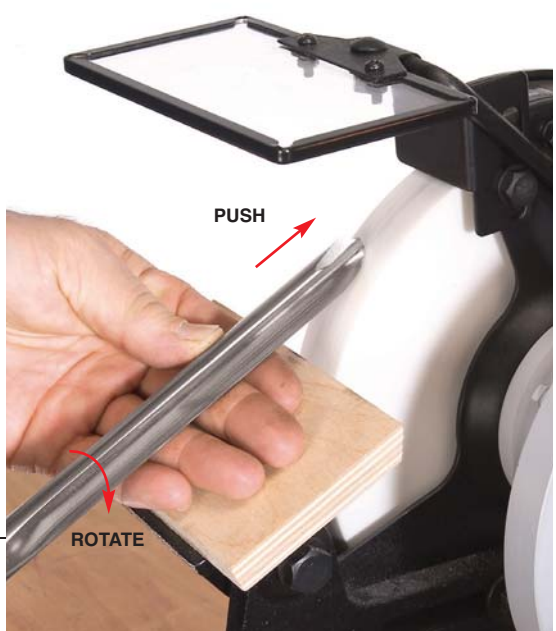
Begin making a swept-back profile by grinding the sides. Hold the gouge on its side and slightly rotate it to create the sweep.

Step 2

Grind the gouge's front. Begin with the center; then slightly rotate with a small upward push.

Step 3

Blend the front and sides of the gouge by pushing and twisting the gouge up the wheel. This technique is similar to that used to create the fingernail profile.



Final Step: Honing

I hone all my bowl gouges after sharpening and routinely touch them up at the first hint of dullness during turning. Honing isn't absolutely necessary, but it has many benefits. A honed gouge produces a cleaner cut, makes crisper details and reduces the time I spend sanding. The more often you hone, the less time you'll spend going back to the grinder for sharpening.

HSS gouges are very tough steel. Most slipstones don't work well on HSS because they cut too slow, or not at all. I use a special diamond slipstone that cuts much faster and fits the radius of every bowl-turning gouge (see Sources, below).

I hone the bevel first (Step 1). The trick is to hold the stone flat on a bevel. Straight from the grinder, this bevel should be slightly concave. The stone should always contact the ground bevel at two points: the back or heel, and the area below the cutting edge, called the toe. I start honing by only contacting the heel and then angle the stone to touch both surfaces. Honing the flute is much easier (Step 2).

Step 1
Using a diamond slipstone to hone a gouge really improves its performance. Hone the ground bevel first by bracing the gouge and moving the stone up and down.

Step 2
Hone the inside of the gouge using the slipstone's rounded edges. Brace the gouge against your side, place the stone flat on the gouge's flute and slide the stone back and forth.

Equipment

Most turners use a bench grinder to reshape and sharpen their tools. Just about any equipment will do, but here's what I suggest (see Sources, below):

- **8-in. grinder.** I prefer a slow-speed model that runs about 1,725 rpm. I haven't tried them all, but I really like the heavy-duty Delta 23-275, $175. It has lots of power and feels very stable.
- **Rock-solid tool rests.** This is the greatest weakness of most grinders, but not the Delta. Look for supports that have no flex. They should be easy to angle and move in and out. I added wood platforms to the Delta's tool rests to make larger support areas.
- **Friable grinding wheels.** They come in white, pink, blue or orange. I prefer a 60 or 80 grit for sharpening and a 46 or coarser grit for shaping. Look for a J- or K-level hardness for turning tools.
- **Diamond wheel dresser.** Dressing a wheel is critical for good sharpening. A dresser cleans, flattens and sharpens the wheel by exposing fresh grit. I prefer this T-handle dresser ($35, see photo, left) because it works extremely fast.
- **Movable lamp.** It should be able to illuminate either side of both wheels.
- **A face shield or safety glasses and a dust mask.** Be sure to use these because the grinding dust is a health hazard. Dressing a wheel creates lots of dust.

