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Page 42

WOODWORKER'S JOURNAL

www.woodworkersjournal.com

February 2004,
Volume 28,
Number 1

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- Taper legs on a jointer ■ Perfect tusk tenons
- Shop-made tambour ■ Knockdown joints
- Spline miter basics ■ Fluting with a router

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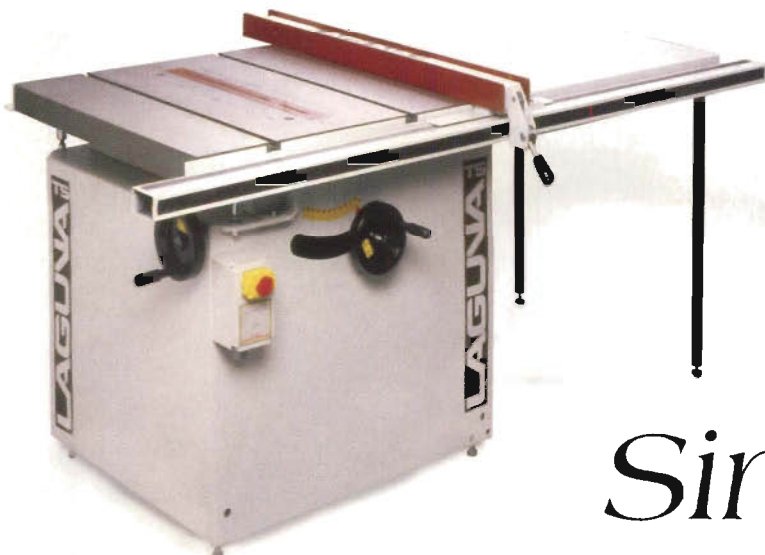
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Features

January/February 2004



Volume 28, Number 1

50 Tusk Tenon Table

By Ian Kirby

Discover the secrets of traditional tusk tenon joinery with this sofa-sized table.

60 Battery Charging Cabinet

By Sandor Nagyszalanczy

A lesson in creating your own tambour and a great shop project all rolled up in one.

68 Splined Mirror

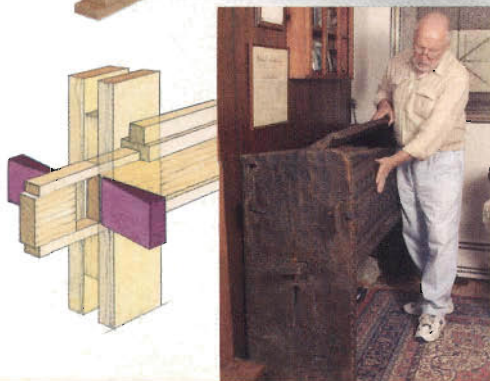
By J. Petrovich

This project will reflect well on you — and on the splines which shore up the miters for your octagon-shaped frame.

75 Fluting Jig

By Ralph Bagnall

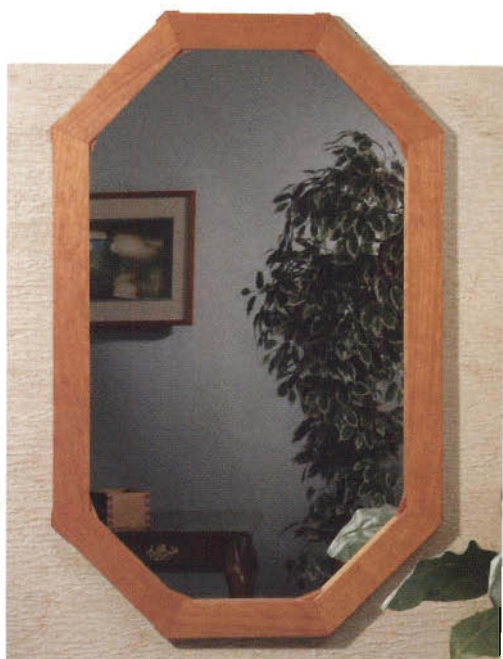
A flexible second fence keeps your router on track to make flutes of varying widths.



Page 50



Page 60



Page 68



Page 75

Woodworker's Journal Departments

January/February 2004

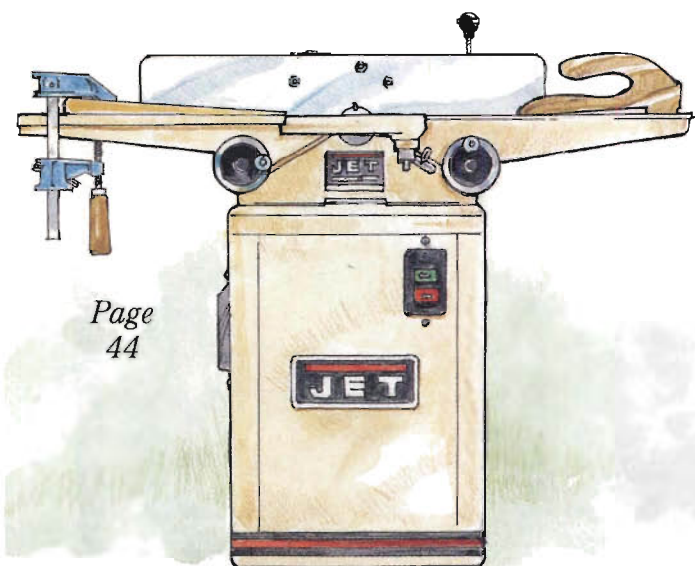
Volume 28, Number 1



Page 40



Page 38



Page 44

Page 28



Woodworkers

8 Editor's Note

Getting the details right.

10 Letters

Do the math: cove cutting formula gets used.

16 Questions & Answers

Gluing mortise and tenon joints, planning a shop, wood filler and more.

24 Tricks of the Trade

Portable vises and knockdown platforms for cutting sheet stock the easy way.

36 Shop Talk

Woodworking students learn from masters of the past and present.

48 Stumpers

Sounding out a mystery tool.



Techniques

28 Wood Turning

NEW! Welcome aboard to Steve Blenk, your brand new turning expert.

34 Hardware Hints

Joining large panels giving you trouble? Try knockdown, mechanical fasteners.

44 Techniques

Linda Haus on how to taper legs on a jointer.

108 Finishing Thoughts

Have a yard sale beauty? Michael Dresdner tells you whether to reject, restore or refinish it.

Tools

88 Today's Shop

Chris Marshall digs up the latest on bringing stock together in his review of six pocket-hole jigs.

102 What's In Store

Tools that go the extra mile.



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hand-down to
my son..."
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Biscuits and Dovetails

Texas woodworker Ron Paque sent the *Journal* an opinion (see "Letters," page 10) that gave us pause. Ron wrote about Ian Kirby's article in the *October 2003* issue "More Dovetail Lore" and seriously questioned the need for such "esoteric, complex and hardly relevant woodworking techniques ..." After reading the article three times, Ron concluded, "Hell, why not just miter the two pieces, cut a biscuit slot and glue it?"

"Hell, why not just miter the two pieces, cut a biscuit slot and glue it?"



After reading Ron's letter, I went back and read Ian's article again. It featured no less than 27 detailed, step-by-step photos and another 14 illustrations, mostly showing how to create the secret mitred dovetail. No doubt, it's a challenging joint to master, and one you probably won't find use for all that often. But woodworking is a craft, and to become your best at a craft you need to learn everything you can about it ... even some of the esoteric and complex details. Ian Kirby, ever the educator, brings a devotee's perspective to that craft.

Don't get me wrong ... I have a great deal of respect for our readers, especially those who take the time to write offering advice and guidance. In fact, Ron's letter motivated me to think hard about my "day job" craft: writing and editing.

As an editor, I'm expected to know when to use who or whom. But, and

this is going to get a tad esoteric, I also need to know when to use a virgule (/) or the pluperfect tense. Of course, I'm fully capable of workarounds (biscuits?), but at the end of the day, I still want to master all the tricks of my craft — however infrequently I have to use them.

I guess Ian was somewhat prophetic when he wrote, in the very first line of the article in question, "Few aspects of woodworking evoke as much emotion as the dovetail joint." (Curiously, in this issue Ian builds a tusk tenon table to which purists may have the opposite reaction — and call him to task for using nails and screws ... not esoteric enough.)

Larry N. Stouken

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Woodworker's Journal (ISSN: 0199-1892), is published in February, April, June, August, October and December by Rockler Press, 4365 Willow Dr., Medina, MN 55340. Periodical postage paid at Medina, Minnesota and additional mailing offices. Postmaster: Send all address changes to *Woodworker's Journal*, P.O. Box 56585, Boulder, CO 80322-6585. Subscription Rates: One-year, \$19.95 (U.S.); \$31.95 U.S. funds (Canada and other countries). Single copy price, \$5.99 (U.S.); \$8.99 (Canada/other countries). Reproduction without permission prohibited. Publications Mail Agreement Number 0861065. Canadian Publication Agreement #40009401. Printed in the USA.

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Calculating Coves on the Computer

Computing Coves

I found the article "Two Easy Ways to Calculate Cove Cuts" (*October 2003*) very helpful. I used the spreadsheet formula, and it worked great. It got me to thinking that using my PC to solve complex setup problems is the best way to go.

*Talley Pollard
Spruce Pine, North Carolina*

I was also quite impressed with the article on cove cuts. I hope to try this method in the future.

*Charles Stopczynski
Lawrenceville, Georgia*

A Steadier Rest

I was just about to build a self-conceived design of a steady rest for my JET mini lathe when I found the article by Ron Mosel in the *October 2003* issue ("Jigs & Fixtures"). When I saw the drawing of the steady rest in the table of contents, "zoom," my fingers were on their way to page 62. The drawing "spoke to me," you might say. It was so clear, clean,

well drawn, and of a very nice size for easy study. Within a minute or two, I realized the superiority of the design over my own and decided to build it. As soon as the project was built, it was put to use on a small hollow vessel and it worked very well!

*Charles Stopczynski
Lawrenceville, Georgia*



Squeeze-out Secrets

I enjoyed Simon Watts' answers to the question about squeeze-out ("Questions & Answers," *October 2003*), but he missed a few other easy ways it can be prevented.

My high school teacher, Steve Lucero, taught me to use paste wax anywhere squeeze-out was to be avoided. The wax is easily removed with solvent. It does not raise the grain like water. If any glue is left on the wood it can easily be seen with the solvent, so there are no surprises.

Another method is to use blue painter's tape, which leaves no residue. The tape is put over the area surrounding the joint, and is removed after the glue squeezes out. You should let it set for a short time before removal. Some light sanding or scraping is sometimes necessary.

*Ed Laveroni
Los Gatos, California*



Serving Up a Great Table

A friend took a picture of LiLi Jackson's serving table (*August 2003*), which I modified with a straight piece of dowel for the stretcher because I don't have a lathe. It is a great piece.

*Rusty Brett
Houston, Texas*

In your *August 2003* issue, I couldn't help but note that, for the "Serving Table and Tray" project, for piece 6 you could purchase a $1\frac{3}{4}$ " x 12" x 35" and get all four legs out of one piece of lumber. You could also get all four out of one piece with a $1\frac{3}{4}$ " x 8" x 72". By laying out the leg pattern just right, you can cut the front of one leg as you cut the back at the same time. This would save you money on material and waste (waste not, want not).

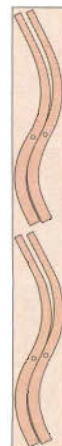
*William Brannock
Tulsa, Oklahoma*

WJ Responds:

Close, but as the drawings at right show, you won't be able to have one cut serve as an edge on both pieces.

Lining them up to save material is a smart move.

— The Editors



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Hide Glue Reservations

First, let me congratulate you on a fine publication.

I would agree with [almost] all that was written in Michael Dresdner's excellent article regarding the attributes of hide glue ("Hide Glue: A High-tech Antique," *August 2003*).

But I have a reservation: As a luthier and antique restorer my work is often made easier by an inherent failure of hide glue. It is an organic compound and thus is susceptible to attack by microorganisms — it gets eaten away!

I admit that this is rare, but in damp or uncontrolled environments, still a real problem.

While this makes the job of dismantling antiques easier, it would not be the glue I would recommend for something intended to last.

If epoxy glues had been available, Stradivarius would have been overjoyed.

As an aside, I use "urea formaldehyde" or "resorcinol formaldehyde" for high stress applications in musical instruments and chair legs.

Steve Johnston
Canberra, Australia



Dovetails for the Ego?

While I've enjoyed your magazine in the past, Ian Kirby's article on hidden, mitred dovetails ("More Dovetail Lore," *October 2003*) really made me question my choice of subscriptions. While Kirby might get an ego trip for writing such esoteric, complex and hardly relevant woodworking techniques, (reminding the rest of us mortals how inferior our skills are) the practical necessity of such nonsense is lost on most of us. I read the article through three times to access what he was trying to relate, and finally said, "Hell, why not just miter the two pieces, cut a biscuit slot, and glue it?" Hidden dovetails indeed! I'm searching for a new magazine. Kirby and your editors have lost touch with most of us.

Ron Paque
San Antonio, Texas

WJ Responds:

Not everyone wants to make hand-cut dovetails, but many do. Ian and the *Journal* know that. Ron, before you drop your subscription, check out Ian's project in this issue. It is a lovely tusk tenoned table that is simply screwed and glued together ... you might really like it.

— Rob Johnstone, Editor

continues on page 12 ...

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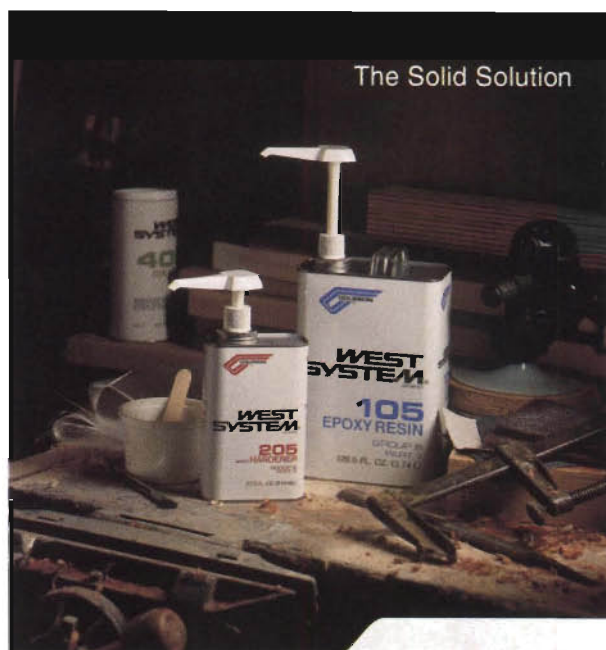
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Safety First: Learning how to operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary guards have been removed from equipment shown in our magazine. We in no way recommend using this equipment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

Publishing Barry's Letter: Thumbs Up ...

I just received my October, 2003 issue of *Woodworker's Journal*. I enjoyed reading the letters in response to Barry Nelson's letter ("Letters," June 2003). Some men will never accept the fact that women can be, and often are, better woodworkers than men!

I was part of an article for your August 2002 issue titled "Woodworking's Crumbling Gender Barrier." For the past nine months, I've been working on a home office and wanted to show you pictures of the project [below]. I'm really happy with the way it turned out. I'd LOVE to send these pictures to Barry Nelson!

*Carol Johnston
Peru, Indiana*

... Thumbs Down

I recently read Traci Remmo and Catherine Morris' responses to the letter Barry Nelson sent in, along with a comment from your associate editor, Joanna Takes.

If the editors felt that Nelson's letter was idiotic, they should have used some editorial discretion and not

published it. To set him up so that others could "have at" him is irresponsible and unprofessional muckraking if not outright pandering to hotheads on both sides of a non-issue.

Keep your focus. It's woodworking, not promoting social betterment or ambushing society's less progressive elements.

*Joseph Trapple
Alexandria, Virginia*

Caring About a Chair

I want to thank you for helping with the "Teddy Bear Rocking Chair" [from our expired sister publication, *Today's Woodworker*, Dec. 1991]. The suggestion about using a 1" grid and starting at a center point was helpful.

I made the chair for my niece's new baby. When her brother-in-law saw it, he wanted one for his grandson, so I made one for him as well. Both turned out great.

*Ed Schiermann
Dallas, Texas*

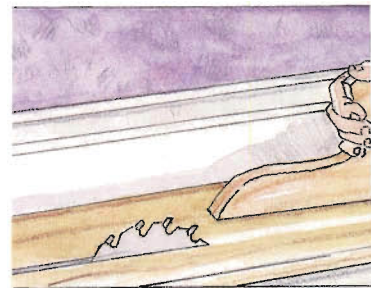
"Oneway" to a Holy Grail

In your October *Tool Review* by Steve Blenk ("Small Lathes Are Growing Up"), the Mercury Mini Lathe was not included. I wouldn't trade my Mercury for any of the ones you tested except the Oneway.

*John Cleckler
Odessa, Texas*



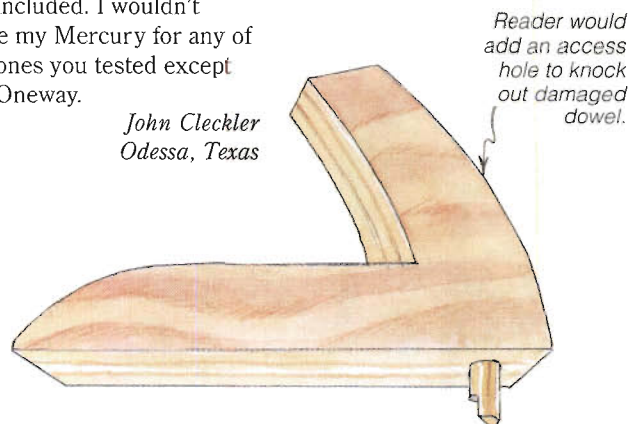
*Ed Schiermann's
Teddy Bear
Rocking Chair*



A Better Pusher

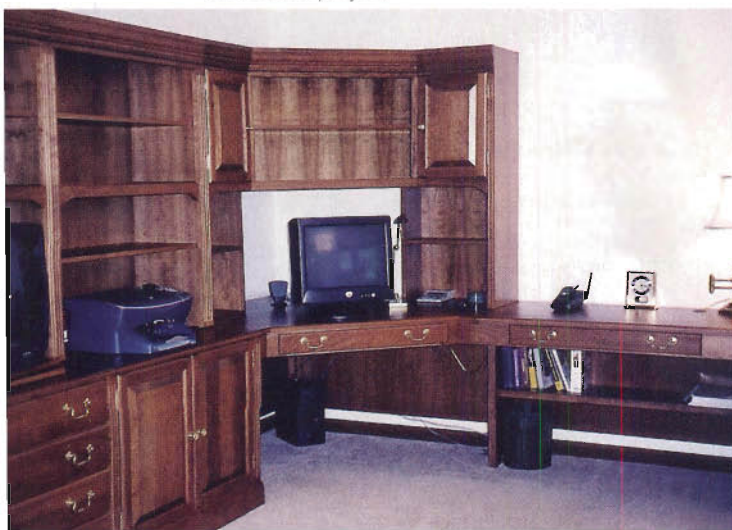
Just read my first copy of the magazine. In "Tricks of the Trade" (October 2003), Ken Collier's push stick can be improved simply by drilling a 1/4" diameter hole all the way through from the 1/2" hole. When the dowel needs replacement, knock it out with a punch or nail. Repeated drilling will ruin the hole.

*John Truskowski
Plymouth, Michigan*



*Reader would
add an access
hole to knock
out damaged
dowel.*

Carol Johnston's home office project



continues on page 14 ...

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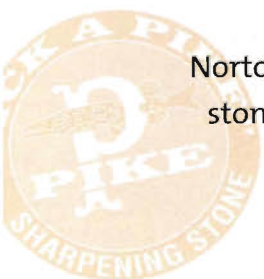
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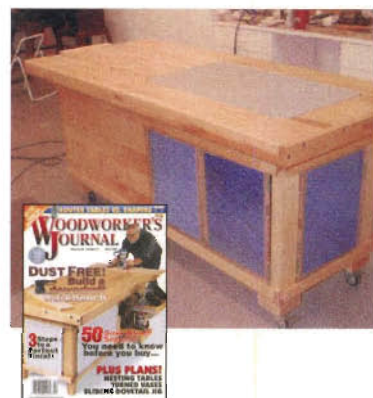
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LETTERS

Get Well Soon, Rick!

In the editorial in the October 2003 issue ("On the Level"), Larry Stoiaken shared the news that WJ shop master Rick White is laid up, and asked for your photos of projects you've built from Rick's plans over the years, as well as your well wishes. Here are some of the responses — keep the pictures coming!

— The Editors



Hey Rick, I just wanted to send you a few pictures of a recent project I completed from April 2002, the "Downdraft Workbench."

It took me six weekends to complete, and I just put the final coat of wax on it. I almost don't want to put it to work ... my wife says it's really furniture.

Thanks to you, and your innovative designs and "show me" techniques, I was able to continue to expand my woodworking skills.

From the most recent issue of WJ, I learned you're not feeling too well. Please get better and know that woodworking fans like myself are eagerly awaiting your return. Good luck, and looking forward to your next project.

Tracy A. Novak
Henderson, Nevada

I have been subscribing to *Woodworker's Journal* for over 10 years now, and I couldn't help but feel saddened that you are laid up for now. I was laid up for about six weeks myself with a back injury. What gave me the drive to get better was reading my favorite woodworking magazines and watching woodworking videos I've collected over the

years. Get well soon so you can get back to the shop and smell the aroma of freshly cut wood, hear the sound of whirling saw blades and router bits, but most of all continue to make those great projects so we can all become better woodworkers.

Praying for you!!

Edroy McQuarters, Jr.
Tulsa, Oklahoma

You don't know me, but I have enjoyed your work and your articles. I can empathize with you about wanting to get back to work. I contracted some weird disease, and it laid me up for six months — and all I wanted to do was get back into my little cellar shop. Eventually, I got better, and I know you will, too. Keep thinking positive and watch a lot of funny DVDs and movies. Laughter is the cure.

Chris Dillion
St. Augustine, Florida

I've enjoyed your projects in the *Journal*, and I hope you will be back in your shop doing more projects soon. Best wishes for a speedy recovery.

Ron Orth
Sonora, California

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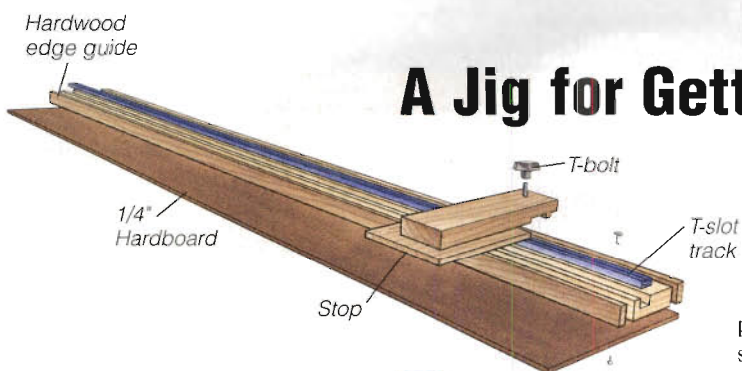
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A Jig for Getting Your Groove On



Q I am making a garden gate out of red cedar. The gate is 3' by 4' high, but I think the surface is too flat and needs a textural element. I thought that a V-groove in the center and one every 3" expanding outward would break up the surface to give it more visual interest. Do you know of a jig design or another way to keep my router's V-grooves straight and the lines parallel to each other?

*Donald Kennedy
East Hampton, New York*

A If you have a router table big enough for this project, that would be the ideal solution. Barring that, the next best answer is a straightedge jig like the one I built for the *June 2000* issue of the *Journal*.

The heart of the jig is a very straight, jointed

plywood fence, which is sealed along its two ripped edges with strips of solid hardwood banding. A groove is then plowed in the top, to house an aluminum T-slot track.

Your router runs along the fence of the jig, and that guides a straight bit along a hardboard template attached to the bottom of the fence.

If you want to customize your jig, you can index the end off your first groove to your 3" spacing. Sandwich the gate on the board, and put a marker to use for indexing off a slot. Then continue down the gate, putting in all your V-grooves.

— *Rick White*

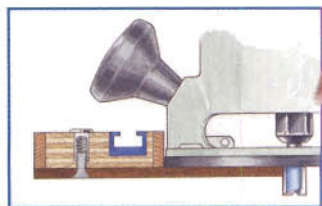
Q Whenever I assemble a mortise and tenon with glue, I always miss at least one spot in cleaning up. This, of course, shows up once the workpiece is stained. How important is it to apply glue to the mating surfaces of a tenon's shoulder?

Must the entire tenon be coated with glue? If I do not apply glue to the shoulders, would I be reducing the strength of the joint?

*Robert Eaton
Garden City, Michigan*

A There is no need to put glue on the shoulder of a tenon. Traditional teaching says that end grain gluing has no holding strength. It's not strictly true — it does have some. But compared to the holding strength of the glue on the tenon and in the mortise proper, its value is insignificant.

Glue cannot work unless the mating surfaces are wet. The best technique is to brush or paddle the thinnest layer of glue on all parts of the mortise and the tenon, but not the shoulder areas. What you can't do is put a heavy layer of glue on the tenon and think that it will transfer to the walls of the mortise as they are put together — similarly don't "load up" the mortise and expect transfer onto a dry



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us at (763) 478-8396 or
by e-mailing us at:

QandA@woodworkersjournal.com

Please include your home
address, phone number and
e-mail address (if you have
one) with your question.

THIS ISSUE'S EXPERTS

Rick White is a master woodworker and contributing editor to Woodworker's Journal.

Ian Kirby is the author of The Accurate Table Saw from Cambium Press and a regular contributor to the Woodworker's Journal.

Rob Johnstone is the editor of Woodworker's Journal.

Sandor Nagyszalanczy is a power tool expert and author of The Homeowner's Ultimate Tool Guide from Taunton Press.

Michael Dresdner is a nationally known finishing expert and author of Wood Finishing Fixes from Taunton Press.



tenon. In other words, the key to a sound glue-up is complete meeting of the mating parts along with a controlled glue deposit.

To thoroughly clean up all the squeeze-out — and there is always going to be a little — clamp up the work as normal. Quickly remove what's easy to get at with the clamps in place. Within four or five minutes, remove the clamps one at a time and clean off whatever was obscured by it, return the clamps and move on.

— Ian Kirby

continues on page 18 ...

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(Circle No. 115 on PRODUCT INFORMATION form)

Q We recently retired to central Texas where it's either hot and humid or cold and humid. A 12' x 16' shed could make a small workshop. I make small items, but need space for tool storage. I also need to store a walk-behind lawn mower, wheelbarrow, and garden tools.

Aside from the space problem, I'm concerned about dust clogging an air conditioner filter or exploding from a gas or electric heater. Flammable fumes, too, are a concern. Maybe I want more than I can have, but if you can suggest ways to solve these problems, you'll have my vote for president.

— R. R. Ihrig
Whitney, Texas

space, finishing with hazardous fumes can best be dealt with by avoiding them altogether. With the large selection of shellac and waterbased finishes on the market, not to mention products like wipe-on polyurethane, I would be surprised if you would need to resort to spraying lacquer or its like. I would avoid a heating system that uses an open flame, but I am aware of hundreds of shops that use woodburning stoves to heat them. I wouldn't ... and, in fact, when I run for office, that will be part of my policy statement: I'm strongly against open flames in the workshop.

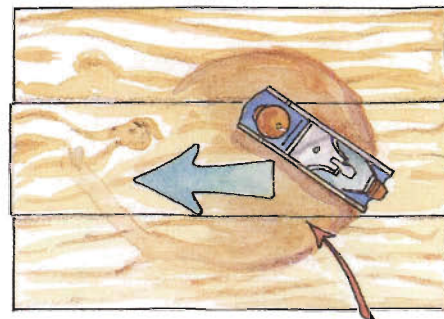
— Rob Johnstone

Q I have a question about planing. I am using a 15" PITBULL planer and find that on many occasions I get a chipping of the wood. I would like to find out what is causing this and how to correct it.

William Engle
Hunters, Washington

A Grain tearout during thickness planing occurs when small chunks of wood are torn out instead of sheared off cleanly by the spinning cutterhead.

This usually happens when the wood's grain direction runs opposite to cutterhead rotation. Minimize tearout by checking the edge of each board and making sure the grain lines run parallel to or



Skewing a hand plane at about a 30° angle will give you a cleaner cut and is less likely to tear out large chunks of highly figured woods with difficult grain.

slant away from the planing direction on the board's top surface. On figured woods, take very shallow cuts on each pass, and if your planer has a locking carriage, lock it before each pass. Also, make sure your knives are sharp and properly set.

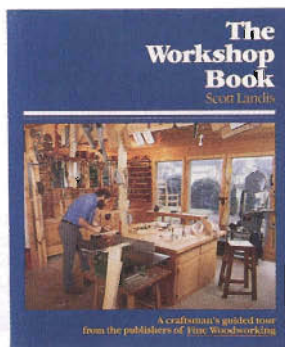
Unfortunately, on boards with inconsistent grain that runs in varying or opposite directions, your most valiant planer thicknessing efforts might still result in unacceptable tearout. In such cases, your options are:

1. Switch to a drum sander or, better yet, a wide-belt sander fitted with a coarse-grit belt. As few small-shop woodworkers own such an expensive piece of equipment, check your yellow pages and contact a local production cabinet shop, which may well rent you time on their machine.

2. Hand plane boards, using a skewed cutting action: Keep the plane at about a 30° angle relative to the edges of the board while pushing it straight forward.

— Sandor Nagyszalanczy

continues on page 20 ...



The Workshop Book, by Scott Landis, has our editor's endorsement as a great guide to planning your shop layout.

A If nominated, I will not run; if elected, I will not serve ... but thanks for your vote of support! It sounds like you are willing to put some time and money into creating an efficient and functional shop space. And you are doing it in the right way by planning to avoid problems before you begin. My favorite book on this subject remains Scott Landis's *The Workshop Book*, from Taunton Press.

To your questions about dust and flammable fumes, common sense is the key in dealing with both. Sufficient dust collection (both point source dust extraction and ambient air filtration) is a great investment. New options for both enter the market every day. In a small

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QUESTIONS & ANSWERS



WINNER! For simply sending in his question on creating a shop, R.R. Ihrig of Whitney, Texas wins a **Bosch wet/dry vacuum**. Each issue we toss new questions into a hat and draw a winner.

Q

I was completing an oak computer desk and sought paste wood filler to use before applying the final finish. Nobody has it anymore, except one paint dealer offered to special order a gallon at \$42. Can I make this? If so, how?

Gene Stebbins
Stow, Ohio

A

Although not commonly sold in home or paint stores, paste wood filler is available at most woodworking specialty stores and in catalogs that sell finishing materials.



You can make your own paste wood filler if you really want to — but it's readily available for purchase, in the colors of the most commonly used woods.

You'll find a variety of them at www.cheyennesales.com, www.rockler.com, www.homesteadfinishing.com, and direct from the manufacturer at www.mohawk-finishing.com, to name just a few. While you can make your own, I doubt you could get one that performs nearly as well as the commercial versions.

But since you asked, pore filler is a mixture of solvent, binder (usually either boiled linseed oil or acrylic, waterbased resin) and a variety of inert particles, which may include clay, talc, calcium carbonate, wood dust, silica, and colored pigments.

