No-Nonsense, Super-Cheap Rolling Clamp Rack

OCTOBER 2007
ISSUE #164

POPULAR Woodworking

Learn How. Discover Why. Build Better.

After Machining, Get Your Boards Dead Flat

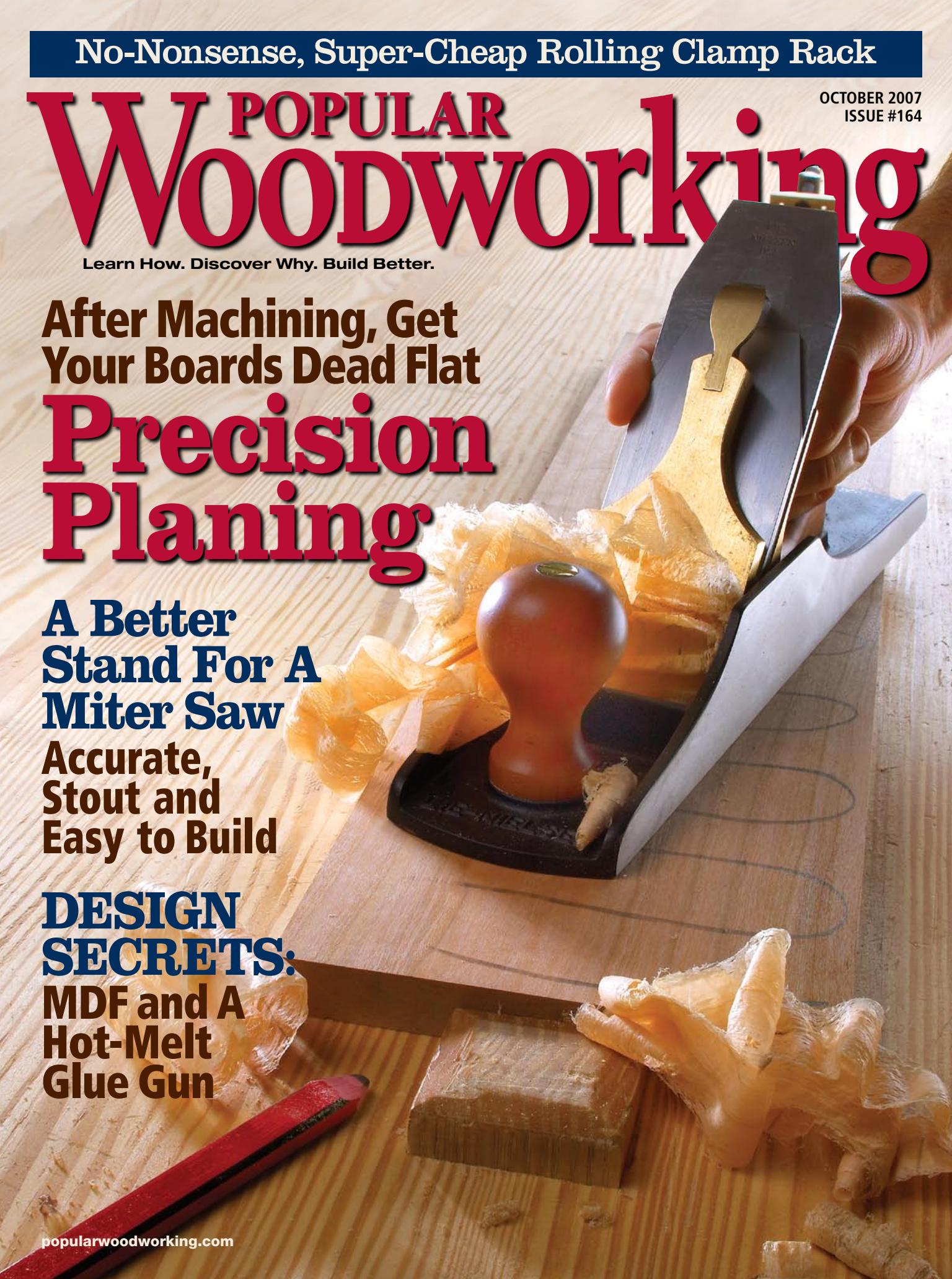
Precision Planing

A Better Stand For A Miter Saw

Accurate, Stout and Easy to Build

DESIGN SECRETS:

MDF and A Hot-Melt Glue Gun



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OCTOBER 2007

Features

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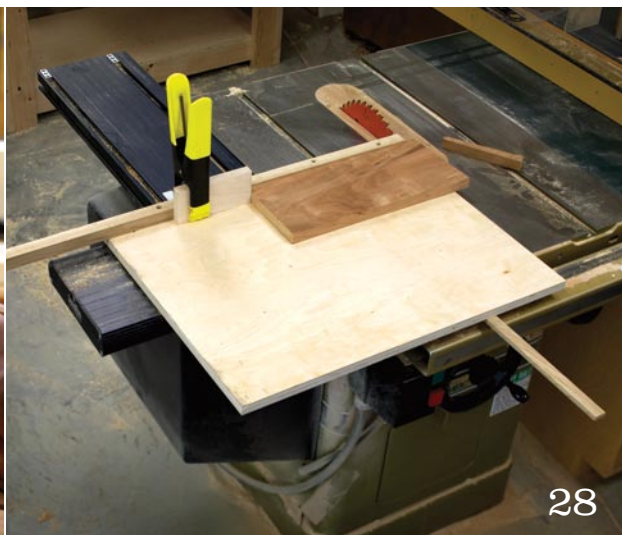
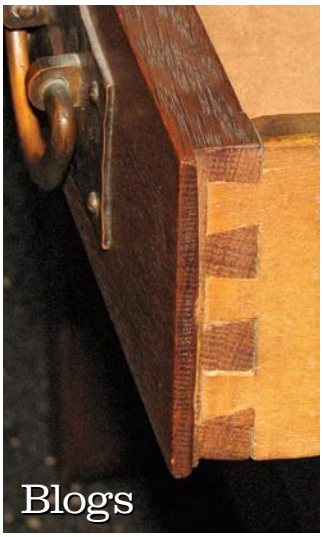


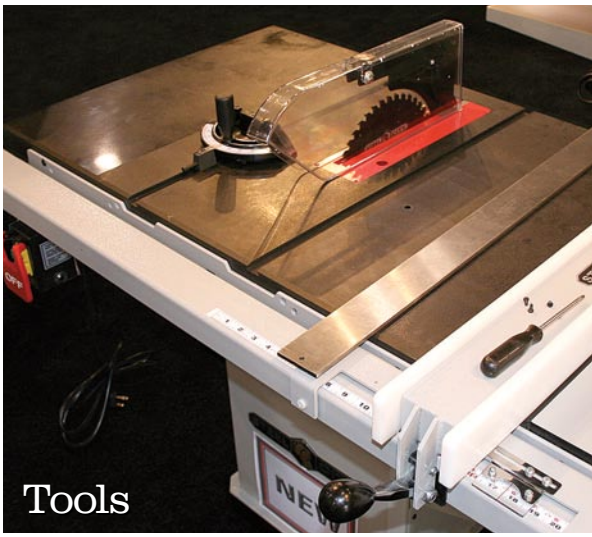
ON THE OCTOBER COVER

Boards that come out of your machines are seldom truly flat. Discover how to use a handplane to get them so flat even a machinist would be pleased. Page 54.

COVER PHOTO BY AL PARRISH

OCTOBER 2007
ONLINE





Video Gallery

Square Panels, Stopped Grooves and Norm Abram

Senior Editor Glen D. Huey shows you how to use a panel sled to square panels, and Editor Christopher Schwarz reveals how to use a plow plane to cut stopped grooves. Plus, Publisher Steve Shanesy interviews woodworking stars Norm Abram and Scott Phillips. You'll find these new videos and more.
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On the Blogs

Stickley Details

Senior Editor Robert W. Lang had the opportunity to get up-close and personal with some original Stickley pieces at a local auction; his pictures reveal interesting and surprising things about the makers' methods.
popularwoodworking.com/blogs

You Don't Need HVLP To Get a Great Finish

While an HVLP gun and spray booth can produce a picture-perfect finish, you can achieve the same results with a good brush and a little patience. Senior Editor Glen D. Huey shows you how.
popularwoodworking.com/blogs

New This Month:

Get a Preview of The Newest Equipment

Most of the *Popular Woodworking* editors attended the 2007 Association of Woodworking & Furnishings Suppliers (AWFS) fair in Las Vegas, where they got the inside track on what tools and machines we'll be seeing in the upcoming months and in 2008. And, they share it all on a special web page dedicated to the event.

You'll find out about innovative granite-topped machines from Steel City Tool Works; discover calipers made specifically for woodworkers; see the new handplanes from Lee Valley; get a look at a new Oneway lathe with an adjustable bed that literally lets you sit and spin; and much more. Plus, you'll find links to sponsored videos on new products from Delta/Porter-Cable, Jet, Powermatic, Grex, Epilogue Laser and more.
popularwoodworking.com/awfs

And More!

Visit popularwoodworking.com/oct07 to find a complete list of all the online resources for this issue – including videos, additional drawings and photos.

Contributors

David Charlesworth

David is an author and furniture maker who has specialized in teaching since 1977. He lives in Devon, England, where he teaches at Harton Manor Workshops – but he can also be found for a week or two every summer at the Marc Adams School of Woodworking in Indiana.

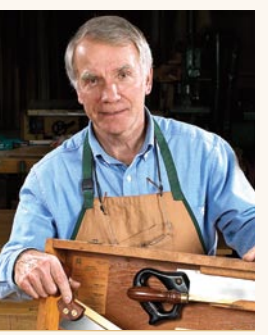
An accomplished author and DVD host, David's books include "Furniture-making Techniques" (volumes 1 and 2) and the new "A Guide to Hand Tools and Methods" (Guild of Master Craftsman).

In this issue, David writes about "Precision Handplaning," beginning on page 54.

Ted Brown

Ted is a furniture designer/maker from Almonte, Ontario, Canada. He was educated in fine woodworking in Canada, and later at The College of the Redwoods under James Krenov. Ted was the founder of Rosewood Studio, a now-closed school that taught high-end woodworking and attracted some of the finest teaching talent. He now designs and makes fine hand-made furniture in a small shop in Almonte, Ontario.

Frank Klausz



At the age of 14, Frank entered the Hungarian trade school system, earned his journeyman cabinetmaker certificate, and later became a master. His apprenticeship may have been tougher than most, for he had an exceptionally strict master – his father. Today, Frank builds fine furniture in his New Jersey-based shop, and teaches at various schools and woodworking shows. In this issue, Frank writes about his "Ruhlmann-style Poker Table," beginning on page 72.

Paul Anthony

Paul has been working wood for more than 30 years, turning it into everything from cabinets and furniture to guitars and carved wooden marionettes. Author of several woodworking books, and editor of *Popular Woodworking*'s "Tricks of the Trade" column, Paul never tires of sharing tips and techniques with other sawdust junkies.

Kara Gebhart Uhl

As *Writer's Digest*'s managing editor, Kara, *Popular Woodworking*'s former managing editor, now profiles authors instead of woodworkers and edits articles on nominalizations instead of shellac. Still, she was delighted when asked to profile John Wilson (p. 82). Although happy in her new position, sometimes she sneaks down to the woodshop just to take in that sweet sawdust scent.

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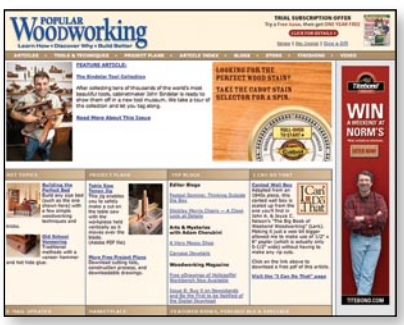
BY CHRISTOPHER SCHWARZ, EDITOR

Turbocharge Your Magazine

The magazine in your hands is just one part of the woodworking information that we create here at *Popular Woodworking*. And if you like the printed version, I think you'll sop up the online information we provide.

I know there are some readers who still resist the Internet. And if that's you, I encourage you to visit your library and use one of the computers there to visit popularwoodworking.com and look around.



There's lots of information on our site that we don't have room for in the printed magazine: older articles, extra step photos, additional tool reviews and video. Here's a quick look at what's out there (at no additional cost to you):

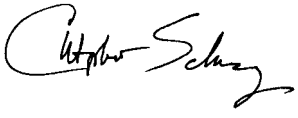
Subscribe to our Free Electronic Newsletter. Every week, we send out a short newsletter via e-mail to tell you about the new content on the site. You'll be the first to find out about new contests, free videos and tool reviews we don't have room for in the magazine. Sign up for the newsletter on our home page. It takes one minute and is the key to exploring all the additional information on our web site.

Read our Editor's Blogs. All the editors write for our magazine's blogs, which are like an online diary. While some bloggers chronicle what their kids ate for breakfast, we fill ours with woodworking information. Read about Senior Editor Robert W. Lang's trip to a furniture auction and see the surprising photos he took of the inside of classic Arts & Crafts pieces. And find out the rationale for why Senior Editor Glen D. Huey never finishes the inside of his drawers. Go to popularwoodworking.com/blogs to get started. Also, the easy way to read our blogs is to have the content sent to your e-mail box. To sign up for e-mail notification, look at the top of the blog's main page.

Watch our Videos. This year we purchased a digital video camera and are posting instructional videos at popularwoodworking.com/video.

Find Additional Content for Each Issue. When we build a project or research a technique for the magazine, we always have additional content to share. And the Internet lets us do that easily. Throughout the magazine, you'll find an icon that tells you there is additional Internet content available. But how do you find that content? It's easy. Each new issue of *Popular Woodworking* has a special web page that lists all the stories in the magazine and points you to any additional digital content. To get to the page for that issue, you need the month and the year of the issue. You're holding the October 2007 issue. The special page for this issue is popularwoodworking.com/oct07. Next month's issue will be popularwoodworking.com/nov07 and so on.

So sign up for the newsletter, sign up for our blogs and check out the special page for this issue. It's really a way to get more woodworking information for the same price you paid for the subscription. **PW**



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Safety Note

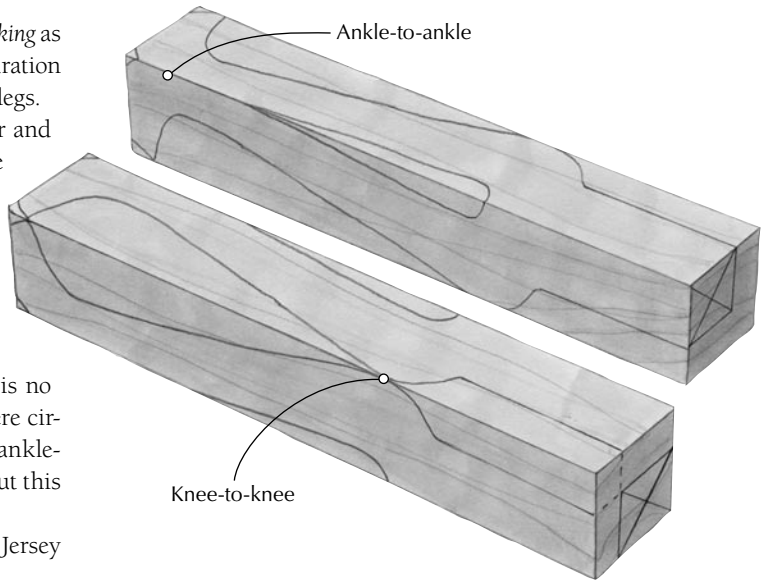
Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand.

Cabriole Leg Layout is Mostly A Matter of Preference

I have been researching my past issues of *Popular Woodworking* as well as other magazines, books and references I have in preparation to begin work on a Queen Anne-style side table with cabriole legs.

In reading Glen Huey's side-table articles in the October and November 2004 issues (#143 and #144), I noticed that he marks out his leg blanks by arranging the leg pattern on adjacent faces knee-to-knee. In contrast to that, Lonnie Bird states in "The Complete Illustrated Guide to Shaping Wood" (Taunton) that the leg should be marked on adjacent faces but by arranging the pattern ankle-to-ankle. It is obvious from the beautiful work done by both of these fine craftsmen that, as in most aspects of woodworking, there is no single correct way to accomplish this task. However, are there circumstances when knee-to-knee should be used instead of ankle-to-ankle (or vise versa) or are the two methods of marking out this style of legs basically interchangeable?

— Bob Rozaieski, Swedesboro, New Jersey



You raise an interesting point. Although some woodworkers feel their method is the only correct method to use, there is no difference in drawing the pattern and cutting the cabriole legs by positioning the pattern knee-to-knee or ankle-to-ankle. Each method results in a correctly cut leg awaiting the shaping process.

However, there is one important piece to this puzzle that needs to be addressed. That is the leg stock.

If you've milled your stock to the widest measurement of the leg profile, which is how most cut sheets are published in magazines and books, either method will yield great results. But if you haven't milled the lumber to the final size before band sawing, you'll need to set the pattern ankle-to-ankle. With oversized leg stock, setting the pattern knee-to-knee will affect the size of the post block at the top of each cabriole leg.

— Glen D. Huey, senior editor

Traditional Methods for Mortise and Tenons, Glue

I always enjoy reading Adam Cherubini's articles in *Popular Woodworking*. However, after looking through the June 2007 issue (#162), I would like to respond to two statements he made about traditional methods.

The first is about making single or double mortises on wide boards. Adam states, "I believe this was done to save time mortising." There are two reasons why this is not true. First, it actually takes slightly longer to cut two mortises, because cutting the end grain is slower than cutting the long grain. Second, and more important, making two smaller mortises instead of one longer mortise prevents the sides of the mortise from breaking out. Thus, the joint is stronger.

The second statement is the differences between hide glues and yellow glues when making the joint tight or "gappy." Hide glue is not a gap filler and requires a tight joint, which is the goal of good woodworking. Hide glue, when at the proper temperature and viscosity, forms a very fine film, much finer than yellow glue. Thus, hide glue allows for much tighter joints, and works perfectly in that situation.

Traditional 18th-century woodworkers relied more on the mechanical strength of good joinery, such as dovetails and pegged mortise-and-tenon construction. Glue was used, but the real structural integrity came from the joints themselves.

— W. Patrick Edwards, San Diego, California

Edwards is the seller of Old Brown Glue, available at wpatrickedwards.com.

ILLUSTRATIONS BY HAYES SHANESY

Use of Tar in Arts & Crafts Finish

I am a novice woodworker and have been slowly developing my skills with the restoration of my 1923 Craftsman bungalow. I'm always on the lookout for new finishing ideas (this being one of my weaker skills) and read the Authentic Arts & Crafts Finish article (*Woodworking Magazine*, Spring 2007) with great interest. There was some new information there that I look forward to applying to my own projects.

However, it also prompted me to write in regarding a finishing technique (or more aptly a formula) that I had read about in a publication I've long since misplaced. It was another method of recapturing the Stickley finish without resorting to fuming. As unorthodox as it sounds, it pretty much involved mixing one part non-fibered roofing tar with four parts Minwax red oak stain, then using it as a wiping stain. The idea is that the tar particles get stuck in the grain and the rest of the muddy-brown stain leaves a nice color behind.

It's then up to the finisher to apply a clear sealer coat of some kind – for which I use Waterlox's tung-oil varnish. I've experimented with this process and it works beautifully. Also, presumably because the tar in the stain doesn't dry quickly, you can lighten over-application (or correct splotches) by rubbing it out with the tung oil – a boon to an amateur finisher.

Aside from the obvious oak, I've also had luck using it on closed-grain woods like Douglas fir (of which all my house trim is made) and pine. My main concern is longevity – I have no idea how the finish is going to hold up over time. I'm also curious as to where this formula came from and if anyone else uses it. Am I crazy to put tar in my stain?

— Jason Miller, Sea Cliff, New York

There is a good historic precedent for using roofing tar. Modern wood stains were in their infancy in the first 20 years of the 20th century. Asphaltum and Gilsonite (a similar mineral) were both used in period stains and are still an ingredient in some pigment stains. In theory there shouldn't be any problems. The asphalt dissolves in mineral spirits and is certainly the right color. As long as the stain is thoroughly dry this method will work. A sealer coat of shellac will provide good insurance.

I've always been afraid to try the roofing tar because I don't know what other chemicals might be in the mix, but many woodworkers have successfully used this.

— Robert W. Lang, senior editor

Stickley Morris Chair Blog Entry

The blog entry on Stickley Morris chair details is one of the best I've seen posted (popularwoodworking.com/blog on July 2, 2007). I love Arts & Crafts and Shaker furniture; the detail is what always makes the difference in quality work. Great job – please do more.

— Bill Dalton, via e-mail

Thanks Bill. Since the first post on Morris chair details, I've written another one on Stickley drawer construction. Because of the enthusiastic response, you can be sure that we will be doing similar features on authentic details both on the blog and in the magazine. We've been talking over what to cover, and have planned some interesting road trips for the coming months.

— Robert W. Lang, senior editor

Before Buying a Respirator, Make An Appointment With the Doctor

After reading Out on a Limb in the August 2007 issue (#163), I have a comment. I agree wholeheartedly that we need to control dust to reduce the impact on our precious lungs (especially breathing such things like smoke!). One thing you (essentially) suggest is using a cartridge type of respirator.

Before using a cartridge respirator, one should be sure that one's lungs and heart can withstand the extra pressure that these exert. I do this sort of thing as part of my job (I'm the health and safety officer at South Dakota State University). It's usually just called "lung testing" or "breath testing." In addition, respirators are then "fit tested" to be sure that they fit properly. I'm sure lung testing can be done by any physician, and there are other trained individuals who can do this.

Putting on these respirators seems trivial, but it is not. In the past, we have rejected people from using such respirators after finding problems such as a young fellow (22) who had TB lesions and he never knew that he was infected. Another person was found to have heart irregularities. Both of these conditions could have caused dire consequences when using a respirator for long periods. We found these by finding "something not right" during the test, and having them go to a medical doctor for further testing. In the past, there have been cases where we found problems after someone started using a respirator without first being tested, including shortness of breath, high pulse rates and other problems.

I applaud the use of proper respirators and nuisance masks for working around dust (and other stuff), but really feel people should know that their initial health should be checked before using respirators. In addition, make sure the proper type of cartridge is being used, as many different types are available from dust, to organic solvents, to many other chemicals. **PW**

— Gary Yarrow, Brookings, South Dakota

Question? Comment?
We want to hear from you.

Popular Woodworking welcomes comments from readers about the magazine or woodworking in general, as well as questions on all areas of woodworking. We are more than happy to share our woodworking experience with you by answering your questions or adding some clarity to whatever aspect of the craft you are unsure about, and if you have a complaint, we want to address it whenever possible.

Though we receive a good deal of mail, we try to respond to all correspondence in a prompt manner. Published correspondence may be edited for length or style. All correspondence becomes the property of *Popular Woodworking*.

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Letters
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THE WINNER:

A Sharp Honing Stone Station

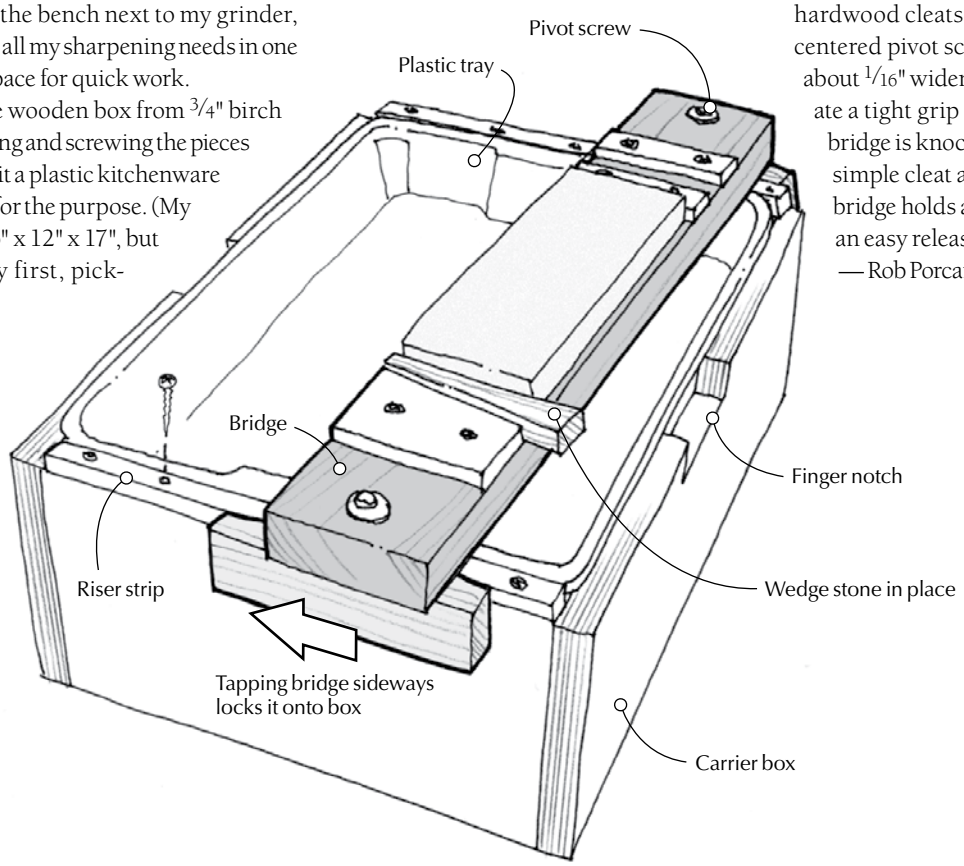
This honing stone setup is part of my dedicated sharpening station. It consists of a plastic tray mounted in a plywood carrier box that also provides solid footing for a wooden stone holder that bridges the box. The unit is screwed to the bench next to my grinder, consolidating all my sharpening needs in one convenient space for quick work.

I made the wooden box from 3/4" birch plywood, gluing and screwing the pieces together to suit a plastic kitchenware tray I bought for the purpose. (My box is about 6" x 12" x 17", but buy your tray first, picking a commonly available brand in case it needs replacement). The narrow lip of my tray rests on the top edges of the box walls, leaving enough room for the riser strips that support the waterstone bridge. Notches on the side of the box allow removal of the tray to change the water.

I made the bridge from 5/4 quartersawn hardwood, finishing it heavily. I attached hardwood cleats to each end with a single, centered pivot screw. The cleats are spaced about 1/16" wider than the box length to create a tight grip on the box sides when the bridge is knocked sideways at one end. A simple cleat and wedge system atop the bridge holds a stone securely and allows an easy release.

— Rob Porcaro, Medfield, Massachusetts

CONTINUED ON PAGE 18



Cash and prizes for your tricks and tips!

Each issue we publish useful woodworking tips from our readers. Next issue's winner receives a $250 gift certificate from Lee Valley Tools, good for any item in the catalog or on the web site (leevalley.com). (The tools pictured at right are for illustration only, and are not part of the prize.)

Runners-up each receive a check for $50 to $100. When submitting a trick (either by mail or e-mail) you must include your complete mailing address and a daytime phone number. If your trick is selected for publication, an editor will need to contact you. All entries become the property of *Popular Woodworking*. You can send your trick by e-mail to popwoodtricks@fwpubs.com, or mail it to Tricks of the Trade, Popular Woodworking, 4700 E. Galbraith Road, Cincinnati, OH 45236.

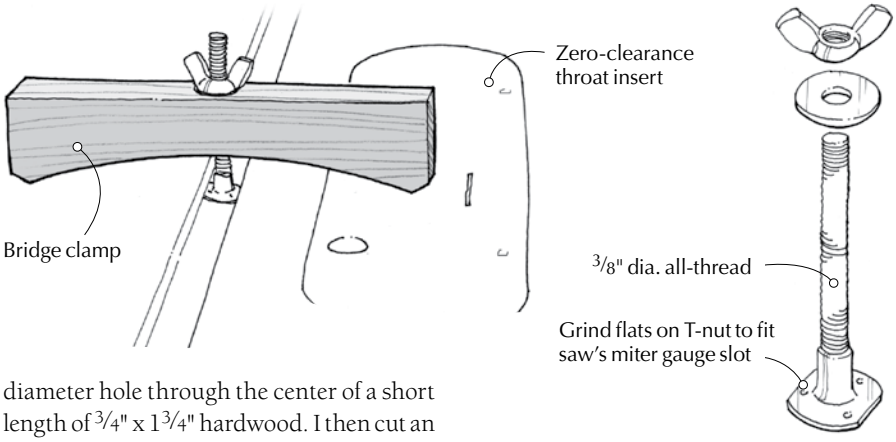
TRICKS COMPILED BY PAUL ANTHONY; ILLUSTRATIONS BY MATT BANTLY

CONTINUED FROM PAGE 16

T-slot Bridge Clamp

I make my own zero-clearance throat plates for my table saw to minimize exit tear-out on workpieces and to prevent narrow pieces from dropping into the saw. When raising the blade through the insert blank for the first time (using a small-diameter blade), it's necessary to hold the insert down for safety. I used to do this by clamping a stout board across the insert and the saw table, with the board parallel to the blade and off to its side. But, this is inconvenient because my outfeed table impedes clamping at the rear of the saw. I recently discovered a better way, putting to use Popular Woodworking Books Editor David Thiel's suggestion that a T-nut can be used to secure jigs in a typical machine table T-slot.

