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- Cutterhead diameter: 3⅛"
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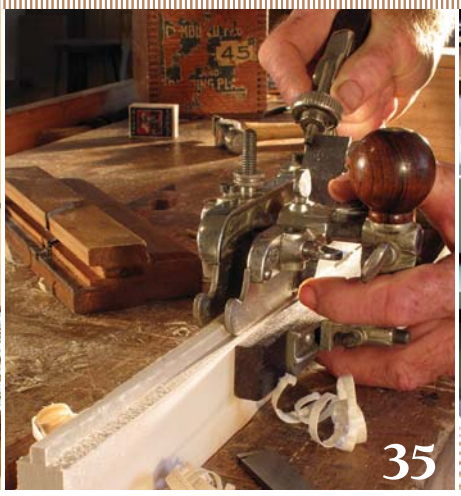

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24 Cabinetmaker's Tool Chest

With a few layout tricks to make it fit your tools, your shop and the way you work, build a chest with stylish Greene & Greene details.

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ONLINE ▸ **Gerstner & Sons**

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Download the manual from Stanley Tools that boasts the benefits of its "universal" plane.

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In this free video, Robert W. Lang builds a simple plywood jig to rout shelf dados.

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45 Tools from Down Under

Meet one of the most dedicated toolmakers on the planet and discover how his passion and devotion begets coveted tools.

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Discover the Australian-made "ultimate arbiter of squareness" from Vesper Tools.

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BY STEVE SHANESY

ONLINE ▸ **Easy Wood Tools**

Learn how a shoe shopping trip morphed into a successful turning-tool company.

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HAMMER VENEER PHOTO BY DON WILLIAMS; STANLEY PLANE PHOTO BY ROY UNDERHILL; CHRIS VESPER PHOTO BY CHRISTOPHER SCHWARZ; PLATE RACK PHOTO BY AL PARRISH

31 Days of Christmas Sweepstakes

To celebrate the season, *Popular Woodworking Magazine* and its sponsors are giving away a prize a day throughout December. To earn your chance, you must enter separately for each day's prize. All entrants will qualify for the Grand Prize: a custom-made Hanging Tool Cabinet by Robert W. Lang, executive editor of *Popular Woodworking Magazine* along with a $1,000 Gift Certificate from Lee Valley Tools.

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Popular Woodworking Magazine and its sponsors will award one prize each day from December 1 through December 31. The prize pictured on each day in the calendar above is the prize offered for that day. To register for a chance to win each prize, you must enter on the day the prize is offered. You may enter as many of the daily contests as you like, but you are limited to one entry per day. All entries from the first 30 days will be eligible for the Grand Prize: a custom-made Hanging Tool Cabinet by Robert W. Lang and a $1,000 Gift Certificate from Lee Valley Tools.

Registration starts 12:01 AM EST, December 1 and ends midnight EST, December 31, 2013.

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POPULAR WOODWORKING MAGAZINE

Number 208, December 2013. *Popular Woodworking Magazine* (ISSN 0884-8823, USPS 752-250) is published 7 times a year, February, April, June, August, October, November and December, which may include an occasional special, combined or expanded issue that may count as two issues, by F+W Media, Inc. Editorial and advertising offices are located at 8469 Blue Ash Road, Suite #100, Cincinnati, OH 45236. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (7 issues) is $24.95; outside of the U.S. add $7/year • Canada Publications Mail Agreement No. 40025316. Canadian return address: 2835 Kew Drive, Windsor, ON N8T 3B7 •

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TABLE SAW & LOCKS PHOTOS BY AL PARRISH; RUSTICATED WOOD PHOTO BY DAN MOSHEIM; LAP DESK PHOTO BY AUTUMN DOUCET

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Learning on Both Sides of the Bench

A recent weekend class at the Marc Adams School of Woodworking reaffirmed my love of teaching – not only because it's rewarding (and fun) to introduce people to new tools and approaches to work, but because I learn something in every class I've taught. And that's time well spent on both sides of the bench or lectern.

I've spent many hours in front of a traditional classroom teaching composition, copy editing and a variety of literature classes, from satire to Shakespeare to T.S. Eliot. Despite my having studied the topics for years to develop a wide range of interpretations and approaches, someone (or several someones) would invariably posit a new idea that took the conversation into unexpected and interesting territory, or ask me a question for which I had no easy answer. In short, I learned as much from teaching as my students learned from me – sometimes about myself as an instructor, sometimes about the material and often about both.

One of the most important lessons I internalized is that not every student has the same set of "tools." That is, their backgrounds in composition and literature varied widely; so, then, did their ability to understand and write about the topics at hand. So I learned on the fly what it is (and how) to teach in any given class. And I made changes as needed.

It is in many respects no different with a woodworking class…except that every student is happy to be there, no one falls asleep in the back of the room and there is typically less bloodletting (paper cuts are nasty).

In the Marc Adams class (a hybrid build of a simple Shaker Table), I had one student who is an advanced woodworker; he was taking the class to absorb a fresh approach and had some good suggestions for other ways to approach select operations. Most of the remaining class members were experienced enough to understand the basics of an approach, even when the tools I was using were new to them. And I had one student who was an eager novice, determined to succeed. She and I worked together for a while on proper saw technique, and by day two, she was cutting straight lines like a champ.

I also had an awesome assistant, Mark Hedin, who was able to help me switch approaches in midstream as necessary to better make use of the tools my students and the school had on hand, the extra tools I'd brought along and the time available.

Not one student left with a fully assembled table – and neither did I. But by late on Sunday afternoon, we all had a collection of parts and subassemblies ready (or almost ready) to put together, and we all left with a new set of intangible tools to go with our actual ones.

I encourage you to pass on your knowledge, too, whether you're new to woodworking or an old hand. I dare say you'll find it more rewarding than do your students – and you'll learn at least as much as do they. **PWM**

PHOTO BY AL PARRISH

POPULAR WOODWORKING MAGAZINE

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Best Saw to Clear Dovetail Waste

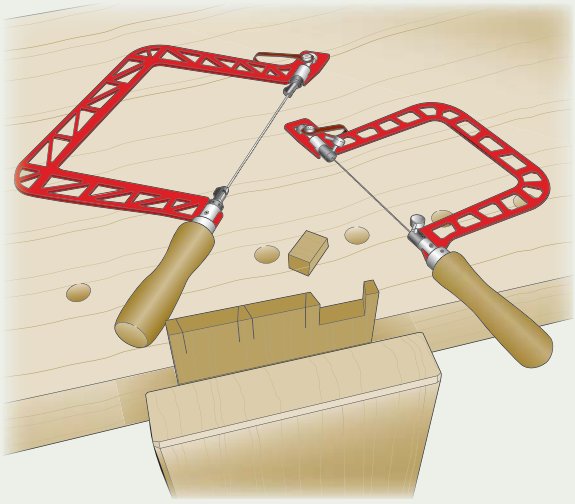
I'm in the market for a top-of-the-line saw for clearing out dovetail waste when cutting my pins and tails – I don't want to ever need to buy another saw. Should I choose a coping saw or a fret saw?

In a recent issue of *Popular Woodworking Magazine*, you show a coping saw from Knew Concepts. Would you purchase a saw from Knew Concepts, or, in your opinion, is there another saw to consider?

David Hunstad
Rochester, Michigan

David,
Well, it depends (doesn't it always).

I think Knew Concepts saws are far and away the best coping and fret saws, so you can't go wrong with either (though they are spendy). As to which one you need, are you typically cutting dovetail waste in thin stock such as for small boxes and drawers, or are you working on furniture pieces with 3/4" or thicker wood? If your primary work is for furniture, I'd suggest the coping saw – but if you work in thin stock, it's the fret saw.



A fret-saw blade with little set allows you to drop the blade into your dovetail-saw kerf then remove the waste in one cut at the baseline; with the coping saw, you usually have to swoop from one side, then the other to completely clean out the waste. But it cuts faster, so....

In most cases, I find myself reaching for the coping saw.

Megan Fitzpatrick, editor

More Scoop, Please

I recently read Mario Rodriguez's article on using a table saw to scoop out a chair seat from *Popular Woodworking Magazine*'s August 2013 issue (#205). I've watched the video, too.

While in the process of building the jig in my shop, I couldn't find any information regarding the hole placement on the bridge. The article states how big (diameter) and how far apart on center to place the holes, but it does not indicate how far from either end of the bridge to begin the holes.

Could you please tell me where the holes start on the bridge?

Scott Starkey
Derby, Kansas

Scott,
It doesn't really matter. As long as the holes are properly spaced from each other, you'll be OK. The pins on the bridge supports are centered on the blade, referenced from the blade's high point. That's the most important measurement and position. The holes on my bridge begin 1/2" from the edge closest to the table-saw operator.

I'm glad you found the jig interesting. It's a pretty neat way to cut a shallow scoop quickly. Have fun.

Mario Rodriguez, contributor

Face & Hand Protection

I am building the Stickley mantel clock from the December 2008 issue (#173). I see no mention of using glass in front of the clock face. I assume this is intentional, but wanted to get some input as to whether it is practical. I'm guessing that not having the glass holds true to the original clock.

Have you run into any problems with the clock face becoming dirty, the hands becoming bent or anything along those lines?

If you were to install glass, what might be a good way to do it? My idea is to attach it directly to the back of the door then set the clock face back into the opening to allow for clearance. My fear is that it might look odd not having the door flush to the clock face. I would appreciate hearing your thoughts on this.

Rennie Heuer
Nampa, Idaho

Rennie,
I must admit that my Stickley clock is not often handled by me or anyone else in the house. It has become a decorative element, and not so much a working clock (not because it doesn't work, but due to the number of clocks already in my home).

You are correct in that glass was not found on the original, and it is possible with daily use and adjustments that a working clock face could become dirty and the hands could be bent, especially if little ones are making the adjustments.

If I were to install glass, I would simply use a rabbeting bit to remove enough material behind the segmented-cut opening to drop in a pane. Of course, cutting glass to that exact shape might be difficult.

In lieu of rabbeting around the segments, you could also rout a circle into the back of the door and drop in a circular piece of glass.

CONTINUED ON PAGE 12

ILLUSTRATION BY MARY JANE FAVORITE

NEW from Woodpeckers®

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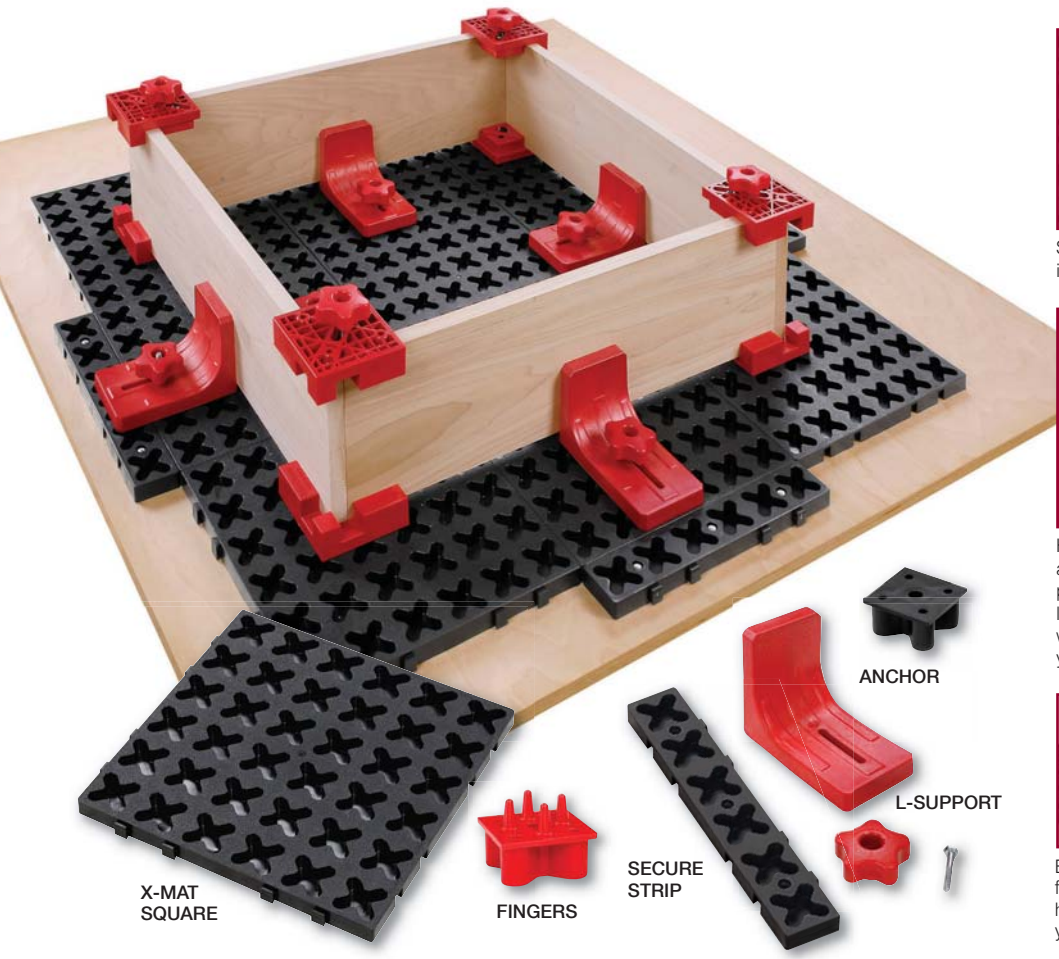
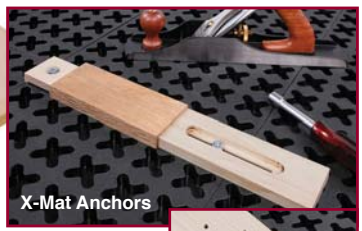
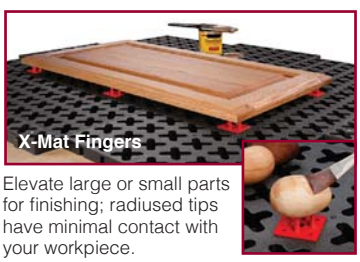


Support upright material; perfect for holding larger parts during assembly.



Hold X-Mat accessories in place; has countless applications when paired with your own shop-made jigs and fixtures.



Elevate large or small parts for finishing; radiused tips have minimal contact with your workpiece.

Introducing the X-Mat Assembly System, designed to help you meet a multitude of shop work-holding challenges from assembling large cabinets to finishing small parts. The X-Mat System is like having a shop helper for those times when you need an extra set of hands.

X-Mat Squares, the Foundation of Our Modular Assembly System. Customize your assembly mat size using modular 12" x 12" X-Mat Squares. Each ¾" thick square is molded from super tough, chemical-resistant resin. The squares fit tightly together with interlocking dovetail-shaped keys. Now you're ready to position X-Mat work-holding accessories into any of the 36 "X" shaped sockets in each 12" x 12" X-Mat. All accessories feature a piston-fit "X" shape bottom that anchors them to the mat and makes them impossible to slip sideways.

X-Mat L-Supports are perfect for holding larger cabinet parts during assembly. These L-shaped brackets are robust in size at 3½" wide, with a 5" long base and 4" tall face and are formed from glass-reinforced polycarbonate making them virtually indestructible. The base is slotted to allow 2" of travel to easily accommodate any cabinet size. When positioned, the L-Supports are easily clamped in place using their comfort-grip knob.

With project parts in position, Woodpeckers Box Clamps are the perfect assembly companion to lock any 90° woodworking joint together.

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CONTINUED FROM PAGE 10

To secure the glass, one option is to use clear silicone caulking. Easy, peasy. If you want a more traditional look, I recommend Durham's Water Putty. The results are quite yellowed when dry which gives it an aged appearance.

Glen D. Huey, managing editor

Accolades Abound

The Shaker blanket chest on the cover of the October 2013 issue (#206) is gorgeous. Good job! I enjoyed the article. Of course, I always enjoy the writings of Editor Megan Fitzpatrick. And I also enjoy the literary quotations placed throughout the magazine.

Keep on doing the good work, and I'll keep on happily reading!

Jim Davis
Reston, Virginia

What's the Best Table Saw To Make Kitchen Cabinets?

I am planning to make my own kitchen cabinets sometime next year. I was told you cannot use a contractor's saw for this purpose. For a home hobbyist, I know a cabinet saw is probably best, but I don't have a cabinet saw and my funds to purchase a new saw are somewhat limited.

Any advice on the type of saw one can use to make a kitchen full of cabinets in one's home?

Dennis Klienstuber
Frankford, Ontario

Dennis,

The answer is easy. You can build kitchen cabinets with any table saw you have available. In fact, there are many woodworkers and cabinetmakers who do not use a table saw at all (think track saws and handsaws).

The type of saw does not do the work—it can only help make the task at hand easier. In my opinion, there is little difference between how contractor saws and hybrid cabinet saws work. Generally speaking, without delving into the interior of the two saw types, about the only difference is the open base of the contractor saw versus the closed base on cabinet saws.

My advice would be to make sure your contractor saw is in the best shape it can be, make sure you have a usable fence setup, install a quality blade then go to work.

Glen D. Huey, managing editor

Hand-tool Procurement

The October 2013 issue of *Popular Woodworking Magazine* was a home run all the way around. Being mainly a hand-tool woodworker, I was especially interested in Robert W. Lang's article "The Mighty Compass," and about his review of the Liogier floats.

Where can I purchase the compass pictured in his article? Also, I am contemplating a float purchase and am interested in the differences between the straight- and crank-handled models. My primary use would be for mortise-and-tenon work. And maybe I'll try my hand at making a couple of handplanes of my own.

Richard Commins
North Chelmsford, Massachusetts

Richard,

The 7½" Pencil Compass (#05N21.01) is available from Lee Valley Tools (leevalley.com).

The cranked handle on a float keeps you from banging your knuckles on the bench as you work. It also reduces the leverage you have when making a cut. I prefer the straight-handle design for most woodworking. **PWM**

Bob Lang, executive editor

ONLINE EXTRAS

Letters & Comments

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Send your questions and comments via e-mail to popwood@fwmedia.com, or by mail to 8469 Blue Ash Road, Suite 100, Cincinnati, OH 45236.

PHOTO BY CHUCK BENDER

Highly Recommended

The Gramercy veneer saw, with its handle directly over the cutting edge of the sawplate, eliminates problems experienced with the offset handle of traditional English veneer saws. I've used a Gramercy saw for a couple of years and find the grip better for maintaining even downward pressure as I cut veneers. It also helps the saw track a straightedge better than its English counterpart. And interchangeable blades make this saw versatile (toolsforworkingwood.com).

— Chuck Bender, senior editor

POPULAR WOODWORKING MAGAZINE

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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 Magazine*, 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.

THE WINNER:

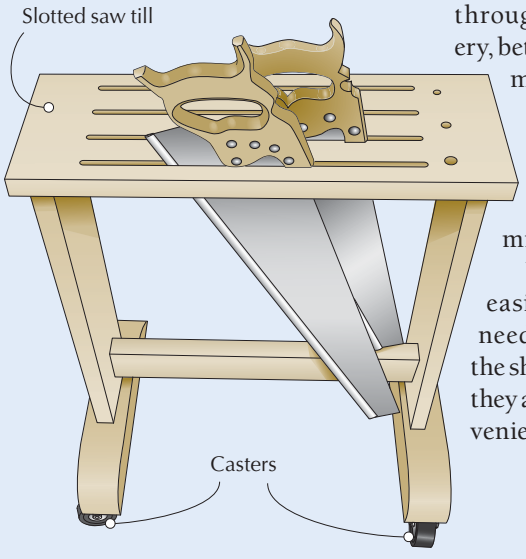
Keep Your Saws Sorted & Accessible

Whenever I work on a project, I end up with my handsaws scattered about the shop. I thought about storing them under my bench, but my bad back keeps me from being able to easily bend down, so it was sometimes difficult to tell which saw I was grabbing. Putting the saw back into my tool chest after each use was time-consuming because my chest is not near my bench.

I thought it would be good to have the saws within reach, if I could design something to hold them that didn't take up too much space – and the idea of a portable saw till just came to me (we woodworkers mustn't think too much; we should just do).

Only six or seven of my saws see regular use, so I took the length of the longest (a 26" ripsaw) and based the design around it. I cut several long slots into a makeshift top, and arranged the slots so the saws don't touch while stored. The long slots allow flexibility in where I place my saws.