— Michael Dresdner

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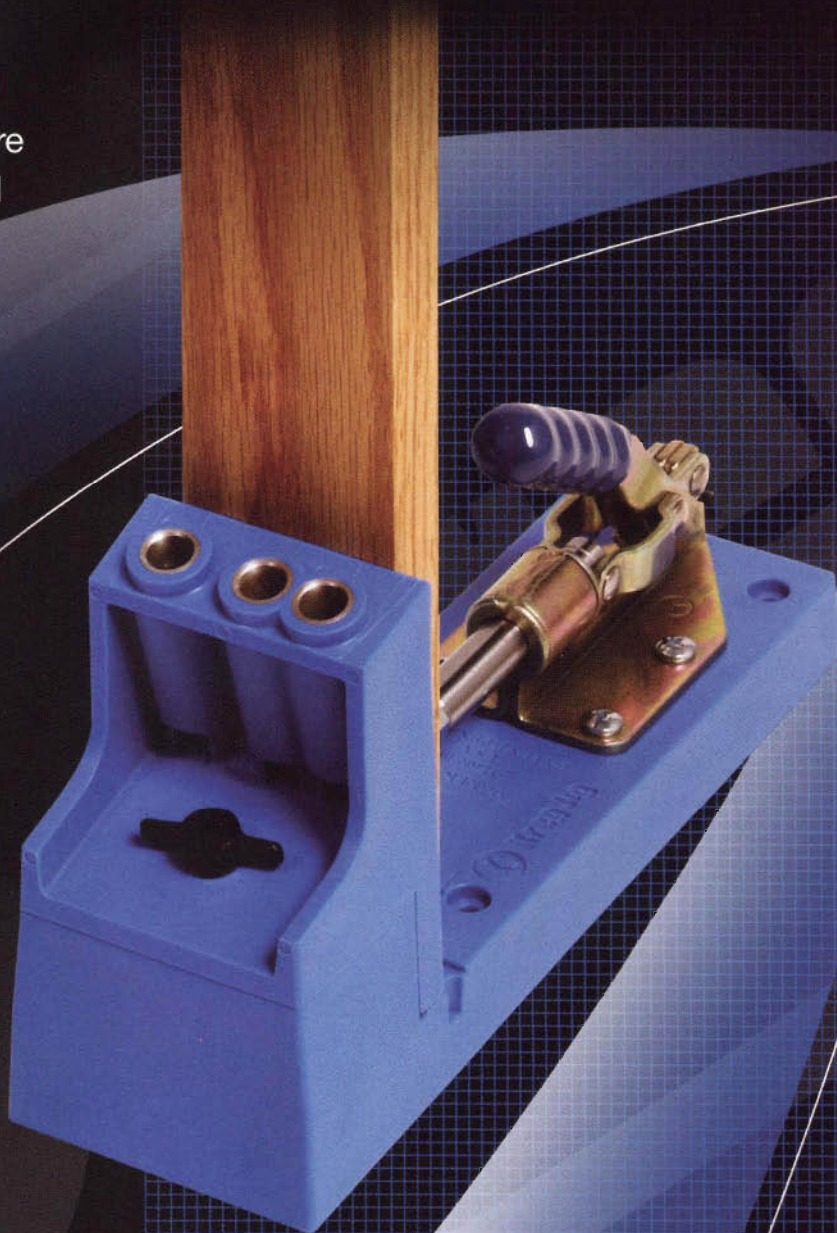
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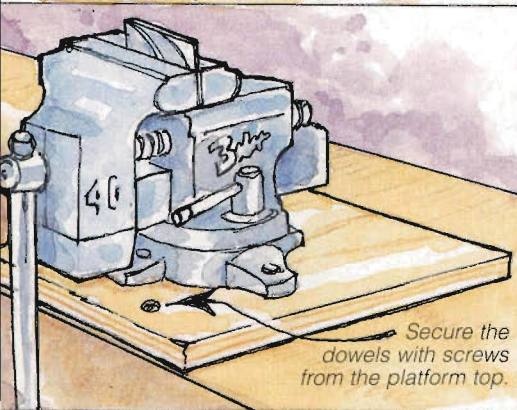
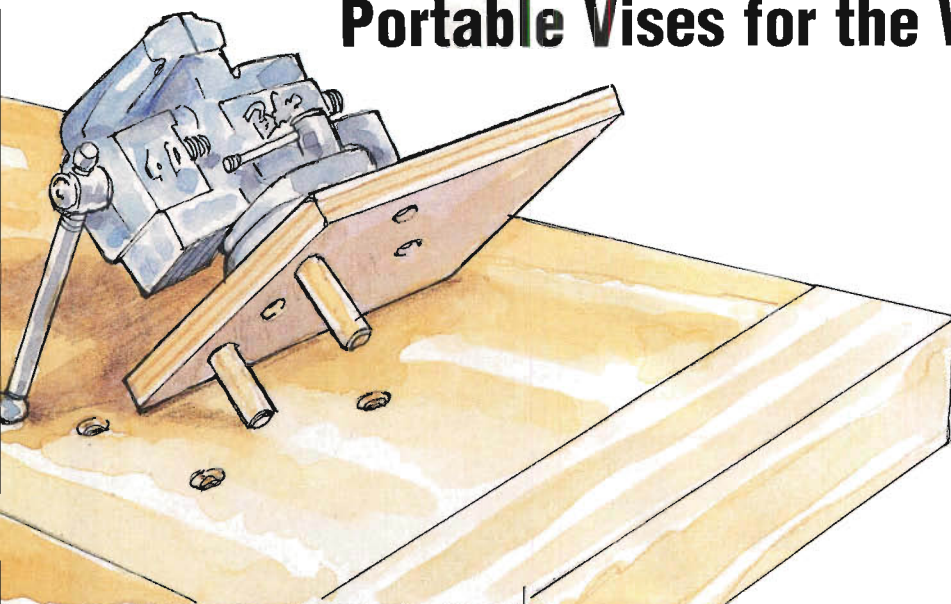
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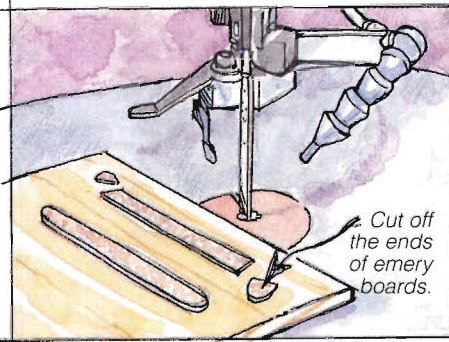
From time to time, even a woodworker will find a use for a machinist's vise. I don't have the bench space for a permanent installation, so I came up with the following: I mounted the vise on a piece of 3/4" plywood, then bored holes for two 3/4" dowels. Using the same spacing, I then drilled pairs of holes in the bench so I could choose where to mount the vise according to the job at hand.

*Allen Formby
Hot Springs, Arkansas*

Scroll Saw Sanding

Most scroll saw owners are familiar with the plastic sanding devices which can be installed instead of the blade. Tired of laying out \$10 for a package of four, I found an alternative at the local drug store ... emery boards for nail care. I cut them to the right length, leaving the ends square, and extend the slot in the throat plate to accommodate them. This only works on scroll saws with pinless blades.

*Daniel Harvey
Kerrville, Texas*

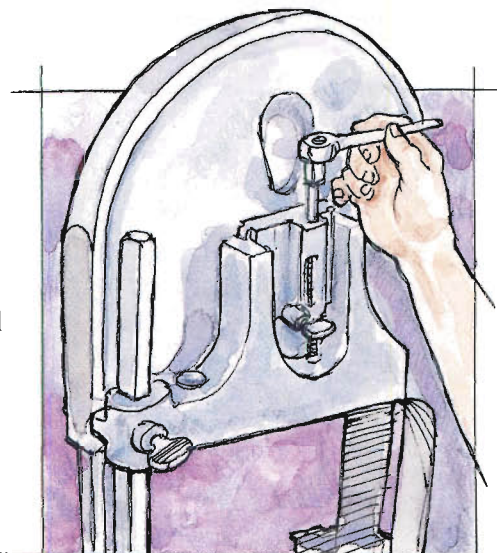


Cut off
the ends
of emery
boards.

Lights, Camera ...

I like the idea of having lights on electric hand tools but don't feel like trading mine in for the newer models. Instead, I put self-adhesive Velcro® pads on the various tools and on a miniature pen light. Now I can move the light around (or remove it) according to the job. It works fine on circular saws, drills, routers or whatever.

*Will Loken
Nekoosa, Wisconsin*



Improved Band Saw Tensioning

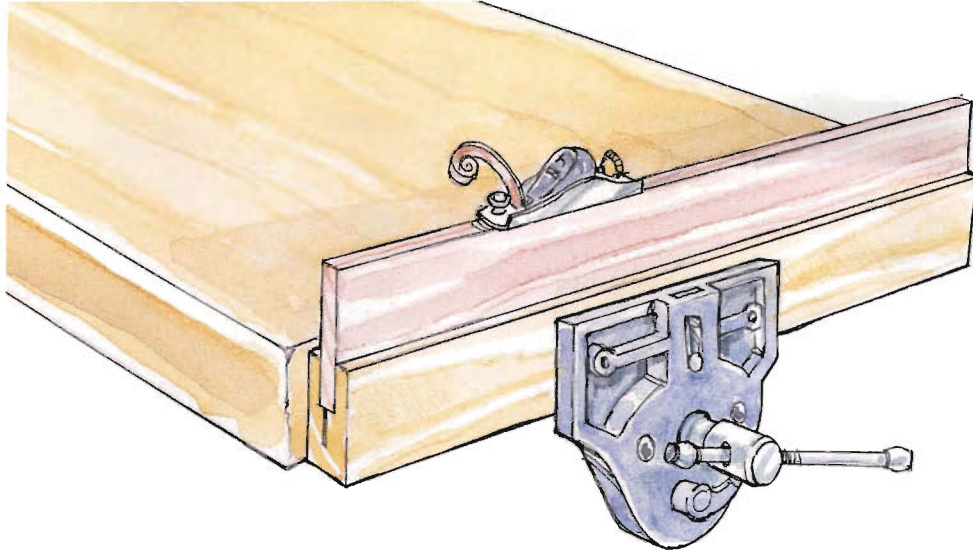
For over 50 years, I've been scraping my knuckles on the blade-tensioning knob of my 14" Delta band saw. It took me half a century but here's what I finally came up with: I removed the knob (it was jammed on so tight I actually had to cut it loose) then filed the threads down a fraction so I could force on an 11/32" socket. This engages with a 1/4" drive reversing ratchet wrench. Now, I even leave the wrench on the saw so I don't have to hunt around each time I need to adjust the blade tension.

*Wilbur Golterman
Bodega Bay, California*

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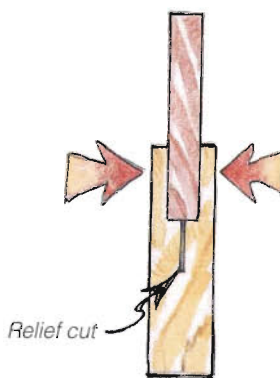
See page 25 for the **details!**



Groovy Clamping Jig

I use this shop-made jig to hold boards on edge for planing, sanding or rounding corners. First cut a deep groove in a piece of 2 x 6 scrap, using either a regular blade or a dado cutter, as shown. Make the groove a fraction wider than the stock you are working so, when the jaws are tightened, the jig grips the work tightly. Follow up with a relief cut down the center of the groove. I use it repeatedly until the jig splits, then I simply replace it.

*Bruce Hertig
Tolono, Illinois*



WINNER!

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California will also receive a Drill Doctor VersaSaw for being selected as the "Pick of the Tricks" winner. We pay from \$100 to \$200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. Submit your Tricks of the Trade to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send us an e-mail:

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continues on page 26 ...



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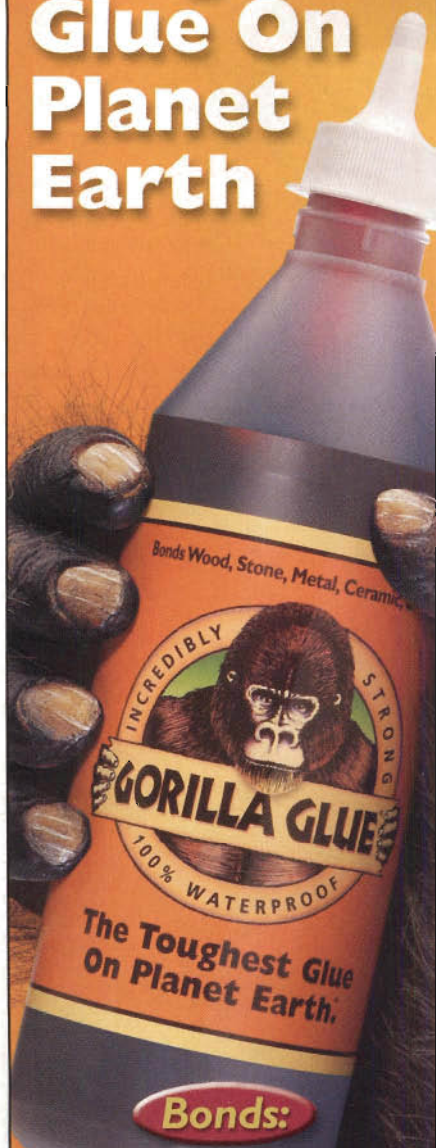
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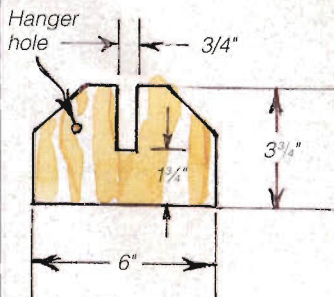
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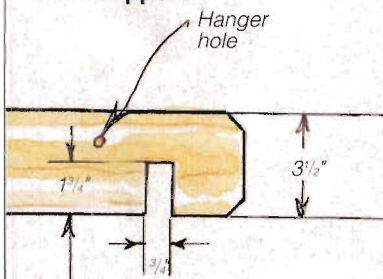
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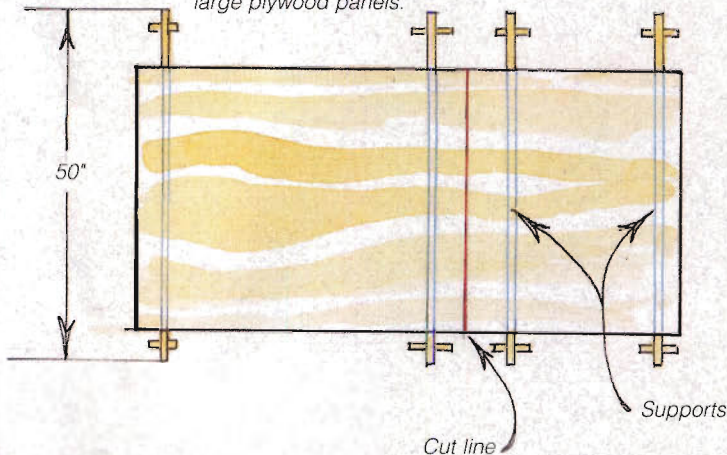


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Sheet-cutting Rack

When cutting sheet materials — particleboard, MDF or whatever — I have to use my handheld circular saw on the floor of my one-car garage workshop. The knockdown cutting “platform” shown in the sketches above both raises and supports the sheet for the cut. I made the plywood brackets (that act like feet) so their top edges stick up 1/4" to hold the sheet securely. When I'm done cutting, I take it all apart — no screws or fasteners — and hang it back on the wall.

Vic Metzgar
Tarzana, California

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My Spin on the Lathe

By Steve Blenk

Welcome to our new column, "Woodturning" by Steve Blenk, a professional woodturner for more than 30 years. In the next year, Steve will be exploring different aspects of woodturning, and teaching techniques you'll want to try on your own projects.

Why try woodturning?

The answer is simple: it's both enjoyable and uniquely satisfying to creative woodworkers. The first time those long shavings start to whisper off the edge of the gouge and pile up around you like snow, you're hooked.

That's really why so many of us keep a lathe in our shops. (I now have six lathes ... but I can quit any time ... honest!) After 30 years, turning hasn't lost its allure, and I haven't come close to hitting the limits of what's possible. As your turning skills improve, the horizons of what you can do simply expand.

The lathe is the only stationary power tool that lets you BE the cutter, instead of just setting one up to do work for you. Shaping and removal are literally in your hands. Results are immediate (good or bad), and the process of shaping the wood to the desired effect is a result of your own skills and abilities. I like to think

of it as subjective woodworking. There is a certain Zen-like satisfaction in this type of woodworking. As you become adept, the turning chisels become like extensions of your hands. You simply reach out and shape the wood by putting the edge in the proper place. You let the wood be cut. OK, enough of the deep mystical stuff. Let me just say ... "it's fun to turn wood."

Beginner-Friendly

A lathe has no spinning blades, bits, knives, rollers, or gears waiting to damage unwary digits. Of course, wearing a chunk of partially turned wood on your forehead as a hood ornament is considered bad form among turners. You do have to respect the laws of physics and kinetic energy, or pay the price. And you must protect your lungs and face from dust and debris, so proper safety gear is essential. But common sense will keep you safe in most turning situations.

A lesson or two from an experienced teacher is the best way to start. You will rapidly learn that while there are certainly a lot of wrong ways to do things on the lathe, there is not just one right way to get specific results. There are many great projects for the beginner to develop their skills, some of which are pre-packaged by catalog merchandisers. Small boxes and vessels, jewelry items and writing implements; all can be made quickly and easily on the lathe, and are good projects for beginners.

Our new columnist, Steve Blenk, instructs his 12-year-old son, Robbie, in outboard turning techniques in his Olympic Peninsula shop.



Fast Results

In addition to being beginner-friendly, turning is the perfect pursuit for woodworkers who have limited shop time (and/or patience). A great aspect of lathe work is that many projects come off the tool totally finished! You can shape, sand, and apply finish right on the machine. Even a complex vessel form seldom takes more than a few hours to produce. For those of us who need that sense of completion when we turn out the shop lights, this is a quick and easy way to get there. A bowl or a box can be turned from beginning to end in a single session ... instant gratification.

The lathe is also a versatile tool. Turners tend to look at the world in terms of what they can get onto their lathe, and how they can hold it there long enough to shape it.

Why turn wood? Beauty, variety, creativity, practicality ... turning brings all these aspects to woodworking and more. Here are a few examples from the author's collection.

I have worked on a bowl over 7 FEET in diameter, and on wine goblets a mere 1/4" tall (... "give me a tool rest, and a place to stand" ...). You can turn between centers, on faceplate, or using chucking systems. You can turn outboard, offset and on multiple axes. Natural edge work is possible, and green wood turning is fast and fun. You can bore, hollow, chase and chatter. You can even spin soft metals. We'll look into some of these

Woodturning continues on page 30 ...



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PRO'S TIP

Clean Cuts on Rough Grain

If you're having a problem getting a clean cut surface on a particularly difficult grain area, take the lightest cut possible with the sharpest gouge you can hone. Remember to slip/hone the inside surface of the gouge to get the wire edge lying out. Try to engage the smallest possible area of the edge while keeping the bevel in contact with the work surface. **DO NOT SCRAPE!** If you do, the problem will usually just get worse!

Proceed slowly along the cut, and be patient. Sometimes changing the direction of the cut will solve the problem, as you will stop lifting the grain. Varying the lathe's speed slightly may also help remove a harmonic vibration. I often find getting the gouge almost vertical will do it, but beware of letting it catch!

— Steve Blenk



A very sharp gouge applied with a very light touch can help cut a difficult patch of grain smoothly. The author also likes to hold his gouge "close to vertical" ... but carefully!

methods and techniques in upcoming columns. Furnituremakers, our more practical woodworking brethren, justify the lathe's presence in their shops by using it to expand design horizons. Legs, pedestals, rungs, balusters, newels and finials, split turnings: the list goes on and on.

Turning Won't Break Your Budget

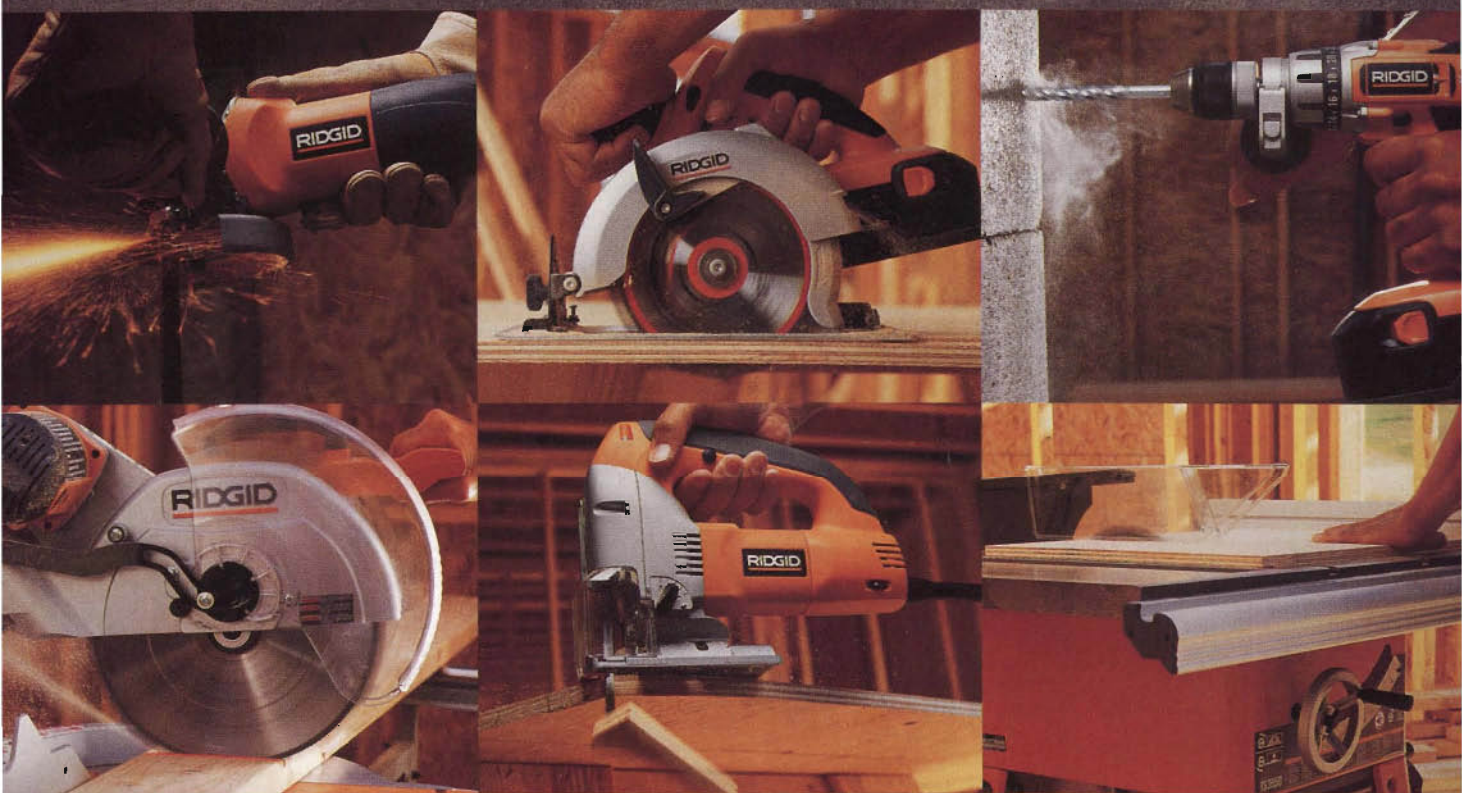
A frustrated vendor at a turning symposium once told me sadly that if turners ran the country there would be no national debt. We are indeed a frugal bunch and manufacturers have responded with a number of lower cost lathes a beginner can reasonably consider. (See the "Mini-lathe Roundup" in the Journal's December 2003 issue.) You will need a basic set of high-speed steel (HSS) turning chisels, and a good versatile lathe chuck is a real plus. Add in the price of a couple of turning lessons and a few books or tapes on the topic, and you can be up and running for less than the cost of a good table saw. Of course, once you do get that far, you'll soon want to buy a band saw for cutting bowl blanks, and some deep hollowing tools, and a coring system, and ... ! Wood, on the other hand, is often free for the taking. Almost any wood can be turned, especially for beginning drills. My own firewood pile regularly yields prizes.

If you're already turning, then I'm preaching to the choir ... you know what I'm talking about. Check back here in each issue: I'll cover techniques as well as projects, and many of the subjects I've mentioned in this article. And if you have a turning related question or two, I can be reached online through www.Lathecraft.com. I may not be able to get back to everyone individually, but I will try to address common problems in this column. I'm looking forward to turning with the *Journal* in the months to come!

Steve Blenk is a Washington state woodturner who also knows a couple of things about catching salmon.



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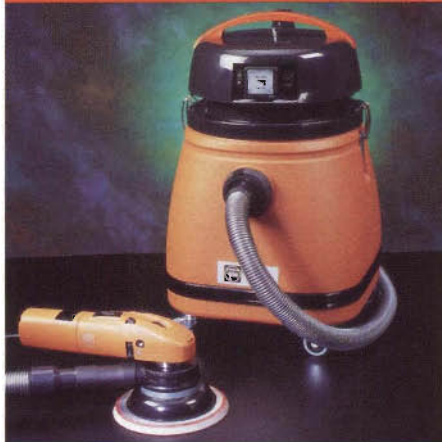
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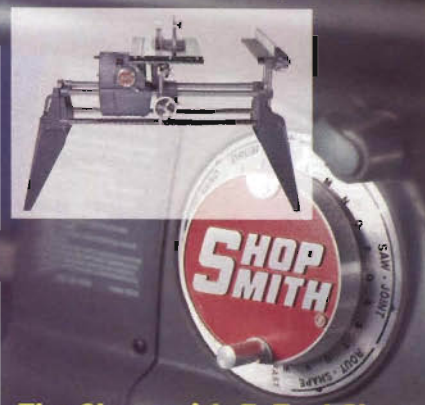
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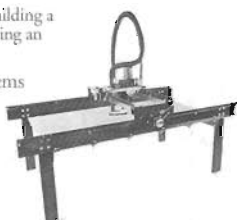
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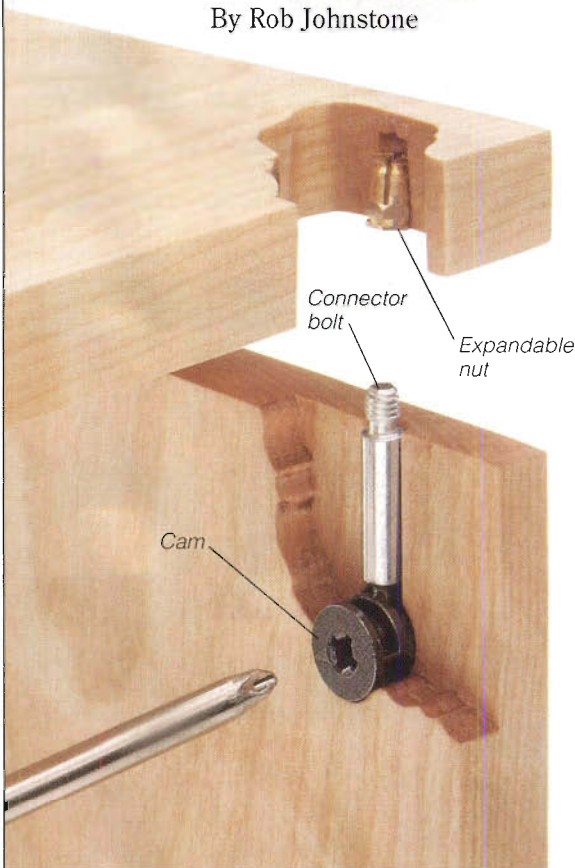
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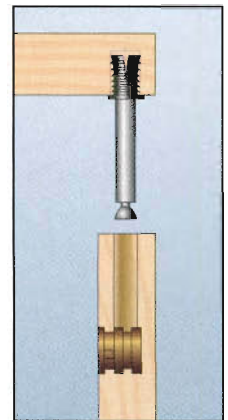
HARDWARE HINTS

Minifix Fasteners

By Rob Johnstone



The anchor of the Minifix is a small expandable nut that fits into a predrilled hole. Tap this nut firmly into place until its collar seats tightly to the surface.



Once the expandable nut is seated, thread the connector bolt into it and tighten with a screwdriver. This expands the nut in its hole and locks it in place. When you assemble your pieces, a simple quarter turn on the cam engages the connector bolt and secures the joint.

When clamping up large panels is getting the best of you, or you're having trouble assembling very large components, mechanical fasteners are often your best option. Minifix fittings from German-based Hafele are one of the more versatile of the breed. As shown in the photo and illustration above, this type of fastener is simple to install and provides a very tight joint. It's also reversible; i.e., you can knock your project down in moments and reassemble it later — without sacrificing any strength.

These fasteners are available in two versions that work appropriately in 1/2" and 3/4" material. For each fitting you'll have to drill three holes: one for the expandable nut, one for the connector and one (using a Forstner bit) for the cam.

While knockdown fasteners are commonly employed for bed rail connectors and shelving, if you've got a college-age friend, everything from bookshelves to tables start to makes sense, given these fasteners' unique combination of strength and versatility. They will work for inline, non-load bearing joints (such as pulling together two large sections of countertop), but are generally called on for right angle situations. I've put them to good use joining sides to the front and back of a router table base.

It's very important when drilling the holes for these fasteners that you stay square to the stock. This is the key to achieving a clean, tight joint. A drill guide or drill press helps to ensure accurate drilling and makes knockdown joinery a snap.

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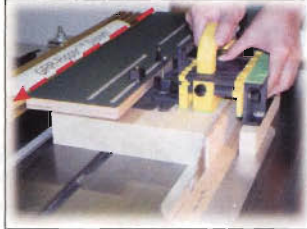
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Woodworking: Classics and Classes

17th Century Work

Historic Pulpit Adds Class

Students studying history at Westminster College in Fulton, Missouri, already have the aura of Winston Churchill keeping them company: their alma mater is where he delivered his famous “Iron Curtain” speech.

Now, when they and citizens of the nearby town attend services in the chapel that serves as a Churchill Memorial, the shades of a couple more big names in history — particularly woodworking history — will keep them company.

The man who installed the organ when the memorial was erected in the 1960s has been searching for an appropriate pulpit ever since, and last fall he found one: designed by Christopher Wren, and believed to have been carved by Grinling Gibbons, the 17th century pulpit was installed in the Church of St. Mary the Virgin on Westminster’s campus in September 2003.

A Little History

The church itself also dates back to the 17th century — it was moved stone by stone to the U.S. in the 1960s before being rehallowed and dedicated as the Winston Churchill Memorial & Library. Both St. Mary and All Hallows in London, the original home of Westminster’s “new” pulpit, burned in the Great Fire of London in 1666. Afterward, famed architect Christopher Wren redesigned and reconstructed All Hallows, which became known for its elaborately carved woodwork, particularly the screen and the pulpit.



The detailed carving style on the new pulpit at the Westminster College’s Churchill Memorial is in the style of historic carver Grinling Gibbons — appropriate, since the pulpit dates to 17th century London, when Gibbons and architect Christopher Wren were working together on such projects.

While there’s no direct evidence to link carver Grinling Gibbons to the pulpit, the circumstantial evidence exists. He is known to have worked for Christopher Wren, and the pulpit was built in the time and the place when this Dutch-born carver was changing the face of English carving. Prior to Gibbons’s influence in the 1660s and 70s, English wood carving was known for its solidity. His style of carvings, although it also had strength, exhibited more airy lightness as well. He changed the face of English wood carving — and much of his work appeared in churches.

This particular pulpit was used in another London church after All Hallows was destroyed in the late 19th century. Changes in worship style led the Diocese of London to donate it to Westminster College and the Churchill Memorial, in honor of those who died during the events of September 11, 2001. Following restoration in England, it now resides in the heart of America.

To learn more about this work from 17th century woodworking masters, visit the web site www.churchillmemorial.org.

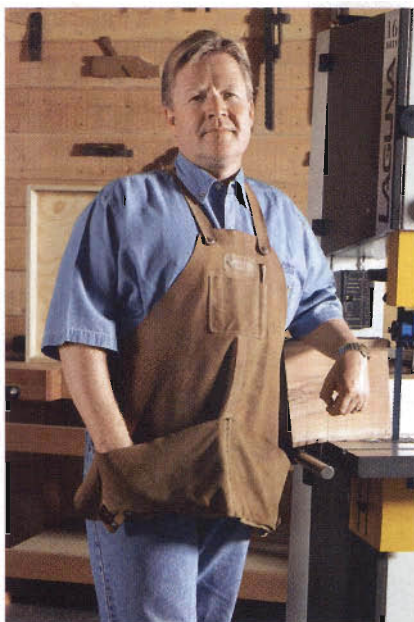
Tools for Schools

Laguna Conducts Contest

Laguna Tools isn't just lamenting ill-equipped shop classrooms: they're doing something about it. During this academic year, any school with a woodworking program — from junior high to college — can enter a competition to win Laguna machinery for their shop.

"We want to make it easy for schools who have a dire necessity to get these machines, because we recognize the need due to budget cuts in many school districts," says vice president Catherine Helshoj. Offered in conjunction with the company's 20th anniversary, the contest has two levels. The first requires students enrolled in a woodworking course, under the supervision of a woodworking teacher, to build a piece of furniture — any size, out of any wood — and submit pictures of it. The winning school (judged on the skill level of the woodworkers versus the final piece) will receive a Knapp jointer/planer; an LT16HD band saw; a 25" wide belt sander and a school workbench. The other

Shop teachers dreaming of tools have a chance to equip their classrooms with winnings from Laguna.



Torben Helshoj's goal "to support and encourage education in our industry" is the motivation for Laguna Tools' classroom tools competition.

portion of the contest is the "greatest need competition" — aimed in part at inner city school districts — which a school can enter by completing an application stating a general need for the machines. First prize is a TS table saw, XSD jointer/planer and a school workbench. Both levels of the contest also have runners-up.

Deadline for the applications is March 10, 2004 with more information available at www.lagunatools.com or 800-234-1976.



continues on page 38 ...

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Gilding LiLi

WJ Apprentice at School
Woodworker's Journal apprentice LiLi Jackson learned a finishing technique from a recent course at the Marc Adams School of Woodworking — useful knowledge for someone at the start of her woodworking career. When she's not learning from the masters in Rick White's shop, LiLi has been touring some of the country's top woodworking schools.

Her visit to the Marc Adams school, located in North Franklin, Indiana, focused on a class taught by David Marks on creating a gilded finish.

Her classroom — one of the workbench rooms, as opposed to the machine room — boasted cameras mounted on the wall to eliminate the need to crowd around a demonstrating instructor. "We all



LiLi Jackson's gilding class at Marc Adams's school taught her the importance of sanding: a smooth surface leads, eventually, to an interesting finish.

ended up crowding around anyway, though," LiLi said. "It was more exciting to see up close."

While David Marks led LiLi and her classmates through the process of gilding and patination, in the next room over, Yeung Chan was teaching classic wooden joints with power tools. Marc Adams himself, the founder and namesake of the school, popped into the classes to help out

the instructors, assist his daughter with her gilding project or learn and absorb with the students.

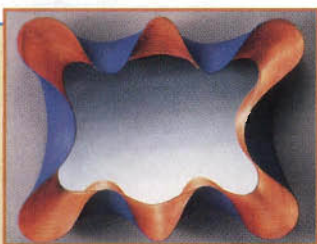
Sanding Some More

The gilding class was very hands-on, as LiLi sanded her piece of MDF, coated with white shellac and blue and red Japan color, to gain a smooth surface. "You sand it and sand it, then sand some more," she said.

After applying the leaf (copper, silver, gold or Dutch metal — imitation gold) and then experimenting with chemicals such as cupric nitrate and barium sulfate to see their impact on the gilding, LiLi had a better assessment of the technique. "In the end, it's not that hard, and it's really cool," she said. "You can gild anything: maybe a project that didn't turn out quite right — cover it with gold leaf, and all of a sudden it's stunning."

She's already used the technique since she left the school, and wishes she could have stayed for another class or two at the facility just south of Indianapolis.

If you'd like to find out more about the Marc Adams School of Woodworking for yourself, visit www.marcadams.com or call 317-535-4013.



Mirror, Mirror ...

Woodworkers Reflect

"Around the Looking Glass," the 10th annual thematic woodworking competition from the

Wharton Esherick Museum, drew entries from over 40 woodworkers who submitted their framed mirrors. The winner used quilted maple, rosewood and brass to create a 4" wide by 5" deep "compact." For more details about the museum and contest, call them at 610-644-5822.



"Compact" by Michael Broly (right) took best in show, while "Wall Mirror No. 2" by David Hurwitz was the Members' Choice.

Readin', 'Ritin' — and Woodworking

*Bringing Woodworking
to Schoolkids*

"Our school district really emphasizes the three Rs. Woodworking doesn't fall in their definition of what kids should be learning," says Eugene Bagdon of Renton, Washington. So Eugene has taken it upon himself to volunteer at the schools and bring the idea of woodworking with him.

One of the latest projects, completed with the fifth grade at Briarwood Elementary in Renton, was a "Picasso Chair" inspired by a design of Tom Loeser's. Eugene gave the kids ergonomic and structural considerations, showed them pictures of Tom's chair, then let them design their own version. "I cut it out, they painted it, and we bolted it together," Eugene said.