To make a bridge clamp for holding the throat insert in place, I first drilled a 7/16"-diameter hole through the center of a short length of 3/4" x 1 3/4" hardwood. I then cut an arch on the underside of the piece, shaping a slight return on the ends as shown in the drawing. After grinding the edges of a 3/8" barb-less T-nut to fit my saw's miter gauge T-slot, I inserted a 3" length of 3/8"-diameter all-thread into it. (You could instead use a bolt with the head cut off). A wing nut and washer complete the clamp. Obviously, you could use this basic concept to make your own featherboards and other hold-downs as well.



— Paul Anthony, PW contributor

Quick-press Veneering

Occasionally, I like to veneer my own cabinet doors. Like many small-shop woodworkers, I do the job by covering the veneered face with a platen, then applying clamping pressure onto the work via hardwood cauls that extend across the platen. The cauls are slightly crowned on their bearing edges to better transfer clamping pressure to the center of the platen.

In the past, I had to use special slow-set glues to allow enough time to position all the cauls and clamps. Unfortunately, these glues required longer clamping time, which tied up the press and slowed down progress, especially when producing multiple panels. I decided I needed a better system, so I devised this benchtop setup that saves a lot of time and does a great job. It can also be easily broken down and stashed away when not in use.

The setup consists of a workboard panel atop a couple risers and a series of thick, wide clamping cauls that extend slightly beyond the edges of my bench. The opposing upper and lower cauls ensure consistent pressure and flat panels. At one end of the workboard, I use cleats to attach slotted caul guides made from 3/4"-thick plywood. Then I place a scavenged mattress box spring adjacent to each slot. The guides and springs hold the upper cauls at the ready.

Veneering jobs go much more quickly now. I begin work on the riser-supported end of the workboard by preparing and gluing up the veneered panel between two 3/4"-thick MDF or plywood platens covered with glue-resistant paper or plastic. Then I slide the sandwich underneath the waiting cauls, and clamp everything down.

— George Murphy, Cincinnati, Ohio

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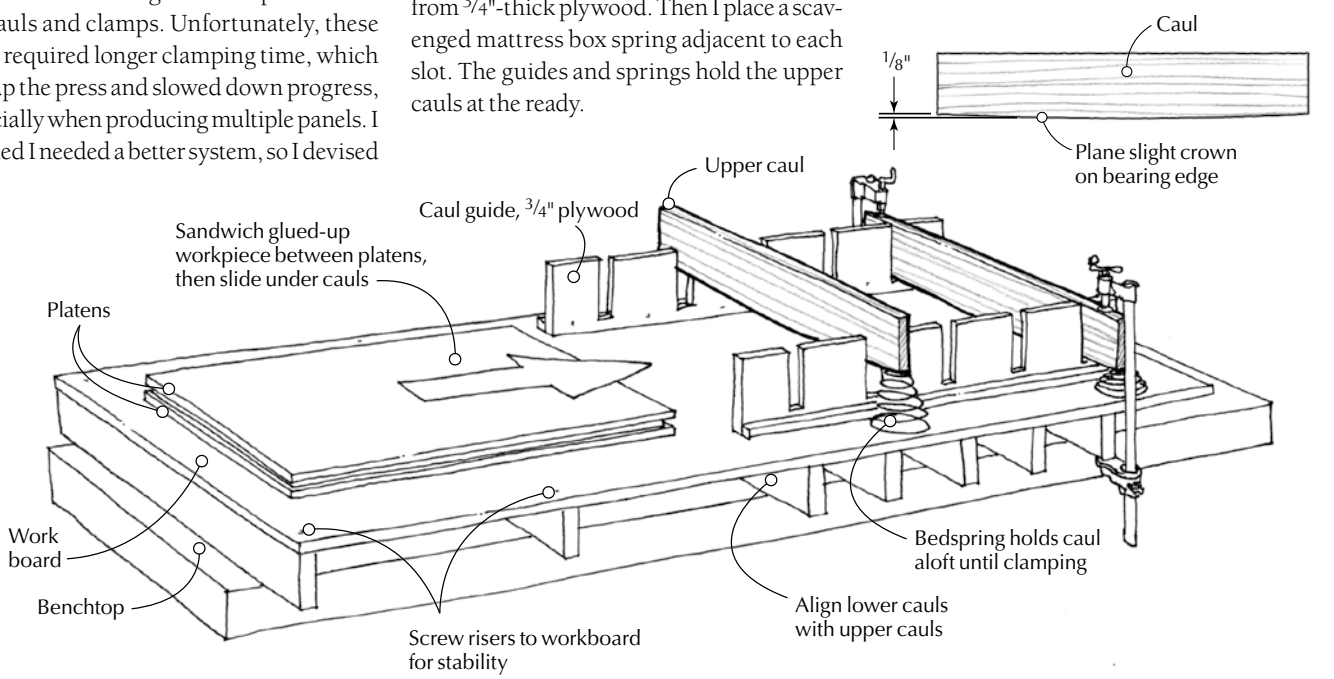

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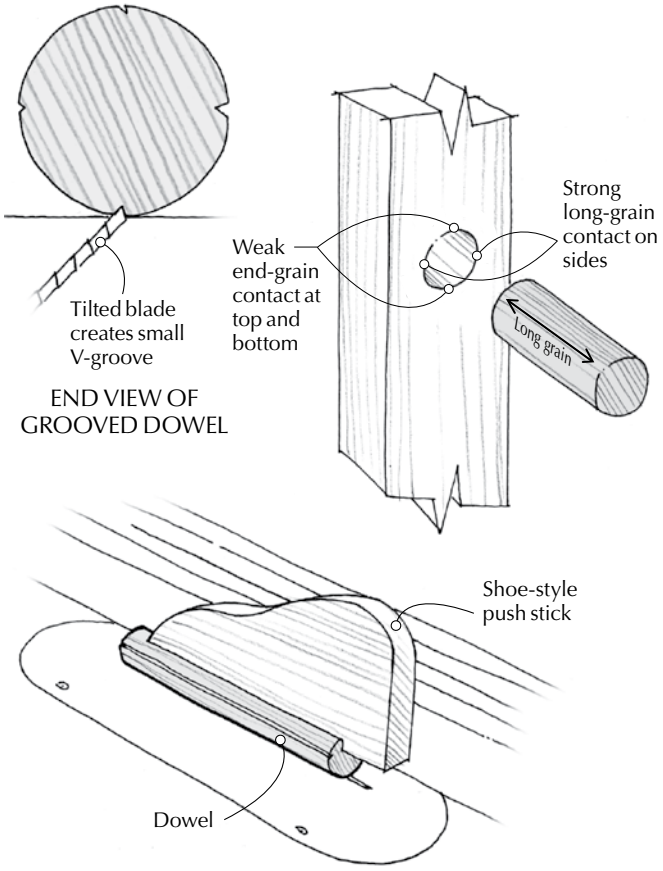
Better Shop-made Dowels

I have to admit that I'm not very fond of dowel joinery. I've repaired too many old dowel joints over the years to trust them. Part of the problem is that a dowel hole in face grain offers only about 50 percent long-grain-to-long-grain contact, which a strong joint requires. The remaining long-grain-to-end-grain contact provides only minimal strength. Dowel joints can also be fussy to align, even with a jig.

As a result, I don't use dowels often enough to justify buying quantities of pre-cut, grooved, chamfered dowels. When necessary, I just make my own dowels from long hardware-store stock, which I like to keep on hand for a number of general shop applications. When making dowels for joinery, I groove them on the table saw to create escape passages for air and glue during insertion. To prevent cutting a groove that's as wide as the saw teeth (which minimizes the glue surface on the dowel), I tilt the blade to 45° and raise it to cut only about $^{1}/_{32}$" deep into the dowel. A zero-clearance throat plate prevents the dowel from sinking into the wide opening on a stock plate. I make the cut for a new zero-clearance insert using the 8"-diameter blade from my stack dado set because a 10"-diameter blade, when set in the lowest position, prohibits proper seating of the insert into the throat.

For efficiency and control, I cut the grooves on lengths of dowel that approximately match the length of the sole on my shoe-style push stick. Afterward, I cut the individual dowels to length, then chamfer the ends for easy insertion. A quick way to chamfer the ends is to lightly chuck a dowel into a drill and touch it to a belt or disk sander, with the two tools rotating against each other.

— Paul Anthony, PW contributor



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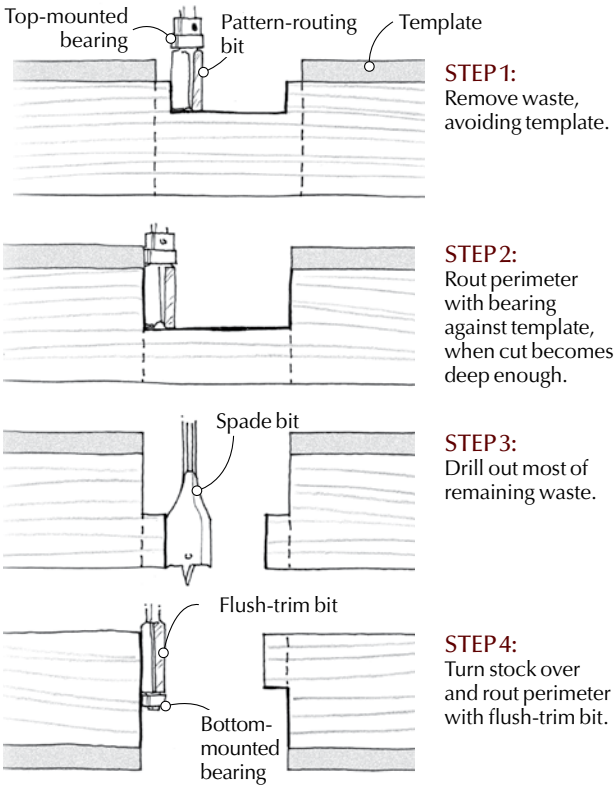
Routing Through-mortises in Thick Stock

I recently had to make some through-mortises in a couple large, 3"-thick wood slabs to accommodate the tenons on a connecting stretcher. The size of the slabs precluded using a tabletop mortiser or drill press to cut the mortises, so I decided to rout them. Unfortunately, I didn't have a router bit with a 3"-long cutting flute, which might whip around at that length anyway. And I didn't think that routing in from opposing faces would be successful enough to yield straight mortise walls, even with careful layout.

I solved the problem perfectly using a combination of template routing and flush-trim routing. Using 1/4"-thick sheet stock, I made a template to the exact size of the finished mortise. After securing the template to the slab, I installed a pattern-routing bit (with a top-mounted bearing) in my router. Then I routed out the waste within the template cutout, keeping reasonably close to the edge without hitting it. When I reached sufficient depth to allow the bearing to ride on the template, I routed the perimeter.

Next, I used a large spade bit to drill out most of the remaining wood, making a series of closely spaced holes while keeping away from the finished edges. I switched out my pattern-routing bit for a flush-trim bit (with a bottom bearing) and, entering from the opposite side of the slab, I trimmed away the remaining stock with the bearing riding against the previously routed perimeter surface. The result was a hole with straight sides cut completely through the workpiece. All that was left was to chisel the rounded corner square – a relatively easy chore.

— Stephen Gross, Hilo, Hawaii

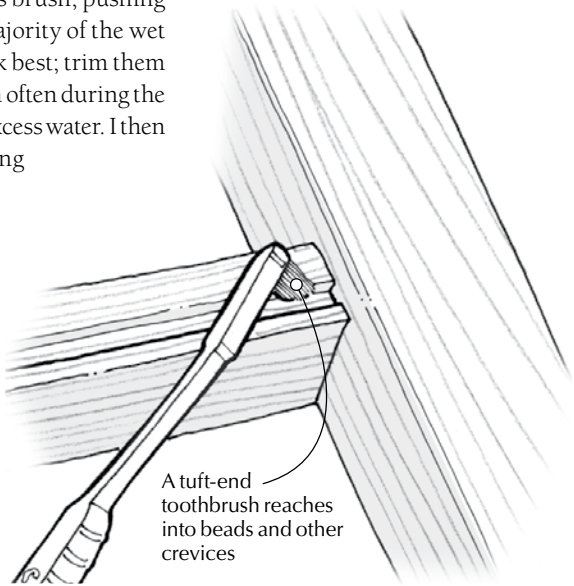


Glue Cleanup in Tight Spots

Glue squeeze-out can be difficult to clean up in tight spaces such as beads and grooves because you can't wipe the area very effectively with a damp rag nor insert a chisel to slice away the hardened glue afterward. I've found that a good approach is to clean up the wet glue with a stiff-bristle artist's brush and a soft-bristle toothbrush.

I begin by using the artist's brush, pushing it forward to scoop up the majority of the wet glue. (Short, stiff bristles work best; trim them if necessary.) I clean the brush often during the process, and squeeze off the excess water. I then follow up by quickly scrubbing the area with the clean, wet toothbrush. A "tuft-end" toothbrush works best for this kind of detail work. The trick here is to keep rinsing the brushes with clean water so you don't leave a glue wash on the surface. And don't use them too wet; you don't want to slop a lot of water into the joint. **PW**

— Frank Ellis,
O'Fallon, Missouri



BY ADAM CHERUBINI

Mysteries of 18th-century Drawers

Practical factors influence drawer construction.

Eighteenth-century cabinetmakers constructed drawers in a variety of ways. The differences have thus far been attributed to either the period of construction or regional differences. Some differences appear to be functional improvements over earlier styles. In this article, we'll have a look at 18th-century drawer construction; I'll use this information to make the drawers for my standing desk.

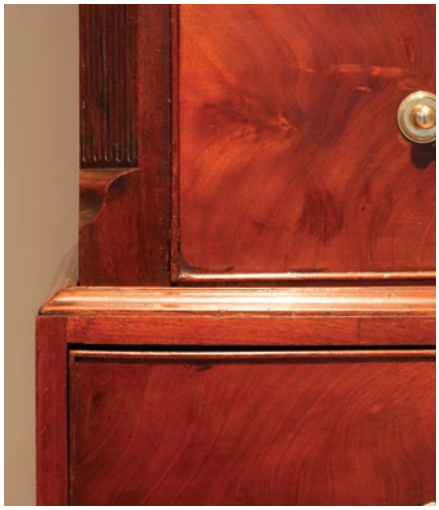
Cockbeaded, Lipped or Flush

Eighteenth-century craftsmen used three styles of drawer fronts. I can't isolate any of these styles to a specific region or period. Cockbeaded drawers for example, were used throughout the 18th century. I suspect their usage corresponds to the use of veneered drawer fronts, which were present from late 17th-century to early 19th-century-style pieces. The cockbeading may have served to protect the fragile edge of the veneer. That said, I have seen examples of cockbeading applied to non-veneered drawers.

Lipped fronts are found on early to mid-century (American) pieces. Aesthetically, I see them as part of the baroque tradition of creating depth. The overhanging lips are often very small and fragile. Cracked lips are common. I've never seen a lipped lower edge.

Flush drawer fronts are not found solely on primitives or deconstructionist styles. In the William & Mary period, flush drawers were punctuated by double-arched mouldings. In later periods, flush fronts were used for pieces with curved or blocked fronts or where decorative stringing or banding was used to provide visual interest in lieu of contoured fronts.

While drawer-front designs were probably chosen using aesthetic criteria, it seems clear the choice wasn't made without considering the shape of the drawer front, or whether it was veneered or not. The drawer front design had to fit within the capabilities and constraints of the workshop.



Cockbeaded. *The thin strip of wood, outlining these drawers is called "cockbeading." The drawer front is typically rabbeted to receive the strips. The rabbet is never the full thickness of the drawer front. But neither is it small enough to avoid partially covering the fine dovetails joining the drawer sides to the front. Note that despite this being one of the finest masterpieces of the 18th century, its maker, Thomas Elfe didn't see fit to prevent the tapered gap at the top of the top drawer of the lower carcase.*

Lipped*. Lipped drawer fronts mask the often-loose fit of the drawers in the carcase. It may be too hard for you to see, but I can just make out tiny wear marks where the drawer sides have rubbed against the drawer dividers of the top two drawers. This may have been caused by the nails attaching the drawer bottom to the sides.*

Flush. *The flush drawers of this William & Mary piece are punctuated by delicate double arch mouldings attached to the case front.*

PHOTOS AND ILLUSTRATIONS BY THE AUTHOR

Making Lipped Drawers

In this article, I'm going to focus my attention on lipped drawers. A good drawer starts with a good front. The front must be flat and should have grain oriented to keep it thus. If the drawer front twists, the whole drawer will rack and not operate smoothly.

I prefer to saw the end rabbet, as it can be tricky to plane. Saw to the line, but sneak up on the depth to make a nice crisp inside corner. If you'd rather plane it, place as many drawers as possible edge to edge and plane them all together the same way I cut the mouldings through the end grain as shown at right. As you'll see later, this a very important little detail so don't just eyeball it.

Drawer Joinery

Drawer sides were typically attached to the drawer fronts with half-blind dovetails. The number and shape of those dovetails varied over the course of the century. Executing this joint with hand tools is not difficult, but there are a few tricks.

When the drawer fronts are done, I prepare the stock for the sides and back. I rip white pine 1x12s from my local home center to get essentially quartersawn boards. The drawer sides must be exactly the same and their ends must be square. The back must match the front.

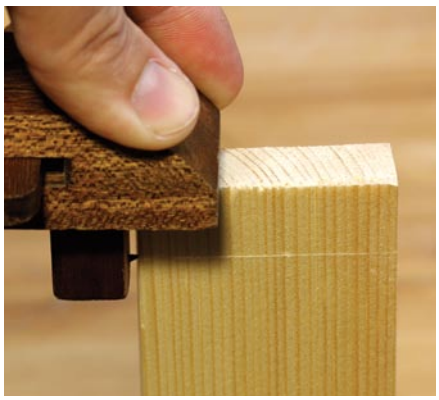
Nailed-on Drawer Bottoms

Craftsmen in the 18th century often nailed drawer bottoms on from underneath. Though this seems a crude way to make a drawer, the practice continued throughout the period and is found on very fine pieces. A thin "wear strip" was typically glued onto the bottom to cover

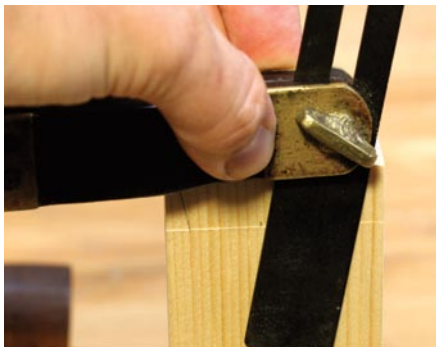
1 ***Mould the end grain first.*** *I stack as many drawer fronts as I can. This saves time and actually makes the moulding easier (since the plane has more wood to register against). I saved an offcut (same thickness) to protect the end fibers. For best results, make sure your moulding plane is razor sharp. When the end grain is done, do the long-grain edges.*

2 ***Rabbet the back.*** *With the moulding done, it's time to rabbet the back edge of the drawer front to fit the drawer opening. This cut is 5/8" wide and 3/16" deep. I'm using my moving fillister plane.*

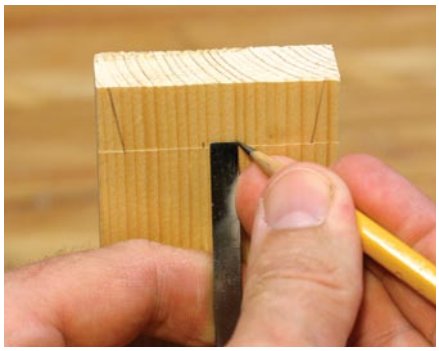
3 ***First you'll need to gauge*** *the drawer front to know how long your tails must be. Take this opportunity to make sure this rabbet is consistent. You can see from the pencil line that this one isn't. It must be fixed before I proceed.*



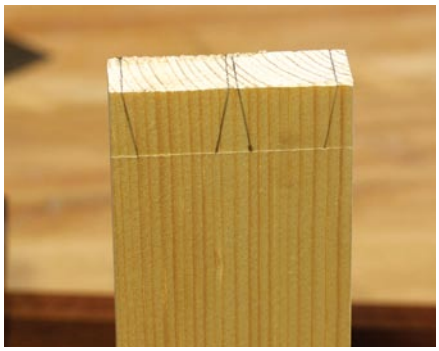
4 ***Transfer the drawer front's rabbet*** *to the drawer side. Don't be lazy and assume both sides are the same. Recheck your gauge for both left and right hand sides.*



5 ***I use a bevel gauge*** *to mark my tails. Sawing these by eye is a pointless parlor trick in my opinion. It's no timesaver to not mark, and this is yet another opportunity to practice sawing to a pencil line.*



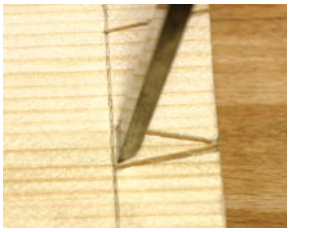
6 ***The pin spacing may be irrelevant,*** *but their sizes aren't. I size this gap to the chisel that will chop it out.*



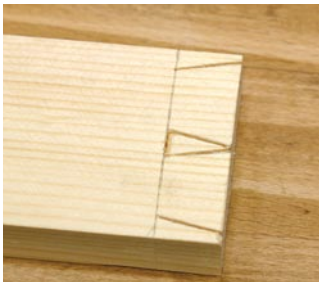
7 ***With the tails marked,*** *draw square lines through the end grain. When sawing tails, this is the most important line.*

8 ***Begin the cut at the near corner.*** *As I saw, I proceed on both lines at once. This is the same principle I use for all of my saw cuts.*

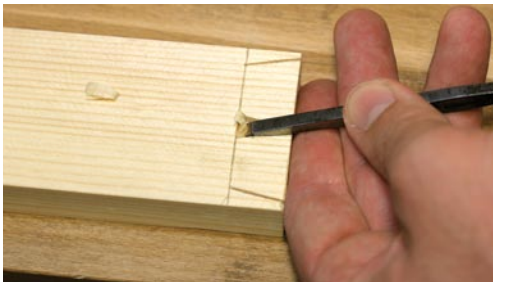
9 ***Tip the saw's toe down*** *to finish the cut. You don't need a saw without set for this to work. The saw finds the path of least resistance. Just keep a nice relaxed grip like the one you see here.*



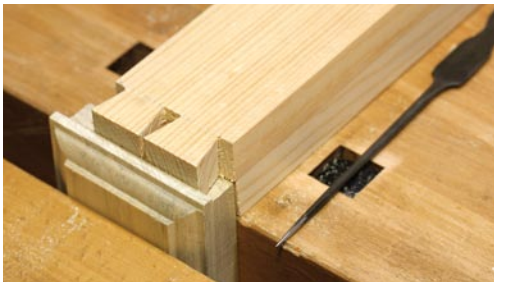
10 ***Place the chisel*** *a tiny distance from the gauged line. Even though I'll hold the chisel vertically when I tap it with my mallet, a single tap will bring me back to the gauged line.*



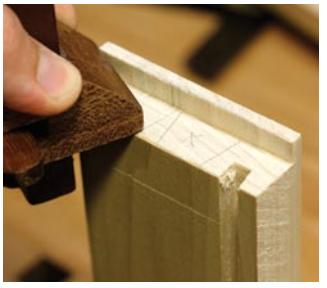
11 ***You can still see the line.*** *That's just where I want it. Whether you leave this line or chop it out affects the fit of the finished joint. I always try to leave this line.*



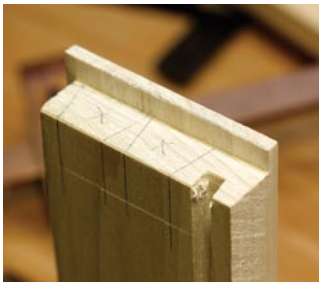
12 ***Pare away material*** *to make room for the beveled side of the chisel, then tap tap again at the gauged line. Repeat this tap-and-pare process until you are almost halfway through. Then flip the board over and repeat the process from the other side.*



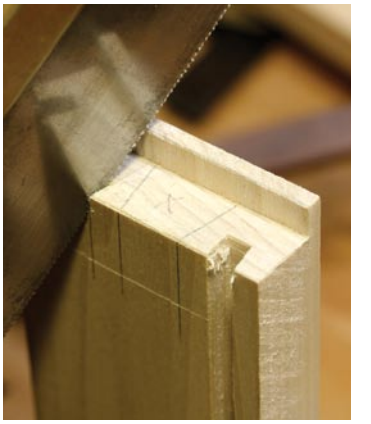
13 ***The tails are done.*** *Now it's time to mark the pins. No pencil is going to fit between these tails! I use the awl end of my trusty striking knife at right.*



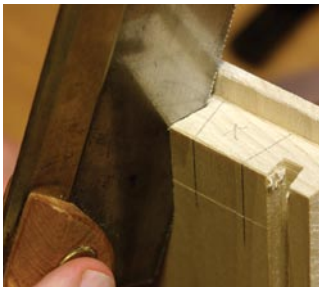
14 ***With the pins marked,*** *gauge the thickness of the drawer sides and transfer that mark to the drawer front. Again, do both sides independently.*



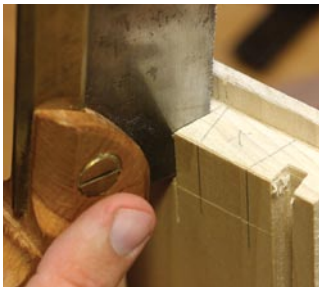
15 ***Pencil lines drawn square*** *to the rabbet complete the marking.*



16 ***Use the same sawing technique*** *as before. If I were joining two harder woods, I'd have to saw these lines out. But the white pine is so soft, I can leave some of the line. Remember when I was chopping out the tails? Had I chopped out the gauged line, I'd have to leave these lines. There's no definitive answer about leaving lines or chopping them out. All you need to know is that the fit is influenced by this saw cut and how you chop the waste between the tails.*

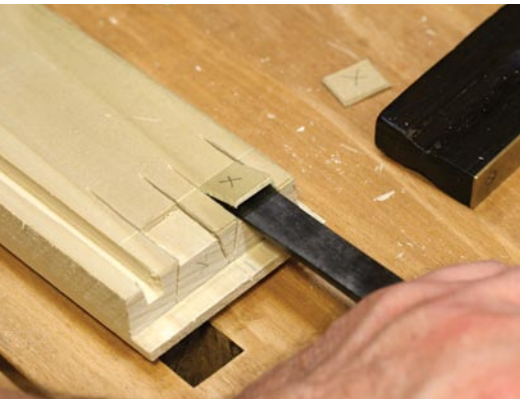


17 ***Oh no!*** *I've gone over the gauged line. Terrible mistake? No, this is the way it was done in the 18th century. It allows me to get my saw a little bit deeper, which saves time chopping out the waste.*



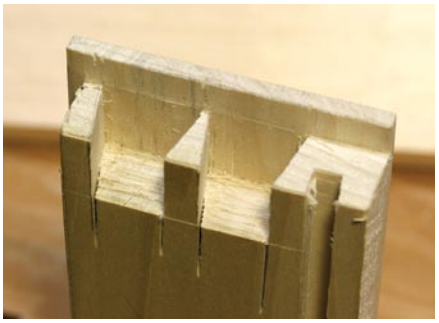
18 ***Here's my little trick.*** *With the saw cut extended, I can dig the heel of my saw deep into this corner. I sharpen my saws to include some aggressive teeth here, just for this purpose.*

19 ***This time, place the chisel*** *into the gauged line. If I left the line, I might have to plane the drawer sides down to bring them flush with the pins. This approach might make the sides "under flush." But I'll use hide glue to glue this drawer up and I may need a little space for the glue. I'm hoping it will all come out just right.*



20 ***No paring required here.*** *Just a light tap in the end grain will take these pieces out.*

21 ***Of course the waste is widening*** *as the cut gets deeper. I use a tiny chisel to follow the angle of the pins and score the fibers my wider chisel can't reach.*



22 ***Nice and clean and square.*** *If I've done my sawing correctly, this joint should just go together on the first try.*

23 ***And it did!*** *I don't think of dovetails as decorative. I'm no more proud of this joint than I'd be ashamed of a joint with a shim in it. The trick is to get this done as fast and as painlessly as possible. Working smart and sawing well are the keys to getting tight joints every time.*

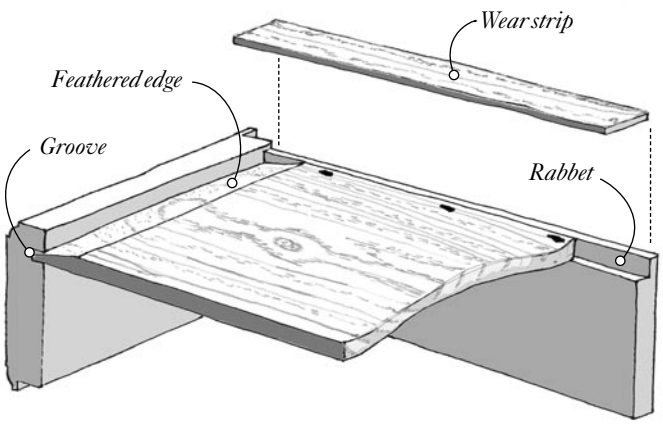
the irregular hand-forged nail heads. Without this strip, the nail heads would quickly wear the runners and drawer divider. Drawer bottoms were sometimes oriented with their grain running front to back. The advantage appears to be that the wear strip, drawer side and bottom all had their grain oriented the same way.