I added a Shaker-style trestle base for stability (I'm often inspired by Shaker work) and fit a stretcher, with through mortise-and-tenon joinery, between the legs. A set of casters made the till movable.



It is a very simple piece to make (it took me only three hours) and is stable, sturdy and easy to move (I can move mine with just one finger).

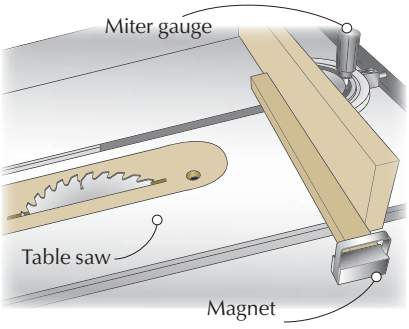
With my saw till nearby (and easily moved out of my way as needed), I never have to search the shop for my handsaws because they are always organized and convenient.

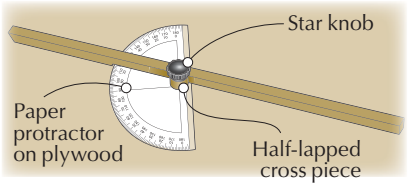
Jan Ham,
Nijkerk, Netherlands

Magnetic Crosscut Stop

When I crosscut at my table saw using a miter gauge, I use a handled magnet as a stop-block for repetitive cuts on longer stock. It's easier than trying to attach a fence and stop-block to the miter gauge, and it's quick and accurate. A 50-pound pull-force magnet costs around $3.

Charles Mak
Calgary, Alberta





Shop-made Protractor

I often make projects with tapered pieces, and wished I had a reliable way to measure and mark the angles. None of my store-bought protractors were quite right; I wanted something more in line with my T-square, but also adjustable. So I decided to make one. It's easy, but precise layout and alignment are essential.

To build this protractor, make a photocopy of a drafting protractor and print the image on adhesive-backed paper. Cut a similar shape out of 3/8" plywood and ink in horizontal and vertical lines identical to the lines on the paper protractor image.

In the plywood, exactly at the intersection of the two lines, drill a 1/4" hole for a T-nut.

Use a 5/8" x 3/4" x 24" piece of wood for the bar (hardwood is a better choice), then join a 5/8" x 1 1/4"-long piece at the mid-point using a half-lap joint. Drill a 1/4" hole for a star-knob bolt at the intersection of the two pieces to offset the hole. (The offset is so you can read the angle directly where the side of the bar crosses the protractor scale.)

Punch a hole in the protractor image where the horizontal and vertical lines intersect. Lay the paper over the plywood shape with the T-nut inserted, but don't take the backing paper off the protractor image yet.

To get accurate alignment, clamp the bar square to the edge of the base, then adjust the paper position until the edge of the bar falls on the 90° mark. With everything aligned, peel off the backing paper (one side at a time) to affix the scale to the plywood. Attach the star knob and a washer to finish the protractor.

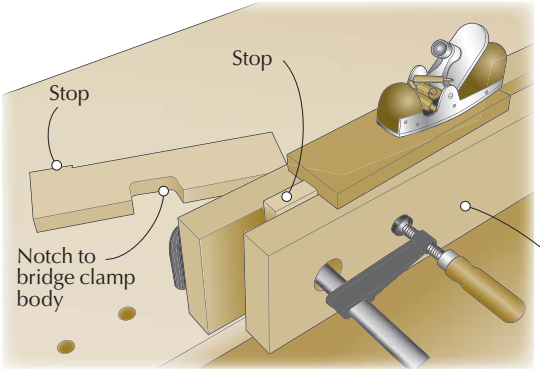
Bill Wells
Olympia, Washington

ILLUSTRATIONS BY MARY JANE FAVORITE

Moxon Vise Plane Stop

I made this plane stop in about five minutes using a piece of oak stair tread. The dimensions are about 1" thick x 4" tall x 12" long. When I put the stop in my Moxon-style vise, I have a solid surface almost 5" wide that's perfect for planing small boards – the cutout on the bottom allows me to fit the stop over the rod of the vise, and there is enough play that I can raise or lower the stop as necessary.

The stop portion is about 3/8" tall and cut at a slight angle for holding the wood. In another version, I made it much shorter and as a result the stop broke off when I subjected it to too much force. The stop portion in this version is about 2" long.



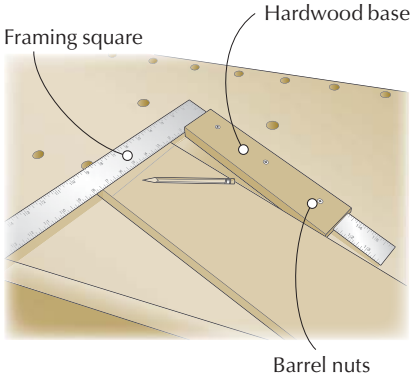
You could make a similar plane stop thicker to have a wider planing surface, or you could make it longer with two cutouts for the threaded rods. That way you could rest it on top of the rods while you're tightening the vise.

As simple as it is, I use this quite frequently.

Mitch Roberson
Nashville, Tennessee

Inexpensive 24" Try Square

I often have need for a large try square to hook over the edge of my panels when laying out drawer dividers or checking the end of a large panel for square. By kerfing a small piece of hardwood on my table saw, I converted a 24" framing square to a 24" try square that can be easily trued on its interior face by removing and planing the wooden section.



Because most commercial table saw blades and framing squares are 1/8" thick, the kerfing is a breeze. I wait until after I've installed the wooden base to drill for barrel nuts (available at any hardware store). After installing the nuts, check the try square to see if it's true. If it is not square, remove the wooden base and plane accordingly. The entire project costs $10 - $15.

Joe Powers
Stanford, California

Hot-glue Jointer

I found a way to surface a bowed board on a thickness planer and get it flat without first having to work one side on a jointer. Simply put hot-melt glue in the center of the concave side a little thicker than the depth of the bow. While it is still hot, cover it with waxed paper and press it flat across the width of the board and let it cool.

Leave the waxed paper in place and repeat this every 4" to 5" down the length of the board.

Plane the board with the concave side down to flatten the convex side. The hot-melt glue is rigid enough to keep the planer from pressing the concave side of the board flat as the machine does its job, while the top of the board is flat as it exits the rollers.

With the convex side sufficiently flat, I pop the hot-melt glue out and plane the concave side, leaving flat, parallel sides of the desired thickness. PWM

Randy Wolfe
Owensboro, Kentucky

ONLINE EXTRAS

For links to all online extras, go to:

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Powermatic PM1000 Table Saw

This saw packs a professional punch for your home workshop.

Powermatic's new table saw isn't over-shadowed by its big brother, the PM2000, and it can fit into your home workshop without the added fuss of rewiring your home.

Straight out of the crate you can see that the PM1000 is a well-built shop machine. I was immediately impressed with the finish of the precision-ground, cast iron top. The massive base anchors the saw to your workshop floor. At first glance this saw could easily be mistaken for an industrial-grade cabinet saw.

As you get under the hood, the saw remains heavy-duty. I liked the trunnion and blade-adjustment systems, and there are lots of cast and highly machined parts. The height and angle adjustments are smooth and easy, and the polished 7" hand wheels have the feel of the venerable Powermatic 66.

One of the best features of the saw is that the 1¾-horsepower motor runs on standard 115v current, so the PM1000 plugs into nearly any outlet in your home. (While you may be tempted, I suggest you resist the urge to set up shop in the dining room.)

Many of the details are solid. The bullet catches in the side of the throatplate – an advance in throat plate design – positively lock it into the table. Along the same lines, the swing-away motor cover provides easy access to the motor, and clears a path to the cabinet to clean away excess dust.

Most of the dust generated on the PM1000 runs through a funneled shroud that covers the lower half of the blade, and it empties directly into a hose that leads to and completely fills the cabinet's rear 4" dust port. Without the saw hooked to a collector, I was amazed to see how the dust propelled from the port out onto the floor. With a collector in place, little dust remained in the shroud while a small amount settled in the cabinet.

Because the hose fills the dust port, you occasionally have to open the motor cover to clear the cabinet. To be fair, in the entire time I ran the saw, little dust collected inside the cabinet.

The guard system resembles the old-style guard/splitter that came with the 1990s Model 66. On the new saw, you can quickly remove the guard and anti-kickback pawls from the splitter – vast improvements over the 1990s version.

One concern I have with the guard is that, while the splitter travels with the blade, it's always above the blade's apex – no non-through cuts can be made with the splitter in place. To address this problem, Powermatic is adding an interchangeable, low-profile riving knife to the PM1000. Anyone who purchased the saw previous to the addition will get a riving knife free of charge.

Another concern I have is with the blade guard. With little effort the guard's mounting bolts, when pushed toward the blade, can easily make contact. It's problems such as this that cause users to remove the guard altogether.

When I plugged in and used the saw for the first time, it seemed a bit underpowered; the blade stopped while I was sawing 4/4 poplar. This seemed off, so I placed a call to Powermatic. Company representatives suggested I try tightening the polyvinyl drive-belt. I did, and that addressed the problem sufficiently that I could easily rip 8/4 hard maple. (I'll bet other users experience the same; this should have been mentioned in owner's manual.)

If you're looking for a premium saw that runs on standard 115v power, put the PM1000 on your list.

— Chuck Bender

CONTINUED ON PAGE 18

Pro features. *The solid base, cast top and details like large cast adjustment wheels make this saw a welcome addition to any workshop.*

PM1000 Table Saw

Powermatic ▪ powermatic.com or 800-274-5688

Street price ▪ from $2,000

▪ **BLOG** *Learn more about how the PM1000 works and its best features.*

Price correct at time of publication.

PHOTOS BY AL PARRISH

CONTINUED FROM PAGE 16

Wood Owl 'Nail Chipper' Auger Bits

I've built a couple workbenches – and helped to build a couple more – and have drilled 3/4"-diameter holes for dogs and holdfasts variously by hand with a brace and bit, with an spiral-upcut bit in a router and with a combination of both (start with the router then finish by hand to make it through a thick benchtop). Well now I've a new favorite approach: Wood Owl "Nail Chipper" auger bits.

Christopher Schwarz was introduced to Wood Owl bits last summer by Jameel Abraham during a Roubo bench building session, and he waxed prolific to me about how great they were, and even posted a video (see below) – but I didn't truly comprehend how well these work until I tried one myself. And at just $15 for a 3/4"-diameter x 7 1/2" bit, there's no reason you shouldn't try one, too.

This carbon steel, Teflon-coated auger bit's three precision-ground edges and lead screw help it bore though 6" hardwoods in just seconds with a remarkably clean cut – though there's still a little cleanup on the entry and exit. (Also available are "Ultra Smooth" bits, which leave a cleaner hole, but a company representative tells me that model is best reserved for thinner stock and softwoods.)

The Nail Chipper also does exactly what the name implies – so it's a good choice if you work in reclaimed stock in which nails could be present, no matter what the species.

Made in Miki City, Japan, the bits are available in diameters from 3/8" to 1 1/2" in both 7 1/2" and 18" lengths.

The only drawback I found is that the 7/16" hex shank doesn't fit in the chuck of many of our drills, and to provide enough power, a corded drill is by far the better choice. So while the bits I'd typically use in the shop are affordable, a new drill could be in order.

— Megan Fitzpatrick

Wood Owl Auger Bits

Wood Owl ▪ woodowl.com or 877-552-9663

Street price ▪ from $13 to $64

▪ VIDEO *Watch a Wood Owl auger bit chew through 6"-thick oak in seconds.*

Prices correct at time of publication.

Festool Carvex PS 420 Jigsaw

Festool's Carvex jigsaw has innovation written all over it. How much innovation? These jigsaws are available in both corded and battery-powered (due out late in 2013), and you can choose between a D-handle or barrel-grip design. Plus there's an accessory angle base that folds inward or outward, so you can bevel on the edge of a board.

The jigsaw we tested has a contoured barrel grip that fits my hand comfortably, and the weight of the saw (4.16 pounds) is sufficient to absorb much of the reciprocal vibration.

I don't care for the power switch; it is difficult to reach while holding saw in one hand, plus you have to push the switch forward to both start and stop the blade – that seems counter-intuitive to me.

Another feature that bothered me is the strobe light; I found that made it difficult to follow my line during the cut – but other editors weren't bothered by the light. (The strobe effect can, however, be turned on or off, so you can decide if you want to use it or not.)

The accessories are what make this tool special. There's a circle guide, a base for delicate surfaces, a metal-cutting base and more – six bases in all. And, a quick-change base system makes for fast switches. With all the different base plates available for this saw, it's good to have a quick release. This makes using the bases a snap; just push on the lever with your thumb and the base comes right off. Adding a new base is even easier. The change happens in seconds.

At around $90 more than a comparable Bosch jigsaw (saw only), the Carvex is a great choice if you're looking for versatility. To take full advantage of this saw's potential, however, you'll need to spend another couple of hundred dollars for the accessories. **PWM**

— CB

Festool Carvex Jigsaw

Festool ▪ festoolusa.com or 877-865-5688

Street price ▪ from $350

▪ VIDEO *See the Carvex in action cutting dovetails.*

Price correct at time of publication.

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Furniture design is a chip off the old block.

Inspired by the tree. *This claro walnut tabletop with the live edges exposed suggests the forest where it grew.*

An old proverb states that architecture is the mother of all arts. Of all the related decorative arts, furniture is most closely wedded to architecture, and all major furniture styles up through the early 20th century were inspired by an architectural parent. From Jacobean to Chippendale to mission, furniture has always taken design cues from buildings.

Some might find this close connection restrictive, but I find it a huge library of inspiration. It means that not only can we look at outstanding furniture examples to glean ideas, but we can also gather inspiration from buildings both grand and humble.

Let's begin by taking just one small design idea borrowed from architecture that's often found in furniture – and just for the fun of it, take a look at a few ways that same idea is expanded and exploited in architecture. Think of this as a search for creative clues to your next design in wood. We'll start this journey by taking a look at the use of natural or "live" edges incorporated on a tabletop.

Rustication & Live Edges

In the mid-20th century, furniture designers began leaving the natural surface exposed on the edge of tabletops, making what seemed at the time a novel statement in furniture design. These organic edges complemented the natural beauty of the figured wood tabletops, and stood in stark contrast to the post-World War II love affair with concrete, steel and plastic.

Yet this was not a new or novel idea. Going far back to antiquity, designers have played with the idea of the interplay between the rough irregular surfaces found in nature and the smooth, sometimes polished surfaces created by the hand of the artisan.

The architectural term for this is "rustication," and it's found in abundance on older brick and stone buildings. At its most basic, rustication is found on stonework closest to the ground. The initial courses are often left with rough, jagged faces to give the impression that the building sprang naturally from the earth. Exposing a live edge on a tabletop in a similar way makes that subtle connection back to the natural forest.

More Than a One-trick Pony

Yet rustication in architecture is more than rough foundation stones on a building and it has much more to teach us. In application it covers a broad range of surface treatments and can be applied to a variety of design problems. The common theme is that it uses texture to create a contrast with a nearby surface. Rock faces were left jagged as though just pulled from the earth and juxtaposed against a smooth worked surface.

This contrast between textured and smooth can be found on adjacent surfaces such as the edge of a table and its top, or it can take the form of a narrow band of textured surface that acts as a border. Bands of texture can be used

Written in stone. *This is the stone version of a live edge on a wood tabletop. Designers have used this treatment for millennia.*

Natural border. *Note how narrow bands of rough stone act as borders on this brick firehouse. Imagine how bland it might look without these bands of texture.*

CONTINUED ON PAGE 22

LEAD PHOTO BY DAN MOSHEIM; STONE PHOTO BY THE AUTHOR; FIREHOUSE PHOTO BY DICK WALKER

CONTINUED FROM PAGE 20

Grounded. *This carving seems to sprout from the earth when surrounded by the rusticated band flowing in and out.*

effectively to divide one part of a design from another, thus breaking up a form, adding rhythm and avoiding a static look. These narrow rusticated bands can morph into a carving and then flow back into the textured border and continue on.

Artificial Rustication

Rustication isn't just limited to natural edges plucked from the ground or the organic edge of a tree trunk. Think of it as any textured surface that plays off an adjacent surface. Stone carvers may use of a variety of texturing methods to achieve visual contrast. It can take the form of a border of smooth blocks with heavily chamfered edges to add depth and shadow lines against an adjacent brick surface. Rustication also includes a variety of textured surfaces created by random cuts with a chisel. Some rusticated surfaces have a stippled, pock-marked look as though they have been textured with a decorative punch.

Shadow lines. *A border consisting of small blocks with deep chamfers creates texture, the result of distinct shadow lines.*

Texture. *Beyond the rough patterns of nature, carving chisels can be employed to create an endless variety of textured patterns.*

Field Trip

On your next trip to a city or your county seat, take your sketch pad and camera. Take note how rustication is used on stone and brick buildings and note your impressions of the effect. Think of that old library across the street with its rusticated treatment not as a building, but as a big piece of furniture. Ask yourself how well the borders highlight the overall form and complement the design.

This is great training for your eye and can germinate ideas that you may want to translate into your next furniture project. In addition, observing closely the variety of rusticated treatments on buildings will help you get a keener sense when something works or doesn't. Are the borders too wide or narrow? Is the design too busy? Does the whole design sing the same melody?

Besides rustication, a close field study like this is likely to unveil to your eyes additional connections between architecture and furniture. Who knows – your next great inspiration might be found waiting outside the library, not in it. **PWM**

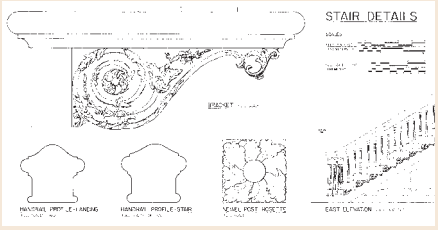
George is the author of two design DVDs (Lie-Nielsen Toolworks) and co-author (with Jim Tolpin) of "By Hand & Eye" (Lost Art Press).

HABS

The "Historic Architectural Buildings Survey," or HABS for short, is an on-line library of historic American architecture. HABS was a public works program hatched during the Great Depression that sent an army of the nation's architects to document the quickly vanishing building treasures from the American landscape. The result was a huge repository of photos and architectural drawings of buildings both public and private with historic or architectural interest.

The database is searchable by location or by keywords. Furniture builders may find ideas by searching terms like "corner cupboard" or "fireplace." Many of the entries contain detailed drawings that include moulding profiles and architectural turnings.

You can access the HABS search page at memory.loc.gov/ammem/collections/habs_haer/



Design inspiration. *HABS drawings are chock-full of carving, moulding and turning details.*

ONLINE EXTRAS

For links to all these online extras, go to:

- **popularwoodworking.com/dec13**

BLOG: *Read more from George R. Walker on his Design Matters blog.*

IN OUR STORE: *George R. Walker's DVDs and "By Hand & Eye" (with Jim Tolpin).*

Our products are available online at:

- **ShopWoodworking.com**

About This Column

Design Matters

Design Matters dives into the basics of proportions, forms, contrast and composition to give you the skill to tackle furniture design challenges with confidence.

CARVING & TEXTURE PHOTOS BY THE AUTHOR; ILLUSTRATION & CHAMFERED BLOCKS PHOTO COURTESY OF HABS

Cabinetmaker's Tool Chest

BY ROBERT W. LANG

Store all the tools you need in easy reach.

If I were to make three lists – the tools I want, the tools I own and the tools I need – the last would be the shortest. When I decided to build a wall cabinet for my hand tools, I put my most-used tools close at hand and at eye level, along with plenty of drawer storage for tools I don't need so often.

I spent time sorting through my tools and experimenting. I cut some pieces of 1/4"-thick foam core (plywood or cardboard would work as well) to pin down the size and shape of the cabinet and the layout of the tools. My goal was to store as much as possible in a compact and organized space.

Tailor the Plan

If you're thinking of building a tool chest similar to this, I suggest that you alter my design and adapt it to your tools, your shop and the way you work.

LEAD PHOTOS BY AL PARRISH; STEP PHOTOS & ILLUSTRATIONS BY THE AUTHOR

Function first. *Plan the cabinet around groups of tools; put the most-often used ones where they will be near at hand.*

The results will be more useful to you, and you'll be happier.