His other projects with the kids have included birdhouse clocks, some shaped like castles; CD towers shaped like spaceships; and whirligigs. The kids do occasionally get to use a drill, Eugene says. "I like to feel I'm inspiring them to expand their interest in woodworking."

Eugene Bagdon helped Mr. Coyne's class at Briarwood Elementary (Renton, Washington) build a chair: one of many woodworking projects he's collaborated on with kids.



continues on page 40 ...

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“Looking Good”



Lowell Zercher, left, helps blind Alaskan woodworker Jerry Eastham find a starting position on the lathe.



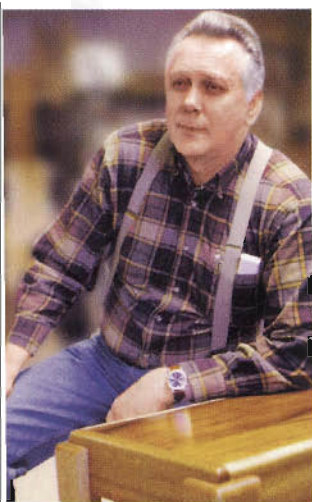
photos by Robert DeBerry

Blind Woodworkers

Jerry Eastham walked his fingers across the wood, checking for dents and rough patches in the grain. His eyes slightly closed, he stopped at one point midway on one edge. “Here’s a little nick,” he told Lowell Zercher, his manual skills instructor. Time to get out the iron and steam out the dent.

“Looks good, Jerry,” said shop-mate Larry Meader as he pulled himself onto a stool in the shop.

“That’s what they tell me.” Those in the room laugh. Just a little blind humor between friends, they say.



Jerry called his first project a “crab table” because the legs attach outside the tabletop instead of underneath.

Three years ago, Eastham could have told you himself that his table, made of mahogany and koa, looked good. But on Aug. 3, 2001, he woke up and couldn’t see a thing. Sudden, yes. But he wasn’t surprised.

Eastham has Doyme honeycomb retinal dystrophy, a genetic disease that essentially eats away holes in the retina. Eventually, the holes move their way into the line of sight, and the person is blind.

“Imagine a jigsaw puzzle where you take pieces out of it here and there: that’s what I see,” he said. “Each eye is different, so it gets all messed up and confused. My brain doesn’t comprehend what it sees.”

The Alaska Center for the Blind and Visually Impaired is a private nonprofit organization to help people like Jerry adjust to a new life and rebuild self-confidence. “People assume you can’t do something because you can’t see,” said Jim King, the center’s executive director.

One way they build confidence is through the woodshop. While the idea is not to turn out master woodworkers, one might be surprised by the beauty — as well as the blue ribbons — that result from the work.

The multi-colored wooden bowls made at the shop by blind and visually impaired clients have raked in blue ribbons at the Alaska State Fair, sweeping a couple of the wood categories.

Jerry planned to enter his table in Anchorage’s winter carnival, then present the work to his daughter. He chose the project because he wanted to build something simple for his first go-around at woodworking. The table’s legs are V-shaped and tapered from top to bottom. The legs and apron are made of koa, and the top is well-patterned mahogany plywood. After fixing the legs to the outside corners, Jerry rubbed on finishing oil to bring his creation to a beautiful shine.

Jerry’s son, an engineer, is working on the design for his next project. All he’ll say so far is that it’s going to be round.

Jerry had to work up his confidence to try out the lathe. “I wouldn’t get on the lathe for a long time,” he said. “I like my hands too much. But I’m gonna try it.”

— Melissa Campbell



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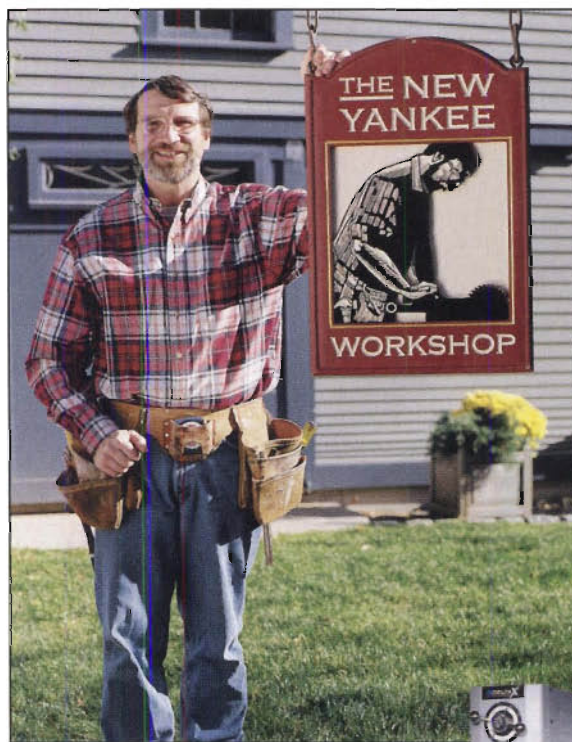
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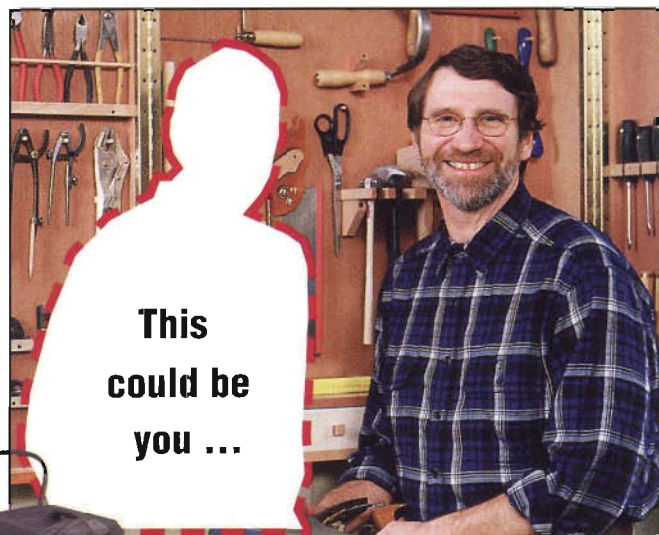
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WOODWORKER'S JOURNAL

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Official Rules. No purchase necessary. Purchase will not improve your chances of winning. Names automatically entered with receipt of one of the entry forms described above. You can also enter by printing your name, address and phone number on a postcard. Send to: WOODWORKER'S JOURNAL WIN NORM'S SHOP Sweepstakes, 4365 Willow Drive, Medina MN, 55340. One entry per household. Entries must be postmarked by 12/31/04. No responsibility is assumed for lost, late, incomplete, illegible or misdirected entries. The Sweepstakes is open to all legal residents of the United States 18 years of age or older at time of entry. Winner will be selected in a random drawing and will be notified within 30 days from deadline and may be required to complete an affidavit of eligibility and release, allowing Woodworker's Journal to use the winner's name for publicity, except where prohibited. Prize winners must respond within 15 days of notification or the prize will be forfeited and an alternate winner selected. All decisions are final. All prizes will be awarded. No duplicate prizes and no substitutions other than as necessary due to availability. Prizes may not be redeemed for cash or other consideration. Taxes are the responsibility of the winner. Odds of winning dependent on total entries received. The combined value of prizes is \$21,500. Sweepstakes open to residents of the U.S. only. All federal, state and local laws and regulations apply. Void where prohibited or restricted by law. Employees (and their families) of Rockler Companies Inc., Della International Machinery Corp., Porter-Cable, WGBH and their affiliates are not eligible. For winner's name, send a self-addressed, stamped envelope to WOODWORKER'S JOURNAL Norm's Shop Winner, 4365 Willow Drive, Medina MN 55340 by March 01, 2005.

Making Tapered Legs on a Jointer

By Linda Haus

The first time I saw someone setting up to taper legs on a jointer, I was amazed. I felt like I was watching a car race: I didn't really want to see them lose a finger (crash a car), but the apparent danger absolutely held my attention. When the task was done, it became clear that, not only was the technique safe, but it let you do things you just can't do when forming legs on a band saw or table saw tapering jig.

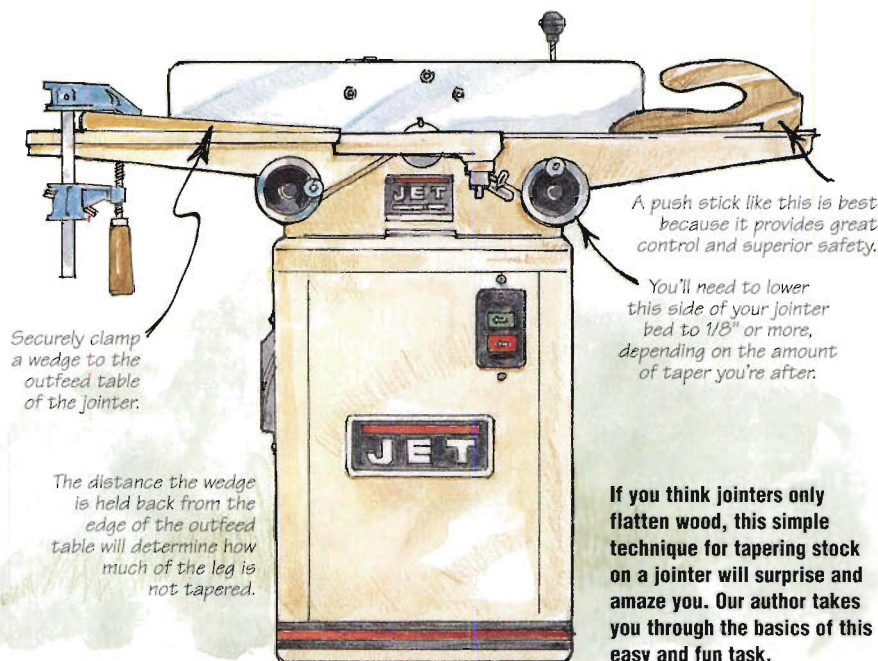


A piece of 2 X 4 is the perfect choice for a wedge. Be sure to leave the leading edge of the wedge about 1/16" thick.

The key to the technique is a wooden wedge clamped to the outfeed table of the jointer. The wedge becomes a ramp for the leg to climb as the cutterhead shapes the face of the stock. The leading edge of the leg forms the geometry of the cut as it climbs the wedge and the forward edge of the infeed table: the leg stock gets dragged through the cutter in a gentle arc and provides the unique style of a jointer-tapered leg.

Four Tapering Variables

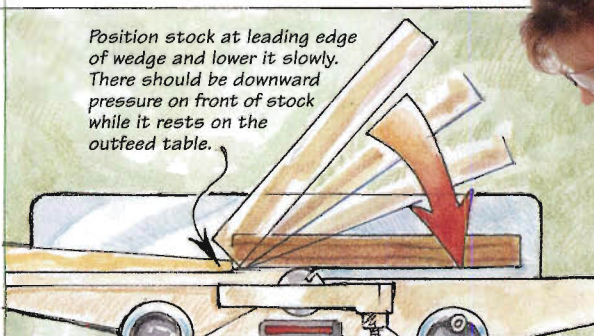
The taper of the leg is affected by four variables. First; the incline of the wedge: the steeper the incline, the more acute the taper. Second; how close to the front edge of the outfeed table the wedge is clamped:



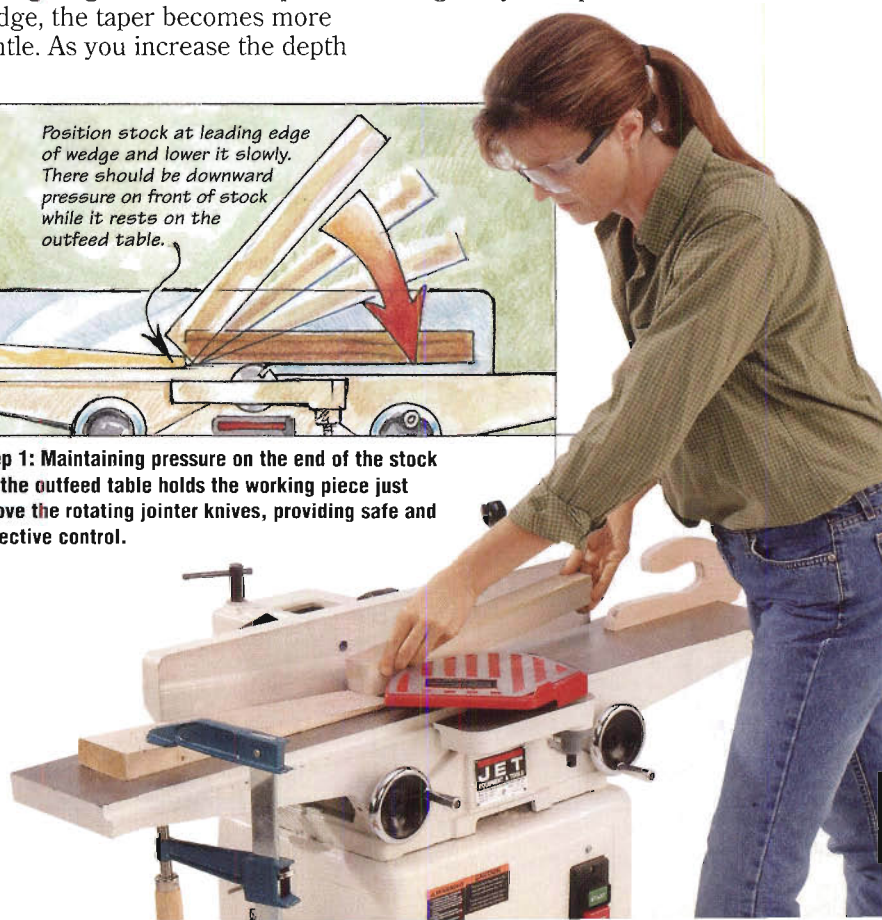
the spacing sets the flat (or apron) area. Third and Fourth, the length of the leg and depth of cut set by the infeed table: as you increase the leg length in relationship to the wedge, the taper becomes more gentle. As you increase the depth

of cut, the taper becomes more acute or pronounced.

A shop-made plywood push stick is a must from my point of view. It gives you superior control and



Step 1: Maintaining pressure on the end of the stock on the outfeed table holds the working piece just above the rotating jointer knives, providing safe and effective control.



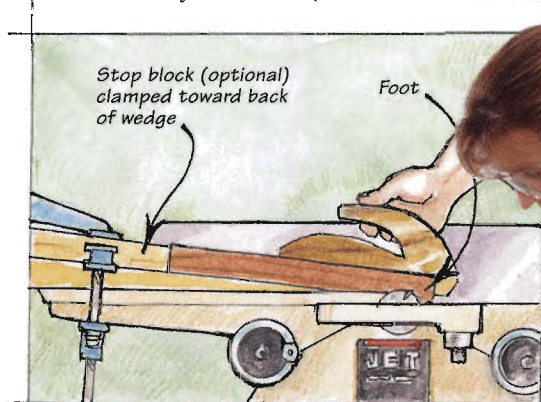
completely protects your pushing hand as you move the stock across the cutter (no crashes!). Your lead hand is always held past the cutter, as shown in the photos and illustrations below. The whole operation is also done with the guard in place, for additional safety. (Jointers, like all power tools, are inherently dangerous. Use common sense and protective gear.)

After the wedge is made and clamped in place, the cutting process is simple. Place the "top end" of the prepared stock (cut to length and surfaced exactly square) onto the outfeed table and bump it gently against the end of the wedge and tight to the jointer fence. Hold it in place with your left hand (with gentle downward pressure) as you grab the push stick and hook it onto the other end of the leg. Rotate the infeed end of the leg toward the table, and when you make contact, move it slowly forward. (The front

end of the leg will lift and start riding the incline.) Because you've lowered the infeed table by 1/8" or more, you won't really start cutting until you're near the end of the leg on the first cuts. If you are tapering more than one face of the leg, spin the leg and repeat the cut. (For symmetrical tapers, you need to duplicate the same number of cuts per face.) Repeat the process until you're pleased with the taper. If you are leaving a little foot on the bottom of the leg, you'll need to incorporate a stop block on the wedge after the first or second pass on the each face of the leg.

You can make a variety of leg shapes and styles using this basic setup. One real benefit to tapering your legs on the jointer is, if your knives are sharp, sanding is held to a minimum.

Easily tapered legs and virtually no sanding ... simply amazing!



Step 2: Using your push stick, first lower your stock down to the level of the infeed table and then push it up the ramp. You can clamp a stop block to the back of your ramp to create a foot on your leg.



Variations On a Tapered Theme

You can create several variations of the typical four-sided tapered leg on your jointer. For instance, you can make them with or without a foot. You can taper two adjacent faces (with or without a foot). You can start the taper high or low ... you get the idea. Here are four possible legs made from stock of the same length and thickness.



This leg is tapered on all four sides and has no foot. It requires several passes and a depth of cut setting of about 3/16".

This leg is tapered on four sides but ends with a foot. You create the foot by clamping a stop block in place after you've made the first few passes across the jointer.



This is a two-sided taper without a foot. It's very basic, but appropriate in many situations.

It is possible to mix and match as you design your legs. Here is a two-sided taper with a foot. The back corner was chamfered to present a more delicate shape.



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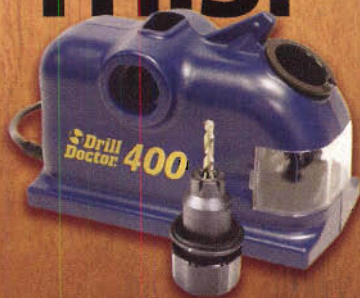
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What's This?



Take a fly at identifying these tools from **Shari Heinze's** grandfather's shop. A hint: **Shari** (of **Montrose, Minnesota**) says there's more in the set. Know what they are? Send in your answer for a chance to win a prize!

If you have your own woodworking mystery tool (or the answer to this issue's entry), send it to Stumpers, c/o Woodworker's Journal, P.O. Box 261, Medina, Minnesota 55340. Or send us an e-mail: jtakes@woodworkersjournal.com

Sounding Off

Tin Ear, But Good Eye

When I made violins, I used [the October 2003 "Stumpers" mystery] tool to set the peg that sits inside. The little wooden dowel is an intricate part of the soundboard, and you can really make a violin change its tones, etc. by just moving the peg. Set the wooden dowel peg in the wrong spot, and you have a crummy sounding instrument. Set it in the right spot, and it might sound like a million dollars.

It takes a better ear than I have to know exactly where it goes. I left that up to people who could hear much better than I could.

*Kevin Cradic
Leavenworth, Kansas*

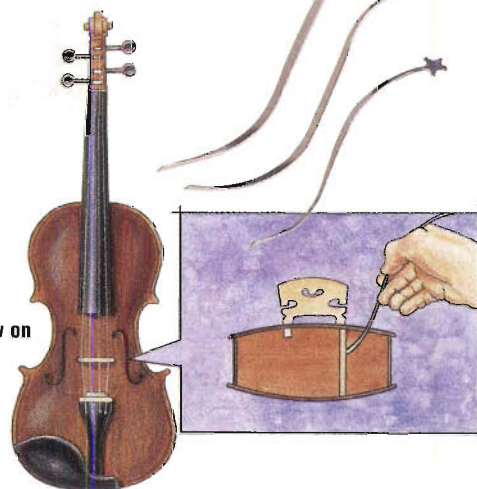
A Challenging Process

Kevin's ears might be bad, but he has a good eye. **Tom Gist** of Dayton, Ohio, guessed correctly that luthier-trained **Rob Johnstone** "plays or repairs classical stringed instruments, because what he contributed is a set of soundpost setters."

"They come in different sizes for different instruments," says **Dennis Morris** of Evanston, Illinois. "The handheld one in the picture looks like it's the right size for a violin."

How does it work? "The sharp end holds the post for insertion through the sound hole, and the star-shaped end is a 'push/pull' to set the soundpost in an upright position between the

Kevin Miller of Saline, Michigan, drew on his knowledge of soundpost setters solve our mystery.



soundboard and the back of the instrument, or to move the post to another location," explains **Roger Templin** of Calera, Alabama.

This process, says **Ed Roberts** of Clemmons, North Carolina, "can be quite challenging, especially since it must be done while peering through the small endbutton hole at the violin's base. It's best to spend a few extra bucks and buy the soundpost retriever to help recover the soundpost when it keeps falling off the end of the setter. It's almost like playing the child's game 'Operation' with the lights off."

Paul R. Joines of South Ogden, Utah, also notes that

"the post is prone to falling over as it is only the tight fit between two compound sloping sides and the exact cutting of the feet that hold it upright."

Another challenge? **Susan Firor** of LaGrande, Oregon, says there's "a companion tool that looks like a mutant pair of pliers. However, most people prefer the tool you have pictured because it's awfully easy to bugger up the f-hole using the pliers." Perhaps that's why **Keith Keller** of Maple Grove, Minnesota, says more current soundpost setters "have a protective sleeve so the f-hole doesn't get damaged while inserting the soundpost."

Of course, **Bob Parshall** of Davis, Illinois, says he remembers his music teacher mother "using a really exasperating method: looping string around upper and lower ends of a fallen soundpost and trying to drag it into place!" — *Joanna Werch Takes*



Jim Best of Mount Airy, North Carolina, says setting a soundpost is "easy as pie ... to watch."



WINNER! **James Roscher** of Hockley, Texas wins a **Delta ShopMaster Triangle Air Cleaner and Work Light**. We toss all the Stumpers letters into a hat to select a winner.

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Traditional Tusk Tenon Joint

Wedge — how big?
What angle of slope?

Tusk tenon

"Pull-up" space as
wedge is tightened.

How long?

Shoulder which
resists the
wedge

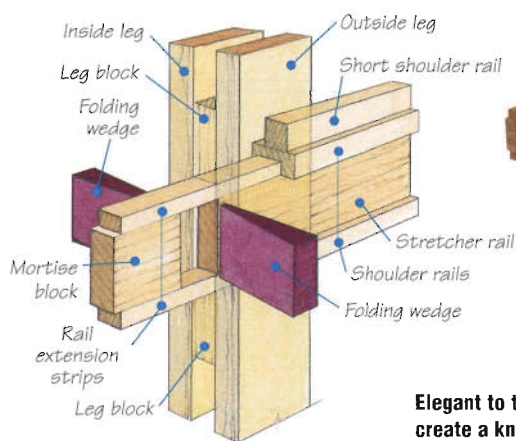
Lines of
shear stress

Parts and design considerations for making a traditional tusk tenon joint with vertical wedge

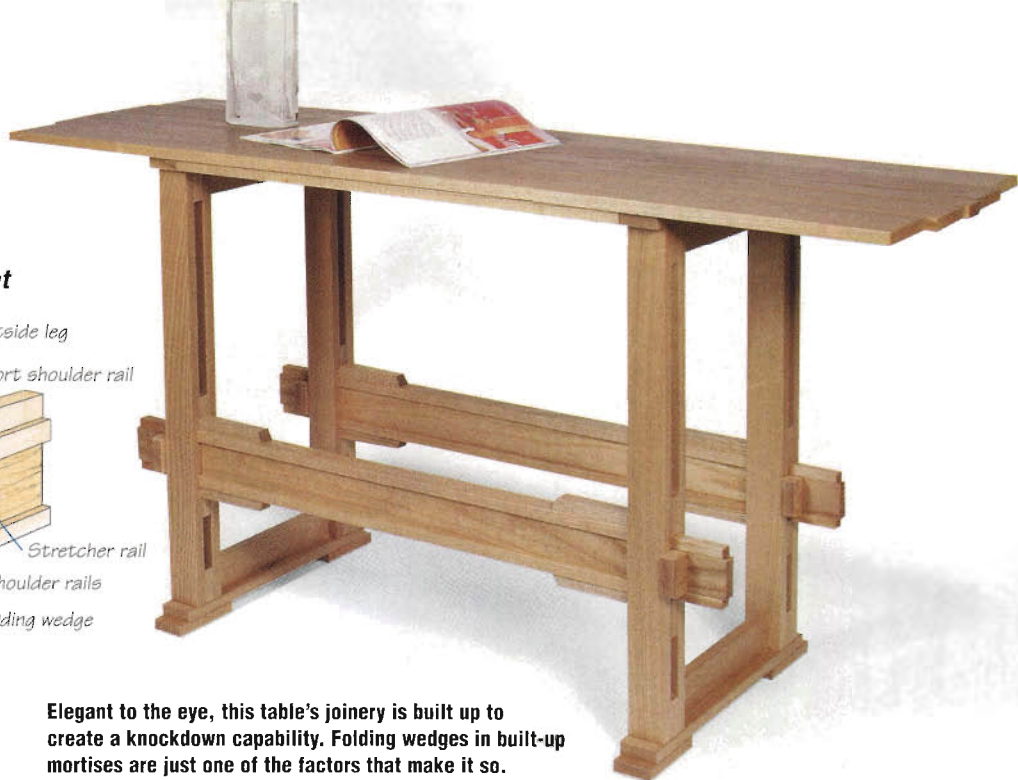
By Ian Kirby

Harness the power of folding wedges by building this elegant tusk tenon table using stock material and joinery done by adding pieces rather than cutting out material.

Folding Wedges Joint



Elegant to the eye, this table's joinery is built up to create a knockdown capability. Folding wedges in built-up mortises are just one of the factors that make it so.



A tusk tenon is a through tenon made so that it projects way beyond the mortise. A wedge is fitted into the projection which, when driven hard, pulls the shoulder of the tenon tightly and firmly to the mortise piece.

The Mechanics of a Tusk Tenon

The joint can be designed in a variety of ways, but no matter the variation, a successful joint requires several characteristics common to all.

The Shoulders — I'll begin with the shoulders on the tenon piece which form the dead stop that the wedge is pulling against.

You could make the shoulders on the sides and edges of the tenon as you would for a normal glued-up tenon. However, the resistance to stress comes largely from the two outer edges (top and bottom) of the rail and less from the shoulders on the sides of the rail which would normally form the joint line. Indeed, on many tusk tenons you will find that there are no shoulders on the sides of the tenon. And there is no virtue in the tenon being a tight fit in its mortise as you would expect in a glued-up joint. In fact, the fit can be quite sloppy and still work well. I aim for a comfortable sliding fit.

The ratio/relationship between the tenon and rail width is something you have to design, but the wedge and its mortise play a part in your decision.

The Wedge — The wedge is generally made straight on one edge and tapered on the other edge. The slope of the taper is critical. If it's too steep, the wedge will drive OK but will pop out when the assembly is racked — that is, unless it's been crushed by being driven too hard. If the slope is too slight, it will pull up the shoulders very tightly, but it takes too long a wedge to close them. I've found that a slope of 12° works well.

The Mortise for the Wedge — The outer end wall of the mortise must have exactly the same slope as the wedge. The inner end wall of the mortise must be inboard of the face of the upright leg or stile. Unless the mortise is "oversized," the wedge cannot bear against the upright and pull the shoulders tight. (See the *Traditional Tusk Tenon Joint Drawing*, page 50.) This also means that the wedge must be sufficiently beefy to withstand bending as it crosses the void. And it must be sufficiently long so that there is plenty of wedge above and below the void.

The Sheer Load on the Tusk —

As the wedge is driven, the shoulders pull up tight. The counter stress is transferred to the extra length of the tenon, the tusk. If the tusk is too short, the wood which is buttressing the wedge will break out. So another part of your design consideration is how long should the tenon be to prevent such a collapse. Factors include the species of wood and whether you orient the wedge up-and-down or side-to-side. For example, what would be good for elm, a resistant splitter, would not be good for quartersawn oak.

This joint design was common on early furniture. It's probably the more difficult design to make and the bigger the parts, the greater the difficulty on two counts. First, you have to chop out the narrow tenon for the wedge and, second, you have to get the slope of the end of the narrow tenon to be exactly the same as the slope on the wedge.

A simpler tusk tenon variation, and the one used to assemble the table featured here, is to make a rectangular hole and use two identical wedges, called folding wedges, as shown in the *Folding Wedges Joint Drawing* above.

Designed for Simplicity

I designed the underframe of this table so that it was very simple to make while looking like a sophisticated piece of joinery.

Two characteristics make it different from more traditional structures. First, most of the parts are made from material that is the



Figure 1. To accurately position the shoulder rails on the cap rails, mark their centers with a marking gauge.

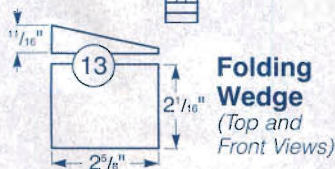
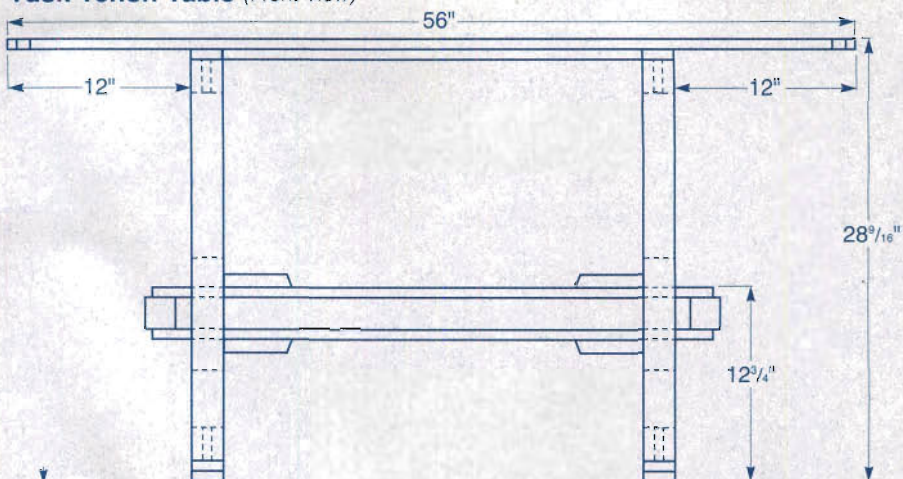


Figure 2. Clamp, drill, and screw the parts together dry to assist with positioning them once the glue is applied.

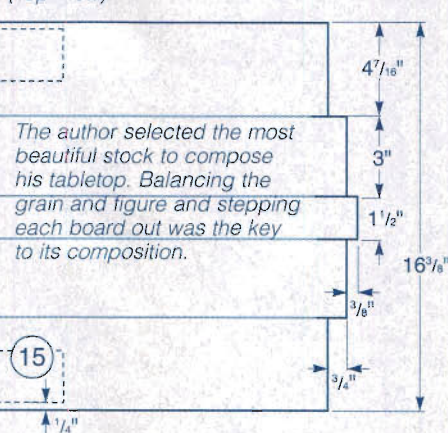
same width and thickness. So you begin with about 50 feet of wood, all milled to dimension, which you then cut up into precise lengths. Second, the cut-up pieces are glued together aided by screws or staples. Even the holes for the wedges are made by surrounding a rectangular space with wood instead of starting with a solid piece of wood and chopping out the square space. In summary, the “joinery” is done by cutting parts to length and putting them together.

I designed the legs to be square once all three elements are put together, so if you decided to use 3/4" thick materials, then the width would be three times that — 2 1/4".

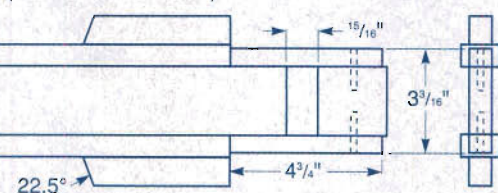
Tusk Tenon Table (Front View)



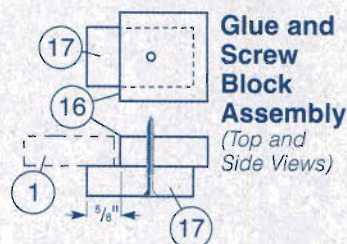
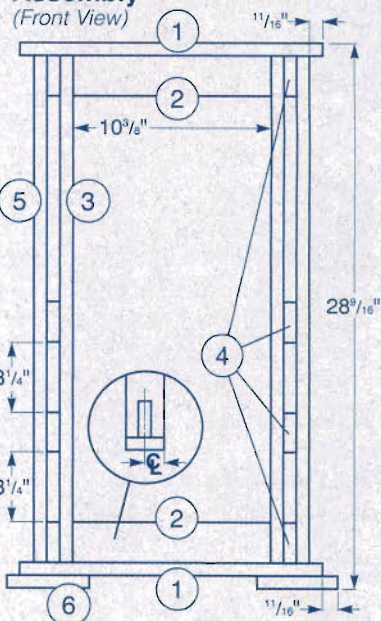
Top Board Layout (Top View)



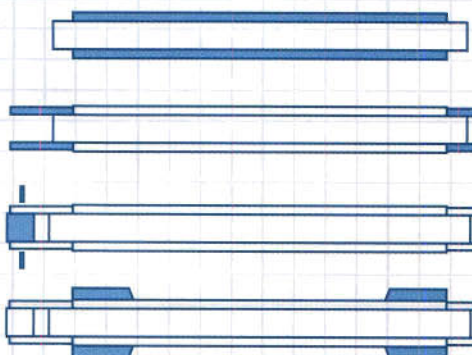
Rail Subassembly (Front and End Views)



End Frame Assembly (Front View)



Four Steps to Making the Rail Assembly



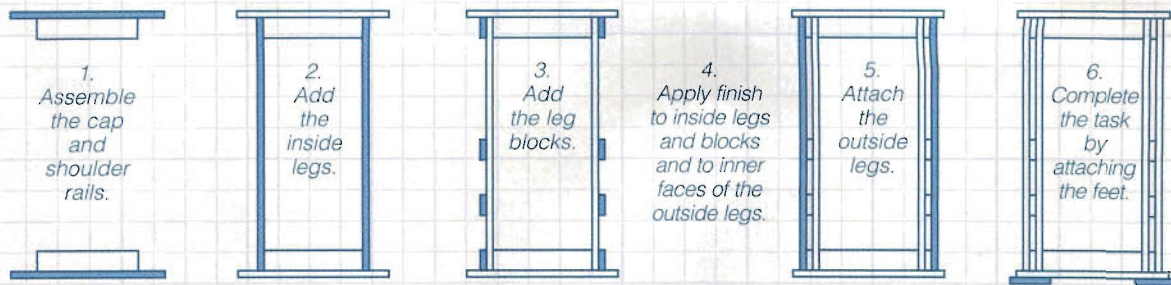
1. Attach shoulder rails to the stretcher rail.