We know shingles were sometimes used for drawer bottoms. They were everything one needed in a drawer bottom. They were cheap, thin, and basically quartersawn. Could it be that the bottoms were oriented to allow use of the stock available?

Conclusion

Eighteenth-century cabinetmakers made drawers in different ways. Collectors have used these features to categorize furniture. But their categories are typically aesthetic, regional or date specific. This approach may have obscured the functional or structural issues that influenced or defined these features. By attempting to reproduce even the simplest products of the 18th century, period furniture makers can suggest alternate explanations for features previously consider solely aesthetic. **PW**

Visit Adam's blog at artsandmysteries.com for more discussion of traditional woodworking techniques.



Some craftsmen oriented the grain of their drawer bottoms, from front to back. The sides were rabbeted or just left square. Sometimes a groove in the back of the drawer front held a feathered edge of the drawer bottom. Other times the drawer front was rabbeted along its lower edge and the drawer bottom was attached to it with more nails.

London Pattern Dovetails

Modern woodworkers have become smitten with the tiny pins used later in the century and often characteristic of London makers. Despite the fact that this style of the joint is no more difficult than any other, woodworkers have chosen it as a sort of symbol of woodworking excellence.

On period pieces, this style of joint is used almost exclusively at the attachment of the drawer sides to the front. It could be that these joints would be regularly seen when the drawer was accessed. Perhaps the "better" work was reserved for this joint other than the rear joints which would be never seen. Carcase dovetails, when not covered by mouldings, at least didn't include contrasting woods and therefore would be less obvious.

What we can know from looking at the joint is that the tiny pins in a half-blind joint cover more of the end grain of the drawer front. This may have been done to help prevent warping and splitting of the drawer fronts. — AC

BY GLEN D. HUEY

Panel-cutting Sled

This jig carries its share of work while increasing the usefulness of your table saw.

I've never been a fan of any jig that requires a degree from the Massachusetts Institute of Technology to build or use. So the Jig Journal column is a perfect fit for my shop jigs. This month's offering is a jig that has carried many of my furniture parts over the past 15 years – a panel-cutting sled.

Three Parts to Square Panels

This jig is made up of three parts, all of which can likely be found in your scrap bin. The major player is the panel (3/4" x 18" x 24") that carries the workpiece. Attached to that panel is a straightedge fence (7/8" x 7/8" x 36") running perpendicular to the blade and a guide (3/8" x 3/4" x 27") that runs in the miter-gauge slot of the table saw. It's best to use quartersawn hardwood for the fence and guide. Small pieces of plywood tend to delaminate – or if you hit a void it's trouble.

However, plywood is the best choice for the panel. There's greater stability in plywood over a hardwood panel, because there is no seasonal movement. And plywood is better than MDF because it's tougher to ding as you move it around the shop and it's more resistant to moisture.

To locate the guide bar, measure the distance from the right edge of the left-hand miter-gauge slot to the saw blade, then add 1/4" – this jig rides to the left of the blade. Once the guide bar is attached, the additional 1/4" allows you to trim a straight edge that's aligned with the table-saw blade.

Transfer that distance to the underside of the panel. Hold one end of the guide bar flush with the leading edge of the panel as shown in the center picture atop the next page, and attach the 3/8"-thick hardwood, snugly fit to the saw's slot, with four #6 x 1/2" flathead wood screws. The guide bar attaches at the line, away from the blade.

Repeatable, perfect 90° cuts. *Cutting panels with a standard issue miter gauge is "iffy" at best. While the degree of difficulty to build and use this panel-cutting sled is near zero, the results are a 10.*

Online EXTRAS

For a video on using this jig to square panels and how to use the stop, go to:

popularwoodworking.com/oct07

By allowing the guide to extend beyond the back edge of the panel (the edge nearest the operator), you gain additional panel-cutting width. But don't go overboard. You need to have the majority of the panel resting on your saw's top after the cut is complete. Push too far and the sled tumbles off the saw.

Place the guide bar into the saw slot so it's well behind the saw blade. Start the saw and push the sled into the blade. The edge of the sled's panel is now parallel to the guide and the saw blade.

Squaring the Important Piece

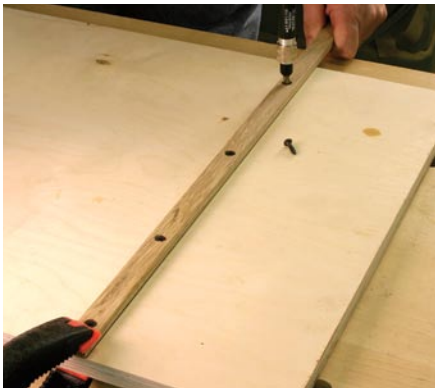
Aligning the sled's fence is the most important step in building the jig. To accurately set the fence, use geometry. The calculation is a 3-4-5 triangle. Using multiples of three and four for the two legs sets any right triangle. Then, the hypotenuse is a multiple of five.

Measure down the cut edge marking at 1" from the front edge of the panel (this gives you a place to connect the fence) and again at 16". The 15" difference is a multiple of three – 3 x 5". Set a ruler across the panel holding the zero mark at the 1" line. Set a second ruler with the zero point at the 16" line while angling up toward the first rule. Where the 20" mark on the first rule and the 25" mark on the second overlap, is the second point of the straight line to which the fence is to fit (see the photo at the bottom of the next page).

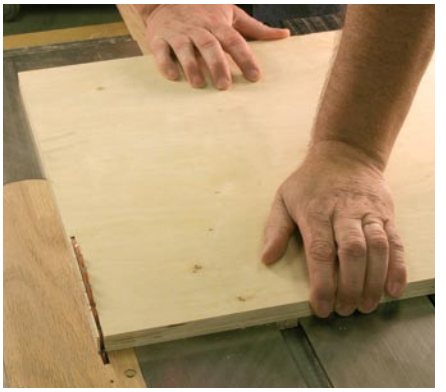
Attach the fence to the panel with #8 x 1 1/4" wood screws directly along that layout line allowing the end to extend slightly past the edge closest to the saw blade. Make a second

LEAD PHOTO BY AL PARRISH

Follow the guide. *The guide is a key component of the sled. The accuracy of the fit to the table slot is paramount in attaining a square cut. A sloppy fit equals a sloppy cut.*



Guiding the sled. *Countersink the screws for the guide. The quartersawn-hardwood guide should show no sign of sloppiness. Paste wax allows the pieces to slide easily.*



Getting the accurate edge. *Sawing the edge of the jig after the guide is attached to the panel ensures the edge is parallel to the blade as well as the guide.*

cut with the guide in the miter slot to cut the fence exactly at the blade. Now the fence shows you the exact cut of the blade and is great for a reference point while aligning your cuts.

Properly Cut Panels

Using the sled is a simple and effective process. The design allows you to cut the end of a wide panel square to the edge that's placed against the fence.

Begin with a panel that is surfaced on three sides at a minimum. Position the panel flat on the sled, with the milled edge against the straightedge fence and the end hanging beyond the edge of the sled. Trim the end of the panel by sliding the jig and panel through the blade. That end is now square to the edge pushed against the fence.

Next, flip the panel end for end without changing the edge that is against the fence. This ensures that the two ends will be square to that one edge. If you switch the edge that's against the fence and the board's edges are not truly parallel, the end cuts won't be parallel to each other.

Mark the measurement, the exact cut line, on your panel along the fence edge then set that layout mark even with the end of the straightedge fence closest to the saw blade. Because the end of the fence is the exact cut line of the jig, it will also be the exact cut line of the panel.

It's possible to nick the fence with a turning saw blade as you position the jig, so be careful. If that happens you'll be unable to use the fence to set your cut into position. If that occurs, you can relocate the guide and create a new edge or match the exact cut line with the blade each time you use the sled.

This jig works with different sized panels, both wide and narrow. I've used it to square cut the ends of drawer dividers and pieces as small as 1" in width.

Other Operations

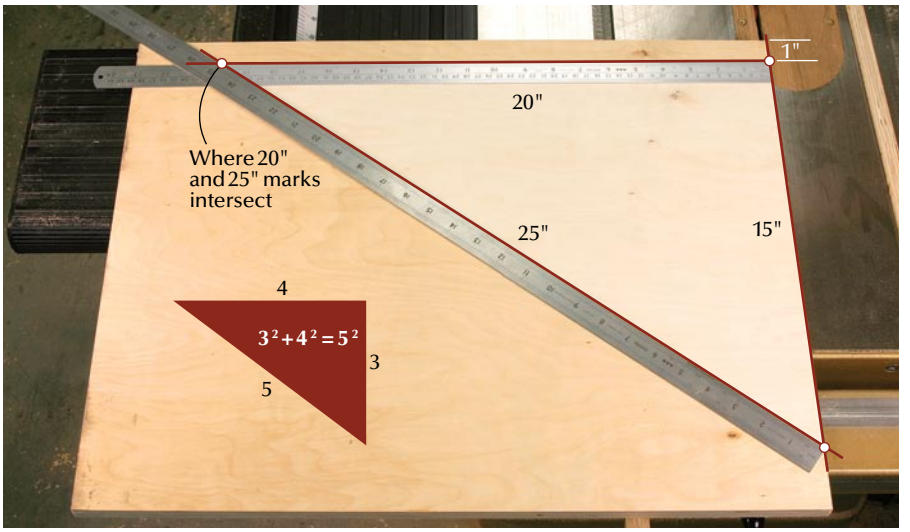
Need a few pieces cut to the same length? Another woodworking operation at which the sled excels is making multiple pieces using a stop block. I used this setup for years before bringing a miter saw into my shop.

Find your length by nudging your rule tight to the saw blade and mark the location on the jig. Clamp a secondary piece, the stop block, to the fence at that location. Remember to slide the table saw's fence out of the way before making any cuts.

Place a squared end of stock against the stop block allowing extra material to hang past the sled's edge nearest the blade. Make the cut. The second end is now square and the piece is cut to the correct length. Slide the leftover material, which also has a freshly cut, squared end, toward the stop block to make another piece that matches the previous one. Repeat the operation until the desired number of pieces is reached or the stock runs out.

The panel-cutting jig is one of a handful of jigs that get a tremendous amount of work in my shop. The sled extends the total amount of work that you're able to complete with the table saw. It's a real woodworking timesaver. **PW**

Glen is a senior editor of Popular Woodworking, *a published author, host of the Woodworker's Edge DVD series and teaches woodworking classes and seminars. Contact him at 513-531-2690 x1293 or glen.huey@fwpubs.com.*



Caution — geometry ahead. *Come down 1" from the edge of the plywood to leave room for the fence. Using the 3-4-5 triangle formula guarantees the jig's fence is perpendicular to the blade and that the resulting cut will be square. Use 15 ", 20" and 25" to set the fence line.*

BY THE POPULAR WOODWORKING STAFF

Woodworker's Drill Press

Powermatic introduces a machine with features just for woodworkers.

Powermatic 2800 Drill Press

Powermatic ▪ 800-274-6848 or powermatic.com
Street price ▪ $899
For more information, circle #157 on Free Information Card.

A good drill press is an essential power tool in a well-equipped shop. It won't see as much use as other machines, but there are times when no other machine will do. Unlike saws and surfacing tools that were developed specifically for wood, the drill press has been borrowed from metalworking, and with a few exceptions in the past (Ryobi, Delta), woodworkers have usually had to adapt.

But, the PM2800 variable-speed drill press has been designed for the woodshop and features an expanding table and fence system that might make a machinist scratch his head, but will make woodworkers smile. Also noteworthy is the variable-speed system that lets you dial in the speed you want. No more lifting the top cover, deciphering the speed chart and shifting belts.

The 1-horsepower motor drives the system that changes speeds by altering the diameters of the two pulleys while the machine is running. There is a lever on the left side of the pulley cover that controls the speed. You twist the handle to release it, slide the lever to the speed you want, then tighten the handle to lock in the setting. A digital readout on the front of the machine gives the exact speed, and a scale below the lever gives ballpark indications.

The drive system works well, but is considerably noisier than a conventional drive system. It sounds as if it is about to rattle apart – but at the business end it is smooth and vibration-free. The lowest speed, 400 rpm, is faster than the low speed on most drill presses, while the top speed of 3,000 rpm is about the same as on comparable machines.

My favorite feature is the table and fence system with an integral dust-collection port. The cast iron table is a good size to begin with for most woodworking tasks – 16" x 20". But, it also features extensions on both the right and left. Reaching under the table and releasing a cam lock allows the table to expand to 30" wide.

The aluminum-extrusion fence slides front to back in slots in the table. A pair of knobs conveniently located just behind the fence lock it in place. A second pair of knobs allows the fence faces to slide left and right, opening up space directly behind the bit. A plastic housing in the center of the fence provides a port to hook up a shop-vacuum hose. This is the first built-in dust-collection port I've seen on a drill press, and while it isn't perfect, it works remarkably well.

Other features include a pair of LED lights, and a pair of lasers that throw a cross beam at the center point of the bit. The work lights are a welcome addition, as is the large on/off switch located front and center.

I wasn't that impressed with the laser guide, or the keyless chuck (though other editors here were). Maybe I'm getting set in my ways. I'm certain that many will see these as benefits. All in all this is a solid machine and if you're ready to step up to the last drill press you'll ever need, this would be a great choice.

— Robert W. Lang

PHOTOS BY AL PARRISH

18v Ridgid Li-ion Drill

The 18-volt lithium-ion drill (model R86006), the latest release from Ridgid, has the components that make the tool worthy of purchase. The package includes the drill, two batteries that are each 1.5 amp-hour rated, a 30-minute charger and a heavy-duty bag for storage.

Features on the drill include a heavy-duty 1/2" single-sleeve Jacobs 500 series keyless chuck with serrated jaws, a switch-activated LED light positioned to illuminate the work area as well as a 24-position clutch for torque adjustment.

Although the torque number (455 inch pounds) is smaller than some competitor's drills, it is plenty to do most jobs. This drill has a two-speed gear train that allows you to match your work with speeds from 0 - 450 or 0 -1,500 rpm. This is certainly more than adequate. It was easy to drill through 8/4 cherry with a 3/4" spade bit.

Ridgid has developed a user-friendly feature in that the batteries from this drill power any of its 18-volt or 24-volt tools. That's a big plus if you work with other Ridgid tools. Another great attribute is that the battery charger included in the kit charges any of the older style nickel-cadmium batteries (however, the older chargers do not charge the lithium-ion batteries). The total battery recharging time was 27 minutes.

All this is packed into a drill weighing a bit more than 4.25 pounds. And while that may not be the lightest drill in the category, I doubt your arms will tire using it.

— Glen D. Huey

Ridgid 18v Li-ion Drill

Ridgid ▪ 800-474-3443 or ridgid.com
Street price ▪ $179
For more information, circle #158 on Free Information Card.

Gramercy Tools 9" Dovetail Saw a Fine Instrument

More than any other saw, dovetail saws are an extension of your arm and are capable of great finesse – and fantastic blunders. So it pays to look for a saw that feels good in your hand and cuts smoothly.

The new Gramercy Tools 9" dovetail saw is going to absolutely delight woodworkers who prefer a lightweight saw, a shapely and delicate handle and a smooth cut that's easy to start. In fact, in passing the saw around to editors and woodworking friends, several remarked that this saw was the most comfortable saw they'd ever held.

The Gramercy Tools dovetail saw is the result of a lot of research by toolmaker Joel Moskowitz, and it's clear his homework paid off. The saw has a finer pitch than most Western dovetail saws (19 points per inch (ppi) as opposed to 15 ppi), yet I found that it cuts as fast as the 15 ppi saws. The fine pitch makes the saw easy to start, and the hand-filed and hand-set rip teeth make the cut quite smooth.

The blade is thinner than most saw blades (.018" thick) and the folded brass back is smaller (7/16" high). Plus the blade has less depth capacity. All those factors make for a saw that is lighter in weight and easy to control. The reduced depth capacity (you can get almost 1 3/8" deep) isn't ever a factor with dovetailing.

Other details: The handle hangs at a higher angle and the blade's depth reduces a bit at the toe of the saw. These two features encourage you to stand more upright when sawing.

This $139.95 saw is not a copy-cat saw of the other premium dovetail saws on the market today. It is a remarkably different animal and absolutely must be on your short list when shopping for saws. You might be wondering if I'm switching saws; it's just too early to tell. The Gramercy goes in the rack above the bench, right next to my old reliable. A year of dovetailing should settle the debate. And I'll then get back to you.

— Christopher Schwarz

Gramercy Tools 9" Saw

Tools for Working Wood ▪ 800-426-4613 or toolsforworkingwood.com
Street price ▪ $139.95
For more information, circle #159 on Free Information Card.

Dispoz-A-Blade Cutters

Changing planer knives is on the same list of jobs I hate to do as digging a hole or fixing a roof. I put it off until I absolutely have to do it, and when I do get around to it, I fuss and complain the entire time.

A little more than a year ago, we changed the standard knives in our 20" planer for a set of Dispoz-A-Blade replaceable knives. The system consists of permanent knife holders, tiny magnets that locate the knives in the cutterhead, and disposable two-sided knives. The initial changeover was faster than a regular knife change because the usual ritual of setting the knives in relation to the cutterhead was eliminated.

The results were better than I expected. In a planer as wide as ours it is tough to get all the knives set to exactly the same height. The new knives were set more consistently, and the quality of cut was significantly improved.

Fast forward six months to the first knife change, and I was done before I had the chance to get cranky. The gib bolts were loosened, the knife holders removed and the knives were flipped over to fresh sharp edges. The gib bolts were retightened and the deed was done.

There is a bit of sticker shock for the initial setup, but replacement knives can cost less than sending knives out for resharpening. Factor in the time savings and convenience and this system is a winner. Knives are available for most models and sizes of jointers and planers. — *RL*

Dispoz-A-Blade

ESTA USA ▪ 800-557-8092 or estausa.com
Street price ▪ Startup package: 6"-$169, 24"-$375
Replacement knives: $25-$70

For more information, circle #160 on Free Information Card.

CMT Dado Pro Makes the Cut

Mention dado stacks and my mind wanders back to the set I used as a youngster. The blades were a larger diameter than the chippers. Yuk! However, the 8" dado set from CMT, the Dado Pro, pushes that memory farther into the deepest recesses of my mind. And CMT has taken great strides to make this dado stack user-friendly.

The Dado Pro set includes two 12-tooth outside blades, four 1/8" and one 1/16" two-tooth chippers and a set of shims for fine-tuning any cut. Each carbide tooth is set to a negative hook angle (-12°). This angle is less aggressive and prevents self-feeding, giving the operator more control – just what you want in a dado blade when you're making wide cuts. As a result, the Dado Pro works equally well with cabinet- and contractor-type saws.

So how does one dado stack rise above others? In details and precise workmanship, that's how. Each chipper, as well as the entire shim set, is labeled for size. That's a feature not seen on many dado stacks. No guesswork is needed. Choose the appropriate size shim or chipper required for the job at hand. Fine-tuning is a breeze.

And how about precision? The two blades stacked together should be .25" in width. The Dado Pro was at .2505". Stacked according to the sizing chart provided, the 3/4"-blade/chipper combination measured 3/4" spot-on. In addition, each shim matched the labeled sizes with a variation of only .005".

But the bottom-line test of any dado stack is the cut. With the CMT Dado Pro, the 3/4"-dado cut left a dead-flat bottom – no indication of an elevation change between the blades and chippers – and the sides were smooth. The same held true whether plowing with the grain or across, in plywood, cherry or oak. No tear-out was evident in any material.

Finally, the CMT Dado Pro is packaged in a plastic carrying case and the entire set stores in a form-fitted foam nest. — *GH*

CMT Dado Pro

CMT ▪ 888-268-2487 or cmtusa.com
Street price ▪ $107

For more information, circle #161 on Free Information Card.

Lie-Nielsen Large Router Plane

Router planes are one of those tools that you never knew was missing from your toolbox. Once you've cleaned up a dado, adjusted a tenon or made a hinge mortise with a router plane, I think you'll wonder why you were fiddling around for so many years with other tools to do those jobs.

Router planes were once common, but they descended into obscurity once Stanley stopped making its version, the No. 71. In recent years, premium tool makers have filled the gap with improved versions of the tool, and the Large Router Plane from Lie-Nielsen Toolworks is the newest one.

The Lie-Nielsen is what is called an "open-throat" router plane, which means the casting in front of the blade is arched instead of simply flat. The open throat increases your field of vision (especially when pulling the tool), but it reduces the support in front of the blade. This makes the tool difficult to use on narrow edges of boards without adding a wooden sub-base (a simple task).

Lie-Nielsen made some significant upgrades to the venerable Stanley No. 71 that are worth noting: The depth stop on the Lie-Nielsen is a world better than the sad excuse for the one on the Stanley. The blade is surrounded by a brass collar that you lock in at your finished depth. Then you simply take repeated passes and increase your depth until you get to where the brass collar touches the main casting of the tool. In addition to improving the depth stop, the entire blade-holding mechanism of the tool has been simplified and strengthened compared to the vintage Stanley.

The Lie-Nielsen comes standard with a 3/8" square-tipped blade, but the company says other sizes and shapes are in the works. The biggest question about this plane is how it compares to the Veritas or a vintage Stanley router plane. Here's my take:

Lie-Nielsen Router Plane

Lie-Nielsen ▪ 800-327-2520 or lie-nielsen.com
Street price ▪ $125
For more information, circle #162 on Free Information Card.

Skip the Stanley unless you get a steal of a deal. The upgrades on the new tools (both have excellent depth stops) are worth a few extra bucks (vintage Stanleys in good shape fetch about $80). The Veritas router plane is a closed-throat router, which makes it ideal for working on narrow edges. Plus, the Veritas comes with a bigger fence – again, this is a plus when working on edges. For working on faces of boards, such as cleaning up dados, I like the open throat of the Lie-Nielsen. Plus the Lie-Nielsen's handles seem better suited (to me at least) to holding the tool for this sort of operation.

On the topic of depth adjustment, I found the depth stop of the Veritas locks down tighter (it has two jam nuts like a drill press's depth stop), but the Lie-Nielsen adjusts much faster (slide it, screw it, done). Both stops function perfectly in my book.

Both premium router planes are well-made from unbreakable ductile iron and feature a lot of flashy brass touches for those woodworkers who appreciate the aesthetics of a tool. And the price difference between the two is slight. The Veritas is $139 with the fence and three blades; the Lie-Nielsen is $125 for a fence and one blade.

So is the Lie-Nielsen plane the one for you? If most of your work is on the faces of the boards, then yes. If you do a lot of edge work, consider the Veritas. — *CS*

Two New DVDs for Turners

"Turned Bowls Made Easy" and "Beyond the Basic Bowl" are instructional DVDs from Pennsylvania wood turner Bill Grumbine. Grumbine is a "regular" guy, not a slick television personality, and he knows his stuff.

Most important, he knows how to convey years of experience in a 1 hour 40 minute DVD. Starting with chainsawing a blank from a log to completing a finished bowl. Bill is an excellent teacher; he covers details like hand and body position, and isn't afraid to show you what can go wrong. He's right there to show you how to make it right.

The down-to-earth presentation is enjoyable to watch, and this is the next best thing to taking a class and receiving hands-on instruction. If you're new to turning this is essential information, and if you have some experience there is enough inside information to make these a worthy addition to your library.

At times the production values are a little rough, but the quality (and quantity) of solid technical information more than make up for that. If you want to learn to turn, these are a great start. **PW** — *RL*

Grumbine Turning DVDs

Wonderful Wood ▪ wonderfulwood.com
Street price ▪ $29.95 each

Silverware Tray

BY CHRISTOPHER SCHWARZ

Hone your hand skills with a project that has low risks but high rewards.

Trying something new in the shop can be, well, trying. Once I get comfortable with one technique to make a joint, I am loathe to try another, no matter how many people (or magazines) tell me how much better it is.

This is human nature, I suppose. Whenever I want to attempt something new, I try to use it in a project that doesn't consume a lot of wood or time. That way, if I botch the project, I've made just a few sticks of firewood.

This Shaker silverware tray is an ideal project for this sort of experiment. Beginning dovetailers will find this project a good starter project. Want to try using rasps and files? The curves on the end pieces and the cutout handles are excellent practice. How about cutting rabbets or grooves with hand tools? Or even just hand-planing all the boards and giving your sander a rest? This article and its drawings explain how the box goes together; the methods you choose to execute those joints are up to you.

Online EXTRAS

For a video on making stopped grooves, go to:
popularwoodworking.com/oct07

About the Box

All the parts for this project are 1/2"-thick stock. Using thin stock is what makes this project ideal for people who want to hone their dovetail skills. Thin stock is easier to cut true than thick stock. Cut all your parts to size and then cut your dovetails at all four corners.

The bottom of the tray is a single panel that floats in a groove cut into the sides and ends. The groove is 1/4" x 1/4". Cut the groove so it is located 5/8" up from the bottom edge of your sides and ends. Note that the groove in the two side pieces needs to be stopped or you will be able to see it on the outside of the project. The groove in the end pieces does not need to be stopped as its exit point will be hidden by the tails on your side pieces.

The bottom itself needs a tongue on all of its four edges so it will fit into the 1/4" x 1/4" groove. To create this tongue, cut a 1/2"-wide x 1/4"-deep rabbet on all four edges of the bottom piece. The rabbet is wider than you need, but the extra width makes it easier to fit the bottom in the groove, and to get the bottom in and out of the groove during both test-fitting and assembly.

The size of the bottom piece is critical. It should bottom out in the groove in the end pieces. But the long edges of the bottom piece should have some room to allow the bottom to expand and contract with the change of seasons. The size of the bottom in the cutting list allows 1/16" for expansion on either side.

Cut the curves on the end pieces. The easiest way to mark the curve is to mark a line 1 1/2" in from the top edge of the ends. Take a thin and long piece of scrap and bend it so it joins your two pencil marks on the ends and the top of the end. Trace the curve and cut it.

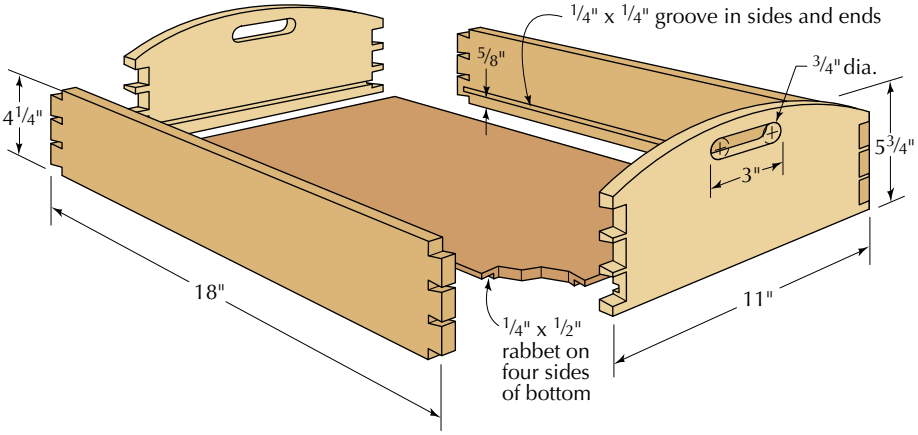
The cutout handles on the ends are 3/4" high, 3" long and located 5/8" from the top edge of the end. Here's a hint: Use a 3/4" auger or Forstner bit to both remove the waste and form the curves on the ends. Then refine and smooth the inside edges of each cutout.

Assemble the box by gluing two end pieces to one side piece. Then slide the bottom into its groove and glue the other side in place. My finish recipe for the box shown here is simple: Rag on a coat of boiled linseed oil (follow the instructions on the container) and allow the oil to fully cure. This takes a couple weeks in a warm room. Then spray on three coats of a clear aerosol lacquer, sanding lightly between each coat with #320-grit paper.