I let function lead the way, with a single door for hanging storage. The stiles were turned 90° to provide depth. I wanted to hang a framing square in a corner of the door, and a bit of experimentation led to an overall height of 30" and a width of 22¼". A survey of the tools destined to hang in the door led to an overall depth of the door at 2½" and I settled on a case depth of 11¾".

My initial thought was drawers at the bottom of the case with hanging and shelf storage above. I didn't want the drawers too tall and I settled on varying heights from 1½" to 2⅜" with one taller narrow drawer. A mock-up of the plane ramp left room at the top and rather than redo my layout, I sketched in three 2"-high drawers at the top.

I thought that looked pretty good, found a few people to agree with me and carried the horizontal division of the drawers down to the lower drawers. I wanted some wider drawers, and made those two-thirds of the space. Alternating the arrangement from side to side kept things interesting and the regular division meant fewer sizes to deal with.

From the Outside In

The outer case is solid wood, connected with through-dovetails, as is the door frame. I laid out the dovetails to leave a half-tail where the case and door meet and half-pins at the wall and the outer edges of the door.

After sawing the pins by hand I lowered the end of the board in my vise to place it even with the top of a piece of scrap on top of a box. Then I used a trim router with a straight bit to remove the waste between the pins, stopping short of the saw cuts. The small amount of material that remained was cleaned out with a chisel.

With the pins complete, I marked and cut the tails then made the first of many trial assemblies. With a complex case like this, I lay out the joinery from existing parts when I can. With the outer case together, I marked the locations of the dados that capture the shelves and web frames.

I used a router with a straight bit and a right-angle guide to rout the dados. Because the dados are different widths, I set up a few different routers so I wouldn't need to change or repeat my tool setups. There are times when you really do need four routers.

There is a solid shelf below the top drawers and another solid shelf above the lower drawers. The two shelves are connected with a solid vertical divider that sits back 1" from the front edge. The dados for the vertical divider stop back from the front by 1½", and the front of the divider is notched at each end to cover the ends of the dados. After fitting the two shelves and the vertical divider, I reassembled the case, then cut and fit the front rails of the web frames.

Next I laid out and cut the dados for all the vertical dividers between the drawers. These dividers have a short piece at the front glued cross-grain to a longer piece that runs front to back. These pieces are trapped in dados and have nowhere to go, even if the cross-grain joint should someday fail.

The last set of dados are for the small shelf that sits above the plane ramp. These stop about ½" from the front edge of the shelf, which is notched beyond the ends of the dados.

With all the visible pieces in place, I made the secondary parts to complete the web frames. I made the back rails the same length as the fronts, and ran a groove down all the inside edges. I then cut stub tenons on the ends of the pieces that connect the rails front to back.

The web frames are glued together and dry-fit to the case to make sure all parts fit tight and square. This dress rehearsal also showed where I needed to clamp during the final assembly. Then the case came back apart to clean up all the visible surfaces.

The back of the case is a piece of ½" - thick plywood that sits in 1"-deep rabbets in the sides. I skipped the rabbets in the top and bottom to avoid cutting into the dovetails at the corners. There is plenty of material in the area to screw the back to, and the top and bottom of the back are hidden behind drawers.

Rapid removal. *A trim router with a straight bit makes quick work of clearing waste between the pins, and it leaves a flat baseline.*

Plan meets reality. *With the case dry-fit, dados for interior partitions are laid out from a story stick.*

Right angle. *This T-square jig indexes off the router cut in the arm. Line up that cut to your layout lines, then rout the workpiece.*

I clamped a straightedge to my layout line at the back of the sides and cut the rabbets with a large straight bit. A bearing above the cutter rode along the straightedge. I stopped short at the beginning and end of the cut and cleaned up the corners with a chisel.

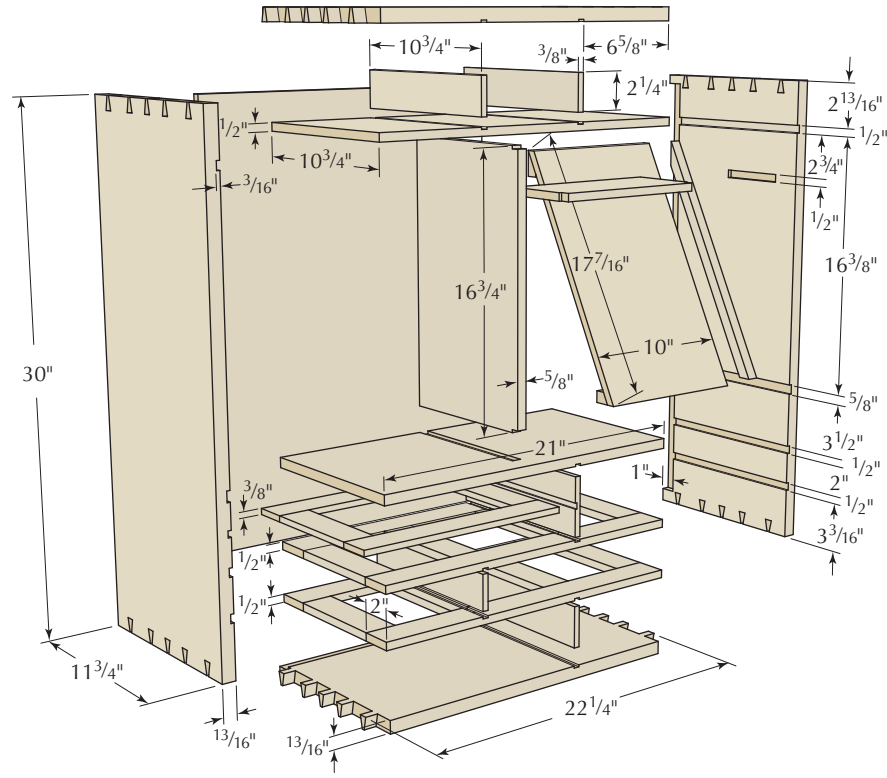
Fronts first. *Dados for the vertical dividers are also laid out with the carcase together, before the web frames that support the drawers are assembled.*

Take care. *Good openings will ensure good-fitting drawers. Check and adjust each opening with a dry assembly.*

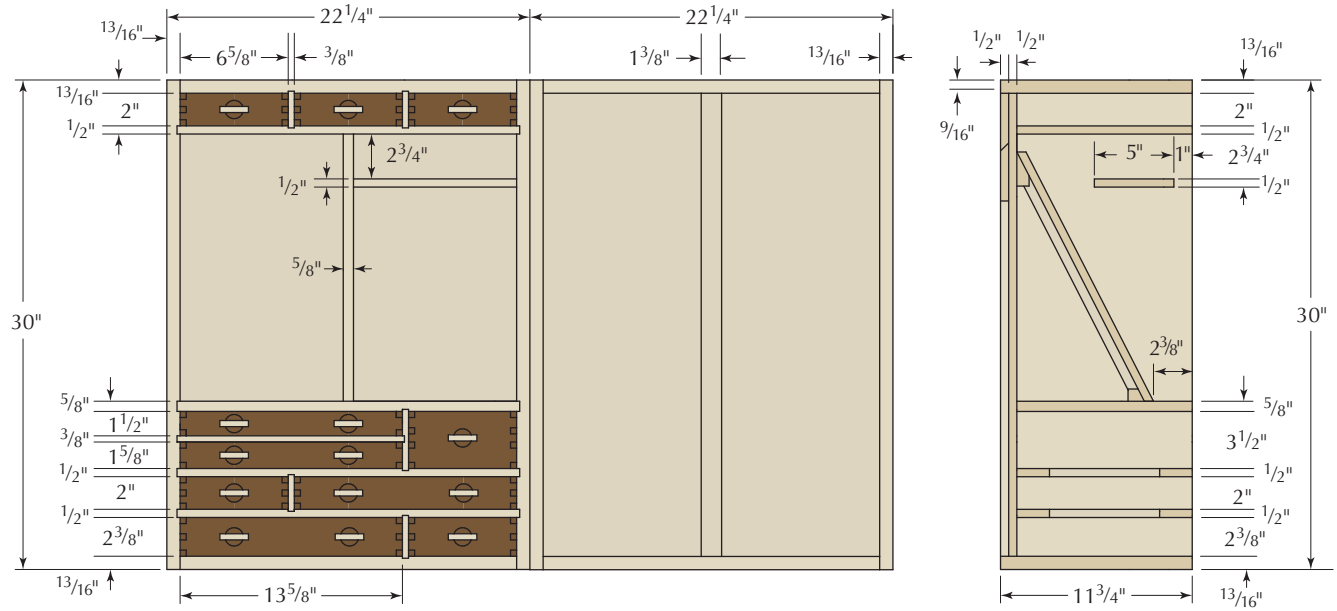
Not Your Average Door

I made the door before I glued the carcase together, just in case I needed to adjust one or the other to ensure they fit together nicely. The outer corners of the door are simple through-dovetails. The extra stile in the middle of the door makes it a beefier structure and allows for two solid-wood panels.

A single dovetail at each end of the central stile holds it to the rails. This tail is lapped back to the edge of the groove that holds the panels, about 1" from the front edge. I dry-fit the five

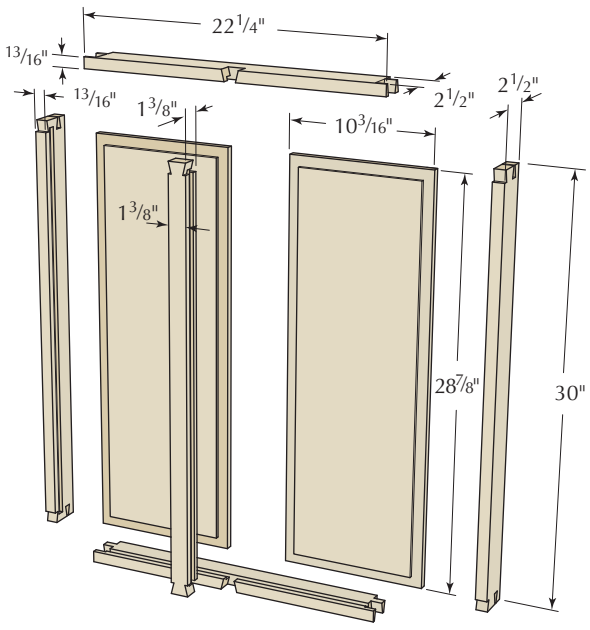


EXPLODED VIEW



FRONT

SECTION



EXPLODED VIEW – DOOR

Mark together. *Assemble the frame of the door before laying out the groove locations for the panels.*

Stop right there. *It's easiest to make stopped grooves by bringing the tool to the work. Plunge first close to the ends, then make the cut in between. A mortise chisel makes short work of squaring the ends of the grooves.*

frame parts, then marked the location of the groove with these pieces together.

The panels are 3/4" thick, with a cove cut from both sides to leave a 1/4"-wide tongue. The cove is a 1/2" radius and I set the front by eye until the cut looked pleasant, then lowered the cutter to make a smaller cut at the back. I then put a 1/4"-diameter spiral-upcut bit in a small plunge router and cut the grooves in my door frames.

The door is sturdy and easy to put together as long as the panels can slide easily in the grooves. The center stile is fit to the top and bottom rails, the panels are slid into place, then the stiles go on either end.

Moment of Truth

If all of the carcase pieces have successfully gone together in the dry-fit, final assembly can be done in one go. I made a couple of practice runs to be sure of the sequence and that I had the right number and type of clamps ready.

I laid one side down on my bench, with the dados facing up. Then I brushed liquid hide glue (for its long open time) into the dados and on the end-grain surfaces of the dovetails. (Letting the glue wick into the end grain gives much better glue joints.)

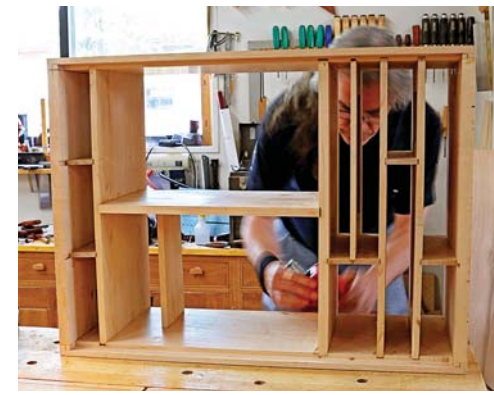
Assembly is from the center out. I fit the large vertical divider into the two solid shelves, then placed the shelves into their dados. The small shelf above the planes also goes in at this time. Then I placed the web frames, along with the small vertical dividers. There should be enough play between the frames and the shelves so that the dividers can drop into their dados.

Sliding the dividers in from the front would be silly unless the fit were too loose. If the fit is right they will get stuck before they get halfway back. With the dividers and frames all in place, I brushed more glue on the dovetails and added the top and bottom.

Before adding the second side, I brushed glue on the joining surfaces of the shelves and frames. Adding the second side is tricky, but not bad if the parts fit. I started the dovetails at the top and bottom, then lined up the shelves and frames and tapped them into the dados. When all the joints were started I drove them home with a mallet.

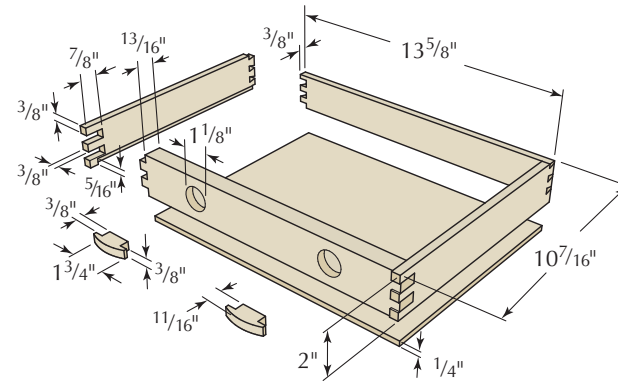
If the dovetails fit, they shouldn't need to be clamped, but I needed clamps front and back at most of the dado joints. As I clamped I checked to be sure that both the entire assembly and each corner was square. The final step was to cut and fit the plane ramp from 1/2"-thick plywood. It attaches to 3/4" x 3/4" cleats nailed to the side of the case and the vertical divider.

In sequence. *There is a logical sequence to the final carcase assembly; with this many parts, it is worth a couple of practice runs to make sure everything fits*



Square & tight. *Liquid hide glue has a longer open time than yellow or white glue. That gives me time to make sure the corners are square and the joints are tight.*

Fit first. *I make sure that the drawer fronts fit in their respective openings before assembling the drawers.*



EXPLODED VIEW – DRAWER

A Fitting Strategy

I have two methods to ensure nice-fitting drawers. The first is to fuss over the openings and try to get them as perfect as possible. The second is to fit the parts of the drawers to the openings before assembling the drawer boxes.

I start with the drawer fronts. After marking a rough layout with chalk, I cut the fronts slightly larger than the openings. I carefully trim each front until it just fits in the opening. I want a slight gap when I'm done, but at this point I aim for a snug fit.

I fit each side to easily slide into an opening. If there are any variations in the openings, I plane the edges of the drawer sides to compensate. My goal is a gap of 1/32" at the top of the sides. This means the sides can vary, so I mark each one with its location.

My theory is this: If the fronts and sides fit nicely, the assembled drawer should fit with minimal fuss, as long as the joints between them are correct. I chose to use Greene & Greene-style finger joints, but the principle applies no matter how the pieces are joined.

I started by laying out the joints on the fronts. Each has a 3/8" x 3/8" notch at the top and bottom corner and except for the two short drawers and the tall drawer there is a 3/8" x 3/8" notch centered vertically. The tall drawer has notches that line up with the notches in the short drawers next to it.

I made a jig from two pieces of plywood and attached that to the miter gauge of the table saw. I used a Freud box-joint cutter set to make 3/8"-wide cuts and set the height of the blade to 3/8" above the flat part of my jig. I ran the jig over the blade then set the pieces vertically, lining up the layout lines to the edge of the cut.

For the corner cuts I clamped a stop-block to the jig and for the interior cuts I positioned the fronts by eye. These pieces are rather small, so I recommend clamping the work to the jig.

When the notches were all cut in the fronts, I cut a shallow rabbet in the back face behind the pins to make them easy to register on the sides and marked the joint locations with a pencil. (I fudged the sides down from the fronts about 1/32" when marking the joints.) This leaves the desired gap at the bottom of the drawer front after assembly.

I raised the blade by the thickness of the drawer fronts plus 1/16" and cut the fingers at the table saw. These joints should fit easily together with hand pressure only. When I had two sides connected to a front, I tested the fit in the corresponding opening. The offset in the joints raises the front, so I planed the top edge of the drawer fronts to leave a slight gap.

I cut the drawer backs to length, matching the distance from side to side of the dry-fit sides and

In this corner. *A stop-block on the jig (attached to the table saw miter gauge) is used to make identical cuts on all corners of the drawer fronts.*

This to that. *Much like a dovetail joint, the finished fingers of the drawer fronts are used to mark the sides for the matching half of the finger joints.*

A little higher. *The same jig is used to cut the fingers in the drawer sides. The saw blade is raised to the thickness of the drawer fronts plus 1/16".*

SUPPLIES

Lee Valley
leevalley.com or 800-871-8158

3 ▪ 3" x 1 11/16" narrow brass butt hinges, #00D02.04, $22 pr.

1 ▪ piano lock, #00N02.01, $23.90

1 ▪ 5/8" extruded escutcheon, #00A03.02 $4.80

Prices correct at time of publication.

fronts. The drawer bottoms fit in 5/16"-deep rabbets to maximize space in the drawer, so the width of the backs is 5/16" less than the sides. The backs and sides join with through-dovetails.

After cutting the back joints, I dry-fit each drawer and made sure it fit in its openings before cutting the rabbets at the router table. The rabbet should be as narrow as possible because the drawers slide on what remains beyond the rabbet. After routing, I cleaned up the corners with a chisel.

Get a Grip

Rather than throw money at the drawer pulls, I decided to make my own. I played around with the concept of a shaped wood pull in a shallow hole. After settling on a design that looked and felt good, I needed to come up with a way to efficiently and safely make 14 pulls. I prepared a few pieces of maple 3/8" thick x 11/16" wide.

I laid out the pulls on the blank stock, leaving a couple of inches extra on each end. I set up at the drill press to hold the blanks at an angle below a 1 1/8"-diameter Forstner bit, then lowered the bit to scoop the center of both sides of each pull.

I took the blanks to the table saw (where the 3/8"-wide box-joint cutter setup was still in place) and cut notches at the end of each pull. At the band saw I cut the arcs on the other edge of the blanks then separated the pulls. I refined the edges of the scoops with a gouge, rounded off the curved surfaces, then drilled a 3/8"-deep x 1 1/8"-diameter hole in the center of the narrow drawer fronts. The holes in the wide drawer fronts line up with the holes in the short ones.