2. Add the rail extension strips.

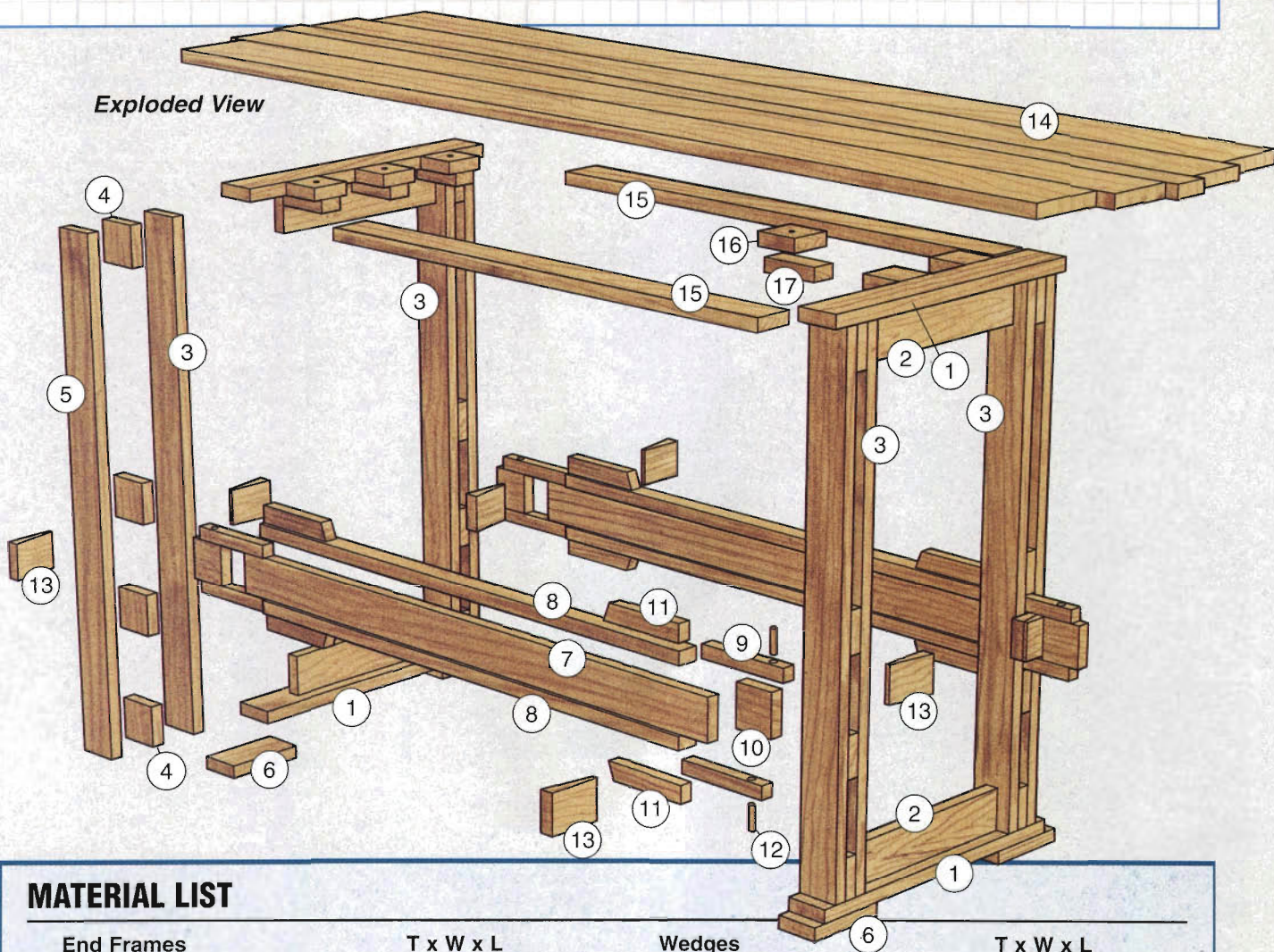
3. Use dowels to join the mortise blocks to the subassembly.

4. Mount the short shoulder rails last.

Six Steps to Making the End Frames



Exploded View



MATERIAL LIST

End Frames	T x W x L
1 Cap Rails (4)	11/16" x 2 1/16" x 15 7/8"
2 Shoulder Rails (4)	11/16" x 2 1/16" x 10 3/8"
3 Inside Legs (4)	11/16" x 2 1/16" x 26 1/2"
4 Leg Blocks (16)	11/16" x 2 1/16" x 2 1/16"
5 Outside Legs (4)	11/16" x 2 1/16" x 26 1/2"
6 Foot Pieces (4)	4 1/4" x 1 1/16" x 2 1/16"
Rails	T x W x L
7 Stretcher Rails (2)	11/16" x 2 1/16" x 31 3/4"
8 Shoulder Rails (4)	11/16" x 1 3/16" x 27 3/4"
9 Rail Extension Strips (8)	9/16" x 11/16" x 4 3/4"
10 Mortise Blocks (4)	11/16" x 2 1/16" x 2"
11 Short Shoulder Rails ¹ (8)	11/16" x 7/8" x 4 1/2"
12 Dowels (16)	1/4" Dia. x 1 1/2"

Wedges	T x W x L
13 Wedge Blocks ² (8)	11/16" x 2 1/16" x 2 5/8"
Top Boards	T x W x L
14 Top Boards (5)	11/16" x varies x 60"
15 Thickener Rails (2)	11/16" x 2 1/16" x 27 3/4"
16 Glue Blocks (6)	11/16" x 2 1/16" x 2 1/16"
17 Screw Blocks (6)	11/16" x 1 3/8" x 2 1/2"
Spacer Blocks	T x W x L
18 Leg Block Spacer ³ (1)	11/16" x 2 1/16" x 3 1/4"
19 Mortise Block Spacer ⁴ (1)	15/16" x 15/16" x 2"

¹End angle is 22.5°

²Cut in wedge jig

³To position leg blocks

⁴To position mortise block

Figure 3. Clamp the shoulders tight to the cap and shoulder rail assembly with the inside legs in place.



For this side table, which could serve very well as a sofa table, I wanted a slimmer look, so I milled the stock to 11/16" thick and 2 5/8" wide. I've no doubt that 1/2" x 1 1/2" material would look most elegant on the right piece. In other words, the dimensions of the stock give you a lot of design flexibility.

Species

The species you choose also plays a big role in the feel that the finished piece projects. For instance, you could use 3/4" thick pine which had its fair share of knots and bruises to produce a rustic-looking piece. I chose to use flat-sawn sassafras that looks a lot like chestnut and has a very basic wood color and appearance. No matter what your wood or dimension, begin with enough of it



Short History of a Tusk Tenon



This massive chest with its lift-up lid is made of six pieces of wood held together by six tusk tenons. Despite the wear and tear of the ages, it remains a functioning, practical piece of furniture.

Like most woodworking joints, the ancestry of the tusk tenon spans millennia and cultures around the world. We find it used to hold frames together to make beds and tables, and we find it used to hold boards together to make storage boxes. There is nothing standard about the dimensions of the tenon nor the dimensions of the wedge — they come in all manner of

shapes and sizes. Because it can be made in so many different ways and can be used on such a variety of items, it's probably the most versatile of our joint repertoire. As well, it can be used as a temporary joint or a permanent one, and all without the use of glue.

This chest comes from the province of Noorestan in Afghanistan. It belongs to my friend and next-door neighbor,

Prince Ali Seraj. It's believed to be about five hundred years old, and it's a perfect example of a large slab structure held together by six tusk tenons.

The ends are two inches thick. Their faces were refined using an adze, and the edges are chip carved with an intricate cross ribbon pattern. The lift-up lid has a hinge pivot which gets trapped in its hole as the ends are wedged in place. To make the pivot, about two inches of the ends have been cut away on the top board to leave a peg, which is modeled into a cylinder. The four slabs that make up the case are decorated with fine line carving on every show face.

What I find most interesting are the wedges. They go through the thickness of the tenon — the simplest solution — but for the job they have to do, to my mind, they are very thin.

Made to look a bit like a metal spike, the visible wear attests to their having been driven in and removed on many occasions. They all appear to be original, and their survival is a good



Figure 4. Screw through the cap rail into the end grain of the inside leg. Screws are angled towards one another for extra strength.



Honest, functional and portable. In less than a minute you could remove the wedges, part the pieces and pack them on the four-legged transport of your choice.

example of how little we know and respond to the engineering qualities of this material which we fool ourselves into thinking we have mastered.

The artisans of Noorestan are believed to be some of the remnants of the army of Alexander the Great that trekked through that region. Until about 1890, their land was called Kafistan — land of the unbeliever. At that time, they were converted to Islam and had a name change. They remain makers of furniture and other domestic goods to the nation.

milled to the same thickness and width. Overall, you will need 55' to 60' max. You'll have very little waste if you cut the long pieces first and pick the best looking stuff for these parts.

Cutting to Length and Plane

Step 1: Chop the parts to length. Whether you use a chop saw or a table saw, you must use some sort of end stop in order to get equal length parts exact.

Step 2: I remove mill marks by planing. You can't do this after assembly, so do it now. Use a sharp plane, set fine, and count the same number of passes on each piece — it takes about three. Don't plane the leg spacer blocks, because their slight extra thickness lets the rail enter between them.

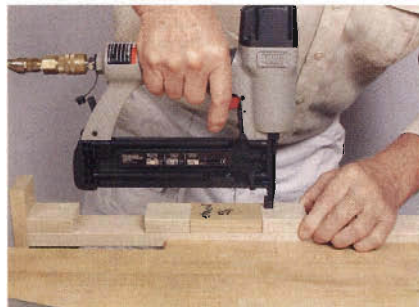


Figure 5. Glue leg blocks, avoiding squeeze-out, then screw or staple into place. Position center leg blocks using the 3/4" spacer.

Step 3: Machine some form of edge treatment. The square edge is too sharp, and the slightest misalignment of the parts looks bad. A chamfer or a radius solves the problem. I chose a 45° chamfer done on a router table. It's less than 1/16" across the flat, and it's on all exposed edges.

Joining the End Frames

Step 4: Join the cap rail to the shoulder rail. The shoulder rail is centered in both length and width. Mark the center on both pieces with a marking gauge. (See *Figure 1* on page 52) The cross grain line on the cap rail is marked from the end of the rail using a sliding head try square set to 2 3/4" (2 1/16" leg and

11/16" overhang.) Clamp the two parts together dry, drill and counter-sink the holes for two 1 1/8" screws. Drive the screws dry and remove them. (See *Figure 2*.) Roll glue onto the edge of the shoulder rail. Limit

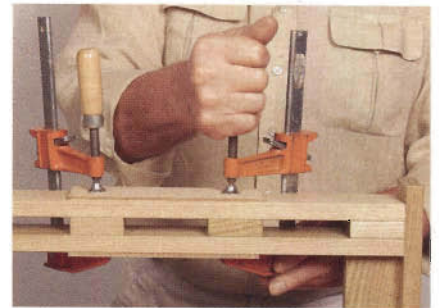


Figure 6. Glue and clamp the outer leg to the leg blocks.

the glue so there is practically no squeeze-out. Put the parts back together using the already located screw holes and they will center in the correct place. Clean up any glue squeeze-out from here on as you go.

Step 5: Attach the inside legs. Clamp the frame of the leg and cap rail assembly together so the shoulders are tight. (See *Figure 3*.) Screw through the cap rail into the end grain of the leg. I used two 1 1/8" screws angled together. (See *Figure 4*.) Remove the clamps and screw through the inside leg into the end grain of the shoulder rail.



Figure 7. Glue and clamp outer legs to the leg blocks, then screw them through the cap rail.

Step 6: Glue in the leg blocks. There are four blocks to each leg. Two go tight to the corners and two are positioned 3/4" apart by the leg block spacer. (See *Figure 5*.) The aim is to have no glue squeeze-out. For this small area, I find a roller is

uncontrollable. Instead, paddle a small circle onto each surface, then press the leg block in place — you can lift it off to assess the spread. Align the leg block with a straightedge, then screw or staple it in place. Screws will hold the leg block in place and clamp it as well. A staple will hold the leg block in position but give marginal clamping. If you use staples, clamp the corner leg blocks using a bar clamp and the center leg blocks with a C-clamp.

Step 7: Put the finish on the inside of the legs. I used a sealer coat of a drying oil followed by beeswax. Mark the outside leg at the glue areas and keep finish off all faces that will be glued.

Step 8: Attach the outer legs as shown in *Figure 6*. Glue the blocks and the legs and clamp in place much the same as in Step 6. Clamp the end blocks with a bar clamp and put two screws through the cap rail into the end grain of the outer leg. (See *Figure 7*.)

Step 9: Attach the foot pieces. Position each piece with an 11/16" overhang and screw into place. (See *Figure 8*.)

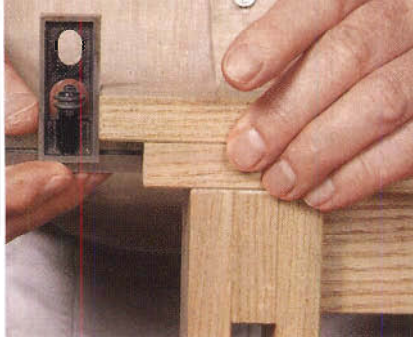


Figure 8. Position the overhang of the foot piece using a sliding head square, then screw into place.

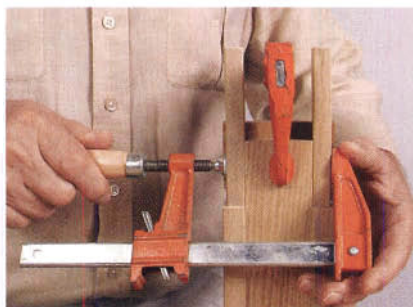


Figure 9. Position, glue and clamp rail extension strips with the aid of an alignment block.

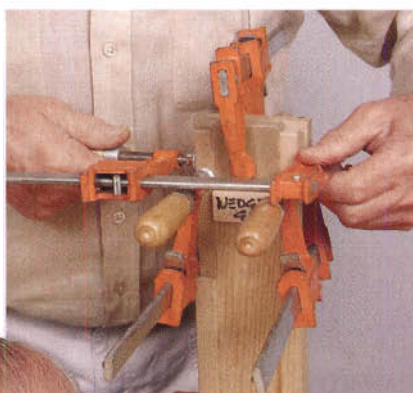


Figure 10. Position, clamp and glue the mortise block between the rail extension strips with the aid of an alignment block (at rear) and a wedge spacer strip.

Figure 11. Position the first shoulder rail on the stretcher rail with a screw at each end, then glue and clamp in place.

Figure 12 (right). Position the second shoulder rail with the aid of a block clamped tight and square to the first shoulder rail.

Joining the Rails

Step 10: Attach the shoulder rails to the stretcher rail. Mark centers on both parts using your marking gauge. Score a line 2" from the end. The shoulder rail should fit between the marks and leave a 1/16" pull-up space in the mortise so that the wedges can work. To attach the shoulder rails one at a time, begin by clamping one in place dry and put in screws about 2" from each end. (See *Figure 11*.) Remove the screws and roll a conservative layer of glue on the edge of the stretcher rail. Screw the two parts back together, which should retain your centers and clamp the middle area. To position the second shoulder rail, clamp an alignment block square to the first shoulder tail at each end. (See *Figure 12*.) Position the second shoulder rail. Dry screw and glue as you did for the first one.

Step 11: Attach the rail extension strips. (See *Figure 9*.) Clamp the same alignment block as you used in Step 10 to the end of the stretcher rail. Glue the extension strips, align and clamp them.

Step 12: Attach the mortise blocks. Clamp the alignment block to the extension strips and trap the wedge gap block in place with it. (See *Figure 10*.) Put glue on the mating contact faces of the extension strips and the mortise block. Clamp in place.

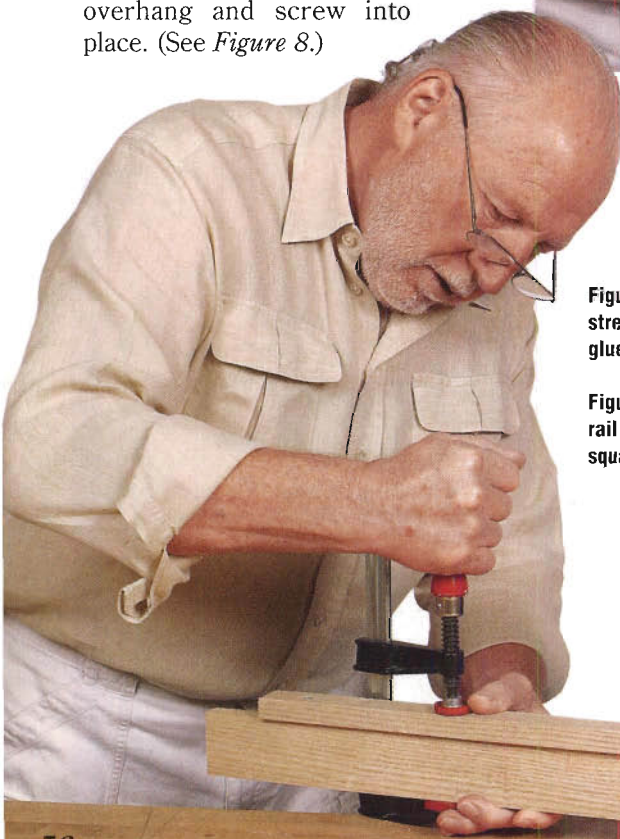


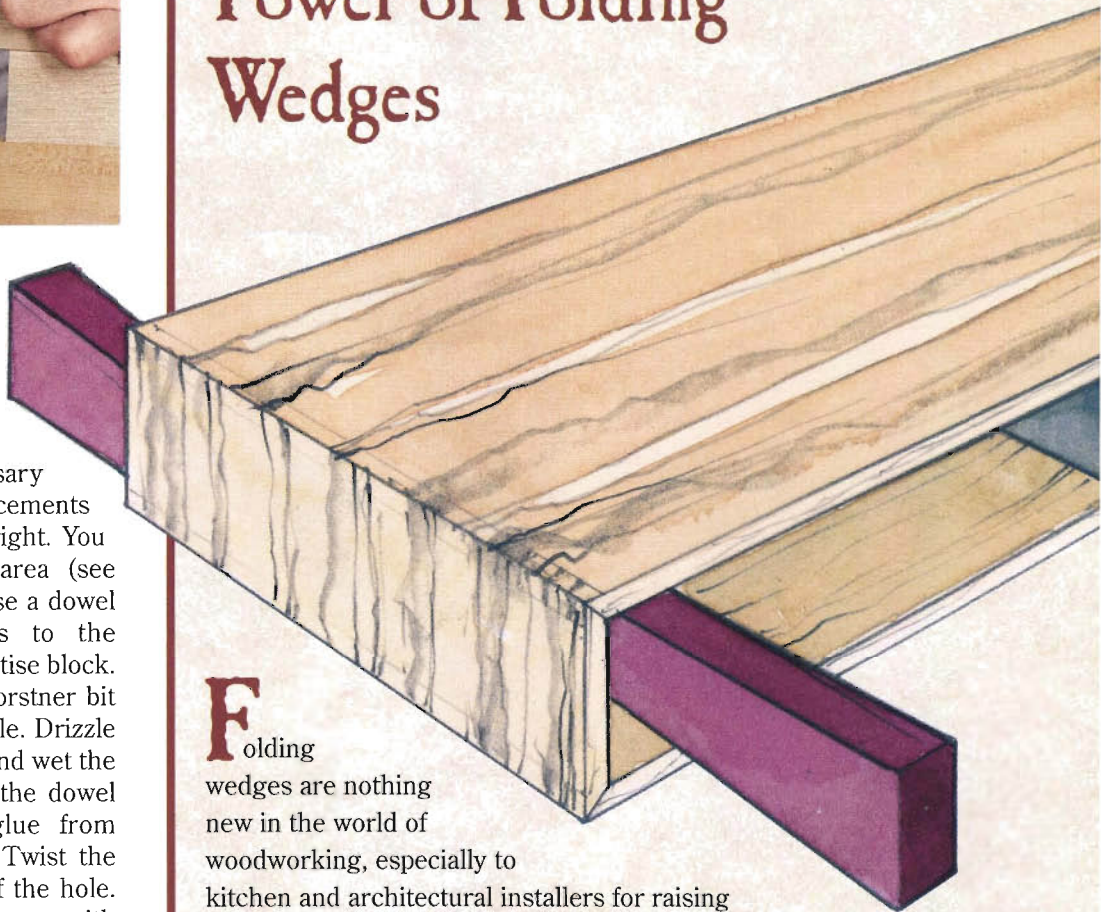


Figure 13. Saw off the excess length of dowel before cleaning flush with a chisel.

Step 13: Peg the extension strips. I have no laboratory or field tests to prove how necessary or effective these reinforcements might be, but they feel right. You can staple the hidden area (see Figure 14), or you can use a dowel to peg the extensions to the stretcher rail and the mortise block. It's important to use a Forstner bit to make the 1 1/4" deep hole. Drizzle some glue into the hole and wet the end of the dowel. Push the dowel home hard to force glue from the bottom of the hole. Twist the dowel to wet the walls of the hole. Saw off the dowel and clean up with a chisel. (See Figure 13.)

Step 14: Attach the short shoulder rails. Attach one and let it cure before you do the second. (See Figure 15.) Paddle a mean amount of glue on the short shoulder rail. Hold the stretcher rail in the vise, press the short rail in place and rub it about 1/2" up and down to spread the glue and wet both faces. Pull it off and add dabs of glue where needed. Rub it into place again and position it using a straightedge — taken from a try square. Center it by eye. Clamp it and check the shoulder again.

A Tale about the Inspired Power of Folding Wedges



Folding wedges are nothing new in the world of woodworking, especially to kitchen and architectural installers for raising and levelling cabinets.

I well remember a colleague during my student years who was making a writing table that was a solid case about 45" long, 18" wide and 4" deep, joined by secret mitered dovetails at all corners. The case was to be mounted on a typical four-legged base with stretcher rails.

In his enthusiasm to check the fit of the dovetails, he hammered them all home. They were perfect — and tight! How to disassemble the case now became a nightmare, because it was impossible to get into a 4" space with a hammer and block to part the joints. We pondered the problem to no avail. The ever-present tutor, after chuckling over the dilemma and our inability to solve it, provided the "obvious" solution: folding wedges.

Making the Wedges

The wedges are made using a jig and a chop saw. The wedge blocks are made from the $2\frac{1}{16}$ " wide stock cut to $2\frac{5}{8}$ " long. You need two of these blocks to make the jig. I used some $\frac{1}{2}$ " maple plywood and cut four strips $2"$ x $12"$. The strips are stapled or screwed to the blocks, which are set square $11/16"$ from the ends. The chop saw is set to an angle of 12° . The box is positioned so that the cut will leave a full $11/16"$ thickness at one end and a full $1/8"$ flat at the other. It's important to clamp the wedge box securely to the fence and the bed of the chop saw. (See *Figure 19.*) The wedge blocks fit tightly into the end pocket of the jig. Once you've made the first cut, you understand why the box is made with exposed corners. To remove the wedge, I pry carefully, first with the blade of the knife, followed by a screwdriver. (See *Figure 18.*) The wedges are chamfered on the exposed edges and ends. (See *Figure 16.*)

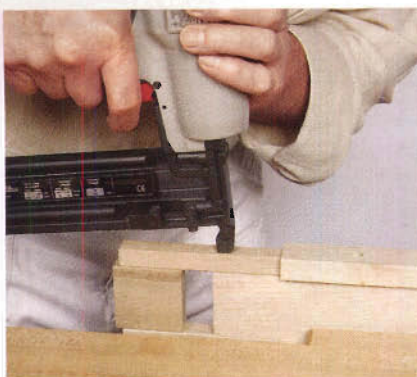


Figure 14. The hidden parts of the joint can be reinforced with staples. A dowel is better.

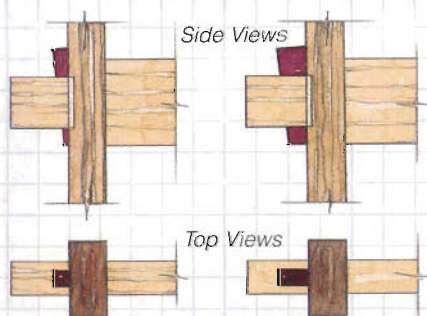


Figure 15. Glue and clamp the short shoulder rail flush to the shoulder rail.

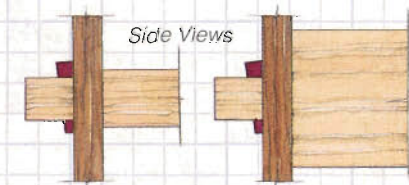
Making and Attaching the Top

The overall dimensions of the top are $56"$ x $16\frac{3}{8}"$ x $11/16"$. I wanted the drama of the $12"$ long end overhang and the minimal $1/4"$ edge overhang in order to let the base be as visible as possible. The top dimensions also make for an elegant rectangle.

We all have to compose tops from the boards at hand. I had three whose grain went together the best but were too narrow by an inch. The solution was to split the center piece and insert the $1\frac{1}{2}"$ strip. To make some visual connect with the step and shadow effect of the rail and tenon, I stepped the end of the boards. To help make the different grain patterns come together better and to elongate the look of the top while keeping in step with the edge detail on the base, I chamfered the top boards all round.



The wedge on the left is too narrow: it will bend into the pull-up space — or break. The wedge on the right is sized correctly.



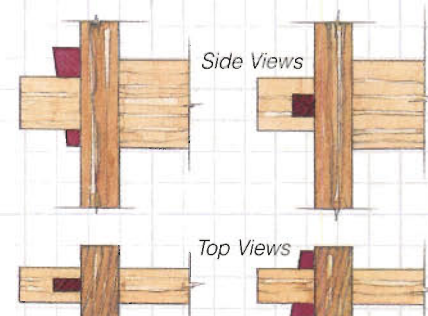
Two identical joints, but the wider shoulders of the one on the right make it stronger because of triangulation.

Joint Variations

In the "History of the Tusk Tenon" sidebar, I noted that the joint is used to hold together all manner of furniture forms, but there is nothing standard about its design details. You can design it any way you want, provided the wedge pulls up the shoulders and stays tight.

Vertical Wedge

In the traditional version of the joint, you can vary the shape and dimensions of the parts, but the wedge must be made wide enough so that it won't bend or break in the "pull-up" space of wedge hole.



The horizontal wedge on the right is easier to make as there is less wood to cut through. The vertical wedge on the left is more difficult to form.

Horizontal Wedge

To avoid the complication of making a deep narrow hole for the vertical wedge, you can make the wedge go horizontal. It works equally well, and it adds a more "locked-up" appearance to the joint.

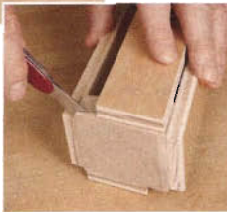


Figure 16. All exposed ends and edges are chamfered, including the wedges.



Figure 17. Make the wedge jig using two wedge blanks and strips of 1/2" plywood.

Figure 18 (inset). The narrow strips allow access to the corner of the wedge to pry it out after cutting.



The top has two 11/16" x 2 1/16" x 27 3/4" thickener rails glued to it which fit snugly between the legs and are aligned with the ends of the cap rails. As well as positioning the top, they create a visual tie between the top and the base.

I used a variation on the traditional button method to hold the top to the base. Three 11/16" x 2 1/16" x 2 1/16" glue blocks are glued to the top on the inside edge of each cap rail. (See *Figure 20*.) An 11/16" x 1 3/8" x 2 1/2" screw block is screwed to each glue block so that it traps the overhang of the cap rail. The center screw block also has a screw into the cap rail which keeps the top on center to the base but leaves it free to shrink and expand past the outer screw blocks.



Figure 19. Clamp the jig tight to the bed and fence of the chop saw. To hold by hand is neither safe nor accurate.

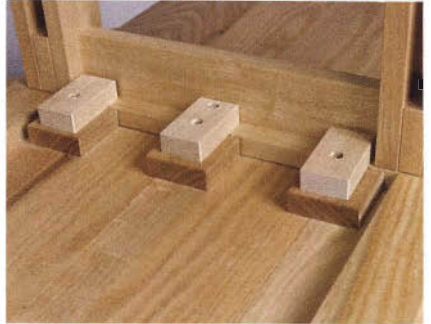
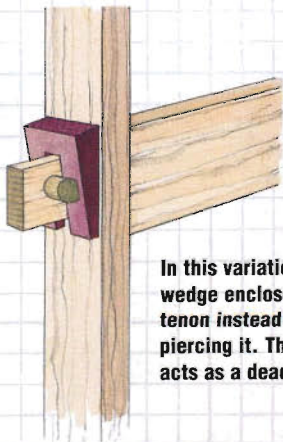


Figure 20. The top is secured and fixed on center by blocks that trap one flange of the cap rail while allowing for shrinkage and expansion.

Ian Kirby is a master woodworker and regular contributor to the Woodworker's Journal. He has written a number of books, which are available from Linden Publishing (www.lindenpub.com).



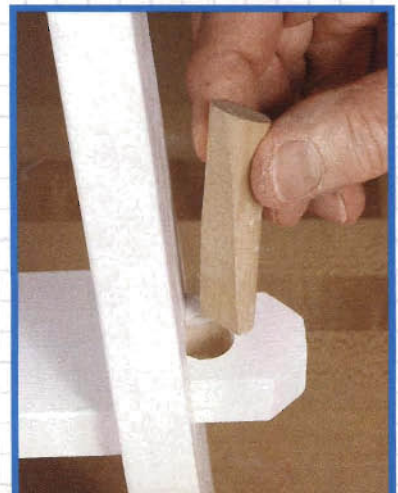
In this variation, the wedge encloses the tenon instead of piercing it. The dowel acts as a dead stop.

Outside Wedge

Yet another variation is an external wedge and a hole with a dowel as the dead stop. A flat on the dowel gives the wedge a larger contact surface and improves its overall appearance.



The hole and dowel joint applies all the tusk tenon principles to hold tight this angled leg and rail assembly on this mockup of an Arts and Crafts-inspired table.





BATTERY CHARGING CABINET

By Sandor Nagyszalanczy

A good-looking, tambour-enclosed cabinet that's quick and easy to build.

If you're one of those woodworkers who wholeheartedly believes that "he who dies with the most tools, wins" then chances are, your shop has more portable power tools in it than you can count on both your hands ... and feet. And if you're a thoroughly modern woodworker, chances are good that an ever growing number of those portables are of the cordless variety.

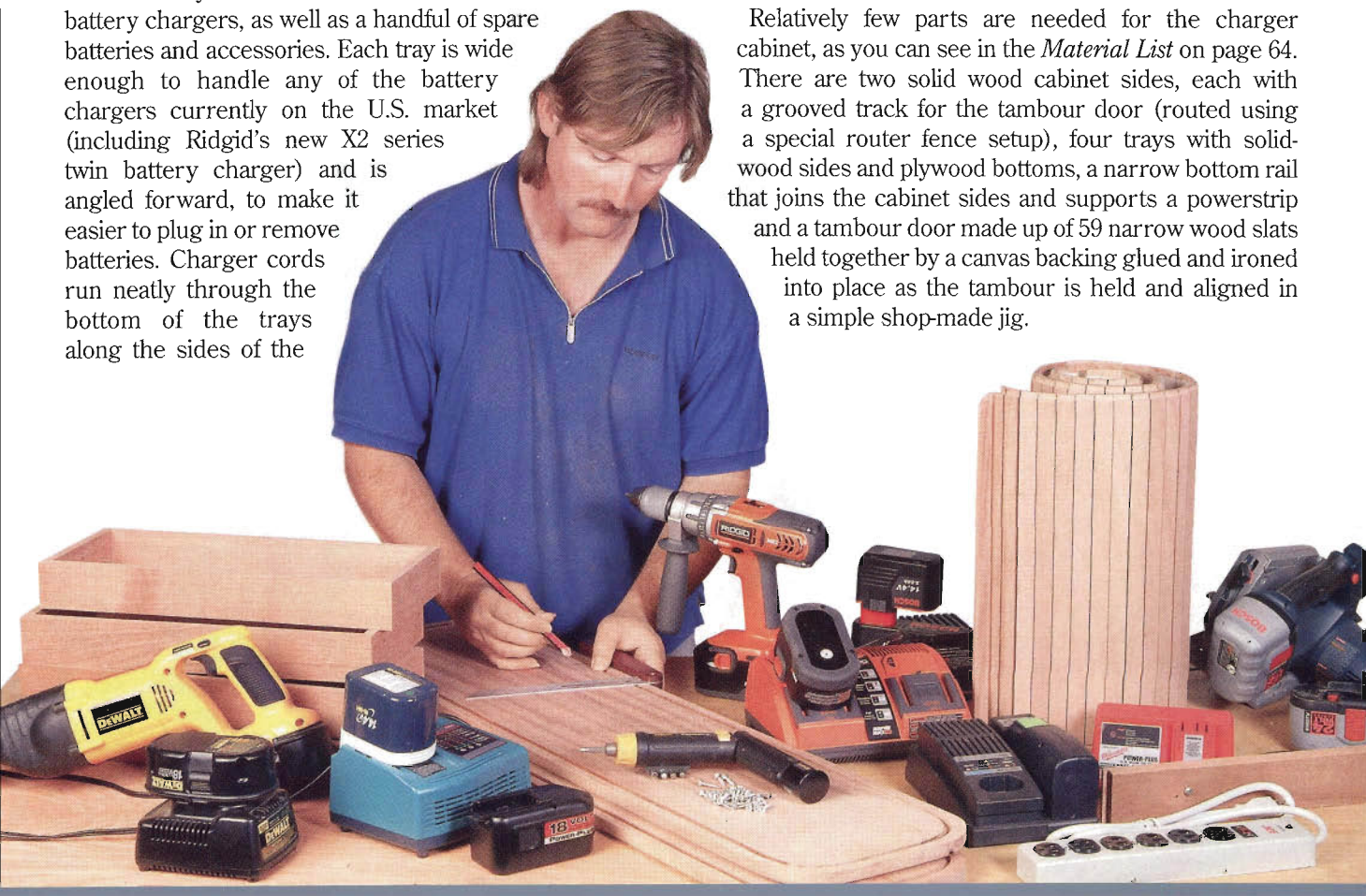
The downside to having all this high-tech hardware on hand is that you're likely to have tools made by three or four different manufacturers, each of which requires separate, dedicated batteries — and battery chargers. It's all too easy to end up with a half dozen chargers and extra batteries sprawled out across your benchtop.