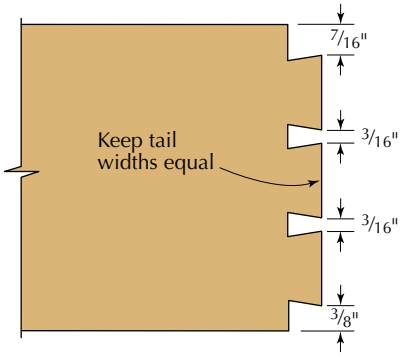
You might be wondering what new technique I tried out when building this project. My new technique was to attempt to build this project for my wife for her January birthday and to actually deliver it on time. And how did I do? Let's just say it was an excellent Groundhog Day gift. **PW**

Christopher Schwarz is the editor of this magazine and the author of the book "Workbenches: From Design & Theory to Construction & Use" (Popular Woodworking Books). You can contact him at 513-531-2690 ext. 1407 or chris.schwarz@fwpubs.com.

"New" way to make rabbets. *A small-scale project such as this is a great way to try out different ways of making joints. Here I'm making the rabbet in the bottom with a moving fillister plane.*



EXPLODED VIEW



DOVETAIL LAYOUT

Silverware Tray

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑	2	Sides	1/2	4 1/4	18	Cherry
❑	2	Ends	1/2	5 3/4	11	Cherry
❑	1	Bottom	1/2	10 3/8	17 1/2	Cherry

LEAD PHOTO BY AL PARRISH; ILLUSTRATIONS BY MARY JANE FAVORITE

A Better Miter Saw Stand

BY ROBERT W. LANG

Is it the saw or where the saw lives that increases your accuracy?

There are two types of miter saws. The first can be a mainstay in the woodshop, dependably making accurate crosscuts day in and day out. Or it can be a cantankerous helper, needing constant attention and delivering inconsistent results. The difference usually isn't in the saw; it is where the saw lives in the shop – how it is set up, the table it sits on and the fence and stop.

Miter saws were designed to be portable, taken to a job site and moved often. In many shops, the miter saw is still treated as a visitor, not a permanent resident. This makes sense if you're just setting up shop, or often move your tools to share space. If, however, you have the room, a fixed location is preferred.

In our shop, our miter saw has floated around for several years on a mobile cart with folding tables. We still have a limited amount of space, but we assessed our needs, the way we work and the way we share our shop, and a permanent miter saw workstation was at the top of our list of shop upgrades.

Meeting of the Minds

I met with the other editors and we talked about how we use the saw and what our expectations were. And we listed the things we didn't like about the old setup. We planned a new stand and decided to concentrate on the important things, leave the bells and the whistles for someone else to add, and keep to a tight budget.

The two main tasks our saw faces are breaking down rough lumber at the beginning of a project and then making precise, repeated cuts after the lumber has been milled. Most saws on the market today are capable of being very precise with one big "if." Tossing rough lumber around can knock a wimpy saw stand out of whack with the first piece of 8/4 hardwood that comes its way, so the first requirement is strength and stability.

But this strength needs to be focused and refined. The alignment of tables and fences needs to be right on – and stay that way – or the saw is useless for precise work.

At least nine out of 10 cuts we make are with the bulk of the material to the left of the saw blade. We decided to trade some flexibility for precision and build a solid stand to the left of the saw. To the right of the blade is a rolling stand that's the same height as the saw to hold material and to give some support when we need it.

Pulling Out the Stops

The final point we agreed on was a stop system. We use stops on a regular basis to cut multiple parts to an exact length. We needed a simple and easy way to add a stop when we needed one. We also decided that it's hard to beat a block of wood and a clamp (especially on the price).

LEAD PHOTO BY AL PARRISH; ILLUSTRATIONS BY MARY JANE FAVORITE

Right at home. *This miter saw workstation is compact and inexpensive to build. As a bonus, our crosscuts are more accurate, and our shop is cleaner.*

All messed up and nowhere to go. *Our old stand had lots of bells and whistles, but it lacked a way to deal with scraps and debris.*

We've seen more than our fair share of systems with T-track and fancy stops that flip up and down and decided that for us the time, expense and chance of a stop moving or slipping weren't worth it.

One of my pet peeves is the buildup of offcuts and sawdust around the saw, so we left the saw table open on top, with a trash can directly below the saw.

We also borrowed a trick from the zero-clearance insert on our table saw. The kerf in the insert shows the exact location of the blade, and is an excellent aid to cutting right to a layout line. It sure beats trying to line up a cut to a tooth on the saw blade, especially if you're trying to cut to one side of your line, or trying to split the line.

We added a sacrificial insert that sits outside of the saw's metal fence. It won't last forever, and it will get trashed as soon as we bevel the saw, but nearly all of the cuts we make are at 90°. The additional accuracy we get from having the insert makes moving or changing it on occasion no big deal.

Little Things Mean a Lot

The saw we chose to use, the DeWalt DW781, has a lot going for it. It is capable of wide crosscuts in thick material. The detents lock in place without wiggling around, it's simple to change the settings and it is solid overall. One of the things we like most is the small footprint and short length of the saw's slide bars. This saves space, of course, but more important, short bars reduce the leverage that works against precision in this type of saw.

Many saws we have used work fine on a narrow piece, but get sloppy when the bars extend to make a wide cut. The guide tubes still take up space behind the saw, but much less than other saws in this category. The thing we like the least is the dust-collection bag, but with the way we mounted the saw, most of the debris falls into the trash can below.

The saw has a flat, level table and a straight fence, but most of the wood you are going to cut will sit off the table. If it isn't properly supported, the quality of cuts will suffer. If we can extend the machine's surfaces, we can cut confidently. What may seem like a tiny error can turn into a woodworker's worst nightmare.

A quarter of a degree, caused by a sagging outfeed table may not seem worth worrying about, but when you assemble four table legs and four aprons all with that error, there will be a lot more to be concerned with. Little errors are a social bunch. They like to gather in one corner of a project and have a party. And when they party, they like to cause trouble. That insignificant deviation can now become a racked carcase, a twisted drawer, or an out-of-square door.

Design Around the Saw

What we came up with works well for us, is adaptable to nearly any saw and shop, and you won't spend a lot of time or money making your own. The first part of designing your stand is establishing the footprint of your miter saw. I set ours on a piece of plywood to mark the layout. Put the front edge of the saw on the edge of the plywood, and push the head of the saw as far back as it will go (if it has a sliding carriage).

Hold one leg of a framing square against the back of the guide tubes and mark the plywood. Swing the table to its right and left extents and make marks both at the back of the guide bars and at the control handle at the front of the saw. Extend the fences out from the saw and mark the distance at full extension. These marks will determine the size of the stand that the saw sits on. When the saw stand is complete, you want it to be tight against the wall, and the saw should be able to move to any position without interference.

Our stand fits in a limited space between an existing lumber rack and a corner of the room. The integral lumber rack we added holds the back of the saw stand away from the wall by $3\frac{1}{4}$". Taking this into account with the footprint of the saw, this stand would be $3\frac{1}{4}$" deeper if we omitted the lumber rack.

We also made this stand a little narrower than the actual width of the saw with the fences extended. This puts the end of the left-hand fence over the end of the fence assembly. This means cutting a notch in the right end of the fence, but makes it easier to line up the end of the fence assembly with the saw's fence.

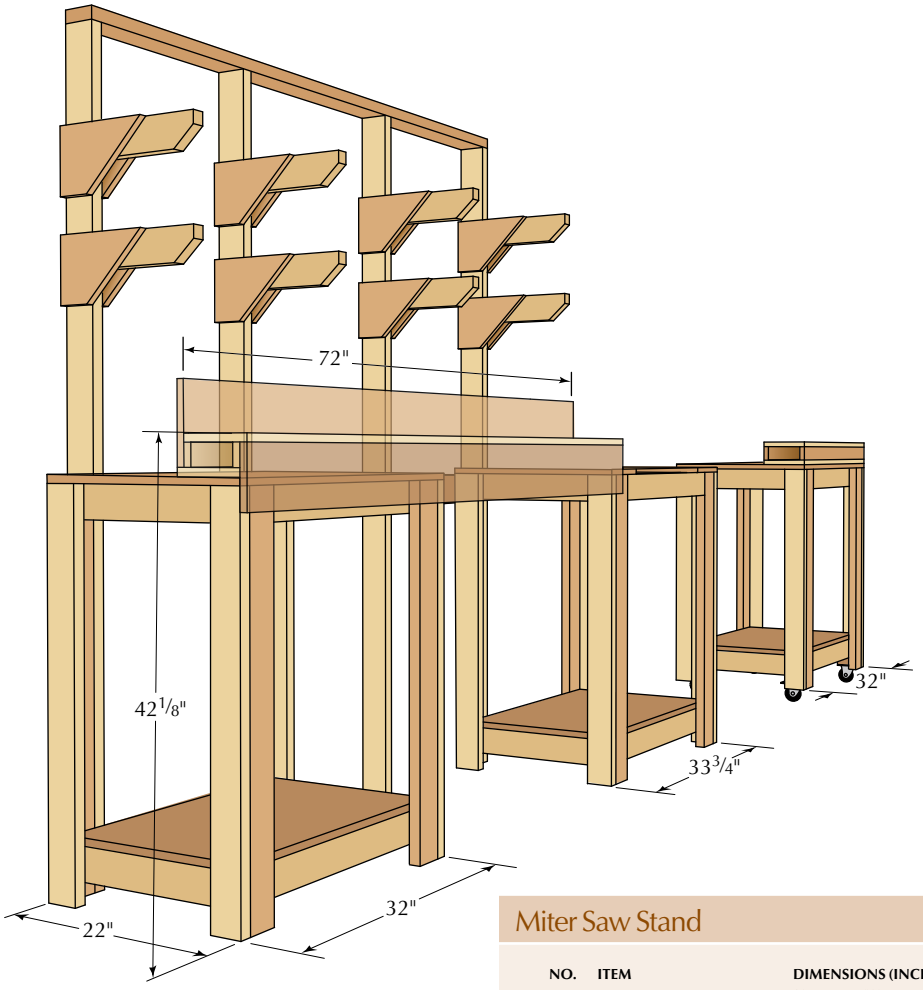
The final parameter is the height above the floor. We chose $42\frac{1}{8}$"—which might seem tall, but it makes it much easier to see our work and line things up without an awkward bend.

Cheap is Good, With Patience

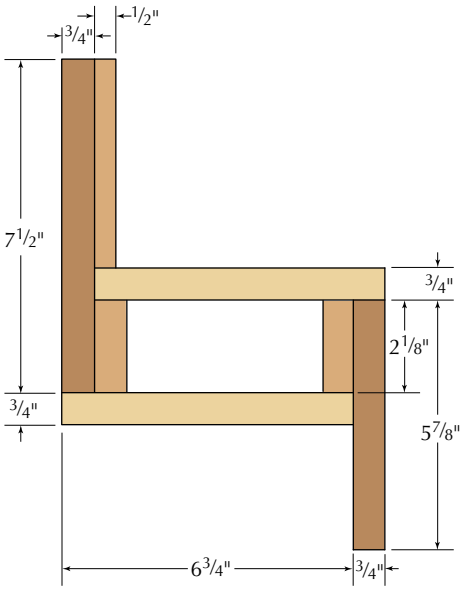
The construction of the tables makes use of a common, cheap material and an assembly method that gives a solid and sturdy surface

Sow's ear. *Construction lumber is so wet that it will twist and warp as it reaches equilibrium with the shop environment. If used in this state, your work won't come out straight.*

Silk purse. *After drying, jointing and planing, this common material is now fit to use.*



3-D VIEW



FENCE, END VIEW

Miter Saw Stand

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑	16	Fixed table legs	1 1/4	3 1/4	37 3/4	SPF*	
❑	8	Rolling table legs	1 1/4	3 1/4	34 5/8	SPF	Adjust to wheel diameter
❑	12	Table frame side rails	1 1/4	3 1/4	19 1/2	SPF	
❑	8	Left & right table frame rails	1 1/4	3 1/4	27	SPF	
❑	4	Saw table frame rails	1 1/4	3 1/4	28 3/4	SPF	
❑	1	Saw table front rail	1 1/4	3 1/4	27 1/4	SPF	
❑	4	Rack uprights	1 1/4	3 1/4	80	SPF	
❑	1	Rack cross piece	1 1/4	3 1/4	71 7/8	SPF	
❑	1	Lower brace between tables	1 1/4	3 1/4	50 1/8	SPF	
❑	8	Lumber supports	1 1/4	3 1/4	12	SPF	
❑	16	Support brackets	3/4	6 1/2	9 3/4	Plywood	
❑	2	Saw supports	3/4	7	20 3/4	Plywood	
❑	2	Tabletops	3/4	20 3/4	32	Plywood	
❑	2	Table shelves	3/4	19 1/2	29 1/2	Plywood	
❑	1	Saw table shelf	3/4	19 1/2	31 1/4	Plywood	
❑	2	Fence top & bottom	3/4	6 7/8	72	Plywood	
❑	2	Fence front & back	3/4	6	72	Plywood	Notch back for saw fence
❑	2	Fence strips	3/4	2 1/8	72	Plywood	Match height of saw table
❑	1	Fixed fence	1/2	4 3/4	60	Plywood	
❑	2	Sacrificial fence	1/2	4 3/4	47 1/2	Plywood	Make extras
❑	1	Cut-off stop	1/2	4 3/4	9	Plywood	

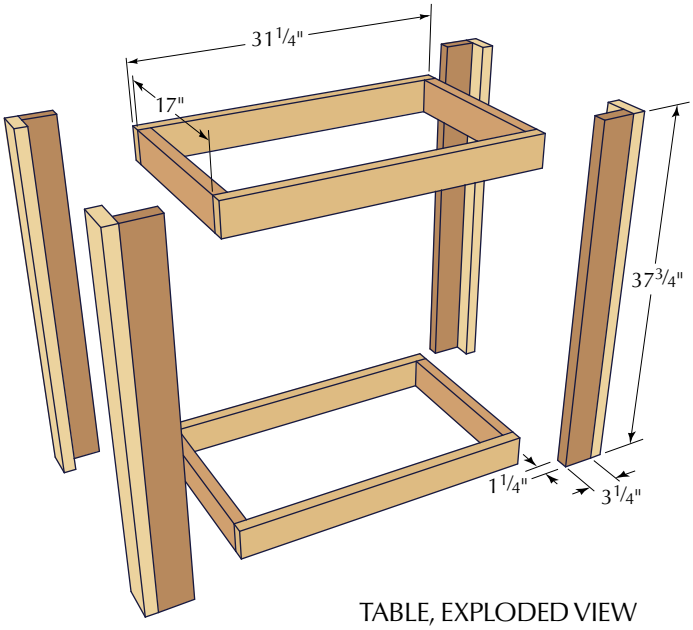
*SPF = Spruce, pine or fir

with basic joinery. All of the solid-wood parts began as spruce, pine or fir 2x4s from the home center. In our neighborhood, the least-expensive hardwood available is poplar, and in 6/4 material, it costs about $2 a board foot.

I paid $2.38 each for "pre-cut" studs, slightly less than 8' long; this works out to about 70 cents a board foot. The drawback is that this stuff can be soaking wet when you buy it. This can be overcome, but it requires time and effort.

Construction lumber is kiln-dried, but it comes out of the kiln at 18-20 percent moisture content. Similar material that has been in our shop for a year is between 8-10 percent moisture content. As the 2x4s reach equilibrium with the shop's environment there will be some shrinkage, warping and twisting.

I've found some ways to work around this. The most important thing to do is wait. The drying process can be assisted, but it still takes time. When the wood gets to equilibrium, I mill it on the jointer and planer and obtain



TABLE, EXPLODED VIEW

straight and flat material. Even though I am a procrastinator, I wanted to speed the process so I cut the studs to rough lengths.

Most of the moisture exits the board through the end grain, so this opens up the middle of the board and lessens the distance the water in the wood needs to move. Then I cut a bunch of scraps into 1/4"-square strips and stacked the rough-length 2x4s with spaces between the edges of the boards and my 1/4" stickers between each layer of the stack. I scanned a few boards with a pinless moisture meter every few days, and in about a month the wood was dry enough to use.

Without a moisture meter, it's still possible to tell when the material is dry enough to use. If you have a piece of similar material that has been in your shop for several months, you can use that as a comparison to the new material. Wet wood will be heavier, and noticeably damp and cool to the touch.

The length of time it takes for the wood to acclimate will vary depending on where you live, and the environment of your shop. A month in our air-conditioned shop is the best-case scenario, but it could take two or three months in a damp basement shop. If you live in the desert, it could dry on the way home from the lumberyard.

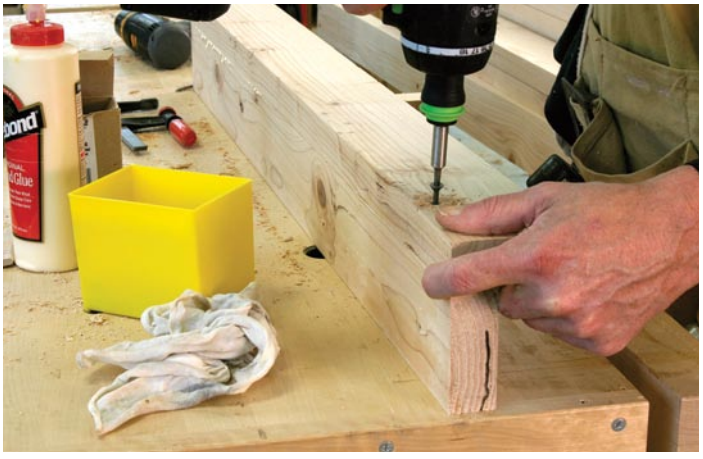
Pretend it's Rough Lumber

When the wood was dry, I milled it down to 1 1/4" x 3 1/4" on the jointer and planer. This may seem like a lot of waste, but in my experience, this is what it takes to get straight material from 2x4s. With a pile of now-straight and square stock, I cut the parts to final length and assembled the benches.

There are two subassemblies to the benches: "L"-shaped legs, and butt-joined frames. Glued and screwed together, the jointed edges of the leg components hold each other straight, resisting warping and twisting. The legs are far stronger than just a 2x4, and the shape allows solid attachment of the frame. This method can be used to make sturdy benches of nearly any size. I also made stands for a lunchbox planer and a mortiser and you can see more details of these online at popularwoodworking.com/oct07.

The legs are held together with #8 x 2 1/2" screws and glue. Set one of the leg parts on edge on the bench, and apply glue to the top surface. Put the other part on top, using a piece of scrap to support it while you align the edge with the face of the vertical piece. With the parts aligned, drill countersunk holes and drive three or four screws to connect the two parts of each leg. The frames are glued and butt-joined and these joints are also screwed together.

The frames fit in the inside corner of the leg assemblies. Lay two legs on the bench with the inside of the "L" facing up. Put some glue on the inside faces of the legs and put a frame unit in place with one of the long pieces down. Drill holes and connect the frame to the legs with #8 x 2" screws. With a combination square, mark the location of the lower frame 20" up from the bottom of the leg and glue and screw it in place. When the three tables are assembled,



Dynamic tension. *The jointed edge of one part helps keep the face of an adjacent part straight. Held together with glue and long screws, these legs are strong and straight.*

All together now. *With the frames inside the leg assemblies, this table is ready for a plywood shelf and top.*

attach the plywood shelves and tops to the frames with glue and #8 x 1¼" screws.

The right-hand table has shorter legs so that it can roll on swivel casters. A block of scrap leg material is glued into the inside corner at the bottom of each leg, providing a place to mount the wheels with #10 x ¾" panhead sheet-metal screws. A simple plywood box, the same height as the fence beam, can be placed on top of this rolling table to provide support for material to the right of the saw when needed.

Leave Yourself an Opening

The front upper rail of the saw table is reinforced with a second piece of wood that fits between the legs. I didn't bother with screws; I just glued it on, holding it to the existing frame's front with clamps while the glue dried. The plywood on the top of this unit isn't a solid piece; it is two 7"-wide strips going front to back at the right and left ends. The lower shelf on this unit may need to be slightly lower than the other units to ensure that the trash can fits. I used a Rubbermaid 32-gallon "Brute" that I purchased from the home center, but you'll need to adjust the opening size if you opt for a different container, or if you change the height of the saw table.

On the Fence

The fence assembly is a plywood box-beam. The extended front and back pieces of the beam are held to the top and bottom with strips of plywood. This beefs up the beam, and the width of the strips helps to level the surface to the surface of the saw table. In this entire project, the width of the strips is the only dimension that is important to hit exactly. This dimension will depend on the exact thickness of the plywood, and on the distance from the top of the saw's table to the base of the saw.

Because ¾" plywood is notorious for being undersized, I took two scraps and placed them on top of each other, next to the base of the saw. To get a precise measurement I took my combination square and set the head on the saw table and slid the blade down until the end of the blade rested on the plywood scraps. After cutting a test strip, I put it on top of the scraps and used the blade of the square as a straightedge to check the width. If the strips are a bit too narrow, that won't cause any problems, as the fence beam can be shimmed up to match the saw table.

One strip is attached to the long edge of each of the front and back pieces. I used 1¼"-long narrow crown staples and glue, but the strip can also be held in place with nails or screws. Be careful to keep the long edges of

Gauge the distance. *Stacking two pieces of plywood next to the saw table will give you a precise distance without measuring.*

Double check. *Checking the width of the strips with a straightedge will help keep the fence beam at the same height as the saw table.*

Keep the edges flush. *The thin plywood strip reinforces the front and back of the fence assembly, and locates the top and bottom correctly.*

Quick and strong. *The box beam construction keeps the fence assembly straight, and the narrow strips of plywood make it easy to put together.*

A place to put your stuff. *Adding brackets to the back of the stand is a convenient way to store material about to be cut and parts that have just been cut.*

Right where you want it. *Using the kerf in the subfence allows you to cut inside or outside a pencil line, or split it down the middle.*

Zero clearance equals accurate cuts. *A replaceable sub fence indicates exactly where the saw blade will be during the cut.*

Keeping it simple. *An offcut of plywood and a clamp make an effective stop system.*

Dealing with the trash. *Miter saws can make a mess, but leaving the top open below the saw lets dust and scraps fall into the trash can below.*

the two pieces of plywood flush during assembly. Attach the beam bottom to the edges of the front and back, then attach the top of the fence beam. If you need to notch the end of the fence, you can cut the notch with a jigsaw, either before or after assembly.

The box that sits on the rolling table is made from the same size parts as the box beam fence, minus the wider pieces that extend up and down. I glued and screwed the parts together and considered attaching it to the rolling tabletop, but it does its job, supporting long pieces to the right of the saw just as well if left loose.

A material rack is built into the back of the saw stand. It isn't designed to hold a lot of material; it is more of a temporary place to put material before and after cutting parts to length. Three 80"-long uprights are screwed to the back legs on the left-hand table, and the back left leg of the saw table. A cross piece connects the two tables at the back, keeping the entire assembly from racking, and this provides a place for a fourth upright. The supports are short pieces of 1¼" x 3¼" material, held in place with simple plywood brackets.

With the tables and fence assembled, the complete saw station can be put in place and assembled. Start with screwing or bolting the saw to its table, then level the table with shims under the legs as needed. The left table is set in place, and the fence beam is set across the two tables. Check to see that the fence beam is sitting level, and that the fence itself is in line with the metal fence on the saw.

When everything is level and in line, attach the fence assembly to the two tables with a couple screws. Attach the ½"-thick secondary fence to the thicker back fence with #6 x ¾" screws. We used Baltic birch plywood, which comes in sheets that are 60" square. The permanent portion of the secondary fence is one rip from the sheet.

Making Sacrifices for Accuracy

Rip some extra pieces from the sheet for the replaceable fence sections. Hold one of these against the right-hand edge of the permanent piece and mark the length directly from the right edge of the metal fence on the saw. To provide clearance for the saw carriage, you'll need to trim the upper portion of the replaceable fence in the middle. Hold it in place, trace the outline of the saw's fence on the back, then make the cut on the band saw or jigsaw.

The sacrificial fence is held in place with #6 x ¾" screws. Most saws have a few holes in the metal fence that will allow you to run a few screws in from behind, and you can run a couple screws from the face of the fence into the thicker plywood back fence. With the saw set at 90°, make a cut through the plywood fence.

This cut through the fence gives a convenient and accurate way to line up a cut line on your work with the saw blade. When you need to renew this kerf line, you don't need to replace the entire piece.

Remove the sacrificial fence, cut the edge back to square and put it back, pushing the freshly cut end against the edge of the remaining right-hand fence. This will leave a gap on the other end, but that won't hurt anything.

The only remaining part is the stop, which is a cut-off piece of ½" plywood. I nicked off the end at a 45° angle to keep sawdust from building up between the end of the stop and the material being cut. **PW**

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PRECISION HAND

Use a curved blade in a handplane to make boards with truly flat faces and dead-straight edges.

I described my method for curved plane blade sharpening in an article titled "Learning Curves" in the August 2005 issue (#149). You may have wondered how it is possible to plane a board so it has an accurate datum surface, which we call a face side, with a blade that is slightly curved.

The face or datum surface of a board is always placed to the inside of a carcase in cabinet work, as this is the reference surface from which all joint-marking out is done. If you think of a half-blind dovetail at the front of a conventional drawer (which we call a single-lap dovetail in England), it is clear that the lap line is gauged from the inside face of the drawer front, which must be true and "out of wind," that is, not twisted. The face side of any board is the less glamorous side, though accurate, and has nothing to do with the show surface, which faces the public. The definition of a face side of a board is a surface that is:

1. Flat in its length.
2. Flat in its width.
3. Out of wind, or free from twist.

Why Use a Handplane If You Have a Planer?

I am assuming that you have a jointer and a planer and that your furniture components have been machined close to finished size, so it is worth asking why we should hand plane at all?

PHOTOS BY CHRISTOPHER SCHWARZ (WITH THANKS TO THE MARC ADAMS SCHOOL OF WOODWORKING); ILLUSTRATIONS BY MATT BANTLY

The pencil is your guide. *Pencil marks, a straightedge and a handplane can help you create truly flat surfaces. The trick is learning to read your pencil marks.*

PLANING

BY DAVID CHARLESWORTH

One reason is to get rid of snipe, which is that irritating change of level near to the ends of the components. This small fault is almost inevitable unless the blades of the jointer are set perfectly relative to the outfeed table. We also get a slightly different snipe when components go through the thickness planer. This occurs when each end of the timber is only held down by one of the feed rollers, and a little bouncing happens due to the pounding of the planer knives. Snipe leaves small steps in our surfaces exactly where we want to use a square to mark out shoulders or ends, and a square is useless when the stock is resting on a bump or step. If the stock isn't stable the tool rocks and gives two unreliable readings.

A second reason for handplaning is to improve the surface finish and eliminate tear-out, which may have been caused by the machine planer.

A third reason, the one stated by venerable British craftsman Alan Peters, is to check over the accuracy of the machine result. Timber sometimes "springs" due to the release of internal tensions during machining, and it is also possible to machine a convex edge on a board and leave it just as convex as when you started! For the best results in furniture making, we need to pay attention to accuracy throughout the project. If the preparation and marking out are as accurate as possible we will be well on the way to a good result. Sod's law (you call it Murphy's Law) predicts that small errors have a nasty habit of accumulating during the job and conspire to produce major errors at the end. They very rarely oblige and cancel each other out.

The first thing to consider is: How can we use a handplane to take a set of "through-shavings" (shavings that are the entire length of our work) off a machined board without losing the flatness of width that is already there? If we work at random, concentrating on the problem areas, flatness will undoubtedly be lost.

I like to work with nothing shorter than a No. 5 or No. 5½ jack plane, which is about 15" long from toe to heel. Longer planes such as a

No. 6 or No. 7 (which are up to 22" in length) would also be ideal. In all cases they need to be tuned up like you would a smoothing plane, not for their original historical functions. (This means a razor-sharp, slightly curved blade with the tool's chipbreaker set very close to the edge, is set up and nicely balanced in the plane. See Illustration 1 at right. The mouth is very narrow and a shaving of no more than .002" thick is set).

The techniques described work extremely well when the timber is no more than twice the length of the plane and up to about twice the width of the plane. The technique has to be varied slightly for very long and very wide boards.

Mark Your Trail and Follow It

First I scribble all over the surface of the board with a soft, 2B pencil. This gives us valuable feedback, showing exactly where material is removed by each shaving.

The first shaving is taken near the edge of the board with the center of the plane positioned about 3/8" in from the edge. A similar shaving is also taken from the opposite edge. I try to use my fingernails as a fence so that the plane remains exactly parallel to the edge of the board. The photo at center below shows the result after these first shavings. The edges of the pencil scribble show us where the first shavings faded away to nothing. These indicate where I place the center of the plane to take the next two shavings on the board. I continue to work like this toward the center of the board, until all the pencil has been removed. It never does any harm to put in an extra shaving in the center of the board, as the plane cannot produce an excessive hollow because of the width of its sole.

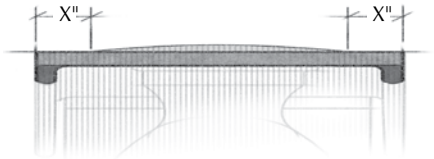


Illustration 1. *When setting a balanced shaving, the protruding curved blade is centered relative to plane body. This setting is balanced, i.e. centered.*

Illustration 2 shows how this system works in practice. The beauty of the pencil scribble is that it shows us where to position the next shaving, regardless of how wide the shaving being taken is. The width of shaving taken depends on the curve sharpened on the blade and the depth of cut you've set, so it will vary from day to day. (Note: For working across the faces of wider boards I use a blade with less curve than I do for trueing narrow square edges of boards, but the precise curvature is not important.)