Cabinetmaker's Tool Chest

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
CARCASE					
❑ 2	Case sides	13/16	11 3/4	30	Maple
❑ 2	Case top/bottom	13/16	11 3/4	22 1/4	Maple
❑ 1	Shelf above drawers	5/8	10 3/4	21	Maple
❑ 1	Vertical divider	5/8	9 3/4	16 3/4	Maple
❑ 1	Shelf below drawers	1/2	10 3/4	21	Maple
❑ 1	Block plane shelf	1/2	5	10 3/8	Maple
❑ 2	Low frame fronts	1/2	2	21	Maple
❑ 1	Mid frame front	3/8	2	13 7/8	Maple
❑ 3	Vert drawer dividers	3/8	2 1/4	10 3/4	Maple
❑ 1	Vert drawer divider	3/8	2 5/8	10 3/4	Maple
❑ 1	Vert drawer divider	3/8	3 3/4	10 3/4	Maple
❑ 1	Plane ramp	1/2	10	17 7/16	Baltic birch ply
❑ 1	Case back	1/2	21 5/8	28 3/8	Baltic birch ply
❑ 2	Low frame backs	1/2	2	21	Poplar
❑ 7	Frame rails	1/2	2	7 3/4	Poplar
❑ 1	Mid frame back	3/8	2	13 15/16	Poplar
❑ 2	Mid frame rails	1/2	2	7 3/4	Poplar
❑ 2	French cleats	1/2	4 1/2	21 5/8	Baltic birch ply
DOOR					
❑ 2	Outer stiles	13/16	2 1/2	30	Maple
❑ 2	Rails	13/16	2 1/2	22 1/4	Maple
❑ 1	Middle stile	1 3/8	1 3/8	30	Maple
❑ 2	Panels	3/4	10 3/16	28 7/8	Maple
DRAWER FRONTS					
❑ 4	Fronts	13/16	2	6 5/8	Walnut
❑ 1	Front	13/16	2	13 5/8	Walnut
❑ 1	Front	13/16	1 1/2	13 5/8	Walnut
❑ 1	Front	13/16	1 5/8	13 5/8	Walnut
❑ 1	Front	13/16	2 3/8	6 5/8	Walnut
❑ 1	Front	13/16	2 3/8	13 5/8	Walnut
❑ 1	Front	13/16	3 1/2	6 5/8	Walnut
❑ 14	Pulls	3/8	11/16	1 3/4	Maple

Drawer sides & backs 3/8" thick, drawer bottoms 1/4"-thick plywood

Here's the scoop. *This blank will become a half-dozen pulls. After laying them all out, the Forstner bit makes an angled cut on each side for make a finger-friendly pull.*

Make the target. *The face of the drawer front is marked directly on the fingers of the drawer side in the dry-assembled drawer.*

Hit the target. *The edges are rounded over to the pencil line with a file. The file also cleans up the saw marks of the end grain.*

With the drawer fronts and sides dry-fit together, I marked the location of the drawer fronts on the fingers of the sides. I pulled the sides off and rounded the edges of the fingers back to the pencil lines with a plastic laminate file. After that, I glued the drawers together, cleaned them up and made sure they still fit.

A Happy Home

I arranged the tools on the door in logical groups. My framing square is in the upper-left corner with my combination squares nested within the legs. The

THE TOOLS I NEED & WHERE THEY LIVE

Hand tools have much in common with the medical profession. When you look at a catalog, or a list of recommended tools in a magazine or online, you see many specialists along with a few tools that tend to most tasks. The problem is that without experience, you can't tell which specialized tools you need (or want), or if problems are the fault of you or the tool.

Too many tools, too early on, cause more problems than they solve. One saw will get you started. When you learn how to control it, you'll be able to assess its shortcomings and make an informed decision about what might suit you better. It's the same with chisels and planes. Start with one tool, learn how to sharpen and set it up then put it to work.

If your goal is to make attractive and useful things, either as a hobbyist or a professional, you need to be familiar with all your options, both hand and power. If you're new to woodworking and stick with it, you'll eventually have a lot of tools, but the secret is to understand what they do and how they do it. That takes experience.

I started with a few good tools and added to them as my experience saw the need and my budget allowed. The following are the tools that I consider essential; they suit my budget and the way I work. Don't blindly follow my list – think about what makes sense for you and where you want to go with woodworking.

In my tool chest, marking, measurement and layout tools are the most visible for good reason. And buying good tools for those tasks was the first investment I made. My combination squares, marking gauge and calipers plot the path before work begins, and check it when it is done. What matters is that the parts are the right size and in the right place – not what tool made them. If I were starting out, the first tool I would get would be a quality combination square. I also rely on a pair of fractional dial calipers, a 6" precision rule, a marking gauge and a sliding bevel. Don't try to get by cheap with your layout tools.

Chisels aren't just for dovetails; they trim little bits and pieces left over from machine work, reach into places power tools can't, scrape excess glue away and perform dozens of other tasks. Inexpensive chisels will teach you how to grind and sharpen (you won't have to worry about ruining the good ones), and the jobs that these can't easily tackle will let you know what specialized chisels to buy when you need them.

Smacking things is more specialized than you might think. You need something metal to pound nails, and something softer to beat on things a metal hammer would damage. A claw hammer and a dead-blow mallet are essentials, although I can justify the others in the photo and the other half-dozen I have tucked away.

Many woodworkers get by without a handsaw, but there are times when pieces are too small, too close to something else or inconveniently located to cut by machine. Or the machine is set up for something else and a single cut needs to be made. One middle-of-the-road saw (in quality and price) will suit your needs, and may lead you to discover the situations where cutting by hand is more efficient, gives better results or both. Practice with a single tool teaches you more than wondering which of the bunch to pick up.

I have more than a few handplanes, and they are called into service to refine the grunt work done by machines. My smoother removes machine marks faster and better than a belt sander or random-orbit sander, and my shoulder and rabbet planes tweak and refine joints that my table saw and router get pretty close. I began with a block plane, and it is still the plane I use most often. It is versatile and simple to set up and use, and its limitations taught me which of its more specialized brethren to add. Of course, if you are building a collection, you'll want one of each. If you're building furniture, experience will lead you to the tool kit that is best for you.

— RWL

Open-ended. *Chisels are gripped by the shape of the holes, while the open faces allow them to be put in place easily.*

Reflection. *This holder for an adjustable square uses the shape of the tool for its overall form. The slot holds the square securely when the door opens and closes.*

In the gap. *The 1/2" space between the front and back of this simple rack provides flexible storage for tools I might need in a hurry.*

holders for the small squares have a rabbet in the top edge. That leaves a ledge to keep the stocks in place, and a notch in the end holds the blades. The curved shapes reflect the shapes of the stocks of the squares.

To the right of my squares is a block to hold smaller tools. The front and back are 3/8" thick, separated by 1/2" x 1/2" squares. At the far right, the end extends above the front and ends in a semi-circle. A screw in the top secures that end to the door stile. At the other end, a screw goes through the block and into the center door stile.

In the lower half of the door is a rack for chisels, placed high enough to clear the drawer pulls. That rack is 1 1/4" wide, with 1"-diameter holes drilled on 1 1/2" centers. The centers of the holes are 3/8" back from the edge. I made saw cuts to square the ends of the openings so chisels can be put in from the front. Two screws through the outside of the door hold the rack in place. Plugs cover all the screws.

I cut some thin pieces of walnut to the shape of the back of my planes, and fastened them to the face of the plane ramp. I put the smooth and jack planes as far up the ramp as I could to make room for smaller planes below.

On the left side of the case is an open area; saws and hammers fit on walnut holders at the sides and back, leaving room for small power tools or my mug.

And Swing It

The door is heavy on its own, and the tools inside add even more weight. I decided to go with three 1 11/16" x 3" brass butt hinges. I centered the middle hinge vertically, and centered the top and bottom hinges on the top shelf and lowest web frame.

I routed the gains for the hinges 1/16" deep. The hinges were not swaged, so I used a chisel and cut the outer edges of the gains deeper to leave the smallest possible gap when the door is closed.

The lock is a full-mortise piano lock let into the door halfway up. It has two wings that extend past the strike when the key is turned.

I sprayed shellac for the finish. The first coat was amber to warm the color, followed by two coats of clear. After letting this cure over a weekend, I took the sheen off with an abrasive pad and applied a coat of paste wax.

Router base. *A scrap clamped inside the door keeps the router base from tipping and the fence defines the back edge of the hinge mortises.*

The back is screwed in place and the cabinet hangs on a French cleat – two 4 1/2" wide pieces of plywood with a 45° bevel on one long edge. The cabinet side of the cleat is screwed to the shelf below the top drawers and the vertical divider. The other part of the cleat is screwed to the wall studs.

I'm not the most organized person, but I like the tools I use the most hanging near my bench. If I can't find a tool I need, then turn around to find the cabinet empty, I know it is time to stop and clean up a bit. **PWM**

Bob is executive editor of Popular Woodworking Magazine *and the author of the "Great Book of Shop Drawings for Craftsman Furniture" and a new PDF book, "Building Blocks of SketchUp."*

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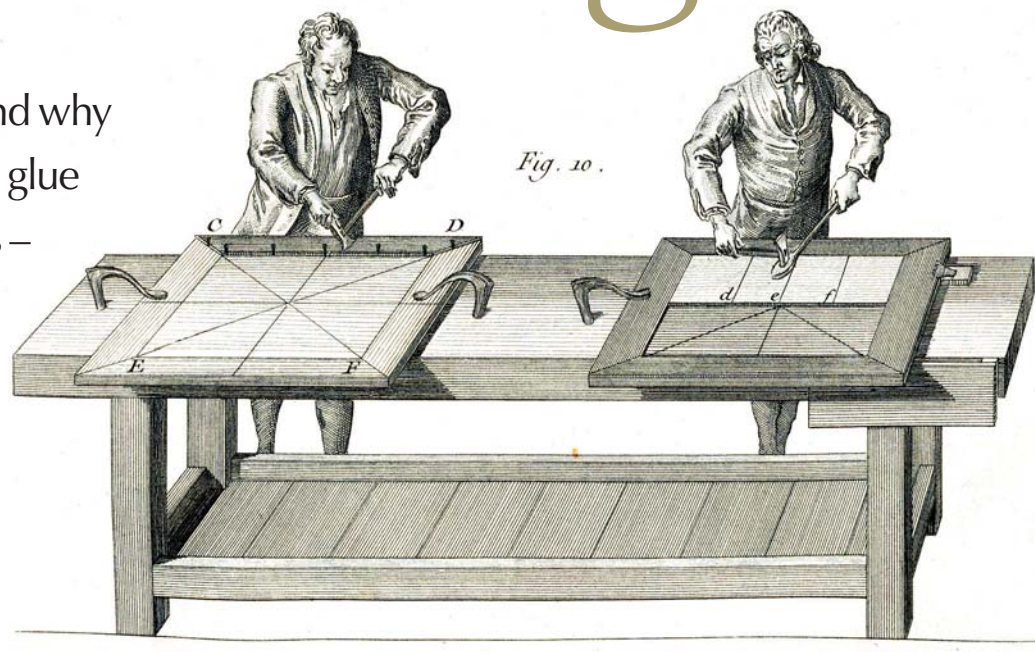
Hammer Veneering

BY DON WILLIAMS

Discover how and why this age-old hide glue technique works – and works best.



Historical standard. *While André Roubo does not discuss hammer veneering in great depth in "L'Art du Menuisier," it's clear that the technique has remained virtually unchanged in 240 years. Interestingly, the figure on the right is clearly re-warming some areas with a heated iron to reactivate the gelled glue to press down the veneer.*

One of the great hurdles for many woodworkers new to traditional craftsmanship is applying veneers to a wooden substrate. This becomes even more problematic when the task involves something more than laying down a single piece of veneer, or at least something beyond several parallel pieces of veneer, onto a perfectly flat substrate.

Often an expert might recommend some overly complex approaches to the task, involving a tonnage of clamps, vacuum bags or robust presses, all in the employ of holding the veneers in place while the glue sets up. Let the application occur on a curved surface or with a composition in veneer and things can get outlandish.

More creative woodworkers might resort to applying either hide glue or polyvinyl acetate (white or yellow glue) as the adhesive and letting it dry, then using a heated iron to tack things down. These strategies begin to approach the traditional and nearly foolproof technique of hammer veneering.

Many artisans interested in historical craft have tried hammer veneering, and even more have observed it.

Why it Works

Without going into a recitation of the process, nor an exhaustive troubleshooting discourse (hint: The two biggest problems are not preparing the substrate or veneer well enough, and using the glue when its viscosity is too high), some fundamentals about the materials science involved might be useful. The question that keeps coming up is a simple one, which fortunately has a pretty simple answer: Why does hammer veneering work?

The answer lies in the nature of the hot hide glue used as the adhesive. More properly, it lies in the processes by which the hot liquid adhesive becomes a rigid, strong glue layer.

Hot hide glue is generally a variety of bovine proteins dissolved in water. Protein solutions such as this undergo a non-intuitive process when going from liquid to solid. When the temperature of the hot hide glue diminishes, at a given point of cooling, the solution no longer remains liquid even if no drying has occurred through evaporation. That temperature is known as the "gel point" where the solution turns into, well, a gel. (The exact numerical value of the temperature where this occurs

ILLUSTRATION FROM "L'ART DU MENUISIER"; PHOTOS BY THE AUTHOR

Slather it on. *By its very nature hammer veneering is a sloppy process. Do not skimp with the application of hot hide glue on either the substrate or the veneer; if you do, the glue will chill and gel too quickly, placing the success of the process in doubt.*

Instant bond. *Done properly with well-prepared surfaces and glue, a fine-tipped veneer hammer squeezes out and gently scrapes off the excess glue from the face of the veneer, leaving some gelled glue in the grain as a filler, and rendering a nearly instant bond.*

depends on a number of things, most importantly the gram weight strength and concentration of the glue.) At a craft level this is when the glue "sets." But that is only one half of the equation.

At the gel point, the glue becomes solid, or at least non-liquid, but it has virtually no cohesion (stick together-ness) nor gluing adhesion (stick to-each-other-ness). But it has enough, and it is pretty sticky (a phenomenon known as "specific adhesion" as opposed to "mechanical adhesion," which relies on the interlocking of the components).

The full hardening of the glue comes only as the water evaporates, leaving behind a thin, epoxy-strong layer of adhesive. To reach this point, all the excess water that was used to soak the glue during its preparation must evaporate for the glue layer to reach a moisture content that's at equilibrium with its environment.

One of the quickest ways to provoke the cooling of any molten material is to reduce the cross section of its mass. In other words, make it thinner so it can disperse its heat more quickly into the surrounding material.

"The prevailing display of luxury is also one of the causes of the lack of excellence in works of cabinetry – everyone wishing to have it but without having the means to pay what they are worth."

—André-Jacbo Roubo (1739-1791), French woodworker and author

WHAT IS GRAM WEIGHT STRENGTH?

The full answer about gram weight strength (GWS) is both complex and fundamental to understanding and using hide glue, hot or cold. Put simply, GWS is a laboratory measurement of some physical properties of glue, reflecting the average molecular weight of the glue mass, which in turn is determined by the "fraction" of the glue liquor decanted from the rendering tank. It is not an indication of either purity or clarity for the glue. That is a different thing altogether.

As animal hides and sinews are washed in giant tanks to extract their water-soluble proteins, the tanks are periodically drained and the contents processed into masses of dry glue. Much like olive oil, there are different properties for the glue extracted from the decanted liquids depending on how hard the vat is "worked" with heat or pressure. The longest protein chains (highest GWS) come off first, the next longest second. Finally, the lowest are the final "fraction" achieved after cooking extracts the maximum amount of soluble material from the hides and sinews.

In the laboratory these fractions of glue are prepared into blocks of glue jelly by following a specific protocol, then measured as to how stiff they are. The result of that test is recorded as the GWS of that particular batch of glue. This number tells us a great deal about the characteristics of the glue once it is in the glue pot or in the glue joint. I have glue grades ranging from 135 to 500 gram strength on my shelf. These numbers are industry standards achieved by mixing batches of different strengths.

Below is a quick reference chart to help remember how the grades behave (these are general tendencies and can be manipulated once you understand what is going on).

Property	Low gram strength	High gram strength
Prep/soaking time	Less time	Longer time
Flexibility	More creep	Less creep
Water uptake in preparation	Less water required	More water required
Water sensitivity once cured	More sensitive	Less sensitive
Shrinkage during curing	Less shrinkage	More shrinkage
Strength of cured continuous glue line	Lower tensile strength	Higher tensile strength
Gel and cure time	Gels and cures quicker	Gels and cures slower

Because a "stronger" grade of glue is also subject to more shrinkage and the attendant stress as the glue line dries, it is entirely possible that a glue joint made with 135 GWS glue is stronger than a joint adhered with 444 GWS glue.

— DW

Check the results. *Testing the surface after the process will tell you immediately if you were successful. Either gently tap with your fingernails or press with your fingertips to determine if the bond is tight over the whole surface. If it is not, either re-warm the area and place a sand bag on it or peel the veneer back off (the glue is still very soft at this point) and start all over.*

Quick & easy. *Only seconds after beginning, the result is a section of veneer firmly adhered to the substrate. This took less than 45 seconds from first application of glue to this point. As a precaution, I usually place sand bags on the uncured veneer/adhesive until the water escapes the system, leaving a hard glue line.*

That is precisely what the hammer veneering technique accomplishes – cooling the molten hide glue to the ambient temperature (below the gel point).

Apply Force

In hammer veneering the critical process involves quickly slathering on a comparatively thick layer of molten glue to the underside of the veneer and to the top side of the substrate, placing the two in contact with each other, and "laying down" the veneer by pressing the cross peen of the hammer over the surface with considerable force. (Some "back of the envelope" calculations indicate that when I hammer veneer, the downward force of the hammer edge approaches 500 pounds per square inch.)

The hammer acts like a squeegee, forcing out the excess molten glue. The nearly immediate effect is to reduce the cross-section of the molten mass, causing the room temperature to cool it in a fraction of a second and induce almost immediate gel formation.

While the remaining glue layer is not yet very strong, it is strong enough to hold everything in place, even if the substrate is curved. Remember, at this point the glue is neither liquid nor fully solid; it is a sticky gel. The good news is that it will become increasingly hard and strong in a relatively short time as the moisture departs the system. Less good is that the glue layer remains water-sensitive, even once fully dried.

Improve the Glue

While nearly perfect, this system can be improved by manipulating the ingredients. Adding a little glycerin (about 5 percent) to the hot glue solution increases the specific adhesion (it is "stickier"), making the immediate gel-tack more robust. You can overcome the glue's vulnerability to moisture through the incorporation of protein cross-linkers to the system.

I accomplish this by brushing a 5 to 10 percent solution of photographic gelatin hardener to both of the dry gluing surfaces then allowing them to dry. This allows the cross-linking agent to leach into the liquid glue when it is applied. Depending on how much of the agent is used, the result can range from a glue layer that is moisture-resistant to one that is impervious to it. In effect, you can accomplish what is – in working and performance effects – an adhesive with the simultaneous benefits of hot hide glue and two-part epoxy. **PWM**

Liquid manipulation. *An introduction of protein cross-linkers – a 5-10 percent solution of photographic gelatin hardener brushed onto the dry surfaces – increases the glue's resistance to moisture.*

This article is excerpted in part from Don's new book, "To Make as Perfectly as Possible: Roubo on Marquetry" (lostartpress.com). Don recently retired to the Virginia mountains. He shares his historic craft and homesteading interests at donsbarn.com.

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One from many. *Here, we see the Stanley No. 55 universal plane and some of the dedicated planes it was purported to replace.*

Mechanical Marvels or Steampunk Sporks?

BY ROY UNDERHILL

Stanley No. 45 and No. 55 combination planes are put to the test.

"This Universal Tool is a PLOW, DADO, RABBET, FILLETSTER, and MATCH PLANE, a BEADING and CENTER BEADING PLANE, a SASH PLANE and a SLITTING PLANE. It is also a superior MOULDING PLANE and will accommodate cutters of almost any shape and size.

Combining as it does all the so-called 'Fancy' Planes, its scope of work is practically unlimited, making the Stanley '55' literally A PLANING MILL WITHIN ITSELF."

— "'55" Plane and How to Use It' The Stanley Works, New Britian, Conn.

It took 2,000 years of fine-tuning for woodworking planes to reach their peak of subtle perfection – each plane elegantly adapted to its niche in the grain. Then, in a coal-fired flash, they were gone, struck down in top-hat times by the cast iron asteroid of the new machines. Toothed with high-speed rotary cutters, the machines could spit out stock mouldings fast and cheap – and they were good enough. The old wooden warriors that survived took shelter in dank chests as new creatures arose to fill the short-run, on-the-job-site niches where the rotary machines could not (yet) roam.

The creature first emerged in 1884 as the Stanley No. 45 Combination Plane. It was joined in 1897 by the even more versatile and complicated No. 55 Universal Plane. Cast iron and machined itself, the No. 55 was compared by its creators not with the perfection of the earlier planes, but with, as they stated, "a planing mill," and it too, was good enough.

So what about today? These tools now evoke curiosity if not respect,

PHOTOS BY THE AUTHOR

'Luke – I am your father.' *The wooden plow plane with interchangeable irons and adjustable fences gave birth to the all-metal combination planes. The Stanley No. 45 shown here makes a fine plow plane for cutting grooves – as long as the fence doesn't slip.*

Put on your spurs or drop your nickers! *Both mean setting one of the ears of the little three-leafed clover into the down-cutting position and fastening it with the tiny screw. When sharpened and set, the spur will slice the grain just before the cutter engages the cross grain – leaving a sharp shoulder and a clean exit.*

novelty if not snob appeal. Enough of them survive that one might consider, "Should I get a bunch of planes – or one of these things?"