My solution to keeping my own gaggle of different battery chargers organized, neatly stored and plugged in and ready for action was to design and build a wall-hung cabinet especially for them. My charger cabinet has four trays that accommodate six or more battery chargers, as well as a handful of spare batteries and accessories. Each tray is wide enough to handle any of the battery chargers currently on the U.S. market (including Ridgid's new X2 series twin battery charger) and is angled forward, to make it easier to plug in or remove batteries. Charger cords run neatly through the bottom of the trays along the sides of the

cabinet to a multi-outlet powerstrip, which is screwed to the bottom of the cabinet. A tambour-style door encloses the entire interior of the cabinet, to keep dust and chips from fouling battery contacts or sensitive charger electronics. The cabinet is designed to mount directly to your shop's 16" on-center wall studs. It's slender and tall, to fit the narrowest spot and save on wall space.

My plan from the start was to build a good-looking cabinet from hardwood but keep the design easy to build. I planned to assemble the trays using simple, but strong, rabbet joints and a captured bottom, then screw the trays to the cabinet sides using wood screws. I also used an unorthodox shortcut method for making the tambour door and the grooved track it slides in without painstaking work or elaborate jigs. Although my construction methods may be called "quick and dirty" by purists, they are aimed at producing a strong, functional piece of shop cabinetry that looks terrific and doesn't take a week to build.

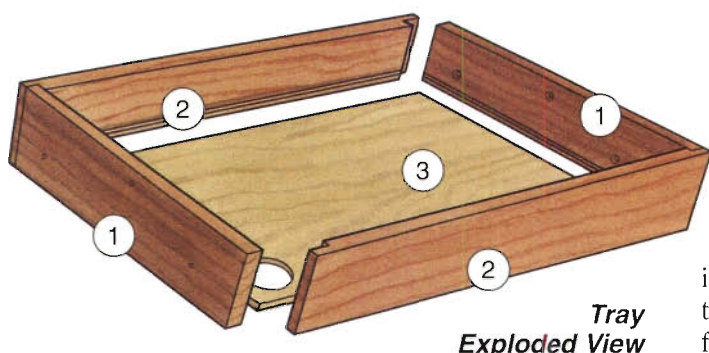
Relatively few parts are needed for the charger cabinet, as you can see in the *Material List* on page 64. There are two solid wood cabinet sides, each with a grooved track for the tambour door (routed using a special router fence setup), four trays with solid-wood sides and plywood bottoms, a narrow bottom rail that joins the cabinet sides and supports a powerstrip and a tambour door made up of 59 narrow wood slats held together by a canvas backing glued and ironed into place as the tambour is held and aligned in a simple shop-made jig.



I built my cabinet from some nice mahogany leftovers, but you can use any kind of straight, even-grained wood. Choose plain-figured stock, and avoid really soft woods with knots and woods prone to twisting or cupping.

For an easier build, buy wide enough lumber to make both of the 11" wide cabinet sides. Make the tray bottoms from any 5mm-thick (1/4") hardwood plywood.

Identical trays for structural support



**Tray
Exploded View**

Start the cabinet project by cutting and assembling the parts for the four identical trays (pieces 1 through 3). The trays serve as the major structural elements that support and align the sides of the cabinet. Cut the solid wood components to size, making sure all the long sides are exactly the same length, as any variation will negatively affect the way the tambour door slides.

To capture the plywood bottom of each tray, cut a groove along the inside of each side, positioned as shown in the *Drawing* on the top of page 64. Next, cut out the four plywood bottoms and take them to the drill press. Using a Forstner bit or hole saw, bore two 1 1/4" diameter holes in each bottom, positioned as shown in the *Drawings*. These holes accommodate the plugs on the charger cords. As long as you're at the drill press, go ahead and bore three holes in each of the tray's short sides (see *Drawings*) for the flathead screws that attach the trays to the sides. Since placement isn't critical, mark out hole positions on one side, then use it as a template to drill the other sides, as shown in the photo above. Countersink the holes (on the inside-facing surfaces) for the flathead screws.



The author used his drill press to drill and counter-bore holes in the tray sides. Placement isn't critical, but use your first side as a template for the rest for a uniform appearance.

To create a strong, simple joint that joins the tray sides, cut a rabbet on each end of each long side piece, using a dado blade in the table saw. To keep the work dependably square and in position as it's cut, I used an aftermarket crosscutting fence with a built-in end stop, as shown in the photo below.

After sanding the inside surfaces of the tray sides and ply bottoms, glue and clamp them together. It is important to make sure at this stage that none of the tray pieces are twisted. After clamping, check each tray for square by measuring diagonally, from corner to corner.

After the glue has set and the clamps are off, reinforce the corners by driving a few 1" long brads into each end, as shown in the inset photo below.



Setting up for repeatable cuts is critical for the trays in this project, as they also serve as structural elements in this cabinet. You can add a little strength to the glued-up corners (right) with several thin brads.

A “sharp pencil” layout trick



Use a sharp carpenter's pencil and an angle gauge set to 70° to mark out where the tray bottoms meet the cabinet sides.

The two sides of the cabinet (pieces 4) are made from 4/4 wood thickness planed down to 3/4". Take care to make sure each end is square. After picking the “good” face of each cabinet side, lay them both good-face-down on your bench, edges aligned. Draw a line 1" in from the back edge of each side and, using the dimensions in the *Cabinet Side View Drawings on page 64*, measure out and mark the bottom, back corner position of each tray. Then, using a bevel gauge set to 70°, mark a fine line with a carpenter's pencil where the bottom edge of each of the trays will go (see the photo above). The pencil indents the wood so you can still see lines after the sides are sanded. Label their front and top edges, so you don't rout the wrong surfaces.

Clamp the two cabinet sides together with their inside faces facing in, using three or four clamps positioned well away from the ends. Set a pencil compass to a 3" radius and mark a quarter circle at the two top corners, and at the single bottom rear corner. Now rough cut the corners just shy of the pencil line. With the sides still clamped together, use a disc sander to smooth all three corners down to the marked radius.

Use a disc sander to smooth the corners of the sides to the marked radii.

The goal is to end up with three 1/4-round, identical corners on each cabinet side.



Routing the Tambour Track

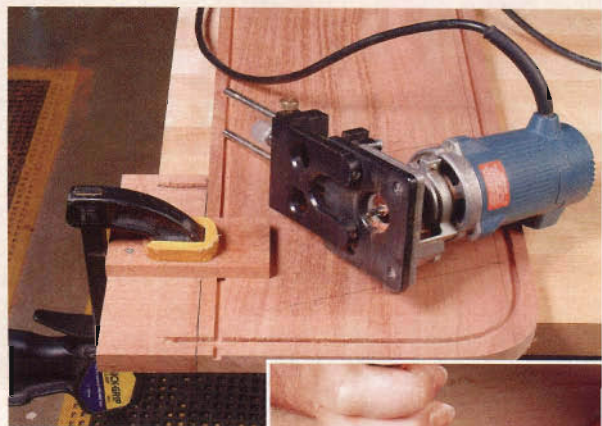
A narrow groove routed around the edges of both sides, as shown in the *Cabinet Side View Drawings, page 64*, creates a track to guide the tambour door. The method I use to rout this track requires a special router fence setup, as described in the *sidebar* below. To provide a surface for the fence's guide to ride on where the groove enters and exits the end of each side, you'll need a runout block, as shown in the photo below. This block is clamped to the end and front edge before routing at those locations.

The tambour track is routed with a 1/4" diameter straight bit. You can use a fixed-base or plunge router, but a laminate trimmer is easier to maneuver than a full-size router. Rout the track in three passes, each successively deeper. Move the router carefully around the corners, using constant and full pressure to keep the twin fence guide lobes against the edge of the work (inset photo below). Don't worry if you make a slight goof, because most of the length of the track itself is hidden by the tambour, and small divots won't affect its operation too much.

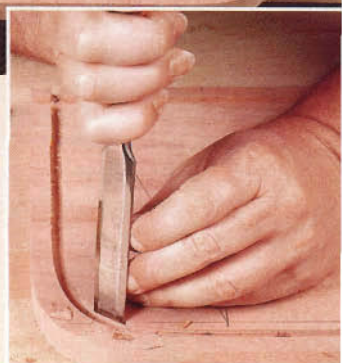
Precision tracking

My tambour track routing method doesn't require a routing template or a bushing router guide. Instead, I used MicroFence's two-point-contact router fence, which rides against the edge of the cabinet side. The contact points guide the cut at a fixed distance from the edge, even around rounded corners. The trick is that the shape of the side's edge determines the shape of the routed track.

As such, the cabinet must have two rounded top corners, and another at the bottom rear. This provides the curved track for the tambour when the door is opened all the way. It takes some skill to guide a two-point fence around a corner, so practice on scrap first. You could make your own fence for this job, but I find it very easy to use MicroFence's router fence for groove routing. This is because the MicroFence comes with two semi-circular guides that mount in place of its normal straight fence bar, making it just right for my track routing method. If you decide to make or adapt your own two-point fence, be sure the two rounded lobes of your fence have 1" radii and are set on center, 2" apart.



Make a runoff block with 3/4" x 1 1/2" x 8" wide scrap wood and screw on a 2" x 4" long crosspiece at 90°, as shown above. When you've routed the track, use a chisel to create a bit more space at the corners.



Cabinet Exploded View

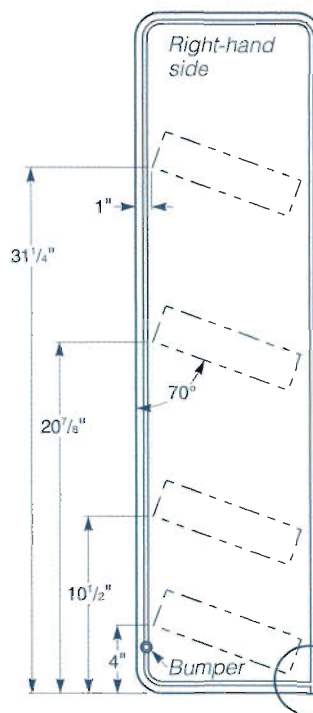
Tray Bottom (Top View)



3

1 1/8" Dia.
13/16"

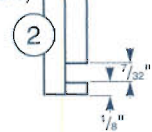
Cabinet Sides (Side View)



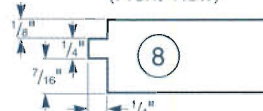
Tray Corner (Top View)



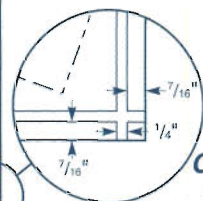
Tray Front Machining Detail (End View)



Bottom Rail (Front View)



Side Corner Detail



MATERIAL LIST

	T x W x L
1 Tray Sides (8)	1/2" x 2 1/4" x 8"
2 Tray Fronts and Backs (8)	1/2" x 2 1/4" x 17"
3 Tray Bottoms (4)	1/4" x 7 15/16" x 16 3/8"
4 Cabinet Sides (2)	3/4" x 11" x 40 1/2"
5 Tambour Slat Blanks* (64)	5/16" x 13/16" x 17 1/2"
6 Tambour Backing (1)	1 yard, 10oz. cotton du
7 Door Pull (1)	13/16" x 1 1/8" x 16 3/4"
8 Bottom Rail (1)	13/16" x 2 1/2" x 17 1/2"
9 Bumper Stops (2)	Screwed-on rubber

*Trim to fit after door is glued up; cut extra slats to select from

Creating a tambour door

Making this tambour door requires about 59 slats (pieces 5). Select wide 13/16" lumber with a clean, evenly planed surface. Crosscut your blanks 17 1/2" long and perfectly square with edges jointed square and parallel to one another. You'll need enough stock to yield about 64 slats (a few extra to choose from). I prefer to cut the slats on a band saw, since the blade's thin kerf wastes less wood. Set the rip fence to cut strips 1 1/32" thick. Rip slats from the edges of the blanks you prepare.

When all your blanks have their edges cut once, clean up their edges on the jointer and rip another set of slats. After repeating this process a few times, check to make sure the edges of all blanks are still parallel.

Once all the slats are cut, it's time to run them through your thickness planer once (paying close attention to grain direction), shaving down the rough side. This should produce a big stack of slats each 5/16" thick, with two clean and parallel surfaces.

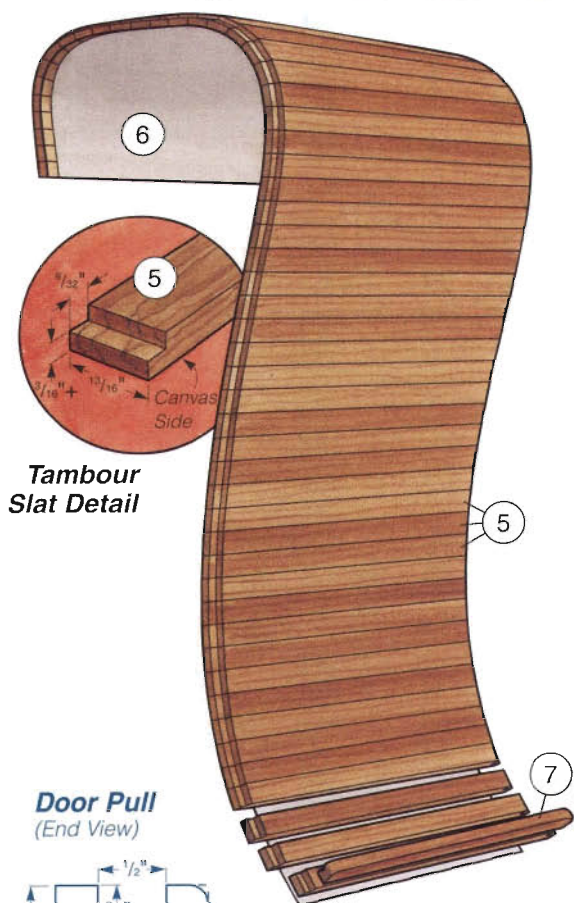


The author used his band saw to rip his tambour slats. Choose the best-looking slats to make your door.



Tambour Door Exploded View

Tambour groove details



Tambour Slat Detail

Door Pull (End View)

Tambour Slat Glue-up Jig



Jig rails must form perfectly square corners.

Tambour alignment jig

Once the slats are set in the jig "good-side-down," you're ready to apply the lightweight (10-oz.) canvas cotton duck (piece 6). Don't cut it to exact size yet, just trim one long edge straight with a razor blade and straightedge.

I used an iron to quick-cure the glue. Fully heat it to "high" before you start. Quickly apply a thin layer of PVA glue to one face of the canvas and slats (see the photo sequence on the next page).

Place the canvas on the slats, aligning the trimmed edge with the long stop of the jig (if the glue is starting to dry, don't worry; the iron's heat will reactivate it). Without dawdling, iron the entire surface of the canvas with large, back and forth sweeping passes. It will only take a minute or so to cure the glue. Remove the glued-up tambour from the jig right away, and flex it to be sure the joints between slats move freely. If adjacent slats are stuck together, clean them with a damp rag. Knock off the slats' sharp edges with some 120 grit paper.

Trim the canvas using a sharp razor and straightedge. Trim it back 3/8" on each long side of the door and flush to the edges of slats at each end.



Use wedges to hold and align the slats in your jig. Tamp the slats flat with a hammer and block (right), then re-tighten the wedges.



Assembly and tambour door fitting



To begin assembling the cabinet, align the trays on the marks you scribed earlier and secure them with screws. The trays are the structural members that join the cabinet sides and hold them square.

The next step is to assemble the cabinet and do a trial fitting of the tambour in its track. With one of the cabinet sides on the benchtop, carefully position the bottom edge and back corner of each tray, following the lines marked earlier. Drive in the three #8 x 1" screws that attach each end of each tray to the side, as shown in the photo above. If you've built your cabinet from a really hard wood, you'll have to drill pilot holes first. Once all the trays are attached, carefully flip the assembly over and set it atop the other cabinet side, and finish screwing on the trays.

With the cabinet lying on its back, gingerly slide the tambour into its groove at the bottom edge. Work it slowly up the front and all the way around the track to the back (see photo at left), pulling it back and forth to wear it in slightly. If the tambour hangs up in the corners, check to see if any of the tongues or sections of the groove need a little more trimming or sanding. Stay with it until the tambour slides all the way around the track without too much effort.

Finishing Up

Once you're finally pleased with how the tambour fits into the cabinet, remove it from its track. You're just about ready for finishing. But first, make the bottom rail (piece 8) that joins the cabinet sides and provides a place to mount the electrical power strip (see the *Elevation Drawings* on page 64 for details). Using a dado blade in your table saw, cut the short tongues that fit into the track grooves. Check the rail for a snug fit, but don't install it just yet.



With the cabinet assembled, tenderly slide the tambour door into its track. This step will require a bit of patience and care.

Gluing the slats to the canvas



Quickly apply a thin layer of glue (yellow or white woodworking glues work equally well) to one side of the canvas and then the slats. (This takes quite a bit of glue.)



Place the canvas on the slats, aligning the trimmed long edge to the long stop of the jig (don't worry if the glue starts to dry; ironing will reactivate it). Press the canvas flat using a round-edged block of wood.



Quick-set the glue with a hot iron. After the glue has cured, cut the canvas back 3/8" on each long side of the tambour. Cut it flush to the edges of slats at each end. If the canvas starts to lift, apply a dab of glue and stick it back down, ironing it as necessary.





One of the last steps is to drive home the cabinet's bottom rail. A power strip is mounted to the rail. It provides electricity to all the battery chargers.

I prefer to apply wipe-on finish such as satin polyurethane gel. Flood the surfaces of the assembled cabinet, the good side of the tambour door and the bottom rail with finish, then wipe the excess off. Wipe finish on and off the edges of all the tambour slats, then leave the wet tambour door rolled up on its edge to dry without adjacent slats sticking together. After a few hours, do a quick touch-sanding with 320-grit sandpaper and apply a second coat of finish. The result is a very serviceable finish that looks great on the outside of the cabinet, and OK on the inside — perfect for a shop project.

When the finish is dry, apply a bit of paraffin or candle wax to the slat tongues as well as the tambour track all the way around. Reinstall the tambour and position the door pull at the top of the front track curve. Now screw on two rubber bumper stops (pieces 9) against the edge of the last slat and directly over the track groove. These keep the door from sliding too far open.

Drive the cabinet's bottom rail flush with the front of the cabinet, as shown in the photo at left. Then drive two #8 x 1½" screws into pilot holes drilled into each end to secure the rail. The screws let you remove the rail in the future, in case you need to adjust the tambour. Mount the power strip to the underside of the bottom rail with a pair of screws.

I mounted the cabinet by "toe-screwing" directly through each side into the wall studs. First, drill four holes spaced evenly along the straight portion of the back edge of each side, angling them at about 45°. Next, position the cabinet on the wall so that it straddles a pair of wall studs. Support and level the cabinet, then drive the #8 x 2" long bugle-head screws into the studs. If your walls lack properly spaced studs, screw a piece of plywood to the wall, and then mount your cabinet to it.

Now for the fun part: filling the cabinet's trays with your chargers and other gear. Feed each charger's electrical cord down through the holes in the bottom of the trays and plug them into the power strip. Wind up the excess cord and use wire or plastic ties to keep them neatly coiled. Plug the strip's cord into an outlet, and you're ready to keep the batteries for all your tools juiced up and ready for action.

Sandor Nagyszalanczy is a designer/craftsman, writer, photographer and author of nine books, including "The Homeowner's Ultimate Tool Guide" available from Taunton Press Books (800-888-8286).

Final trimming details

With the tambour glued up, it's time to trim the door to its final 17½" width, using a table saw and crosscut blade. Start with the canvas side up, positioning the edge that was butted up to the long stop in the jig against the saw's rip fence. Next, rabbet the slats to create a wood "tongue" on each end. This makes it easier for the door to negotiate the corners of the track. Fit the table saw with a dado blade that's at least 5/16" wide and set its height to produce a tongue that's just a skosh over 3/16" thick (see the *Tambour Detail Drawing*, on page 65). Set the rip fence to produce 9/32" long tongues on each side of the tambour. With the canvas side up, carefully feed the tambour over the blade, using a push block to keep it flat and ensure a full depth of cut. It's easiest to unroll the tambour as you feed it through the cut, then roll it back up again at the back of the saw. Sand all surfaces of the tongues to round their edges slightly, to help it slide easier. Roll the tambour up and sand the slats with the outer corners of each tongue exposed.



Roll out the tambour as you trim it on the table saw. Then create "tongues" on the ends of the slat by forming a rabbet with a dado blade (inset).



**Need a room
to appear
larger?
Brighter?
Need a touch
of interest on
a broad open
wall? A mirror
may just be
the answer.**

OCTAGONAL MIRROR

Miters depend on end grain to end grain glue joints, which can be weak and subject to failure. Divide your miters in two to build an octagonal shape, and you have twice as many opportunities for trouble. Our author solved the challenge by adding pentagon shaped decorative splines at every miter.

By J. Petrovich

A mirror's frame should always complement its use. This particular frame, for instance, was designed for a small entry. After years of trying a variety of pictures and "wall hangings", my wife and I came to the conclusion that a mirror was the answer for this space. It brightened the area, gave depth to the adjoining living room and seemed more friendly to visitors.

Designing the mirror was open-ended. The size was determined by the space available, but the style, material and shape were a matter of preference. I wanted a complex shape, flat stock and the usual "California roundover." The result is a design that, while it is quite clearly angular, suggests an oval. Joining the members of the frame with exposed splines adds another bit of complexity and interest. The job could have been done with biscuits in much less time, but I like the subtle accent that the splines added to the geometry.

Preparing and Machining the Stock

Constructing the mirror frame is relatively straightforward. This mirror is made of cherry, but any number of other woods will work as well. If you are purchasing lumber for the frame and do not have a thickness planer, be certain to measure the stock for consistent thickness, side to side and end to end. Cutting the mortises for the splines is done on the table saw and

is dependent upon a consistent thickness. If you are planning to run the stock through a planer, plane all of the stock at the same time using the same thickness setting.

Once the material has been surfaced, rip the stock to width. The design here calls for frame members to be finished at 2". To this, add an additional 1/8". The extra material will be removed later, after mitering and mortising.

Next, the material needs to be cut to length and mitered. Merely setting the miter gauge for the table saw or setting the arm on a chop saw to 22½° will not likely produce miters with sufficient precision. An error of 1/2° multiplied by the eight joints of the frame will mean that the last joint does not close. If you have a protractor head or similar device, use it to adjust the machine you are using. Use some scrap material to make adjusting cuts until you are

satisfied with the tool's accuracy and the consistency of cuts.

If you do not have a protractor head and cannot borrow one, there is an alternative. Most try squares have a 45° shoulder somewhere on the body of the square. To use this method will require making two cuts on separate pieces and "trying" the resultant 45° miter that is produced when the two 22½° angles are brought together.



Two 22½° miters will add up to 45°. The author used his try square to check the accuracy of the frame's miters.



Mirror Exploded View

Mirror Frame Joinery

(Front View)

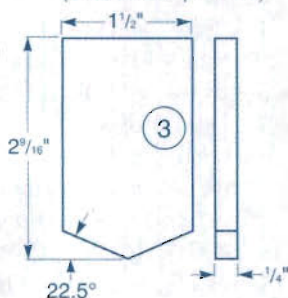
(End View)

(Side View)



Spline

(Side and Top Views)



Purchase your mirror after you have built the frame. A great way to be sure that your mirror will fit correctly is to create a template from 1/8" hardboard. Once your template fits well, take it to the glass fabricator and ask them to use it for a pattern.

MATERIAL LIST

	T x W x L
1 Sides (2)	3/4" x 2" x 22"
2 End Segments (6)	3/4" x 2" x 9"
3 Splines (8)	1/4" x 2 9/16" x 1 1/2"
4 Retainers (6)	Plastic
5 Hanger (1)	Steel
6 Mirror (1)	Cut to fit

CUTTING THE SEGMENTS TO SIZE

Of equal importance to the precision of the miters is accuracy in cutting the segments to length. As little as 1/32" error will make assembly difficult and less than satisfying. To this end, use a stop block. If you're using a miter gauge on the table saw, attach a face board to the gauge of sufficient length to accommodate a stop block screwed to it. If you are using a chop saw, mount the stop block to the support table. With either method, one end of the segment should already be mitered accurately prior to cutting it to exact length. Before each cut, check to be certain that the segment is snug against the fence and against the stop block. The stop block should also be mitered (see photo at right) to provide support along the mitered segment's edge.

If you are using a chop saw to cut the miters, you can take two actions to improve the quality of the cuts.

The author cut his stop block with the same miter as the mirror frame stock.



First, allow the saw to come to full speed before entering the cut and allowing the blade to cut. Every wood cuts a bit differently. Maple, for example, is both hard and tough and requires a slower rate of feed. Your blade was designed to cut at a particular speed that, if exceeded,

might degrade the quality of your miter. Secondly, use the same hand position and motion for each cut. An older or well-used saw (such as mine) may have small amounts of play in the pivot or slide. Consistency in motion will help eliminate the effect of that play.

When cutting the frame segments, you must not only miter them at exactly 22½°, but cut them precisely to length as well. With 16 critical mating surfaces, accuracy is important.



HOW TO FORM PERFECT SPLINES

After cutting the segments to length, lay them out on a flat surface to miter. Clamping several of the segments will make this fit-up easier. If this fit-up is successful, and the miters fit tightly, you are ready to cut the mortises. If not — if that last miter will not close — there are several possible solutions. First, try rearranging the segments. Despite our best efforts, some segments may be 22° or 23° instead of $22\frac{1}{2}^\circ$. (Mating a 22° to a 23° will result in the necessary 45° .) Once all segments mate properly, mark them.

If moving the segments doesn't work, check the segments for wind. (I spent 30 minutes flipping segments and checking miter angles only to discover that one of the long segments had a $1/16$ " wind end to end.) Cutting a new segment or diminishing the width of the frame is the only solution.

With all the segments cut to length and mitered, and after a successful dry fit, you are ready to cut the spline stock. Cut the splines so that the long grain runs perpendicular to the miter. (Resist the temptation to make narrower splines that are parallel to the miter. Each segment is a lever and will exert its force directly against the parallel grain. This configuration is just too weak.) To make the splines, start with a blank $1/4" \times 3" \times 24"$ — even though the total length requirement is only $8 \times 1\frac{1}{2}"$ plus the seven kerfs (or about 13"). The additional material is for safety. Trying to hold a 3" or 4" piece of material steady as you trim off a $1\frac{1}{2}"$ piece is just a bad idea.

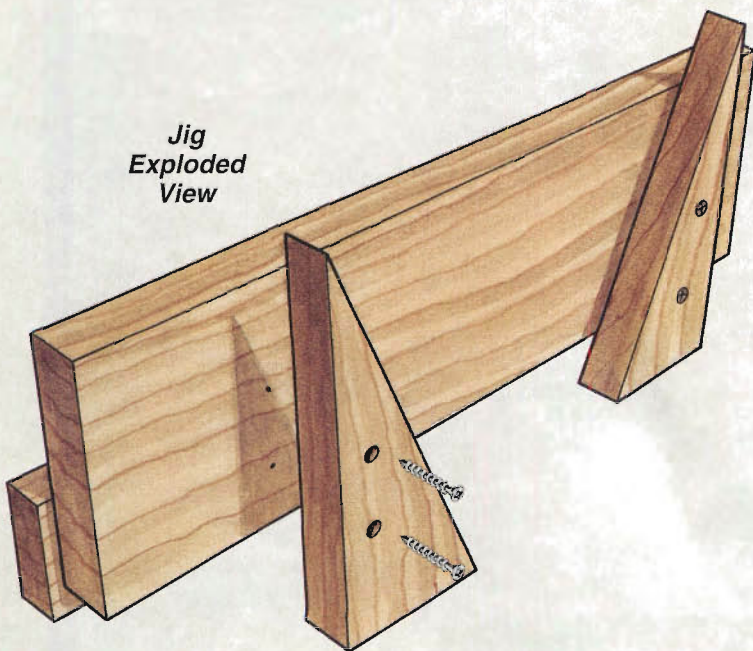
Cutting the spline stock on the table saw is not advised. I find that a band saw is a much better idea. If you are without a planer, use

a hand plane and cabinet scraper to smooth and even both sides of the stock. For a job as small as this, a well-tuned hand plane is nearly as fast as the power tool and considerably more satisfying.

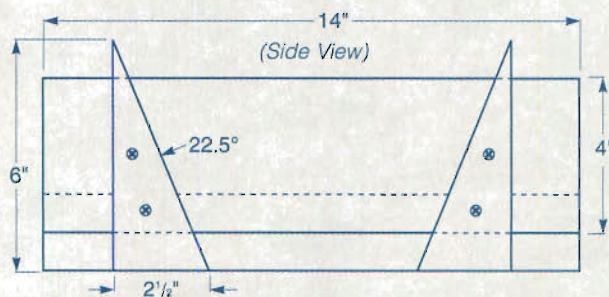
Mortises are cut on the table saw. If you own a mortising jig, use it. If not, you can rig your rip fence with an auxiliary board and clamp your material to a shop-made jig. (See the sidebar below.) To set up and adjust the jig, use some scrap material the same thickness as the frame material. Miter this material to $22\frac{1}{2}^\circ$ and mark it for the mortise using the spline material. Next, raise the saw blade to full height and check it for perpendicularity. Even a slight deflection in the blade can produce a poor fit. Having satisfied yourself with the blade's adjustment, lower it to $3/4"$. With the test material clamped to the sled, move the rip

MAKE A JIG TO CUT YOUR MORTISES

Jig
Exploded
View



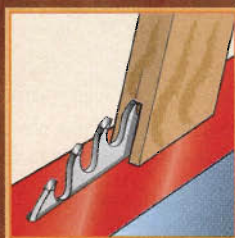
Jig Elevation



This jig rides on an auxiliary fence which is secured to your table saw's fence. The dual blocks allow you to take two passes across your table saw blade, center the cuts and create a $1/4"$ mortise with a standard saw blade.



**FORM A DEAD
CENTER MORTISE
IN TWO PASSES,
ROTATING THE
STOCK AGAINST
THE FENCE
AFTER THE
FIRST CUT.**



fence into position and lock it. By using 1/4" splines and locating them exactly in the middle of the segment, you'll find that the spline's mortises will require only two passes on the saw. Make your first cut on one side, rotate the segment, and move it to the front block of the jig to make the second cut.

Test the mortise with the spline stock. The spline should move in and out of the mortise with light finger pressure. If the spline has any wobble in position, it is too loose. If the spline has to be forced or tapped into position, it is too tight. Adjust the fence accordingly, then re-cut the miter to obtain a fresh end. The need for a fresh end with an oversized mortise is obvious. However, a fresh end is also necessary to an undersized mortise. Merely enlarging the mortise is not as exact as re-cutting the whole

mortise. Attempting to enlarge an existing mortise will deflect the blade (albeit slightly) as one side of the mortise offers resistance and the mortise does not. Using an enlargement adjustment to cut a mortise on a fresh end will usually result in a mortise that is larger than you intended.

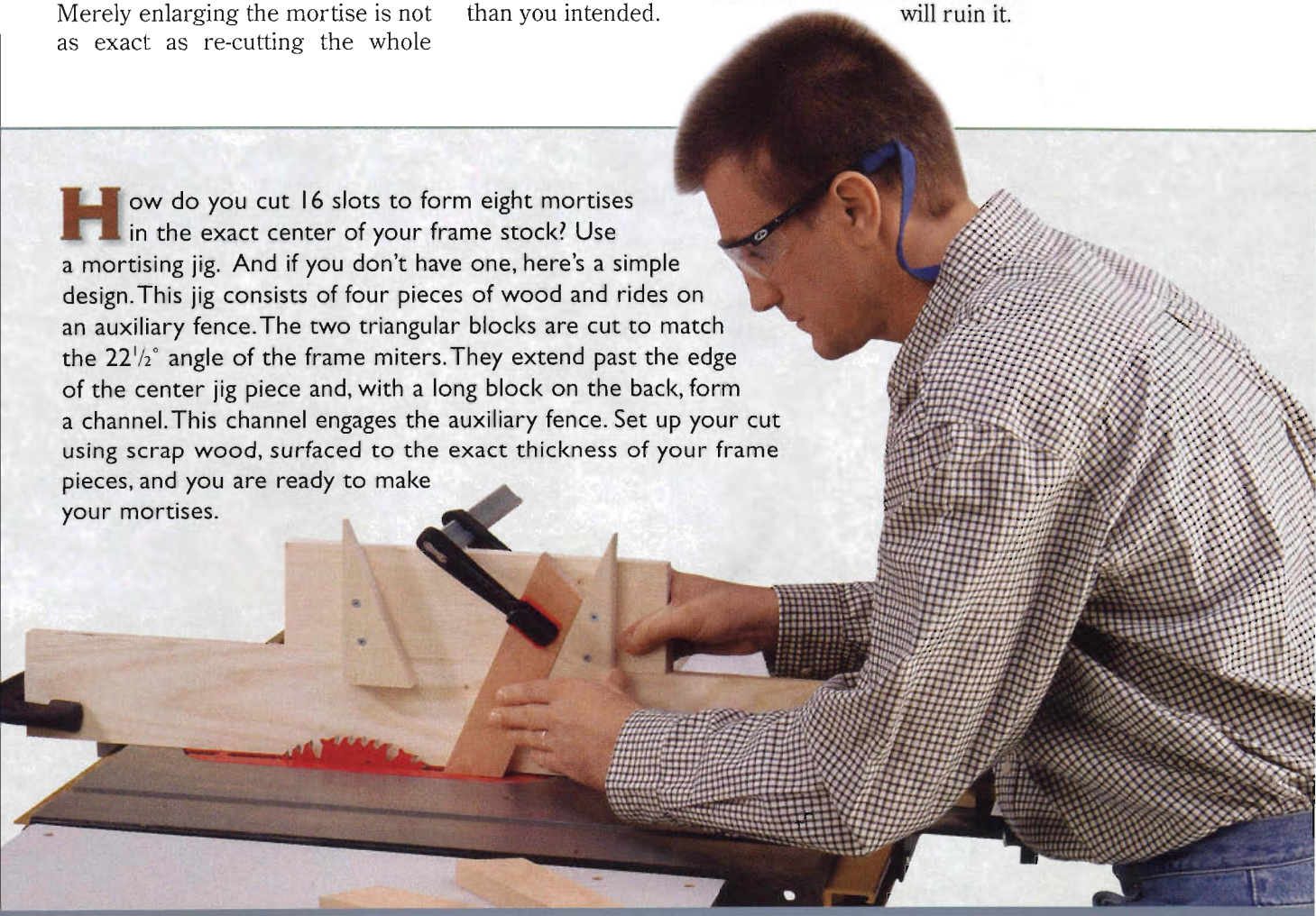
Fitting the Splines

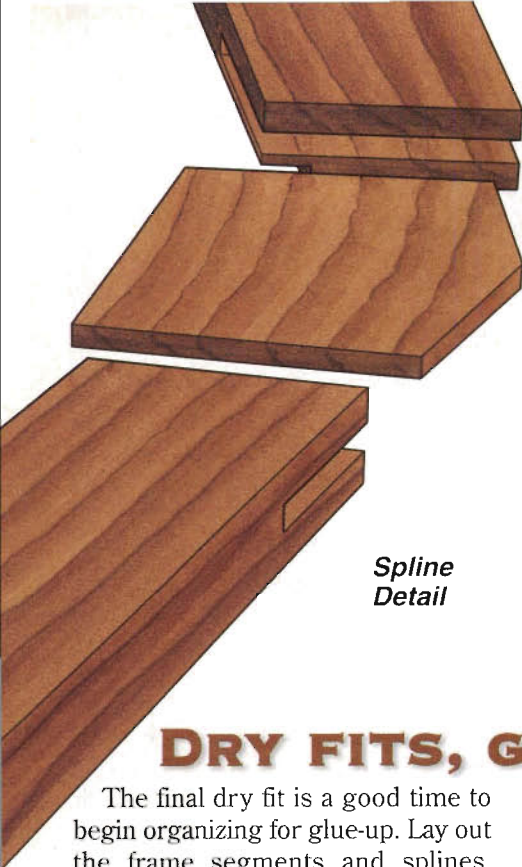
Once the mortising is complete, the splines should be cut to length. Be sure to test fit the first spline. If it's a little long, trim it with a low angle block plane. Once you are satisfied with the fit, cut the rest, using a stop block to ensure uniformity.