Sources Delta Machinery, (800) 223-7278, www.deltamachinery.com 8-in. slow-speed bench grinder, #23-725, $175. • MSC, (800) 645-7270, www.mscdirect.com 8-in. dia., 60-grit wheel, #86758562, $44. Bushing set, #00390955, $1. 8-in.-dia., 46-grit wheel, #05867163, $24. Bushing set #00390989, $1. Steel protractor, #06475172, $9. • Packard Woodworks, (800) 683-8876, www.packardwoodworks.com Diamond Jim grinding wheel dresser, #141504, $35. • Alan Lacer, Worker of Wood, (715) 426-9451, www.alanlacer.com Diamond Slipper slipstone, $88.

by Tom Caspar

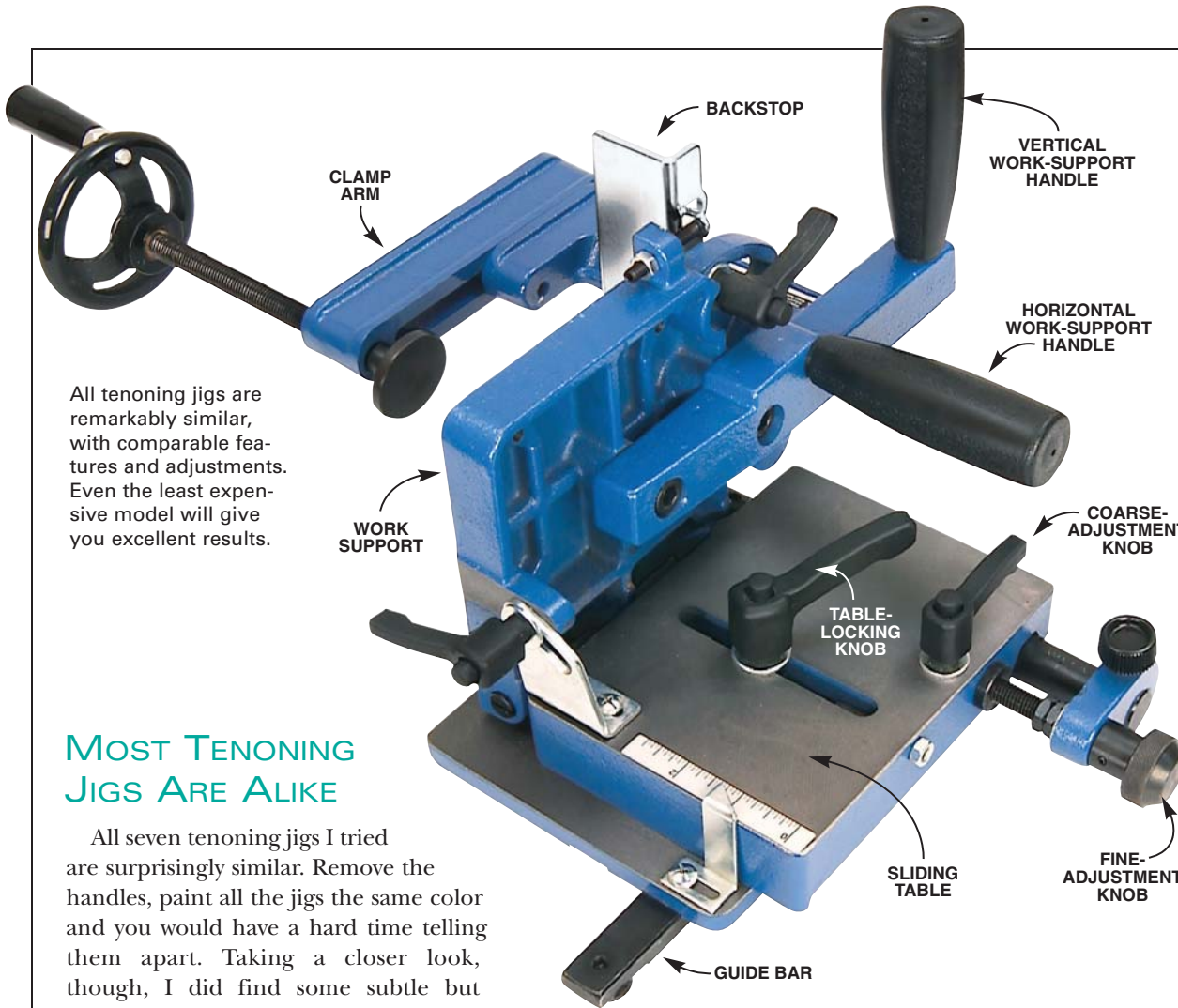
Tenoning Jigs

GET A TERRIFIC TABLESAW ACCESSORY FOR ONLY $60.