We'll test the maker's claims for these beasts, but first let's think about planes – not just about how a plane works, but also why a good plane works well.

Set a sharp cutter in a wooden or metal stock, adjust the cutter to take a fine shaving, and you have a plane that works.

But for a plane to work well – in real wood – you need more. The mouth in front of the cutter must be narrow to hold down the wood until the instant before the sharp edge shears and lifts it. The cutter must be fully supported from behind to prevent chatter. The shavings must have a clear escape path to prevent clogging. For clean work across the grain, the cutter must be fitted at a skew angle to make a shearing cut. And, if there are fences and stops, they must to be dead secure against slipping.

The combination planes skimp on all of these attributes. But that does not keep them from serving as…

A Practical Plow

It makes sense that these would work as a plow because the wooden plow plane was father to the combination.

The noble plow, grooving on down the grain, used interchangeable cutting irons to shave grooves of differing widths. These cutters sat centered on a narrow iron skate or runner that substituted for the bed, or sole of the plane. Because the plow just cuts narrow grooves along the grain (such as for panels in doors) any tear-out caused by the open mouth and lack of sole was confined to the hidden bottom of the groove. To keep the plane parallel to the edge of the workpiece, the adjustable fence was held by two wooden arms secured by wedges or by threaded arms locked by wooden nuts. An adjustable depth stop completed this most trusted of the joiner's tools.

The new iron combination planes took the basic form of the plow plane and added a second runner fitted on two steel rods emerging from the main body. This second runner gave better support on the wood and better backed-up the new, thinner cutters. These cutters could also now link into a cap-nut arrangement to make adjusting the cutting edge exposure easier.

It's this easier adjustment that led me to acquire a stable of Stanley No. 45s for students to use as plow planes. The trade-off is employing a plane whose fence won't hold when placed in the hands of a new user. Too much weight on the left hand will rock the plane out of vertical, generating enough leverage against the fence to force it slightly farther out on the rods. On the second groove of a four-piece frame, they'll start plowing the groove slightly farther into the stock. On the next, it will be even farther over, and so forth, so that when the frame goes together, the grooves don't line up. It's enough to make you want to beat this plow back into a sword!

Still, it's a good enough plow plane, except for the fence troubles, and because you remove the fence entirely for the next task, the combination planes make…

A Decent Dado

A dado is just a groove across the grain, and to make one you need to kick off the fence and turn down the spurs. Dados are typically too far from the end of a board for the fence to work, so instead, you fasten a batten across the work to serve as a guide for the plane.

Cross grain also needs to be cut, knife-like, before it can be shaved out by the plane. The spurs that did this job on the early No. 55 were retractable knives. Later, we got the little three-leaf clovers held by the tiniest screw you can imagine, and woe to ye that drops one! Although they are a fiddly pain to engage, the spurs on the combination planes work fine once you sharpen them. With the fence removed, the plane can be configured just like a dedicated dado plane, except for one critical factor – the cutter on a combination plane is square across instead of skewed.

A proper dado plane has a skewed iron to shear the cross grain with a smooth, clean cut as it feeds the shaving out the side. With the square-across irons on the combination planes, the surface is left rough and the shavings build up and jam. But in the bottom of a dado, most likely to be filled with the end of a shelf, this matters not.

Thus, the square-across iron doesn't matter because you can't see it, and the

Two housings – both alike in dignity. *The square-across cutter on the No. 45 at left leaves a far rougher surface than the skewed iron of the dedicated wooden dado plane at the right. You can always get a smoother cut from the No. 45 by setting it to take finer shavings – the job just takes a bit longer.*

slippy fence doesn't matter because you don't use it. Sure, the wing nuts on the right side bump against the batten, and the left-hand depth stop is unreliable, and the shavings get backed up under the frame, but like a dog walking on it's hind legs, you are cutting a dado with a combination plane! (It is not well done, but you are surprised to find it done at all.)

If removing parts and ignoring rough cutting gets us a serviceable dado plane, I suggest you remove yourself from any visible place before you try the next transformation. Do what you will, but a combination plane makes …

A Ridiculous Rabbet

It hurts to compare the elegance of a traditional rabbet plane to this contraption. You're pitting perfect form, perfect function, pure elemental beauty against an eight-pound-Edward-Scissorhands-Swiss-army-knife. Using the No. 55 to cut a rabbet is like brushing your teeth with a duck. What if somebody saw you? You would have to pretend were just adjusting the thing to make…

A Funky Fillister

Because a fillister plane is simply a more advanced rabbet plane, you'd expect the combination planes to have all the advances you need – and they almost do.

To adjust the width of the cut, mount the fence using the upper pair of holes so it can reach underneath to cover as much of the cutter as you wish. To adjust the depth, dial in the nut on the stop and you're all set for long-grain work.

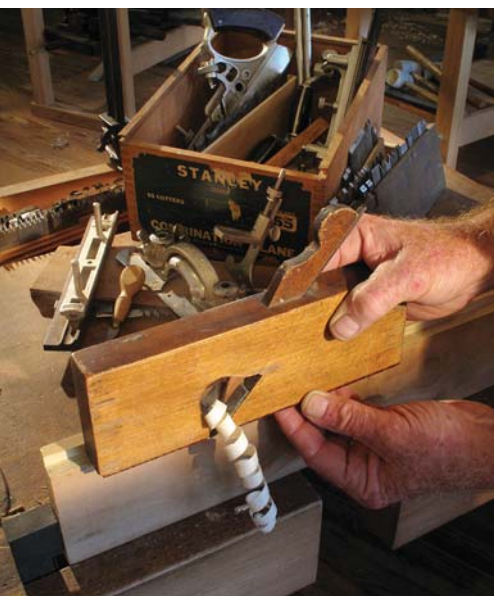
But, a proper fillister works for cross-grained rabbets as well, such as the shoulders many folks like to make on the ends of boards that they are about to dovetail. You can engage the spur on a combination plane, but there's nothing you can do about the square-across cutter. Cross-grained work simply demands a skewed iron to create an acceptable surface.

But not really. In truth, it works well enough. I lied because it would be tragic if you were to forgo time with a classic moving fillister plane for this nickel-plated lunar lander. Simply behold a good wooden moving fillister plane – the boxwood insert, the stratagems for mounting the spur, the brass of the depth stop. It is a true woodworking tool that makes your work rise to meet it.

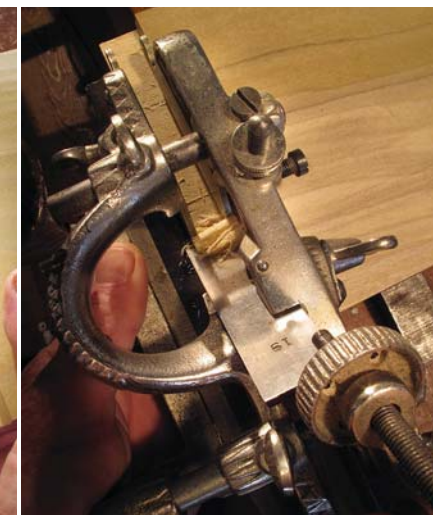
There are also metal skew-ironed fillister planes if you prefer, but like the combos, they have rod-mounted fences and…don't get me started! Too late, I can't stop, because on the next task, if the fence slips you'll end up with …

A Mismatch Plane

At its root, we have a decent plane for making grooves, so all we need do is throw in a gap-toothed tonguing cutter and we should be able to make tongued and grooved stock, or match boards as they used to be called.



Brain games. *If you'd rather play with a Rubik's Cube than get the job done, then by all means use a combination plane for such elemental tasks as cutting a simple shoulder rabbet. A classic rabbet plane in wood or iron just can't be beat.*



The pain in the grain falls mainly on the plane. *With the square-across cutter and the two runners instead of a proper bed (above, right), the No. 55 travels rough. The old wooden fillister, with a full boxwood bed and skewed iron, leaves a smooth, sheared surface across the grain.*

Tongue in cheek! *Combination planes can knock out tongues and grooves – as long as the fence stays put. A dedicated tonguing plane stays set, but can't be so readily adjusted. In this particular board, the grain turned down in the last 6", leaving the roughness seen on the shoulder.*

Takes a beading & keeps on reeding! *In straight-grained wood the combos can bead up a storm. For more accurate work when beading tongued stock, take off the regular fence and put on the little guide seen just to the right of the two runners.*

But, let us assume that the fence on the plane stays put and see how well this works. Now we are not cutting hidden surfaces in the recesses of grooves and dados. Now we have an exposed edge, and if appearance matters, the grain had better be with you. Sad to say, but the combos have no sole, only that narrow skate; there is nothing to hold the wood down and prevent it from splintering ahead of the cutter. In tongued boards, this rough edge shows.

But no matter; if you do get a rough edge, you can conceal it by simply reconfiguring your combination plane for…

Basic Beading

The No. 45 came with seven beading cutters in various sizes. The No. 55 added two more to these, along with three multiple beads or reeding cutters. With these same cutters, you can make torus beads and return beads, and you can even make dowels by beading in from both sides of a board and then cleaning up the edges. Given good grain, these boys can bead.

Beads have long been handy to give a shadow line, distract from gaps and make corners tougher by replacing the sharp angles with a rounded surface less prone to splintering and damage. For tongue-and-grooved stock, the "beading gauge" packed with the planes serves as a little auxiliary fence that slips into the socket on the front of the second runner of the plane. Using this fence instead of the normal one ensures that you are fencing against the certain shoulder of the tongue instead of the unreliable tip.

So if the plane can make tongues and rounded surfaces, it's a small step to put them together to make a…

Suprising Sash Plane

It's true – you can make the muntins and frame of a glazed window or door with this tool, but it's in restoration work where it starts to earn its keep. Say you have a damaged window with one small piece missing. You might search out the antique plane that matches – or you can grind a cutter for your combination plane and make the necessary adjustments to replicate that profile. Window work has always demanded the best, straight-grained stock, so let's take that as a given, and because we're concerned with only short runs of stock for the repair, we can put up with the other frustrations of the plane.

One thing in the combination plane's favor is the way the free end of the cutter on the glazing rabbet side allows you to work the moulding in on both faces of a wider board clamped to the bench. Then, you can slice off the muntin with this same plane adapted to it's minor role as a…

Muntin chops! *The sash moulding cutters that come with the combos have screw-adjustable stops in their middles. These stops, along with the adjustable fences, help you create a range of profiles for short runs of window and door stock.*

Satisfactory Slitting Plane

When you're making slats for shutters or splines for joints, or cutting any thin stock, a slitting plane is a good thing to have. It seems a thoroughly underused tool, but I may be wrong. Because it's a knife and not a saw, it makes a zero-kerf cut. It leaves no waste and makes no noise, so people may be using them all the time – we'd never know!

Both the No. 45 and No. 55 came equipped for slitting, and so far we have looked at tasks that both planes could perform. But the prime difference be-

Side-slitting entertainment! *Fitted with its own depth stop, the slitting knife makes short work of thin stock.*

The No. 55 advantage. *Unlike its little brother, the second runner on the No. 55 can adjust up and down as well as in and out. Fitted with the auxiliary runner, the No. 55 can maintain a footing on three levels of the "#105 Grecian Ogee" profile seen here. Along with the supplied moulding cutters, you can shape mouldings from a sequence of contour cuts or grind a cutter to the profile you desire. The process and the product are seldom as satisfactory as with dedicated planes, but sharp cutters and fine adjustment will get the job done.*

tween the two is that the second runner on the No. 55 can be moved not only in and out, but up and down as well, enabling it to serve as …

A Makeshift Moulding Plane

This up and down movement of the second runner gave the No. 55 footing for cutters that reached beyond the flatland of grooves, dados and the level shoulders of the beading cutters. The No. 55 even came with an "Auxiliary Center Bottom," a third runner that can give more support for wider profiles. But you know the problem; this is a plane without a sole. Such soleless planes need perfect wood to make perfect mouldings. But, if imperfect will do, it works reasonably well, and although it can't handle diving grain, engaging the spur on the right side of the plane will let it cut a cleaner shoulder than most wooden moulding planes in diagonal or crossed grain.

In fact, it's respect for old wooden moulding planes that might lead you to acquire a combination plane. A good number of surviving moulding planes have been damaged by tacked-on fences, chiseled-off corners, reground irons – ruinous modifications just to make a few inches of moulding for restoration work. How excellent to have an adjustable alternative that begs to be modified. So any old wooden plane that turns up its wedge at the sight of the No. 55 is both a snob and an ingrate.

> "This is a truly wonderful tool."
>
> *—Bernard Jones, editor, "Practical Woodworker"*
>
> "If there is a ball and chain of planes, this is it…"
>
> *— Patrick Leach, Blood and Gore*

No doubt, though, they are ugly things. The No. 55 in particular looks like an alien insect in obscene congress with the wood when fitted with the second tilting fence for…

Occasional Chamfers

Yes, indeed, you get two fences with the No. 55 and they both tilt. For working directly into the corner of stock, the left-hand fence holds the plane at the proper angle, the right hand one acts as the depth stop. The left fence moves farther and farther down the sloping face of the work with each pass until the second fence makes contact. Because the cutter makes contact first with the corner of the stock, the runner needs to be precisely positioned to support the edge on that first pass. Otherwise, you are simply digging a heavy knife into the corner of the wood.

Chamfers are intended to be seen, so the tear-out issue is always there. The instructions that come with the No. 55 tell how to solve the problems inherent to chamfer work, but the prospect of two slipping fences leaves me exhausted before I begin – and don't I have a spokeshave around here somewhere?

So What's the Verdict?

The No. 55 in particular is an eight-pound solution in search of a problem, but you never know when that problem might turn up. The very things that make these planes so versatile make them prone to error, but keep that in mind and they do fine.

The Eagle has landed! *The second fence and the rotating rosewood faces on the No. 55 adapt it to chamfer work, but the little spokeshave sitting on the box behind it does a better job. In theory, you can put a beading cutter into the No. 55 at this point and shave a bead into the corner by gradually feeding it deeper and deeper below the runners. In theory, you can empty a lake with a teaspoon.*

I regularly use a Stanley No. 45 as a plow plane and have adopted a decrepit Stanley No. 55 just to give it a good home. I'm glad to have them. The world is just more interesting with these creatures in it. **PWM**

Roy is the host of PBS's "The Woodwright's Shop" – the longest-running how-to show on television. He also teaches woodworking at The Woodwright's School (woodwrightschool.com).

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec13**

WEB SITE: *Take a class from Roy Underhill at his school in Pittsboro, N.C.*

BLOG: *Read more about Stanley Tools and read the manual for the No. 55.*

TO BUY: *Read Underhill's fascinating creative non-fiction article on André Roubo.*

IN OUR STORE: *Find vintage episodes of "The Woodwright's Shop" on DVD in our store, as well as many of Underhill's books.*

Our products are available online at:

- **ShopWoodworking.com**

Kelly Mehler's Plate Rack

BY MEGAN FITZPATRICK

Add pizazz to your kitchen with contemporary curves.

For years, I've been trying to cajole Kelly Mehler to write an article for us on one of his many areas of woodworking expertise: building custom pieces that emphasize the beauty of carefully selected hardwoods.

And I haven't given up on that quest – but one of his forms is just so appealing that I didn't want to wait for Kelly to be convinced in order for everyone to see it. So I built it (with Kelly's permission, of course).

Kelly and his wife, Teri, worked with kitchen designer (and renowned English Arts & Crafts furniture maker) Nancy Hiller to design this plate rack to integrate into their Berea, Ky., log home's kitchen (see "Design Process" on page 43).

Adapt for Your Aesthetics

While Kelly built his plate rack in white oak to match the rest of his family's kitchen, I decided on tiger maple – in part because I had a lot of it, but in truth because I'm not terribly fond of oak.

And after studying the pictures of Kelly's, I also made some minor changes to the design of the plate dividers by setting mine back 1/4" from the front edge to create an additional shadow line – but more on that to come.

In addition, before drawing my plan in SketchUp, I measured the three sizes of Louisville Stoneware plates in my collection to make sure I afforded sufficient clearance for them to slide in and out of the rack, then located my fixed shelves accordingly.

It's all in the Pattern

With six sides that must be identical, I decided on pattern routing as the most efficient approach. So the first task was to create a pattern for the router bit to follow. I used 1/2" plywood because it was handy, but 1/4" plywood or MDF would work as well. Or, if you've no wish to have a pattern on hand for future builds, you could cut and fair the first side from your stock, and use that to guide the pattern bit for the remaining sides.

The sides are 11 1/4" wide at the apex of the curve and 35" in length. I cut my plywood to that size, then tapped in a nail at either end just slightly more than 5" from the back edge (the sides are 5" at the top and bottom), and one

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG FROM THE AUTHOR'S MODEL

nail just inside the edge at the apex of the curve. I then used those to hold a flexible metal rule in place while I penciled in the curve. (Note that to hit the 5" mark perfectly with my flexible rule, the nail locations were adjusted in increments until I found the sweet spot.)

After cutting close to my line on the band saw, I faired the curve using a spokeshave and sandpaper. Take the time to get your pattern as perfect as possible – how close to finished your sides are right off the router depends upon it.

With the pattern completed, process your lumber, then use the pattern to transfer the shape to the wood, registering it off the jointed edge that will become the back edge of each side. I recommend buying more wood than you need; because there is no decorative element beyond the form itself and the exposed joinery, you'll want sufficient lumber from which to choose the best-looking sides possible.

Again, it's to the band saw to cut close to your lines – about 1/8" away is ideal. Then, if you're using a bottom-mount bearing-guided pattern bit as did I, secure the pattern beneath the workpiece (I do this using a holdfast at either end, with the edge to be worked hanging off the front edge of my bench) then rout off the remaining waste moving from left to right (into the direction of the bit's rotation). Note that if you begin to experience tear-out, you may need to try climb-cutting. And if your band saw work was less than ideal and you have an excess of waste, remove it in a few passes (this will also reveal where tear-out is likely to occur) rather than hogging it all off at once.

I recommend making a few passes on a piece of scrap first to determine the speed at which both you and the machine should move; get it right and you'll have an almost finish-ready workpiece (that is, with no burns) right off the bit.

If you do get some burning, you'll need to remove it with a spokeshave (for deep burns) or sandpaper, but try not to change the shape of the edge much. If you do, however, mark that side piece to go on the far right or left of the overall build where minor variations won't be obvious.

Patternmaker. *After cutting 1/2"-thick plywood to the overall length and width of the sides, I used a flexible rule held in place around three nails to draw a fair curve for my pattern.*

Shaving fair. *A sharp spokeshave (followed by sandpaper as needed) made quick work of fairing the pattern's curve.*

Rout to shape. *Move at a steady pace as you guide the router around the pattern, and be sure to keep the base plate firmly on the workpiece.*

On to the Joinery

I considered using the Festool Domino for loose-tenon joinery to attach the sides to the tops and bottoms; that would be plenty strong. But in the end – and for the ends – I decided on dovetails for a touch of added visual interest.

Because the force – and a lot of it if you have heavy dishes – is vertical, the tails are on the sides. And so that the line at the top and bottom of the curves remained clean, I laid out half-tails at the front and back edges. I don't know about you, but I typically have half-pins at the corners when building casework, so I was sure to clearly mark the waste to avoid cutting away the wrong material.

I cut my dovetails by hand, tails first, and cope out the bulk of the waste before chiseling to my baselines. You should, of course, cut your dovetails with whatever method you prefer.

Note that while the two outside units are joined at both the top and bottom with dovetails, the center unit is open at the bottom in this design to accommodate a kitchen faucet.

After you have the dovetails cut and dry-fit, lay out the locations for the fixed shelves. And unless your dinner plates are also 11 1/4" in diameter and your salad plates are 9" in diameter, you'll need to adjust your dado locations accordingly.