The segments are cut to length, mitered and mortised. The splines are cut but not trimmed. Now is the time to rip the segments to final width. Remember that they're 1/8" oversize.

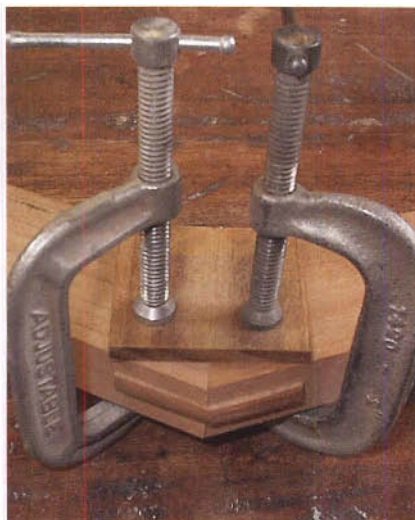
The mortising process will produce some tearout, but trimming 1/16" from both edges should serve to clean up these blemishes. Select the inside or outside to rip first, then flip the stock over and rip the other side. Trust me, removing the entire 1/8" from one edge of the segment will ruin it.

How do you cut 16 slots to form eight mortises in the exact center of your frame stock? Use a mortising jig. And if you don't have one, here's a simple design. This jig consists of four pieces of wood and rides on an auxiliary fence. The two triangular blocks are cut to match the 22½° angle of the frame miters. They extend past the edge of the center jig piece and, with a long block on the back, form a channel. This channel engages the auxiliary fence. Set up your cut using scrap wood, surfaced to the exact thickness of your frame pieces, and you are ready to make your mortises.





**Spline
Detail**



Two C-clamps are used to bring each joint together. Scrap blocks protect the stock from marring.

DRY FITS, GLUEUPS AND FINISHING

The final dry fit is a good time to begin organizing for glue-up. Lay out the frame segments and splines, which should be proud of the edges. With the splines in place, mark them

for trimming — parallel with the outer edge and straight on the inner edge. A thick steel rule snugged against the edge of the frame leaves about the right amount of reveal.

As you disassemble the frame to trim the splines, mark them to correspond with the mortise they'll secure, then smooth and bevel them with a block plane.

Making a Rabbet

Before final assembly, cut the rabbet for the mirror and smooth the edges of the frame. It's easier now, before the splines are in place. A pass or two with a sharp plane should do the job.

Glue up is a matter of organization and forethought. Lay out all of your glue, paper towels, clamps etc. before opening the glue. I used white glue for assembly because I wanted a slower setup time than yellow glues allow.

Remember, the purpose of glue is merely to immobilize the joint. Glue that squeezes out is a pain to clean up. A dot here and there is best left to harden an hour or two rather than wiping it up with a towel. Wiping leaves a ghost that will neither accept stain nor oxidize with time.

I recommend C-clamps for the assembly. One clamp on either side of the miter (16 total) will be enough for the job. Use blocks to prevent marring the face of the frame.

After removing the clamps, check for spots of glue and use a chisel to pop them off. The face of the mirror

is now ready to

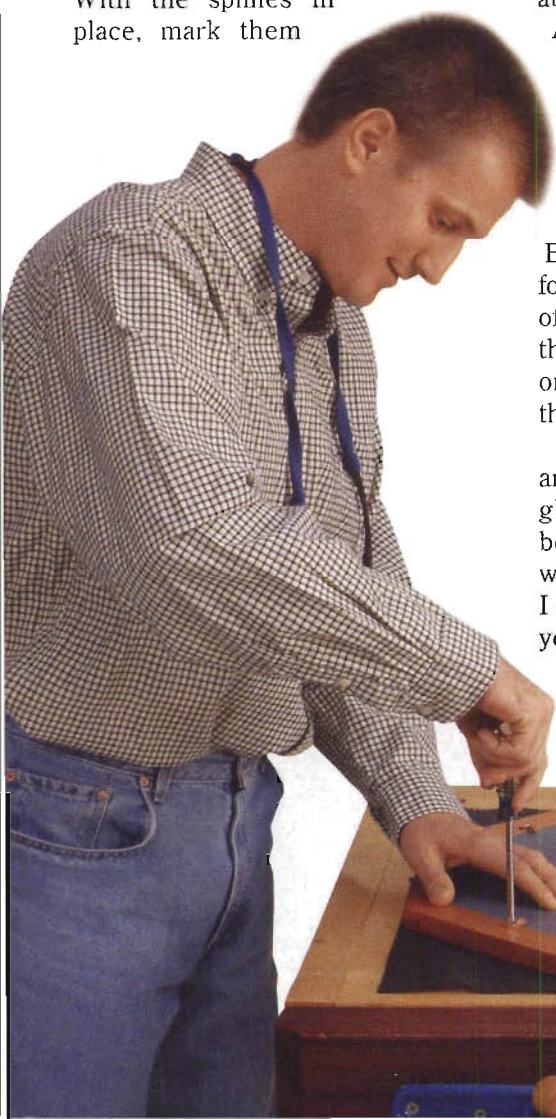
be smoothed. I used a hand plane and scraper, followed by light hand sanding. When you're done, you can bevel the edges of the frame with a small block plane.

Finishing

Finishing is a matter of taste. The frame shown here is cherry. I applied a coat of tung oil and placed it in direct sunlight for three days. Cherry darkens naturally in sunlight. The three days also gives the oil a chance to polymerize. For a topcoat, I applied 3 thin coats of wipe-on poly. When the finish cured, I rubbed the surfaces with 0000 steel wool and applied a thin coat of wax. The final look shows the texture and character of the wood but is smooth and easy to dust.

J. Petrovich, is a furniture designer and maker from Salinas, California.

Always wait to order your mirror until after the frame is done.



The Ultimate Fluting Jig

By Ralph Bagnall

Look behind
the centerspread
for step-by-step
instructions!

This jig will help keep you on the straight and narrow. Plow decorative flutes with accuracy and ease employing the unique second fence.

The Ultimate Fluting Jig



Transfer your router's mounting hole pattern to the jig, using its own plastic base. The jig's router base is made from 1/4" plywood.

Over the years, I have made many a decorative flute cut by simply using a router and an edge guide. But a recent job, which required me to make a number of fluted newel posts (with varied spacings between the flutes), inspired me to create a dedicated jig. Because edge guides can allow the router to waver during the cut, spoiling the flute, I needed a jig that would keep the router on track.

But how do you hold the jig snug to both sides of the stock and still allow it to slide easily while routing? My solution was an adjustable and flexible second fence. It keeps the fixed fence firmly against the edge of the stock as you rout, while allowing for small variations in the stock's width.

The body of the jig is made from good quality 1/2" plywood, while 1/4" plywood is used for the router base. For strength and durability, I chose straight grained hardwood for the guides and fences. Go ahead and cut all the parts to size using the *Material List* as a reference. Layout the grooves and holes on the jig and router base (pieces 1 and 2), using the *Elevation Drawings* at right. Everything is symmetrical, so start with an accurate centerline and work outward toward each side. Remove the sub-base from your router and center it on the router plate center hole so you can mark and drill the mounting holes, as shown in the photo above.

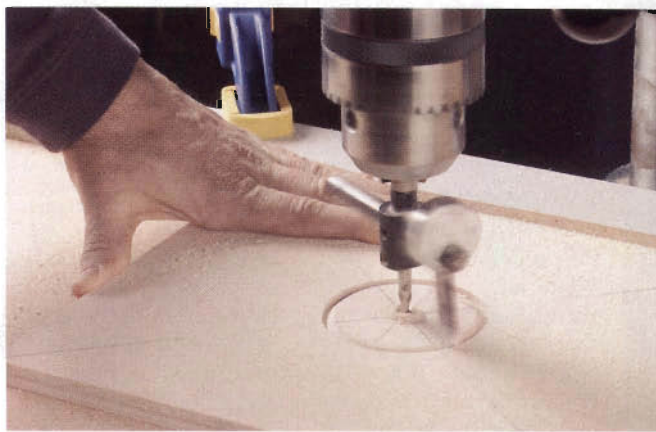
Use a drill press circle cutter (see photo, right) for the 3" openings in both bases. Use your table saw or band saw to remove the rest of the waste in the jig base and follow up by milling the slots in both bases (see photo sequence, upper right). If you don't have a router table, you can cut the slots with a jigsaw.

Milling Solid Stock

The fixed fence (piece 3) is a straight piece of stock, slightly rounded at the ends, glued and screwed to the edge of the jig base. The guides (pieces 4) receive a small rabbet and are affixed to the face of the base. Mount them by attaching one of the guides to the jig base, slide in the router base, then add the second guide. The fit must be snug enough to guide the router base without binding.

Now that you have the guides properly in place, check the accuracy of the T-nut hole locations, drill the holes and counterbore for the T-nuts.

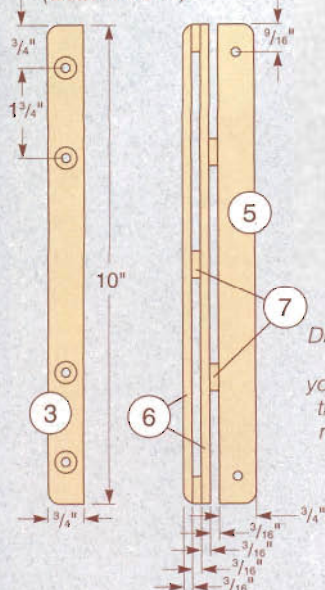
Next, the spring fence (piece 5), the flexible fence that makes the whole jig work well, needs to be built. Thin strips of hardwood held together with small blocks (pieces 6 and 7) provide a spring effect which holds the workpiece firmly against the fixed guide.



The author used an adjustable circle cutting attachment on his drill press to form the 3" diameter openings on the jig base and router base. He removed the rest of the waste on his table saw.

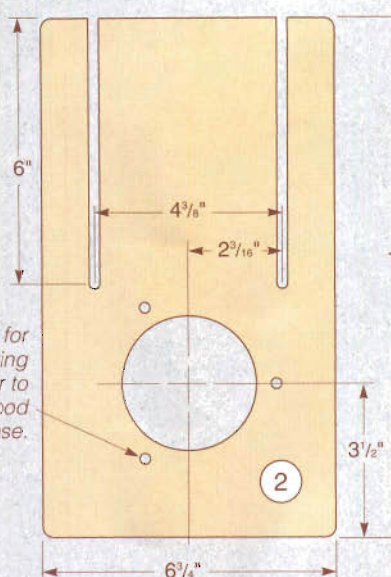
Fixed and Spring Fence

(Bottom Views)



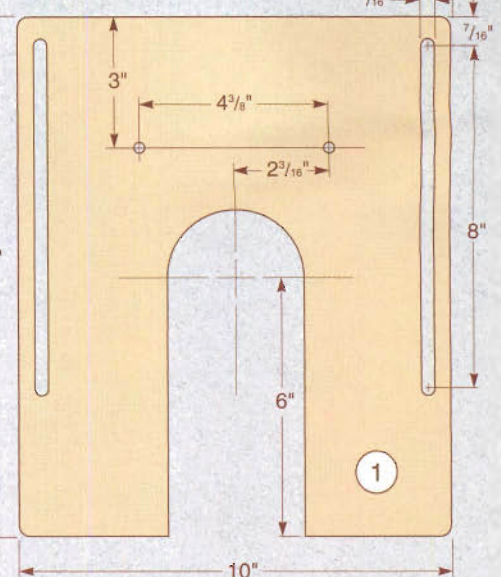
Router Base

(Top View)



Jig Base

(Top View)

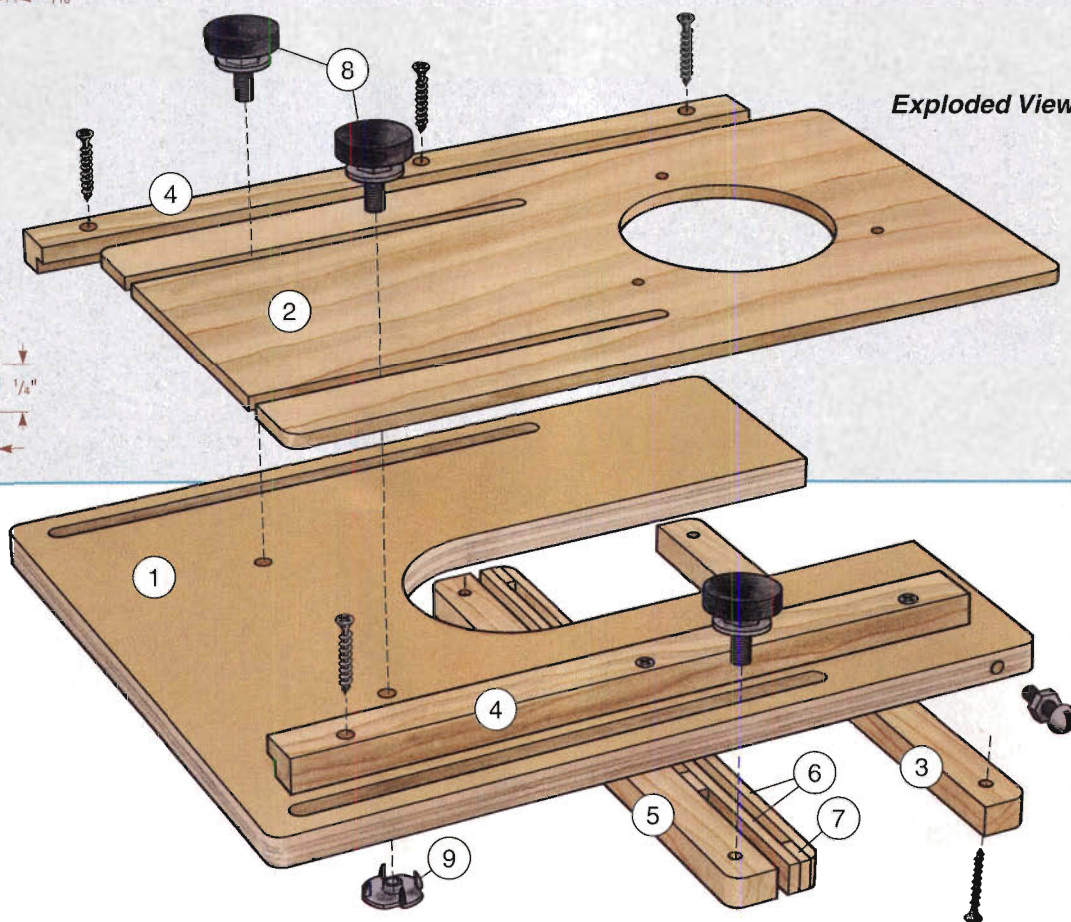
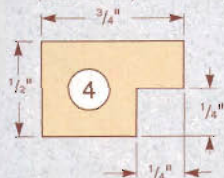


Drill holes for mounting your router to the plywood router base.

Exploded View

Guide

(End View)



MATERIAL LIST

	T x W x L		T x W x L
1 Jig Base (1)	1/2" x 10" x 12"	6 Tension Strips (2)	3/16" x 1/2" x 10"
2 Router Base (1)	3/16" x 6 3/4" x 12"	7 Tension Spacers (5)	3/16" x 1/2" x 1/2"
3 Fixed Fence (1)	1/2" x 3/4" x 10"	8 Knobs (4)	1/4" - 20
4 Guides (2)	1/2" x 3/4" x 11 1/2"	9 T-nuts (2)	1/4" - 20
5 Spring Fence (1)	1/2" x 3/4" x 10"		

Hard-to-find Hardware

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*Four required.

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Making the slots in the jig base is a three-step process. After you've marked where the slots belong on the base, set up your router table with a 1/4" straight bit. Drop the jig base onto the bit and after the bit protrudes through the plywood, slowly push the piece forward until the cut is complete.

Mill up the fence parts a little wide so you can sand the assembly to a uniform thickness after glue-up. Check the spring guide against the outer slots in the base, then drill and tap 1/4" -20 holes in the body of the guide for the knobs. Install the knobs and T-nuts (pieces 8 and 9) and you have the lion's share of this jig project behind you.

The jig's moveable fence, with its "spring" construction, is one of the main reasons it is so effective. It has just the right amount of give to accommodate minor variations in the width of the stock you are fluting.

The final step is to create additional accuracy and adjustability by installing adjustable stops. These are just a couple of stove bolts that thread into the front and back edges of the jig. The addition of a nut (see the *Exploded View* at left) turns them into "micro adjustable" stops. Simply drill and tap a 1/4" - 20 hole in each edge of the base, or use a threaded insert. Mount your stove bolt and nut combination and you are ready to rout. Once the stop is set, the nut is tightened against the base to lock it in place.

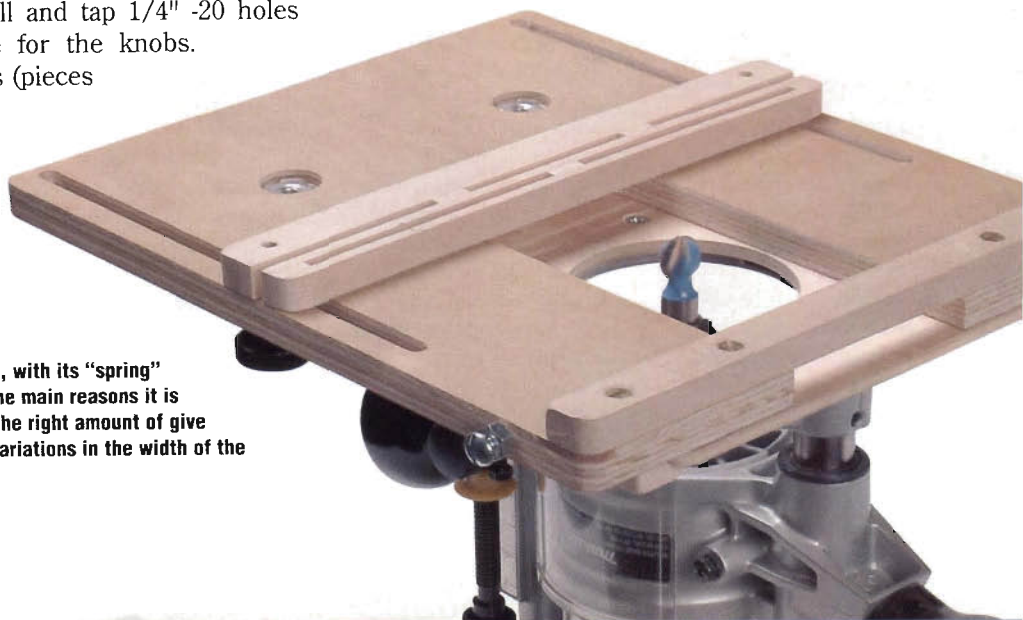
Using the Jig

Putting this jig to work is easy as pie (and I mean apple ... not the transcendental number). Mount the router, then slide the router plate onto the base, and set the center of the bit at the desired distance from the fixed fence. Finally, set the depth of cut. Don't be afraid to make more than one pass if needed. For stopped flutes, you'll have to clamp stop blocks at each end of the workpiece. The stops on the base sides can be set to stop the jig at the right spot at each end.

After the first flute is cut, the jig is reversed, then set back in place. This creates two evenly spaced flutes. After the second cut, the router plate knobs are loosened, and the router is repositioned for the next flute in sequence and the whole process is repeated.

After building the prototype, I quickly began using this jig for all sorts of tasks, some of which are described at right. The two-fence system makes slotting and grooving long narrow parts easy and accurate. So, next time you need to make a mantle, reed or flute a table leg, or make wooden slides, grab this jig. It will keep you on the straight and narrow!

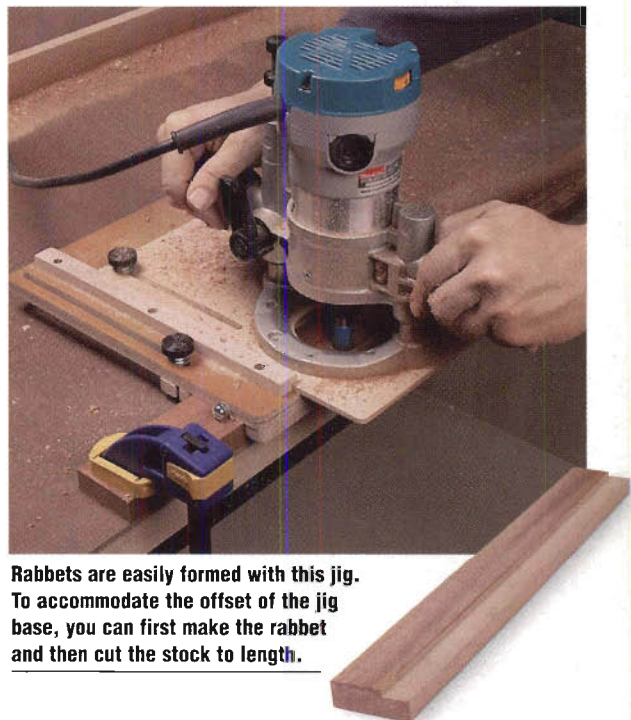
Ralph Bagnall is a professional woodworker and a frequent contributor to Woodworker's Journal.



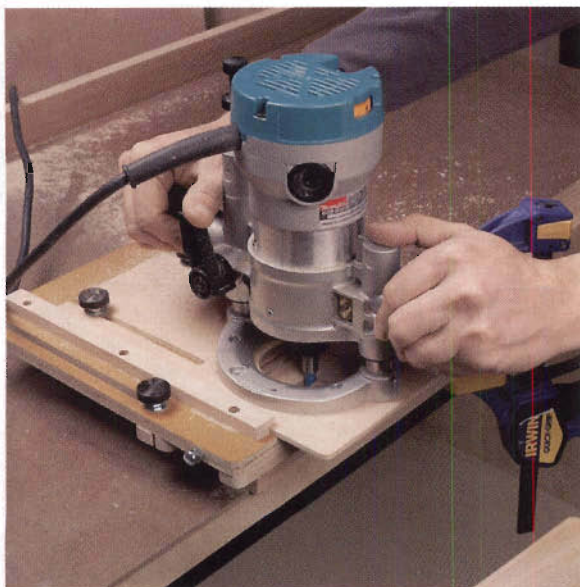
Getting Creative with Your Fluting Jig

As often happens in the world of woodworking, this jig, which I designed for one task, easily lent itself to other related operations. Although necessity is the mother of invention, creativity might be the stepfather of flexibility.

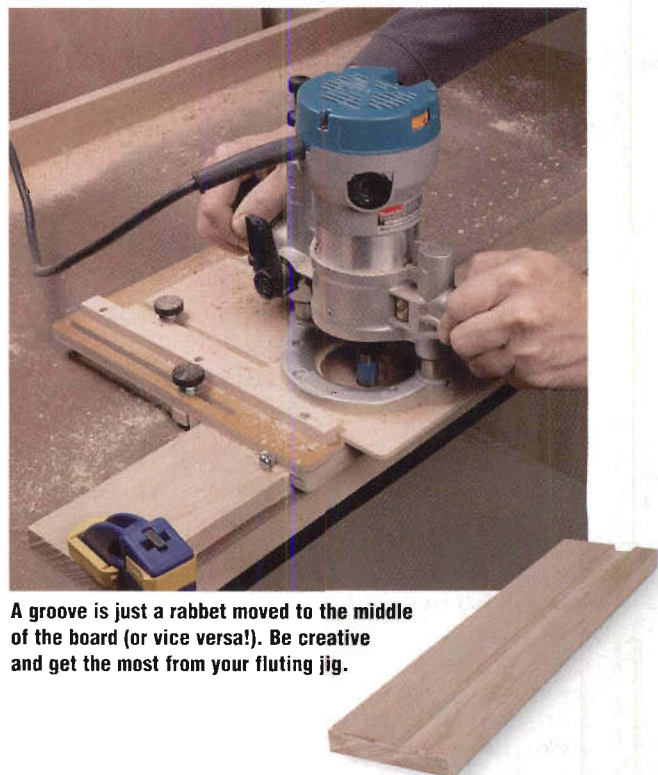
Because this jig accurately guides a router in lineal cuts, any of a variety of routing operations can be preformed with it. The one limitation of the jig is the distance from its edge to the router bit. This offset must be accounted for as you expand the uses of your fluting jig.



Rabbets are easily formed with this jig. To accommodate the offset of the jig base, you can first make the rabbet and then cut the stock to length.

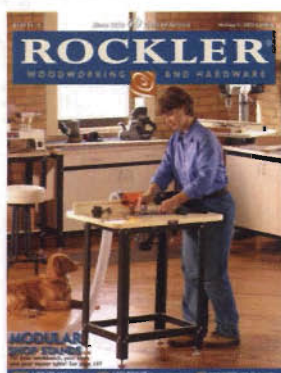


A plunge router is often used to form a mortise. This jig, with its adjustable stops, will help you put the mortise exactly where you want it.



A groove is just a rabbet moved to the middle of the board (or vice versa!). Be creative and get the most from your fluting jig.