Tenoning jigs make the complicated world of mortise-and-tenon joinery a lot simpler. I've used a home-made wooden jig for years. I stand a rail upright on the tablesaw and clamp it to a tall box that slides on my fence. Most shop-made jigs have two drawbacks, though. First, they must be modified for different types of joints. Second, your fist is the only way to make a fine adjustment to the tablesaw fence. I kept telling myself to look into something better, but the only commercially made jig available a few years ago, the venerable Delta 34-172, didn't tilt and was hard to adjust.

A new generation of redesigned jigs has changed everything (see Chart, page 86). They cost as little as $60, are fully adjustable and are extremely accurate. They fit both left- and right-tilt saws. After trying seven different models, I'm ready to honorably retire my beat-up wooden jig and move on.

ART DIRECTION AND PHOTOGRAPHY: VERN JOHNSON



All tenoning jigs are remarkably similar, with comparable features and adjustments. Even the least expensive model will give you excellent results.

Most Tenoning Jigs Are Alike

All seven tenoning jigs I tried are surprisingly similar. Remove the handles, paint all the jigs the same color and you would have a hard time telling them apart. Taking a closer look, though, I did find some subtle but important differences. Let's examine their common features first.

■ **Work support.** This 5-in.-wide by 6-in.-tall cast-iron plate holds the workpiece. It tilts from 0 to 17 degrees (see photo, page 86, left). You can cut steeper angles by tilting the saw blade. On a left-tilt saw, I turn the jig around and run it in the right-hand miter slot when I tilt the blade for steeper angles. This may not work on all saws, however.

■ **Clamp arm.** This adjusts forward or backward a total of 2 in. to center the clamp on the workpiece.

■ **Backstop.** The backstop tilts backward from 0 to 45 degrees (see photo, page 86, right).

■ **Sliding table.** The table moves 2-3/8 in. to adjust the distance between the blade and work support.

■ **Coarse adjustment.** Loosening a knob allows you to slide the table. Many times, though, you must strike the table with your hand to get it going. That gets old real fast. Lubrication doesn't help much.

■ **Fine adjustment.** Turning a knob allows you to fine-tune the sliding table's position. One rotation of the knob moves the table a bit less than 1/16 in. The fine adjustment works so well that I usually skip using the coarse adjustment.

4 User-Friendly Features

Some jigs have additional features that make them easier to set up, adjust and use (see Chart, page 86).

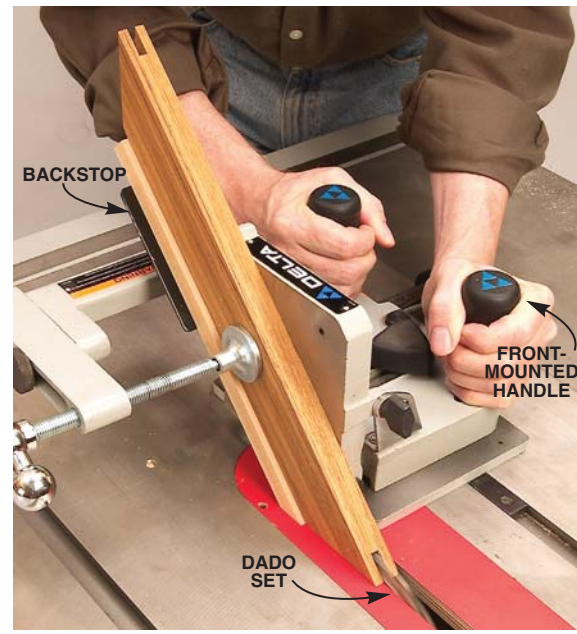
■ **Adjustable guide bar.** Some guide bars can be adjusted to fit tightly in your saw's miter slot. This must-have feature increases accuracy by preventing the jig from wiggling as you cut a tenon. The adjustment consists of a pair of set screws in the guide bar, similar to those on premium miter gauges.

■ **Above-jig guide-bar alignment.** You must align a new jig so that it's parallel to the saw blade by shifting the guide bar's position. This is a lot easier on jigs whose adjustment screws are accessible from above. On other jigs, the screws are below the sliding table, so you must remove the jig from the saw each time you shift the guide bar. That's very awkward.