Also consider any changes you may

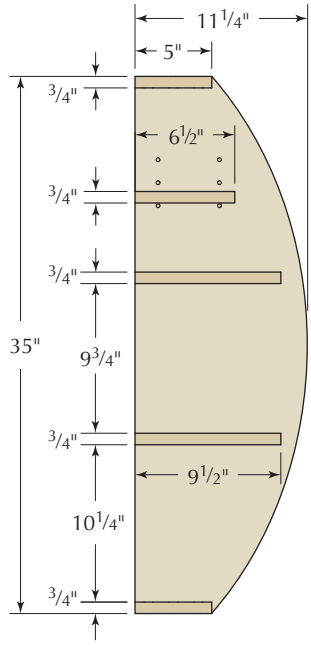
Tail board. *On this build, the side pieces get the tails, with a half-tail on either end so as not to ruin the curve on the front, and to match it at the back.*

wish to make to the divider subassemblies. With my method and dado spacing, the top and bottom of the divider subassemblies can be no more than 1/4" thick and still allow room for my dinner plates to slide in and out. If you decide on thicker material for your subassemblies, you'll need to leave sufficient space both for it and to get your plates in and out.

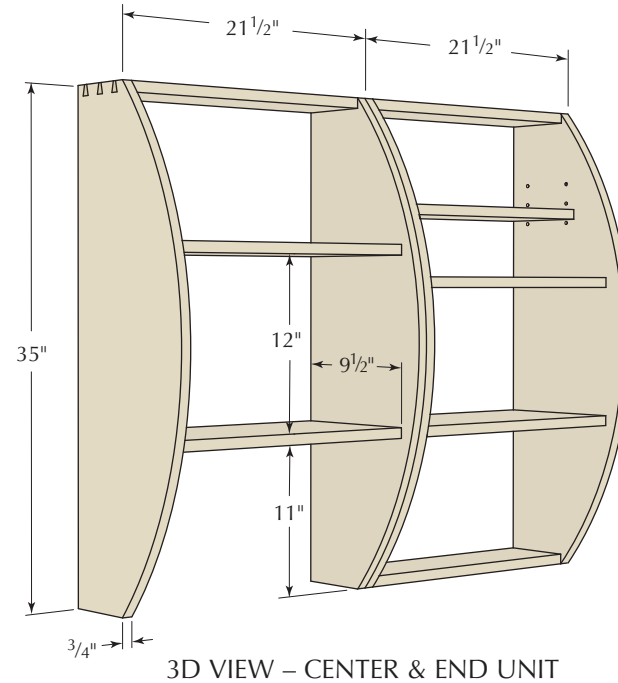
Measuring from the bottom, the locations for the 3/4"-wide stopped dados on mine are at 11" and 21 1/2" on the two outside units, and at 11" and 23 3/4" on the middle unit. Measuring from the back edge, the dados are stopped at 9 1/2". If your dado locations change, confirm that the curve at that point will accommodate a 9 1/2"-long dado; your dado length may require adjustment. I marked both the right and left edges of my dados so that I didn't have to think as much when I clamped my simple router jig in position – because the router always runs to the right of the jig, but the jig placement changes depending on if you're working on the left or right side of the case. Marking both sides of the dado makes it a no-brainer.

And if you decide to cut the dados by hand with a saw (before cleaning out the waste with a chisel), you'll need

Trust but verify. *After marking the dado locations and affixing my jig for the first cut, I ran a dado on a test piece first to confirm the depth of cut – which is 1/4".*



SECTION – END UNIT

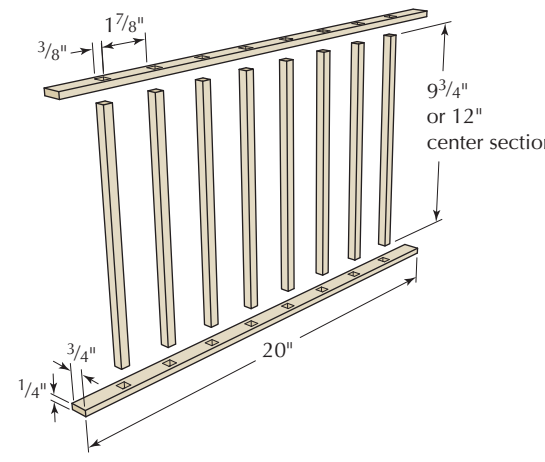


3D VIEW – CENTER & END UNIT

Plate Rack

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑ 6	Sides	3/4	11 1/4	35	Maple
❑ 5	Tops/bottoms	3/4	5	21 1/2	Maple
❑ 6	Fixed shelves	3/4	9 1/2	20h 1/2	Maple
❑ 2	Adjustable shelves	3/4	6 1/2	19 3/4*	Maple
DIVIDER SUBASSEMLIES					
❑ 12	Tops/bottoms	1/4	3/4	20	Maple
❑ 32	Short dividers	3/8	3/8	9 3/4	Maple
❑ 16	Long dividers	3/8	3/8	12	Maple

* Sized for L-shaped supports; if using spoon supports, add 3/16



DIVIDER SUBASSEMBLY

both sides marked to guide the cut.

I stopped the 3/4" straight bit just shy of 9 1/2", then used a chisel to square the end and remove the waste.

Now cut the fixed shelves to size and fit them in their dados. I processed my stock to 25/32", and after sanding up to #180 grit, the shelves fit perfectly with just a little pressure.

Mark and drill the hole locations for the moveable shelves before moving on. Commercial shelf-pin jigs are available, or you can make your own jig that registers off the top or back – but with only three locations for each of the two moveable shelves, a jig isn't strictly necessary. The holes are 1 1/2" from center to center, and start 26 1/2" from the bottom edge; they are located 1 1/2" and 5 1/2" from the back edge.

Prep Before Glue

Before glue-up, I recommend getting all the surfaces as close to ready for finish as possible. Yes, you'll no doubt get a mark or two – and some glue squeeze-out – that will need removing after your

Square 1. *Register the flat of the chisel off the flat of the end of the router cut, and rock it up to mark the remaining shoulders of the dado; try not to cross the penciled-in line of the dado's end.*

Square 2. *With the chisel's flat facing away from the waste, define the end of the mortise then chisel out the remaining waste.*

DESIGN PROCESS

The design for the dinnerware rack was carefully thought-out for function, appearance and for the particular uses and space considerations of the piece. Based on her work with British kitchen designer Johnny Grey, Nancy Hiller's prodigious kitchen-design skills once again proved enlightening. Nancy suggested that we measure each of our existing pottery pieces, glasses etc. with regard to how tall and how wide the dinnerware rack would ultimately need to be in order to accommodate the entire set.

While the sections for the plates are unchangeable, the top shelves are adjustable and thus flexible for changing uses. The dinner plates essentially provided the reference point for the depth of the piece and the apex of the curve on the side pieces so that the plates did not jut out and were firmly supported by the cross members.

Then we had to factor in the height of the primary users of this space – especially my wife, Teri, who is 5'1". Teri wanted to be able to reach the pieces used every day without having to climb up, and we still wanted to have counter space beneath the rack for other uses. We have a deep stainless steel double sink and 9" tall faucets, the space for which needed to be considered functionally and aesthetically in the design. By making the dinnerware rack in three sections, the middle section could be made to specs for the sink faucets.

We chose flexible lighting above the piece that needed to be properly spaced within the context of the height and width of the dinnerware rack, the ceiling height and positioning so as to afford good task lighting. Functionally and ergonomically, the dinnerware rack's location needed to afford convenience to its users. Therefore, proximity to the dishwasher, sink and to eating areas was considered in the placement and capacity of the piece.

Last of all, we realized that the dinnerware rack would be a focal point, so visual appeal and proportion were important. We wanted a fun alternative to the usual rectangular cabinets, but we wanted the piece to blend in with the other cabinetry and not overwhelm the space. Plus, the piece needed be both interesting and not look odd or out of place in our 93-year-old log home.

The clear finish was dictated by wanting to show the grain of the quartersawn white oak on the edges and sides, and we added small splashes of color on the curved edges from local potter and artist Teresa Cole whose graceful and colorful painted, stemmed flowers (inset) provided a unique visual touch in a subtle yet, we think, interesting way. — Kelly Mehler

"Recognizing the need is the primary condition for design."

—Charles Eames (1907-1978), American furniture designer and artist

units come out of clamps, but it's a lot easier to plane or sand with everything flat on your bench.

While I'd typically turn to my No. 4 for this task, the curly maple I chose wasn't having it – so I pulled out the random-orbit sander. (That experience might dictate my wood selection in the future; sanding all the pieces was the only part of building this project that I didn't enjoy.)

With your parts prepped, place one side piece dado-side up on your bench, spread glue on the matching pins and slide them home. Now insert your fixed shelves into their respective dados, put glue on the still-exposed pins of the top and bottom, then slide the other side piece in place. (It helps to have someone on hand to help guide the second end of the shelves into place as you seat the side). Clamp it up and set it aside to dry, then repeat until all three units are assembled.

Before the center unit comes out of the clamps, countersink two screws through each side into the bottom fixed shelf, because there's no bottom dovetailed piece holding it together. It's your choice whether or not to plug the holes and cover the screws – if you're hanging all three units as shown, the screws will never be seen.

I think this plate rack would also make a nice set of contemporary hanging bookshelves – and if I went that route, I'd build each unit with a shelf across the bottom, because there would be no need to make room for a faucet.

And if you're pleased with the open shelf concept, after sanding the moveable shelves, you're ready for finish. If not, see "Divider Subassemblies" to make the inserts before applying your finish – you'll need finish on those, too.

A Simple Finish

For the finish, I decided on a few coats of sprayed lacquer with a satin sheen, with a light sanding between coats. I sanded with a #600-grit block after the final coat for a silky-smooth feel.

The striped grain in the maple imparts a subtle and pleasing chatoyance – but without overwhelming the eye – as you move around the piece and view it from different angles. That allows the wood to whisper while the form sings. **PWM**

Megan is the editor of this magazine. She can be reached at 513-531-2690 x11348 or megan.fitzpatrick@fwmedia.com

DIVIDER SUBASSEMBLIES

I've not yet determined if I'll be using this piece in my kitchen. At the moment, there's no space for it – but if I decide to tear out and replace my current (and careworn) cabinets, I'll fit this into the plan. And if not, I have ample need for bookshelves. So, instead of fully integrating the dividers into the build as did Kelly Mehler, I decided to make six subassemblies that are slip-fit and pinned in place, but easily removed.

I didn't leave myself much wiggle room; the top and bottom pieces could be no more than 1/4" in thickness and still allow me to slip plates in and out. And with a piece that thin, how could I attach the dividers? I decided to use my favorite machine, the mortiser, to cut square holes in the top and bottom pieces. I walked off the hole locations with dividers, and plunged through wood wide enough to make six pieces (plus a saw kerf for each) at once. Then I simply cut the 3/8"-square dividers to length for a snug top-to-bottom fit, and pushed them into the shallow holes until they bottomed out.

I tapped each subassembly in place, with the front units 1/4" back from the front shelf edge, and the back units adjusted in no less than 1" both to hold the plates and to allow room for a cleat under the back of the top fixed shelves to help secure the carcase to the wall. — MF

Six at one plunge. *I chose a piece of wood wide enough so that I could cut the eight holes for the dividers through at least six top and bottom pieces simultaneously, then rip them off at the table saw.*

Slip fit. *Cut the dividers to length for a snug fit between the fixed shelves.*

Little ladder. *Slide the dividers into the holes in the top and bottom pieces, and you get little ladders – six of them in my case.*

ONLINE EXTRAS

For links to all online extras, go to:

- popularwoodworking.com/dec13

WEB SITE: *See more of Nancy Hiller's kitchen design and furniture work at the NR Hiller Design site.*

ARTICLE: *Read about Kelly Mehler's woodworking school in Berea, Ky.*

IN OUR STORE: *"The Complete Kitchen Cabinetmaker," by Robert W. Lang.*

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Tools from Down Under

BY CHRISTOPHER SCHWARZ

Chris Vesper strives for precision and perfection in toolmaking (and dancing).

When it comes to settling the issue of who is the most dedicated toolmaker on the planet, Chris Vesper has the plumbing – or rather, the lack of it – as proof of his single-minded love of the craft.

Several years ago, Chris built his 12 x 8-meter shop and home on the land behind his parents' house in rural Somerville, Australia. After carving out space for his extensive collection of machinery, a bedroom and kitchen, he had to make a choice: Should he make space for his tool collection or should he build a bathroom instead?

Smiling, Chris pulls open a huge metal drawer filled with the largest collection of unusual chipbreakers and irons I have ever seen. Above that drawer are stacks of vintage and rare hand tools he studies. Behind is his collection of rare books and his prototypes.

Yup, the tool collection won.

So Chris takes showers at his parents' house. When visitors arrive, he shows them the particular trees where it's good to do your business.

"Just wave to the neighbors if you see them," he says.

Among all of the passionate toolmakers working today, few can match Chris for his intensity, his attention to detail and his insistence on doing every operation himself. His demeanor has earned him a reputation as somewhat of an outlier.

When I first arrived in Melbourne, Australia, one of the woodworkers I met asked me: "Have you met our very odd Mr. Chris Vesper?"

The funny thing is that while Chris is an incredibly focused person, he also has a genial side that few of his customers see. He loves salsa and ballroom dancing – in public and with groups of people.

"I'm aware I'm pedantic," he says with a laugh. "But I'm pedantic with my tools, and I keep a clean workshop. I wash my car only once a year, and there are times when I let the dishes pile up. I focus my fussiness on what I want to do."

Indeed, after spending a couple days with Chris in his workshop, you can see that he is more than just a talented machinist. In his own shop, he is completely at ease, moving around with surprising fluidity amongst his surface grinders, milling machines, metal lathes and workbenches (it is a bit like dancing).

He cooks a mean breakfast, is still unmarried and has an eye for the women at coffee shops.

But when the conversation turns to tools and his machines, he is all business and precision and microns.

Most of the machinery he uses to make his bevels, squares, marking knives and other tools was purchased

In his element. *Chris Vesper's small shop and home are filled completely with old tools, his machinery and his book collection.*

PHOTOS BY THE AUTHOR

used and restored by Chris to factory-new. For many years, he poured all the profits from his business into his machinery and tool collection.

As a result, he has machines that few individual toolmakers own – including several large surface grinders, a large milling machine, hardness testers, a Mitutoyo profile projector for part inspection, a laser engraver, a Feeler toolroom lathe – and the list goes on.

The results of the machinery and Chris' training pretty much speak for themselves. His sliding bevels are, in my opinion, without equal. They lock tighter than any bevel I've ever used. The fit and finish of the parts is top shelf (or perhaps the shelf above the top shelf). And his metal try squares are good enough to be used for precision toolmaking, as well as woodworking.

He checks every square on an ingenious apparatus he built himself in 2011 called "The General," which remains under a cover most of the time to protect it from dust. The most accurate squares he makes are accurate within 10 microns. (For reference, a human hair is .0035"; a micron is .000039".) These squares are labeled "A+" and are used by other toolmakers and woodworkers who are demanding (read: engineers).

> "Intelligence is the faculty of making artificial objects, especially tools to make tools."
>
> —*Henri Berson (1859-1941), French philosopher*

While some woodworkers gritch about the prices he charges for his tools – a 7" sliding bevel can run about $239 – I always say: compared to what? There's really nothing else out there that can compete with his bevel.

Chris has carved out an incredible little world for himself, both in the woodworking world and in his parents' backyard. You have to ask: Where did this guy come from?

Two Apprenticeships

Chris started as a self-taught woodworker at age 15 who couldn't afford his own tools. He wanted to become a full-time furniture maker, so he decided to make his own tools, including a mortise gauge, a cutting gauge and some planes.

At school, he took the woodworking classes that were offered, but he was too young to use the machinery, except the lathe and the disc sander. Plus all the tools were dull.

After finishing school, Chris got an apprenticeship as a fitter and a turner, but he completed only two years of the four-year program.

"My competitive and perfectionist nature really stressed me out," he said.

So he took a cabinetmaking apprenticeship for a while and left that after nearly two years to work in the trade for other people. It became apparent that he wasn't ever going to be promoted in these shops and Chris says he was tired of working for other people.

"I can remember the time after leaving my last job when I got down to my last $5," he says. "Scary."

He began his business, Vesper Tools,

Showing up. *Chris attends woodworking shows both in the United States and Australia, such as this weekend show in Melbourne, Australia, in 2013.*

Ready for assembly. *Here are some engraved parts for bevel squares, ready for assembly.*

Miller at work. *Chris mills the bed of one of his customer's planes during a workshop in March.*

in 1998 and started by making marking gauges and carving knives, which he sold at Australian woodworking shows. A few years later he started making his current crop of sliding bevels after seeing a 19th-century patent drawing for a bevel with a tough butt-locking mechanism.

Chris even made a few infill shoulder planes for customers. I saw two of them while visiting Australia – they're beautiful – but he doesn't plan on making more.

He doesn't have any employees and he makes every tool himself. The process begins behind his shed in one of the two giant metal containers parked there (by the "bathroom"). One container is filled with vintage machinery he plans to restore, including an old printing press. The other container is filled with wood. Stacks and stacks of the gorgeous and difficult woods he uses to make his tools – Tasmanian blackwood, ringed gidgee, conkerberry and black red gum.

The wood is slabbed up on his 1870s Western & Co. Darby & London band saw (nicknamed the "bandosawrus"). And then he gets to work on the metal parts with the milling machine and surface grinders.

When the tools are complete, they are stored in the "panic room," a climate-controlled room upstairs that also could have been a decent bathroom. He sells his tools direct to his customers for the most part through his web site and at woodworking shows.

It's a full life – building tools, selling them and filling in the spare moments with dancing, collecting old books, music and cooking. What more could he ask for?

"I would like to be married," says Chris, who is 33. "Finding the right girlfriend has been tough."

Fixing that problem won't require a new milling machine or demagnetizer, but it just might require some additional plumbing at Vesper world headquarters. **PWM**

Chris is the editor of Lost Art Press and the author of the forthcoming book "Campaign Furniture."

For turning parts. *One of the more impressive machines on Chris' shop floor is his Feeler toolroom lathe (left) and the chucks he has collected for it (right).*

Early work. *Chris used to make this infill shoulder plane for sale. Now he concentrates on his marking and measuring tools.*

And in this drawer. *Chis is a tool collector, user and maker. His collection of blades and chipbreakers is impressive.*

'The General.' *Every try square Chris makes is checked for accuracy on this device, called "The General," which Chris made.*

World headquarters. *Chris built his workshop and home in the back yard of his parents' home in Australia.*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec13**

BLOG: *Read about an inadvertent drop test to discover how durable Vesper Tools are.*

BLOG: *Read about a plane-tuning workshop at Chris Vesper's shop.*

WEB SITE: *Visit the Vesper Tools web site and read the maker's tool blog.*

TO BUY: *Vesper Tools are available at the Roswell, Ga., Woodcraft.*

IN OUR STORE: *"Build a Custom Backsaw with Matt Cianci" on DVD.*

Our products are available online at:

- **ShopWoodworking.com**

Turn a *Platter*

BY STEVE SHANESY

Shop scraps and a few simple techniques will get you spinning along.

Large turning projects can be daunting. A large bowl, for example, requires gluing up a blank or sourcing part of a tree trunk. When first mounted on the lathe, such stock can be off balance and result in so much vibration that the lathe may start to walk across the shop floor.

Platters are a great alternative to bowls. They can be made as large as your lathe capacity allows so their size can look impressive, plus you can use kiln-dried lumber so your turning blank can be laid out and machined to keep it in better balance when you turn on the lathe. And chances are you already have leftover wide lumber on hand from past projects.

The skills required to turn platters range from beginner to advanced; the difference is the shape and the level of detail you add to your turning.

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR

Dead center. *The face plate is carefully positioned in the center of the top side of the turning blank and attached with #10 screws.*

Double strength. *While the face plate primarily holds the work, bring up the tailstock on the outboard side. Because you'll be leveraging pressure when truing the rim and face of the work, the extra holding power of the live center adds another measure of safety.*

> "If you would know strength and patience, welcome the company of trees."
>
> —*Hal Borland (1900-1978), American author*

The walnut platter I made is about 14" in diameter and the blank was about 1 1/2" thick. As for the turning skills required, this piece falls in the relatively easy range. I used only four turning tools to make it: a round-nosed scraper, a 1/16" parting tool, a small spindle gouge and a 1/2" bowl gouge with a swept back "fingernail" grind on the cutting edge. This last one did nearly all the material removal and final shaping.