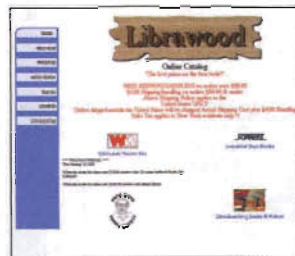
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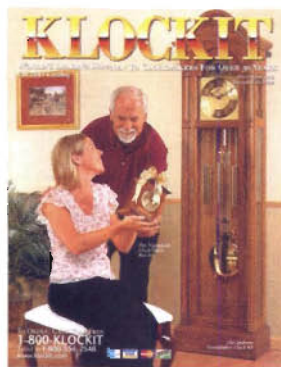
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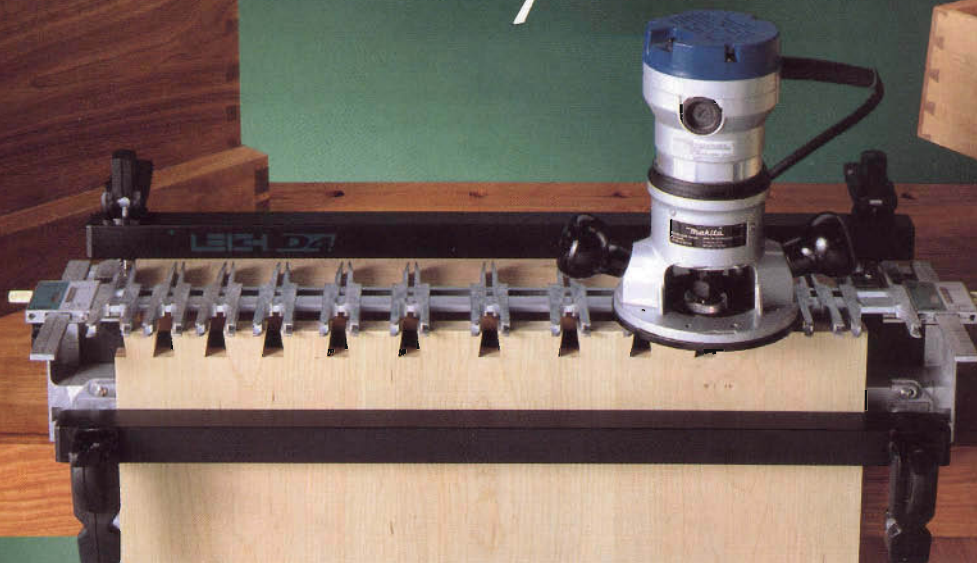
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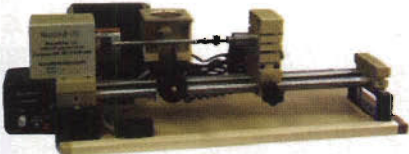
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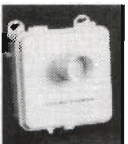
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4	AllPro Tools.....	95	72	MacBeath Hardwoods.....	47
5	Amana Tool Corp.....	27	73,74	Magnate.....	81,84
117	Amazon.com (Tool Crib).....	105	75	Makita USA.....	15
6	Armor Craft.....	32	76	Manny's Woodworker Place.....	11
7	Arrow Fastener Company.....	35	77	MasterGage.....	47
8	Badger Hardwoods.....	46	78	Meisel Hardware.....	34
9	Beall Tool Company, The.....	84	79	Micro Jig.....	35
10	Berea Hardwoods.....	83	80	Miller Dowel Co.....	99
	BrandNew.....	85	81,82	Mini Max USA.....	29,97
13	Bristol Valley Hardwoods.....	47	83	Modine HVAC&R Division.....	84
143	Briwax.....	7	84	Mule Cabinetmaker Machine.....	32
14	Burgess Edge.....	85	85	Murray Bros.....	84
15	Byegone Workshop.....	85	86	Newton Woods.....	46
	Central Boiler.....	84	87	Niagara Lumber.....	46
17,16	Cherry Tree Toys, Inc.....	82,107	88	Norton Abrasives.....	13
18	CMT USA.....	95	89,90	Olson Saw Company.....	81,92
19	Colonial Saw (Lamello).....	99	91	Olympia Steel Buildings.....	34
20	Country Accents.....	31,83	92,93	Osborne Wood Products.....	82,107
22	Craftsman.....	49	107	PanelPro®.....	107
24	Cupboard Distribution.....	85	96	Polymeric Systems.....	86
25	Dakota Alert, Inc.....	86	97	Porter-Cable.....	3
26	Davis Instruments Corp.....	106	33	PriceCutter.com.....	92
30	Delta Machinery.....	2	98	PROXXON Tools.....	105
27,28	Delta Machinery.....	35,37	99	Qty Web Alliance (Laserkerf).....	84
29	Delta Machinery.....	39	142	RB Industries.....	105
31	Donjer Products Corp.....	85	100	Red Hill Abrasives.....	84
32	Drill Doctor.....	46	101	Ridge Carbide Tool Co.....	85
34	Eagle America Corp.....	86	102,103	Rockler Woodworking & Hardware.....	76,97
35	Empire Mfg.....	111		Rockler.com.....	99
	Engraving Arts.....	81,86	105,106	Routerbits.com.....	84,76
36,37	Eureka.....	82,85		Routermania.com.....	82,107
38	Fein.....	33	108	Screw Products, Inc.....	84
39	Festool.....	41	109	ShopBot.....	34
40	Forrest Mfg.....	76	110	Shopsmith, Inc.....	33
	FC&A.....	14	111	Simp'l Products.....	87
42	Franklin International.....	20	113,113	Smithy & Co.....	103,106
43	Freud.....	9	114	Stairways, Inc.....	85
44,45	Fuji Spray.....	46,82		System Three Epoxy.....	105
46	Furniture Medic.....	95	115,116	Tech Mark, Inc. (Rojek).....	17,82
47	General International.....	93	141	Tool Chest.....	85
48	Gilmer Wood Co.....	46	118,119	Turbinaire.....	85,99
49	Gorilla Glue.....	26	120	Viel Tool, Inc.....	103
50,51	Gougeon Bros.....	11,47	121	Waterlox Coatings Corp.....	99
	Guardsman Wood Pro.....	91		West Penn Hardwoods.....	47
53,54	High Noon Woodworks.....	81,84	122	Wildwood Designs.....	107
55	Home Depot (RIDGID).....	31	123,124	Wilke Machinery Co.....	32,76
57,56	HTC Products.....	76,101	125	WILTON.....	19
58	Hut Products.....	33	188	Woodworker's Journal eZine.....	32,97
59	Japan Woodworker, The.....	85	131	Wood-ply Lumber.....	47
60	JessEm Tool Co.....	93	139	Wood-Write, Ltd.....	84
61	JET Equipment & Tools.....	22,23	23	Woodcraft Plans.....	85
62	JET Equipment & Tools.....	112	126	Woodmaster.....	103
63	Jointech.....	101	127,128	Woodpeckers, Inc.....	29,33
65,64	Klockit.....	32,76	129,130	Woodpeckers, Inc.....	83,97
66	Kreg Tool Co.....	21	133	Woodturners, Inc.....	85
67	KUFO Industries Corp.....	25	134	Woodworker's Choice (TWC).....	76
68	Laguna Tools.....	4	135	Woodworker's Choice (TWC).....	84
95,94	Legacy Woodworking Machinery.....	82,85	138,137	Woodworkers Source.....	47,81
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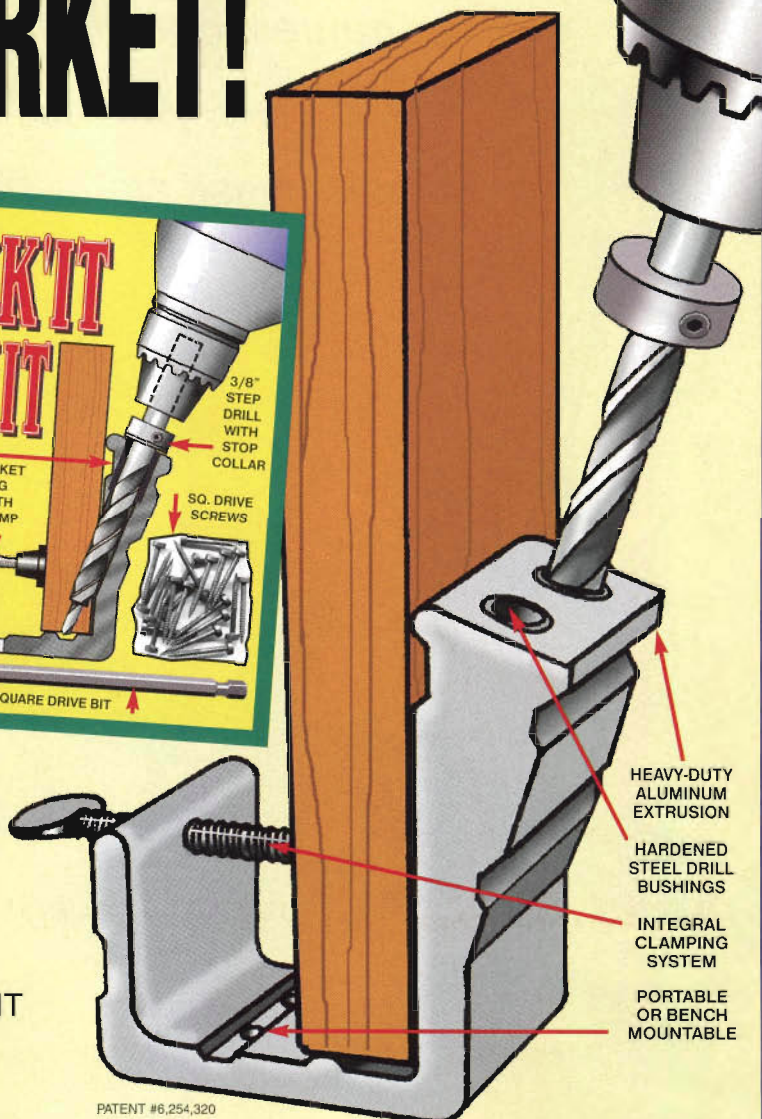
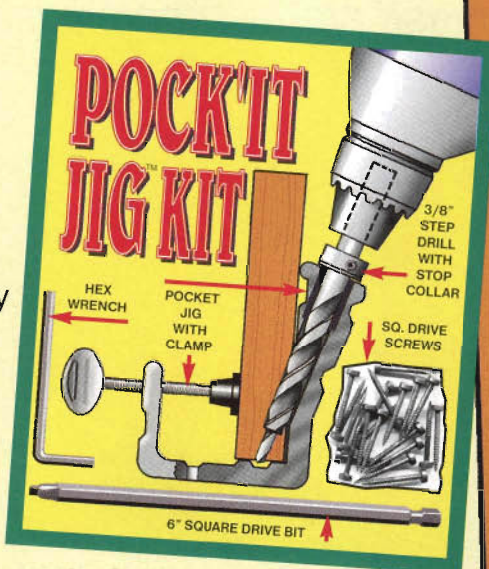
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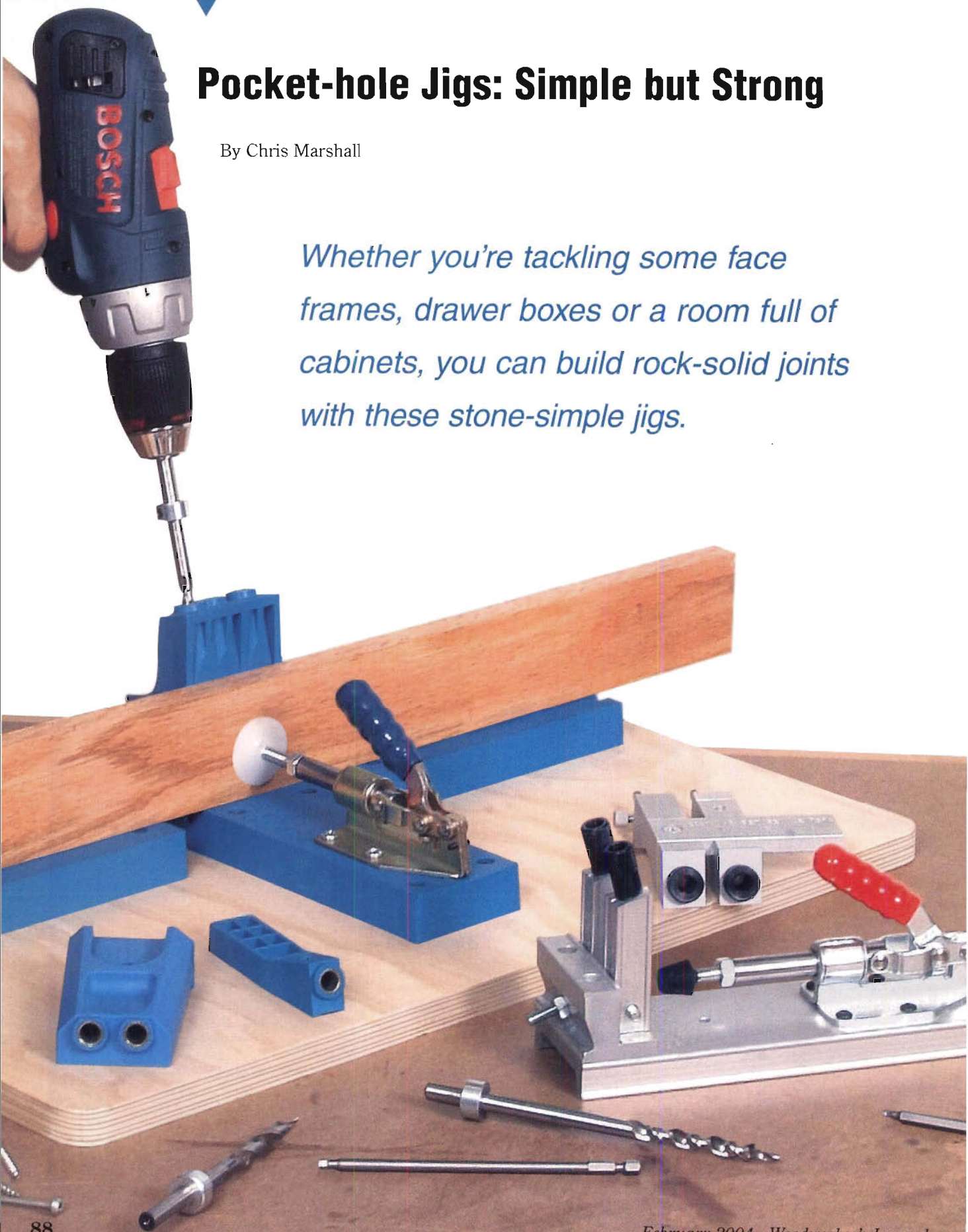
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Pocket-hole Jigs: Simple but Strong

By Chris Marshall

Whether you're tackling some face frames, drawer boxes or a room full of cabinets, you can build rock-solid joints with these stone-simple jigs.



While not the most elegant joinery solution, pocket-hole joints are lightning fast to make, and they're unbelievably strong.

When it comes to making joints the traditional way, I'll confess that I'm a moderate at heart. Sure, chopping mortises and cutting tenons by hand is altogether fine and gratifying work. But the bliss starts to fade for me after sweating through a dozen or more joints. If I had a bunch of cabinets, chairs or tables to make, I'd be tempted to trade traditional mortise and tenons for joints with less sweat equity.

If you're like me, you'll appreciate pocket-hole joinery. In a nutshell, they're simply butt, miter or bevel joints reinforced with a pair of hidden screws. Machining a pocket-hole joint involves drilling deep counterbored pilot holes into one workpiece with a stepped drill bit held at about a 15° angle. Pocket-hole jigs establish the correct drilling angle. Some even come with a toggle clamp to hold the workpiece while you drill it.

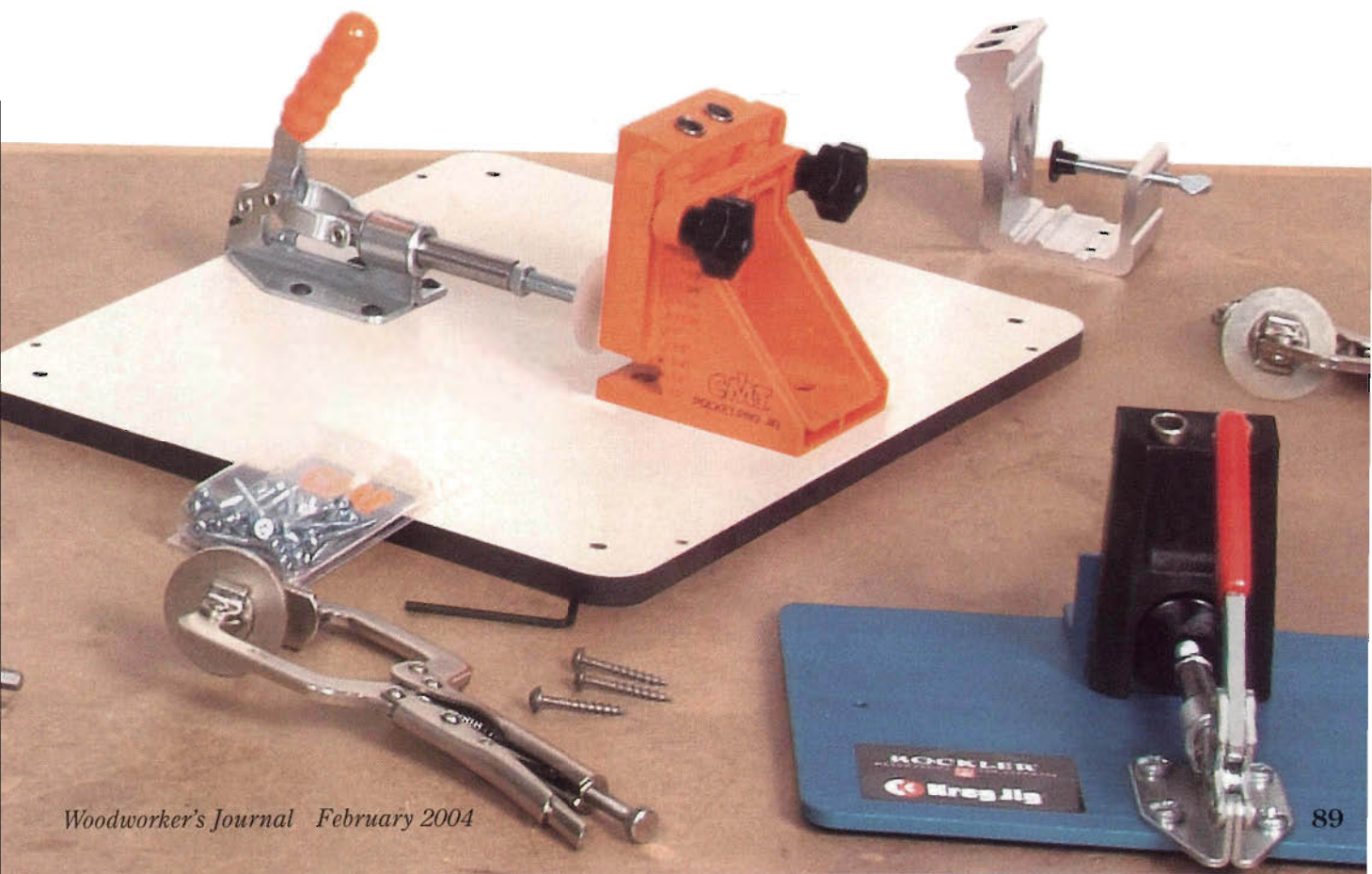
There's no need to drill the mating joint part. Just clamp up the joint with or without glue — the jig manufacturers say you don't really need it — and drive specialized auger-tip screws into the holes to lock the parts together. The screws cut their own pilot holes and the heads set deeply below the surface. Voila! You're done in a fraction of the time it would take to make an interlocking joint with machines or by hand. While not the most elegant joinery solution, pocket-hole joints are lightning fast to make, and they're unbelievably strong.

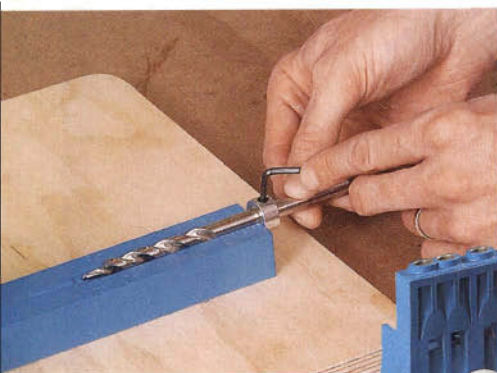
Pocket-hole joints aren't a recent innovation. They actually originated in ancient Egypt, where builders used primitive dowels to bridge the joint parts. Then Craig Sommerfeld gave these

joints a 20th century twist more than a decade ago when he developed the first pocket-hole Kreg Jig®. Other manufacturers have since followed suit with their own versions of the same basic drilling concept.

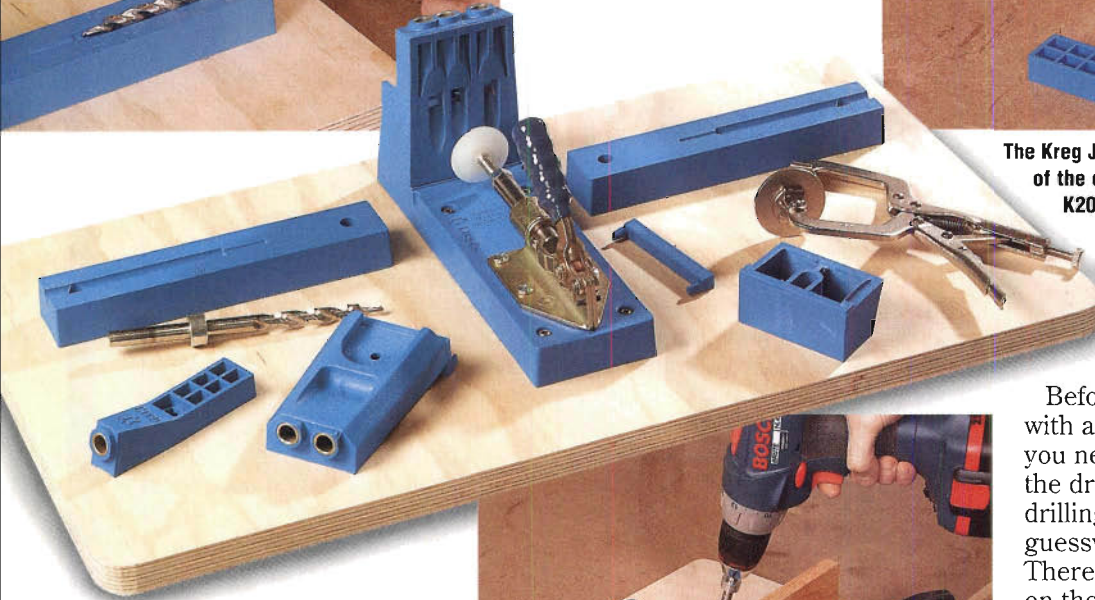
I gathered a bunch of different pocket-hole jigs and tried them out to see how they work. Long story short, they all do the job, but some with more panache than others. Prices range widely, too. In the following pages, I describe how each one fared for me.

Today's Shop continues on page 90 ...

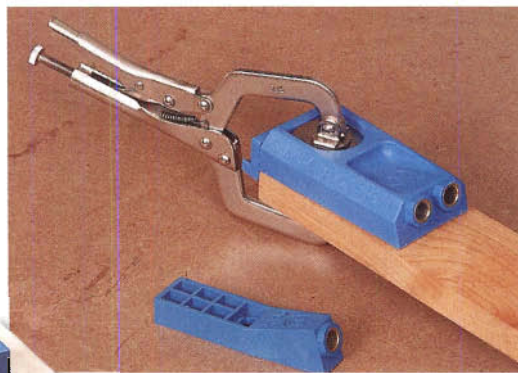




Molded into the support wings of the Kreg K2000 is a depth-stop guide for setting the collar on the stepped drill bit. Quite handy.



A pair of support wings on either side of the K2000 jig hold long or large workpieces steady for drilling.



The Kreg Jig ProPack comes with all three of the company's pocket-hole jigs: The K2000 jig (mounted to a plywood base here) and the Rocket and Mini jigs (above), along with the bits, face clamp, a riser block, spacer and screws.

Before you can drill the holes with any style of pocket-hole jig, you need to set a stop collar on the drill bit for the proper drilling depth. Kreg takes the guesswork out of this step. There's an indexing guide right on the support wings marked for 1½", 3/4" and 1/2" material. It's a super handy reference if you use the jig infrequently. Kreg provides three drilling guides on the jig instead of two so you can choose the pair that best suits the width of material you're drilling. Depending on the guides you use, you can drill joints in material ranging from 1¼" to 3¾" wide without repositioning the stock in the jig.

This package also includes the Rocket™ and Mini Kreg Jig® Pocket-hole jigs. Each of these smaller jigs clamps directly to workpieces using an included Face Clamp™ locking pliers. The Rocket Jig drills a pair of guide holes spaced appropriately for most face frame stock widths, but you'll need to shift the jig to drill holes in particularly narrow or wide stock. It has provisions for working with 1/2" or 2x material as well. The Mini Jig drills a single hole in 3/4" material. It's tiny and well suited for slipping a screw here or there into tight places, like making furniture joint repairs.

Today's Shop continues on page 92 ...

Kreg Jig® ProPack: An All-in-one Solution

Kreg Jig® ProPack

Kreg's flagship pocket-hole joint system, the ProPack, includes three different jigs. The Kreg Jig K2000 is the heart of the system. It's an L-shaped drilling guide made of glass-reinforced nylon with an integral toggle clamp. The jig can be used as is, but the company recommends fastening it to a plywood base. This way, a pair of support wings can be mounted on either side of the jig to provide bearing surfaces for long or wide work.

One of my criteria for sizing up these jigs is their ability to drill joints in workpieces of various thicknesses. Granted, most of the time you'll probably build pocket-hole joints in

1x stock, but not always. Since the drilling guides are locked at 15° angles, you can't vary the pitch of the screw holes — only their entry points into the wood. Kreg's solution for drilling 1/2" stock is to provide a step block that slips into place to raise up the workpiece and in turn, lower the hole positions. For 2x stock, you get a riser block that stacks under the drilling guides to move the screw holes higher on the stock. Using these accessories keeps the hole positions centered across the stock thickness, right where you want them. The changeover is quick and easy, but be sure to store these important jig accessories in the carry case provided to keep from losing them.

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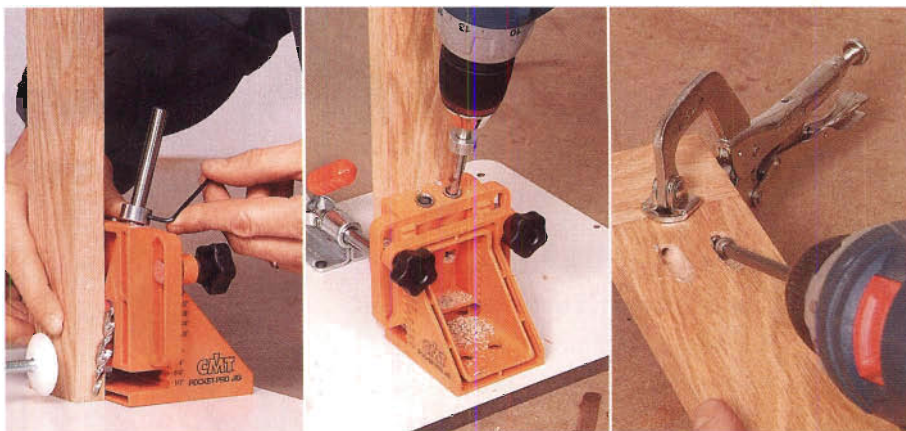
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Pocket-hole Jigs: The Basic Drill

All in all, the Kreg Jig ProPack includes everything you could possibly need for pocket-hole joints, including an exhaustive manual, two packs of screws and a pair of square-drive bits, all for \$140. If this is more than you want to commit to pocket-holes, you can purchase the jigs separately with fewer included goodies. One of the other packaging options, called the Rocket Pocket-hole System, is probably the ideal buy for an occasional user. It comes with the Rocket jig, drill bit, square-drive bit for the screws, face clamp and screws and sells for about \$60. The company also sells bulk screws in various sizes, wood



Regardless of which jig you buy, the technique for building pocket-hole joints is basically the same: Slip the stepped bit into one of the drilling guides on your jig and set the depth collar so the tip of the bit stops about 1/8" short of the end of the workpiece (above left). Clamp the workpiece in the jig (or the jig to the workpiece) so the drilling guides are centered across the width of the wood. Drill both holes (above center). Clamp up the joint and drive the screws home (above right). A face clamp makes the final clamping step awfully convenient.

plugs to fill the pocket-holes, project booklets and videos as well as larger face clamps. With all the options, it's easy to see why Kreg continues to set the bar industry-wide on pocket-hole joints.

Andrews Toolworks Pocket-hole Jig
Around \$30 buys Andrews Toolworks's solution for pocket-hole joinery. It consists of a pair of aluminum drilling guides with hardened steel inserts held

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If your jig doesn't come with a stepped drill bit, buy one. It drills both a 3/8" counterbore and a 1/8" pilot hole for the screw while also providing a flat "step" for the screw head to seat against. Pocket-hole screws come in both panhead and washerhead varieties in three lengths: 1" for 1/2"-thick stock, 1 1/4" for 1x material and 2 1/2" for 2x stock. The fine-thread screws are meant for joining hardwood, while the coarse thread screws are for softwoods and composites. They all have square-drive heads. You'll need a long driver bit to set them into the deep counterbores.

together by a crossbar. The jig adjusts easily to different stock widths by loosening a large thumbscrew and sliding the drilling guides apart. A ruler on top tells you what the distance between the

screws will be. In most cases, this information isn't critical. You really only need to space the holes evenly across the joint, but if you're doing exacting work, the ruler could be helpful. One guide slides off the bar

and works independently for drilling a single pocket-hole in extraordinarily tight spots.

This jig lacks an integral clamp, but a C-clamp works nicely to hold it in place during use. A pair of adjustable backstops allow for varying the hole positions off the board end. You'll need to move them whenever the stock thickness changes. I found the adjustment screws on these stops a bit small to tighten and loosen easily by hand. A single-piece backstop with a larger screw head would make for easier adjustments.

The drilling guide's have a clearance area where the bit enters the wood that allows for chip ejection. It's a sensible detail that isn't there on some other jigs and keeps the bit from clogging up.

Today's Shop continues on page 94 ...

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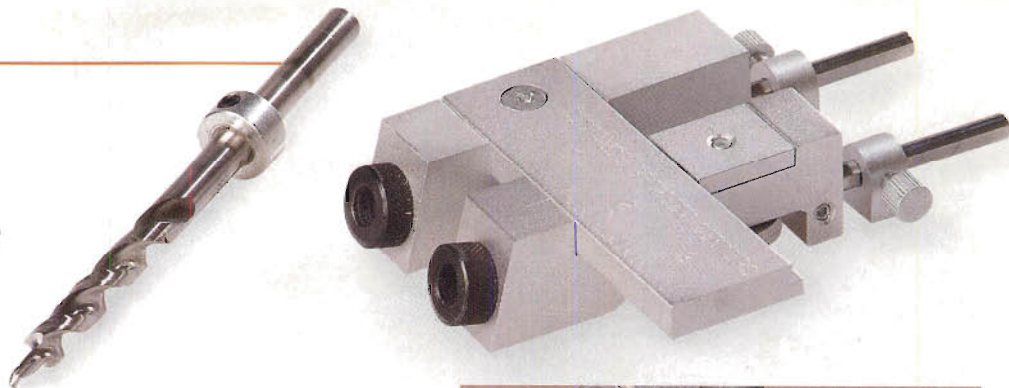
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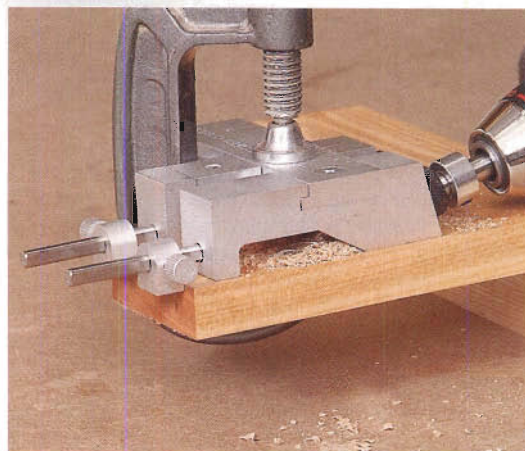


Overall, this sturdy jig is easy to use and works admirably once you figure out how to set the drilling depth. There's no manual that spells out the correct settings — just a few brief instructions on the packaging card. Aside from better directions, a driver bit for the screws would be a nice inclusion.

Rockler®/Kreg™ Pocket-hole System

Rockler is launching pocket-hole joints to different heights by strapping a Kreg Rocket Jig to an aluminum router table plate. Here, the Rocket jig stands vertically and slips over a toggle clamp that moves it back and forth. There's an aluminum backstop to hold workpieces in place when you slide the Rocket forward and lock down the toggle clamp. Or drop the base plate into your Rockler router table to create a pocket-hole drilling station using the router table fence as a backstop. The jig also works fine when clamped to a workbench.

A clearance area on the Andrews Toolworks jig keeps chips from accumulating inside the steel guide bushings and binding the bit. A pair of backstops slide along rods in back and make the jig adjustable for a variety of stock thicknesses.



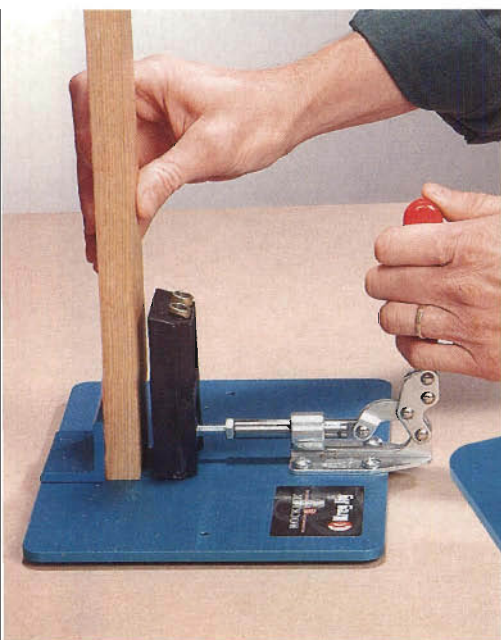
There are no surprises with this jig. The Rocket Jig, toggle clamp and base plate are bulletproof and work together without a hitch. Although you can adjust the toggle clamp in or out to hold workpieces of different thicknesses, the Rocket is designed to drill 1x stock as is. The package doesn't come with Kreg's plastic riser block or spacer to retrofit the Rocket for working with 2x or 1/2" stock.

For \$80 you can buy the Standard Pocket-hole System that comes with just the jig. Drop an extra \$20 for the Master Pack and you'll get a stepped drill bit with depth collar and 100 screws. Either way, the instructions are well written and tell you all you need to know to get started.

Today's Shop continues on page 96 ...

Rockler®/Kreg™ Jig: Rocket with a Twist

Rockler has teamed up with Kreg in this pocket-hole jig design. Clamping down the Rockler/Kreg jig presses the drilling guides against the workpiece — not the other way around like other jigs.



Think you know pocket hole jigs? Not unless you know the Pocket-Pro! Meet CMT's Pocket-Pro™ Joinery System

Sure, there are other pocket hole jigs out there - perhaps you already own one - but there's never been a tool like our new **Pocket-Pro™ Joinery System**.

Developed by CMT and wood-working expert Marc Sommerfeld, the Pocket-Pro lets you make rock-solid pocket hole joints in stock from 1/2" to 1-5/8" thick with unprecedented speed, flexibility & accuracy. The heart of the system is our unique molded jig, which



features an interlocking 2-piece design. Simply sliding the jig up or down allows you to adjust for stock thicknesses in preset 1/16" increments, without test joints or measurements!

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◆ PPJ-001 Pocket-Pro Deluxe Set:

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◆ PPJ-002 Pocket-Pro™ Starter Set:

Not just a set for beginners! This is a great upgrade kit for pocket hole "pros" who own another jig. It includes the Jig, Toggle Clamp, Drill Bit, Stop Collar, 6" Driver Bit and Sample Screws.



Ask your CMT distributor for the full story about the Pocket-Pro, plus CMT's router bits, blades, shaper cutters and more. Or contact CMT for your free 2003 catalog, and the name of a distributor in your area.

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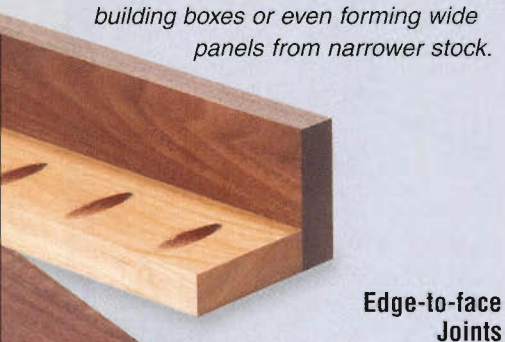
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Pocket-hole Joinery

Pocket-hole joints are perfect for carcass and face frame construction, but the applications don't stop there. They're also well suited for assembling picture frames, making corner blocking, building boxes or even forming wide panels from narrower stock.



Edge-to-face Joints



Miter Joints



Face Frame Joints



Corner Block Bevel Joints



Edge-to-edge Panel Joints

Simp'l Products Pock-It Jig™ Kit

If every tool dollar you spend comes from a modest fund, this jig will get the job done without breaking the bank. The company's credo to "keep it simple, easy to use and economical" holds true here. Everything you need to start building joints comes packaged with the Pock-It Jig for around \$40.

The jig is basically a C-shaped aluminum extrusion with a pair of steel bushings fixed at 1" apart. Workpieces clamp inside the jig using a thumbscrew. There's a plastic pad included to keep the clamp from marring whatever stock you're drilling, but unfortunately, the one on my jig kept falling off. Some sort of

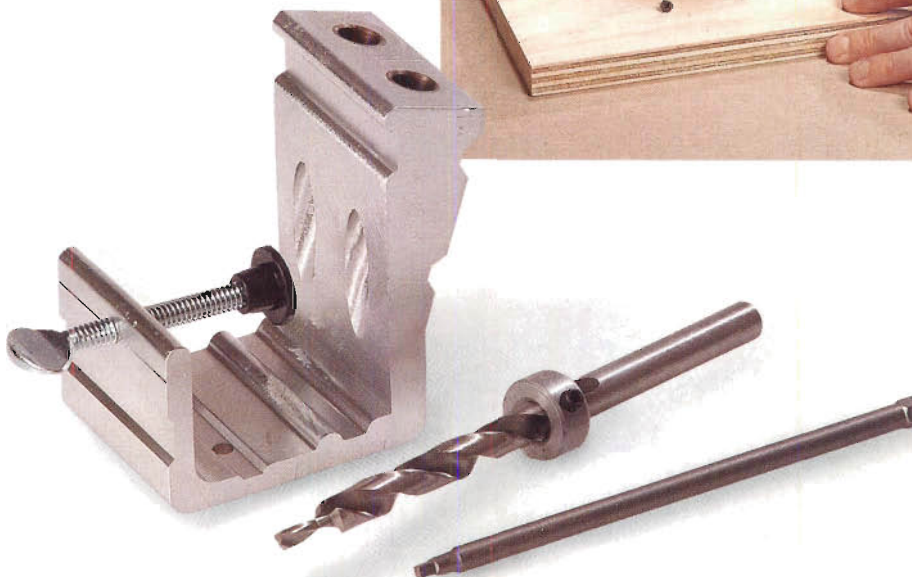
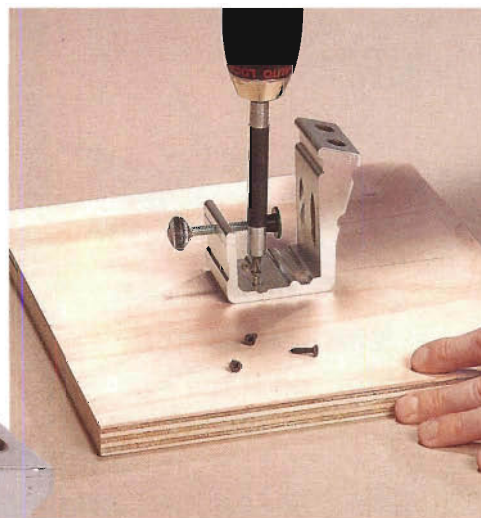
fixed pad would be a good design improvement here, or the pad will disappear into the wastelands of your shop in no time at all. This jig has no holes for clearing the chips during drilling, but that didn't cause me a lot of problems. My bit continued to bore the holes without any sign of binding.

You'll want to mount this small jig to a larger base to keep things steady during use. I appreciated that although the instructions are limited, they tell you how to set the bit stop collar for correct drilling depth. There's no vertical adjustability for these guides, so the jig is limited to drilling 3/4" or thinner stock, which should take care of most of the pocket-hole joinery you're going to come across.

Today's Shop continues on page 98 ...

Simp'l Products Pock-It Jig™

The author mounted the Simp'l Products Pock-It Jig on a plywood base to give it a more solid platform. The jig has predrilled holes in the bottom for this purpose.