■ **Rear handle on table.** For the most accurate cuts, I prefer jigs that have at least one handle mounted on the sliding table (see photo, page 86, left). On other jigs, both handles are located on the work support. As you're cutting a tenon, I find that you can inadvertently twist the work support by pushing too hard on one or both of these handles. That can ruin a cut.

Every tenoning jig has a tilting work support for cutting angled tenons, scarf joints, low-angled miters or bevels.

Caution: The blade guard must be removed when using a tenoning jig. Use both handles.



The backstop on every tenoning jig tilts for cutting grooves or tenons on mitered pieces. This jig, the Delta 34-184, is the only one with a front-mounted handle. This handle makes it much easier to push the jig without wiggling the work support.

■ **Front-mounted handle.** Only one jig, the Delta 34-184, has a handle in front (see photo, above right). I think it's a great idea.

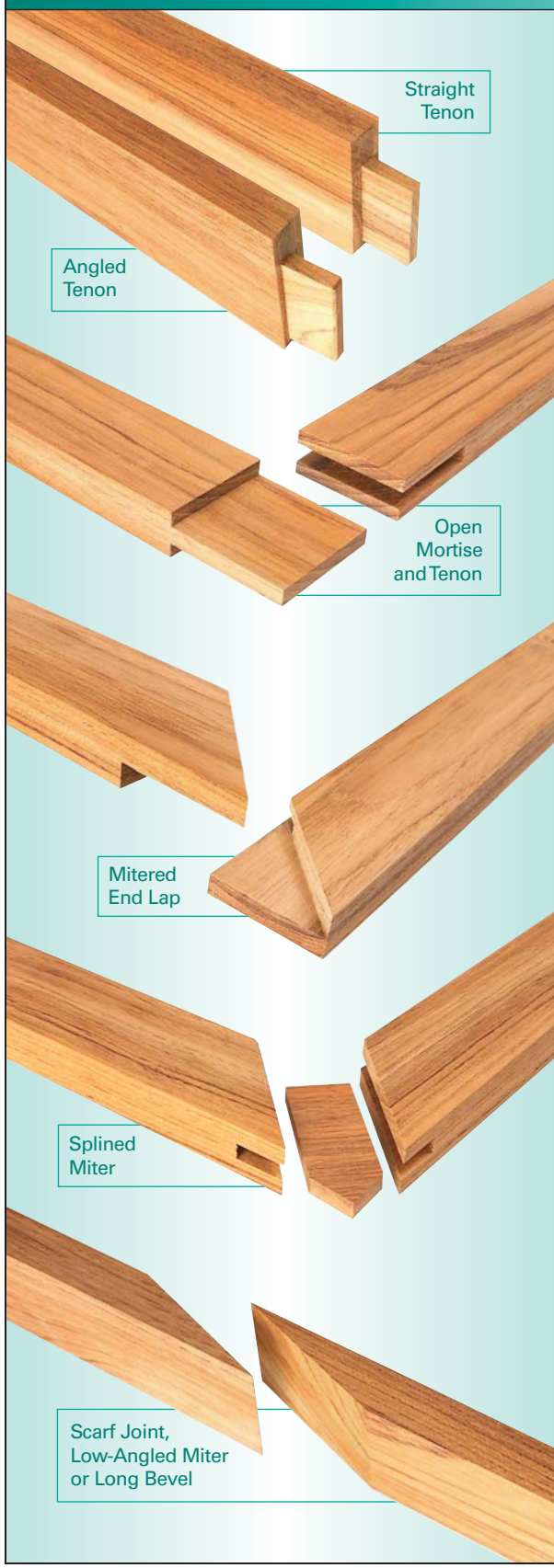
RECOMMENDATIONS

The seven tenoning jigs I tested are very similar to one another, even though their prices vary quite a lot (see Chart, below). They all work very well. Some jigs have a few important improvements for easier setup and more accuracy. The least expensive jig, the Grizzly H7583 ($60), has most of these good features, as do the Woodcraft 144755 ($70) and the Delta 34-183 ($100). For the best value in a tenoning jig, get the Grizzly.