Workholding Strategy

When turning spindles, holding the work is straightforward. The blank is mounted between the drive center on the headstock and live center on the tailstock. With platters (and bowls), you need a different workholding strategy because at least once during the turning process the work is removed then remounted with it flipped in the opposite direction.

A common strategy is to hold the stock with screws and a face plate mounted on the lathe headstock. The face plate is usually fastened to the intended top of the work. That's because you typically remove enough material from this side to eliminate the screw holes. The live center is often used to help hold and stabilize the work while the initial outside shape is roughed out.

With the bottom of the work outboard (facing the tailstock), preparations are made for holding the piece when it's reversed, so you can work on the turning's face. Usually, the work is remounted and held by a four-jaw scroll chuck. These chucks are mounted on the headstock and have a variety of jaws that clamp the work securely.

Start Turning

With your platter blank cut close to round on the band saw and the face plate secured in the center of the blank's top, mount the work on the lathe's headstock. The face plate screws on to the threaded spindle. For extra holding power, bring up the live center to further secure the work. I always use a live center until the last minute before I need to turn away the place where it contacts the work.

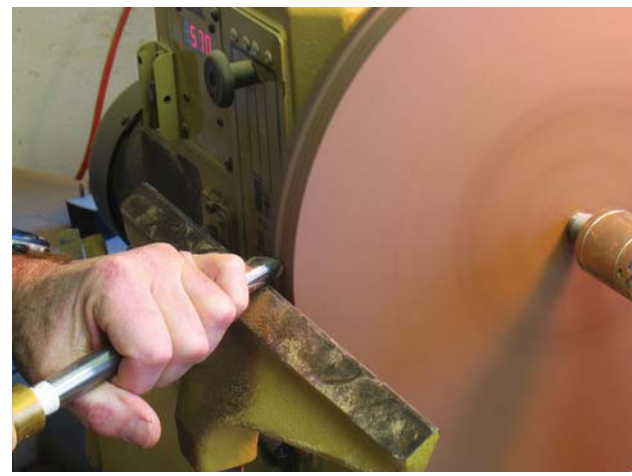
Set the height of the tool rest to just below the center of the work, and perpendicular and as close to the blank as possible. (Turn the work by hand to make sure the blank clears the tool rest all the way around.)

Start the lathe on slow speed while standing to one side of the work. It's a good safety precaution should the work somehow be thrown from the lathe. Slowly increase the lathe speed to a medium-slow range. Start cutting the blank using the bowl gouge to make the perimeter a true circle. This will help balance the piece. The cut starts on the face of the blank and continues across the thickness. Use the tip of the cutting edge placed at about 90° to the face. The objective is to create a shoulder for the bevel of the cutting edge to ride against, which supports the tool for the rest of the cut.

To avoid blowing out the grain as you exit the cut, stop just before you reach the opposite face. Then start a second cut from the backside. You may need to repeat these cuts until you have a truly round blank.

Shape the Bottom

Turning the bottom of the platter is a rather simple matter. There are just three things to accomplish: Form the



Round up. *The first turning task is making the blank truly round. With the lathe set to about 500 rpm and the tool rest close to the work, make the cut with a bowl gouge across the thickness of the blank.*

A bit on edge. *To turn the edge profile make a series of cuts pulling the bowl gouge from inside to out. The tool is rolled over on its edge while making these cuts.*

Just hold it. *I use a 1/16" parting tool to establish the perimeter of the chuck recess on the platter's bottom. I also use the tool to make the edge profile match the dovetail shape of the chuck jaws after the recess is hollowed.*

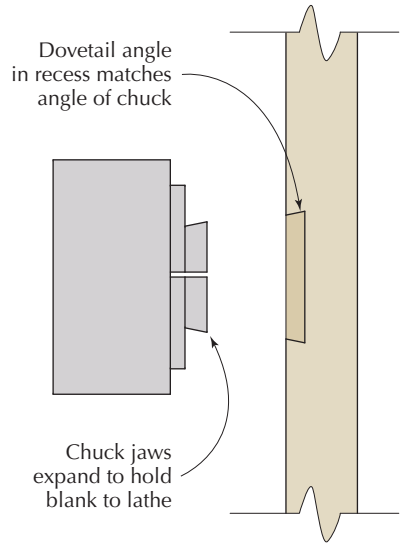
outside edge profile, keep a large portion of the bottom flat so the platter doesn't tip when in use, and turn a slight recess in the center to hold the work with the chuck when it is reversed to shape the opposite face.

I start by turning the edge profile. This is done making a series of cuts at the platter's perimeter. Began by taking material away close to the edge with the bowl gouge, then make another cut a bit farther in and so on. Once I have the basic shape with the edge thinned to where I want it, I begin to refine the shape taking shallow cuts until I arrive at a flowing, fair curve that's free of any tear-out.

With the edge profile done, begin turning the rest of the bottom. Make a few light cuts starting close to the center, pulling the gouge toward the outside. Take only as much material as is needed to flatten the bottom with a seamless transition to the edge profile.

The remaining work on the bottom is near the center of the platter, so you can now safely move the tailstock out of the way. To finish up this side of the platter, turn the dovetail-shaped shallow recess you'll need to hold the work when it's reversed (see the illustration at right above). My chuck jaws are about 2 1/2" in diameter when fully closed, so I cut my recess to 2 5/8".

I cut the recess to a depth of about 3/16" using a thin parting tool. Next, I remove most of the waste with the bowl gouge, then switch to a small spindle gouge to remove material near the recess perimeter. The dovetail profile is cut with the parting tool held at an angle, then I use a spindle gouge to remove the last bit of waste in the corner.



Chuck it in there. *A four-jaw scroll chuck holds the work by clamping the jaws on a tenon turned on the work or by expanding the jaws into a round mortise in the piece.*

To finish the bottom, sand it while it's still mounted on the face plate and easy to access. Depending on how sharp your turning tools are and your ability to cut cleanly, you might begin sanding with #150-grit sandpaper – but if you have tear-out you may need to drop back to #100 grit.

I use an angle drill with a soft, spongy pad for sanding while the work is still on the lathe. If your lathe has a reverse-direction feature, sand with the lathe running in reverse at a relatively slow speed. Progress through the sanding grits up to #220 or #340.

Reverse & Turn the Front

Remove the face plate and mount the chuck on the spindle. Mount the platter on the chuck jaws and expand them until the chuck loosely holds the work. Next bring up the live center on the tailstock and apply medium pressure to the platter. Now you can fully tighten the jaws of the chuck and the live center.

Turning the platter's front is similar to turning the back. Start by making sure the outside 3" are flat using the bowl gouge. You likely won't need to remove much material. You'll also want

Reverse direction. *To work on the platter front, reverse it on the lathe and secure it with the scroll chuck on the bottom and the live center on the front.*

to make sure your final cuts leave a surface free of tear-out because once you cut the small groove details on the rim, you won't need to work this area until sanding.

Cut the grooves with the narrow parting tool to a depth of about 1/8". The first one is about 3/8" from the outside edge. The width of the rim is 2 1/2". The innermost groove is 1/4" from where the dishing starts and the third groove is spaced 3/8" from it.

Dish it Out

Carve the waste to lower the center field of the platter by making a series of cuts with the bowl gouge from the center toward the rim. For now, stop a bit short of the rim and don't worry about the transition to it.

As the dishing begins to form the face of the platter, establish the transition point between the rim and the dished area – but you needn't perfect the shape of the transition until the dishing is completed. If your blank started like mine did at 1 1/2" thick, you'll lower the center field about 5/8" to cut slightly deeper than the screw holes that held the face plate. It's best to take even amounts of material on each pass while dishing out the center; this will help keep the area flat.

With the center sufficiently lowered, work on the transition between the rim and central field. This is an important profile detail that, to look good, needs to be a fair curve. And if you don't cut the radius deep enough where it starts at the inside edge of the rim, the profile will look too weak. Make the cut with the bowl gouge starting on the rim and cutting downhill toward the lowered area. Remember to start the cut with the tool's tip held about 90° to the rim to establish a shoulder for the tool to ride against. But be careful – the tool can dig in and pinwheel across the rim, ruining the piece.

With all the heavier cutting near the outside of the platter done, pull the tailstock back and pare away the nub left in the center. Find the center with the tip of the bowl gouge and peel it away in a series of cuts, but leave it a bit high off the surface. Then switch to a round-nose scraper and take small cuts until the nub is removed and the bottom is flat.

Dish it out. *The central field of the platter's face is lowered using the bowl gouge. Make a series of cuts pulling the tool from the center toward the rim. I take about a 1/16" deep cut on each pass.*

Down to the nub. *Carve away the nub where the live center in the tailstock held the platter. To start the cut, the tip of the gouge must be at dead center on the work or else the tool will spin right off.*

Sand & Finish

Take your time sanding the platter face – it's the face at which people will be looking. So be careful when power sanding to avoid rounding over details that should remain crisp, such as the inside and outside edges of the rim. Start with #150 grit and progress up to #320, removing the scratches from each previous grit before moving on.

I simply used a couple applications of linseed oil on my walnut platter. Your finish choice will depend on how you plan to use your platter. If it's for display and decoration only, a nice polyurethane or lacquer finish would be a good choice – and if you follow this route, grain-filling the walnut (or any other open-pored wood) enhances your work. If you plan to put your platter in service, a non-toxic oil finish is the better choice (and wait until the oil is fully cured before allowing any food to contact it).

Whether you plan to use your platter for serving guests hors' d'œuvre or plan to make a few of them as holiday gifts, this simple project is sure to impress. **PWM**

Steve is the former editor then publisher of Popular Woodworking Magazine*; he retired in early 2013 to spend more time in his own shop.*

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Pick the Perfect Lock

The key to selection is knowing the terminology and how a lock works.

Locks protect our worldly goods from outsiders who wish to take those goods from us. In earlier days, the use of furniture locks had a somewhat different purpose.

It used to amaze me that spice box doors had locks. Sure, spices were expensive in the past, but a party intent on absconding with your spices could just as easily walk away with the entire box.

When I learned that servants would pinch the spices, or nip from the sugar stash, I better understood the use of locks back in the day.

In almost any hardware catalog, there can easily be several pages of locks shown. As you thumb through the choices, you could get the idea that there are many types from which to choose. All furniture locks, however, fit into one of three primary types: full-mortise, half-mortise and surface-mounted (these can be plain or fancy).

Within those three types, there are a few different designs: locks for desk lids, drawer and door locks and box and chest locks.

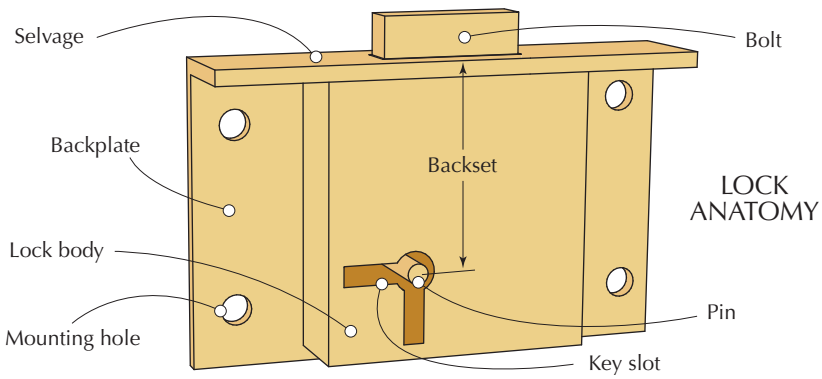
Unlock the Lexicon

Before we delve into designs, you should become familiar with terms used in lock-speak. There are only a handful, and knowing these is a great place to start. But keep in mind that these terms are evolving and are different from company to company – and even among our editors.

Full-mortise lock. The body of this lock is housed within the walls of your project. It was seldom used prior to the introduction of power tools because they make it easier to cut the narrow and deep mortises. When installed, it does not show except for the selvage.

Selvage. This is one term that's big on evolution. To some woodworkers and lock companies, selvage refers to the edge of a lock through which the bolt extends (this is the definition I use in this article). To other lock aficionados it's the distance from the top edge of the lock to the center of the pin. Selvage is found on full-mortise and half-mortise locks, but not on the surface-mounted style. (By the way, "selvage" and "selvedge" are both accepted spellings.)

Bolt. In door and drawer locks, it's a rectangular piece that extends into the furniture to hold the item secure. In a chest or box lock, it's the main lever



Distinct difference. *The lock body of a full-mortise lock differs greatly from the half-mortise style – no plate is common, but the centered keyhole is not.*

CONTINUED ON PAGE 54

LEAD PHOTO BY AL PARRISH, CRAB-LOCK PHOTO BY CHRISTOPHER SCHWARZ; LOCK INTERIOR PHOTOS BY PABLO ALVARADO; ILLUSTRATION BY ROBERT W. LANG FROM AUTHOR'S DRAWING & OTHER LOCK PHOTOS BY AUTHOR

CONTINUED FROM PAGE 52

inside the lock body that slips from side to side to catch the strike.

Strike. This piece is attached to the lid of boxes and chests. It generally has short protrusions on which the main lever catches. A strike used with drawer and door locks (no protrusions) helps to reduce wear on the furniture from the constant sliding of the bolt.

Half-mortise lock. These locks were often used on period furniture from the 18th and early 19th centuries. The selvage and backplate of half-mortise locks are set flush with a workpiece's surface. The lock's body is mortised into the workpiece and a keyhole is cut in from the front face of the workpiece. (This design was well-suited for

INSIDE A HALF-MORTISE LOCK

Take a quick look at the furniture you have around your home. You'll see plenty of drawers and doors that have keenly shaped or inlaid escutcheons – but what sits behind those fancy fronts? It may be nothing at all, or it could be a lock – hardware used to secure hidden contents from those wanting to take possession of said goods.

We have the desire to protect what is ours, so we rely on locks. But do you know how locks actually work? I've installed many half-mortise locks during my tenure as a woodworker, but I never took the time to delve into what makes a lock latch. When the locks arrive from my supplier, the bodies are intact and they are ready to be installed. There is no need to dismantle the hardware.

But curiosity got the best one me one day. Instead of prying apart one of my locks, however, I asked Orion Henderson, of Horton Brasses (horton-brasses.com), about the inner workings. He graciously supplied information and photos explaining how locks work.

The inside of a furniture lock – a chest or box lock in this case – begins with the backplate and three positioned pins, as well as a pin to exactly locate the key. The first part assembled to the backplate is the main lever – it's sometimes referred to as the bolt. (On a chest lock the main lever slides from side to side to catch the strike, but on a drawer or door lock the bolt extends through the selvage.)

The next piece to join the assembly is a runner. This small U-shaped (in this case) piece of hardware guides the travel of the main lever. In some locks there may be more than one runner. (A second runner is just a spacer or filler to replace an extra lever.)

The last pieces installed inside a lock body are the levers. Each lever is spring-loaded. This keeps pressure on the lever until a turn of the key moves the part enough so that the main lever (aided by the key turn) is allowed to slide to the opposing position – opened to locked or vice versa. Single-lever locks, the most basic of furniture locks, are the smoothest in operation and the easiest to pick. . . if you're inclined to do so. The more levers used in a lock, the more difficult it is to pick that lock. I've seen photos of locks with as many as eight levers.

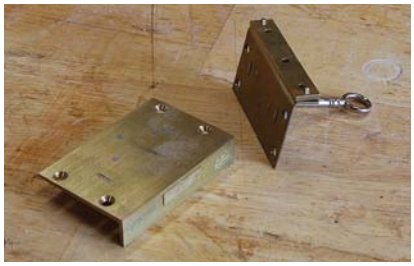
If you look closely at the photos below, you'll notice that the "obstacles" on the two levers (center protrusions extending from top) vary in height. These protrusions affect how the lock opens and dictate the shape or design of the key. Change the levers (or even the order of the levers) and you change the key needed to open that lock.

How a traditional furniture lock works – shown as steps in the photos below – is just as interesting as the parts inside. The key slips over the pin and as it turns, notches cut in the key lift the levers. When a clear path opens (no obstacles), the main lever, as pictured in this chest lock, is allowed to slip to one side. (In other lock designs, the bolt extends from or recedes into the lock body.) After the key is completely turned, the spring-action of the levers pushes them back down, fixing the lock in its selected position. —GH

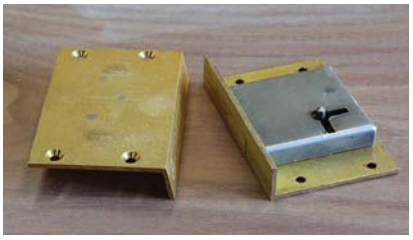
Ready to engage. *With the main lever set under the openings in the selvage, the key is positioned to unlock or open the lock.*

Lifted lever. *At mid-turn, the key has engaged the levers and begins to clear the path to a fully unlocked position.*

Mission completed. *The main lever has slid to the unlocked position. The spring pushes the levers down to hold the lock open.*



One style, two designs. *These are both half-mortise locks. The left-hand lock is for a drawer or door and the right-hand hardware is a chest lock.*



How's it different? *The slight variation that transforms a standard half-mortise lock into a desk lock is the angled selvage. (A standard half-mortise lock can also be used to secure items in your desk.)*

It takes three. *Chest or box locks come with a third part, a strike. Protrusions on the strike become engaged with the lock's main lever to secure your valuables.*

those working wood before the advent of power tools.)

Backplate. This is the face of the lock, which is typically screwed to the workpiece. The body of the lock is attached to the backplate.

Lock body. The body holds the interior workings of a lock.

Keyhole. As the name implies, this is the workpiece hole through which the key slips over the pin. Often, the keyhole is not centered in the body, so this has to be considered when installing a lock. The keyhole also determines the distance to the pin, or backset.

Backset. This is the most critical measurement when replacing or installing locks; it's the distance between the selvage and the center of the pin.

Surface-mounted locks. The easiest-to-install locks are of this design. There is no mortising, fitting or cutting required. The lock simply screws to the back of the drawer, door or chest wall. On many of these locks, the bolt can be thrown to either side depending on which direction you turn the key.

Simple, not plain. *This crab lock is surface mounted. It is the easiest type of lock to install; nonetheless, they can be extremely decorative.*

The bolt engages behind the adjacent woodwork to secure the drawer, door or lid. On antique furniture, these locks were more often found on country-style pieces.

Lock Designs

Desk-lid locks are the easiest to cover because these locks have one attribute that pushes them into a stand-alone group: Desk-lid locks have an angled selvage greater than 90°. These locks work with an angled profile on the rabbeted edge of the desk lid that some woodworkers use to better allow for seasonal adjustments of the lid. Often, however, half-mortise locks with a 90° selvage are used on desk lids.

Door and drawer locks, whether they are of the full-mortise or half-mortise type, most often have dual key slots (which means there are two openings set at 90° to each other) in the body. This allows the lock to be used when set horizontal as in a drawer lock, or vertical as when used for doors. Note: While some locks are "unhanded," or can be used in any door application, most locks are one hand or the other. It's best to decide whether your door is a right-hand or left-hand design to correctly order locks – companies differ in how doors are handed, so check with the supplier before ordering.

Chest and box locks are the odd ducks of locks. While other locks have bolts that slip into mortises or behind adjacent stiles or frames, these locks require the use of a strike to lock secure – and they have only one key slot, or orientation. Chest and box locks are installed horizontally.

The strike, as well as the lock itself, should be set flush with the workpiece.

How to Choose

Each of these lock styles and designs are available in many different sizes. Choose a style that best fits your woodworking abilities and available tools, then look to the period of work if your project is a reproduction. Also take into consideration your keyhole location and escutcheon. Placement of the escutcheon can dictate your lock size – you'll need to match the distance to the pin with the escutcheon location.

Protecting your spices is no longer a primary concern. But if you have something to lock in or someone to lock out, there is a lock for the task. **PWM**

Glen locked up the position as managing editor of this magazine in February 2013. He can be reached at glen.huey@fwmedia.com.

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Choose Your Woods Wisely

Materials matter more when it comes to hand tools.

As a result of the inherent beauty in the material, for some of today's woodworkers, visual appeal is the primary consideration in construction. That's because most machines can more easily overcome a board's physical properties than a person using hand tools. Modern machinery has taken a good deal of the physical labor out of woodworking, and in many cases, has permitted the use of woods that traditionally would have been used for heat rather than woodwork.