I think that the cross-section drawing of the board in Illustration 2 shows how this system leaves the surface (which is minutely scalloped) substantially flat in its width.

When we first handplane a machined board, the surface may not all clean up after the first set of shavings, so it may be necessary to take two or three sets of shavings, applying fresh pencil lines for each set of shavings. As soon as the whole surface is clean, we can start to examine it for errors.

Test the Length for Bumps

If you have an accurate 2'-long metal straightedge, it can be used to inspect the length for high spots. I like to hold it near to one end and move it across the width of the timber, noting where it pivots. (You can see this technique in my second DVD "Hand Tool Techniques Part 2: Hand Planing," available from Lie-Nielsen Toolworks, lie-nielsen.com, and from my web site at davidcharlesworth.co.uk) The process is then repeated holding the other end. This is much less tiring than peering under the edge against a good light source. However, if the component is not more than twice the length of the plane, a straightedge is not really needed

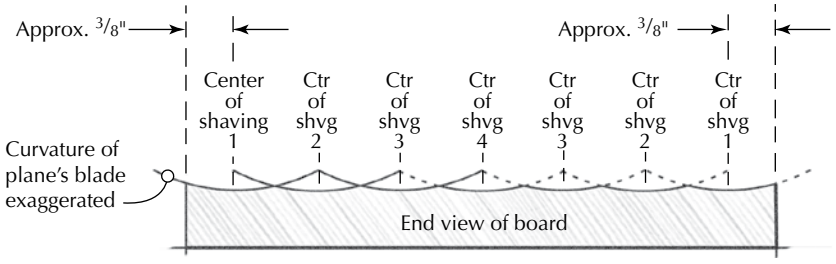


Illustration 2. *This diagram shows how a scalloped surface is left substantially flat.*

Pencil scribbles provide valuable feedback. *First use a soft pencil to cover the face of your board with a series of scribbles.*

First marks removed. *After taking the first two passes with the plane, the pencil marks at the edges of the board are removed. Now place the center of the plane on the line where the pencil disappears and take another pass.*

Working toward the middle. *Plane the face of the board with the center of the tool on the point where the pencil lines disappear. Continue to the center. Then repeat the entire process until the surface is clear of pencil lines.*

at all. I simply take sets of "stop-shavings" to hollow the length of the surface.

Stop-shavings are similar to a set of through-shavings except we start the shavings just inside the end of the board and lift the plane just before the other end of the board is reached. I draw a pair of soft pencil lines across either end, and they should not be removed. If they are removed we have wasted the hollowing effect of the stop-shaving.

It is easy to start each shaving just inside the end of the board but not so easy to stop in the right place, especially as the plane needs to be moving when we lift it. It does not matter how slowly it is moving, but if you stop and then lift, the shaving remains attached to the board and is dragged backward through the mouth. It can take a few moments to clean up and clear the mouth when this happens. I find that planing becomes much easier and more controllable if you keep your dominant-hand elbow pressed firmly against your ribs and use your legs to drive the plane.

I take sets of stop-shavings until the plane stops cutting; and then I take one or two sets of clean-up through-shavings to remove the pencil and small steps from the ends. If you now examine the length of the surface with a straightedge it should still have a minute hollow. The hollow can be measured with cigarette papers or feeler gauges and it rarely exceeds .001" or .002". This really is an astonishing result. A hollow of .001" or .002" over 15" is a remarkable tolerance. (If the work is about 30" long I expect a hollow of about 004".) Of course it is not possible to achieve this result if your handplane has a substantial hollow in the length of its sole. This demonstrates why plane tuning is so important.

This is My Definition of Straight

I know this bothers some people, but we cannot achieve perfect straightness, and so I would suggest that a minute hollow in a surface is infinitely preferable to a minute bump.

The beauty of this system is that you don't even need a precision straightedge to do it, providing the timber is not more than twice as long as the plane. You just clean the surface with sets of through-shavings, hollow it with sets of stop-shavings and clean up with one or two sets of through-shavings at the end! (For very long surfaces some kind of long straightedge is necessary as a plane can ride up and down to follow the hills and valleys of the board.)

One thing that can prevent a successful outcome is if thinner timber is not well supported on the workbench. If the underside is not sitting flat on a flat bench surface the timber can flex downward as the plane passes over, and it springs up again when it has passed. A tip for avoiding this is to shim the voids under the work with strips of paper. I never clamp thin timber with dogs and an end vise, as this will inevitably bow the component. The wood is also not properly supported above the open jaws of the end vise, and the end vise is extremely unlikely to be exactly level with the bench surface.

Mark your stop sign. *Draw soft pencil lines across both ends of the board as shown then scribble in the middle as before. The object is to then remove the scribbled lines without touching the lines on the ends.*

Ready for through-shavings. *Continue to remove shavings in the middle of your board (hollowing it) until the plane stops cutting. Then take a set of through-shavings to remove the marks at the ends.*

Remove a bump in the width. *If the board is convex across its width, you can fix it. First scribble on the surface and take a single shaving from the middle. Then work out toward the edges.*

Leave a little at the edges. *Work from the center out to the edges, but allow 1/4" of your pencil lines to remain at the edges. Repeat this pattern of work until the plane stops cutting.*

Testing the Width of the Board

Having established the flatness of the length of the board, I now examine the flatness of the width using the blade of a square. In most cases you will find a minute hollow already exists across the width of the component. This is not an accident but a by-product of my system for taking a set of shavings. If a bump does show up in the width, I have a slightly different pattern of shavings to get rid of it.

Having scribbled over the surface, I start by taking a through-shaving down the center, and spread the next shavings outward toward the edges. However, we must take great care when we are near to the edges, as we do not want to remove any timber from the edges. This would waste the hollowing effect of this shaving pattern. It is necessary to have a clear visual image of the places where the blade disappears back into the body of the plane, in order to position the shavings nearest to the edges. I suggest that we are aiming to leave unplaned strips of about 1/4" along either edge.

It is a useful exercise to repeat this hollowing set of shavings until the plane stops cutting. It is not possible for the plane to produce a large hollow in the width when the timber is not more than twice the width of the plane. If you then take a set of ordinary through-shavings to clean up the pencil on the edges, the hollow left in the width will diminish to .002" or less. Again I would suggest that this is a desirable and useful result. Any kind of

bump in the width makes readings of the edge squareness unreliable.

Check for Twist

The final task is to check the surface for twist or wind and remove it if present.

There are few sources for winding sticks and most craftsmen make them for themselves. They are a pair of accurately planed sticks, possibly with inlaid white reflectors. (Bone, acrylic, alternative ivory, pale timber etc. It helps if the timber used is dark, quartersawn and stable. Mine have a dark background strip set into the top edge of one stick so the white keys do not disappear into a white wall – see the photos at the beginning of the article.) These are placed across either end of the component and sighted from some significant distance away. You keep your best eye open and gradually lower your head until the tops of the white keys reach their disappearing point, behind the plain stick.

Wind or twist is present if one key vanishes before the other. The winding sticks will magnify the error if the sticks are wider than the work, enabling us to see very small errors. When I started I found the removal of wind frustrating, tipping the surface to and fro, before eventually getting it right, so I came up with a simple method of measuring it.

Measuring Wind with Paper Strips

It is convenient to have a supply of ordinary writing paper, which is about .004" thick. Paper thickness varies so it is good to check with calipers or a micrometer. The perceived error of the winding sticks can be shimmed out, by adding thin strips of paper at one low corner. Let us suppose that one sheet of paper corrected the error and that your handplane is set to make a .002"-thick shaving. This means that the two high corners of the work need to be lowered by one shaving each. I say two high corners because we are creating a datum surface and have no means of telling which corner might be .004" high!

The illustrations below show the pattern of shavings I would use to correct the twist in our theoretical example. As usual, scribbling over the surface and marking the high and low corners is very helpful. I do all my planing as sets of shavings, keeping them parallel to the edge of the work. It may be possible to remove wind with diagonal shavings but I have not tried that method.

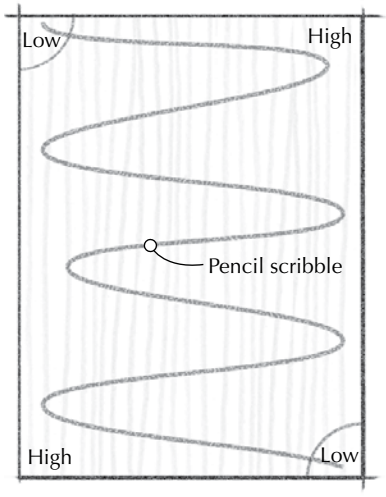
It is clear that we must take a shaving from a high corner but not so clear that this shaving is stopped just short of the far end, which is a low corner. If you stop halfway through, a small step is created and a straightedge will read this step as a bump.

The other high corner is removed with a shaving that starts just inside the low corner and goes right through the far high corner.

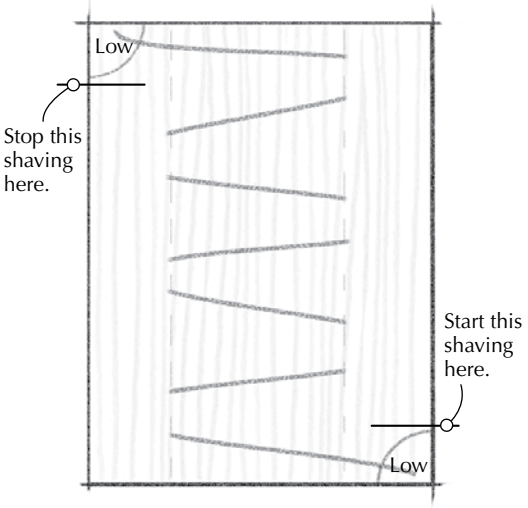
If you consider what has happened to our flat width, you may see why it is necessary to complete the set of shavings, removing pencil from the whole of the rest of the board. Only the low corners will have a trace of pencil left, and the twist should have been removed. The result is now re-checked with the winding sticks.

The beauty of this method is that you can measure the amount of twist with the paper strips. If you know the relationship between the paper thickness and the shaving thickness from your plane, it is possible to home in on

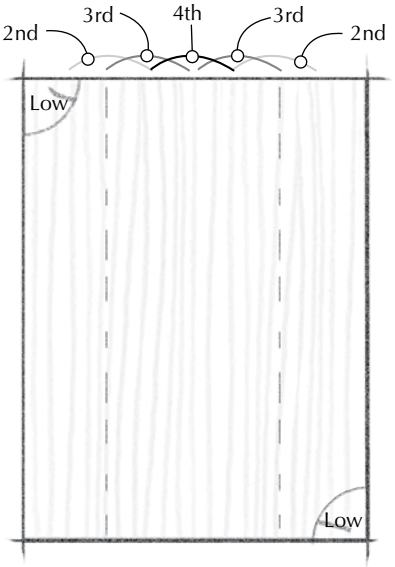
Watch for wind. *Place a winding stick at each end of the board and sight across them – lining up their top edges in your eye. If they do not line up, your board is in wind.*



1 ***Mark high and low corners*** *and scribble as usual.*



2 ***This is the view of the surface*** *after the first two shavings.*



3 ***Remove the rest of the pencil scribble*** *with through shavings 2, 3 and 4, leaving only the marked low corners.*

a result, almost immediately, avoiding the frustration of over-correcting and seesawing backwards and forwards.

Removal of wind may sound a little theoretical but it is extremely important that the inner face of a drawer front is not twisted. If it is, the two drawer sides will end up after dovetailing with one pointing up and one pointing down. The longer your drawer sides are, the worse the problem.

Straighten the Edge

With the datum surface flat, draw a face-side pencil mark with its tail pointing towards the board's edge that we are going to now perfect. I first secure the board on edge in my vise and take some through-shavings to clean the edge. Then I hollow the length with stop-shavings, following with one or two through-shavings to remove the small "stopping and starting bumps." This will leave the edge minutely hollow in its length. Test it with a straightedge if you wish to confirm this.

I now use a combination square to check the squareness of the edge every 4" or 5" along its length. Sliding the square along the edge is bad practice, as it will eventually wear away the blade. I keep a soft pencil tucked into the hand holding the square, and I mark the high spots on the edge as I spot them, using a code to indicate how many shavings I think will be needed to correct the error. This process takes some practice but is helpful in the long run. If the edge is square I mark a line right across the edge.

A typical twisted edge is shown in Illustration 3. The plane is simply eased off center toward the high points of the edge as the shaving is taken, and then eased back onto center when there is no error. This is not as difficult as it sounds and the fingernails under the sole are used as a fence, to assist in this operation. Illustration 4 shows how the curved blade takes correcting shavings when the plane is moved to one or the other side.

Inspect again after the correcting shavings have been taken. If small errors remain, mark them again and make smaller sideways movements with the next pass.

I mentioned earlier that a blade with less curve can be used for planing face sides. When correcting narrow edges, it is important to have enough curve, or the plane has to be moved a long way off center to have any effect when correcting an edge. The ideal setup is when the width of blade exposed in the mouth of the tool is about twice the thickness of the timber you are working on (for example, you would want to be able to take a $1\frac{1}{2}$"-wide shaving when correcting a $\frac{3}{4}$"-wide edge). The maximum correction is achieved when the center of the plane is positioned directly over the high side of the edge.

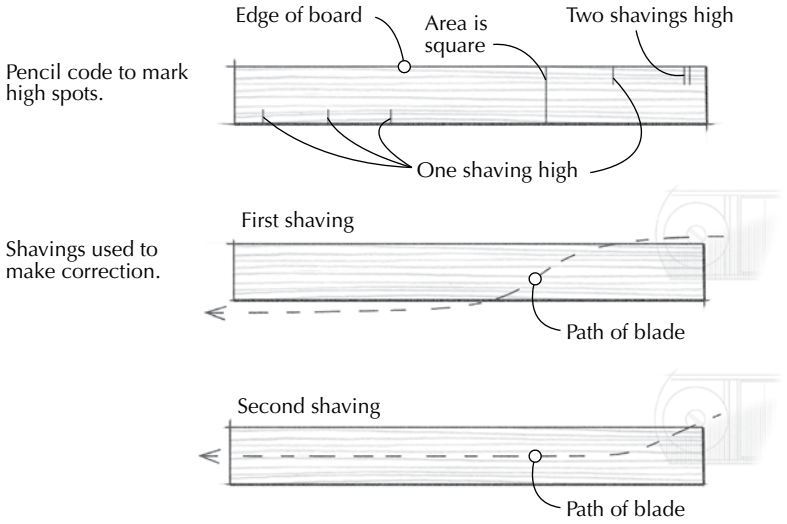


Illustration 3. *Pencil lines also guide your work when straightening the edge of a board.*

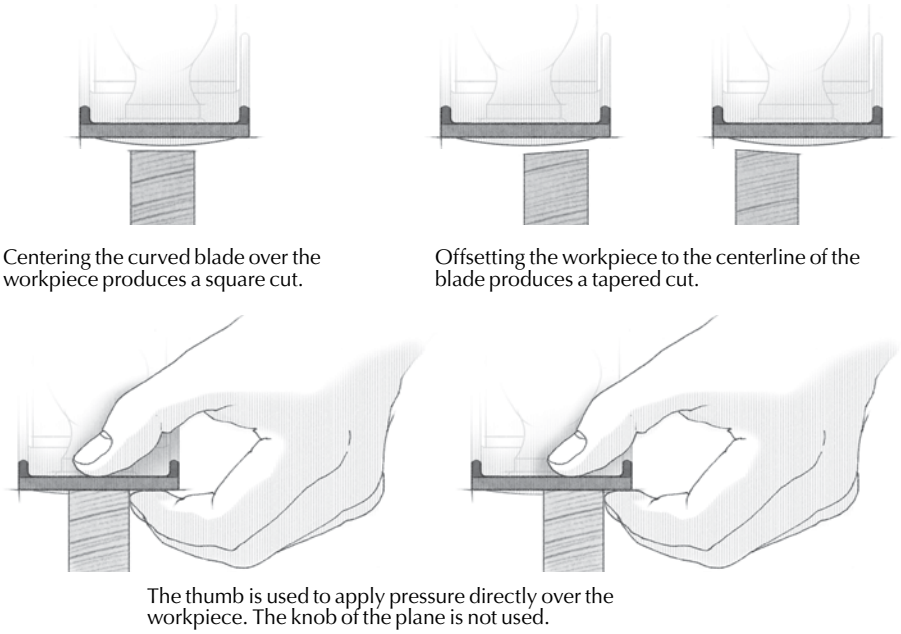


Illustration 4. *A plane blade sharpened with a curve (exaggerated here) can be used to produce a straight edge.*

The job is finished by taking a through-shaving with the plane down the center of the edge. If you see a continuous full-width shaving coming up through the mouth of the plane, you know that the edge is minutely hollow in its width, which I call flat. If you do not see a full-width shaving, the edge is composed of two facets, and it has a bump in the width. A bump is the last thing we want for accurate edge joints. Some woodworkers will want to question the hollow, but it is likely to be less than .0005". Wood is compressible, and I'm sure the surfaces will be brought together by clamping pressure.

To sum up, I do almost all my planing with a curved blade and would not be without it. I hope you will enjoy experimenting with these valuable techniques. **PW**

David is an author and furniture maker who has specialized in teaching since 1977. An accomplished author and DVD host, David's books include "Furniture-making Techniques" (volumes 1 and 2) and the new "A Guide to Hand Tools and Methods" (Guild of Master Craftsman).

MAKING A Spokeshave

BY JOHN WILSON

WITH PROJECT DEVELOPMENT
BY GIL CHESBRO

Make this tool in your workshop using scrap wood and a piece of tool steel.

If you have been reading these pages during the past few years, you have been introduced to the traditional spokeshave. I'm going to show you how to make your own. This means making everything from a shaped, hardened and tempered steel blade, to making the tool's wooden body with a micro-adjustable mechanism, right in your own shop.

History of the Spokeshave

The traditional wood-bodied spokeshave has a blade that lays flat to the work surface, or sole, of the plane. It cuts in fine, smooth strokes that rivals or surpasses its cousin, the angled blade of the metal-bodied shave.

The spokeshave receives its name from wood wheel making, where it is indispensable to the wheelwright in planing the transition from the square hub end of a spoke to the round. And, you can fit the wood sole of the plane in tight recesses if needed—just increase the angle of wood in front of the blade.

How Tool Steel Works

The project starts with making your blade, which will become the template for carving the wood body. Tool steel for the blade is an alloy that changes properties when subjected to heat. The 01 (oil-hardened) stock is a good steel for general applications, and has rather forgiving parameters when heat treating.

There are three stages through which you take the steel. It is manufactured in lengths 1/8" x 5/8" x 18", enough for four blades. The cost is less than $10. (I suggest ordering parts for several shaves while you are at it.) Tool steel is annealed when manufactured, meaning that it is soft enough (Rockwell 45) that it can be cut with a hacksaw and drilled.

The second stage is where the steel is hardened. Here, you play blacksmith and heat the blade red hot in your shop-made furnace. The temperature of steel when it glows red is between 1,450° Fahrenheit (F) and 1,700° F. The duller color of cherry red is the desired temperature range of 1,450°F to 1,500° F for 01 tool steel. It is now subject to abrupt cooling by quenching in oil. The 01 steel gets its name from being formulated to require the shock that happens when it is immersed in oil that boils at 325° F. Some other steels are designed for a water quench that is a more severe temperature drop to 212° F. The blade is now super hard at Rockwell 75, but also very brittle; it will shatter if struck with a hammer.

To restore the desired toughness, or ductility, the blade is then tempered in an oven that heats to 425° F, and then it is slowly cooled. This will be done in your own heat-treat oven, aka toaster oven. The shiny surface of the steel at this temperature has a light straw color which is the first of a rainbow of surface patinas from yellow to bronze to blue as the steel is heated to 625° F. The final hardness is determined by the amount of heating. Light straw heating will result in a blade of Rockwell 60 hardness that possesses adequate toughness for long edge life.

Making the Blade

The steps for blade making are:

1. Lay out the shape and holes on the 01 steel.

2. Center punch the location for holes and drill with a #21 or 5/32" drill, and tap the 10-32 threads.

3. Hacksaw the blade to length and notch the ends.

4. Cut two pieces of 10-32 threaded rod to 1 1/4" long, which will serve as handles while grinding. Grind the bevel of the blade, leaving a small flat on the leading edge.

5. Harden the blade by heating the sharpened edge to cherry red (1,450° F - 1,500° F) and quench in oil.

6. Temper to light straw (425° F) in your toaster oven.

7. Sharpen edge and flatten the back of the blade on the belt sander.

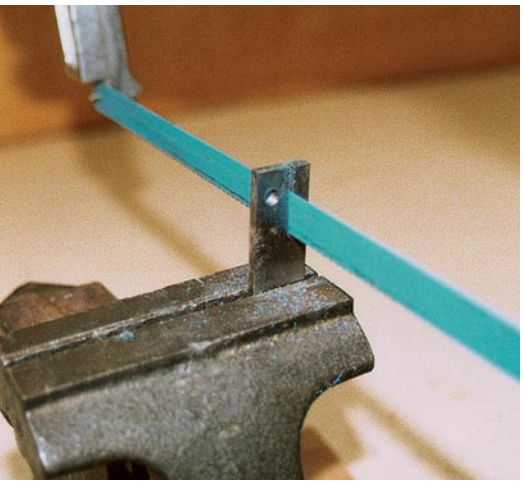
8. Use the new blade as the template for making the wood body.

9. Attach the threaded rod permanently to the blade with cyanoacrylate (CA) glue.

You can follow these steps as illustrated in the drawings and photos. While 01 annealed steel is soft, that is relative to its hardened state. So you will find that starting with a new 24-tooth blade in your hacksaw is helpful. If you have not used a tap before, be careful; they are brittle and easily broken. As you start cutting threads, retract a quarter turn for every half-turn advance. That technique, plus a drop of

Tap first. *An 18" length of 01 tool steel 1/8" x 5/8" will make four spokeshave blades. Black magic marker is used to highlight layout lines to locate holes for 10-32 threaded rod posts. Here a tap and tap wrench are used in a setup on the drill press using a spring-loaded center (taken out of the drill chuck for viewing purposes) to keep the tap straight while threading.*

LEAD PHOTO BY AL PARRISH; REMAINDER OF PHOTOS AND ILLUSTRATIONS BY THE AUTHOR



Blanks. *Cut individual blanks to length, and notch the ends. (Save the scrap piece for later.)*

Shape the blade. *Grind the blade edge using the threaded rod posts to aid holding. Note that the posts are attached opposite of the finished blade for this purpose. After the edge is ground to rough shape, the belt sander is my favorite means of achieving a perfectly shaped edge.*

Heat Source for Making Blades

Hardening the 01 tool steel for a blade requires a heat source to make it cherry red, or 1,450° F to 1,500° F. Finding the right source involves safety, affordable cost, availability and effectiveness. Balancing these is what I want to share with you.

I have used a charcoal grill as a small forge with success, although to be effective you need to rig up a blower to intensify the heat. A hair dryer with a length of flexible steel tube can do this. For safety, and to avoid smoke nuisance, this needs to be done outside. Now you have to know how to gauge the color of hot steel. Cherry red indicates the right temperature when seen in the dim interior of the old forge, and not out in bright sunlight. Be cautious not to overheat the steel when outside. The requisite temperature of 01 tool steel means that heating above 1,500°F will not make it any harder; it will only create coarser crystalline grain structure and damage from loss of carbon.

Speaking of adding oxygen to fuel to intensify heat, bottled oxygen and either acetylene or propane are standard for farming, auto repair or machine-shop work. It is an excellent heat source for making blades as it gives abundant heat, is well focused and easily turned on and off. While the torch and regulators can cost as little as $100, you may be surprised to find each gas tank can cost $250 to buy, while refilling them after the initial charge is only $20 to $30 each. Propane is a viable alternative to acetylene by simply swapping the torch tip size, and avoids the cost of one tank charge by using the standard 25-pound propane tank sold for outdoor grills. Be sure to seek help to learn effective and safe usage for this.

The most accessible heat source these days is the small gas torch used for home repairs and plumbing. A 16-ounce bottle of fuel and torch are less than $50. No tank buying is involved as bottles are not refillable. However, buying the right torch to get enough heat to do the job is the problem. There are two kinds of fuel: standard propane and MAPP gas that burns 200° F hotter. We ran tests on this and found that burning temperature was only one factor; the other was quantity of flame. Many torches have a small output that will not heat a sufficient area to do the job, whether using propane or MAPP. Larger volume torches work when using a simple heat-conserving forge as described in the article (with either MAPP or propane), but the MAPP is faster and also could surpass the cherry-red stage advised for 01 tool steel.

BenzOmatic torches (series JT, BT and TS) all have a brass regulator valve with a side-mounted burner tube that delivers enough flame to do the job. In one case we used the BenzOmatic TS99 (Lenox also has a similar model, #LS10) which has a plastic handle with electronic strike in line of the burning tube (see photo at top right on the following page) and found the plastic melted from the intensity of heat in the furnace. A small metal shield with a 1/2" hole for the burner tube to slip through served to save the plastic handle, but one of the company's other models without the plastic handle would be my first choice.

The right small torch to harden the tool steel and a toaster oven for tempering your blade will set you up to make woodworking tool blades. — JW

oil, will prevent breaking the flutes on scrap buildup.

When grinding the bevel, use two 1 1/4" pieces of threaded rod as handles, as shown at left. You will find it fairly easy going and there is no need to keep from bluing the annealed blade with heat. However, it is good practice to leave a 1/32"-thick blunt edge to protect from carbon loss in the heat treatment.

Heating Furnace

To harden the tool steel, it needs to be heated until it glows cherry red. That puts it in the temperature range of 1,450° F to 1,500° F. If you have access to an acetylene torch this is easily done. What is helpful for those who don't is to be able to heat-treat using an ordinary soldering torch and MAPP gas which is 200°F hotter than LP (see "Heat Source for Making Blades," this page). Used alone there is not sufficient heat to fully turn the blade cherry red. What is needed is your own furnace.

Refractory brick can be stacked (as seen in the photo at far right on the next page) to shield the blade to conserve heat. Fire brick at $2 each can be purchased where pottery kiln supplies are sold, or a potter may have pieces you can have. (Do not use common brick as heat can cause them to explode.) My favorite furnace is made from two tin cans pop riveted together. Here the insulating layer of air between the two cans will preserve the heat. The heavier steel used in diet drink cans such as Slim Fast served as the inside, and an evaporated milk can is used for the outside. One pop rivet in the bottom holds the two together.

The trick is to get the entire length of the blade heated to cherry red ready for the oil quench. That is the reason for the furnace. Your existing torch and gas may work fine. If not, try switching to hotter MAPP gas and another torch that delivers a larger flame. Wear protective gloves and safety glasses while holding the blade in the furnace with pliers. Fire is always dangerous in a wood shop, so do this somewhere where you are safe.

Have a metal container with sufficient oil in it to plunge the blade completely beneath the surface in one quick motion. Doing so will evenly quench the steel and prevent warpage. You can use motor oil, either new or used, or household vegetable oil. A red-hot blade will burn the oil if held at the surface where there is oxygen.

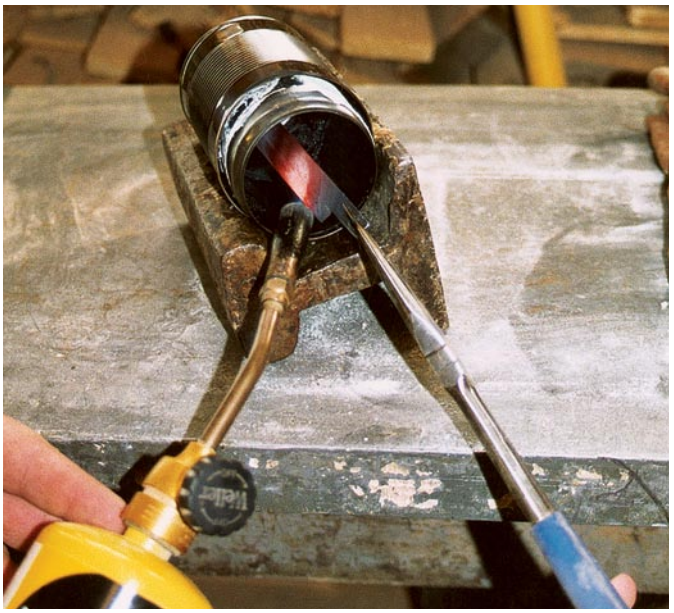
Once the blade is hardened be careful not to drop it as it can chip in this brittle hard state. Use a belt sander to true up all surfaces. Use

the threaded rod pieces to hold on to it. The final feathering of the cutting edge is done now. The belt sander will give flat surfaces with good control and low heat. Keep a water quench handy to dip into. Any belt will be used up on steel, so I use partially worn #80-grit belts no longer usable for wood. You can also use higher-grit belts.