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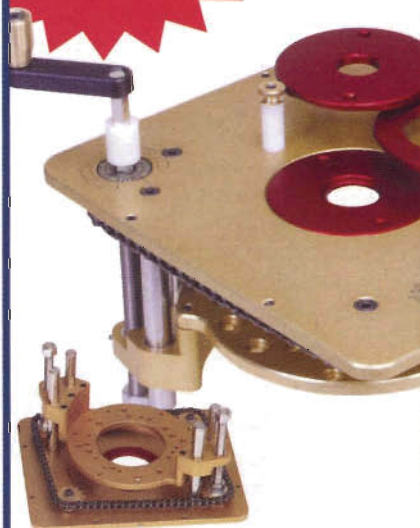
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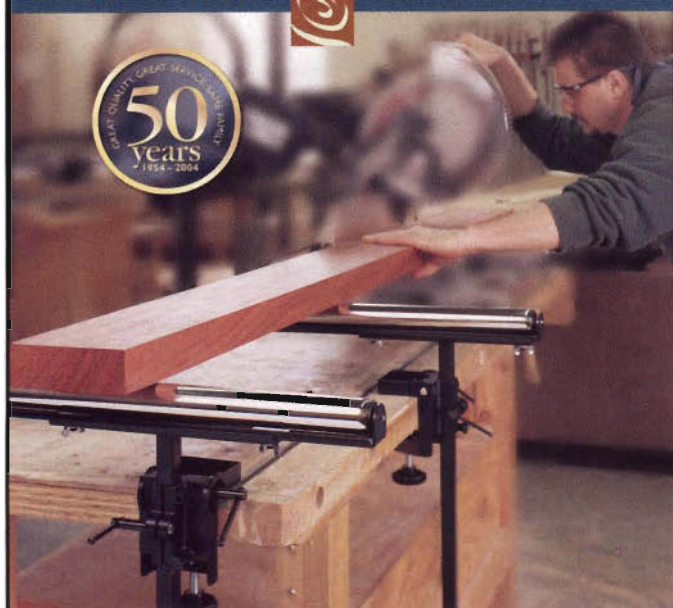
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TASK Pro Center Jig: A Convertible Choice

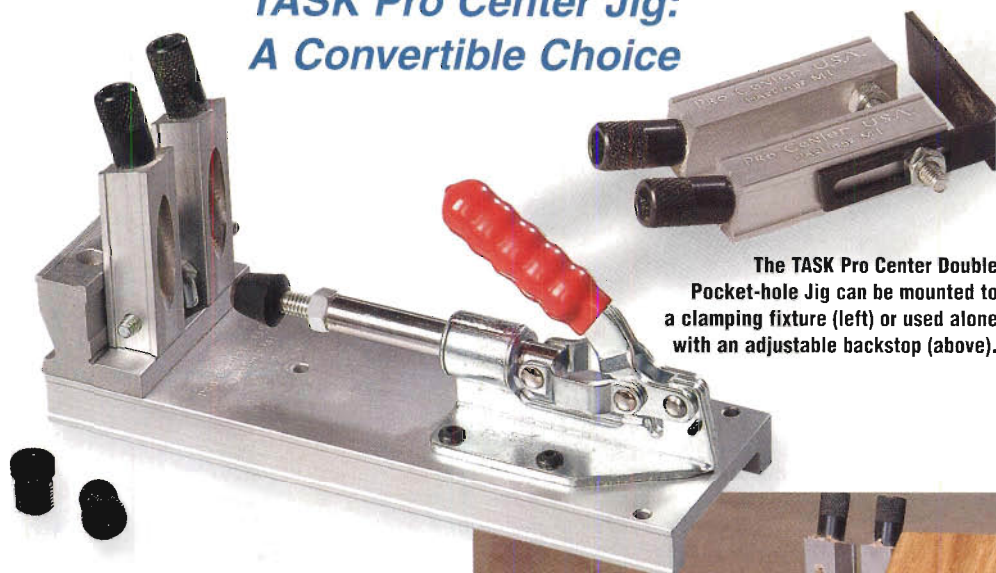
Simp'l Products scores points for including the stepped drill bit, driver bit and a handful of screws. If pocket-hole joints tend to find their way into your projects only occasionally, this kit is the way to go.

TASK Pro Center Double Pocket-hole Guide and Clamping Fixture

The folks at TASK give you the option to go "bare bones" with their Double Pocket-hole Guide for around \$21 or buy it in tandem with a Clamping Fixture for about \$100. My test kit didn't come with a stepped drill bit, driver bit or screws.

If you buy only the Double Pocket-hole Guide, it includes a one-piece backstop that can be adjusted for drilling stock of different thicknesses. The pair of aluminum guides comes with thread-in 3/8" guide bushings and a second set of 1/8" bushings. You can use the large and small bushings if you drill the counterbores and pilot holes for the screws with conventional drill bits. A stepped bit poses less hassle because it tackles both holes using only the larger bushings.

The guides adjust laterally on a threaded rod for spacing screw holes from 7/8" to 2 7/8" apart. You won't get a locking clamp with this jig for holding the guides on a workpiece. I used a pair of small C-clamps with good results. It takes



The TASK Pro Center Double Pocket-hole Jig can be mounted to a clamping fixture (left) or used alone with an adjustable backstop (above).

The only tarnish on TASK Pro Center's otherwise sturdy and easy-to-use jig is the lack of chip ejection. Chips became impacted inside the pocket-holes during drilling, which tended to bind the bit.



two clamps to hold things down since the guides move independently on the threaded rod.

For serious joint-making, I'd recommend buying the clamping fixture. It's a sturdy aluminum unit with an integral toggle clamp. A J-bolt and nut grab the threaded rod and hold the drilling guides in place. Once the guides are bolted down, the fixture doesn't allow the guides to adjust up and down. As is, it will handle 1x or thinner stock if you fashion a spacer to lift the wood off the base. You'll have to remove the guides and use them with the backstop for drilling 2x material.

My only other gripe with an otherwise well-made jig is that there are no chip ejection holes in the design. My drill bit loaded up regularly on impacted wood chips inside the guides, and I had to reverse the drill to back out the bit. This happened both when I used the guides and backstop and when the guides were mounted in the clamping fixture. I didn't have this problem with any other jig — even others without chip ejection provisions. It could be that the

Today's Shop continues on page 100 ...

Contact Box

Here's a list of the companies mentioned in this article. Call them for more info on where to buy their pocket-hole jigs or to find out more about their complete line of products.

Andrews Toolworks	800-821-8378
Kreg Tool Company	800-447-8638
Rockler Woodworking & Hardware	800-279-4441
Simp'l Products, Inc.	914-662-2820
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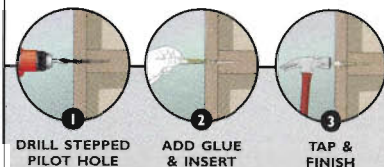


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CMT's Pocket-Pro™: Two Options

The CMT Pocket-Pro is available in two packaging options. The system I tested comes complete with a phenolic base plate, face clamp, toggle clamp and bits. Or you can spend a bit less, pass on the base plate, and mount the same jig on plywood.



Raising the drilling guides for boring stock of different thicknesses is easy with the CMT Pocket-Pro. Just ratchet the drilling guides up or down on the sawtooth rack using the thickness scale printed on the jig.

bores in the aluminum guide blocks are slightly smaller than others, so the chips tend to load up.

The instructions that come with this tool are brief but won't leave you in the dark about setup or use. While this jig will surely provide years of reliable service, a stepped drill bit and driver bit would make it a better all-around value.

CMT Pocket-Pro™ Joinery System

Ingenuity runs in the Sommerfeld family. Marc Sommerfeld, brother of Craig Sommerfeld, has developed a pocket-hole joint system in conjunction with Italian bit and blade producer CMT. The drilling guide is made of molded material and features a pair of interlocking

parts that fit together on a sawtooth rack. Adjusting the jig vertically for different stock thicknesses is a breeze. A scale printed next to the rack tells you exactly which height setting to use for the workpiece thickness you're drilling. The jig will handle stock from 1/2" to 1 5/8" thick with settings in 1/8" increments. No extra spacers or riser blocks are needed here.

This jig has two hardened-steel guide bushings set 7/8" apart, on-center. For drilling wider workpieces, you'll have to shift and reclamp the work to space the holes farther apart.

The Pocket-Pro is packaged as a Starter Set or a Deluxe Set. The Starter Set has a street price of \$70 and comes with a toggle clamp, driver bit, a locking-pliers style face frame clamp and a sampling of screws. The drilling guide and toggle clamp need to be mounted to a plywood base plate. The face frame clamp provided with this jig is a helpful third hand when driving the screws. If the jig you buy doesn't come with one of these clamps, it's worth the extra expense.

Sommerfeld's Deluxe Pocket-Pro Set sells for around \$130 and includes more bells and whistles. You'll get the sawtooth drilling jig, toggle clamp, face clamp, two stepped drill and driver bits and a 3/8"-thick phenolic base plate for mounting the guide and toggle

clamp. Everything conveniently fits into a nice plastic carry case.

One minor grumble is that I found the tiny installation screws hard to thread into the base plate when I first mounted the drilling jig and clamp. Once assembled, the base plate fits right into Sommerfeld's Industrio™ router table, if you have one, to make a pocket-hole drilling station. Otherwise, it makes a sturdy foundation for the jig if you clamp it to a workbench instead.

Versatility and ease of use make either of these systems sure winners for building cabinets and face frames on a regular basis. Sommerfeld also offers videos and DVDs on cabinetmaking using the Pocket-Pro.

And the Winner Is ...

Hard to pick. Simp'l Products definitely gets my vote for low-cost, no frills joint-making. If you're serious about adding pocket-hole joints to your joint repertoire, you can't go wrong with either the Kreg or CMT lines of jig products. They come with everything you'll need and deliver solid results. Remember, whichever jig you buy, the stepped bit, driver bit and screws are necessities, and they'll boost the purchase price by \$20 or more.

Chris Marshall is a Woodworker's Journal contributing editor.



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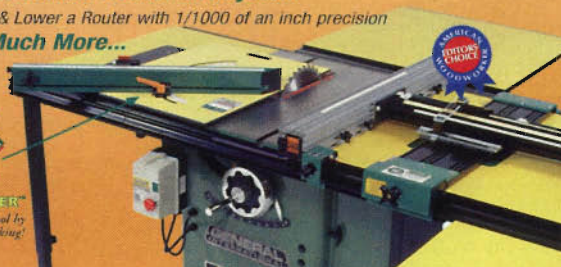
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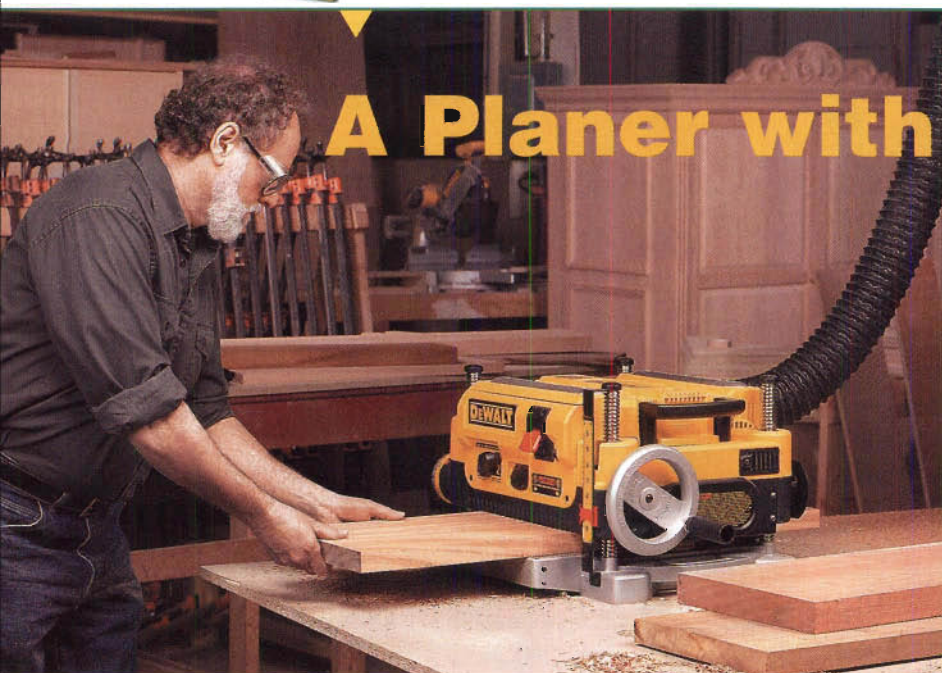
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A Planer with Extras

If you're in the market for a 13" benchtop planer with all the extras, look no further than DeWalt's DW735. I used it extensively when building the "Dresser Valet" last issue, and it worked like a champ.

Released late last summer, this all-new, 15-amp planer has a two-speed transmission that produces 96 cuts per minute (cpm) in "dimensioning" mode or 179 cpm in "finishing" mode. Shift gears by flipping a lever. Underneath is a three-knife cutterhead — a first for benchtop planers — with indexed, reversible knives that can be changed with one onboard tool. Adding the third knife and higher cpm setting dramatically reduces tearout, even when the grain direction changes in mid-pass.

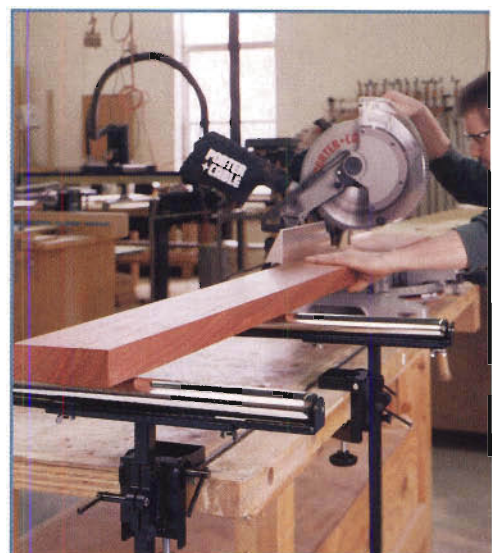
Setting cutting depths is easy. There's a turret depth stop on the side with six presets ranging from 1/8" to 1 1/4", or use the material thickness scale in front for shaving off just what you want, whatever the stock thickness. The conventional depth scale is there, too, large and right out front where it's easy to see.

DeWalt's industry-leading three knife, 13" planer also features a large and easy-to-read cutting depth scale.

DeWalt has taken great pains to help make snipe a non-issue with this planer. Each of the four oversized columns has a built-in carriage lock, so there's no extra lever to engage (or forget to engage!) before planing. Just crank the planer to the cutting height you need and go — anti-snipe is always on. During planing, fan-assisted chip ejection draws debris up and away from the knives where it could otherwise leave divets and blows it out a 4" port in back. With a dust collector attached, the system leaves scant few chips behind.

A mobile stand, folding infeed and outfeed tables and replacement knives are all separate accessories. The DW735 sells for \$479. *For more information, call 800-433-9258 or visit www.dewalt.com.*

— Chris Marshall



Rolling support anywhere in your shop

The new Roller Support with Universal Clamp from Rockler Woodworking and Hardware is ready to lend some friendly support in your shop. "This is a versatile tool that features a roller head which can be rotated 90 degrees to provide support in any direction," says Steve Krohmer, Rockler's vice president of merchandising.

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The sander includes two 4" dust ports and comes with a cabinet stand that includes a latching door and interior shelf. The G0518 sells for \$395.

For more information, visit www.grizzly.com or call 800-523-4777.

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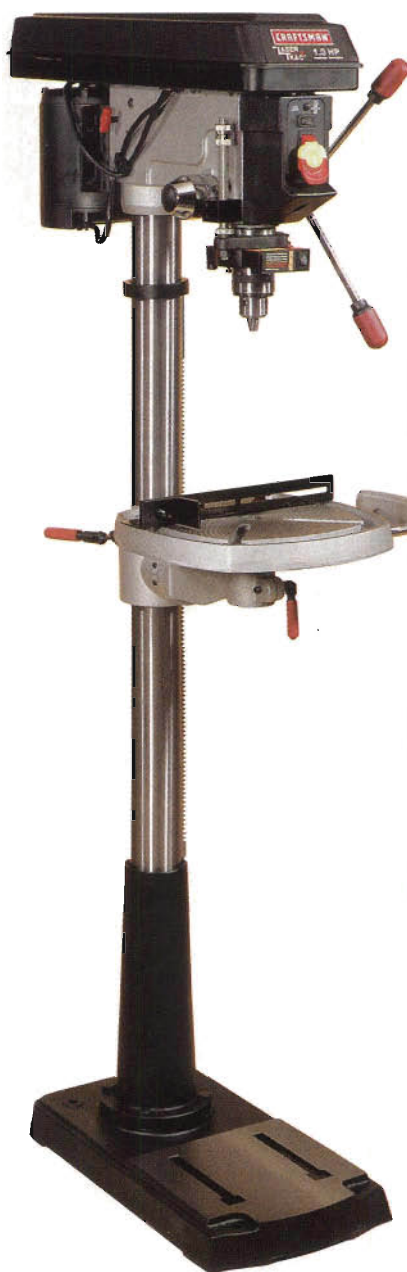
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First Laser Drill Press

Shopping for woodworking tools is starting to have a lot in common with viewing a laser light show. This week, another beam cuts through the air as the first laser-equipped drill press hits the stores.

Craftsman's 15" drill press with LaserTrac™ features an "X-Y Axis Laser Attachment." What this means is that the showy red lights form an "X-marks-the-spot" cross on your workpiece. The idea is that, after you've lined up the center of the X with the mark on your workpiece, you can be confident of bringing the drill bit down exactly in the right place.

(Once you've started to drill in the right place, you can also use the depth adjustment rod to set the depth of the bit for repeat drilling.)

Besides featuring the latest laser technology, the drill press (Sears model number 22925) is also ambidextrous: the feed handle can be mounted for either left- or right-handed operation. Other adjustments come from a table that can bevel 45 degrees and swivel 360, as well as be raised and lowered, and from a telescoping table extension that provides support for large workpieces.

Bits and sanding drums up to 5/8" fit the keyed chuck. A 1 HP induction motor has 12 speed settings ranging from 250 to 3,100 rpm.

A few more little extras also come with this drill press: a fence and stop block, and a removable locking key for the on/off switch. (If you put the key in your pocket, you'll be the only one able to turn on the drill press and check out the laser action).

You can find out more about the LaserTrac Drill Press at www.craftsman.com or by calling 800-549-4505.



Laser-illuminated Miters

As part of its new line aimed at professional woodworkers, Ridgid Tools is introducing the MS1290LZ 12" Dual Bevel Sliding Compound Miter Saw. The MS1290LZ incorporates what is now a standard feature on all Ridgid compound miter saws: the Exactline laser alignment system. Ridgid spokesperson Jeff Drake says, "Ridgid's family of compound miter saws has set a higher standard for accuracy and ease of alignment with Exactline."

The system projects a line from an arbor-mounted laser onto the work, with no adjustments required after a blade change. The spinning arbor automatically activates the laser — as the saw comes up to speed, the laser projects its beam directly alongside the blade, regardless of thickness. The MS1290LZ bevels left and right, allowing you to adjust the saw instead of flipping the workpiece. The MS1290LZ's suggested retail price is \$599.00. For more information, call 800-474-3443 or visit www.ridgid.com.

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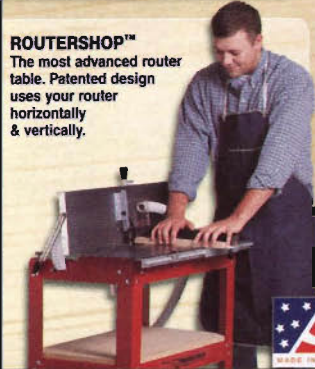


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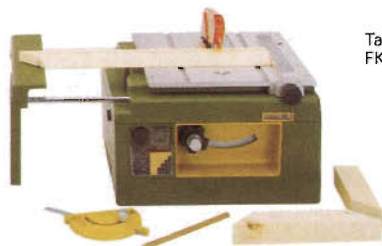


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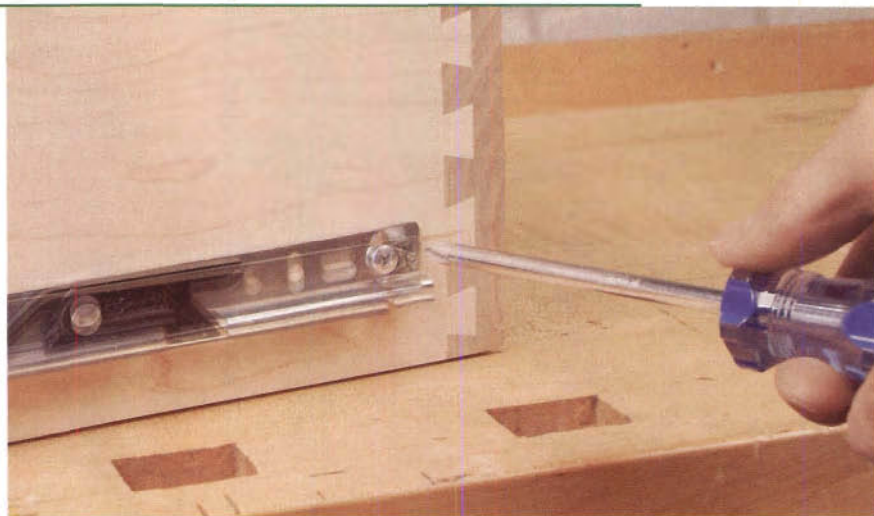
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Palmgren has recently moved into woodworking with a line of 40 tools — including this 10" Tilt Head Band Saw. Since the head tilts, not the table, you have a horizontal work surface for making angle cuts. (A miter gauge is included for this purpose.) A patented feature on Palmgren's woodworking tools is the "dustup" dust collection system: a built-in impeller and duct system collects sawdust and wood debris. The 10" Tilt Head Band Saw has a 1/2 HP motor and 63.5" blade, with six teeth per inch. The Tilt Head Band Saw lists for \$299.00.

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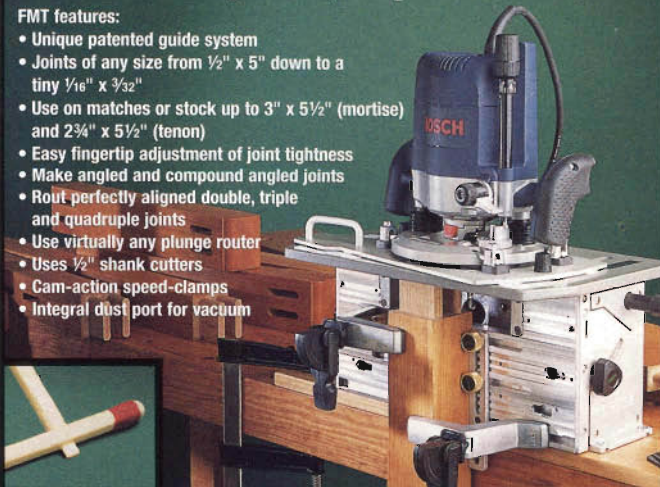
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Reject, Restore or Refinish

By Michael Dresdner

Chances are, there are some pieces around your house whose finish could benefit from some attention. You'll need to decide first whether or not they are worth salvaging at all, and then choose between two options: saving and restoring the finish, or stripping it off and refinishing.

Rejected

In most cases, it is not an abysmal finish that will deter you, but rather advanced structural problems. Peeled veneer, missing parts or poorly repaired joinery make some pieces not worth the effort to save, even if they were refinished.

While refinishing is always an option, it is wise to remember that thick, multiple layers of paint are messy and time-consuming to remove. Before you start, carefully

scrape the finish off a small area to see if beautiful wood hides below, then wet the scraped area with water or mineral spirits to see the wood's true color and figure.

Almost all finishes will come off, though not necessarily easily. Watch out for thick, plastic-looking clear coats, like those used for decoupage and some bar tops. They will resist most chemical strippers, and sanding them off may result in more damage than the job is worth. Milk paint, a durable, traditional coating, is also impervious to most strippers, but can be removed with either lye or special milk paint strippers. The bottom line is often "Is it really worth that much effort to save a pig in a poke?" If it is, Real Milk Paint Company (800-339-9748) has a stripper, as does Behlen (PDE Paint Remover), available at Rockler or Woodcraft.

Restore It

Many pieces, including most kitchen cabinets, are clear finishes over stain. If the finish is intact and not peeling, and there are no huge bare areas, you can usually restore what is there. That can include cleaning, removing white rings, rubbing out minor scratches, touching up serious ones, filling dings or even adding extra finish. You may have to do some or all of these steps, pretty much in that order.

•**Cleaning Up:** Clean the finish first. Use mild soap and water for gentle cleaning, or graduate to TSP in water or mineral spirits to remove old wax and greasy or heavy dirt. In tough cases, use fine (0000) steel wool to help dislodge the dirt. You'd be surprised at how often a good cleaning is all that is needed, in which case you can go directly to rub (below) to restore the sheen.

•**White Rings:** White rings caused by water marks often come out when you clean the surface and remove old wax. If they don't, simply wipe them with a cotton cloth dampened with denatured alcohol. The cloth should be damp, not soaked. Damp means "about as wet as a healthy dog's nose." Alcohol may degloss the finish, in which case, move on to the next step.

There's not much value in a perfect finish if your piece is suffering advanced structural problems. The bottom line: Is it worth the effort to save a pig in a poke?



•**Rub:** If the finish is in good shape, but has merely lost some of its sheen to minor surface scratches, rub it. For a satin luster, use 0000 steel wool dipped into paste wax and rub back and forth in the direction of the grain to impart a series of fine, uniform scratches. Wipe off the excess wax immediately, or let it dry and buff it off for a slightly shinier surface. For gloss finishes, use rubbing and polishing compounds from the automotive store.

•**Touchup:** Now that it's clean, you'll see all the little nicks and scratches where color is missing. Your local woodworking specialty or hardware store will stock several different brands of touchup markers in a range of wood colors. They look like normal felt-tip markers, and work the same way. Simply color in the light sections of scratches or edges where the finish has rubbed through. It's a good idea to buy several colors close to what you think you will need, and use whatever matches best, including combinations.

In the same section, you'll also find wax fill sticks that look like crayons in woodtone colors. Use them to fill in small dings and nicks. Rub the crayon over the defect until it fills up, then scrape off the excess with the edge of a credit card to leave a smooth, flat surface.

French Polish

The classic way to rejuvenate a clear finish on a fine antique is with French polish. Describing both the finish and the method of applying it, French polish involves applying thin coats of shellac with a cloth pad. Behlen (sold in many wood specialty stores) and Mohawk (sold online and through distributors) offer several versions of pre-mixed,

White rings from water marks often will disappear when you clean the surface and remove the old wax. If they don't, dampen a cotton cloth with denatured alcohol and gently wipe the area.

ready-to-use French polish under names like Qualasole™, Rapid Pad, Lacover®, and Lac French. This beautiful shellac finish is great for fairly gentle wear, but on the down side, it is neither heat nor alcohol resistant. Additionally, it does take some skill and practice to get a nice surface.

If you don't have the skill, you might try a new product I've been experimenting with — Bulls Eye™ French Polish from Zinsser. It is a traditional clear wiping finish that goes on in one step. Look for it to hit woodworking specialty stores around February 2004.

Overcoat

Finishes that are wearing thin can be recoated to add another layer (or two) of protection and many more years of wear. Almost any finish can be recoated with more of the same, but if you don't know what is on already, there are still several safe options.

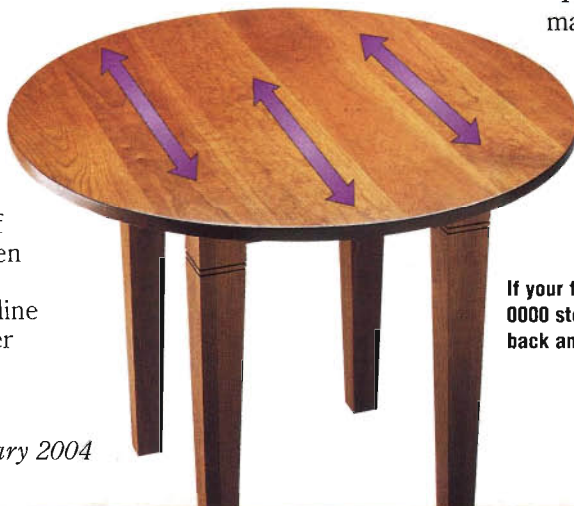
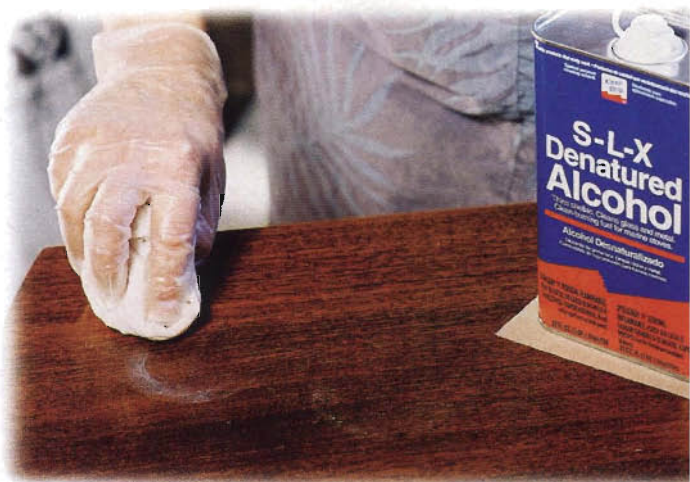
After cleaning, lightly sand the surface with 320 grit paper. Avoid sanding through the color, or you'll have extra touchup to do. Zinsser SealCoat™ is a good first step, as it will bond to any finish, and any coating, including waterbased ones, can go over it. Apply one coat as a clear primer, or add several to give you a classic shellac finish. Oil-based polyurethane can also go over any finish, including SealCoat, and is more durable. Painting is another option.

Refinish

When all else fails, refinish, but first, make sure it's appropriate. If you suspect you have a valuable antique, have a conservator or appraiser look at it. Stripping very old pieces can detract substantially from their value. But painted yard sale windfalls and battered, but sturdy, household pieces have a new life awaiting them once the stripper does its job.

I find it easiest to remove many layers of old paint by using a combination of methods. Start with a heat gun to get the bulk of the gunk off quickly and easily, then graduate to a semi-paste paint remover to get the remainders out of the

If your finish is in pretty good shape, try some 0000 steel wool dipped into paste wax, and rub back and forth in the direction of the grain.



I don't want to blow it!

I've got some stunning quilted maple and want to bring out the figure — but I don't want it too dark! Is there a way to use dye or stain but still keep the great look I get with boiled linseed oil — it adds so much depth to the wood?

*John Fels
West Allis, Wisconsin*



Boiled linseed oil brings out the best in many woods, particularly those with dramatic figure, like curly or quilted maple. Dye will do the same thing, even more dramatically, but may add too much color for some tastes. Here are two recipes for "popping the grain."

To add richness and a small amount of amber color to figured wood, flood the surface with straight boiled linseed oil (no solvent added) and keep it wet for 10 minutes. Then wipe off whatever was not absorbed. Let it dry two days before continuing with shellac, lacquer, oil varnish or polyurethane. If a waterbased coating is on the menu, seal the wood with a coat of dewaxed shellac first.

For a darker color, add oil-soluble dye to the linseed oil, but you'd be better off doing it in two steps. That's because most oil-soluble dyes fade in sunlight much more than water-soluble ones. The first step is to color the wood with a water-soluble dye by flooding it on, then wiping it all off immediately, while it is still wet. Let the wood dry, then do the above oil treatment on the dyed wood.

— Michael Dresdner

Winner! For simply sending in his question on popping a finish, John Fels of West Allis, Wisconsin wins the complete ZAR® Wood Finishing Kit at left.



If French polishing is new to you, help is on the way. Bull's Eye™ French polish, a one step clear wiping finish, will hit the shelves this February.

corners and moldings. For thin, single coats of paint or clear finishes, go straight to the chemical stripper. Either method is easier, and safer, than trying to sand off a finish, which will destroy patina, leave previously stained wood mottled and may cause you to abrade through thin veneers.

One word of warning is in order, and that word is "lead." Until 1978, lead was commonly used in house paint. If you suspect the piece is old enough to have lead-based paint on it, DO NOT sand the finish, and DO NOT use a heat gun on it. Chemical stripping is safer, but make sure the stripping gunk is allowed to harden and dry before disposing of it. For guidelines on removing lead paint safely, contact HUD's Office of Lead Hazard Control at 202-755-1785.

Sometimes, removing layers of old paint reveals beautiful wood underneath. Then again, you might find a chair made from mismatched lumber never meant to sport a clear finish, and even staining won't hide its piebald appearance. Don't worry; you can always resort to repainting it, and this time you get to choose a color you like.

Contributing editor Michael Dresdner's latest book, *Wood Finishing Fixes: Quick Answers to Over 175 Most Frequently Asked Questions*, is available from Taunton Press.

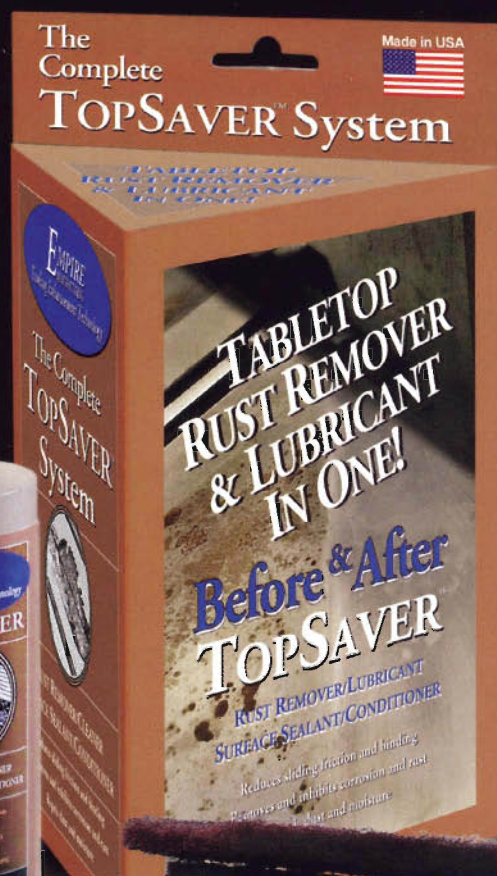
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