As a student of traditional woodcraft, I was drawn away from the machines that I grew up and learned the craft with, and toward using traditional hand tools. However, to learn to effectively use my hand tools, I had to really learn about wood – something I hadn't much concerned myself with before. Even if you aren't into period furniture and woodwork, if you have any interest at all in hand work you'll find it's important to become a student of the material itself (and it's a lesson from which every woodworker can benefit).

Looks are secondary. *Woods weren't traditionally chosen just for appearance. Application and workability were important considerations as well.*

Period Lumber

Studying period woodwork is a good introduction to selecting woods for hand work. Much of the furniture through the beginning of the Industrial Revolution was made using a relatively small variety of wood species. Interestingly, certain woods were used frequently for some items, but were avoided in others.

As a result of working only with tools similar to those that were used at the time these items were made, I have a theory as to why this was so.

While regional availability certainly influenced the woods that were used, our ancestors weren't limited to local woods. Mahogany, imported from the Caribbean region, was one of the most popular woods used in period furniture. At the same time, we don't typically see certain domestic woods used in furniture. Elm, hickory, ash and, after the 17th century, oak were rarely used in furniture, except in certain, limited applications.

Aesthetic tastes of the time played a role in the woods used to make furniture, however, another important consideration was the workability of certain species. If you use hand tools at all and have tried to use any of the dry, harder or highly figured species, you already understand why these woods were often thrown in the fireplace rather than used in the woodwork that surrounded it. Maple, hickory and elm are simply more effort to work by hand.

Chop chop. *Hickory was a traditional choice for axe handles due to its natural springiness, strength-to-weight ratio and ease of riving when it's green.*

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PHOTOS BY THE AUTHOR

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Work wet. *Woods such as this red oak are a joy to work with when they're straight grained and green, but become much more difficult to work with once they dry.*

Plane truth. *For tall, lightweight casework, woods such as mahogany, cherry and walnut were favored not just for their looks, but also because they work much easier when they're dry. Here, I'm working with air-dried walnut.*

To overcome this, different strategies were employed.

Methods Matter

The harder species were used, but they were typically used only in specific situations. Take, for example, the oaks. The majority of the oak we see in period furniture is used in applications where it can be worked green. That's because woods such as oak, ash and hickory are much easier to work with when they're wet. They split easier, they plane easier and they can be turned into lumber easier by riving instead of sawing. Much of the furniture in the 17th century was made of oak because it was much less effort to build those types of pieces with green wood that rives easily.

Toward the end of the 17th and into the 18th century, the trend moved toward lighter, taller case furniture. This new form created a problem, though. Woods that were traditionally used for their ease of riving and working when green made for tall, large casework that was quite heavy. To make things lighter, case sides began to be made from thin, solid panels instead of bulky, heavy frame-and-panel construction. The dovetail joint, which was employed rather infrequently prior to the 18th century, allowed for strong casework that could be tall but still lightweight.

At the same time, sawn boards began to replace riven stock. Riving an 18"-wide board requires a log of 40" or more in diameter. Sawn boards of that size can be gotten from trees half as big. However, sawn boards tend to cup much more than riven stock during drying, so the solution is to saw the boards and then thoroughly dry them before planing them flat. But dry oak is much harder to work, so mahogany, walnut and cherry, which are much easier to work when they're dry (and lighter than oak), became all the rage. Also, except in certain regional cases, pine, cedar and poplar (which are even easier to work, and therefore less expensive) began to be used as secondary woods and for less expensive casework.

Learning from the Old Guys

Our ancestors did everything by hand because they had no other way. However, they found ways to make their work as efficient as possible. Part of doing so was choosing their materials carefully based upon the application.

We can learn from our predecessors by looking beyond aesthetics and choosing woods to suit a particular function and style of work. I make it a point to almost never buy wood unless I have a specific application in mind. Tough, springy woods such as oak, hickory and ash work easiest when they're green and make great tool handles and riven chair parts.

Less dense woods, on the other hand, including cherry, mahogany, walnut, poplar and pine, work nicely when they're dry and are great for casework, but they are not the best choice for high-stress applications.

If you prefer dense, highly figured, dry hardwoods, you may experience some frustration with hand tools. Very light cuts and sharp tools are a must, and it will still be slow going. If you can, try to work these varieties while they're green.

So don't consider appearance only; think about the application and the construction before you buy. **PWM**

Bob has been building furniture for two decades and now works entirely by hand. Read his blog and listen to his podcast at logancabinetshoppe.com

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BLOG: *Read Bob Rozaieski's hand-tool blog.*

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About This Column

ARTS & Mysteries

Bob Rozaieski of Logan Cabinet Shoppe is taking the Arts & Mysteries reins for Adam Cherubini for several issues. "Arts & Mysteries" refers to the contract between an apprentice and master – the 18th-century master was contractually obligated to teach apprentices trade secrets of a given craft (and the apprentice was expected to preserve those "mysteries").

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Fish Eye & Silicone

The truth behind craters and ridges.

If your finishing career has been limited to finishing projects you have made, you may never have experienced fish eye. But if you have done much refinishing, especially of furniture, you have surely seen fish eye.

Fish eye is the finish crawling up to form moon-like craters or ridges within seconds of your having brushed or sprayed a coat of finish. You can actually see the finish move. The cause is almost always silicone contamination, so the first thing to understand is silicone and how it gets on furniture.

Polishes. *Most aerosol furniture polishes and some non-aerosols contain silicone along with petroleum distillates. These polishes are popular because they add shine, depth and scratch resistance for weeks at a time.*

Silicone

Silicone is a synthetic material made from silicon (sand), oxygen, carbon, hydrogen and additional elements to make a liquid, gel, resin or hard plastic. You are surely familiar with silicone caulk, and you may have heard of silicone breast implants.

It's the liquid silicone that we're concerned with here because many furniture polishes, especially those packaged in aerosols, contain silicone. It's a very slick oil, noticeably slicker than mineral oil if you compare by putting a drop between your thumb and finger and rub them together. It's also totally inert, so it doesn't damage anything.

If the silicone gets through a finish and into the wood – through a crack or rub through, for example – it will get in the pores and create a very slick area with such a low surface tension that most new finishes will pull away. This is what causes fish eyes.

Fish eyes can also occur on new wood projects. For example, you could be using a hand lotion that contains silicone, or you could have sprayed a silicone furniture polish or lubricant near the wood you're finishing.

Silicone & Refinishing

When I began refinishing furniture in the mid-1970s, I encountered fish eye, of course. I was told by other refinishers, product suppliers, antique dealers, etc., that the culprit was Pledge and that I should discourage people from using Pledge. I dutifully obeyed.

I was also told that Pledge caused finishes to soften and become sticky, harden and crack (the opposite!), and that Pledge scratched finishes (the silicon), among other problems. But I would go into people's homes and see dining tables that had been treated with Pledge for many decades and still looked great. I began to question what I was being told.

Slowly, I figured out what was going on. Finishes can soften and get sticky from contact with acids (body oils) or alkalis (cleaning products). They can get hard, brittle and crack simply from age, which can be accelerated by sunlight through a window. And they can get scratched from contact with all sorts of objects.

In other words, there are accurate explanations, but a refinisher without this information knew only what he or she had heard through the rumor mill. So the obvious question to the homeowner was, "Have you ever used Pledge?" The answer was almost always "Yes" because Pledge had a 60 percent market share. This just confirmed that Pledge must be the culprit.

Why are silicone furniture polishes so popular despite many people having heard they shouldn't use them? Because the silicone doesn't evaporate quickly like the petroleum-distillate solvents in other furniture polishes. The oiliness provides shine for a week or two.

It also provides resistance to scratches as long as it lasts, so the furniture maintains its near-new appearance much longer. And silicone has a low index of refraction, so the wood in a tabletop looks deeper and richer when viewed at a low angle.

Consumers love these polishes despite their bad reputation. It has created a quandary for manufacturers who can't brag about the included silicone on their containers. Instead, they brag when they don't contain silicone, "contains no silicone," as if that is a positive.

PHOTOS BY THE AUTHOR

Refinishers and others still discourage the use of silicone polishes (grouped together as "Pledge"), but the battle is lost. Maybe as much as 90 percent of all furniture polishes contain silicone. We just have to learn to deal with it.

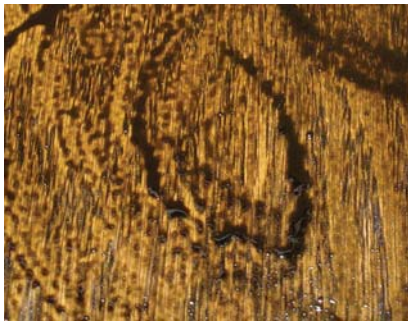
Solutions

The first step is to spot the potential for fish eye before it happens.

If you're using a stain, you should see the fish eye develop right after a wet application. It disappears, of course, when you wipe off the excess because a thickness has to remain for the finish to crawl. If you aren't using a stain, you could apply a wet coat of mineral spirits (paint thinner) or water to see if fish eye appears.

If the test is positive for silicone, there are three primary ways to deal with it:

1. Remove the silicone from the wood



Stain. *A stain will reveal silicone contamination by bunching up when you wipe or brush a wet coat.*

Liquid test. *If you're not staining, you can test for silicone contamination by applying a wet coat of solvent or water.*

Shellac sealer. *A sealer coat of shellac (right) will provide a barrier so another finish will go on top without fish eyes unless the contamination is very bad.*

2. Apply a sealer coat of shellac
3. Add fish-eye eliminator to the finish.

Silicone is oil, so it can be removed by washing many times with a solvent such as naphtha, mineral spirits, acetone or lacquer thinner. It can also be emulsified with an alkali such as household ammonia or trisodium phosphate (TSP) and water, then washed off with water. (The downside, of course, is that the water will raise the grain.)

Shellac is not affected by silicone unless the contamination is really bad, so shellac can be used as a sealer under another finish. If the shellac doesn't provide enough of a barrier, combine it with one or two of the other methods.

If you are finishing with lacquer or varnish (oil-based polyurethane), add an eyedropper or two of fish-eye eliminator to a quart and stir well. With varnish, thin the eliminator first with mineral spirits so it mixes easier. Fish-eye eliminator is, itself, silicone, so it lowers the surface tension of the finish enough to level well. Once you have added the eliminator to one coat, you must add it to all coats.

A fourth, more difficult, method of dealing with fish eye is to spray many dustcoats of lacquer to get a build, then spray a coat that is wet enough to dissolve the dust but not so wet that it dissolves through and causes fish eye. This will take practice to get right, but it does work.

If you don't discover the fish-eye problem until you have already applied a coat or two of finish, it's best to remove the finish and begin again, employing one or more of the above steps. You can also try to build some dustcoats and sand back until level, but this is difficult.

Worst case: Strip everything off and start over. **PWM**

Add some silicone. *Fish-eye eliminators are silicone that lowers the surface tension of the finish so it flows out level. These products are available in paint stores and online catalogues.*

Not just a solvent-based problem. *Fish eye can occur in water-based finishes, but emulsified fish-eye eliminators that mix well with these finishes aren't widely available. So use a shellac sealer coat instead, or clean all the silicone off the surface before finishing.*

Bob is author of "Flexner on Finishing," "Wood Finishing 101" and "Understanding Wood Finishing."

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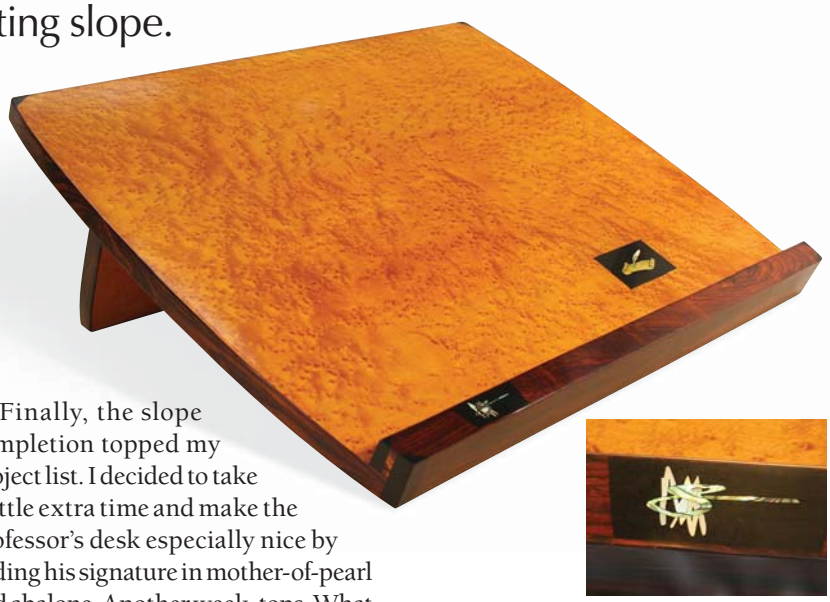
Promise to a Professor

Mr. Sheffield's two-year writing slope.



About a decade ago, I walked into my English professor's office for advising and couldn't take my eyes off of his homemade writing slope. He was talking credits and prerequisites; I was thinking this guy didn't know a tenon from a tang. A couple of quarters later, I felt comfortable enough to comment on his glue-and-screw slope made from AC plywood.

"I made it in high school shop class," Mr. Sheffield said. I didn't want to offend him, but the words spewed out of my mouth before my mind engaged. "I can make you one a lot nicer than that."

The comment came easily; I hadn't taken into consideration that I'd recently moved, and most of my woodworking tools were in storage. And building my shop was on my "do-later" list.

Armed with a small battery-powered Skil saw, a chisel and a block plane, I tromped down to the basement and pressed the ironing board into service as a temporary workbench. I cut the main panel for the slope out of some nice bird's-eye maple plywood I had in storage and sat on the basement floor astride a board for a few hours, hand-planing cocobolo strips for the edging.

Then came the wind storm. The building I'd planned to convert into a shop almost blew over, so that project moved to my "do-now" list. Between building the shop, full-time college classes and two part-time jobs, the professor's project sat in the darkness of the basement waiting its turn. I often heard his voice echoing down the collegiate hallways with, "I'm still waiting for that slope!"

Almost a year and a half later, I graduated and became employed by the same college. The voice continued to chide me, teasingly. He wasn't going to let me off the hook.

Finally, the slope completion topped my project list. I decided to take a little extra time and make the professor's desk especially nice by adding his signature in mother-of-pearl and abalone. Another week, tops. What I hadn't planned on was a death-bed request from a dear friend: Would I please repair and refinish a walnut table made for her by a past paramour, something she could leave to her daughter?

The two simple slope pieces sat as I tackled the walnut table, a task I expected would take a couple of weeks to complete. A couple of months later, the daughter of my departed friend picked up her heirloom, and I was able to begin work, again, on the slope desk.

With the signature inlay completed, the bête noir of woodworking confronted me: the finish. The Danish oil I wiped on wasn't pretty enough, and the brushed polyurethane left bubbles. Spray lacquer spewed and sputtered out of the can, and the gods of the French polish had not yet deigned to bestow their grace upon me.

I was sanding off the second or third finish when I felt a soft spot under the veneer. A tap with my fingernail elicited a hollow sound reminiscent of a ripe watermelon. Cutting back to the edges of the hollow spot revealed a football-shaped void under the veneer. I contacted the professor and told him the project would take longer to complete.

A luthier once gave me great advice for patching unexpected inconsistencies in a wood surface: "Slap some mother-of-pearl on it and charge an extra hundred dollars." This desk was a gift, so no extra money. But I did create a scroll and quill inlay to fill the void, and it looked as if it had been part of the plan all along.

I've never felt satisfied with the wipe-on polyurethane finish I finally resorted to, but the professor won't let me take the desk back now that I have mastered French polishing. Methinks he's afraid another two years will pass before he sees it again. And that might very well be the case. **PWM**

Autumn enjoys woodworking and writing; she finds inspiration from living in the foothills of Washington's Cascade Mountains.

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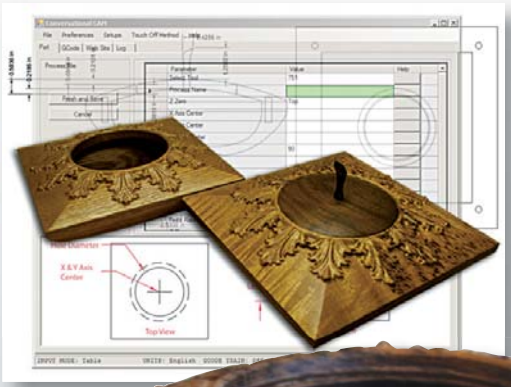

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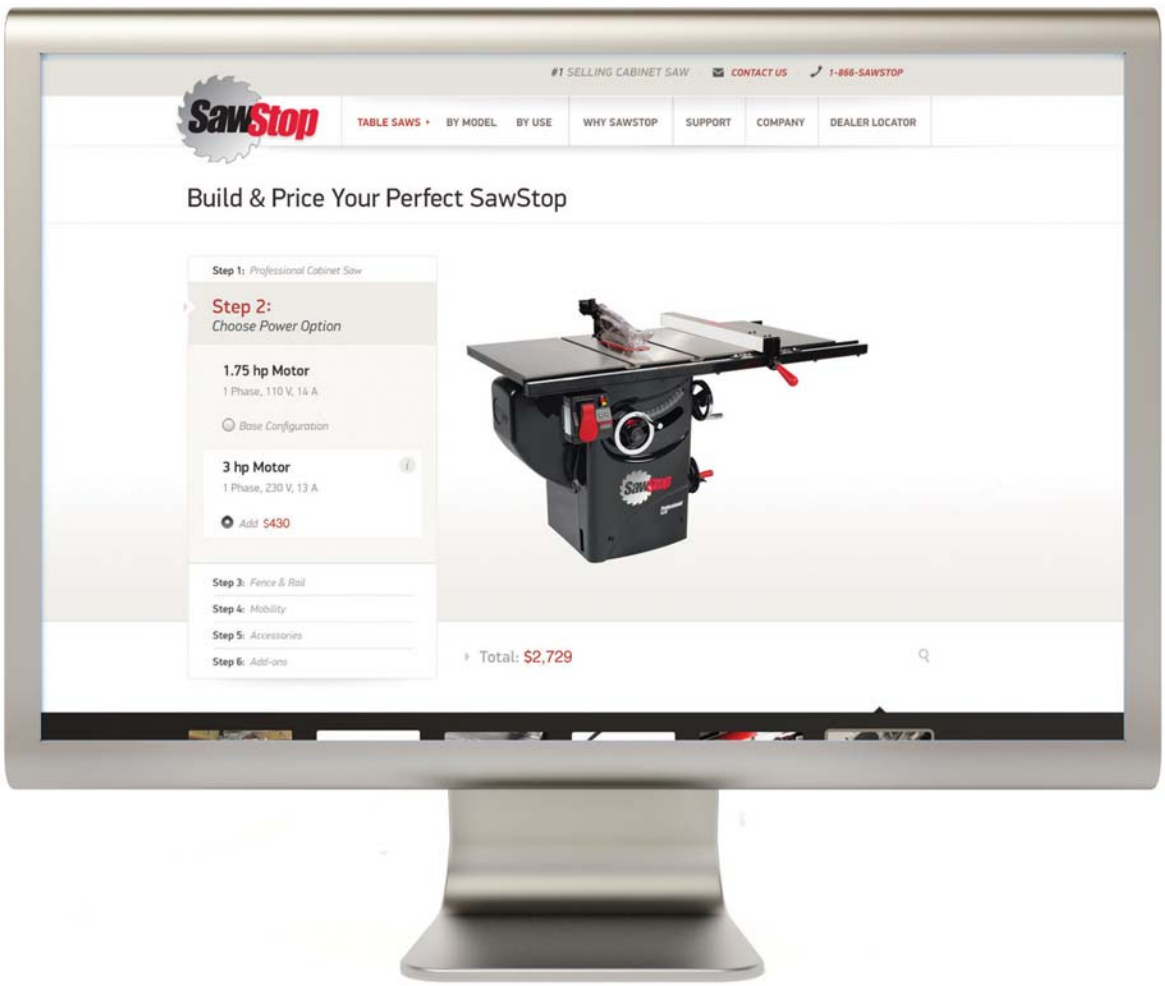

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