Tempering the Blade

The 01 tool steel is formulated to reduce the super hardness in it to a moderate Rockwell 60 with toughness restored for durability when it is heated to 425° F. You have your own heat treatment oven in the form of a toaster oven. Set the dial at 400° F and heat your blade for 20 minutes. The shiny surface will provide the heat gauge for tempering. Check for light straw color. This will be just a hint of a surface blush of color. If there is nothing yet, turn up the heat to 425° F and watch it. When done, allow it to cool slowly.

The blade can now be sharpened to a fine finish. Avoid any bluing of the edge, as that will mean the steel was heated to 600° F



Heat the blade. *Blades can be heated in several ways. Making a simple furnace will conserve heat and allow a small torch to do the job. The two tin cans are held with a pop rivet through the bottom providing a 1/4" space all around the sides. The "pencil point" torch shown here just barely delivers enough flame for heating the blade, and not enough for larger plane irons (see "Heat Source for Making Blades" on the previous page).*

Inexpensive furnace. *The furnace here is made of stacked-up insulating refractory brick available as pottery kiln bricks. (Do not use common brick for heating.) The plastic igniter on this torch can melt from heat reflected back from the furnace. Buy a different model, or shield it with a 2" square of sheet metal with a 1/2" hole in the center through which to pass the flame tube.*

Temper the blade. *Heat treating consists of hardening by heating tool steel to about 1,450°–1,500°F (cherry red) and quenching it in oil. The unwanted brittleness from this step is removed, or tempered, by reheating to 425°F in a toaster oven. The blade is polished after the oil quench, and heated until the surface color is light straw. Allow it to cool slowly.*

Sharpen and lap. *Final sharpening is done now before securing the threaded posts. Lap the back as well.*

and made softer than desired at the point hardness is needed most – on the cutting edge.

Making the Wood Body

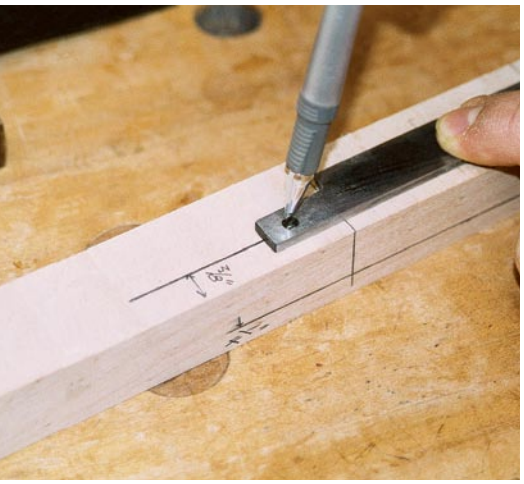
Using a piece of hardwood, such as hard maple, cut a blank 7/8" x 1 1/4" x 11 1/2". Study the plan to identify which sides of the body into which the blade is to be recessed and where the throat is cut out. The picture below illustrates the layout of the blade for locating the holes for the threaded posts. Use a drill press to make the 7/32" holes.

Thread the posts into the correct side of the blade (opposite what is used when grinding and shaping the blade) and insert the assembly into your wood blank. Mark the location of the ends of the cutter, then extend those lines using a square to define the throat. Cutting this with a fine saw is made easier by a wedge and V-block made from scrap wood. Remove the waste with a chisel.

The tangs of the blade are recessed using a 1/4" chisel. Use a scrap of tool steel to check for depth while chiseling. Be careful not to split out the narrow edge of the recess while using a chisel to define the tang slot. My suggestion is to use a knife for this cut line instead.

Micro Adjustment

Adjustment for blade exposure is accomplished by leveling screws under the blade. Two methods are possible. One uses #6 x 1/2" flathead wood screws. Adjustment is made by removing the blade and changing the screw depth with a screwdriver. The other option uses a 6-32 set screw adjusted with a small hex key as shown in the drawing on the next page. Drill a 7/64" hole through the body of the shave and thread the hole with a 6-32 tap. The advantage of this arrangement is that adjustment can be made without removing the blade, only a loosening turn of the knurled nut. The disadvantage is that a small hex key may not always be at hand when needed. A screwdriver is more likely. However, you can store the 1/16" Allen wrench in a 11/16" hole drilled into the handle end, and keep it from falling out by adding beeswax to the hole.



Body layout. *Laying out the wood body. The position of the throat and rod holes are marked, with the blade used to center the hole. Use 7/32" bit in drill press for accuracy. (Follow plans for all layout dimensions.)*

Clamp to cut. *Cutting the throat is made easier with a holding block and wedge, as shown. The wedge goes under the body, and a block with 90° cut out serves as a holder. First cut the ends of the throat with a fine handsaw, then chop the waste with chisel.*

Chop recess. *Now clamp the body flat on your bench to chop recesses for the tang end of blade. Here, a piece of scrap steel bit is used as a gauge for how deep to chisel.*

Bevel screw holes. *Leveling screws are put into the tang recess to control blade exposure. The flathead #6 x 1/2" screws need the holes beveled for the flat head. A 3/8" drill bit, hand twisted into the shank hole already drilled, will achieve the necessary bevel.*

Bevel blade approach. *The approach to the blade is beveled to allow for the curvature of the wood to be shaved. A general angle of 8° is planed here using a block plane. With that, the cutting part of the spokeshave is done.*

Rough out the handles. *The handles are roughed out on the band saw or with a coping saw. The shape is individual. I use the roller end of a belt sander for smoothing and chamfering the edges, preferring handles that have some "edge" rather than smoothly rounded ones.*

Plane the approach to the throat to an angle of 8° for a good general angle for the sole. For use in tighter inshaves, the back of the blade will need to be rounded, and the sole planed to a greater angle.

The final step in the cutting section of your shave is to install the blade and file the posts to length. They should be flush with the top of the knurled nuts. Allow the extra length to protrude through the bottom of the blade, and grind off the excess on the belt sander. This will give you the desired flush surface to the blade and sole. A drop of CA glue will anchor the threaded rod in the blade.

Handles and Finish

The patterns for the handles provide the shape of the shave in my project. However, handles appear in many shapes according to personal preference. Band saw the rough outline, and use rasps and sandpaper to smooth. You will notice that my templates provide for curves that sand conveniently over the roller end of a 4" x 36" belt sander making for a quick job. This slightly formal production look may not appeal as your personal expression. So make it your own way.

Set the posts. *With the wood body finished, and the blade ground to final sharpness, the threaded posts are set using CA glue or thread locker (in the package).*

The final step is to apply two coats of varnish, which here is a wipe-on urethane thinned with naptha. Sign and date your new spokeshave. Use it with pride. **PW**

John is the founder of The Home Shop (ShakerOvalBox.com), in Charlotte, Michigan, which produces and sells supplies for making Shaker oval boxes.

Supplies

Any Hardware Store

2 ■ flat head wood screws, #6 x 1/2"

or

2 ■ set screws 6-32 x 3/8"

1 ■ 1/16" hex key

1 ■ 6-32 tap

1 ■ 10-32 tap

Reid Supply Co.
800-253-0421 or reidtool.com

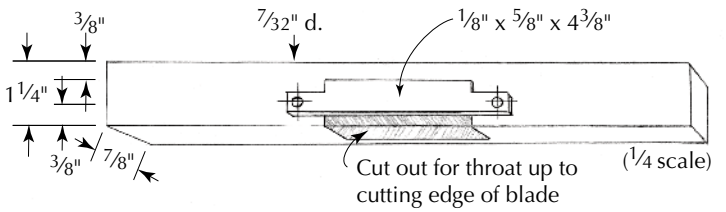
The minimum length of tool steel flat stock is 18", or enough for four blades. Therefore, you may wish to order enough parts to do four shaves.

1 ■ flat stock 01 steel, 1/8" x 5/8" x 18"
#SFS-54000, $6.73

2 ■ brass knurled, 10-32 nuts
#AJ-718, $1.68 each

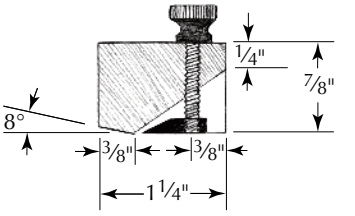
1 ■ threaded rod, 10-32 x 36"
#TR-57, $3.65

Prices correct at time of publication.

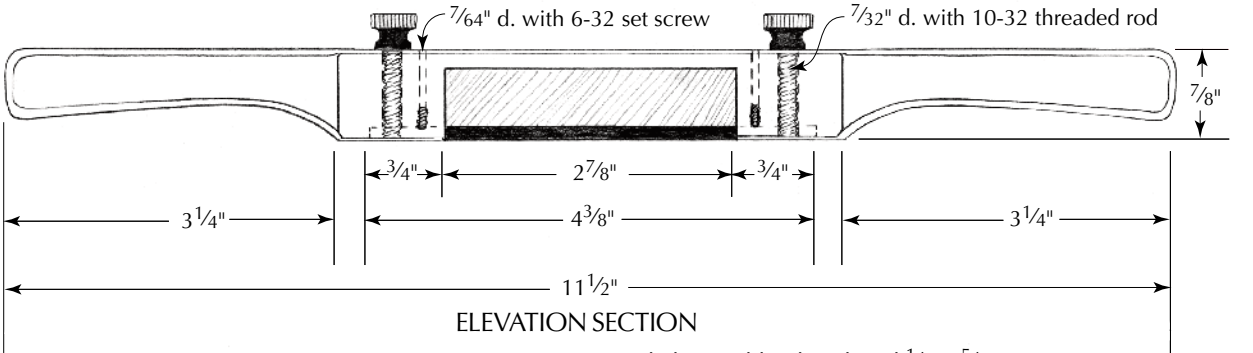


Lay out throat using blade blank without posts

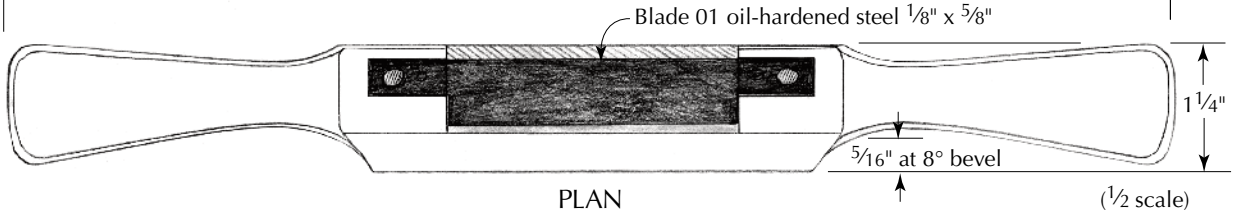
HOLE LAYOUT



PROFILE SECTION



ELEVATION SECTION



PLAN

From Concept

Designing a project from scratch.

Where does a concept come from? For me, it starts with a need – either of my own, or that of a client. In this case, my client needs side tables to go at either end of a sofa. The idea is to design tables that exhibit the beauty of the wood, have a modern yet timeless design, and that suit in terms of functionality. In a discussion with the client, I discovered that he wanted the tables to be visually light, and of a height that worked well with the height of the armrest of his sofa. That is, his glass of wine should be at the proper height for easy access. The tops of the tables should be long and narrow so they are not obtrusive in his living space. These days there is, in my opinion, no need to always match the décor when making furniture. I much prefer to have a juxtaposition of styles within a living area.

Sketching

Sketch with reckless abandon at first – do not try to draw the final piece, just try to bring out the feel of the piece. Use a wide pencil or marker – search initially for only concepts, curves, relative positions and shapes. Make many sketches without refinement. Look at the images upside down – when a shape is truly good, it usually works in either attitude. Keep a sketchbook that you can go back to – sometimes you can go back and use a concept from years ago in concert with a current idea to develop a new design to suit today's requirement. I have for years made sketches and doodles with arches in them – I love the look of bridges across wide expanses and the arches that tie them together.

Another concept that I am fond of when it comes to tables is a "floating top." A top that appears to float is light visually, and playful – the viewer is tempted to get down on the floor and have a look at the construction. Some sketches were rectilinear; some explored the use of curves. From rough sketches, we move on to a second level of sketch with more refinement, and a sense of scale.

Second-level sketches showing refinement. *After initial rough sketches to work out the form, a second set of sketches are developed to refine the lines of the piece.*

Mock-up Modeling

The mock-up is the place where the concept starts to really grow. I honestly cannot use a computer, or sketch, to get anywhere near a final design. The sketch offers the first sense of direction, and then the model offers a 3-D platform to develop the idea.

Many times, I have had students come to me with CAD drawings with full confidence

PHOTOS BY RAY PILON

to Completion

BY TED BROWN

that they can go directly to building their design without regrets. I encourage them to build a quick mock-up, and two days later, we usually have something that looks very different, and quite frankly much better.

When they build the first model, it becomes immediately apparent that their design has flaws based on an inability to physically view the piece. Once we have a 3-D model, we often see that dimensions need adjustment to refine the design. In the case of a table, we make four legs, all of different dimensions. It quickly becomes apparent that some legs are too wide or too narrow, and/or the taper requires refinement.

First mock-up model. *Made from MDF for the top, and spruce (from 2x4s) for the legs. It gives the designer his first look at the piece in 3-D.*

With the model on the floor, we view it from both a standing position, and from a seated position. Walk around the model, and note the visual weight of the components. Look at the overhang of the tabletop. Does it obscure the apron? Does it reveal too much of the apron? Does it adequately hide the stretchers meant to be hidden to create the illusion of the floating top?

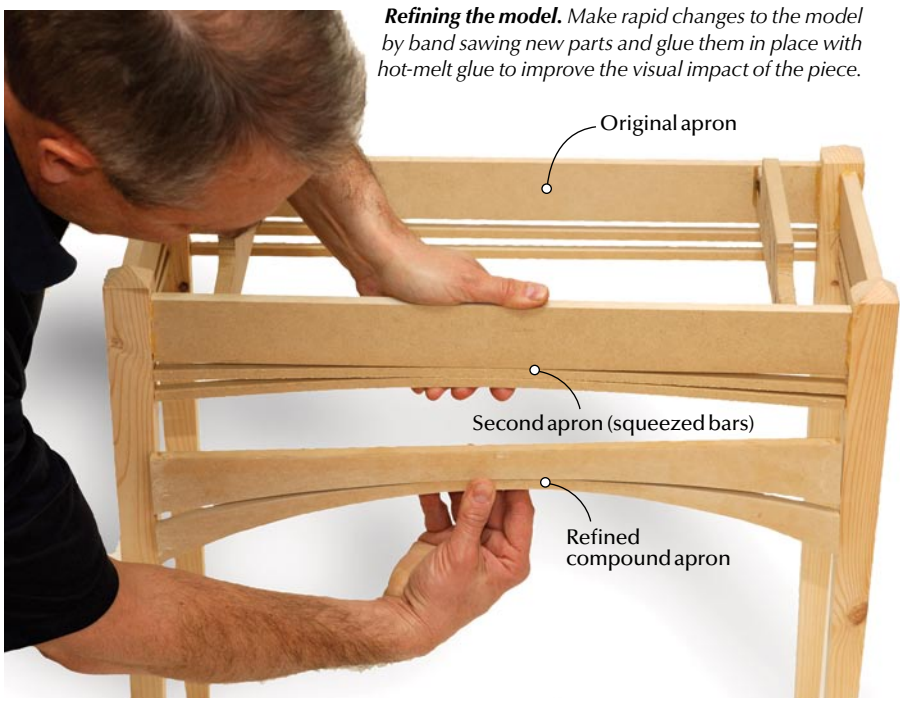
Make your mock-up from inexpensive materials. Here, the mock-up is made from spruce (from 2x4 studs) for the legs, and MDF for the aprons and tabletop. Assemble the model by quickly joining it together with hot-melt glue. This construction allows you to tear it apart for quick adjustments. Use the band saw to make quick cuts by eye – at this point we're not looking for dead-square accuracy, just an overall impression. We may now evaluate the position and size of components, amount of taper, leg length, how much lift on the top, amount of overhang, edge treatment and visual appeal from both a sitting and standing viewpoint.

Once you have chosen one of the four different legs made in the first model, adjust the other legs to the final size. Next, we look at height and shape of the apron, while at the same time evaluating the effects of varying the overhang of the tabletop. If you select a large overhang, then you may well have to increase the height of the aprons lest they get lost under the top, resulting in an uncomfortable feeling for the viewer. With this table, I started with a rectilinear apron, and added bars below to create a theme of repetition. It seemed to work the best when the bars and the spacing between them were of equal dimension. During evaluation, I squeezed the bars upward and revealed an opportunity available if I selected a curve on the bottom of the apron. After several iterations of curved aprons, I came up with the dual apron shown in the photo below. I was able to maintain the repetition of two aprons and the beauty of the tapering curves in this compound apron assembly. It worked best if the arched aprons also exhibited a continuous taper similar to many aprons I have drawn for years in my sketchbook.

In the photo below, you see the path that led to a curved apron found by squeezing the bars in the rectilinear apron. In the bottom apron shown below, you see the refined compound apron with tapered curved components. In the final design, I added a component to attach the aprons at the center. The aprons needed to stay close together to maintain a sense of the tapering negative space between them, while preserving shadow lines. In the final design, the aprons are only about $1/16$" apart in the middle.

Once the apron shape was complete, it became important to select a reasonable overhang for the tabletop so that you can enjoy the curves of the apron. The photos to the right show the effect of shifting the tabletop while viewing the table from a standing viewpoint. The top image is the best wherein we see the apron but not the structure for the floating top. The middle image obscures the apron with excessive overhang. The bottom image has too little overhang. If the viewer leans over slightly he can easily see the stretchers supporting the "floating" top.

***Varying the overhang**. There is a relationship between apron height and overhang – excess overhang can make the apron look too small, you must watch for a balance here.*



***Refining the model.** Make rapid changes to the model by band sawing new parts and glue them in place with hot-melt glue to improve the visual impact of the piece.*

At the same time, I explored the amount of lift to give the tabletop with the raised stretchers. I wanted to create mystery by "floating" the top – this gives us a point of curiosity while making the piece appear light in visual weight.

The tops of the legs form a point. The idea is that the top of the leg approaches the bottom of the tabletop, but does not touch it, creating a "tension point."

At the same time as determining the lift of the top, I dialed in the amount of underbevel to create further visual lightening of the top. I chose a finished thickness of $^{7}/_{8}$" for the solid top to allow enough material to accept the mounting screws. The crisp line of the underbevel gives the viewer the impression that the top is in the order of $^{1}/_{2}$" in thickness, which is in keeping with the scale of the piece.

The photo to the right shows the top of the leg revealing the visual "tension point" between the leg and tabletop. I handplaned a crisp underbevel on a scrap piece of cherry to explore the effects of varying the underbevel in place on the model. I kept the stretcher that supports the top away from the end of the table to hide it from the end view.

The final tweak was to determine the amount of end overhang to take advantage of the play between the convex curve on the top, and the concave curve of the end aprons as seen below.

The convex curve of the top plays off the concave curve in the apron for a pleasing end view of the table. In part two of this article, we will discuss details of constructing the actual piece. **PW**

Ted is a furniture designer/maker from Almonte, Ontario, Canada. He was the founder of Rosewood Studio, a now-closed school that taught high-end woodworking and attracted some of the finest teaching talent. He now designs and makes fine handmade furniture in a small shop in Almonte, Ontario.

Tension point. *The top of the pointed leg approaches the bottom of the "floating" tabletop without actually contacting it, creating a tension point.*

Convex curve. *The curve of the top plays off the curve of the apron for aesthetic consistency.*

Mobile Clamp Cart

BY ROBERT W. LANG

This small rack rolls easily to anywhere you need it.

Ready and mobile. *This simple cart holds many clamps and takes up little floor space.*

There is an old saying in woodworking that you can't have too many clamps. While this is true, it is entirely possible to have too many clamps in the wrong place at the wrong time. The last thing I want to do in the midst of a complicated glue-up is to set off to the far reaches of the shop in search of a needed clamp.

A rolling cart is an obvious solution, and we have had one for years. The problem with it is that it holds only parallel-jaw clamps, and is so big that there is only one place in the shop that it fits. And if we could find another place for it, it would be difficult to move. It's always reminded me of a retail store display. It looks nice, but it may as well be fixed to the wall.

I decided to make a smaller rack, one that would hold wood handscrews and F-style clamps in addition to big cabinet assembly clamps. I wanted it to be mobile and functional with a small footprint.

I sacrificed a bit of organization to gain usable space. The cabinet clamps are contained in a three-sided corral mounted on a simple cart. F-style clamps hang on the outer top rails, and wooden handscrews fit over two upright pieces at the back. Now I can have the clamps I use most often right where I'm working, and when I don't need them, I can roll them out of the way.

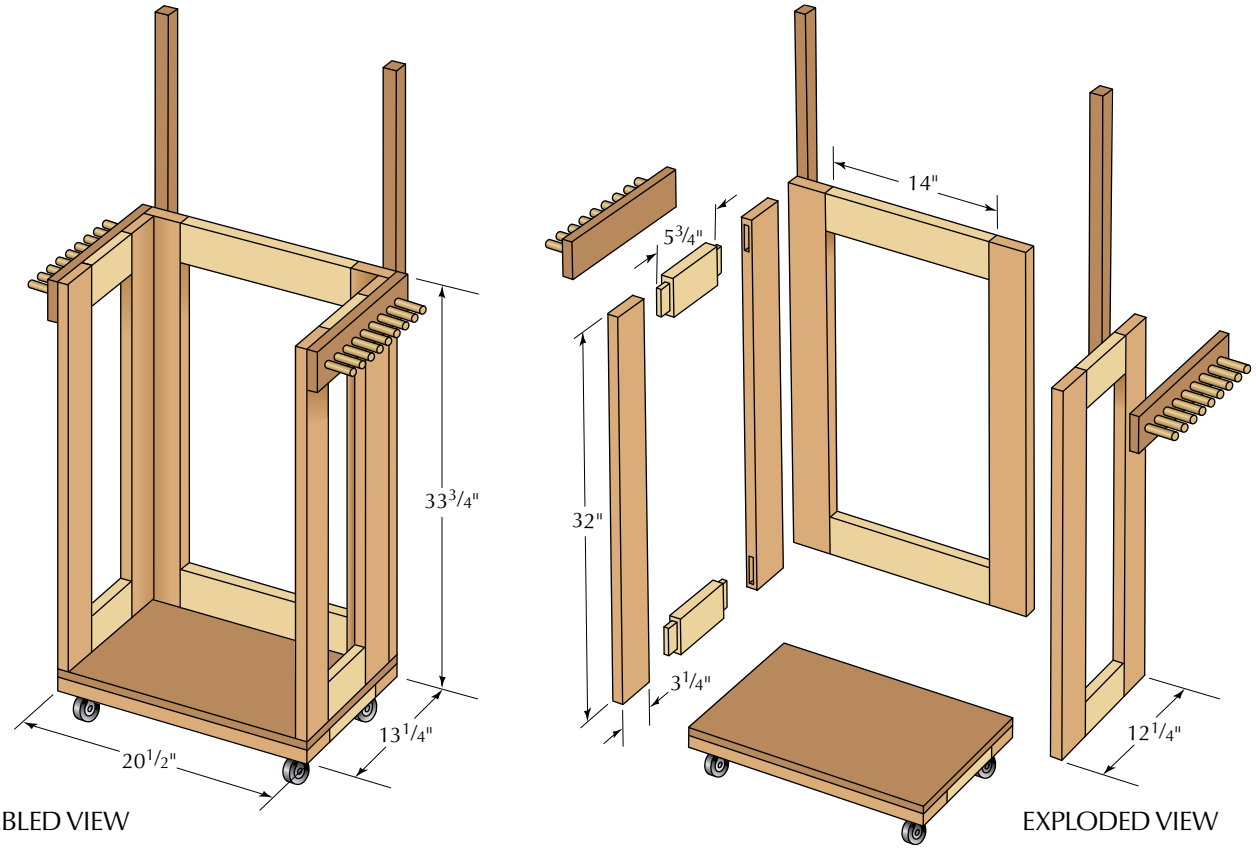
The lower part of the cart is a piece of $^{3}/_{4}$"-thick plywood, fastened to the top of a hardwood frame. On each corner at the bottom of the frame is a $2^{1}/_{2}$"-diameter swivel caster. The frame is made from 1"-thick x $3^{1}/_{4}$"-wide poplar. The three frames that form the upper part are made of the same material. Any hardwood would work, or these parts could be made from 2x4 material prepared the same way as in the miter saw stand article on page 38 in this issue.

The cart holds a lot of weight, so it should be made of solid, sturdy material with solid

Online EXTRAS

For more information on the necessary clamps for your shop, go to:

popularwoodworking.com/oct07



ASSEMBLED VIEW

EXPLODED VIEW

construction. I held the frames together with mortise-and-tenon joints, but there are any number of other joints that would be suitable. I used mortises and tenons because I had a new mortiser and shoulder plane I wanted to try.

The two outer frames are glued to the long edge of the central frame. After assembling the three frames, I attached the plywood to the bottom edges with glue and #8 x 1 3/4" screws. Then I attached the bottom frame with glue on the top face and screws down through the plywood. The wheels were attached with #10 x 3/4" pan head sheet-metal screws.

The two racks for F-style clamps are 1" x 3 1/4" x 13 1/4" poplar, with a series of 5/8"-diameter dowels. The dowels are 3" long. I made the holes at the drill press with a Forstner bit. The holes are 1/2" deep on 1 3/8" centers. After gluing the dowels in place, these assembled pieces were glued and screwed on to the top rails of the frames.

The two holders for hand screws are 1" square and 30" long. They are glued and screwed on to each side of the back with 18" exposed above the top of the frame. I used a 1/4"-diameter roundover bit to break the edges of the frame. This prevents splintering on the edges and makes the cart more user-friendly. **PW**

High and outside. *F-style clamps rest on the top rail with the bars between dowels. The dowels prevent the clamps from sliding off when the cart is moved.*

A handy home for hand screws. *Hand screws drop over a square upright attached to the back of the cart's frame. They simply stack without needing to be clamped.*

Bob is the author of "Shop Drawings for Craftsman Furniture" (Cambium) in addition to other books (more information is available at craftsmanplans.com). Contact him at 513-531-2690 x1327 or robert.lang@fwpubs.com.

Mobile Clamp Cart

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑	1	Cart base	3/4	13 1/4	20 1/2	Plywood
❑	6	Uprights	1	3 1/4	32	Poplar
❑	2	Back rails	1	3 1/4	16 1/2*	Poplar
❑	4	Side rails	1	3 1/4	8 1/4*	Poplar
❑	2	Bottom rails	1	3 1/4	9 1/4*	Poplar
❑	2	Bottom front/back	1	3 1/4	20 1/2	Poplar
❑	2	Hand screw holder	1	1	30	Poplar
❑	18	Pegs	5/8 dia.		3	Poplar

* = 1 1/4" tenon both ends

LEAD PHOTO BY AL PARRISH; ILLUSTRATIONS BY MARY JANE FAVORITE

Architect, craftsman, client. *This table design was a collaborative effort between architect Donato Maselli, cabinetmaker Frank Klausz and client Andrew Horowitz.*

Architect, master craftsman and client design the ultimate gaming table.

PHOTO BY PAUL ANTHONY

Ruhlmann-style Poker Table

BY FRANK KLAUSZ

Émile-Jacques Ruhlmann was one of the finest designers of the Art Deco period. In the 1920s, he designed and produced many memorable pieces of furniture as well as other items for the interiors of the wealthy.

Many of his pieces combine dark wood, such as walnut, with metal. He is best known for inlaid cabinets and most of his designs incorporate elegant and subtle curves.

The Metropolitan Museum of Art had an exhibition of Ruhlmann's work in the summer of 2004. I went to the show to see this magnificent work, and shortly afterward I received a call from architect Donato Maselli, whom I often work with.

He had visited the show with master craftsman Frank Pollaro. Pollaro is an expert on the work of Ruhlmann, and has made many faithful and intricate reproductions. His web site is a wonderful resource for information on Ruhlmann's work. (Editor's note: Links to the Metropolitan Museum exhibition and Frank Pollaro's web site are available online at popularwoodworking.com/oct07.)

Donato asked to come by my shop with a client who was looking to have a poker table made in the Ruhlmann style. I have a Ruhlmann-style barstool in my showroom that has a steel ring piercing the legs. We all liked that detail, and wanted to incorporate it in the poker table. On the original Ruhlmann stool, the ring is attached to the legs with flanges. The pierced legs look cleaner than the original.

This made the table more difficult to build, but for cabinetmakers like us, the more complicated the idea, the more we like it. We get paid for doing the difficulties; that is our specialty. The three of us worked out the details, then the architect made some sketches and returned with finished drawings. After a few rounds of this, we settled on the final design. The table is 48" in diameter with a leather top surrounded by a 2¾" band of walnut.