The most expensive jig, the Delta 34-184 ($110), has two features that make it the most convenient model to use right out of the box. First, it's the only jig with two handles on the sliding table. Other jigs have one or two handles on the work support. Pushing on these handles can cause the support to wiggle during a cut. For most cuts, the wiggle is so small that it's not a big deal, but for cuts that must be very precise, it's a concern. Using both handles on the sliding table, I made more accurate cuts with the Delta 34-184 than using other jigs. The second feature is a fine-adjustment mechanism that's graduated for fine-tuning a setting. Each line on the fine-adjustment knob indicates that you've shifted the work support by about .004 in.

Company	Model	Price	Adjustable guide bar	Above-jig guide-bar alignment	Rear handle on table	Front-mounted handle	Contact
Delta	34-184	$110	Y	Y	Y	Y	Delta, (800) 223-7278, www.deltamachinery.com
Delta	34-183	$100	Y	Y	Y	N	Delta, (800) 223-7278, www.deltamachinery.com
Grizzly	H7583	$60	Y	Y	Y	N	Grizzly, (800) 523-4777, www.grizzly.com
Woodcraft	144755	$70	Y	Y	Y	N	Woodcraft, (800) 225-1153, www.woodcraft.com
Jet	JTG-10Q	$110	N	N	N	N	Jet, (800) 274-6848, www.jettools.com
Rockler	29840	$90	N	N	N	N	Rockler, (800) 279-4441, www.rockler.com
Woodtek	116-738	$80	N	N	N	N	Woodworker's Supply, (800) 645-9292, www.woodworker.com

6 Joints You Can Make with a Tenoning Jig



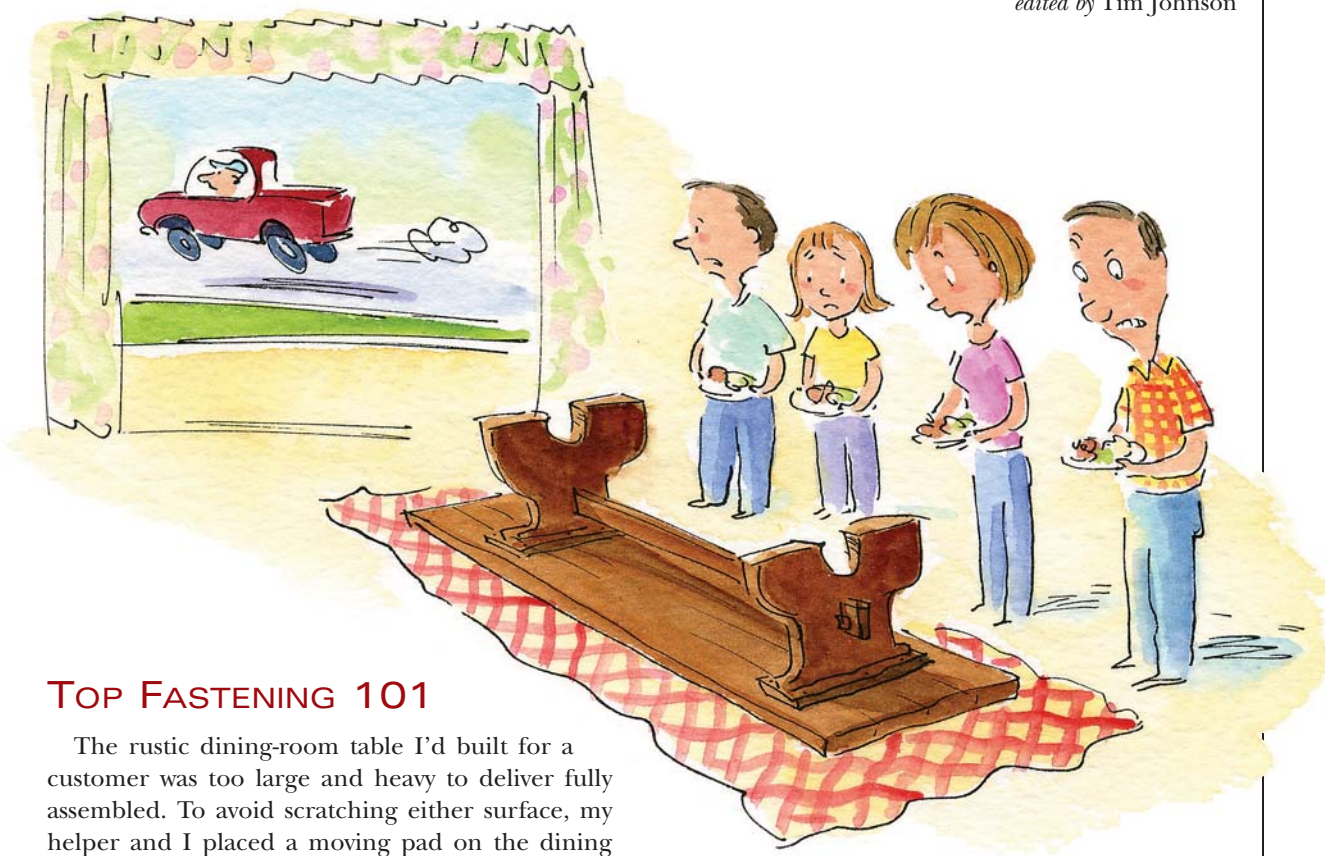
Tenoning jigs do much more than simply make straight tenons. You can create other joints by tilting the jig, leaning the workpiece backward or using a dado set. Here are a few examples:

- **Angled tenon.** This complicated joint is often used on chairs when the seat is wider in front than in back. Angled tenons and shoulders go on the rails connecting the front and back legs. Before getting a tenoning jig, I couldn't figure out how to quickly machine all those angles, so I slowly cut these joints on the bandsaw and by hand. Using a dado set and a tenoning jig, however, I can cut both the tenon and its shoulders with a single setup.
- **Open mortise and tenon.** This joint is best cut with a dado set, too, to form the mortise's bottom with one pass. The tenon's length is limited by the maximum height you can raise your dado set above the saw's table—about 2-1/4 in. for an 8-in. set, 1-1/4 in. for a 6-in. set.
- **Mitered end lap.** This elegant door joint is mitered above and half-lapped below, for additional glue surface. Use a general-purpose or combination blade for all the cuts. Run a groove inside both pieces to receive a panel.
- **Splined miter.** Use a dado set to cut these grooves. They can be wider and deeper than grooves made using a slot cutter on a router table.
- **Scarf joint, low-angled miter or long bevel.** You can't cut steep angles like these with a board lying flat on the tablesaw or a miter saw, but they're no problem when the piece is held upright in a tenoning jig. A scarf joint is used to make one long piece from two shorter ones. A low-angled miter, less than 45 degrees, is used on triangular boxes. A long bevel is a design detail, rather than a joint. You'd use it to taper the end of a cleat under a tabletop or the foot of a trestle base. The bevel's length is limited by the maximum height a 10-in. blade can be raised, which is about 3-1/4 in.

This remarkable jig cuts all these tenons with exquisite precision.

Oops! Crazy Mistakes Woodworkers Make

edited by Tim Johnson



Top Fastening 101

The rustic dining-room table I'd built for a customer was too large and heavy to deliver fully assembled. To avoid scratching either surface, my helper and I placed a moving pad on the dining room's hardwood floor and then laid the tabletop face down on the pad. After positioning the trestle-style base, we fastened it to the top with screws. They fit in counterbored holes, so they wouldn't show. Everything went great, although the screws seemed to go in a bit deep.

After installing the screws, we prepared to turn the table over. "One, two...ummph!" The table wouldn't budge: It was securely anchored to the floor. Argh. While removing the screws, I realized my mistake: I'd counterbored all of the screw holes too deeply.

Fortunately, the accidental holes merely added to the top's rustic appearance. I had putty to patch the floor, but I didn't have shorter screws for the top, so dinner was delayed while I made a dash for the hardware store.

Bill Snyder

Marked-Board Mystery

My husband was building a project in his basement workshop. He carefully marked all the boards and stacked them on his bench for cutting later.

A couple of days passed before he went back downstairs. I heard him talking to himself, so I went down to see what was going on. He was turning the boards over and over, scratching his head. "I know I marked these boards," he said.

When I asked him what he'd used to mark them, he went into my sewing room and came back with a blue felt-tip pen. I started to laugh. It was my fabric-marking pen—with disappearing ink!

Julie Dustin

Make your woodworking mistakes pay! Send us your most memorable "What was I thinking?" blunders. You'll receive $100 for each one we print. **E-mail to oops@readersdigest.com or send to AW Oops!, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

ART DIRECTION: VERN JOHNSON • ILLUSTRATION: STEVE BJÖRKMAN