Leather, walnut and attention to detail. *Drawers within the apron hold supplies and beverages.*

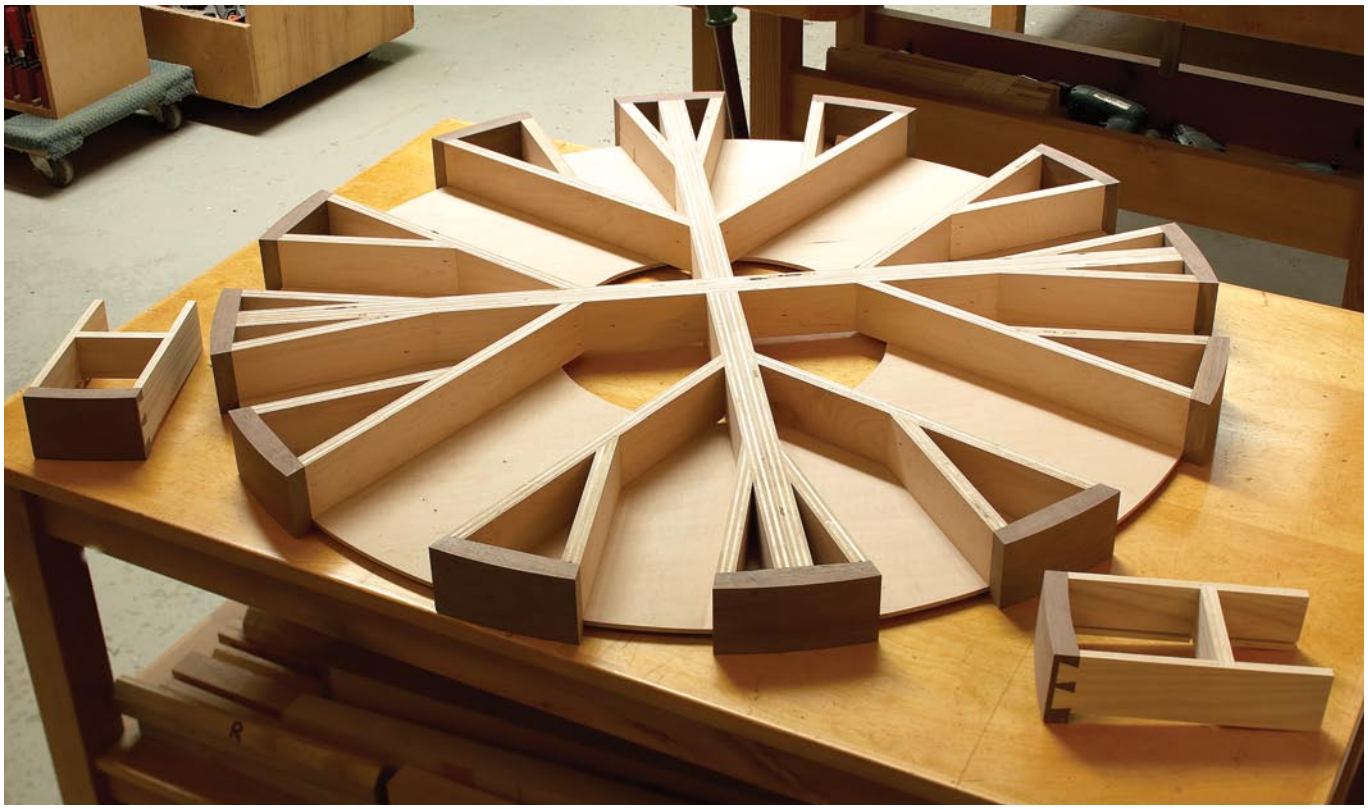
ALL PHOTOS BY AL PARRISH UNLESS CREDITED OTHERWISE; ILLUSTRATIONS BY MARY JANE FAVORITE

A Dozen Drawers

Under the top is a walnut apron containing 12 drawers. At each of the four seats, there is a large center drawer for holding poker chips, a wallet, or other items. On each side of the center drawers, there is a smaller drawer for holding drinks. You could have a different drink on each side of you, but I don't know if that's a good idea when playing poker.

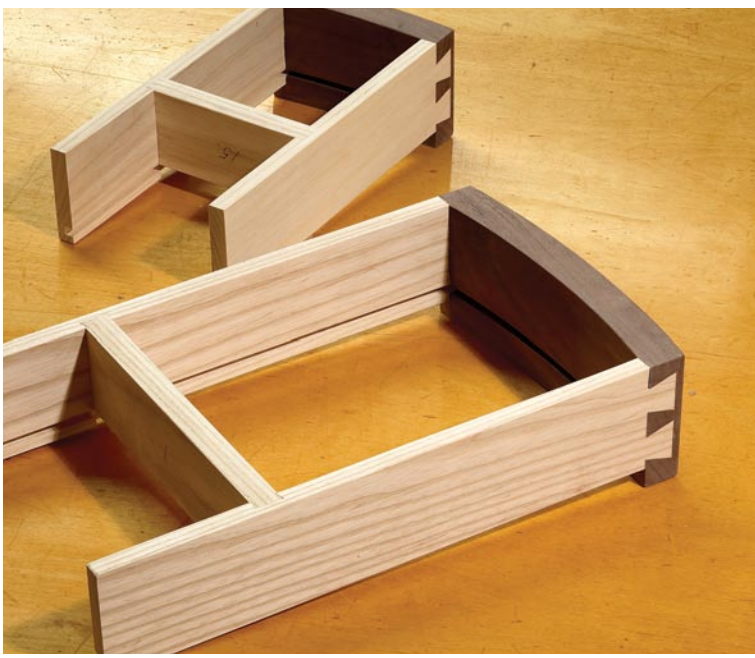
The structure of the tabletop starts with a piece of 3/8"-thick plywood that is maple veneer on an MDF core. On top of this are support pieces made from 3/4"-thick plywood that are glued and screwed to the disc from below. These stiffen the structure, define the drawer openings and provide support for the top.

We usually make leather tops with a tooled edge, that is, the edge of the leather is tucked

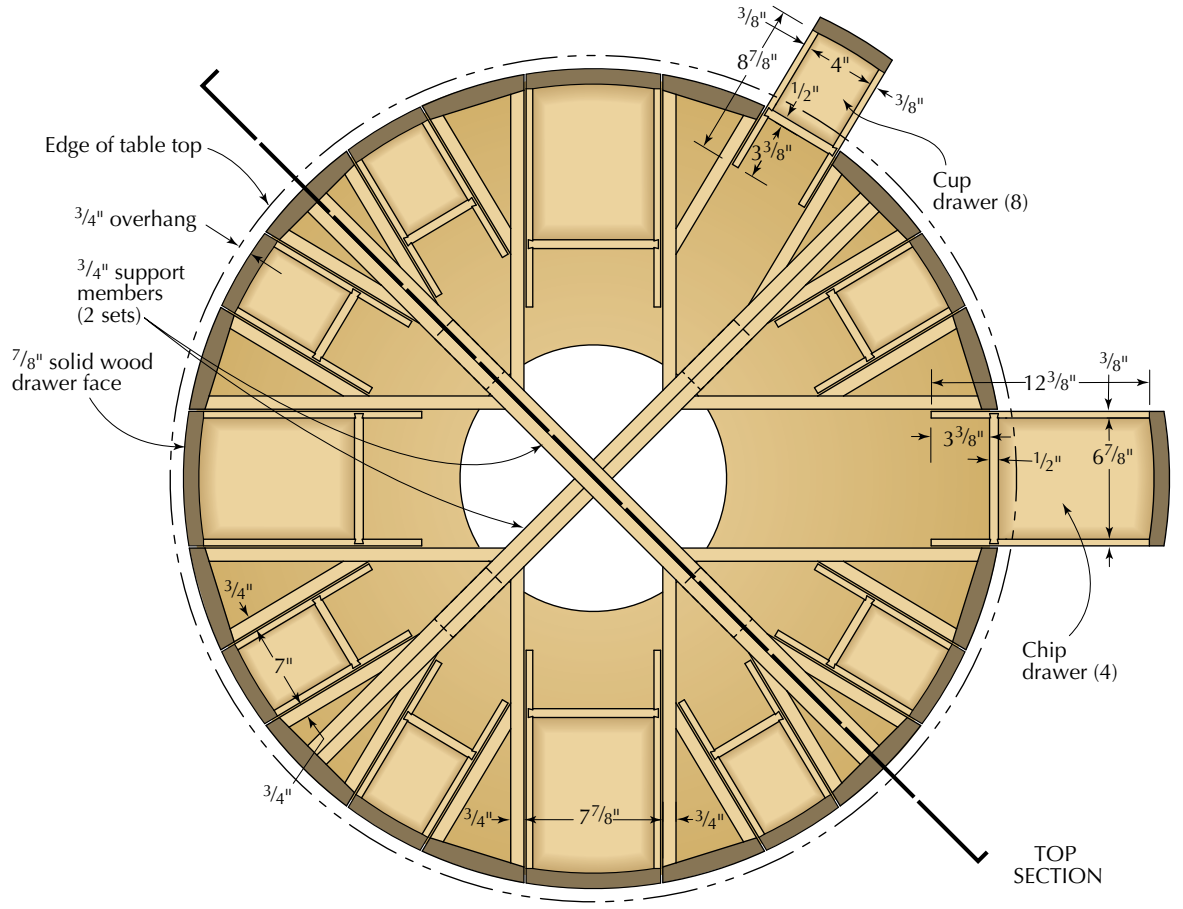


Stacking the deck. *Plywood strips on a maple-veneered MDF base form the intricate structure of the tabletop.*

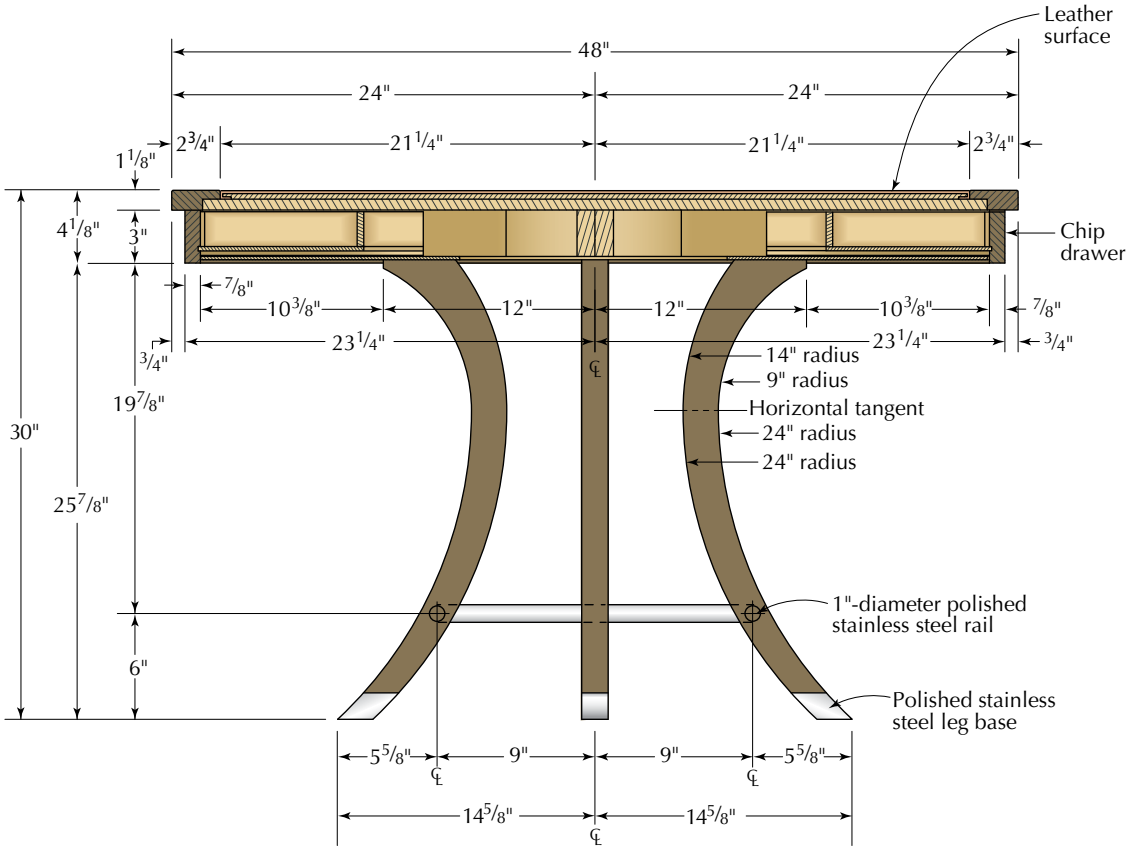
Dropping in a soft top. *Leather glued to another disc of veneered MDF sits on top of the plywood structure and inside the solid walnut trim.*



Curved fronts and extended sides. *The long sides on the drawer boxes keep them from tipping when pulled out.*



PLAN



SECTION

Solid-sawn aprons and trim. *All of the solid-wood parts of the apron were band sawn and fit into place before final shaping.*

into a channel where it meets the wood. The client didn't want that so I glued the leather to a piece of 1/4"-thick veneered MDF and trimmed the leather flush to the edge of the circle.

The drawers are made with extended sides so that they don't tip when pulled out. The drawer fronts are curved on both the inside and outside faces. The fronts and sides connect with half-blind dovetails and the back fits between the sides with sliding dovetails.

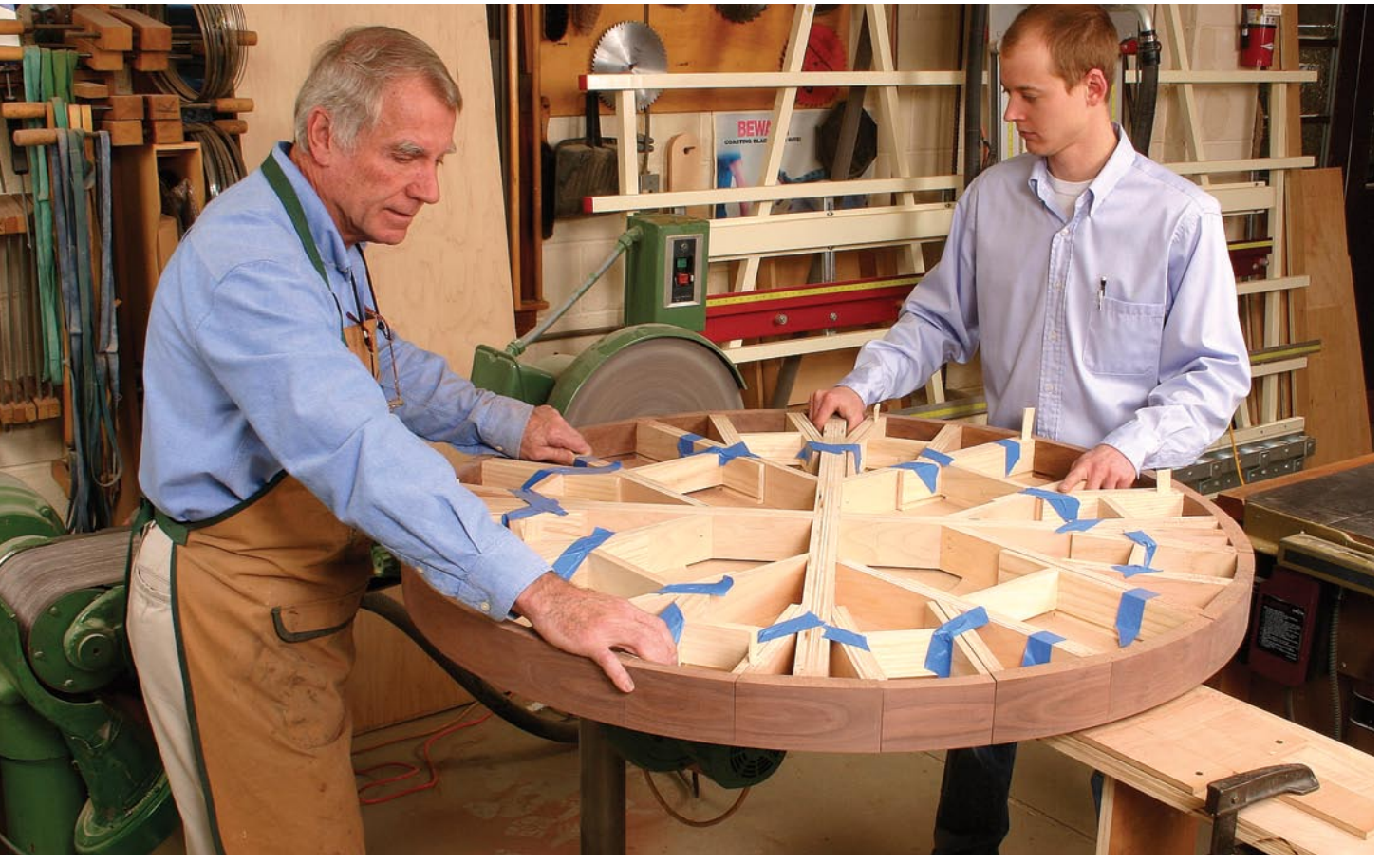
The drawer fronts and the apron trim in between were cut from big chunks of walnut and kept in sequence so the grain would match continuously end to end around the table.

The solid-walnut trim pieces in between the drawers are curved on the outside faces only. All of these curves were all cut on the band saw, cutting just outside the line.

Taking the Table for a Spin

After making all the drawers and attaching the trim, I wanted to bring all the parts of the apron into a perfect circle with all the faces lined up.

I made a trammel jig for my disc sander to smooth and shape the apron edge as well as the



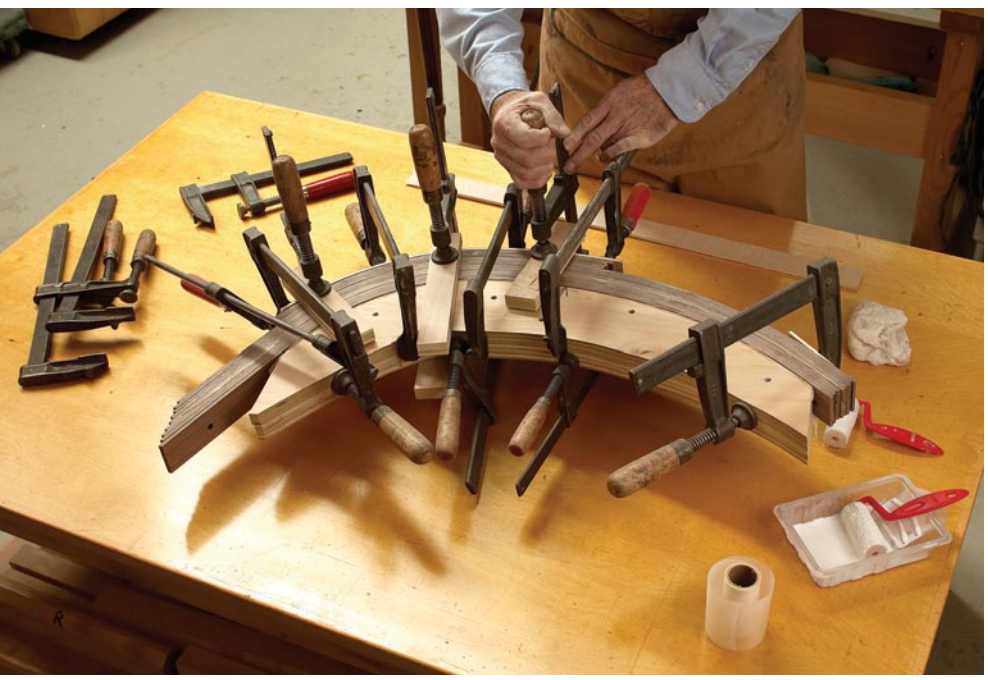
Round and round. *Klausz and Douglas Bloom shape the drawer fronts and apron to a perfect circle with a trammel set up on the disc sander.*

BOTTOM PHOTO BY PAUL ANTHONY

edge of the top itself. The jig was made so that when I changed the grit on the sander, I could move the piece in just a little bit. I sanded on the machine through #180 grit, leaving only a little hand sanding to do.

The walnut trim surrounding the leather top was sanded to shape the same way. After band sawing the eight curved pieces, and assembling them around a 3/4"-thick piece of veneered plywood, I then sanded them to a perfect circle. The leather top fits inside the walnut trim, supported by the thicker plywood below as well as the plywood ribs. With these parts for the top completed, I began to work on the curved legs.

Many pieces form one curve. *Stock for the bent legs is ripped into thin strips at the table saw.*



Curves with a twist. *The strips are glued to a plywood form. To allow the steel ring to pass through the legs, they are glued as two halves.*

Preserving the grain. *A triangle made with a white pencil helps keep the strips in order. When glued together they will look like a solid piece.*

Avoiding a sticky situation. *To keep glue out from between the two halves, a piece of waxed paper is inserted between them.*

No hardware needed. *The stainless steel rail pierces the finished legs. The two halves were clamped together to drill the holes.*

Pierced Legs

The legs are bent laminations. Each leg is made from thin strips cut from a single board and kept in order. To keep the pieces in the original order, I marked each stack with a triangle, using a white pencil. Normally one leg would be glued completely in the form, but I needed to do it differently to let the ring pass through the legs. I glued each leg in two halves, separating the halves with a piece of waxed paper.

When the glue had dried, I clamped the halves together, and at the drill press, I made the holes for the ring. It was necessary to do a little carving to provide clearance for the ring inside each leg. A stainless steel foot completes the bottom of each leg, and I removed material before the final gluing to keep the face of the foot even with the face of the leg.

The final assembly of the legs was done by gluing the halves together around the ring. No form was needed, the half legs were stiff enough to hold their shape during the final glue up. As you can see in the photo above right, it took a lot of clamps – some to hold the two halves together and some to keep the edges aligned.

No turning back. *The two leg halves are permanently glued around the steel ring.*

The Final Connection

The legs connect to the tabletop directly under doubled 3/4"-plywood ribs. A 5/8" dowel fits in a hole at the top of each leg, and in a hole in the bottom of the tabletop assembly. My original plan was to glue the legs to the top after it was delivered. It is much easier to move something like this in two pieces than it is to carry the entire table – especially when it comes time to go through a door or up the stairs.

Instead of gluing, however, I attached the legs to the top with two screws at the top of each leg. This was very sturdy with this connection so I decided not to glue it after all. If the table ever needs to be moved, it will be much easier to remove the top. **PW**

Donato Maselli is co-founder (along with Michael Brandes) of the New Jersey-based firm of Brandes Maselli Architects (brandesmaselli.com). Frank Klausz is a master cabinetmaker, author, teacher and owner of Frank's Cabinet Shop in Pluckemin, New Jersey. For more information visit frankklausz.com.

PHOTO ABOVE RIGHT BY PAUL ANTHONY

BY BOB FLEXNER

Rules for Sanding Wood

Material and finish choice help dictate grit progression.

The objective of sanding wood is to remove mill marks, which are caused by woodworking machines, and to remove other flaws such as dents and gouges that may have been introduced in handling. The most efficient method of doing this is to begin sanding with a coarse enough grit of sandpaper to cut through and remove the problems quickly, then sand out the coarse-grit scratches with finer and finer grits until you reach the smoothness you want – usually up to #150, #180 or #220 grit.

This is a very important concept because it gets past all the contradictory instructions about which sandpaper grits to use. Conditions vary.

For example, a board that has been run through a planer with dull knives will require a coarser grit to be efficient than typical veneered plywood or MDF that has been pre-sanded in the factory. You can finish-sand both of these surfaces with #180 grit, for example, but you might begin with #80 grit on the solid wood and #120 grit on the plywood. It would be a total waste of time and effort to begin with #80 grit on the pre-sanded veneered wood (and you would risk sanding through). So you don't want to begin with too coarse a grit because it will cause you more work than necessary sanding out the scratches.

There's also no fixed rule for how to progress through the grits. Sanding is very personal. We all sand with different pressures, number of passes over any given spot and lengths of time.

Unquestionably, the most efficient progression is to sand through every grit – #80, #100, #120, #150, #180 – sanding just enough with each to remove the scratches of the previous grit. But most of us sand more than we need to, so it's often more efficient to skip grits.

You'll have to learn by experience what works best for you.

Washboarding. *The primary reason you need to sand wood is to remove the washboarding and other mill marks caused by machine tools. On this board, the washboarding, which was caused by a planer and has been highlighted with stain, is particularly severe. I think it would have been most efficient to begin sanding with #80 grit.*

Cross-grain. *Sanding cross-grain tears the wood fibers so the sanding scratches show up much more, especially under a stain. The best policy is to always sand in the direction of the grain when possible. The scratching that does occur is then more likely to be disguised by the grain of the wood.*

Squigglies. *Random-orbit sanders are more efficient than vibrator sanders, but they still leave cross-grain marks in the wood. I refer to these as "squigglies." The best policy is to sand them out by hand in the direction of the grain after sanding to the finest grit, usually #180 or #220, with the sander. Doing this is especially important if you are staining.*

Fine sanding. *Sanding finer than #180 or #220 is wasted effort in most cases, as explained in the text. In fact, the finer the grit the wood is sanded to, the less color a stain leaves when the excess is wiped off. In this case, the top half was sanded to #180 grit and the bottom half to #600 grit. Then a stain was applied and the excess wiped off.*

PHOTOS BY THE AUTHOR

How Fine to Sand

It's rarely beneficial to sand finer than #180 grit.

Film-building finishes, such as varnish, shellac, lacquer and water-based finish, create their own surfaces after a couple of coats. The appearance and feel of the finish is all its own and has nothing any longer to do with how fine you sand the wood.

Oil and oil/varnish-blend finishes have no measurable build, so any roughness in the wood caused by coarse sanding telegraphs through. But these finishes can be made ultimately smooth simply by sanding between cured coats or sanding each additional coat while it is still wet on the surface using #400- or #600-grit sandpaper. It's a lot easier doing this than sanding the wood through all the grits to #400 or #600. (See "What Is Oil?" in issue #154, April 2006, for a more thorough explanation of both processes.)

Only if you are staining or using a vibrator ("pad") or random-orbit sander does sanding above #180 grit make a difference.

The finer you sand, the less stain color will be retained on the wood when you wipe off the excess. If this is what you want, then sand to a finer grit. If it isn't, there's no point going past #180 grit. The sanding scratches won't show as long as they are in the direction of the grain.

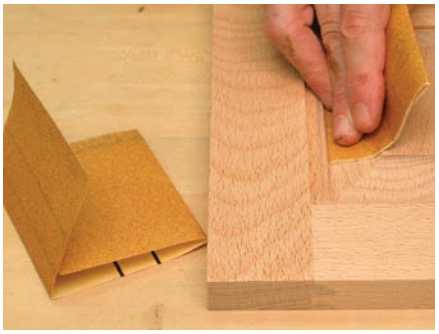
Sometimes with vibrator and random-orbit sanders, sanding up to #220 grit makes the squiggly marks left by these sanders small enough so they aren't seen under a clear finish. Sanding by hand in the direction of the grain to remove these squigglies then becomes unnecessary.

In all cases when sanding by hand, it's best to sand in the direction of the wood grain when possible. Of course, doing this is seldom possible on turnings and decorative veneer patterns such as sunbursts and marquetry.

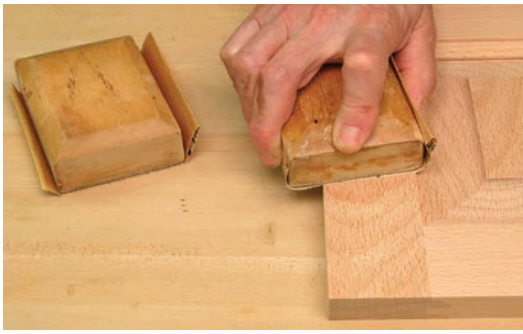
Cross-grain sanding scratches aren't very visible under a clear finish, but they show up very clearly under a stain. If you can't avoid cross-grain sanding, you will have to find a compromise between creating scratches fine enough so they don't show and coarse enough so the stain still darkens the wood adequately. You should practice first on scrap wood to determine where this point is for you.

Three Sanding Methods

Other than using a stationary sanding machine or a belt sander, which will take a good deal of practice to learn to control, there are three methods of sanding wood: with just your hand backing the sandpaper, with a flat block backing the sandpaper and with a vibrator or random-orbit sander.



Hand sanding. *The most efficient use of sandpaper when backing it with just your hand is to tear the sheet into thirds crossways and then fold one of the thirds into thirds lengthways. Flip the thirds to use 100 percent of the paper.*



Block sanding. *The most efficient use of sandpaper when backing it with a flat sanding block is to tear the sheet into thirds crossways and then fold one of the thirds in half. Hold onto the block with your thumb and fingers as shown here. Flip the folded sandpaper for a fresh surface, then open up the sandpaper and wrap it all around the sanding block for a third fresh surface.*

Using your hand to back the sandpaper can lead to hollowing out the softer early-wood grain on most woods. So you shouldn't use your hand to back the sandpaper on flat surfaces such as tops and drawer fronts because the hollowing will stand out in reflected light after a finish is applied.

The most efficient use of sandpaper for hand-backed sanding is to tear the 9" x 11" sheet of sandpaper into thirds crossways, then fold each of these pieces into thirds lengthways. Sand with the folded sandpaper until it dulls, flip the folded sandpaper over to use the second third, then refold to use the third third. This method reduces waste to zero and also reduces the tendency of the folds to slip as you're sanding.

If you are sanding critical flat surfaces by hand, you should always use a flat block to back the sandpaper. If the block is hard (wood, for example), it's best to have some sort of softer material such as cork glued to the bottom to improve the performance of the sandpaper. (I find the rubber sanding blocks, available at home centers, too hard, wasteful of sandpaper and inefficient because of the time involved in changing sandpapers.)

I made my own sanding block. Its measurements are $2\frac{3}{4}$" x $3\frac{7}{8}$" x $1\frac{1}{4}$" thick, with the top edges chamfered for a more comfortable grip. Any wood will work. I used sugar pine because it is very light in weight.

To get the most efficient use of the sandpaper, fold one of the thirds-of-a-sheet (described above) in half along the long side and hold it in place on the block with your fingers and thumb. When you have used up one side, turn the folded sandpaper and use the other. Then open the sandpaper and wrap it around the block to use the middle.

Most woodworkers use random-orbit sanders because they are very efficient, easy to use, and they leave a less-visible scratch pattern than vibrator sanders due to the randomness of their movement. For both of these sanders, however, there are two critical rules to follow.

First, don't press down on the sander when sanding. Let the sander's weight do the work. Pressing leaves deeper and more obvious squigglies that then have to be sanded out. Simply move the sander slowly over the surface of the wood in some pattern that covers all areas approximately equally.

Second, it's always the best policy to sand out the squigglies by hand after you have progressed to your final sanding grit (for example, #180 or #220), especially if you are applying a stain. Use a flat block to back the sandpaper if you are sanding a flat surface. It's most efficient to use the same grit sandpaper you used for your last machine sanding, but you can use one grit finer if you sand a little longer.

Removing Sanding Dust

No matter which of the three sanding methods you use, always remove the sanding dust before advancing to the next-finer grit sandpaper. The best tool to use is a vacuum because it is the cleanest. A brush kicks the dust up in the air to dirty your shop and possibly land back on your work during finishing.

Power sanding. *Random-orbit sanders are easy to use and efficient for smoothing wood. To reduce the likelihood of the squigglies these sanders produce, use a light touch. Don't press down on the sander. Let its weight do the work.*

Tack rags load up too quickly with the large amount of dust created at the wood level. These sticky rags should be reserved for removing the small amounts of dust after sanding between coats of finish.

Compressed air works well if you have a good exhaust system, such as a spray booth, to remove the dust.

It's not necessary to get all the dust out of the pores. You won't see any difference under a finish, or under a stain and finish. Just get the wood clean enough so you can't feel or pick up any dust when wiping your hand over the surface.

How Much to Sand

The biggest sanding challenge is to know when you have removed all the flaws in the wood and then when you have removed all the scratches from each previous grit so you can move on to the next. Being sure that these flaws and scratches are removed is the reason most of us sand more than we need to.

A lot of knowing when you have sanded enough is learned by experience. But there are two methods you can use as an aid. First, after removing the dust, look at the wood in a low-angle reflected light – for example, from a window or a light fixture on a stand. Second, wet the wood then look at it from different angles into a reflected light.

For wetting the wood, use mineral spirits (paint thinner) or denatured alcohol. Avoid mineral spirits if you are going to apply a water-based finish because any oily residue from the thinner might cause the finish to bead up. Denatured alcohol will raise the grain a little, so you'll have to sand it smooth again. **PW**

Bob is the author of "Understanding Wood Finishing" and a contributing editor to Popular Woodworking.

BY KARA GEBHART UHL

The Home Shop

John Wilson has made a successful career out of writing, teaching and selling a Shaker craft.

Shaker oval boxes. *John Wilson, shown here in front of The Home Shop, is renowned for his reproductions of these useful and decorative pieces, and for teaching others how to make them.*

In 1977, Wilson received an offer to teach furniture making at Michigan's Lansing Community College. There was only one catch: The class they wanted him to teach began in two hours. Wilson drove to a library, checked out Ejner Handberg's "Shop Drawings of Shaker Furniture & Woodenware" (Vol. 1), and with the help of his students chose a dovetailed dining tray as the class project. It was in that book the now-famed Shaker-box maker discovered the oval boxes.

Wilson tells this story 30 years later on a cool May evening in Charlotte, Mich., while sitting around a bonfire and eating chocolate with his wife, Sally, and two children, 13-year-old Molly and 7-year-old Will. In front of him is his 32' x 86' shop, The Home Shop. To the right is The Little House, 16' x 16' of space in which he lived for 12 years, including five years making boxes before his shop was finished. Behind him is his current home. For Wilson, home and shop have always been deeply intertwined. Although once one-in-the-same, the two are now separated only by a small yard that serves as a playground for Molly, Will and a handful of chickens.

Today, the teacher, craftsman and writer is best known for his Shaker boxes (see August 2003, issue #135 for his *Popular Woodworking* article on how to make these). For more than 20 years he has made boxes, taught box-making classes, and sold bands, tops and bottoms for various sizes and styles of boxes, carriers and trays. Since 1991, Wilson also has produced and sold the hard-to-find copper tacks, distinctive of the box lap.

Rehoboth – Ample Room

Wilson, who grew up in Syracuse, N.Y., was given free reign of his dad's small basement shop, which consisted only of hand tools. "My parents must have subscribed to the adage that hand tools are reasonably safe if reasonably used, or pain intervenes before damage is done," he said. "Think hand saw versus table saw."

While studying anthropology, Wilson, now 68, worked his way through college as a carpenter. After earning his master's degree

PHOTOS BY AL PARRISH

from London (England) University, Wilson taught anthropology from 1962 to 1972 at Purdue University, Michigan State University and Albion College. Failing to get tenure, Wilson changed careers and became a licensed residential contractor for the next 10 years. Following that was another 10-year period as a teaching craftsman, making and selling Shaker boxes. By 1992 Wilson was a full-time businessman, selling Shaker box supplies and teaching on the side. In 2002 he added writing to the mix.

Walking around his property, Wilson points to a large, old farmhouse, which he no longer owns. There he lived with his first wife and two sons, both now in their early 40s. After his divorce, Wilson moved into The Little House, which he initially built for his sons after vandals burned their fort. Now a guesthouse, The Little House features a wood-burning stove, bathroom fixtures, kitchen appliances and a loft for sleeping. Carved into the bed is the Hebrew word "Rehoboth," which means "ample room." For five years it also held a workbench, lumber and tools.

Growing Business, Growing Space

Wilson finished the first section of The Home Shop in 1988, just in time for his May 8 wedding to Sally. It was in the then-empty shop that they had a potluck reception with friends, piano and dulcimer music, and folk dancing. After the wedding, Wilson moved his shop out of The Little House and into The Home Shop. He and Sally lived in The Little House until Molly was born.

Today The Home Shop consists of three sections on three different levels, which follow the slope of the land. This allows for a 10' ceiling in the main room, and 12' and 14' ceilings in the inventory and storage rooms. Wilson recycles building materials when possible. The 32' x 32' main room contains a 16' x 20' cider mill that resembled a carriage house. A friend offered it to Wilson, so he simply loaded it onto a trailer, took it to his property and worked it into the design. Light floods the shop thanks to 13 skylights – made from old sliding glass doors – and, what Wilson calls "window walls" everywhere.

"I don't regard myself so much a green person, as being a resourceful one, which is a virtue I hold in pretty high regard," he says.

Most of the tools Wilson shares with his two partners – Eric Pintar and John Kellogg – are in the main shop. Work areas are arranged in triangular shapes. Wilson spends 15 to 20 hours a week at his Craftsman table saw cutting bands for sale. Completing this triangle is an old 10" Craftsman radial-arm saw and a jointer. Another triangular work area consists of a 24" Performax drum sander, a 15" Delta planer and an 18" Grizzly band saw.

A long counter lines the back wall with shelves underneath filled with box-making supplies in cherry, bird's eye maple, Eastern white pine and lacewood. In front of the counter is a large, freestanding workbench, one of several in the room.

The main room is heated using an old and ornate, twice-owned potbelly stove fed with wood scraps. (Wilson initially bought it for his old farmhouse. When the farmhouse's new owners decided to sell it, Wilson bought it again for his shop.) Next to the stove are a 1920s veneer press and a four-bag customized Grizzly dust-collection system.

The second section is a 32' x 20' inventory room. In addition to several workbenches, stacks of box parts, including tops, bottoms, shapers and molds, line a counter and shelves.

The Home Shop's third 32' x 36' room is used for an impressive amount of wood

The Little House. *Wilson's home and shop were all in one in The Little House (right) before he built The Home Shop (left).*

Re-purposed. *Recycled sliding-glass doors serve as skylights, flooding the shop with natural light.*

storage. Wilson buys all his wood in the log form. By doing so, he says, you learn the connection between the log and the finished product – you also learn how to live with everything you buy. At least once a year he buys, for example, 3,000 board feet of cherry and 4,000 board feet of pine and basswood. Wilson oversees all the log buying and cutting, and personally controls the drying in hand-built kilns behind the shop (see Wilson's article on building a backyard solar-powered kiln in issue #159, December 2006).

"All logs are cut to dimensional stock and from that point on we handle them," he says. "To be able to dry our own material is an important ingredient."

But the room's main attraction is two machines from the 1880s used to make copper tacks. In 1991 the W.W. Cross Nail Co. – the one small copper tack manufacturer – decided to stop manufacturing tacks. Wilson smartly acquired two machines and today makes seven sizes of tacks and 1/2" copper shoe pegs, which some people use to secure a box's top and bottom boards instead of wood pegs.

Wilson fires up one of the pulleys on one of the old, oily, ingenious machines to show how it works. Depending on the size, it takes from 10 to 50 minutes to make one pound of tacks. Considering there are about 750 tacks in an ounce, that's 12,000 copper tacks. They're tiny, like garden seeds, and easily fit in a small box. Tacks sell from $40 to $130 a pound – enough for a lifetime of box making. And he sells 300 pounds a year.

Copper tacks. *John Wilson runs the more than 125-year-old copper tack machine.*

However, box makers aren't the only ones delighted that Wilson is making copper tacks. He also sees healthy business from the makers of Adirondack guide boats and organ restoration companies.

"Talk about specialty," Wilson says, laughing. "This is the ultimate niche business."

A Blend of Hand and Power

"What would a craftsman of 200 years ago do in my shop?" John asked. "He would delight in the thickness planer, table saw and drum sander to relieve much of the drudgery of woodworking. At the same time he would laugh at some elaborate setup for the router, which could be done simply and quietly with chisel and mallet or with a well-tuned hand plane."

Wilson says the choice to use power tools or hand tools depends on the situation. "The power tool – hand tool debate isn't an exclusionary 'either/or,' but an inclusive 'both,'" he says. "Tools of any kind are problem-solving objects depending on the skill of the craftsman. Learning this is what gaining an educated pair of hands is about." His favorite tools – a blend of power and hand – include a 3" x 21" belt sander, 2 1/2" Red Devil scraper and a Stanley low-angle block plane.

Wilson sponsors events at The Home Shop

Yesterday's press. *Eric Pintar uses a 1920s veneer press. Feeding the potbelly stove keeps the shop warm during Michigan's cold, winter months.*

taught by others besides himself. In 1997 John Brown taught a class on Welsh chairmaking. "He's passionate about hand-tool work, leaving the world of power behind right after blocking out the chair parts on the band saw. It was by far the most effective style for teaching chairmaking I have witnessed. As sponsor as well as participant, I faced a dilemma in getting both jobs done, something not uncommon in life in general." So, Wilson decided save time by using power tools – a decision that didn't go over well with Brown.

"John Brown, who can be a curmudgeon at times, came in at the start of the day after I had been in the shop for three early morning hours getting my chair done. I received a proper dressing down such as a boot camp sergeant might give. I stood attentive like a good soldier, listening to a man deserving of respect because of his expertise and experience. I could appreciate his point of view, so passionately given, on the virtue of hand tools while blending that kernel of truth with the mix of tools I had just employed that morning."

The Business of Selling to Woodworkers

Near the door in the shop's main room are a desk, telephone and files, where Wilson does much of his business. Although he has a web site (ShakerOvalBox.com), he's only seen it once; he leaves the computer world to his business partners. Customers can't order online and Wilson doesn't accept credit cards. Instead, everyone is a "preferred customer" with shipment first and payment after they receive the order.

Once an order is received, Wilson and his partners fill, package and ship it, along with an invoice. They simply trust customers will pay, and 99.7 percent do.

In addition to selling kits, Wilson sells bands, tops, bottoms, handles, forms, patterns, tools (including copper hot water trays, a drilling jig, anvil and sanding block), copper tacks, pegs and rivets, booklets, pattern packets and a DVD video.

Many of Wilson's clients have particpated in his classes, and classes aren't limited to box making. Fond of making his own tools, Wilson also teaches classes in plane, spokeshave and travisher making, as well as hand-cut dovetails, mortise-and-tenon joinery, sailboat building and paddle making.

Wilson has done well thanks to his good business sense and self-described frugality.

"The business has been successful for me," he says. "It supports three families." Currently he grosses about $250,000 a year.

Wilson says part of his success is because of his willingness to share information for free. "I've always made it a policy to be totally open," he says. "It's the only way I want to live."

Piles of stock. *Wilson keeps an impressive supply of wood on stock to ensure constant inventory for his customers.*

Customer service. *Wilson insists on talking through orders with customers to ensure they receive exactly what they want and need.*

Simple Gifts

The Home Shop does have a second floor, used mainly for storage. Boxes, paper bags, $500 worth of toothpicks and pages of material fill the space. Recently Wilson created a kit for a Shaker music box. Its song? The well-known Shaker hymn, "Simple Gifts:"

'Tis the gift to be simple, 'tis the gift to be free,
'Tis the gift to come down where we ought to be,
And when we find ourselves in the place just right,
'Twill be in the valley of love and delight.
When true simplicity is gain'd,
To bow and to bend we shan't be asham'd,
To turn, turn will be our delight,
Till by turning, turning we come round right.

As the bonfire dwindles, Wilson reflects on his accomplishments as well as his goals for the future, which include writing three books. Although Wilson now expects life changes to happen about every 10 years, it's clear he's content with his mix of selling, teaching, building and writing – he's where he ought to be … in his place just right. And, looking at his home, shop and family, it's hard to argue that it's not a valley of love and delight. **PW**

Kara Gebhart Uhl is the former managing editor of Popular Woodworking *and* Woodworking Magazine.

BY JUDY DITMER

Turning Oval Tool Handles

Grip allows greater leverage with less pressure, and can be custom-fit.

If you've ever used a small-handled screwdriver to turn a tight screw, you know that having a decent handle is half the battle. A larger handle makes it so much easier to keep a good grip on the driver. An oval handle goes this one better; you can get great leverage without having to grip so tightly.

It's easy to turn an oval handle on the lathe, plus you can make a handle that suits your own hand, and the specific tool, perfectly.

Although I used a plain piece of ash for this project, you might choose a special piece of wood to make a beautiful, custom tool that you can use effectively for many years.

To make the oval shape, the basic idea is that you will turn the handle using one center point on the end that holds the driver, but on three different centers at the other end. This off-center, multiple-axis technique allows you to make an item that's not round.

Because there will be some faceting of the turned surfaces from the different centers, you'll have some blending to do when you sand the piece, so choose a wood that will sand well. An extremely hard, dense wood (such as rosewood or ebony) will be more difficult to sand into smooth transitions. But wood that's too soft won't make a stiff, sturdy handle. Oak, ash, locust and similar woods will be easier to sand satisfactorily than woods such as hard maple, but with careful sanding and finishing work, any good domestic hardwood will do well.

You'll need to start with a larger piece than you might otherwise use; for this one I used a piece of white oak about $2\frac{1}{4}$" square and about 5" long. I would suggest using a piece at least $1\frac{1}{2}$" longer than the size of the finished handle you are planning, because you need some extra material at the tailstock end to prevent the piece from easily splitting as you shift centers.

It's easy to make oval tool handles on the lathe. *From left: A modern screwdriver with one type of oval handle, a little screwdriver in dire need of a decent handle, a driver I use frequently, fitted with the oval lathe-turned handle I made for this article, and an antique oval-handled driver.*

I usually turn tool handles on a screw chuck; I drill an appropriately-sized hole in the blank (of a size that will be correct for the tool I'll be inserting later), and choose a screw chuck to fit that hole. I keep an assortment of different sizes of lag screws (with the heads ground off), and use the one that fits for a given project. I put the lag screw into a Jacobs-style chuck on the lathe and it's ready to go. This is a very secure way to drive the

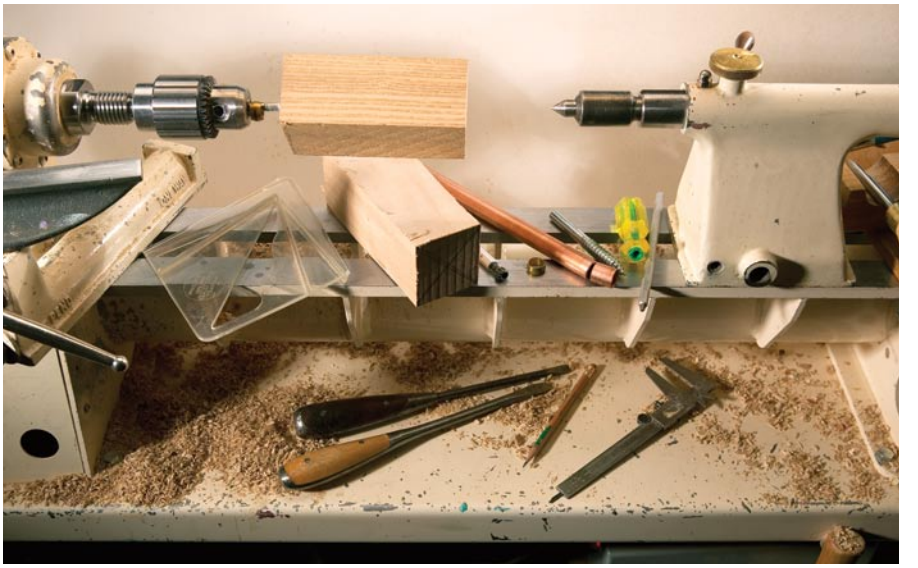
PHOTOS BY AL PARRISH

workpiece, assures a centered hole for the tool and provides enough "give" to move the center on the far end.

As you're turning each side of the handle, you'll alternately be cutting wood, air, wood, air and so on. A higher lathe speed makes this kind of cutting easier, but it also increases the vibration caused by the off-center weight of the piece. So start slowly and increase the lathe speed as you go, being careful not to bump it up too high. When you're ready to sand, slow it way down; doing the blending with the lathe going too fast will just cause the sandpaper to skip large areas. The workpiece has to be moving slowly so the sandpaper can move in and out as it turns, and stay on the surface it's cutting.

With a little practice, turning oval spindles will become so easy you'll be making lovely new handles for all your screwdrivers. And finding them much easier to use than before, as well.

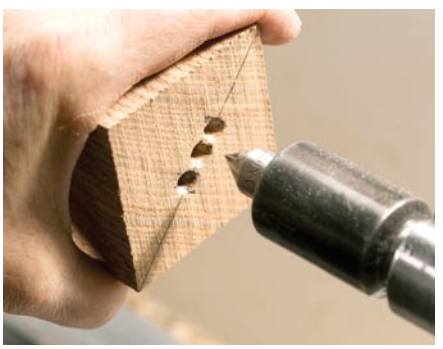
Judy, author of two turning books and many articles, has been turning since 1985. She teaches and demonstrates her skills throughout the United States and Canada.



1 ***All set up to turn,*** *and some relevant items: The workpiece is mounted on a lag screw that is clamped in a Jacobs-style chuck on the headstock (the tailstock will be brought in to turn the handle). Note that the ferrule (in this case a small brass plumbing fitting) has been placed on the lag screw in front of the workpiece, so it is ready to be fitted as the handle is turned.*

On the lathe bed: A gauge used to mark the center of the workpiece ends, another piece of wood suitable for a handle, a driver removed from its previous handle, plumbing fitting and copper pipe (both suitable for ferrules), a lag screw (with the head removed), and another driver taken out of its very-uncomfortable-to-use handle.

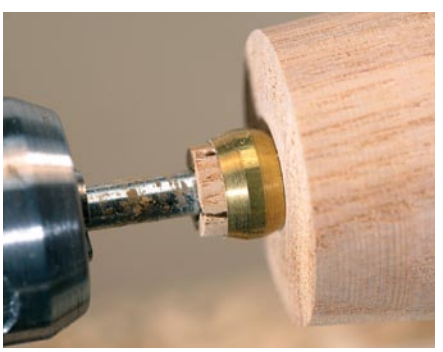
On the bottom shelf of the lathe: Two screwdrivers with another type of oval handle, and a caliper to use in fitting the ferrule.



2 ***Before starting to turn,*** *make three separate recesses for the live center on the end of the workpiece, one in the center, and one about 1/4" to each side of the center mark.*

3 ***Begin with the live center*** *in the middle recess. Turn the piece round (and a bit tapered toward the ferrule end), using a roughing spindle gouge.*

4 ***Use a parting tool*** *to cut a spigot for the ferrule. Cut it slightly tapered until the ferrule just fits on the end, then shave it down evenly with a parting tool.*



5 ***The ferrule should fit*** *all the way onto the spigot (and past the saw cuts, if present, used to mark the center of the workpiece before it was mounted on the screw).*

6 ***Use a detail gouge*** *to cut a nice little curve to tuck into the ferrule.*

7 ***Begin shaping the nose*** *of the handle. You can make any shape you like, but this shape makes it easy to blend in the side cuts later.*

8 ***Use a pencil to mark*** *a couple diameters on the tailstock end of the workpiece. The smaller diameter is marked on the outside of the two side recesses; be sure not to turn any farther in toward center than this mark later on, or the wood may split out. The larger diameter marks how far you'll turn in when you cut the wide sides of the oval.*

9 ***Move the live center*** *to one of the side recesses (this will require pushing it hard enough to overcome the tendency of the lag screw to hold it centered, but the screw is strong enough for this). Be sure to have the tailstock clamped tightly so it won't move. Here you may be able to see that I've already cut one side of the cylinder down (using this center) to the outer pencil mark.*

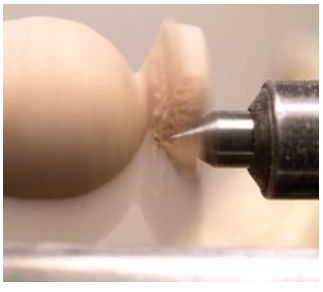
10 ***Having cut the first side,*** *now move the live center to the opposite-side recess. This will be close to the side of the handle you've already cut (making it closer to center and out of the way of the gouge), and farther away from the uncut side, which moves that side outward so it will be cut on the next pass.*

11 ***Cut just down to the outer mark,*** *keeping the shape of the cut the same as the one you just did on the other side. You should now have the basic oval shape of the handle roughed in (you can see the oval shape here on the end).*

12 ***Keeping the live center*** *in the side recess, cut a taper to blend into the cove on the nose end of the handle. Then move the live center to the other side recess and make a similar cut again on this side.*

13 ***Move the live center point*** *into the center recess. With the lathe turned on, you should see a kind of double ghost handle on either side of the solid-looking handle in the middle. The presence of this ghost handle shows you that you now have an oval, not round, workpiece.*

14 ***Here I have moved the live center*** *to a side recess again, and have begun cutting in toward center to shape the end of the handle. You can see that I didn't leave enough waste material to hold it together, and the wood has split out. However, the screw mount is very secure, and as long as the lathe speed isn't too high, the pressure of the cut opposite the tear-out counteracts the outward pressure of centrifugal force. So if this happens, you must slow the speed down for safety.*



15 ***With this split,*** *when the lathe is turned on, you can clearly see the point in the recess. Cool, huh? (Er, ahh – yes, I did that on purpose, just so you could see this.) Note the shadow on one side, showing again that you have an oval, not round, shape. Move the center to the other side recess and turn the same end shape on this side.*

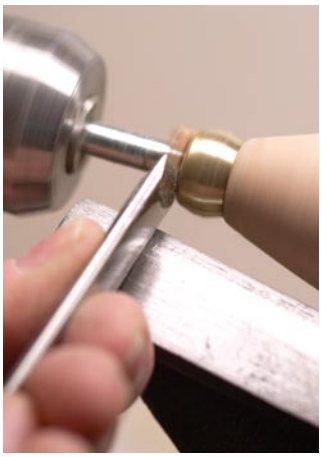
16 ***Now you can see quite clearly*** *the overall shape you have, and the facets created on the surfaces from the different centers used. These facets will be blended together when sanding.*

17 ***Slow the lathe down,*** *and cut nearly in to the center. It's safest to leave just a bit of connection then nip off the waste piece with the lathe stopped.*

18 ***The completed,*** *not-yet-sanded handle. The lag-screw drive method allows all sanding and finishing to be done with the work-piece still on the lathe.*

19 ***With the lathe going very slowly,*** *begin sanding the handle. If your lathe reverses, sanding in both directions will help make the handle even and smooth.*

20 ***You may need to do*** *a bit of blending by hand-sanding with the lathe turned off, and with the grain of the wood, to make all the transition areas nice and smooth. Alternate sanding with the lathe on and off, and alternate the sanding direction, as you progress through the grits.*



21 ***Trim any wood that is protruding*** *from the front of the ferrule. (Yes, you certainly could do this at the time you fit the ferrule. If, however, like me, you didn't, then do it now.)*

22 ***When you are satisfied*** *with the sanding you've done, you can apply a finish. I've used a hard wax, which is buffed out on the lathe. But because (with no tail-stock support) you must now have the lathe speed slow, it may be hard to heat the wax enough to really buff it properly. In that case, use a buffing wheel after removing the handle from the lathe.*

23 ***The completed handle,*** *with driver installed. It's much more appealing visually, and far more pleasant to use than the original.*

24 ***The oval handle gives you great leverage*** *for driving recalcitrant screws without tiring your hands.* **PW**

BY MICHAEL DUNBAR

Turning Pro

No sick days, no paid vacations and no IT department – but it's worth it.

Ah, going pro – telling your boss to take your day job and stick it in his ear while you go off to earn your living doing what you love best. There is not a woodworker who, while looking at the clock and waiting for it to reach quitting time, has not dreamed of taking the plunge.

I write from experience; I did it 35 years ago. I can honestly say with the clarity of hindsight, I would not have had it any other way. A large number of the people who have passed through our woodworking school, The Windsor Institute, have also realized this dream. While here, most of those who have successfully gone pro have taken advantage of the opportunity to talk with my wife, Susanna. She has an extensive background in marketing, public relations and political consulting. I am a beneficiary of her skills. So are the students whom she has counseled. In fact, I cannot think of anyone who is responsible for more successful woodworkers than Susanna.

I am going to tell you what she tells people in the first five minutes. I am not trying to talk you out of pursuing this dream. However, I am trying to help you determine if you really want to go pro, or if you are just a dreamer. This is a crucial step, because a failed dream hurts a lot more than getting up every morning and going off to the day job.

When you go pro, woodworking changes. Right now, it is a pleasant and rewarding hobby, but it will become your job. Now, you dream about getting out of the office and going home to your shop. A professional woodworker dreams about getting out of the shop at the end of the day and pursuing his or her hobby. It is sort of like dessert – if that is all you eat, you end up yearning for vegetables.

When you work for yourself, your boss has to be a real S.O.B. No one will be forcing you to do anything. You must have the drive and gumption to make yourself work. Meanwhile, there are all sorts of temptations: fishing, ball games and guys who think your shop is a great place to hang out. People out there with time to kill will eventually find you. Remember this: Someone who kills time by wasting yours is stealing from you. Every minute you are not working, you are not getting paid.

Forget about benefits. You buy everything. If you want to take the family on vacation, you not only have to save the money, you give up what you could have earned by staying home and working. You will find out how expensive health insurance is. It helps a lot if your spouse has a job that provides this. My wife and I work together and our health insurance dwarfs our mortgage payment. There are no sick days. So, take good care of yourself.

At your day job, someone does the accounting, shipping, receiving, maintenance, IT, etc. Guess who does all these jobs when you go pro? You do not get to work wood all day. You spend a lot of time doing stuff that you don't like. The only other option is to pay someone else to do it, but you have to go out and earn the money you are giving to them.

Susanna's introduction to going pro goes on a lot longer in this discouraging vein, but she is weeding out those who are not being realistic. However, if you are cut out for it, there is no better life in the world than being a self-employed woodworker. **PW**

Michael Dunbar, founder of the The Windsor Institute, has been a chairmaker since 1971. You can read more about his work on his blog at thewindsorinstitute.com.

ILLUSTRATION BY BRUCE BOLINGER